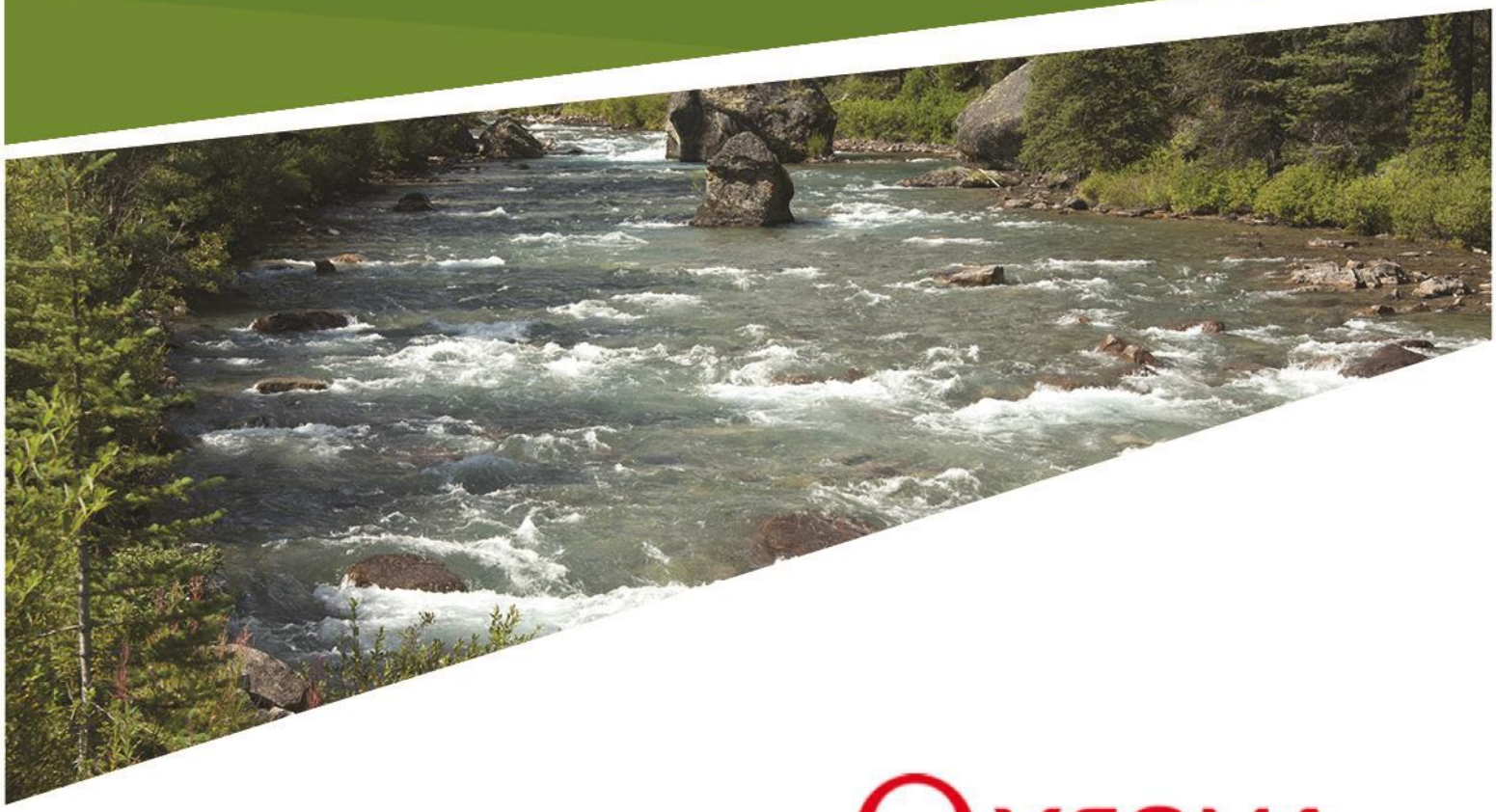

Surface Water and Sediment Quality Monitoring

2024 Report

Prepared for: Veolia Waste Services Alberta Inc.

March 18, 2025

CPP ENVIRONMENTAL

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PROFESSIONAL SIGNOFF

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To the best of my knowledge and the best of my professional ability, recognizing reasonable standard of care expected of a professional doing this work, it is my professional opinion that all the information contained in this report is accurate and complete, and contains all the relevant information for the purposes of this project or application.

This report, including all attachments, data and supplemental information, were prepared by me or under my direct supervision and has been reviewed and accepted by me.

All the information submitted is, to the best of my knowledge, true, accurate, and complete.

EXECUTIVE SUMMARY

The Swan Hills Treatment Centre (SHTC) provides comprehensive treatment and disposal for hazardous waste. It is owned by the Alberta Government and operated by Veolia Waste Services Alberta Inc. under EPEA Approval No. 1744-03-00. Environmental monitoring began in 1985, two years before the SHTC was opened, and it has evolved into an extensive program that provides early detection of potential contaminants on an annual basis. The goal of the monitoring program is to track changes over time to ensure that any facility-related environmental impacts are detected and addressed in a timely manner. This document outlines the surface water and sediment monitoring program conducted by CPP Environmental in July, August, and October of 2024.

Surface Water Monitoring

Surface water quality (i.e., that of lakes and streams) near the SHTC is important for both human health and the integrity of aquatic ecosystems. The surface water monitoring program evaluates spatial and temporal patterns in water quality relative to the SHTC. In 2024, monitoring occurred at one river (Coutts River) and two lakes (Edith Lake and Chrystina Lake) as part of the regulatory environmental monitoring program. The Coutts River and Chrystina Lake monitoring stations are located downgradient and downwind of the SHTC. Specifically, the Coutts River station (S5A) is approximately 5.0 km southeast of the SHTC, while the Chrystina Lake station (S12) is approximately 1.5 km northeast of the SHTC. Edith Lake is the background reference lake for the surface water monitoring program and is situated upwind and up-gradient from the SHTC, approximately 15 km from the facility. 9 additional waterbodies were added to the monitoring program as test sites to capture the impacts of pH decreasing due to the SHTC. These waterbodies had 24 routine water quality parameters lab measured and 7 field measurements taken in July, August, and October.

Over 60 water quality parameters were measured in water samples collected from the Coutts River, S12 and Edith Lake, including routine, nutrient, biological, and metal parameters. Due to low flow, hydrometric measurements were not collected at the time of sampling for any site. For each of the surface water quality parameters measured at each monitoring site, summary statistics were calculated to place the 2024 measurements in historical context (where adequate data were available). Values that were high relative to historic measurements were flagged. Measurements from 2024 were also compared to the *Alberta Surface Water Quality Guidelines for the Protection of Aquatic Life* (PAL; where applicable) and exceedances were noted and described. Finally, non-parametric monotonic trend analysis was conducted on parameters with at least 8 years of data and with fewer than 50% of those measurements being censored. The Mann-Kendall test was used to assess whether water quality parameters significantly increased, decreased, or lacked a distinct pattern over time. In 2024, a “moving window” trend analysis approach was implemented, where only the 10 most recent observations were included in the analysis to ensure that any trends detected are representative of current conditions.

A summary of historical range and regulatory guideline exceedances, as well as significant water quality trends, is outlined in **Table i**. Based on the 2024 monitoring results, surface water quality near the SHTC is largely comparable to historical conditions observed in the Coutts River and Edith Lake. The Coutts River had 2 parameter above historical conditions (Total Kjeldahl Nitrogen [TKN] and dissolved oxygen); Chrystina Lake had 10 parameters above historical conditions (barium, dissolved and total calcium, chlorophyll-a, electrical conductivity, hardness, dissolved and total potassium, strontium, and total suspended solids [TSS]); and Edith Lake had 4 parameters above historical conditions (hardness, dissolved calcium, chlorophyll-a, and TKN). PAL guidelines were met for all parameters, except total alkalinity and pH (below minimum guideline) in Edith

Lake and 4 of the extra waterbodies sampled; and dissolved iron in the Coutts River. The low alkalinity value reflects the naturally low buffering capacity in the lakes, and the guidelines only apply if natural conditions are not normally low. Dissolved iron values are consistent with historical results for the Coutts River. There are decreasing trends for pH at Chrystina Lake; total organic carbon for Coutts River; and silicon in Edith Lake. There are increasing trends for TKN, total potassium, copper, and chlorophyll-a in Edith Lake; total silicon in S5A; and increasing barium, sodium, strontium, and chlorophyll-a in Chrystina Lake. There are no guidelines for any of these parameters, except for pH. An examination of pH in 11 lakes across the region showed that pH values in Edith and Chrystina lakes are within the range of other lakes in the region. pH seems to be lower in lakes that have relatively small watersheds, meaning that the relative proportion of water feeding the lakes comes more from rain and snow (which have lower pH).

Sediment Monitoring

Sediment quality in waterbodies near the SHTC is an important indicator of both current environmental conditions affecting aquatic biota and of cumulative pollutant deposition. The sediment monitoring program evaluates spatial and temporal patterns in water quality relative to the SHTC, with stream stations being monitored annually and lake stations monitored biannually. In 2024, sediment samples were collected from two streambed sites (Coutts River (S5A) and S6) and two lake sites (Edith Lake and Chrystina Lake (S12)) as part of the regulatory environmental monitoring program. Over 300 sediment quality parameters were measured, including nutrient, metal, and organic parameters. S6 (reference stream) is located approximately 700 m southwest of the SHTC and is along an unnamed tributary of the Coutts River. This tributary discharges into the main stem of the Coutts River downstream of S5A (Coutts River); thus, the two stations do not influence each other. The Edith Lake (reference lake), Chrystina Lake (S12) and Coutts River (S5A) monitoring stations are as described above.

Similar to the surface water quality monitoring program, summary statistics were calculated for each sediment parameter at each site to place the 2024 measurements in historical context (where adequate data were available). Values that were high relative to historic measurements were flagged. Measurements from 2024 were also compared to *CCME Sediment Quality Guidelines for the Protection of Aquatic Life* (PAL; where available) and exceedances were noted and described. Finally, non-parametric monotonic trend analysis was conducted on parameters with at least 8 years of data and with fewer than 50% of those measurements being censored. The Mann-Kendall test was used to assess whether sediment quality parameters significantly increased, decreased, or lacked a distinct pattern over time. As with the surface water quality analysis, in 2024 a 10 year “moving window” trend analysis approach was implemented, highlighting contemporary trends in sediment quality instead of being driven by historically high values.

A summary of historical range and regulatory guideline exceedances, as well as significant sediment quality trends, is outlined in **Table ii**. In 2024, sediment quality near the SHTC in Chrystina Lake, Edith Lake, S6, and the Coutts River had historically high metals, although only a few sites had historical range exceedances that included toxic metals (arsenic, mercury, zinc, and copper). The PCB TEQ was historically high at all sites, but it is based on relatively few samples (8-10) taken in more recent years. Interim Sediment Quality Guideline (ISQG) exceedances were documented for arsenic at all 4 stations; nickel at Chrystina Lake and Edith Lake; mercury at Edith Lake, Cadmium at Edith and S6; and manganese at all 4 stations. Only S5A had a significant increasing trend for PCB TEQ. Total PCBs remained unchanged at both lake sites – likely because the historically high PCB values occurred several decades ago and the moving window trend analysis is now

capturing baseline values. However, a large spike was noted at both S6 and S5A. This may be due to historically-high organic carbon in the sediment or scouring of the stream channels during summer rain events. No significant trends in PCDD/F Toxic Equivalents (TEQs) occurred at any sites; however, PCDD/F TEQs exceeded the respective ISQG at Chrystina Lake and Edith Lakes, as has been the case for much of the data record.

Table i: 2024 surface water quality summary, including historically high values in 2024, regulatory guideline exceedances (AB chronic surface water quality guidelines, 2018), and significant (α = 0.1) water quality trends over 10 years for each of three monitoring sites.

Parameter	Above Historical Range			Exceeding Regulatory Guidelines			Mann-Kendall Trends		
	Chrystina L. (S12)	Edith L.	Coutts R. (S5A)	Chrystina L. (S12)	Edith L.	Coutts R. (S5A)	Chrystina L. (S12)	Edith L.	Coutts R. (S5A)
Alkalinity, total as CaCO3	-	-	-	-	**Above chronic**	-	NT	NT	NT
Barium	**Above**	-	-	-	-	-	**Up**	NT	NT
Calcium	**Above**	-	-	-	-	-	NT	NT	NT
Calcium, dissolved	**Above**	**Above**	-	-	-	-	NT	NT	NT
Chlorophyll-a	**Above**	**Above**	-	-	-	-	**Up**	**Up**	NT
Copper	-	-	-	-	-	-	NT	**Up**	NT
Electrical conductivity	**Above**	-	-	-	-	-	NT	NT	NT
Hardness	**Above**	**Above**	-	-	-	-	NT	NT	NT
Iron, dissolved	-	-	-	-	-	**Above chronic**	ID	NT	NT
Oxygen, dissolved (mg/L)	-	-	**Above**	-	-	-	NT	NT	NT
pH	-	-	-	-	**Below minimum**	-	**Down**	NT	NT
Phosphorous	-	-	-	-	-	-	ID	ID	NT
Potassium	**Above**	-	-	-	-	-	NT	**Up**	NT
Potassium, dissolved	**Above**	-	-	-	-	-	NT	NT	NT
Silicon	-	-	-	-	-	-	NT	**Down**	**Up**
Sodium, total	-	-	-	-	-	-	**Up**	NT	NT
Strontium	**Above**	-	-	-	-	-	**Up**	ID	NT
Total Kjeldahl Nitrogen	-	**Above**	**Above**	-	-	-	NT	**Up**	NT
Total Nitrogen	-	**-**	**Above**				ID	NT	ID
Total Organic Carbon	-	-	-	-	-	-	NT	NT	**Down**
Total Suspended Solids	**Above**	-	-	-	-	-	NT	NT	ID

Note: ID = insufficient data available for trend calculation, NT= non-significant trend.

Table ii: 2024 sediment quality monitoring program summary, including variables that were high in 2024 relative to historical levels, exceedances of regulatory guidelines (ISQG = interim sediment quality guidelines; CCME 2001c), and significant (α = 0.1) trends over 10 years.

Parameter	Above Historical Range				Exceeding Regulatory Guidelines				Mann-Kendall Trends			
	Chrystina L. (S12)	Edith L.	Coutts R. (S5A)	S6	Chrystina L. (S12)	Edith L.	Coutts R. (S5A)	S6	Chrystina L. (S12)	Edith L.	Coutts R. (S5A)	S6
Aluminum	-	-	-	**Above**	-	-	-	-	NT	NT	NT	**Up**
Arsenic	-	**Above**	-	-	**Above** ISQG, Below PEL	**Above** ISQG, Below PEL	-	**Above** ISQG, Below PEL	NT	**Up**	NT	NT
Barium	**Above**	-	**Above**	-	-	-	-	-	NT	NT	NT	NT
Cadmium	-	-	-	**Above**	-	**Above** ISQG, Below PEL	-	**Above** ISQG, Below PEL	NT	**Up**	NT	NT
Calcium	-	-	-	**Above**	-	-	-	-	NT	NT	NT	**Up**
Cobalt	-	**Above**	-	-	-	-	-	-	**Up**	**Up**	NT	NT
Copper	-	-	-	**Above**	-	-	-	-	NT	NT	NT	NT
Iron	**Above**	**Above**	-	**Above**	-	-	-	-	NT	NT	NT	NT
Lead	-	**Above**	-	-	-	-	-	-	NT	**Up**	NT	NT
Magnesium	**Above**	**Above**	-	-	-	-	-	-	NT	NT	NT	NT
Manganese	-	**Above**	**Above**	-	**Above** ISQG	**Above** ISQG	**Above** ISQG	**Above** ISQG	NT	NT	NT	NT
Mercury	-	-	-	**Above**	-	**Above** ISQG Below PEL	-	-	NT	NT	NT	ID
Molybdenum	-	-	ID	**Above**	-	-	-	-	NT	NT	NT	NT
Nickel	-	-	-	-	**Above** ISQG	**Above** ISQG	**Below** ISQG	-	NT	NT	NT	NT
Organic carbon, total	-	**Above**	-	**Above**	-	-	-	-	NT	NT	NT	**Up**
PCB TEQ	**Above**	**Above**	**Above**	**Above**	-	-	-	-	NT	NT	NT	NT
PCB 77	**-**	**-**	**-**	**Above**					-	**Up**	**Up**	NT
PCB 123			**Above**	**Above**							**Up**	-
PCB 156+157	**-**	**Above**	**Above**	**Above**	-	-	-	-	NT	NT	**Up**	**Up**

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Parameter	Above Historical Range				Exceeding Regulatory Guidelines				Mann-Kendall Trends			
	Chrystina L. (S12)	Edith L.	Coutts R. (S5A)	S6	Chrystina L. (S12)	Edith L.	Coutts R. (S5A)	S6	Chrystina L. (S12)	Edith L.	Coutts R. (S5A)	S6
PCDD/F TEQ	-	-	-	-	**Above** ISQG, Below PEL	**Above** ISQG Below PEL	-	-	NT	NT	NT	NT
Phosphorus	-	-	-	**Above**	-	-	-	-	NT	NT	NT	NT
Strontium	-	ID	**Above**	**Above**	-	-	-	-	NT	NT	NT	**Up**
Sulphur	-	**Above**	-	**Above**	-	-	-	-	NT	NT	NT	**Up**
Thallium	-	**Above**	ID	ID	-	-	-	-	**Up**	NT	NT	ID
Uranium	-	-	-	**Above**	-	-	-	-	**Up**	NT	NT	NT
Vanadium	**Above**	**Above**	-	**Above**	-	-	-	-	**Up**	**Up**	NT	NT
Zinc	-	**Above**	**Above**	**Above**	-	-	-	-	**Up**	**Up**	NT	NT

Note: ID = insufficient data available for trend calculation, NT= Non-significant trend.

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1 Introduction

The Swan Hills Treatment Centre (SHTC) provides comprehensive treatment and disposal for hazardous waste. It is owned by the Alberta Government and operated by Veolia Waste Services Alberta Inc. Since operations began in 1987, the SHTC has safely processed more than 500,000 tonnes of hazardous waste. Environmental monitoring began in 1985, two years before the SHTC was opened, establishing a baseline or pre-operation conditions for the environmental monitoring program. This program has evolved into an extensive environmental monitoring program that provides early detection of potential contaminants on an annual basis. The SHTC currently operates under EPEA Approval No. 1744-03-00.

The goal of the monitoring program is to track changes over time to ensure that any facility-related impacts are detected and addressed in a timely manner. This document outlines the water monitoring program conducted by CPP Environmental in 2024. In this report, two specific objectives are addressed, as follows:

- Evaluate the potential exposure of aquatic organisms to organic and inorganic compounds via surface water/sediments (i.e., guideline comparisons, and comparing up- and down-gradient sites); and
- Determine if SHTC plant operations have caused changes in water quality (i.e., trend analysis, and comparison of current values to historical ranges).

2 Project Locations

The Swan Hills Treatment Center (SHTC) is located approximately 13.5 km northeast of the town of Swan Hills (**Figure 1**). The legal land description of the site is W½ 06-067-08 W5M. The SHTC is in the Upper Foothills Natural Subregion within the Athabasca River watershed. There is considerable human activity in the surrounding landscape (**Figure 1**), with local land uses including oil and gas, forestry, and recreation activities. Four sampling stations are included in both the surface water and sediment monitoring program: Chrystina Lake, Edith Lake, S5A, and S6. S5A and Chrystina Lakes were selected as “test” sites by previous monitoring initiatives because these waterbodies were documented to be downgradient and downwind of the SHTC. Conversely Edith Lake and S6 were selected to be “reference” sites because they were documented to be located both upgradient and upwind of the SHTC. Nine sampling stations were added to the surface water monitoring program: Freeman Lake, Krause Lake, Sarah Lake, Lois Lake, Unnamed Lake 1 (FWMIS WBID 334233), Unnamed Lake 3 (WBID 334091), Unnamed Lake 4 (WBID 334230), Unnamed Lake 5 (WBID 334349), and Unnamed Lake 6 (WBID 334166). The purpose of these stations is to examine regional patterns in pH, as per the recommendations from the 2023 monitoring program report.

Station S5A is located approximately 5 km southeast and downwind of the SHTC on the Coutts River. Coutts River originates at Chrystina Lake and flows in a southeast direction, which eventually curves north and discharges into the Saulteaux River. Station S5 (now S5A) was moved in 2012 as a replacement for S5 due to flooding from a beaver dam. The Coutts River has been monitored since 1985.

Station S6 is located on an unnamed creek approximately 700 m southwest and upwind of the SHTC. The creek flows for approximately 7 km before discharging to the Coutts River. The confluence (discharge point) with the Coutts River is approximately 1 km downstream of station S5A. Thus, the two stations do not influence each other. This station has been monitored since 1987.

Chrystina Lake (or station S12) is located approximately 1.5 km northeast of the SHTC. Access to the lake is from a gravel road spur off Hwy 33 leading to the SHTC. Chrystina Lake has no major streams flowing into it and the outflow, which feeds the Coutts River, is moderated by a flow control structure. Chrystina Lake has a surface area of 0.49 km^2, a watershed area of 1.6 km^2, a maximum depth of 10 m and a mean depth of 3.2 m. Chrystina Lake has been monitored since 1991.

Edith Lake is located approximately 15 km west and upwind of the SHTC. Access to the lake is from a dirt road spur off Hwy 33 to the north of the Town of Swan Hills. Edith Lake has no major flows in or out of it. Edith Lake has a surface area of 0.26 km^2, a watershed area of 0.83 km^2, a maximum depth of 6.3 m and a mean depth of 2.6 m. Historically, Victor Lake was used as a reference station in 1997/1998, but due to access issues, it was replaced by Edith Lake in 1998.

3 Methods

The scope of the water and sediment monitoring program has varied over time. The current program focusses on late summer for two reasons: 1) to reduce the influence of flow on water chemistry; and 2) to capture sediments deposited during the summer season. Water sampling occurs annually at 3 stations: Coutts River (S5A), Chrystina Lake (S12), and Edith Lake. Sediment sampling occurs every other year at all stations (**Table 1**). CCME (2011) aquatic field sampling protocols were followed in 2024. A list of the sediment and water quality parameters measured is presented in **Appendix 1**.

3.1 Hydrology

A hydrograph of the Swan River near the Town of Swan Hills was generated to provide regional context regarding changes in local small rivers in 2024 (**Figure 2**). There appeared to be a delay between peak rainfall and peak discharge for spring freshet. Besides an increase in flow in late July and August, it remained consistently low for the remainder of the recording period. It is expected that the monitored waterbodies of interest (e.g., the Coutts River) had similar hydrological patterns during 2024.

Water quality parameters in streams can be affected by the flow rate (Aroner, 2011). Stream flow measurement was attempted at S5A on October 5, 2024; however, flow velocities were too low to be measurable.

3.2 Water Quality

Surface water quality sampling was completed on October 4, 2024, for the Coutts River (S5A), and October 7, 2024, for Chrystina Lake (S12), and October 4, 2025, for Edith Lake, as follows:

- Water samples were collected 30 cm below water surface into bottles supplied by Bureau Veritas Laboratories. Bottles were triple rinsed with sample water prior to collection (only when no preservative was in the bottle) and samples were stored on ice in coolers and transported to Bureau Veritas Laboratories in Edmonton for routine, nutrient and metal analyses.
- Stream samples were collected from the Coutts River near shore in flowing water, approximately 50 m upstream of the access road.
- Lake samples were collected by boat at the deepest location of each lake.

- *In situ* water quality measurements of electrical conductivity, pH, temperature, and dissolved oxygen were taken using an In-Situ Aqua TROLL 500 Multiparameter Sonde.

Surface water quality sampling for Freeman, Krause, Lois, and Sarah Lake; and the 5 unnamed waterbodies were completed in July, August, and October as follows:

- Samples were collected by boat in the deepest location of each lake 30 cm below the water surface into bottles supplied by Bureau Veritas Laboratories. Bottles were triple rinsed with sample water prior to collection (only when no preservative was in the bottle) and samples were stored on ice in coolers and transported to Bureau Veritas Laboratories in Edmonton for routine analysis only.
- *In situ* water quality measurements of electrical conductivity, pH, temperature, and dissolved oxygen were taken using an In-Situ Aqua TROLL 500 Multiparameter Sonde at varying depths depending on the waterbody's total depth (0.2 m, 1.0 m, 2.0 m, etc.)

3.3 Sediment Quality

Sediment sampling was completed October 5, 2024, for the Coutts River (S5A); October 7, 2024, for Chrystina Lake (S12), October 4, 2024, for Edith Lake; and October 3, 2024 for S6 as follows:

- In river/stream sites, prior to sampling sites were walked to identify depositional pools in which to take the sample. A hand suction corer was used to collect approximately 20 short cores (approx. 20 cm each) of the sediment at multiple locations in the depositional pools, moving in an upstream direction.
- Each core was extruded, and the top 1 cm of sediment (representing recent deposition) was collected and pooled in a glass container.
- Pooled samples were transferred to jars supplied by the labs. Samples were stored on ice in coolers and transported to Bureau Veritas Laboratories and ALS Environmental in Edmonton for analysis of inorganic and organic components, respectively.

3.4 Quality Assurance and Quality Control

Our QA/QC program is consistent with standard protocols (AENV, 2006; CCME, 2011), where the total number of QA/QC samples represent a minimum of 10% of the total number of samples. The QA/QC program included:

- Standard laboratory QA/QC procedures completed by Bureau Veritas.
- A field duplicate water sample was taken from Chrystina Lake (S12) on July 9, 2024 and October 7, 2025. These duplicates were used to compare results from 2 samples from the same site to determine the variability in field protocols and laboratory tests. If results from the two samples are very similar, then sampling techniques are consistent from one sampling event to the next. The duplicate samples were sent to Bureau Veritas Laboratories for routine and metal analysis along with the original samples.
- A field blank prepared in the field using laboratory-supplied deionized water that is poured in the field and disguised as a water sample. This field blank is used to determine if contamination occurred during field sampling since results should be undetectable across the board. The field blank was sent to Bureau Veritas Laboratories for routine analysis.

- A trip blank was prepared by Bureau Veritas Laboratories and travelled with the sample bottles from the laboratory to the sample site and then back to the lab without being opened for routine analysis. Trip blanks indicate contamination within the bottle or from volatile compounds (AENV, 2006).

3.5 Data Analysis

We implemented the following analytical approach to address project objectives (see Section 1):

1. Prior to analysis, data were filtered so that the input files contained one value per site per year in late summer (August-October). Variables where greater than 50% of the dataset was censored (i.e., values were below the Method Detection Limit, or MDL) were excluded from trend analysis. For variables where less than 50% of the dataset was censored, the censored data were substituted with ½ of the MDL. If the dataset had multiple MDLs, we substituted all values below the highest MDL to ½ of the highest MDL to remain conservative and prevent the detection of false trends. Finally, variables that had over 50% missing values were excluded from trend analysis.

- Summary statistics were calculated for historical data spanning 1985 to 2023, including 5th, 10th, 25th, 50th (median), 75th, 90th, and 95th percentiles for each variable. 2024 water quality values that were higher than the 1985-2023 95th percentiles were flagged as being high relative to the historical data. Parameters that were flagged were discussed in the context of water quality guidelines and trend analysis, as follows. Where censored values existed, these were replaced with ½ of their respective MDL to permit calculation of summary statistics; however, if more than 50% of the dataset was censored, summary statistics were not calculated for that variable. Additionally, summary statistics were only calculated for variables that met a minimum sample size criterion of 10 observation years (inclusive of 2023, or 8 years if all values were not censored).
- To determine if there were changes in constituents over time, non-parametric trend analysis was conducted on variables with eight or more years of data available, as per Aroner (2011). The Mann-Kendall test was used on late summer data, representing low flow conditions, using the statistical software R v. 4.1.2 (R Core Team, 2021) and the "trend" analysis package v. 1.1.4 (Pohlert, 2020). A "moving window" method was used in 2024, wherein only the 10 most recent observations of a variable were included in the trend analyses (rather than the entire data record). The moving window approach focuses the analyses on current conditions and trends, rather than having historic values skew the analysis. Shaded regions on the trend plots indicates the 5-95th percentile range based on the <u>moving window data subset</u> rather than the 95th percentiles calculated using the entire variable data record (as described above). This was done to prevent excessive scaling of the vertical axes to accommodate historically high values that would impede render the plot illegible. For each site, the significance of trends over time (increasing or decreasing, assessed at 90% significance level) was calculated for each water or sediment quality variable and plotted with the estimated Sen's slope (see **Appendix 3**).

2. To evaluate the potential exposure of aquatic organisms to organic and inorganic constituents, water quality and sediment data were compared to provincial surface water quality guidelines (Government of Alberta, 2018) and federal sediment quality guidelines (CCME, 2001c) for the protection of aquatic life (PAL). Any exceedances were described and put into regional and historical context.
3. Toxic equivalency values for fish (TEQ_{fish}) were calculated for polychlorinated dibenzo-*p*-dioxin and -furan (PCDD/F) and polychlorinated biphenyl (PCB) sediment data to assess the potential toxicity of sediments to aquatic life. Briefly, the detected concentrations of each of 17 dioxin and furan

congeners that have chlorine atoms attached in at least the 2, 3, 7, and 8 lateral positions of their chemical structure, as well as 12 dioxin-like PCBs, were multiplied by a Toxic Equivalency Factor (TEF) and summed to produce the PCDD/F and PCB $TEQf_{ish}$ values. TEFs expresses the toxicity of each compound relative to that of 2,3,7,8-TCDD, and follow the values assigned for fish by Van den Berg et al. (1998). Censored values (i.e., below the MDL) were replaced with ½ MDL prior to calculating TEQs (the "midpoint" approach), and years where any of the requisite variables required to calculate the TEQ were absent in the database censored were excluded from trend analysis. Lastly, we compared TEQ values for both PCDD/Fs and PCBs to their respective freshwater interim sediment quality guidelines and probable effect levels (CCME, 2001a, b).

Other methods typically employed to determine the effects of pollution on the environment are not applicable to the dataset available through this project. For example, a "Before and After" study design can be used where pre- and post- operation data exist, or a "Reference Condition Approach" can be used when a population of reference sites is used as a comparison point to "test" sites. The dataset available to this study consists of two years of pre-operational data (1985-1987) at one site (S5A). This pre-operational data is difficult to compare to post-operational data since methods and measured parameters have changed over time. For instance, sediment quality and flow are not available in the pre-operational dataset. In addition, two years of pre-operational data at one site are insufficient to create a statistically representative population against which to compare effects.

4 Results and Discussion

4.1 Surface Water Quality

An examination of the field and trip blank laboratory results (**Appendix 4**) indicates that all routine parameters were below detection limits. Metal parameters were not analyzed for these blank samples.

The Chrystina Lake duplicate samples had comparable – if not identical – values for most assessed parameters compared to the Chrystina Lake samples. Relative Percent Difference Analysis (RPD) revealed 0 variables with a RPD > 20%. The variables closest to this precision was a RPD of 18.2 % for dissolved manganese (0.0002 mg/L vs 0.00024 in duplicate sample) and a RPD of 15.6% for dissolved potassium (0.864 vs 1.01 in duplicate sample). Comparison of the two samples indicates very consistent results.

Historical Water Data Comparison

4.1.1.1 Routine and Nutrients

The concentrations of the following routine and nutrient parameters exceeded the 95th percentile of historical data in 2024 (**Table 2**):

- Chrystina Lake: hardness, electrical conductivity, calcium, potassium, and chlorophyll-a.
- Edith Lake (reference site): hardness, calcium, total Kjeldahl nitrogen, and chlorophyll-a.
- S5A: total Kjeldahl nitrogen.

Chlorophyll-a was historically high at Edith Lake and Chrystina Lake, which may be driven by nutrient (N and/or P) or climate (temperature, sunlight) dynamics. Edith lake was historically high for total Kjeldahl nitrogen, while the value for Chrystina Lake (0.49 mg/L) was just below the 95 percentile (0.5304 mg/L).

Other nutrients for these two sites, including dissolved nitrate, nitrite, ammonia, and total phosphorus, were below detection limits, which is consistent with the historical data (insufficient detectable values for summary statistics). Only the total organic carbon value for Edith Lake (13 mg/L) was above the historical median value (12.15 mg/L) and nearing a historical high (15.95 mg/L). Nutrients do not appear to be higher than in past years, thus a climatic effect may have been at play in 2024. Although hardness was historically high in 2024 for Chrystina Lake (17.5 mg/L) and Edith Lake (9.21 mg/L), values are low relative to the 9 other lakes sampled in 2024 (average of 32.0 mg/L).

4.1.1.2 Metals

The concentrations of the following metal parameters exceeded the 95th percentile of historical data and are thus considered to be high in 2024 (**Table 3**):

- Chrystina Lake: barium, calcium, potassium, and strontium

In general, very few metals were historically high in 2024. Most of the historically high values were constituents that are relatively benign, as per the lack of guidelines.

Water Quality Guidelines Comparison

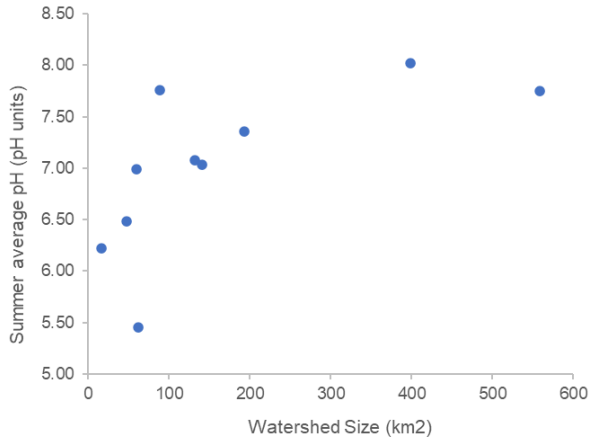
4.1.1.3 Routine and Nutrients

The following routine or nutrient parameters do not meet the relevant surface water quality PAL guidelines (where applicable) in 2024 (**Table 4**):

- Edith Lake (reference site): total alkalinity (as $CaCO_3$) and pH (below minimum guidelines)
- Unnamed Lake 1: total alkalinity (as $CaCO_3$) and pH (below minimum guidelines)
- Unnamed Lake 3: total alkalinity (as $CaCO_3$) and pH (below minimum guidelines)
- Unnamed Lake 4: total alkalinity (as $CaCO_3$) and pH (below minimum guidelines)
- Unnamed Lake 6: total alkalinity (as $CaCO_3$) (below minimum guideline)

Total alkalinity was measured as being below the minimum water quality guideline at Edith Lake; however, the provincial guidelines indicate that the 20 mg/L guideline does not apply if natural conditions are less than this. These results align with the fact that Edith Lake is surrounded by peatlands, which are naturally acidic.

Examining results from the 11 lakes sampled for routine analysis across the region, it is evident that pH varies broadly across sites (average summer pH from 5.45 to 8.02) (**Appendix 5**). pH at these sites seems to be consistent with those of Edith Lake and Christina Lake. There appears to be a relationship between pH and the size of the watershed (see adjacent figure). Lakes with smaller watersheds would have a water balance that is more driven by atmospheric input of water (rain, snow), which has lower pH, than lakes with larger contributing areas.



4.1.1.4 Metals

The following metal parameters have exceeded the relevant surface water quality PAL guidelines (where applicable) in 2024 (**Table 5**):

- S5A: dissolved iron

Total mercury (Hg) values measured in water for each site were as follows:

- Chrystina Lake: <0.0019 µg/L
- Edith Lake: <0.0019 µg/L
- S5A: 0.0030 µg/L

The dissolved iron exceedance at S5A is not out of the ordinary, since it is within the historical range and the 2024 value is just below the historical median for this site (**Table 3**). Iron is a major element in soil and is naturally elevated in the Alberta geology, and surface water samples frequently exceed guidelines. Over the past ten years, 5 dissolved iron measurements at S5A exceeded the guidelines.

Water Trends

4.1.1.5 Routine and Nutrients

Routine and nutrient parameters have largely remained consistent over the past ten years at Edith and Chrystina Lakes and S5A (**Table 4**; **Appendix 2** and **3**). However, the following parameters had a significant (α = 0.1) trend:

- Chrystina Lake: Increasing trend in chlorophyll-a, and decreasing trend in lab measured pH and field-measured EC.
- Edith Lake (reference site): Increasing trend in total Kjeldahl nitrogen and chlorophyll-a, and decreasing trend in field-measured EC.
- S5A: Decreasing trend in total organic carbon (TOC); increasing trends in silicon and dissolved oxygen (%).

Lab-measured pH appears to be decreasing at Chrystina Lake (**Appendix 2, 3**). Given the higher precision of lab measurements, and the sporadic field measurement records (several years of data are missing), we recommend interpreting pH trends from the lab measurements as opposed to the same parameters measured in the field. There are no guidelines for any of these parameters, except for pH. Of the parameters with increasing trends, chlorophyll-a in Chrystina Lake and Edith Lake, as well as total Kjeldahl nitrogen in Edith Lake were high relative to historical values (**Table 2**).

4.1.1.6 Metals

Metal concentrations in water have largely remained consistent over the past ten years at Edith and Chrystina Lakes and S5A (**Table 5**; **Appendix 2** and **3**). However, the following metals had a significant (α = 0.1) trend:

- Chrystina Lake: Increasing trend in barium, sodium, and strontium (total).
- Edith Lake (reference site): Increasing trend in copper and potassium (total) and decreasing trend in silicon.
- S5A: Increasing trend in silicon.

Edith Lake is a reference site and thus would not be under the influence of the SHTC. The test sites (Chrystina Lake and S5A) had four increasing metal trends. Barium and strontium were historically high at Chrystina Lake in 2024 (**Table 3**). As described above, silicon and potassium are relatively benign. Also, barium, strontium, and sodium do not have guidelines. The strontium value in Chrystina Lake (0.026 mg/L) is well below the federal environmental quality guidelines of 2.5 mg/L (Environment and Climate Change Canada, 2020). Surface water quality results do not appear out of the ordinary.

4.2 Sediment Quality

Historical Sediment Data Comparison

4.2.1.1 Organics

The concentrations of the following organic parameters exceeded the 95th percentile of historical data in 2024 (**Table 6**):

- Chrystina Lake: PCB TEQ
- Edith Lake (reference site): Total organic carbon, 1, 2, 3, 4, 5, 6, 7, 8-OCDF, PCBs 156+157, Total OctaCB, PCB TEQ
- S5A: PCB 123, PCBs 156+157, total Hexa-, Hepta-, Octa-, and NonaCBs, and PCB TEQ
- S6 (reference site): Total organic carbon, 1,2,3,4,6,7,8-HpCDD, PCB 77, PCB 123, PCBs 156+157, PCB 167, Total Mono-, Di-, Tri-, Tetra-, Penta-, Hexa-, Hepta-, Octa-, and NonaCB; and PCB TEQ

For S6, most of the parameters listed above were also new historic maximum values, with some more than double or quadruple the previous historical maximum (see **Table 6**).

4.2.1.2 Metals

The concentrations of the following metal parameters in sediment exceeded the 95th percentile of historical data in 2024 (**Table 7**):

- Chrystina Lake: Iron, magnesium, and vanadium.
- Edith Lake (reference site): Arsenic, cobalt, iron, lead, magnesium, manganese, sulphur, thallium, vanadium, and zinc.
- S5A: Barium, manganese, strontium, and zinc.
- S6 (reference site): Aluminum, cadmium, calcium, copper, iron, mercury, molybdenum, phosphorus, strontium, sulphur, uranium, vanadium, and zinc.

The total number of metals exceeding the 95th percentile of historical data in 2024 is higher compared to previous years (14 in 2015; 15 in 2016; 17 in 2017; 6 in 2018 & 2019; 3 in 2020; 0 in 2021; 3 in 2022; and 6 in 2023).

Sediment Quality Guidelines Comparison

4.2.1.3 Organics

The following organic parameters have exceeded the relevant CCME sediment quality guidelines (where applicable) in 2024 (**Table 8**):

- Chrystina Lake: PCDD/F TEQ_{fish}

- Edith Lake (reference site): PCDD/F TEQ_{fish}

The PCDD/F (mid-point) TEQ_{fish} values at Chrystina Lake (2.6 pg/g) and reference site Edith Lake (3.09 pg/g) exceeded the ISQG value of 0.853 pg/g. These values are driven by the relative concentrations of the PCDD/F compounds that factor into the TEQ calculation, each of which is multiplied by a toxic equivalency factor (TEF). PCDD/F TEQ_{fish} values at Chrystina Lake have exceeded the guideline in all but two years of the data record for this site (1995 and 2005), while the values at Edith Lake were above the guideline for all its 22 years of monitoring. As a safety factor of 10 was applied to the ISQG and PEL values, the calculated PCDD/F TEQ_{fish} values for Chrystina and Edith Lakes are not believed to represent conditions that may result in adverse biological in these lakes.

4.2.1.4 Metals

The following metal parameters have exceeded the relevant CCME sediment quality guidelines (where applicable) in 2024 (**Table 9**):

- Chrystina Lake: arsenic, manganese, and nickel
- Edith Lake (reference site): arsenic, cadmium, manganese, mercury, and nickel
- S5A: manganese
- S6 (reference site): arsenic, cadmium, and manganese

The total mercury (Hg) measured in sediment was as follows:

- Chrystina Lake: 0.13 mg/kg
- Edith Lake: 0.21 mg/kg
- S5A: 0.066 mg/kg
- S6: 0.16 mg/kg

Arsenic, manganese, and nickel were previously documented by CPP Environmental as variously exceeding guidelines at the same sites between 2014 and 2023, indicating that these metals occur in these sediments at concentrations regularly exceeding guidelines. Of these 3 metals, only arsenic has an increasing trend in a reference site (Edith Lake). For S6, the level of mercury (0.16 mg/kg) was just under the ISQG (0.17 mg/kg). Arsenic is naturally elevated in groundwater in some locations in Alberta (Alberta Health, 2000), and has been linked to marine shales. In surface water, arsenic can be high in soils rich in clay and organic matter. Note that there was no significant trend in water-borne or sediment-borne arsenic except for sediment in Edith Lake (**Appendix 2** and **3**). Similarly, manganese is often naturally high in Alberta groundwater. Some of these metals can be released by anthropogenic combustions such as those of the SHTC; however, given that the concentrations are known to be relatively high in the reference site (S6), it is unlikely that the SHTC caused the exceedances. Similarly, the nickel exceedances are believed to be driven by other factors since they occur in the reference site (Edith Lake).

Sediment Trends

4.2.1.5 Organics

Organic parameters have declined considerably (i.e., by orders of magnitude) since monitoring for these compounds began. The declines are attributed to improvements in SHTC's emissions reduction technology. To characterize contemporary conditions and potential environmental impacts of the SHTC, a 10-year moving

window approach was used for trend analysis. Consequently, the long-term downward trends in PCB and PCDD/F concentrations that have occurred over time may not be observable at this finer scale; within the 10-year moving window, concentrations of most parameters have generally remained consistent (i.e., no trend) at Edith and Chrystina Lakes and S5A and S6 (**Table 8**; **Appendix 2** and **3**). However, the following parameters had a significant (α = 0.1) trend:

- Chrystina Lake: Increasing trends in 2,3,7,8-TCDF, 1,2,3,7,8-PeCDF, and 2,3,4,7,8-PeCDF.
- Edith Lake (reference site): Increasing trend in 1,2,3,6,7,8-HxCDD, 1,2,3,4,5,6,7,8-OCDF, PCB 77, total PentaCB, HexaCB, HeptaCB, and OctaCB.
- S5A: Increasing trends in 1,2,3,4,6,7,8-HpCDD, 1,2,3,4,5,6,7,8-OCDF, PCB 77, PCB 105, PCB 114, PCB 118, PCB 123, PCB 156+157, PCB 167, PCB 169; total PCBs, MonoCB, DiCB, TetraCB, PentaCB, HexaCB, HeptaCB, and OctaCB; as well as PCB TEQ.
- S6 (reference site): Increasing trend in total inorganic and organic carbon, PCB 159, PCB 68, PCB 128+166, PCB 45+51 and 1,2,3,4,5,6,7,8-OCDF.

Total PCBs had a significant (α = 0.005) upward trend at the S5A site. In addition to the parameters listed above, several individual PCB congeners had significant trends. These are listed in **Appendix 2**. The increasing trends in total PCBs and PCB TEQ should continue to be monitored closely to determine if trends persist, given that S5A is a test site and we don't see increasing trends of these variables at reference sites. There is no urgency in investigating these trend results since total PCB values at S5A (796 pg/g) are well below the Interim Sediment Quality Guidelines (34,100 pg/g). Thus, we recommend re-sampling sediment as per the original biennial schedule.

4.2.1.6 Metals

Metal concentrations have largely remained consistent over the past ten years at Edith and Chrystina Lakes and S5A and S6 (**Table 9**; **Appendix 2** and **3**). However, the following metals had a significant (α = 0.1) trend:

- Chrystina Lake: Increasing trends in beryllium, cobalt, thallium, uranium, vanadium, and zinc.
- Edith Lake (reference site): Increasing trend in arsenic, cadmium, cobalt, lead, vanadium, and zinc. Decreasing trend in antimony.
- S6 (reference site): Increasing trends in aluminum, chromium, strontium, and sulphur.

No significant trends in sediment metals were reported at S5A.

Of the metals with increasing trends, the 2024 concentrations were historically high for arsenic, cobalt, lead, vanadium, and zinc at Edith Lake; vanadium for Chrystina Lake; and aluminum, strontium, and sulphur for S6 (**Table 7**). There are no guidelines for beryllium, cobalt, and vanadium. Also, there are current and/or historical trends and guideline exceedances in both test and reference sites for arsenic and zinc. Thus, there are no unusual patterns in these results.

5 Recommendations

Recommendations for the 2025 surface water and sediment monitoring program are as follows:

- Low pH in Edith and Christina lakes appear to be consistent with other lakes in the region. Thus, there is no need to look into this further.

- Continue monitoring metals with toxicity related to hardness (i.e., cadmium, copper, lead, and nickel), since hardness is naturally low in the lakes.
- Continued measurement of flow at site S5A in the Coutts River so that flow-correction may be applied to the water quality data in the future once enough flow-chemistry paired data points are obtained.
- Continued sediment sampling every second year, as per the regular schedule.

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TABLES

Table 1: Summary of 2024 water monitoring efforts

Station ID	Station Name	Water Quality	Sediment Quality	Discharge	Location	
					Latitude	Longitude
S5A	Coutts River	✓	✓	✓*	54.74551°	115.15205°
S6	Unnamed Creek	-	✓	-	54.76703°	115.22267°
S12	Chrystina Lake	✓	✓	-	54.78587°	115.19350°
Edith	Edith Lake	✓	✓	-	54.80043°	115.38441°

* flow at Coutts River was minimal

Table 2: Routine and nutrient parameters measured in **WATER** in 2024 as compared to historical values.

Parameter	Units	Sampling Station																	
		Station S12 (Chrystina Lake)						Edith Lake						Station S5A (Coutts River)					
			Historical (1985-2023)						Historical (1999-2023)						Historical (1985-2023)				
		2024 Value	N	Min	Median	95th %ile	Max	2024 Value	N	Min	Median	95th %ile	Max	2024 Value	N	Min	Median	95th %ile	Max
Routine																			
Alkalinity, tot (as $CaCO_3$)	mg/L	21	30	12	17	21.3	22	8	26	3.5	6.4	10.82	11.2	40	30	15	40.7	72.2	84
Hydroxide (OH^-)	mg/L	<1	30	ID	ID	ID	ID	<1	26	ID	ID	ID	ID	<1	30	ID	ID	ID	ID
Bicarbonate (HCO_3^-)	mg/L	25	31	14	21	25.66	27	9.7	26	4.3	7.9	13.36	14	48	39	17.8	46.45	87.3	103
Carbonate (CO_3^-)	mg/L	<1	30	ID	ID	ID	ID	<1	26	ID	ID	ID	ID	<1	30	ID	ID	ID	ID
Hardness (as $CaCO_3$)	mg/L	**18**	29	13	16	17.72	18	**9.4**	26	5.7	7.9	9.06	9.2	46	29	11	42.5	70.9	85
Total Dissolved Solids (TDS)	mg/L	21	31	14	19	21.495	30	11	25	5	10	15.465	24	54	41	23.42	49	90.245	103
pH	pH units	6.88	32	6.29	7.2	7.46	7.74	6.28	26	5.91	6.79	6.956	7.06	7.03	42	6.02	7.08	7.65	7.68
Electrical Conductivity (EC)	µS/cm	**42**	32	31	36.5	40.3	50	24	26	20	24	27	51	100	42	46	86	150	189
Sulphate, diss (SO_4^{2-})	mg/L	<1	32	ID	ID	ID	ID	<1	26	ID	ID	ID	ID	<4	39	0.1	1	5.15	24
Chloride, diss (Cl^-)	mg/L	<1	32	ID	ID	ID	ID	<1	26	ID	ID	ID	ID	5.8	40	0.3	5	15.21	19
Calcium, diss (Ca^{2+})	mg/L	**5.3**	32	3.5	4.4	5.15	5.3	**2.8**	26	1.7	2.4	2.78	2.8	13	40	3.2	11	19.1	24.4
Magnesium, diss (Mg^{2+})	mg/L	1.2	32	1	1.19	1.35	1.6	0.59	26	0.4	0.5	0.6	0.6	3.5	40	0.82	2.7	4.8	5.9
Potassium, diss (K^+)	mg/L	**1**	32	0.15	0.76	0.98	1.7	0.68	26	0.15	0.61	0.88	2	0.78	40	0.15	0.48	1.2	1.4
Sodium, diss (Na^+)	mg/L	1.2	32	0.25	1.2	1.55	2.3	1.8	26	0.25	1.8	2.2	2.3	6.1	40	1.3	4	8.12	9.2
Nutrients																			
Nitrate, diss (NO_3^-)	mg/L	<0.044	32	ID	ID	ID	ID	<0.044	26	ID	ID	ID	ID	<0.01	40	ID	ID	ID	ID
Nitrite, diss (NO_2^-)	mg/L	<0.033	29	ID	ID	ID	ID	<0.033	27	ID	ID	ID	ID	<0.044	28	ID	ID	ID	ID
Ammonia as nitrogen (NH_3)	mg/L	<0.015	16	ID	ID	ID	ID	0.039	16	ID	ID	ID	ID	<0.015	16	ID	ID	ID	ID
Phosphorus, total (P)	mg/L	<0.1	27	ID	ID	ID	ID	<0.1	26	ID	ID	ID	ID	<0.1	27	ID	ID	ID	ID
Total Kjeldahl Nitrogen (TKN)	mg/L	0.49	15	ID	0.36	0.5304	ID	**0.79**	16	ID	0.54	0.69205	ID	**1.3**	15	ID	0.6	0.88	ID
Total Organic Carbon (TOC)	mg/L	5.9	28	5.9	8.2	11.21	15	13	23	10	12.15	15.95	21	17	28	9.6	20	25.82	27
Biological																			
Chlorophyll a	µg/L	**8.5**	16	2.62	6.86	7.84	8.4	**17**	16	1.56	7.26	14.6	16	2.6	14	0.25	1.51	3.746	5

Notes: Shaded values are above the 95th percentile of historical data. These represent high values. Historical comparisons were conducted if <50% of the parameter's data record was censored and at least 8 non-censored observations, otherwise insufficient data were available to calculate summary statistics (ID). Censored data were replaced by 0.5 of their respective MDL to permit calculations of summary statistics. If the 2024 value was censored, the censored value was presented in the table, but comparisons to the 95th percentile were done using 0.5 of the value's MDL. NC indicates the lab analysis for that parameter was not conducted for 2024.

Table 3: Metals measured in **WATER** in 2024 as compared to historical values.

Parameter	Units	Sampling Station																	
		Station S12 (Chrystina Lake)						Edith Lake						Station S5A (Coutts River)					
		2024	Historical (1985-2023)					2024	Historical (1999-2023)					2024	Historical (1985-2023)				
		Value	N	Min	Median	95th %ile	Max	Value	N	Min	Median	95th %ile	Max	Value	N	Min	Median	95th %ile	Max
Aluminum (Al)	mg/L	0.022	27	0.01	0.0205	0.20125	0.286	0.025	25	0.01	0.031	0.063	0.117	0.067	27	0.031	0.12	0.25025	0.38
Antimony (Sb)	mg/L	<0.0006	28	ID	ID	ID	ID	<0.0006	26	ID	ID	ID	ID	<0.0006	28	ID	ID	ID	ID
Arsenic (As)	mg/L	0.00046	28	0.0001	0.00045	0.000628	0.0018	0.00062	26	0.0001	0.00046	0.000716	0.0018	0.0011	28	0.0003	0.0012	0.00277	0.0034
Barium (Ba)	mg/L	**0.032**	28	0.013	0.0232	0.03	0.03	0.02	26	0.0035	0.0134	0.0208	0.025	0.034	28	0.025	0.0405	0.0562	0.0639
Beryllium (Be)	mg/L	<0.001	28	ID	ID	ID	ID	<0.001	26	ID	ID	ID	ID	<0.001	28	ID	ID	ID	ID
Boron (B)	mg/L	<0.02	27	ID	ID	ID	ID	<0.02	26	ID	ID	ID	ID	<0.02	27	ID	ID	ID	ID
Cadmium (Cd)	µg/L	<0.02	28	ID	ID	ID	ID	<0.02	26	ID	ID	ID	ID	<0.02	28	ID	ID	ID	ID
Calcium (Ca)	mg/L	**5.5**	27	3.3	4.15	5.36	5.6	2.8	26	1.9	2.4	2.88	3.3	13	27	6.5	13.5	20.15	24.5
Chromium (Cr)	mg/L	<0.001	28	ID	ID	ID	ID	<0.001	26	ID	ID	ID	ID	<0.001	28	ID	ID	ID	ID
Cobalt (Co)	mg/L	<0.0003	28	ID	ID	ID	ID	<0.0003	26	ID	ID	ID	ID	<0.0003	28	0.00015	0.0007	0.00312	0.0048
Copper (Cu)	mg/L	<0.001	28	0.0001	0.0004	0.00179	0.0032	<0.001	26	0.0001	0.00039	0.00078	0.0009	<0.001	28	0.0001	0.0005	0.00346	0.006
Iron, Diss (Fe)	mg/L	<0.06	27	ID	ID	ID	ID	0.13	26	0.005	0.13	0.334	0.48	1	27	0.005	1.1	2.9	3.4
Iron (Fe)	mg/L	0.12	28	0.02	0.15	0.285	0.66	0.37	26	0.1	0.28	0.504	0.58	1.5	28	0.098	1.85	4.876	5.3
Lead (Pb)	mg/L	<0.0002	28	ID	ID	ID	ID	<0.0002	26	ID	ID	ID	ID	0.0003	28	ID	ID	ID	ID
Lithium (Li)	mg/L	<0.02	27	ID	ID	ID	ID	<0.02	26	ID	ID	ID	ID	<0.02	27	ID	ID	ID	ID
Magnesium (Mg)	mg/L	1.3	27	0.98	1.1	1.3	1.7	0.56	26	0.39	0.5	0.6	0.7	3.3	27	1.7	3.3	5.25	5.9
Manganese (Mn)	mg/L	0.023	28	0.002	0.026	0.0484	0.061	0.023	26	0.008	0.025	0.042	0.088	0.034	28	0.021	0.12	0.8479	1.1
Manganese, Diss (Mn)	mg/L	<0.004	27	ID	ID	ID	ID	<0.004	22	0.0005	0.006	0.0232	0.043	0.025	27	0.002	0.045	0.48525	1.1
Mercury (Hg)	µg/L	<0.0019	28	ID	ID	ID	ID	<0.0019	26	ID	ID	ID	ID	0.003	27	ID	ID	ID	ID
Molybdenum (Mo)	mg/L	0.0022	28	ID	ID	ID	ID	<0.0002	26	ID	ID	ID	ID	0.0003	28	ID	ID	ID	ID
Nickel (Ni)	mg/L	<0.0005	28	ID	ID	ID	ID	<0.0005	26	0.00025	0.00055	0.00156	0.004	0.0017	28	0.00025	0.002	0.00449	0.0056
Potassium (K)	mg/L	**0.98**	27	0.15	0.725	0.9	1.7	0.65	26	0.15	0.62	1.54	2	0.86	27	0.3	0.61	1.35	1.4
Selenium (Se)	mg/L	<0.0002	28	ID	ID	ID	ID	<0.0002	26	ID	ID	ID	ID	<0.0002	28	ID	ID	ID	ID
Silicon (Si)	mg/L	<0.5	27	0.1	0.325	0.76	0.99	<0.5	26	0.05	0.27	0.692	0.71	5.6	27	0.38	4.44	7.1	8
Silver (Ag)	mg/L	<0.0001	28	ID	ID	ID	ID	<0.0001	26	ID	ID	ID	ID	<0.0001	28	ID	ID	ID	ID
Sodium (Na)	mg/L	1.2	27	0.25	1.1	1.515	1.6	1.7	26	0.25	1.8	2.18	2.3	6	27	3.3	5.3	8.125	9.9
Strontium (Sr)	mg/L	**0.026**	27	0.007	0.02	0.02375	0.025	<0.02	26	ID	ID	ID	ID	0.06	27	0.02	0.0505	0.09225	0.11
Sulphur (S)	mg/L	0.22	27	0.1	0.215	1.925	661	0.32	26	0.1	0.52	0.796	1.3	0.71	27	0.1	0.5	3.85	6.7
Thallium (Tl)	mg/L	<0.0002	28	ID	ID	ID	ID	<0.0002	26	ID	ID	ID	ID	<0.0002	28	ID	ID	ID	ID
Tin (Sn)	mg/L	<0.001	26	ID	ID	ID	ID	<0.001	26	ID	ID	ID	ID	<0.001	26	ID	ID	ID	ID
Titanium (Ti)	mg/L	<0.001	27	ID	ID	ID	ID	<0.001	26	ID	ID	ID	ID	0.0014	27	0.0005	0.002	0.00875	0.037
Uranium (U)	mg/L	<0.0001	27	ID	ID	ID	ID	<0.0001	26	ID	ID	ID	ID	<0.0001	27	ID	ID	ID	ID
Vanadium (V)	mg/L	<0.001	28	ID	ID	ID	ID	<0.001	26	ID	ID	ID	ID	<0.001	28	ID	ID	ID	ID
Zinc (Zn)	mg/L	<0.003	28	ID	ID	ID	ID	<0.003	26	ID	ID	ID	ID	<0.003	28	0.0015	0.007	0.03288	0.036

Notes: Shaded and bolded values, if present, are above the 95th percentile of historical data. These represent high values. Historical comparisons were conducted if <50% of the parameter's data record was censored and at least 8 non-censored observations, otherwise insufficient data were available to calculate summary statistics (ID). Censored data were replaced by 0.5 of their respective MDL to permit calculations of summary statistics. If the 2024 value was censored, the censored value was presented in the table, but comparisons to the 95th percentile were done using 0.5 of the value's MDL.

Table 4: Routine and nutrient chemistry measured in **WATER** in 2024 as compared to the Alberta Surface Water Quality Guidelines for the Protection of Aquatic Life (2018) and with results of trend analysis.

Parameter	Units	Sampling Station						AB Surface Water Quality Guidelines (Government of Alberta 2018)	
		Station S12 (Chrystina Lake)		Edith Lake		Station S5A (Coutts River)			
		2024 Value	Trend	2024 Value	Trend	2024 Value	Trend	Chronic	Acute
Routine									
Alkalinity, tot (as $CaCO_3$)	mg/L	21	NT	**8**	NT	40	NT	<20[1]	-
Hydroxide (OH^-)	mg/L	<1	ID	<1	ID	<1	ID	-	-
Bicarbonate (HCO_3^-)	mg/L	25	NT	9.7	NT	48	NT	-	-
Carbonate (CO_3^-)	mg/L	<1	ID	<1	ID	<1	ID	-	-
Hardness (as $CaCO_3$)	mg/L	18	NT	9.4	NT	46	NT	-	-
Total Dissolved Solids (TDS)	mg/L	21	NT	11	NT	54	NT	-	-
pH	pH units	6.88	↓***	**6.28**	NT	7.03	NT	<6.5 or >9	-
Electrical Conductivity (EC)	µS/cm	42	NT	24	NT	100	NT	-	-
Sulphate, diss (SO_4^{2-})	mg/L	<1	ID	<1	ID	<4	ID	128-218[2]	-
Chloride, diss (Cl^-)	mg/L	<1	ID	<1	ID	5.8	NT	120	640
Calcium, diss (Ca^{2+})	mg/L	5.3	NT	2.8	NT	13	NT	-	-
Magnesium, diss (Mg^{2+})	mg/L	1.2	NT	0.59	NT	3.5	NT	-	-
Potassium, diss (K^+)	mg/L	1	NT	0.68	NT	0.78	NT	-	-
Sodium, diss (Na^+)	mg/L	1.2	NT	1.8	NT	6.1	NT	-	-
Nutrients									
Nitrate, diss (NO_3^-)	mg/L	<0.044	ID	<0.044	ID	<0.01	ID	3	124
Nitrite, diss (NO_2^-)	mg/L	<0.033	ID	<0.033	ID	<0.044	ID	0.08[3]	0.24[3]
Ammonia as nitrogen (NH_3)	mg/L	<0.015	ID	0.039	ID	<0.015	ID	2.48[4]	-
Phosphorus, total (P)	mg/L	<0.1	ID	<0.1	ID	<0.1	NT	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.49	NT	0.79	↑*	1.3	NT	-	-
Total Organic Carbon (TOC)	mg/L	5.9	NT	13	NT	17	↓*	-	-
Biological									
Chlorophyll a	µg/L	8.5	↑**	17	↑**	2.6	NT	-	-
Field Measurements									
Temperature	°C	8.43	NT	9.21	NT	5.22	ID	-	-
Dissolved Oxygen	mg/L	10.97	NT	9.59	NT	12.06	NT	<6.5[1]	<5[1]
pH	pH units	7.46	NT	**6.36**	NT	7.28	NT	<6.5 or >9	-
Electrical Conductivity (EC)[2]	µS/cm	19.99	↓**	10.21	↓***	56.79	NT	-	-

Notes: Shaded values, if present, represent data that do not meet water quality guidelines. Arrows with *** represent a significant upward or downward trend at a 99% confidence level. Arrows with ** represent a significant upward or downward trend at a 95% confidence level. Arrows with an * represent a significant upward or downward trend at a 90% confidence level. NT= no significant trends. ID = insufficient data available for trend calculation.

[1]A minimum value unless natural conditions are less. [2]Calculated at a Hardness of 0-30 mg/L for 128 mg/L (Edith and Chrystina Lake) and a Hardness of 31-75 mg/L for 218 mg/L (Coutts River) from Table 1.7 in Government of Alberta (2018). [3]Calculated at a Cl <2 mg/L and Cl 6-8 mg/L (Coutts River) from Table 1.4 in Government of Alberta 2018. [4]Calculated at pH of 7.5 and temperature of 11 °C.

Table 4: Metals measured in **WATER** in 2024 as compared to the Alberta Surface Water Quality Guidelines for the Protection of Aquatic Life (PAL) (2018) and with results of trend analysis.

		Sampling Station						AB Surface Water Quality Guidelines (Government of Alberta 2018)	
		Station S12 (Chrystina Lake)		Edith Lake		Station S5A (Coutts River)			
Parameter	Units	2024 Value	Trend	2024 Value	Trend	2024 Value	Trend	Chronic	Acute
Aluminum (Al)	mg/L	0.022	NT	0.025	NT	0.067	NT	-	-
Antimony (Sb)	mg/L	<0.0006	ID	<0.0006	ID	<0.0006	ID	-	-
Arsenic (As)	mg/L	0.00046	NT	0.00062	NT	0.0011	NT	0.005	-
Barium (Ba)	mg/L	0.032	↑***	0.02	NT	0.034	NT	-	-
Beryllium (Be)	mg/L	<0.001	ID	<0.001	ID	<0.001	ID	-	-
Boron (B)	mg/L	<0.02	ID	<0.02	ID	<0.02	ID	1.5	29
Cadmium (Cd)	µg/L	<0.02	ID	<0.02	ID	<0.02	ID	varies[1]	varies[1]
Calcium (Ca)	mg/L	5.5	NT	2.8	NT	13	NT	-	-
Chromium (Cr)	mg/L	<0.001	ID	<0.001	ID	<0.001	ID	-	-
Cobalt (Co)	mg/L	<0.0003	ID	<0.0003	ID	<0.0003	ID	varies[1]	varies[1]
Copper (Cu)	mg/L	<0.001	NT	<0.001	↑*	<0.001	NT	-	varies[1]
Iron, Diss (Fe)	mg/L	<0.06	ID	0.13	NT	**1**	NT	0.3	-
Iron (Fe)	mg/L	0.12	NT	0.37	NT	1.5	NT	-	-
Lead (Pb)	mg/L	<0.0002	ID	<0.0002	ID	0.0003	ID	varies[1]	varies[1]
Lithium (Li)	mg/L	<0.02	ID	<0.02	ID	<0.02	ID	-	-
Magnesium (Mg)	mg/L	1.3	NT	0.56	NT	3.3	NT	-	-
Manganese (Mn)	mg/L	0.023	NT	0.023	NT	0.034	NT	-	-
Manganese, Diss (Mn)	mg/L	<0.004	ID	<0.004	NT	0.025	NT	-	-
Mercury (Hg)	µg/L	<0.0019	ID	<0.0019	ID	0.0030	ID	0.005	0.013
Molybdenum (Mo)	mg/L	0.0022	ID	<0.0002	ID	0.0003	NT	0.073	-
Nickel (Ni)	mg/L	<0.0005	ID	<0.0005	NT	0.0017	NT	varies[1]	varies[1]
Potassium (K)	mg/L	0.98	NT	0.65	↑*	0.86	NT	-	-
Selenium (Se)	mg/L	<0.0002	ID	<0.0002	ID	<0.0002	ID	0.001	-
Silicon (Si)	mg/L	<0.5	NT	<0.5	**↓****	5.6	↑*	-	-
Silver (Ag)	mg/L	<0.0001	ID	<0.0001	ID	<0.0001	ID	0.0001	-
Sodium (Na)	mg/L	1.2	↑*	1.7	NT	6	NT	-	-
Strontium (Sr)	mg/L	0.026	↑**	<0.02	ID	0.06	NT	-	-
Sulphur (S)	mg/L	0.22	ID	0.32	NT	0.71	NT	-	-
Thallium (Tl)	mg/L	<0.0002	ID	<0.0002	ID	<0.0002	ID	0.0008	-
Tin (Sn)	mg/L	<0.001	ID	<0.001	ID	<0.001	ID	-	-
Titanium (Ti)	mg/L	<0.001	ID	<0.001	ID	0.0014	NT	-	-
Uranium (U)	mg/L	<0.0001	ID	<0.0001	ID	<0.0001	ID	0.015	0.033
Vanadium (V)	mg/L	<0.001	ID	<0.001	ID	<0.001	ID	-	-
Zinc (Zn)	mg/L	<0.003	ID	<0.003	ID	<0.003	ID	0.03	-

Notes: Shaded values, if present, represent data that exceed water quality guidelines. Arrows with *** represent a significant upward or downward trend at a 99% confidence level. Arrows with ** represent a significant upward or downward trend at a 95% confidence level. Arrows with an * represent a significant upward or downward trend at a 90% confidence level. NT= no significant trend. ID = insufficient data available for trend calculation.

[1] Variable guideline from Table 1.3 metal guidelines (Cadmium, Cobalt, Copper, Lead, and Nickel) for the PAL at varying hardness from the Government of Alberta (2018). Shaded values represent guideline exceedances at the respective hardness level, where applicable.

Table 5: Selected organics measured in **SEDIMENT** in 2024 as compared to historical values.

Parameter	Units	Sampling Station																							
		Station S12 (Chrystina Lake)						Edith Lake						Station S5A (Coutts River)						Station S6 (Unnamed Creek)					
		2024 Value	Historical (1993-2023)					2024 Value	Historical (1999-2023)					2024 Value	Historical (1985-2023)					2024 Value	Historical (1987-2023)				
			N	Min	Median	95th %ile	Max		N	Min	Median	95th %ile	Max		N	Min	Median	95th %ile	Max		N	Min	Median	95th %ile	Max
Carbon																									
TOC	%	13.3	23	0.34	14	17.9	20	**22.7**	17	9.95	18.04	22.075	25	3.69	24	0.3	1.6	3.86	6.5	**23**	24	0.66	3.8	10.788	12
Dioxins (PCDDs)																									
2,3,7,8-TCDD	pg/g	<0.31	42	ID	ID	ID	ID	<0.41	34	ID	ID	ID	ID	<0.034	42	ID	ID	ID	ID	<0.12	44	ID	ID	ID	ID
1,2,3,7,8-PeCDD	pg/g	0.49	26	ID	ID	ID	ID	0.94	20	ID	ID	ID	ID	<0.044	26	ID	ID	ID	ID	<0.14	26	ID	ID	ID	ID
1,2,3,4,7,8-HxCDD	pg/g	<0.5	26	ID	ID	ID	ID	<1.1	20	ID	ID	ID	ID	<0.056	26	ID	ID	ID	ID	<0.28	26	ID	ID	ID	ID
1,2,3,6,7,8-HxCDD	pg/g	0.93	26	ID	ID	ID	ID	2.1	20	ID	ID	ID	ID	0.12	26	ID	ID	ID	ID	<0.27	26	ID	ID	ID	ID
1,2,3,7,8,9-HxCDD	pg/g	1.11	26	ID	ID	ID	ID	3.7	20	ID	ID	ID	ID	0.19	26	ID	ID	ID	ID	<0.26	26	ID	ID	ID	ID
1,2,3,4,6,7,8-HpCDD	pg/g	19.9	26	2.7	18	35.28	37	58.7	20	16	48.7	72.25	79	4.42	26	0.57	2.02	7.84	16	**1.7**	26	0.1	0.663	1.208	1.82
1,2,3,4,6,7,8,9-OCDD	pg/g	116	26	24	109	167.6	240	383	20	110	327	462.8	470	47.4	26	2.8	23	80.8	250	13.3	26	1.3	6.93	13.778	16.3
Furans (PCDFs)																									
2,3,7,8-TCDF	pg/g	4.1	26	0.3	3.44	12.78	16.2	2.2	20	ID	ID	ID	ID	0.202	26	ID	ID	ID	ID	1.28	26	ID	ID	ID	ID
1,2,3,7,8-PeCDF	pg/g	1.35	26	ID	ID	ID	ID	0.86	20	ID	ID	ID	ID	0.091	26	ID	ID	ID	ID	0.34	26	ID	ID	ID	ID
2,3,4,7,8-PeCDF	pg/g	2.5	26	0.1	1.93	4.3	5.9	<0.45	20	ID	ID	ID	ID	0.085	26	ID	ID	ID	ID	0.62	26	ID	ID	ID	ID
1,2,3,4,7,8-HxCDF	pg/g	0.8	26	0.14	0.68	2.5	3.6	0.61	20	ID	ID	ID	ID	0.052	26	ID	ID	ID	ID	<0.14	26	ID	ID	ID	ID
1,2,3,6,7,8-HxCDF	pg/g	0.6	25	ID	ID	ID	ID	<0.52	20	ID	ID	ID	ID	0.053	26	ID	ID	ID	ID	<0.13	26	ID	ID	ID	ID
1,2,3,7,8,9-HxCDF	pg/g	0.86	26	ID	ID	ID	ID	0.87	20	ID	ID	ID	ID	0.073	26	ID	ID	ID	ID	<0.21	26	ID	ID	ID	ID
2,3,4,6,7,8-HxCDF	pg/g	<0.45	26	ID	ID	ID	ID	<0.76	20	ID	ID	ID	ID	<0.037	26	ID	ID	ID	ID	<0.15	26	ID	ID	ID	ID
1,2,3,4,6,7,8-HpCDF	pg/g	3.2	26	0.4	2.42	5.028	6.2	8.46	20	0.385	4.98	10.13	11.3	0.36	27	ID	ID	ID	ID	0.64	27	ID	ID	ID	ID
1,2,3,4,7,8,9-HpCDF	pg/g	<0.85	26	ID	ID	ID	ID	<1.3	20	ID	ID	ID	ID	<0.08	27	ID	ID	ID	ID	<0.39	27	ID	ID	ID	ID
1,2,3,4,5,6,7,8-OCDF	pg/g	11.2	26	0.6	3.41	11.94	15.6	**30.7**	20	1	9.5	21.4	33.1	0.7	26	ID	ID	ID	ID	2.3	26	ID	ID	ID	ID
PCBs																									
Aroclor 1254	mg/kg	<0.155	14	ID	ID	ID	ID	<0.366	13	ID	ID	ID	ID	<0.017	15	ID	ID	ID	ID	<0.045	15	ID	ID	ID	ID
PCB Total	pg/g	8410	24	3100	10300	31914	65000	2640	20	300	2570	17534	17570	786	25	40	495	6817.5	12000	4920	27	30	779.5	8625	12000
PCB 77	pg/g	23.4	24	5	26.8	80.7	96.85	7.7	19	0	5.665	23.95	35	2.59	25	0.4	2.01	12.76	26	**23.7**	25	0.38	2.535	7.9205	130
PCB 81	pg/g	<1.1	22	ID	ID	ID	ID	<1.9	19	ID	ID	ID	ID	<0.14	23	ID	ID	ID	ID	<3.4	23	ID	ID	ID	ID
PCB 105	pg/g	162	26	115.89	220	605.6	785.99	41.7	20	9.99	41.5	292.091	407.75	18.9	27	0	12.055	411	500	121	29	0	15.7	348.135	500
PCB 114	pg/g	7.7	22	0	8	48.6	60	<1.8	19	ID	ID	ID	ID	0.79	24	0	0.5	4.913	5	<5.2	24	ID	ID	ID	ID
PCB 118	pg/g	361	26	269.21	451.83	1240	1511.79	92.5	21	20.9	106.5	579.2385	737.86	39.6	25	2.76	25.25	462.8	500	278	26	5.46	38	426	500
PCB 123	pg/g	5.3	9	ID	ID	ID	ID	<2	8	ID	ID	ID	ID	**0.76**	10	0.0285	0.33	0.51	0.51	**<4.0**	10	0.1	0.42	1.3408	1.8
PCB 126	pg/g	5.5	24	ID	ID	ID	ID	<1.9	19	ID	ID	ID	ID	0.7	27	ID	ID	ID	ID	5.2	26	ID	ID	ID	ID
PCBs 156+157	pg/g	70.8	9	63.4	77.7	125.7	132	**17.3**	8	3.46	13	15.12	15.6	**7.84**	10	1.11	3.33	5.566	5.81	**43.5**	10	2.25	4.66	9.504	10
PCB 167	pg/g	25	22	5	28	109.55	290	5.7	19	1.2	4.6	49.866	60.44	2.95	24	0.1	1.5	25.58	29	**14.8**	23	0.15	2.1	5	22
PCB 169	pg/g	1.4	24	ID	ID	ID	ID	<1.3	19	ID	ID	ID	ID	0.99	25	ID	ID	ID	ID	<4.3	25	ID	ID	ID	ID
PCB 189	pg/g	7.3	22	1.45	6.38	16	22.81	2.4	19	ID	ID	ID	ID	0.68	23	ID	ID	ID	ID	5.28	23	ID	ID	ID	ID
Total MonoCB	pg/g	29.7	9	ID	ID	ID	ID	41.1	8	19.5	31.1	88.26	108	3.37	10	0.52	1.6	5.572	6.92	**13.9**	10	1.08	4.29	6.47	6.65
Total DiCB	pg/g	290	9	104	151.5	617.05	644	303	8	61.8	99.6	532.8	687	23.8	10	2.53	9.45	47.04	49.8	**79.3**	10	4.2	10.9	49.86	55.5
Total TriCB	pg/g	429	9	299	384.5	1855.3	2360	179	8	43.9	159	477.1	583	22.7	10	7.47	18	38.98	40.1	**201**	10	13.7	21	59.24	60.8
Total TetraCB	pg/g	877	16	685	1100	3241	5600	349	13	90.1	376.5	2953	4900	58.1	17	12.8	53.05	194.5	253	**478**	17	21.4	74.25	380.75	452
Total PentaCB	pg/g	2100	16	1460	2010	3019	3670	628	13	153	428.5	1607.5	1800	193	17	13.8	99.35	238.25	263	**1350**	17	56	149	454.5	699
Total HexaCB	pg/g	2640	16	768	2520	3761	4020	668	13	111	470.5	1422.5	1450	**280**	17	2.5	100.15	209.75	221	**1630**	17	44	160.5	484.75	637

Parameter	Units	Sampling Station																							
		Station S12 (Chrystina Lake)						Edith Lake						Station S5A (Coutts River)						Station S6 (Unnamed Creek)					
		2024 Value	Historical (1993-2023)					2024 Value	Historical (1999-2023)					2024 Value	Historical (1985-2023)					2024 Value	Historical (1987-2023)				
			N	Min	Median	95th %ile	Max		N	Min	Median	95th %ile	Max		N	Min	Median	95th %ile	Max		N	Min	Median	95th %ile	Max
Total HeptaCB	pg/g	1560	16	930	1700	2576	2660	330	13	2.5	248.5	470	470	**156**	17	2.5	54.7	132.5	158	**930**	17	10	99.75	285.75	381
Total OctaCB	pg/g	451	16	25.5	397	651.2	654	**112**	13	2.5	38	89.235	98.2	**41.4**	17	2.5	11.02	28.575	35.4	**215**	17	2.5	14.1	57.125	77.6
Total NonaCB	pg/g	34.7	12	2.5	32.2	78.95	87	15.2	11	2.5	9.3	31.945	40	**2.96**	13	0.12	0.995	2.5	2.5	**17.7**	13	0.19	1.56	6.627	7.76
TEQs																									
PCB TEQ	pg/g	**0.616**	8	0.01724425	0.0307	0.04183025	0.0450575	**0.125**	8	0.002550555	0.00632	0.0111313	0.011359	**0.090**	10	0.00065145	0.00106	0.003371803	0.00409	**0.636**	10	0.0011	0.002628145	0.006203415	0.007374025
PCDD/F TEQ	pg/g	2.6	22	0.45796	3.18497	8.604575	8.91845	3.09	20	1.0353	2.7077	10.3565485	24.2038	0.203	26	0.1266226	0.230605	1.222307	1.580145	0.684	26	0.143036	0.30394	1.2084552	1.863385

Notes: Shaded values, if present, are above the 95th percentile of historical data. These represent high values. Historical comparisons were conducted if <50% of the parameter's data record was censored and at least 8 non-censored observations, otherwise insufficient data were available to calculate summary statistics (ID). Censored data were replaced by 0.5 of their respective MDL to permit calculations of summary statistics. If the 2024 value was censored, the censored value was presented in the table, but comparisons to the 95th percentile were done using 0.5 of the value's MDL.

Table 6: Total metals measured in **SEDIMENT** in 2024 as compared to historical values.

		Sampling Station																							
		Station S12 (Chrystina Lake)						Edith Lake						Station S5A (Coutts River)						Station S6 (Unnamed Creek)					
			Historical						Historical						Historical						Historical				
Parameter	Units	2024 Value	N	Min	Median	95th %ile	Max	2024 Value	N	Min	Median	95th %ile	Max	2024 Value	N	Min	Median	95th %ile	Max	2024 Value	N	Min	Median	95th %ile	Max
Aluminum (Al)	mg/kg	14000	23	4900	13000	16475	17000	13000	19	8800	10950	14015	14100	10000	25	2830	6445	10595	11000	**13000**	25	1480	6100	9910	13000
Antimony (Sb)	mg/kg	<1	26	ID	ID	ID	ID	<1	20	ID	ID	ID	ID	<0.5	28	ID	ID	ID	ID	<1	27	ID	ID	ID	ID
Arsenic (As)	mg/kg	7.5	27	2.3	5.8	7.95	10	**10**	21	3	5	6.715	7	5.1	29	0.05	2.8	5.2	9	11	28	1.3	6.9	12.91	14
Barium (Ba)	mg/kg	230	27	100	207	283.25	517	230	21	120	220	269.05	517	**210**	27	45.8	101.5	202	250	350	28	88	180	357	642
Beryllium (Be)	mg/kg	0.91	27	0.01	0.775	0.98	1.8	0.85	21	0.2	0.635	0.8735	1.7	0.41	29	ID	ID	ID	ID	<0.8	28	ID	ID	ID	ID
Boron (B)	mg/kg	3.3	26	0.5	2	8.32	11.5	2.2	21	0.3	2.9	5.62	6	<2	26	ID	ID	ID	ID	<2	26	ID	ID	ID	ID
Cadmium (Cd)	mg/kg	0.39	27	0.08	0.375	0.7075	0.9	0.69	21	0.15	0.58	0.7865	1.1	0.24	29	0.01	0.1	0.341	0.5	**0.67**	28	0.02	0.2	0.446	0.7
Calcium (Ca)	mg/kg	5600	21	2700	4755	5824.5	6290	4500	18	2800	4700	5562	5650	4100	22	14	2200	4200	4340	**11000**	22	27.4	3600	6500	6800
Chromium (Cr)	mg/kg	13	27	8.6	13.45	38.225	73.7	15	21	12	14.5	29.1	31	15	29	3.4	9.4	23.7	70.3	16	28	0.82	8.7	39.71	149
Cobalt (Co)	mg/kg	7.1	27	3.35	6.15	8.675	10	**9.2**	21	4	6.9	8.005	8.1	9.1	29	1.36	5	11.65	12	17	28	4.02	11	21.52	26
Copper (Cu)	mg/kg	18	27	7.9	15	19.8	21	24	21	10	18.55	24.9	80	9	29	2	6.1	15.705	18.5	**11**	28	1	5.1	10.7	17.8
Iron (Fe)	mg/kg	**19000**	23	9670	15350	18900	19900	**16000**	19	7300	11000	13150	14000	17000	24	3830	10000	18950	19100	**33000**	24	7650	17300	28000	30000
Lead (Pb)	mg/kg	16	27	5.3	15.35	20.175	24	**30**	21	13	20	23.3	29	7.6	29	1	5.195	12.085	17	11	28	1.5	5.7	12.01	29.4
Lithium (Li)	mg/kg	<10	19	ID	ID	ID	ID	<10	16	ID	ID	ID	ID	<10	19	ID	ID	ID	ID	<10	19	ID	ID	ID	ID
Magnesium (Mg)	mg/kg	**2700**	22	18	2200	2530	2700	**2000**	19	4.5	1500	1840.5	1900	2200	22	4.2	1500	2800	2810	2200	22	6.1	1710	2400	2900
Manganese (Mn)	mg/kg	590	22	241	463	629	639	**570**	19	199	411	522	590	**640**	22	35.6	280	576	648	3200	22	0.05	2000	4470	6000
Mercury (Hg)	mg/kg	0.13	25	0.025	0.1225	0.18685	0.191	0.21	19	0.11	0.183	0.2311	0.26	0.066	26	0.01	0.025	0.0888	0.15	**0.16**	25	0.01	0.03	0.1182	0.128
Molybdenum (Mo)	mg/kg	1	27	0.15	0.955	1.9575	11	1.5	21	0.15	0.845	1.795	5.5	<0.4	29	ID	ID	ID	ID	**1.2**	28	0.15	0.54	1.17	85.7
Nickel (Ni)	mg/kg	19	27	10	18.85	28.75	50.3	26	21	14.8	23.3	29.015	29.3	13	29	2.84	8.25	17.16	18	13	27	0.25	10	19.5	36.2
Phosphorus (P)	mg/kg	1300	21	320	1365	1691	3420	1400	18	700	1200	1812	1900	530	20	119	280	600	1500	**1400**	20	147	360	715	760
Potassium (K)	mg/kg	1200	22	500	1100	1330	1380	770	19	189	771.5	1009	1060	740	22	0.8	460	908	1100	630	22	2.1	361	660	940
Selenium (Se)	mg/kg	<1	27	ID	ID	ID	ID	1.3	21	ID	ID	ID	ID	<0.5	29	ID	ID	ID	ID	<1	28	ID	ID	ID	ID
Silicon (Si)	mg/kg													5.6	27	0.38	4.44	7.1	8						
Silver (Ag)	mg/kg	<0.4	27	ID	ID	ID	ID	<0.4	21	ID	ID	ID	ID	<0.2	28	ID	ID	ID	ID	<0.4	28	ID	ID	ID	ID
Sodium (Na)	mg/kg	99	22	36	120	417	4140	130	19	45	132	574.35	1500	88	22	4.1	63	329	373	<50	22	ID	ID	ID	ID
Strontium (Sr)	mg/kg	30	24	20	27.6	31	32.2	35	20	20	38	42.09	42.9	**32**	25	5	16	31.76	32.3	**62**	25	8.4	21.5	36.55	40
Sulphur (S)	mg/kg	2300	17	130	2340	2827.5	2910	**4000**	16	2100	2970	3690	3900	570	17	66	190	985	2800	**1700**	17	105	270.5	717.5	740
Thallium (Tl)	mg/kg	0.2	26	0.05	0.15	0.292	0.4	**0.21**	20	0.13	0.15	0.2	0.2	0.13	26	ID	ID	ID	ID	<0.2	26	ID	ID	ID	ID
Tin (Sn)	mg/kg	<2	21	ID	ID	ID	ID	<2	18	ID	ID	ID	ID	<1	21	ID	ID	ID	ID	<2	21	ID	ID	ID	ID
Uranium (U)	mg/kg	1.9	25	0.61	1.8	21.5545	143	1.7	20	0.5	1.5	4.3	25	1.1	24	0.29	0.5	1.83	25	**2.8**	24	0.16	0.5	1	25
Vanadium (V)	mg/kg	**24**	27	6.1	19.55	23.55	24	**29**	21	13.5	20.85	23.765	25	21	29	2.9	12.5	24.99	25.6	**28**	28	2	13	27.27	67.3
Zinc (Zn)	mg/kg	72	27	36	63.35	76.8	101	**120**	21	41.9	85.35	100.5	110	**65**	29	9.8	31.5	57.365	68	**53**	28	11	33	47.89	51.3

Notes: Shaded values, if present, are above the 95th percentile of historical data. These represent high values. Historical comparisons were conducted if <50% of the parameter's data record was censored and at least 8 non-censored observations, otherwise insufficient data were available to calculate summary statistics (ID). Censored data were replaced by 0.5 of their respective MDL to permit calculations of summary statistics. If the 2024 value was censored, the censored value was presented in the table, but comparisons to the 95th percentile were done using 0.5 of the value's MDL.

Table 7: Selected organics measured in **SEDIMENT** in 2024 as compared to CCME sediment quality guidelines and with results of trend analysis.

Parameter	Units	Sampling Station								CCME Sediment Quality Guidelines (2001c)	
		Station S12 (Chrystina Lake)		Edith Lake		Station S5A (Coutts River)		Station S6 (Unnamed Creek)			
		2024 Value	Trend	2024 Value	Trend	2024 Value	Trend	2024 Value	Trend	ISQG[1]	PEL[2]
Carbon											
TOC	%	13.3	NT	22.7	NT	3.69	NT	23	↑**	-	-
Dioxins (PCDDs)											
2,3,7,8-TCDD	pg/g	<0.31	ID	<0.41	ID	<0.034	ID	<0.12	ID	-	-
1,2,3,7,8-PeCDD	pg/g	0.49	ID	0.94	ID	<0.044	ID	<0.14	ID	-	-
1,2,3,4,7,8-HxCDD	pg/g	<0.5	NT	<1.1	ID	<0.056	ID	<0.28	ID	-	-
1,2,3,6,7,8-HxCDD	pg/g	0.93	NT	2.1	↑*	0.12	NT	<0.27	ID	-	-
1,2,3,7,8,9-HxCDD	pg/g	1.11	NT	3.7	NT	0.19	NT	<0.26	ID	-	-
1,2,3,4,6,7,8-HpCDD	pg/g	19.9	NT	58.7	NT	4.42	↑*	1.70	NT	-	-
1,2,3,4,6,7,8,9-OCDD	pg/g	116	NT	383	NT	47.4	NT	13.3	NT	-	-
Furans (PCDFs)											
2,3,7,8-TCDF	pg/g	4.1	↑**	2.2	NT	0.202	NT	1.28	NT	-	-
1,2,3,7,8-PeCDF	pg/g	1.35	↑**	0.86	NT	0.091	ID	0.34	ID	-	-
2,3,4,7,8-PeCDF	pg/g	2.5	↑**	<0.45	ID	0.085	NT	0.62	NT	-	-
1,2,3,4,7,8-HxCDF	pg/g	0.8	NT	0.61	NT	0.052	ID	<0.14	ID	-	-
1,2,3,6,7,8-HxCDF	pg/g	0.6	NT	<0.52	NT	0.053	ID	<0.13	ID	-	-
1,2,3,7,8,9-HxCDF	pg/g	0.86	ID	0.87	ID	0.073	ID	<0.15	ID	-	-
2,3,4,6,7,8-HxCDF	pg/g	<0.45	NT	<0.76	NT	<0.037	ID	<0.21	ID	-	-
1,2,3,4,6,7,8-HpCDF	pg/g	3.2	↑*	8.46	NT	0.36	NT	0.64	NT	-	-
1,2,3,4,7,8,9-HpCDF	pg/g	<0.85	ID	<1.3	ID	<0.08	ID	<0.39	ID	-	-
1,2,3,4,5,6,7,8-OCDF	pg/g	11.2	↑**	30.7	↑**	0.7	↑**	2.3	↑*	-	-
PCBs											
Aroclor 1254	mg/kg	<0.155	ID	<0.366	ID	<0.017	ID	<0.045	ID	0.06	0.34
PCB Total	pg/g	8410	NT	2640	NT	786	↑***	4920	NT	34100	277000
PCB 77	pg/g	23.4	NT	7.7	↑**	2.59	↑*	23.7	NT	-	-
PCB 81	pg/g	<1.1	ID	<1.9	ID	<0.14	ID	<3.4	ID	-	-
PCB 105	pg/g	162	NT	41.7	NT	18.9	↑*	121	NT	-	-
PCB 114	pg/g	7.7	NT	<1.8	ID	0.79	↑*	<5.2	NT	-	-
PCB 118	pg/g	361	NT	92.5	NT	39.6	↑*	278	NT	-	-
PCB 123	pg/g	5.3	ID	<2	ID	0.76	↑*	<4.0	NT	-	-
PCB 126	pg/g	5.5	NT	<1.9	ID	0.7	NT	7.5	NT	-	-
PCBs 156+157	pg/g	70.8	NT	17.3	NT	7.84	↑**	43.5	NT	-	-
PCB 167	pg/g	25	NT	5.7	NT	2.95	↑**	14.8	NT	-	-
PCB 169	pg/g	1.4	↓*	<1.3	ID	0.99	↑**	<4.3	NT	-	-
PCB 189	pg/g	7.3	↑**	2.4	ID	0.68	NT	5.28	NT	-	-
Total MonoCB	pg/g	29.7	ID	41.1	NT	3.37	↑**	13.9	NT	-	-
Total DiCB	pg/g	290	NT	303	NT	23.8	↑*	79.3	NT	-	-
Total TriCB	pg/g	429	NT	179	NT	22.7	NT	201	NT	-	-
Total TetraCB	pg/g	877	NT	349	NT	58.1	↑**	478	NT	-	-
Total PentaCB	pg/g	2100	NT	628	↑**	193	↑**	1350	NT	-	-
Total HexaCB	pg/g	2640	NT	668	↑**	280	↑**	1630	NT	-	-
Total HeptaCB	pg/g	1560	NT	330	↑**	156	↑**	930	NT	-	-
Total OctaCB	pg/g	451	↑**	112	↑**	41.4	↑**	215	NT	-	-
Total NonaCB	pg/g	34.7	NT	15.2	NT	2.96	NT	17.7	NT	-	-
TEQs											
PCB TEQ	pg/g	0.616	NT	0.125	NT	0.102	↑*	0.636	NT	-	-
PCDD/F TEQ	pg/g	**2.6**	NT	**3.09**	NT	0.203	NT	0.684	NT	0.853	21.53

Notes: Shaded values, if present, represent data that exceed CCME Sediment Quality Guidelines. Arrows with *** represent a significant upward or downward trend at a 99% confidence level. Arrows with ** represent a significant upward or downward trend at a 95% confidence level. Arrows with an * represent a significant upward or downward trend at a 90% confidence level. NT= no significant trend. ID = insufficient data available for trend calculation.[1] ISQG = Interim Sediment Quality Guidelines are sediment quality guidelines where data are available but too limited to derive a formal Sediment Quality Guideline. A Sediment Quality Guideline is meant to represent the Threshold Effects Level, which is the concentration below which adverse biological effects are not likely to occur. ISQGs are derived using the weight of evidence of available toxicological data. [2] PEL = Probable Effect Level, above which adverse biological effects are usually or always observed. [3] Expressed on a TEQ basis using TEFs for fish as per Van Den Berg et al. (1998).

Table 8: Total metals measured in **SEDIMENT** in 2024 as compared to CCME sediment quality guidelines and with results of trend analysis.

Parameter	Units	Sampling Station								CCME Sediment Quality Guidelines (2001c)	
		Station S12 (Chrystina Lake)		Edith Lake		StationS5A (Coutts River)		Station S6 (Unnamed Creek)			
		2024 Value	Trend	2024 Value	Trend	2024 Value	Trend	2024 Value	Trend	ISQG	PEL
Aluminum (Al)	mg/kg	14000	NT	13000	NT	10000	NT	13000	↑***	-	-
Antimony (Sb)	mg/kg	<1	ID	<1	↓*	<0.5	ID	<1	ID	-	-
Arsenic (As)	mg/kg	**7.5**	NT	**10**	↑**	5.1	NT	**11**	NT	5.9	17
Barium (Ba)	mg/kg	230	NT	230	NT	210	NT	350	NT	-	-
Beryllium (Be)	mg/kg	0.91	↑*	0.85	NT	0.41	NT	<0.8	ID	-	-
Boron (B)	mg/kg	3.3	NT	2.2	NT	<2	NT	<2	ID	-	-
Cadmium (Cd)	mg/kg	0.39	NT	**0.69**	↑*	0.24	NT	**0.67**	NT	0.6[1]	3.5[1]
Calcium (Ca)	mg/kg	5600	NT	4500	NT	4100	NT	11000	NT	-	-
Chromium (Cr)	mg/kg	13	NT	15	NT	15	NT	16	↑**	37.3	90
Cobalt (Co)	mg/kg	7.1	↑**	9.2	↑**	9.1	NT	17	NT	-	-
Copper (Cu)	mg/kg	18	NT	24	NT	9	NT	11	NT	35.7	197
Iron (Fe)	mg/kg	19000	NT	16000	NT	17000	NT	33000	NT	-	-
Lead (Pb)	mg/kg	16	NT	30	↑*	7.6	NT	11	NT	35	91.3
Lithium (Li)	mg/kg	<10	ID	<10	ID	<10	ID	<10	ID	-	-
Magnesium (Mg)	mg/kg	2700	NT	2000	NT	2200	NT	2200	NT	-	-
Manganese (Mn)	mg/kg	**590**	NT	**570**	NT	**640**	NT	**3200**	NT	460[2]	-
Mercury (Hg)	mg/kg	0.13	NT	**0.21**	NT	0.066	ID	0.16	ID	0.17	0.486
Molybdenum (Mo)	mg/kg	1	NT	1.5	NT	<0.4	ID	1.2	NT	-	-
Nickel (Ni)	mg/kg	**19**	NT	**26**	NT	13	NT	13	NT	16[2]	-
Phosphorus (P)	mg/kg	1300	NT	1400	NT	530	NT	1400	NT	-	-
Potassium (K)	mg/kg	1200	NT	770	NT	740	NT	630	NT	-	-
Selenium (Se)	mg/kg	<1	NT	1.3	NT	<0.5	ID	<1	ID	2	
Silicon (Si)	mg/kg					5.6	↑*			-	-
Silver (Ag)	mg/kg	<0.4	ID	<0.4	ID	<0.2	ID	<0.4	ID	-	-
Sodium (Na)	mg/kg	99	NT	130	NT	88	NT	<50	ID	-	-
Strontium (Sr)	mg/kg	30	NT	35	NT	32	NT	62	↑**	-	-
Sulphur (S)	mg/kg	2300	NT	4000	NT	570	NT	1700	↑**	-	-
Thallium (Tl)	mg/kg	0.2	↑*	0.21	NT	0.13	NT	<0.2	ID	-	-
Tin (Sn)	mg/kg	<2	ID	<2	ID	<1	ID	<2	ID	-	-
Uranium (U)	mg/kg	1.9	↑**	1.7	NT	1.1	NT	2.8	NT	-	-
Vanadium (V)	mg/kg	24	↑*	29	↑**	21	NT	28	NT	-	-
Zinc (Zn)	mg/kg	72	↑**	120	↑**	65	NT	53	NT	123	315

Notes: Shaded values, if present, represent data that exceed CCME Sediment Quality Guidelines. Arrows with *** represent a significant upward or downward trend at a 99% confidence level. Arrows with ** represent a significant upward or downward trend at a 95% confidence level. Arrows with an * represent a significant upward or downward trend at a 90% confidence level. NT= no significant trend. ID = insufficient data available for trend calculation.[1] Values are being compared to CCME guidelines. [2] Represents LEL (Lowest Effects Level) guidelines, not ISQG guidelines

Table 10: Routine and nutrient chemistry measured in **WATER** for all lake sites in July, August and/or October as compared to the Alberta Surface Water Quality Guidelines for the Protection of Aquatic Life (2018).

		Sampling Station																				AB Surface Water Quality Guidelines (Government of Alberta 2018)	
		Station S12 (Chrystina Lake)	Edith Lake	Freeman Lake		Krause Lake		Lois Lake		Sarah Lake		Unnamed Lake 1		Unnamed Lake 3*		Unnamed Lake 4*		Unnamed Lake 5		Unnamed Lake 6			
Parameter	Units	Oct 2024 Value	Oct 2024 Value	Average 2024 Value	Range	Average 2024 Value	Range	Average 2024 Value	Range	Average 2024 Value	Range	Average 2024 Value	Range	Average 2024 Value	Range	Average 2024 Value	Range	Average 2024 Value	Range	Average 2024 Value	Range	Chronic	Acute
Routine																							
Electrical Conductivity (EC)	µS/cm	42	24	97	13.3	93	9.4	64.8	6.8	118	7	8	2.7	27	2.2	17	1.8	209	8	32.3	6.5	-	-
Alkalinity, tot (as $CaCO_3$)	mg/L	21	**8**	53	11.8	46.6	4	20.97	4.5	44.93	7.2	**1.5**	0.3	**1.9**	0.1	**4.4**	0.6	69	5.2	**14.2**	3.5	<20[1]	
Hydroxide (OH^-)	mg/L	<1	<1	<1.0	-	<1.0	0	<1.0		<1.0	0	<1.0	0	<1.0	0	<1.0	0	<1.0	0	<1.0	0	-	-
Bicarbonate (HCO_3^-)	mg/L	25	9.7	64.7	14.3	55.8	2.8	25.6	5.5	54.83	4.4	2.5	0.8	3.03	1.3	5.35	0.7	84.1	6.3	17.3	4.3	-	-
Carbonate (CO_3^-)	mg/L	<1	<1	<1.0	-	1.6	1.6	<1.0	0	<1.0	0	<1.0	0	<1.0	0	<1.0	0	<1.0	-	<1.0	0	-	-
Hardness (as $CaCO_3$)	mg/L	18	9.4	49	12.7	44.8	4.6	22.9	2.1	50.23	7.2	2.5	0.28	9	0.97	7.21	0.69	67	10	15.9	2.8	-	-
Total Dissolved Solids (TDS)	mg/L	21	11	66.4	8.8	53.17	4.5	37.37	5.2	69.2	7.3	3.2	1.1	22.8	3.7	7.3	0.8	115	10	17.1	5.7	-	-
pH	pH units	6.88	**6.28**	7.80	0.49	8.02	0.24	7.03	0.30	7.45	0.50	**6.22**	0.14	**5.45**	0.51	**6.48**	0.08	7.76	0.42	7.08	0.28	<6.5 or >9	-
Sulphate, diss (SO_4^{2-})	mg/L	<1	<1	1.89	0.76	0.77	0.38	0.33	0.07	<0.30	0	0.36	0.12	<0.30	0	0.39	0.39	0.34	0.06	0.68	0.68	128-2182	-
Chloride, diss (Cl^-)	mg/L	<1	<1	<0.50	<0.50	2.64	2.14	5.35	0.41	10.97	0.7	<0.50	0	2.16	0.69	<0.5	0	27.9	21.8	0.84	0.83	120	640
Calcium, diss (Ca^{2+})	mg/L	5.3	2.8	15.13	4.1	13	1.2	6.64	0.79	13.9	2.3	0.558	0.053	2.21	0.23	1.91	0.29	19.73	3.2	4.8	1.04	-	-
Iron, diss (Fe)	mg/L	<0.06	0.13	0.1533	0.152	0.116	0.106	0.258	0.065	0.095	0.074	0.031	0.028	0.736	0.291	0.094	0.12	0.137	0.186	0.088	0.119	-	-
Magnesium, diss (Mg^{2+})	mg/L	1.2	0.59	2.72	0.59	3.00	0.58	1.543	0.040	3.77	0.59	<0.020	0	0.844	0.095	0.594	0.008	4.297	0.51	0.960	0.059	-	-
Manganese, diss (Mn)	mg/L	<0.004	<0.004	0.0096	0.0172	0.0117	0.0181	0.0262	0.0251	0.006	0.01277	0.00407	0.0032	0.0491	0.0543	0.0131	0.0236	0.00658	0.00653	0.01035	0.01616	-	-
Potassium, diss (K^+)	mg/L	1	0.68	0.738	0.175	0.314	0.555	0.305	0.136	0.675	0.392	0.257	0.128	0.832	0.143	0.603	0.013	0.911	0.165	0.404	0.134	-	-
Sodium, diss (Na^+)	mg/L	1.2	1.8	2.980	0.770	3.400	1.120	6.477	0.190	7.11	0.07	0.500	0.066	1.960	0.23	0.750	0.360	19.4	1.7	0.675	0.043	-	-
Nutrients																							
Nitrate, diss (NO_3^-)	mg/L	<0.044	<0.044	<0.020	-	0.029	0.088	0.025		<0.020	0	<0.020	0	<0.020	0	<0.020	0	<0.020	0	0.008	0	3	124
Nitrite, diss (NO_2^-)	mg/L	<0.033	<0.033	<0.010	-	<0.010	0	<0.010	0	<0.010	0	<0.010	0	<0.010	0	<0.010	0	<0.010	0	<.010	0	0.083	0.243
Ammonia as nitrogen (NH_3)	mg/L	<0.015	0.039	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	2.484	-
Phosphorus, total (P)	mg/L	<0.1	<0.1	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	-	-
Total Kjeldahl Nitrogen (TKN)	mg/L	0.49	0.79	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	-	-
Total Organic Carbon (TOC)	mg/L	5.9	13	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	NC	-	-	-
Field Measurements																							
Temperature	°C	8.43	9.21	7.15**	13.55	6.6**	18.2	5.37**	15.93	6.85**	16.55	5.34**	17.7	NC	7.7	NC	2.7	6.99**	16.01	8.86**	14.07	-	-
Dissolved Oxygen	mg/L	10.97	9.59	8.72	4.21	10.21	12.9	7.94	4.65	7.7	1.9	8.61	4.89	**5.65**	0.24	7.96	0.35	**4.64**	8.46	7.24	0.68	<6.51	<5[1]

Parameter	Units	Sampling Station																				AB Surface Water Quality Guidelines (Government of Alberta 2018)	
		Station S12 (Chrystina Lake)	Edith Lake	Freeman Lake		Krause Lake		Lois Lake		Sarah Lake		Unnamed Lake 1		Unnamed Lake 3*		Unnamed Lake 4*		Unnamed Lake 5		Unnamed Lake 6			
		Oct 2024 Value	Oct 2024 Value	Average 2024 Value	Range	Average 2024 Value	Range	Average 2024 Value	Range	Average 2024 Value	Range	Average 2024 Value	Range	Average 2024 Value	Range	Average 2024 Value	Range	Average 2024 Value	Range	Average 2024 Value	Range	Chronic	Acute
pH	pH units	7.46	**6.36**	7.6	1.31	8.58	0.59	**6.14**	1.05	7.13	0.5	**6.29**	3.62	**4.67**	0.74	**5.92**	0.44	7.56	0.85	**6.21**	1.1	<6.5 or >9	-
Electrical Conductivity (EC)[2] or Specific Conductance (SC)	µS/cm	19.99	10.21	94.57	32.4	85.7	28.8	60.09	12.03	114.69	19.13	6.86	4.93	29.35	1.5	17.95	0.9	198.86	56.51	30.23	8.1	-	-
Oxidation-Reduction Potential (ORP)	mV	109.67	142.68	173.53	360.7	158.5	328.1	150.5	275.7	188.87	299	187.6	394.4	199.8	311	184.9	294.4	162.45	347.3	190.73	354.5	-	-

Notes: Shaded values, if present, represent data that do not meet water quality guidelines. [1]A minimum value unless natural conditions are less. [2]Calculated at a Hardness of 0-30 mg/L for 128 mg/L (Edith and Chrystina Lake) and a Hardness of 31-75 mg/L for 218 mg/L (Coutts River) from Table 1.7 in Government of Alberta (2018). [3]Calculated at a Cl <2 mg/L and Cl 6-8 mg/L (Coutts River) from Table 1.4 in Government of Alberta 2018. [4]Calculated at pH of 7.5 and temperature of 11 °C. *No field measurement taken in October. **Value of October sample only

FIGURES

Figure 1: Location of 2024 surface water monitoring stations

VEOLIA

Surface Water and Sediment Quality Monitoring

2024 Monitoring Stations

- Sampling Station
- Sampling Station Access Road
- Swan Hills Treatment Center
- Highway
- Arterials
- Watercourse
- Waterbody

Source: Contains information licensed under the Open Government Licences – Canada and Alberta

Coordinate System: NAD 1983 10TM AEP Resource

N W E S

1:103,734

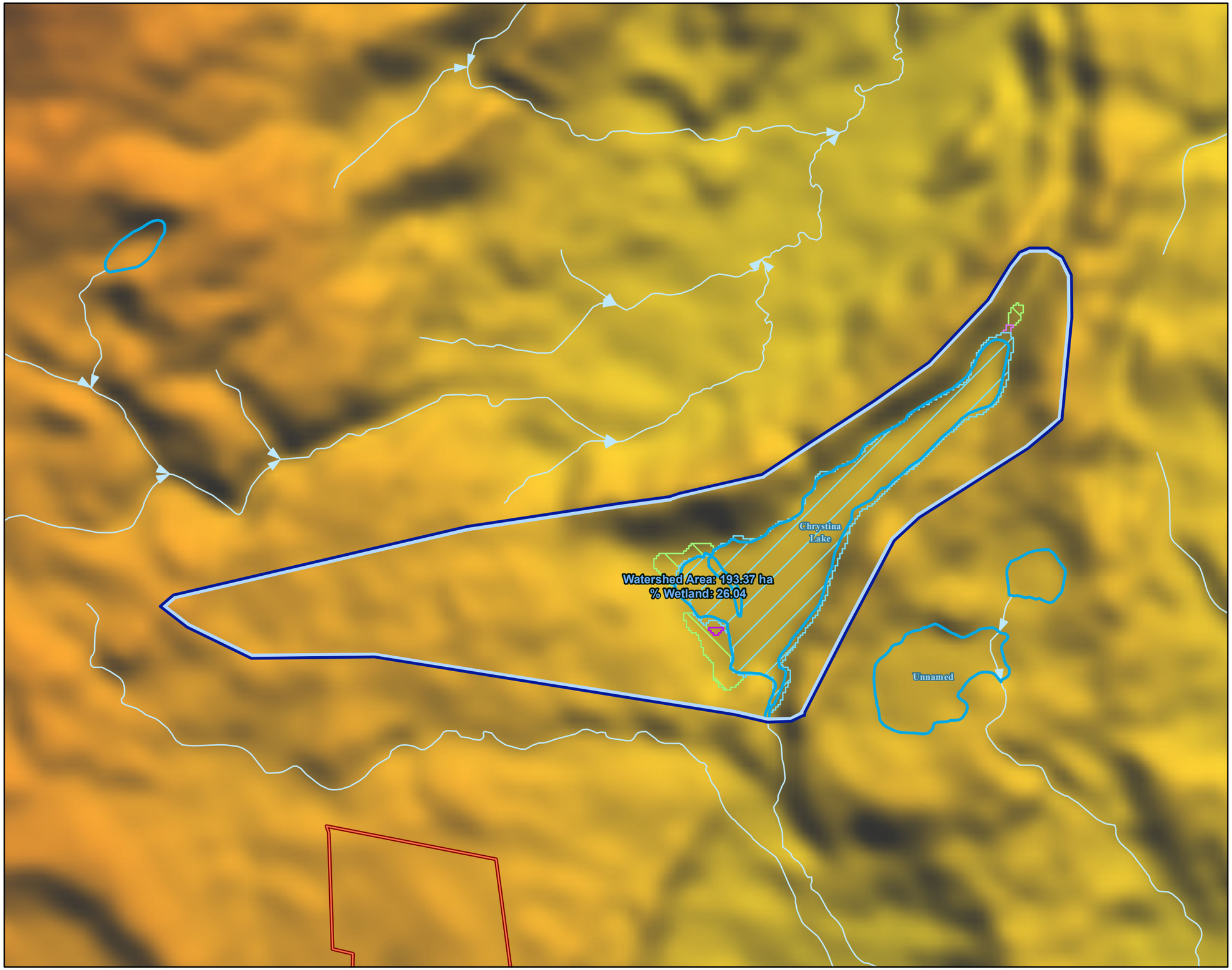
0 2 4 6 8 km

Date: July 5, 2024

Prepared by: T. Kjorlien

CPP ENVIRONMENTAL

Figure 2: Lake Station Watersheds and Wetland Area



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2024 Surface Water and Sediment Quality Monitoring

Lake Station Watersheds and Wetland Area
Chrystina Lake

Watershed
FWMIS Waterbody
Swan Hills Treatment Center
FWMIS Watercourse

ABMI Wetland Inventory
Fen
Marsh
Open water
Swamp

1,372 m
1,250 m
1,125 m
1,000 m
875 m
758 m

Source: Contains information licensed under the Open Government Licences – Canada and Alberta
MRDEM: Natural Resources Canada (2024)

Coordinate System: NAD 1983 10TM AEP Resource

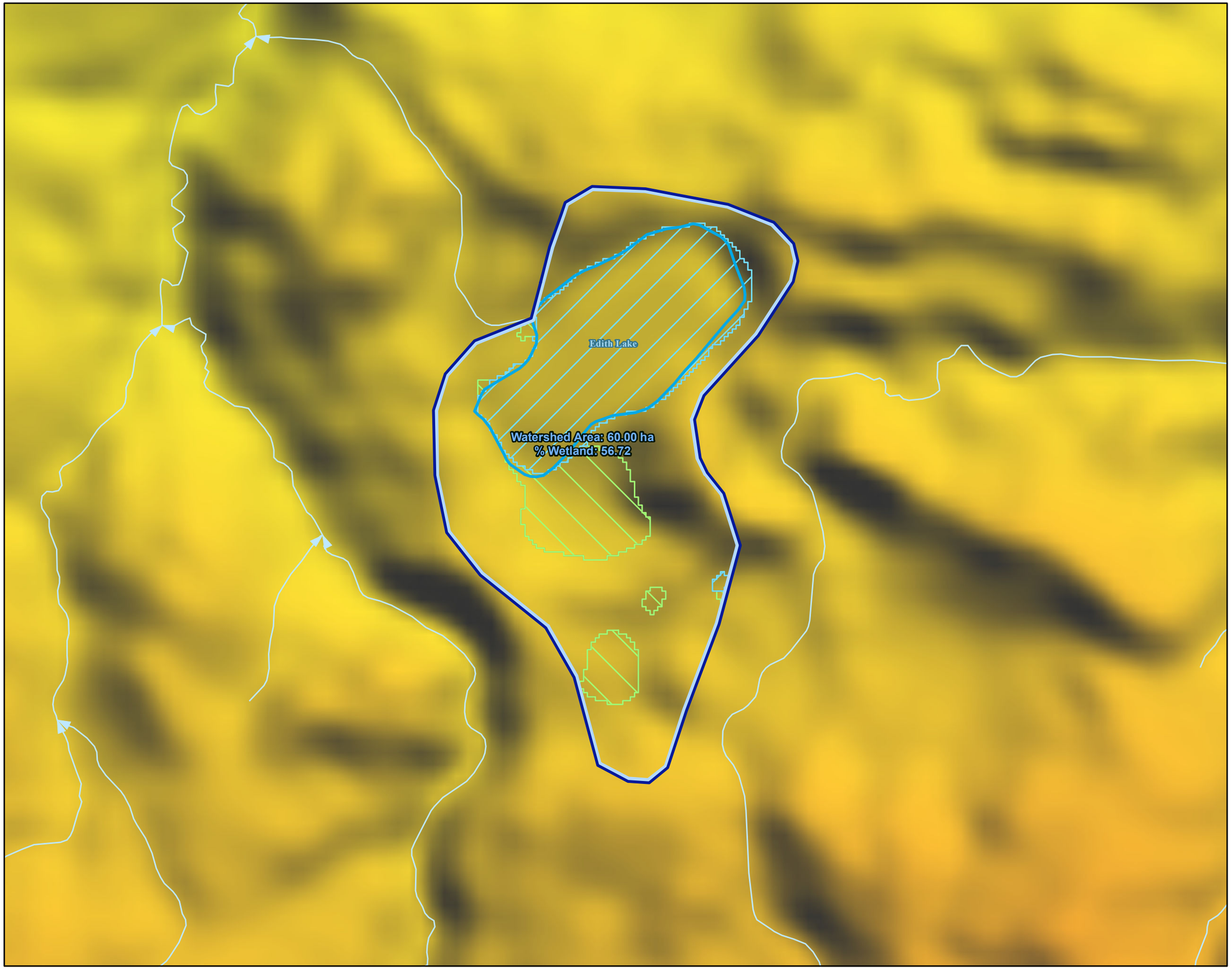
N W E S

1:15,000
0 100 200 300 400 500 600 700 m

Date: March 5, 2025

Prepared by: S. Farrugia

CPP ENVIRONMENTAL



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2024 Surface Water and Sediment Quality Monitoring

Lake Station Watersheds and Wetland Area
Edith Lake

Watershed
FWMIS Waterbody
FWMIS Watercourse

ABMI Wetland Inventory
Fen
Open water

1,372 m
1,250 m
1,125 m
1,000 m
875 m
758 m

Source: Contains information licensed under the Open Government Licences – Canada and Alberta
MRDEM: Natural Resources Canada (2024)

N W E S

Coordinate System: NAD 1983 10TM AEP Resource

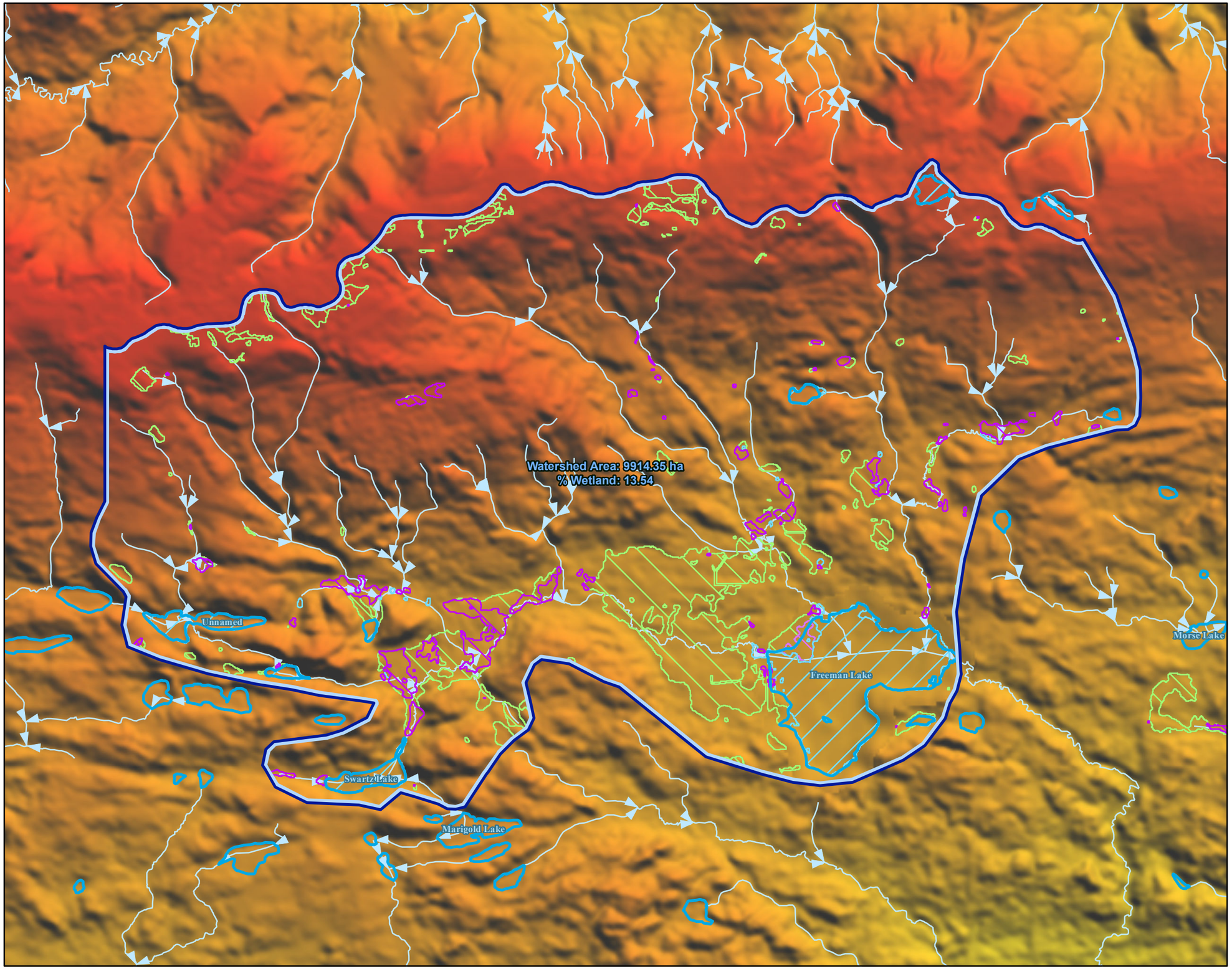
1:9,500

0 100 200 300 400 500 600 m

Date: March 5, 2025

Prepared by: S. Farrugia

CPP ENVIRONMENTAL



VEOLIA

2024 Surface Water and Sediment Quality Monitoring

Lake Station Watersheds and Wetland Area
Freeman Lake

Watershed
FWMIS Waterbody
FWMIS Watercourse

ABMI Wetland Inventory
Fen
Marsh
Open water
Swamp

1,372 m
1,250 m
1,125 m
1,000 m
875 m
758 m

Source: Contains information licensed under the Open Government Licences – Canada and Alberta
MRDEM: Natural Resources Canada (2024)

N W E S

Coordinate System: NAD 1983 10TM AEP Resource

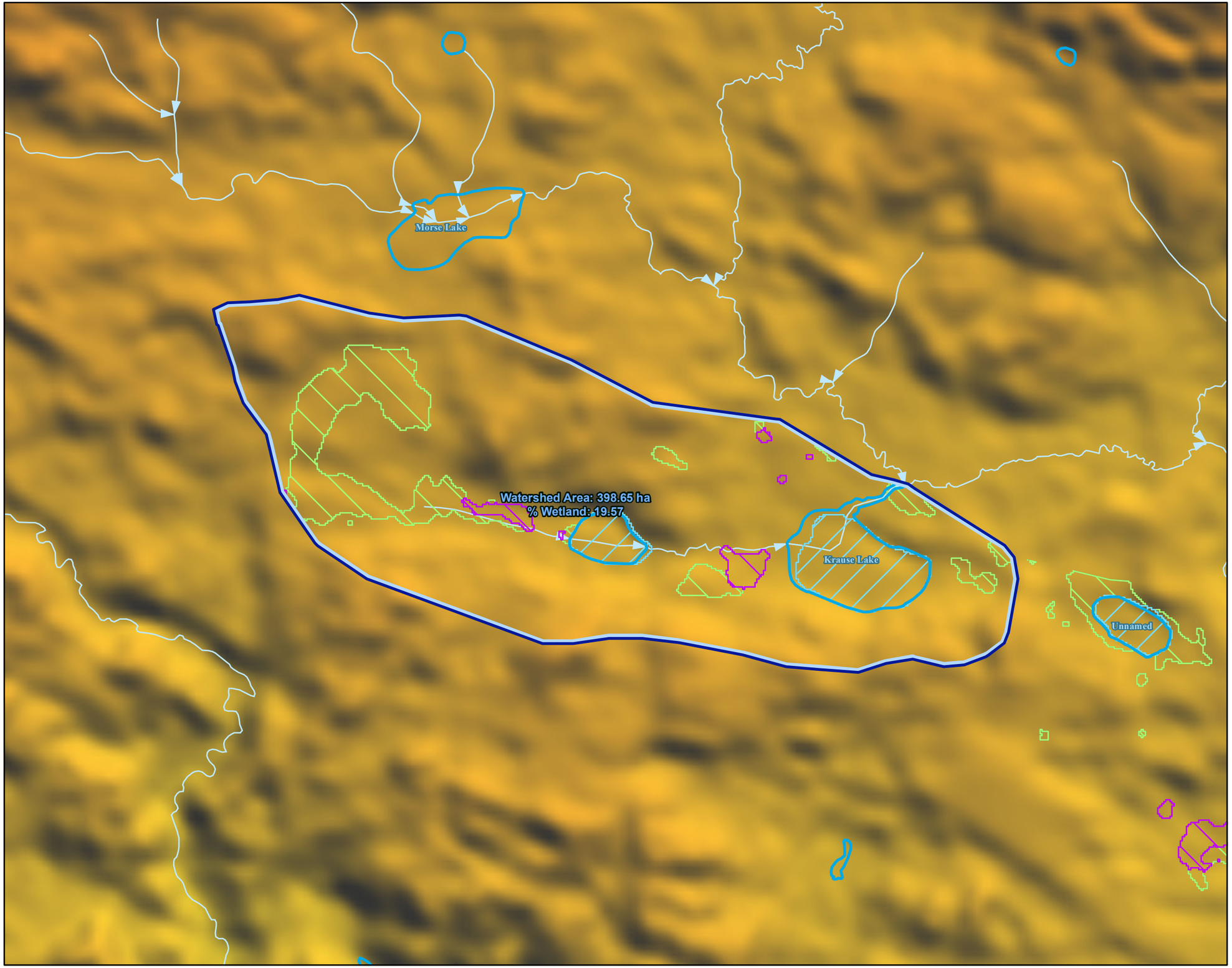
1:55,000

0 500 1,000 1,500 2,000 2,500 3,000 3,500 m

Date: March 5, 2025

Prepared by: S. Farrugia

CPP ENVIRONMENTAL



VEOLIA

2024 Surface Water and Sediment Quality Monitoring

Lake Station Watersheds and Wetland Area
Krause Lake

Watershed
FWMIS Waterbody
FWMIS Watercourse

ABMI Wetland Inventory
Fen
Open water
Swamp

1,372 m
1,250 m
1,125 m
1,000 m
875 m
758 m

Source: Contains information licensed under the Open Government Licences – Canada and Alberta
MRDEM: Natural Resources Canada (2024)

Coordinate System: NAD 1983 10TM AEP Resource

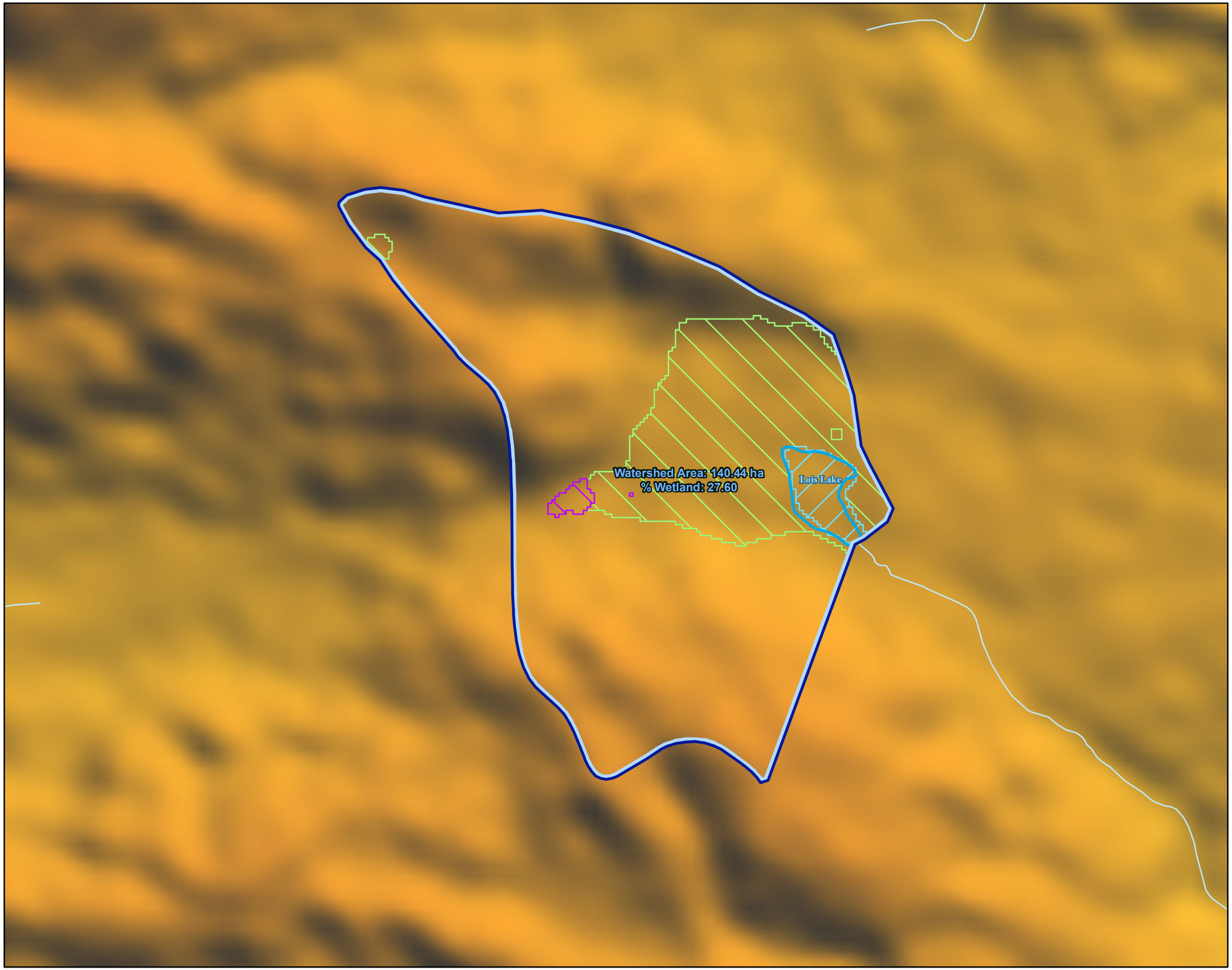
N W E S

1:18,000
0 100 200 300 400 500 600 700 m

Date: March 5, 2025

Prepared by: S. Farrugia

CPP ENVIRONMENTAL



VEOLIA

2024 Surface Water and Sediment Quality Monitoring

Lake Station Watersheds and Wetland Area
Lois Lake

Watershed
FWMIS Waterbody
FWMIS Watercourse

ABMI Wetland Inventory
Fen
Open water
Swamp

1,372 m
1,250 m
1,125 m
1,000 m
875 m
758 m

Source: Contains information licensed under the Open Government Licences – Canada and Alberta
MRDEM: Natural Resources Canada (2024)

Coordinate System: NAD 1983 10TM AEP Resource

N W E S

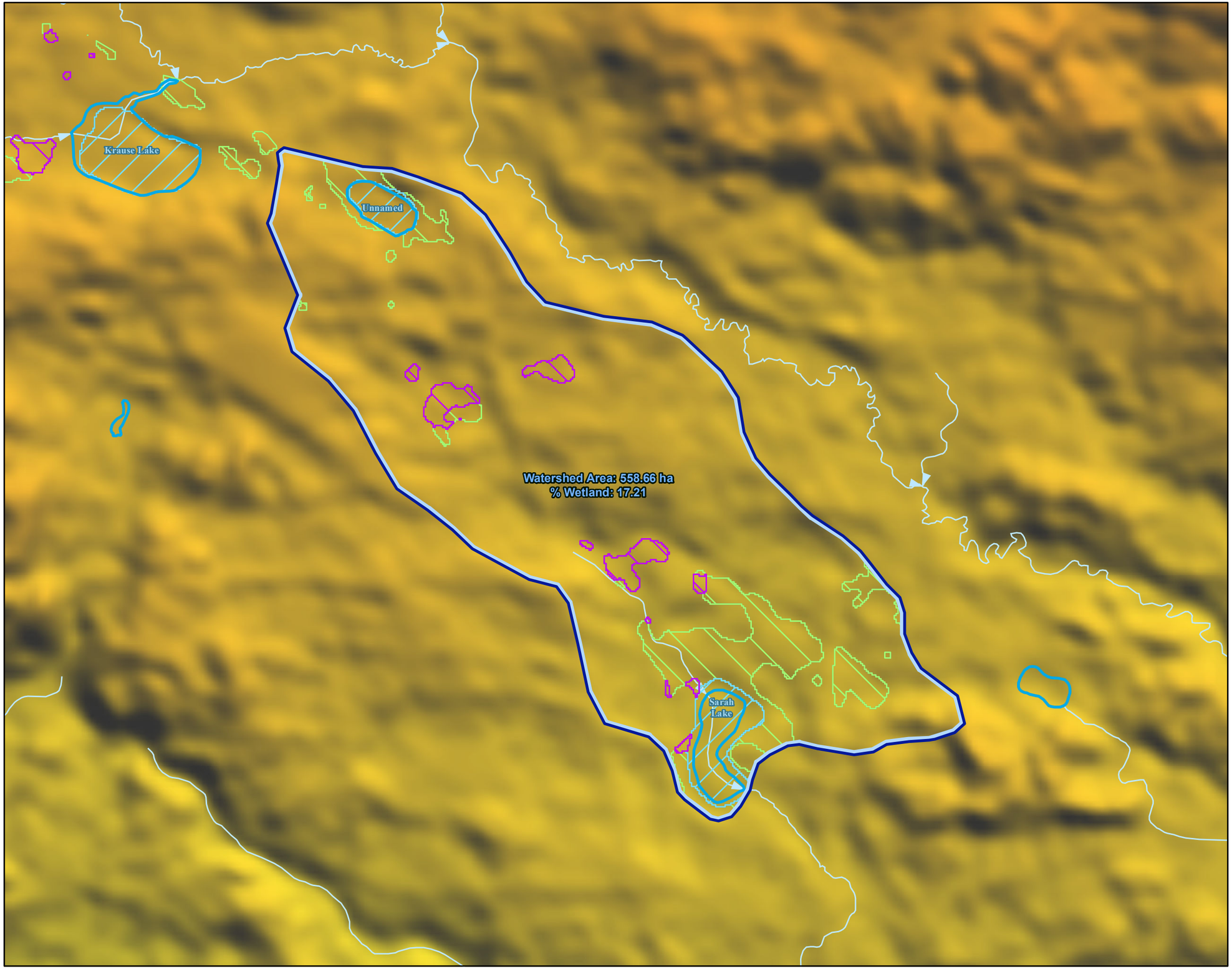
1:10,500

0 100 200 300 400 500 600 700 m

Date: March 5, 2025

Prepared by: S. Farrugia

CPP ENVIRONMENTAL



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2024 Surface Water and Sediment Quality Monitoring

Lake Station Watersheds and Wetland Area
Sarah Lake

Watershed
FWMIS Waterbody
FWMIS Watercourse

ABMI Wetland Inventory
Fen
Open water
Swamp

1,372 m
1,250 m
1,125 m
1,000 m
875 m
758 m

Source: Contains information licensed under the Open Government Licences – Canada and Alberta
MRDEM: Natural Resources Canada (2024)

Coordinate System: NAD 1983 10TM AEP Resource

N W E S

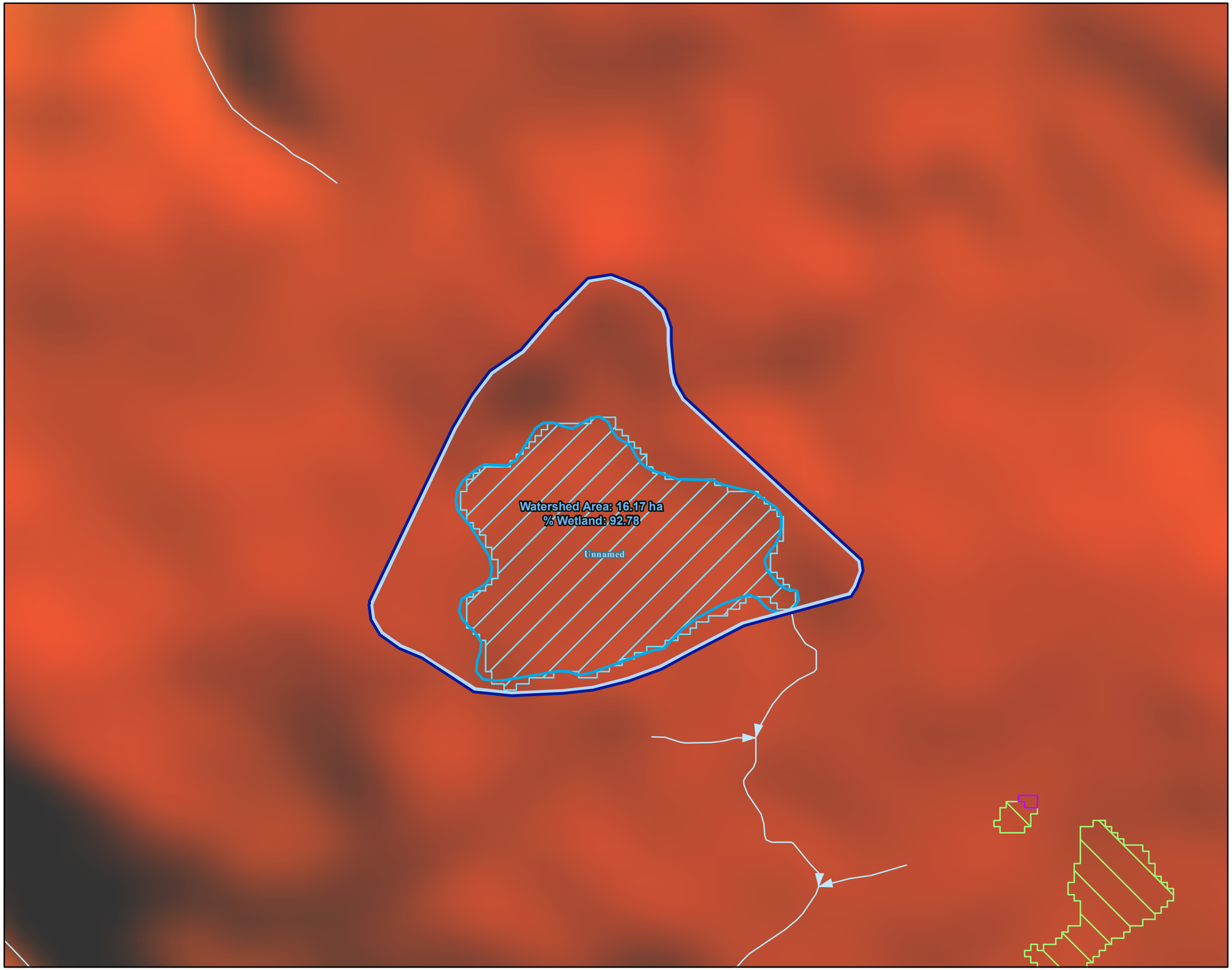
1:20,000

0 200 400 600 800 1,000 1,200 1,400 m

Date: March 5, 2025

Prepared by: S. Farrugia

CPP ENVIRONMENTAL



VEOLIA

2024 Surface Water and Sediment Quality Monitoring

Lake Station Watersheds and Wetland Area
Unnamed Lake 1

Watershed
FWMIS Waterbody
FWMIS Watercourse

ABMI Wetland Inventory
Fen
Open water
Swamp

1,372 m
1,250 m
1,125 m
1,000 m
875 m
758 m

Source: Contains information licensed under the Open Government Licences – Canada and Alberta
MRDEM: Natural Resources Canada (2024)

Coordinate System: NAD 1983 10TM AEP Resource

N W E S

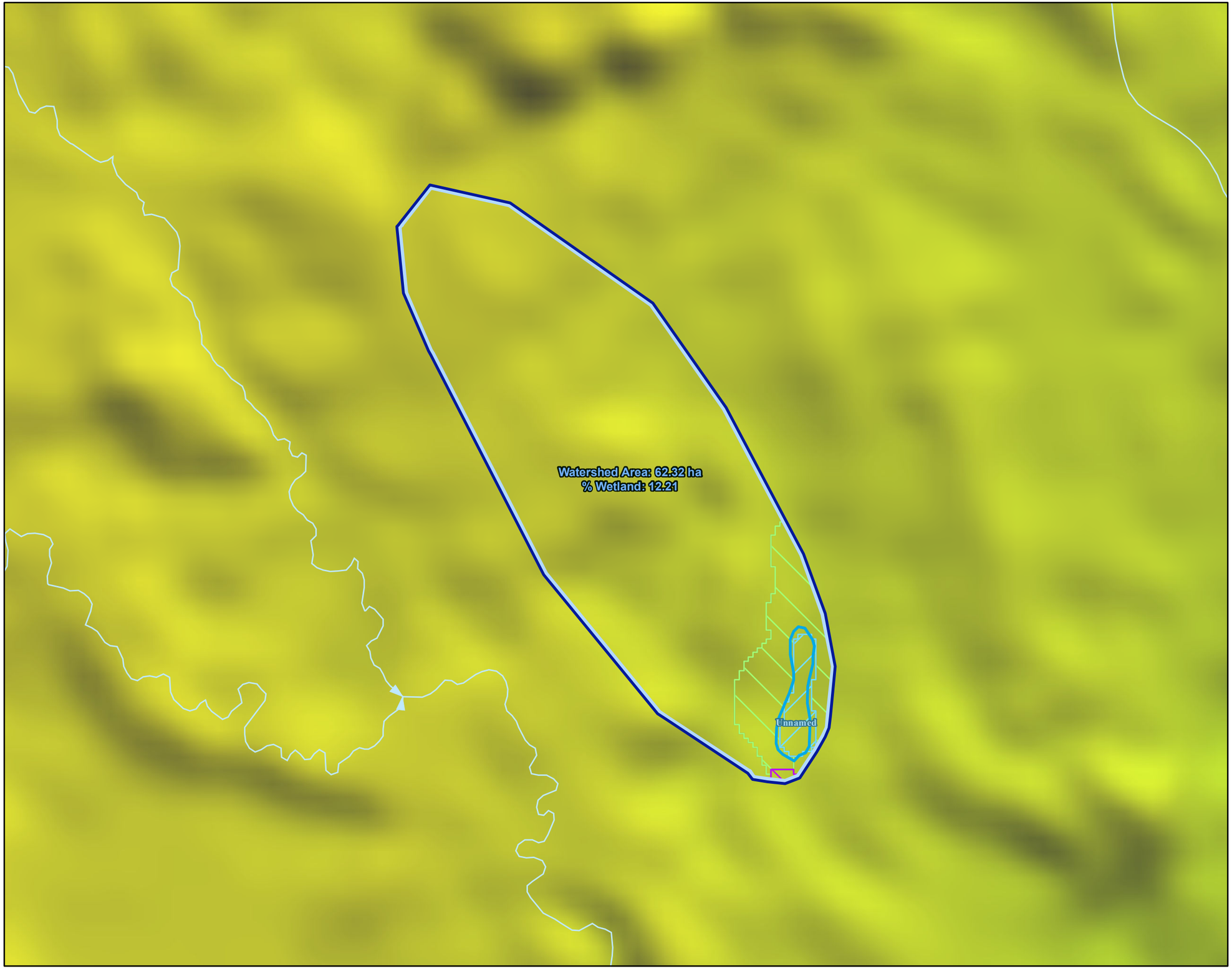
1:6,000

0 100 200 300 400 m

Date: March 5, 2025

Prepared by: S. Farrugia

CPP ENVIRONMENTAL



VEOLIA

2024 Surface Water and
Sediment Quality Monitoring

Lake Station Watersheds and Wetland Area
Unnamed Lake 3

Watershed
FWMIS Waterbody
FWMIS Watercourse

ABMI Wetland Inventory
Fen
Open water
Swamp

1,372 m
1,250 m
1,125 m
1,000 m
875 m
758 m

Source: Contains information licensed under the Open Government Licences – Canada and Alberta
MRDEM: Natural Resources Canada (2024)

N
W E
S

Coordinate System: NAD 1983 10TM AEP Resource

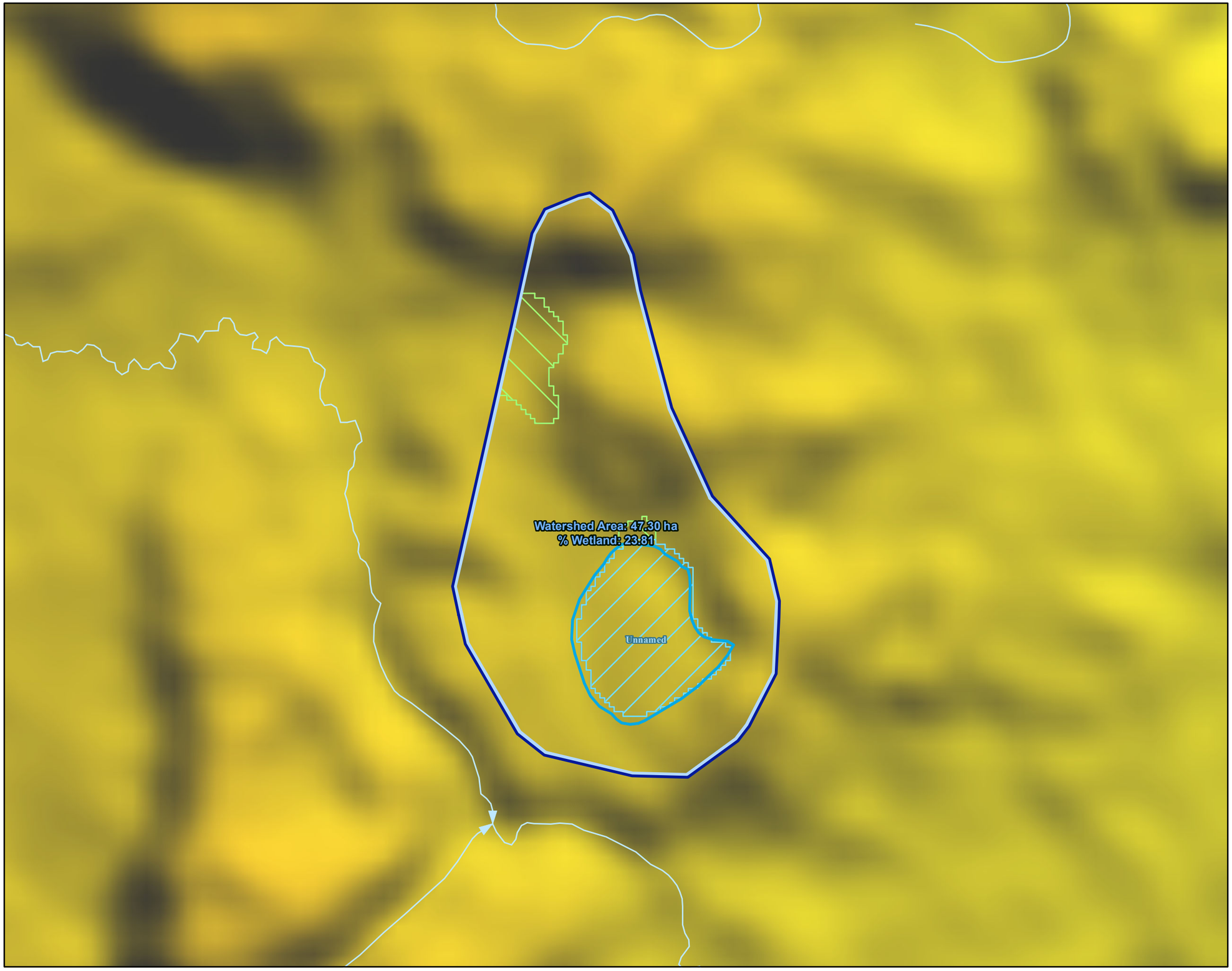
1:8,250

0 100 200 300 400 500 600 m

Date: March 5, 2025

Prepared by: S. Farrugia

CPP ENVIRONMENTAL



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2024 Surface Water and Sediment Quality Monitoring

Lake Station Watersheds and Wetland Area
Unnamed Lake 4

Watershed
FWMIS Waterbody
FWMIS Watercourse

ABMI Wetland Inventory
Fen
Open water

1,372 m
1,250 m
1,125 m
1,000 m
875 m
758 m

Source: Contains information licensed under the Open Government Licences – Canada and Alberta
MRDEM: Natural Resources Canada (2024)

N W E S

Coordinate System: NAD 1983 10TM AEP Resource

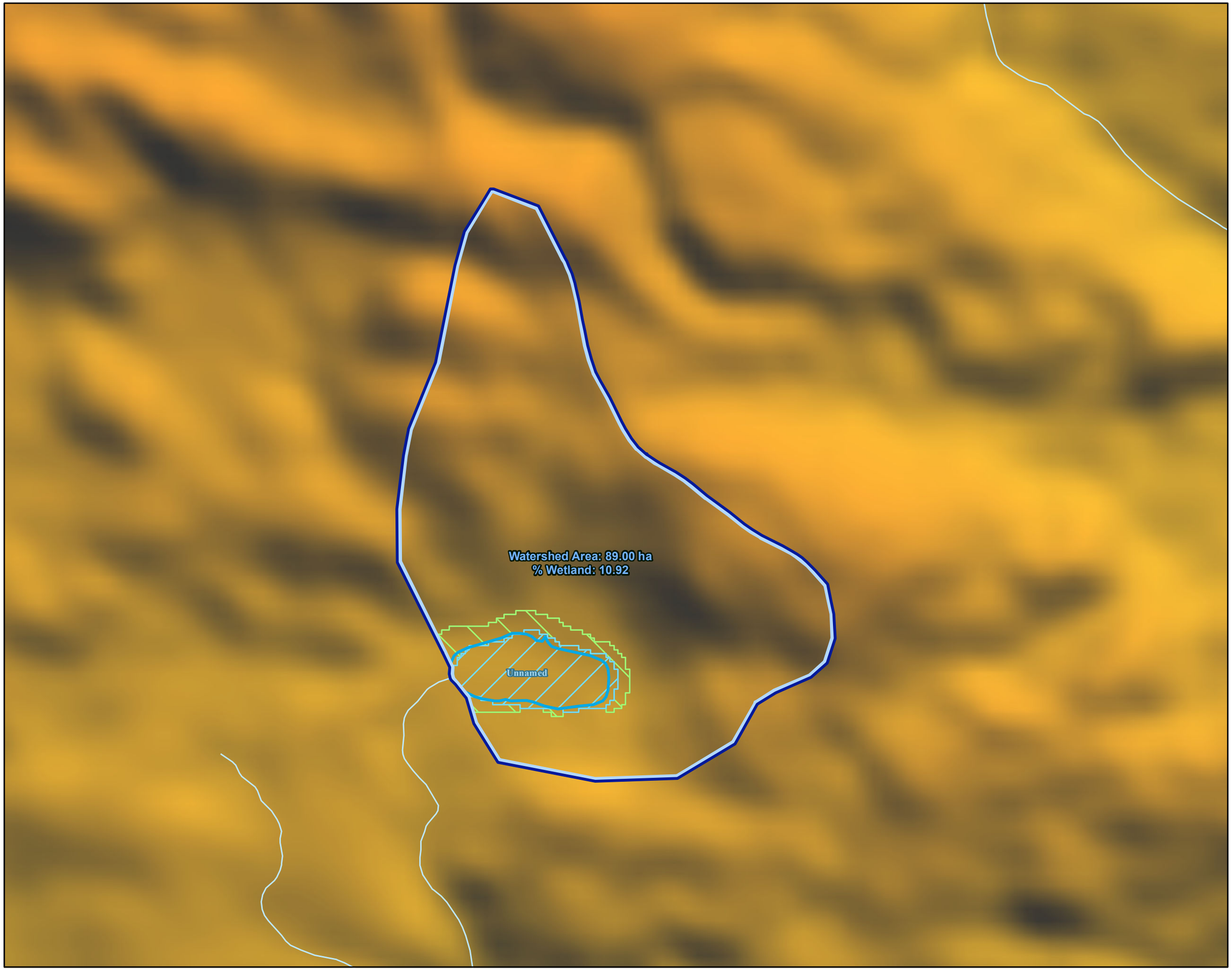
1:8,000

0 100 200 300 400 500 m

Date: March 5, 2025

Prepared by: S. Farrugia

CPP ENVIRONMENTAL



VEOLIA

2024 Surface Water and
Sediment Quality Monitoring

Lake Station Watersheds and Wetland Area
Unnamed Lake 5

Watershed
FWMIS Waterbody
FWMIS Watercourse

ABMI Wetland Inventory
Fen
Open water

1,372 m
1,250 m
1,125 m
1,000 m
875 m
758 m

Source: Contains information licensed under the Open Government Licences – Canada and Alberta
MRDEM: Natural Resources Canada (2024)

Coordinate System: NAD 1983 10TM AEP Resource

N
W E
S

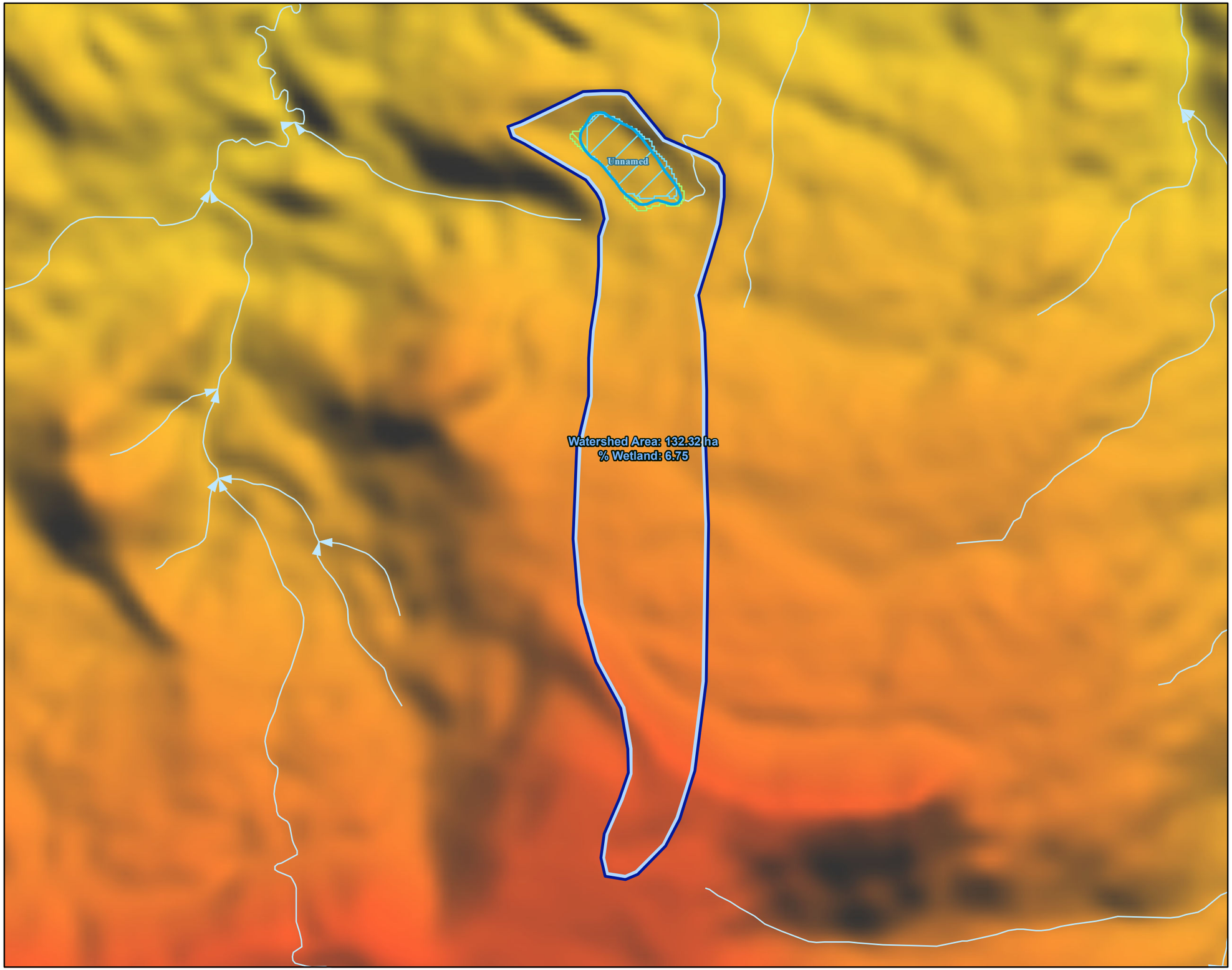
1:9,500

0 100 200 300 400 500 600 m

Date: March 5, 2025

Prepared by: S. Farrugia

CPP ENVIRONMENTAL



VEOLIA

2024 Surface Water and Sediment Quality Monitoring

Lake Station Watersheds and Wetland Area
Unnamed Lake 6

Watershed
FWMIS Waterbody
FWMIS Watercourse

ABMI Wetland Inventory
Fen
Open water

1,372 m
1,250 m
1,125 m
1,000 m
875 m
758 m

Source: Contains information licensed under the Open Government Licences – Canada and Alberta
MRDEM: Natural Resources Canada (2024)

Coordinate System: NAD 1983 10TM AEP Resource

N W E S

1:15,000

0 100 200 300 400 500 600 700 m

Date: March 5, 2025

Prepared by: S. Farrugia

CPP ENVIRONMENTAL

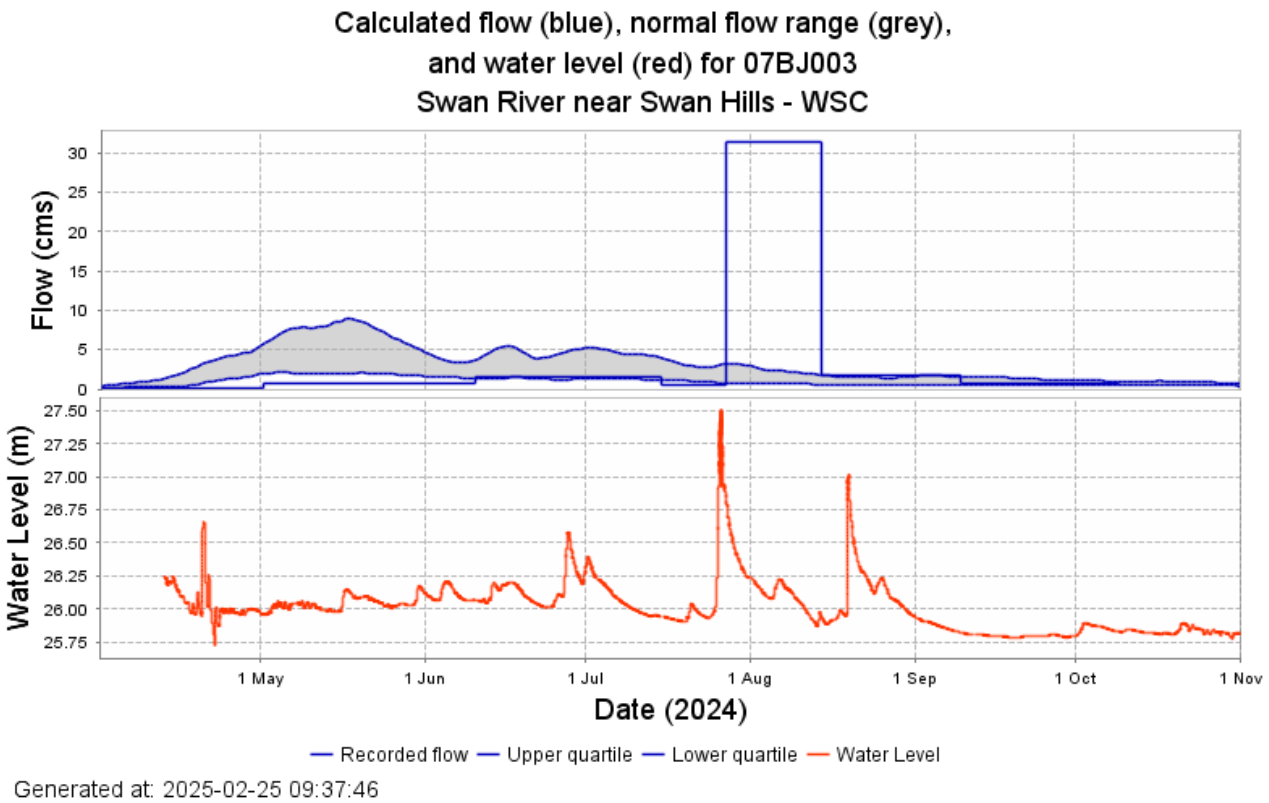
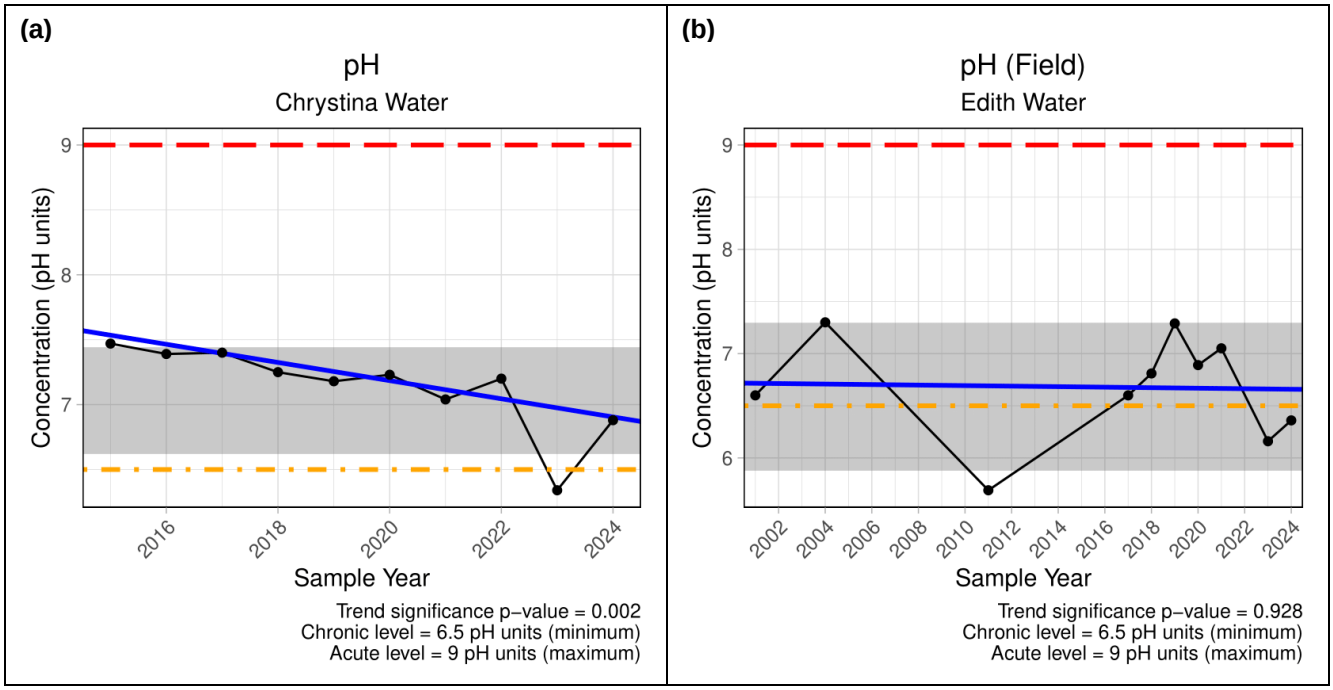
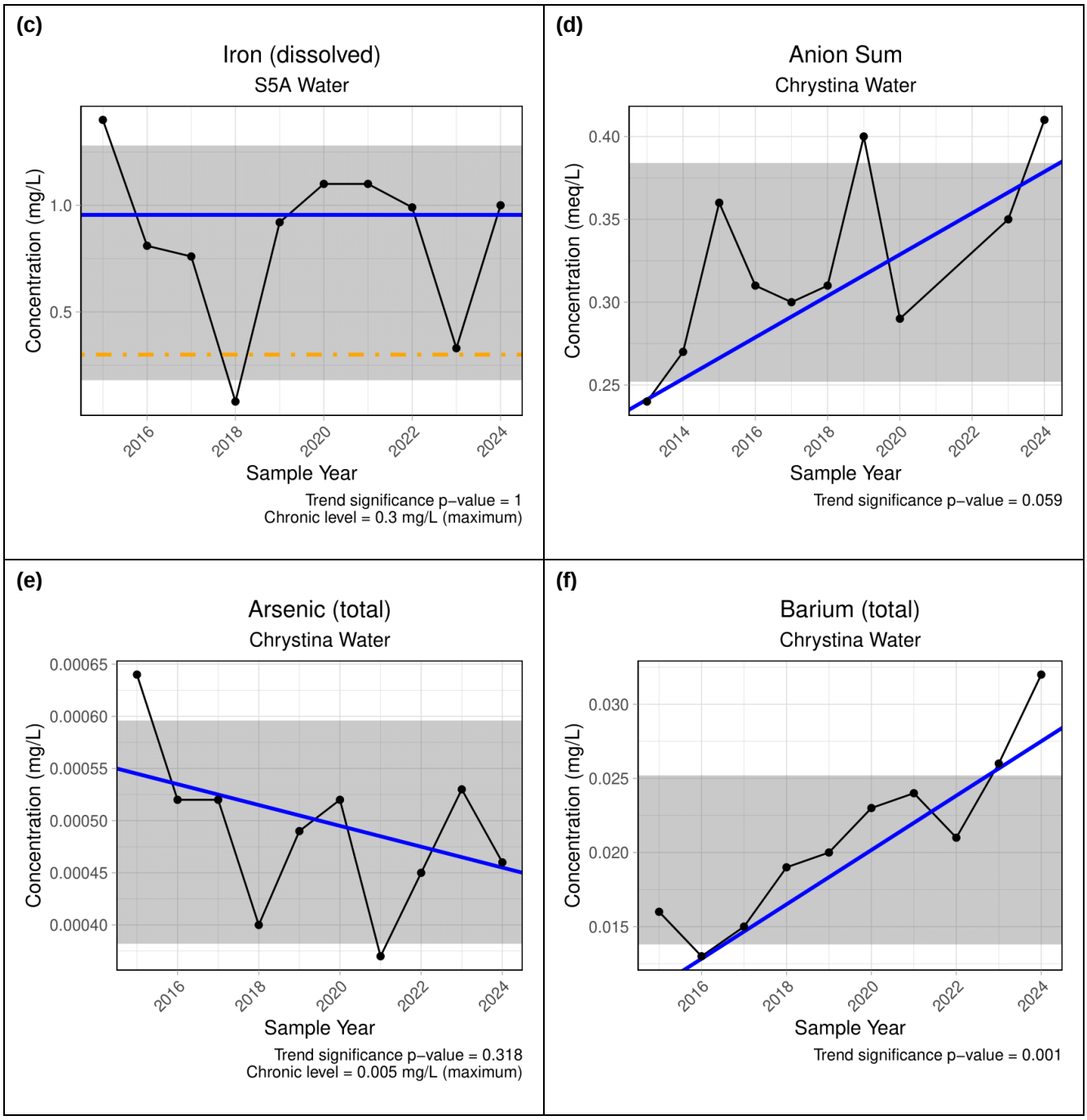
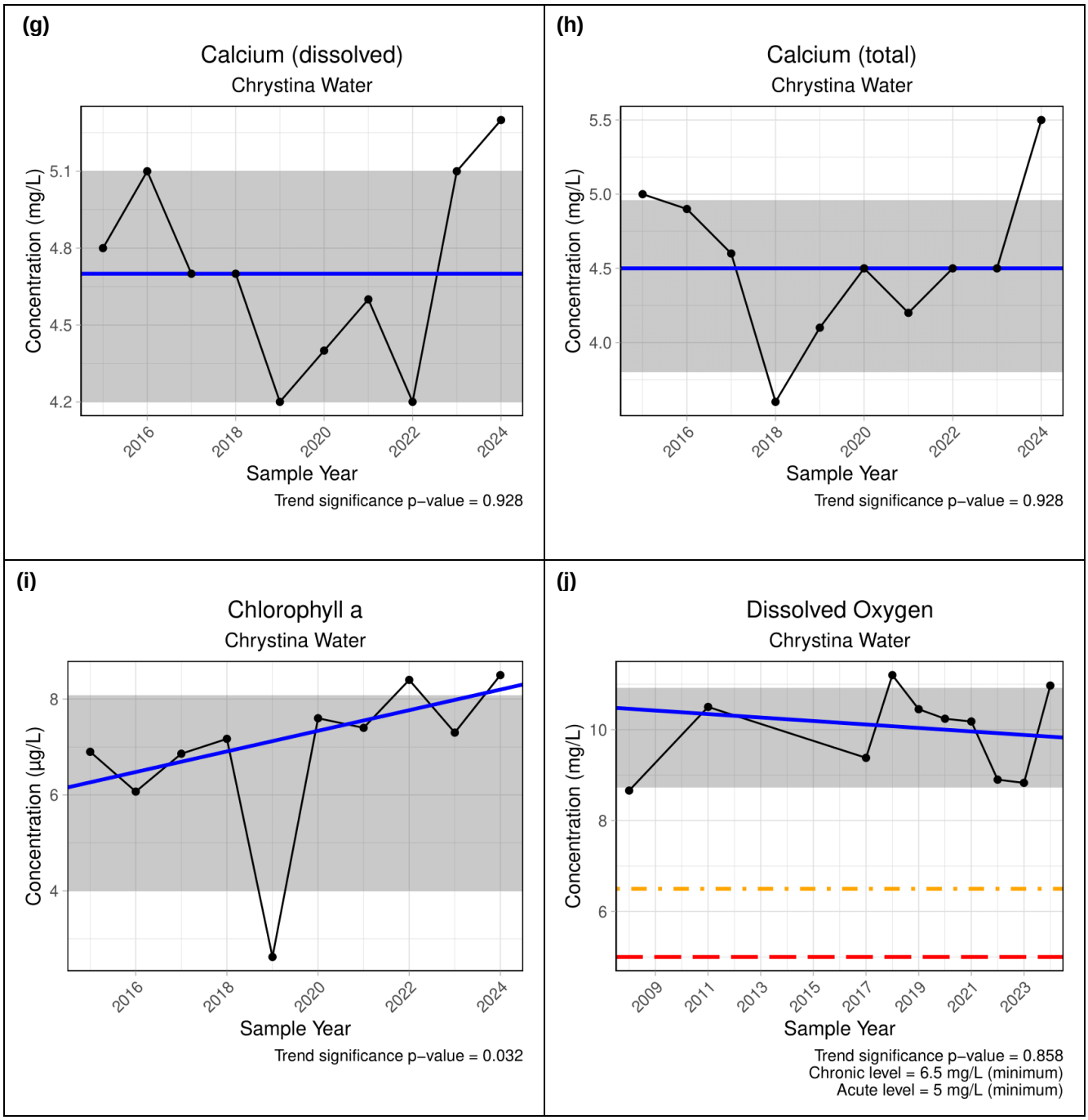


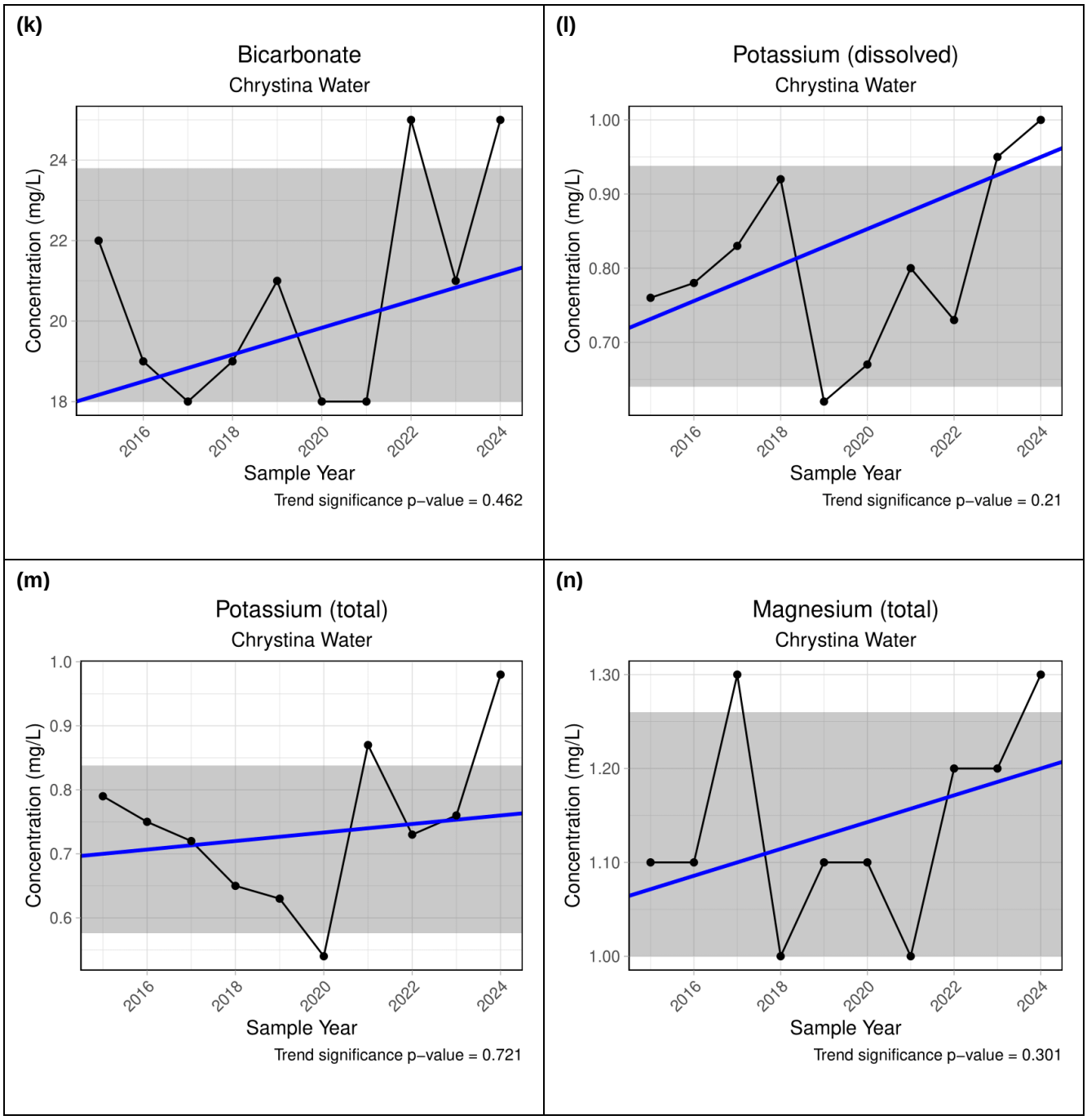
Figure 3: Hydrograph for the Swan River near Swan Hills for the 2024 open water season (April-November), showing daily flow and water levels (Government of Alberta, 2025).

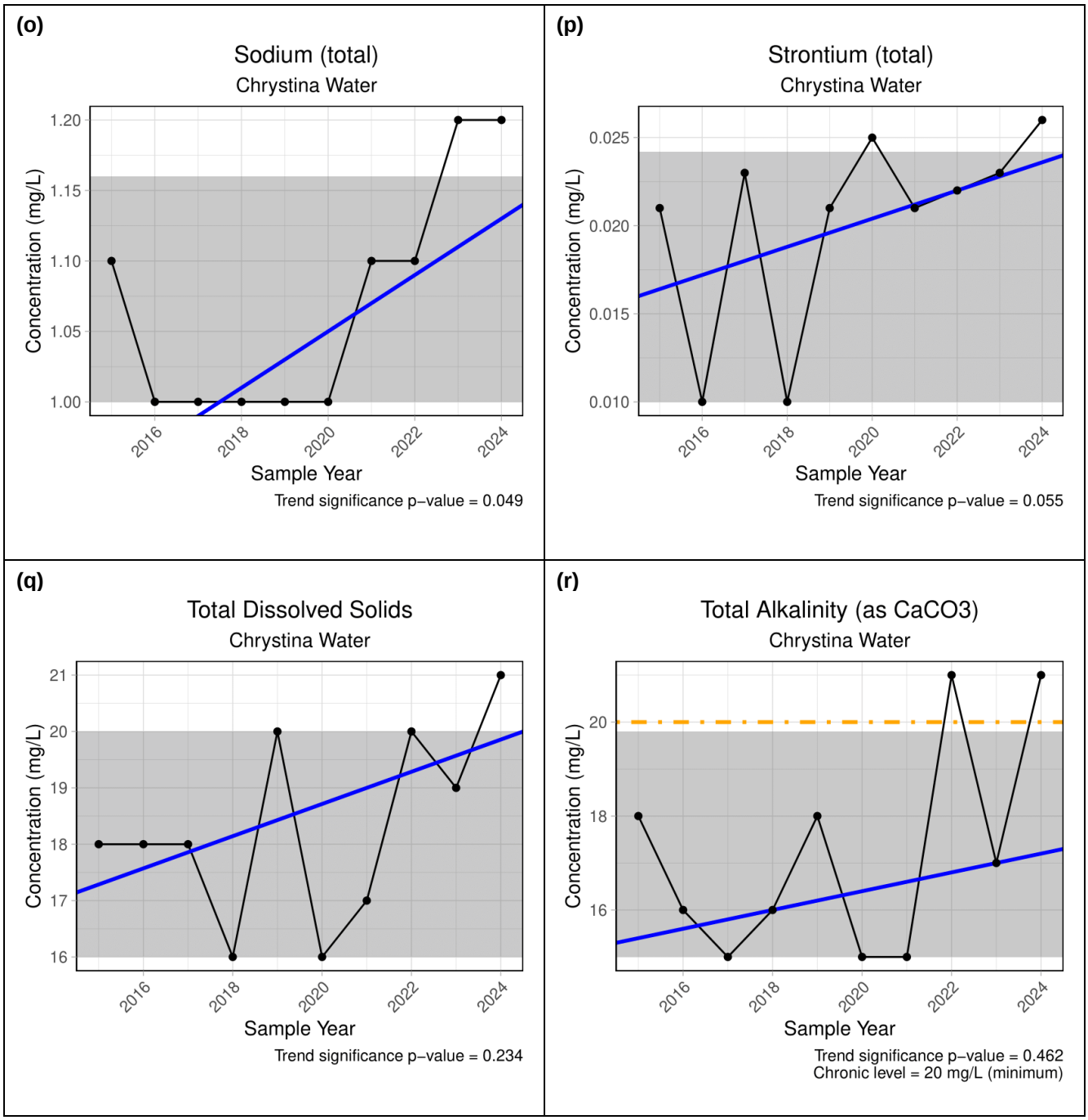
Figure 4: Select trend analysis figures for water quality variables. Horizontal lines represent environmental guidelines; the shaded boxes represent values within the 5th to 95th percentiles within the ten-year moving window. Variables that had both significant trends and applicable guidelines are presented: pH in Chrystina Lake (a), pH (field) in Edith Lake surface water (b), and dissolved iron in S5A (c). Additionally, variables that were high compared to the 10-year moving window (above the 95th percentile): anion sum, total arsenic, barium, calcium, potassium, magnesium, sodium, and strontium; chlorophyll-a, dissolved oxygen, bicarbonate, total alkalinity (as CaCO3), dissolved solids, and suspended solids, dissolved calcium and potassium at Chrystina Lake (d-s); chlorophyll *a*, dissolved and total magnesium, temperature, and total alkalinity (as CaCO3) at Edith Lake (t-x); dissolved oxygen concentration and percent, total nitrogen, sulphur, and TKN at S5A (y-cc). Trend analysis figures for all variables analyzed in this study are presented in **Appendix 3**.

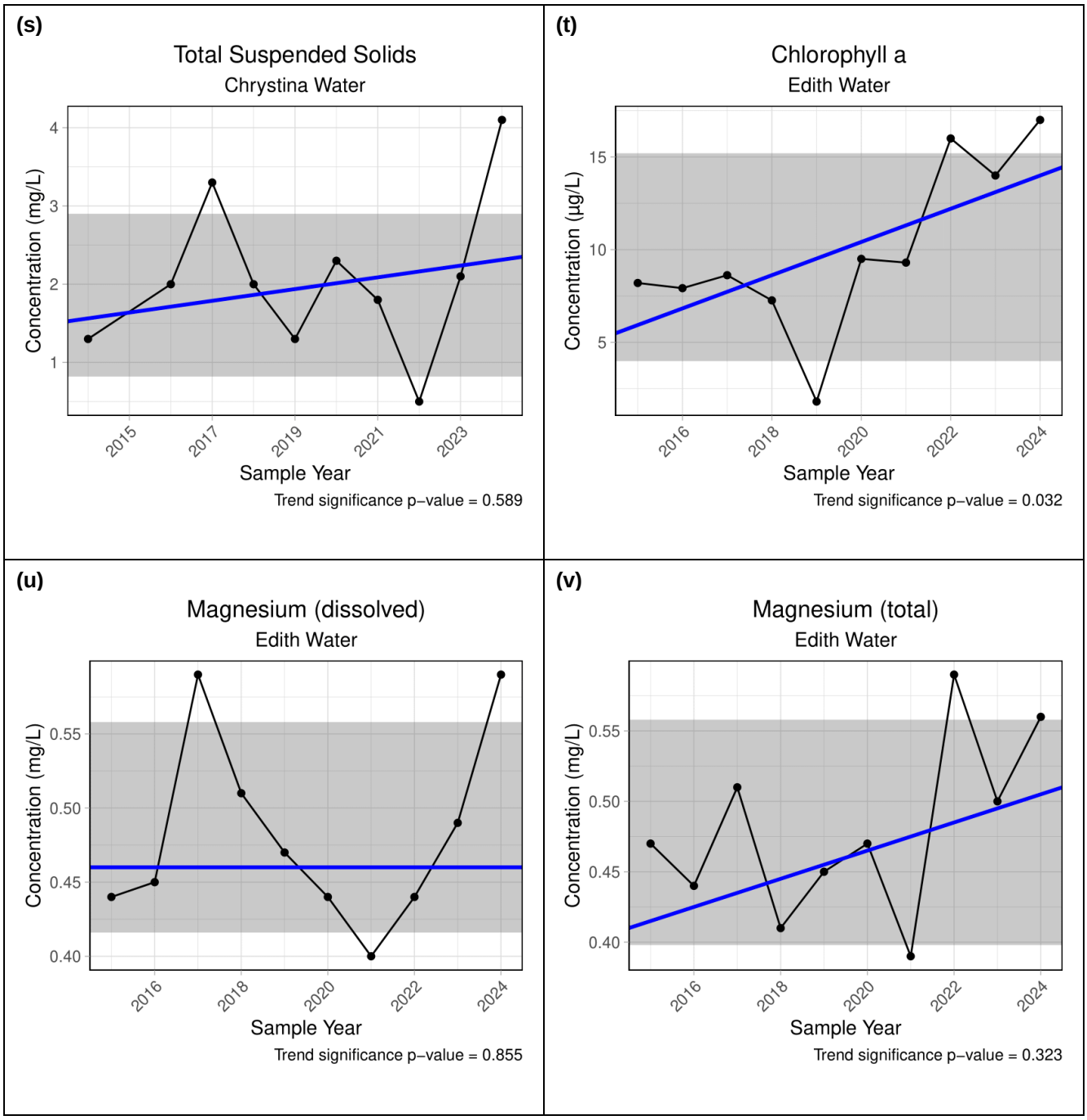


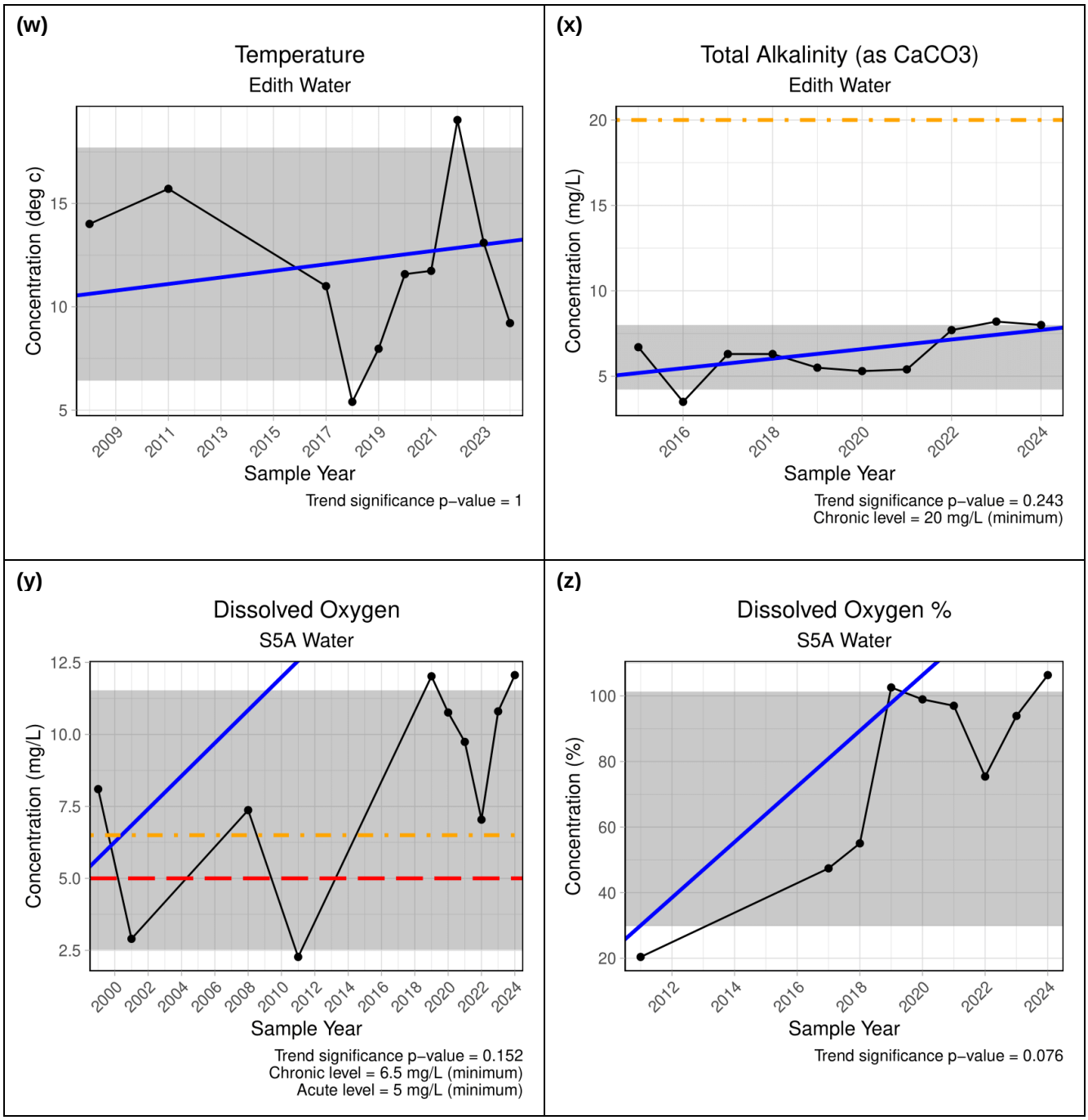

(c)
Iron (dissolved)
S5A Water
Concentration (mg/L)
1.0
0.5
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 1
Chronic level = 0.3 mg/L (maximum)
(d)
Anion Sum
Chrystina Water
Concentration (meq/L)
0.40
0.35
0.30
0.25
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.059
(e)
Arsenic (total)
Chrystina Water
Concentration (mg/L)
0.00065
0.00060
0.00055
0.00050
0.00045
0.00040
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.318
Chronic level = 0.005 mg/L (maximum)
(f)
Barium (total)
Chrystina Water
Concentration (mg/L)
0.030
0.025
0.020
0.015
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.001


(g)
Calcium (dissolved)
Chrystina Water
Concentration (mg/L)
5.1
4.8
4.5
4.2
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.928
(h)
Calcium (total)
Chrystina Water
Concentration (mg/L)
5.5
5.0
4.5
4.0
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.928
(i)
Chlorophyll a
Chrystina Water
Concentration (µg/L)
8
6
4
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.032
(j)
Dissolved Oxygen
Chrystina Water
Concentration (mg/L)
10
8
6
2009
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.858
Chronic level = 6.5 mg/L (minimum)
Acute level = 5 mg/L (minimum)


(k)
Bicarbonate
Chrystina Water
Concentration (mg/L)
Sample Year
Trend significance p−value = 0.462
(l)
Potassium (dissolved)
Chrystina Water
Concentration (mg/L)
Sample Year
Trend significance p−value = 0.21
(m)
Potassium (total)
Chrystina Water
Concentration (mg/L)
Sample Year
Trend significance p−value = 0.721
(n)
Magnesium (total)
Chrystina Water
Concentration (mg/L)
Sample Year
Trend significance p−value = 0.301


(o)
Sodium (total)
Chrystina Water
Concentration (mg/L)
1.20
1.15
1.10
1.05
1.00
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.049
(p)
Strontium (total)
Chrystina Water
Concentration (mg/L)
0.025
0.020
0.015
0.010
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.055
(q)
Total Dissolved Solids
Chrystina Water
Concentration (mg/L)
21
20
19
18
17
16
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.234
(r)
Total Alkalinity (as CaCO3)
Chrystina Water
Concentration (mg/L)
20
18
16
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.462
Chronic level = 20 mg/L (minimum)


(s)
Total Suspended Solids
Chrystina Water
Concentration (mg/L)
Sample Year
Trend significance p−value = 0.589
(t)
Chlorophyll a
Edith Water
Concentration (µg/L)
Sample Year
Trend significance p−value = 0.032
(u)
Magnesium (dissolved)
Edith Water
Concentration (mg/L)
Sample Year
Trend significance p−value = 0.855
(v)
Magnesium (total)
Edith Water
Concentration (mg/L)
Sample Year
Trend significance p−value = 0.323


(w)
Temperature
Edith Water
Concentration (deg c)
Sample Year
Trend significance p−value = 1
(x)
Total Alkalinity (as CaCO3)
Edith Water
Concentration (mg/L)
Sample Year
Trend significance p−value = 0.243
Chronic level = 20 mg/L (minimum)
(y)
Dissolved Oxygen
S5A Water
Concentration (mg/L)
Sample Year
Trend significance p−value = 0.152
Chronic level = 6.5 mg/L (minimum)
Acute level = 5 mg/L (minimum)
(z)
Dissolved Oxygen %
S5A Water
Concentration (%)
Sample Year
Trend significance p−value = 0.076

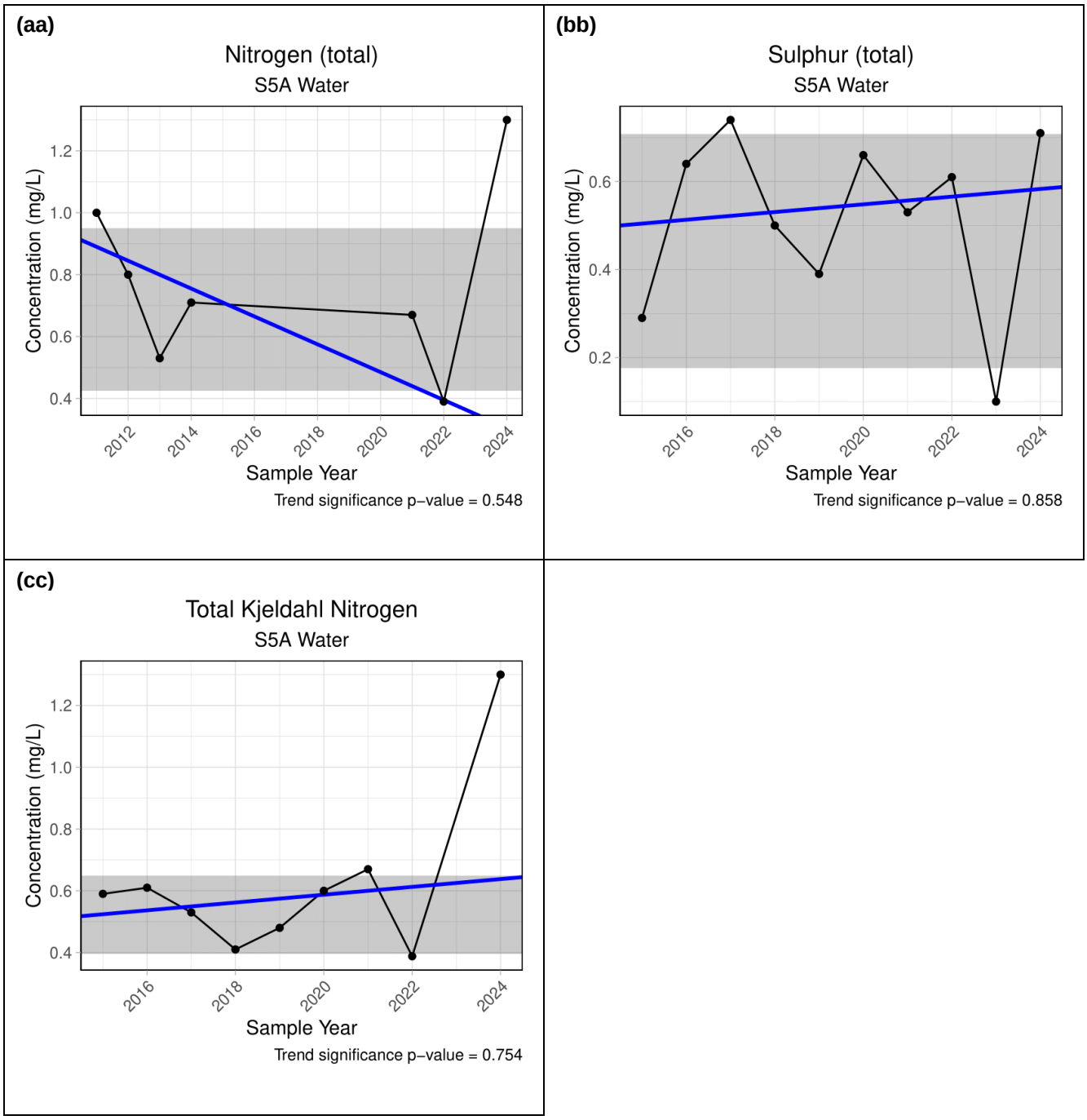
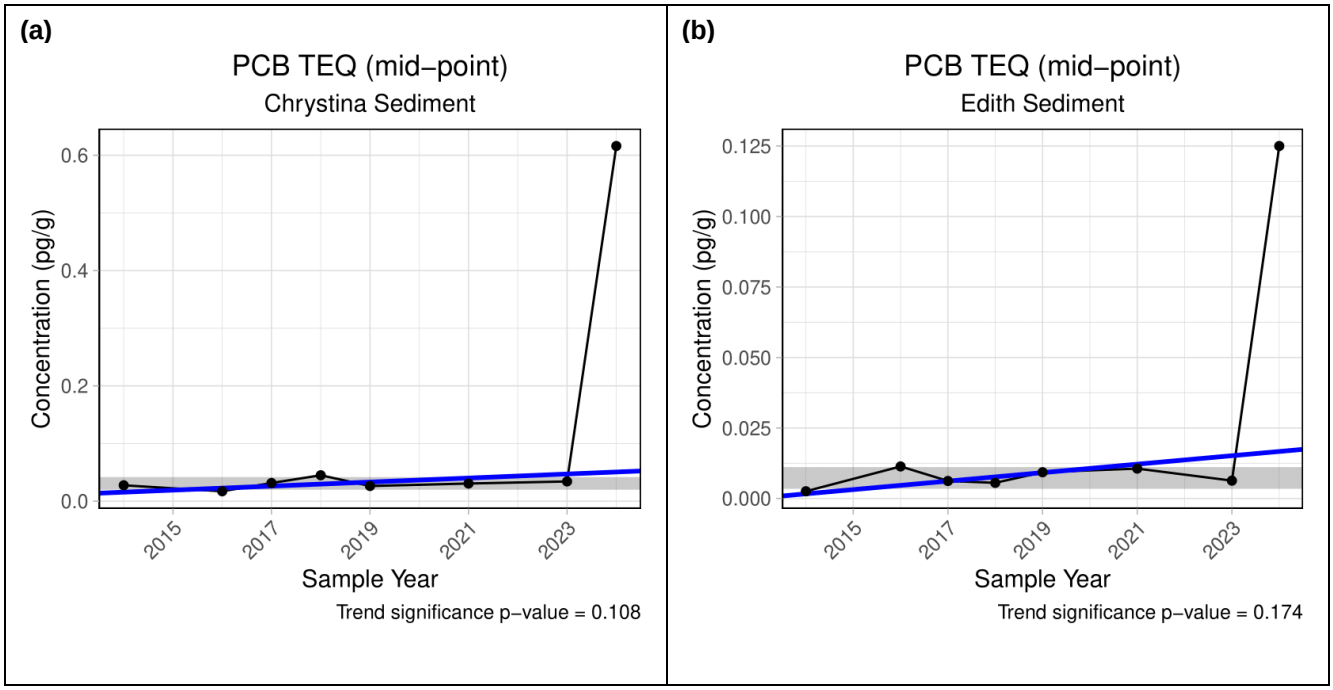
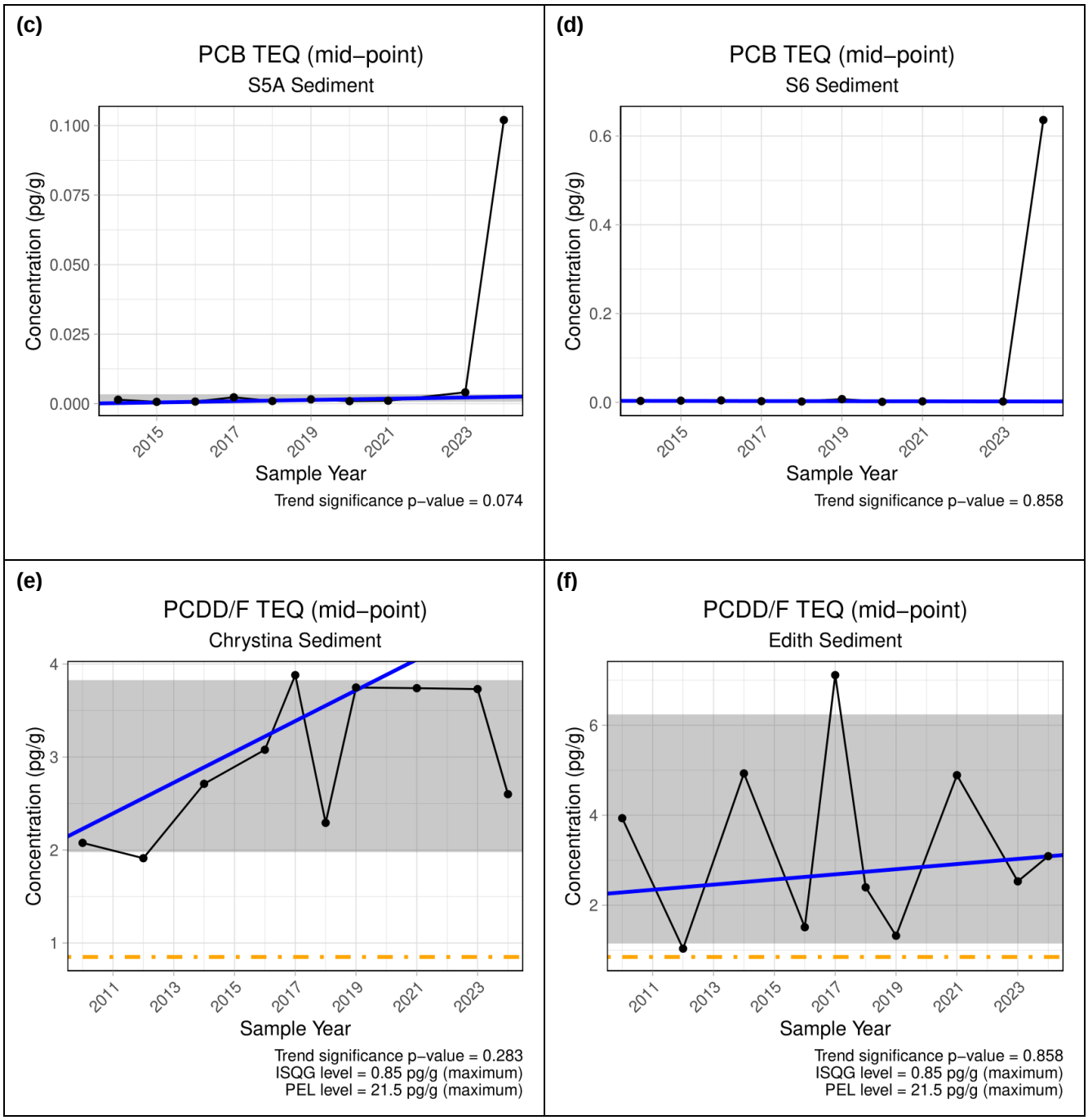
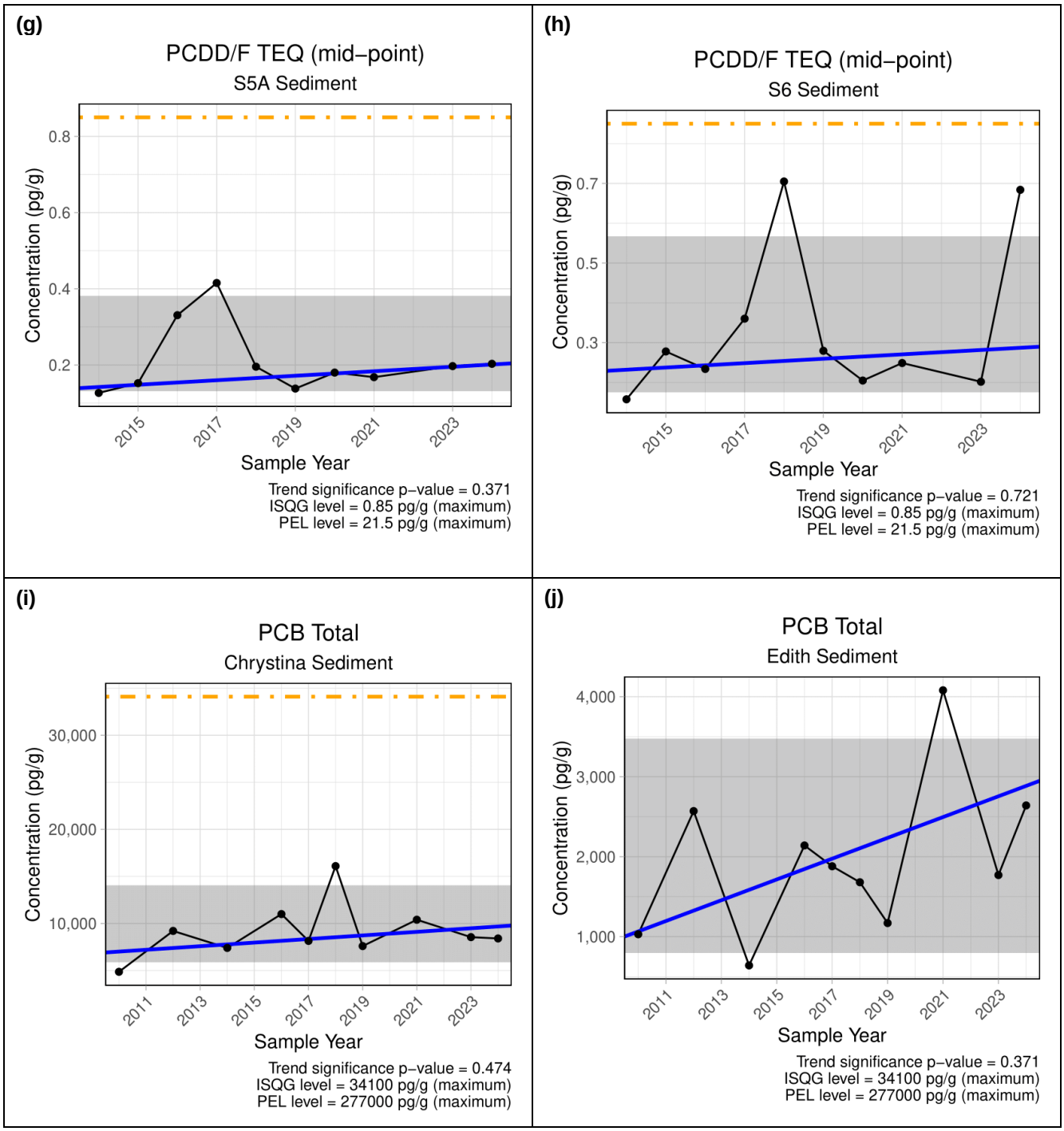
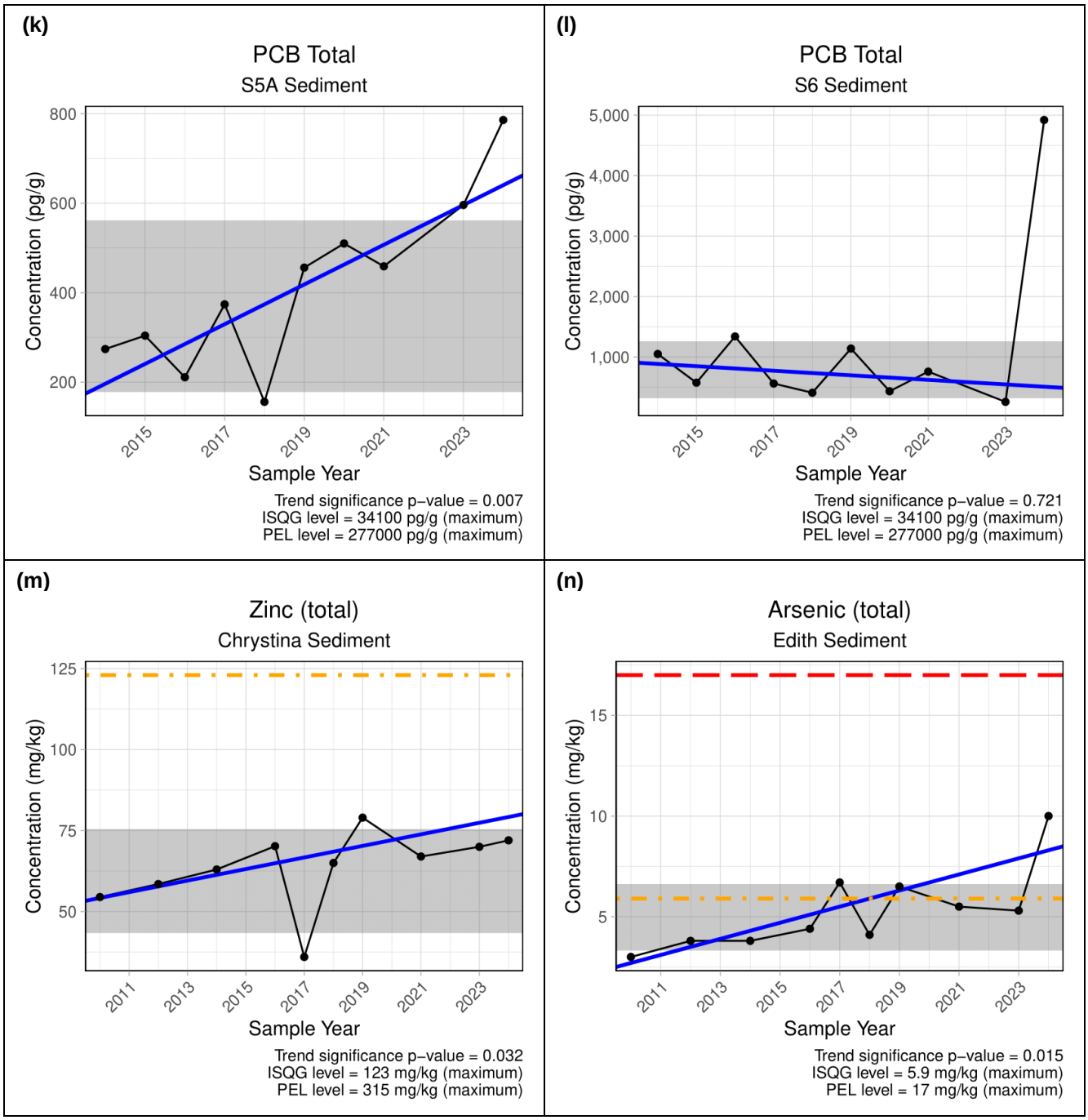

(aa)
Nitrogen (total)
S5A Water
Concentration (mg/L)
1.2
1.0
0.8
0.6
0.4
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.548
(bb)
Sulphur (total)
S5A Water
Concentration (mg/L)
0.6
0.4
0.2
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.858
(cc)
Total Kjeldahl Nitrogen
S5A Water
Concentration (mg/L)
1.2
1.0
0.8
0.6
0.4
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.754

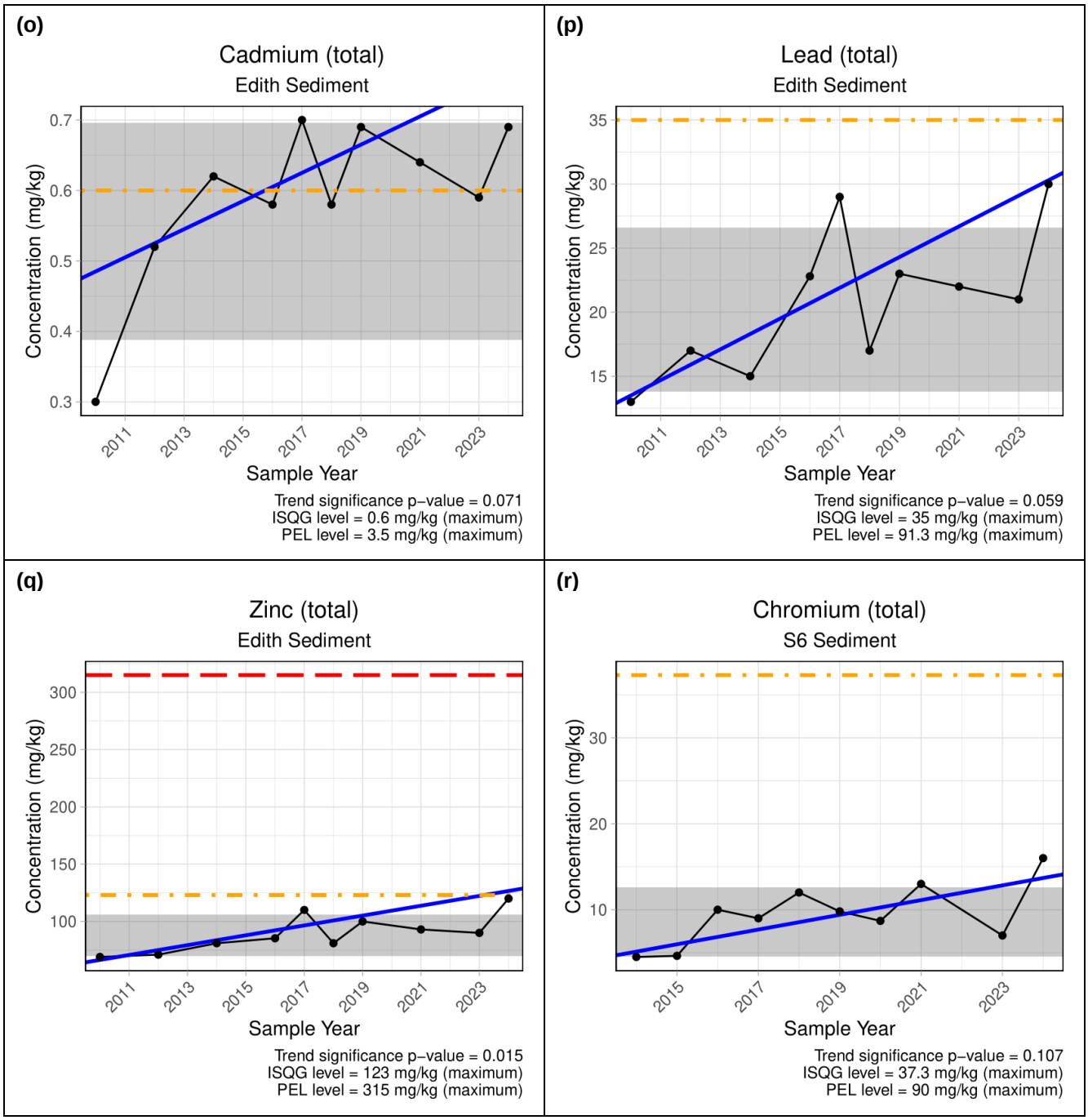
Figure 5: Select trend analysis figures for sediment quality variables. Horizontal lines represent environmental guidelines; the shaded boxes represent values within the 5th to 95th percentiles within the ten-year moving window. PCB TEQ trend figures are presented for four sites (a-d); PCDD/F TEQ (e-h) and Total PCB (i-l) trend figures are presented for sediments at four sites. Variables that had both significant trends and applicable guidelines are presented: zinc in Chrystina Lake (m); and arsenic, cadmium, lead, and zinc in Edith Lake (n-q); and chromium at S6 (r). Trend analysis figures for all variables analyzed in this study are presented in **Appendix 3**.




(c)
PCB TEQ (mid–point)
S5A Sediment
Concentration (pg/g)
0.100
0.075
0.050
0.025
0.000
2015
2017
2019
2021
2023
Sample Year
Trend significance p–value = 0.074
(d)
PCB TEQ (mid–point)
S6 Sediment
Concentration (pg/g)
0.6
0.4
0.2
0.0
2015
2017
2019
2021
2023
Sample Year
Trend significance p–value = 0.858
(e)
PCDD/F TEQ (mid–point)
Chrystina Sediment
Concentration (pg/g)
4
3
2
1
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p–value = 0.283
ISQG level = 0.85 pg/g (maximum)
PEL level = 21.5 pg/g (maximum)
(f)
PCDD/F TEQ (mid–point)
Edith Sediment
Concentration (pg/g)
6
4
2
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p–value = 0.858
ISQG level = 0.85 pg/g (maximum)
PEL level = 21.5 pg/g (maximum)


(g)
PCDD/F TEQ (mid–point)
S5A Sediment
Concentration (pg/g)
0.8
0.6
0.4
0.2
2015
2017
2019
2021
2023
Sample Year
Trend significance p–value = 0.371
ISQG level = 0.85 pg/g (maximum)
PEL level = 21.5 pg/g (maximum)
(h)
PCDD/F TEQ (mid–point)
S6 Sediment
Concentration (pg/g)
0.7
0.5
0.3
2015
2017
2019
2021
2023
Sample Year
Trend significance p–value = 0.721
ISQG level = 0.85 pg/g (maximum)
PEL level = 21.5 pg/g (maximum)
(i)
PCB Total
Chrystina Sediment
Concentration (pg/g)
30,000
20,000
10,000
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p–value = 0.474
ISQG level = 34100 pg/g (maximum)
PEL level = 277000 pg/g (maximum)
(j)
PCB Total
Edith Sediment
Concentration (pg/g)
4,000
3,000
2,000
1,000
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p–value = 0.371
ISQG level = 34100 pg/g (maximum)
PEL level = 277000 pg/g (maximum)


(k)
PCB Total
S5A Sediment
Concentration (pg/g)
800
600
400
200
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.007
ISQG level = 34100 pg/g (maximum)
PEL level = 277000 pg/g (maximum)
(l)
PCB Total
S6 Sediment
Concentration (pg/g)
5,000
4,000
3,000
2,000
1,000
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.721
ISQG level = 34100 pg/g (maximum)
PEL level = 277000 pg/g (maximum)
(m)
Zinc (total)
Chrystina Sediment
Concentration (mg/kg)
125
100
75
50
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.032
ISQG level = 123 mg/kg (maximum)
PEL level = 315 mg/kg (maximum)
(n)
Arsenic (total)
Edith Sediment
Concentration (mg/kg)
15
10
5
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.015
ISQG level = 5.9 mg/kg (maximum)
PEL level = 17 mg/kg (maximum)


(o)
Cadmium (total)
Edith Sediment
Concentration (mg/kg)
Sample Year
Trend significance p−value = 0.071
ISQG level = 0.6 mg/kg (maximum)
PEL level = 3.5 mg/kg (maximum)
(p)
Lead (total)
Edith Sediment
Concentration (mg/kg)
Sample Year
Trend significance p−value = 0.059
ISQG level = 35 mg/kg (maximum)
PEL level = 91.3 mg/kg (maximum)
(q)
Zinc (total)
Edith Sediment
Concentration (mg/kg)
Sample Year
Trend significance p−value = 0.015
ISQG level = 123 mg/kg (maximum)
PEL level = 315 mg/kg (maximum)
(r)
Chromium (total)
S6 Sediment
Concentration (mg/kg)
Sample Year
Trend significance p−value = 0.107
ISQG level = 37.3 mg/kg (maximum)
PEL level = 90 mg/kg (maximum)

Appendix 1: Surface Water Analytical Parameters

Table A-1a: Analytical parameters of interest for surface water quality. Note that not all parameters were eligible for trend analysis at each site.

Type	Parameters	
Biological	Chlorophyll-*a*	
Carbon	Total Organic Carbon	
Field Measurements	Dissolved Oxygen (mg/L)	pH
	Electrical Conductivity	Temperature
	Flow (stream sites only)	Water Depth
	Oxidation-Reduction Potential	Dissolved Oxygen Saturation (%)
Nutrients	Nitrate as N	Total Ammonia as N
	Nitrate plus Nitrite as N	Total Kjeldahl Nitrogen
	Nitrite as N	Total Phosphorus
Routine/Ionic Chemistry	Bicarbonate	Dissolved Sodium
	Carbonate	Electrical Conductivity
	Chloride	Hardness
	Dissolved Calcium	Hydroxide
	Dissolved Iron	pH
	Dissolved Magnesium	Sulphate
	Dissolved Manganese	Total Alkalinity
	Dissolved Potassium	Total Dissolved Solids
Total Metals	Aluminum	Molybdenum
	Antimony	Nickel
	Arsenic	Potassium
	Barium	Selenium
	Boron	Silicon
	Cadmium (low level analysis)	Silver
	Calcium	Sodium
	Chromium	Strontium
	Cobalt	Sulphur
	Copper	Thallium
	Iron	Tin
	Lead	Titanium
	Lithium	Uranium
	Magnesium	Vanadium
	Manganese	Zinc
	Mercury (low level analysis)	

Table A-1b: Analytical parameters for sediment quality. Note that not all parameters were eligible for trend analysis at each site.

Type	Parameters	
Carbon and Nutrients	Total Carbon	Total Organic Carbon
	Nitrogen	Sulphur
Physical	Moisture Content	Grain Size
	Sieve Analysis (#10. #200, Pan)	Organic Matter
Polychlorinated Biphenyls (PCBs)	Total PCBs	Full congener analysis (209 congeners)
	Total MonoCB Homologues	Total HexaCB Homologues
	Total DiCB Homologues	Total HeptaCB Homologues
	Total TriCB Homologues	Total OctaCB Homologues
	Total TetraCB Homologues	Total NonaCB Homologues
	Total PentaCB Homologues	PCB TEQ (lower bound, midpoint, upper bound estimates)
	Aroclor 1016	Aroclor 1254
	Aroclor 1221	Aroclor 1260
	Aroclor 1232	Aroclor 1262
	Aroclor 1242	Aroclor 1268
	Aroclor 1248	
Polychlorinated Dibenzo-*p*-Dioxins and Dibenzofurans (PCDD/Fs)	2,3,7,8-TCDD	2,3,4,7,8-PeCDF
	1,2,3,7,8-PeCDD	1,2,3,4,7,8-HxCDF
	1,2,3,4,7,8-HxCDD	1,2,3,6,7,8-HxCDF
	1,2,3,6,7,8-HxCDD	2,3,4,6,7,8-HxCDF
	1,2,3,7,8,9-HxCDD	1,2,3,7,8,9-HxCDF
	1,2,3,4,6,7,8-HpCDD	1,2,3,4,6,7,8-HpCDF
	1,2,3,4,6,7,8,9-OCDD	1,2,3,4,7,8,9-HpCDF
	2,3,7,8-TCDF	1,2,3,4,5,6,7,8-OCDF
	1,2,3,7,8-PeCDF	PCDD/F TEQ (lower bound, midpoint, upper bound estimates)
	Total TetraCDD Homologues	Total TetraCDF Homologues
	Total PentaCDD Homologues	Total PentaCDF Homologues
	Total HexaCDD Homologues	Total HexaCDF Homologues
	Total HeptaCDD Homologues	Total HeptaCDF Homologues
Soluble Ions	Chloride	pH
	Calcium	Sodium
	Electrical Conductivity	Sodium Adsorption Ratio
	Magnesium	Sulphate
	Potassium	

Type	Parameters	
Total Metals	Aluminum	Magnesium
	Antimony	Manganese
	Arsenic	Mercury
	Barium	Molybdenum
	Beryllium	Phosphorus
	Boron	Potassium
	Cadmium	Selenium
	Calcium	Silver
	Chromium	Sodium
	Chromium (VI)	Strontium
	Cobalt	Thallium
	Copper	Tin
	Iron	Uranium
	Lead	Vanadium
	Lithium	Zinc

Appendix 2: Significant Trends in Surface Water Quality

Table A-2a: Summary of significant (α = 0.1) 10 year moving window trends for **surface water** parameters. All surface water trend analysis results are presented in **Appendix 3**.

Site	Parameter	Trend Direction	Trend Significance [1]	*p*-value
Chrystina	Chlorophyll *a*	Up	**	0.032
Chrystina	Electrical Conductivity (field)	Down	**	0.049
Chrystina	pH (lab)	Down	**	0.002
Chrystina	Barium (total)	Up	***	0.001
Chrystina	Sodium (total)	Up	*	0.049
Chrystina	Strontium	Up	**	0.055
Edith	Chlorophyll *a*	Up	**	0.032
Edith	Electrical Conductivity (field)	Down	***	0.004
Edith	Potassium (total)	Up	*	0.059
Edith	Silicon	Down	**	0.037
Edith	Total Kjeldahl nitrogen	Up	*	0.059
S5A	Dissolved Oxygen (%)	Up	*	0.076
S5A	Silicon (total)	Up	*	0.088
S5A	Total Organic Carbon	Down	*	0.0088

[1] Asterisks indicate level of significance: *** = $p < 0.01$; ** = $p < 0.05$; * = $p < 0.1$.

Table A-2b: Summary of significant (α = 0.1) 10 year moving window trends for **sediment** parameters. All sediment trend analysis results are presented in **Appendix 3**.

Site	Parameter	Trend Direction	Trend Significance [1]	*p*-value
Chrystina	Beryllium	Up	*	0.074
Chrystina	Cobalt	Up	**	0.047
Chrystina	Thallium	Up	*	0.092
Chrystina	Uranium	Up	**	0.023
Chrystina	Vanadium	Up	*	0.068
Chrystina	Zinc	Up	**	0.032
Chrystina	PCB 169	Down	*	0.055
Chrystina	PCB 189	Up	*	0.088
Chrystina	PCB 197	Down	**	0.041
Chrystina	PCB 208	Down	*	0.064
Chrystina	2,3,7,8-TCDF	Up	**	0.014
Chrystina	1,2,3,7,8-PeCDF	Up	**	0.029
Chrystina	2,3,4,7,8-PeCDF	Up	**	0.025
Chrystina	PCB TEQ (Upper-Bound)	Up	*	0.063
Chrystina	Total Octa CB	Up	*	0.074
Edith	Antimony	Down	*	0.084
Edith	Cadmium	Up	*	0.071
Edith	Cobalt	Up	**	0.012
Edith	Zinc	Up	**	0.015
Edith	1,2,3,4,5,6,7,8-OCDF	Up	**	0.015
Edith	1,2,3,6,7,8-HxCDD	Up	*	0.064
Edith	Moisture Content (%)	Up	*	0.059
Edith	Lead	Down	*	0.059
Edith	PCB 77	Up	**	0.039
Edith	PCB 82	Up	**	0.037
Edith	PCB 132	Up	**	0.025
Edith	PCB 144	Up	*	0.077
Edith	PCB 154	Down	*	0.084
Edith	PCB 170	Up	*	0.074
Edith	PCB172	Up	*	0.085
Edith	PCB 174	Up	**	0.039
Edith	PCB 177	Up	*	0.059
Edith	PCB 178	Up	**	0.041
Edith	PCB 194	Up	**	0.015
Edith	PCB 195	Up	*	0.064

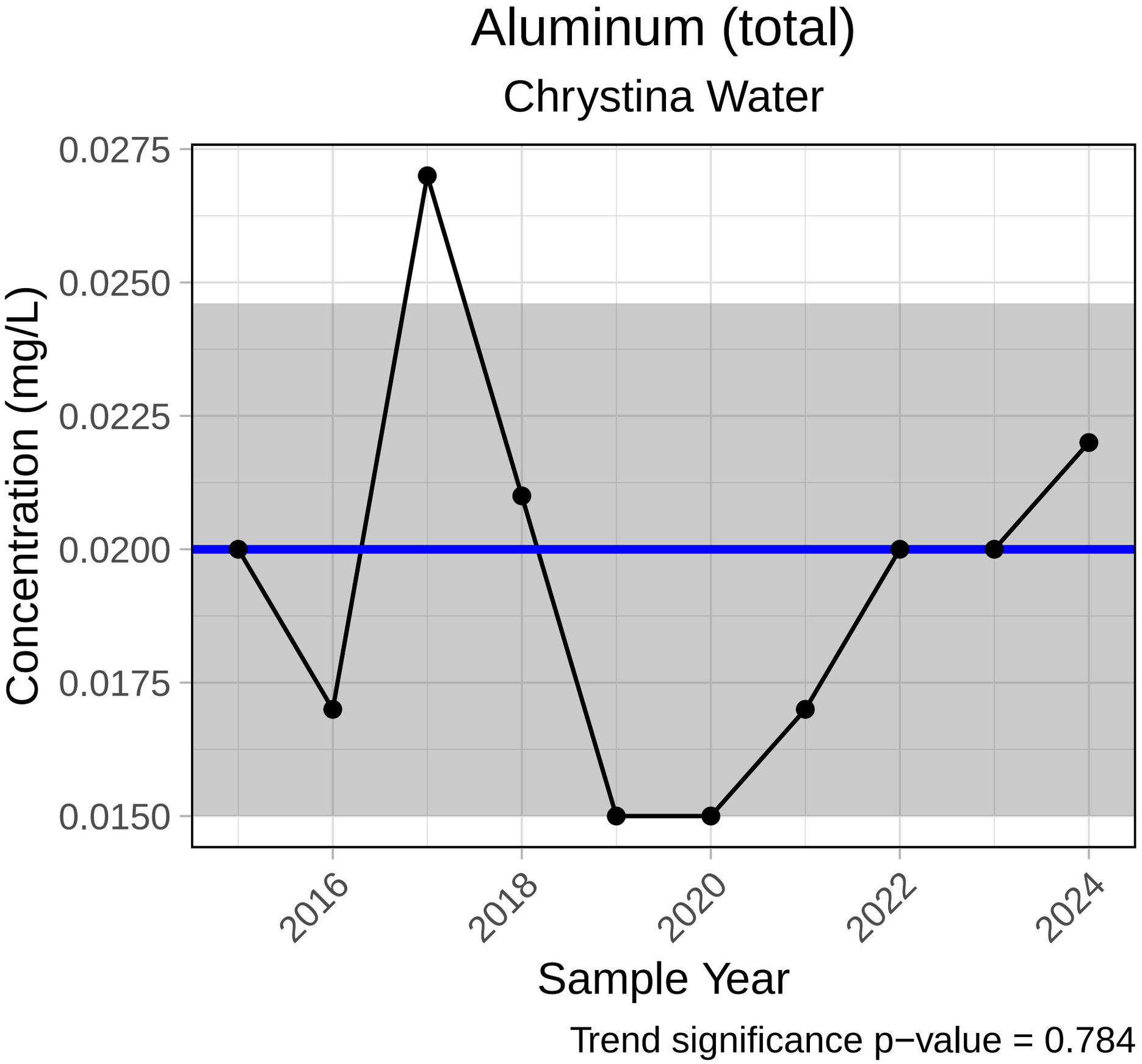
Site	Parameter	Trend Direction	Trend Significance [1]	*p*-value
Edith	Total DiCB	Up	**	0.174
Edith	Total HeptaCB	Up	**	0.025
Edith	Total HxCDD	Up	**	0.045
Edith	Total OctaCB	Up	**	0.039
Edith	Total PentaCB	Up	**	0.032
S5A	1,2,3,4,5,6,7,8-OCDF	Up	**	0.037
S5A	1,2,3,4,6,7,8-HpCDD	Up	*	0.074
S5A	PCB 1	Up	*	0.064
S5A	PCB 19	Up	**	0.016
S5A	PCB 105	Up	*	0.088
S5A	PCB 118	Up	*	0.074
S5A	PCB 122	Up	*	0.088
S5A	PCB 123	Up	*	0.088
S5A	PCB 130	Up	**	0.02
S5A	PCB 131	Up	***	0.005
S5A	PCB 132	Up	**	0.049
S5A	PCB 133	Up	*	0.074
S5A	PCB 136	Up	**	0.032
S5A	PCB 141	Up	**	0.016
S5A	PCB 144	Up	**	0.049
S5A	PCB 146	Up	**	0.02
S5A	PCB 158	Up	*	0.049
S5A	PCB 159	Up	*	0.088
S5A	PCB 162	Up	**	0.016
S5A	PCB 167	Up	**	0.049
S5A	PCB 169	Up	**	0.012
S5A	PCB 170	Up	**	0.02
S5A	PCB 172	Up	**	0.02
S5A	PCB 174	Up	*	0.074
S5A	PCB 176	Up	*	0.074
S5A	PCB 177	Up	*	0.074
S5A	PCB 178	Up	**	0.02
S5A	PCB 179	Up	**	0.049
S5A	PCB 183	Up	*	0.074
S5A	PCB 187	Up	**	0.032
S5A	PCB 190	Up	**	0.02

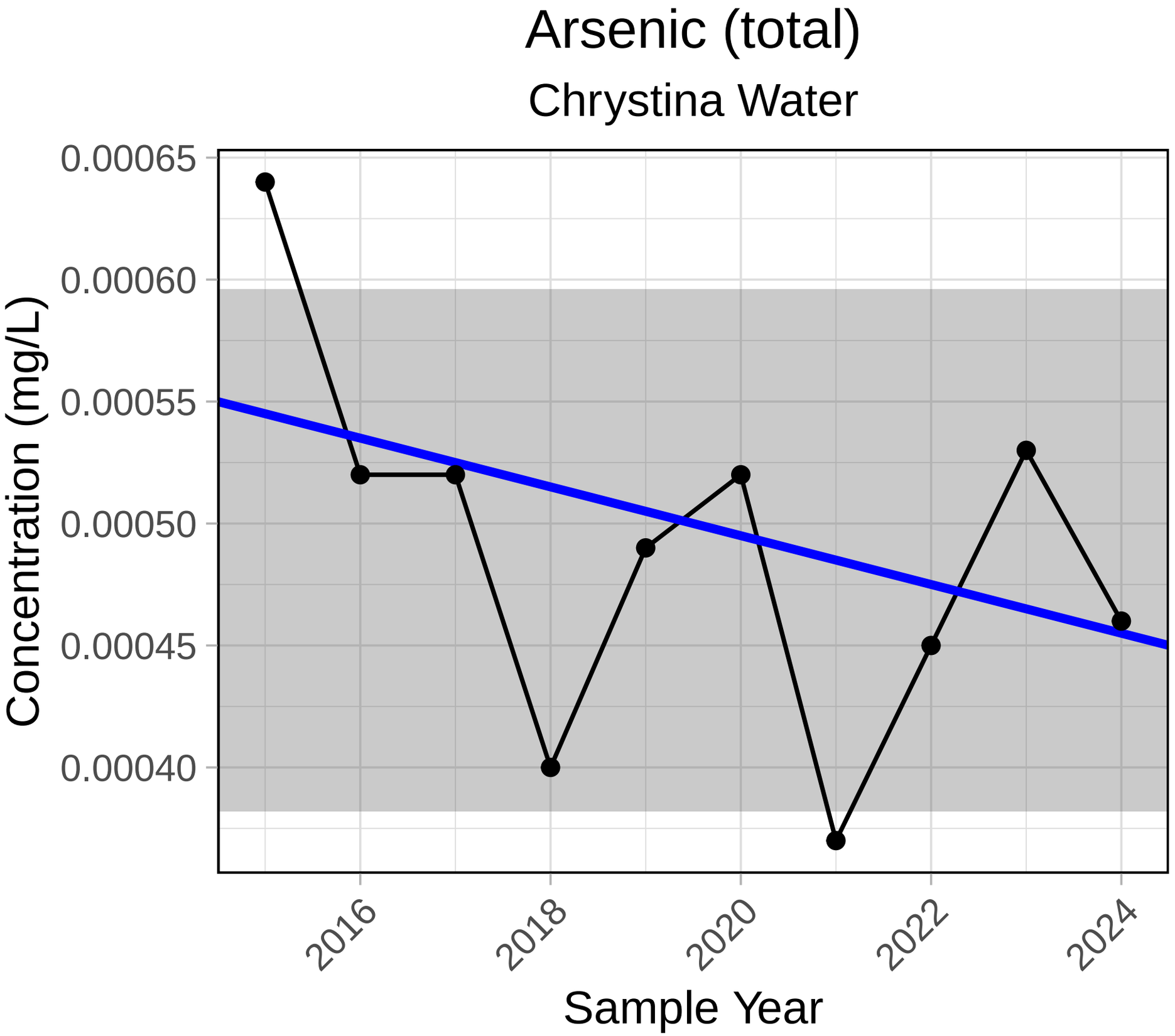
Site	Parameter	Trend Direction	Trend Significance [1]	*p*-value
S5A	PCB 191	Up	*	0.074
S5A	PCB 194	Up	**	0.032
S5A	PCB 195	Up	**	0.032
S5A	PCB 196	Up	**	0.02
S5A	PCB 2	Up	**	0.049
S5A	PCB 200	Up	**	0.02
S5A	PCB 201	Up	*	0.074
S5A	PCB 202	Up	**	0.049
S5A	PCB 203	Up	**	0.049
S5A	PCB 209	Up	**	0.023
S5A	PCB 35	Up	*	0.095
S5A	PCB 38	Up	***	0.007
S5A	PCB 52	Up	*	0.074
S5A	PCB 60	Up	*	0.074
S5A	PCB 63	Up	**	0.045
S5A	PCB 68	Up	***	0.008
S5A	PCB 77	S5A	*	0.074
S5A	PCB 82	S5A	**	0.032
S5A	PCB 84	S5A	*	0.074
S5A	PCB 92	S5A	***	0.007
S5A	PCB TEQ	S5A	*	0.074
S5A	PCB TEQ UB	S5A	**	0.049
S5A	PCB Total	S5A	***	0.007
S5A	PCBs 12+13	S5A	**	0.041
S5A	PCBs 128+166	S5A	**	0.032
S5A	PCBs 147+149	S5A	**	0.025
S5A	PCBs 153+168	S5A	**	0.032
S5A	PCBs 156+157	S5A	**	0.049
S5A	PCBs 171+173	S5A	**	0.032
S5A	PCBs 180+193	S5A	**	0.015
S5A	PCBs 198+199	S5A	**	0.032
S5A	PCBs 44+47+65	S5A	**	0.032
S5A	PCBs 83+99	S5A	**	0.02
S5A	PCBs 88+91	S5A	***	0.007
S5A	Total HeptaCB	Up	**	0.032
S5A	Total HexaCB	Up	**	0.02
S5A	Total HpCDD	Up	*	0.059

Site	Parameter	Trend Direction	Trend Significance [1]	*p*-value
	Total HxCDD	Up	*	0.085
S5A	Total MonoCB	Up	**	0.012
S5A	Total OctaCB	Up	**	0.032
S5A	Total PentaCB	Up	**	0.032
S5A	Total TCDF	Up	*	0.057
S5A	Total TetraCB	Up	**	0.049
S6	Aluminum	Up	***	0.007
S6	Calcium	Up	**	0.032
S6	PCB 159	Up	*	0.095
S6	PCB 68	Up	*	0.084
S6	PCB 128+166	Down	*	0.074
S6	PCB 45+51	Up	*	0.059
S6	Sulphur	Up	**	0.012
S6	Sieve #10 (grain size > 2.00 mm)	Up	**	0.015
S6	Strontium	Up	**	0.015
S6	Total Inorganic Carbon	Up	**	0.037
S6	Total Organic Carbon	Up	**	0.032
S6	1,2,3,4,5,6,7,8-OCDF	Up	*	0.074

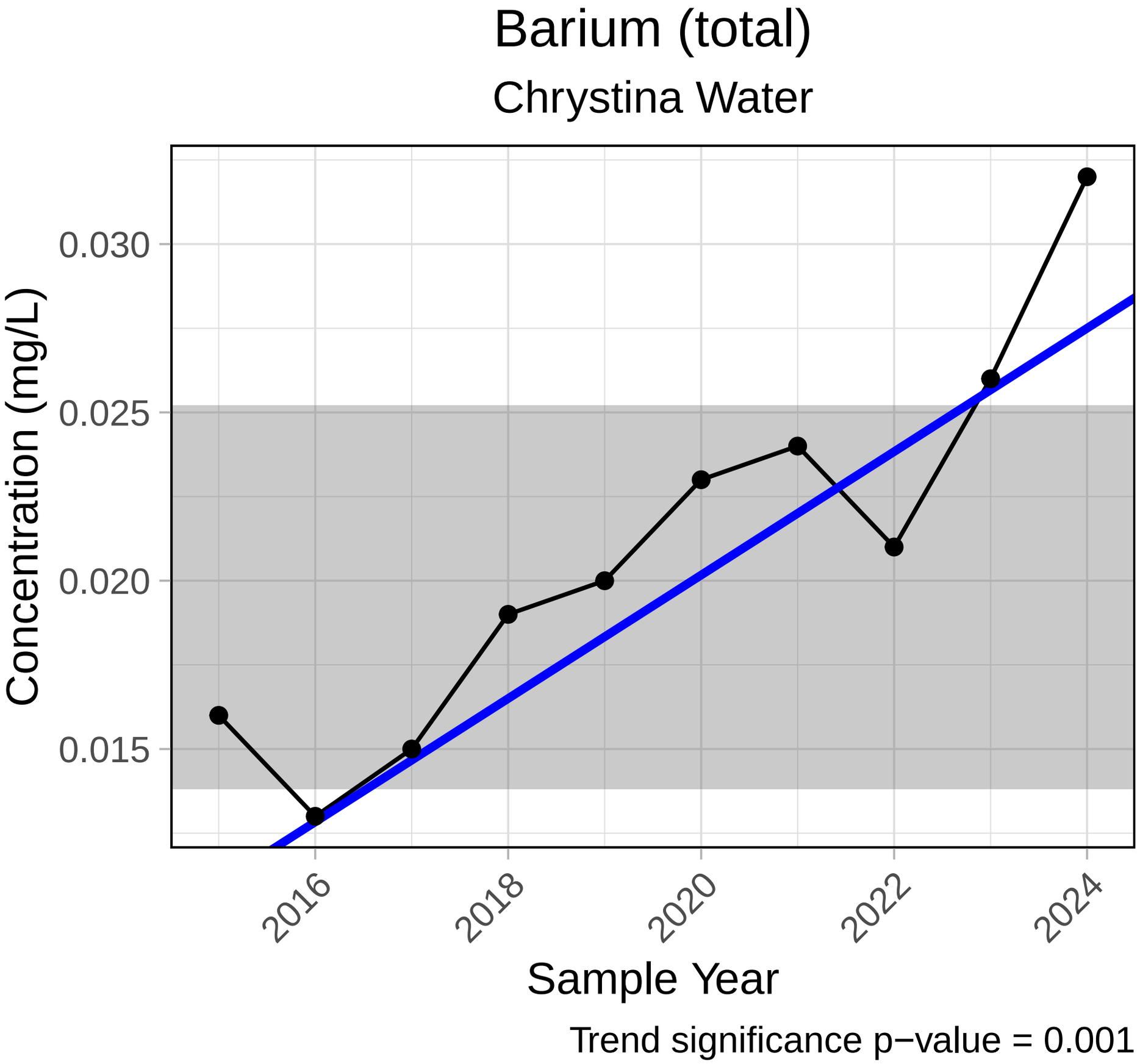
[1] Asterisks indicate level of significance: *** = $p < 0.01$; ** = $p < 0.05$; * = $p < 0.1$.

Appendix 3: Trend Analysis Figures


Aluminum (total)
Chrystina Water
0.0275
0.0250
0.0225
0.0200
0.0175
0.0150
Concentration (mg/L)
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.784

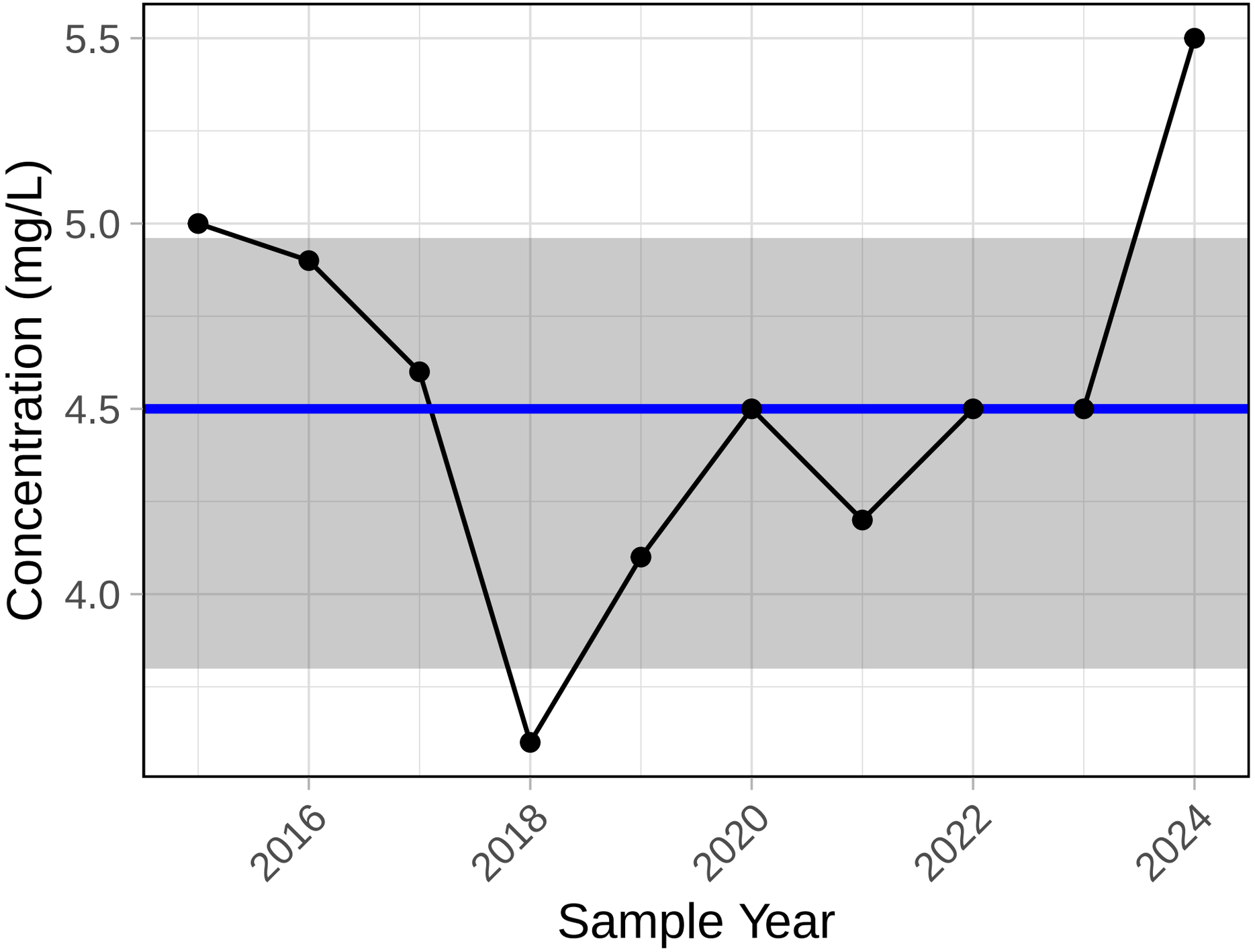


Trend significance p−value = 0.318
Chronic level = 0.005 mg/L (maximum)


Barium (total)
Chrystina Water
Concentration (mg/L)
0.030
0.025
0.020
0.015
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.001

Calcium (total)

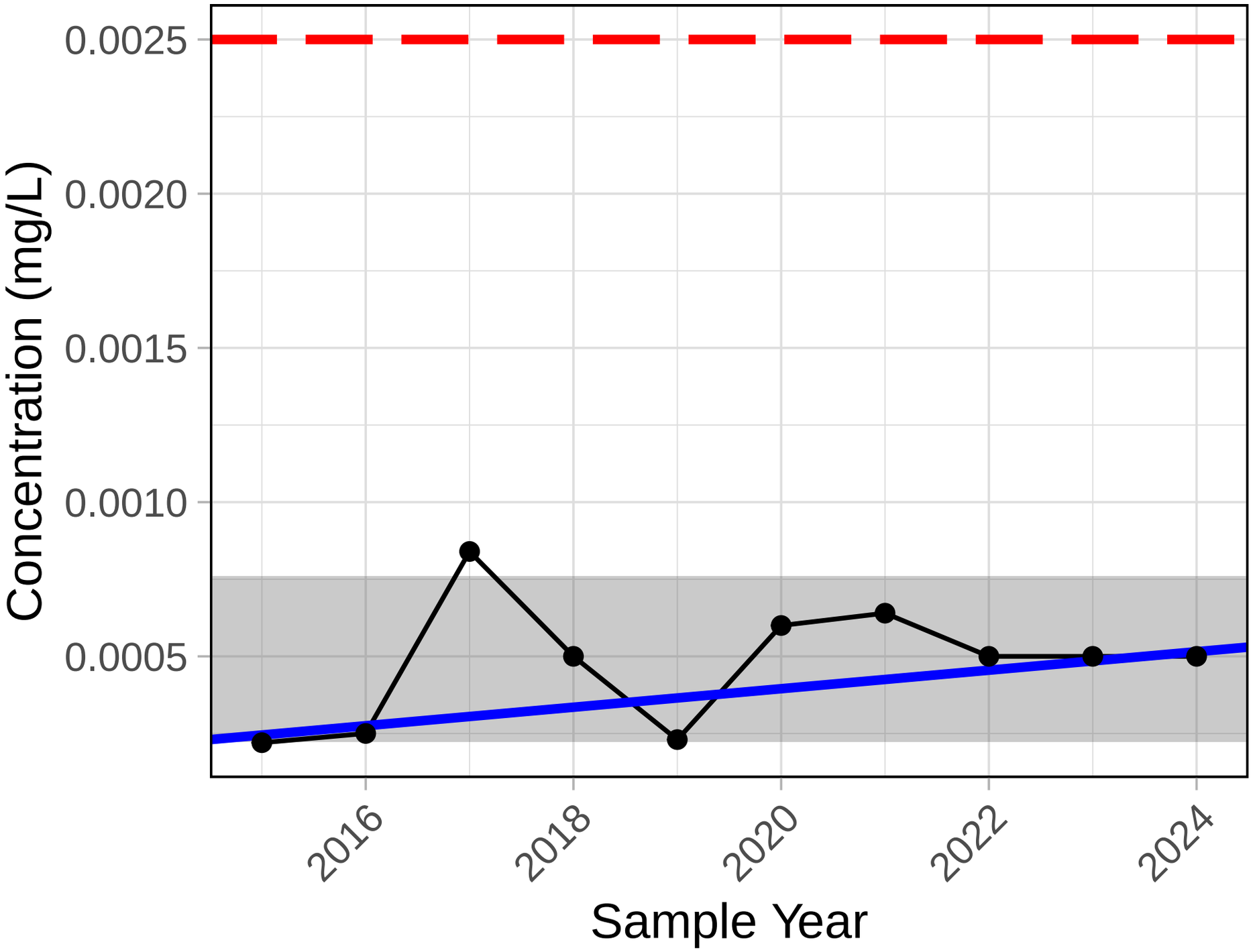
Chrystina Water



Trend significance p−value = 0.928

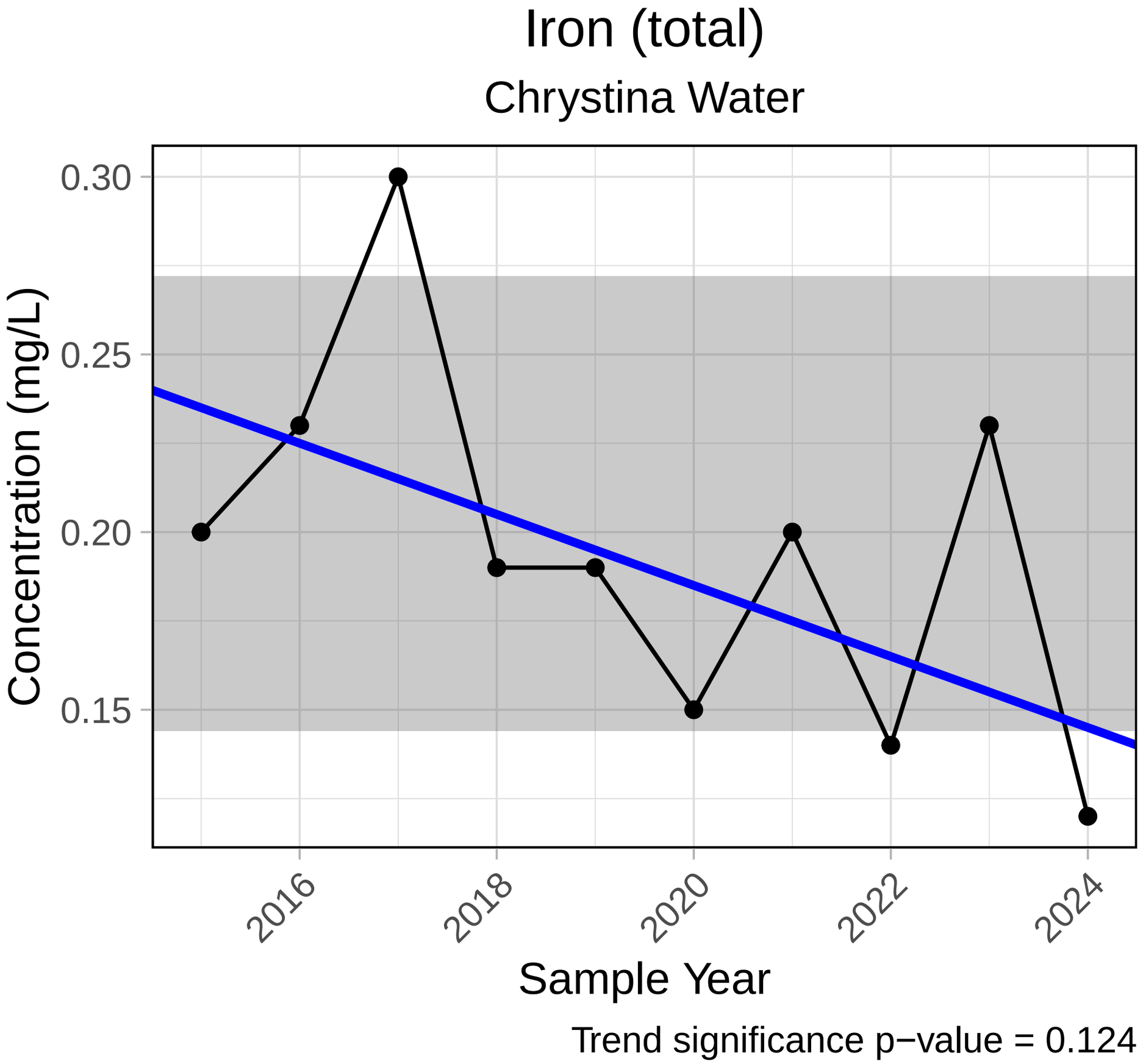
Copper (total)

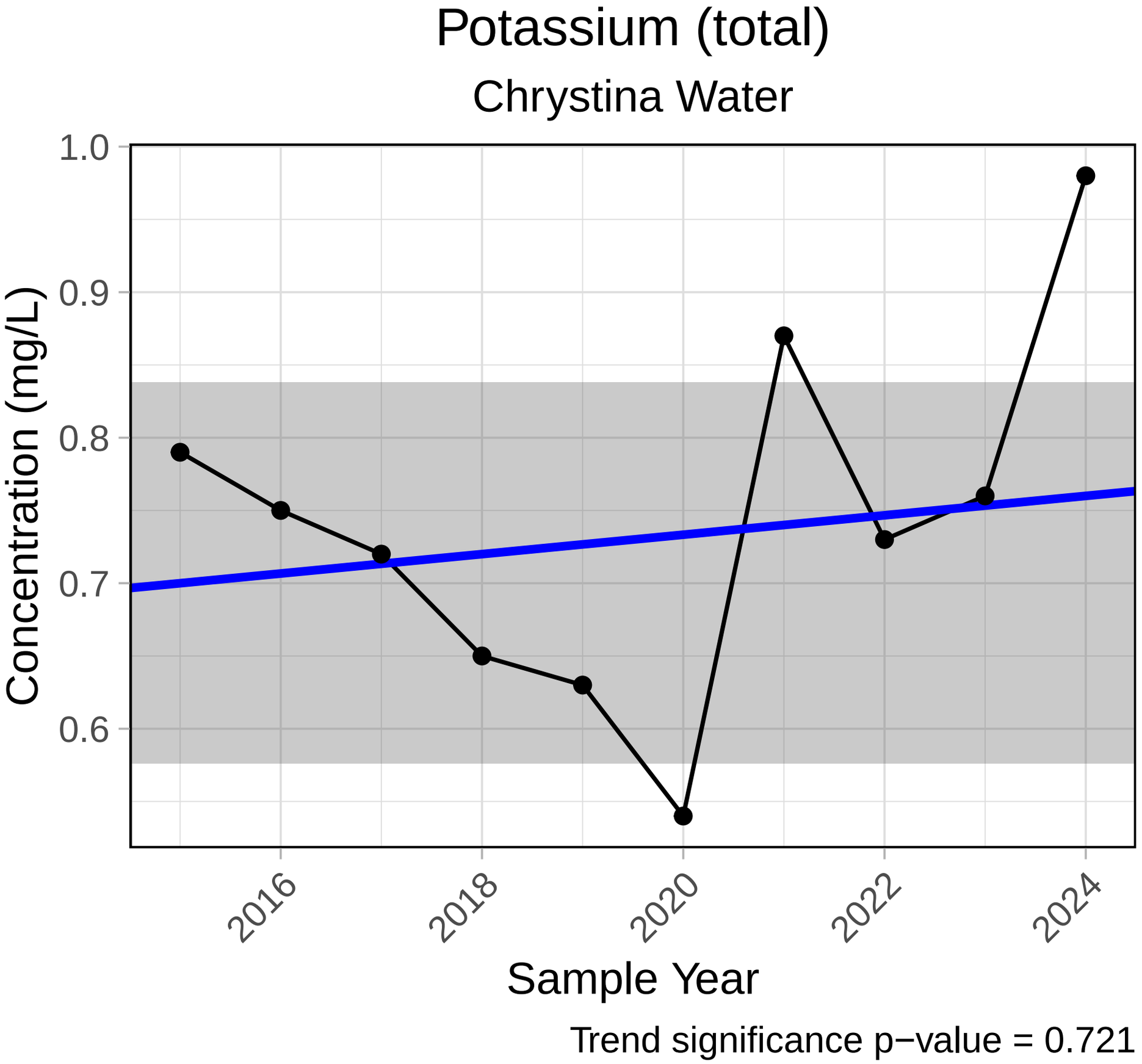
Chrystina Water

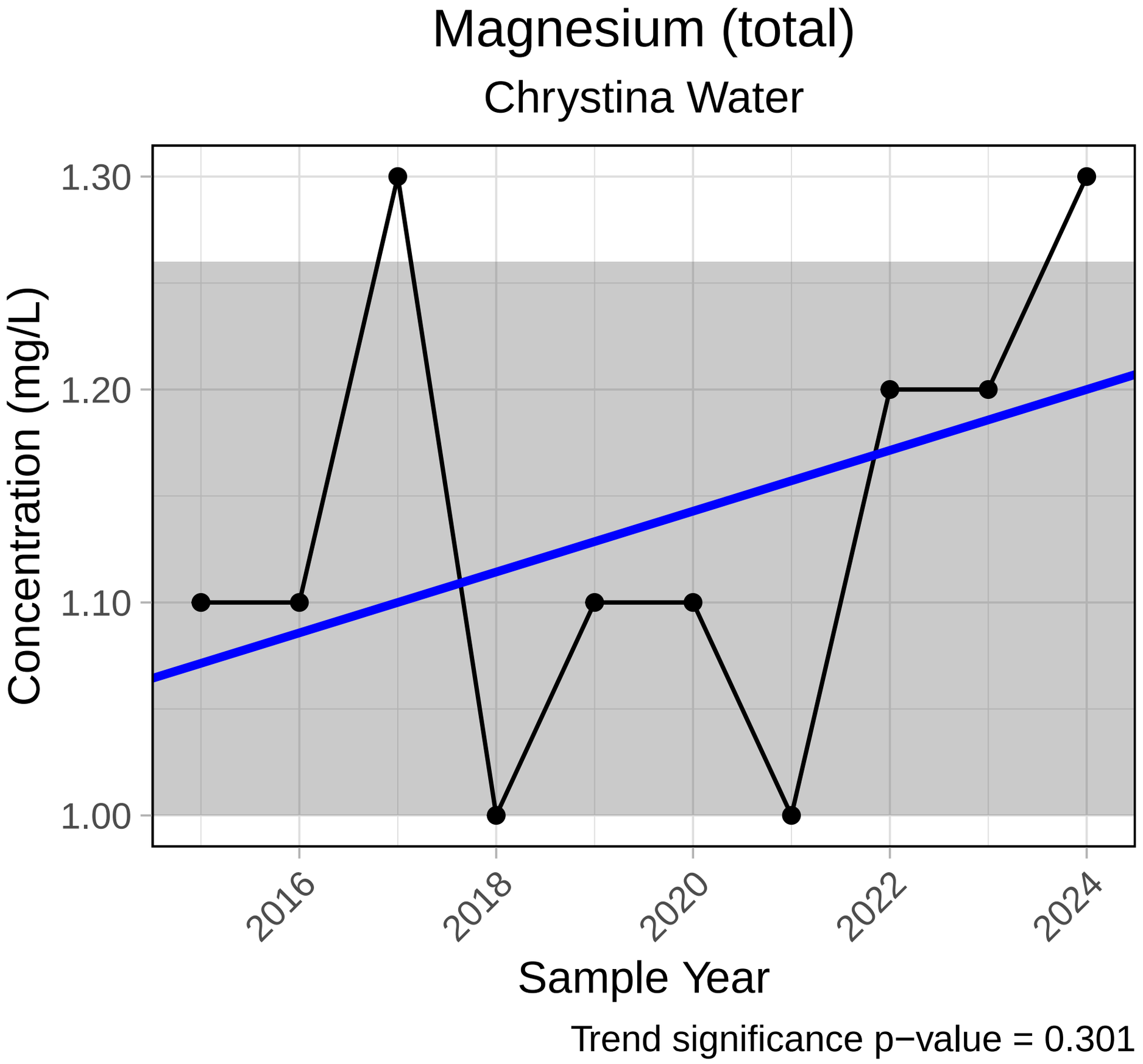


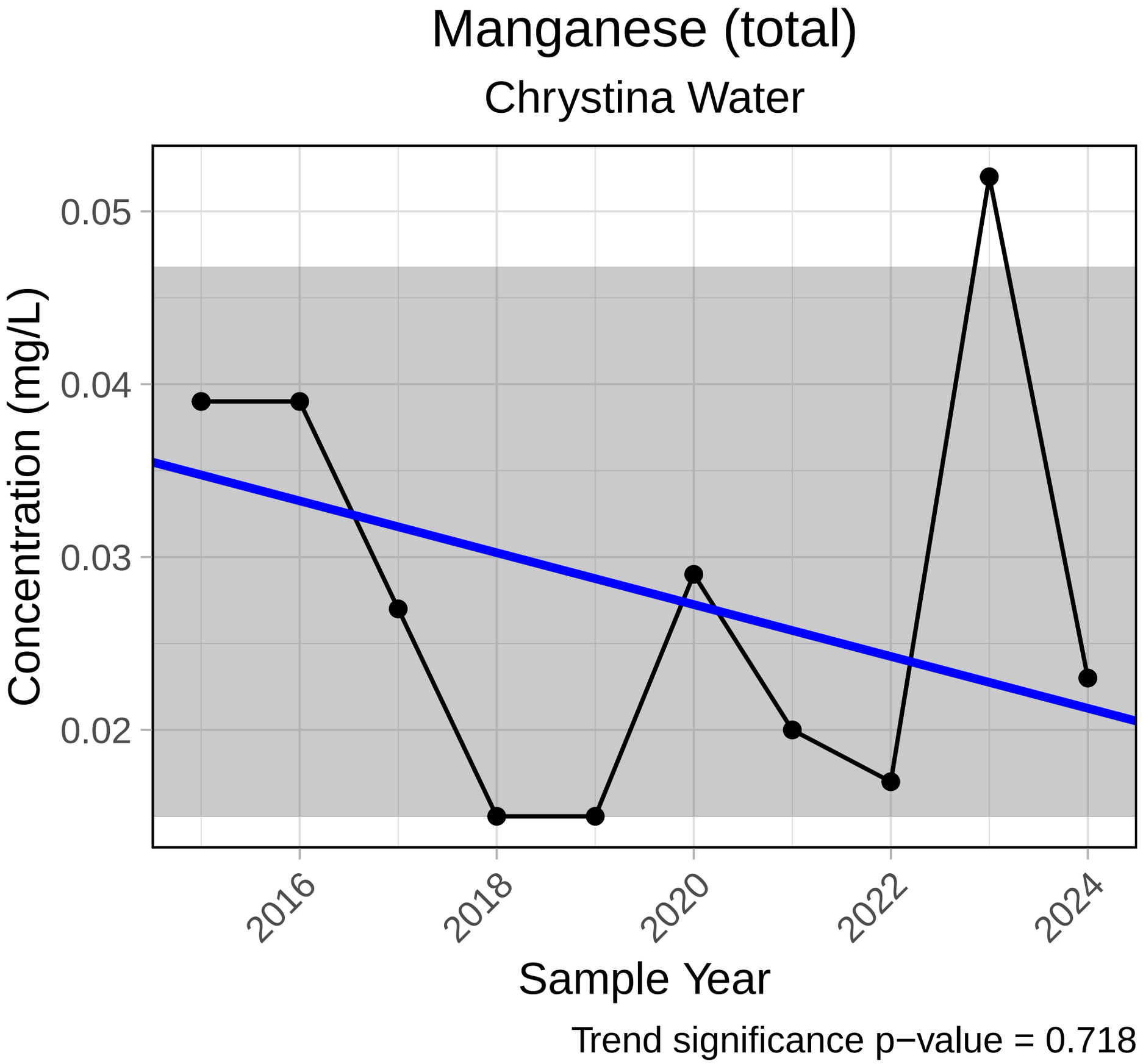
Trend significance p−value = 0.458

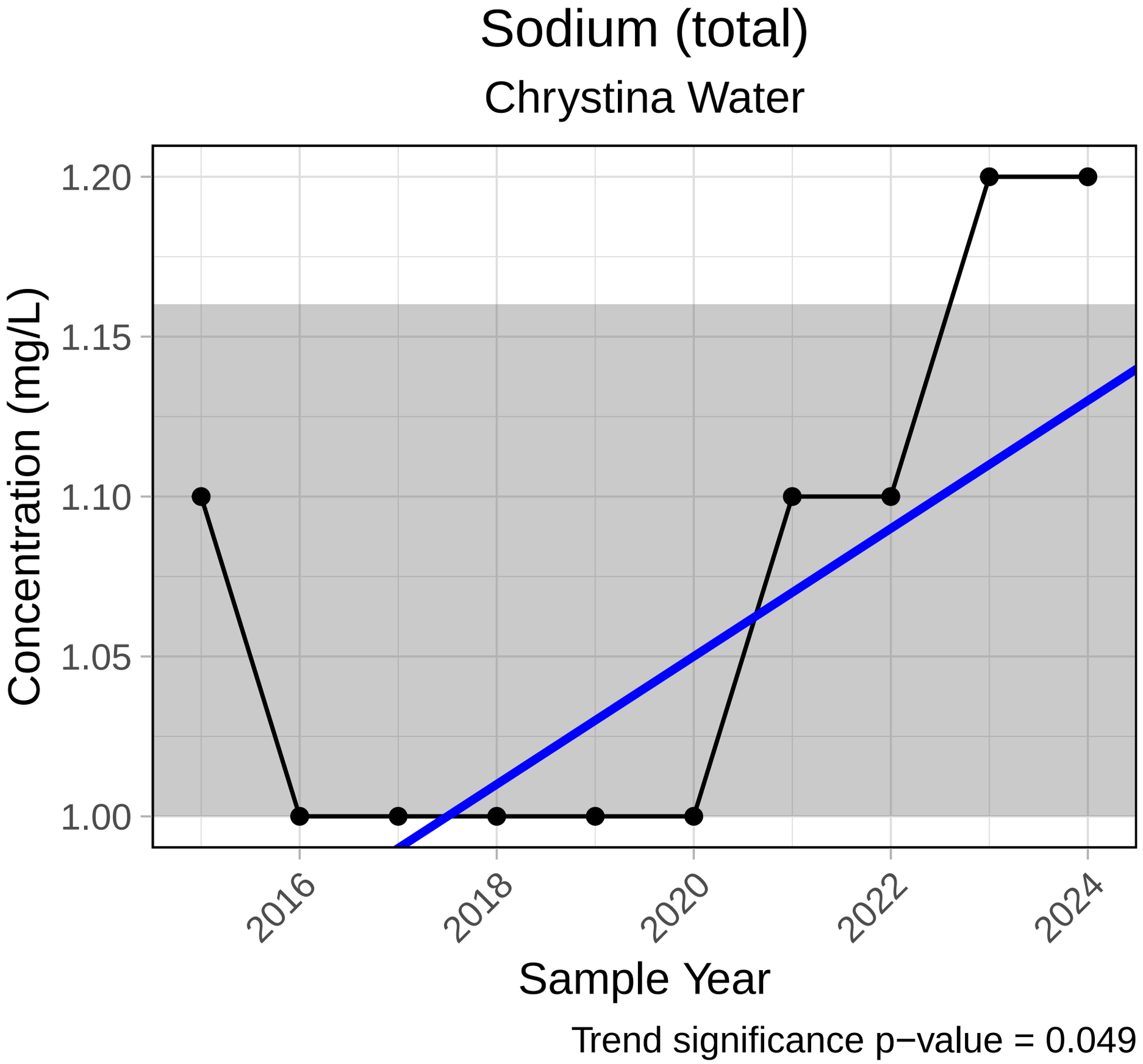
Acute level = 0.0025 mg/L

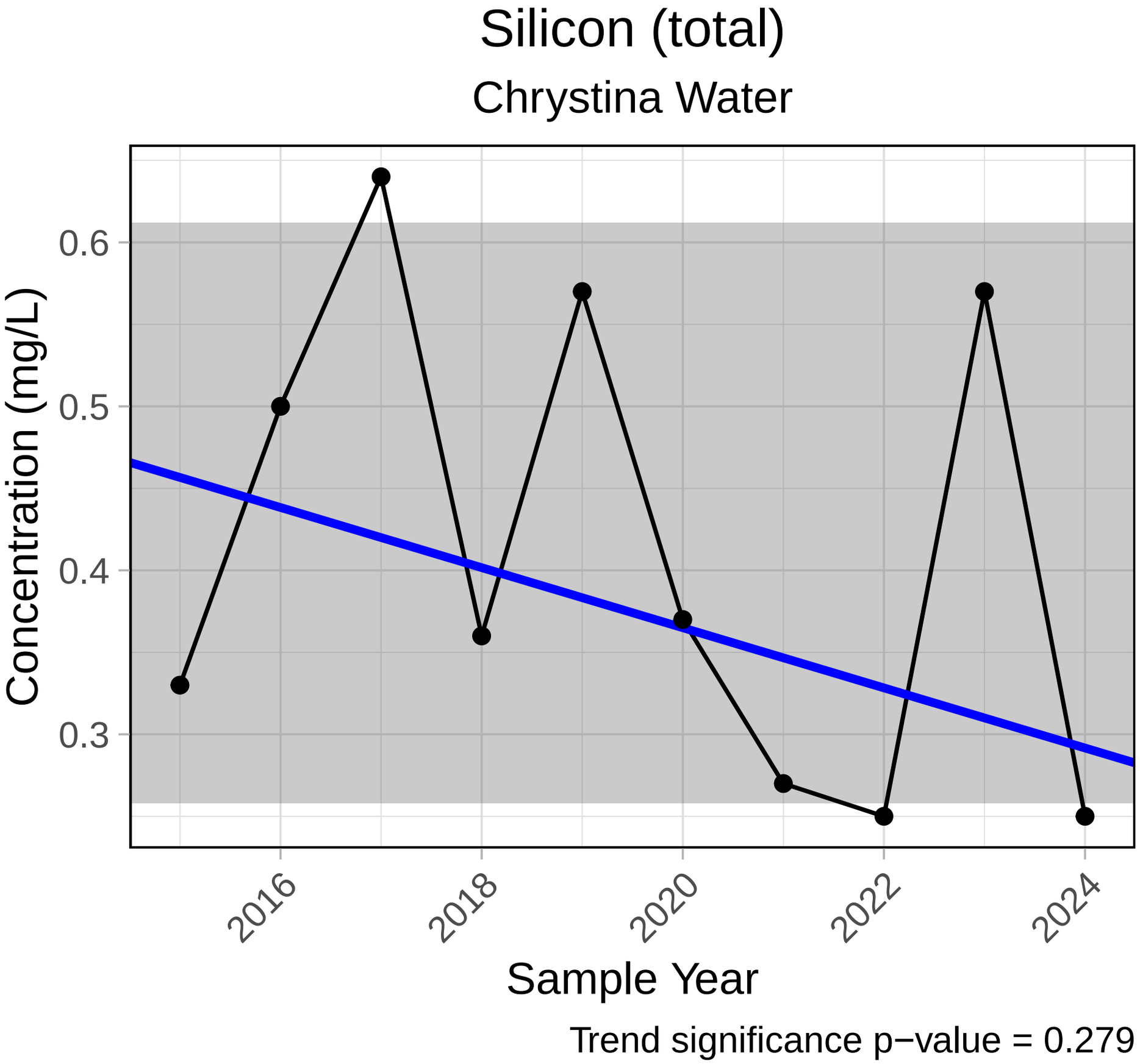

Iron (total)
Chrystina Water
0.30
0.25
0.20
0.15
Concentration (mg/L)
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.124

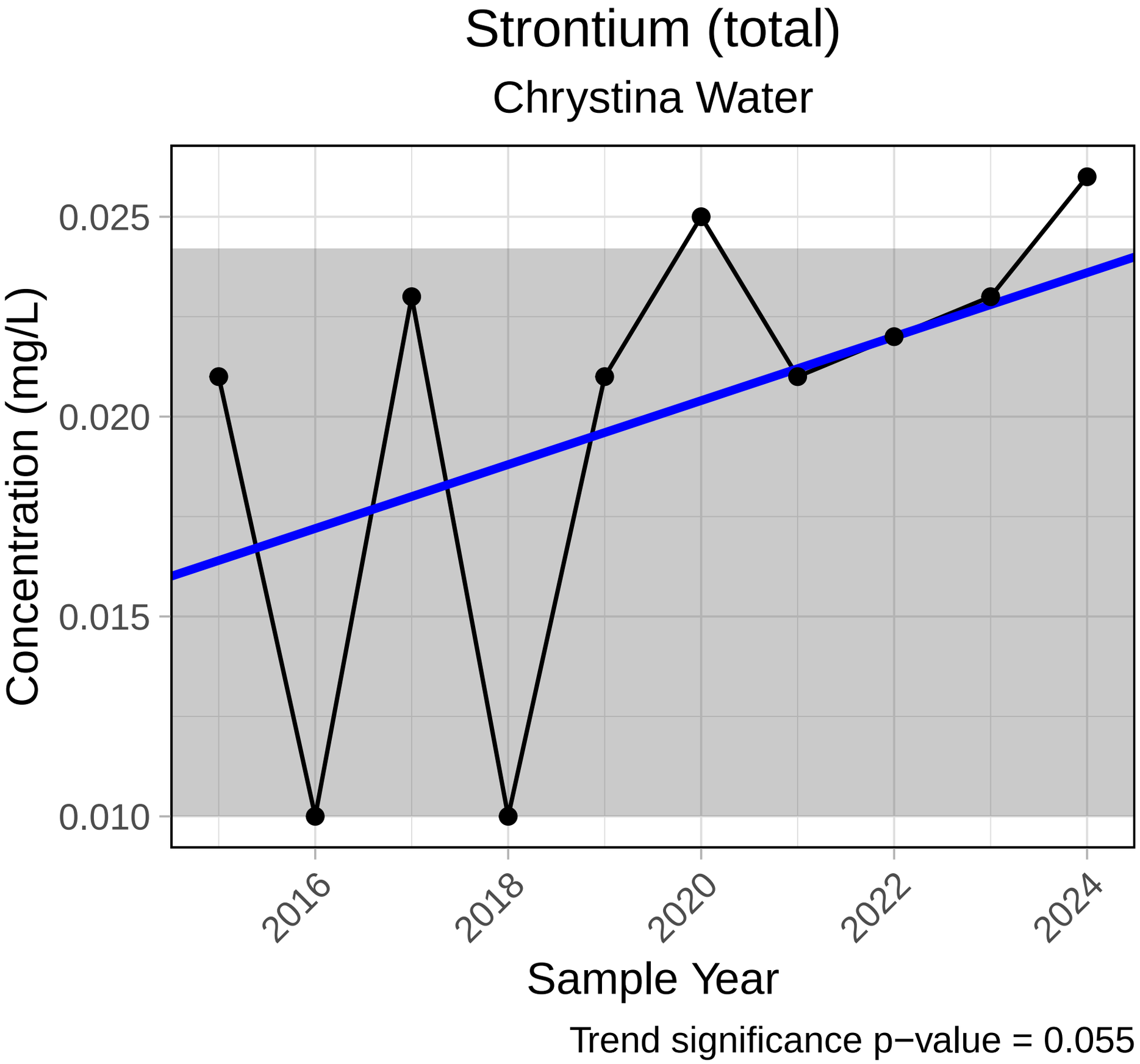

Potassium (total)
Chrystina Water
1.0
0.9
0.8
0.7
0.6
Concentration (mg/L)
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.721


Magnesium (total)
Chrystina Water
Concentration (mg/L)
1.30
1.20
1.10
1.00
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.301


Manganese (total)
Chrystina Water
Concentration (mg/L)
0.05
0.04
0.03
0.02
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.718

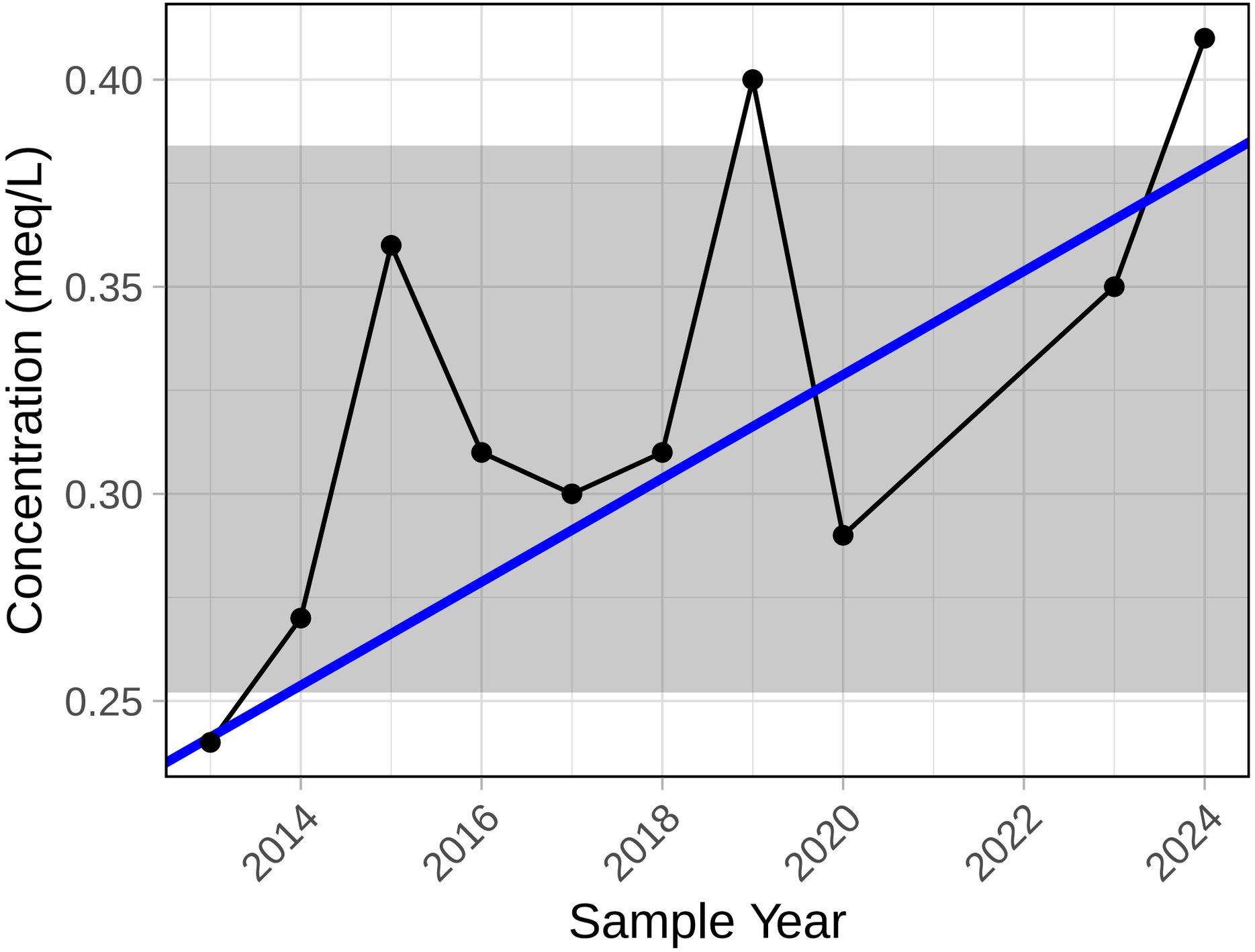

Sodium (total)
Chrystina Water
Concentration (mg/L)
1.20
1.15
1.10
1.05
1.00
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.049


Silicon (total)
Chrystina Water
Concentration (mg/L)
0.6
0.5
0.4
0.3
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.279

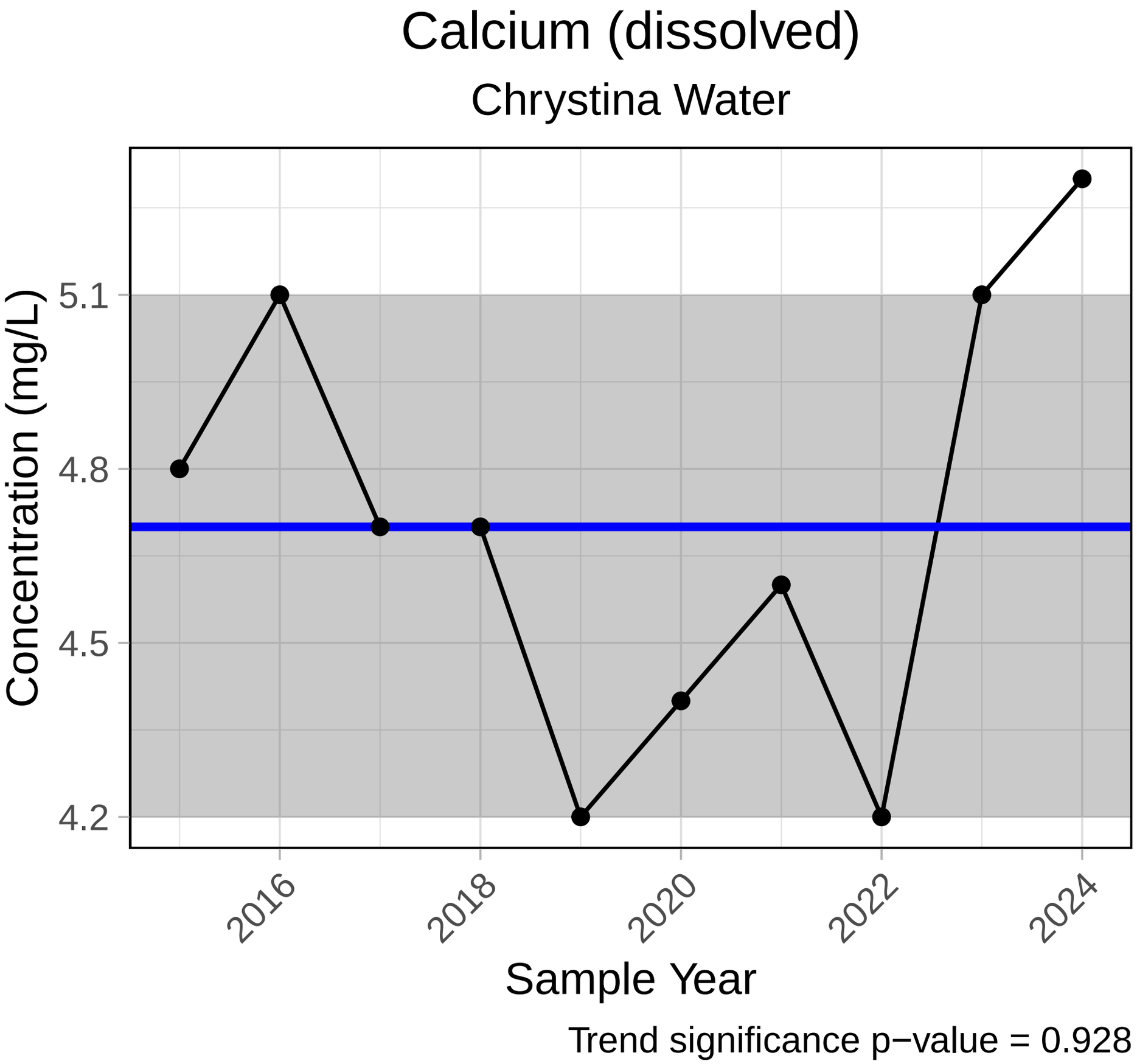

Strontium (total)
Chrystina Water
Concentration (mg/L)
0.025
0.020
0.015
0.010
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.055

Anion Sum

Chrystina Water

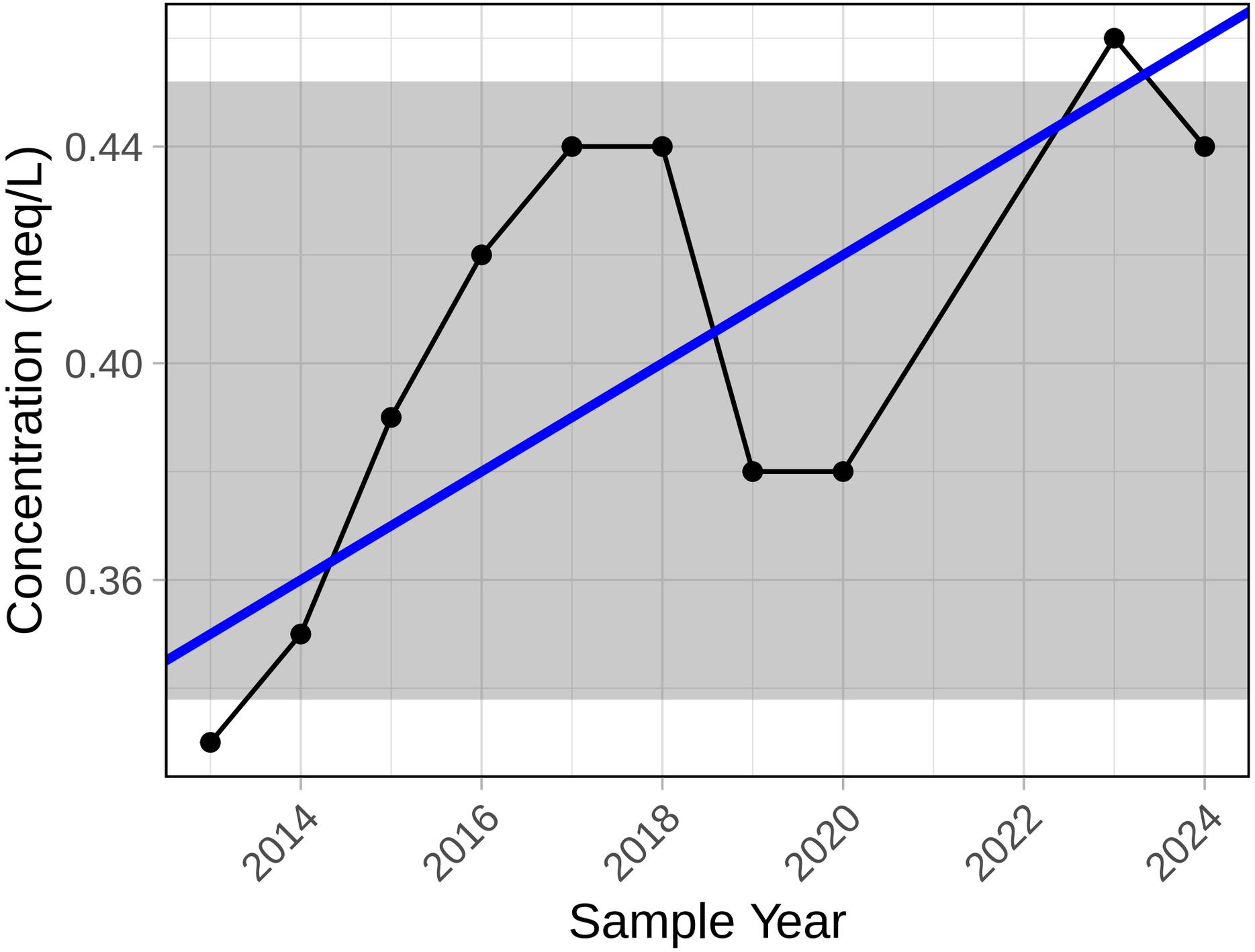


Trend significance p−value = 0.059

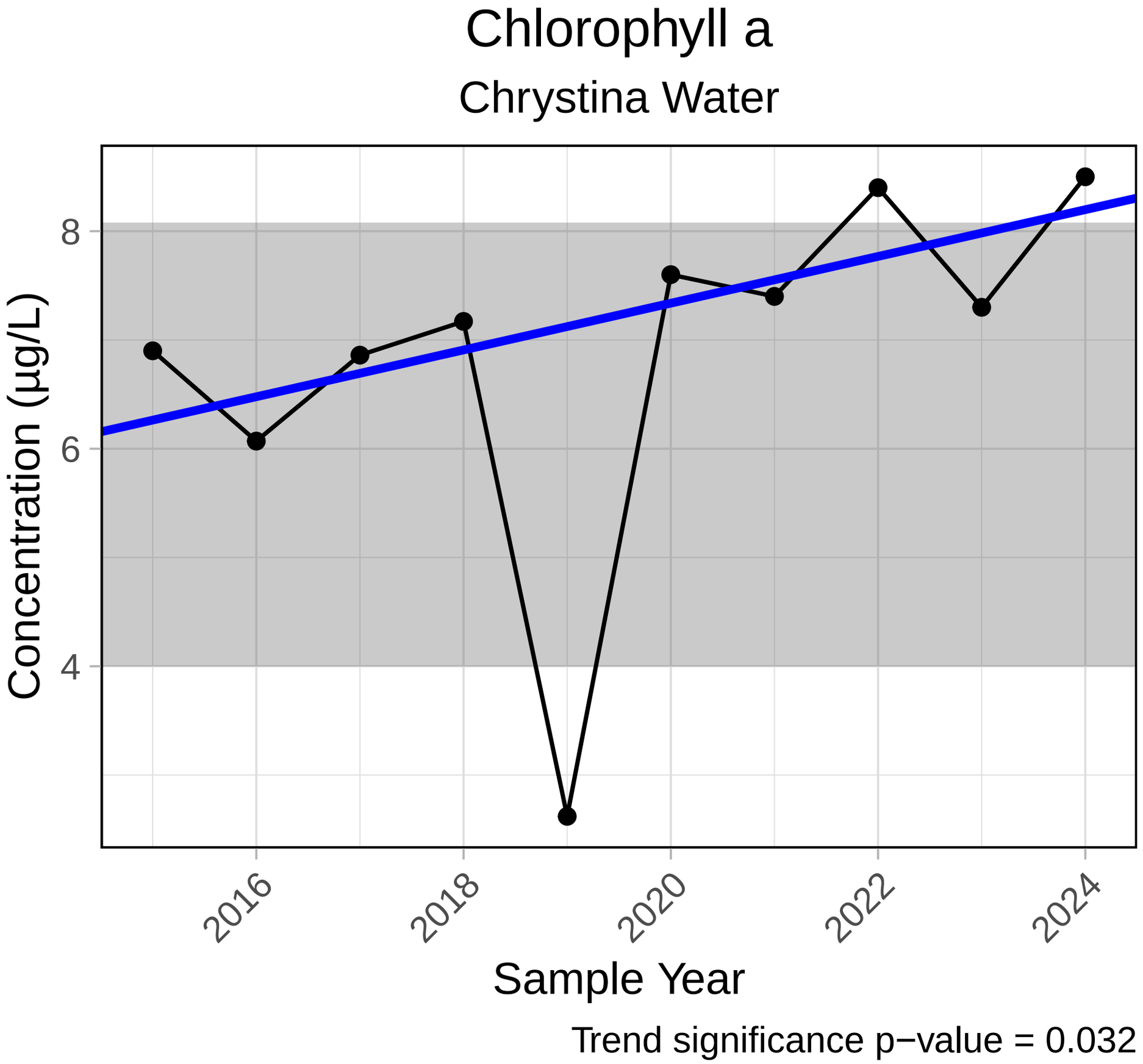

Calcium (dissolved)
Chrystina Water
Concentration (mg/L)
5.1
4.8
4.5
4.2
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.928

Cation Sum

Chrystina Water

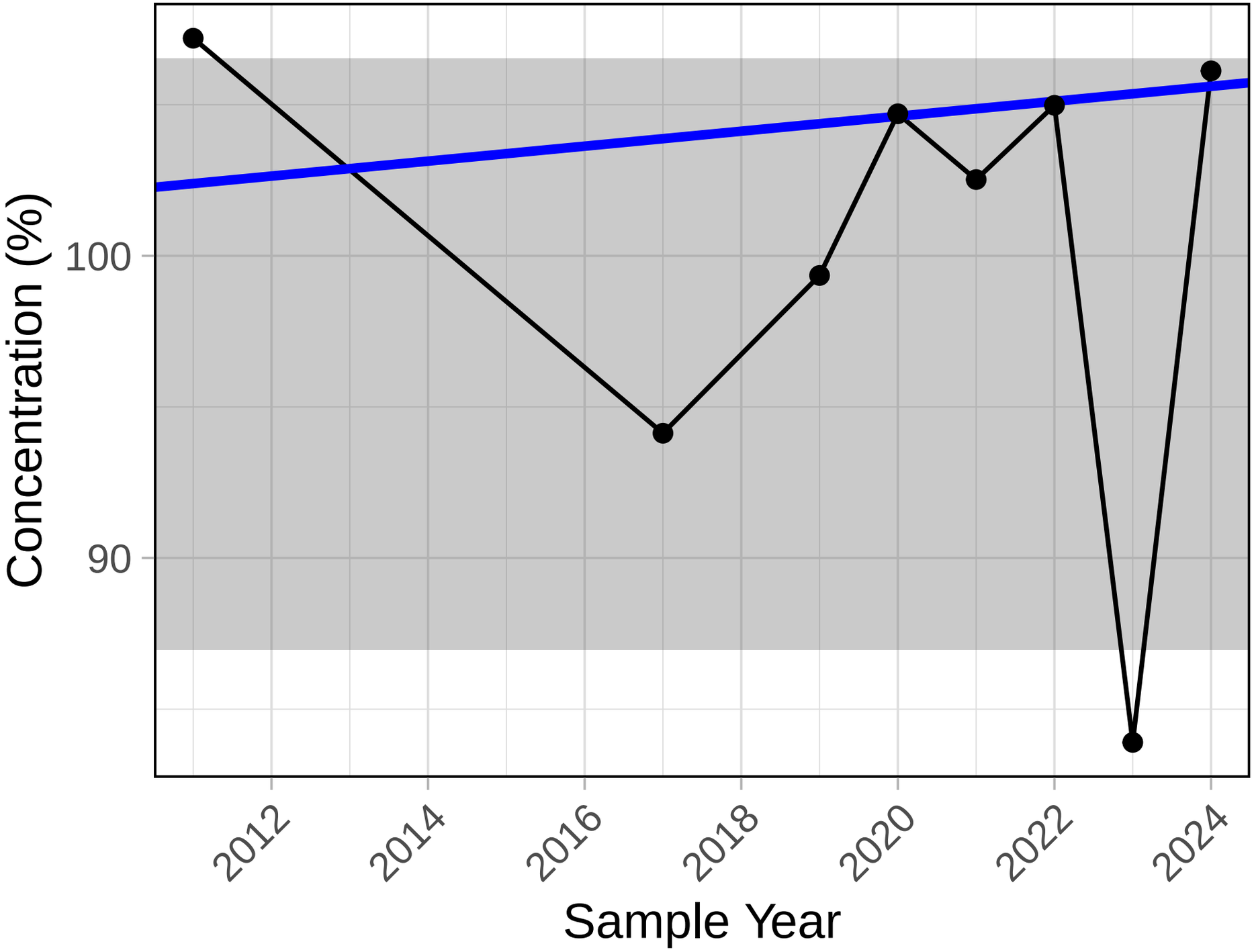


Trend significance p−value = 0.045


Chlorophyll a
Chrystina Water
Concentration (µg/L)
8
6
4
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.032

Dissolved Oxygen %

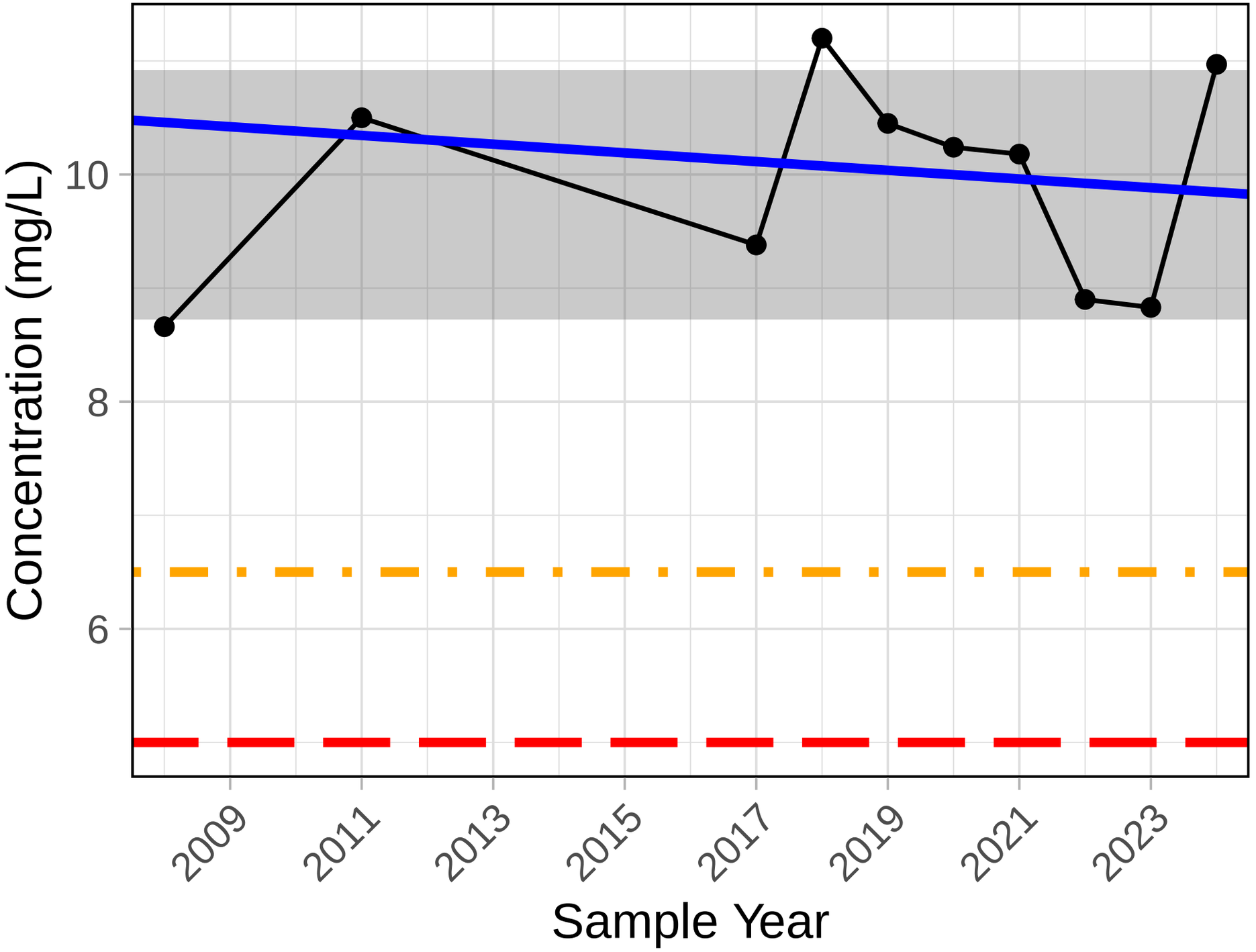
Chrystina Water



Trend significance p−value = 0.902

Dissolved Oxygen

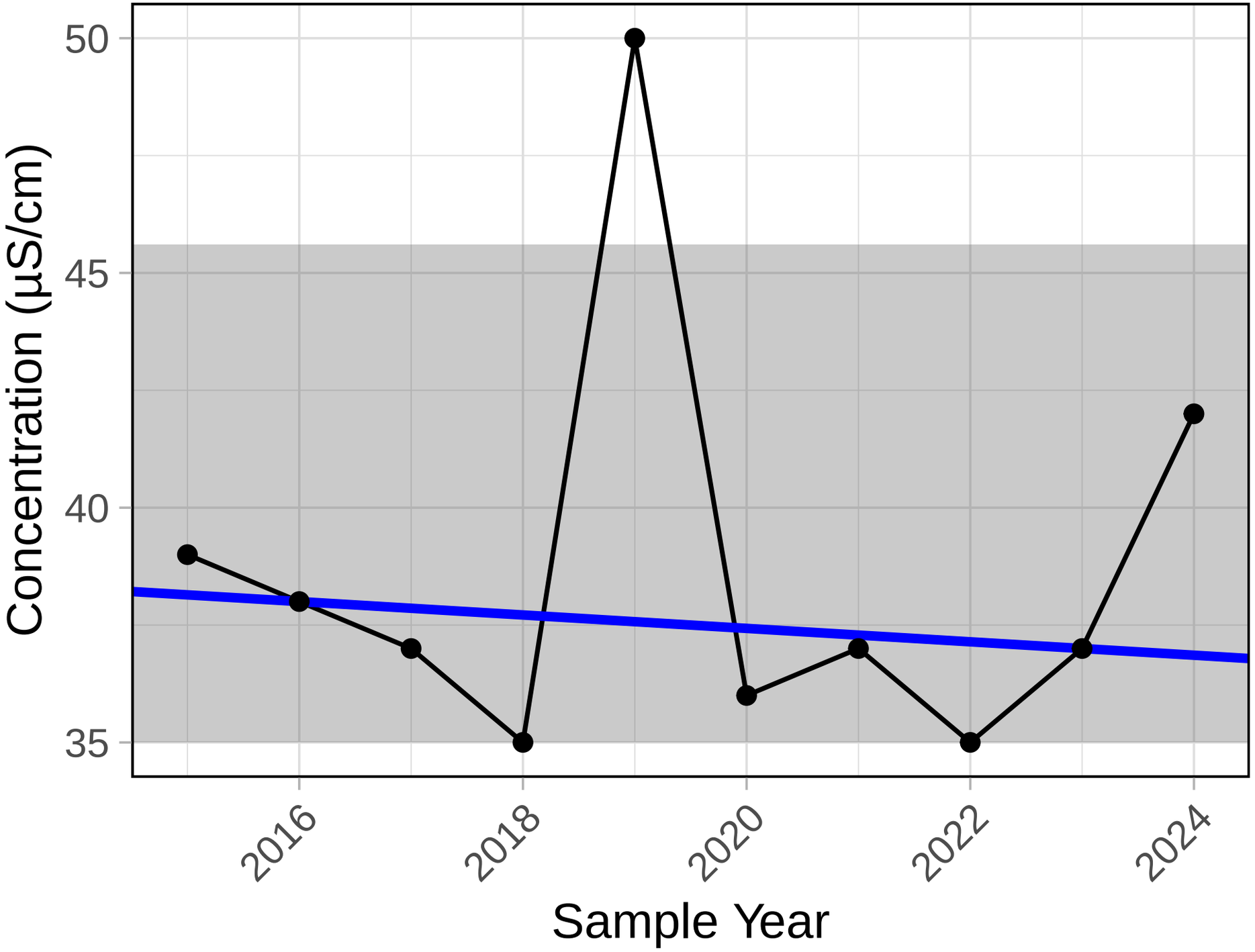
Chrystina Water



Trend significance p−value = 0.858
Chronic level = 6.5 mg/L (minimum)
Acute level = 5 mg/L (minimum)

Electrical Conductivity

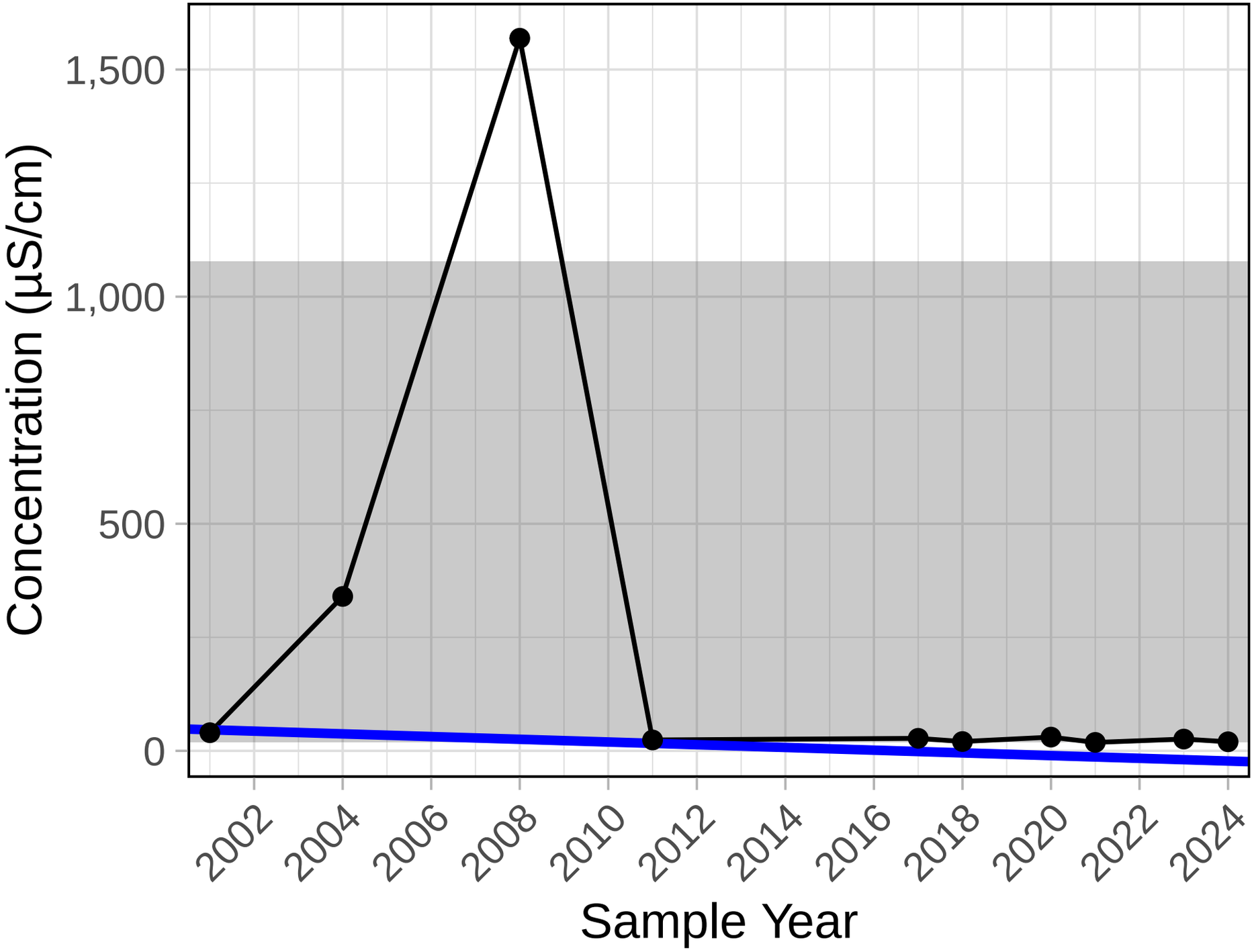
Chrystina Water



Trend significance p−value = 0.715

Electrical Conductivity (Field)

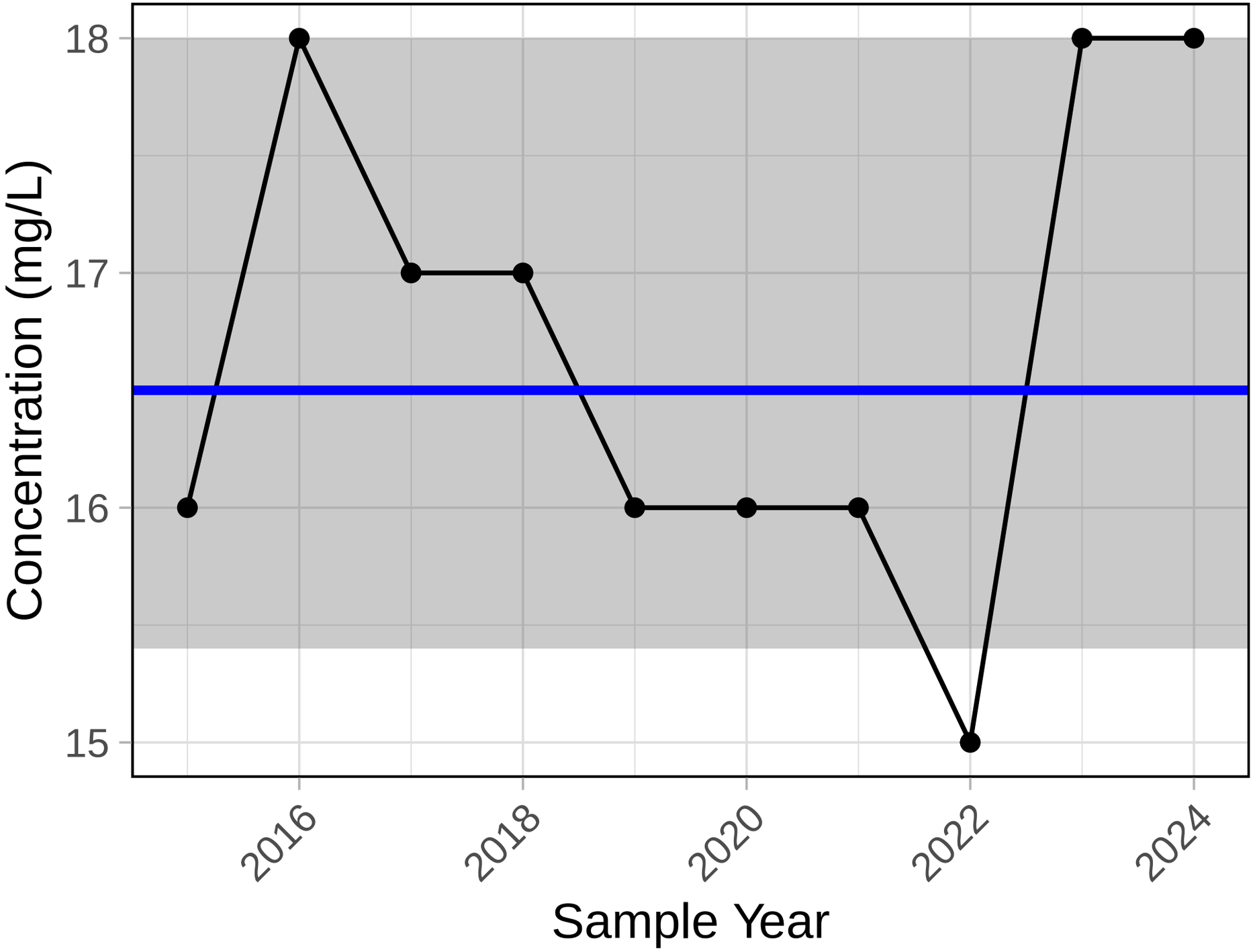
Chrystina Water



Trend significance p−value = 0.049

Hardness

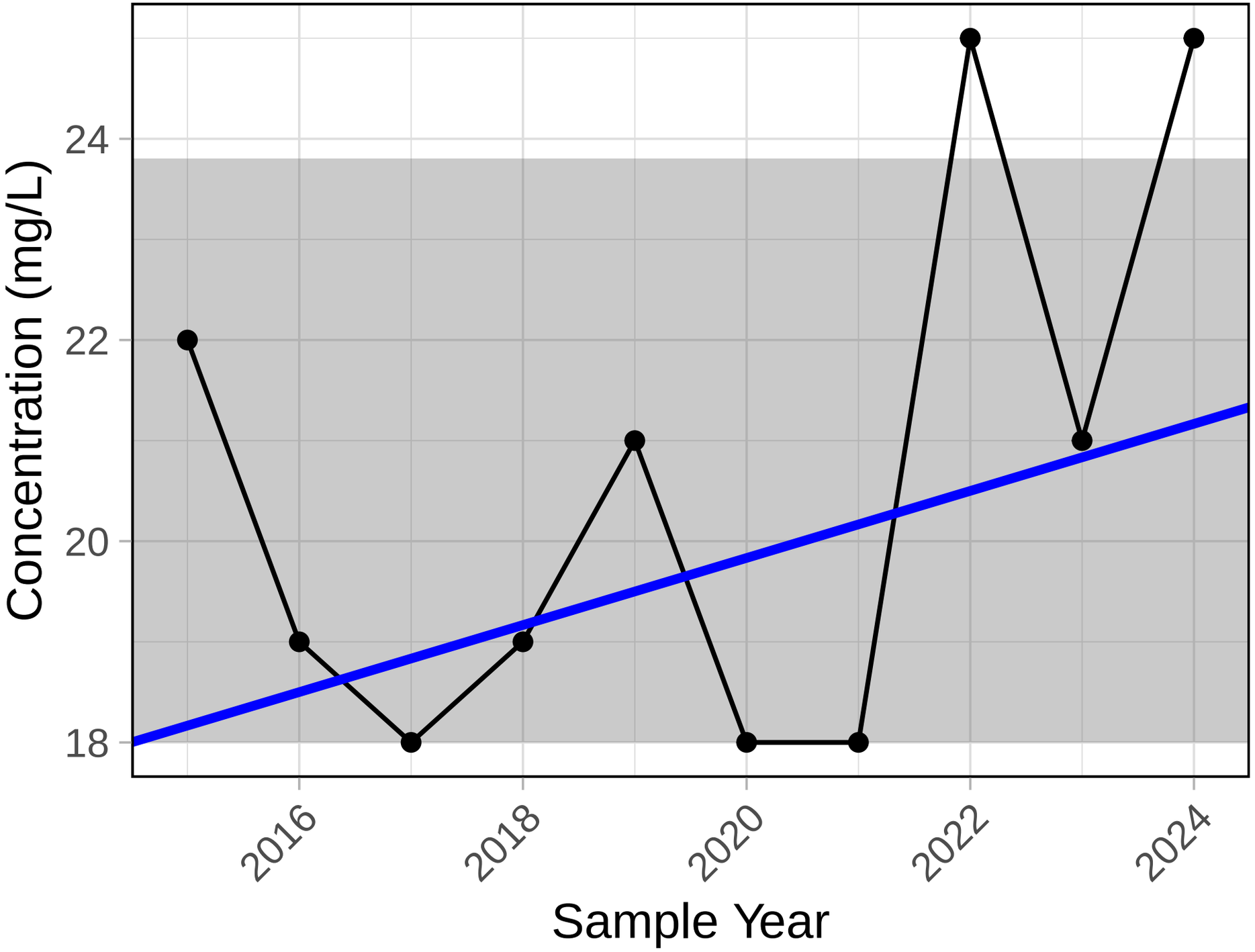
Chrystina Water



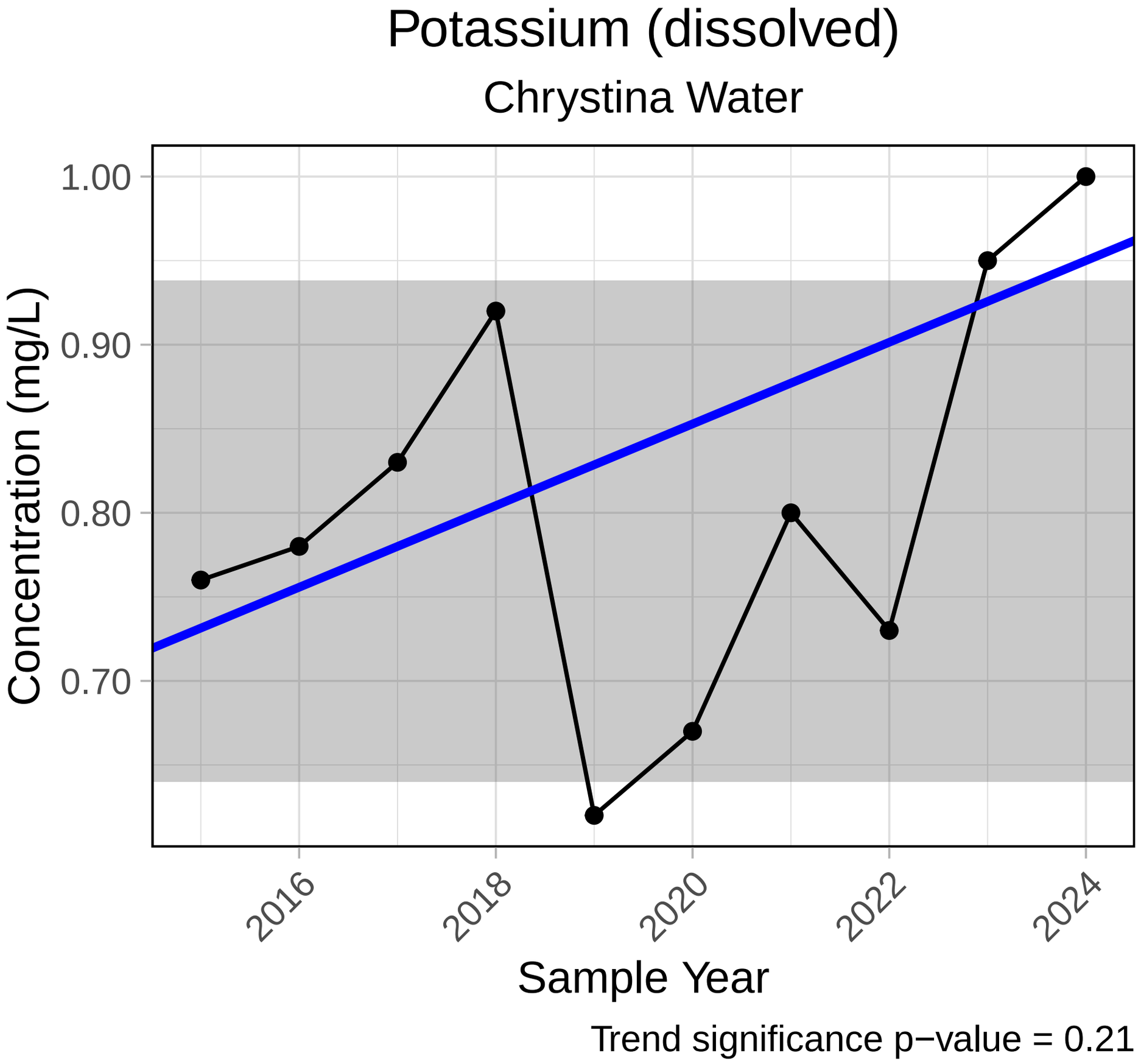
Trend significance p−value = 1

Bicarbonate

Chrystina Water

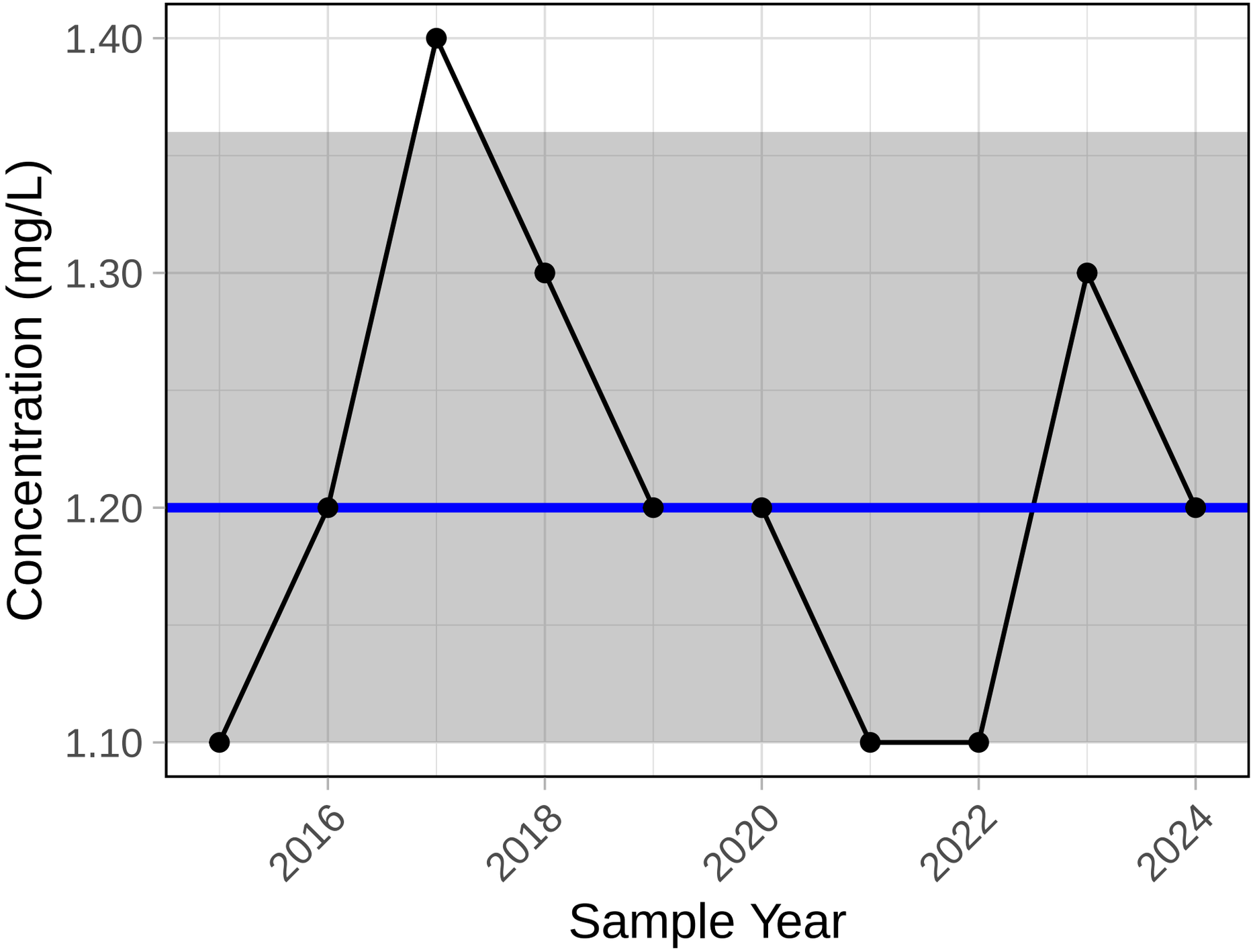


Trend significance p−value = 0.462

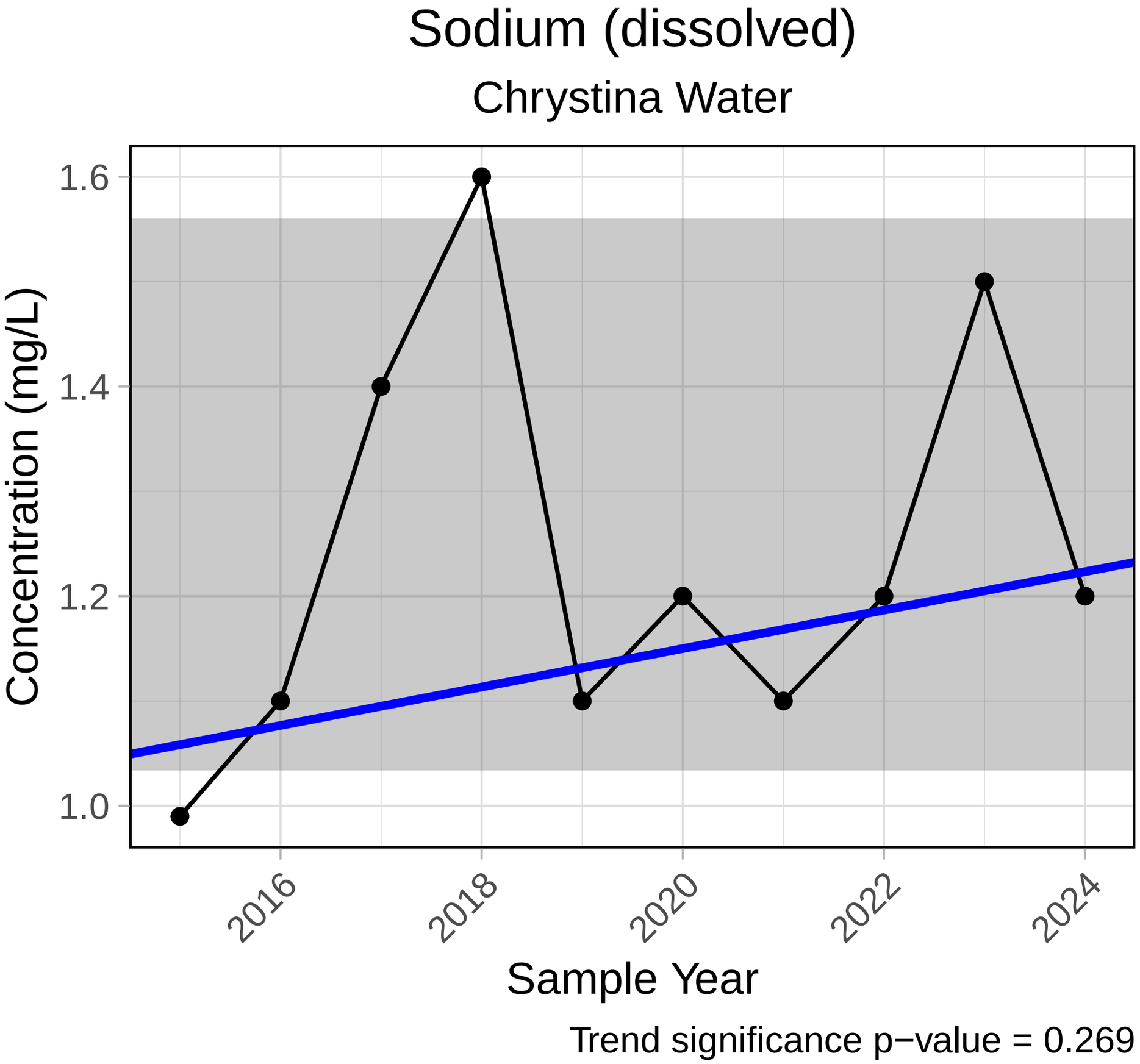

Potassium (dissolved)
Chrystina Water
1.00
0.90
0.80
0.70
Concentration (mg/L)
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.21

Magnesium (dissolved)

Chrystina Water

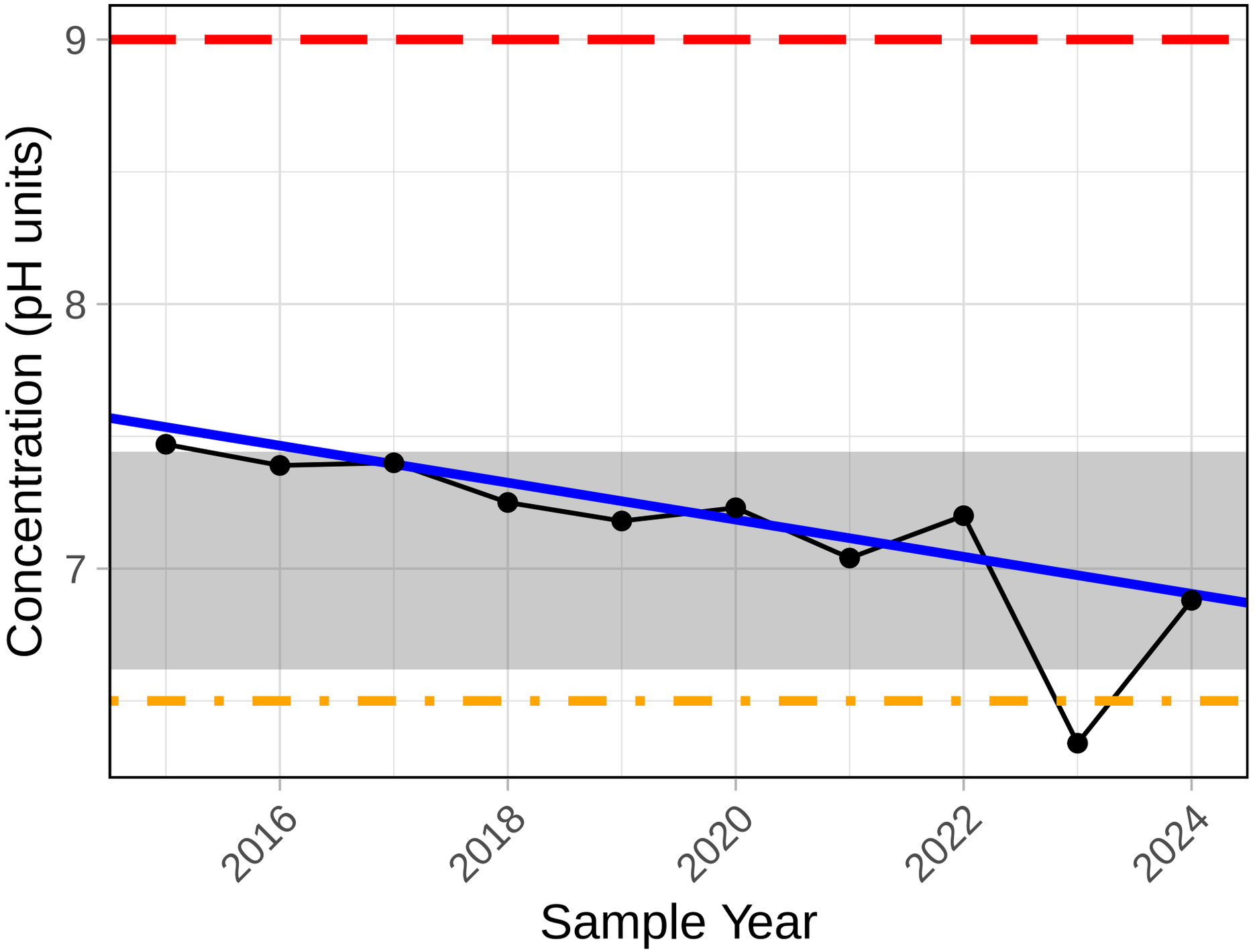


Trend significance p−value = 0.85


Sodium (dissolved)
Chrystina Water
Concentration (mg/L)
1.6
1.4
1.2
1.0
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.269

pH

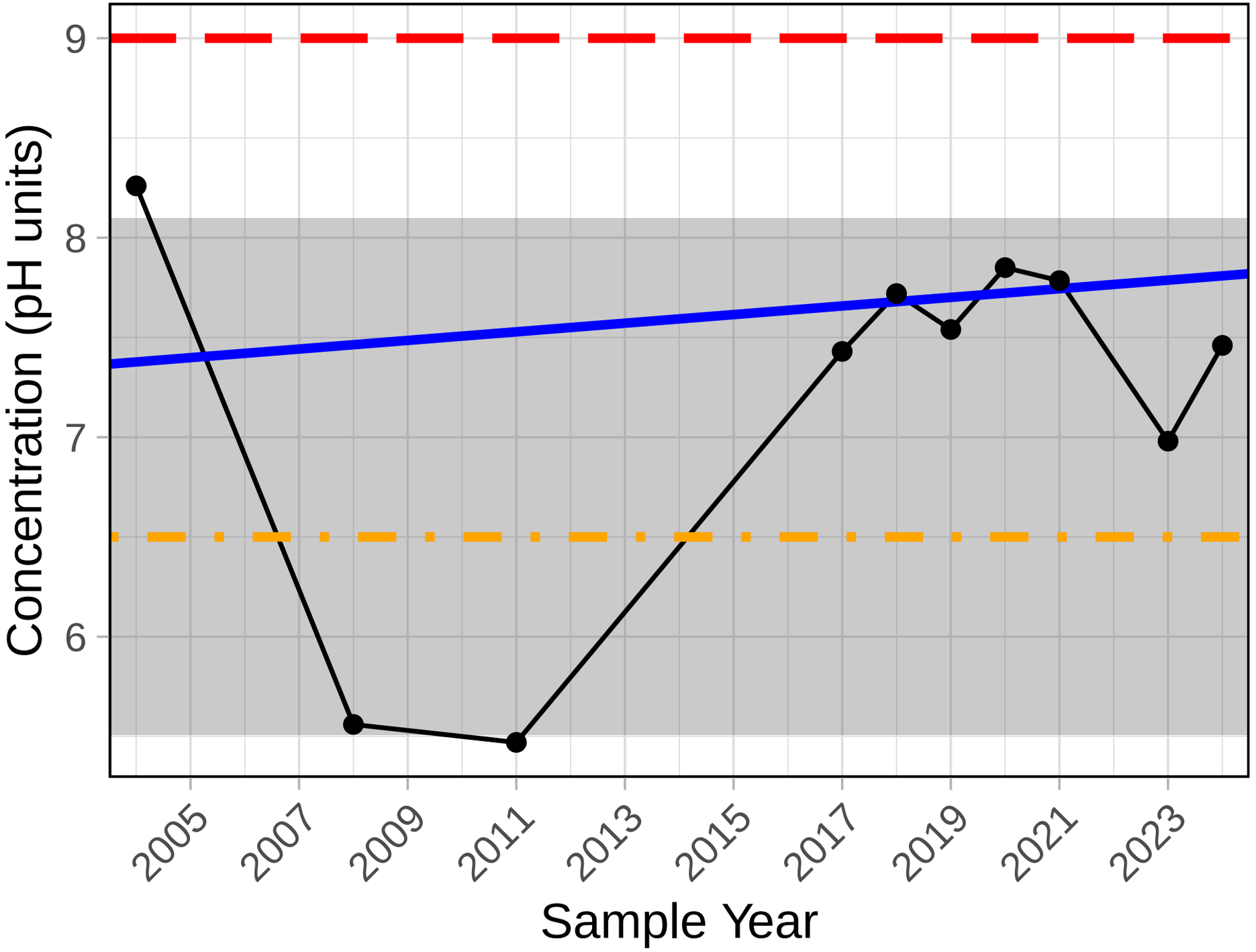
Chrystina Water



Trend significance p−value = 0.002
Chronic level = 6.5 pH units (minimum)
Acute level = 9 pH units (maximum)

pH (Field)

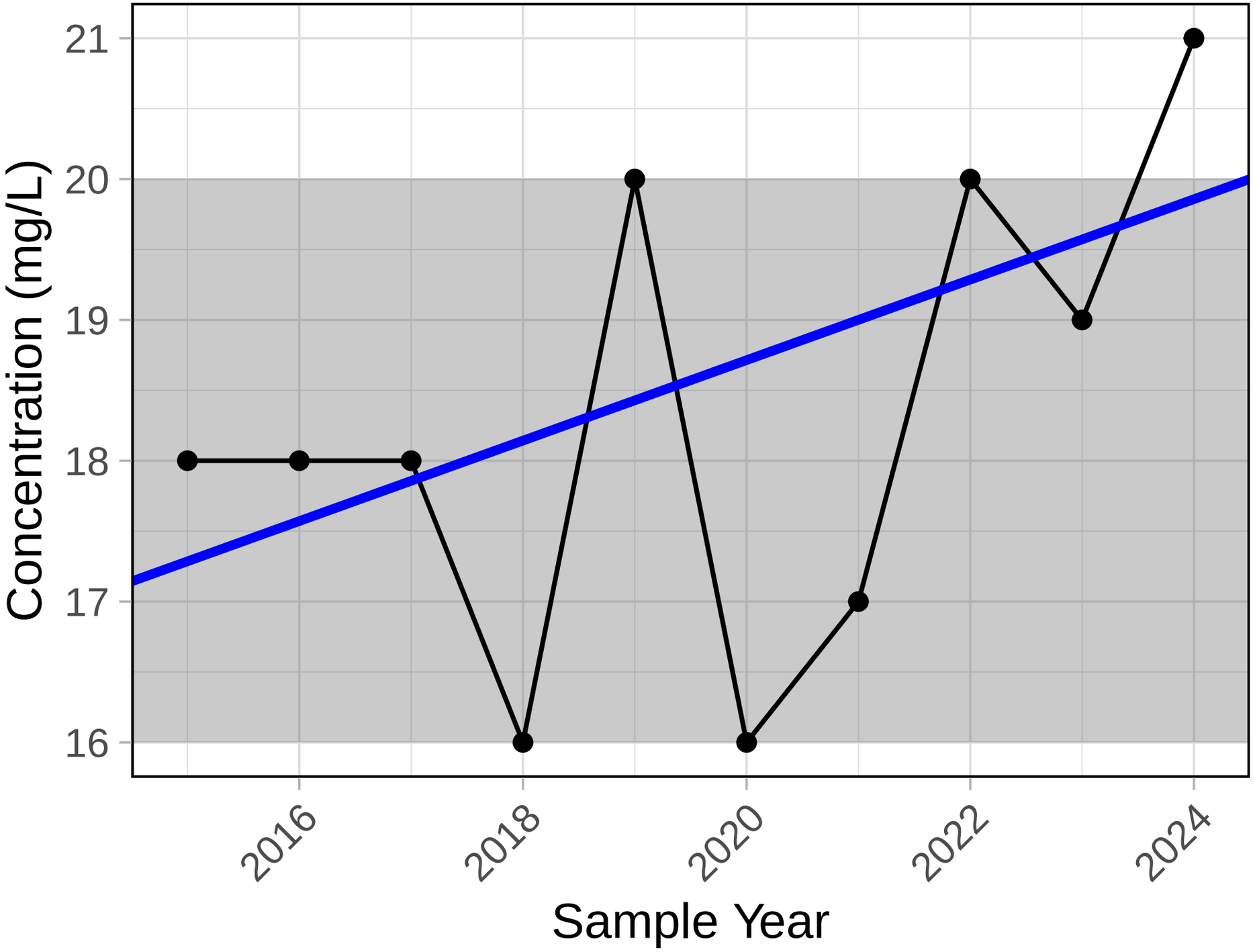
Chrystina Water



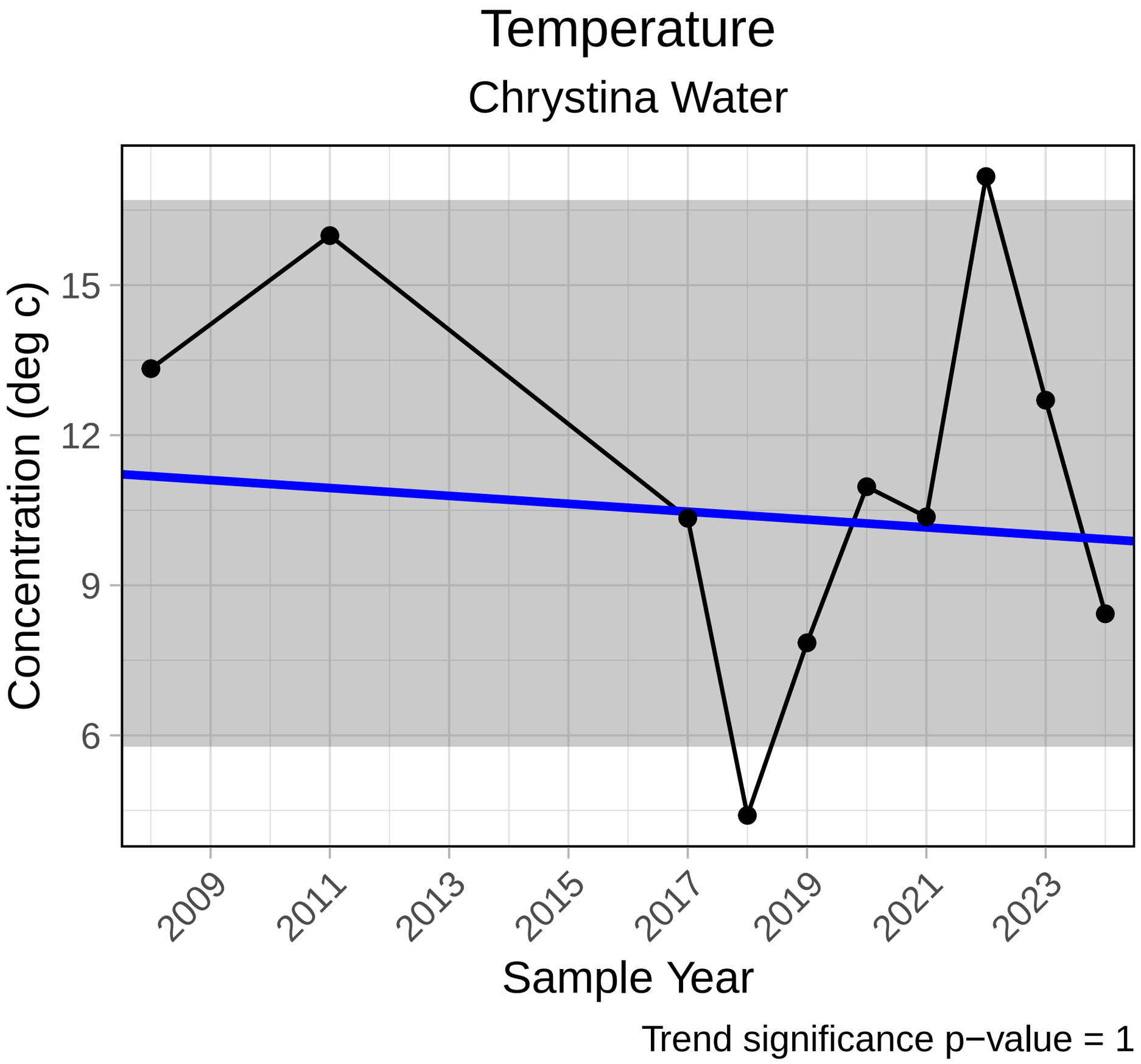
Trend significance p−value = 0.858
Chronic level = 6.5 pH units (minimum)
Acute level = 9 pH units (maximum)

Total Dissolved Solids

Chrystina Water

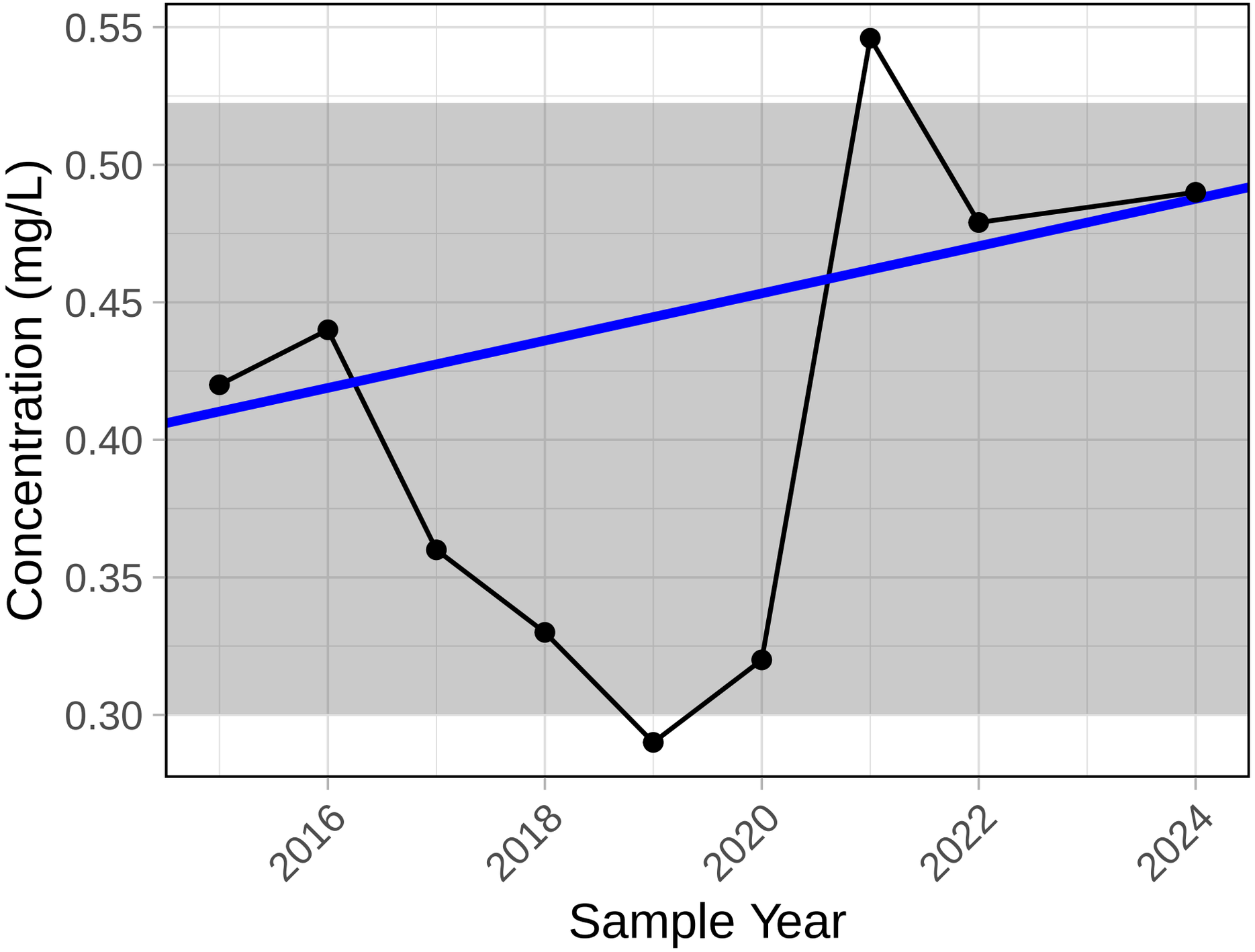


Trend significance p−value = 0.234


Temperature
Chrystina Water
Concentration (deg c)
15
12
9
6
2009
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

Total Kjeldahl Nitrogen

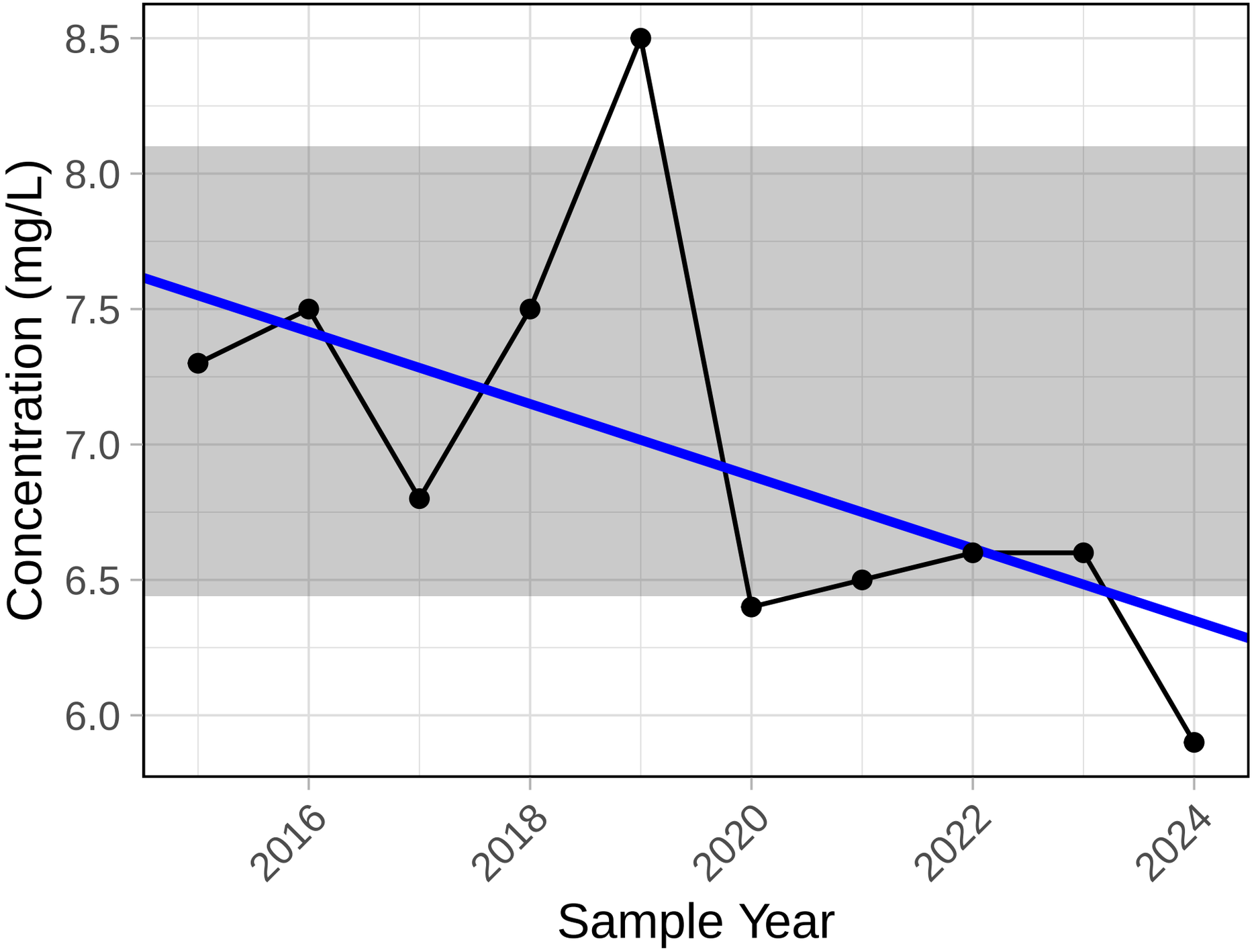
Chrystina Water



Trend significance p−value = 0.602

Total Organic Carbon

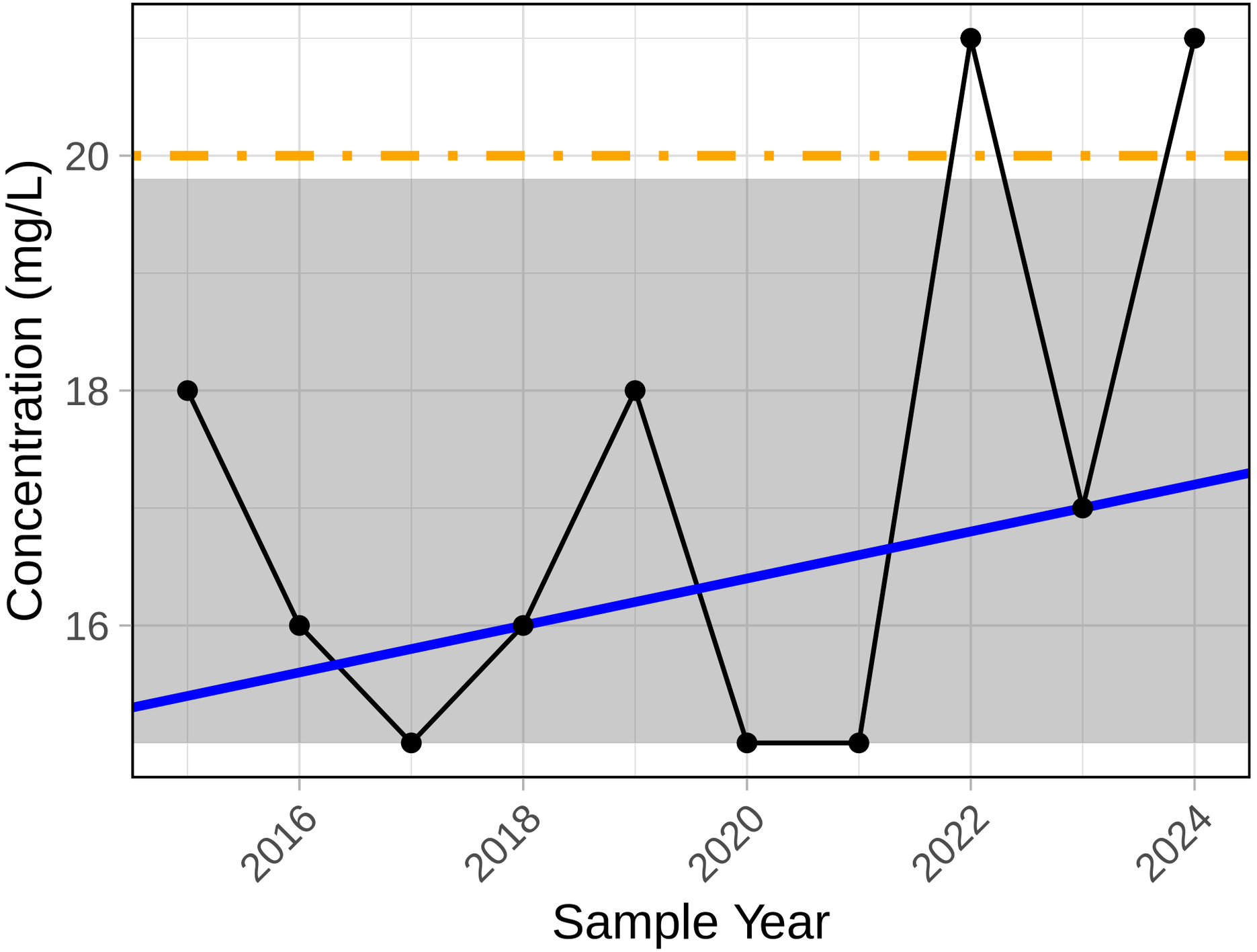
Chrystina Water



Trend significance p−value = 0.105

Total Alkalinity (as CaCO3)

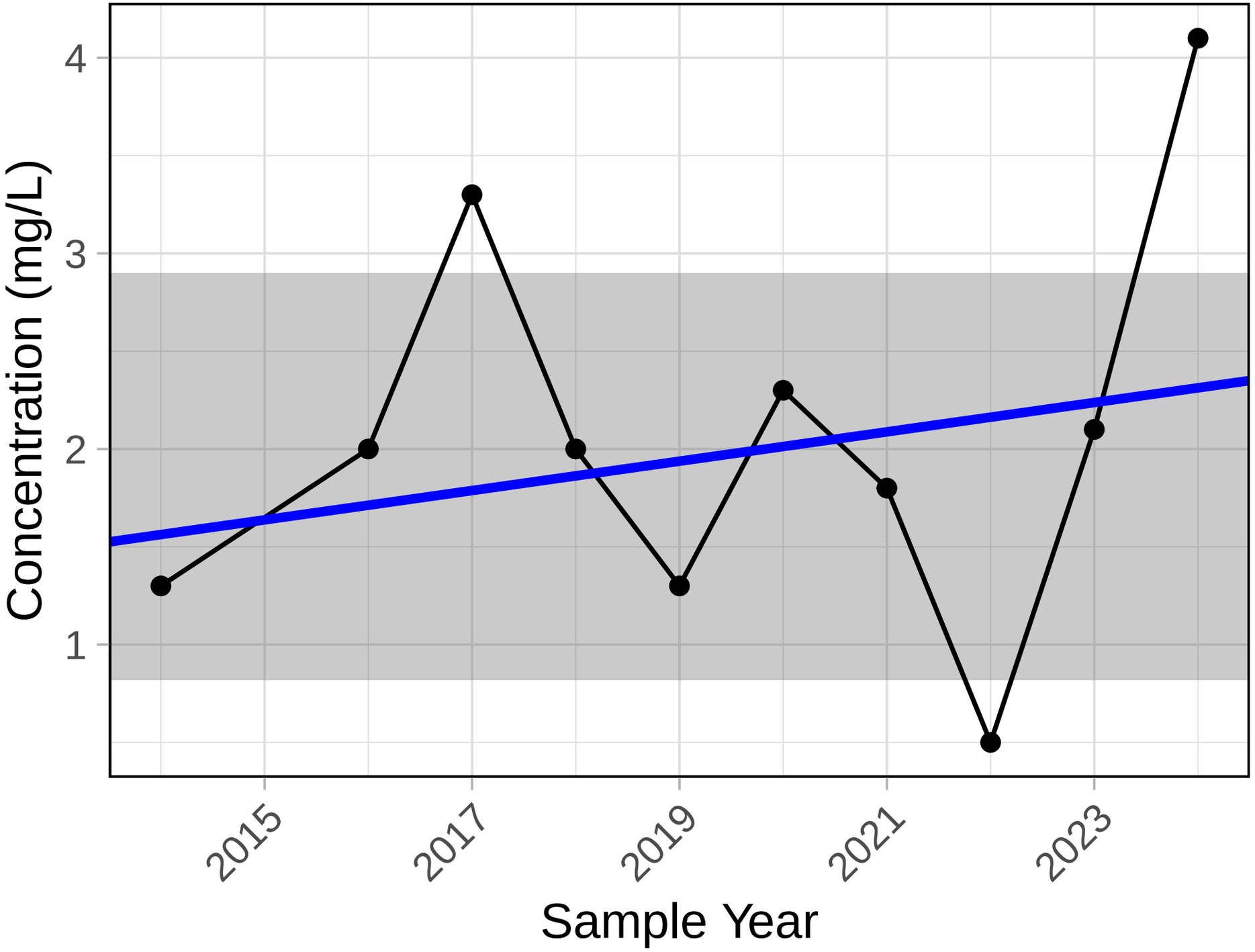
Chrystina Water



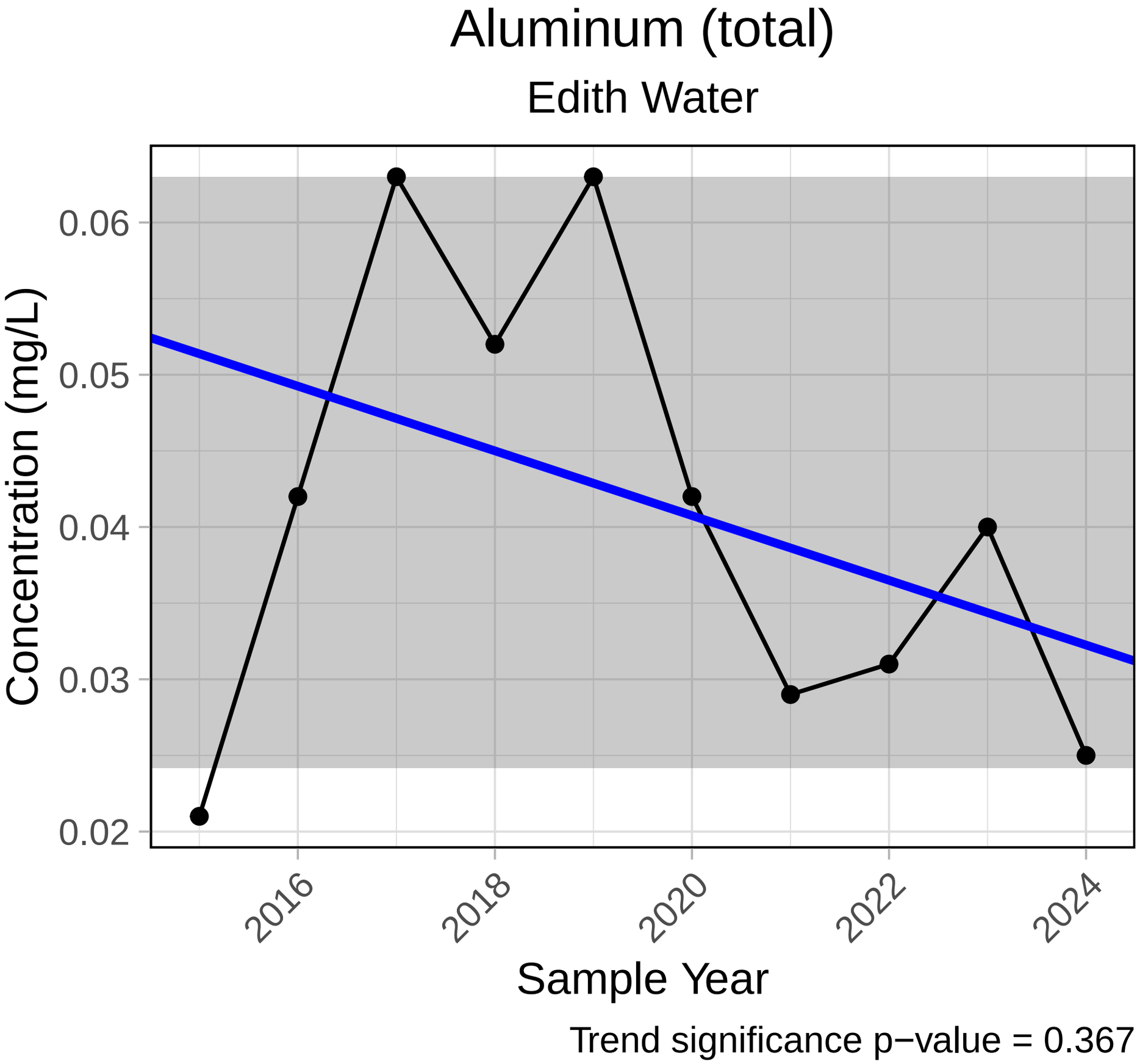
Trend significance p−value = 0.462
Chronic level = 20 mg/L (minimum)

Total Suspended Solids

Chrystina Water

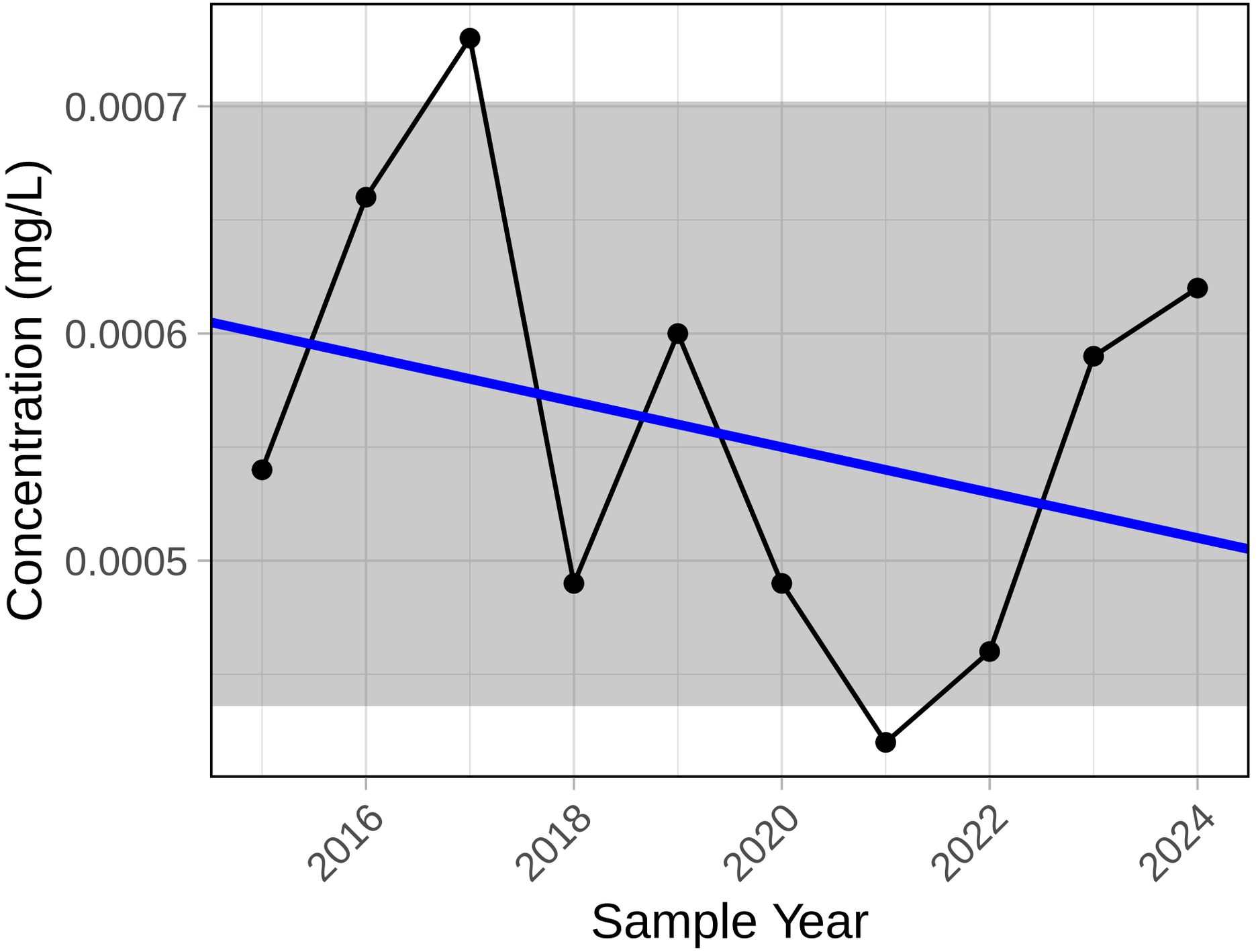


Trend significance p−value = 0.589

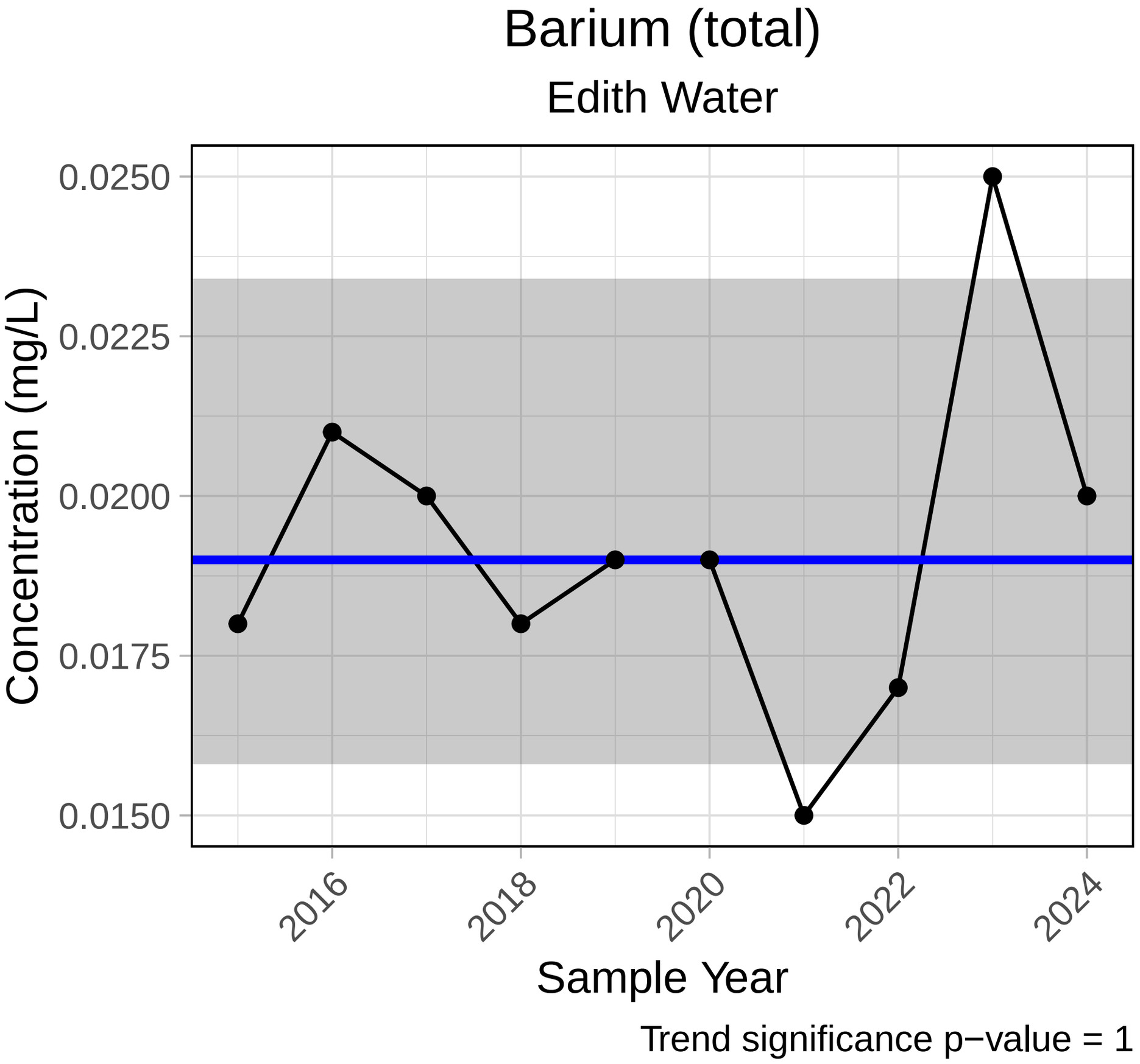

Aluminum (total)
Edith Water
Concentration (mg/L)
0.06
0.05
0.04
0.03
0.02
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.367

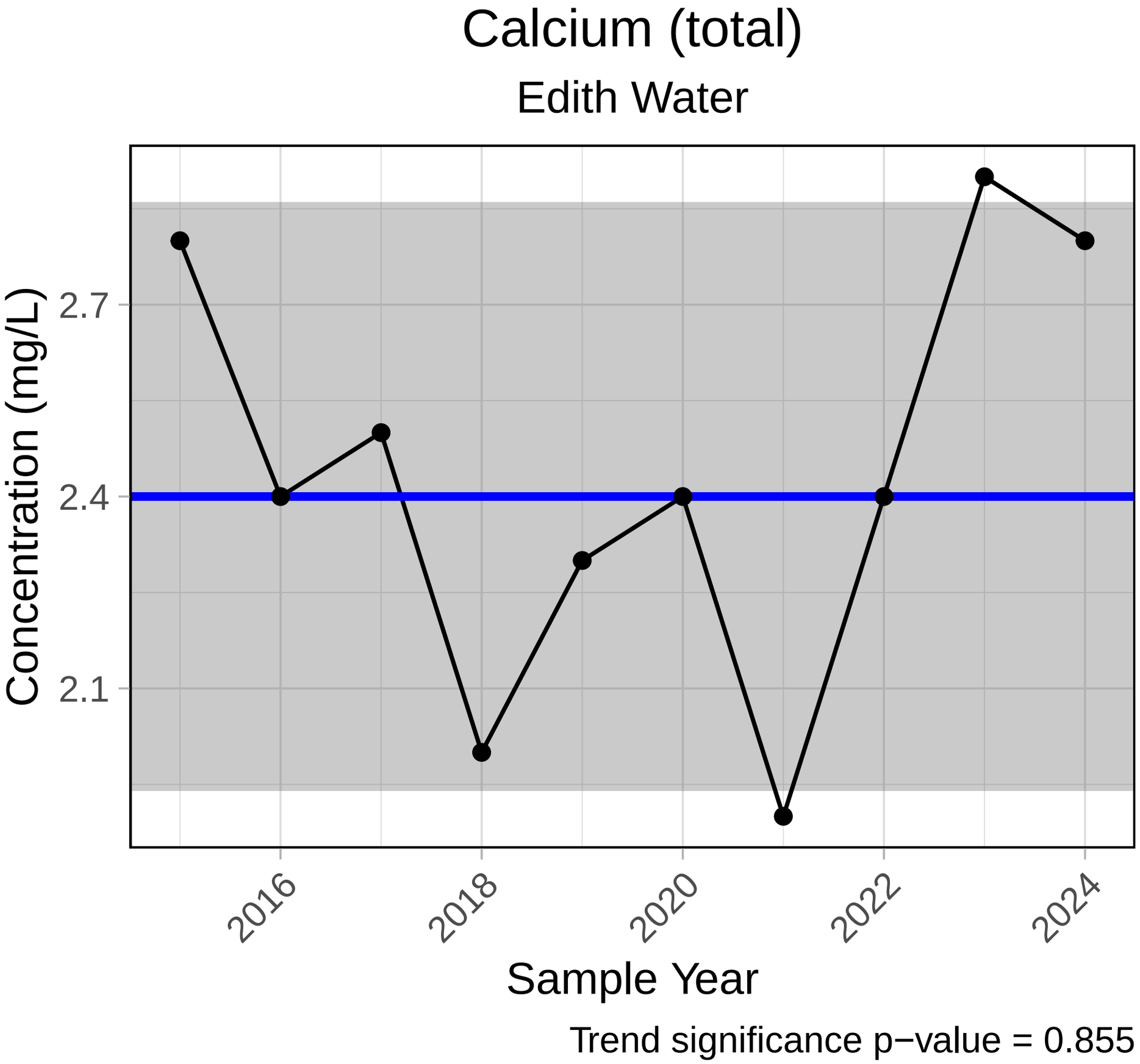
Arsenic (total)

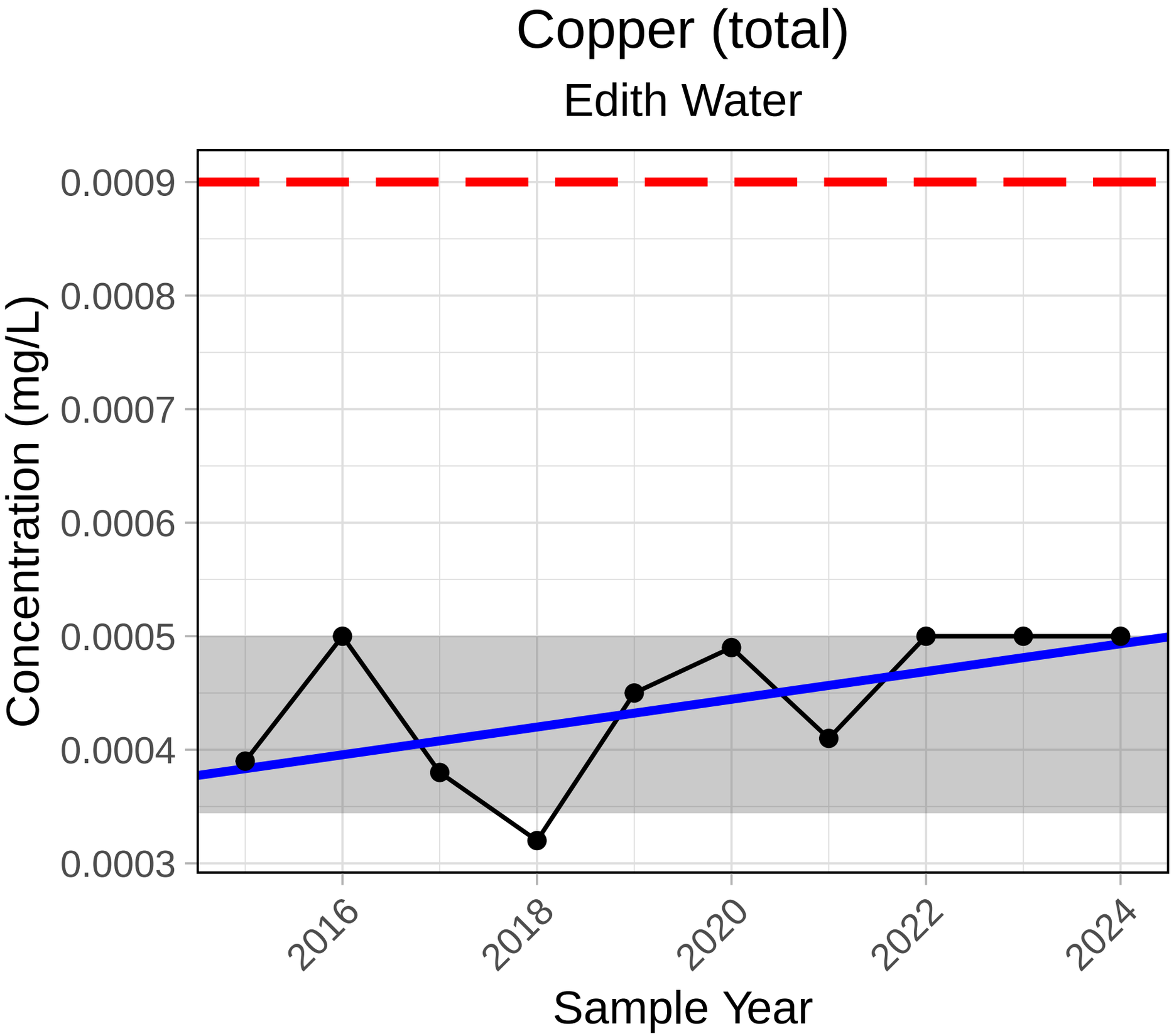
Edith Water



Trend significance p−value = 0.53
Chronic level = 0.005 mg/L (maximum)

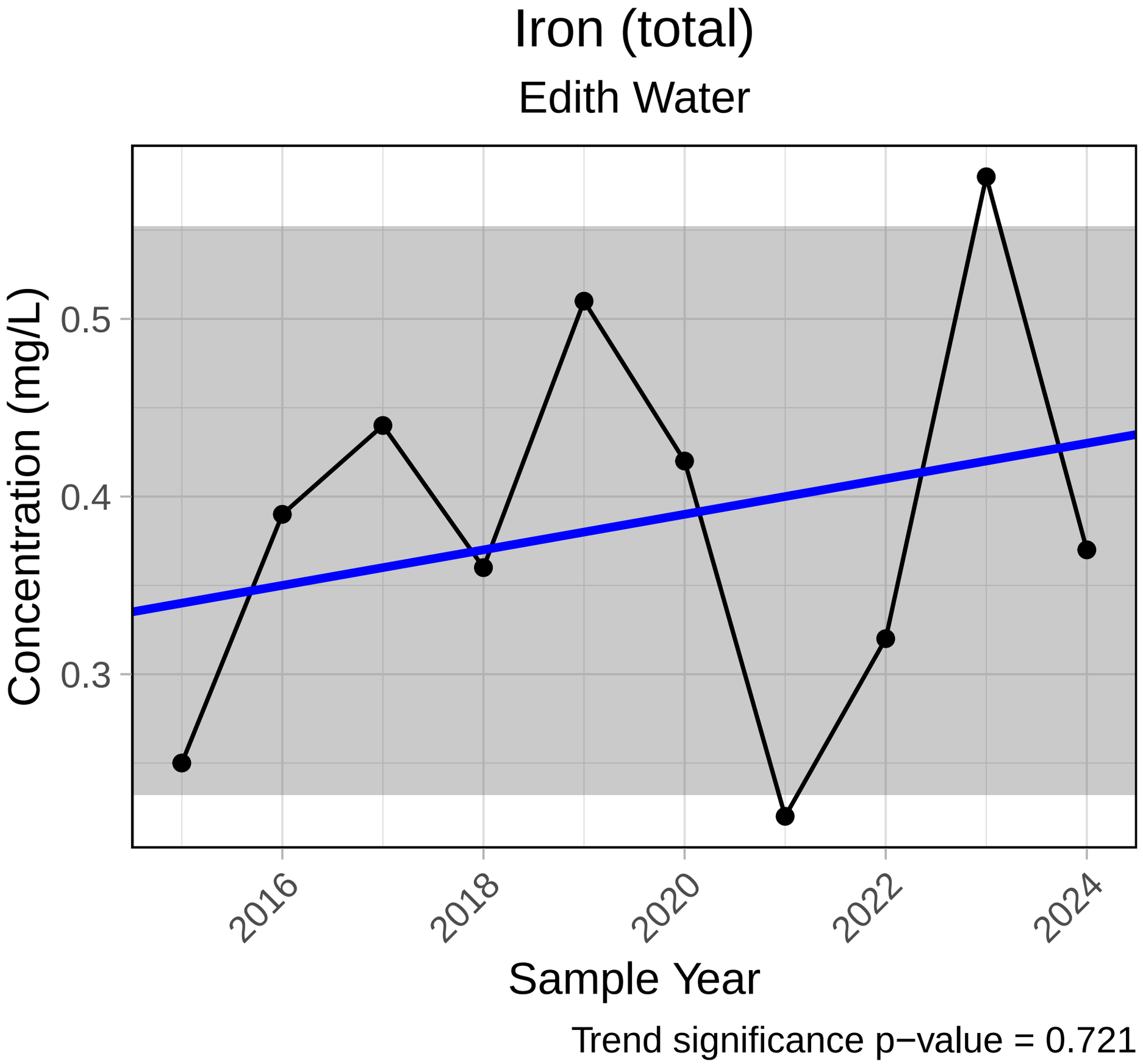

Barium (total)
Edith Water
0.0250
0.0225
0.0200
0.0175
0.0150
Concentration (mg/L)
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 1

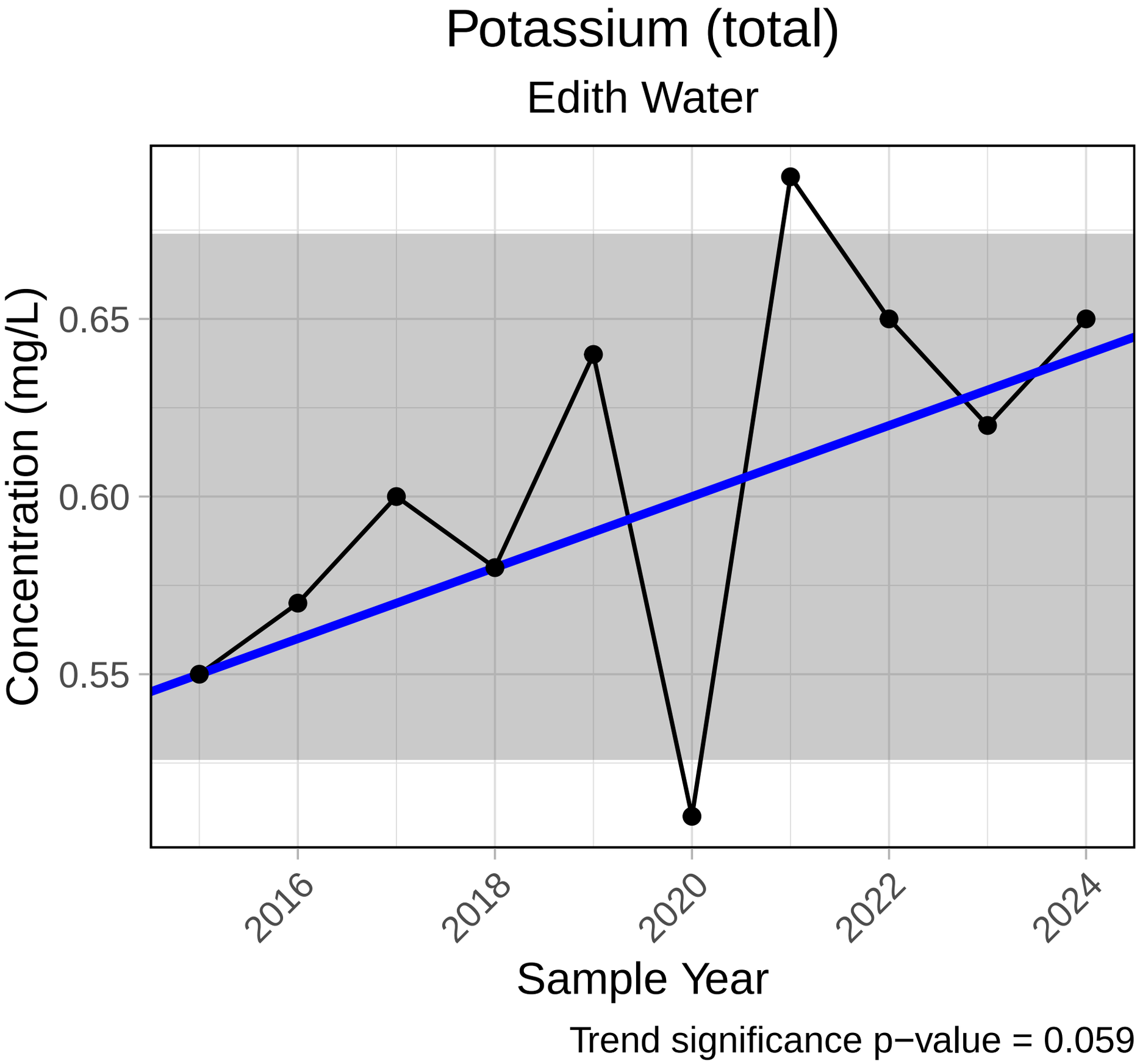

Calcium (total)
Edith Water
Concentration (mg/L)
2.7
2.4
2.1
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.855

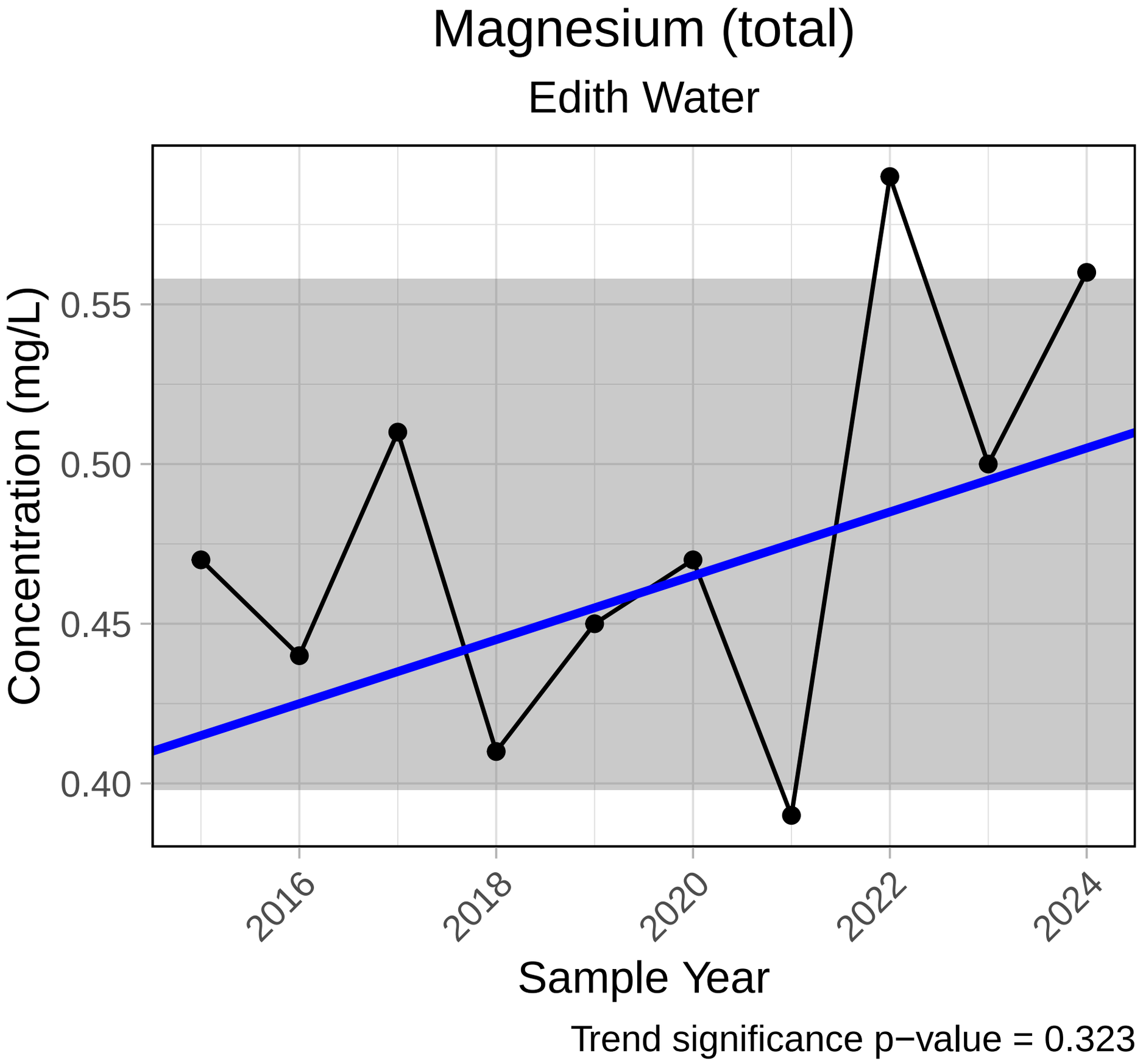


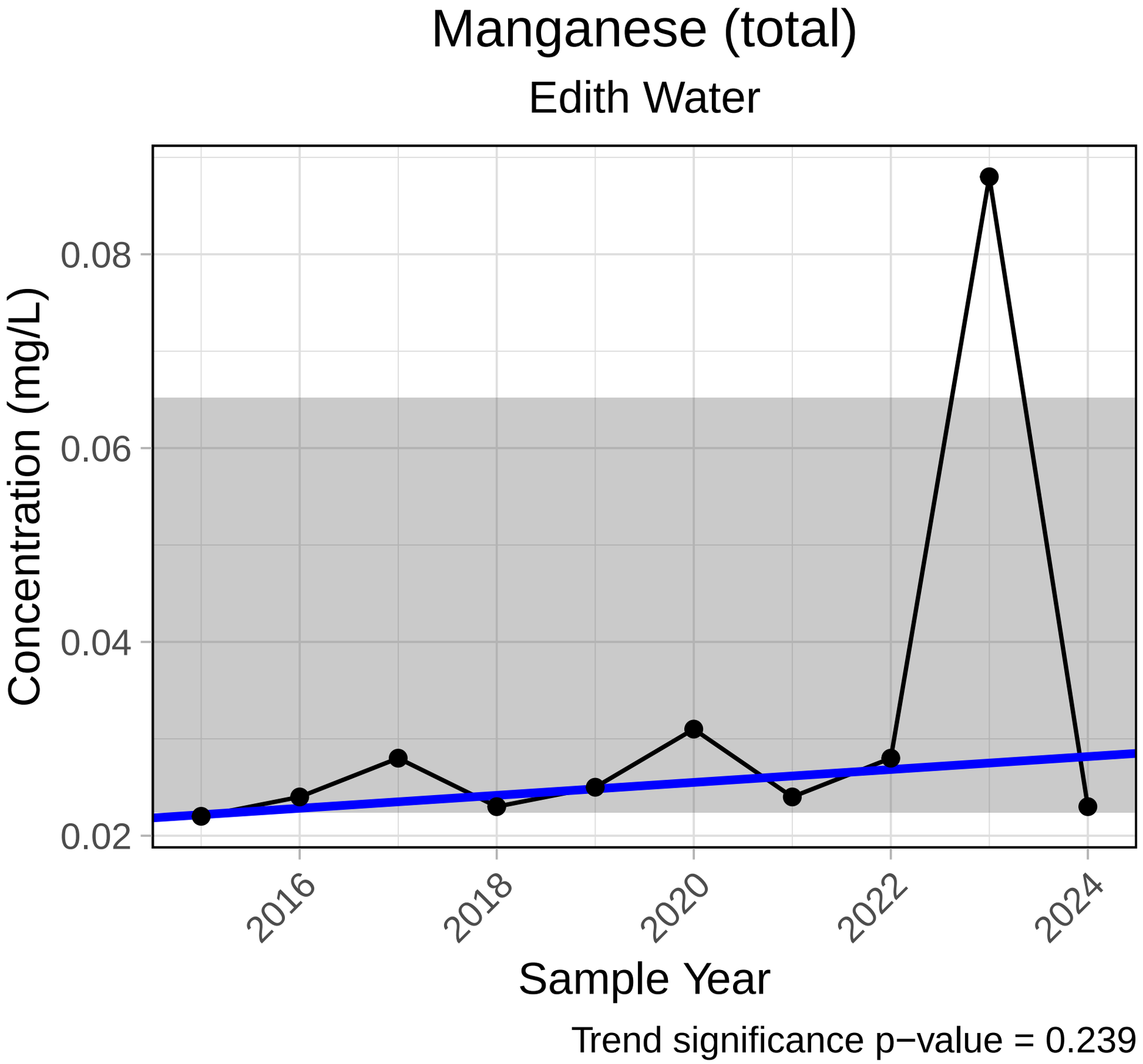
Trend significance p−value = 0.095

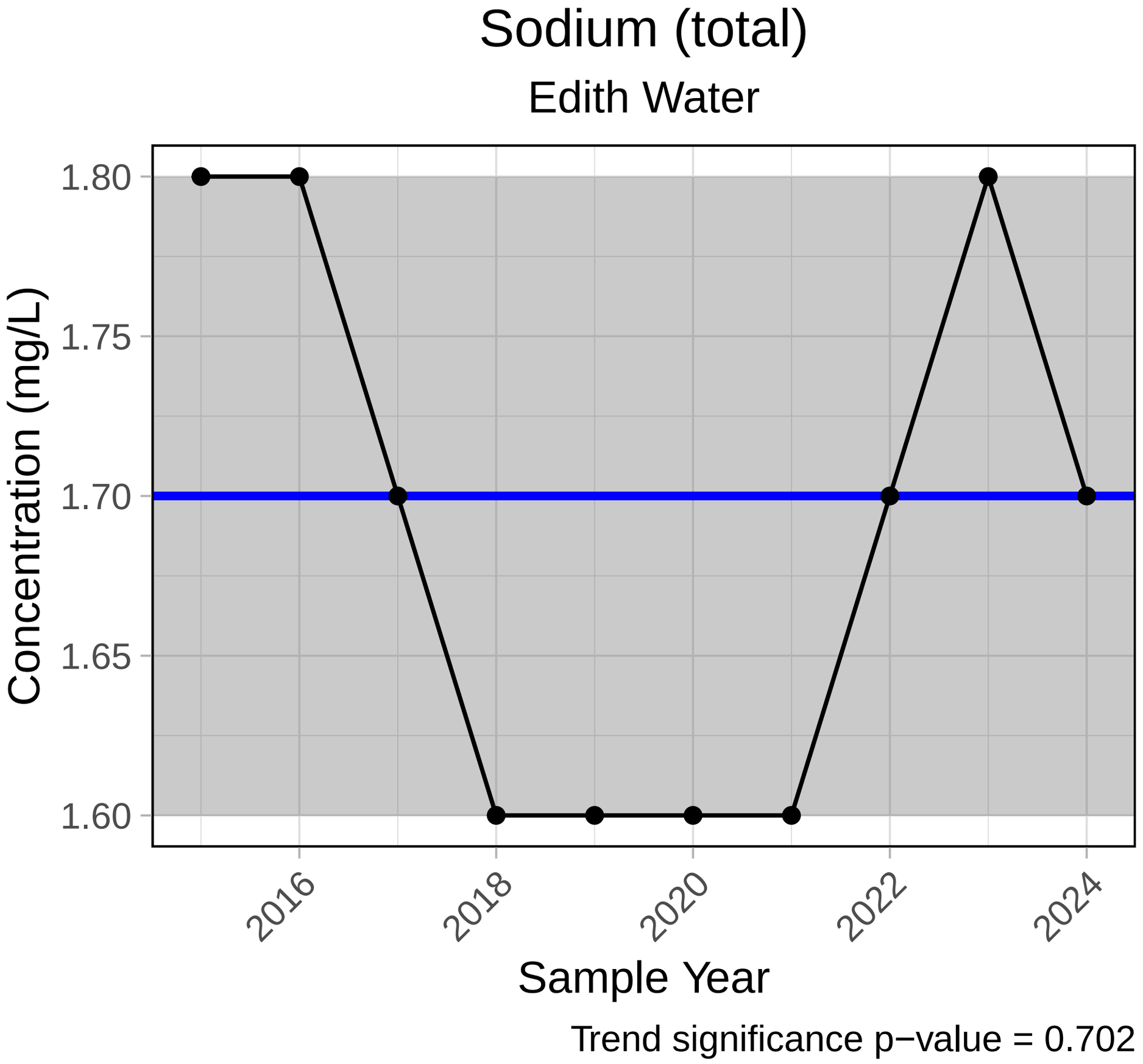
Acute level = 0.0009 mg/L


Iron (total)
Edith Water
Concentration (mg/L)
0.5
0.4
0.3
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.721


Potassium (total)
Edith Water
Concentration (mg/L)
0.65
0.60
0.55
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.059

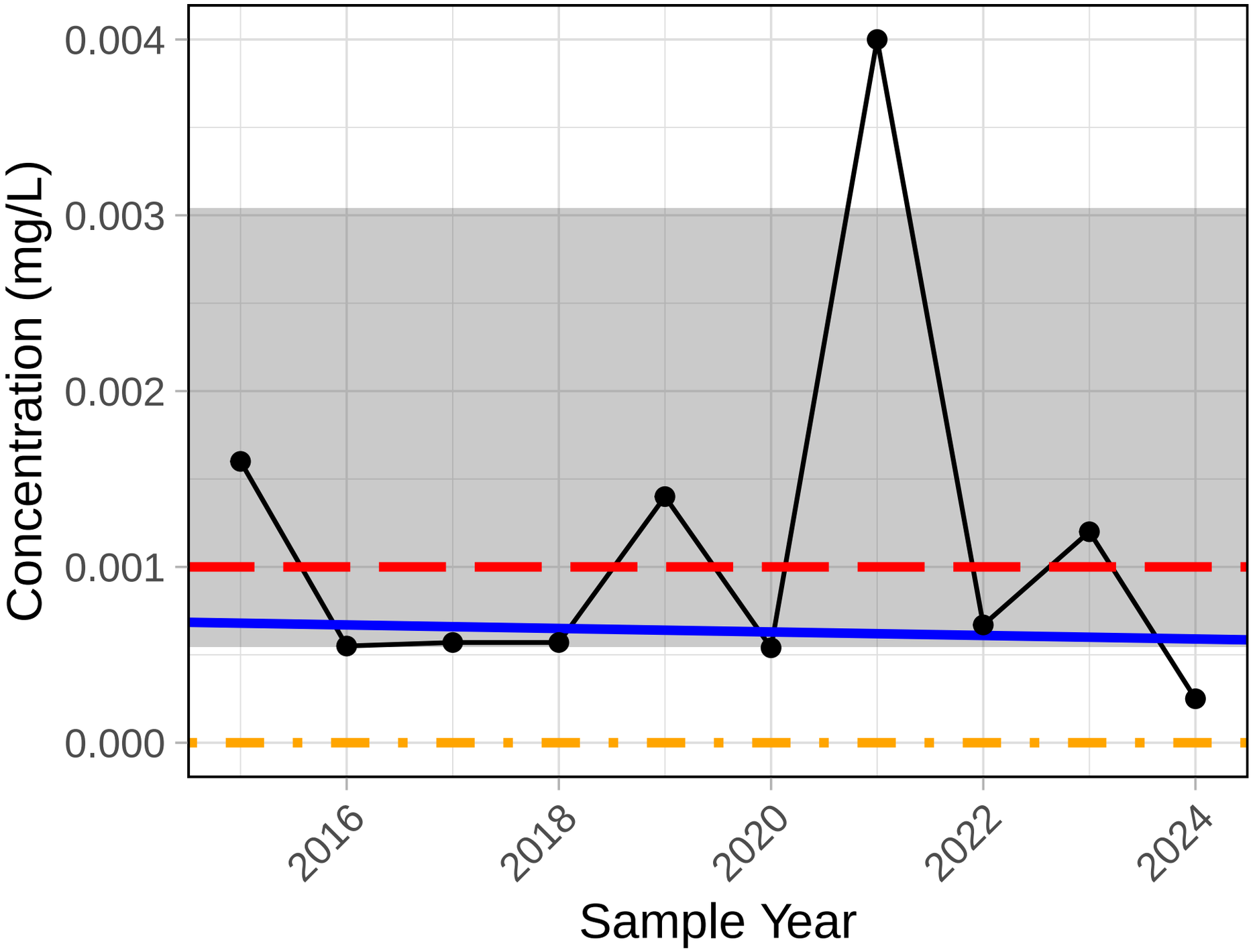

Magnesium (total)
Edith Water
Concentration (mg/L)
0.55
0.50
0.45
0.40
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.323


Manganese (total)
Edith Water
Concentration (mg/L)
0.08
0.06
0.04
0.02
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.239

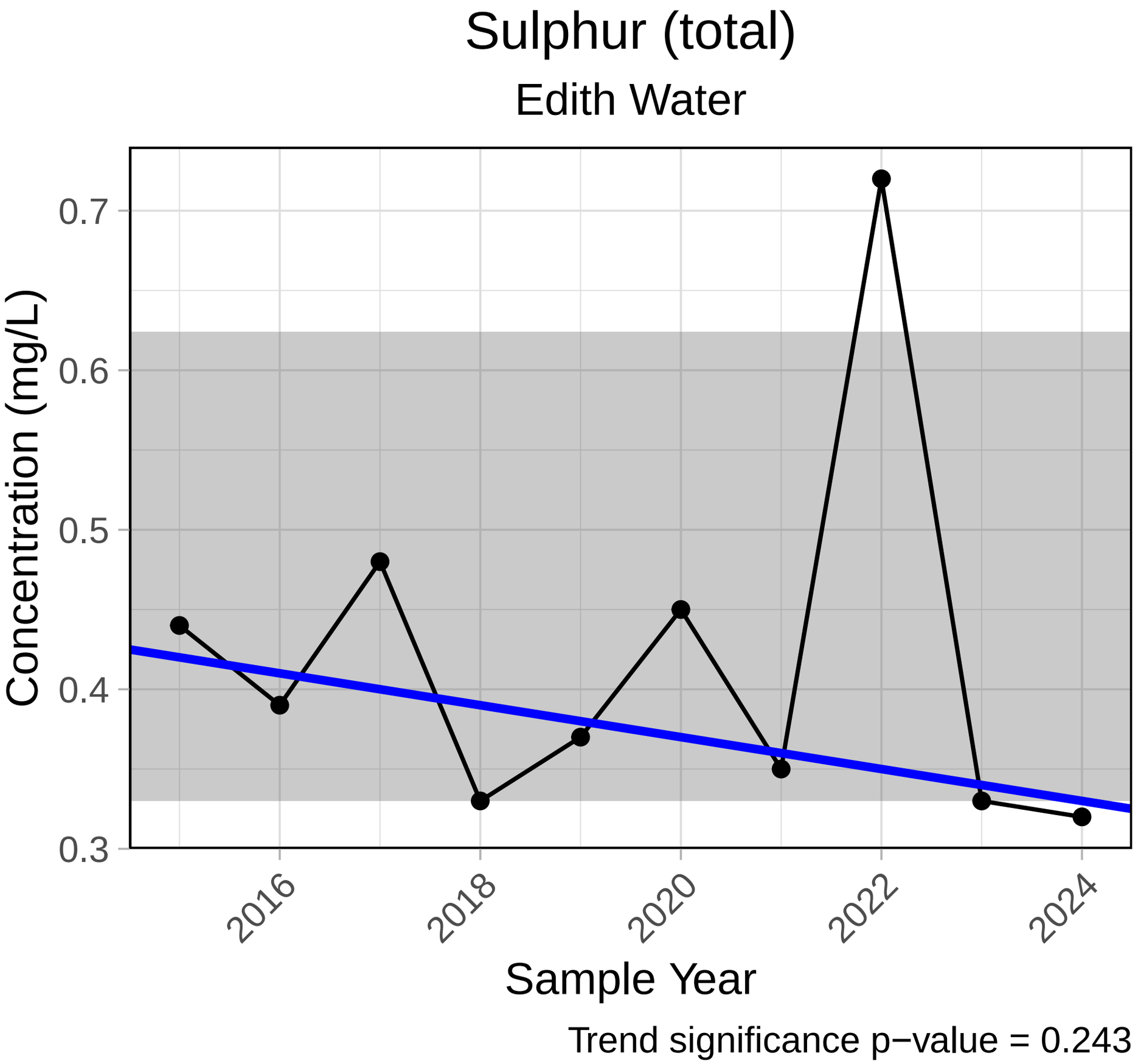

Sodium (total)
Edith Water
Concentration (mg/L)
1.80
1.75
1.70
1.65
1.60
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.702

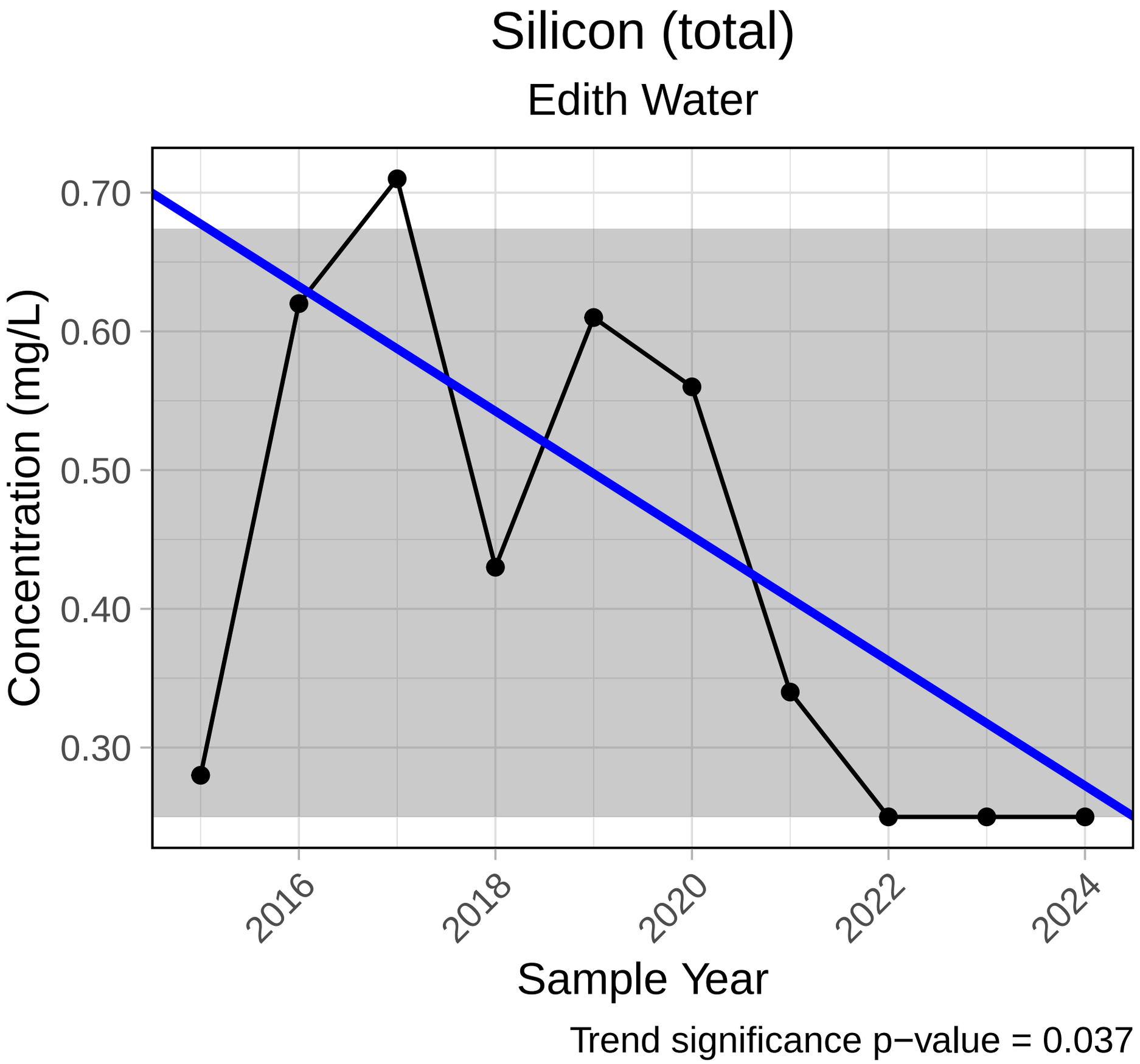
Nickel (total)

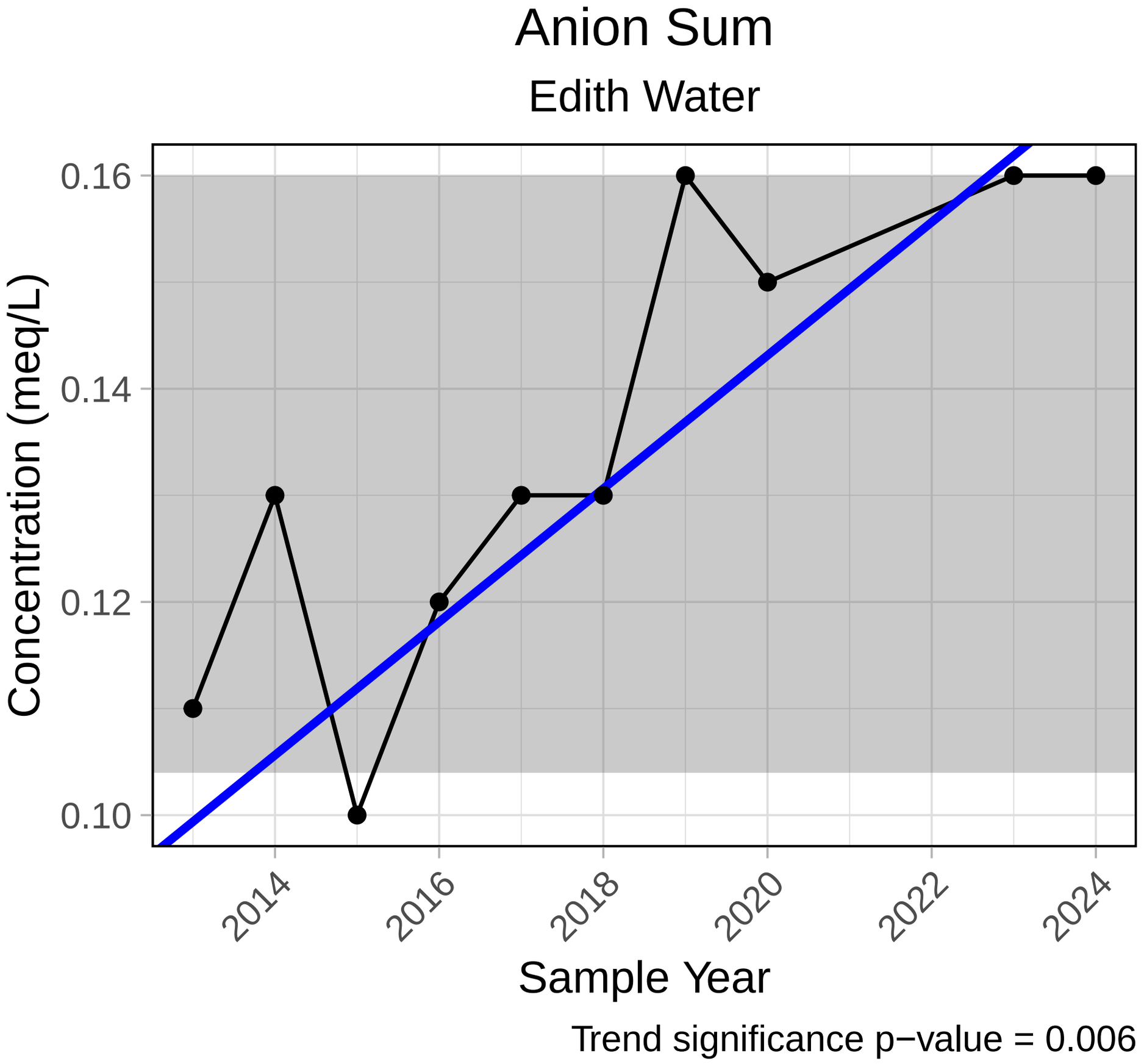
Edith Water

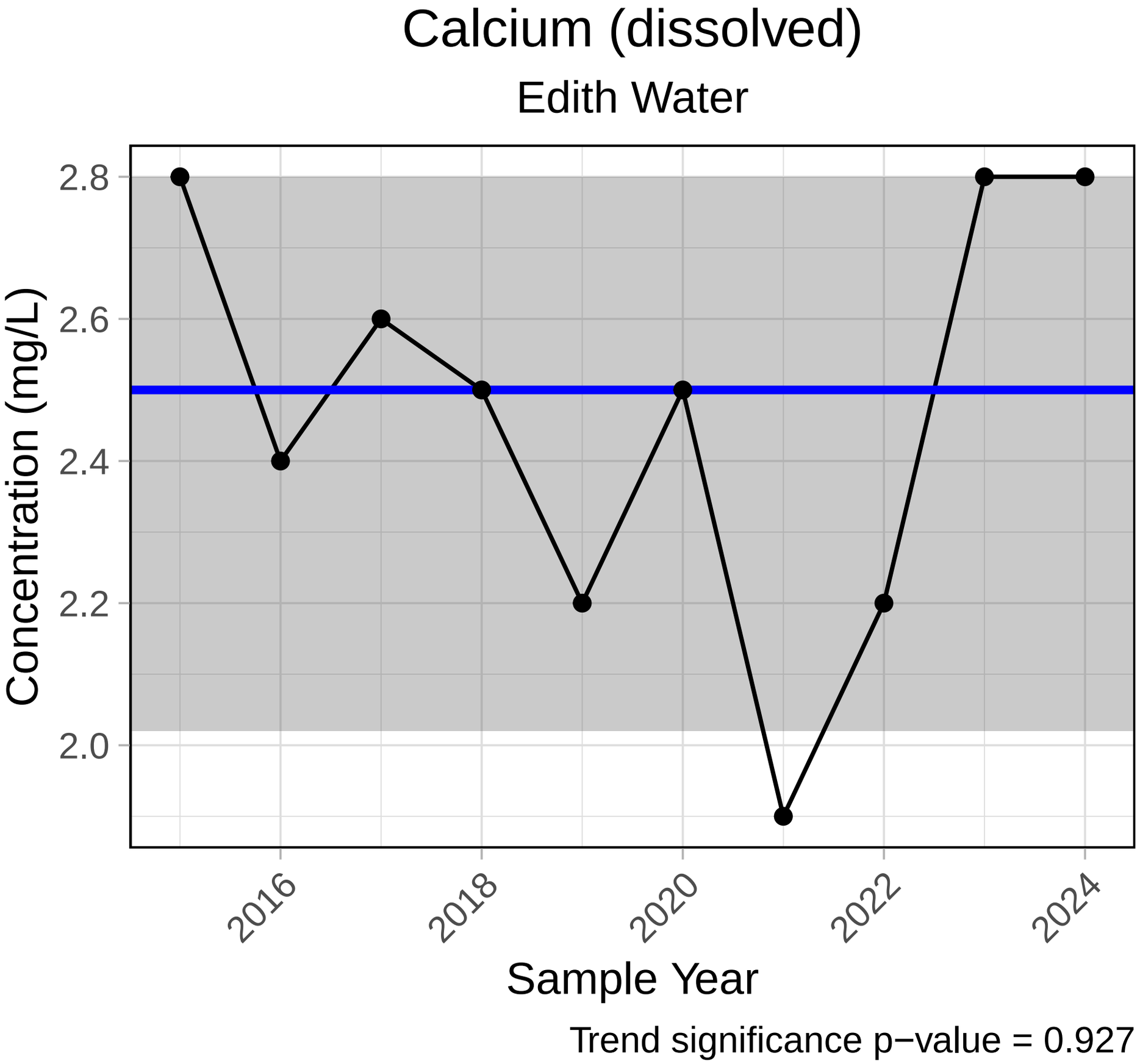


Trend significance p−value = 0.788
Chronic level = 0 mg/L
Acute level = 0.001 mg/L


Sulphur (total)
Edith Water
Concentration (mg/L)
0.7
0.6
0.5
0.4
0.3
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.243

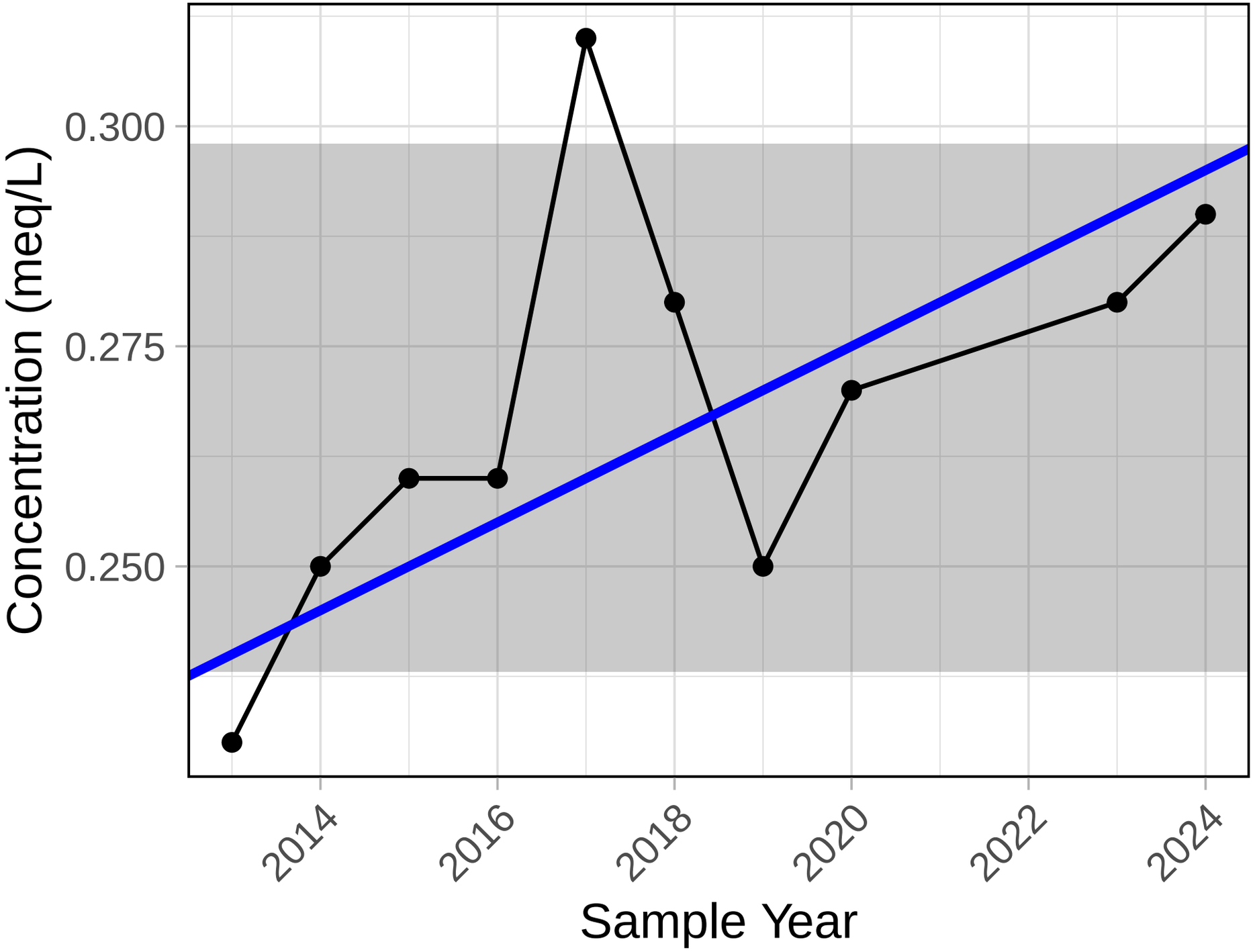

Silicon (total)
Edith Water
Concentration (mg/L)
0.70
0.60
0.50
0.40
0.30
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.037


Anion Sum
Edith Water
Concentration (meq/L)
0.16
0.14
0.12
0.10
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.006

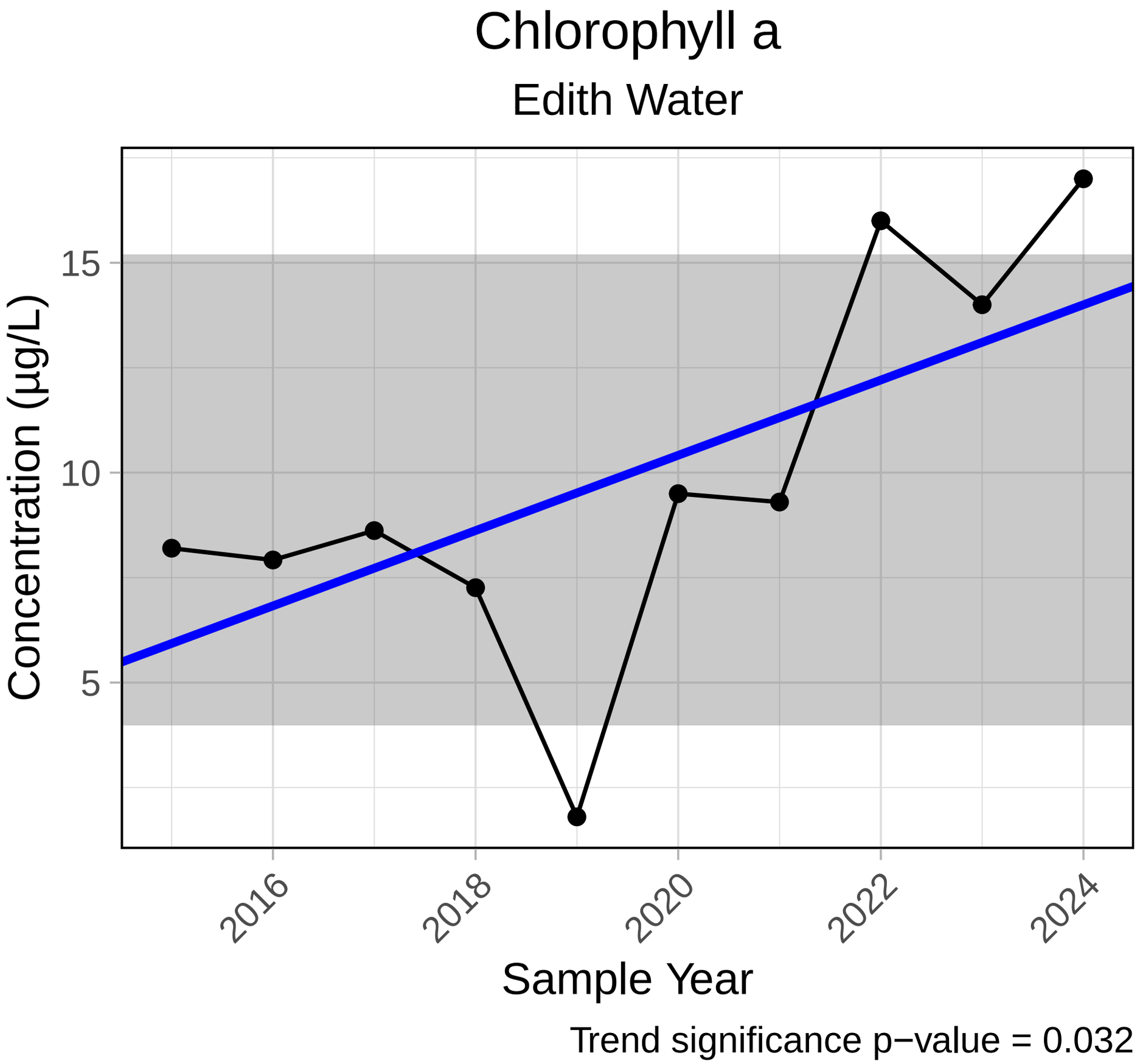

Calcium (dissolved)
Edith Water
Concentration (mg/L)
2.8
2.6
2.4
2.2
2.0
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.927

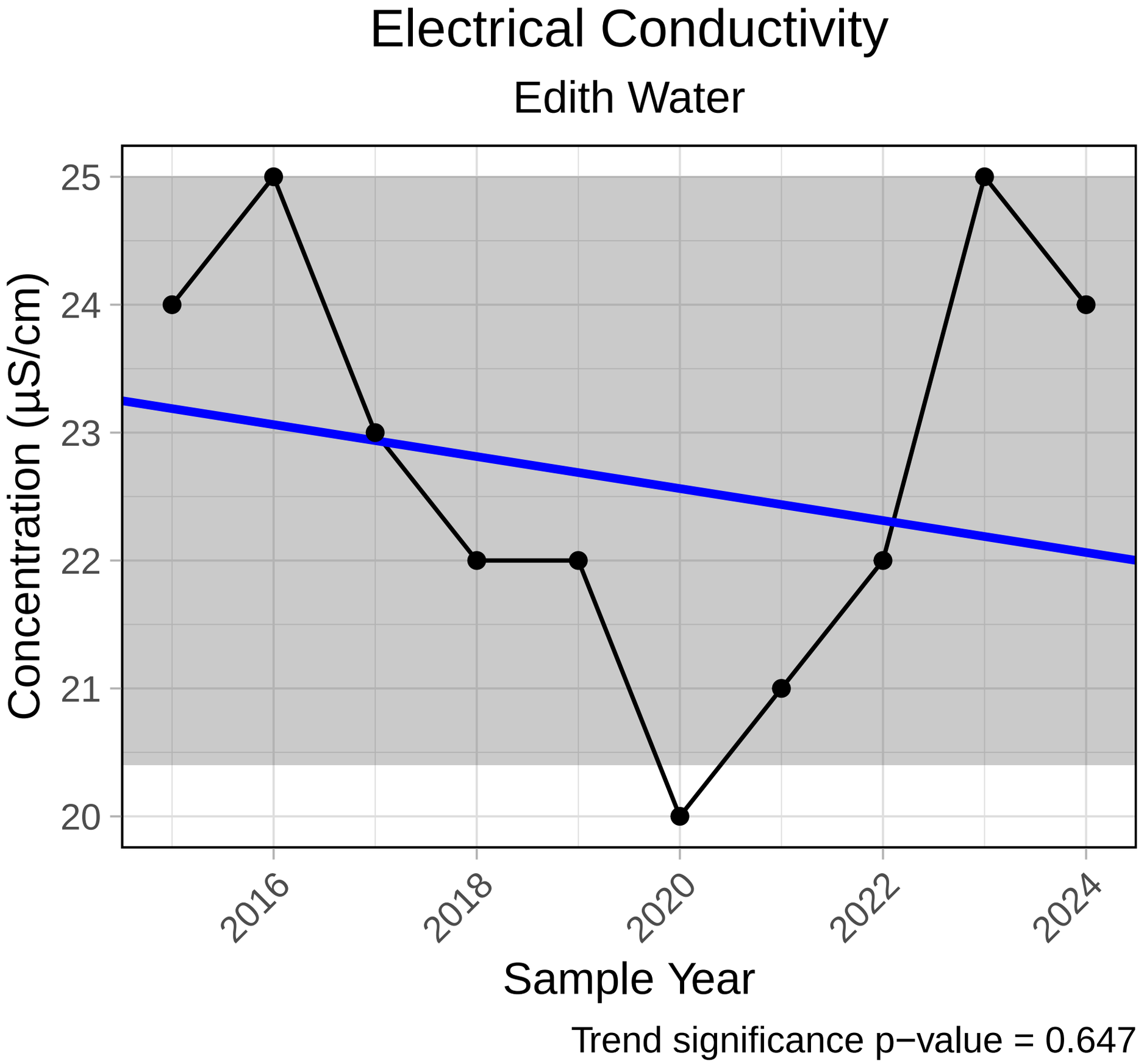
Cation Sum

Edith Water



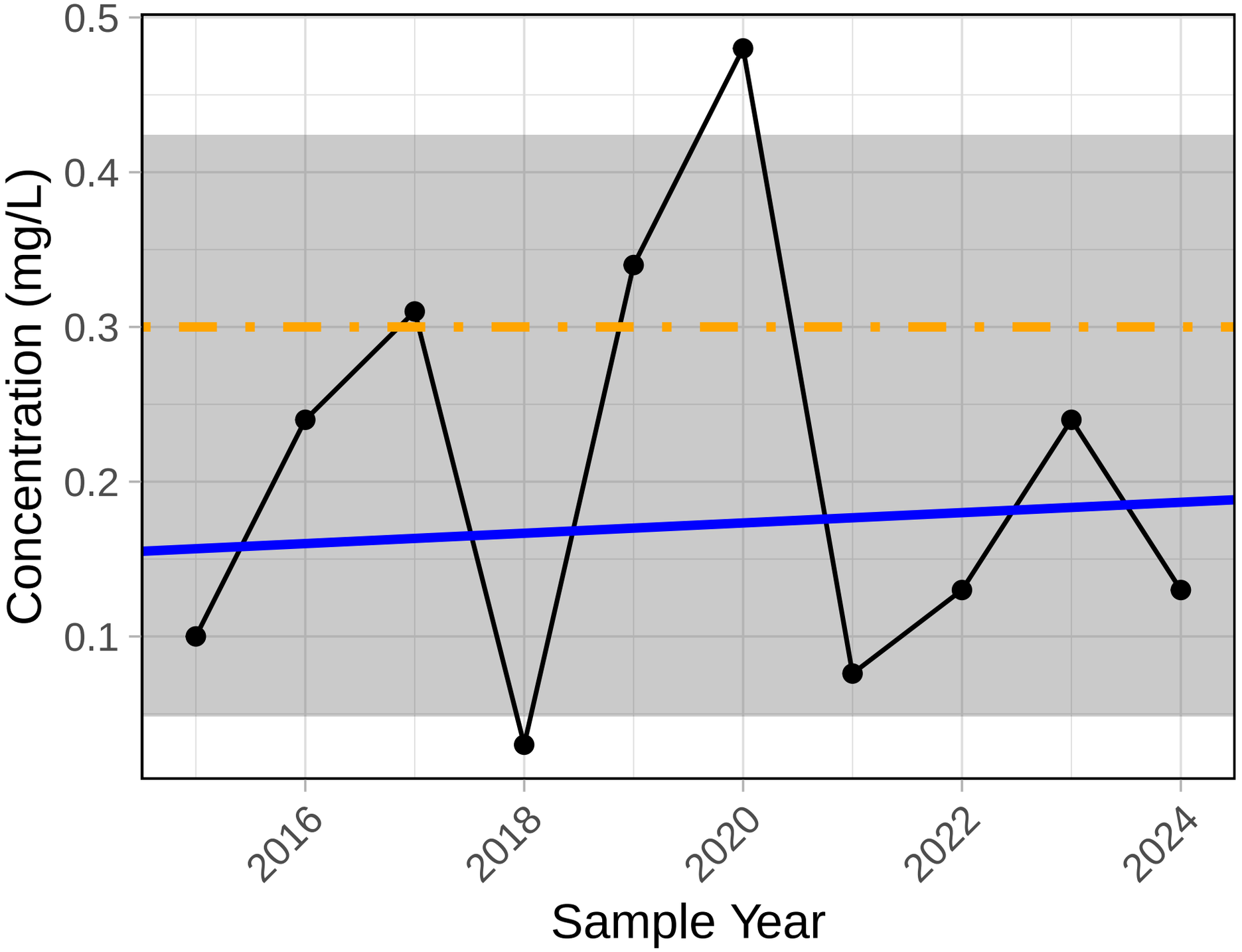
Trend significance p−value = 0.037


Chlorophyll a
Edith Water
Concentration (µg/L)
15
10
5
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.032


Electrical Conductivity
Edith Water
Concentration (µS/cm)
25
24
23
22
21
20
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.647

Iron (dissolved)

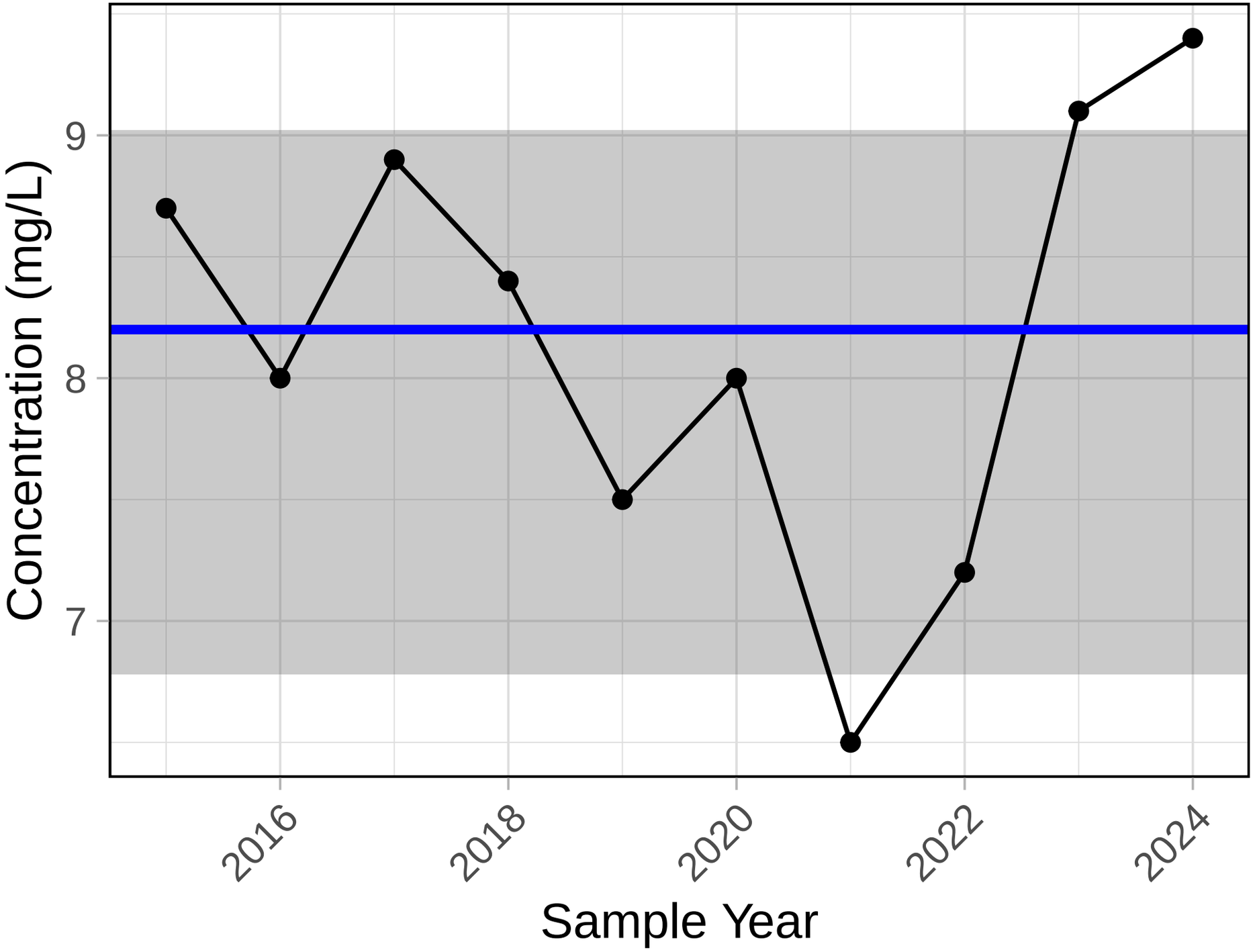
Edith Water



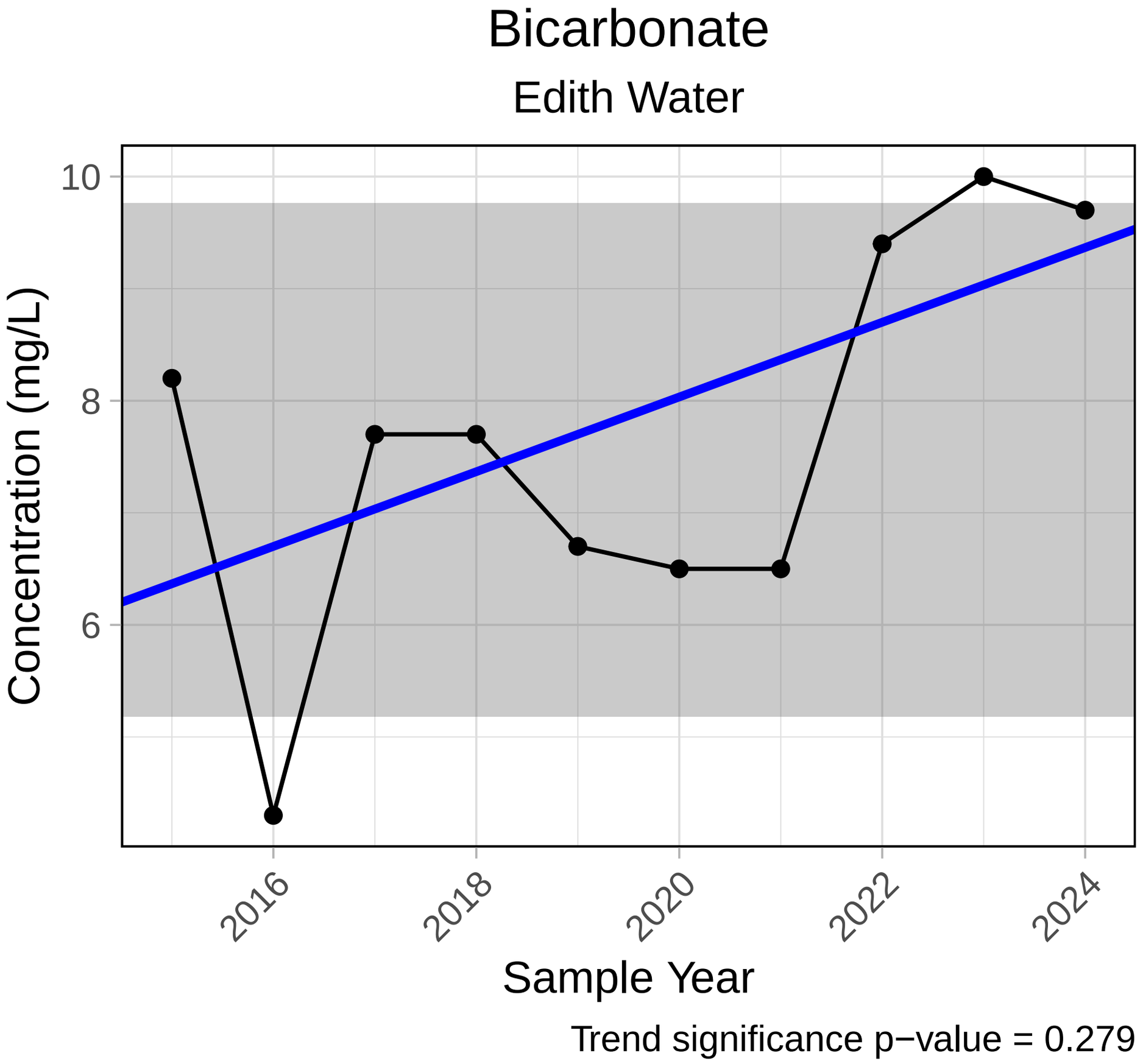
Trend significance p−value = 0.857
Chronic level = 0.3 mg/L (maximum)

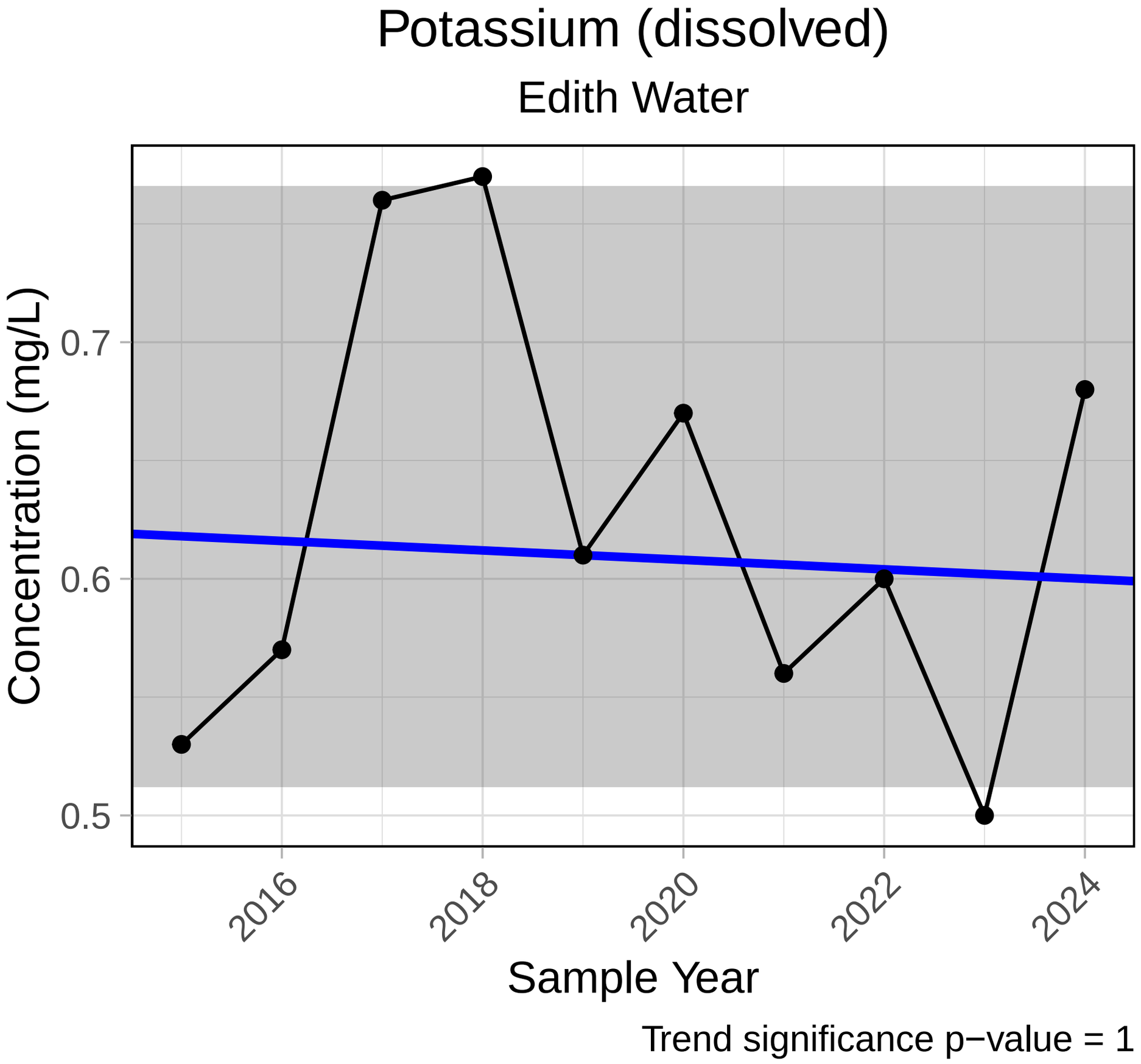
Hardness

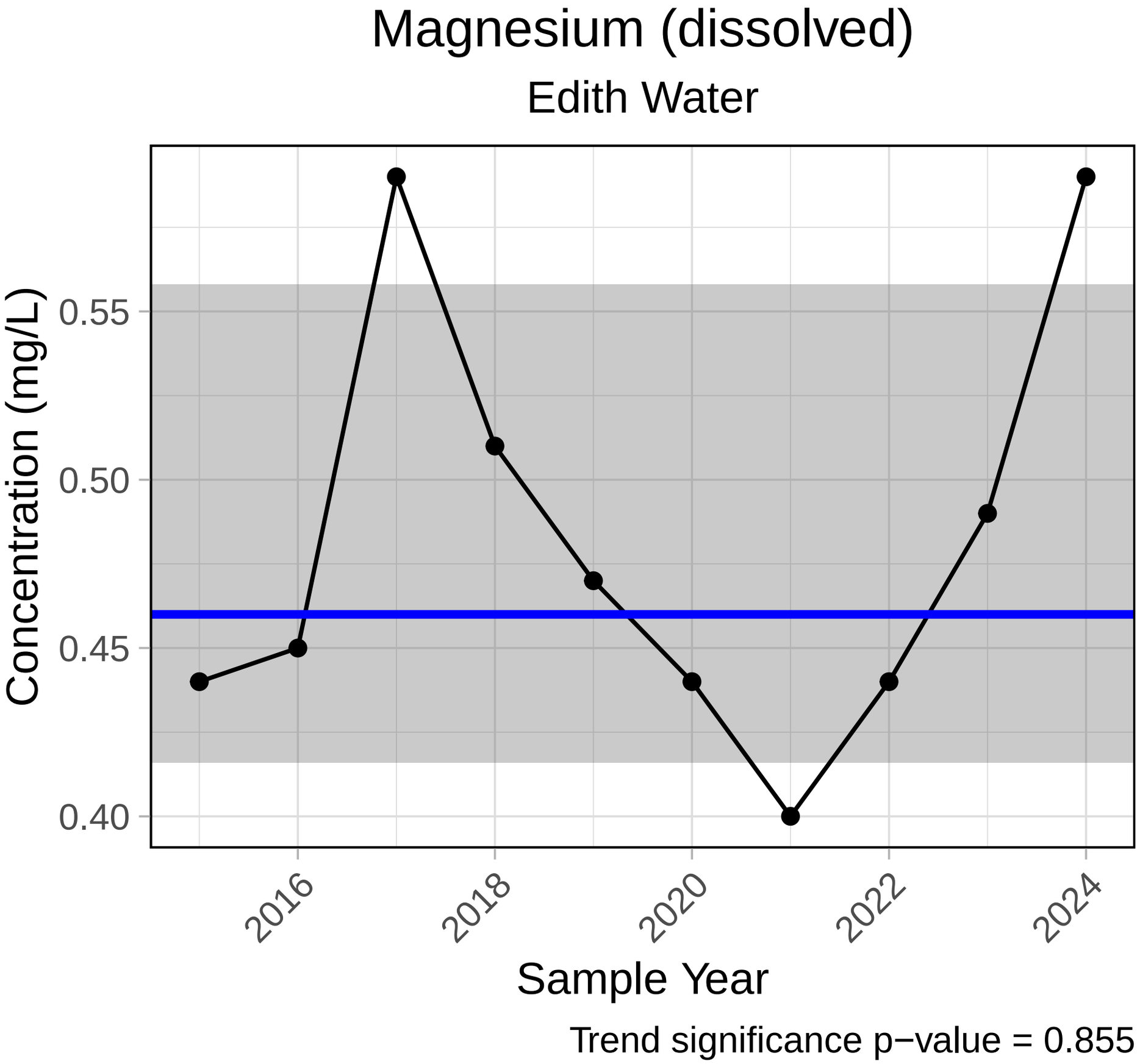
Edith Water



Trend significance p−value = 1

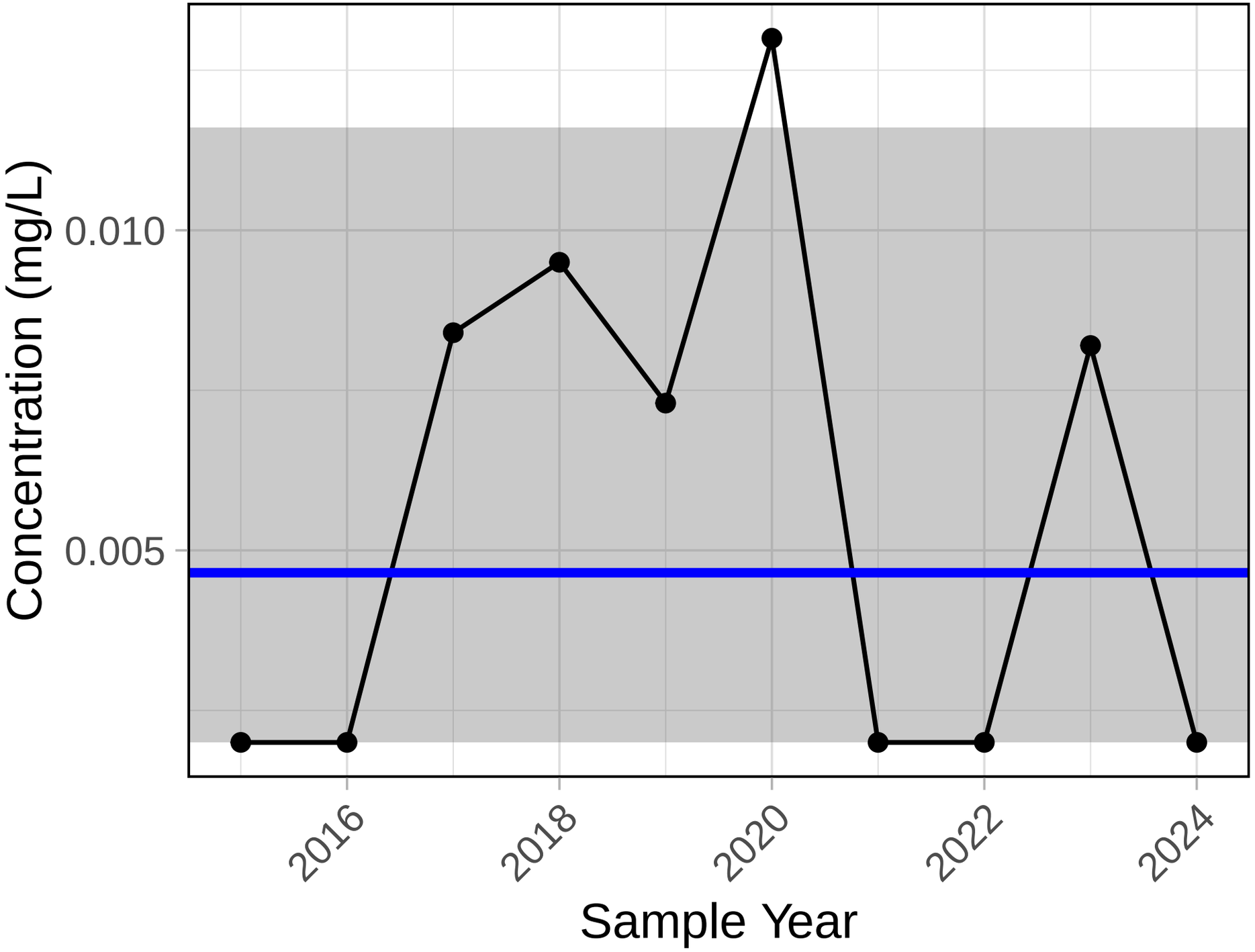

Bicarbonate
Edith Water
10
8
6
Concentration (mg/L)
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.279


Potassium (dissolved)
Edith Water
Concentration (mg/L)
0.7
0.6
0.5
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 1

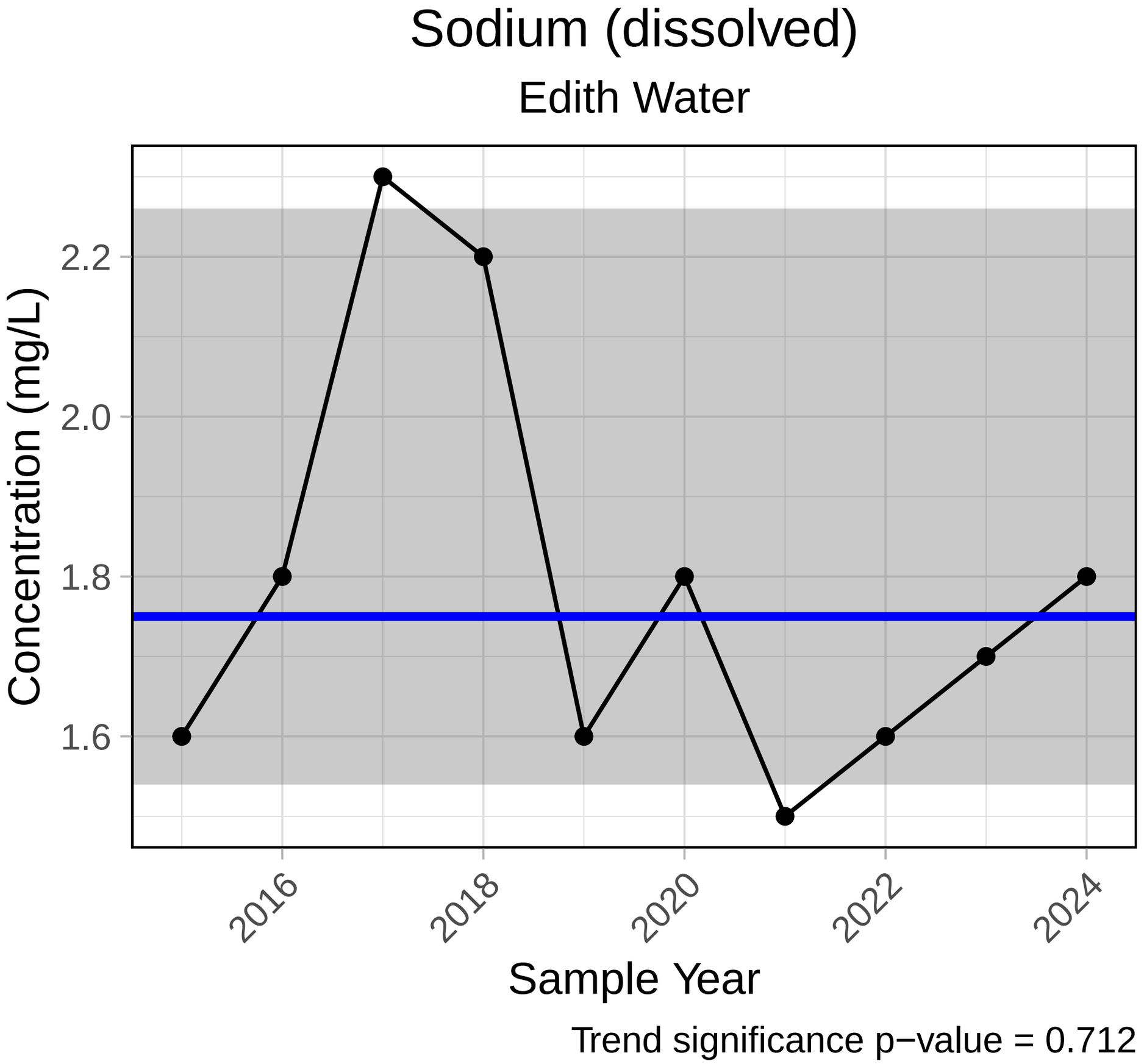

Magnesium (dissolved)
Edith Water
Concentration (mg/L)
0.55
0.50
0.45
0.40
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.855

Manganese (dissolved)

Edith Water

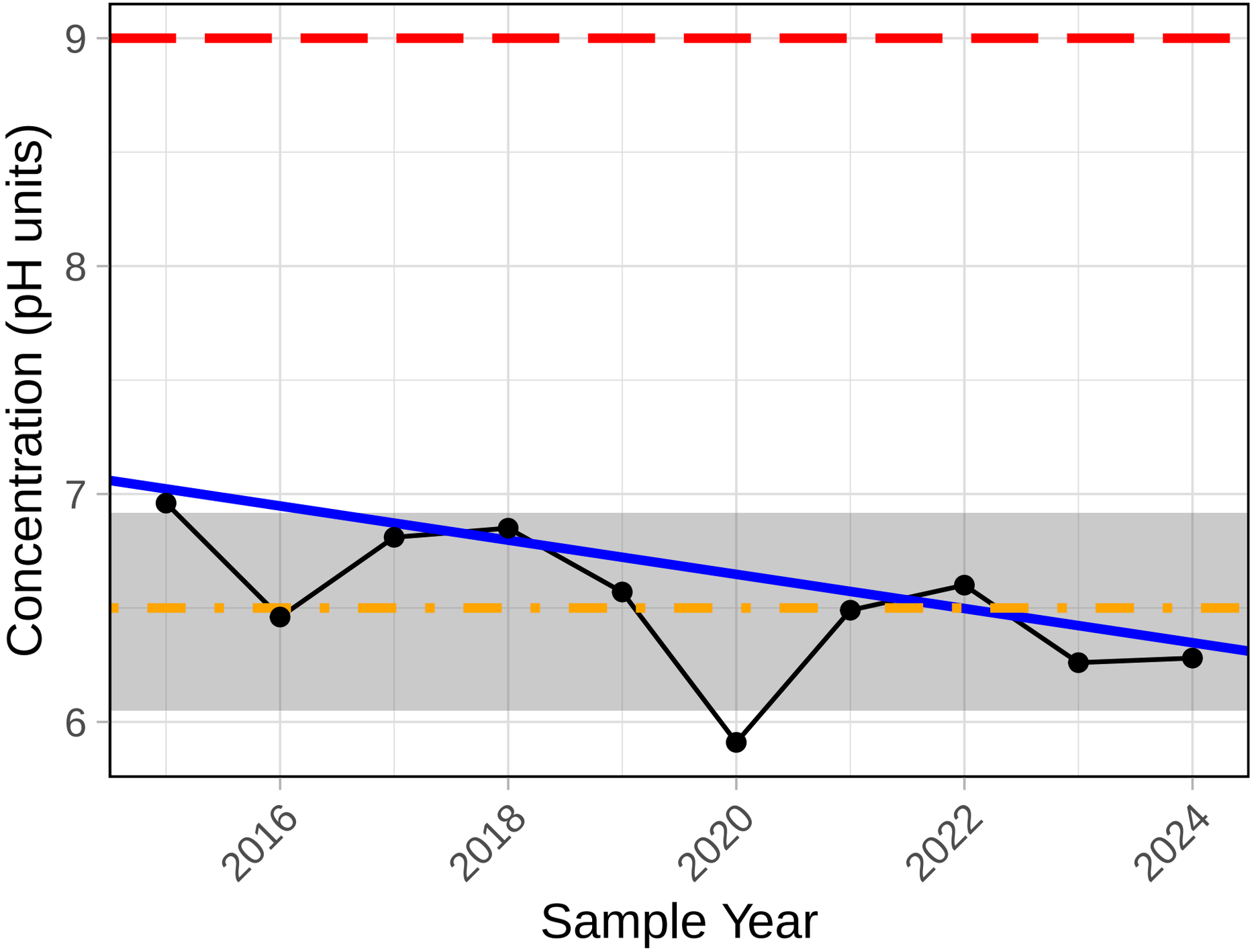


Trend significance p−value = 1


Sodium (dissolved)
Edith Water
Concentration (mg/L)
2.2
2.0
1.8
1.6
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.712

pH

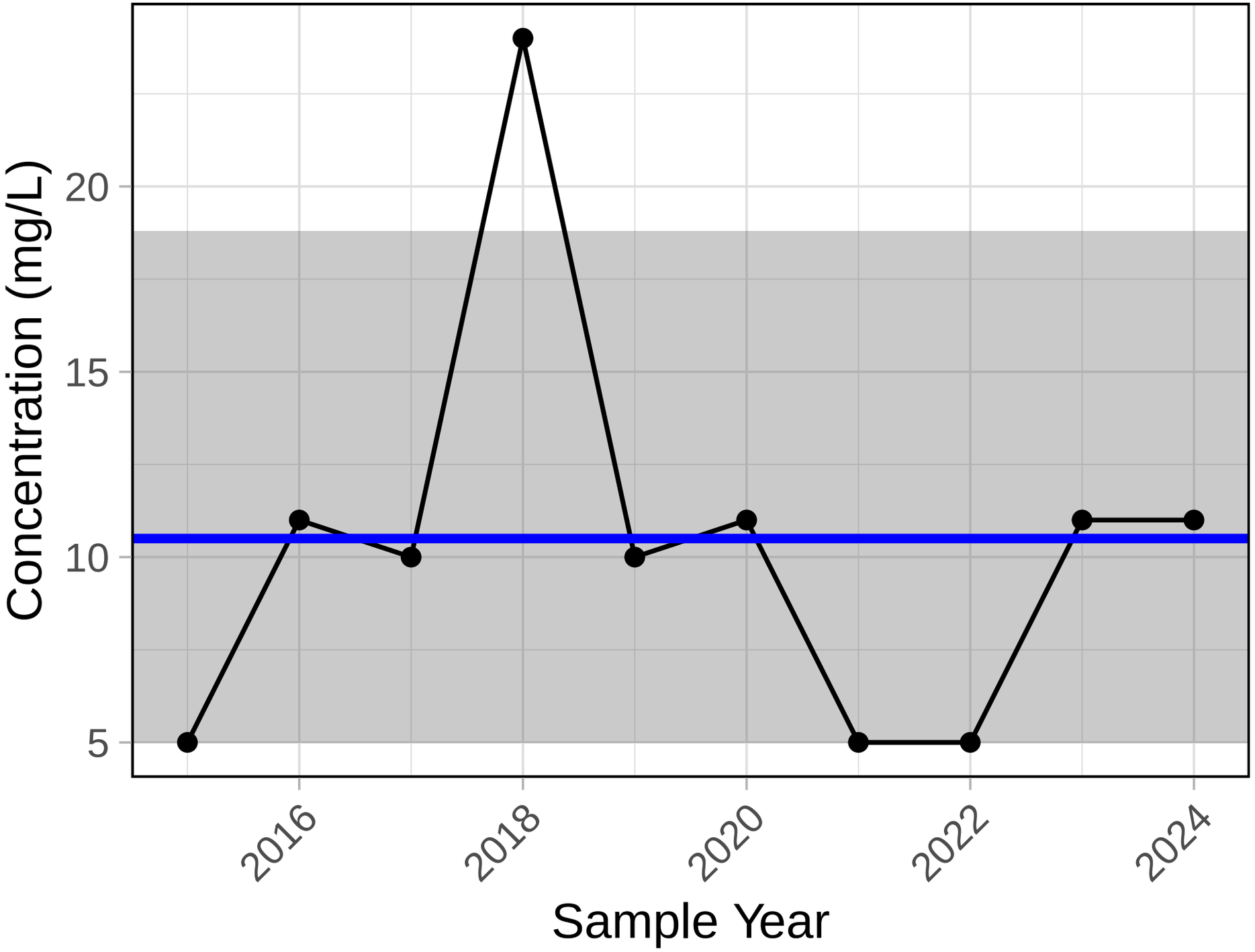
Edith Water



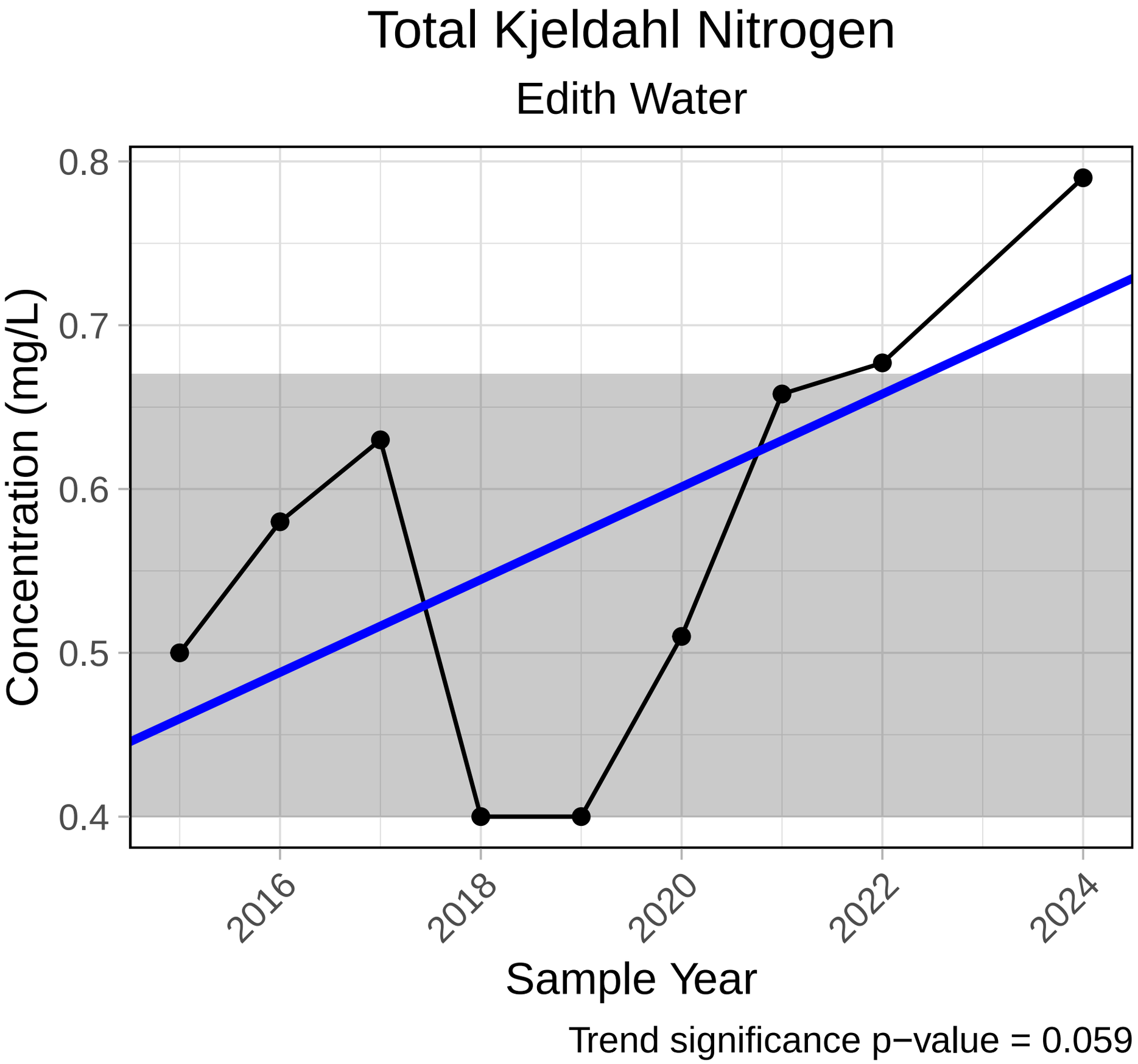
Trend significance p−value = 0.107
Chronic level = 6.5 pH units (minimum)
Acute level = 9 pH units (maximum)

Total Dissolved Solids

Edith Water

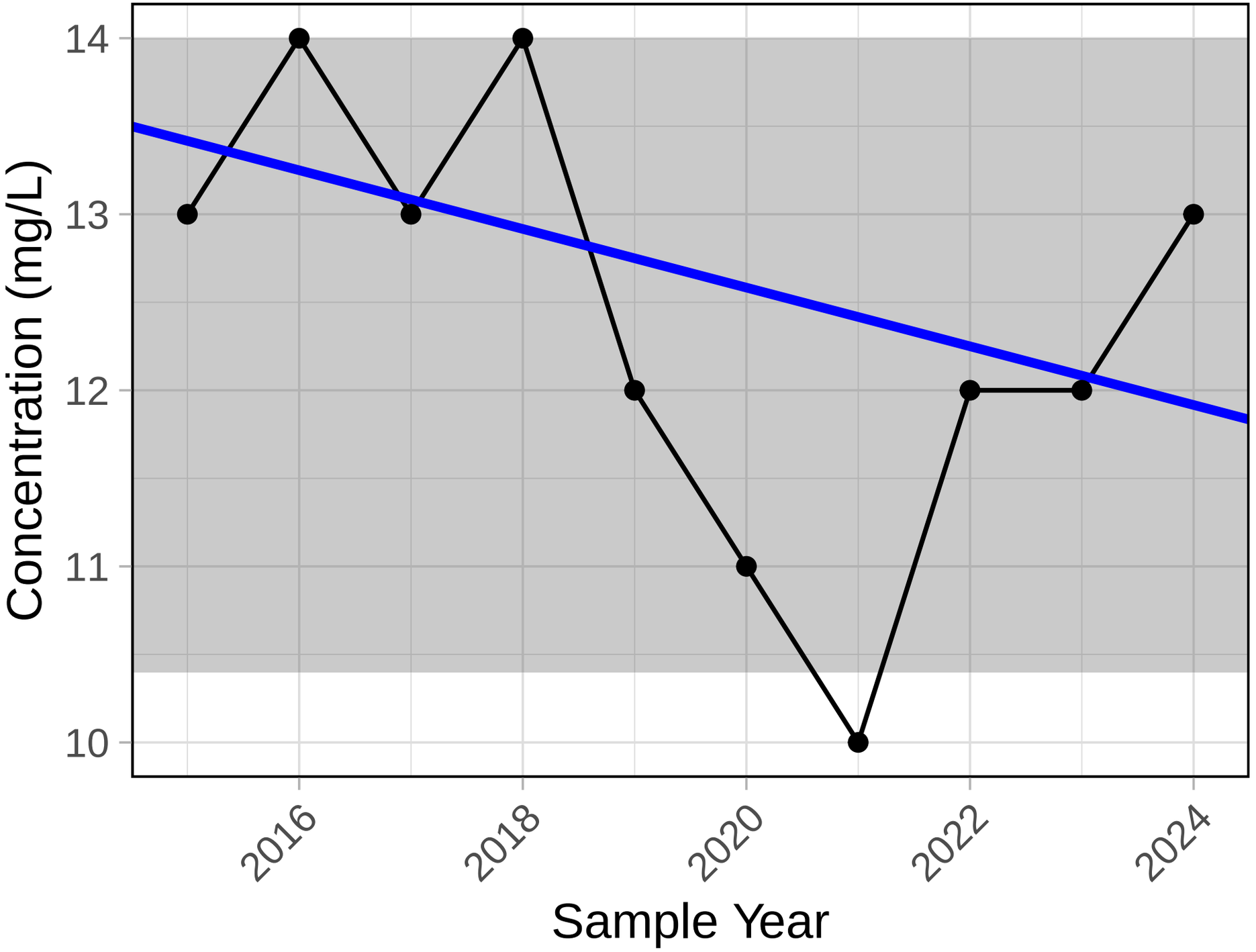


Trend significance p−value = 0.85


Total Kjeldahl Nitrogen
Edith Water
0.8
0.7
0.6
0.5
0.4
Concentration (mg/L)
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.059

Total Organic Carbon

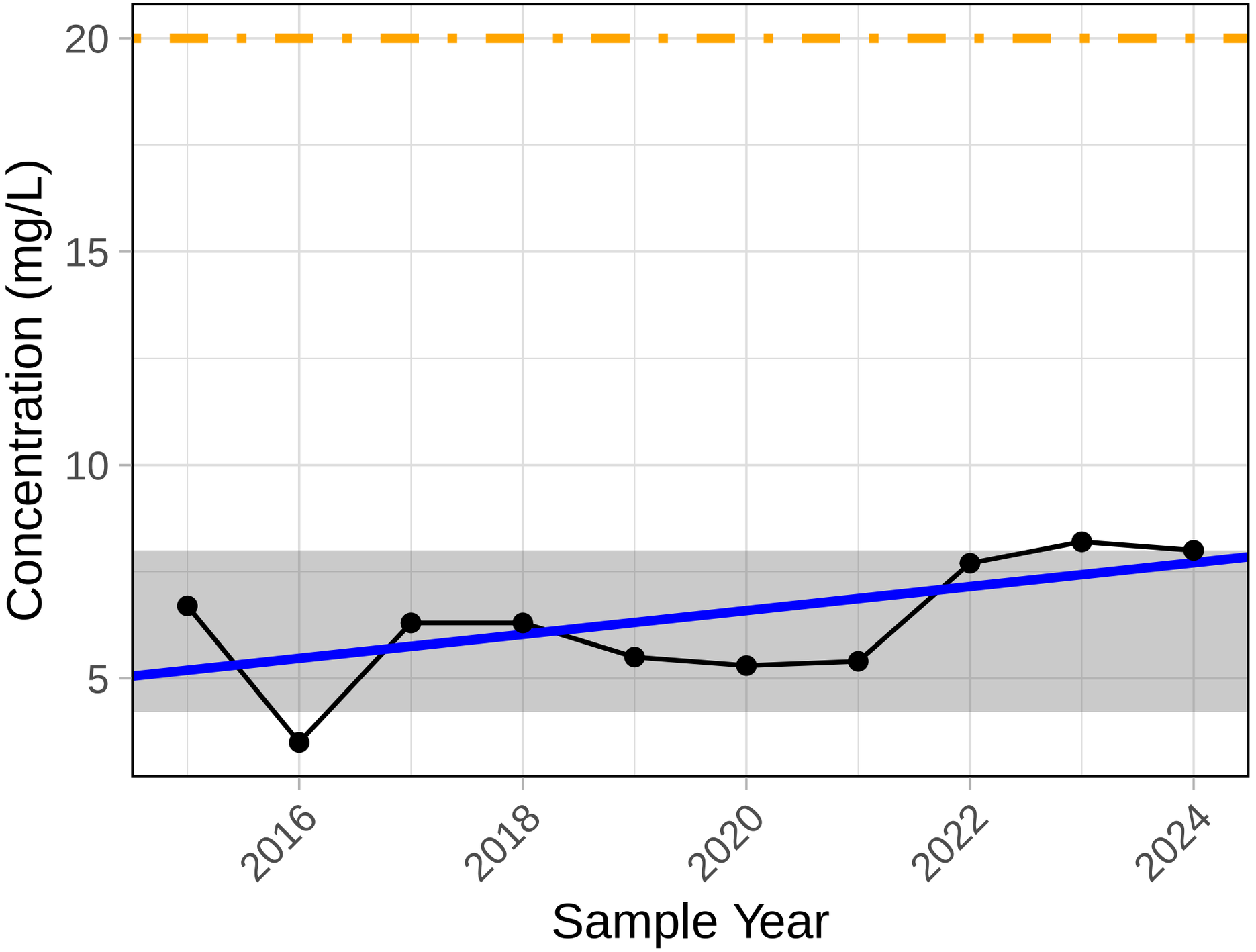
Edith Water



Trend significance p−value = 0.229

Total Alkalinity (as CaCO3)

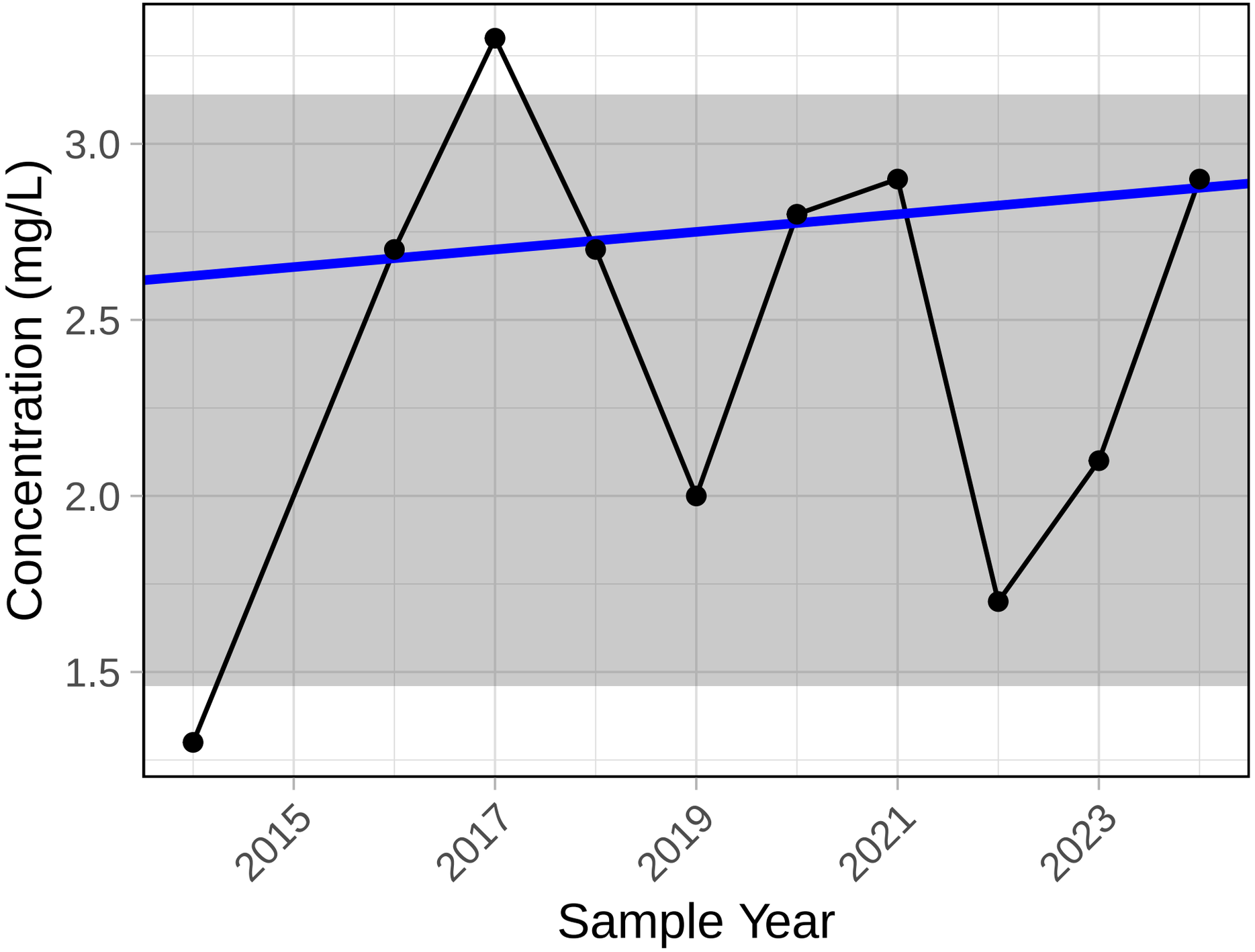
Edith Water



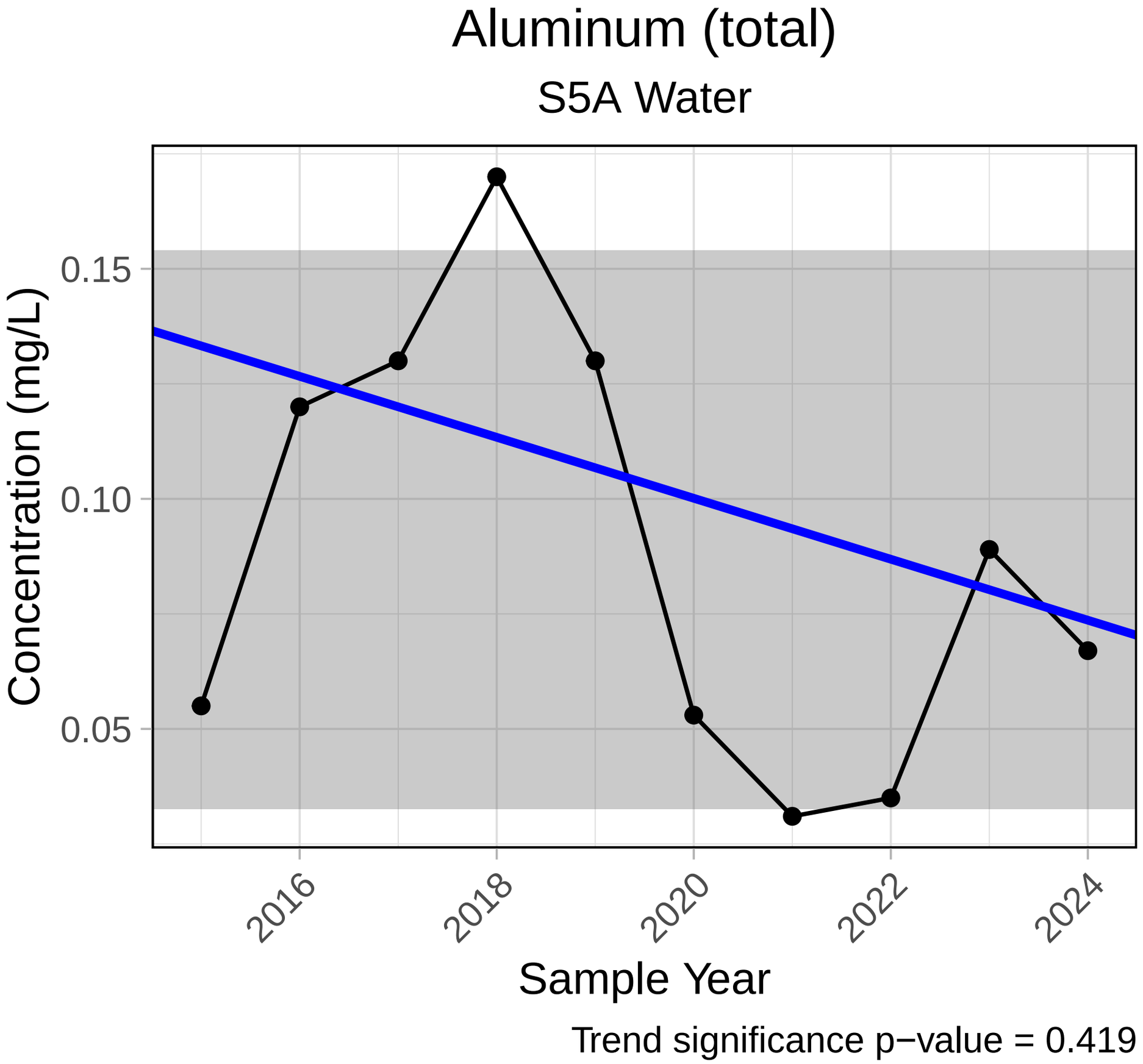
Trend significance p−value = 0.243
Chronic level = 20 mg/L (minimum)

Total Suspended Solids

Edith Water

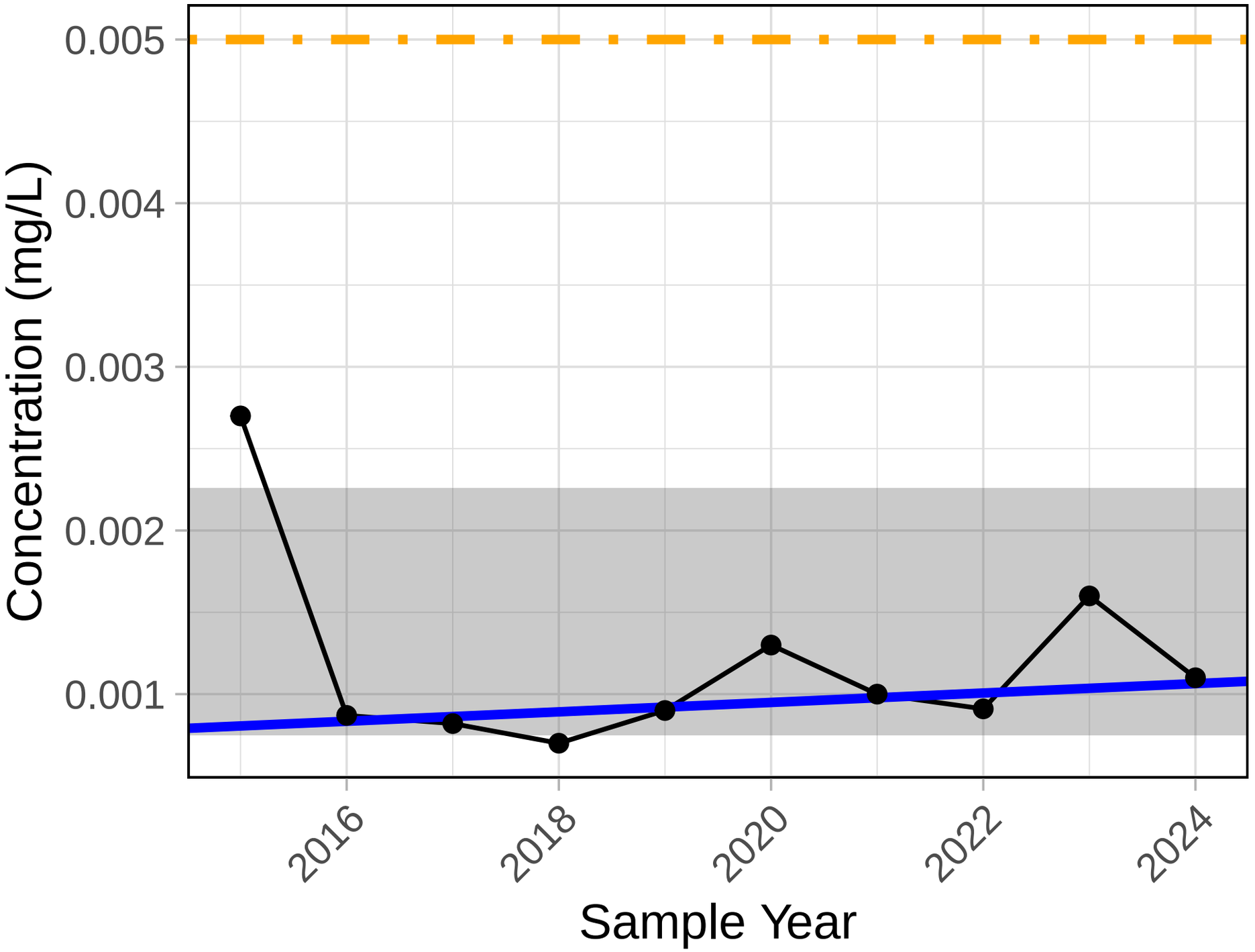


Trend significance p−value = 0.589

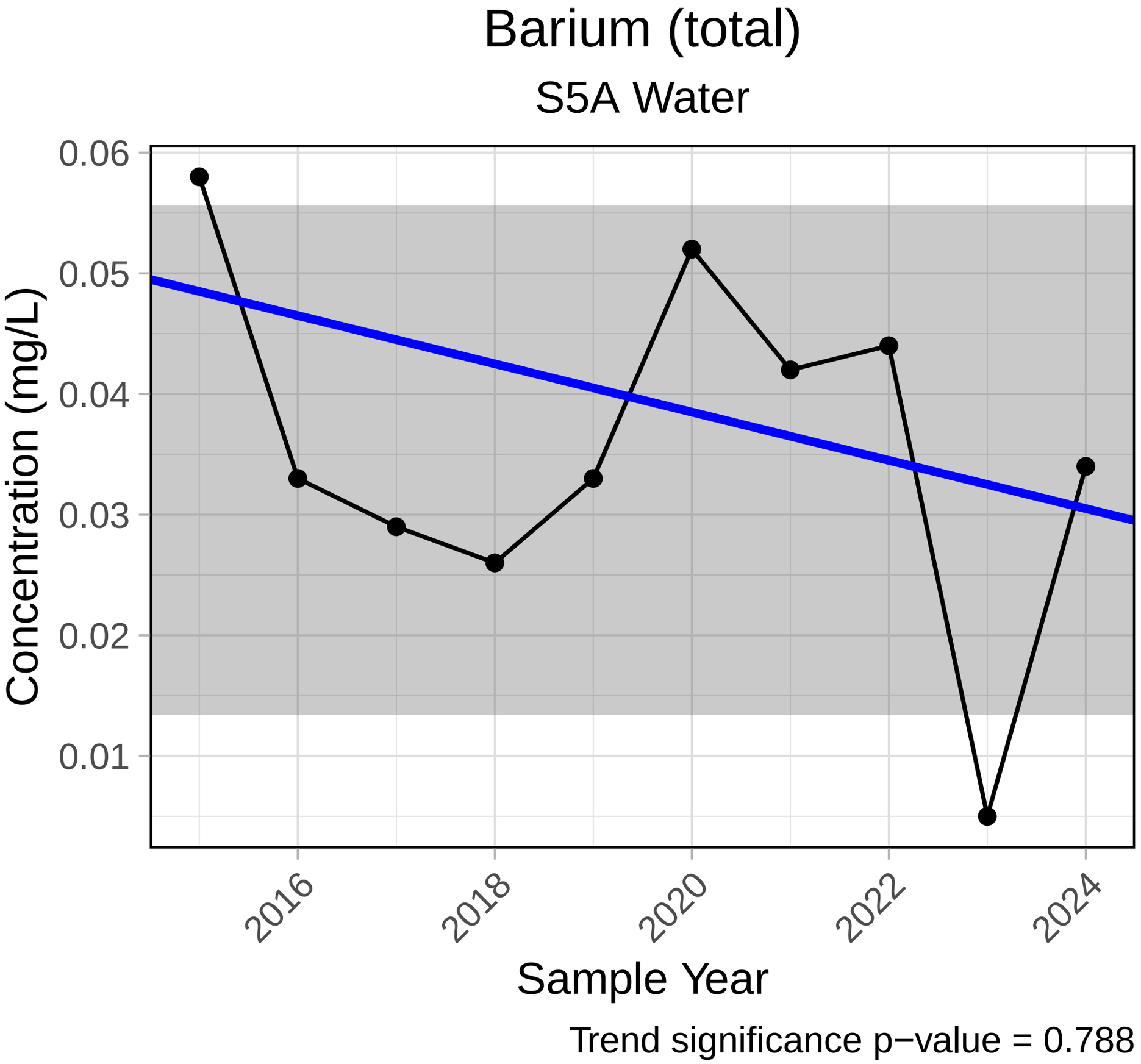

Aluminum (total)
S5A Water
Concentration (mg/L)
0.15
0.10
0.05
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.419

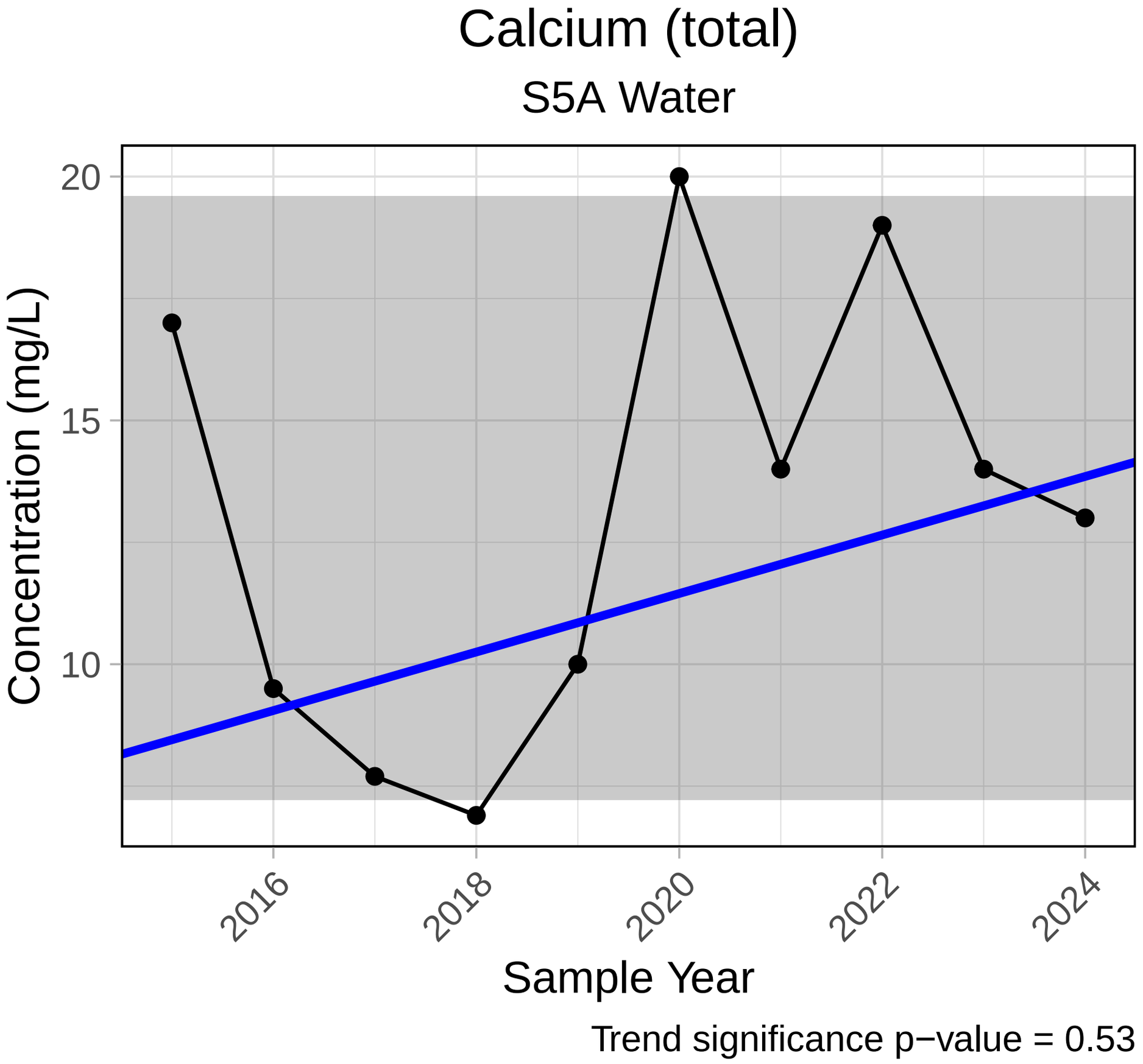
Arsenic (total)

S5A Water



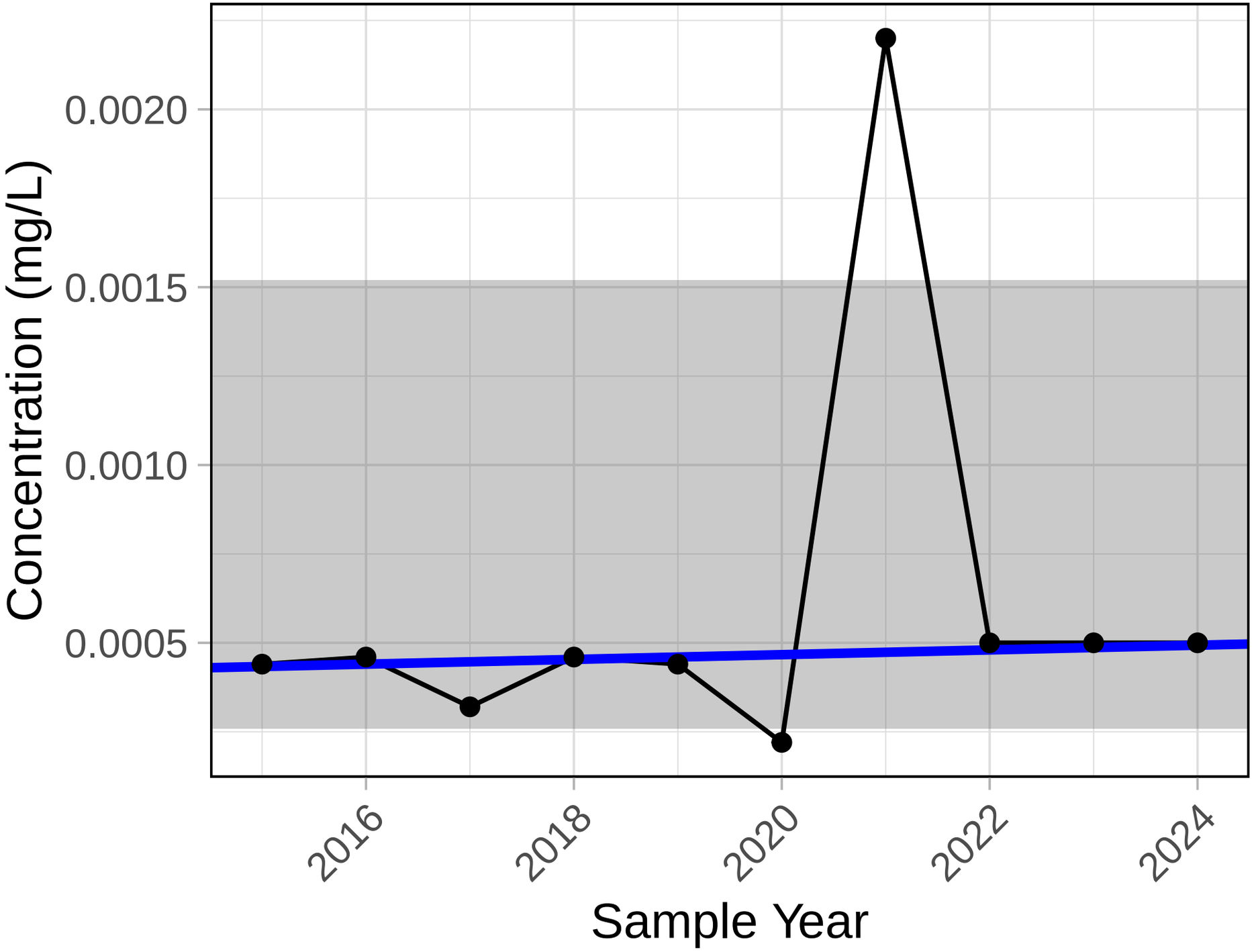
Trend significance p−value = 0.371
Chronic level = 0.005 mg/L (maximum)


Barium (total)
S5A Water
0.06
0.05
0.04
0.03
0.02
0.01
Concentration (mg/L)
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.788


Calcium (total)
S5A Water
Concentration (mg/L)
20
15
10
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.53

Copper (total)

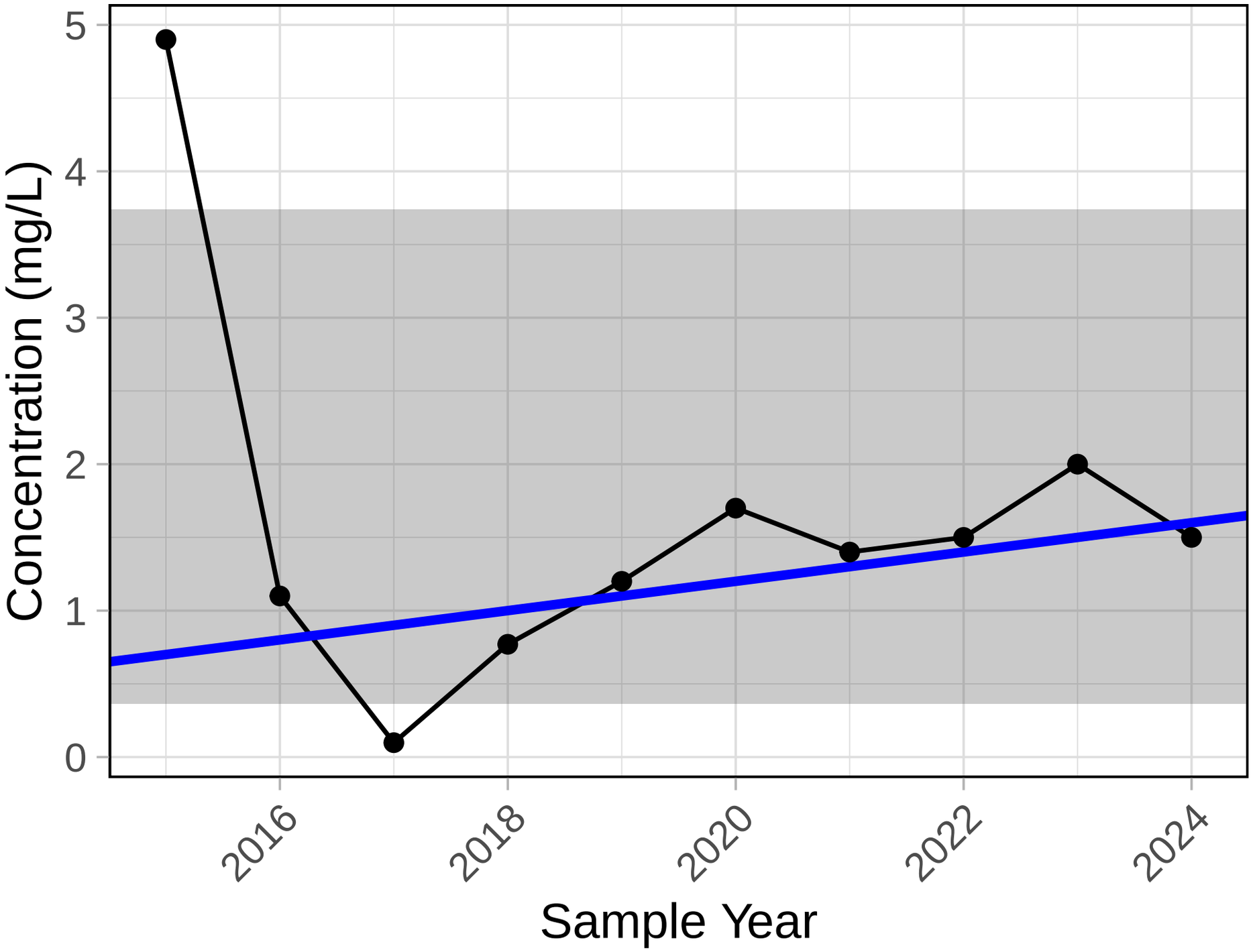
S5A Water



Trend significance p−value = 0.17
Chronic level = 0.007 mg/L
Acute level = 0.0073 mg/L

Iron (total)

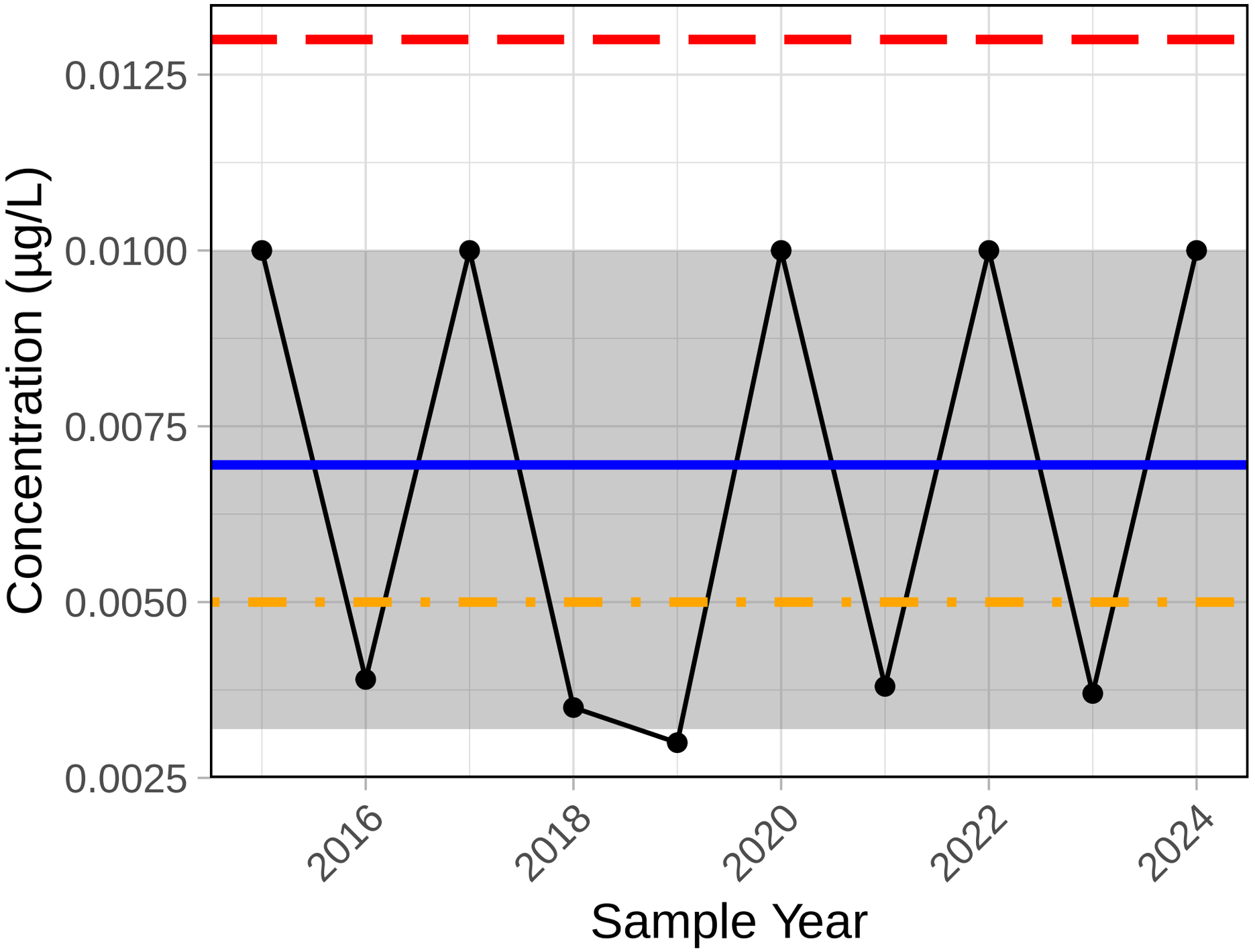
S5A Water



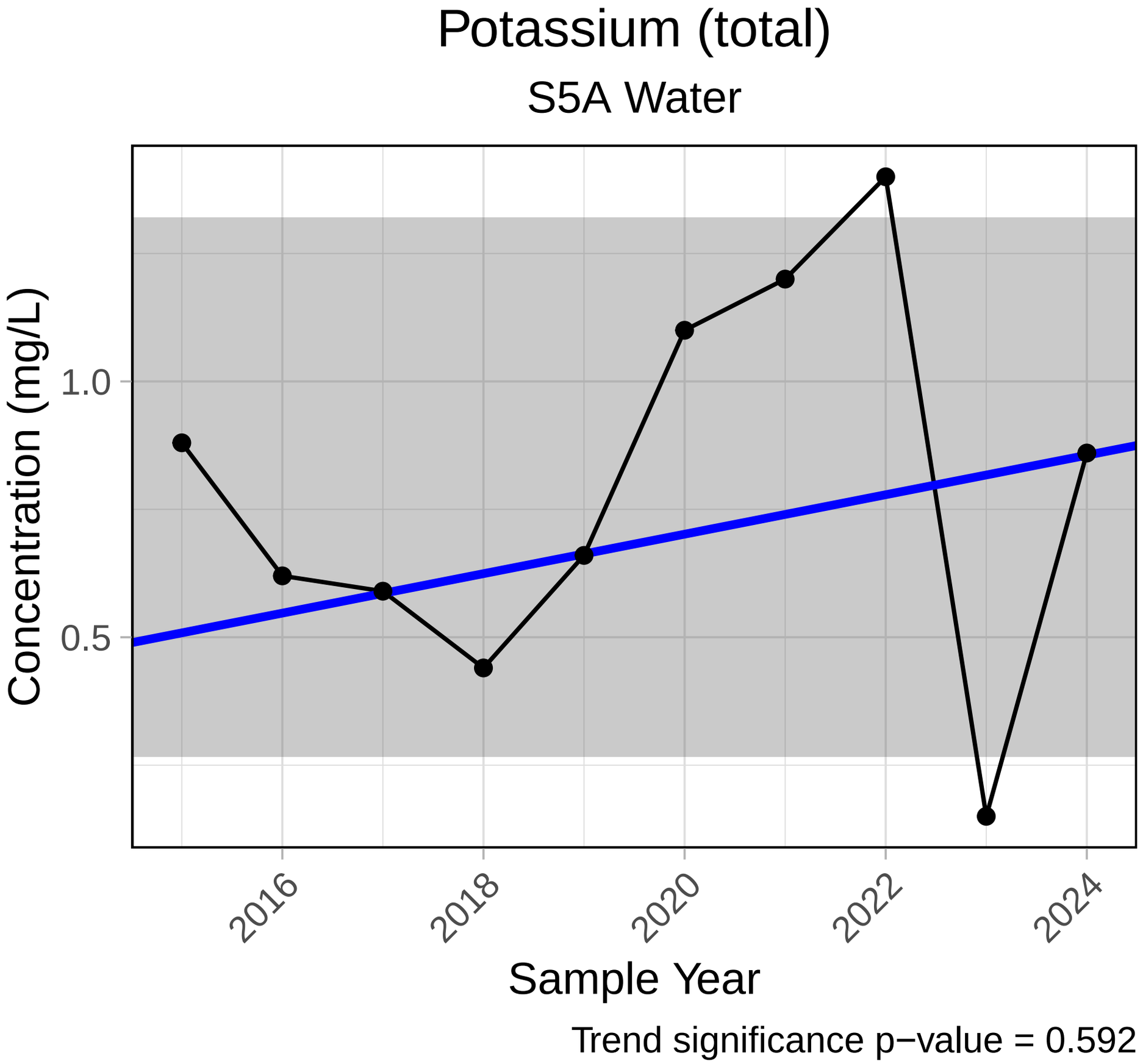
Trend significance p−value = 0.243

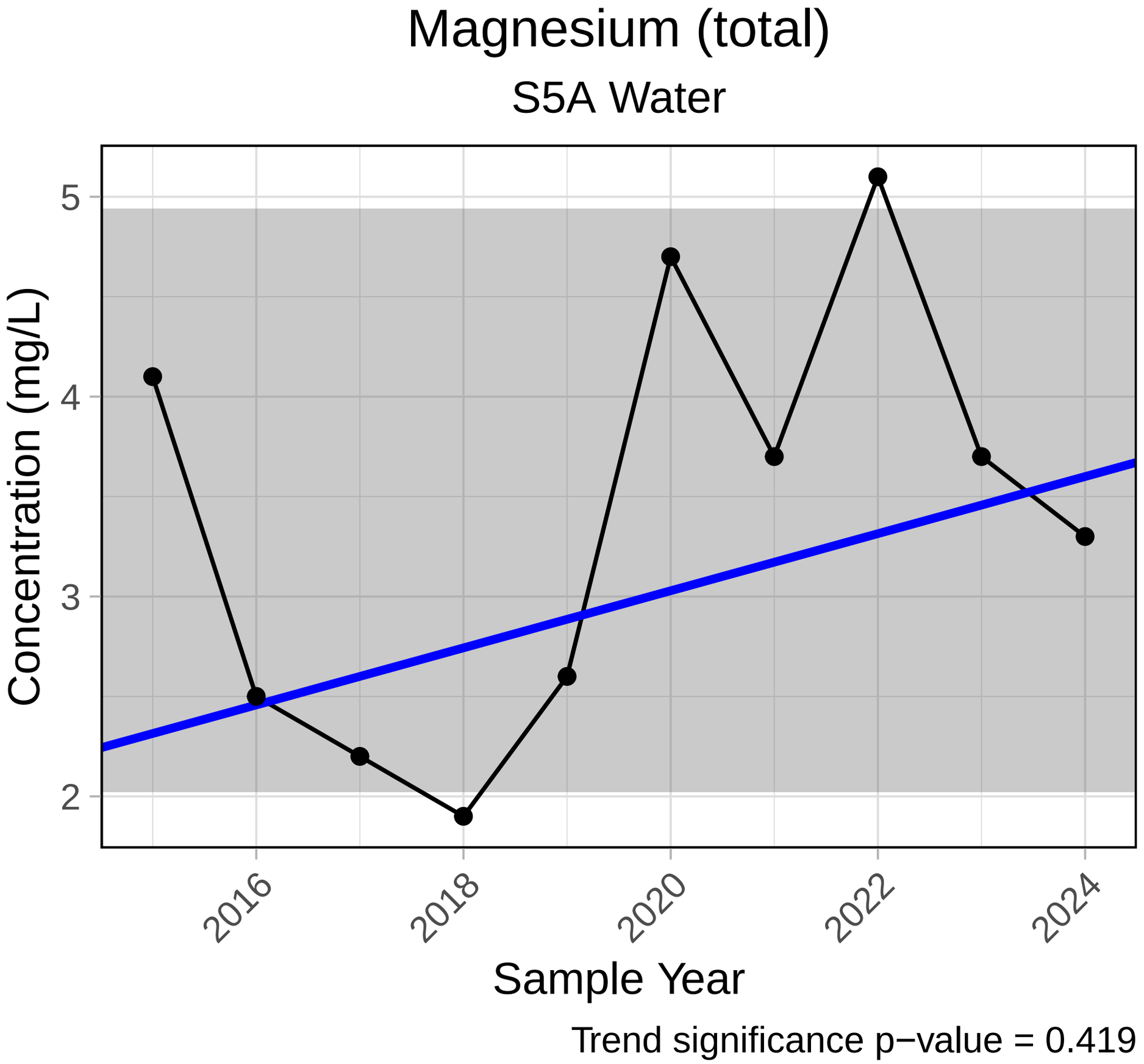
Mercury (total)

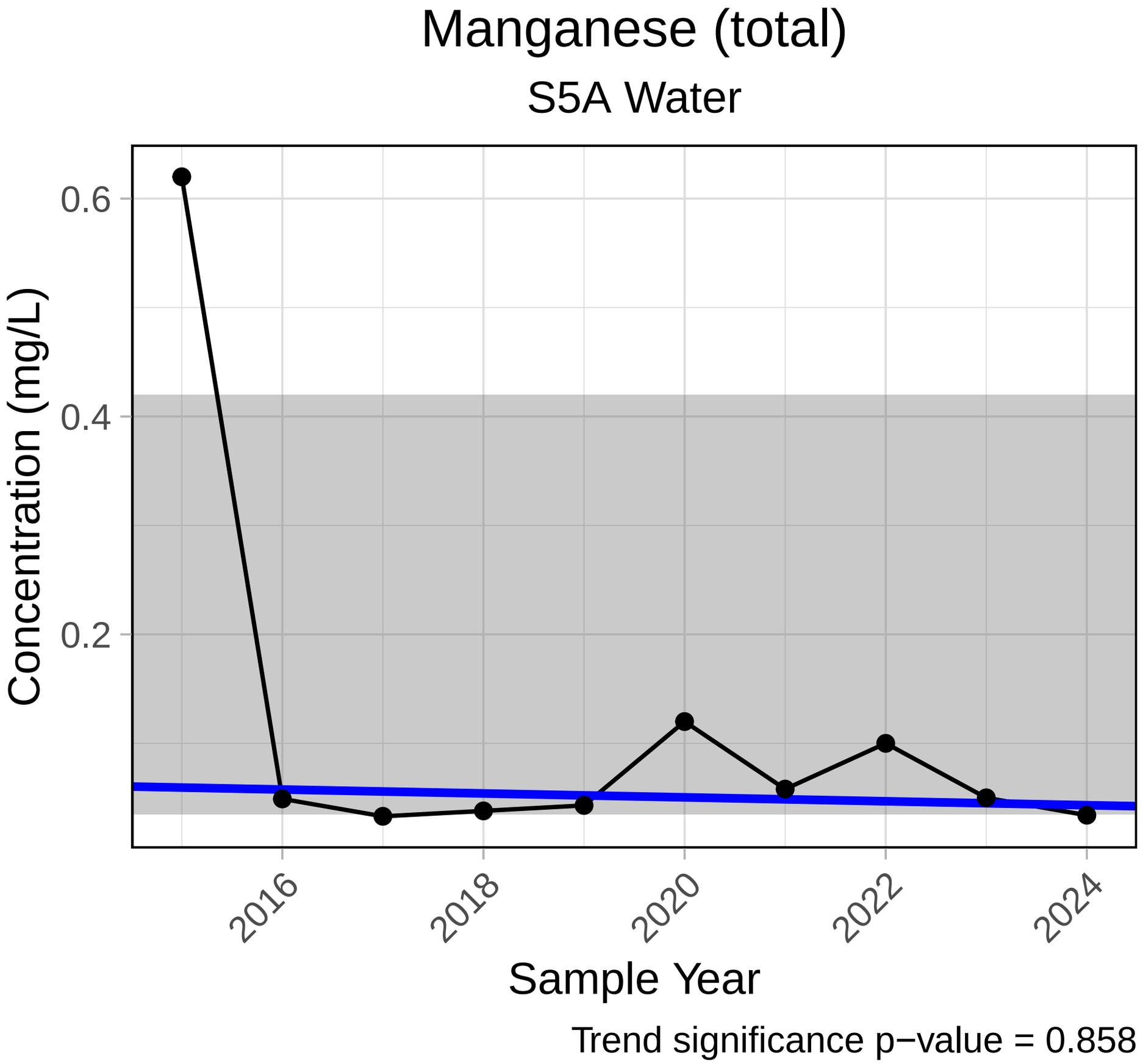
S5A Water



Trend significance p−value = 1
Chronic level = 0.005 µg/L (maximum)
Acute level = 0.013 µg/L (maximum)

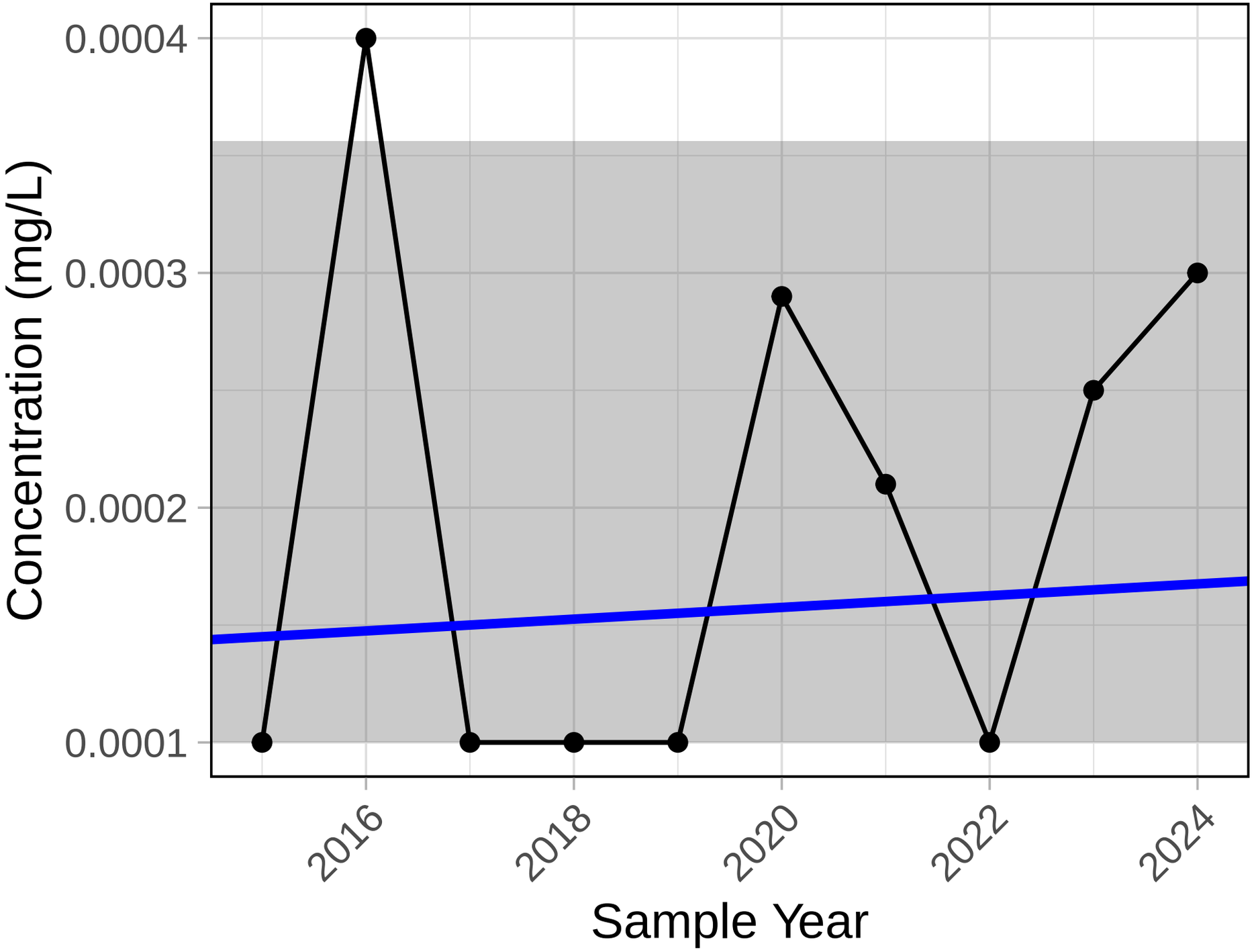

Potassium (total)
S5A Water
Concentration (mg/L)
1.0
0.5
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.592


Magnesium (total)
S5A Water
Concentration (mg/L)
5
4
3
2
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.419

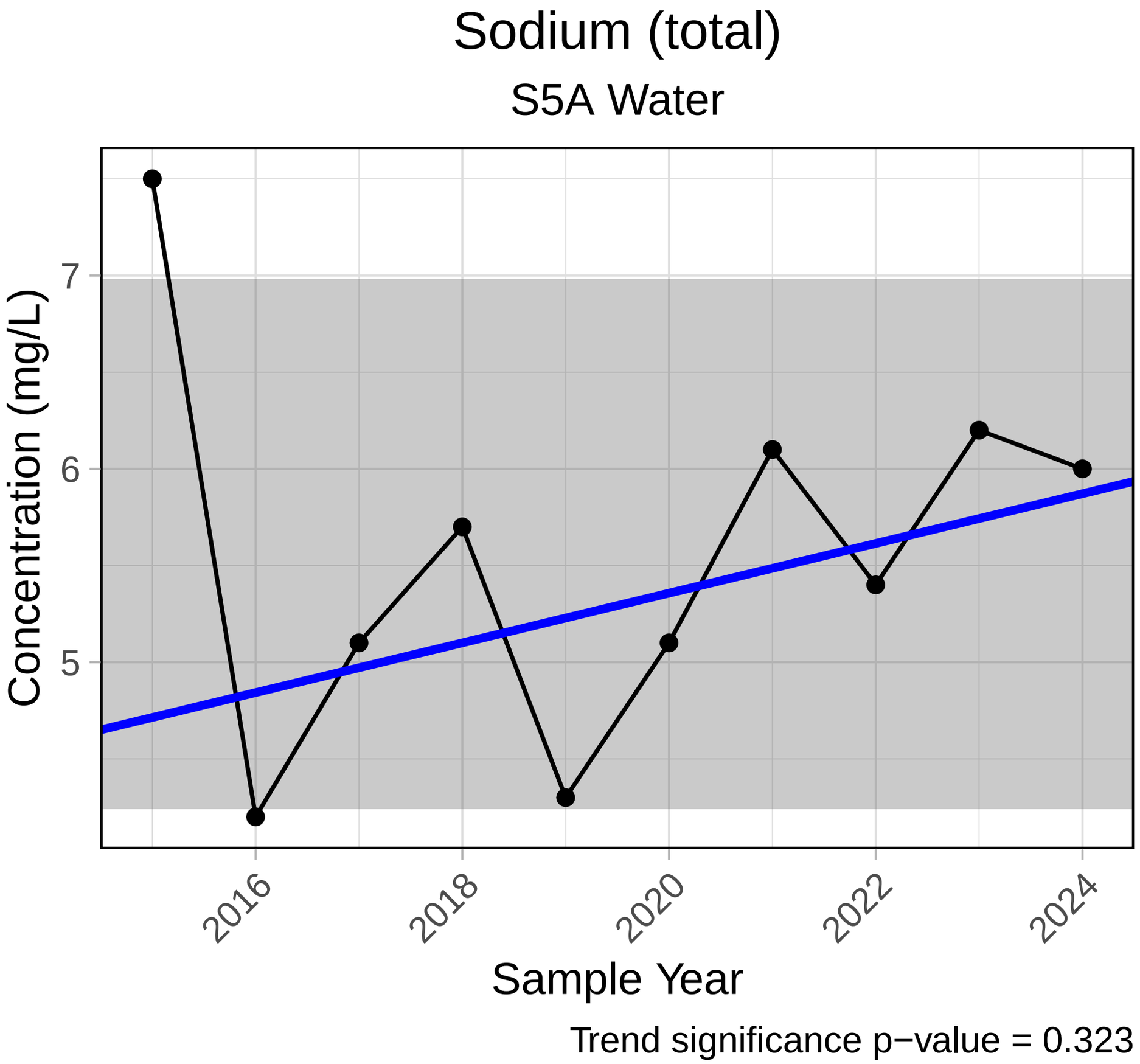

Manganese (total)
S5A Water
Concentration (mg/L)
0.6
0.4
0.2
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.858

Molybdenum (total)

S5A Water

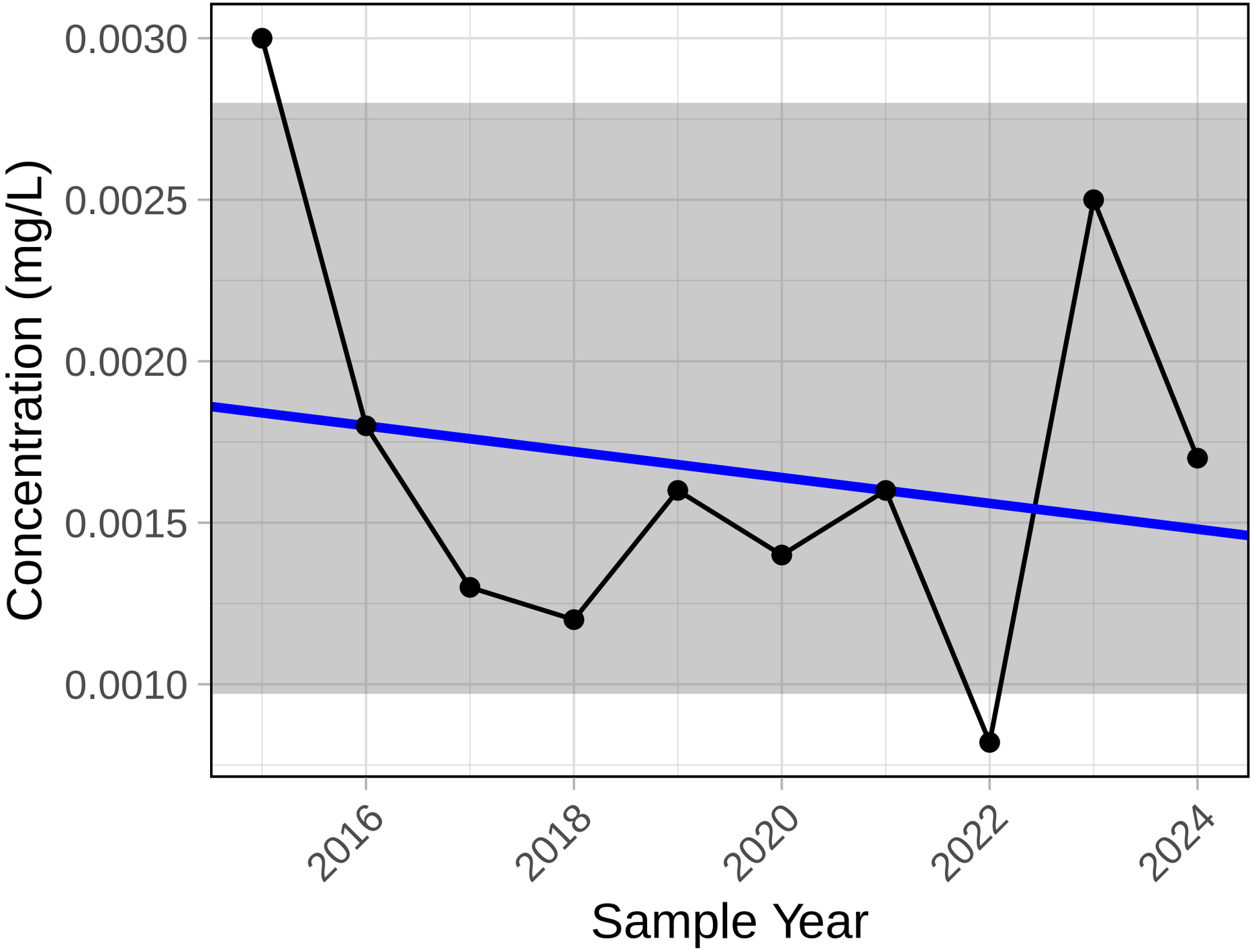


Trend significance p−value = 0.337
Chronic level = 0.073 mg/L (maximum)

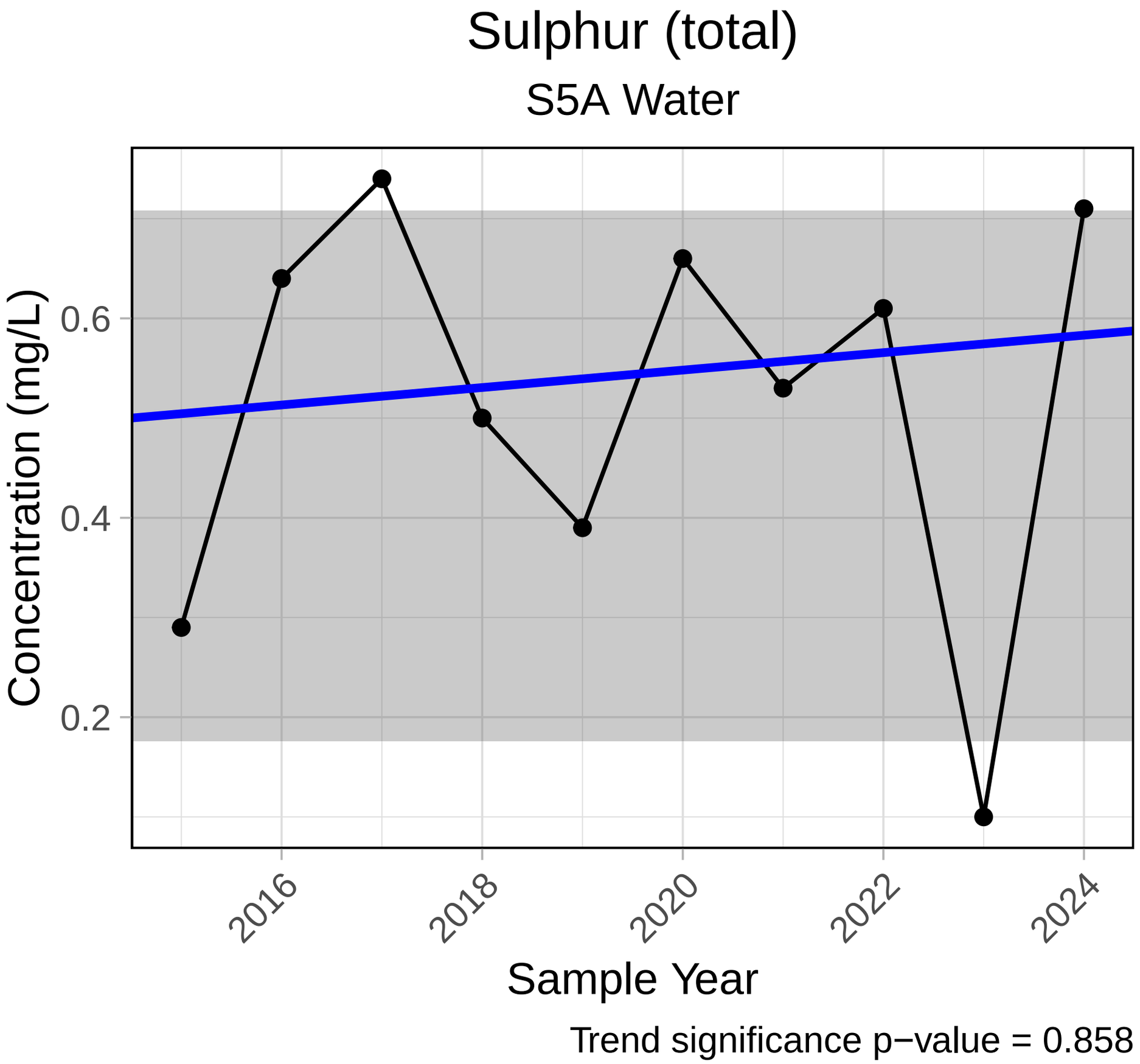

Sodium (total)
S5A Water
Concentration (mg/L)
7
6
5
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.323

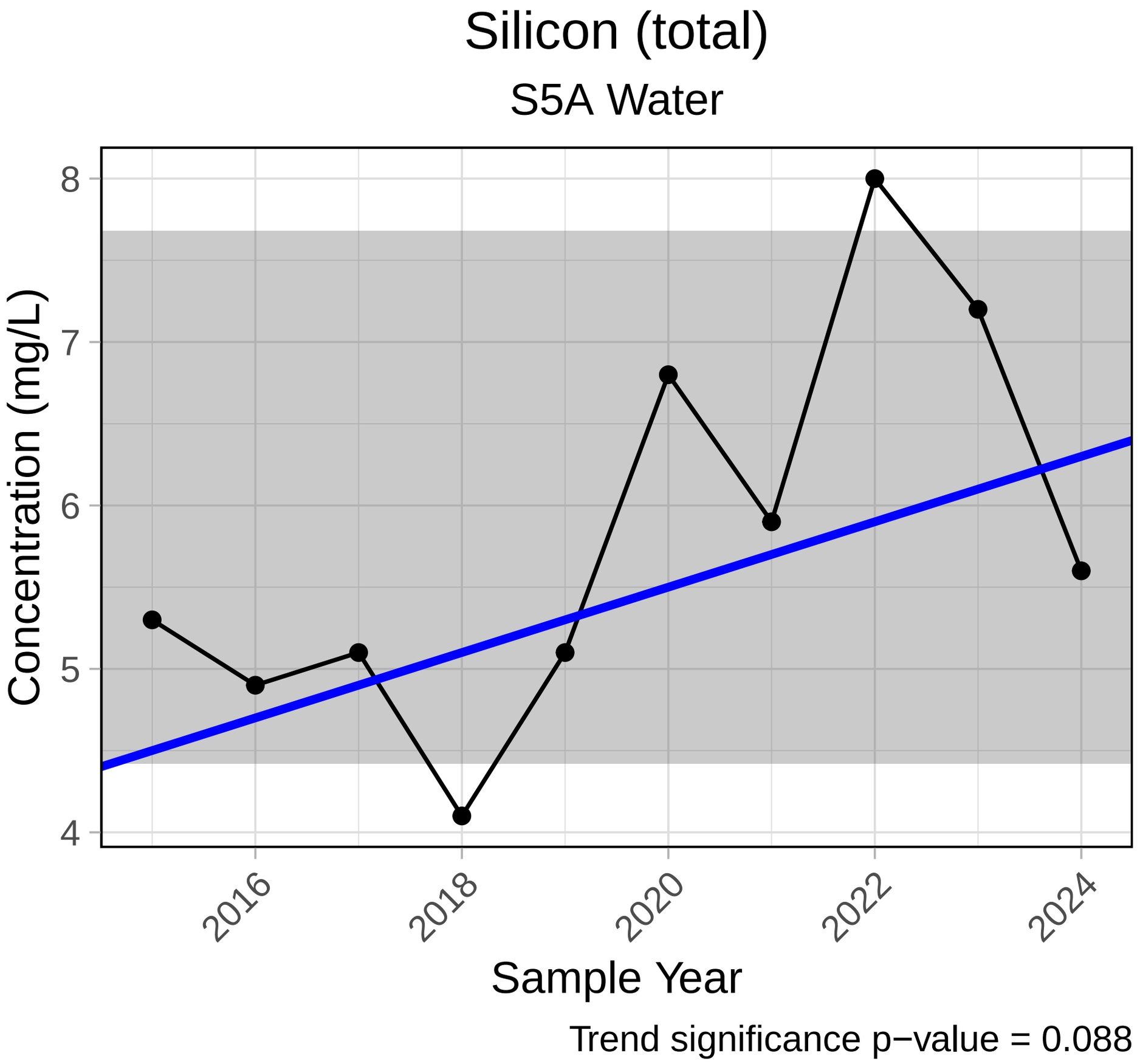
Nickel (total)

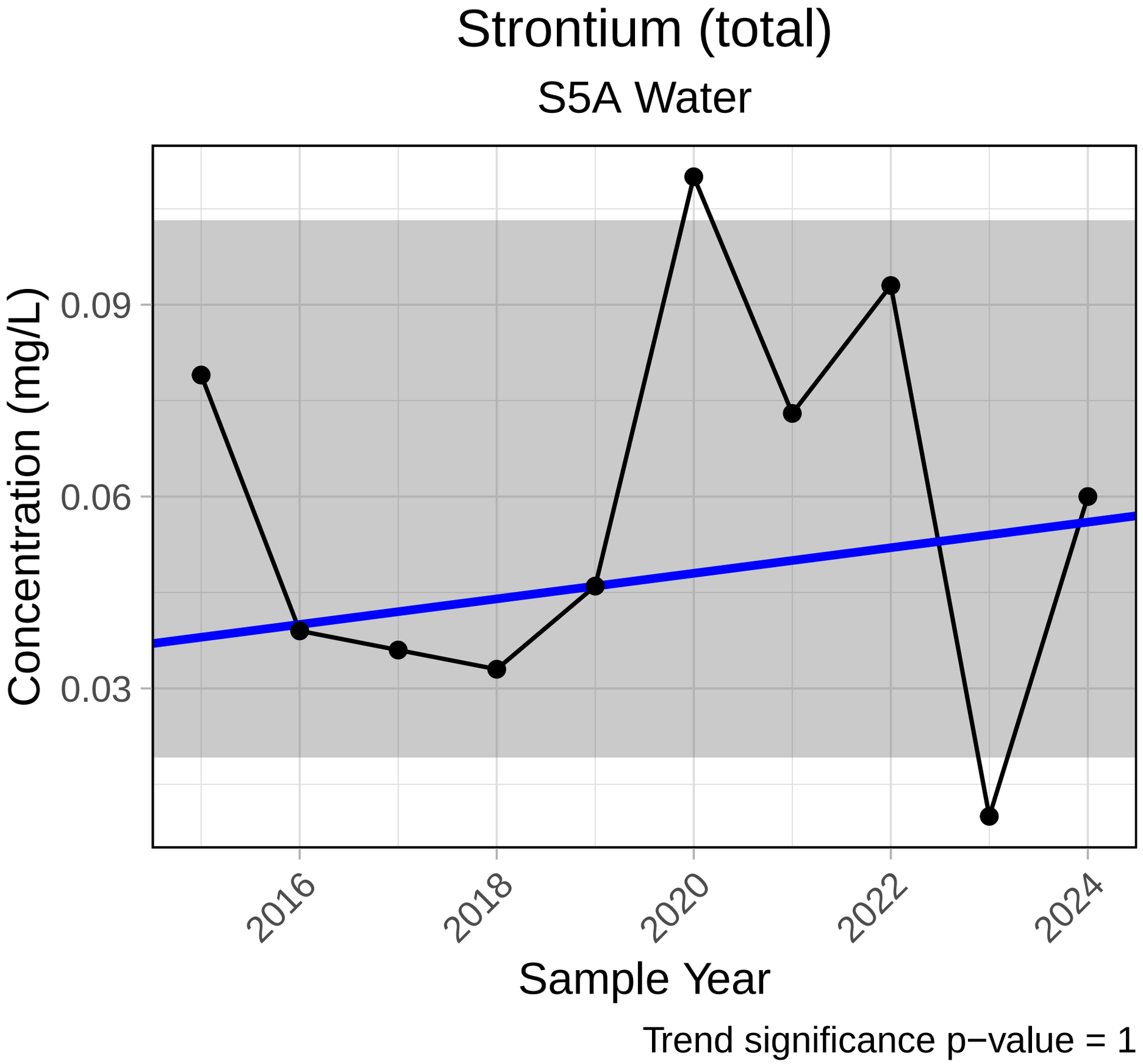
S5A Water

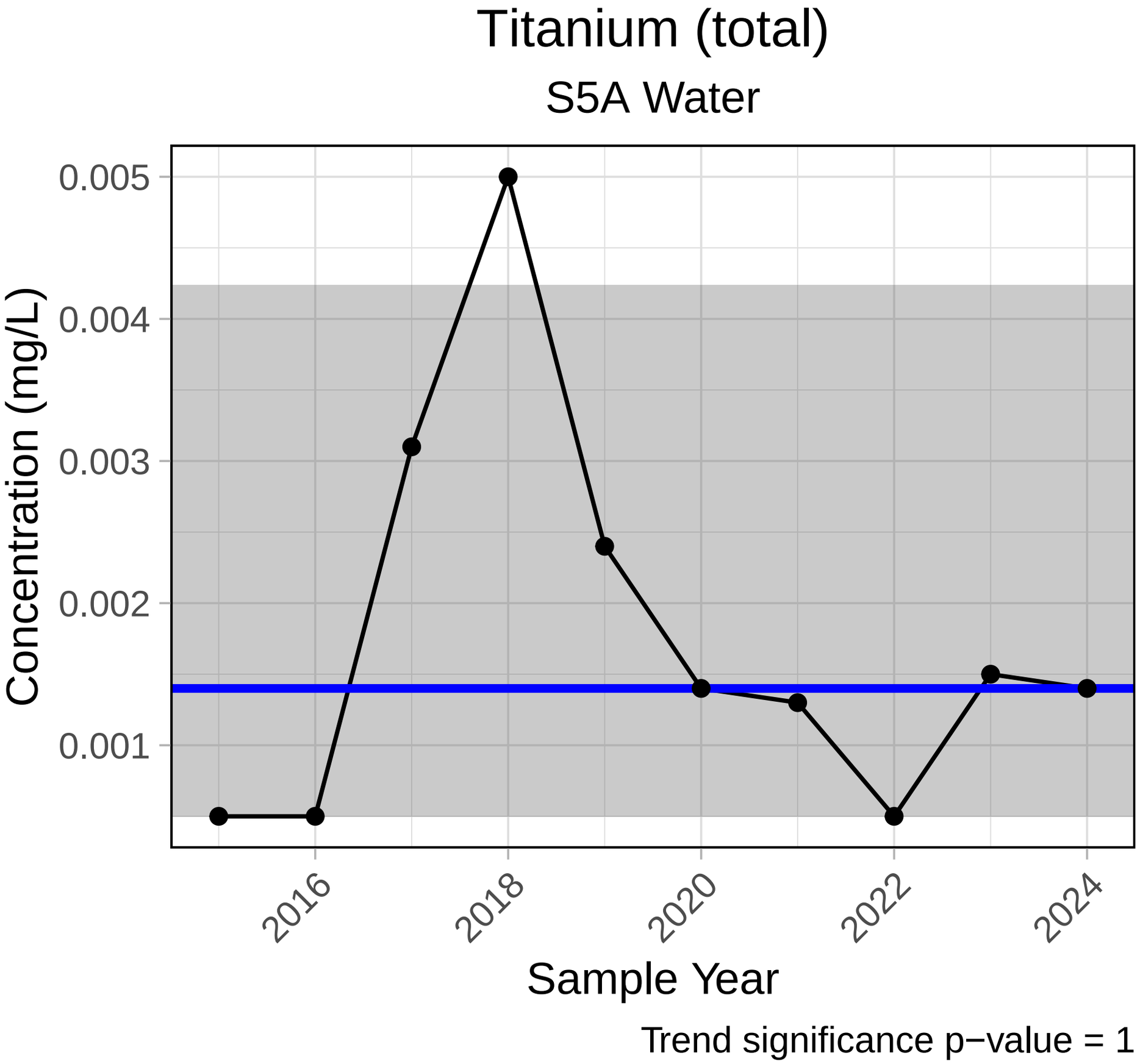


Trend significance p−value = 0.788
Chronic level = 0.027 mg/L
Acute level = 0.24 mg/L


Sulphur (total)
S5A Water
Concentration (mg/L)
0.6
0.4
0.2
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.858

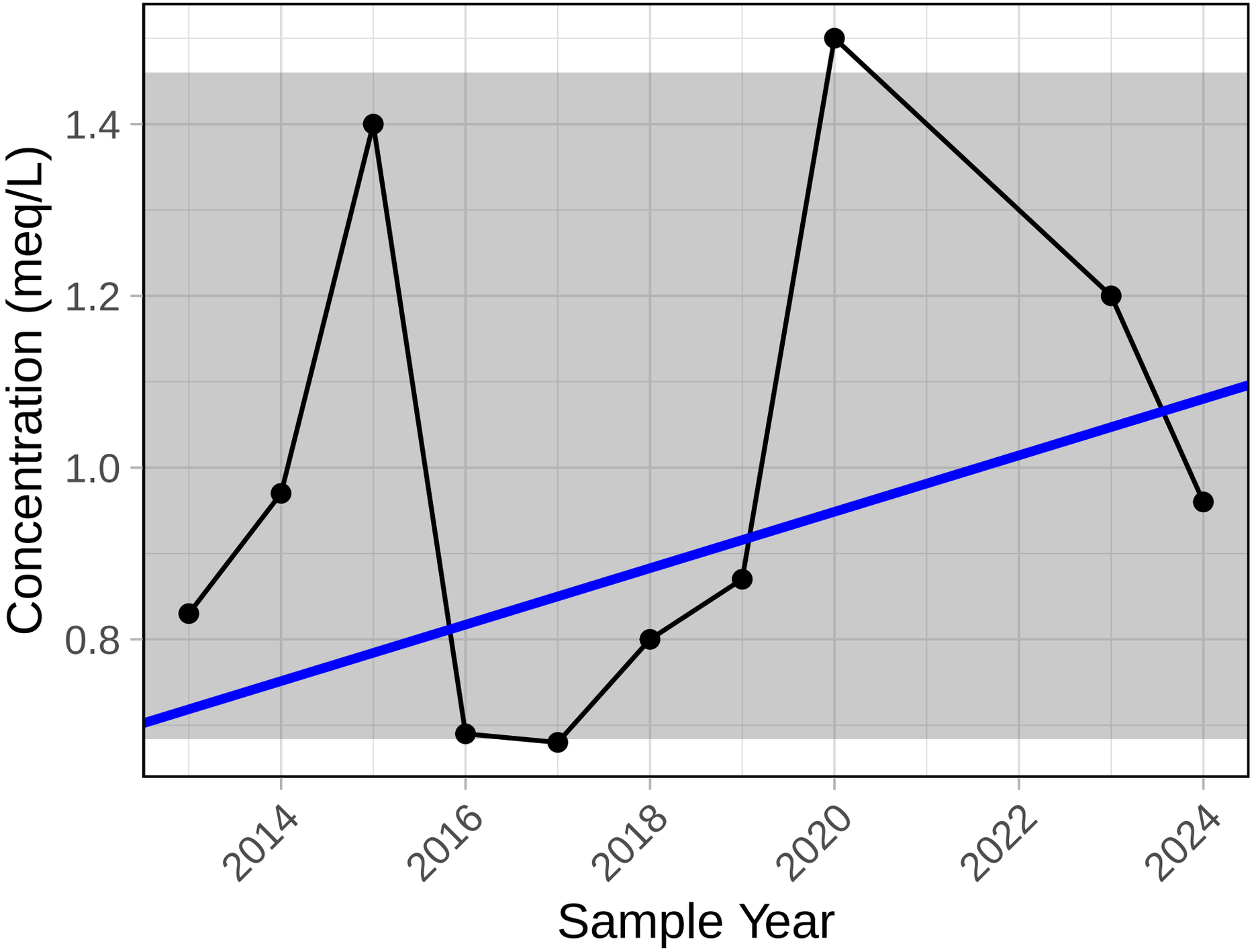

Silicon (total)
S5A Water
Concentration (mg/L)
8
7
6
5
4
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.088


Strontium (total)
S5A Water
Concentration (mg/L)
0.09
0.06
0.03
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 1

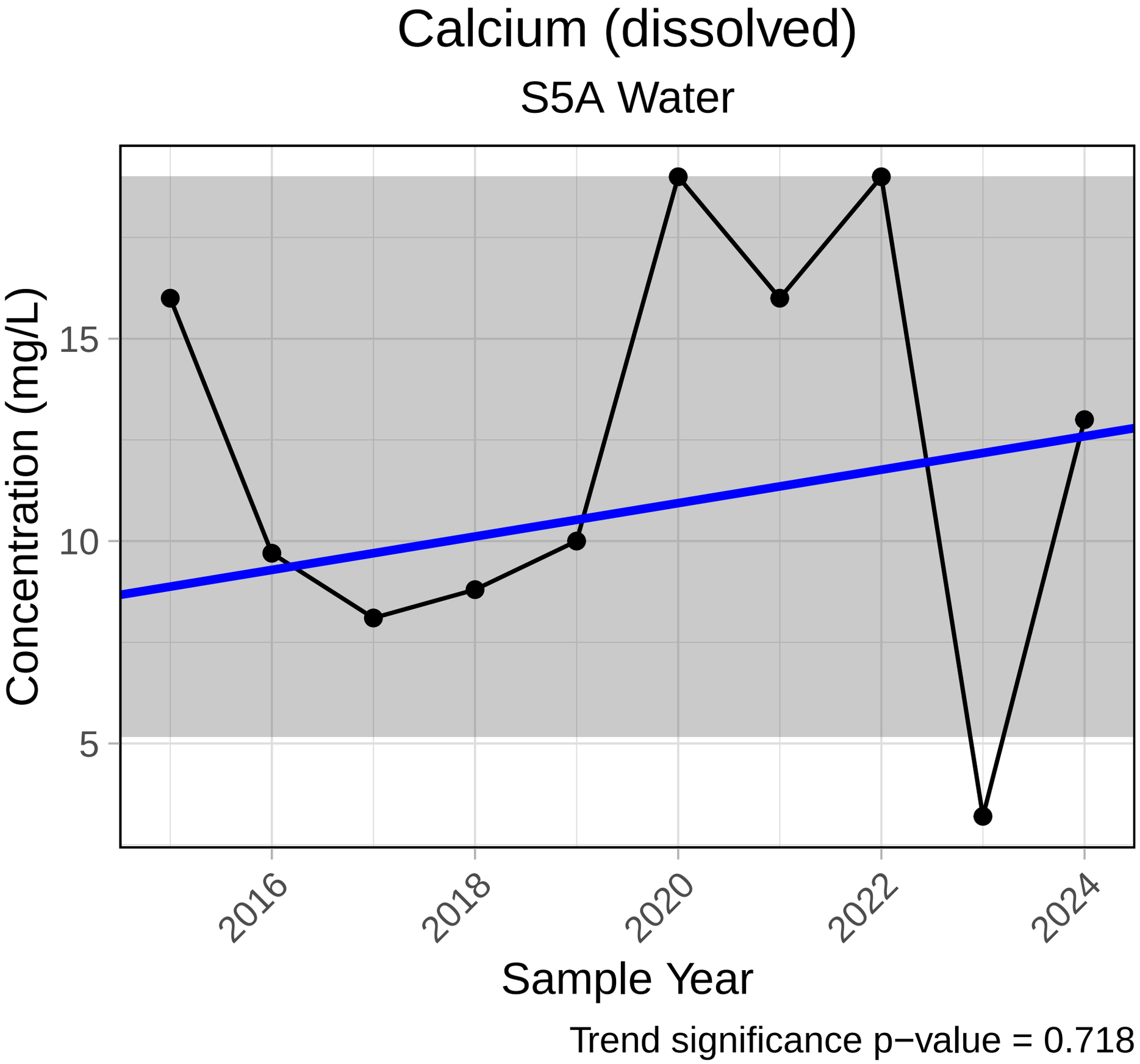

Titanium (total)
S5A Water
0.005
0.004
0.003
0.002
0.001
Concentration (mg/L)
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 1

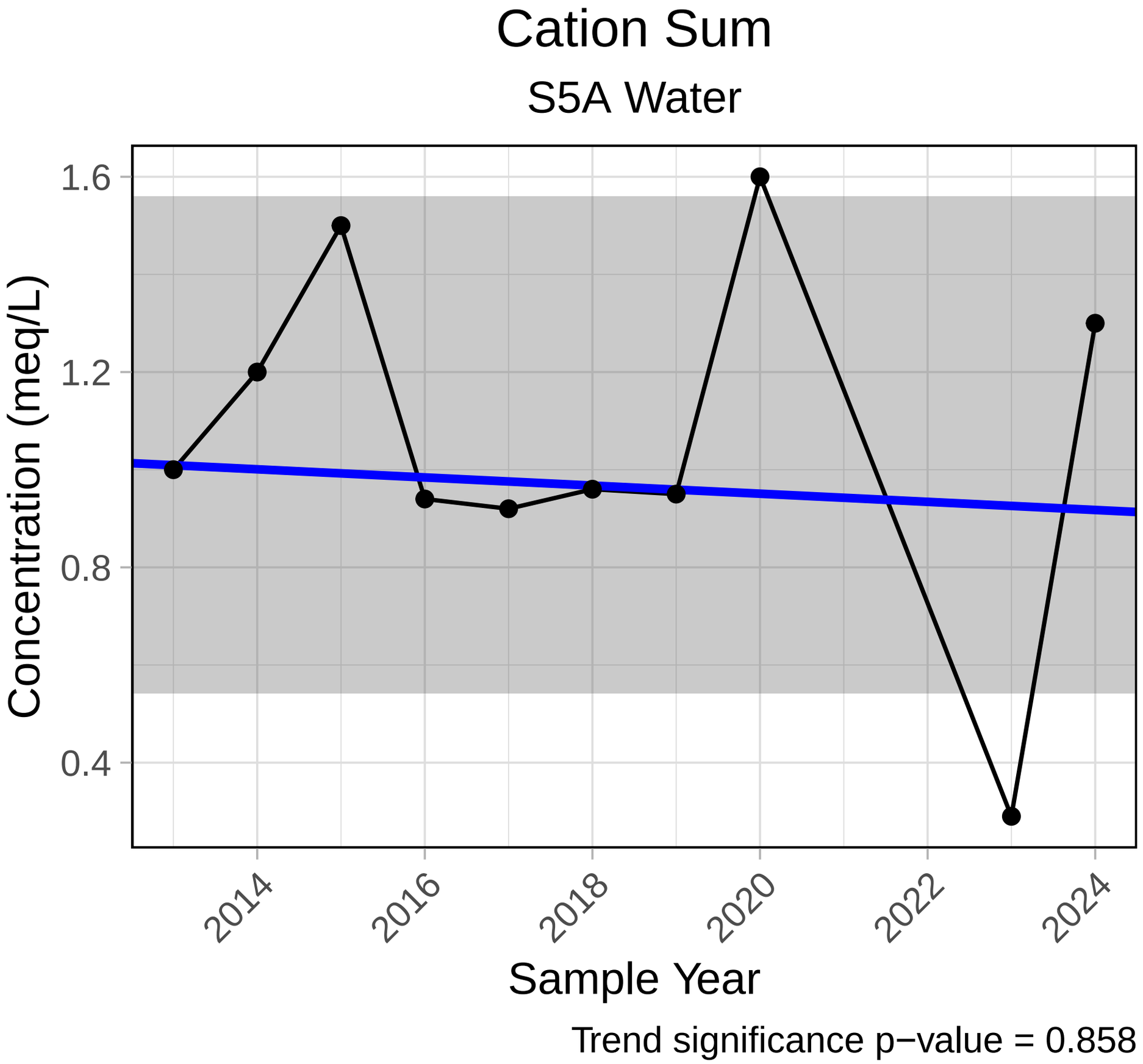
Anion Sum

S5A Water



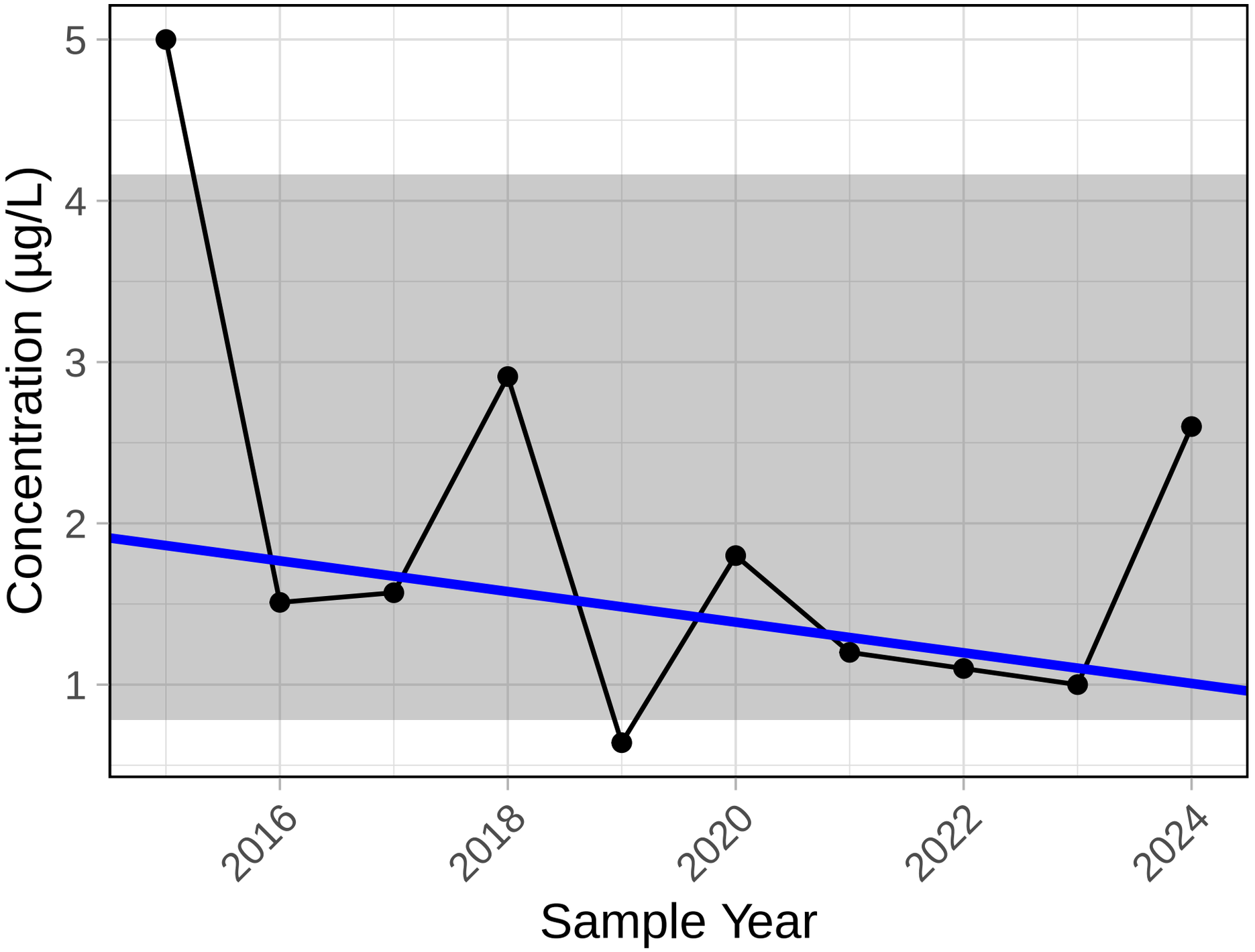
Trend significance p−value = 0.474


Calcium (dissolved)
S5A Water
Concentration (mg/L)
15
10
5
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.718


Cation Sum
S5A Water
Concentration (meq/L)
1.6
1.2
0.8
0.4
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.858

Chlorophyll a

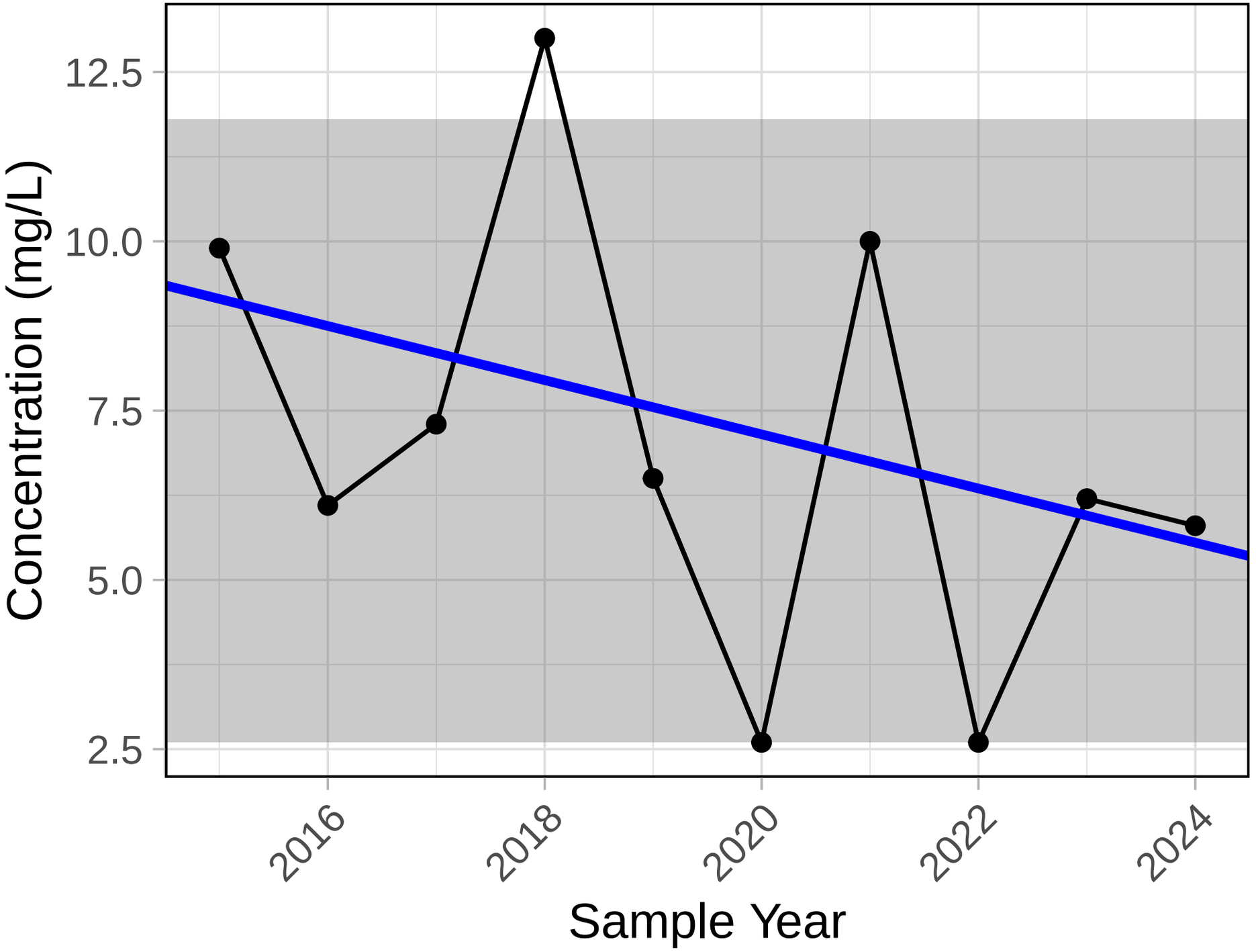
S5A Water



Trend significance p−value = 0.283

Chloride (dissolved)

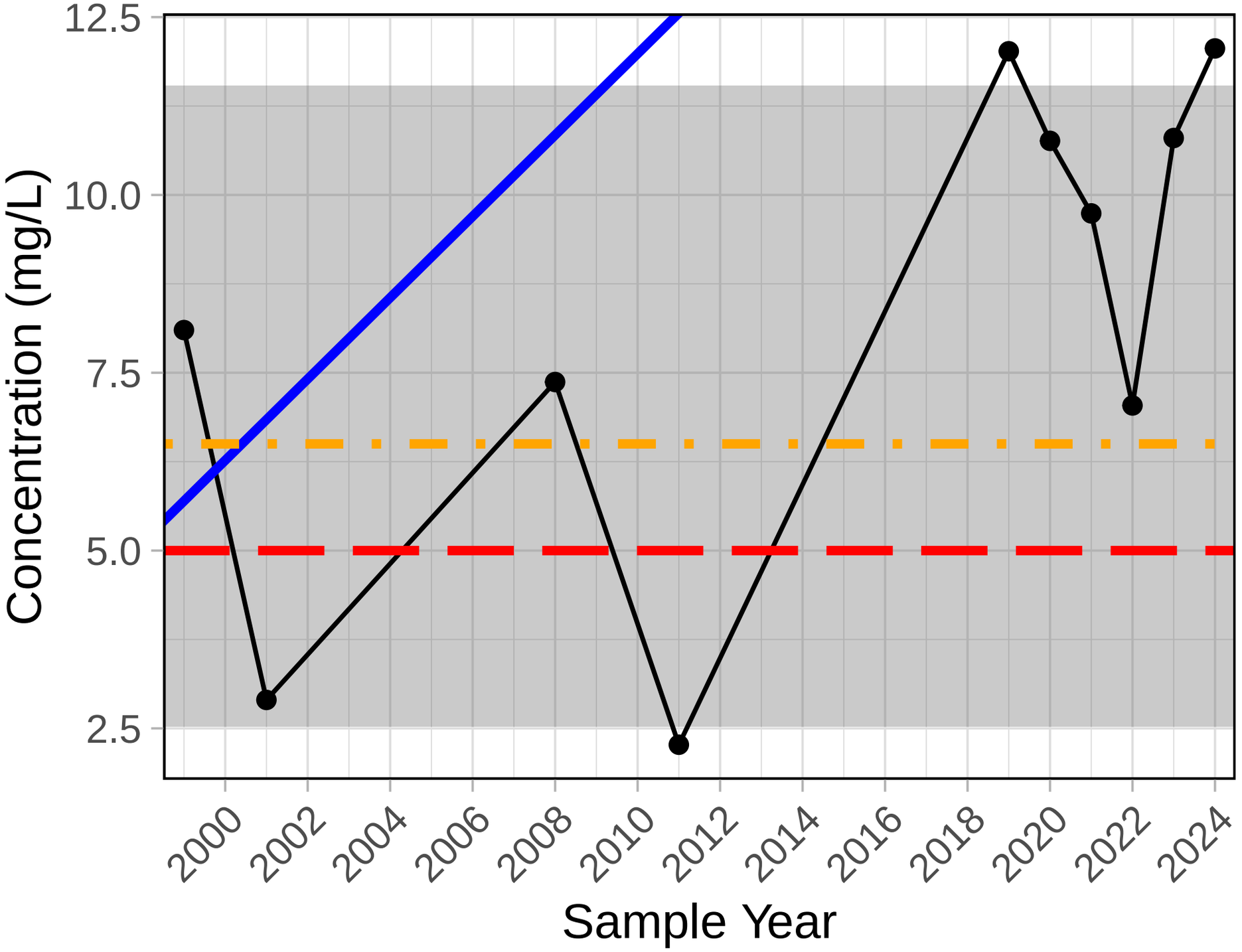
S5A Water



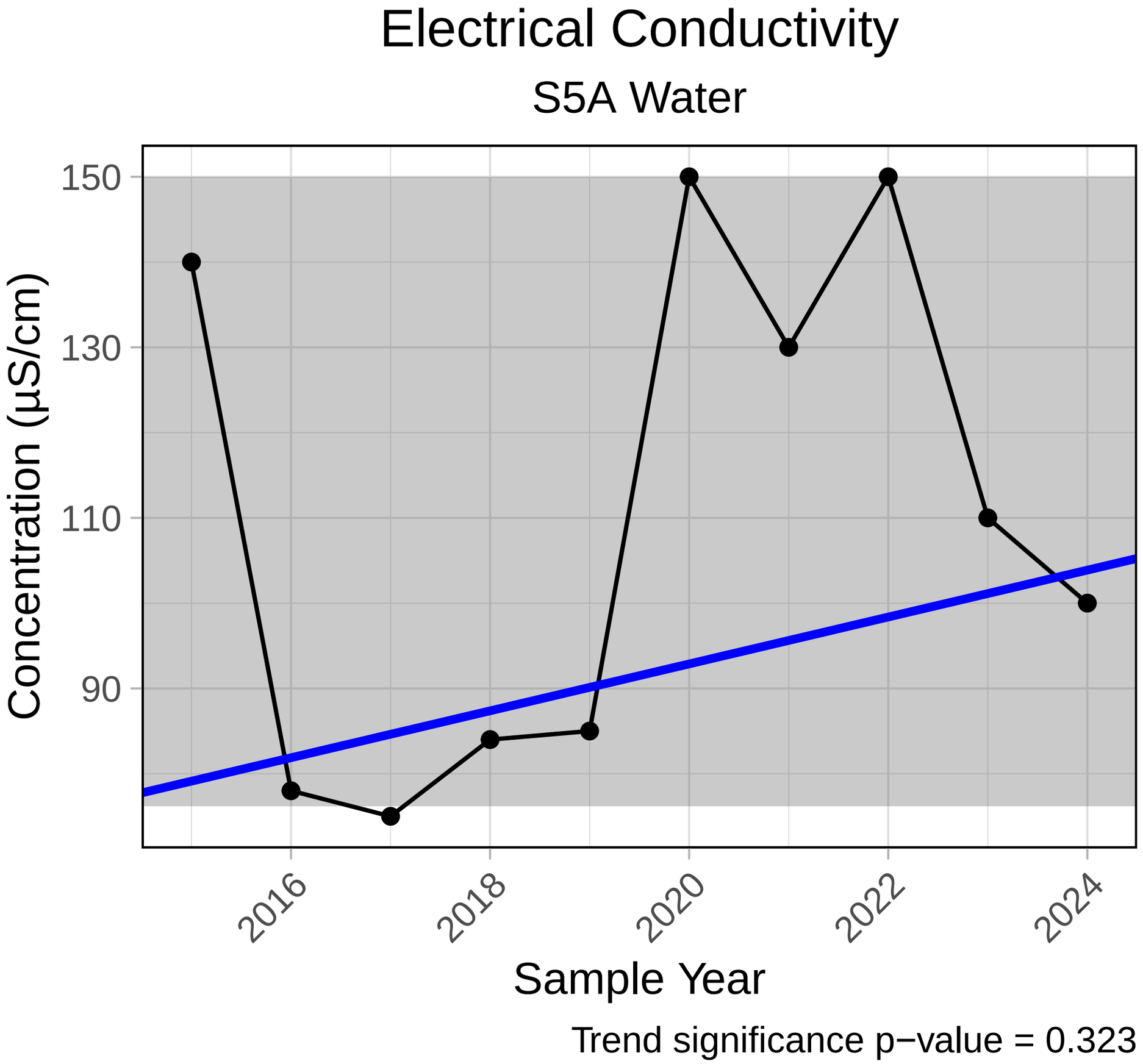
Trend significance p−value = 0.243
Chronic level = 120 mg/L (maximum)
Acute level = 640 mg/L (maximum)

Dissolved Oxygen

S5A Water

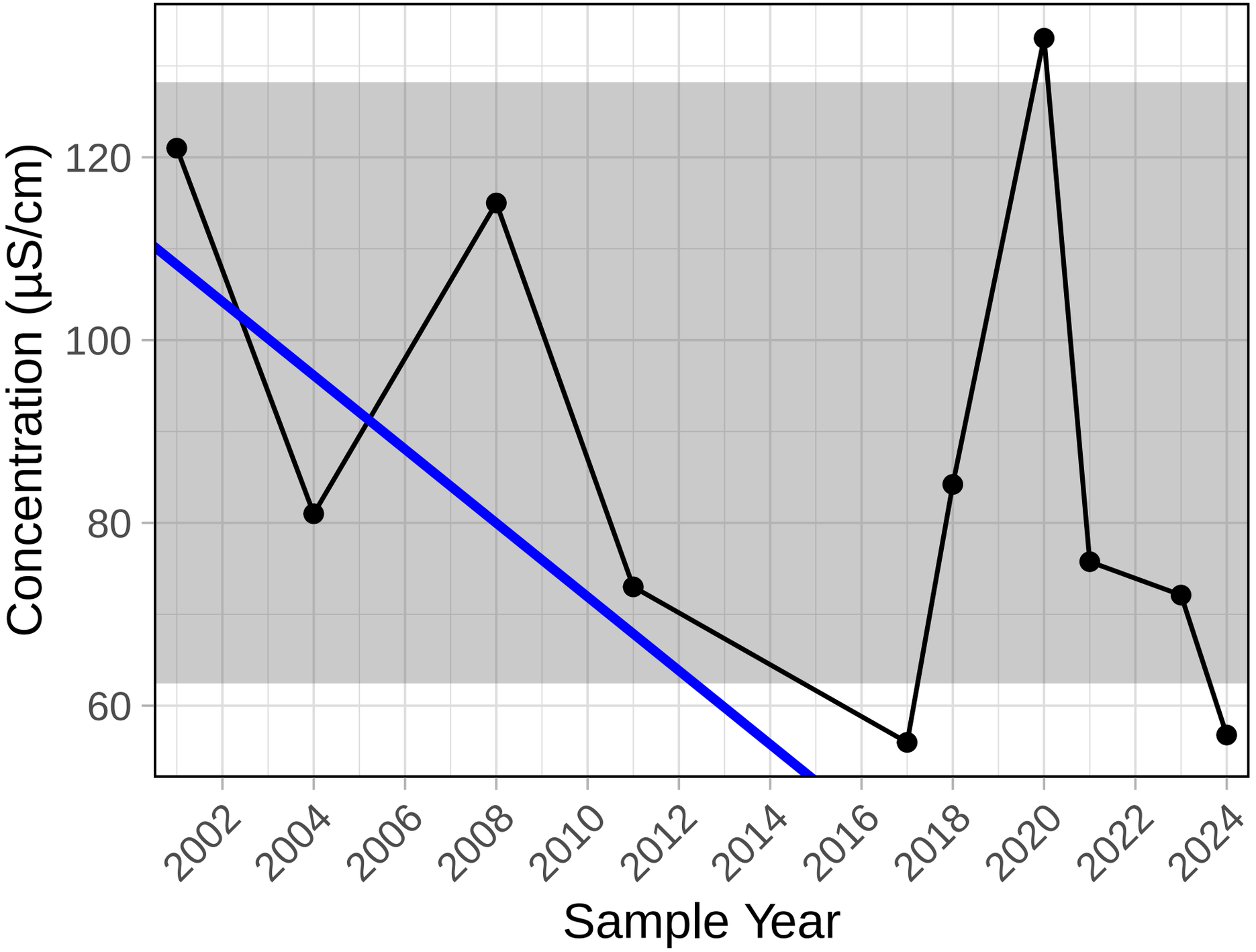


Trend significance p−value = 0.152
Chronic level = 6.5 mg/L (minimum)
Acute level = 5 mg/L (minimum)


Electrical Conductivity
S5A Water
150
130
110
90
Concentration (µS/cm)
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.323

Electrical Conductivity (Field)

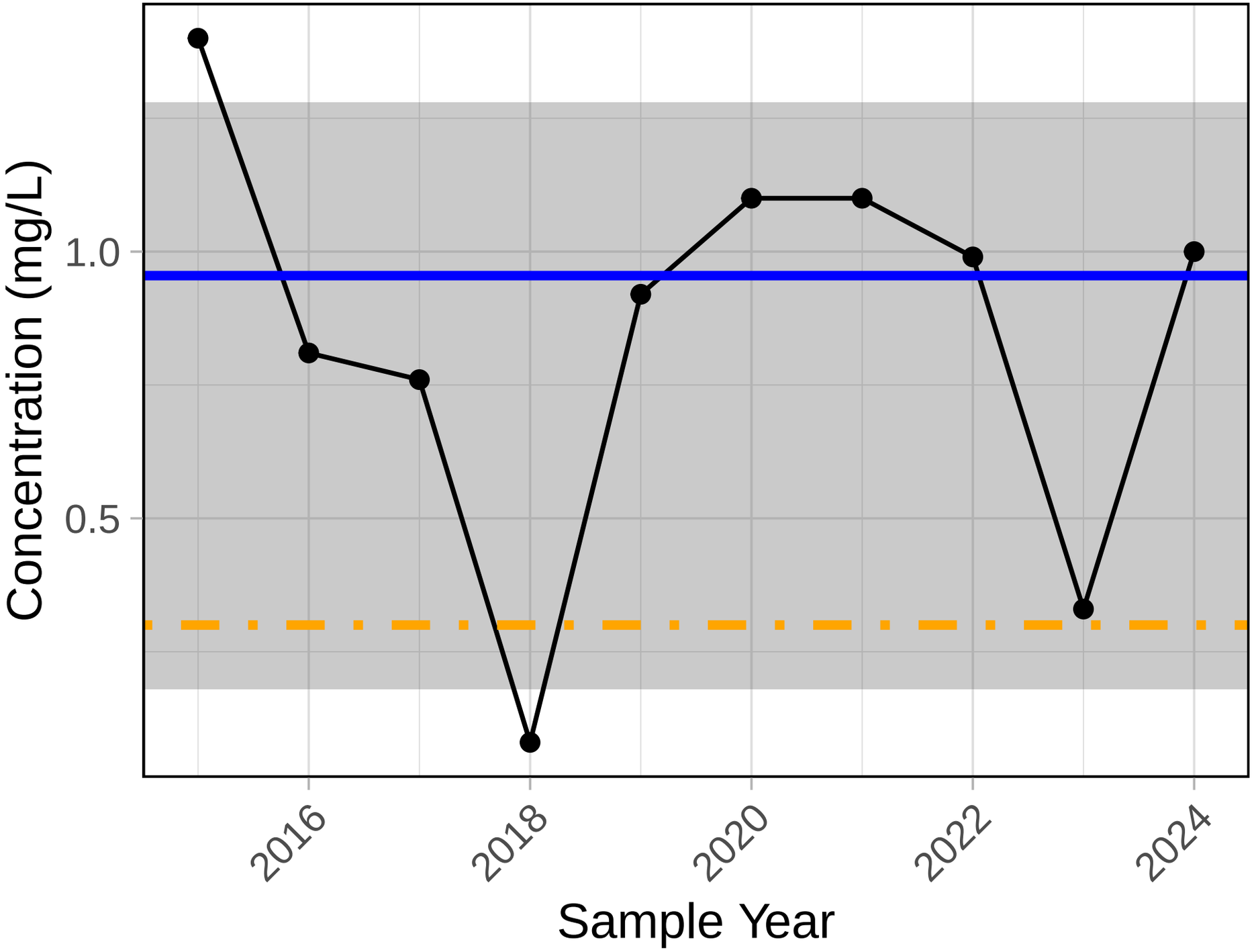
S5A Water



Trend significance p−value = 0.152

Iron (dissolved)

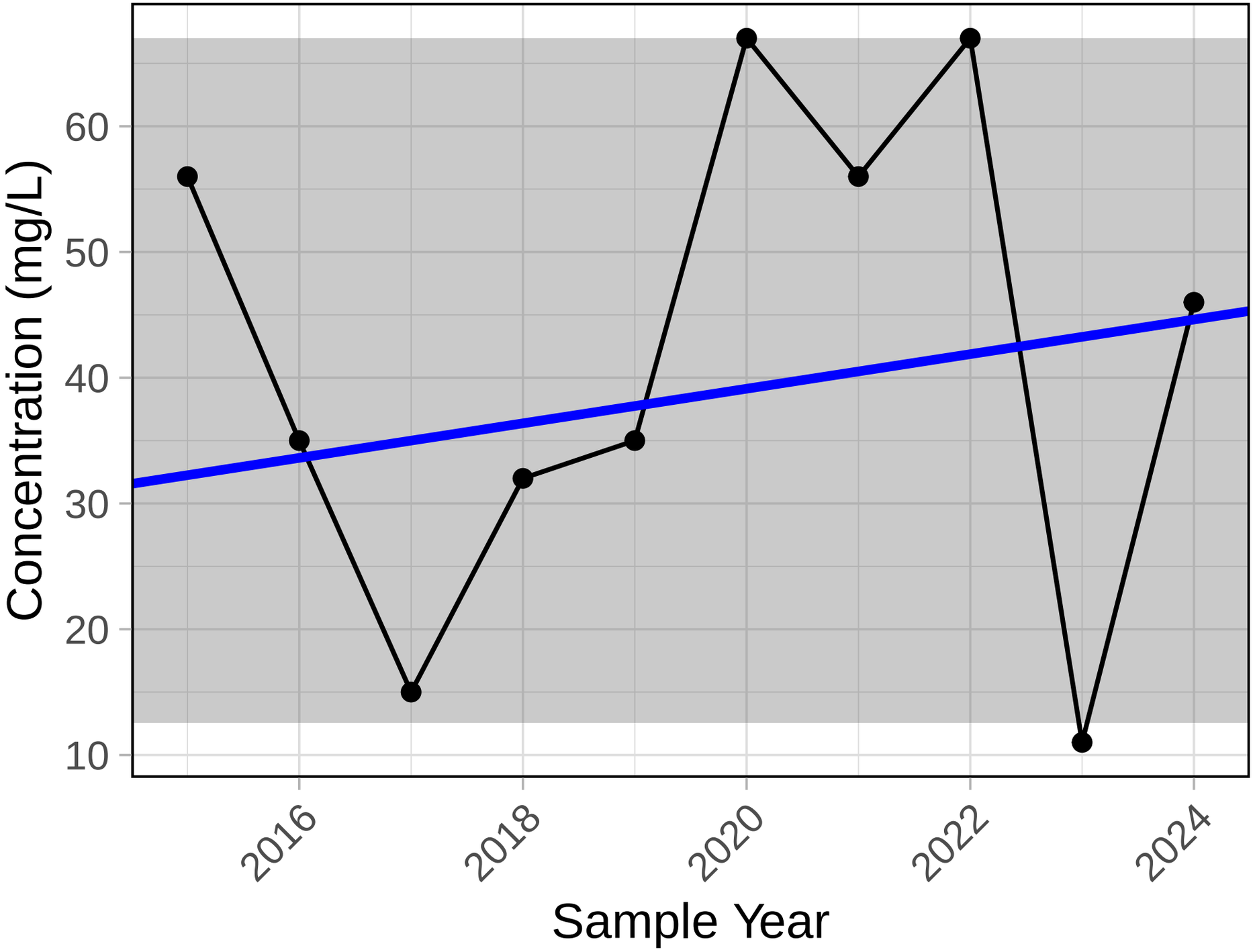
S5A Water



Trend significance p−value = 1
Chronic level = 0.3 mg/L (maximum)

Hardness

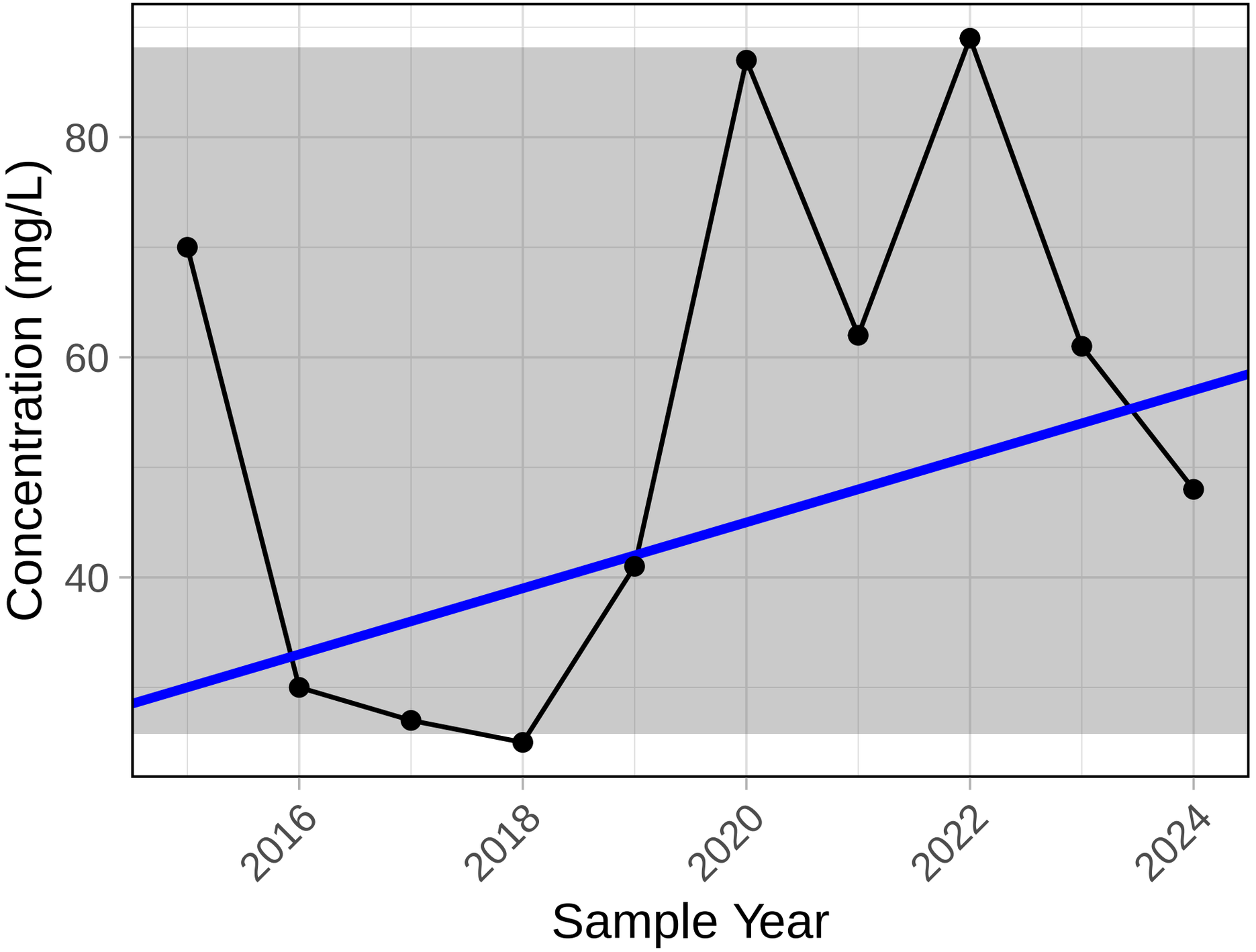
S5A Water



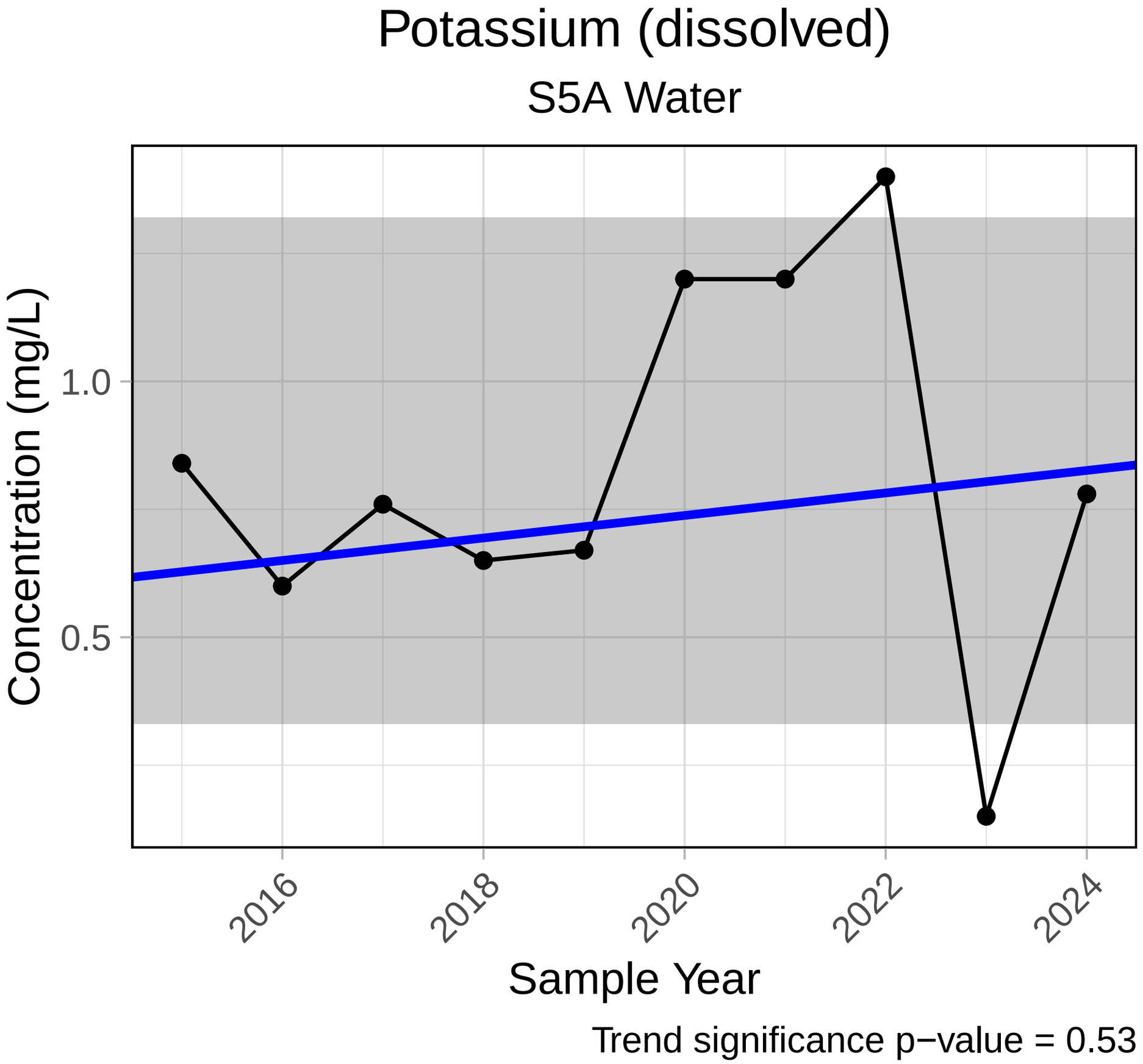
Trend significance p−value = 0.786

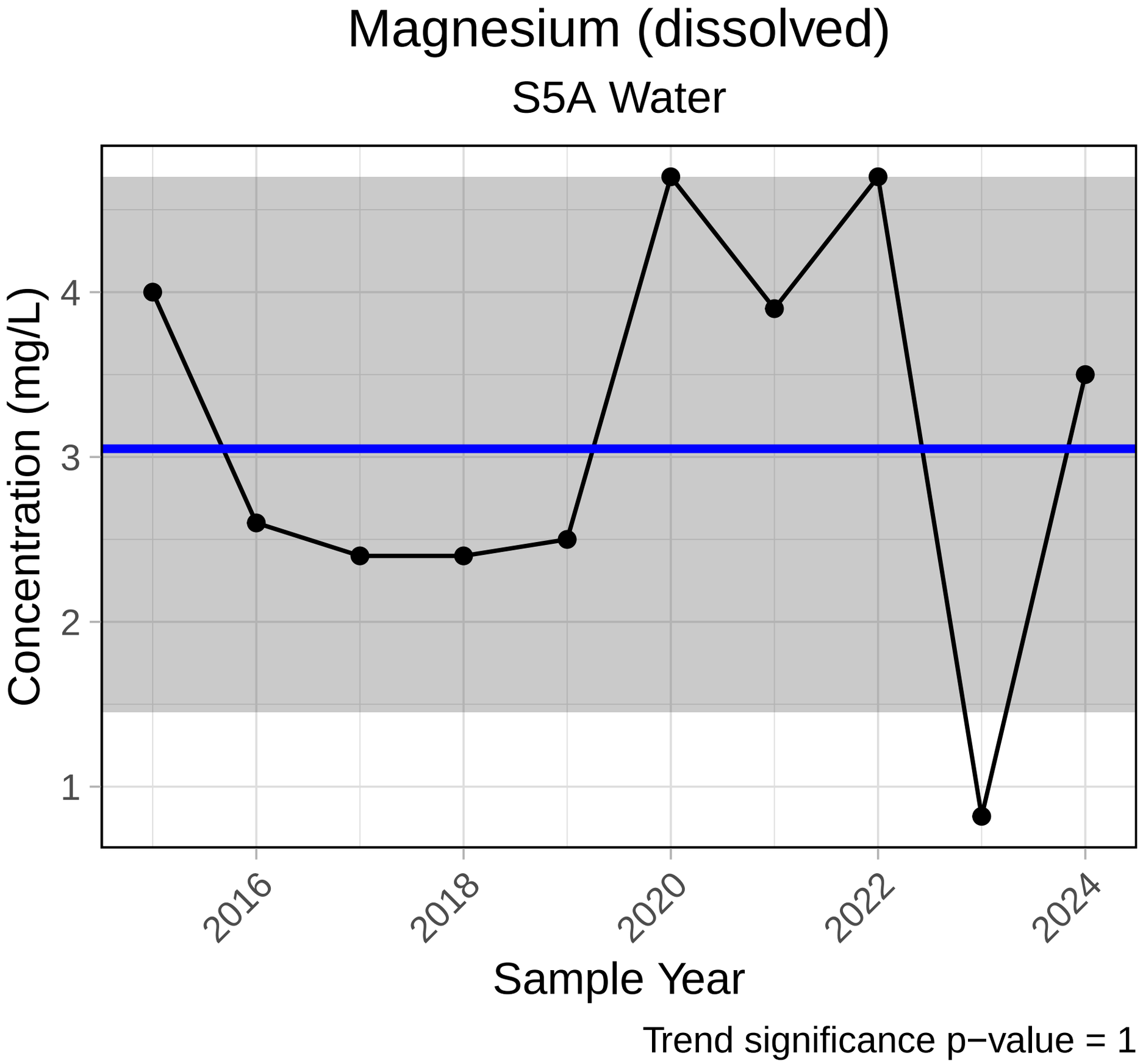
Bicarbonate

S5A Water



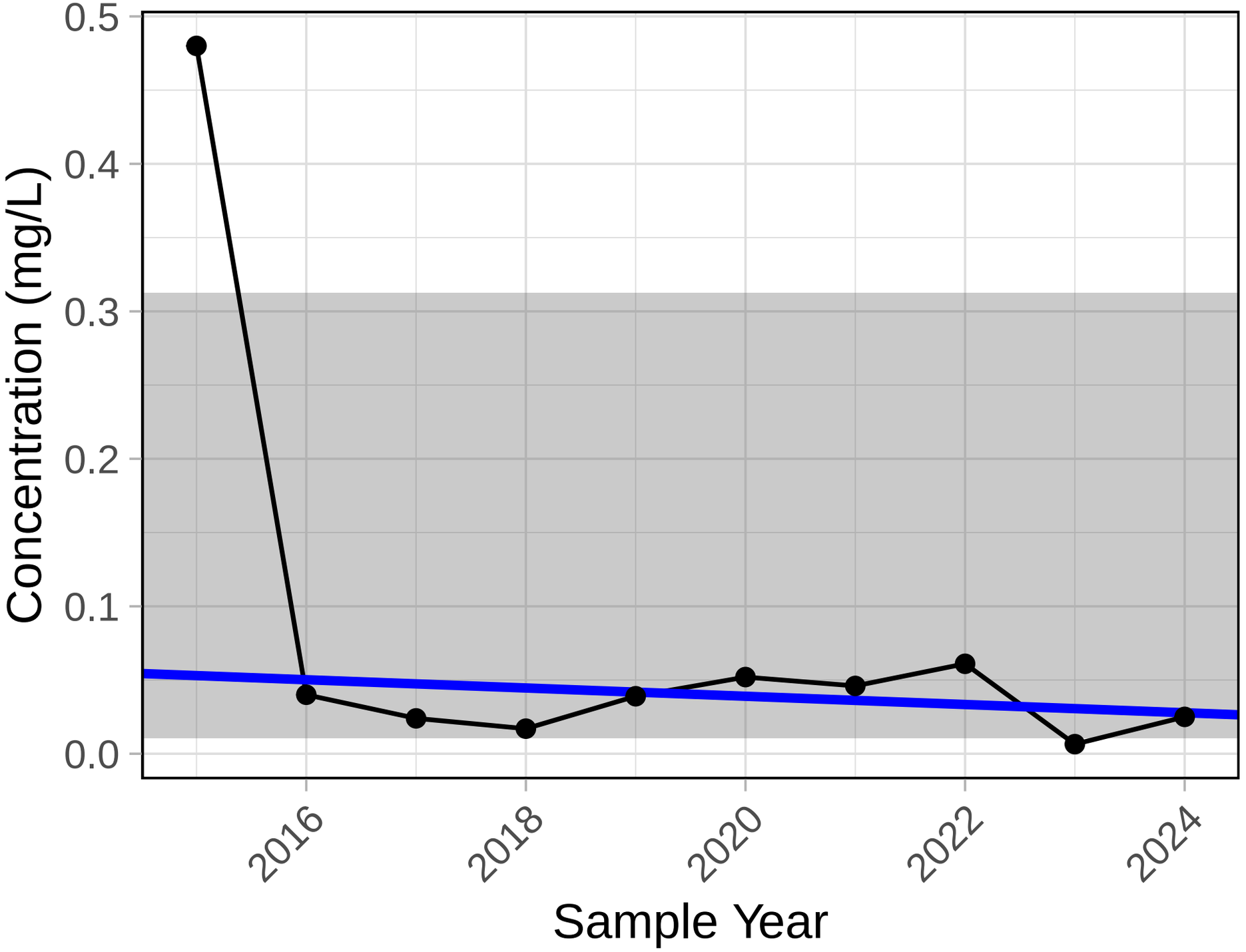
Trend significance p−value = 0.474


Potassium (dissolved)
S5A Water
Concentration (mg/L)
1.0
0.5
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.53

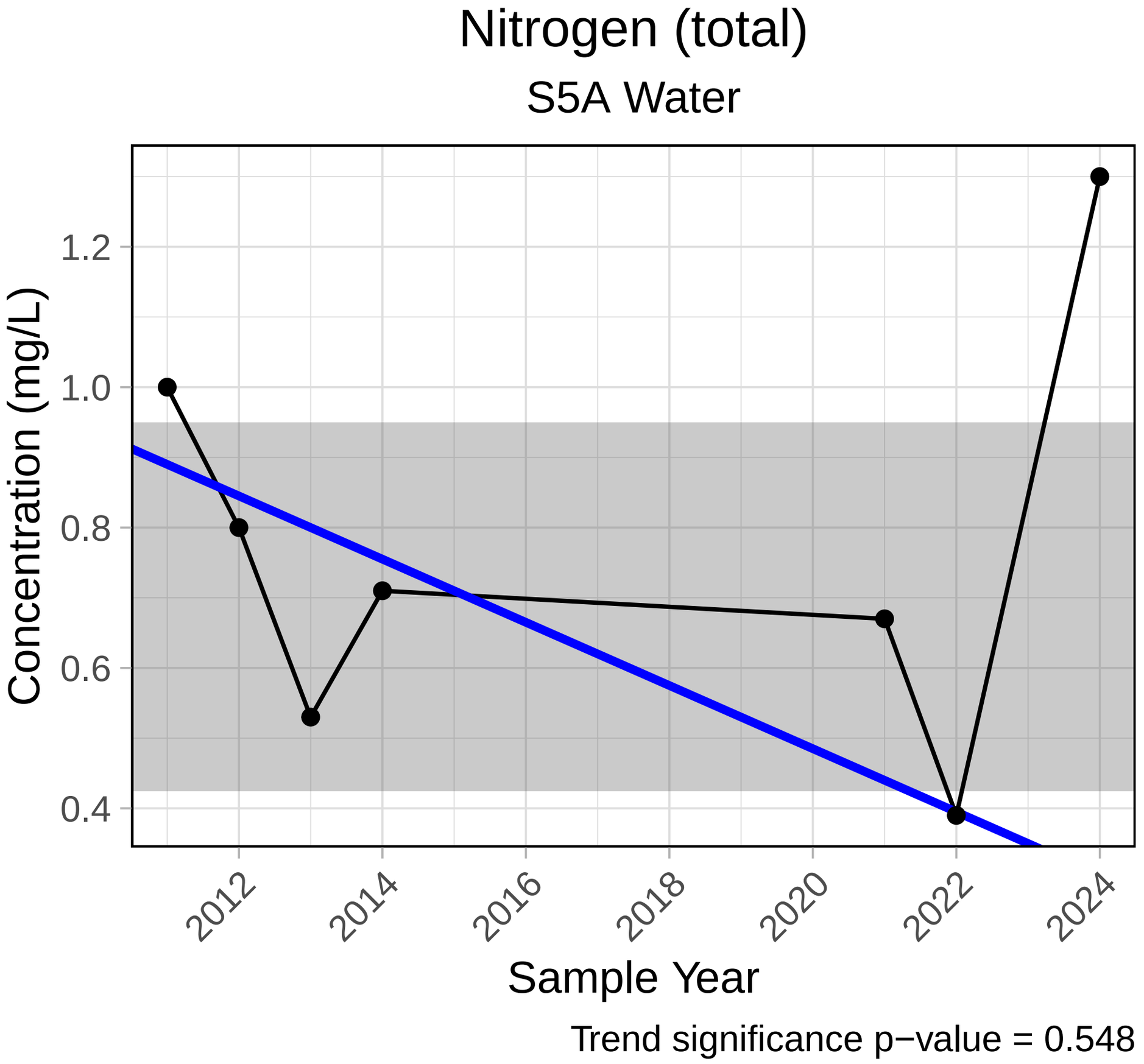

Magnesium (dissolved)
S5A Water
Concentration (mg/L)
4
3
2
1
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 1

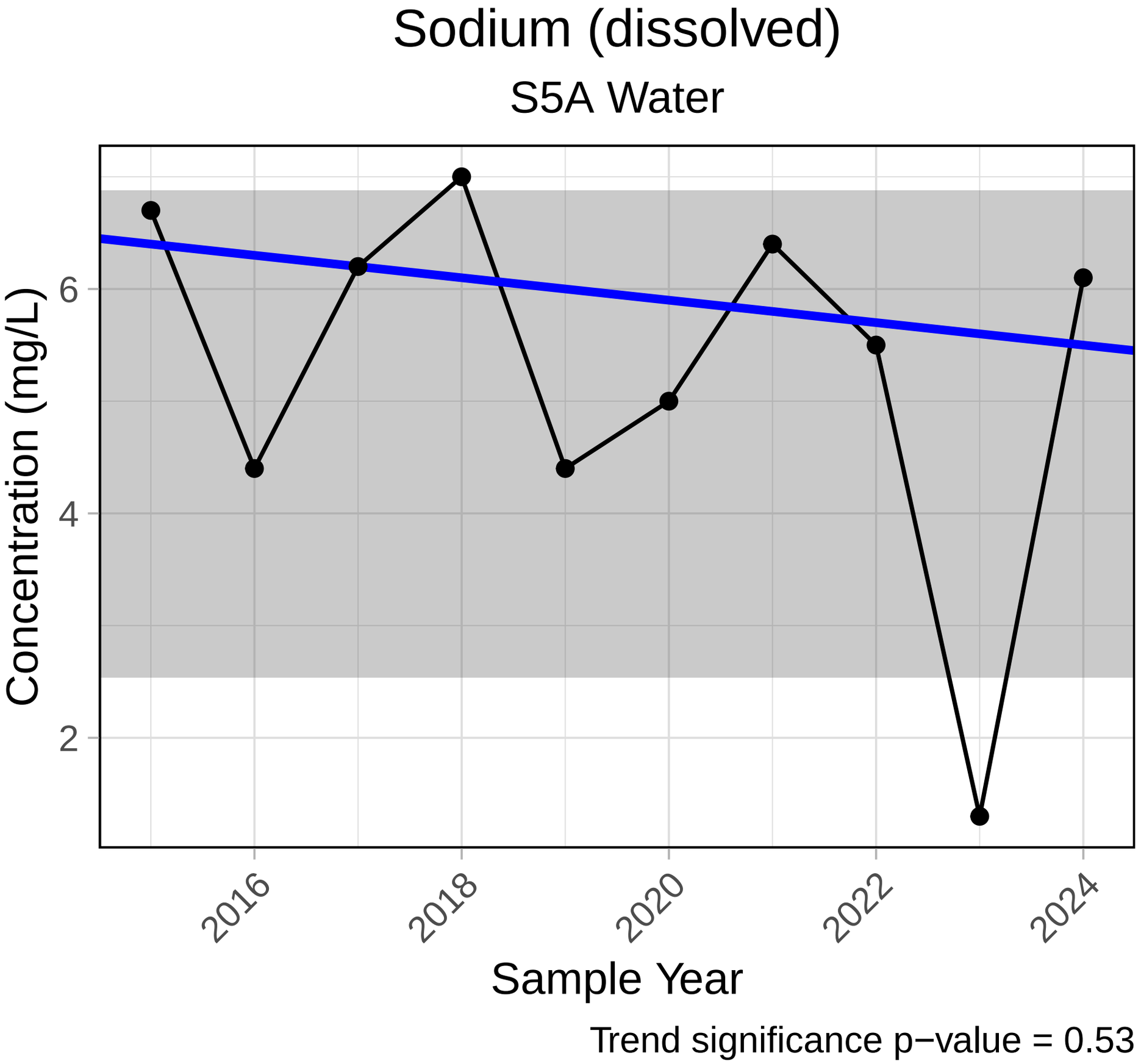
Manganese (dissolved)

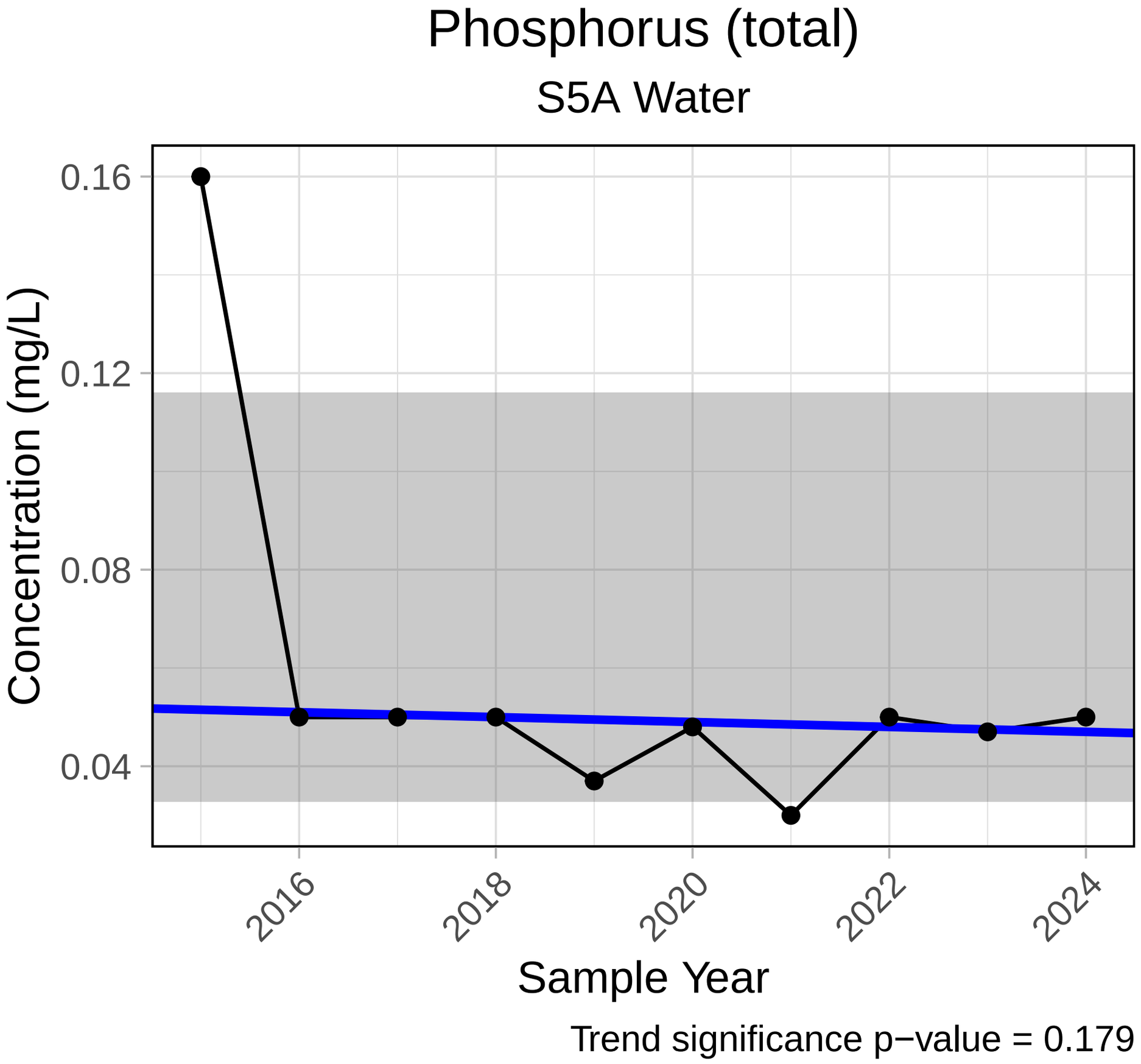
S5A Water

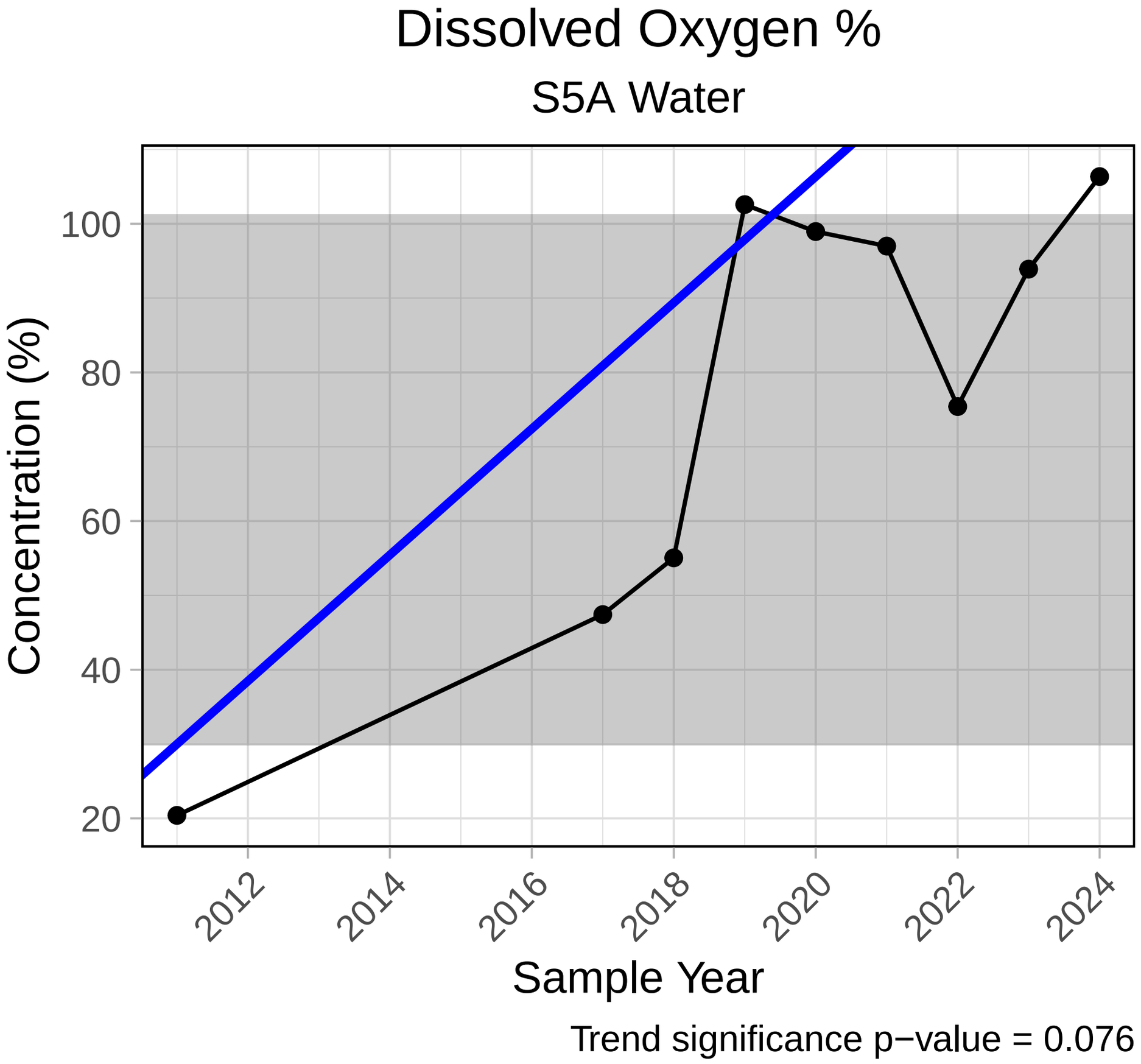


Trend significance p−value = 0.592


Nitrogen (total)
S5A Water
Concentration (mg/L)
1.2
1.0
0.8
0.6
0.4
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.548

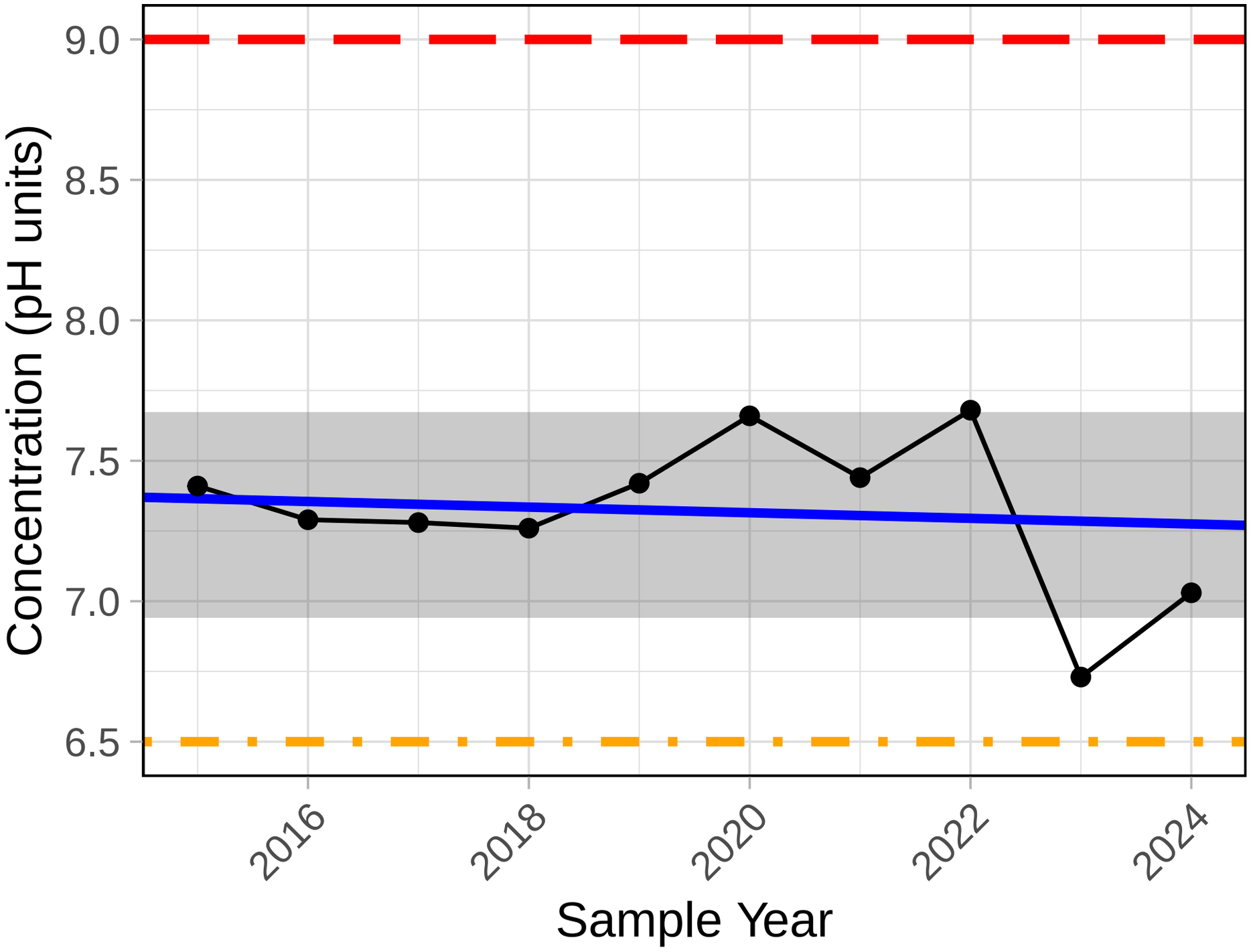

Sodium (dissolved)
S5A Water
Concentration (mg/L)
6
4
2
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.53


Phosphorus (total)
S5A Water
Concentration (mg/L)
0.16
0.12
0.08
0.04
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.179


Dissolved Oxygen %
S5A Water
Concentration (%)
100
80
60
40
20
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.076

pH

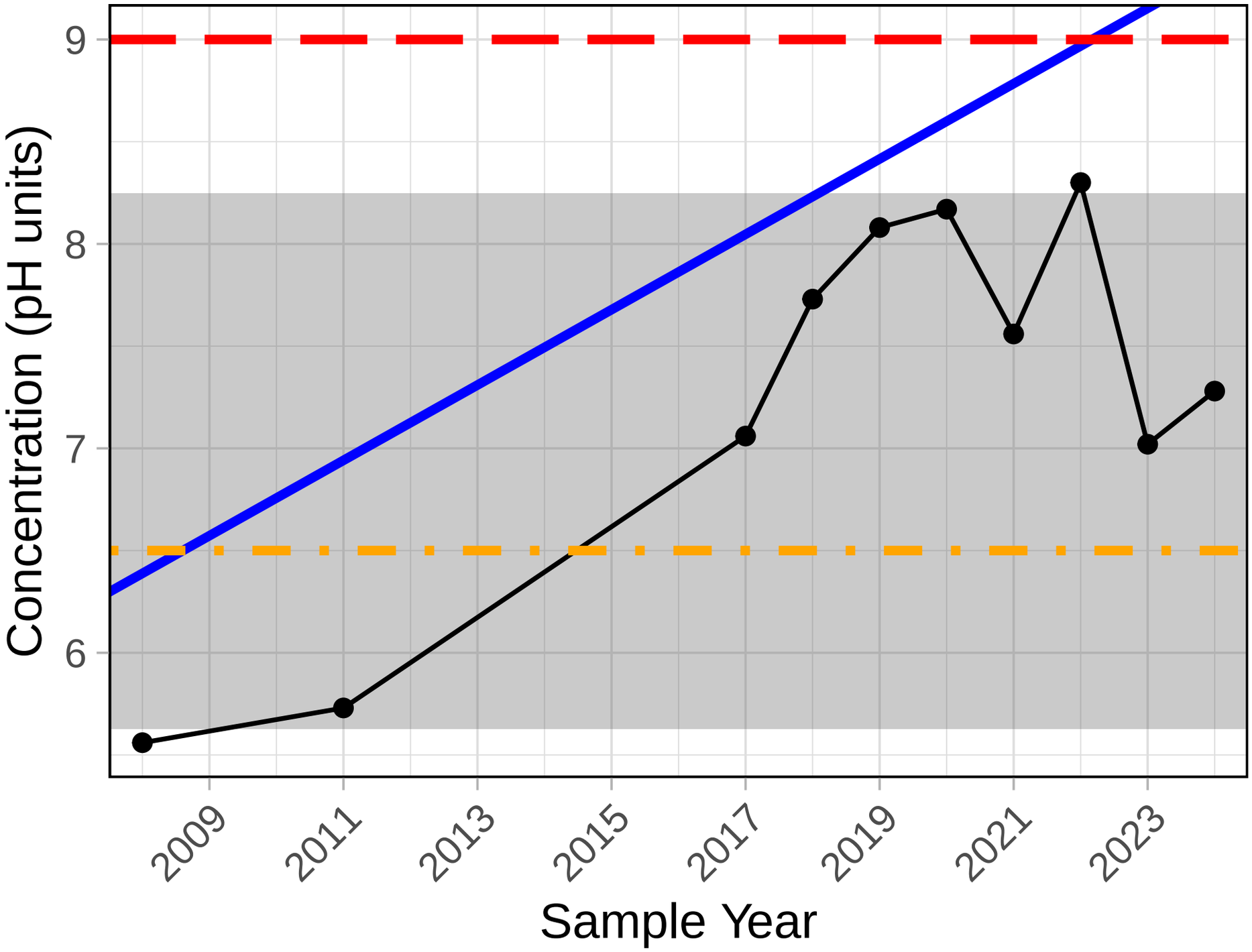
S5A Water



Trend significance p−value = 1
Chronic level = 6.5 pH units (minimum)
Acute level = 9 pH units (maximum)

pH (Field)

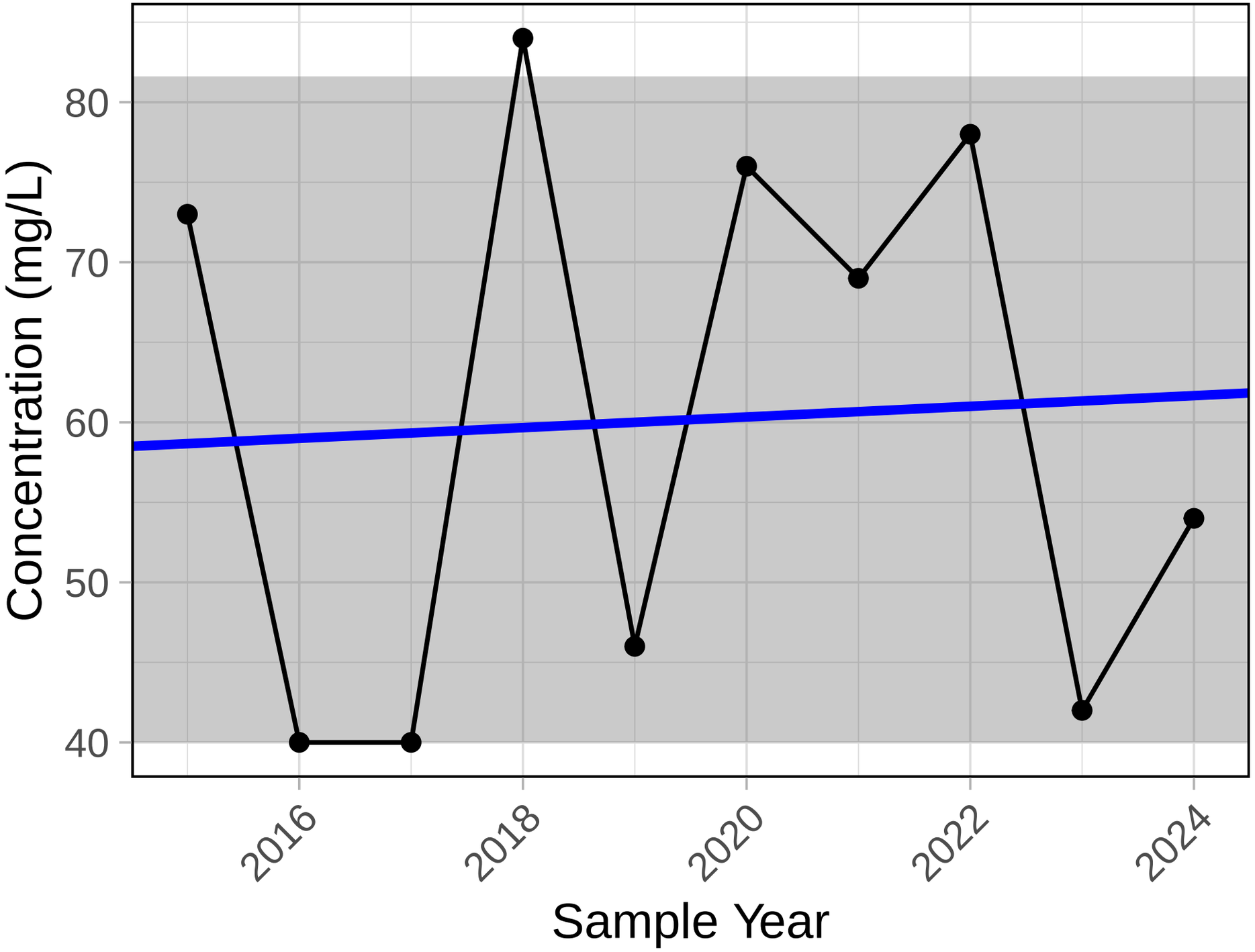
S5A Water



Trend significance p−value = 0.152
Chronic level = 6.5 pH units (minimum)
Acute level = 9 pH units (maximum)

Total Dissolved Solids

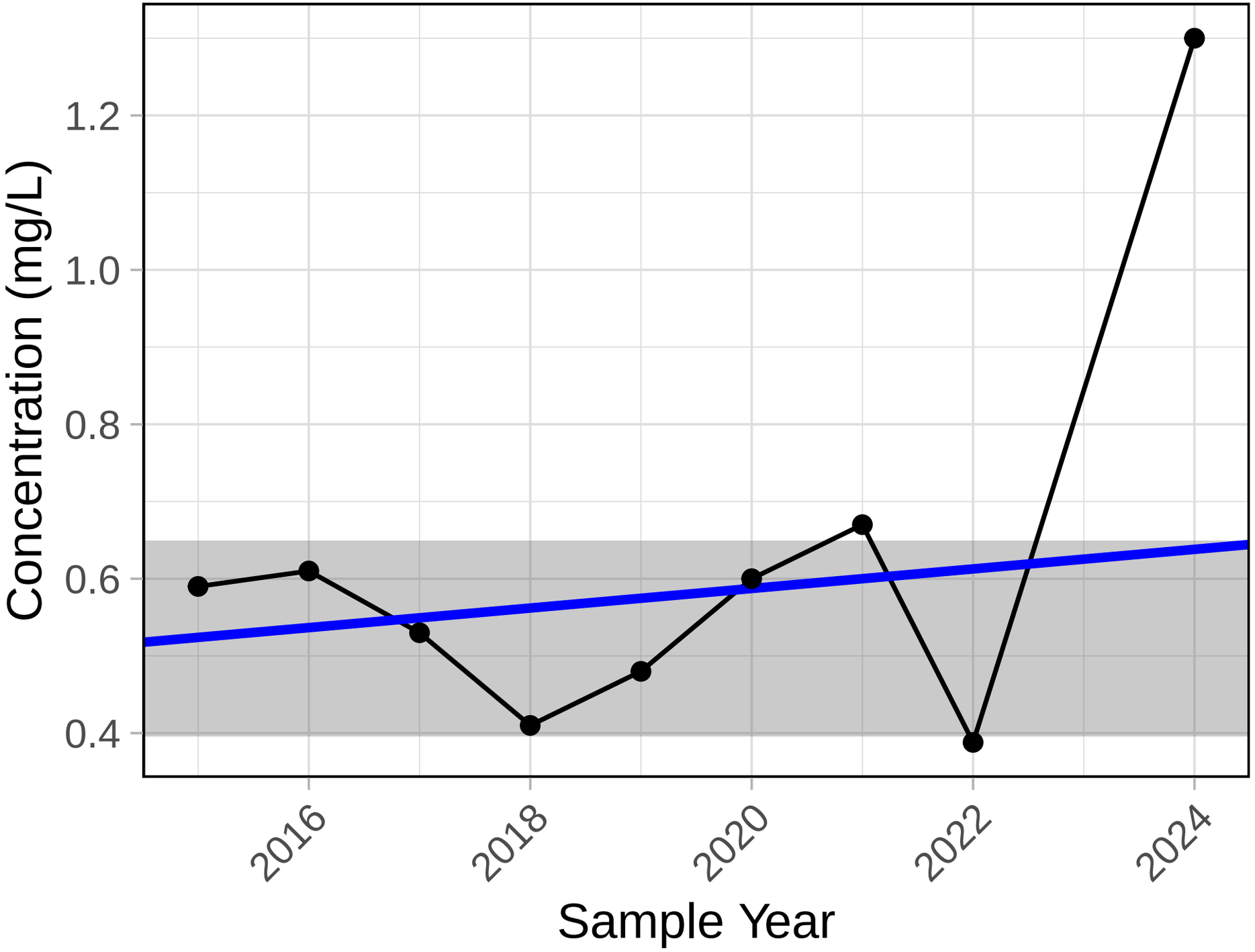
S5A Water



Trend significance p−value = 0.788

Total Kjeldahl Nitrogen

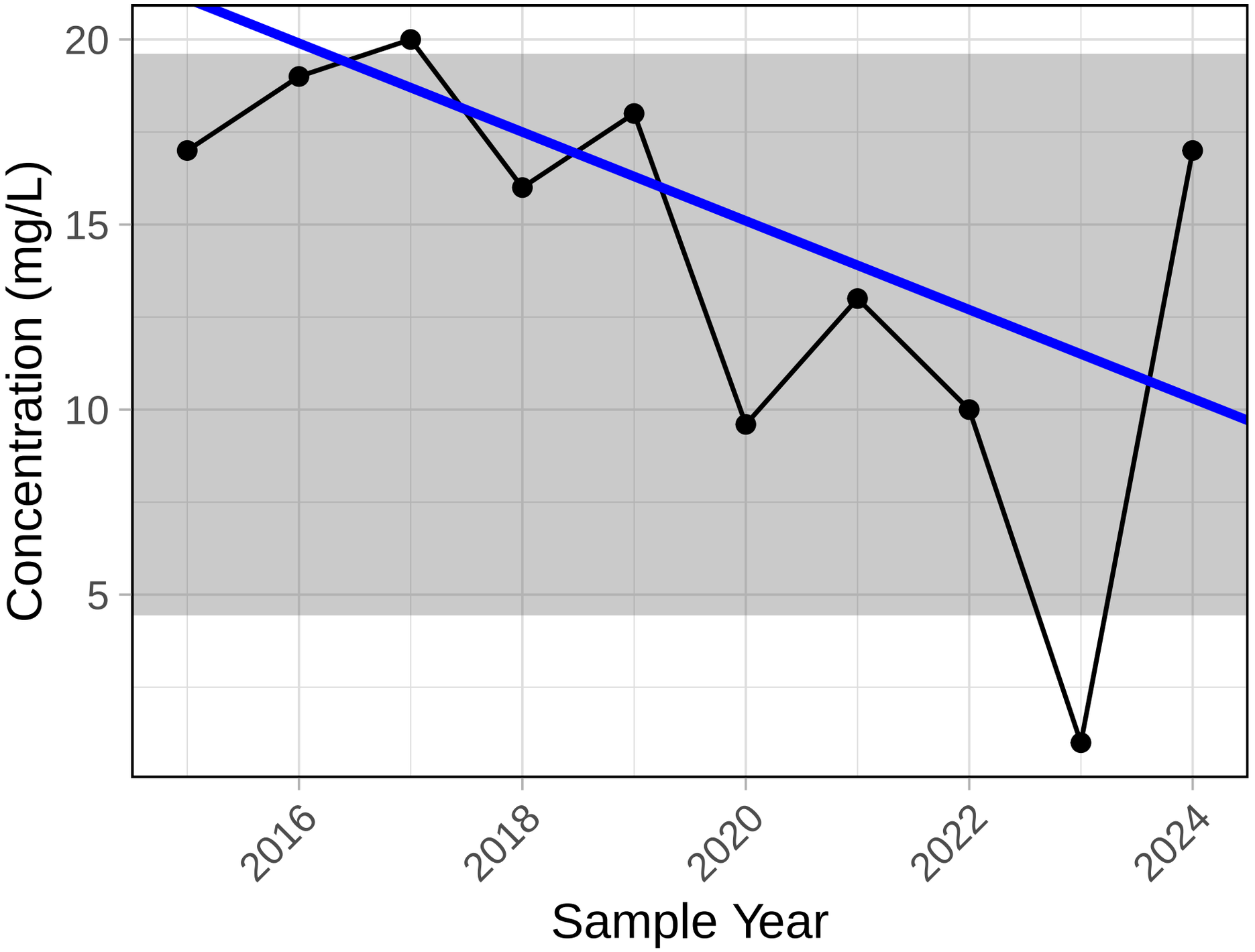
S5A Water



Trend significance p−value = 0.754

Total Organic Carbon

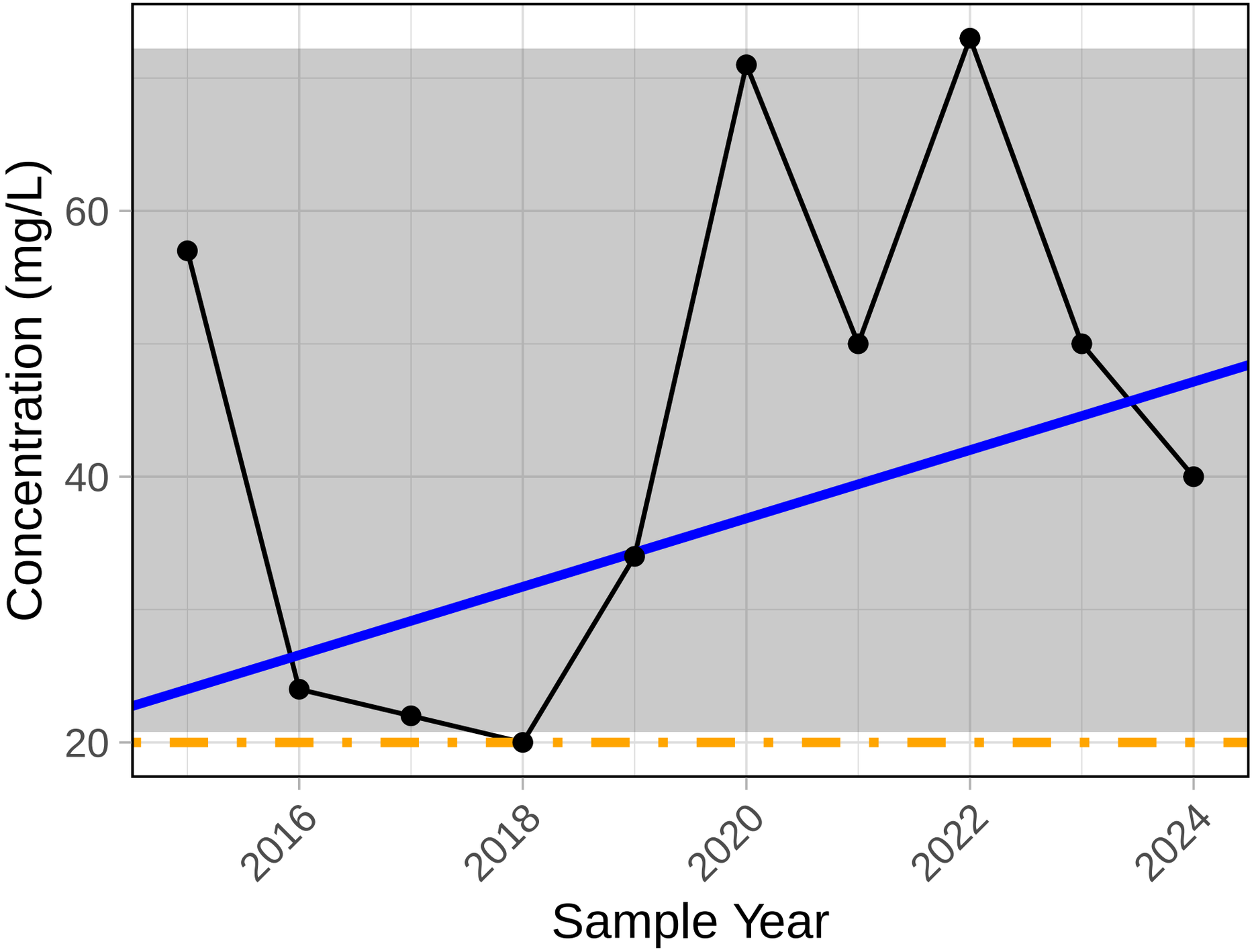
S5A Water



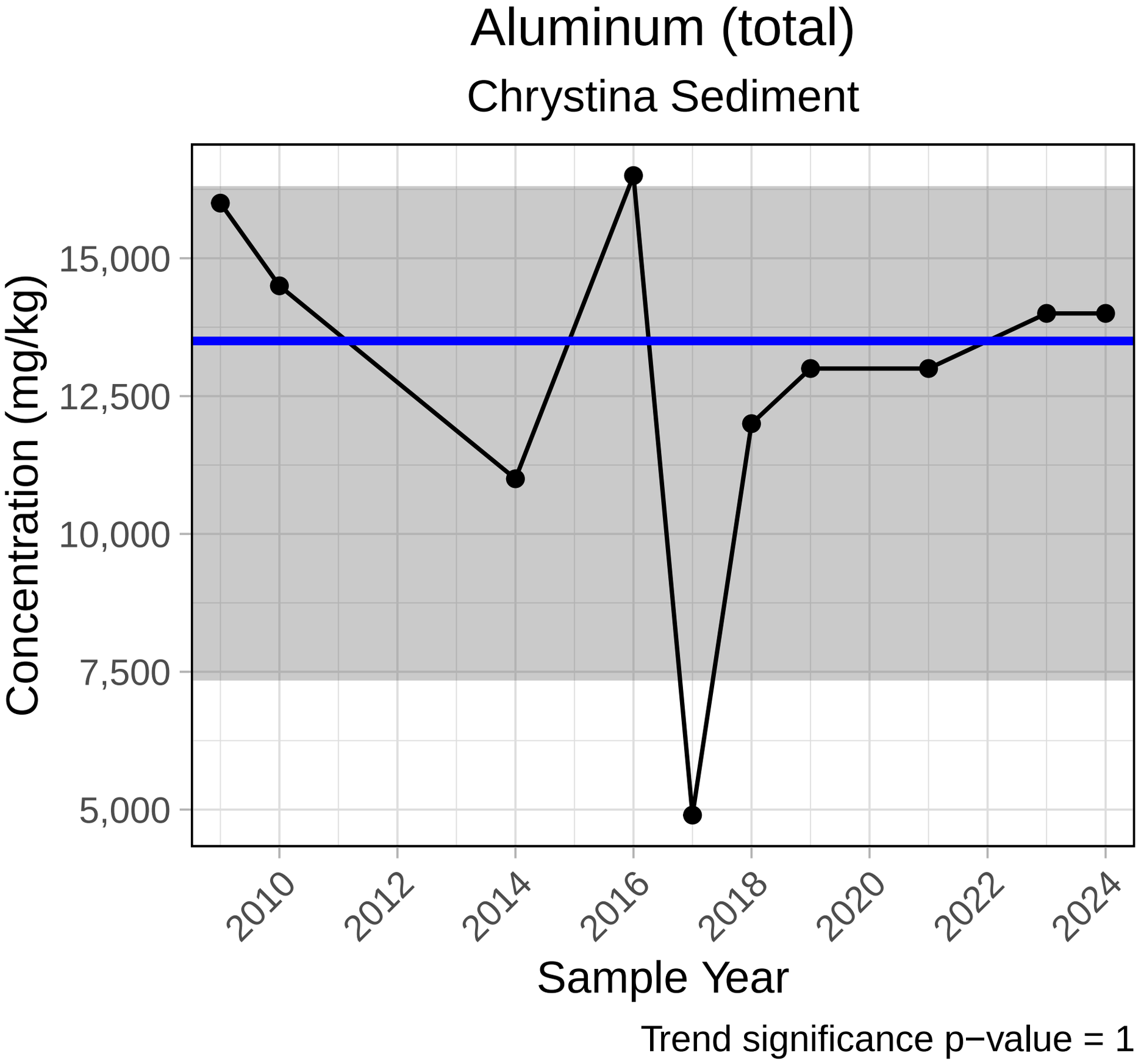
Trend significance p−value = 0.088

Total Alkalinity (as CaCO3)

S5A Water

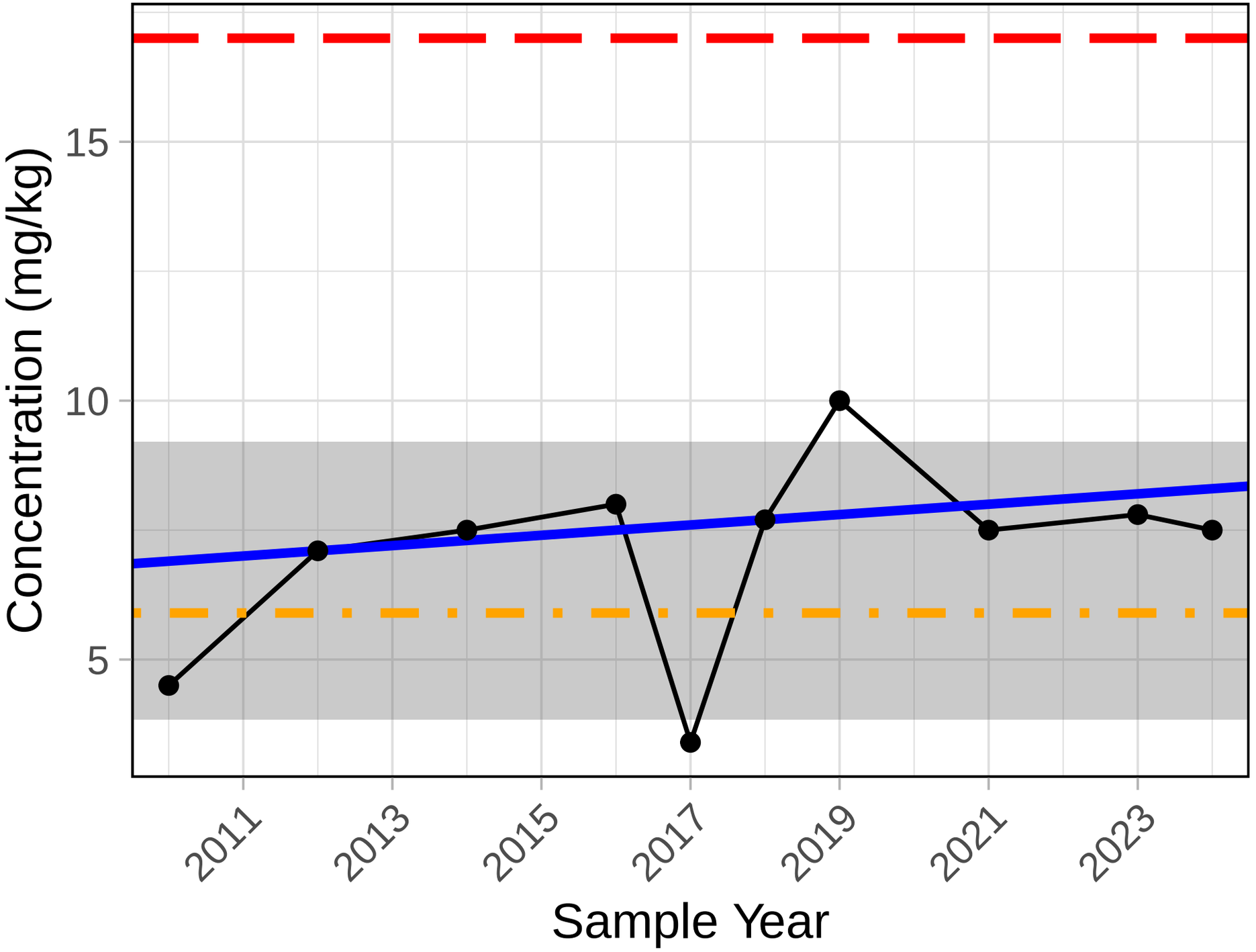


Trend significance p−value = 0.419
Chronic level = 20 mg/L (minimum)

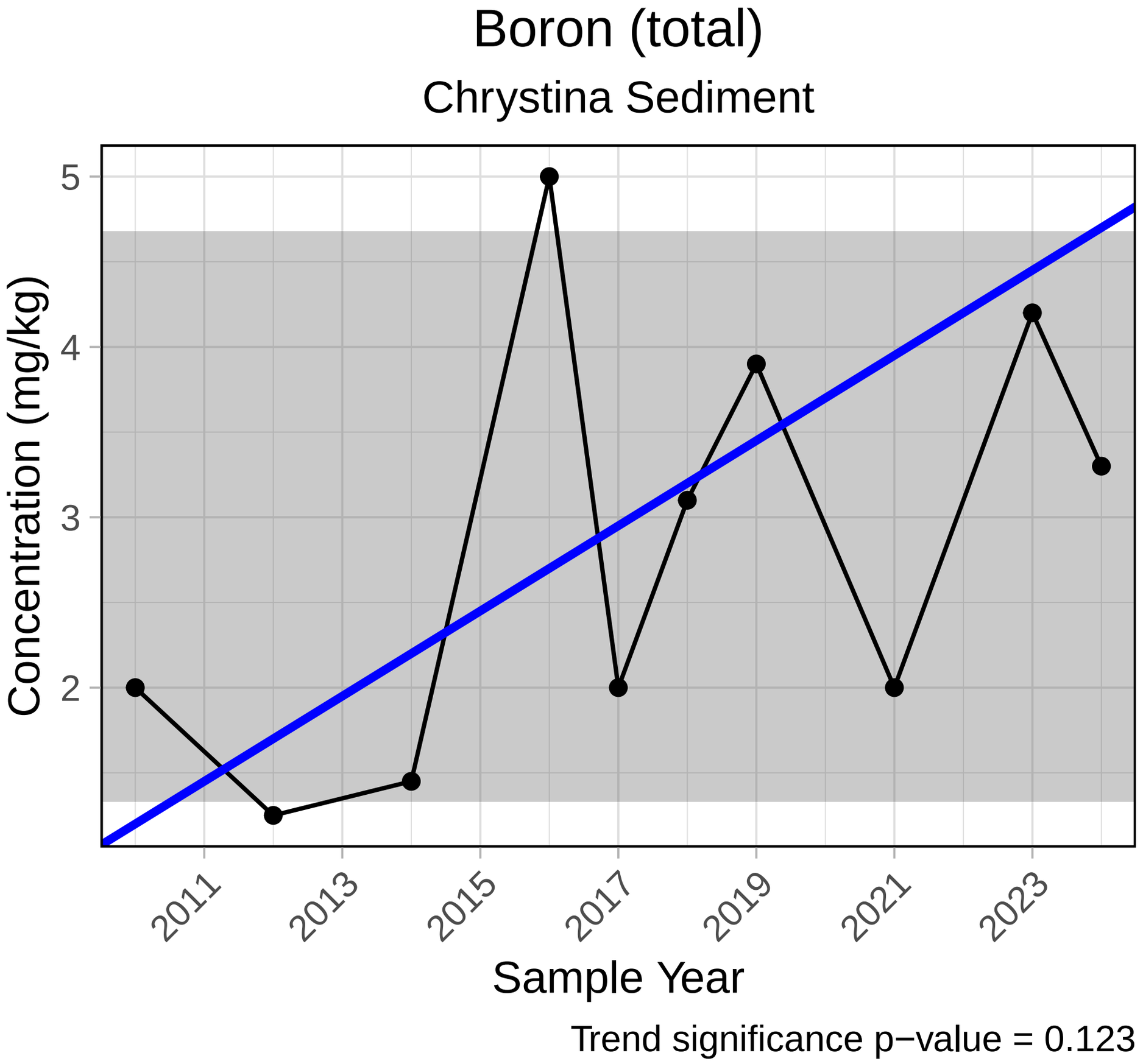

Aluminum (total)
Chrystina Sediment
Concentration (mg/kg)
15,000
12,500
10,000
7,500
5,000
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 1

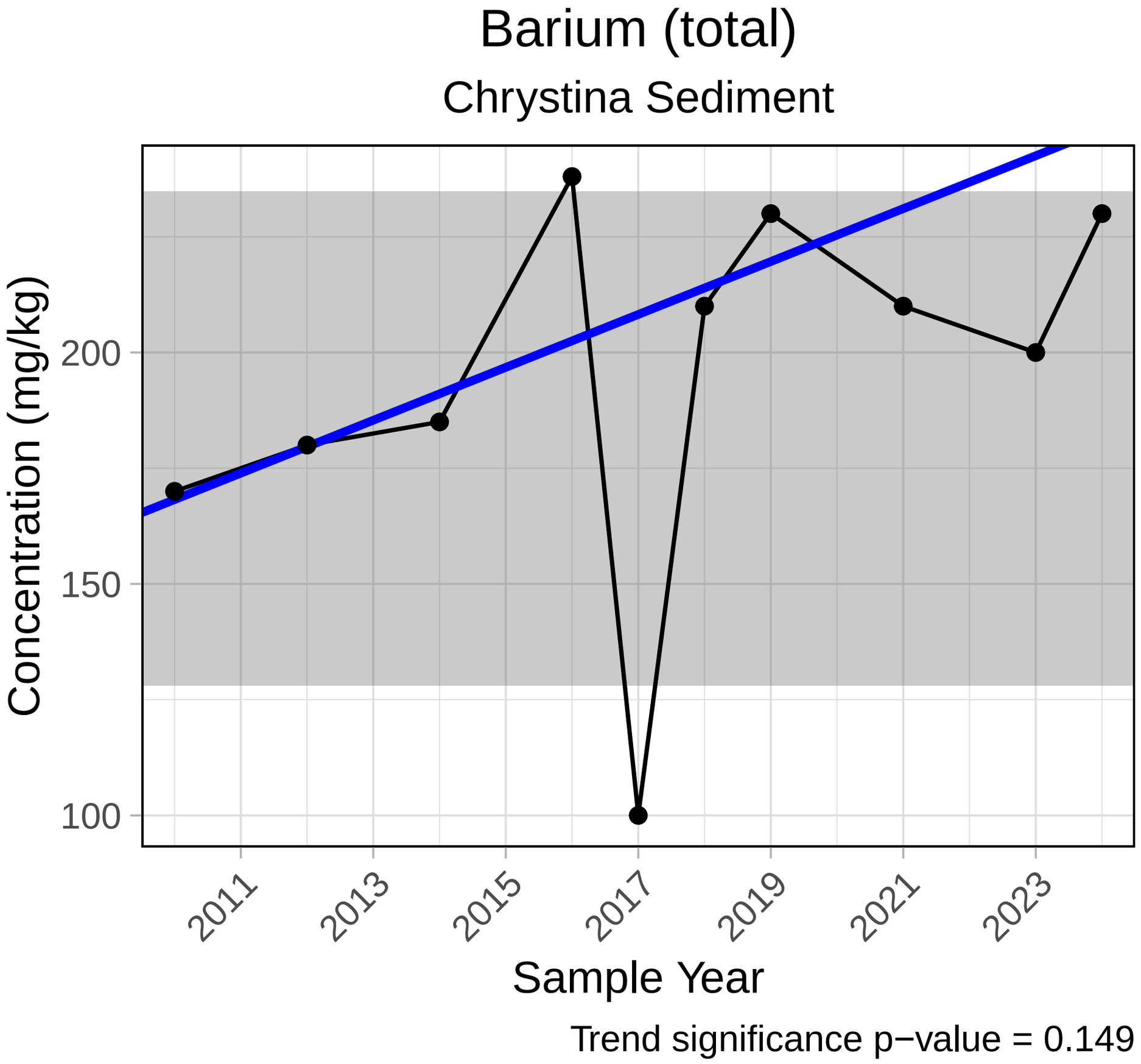
Arsenic (total)

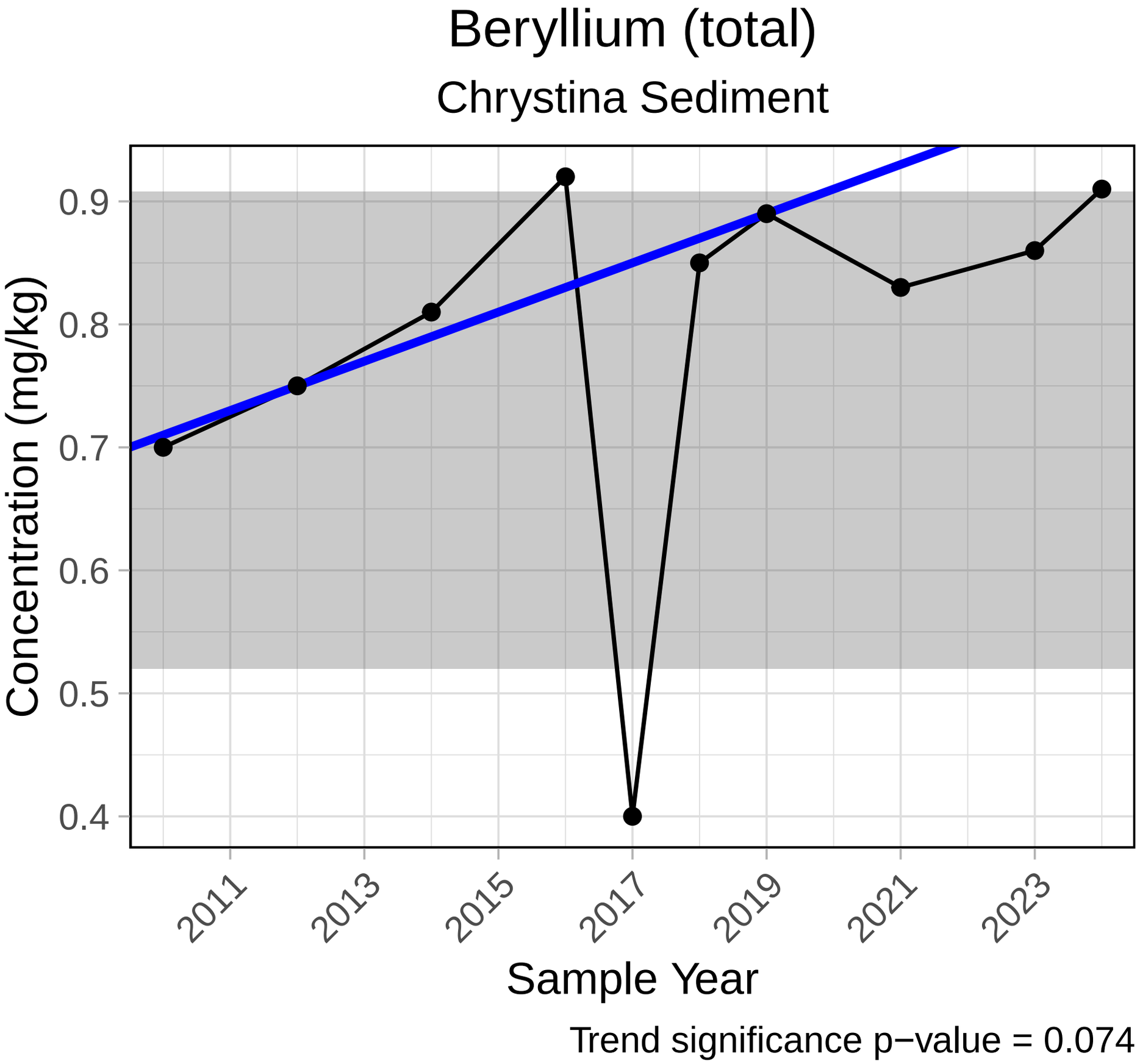
Chrystina Sediment

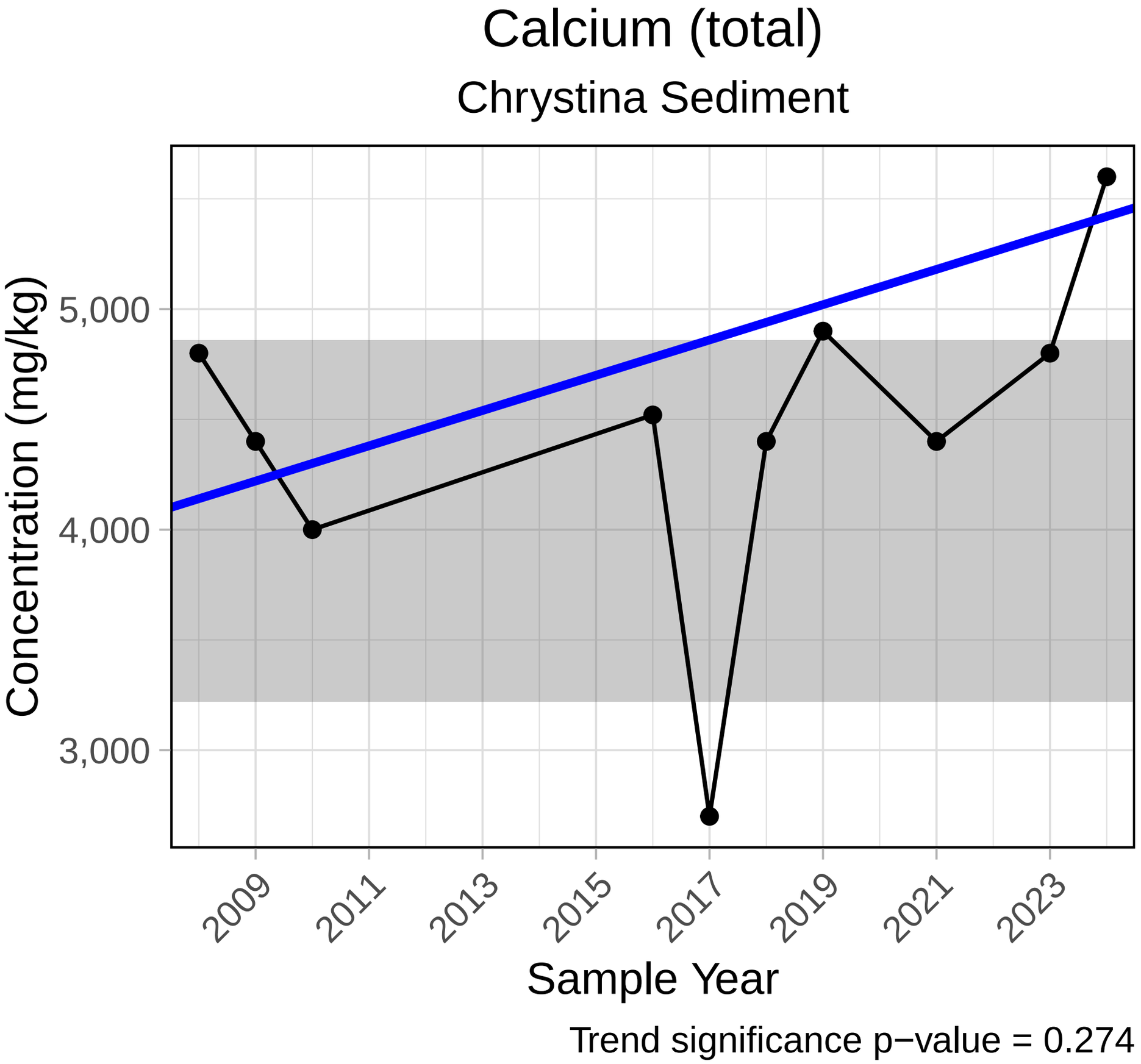


Trend significance p−value = 0.238
ISQG level = 5.9 mg/kg (maximum)
PEL level = 17 mg/kg (maximum)


Boron (total)
Chrystina Sediment
Concentration (mg/kg)
5
4
3
2
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.123

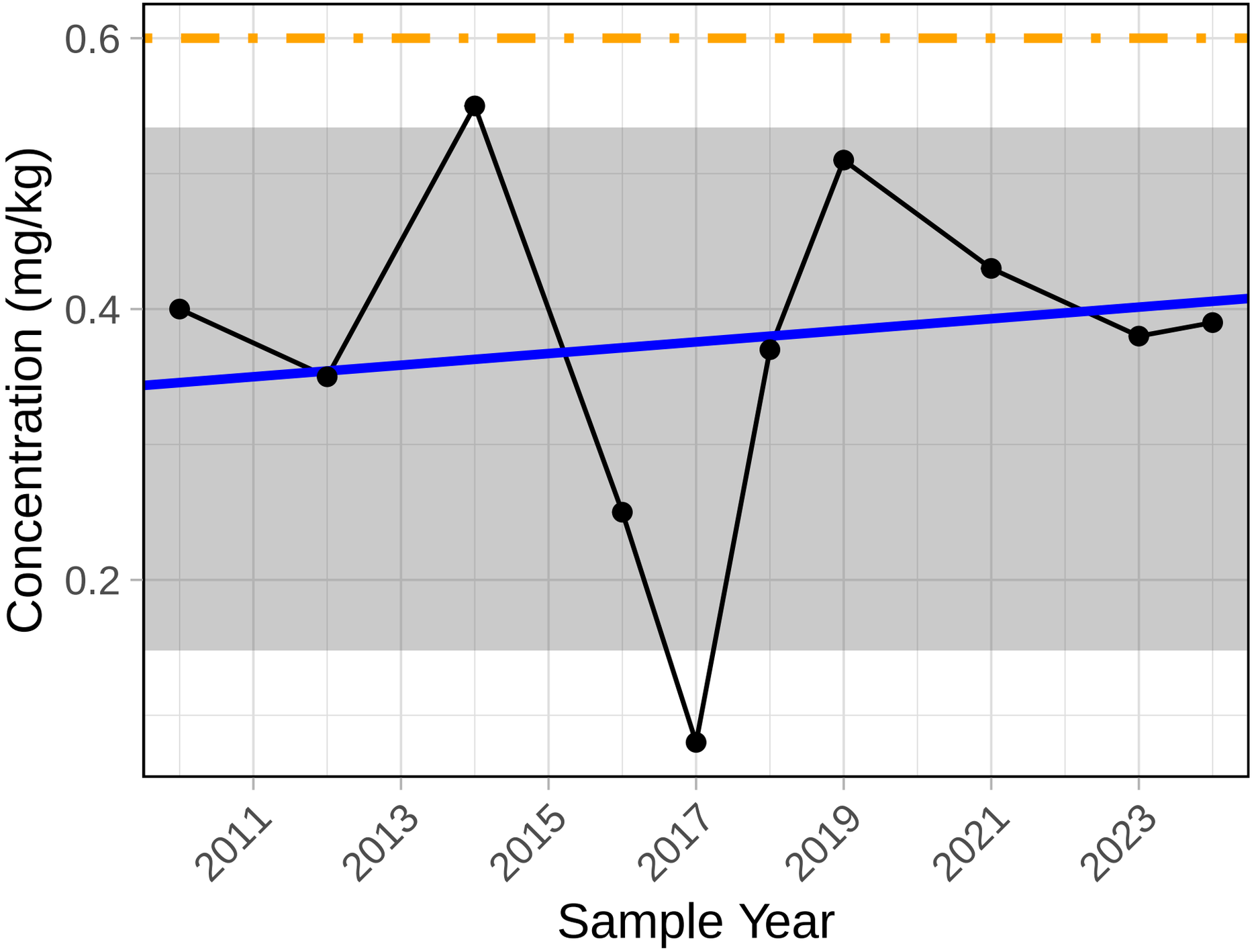

Barium (total)
Chrystina Sediment
Concentration (mg/kg)
200
150
100
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.149


Beryllium (total)
Chrystina Sediment
Concentration (mg/kg)
0.9
0.8
0.7
0.6
0.5
0.4
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.074


Calcium (total)
Chrystina Sediment
Concentration (mg/kg)
5,000
4,000
3,000
2009
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.274

Cadmium (total)

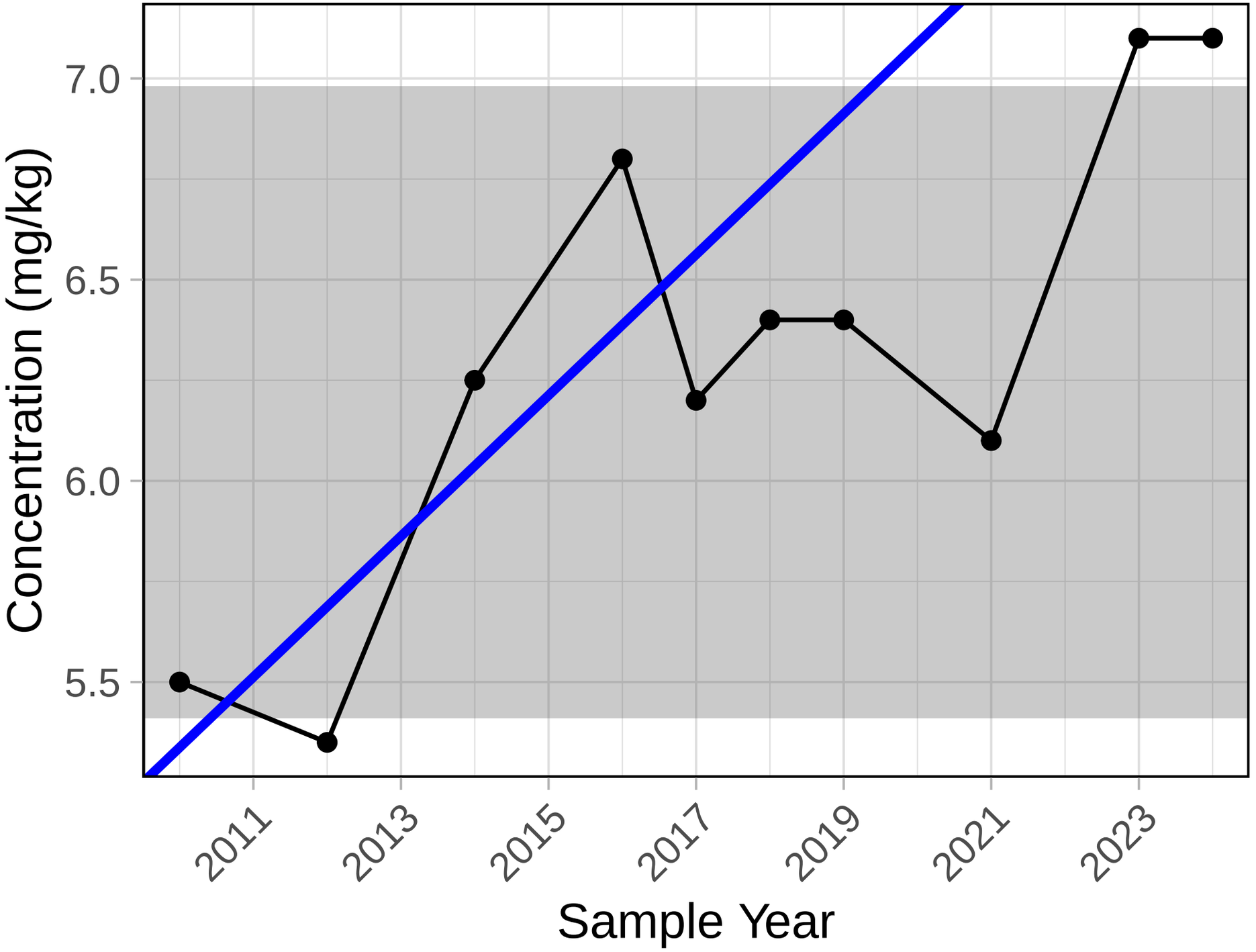
Chrystina Sediment



Trend significance p−value = 0.858
ISQG level = 0.6 mg/kg (maximum)
PEL level = 3.5 mg/kg (maximum)

Cobalt (total)

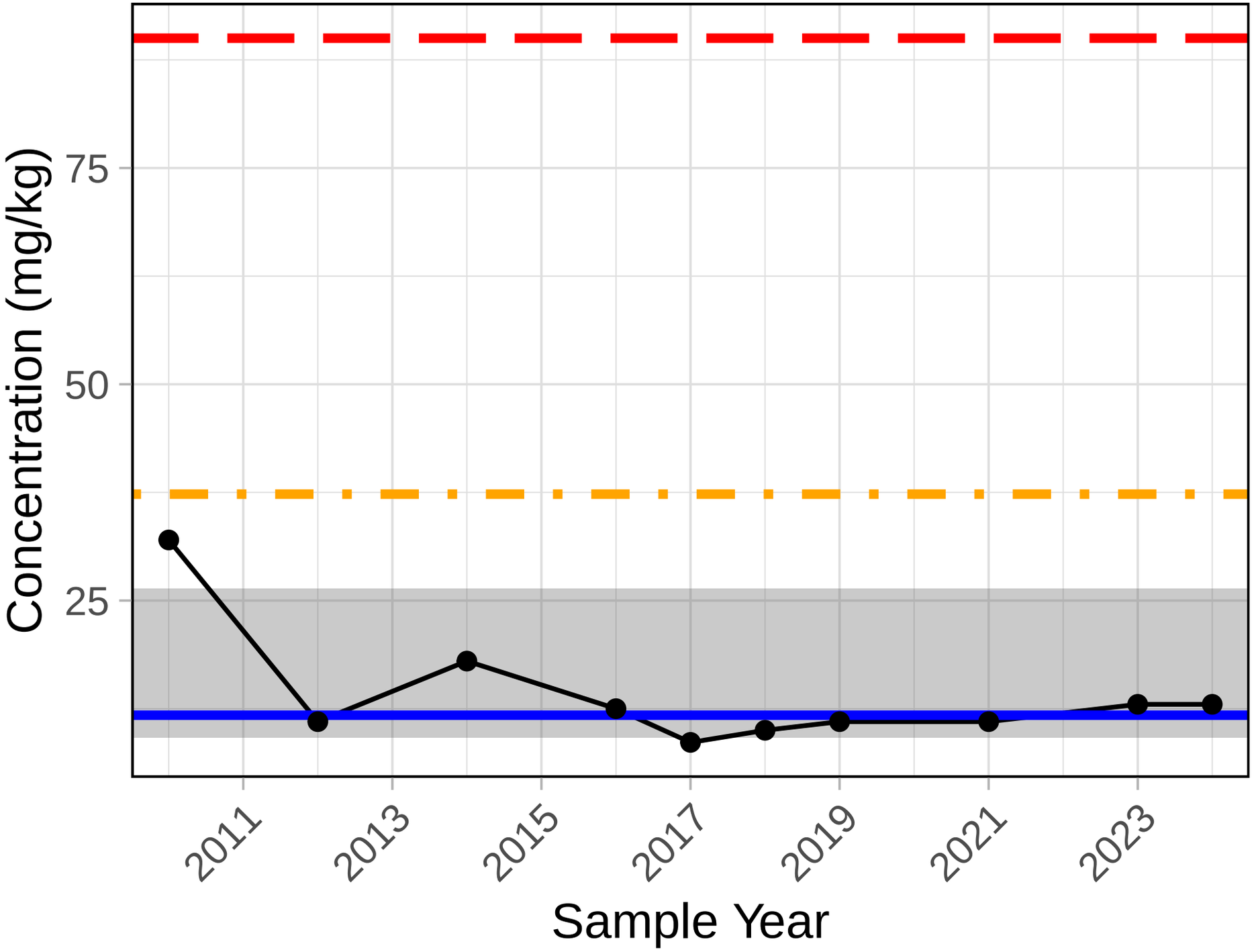
Chrystina Sediment



Trend significance p−value = 0.047

Chromium (total)

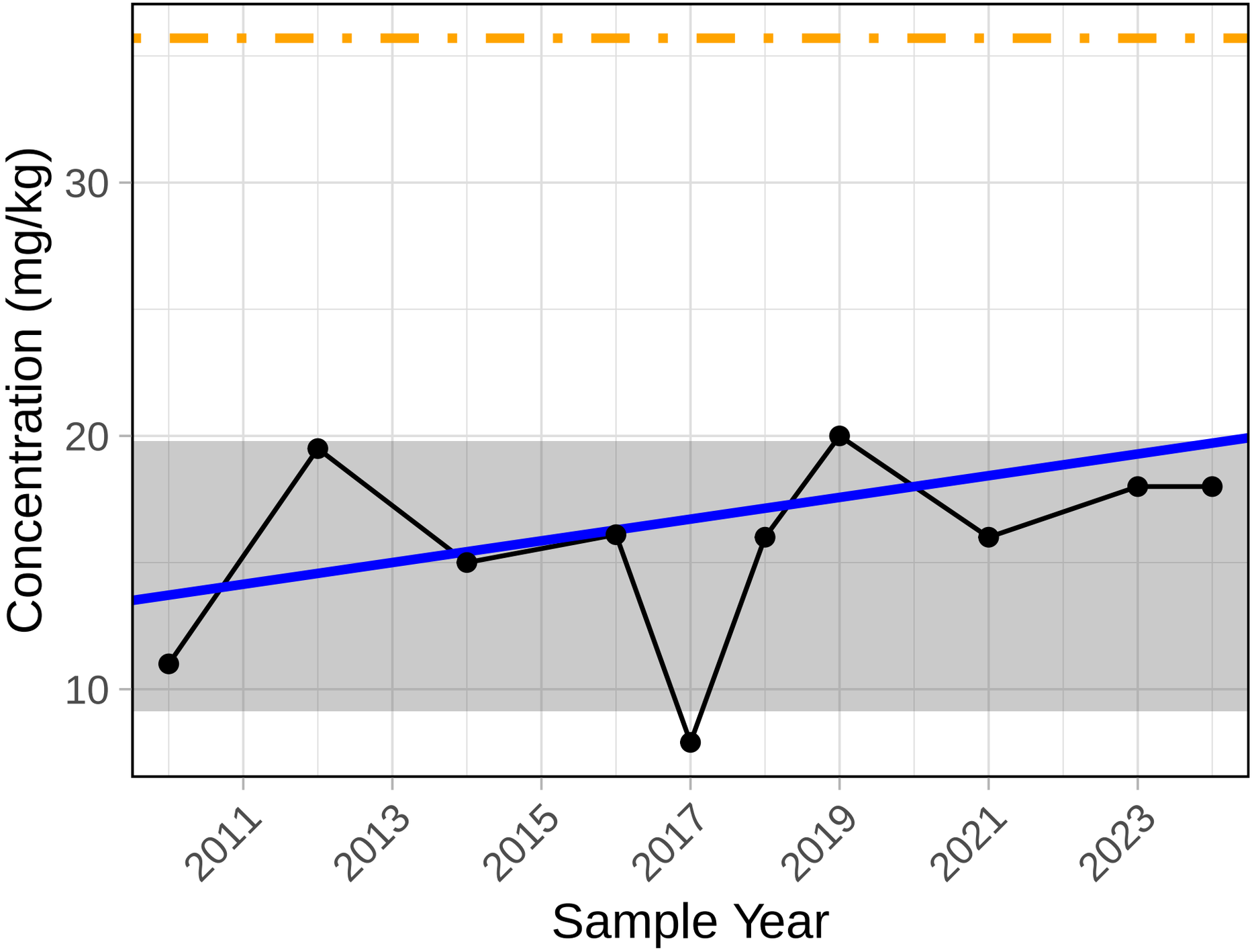
Chrystina Sediment



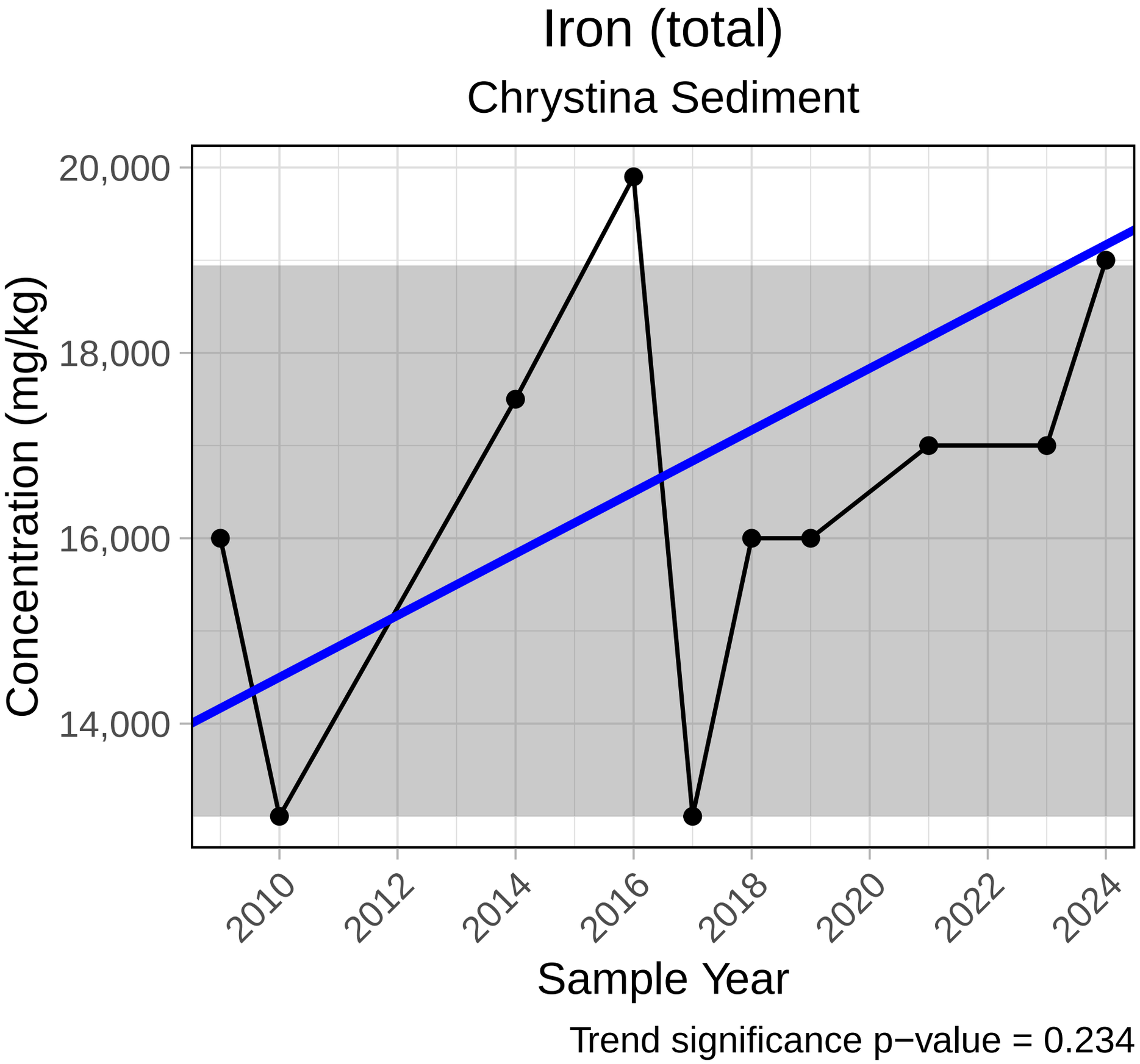
Trend significance p−value = 0.855
ISQG level = 37.3 mg/kg (maximum)
PEL level = 90 mg/kg (maximum)

Copper (total)

Chrystina Sediment

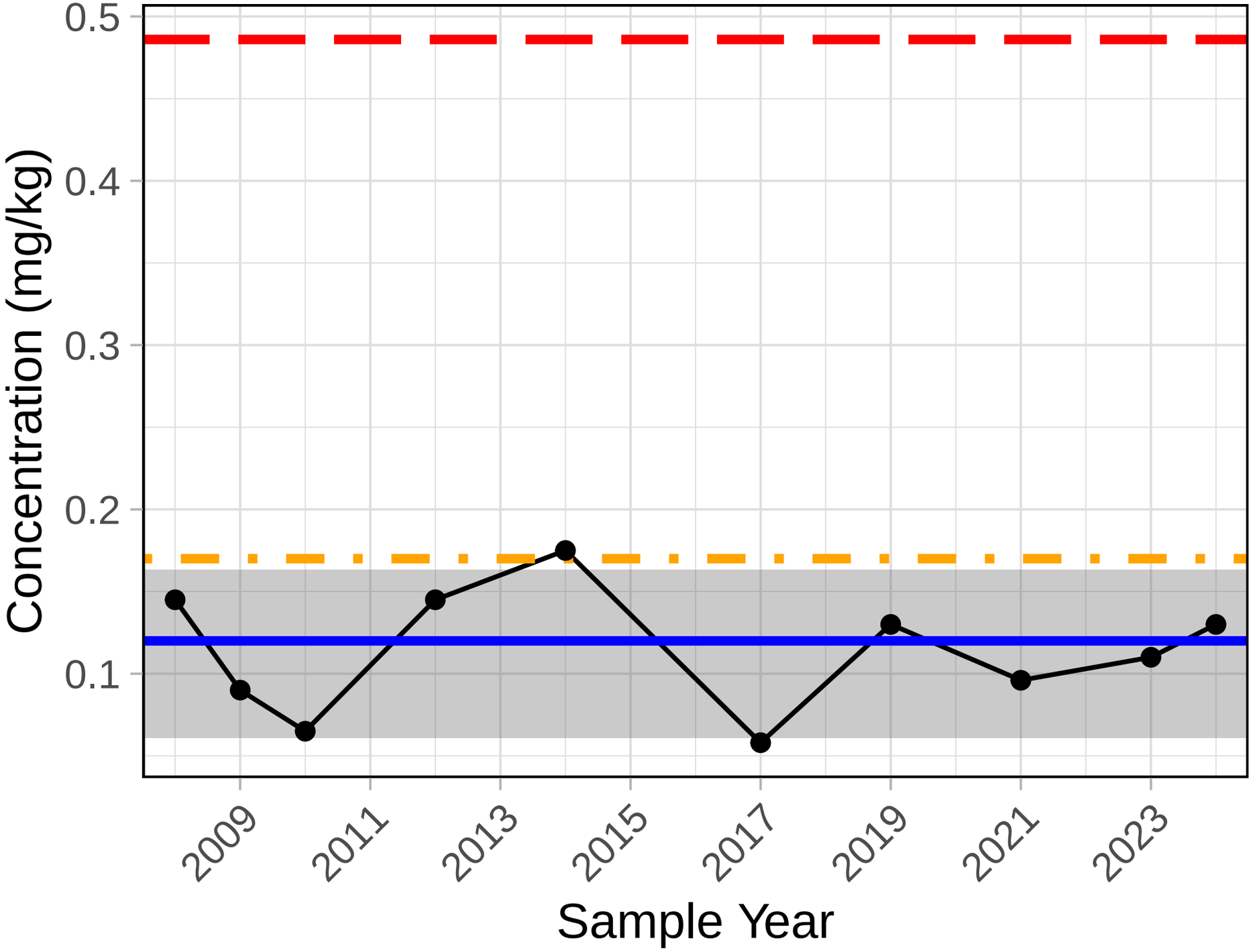


Trend significance p−value = 0.279
ISQG level = 35.7 mg/kg (maximum)
PEL level = 197 mg/kg (maximum)

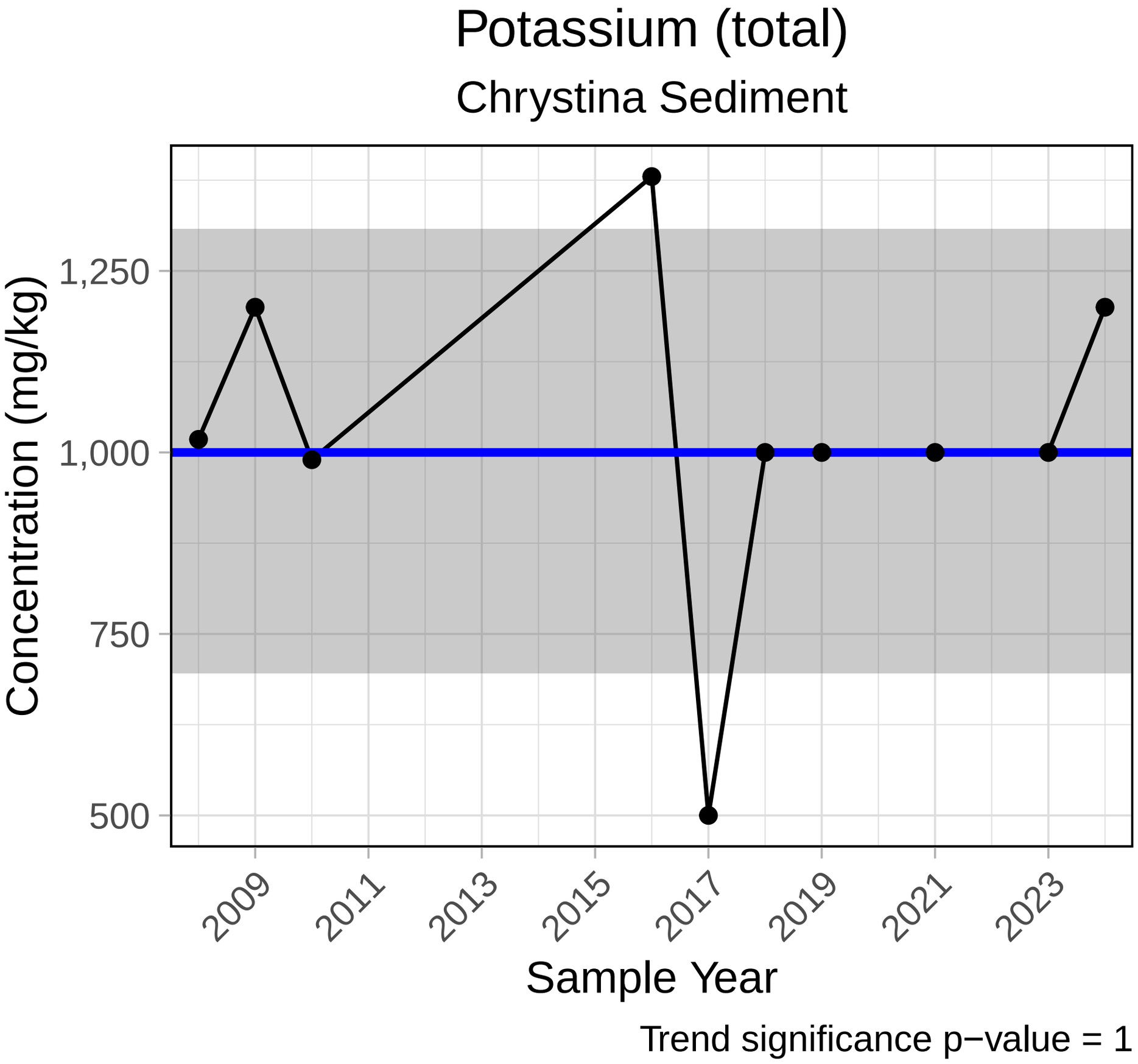

Iron (total)
Chrystina Sediment
20,000
18,000
16,000
14,000
Concentration (mg/kg)
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.234

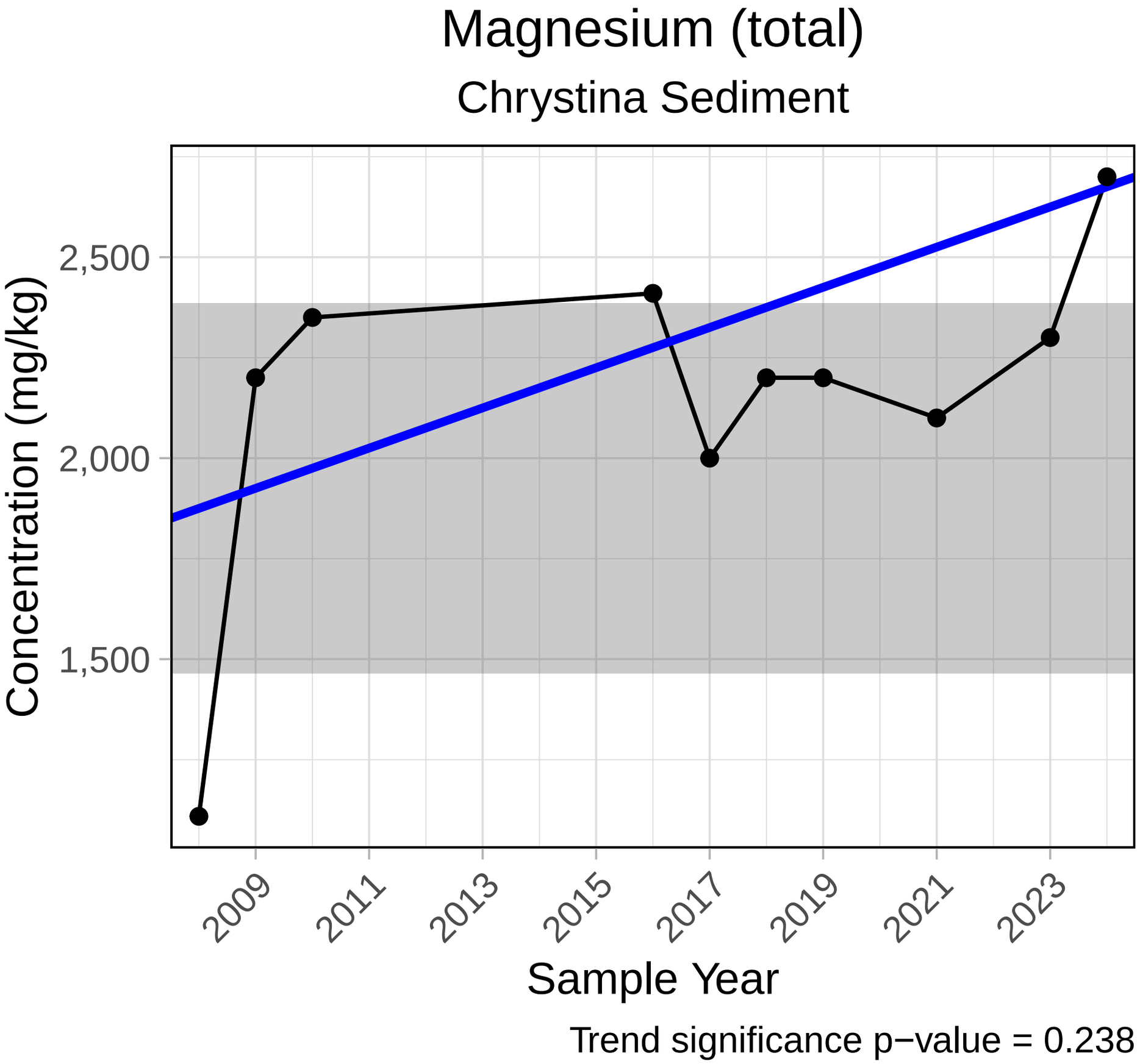
Mercury (total)

Chrystina Sediment



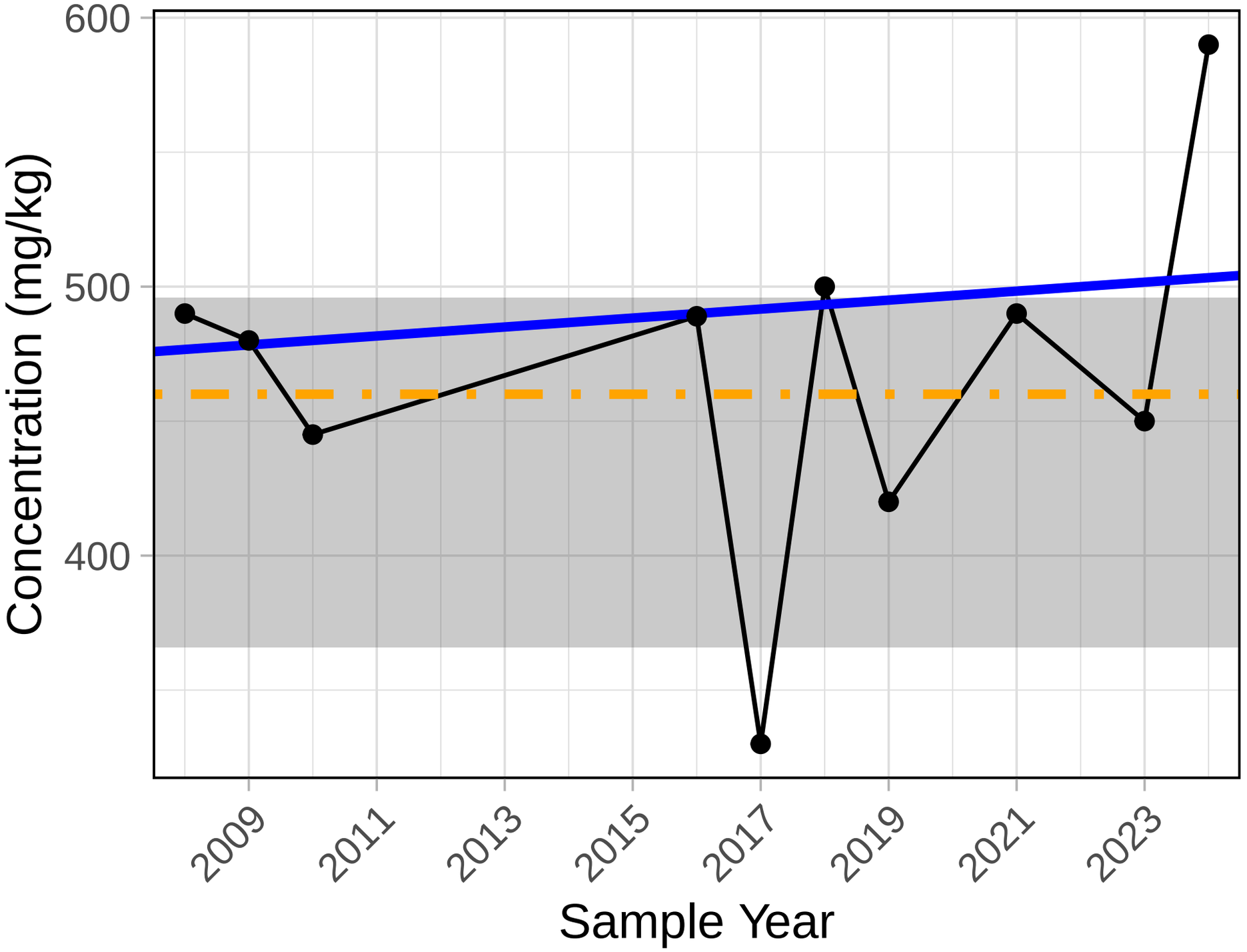
Trend significance p−value = 1
ISQG level = 0.17 mg/kg (maximum)
PEL level = 0.486 mg/kg (maximum)


Potassium (total)
Chrystina Sediment
Concentration (mg/kg)
1,250
1,000
750
500
2009
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1


Magnesium (total)
Chrystina Sediment
Concentration (mg/kg)
2,500
2,000
1,500
2009
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.238

Manganese (total)

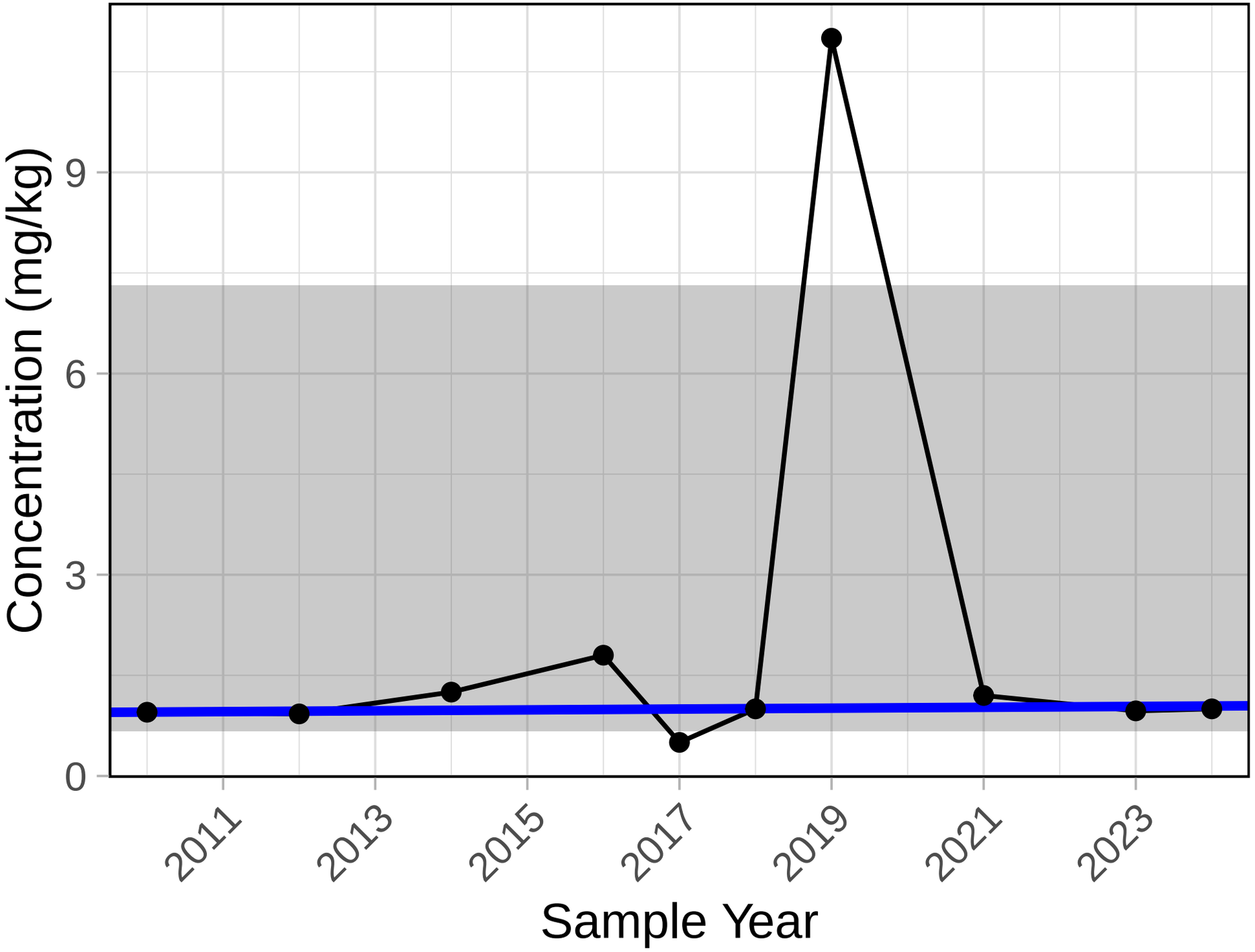
Chrystina Sediment



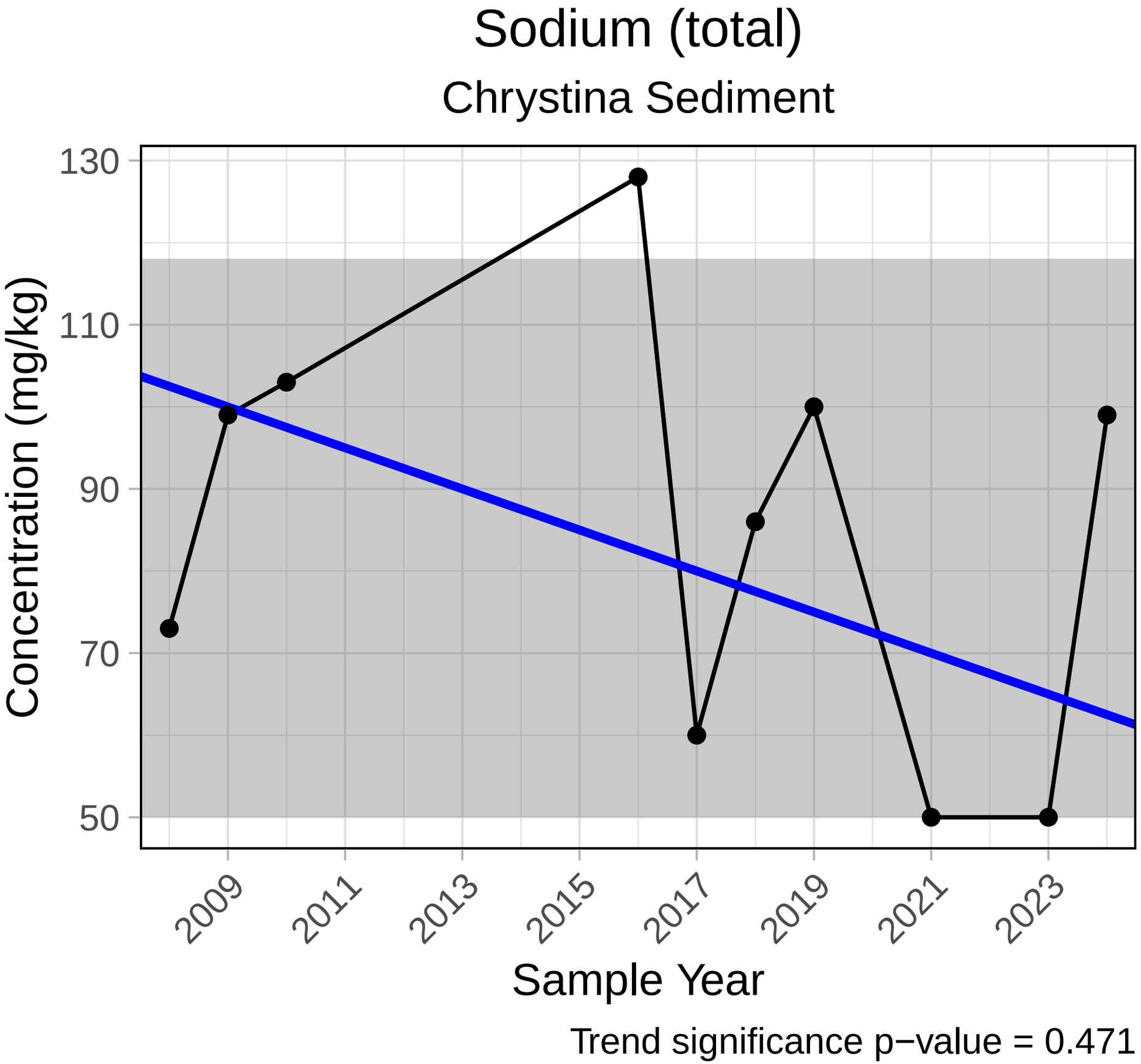
Trend significance p−value = 0.653
ISQG level = 460 mg/kg (maximum)

Molybdenum (total)

Chrystina Sediment

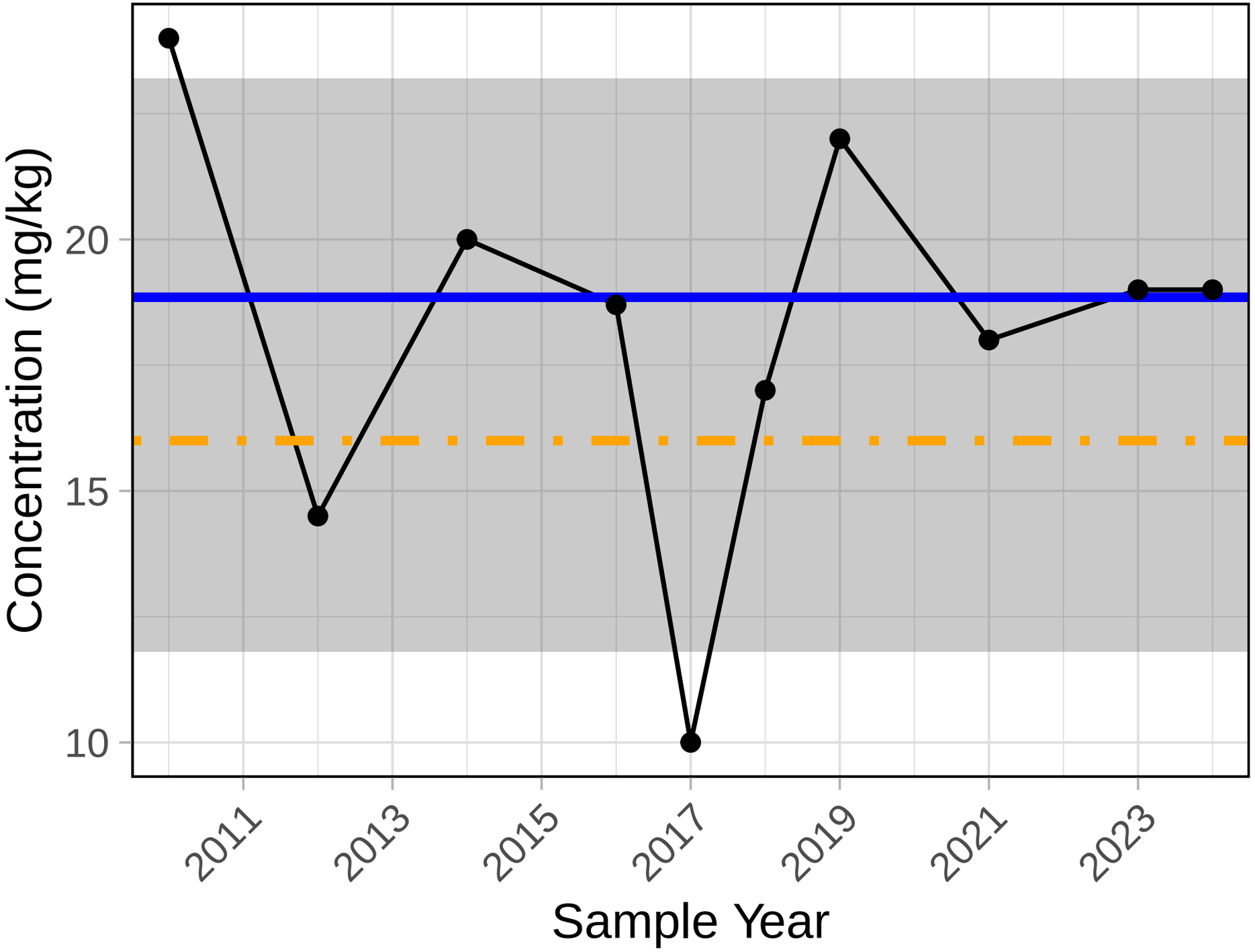


Trend significance p−value = 0.653

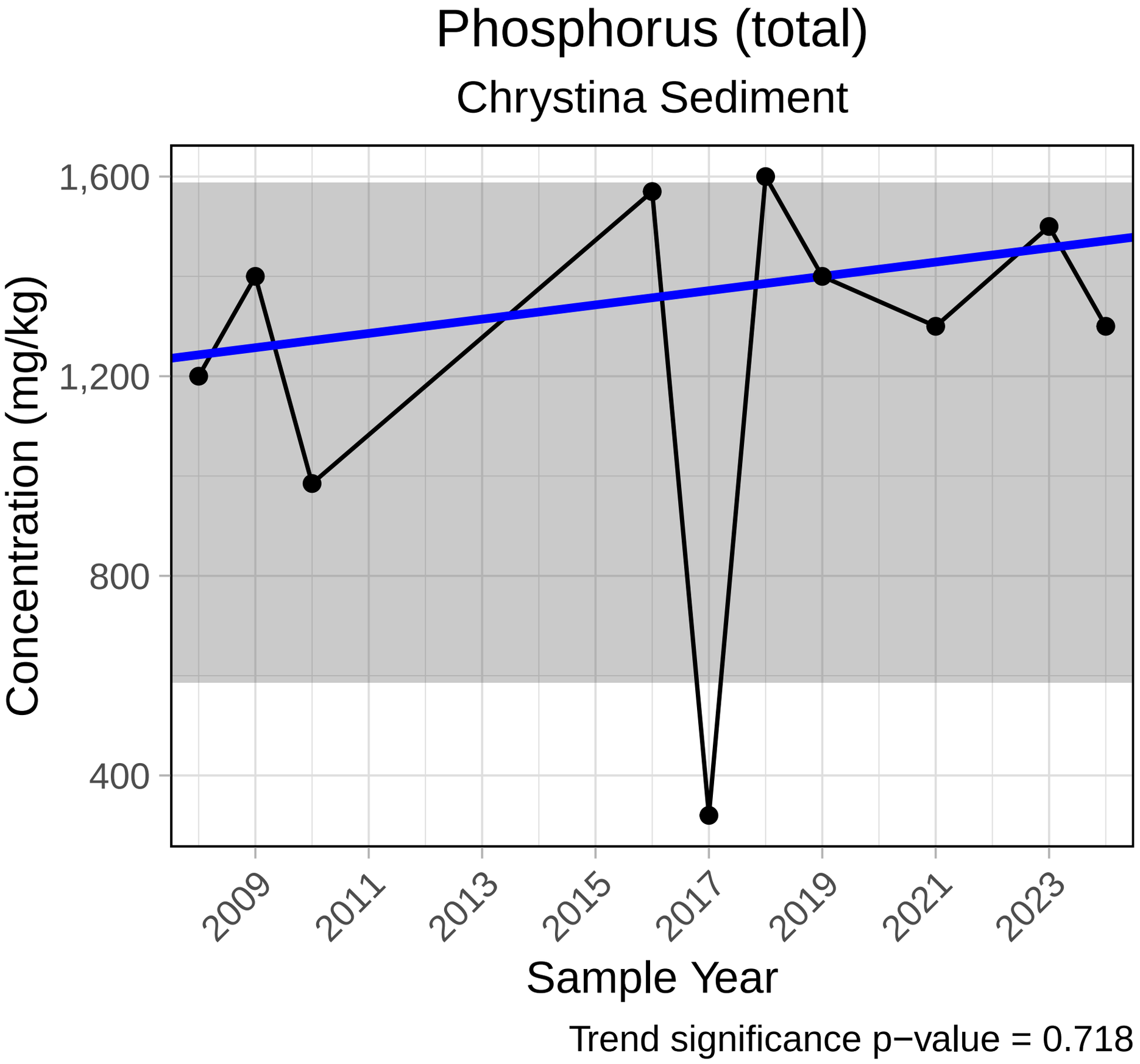

Sodium (total)
Chrystina Sediment
130
110
90
70
50
Concentration (mg/kg)
2009
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.471

Nickel (total)

Chrystina Sediment

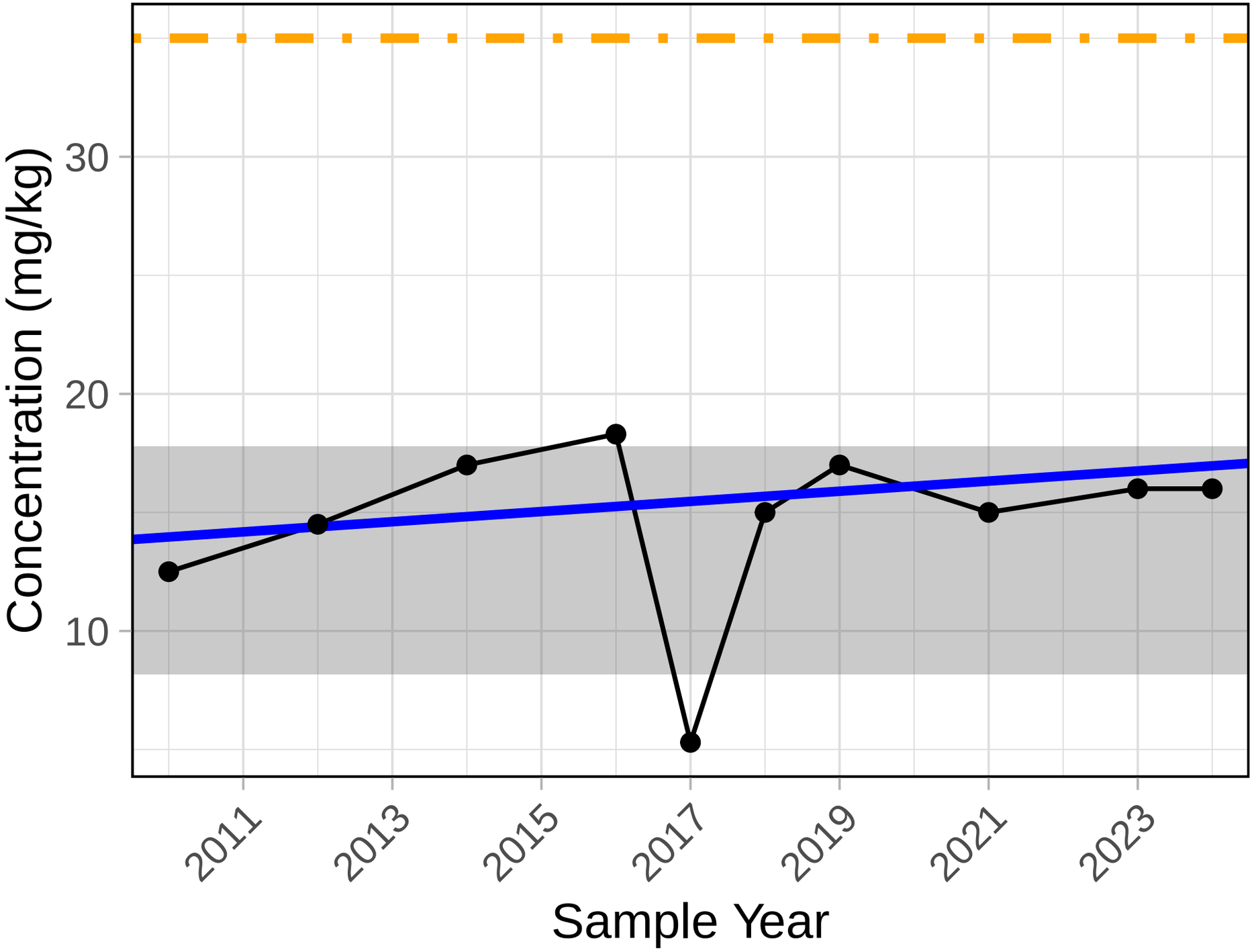


Trend significance p−value = 1
ISQG level = 16 mg/kg (maximum)

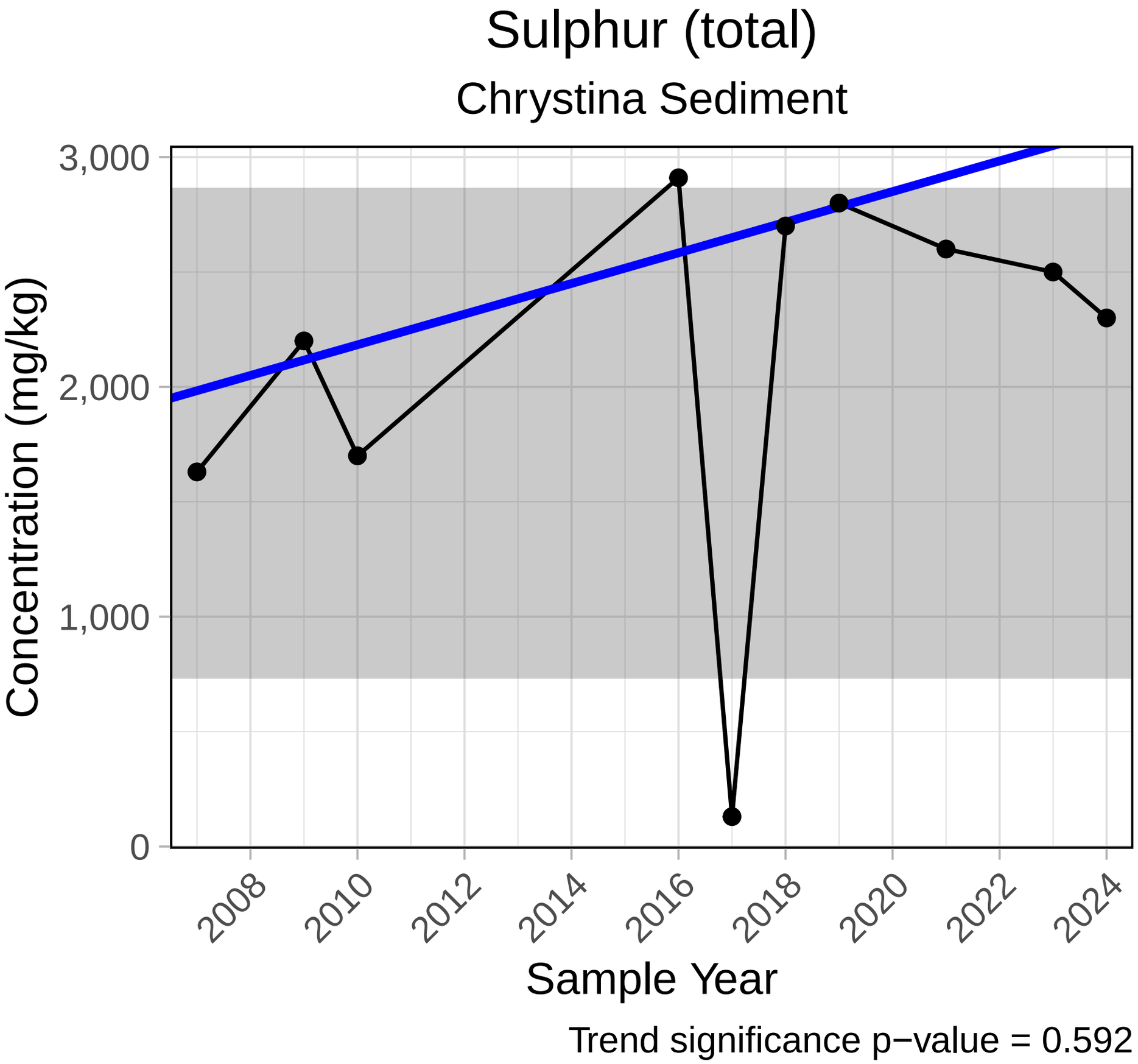

Phosphorus (total)
Chrystina Sediment
1,600
1,200
800
400
Concentration (mg/kg)
2009
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.718

Lead (total)

Chrystina Sediment

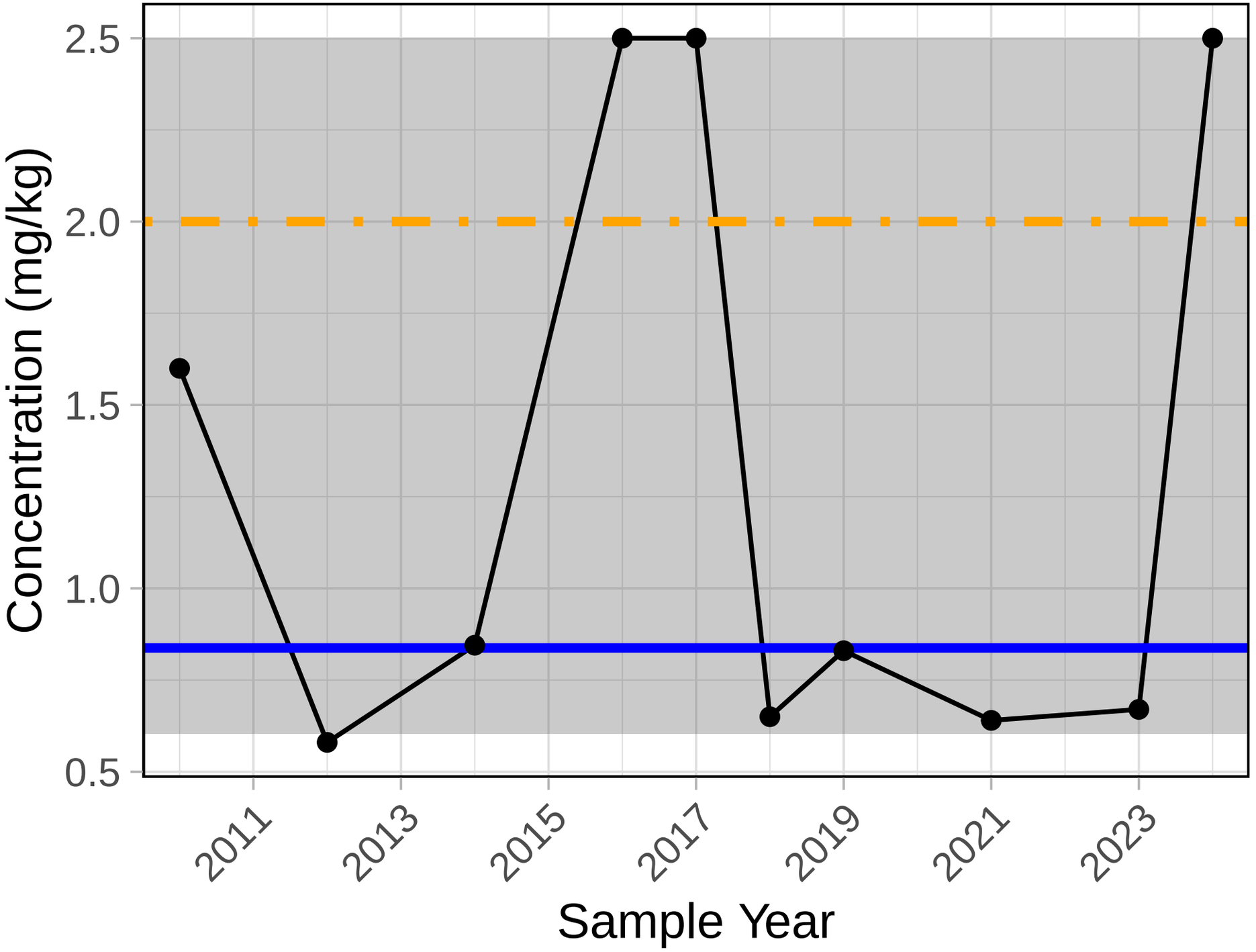


Trend significance p−value = 0.415
ISQG level = 35 mg/kg (maximum)
PEL level = 91.3 mg/kg (maximum)

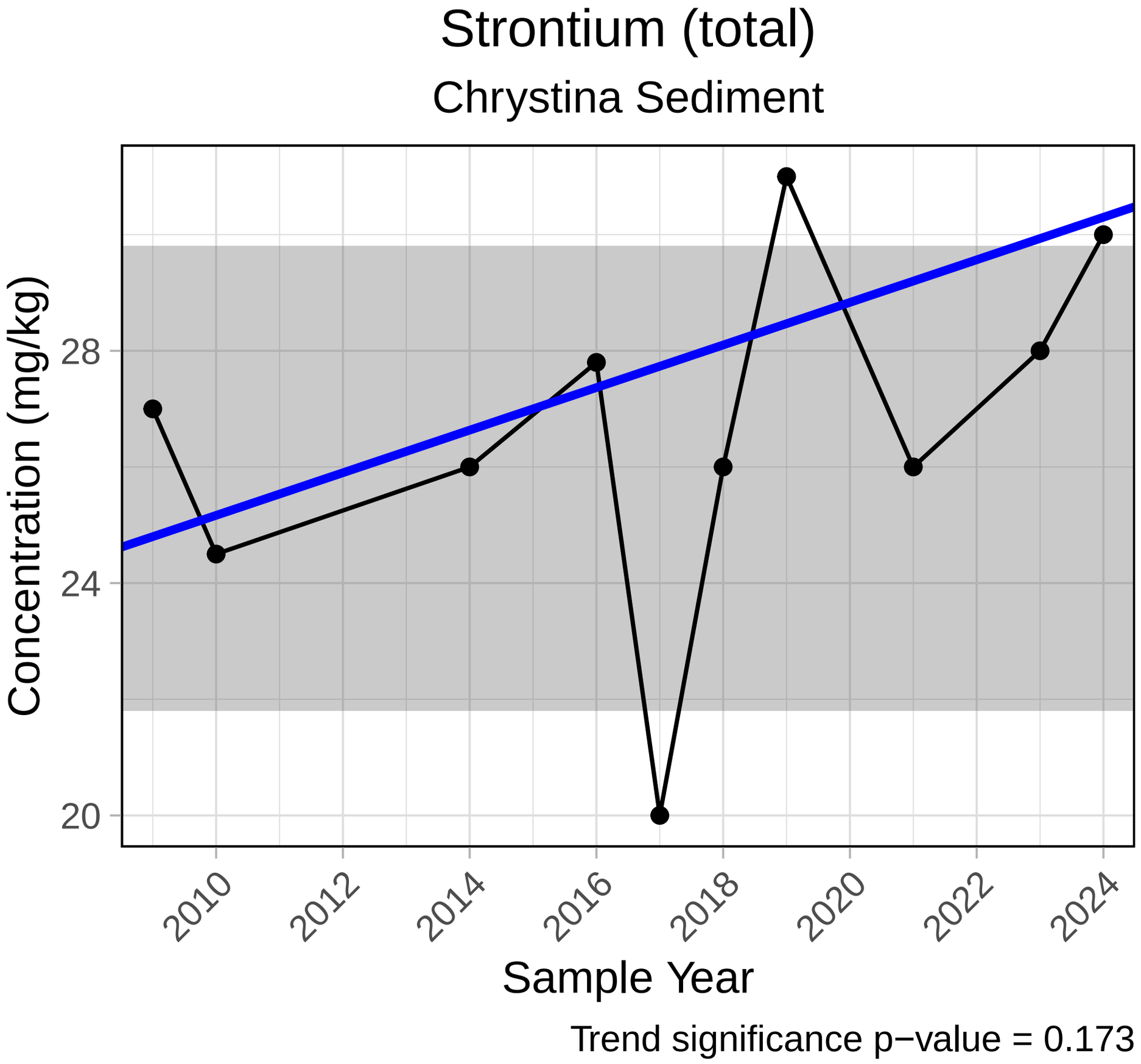

Sulphur (total)
Chrystina Sediment
3,000
2,000
1,000
0
Concentration (mg/kg)
2008
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.592

Selenium (total)

Chrystina Sediment

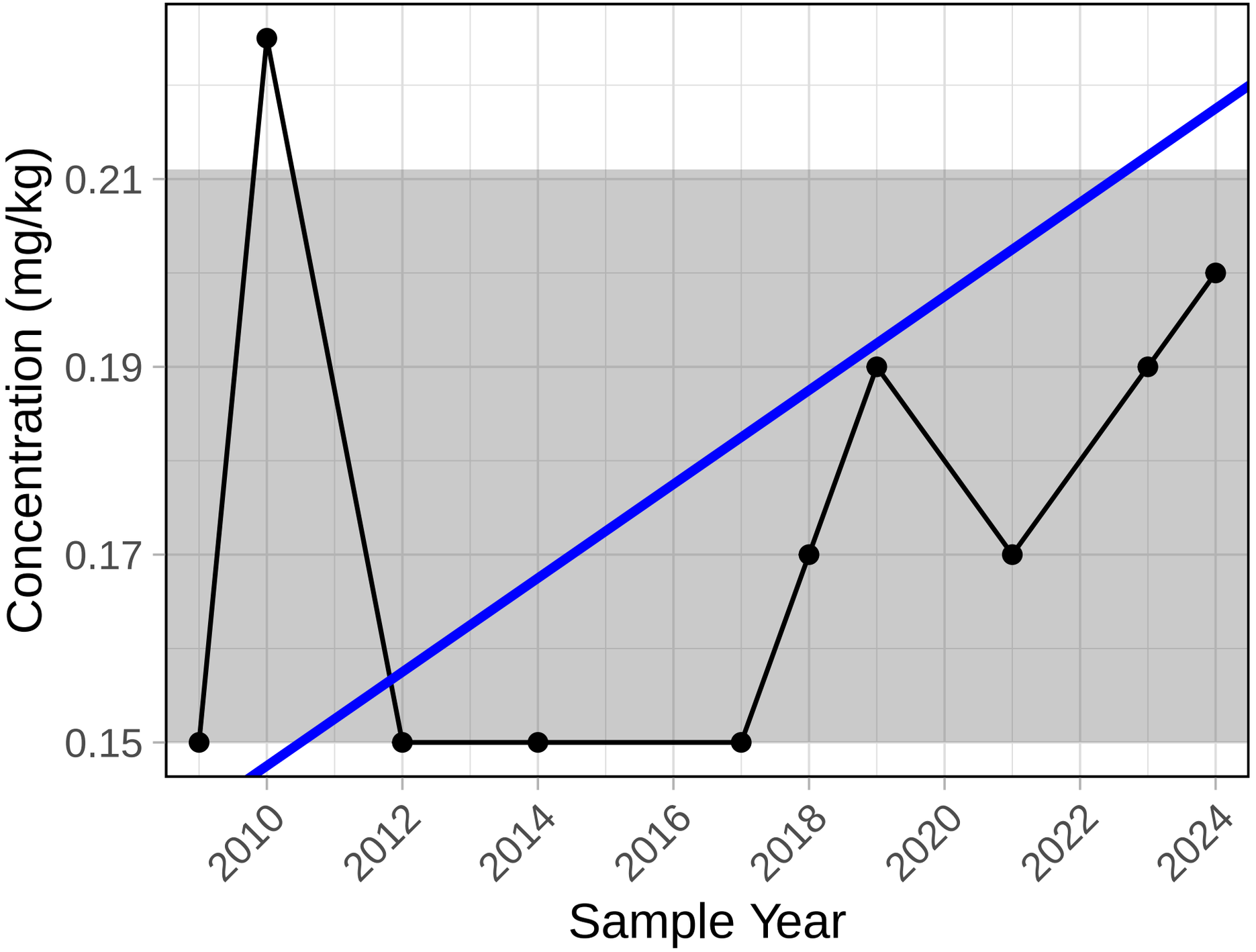


Trend significance p−value = 1
ISQG level = 2 mg/kg (maximum)

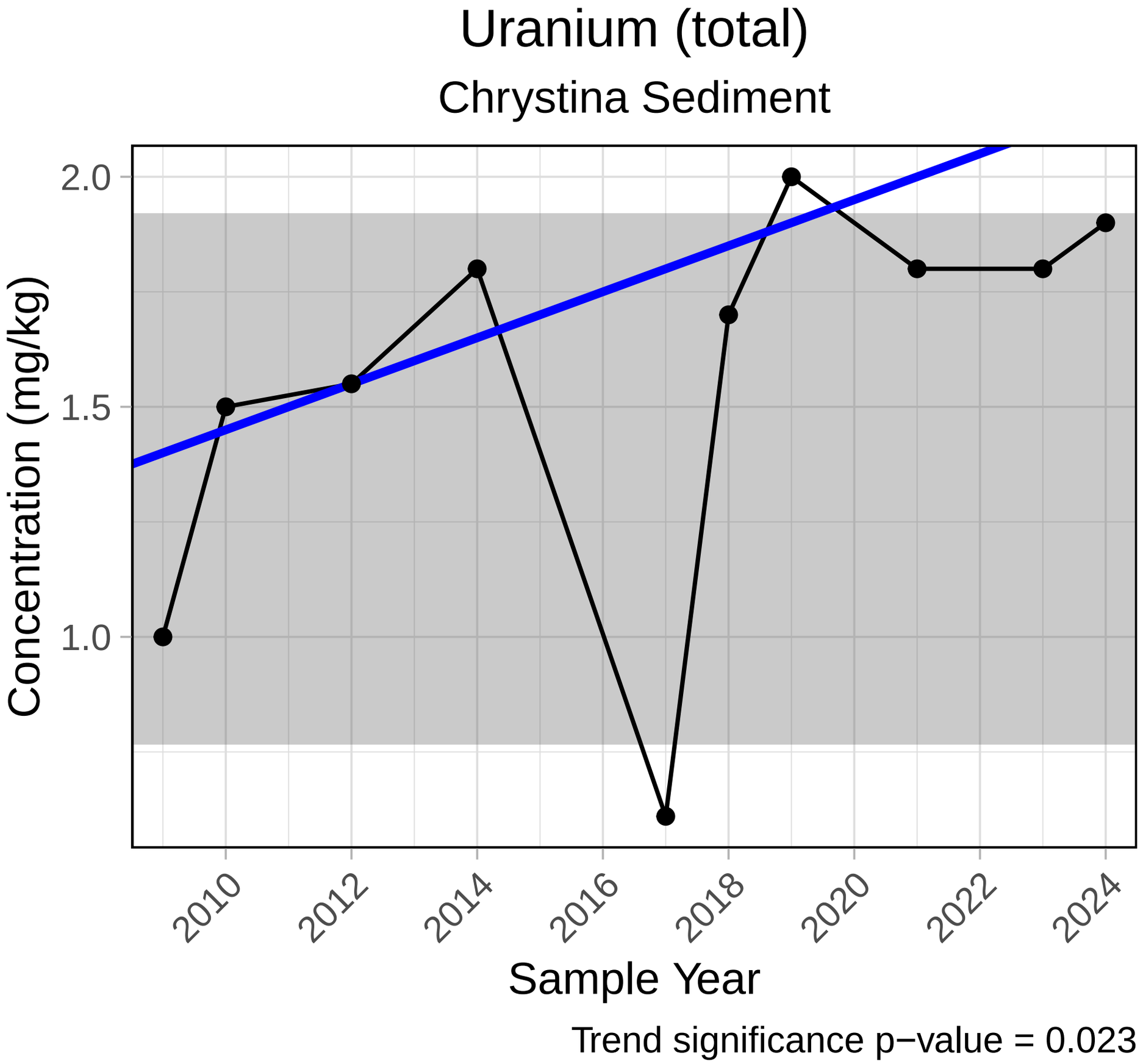

Strontium (total)
Chrystina Sediment
Concentration (mg/kg)
28
24
20
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.173

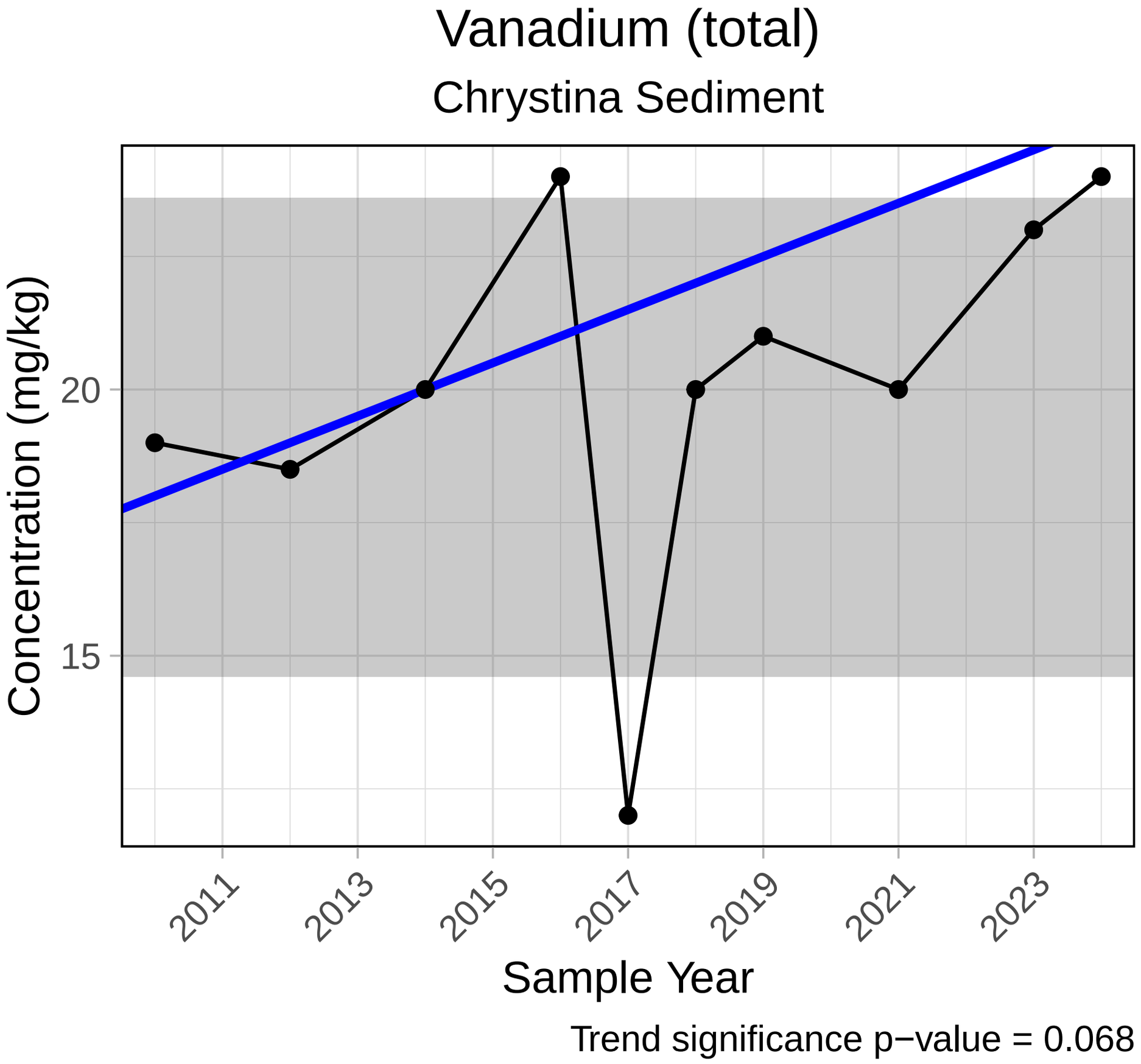
Thallium (total)

Chrystina Sediment



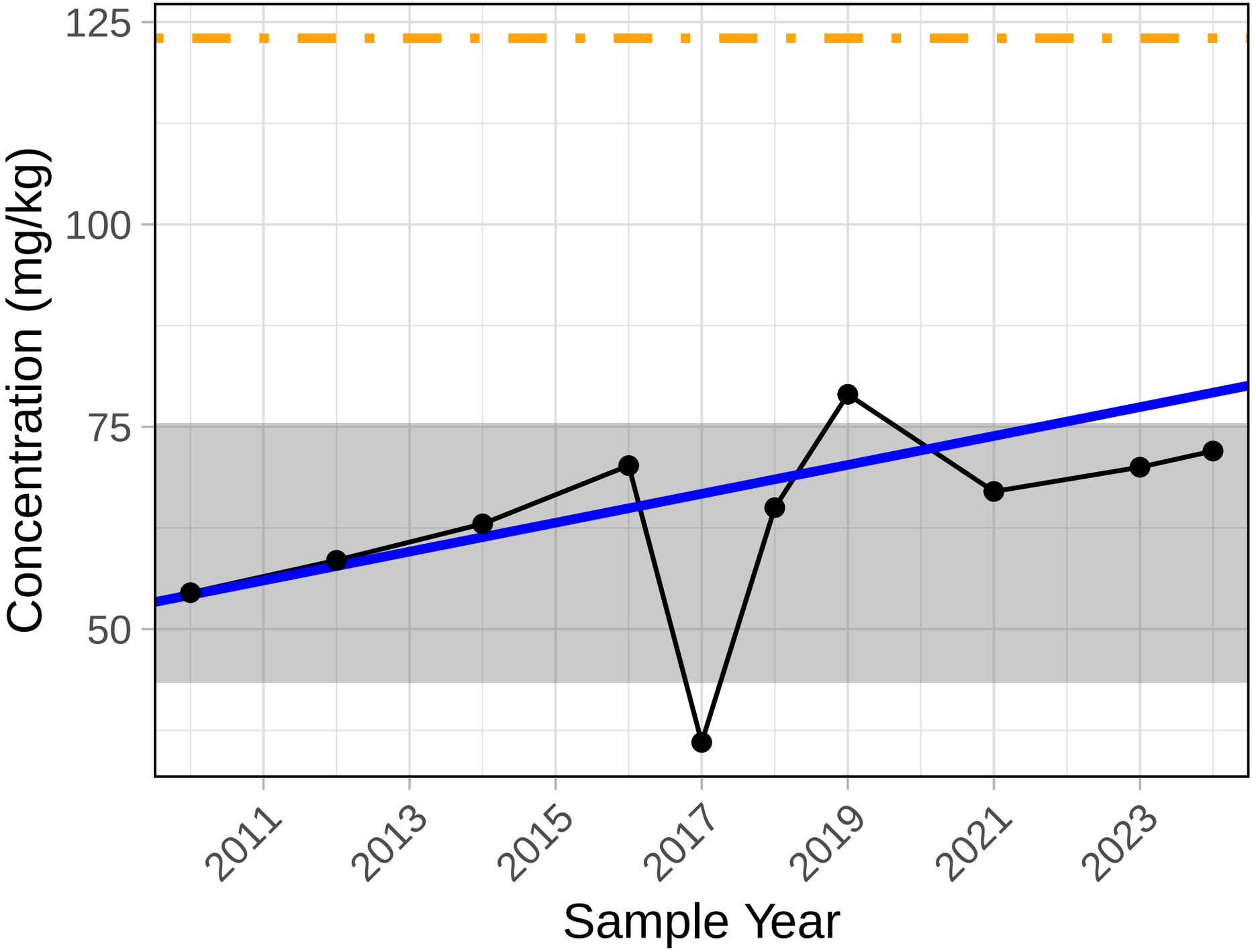
Trend significance p−value = 0.092


Uranium (total)
Chrystina Sediment
Concentration (mg/kg)
2.0
1.5
1.0
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.023


Vanadium (total)
Chrystina Sediment
Concentration (mg/kg)
20
15
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.068

Zinc (total)

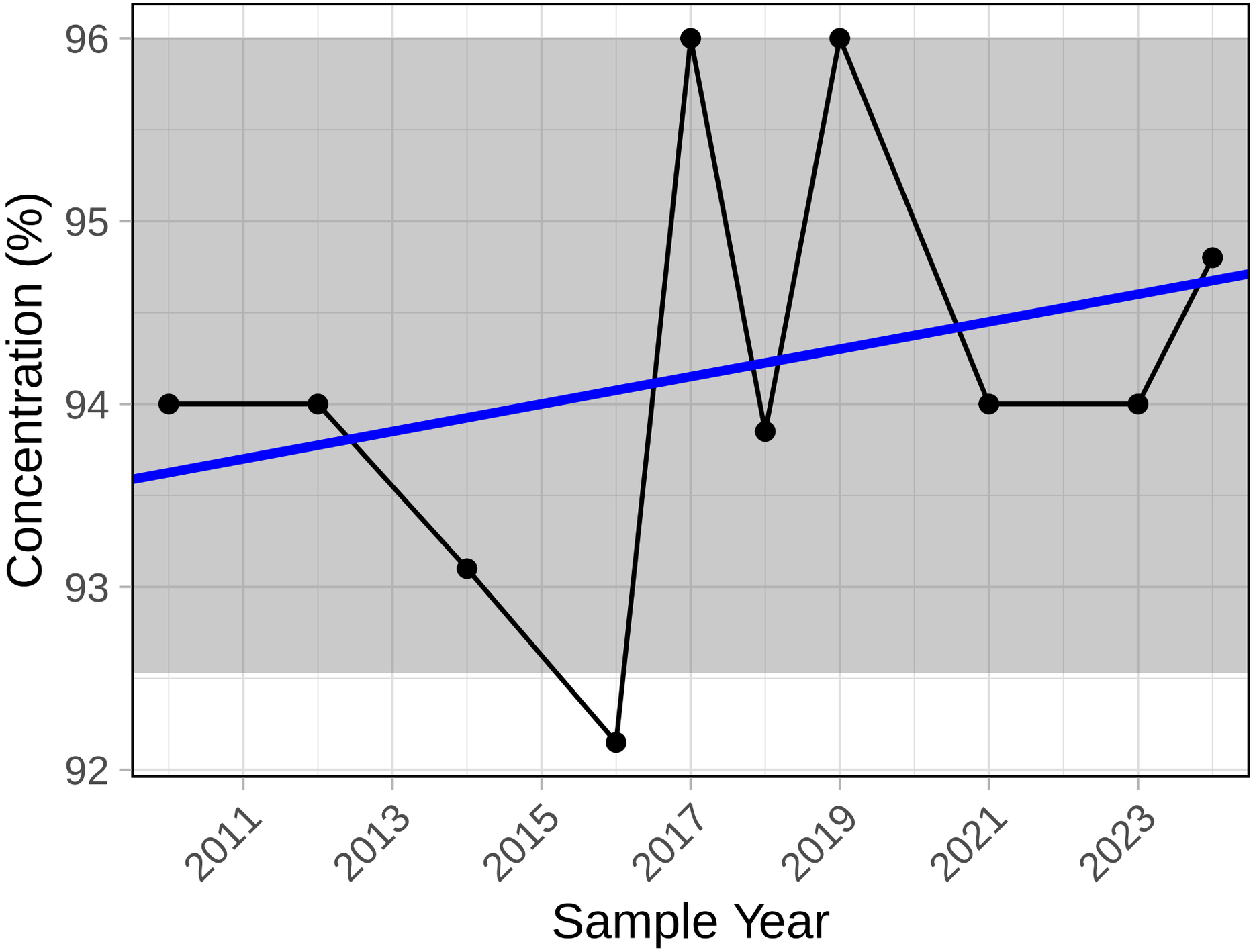
Chrystina Sediment



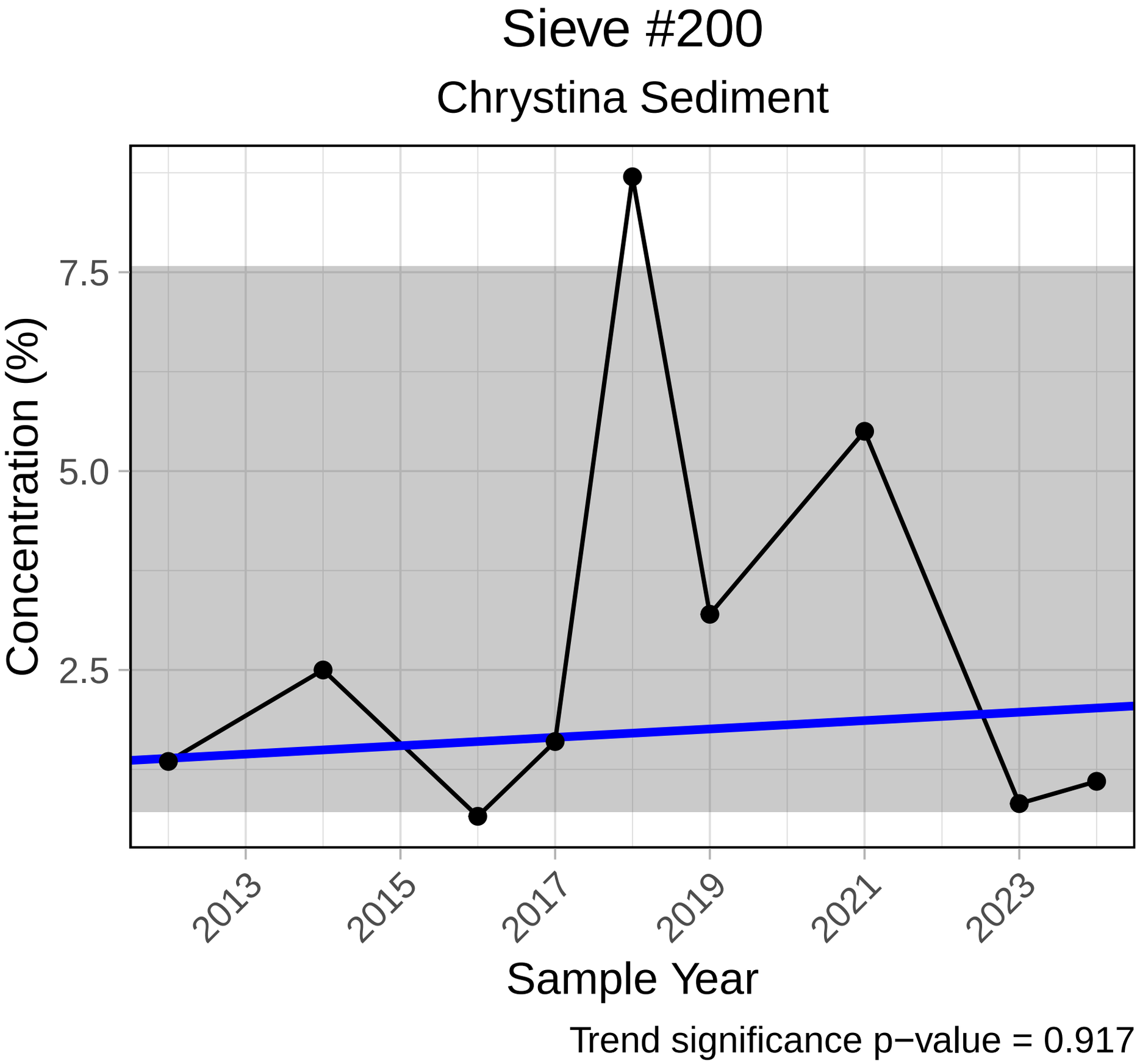
Trend significance p−value = 0.032
ISQG level = 123 mg/kg (maximum)
PEL level = 315 mg/kg (maximum)

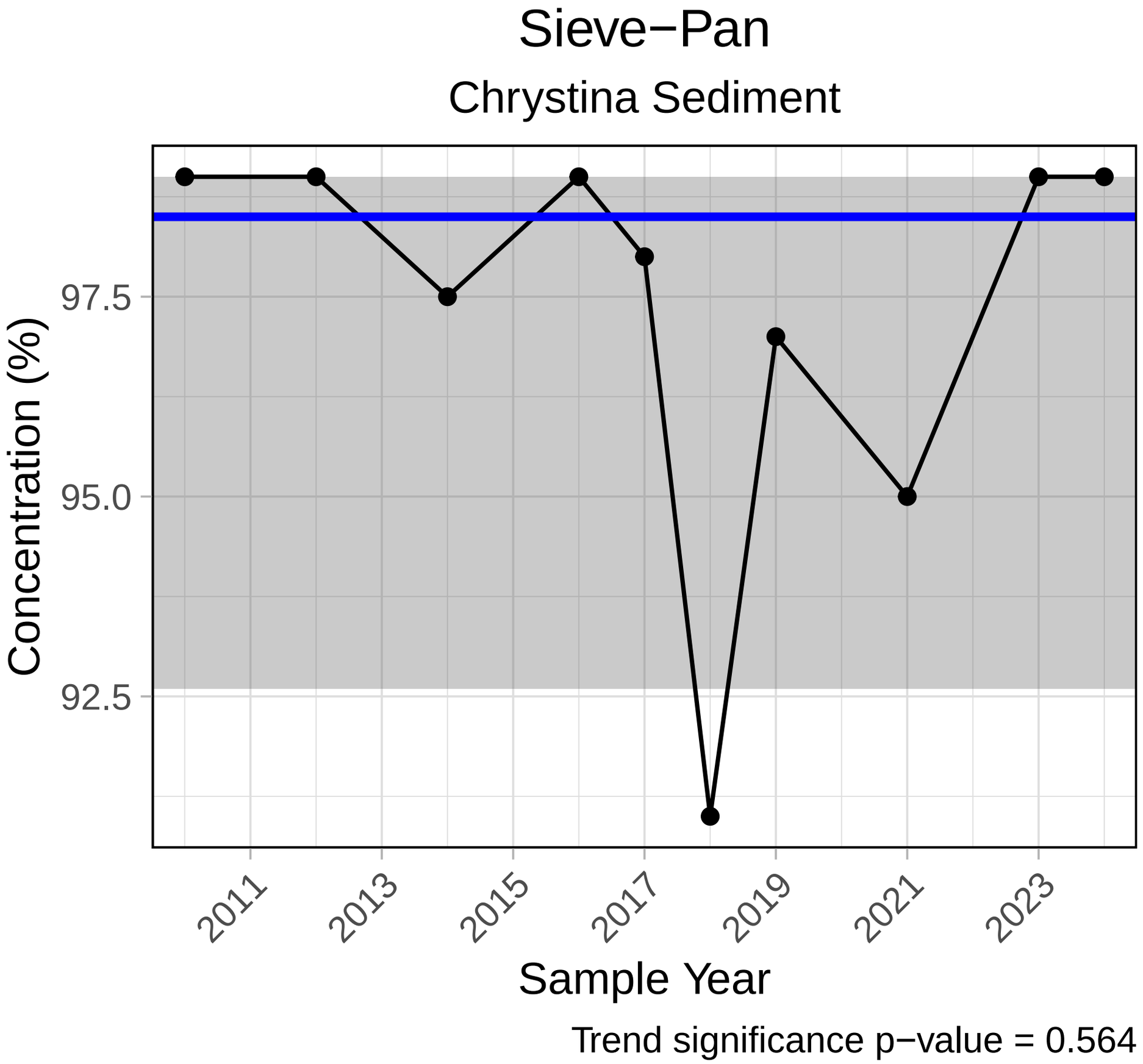
Moisture Content

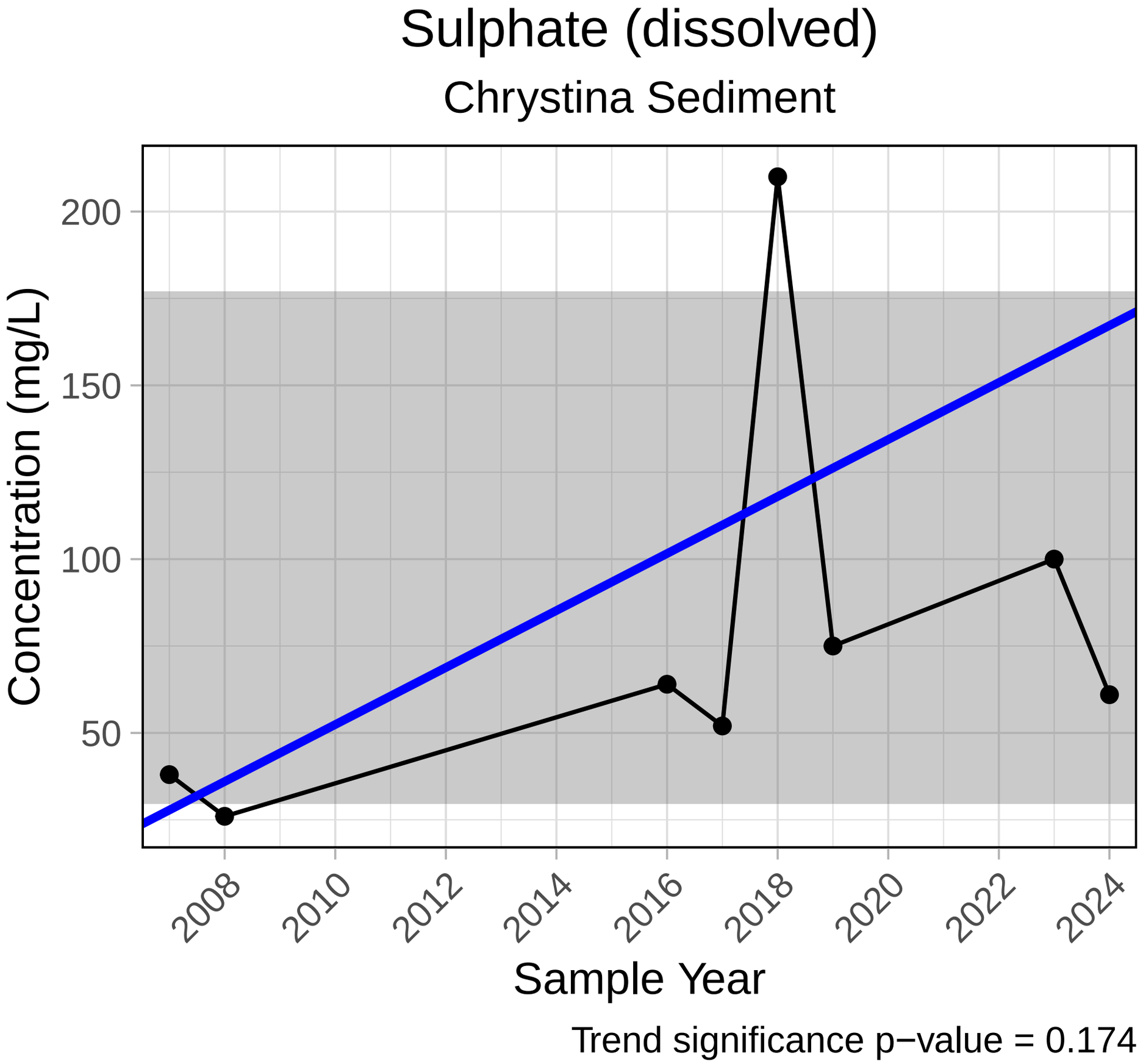
Chrystina Sediment

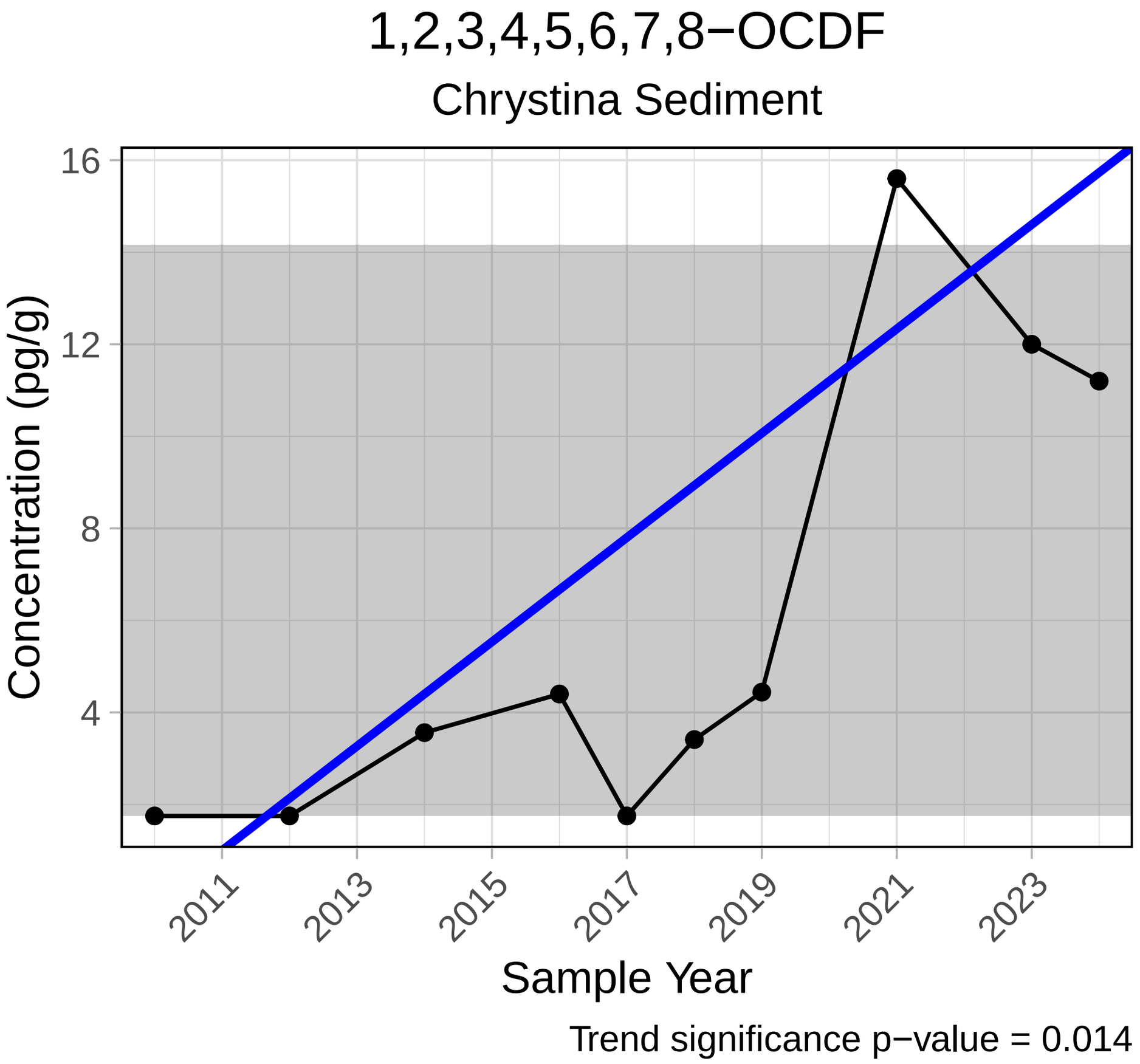


Trend significance p−value = 0.402


Sieve #200
Chrystina Sediment
Concentration (%)
7.5
5.0
2.5
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.917

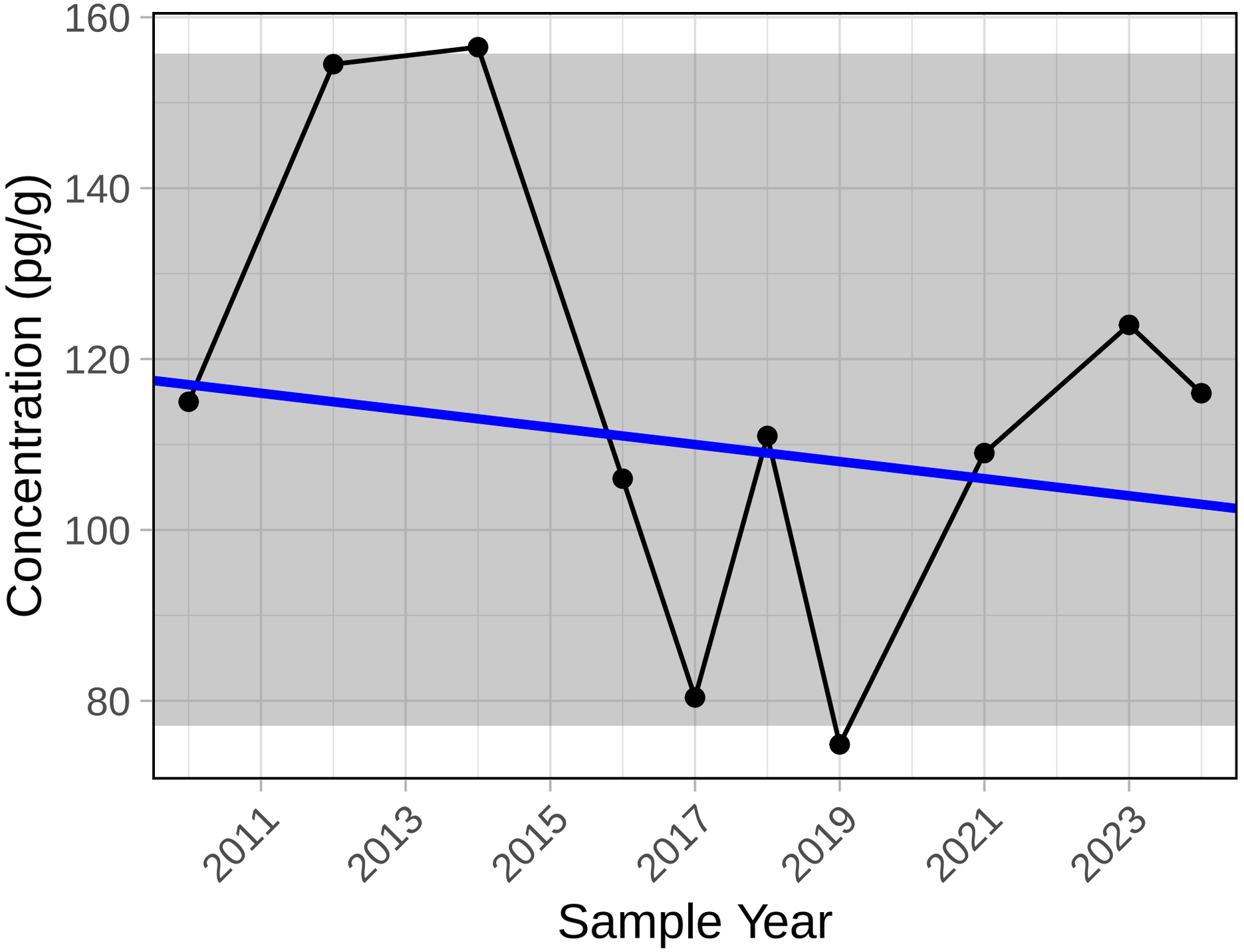

Sieve−Pan
Chrystina Sediment
Concentration (%)
97.5
95.0
92.5
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.564


Sulphate (dissolved)
Chrystina Sediment
Concentration (mg/L)
200
150
100
50
2008
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.174

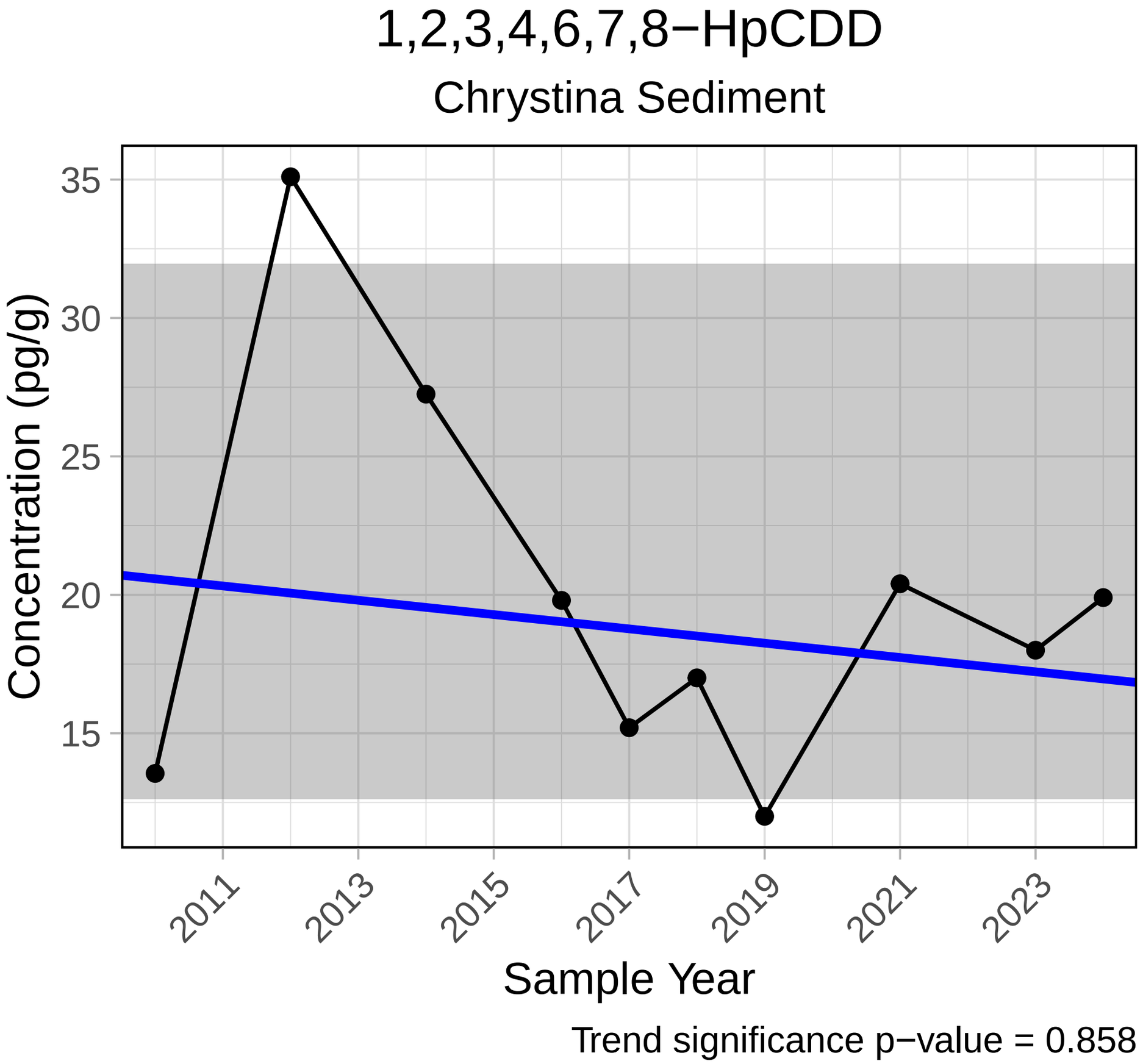

1,2,3,4,5,6,7,8−OCDF
Chrystina Sediment
Concentration (pg/g)
16
12
8
4
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.014

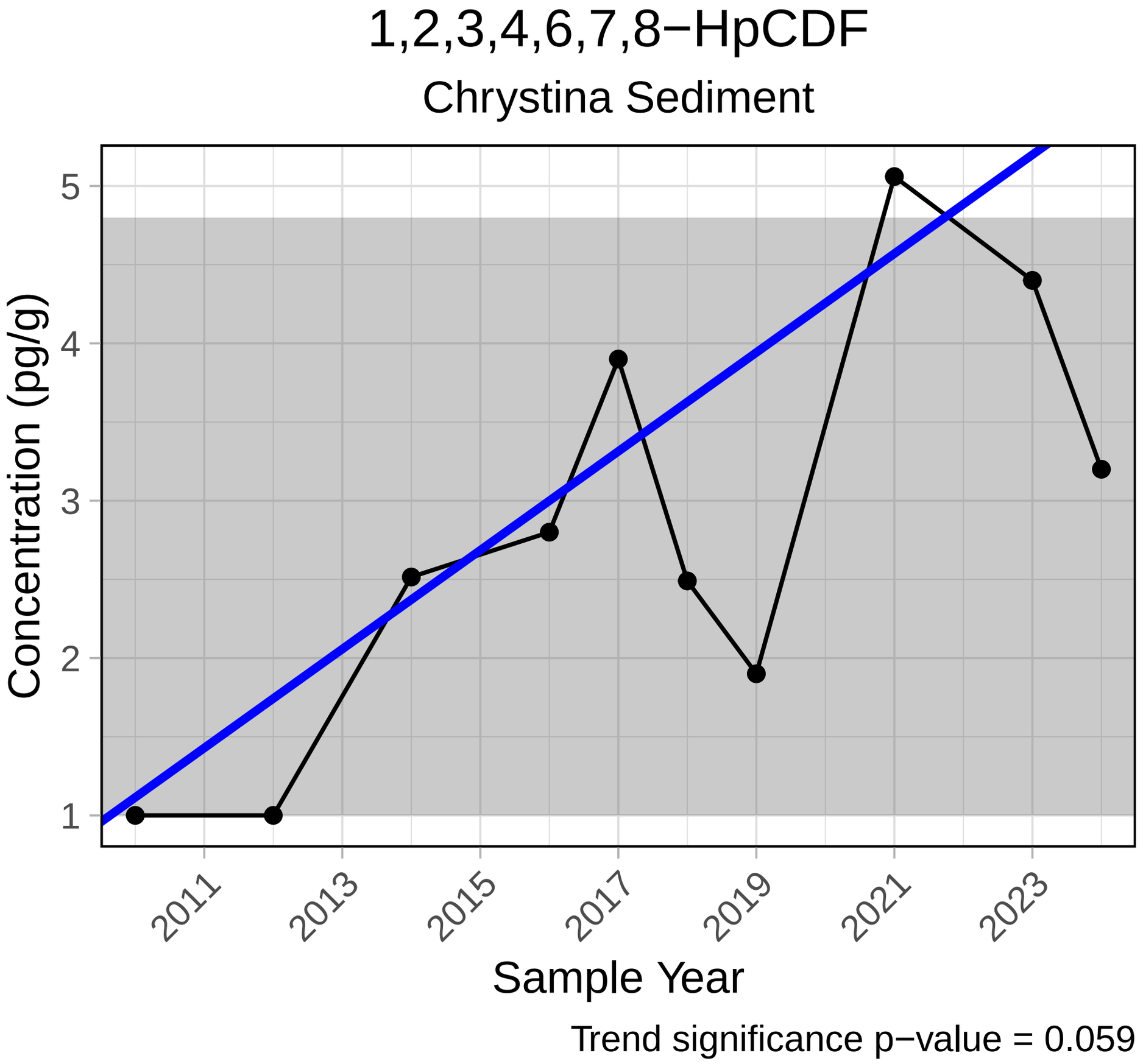
1,2,3,4,6,7,8,9−OCDD

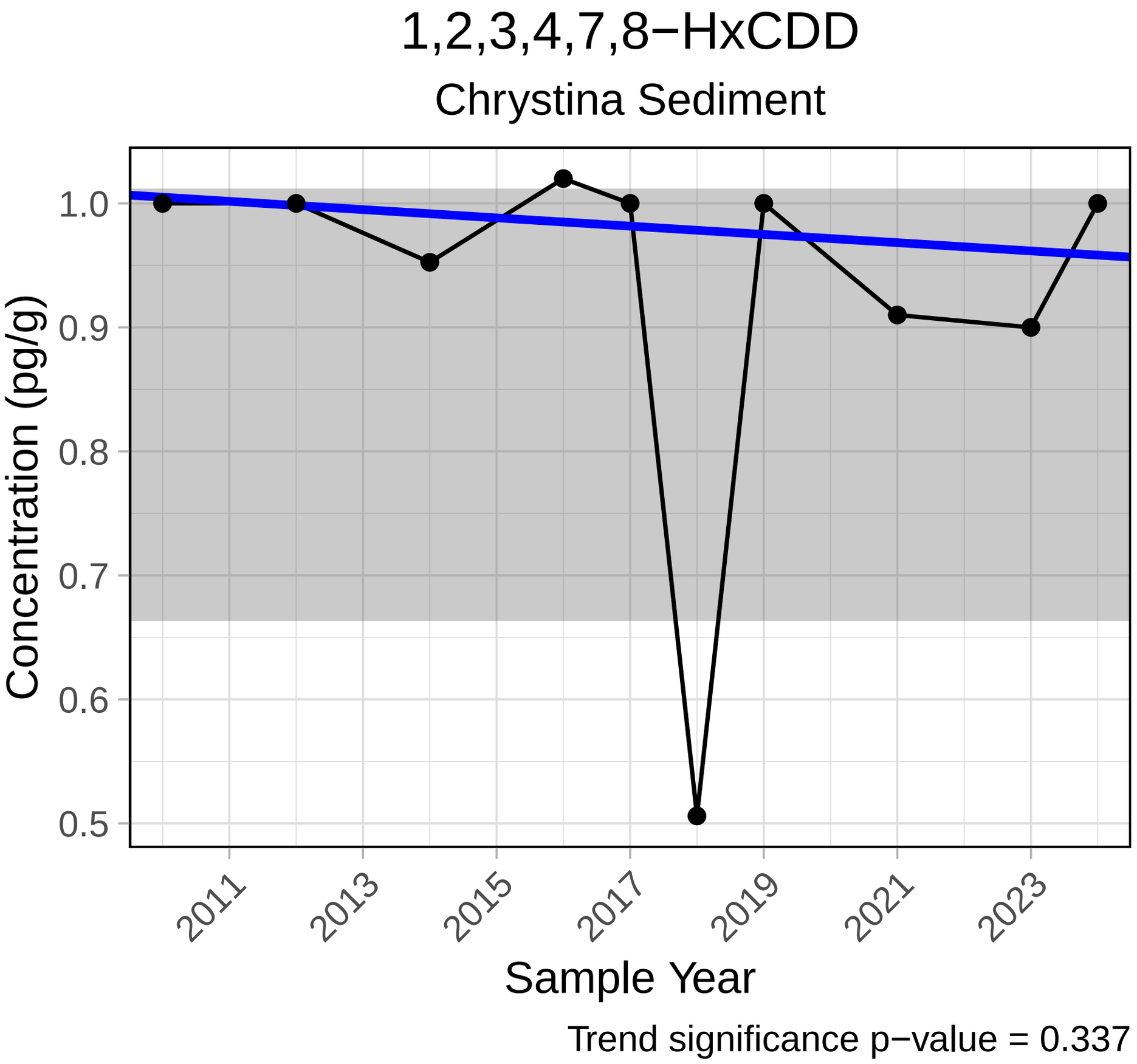
Chrystina Sediment

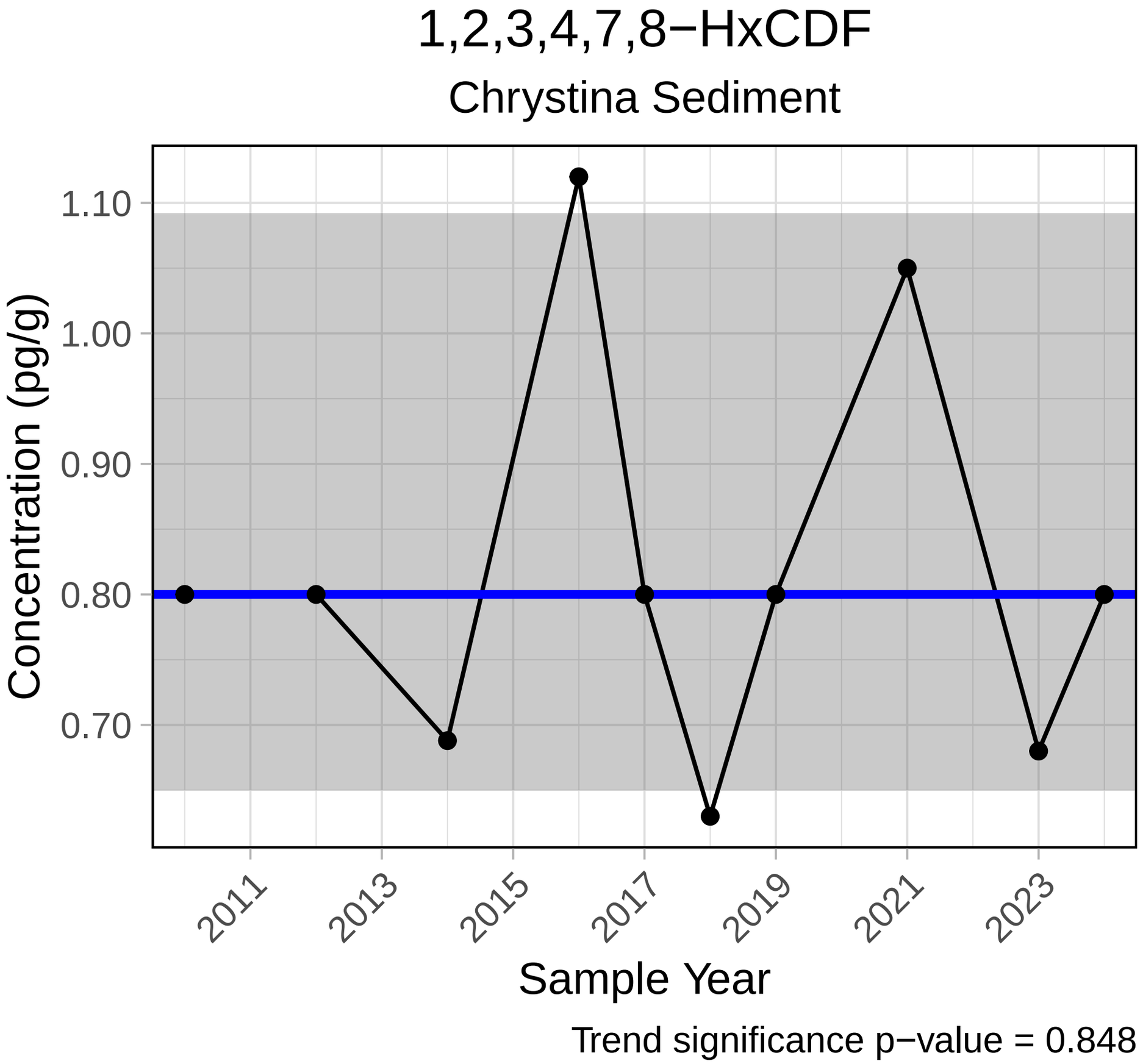


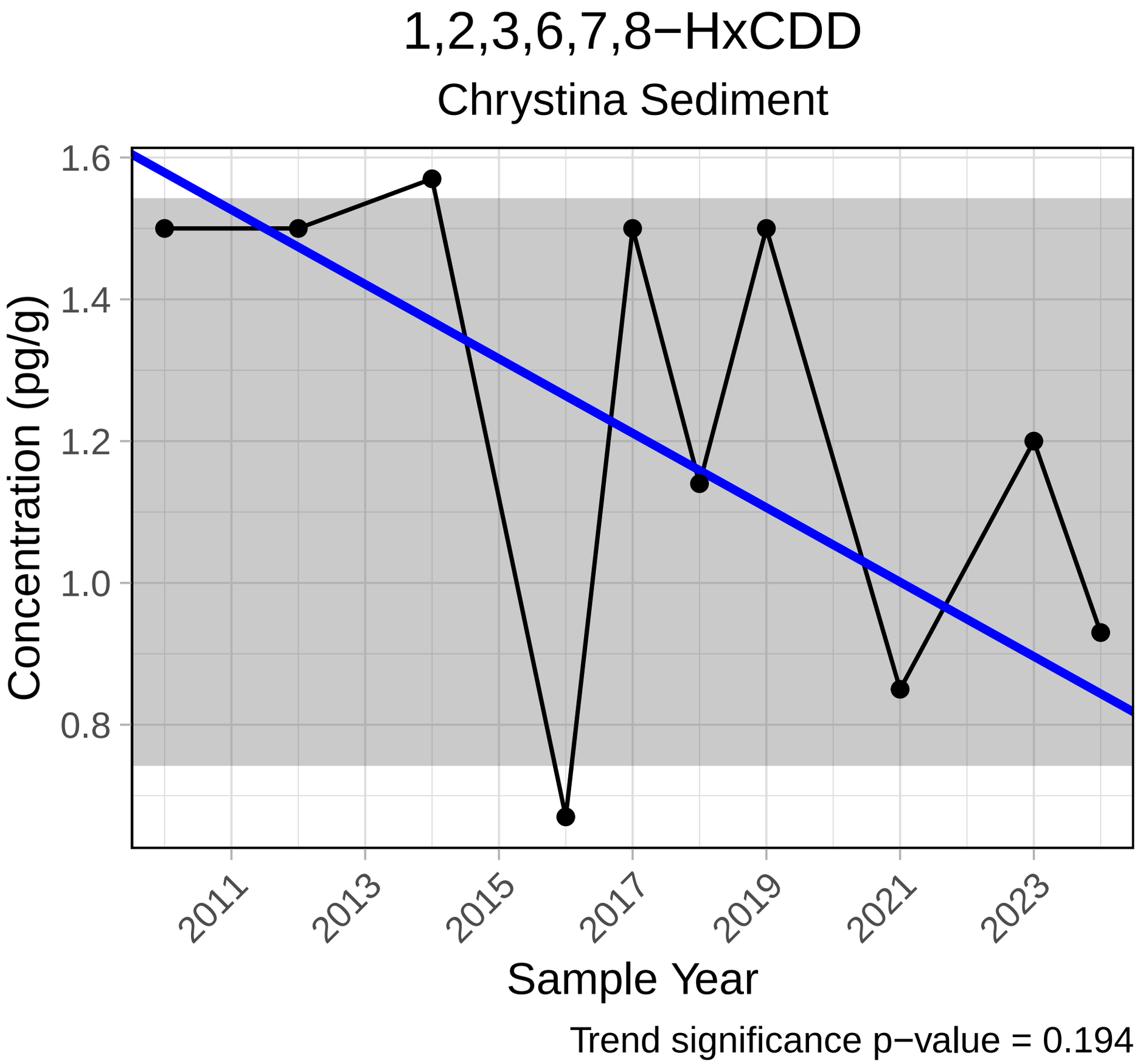
Trend significance p−value = 0.721

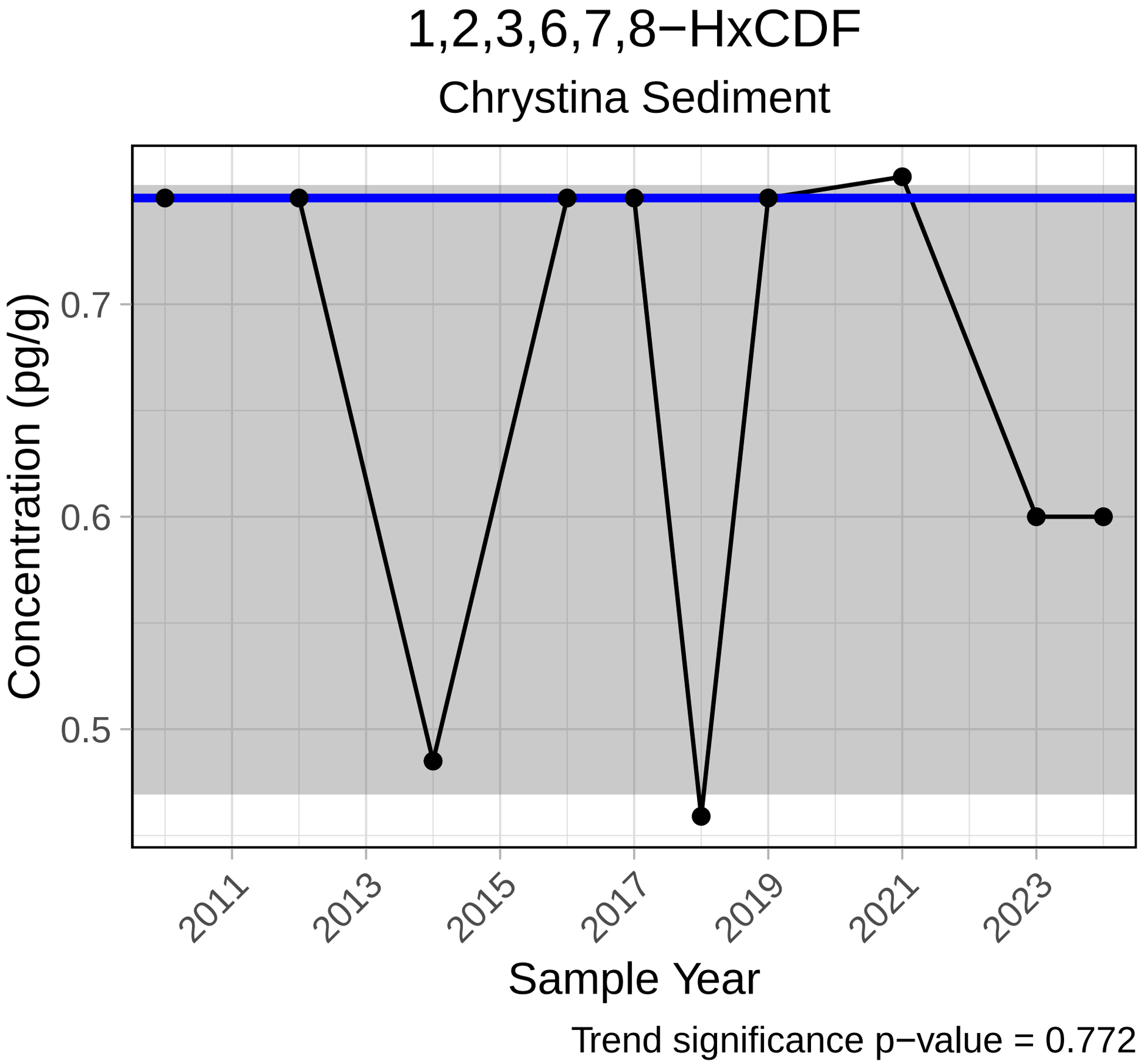

1,2,3,4,6,7,8−HpCDD
Chrystina Sediment
Concentration (pg/g)
35
30
25
20
15
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.858

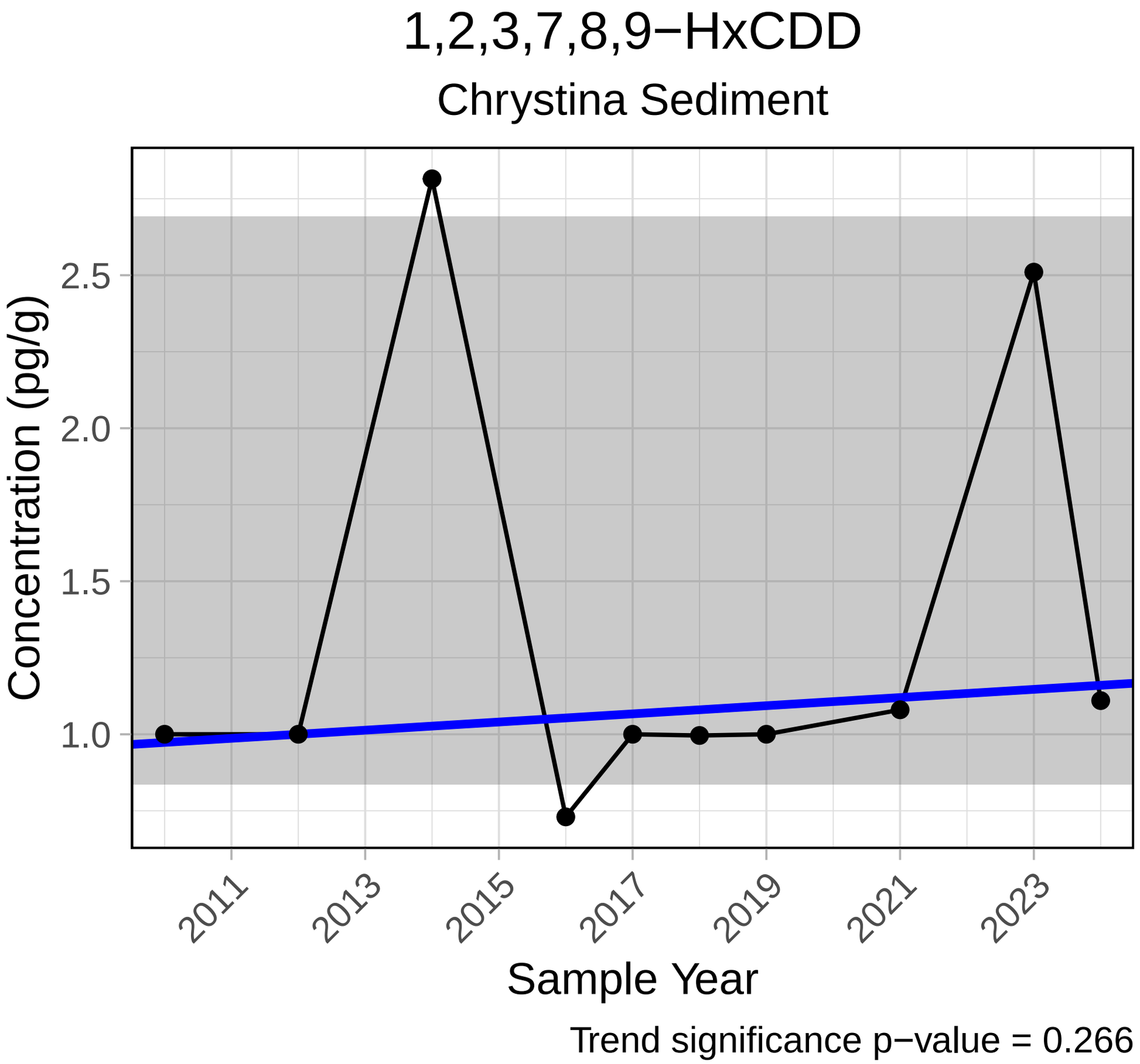

1,2,3,4,6,7,8−HpCDF
Chrystina Sediment
Concentration (pg/g)
5
4
3
2
1
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.059

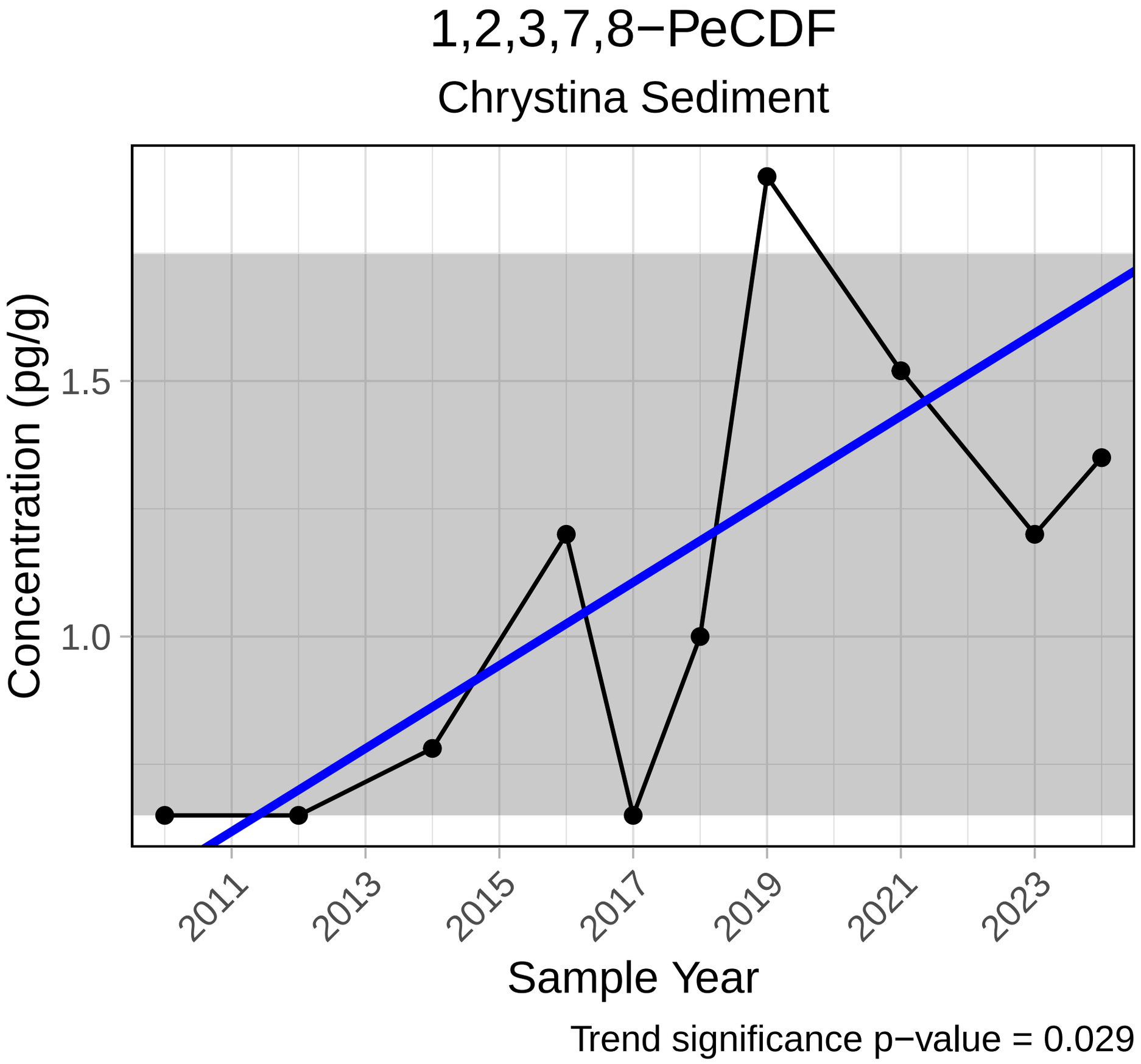

1,2,3,4,7,8−HxCDD
Chrystina Sediment
Concentration (pg/g)
1.0
0.9
0.8
0.7
0.6
0.5
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.337

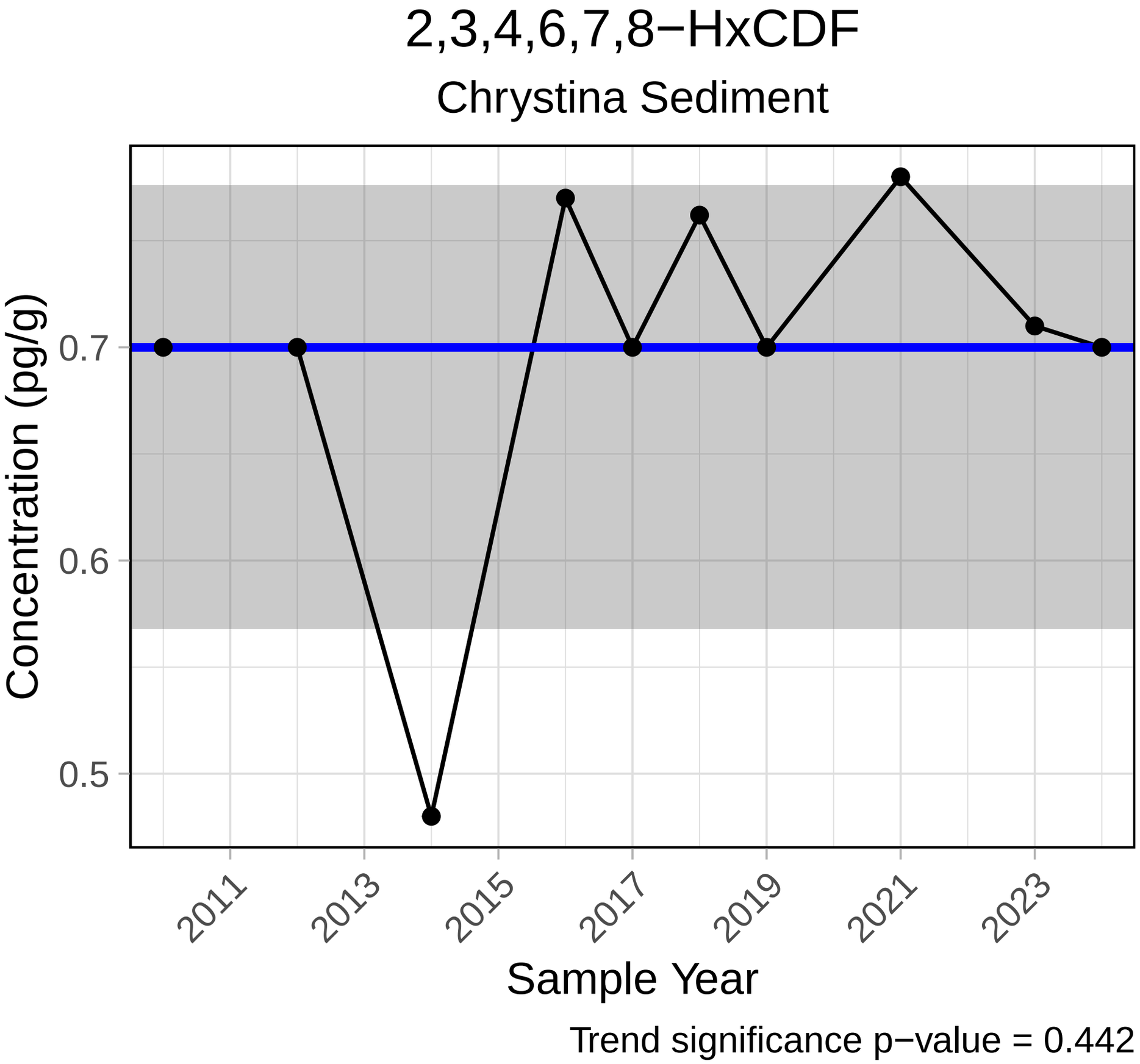

1,2,3,4,7,8−HxCDF
Chrystina Sediment
Concentration (pg/g)
1.10
1.00
0.90
0.80
0.70
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.848

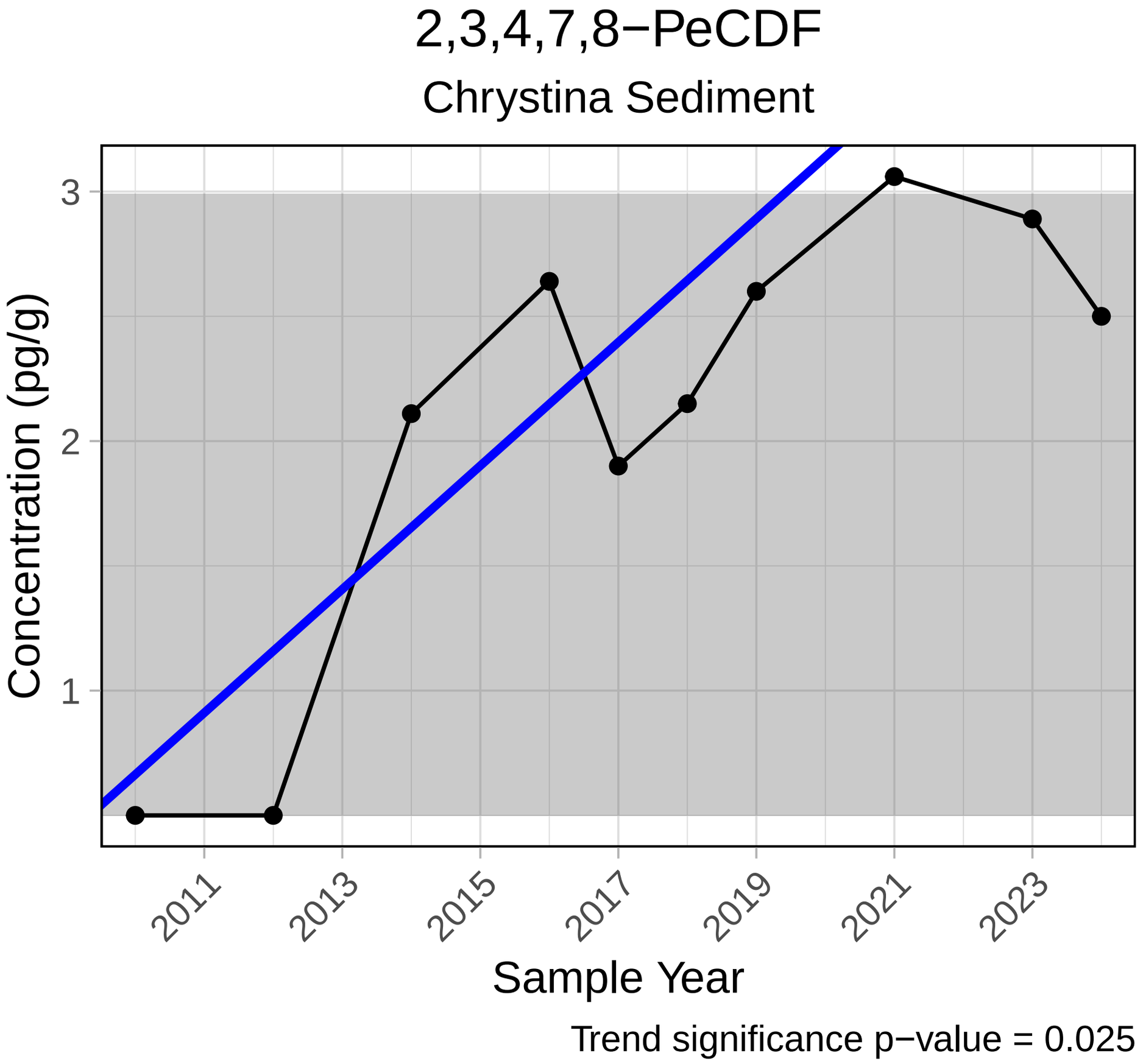

1,2,3,6,7,8−HxCDD
Chrystina Sediment
Concentration (pg/g)
1.6
1.4
1.2
1.0
0.8
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.194

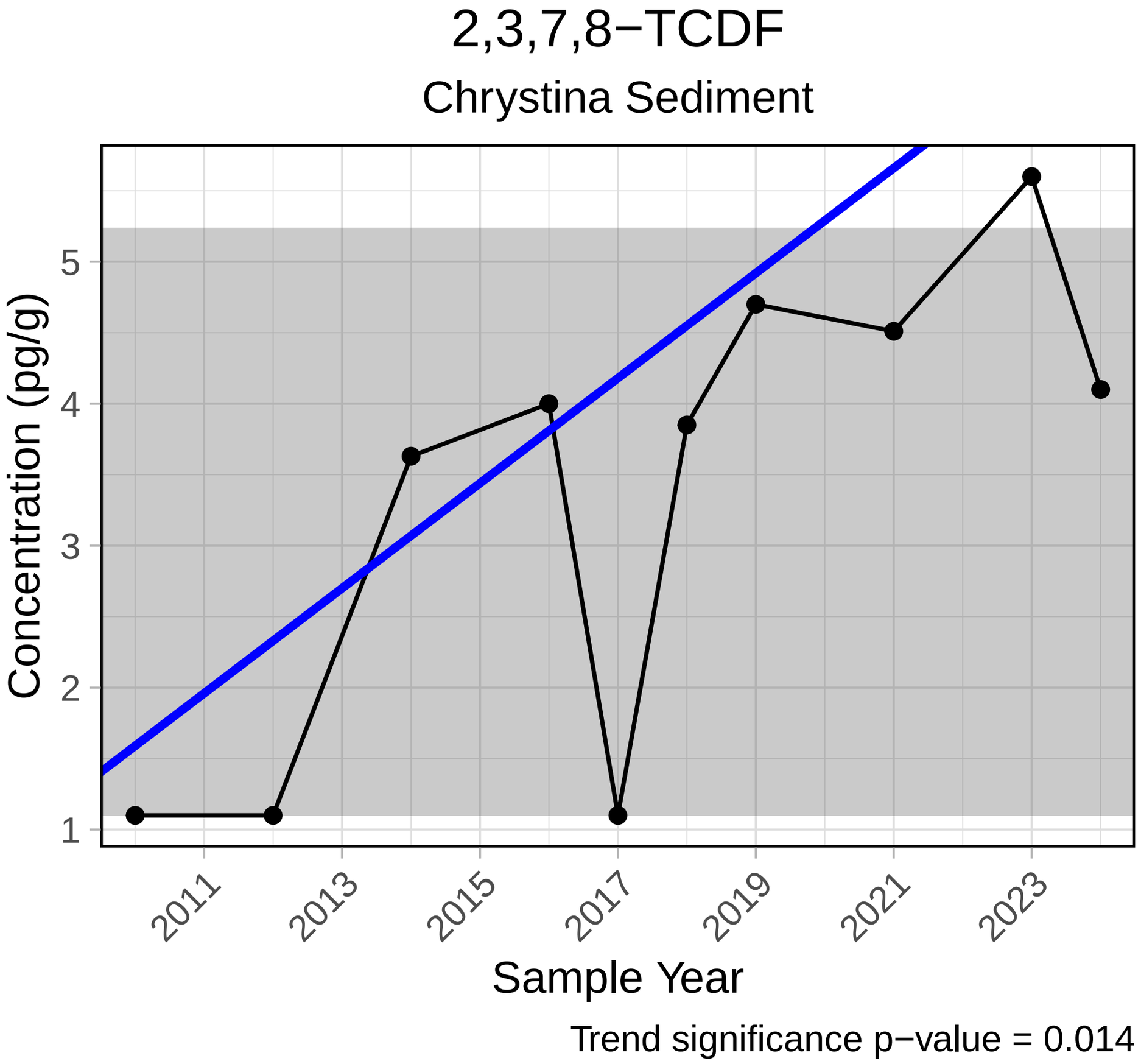

1,2,3,6,7,8−HxCDF
Chrystina Sediment
Concentration (pg/g)
0.7
0.6
0.5
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.772


1,2,3,7,8,9−HxCDD
Chrystina Sediment
Concentration (pg/g)
2.5
2.0
1.5
1.0
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.266


1,2,3,7,8−PeCDF
Chrystina Sediment
Concentration (pg/g)
1.5
1.0
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.029

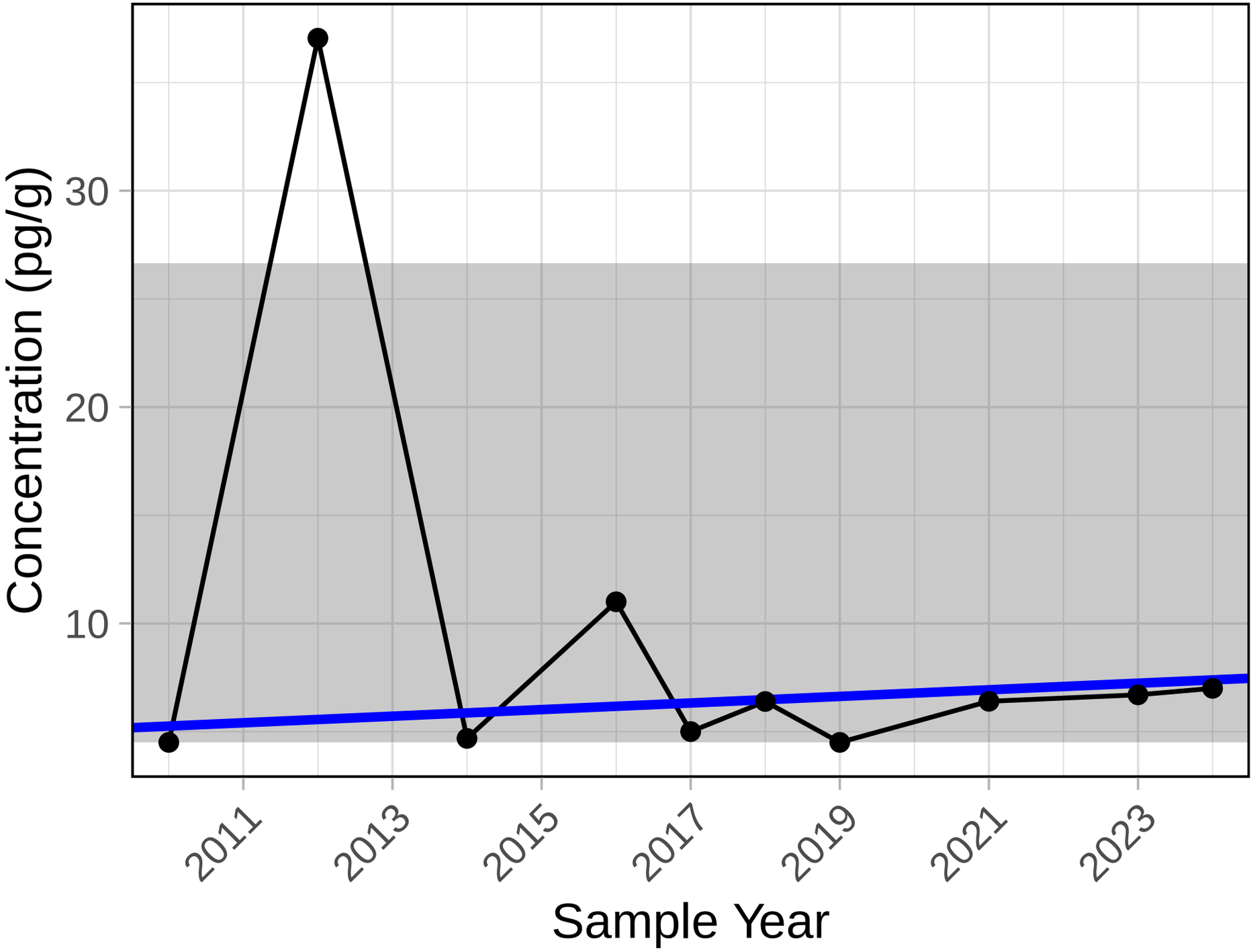

2,3,4,6,7,8−HxCDF
Chrystina Sediment
Concentration (pg/g)
0.7
0.6
0.5
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.442


2,3,4,7,8−PeCDF
Chrystina Sediment
Concentration (pg/g)
3
2
1
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.025


2,3,7,8−TCDF
Chrystina Sediment
Concentration (pg/g)
5
4
3
2
1
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.014

PCB 1

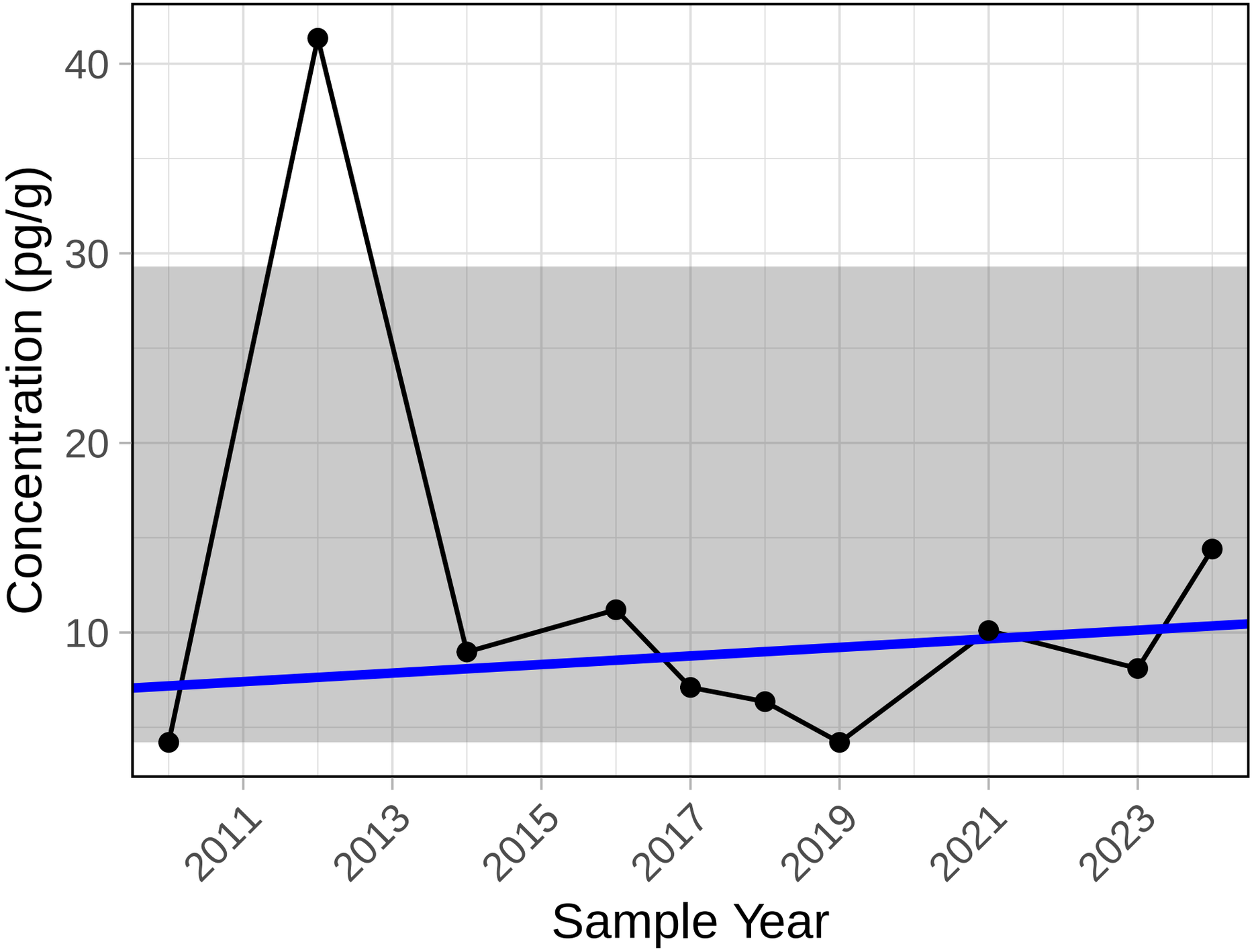
Chrystina Sediment



Trend significance p−value = 0.419

PCB 2

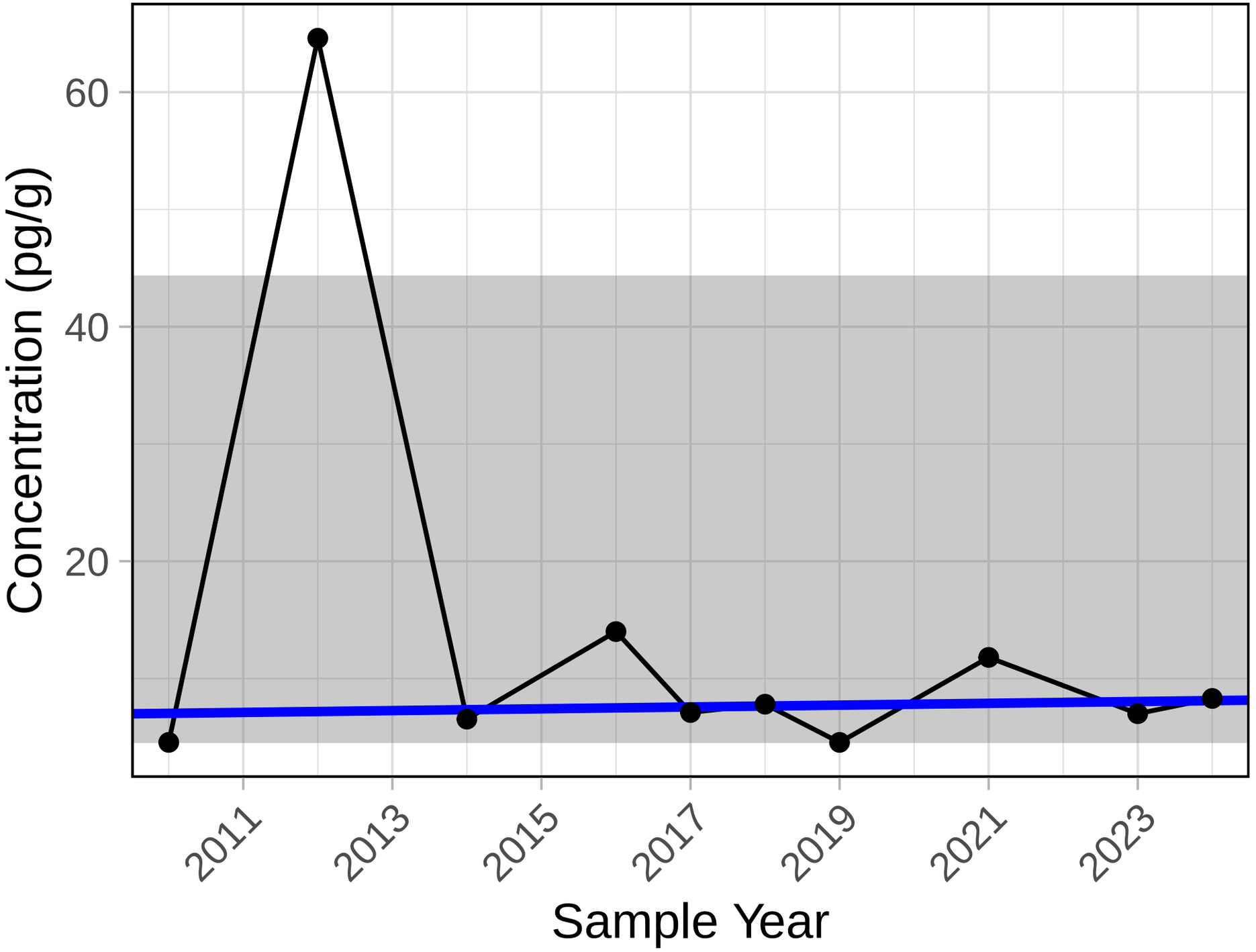
Chrystina Sediment



Trend significance p−value = 0.928

PCB 3

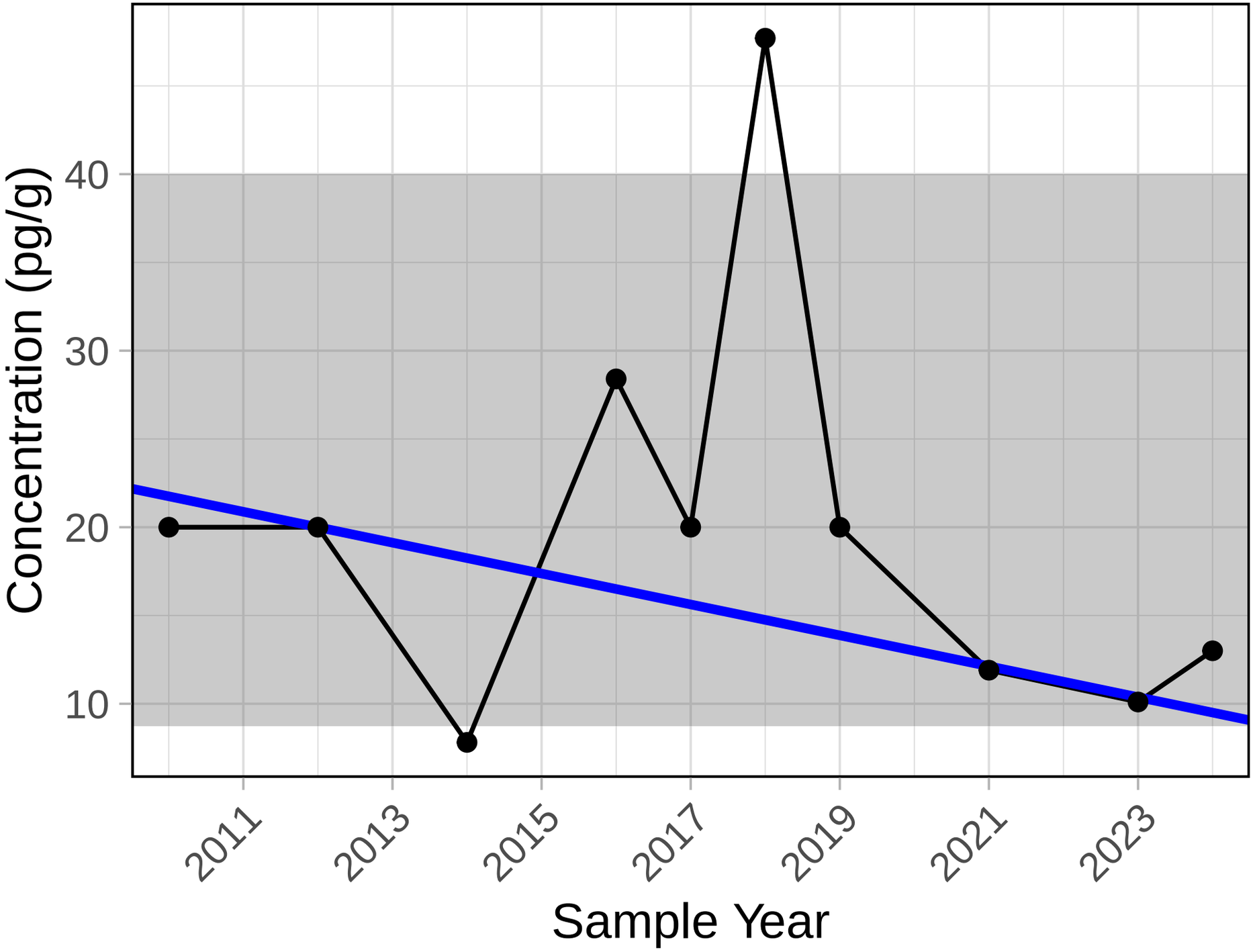
Chrystina Sediment



Trend significance p−value = 0.928

PCB 6

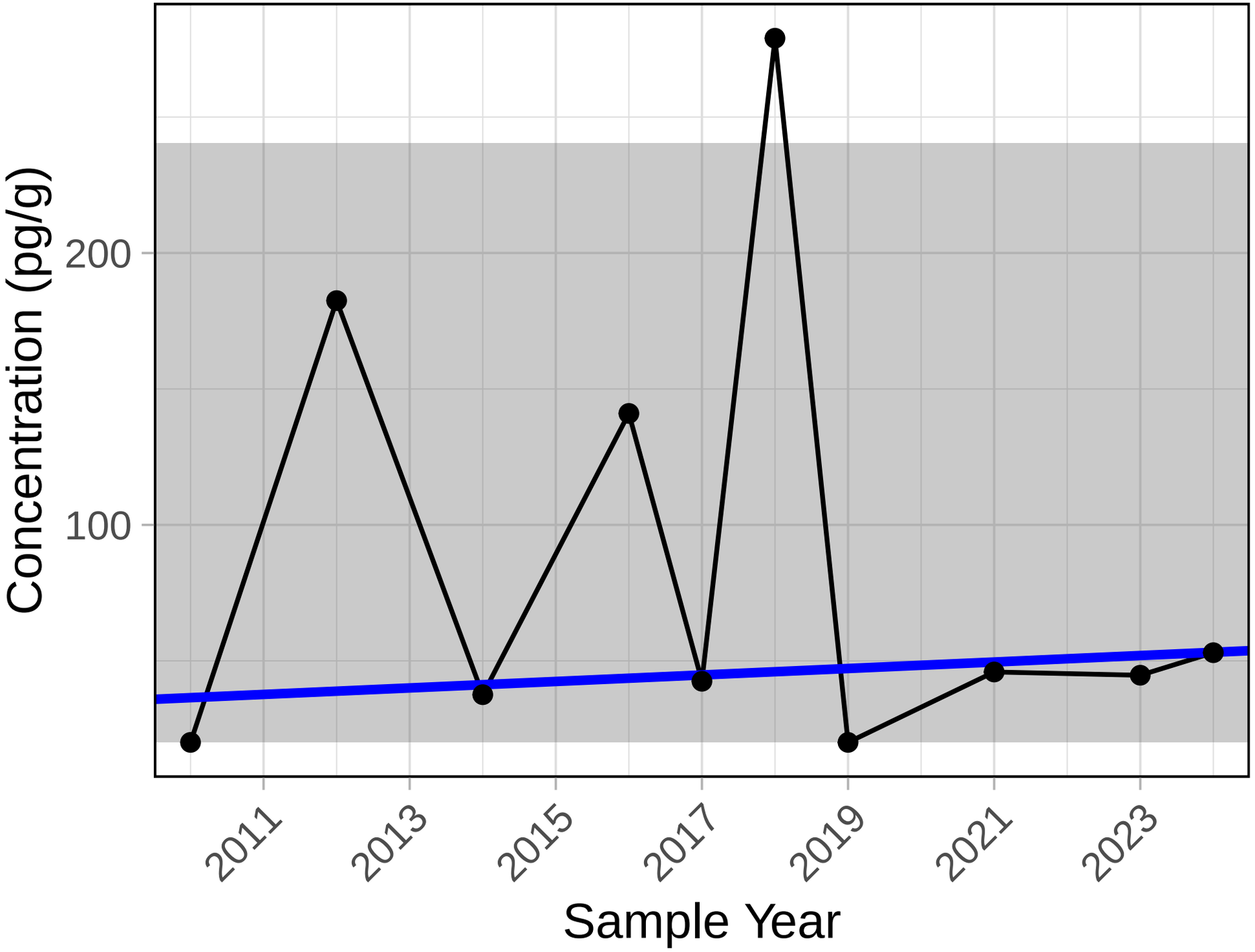
Chrystina Sediment



Trend significance p−value = 0.458

PCB 8

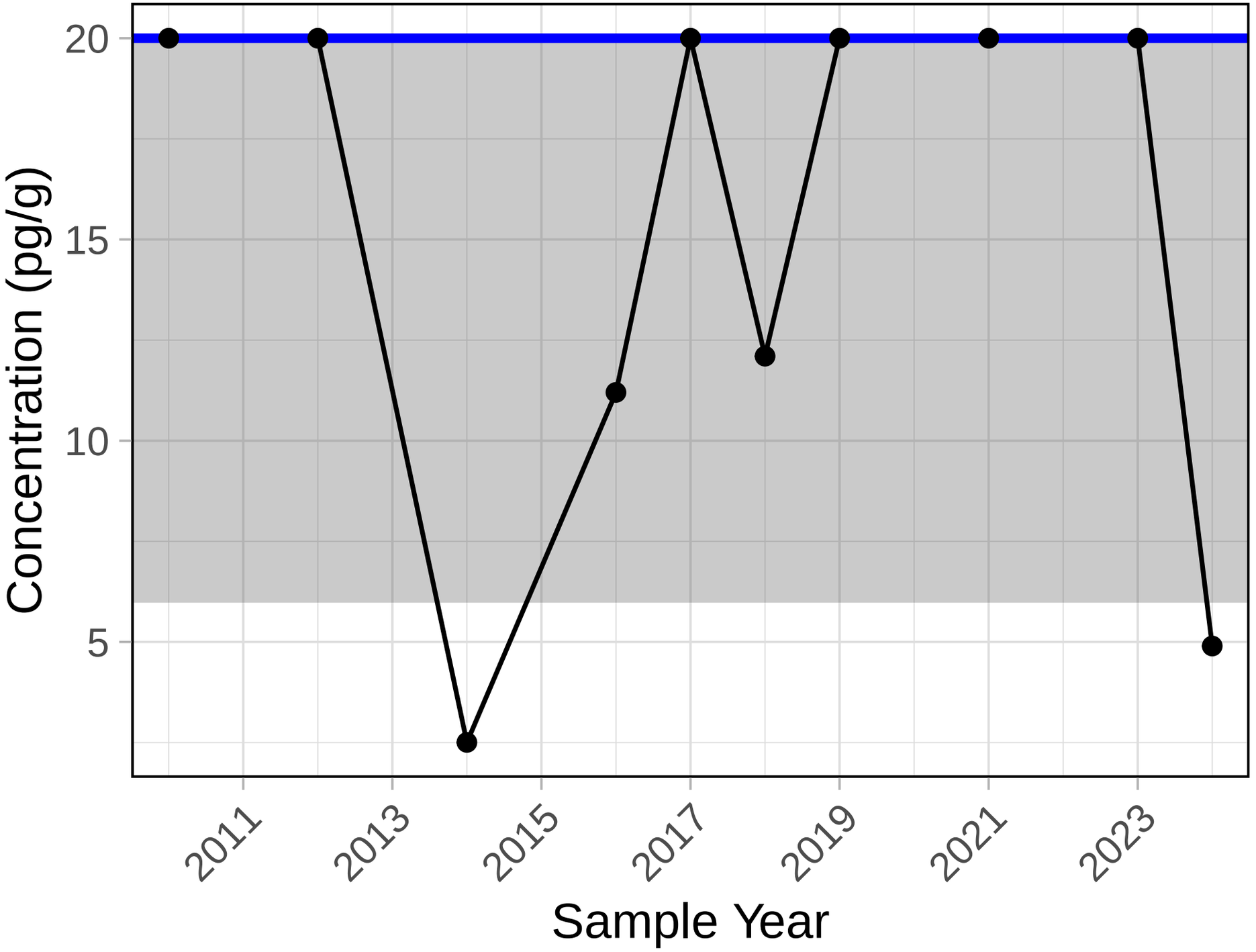
Chrystina Sediment



Trend significance p−value = 0.653

PCB 9

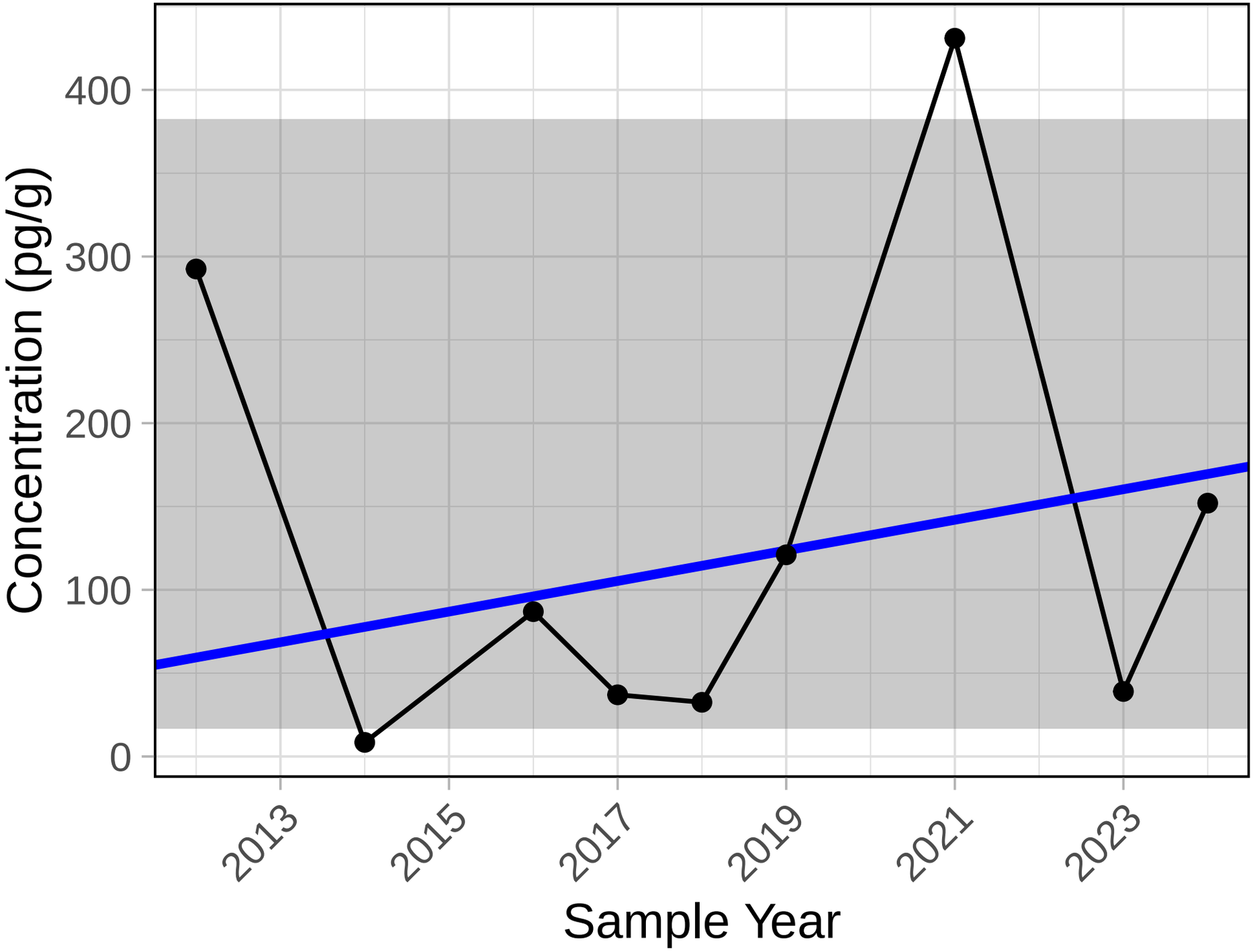
Chrystina Sediment



Trend significance p−value = 1

PCB 11

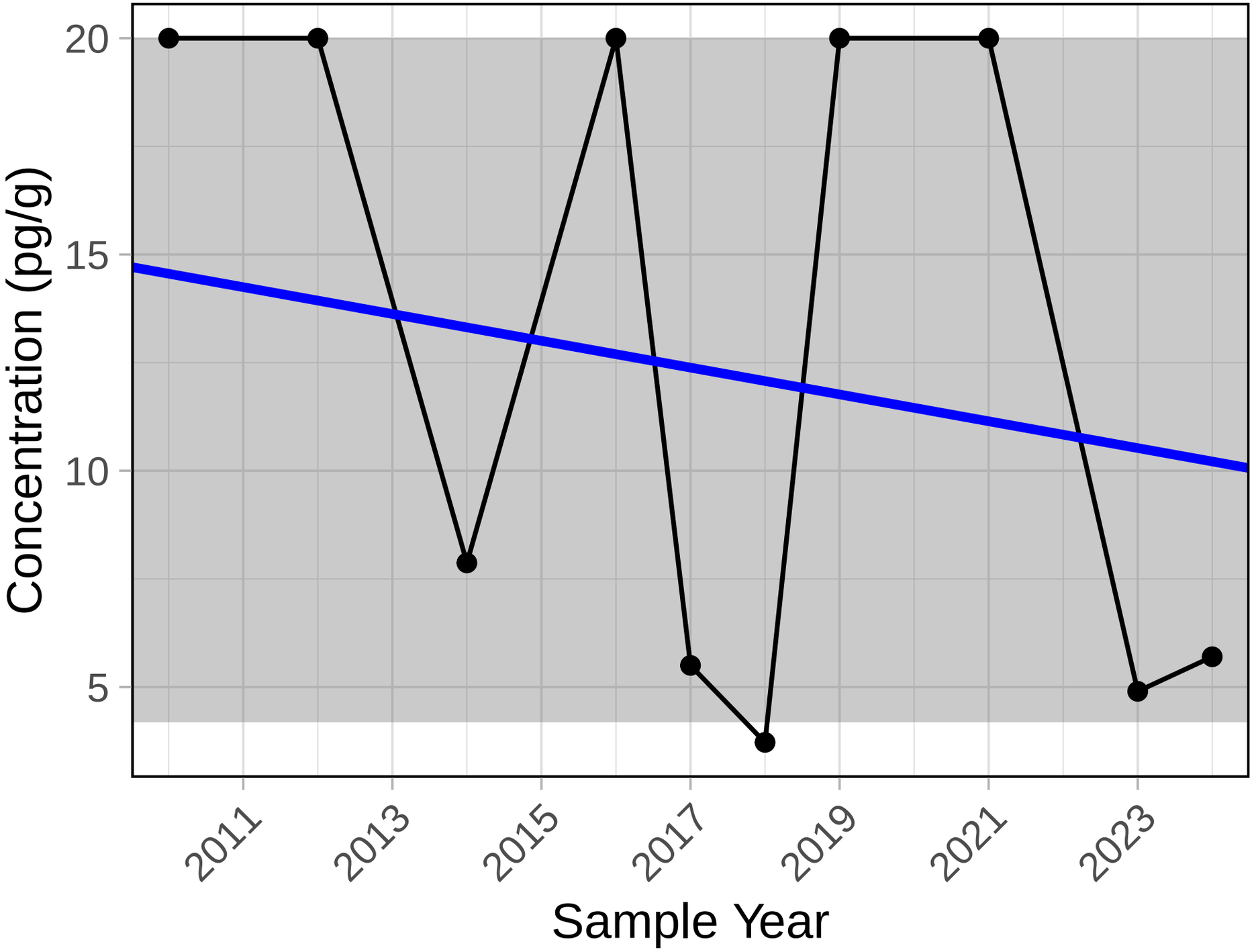
Chrystina Sediment



Trend significance p−value = 0.466

PCB 14

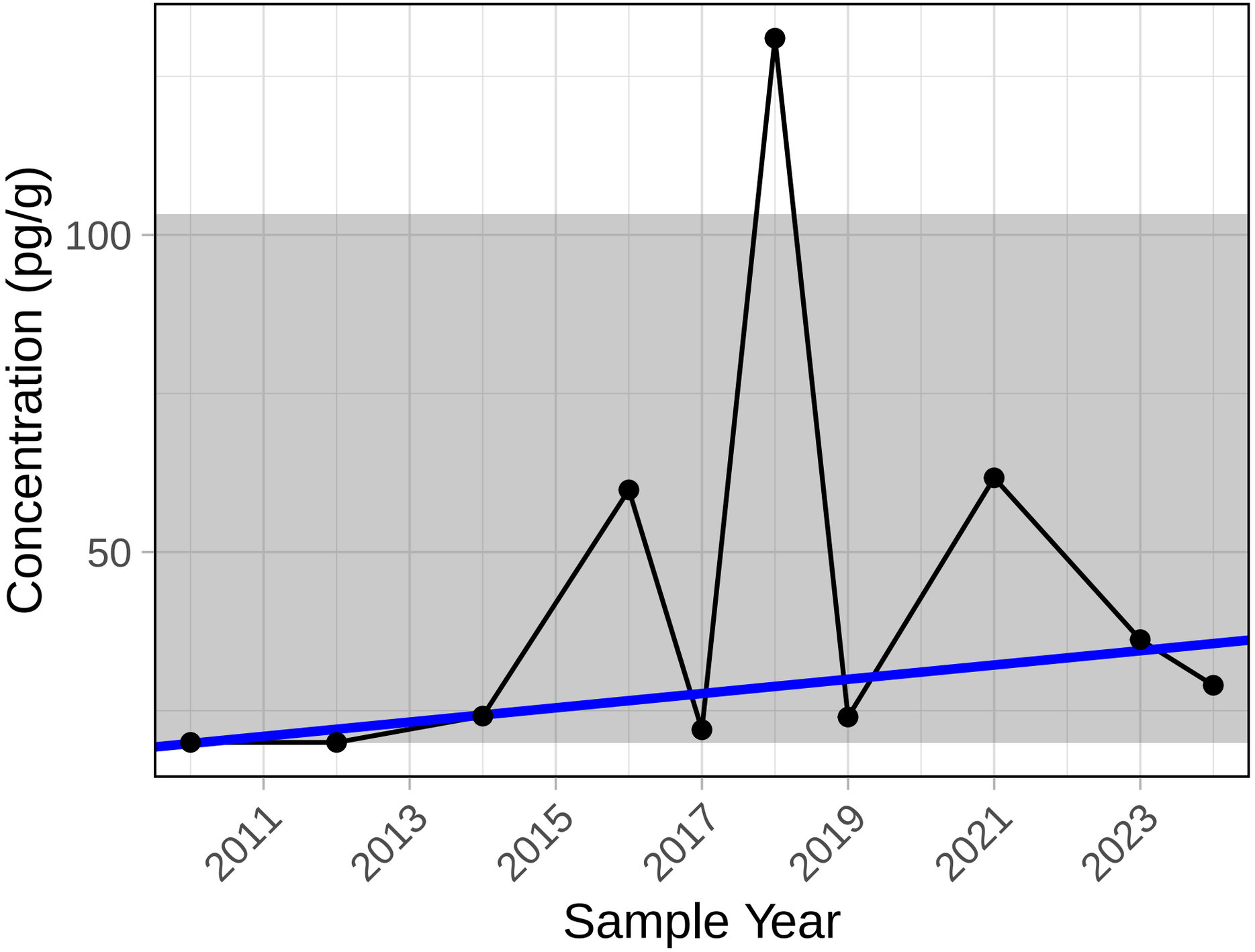
Chrystina Sediment



Trend significance p−value = 0.249

PCB 15

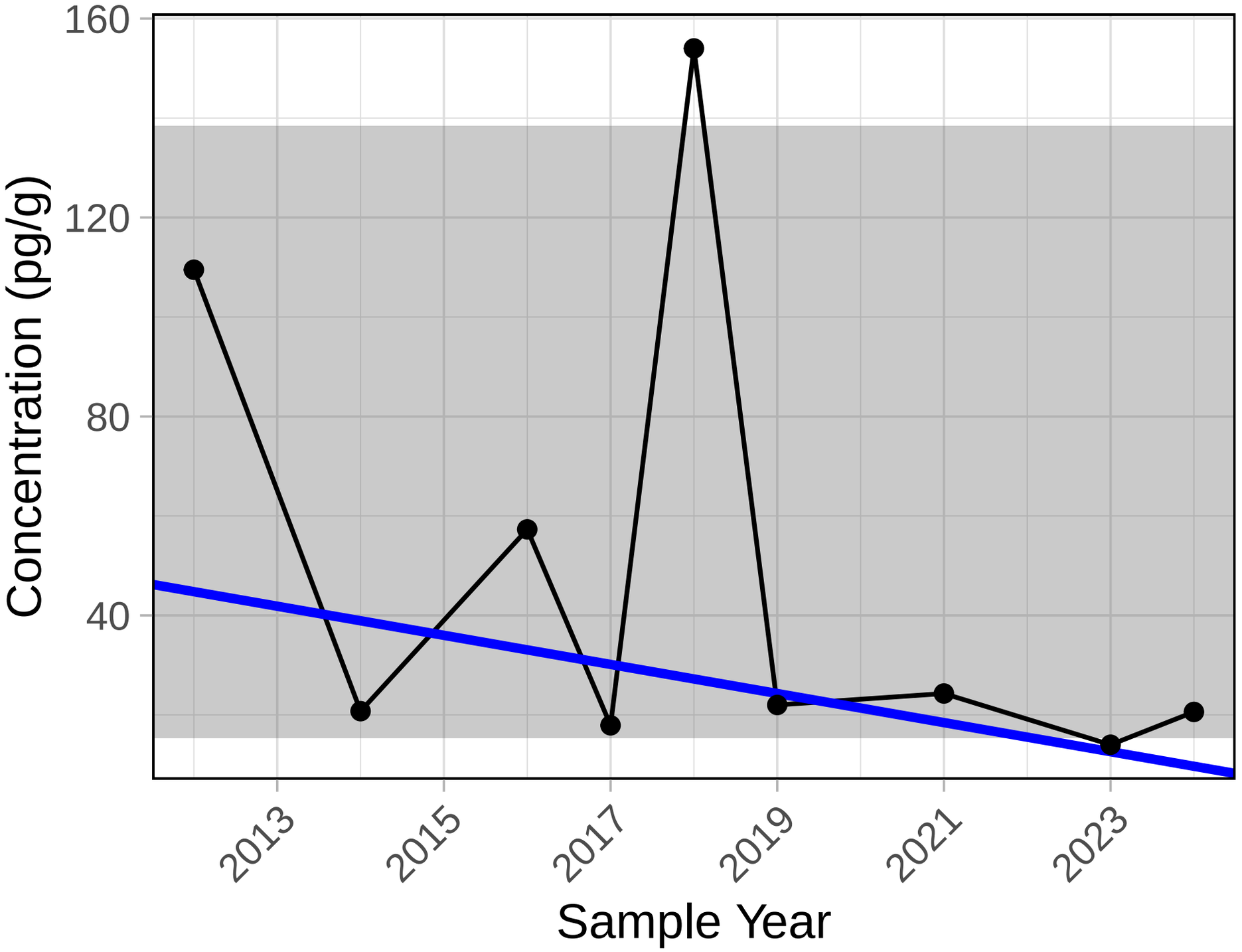
Chrystina Sediment



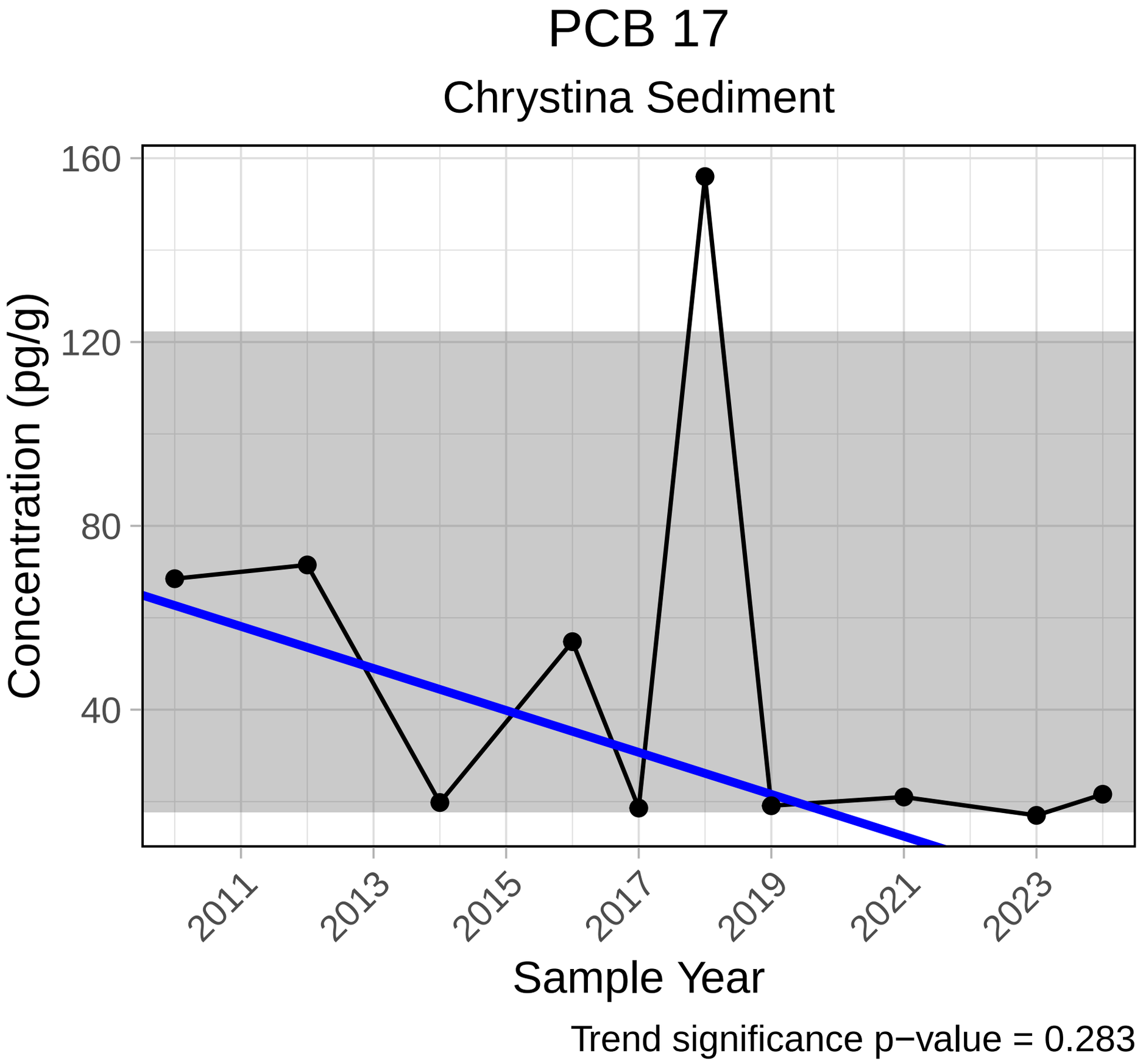
Trend significance p−value = 0.127

PCB 16

Chrystina Sediment

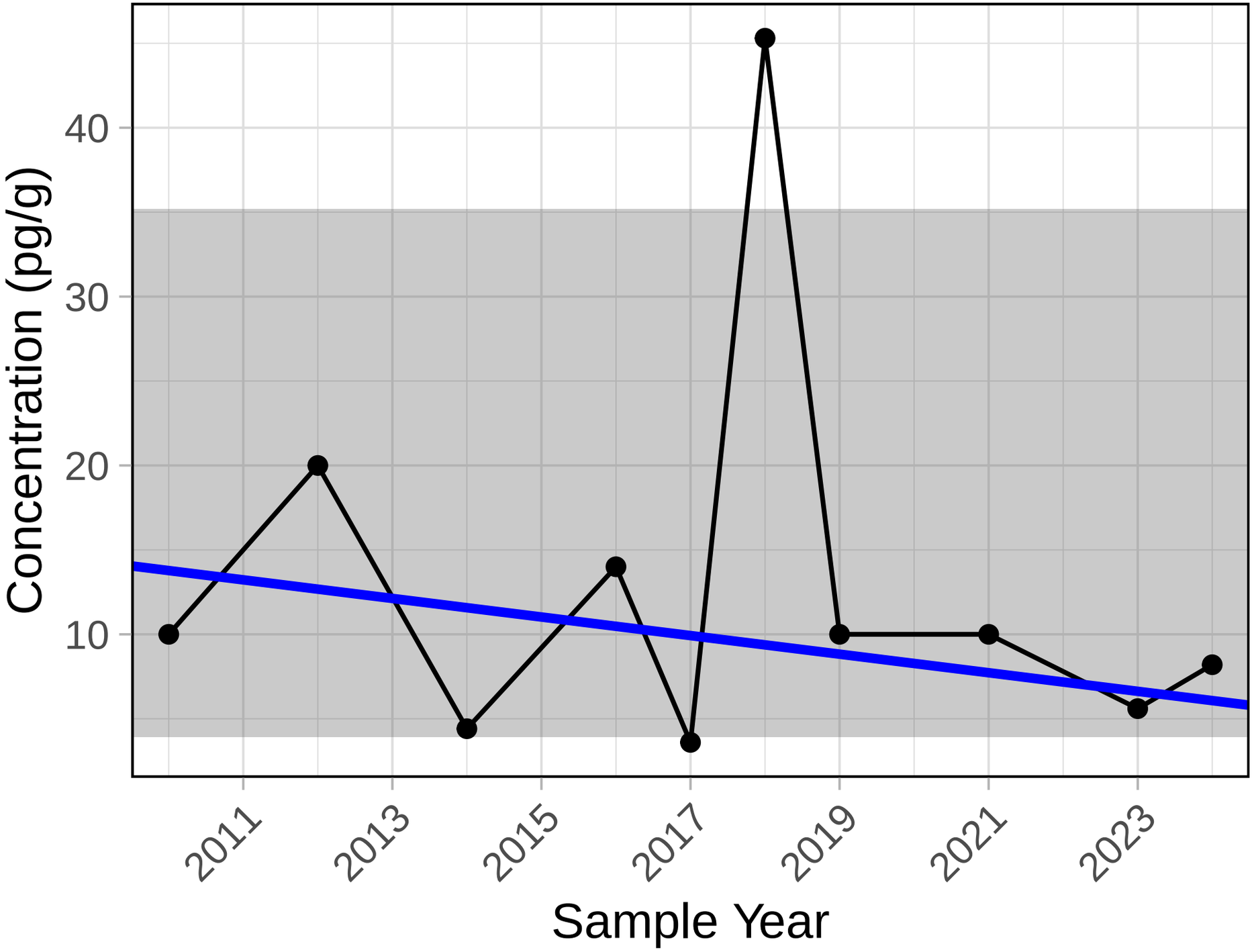


Trend significance p−value = 0.251


PCB 17
Chrystina Sediment
160
120
80
40
Concentration (pg/g)
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.283

PCB 19

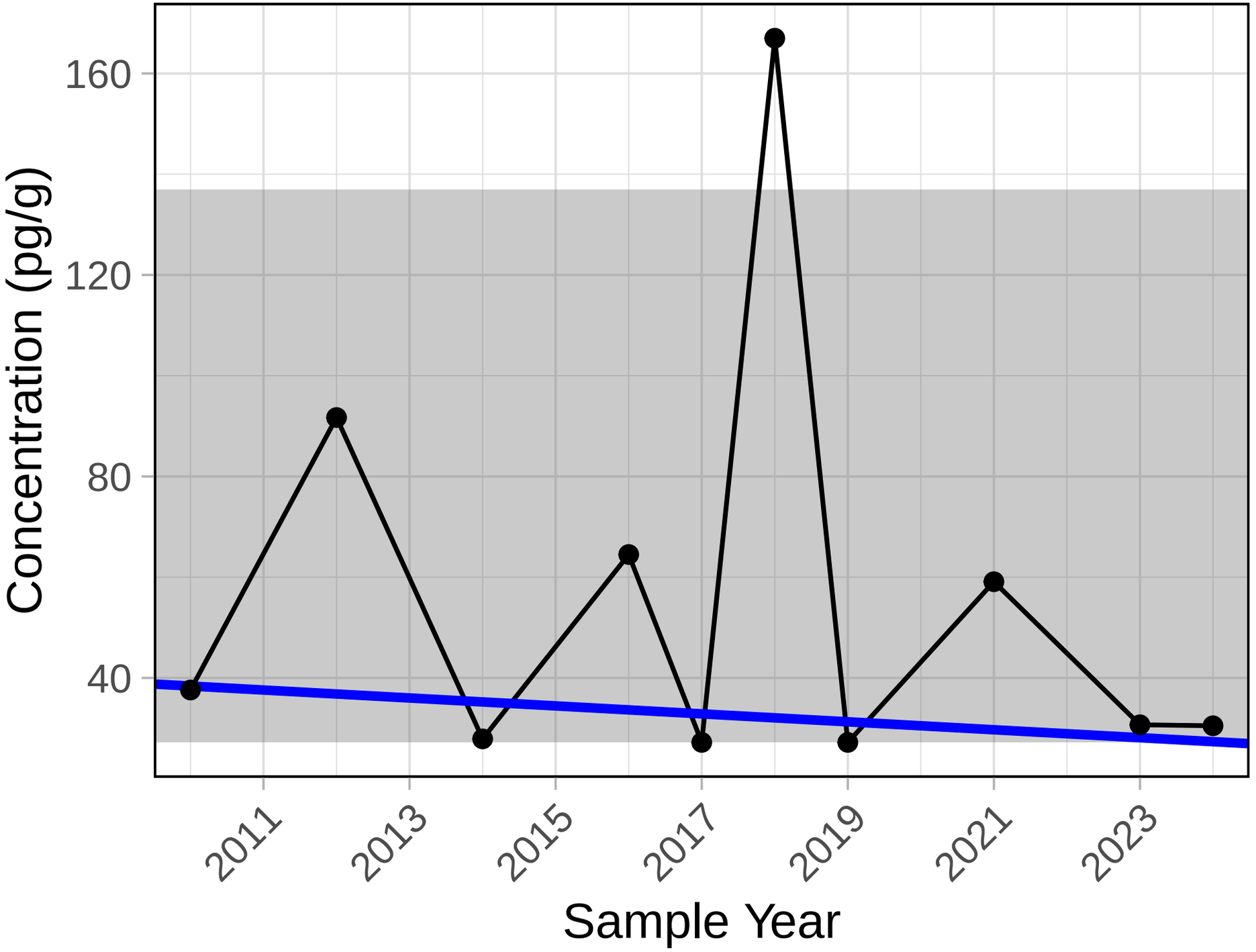
Chrystina Sediment



Trend significance p−value = 0.525

PCB 22

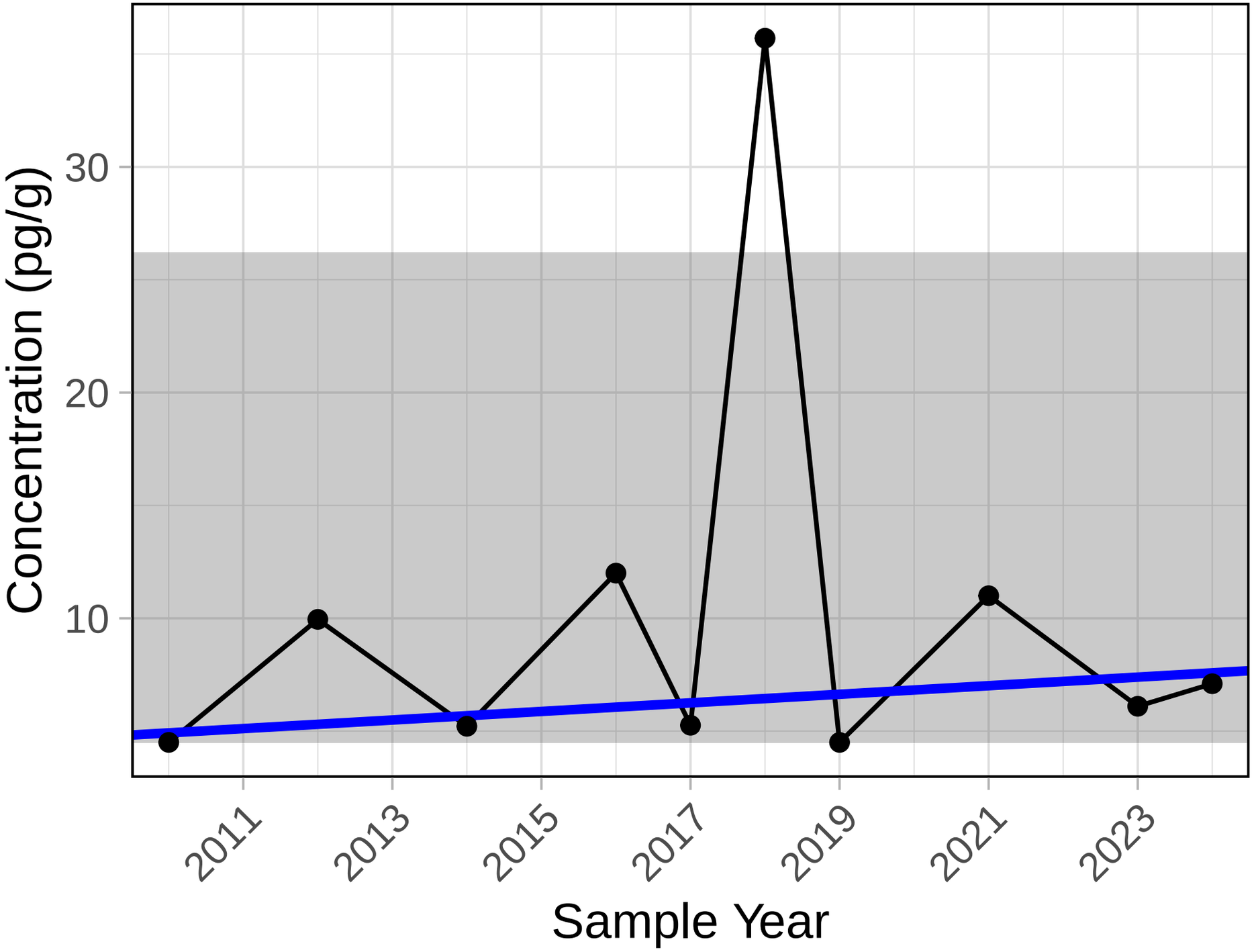
Chrystina Sediment



Trend significance p−value = 0.53

PCB 25

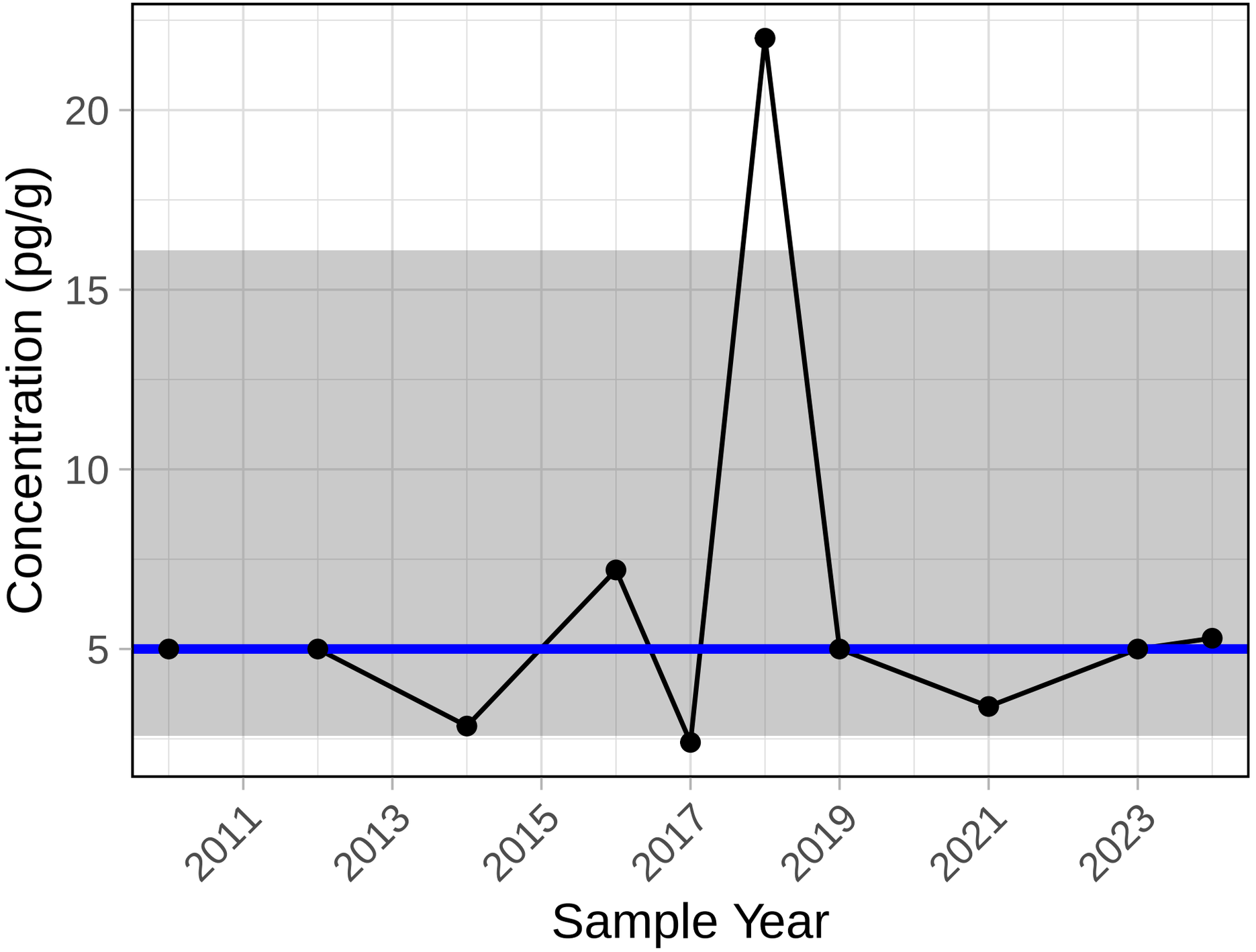
Chrystina Sediment



Trend significance p−value = 0.53

PCB 27

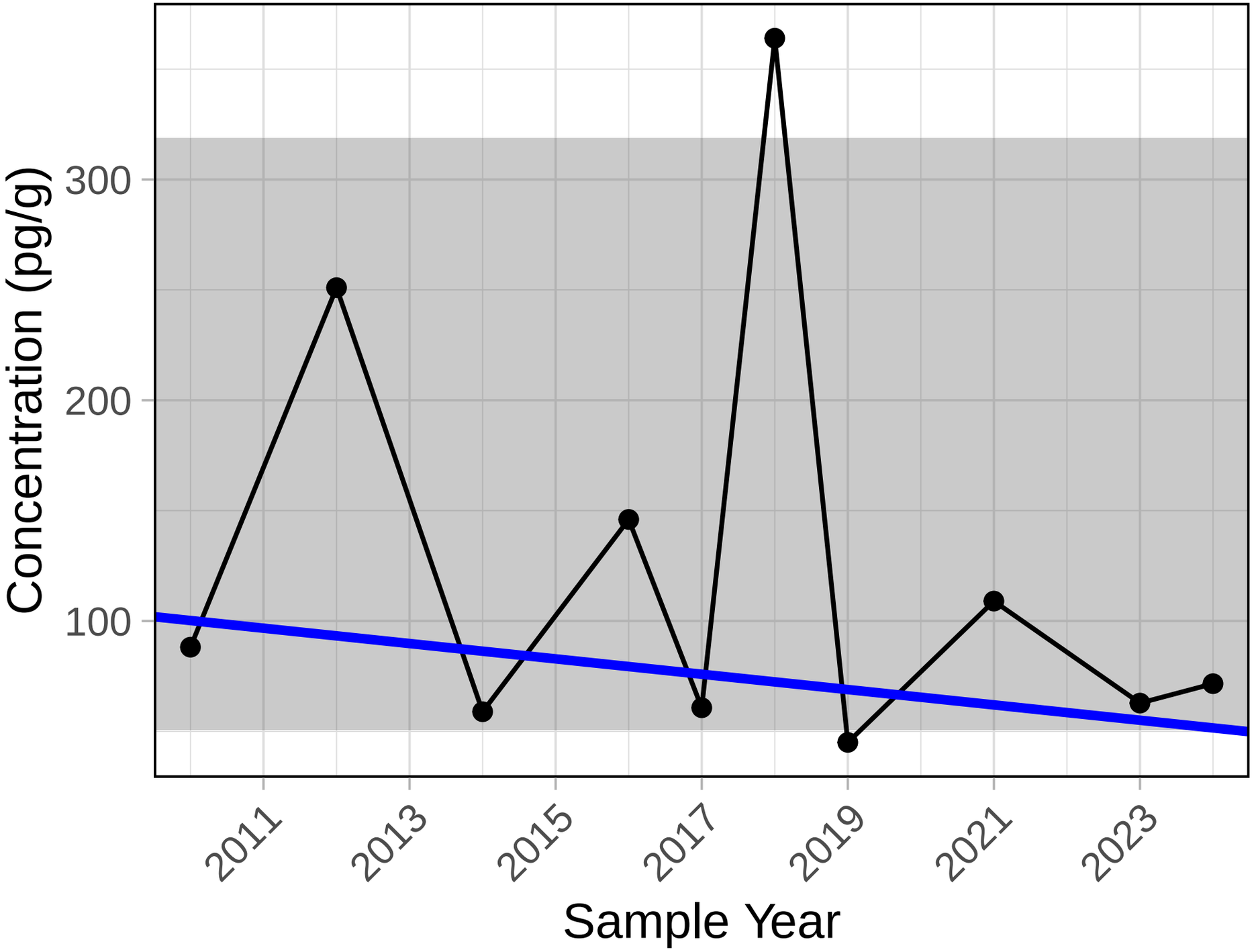
Chrystina Sediment



Trend significance p−value = 0.711

PCB 31

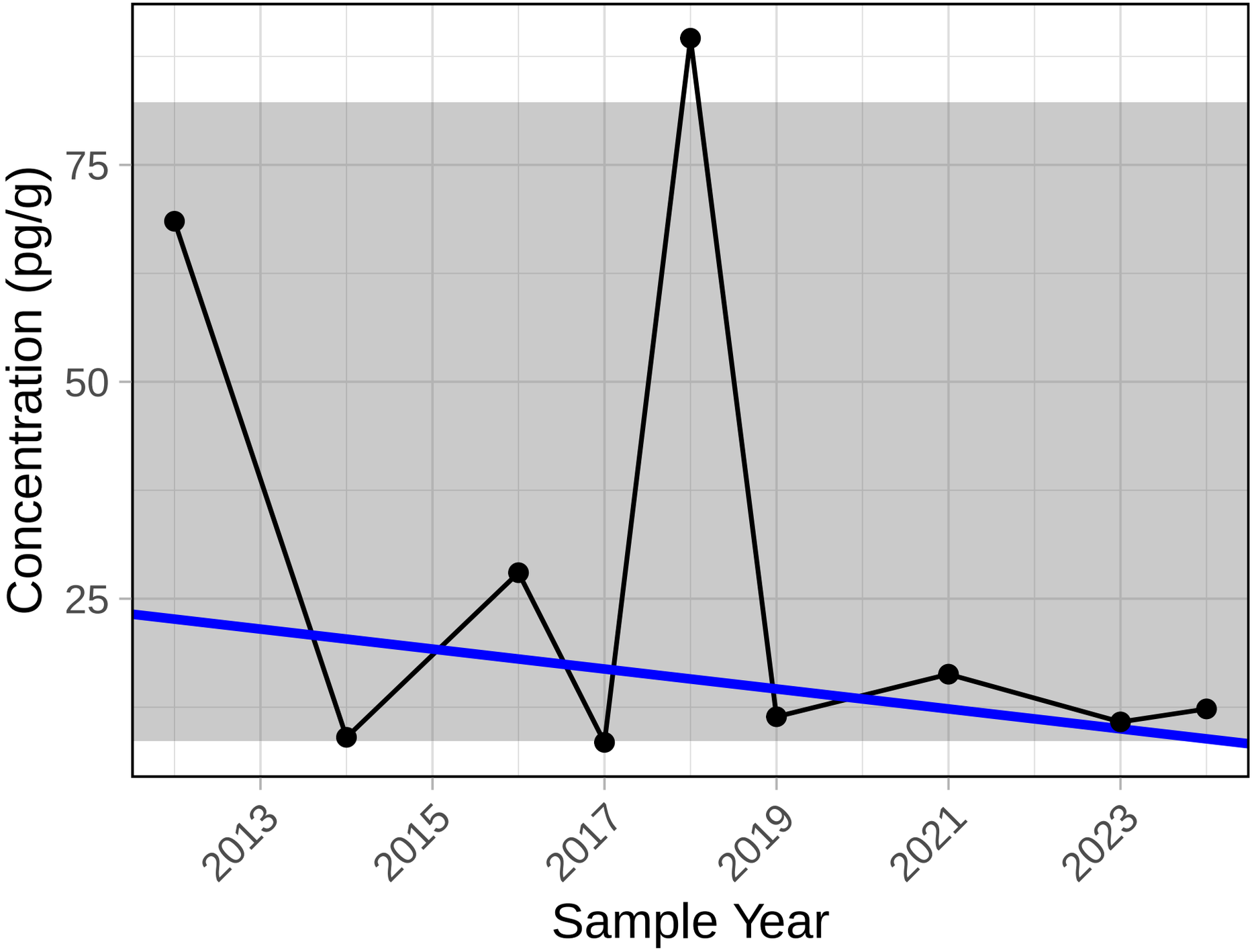
Chrystina Sediment



Trend significance p−value = 0.721

PCB 32

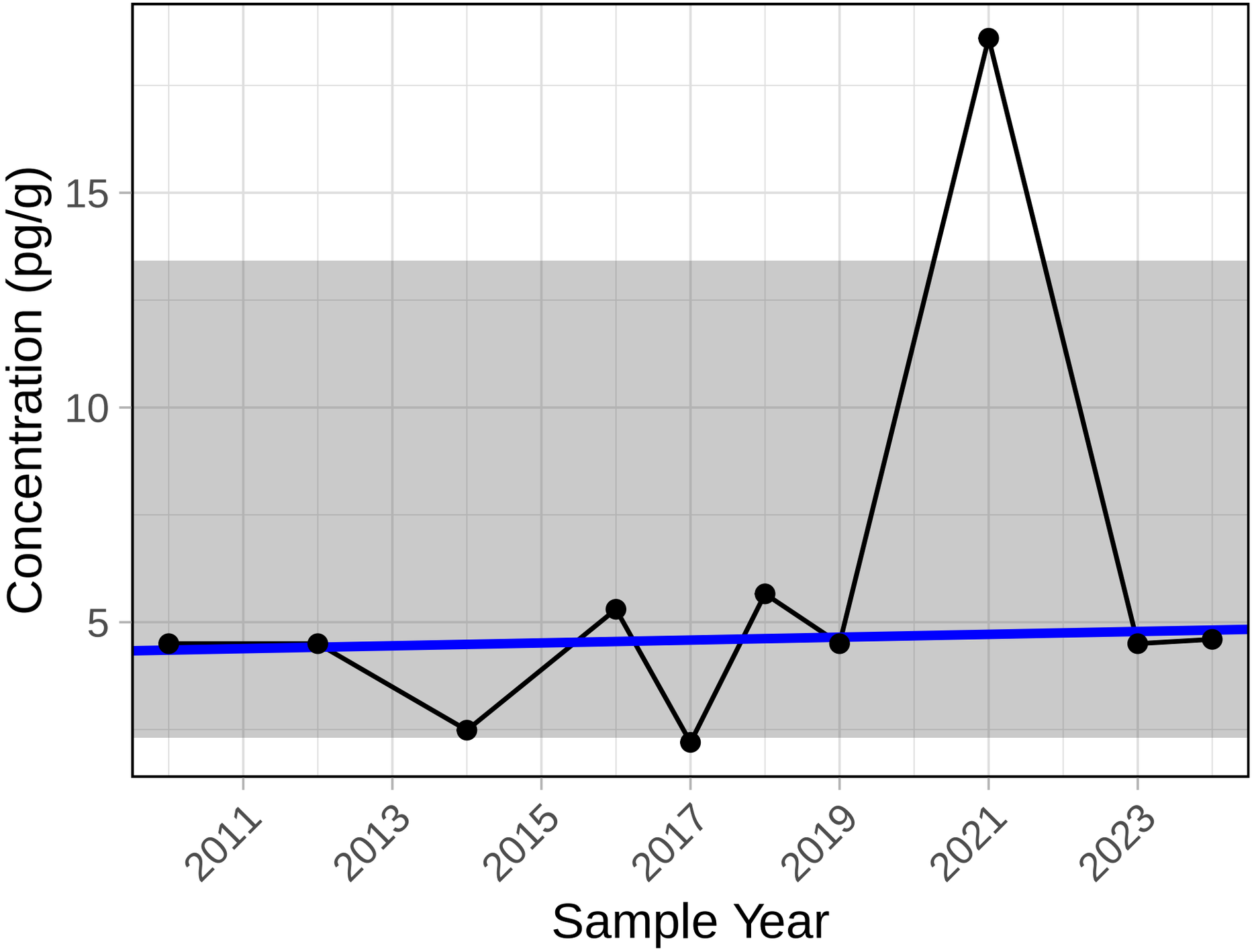
Chrystina Sediment



Trend significance p−value = 0.754

PCB 35

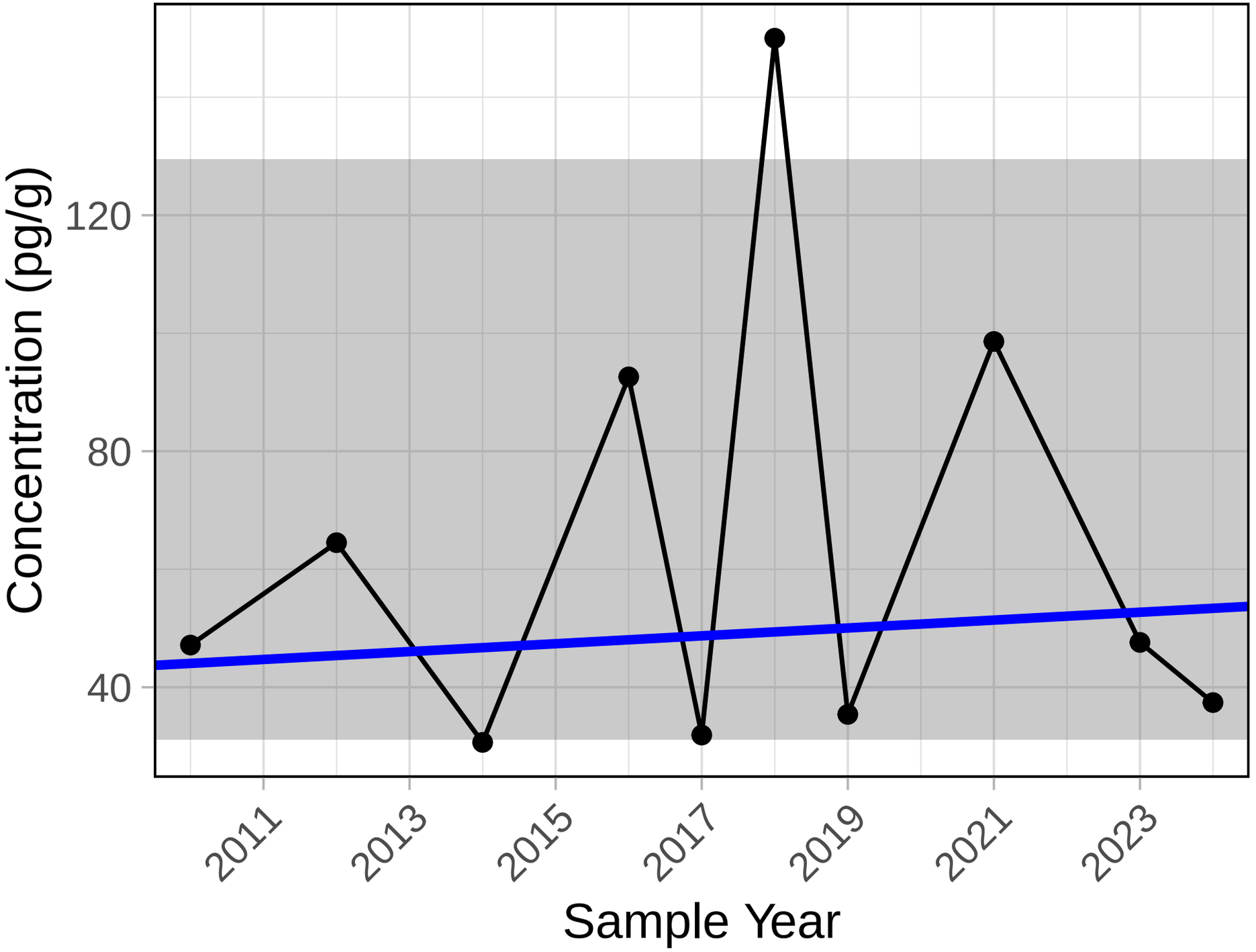
Chrystina Sediment



Trend significance p−value = 0.354

PCB 37

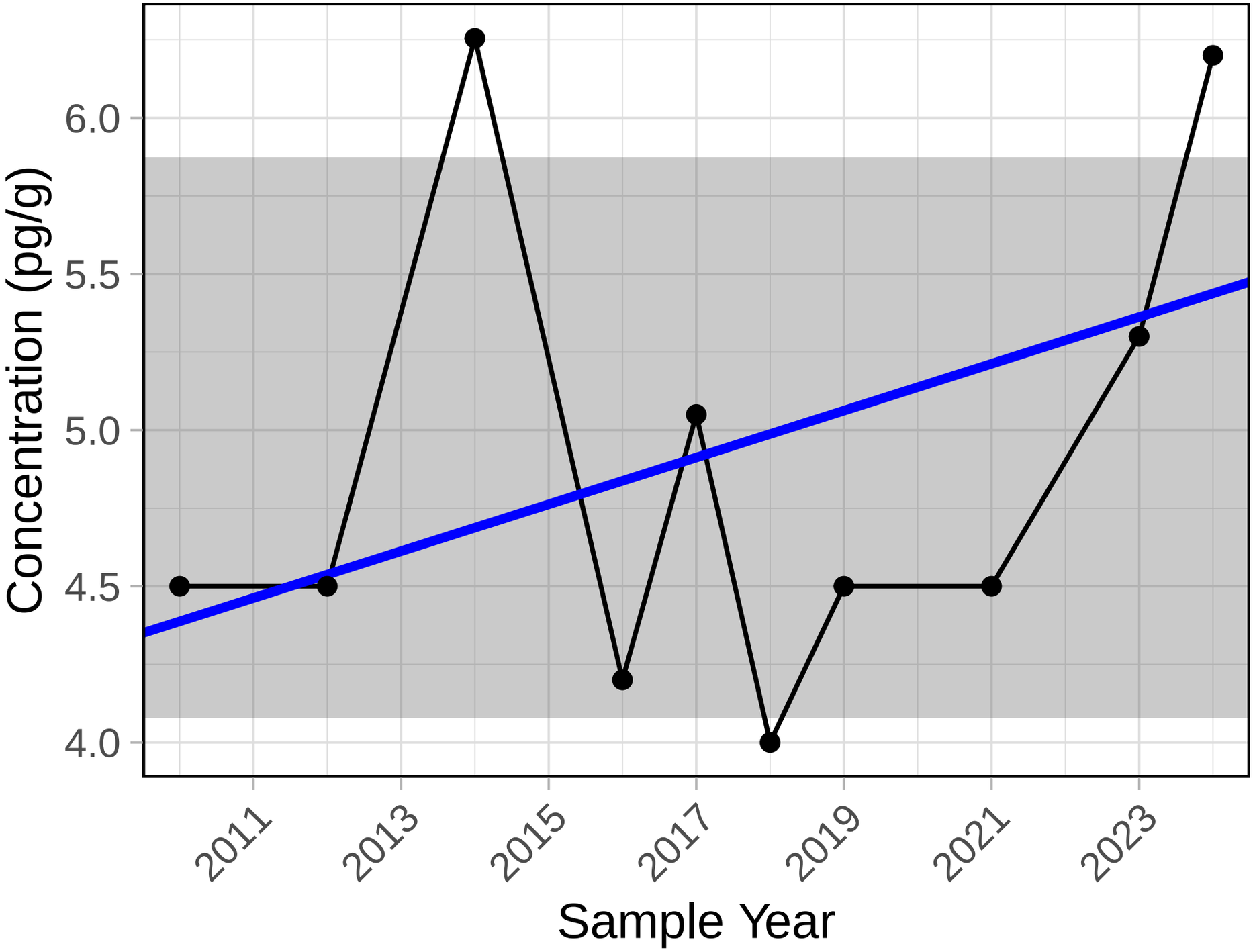
Chrystina Sediment



Trend significance p−value = 0.721

PCB 38

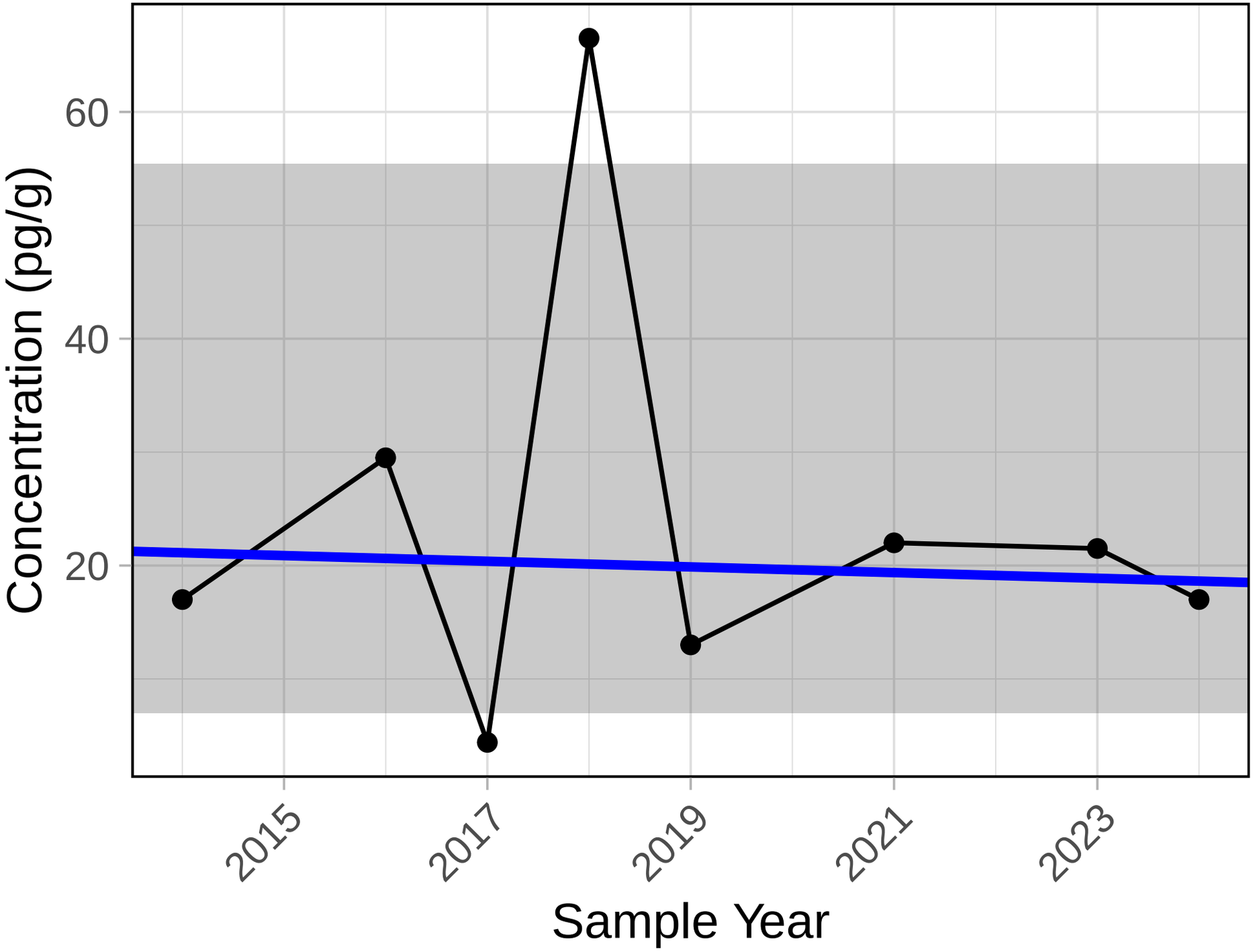
Chrystina Sediment



Trend significance p−value = 0.458

PCB 42

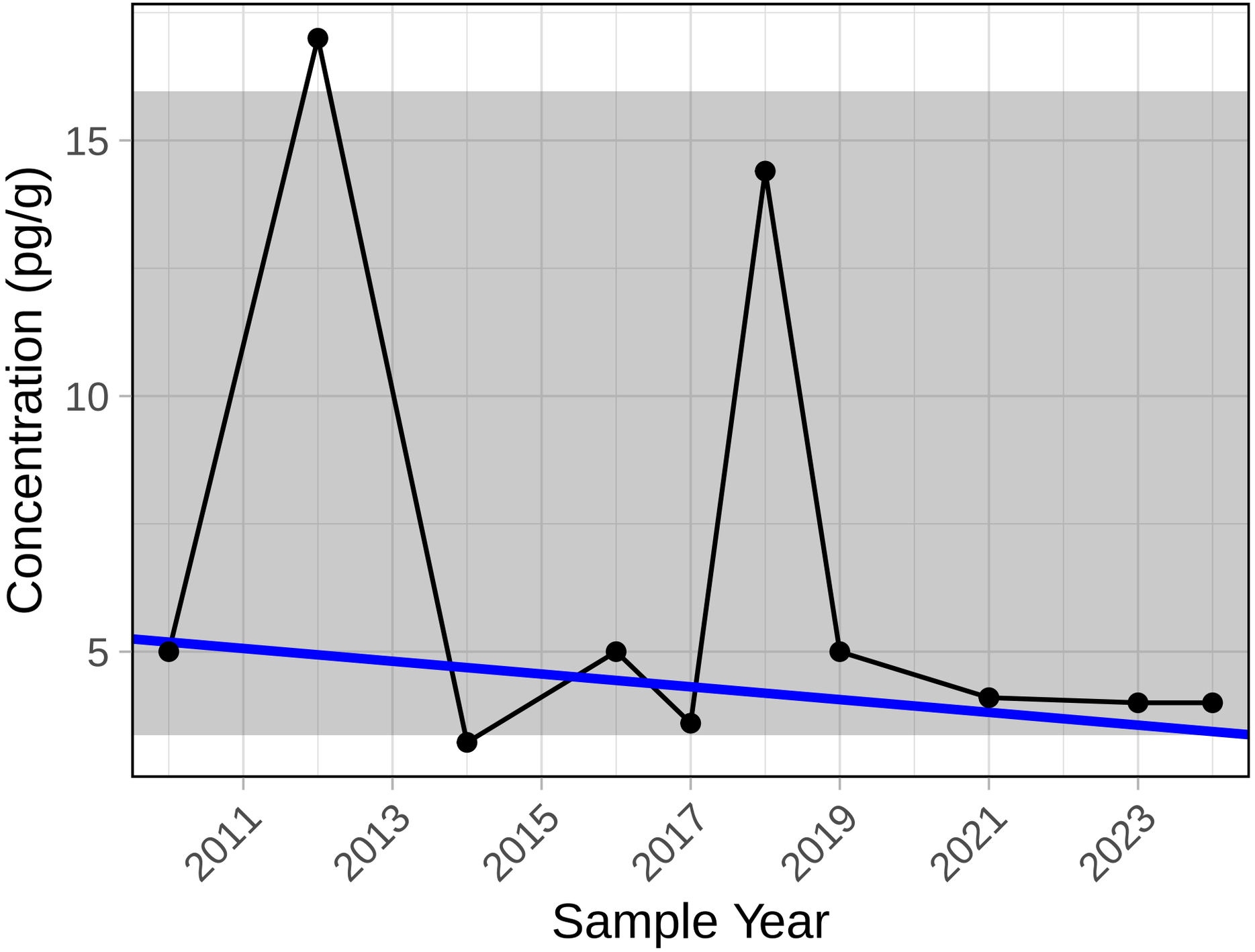
Chrystina Sediment



Trend significance p−value = 1

PCB 46

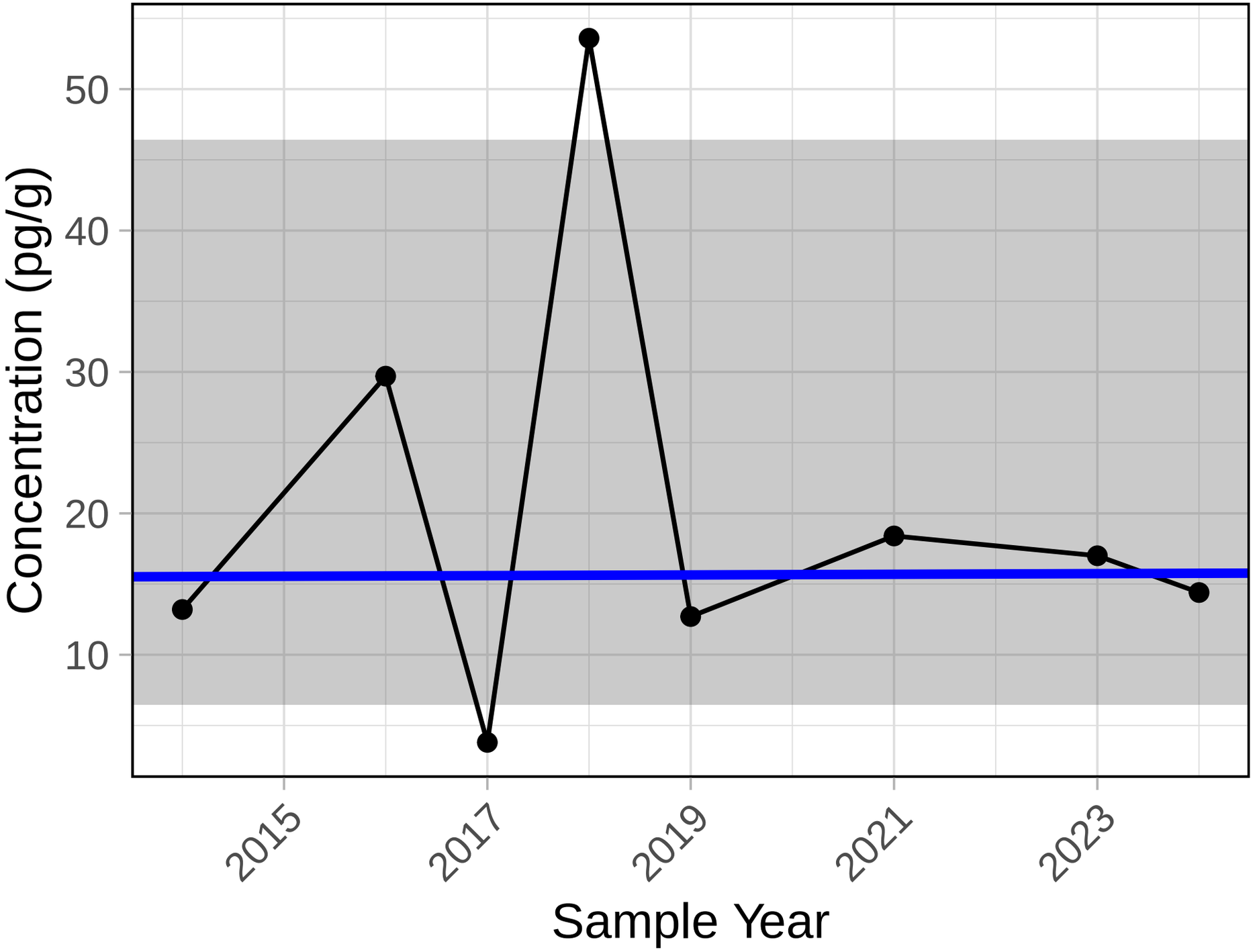
Chrystina Sediment



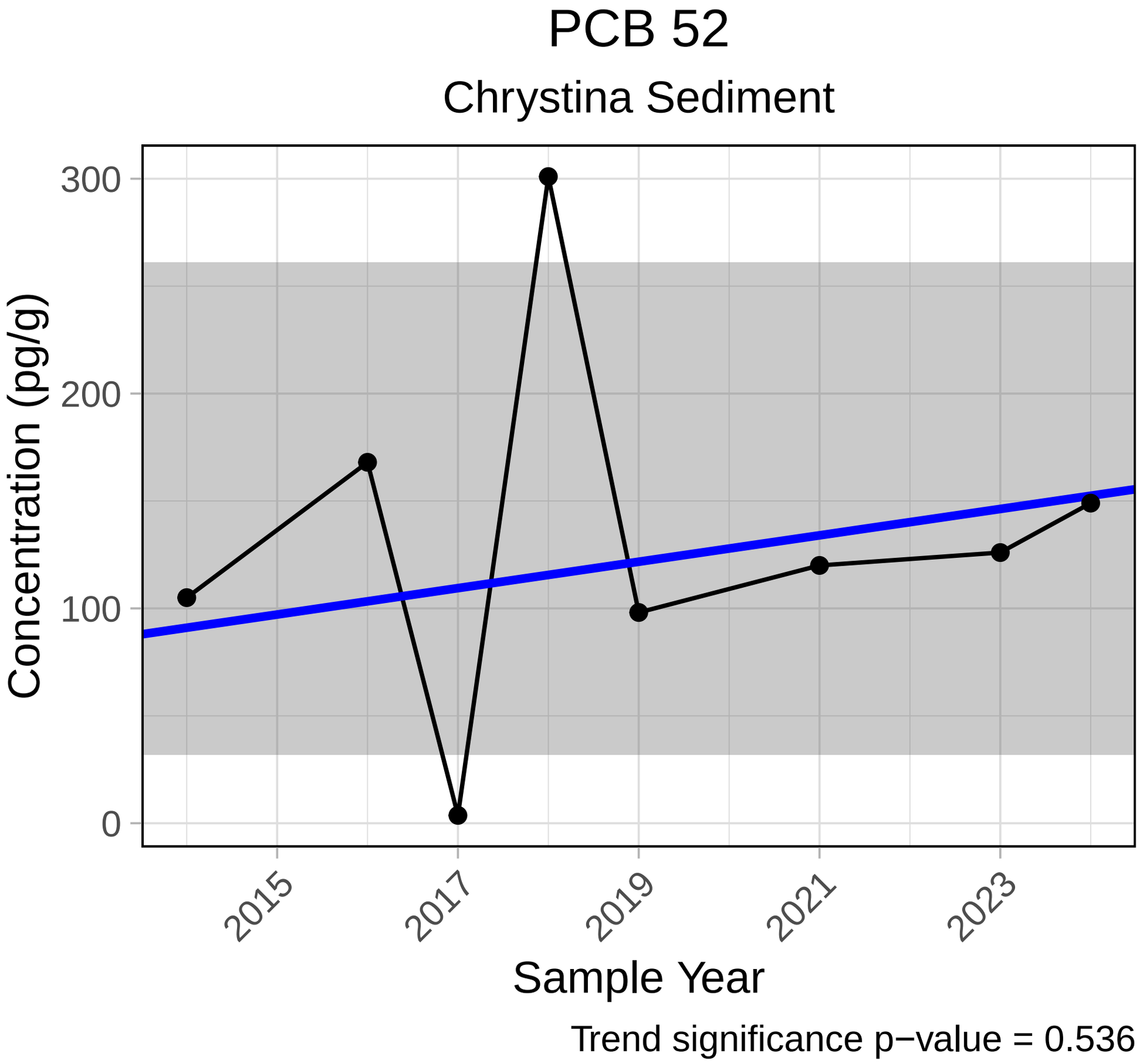
Trend significance p−value = 0.362

PCB 48

Chrystina Sediment

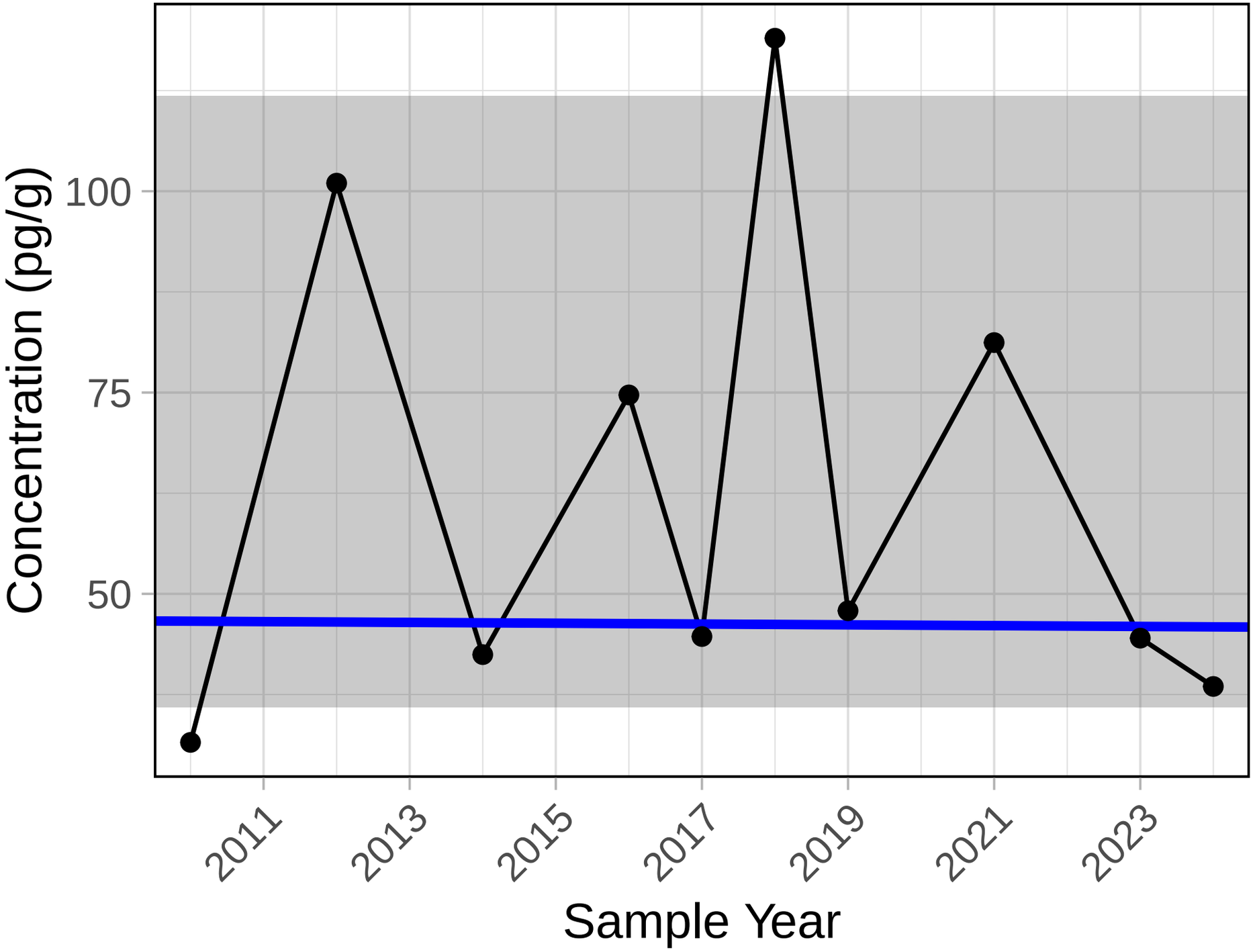


Trend significance p−value = 1


PCB 52
Chrystina Sediment
Concentration (pg/g)
300
200
100
0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.536

PCB 56

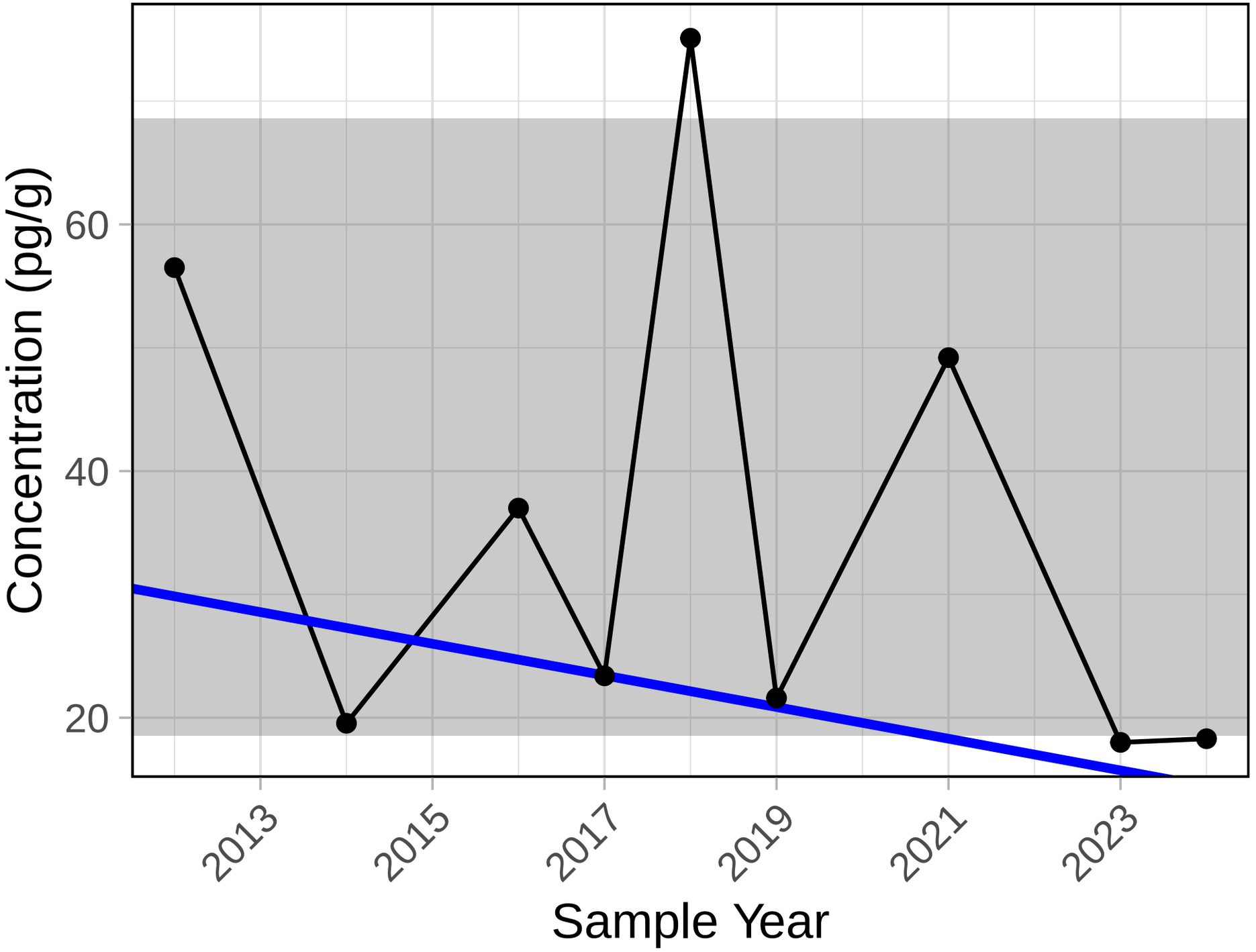
Chrystina Sediment



Trend significance p−value = 1

PCB 60

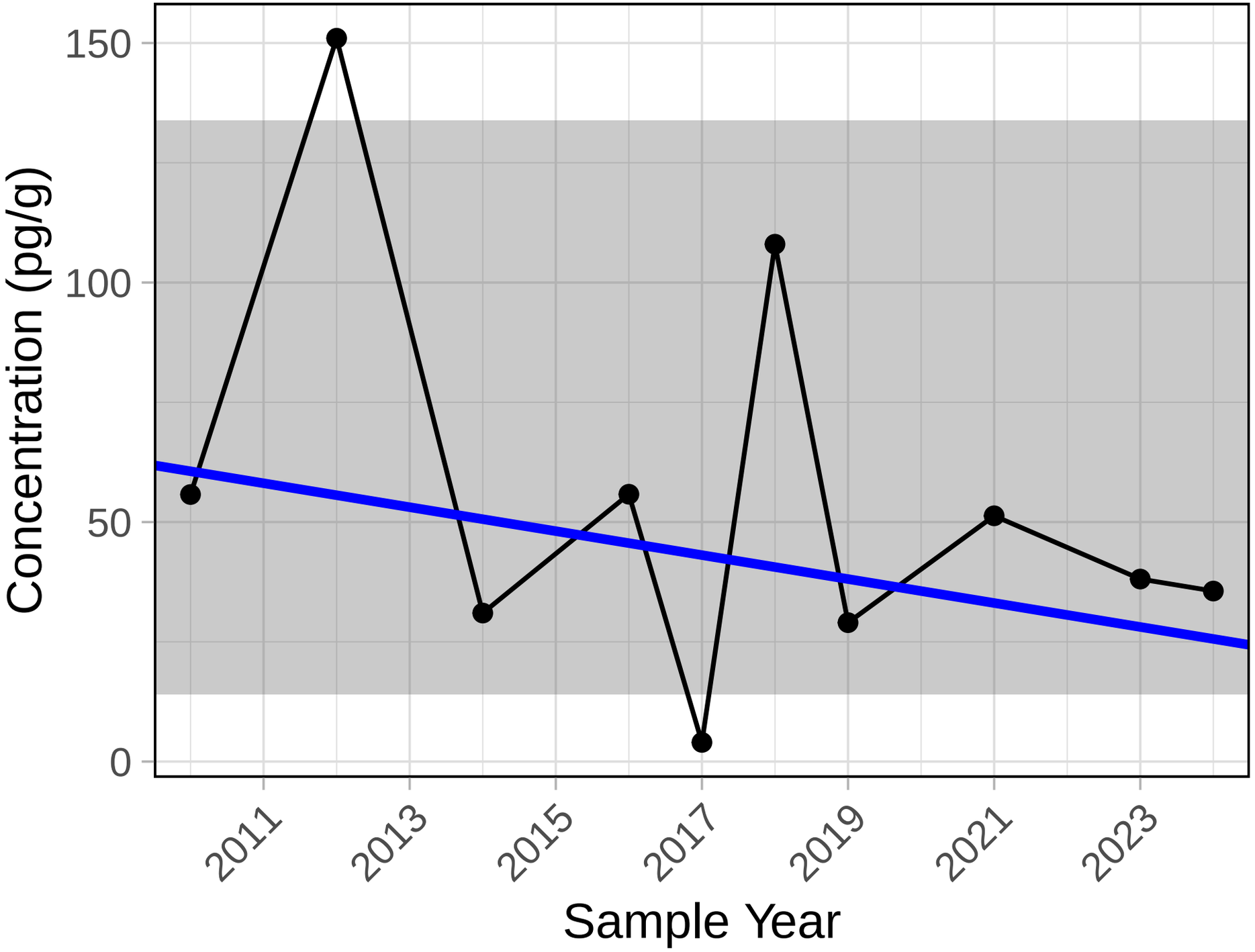
Chrystina Sediment



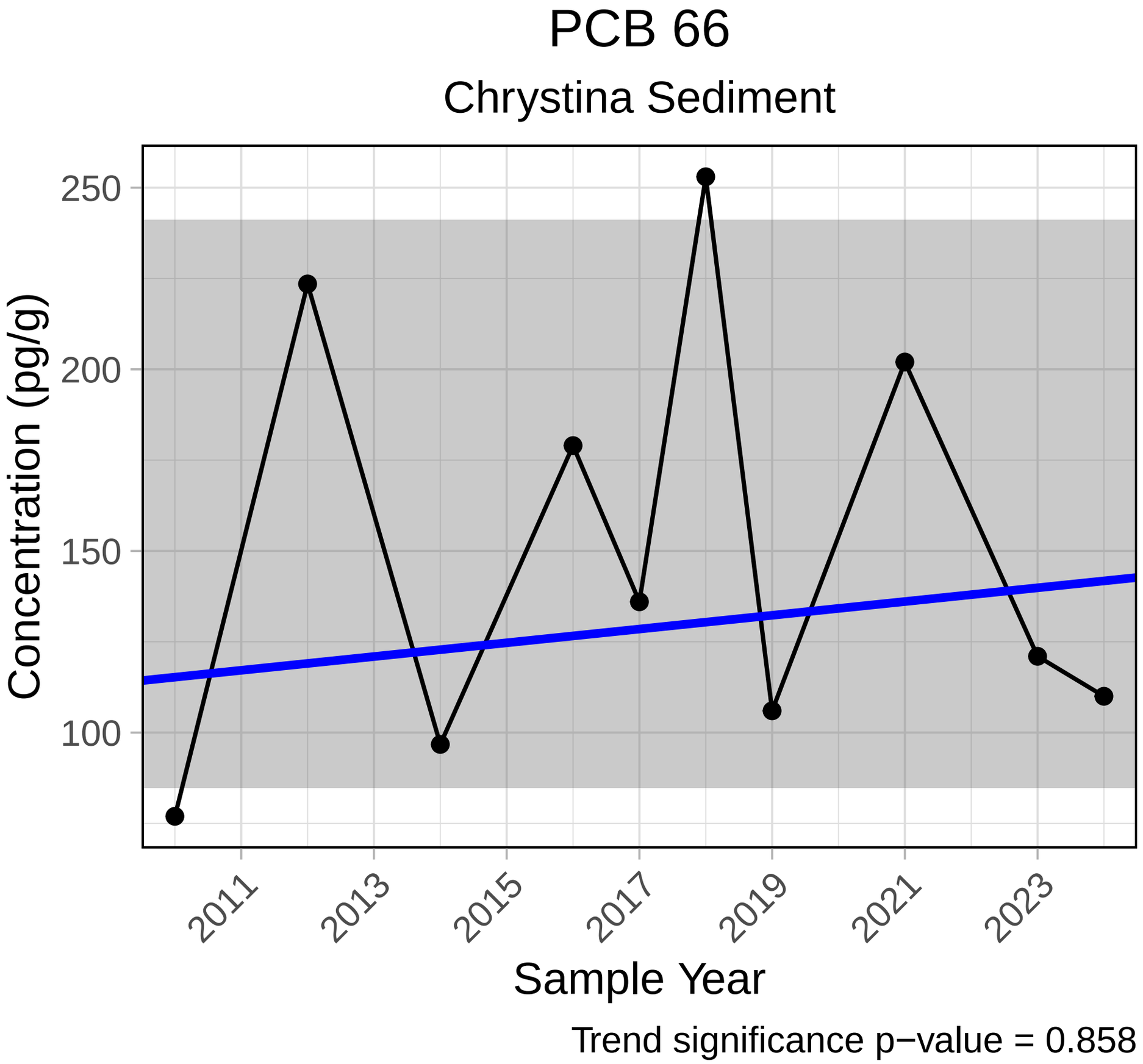
Trend significance p−value = 0.251

PCB 64

Chrystina Sediment

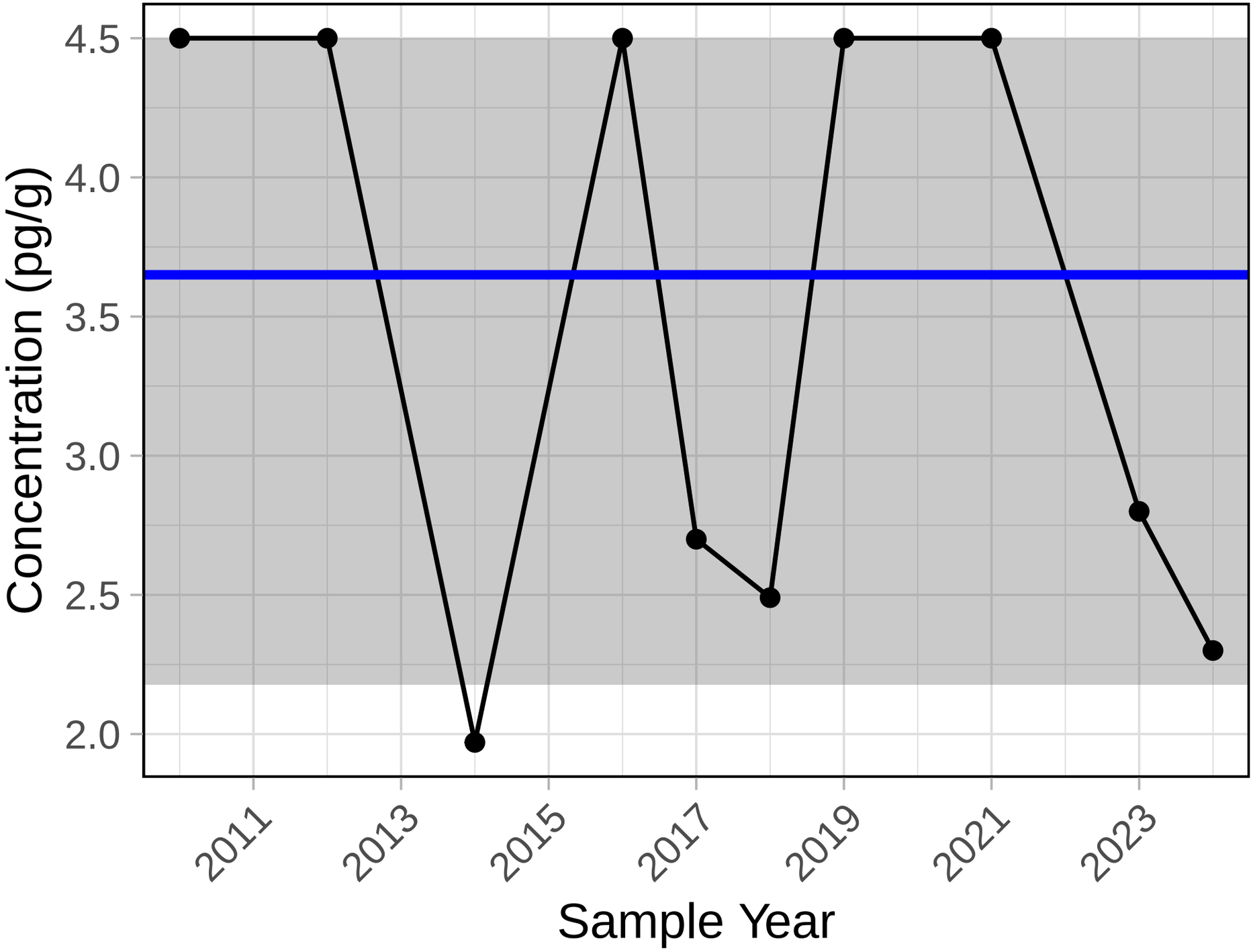


Trend significance p−value = 0.371

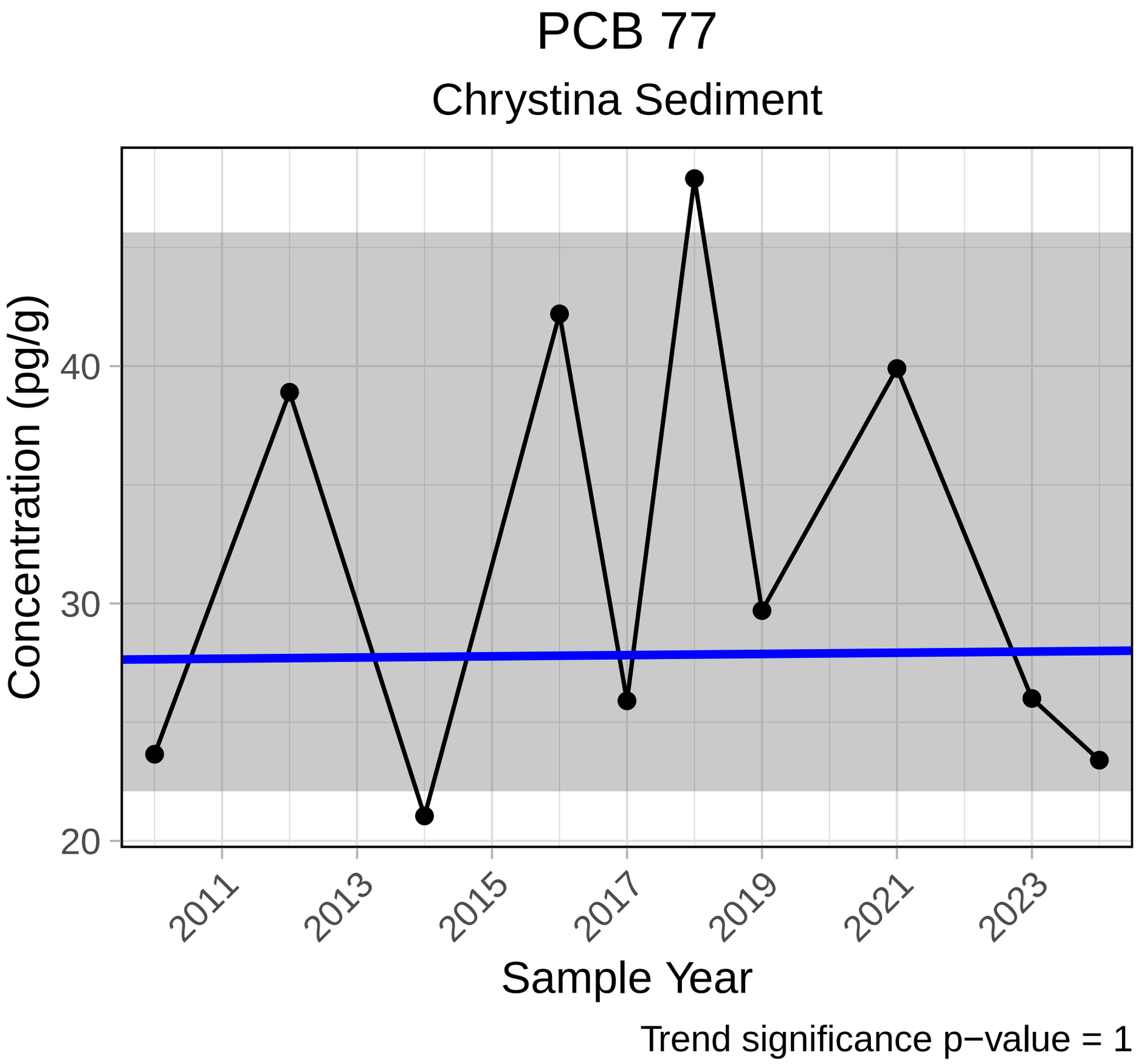

PCB 66
Chrystina Sediment
Concentration (pg/g)
250
200
150
100
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.858

PCB 72

Chrystina Sediment

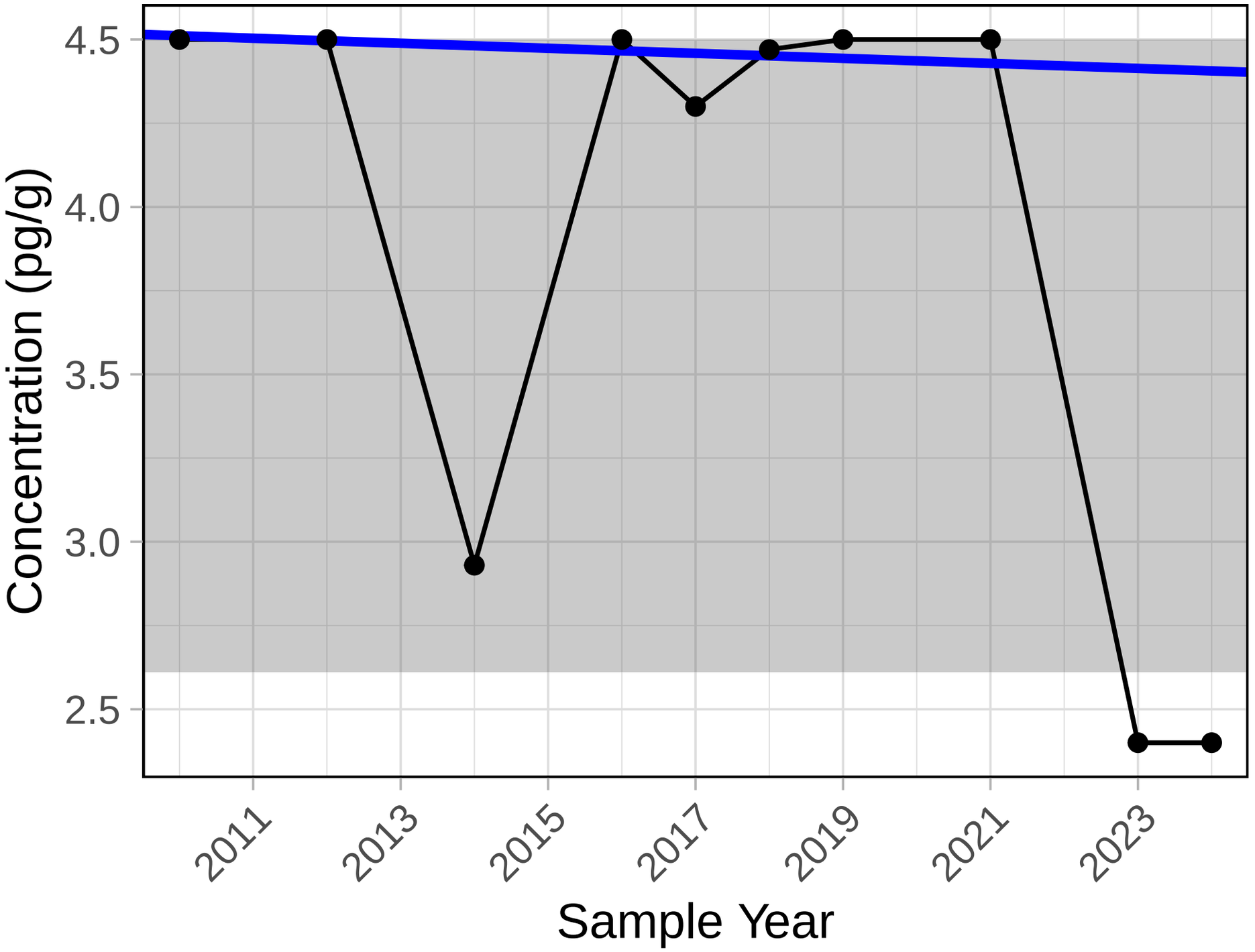


Trend significance p−value = 0.442


PCB 77
Chrystina Sediment
Concentration (pg/g)
40
30
20
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

PCB 79

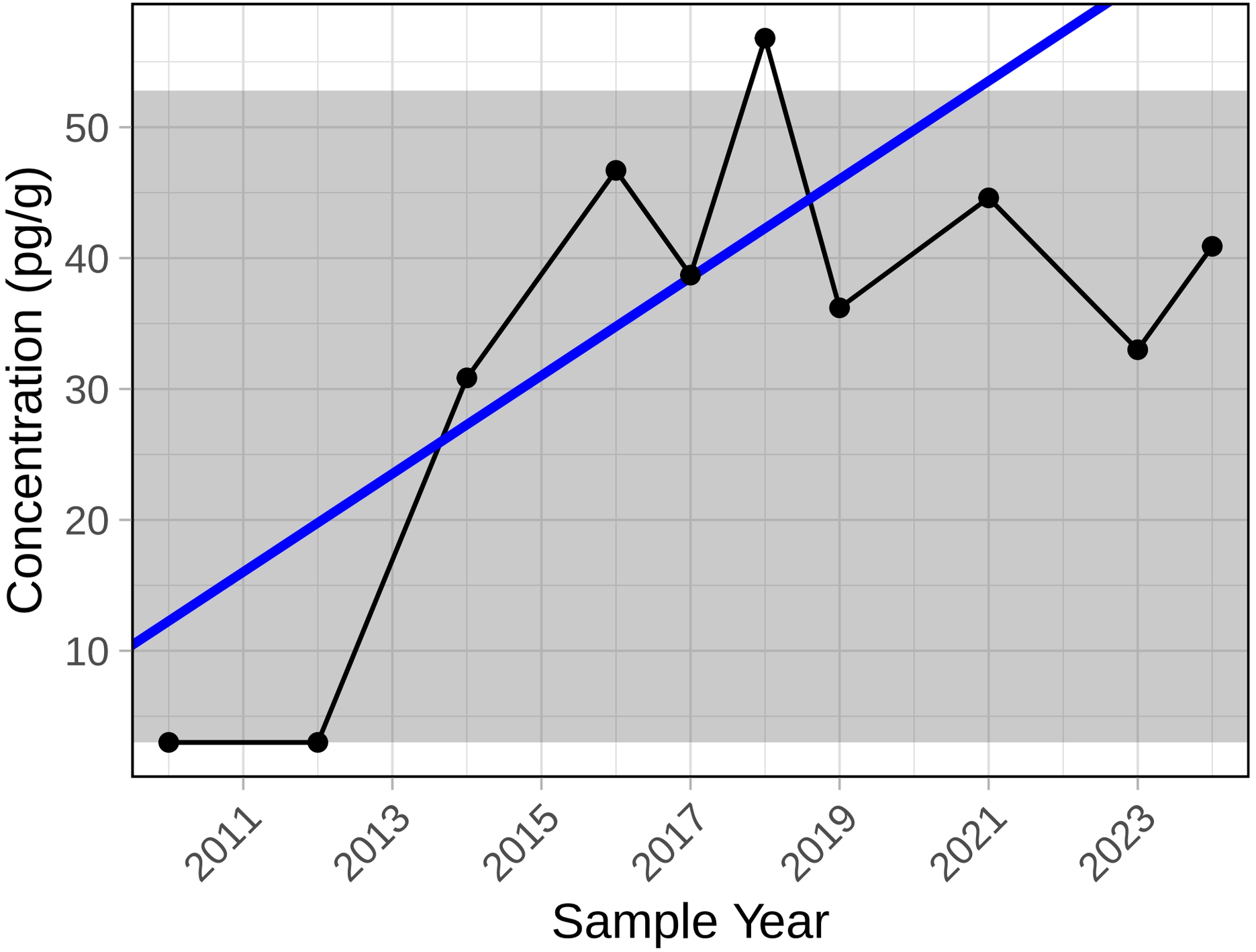
Chrystina Sediment



Trend significance p−value = 0.21

PCB 82

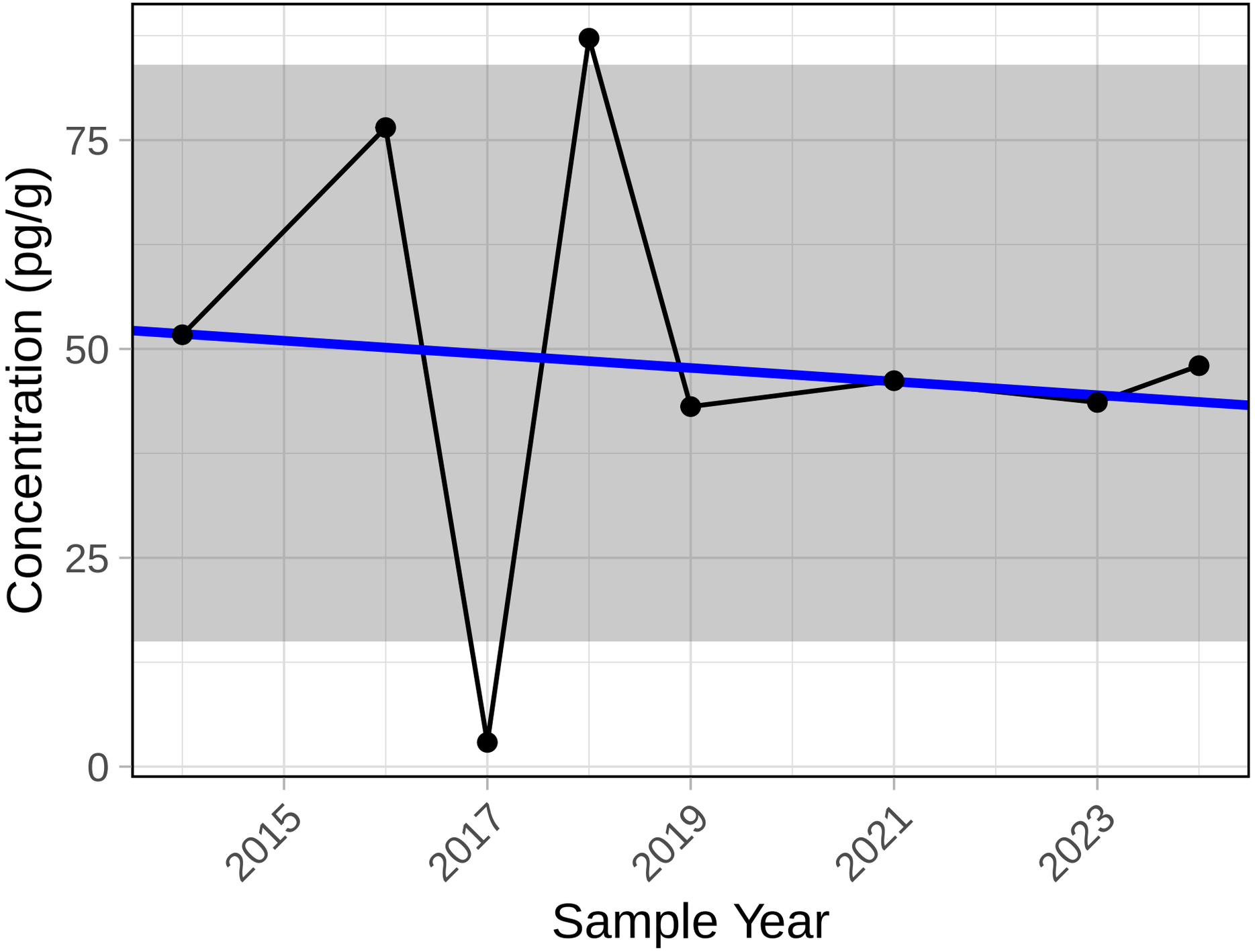
Chrystina Sediment



Trend significance p−value = 0.178

PCB 84

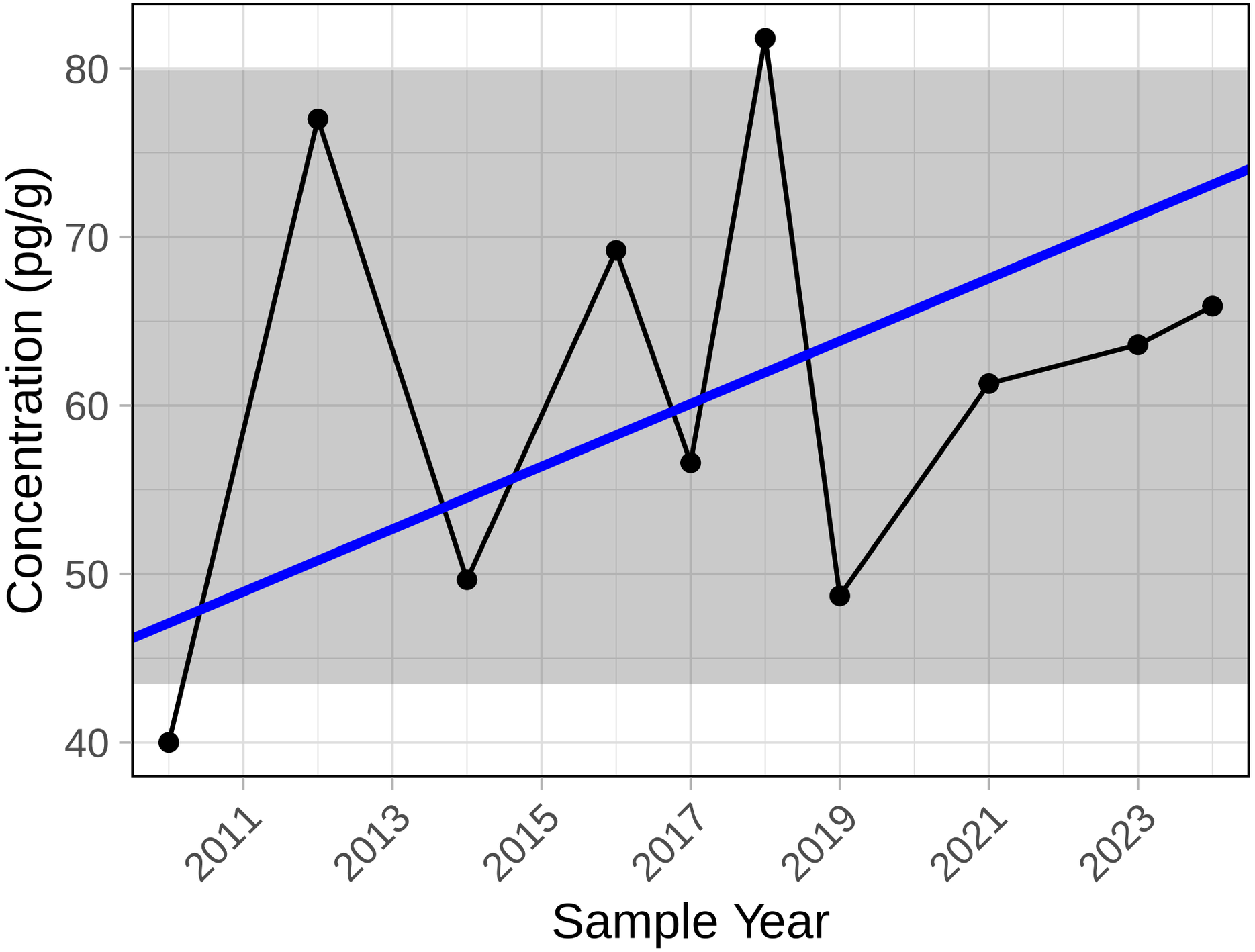
Chrystina Sediment



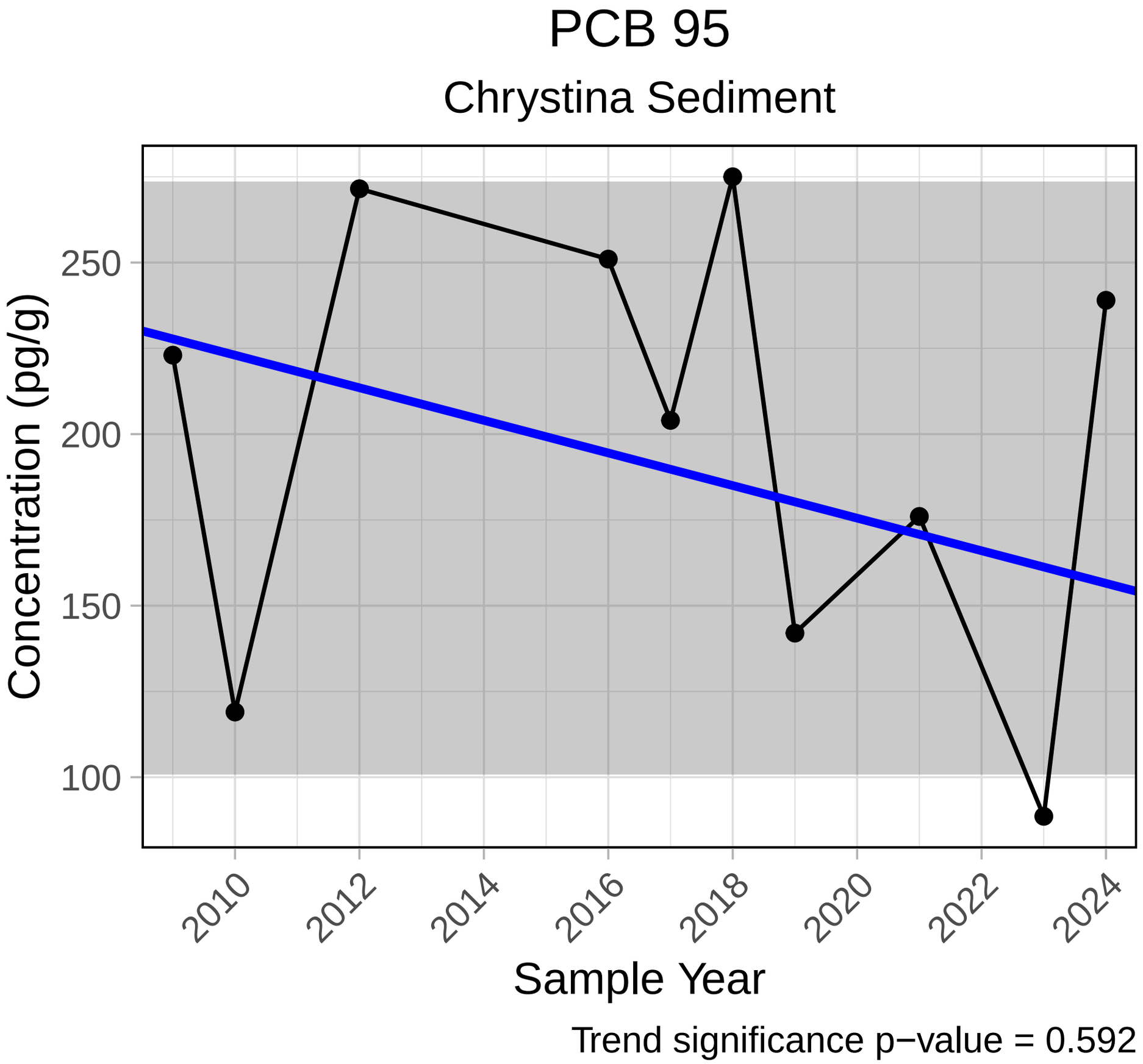
Trend significance p−value = 0.902

PCB 92

Chrystina Sediment

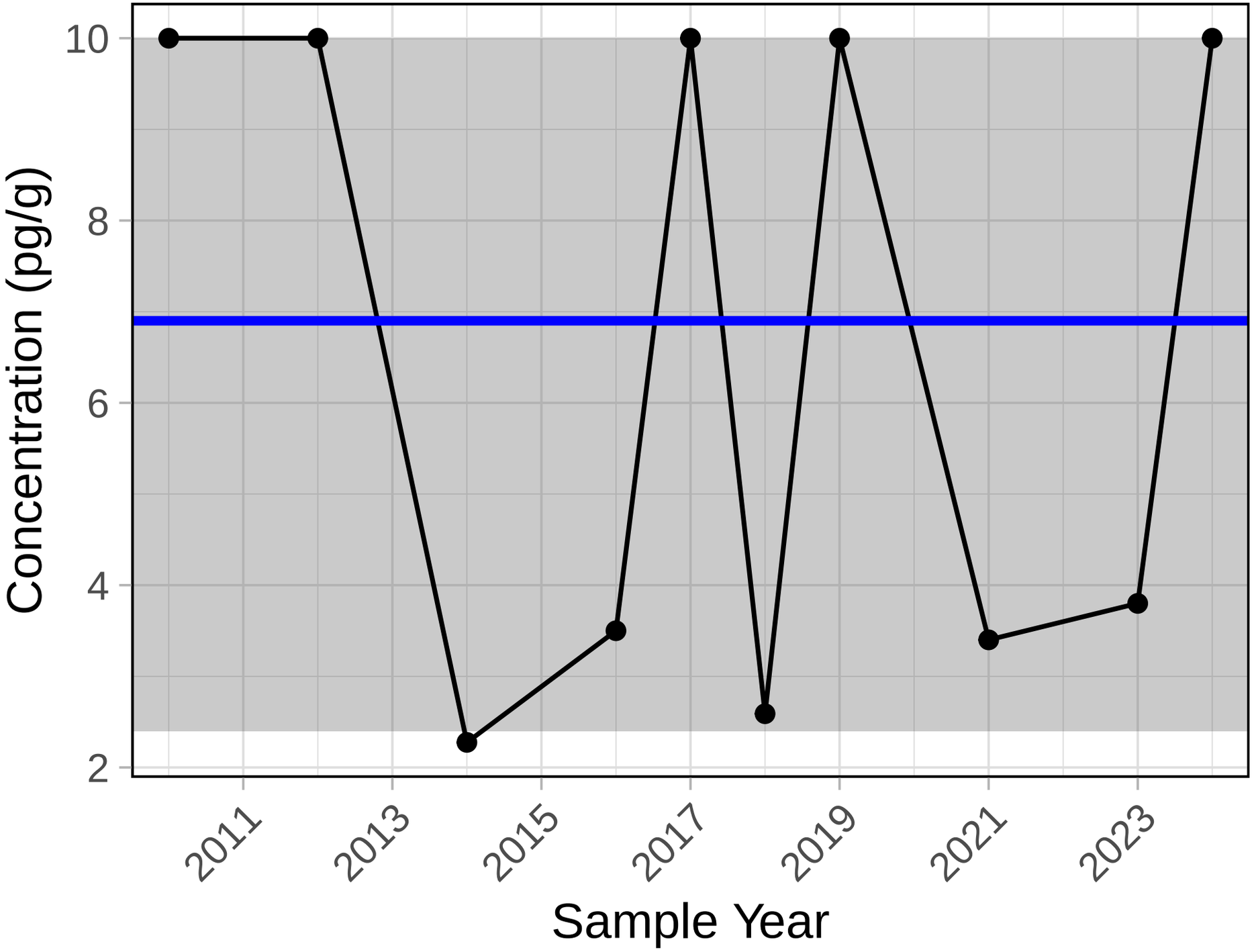


Trend significance p−value = 0.474


PCB 95
Chrystina Sediment
Concentration (pg/g)
250
200
150
100
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.592

PCB 103

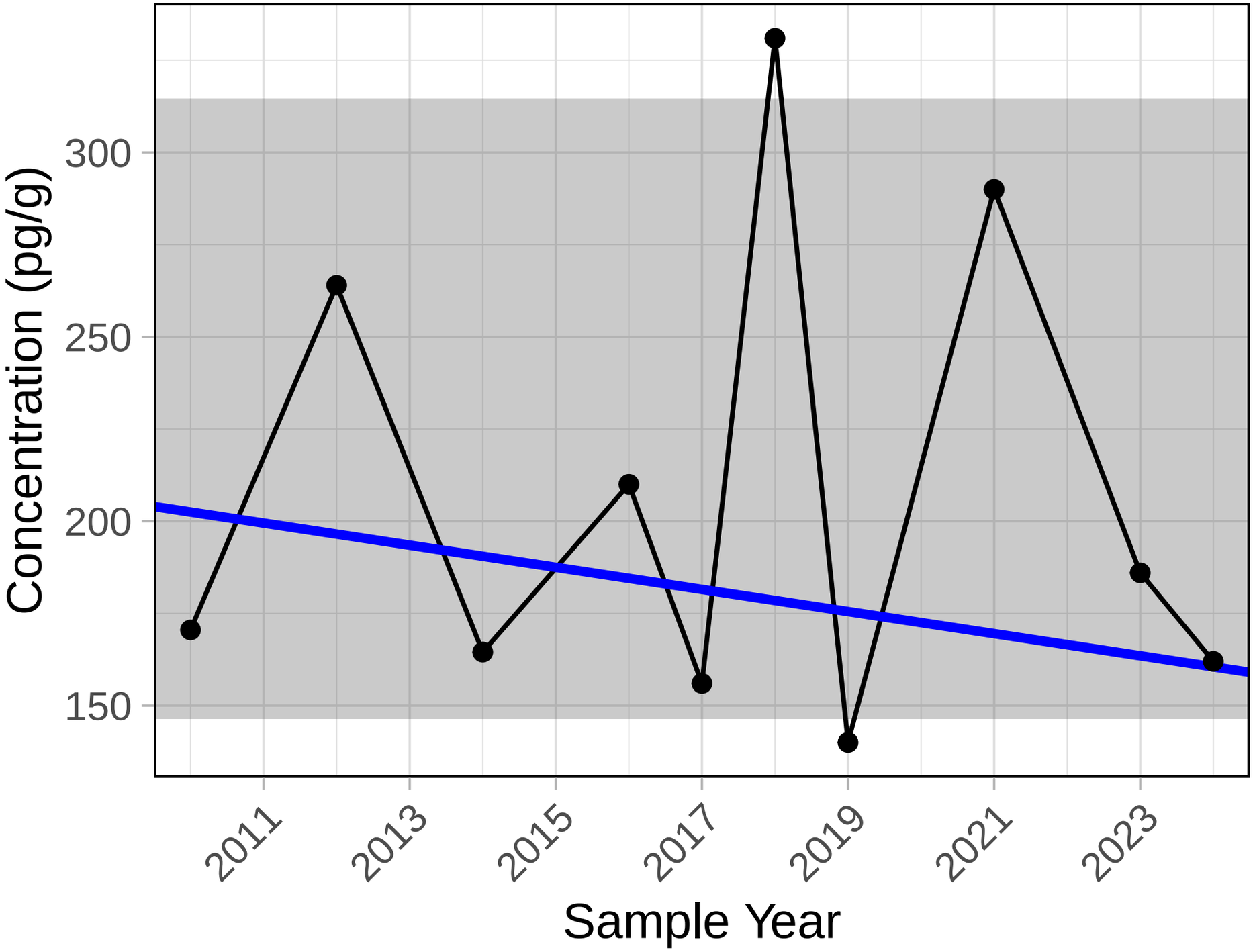
Chrystina Sediment



Trend significance p−value = 1

PCB 105

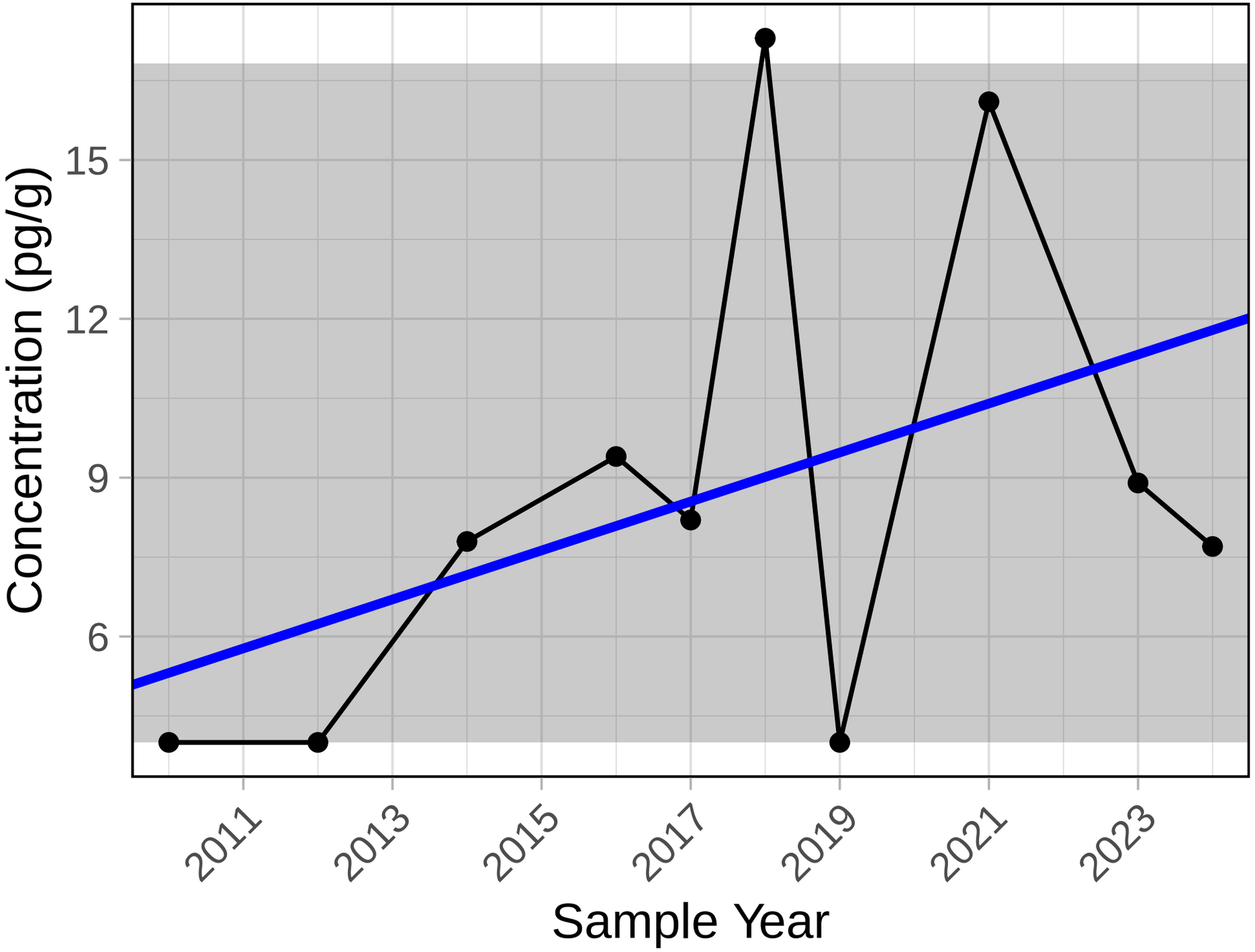
Chrystina Sediment



Trend significance p−value = 0.721

PCB 114

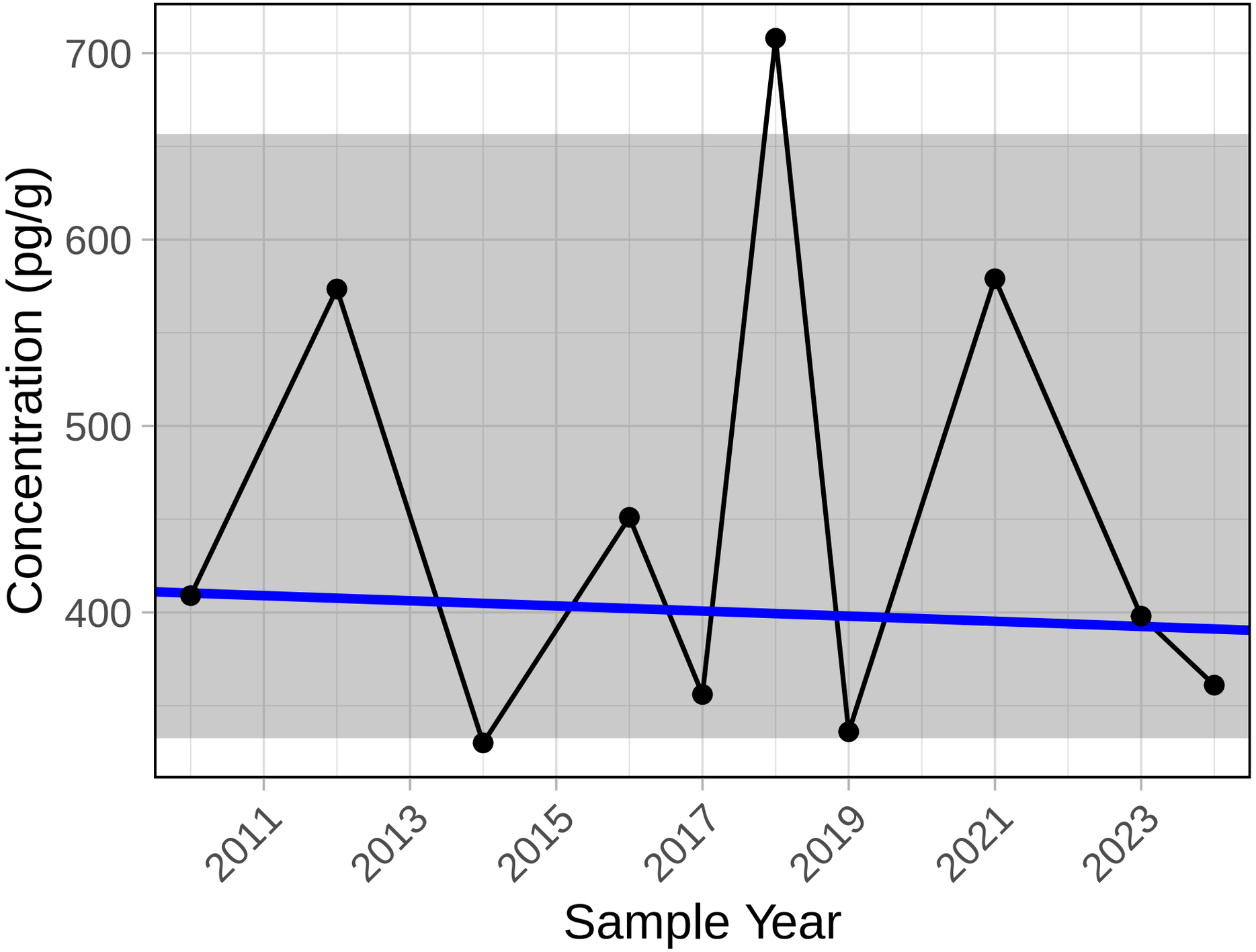
Chrystina Sediment



Trend significance p−value = 0.318

PCB 118

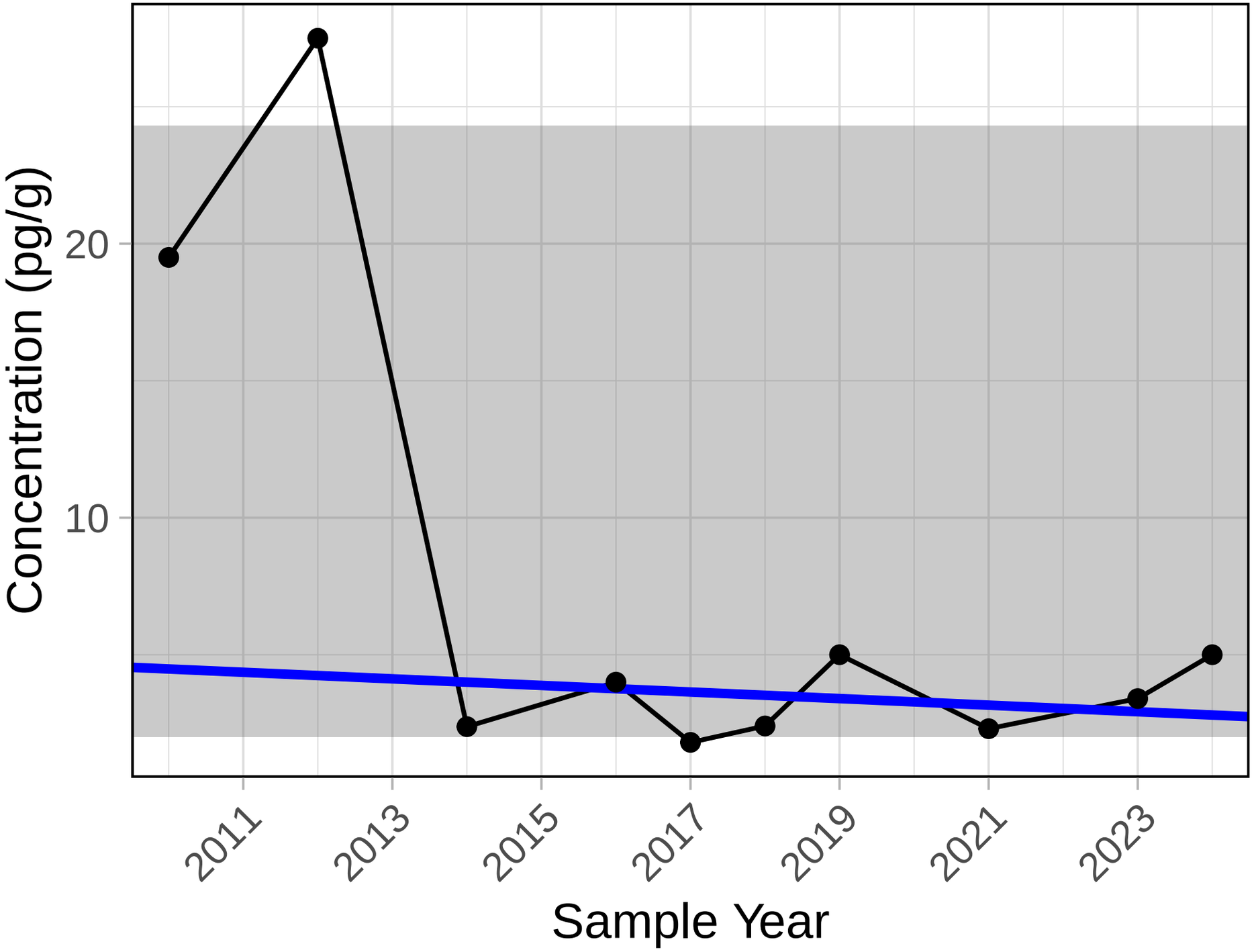
Chrystina Sediment



Trend significance p−value = 1

PCB 120

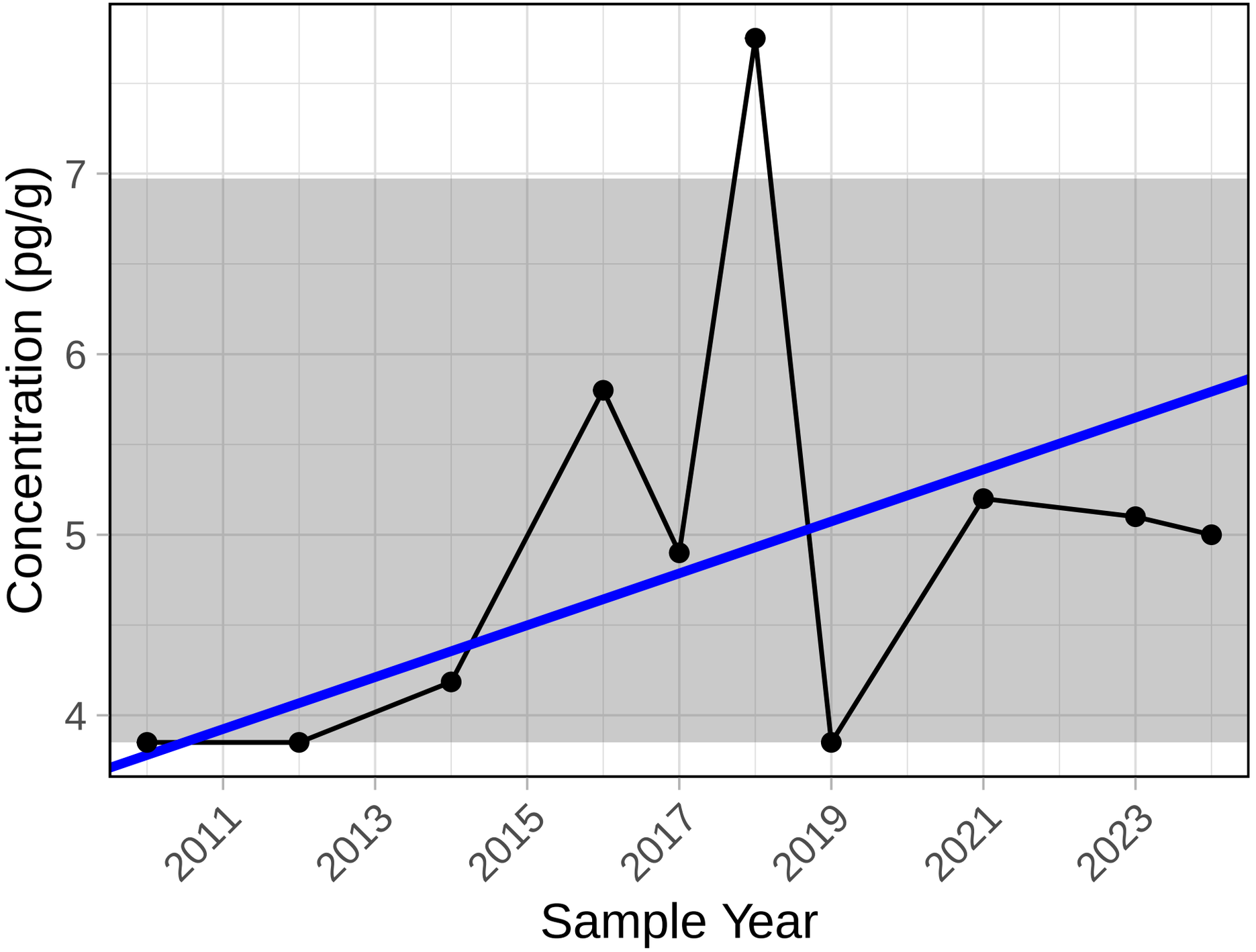
Chrystina Sediment



Trend significance p−value = 0.653

PCB 122

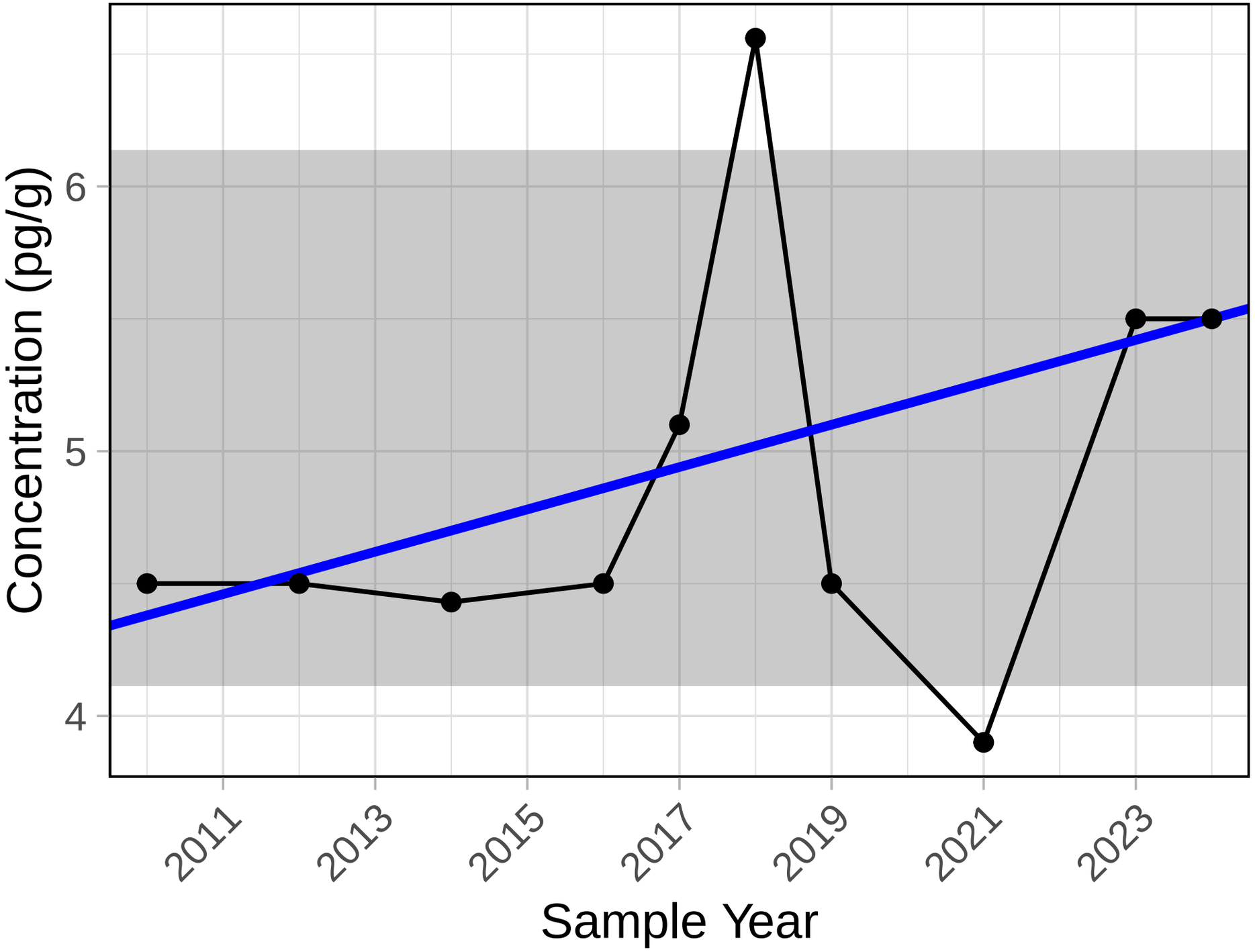
Chrystina Sediment



Trend significance p−value = 0.238

PCB 126

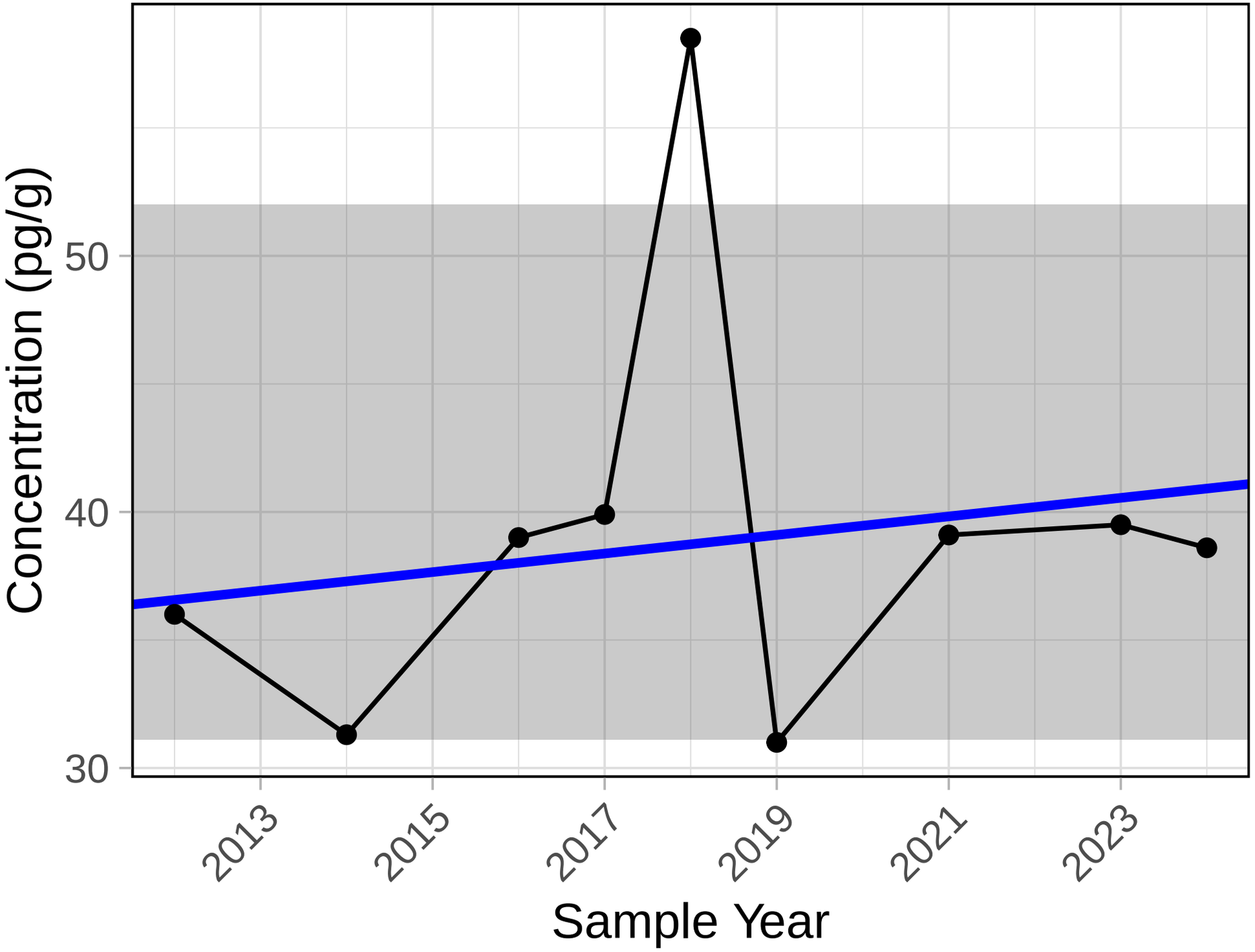
Chrystina Sediment



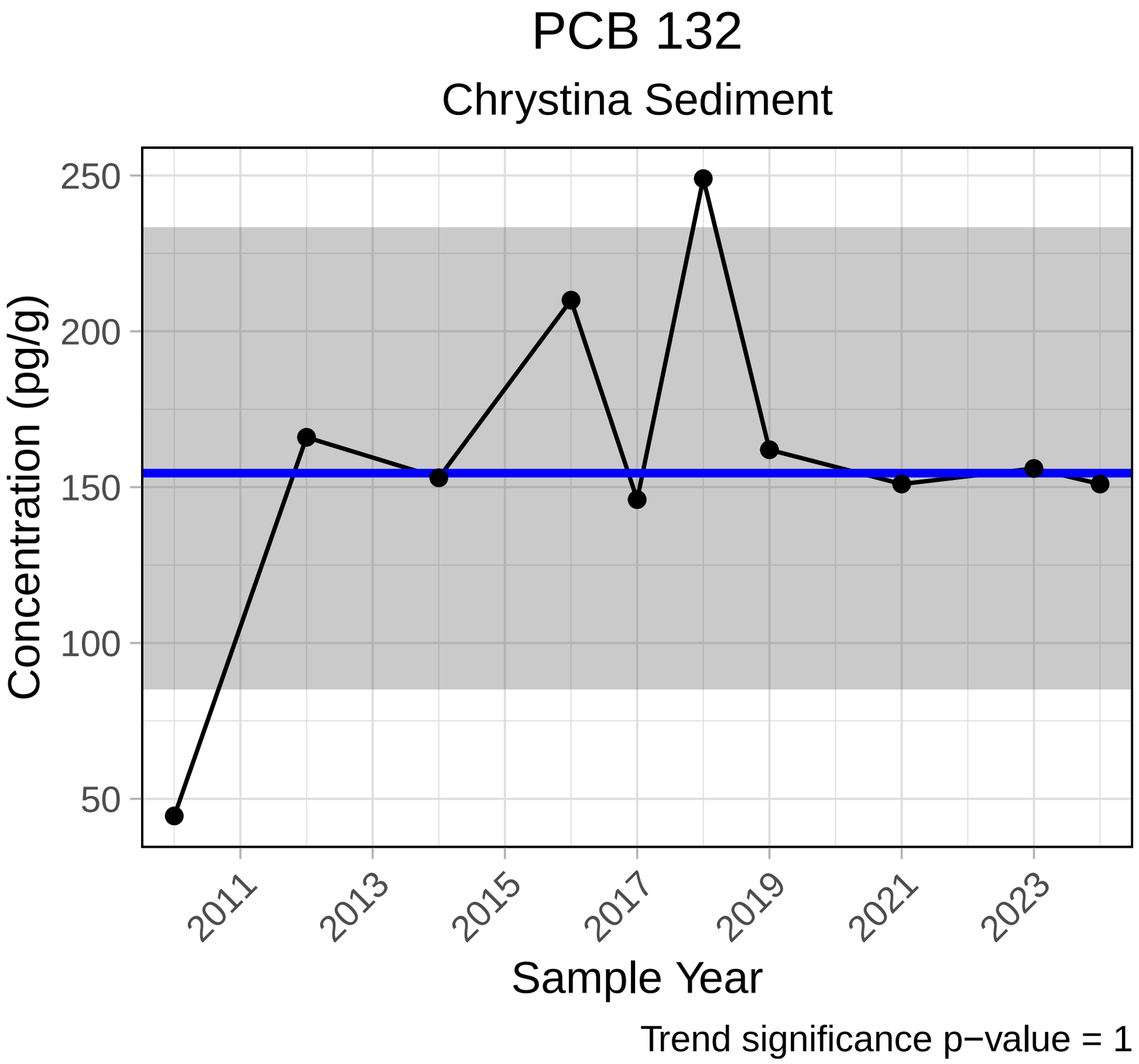
Trend significance p−value = 0.306

PCB 130

Chrystina Sediment

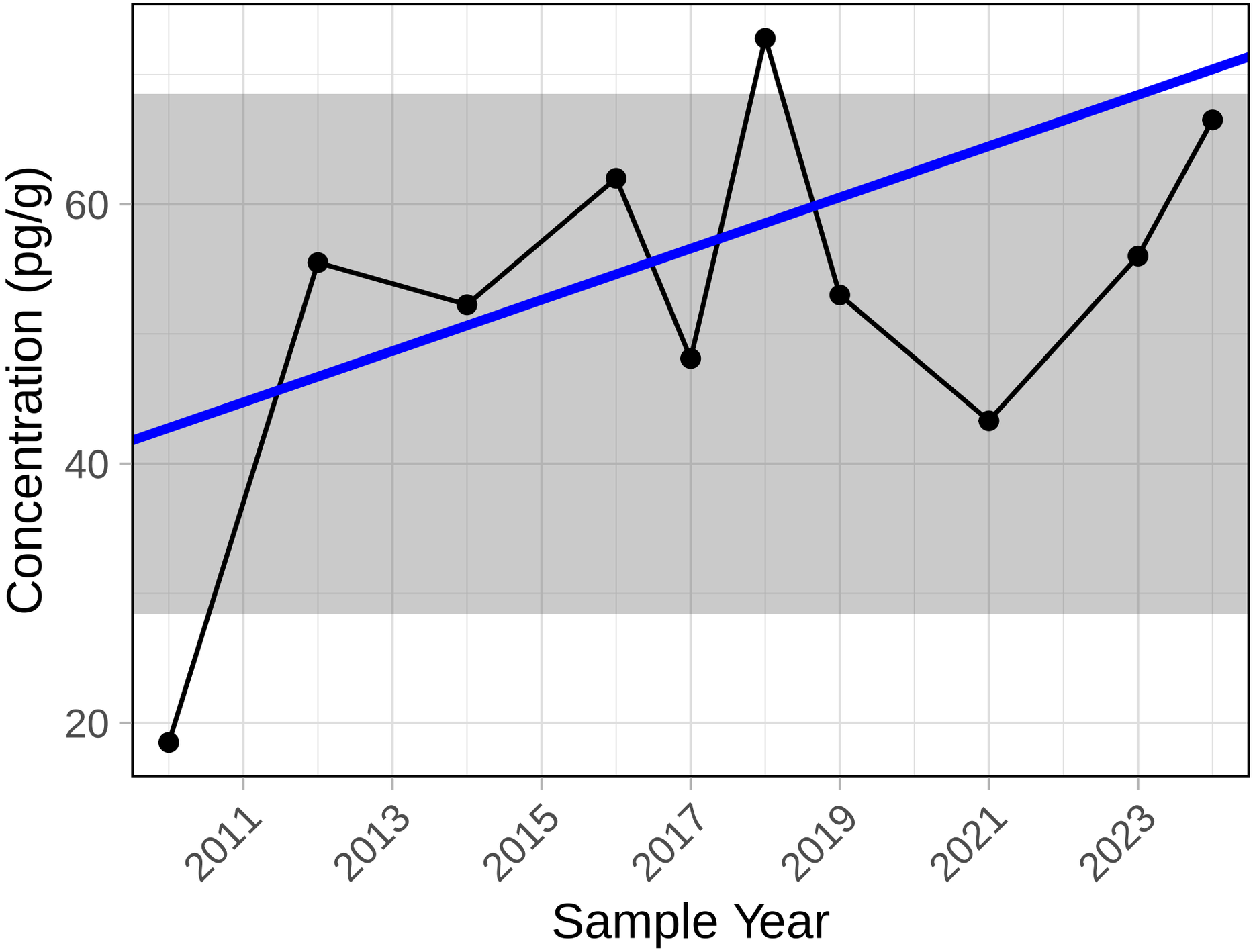


Trend significance p−value = 0.602


PCB 132
Chrystina Sediment
Concentration (pg/g)
250
200
150
100
50
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

PCB 136

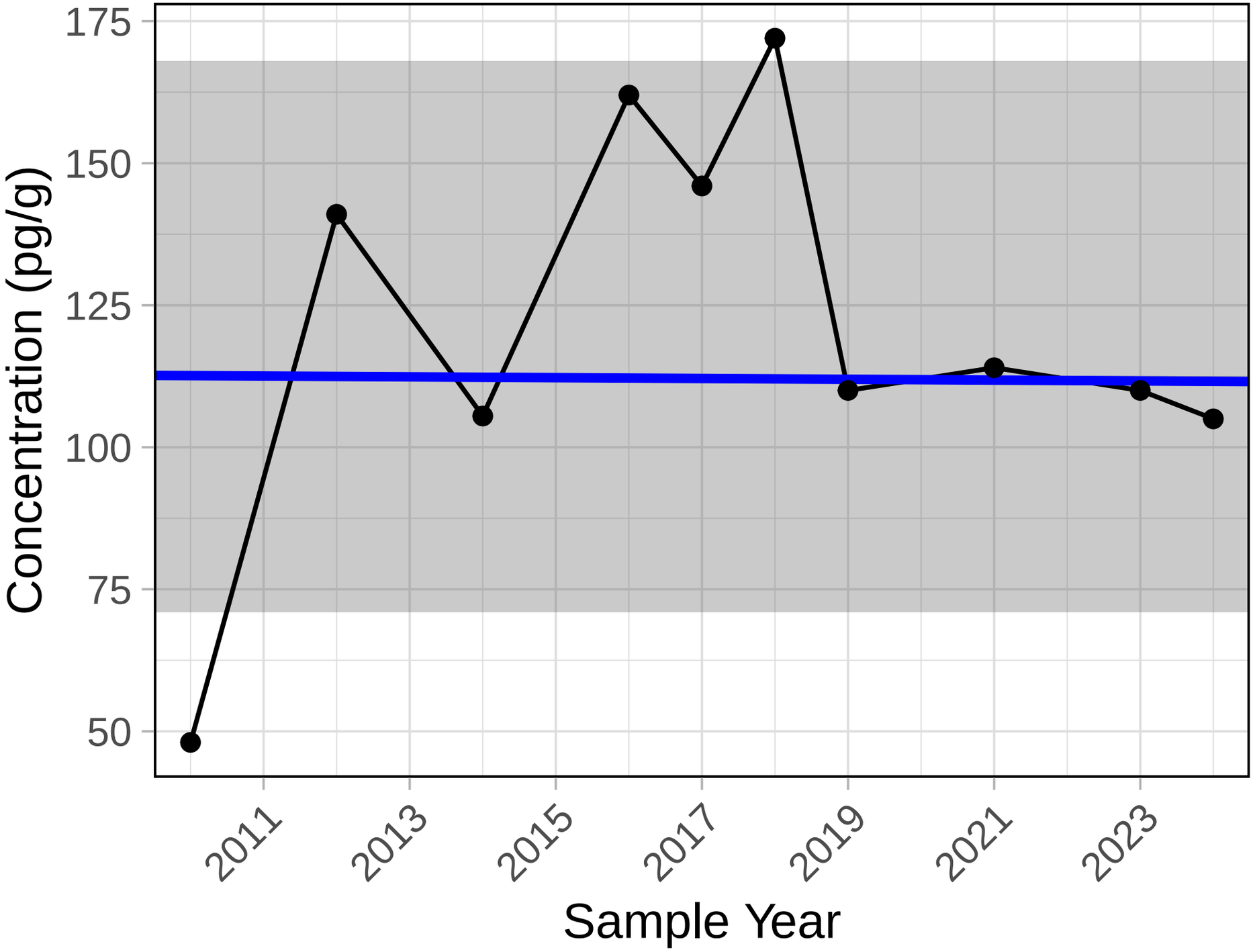
Chrystina Sediment



Trend significance p−value = 0.283

PCB 141

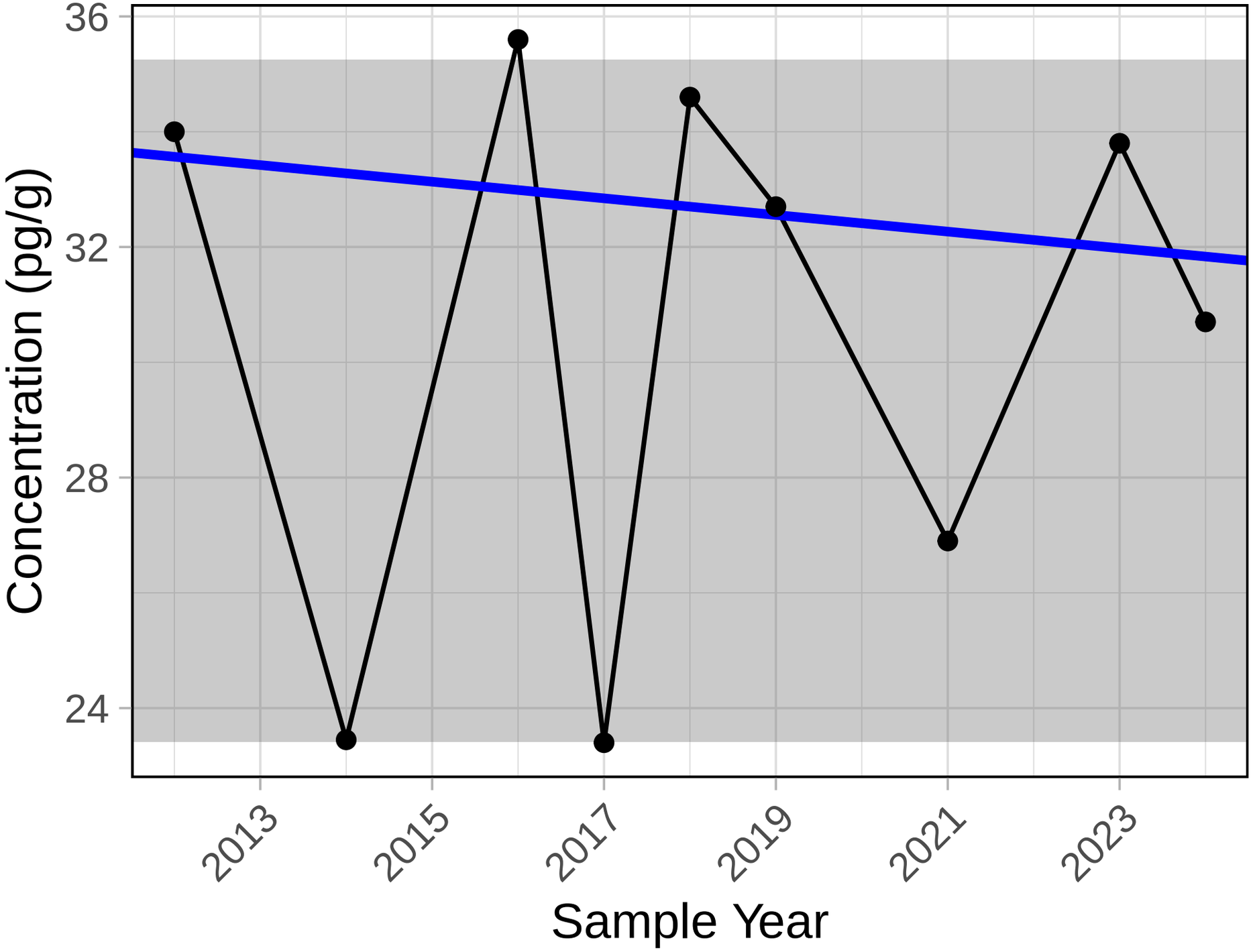
Chrystina Sediment



Trend significance p−value = 0.928

PCB 144

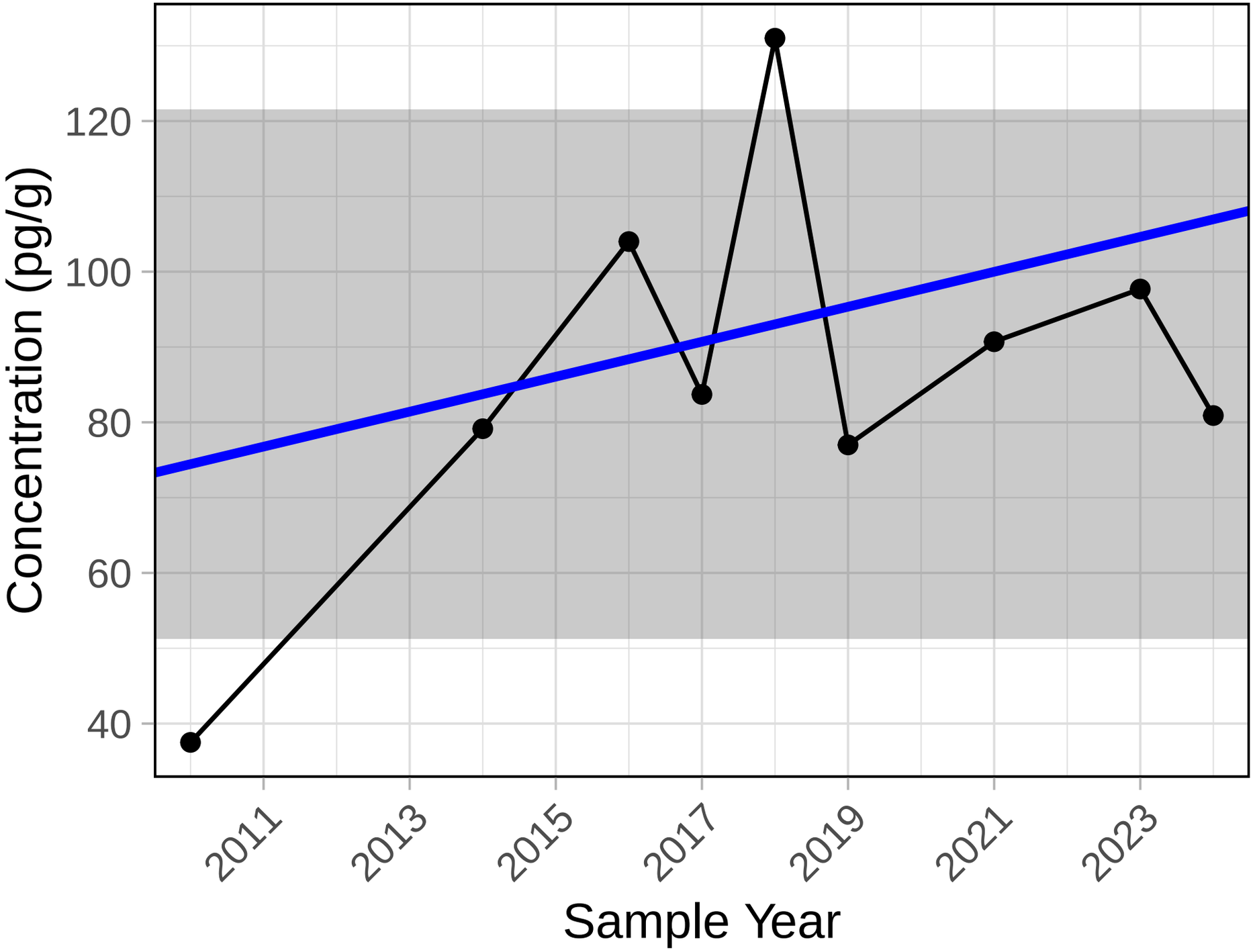
Chrystina Sediment



Trend significance p−value = 0.754

PCB 146

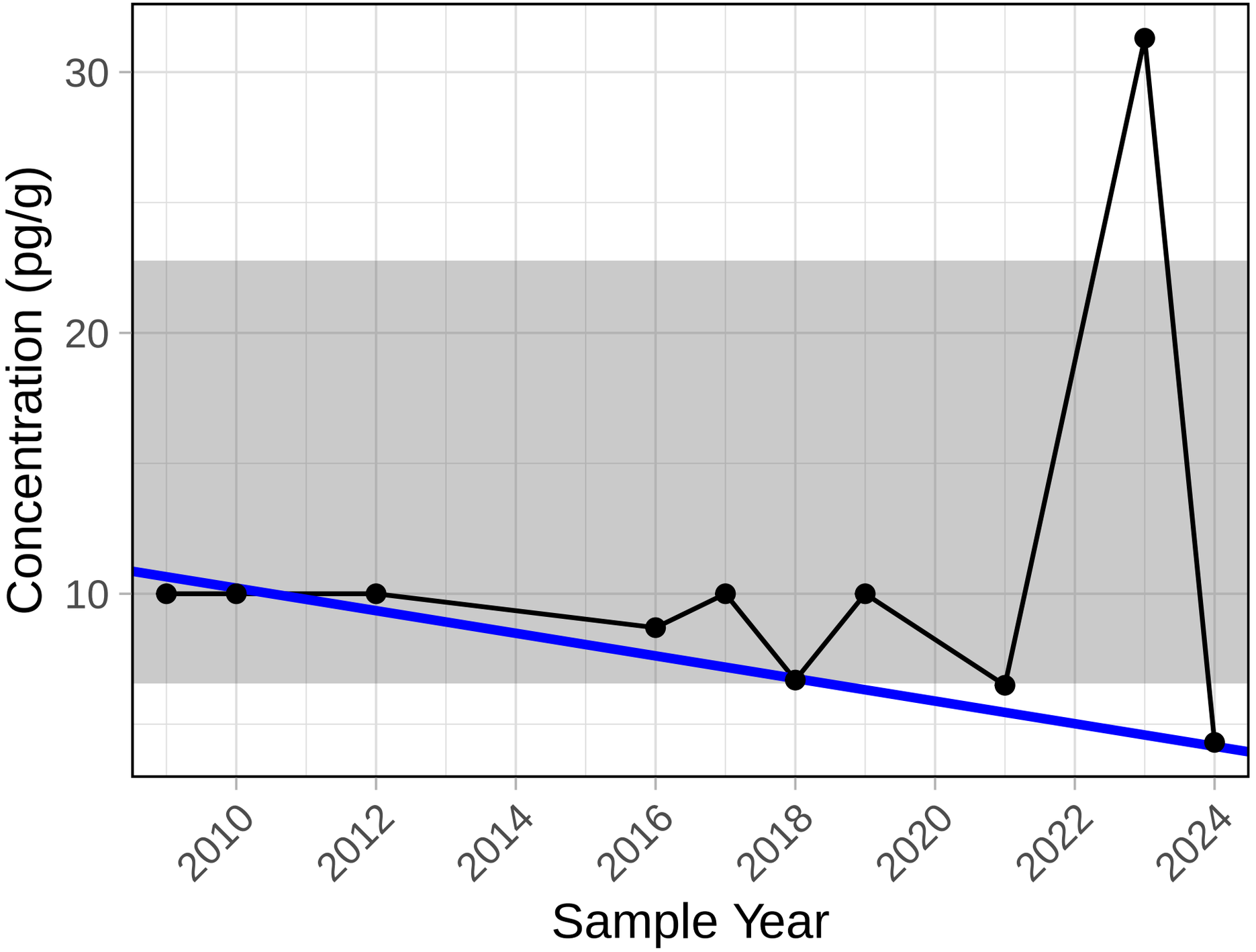
Chrystina Sediment



Trend significance p−value = 0.466

PCB 154

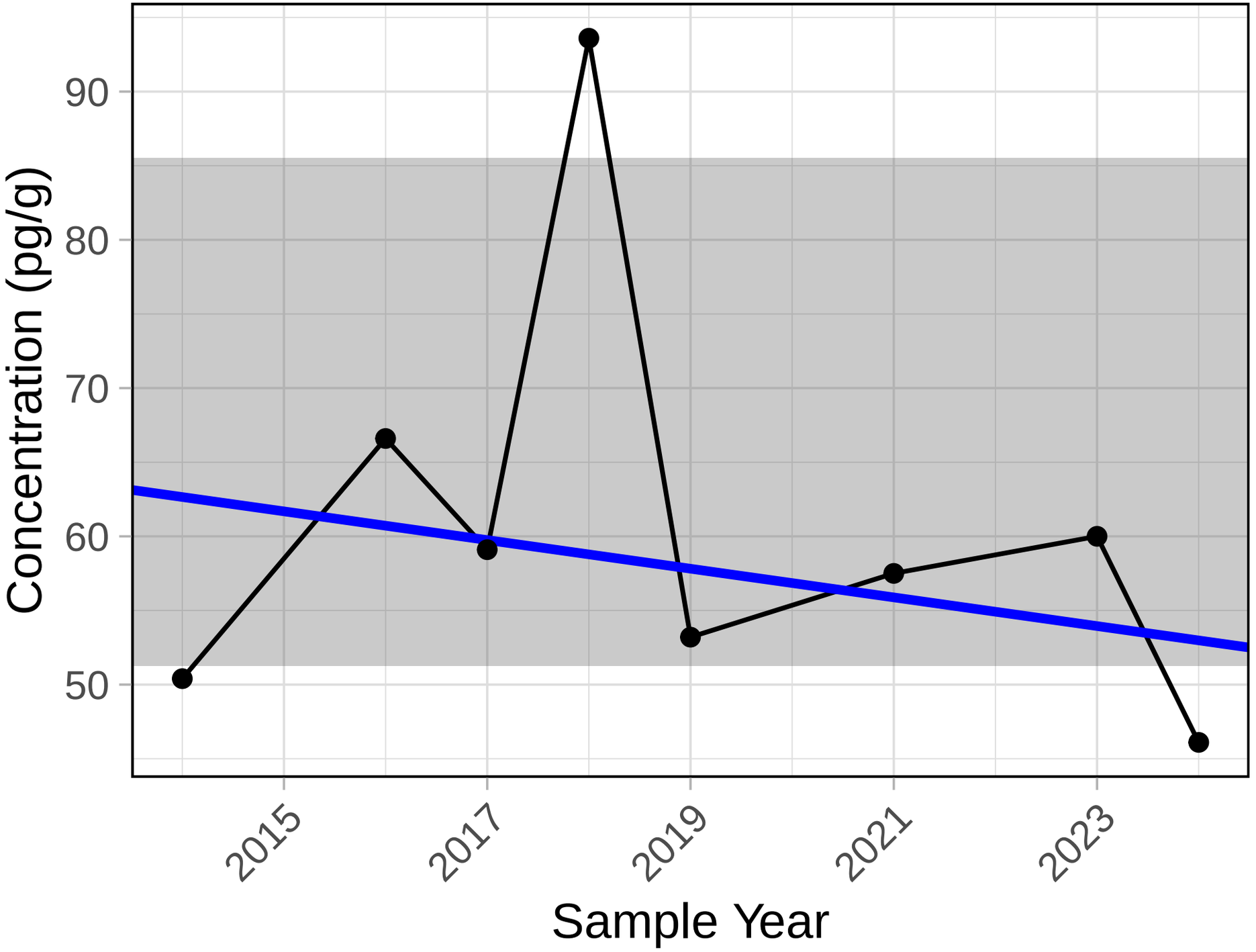
Chrystina Sediment



Trend significance p−value = 0.249

PCB 158

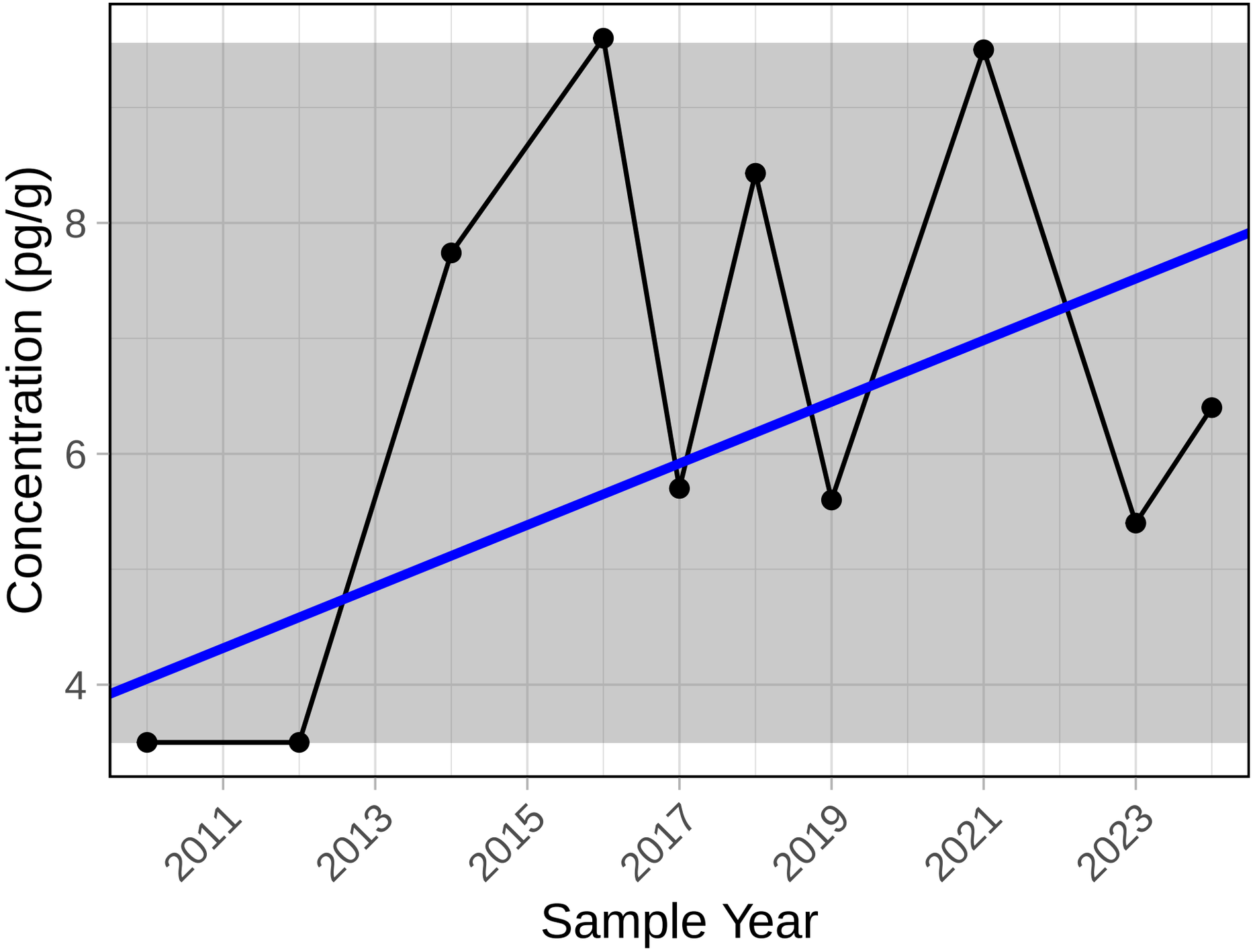
Chrystina Sediment



Trend significance p−value = 0.711

PCB 159

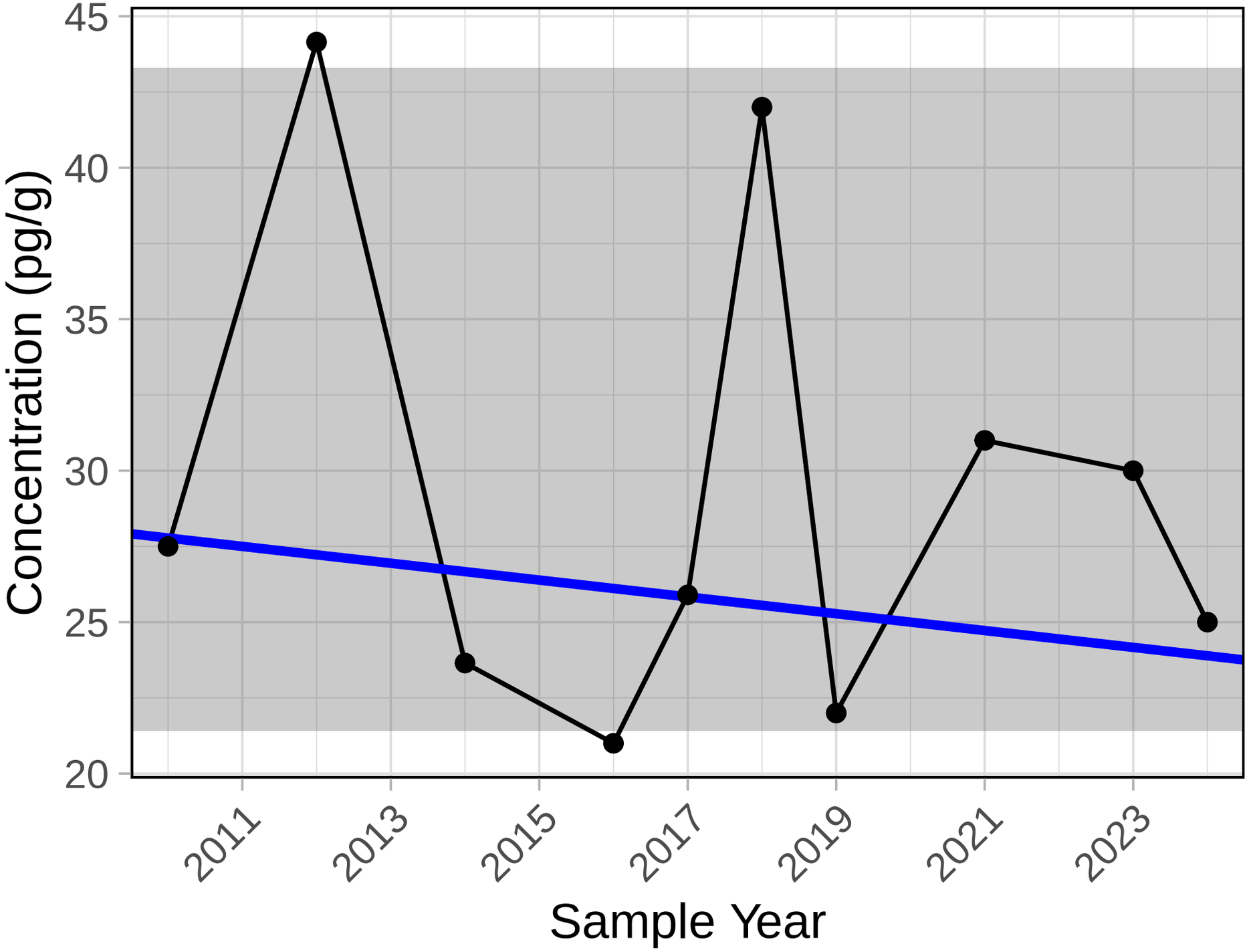
Chrystina Sediment



Trend significance p−value = 0.53

PCB 167

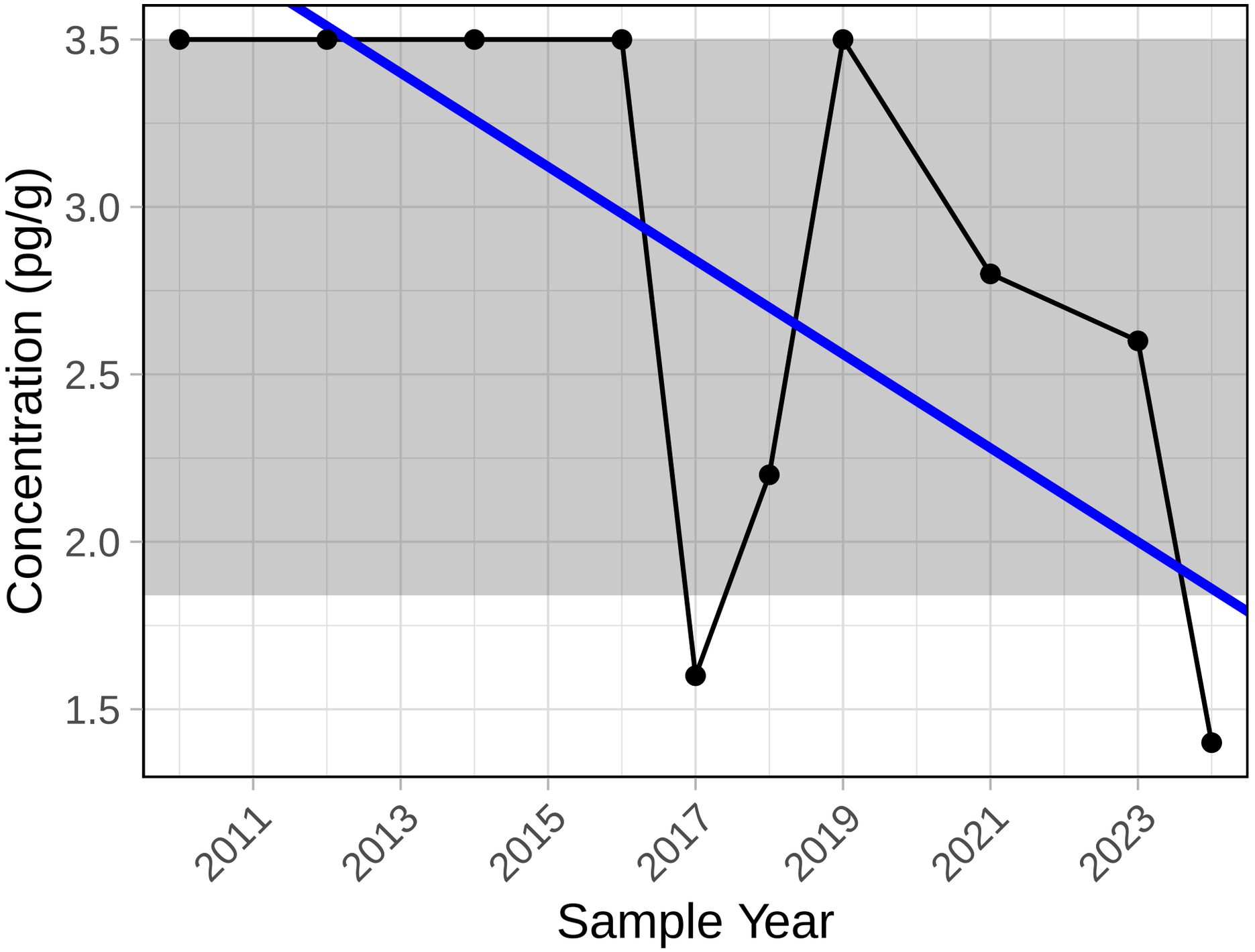
Chrystina Sediment



Trend significance p−value = 0.858

PCB 169

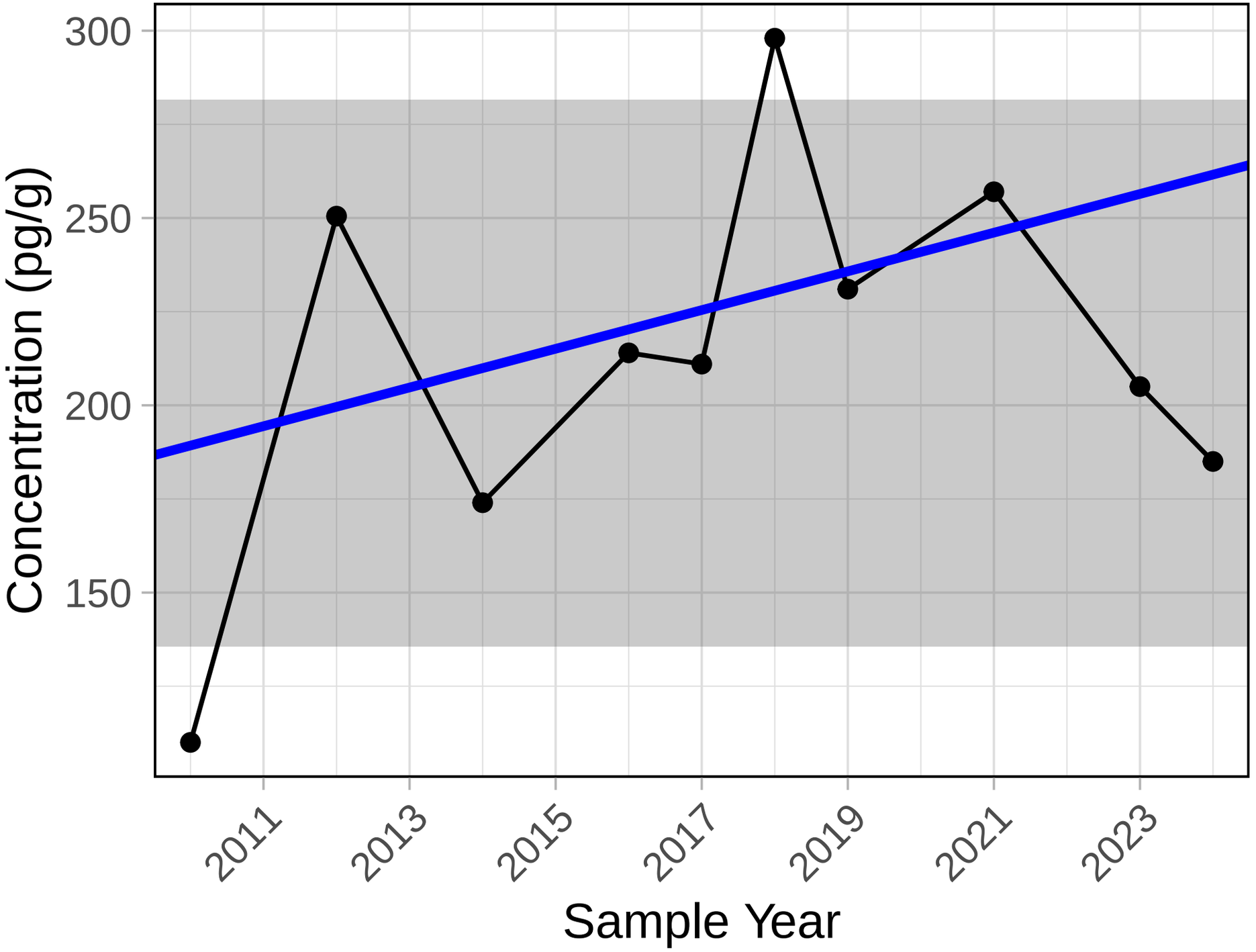
Chrystina Sediment



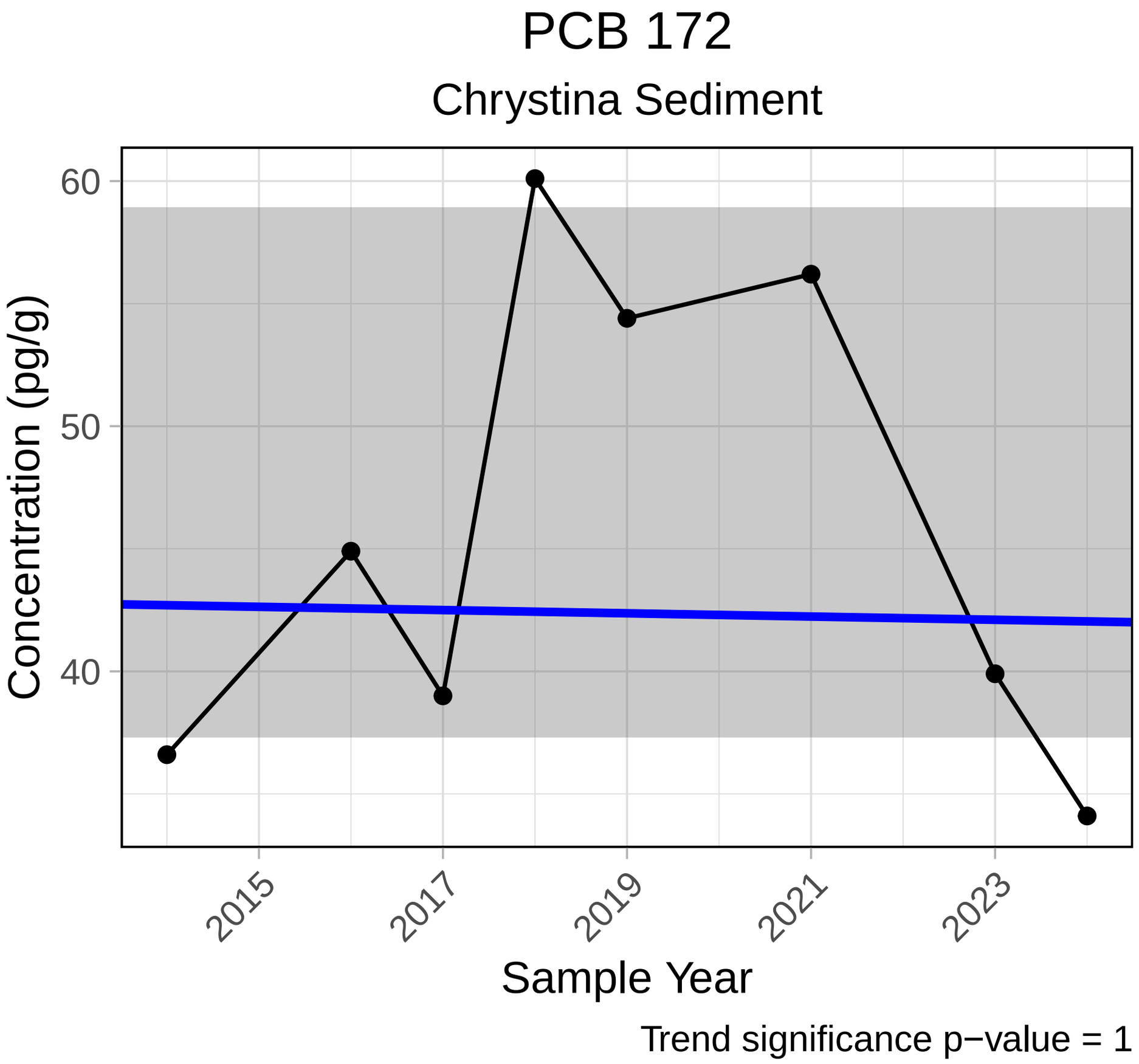
Trend significance p−value = 0.055

PCB 170

Chrystina Sediment

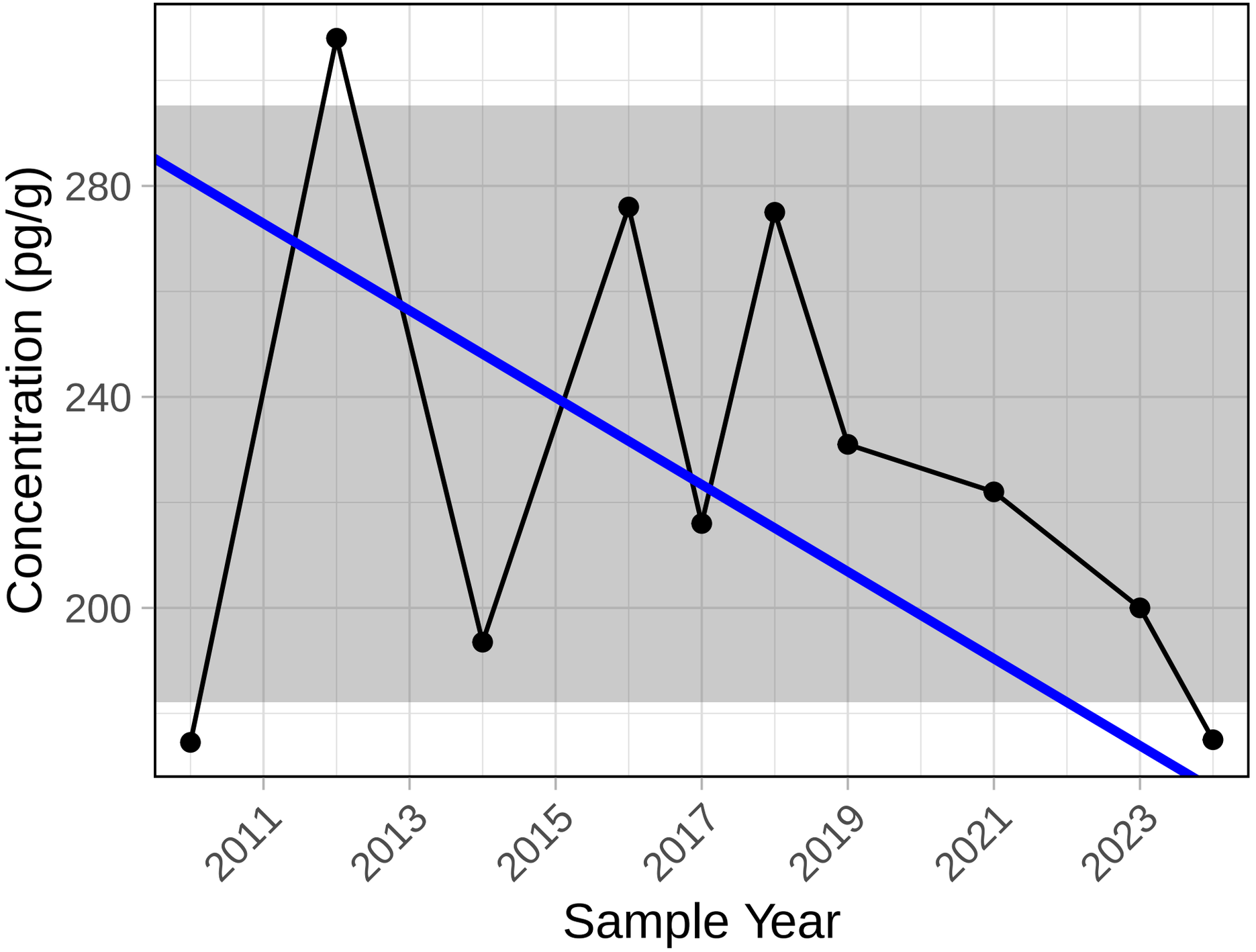


Trend significance p−value = 0.721


PCB 172
Chrystina Sediment
Concentration (pg/g)
60
50
40
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

PCB 174

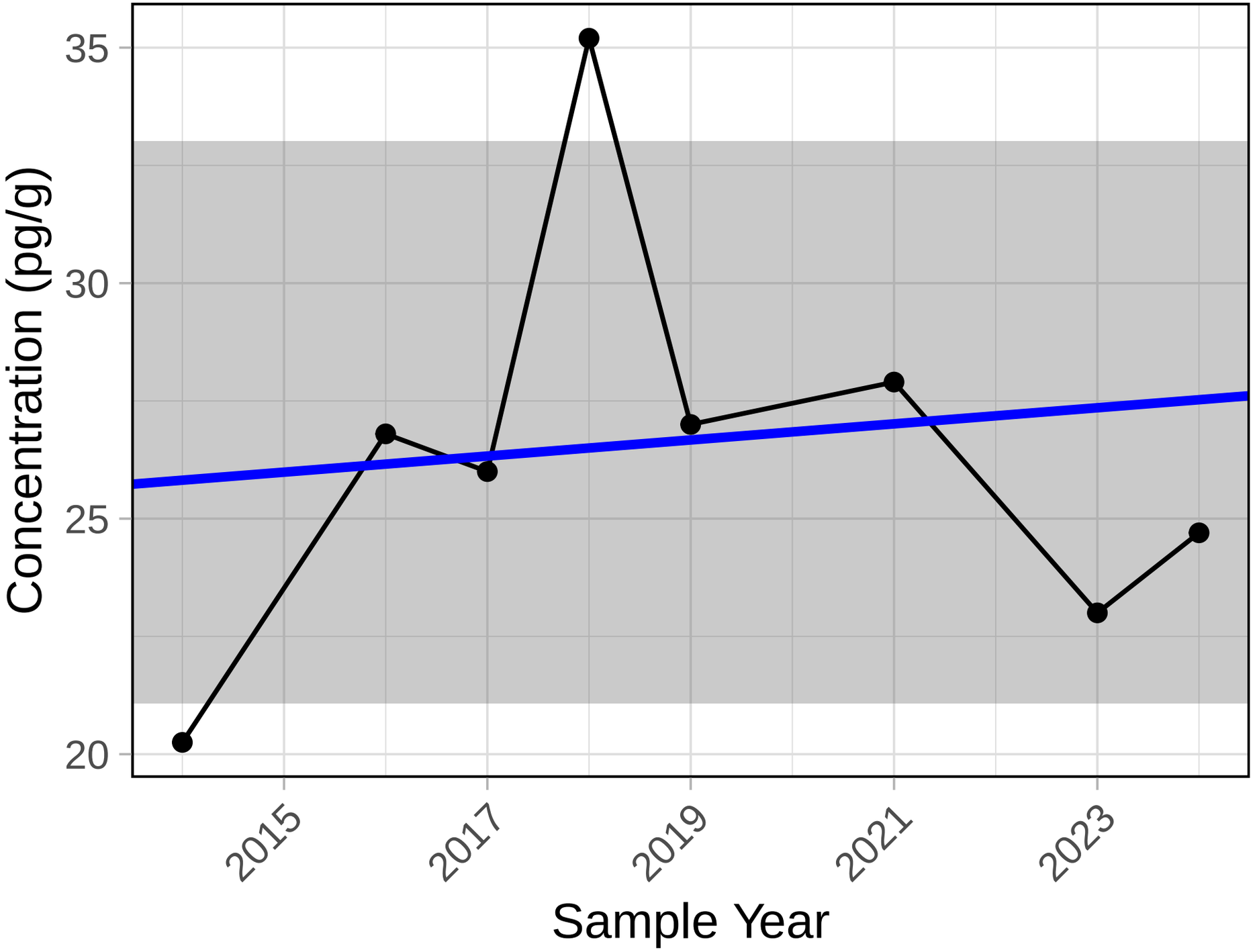
Chrystina Sediment



Trend significance p−value = 0.474

PCB 176

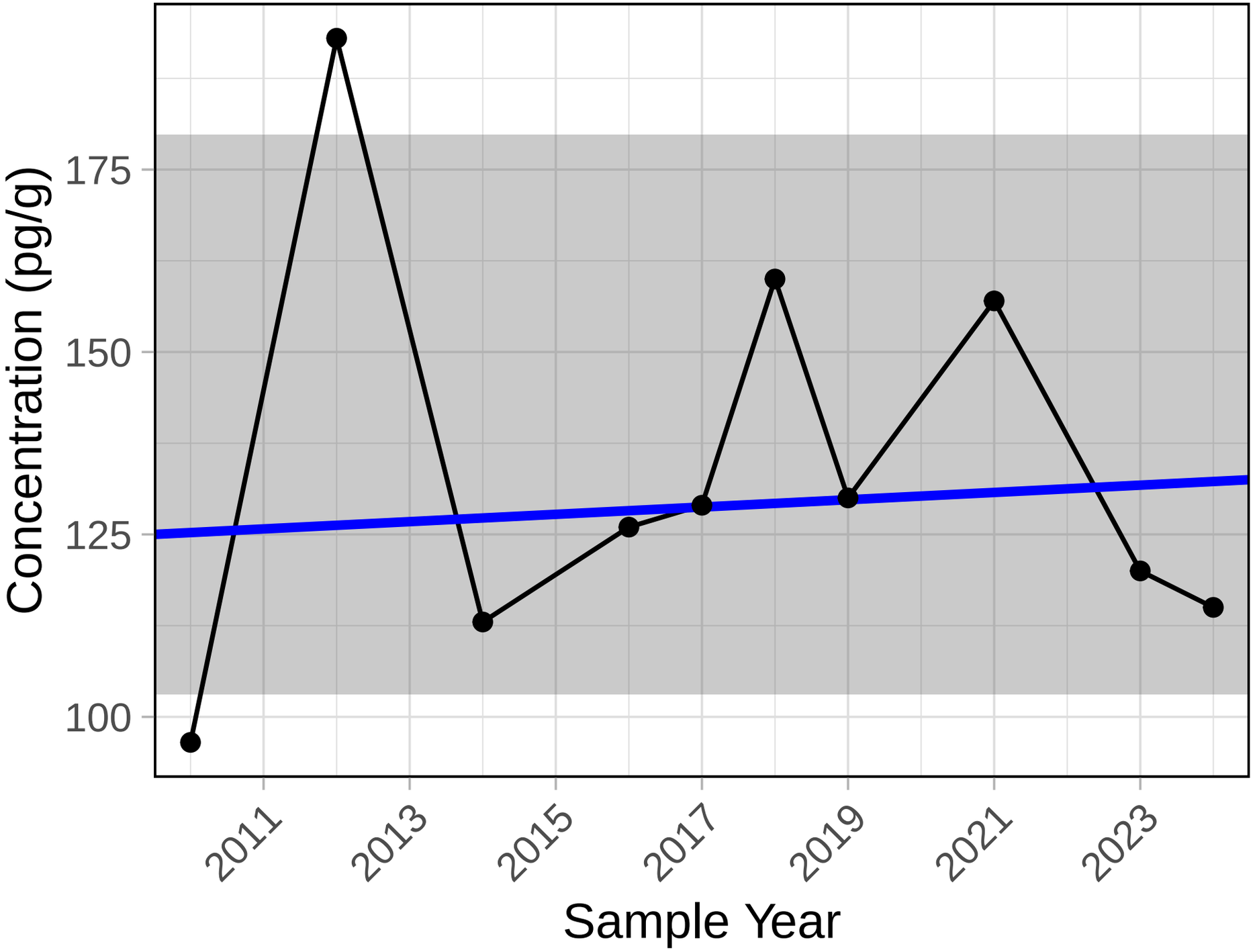
Chrystina Sediment



Trend significance p−value = 0.902

PCB 177

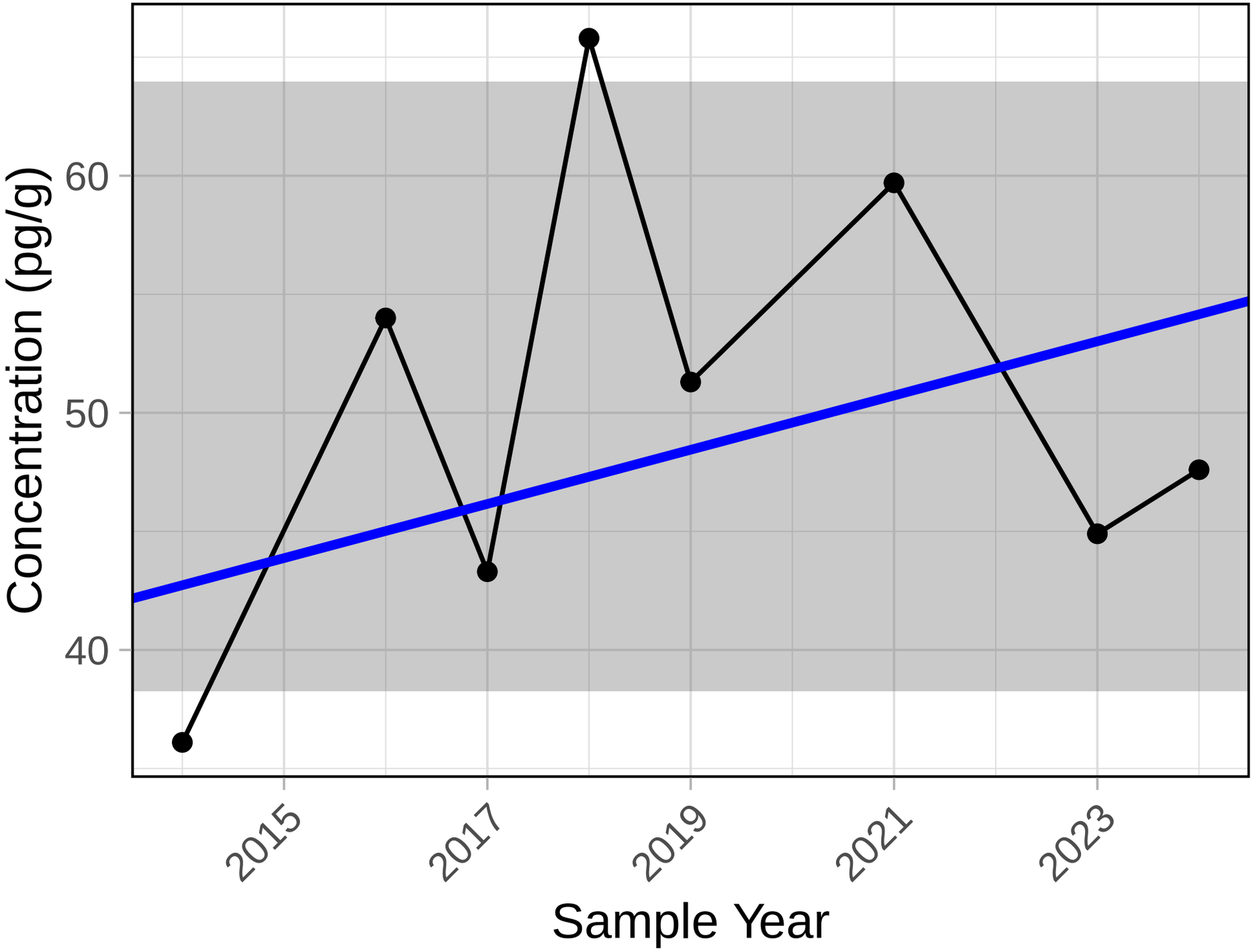
Chrystina Sediment



Trend significance p−value = 0.858

PCB 178

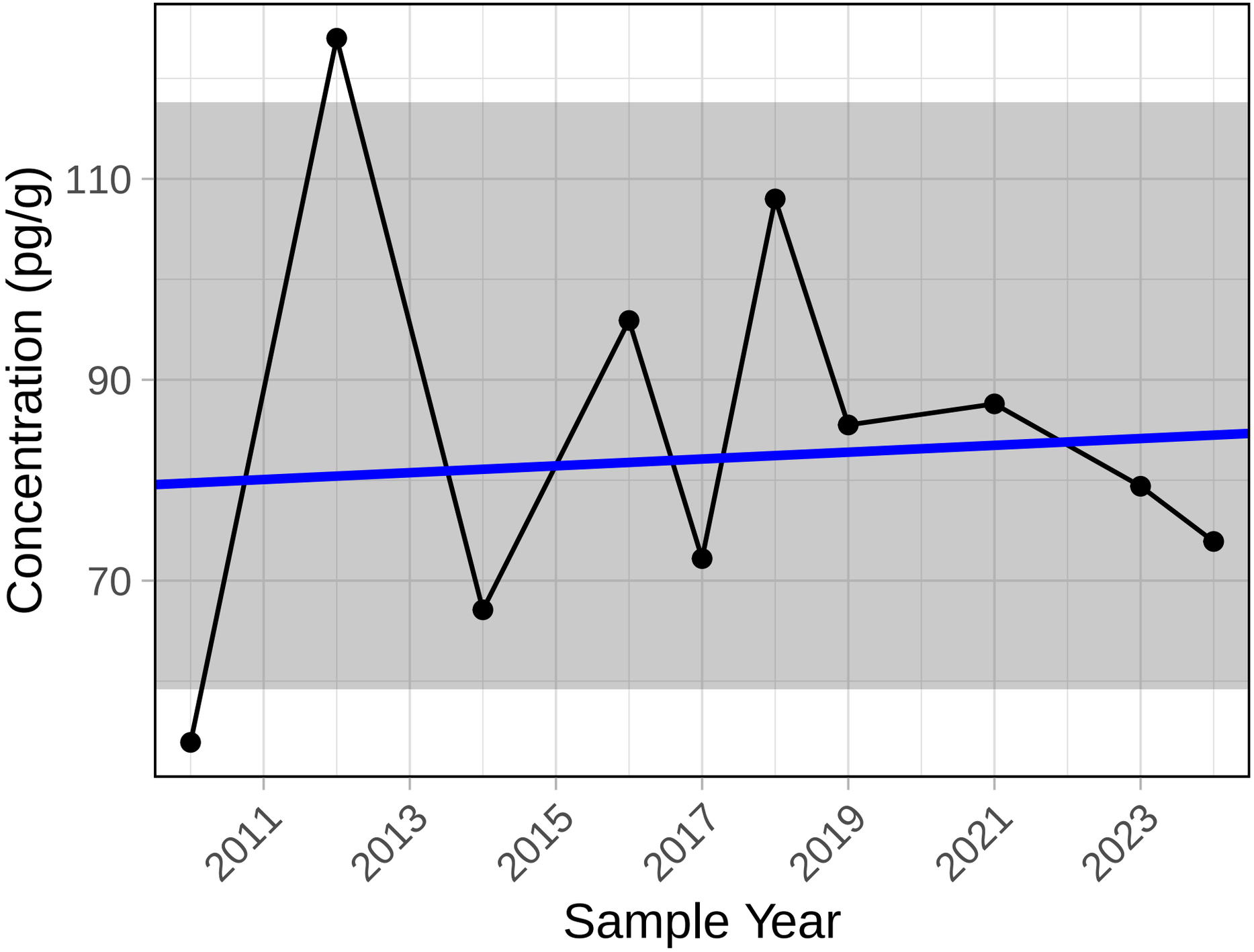
Chrystina Sediment



Trend significance p−value = 0.711

PCB 179

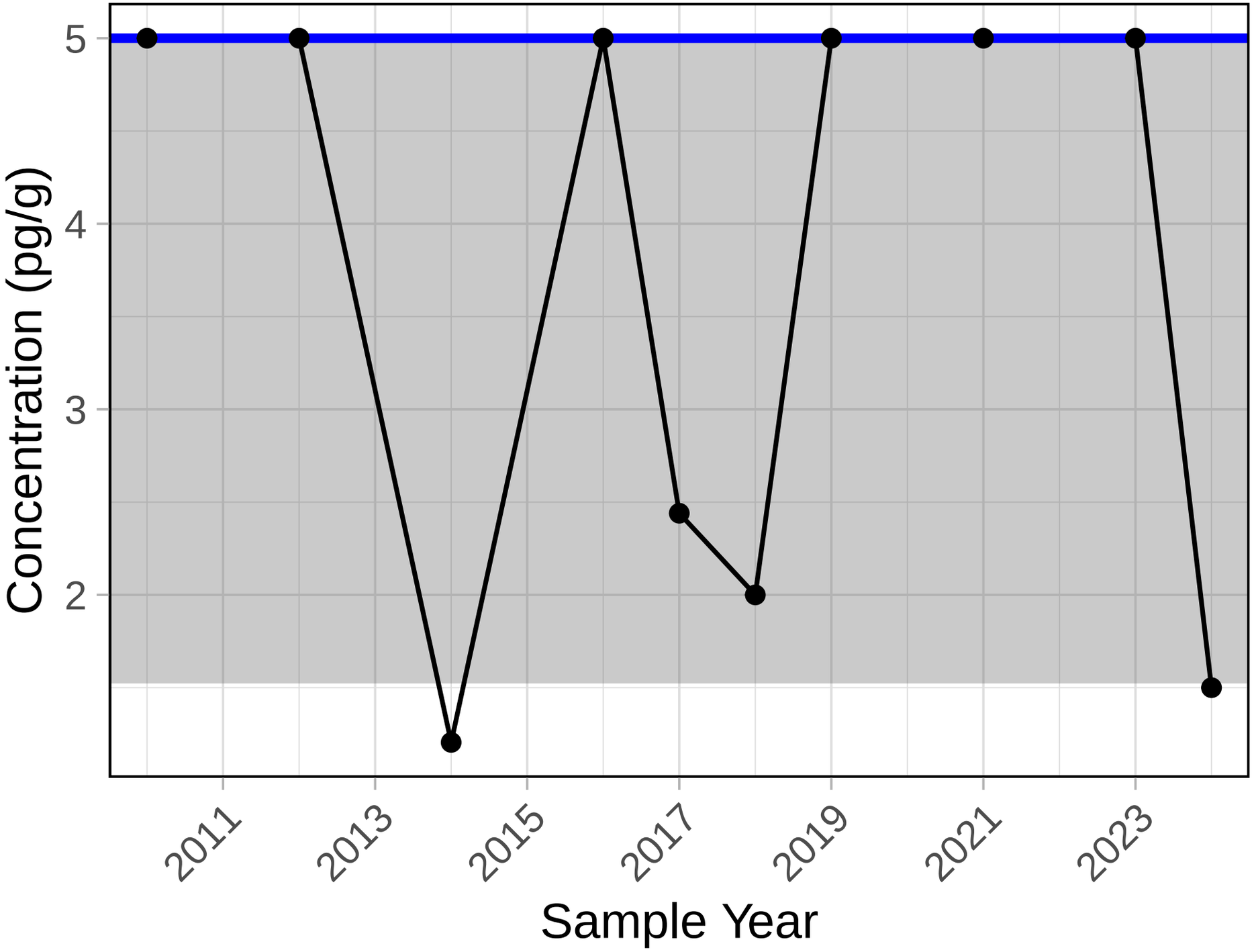
Chrystina Sediment



Trend significance p−value = 1

PCB 181

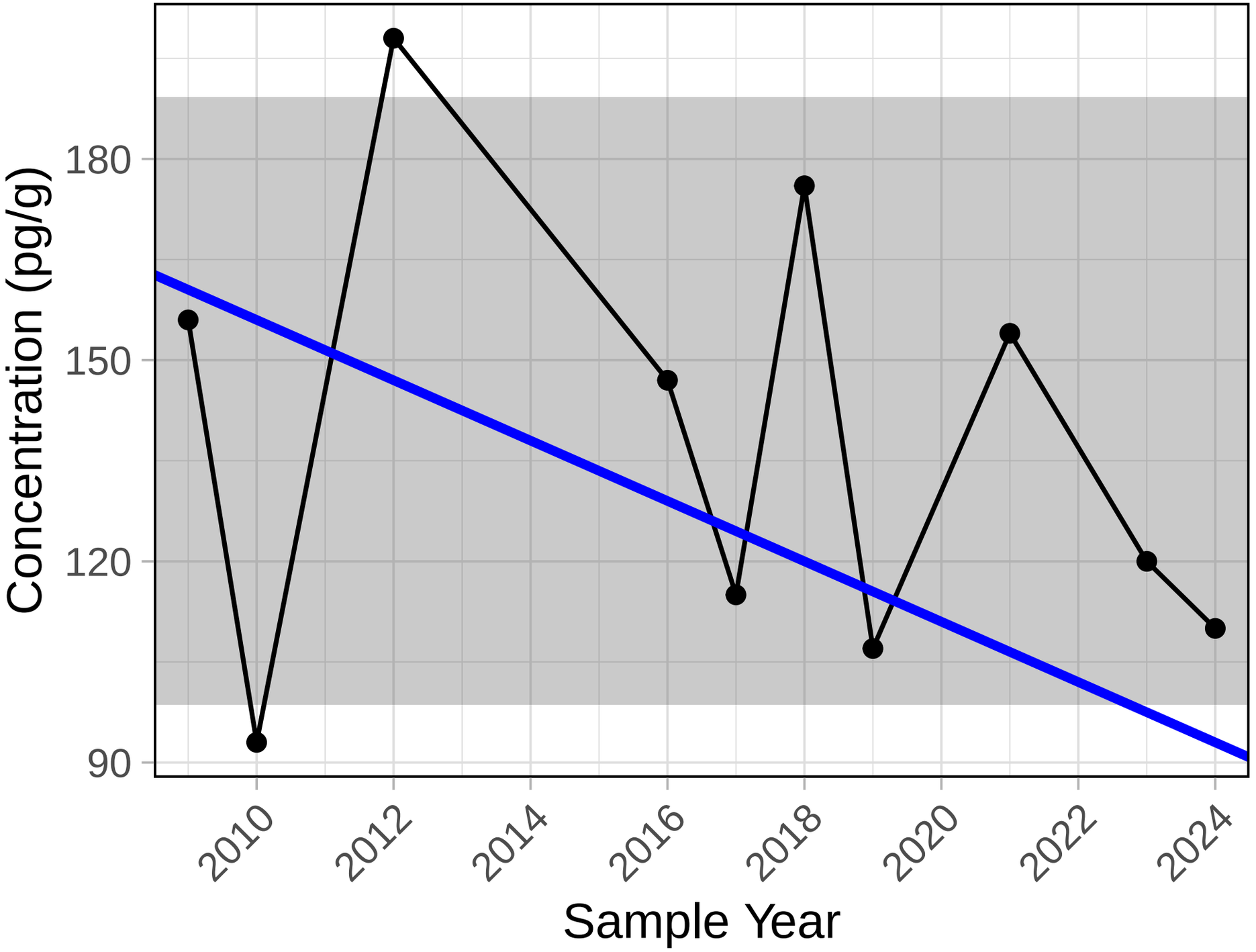
Chrystina Sediment



Trend significance p−value = 0.76

PCB 183

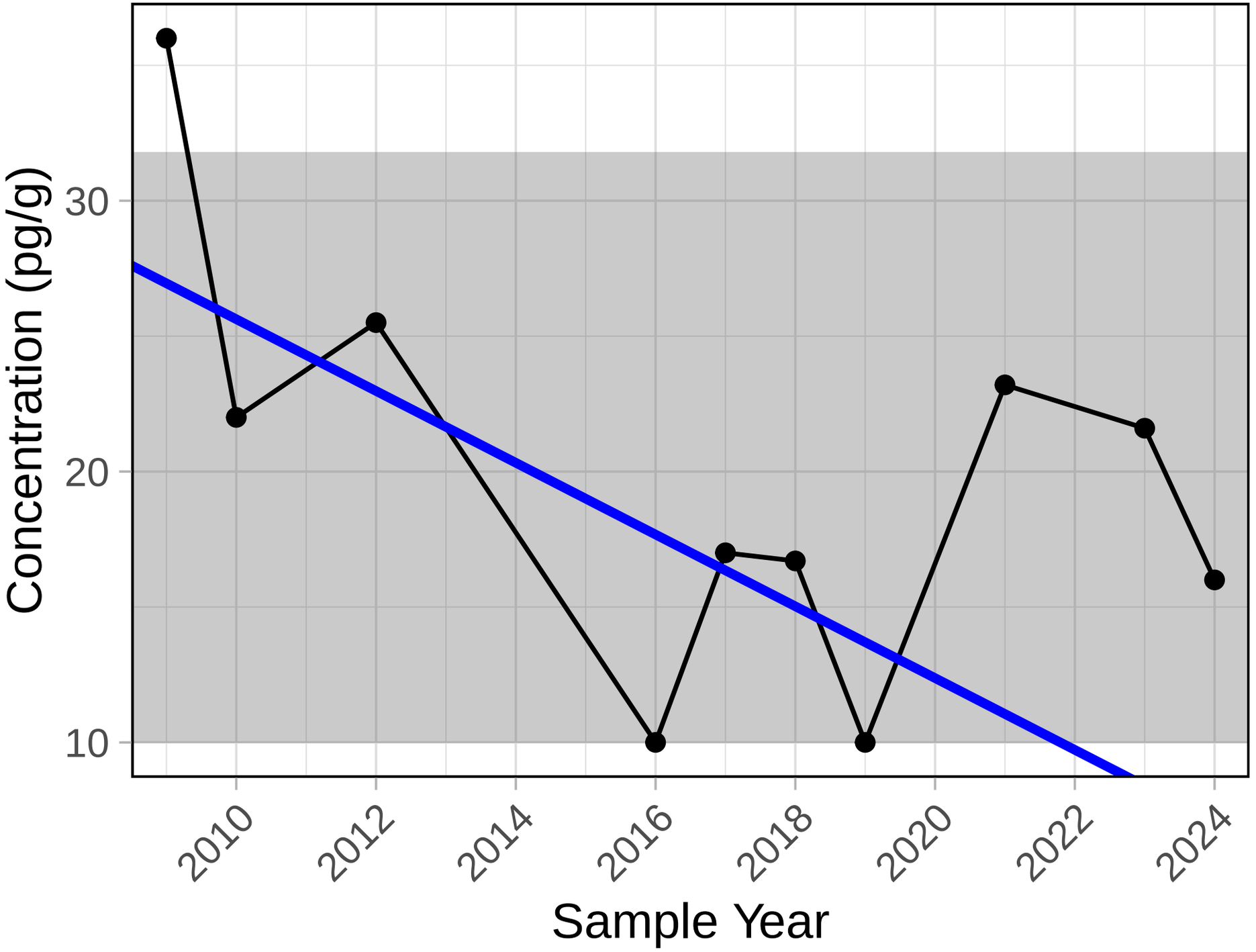
Chrystina Sediment



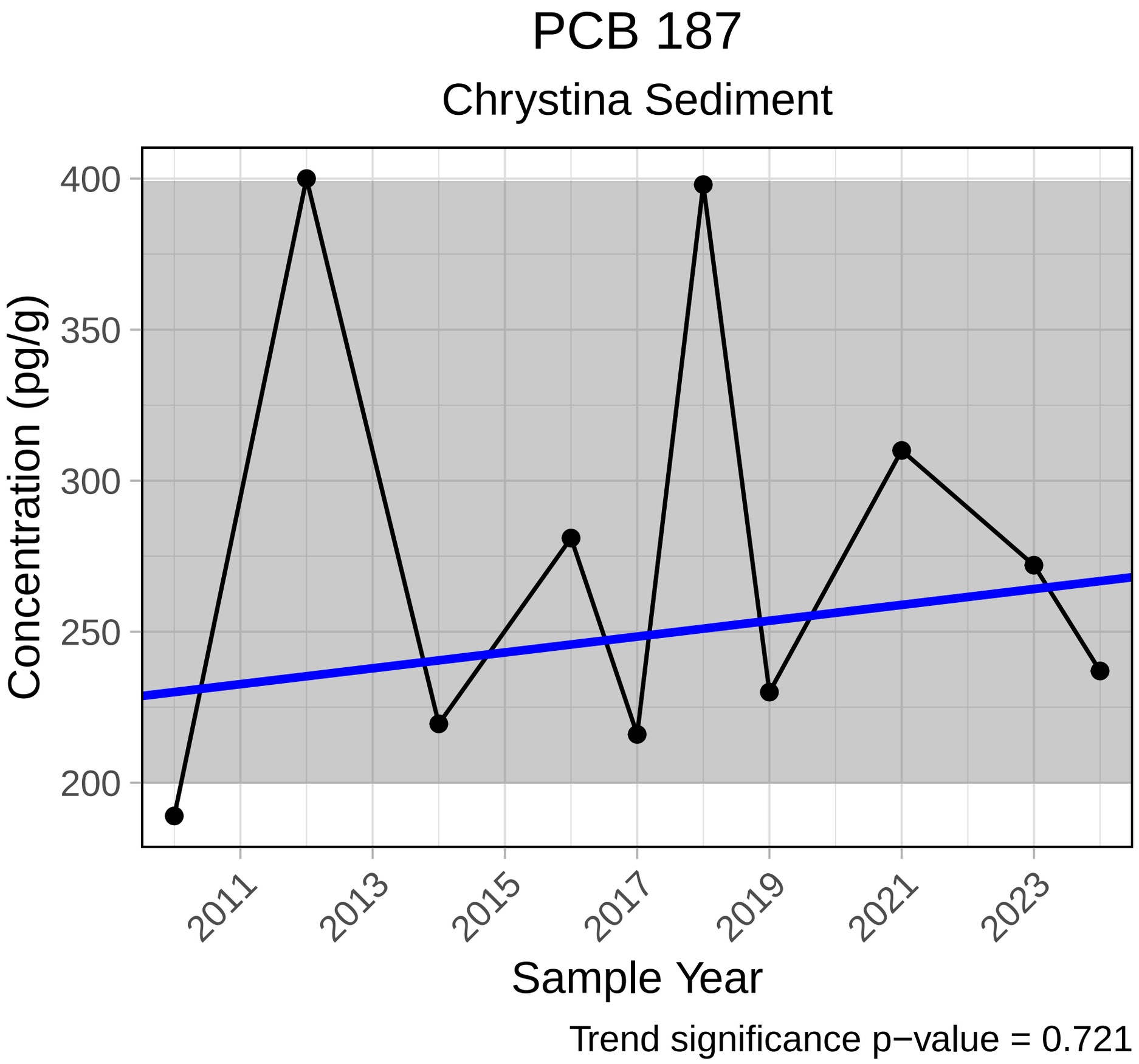
Trend significance p−value = 0.474

PCB 185

Chrystina Sediment

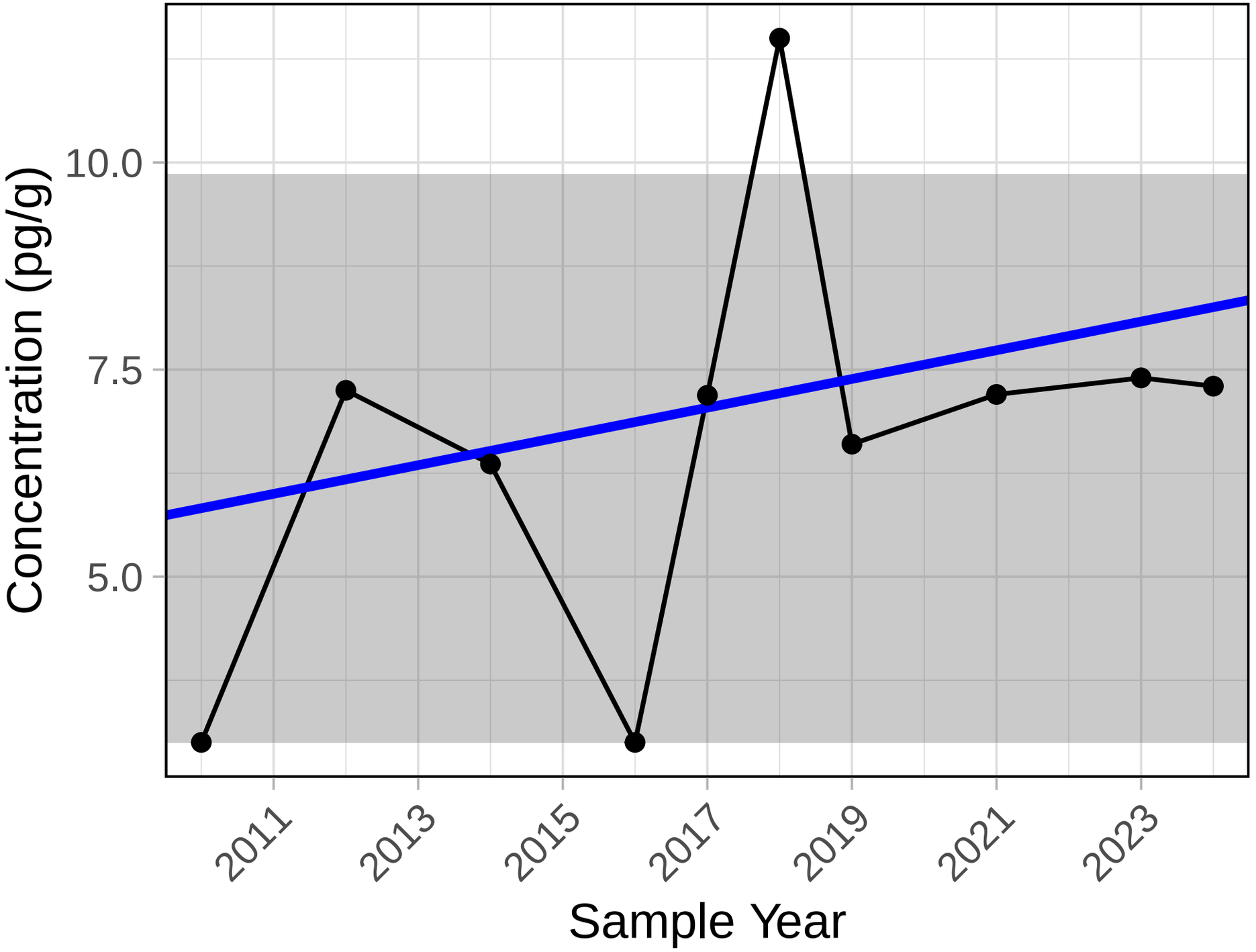


Trend significance p−value = 0.178


PCB 187
Chrystina Sediment
Concentration (pg/g)
400
350
300
250
200
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.721

PCB 189

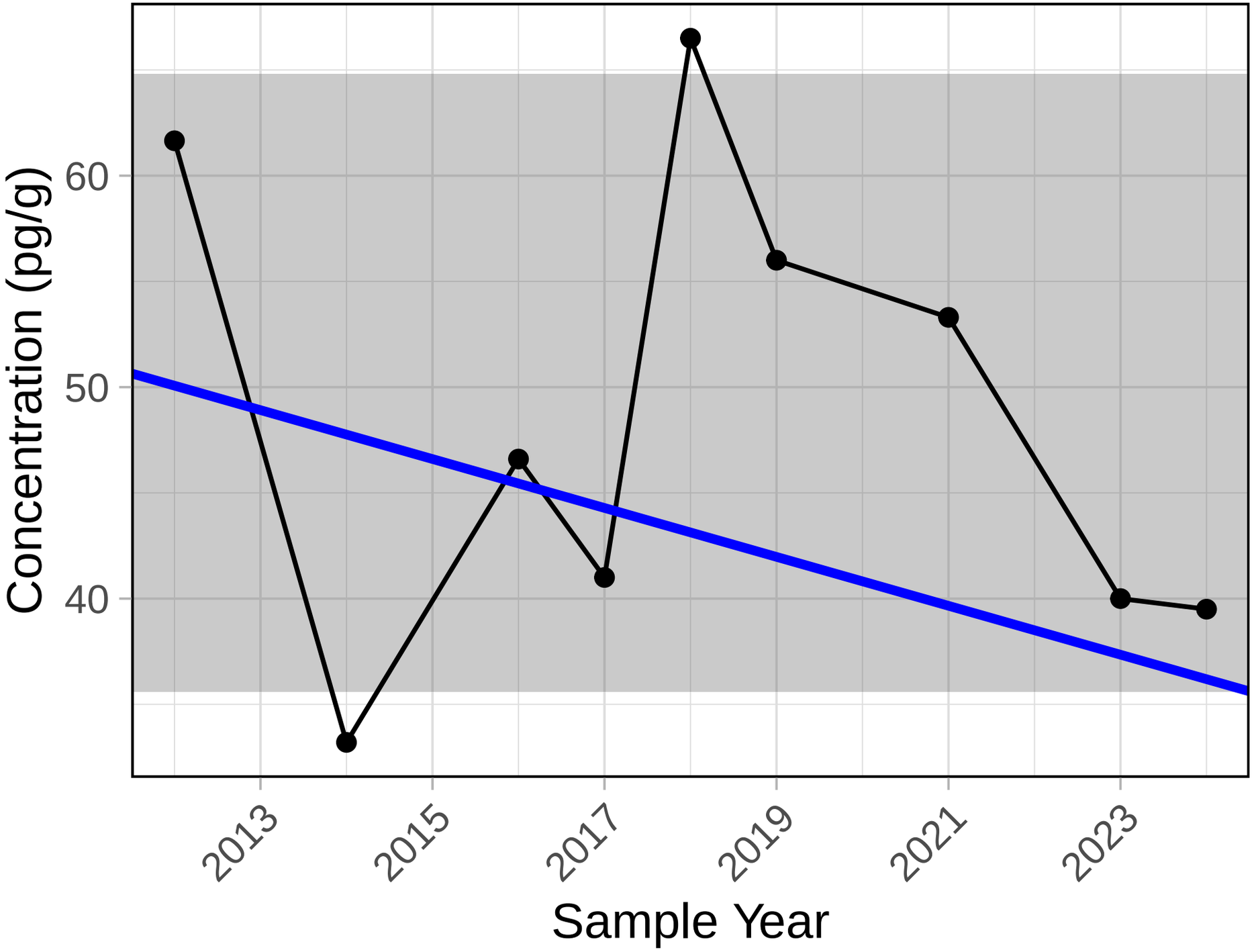
Chrystina Sediment



Trend significance p−value = 0.088

PCB 190

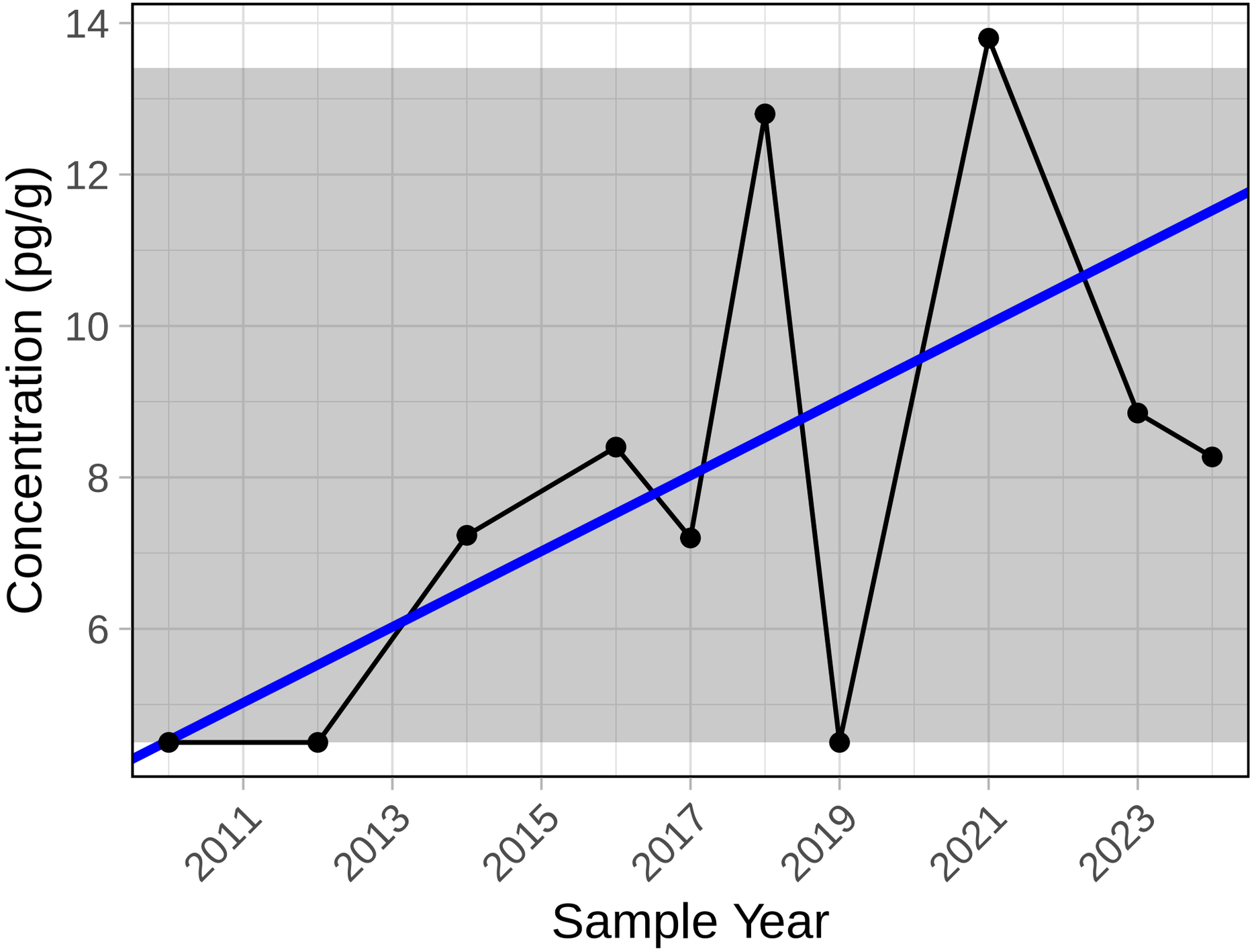
Chrystina Sediment



Trend significance p−value = 0.466

PCB 191

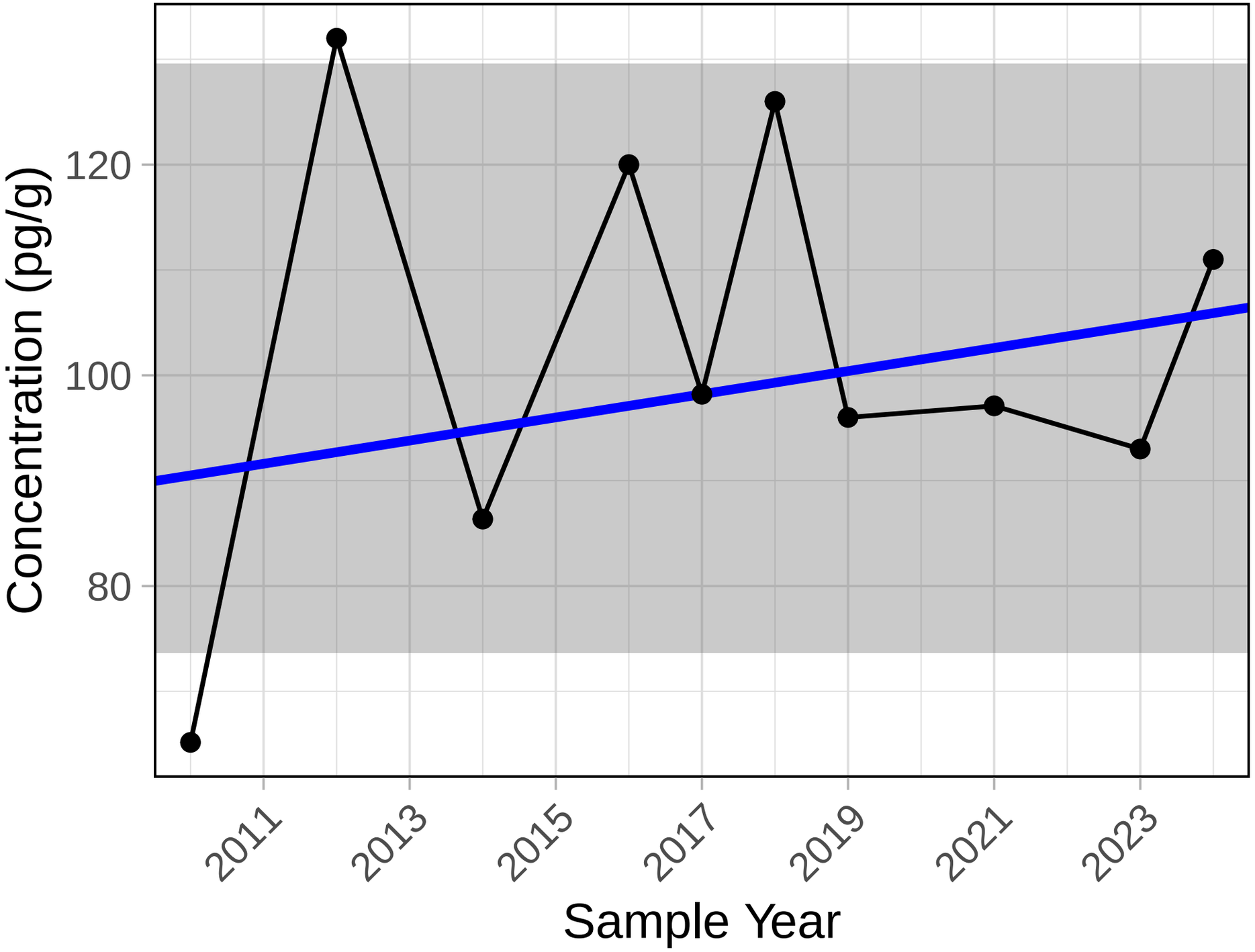
Chrystina Sediment



Trend significance p−value = 0.123

PCB 194

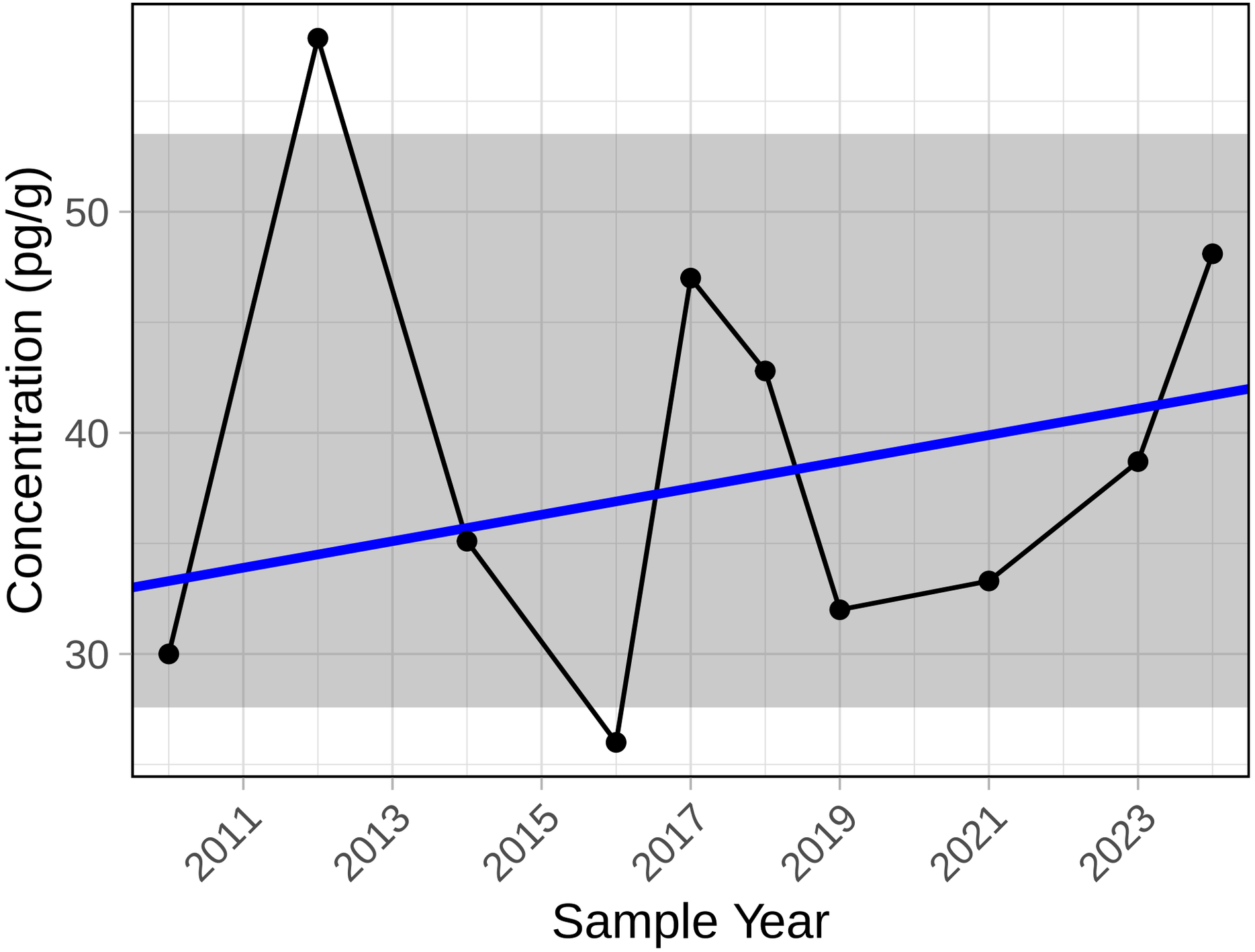
Chrystina Sediment



Trend significance p−value = 1

PCB 195

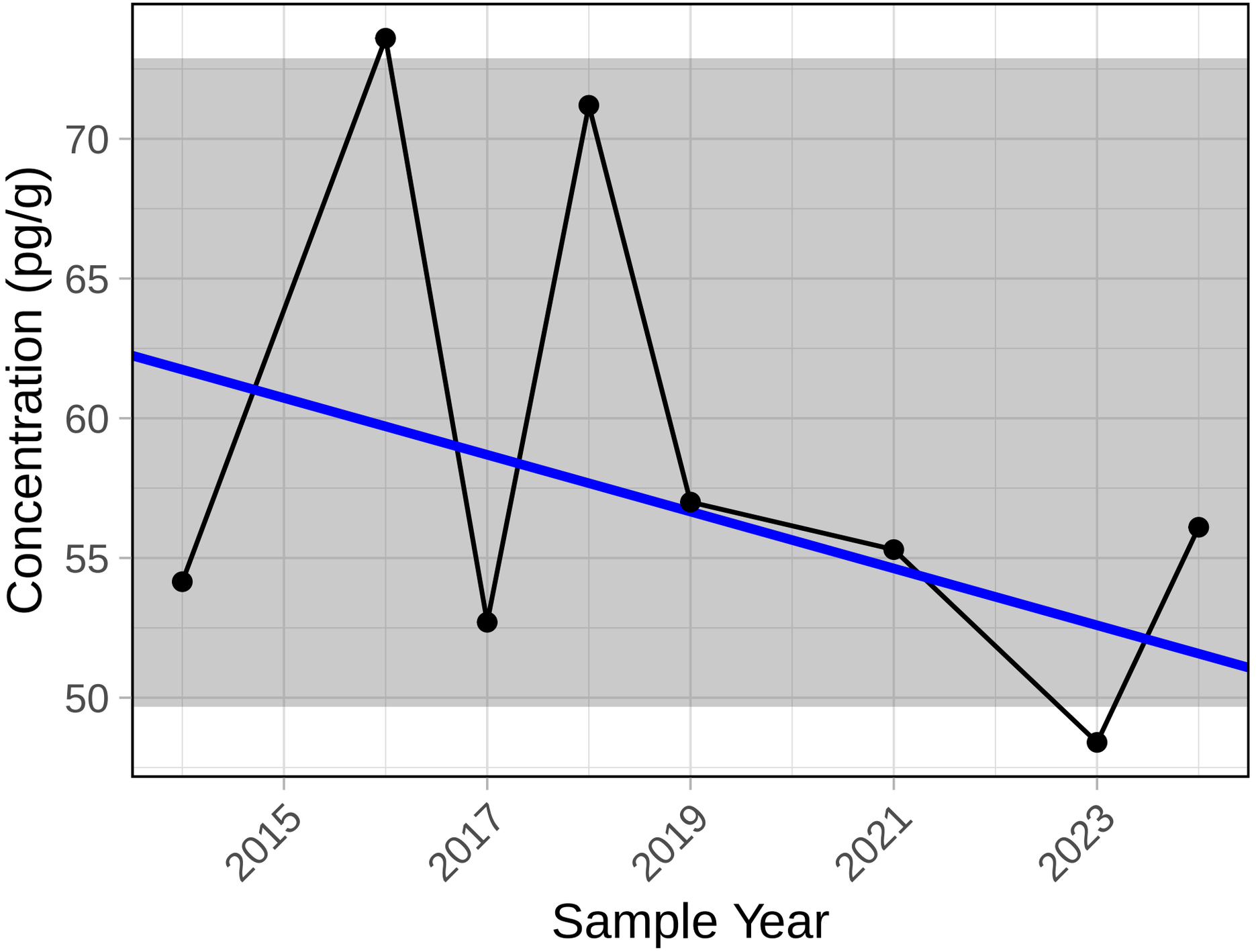
Chrystina Sediment



Trend significance p−value = 0.592

PCB 196

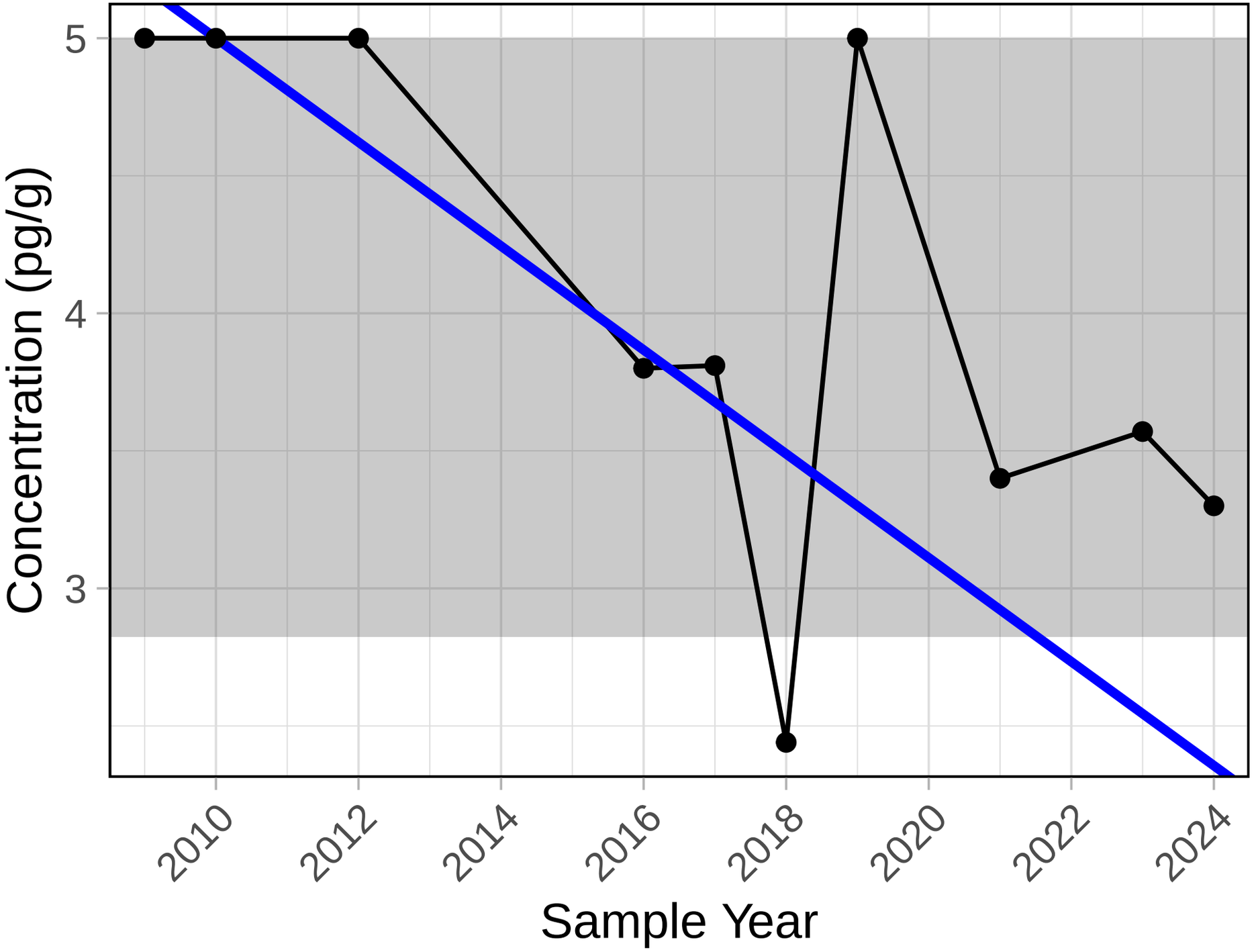
Chrystina Sediment



Trend significance p−value = 0.536

PCB 197

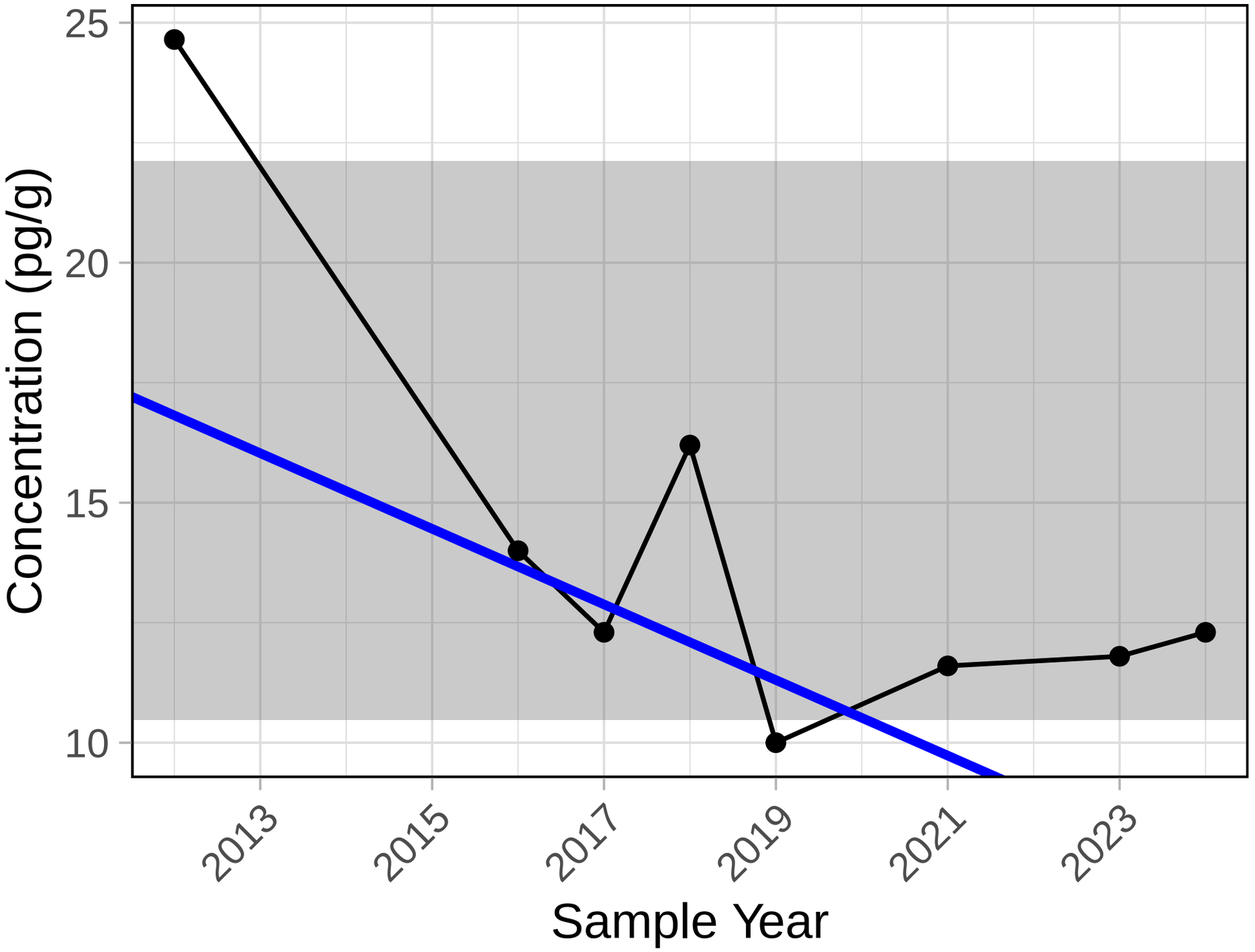
Chrystina Sediment



Trend significance p−value = 0.041

PCB 200

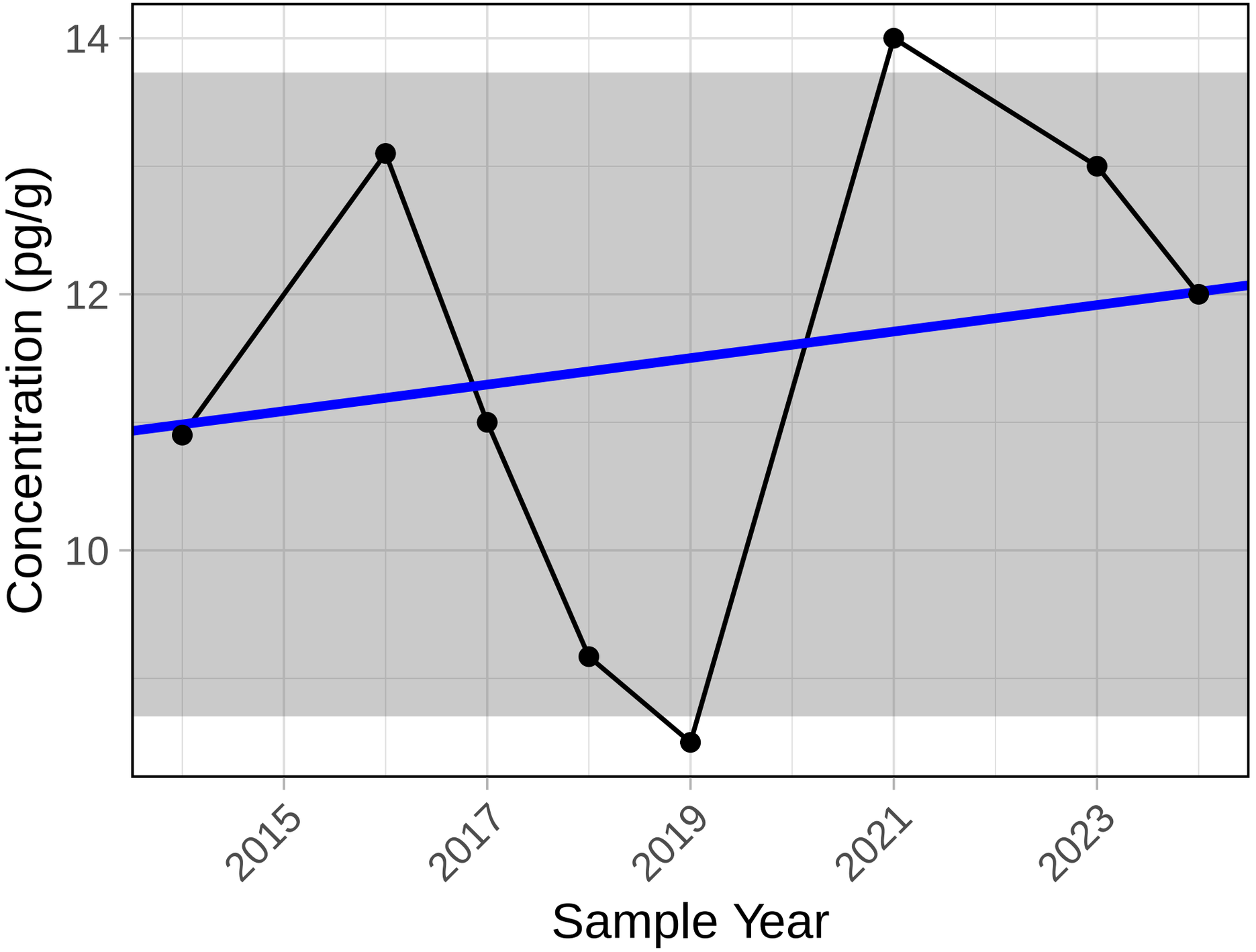
Chrystina Sediment



Trend significance p−value = 0.212

PCB 201

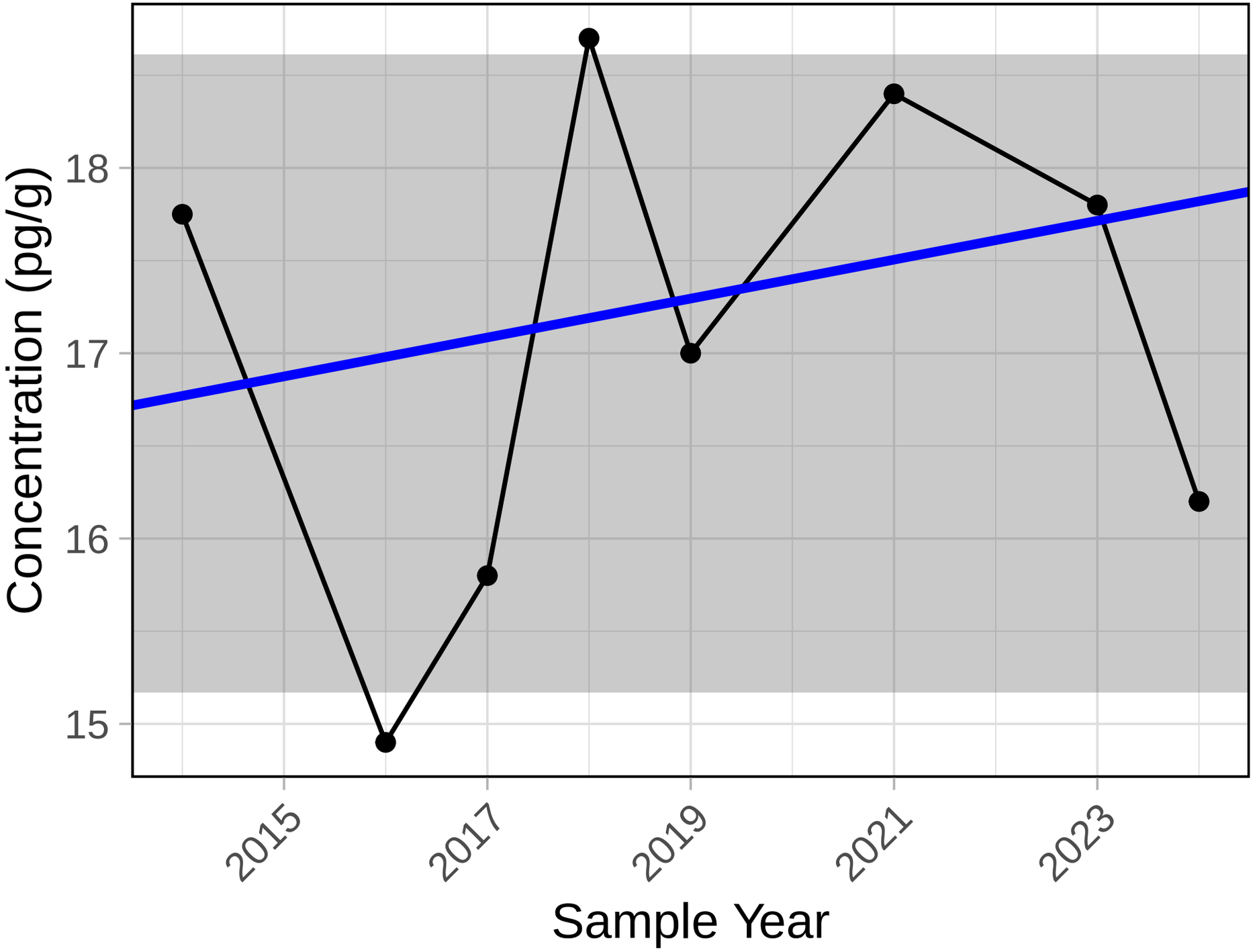
Chrystina Sediment



Trend significance p−value = 0.902

PCB 202

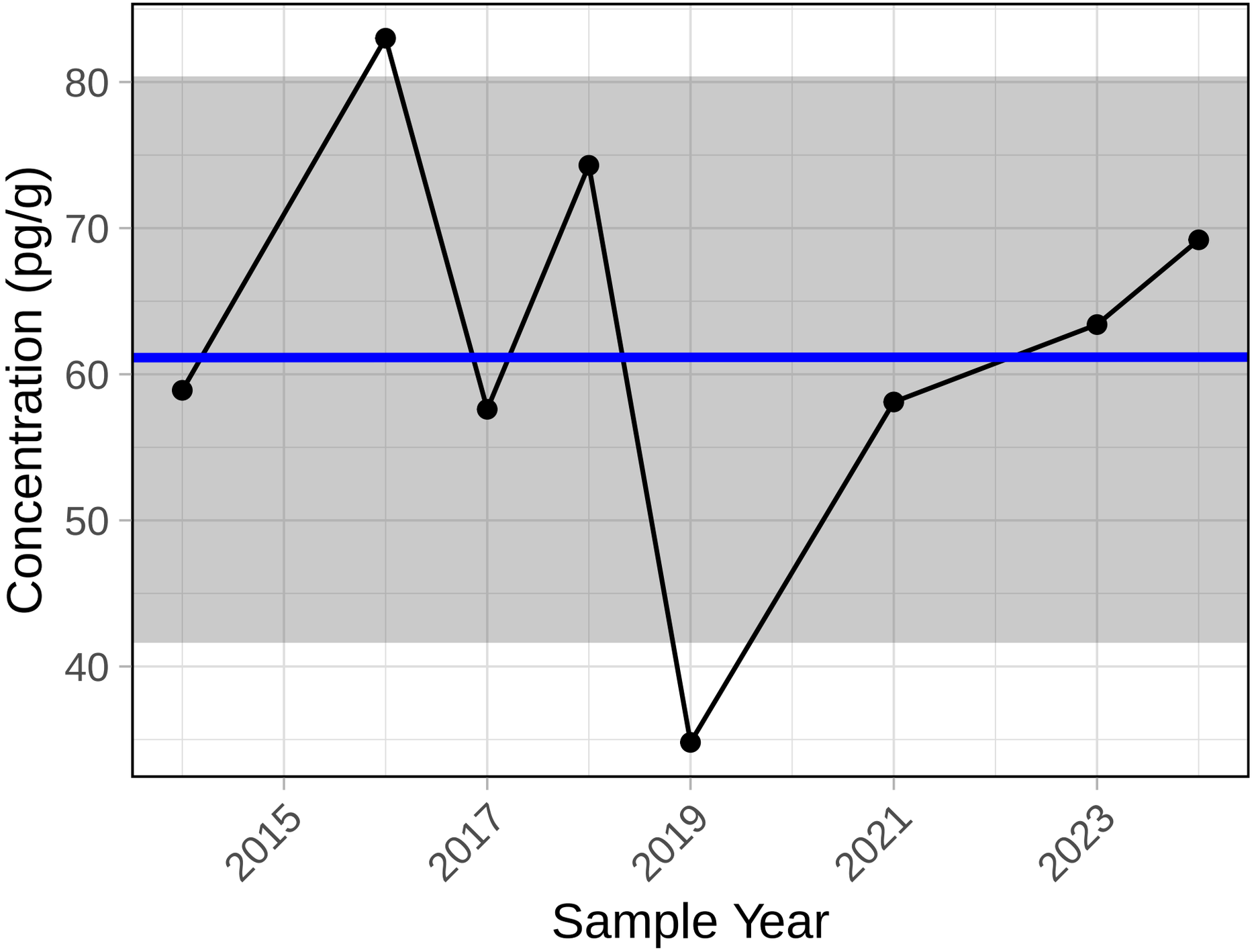
Chrystina Sediment



Trend significance p−value = 0.711

PCB 203

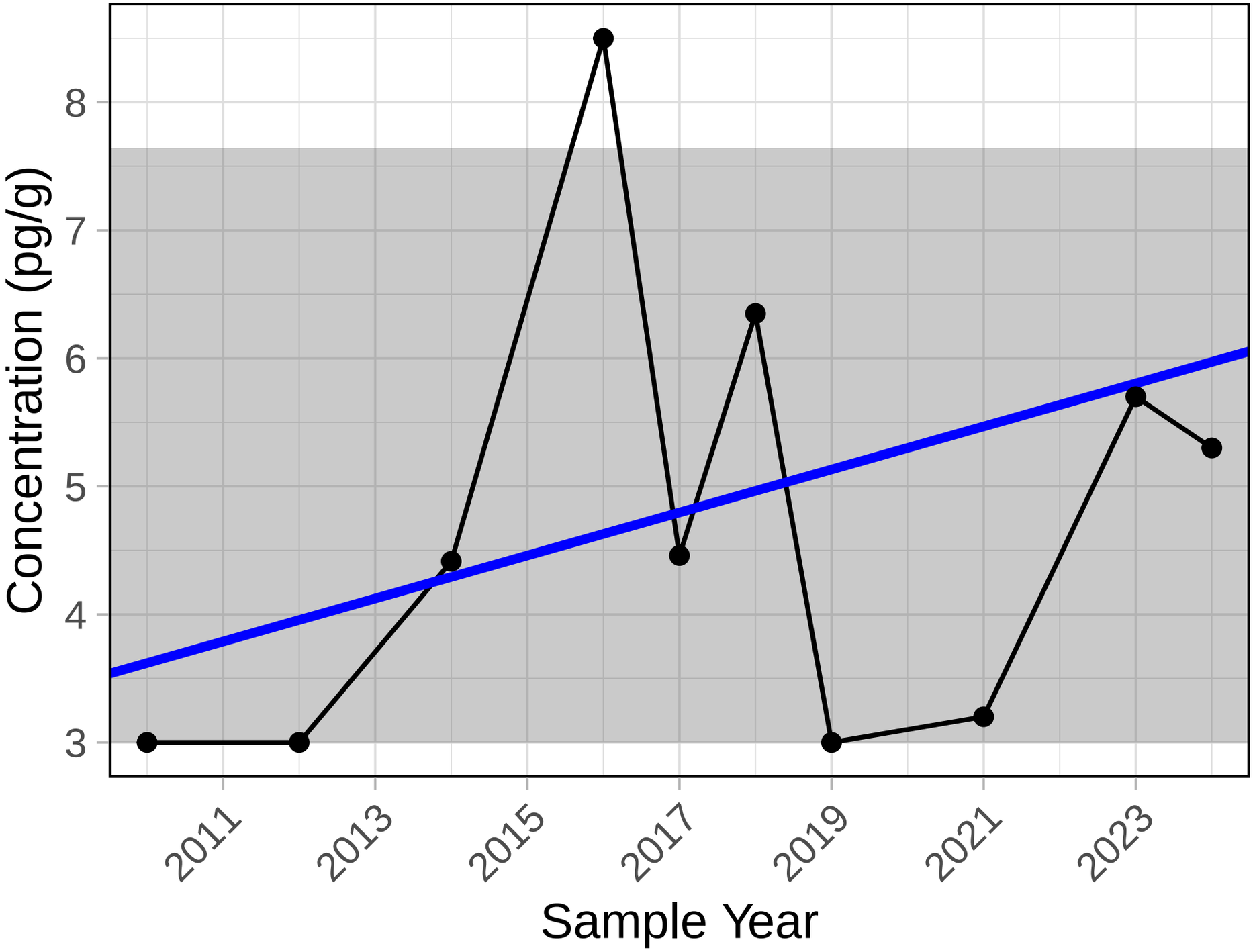
Chrystina Sediment



Trend significance p−value = 1

PCB 205

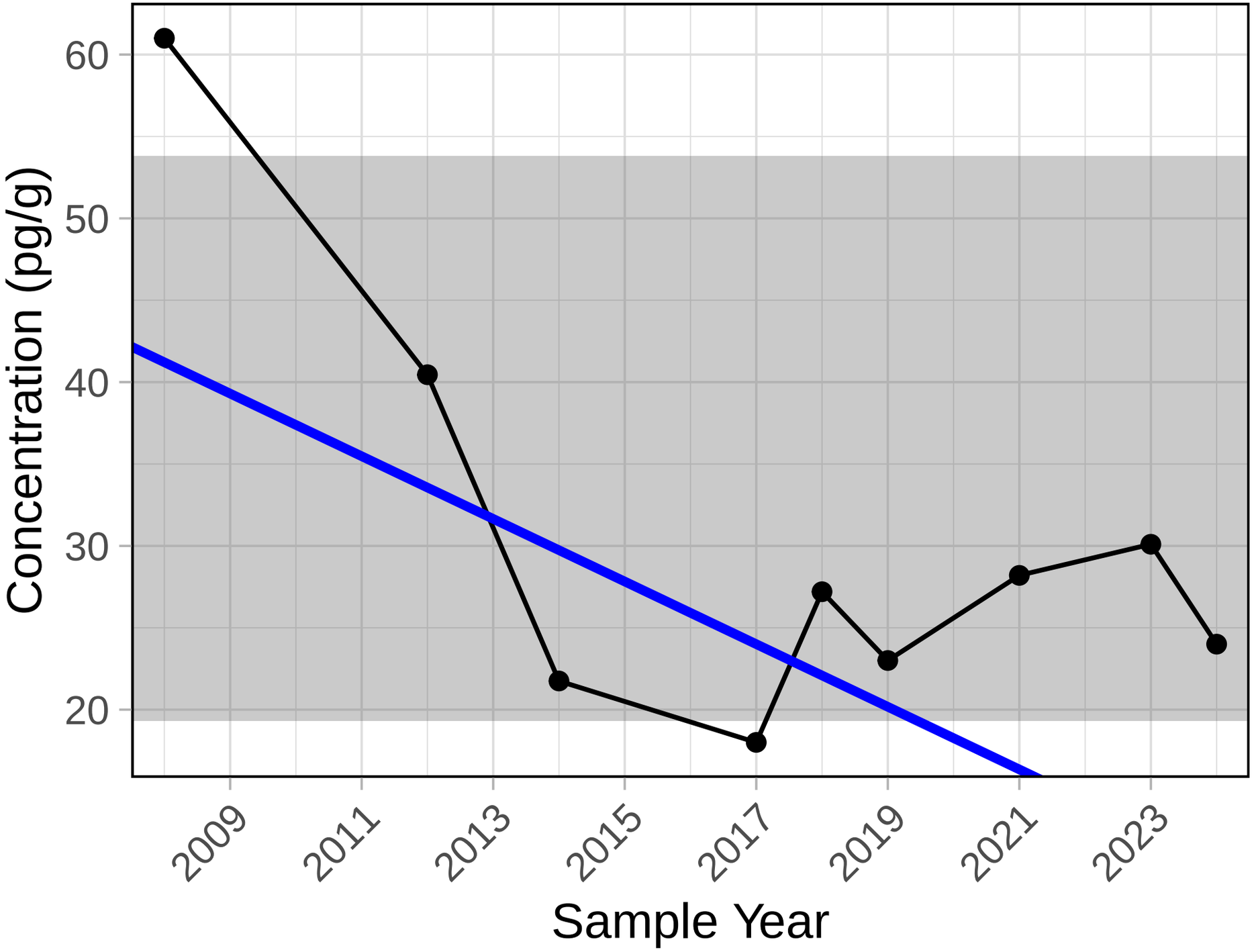
Chrystina Sediment



Trend significance p−value = 0.318

PCB 206

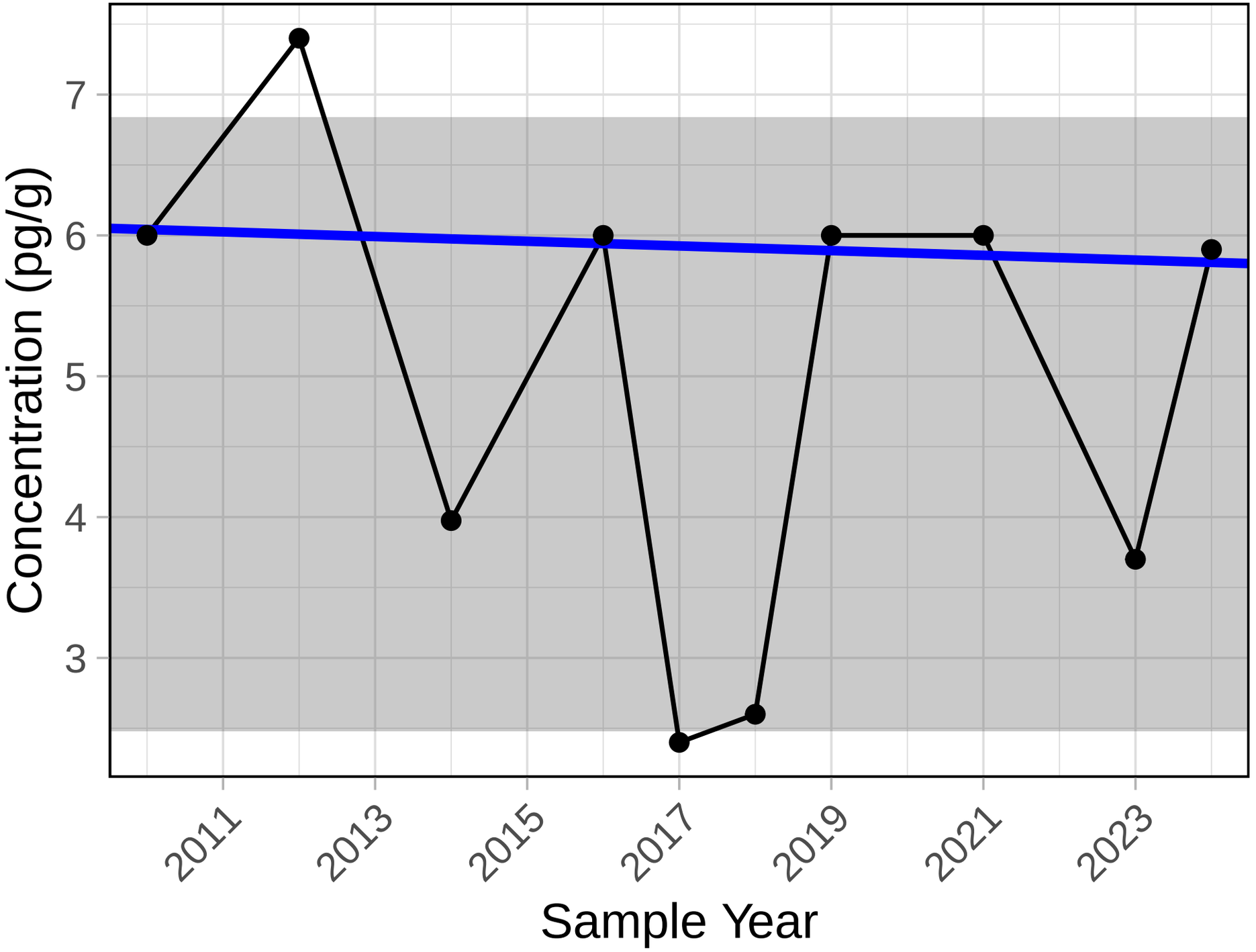
Chrystina Sediment



Trend significance p−value = 0.754

PCB 207

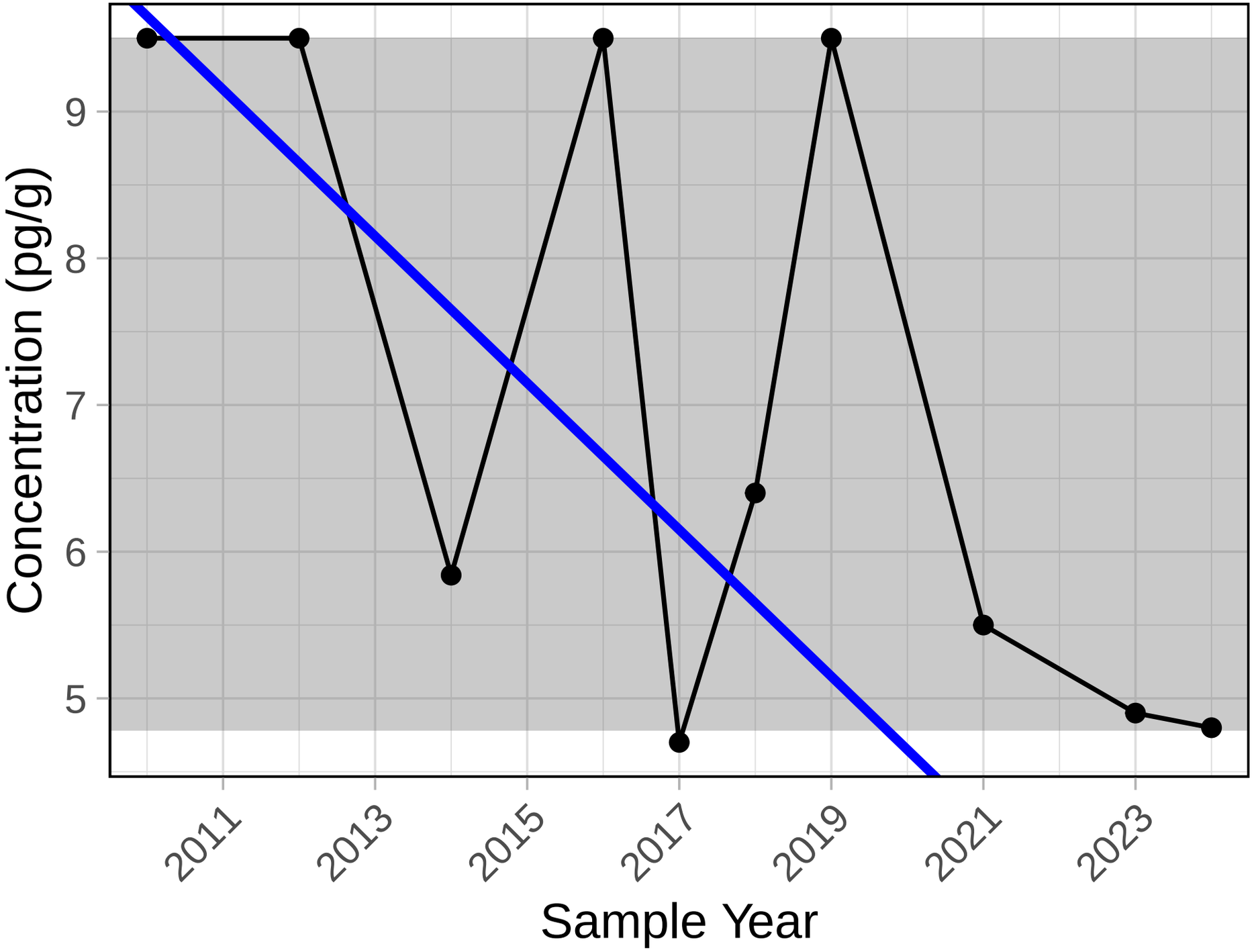
Chrystina Sediment



Trend significance p−value = 0.458

PCB 208

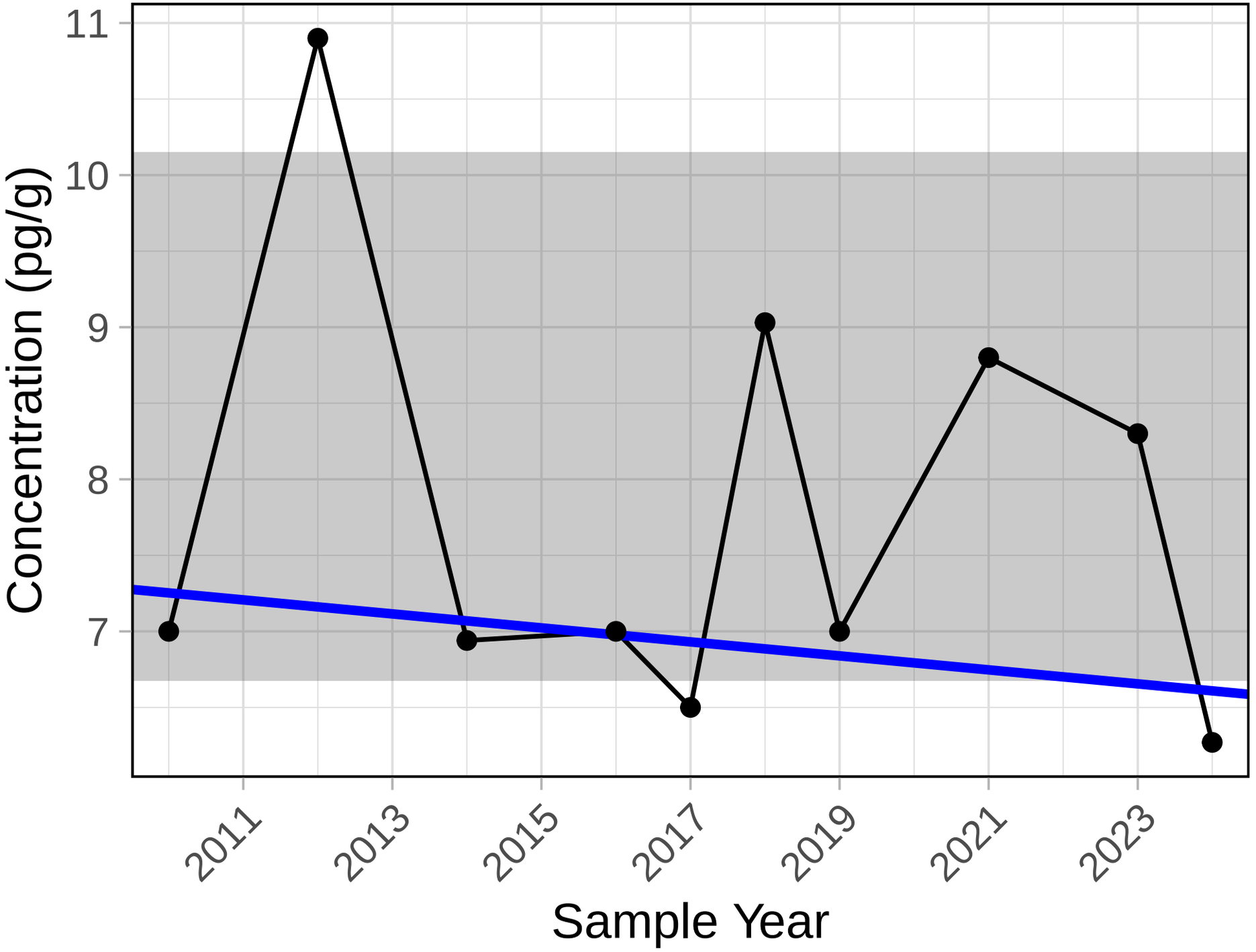
Chrystina Sediment



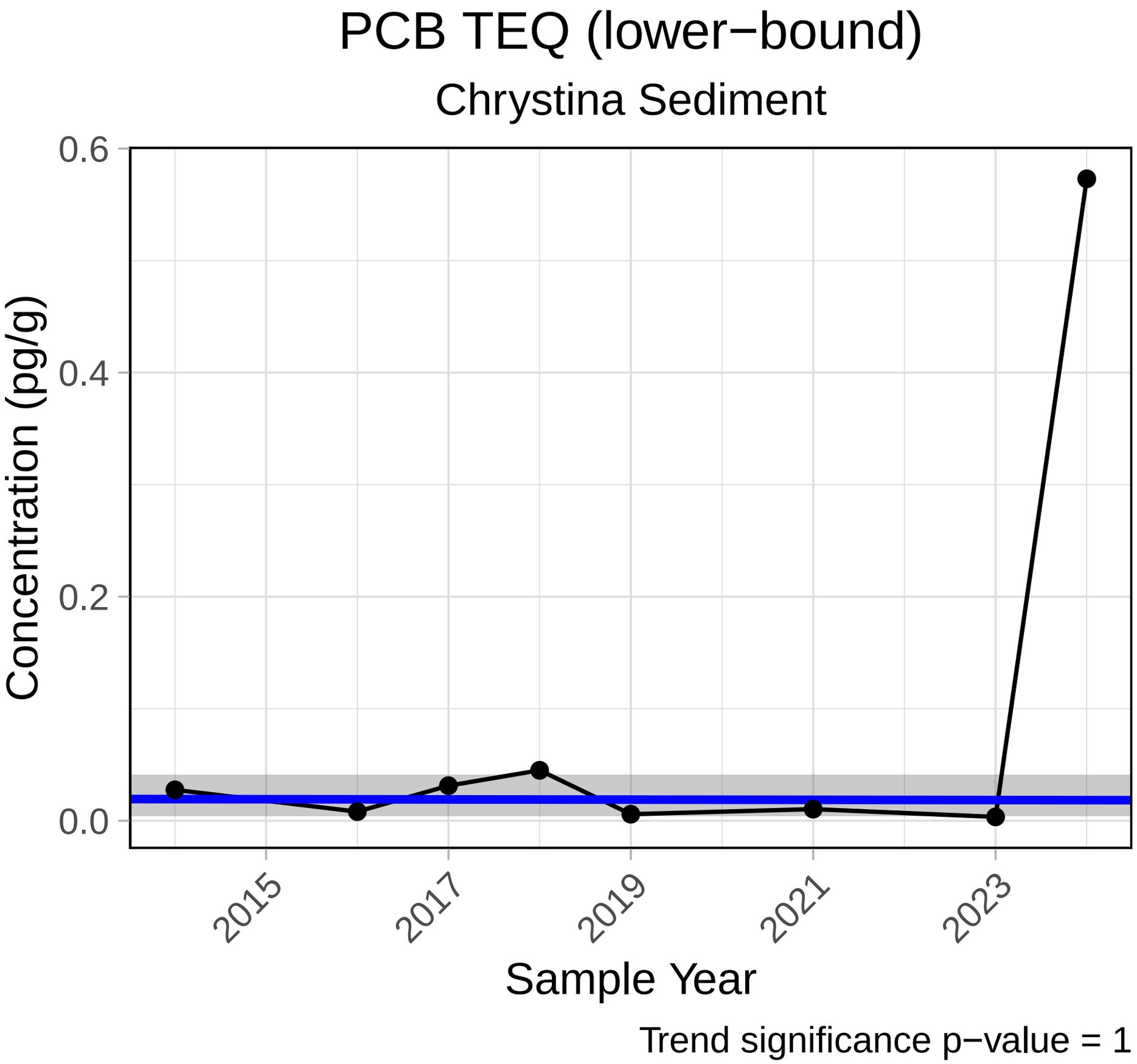
Trend significance p−value = 0.064

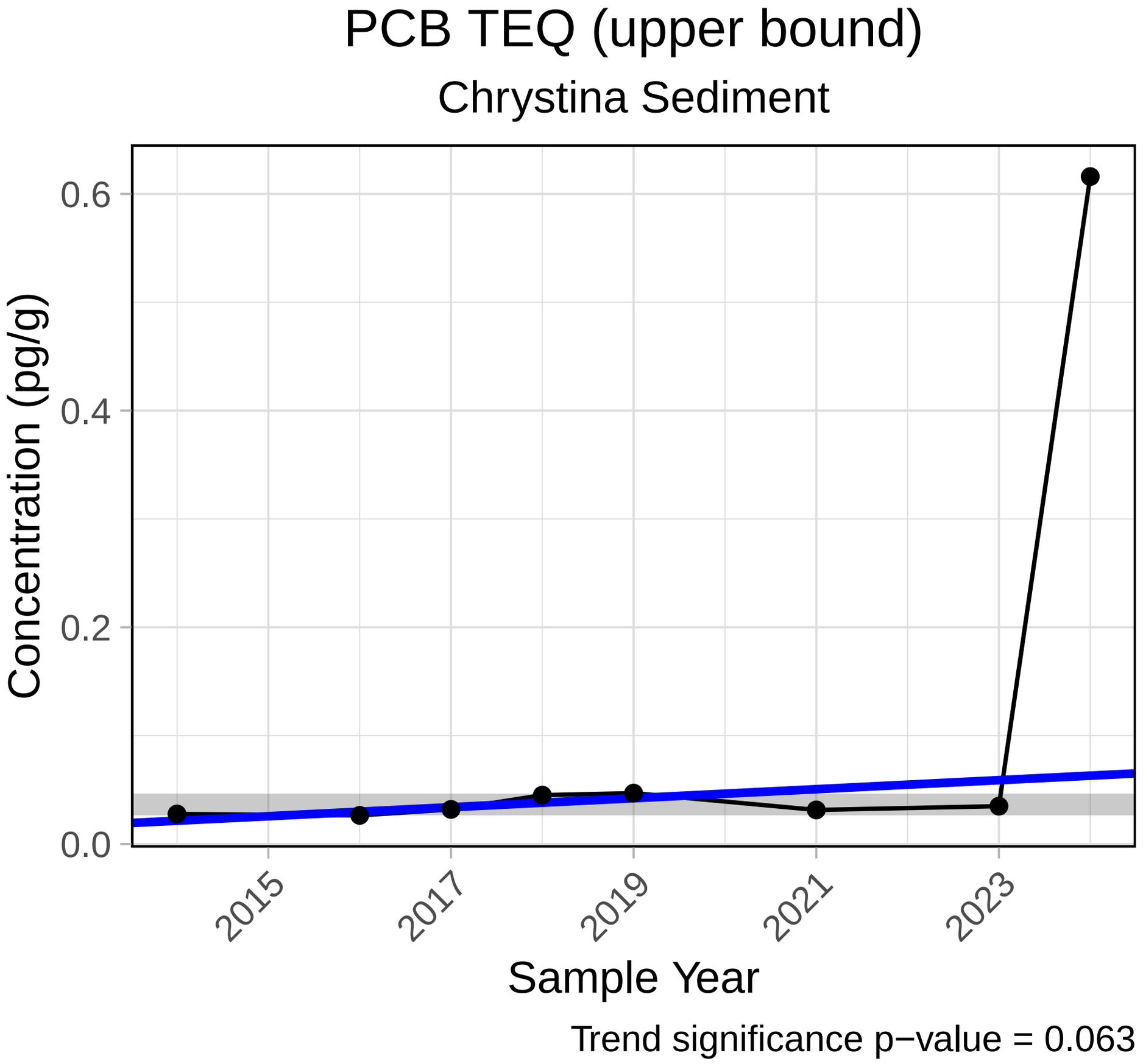
PCB 209

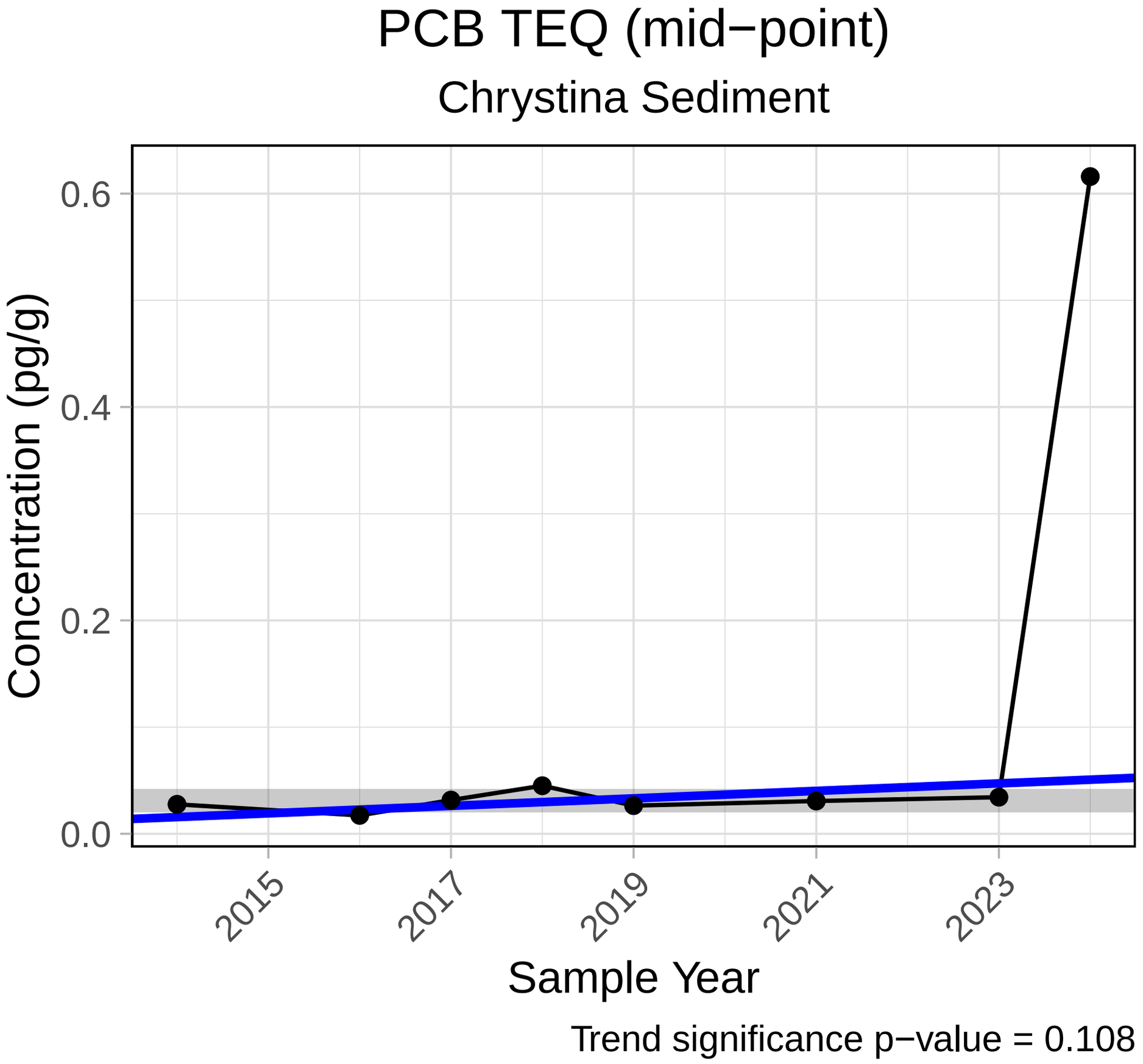
Chrystina Sediment



Trend significance p−value = 0.65

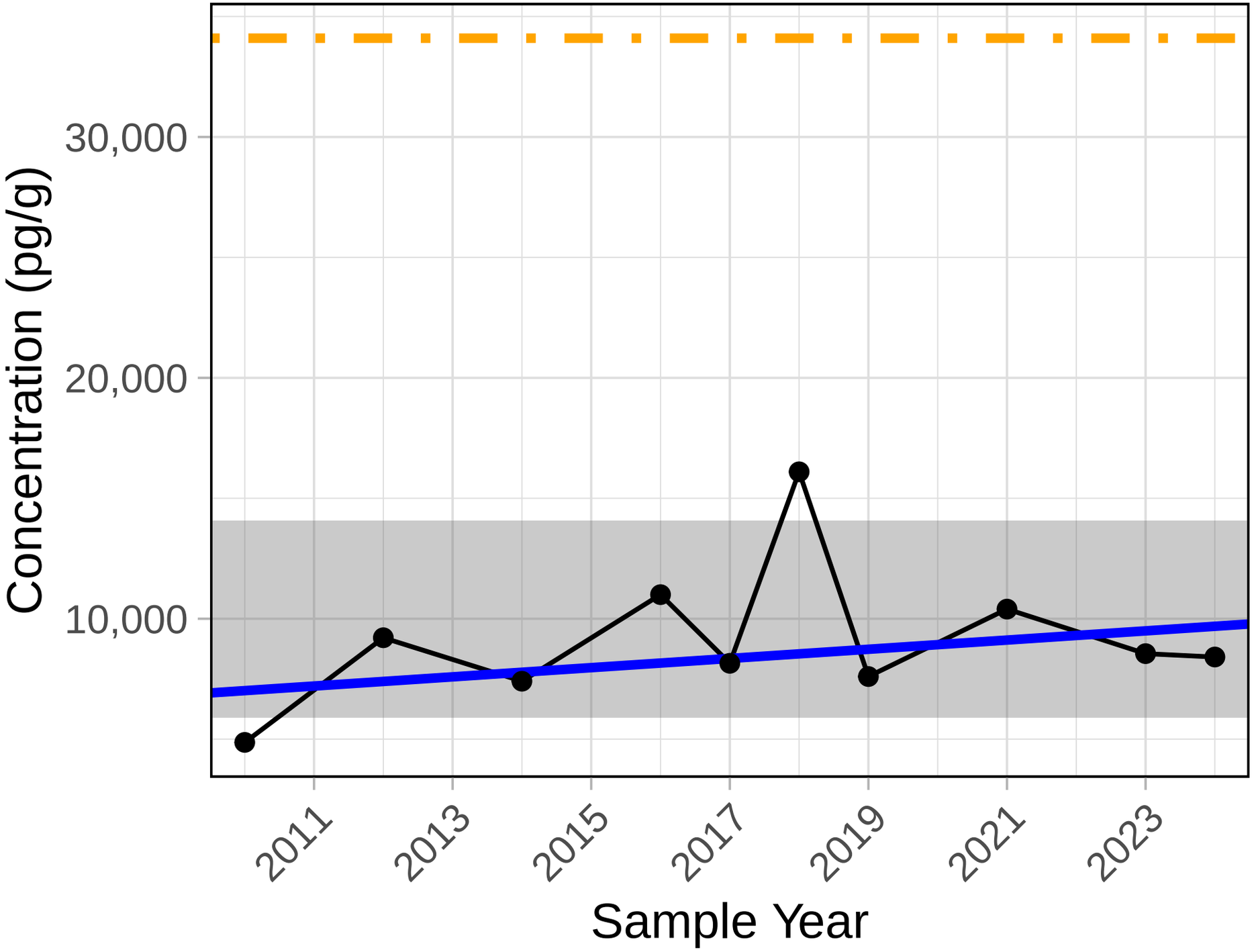

PCB TEQ (lower−bound)
Chrystina Sediment
Concentration (pg/g)
0.6
0.4
0.2
0.0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1


PCB TEQ (upper bound)
Chrystina Sediment
Concentration (pg/g)
0.0
0.2
0.4
0.6
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.063


PCB TEQ (mid−point)
Chrystina Sediment
Concentration (pg/g)
0.6
0.4
0.2
0.0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.108

PCB Total

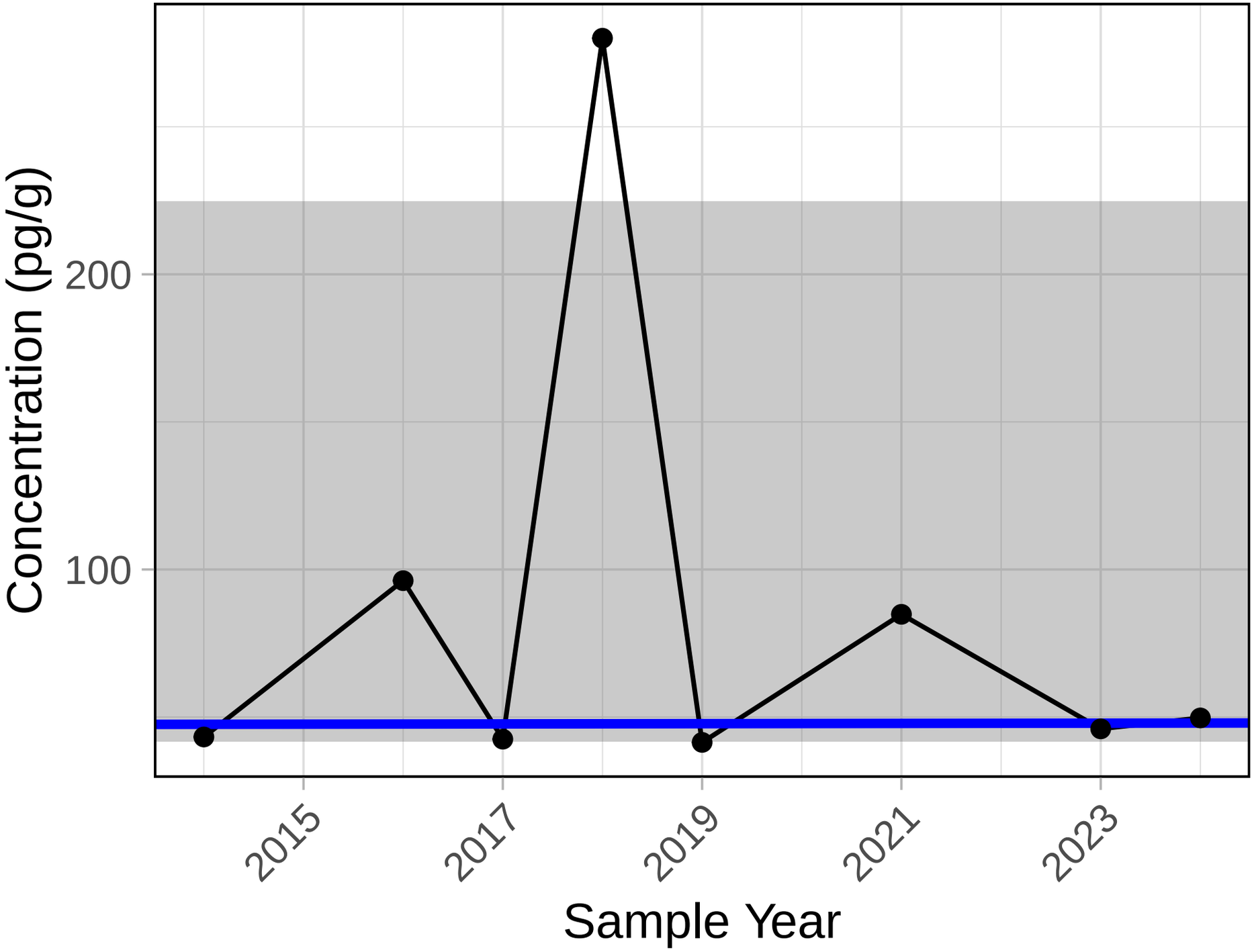
Chrystina Sediment



Trend significance p−value = 0.474
ISQG level = 34100 pg/g (maximum)
PEL level = 277000 pg/g (maximum)

PCBs 21+33

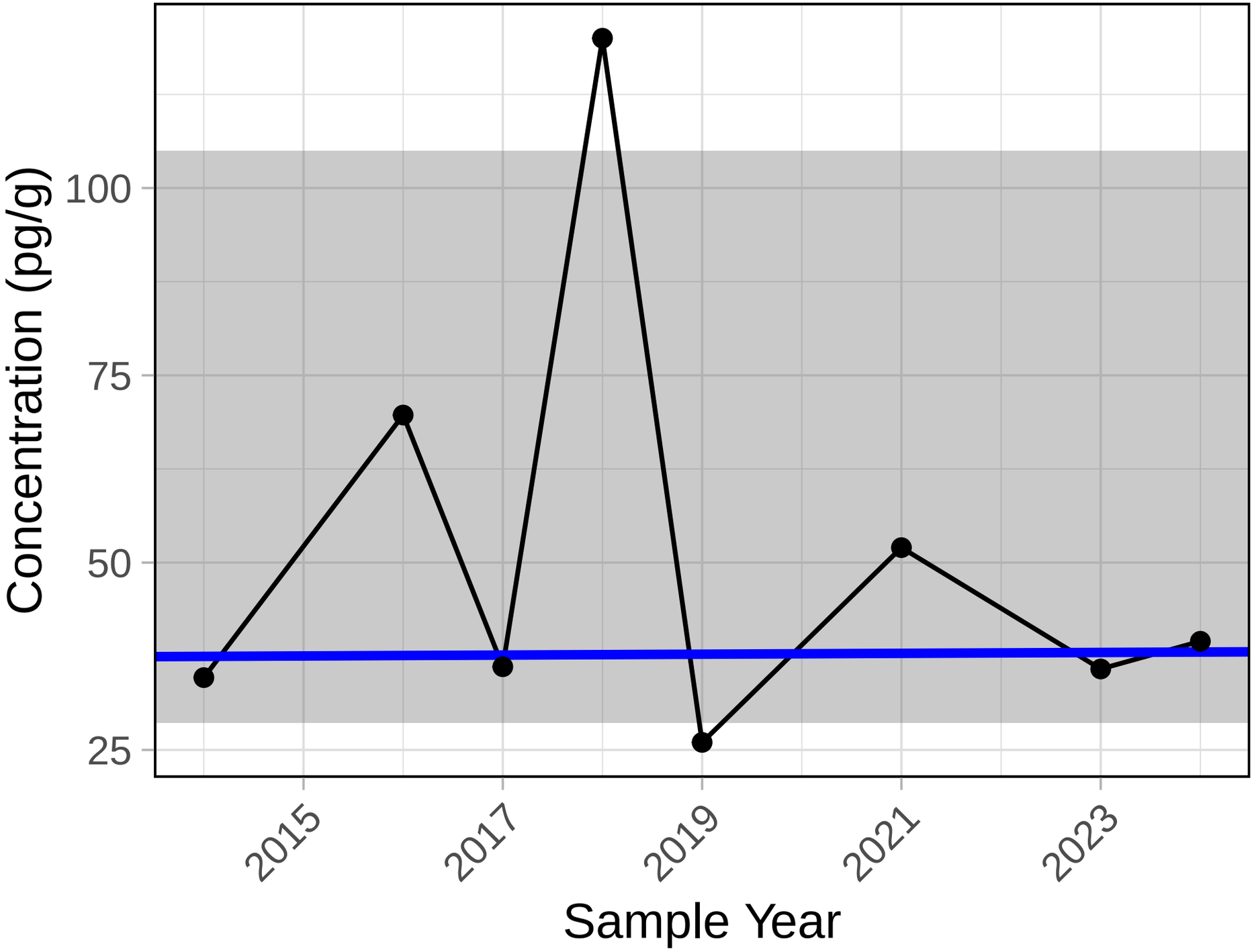
Chrystina Sediment



Trend significance p−value = 1

PCBs 41+71+40

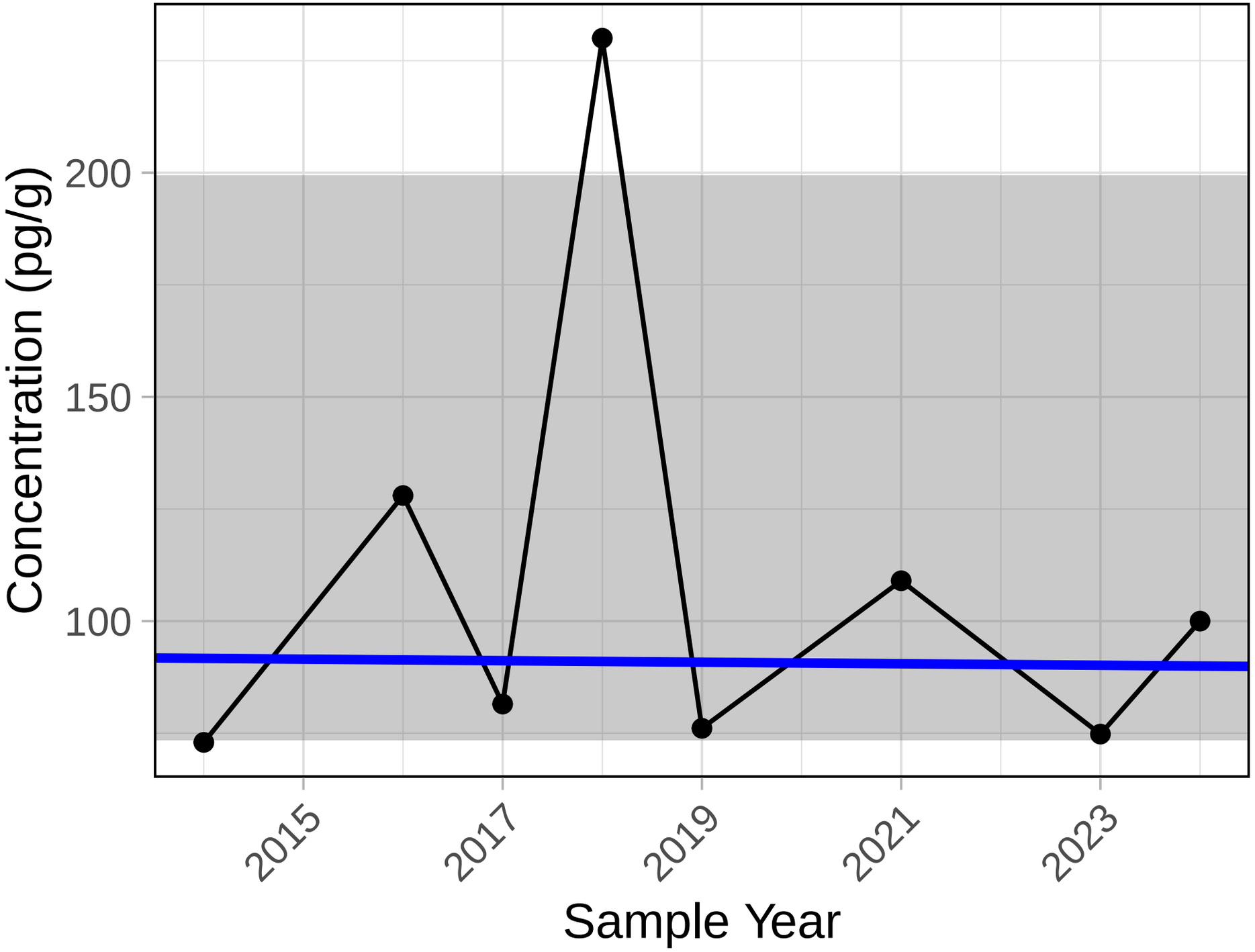
Chrystina Sediment



Trend significance p−value = 1

PCBs 44+47+65

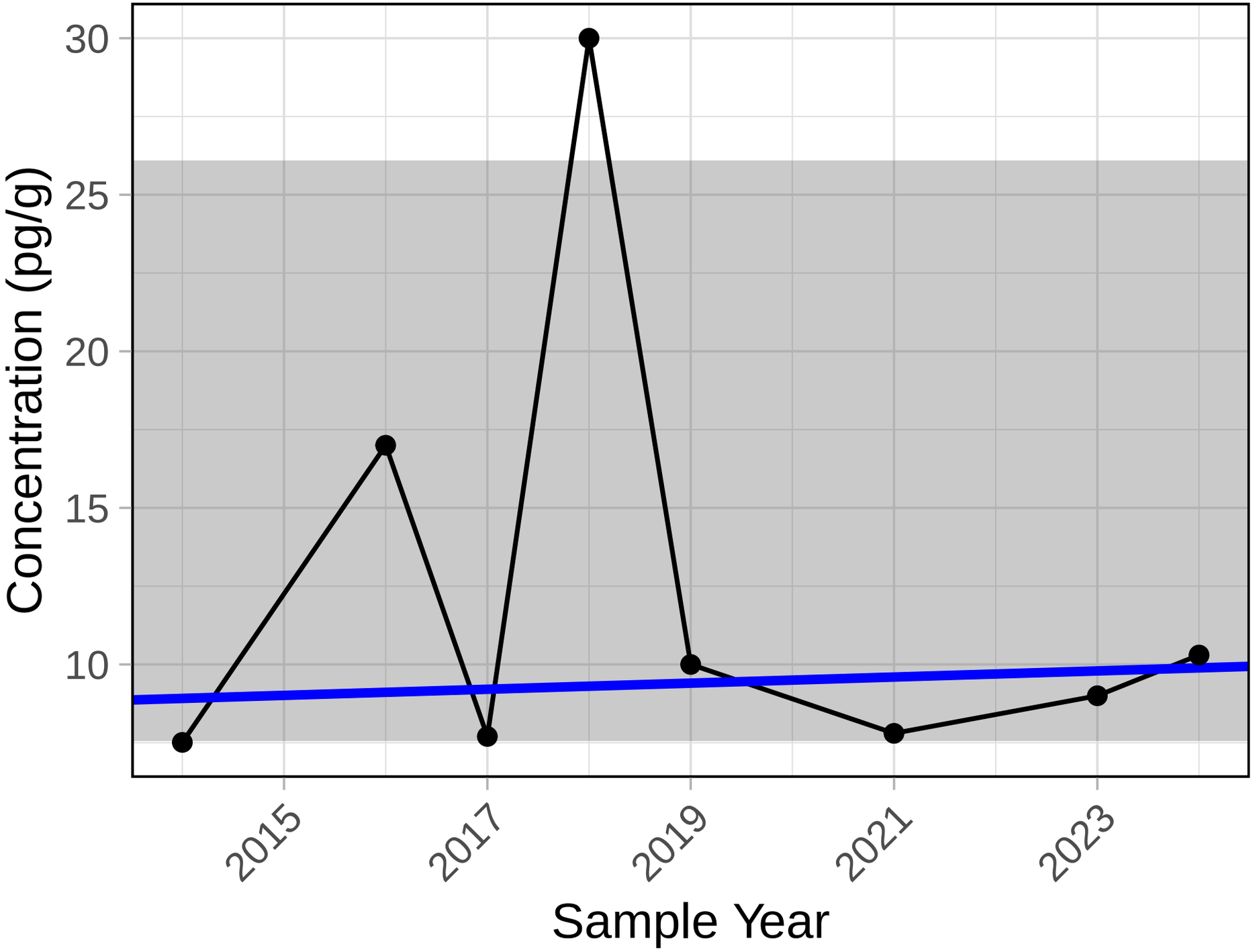
Chrystina Sediment



Trend significance p−value = 1

PCBs 50+53

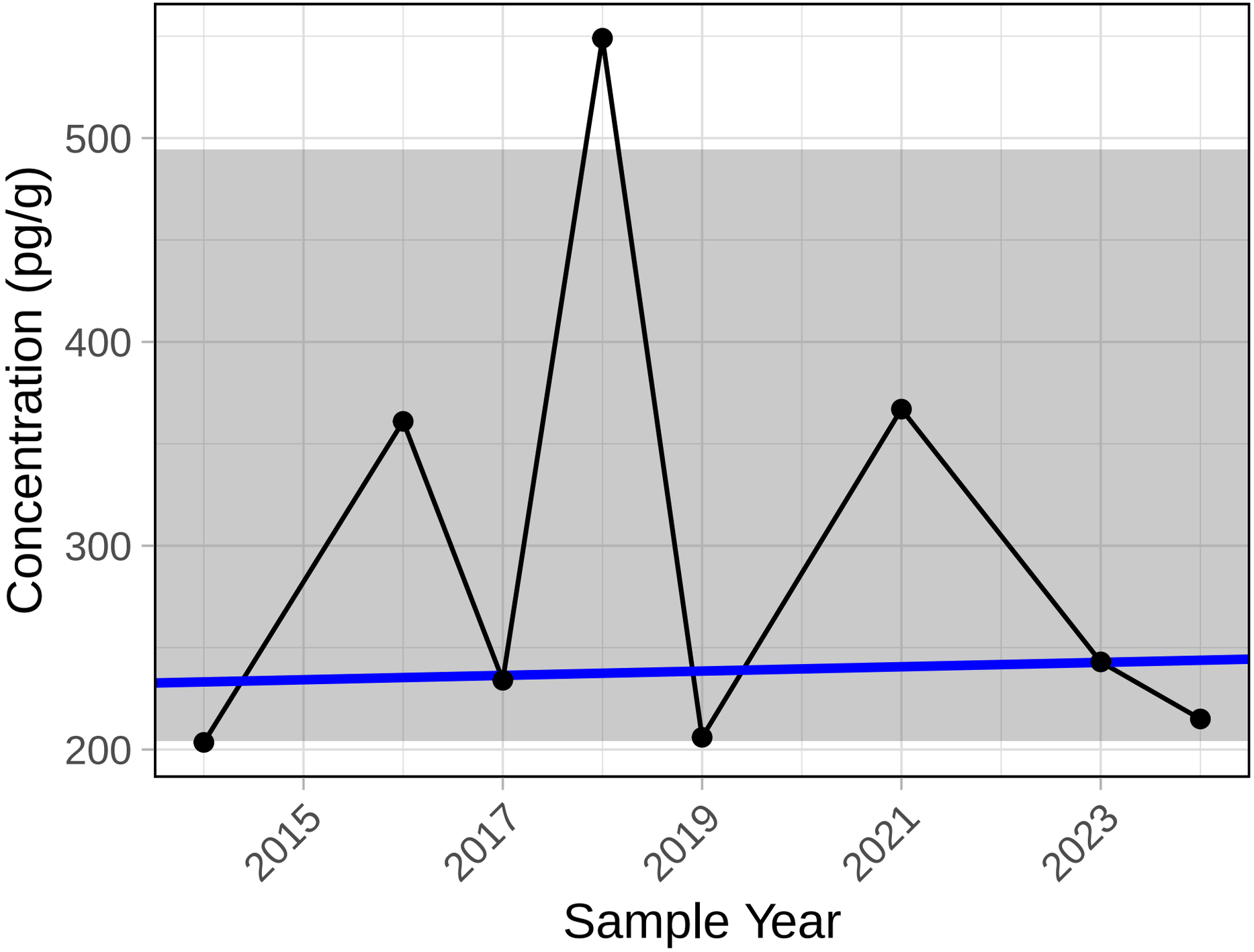
Chrystina Sediment



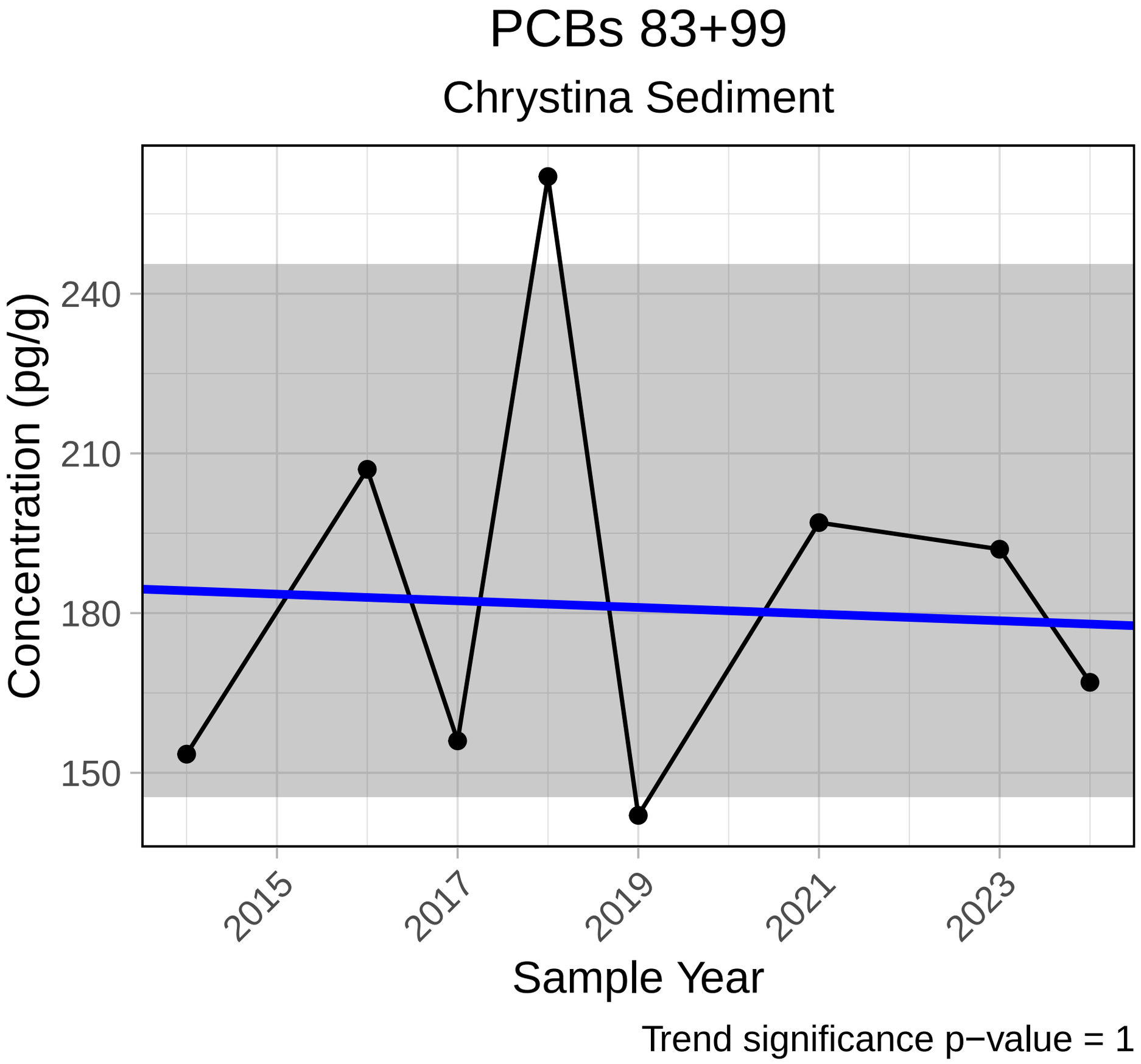
Trend significance p−value = 0.536

PCBs 70+61+74+76

Chrystina Sediment

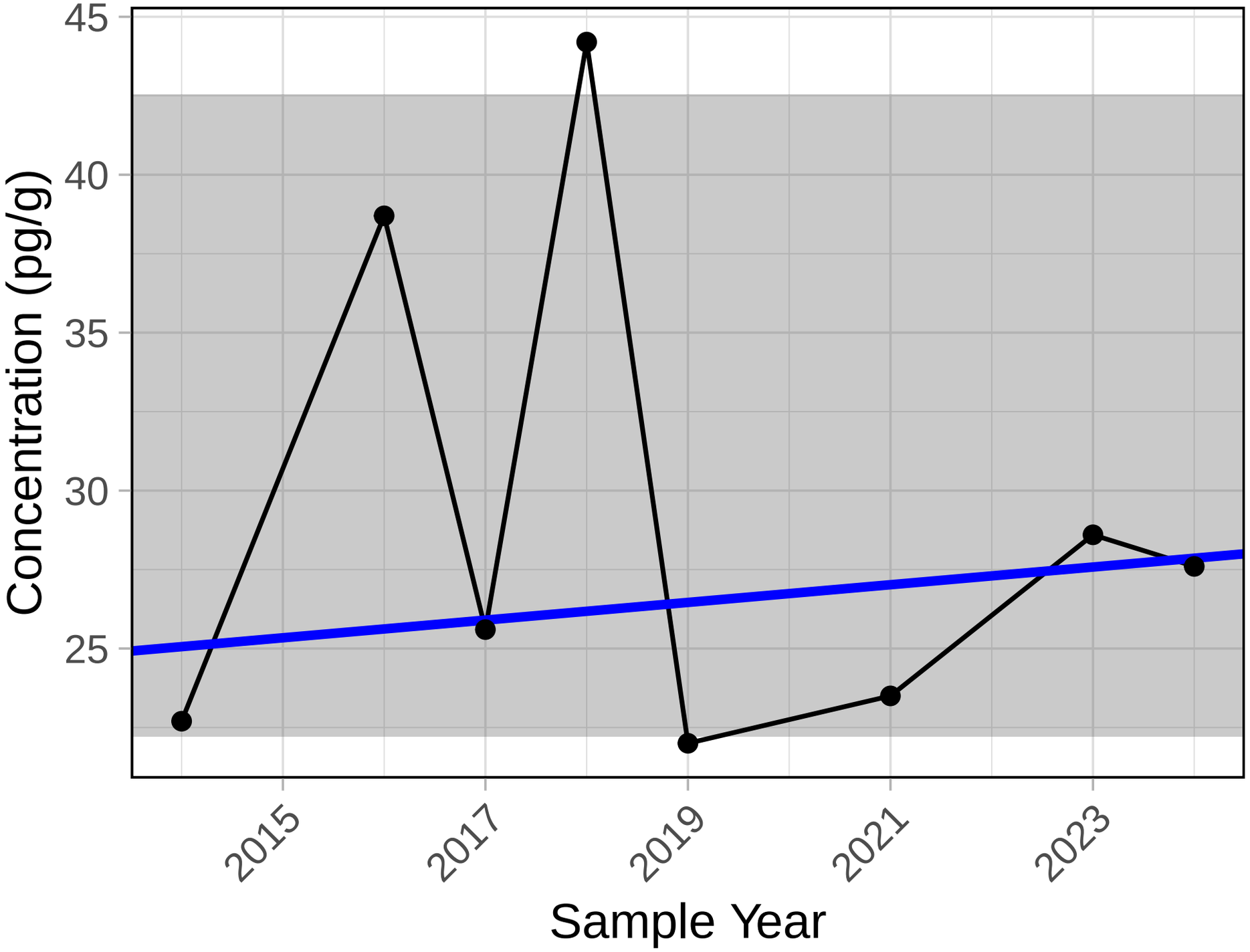


Trend significance p−value = 0.902


PCBs 83+99
Chrystina Sediment
Concentration (pg/g)
240
210
180
150
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

PCBs 88+91

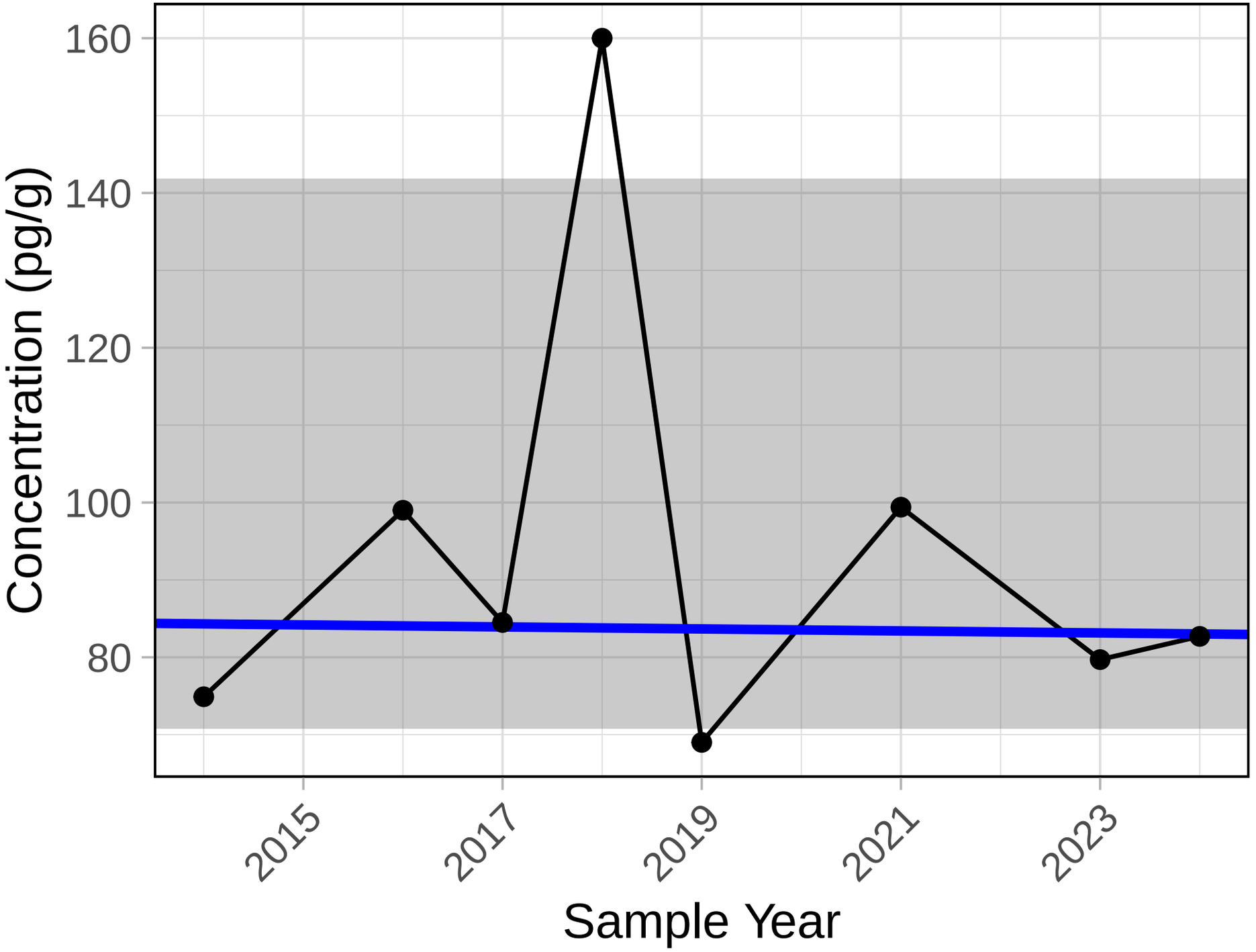
Chrystina Sediment



Trend significance p−value = 0.902

PCBs 128+166

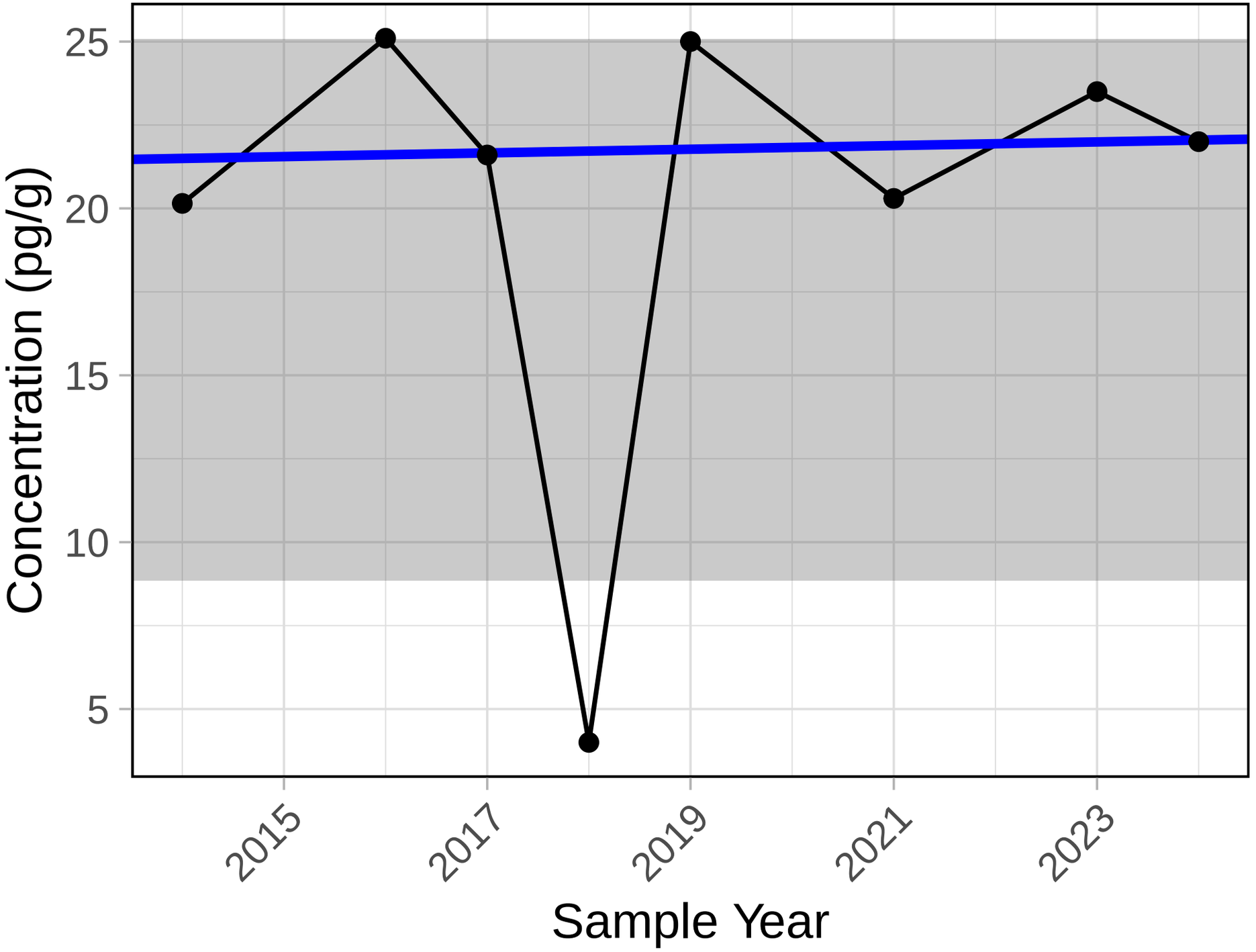
Chrystina Sediment



Trend significance p−value = 1

PCBs 134+143

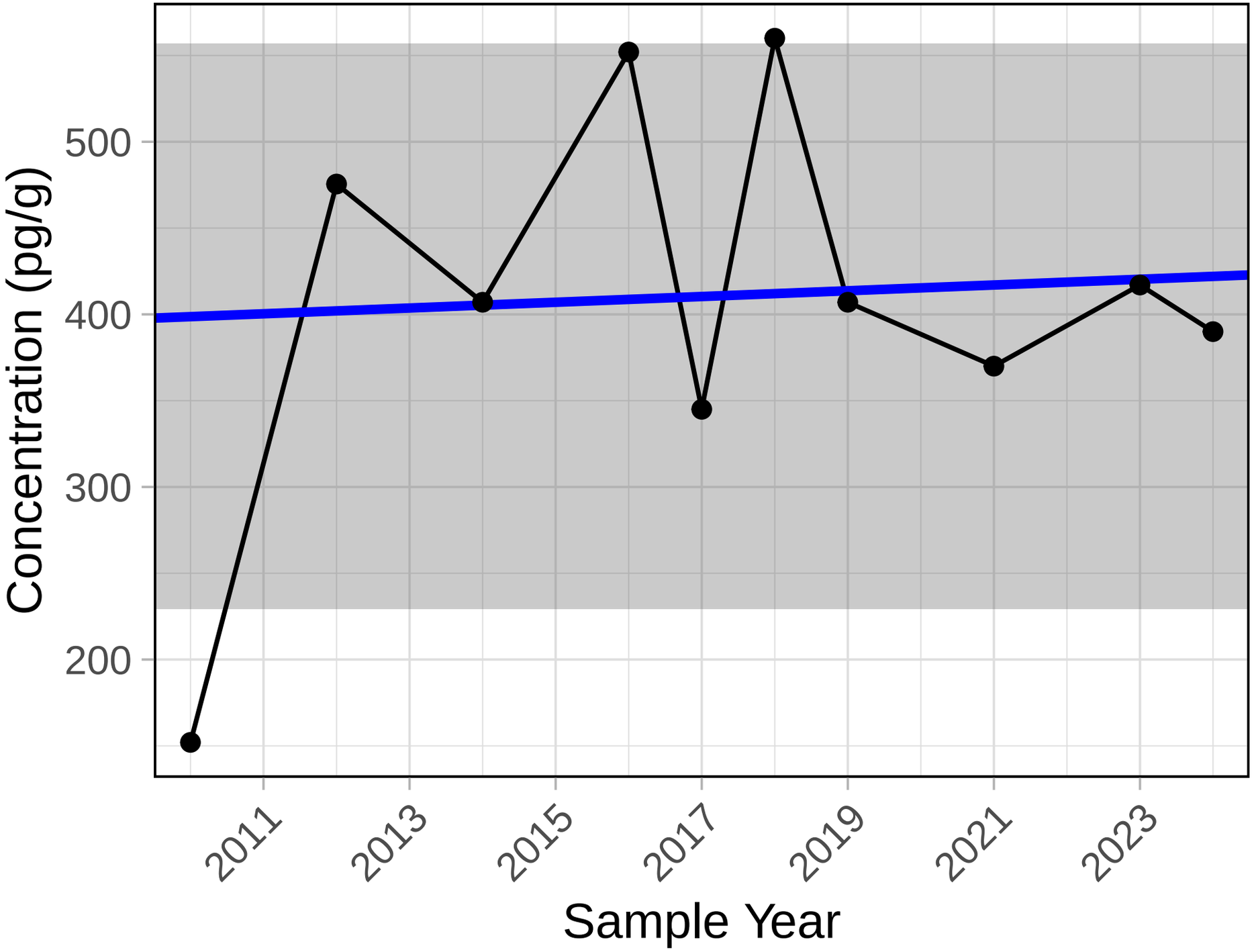
Chrystina Sediment



Trend significance p−value = 0.902

PCBs 147+149

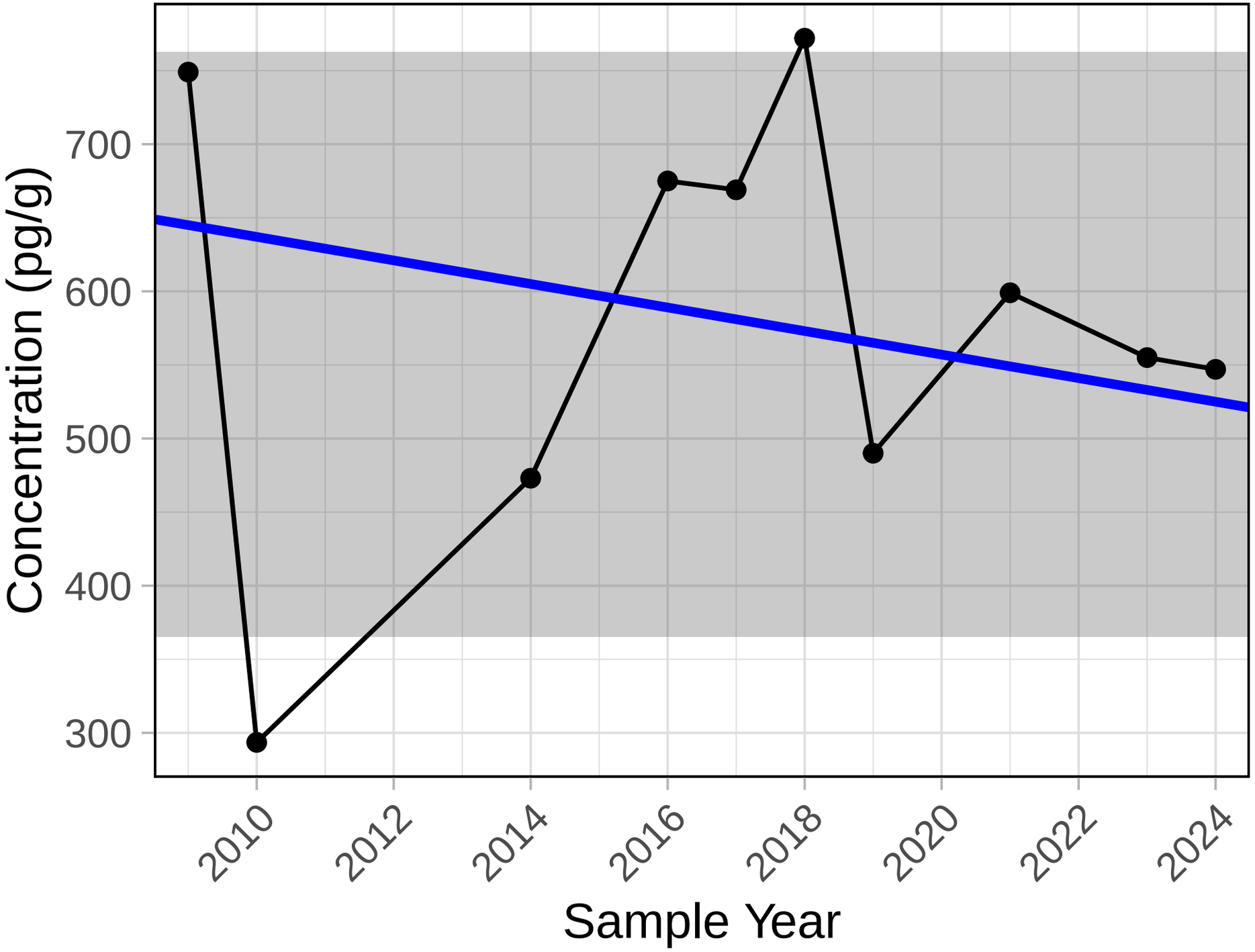
Chrystina Sediment



Trend significance p−value = 0.928

PCBs 153+168

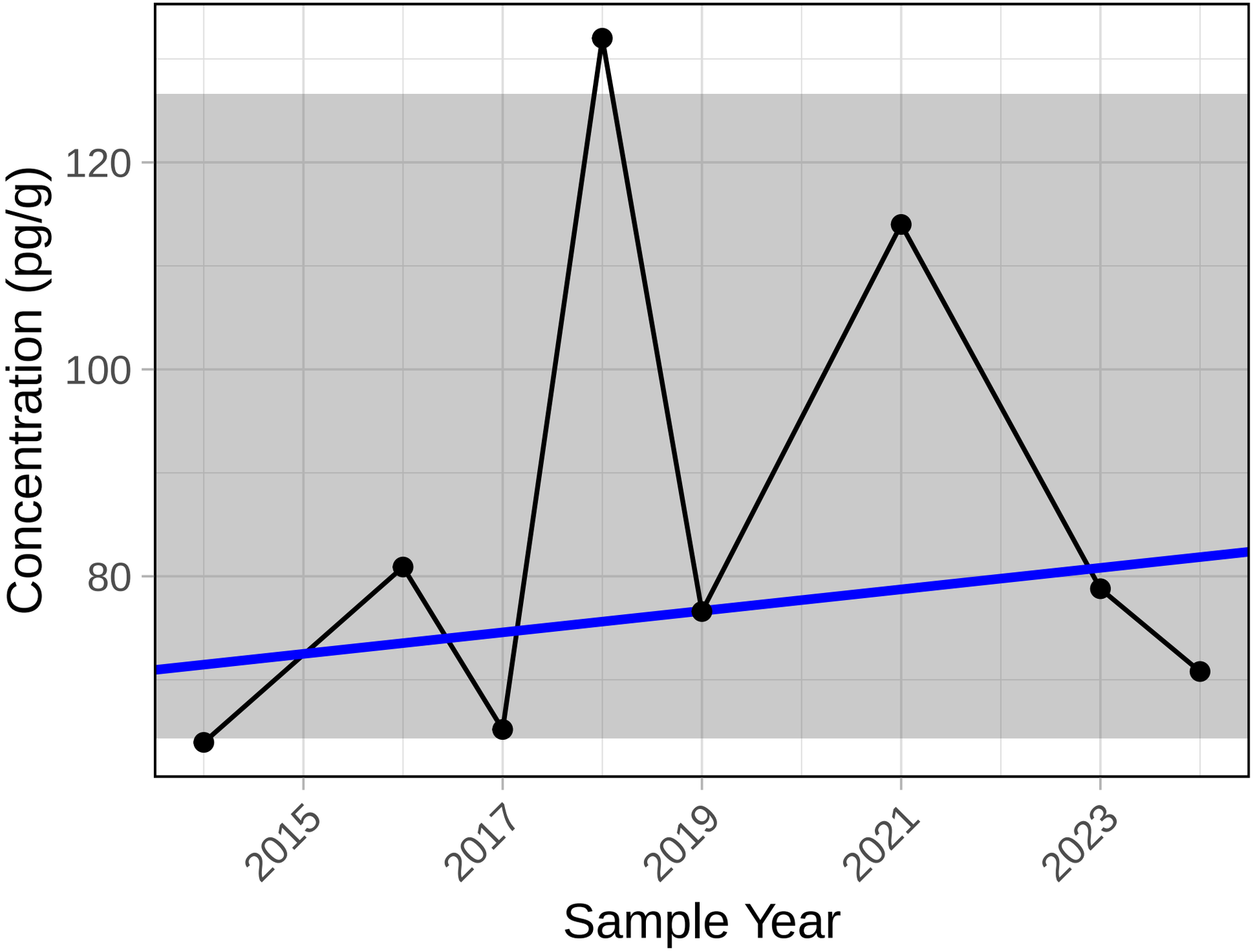
Chrystina Sediment



Trend significance p−value = 0.858

PCBs 156+157

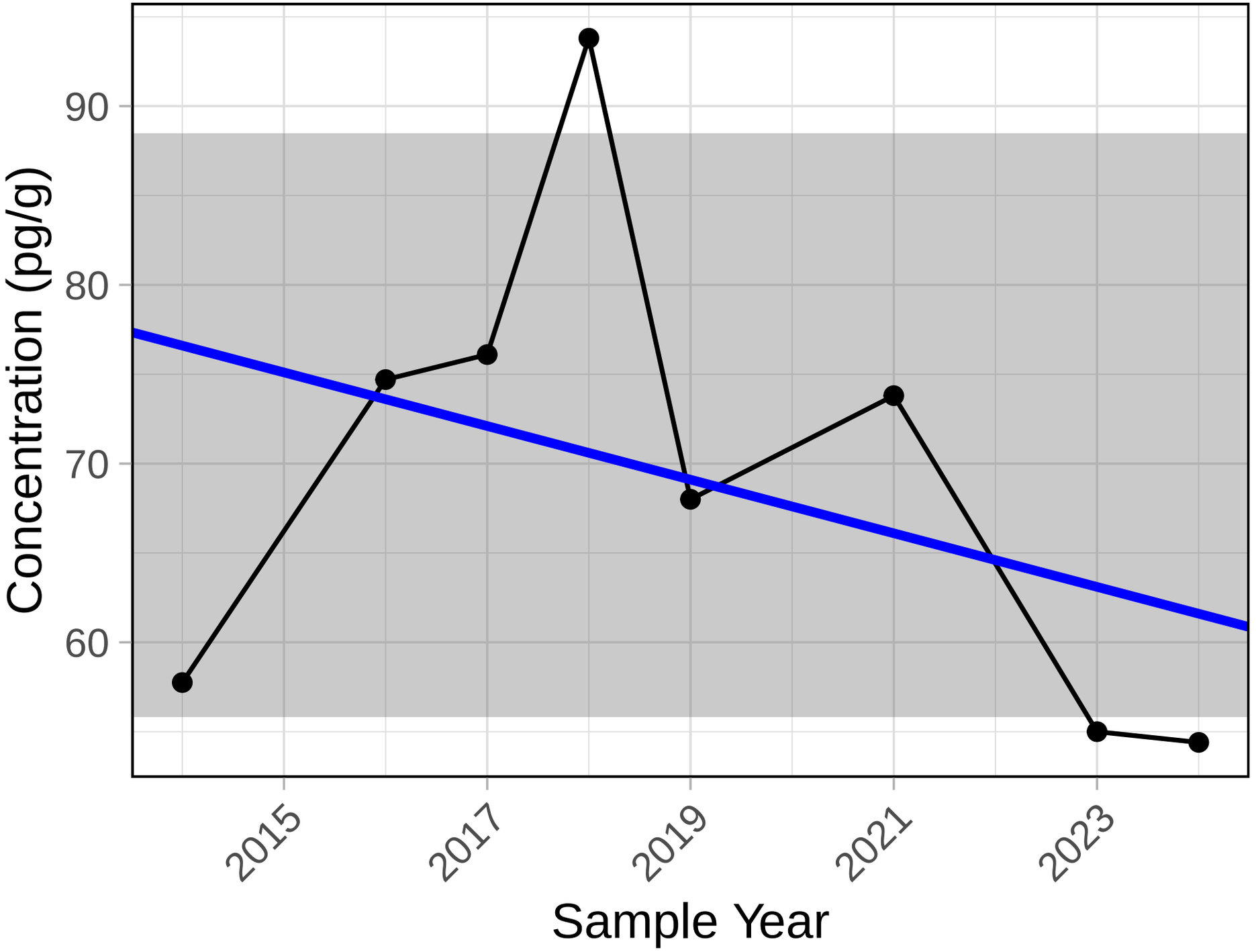
Chrystina Sediment



Trend significance p−value = 0.711

PCBs 171+173

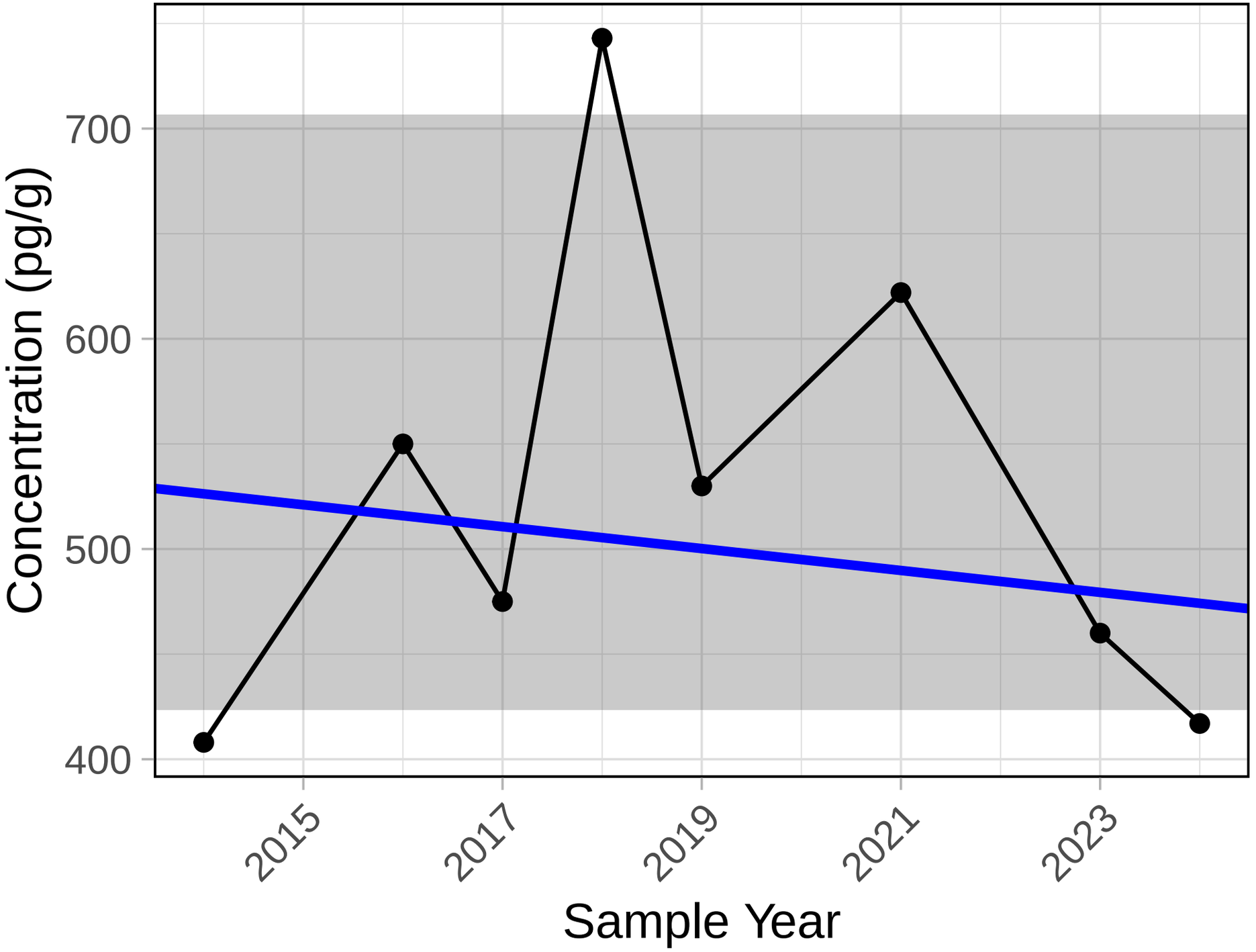
Chrystina Sediment



Trend significance p−value = 0.266

PCBs 180+193

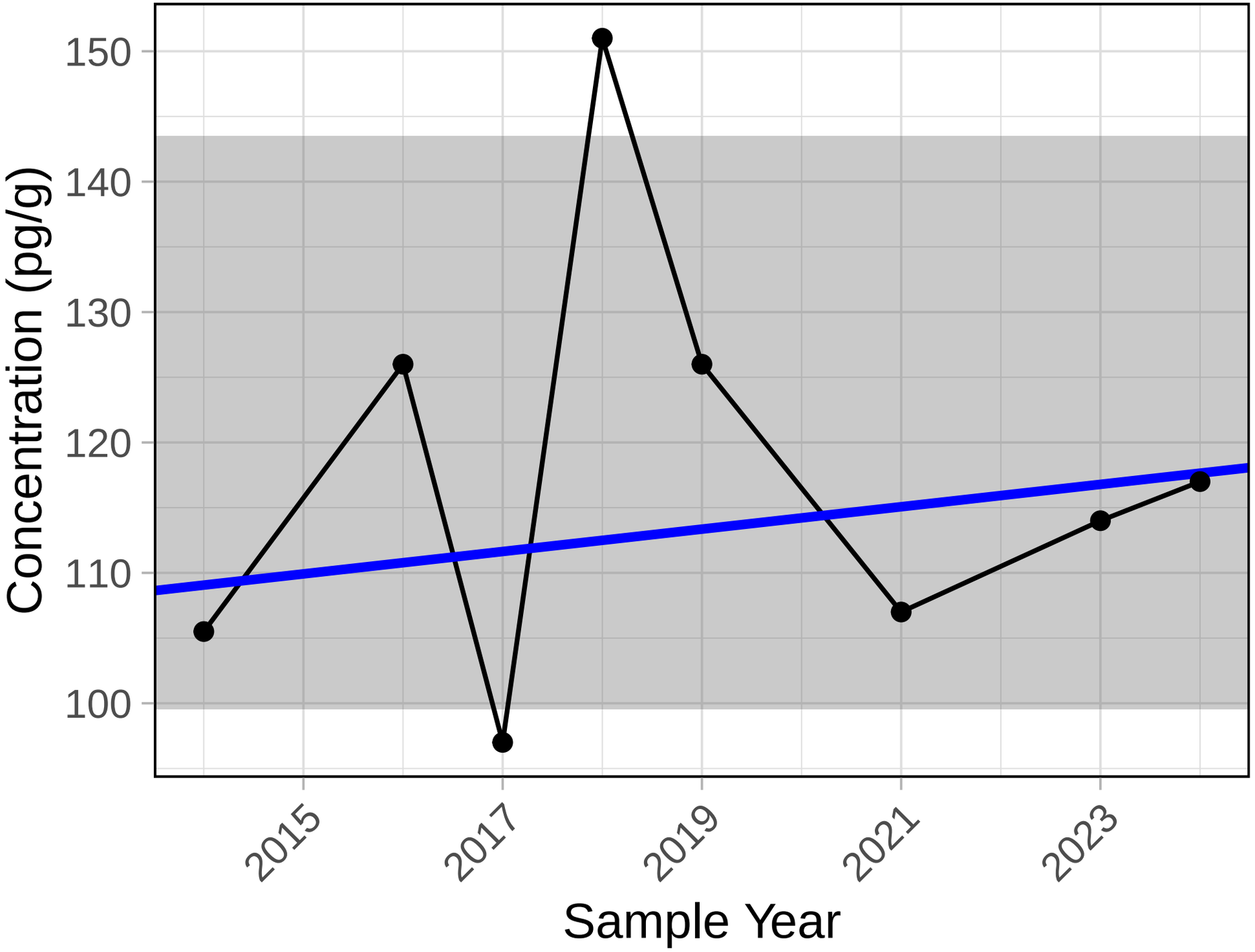
Chrystina Sediment



Trend significance p−value = 0.902

PCBs 198+199

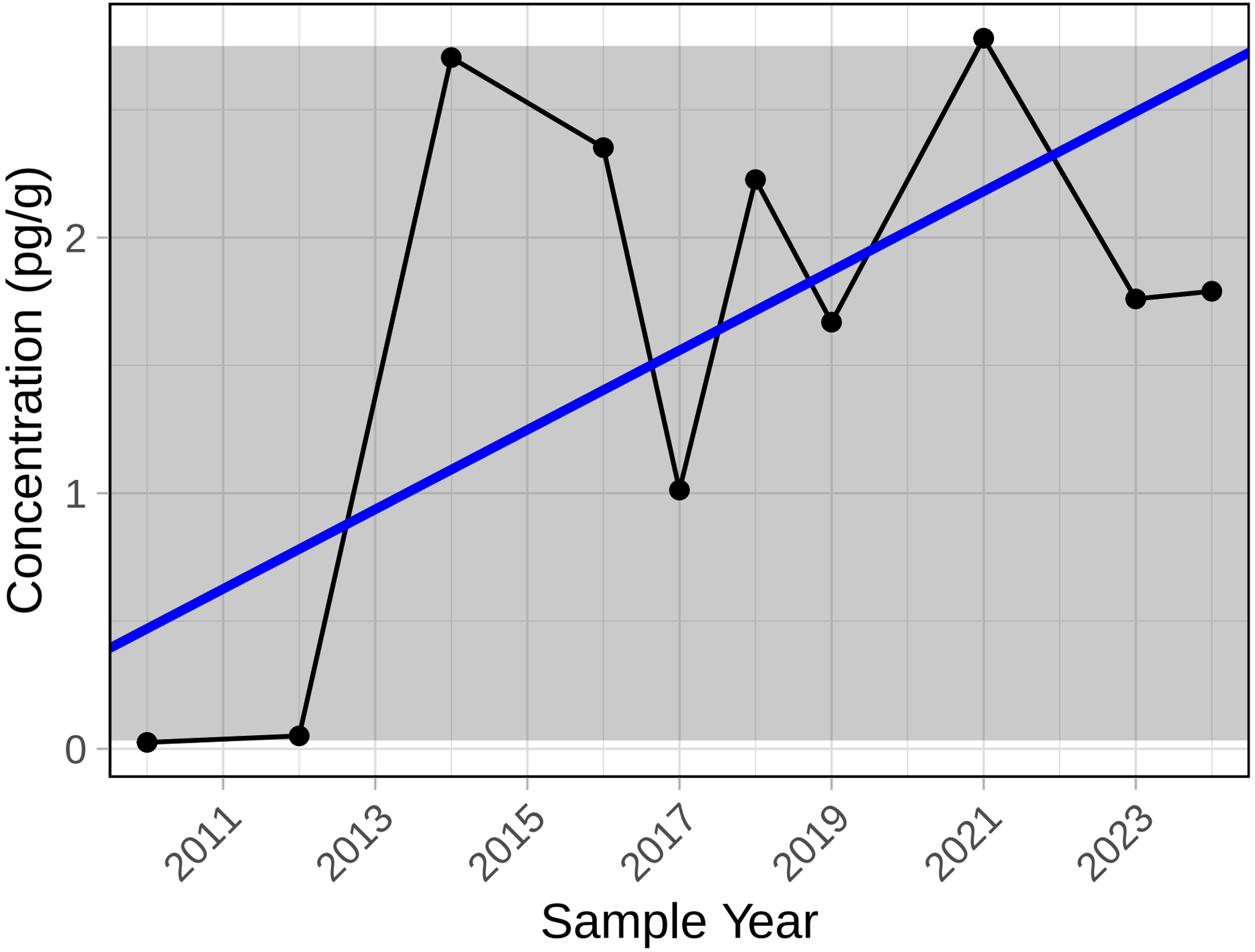
Chrystina Sediment



Trend significance p−value = 0.803

PCDD/F TEQ (lower−bound)

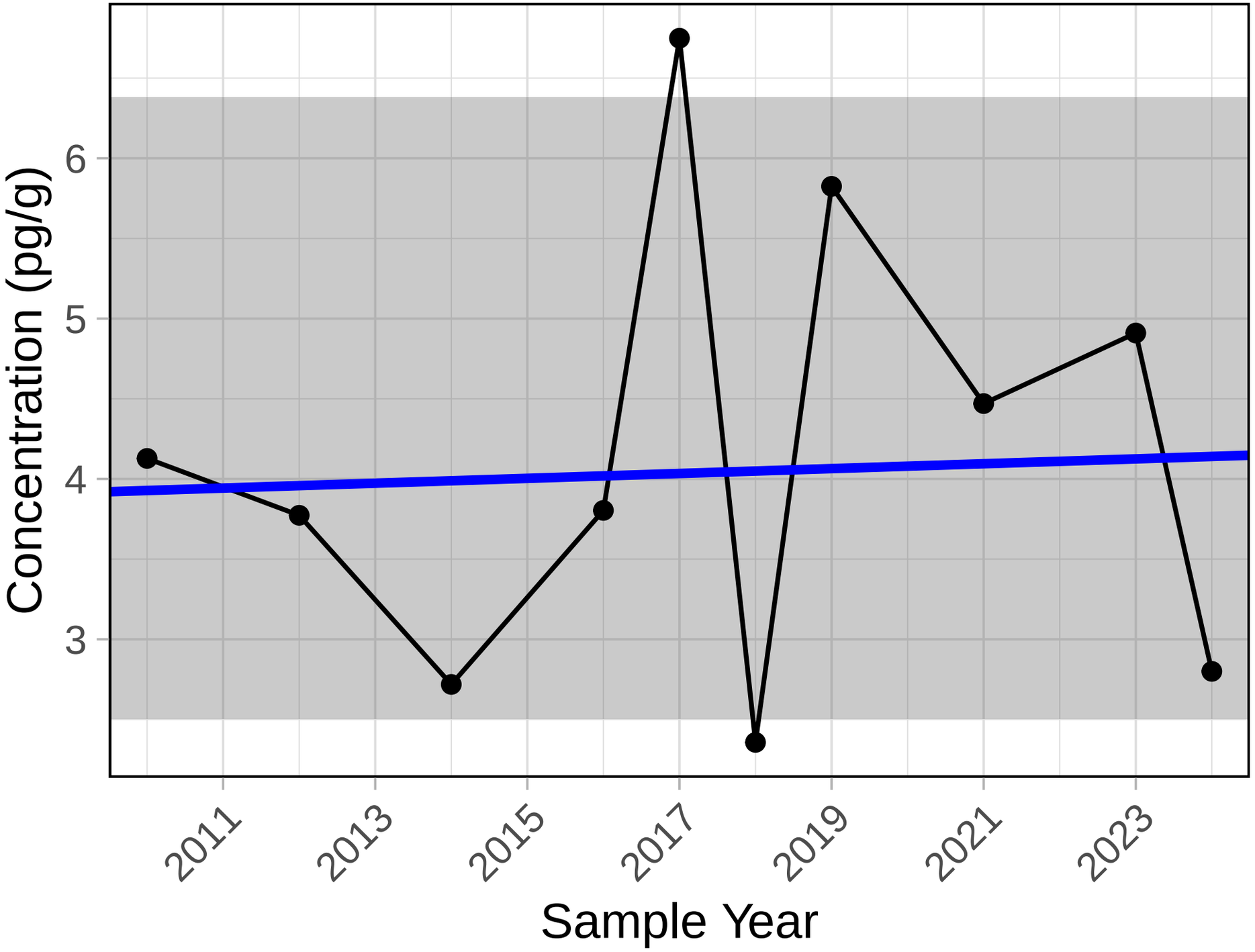
Chrystina Sediment



Trend significance p−value = 0.283

PCDD/F TEQ (upper−bound)

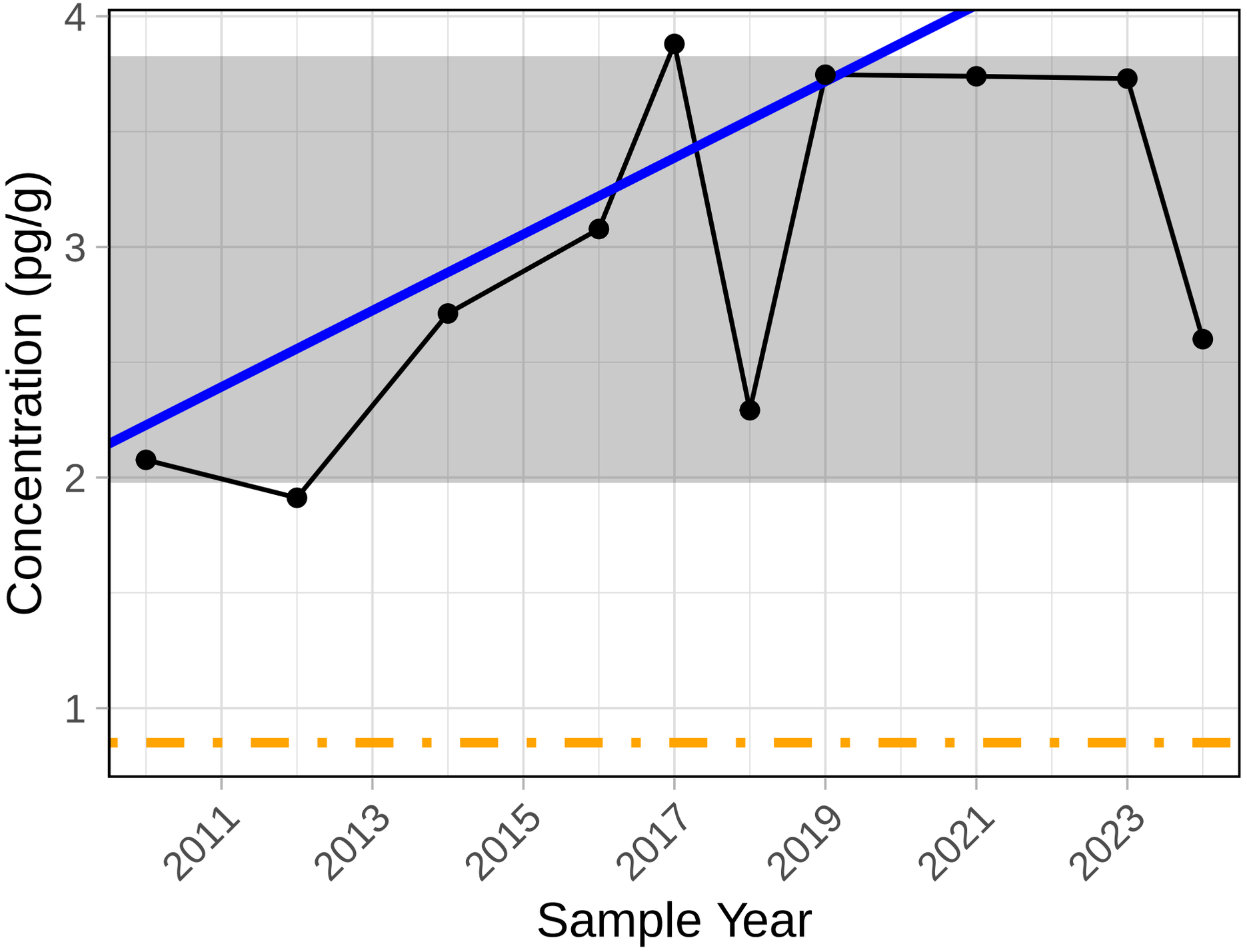
Chrystina Sediment



Trend significance p−value = 0.858

PCDD/F TEQ (mid−point)

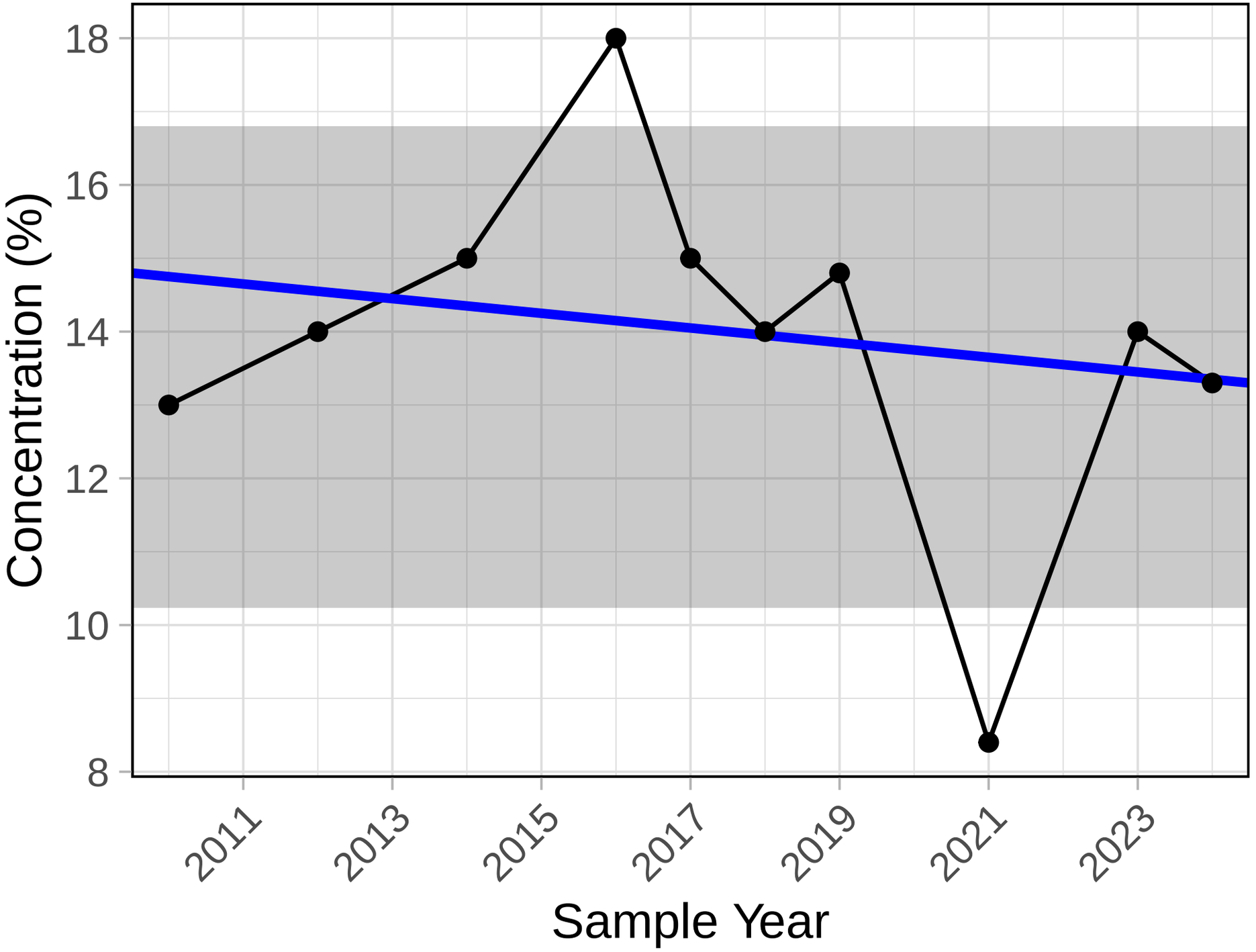
Chrystina Sediment



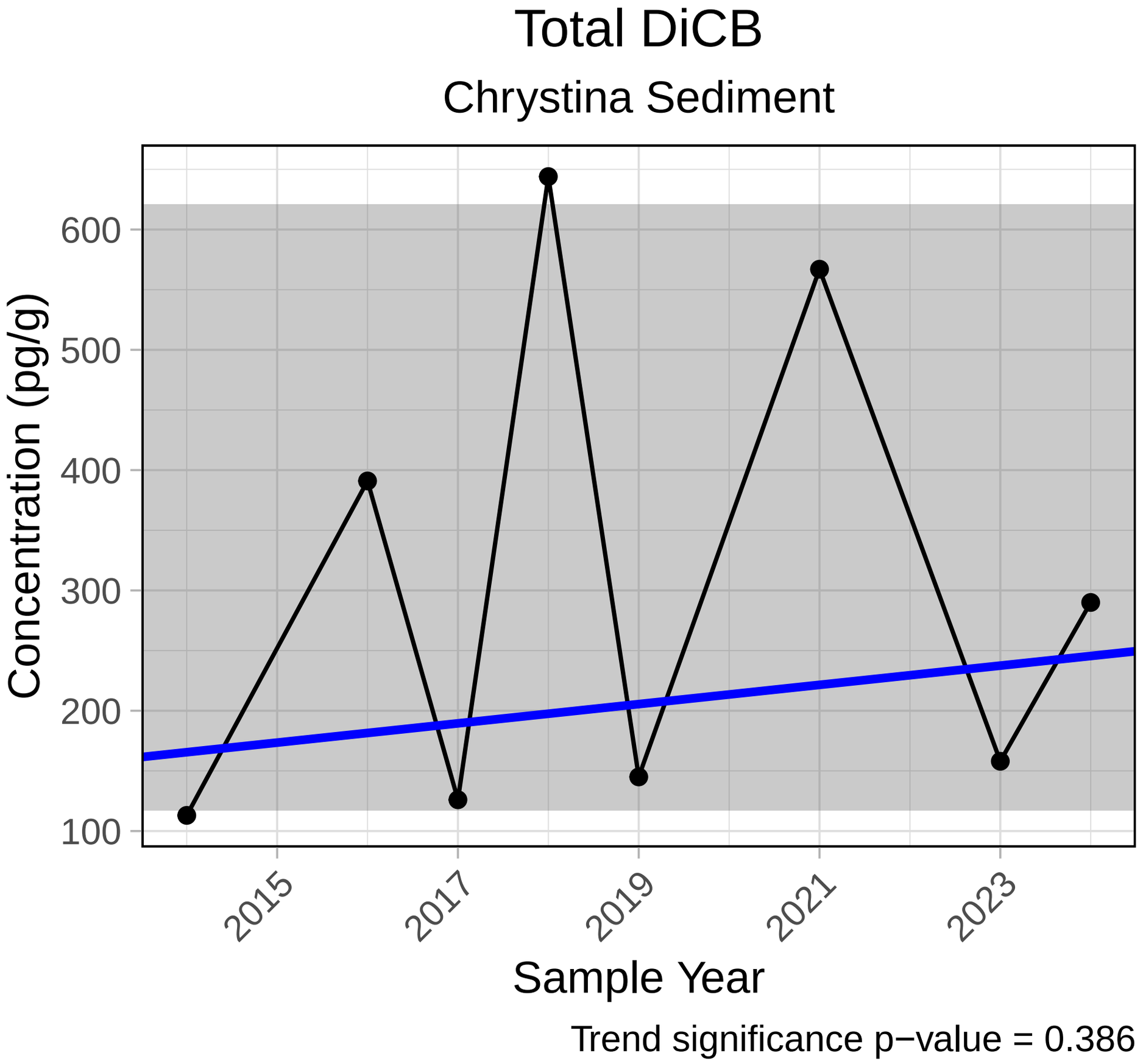
Trend significance p−value = 0.283
ISQG level = 0.85 pg/g (maximum)
PEL level = 21.5 pg/g (maximum)

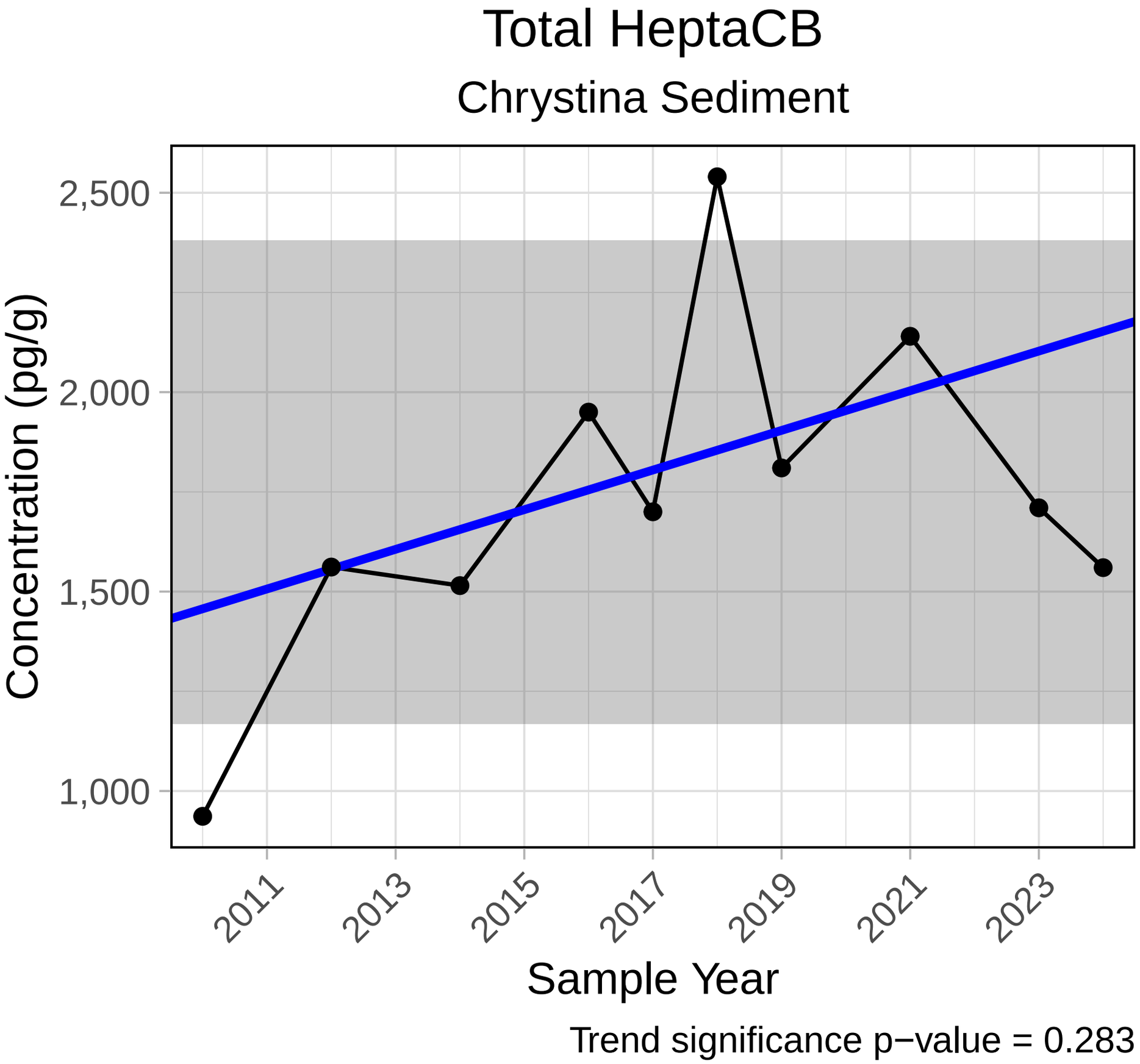
Total Organic Carbon

Chrystina Sediment



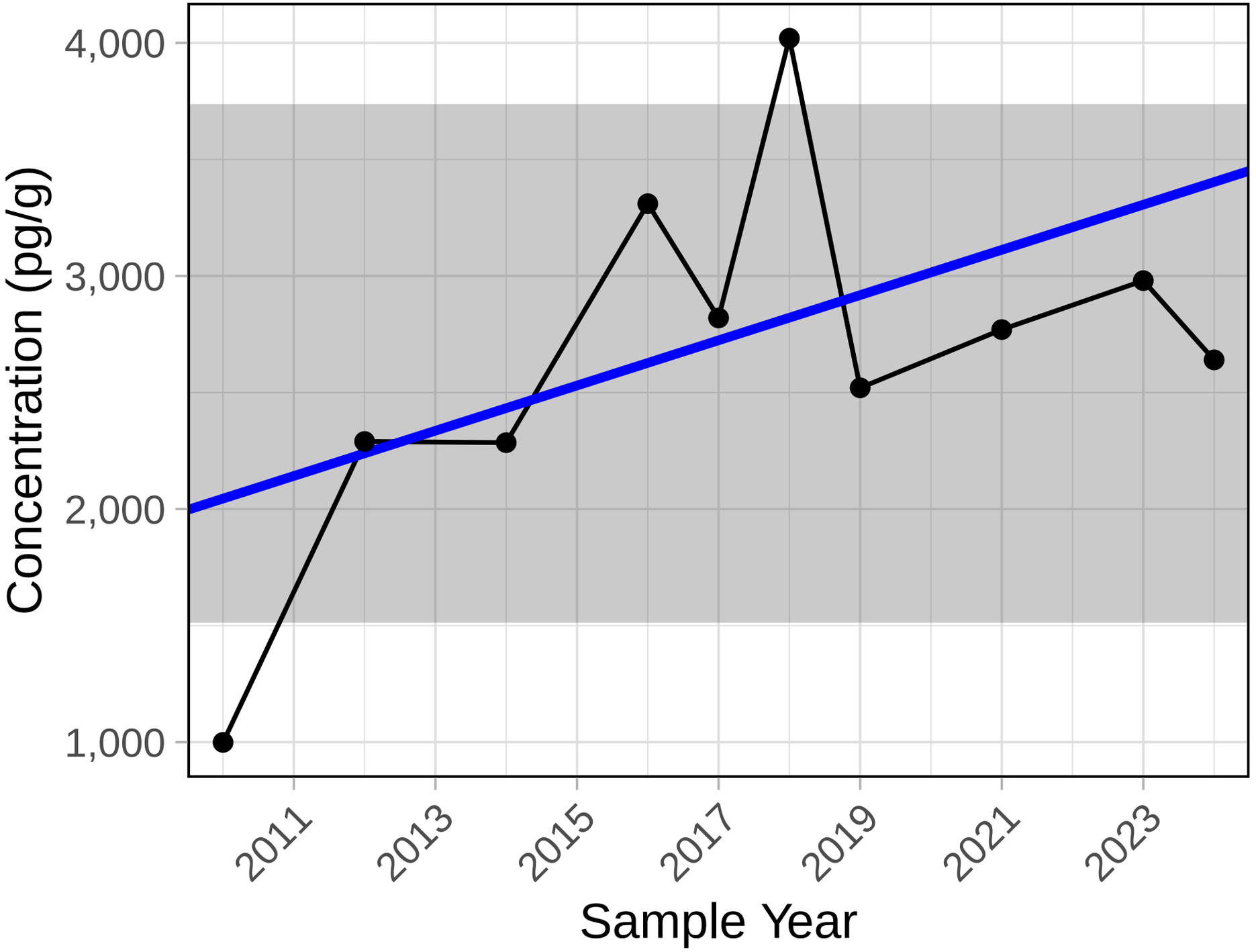
Trend significance p−value = 0.466


Total DiCB
Chrystina Sediment
Concentration (pg/g)
600
500
400
300
200
100
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.386

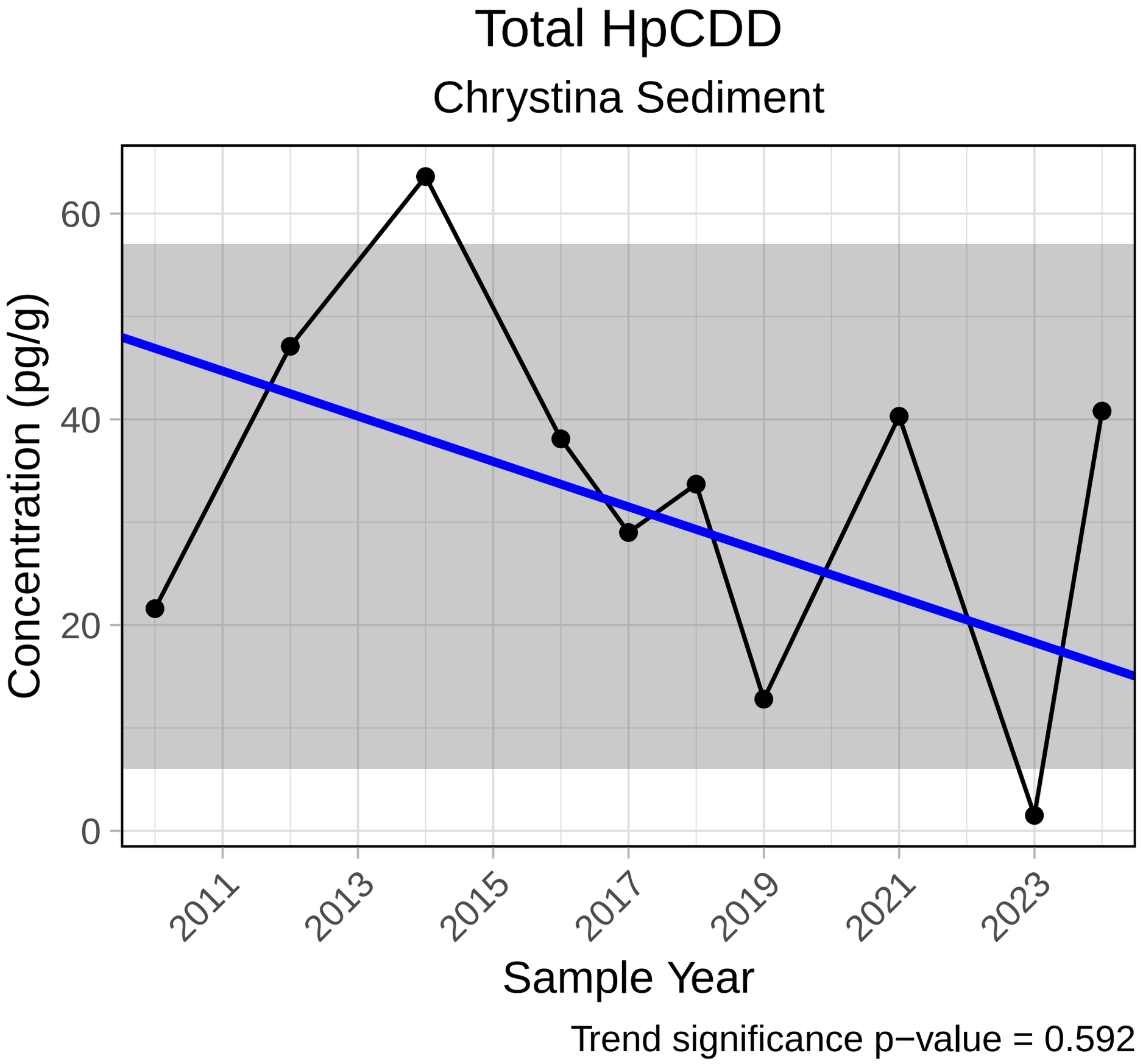

Total HeptaCB
Chrystina Sediment
Concentration (pg/g)
2,500
2,000
1,500
1,000
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.283

Total HexaCB

Chrystina Sediment

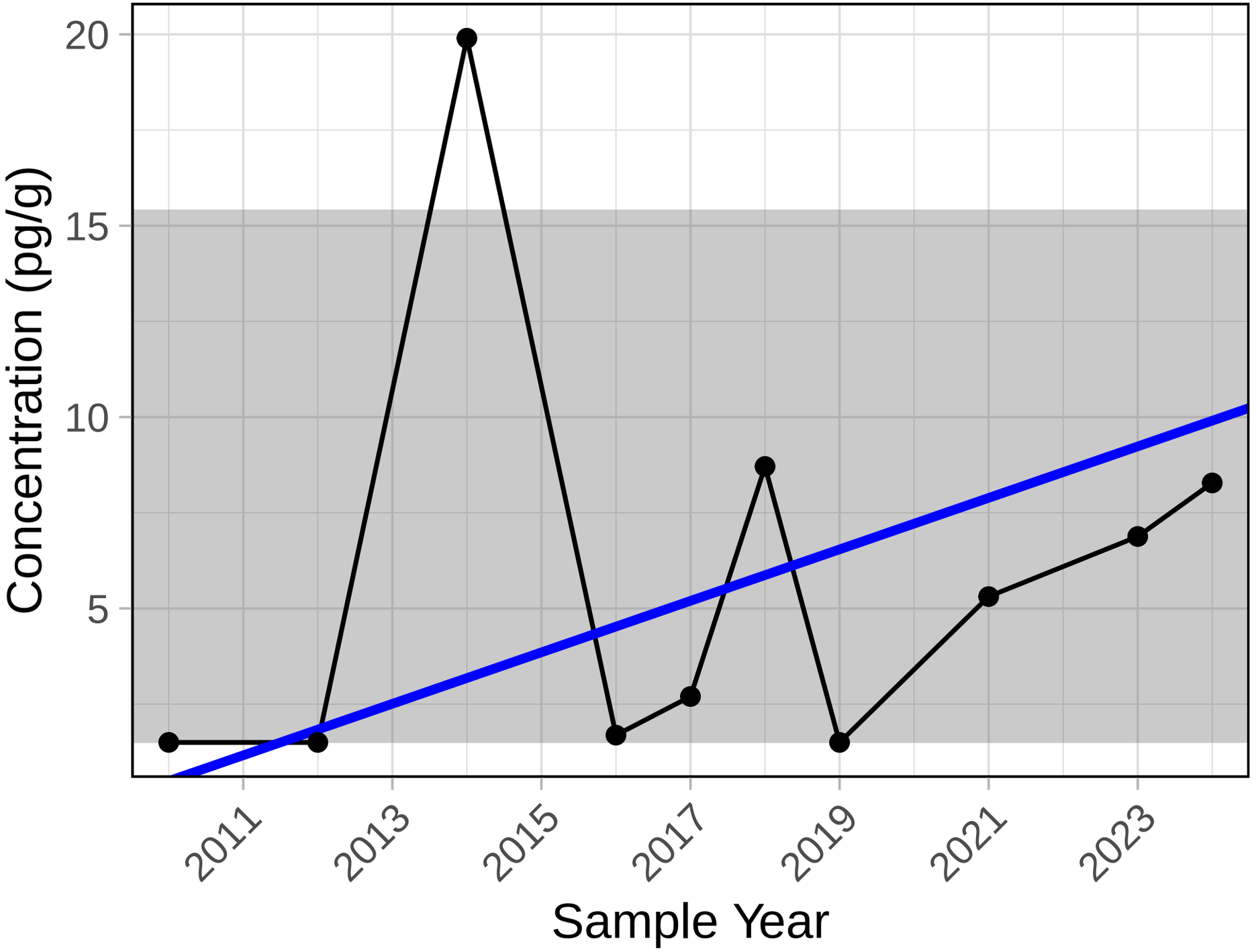


Trend significance p−value = 0.21


Total HpCDD
Chrystina Sediment
Concentration (pg/g)
60
40
20
0
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.592

Total HxCDD

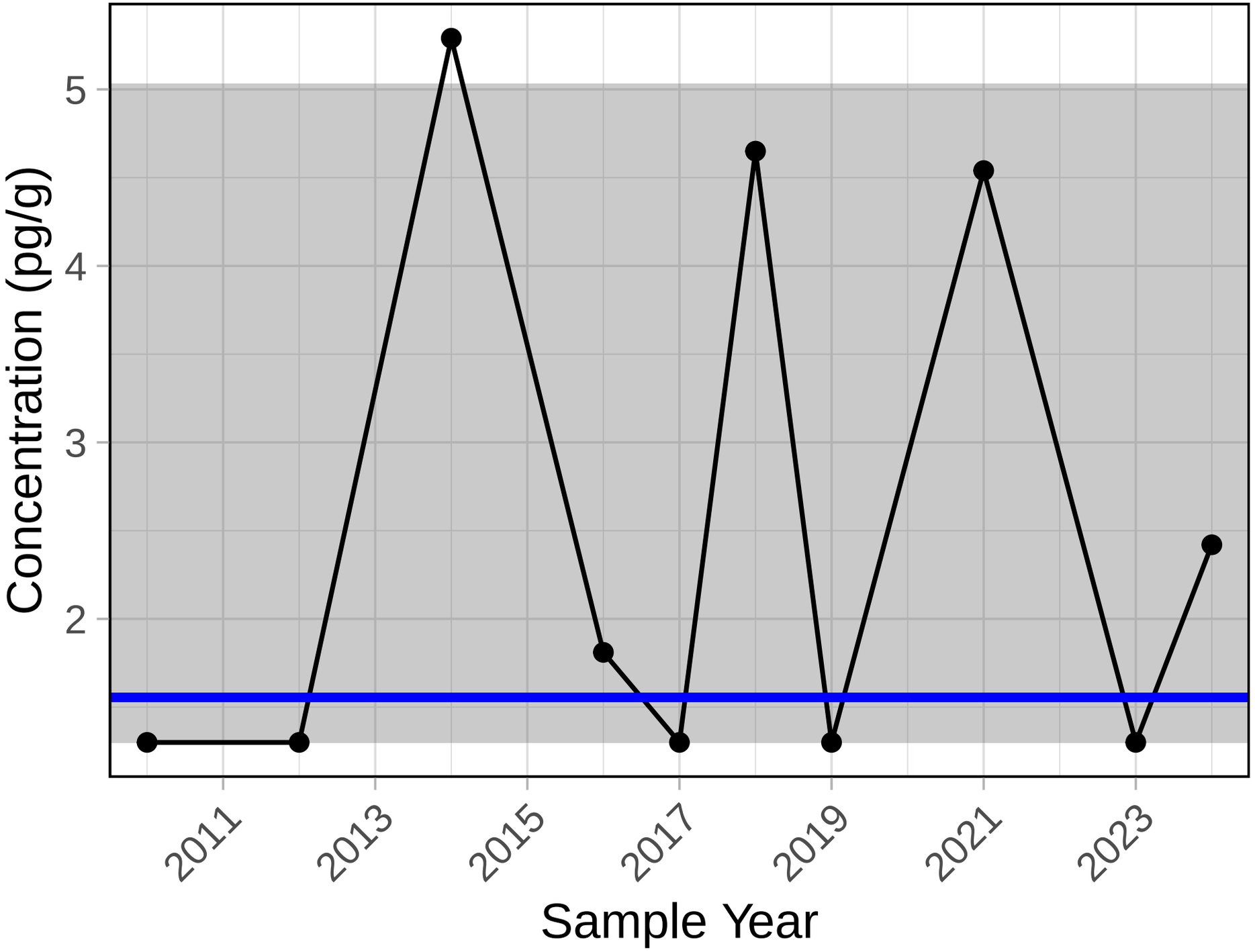
Chrystina Sediment



Trend significance p−value = 0.173

Total HxCDF

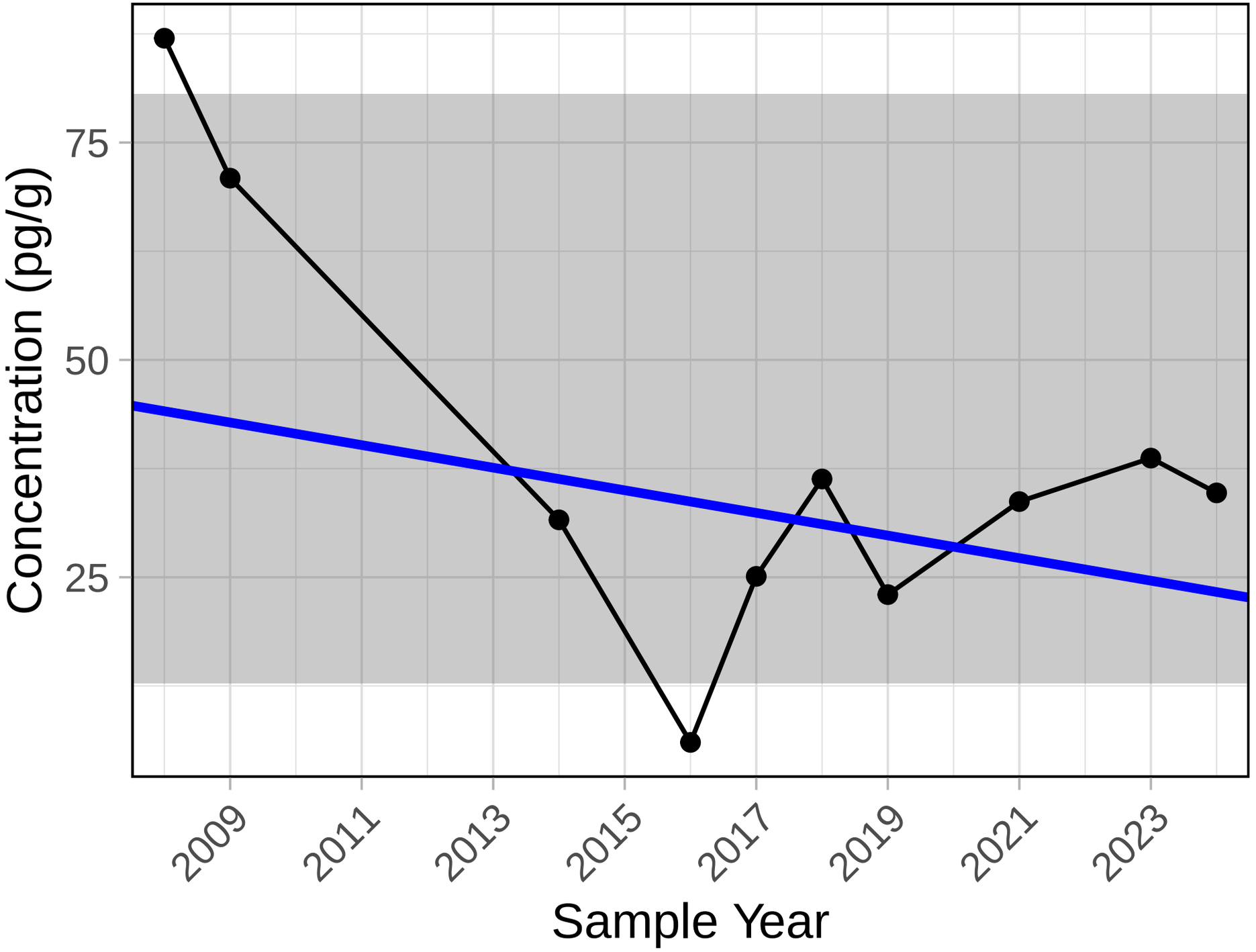
Chrystina Sediment



Trend significance p−value = 0.848

Total NonaCB

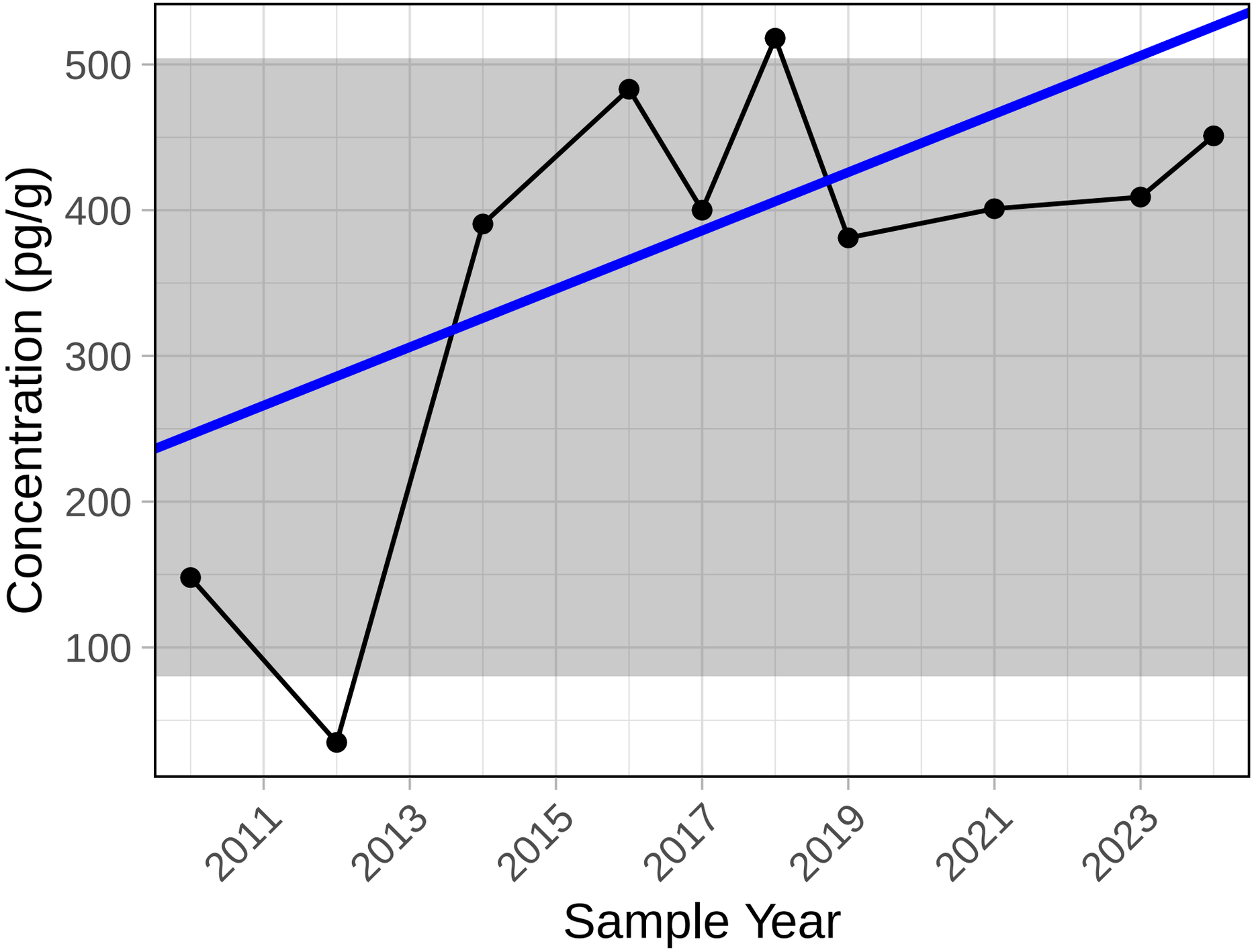
Chrystina Sediment



Trend significance p−value = 0.721

Total OctaCB

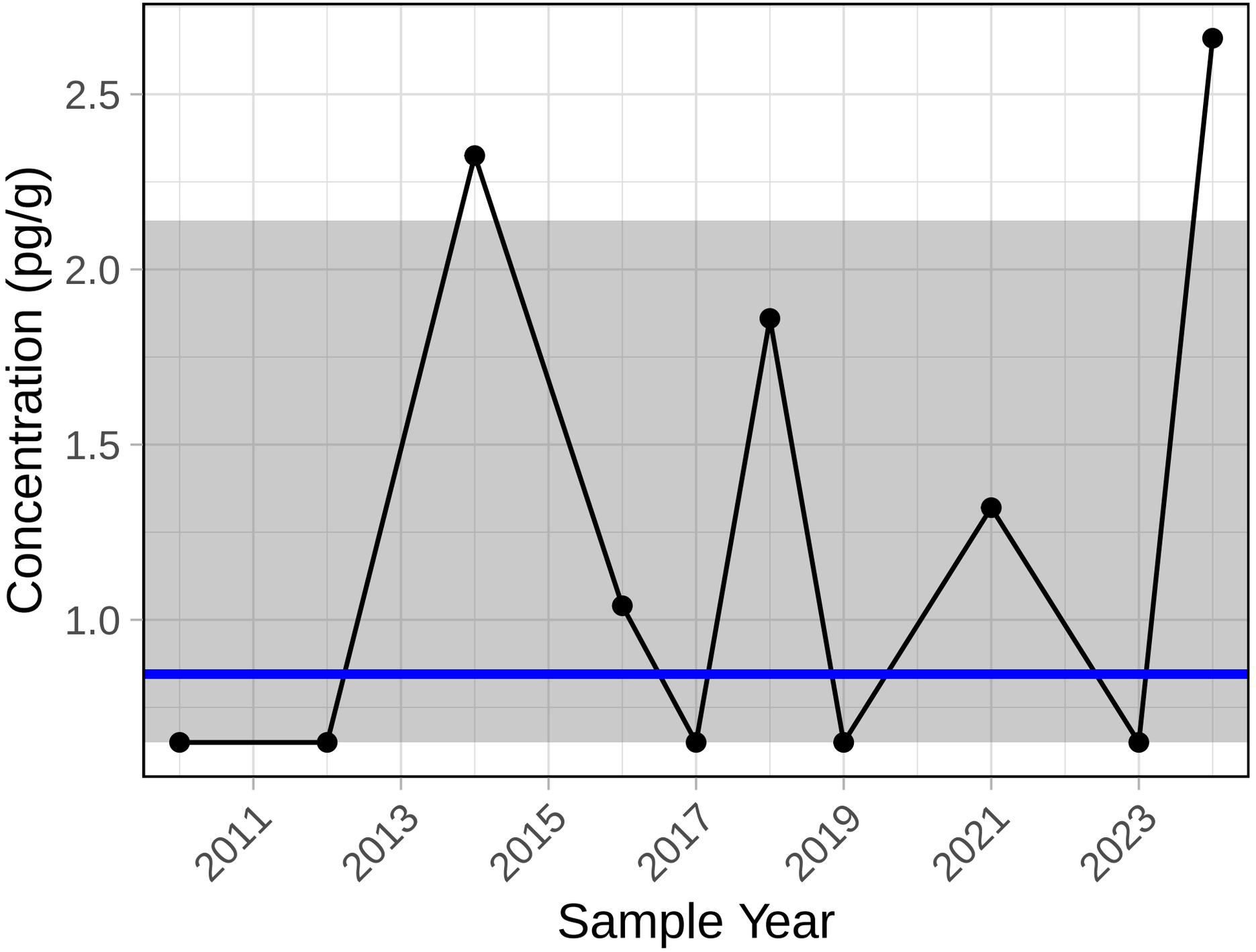
Chrystina Sediment



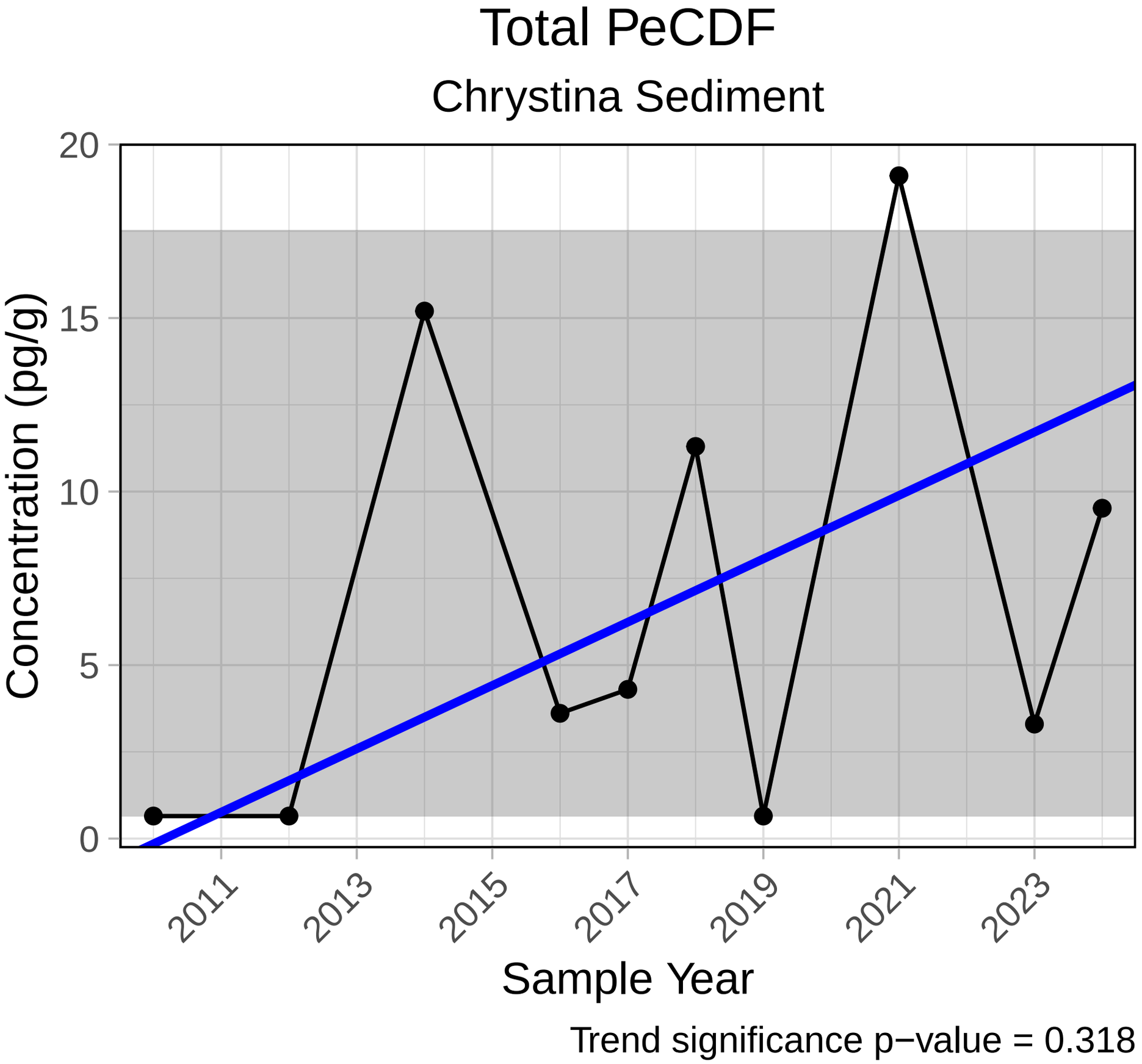
Trend significance p−value = 0.074

Total PeCDD

Chrystina Sediment

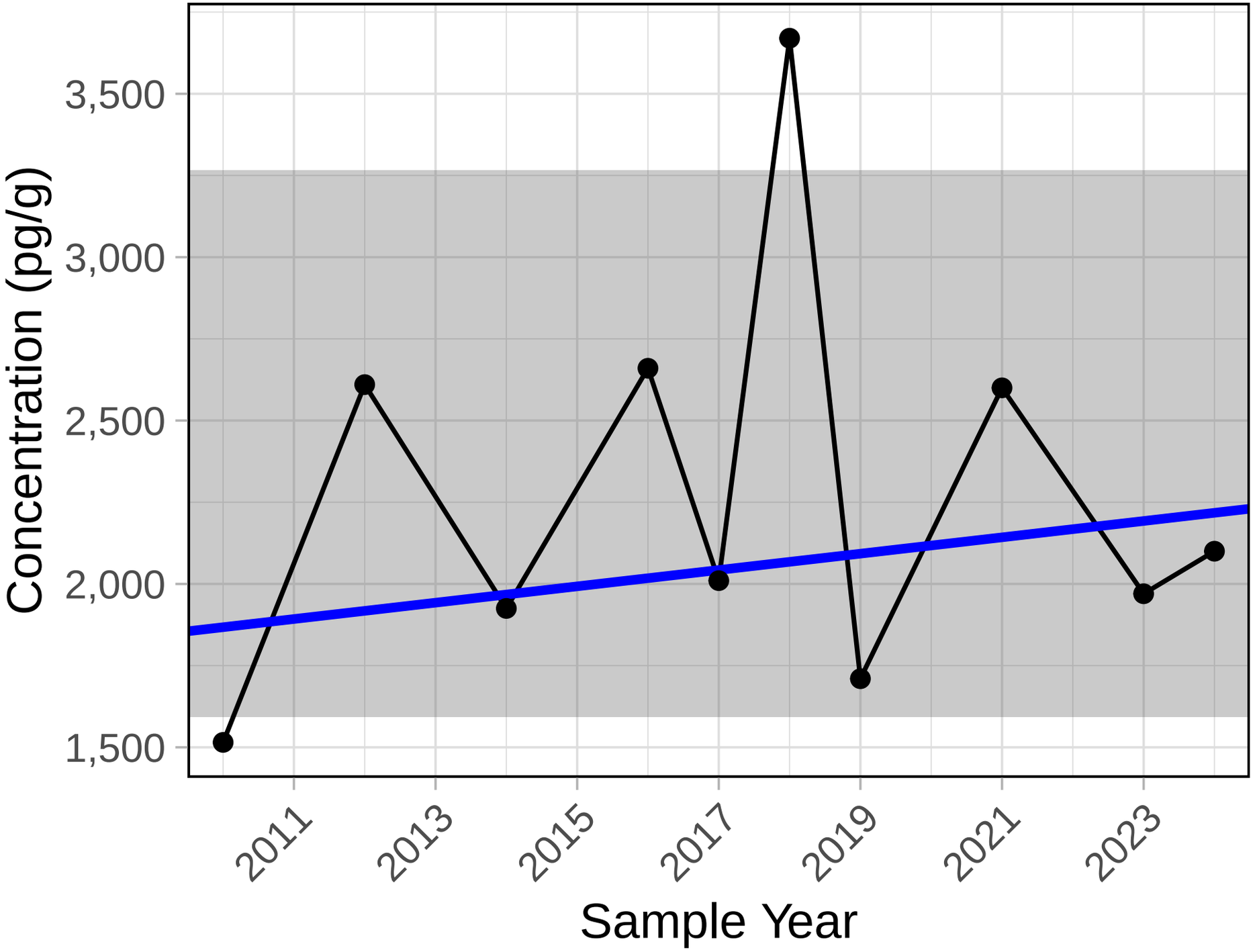


Trend significance p−value = 0.442


Total PeCDF
Chrystina Sediment
Concentration (pg/g)
20
15
10
5
0
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.318

Total PentaCB

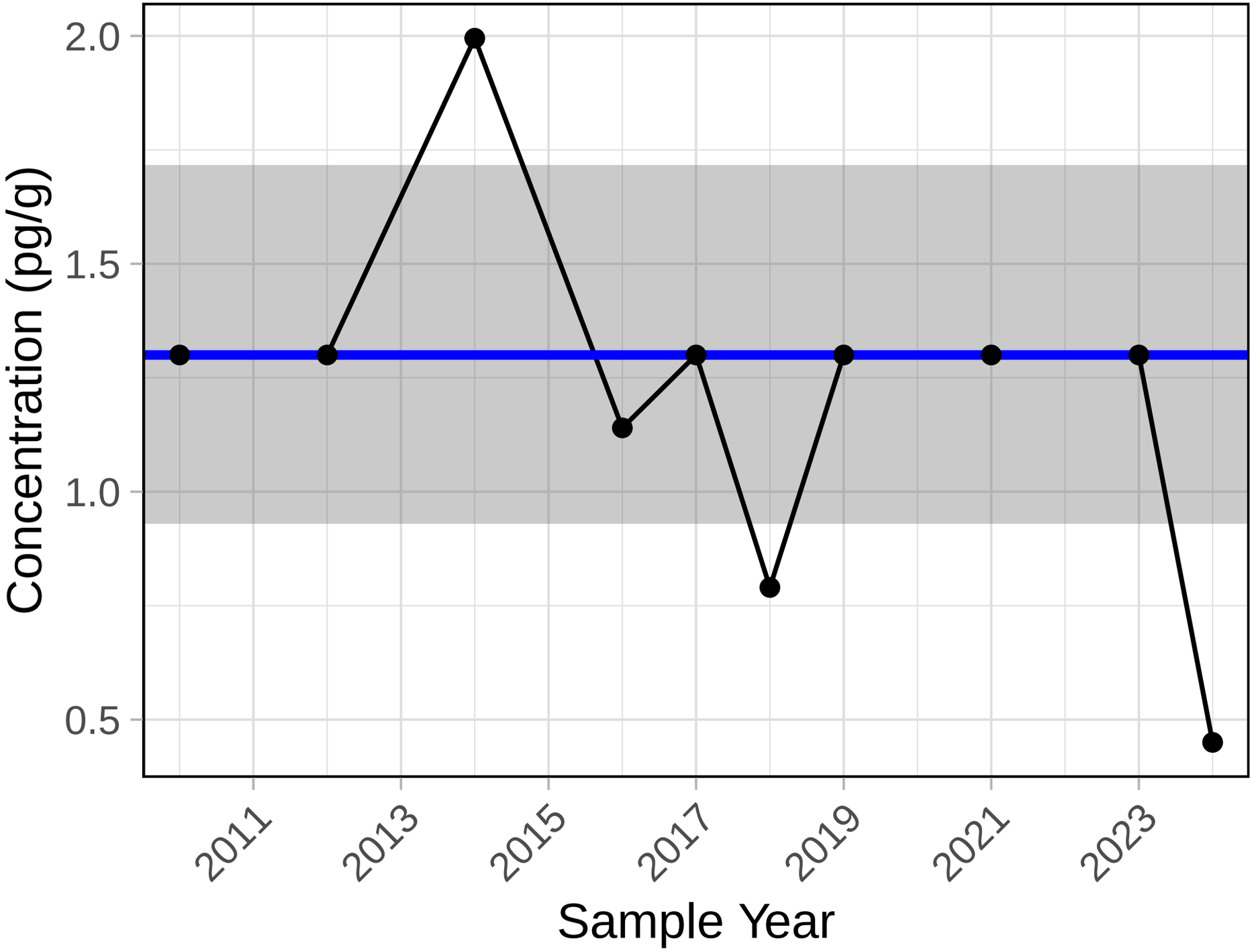
Chrystina Sediment



Trend significance p−value = 0.721

Total TCDD

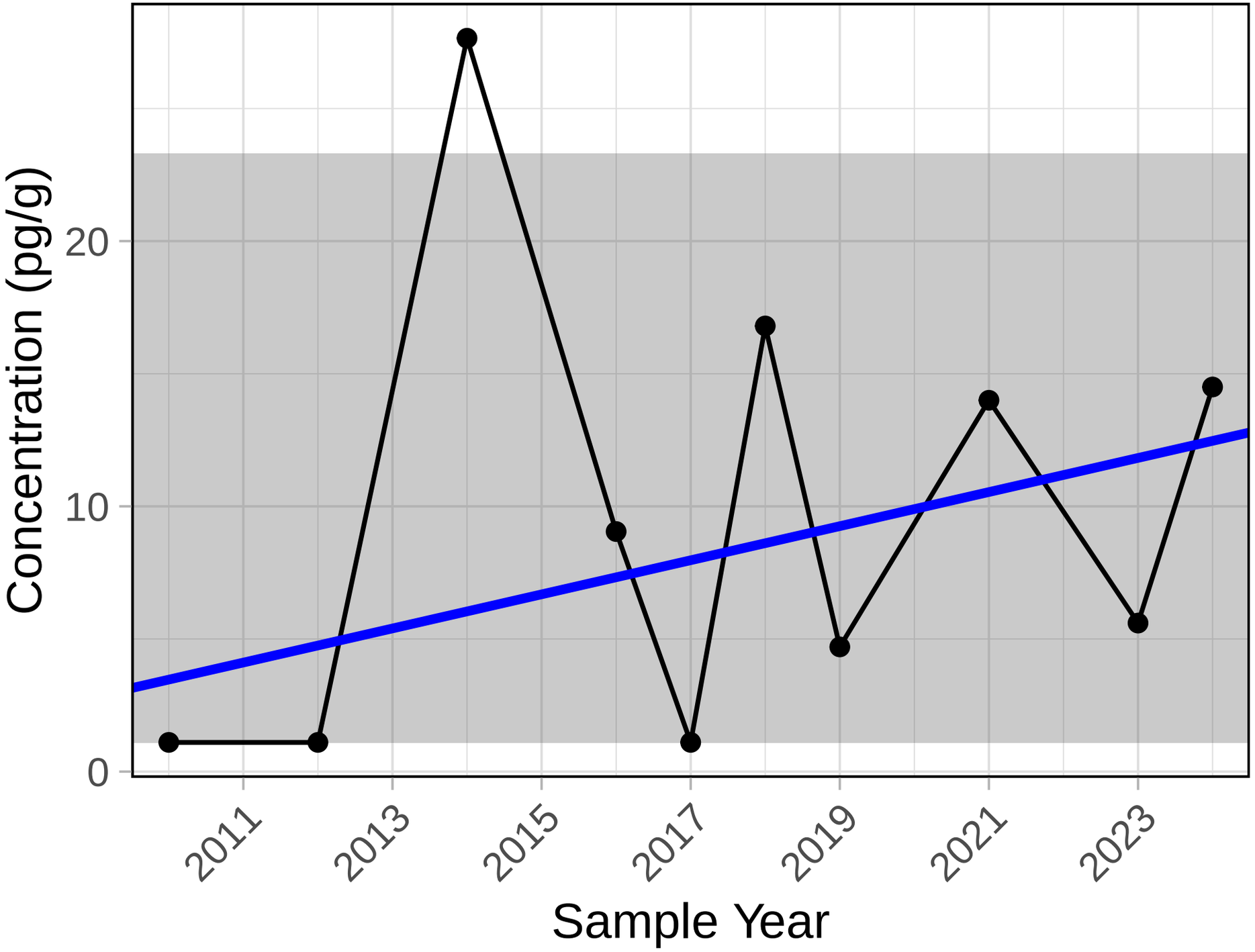
Chrystina Sediment



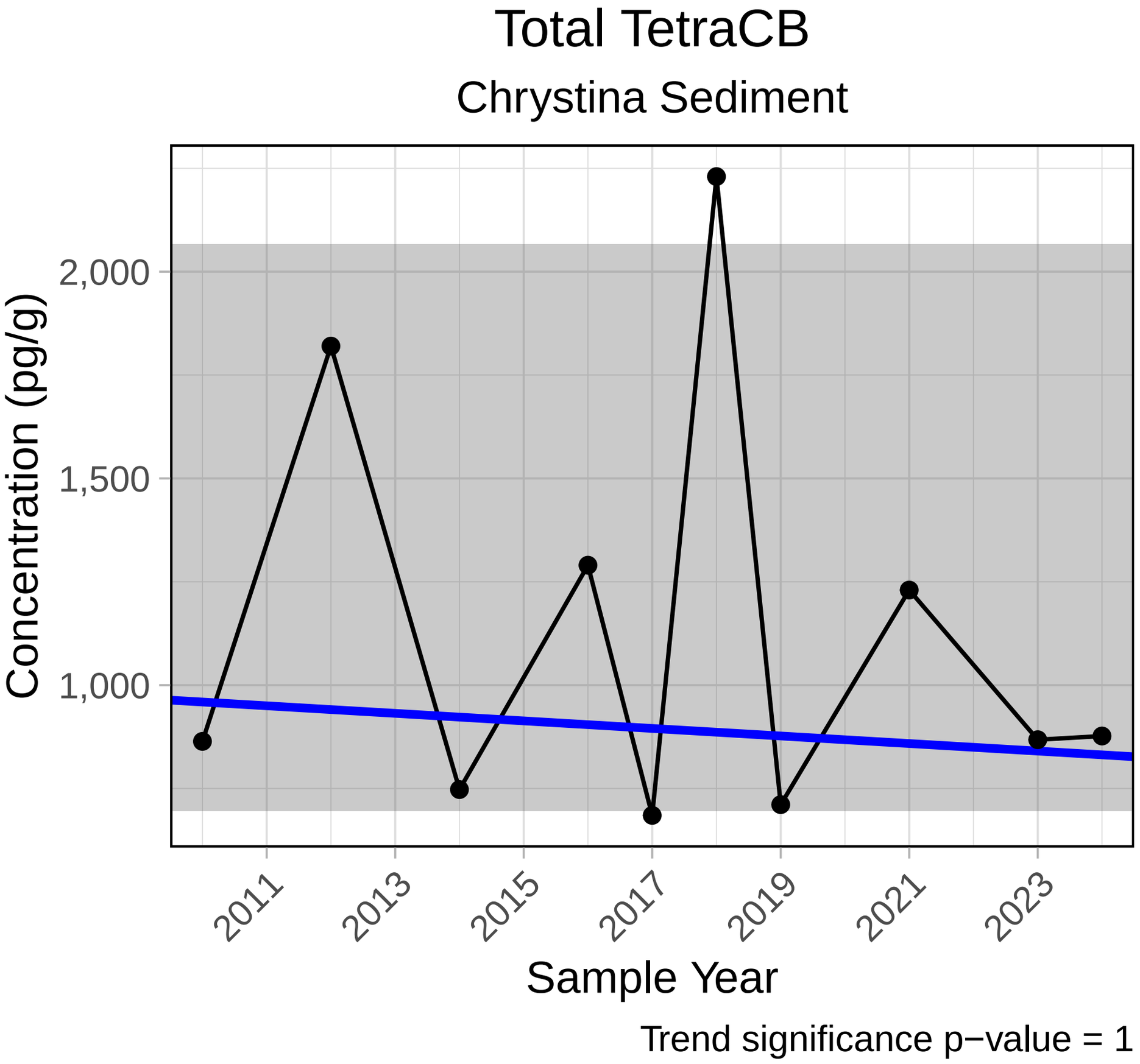
Trend significance p−value = 0.263

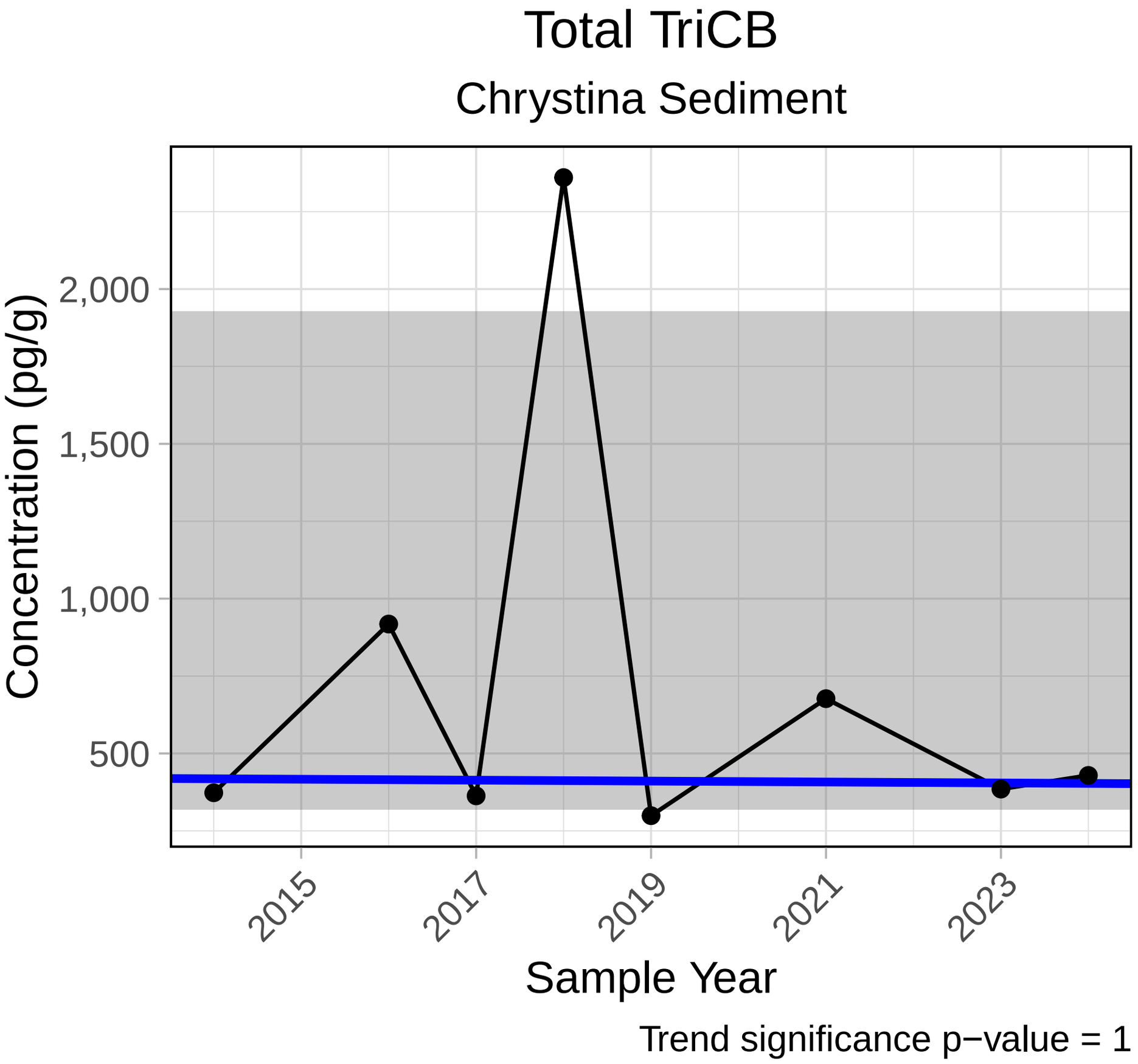
Total TCDF

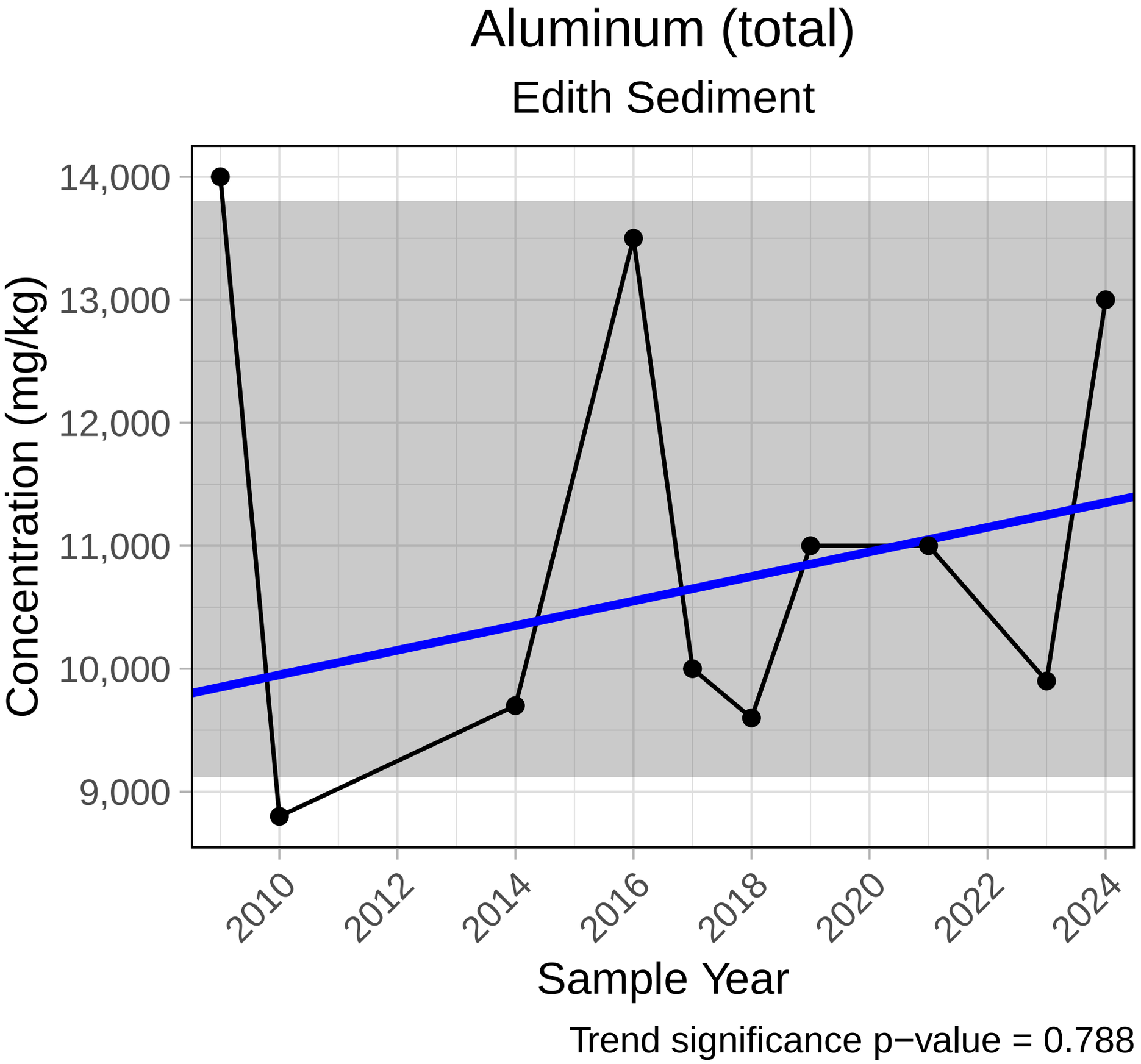
Chrystina Sediment



Trend significance p−value = 0.318

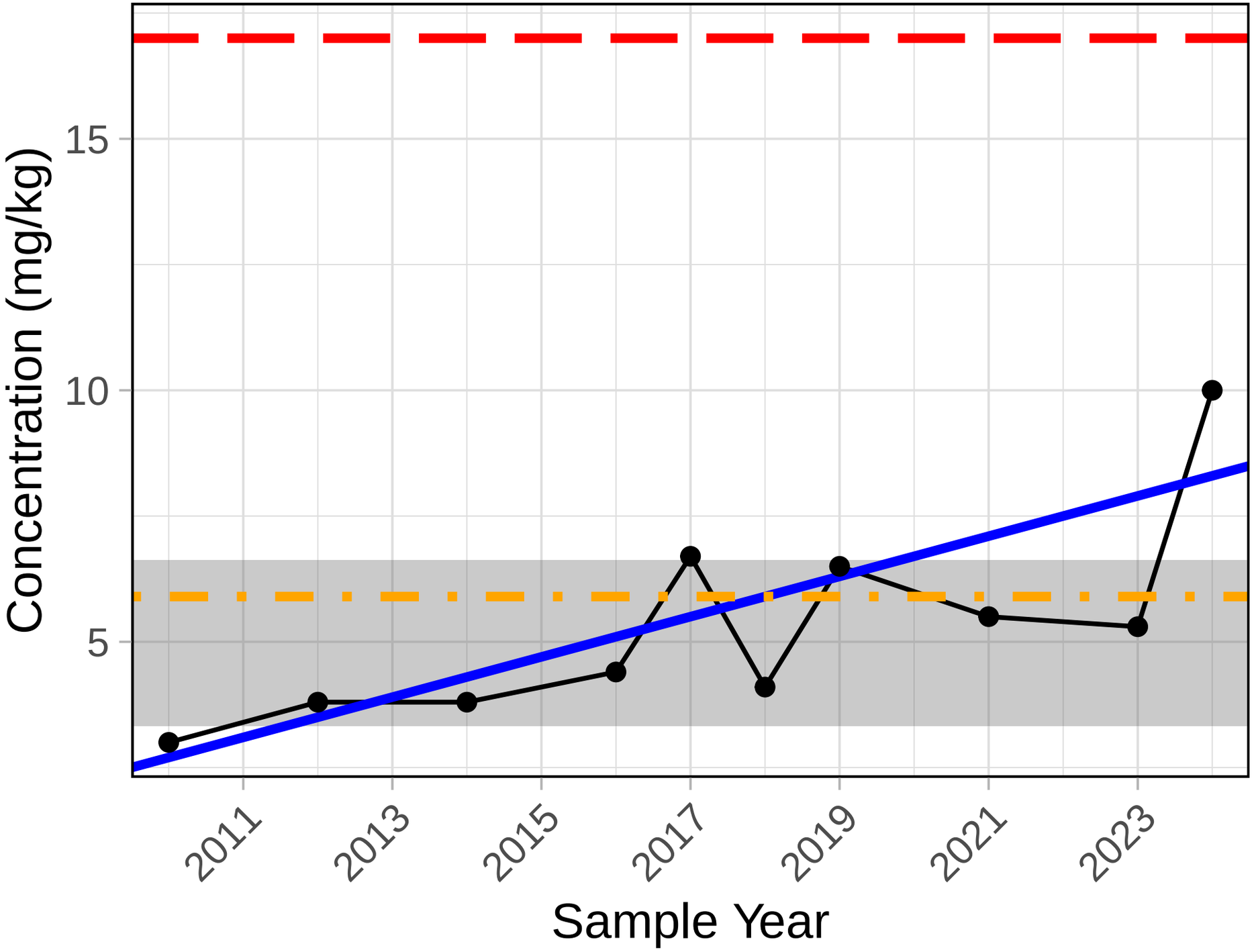

Total TetraCB
Chrystina Sediment
Concentration (pg/g)
2,000
1,500
1,000
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1


Total TriCB
Chrystina Sediment
Concentration (pg/g)
2,000
1,500
1,000
500
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

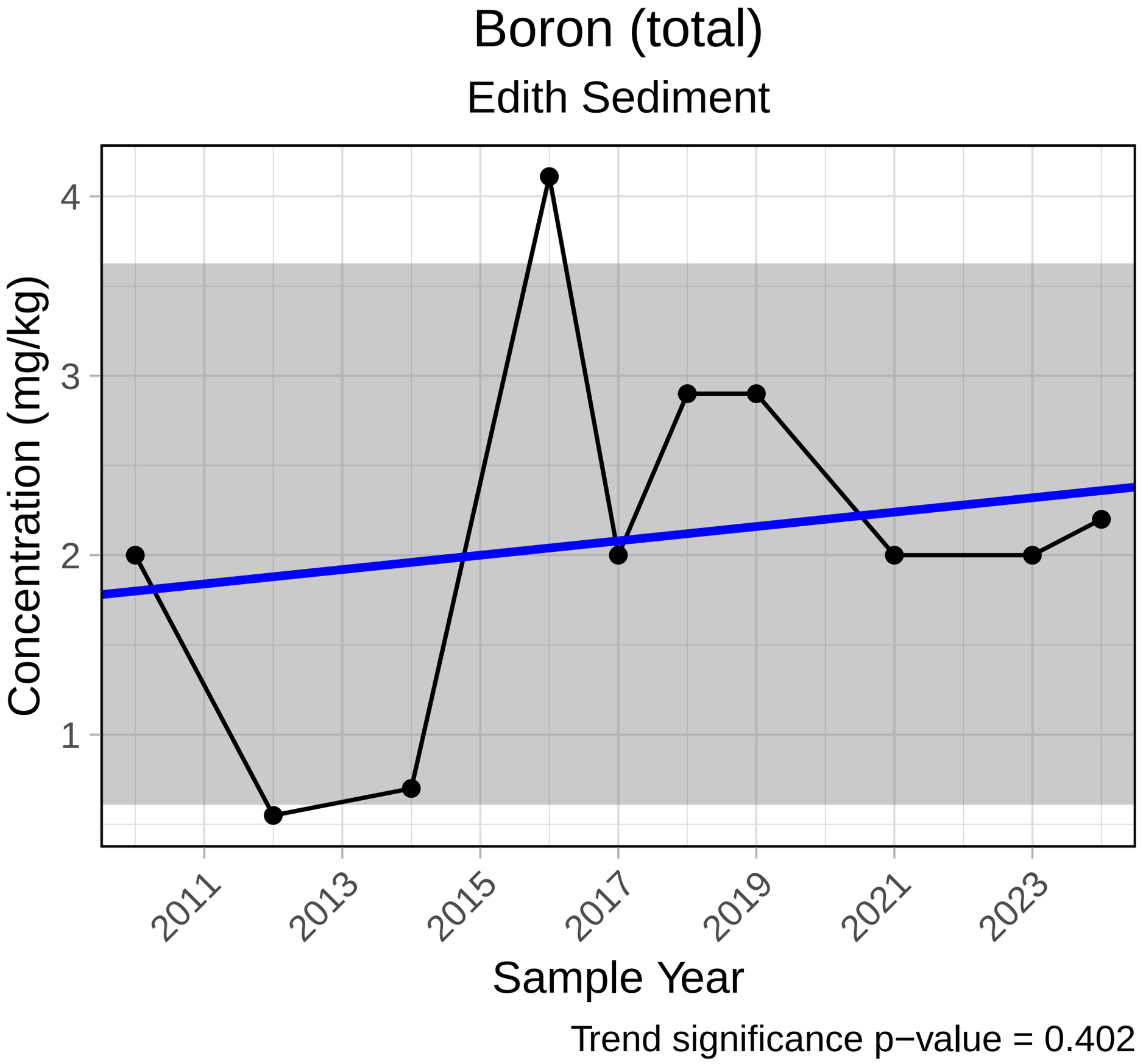

Aluminum (total)
Edith Sediment
14,000
13,000
12,000
11,000
10,000
9,000
Concentration (mg/kg)
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.788

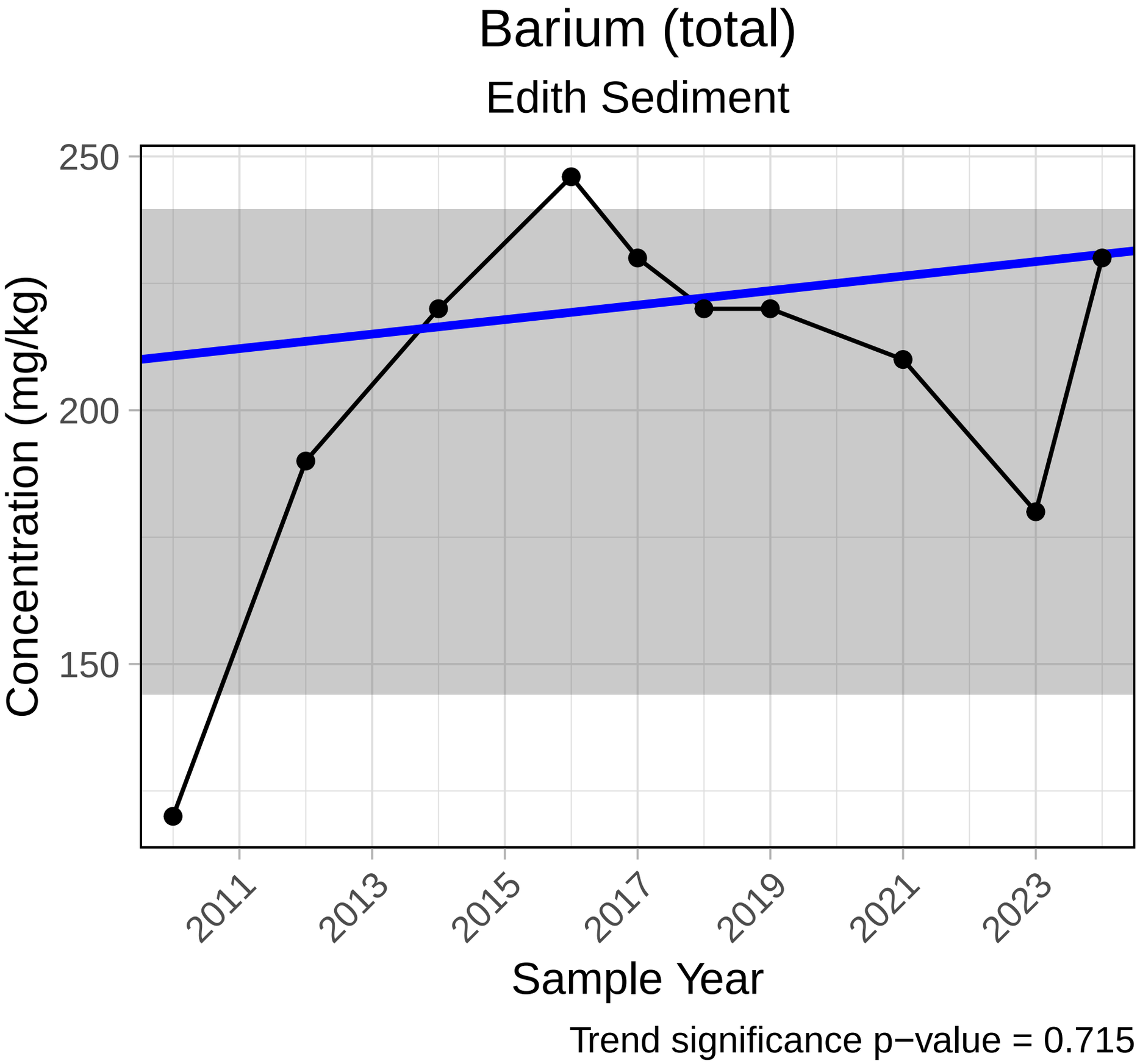
Arsenic (total)

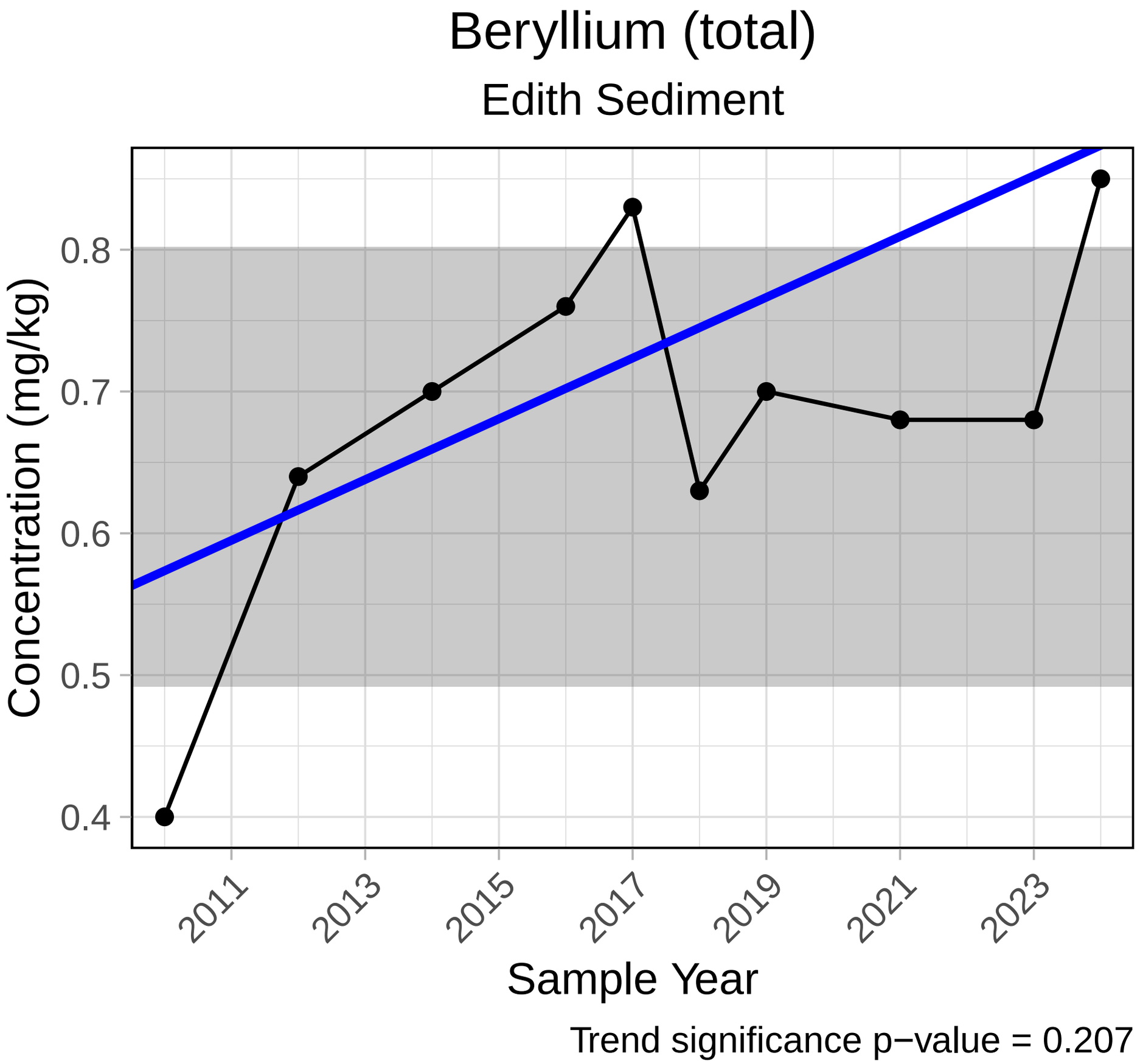
Edith Sediment

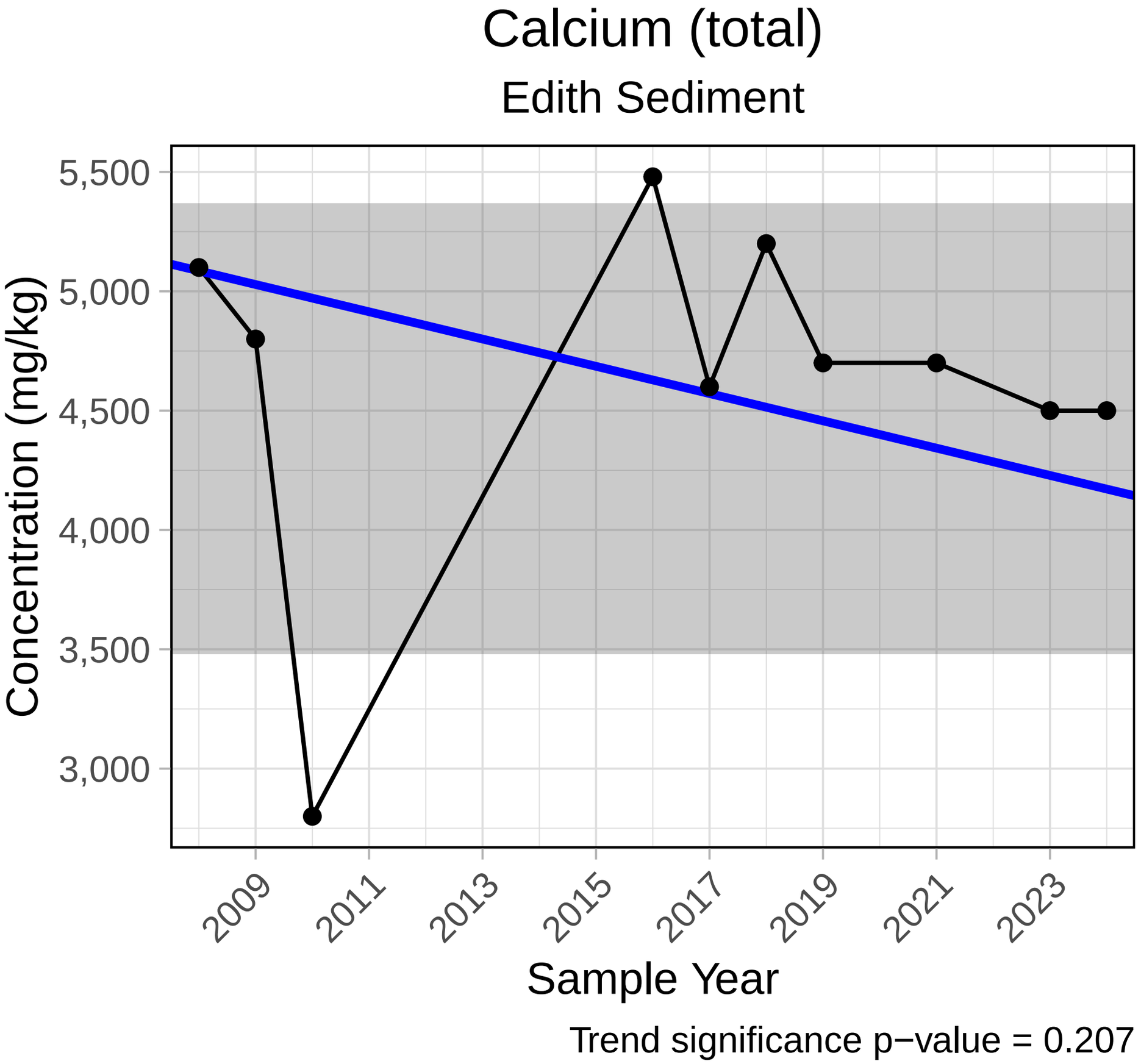


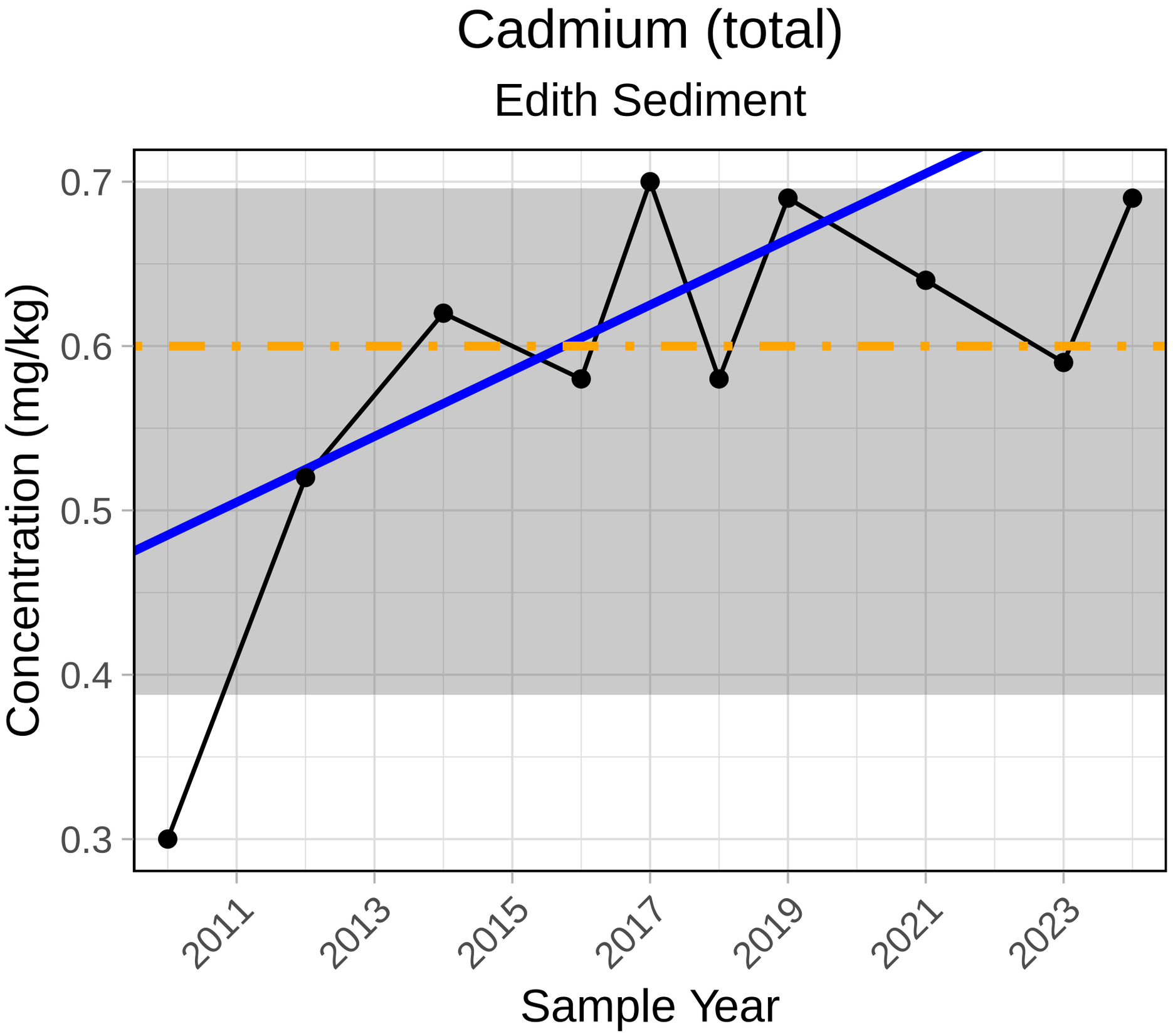
Trend significance p−value = 0.015
ISQG level = 5.9 mg/kg (maximum)
PEL level = 17 mg/kg (maximum)


Boron (total)
Edith Sediment
Concentration (mg/kg)
4
3
2
1
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.402


Barium (total)
Edith Sediment
250
200
150
Concentration (mg/kg)
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.715


Beryllium (total)
Edith Sediment
Concentration (mg/kg)
0.8
0.7
0.6
0.5
0.4
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.207

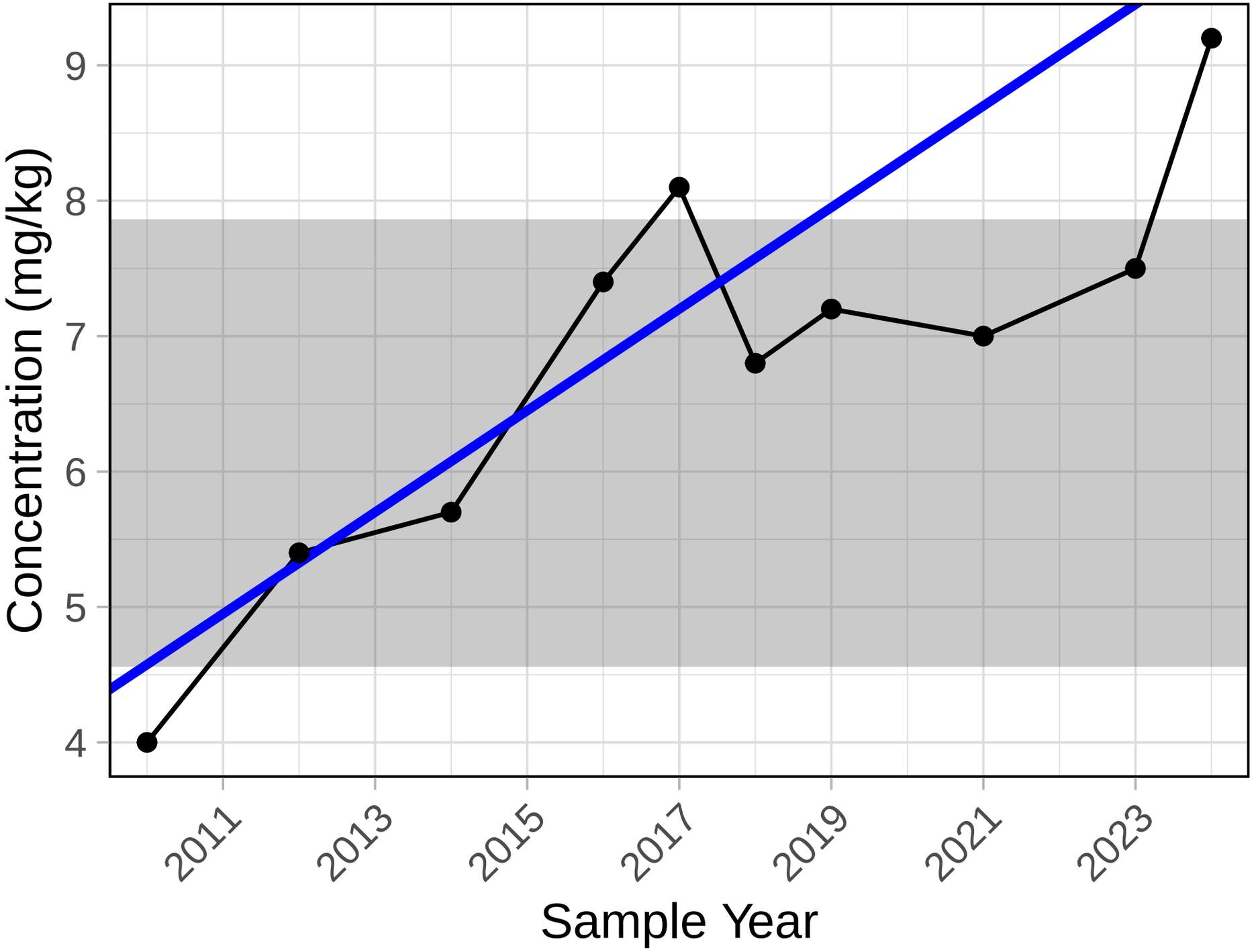

Calcium (total)
Edith Sediment
Concentration (mg/kg)
5,500
5,000
4,500
4,000
3,500
3,000
2009
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.207



Trend significance p−value = 0.071
ISQG level = 0.6 mg/kg (maximum)
PEL level = 3.5 mg/kg (maximum)

Cobalt (total)

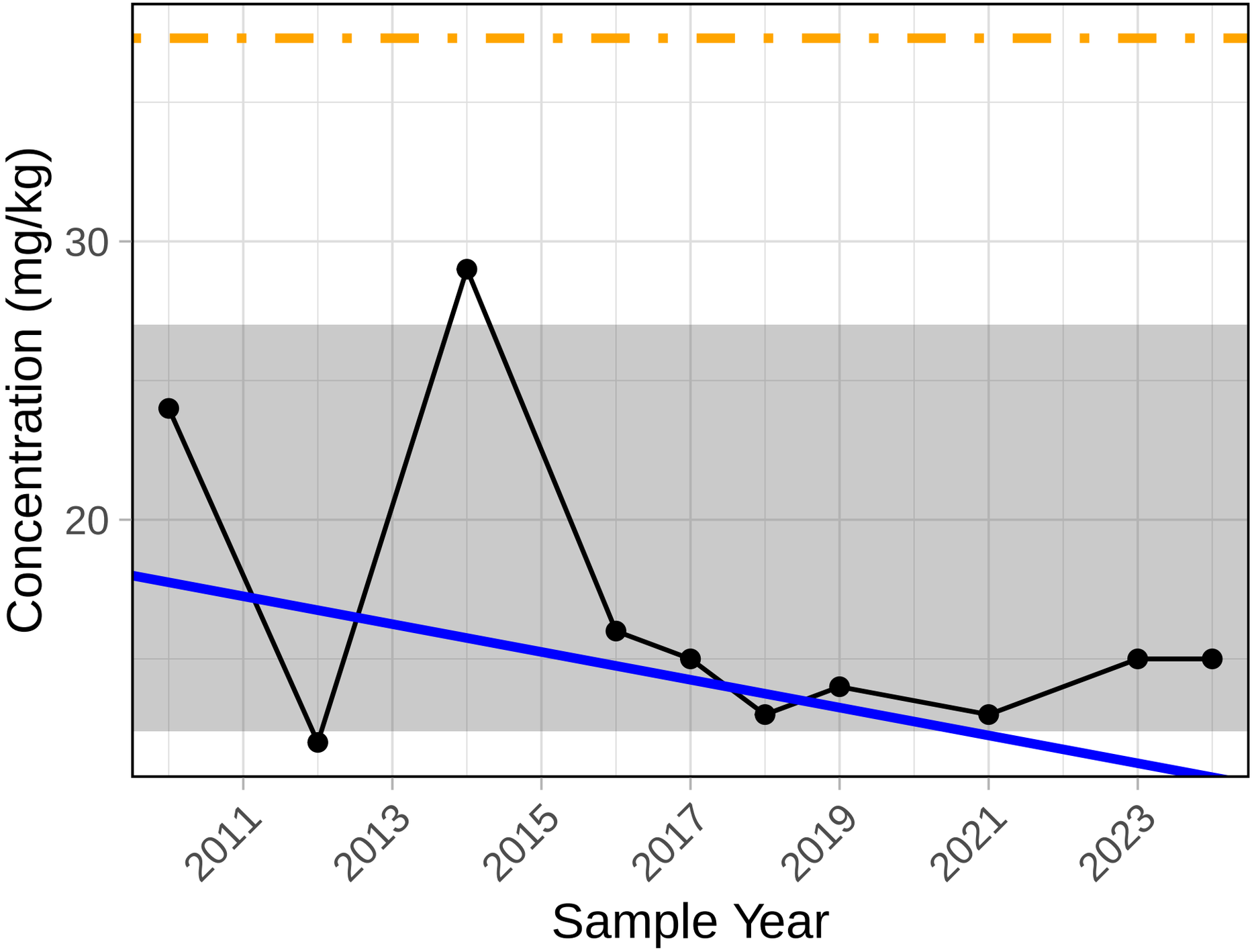
Edith Sediment



Trend significance p−value = 0.012

Chromium (total)

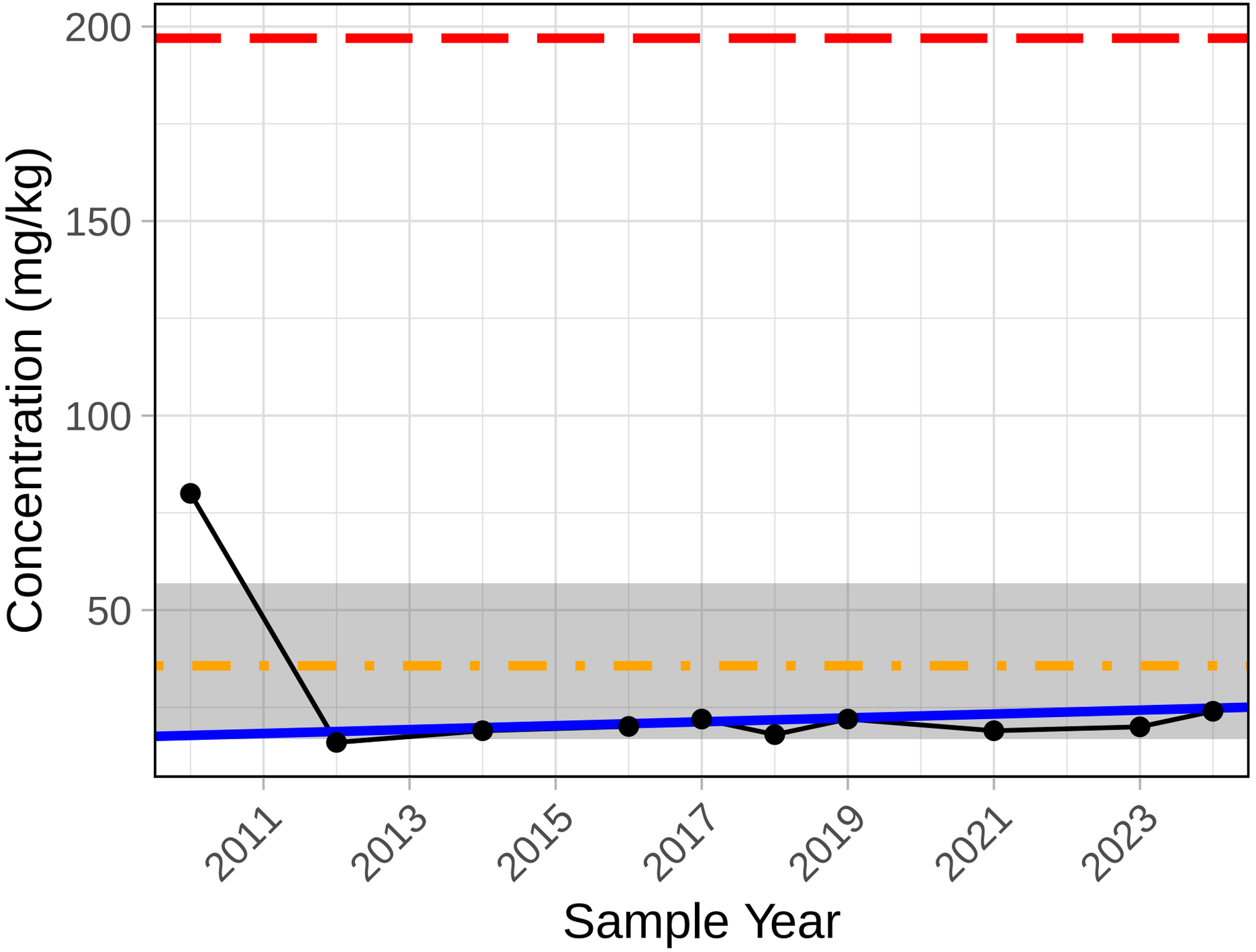
Edith Sediment



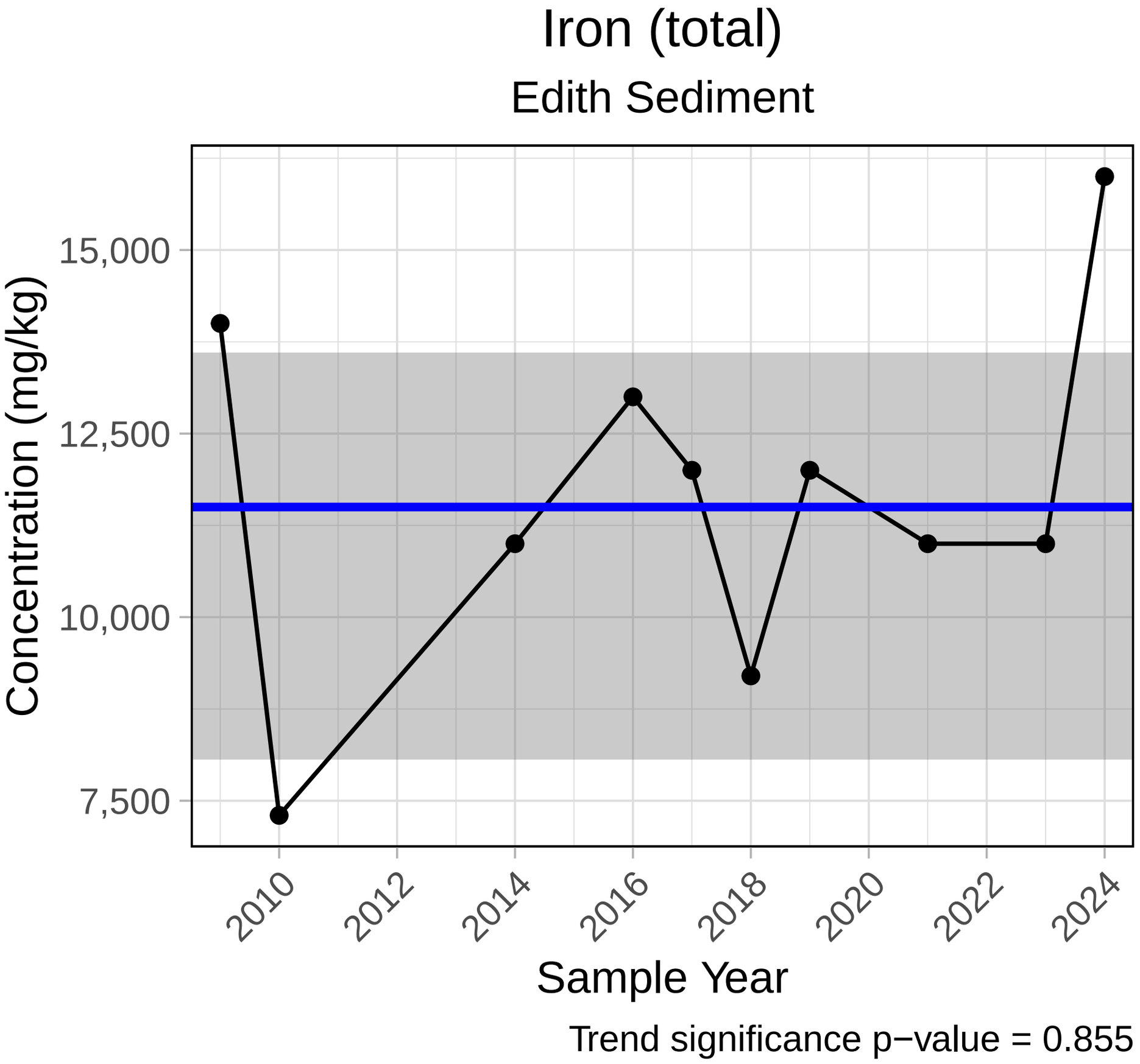
Trend significance p−value = 0.466
ISQG level = 37.3 mg/kg (maximum)
PEL level = 90 mg/kg (maximum)

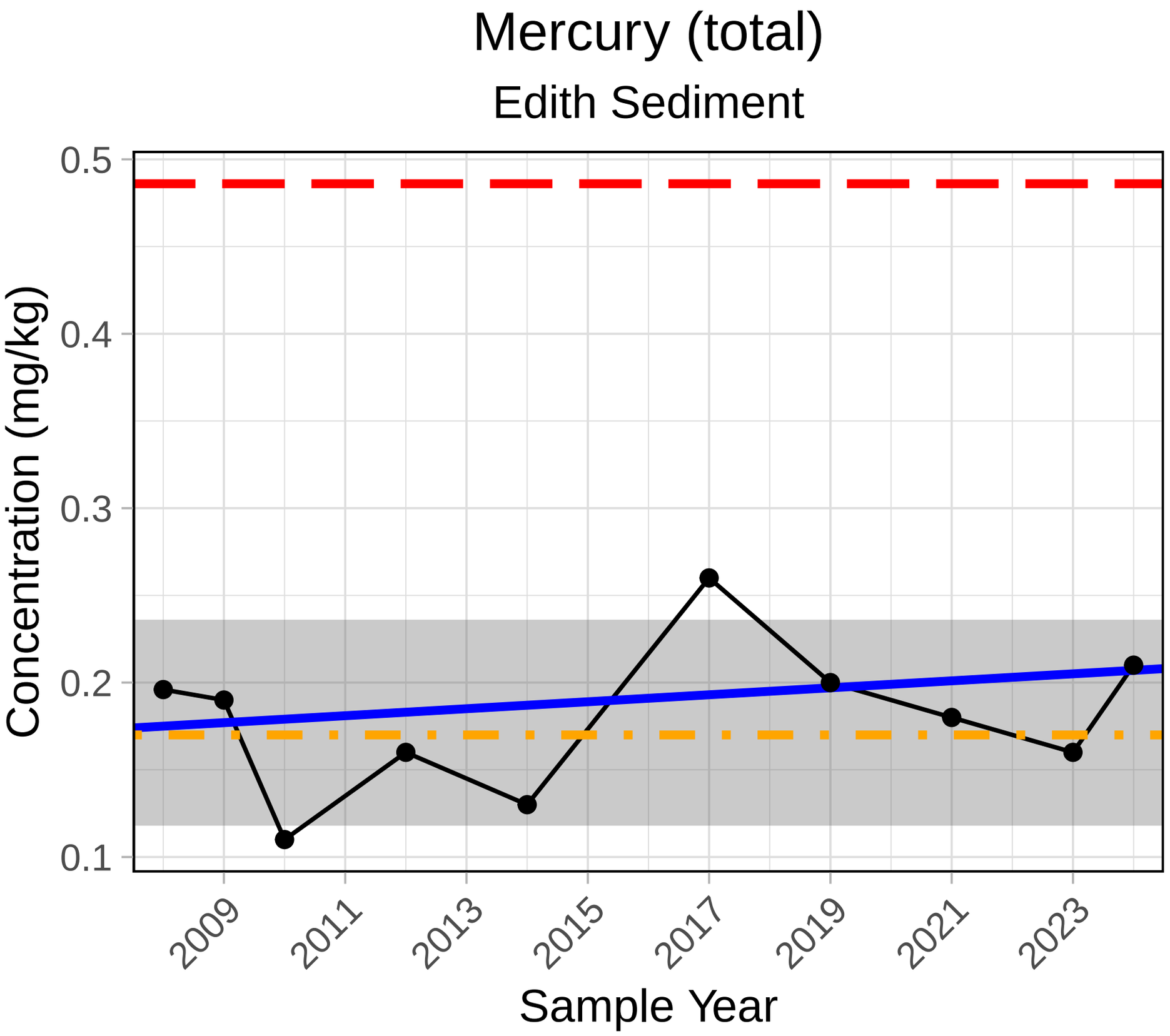
Copper (total)

Edith Sediment

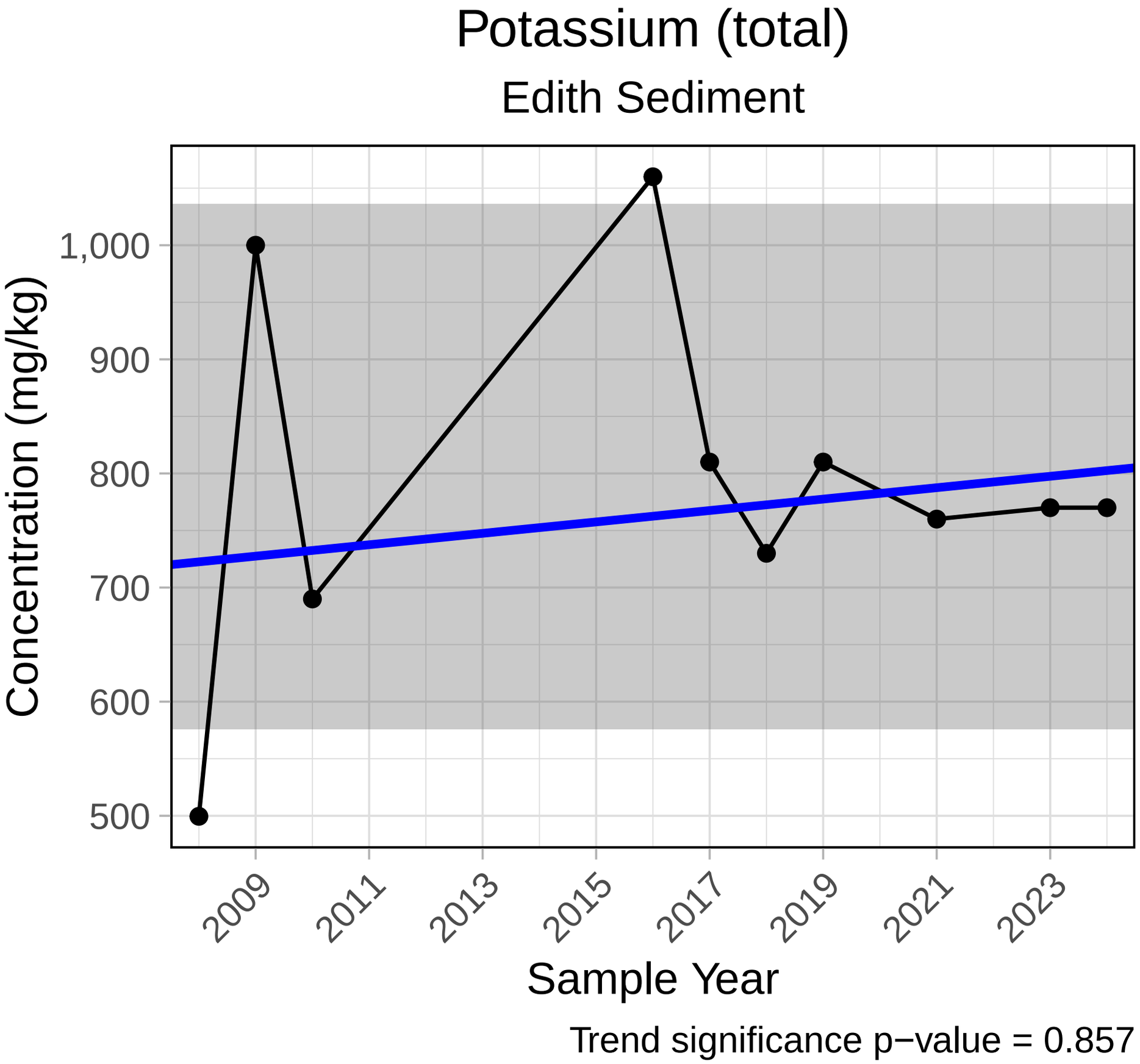


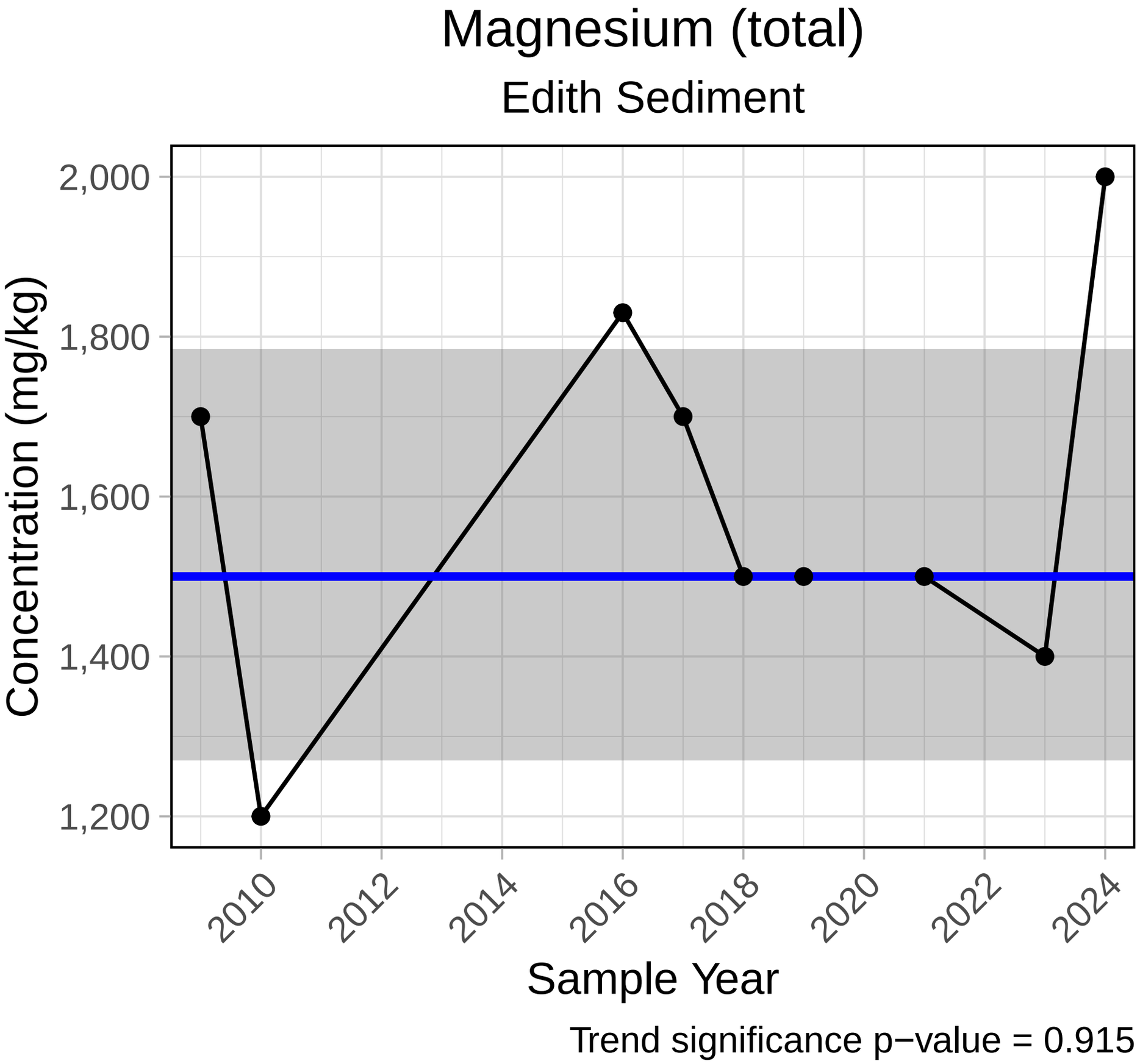
Trend significance p−value = 0.589
ISQG level = 35.7 mg/kg (maximum)
PEL level = 197 mg/kg (maximum)

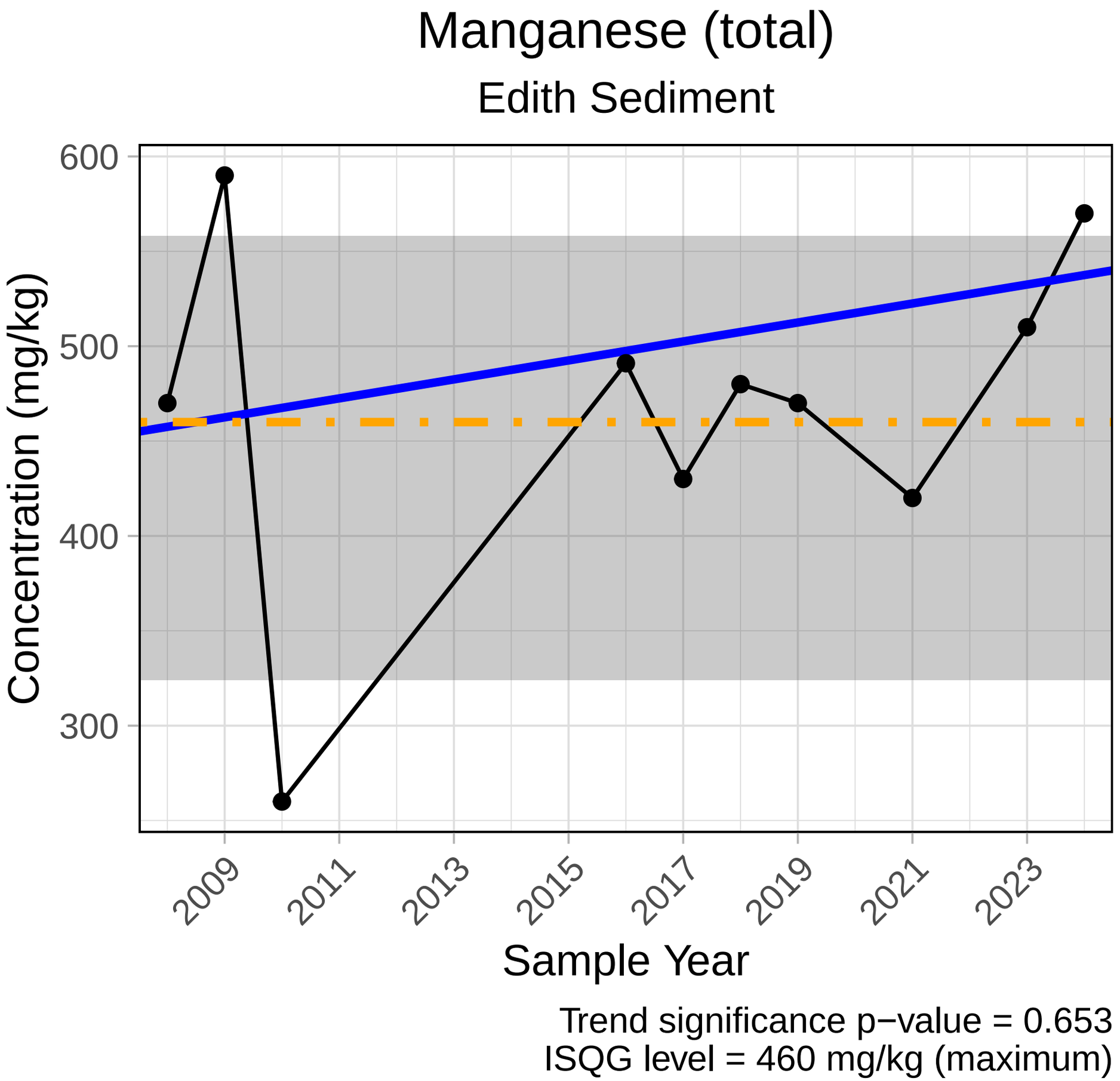

Iron (total)
Edith Sediment
Concentration (mg/kg)
15,000
12,500
10,000
7,500
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.855



Trend significance p−value = 0.653
ISQG level = 0.17 mg/kg (maximum)
PEL level = 0.486 mg/kg (maximum)

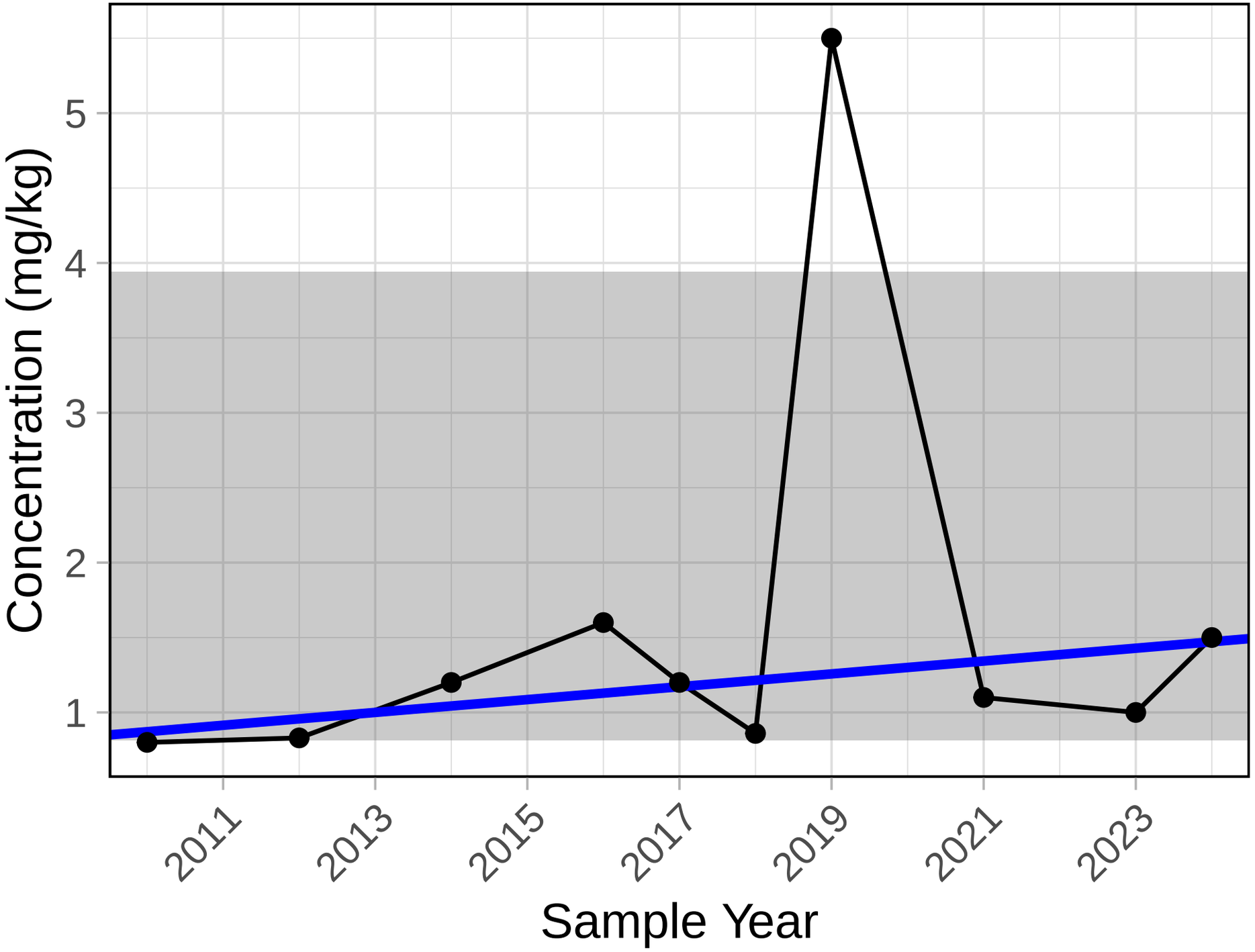

Potassium (total)
Edith Sediment
Concentration (mg/kg)
1,000
900
800
700
600
500
2009
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.857


Magnesium (total)
Edith Sediment
Concentration (mg/kg)
2,000
1,800
1,600
1,400
1,200
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.915

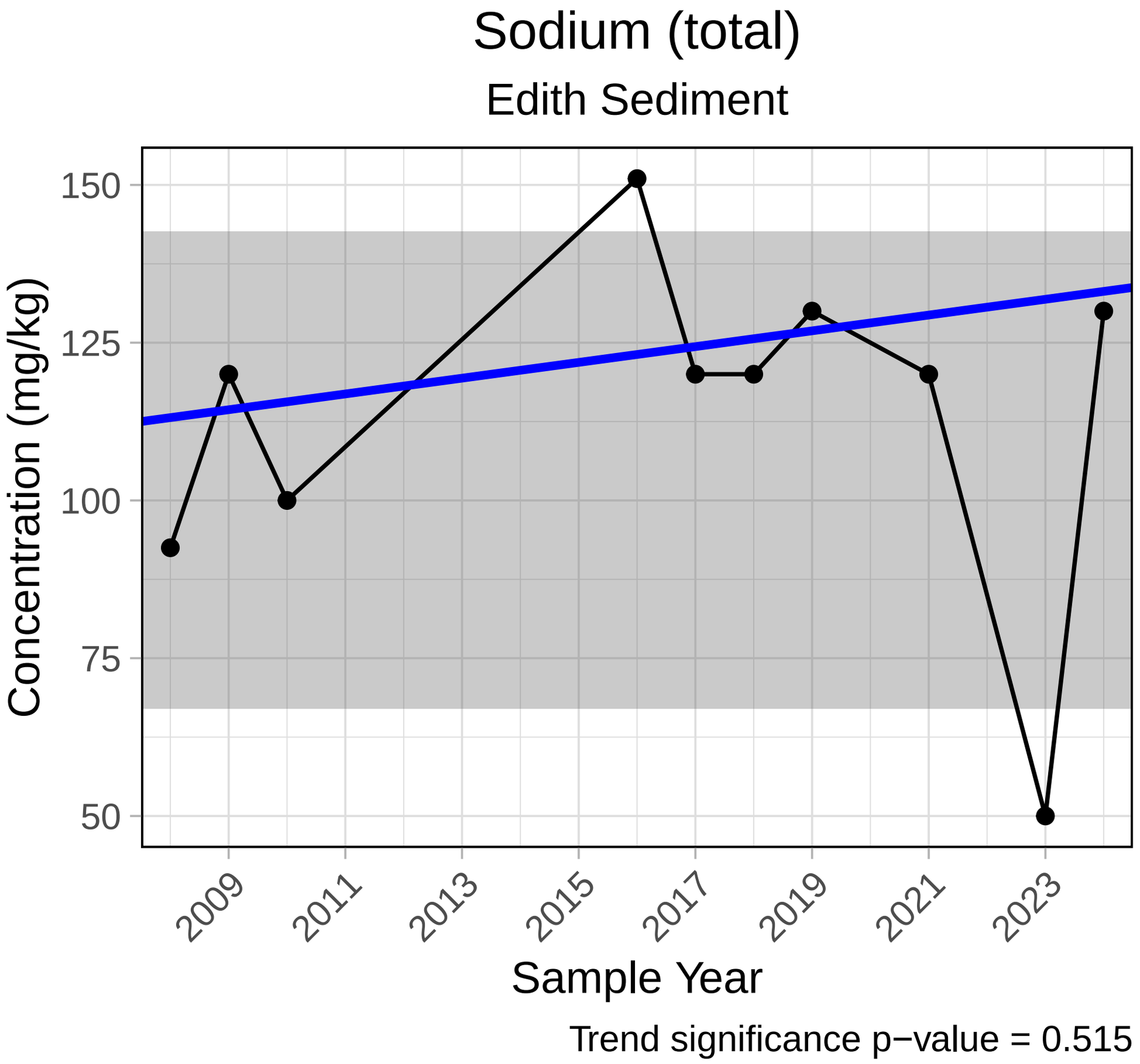

Manganese (total)
Edith Sediment
600
500
400
300
Concentration (mg/kg)
2009
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.653
ISQG level = 460 mg/kg (maximum)

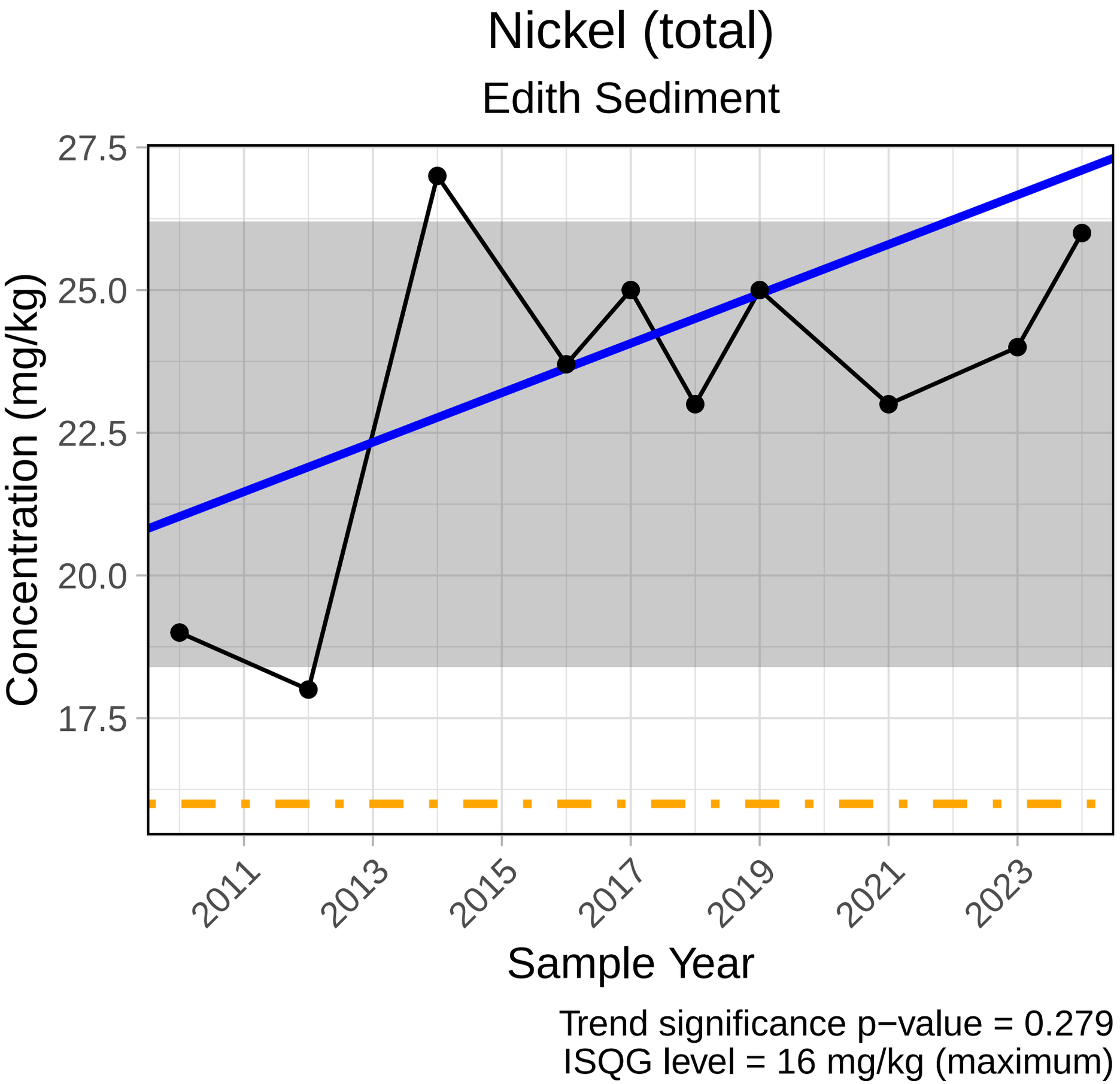
Molybdenum (total)

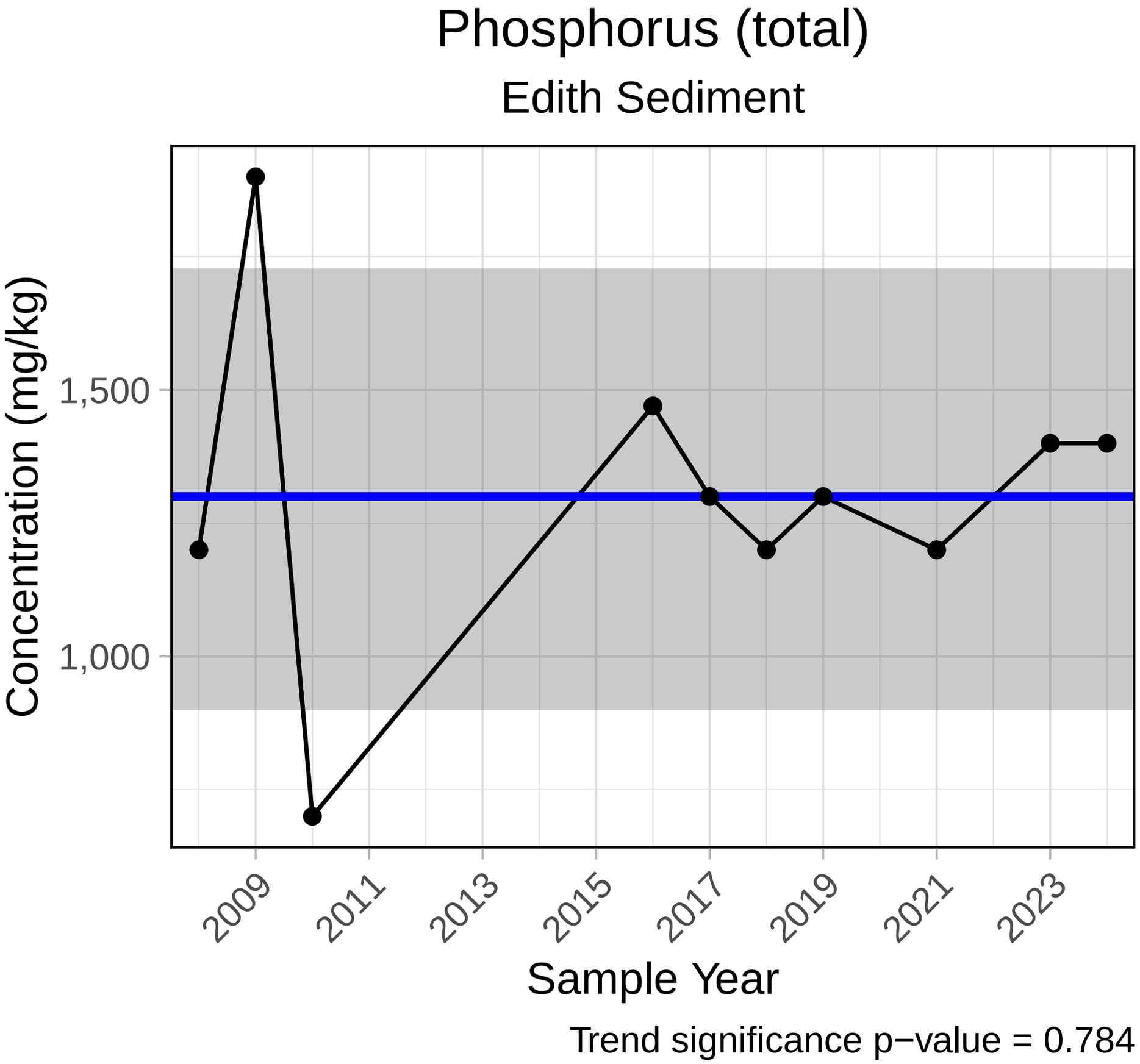
Edith Sediment



Trend significance p−value = 0.243

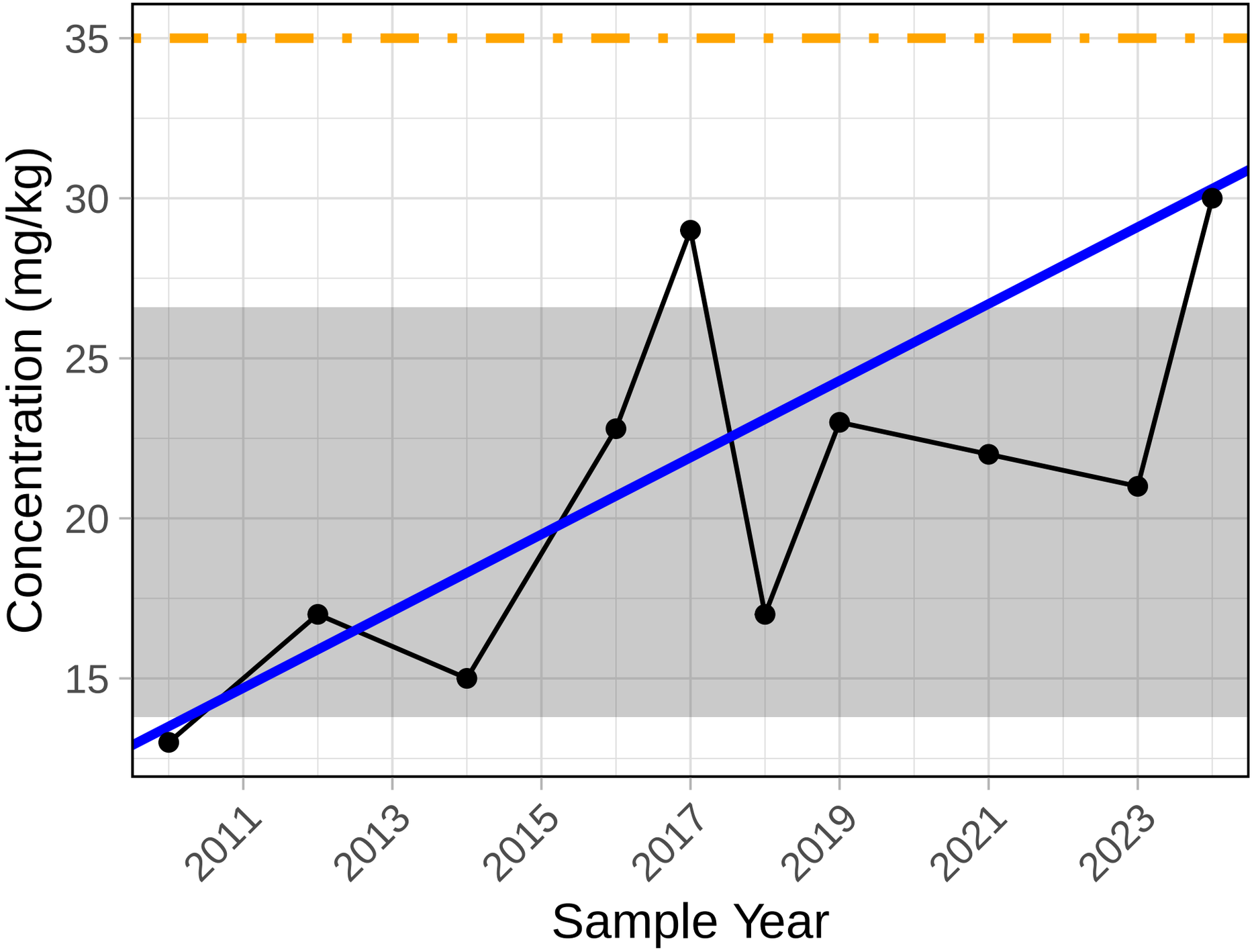

Sodium (total)
Edith Sediment
Concentration (mg/kg)
150
125
100
75
50
2009
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.515


Nickel (total)
Edith Sediment
27.5
25.0
22.5
20.0
17.5
Concentration (mg/kg)
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.279
ISQG level = 16 mg/kg (maximum)

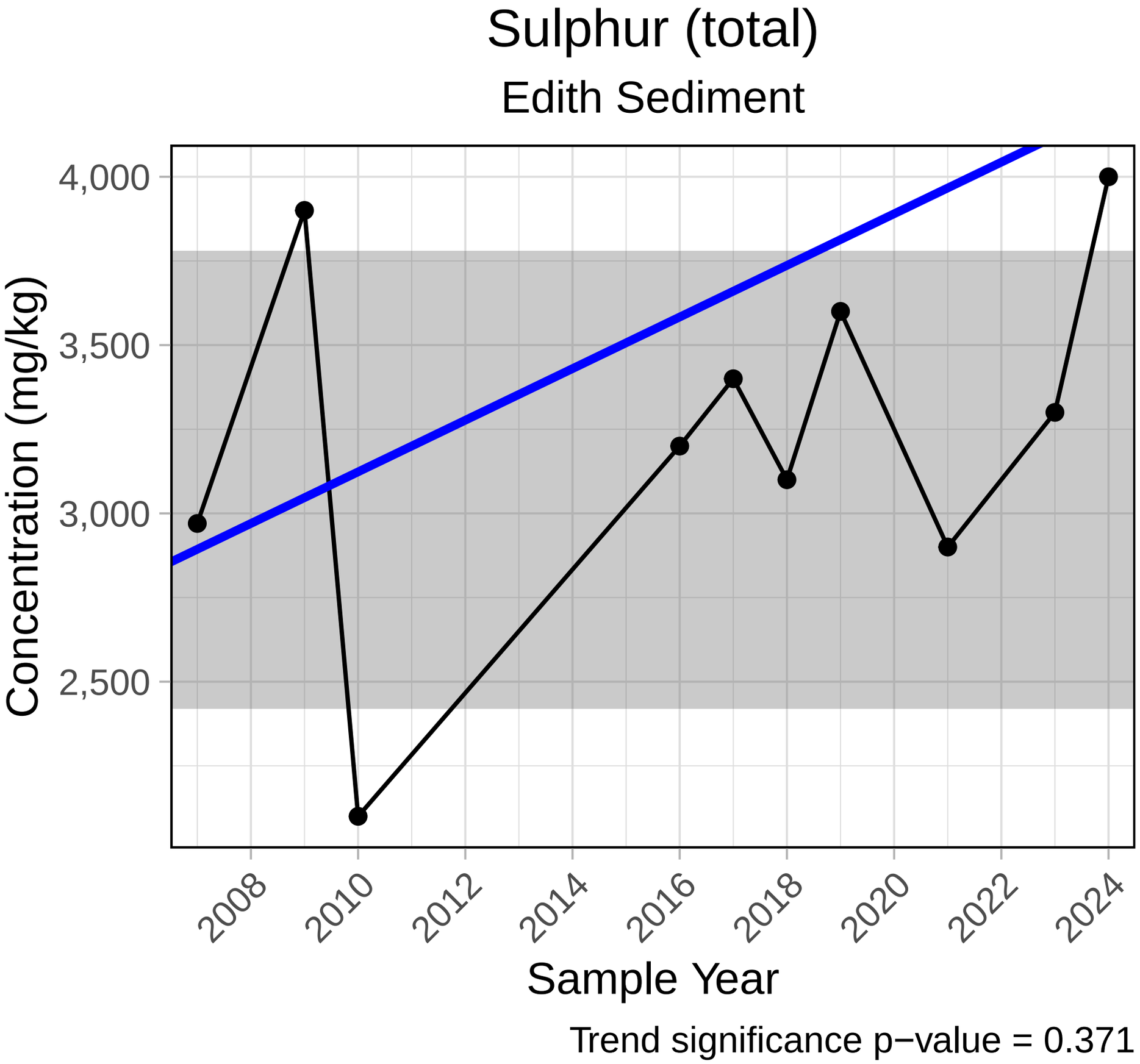

Phosphorus (total)
Edith Sediment
Concentration (mg/kg)
1,500
1,000
2009
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.784

Lead (total)

Edith Sediment

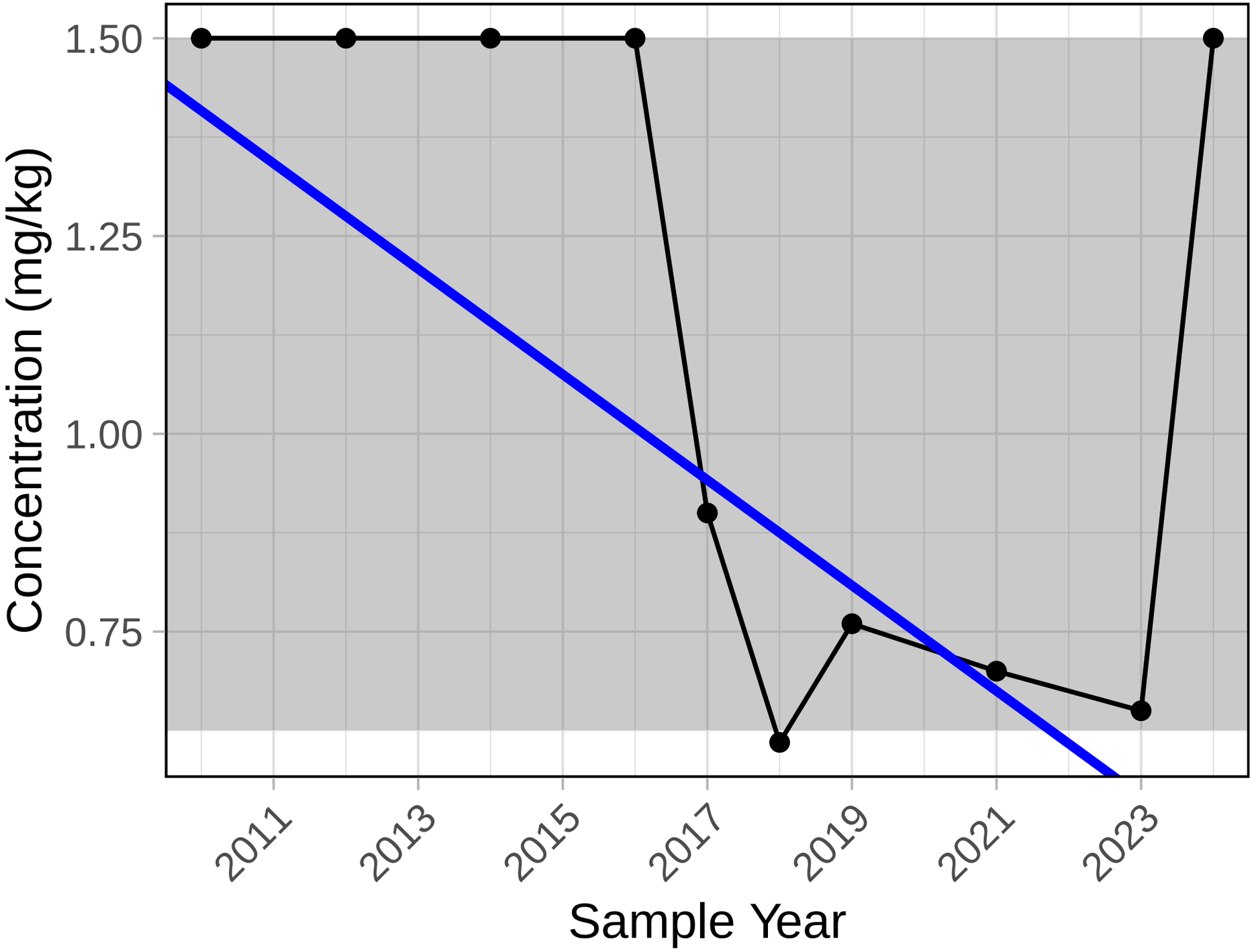


Trend significance p−value = 0.059
ISQG level = 35 mg/kg (maximum)
PEL level = 91.3 mg/kg (maximum)

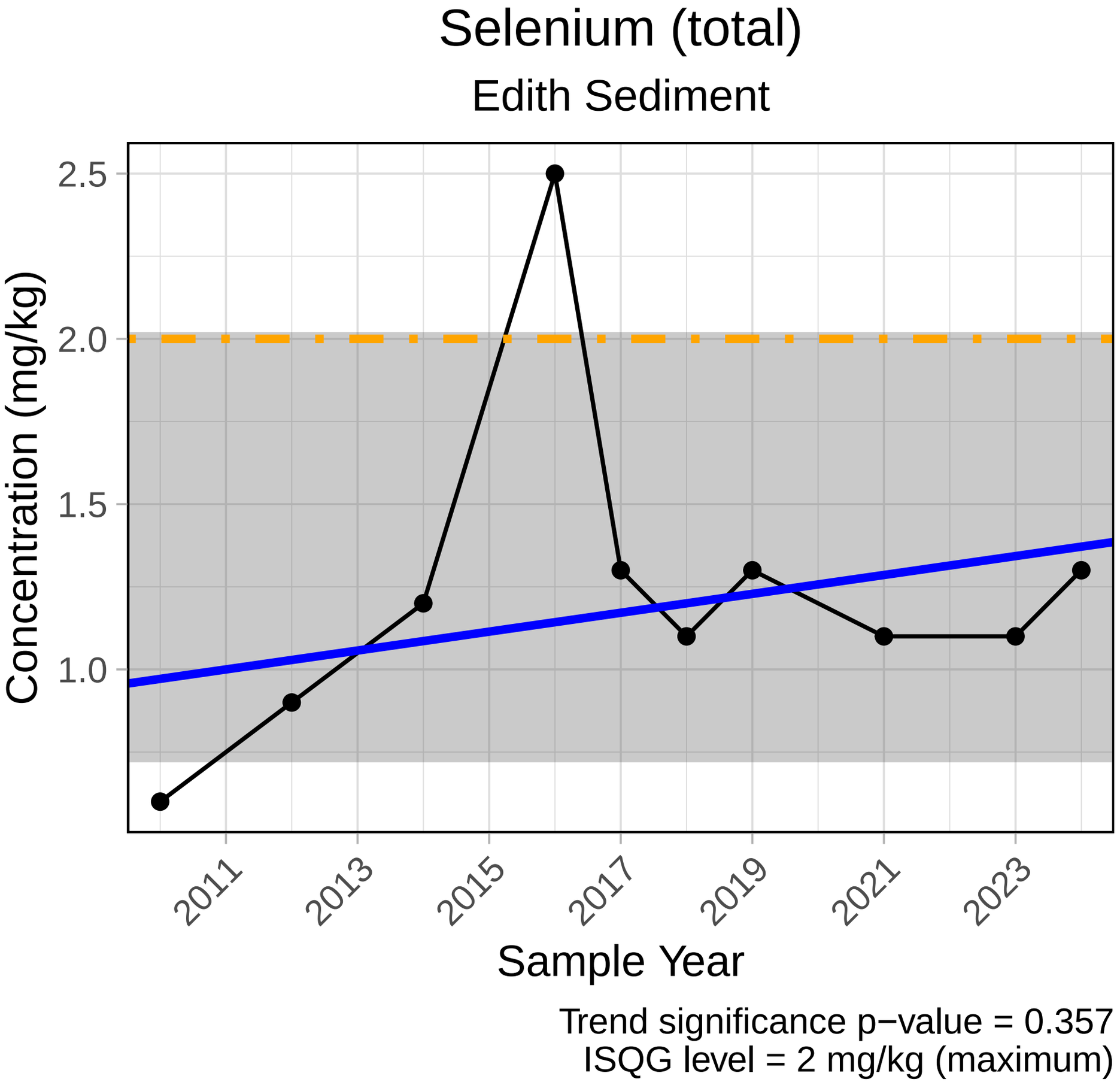

Sulphur (total)
Edith Sediment
4,000
3,500
3,000
2,500
Concentration (mg/kg)
2008
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.371

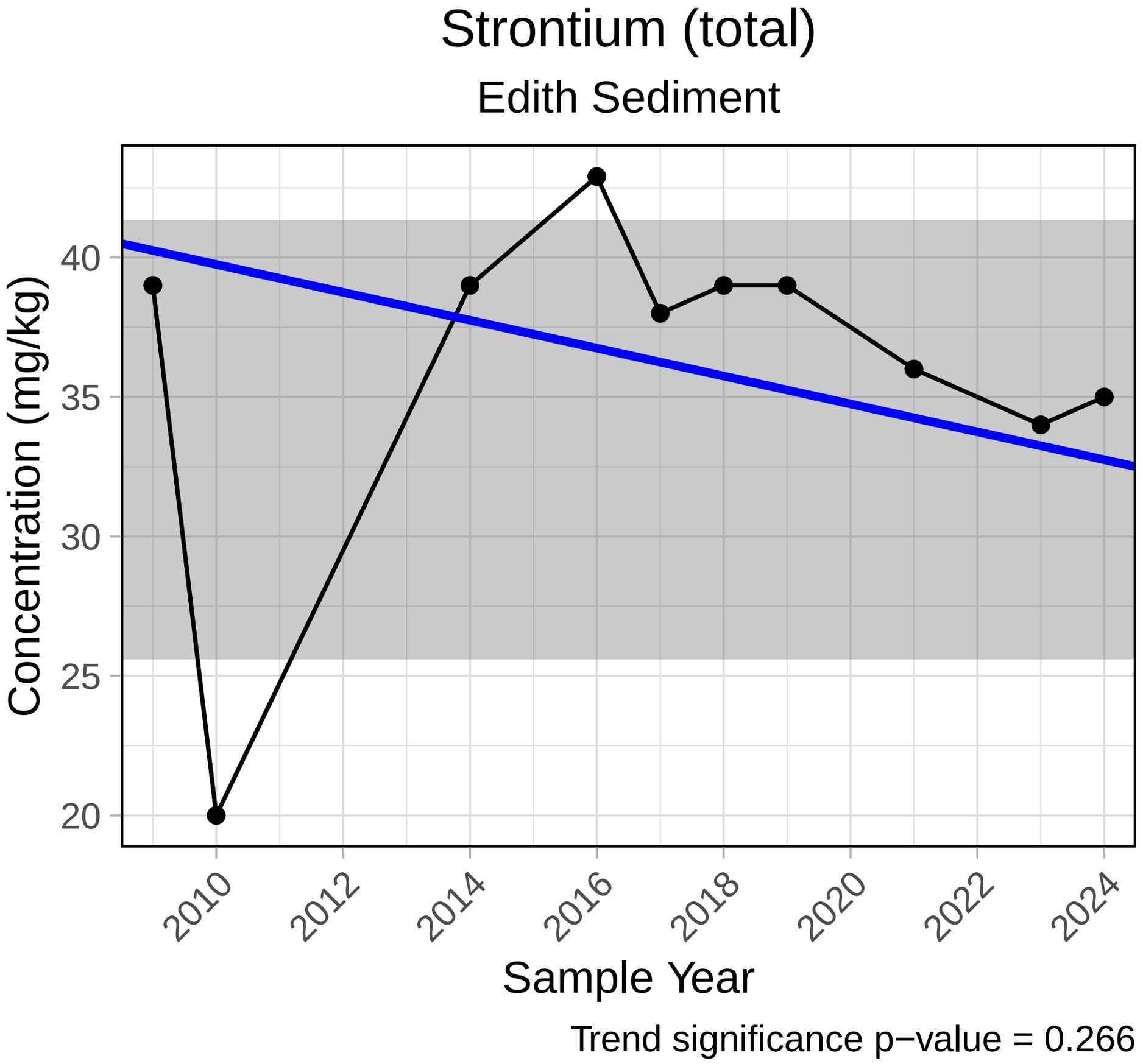
Antimony (total)

Edith Sediment



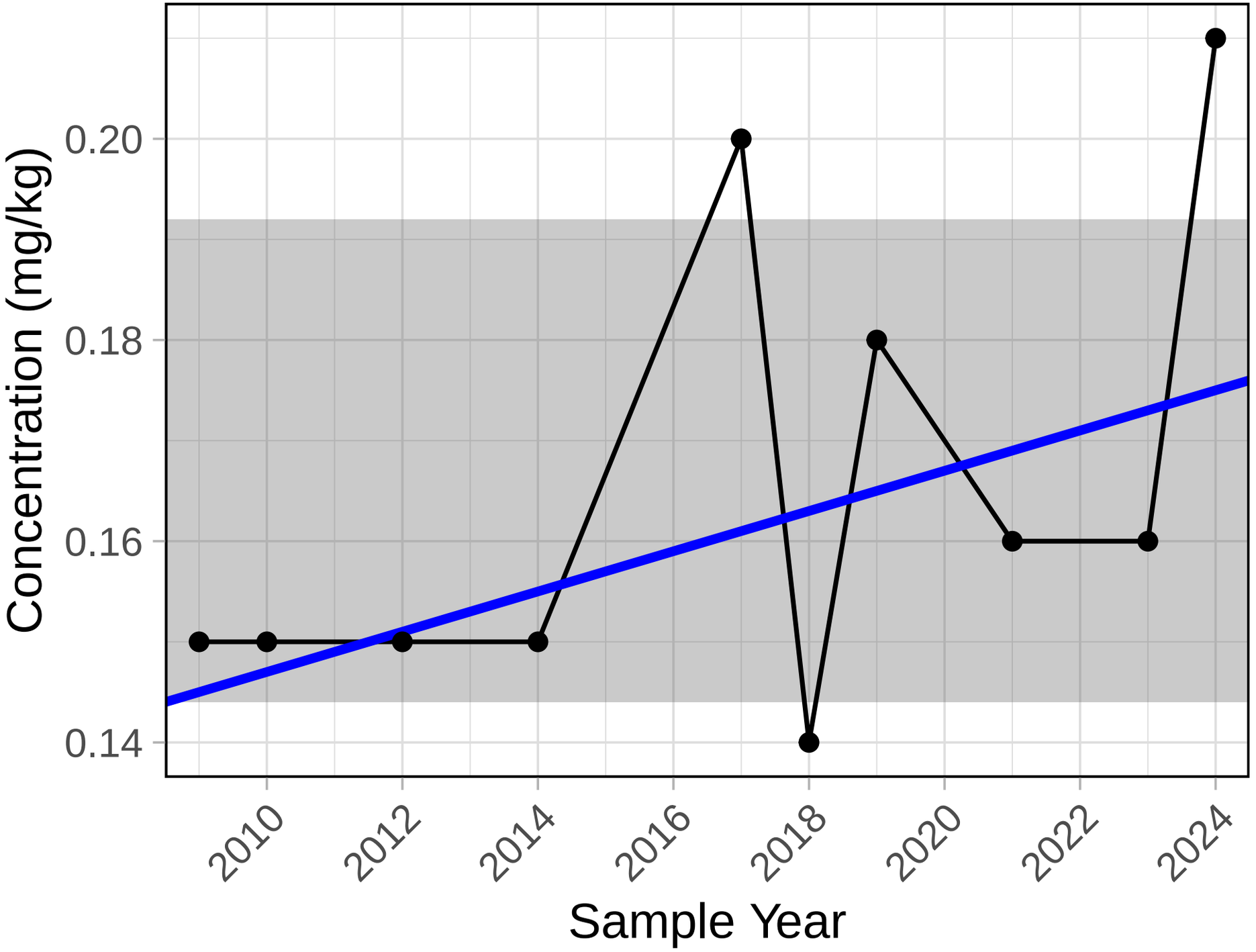
Trend significance p−value = 0.084


Selenium (total)
Edith Sediment
Concentration (mg/kg)
2.5
2.0
1.5
1.0
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.357
ISQG level = 2 mg/kg (maximum)

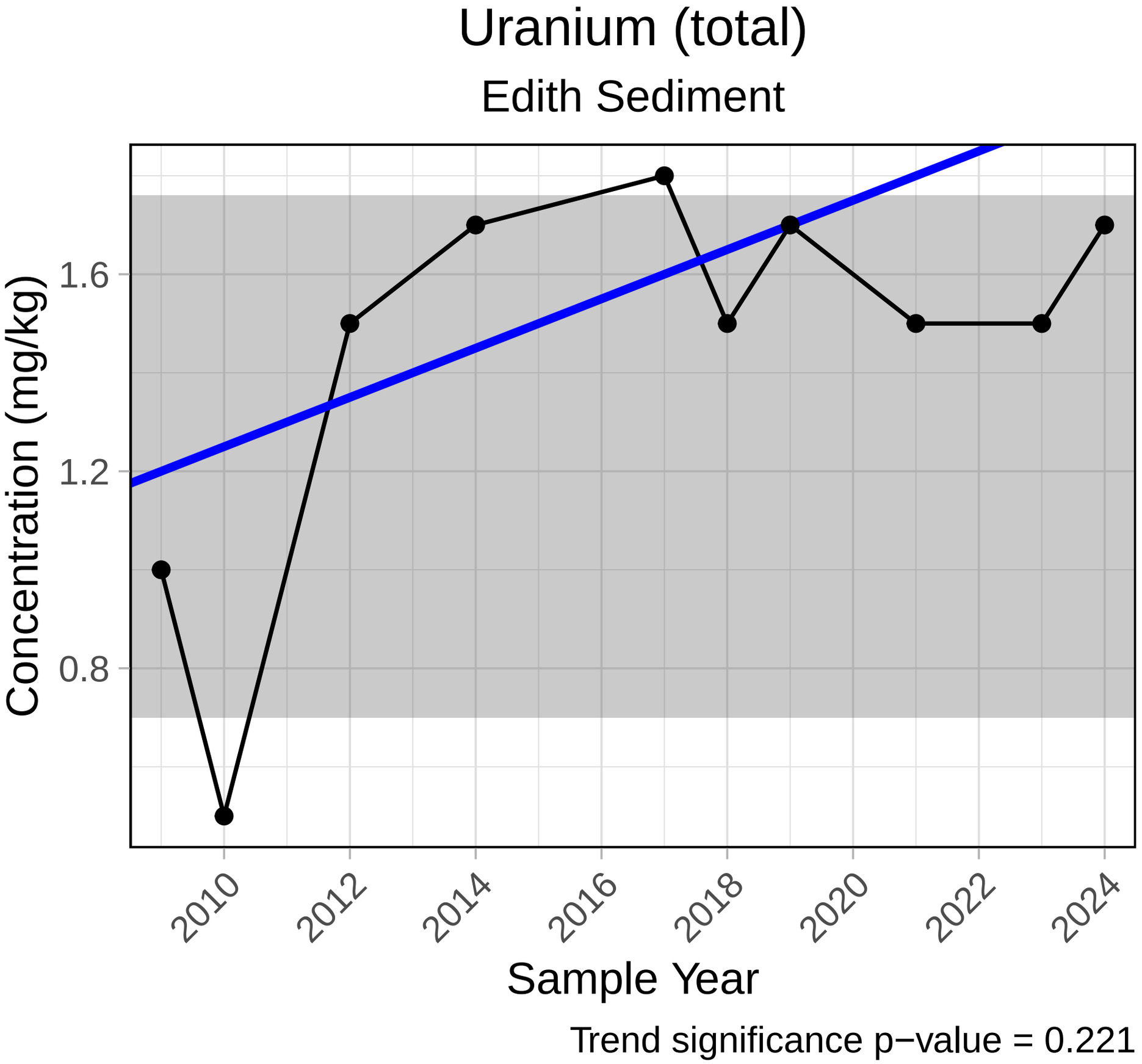

Strontium (total)
Edith Sediment
Concentration (mg/kg)
40
35
30
25
20
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.266

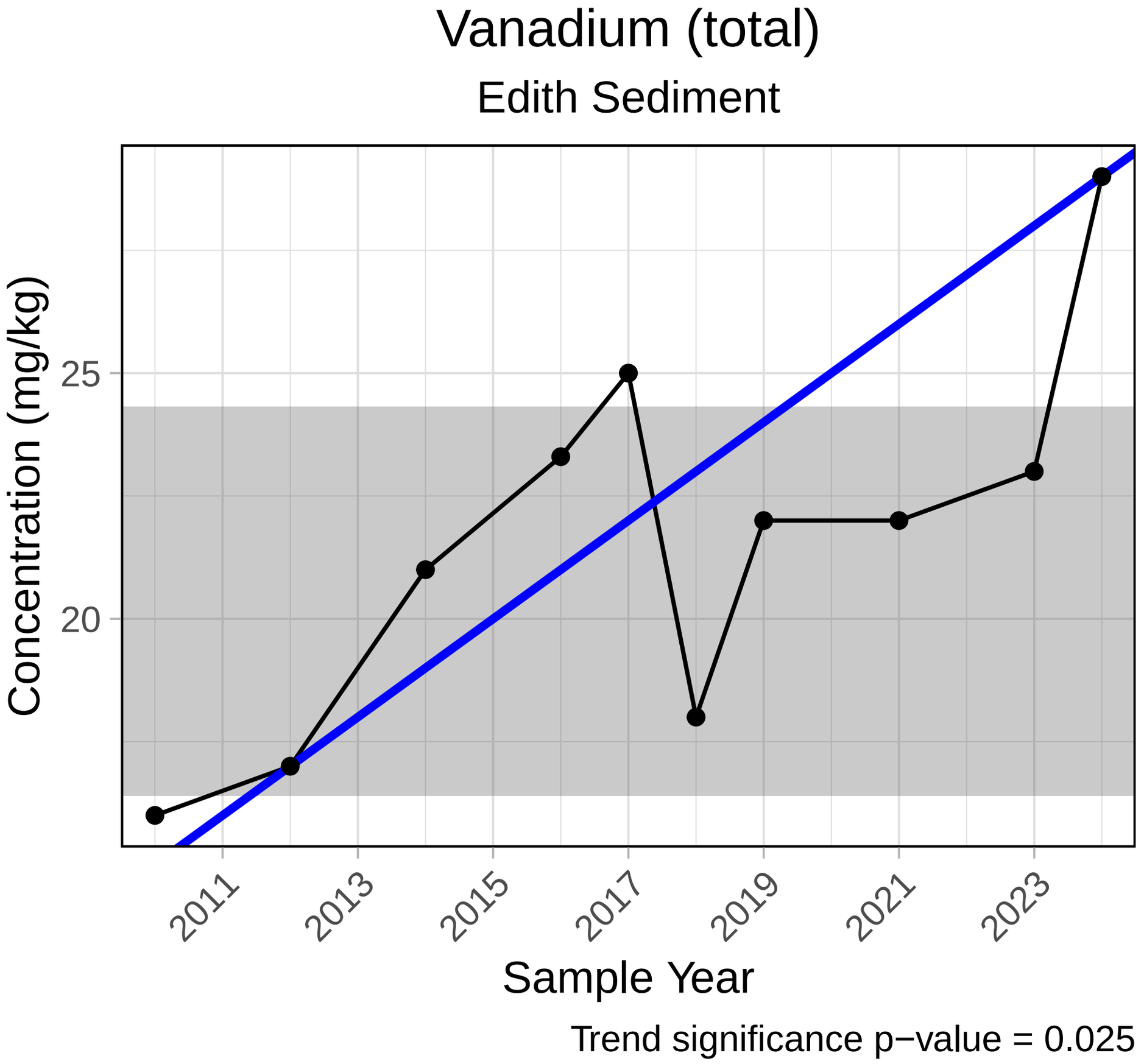
Thallium (total)

Edith Sediment



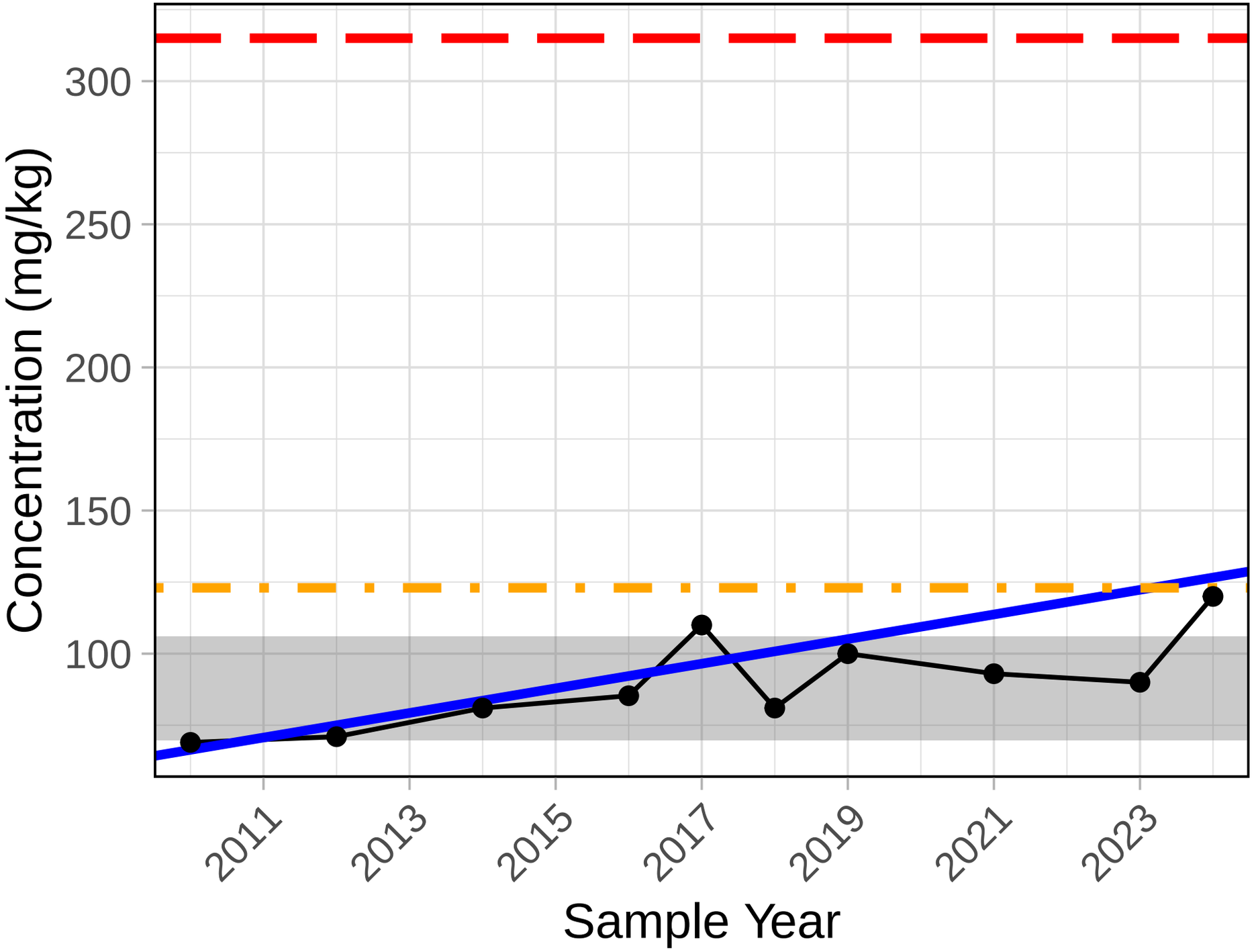
Trend significance p−value = 0.113


Uranium (total)
Edith Sediment
Concentration (mg/kg)
1.6
1.2
0.8
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.221

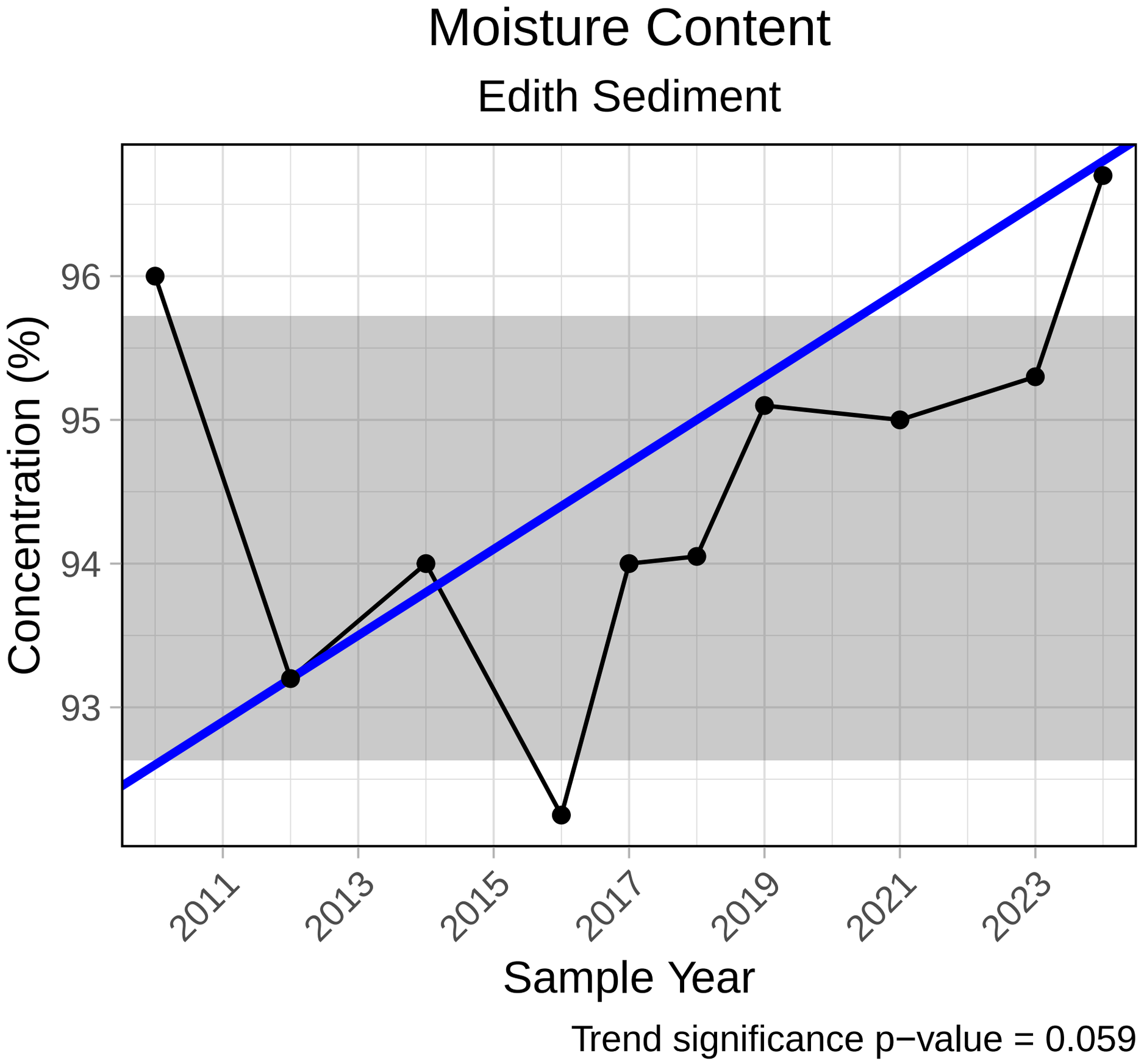

Vanadium (total)
Edith Sediment
Concentration (mg/kg)
25
20
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.025

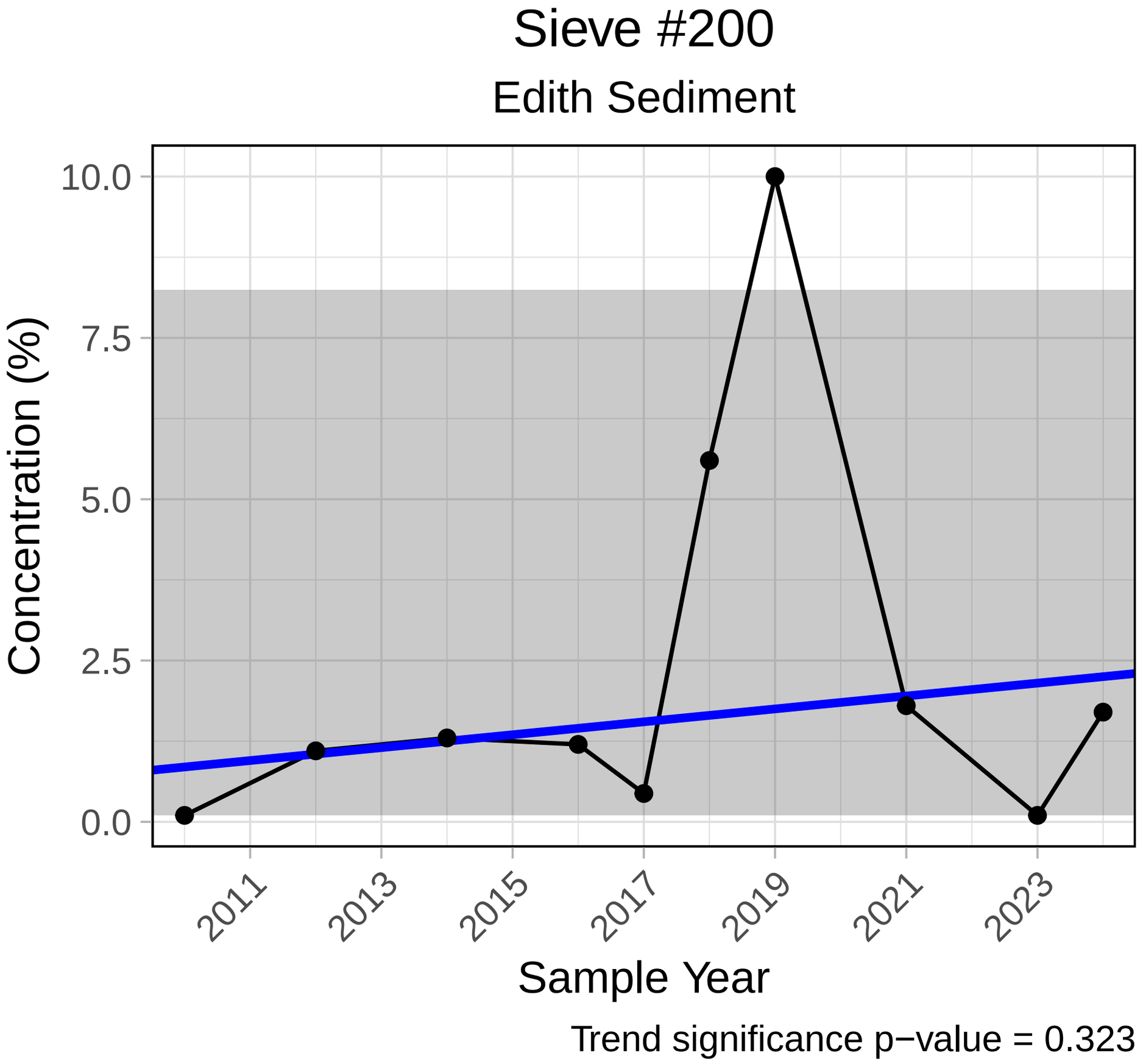
Zinc (total)

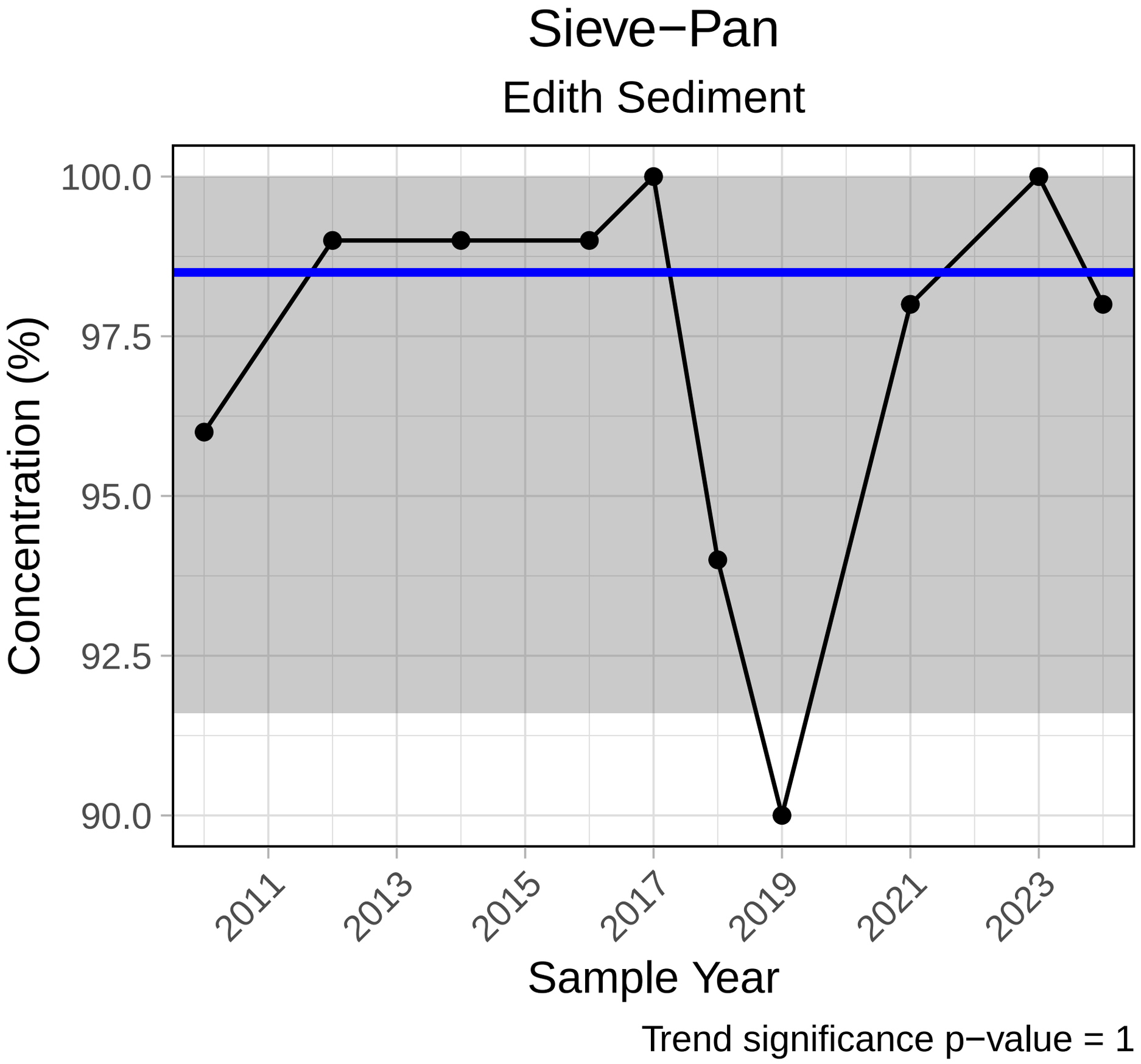
Edith Sediment

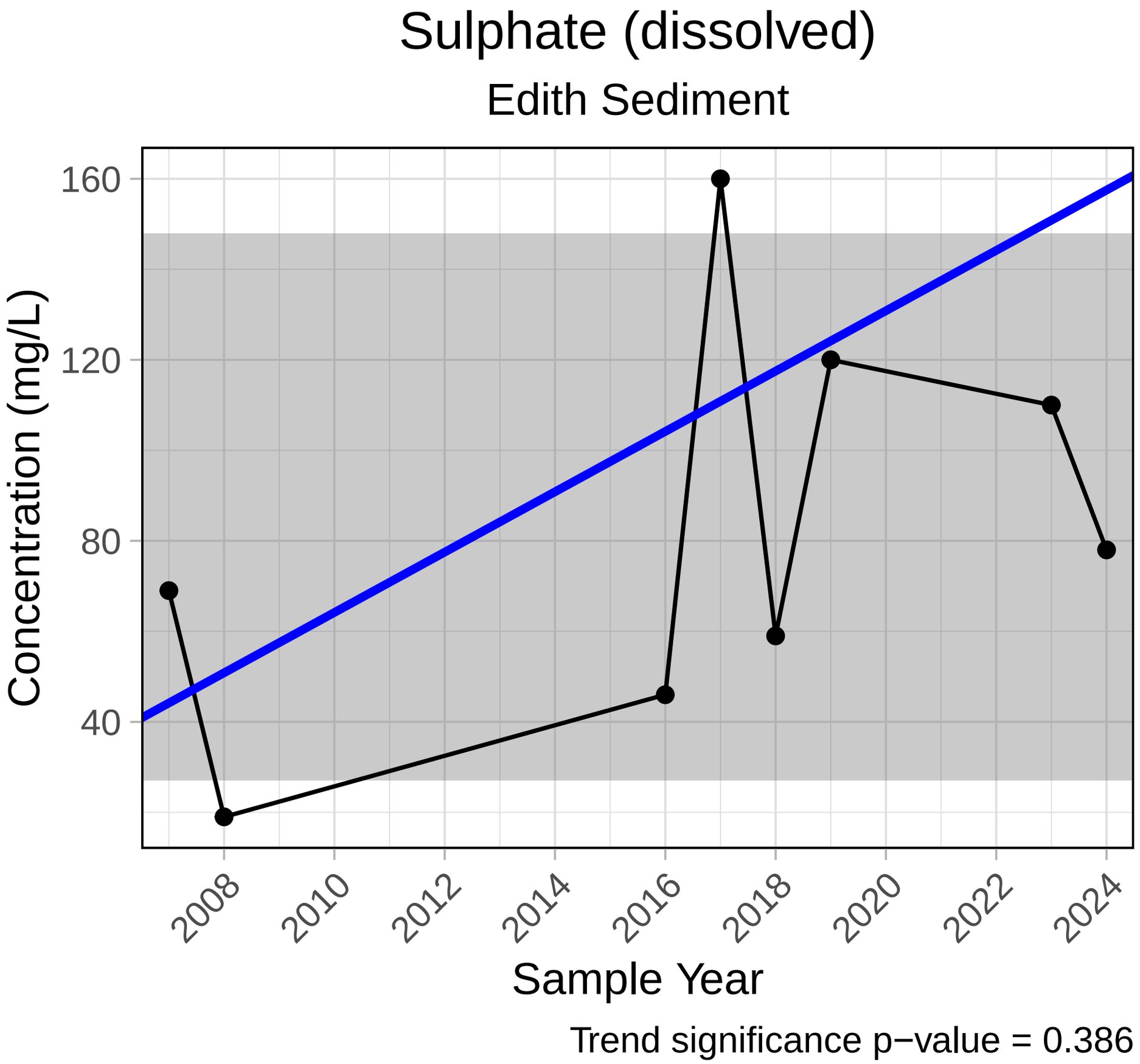


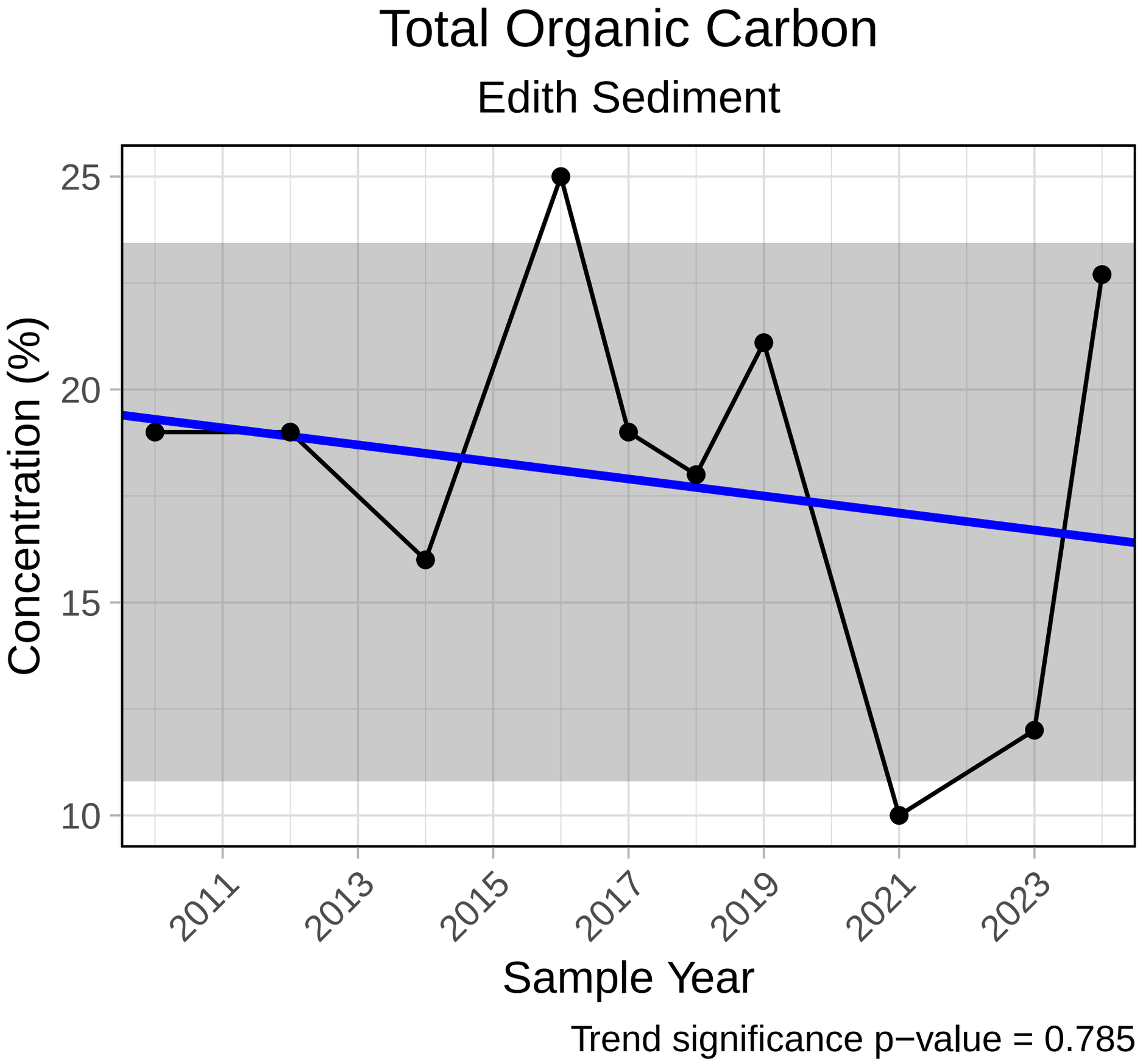
Trend significance p−value = 0.015
ISQG level = 123 mg/kg (maximum)
PEL level = 315 mg/kg (maximum)

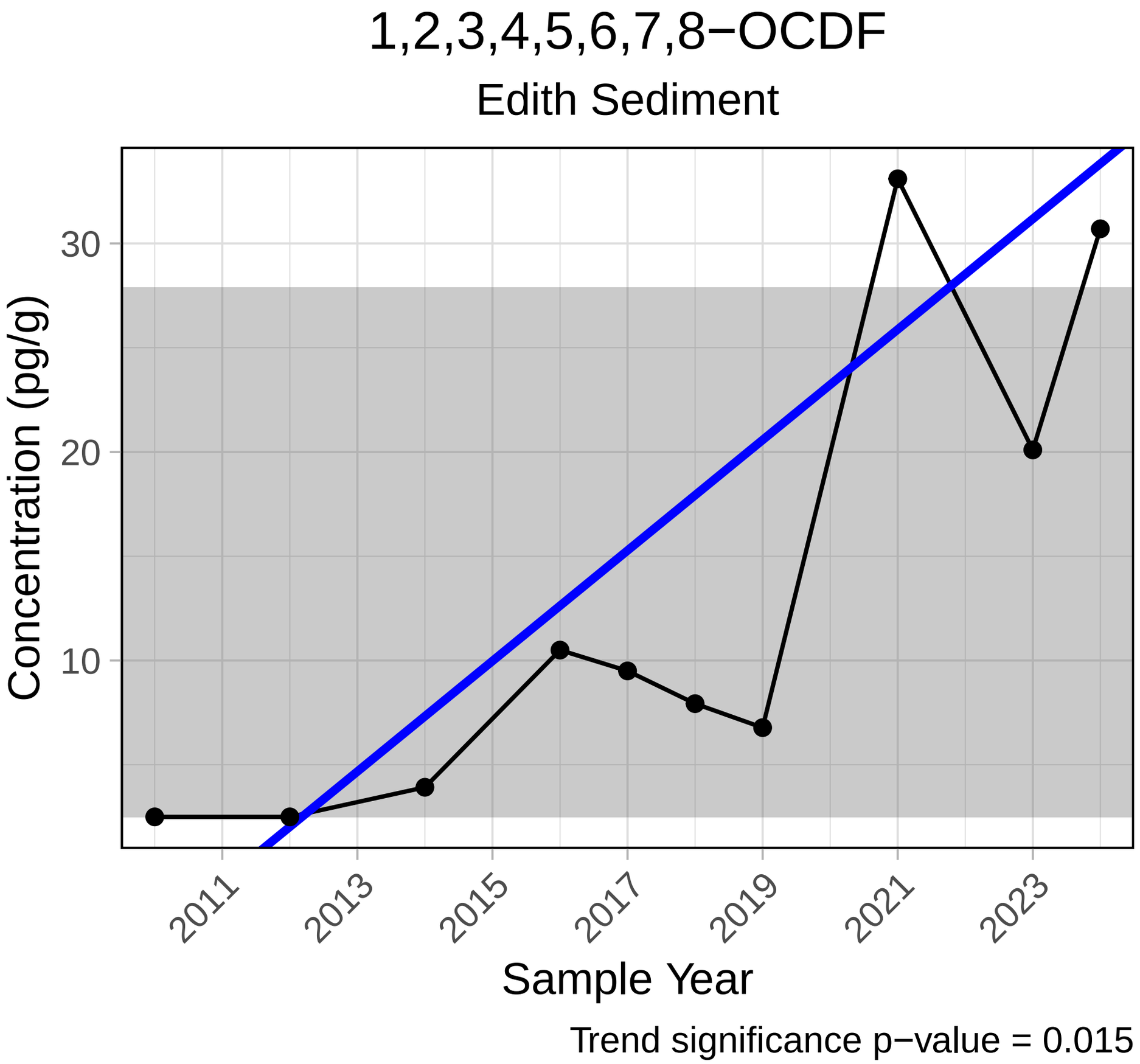

Moisture Content
Edith Sediment
Concentration (%)
96
95
94
93
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.059

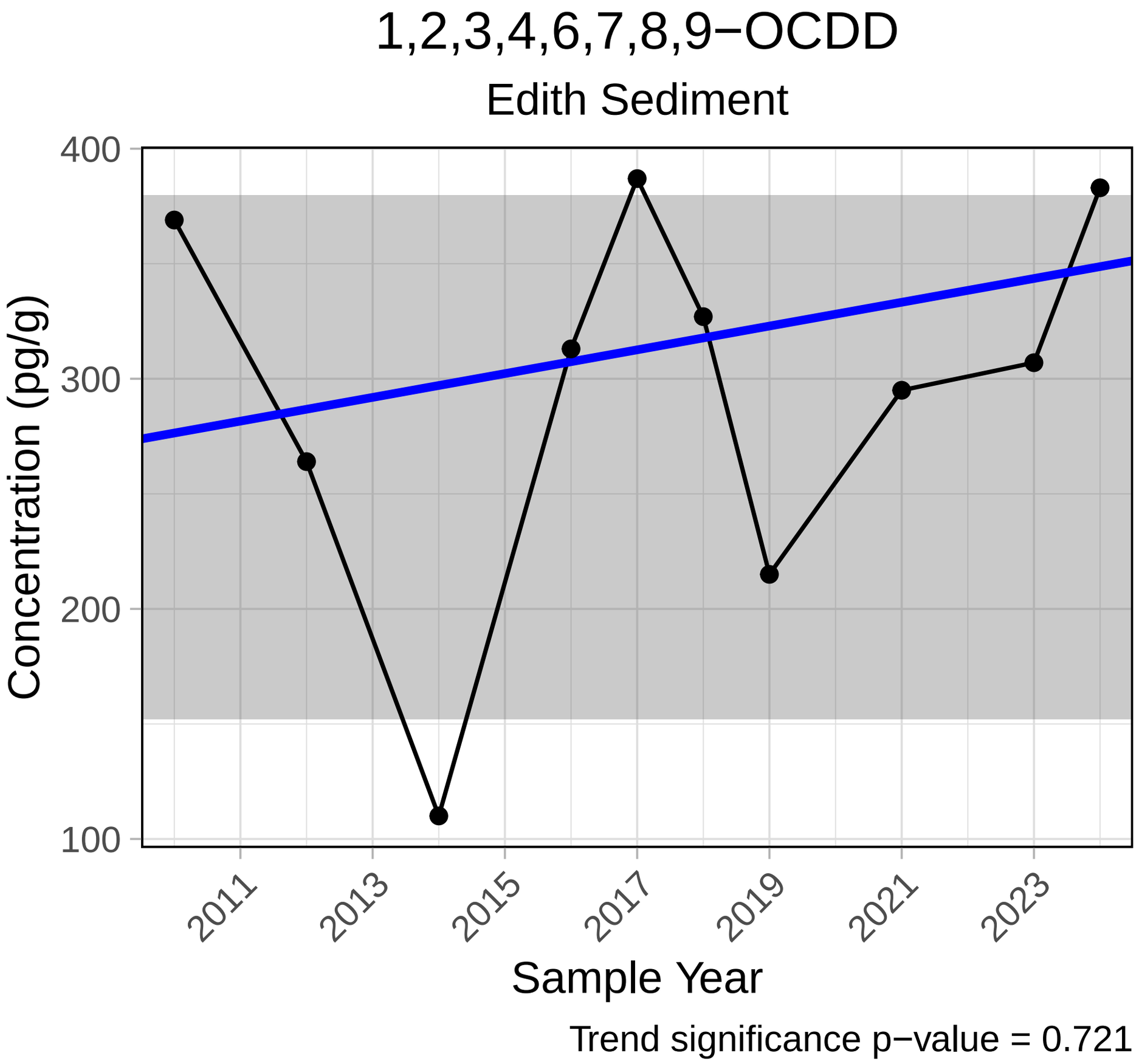

Sieve #200
Edith Sediment
Concentration (%)
10.0
7.5
5.0
2.5
0.0
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.323

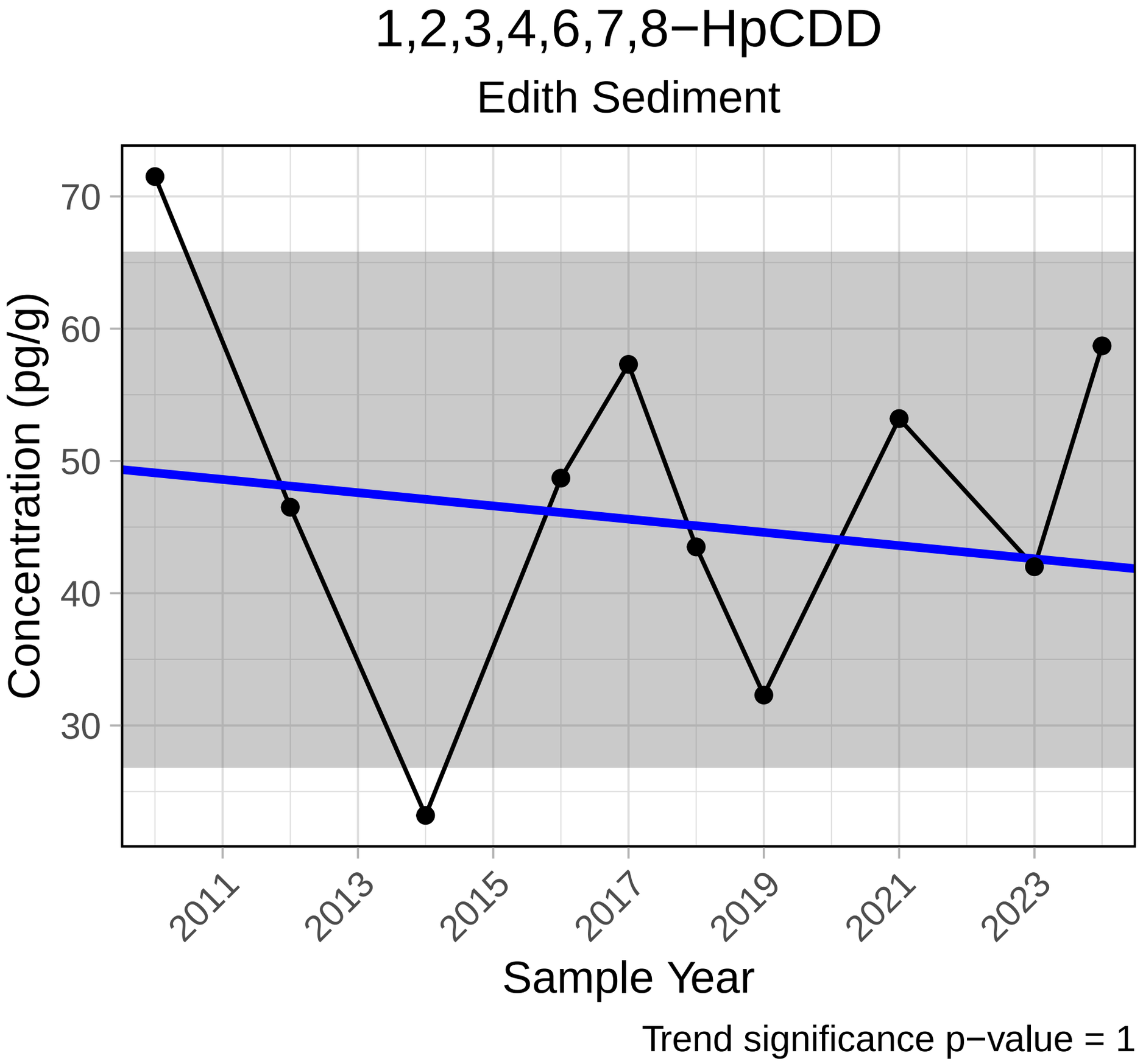

Sieve−Pan
Edith Sediment
100.0
97.5
95.0
92.5
90.0
Concentration (%)
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

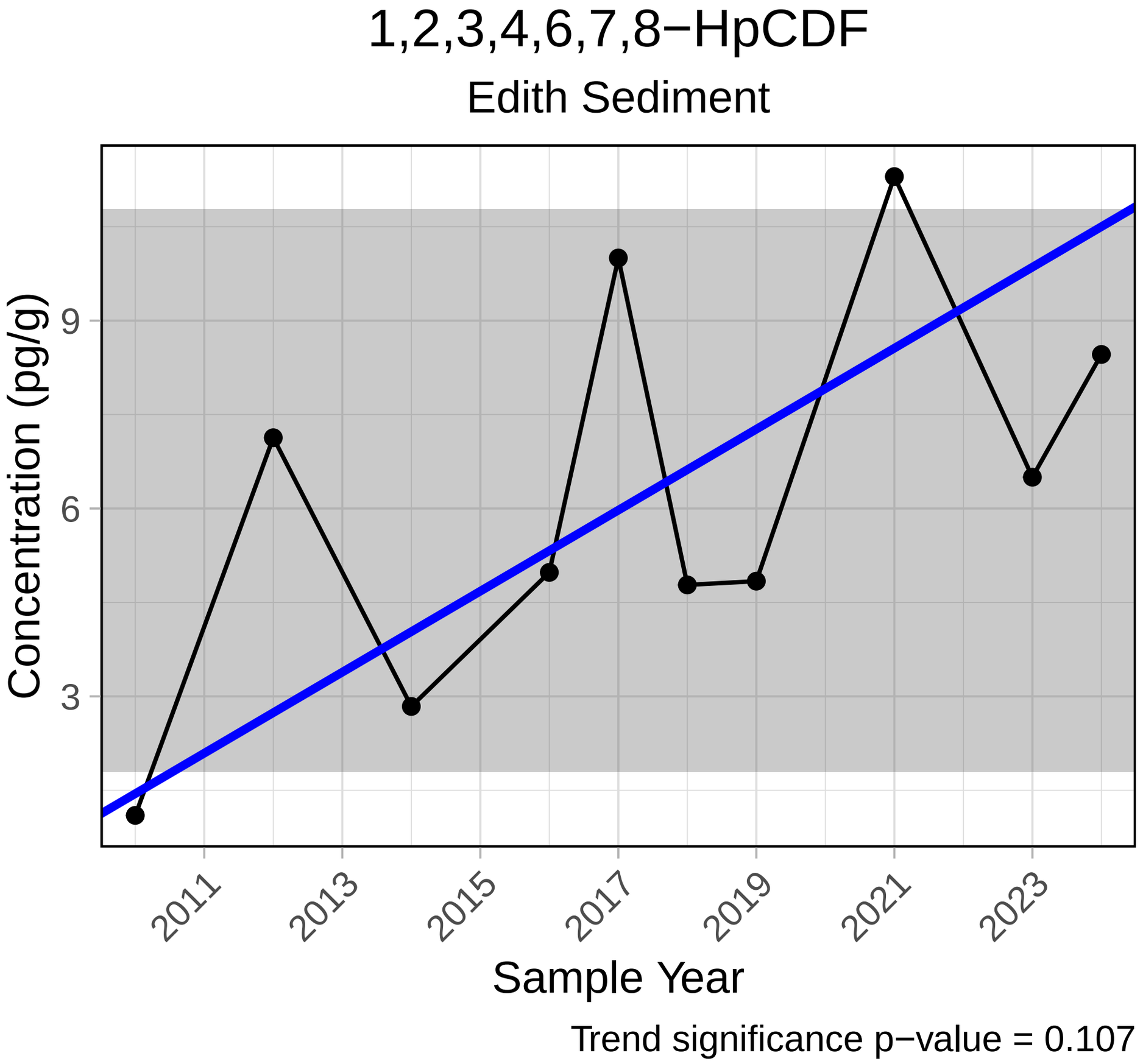

Sulphate (dissolved)
Edith Sediment
Concentration (mg/L)
160
120
80
40
2008
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.386

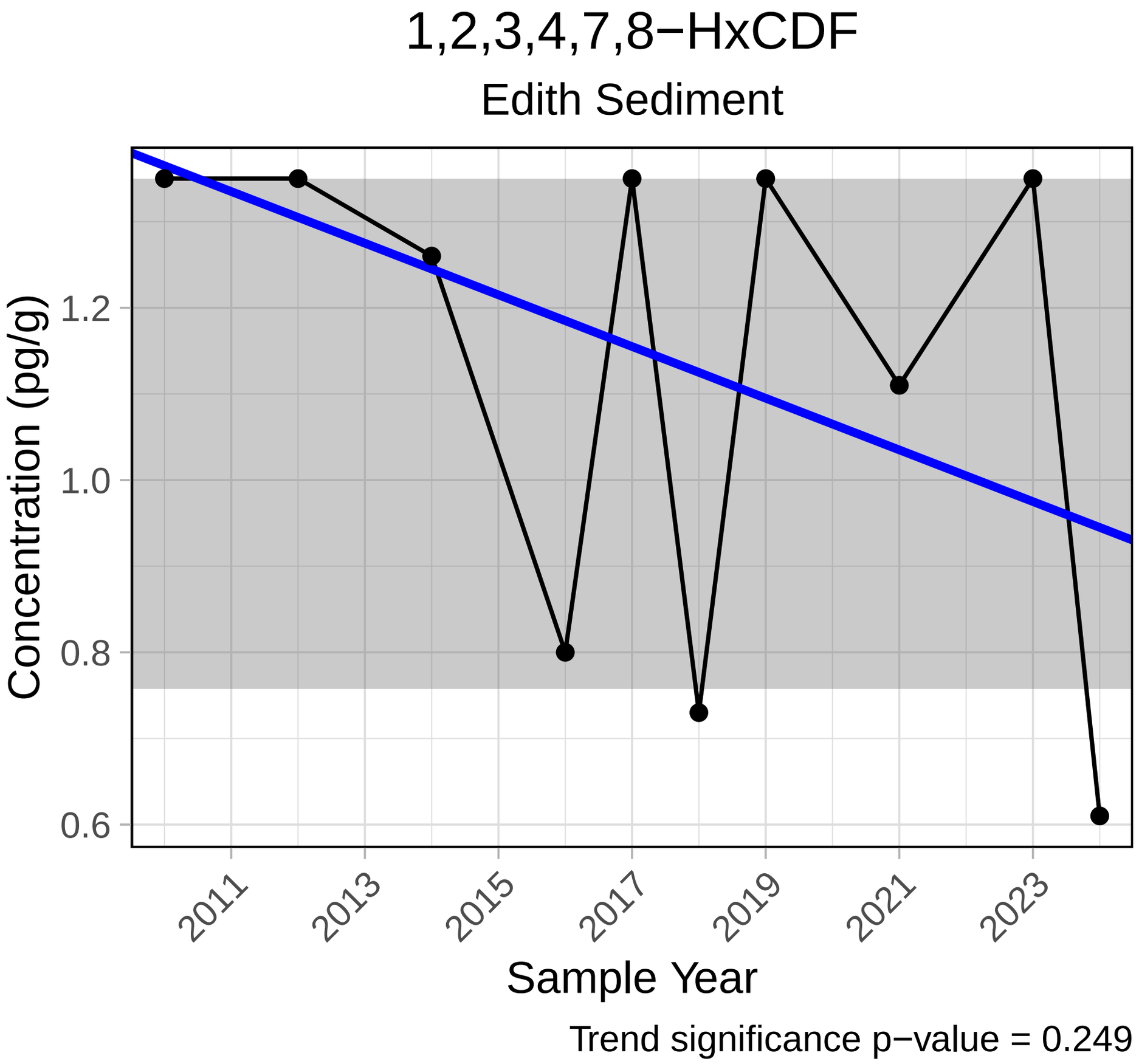

Total Organic Carbon
Edith Sediment
Concentration (%)
25
20
15
10
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.785

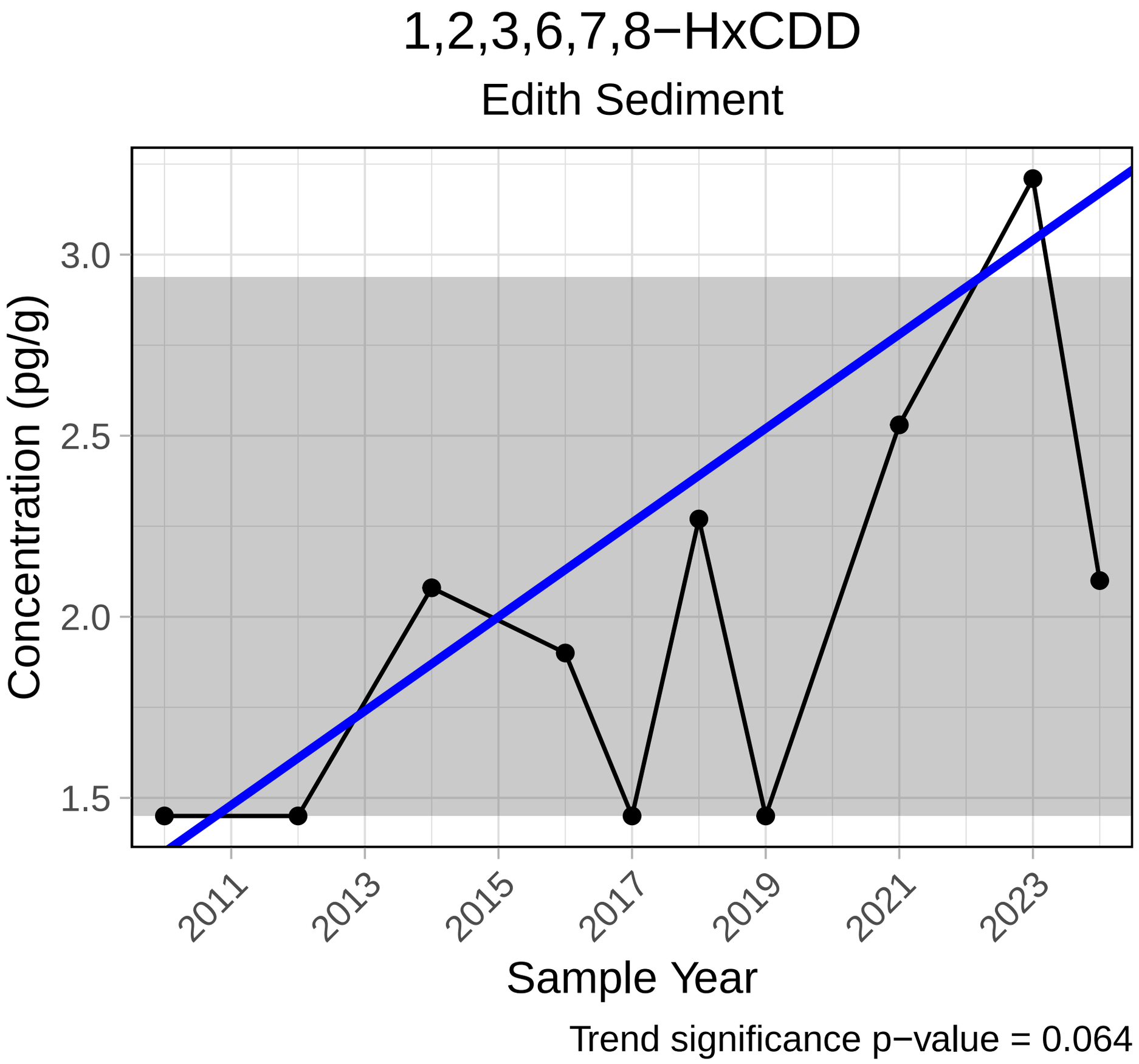

1,2,3,4,5,6,7,8−OCDF
Edith Sediment
Concentration (pg/g)
30
20
10
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.015

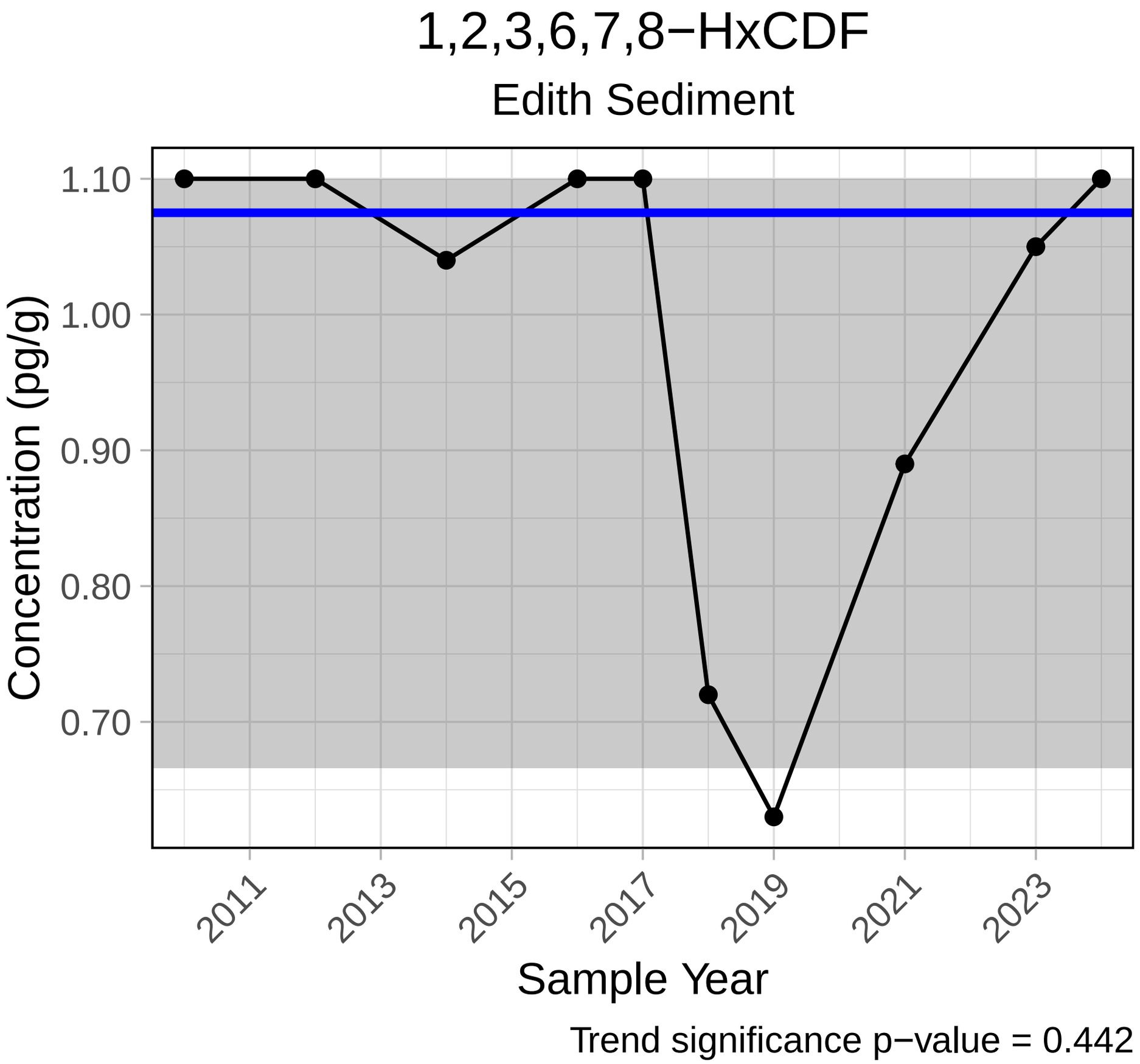

1,2,3,4,6,7,8,9−OCDD
Edith Sediment
400
300
200
100
Concentration (pg/g)
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.721

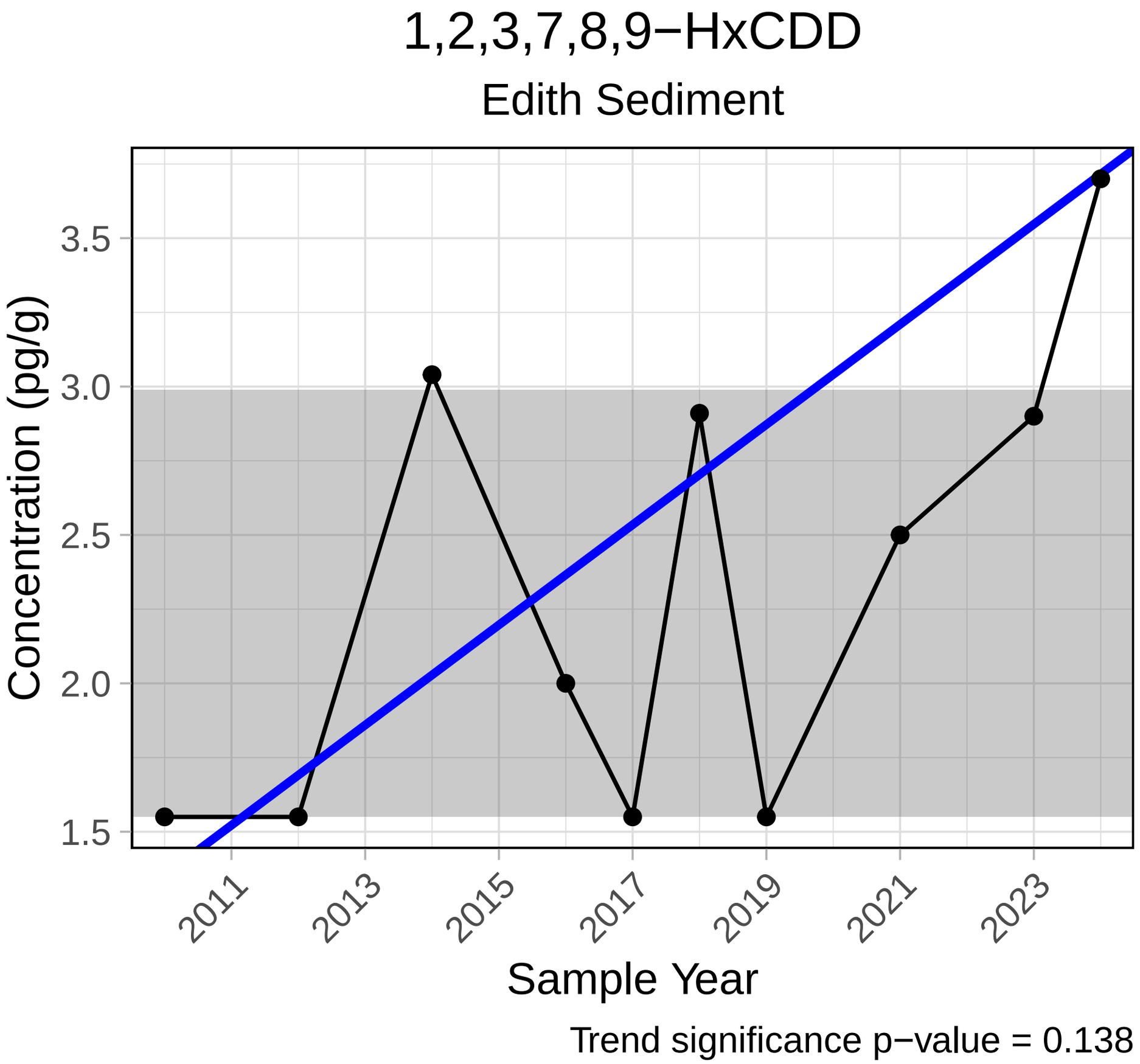

1,2,3,4,6,7,8−HpCDD
Edith Sediment
Concentration (pg/g)
70
60
50
40
30
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

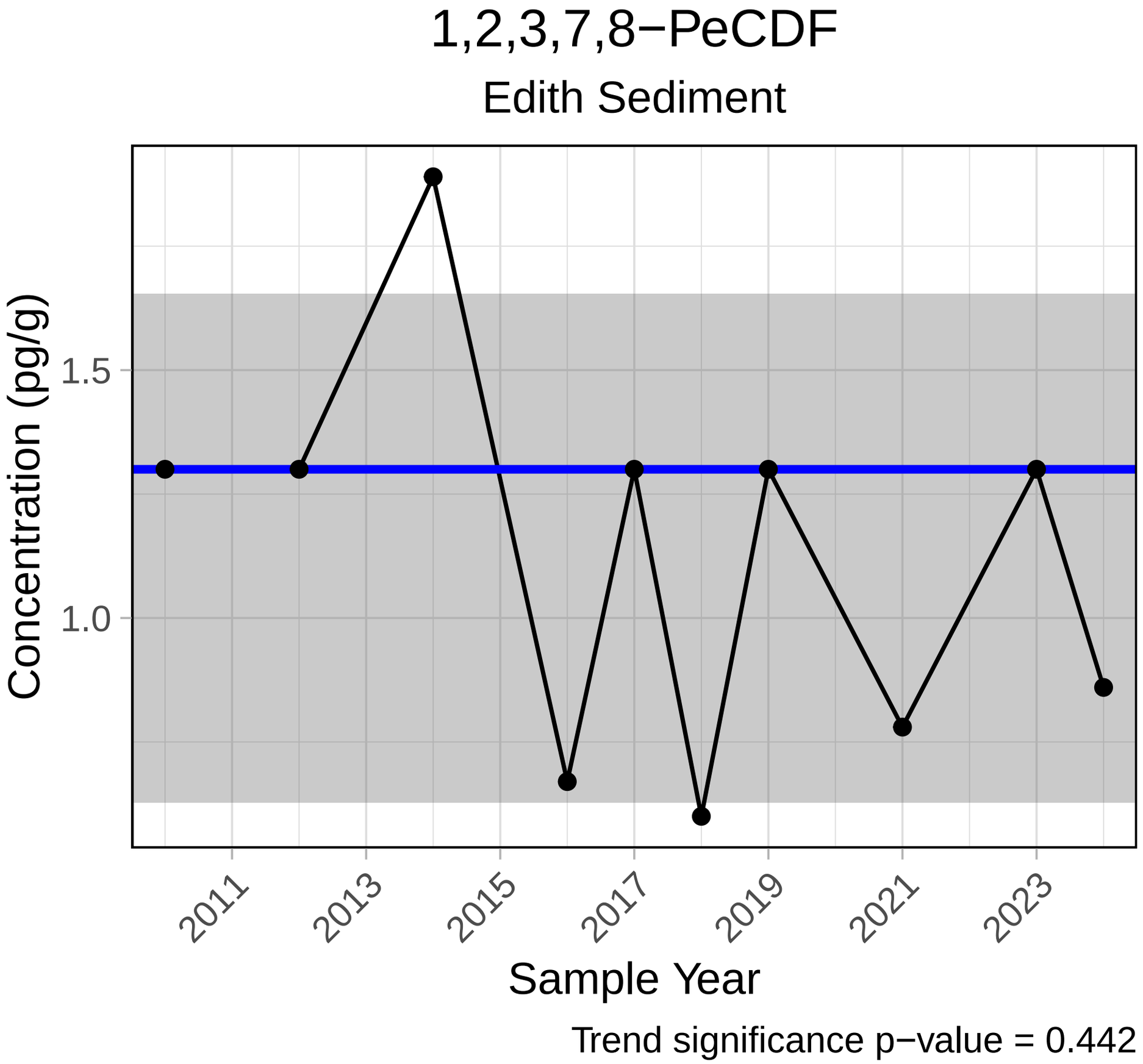

1,2,3,4,6,7,8−HpCDF
Edith Sediment
Concentration (pg/g)
9
6
3
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.107

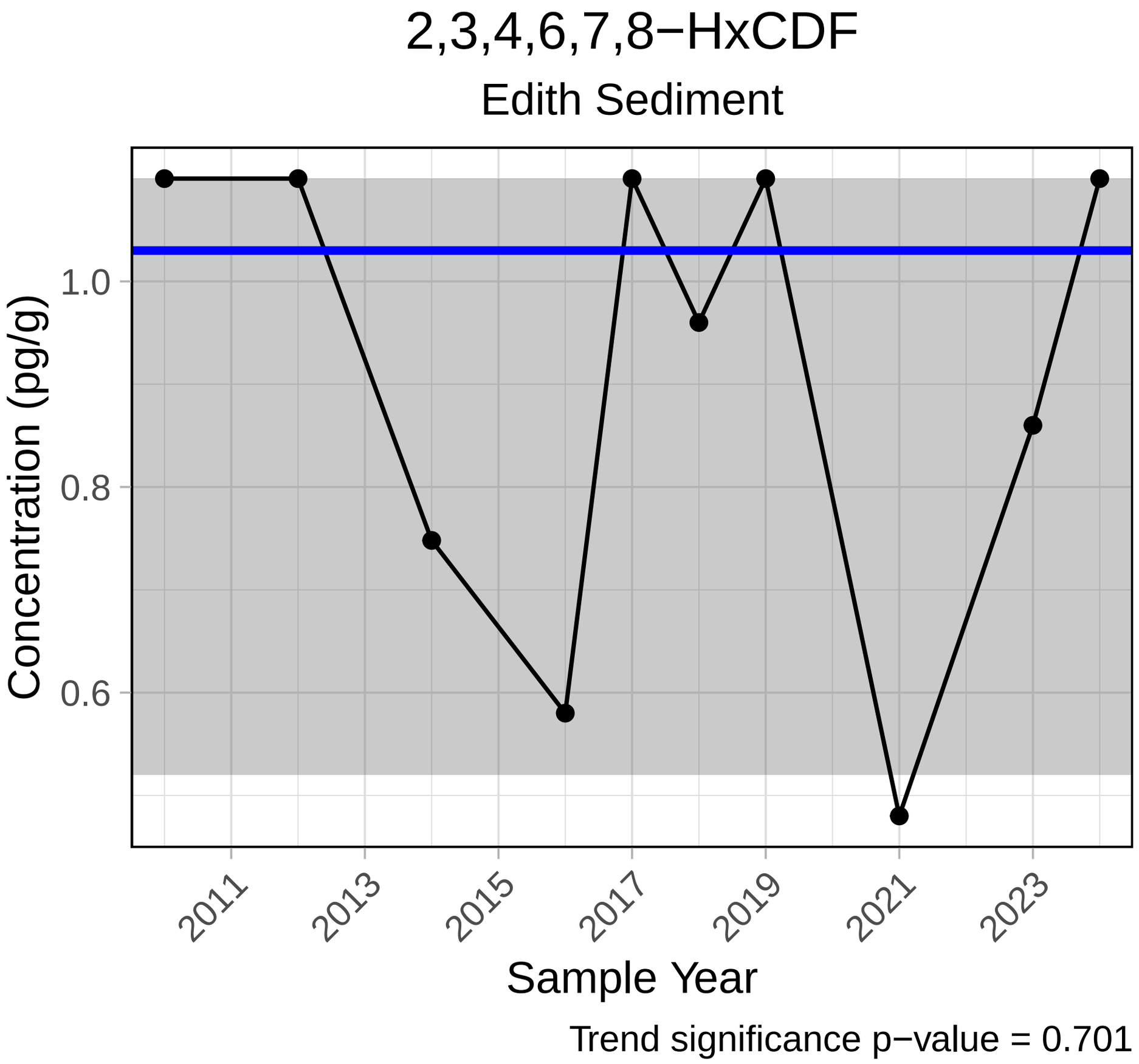

1,2,3,4,7,8−HxCDF
Edith Sediment
Concentration (pg/g)
1.2
1.0
0.8
0.6
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.249

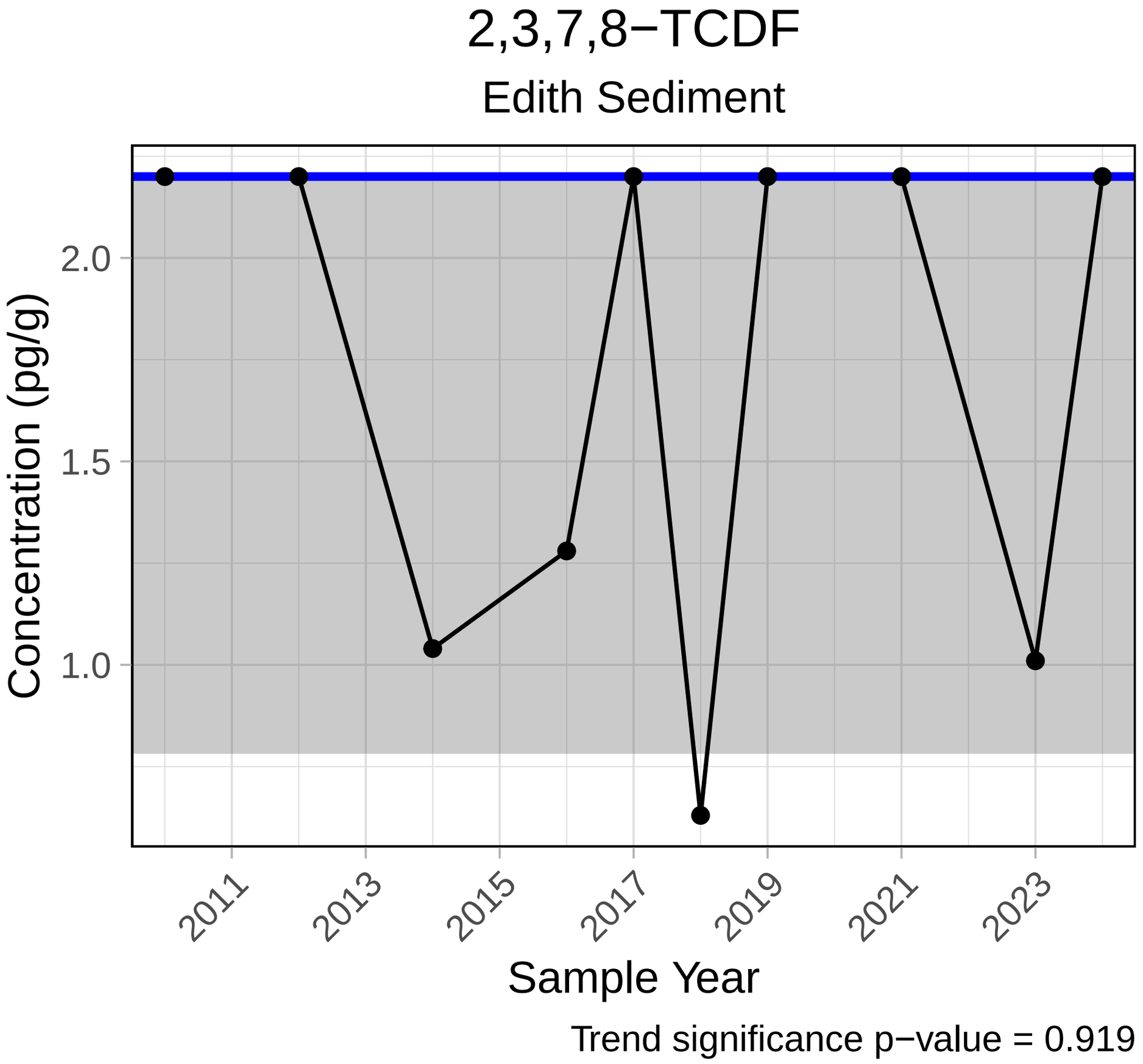

1,2,3,6,7,8−HxCDD
Edith Sediment
Concentration (pg/g)
3.0
2.5
2.0
1.5
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.064


1,2,3,6,7,8−HxCDF
Edith Sediment
Concentration (pg/g)
1.10
1.00
0.90
0.80
0.70
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.442


1,2,3,7,8,9−HxCDD
Edith Sediment
Concentration (pg/g)
3.5
3.0
2.5
2.0
1.5
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.138

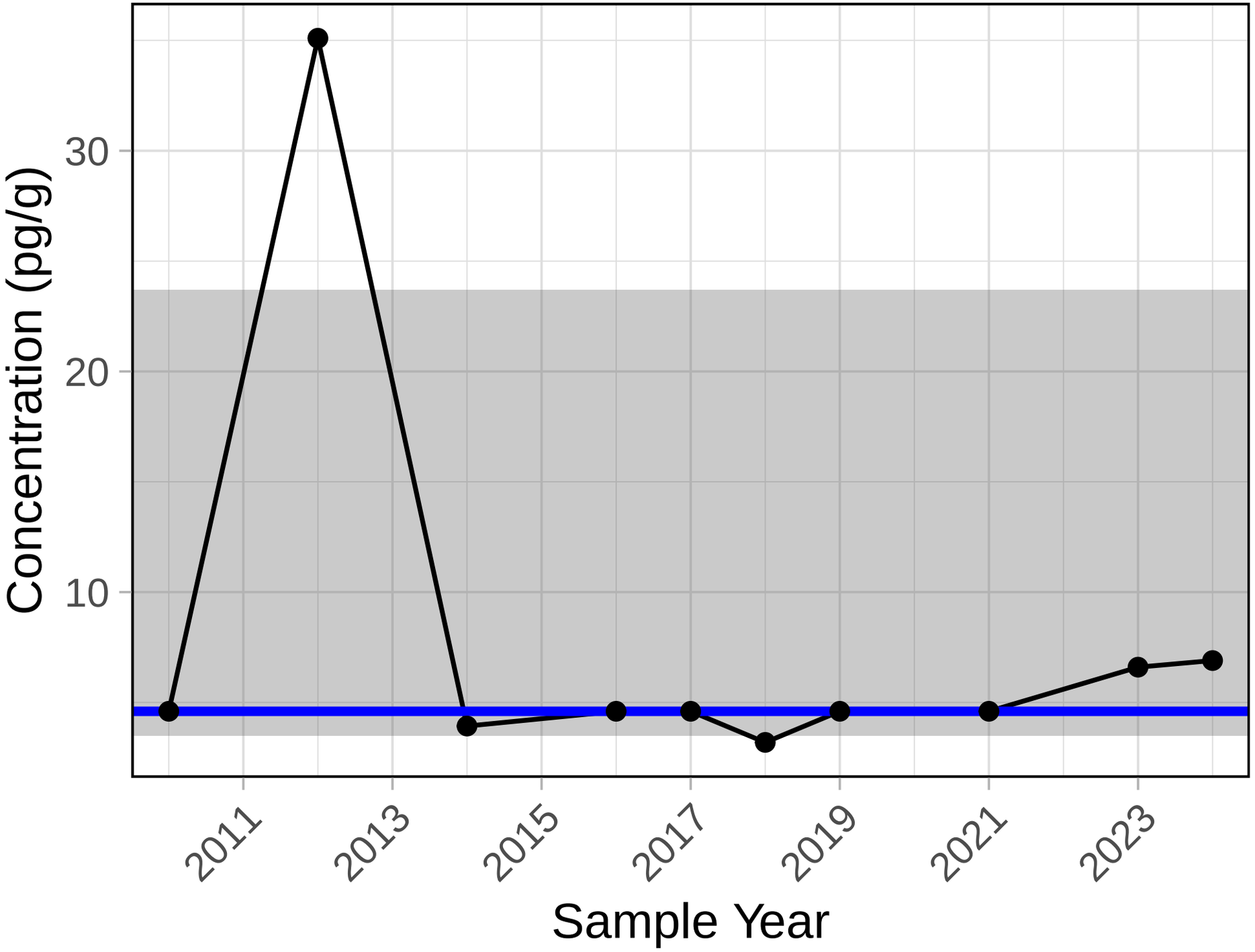

1,2,3,7,8−PeCDF
Edith Sediment
Concentration (pg/g)
1.5
1.0
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.442


2,3,4,6,7,8−HxCDF
Edith Sediment
Concentration (pg/g)
1.0
0.8
0.6
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.701


2,3,7,8−TCDF
Edith Sediment
Concentration (pg/g)
2.0
1.5
1.0
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.919

PCB 1

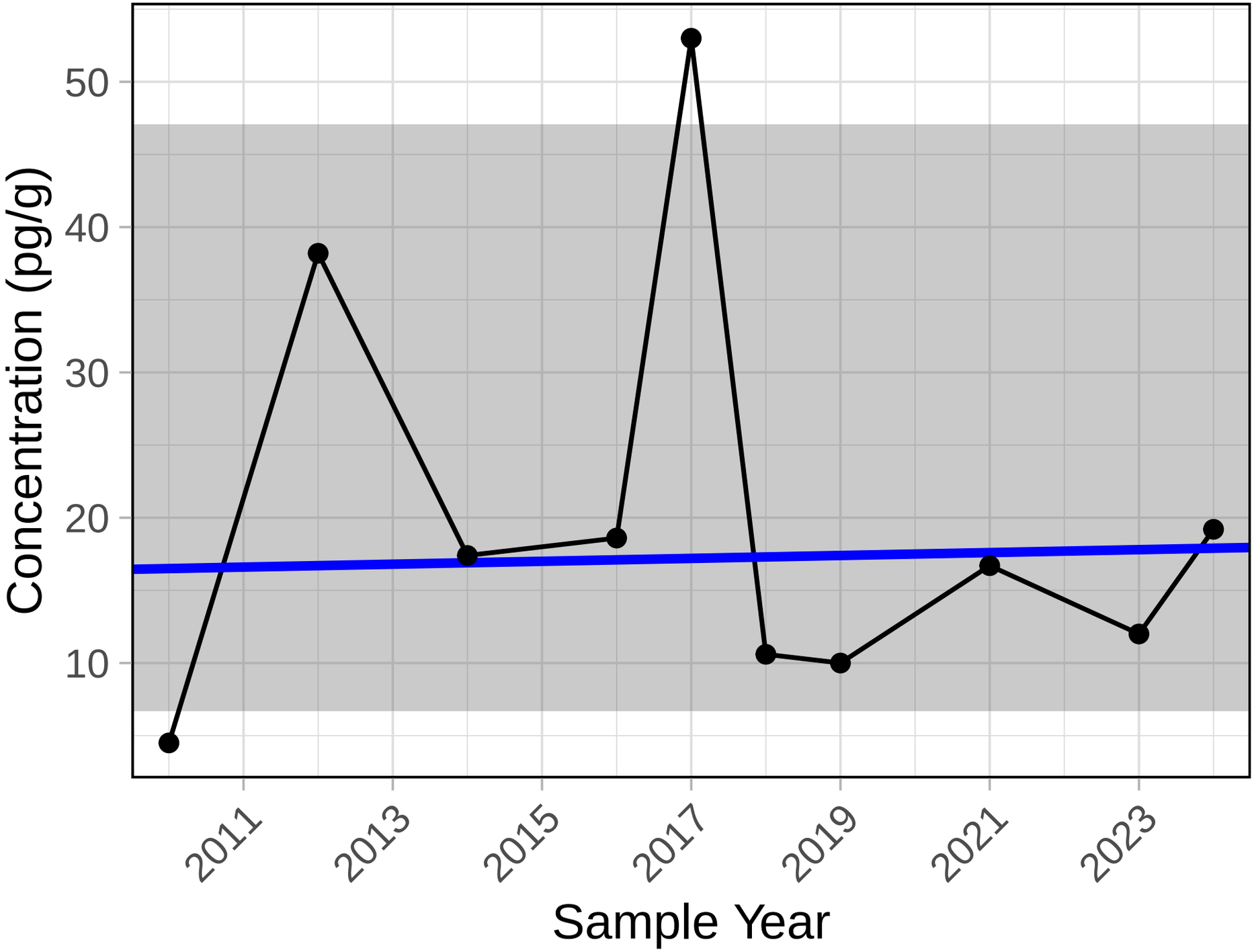
Edith Sediment



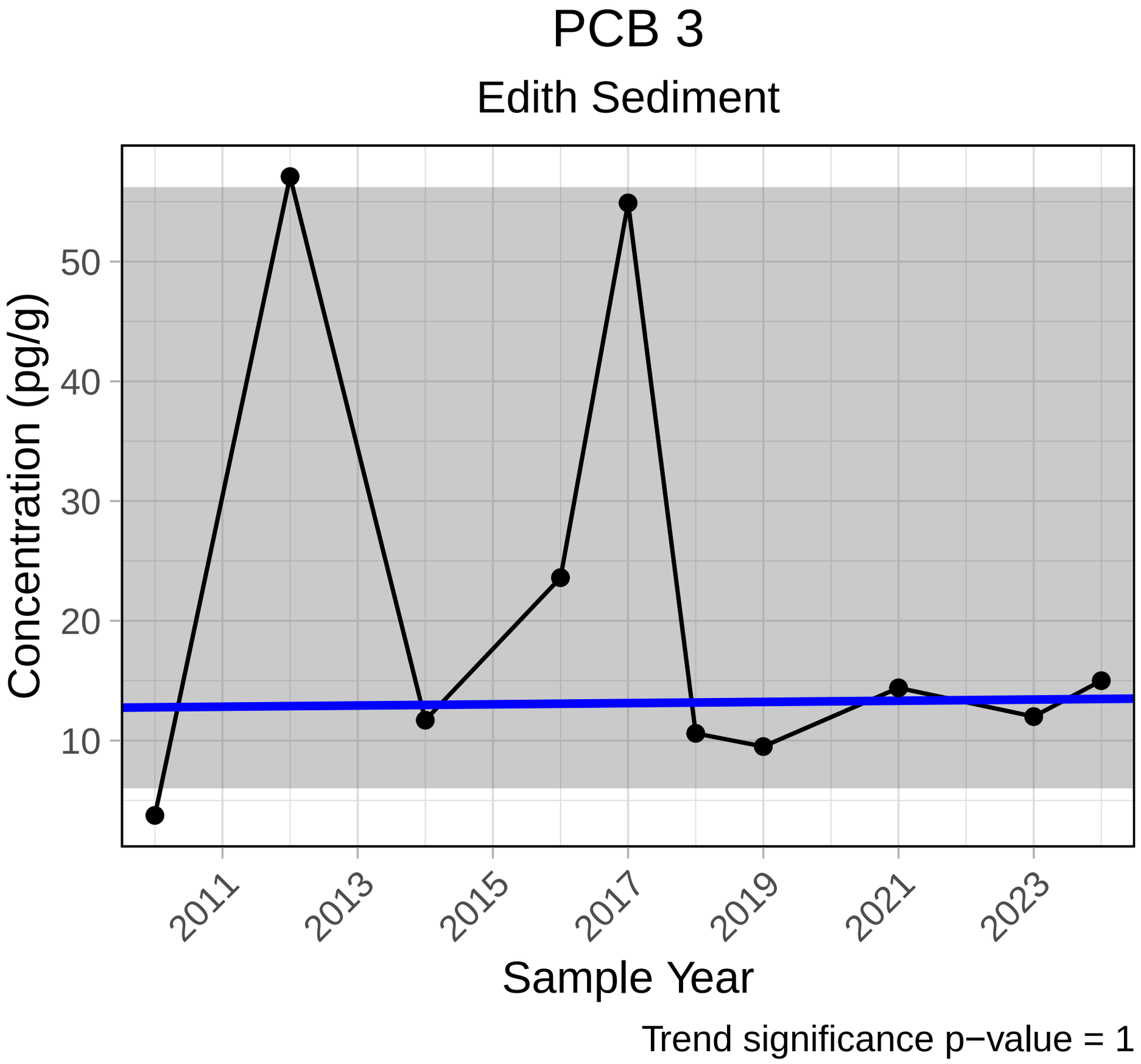
Trend significance p−value = 0.442

PCB 2

Edith Sediment

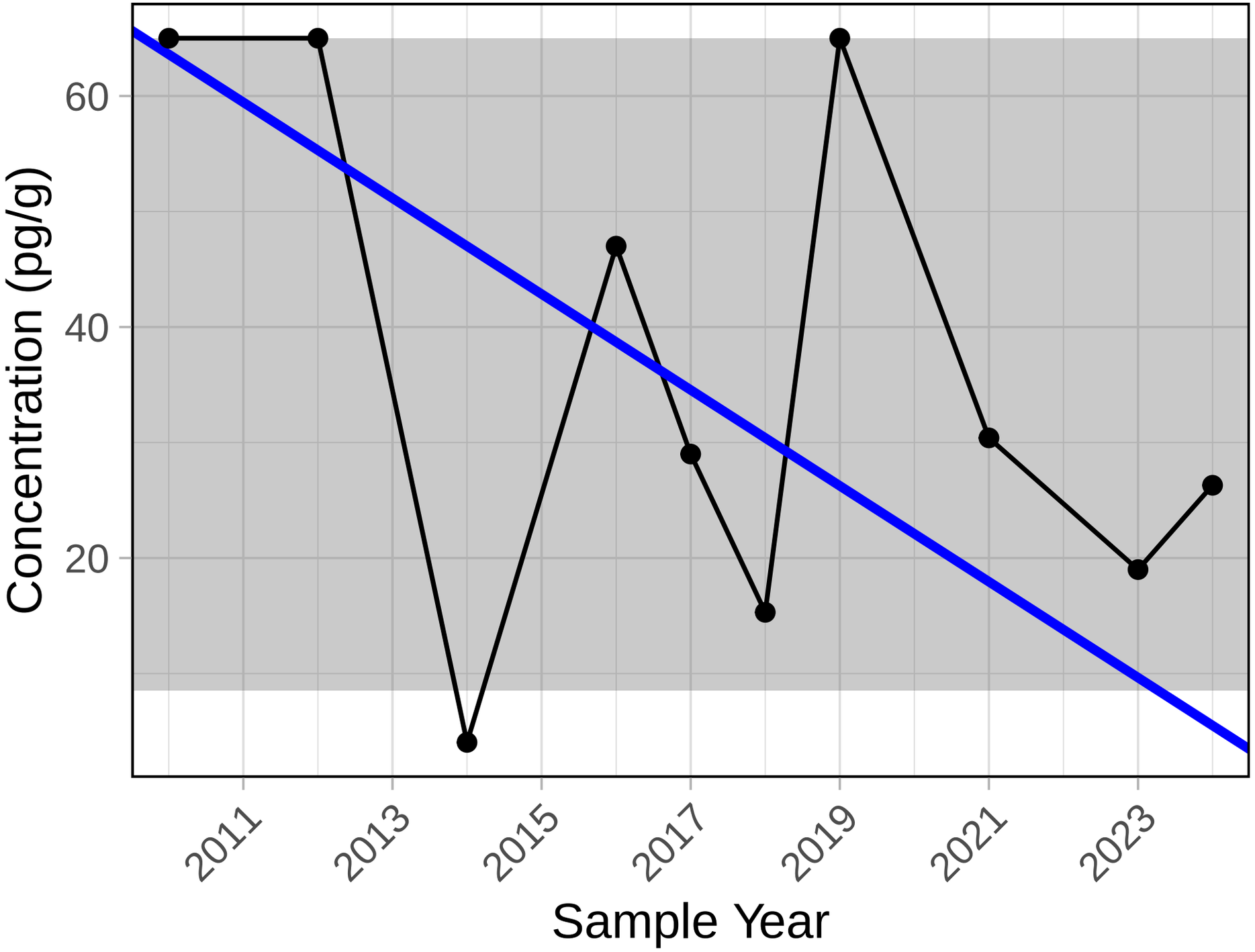


Trend significance p−value = 1


PCB 3
Edith Sediment
Concentration (pg/g)
50
40
30
20
10
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

PCB 8

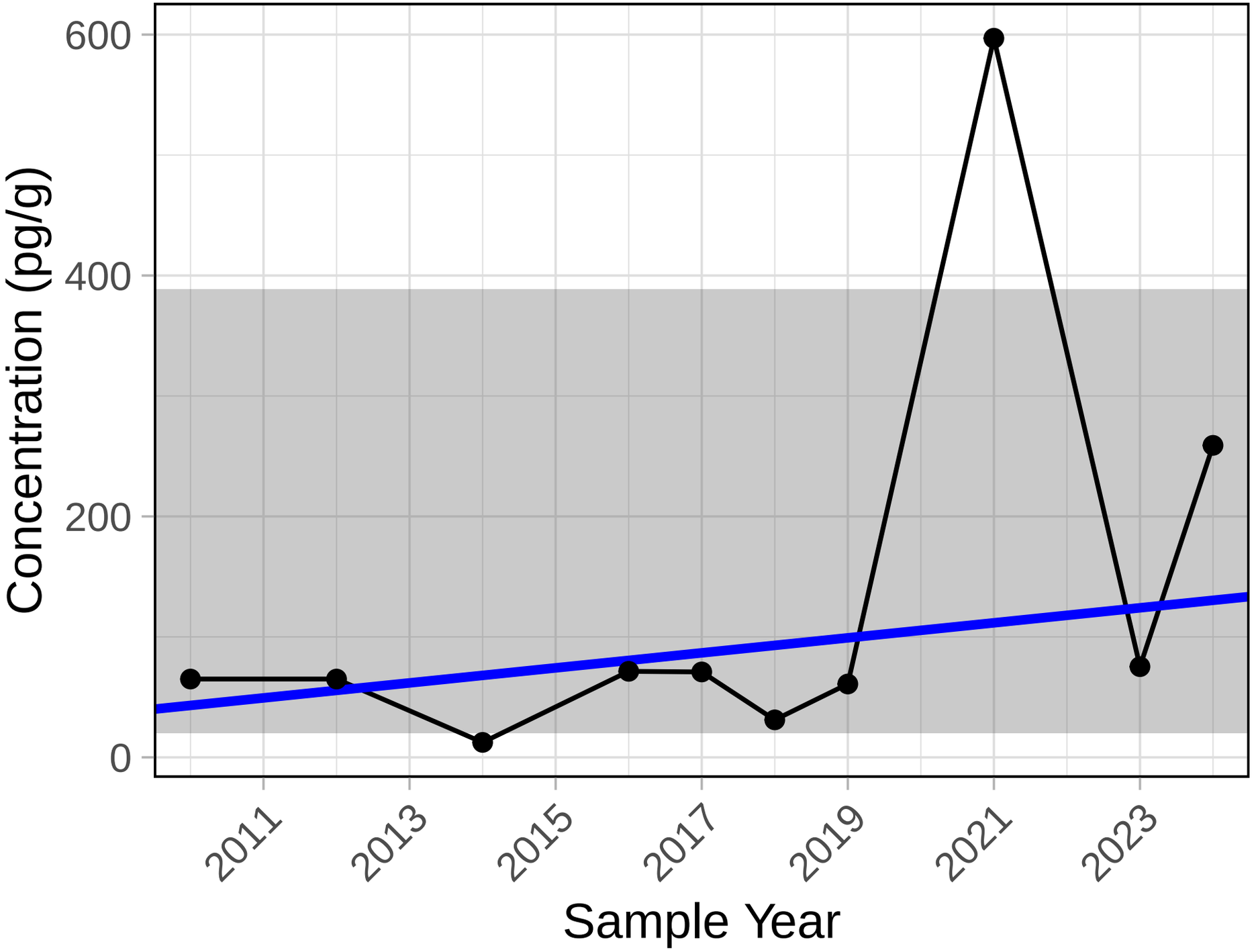
Edith Sediment



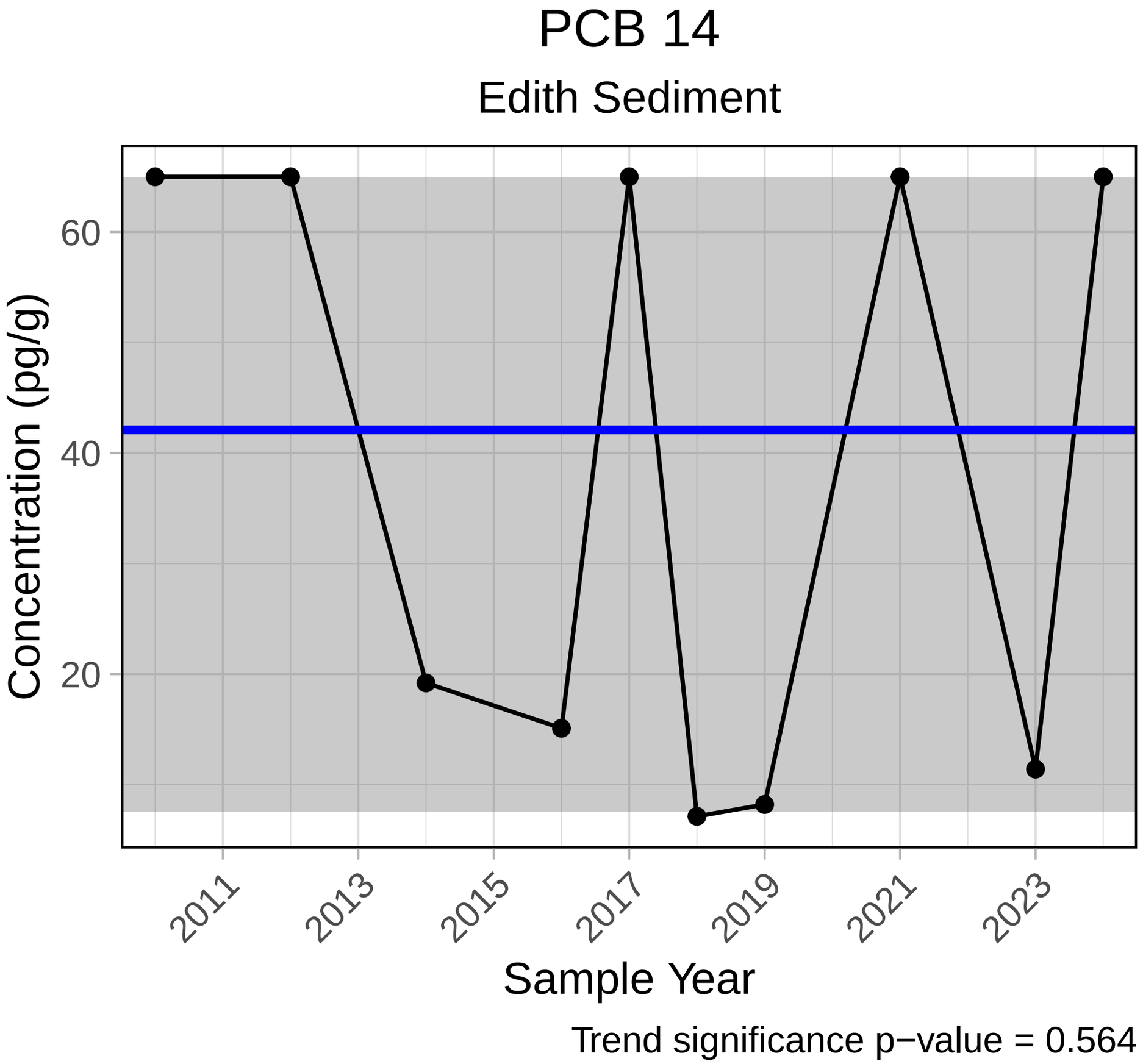
Trend significance p−value = 0.318

PCB 11

Edith Sediment

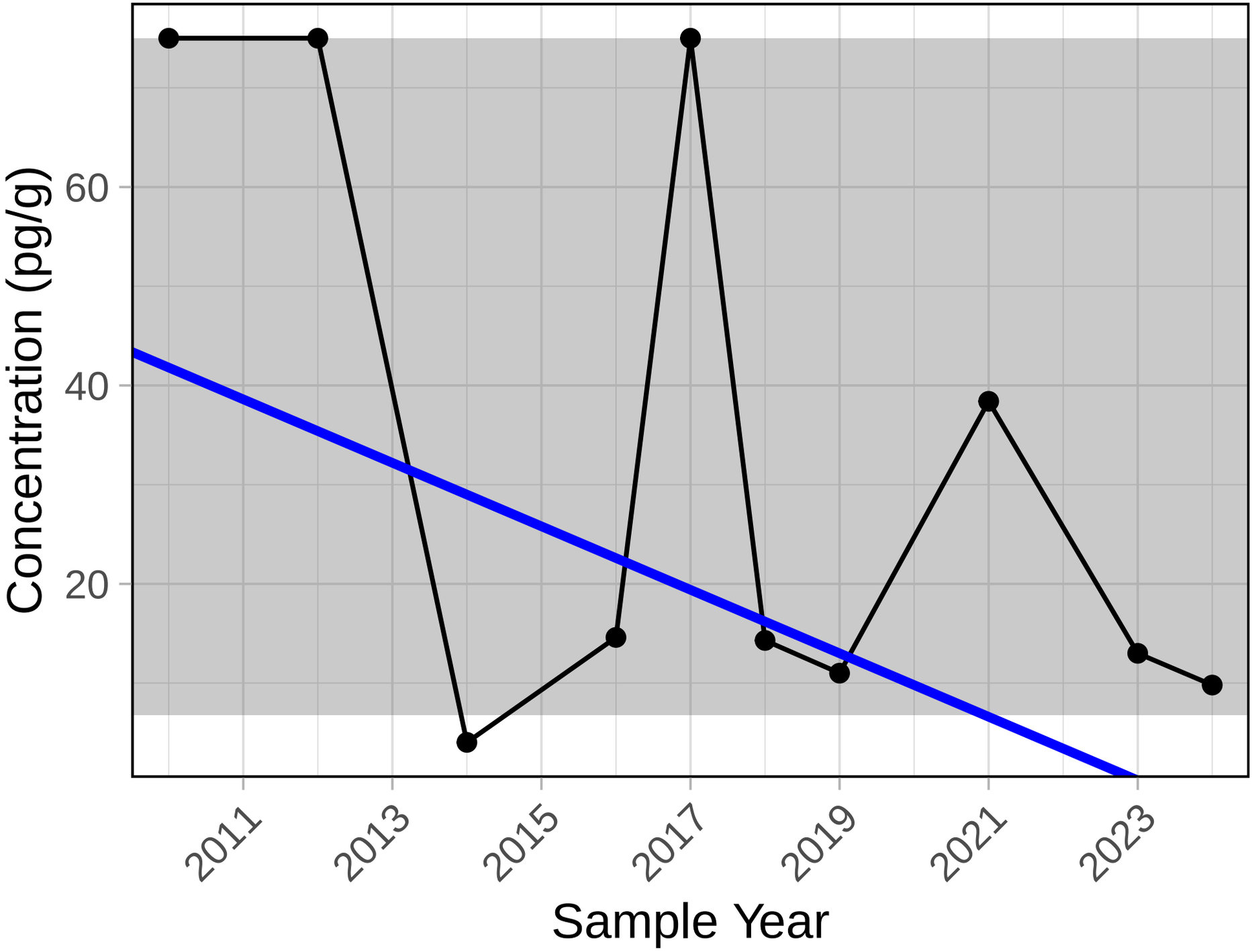


Trend significance p−value = 0.127


PCB 14
Edith Sediment
Concentration (pg/g)
60
40
20
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.564

PCB 15

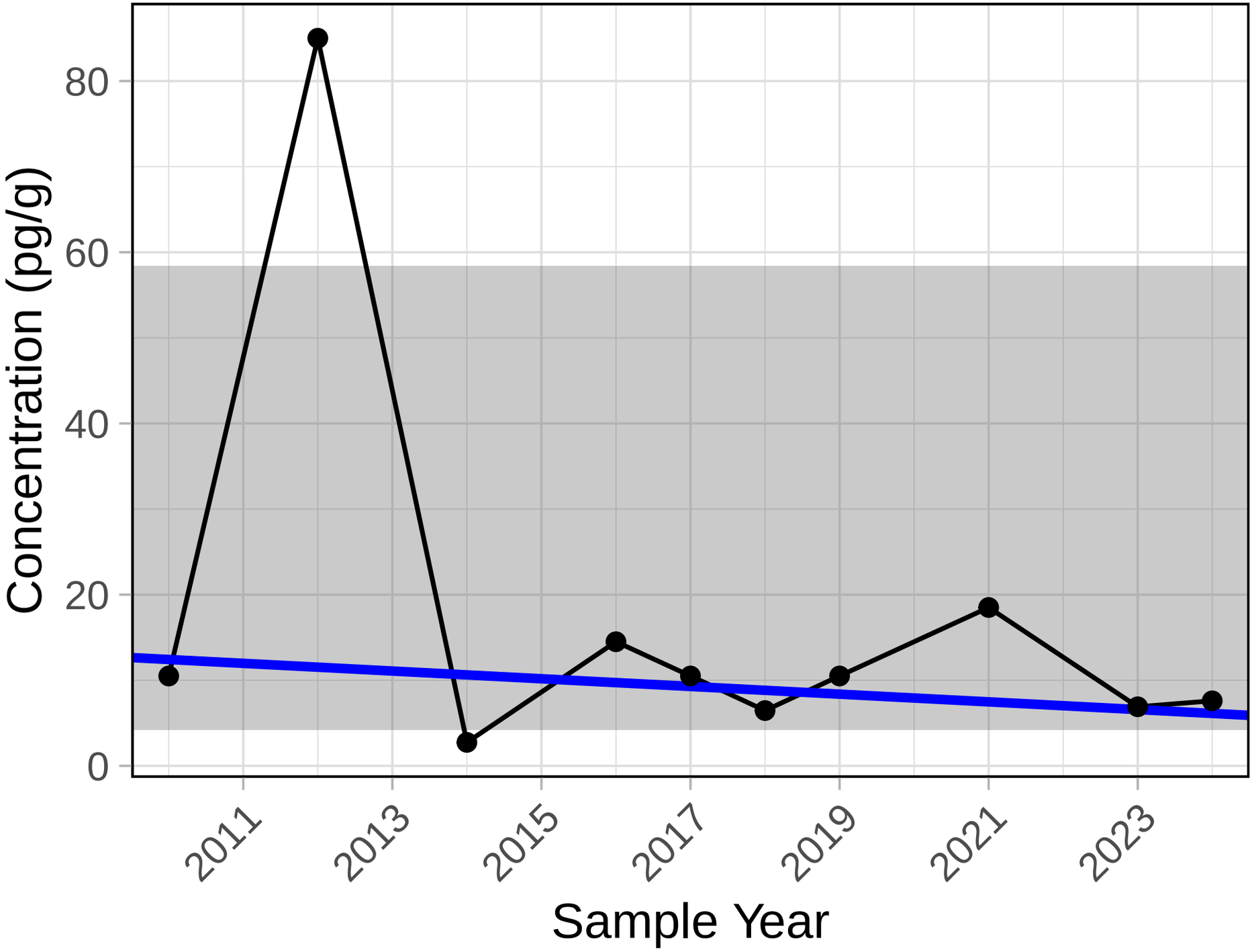
Edith Sediment



Trend significance p−value = 0.123

PCB 16

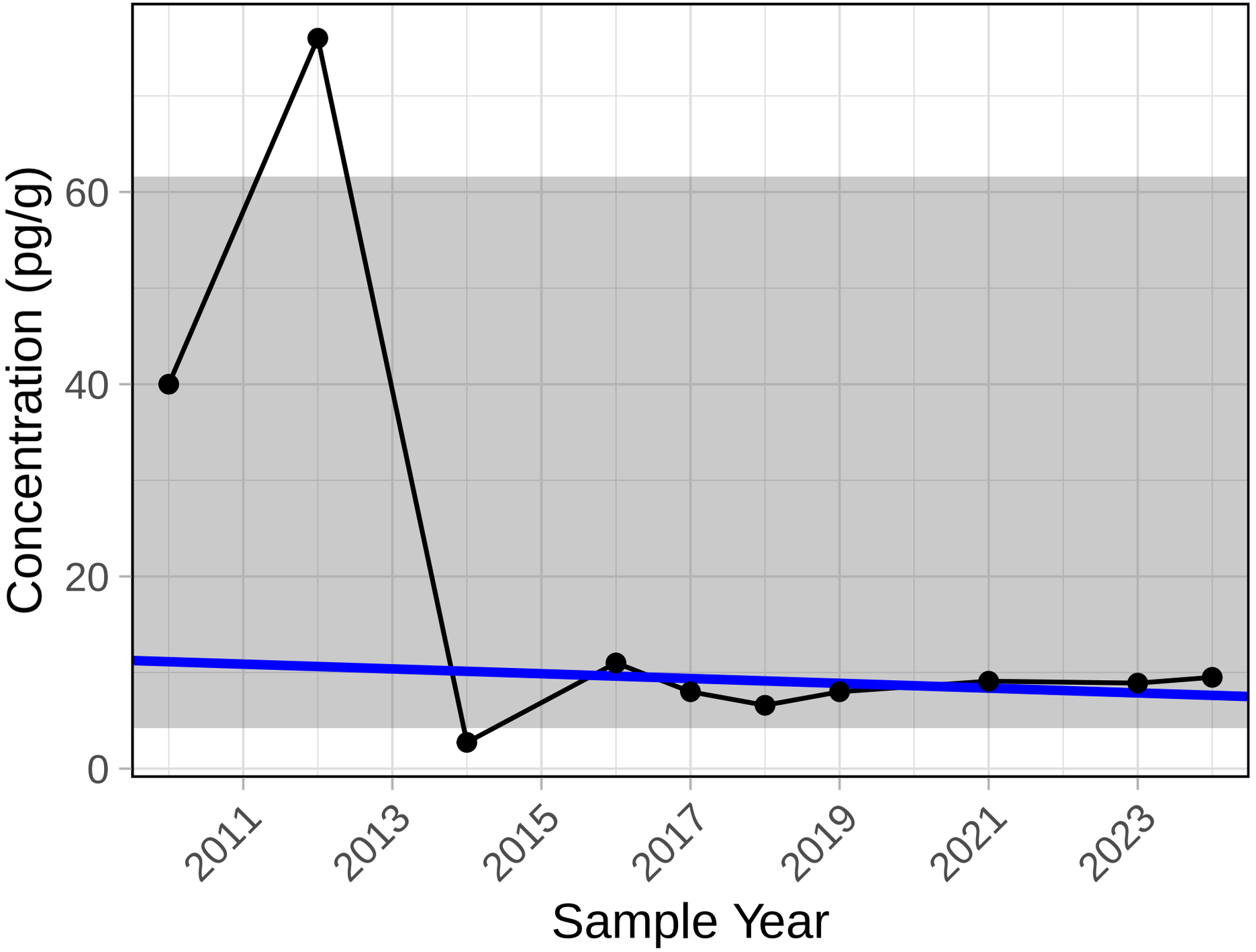
Edith Sediment



Trend significance p−value = 0.65

PCB 17

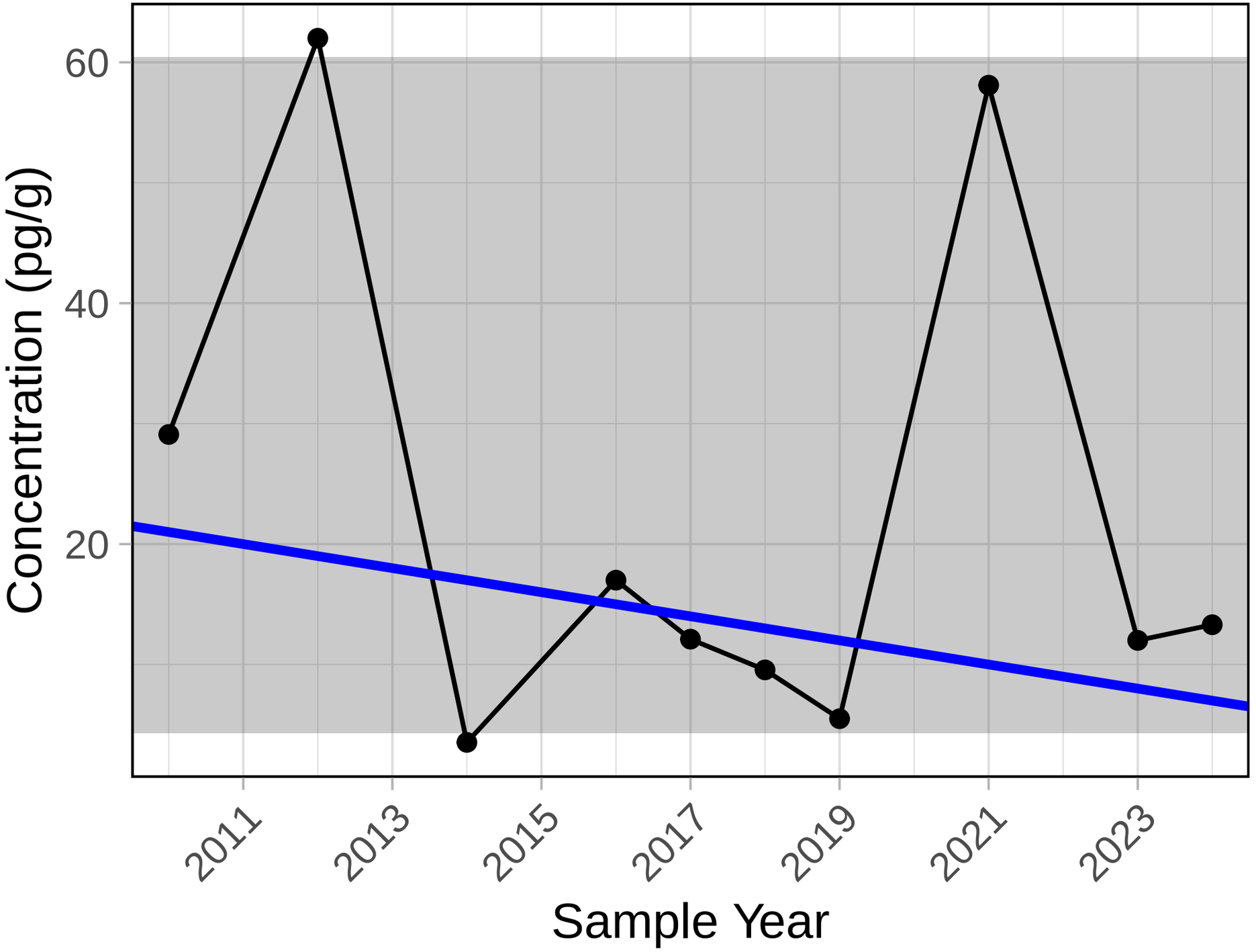
Edith Sediment



Trend significance p−value = 0.788

PCB 22

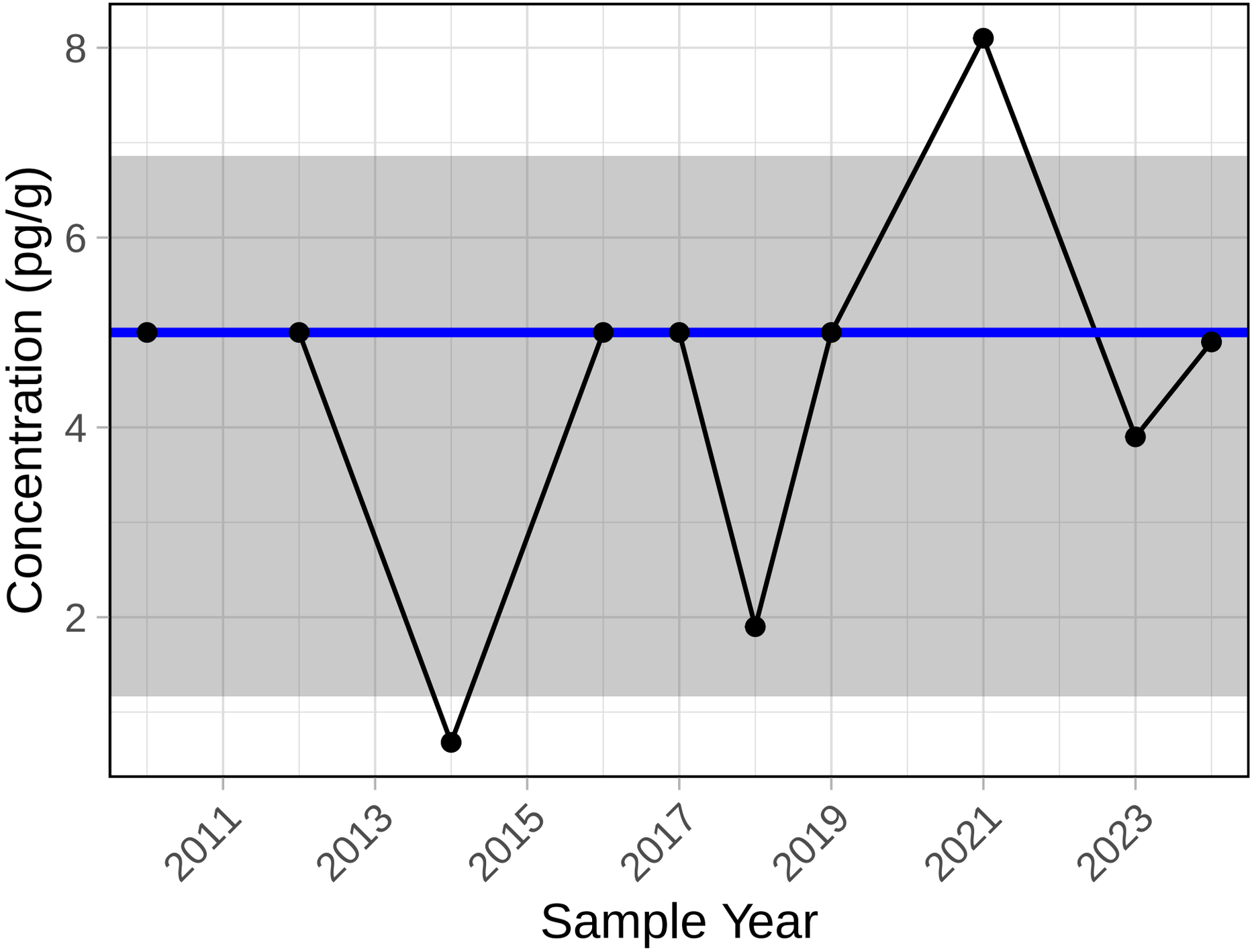
Edith Sediment



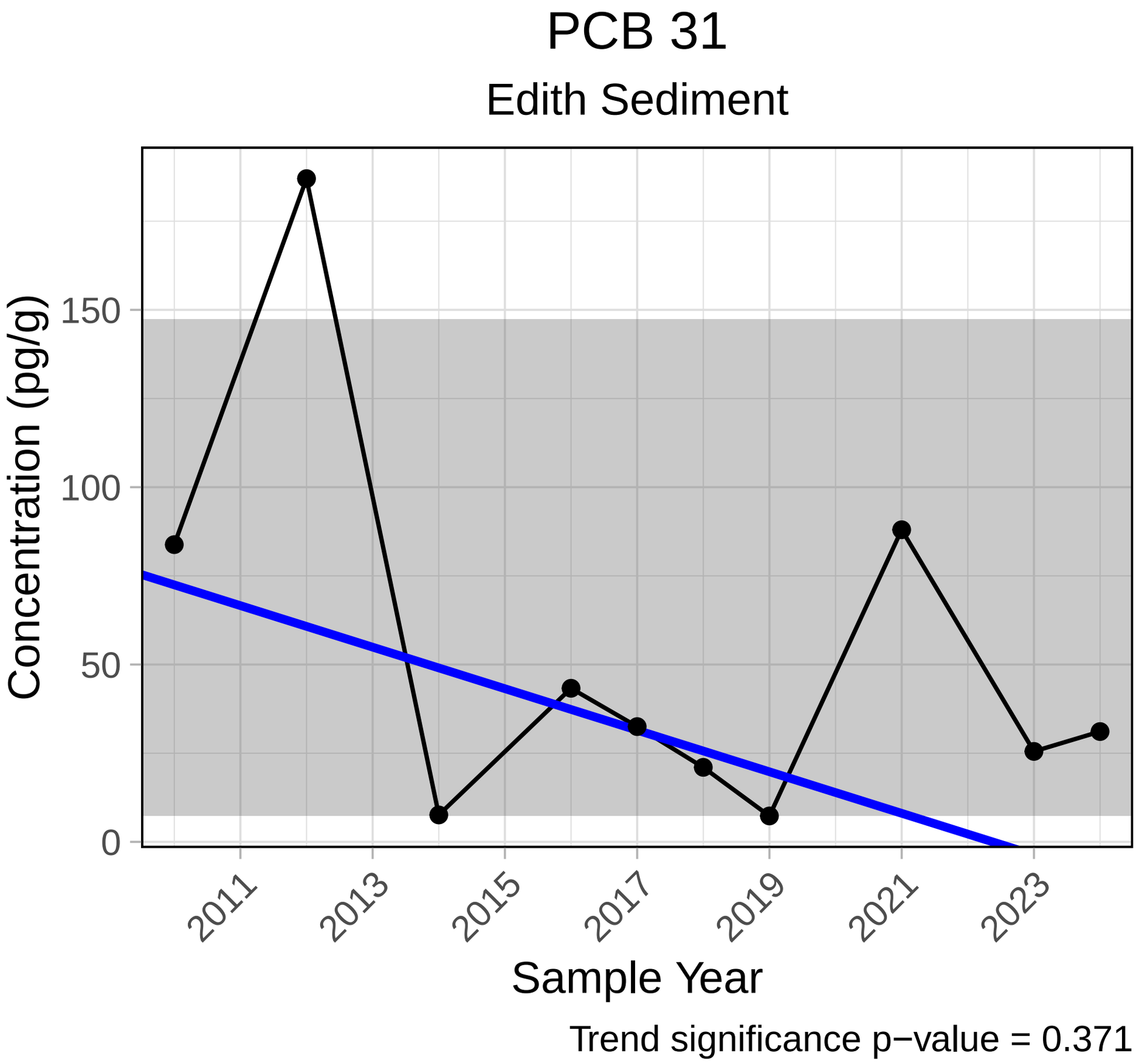
Trend significance p−value = 0.592

PCB 25

Edith Sediment

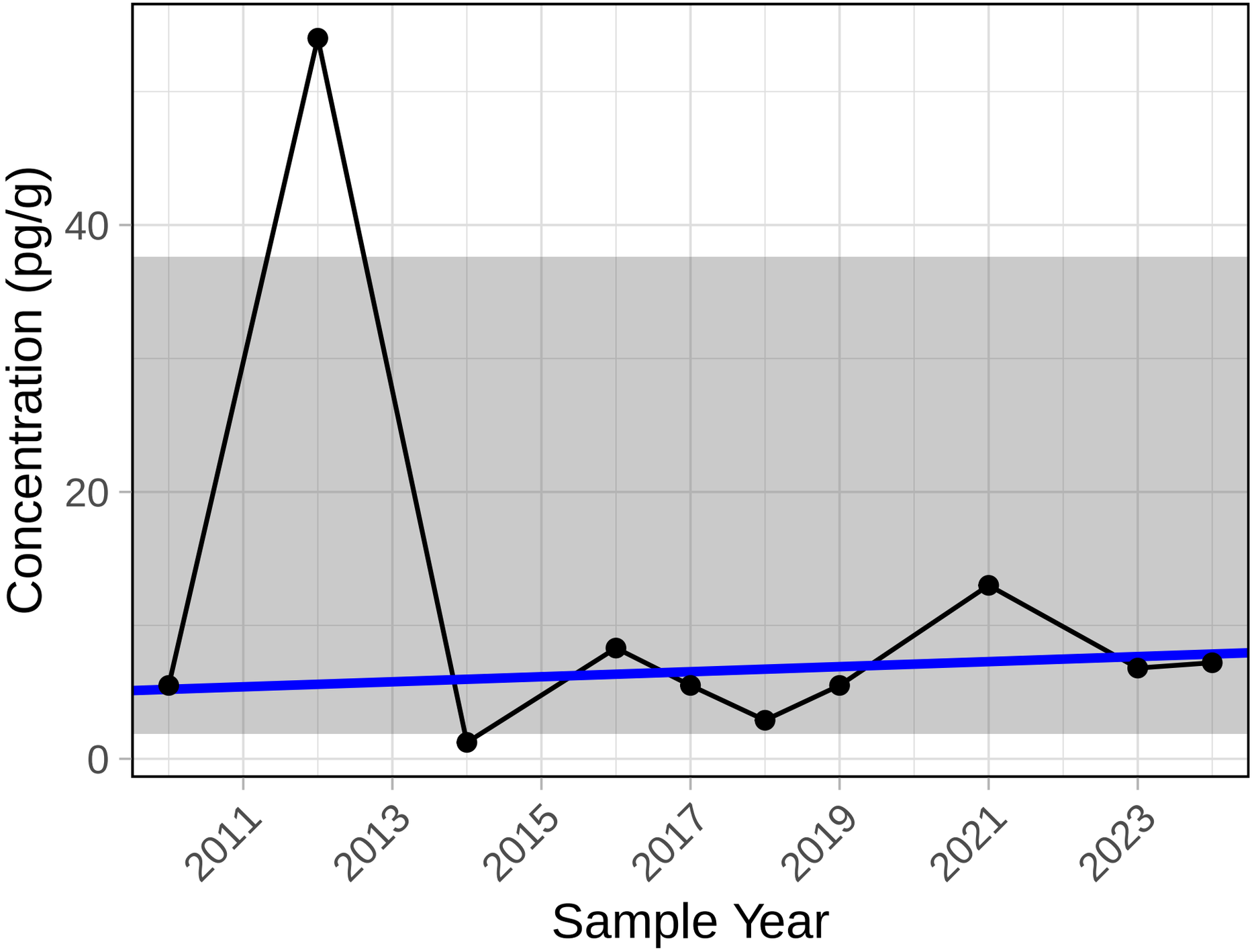


Trend significance p−value = 1


PCB 31
Edith Sediment
Concentration (pg/g)
150
100
50
0
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.371

PCB 32

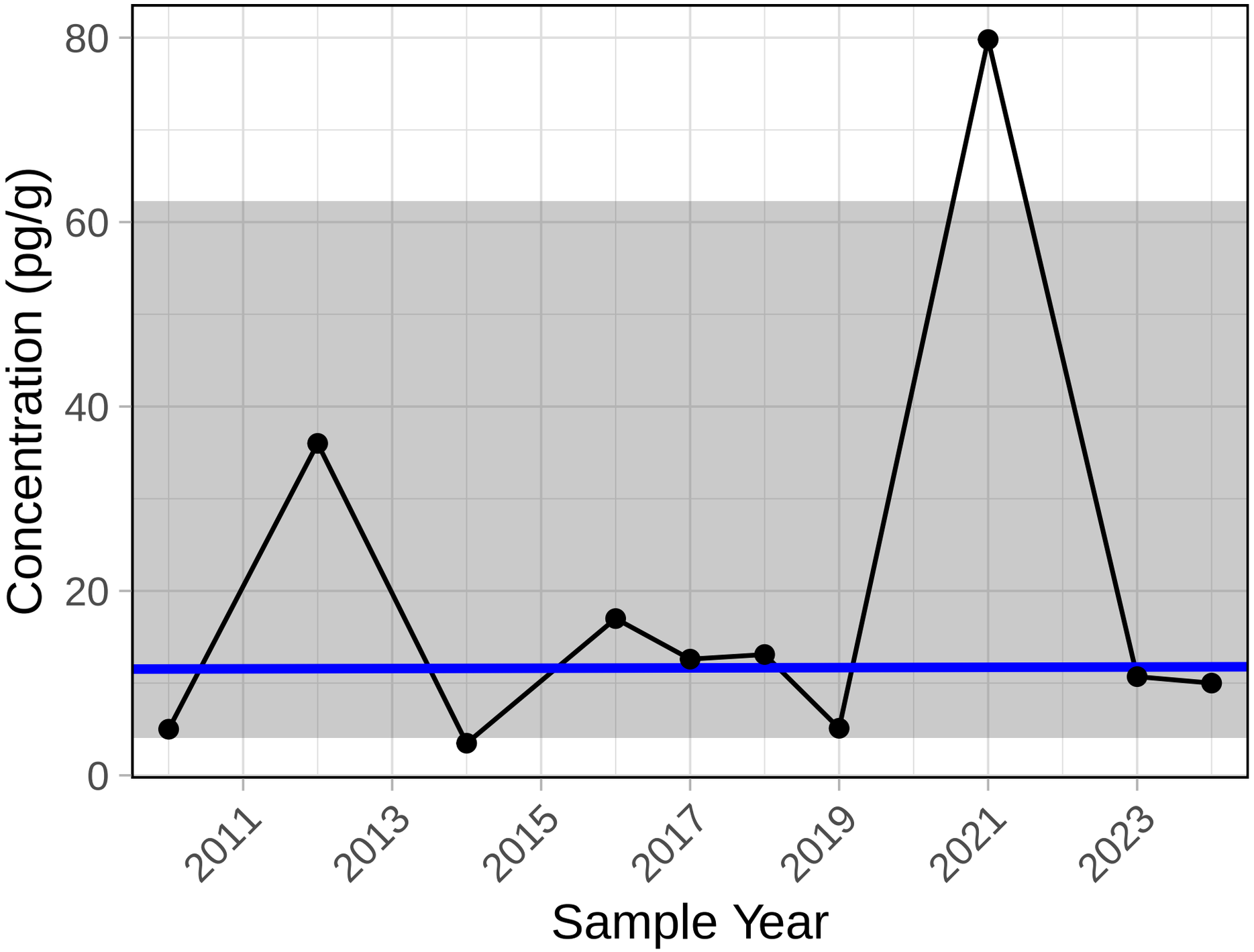
Edith Sediment



Trend significance p−value = 0.65

PCB 37

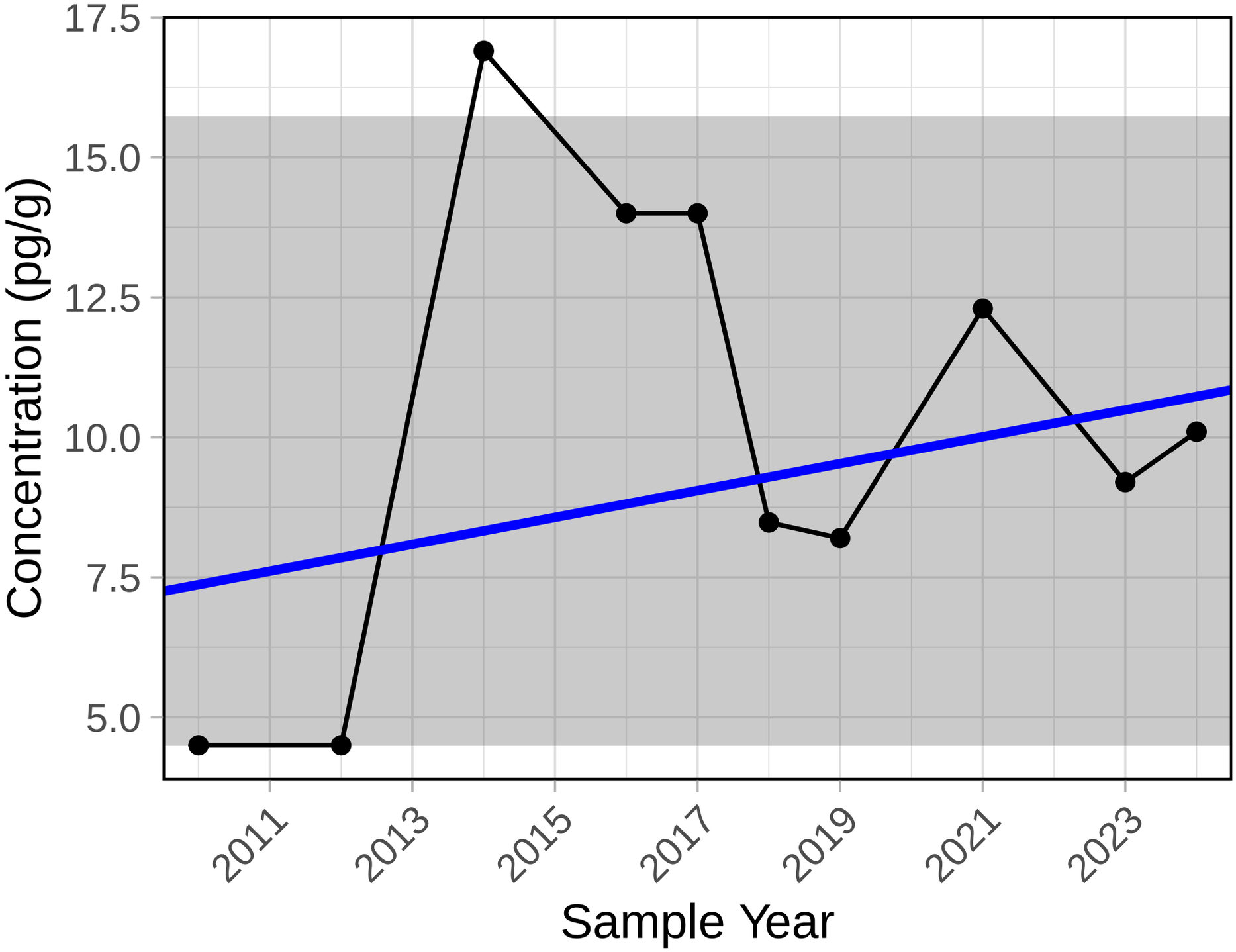
Edith Sediment



Trend significance p−value = 1

PCB 38

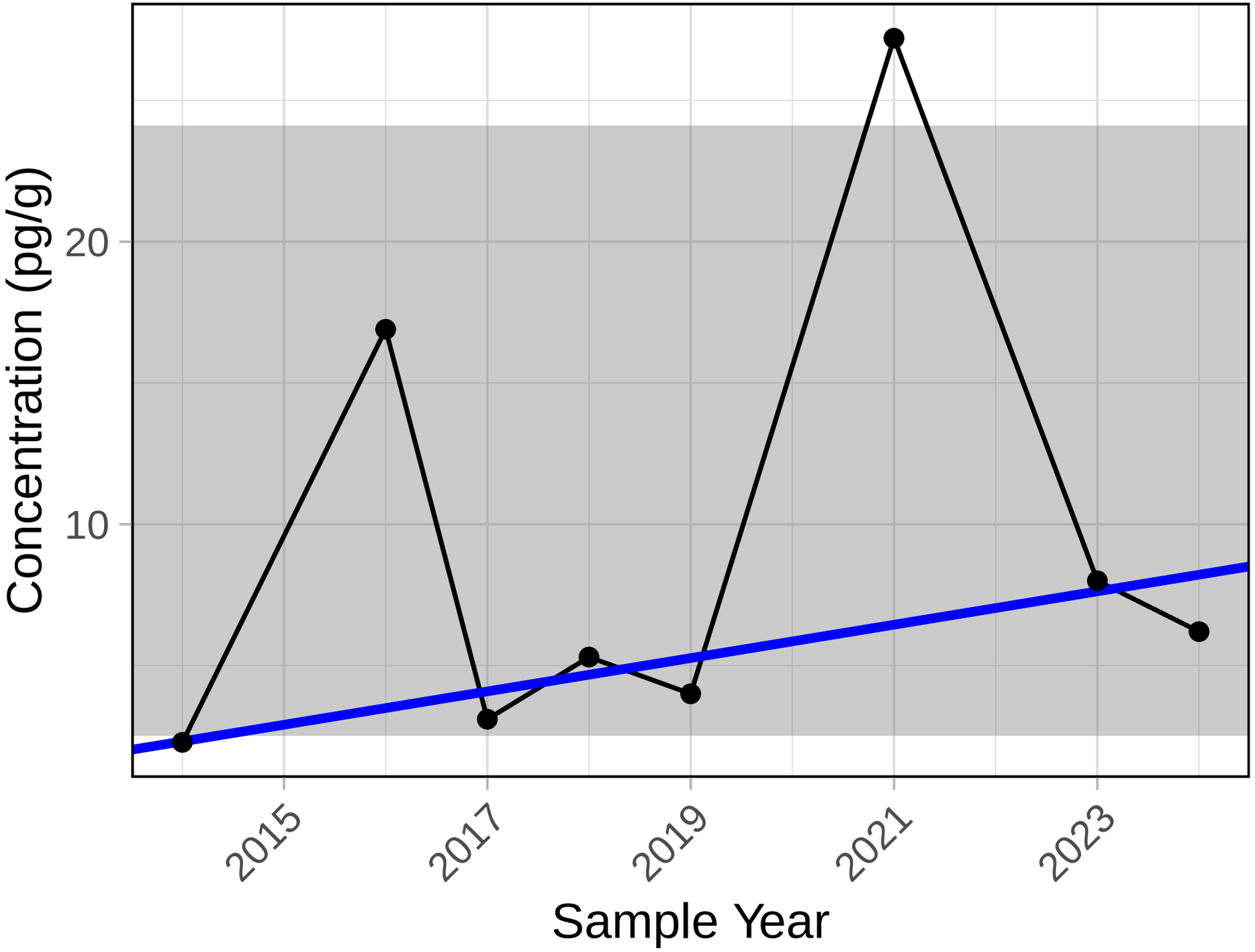
Edith Sediment



Trend significance p−value = 0.857

PCB 42

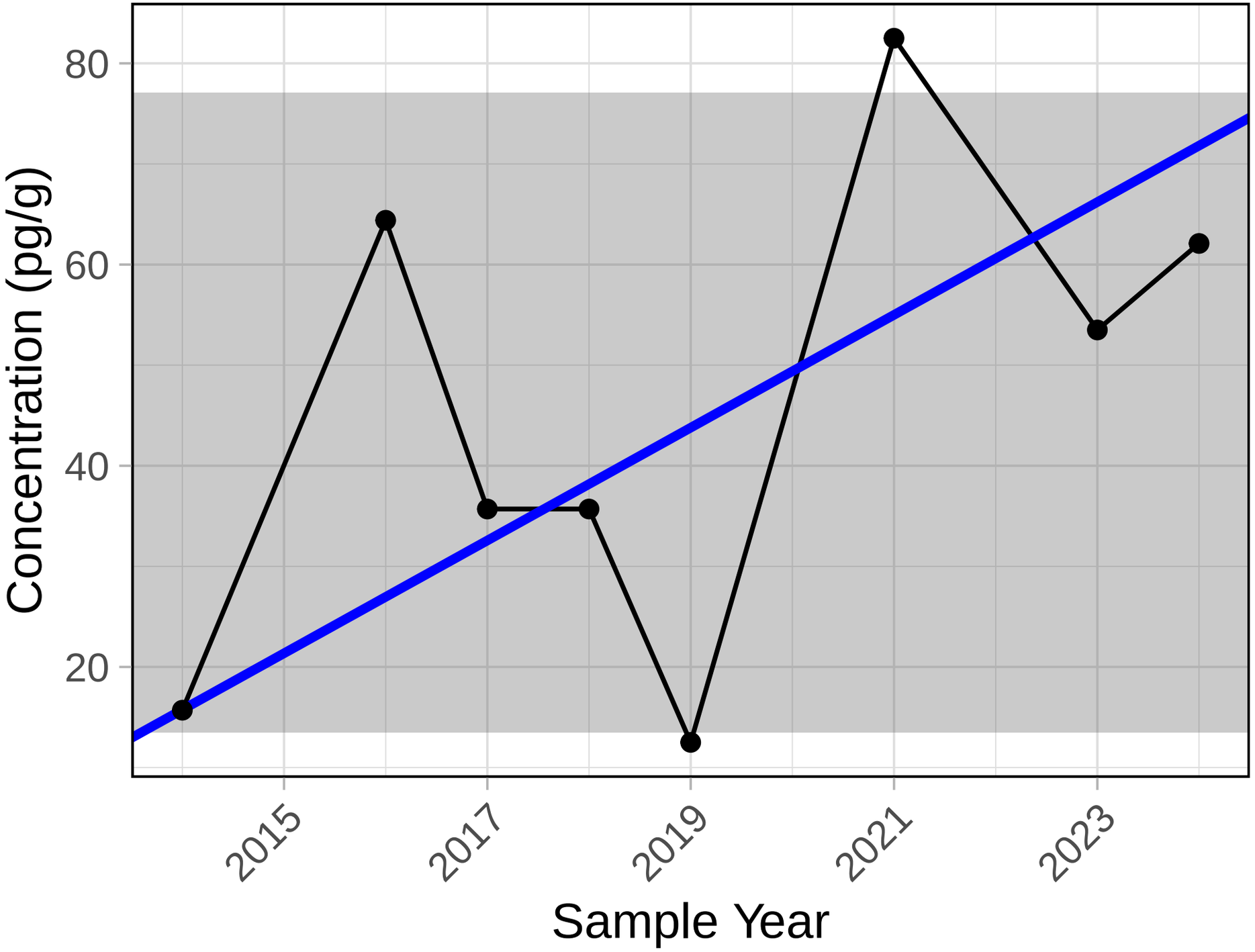
Edith Sediment



Trend significance p−value = 0.266

PCB 52

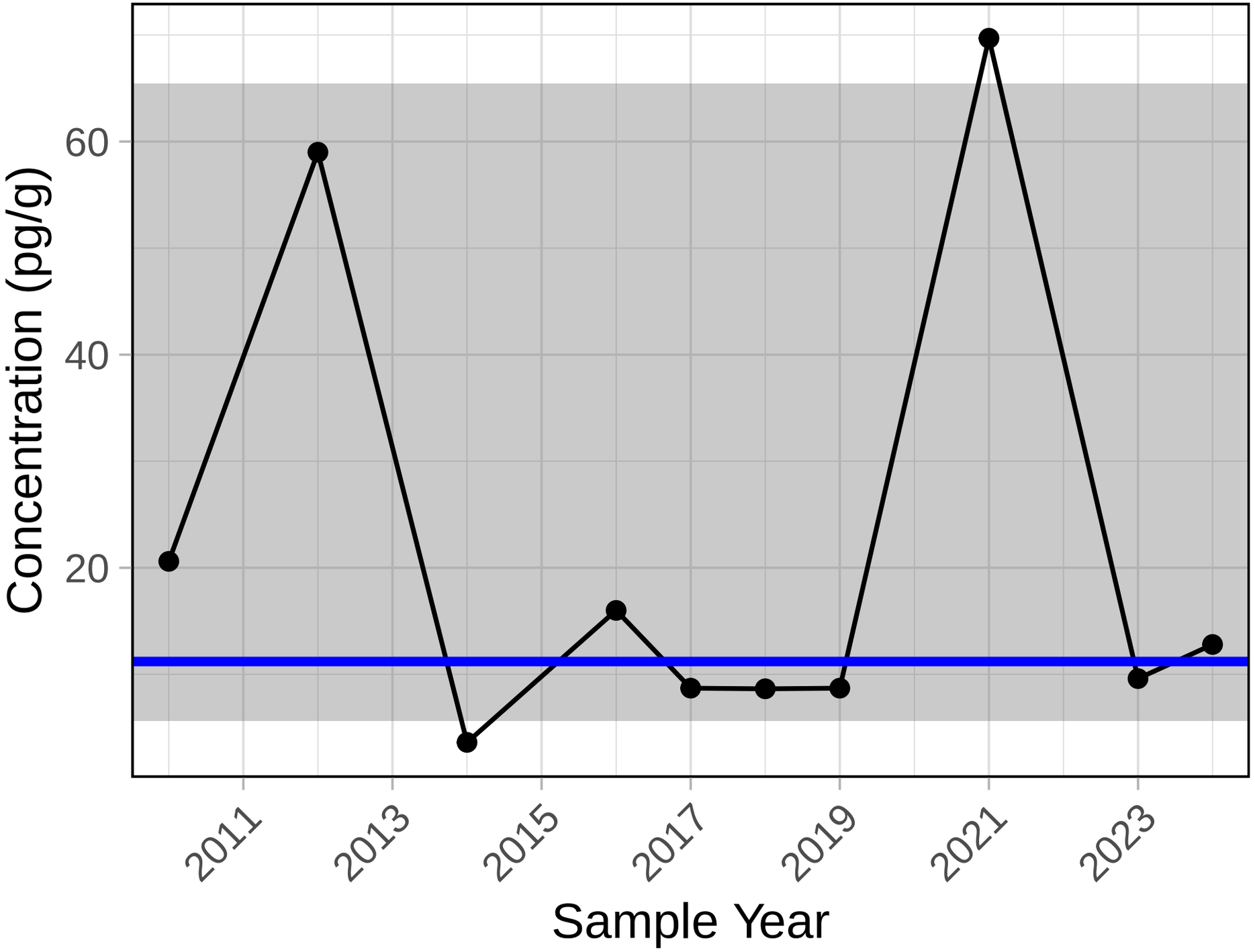
Edith Sediment



Trend significance p−value = 0.454

PCB 56

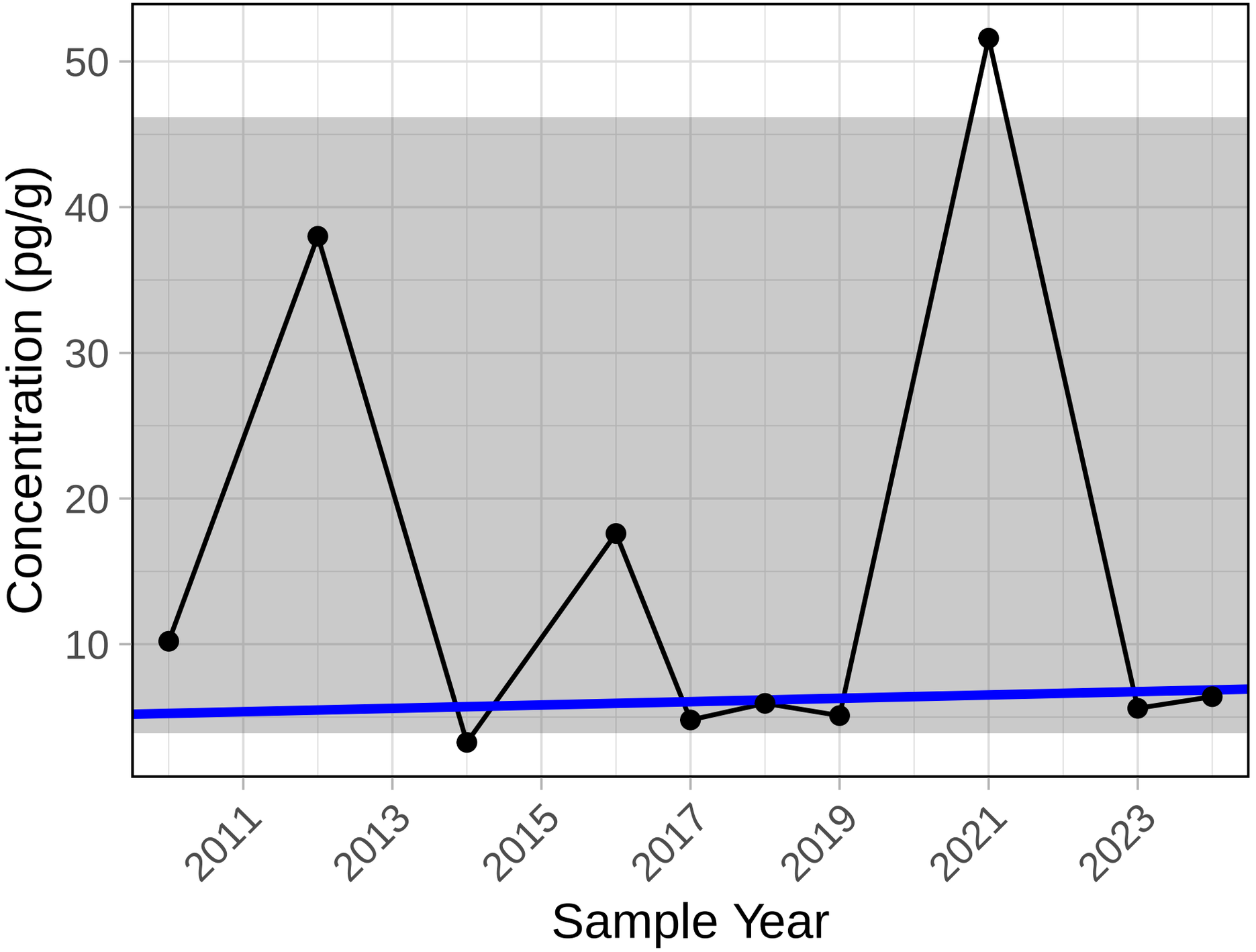
Edith Sediment



Trend significance p−value = 1

PCB 60

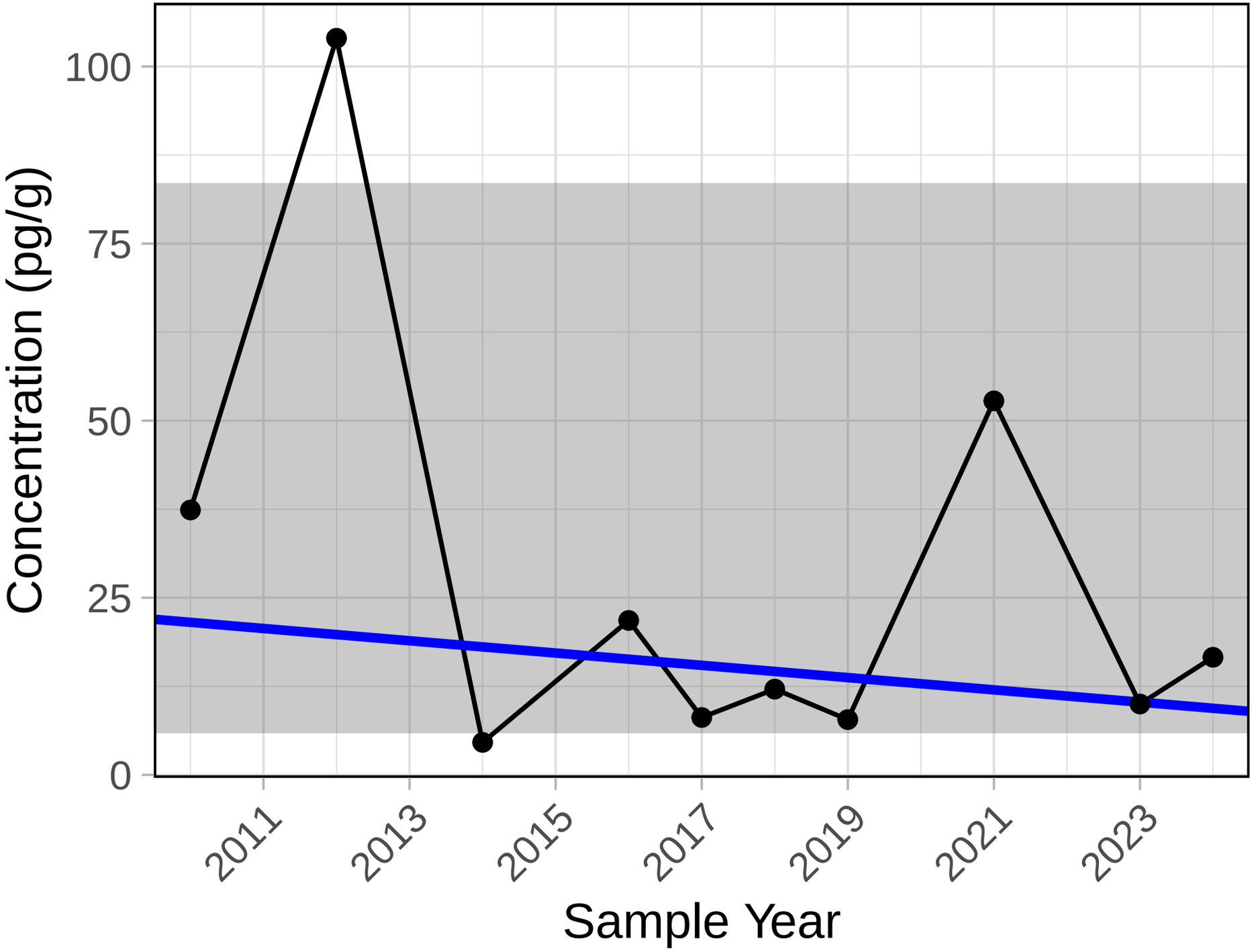
Edith Sediment



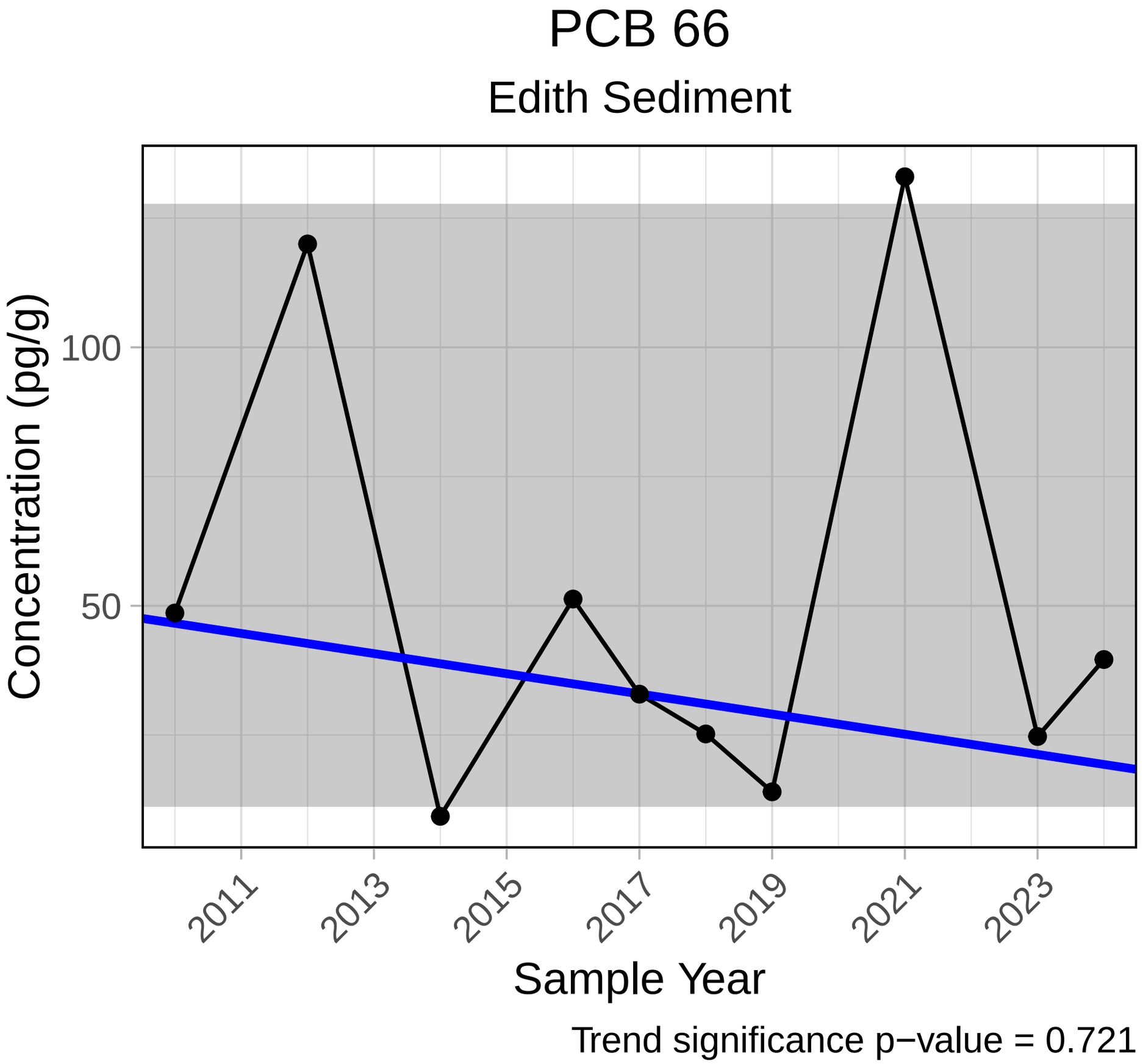
Trend significance p−value = 1

PCB 64

Edith Sediment

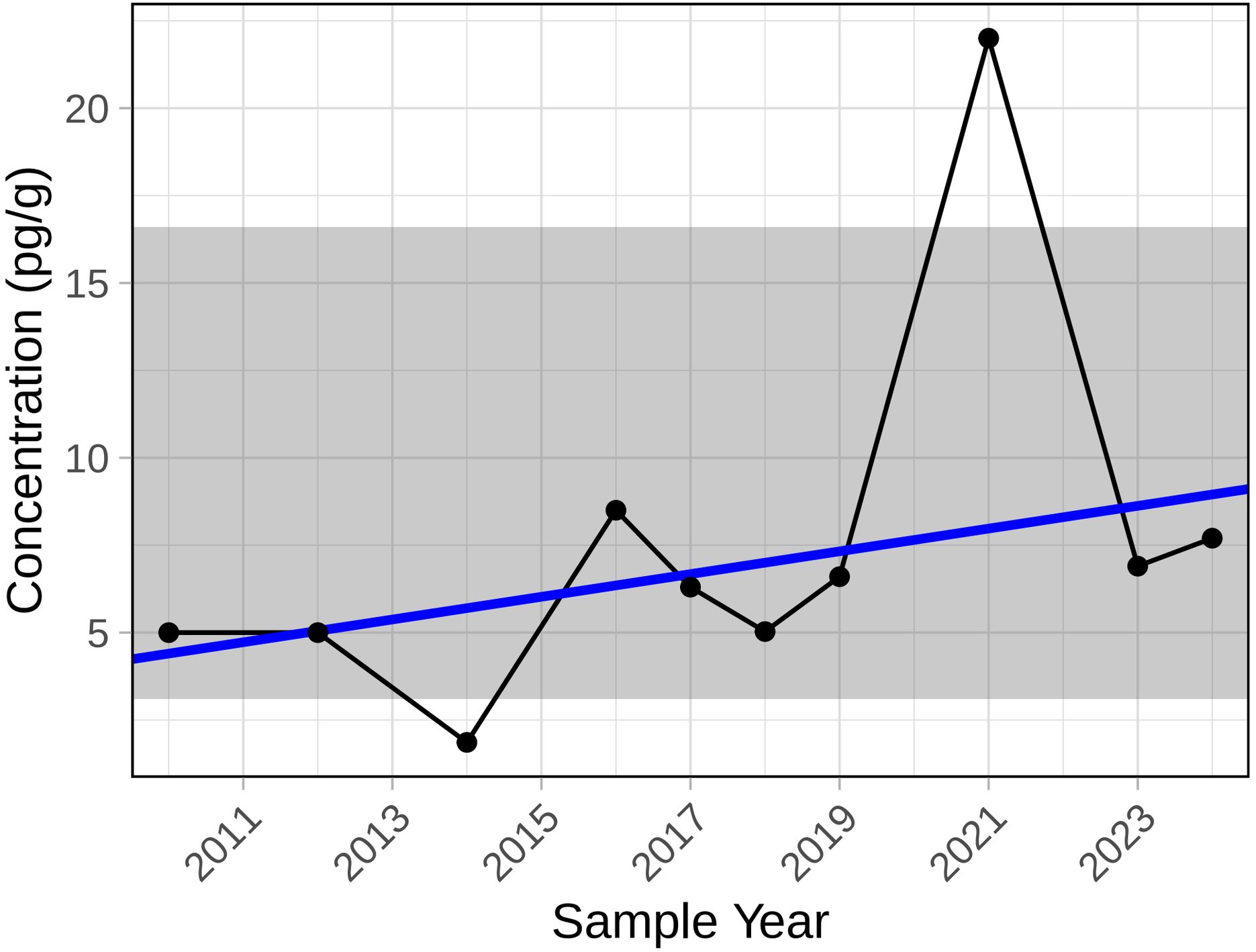


Trend significance p−value = 0.721


PCB 66
Edith Sediment
Concentration (pg/g)
100
50
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.721

PCB 77

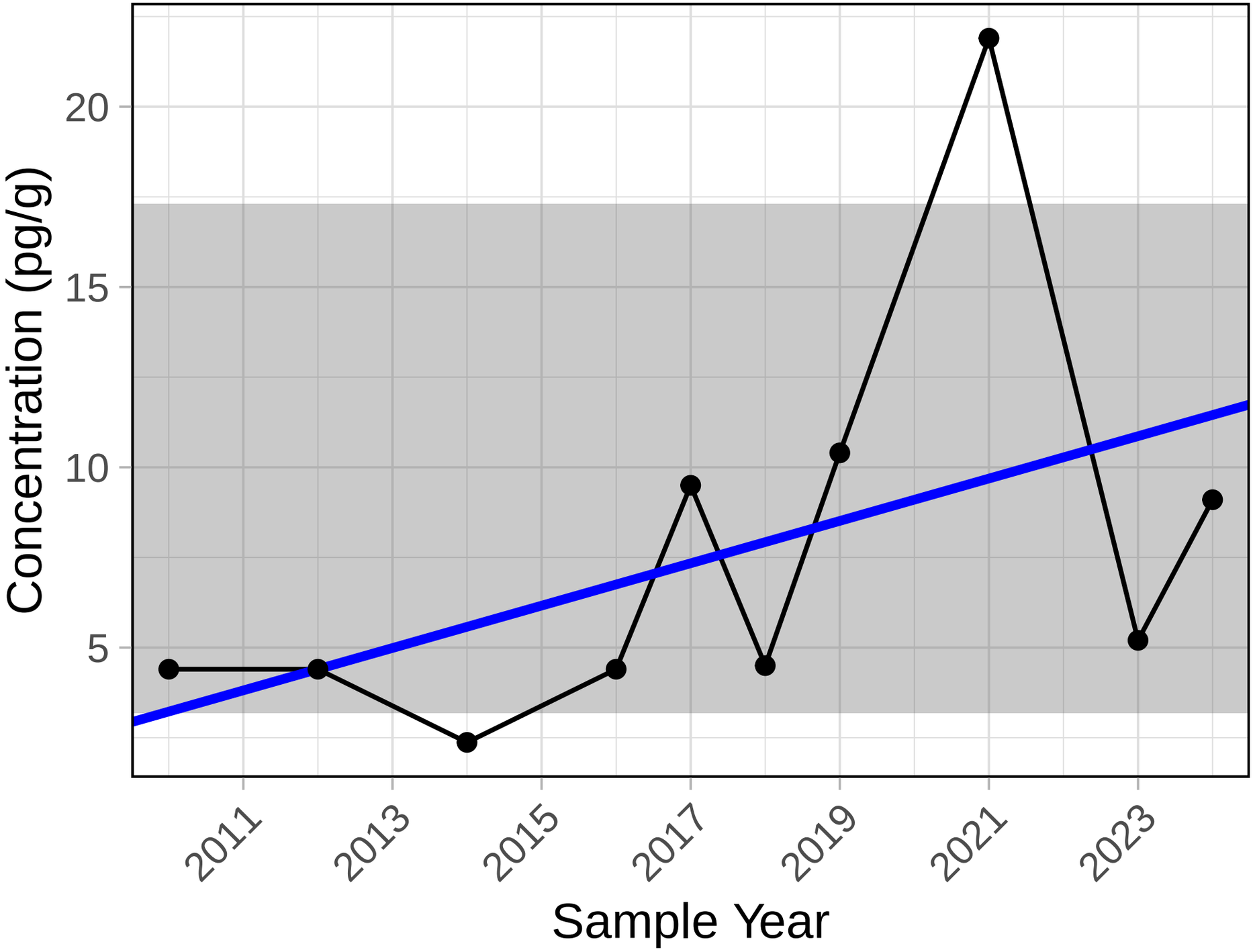
Edith Sediment



Trend significance p−value = 0.039

PCB 82

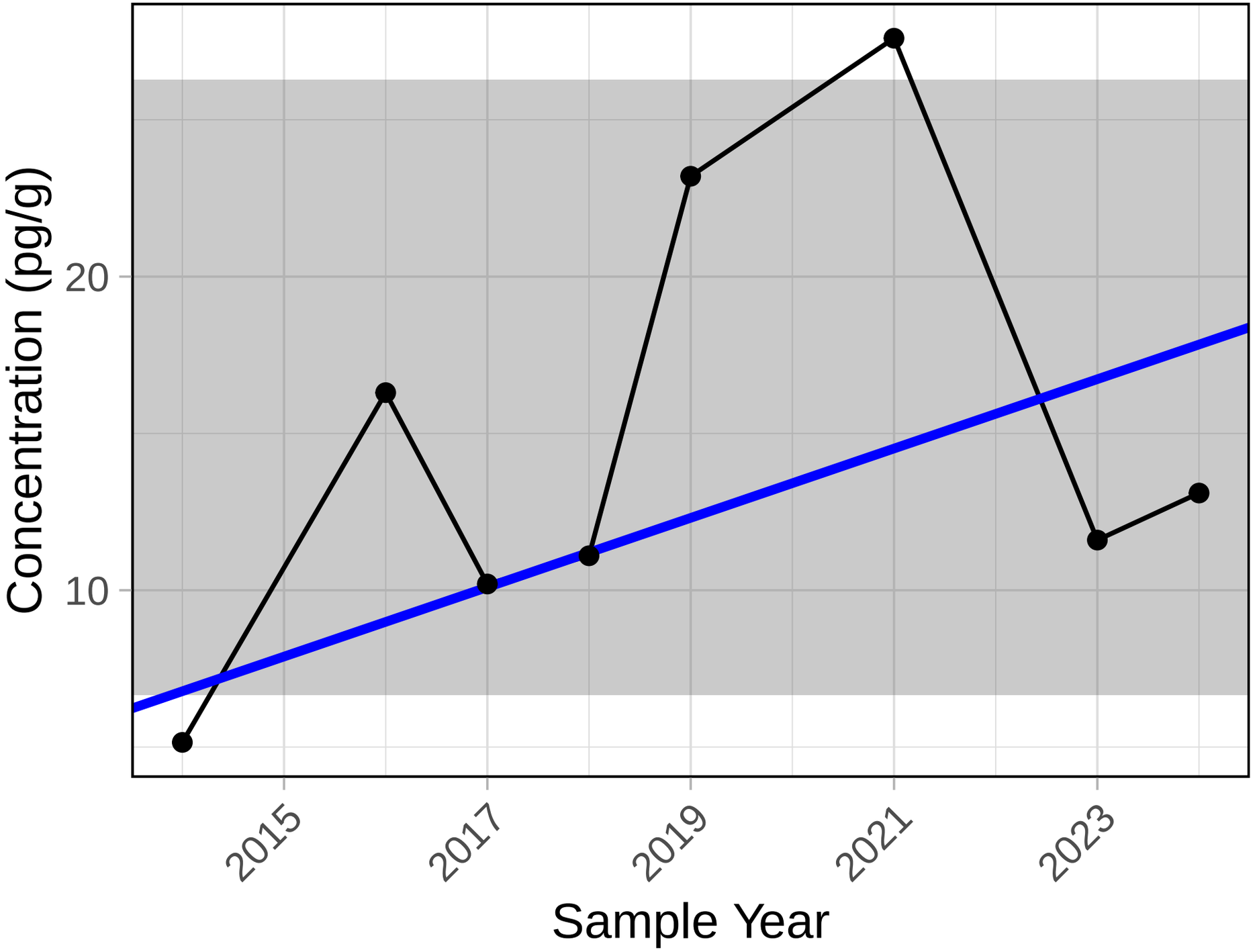
Edith Sediment



Trend significance p−value = 0.037

PCB 84

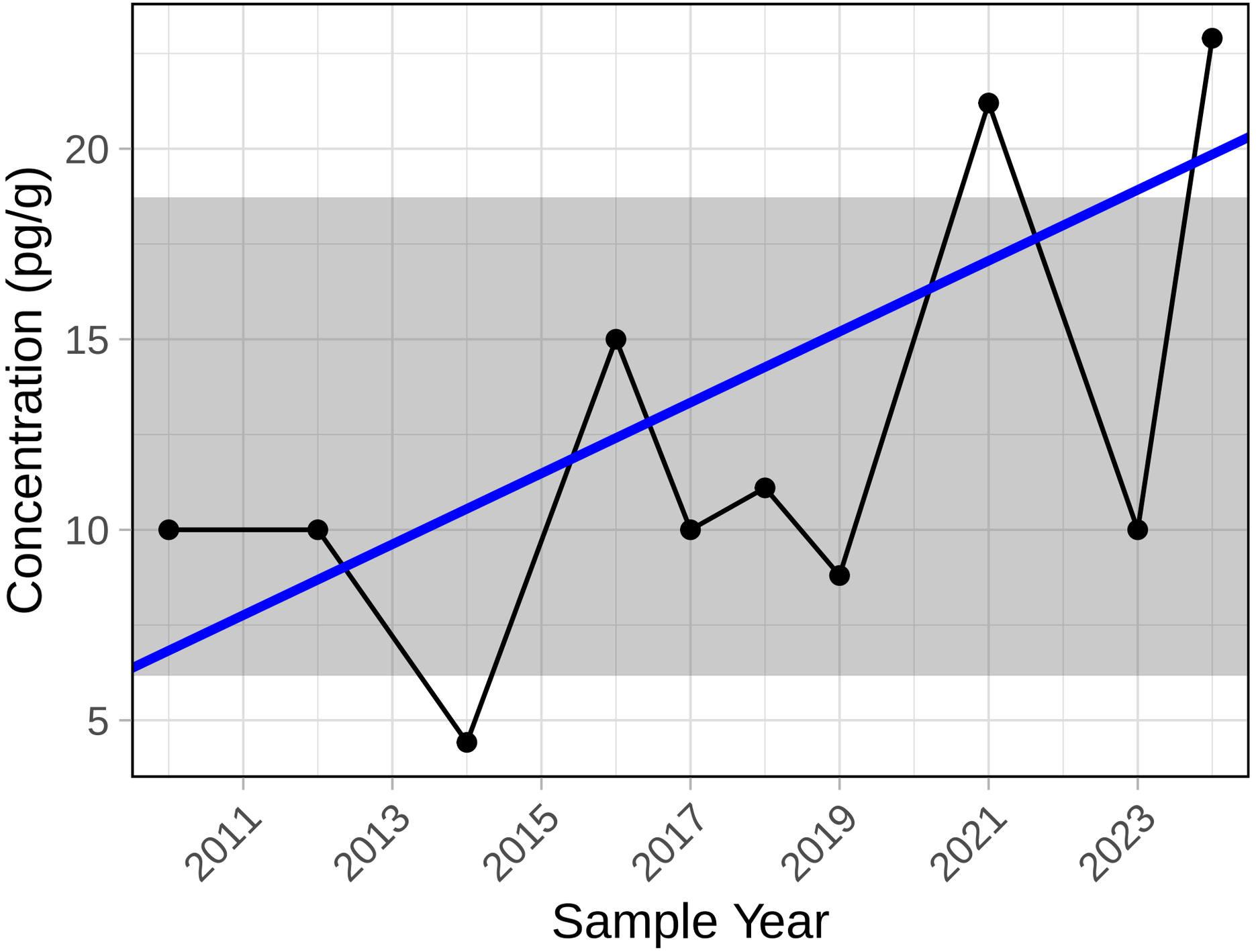
Edith Sediment



Trend significance p−value = 0.174

PCB 92

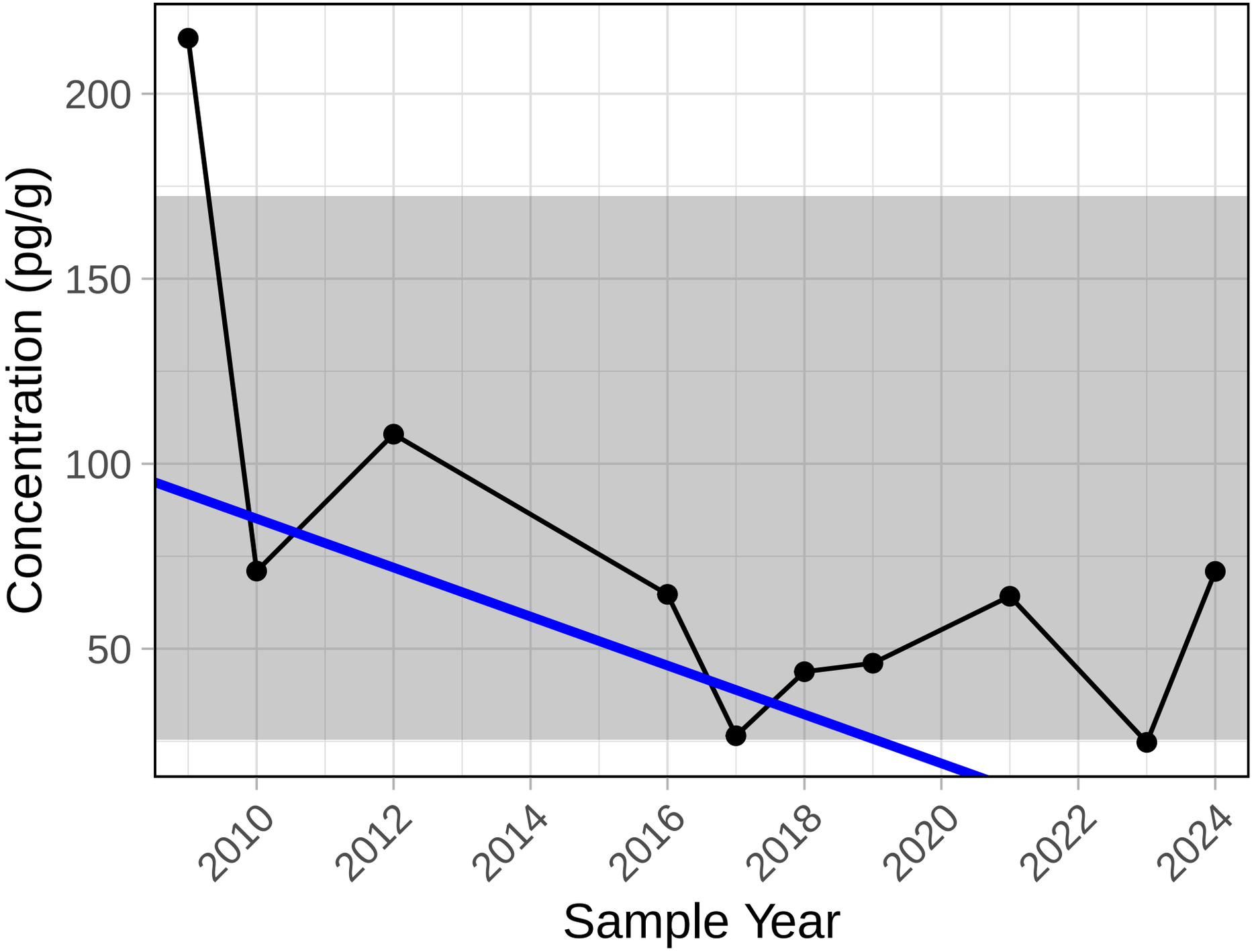
Edith Sediment



Trend significance p−value = 0.194

PCB 95

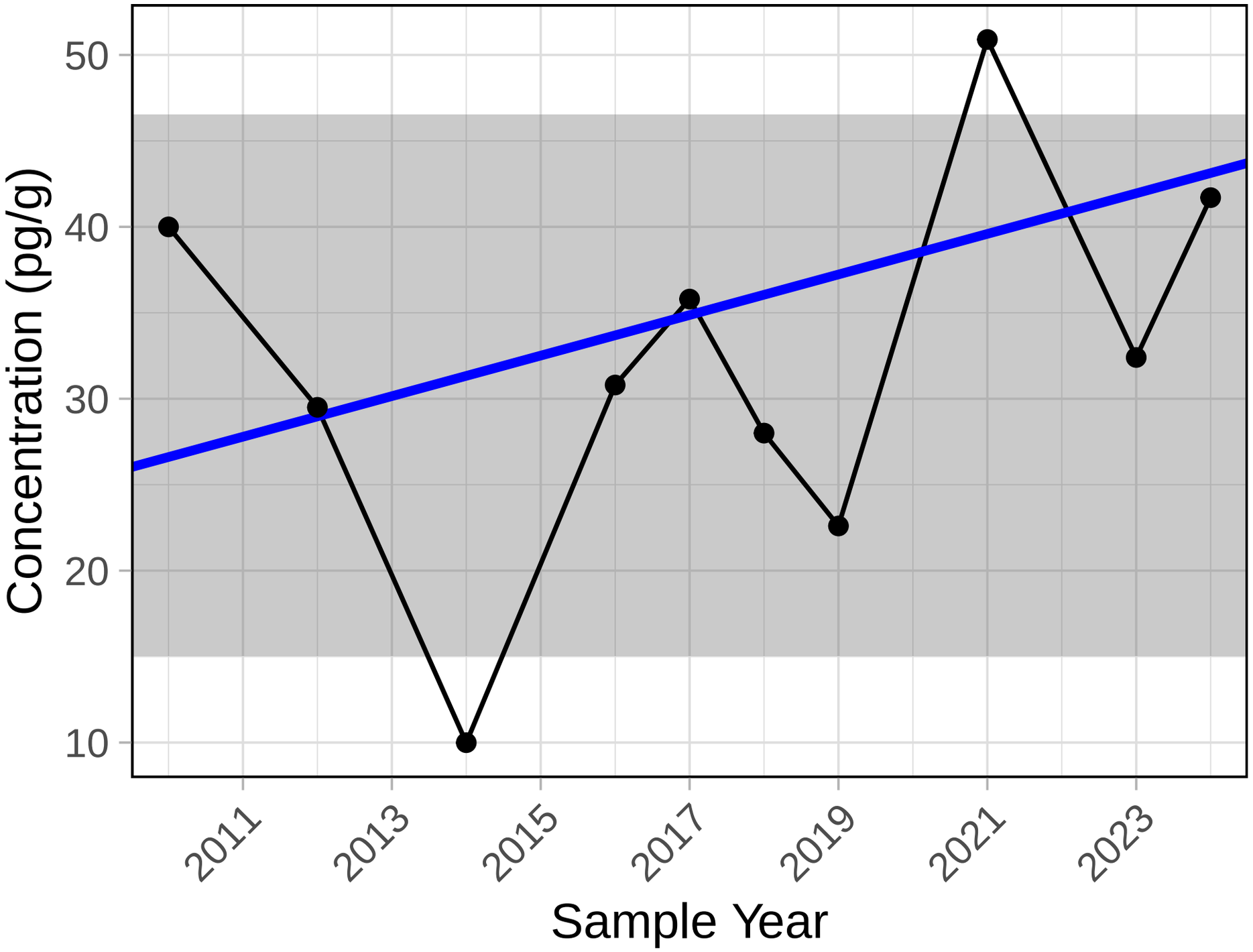
Edith Sediment



Trend significance p−value = 0.107

PCB 105

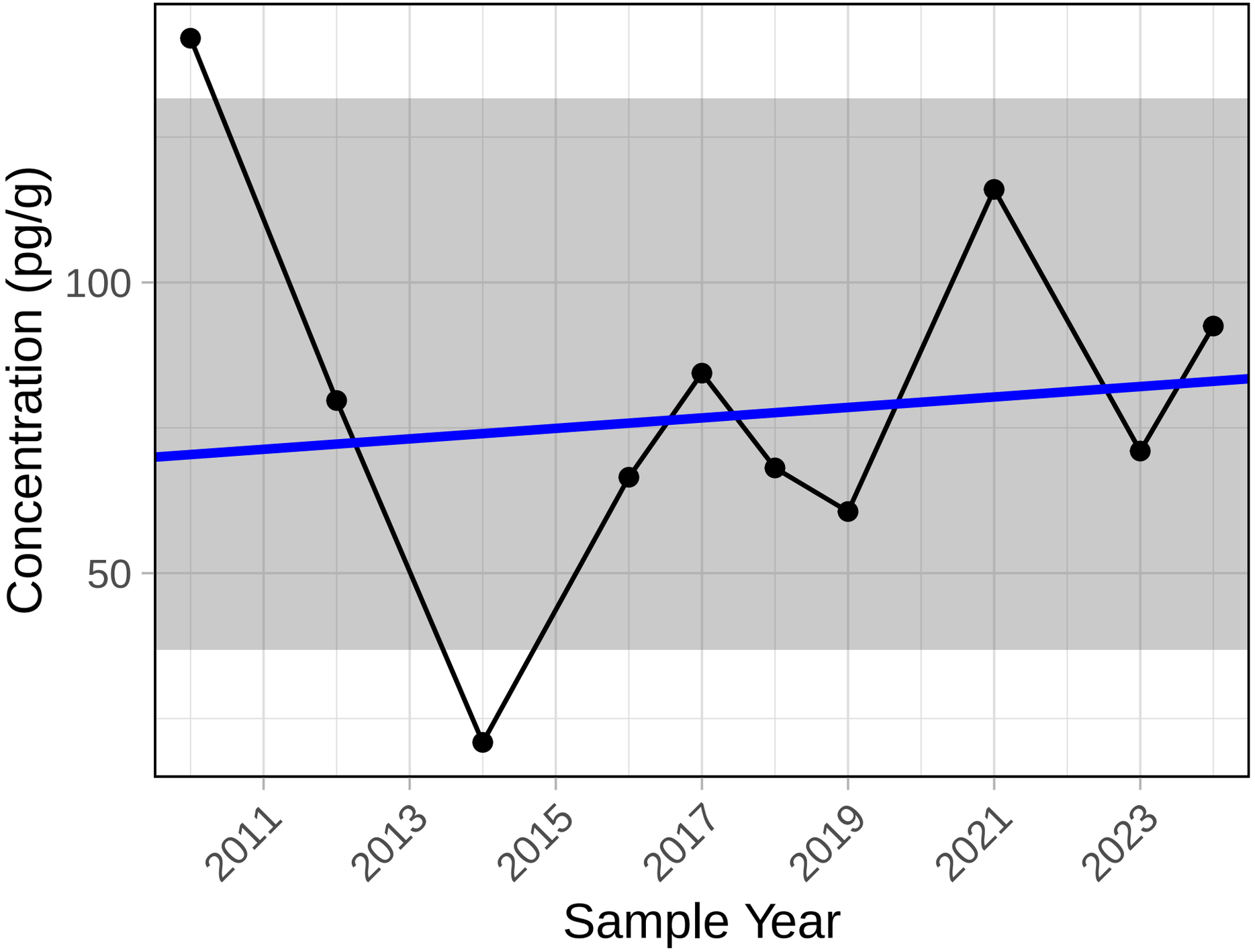
Edith Sediment



Trend significance p−value = 0.474

PCB 118

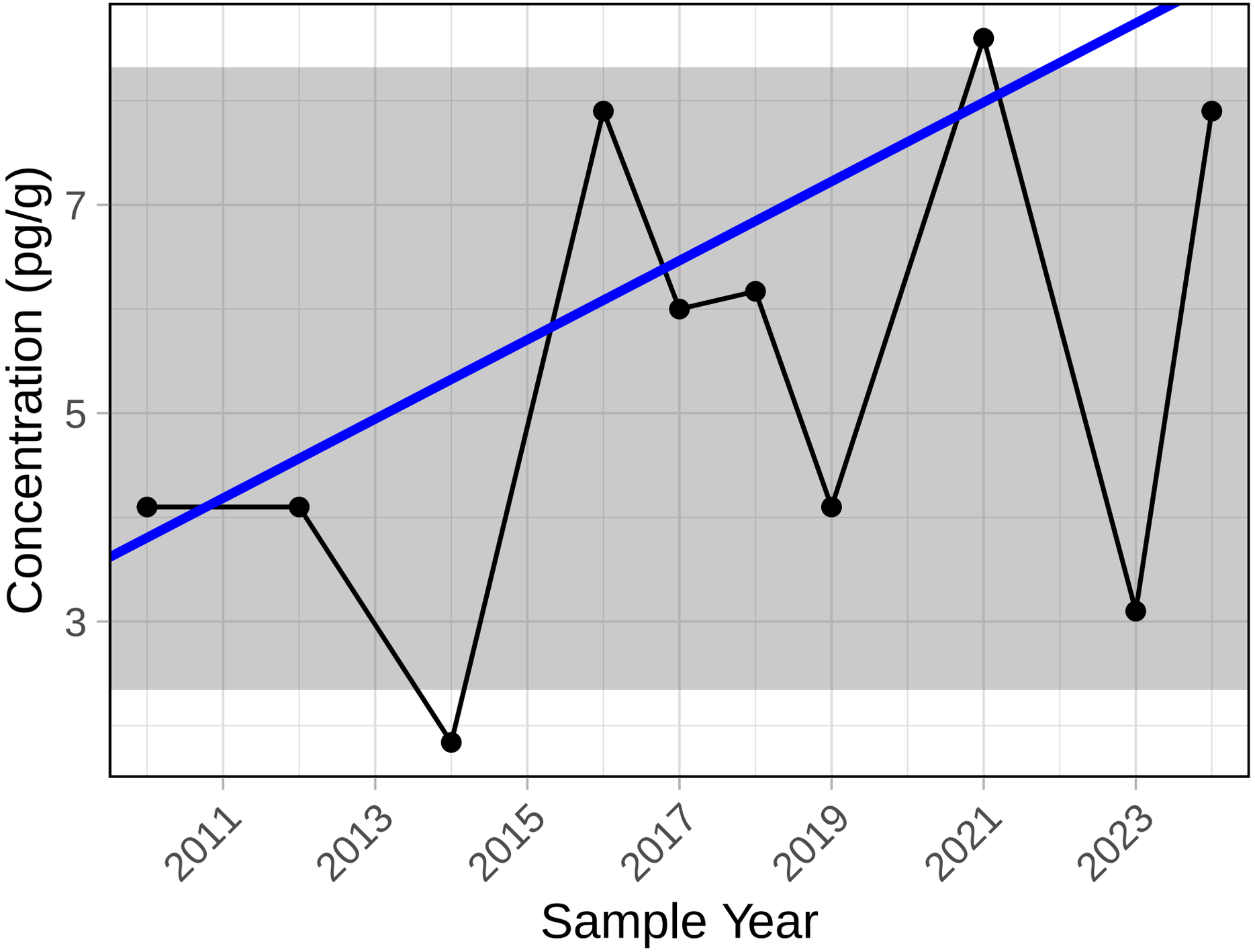
Edith Sediment



Trend significance p−value = 0.858

PCB 130

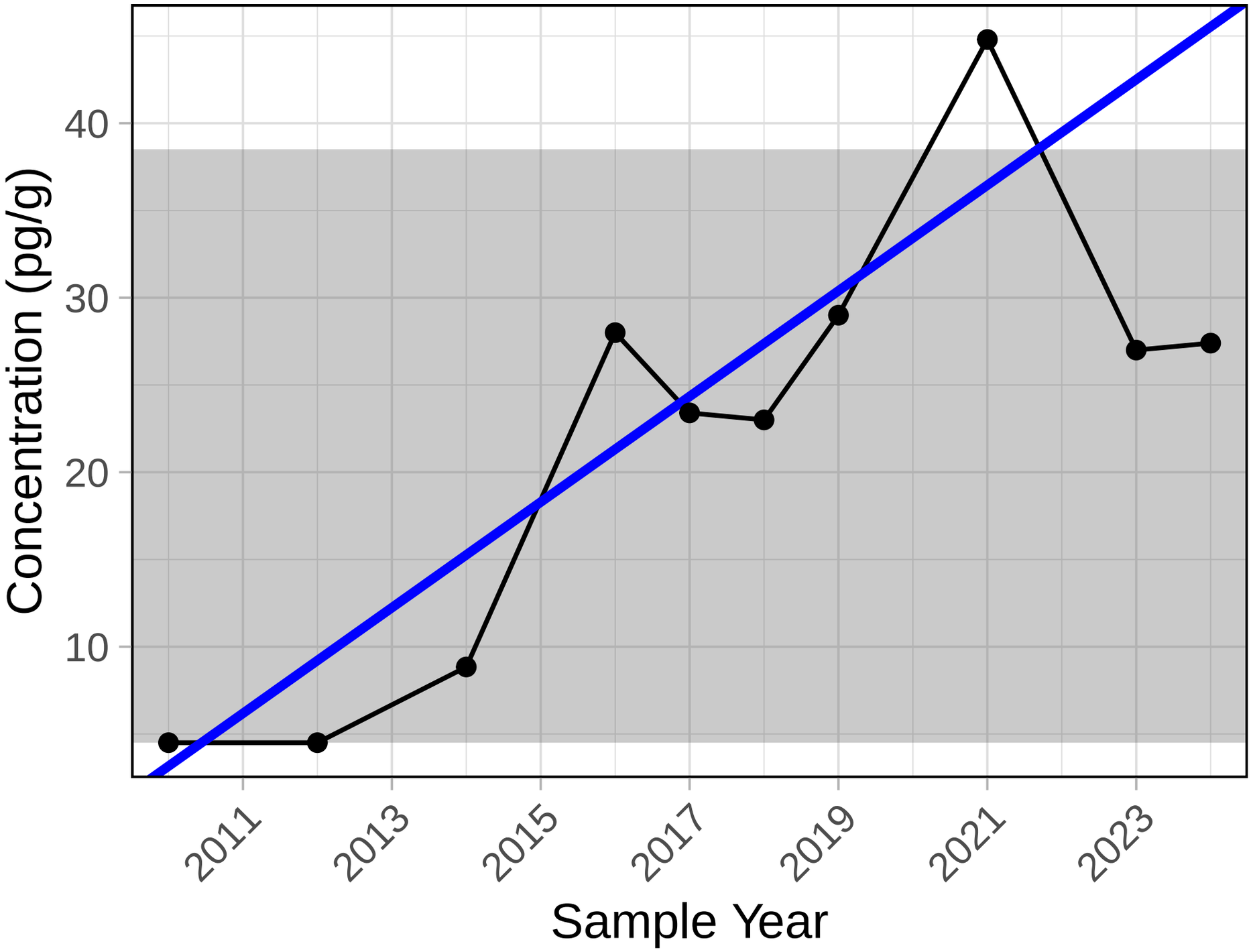
Edith Sediment



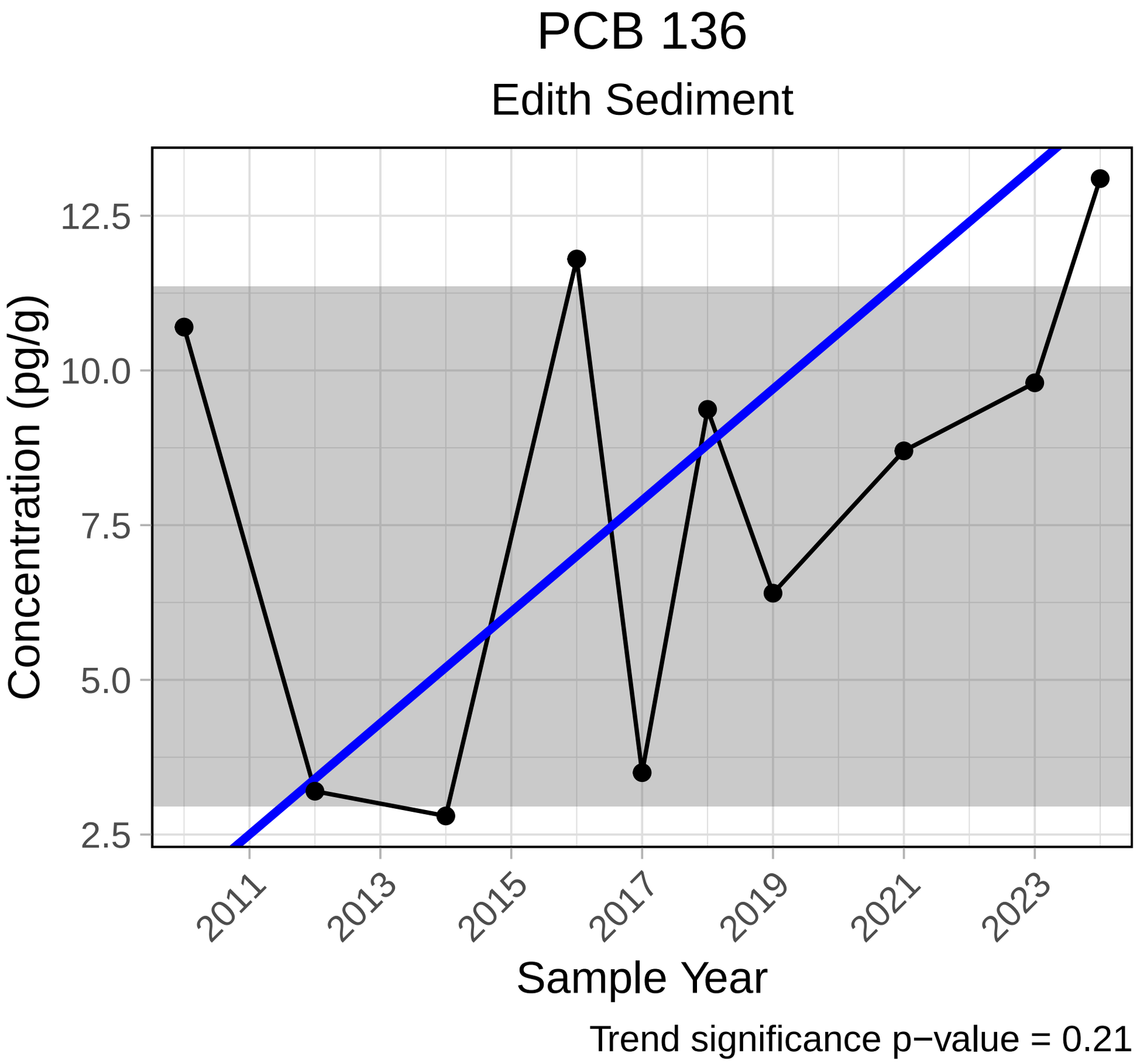
Trend significance p−value = 0.362

PCB 132

Edith Sediment

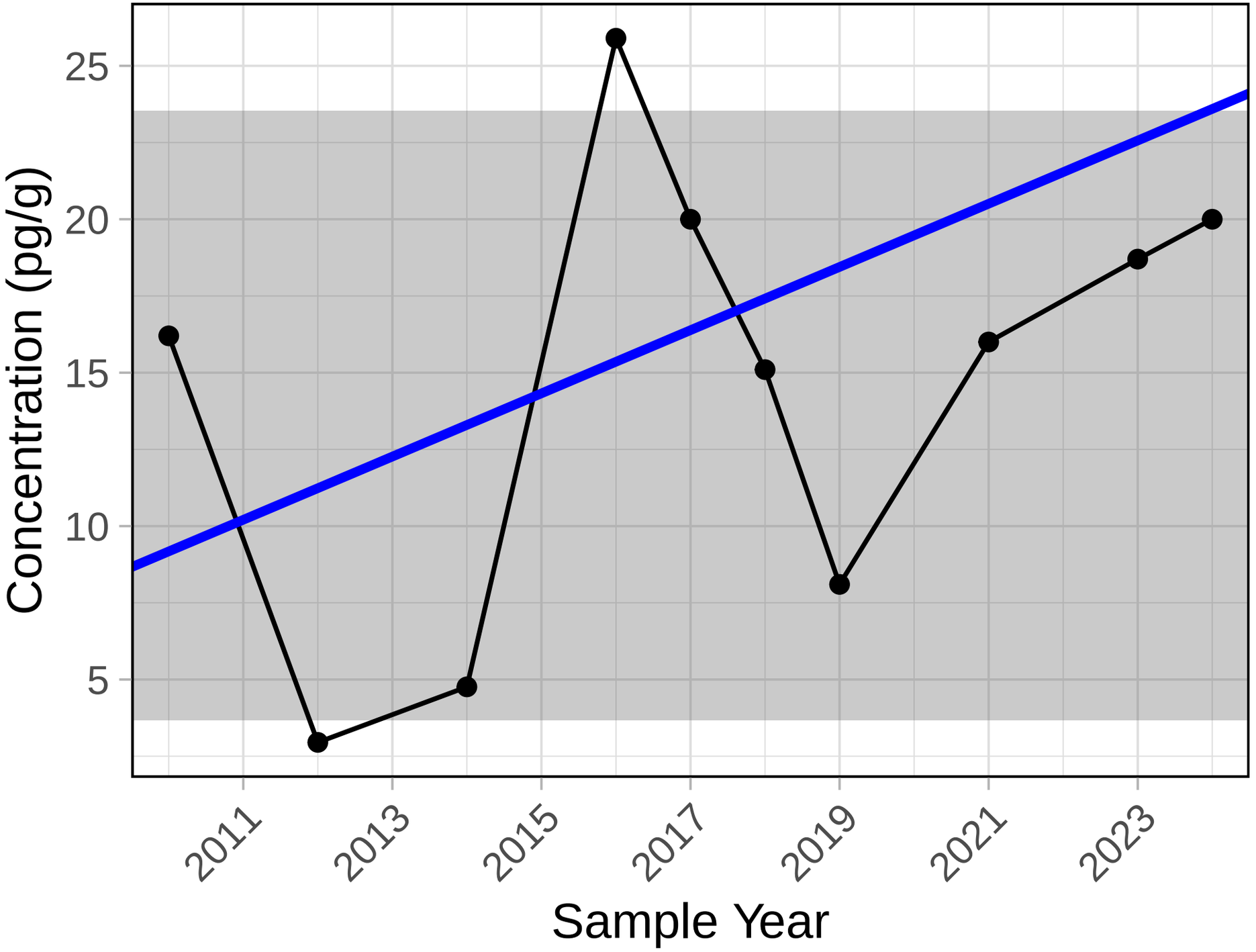


Trend significance p−value = 0.025


PCB 136
Edith Sediment
Concentration (pg/g)
12.5
10.0
7.5
5.0
2.5
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.21

PCB 141

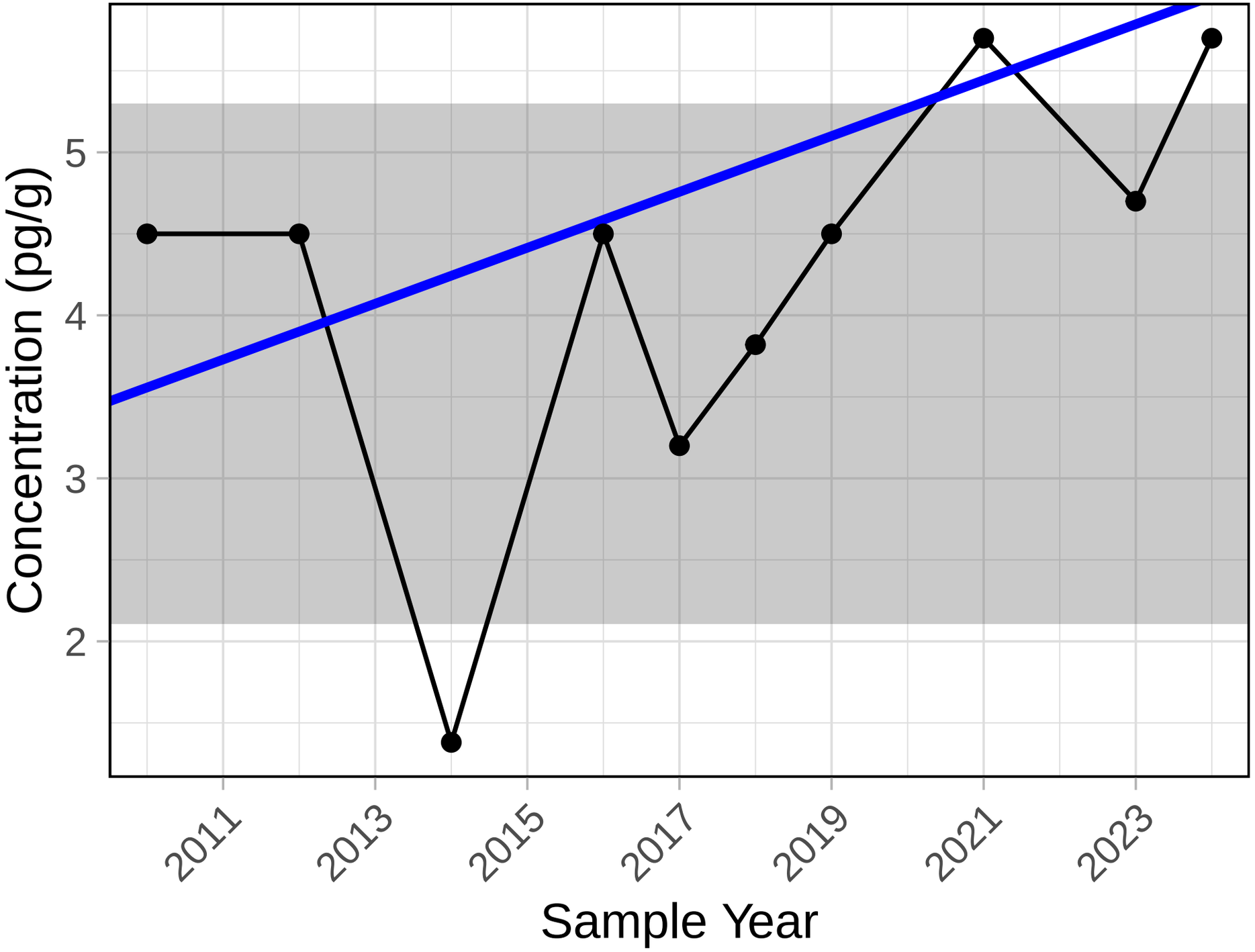
Edith Sediment



Trend significance p−value = 0.323

PCB 144

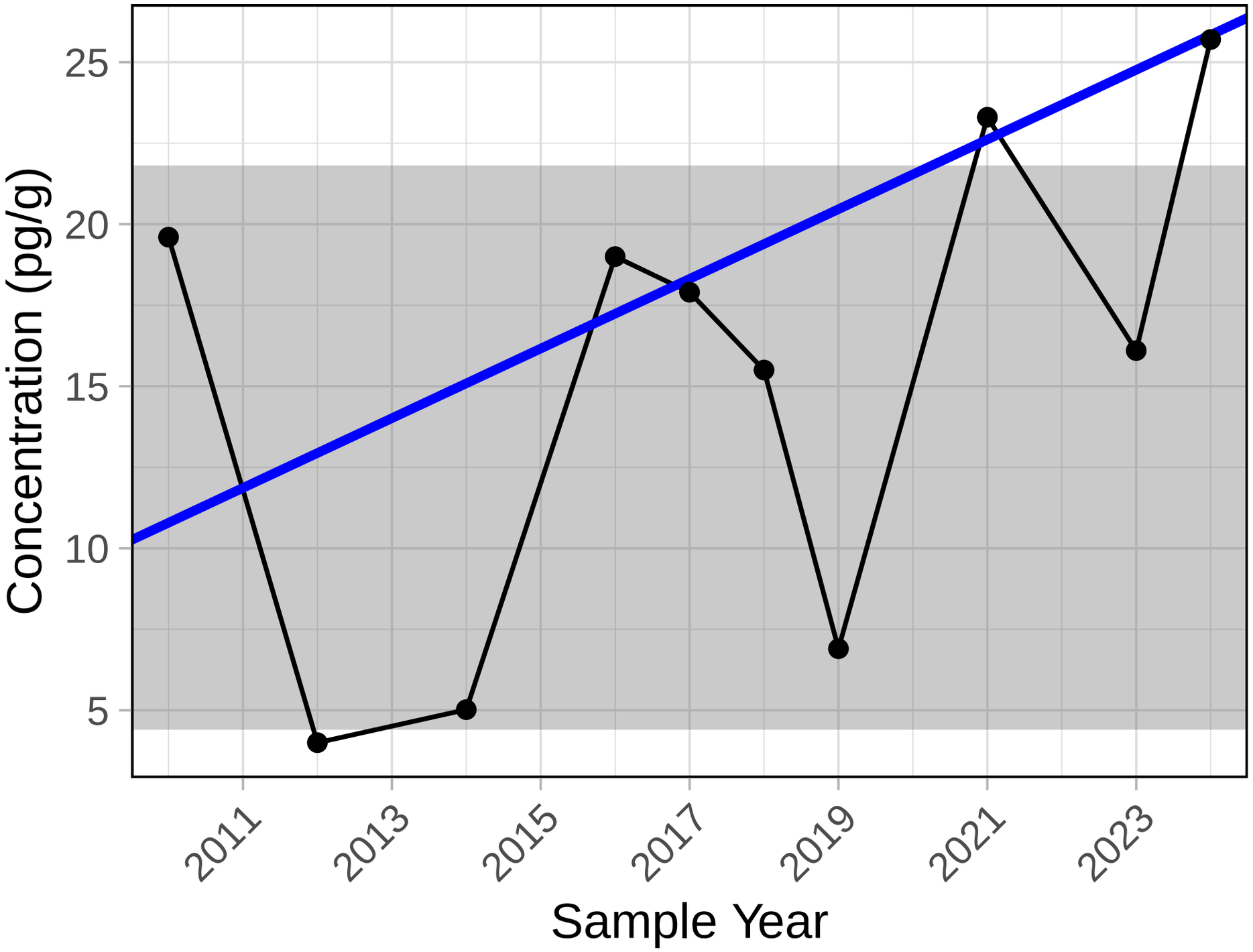
Edith Sediment



Trend significance p−value = 0.077

PCB 146

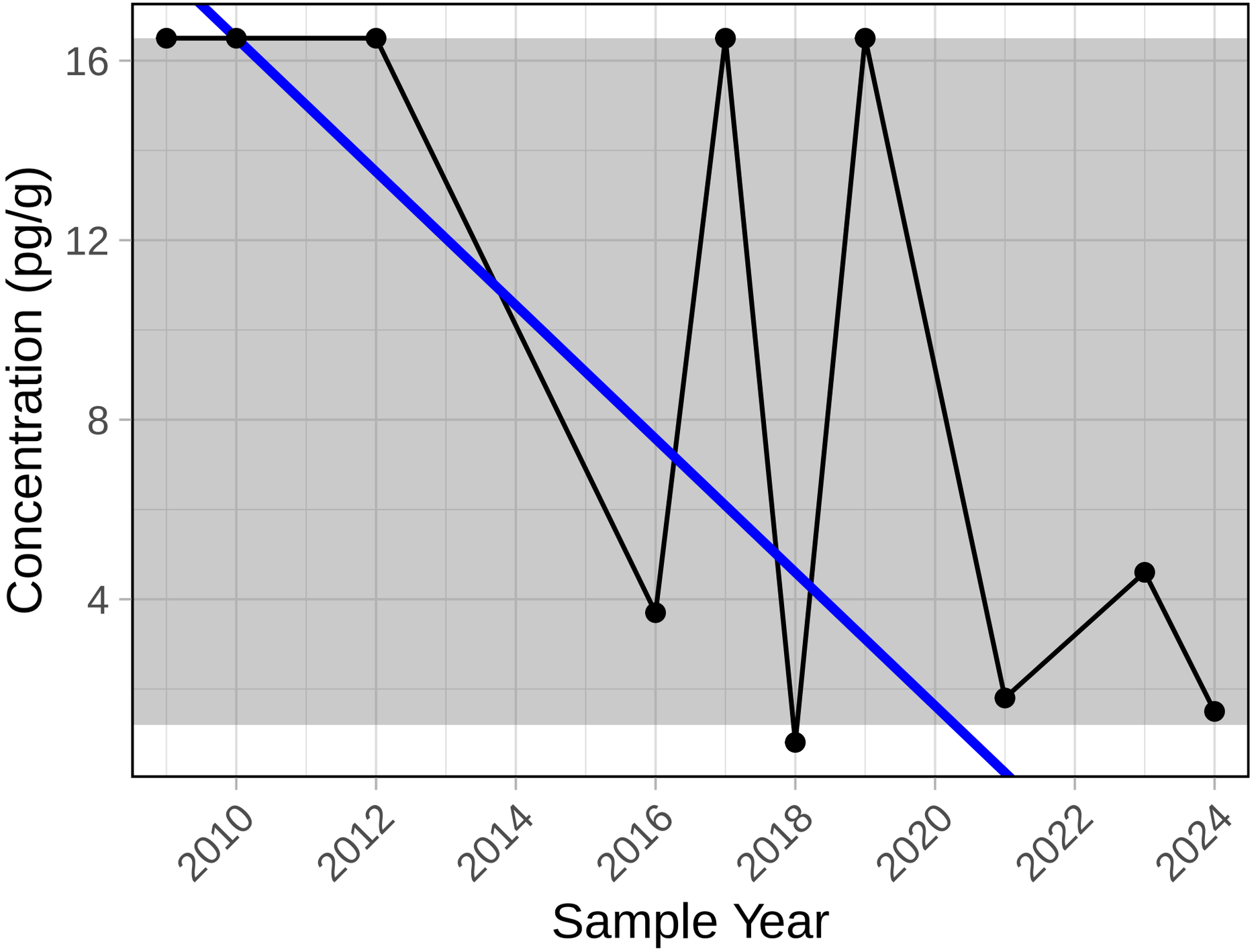
Edith Sediment



Trend significance p−value = 0.283

PCB 154

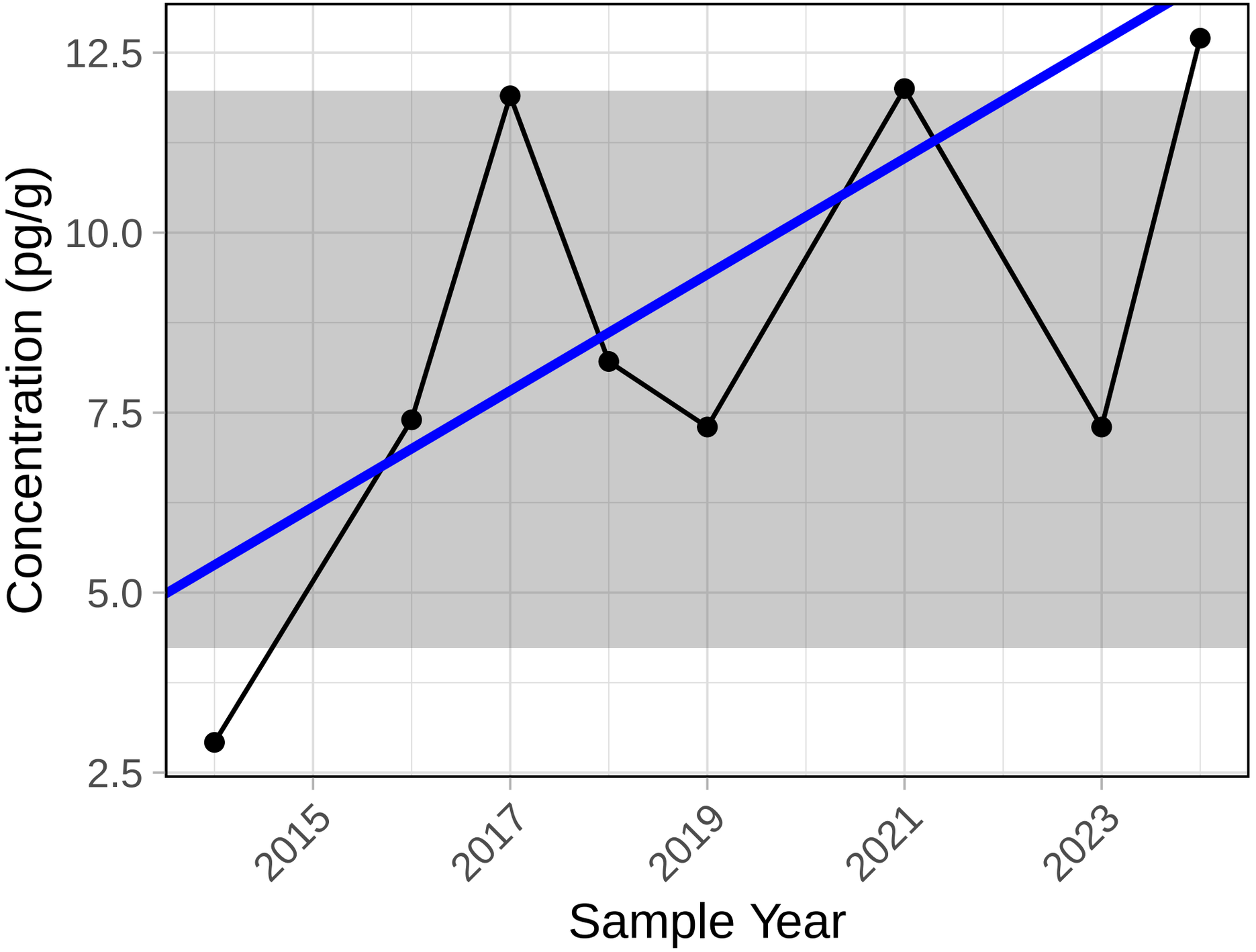
Edith Sediment



Trend significance p−value = 0.084

PCB 158

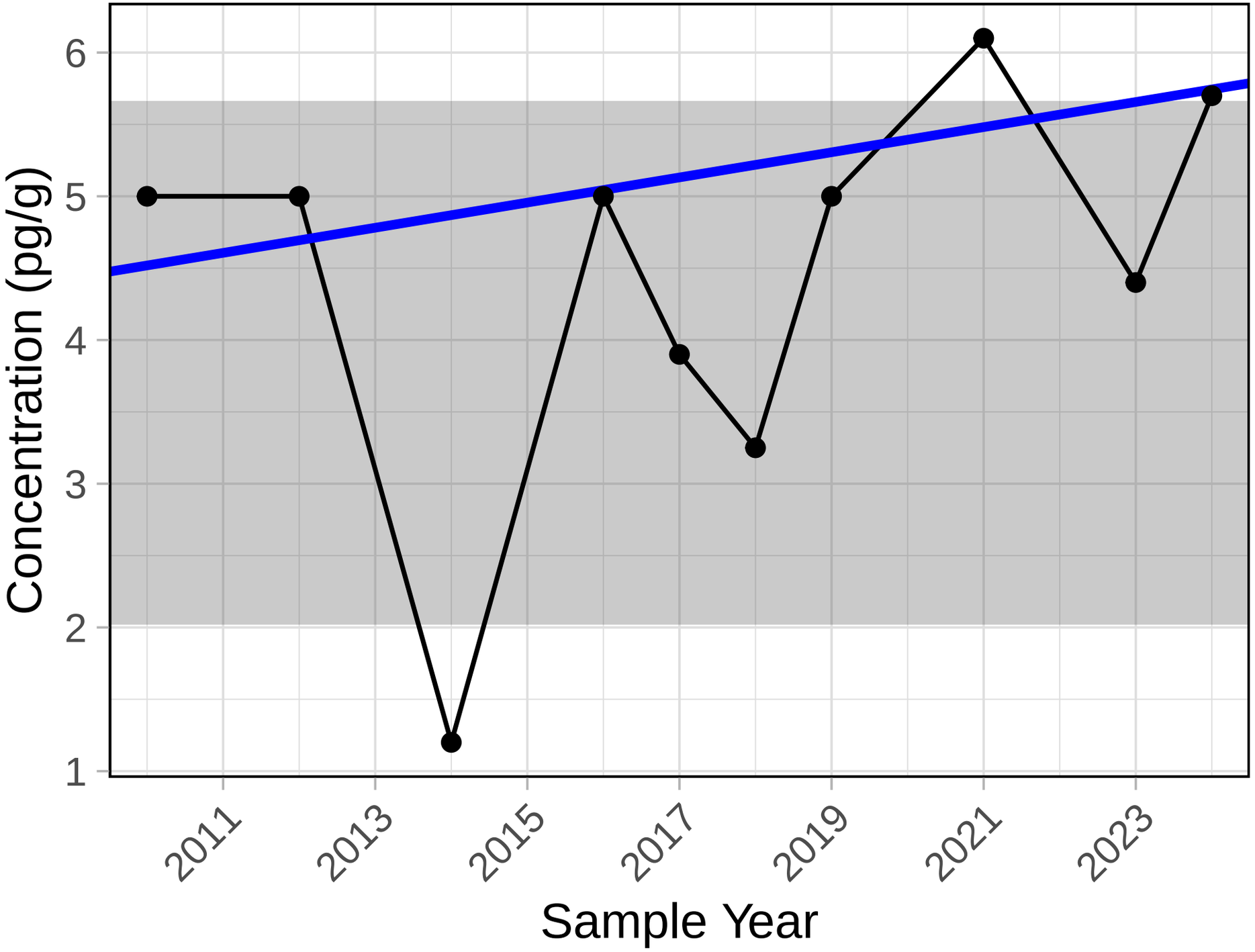
Edith Sediment



Trend significance p−value = 0.212

PCB 167

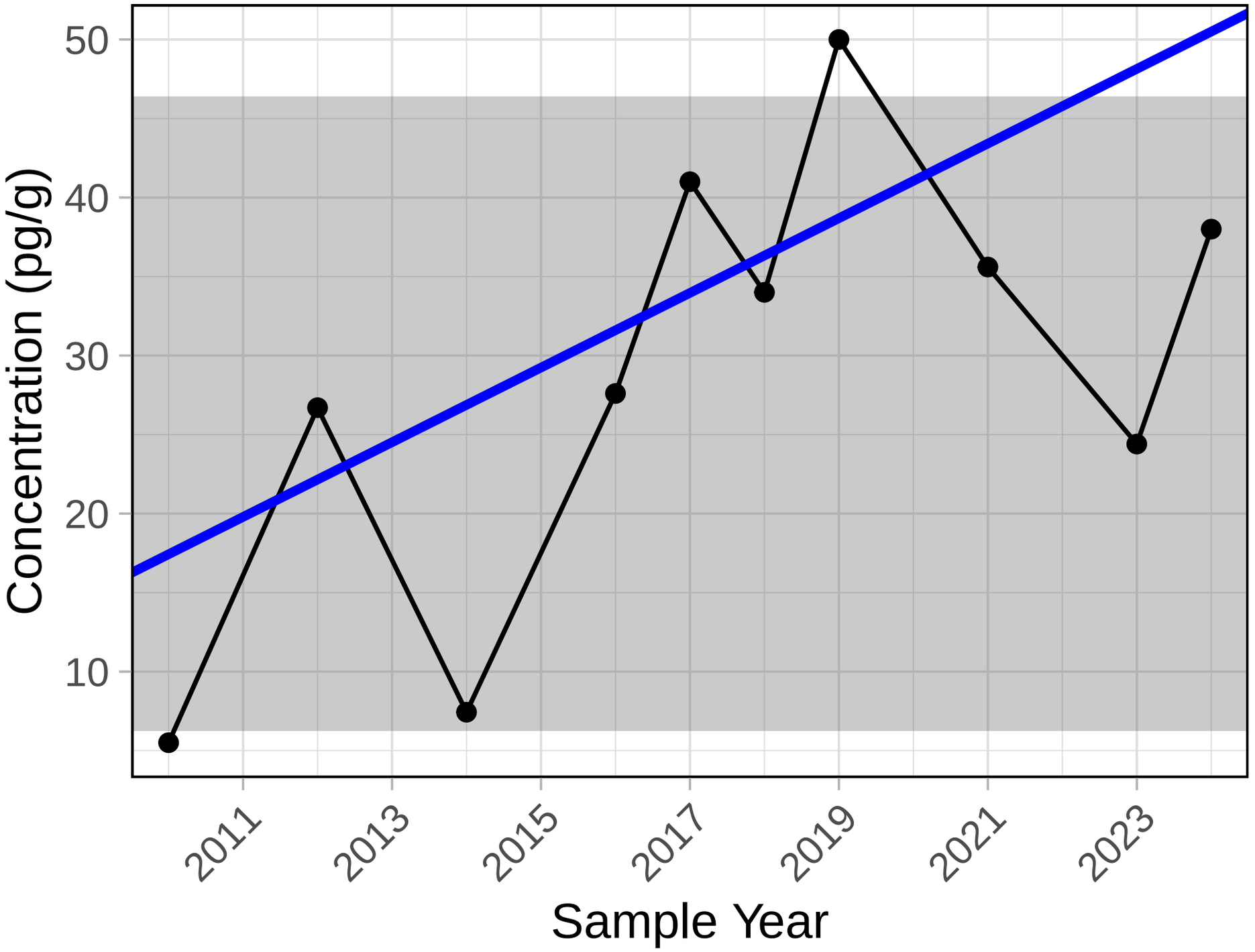
Edith Sediment



Trend significance p−value = 0.458

PCB 170

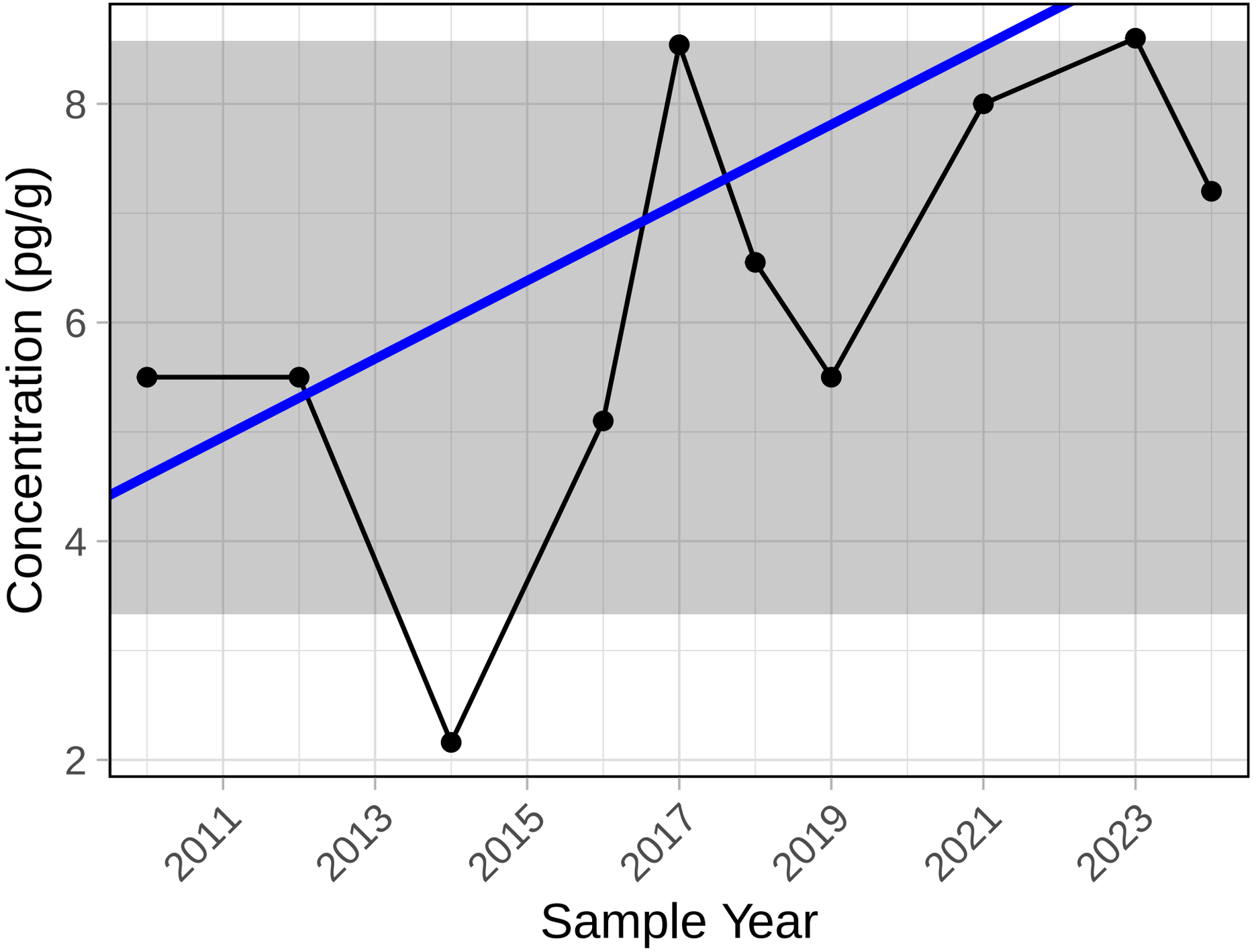
Edith Sediment



Trend significance p−value = 0.074

PCB 172

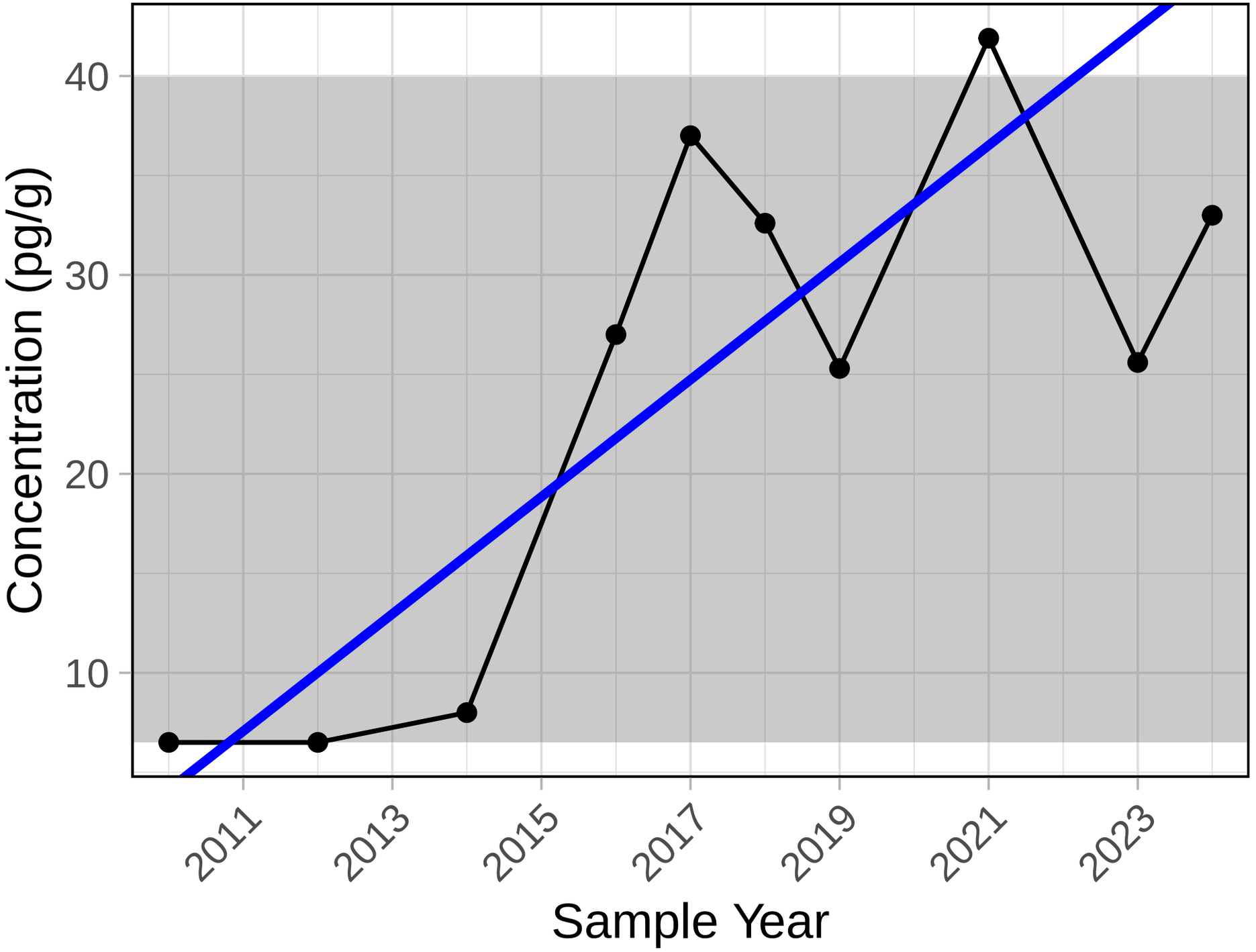
Edith Sediment



Trend significance p−value = 0.085

PCB 174

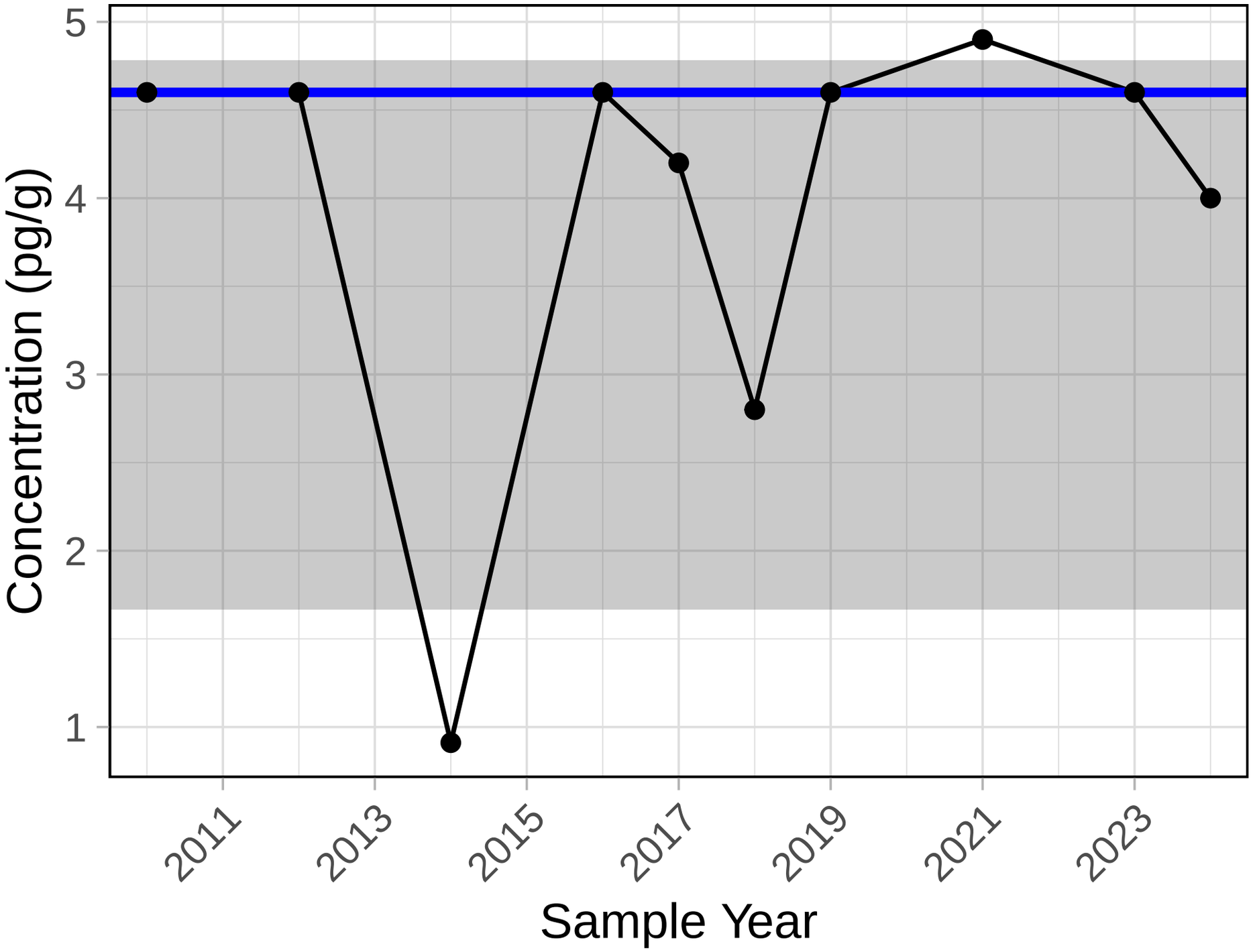
Edith Sediment



Trend significance p−value = 0.039

PCB 176

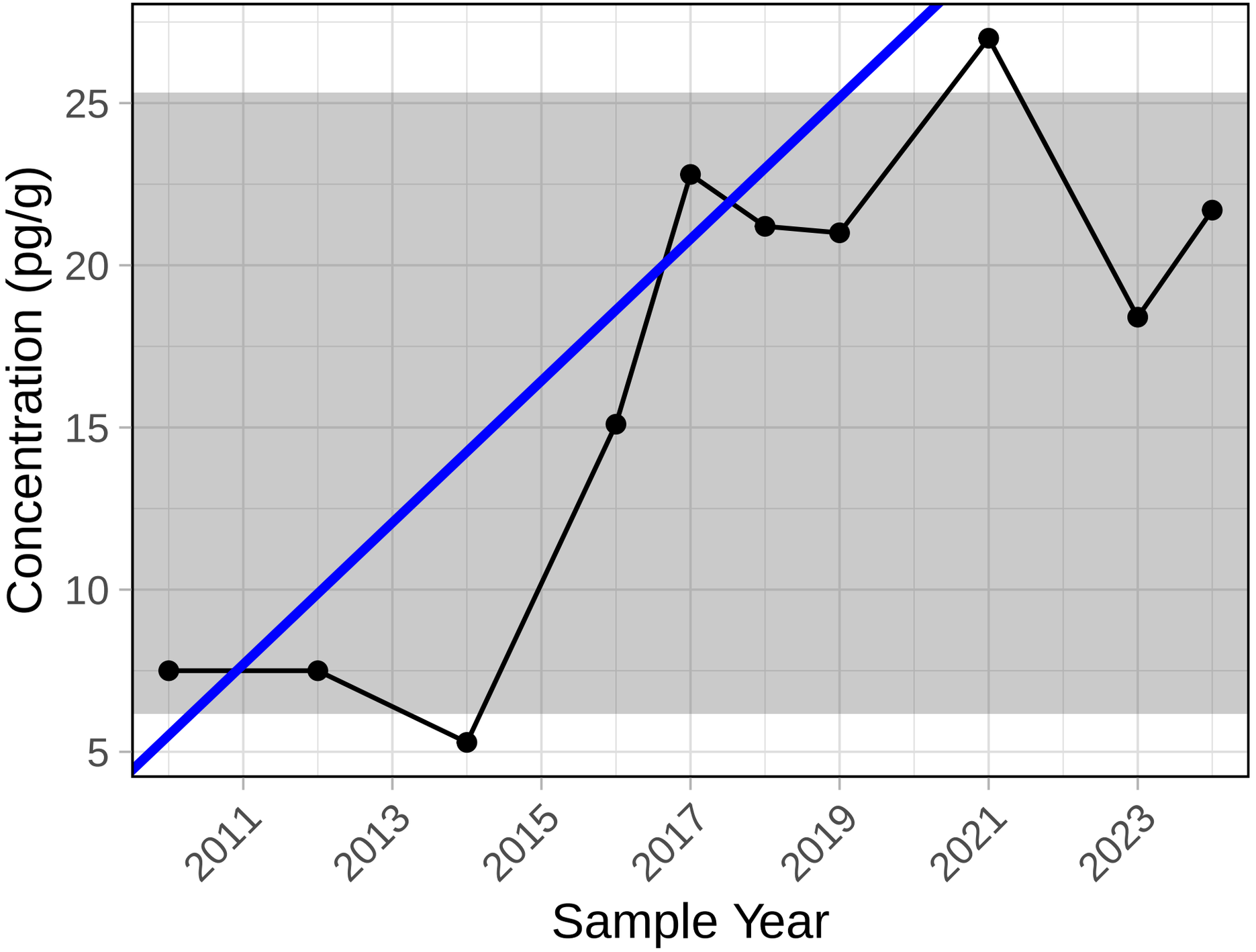
Edith Sediment



Trend significance p−value = 1

PCB 177

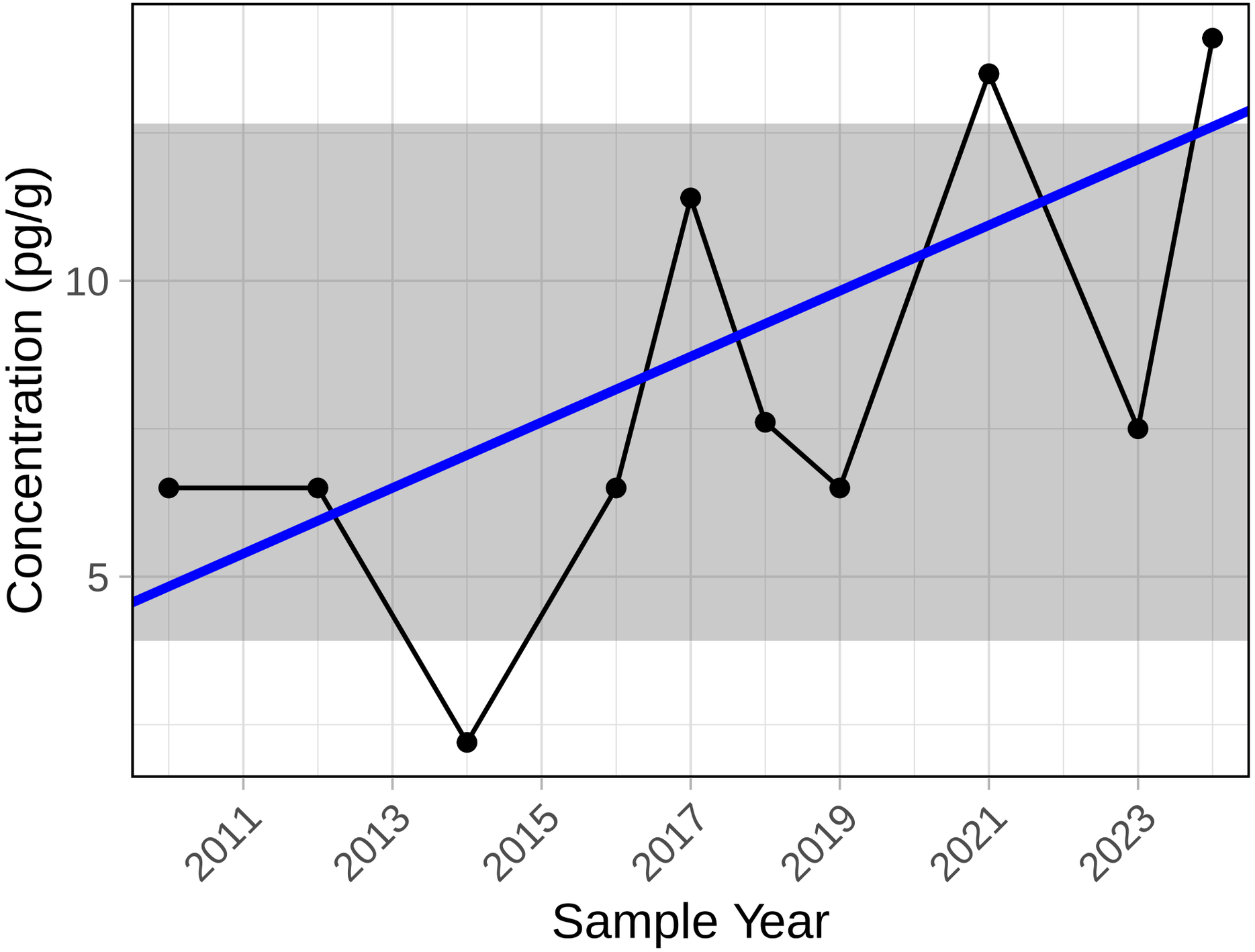
Edith Sediment



Trend significance p−value = 0.059

PCB 178

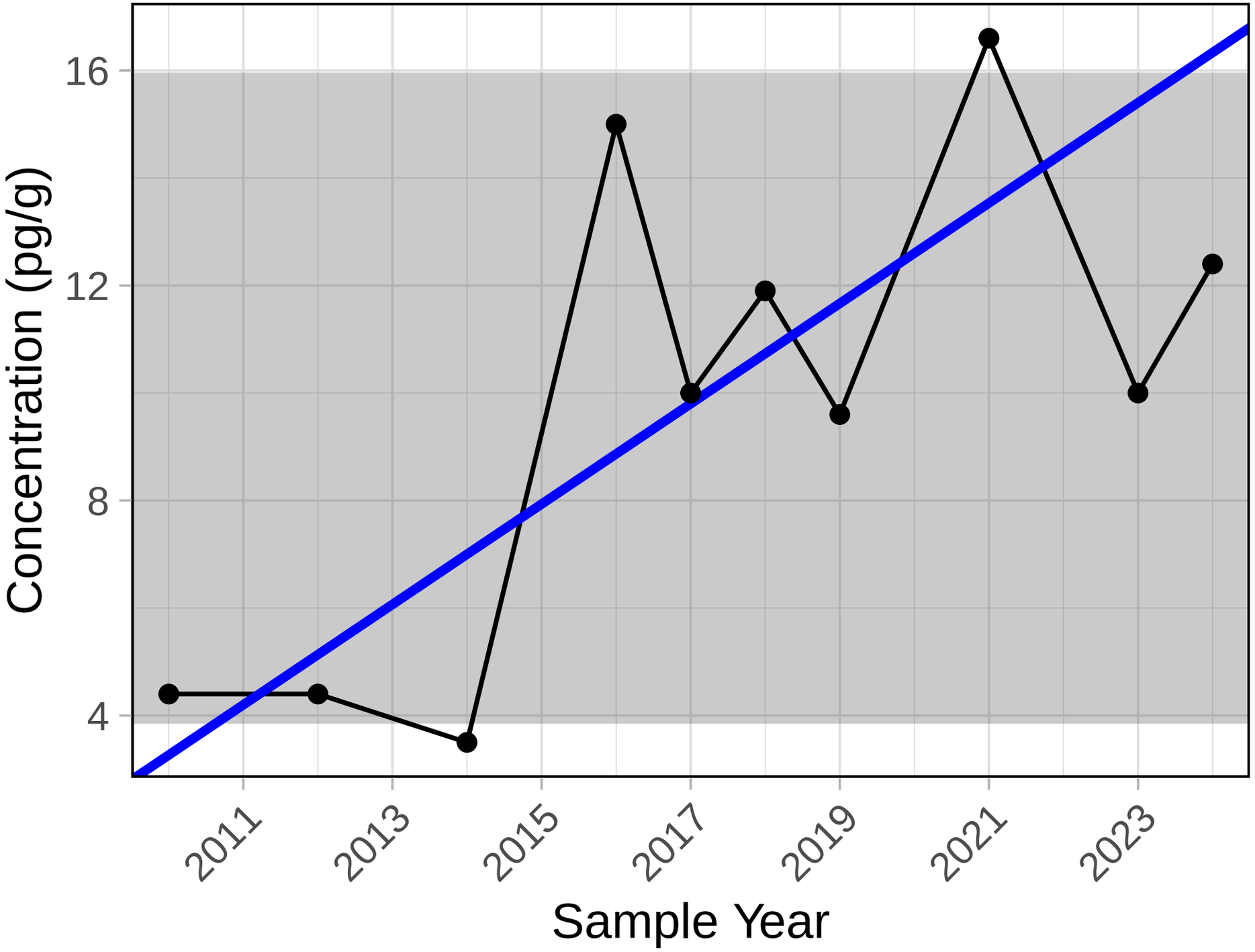
Edith Sediment



Trend significance p−value = 0.041

PCB 179

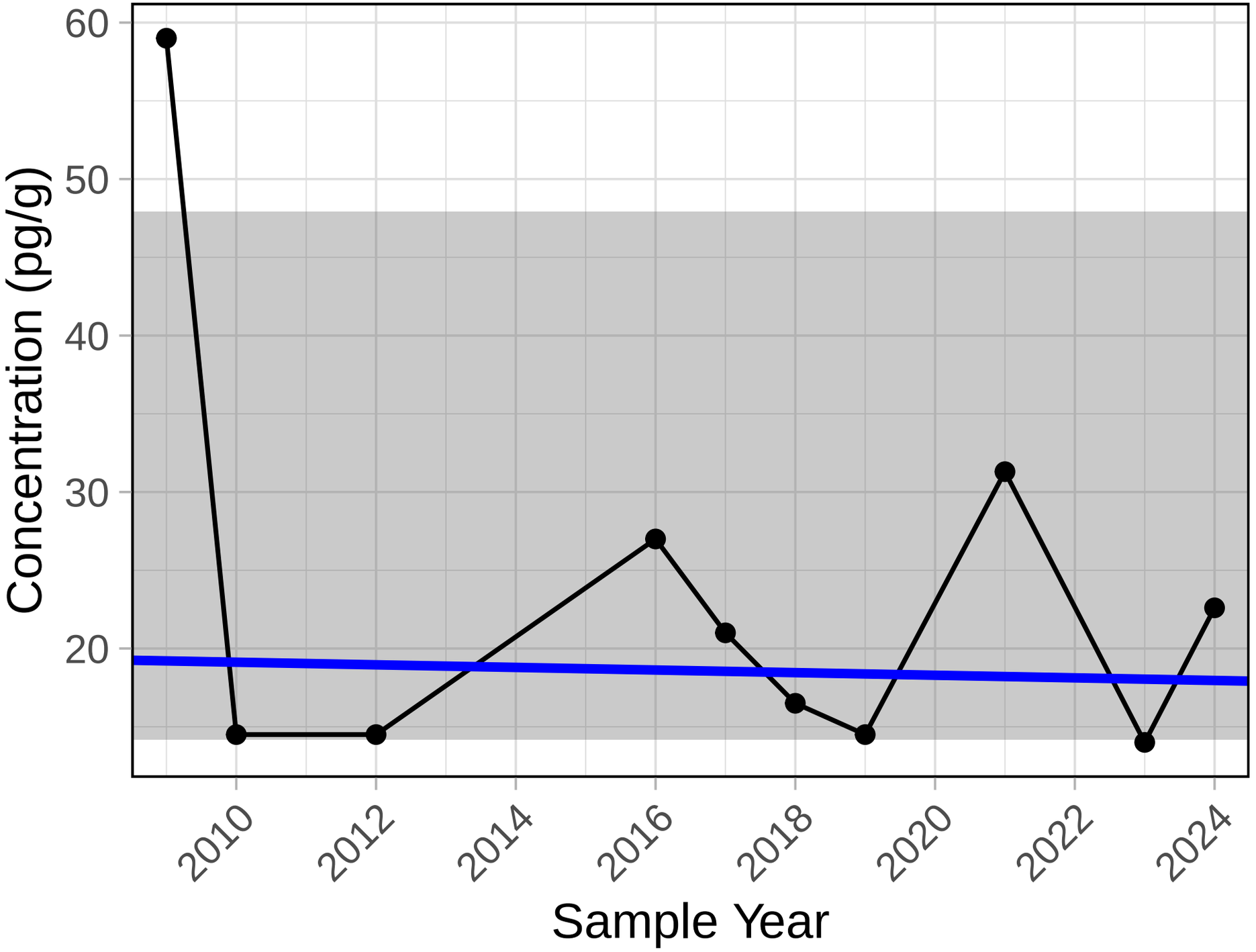
Edith Sediment



Trend significance p−value = 0.105

PCB 183

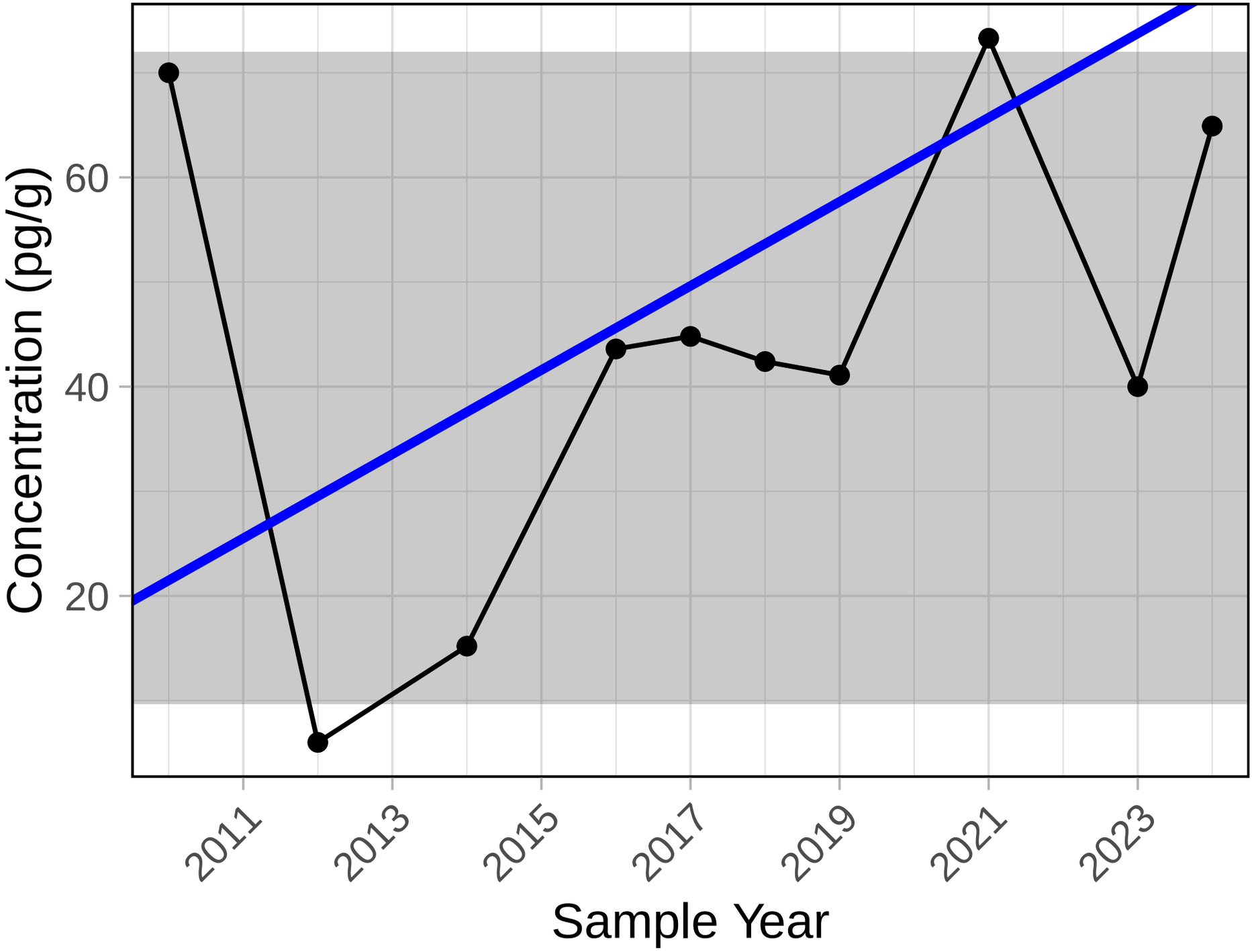
Edith Sediment



Trend significance p−value = 0.65

PCB 187

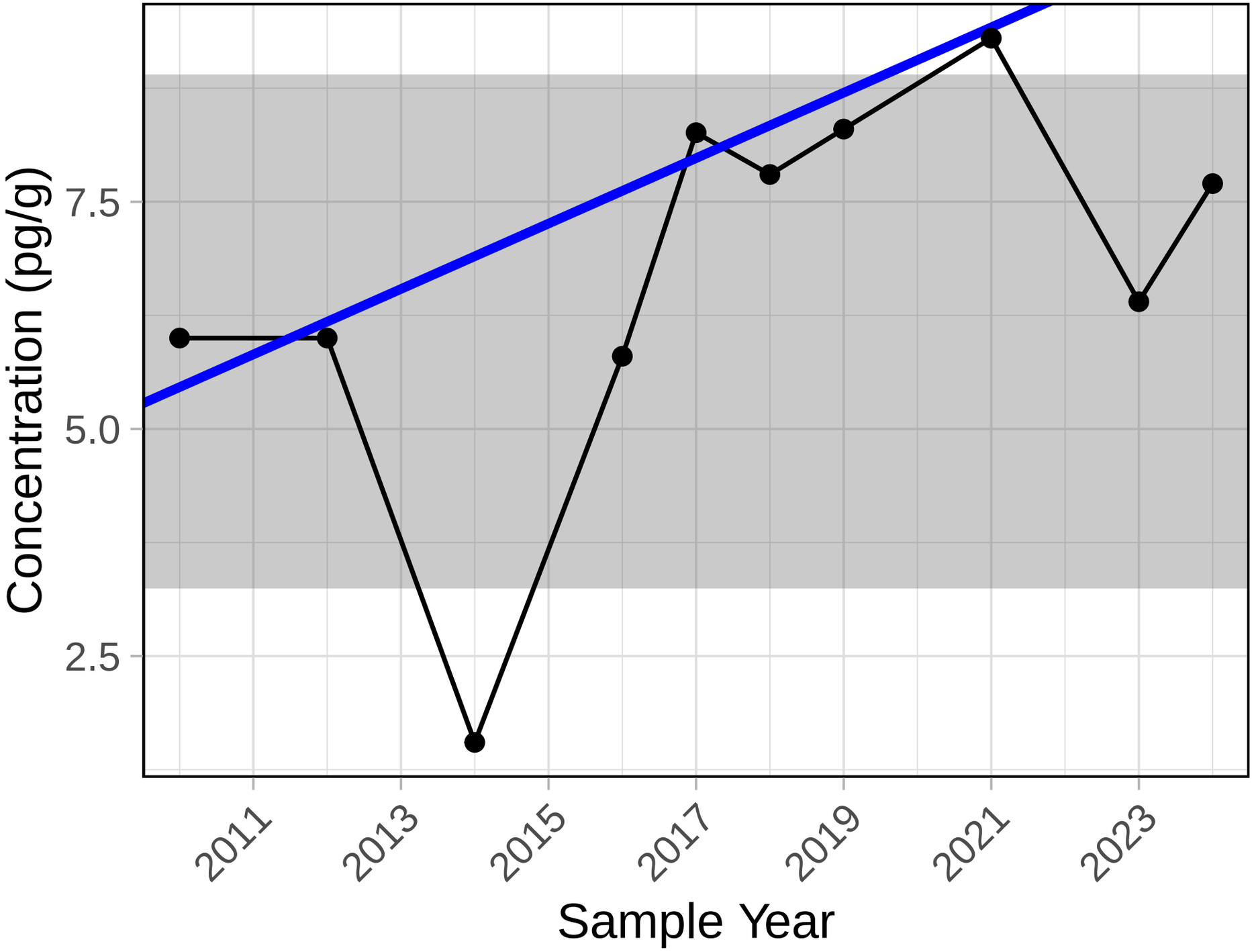
Edith Sediment



Trend significance p−value = 0.592

PCB 190

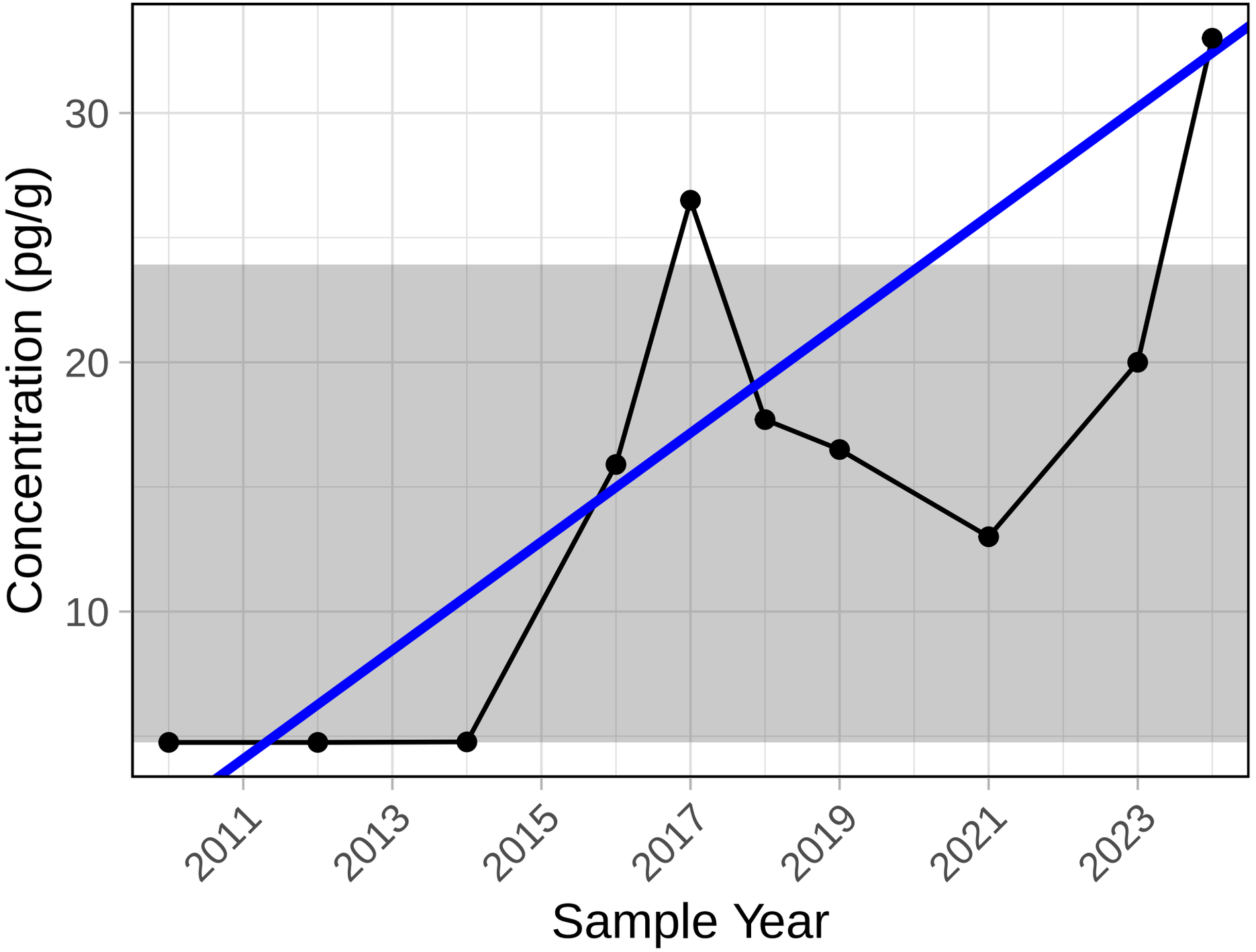
Edith Sediment



Trend significance p−value = 0.127

PCB 194

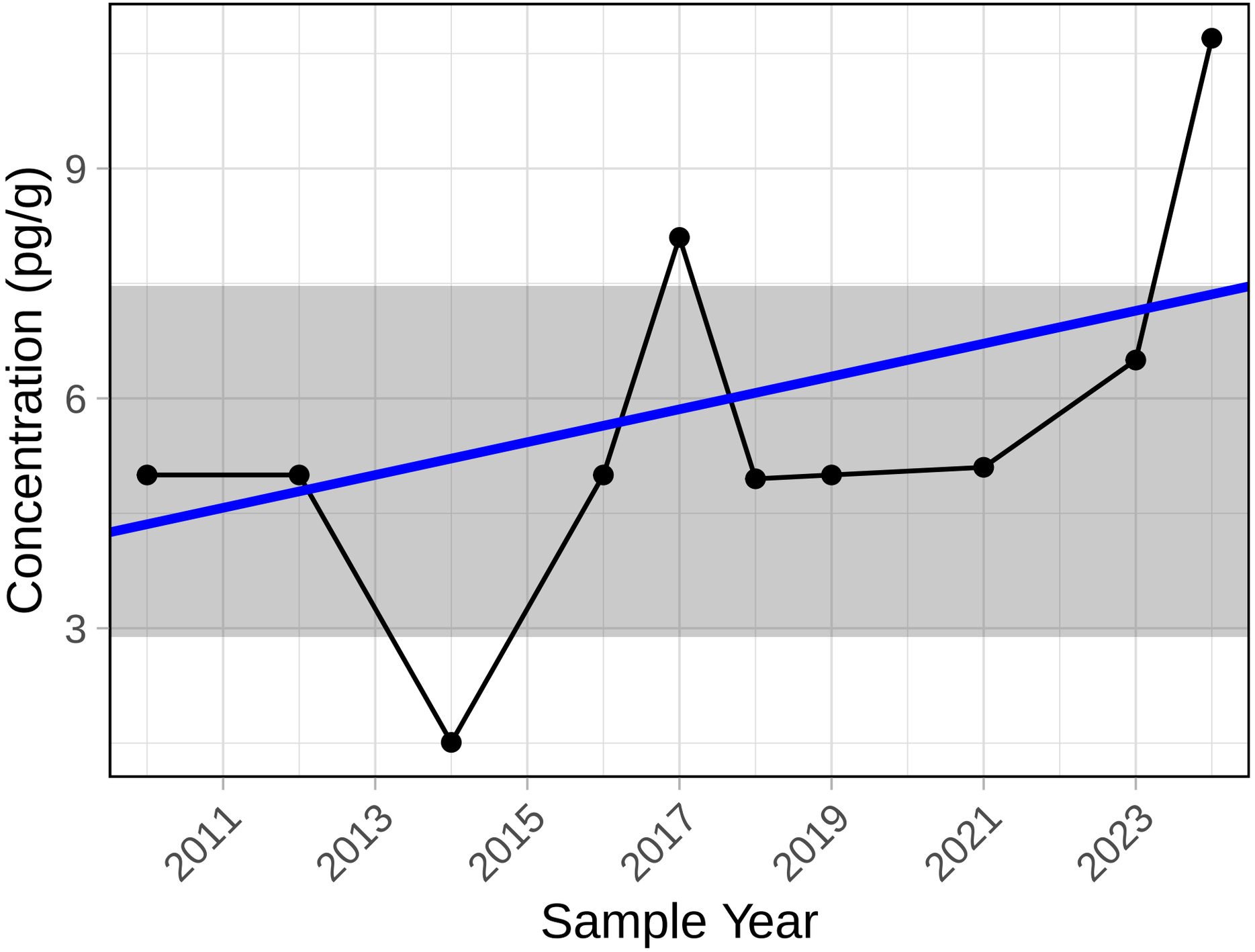
Edith Sediment



Trend significance p−value = 0.015

PCB 195

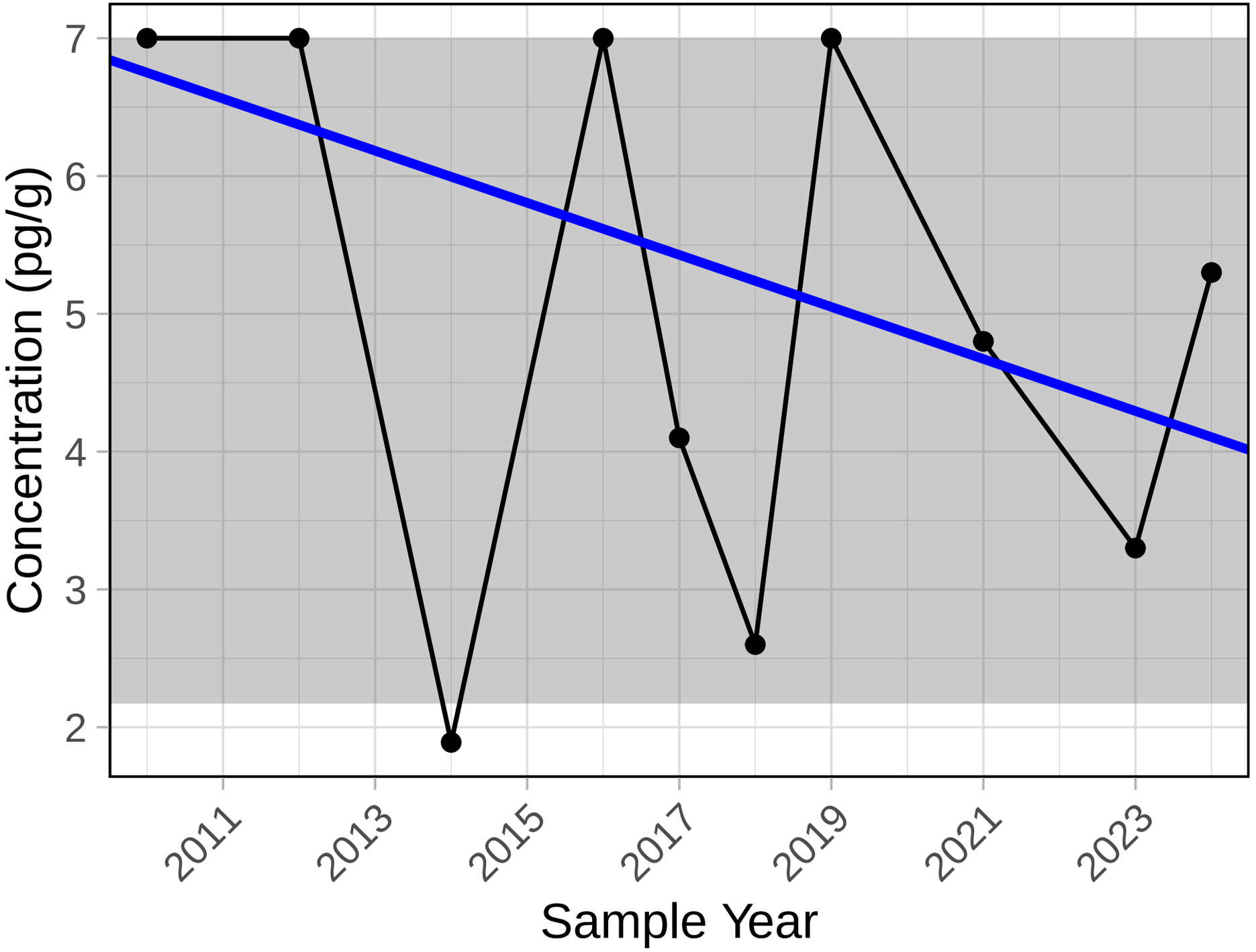
Edith Sediment



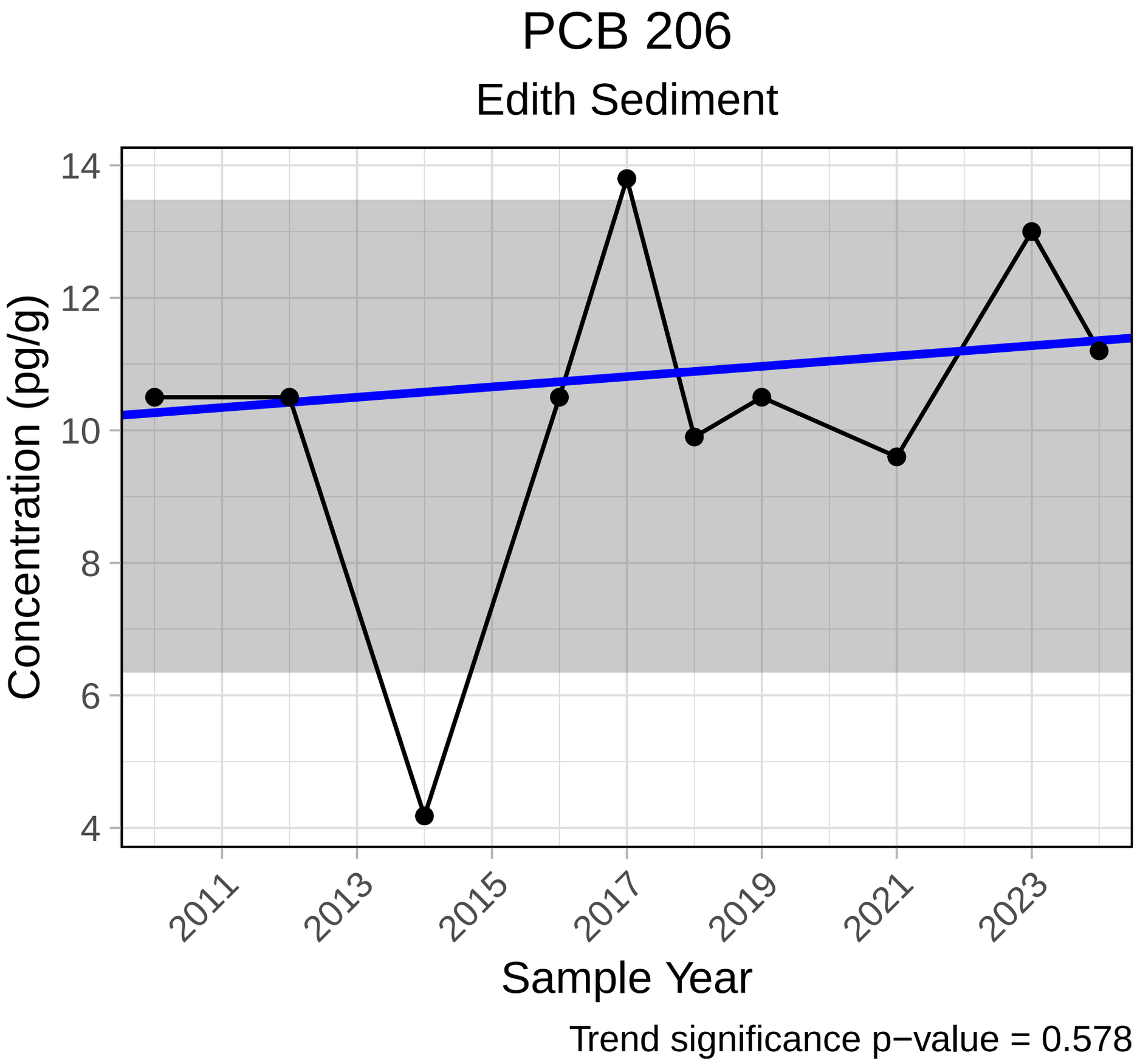
Trend significance p−value = 0.064

PCB 202

Edith Sediment

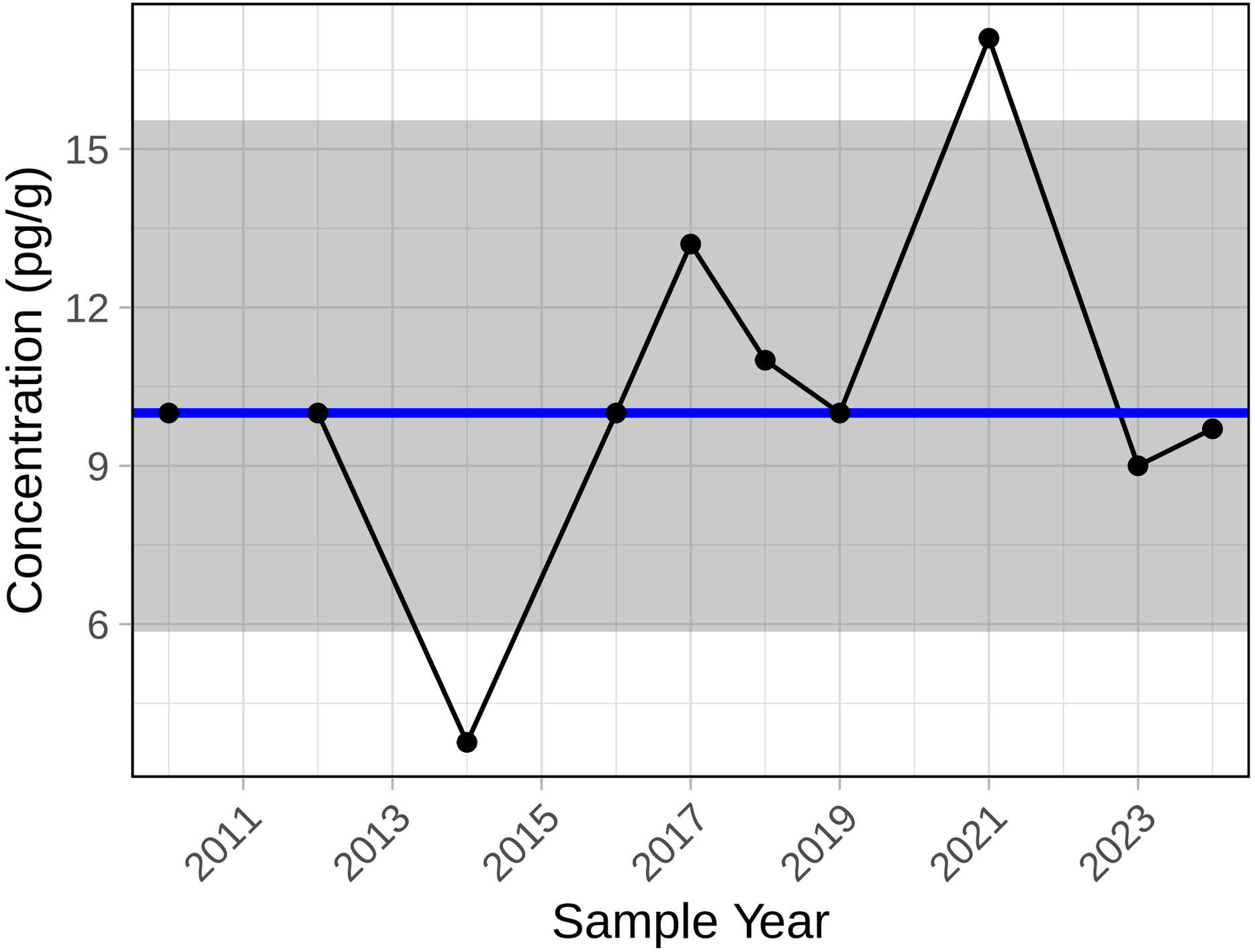


Trend significance p−value = 0.578

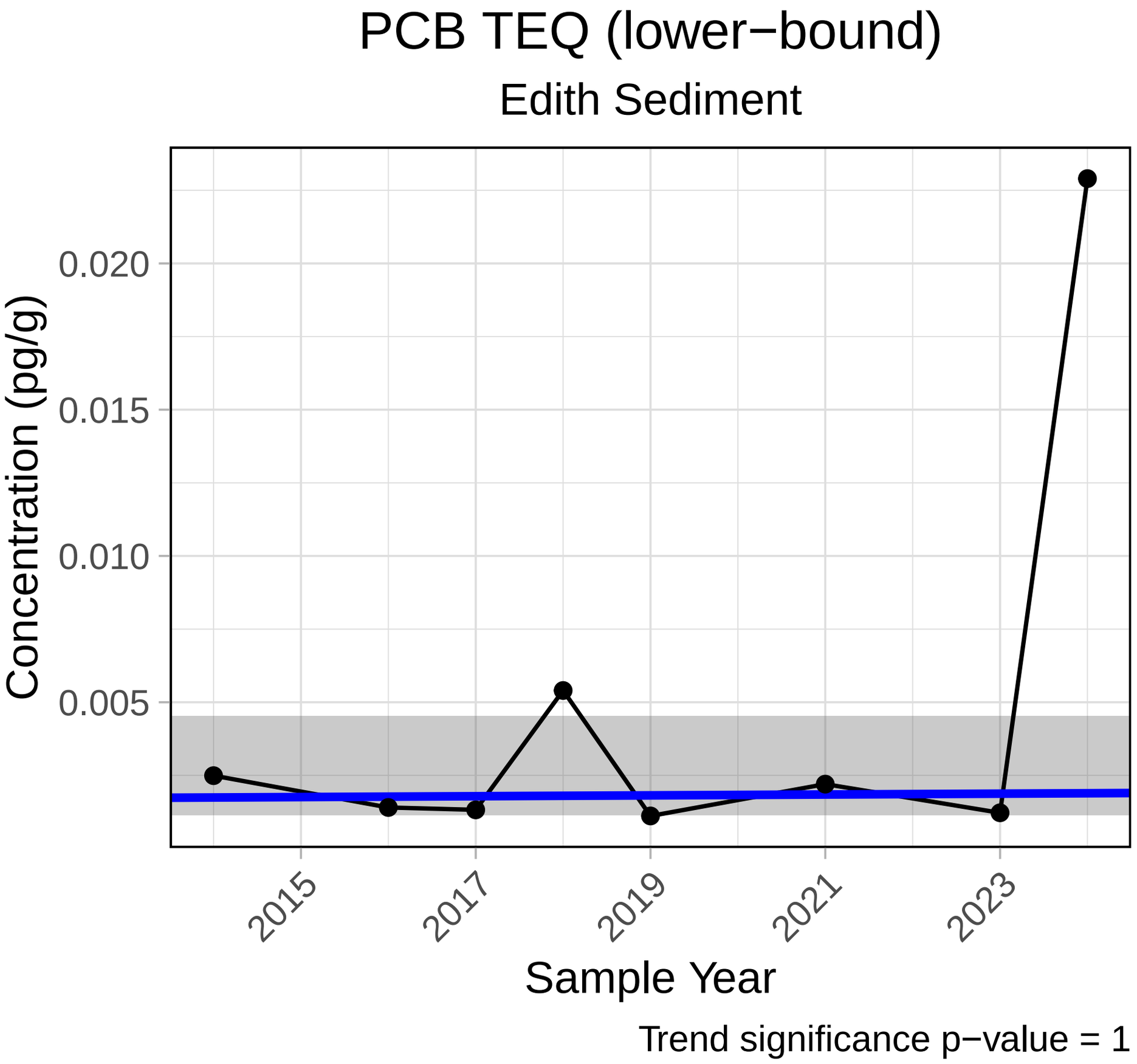

PCB 206
Edith Sediment
Concentration (pg/g)
14
12
10
8
6
4
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.578

PCB 209

Edith Sediment

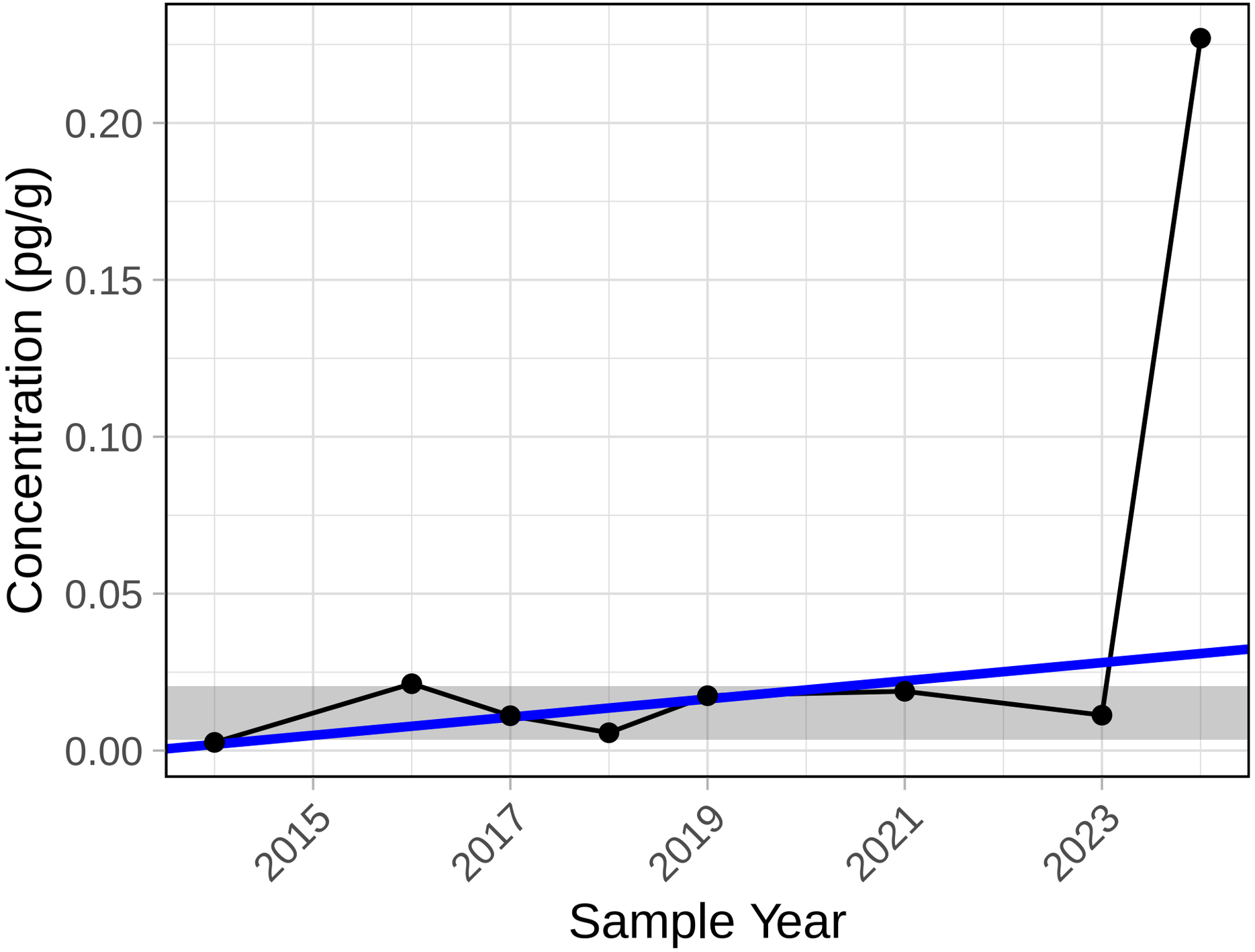


Trend significance p−value = 1

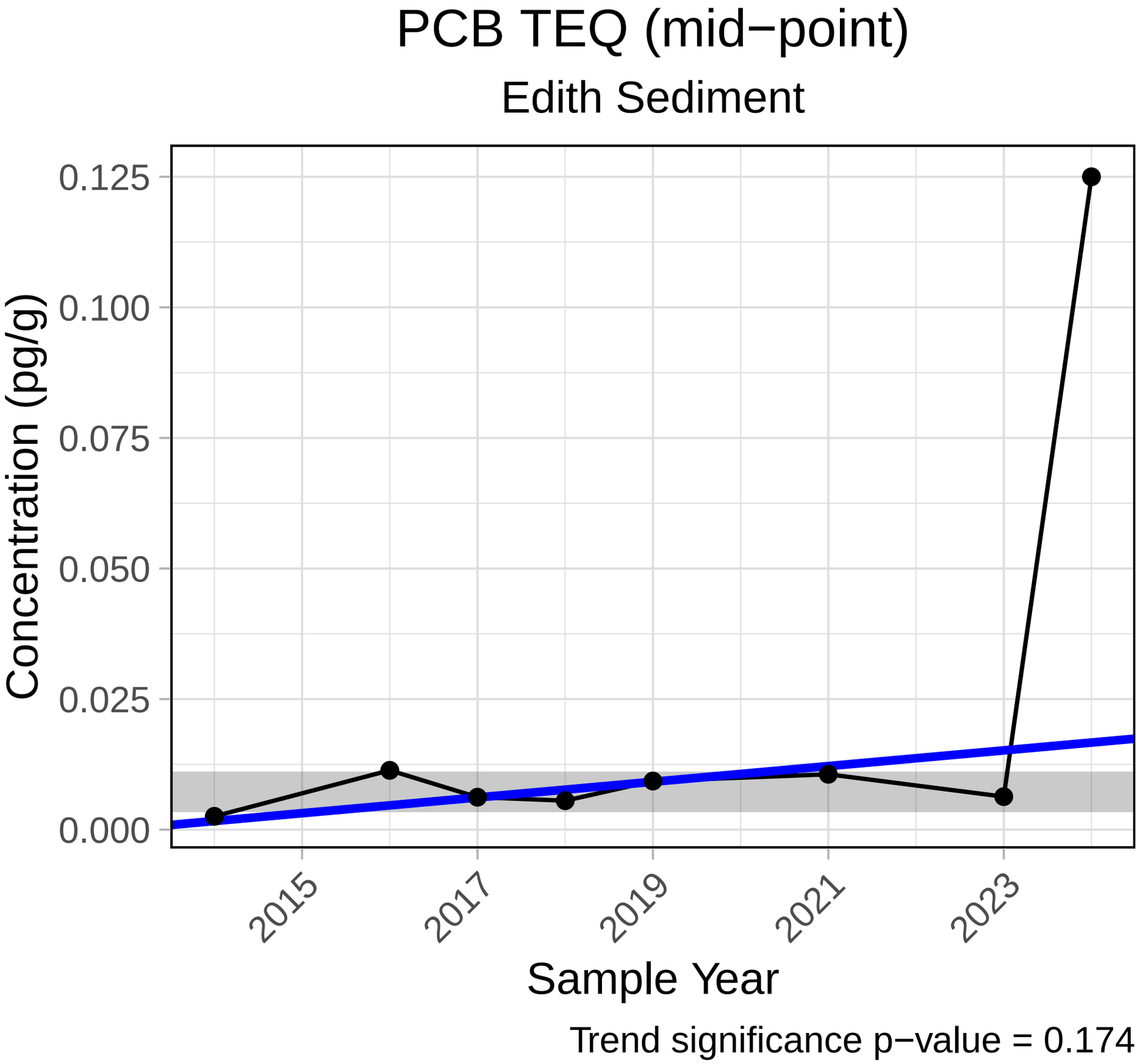

PCB TEQ (lower−bound)
Edith Sediment
Concentration (pg/g)
0.020
0.015
0.010
0.005
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

PCB TEQ (upper bound)

Edith Sediment

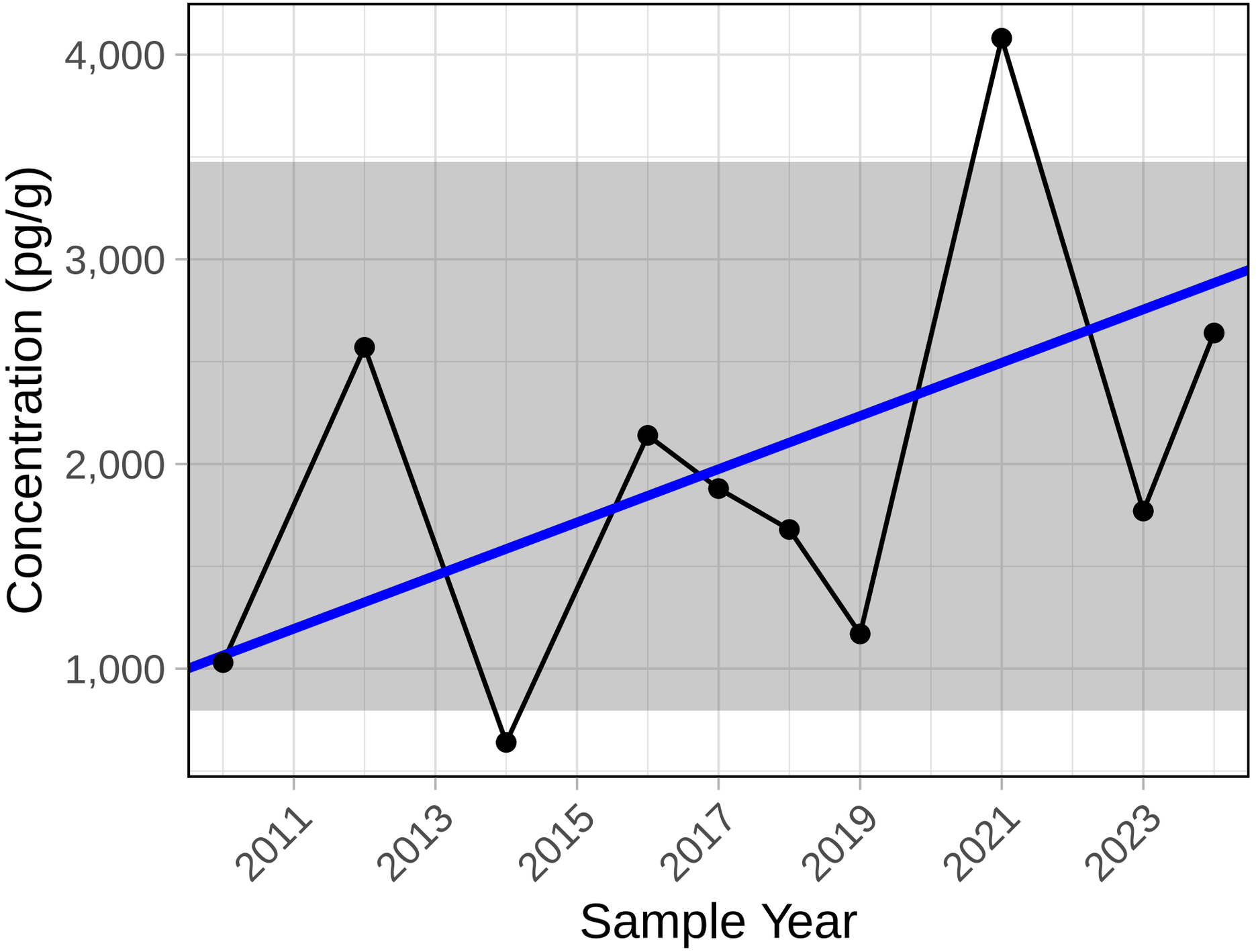


Trend significance p−value = 0.174

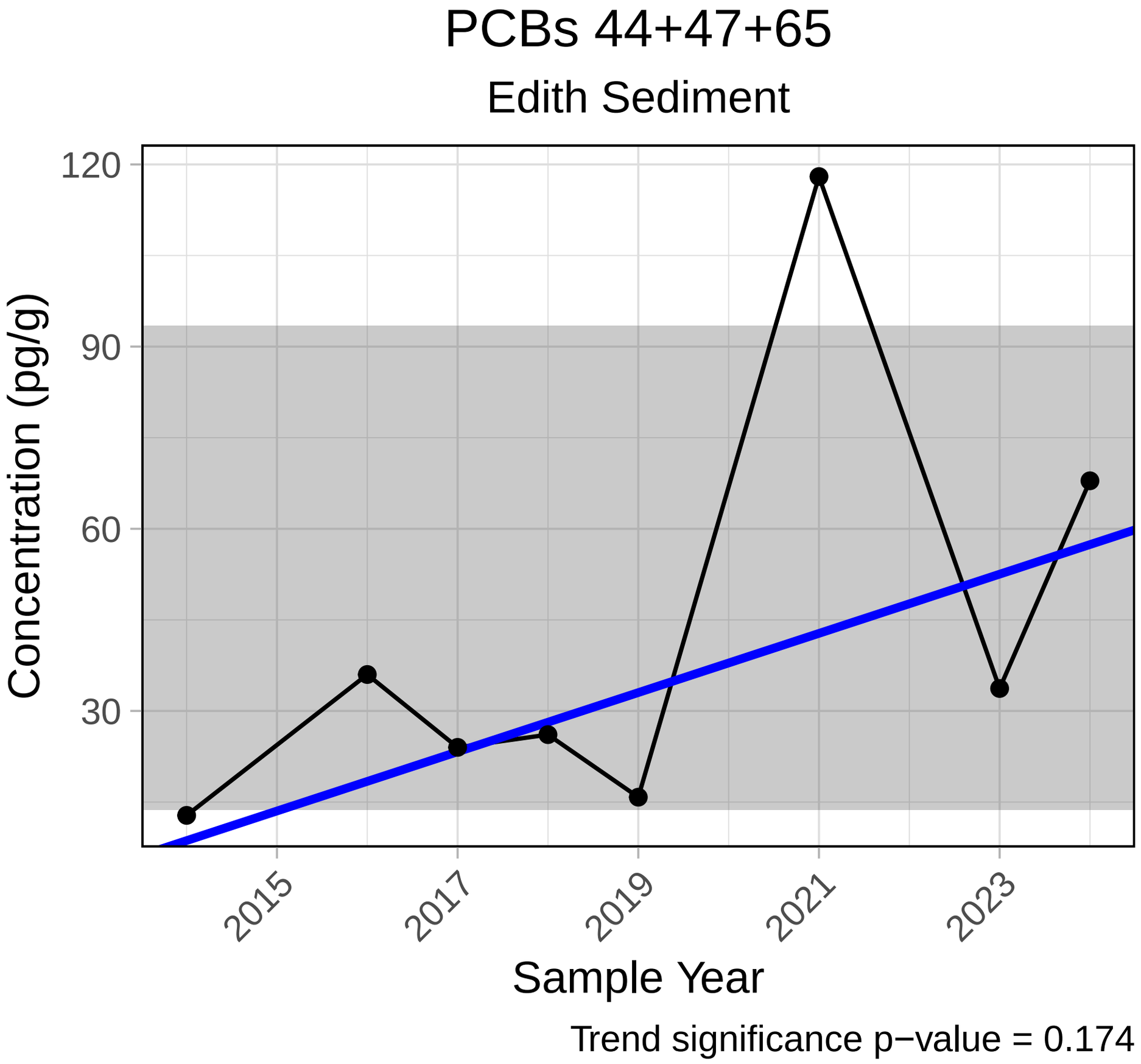

PCB TEQ (mid−point)
Edith Sediment
Concentration (pg/g)
0.125
0.100
0.075
0.050
0.025
0.000
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.174

PCB Total

Edith Sediment

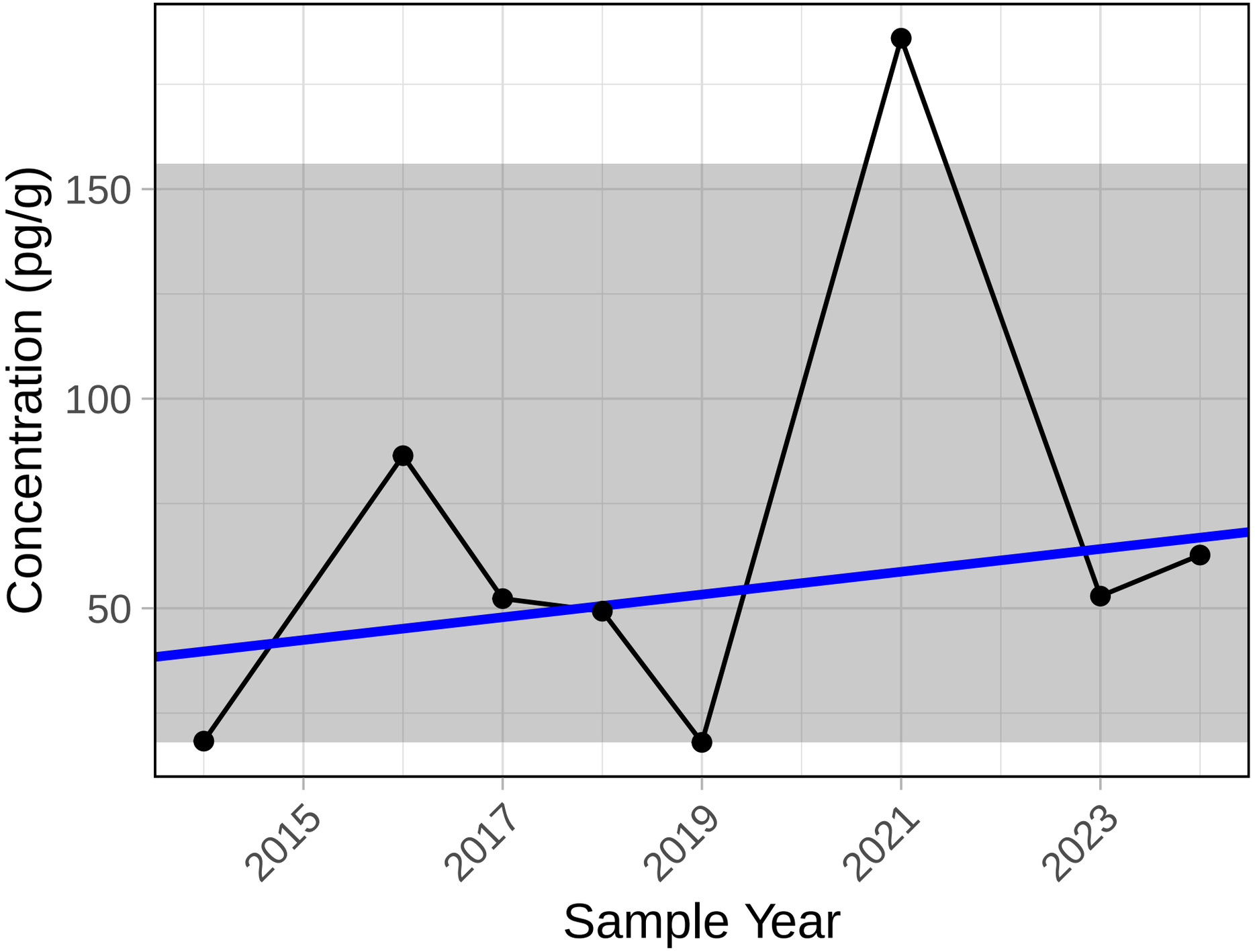


Trend significance p−value = 0.371
ISQG level = 34100 pg/g (maximum)
PEL level = 277000 pg/g (maximum)

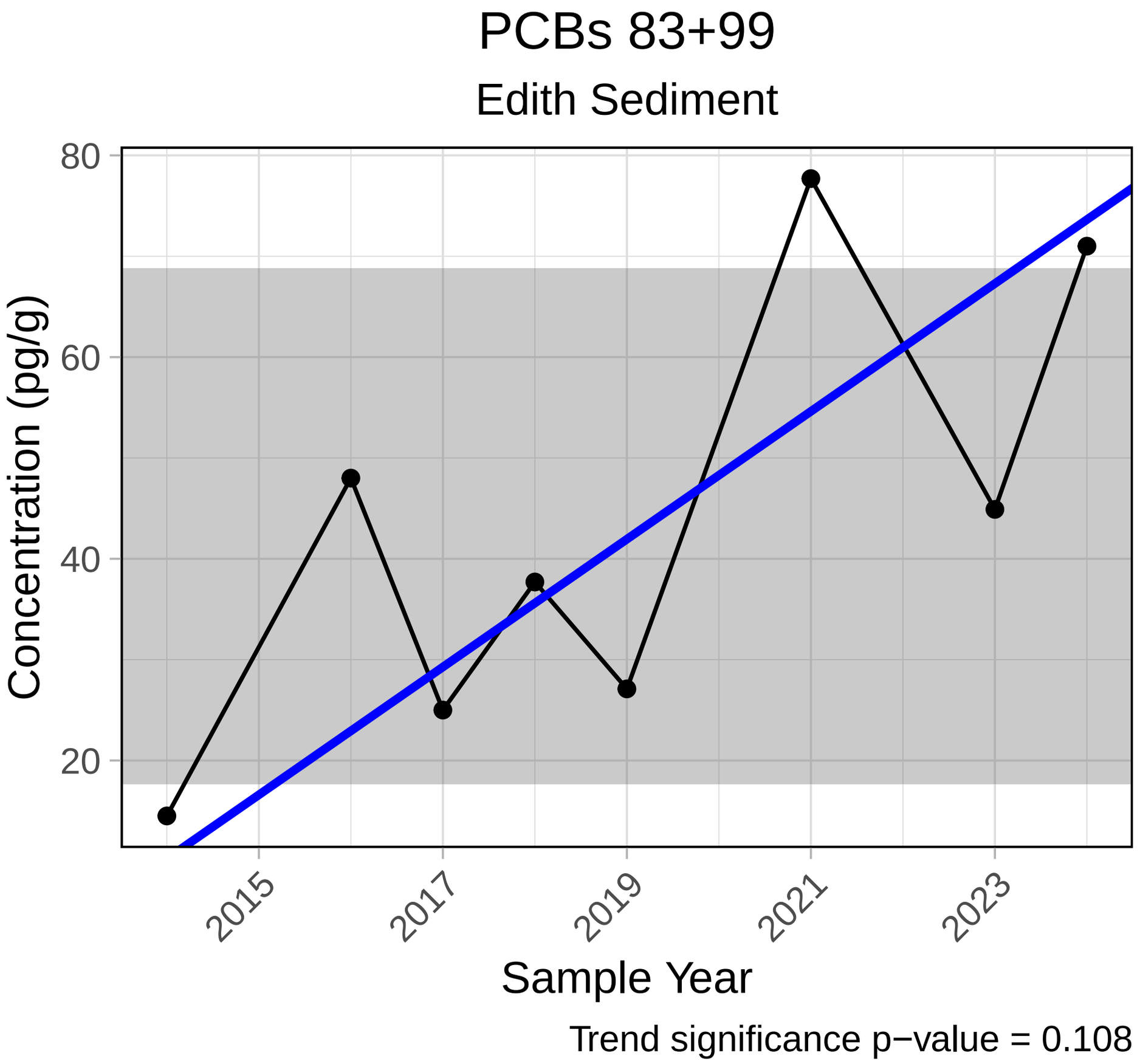

PCBs 44+47+65
Edith Sediment
120
90
60
30
Concentration (pg/g)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.174

PCBs 70+61+74+76

Edith Sediment

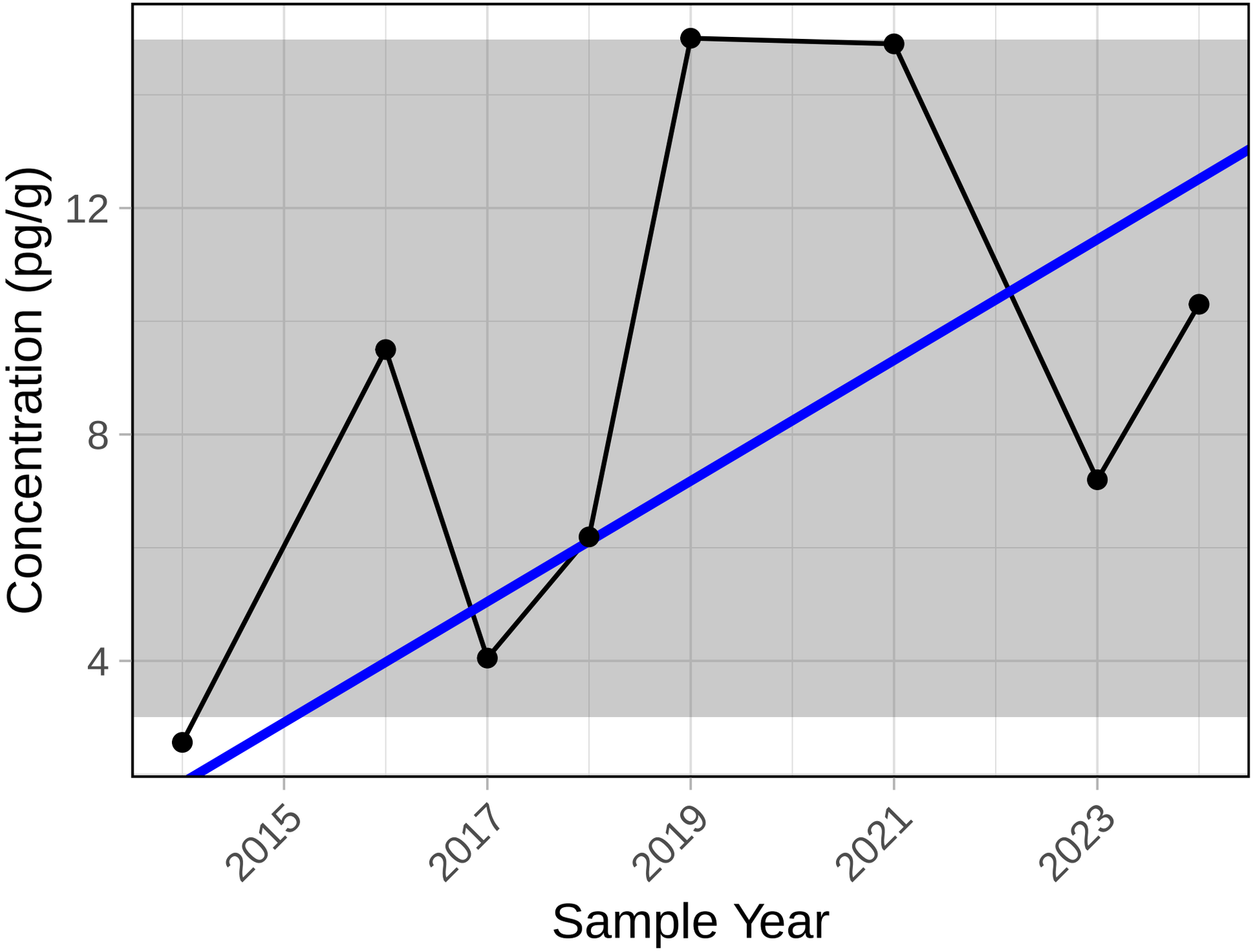


Trend significance p−value = 0.536

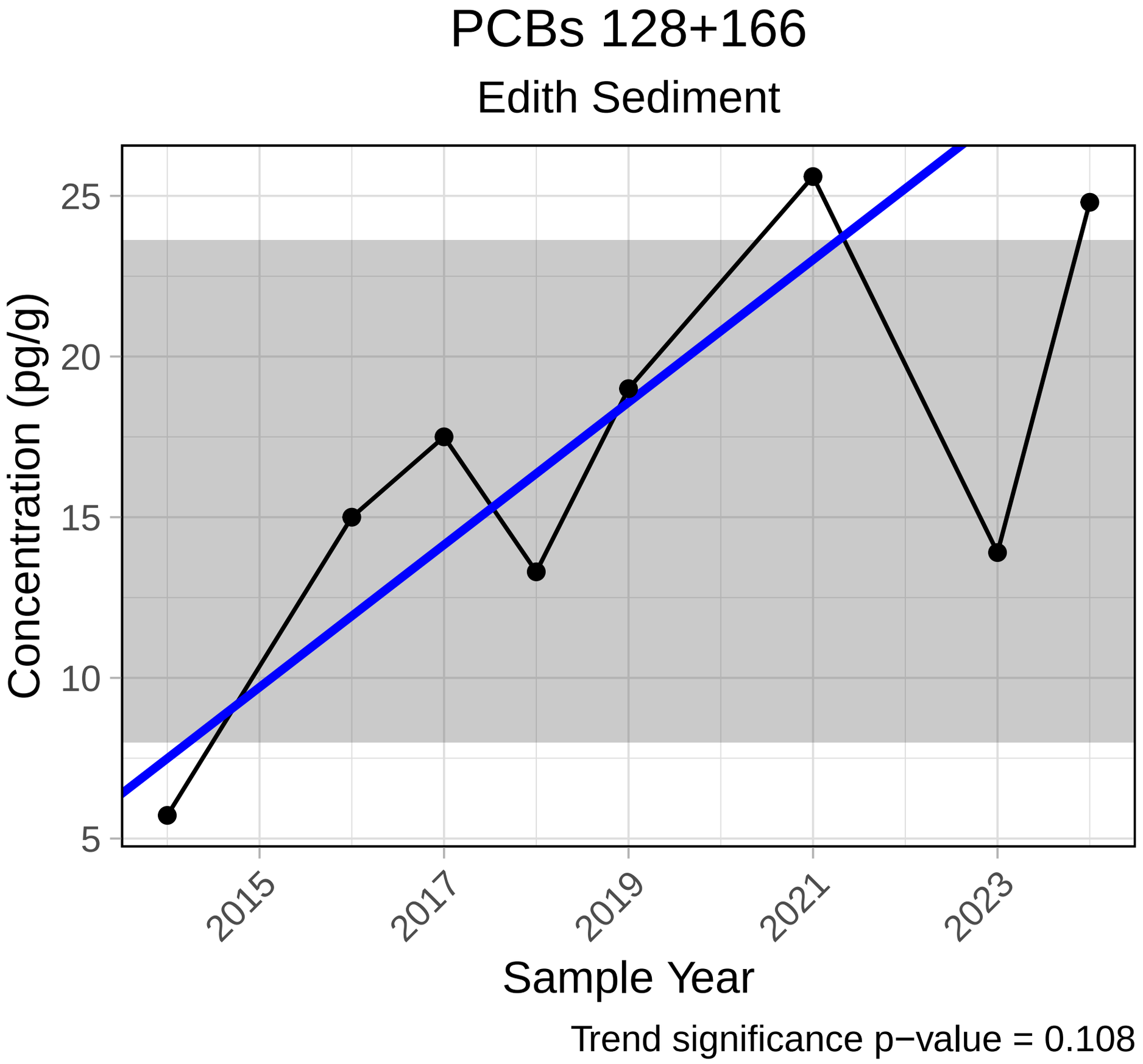

PCBs 83+99
Edith Sediment
80
60
40
20
Concentration (pg/g)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.108

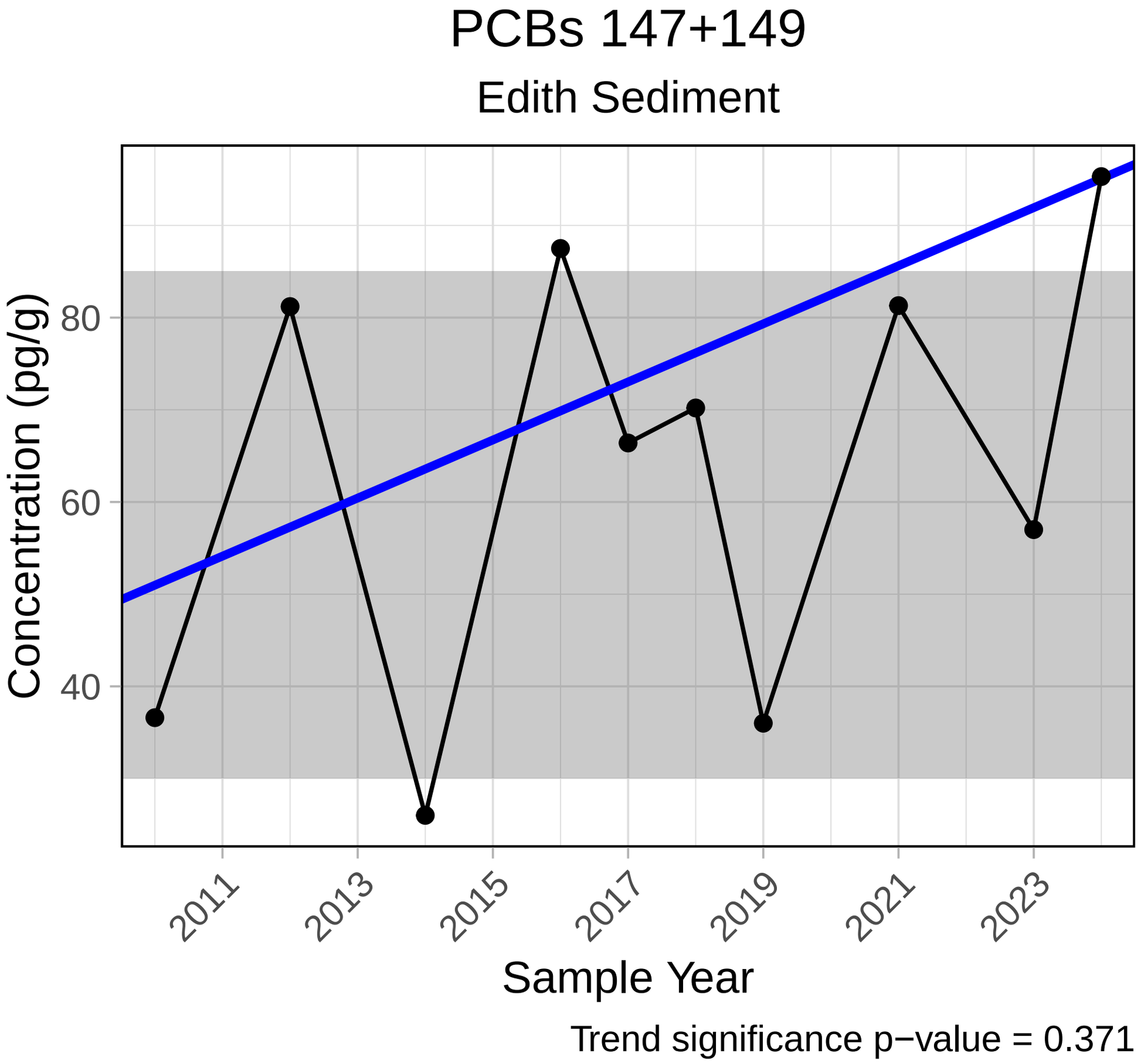
PCBs 88+91

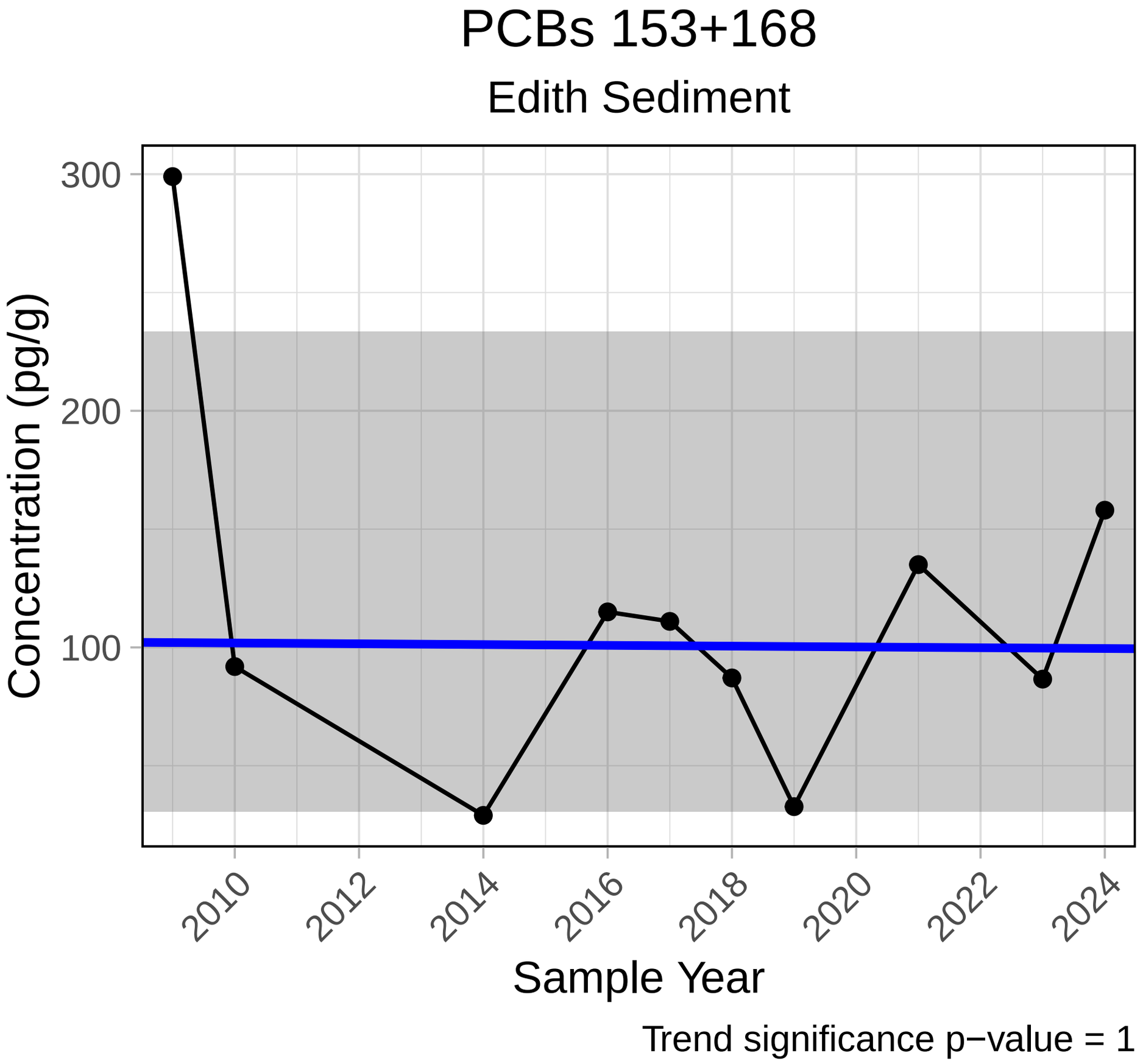
Edith Sediment



Trend significance p−value = 0.174

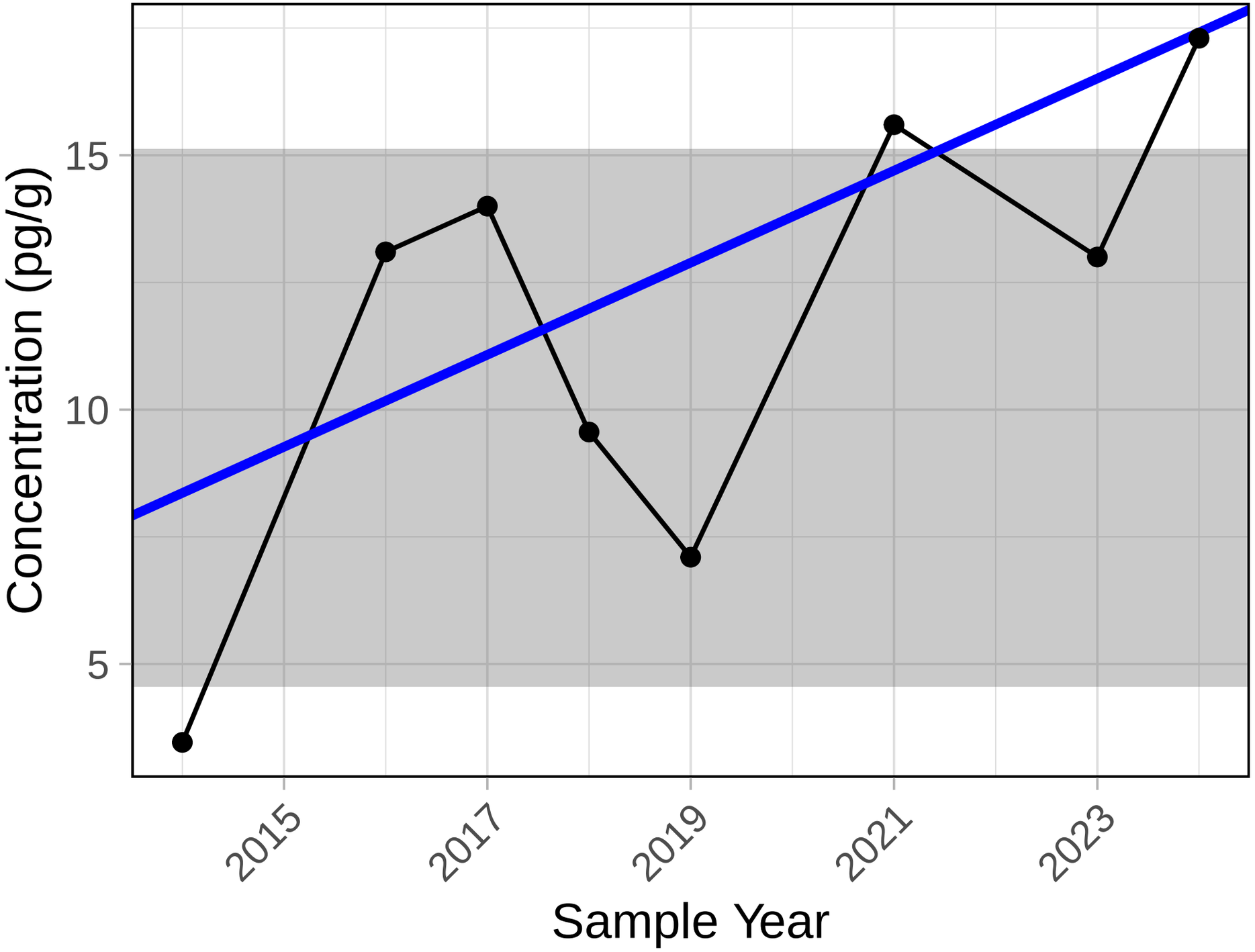

PCBs 128+166
Edith Sediment
Concentration (pg/g)
25
20
15
10
5
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.108


PCBs 147+149
Edith Sediment
Concentration (pg/g)
80
60
40
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.371

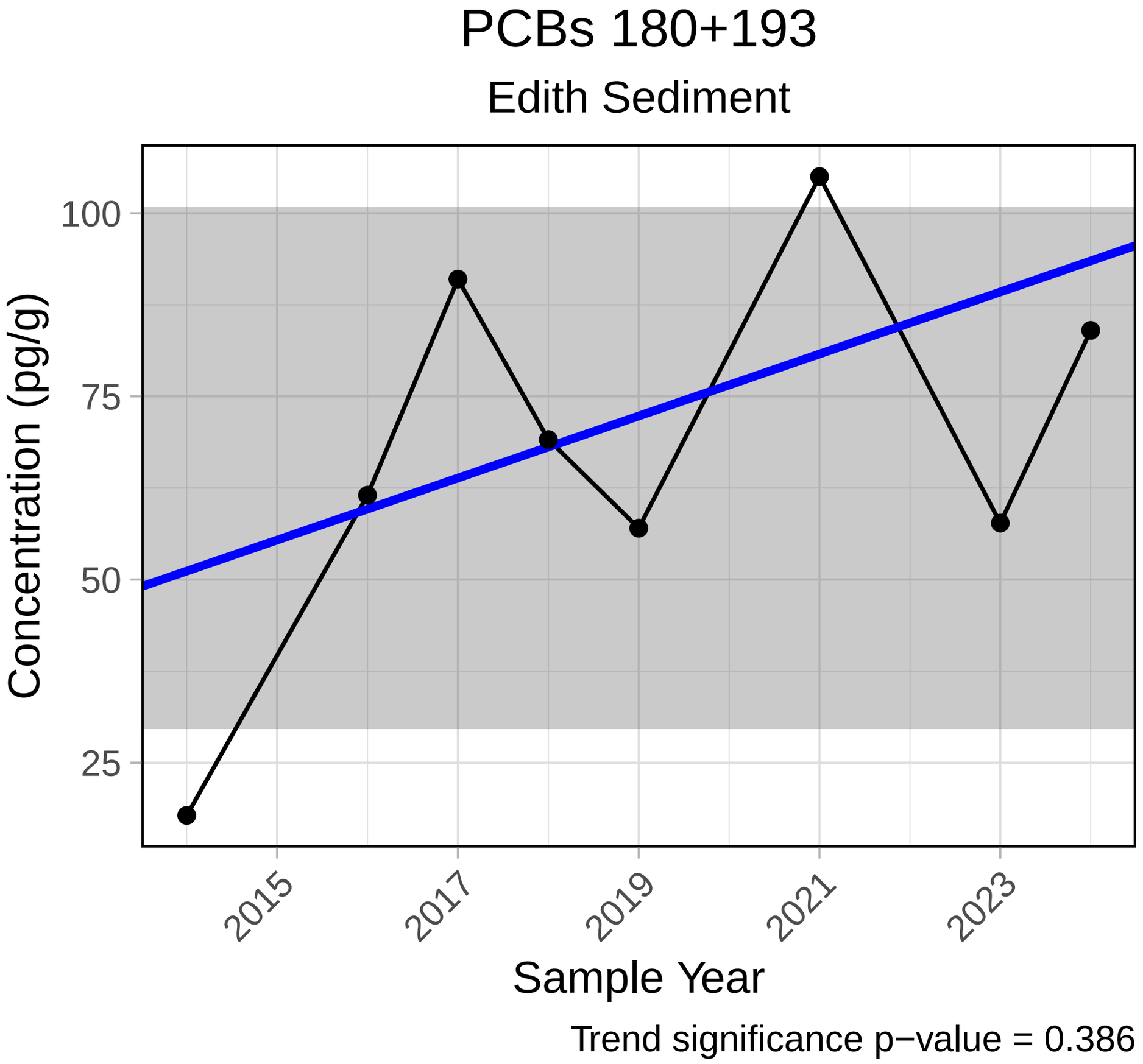

PCBs 153+168
Edith Sediment
300
200
100
Concentration (pg/g)
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 1

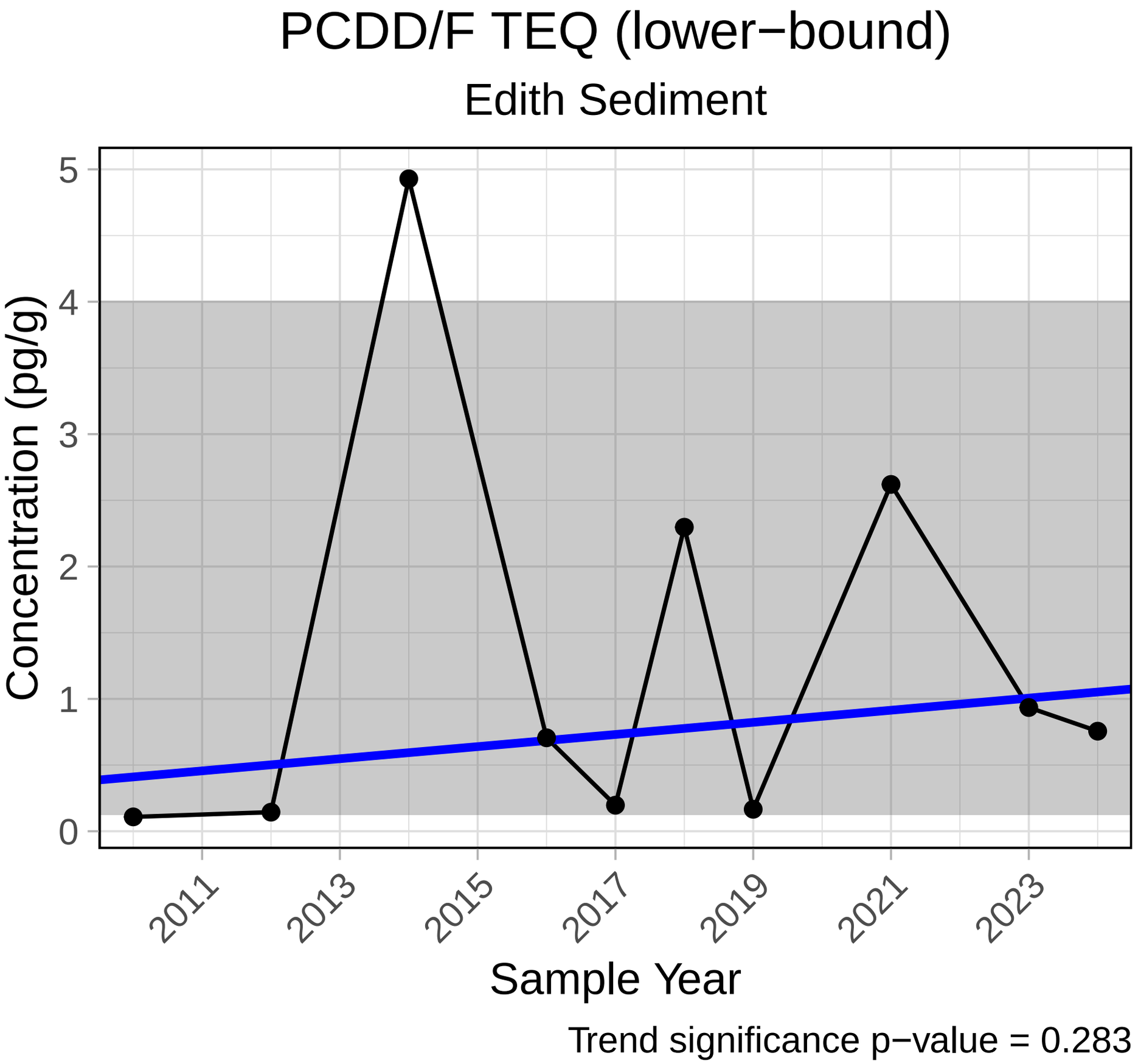
PCBs 156+157

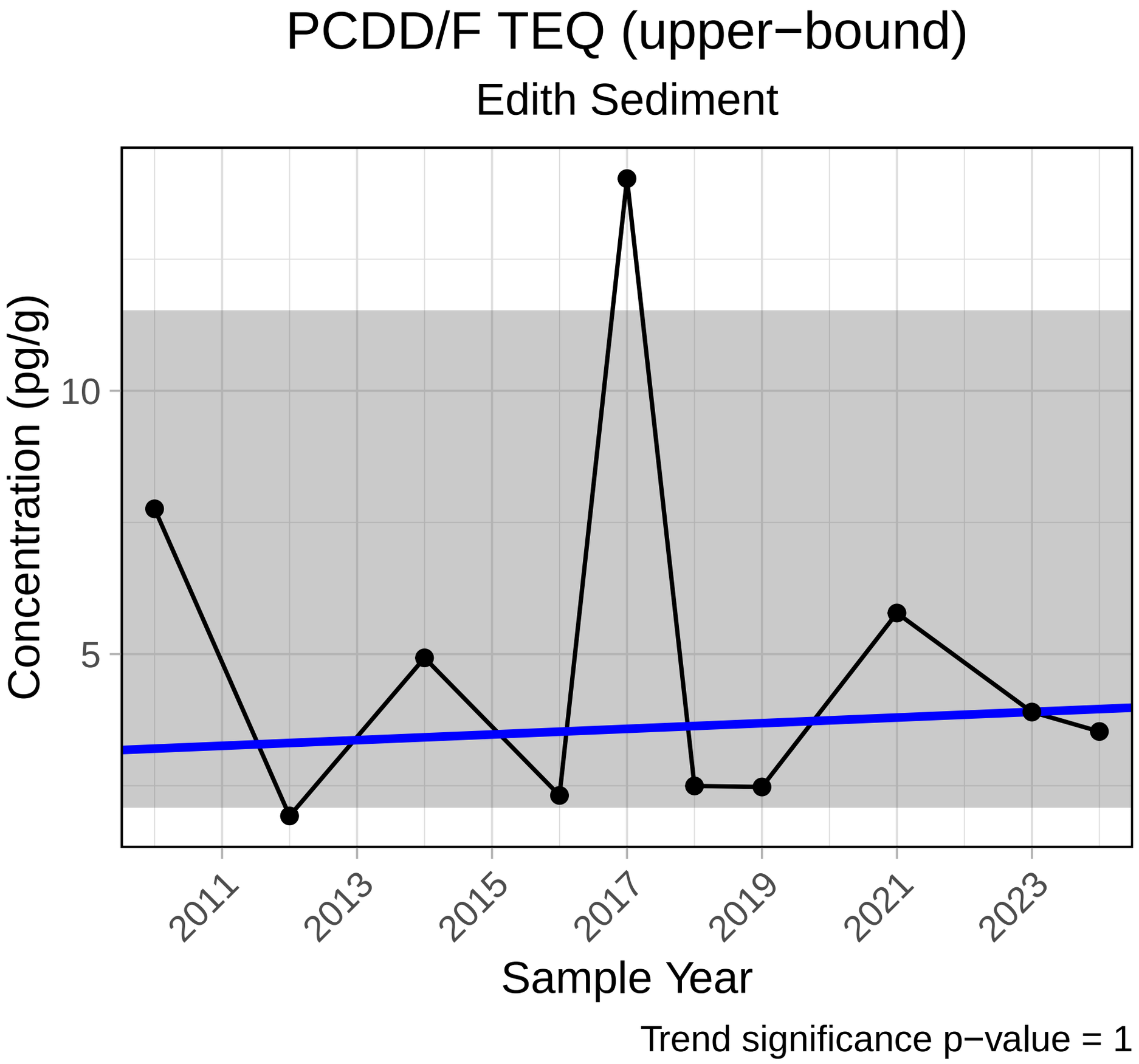
Edith Sediment



Trend significance p−value = 0.174

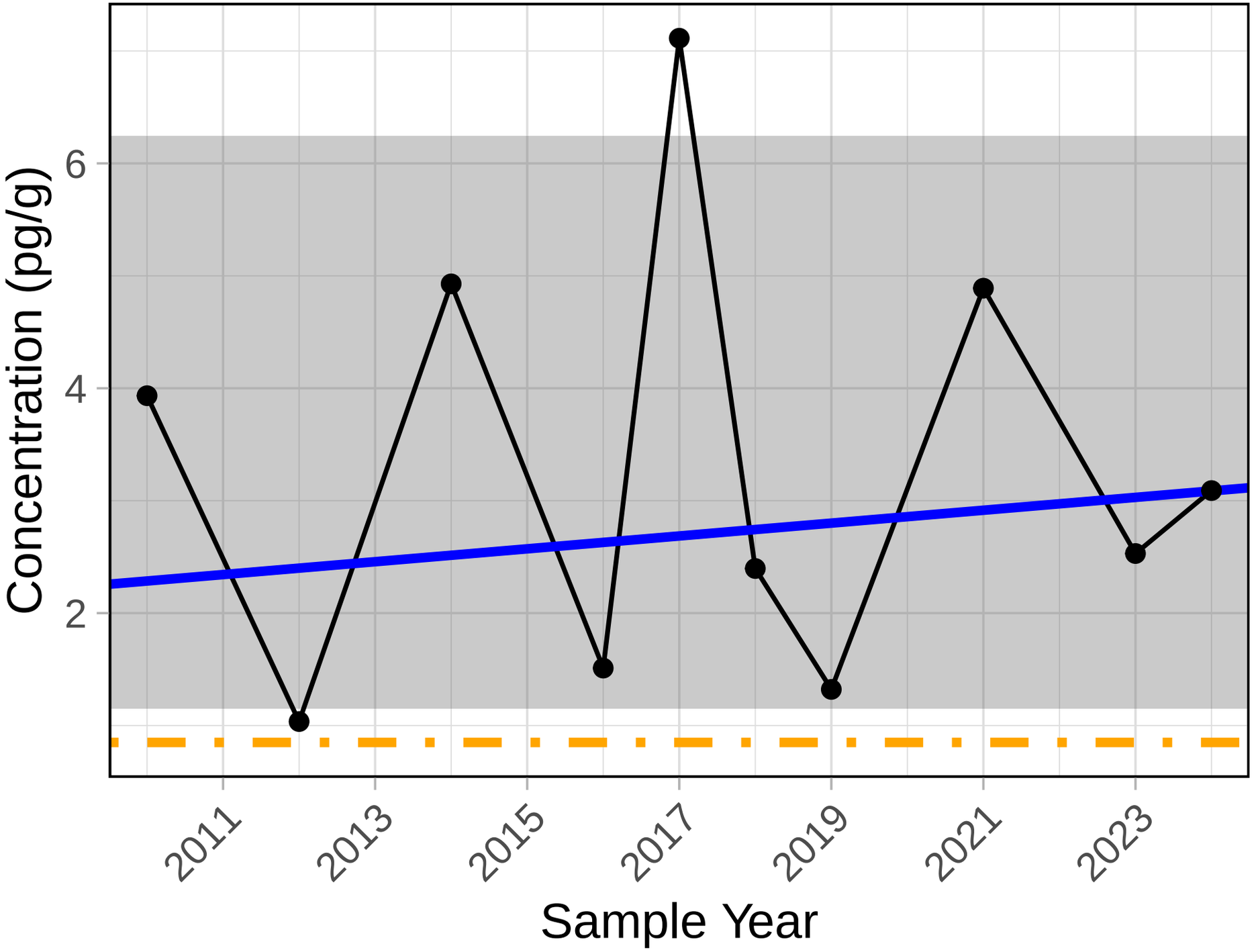

PCBs 180+193
Edith Sediment
Concentration (pg/g)
100
75
50
25
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.386


PCDD/F TEQ (lower−bound)
Edith Sediment
Concentration (pg/g)
0
1
2
3
4
5
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.283

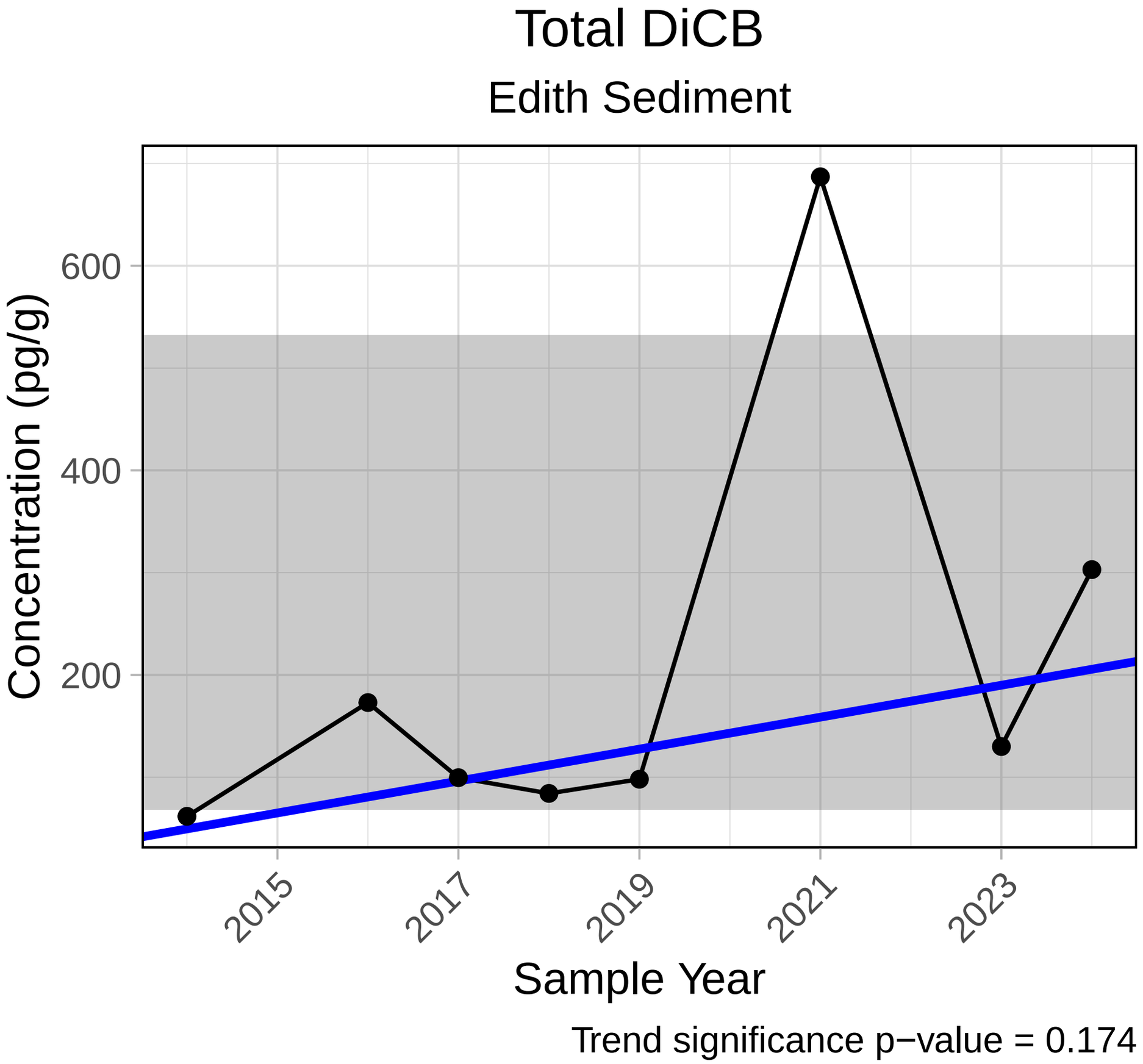

PCDD/F TEQ (upper−bound)
Edith Sediment
Concentration (pg/g)
10
5
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

PCDD/F TEQ (mid−point)

Edith Sediment

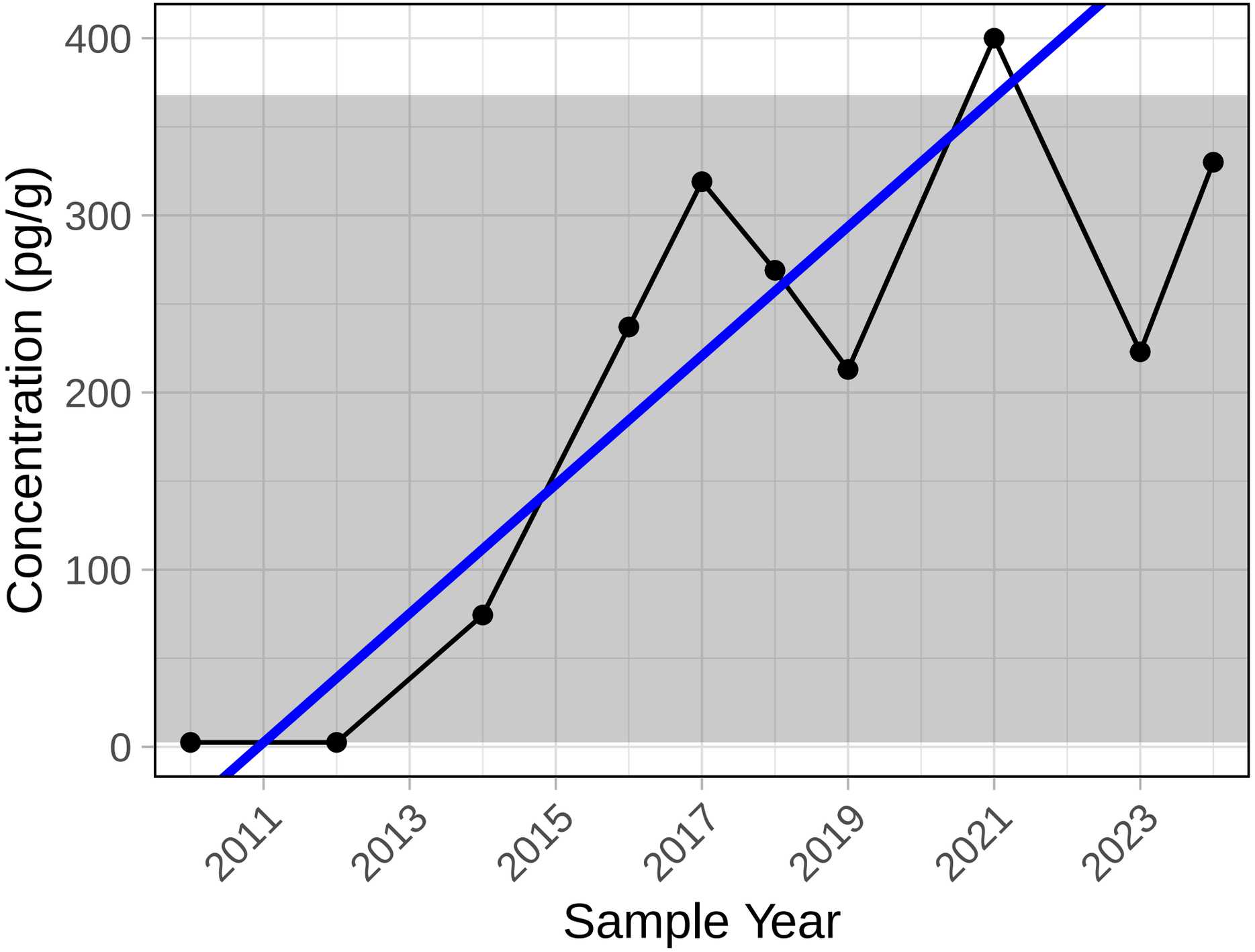


Trend significance p−value = 0.858
ISQG level = 0.85 pg/g (maximum)
PEL level = 21.5 pg/g (maximum)

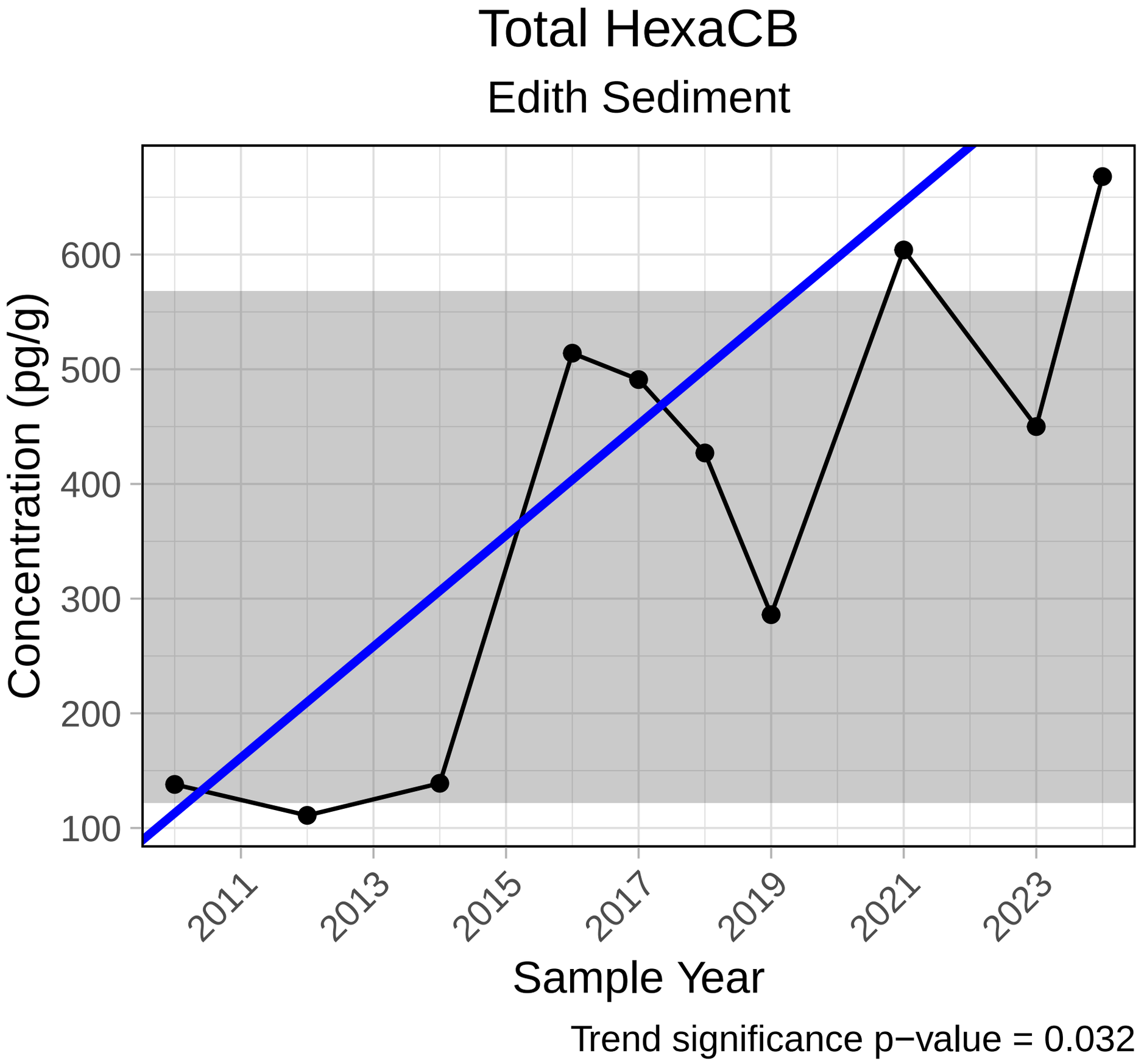

Total DiCB
Edith Sediment
Concentration (pg/g)
600
400
200
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.174

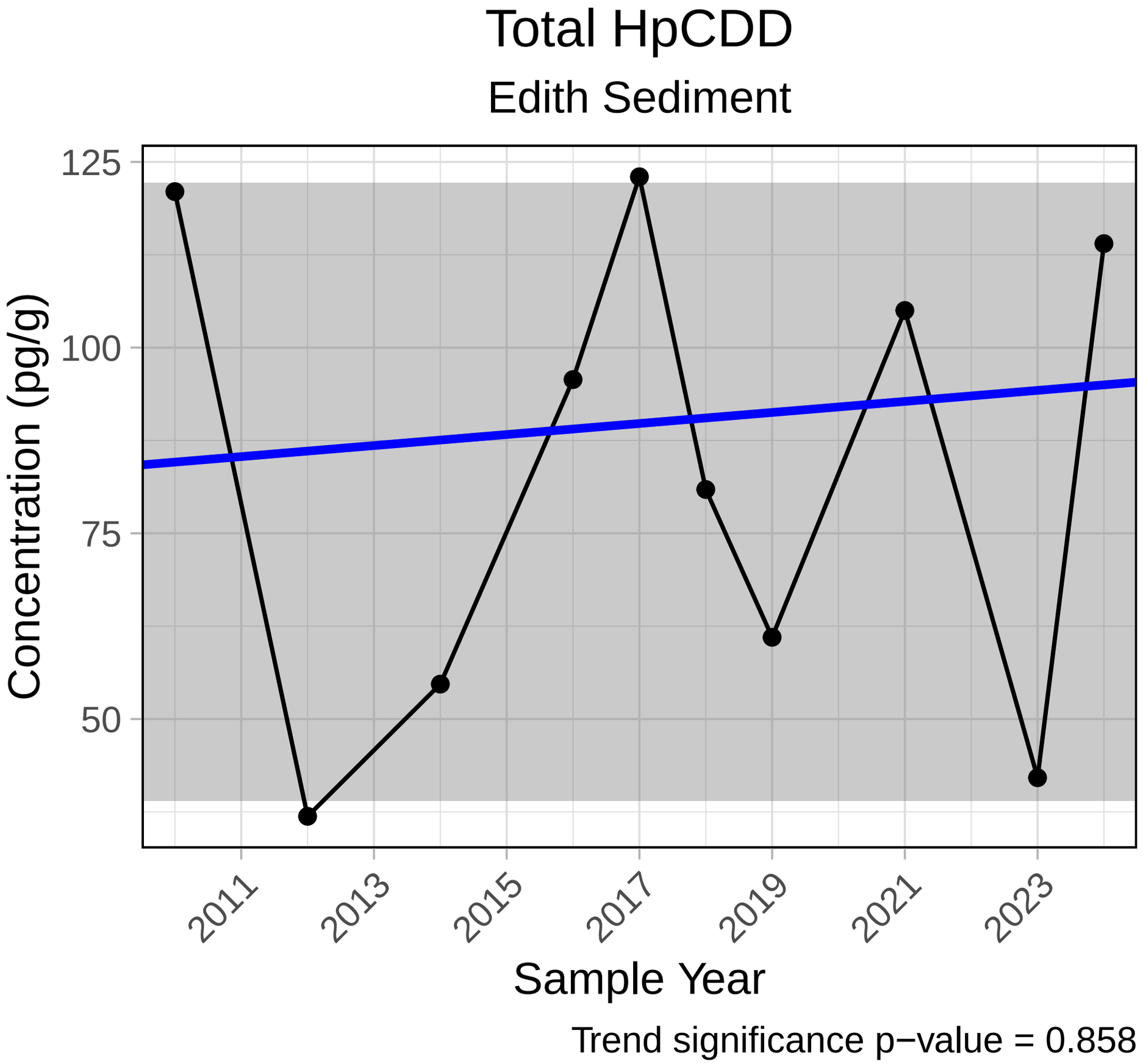
Total HeptaCB

Edith Sediment



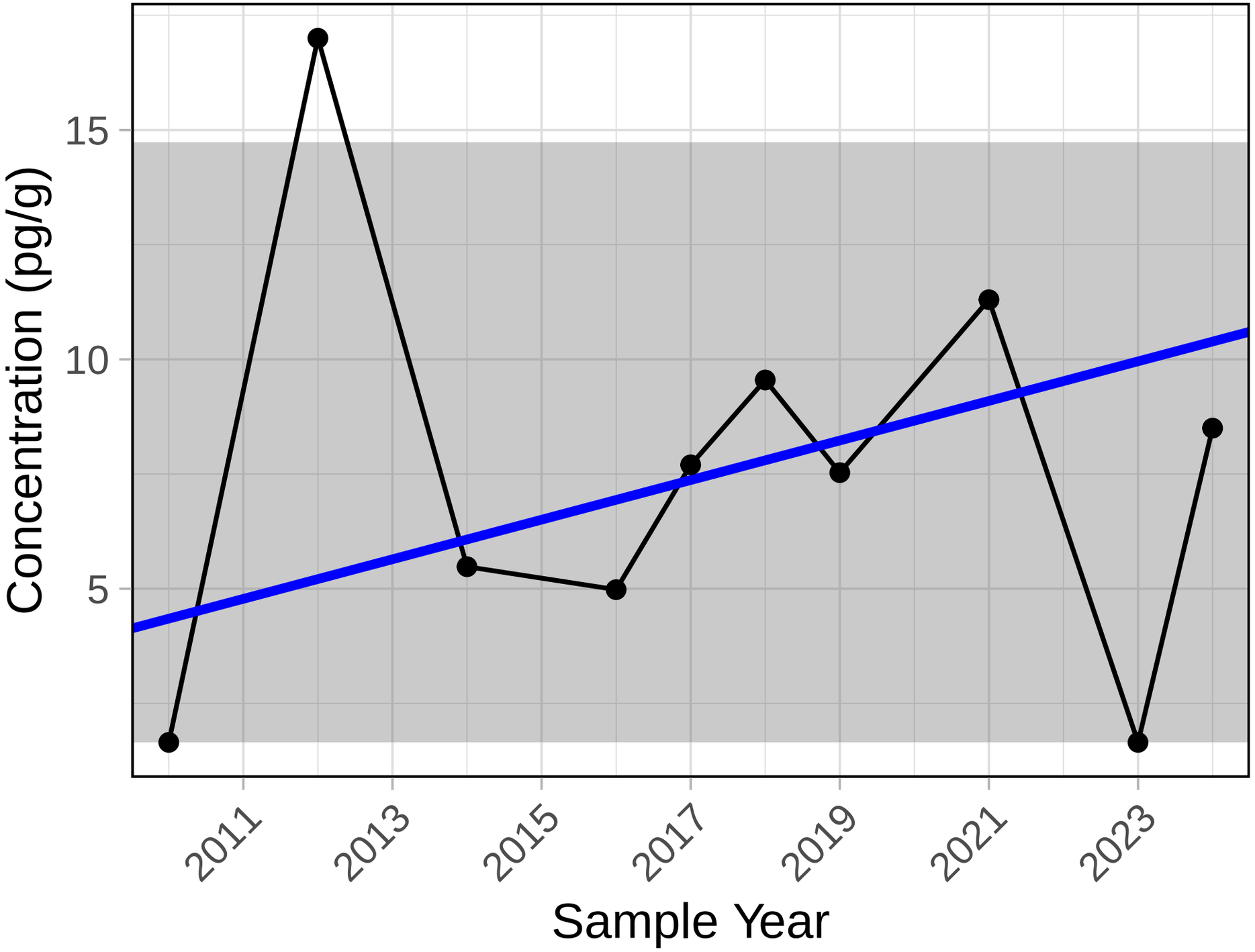
Trend significance p−value = 0.025


Total HexaCB
Edith Sediment
Concentration (pg/g)
600
500
400
300
200
100
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.032


Total HpCDD
Edith Sediment
125
100
75
50
Concentration (pg/g)
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.858

Total HpCDF

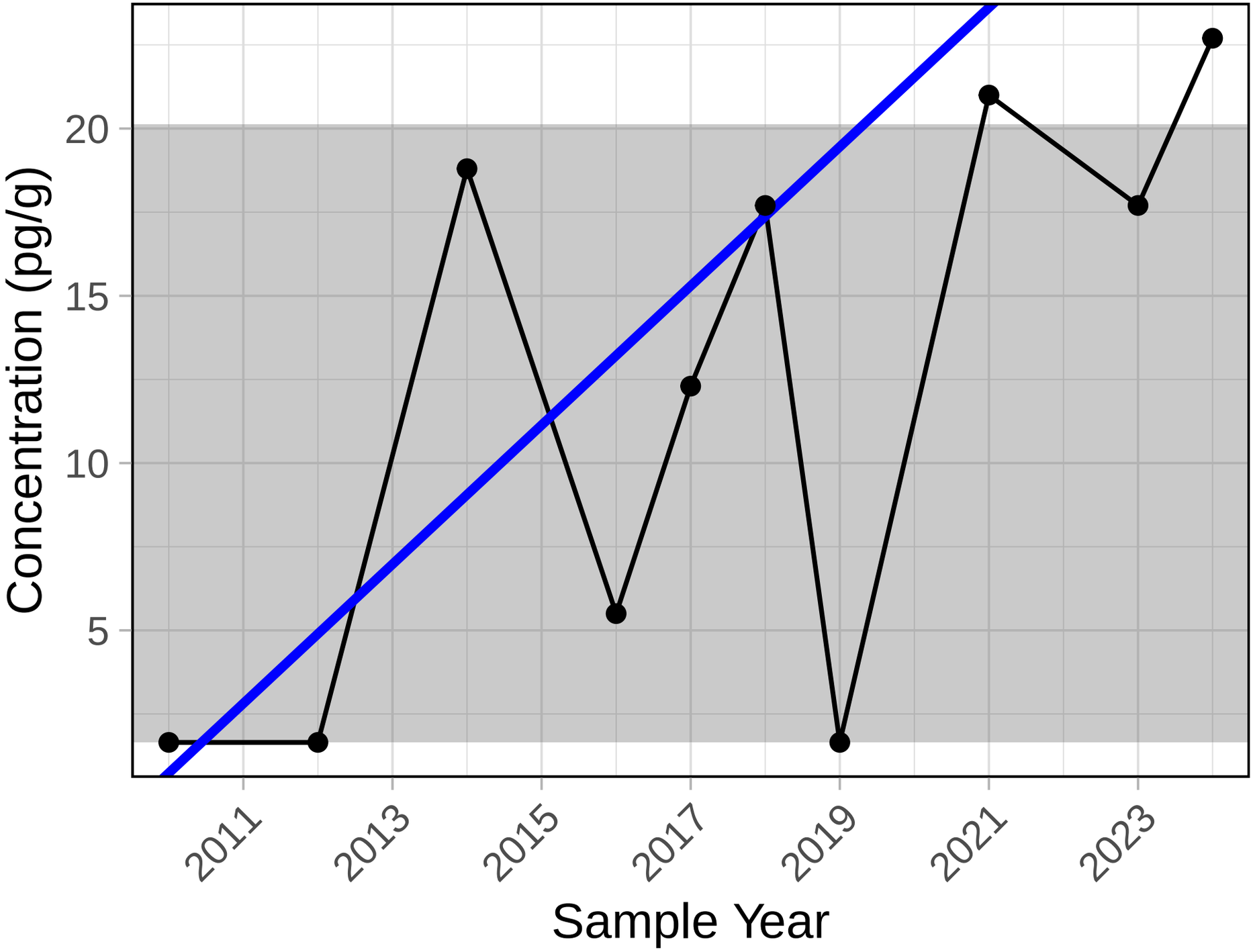
Edith Sediment



Trend significance p−value = 0.653

Total HxCDD

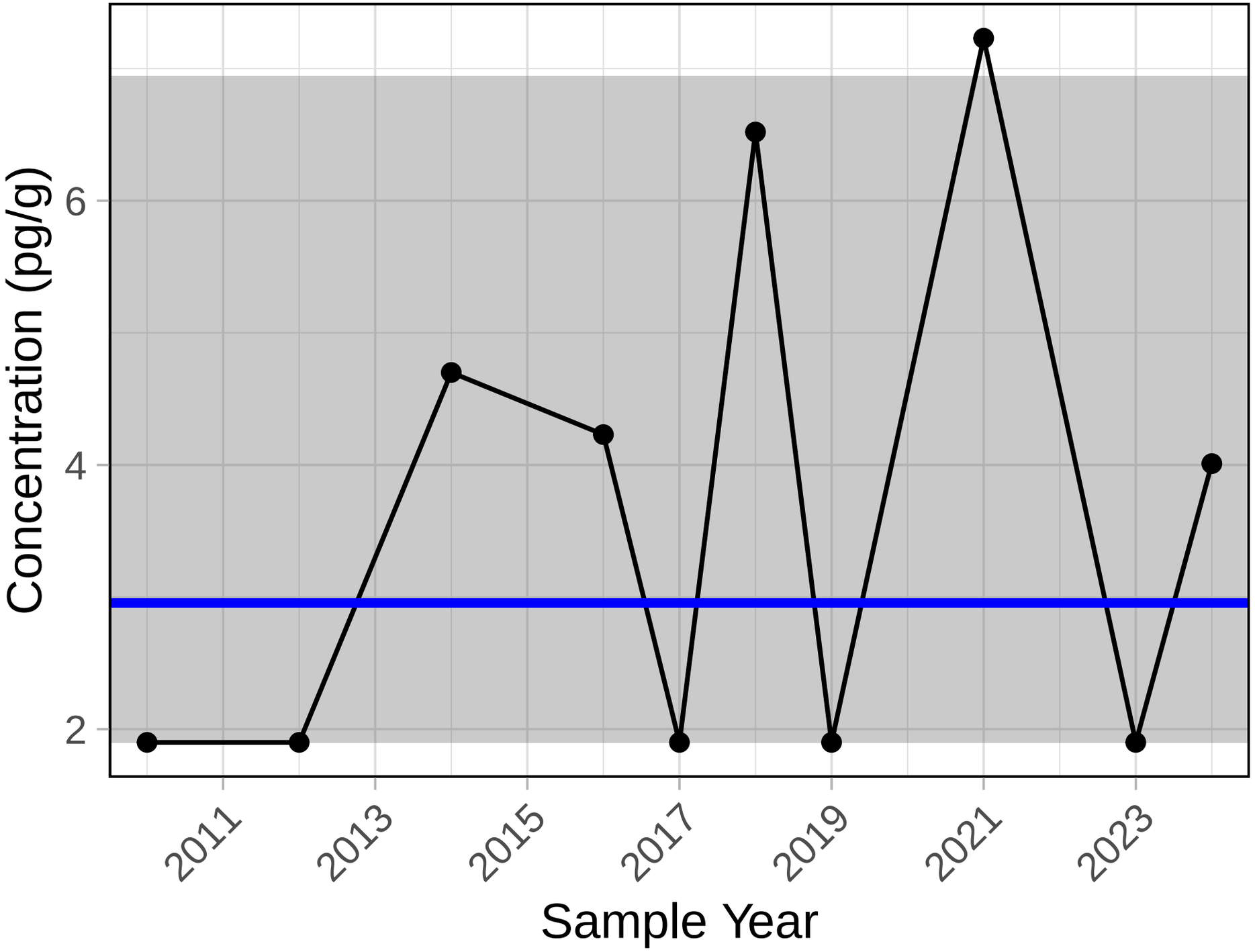
Edith Sediment



Trend significance p−value = 0.045

Total HxCDF

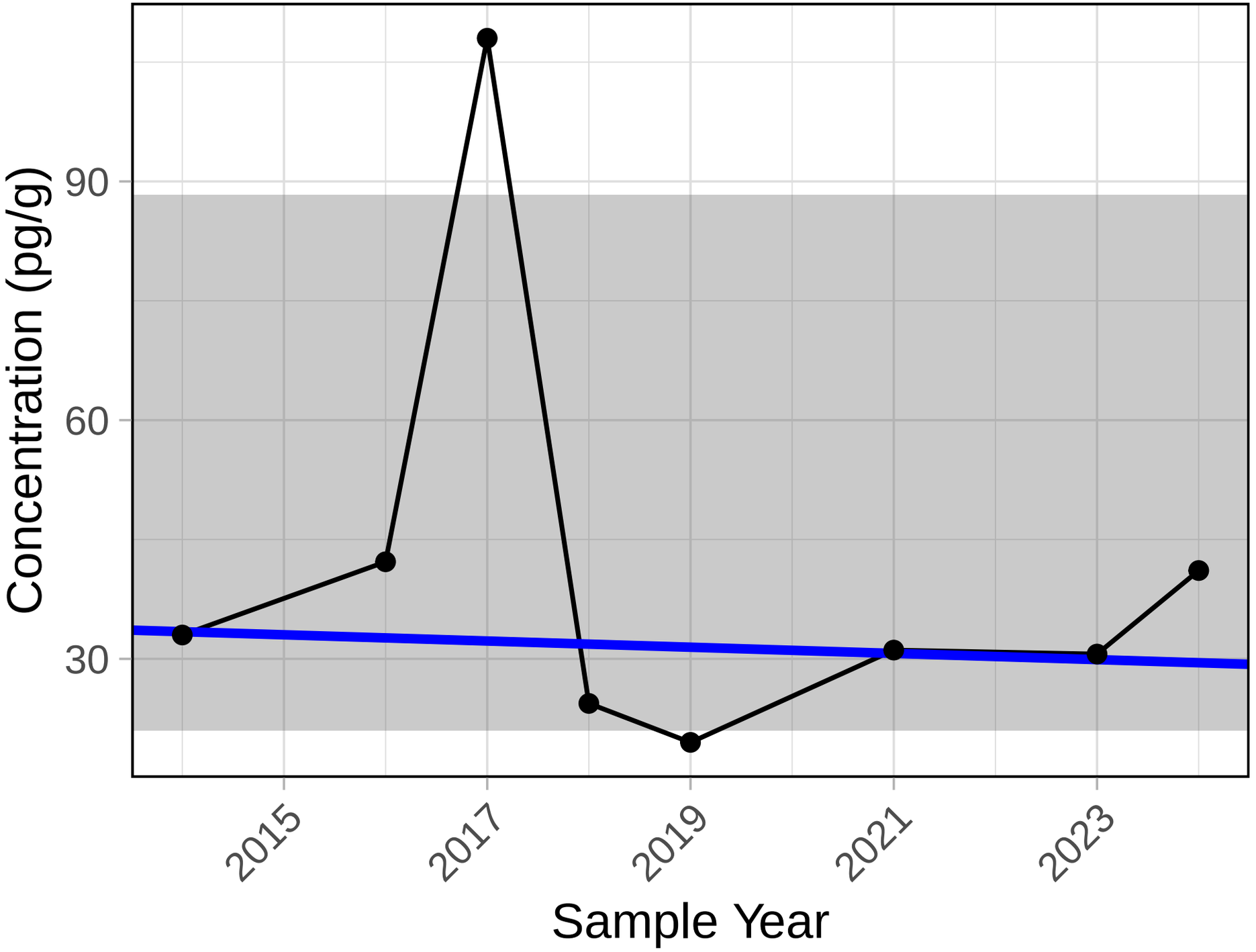
Edith Sediment



Trend significance p−value = 0.564

Total MonoCB

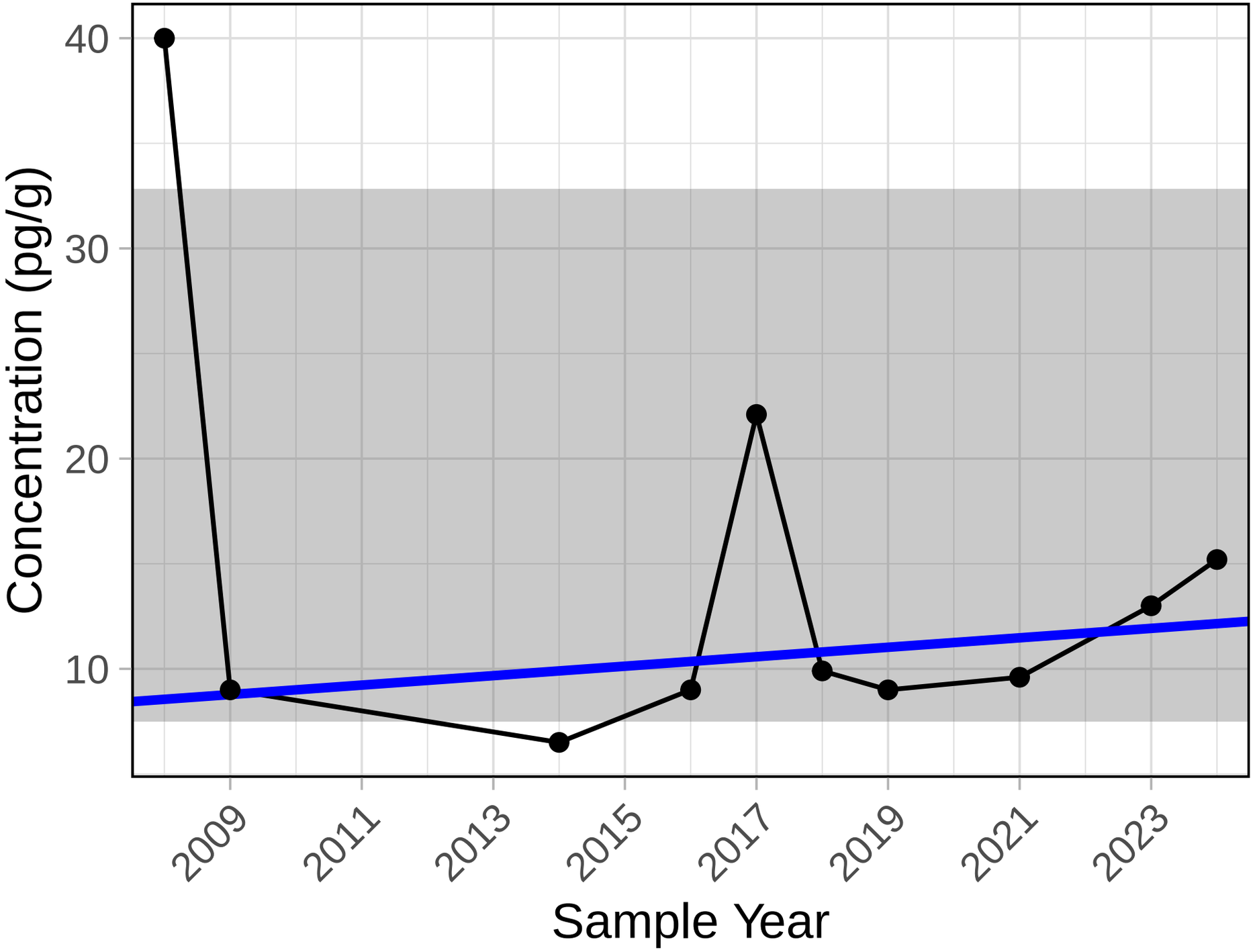
Edith Sediment



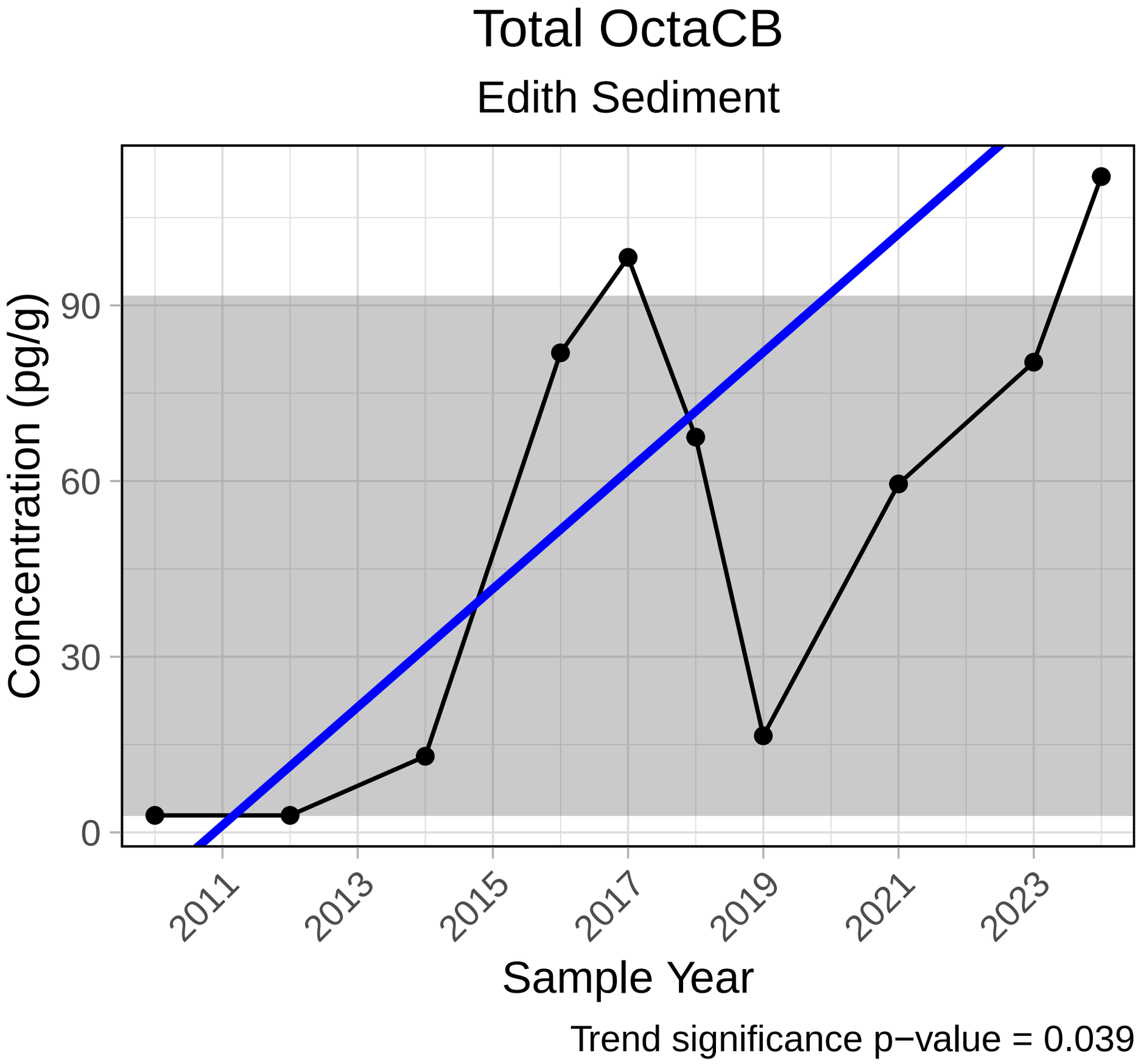
Trend significance p−value = 0.711

Total NonaCB

Edith Sediment

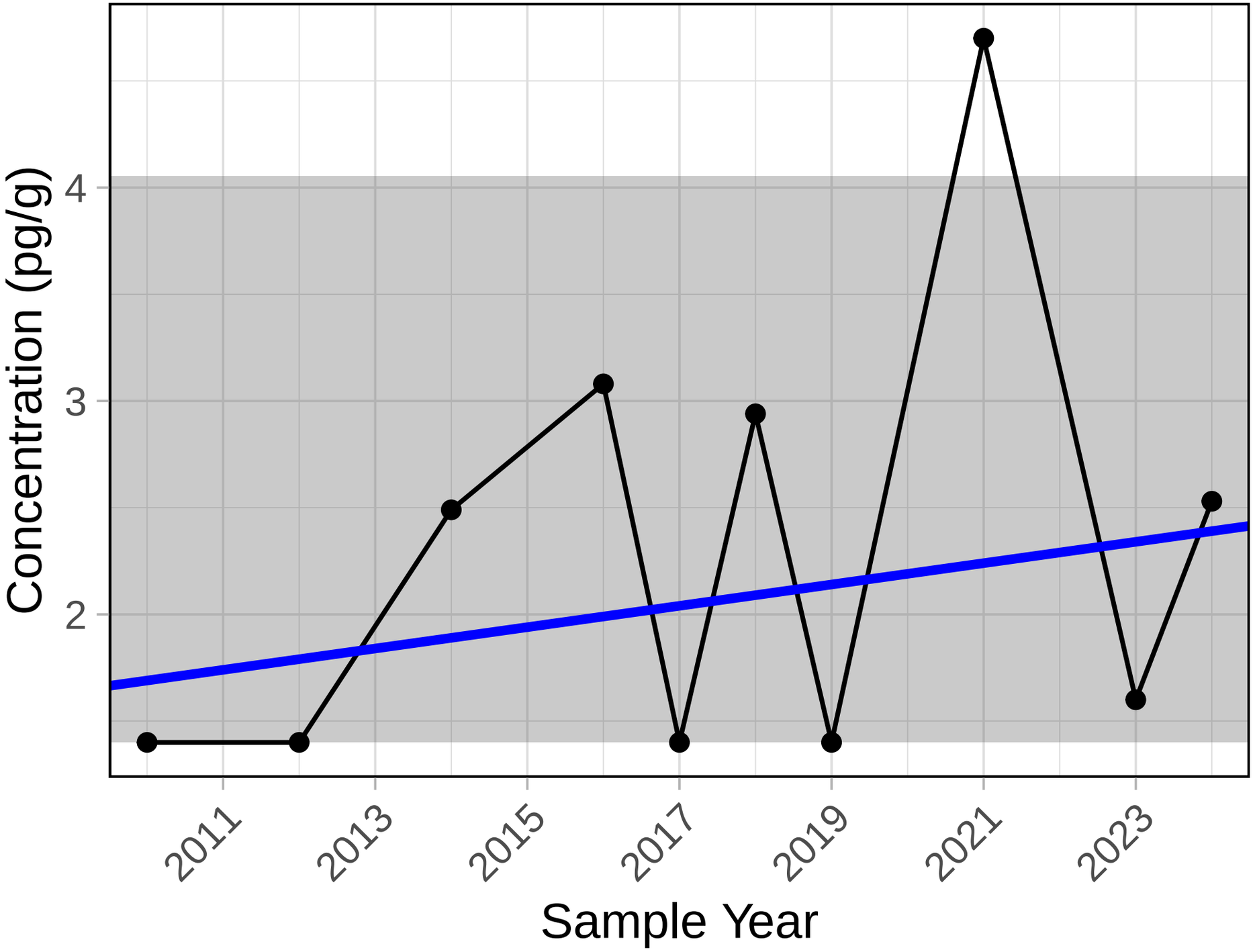


Trend significance p−value = 0.525

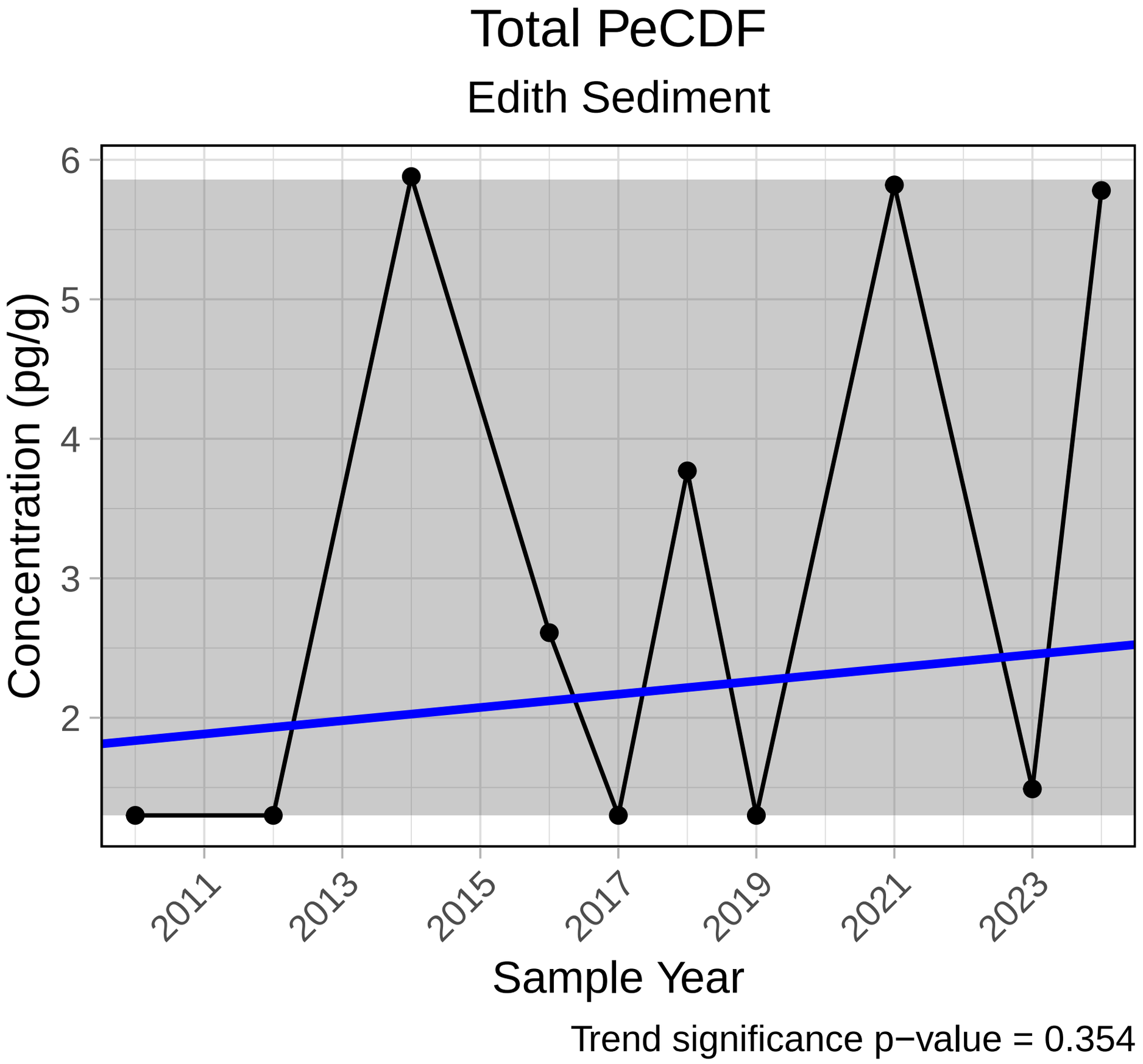

Total OctaCB
Edith Sediment
Concentration (pg/g)
90
60
30
0
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.039

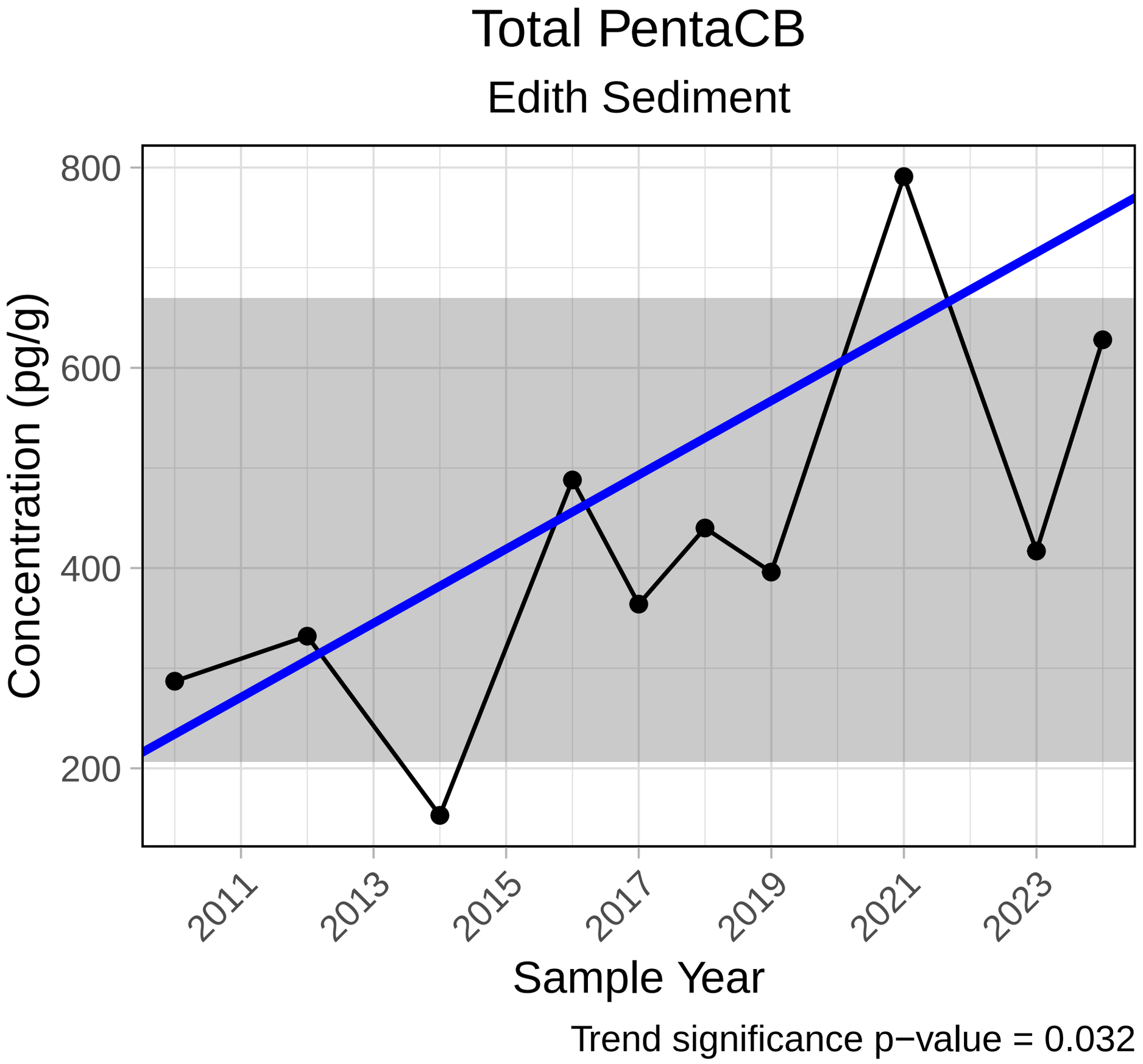
Total PeCDD

Edith Sediment



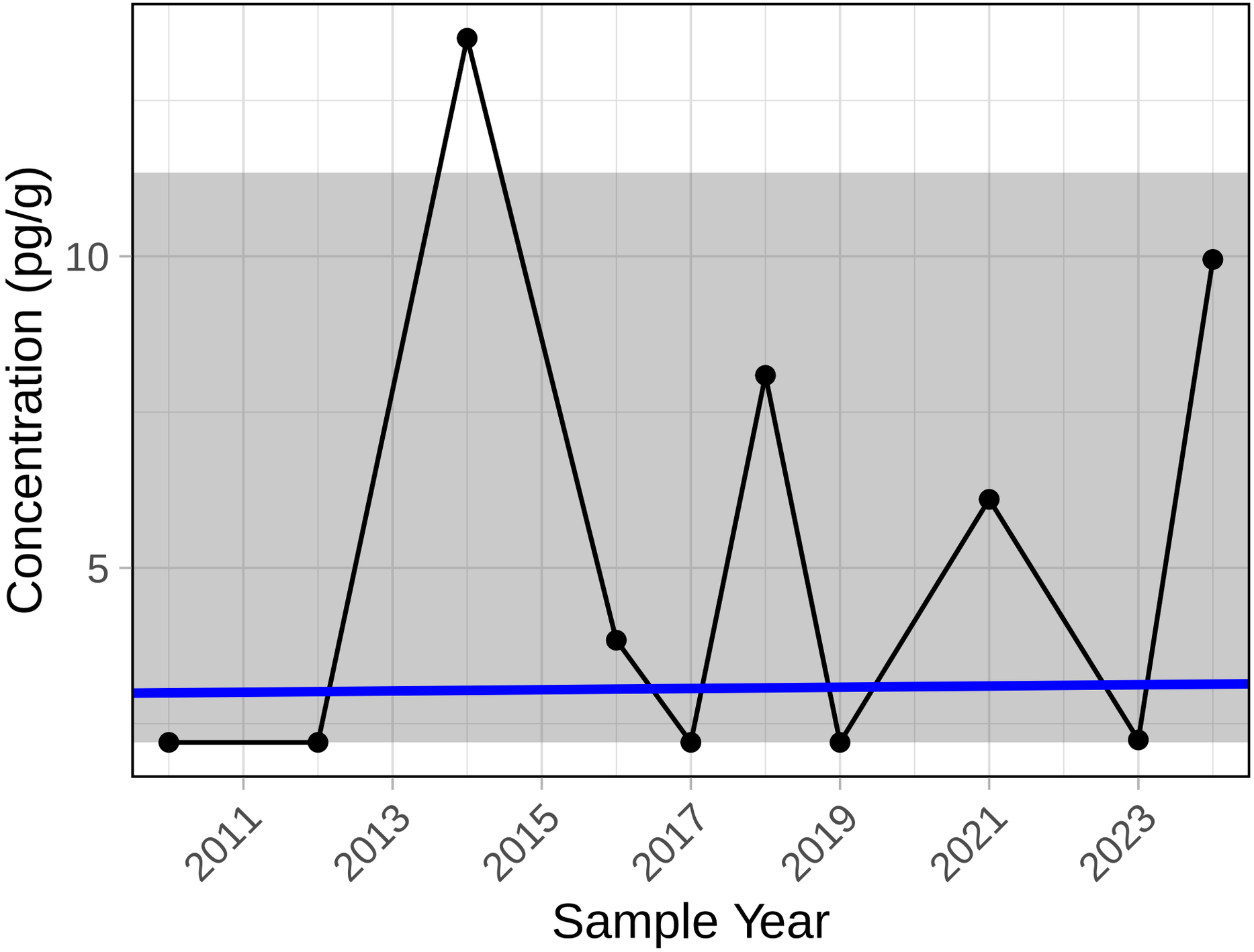
Trend significance p−value = 0.266


Total PeCDF
Edith Sediment
Concentration (pg/g)
6
5
4
3
2
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.354

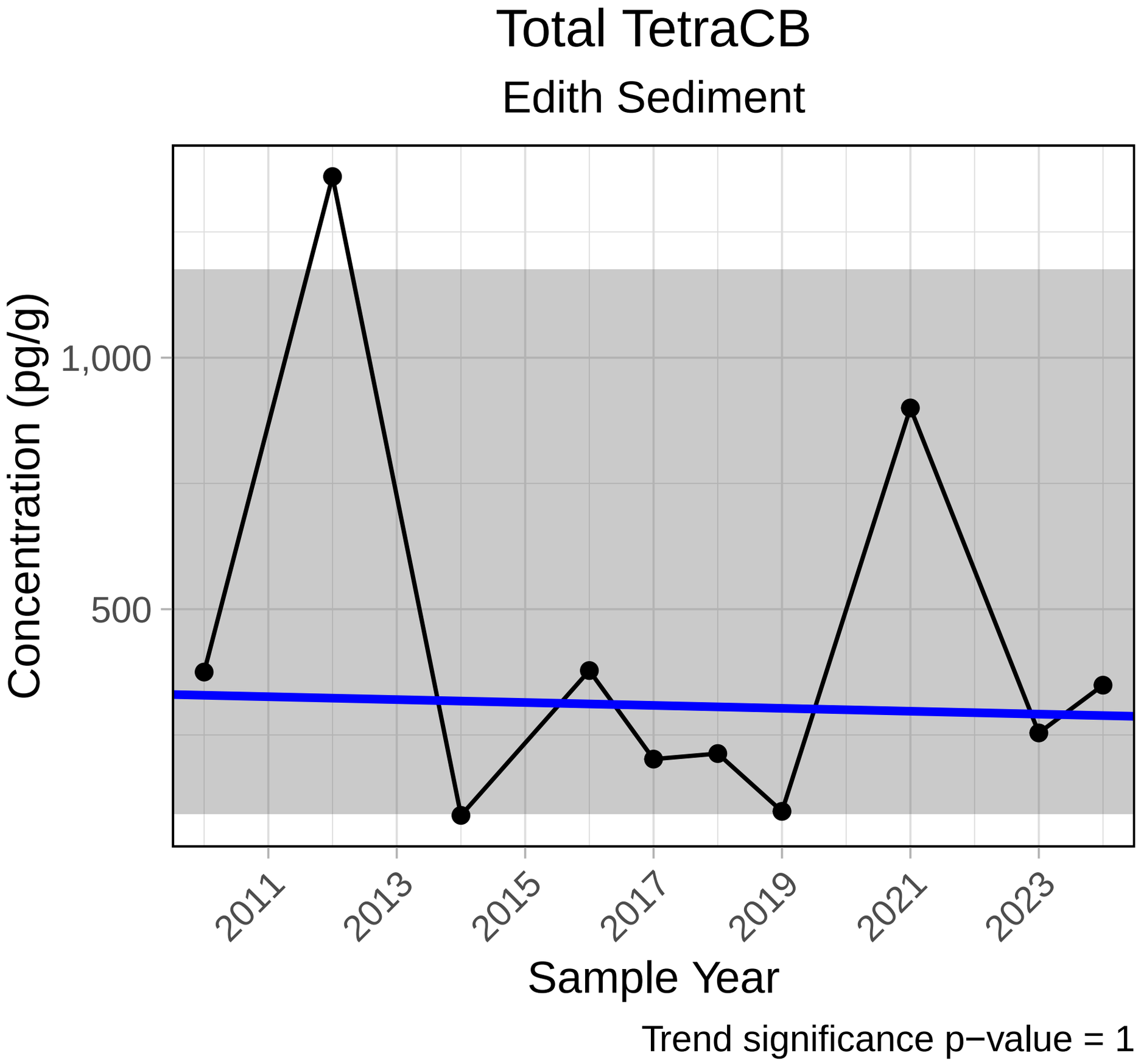

Total PentaCB
Edith Sediment
800
600
400
200
Concentration (pg/g)
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.032

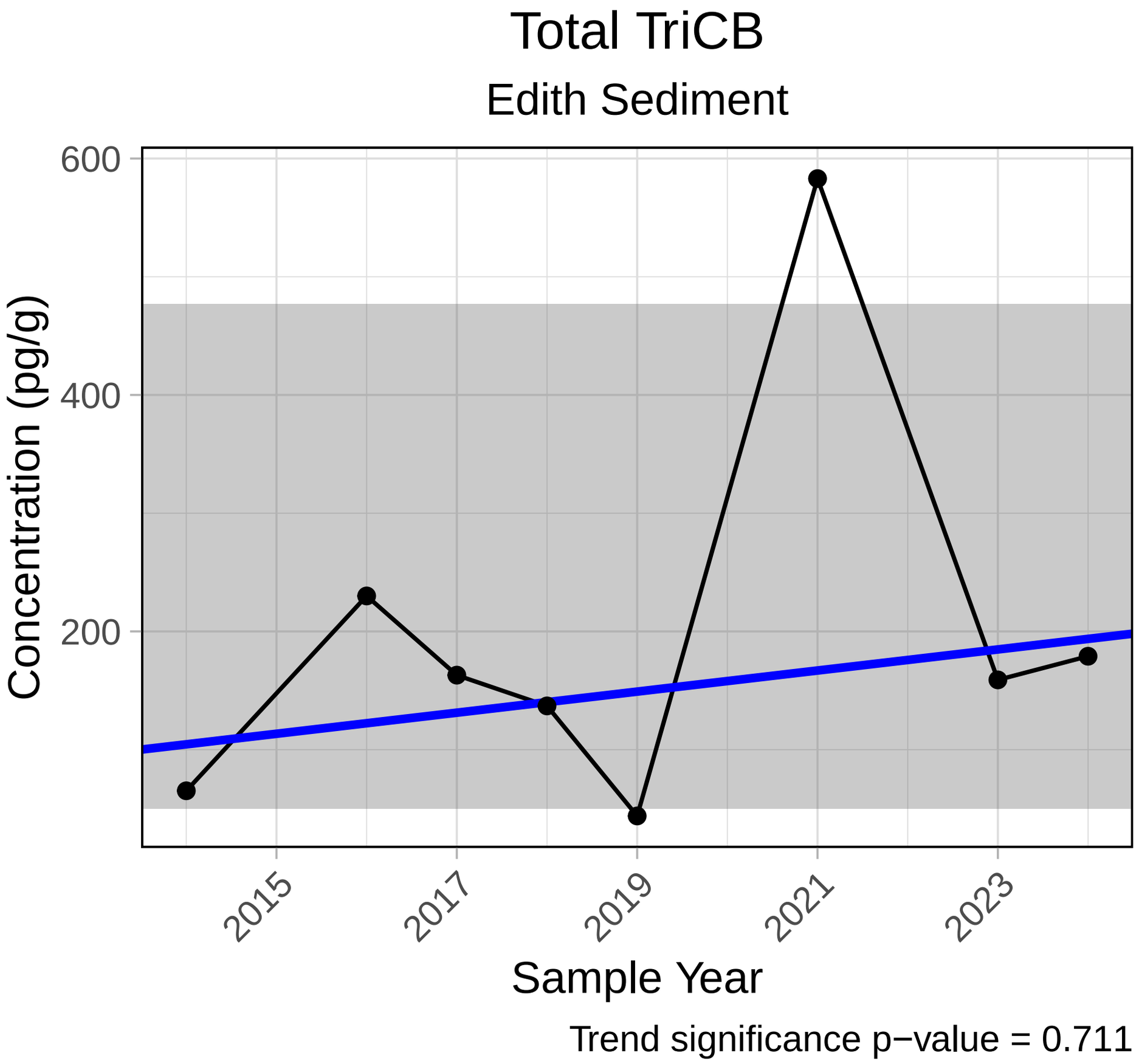
Total TCDF

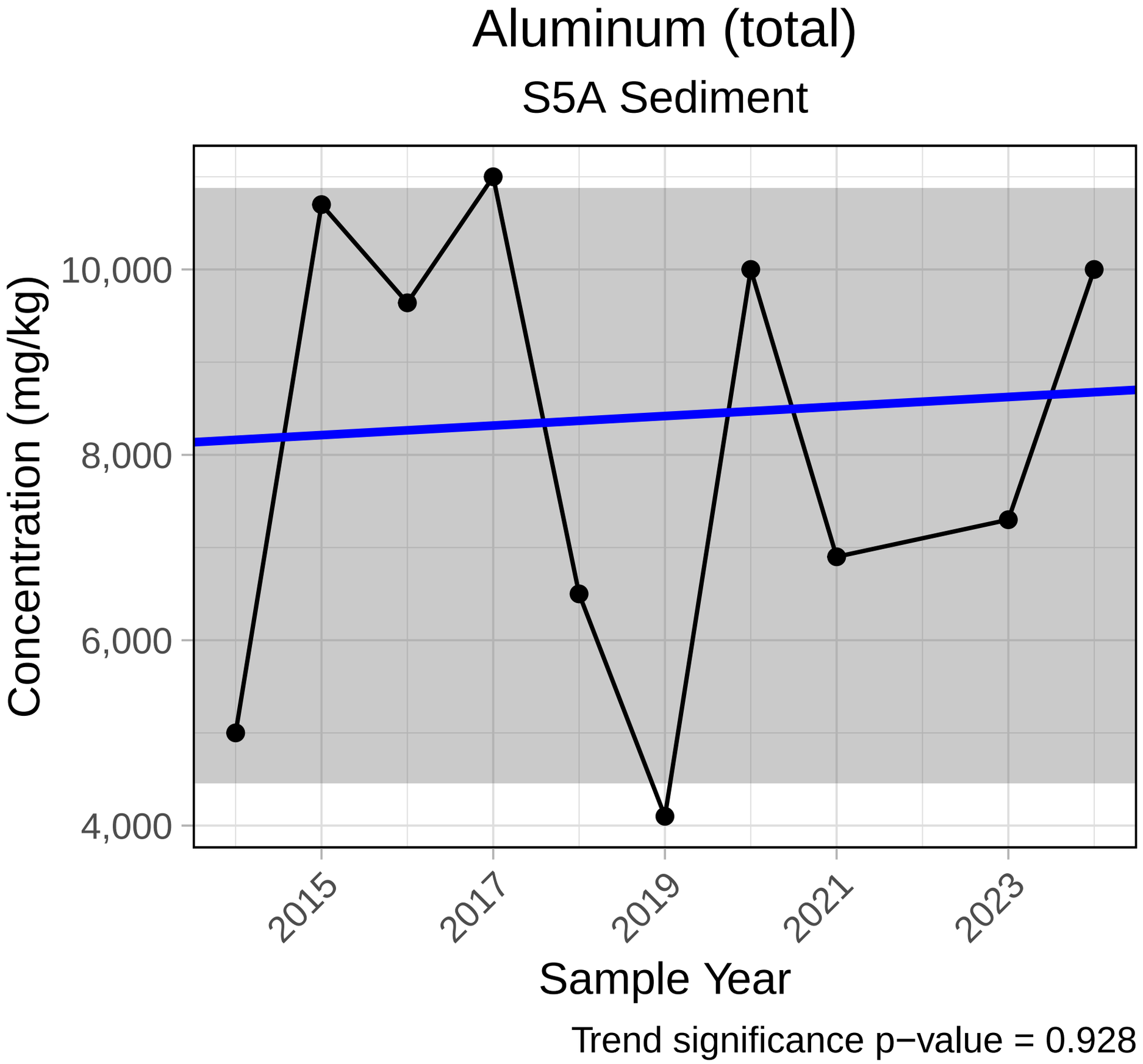
Edith Sediment



Trend significance p−value = 0.354

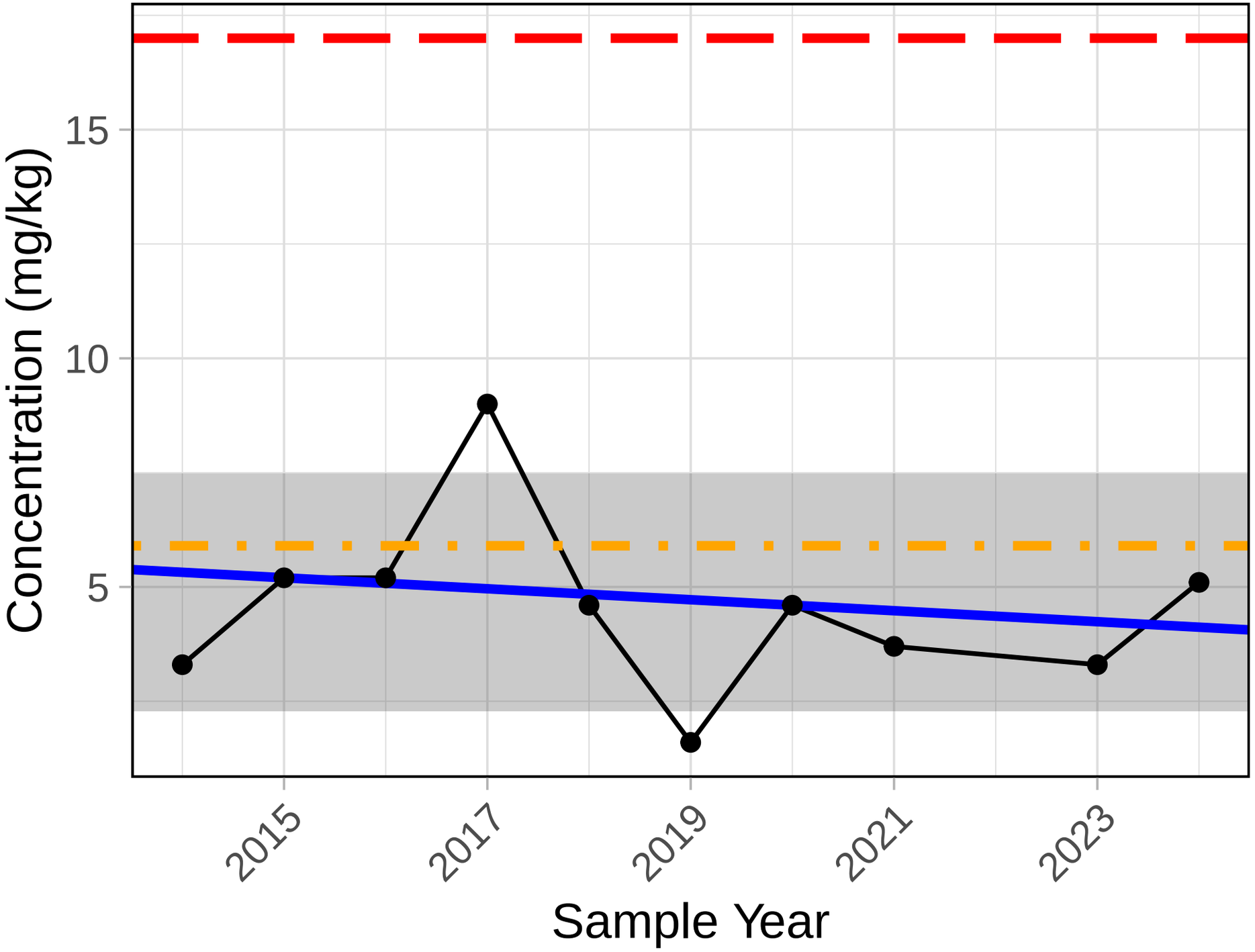

Total TetraCB
Edith Sediment
Concentration (pg/g)
1,000
500
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1


Total TriCB
Edith Sediment
600
400
200
Concentration (pg/g)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.711


Aluminum (total)
S5A Sediment
Concentration (mg/kg)
10,000
8,000
6,000
4,000
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.928

Arsenic (total)

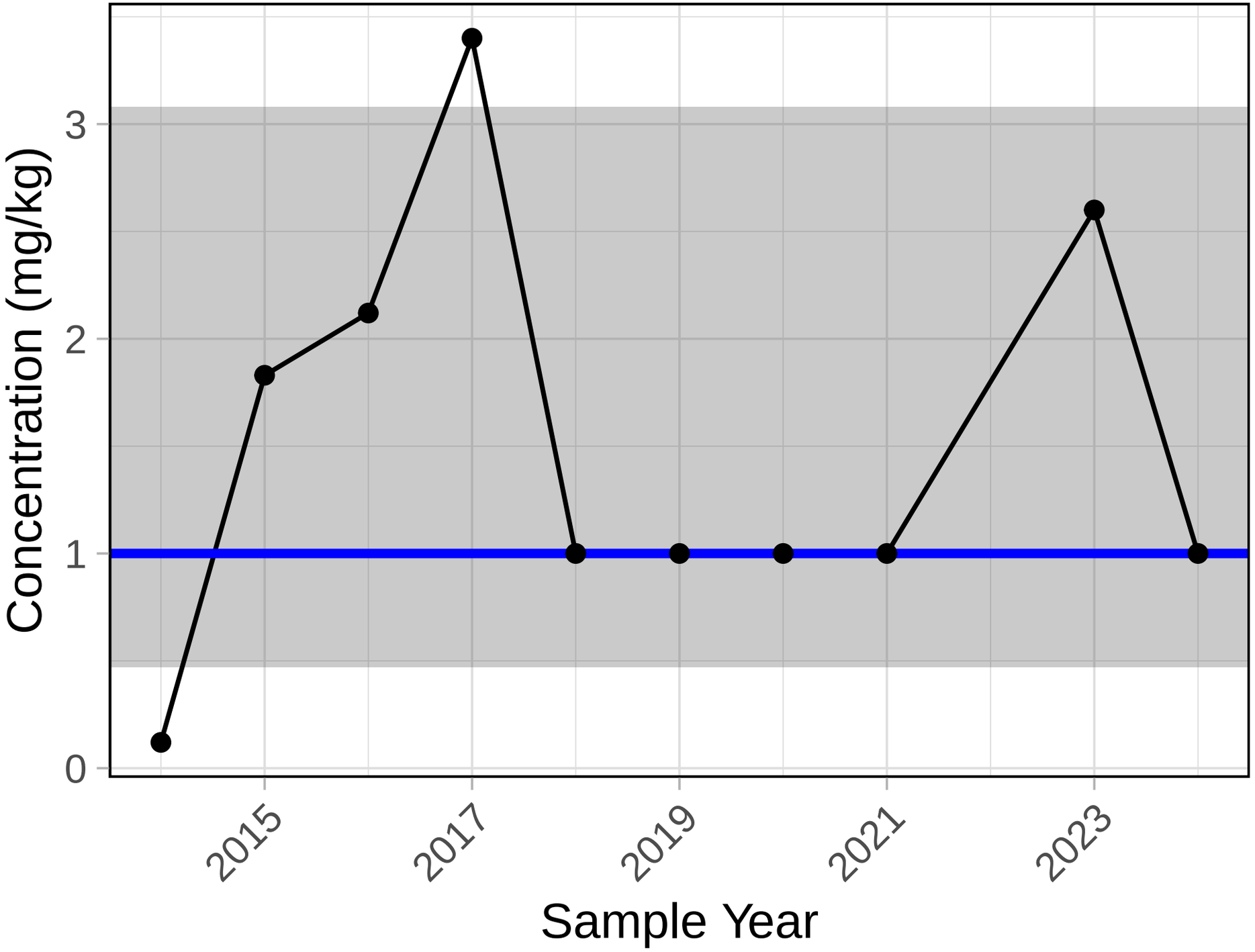
S5A Sediment



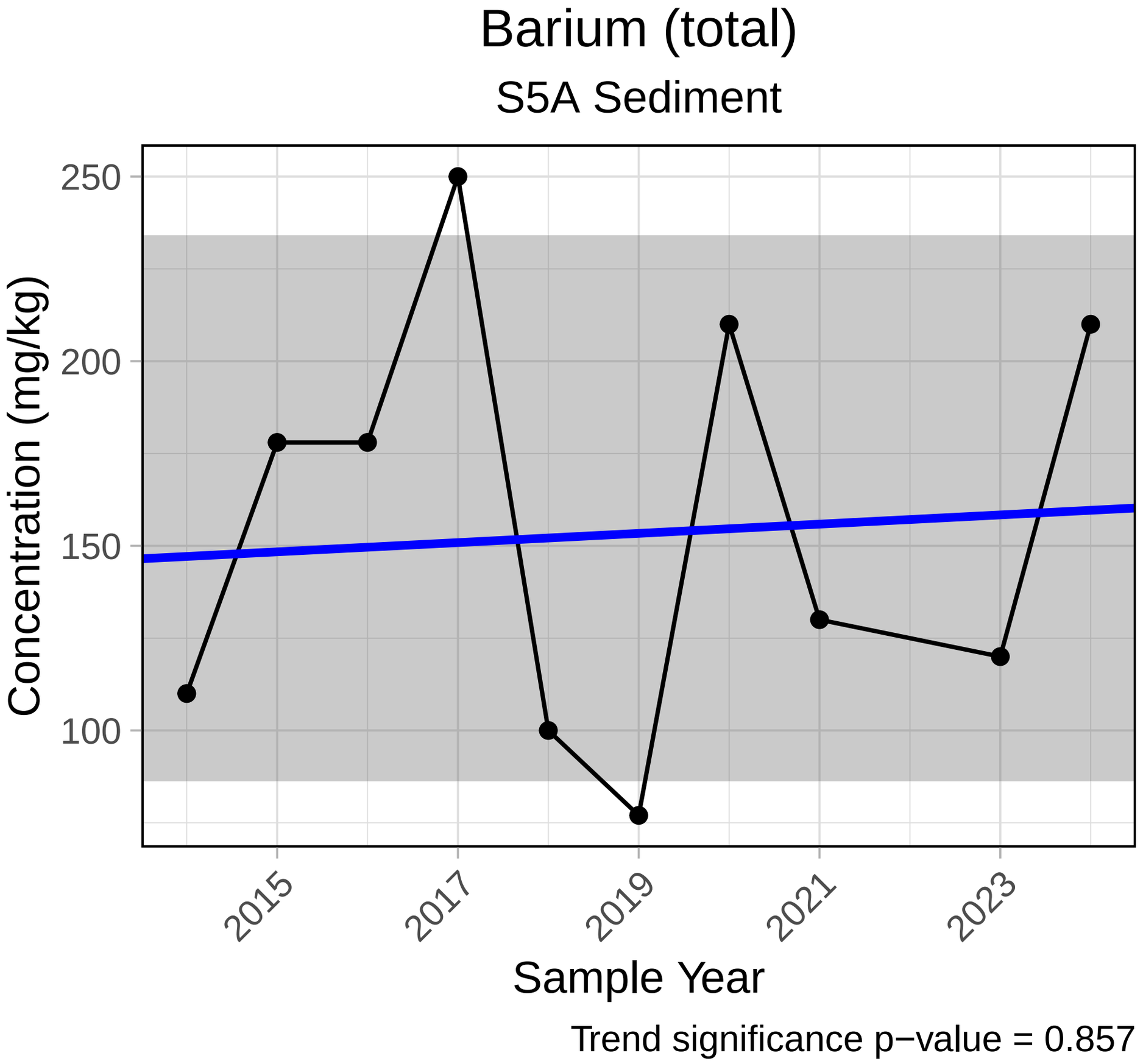
Trend significance p−value = 0.526
ISQG level = 5.9 mg/kg (maximum)
PEL level = 17 mg/kg (maximum)

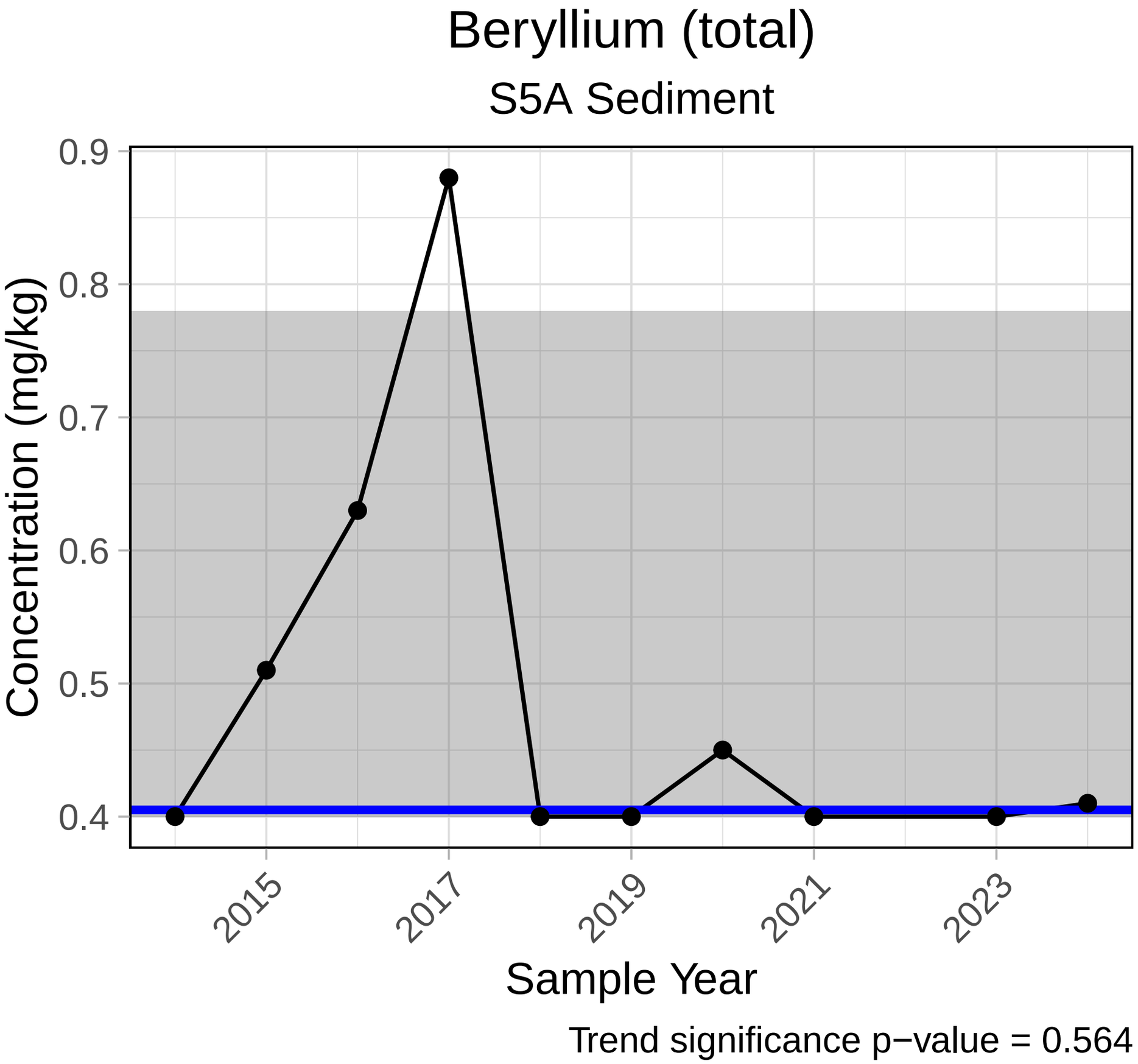
Boron (total)

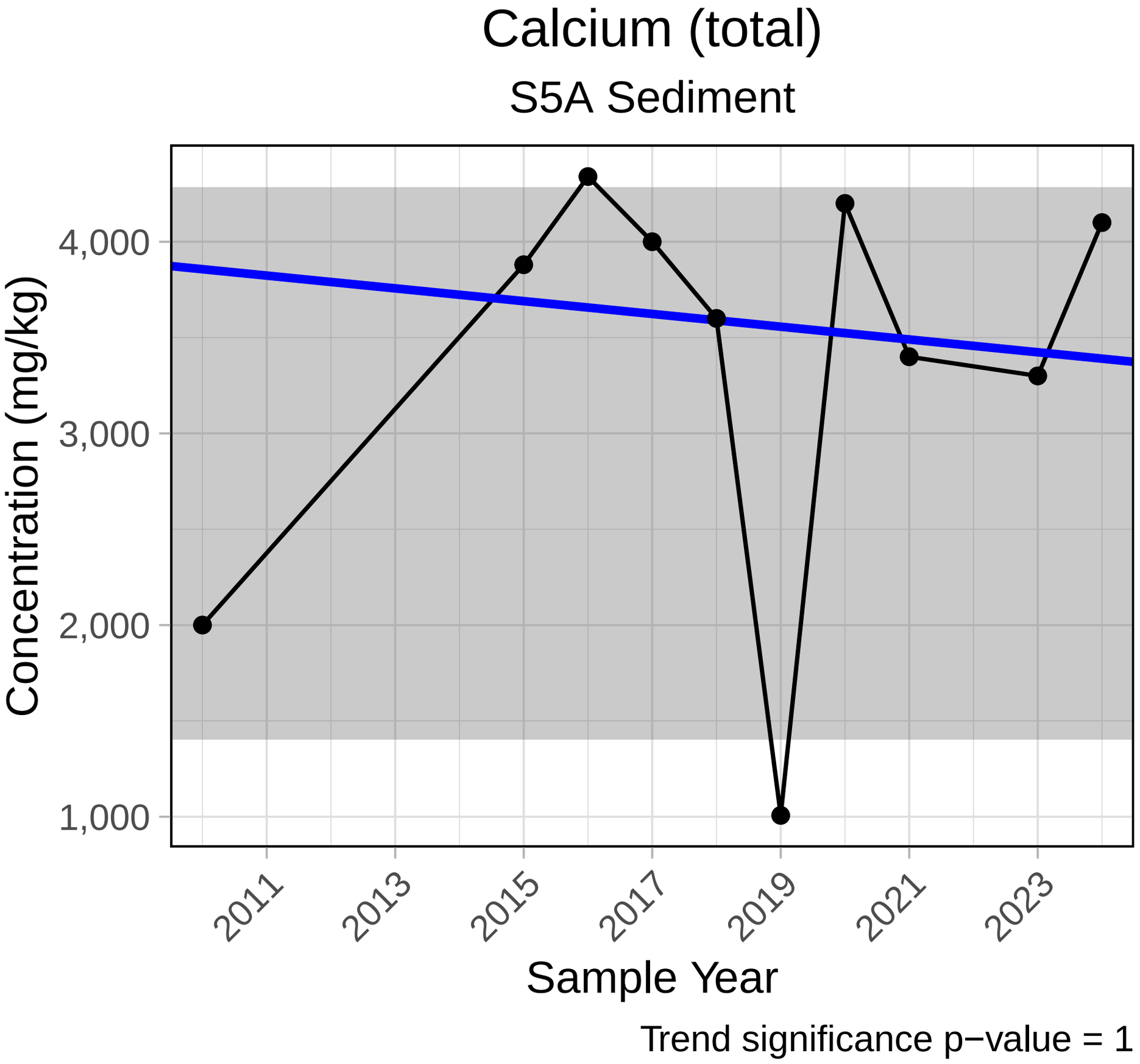
S5A Sediment



Trend significance p−value = 1

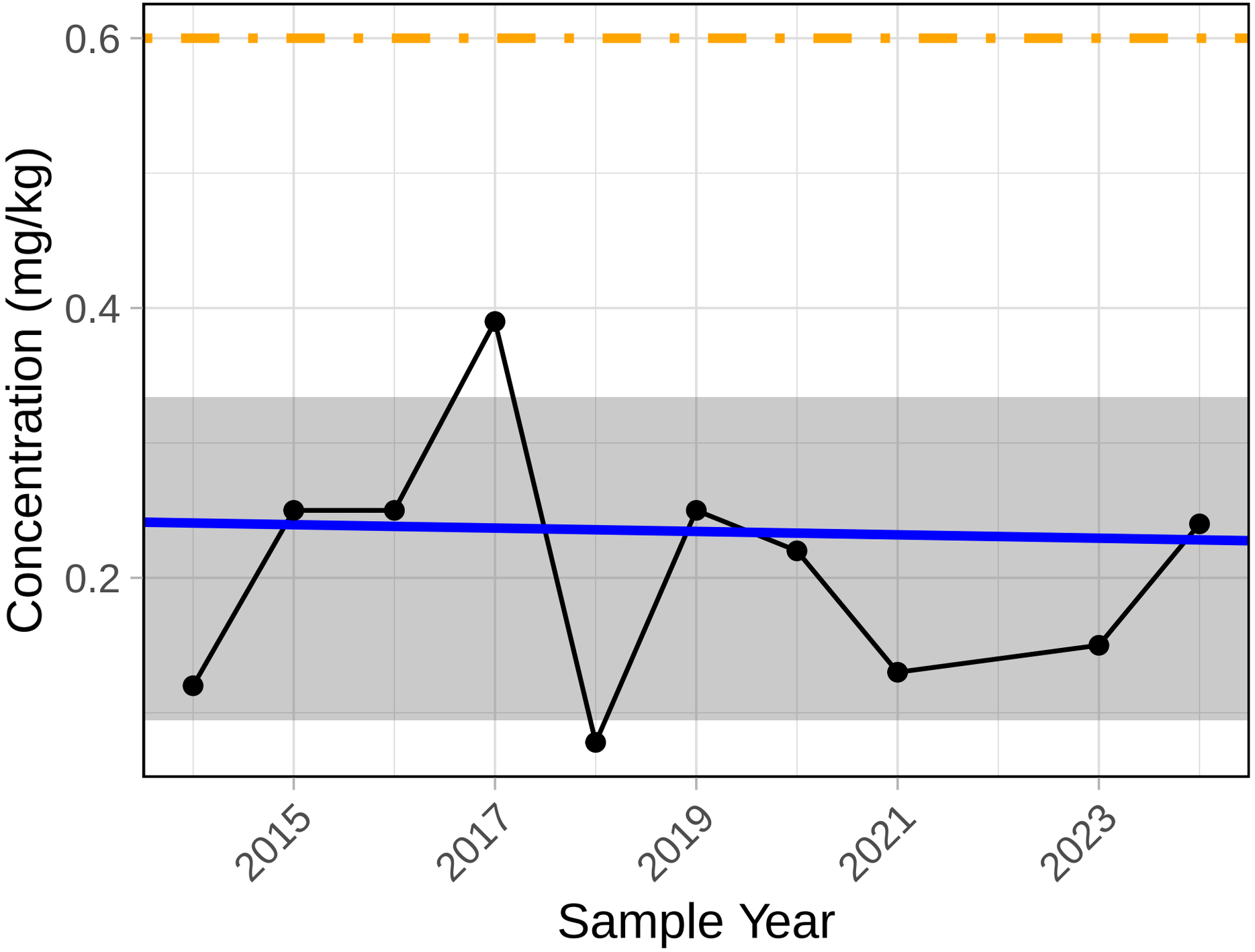

Barium (total)
S5A Sediment
Concentration (mg/kg)
250
200
150
100
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.857


Beryllium (total)
S5A Sediment
Concentration (mg/kg)
0.9
0.8
0.7
0.6
0.5
0.4
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.564


Calcium (total)
S5A Sediment
Concentration (mg/kg)
4,000
3,000
2,000
1,000
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

Cadmium (total)

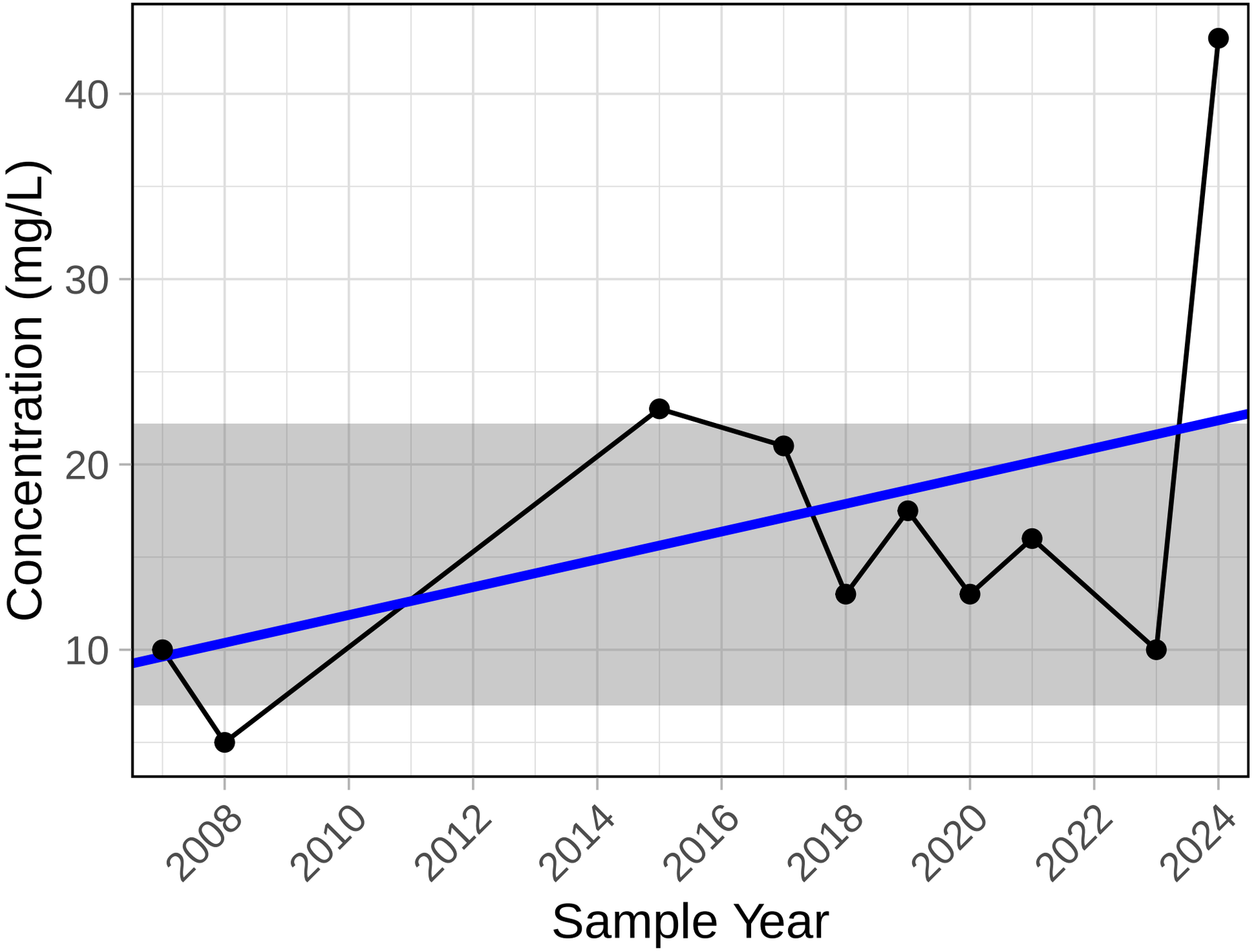
S5A Sediment



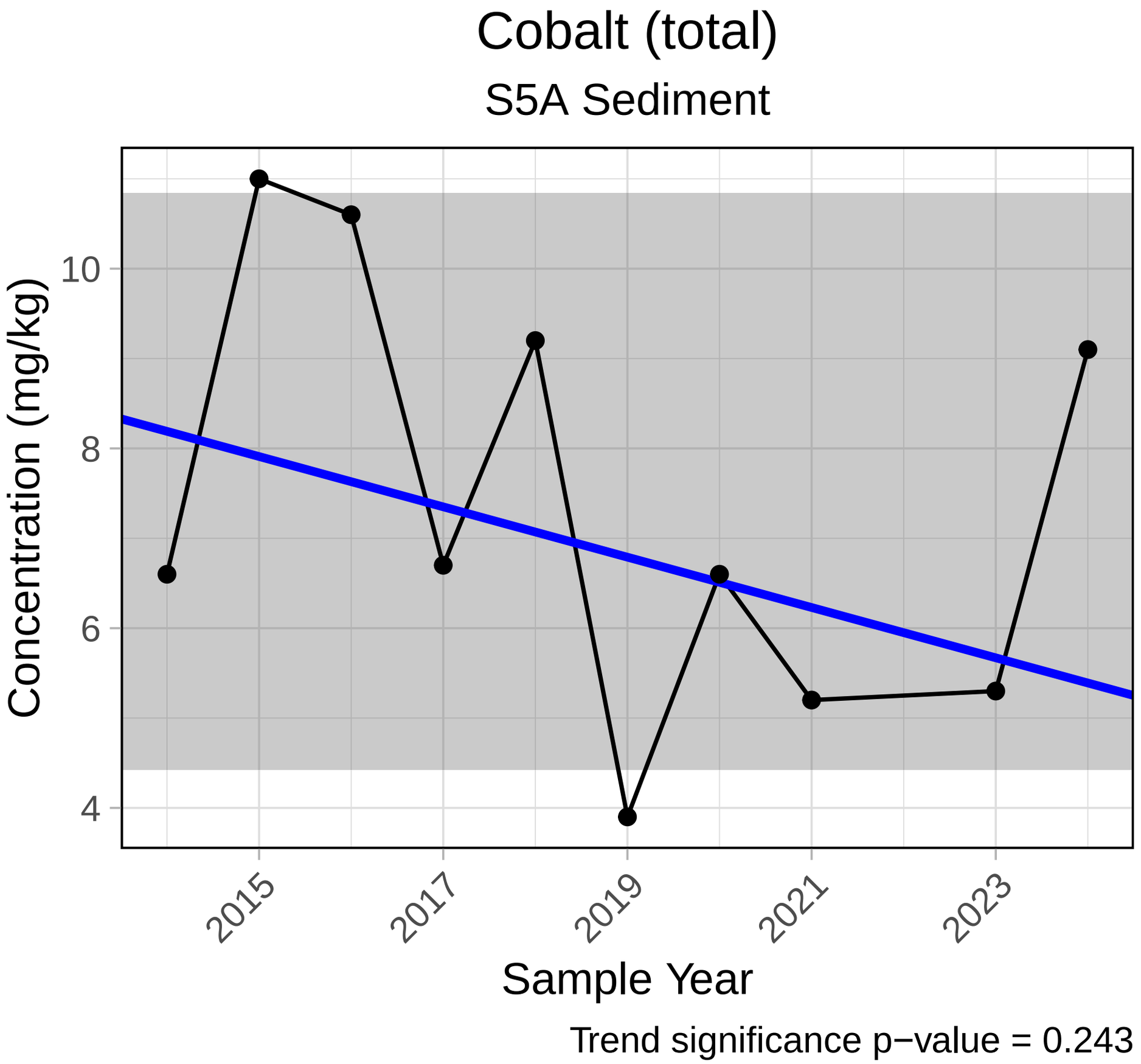
Trend significance p−value = 0.785
ISQG level = 0.6 mg/kg (maximum)
PEL level = 3.5 mg/kg (maximum)

Chloride (dissolved)

S5A Sediment

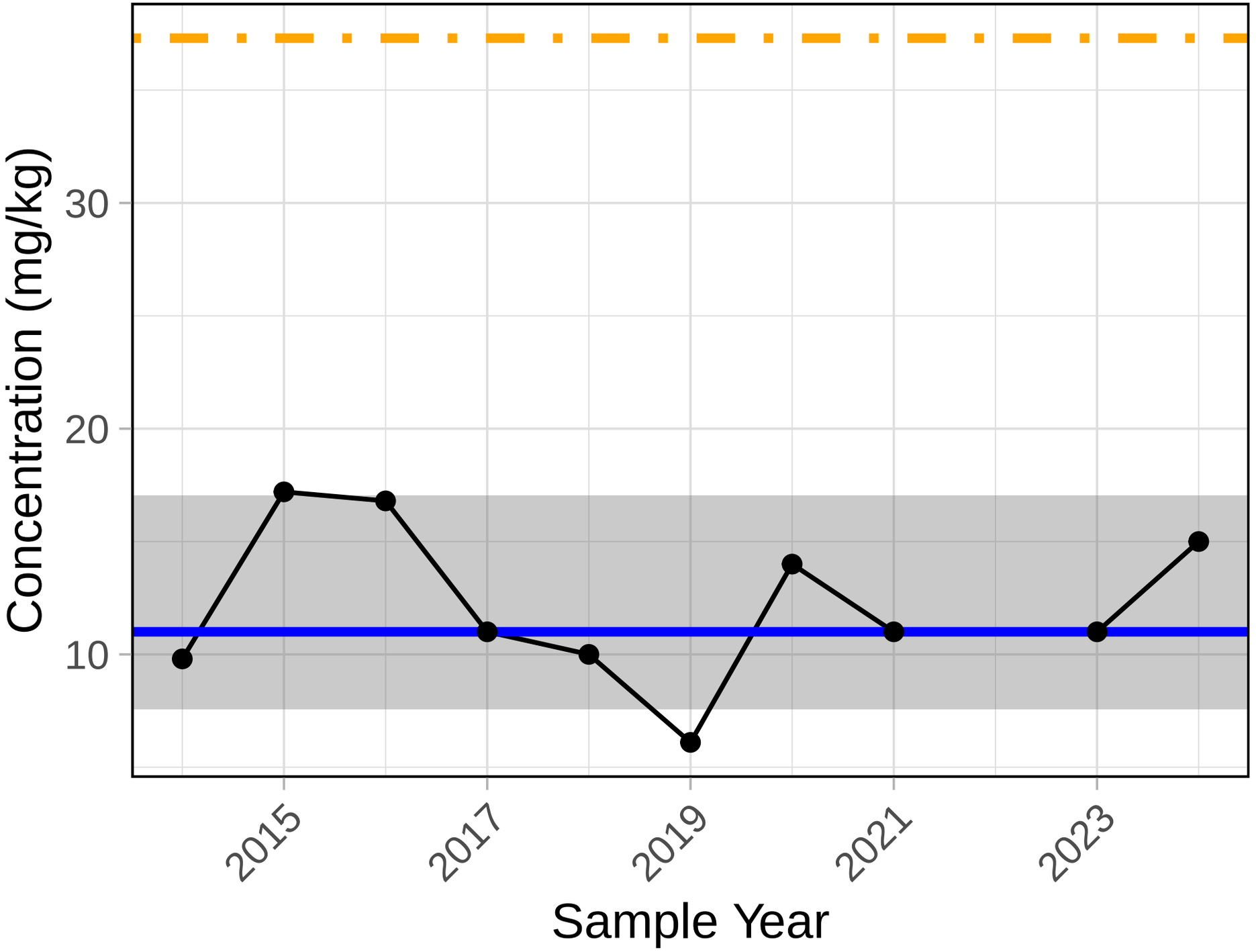


Trend significance p−value = 0.589


Cobalt (total)
S5A Sediment
Concentration (mg/kg)
10
8
6
4
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.243

Chromium (total)

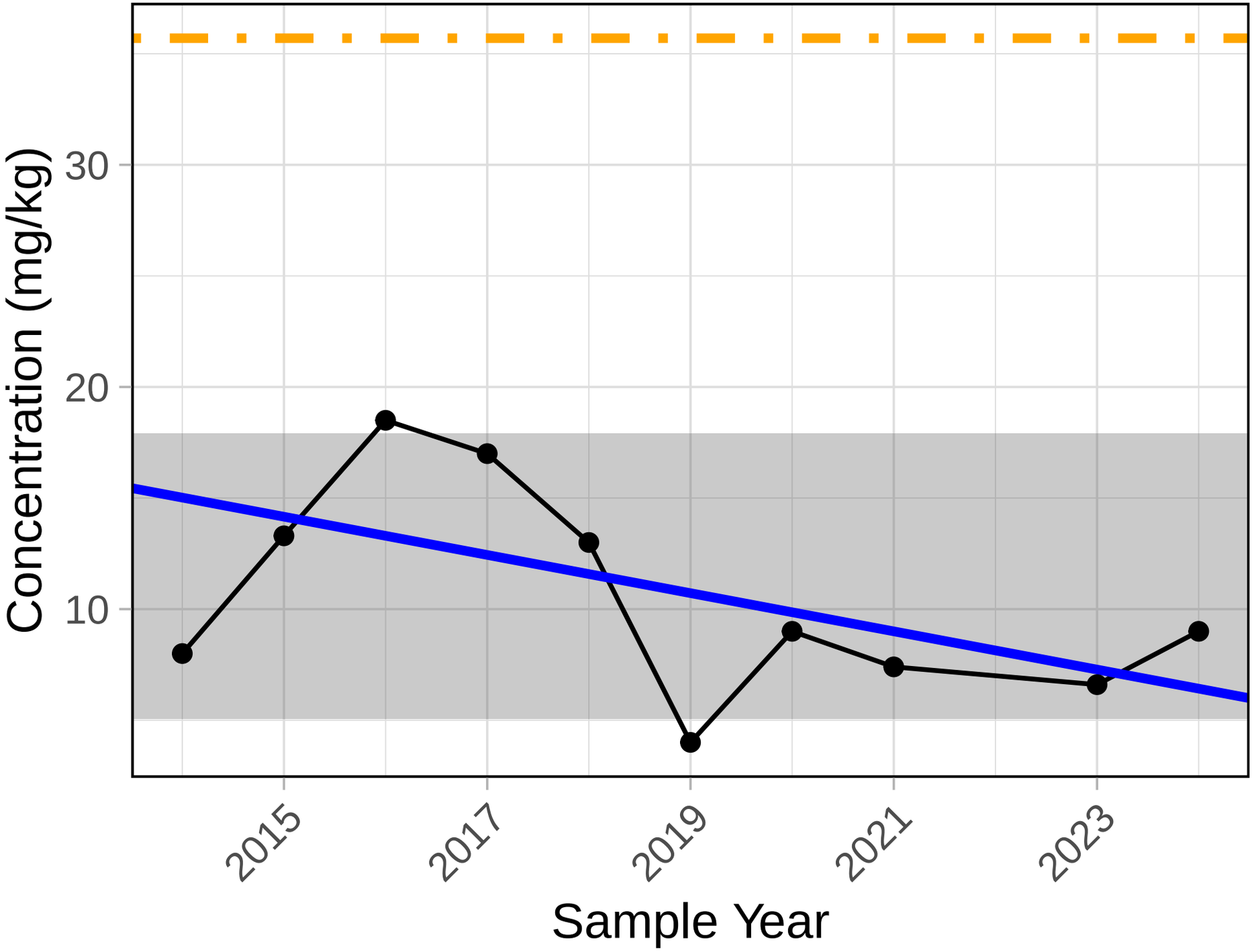
S5A Sediment



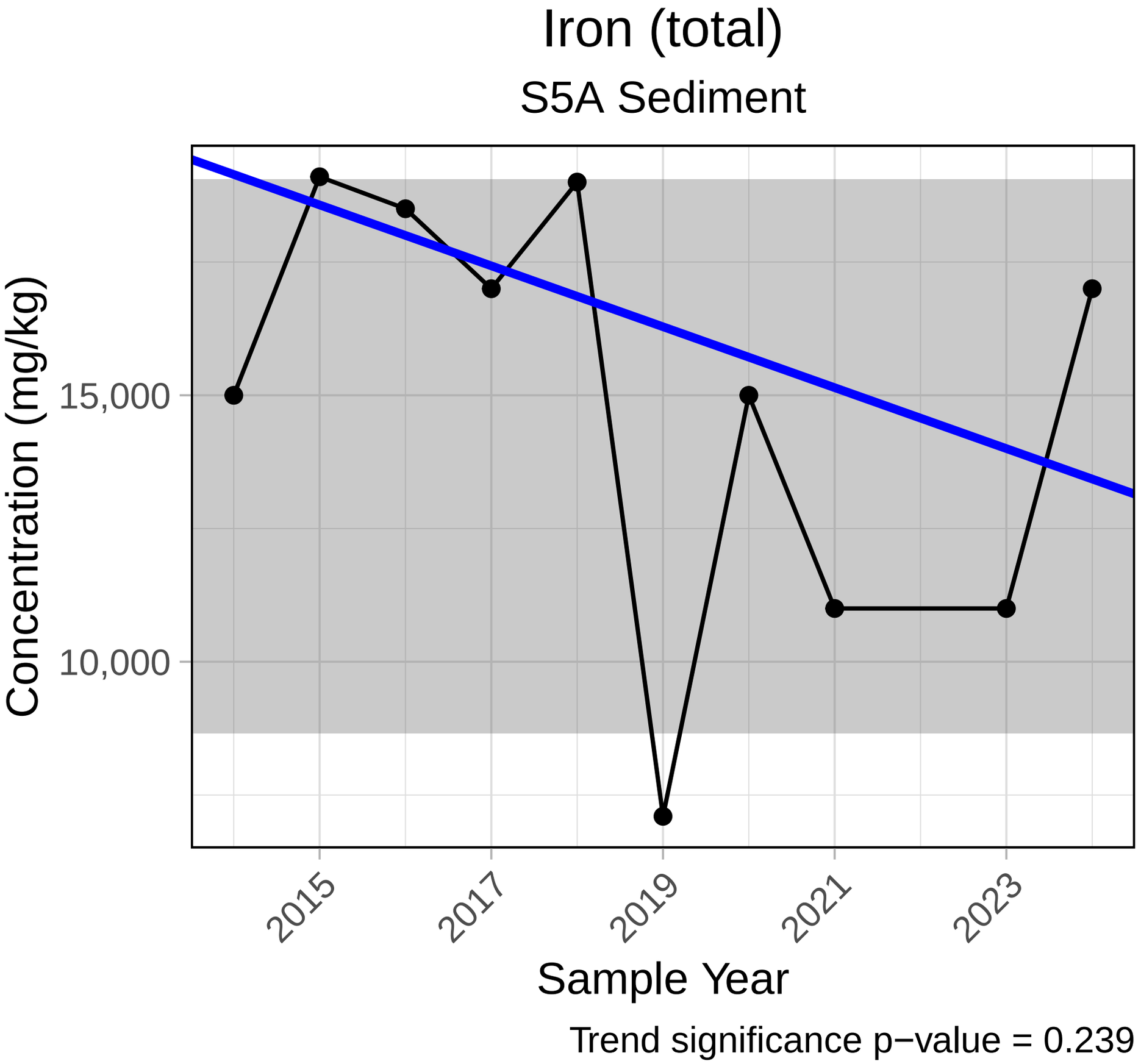
Trend significance p−value = 1
ISQG level = 37.3 mg/kg (maximum)
PEL level = 90 mg/kg (maximum)

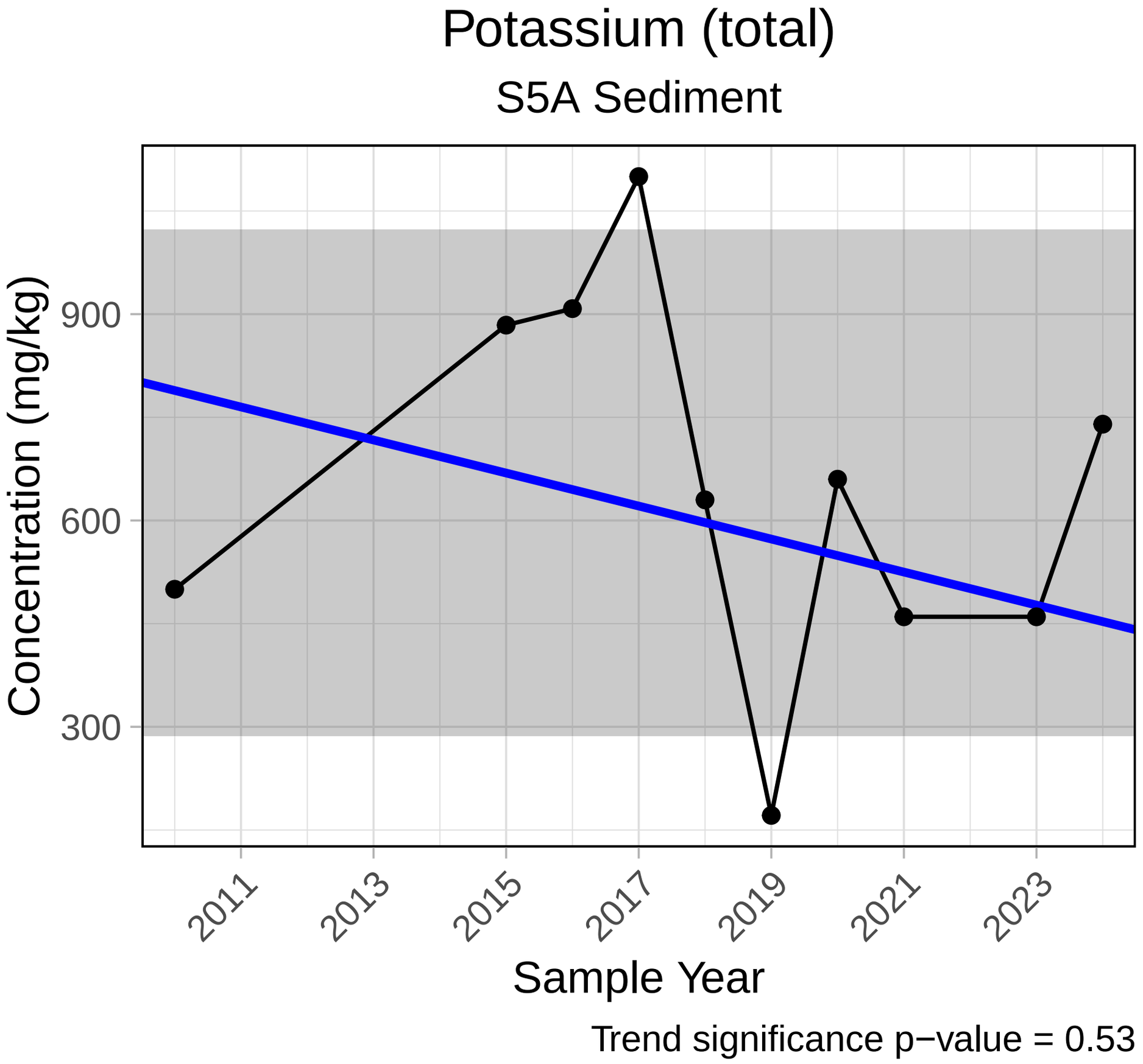
Copper (total)

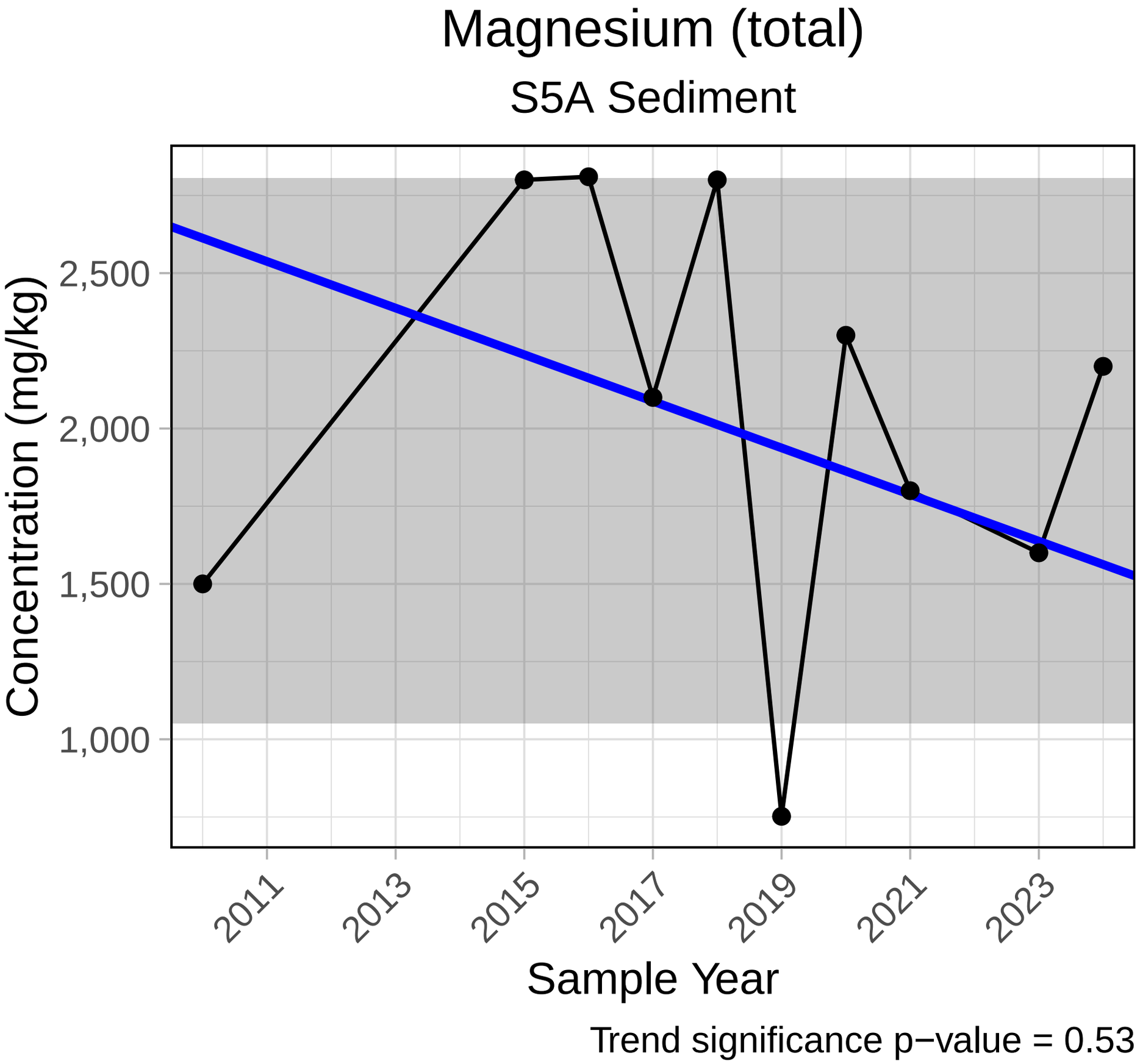
S5A Sediment



Trend significance p−value = 0.178
ISQG level = 35.7 mg/kg (maximum)
PEL level = 197 mg/kg (maximum)

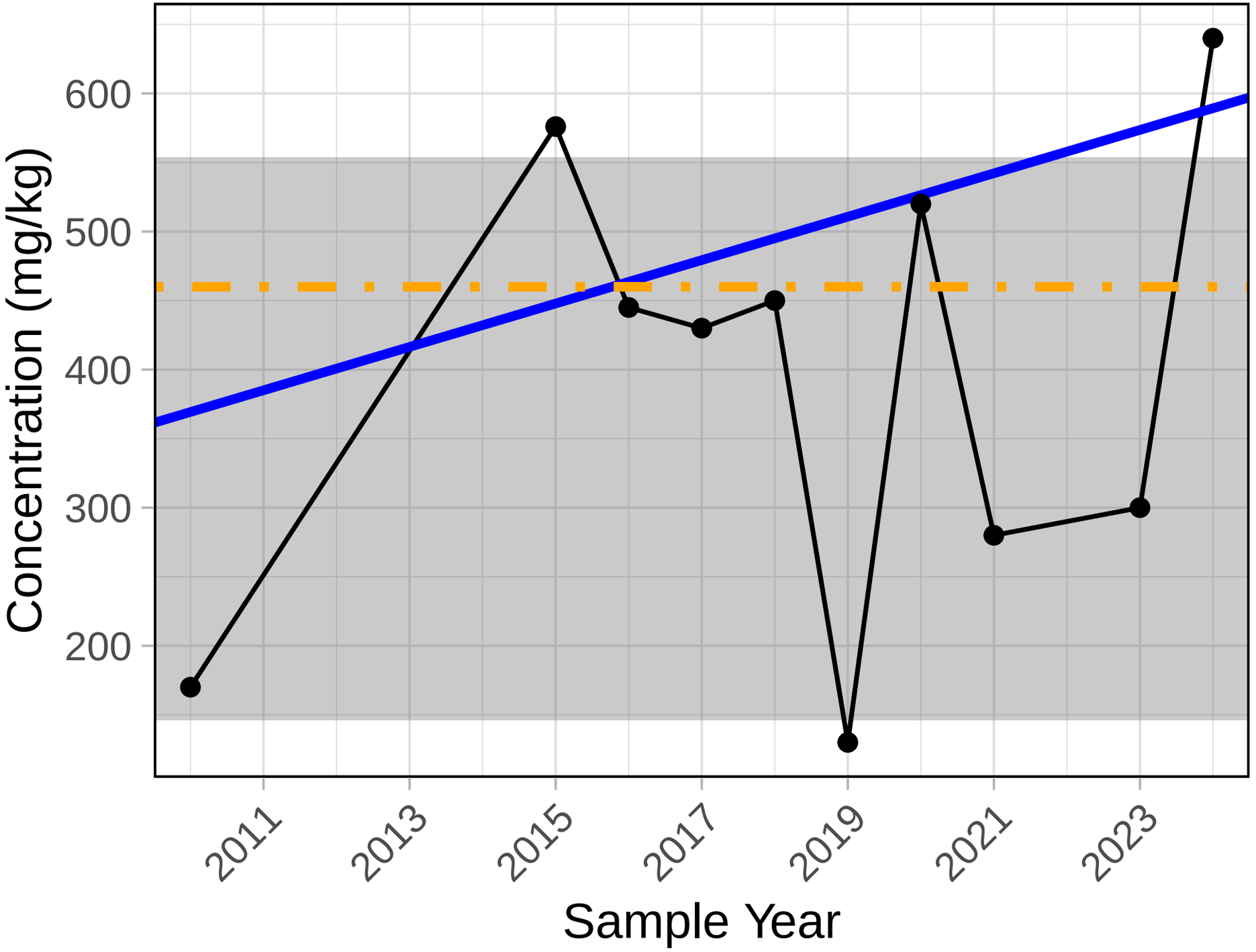

Iron (total)
S5A Sediment
Concentration (mg/kg)
15,000
10,000
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.239


Potassium (total)
S5A Sediment
Concentration (mg/kg)
900
600
300
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.53

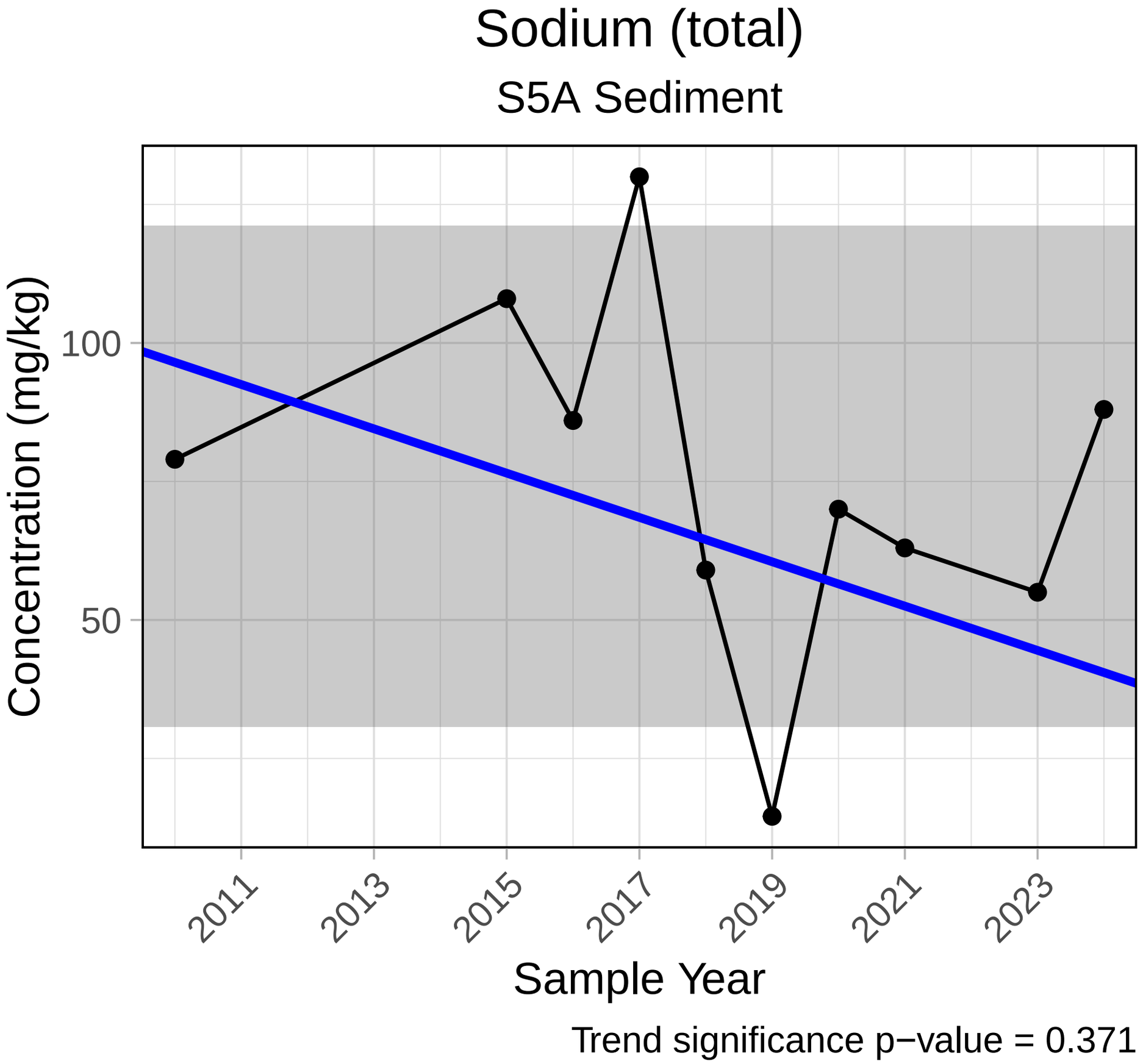

Magnesium (total)
S5A Sediment
Concentration (mg/kg)
2,500
2,000
1,500
1,000
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.53

Manganese (total)

S5A Sediment

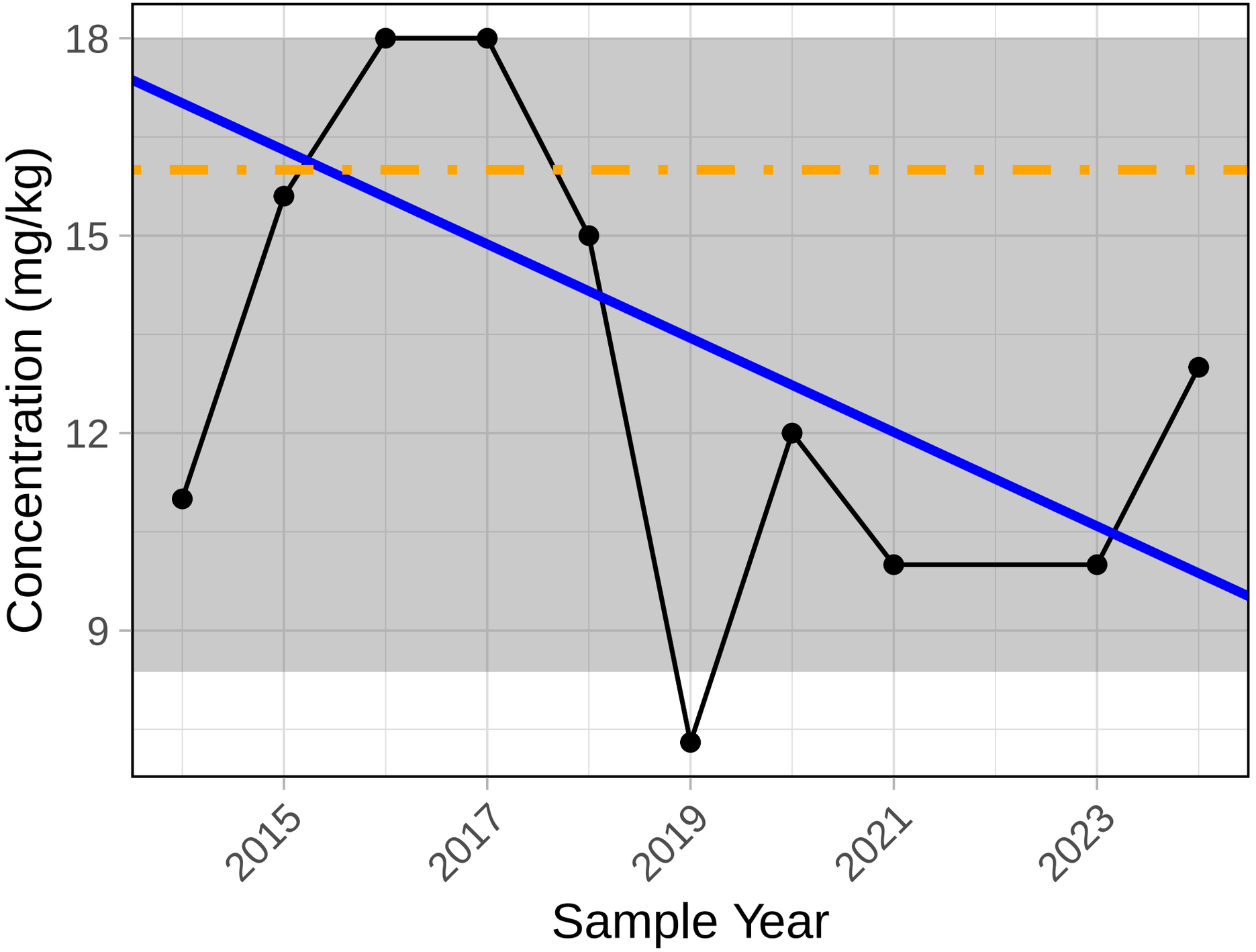


Trend significance p−value = 0.721
ISQG level = 460 mg/kg (maximum)

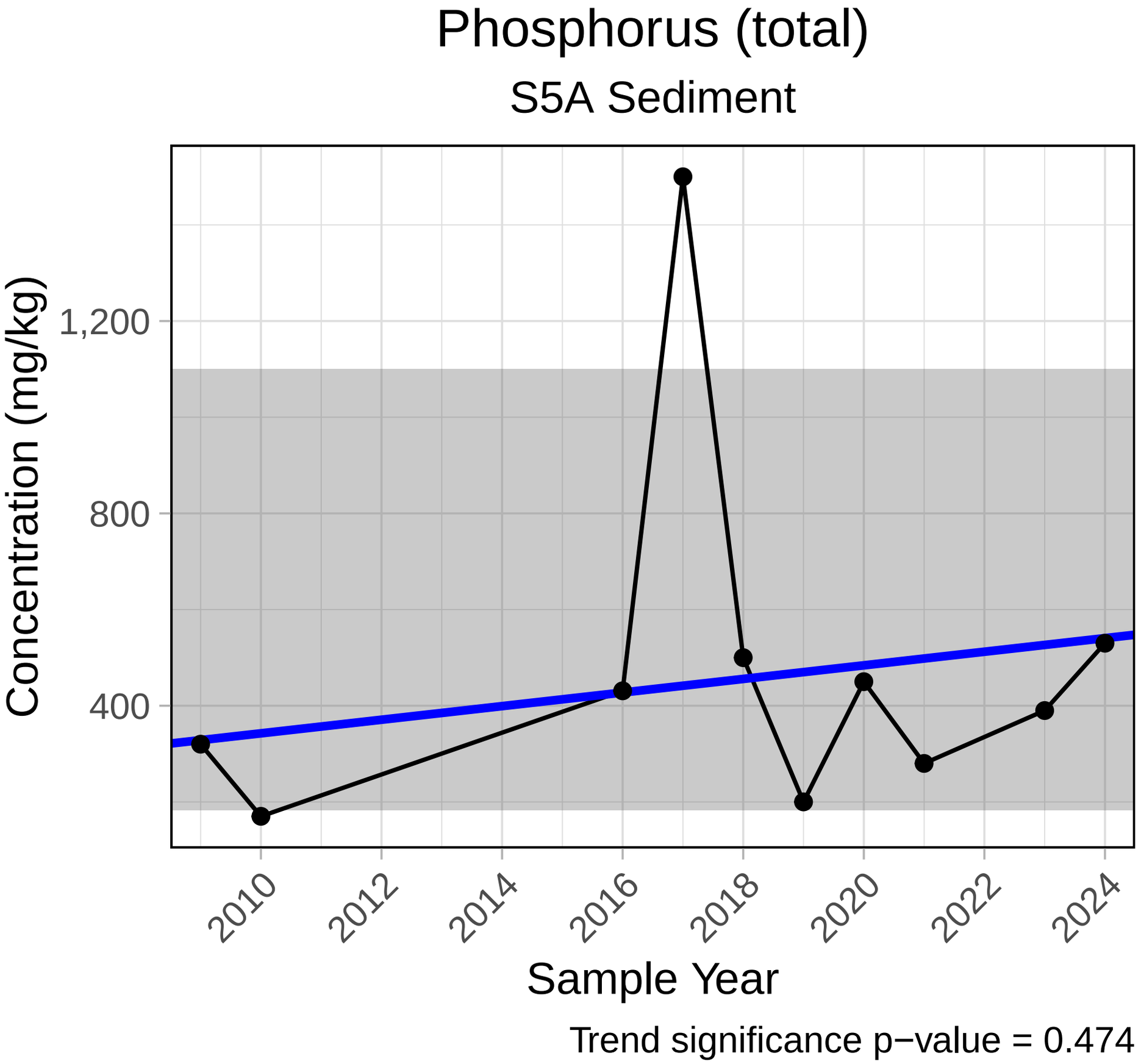

Sodium (total)
S5A Sediment
Concentration (mg/kg)
100
50
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.371

Nickel (total)

S5A Sediment

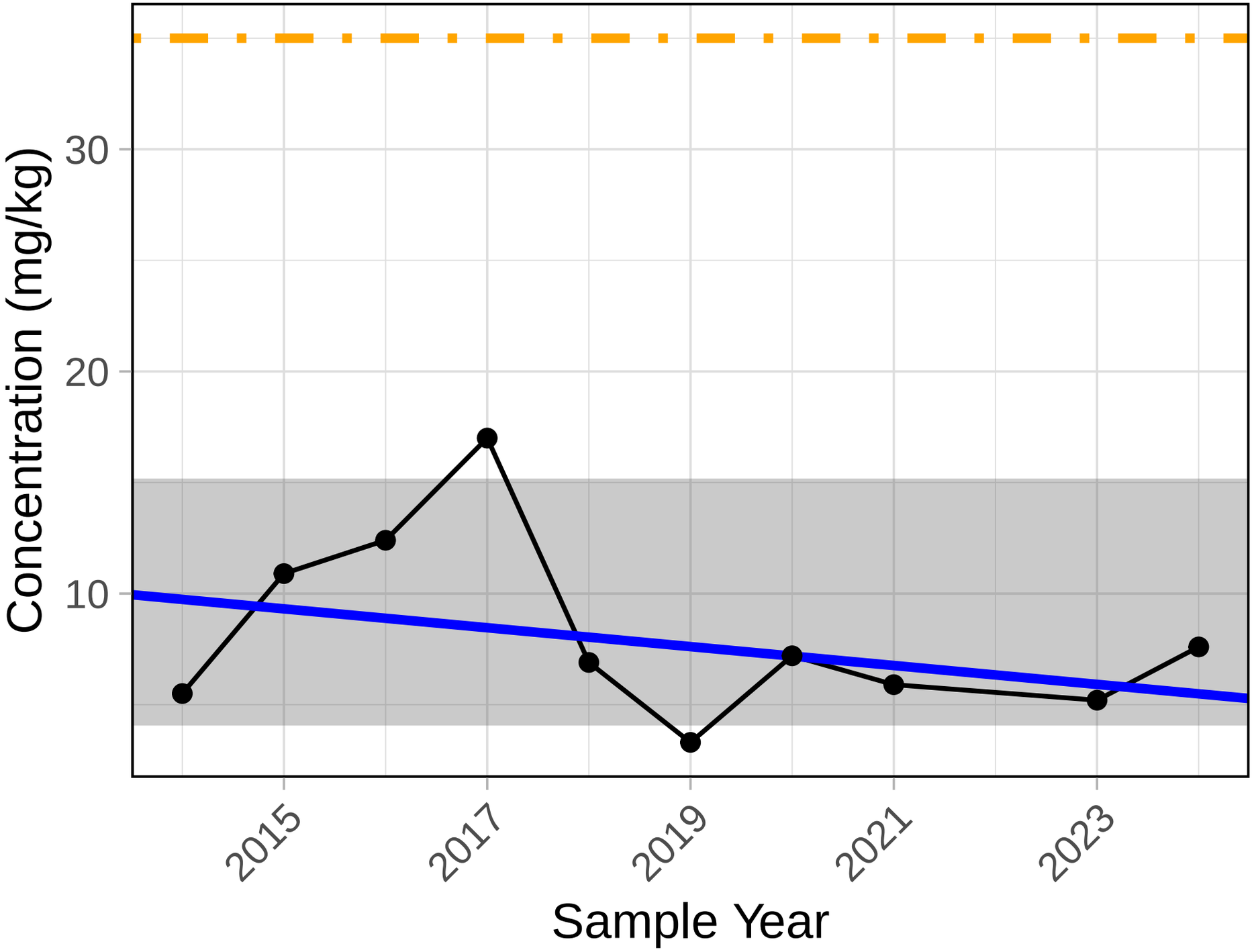


Trend significance p−value = 0.279
ISQG level = 16 mg/kg (maximum)

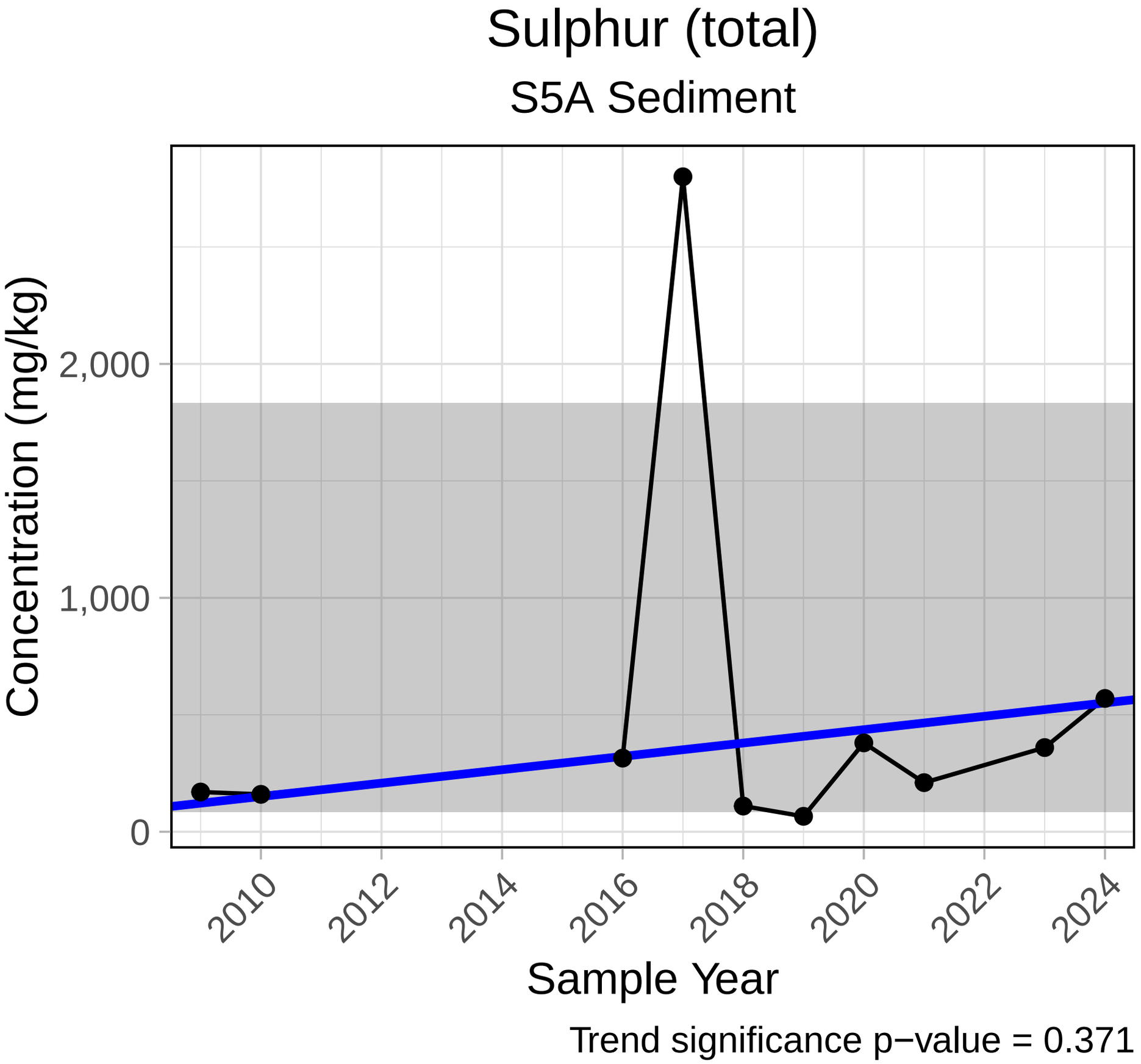

Phosphorus (total)
S5A Sediment
Concentration (mg/kg)
1,200
800
400
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.474

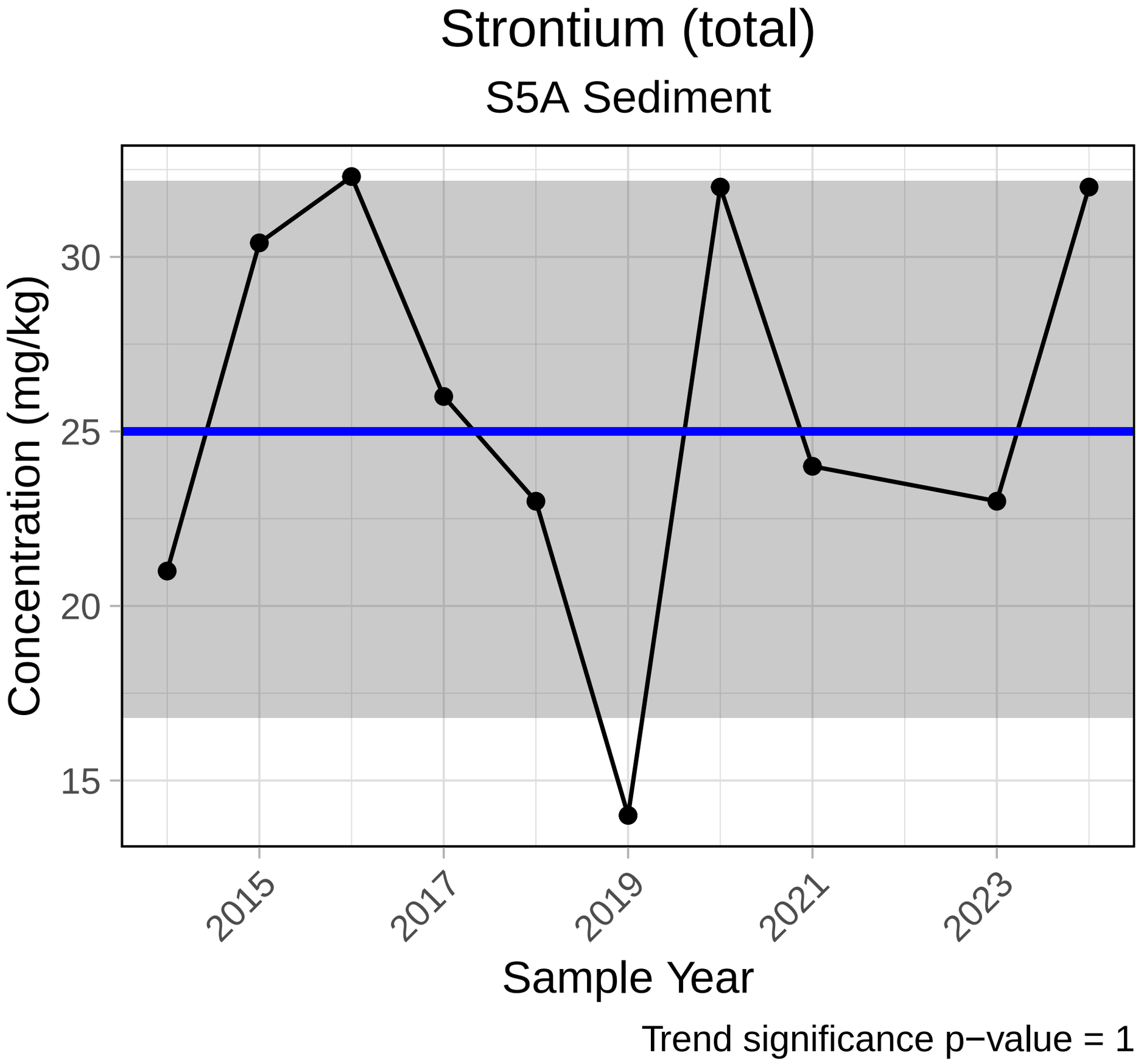
Lead (total)

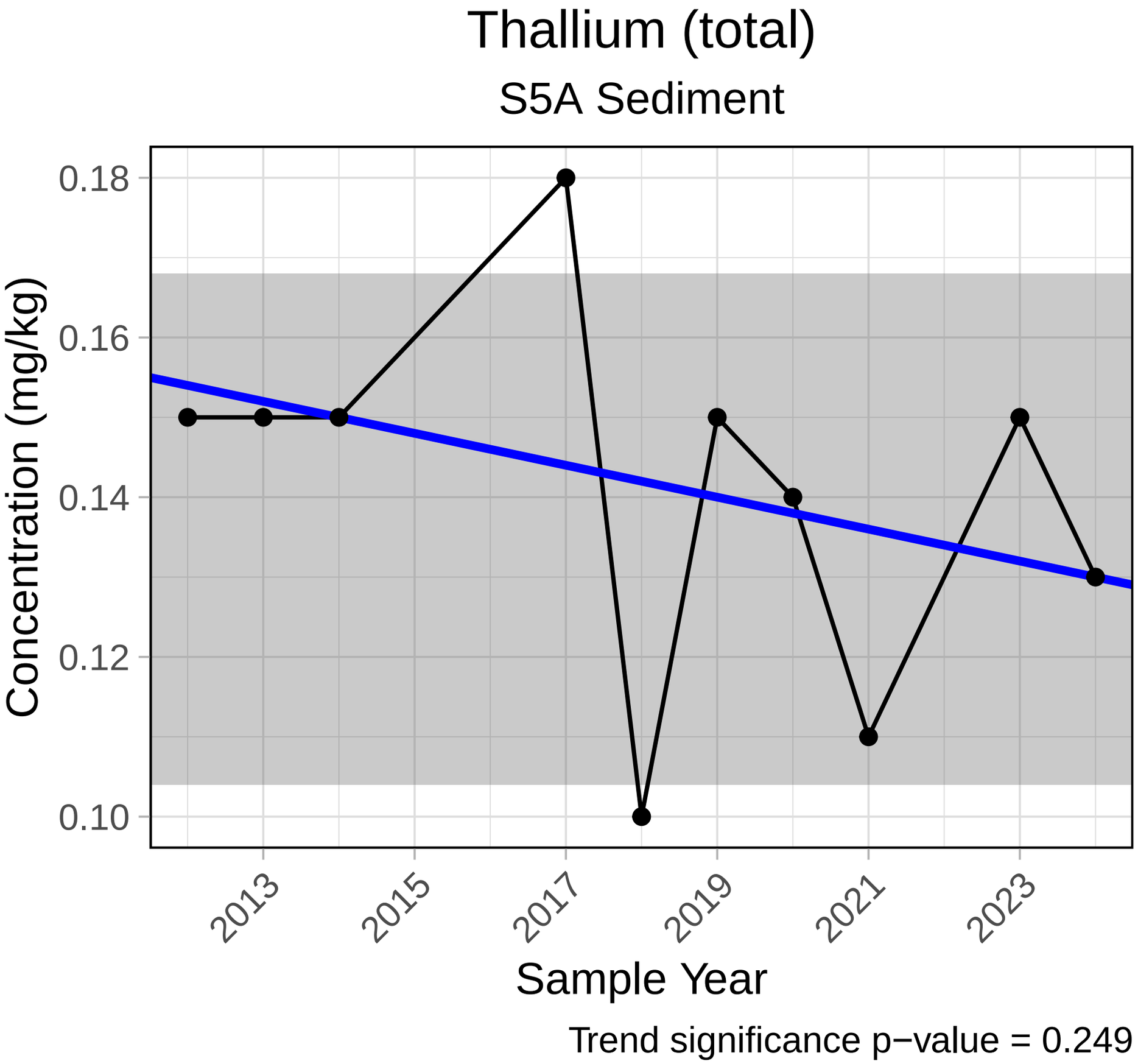
S5A Sediment

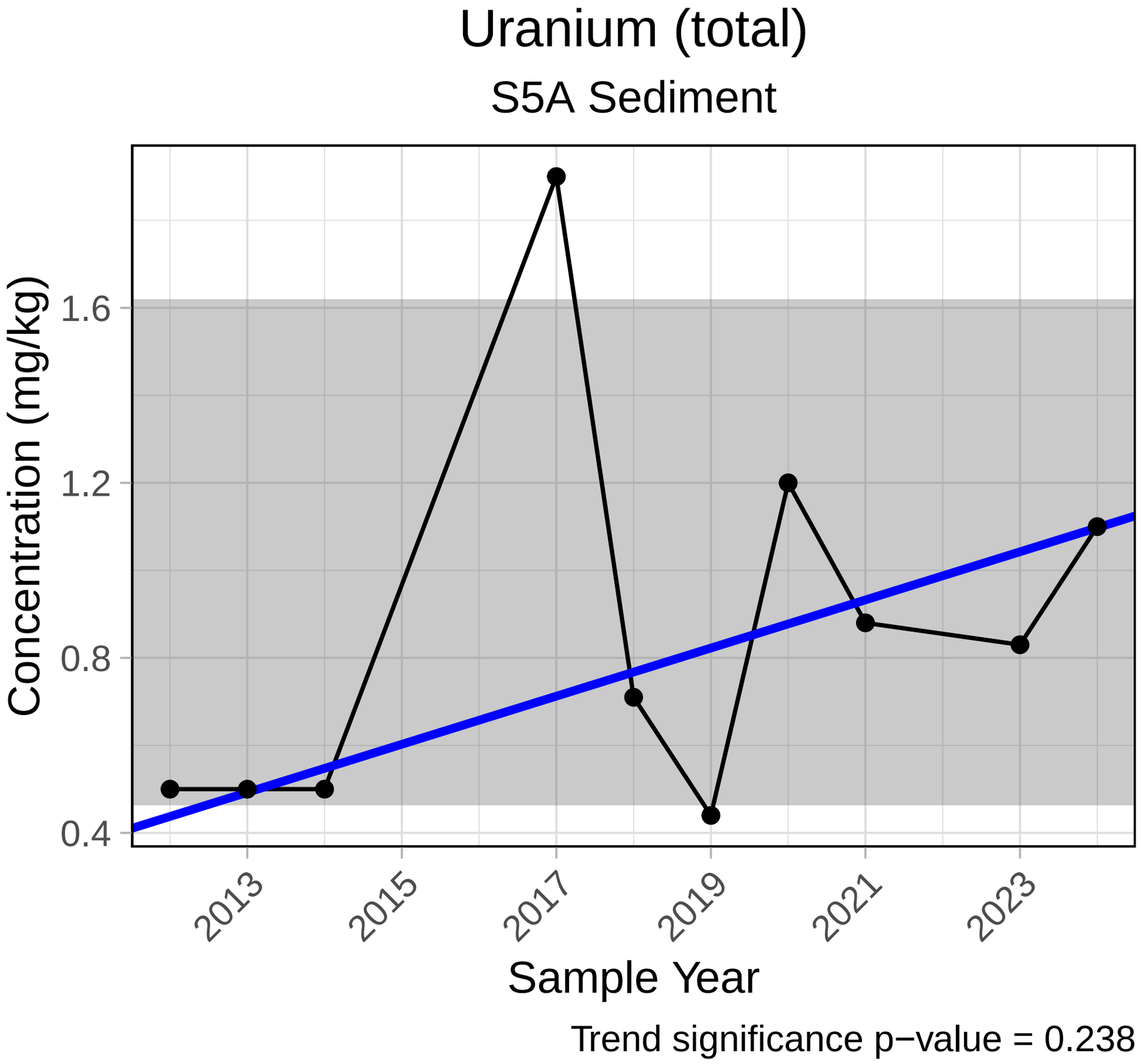


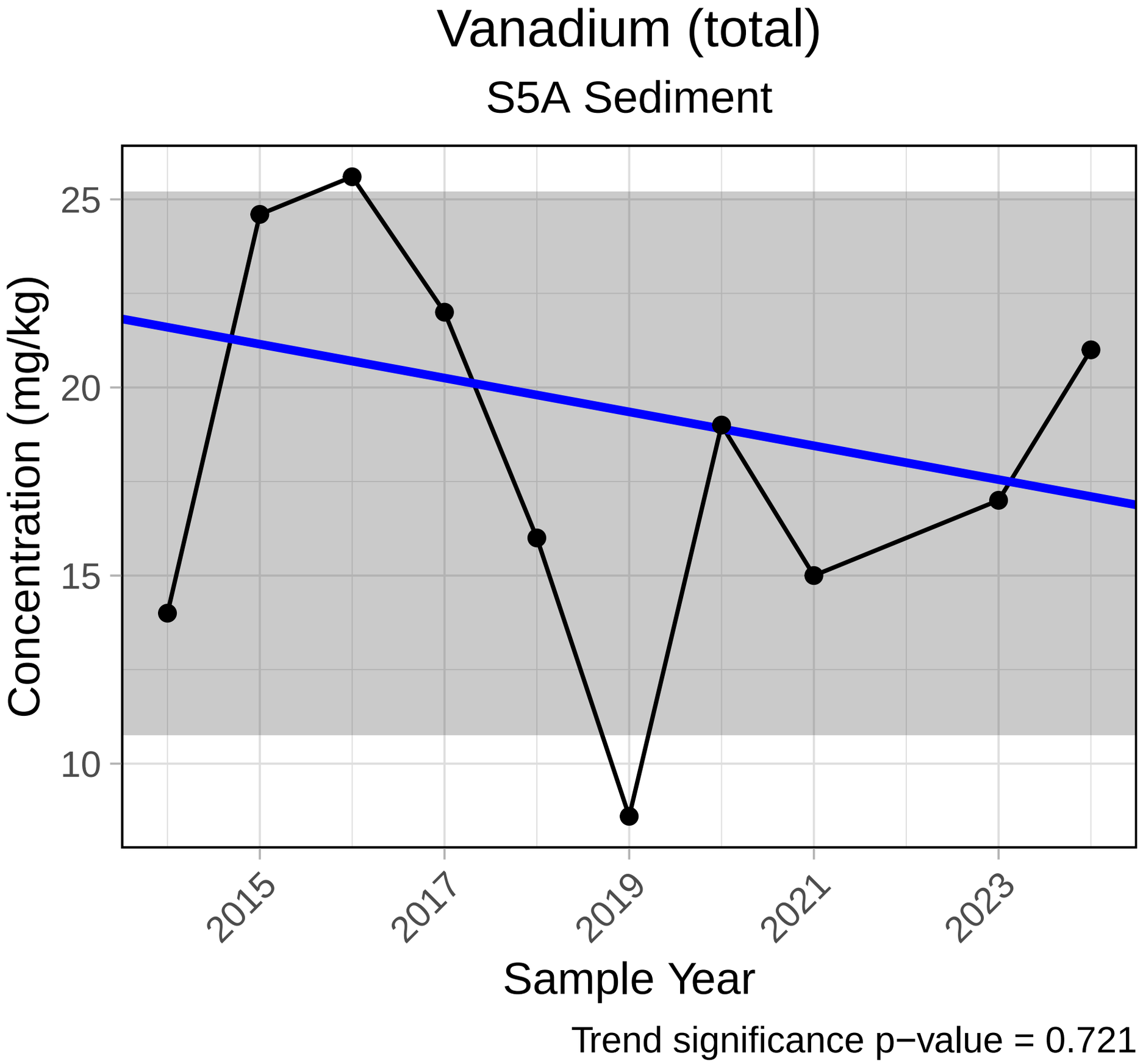
Trend significance p−value = 0.592
ISQG level = 35 mg/kg (maximum)
PEL level = 91.3 mg/kg (maximum)


Sulphur (total)
S5A Sediment
Concentration (mg/kg)
2,000
1,000
0
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.371


Strontium (total)
S5A Sediment
Concentration (mg/kg)
30
25
20
15
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

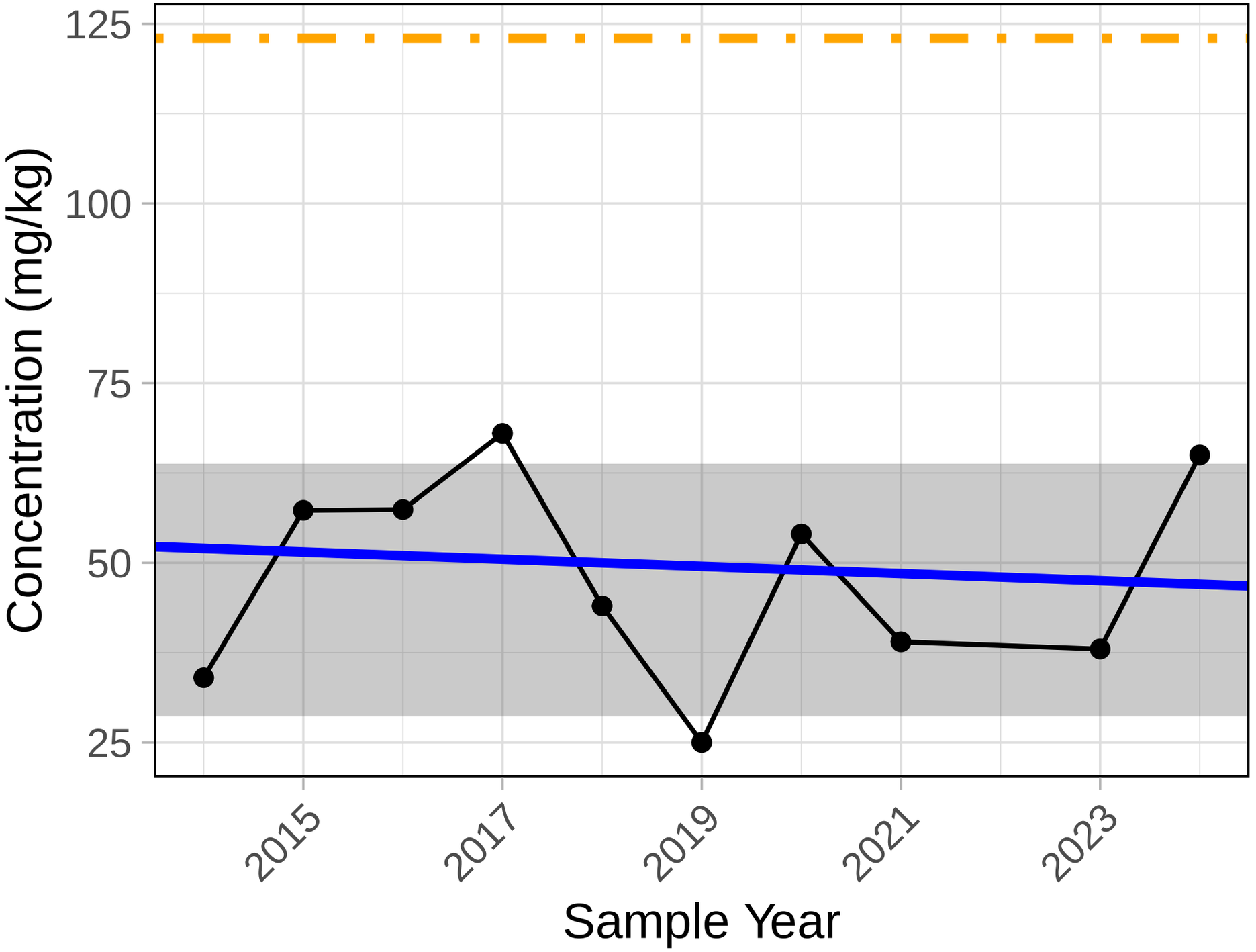

Thallium (total)
S5A Sediment
Concentration (mg/kg)
0.18
0.16
0.14
0.12
0.10
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.249


Uranium (total)
S5A Sediment
Concentration (mg/kg)
1.6
1.2
0.8
0.4
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.238


Vanadium (total)
S5A Sediment
Concentration (mg/kg)
25
20
15
10
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.721

Zinc (total)

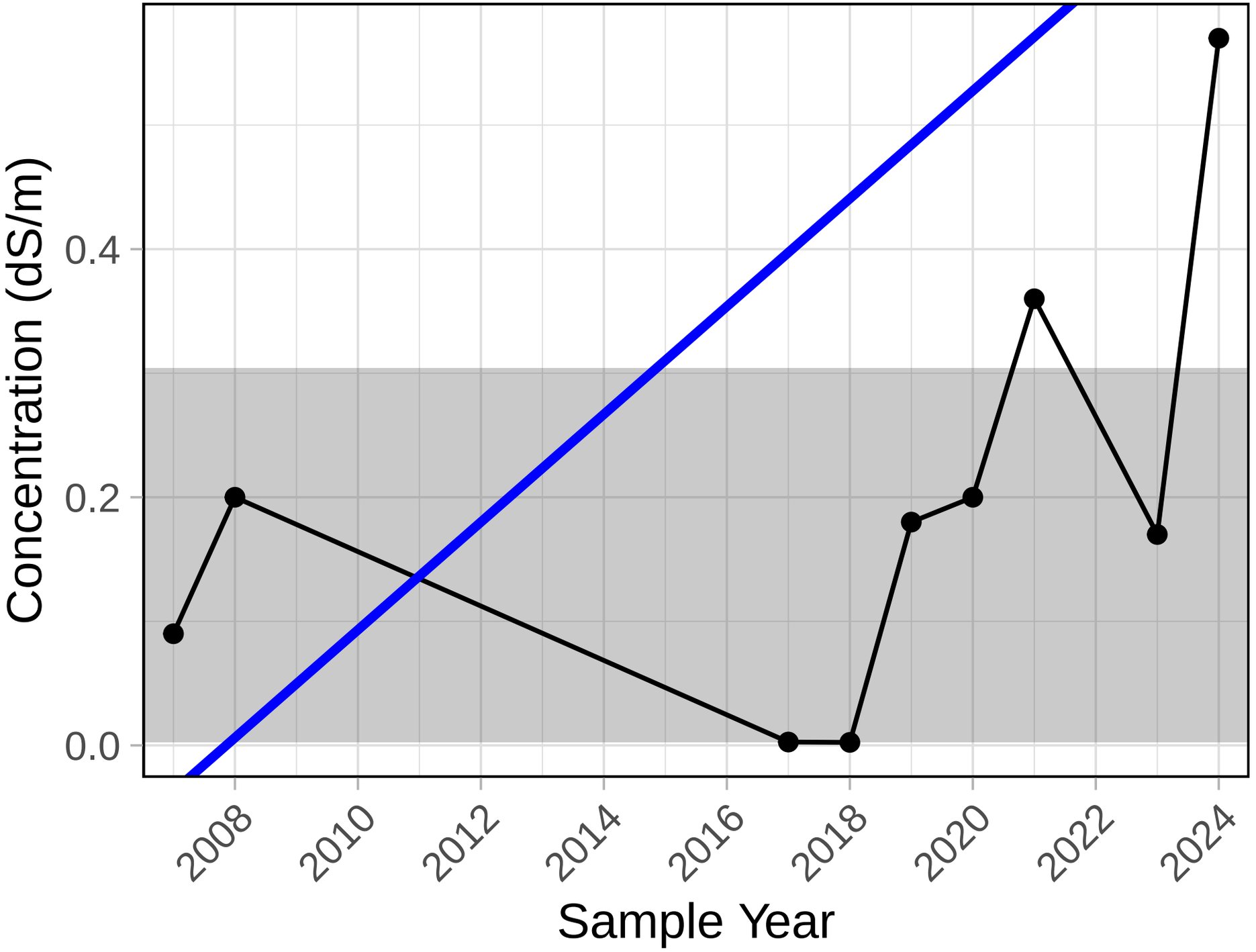
S5A Sediment



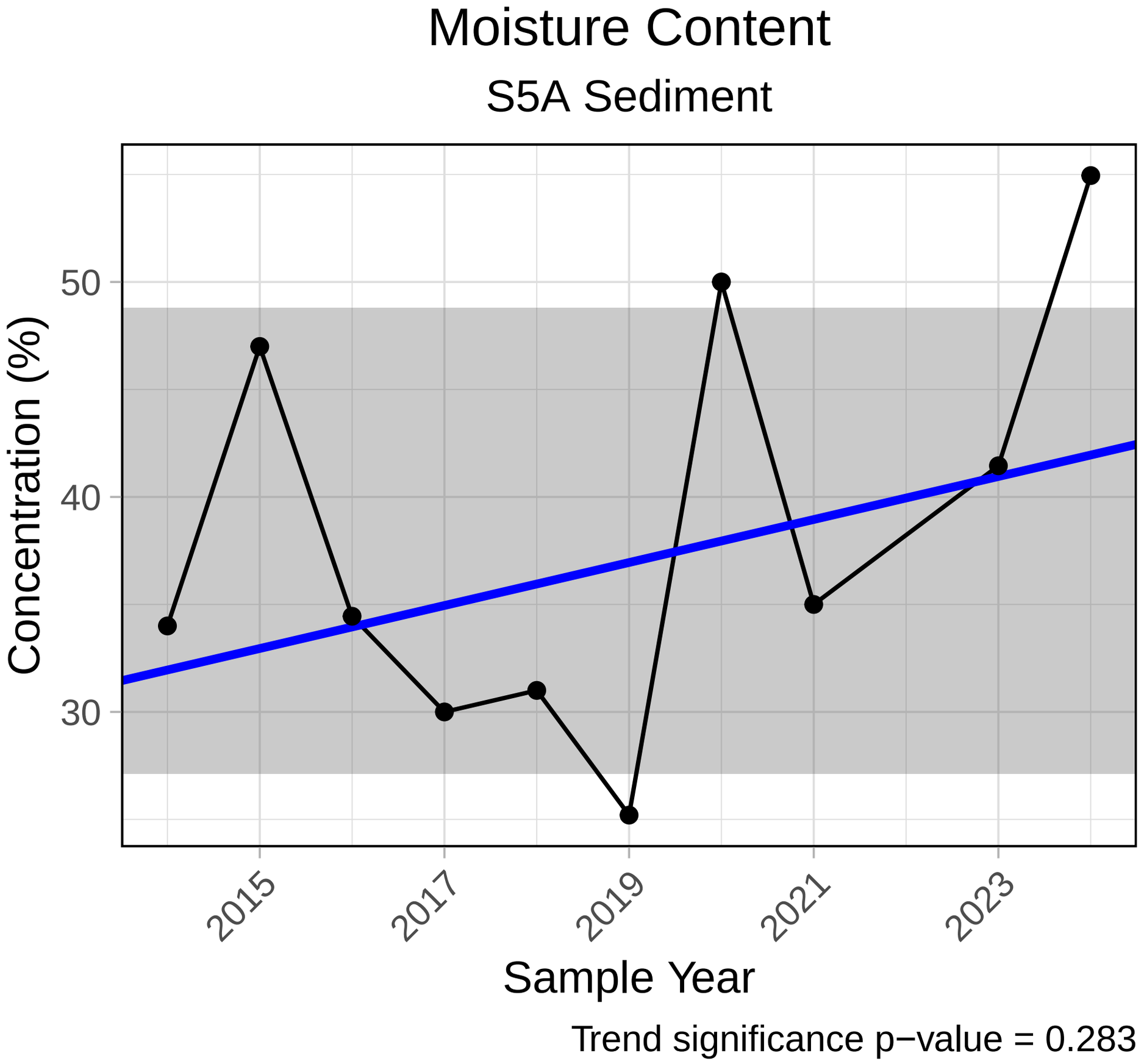
Trend significance p−value = 1
ISQG level = 123 mg/kg (maximum)
PEL level = 315 mg/kg (maximum)

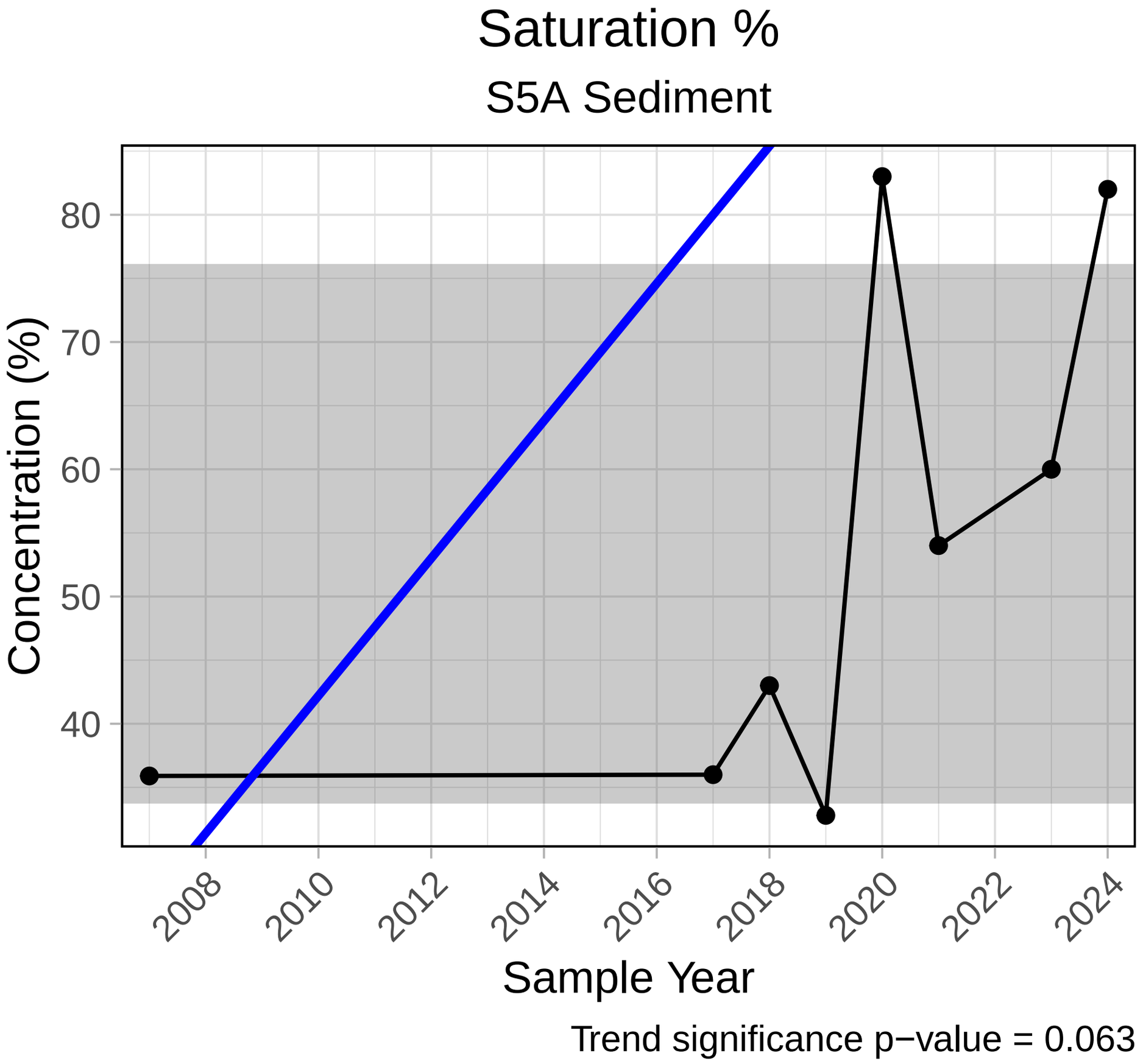
Electrical Conductivity

S5A Sediment



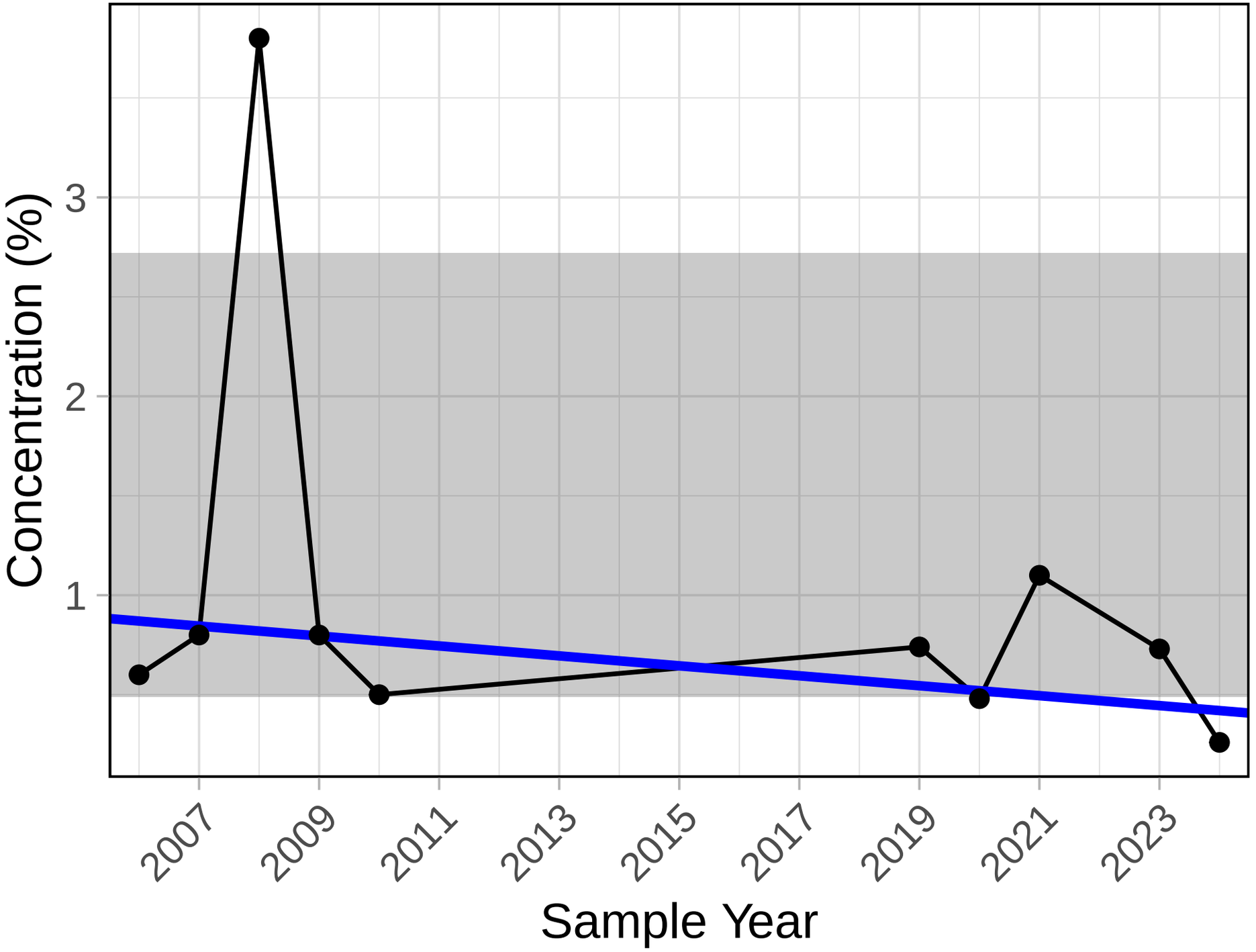
Trend significance p−value = 0.142


Moisture Content
S5A Sediment
Concentration (%)
50
40
30
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.283

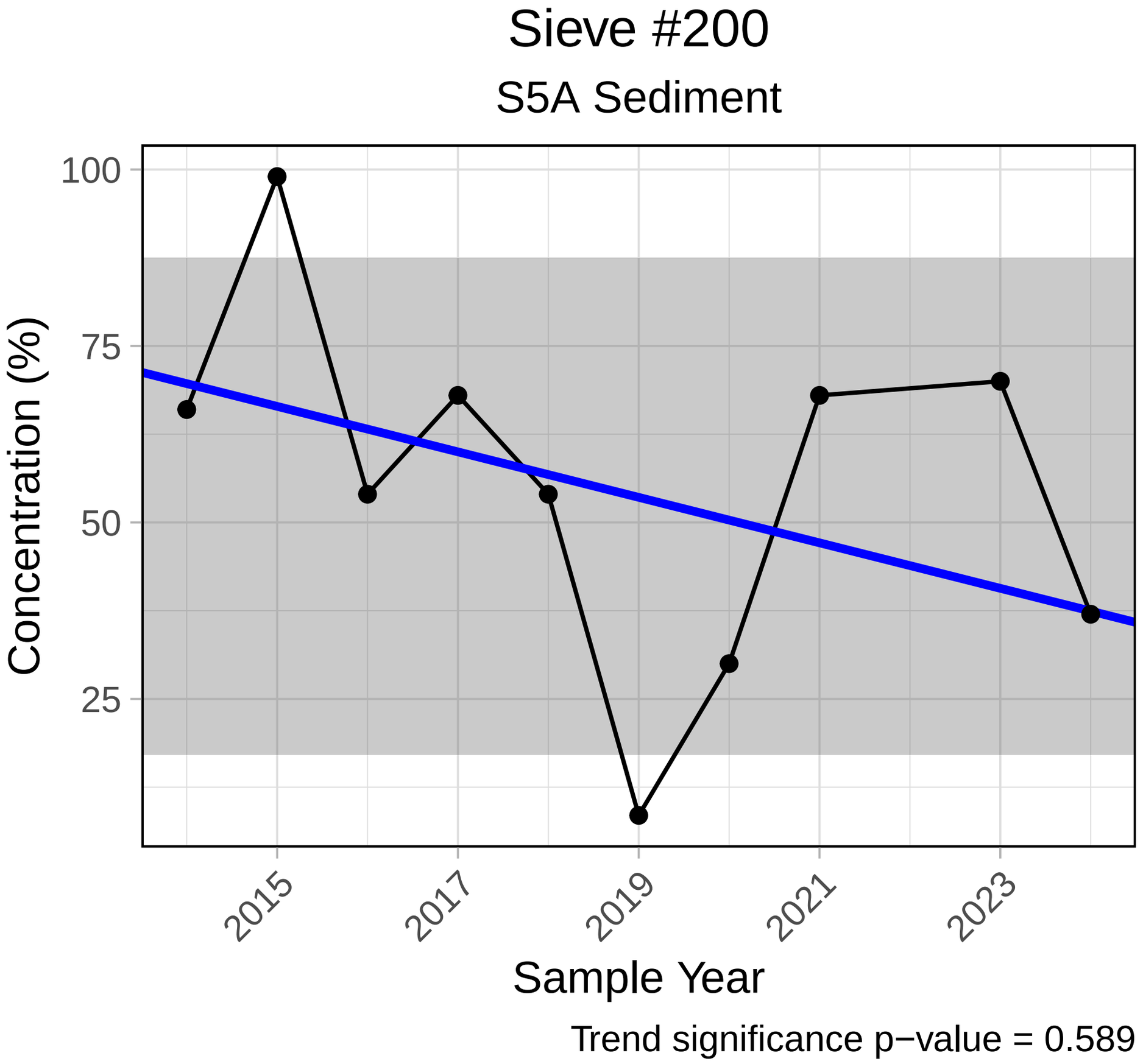

Saturation %
S5A Sediment
Concentration (%)
80
70
60
50
40
2008
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.063

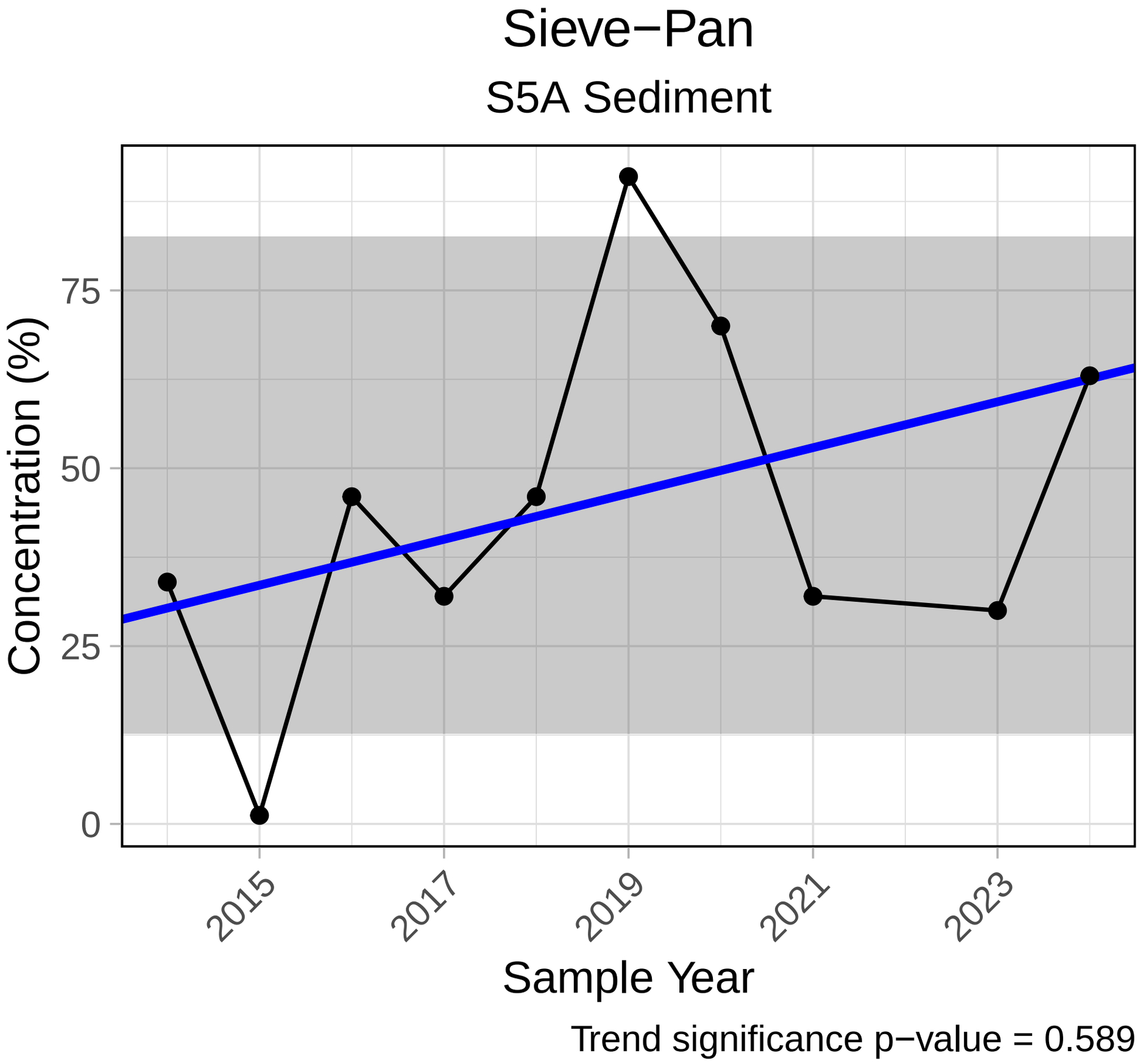
Sieve #10

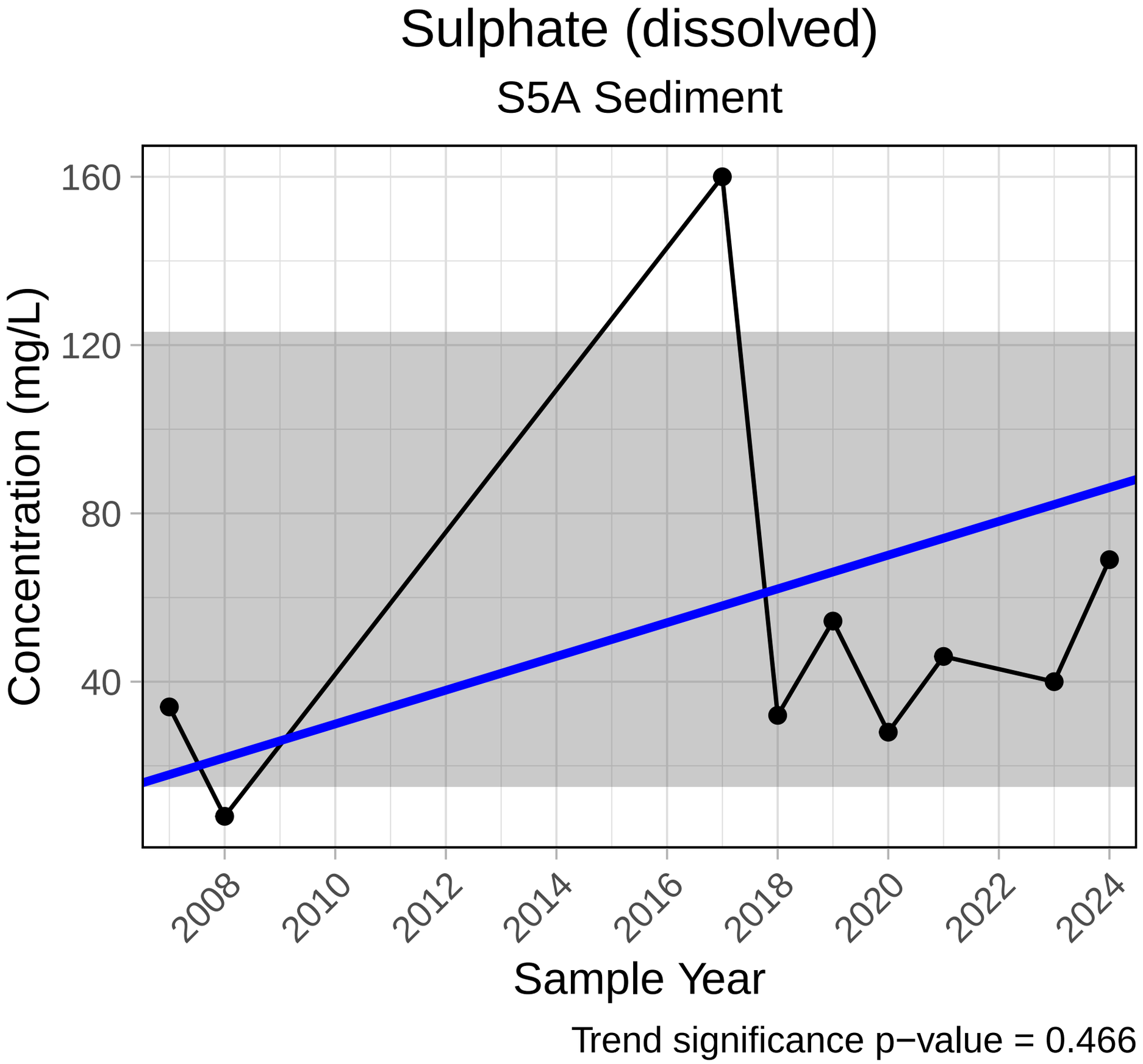
S5A Sediment

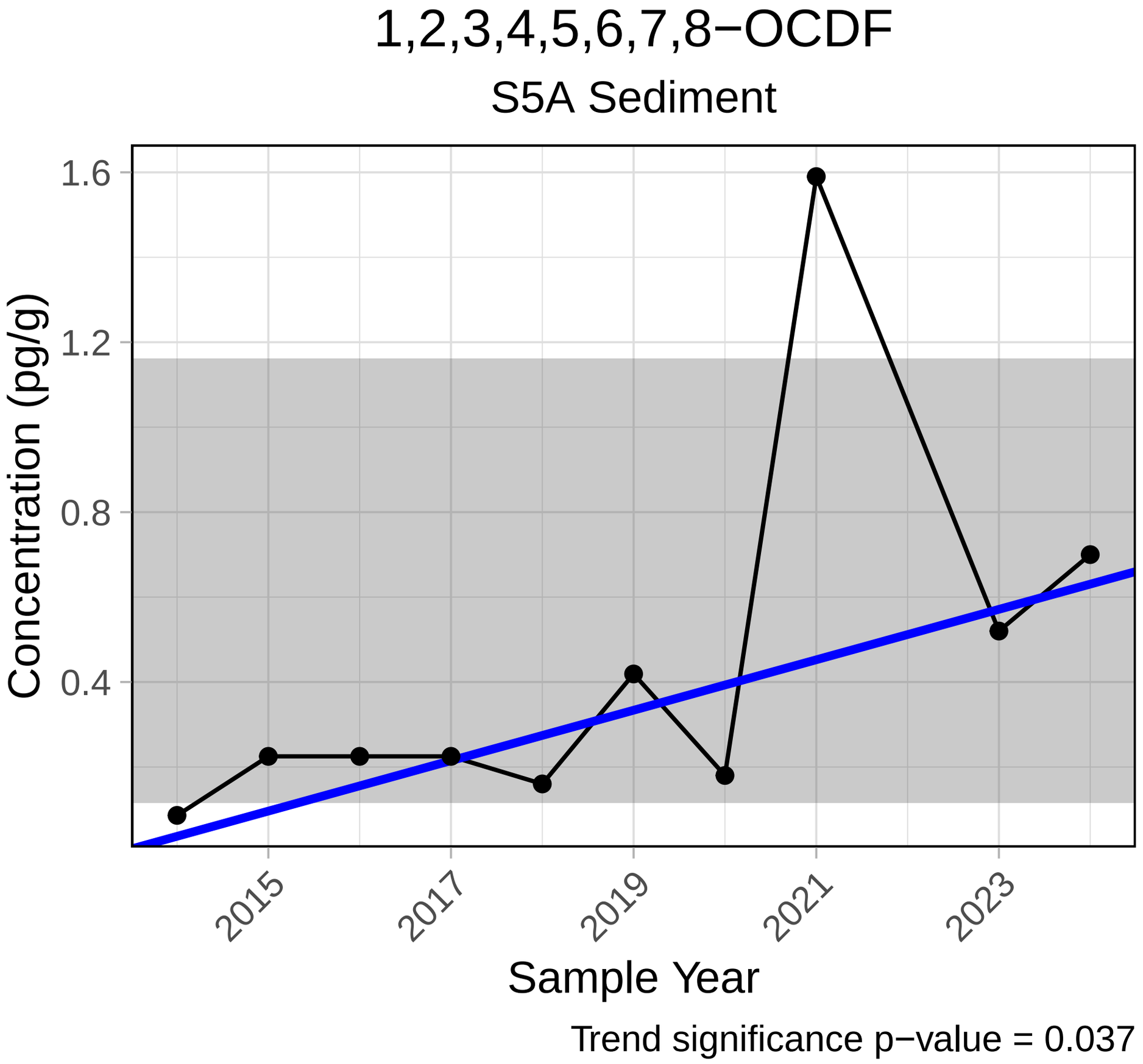


Trend significance p−value = 0.243


Sieve #200
S5A Sediment
100
75
50
25
Concentration (%)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.589

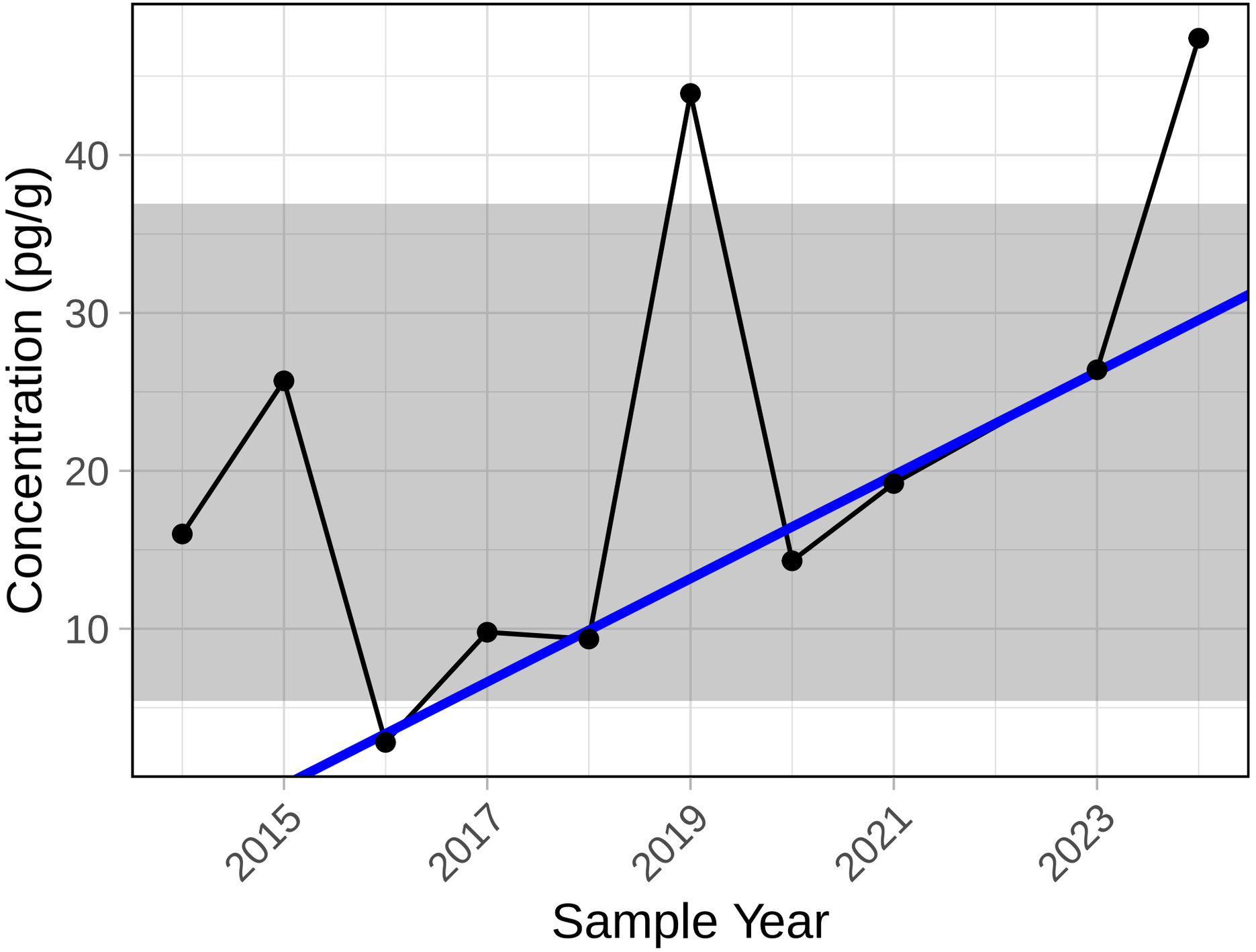

Sieve−Pan
S5A Sediment
Concentration (%)
75
50
25
0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.589


Sulphate (dissolved)
S5A Sediment
Concentration (mg/L)
160
120
80
40
2008
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.466


1,2,3,4,5,6,7,8−OCDF
S5A Sediment
Concentration (pg/g)
1.6
1.2
0.8
0.4
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.037

1,2,3,4,6,7,8,9−OCDD

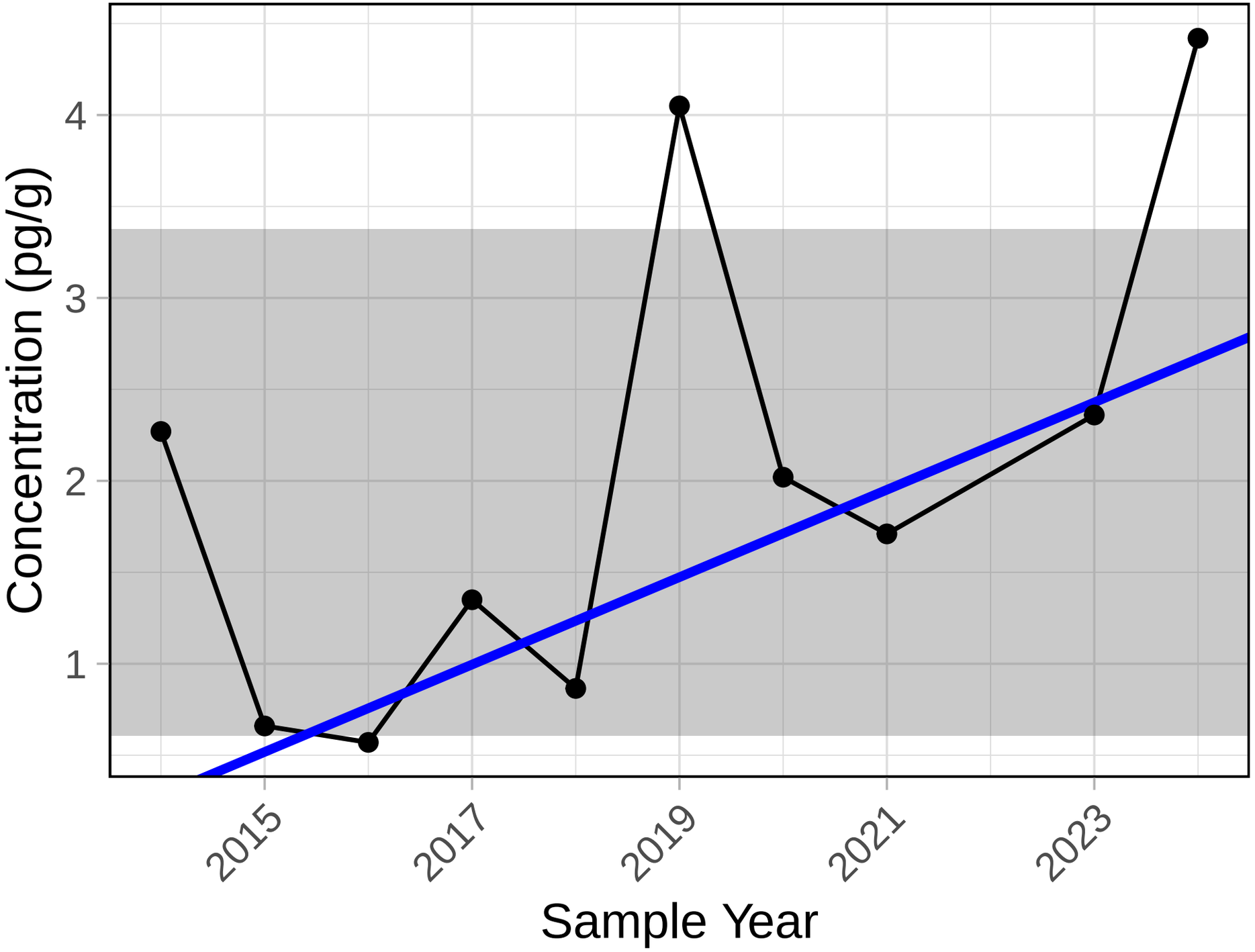
S5A Sediment



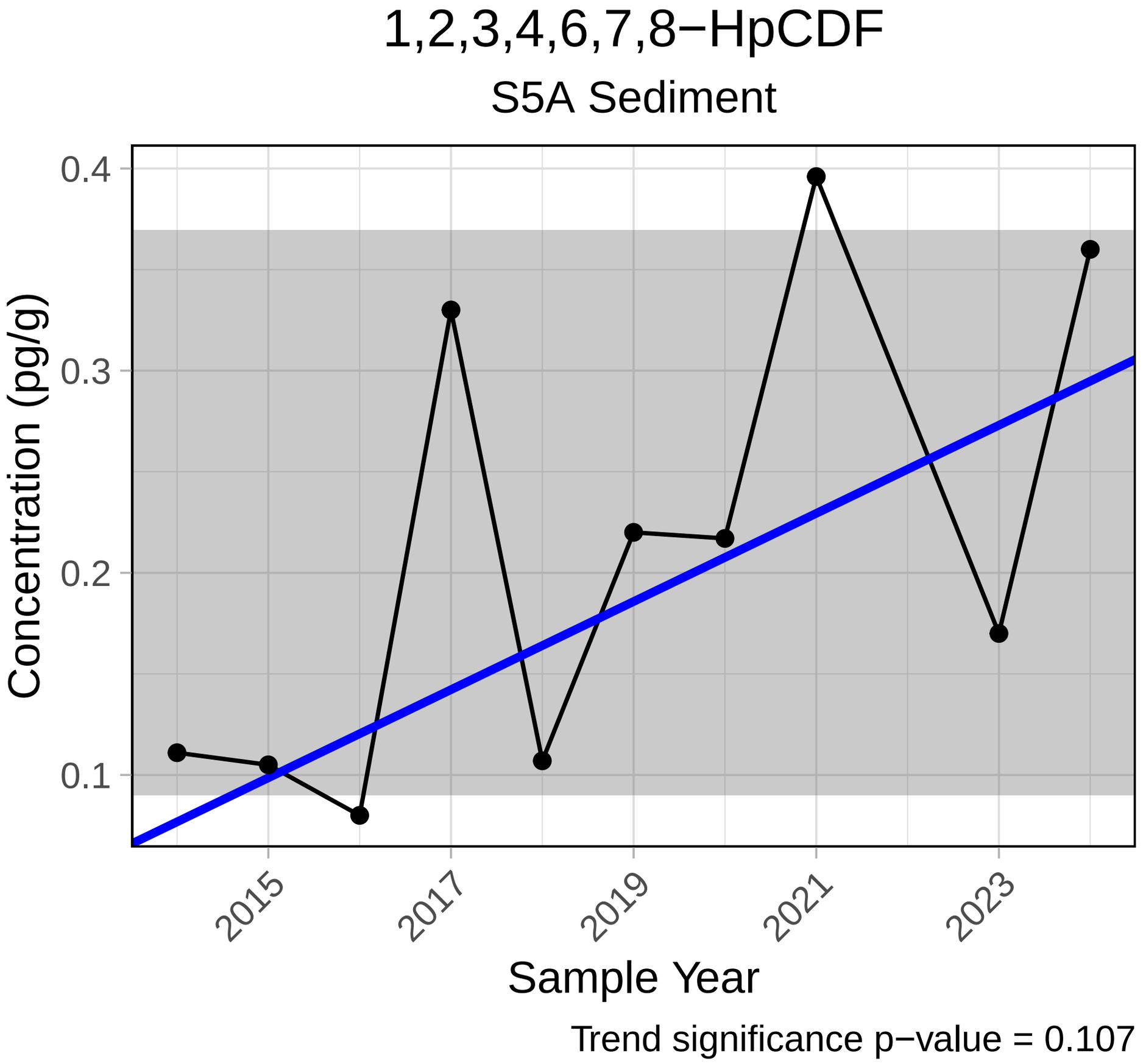
Trend significance p−value = 0.107

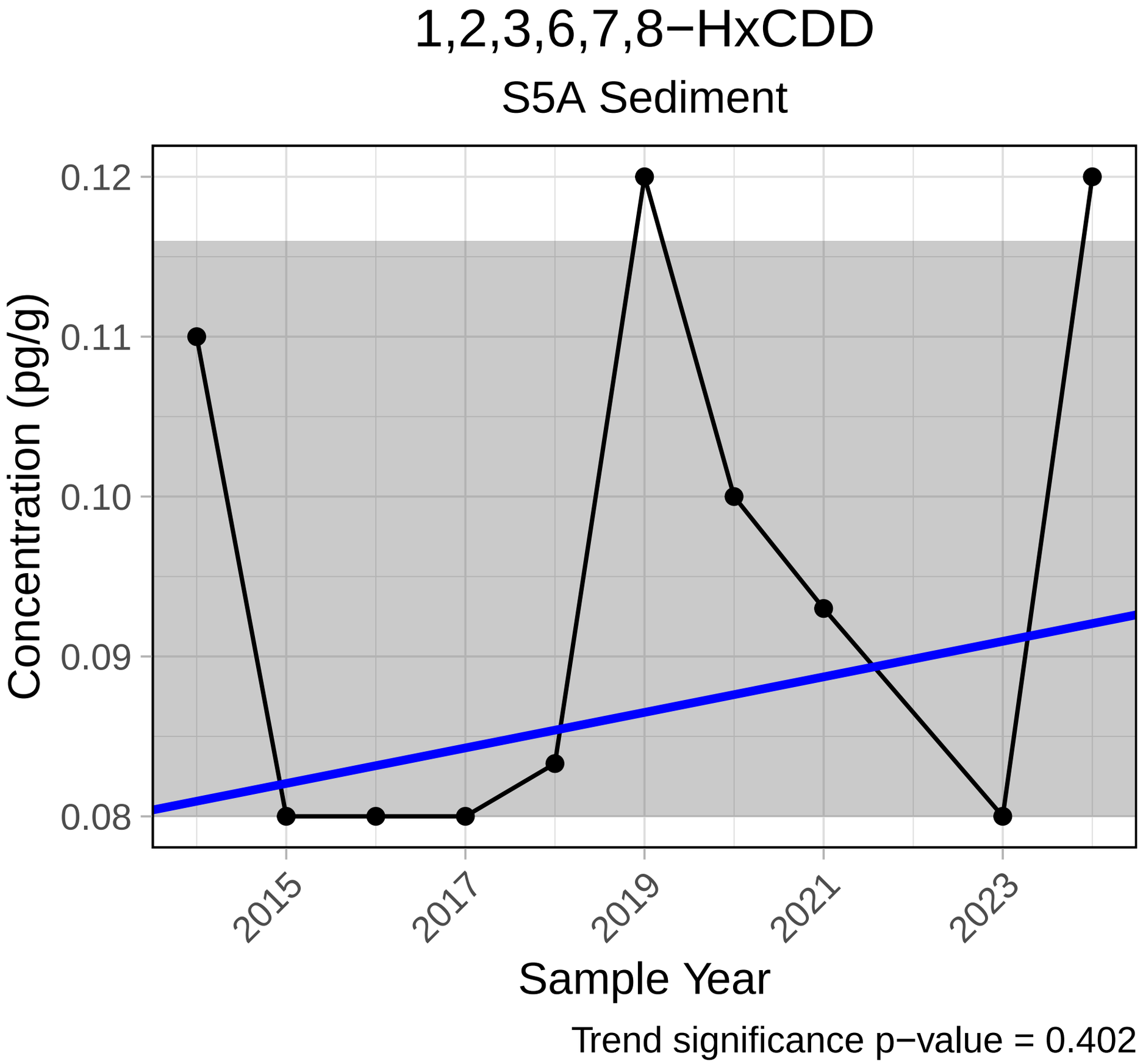
1,2,3,4,6,7,8−HpCDD

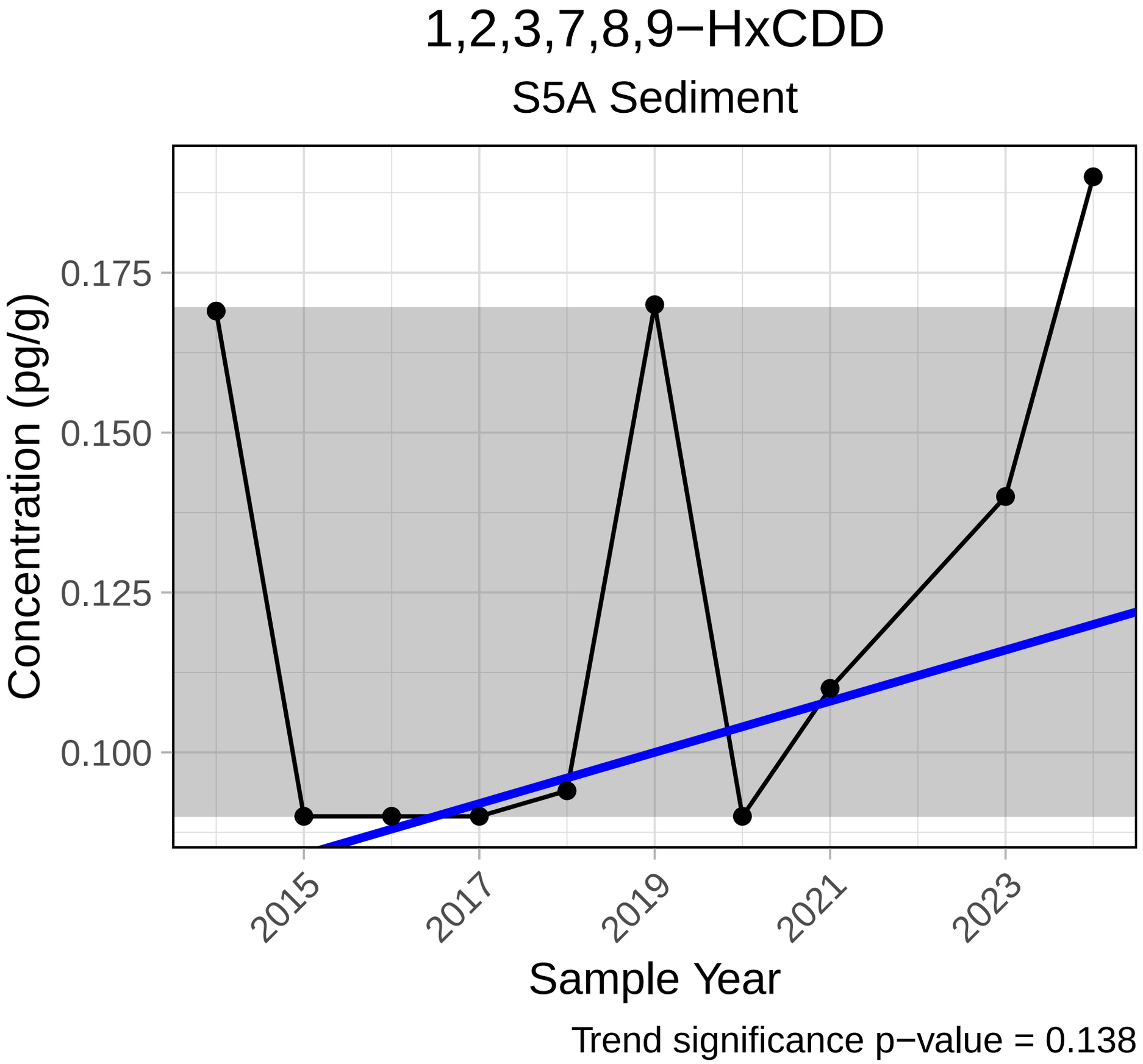
S5A Sediment

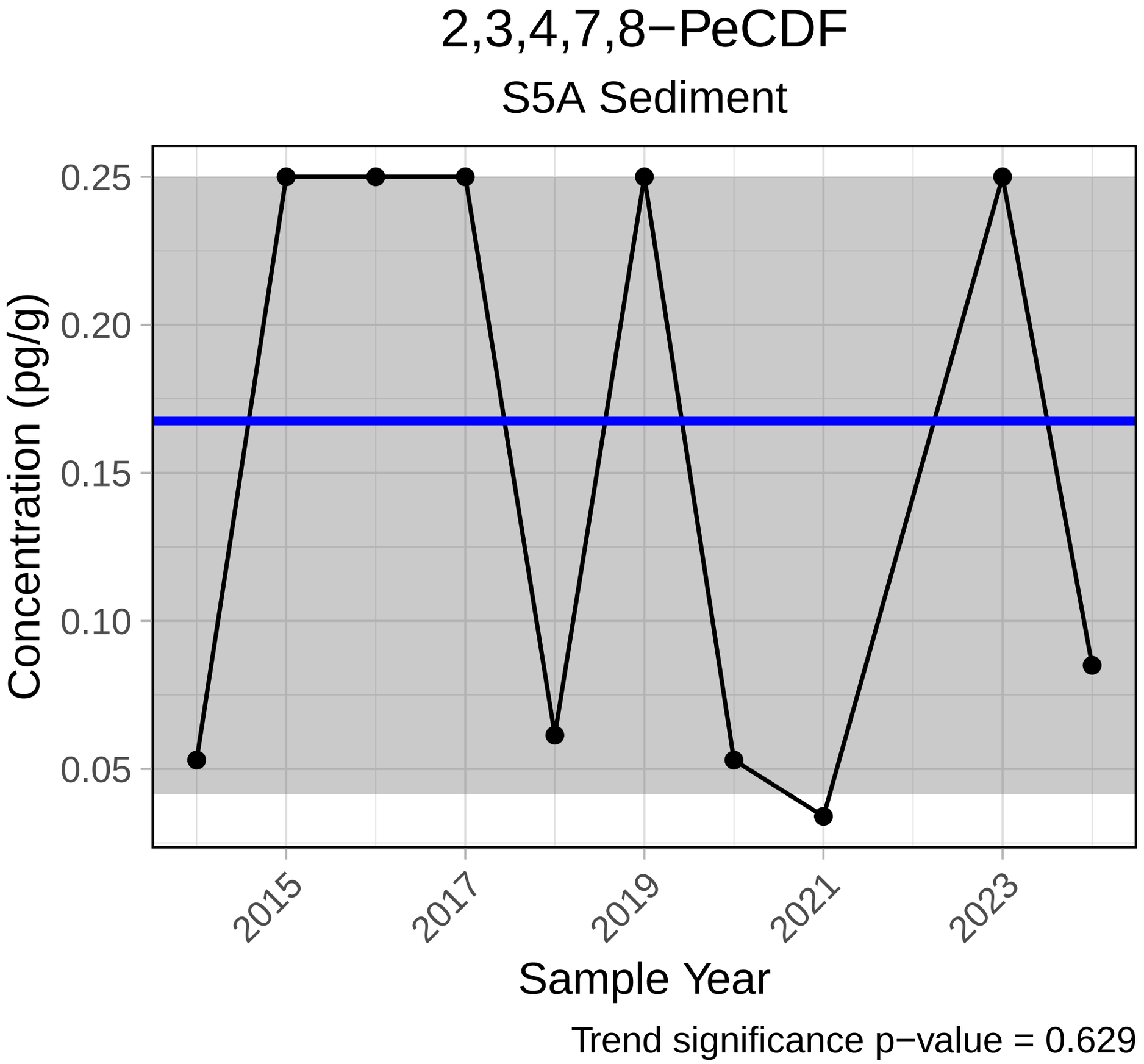


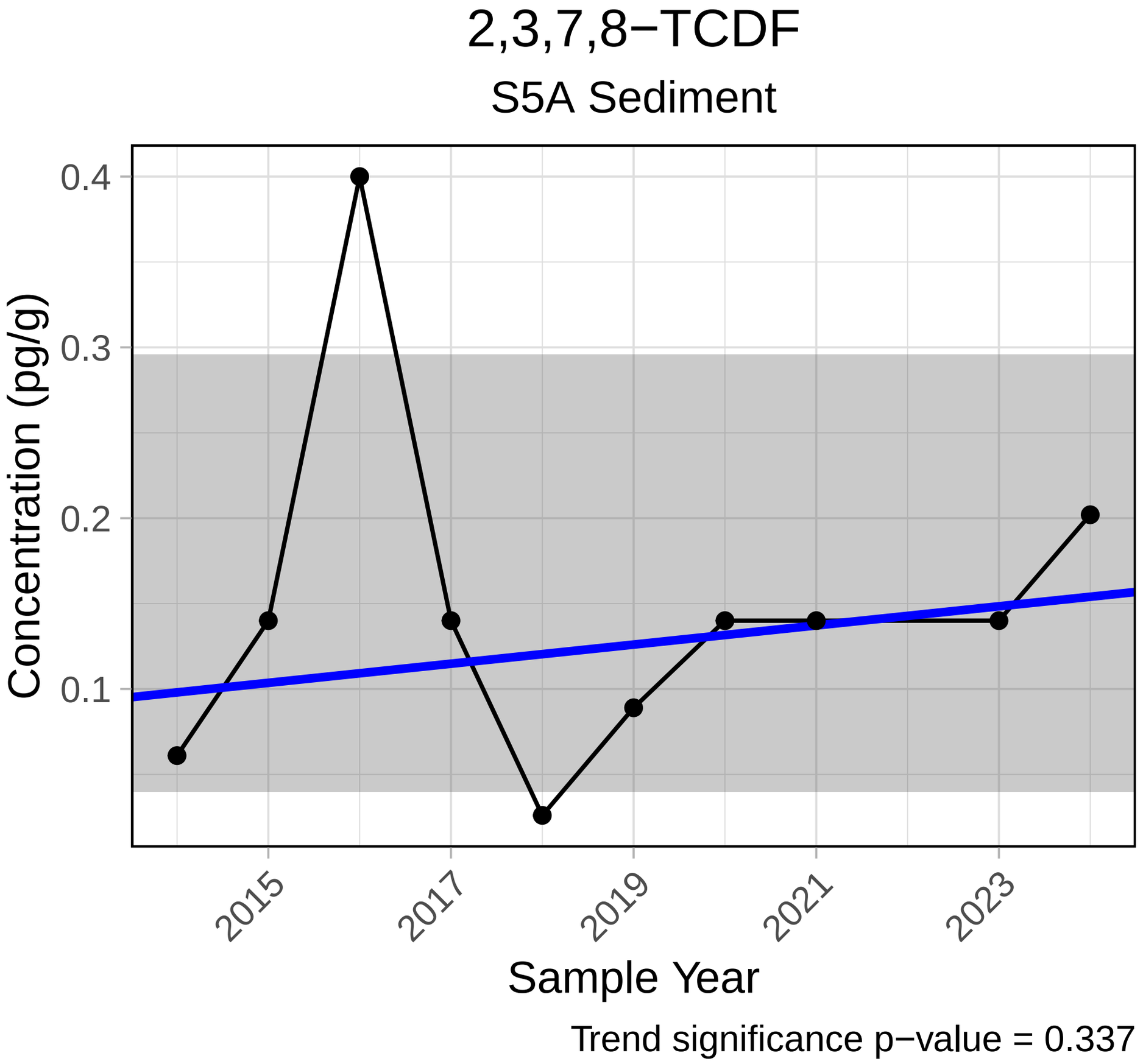
Trend significance p−value = 0.074


1,2,3,4,6,7,8−HpCDF
S5A Sediment
Concentration (pg/g)
0.4
0.3
0.2
0.1
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.107


1,2,3,6,7,8−HxCDD
S5A Sediment
Concentration (pg/g)
0.12
0.11
0.10
0.09
0.08
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.402

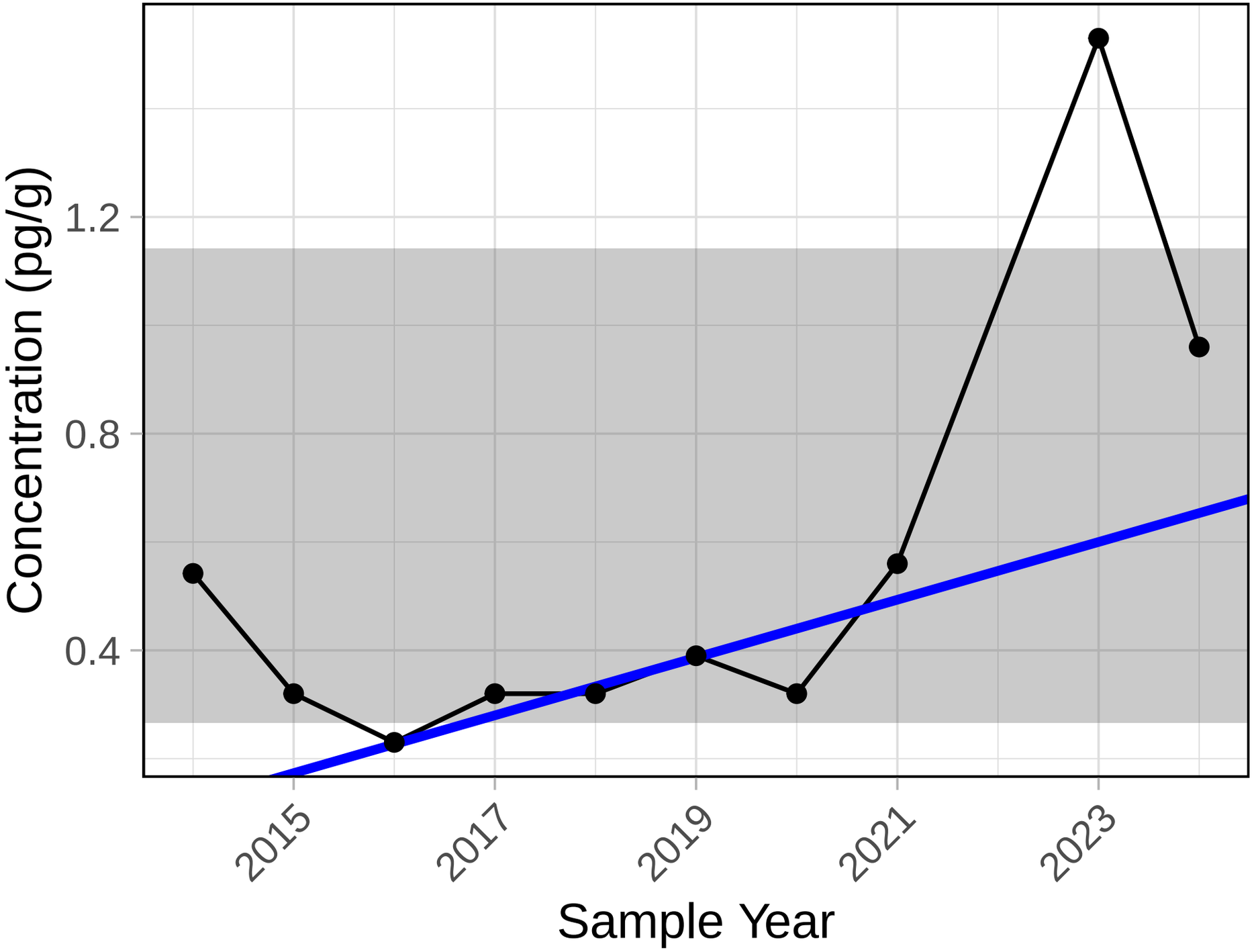

1,2,3,7,8,9−HxCDD
S5A Sediment
Concentration (pg/g)
0.175
0.150
0.125
0.100
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.138


2,3,4,7,8−PeCDF
S5A Sediment
Concentration (pg/g)
0.25
0.20
0.15
0.10
0.05
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.629


2,3,7,8−TCDF
S5A Sediment
Concentration (pg/g)
0.4
0.3
0.2
0.1
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.337

PCB 1

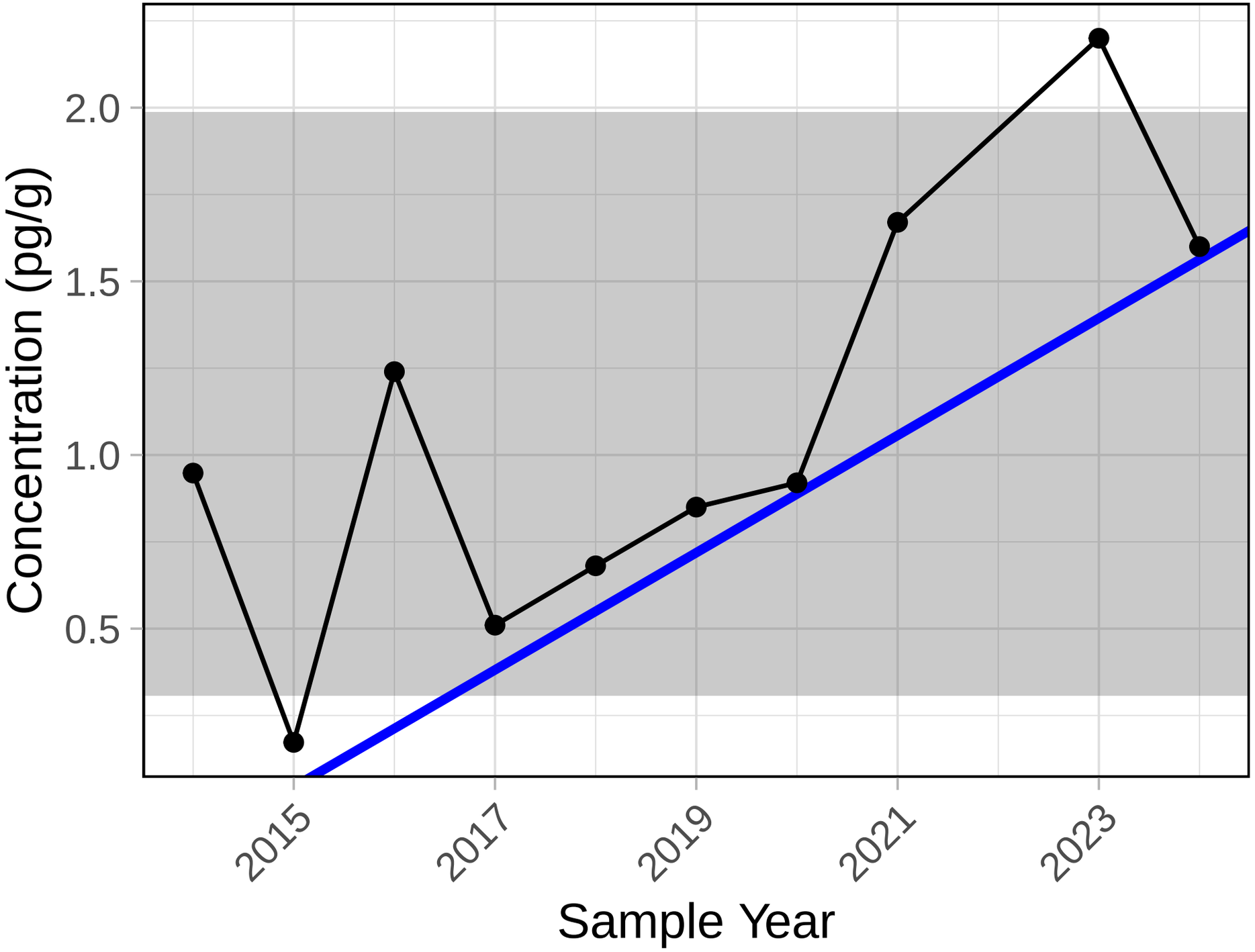
S5A Sediment



Trend significance p−value = 0.064

PCB 2

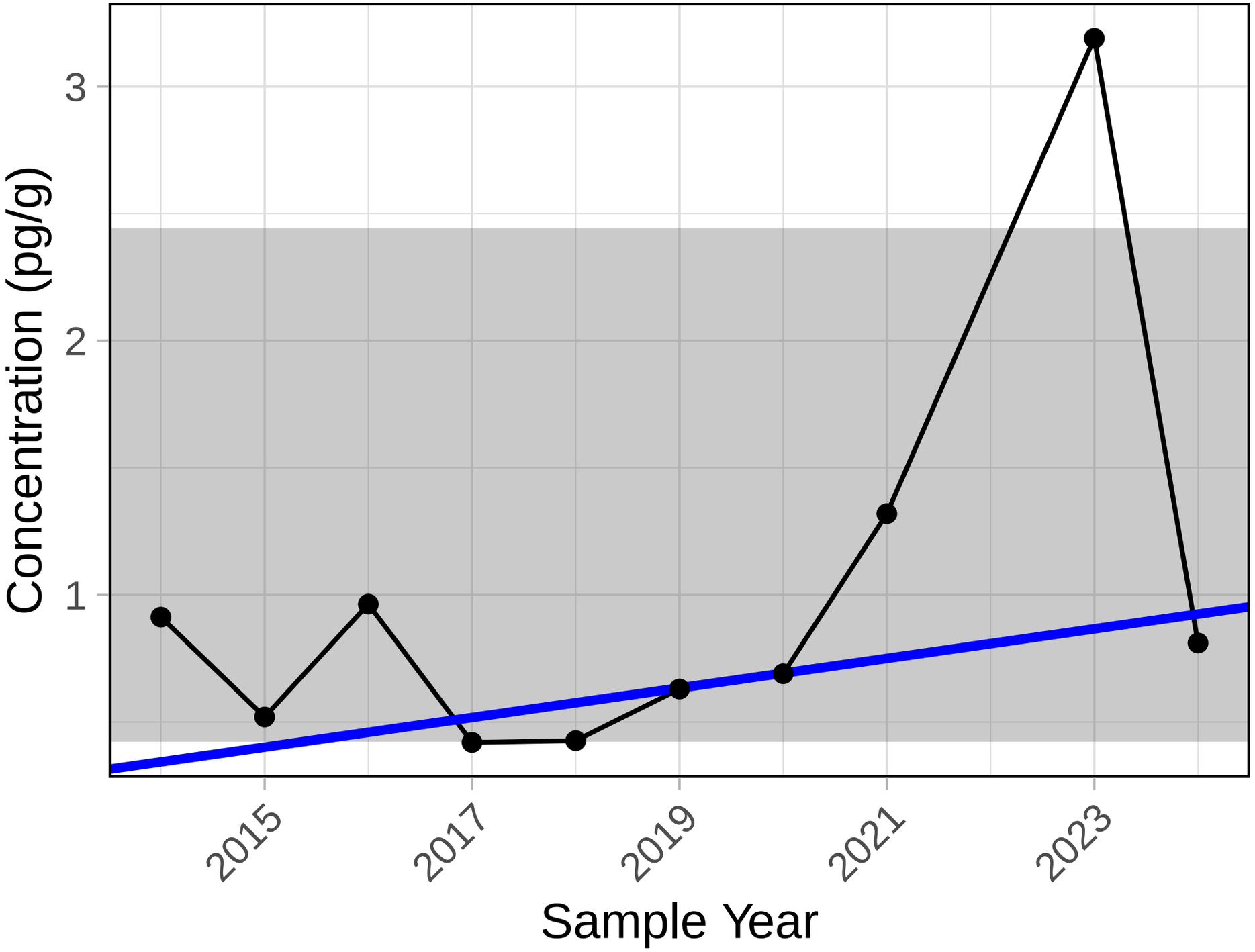
S5A Sediment



Trend significance p−value = 0.049

PCB 3

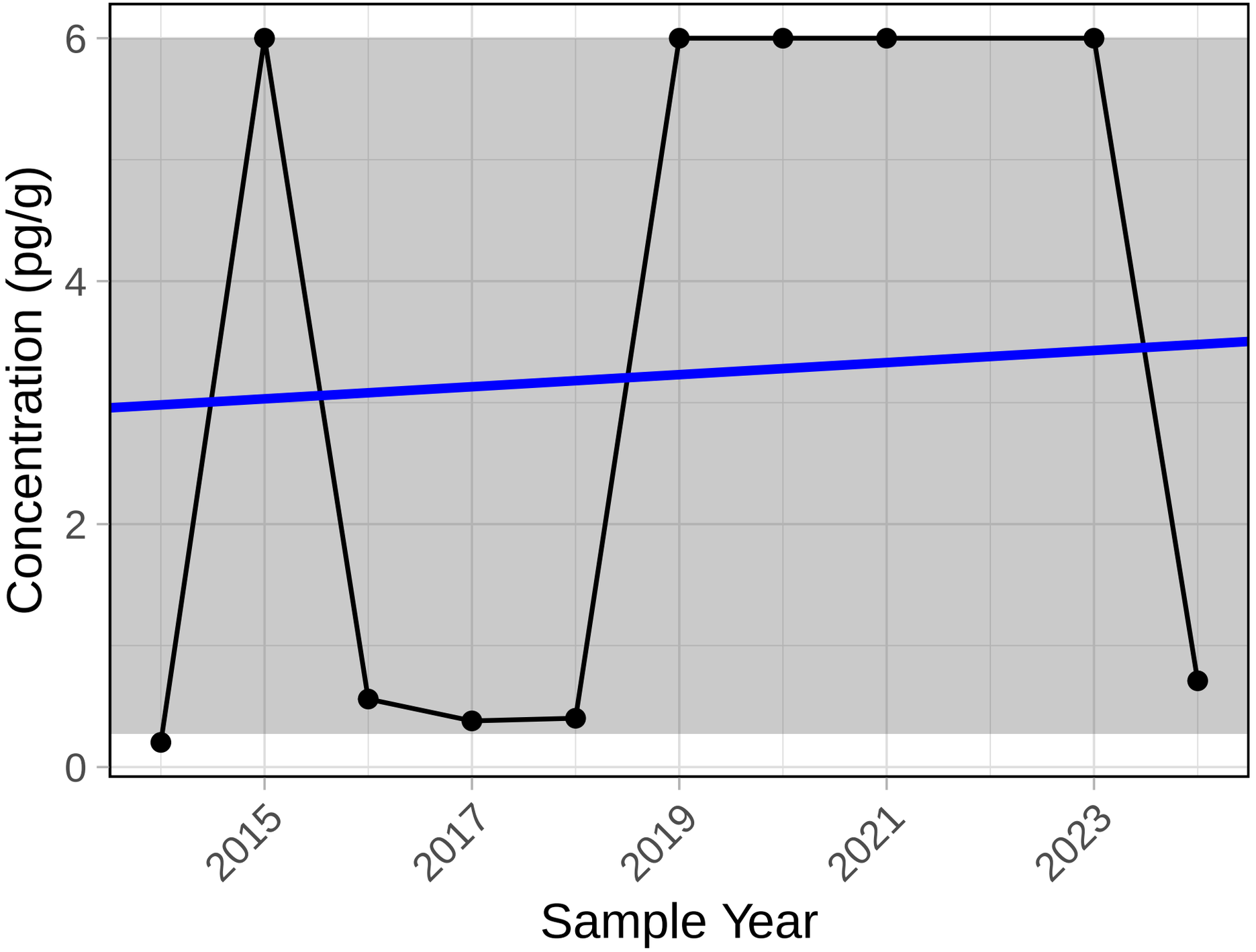
S5A Sediment



Trend significance p−value = 0.21

PCB 4

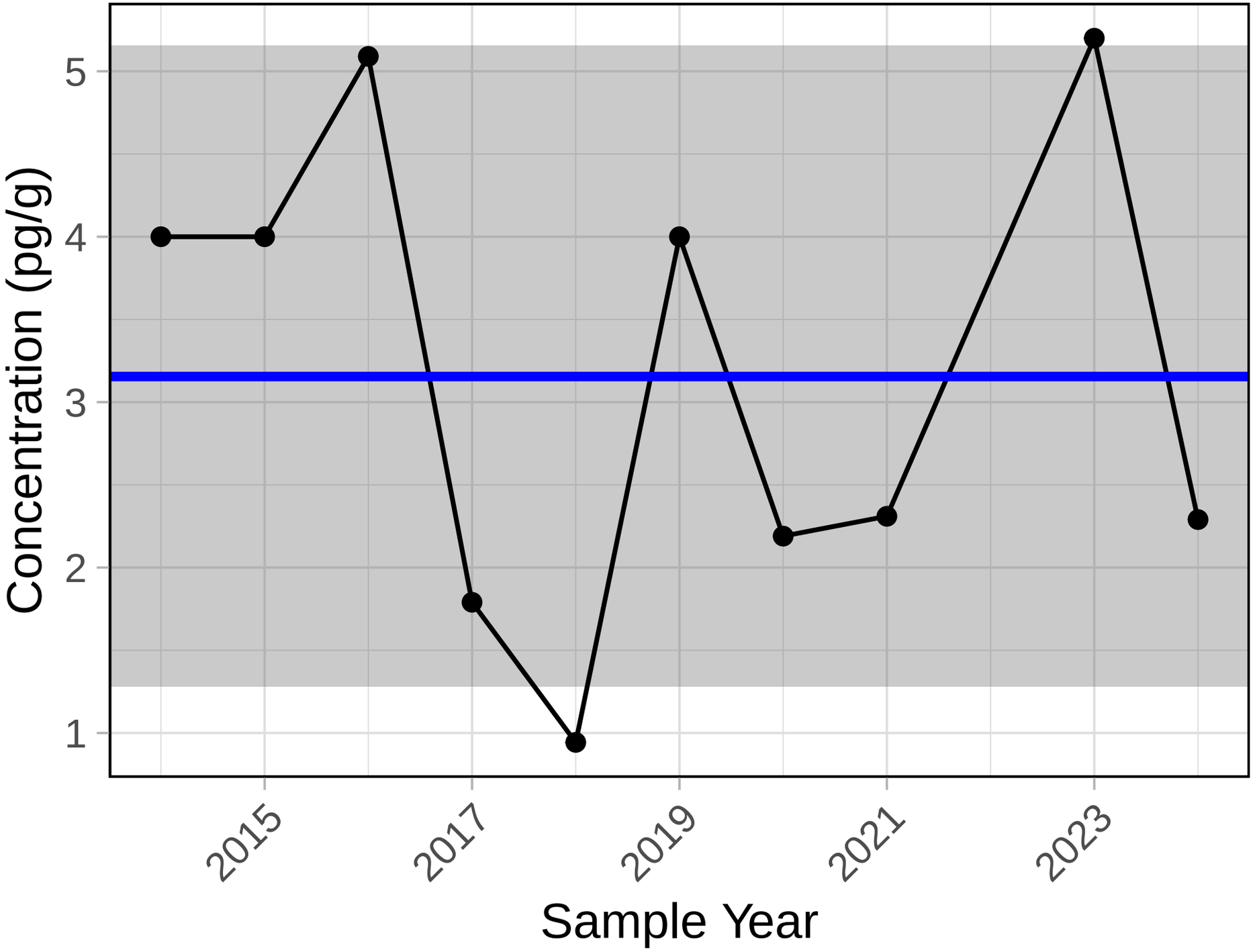
S5A Sediment



Trend significance p−value = 0.179

PCB 8

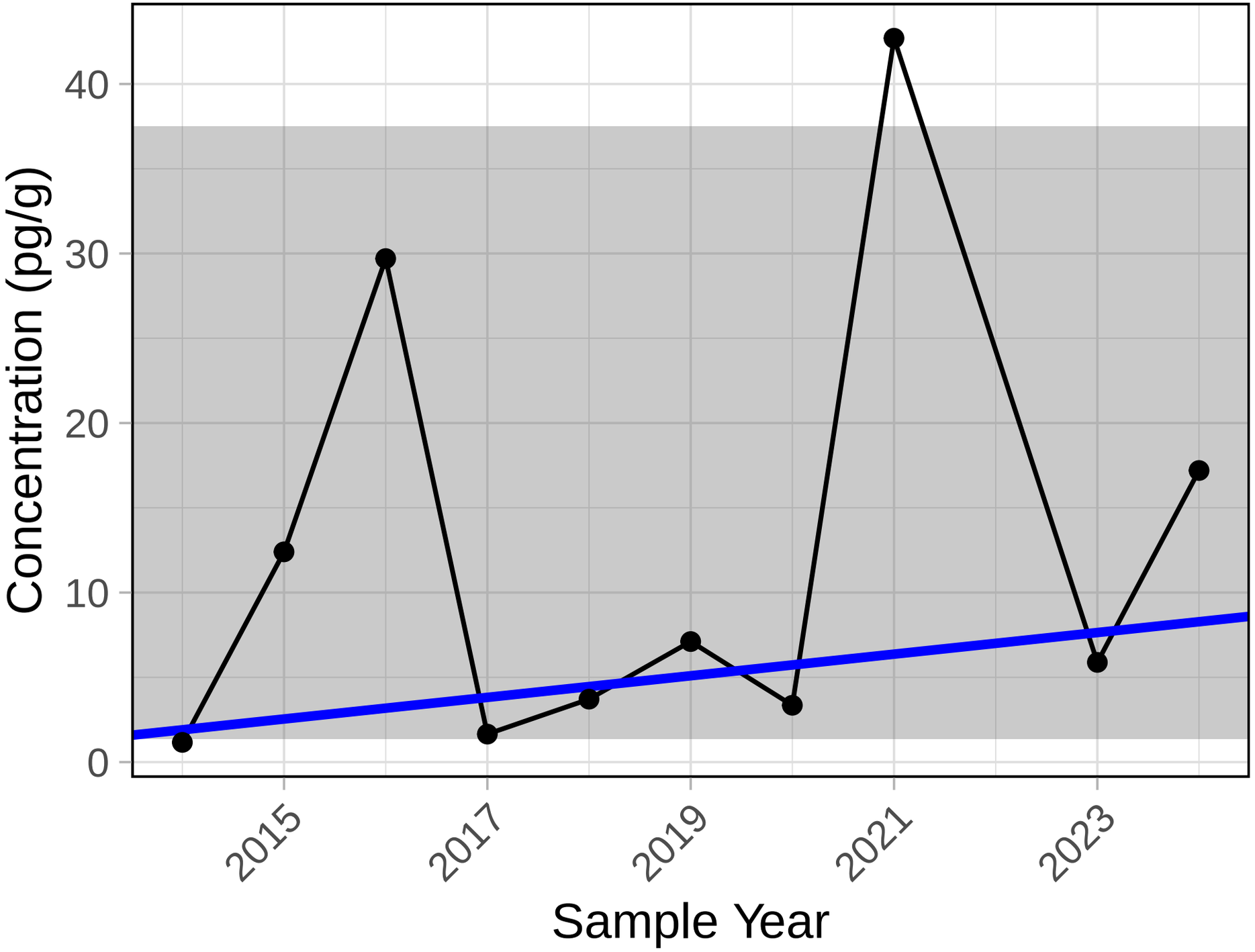
S5A Sediment



Trend significance p−value = 0.928

PCB 11

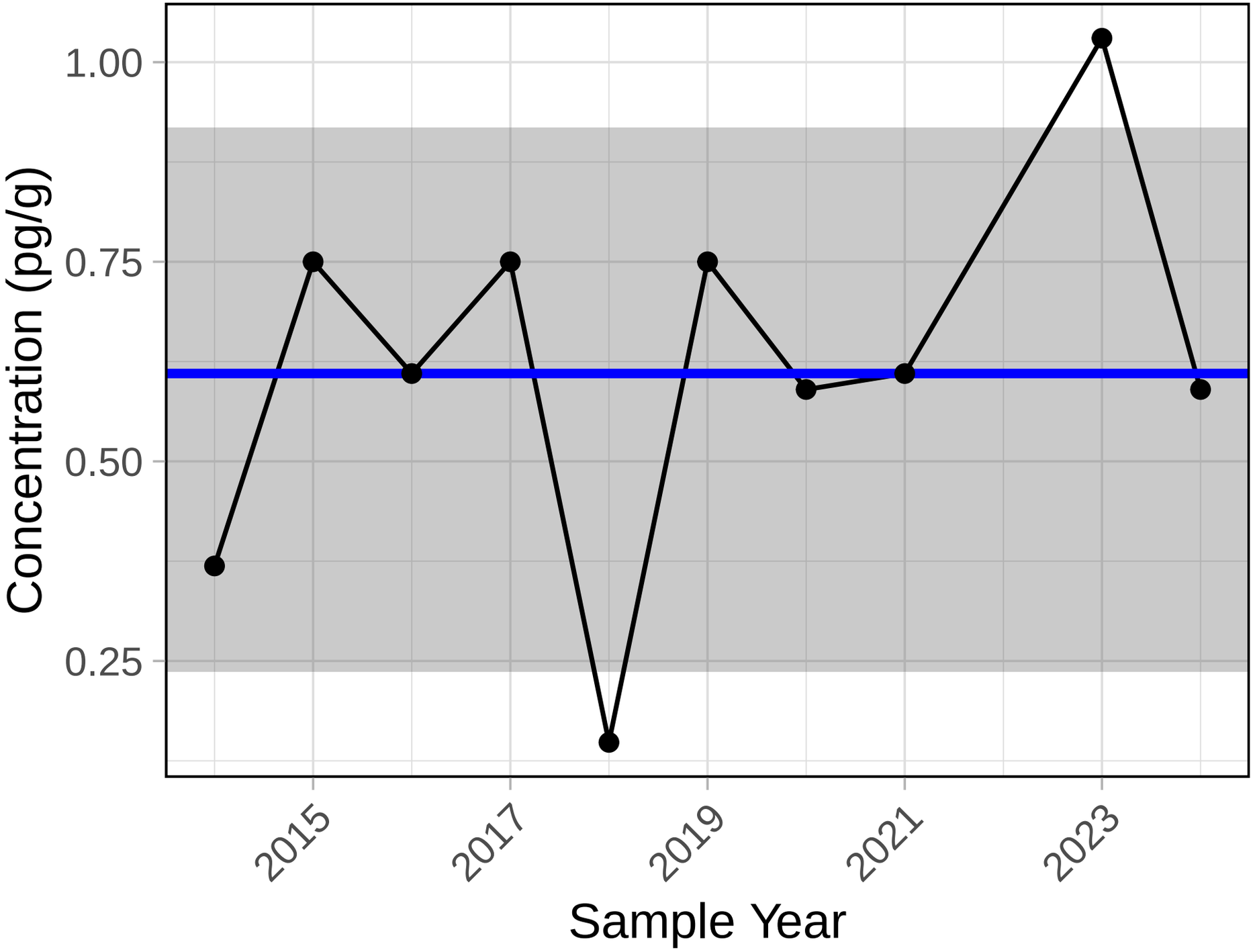
S5A Sediment



Trend significance p−value = 0.283

PCB 14

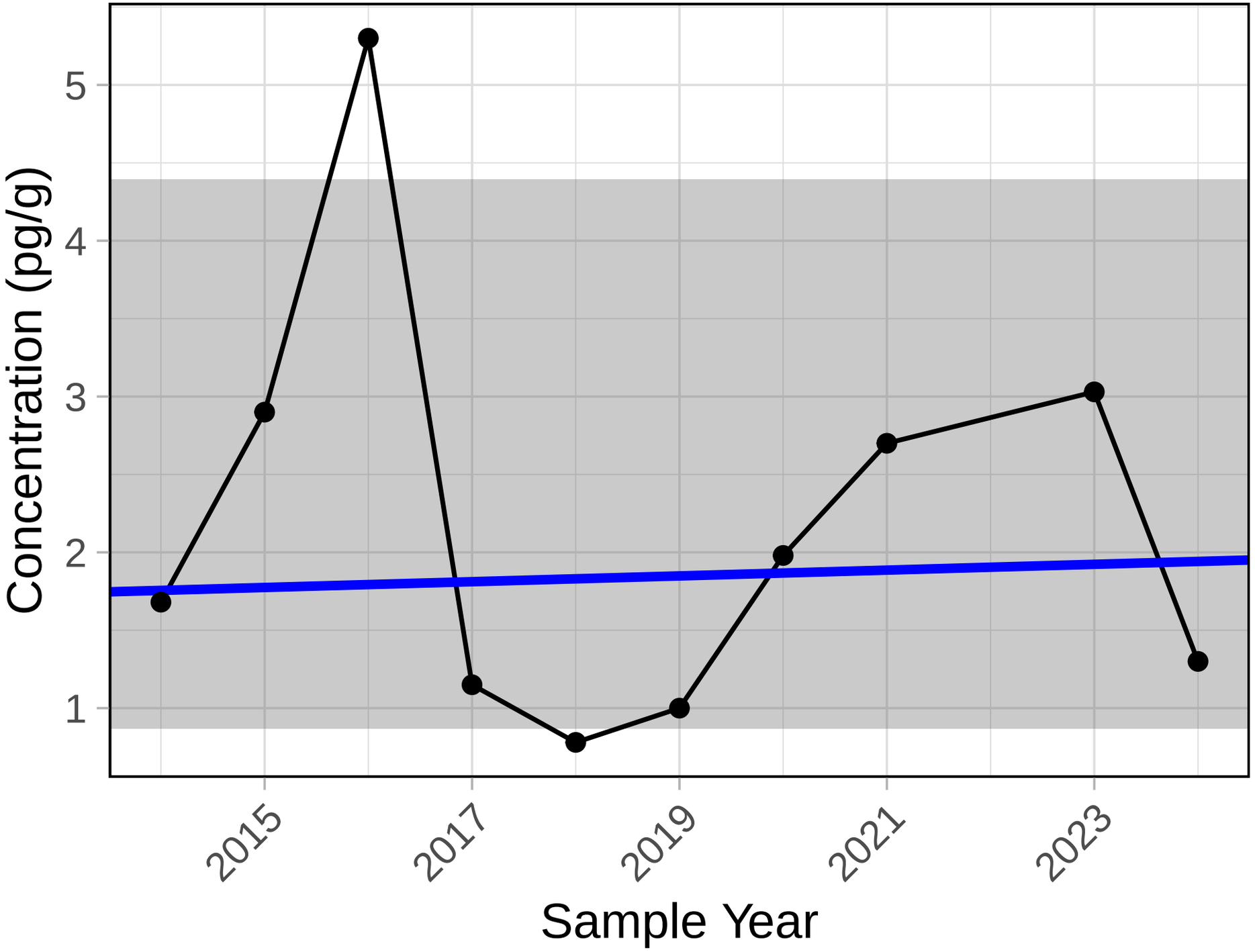
S5A Sediment



Trend significance p−value = 0.784

PCB 15

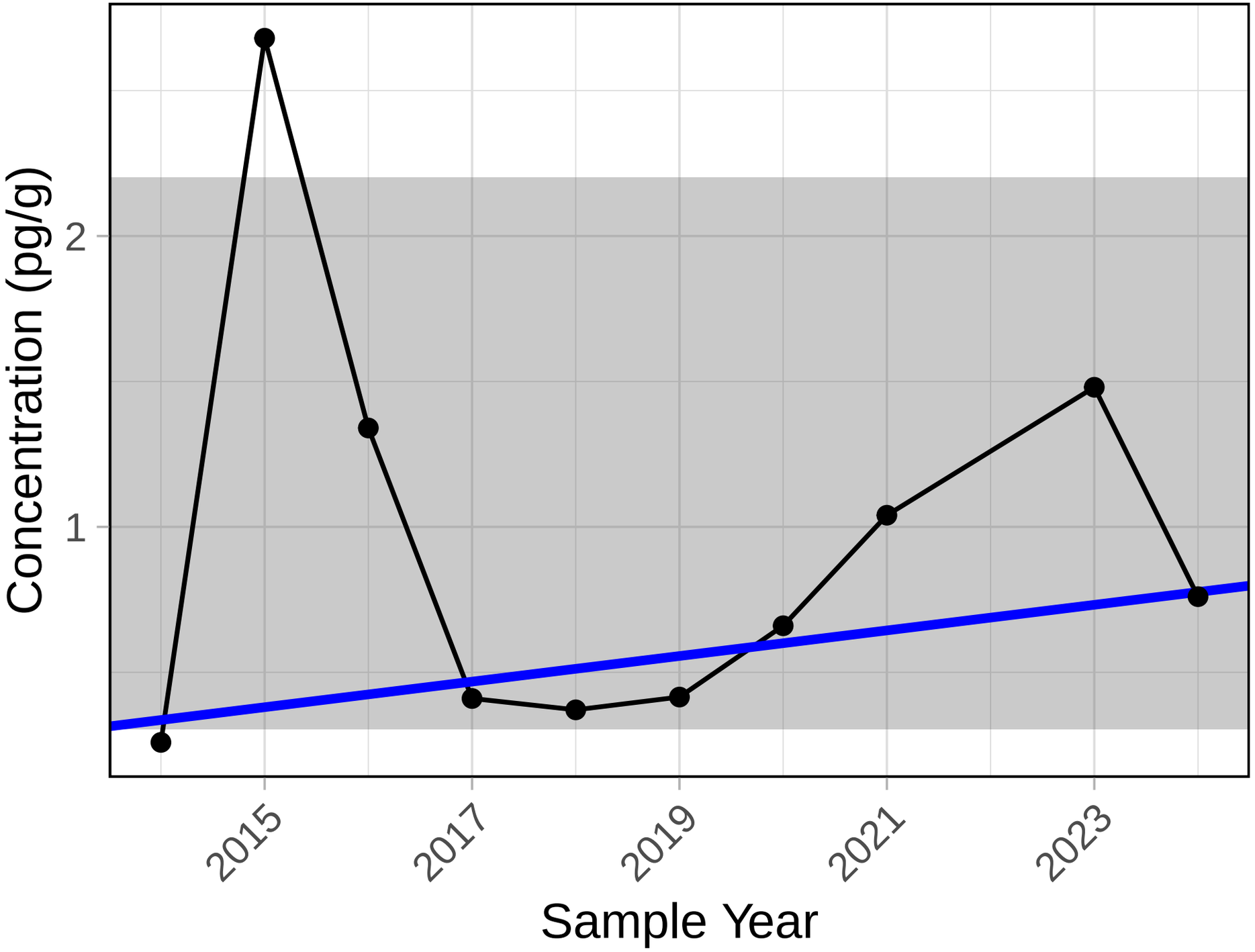
S5A Sediment



Trend significance p−value = 1

PCB 16

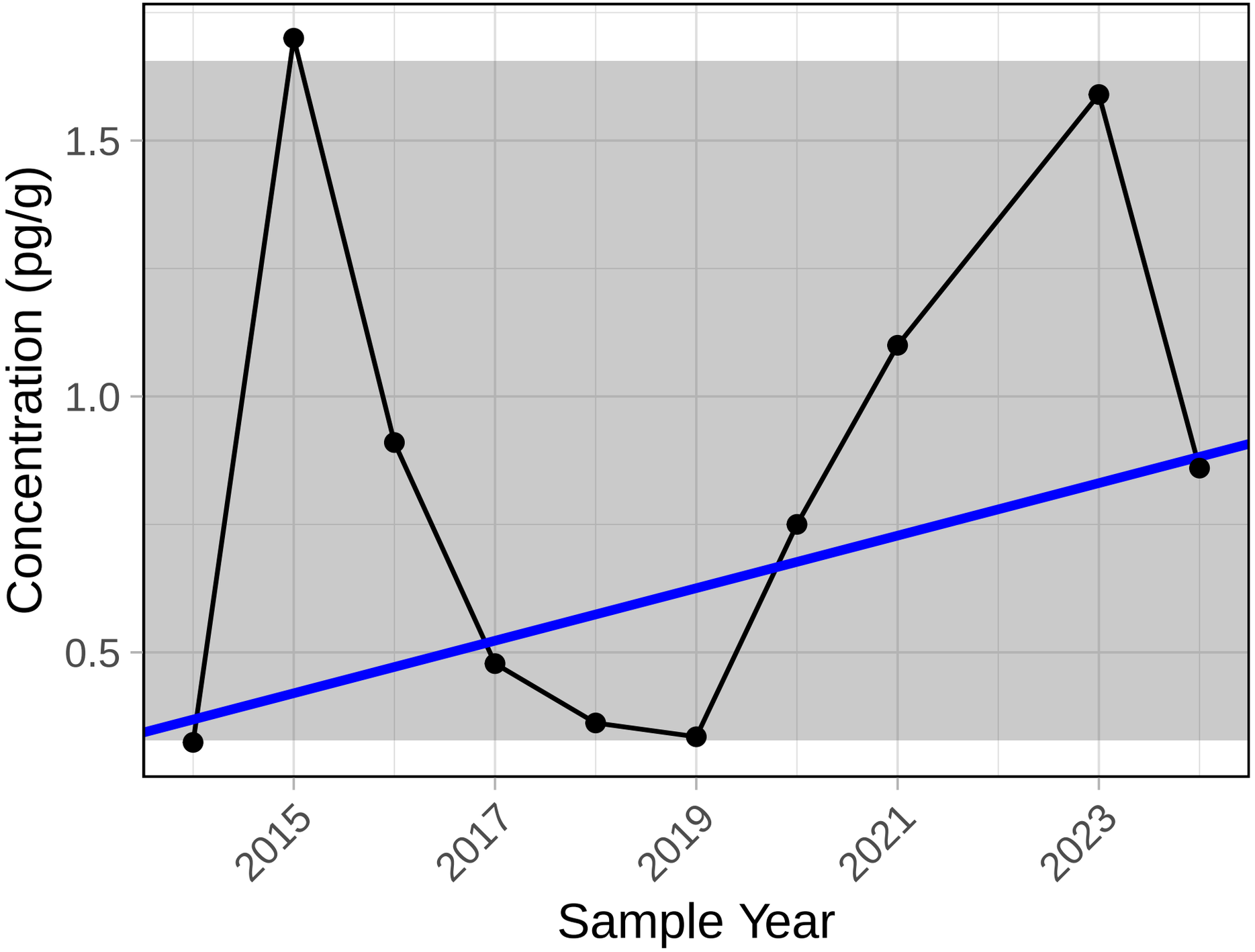
S5A Sediment



Trend significance p−value = 0.371

PCB 17

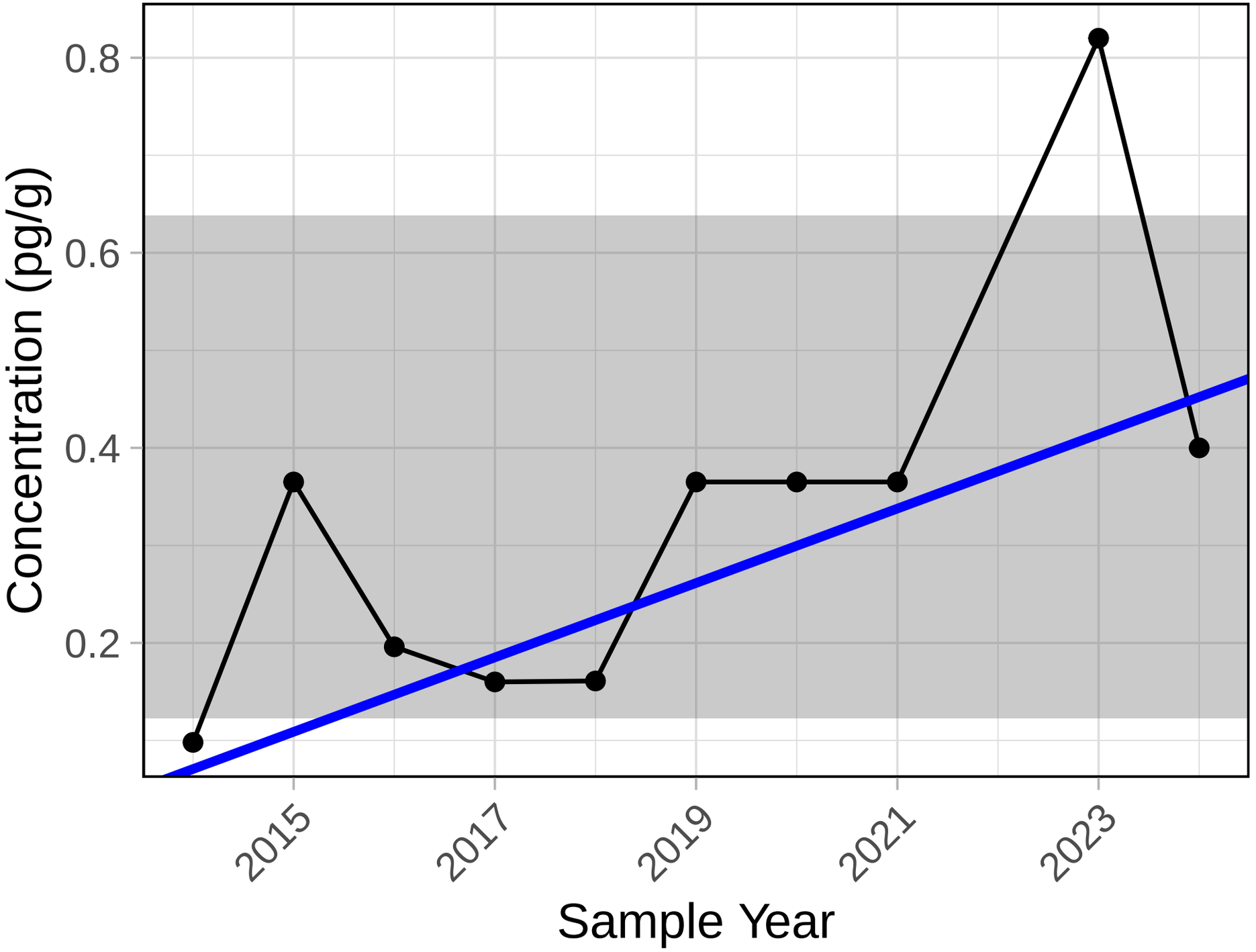
S5A Sediment



Trend significance p−value = 0.474

PCB 19

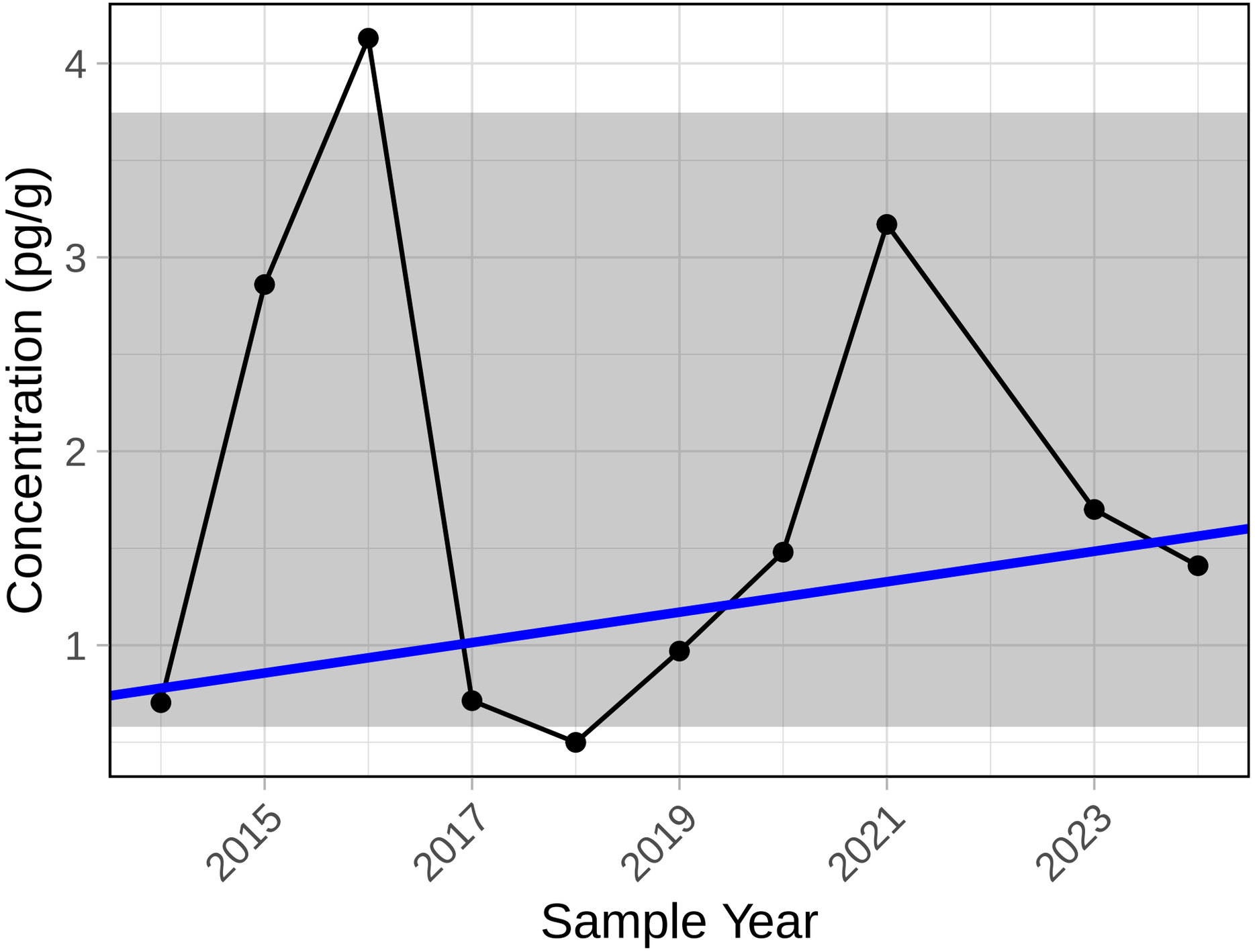
S5A Sediment



Trend significance p−value = 0.016

PCB 22

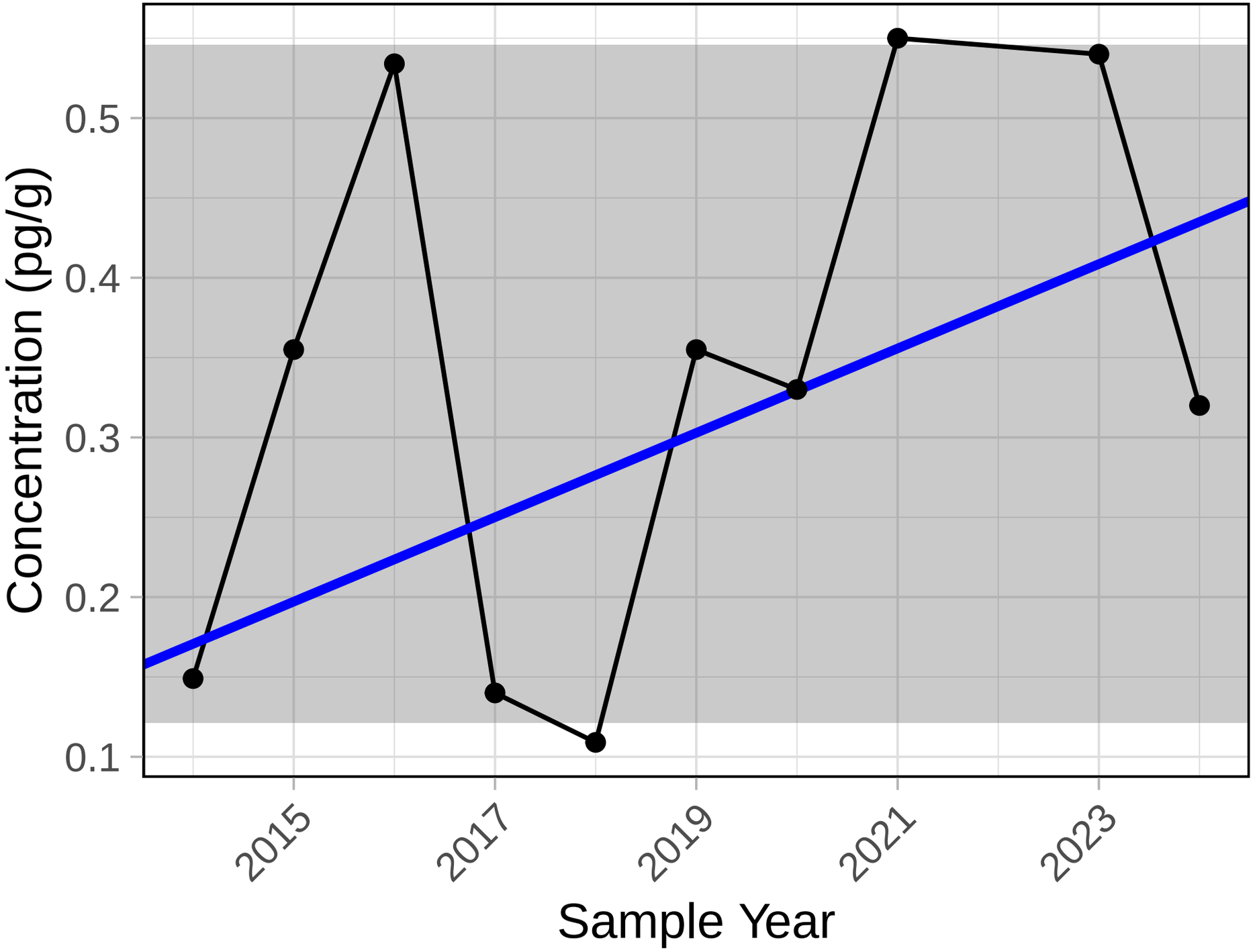
S5A Sediment



Trend significance p−value = 0.592

PCB 25

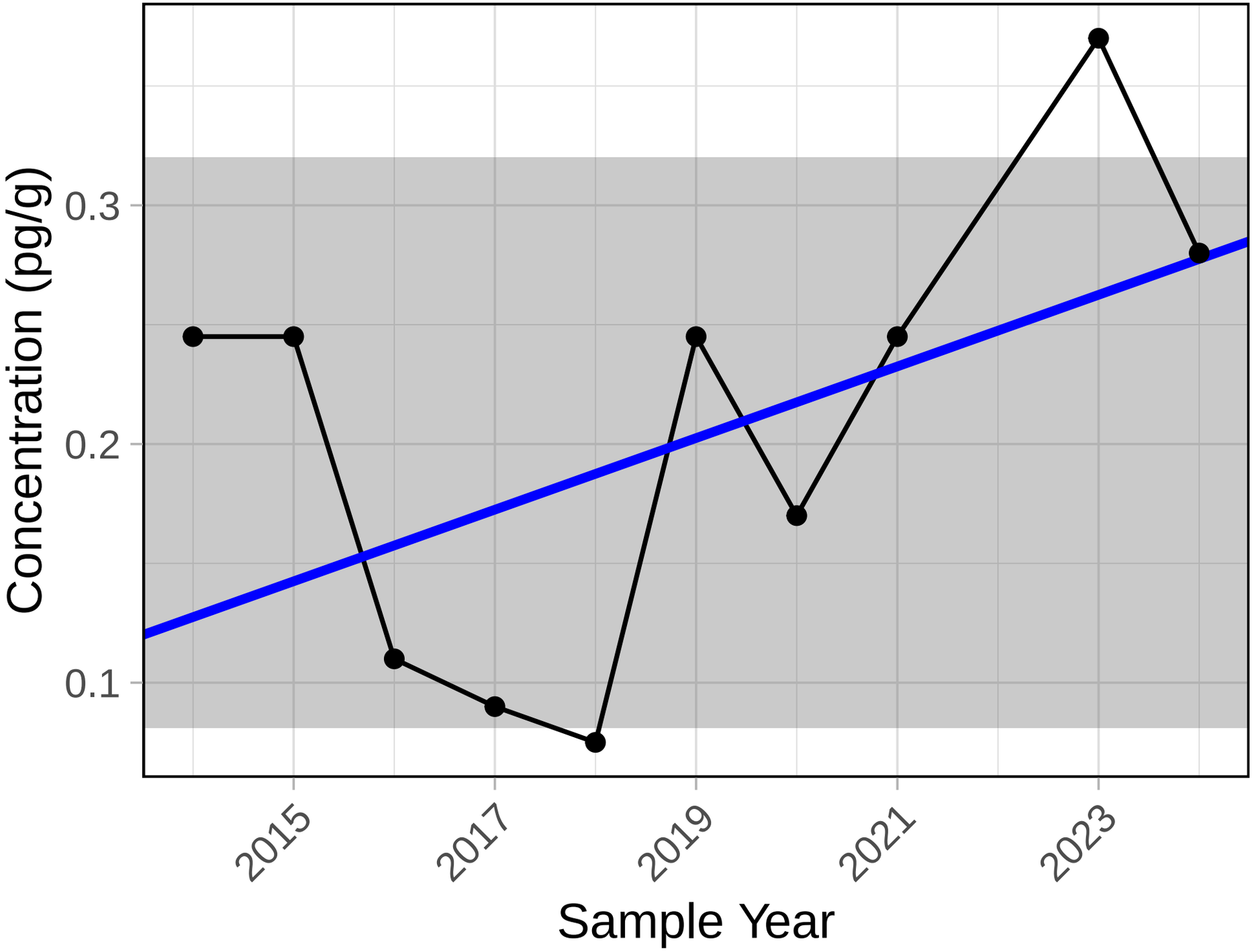
S5A Sediment



Trend significance p−value = 0.53

PCB 27

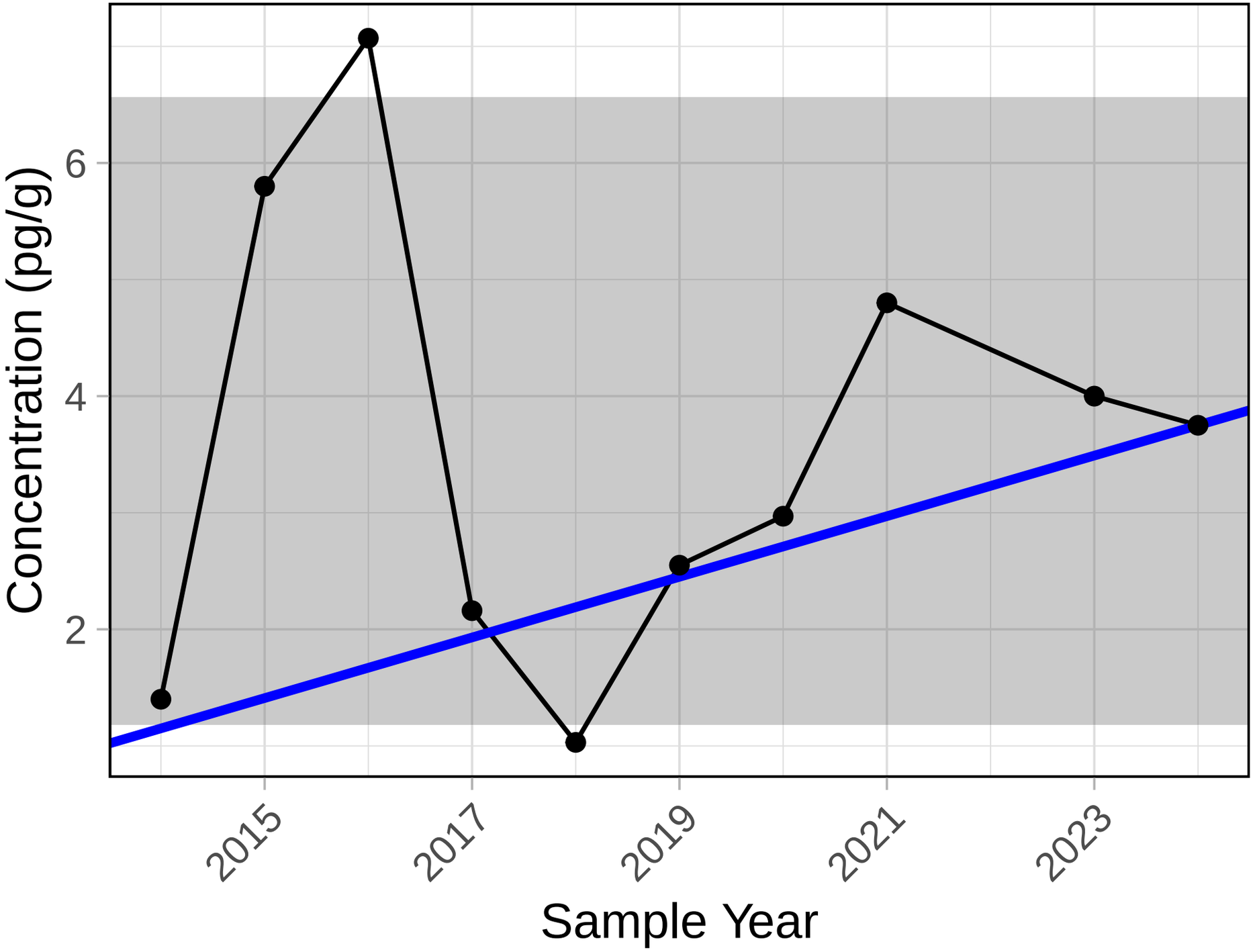
S5A Sediment



Trend significance p−value = 0.266

PCB 31

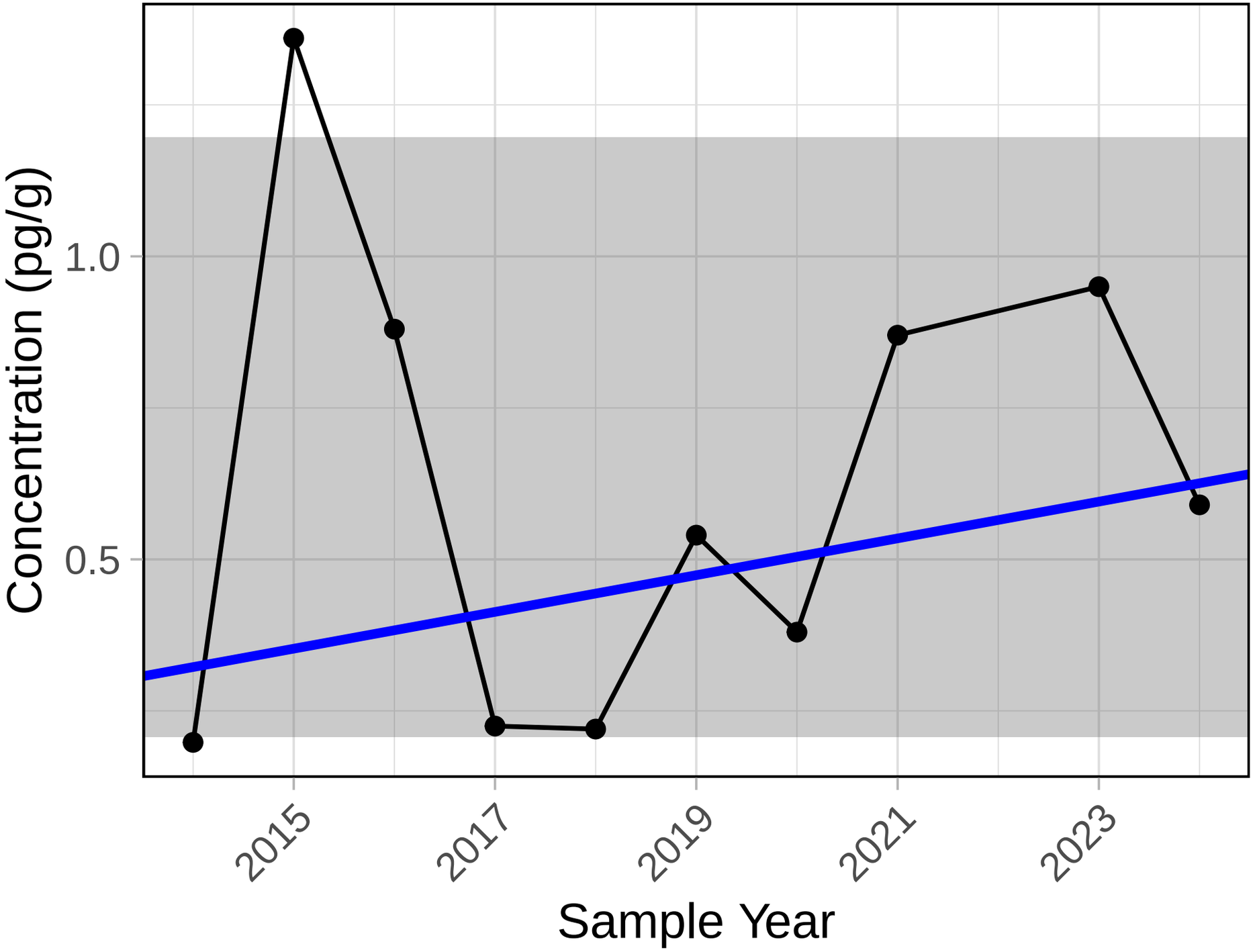
S5A Sediment



Trend significance p−value = 0.592

PCB 32

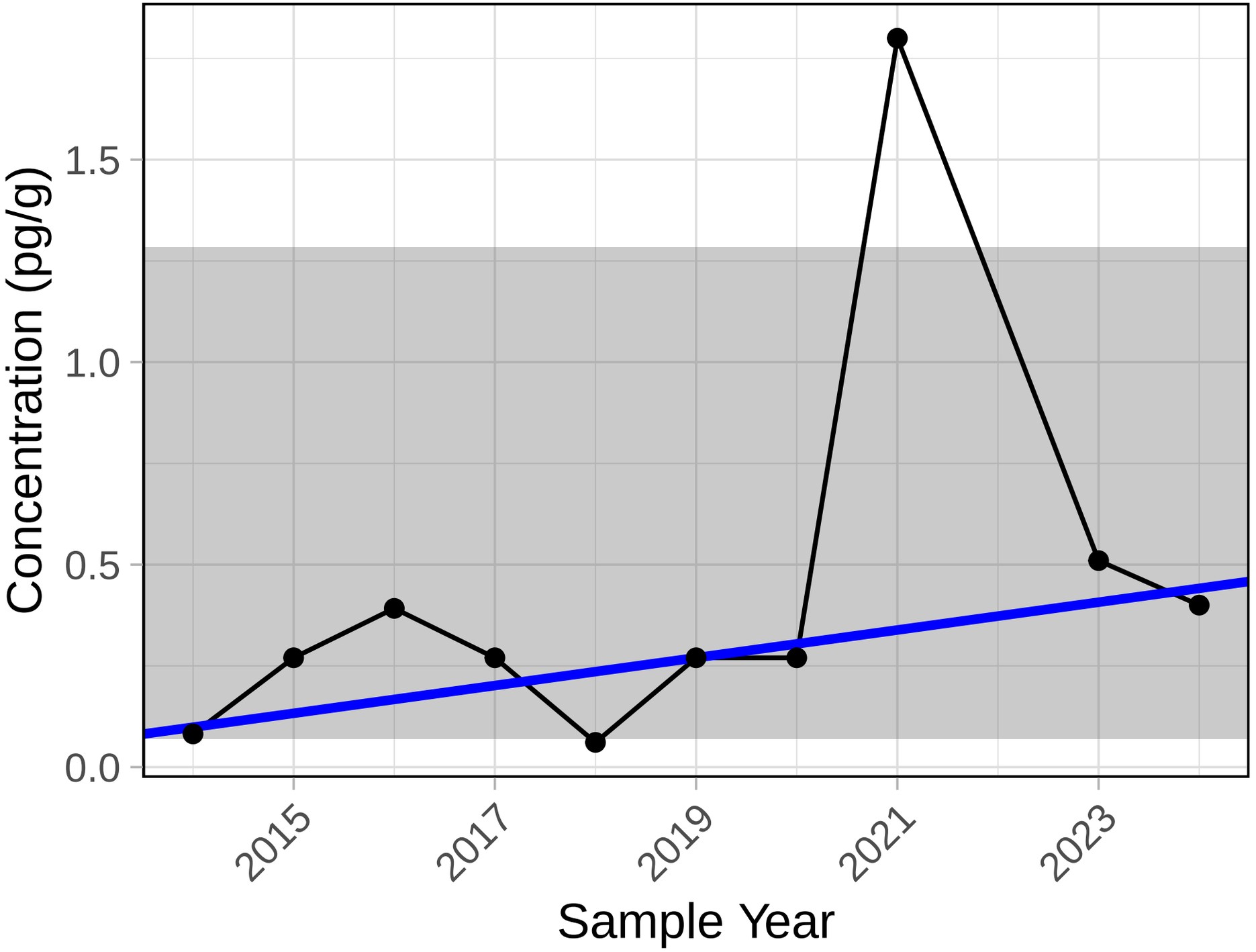
S5A Sediment



Trend significance p−value = 0.474

PCB 35

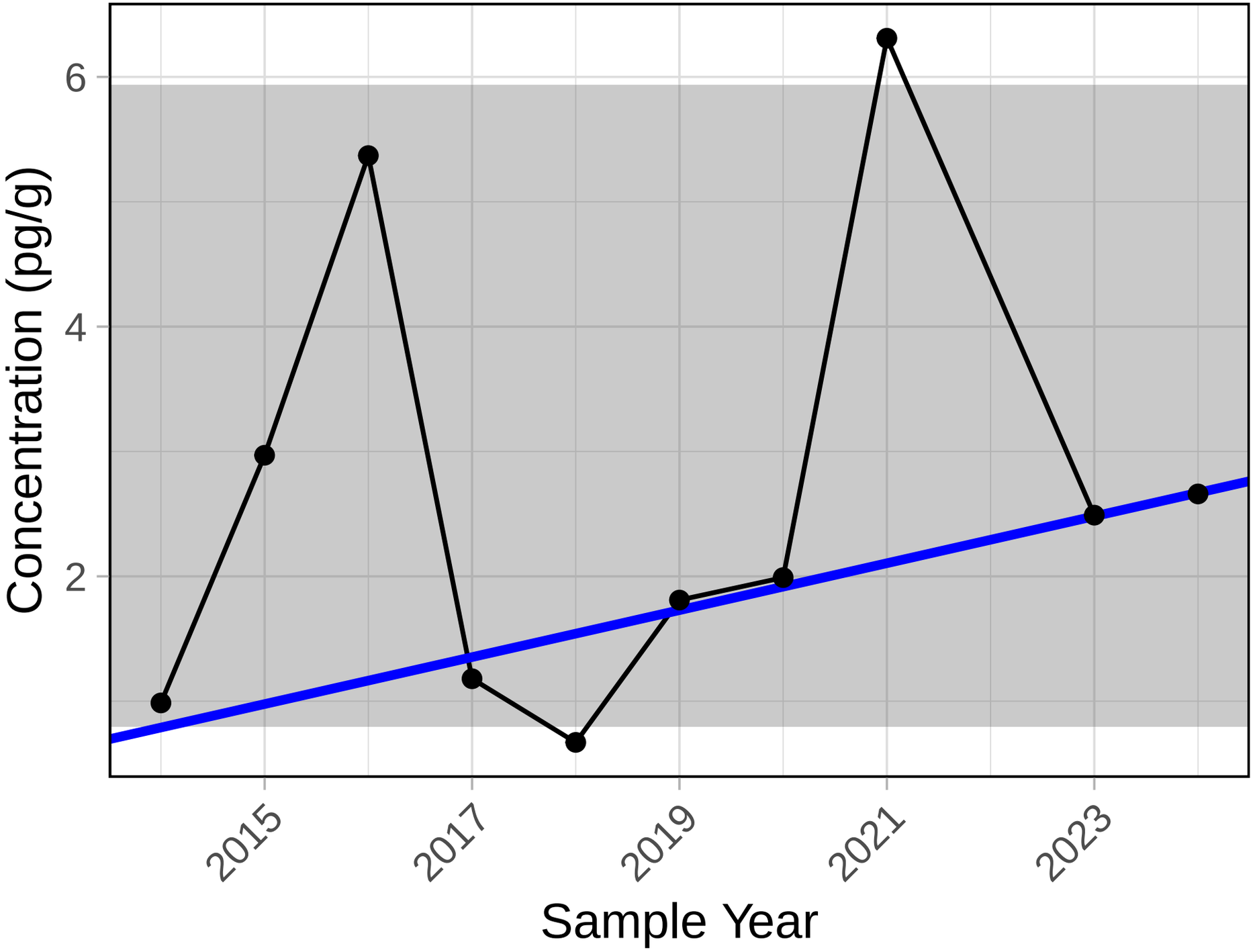
S5A Sediment



Trend significance p−value = 0.095

PCB 37

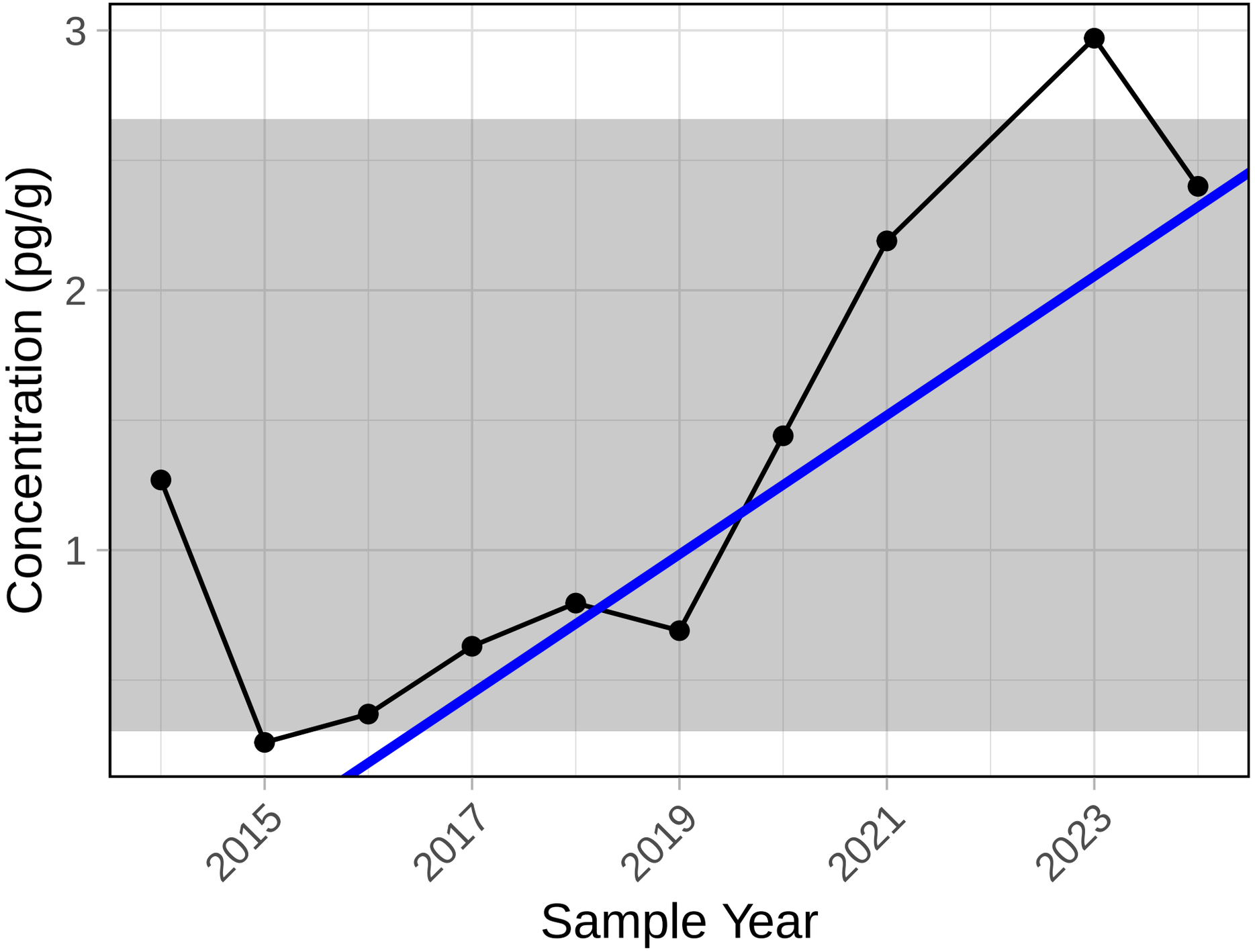
S5A Sediment



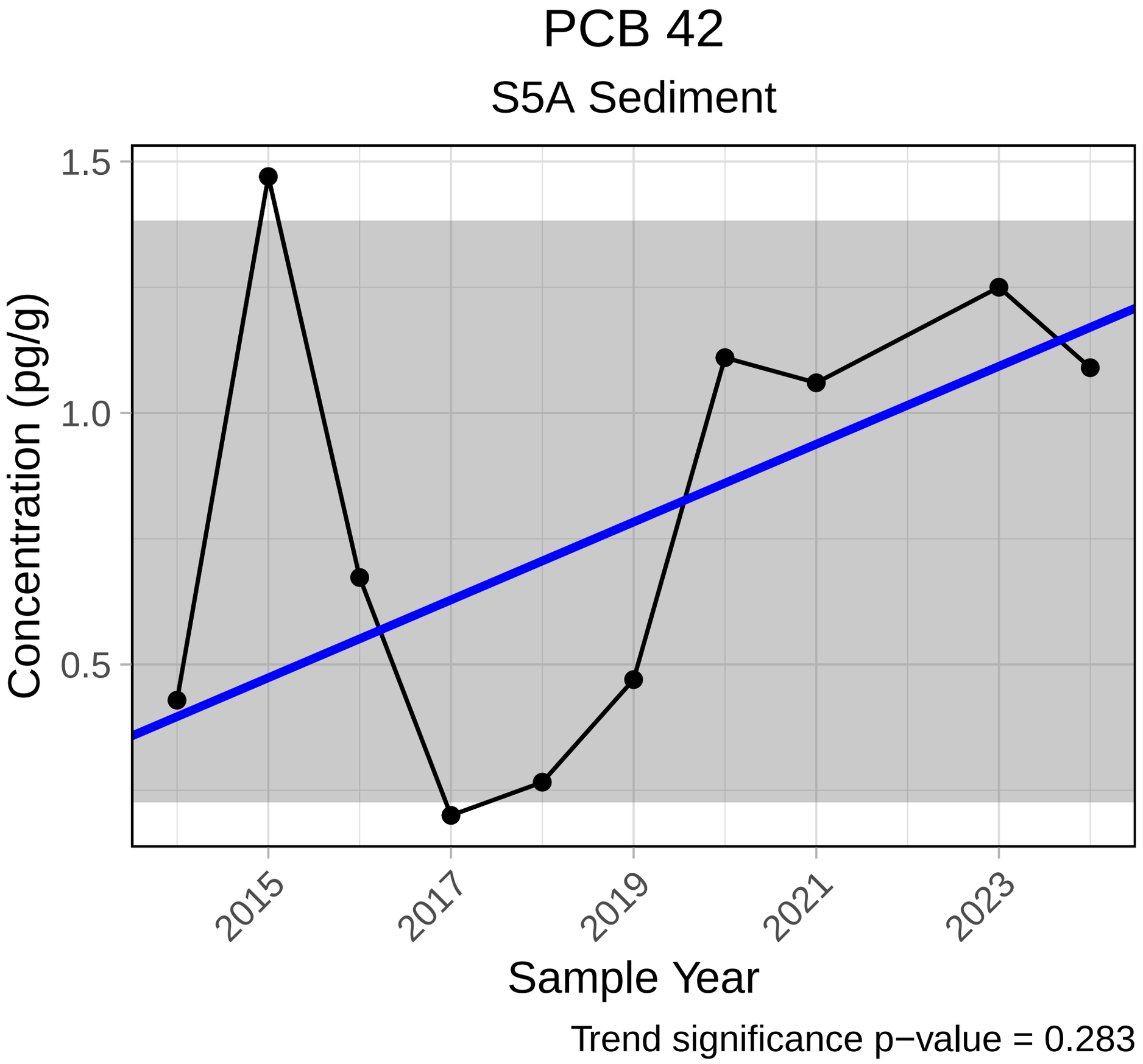
Trend significance p−value = 0.283

PCB 38

S5A Sediment

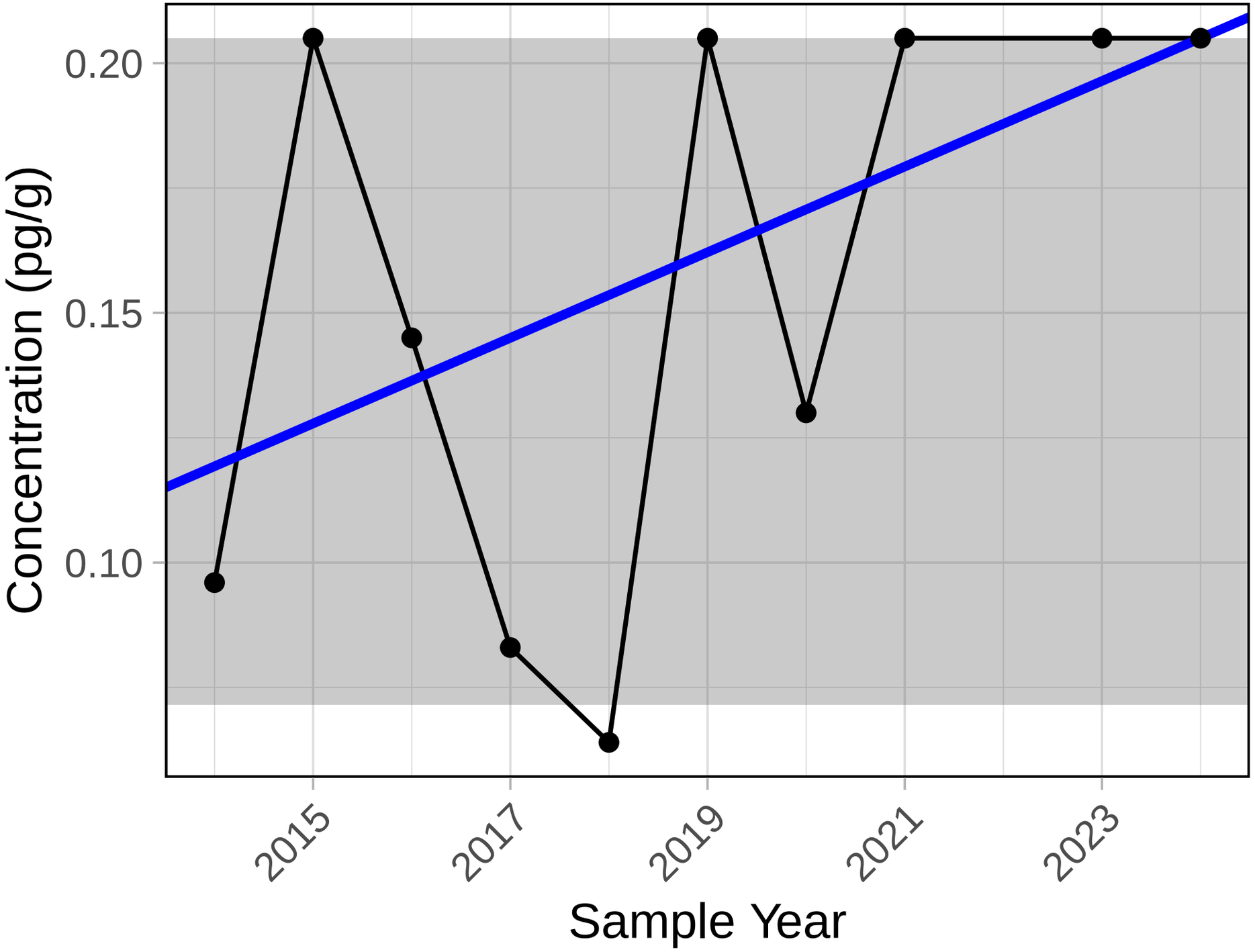


Trend significance p−value = 0.007


PCB 42
S5A Sediment
1.5
1.0
0.5
Concentration (pg/g)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.283

PCB 46

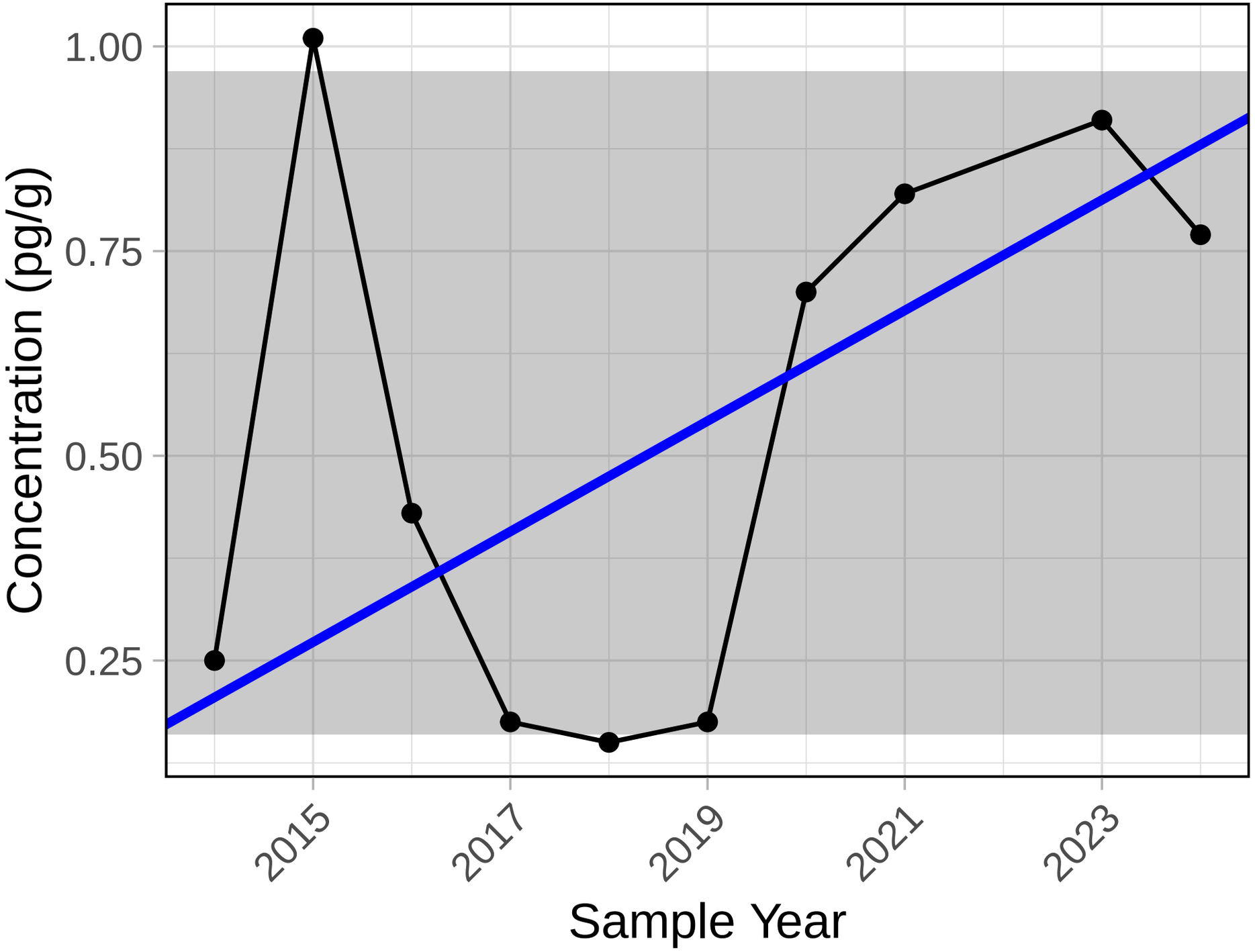
S5A Sediment



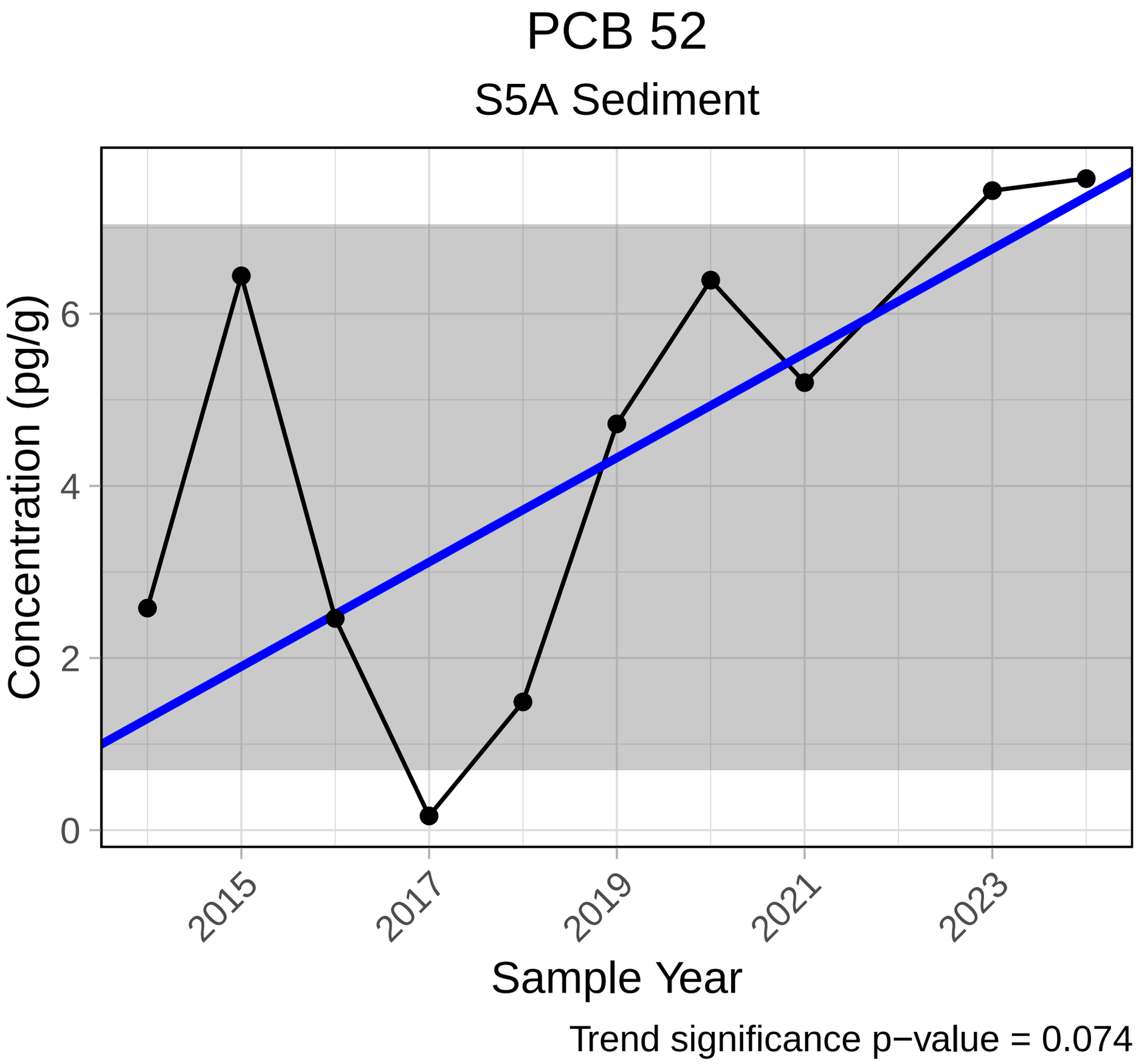
Trend significance p−value = 0.249

PCB 48

S5A Sediment

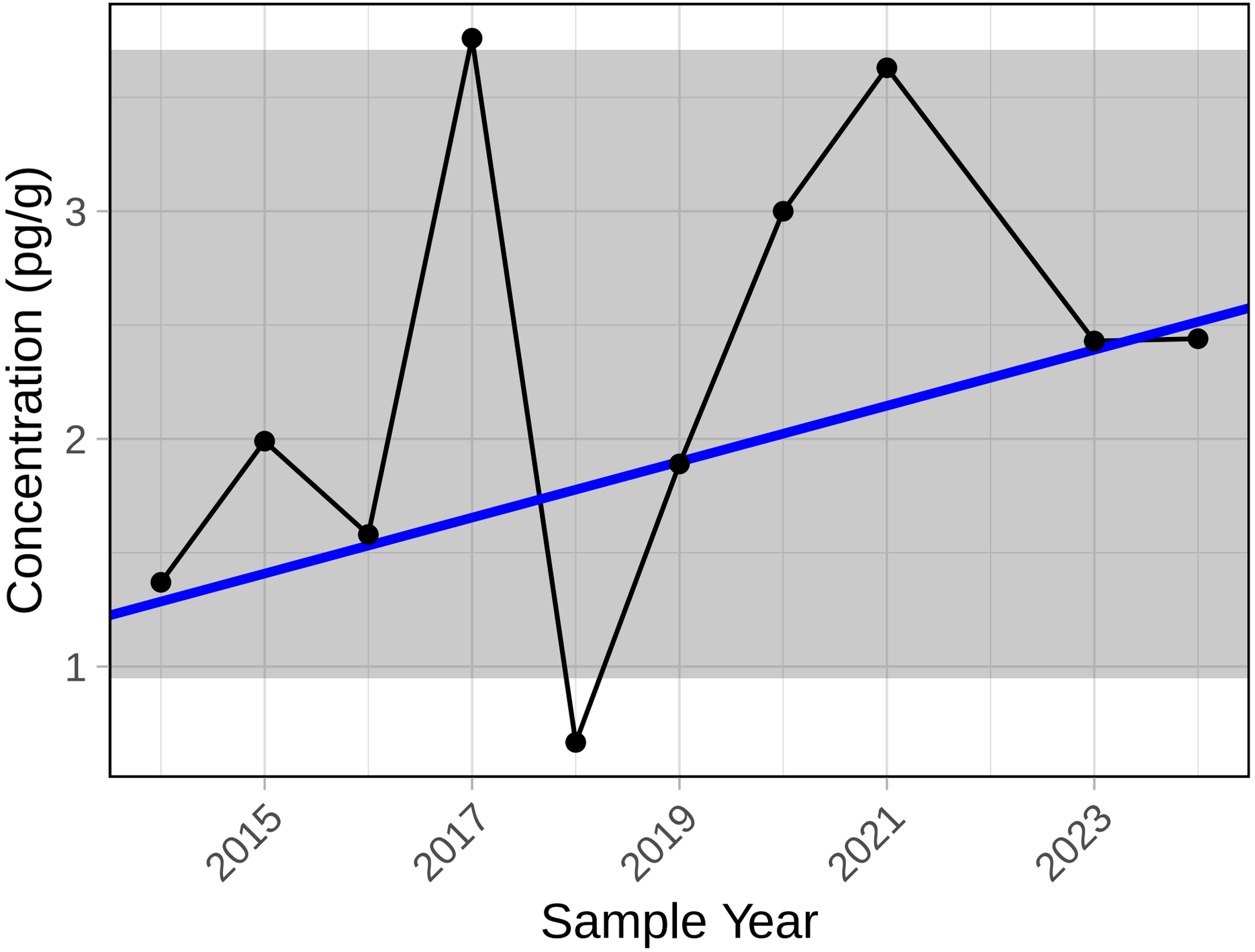


Trend significance p−value = 0.419


PCB 52
S5A Sediment
Concentration (pg/g)
0
2
4
6
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.074

PCB 56

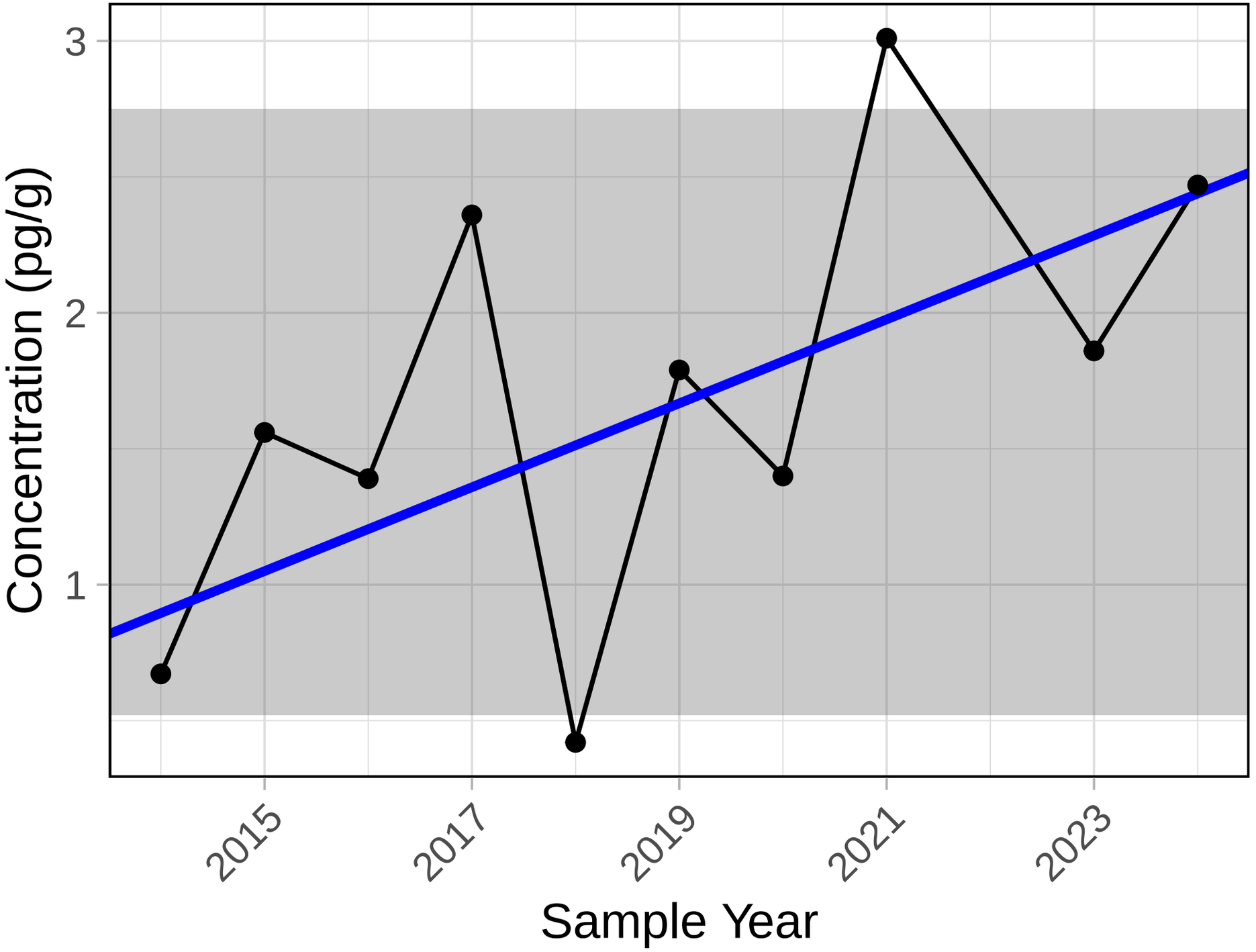
S5A Sediment



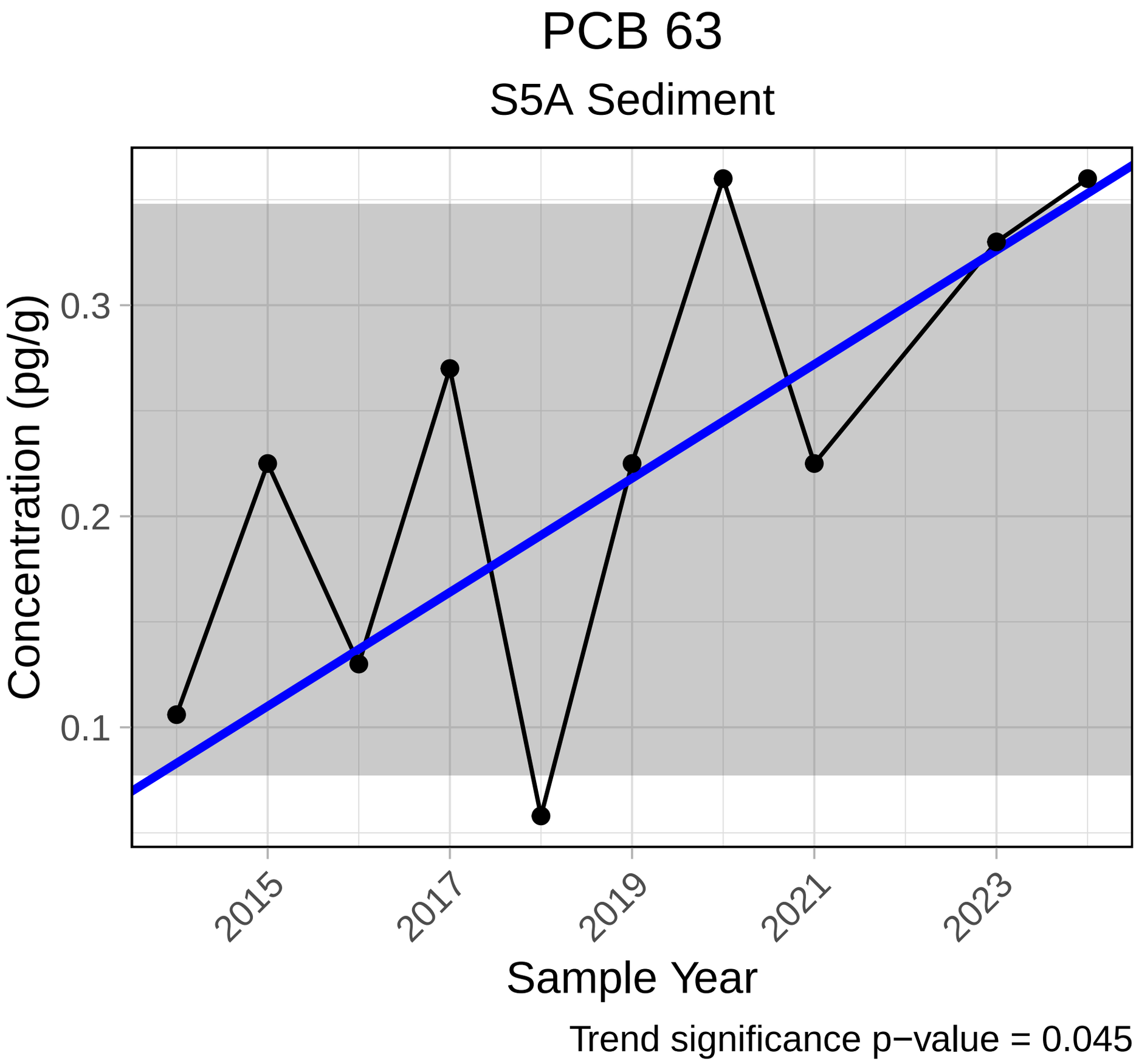
Trend significance p−value = 0.21

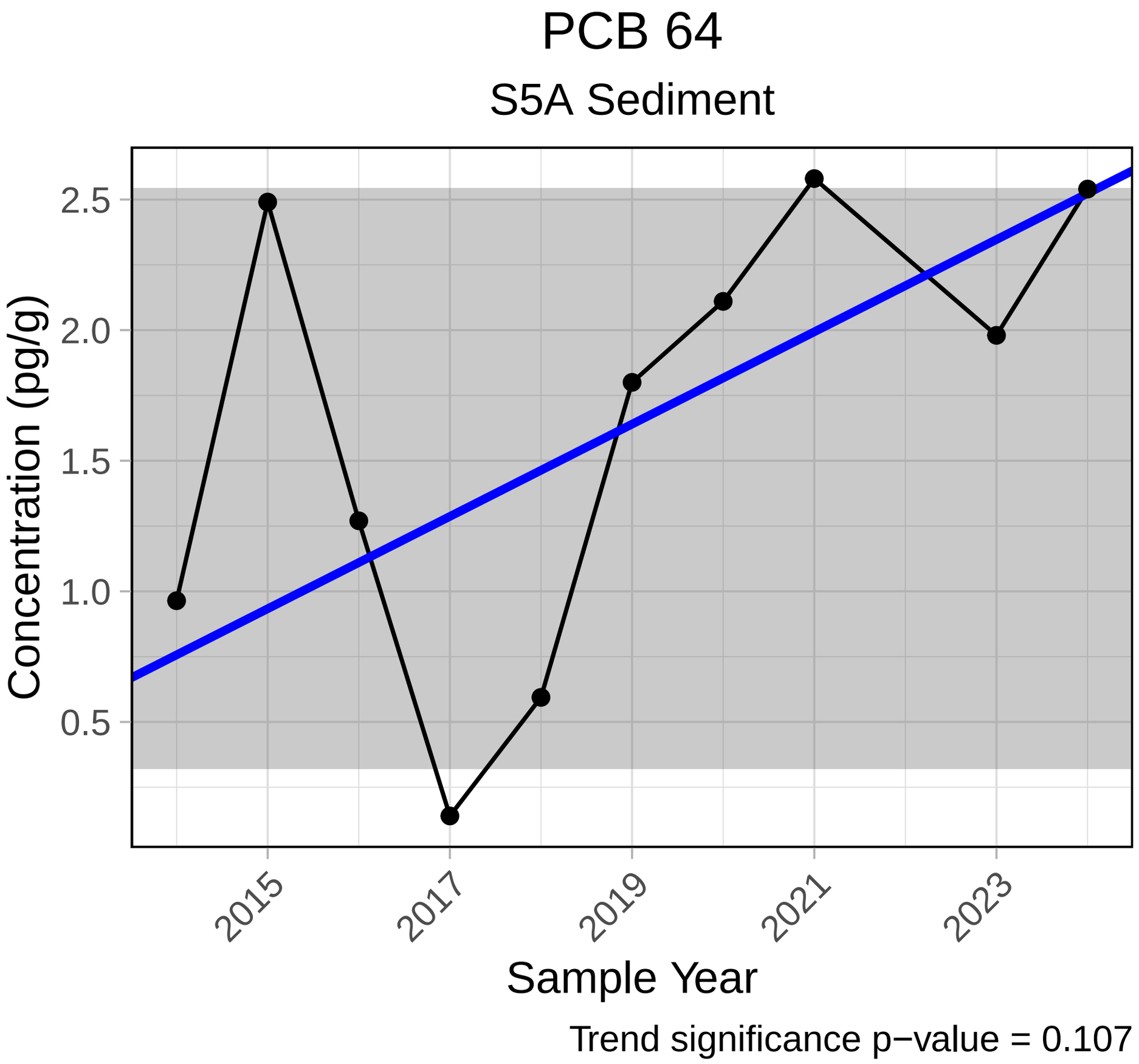
PCB 60

S5A Sediment



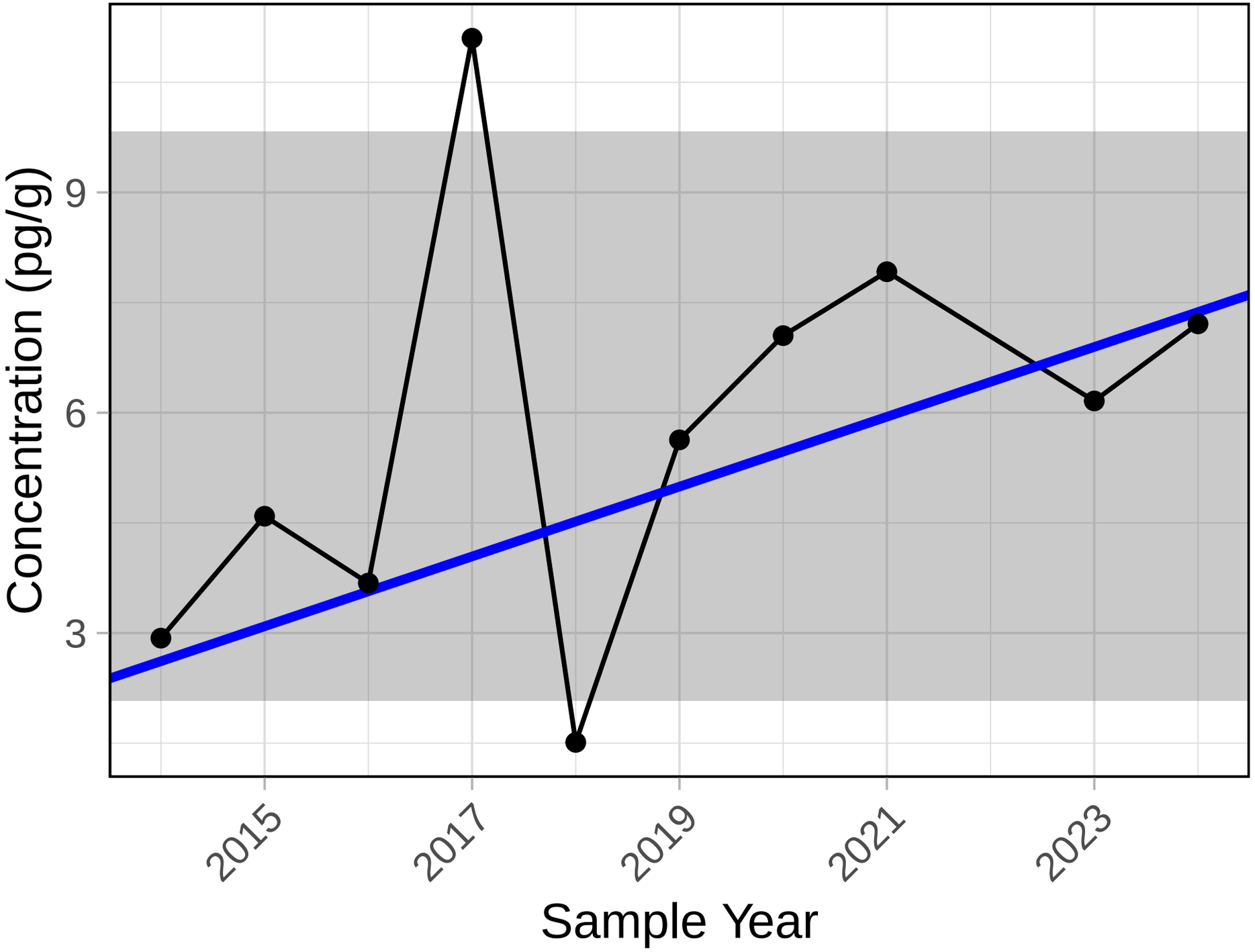
Trend significance p−value = 0.074


PCB 63
S5A Sediment
Concentration (pg/g)
0.3
0.2
0.1
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.045


PCB 64
S5A Sediment
Concentration (pg/g)
2.5
2.0
1.5
1.0
0.5
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.107

PCB 66

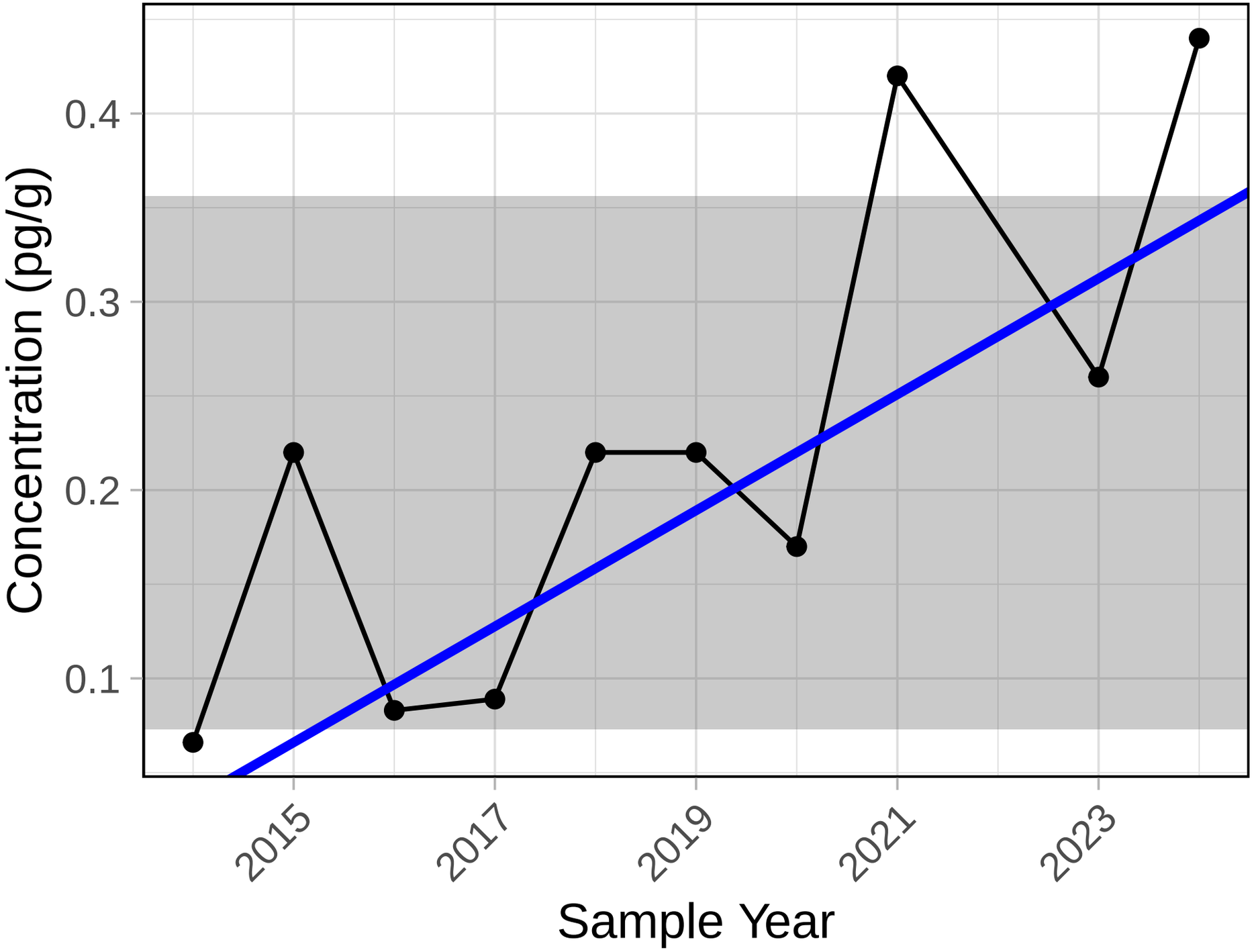
S5A Sediment



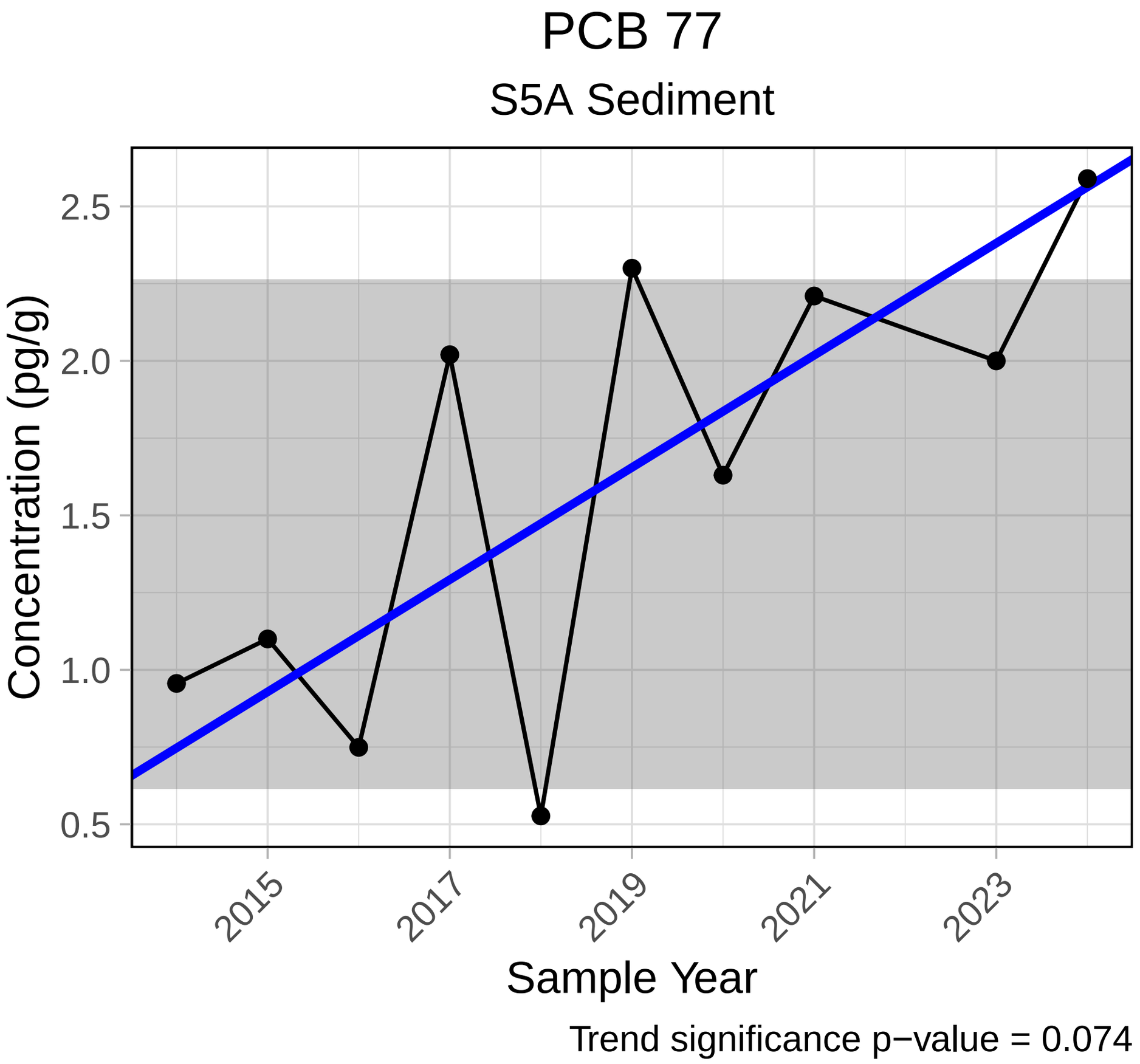
Trend significance p−value = 0.107

PCB 68

S5A Sediment

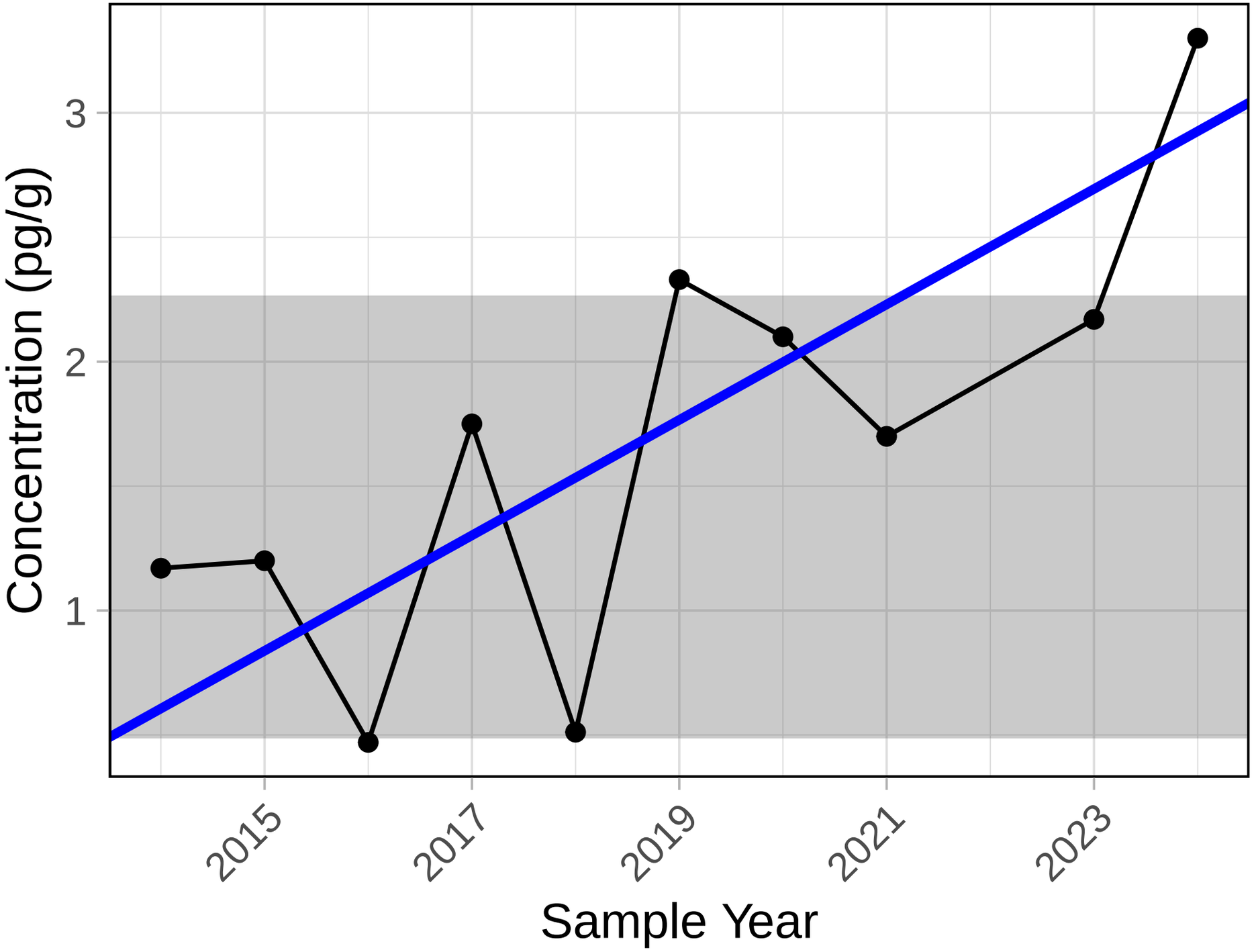


Trend significance p−value = 0.008

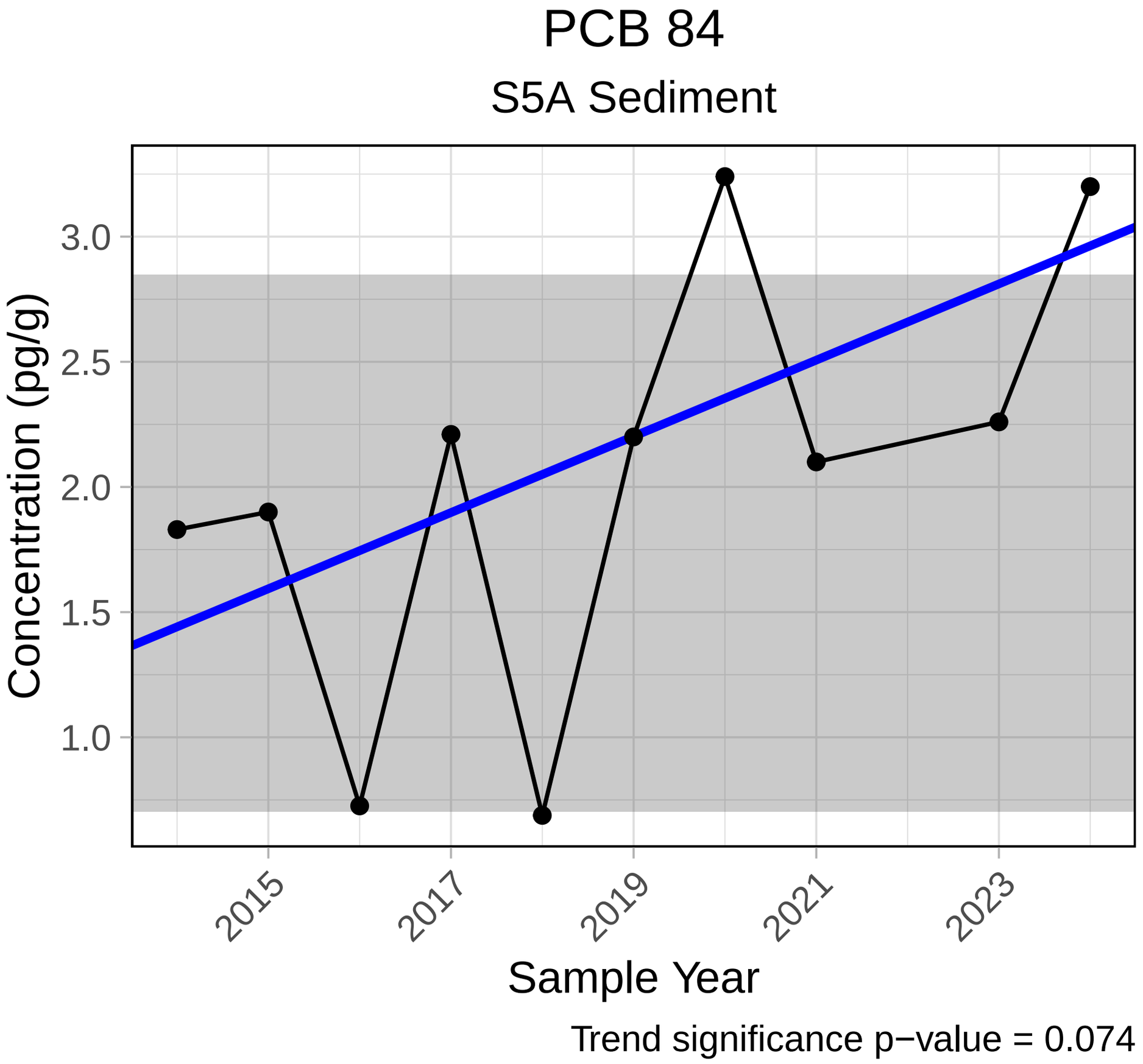

PCB 77
S5A Sediment
Concentration (pg/g)
2.5
2.0
1.5
1.0
0.5
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.074

PCB 82

S5A Sediment

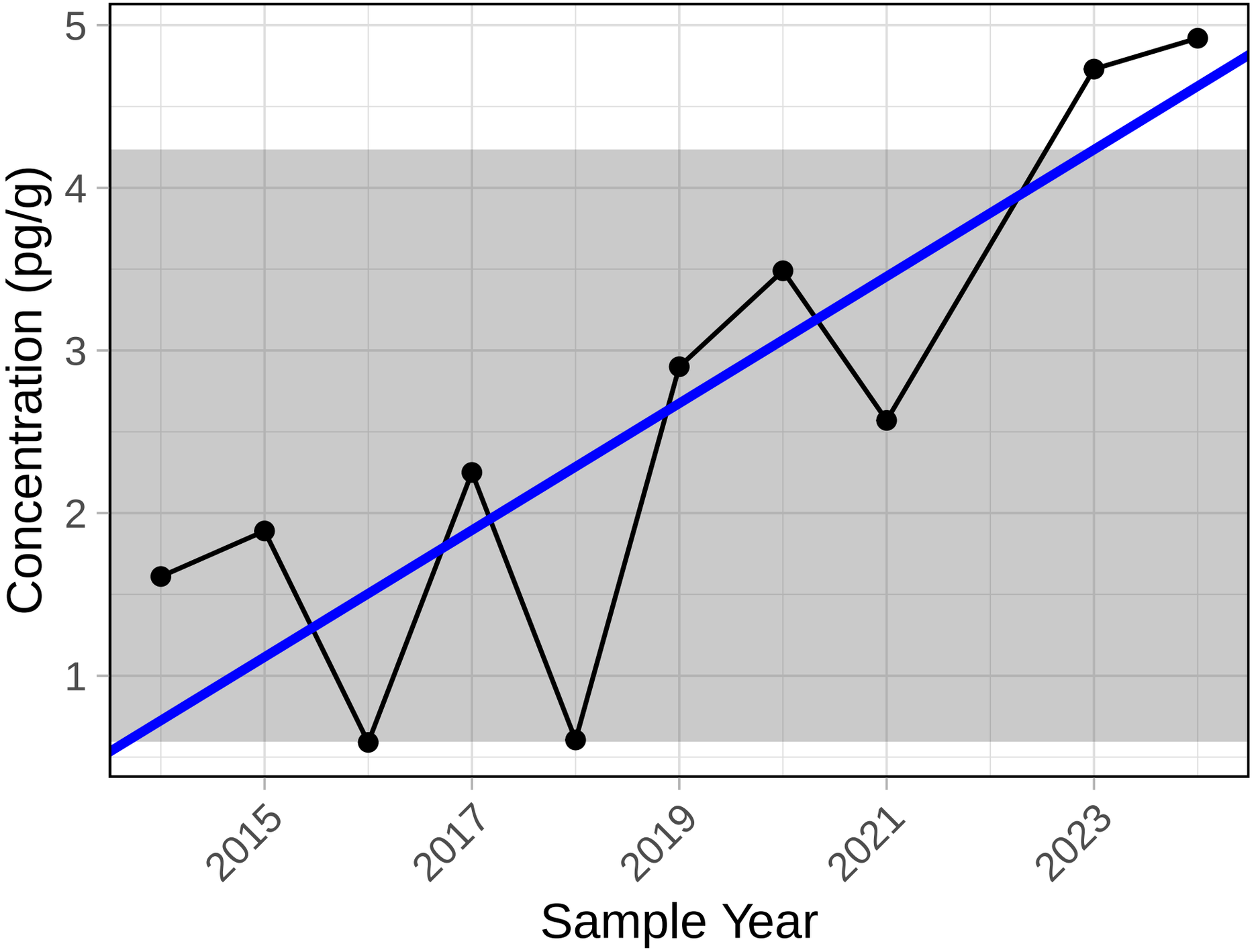


Trend significance p−value = 0.032


PCB 84
S5A Sediment
Concentration (pg/g)
3.0
2.5
2.0
1.5
1.0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.074

PCB 92

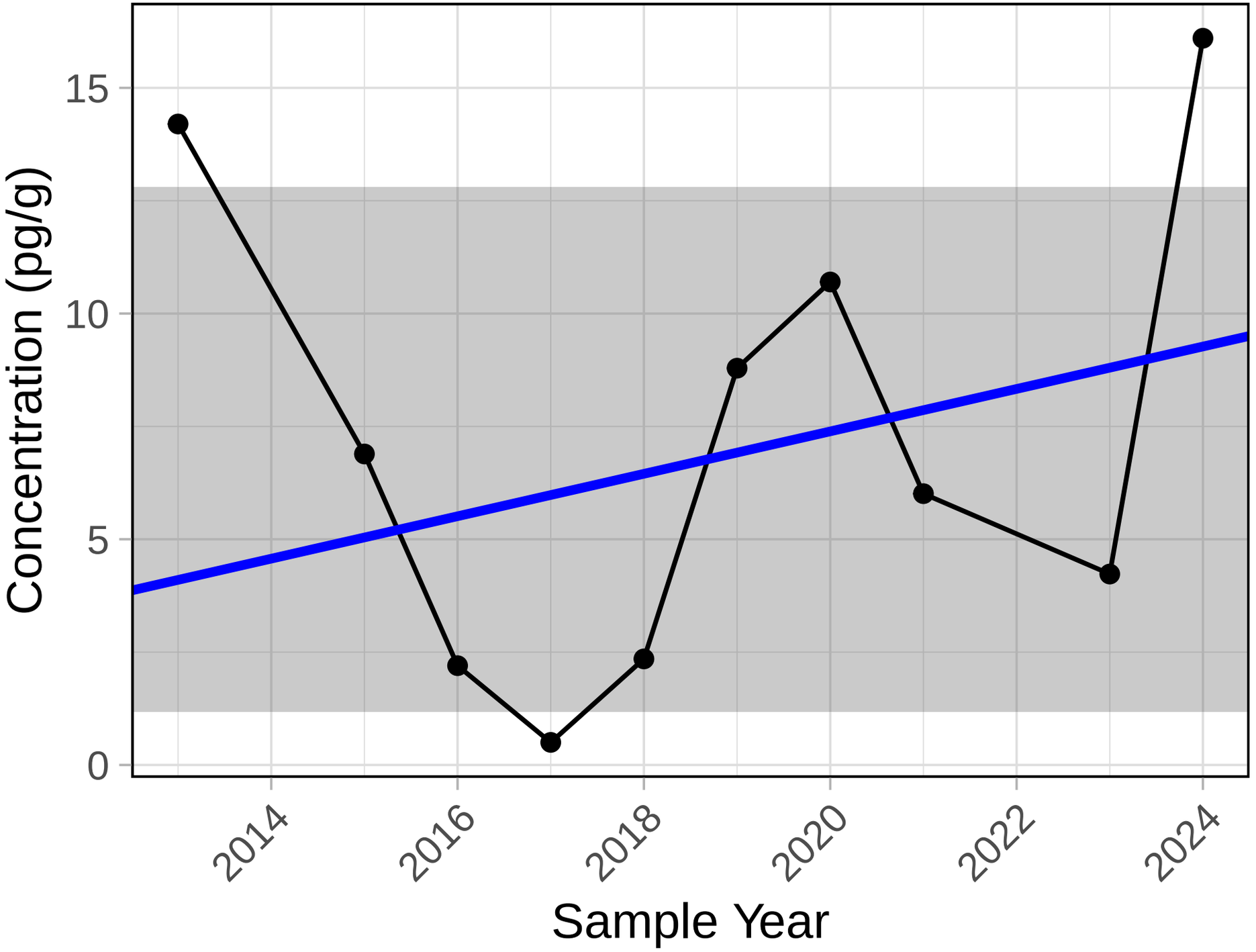
S5A Sediment



Trend significance p−value = 0.007

PCB 95

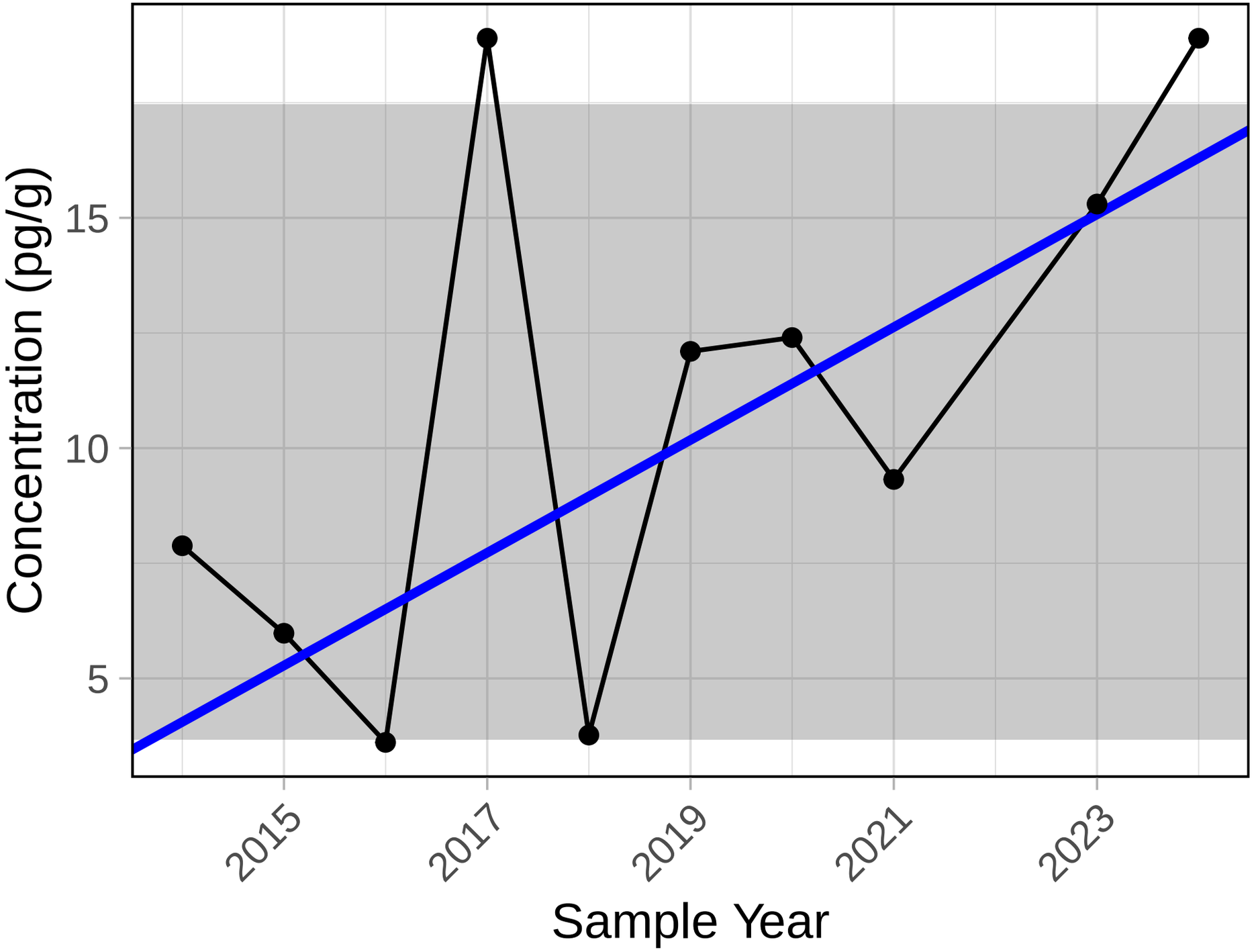
S5A Sediment



Trend significance p−value = 0.592

PCB 105

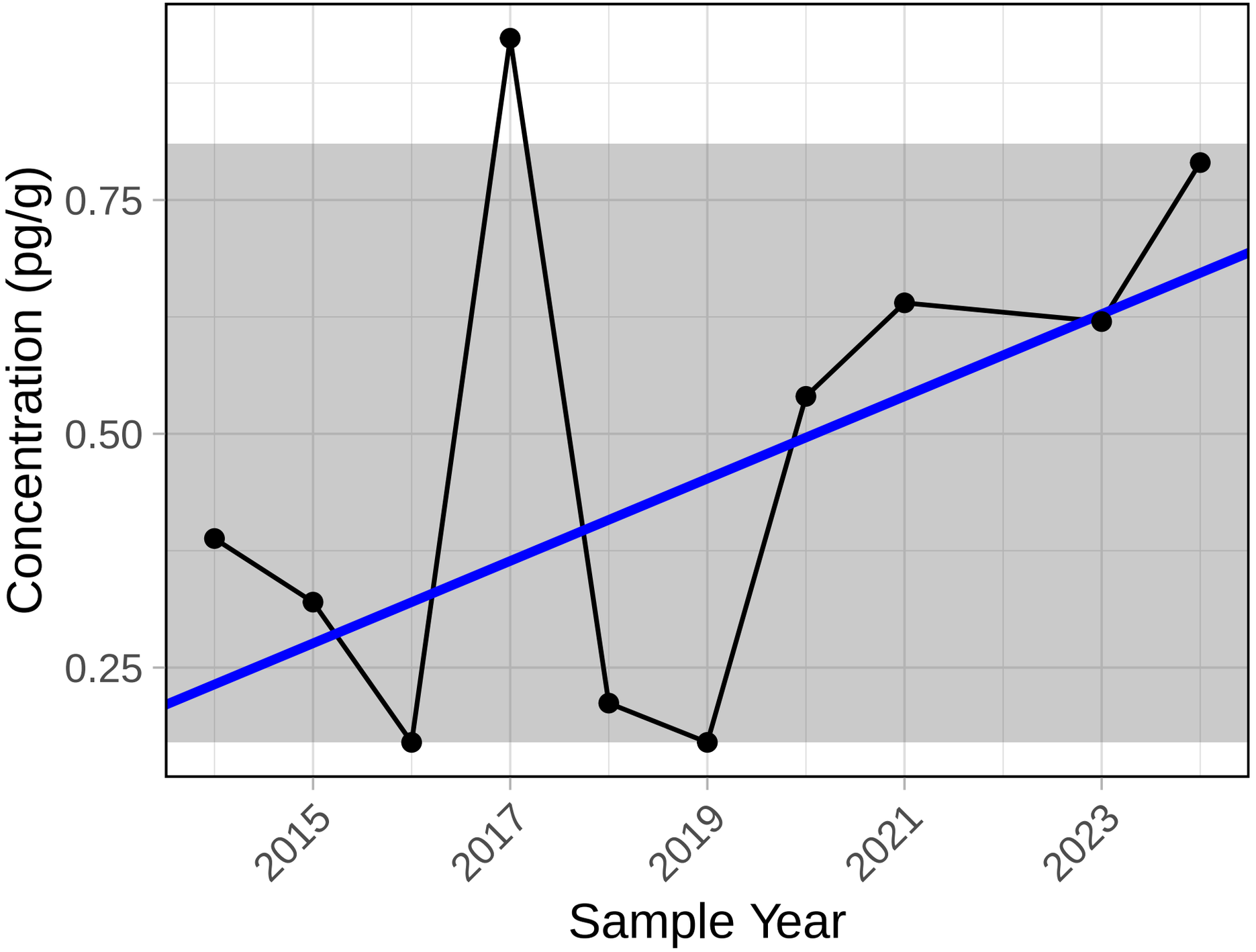
S5A Sediment



Trend significance p−value = 0.088

PCB 114

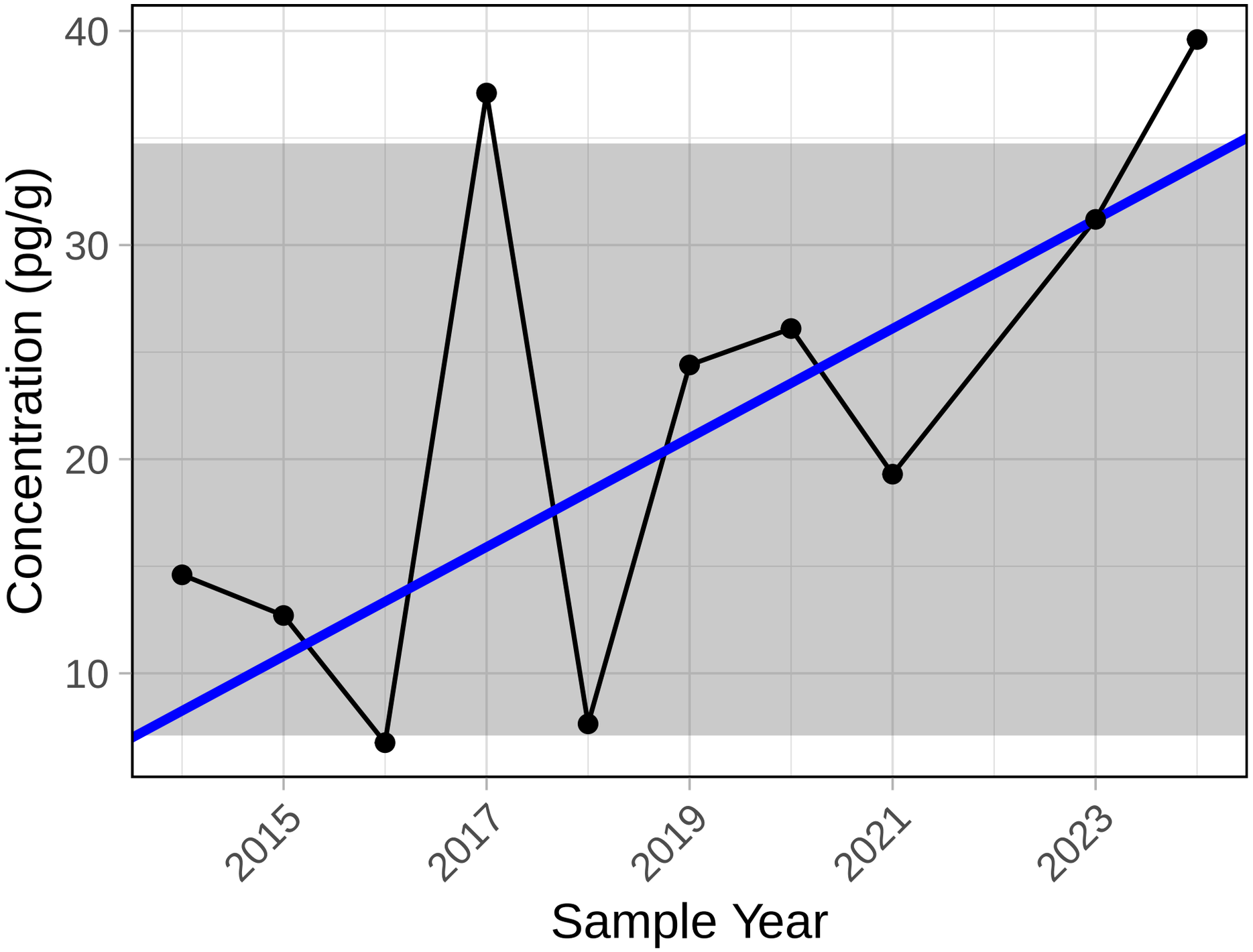
S5A Sediment



Trend significance p−value = 0.243

PCB 118

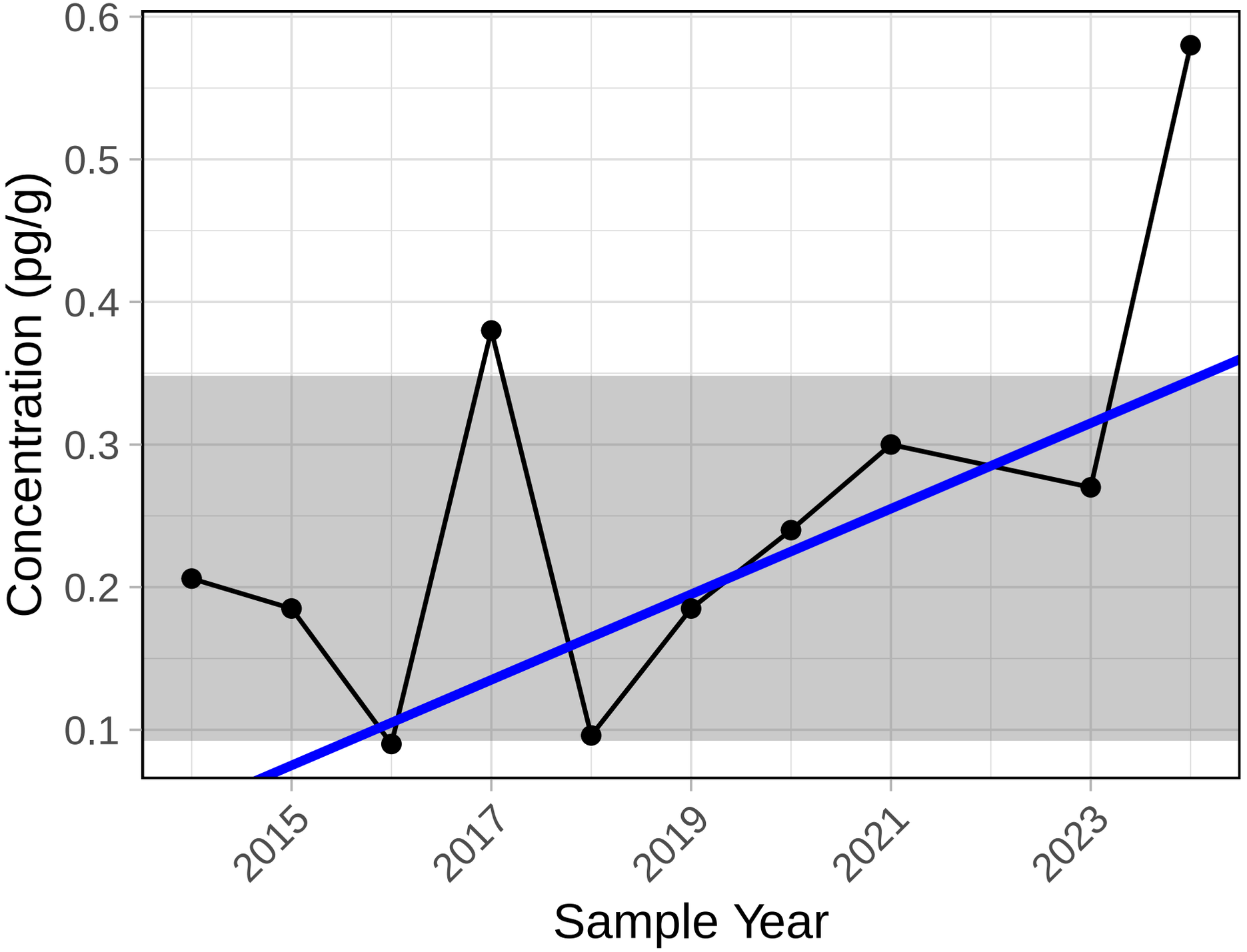
S5A Sediment



Trend significance p−value = 0.074

PCB 122

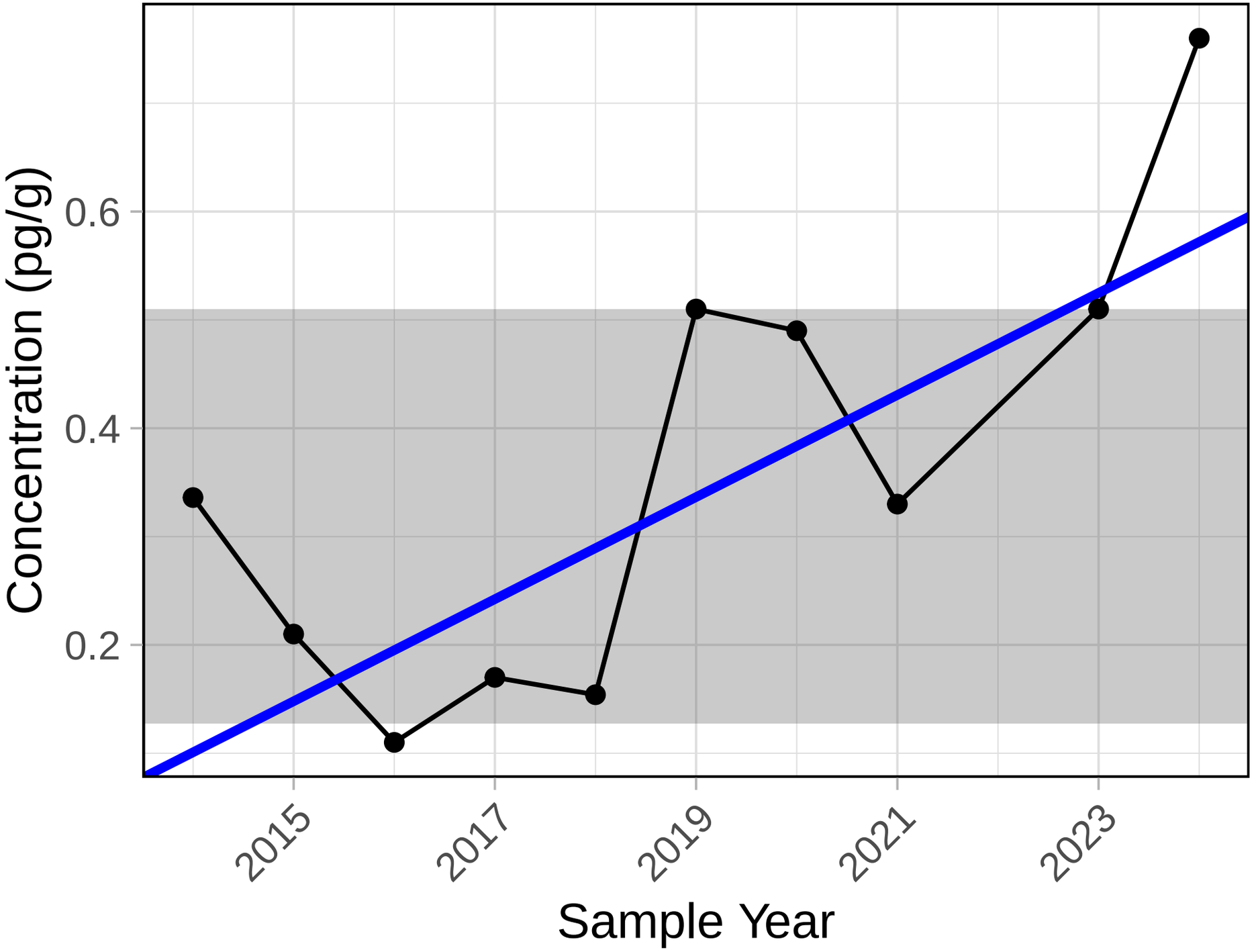
S5A Sediment



Trend significance p−value = 0.088

PCB 123

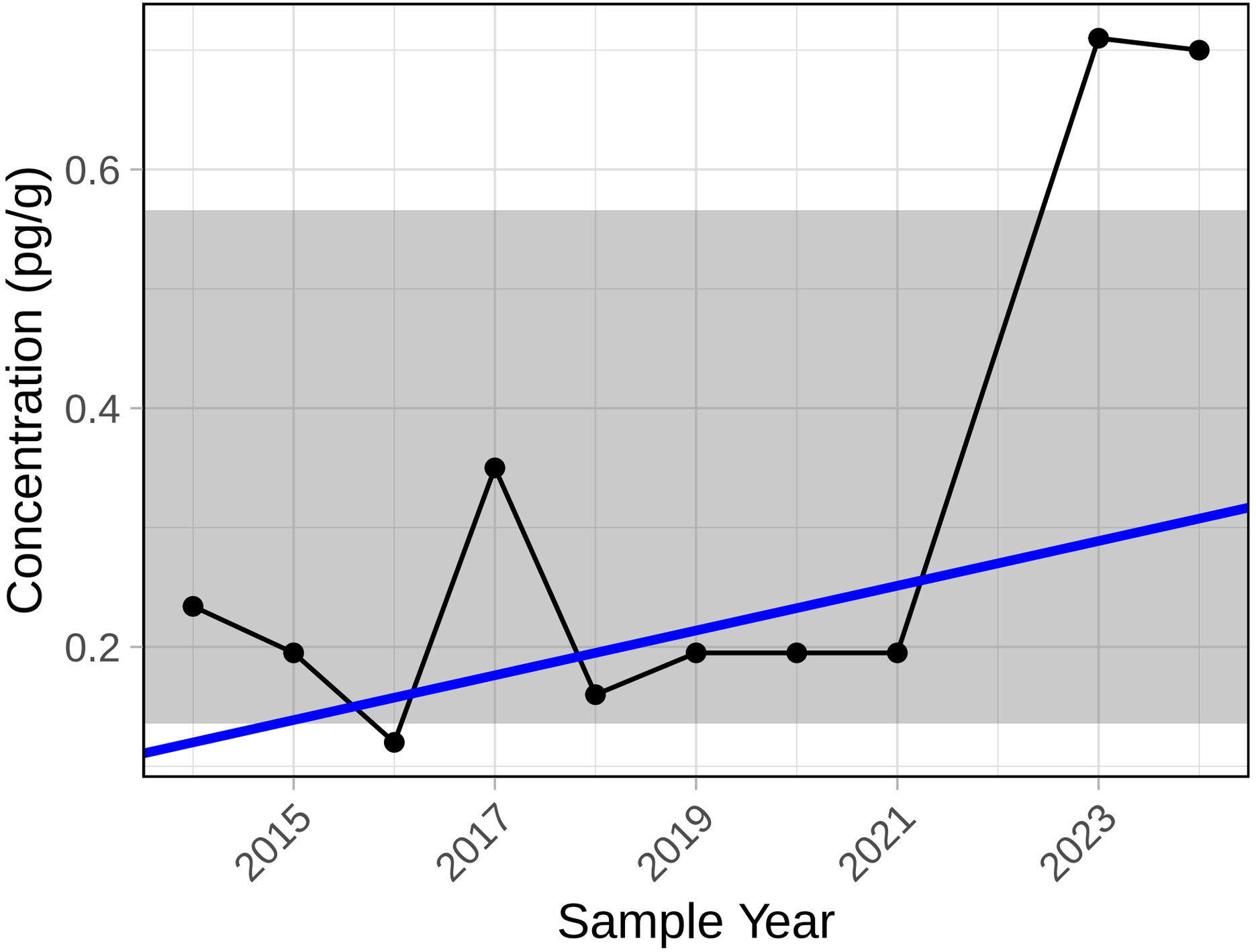
S5A Sediment



Trend significance p−value = 0.088

PCB 126

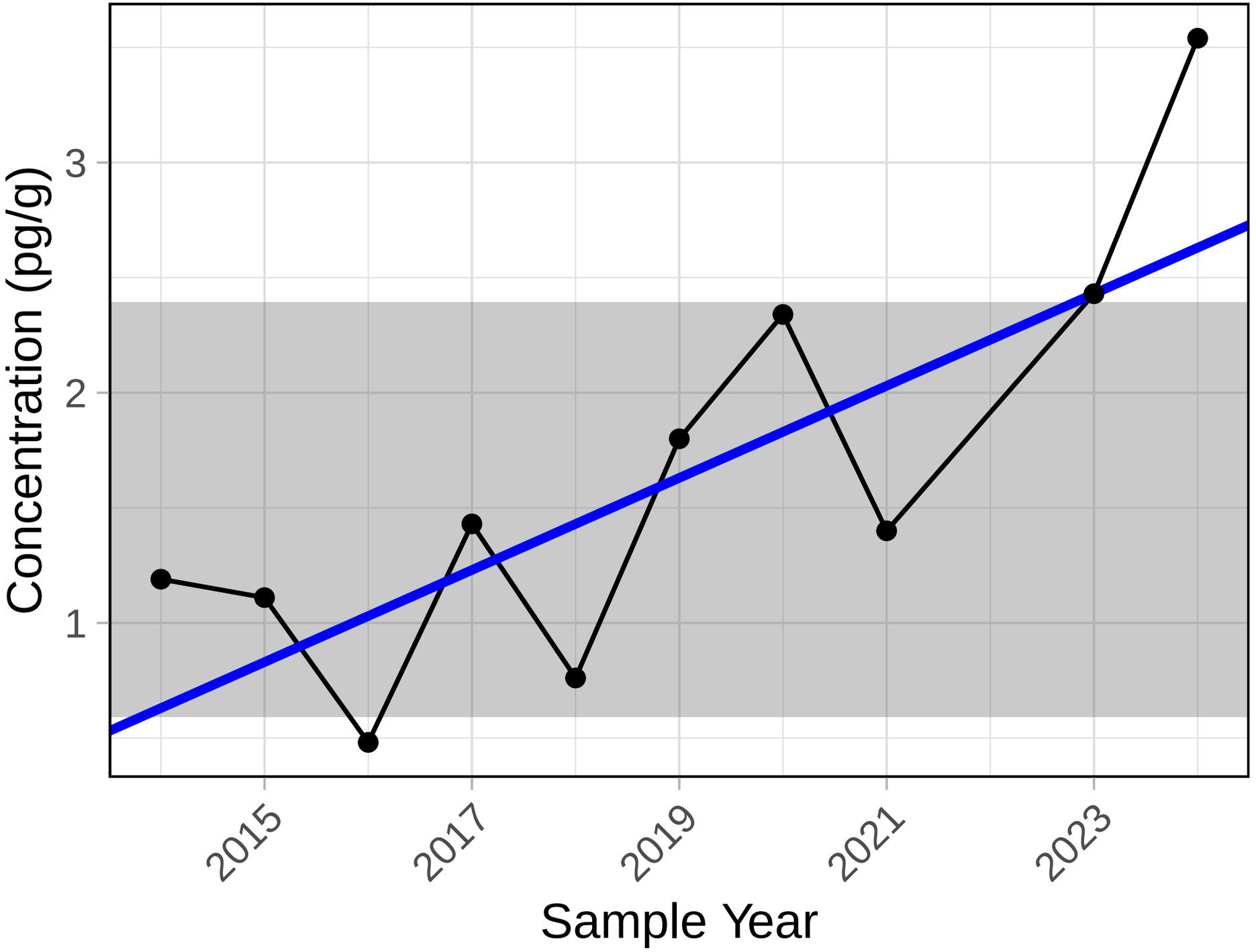
S5A Sediment



Trend significance p−value = 0.266

PCB 130

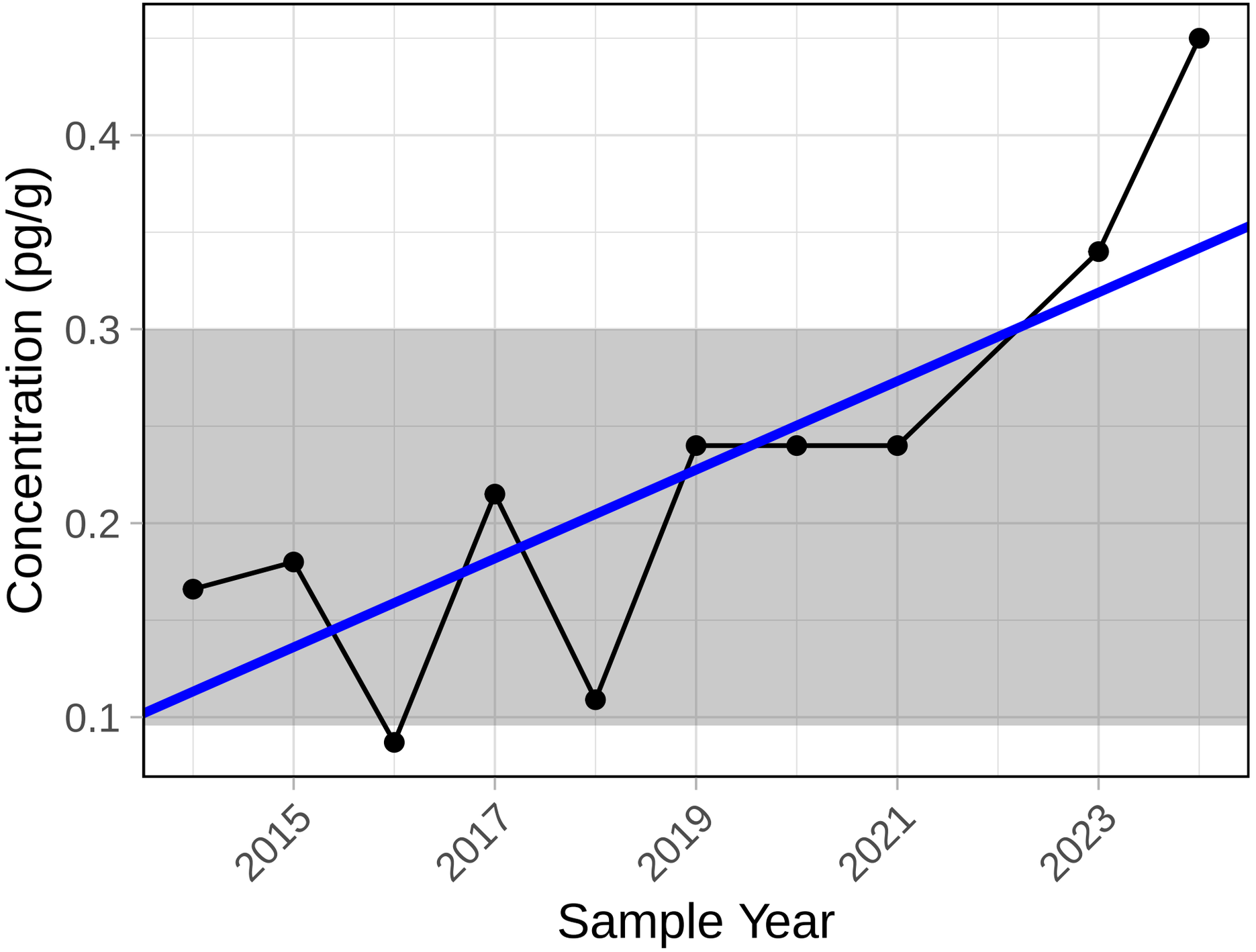
S5A Sediment



Trend significance p−value = 0.02

PCB 131

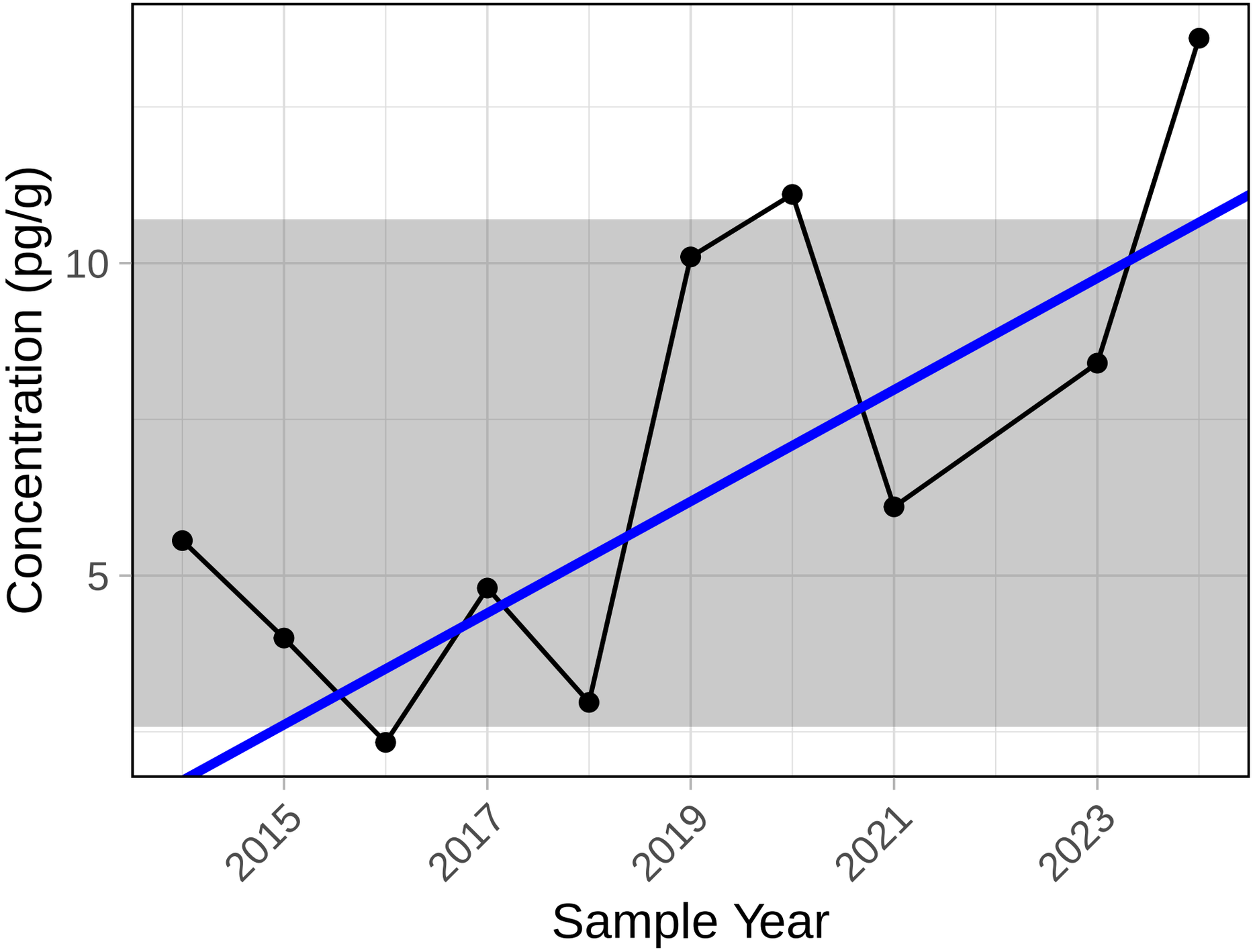
S5A Sediment



Trend significance p−value = 0.005

PCB 132

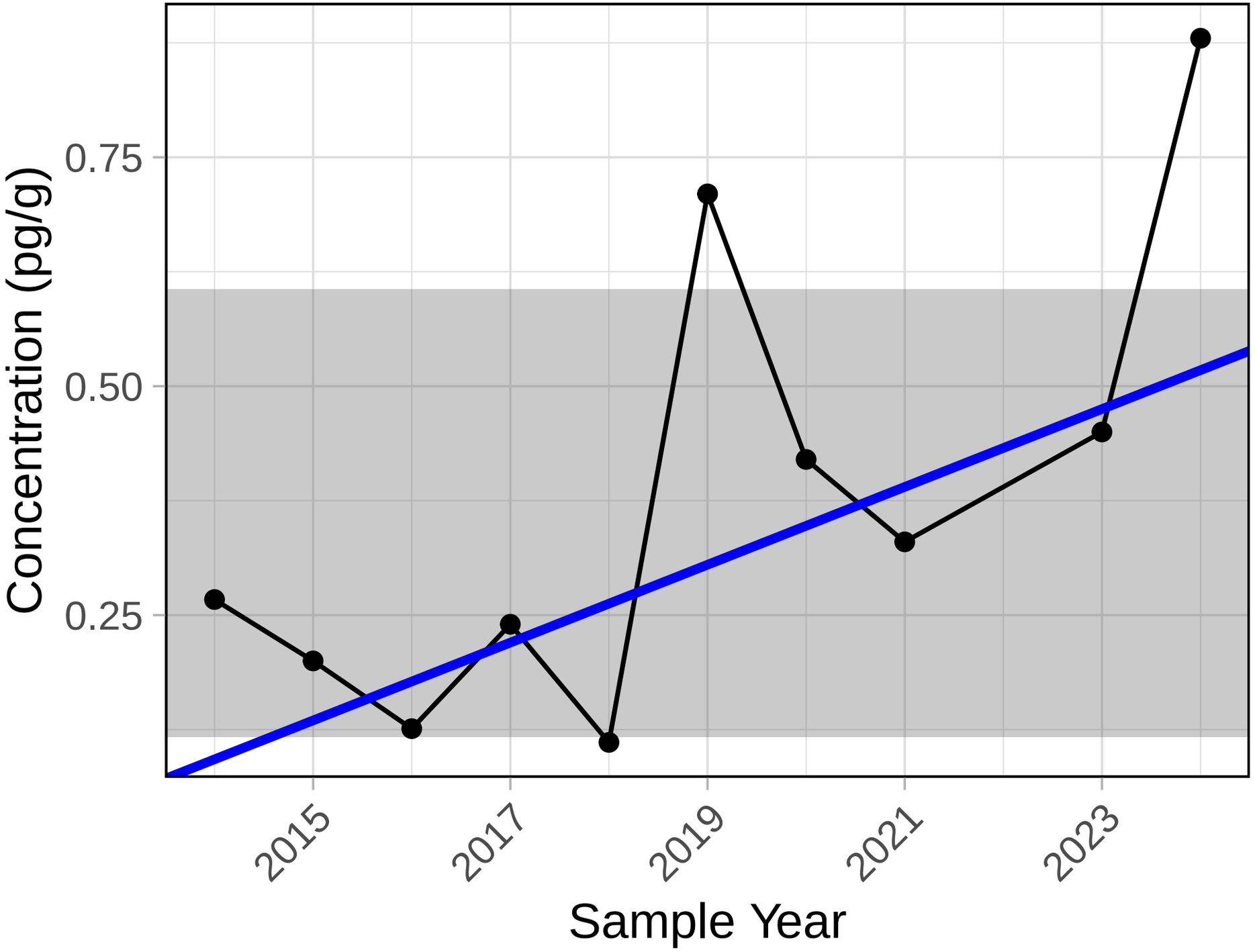
S5A Sediment



Trend significance p−value = 0.049

PCB 133

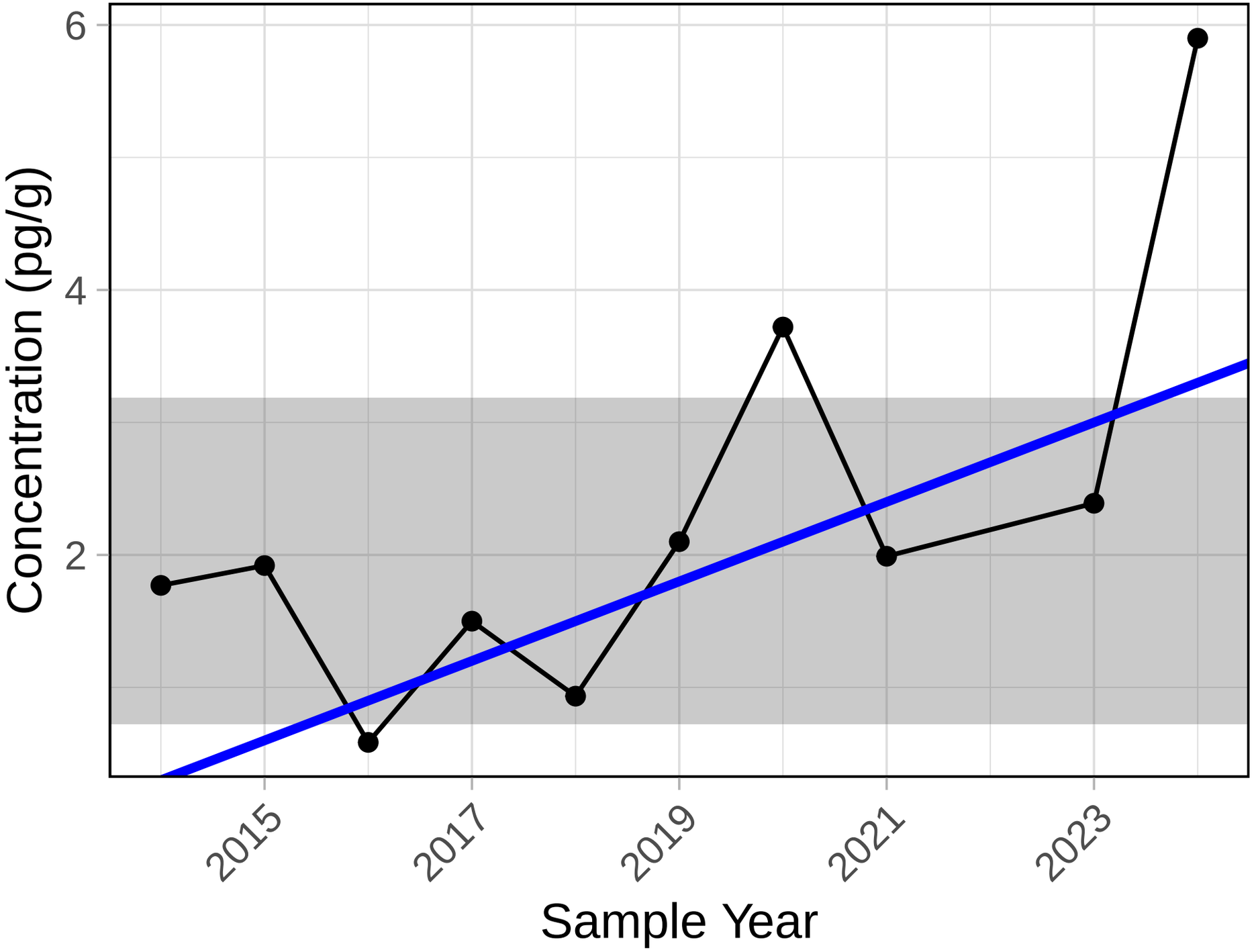
S5A Sediment



Trend significance p−value = 0.074

PCB 136

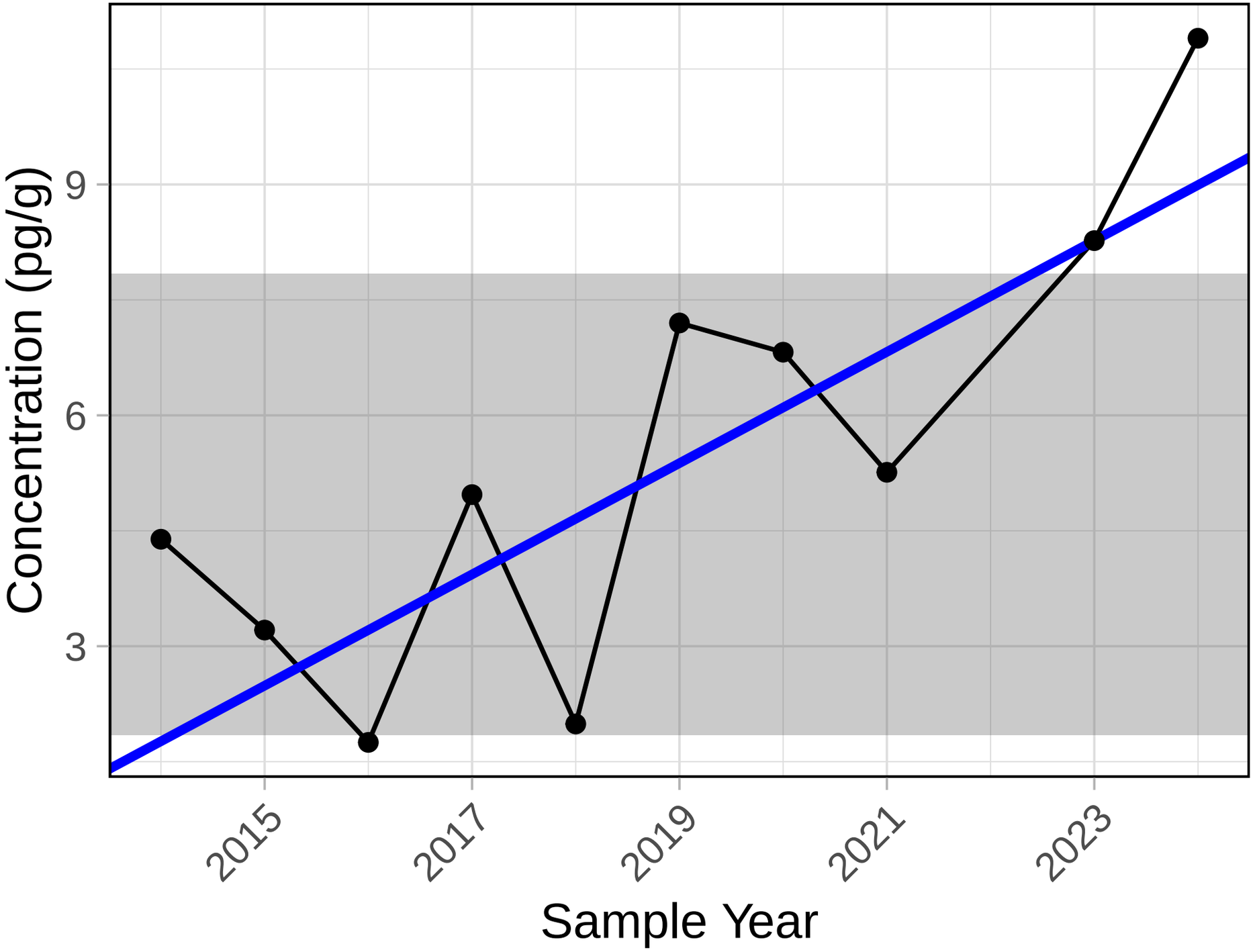
S5A Sediment



Trend significance p−value = 0.032

PCB 141

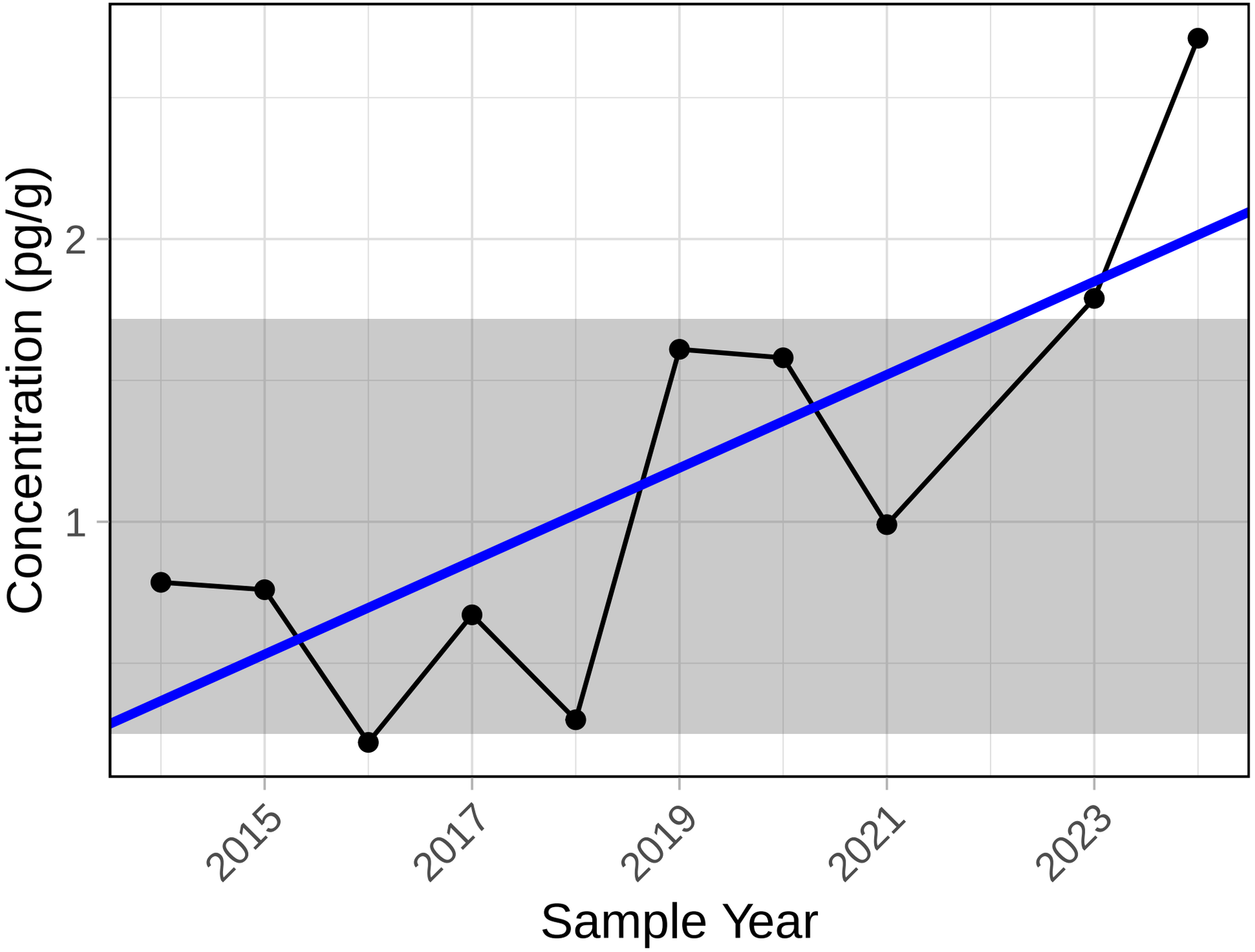
S5A Sediment



Trend significance p−value = 0.02

PCB 144

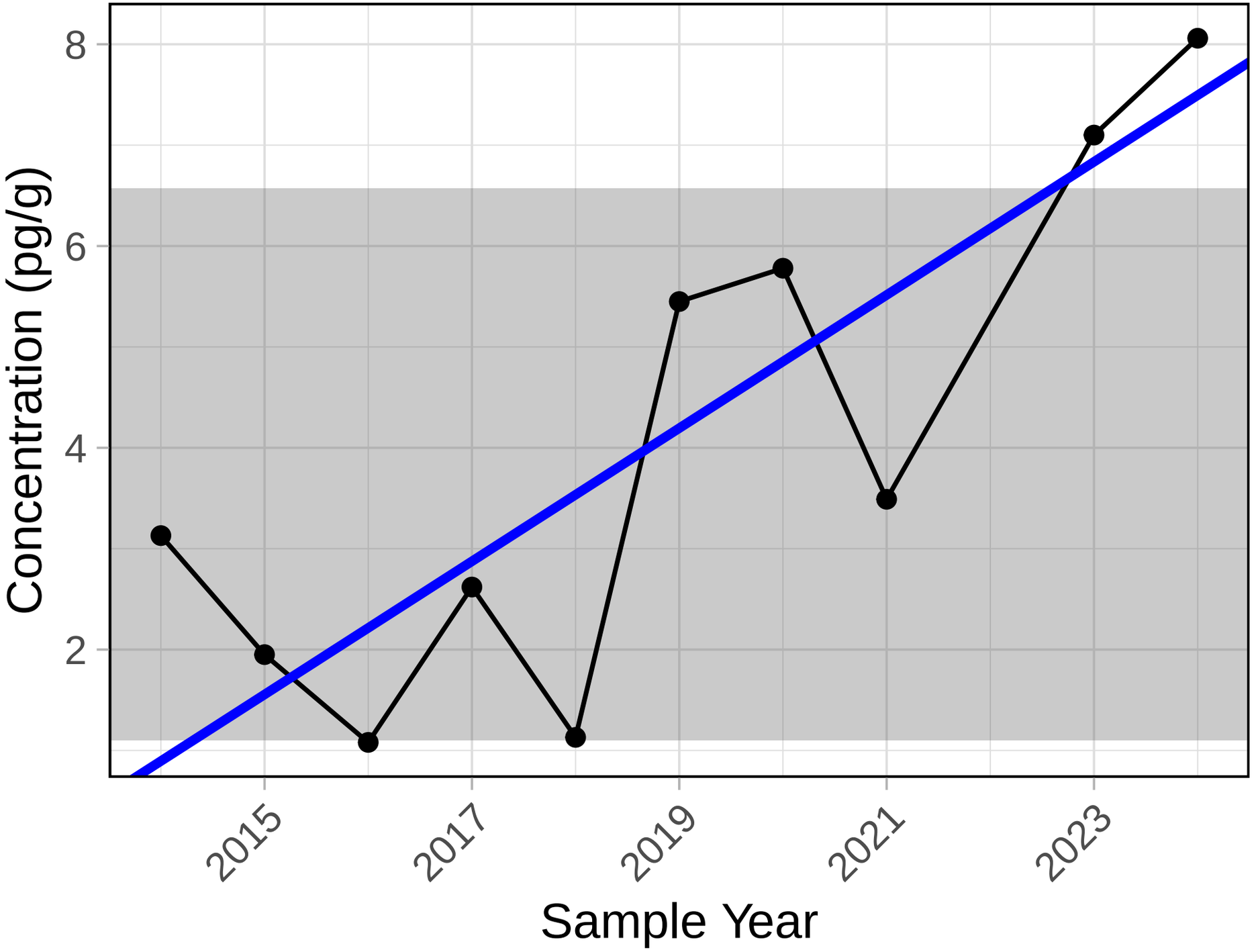
S5A Sediment



Trend significance p−value = 0.049

PCB 146

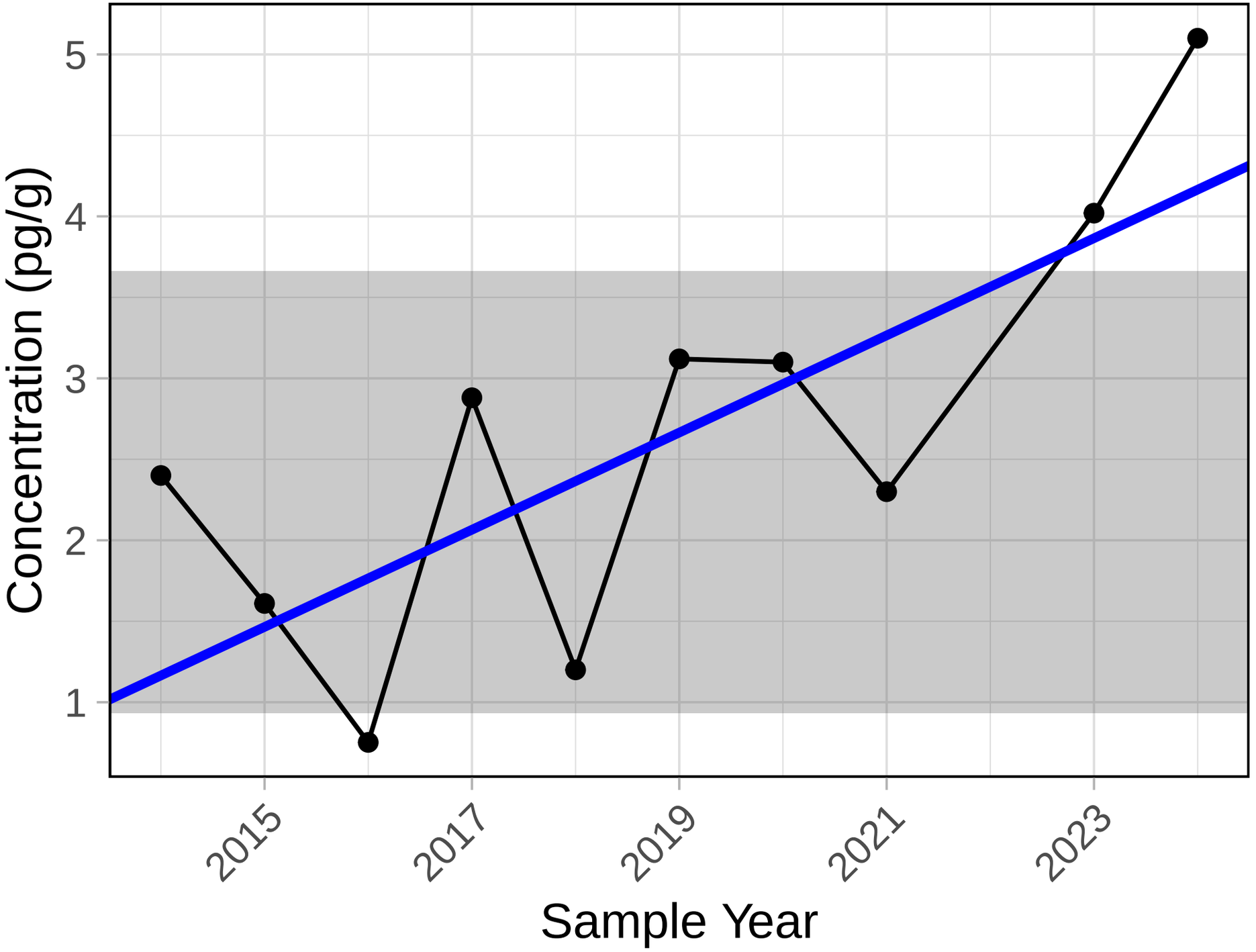
S5A Sediment



Trend significance p−value = 0.02

PCB 158

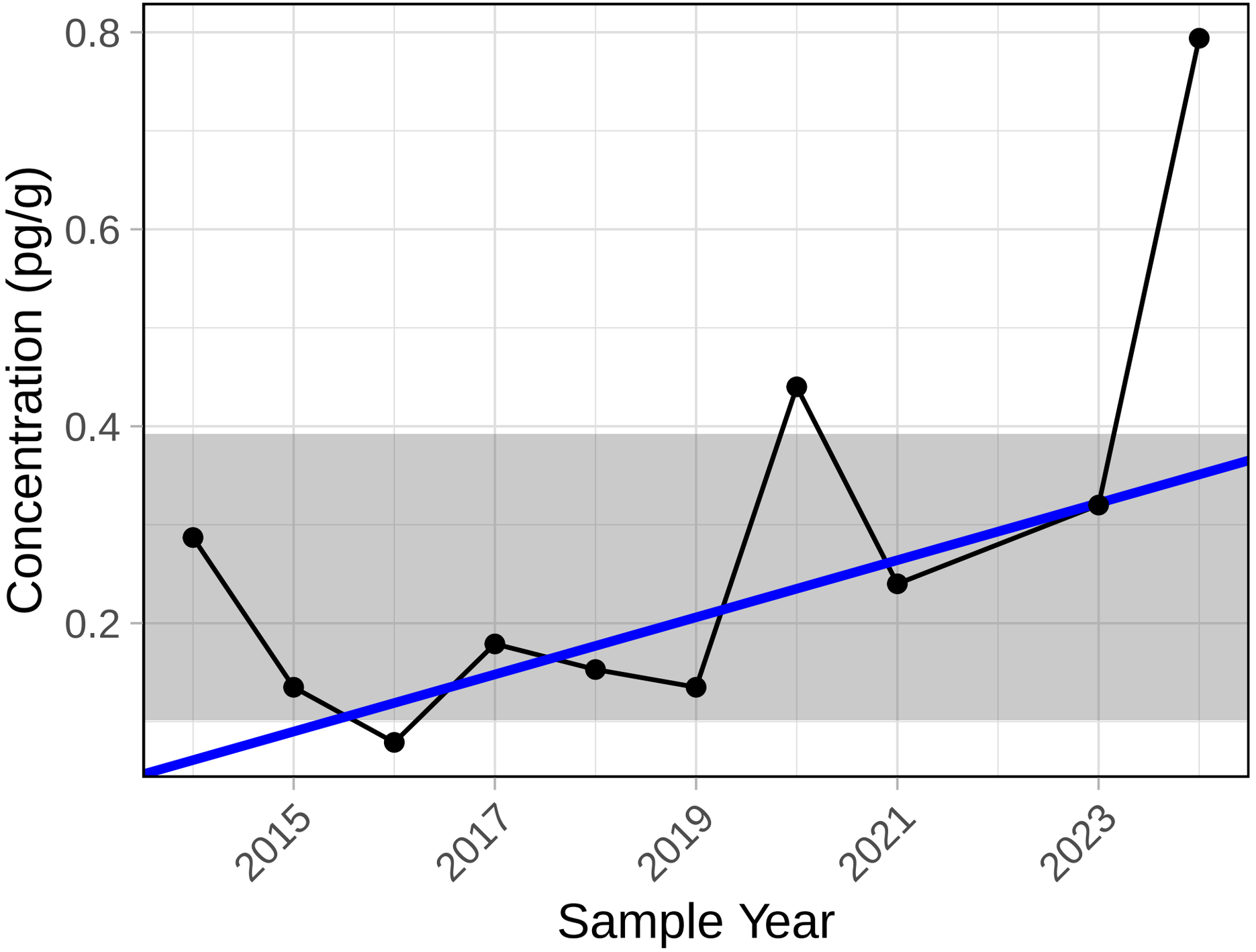
S5A Sediment



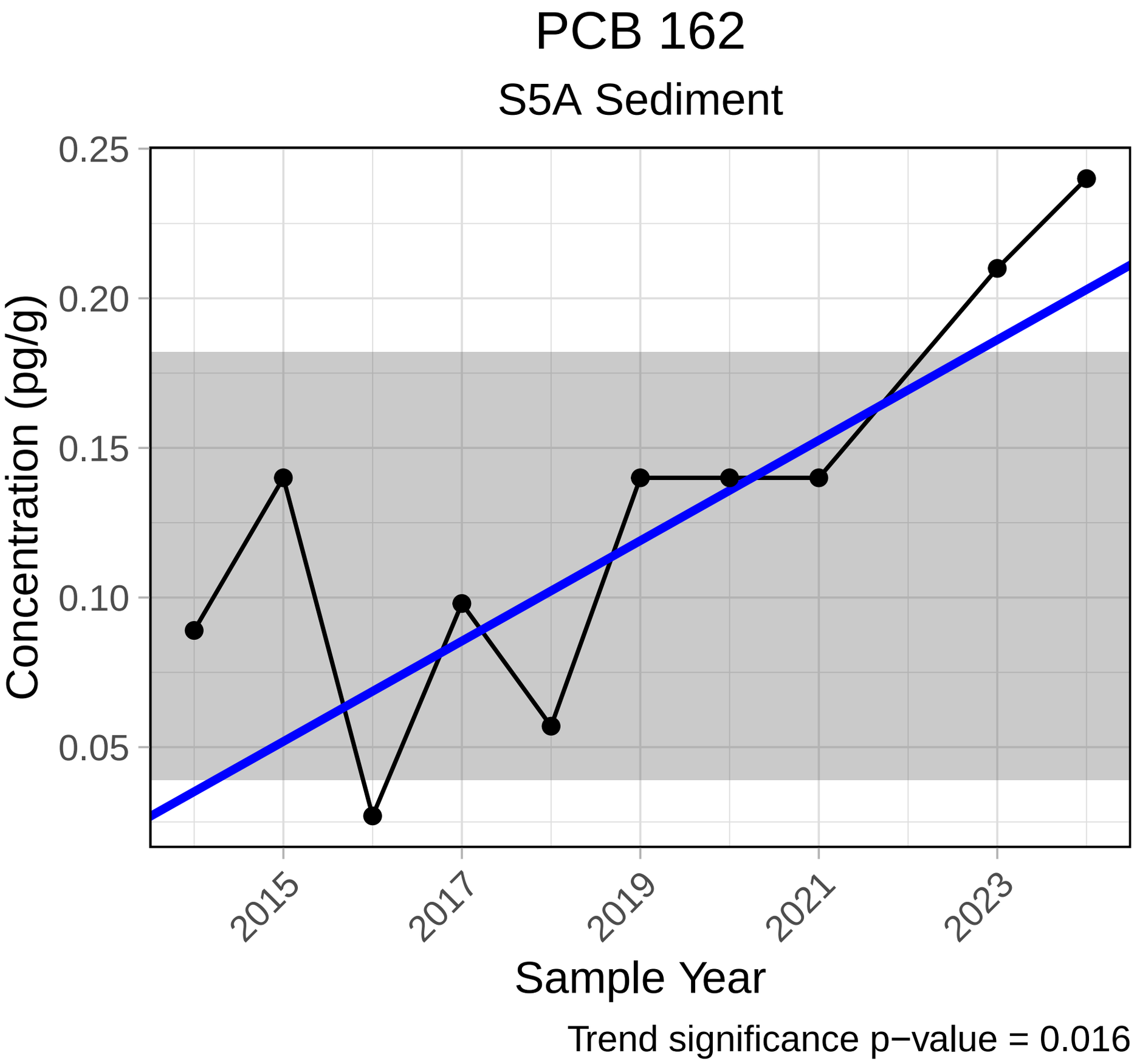
Trend significance p−value = 0.049

PCB 159

S5A Sediment

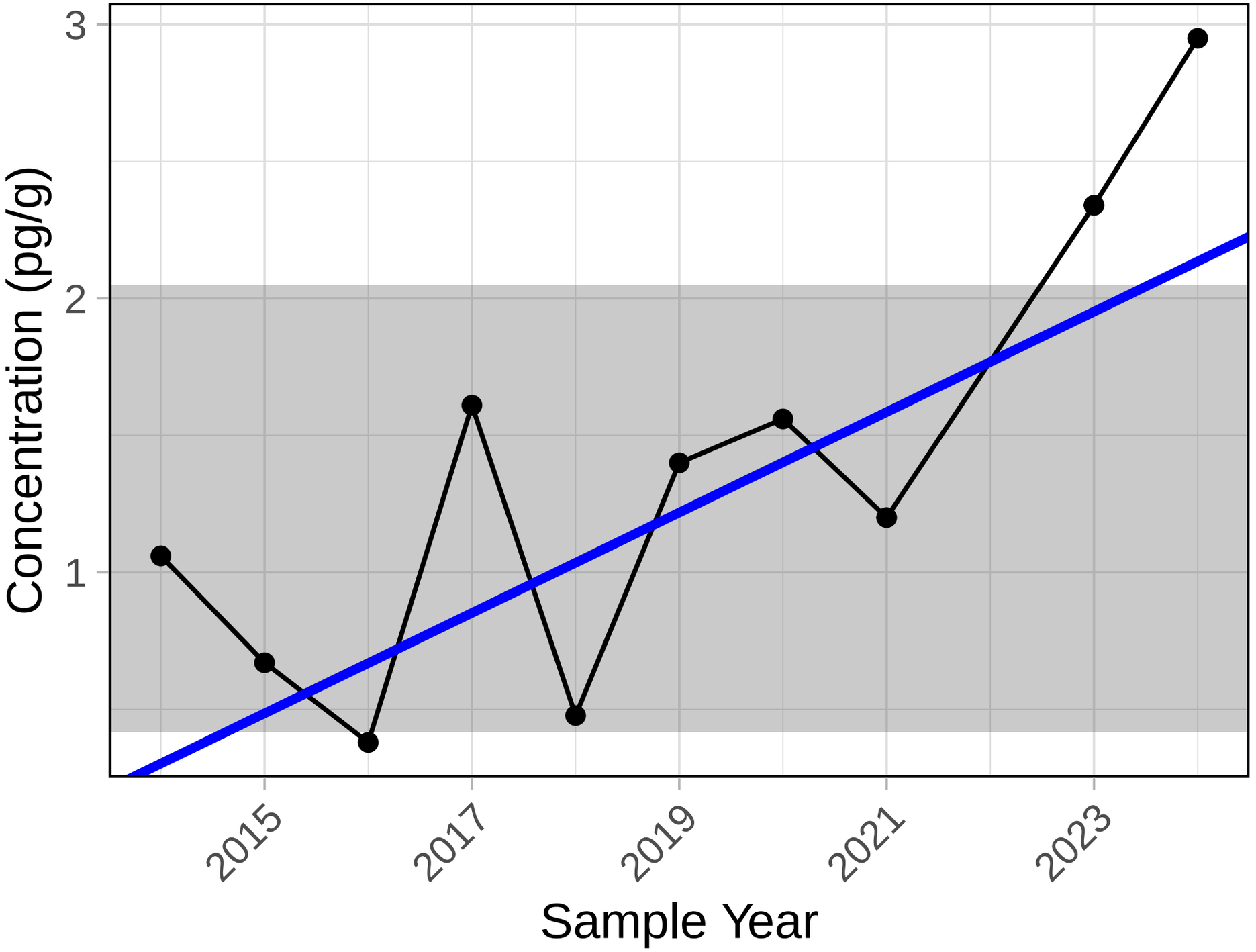


Trend significance p−value = 0.088


PCB 162
S5A Sediment
0.25
0.20
0.15
0.10
0.05
Concentration (pg/g)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.016

PCB 167

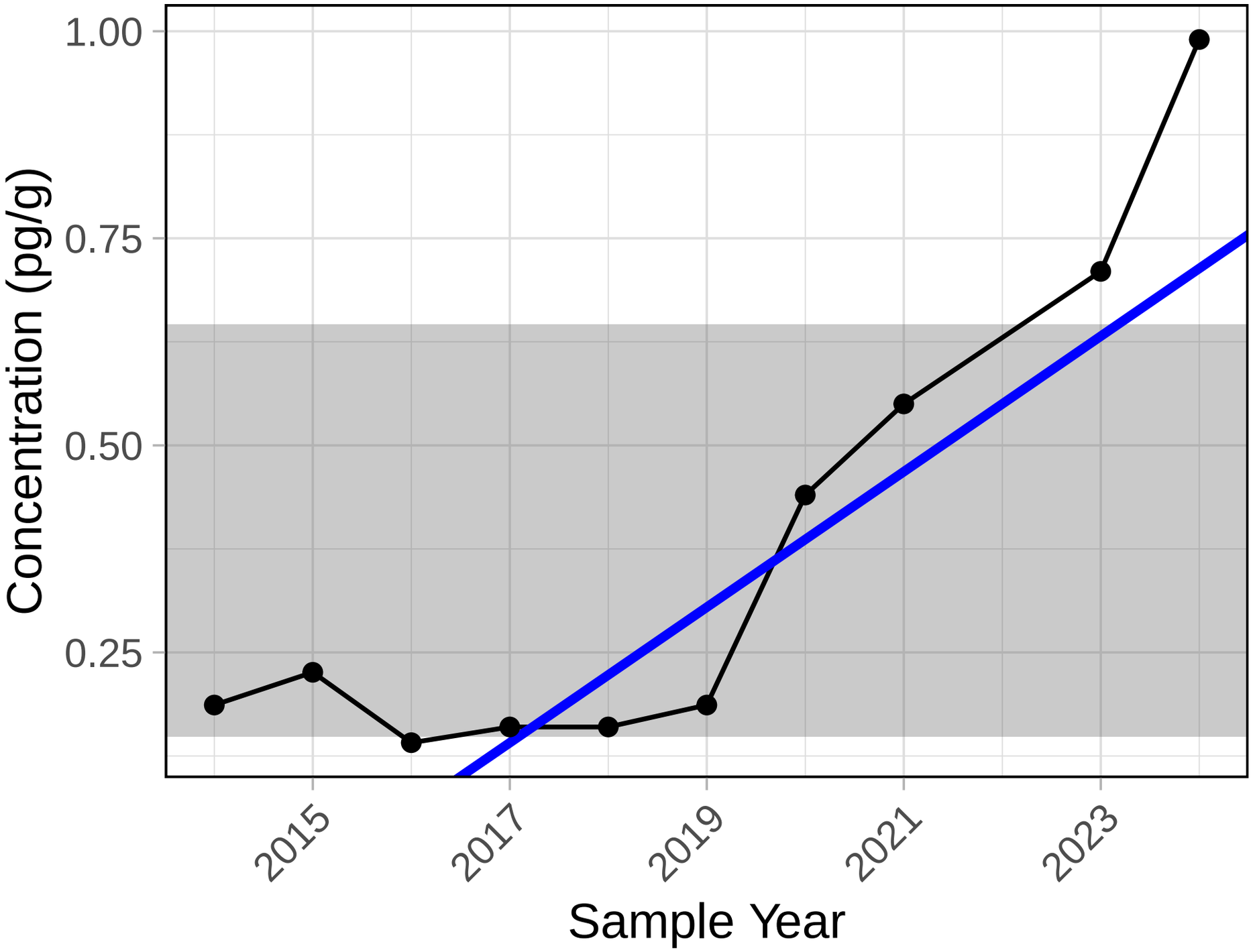
S5A Sediment



Trend significance p−value = 0.049

PCB 169

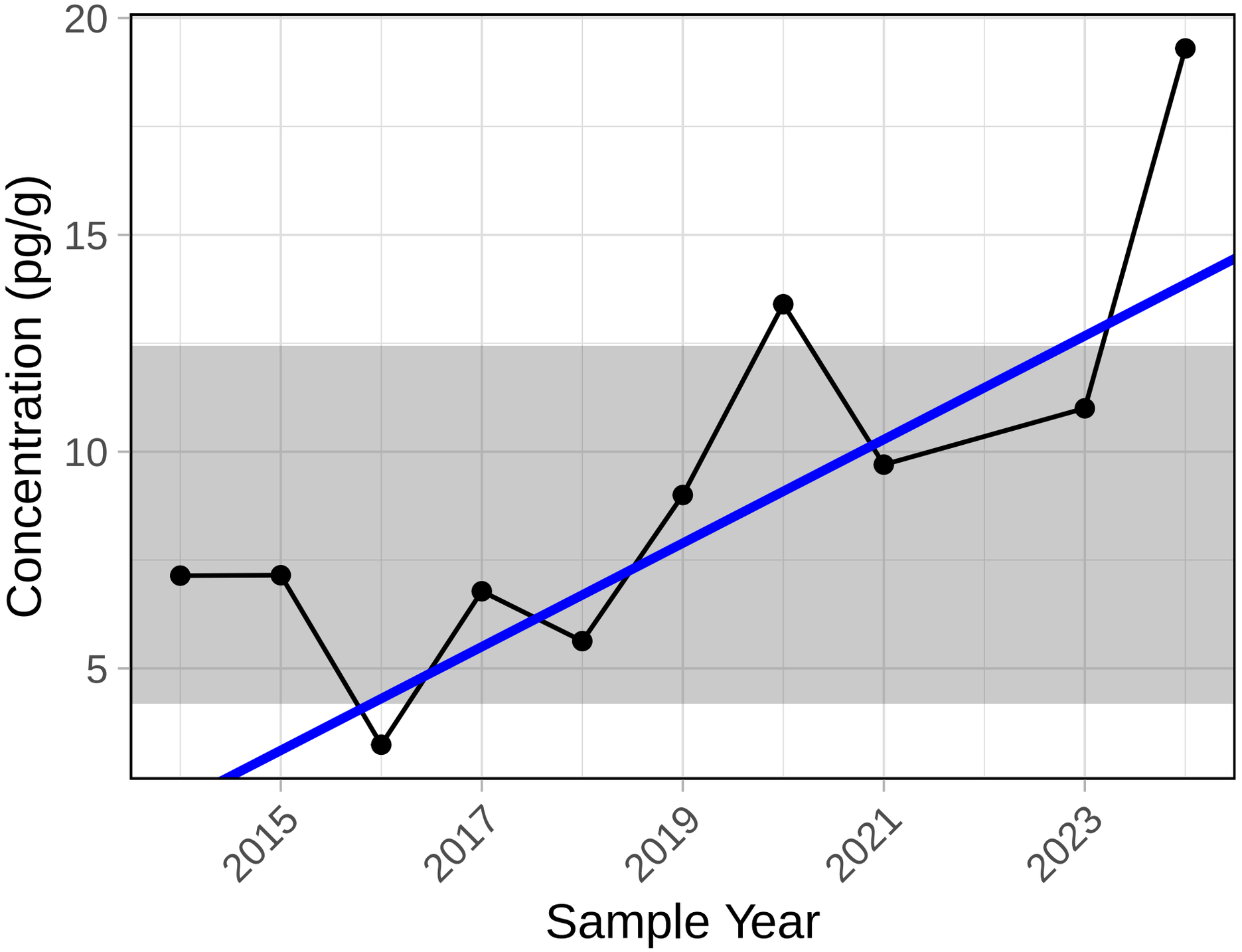
S5A Sediment



Trend significance p−value = 0.012

PCB 170

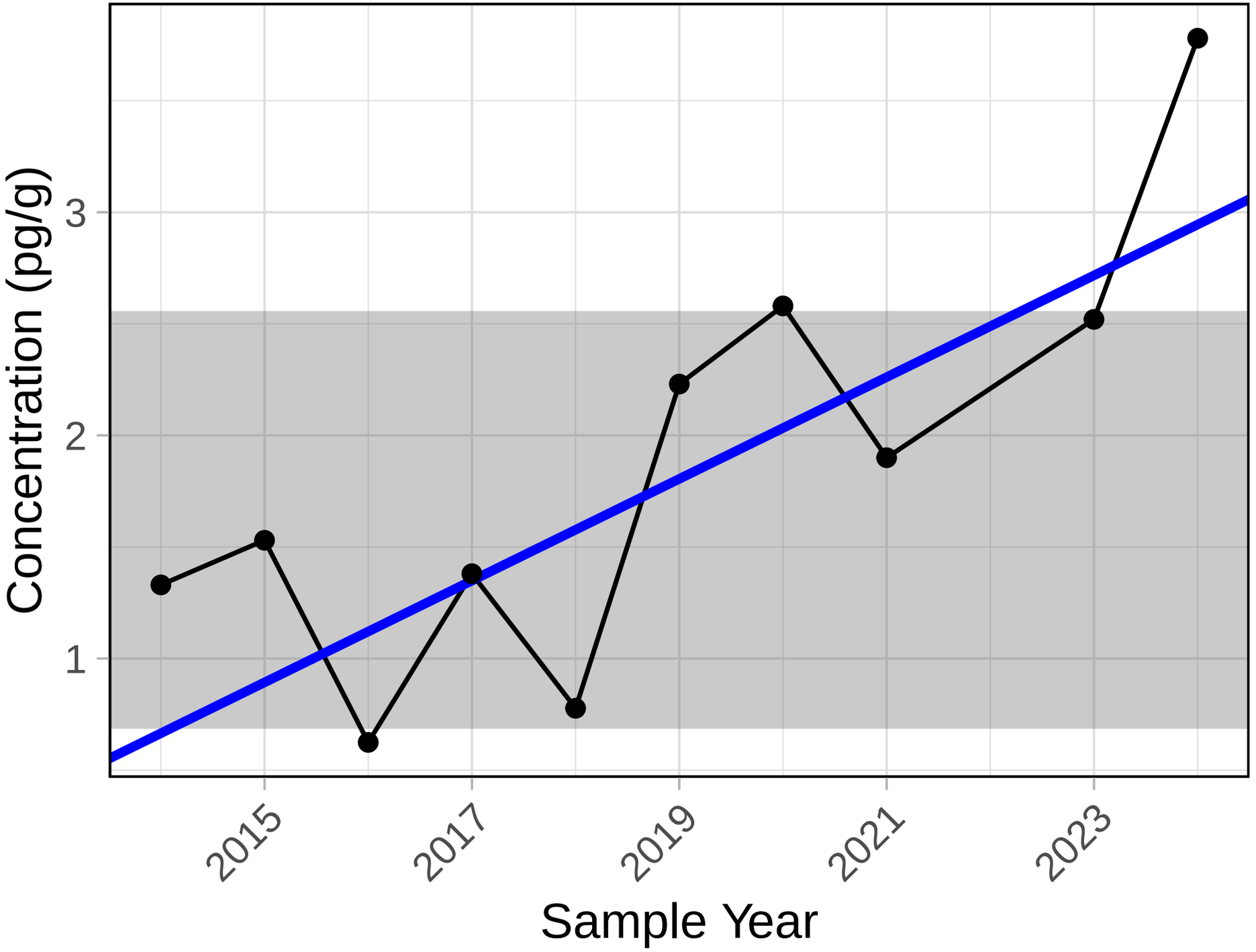
S5A Sediment



Trend significance p−value = 0.02

PCB 172

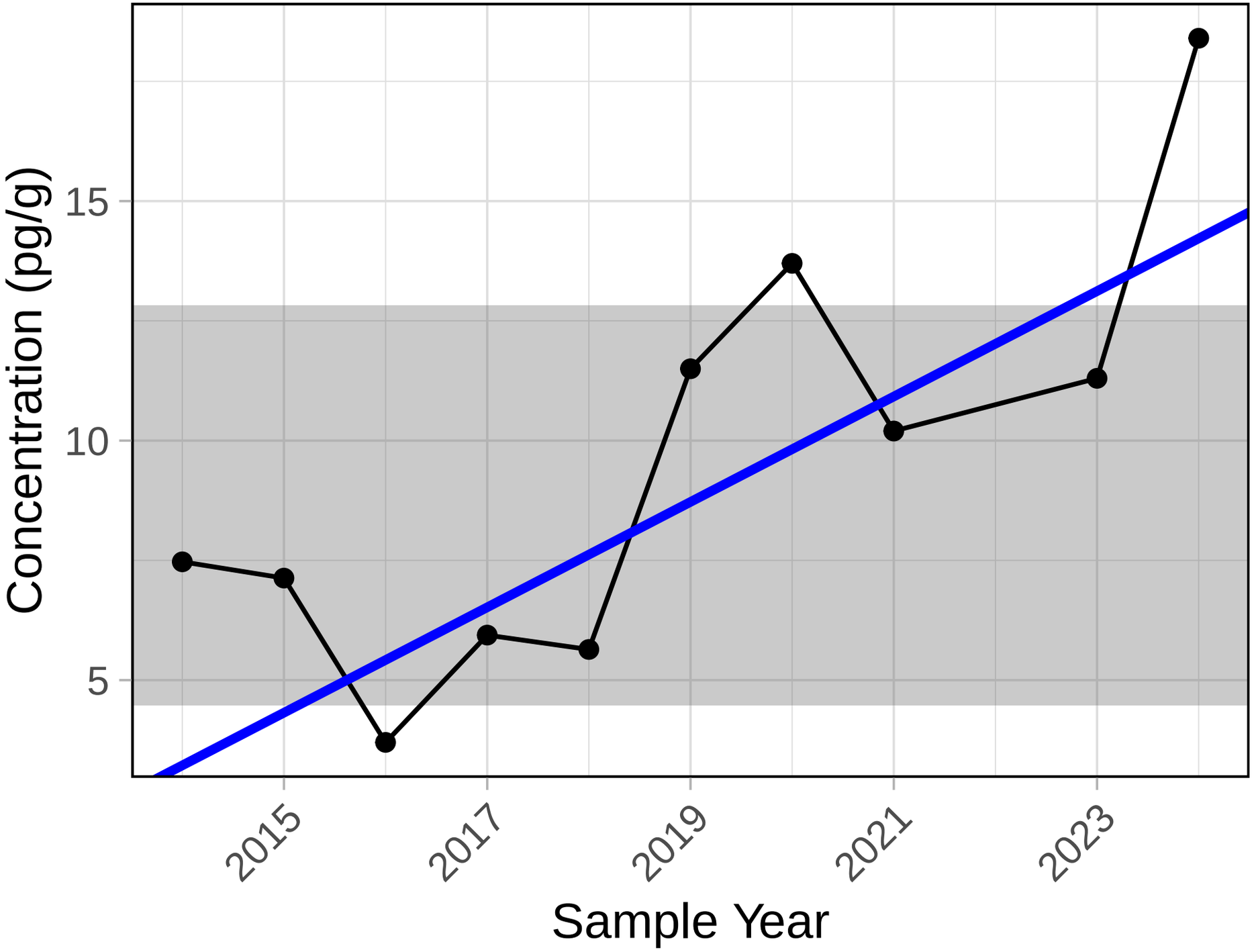
S5A Sediment



Trend significance p−value = 0.02

PCB 174

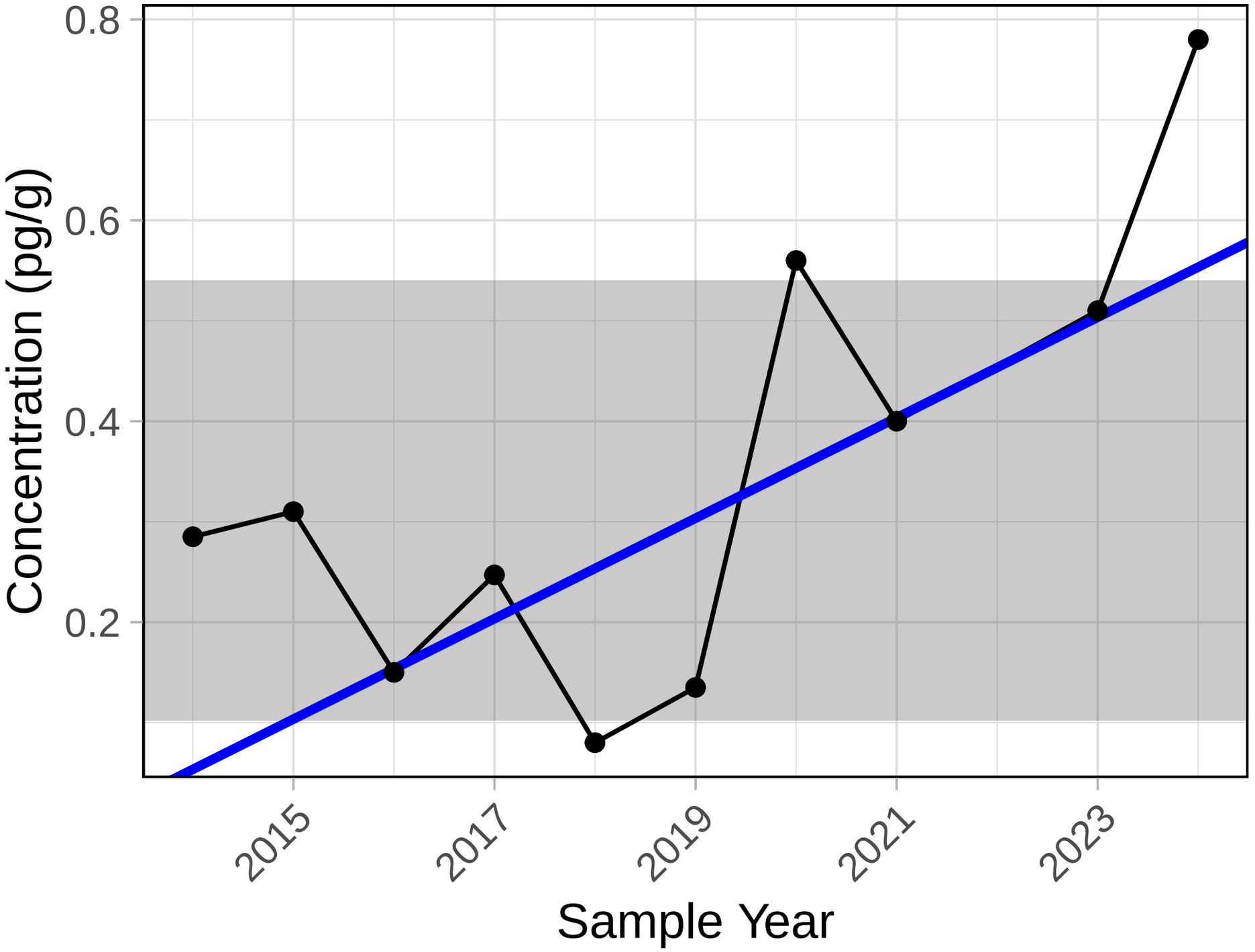
S5A Sediment



Trend significance p−value = 0.074

PCB 175

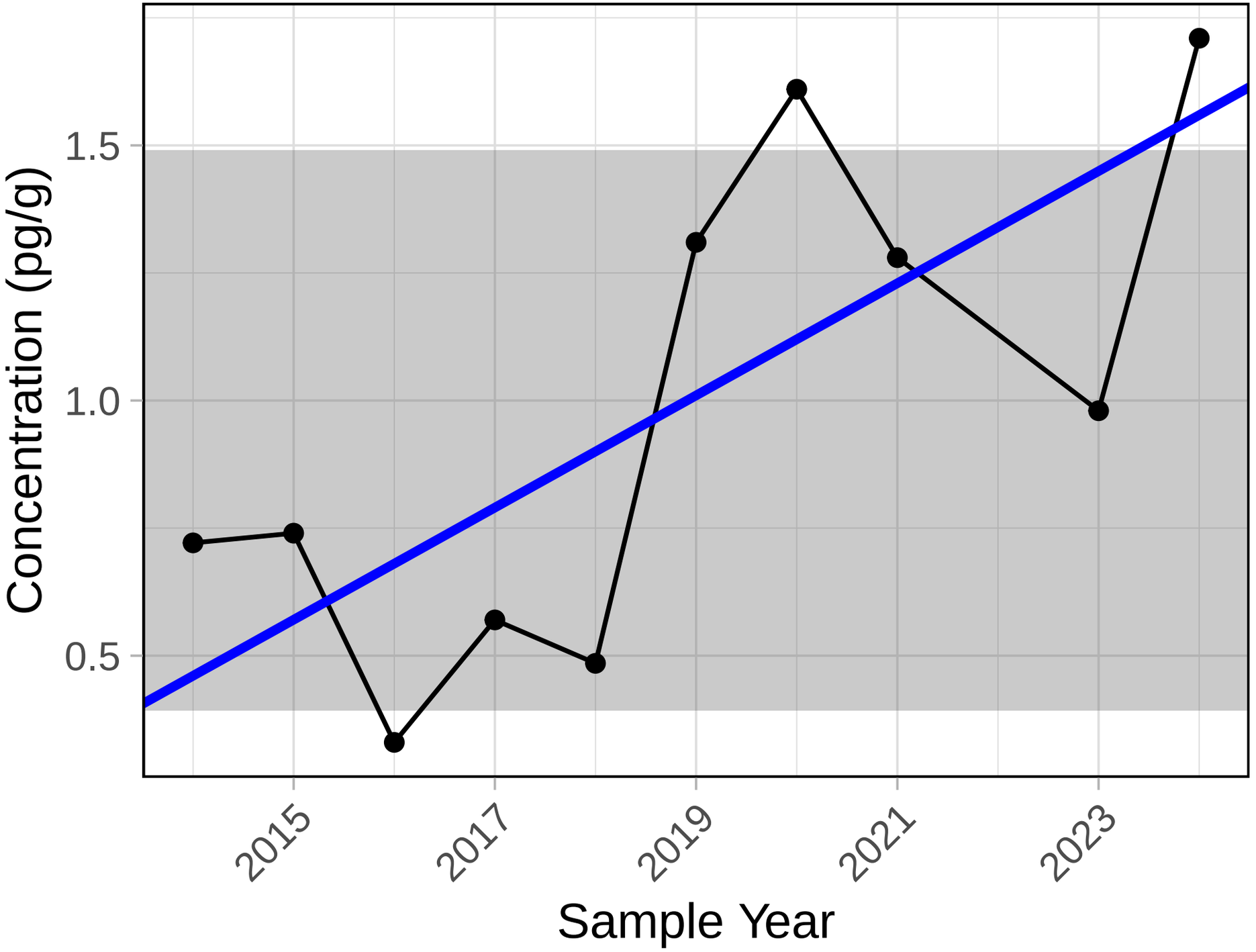
S5A Sediment



Trend significance p−value = 0.152

PCB 176

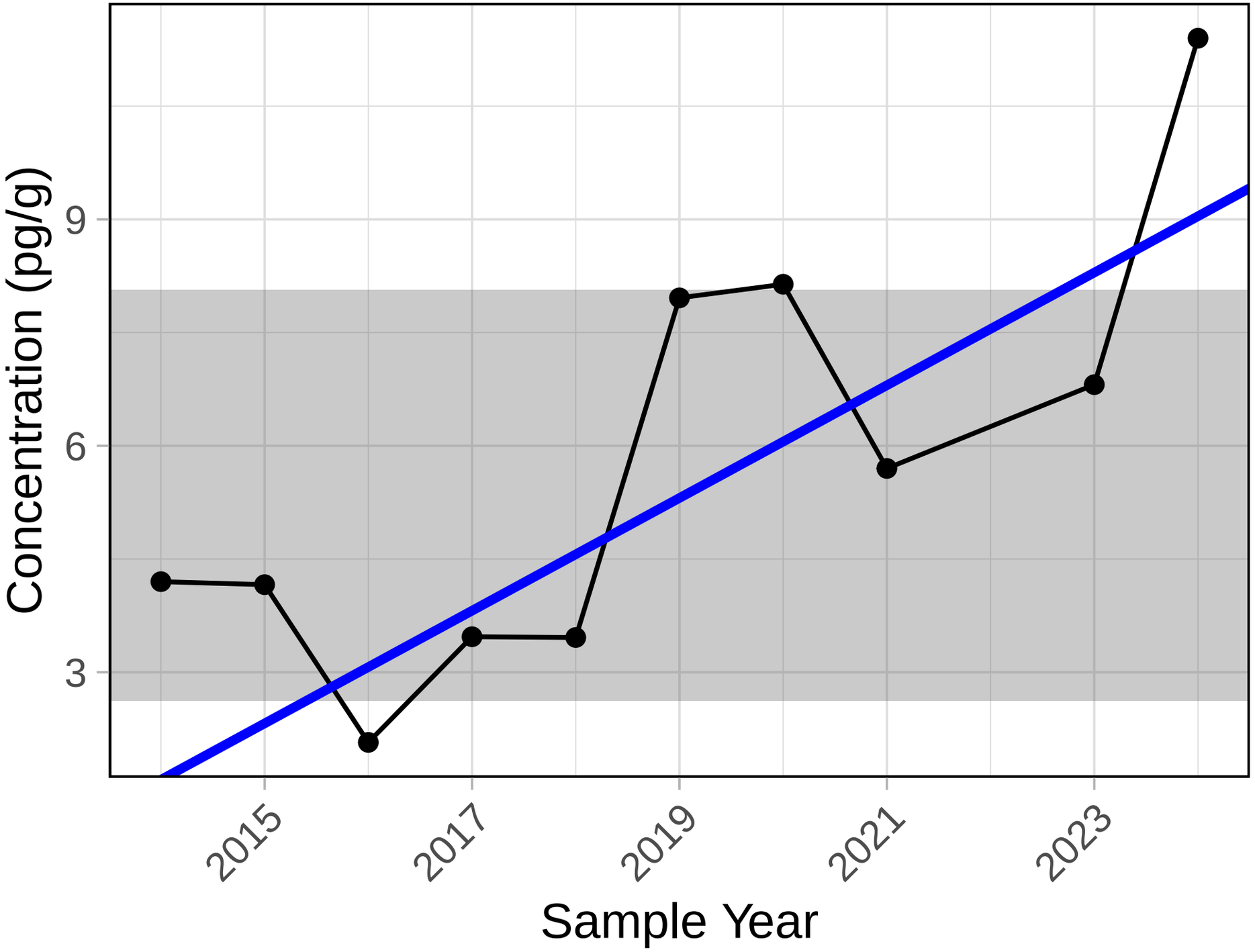
S5A Sediment



Trend significance p−value = 0.074

PCB 177

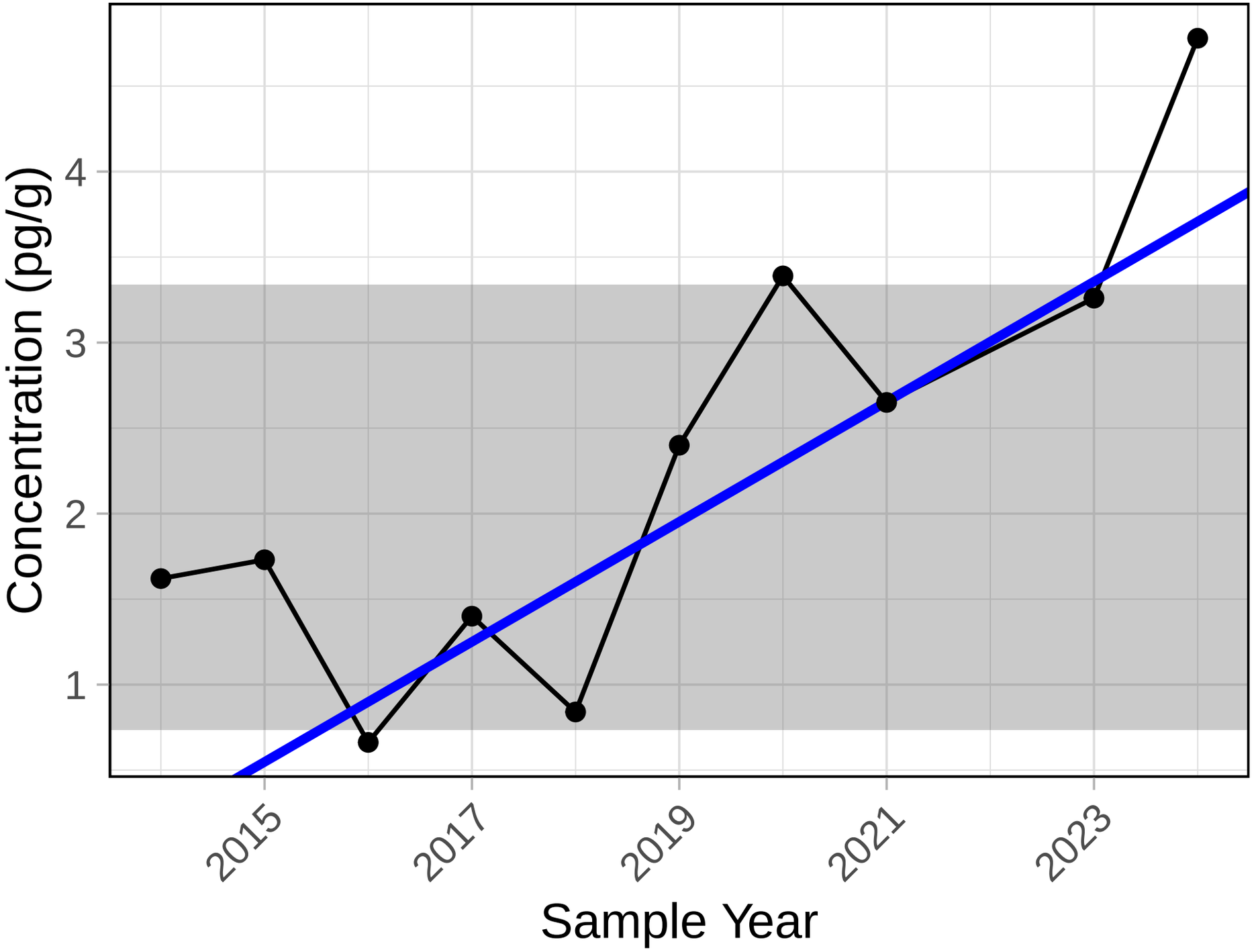
S5A Sediment



Trend significance p−value = 0.074

PCB 178

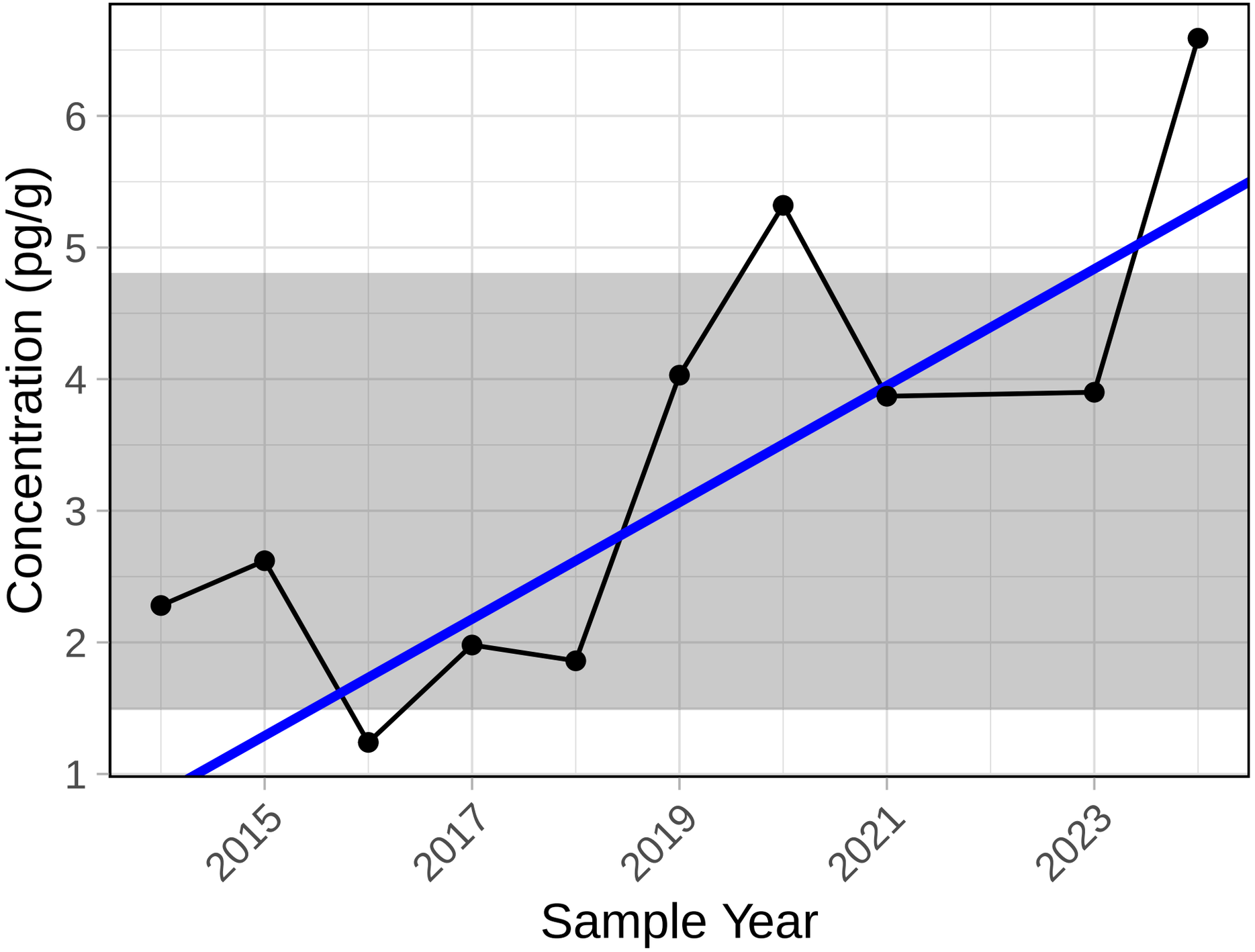
S5A Sediment



Trend significance p−value = 0.02

PCB 179

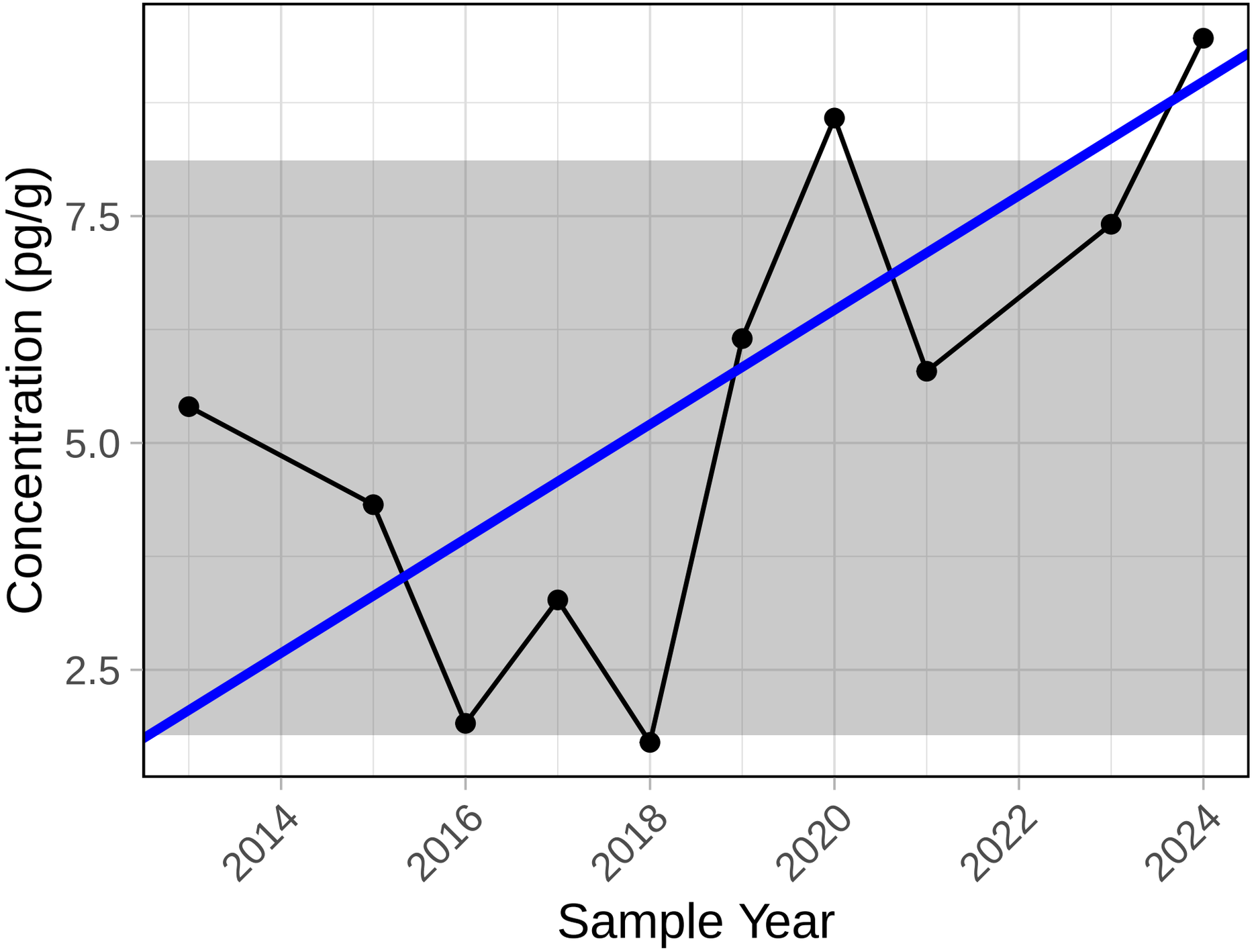
S5A Sediment



Trend significance p−value = 0.049

PCB 183

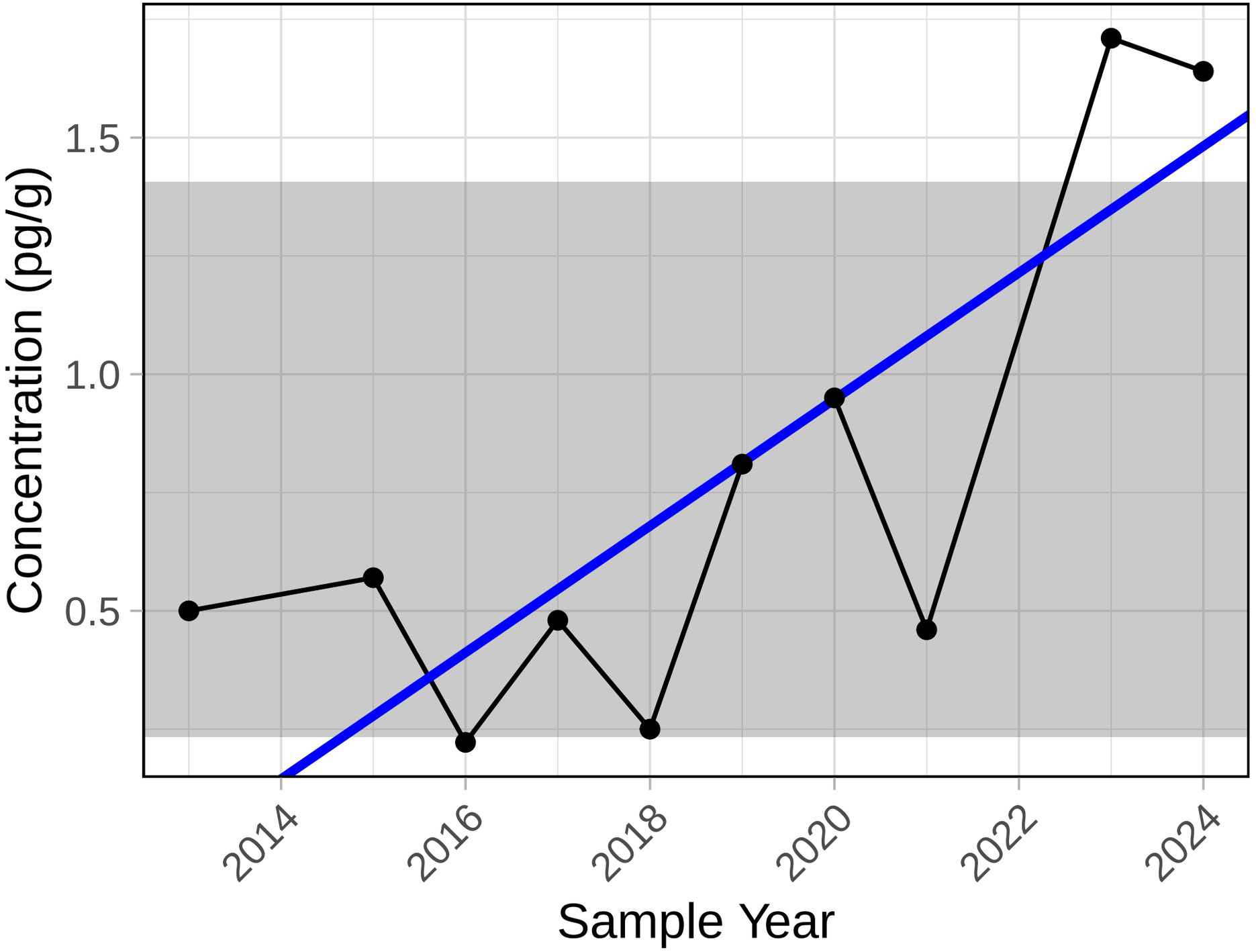
S5A Sediment



Trend significance p−value = 0.074

PCB 185

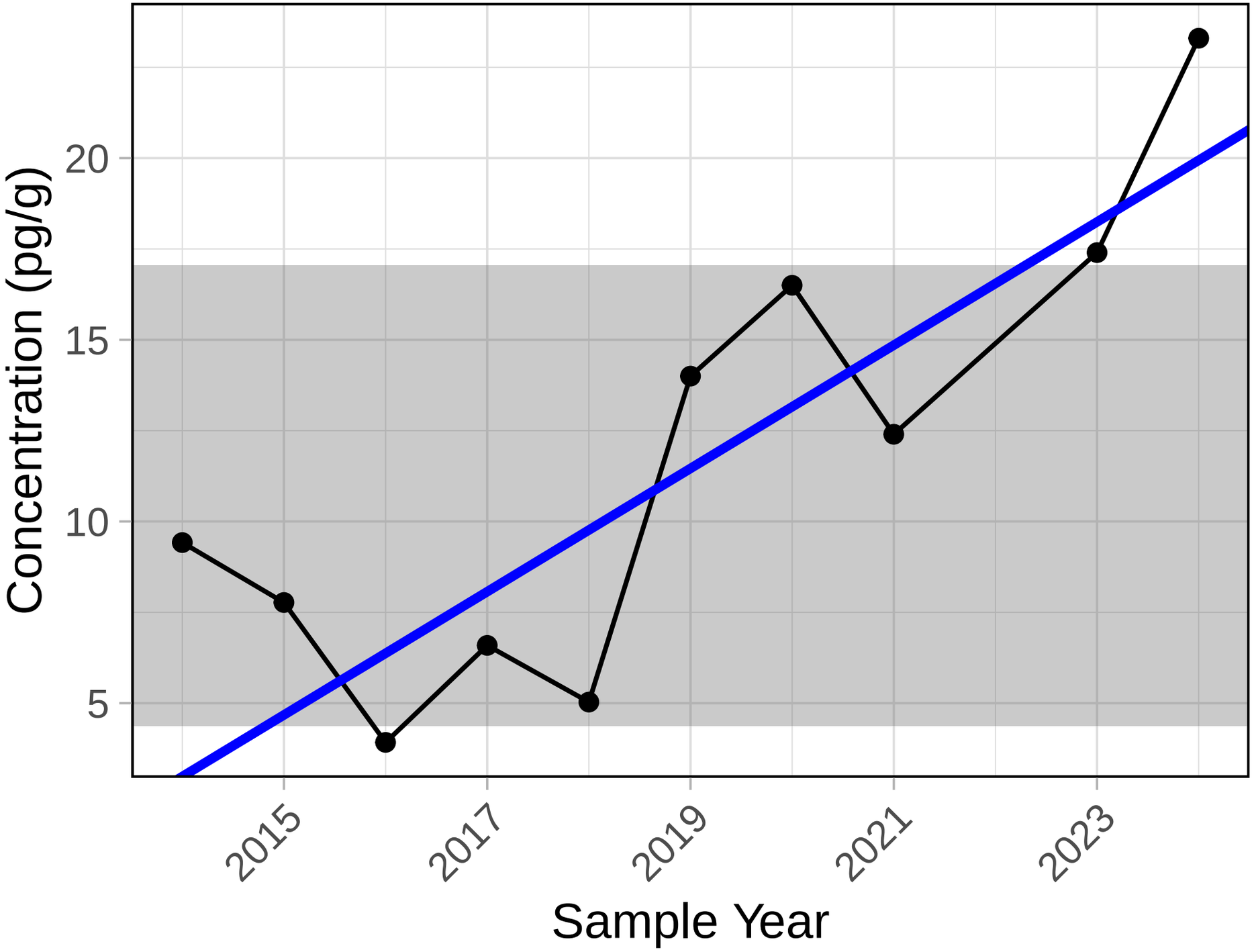
S5A Sediment



Trend significance p−value = 0.107

PCB 187

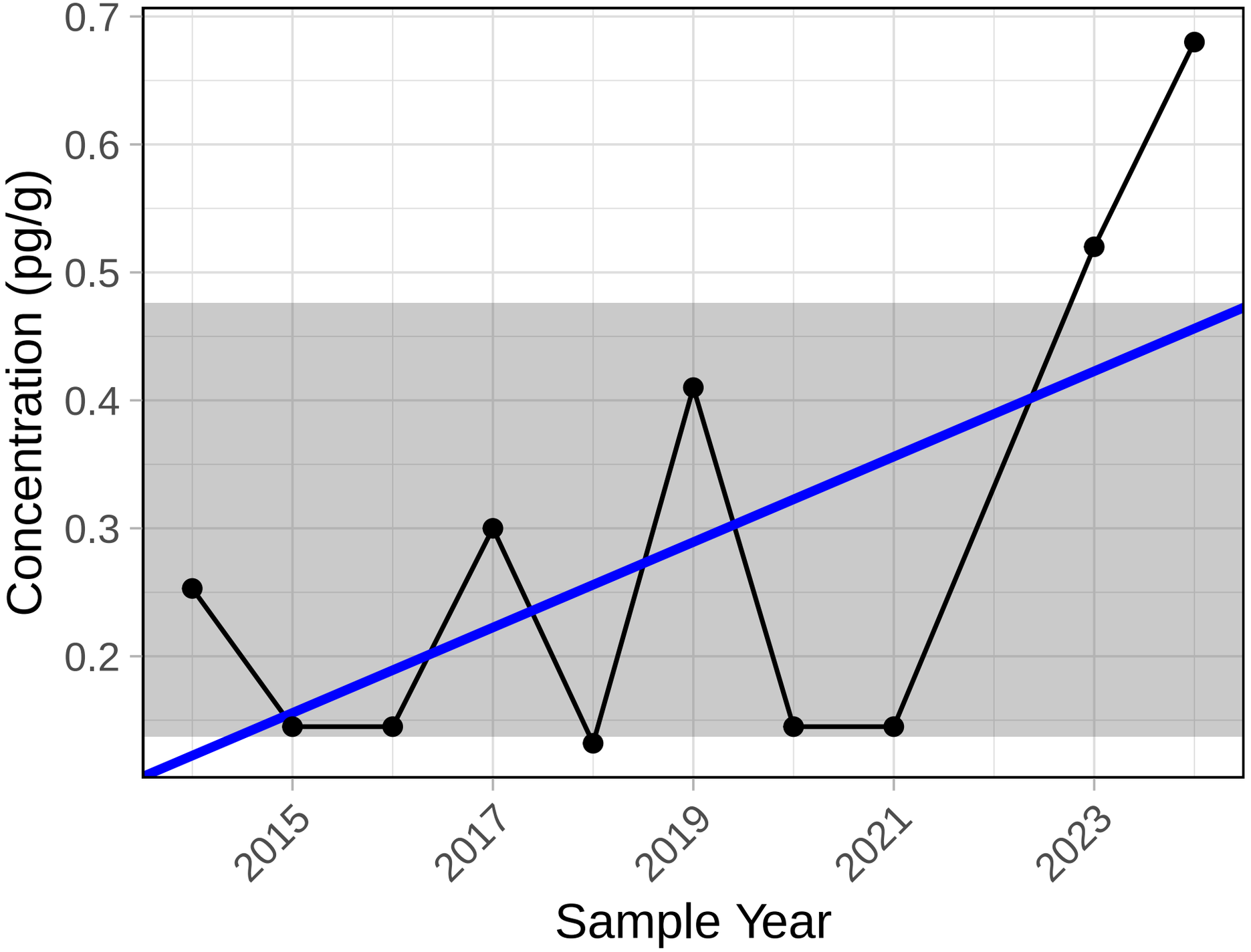
S5A Sediment



Trend significance p−value = 0.032

PCB 189

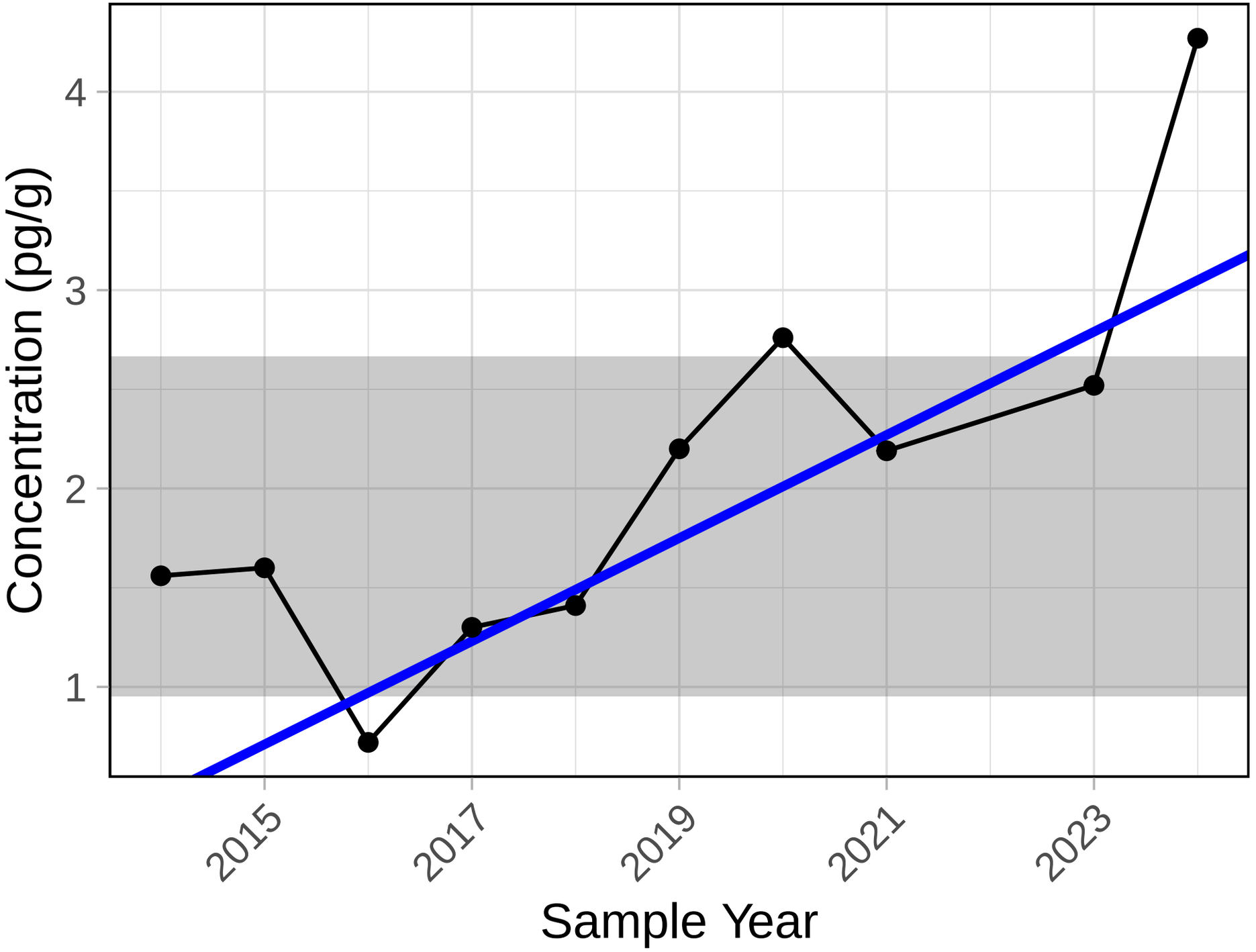
S5A Sediment



Trend significance p−value = 0.194

PCB 190

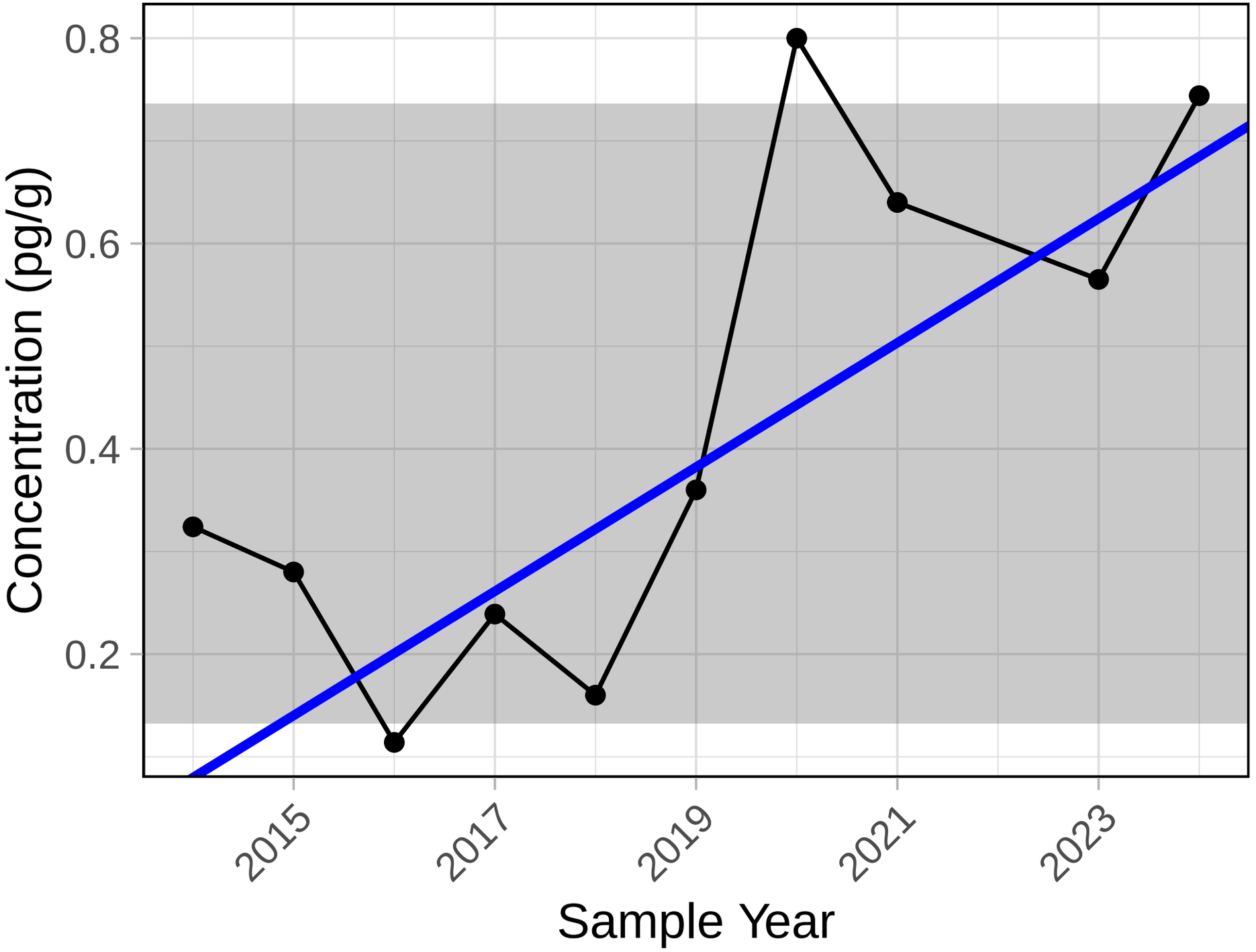
S5A Sediment



Trend significance p−value = 0.02

PCB 191

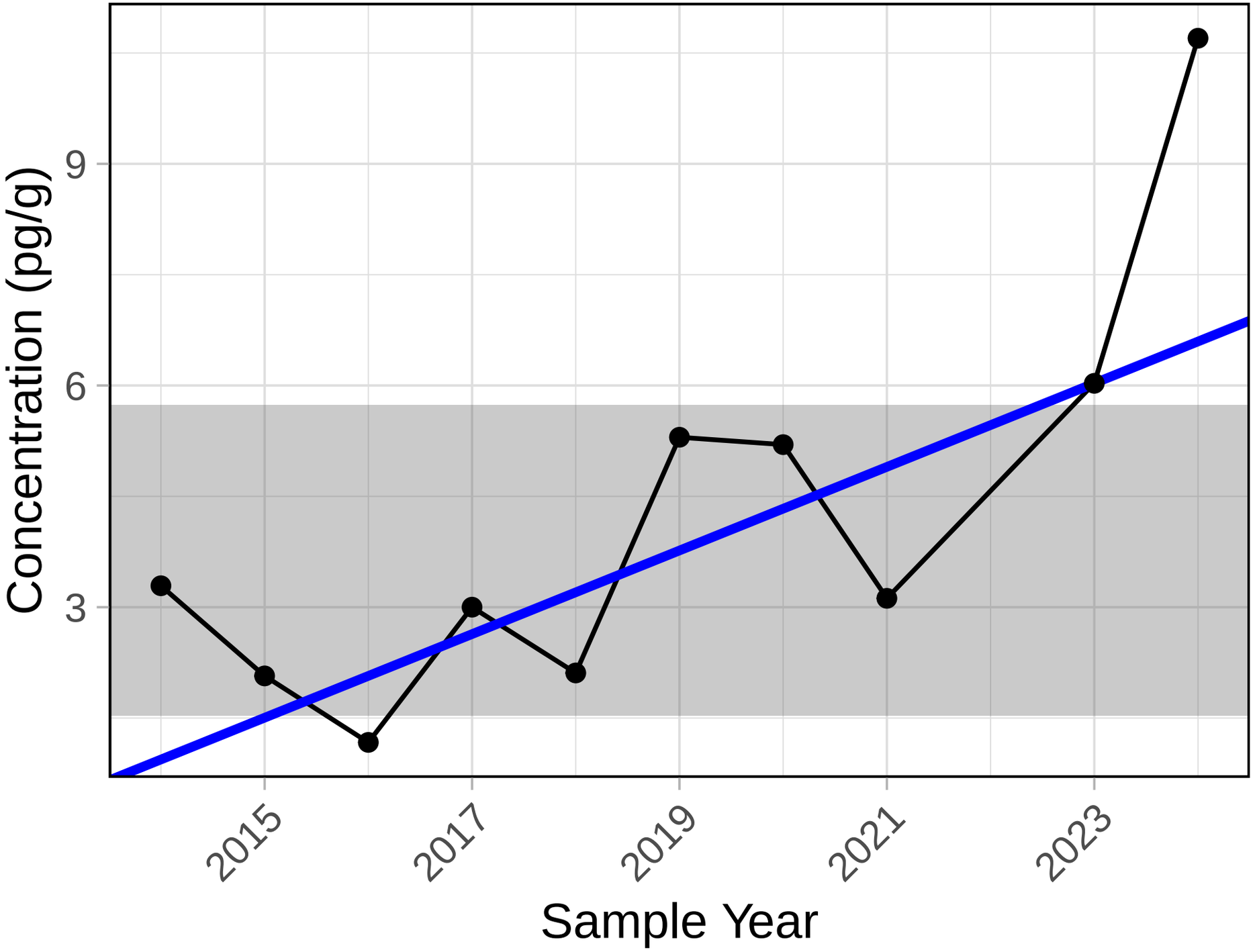
S5A Sediment



Trend significance p−value = 0.074

PCB 194

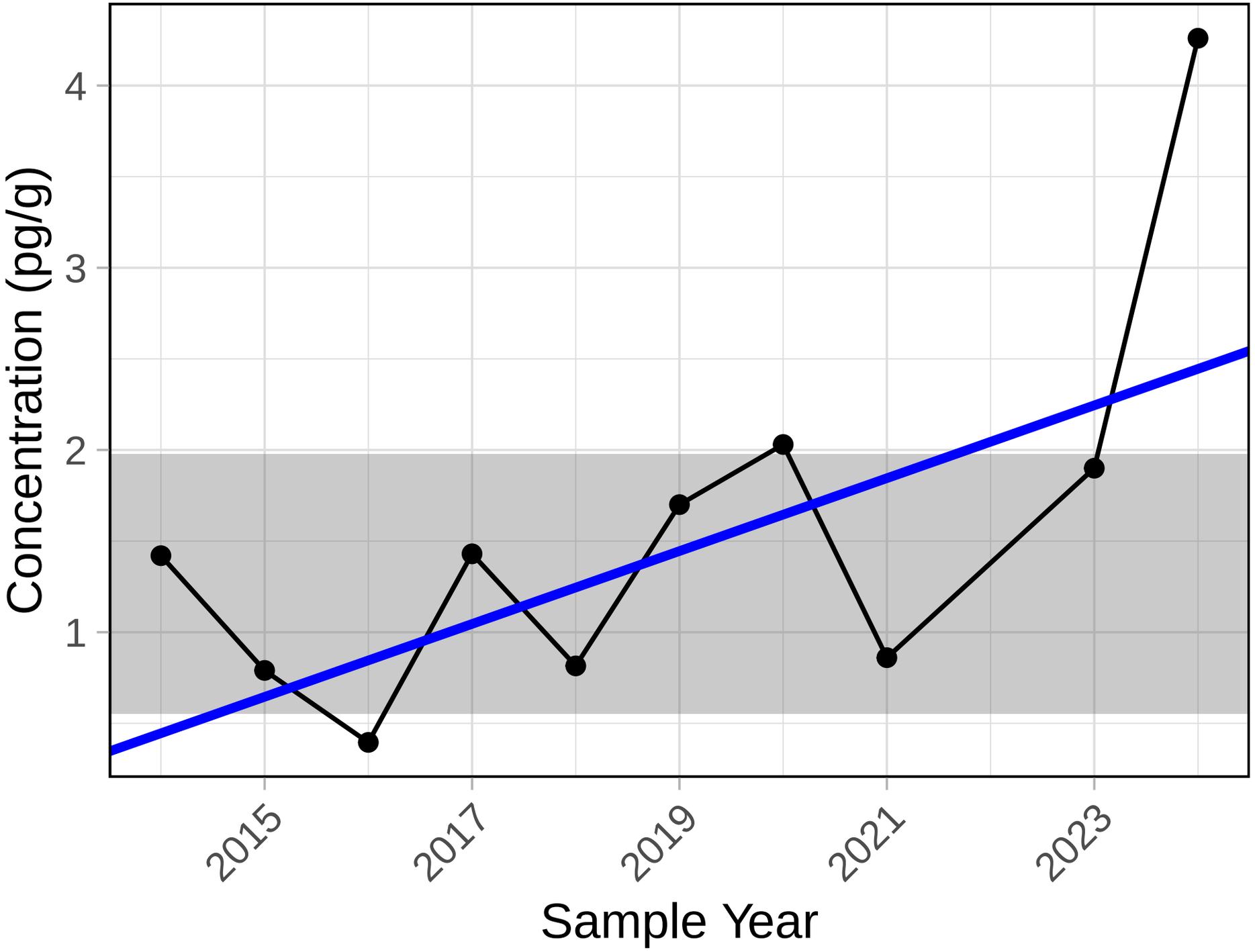
S5A Sediment



Trend significance p−value = 0.032

PCB 195

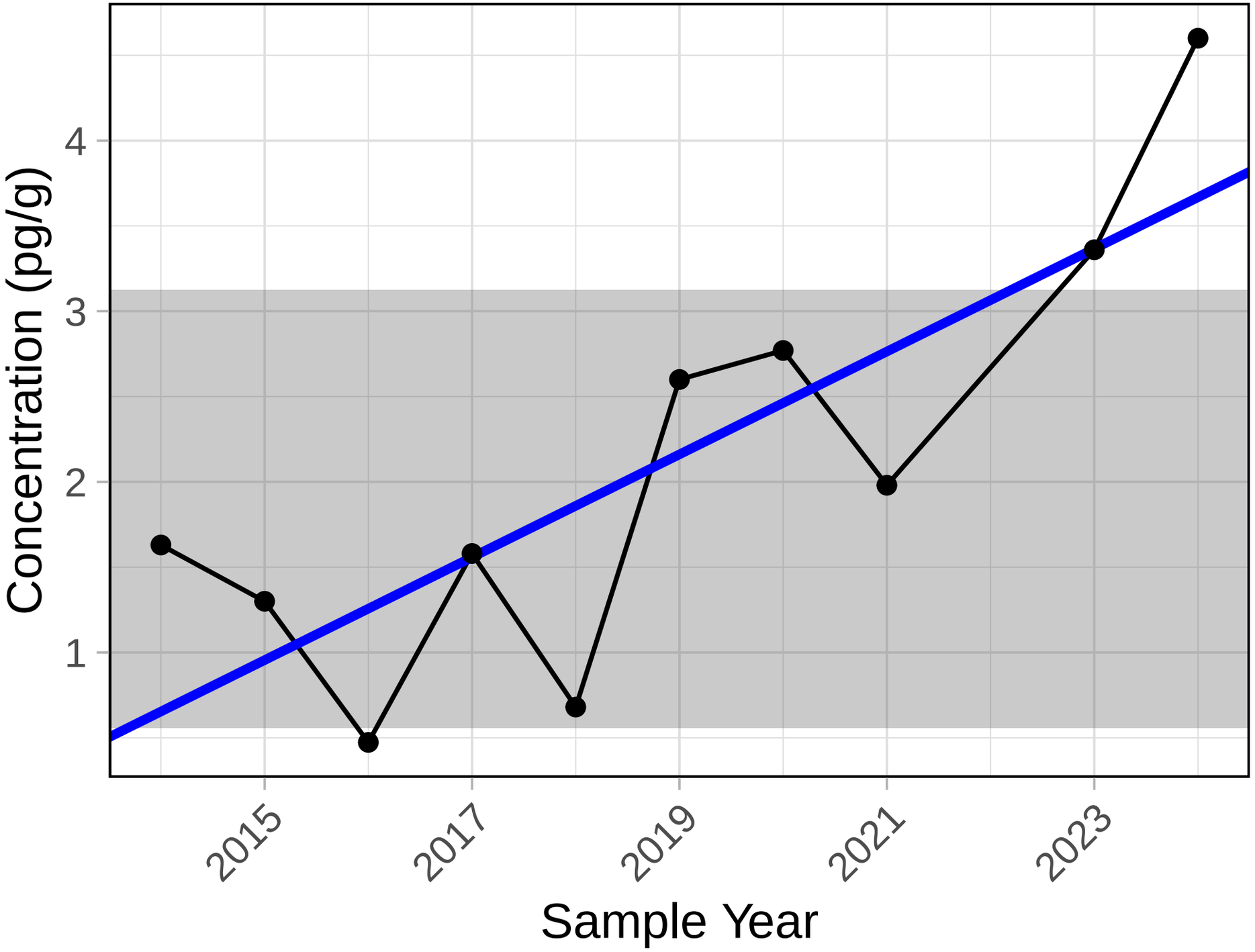
S5A Sediment



Trend significance p−value = 0.032

PCB 196

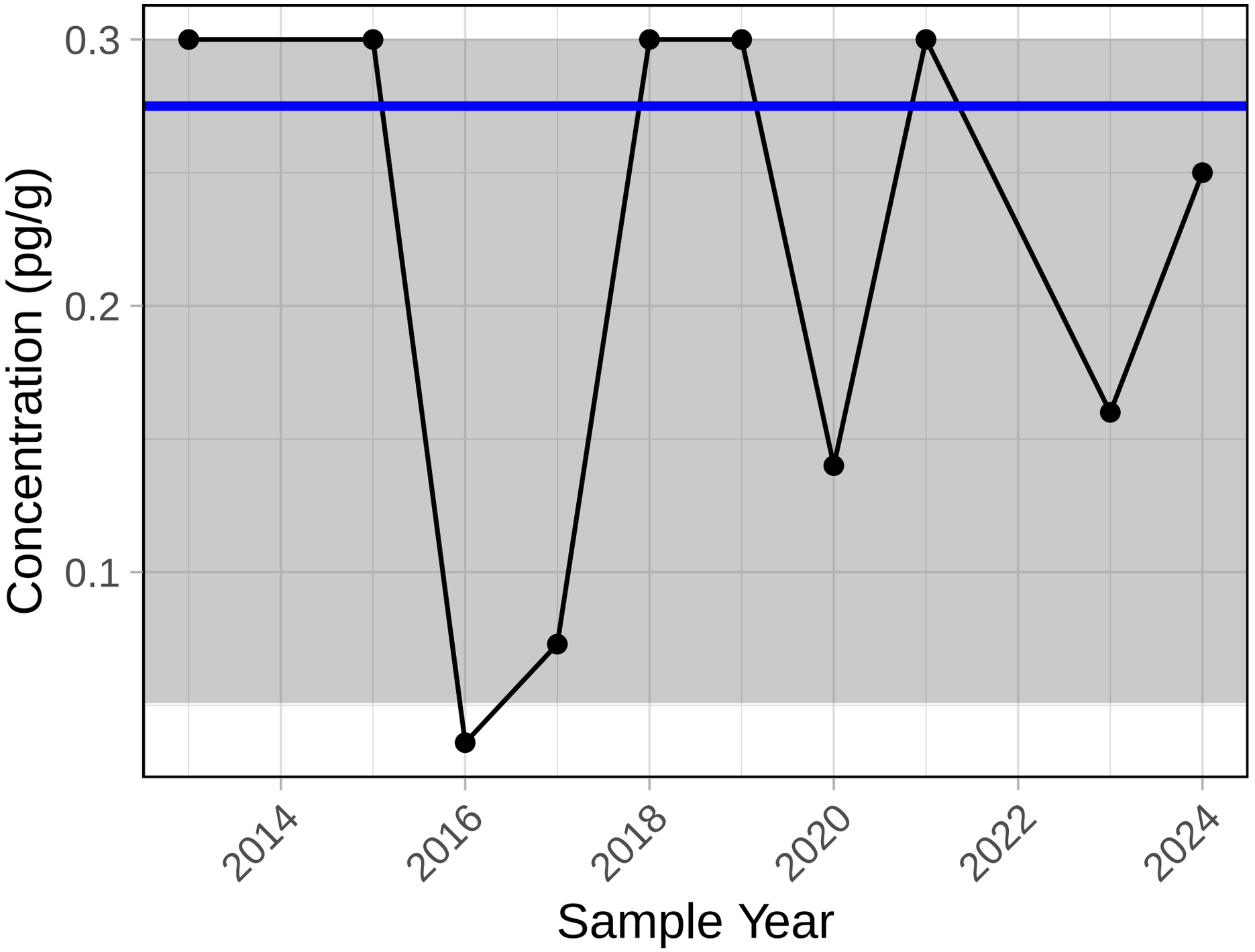
S5A Sediment



Trend significance p−value = 0.02

PCB 197

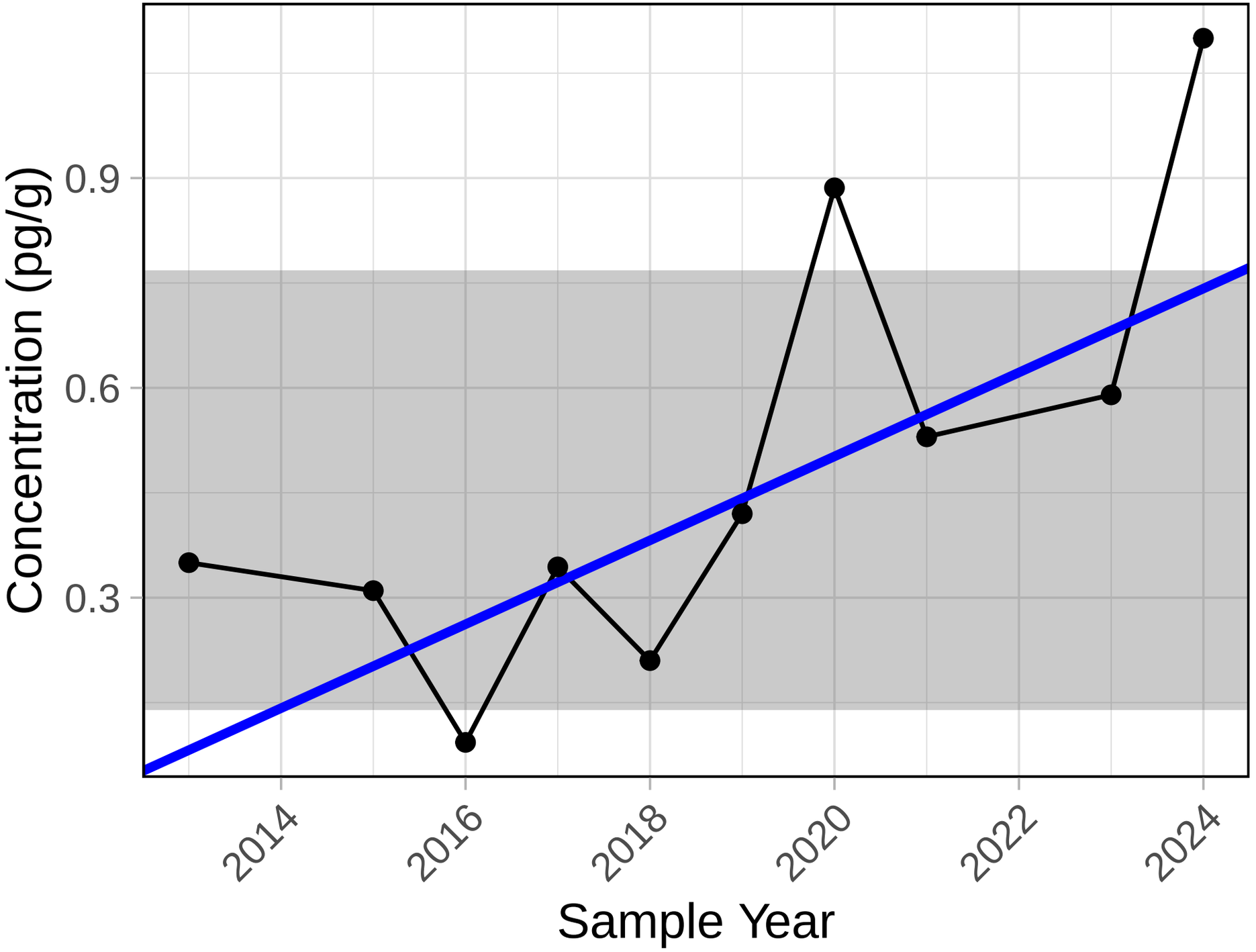
S5A Sediment



Trend significance p−value = 1

PCB 200

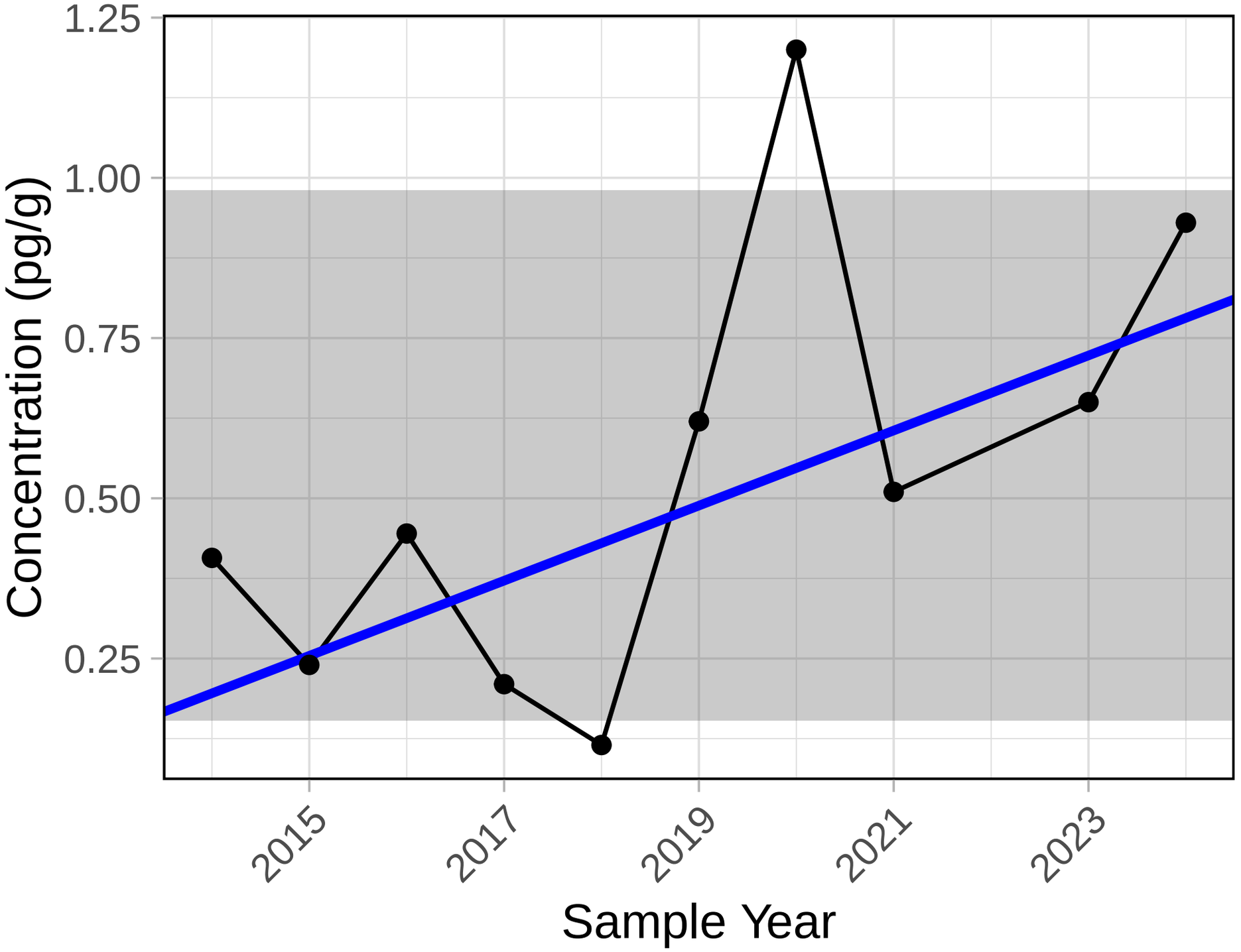
S5A Sediment



Trend significance p−value = 0.02

PCB 201

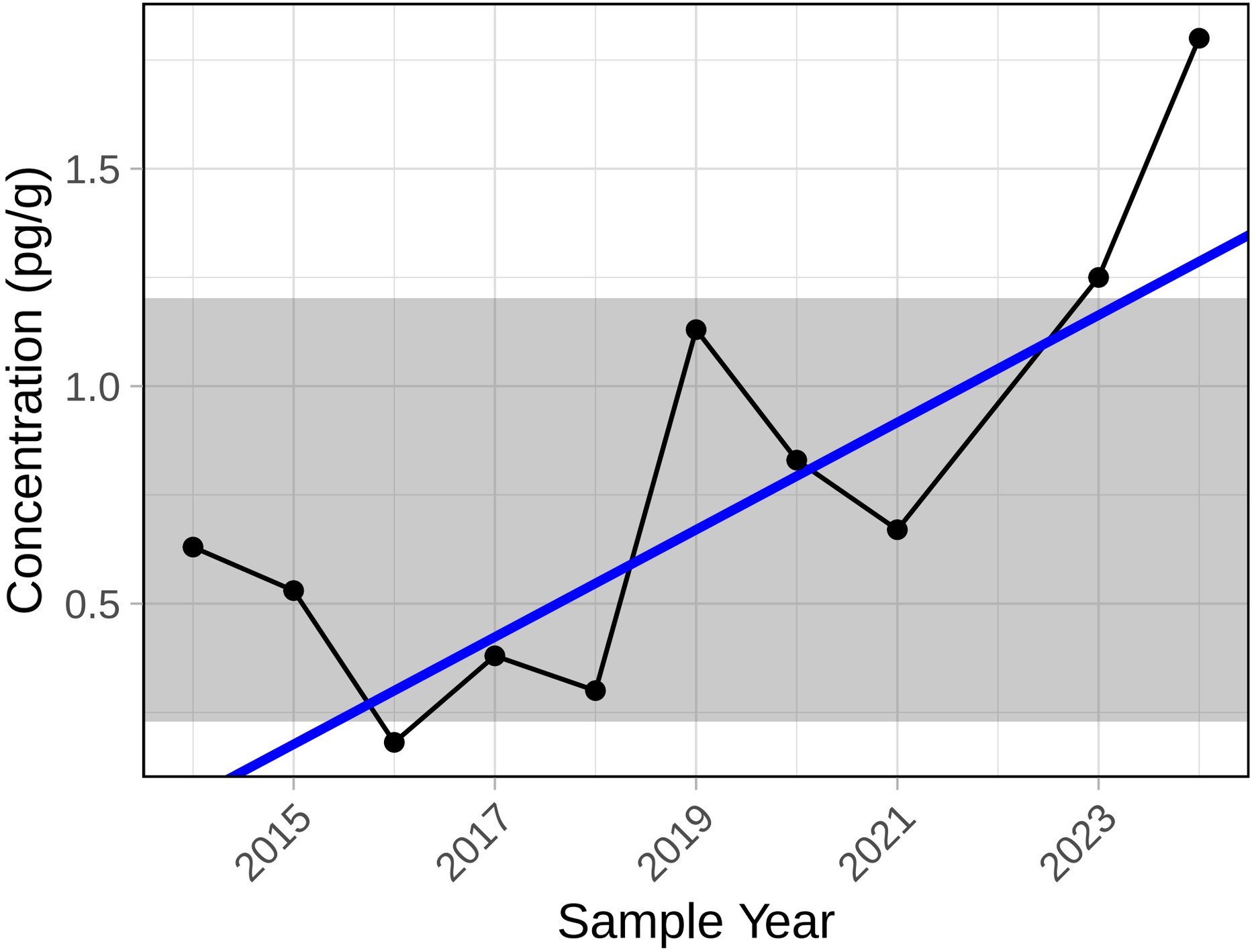
S5A Sediment



Trend significance p−value = 0.074

PCB 202

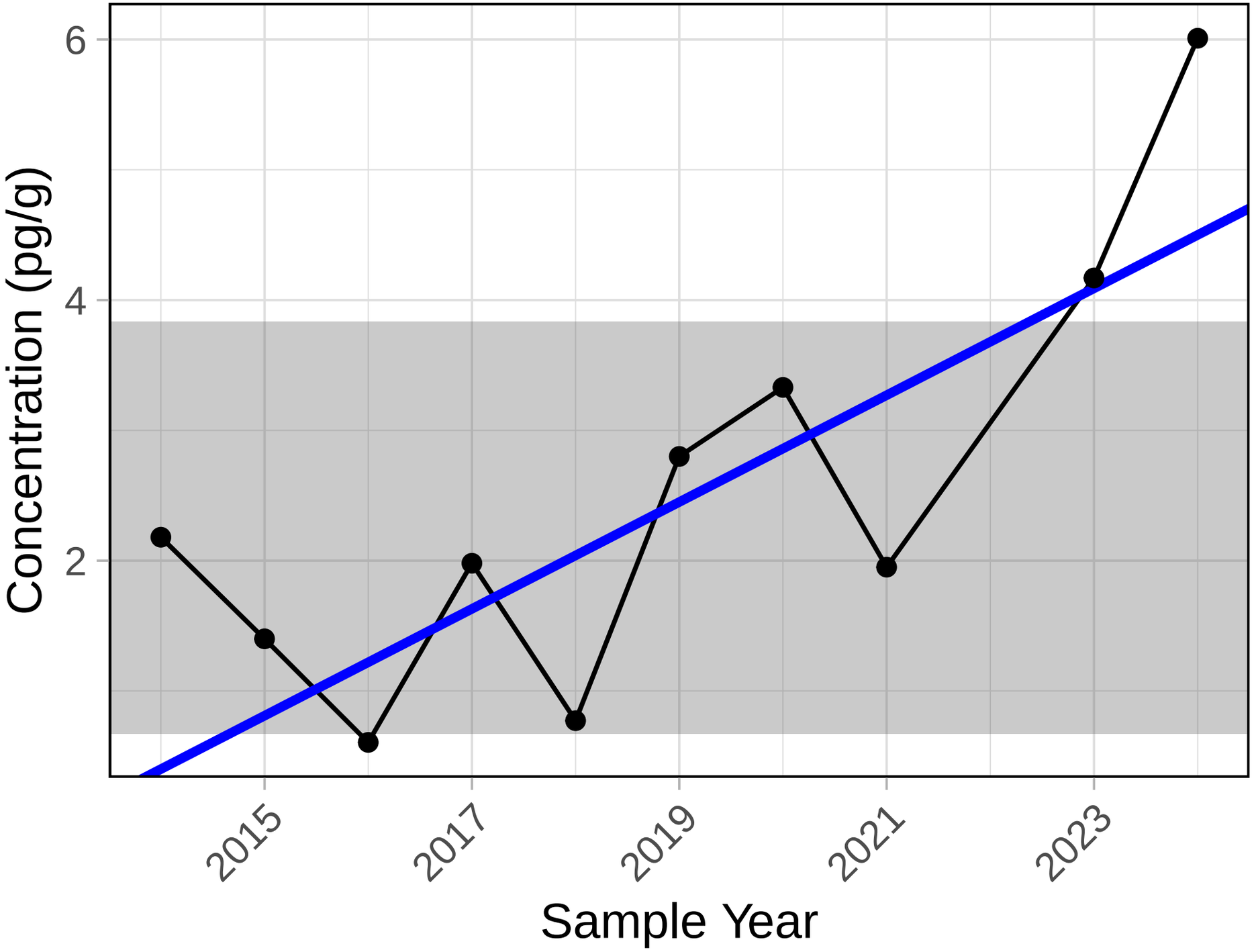
S5A Sediment



Trend significance p−value = 0.049

PCB 203

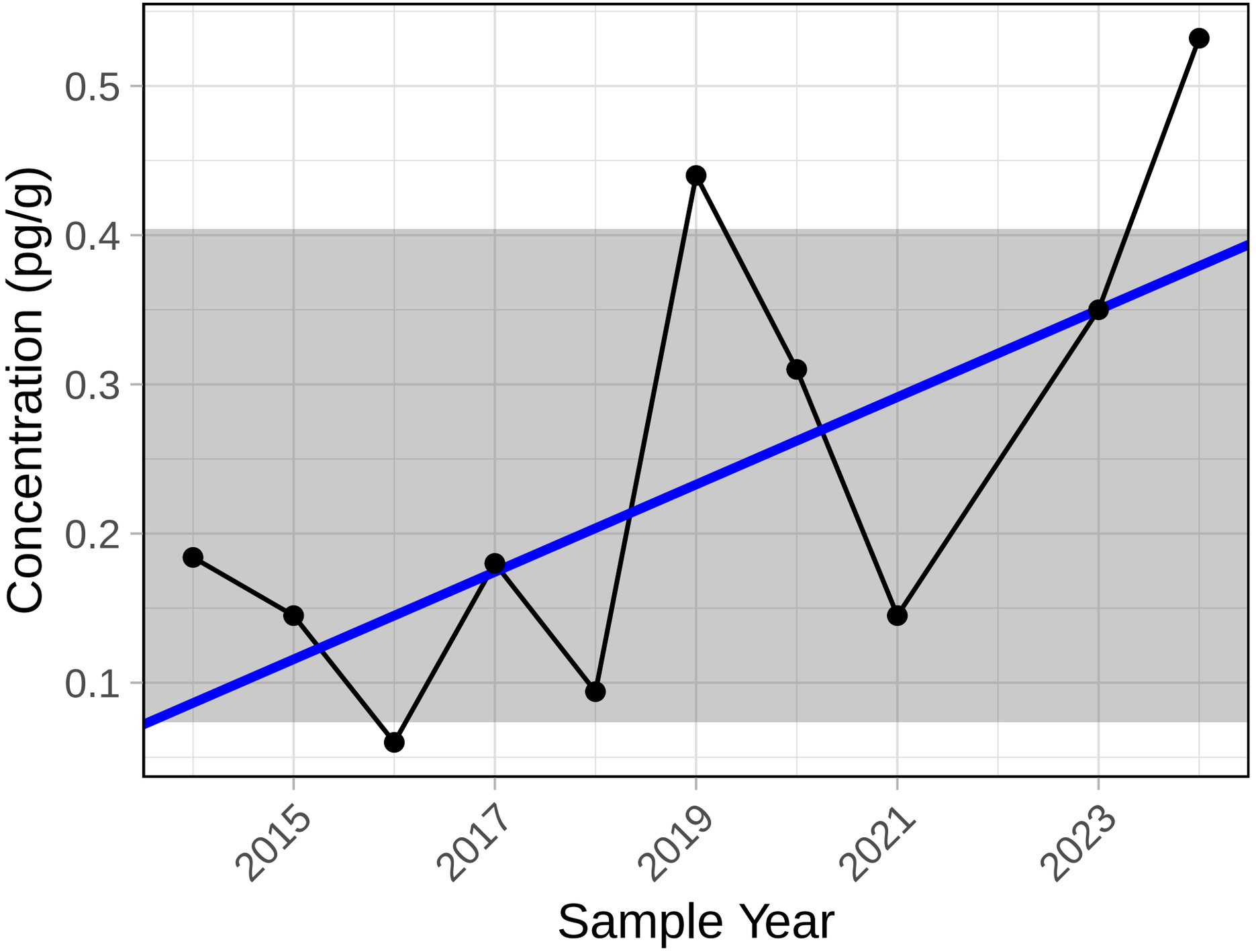
S5A Sediment



Trend significance p−value = 0.049

PCB 205

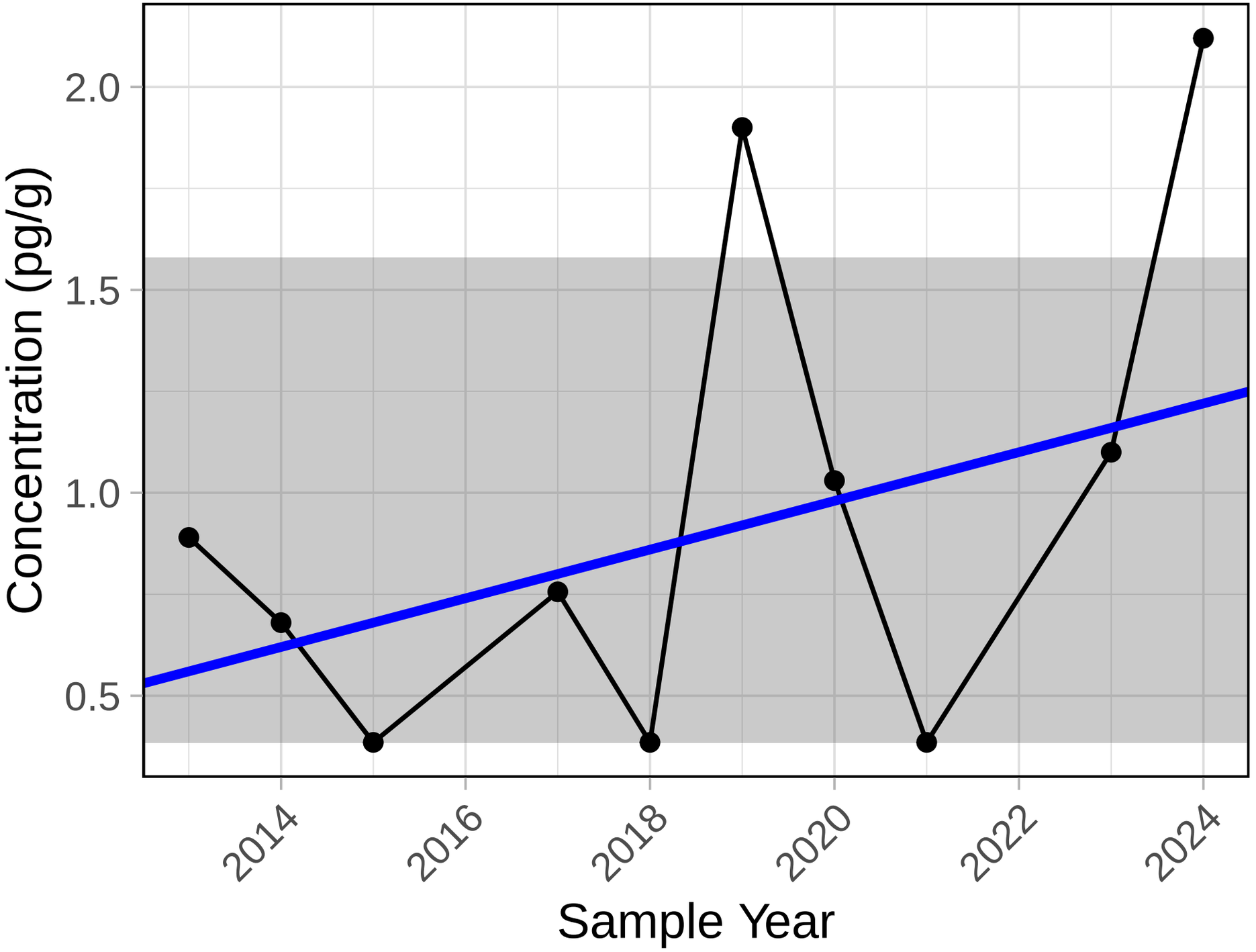
S5A Sediment



Trend significance p−value = 0.127

PCB 206

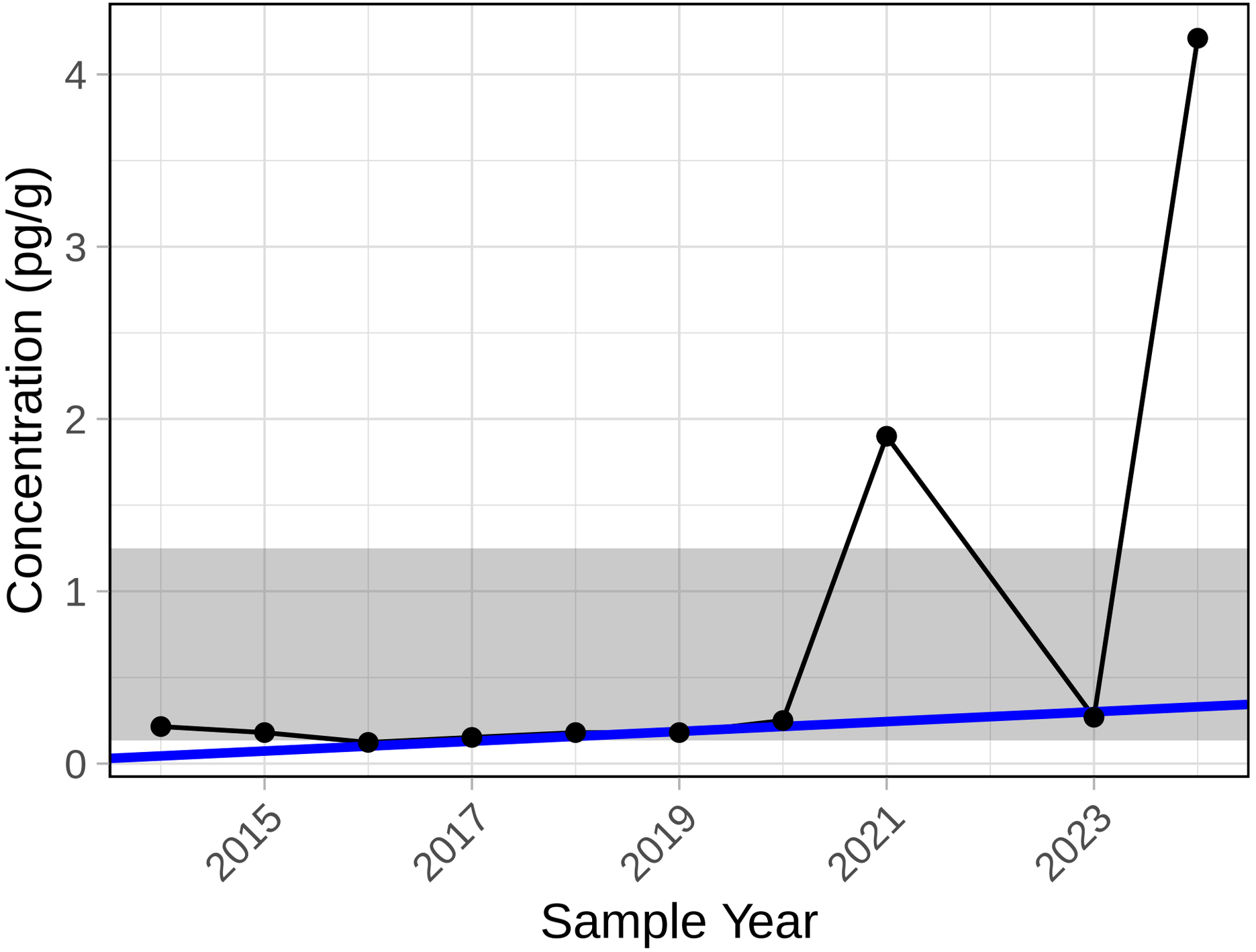
S5A Sediment



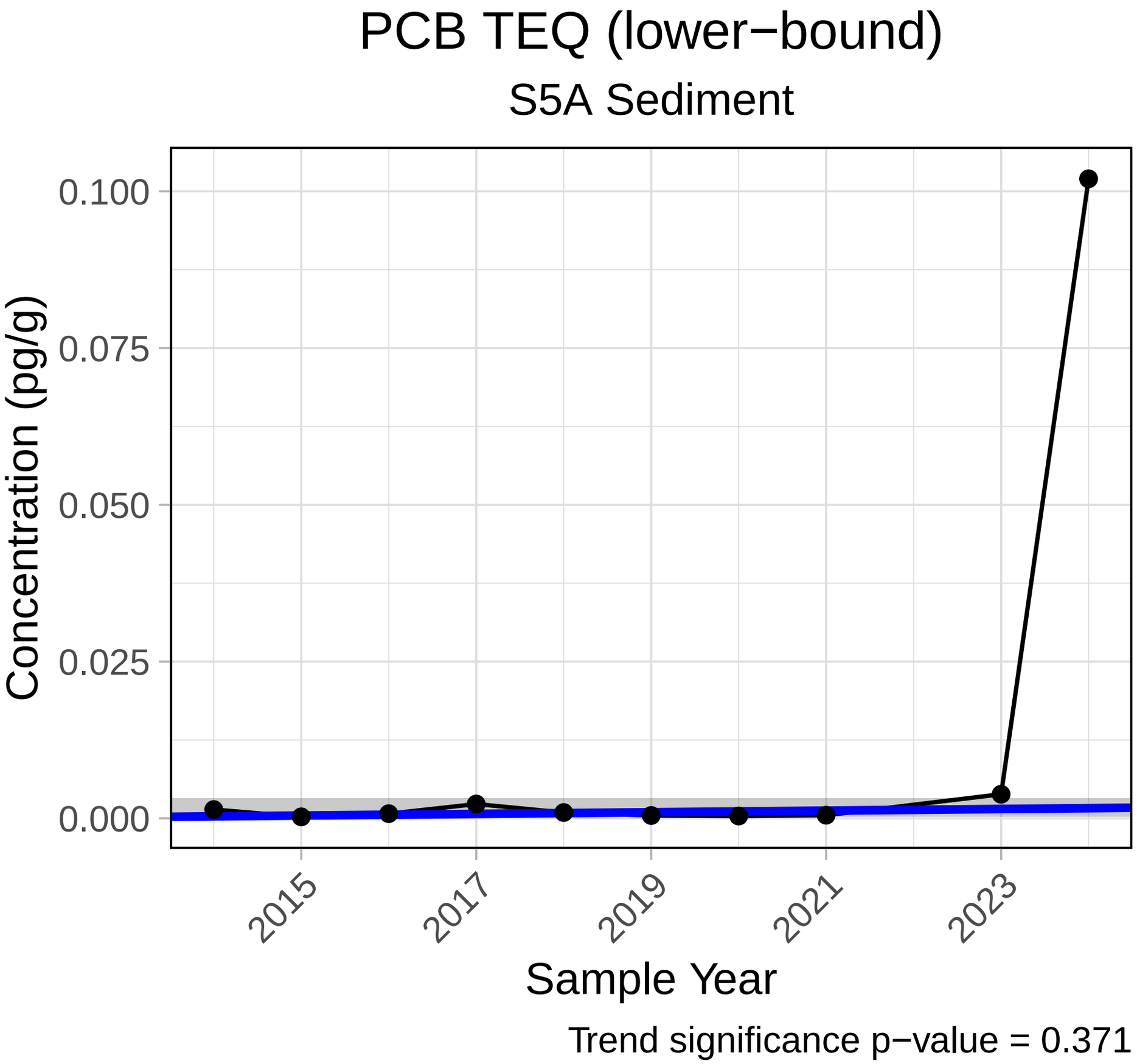
Trend significance p−value = 0.238

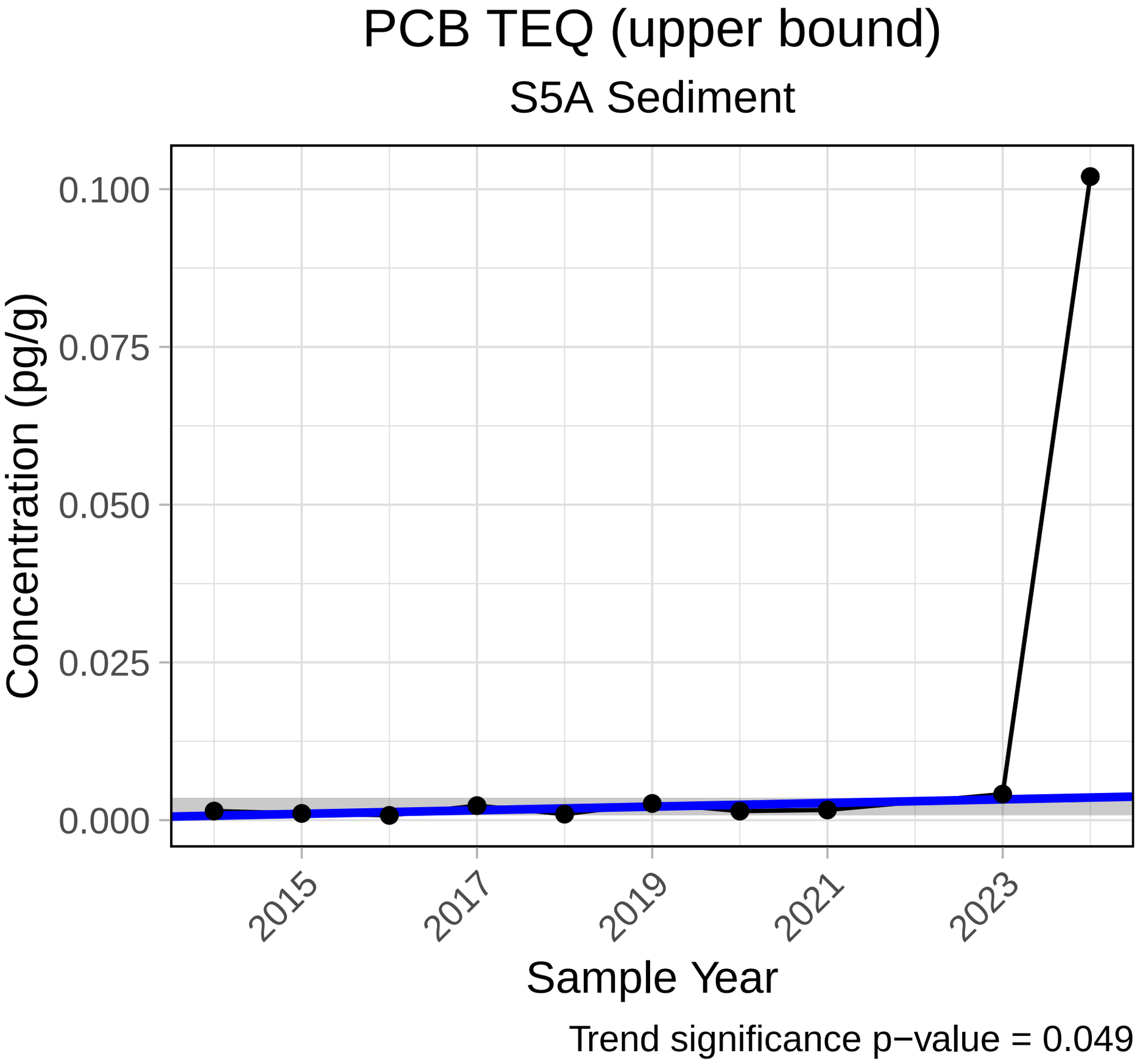
PCB 209

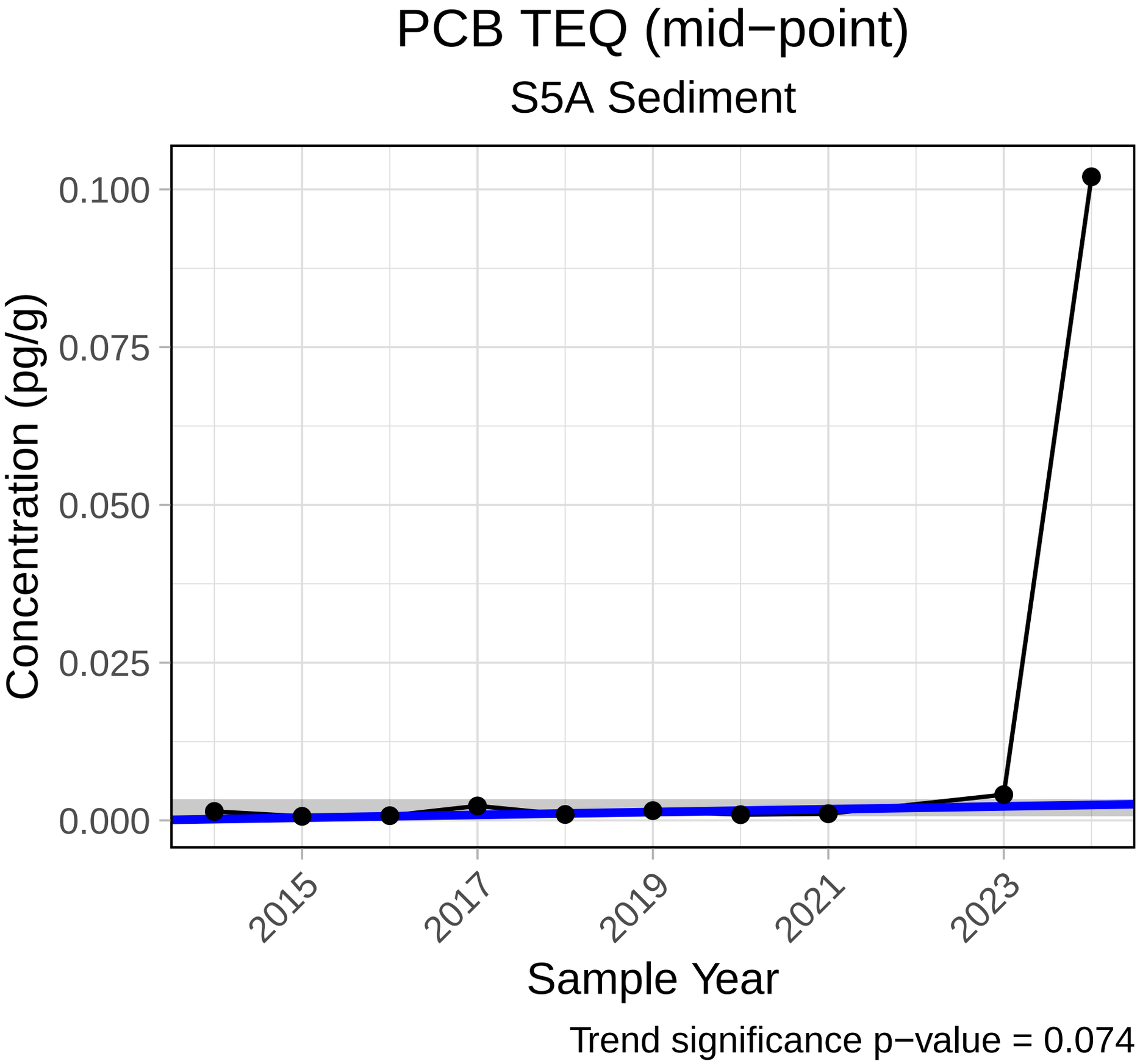
S5A Sediment



Trend significance p−value = 0.023

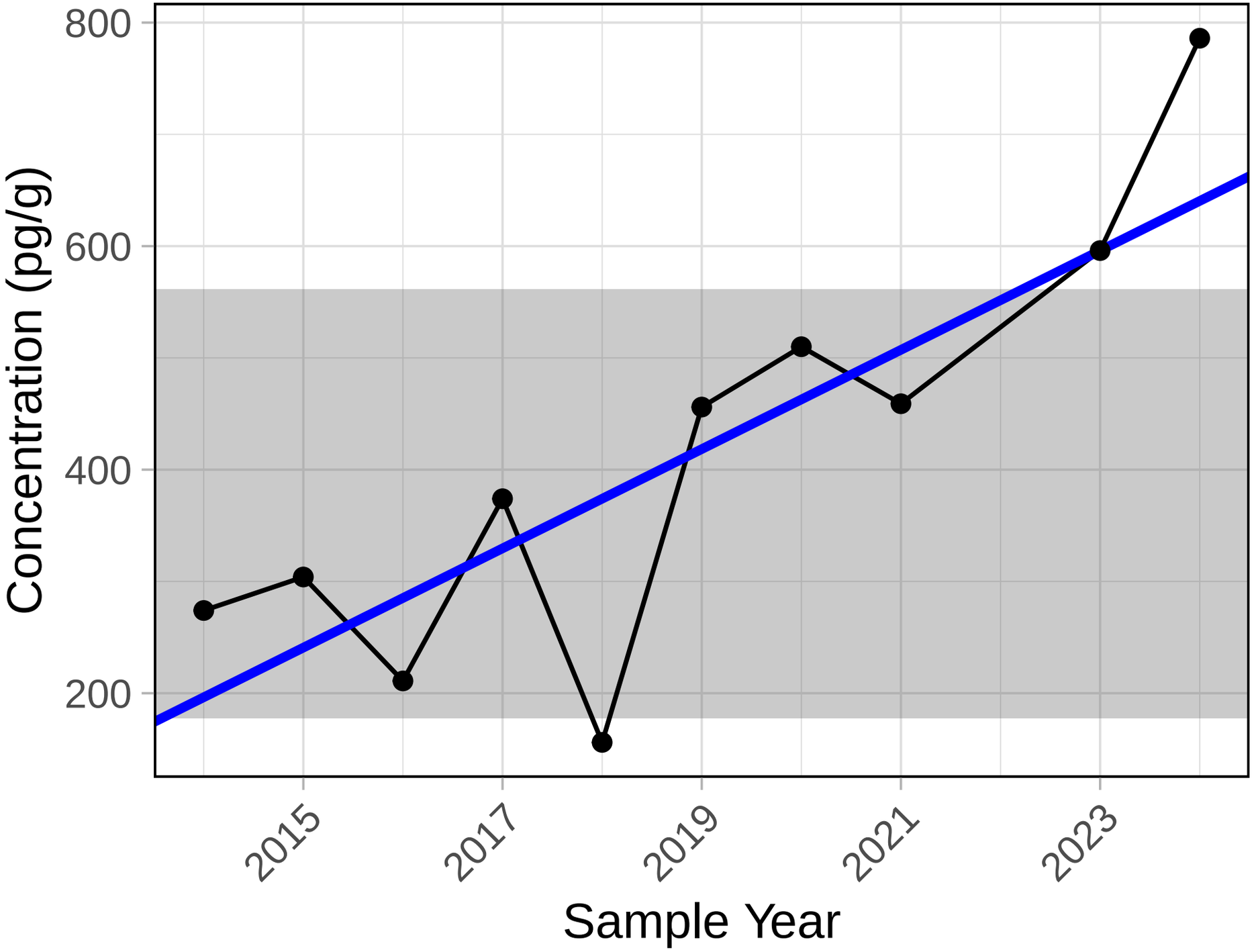

PCB TEQ (lower−bound)
S5A Sediment
Concentration (pg/g)
0.100
0.075
0.050
0.025
0.000
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.371


PCB TEQ (upper bound)
S5A Sediment
Concentration (pg/g)
0.100
0.075
0.050
0.025
0.000
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.049


PCB TEQ (mid−point)
S5A Sediment
Concentration (pg/g)
0.100
0.075
0.050
0.025
0.000
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.074

PCB Total

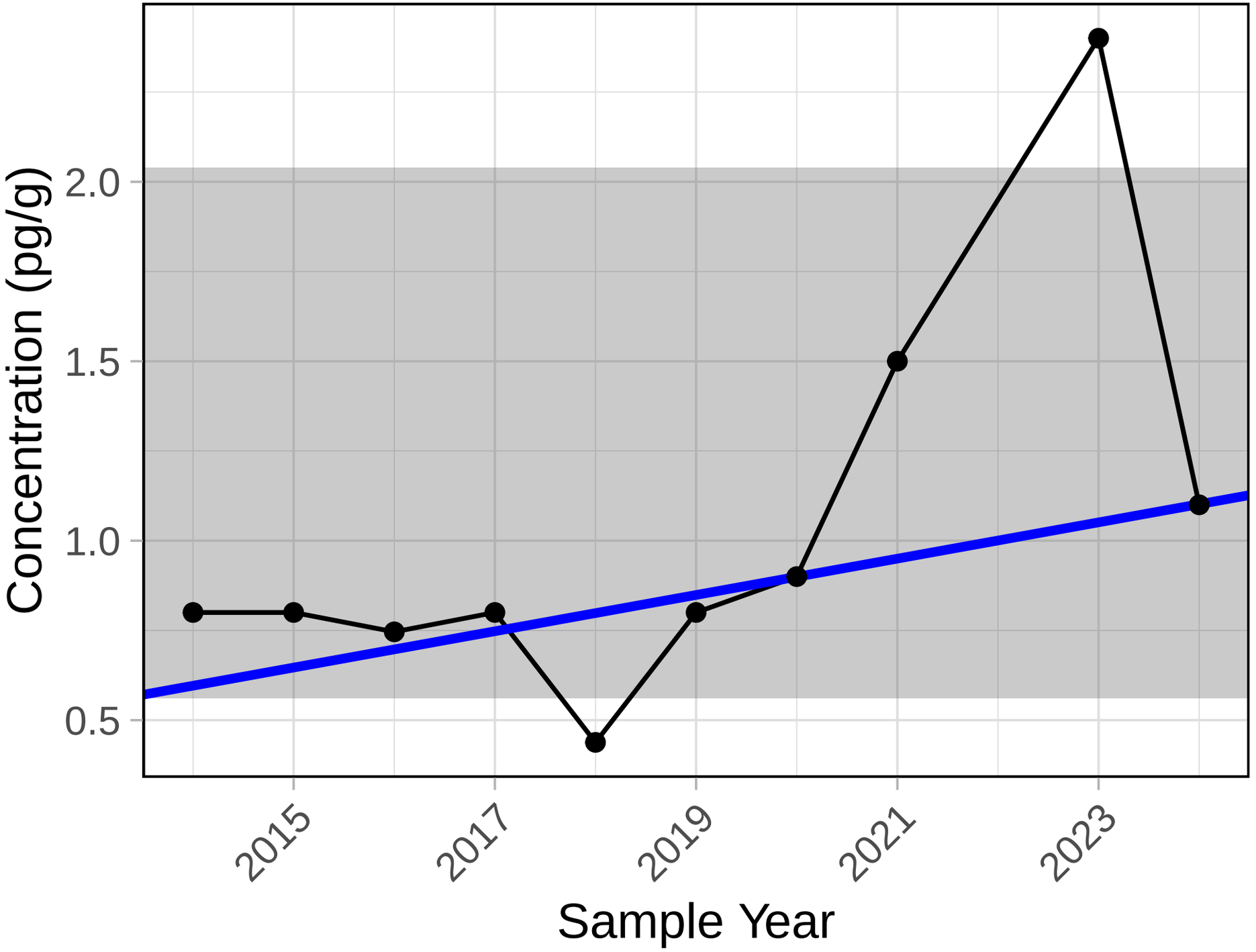
S5A Sediment



Trend significance p−value = 0.007
ISQG level = 34100 pg/g (maximum)
PEL level = 277000 pg/g (maximum)

PCBs 12+13

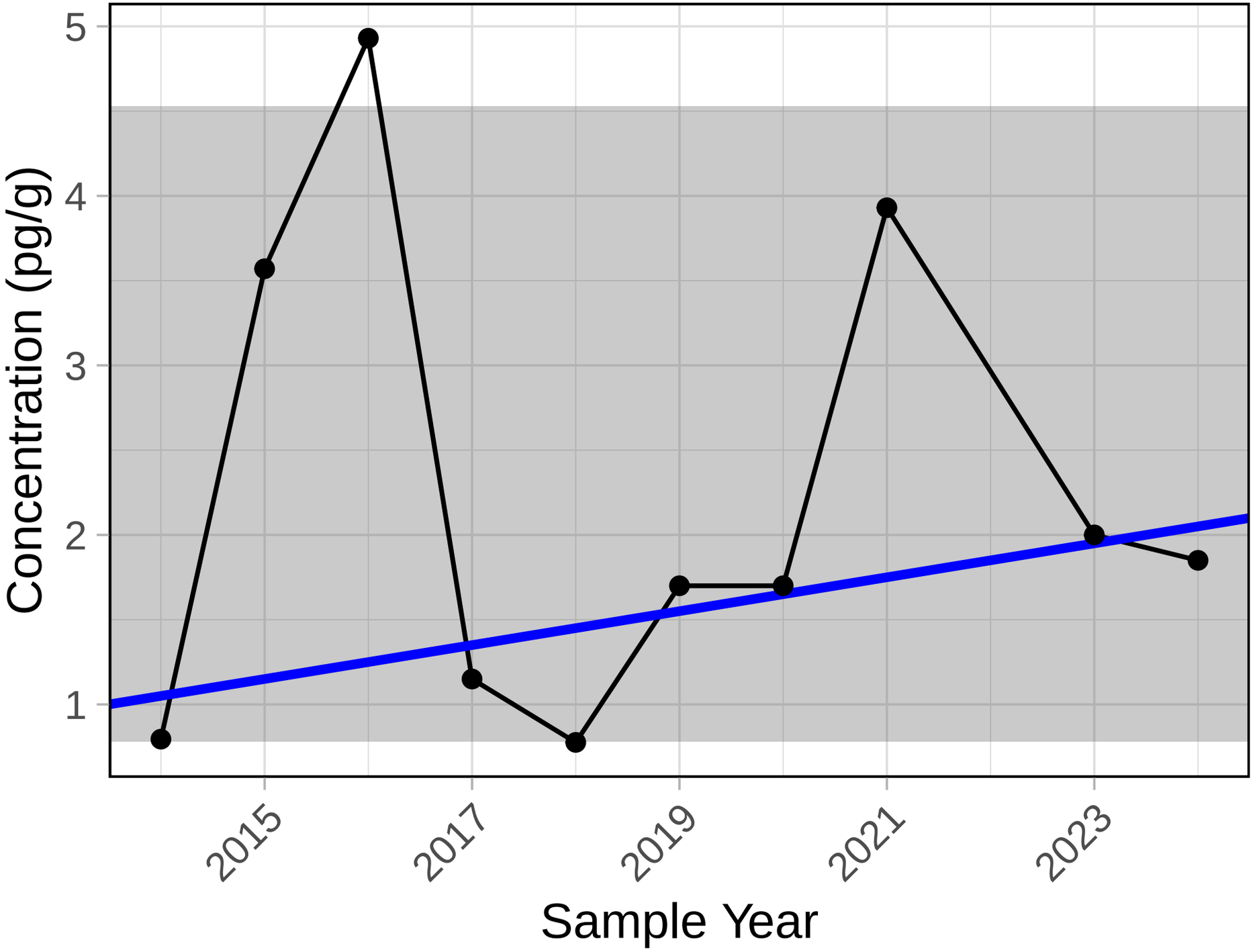
S5A Sediment



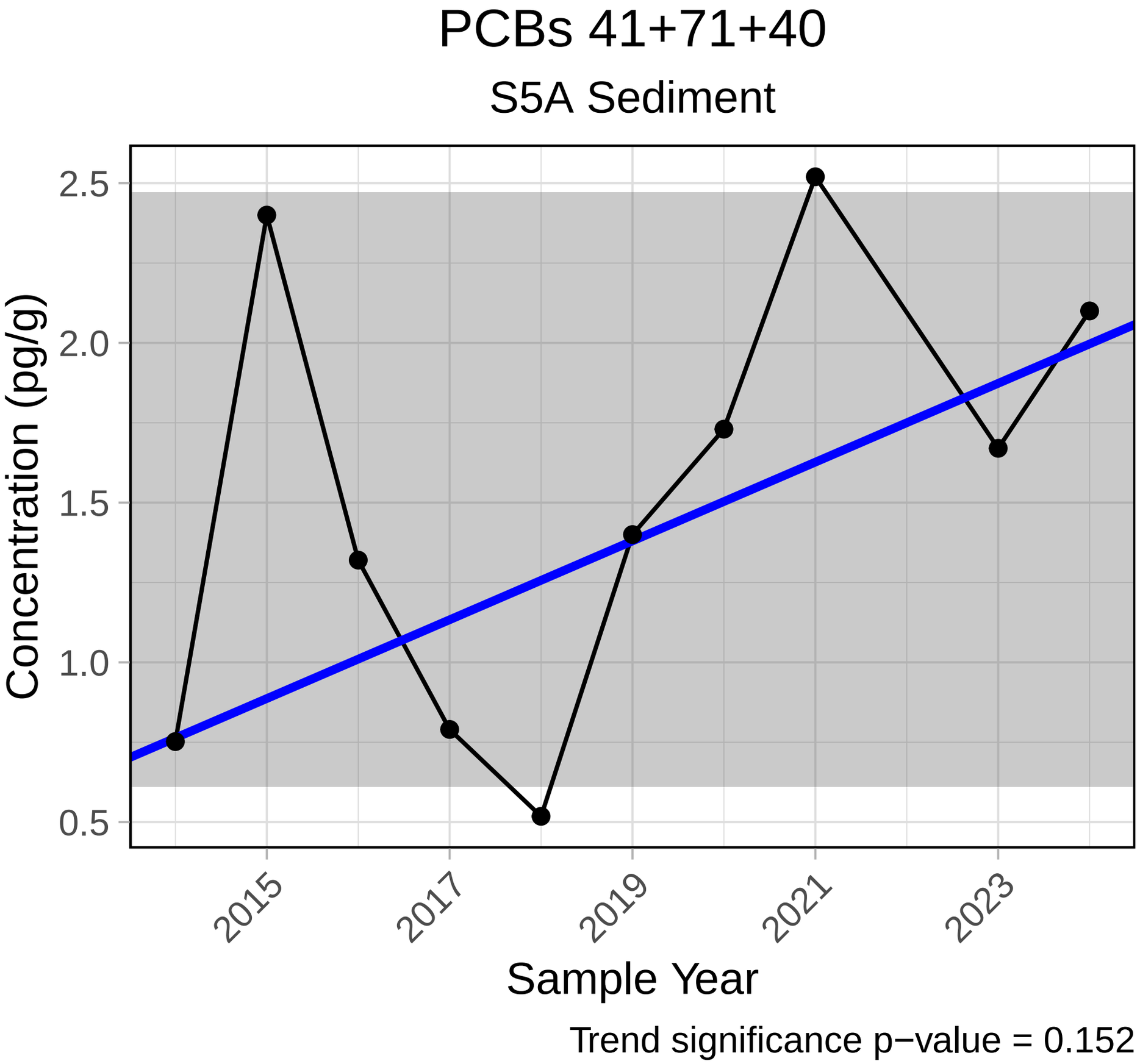
Trend significance p−value = 0.041

PCBs 21+33

S5A Sediment

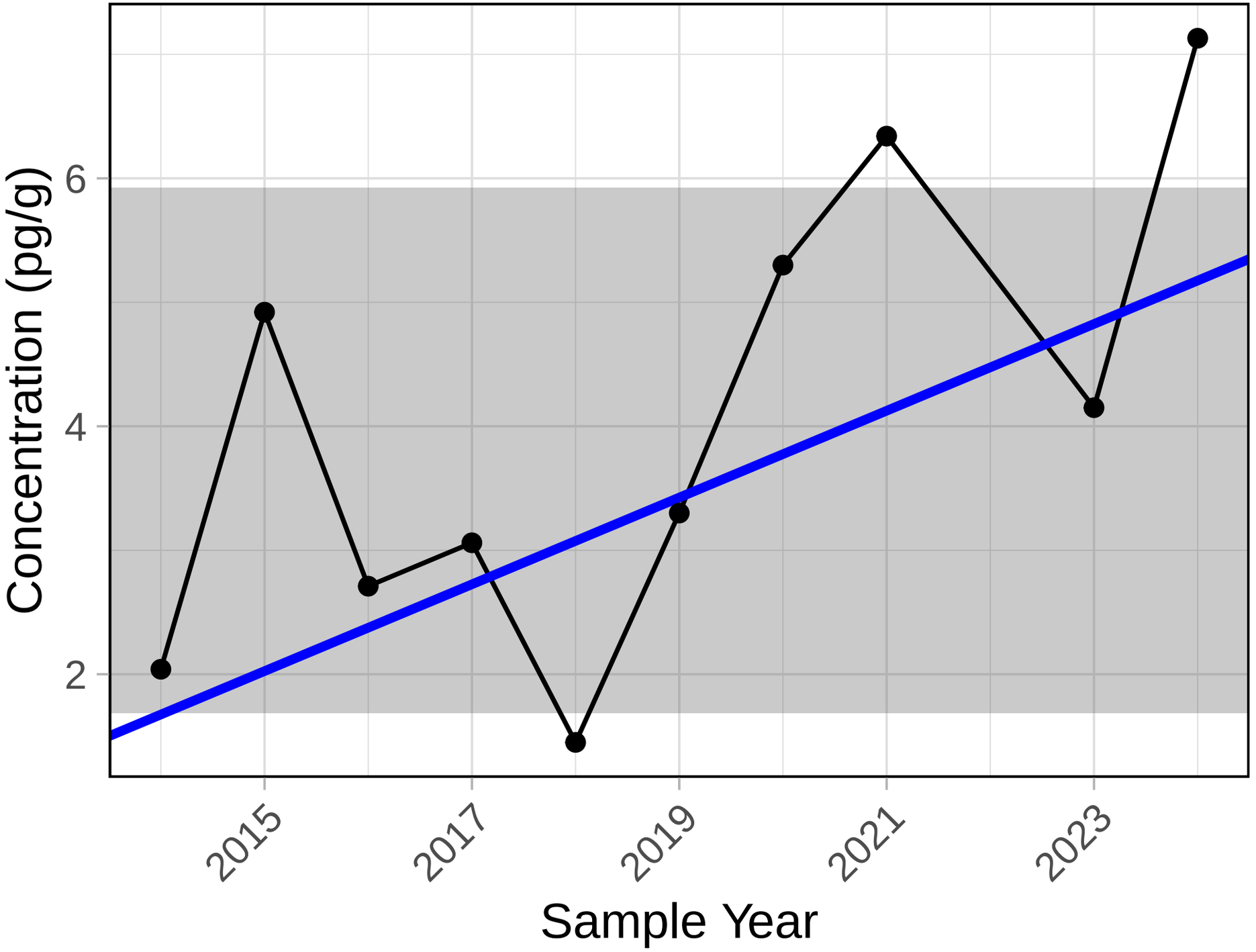


Trend significance p−value = 0.53


PCBs 41+71+40
S5A Sediment
Concentration (pg/g)
2.5
2.0
1.5
1.0
0.5
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.152

PCBs 44+47+65

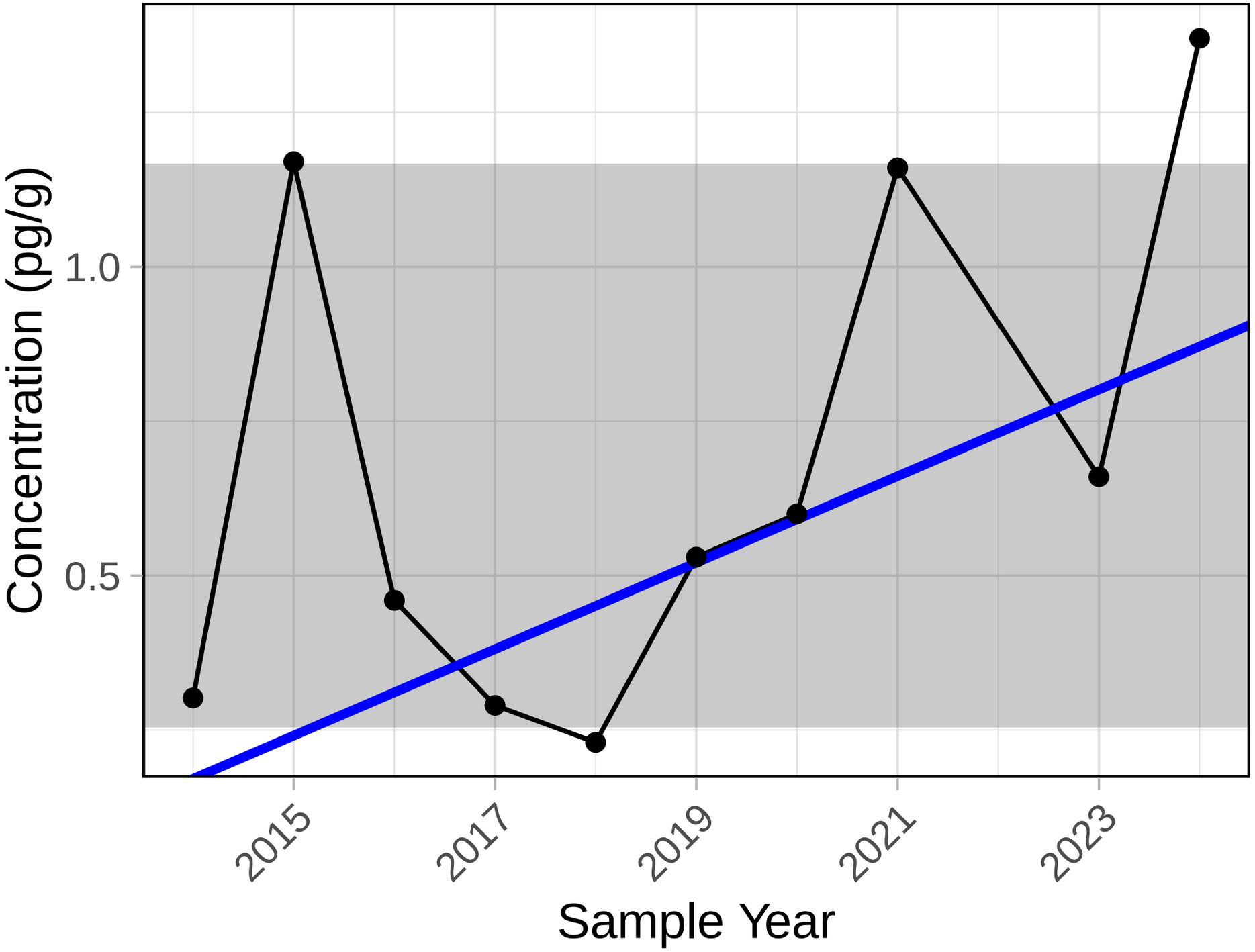
S5A Sediment



Trend significance p−value = 0.032

PCBs 45+51

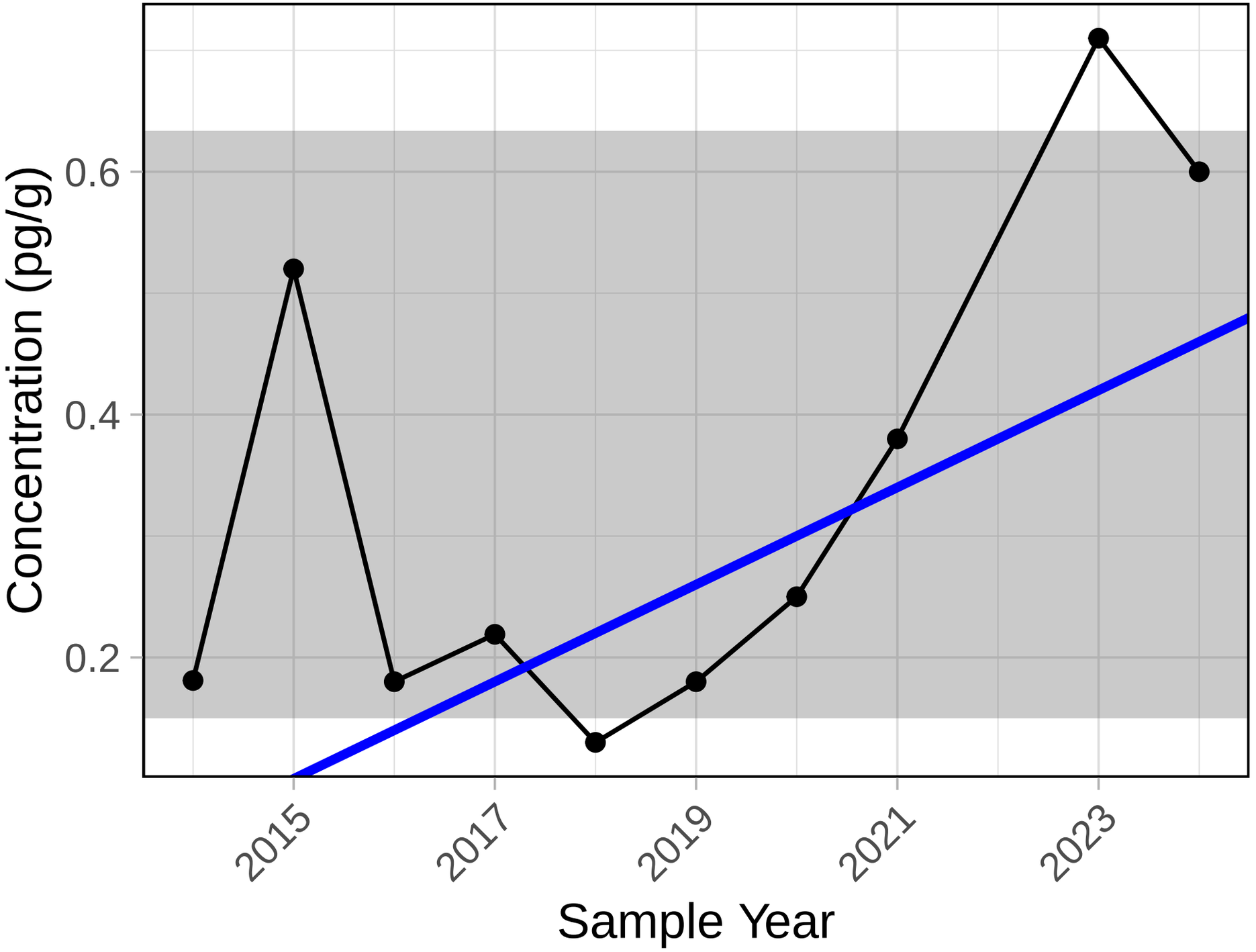
S5A Sediment



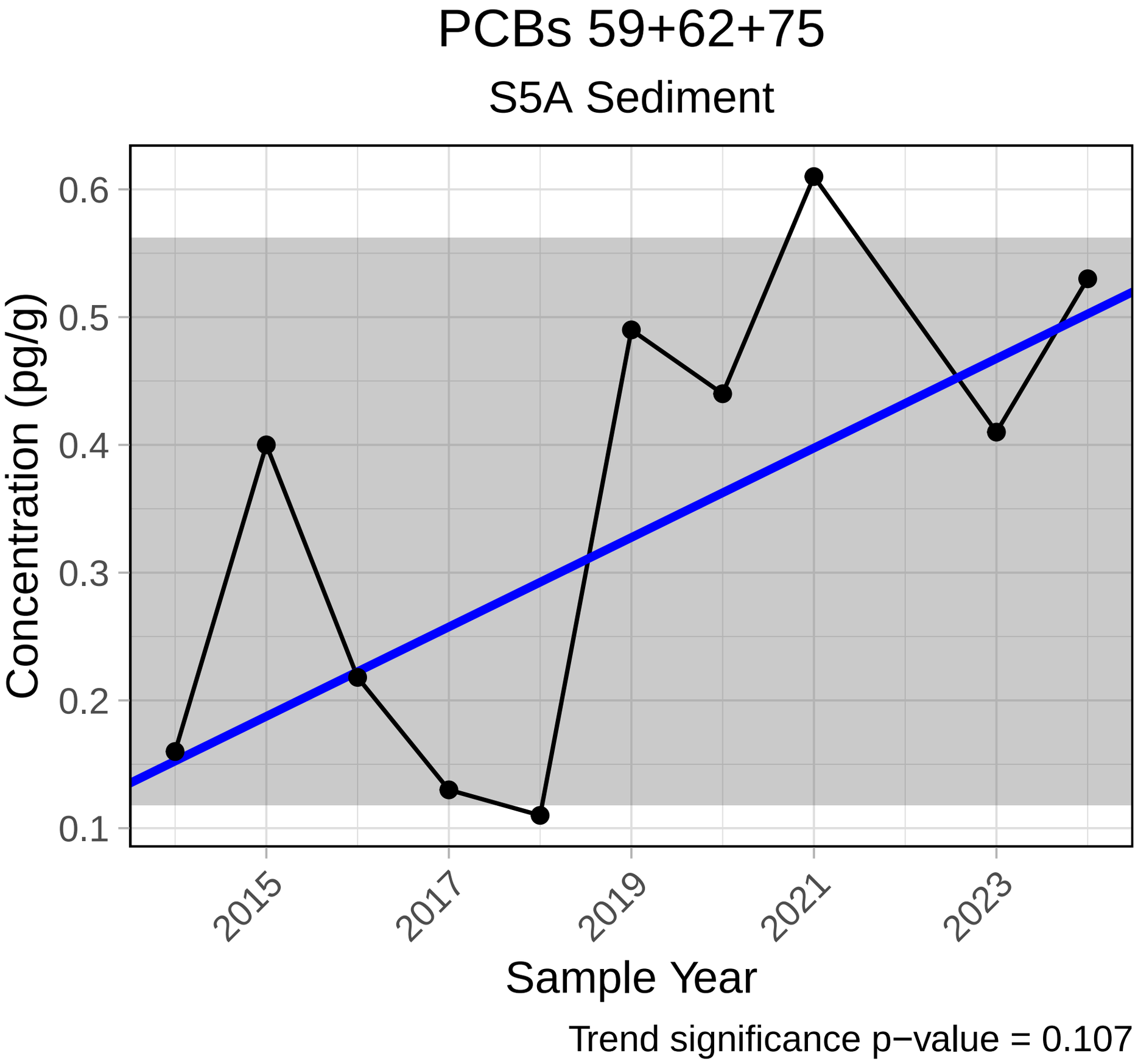
Trend significance p−value = 0.107

PCBs 50+53

S5A Sediment

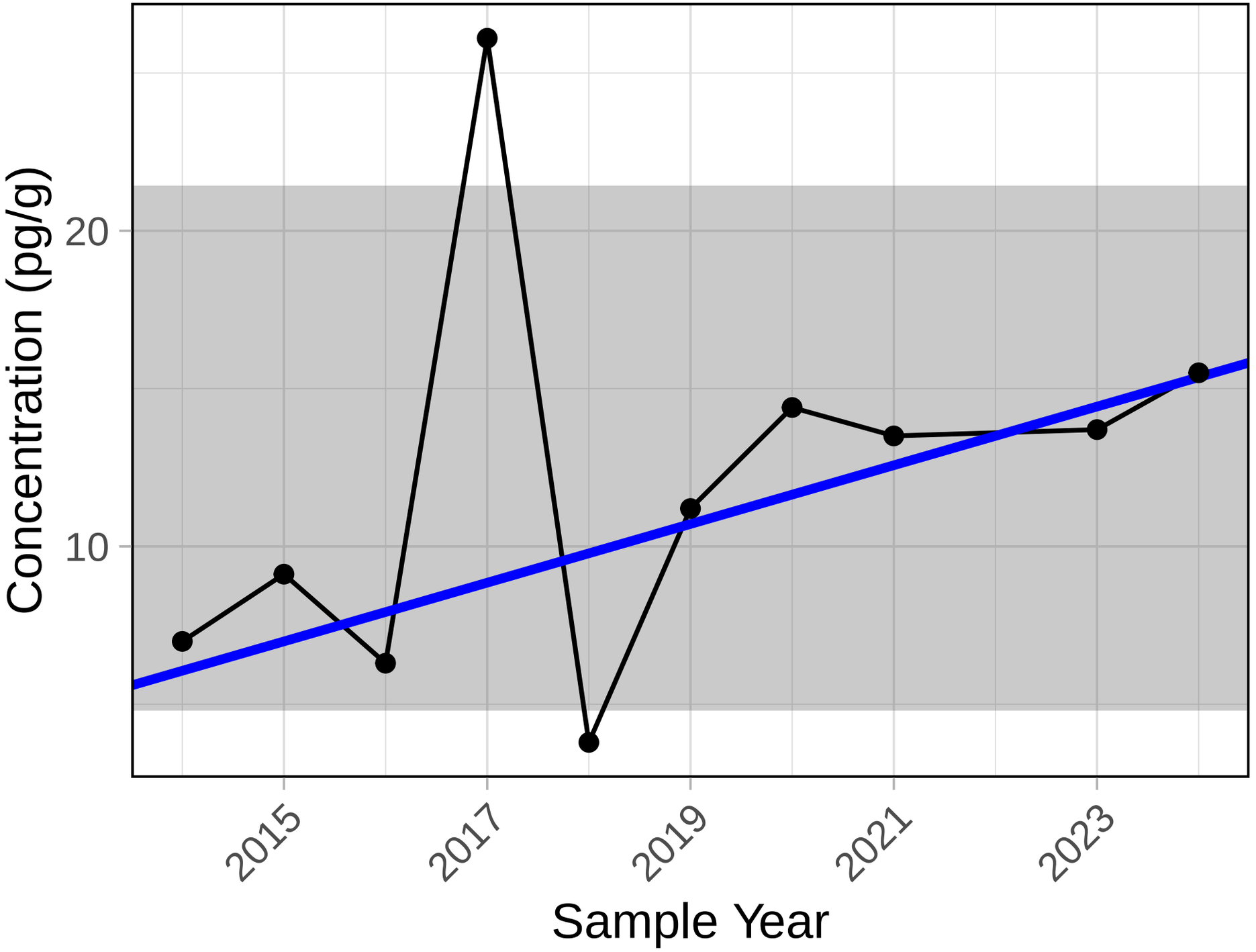


Trend significance p−value = 0.127

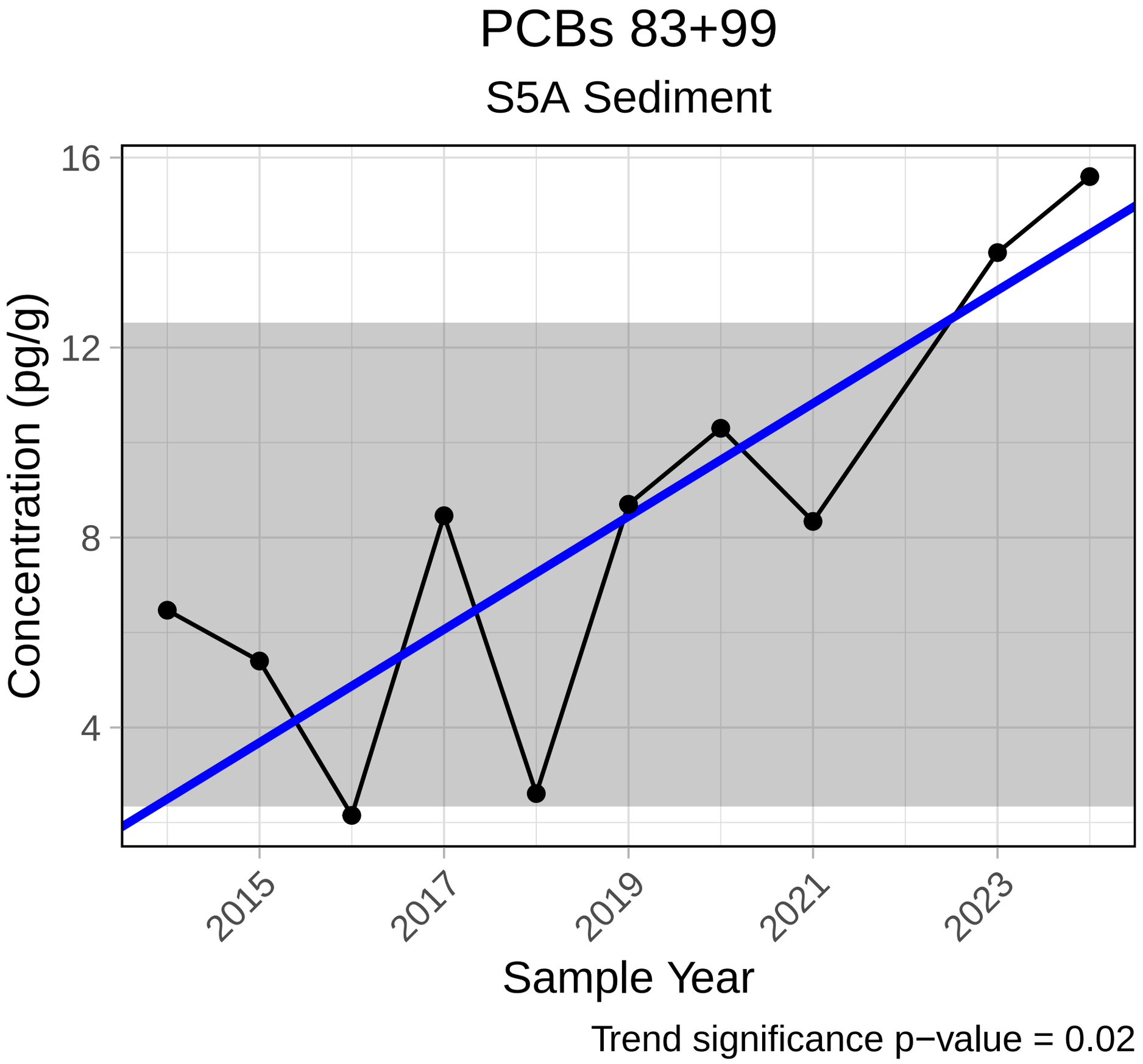

PCBs 59+62+75
S5A Sediment
Concentration (pg/g)
0.6
0.5
0.4
0.3
0.2
0.1
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.107

PCBs 70+61+74+76

S5A Sediment

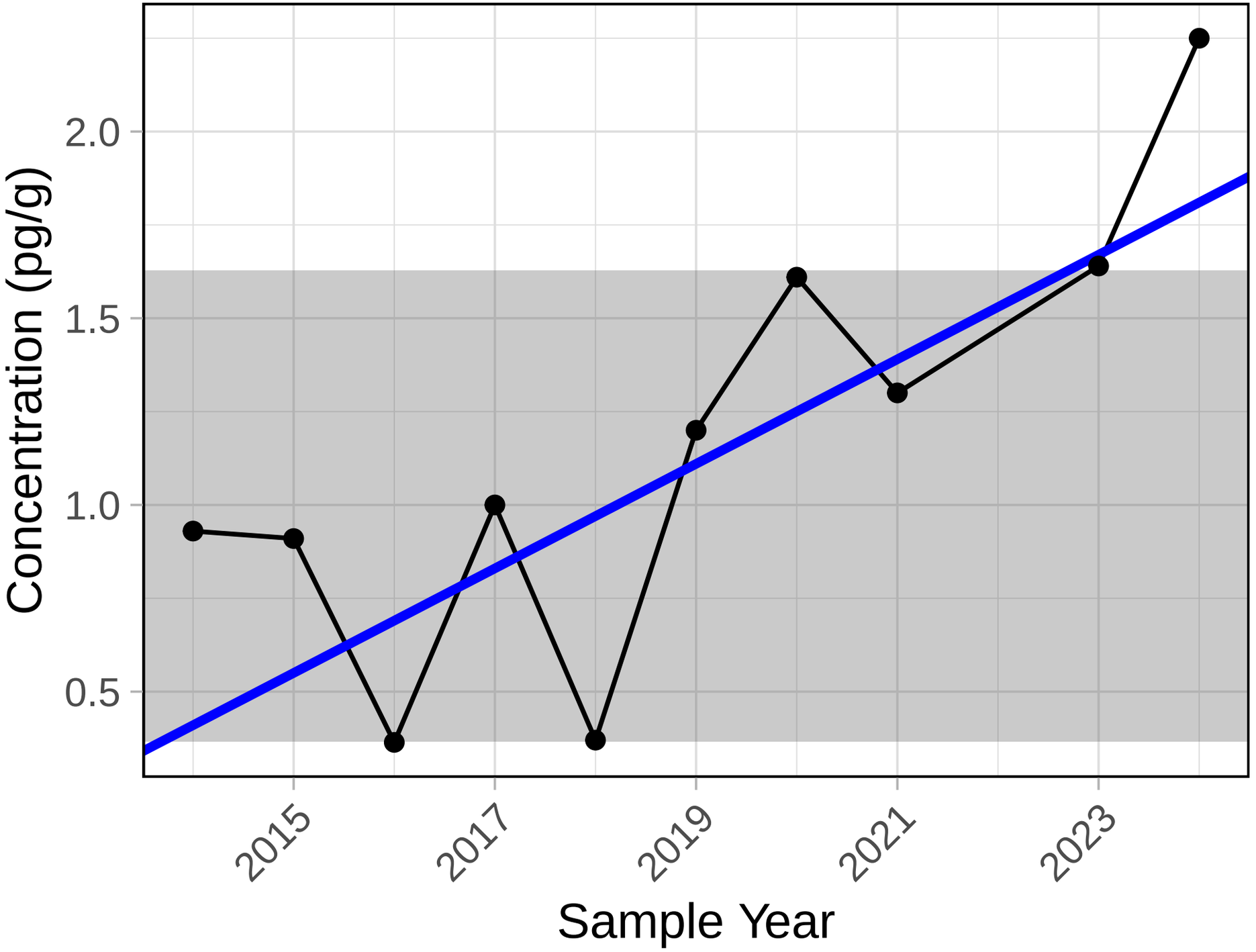


Trend significance p−value = 0.107

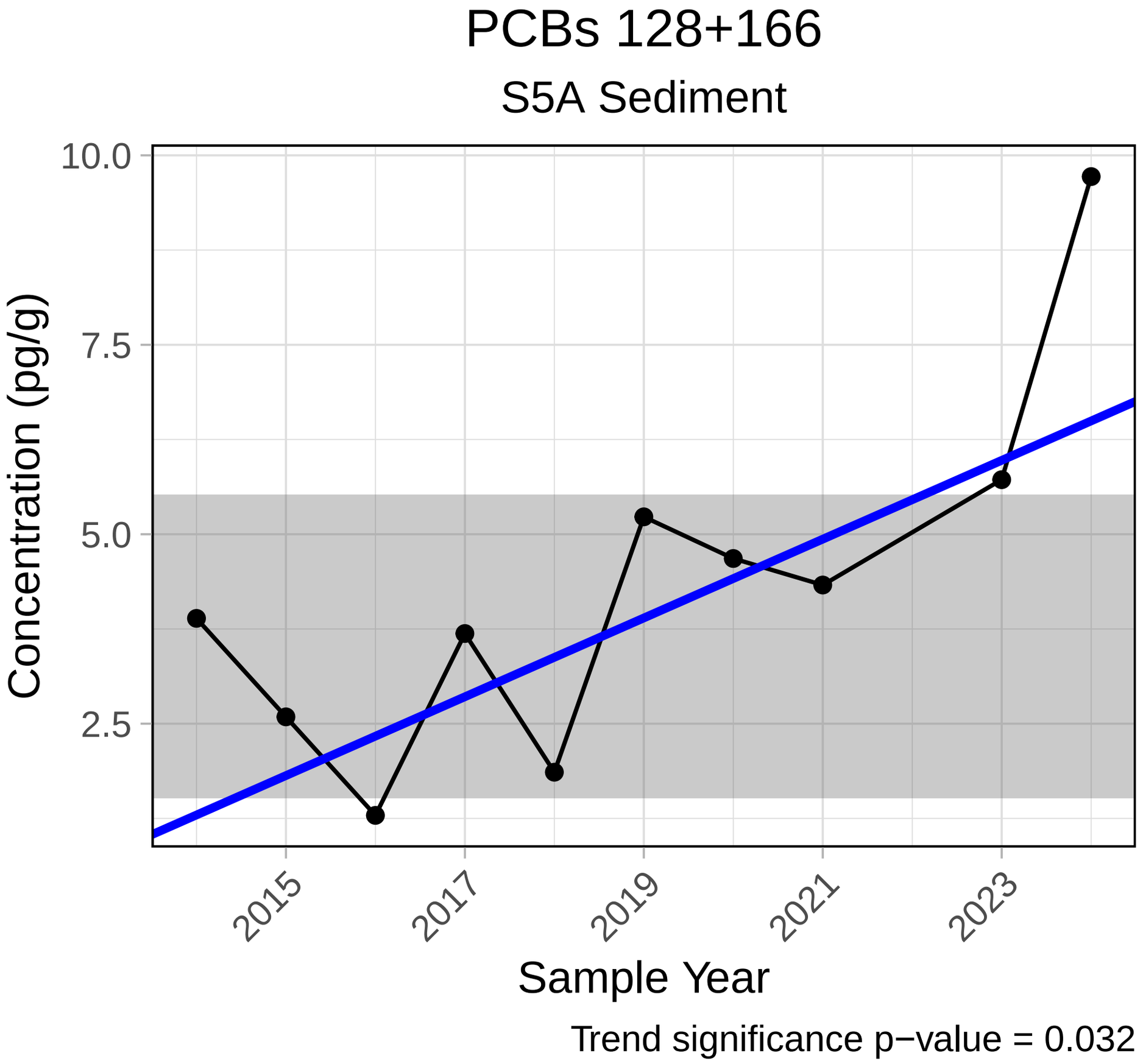

PCBs 83+99
S5A Sediment
16
12
8
4
Concentration (pg/g)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.02

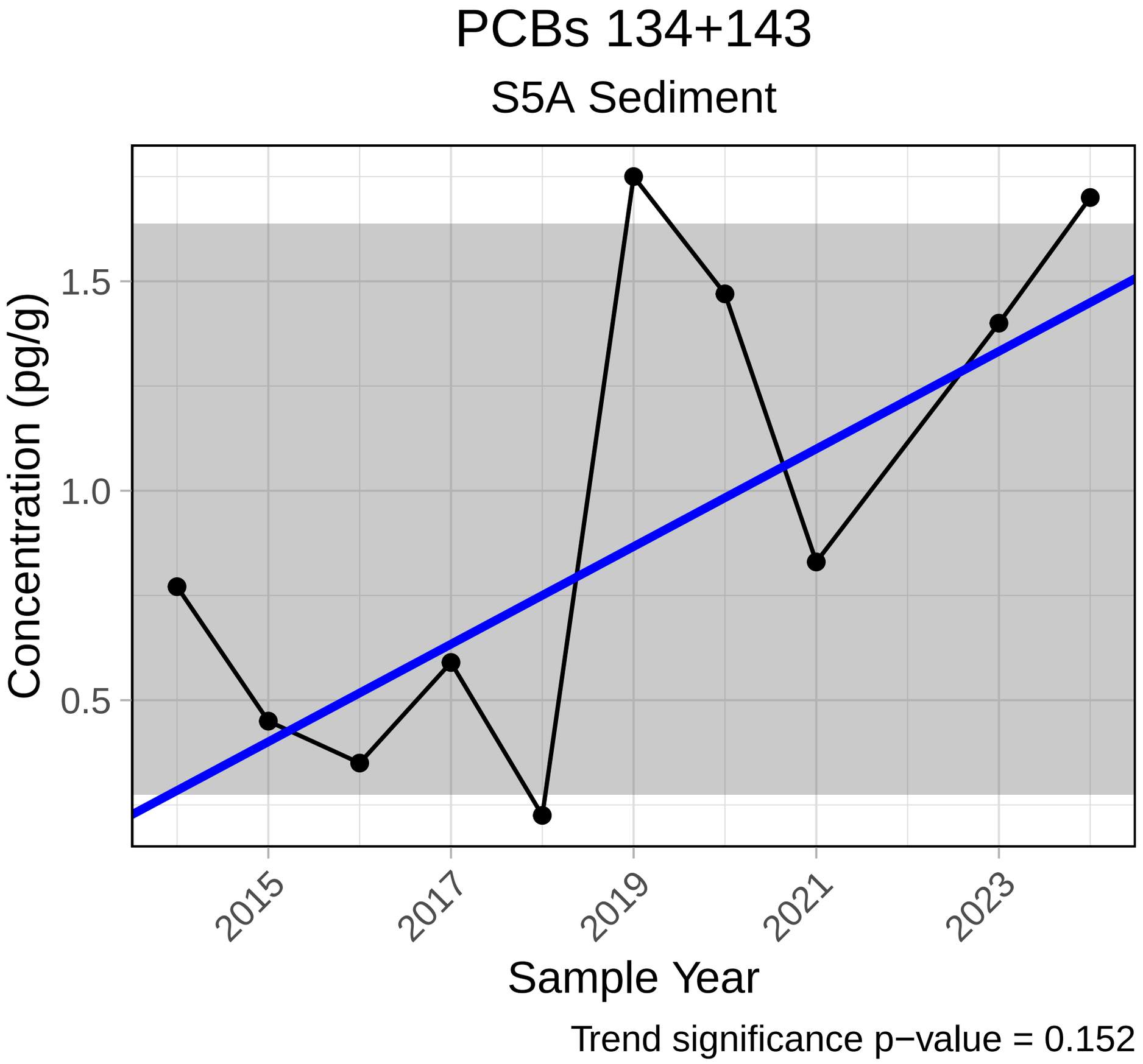
PCBs 88+91

S5A Sediment



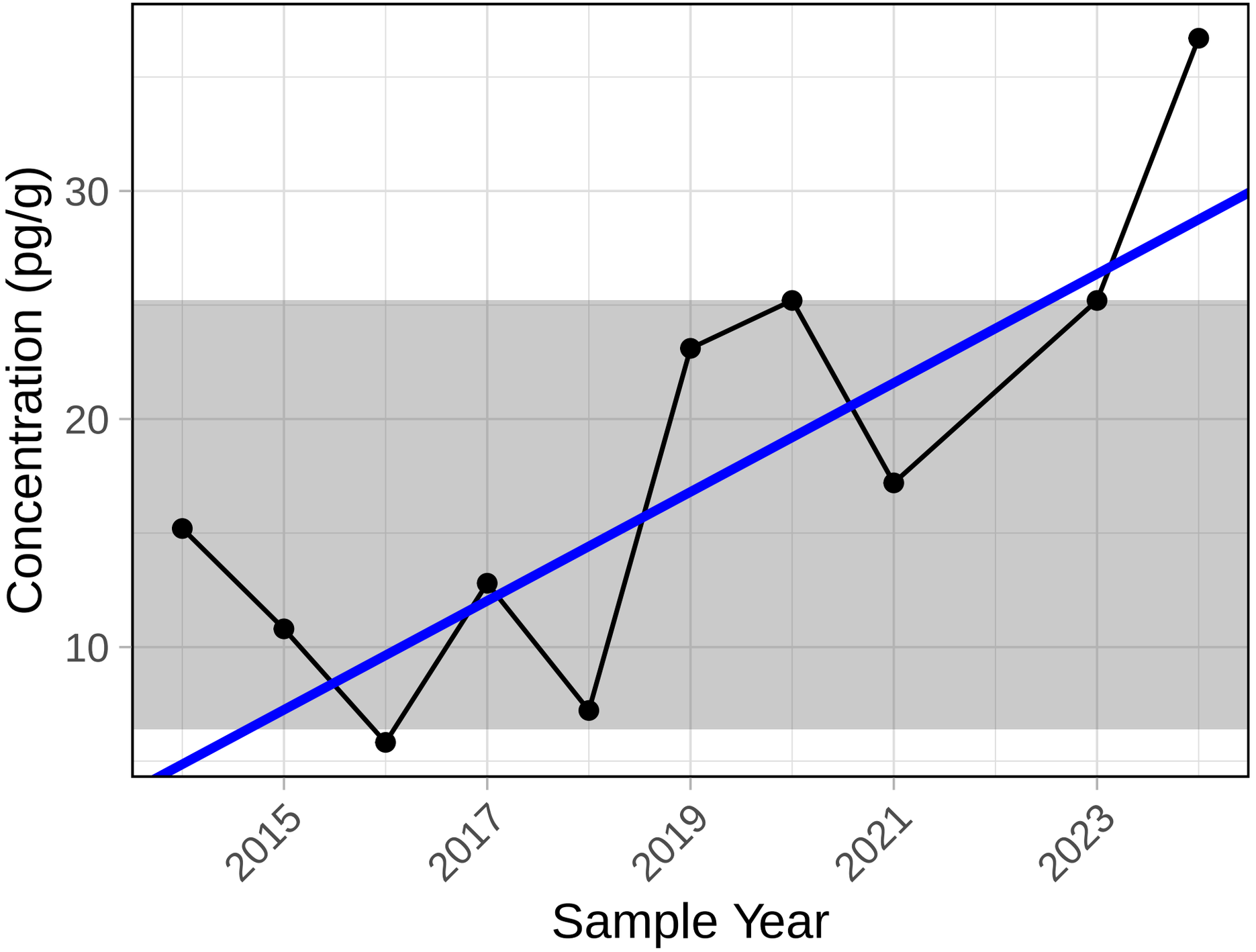
Trend significance p−value = 0.007


PCBs 128+166
S5A Sediment
10.0
7.5
5.0
2.5
Concentration (pg/g)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.032


PCBs 134+143
S5A Sediment
Concentration (pg/g)
1.5
1.0
0.5
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.152

PCBs 147+149

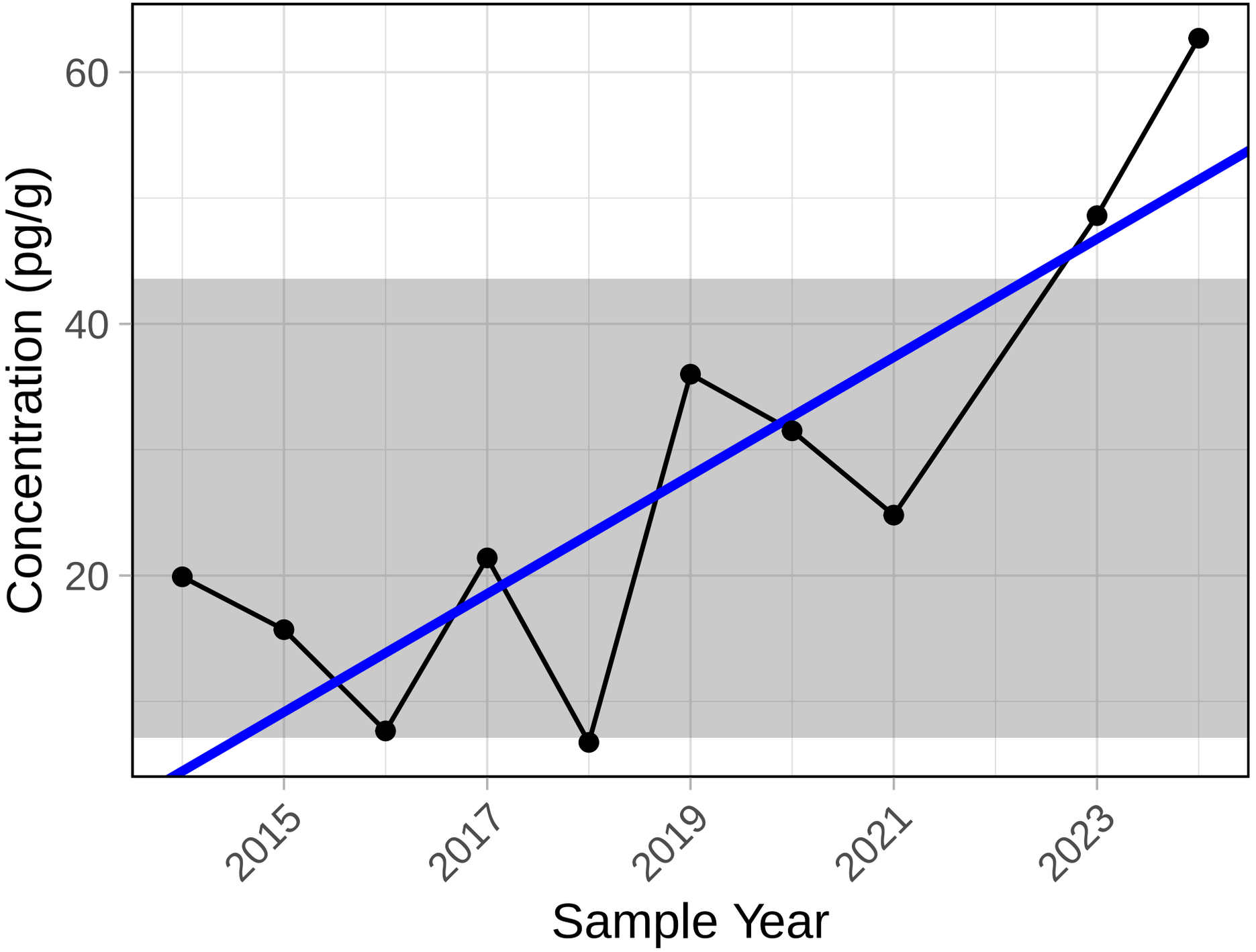
S5A Sediment



Trend significance p−value = 0.025

PCBs 153+168

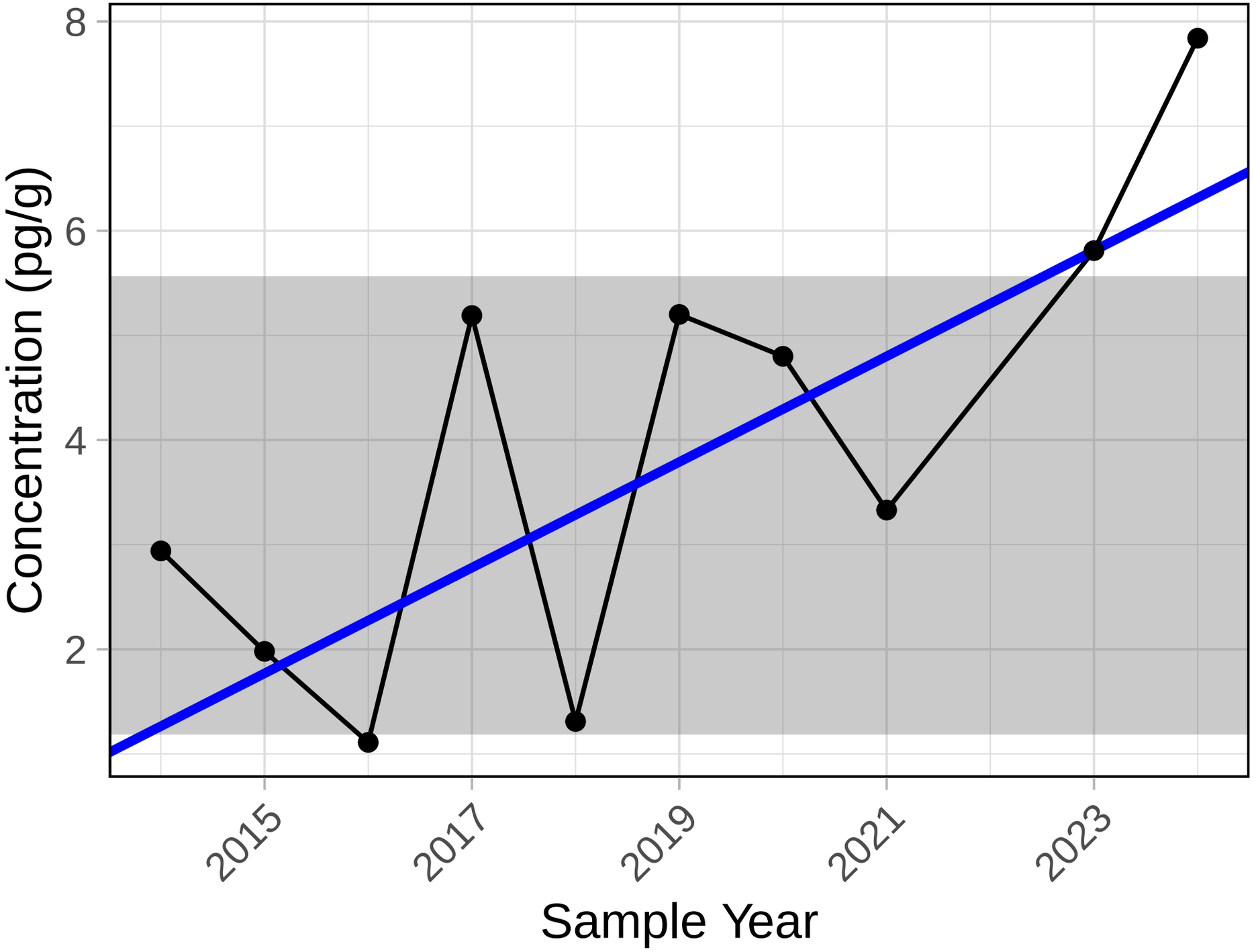
S5A Sediment



Trend significance p−value = 0.032

PCBs 156+157

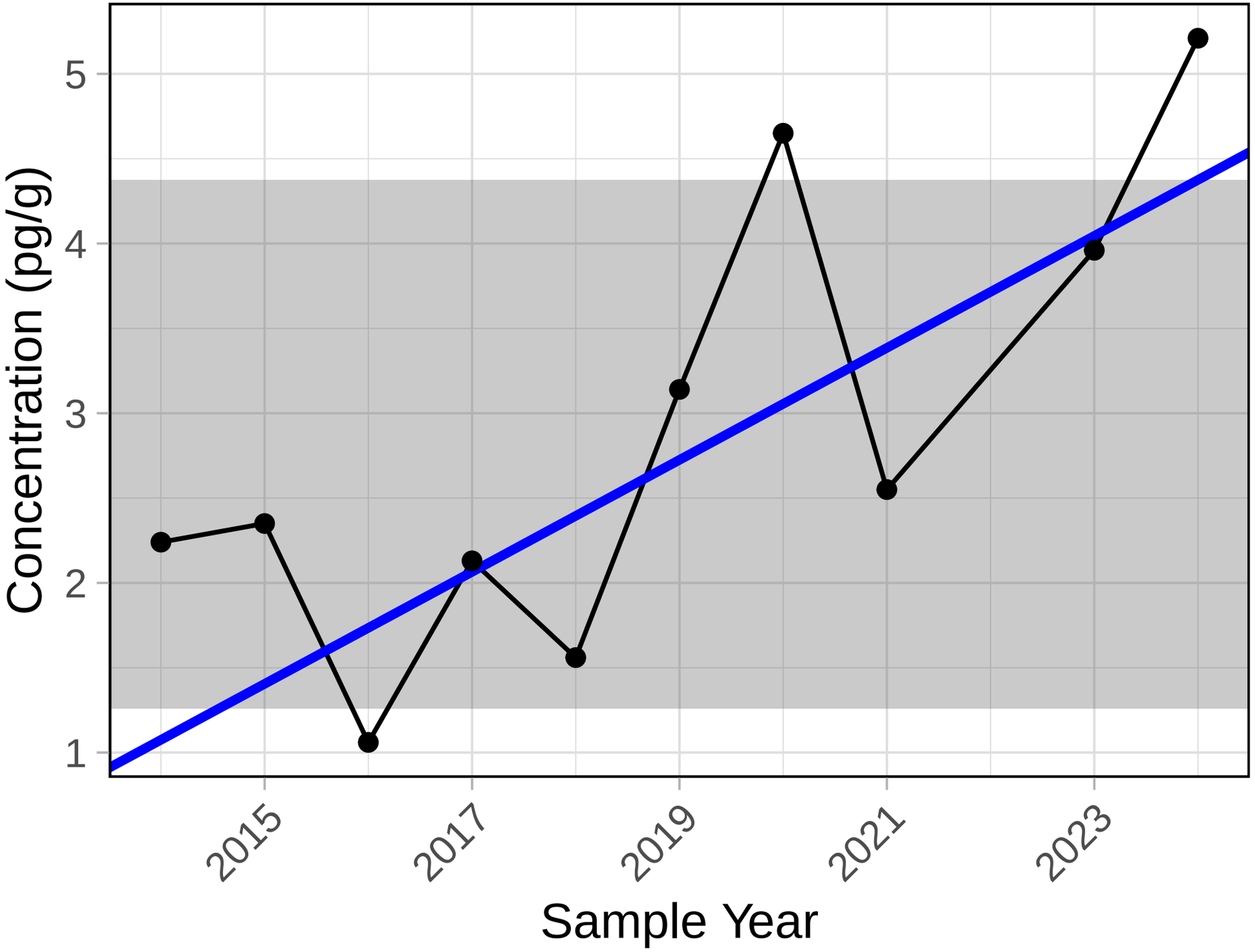
S5A Sediment



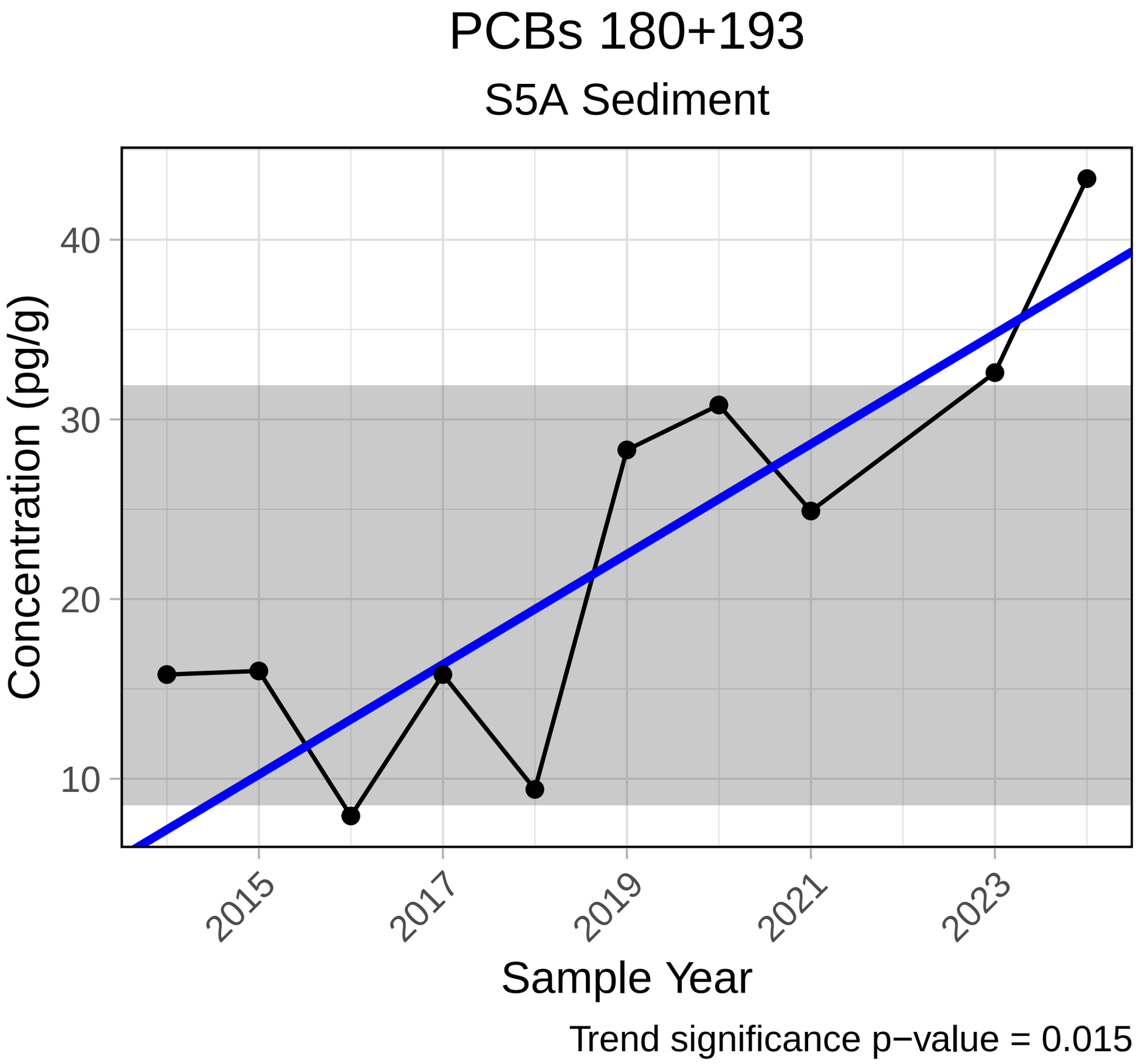
Trend significance p−value = 0.049

PCBs 171+173

S5A Sediment

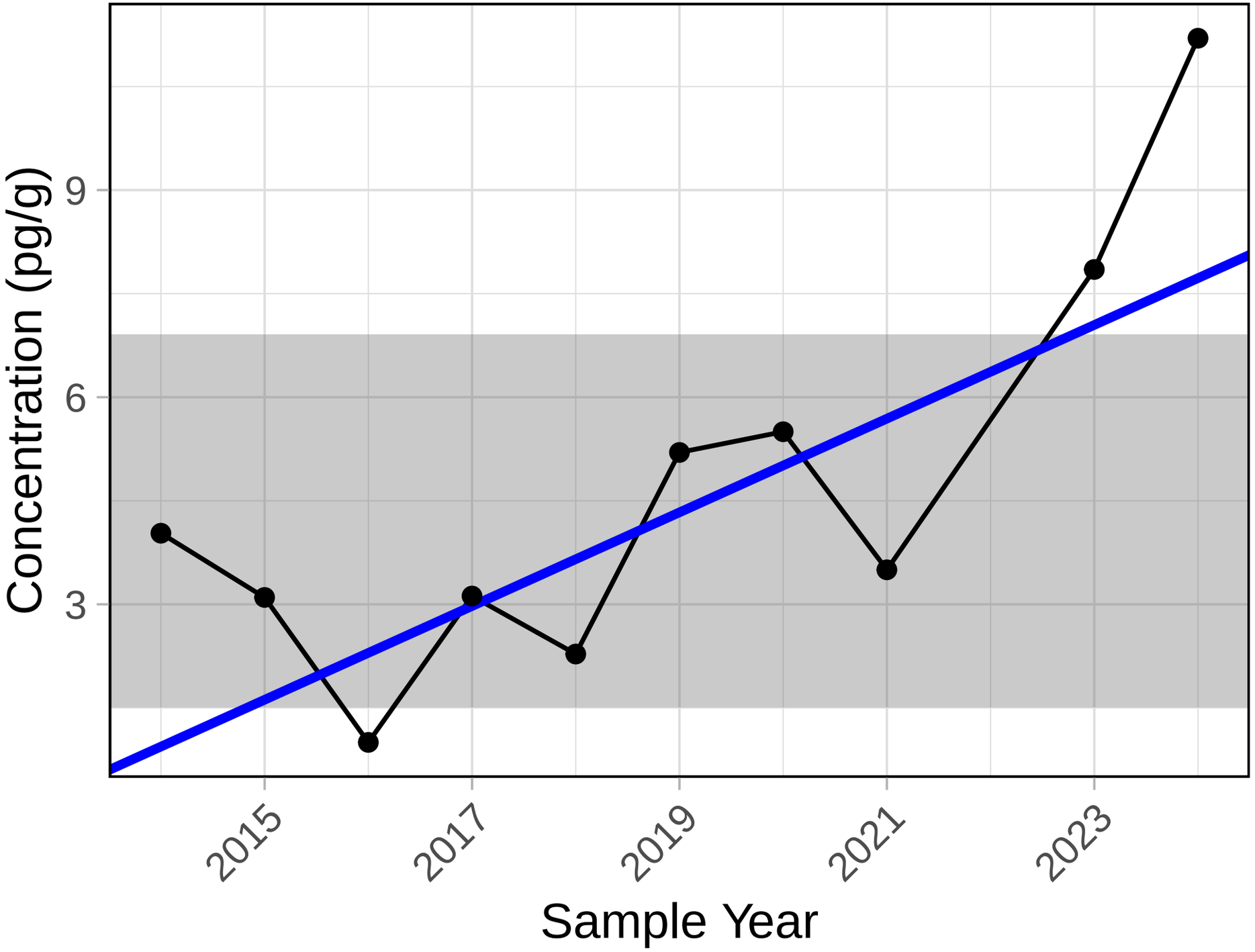


Trend significance p−value = 0.032

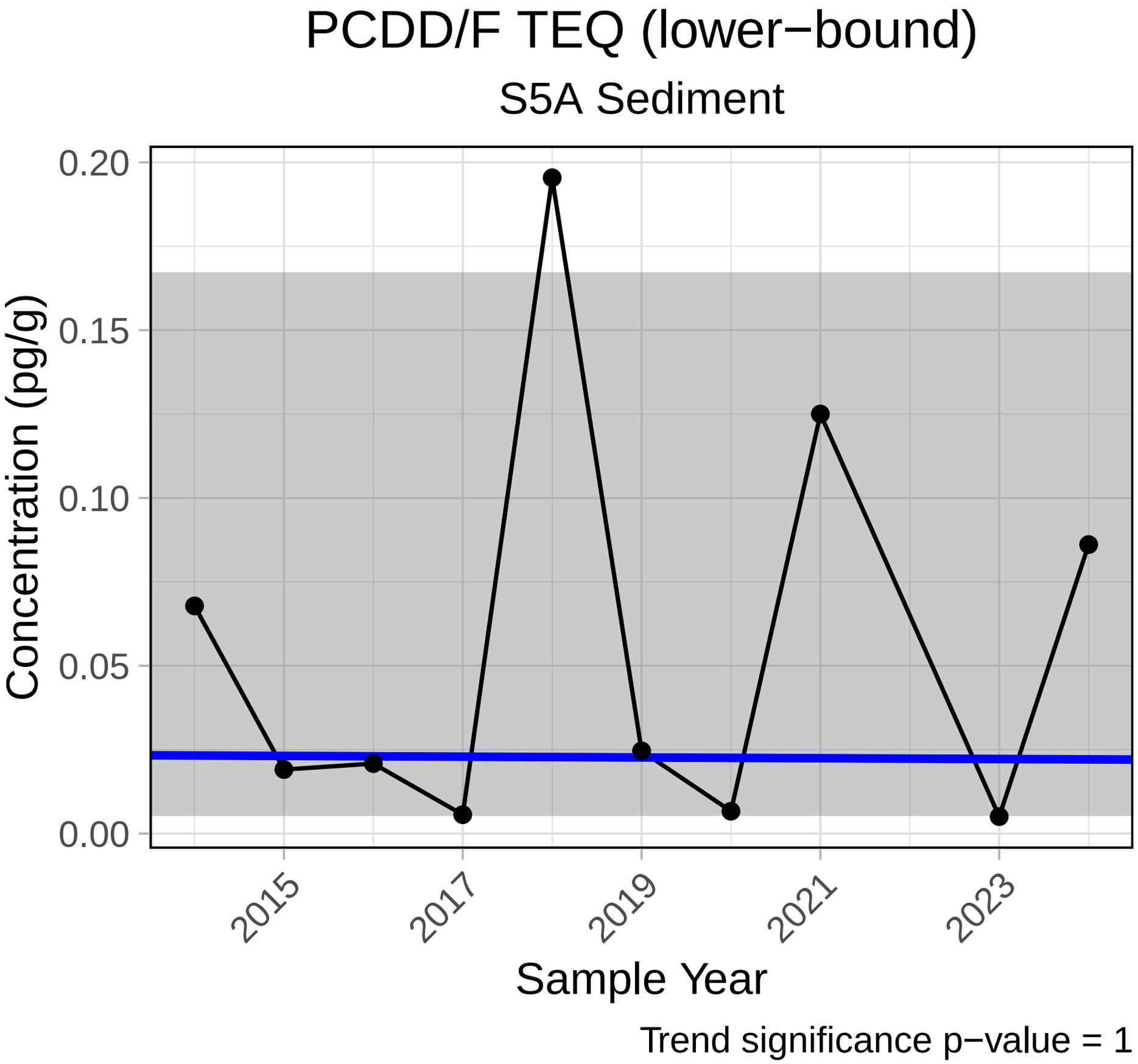

PCBs 180+193
S5A Sediment
Concentration (pg/g)
40
30
20
10
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.015

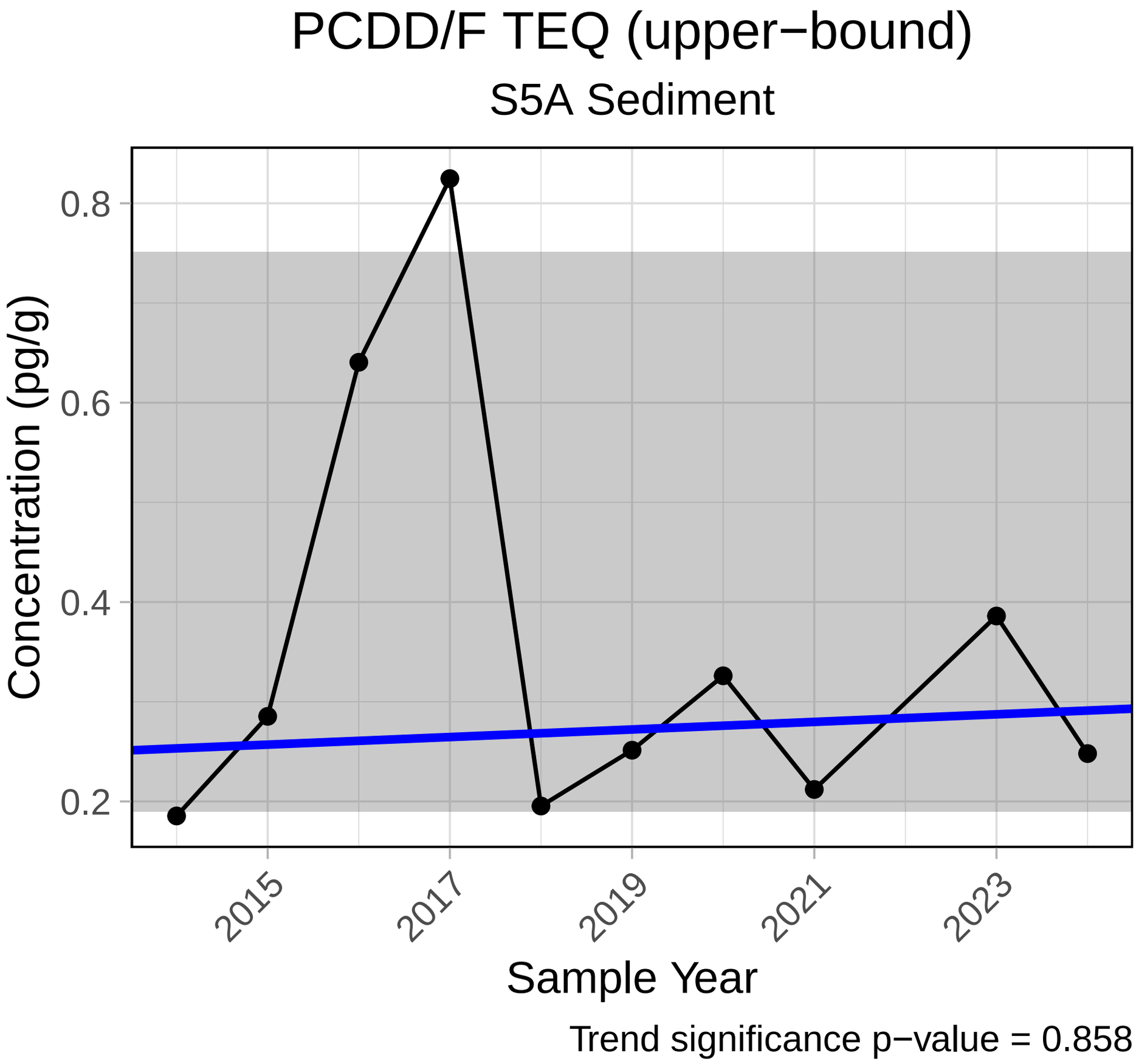
PCBs 198+199

S5A Sediment



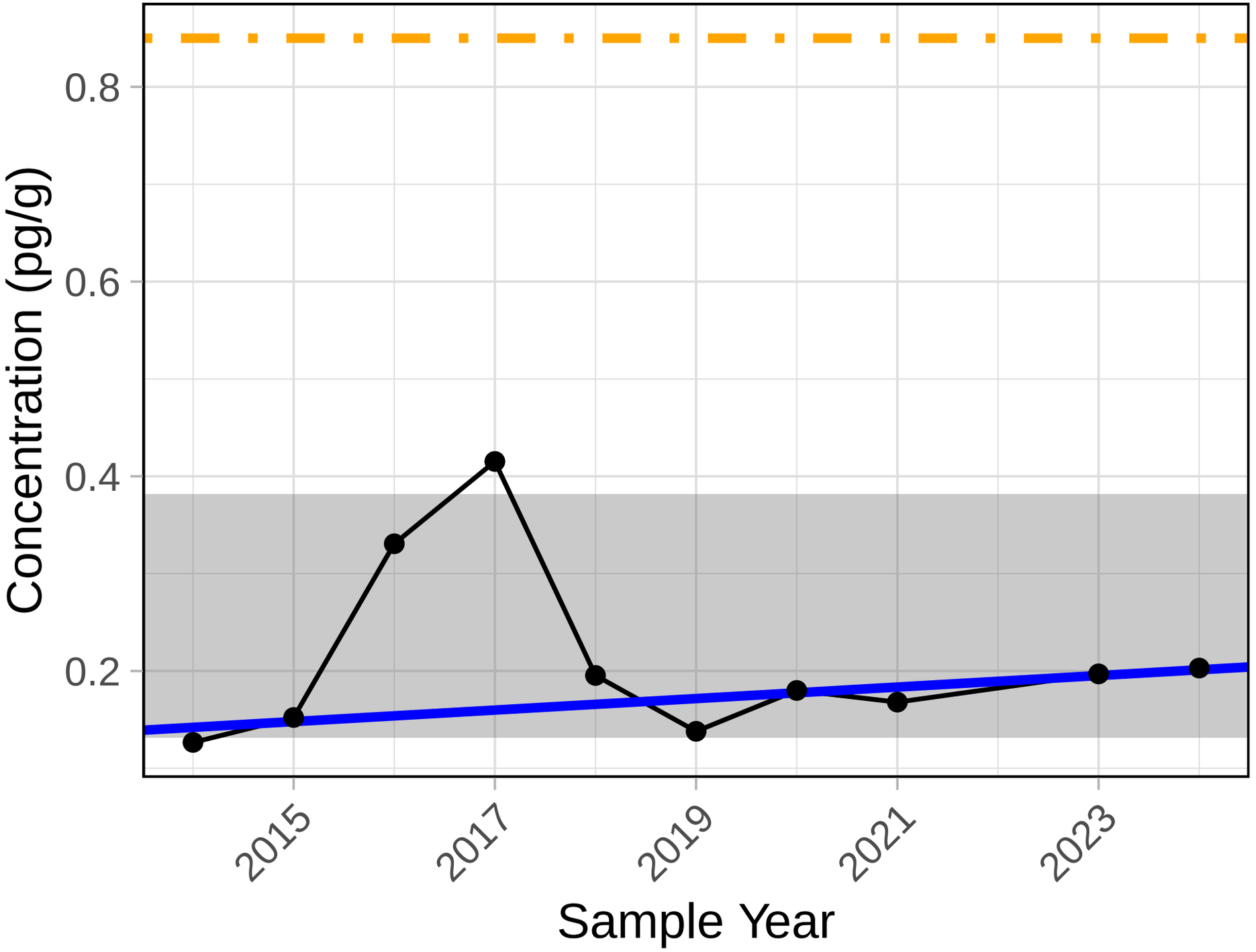
Trend significance p−value = 0.032


PCDD/F TEQ (lower−bound)
S5A Sediment
Concentration (pg/g)
0.20
0.15
0.10
0.05
0.00
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1


PCDD/F TEQ (upper−bound)
S5A Sediment
Concentration (pg/g)
0.8
0.6
0.4
0.2
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.858

PCDD/F TEQ (mid−point)

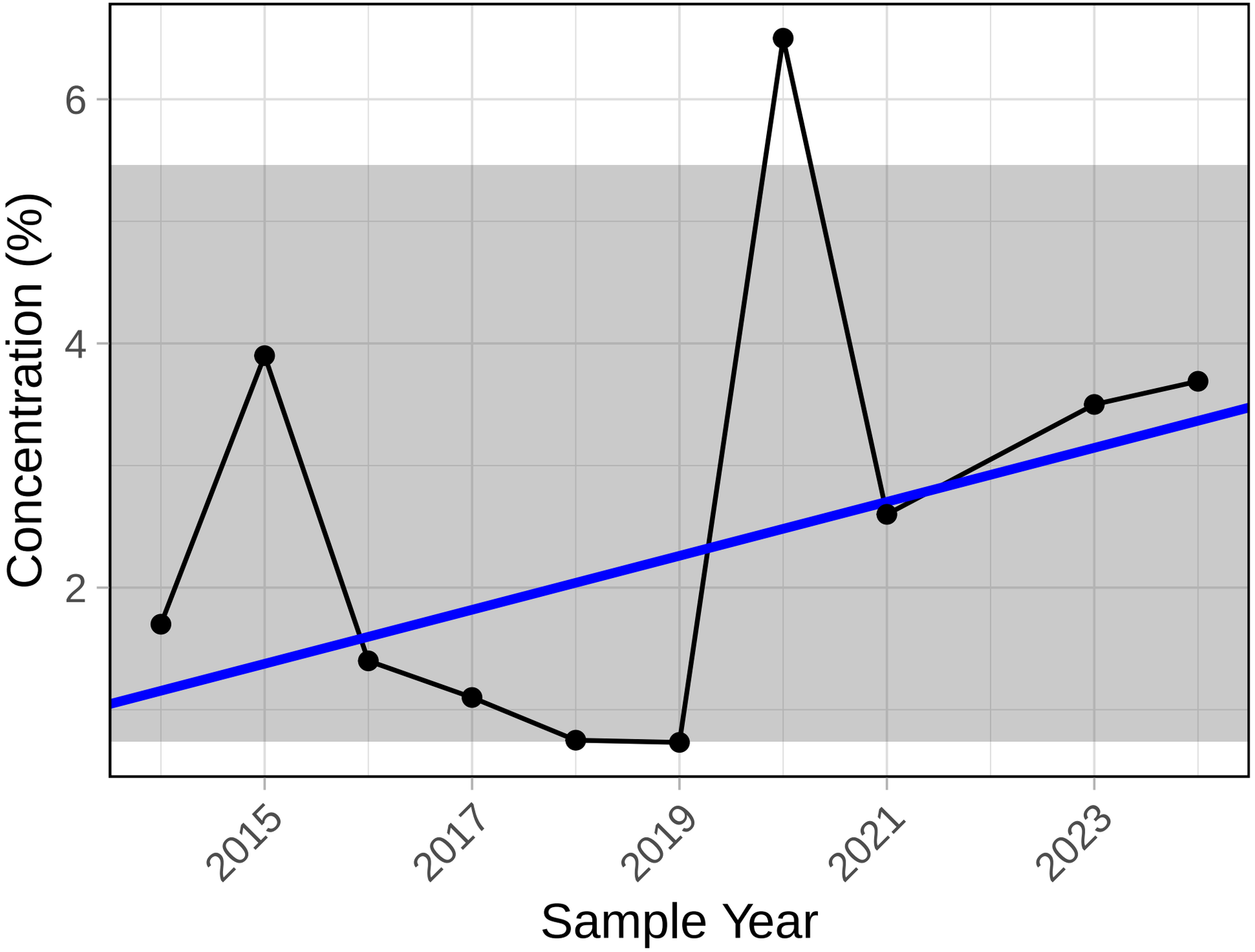
S5A Sediment



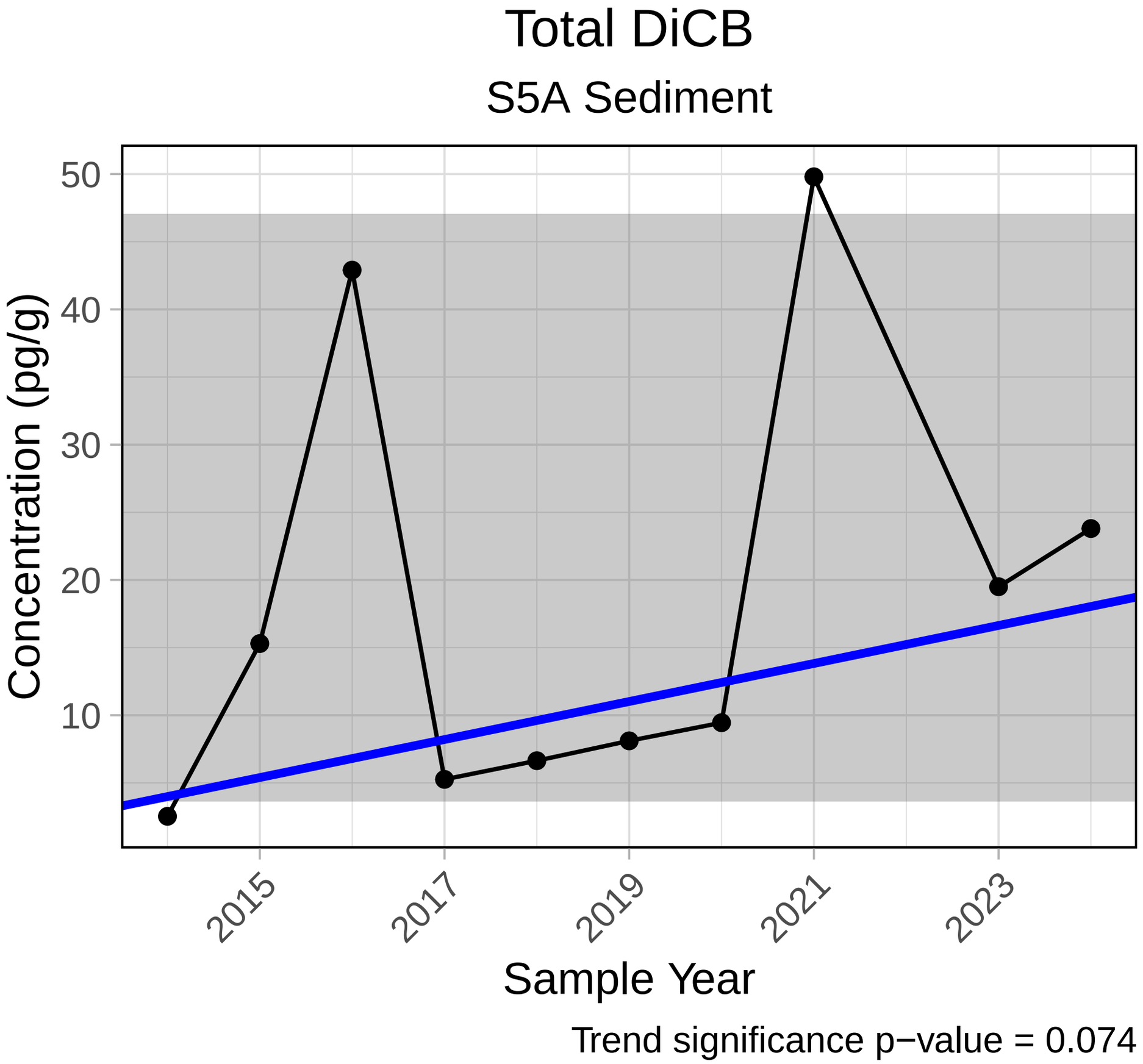
Trend significance p−value = 0.371
ISQG level = 0.85 pg/g (maximum)
PEL level = 21.5 pg/g (maximum)

Total Organic Carbon

S5A Sediment

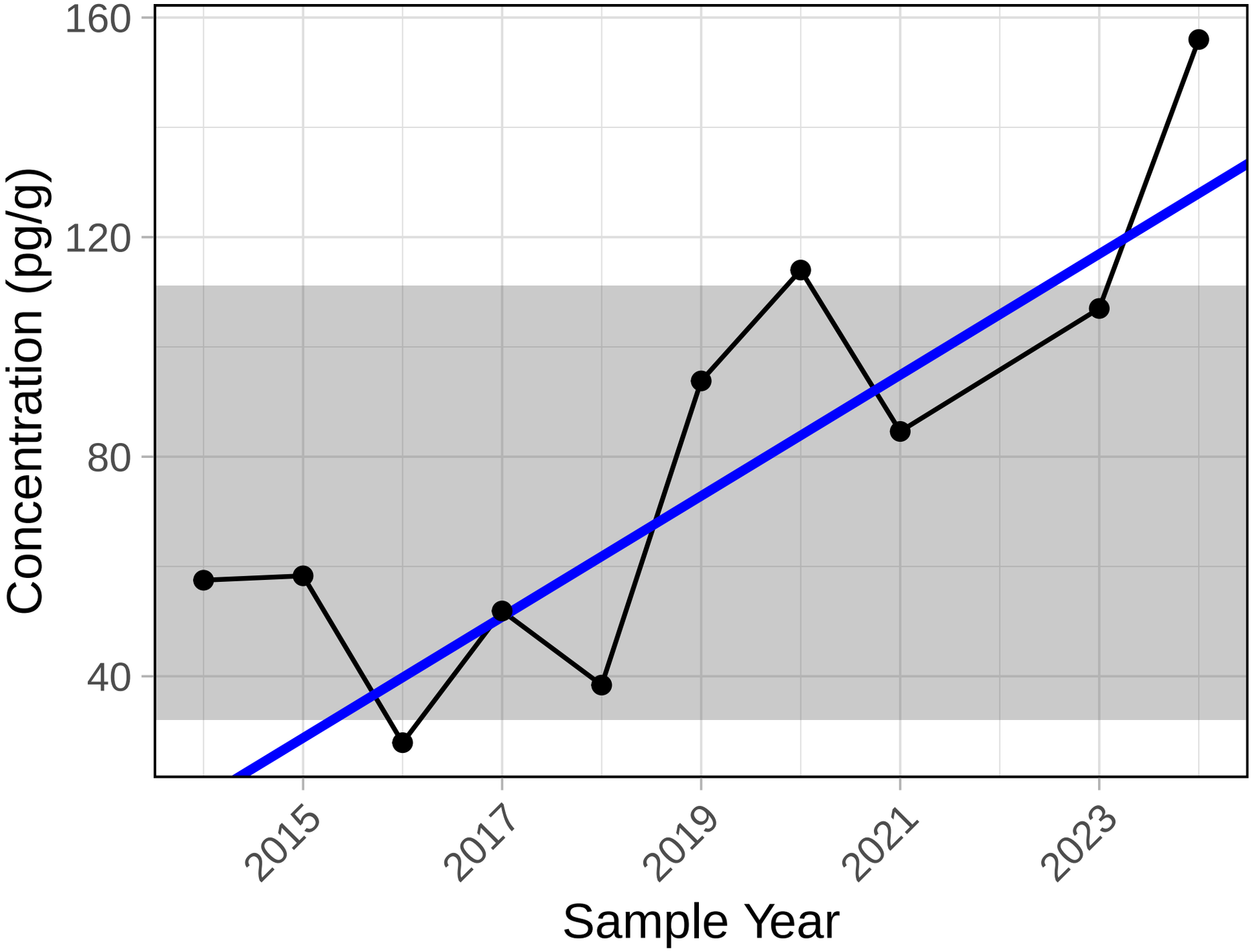


Trend significance p−value = 0.721


Total DiCB
S5A Sediment
Concentration (pg/g)
50
40
30
20
10
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.074

Total HeptaCB

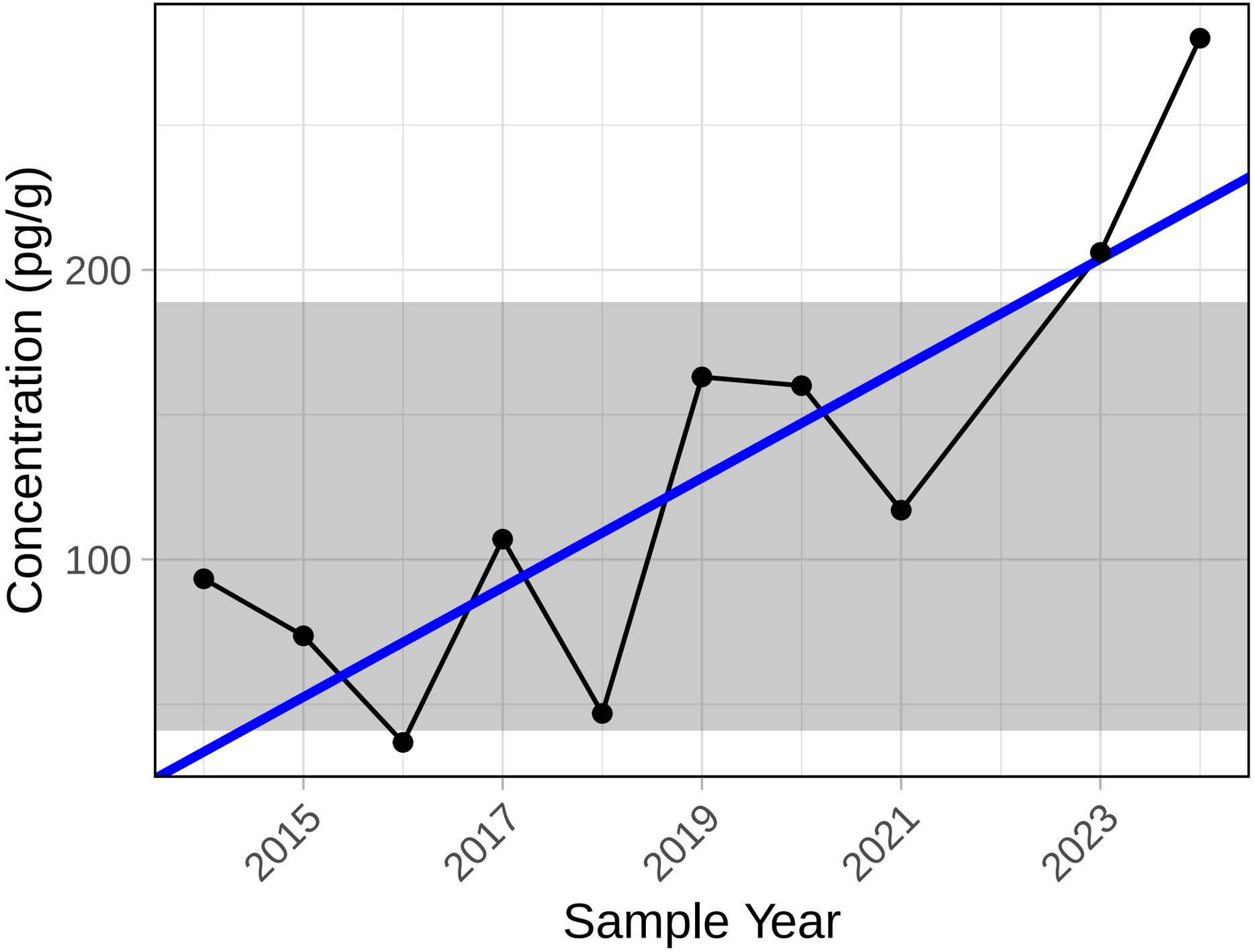
S5A Sediment



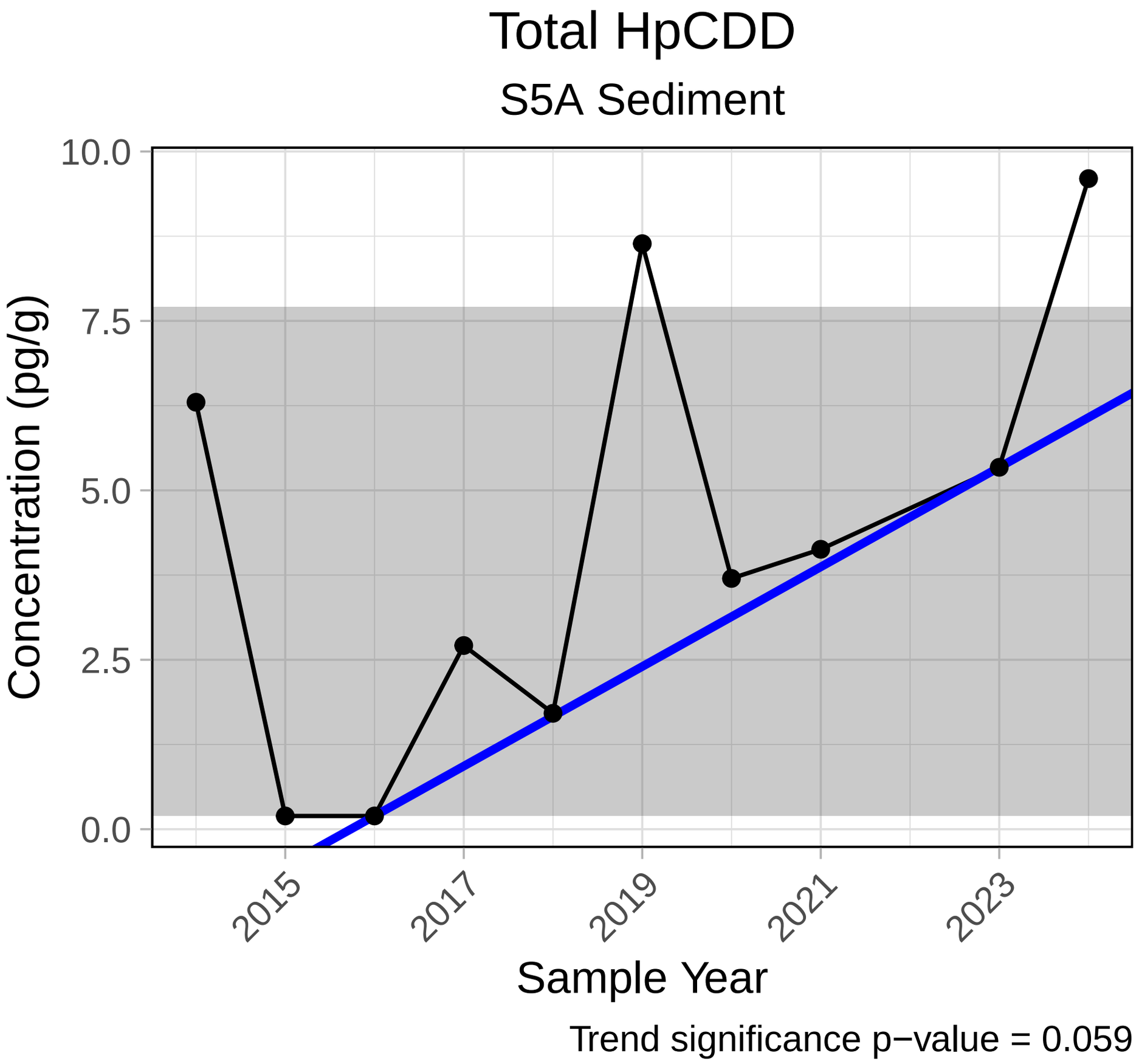
Trend significance p−value = 0.032

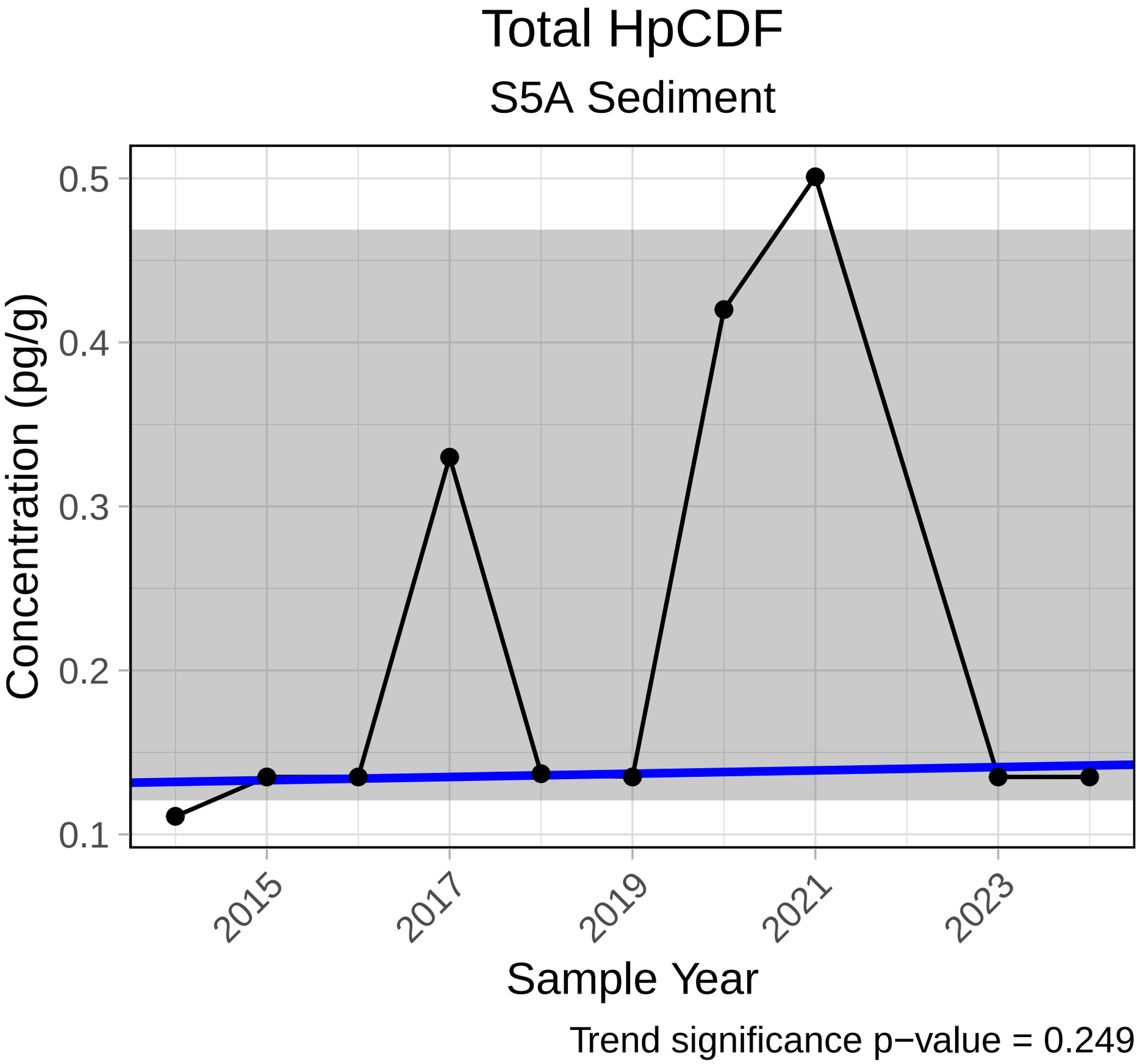
Total HexaCB

S5A Sediment



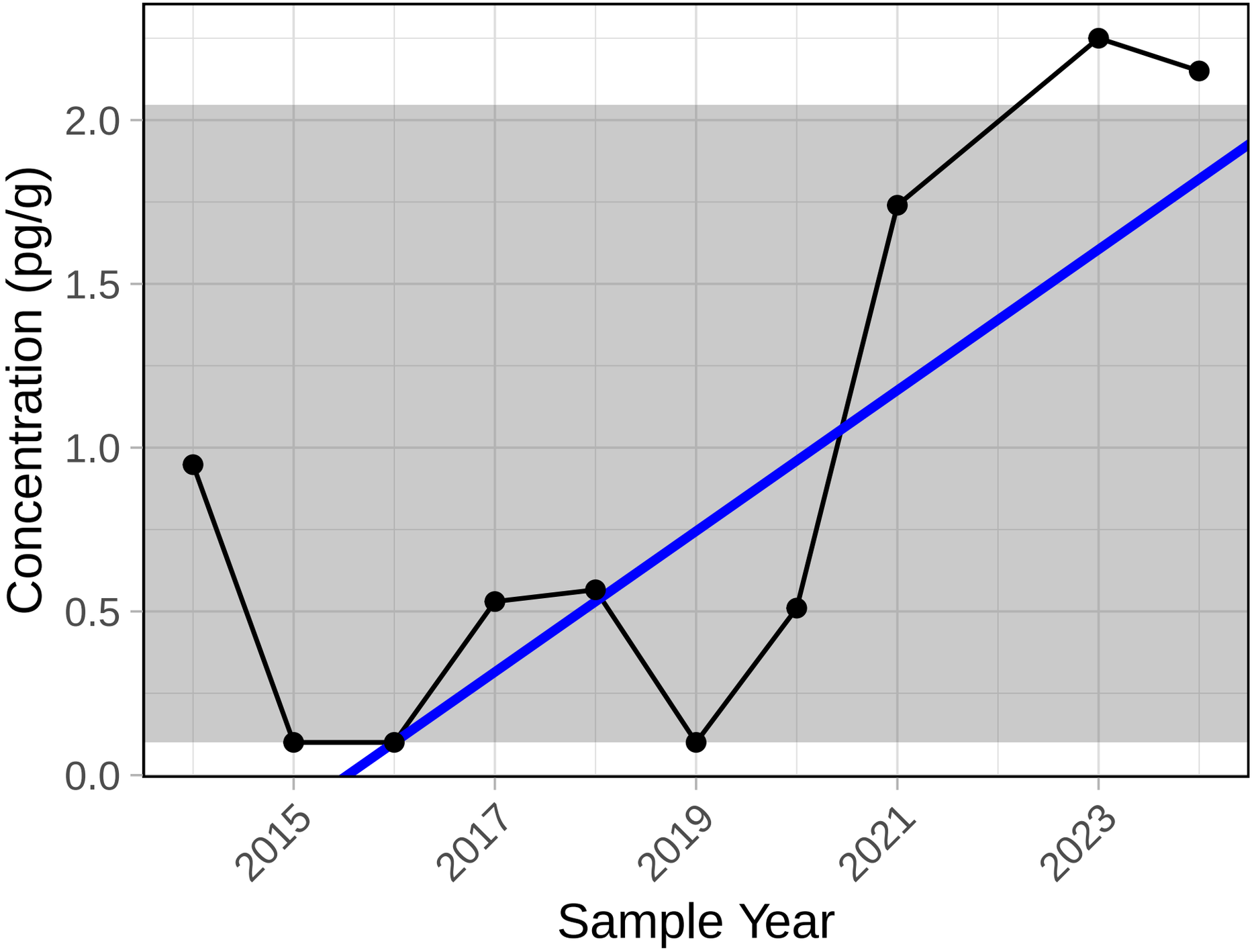
Trend significance p−value = 0.02


Total HpCDD
S5A Sediment
10.0
7.5
5.0
2.5
0.0
Concentration (pg/g)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.059


Total HpCDF
S5A Sediment
Concentration (pg/g)
0.5
0.4
0.3
0.2
0.1
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.249

Total HxCDD

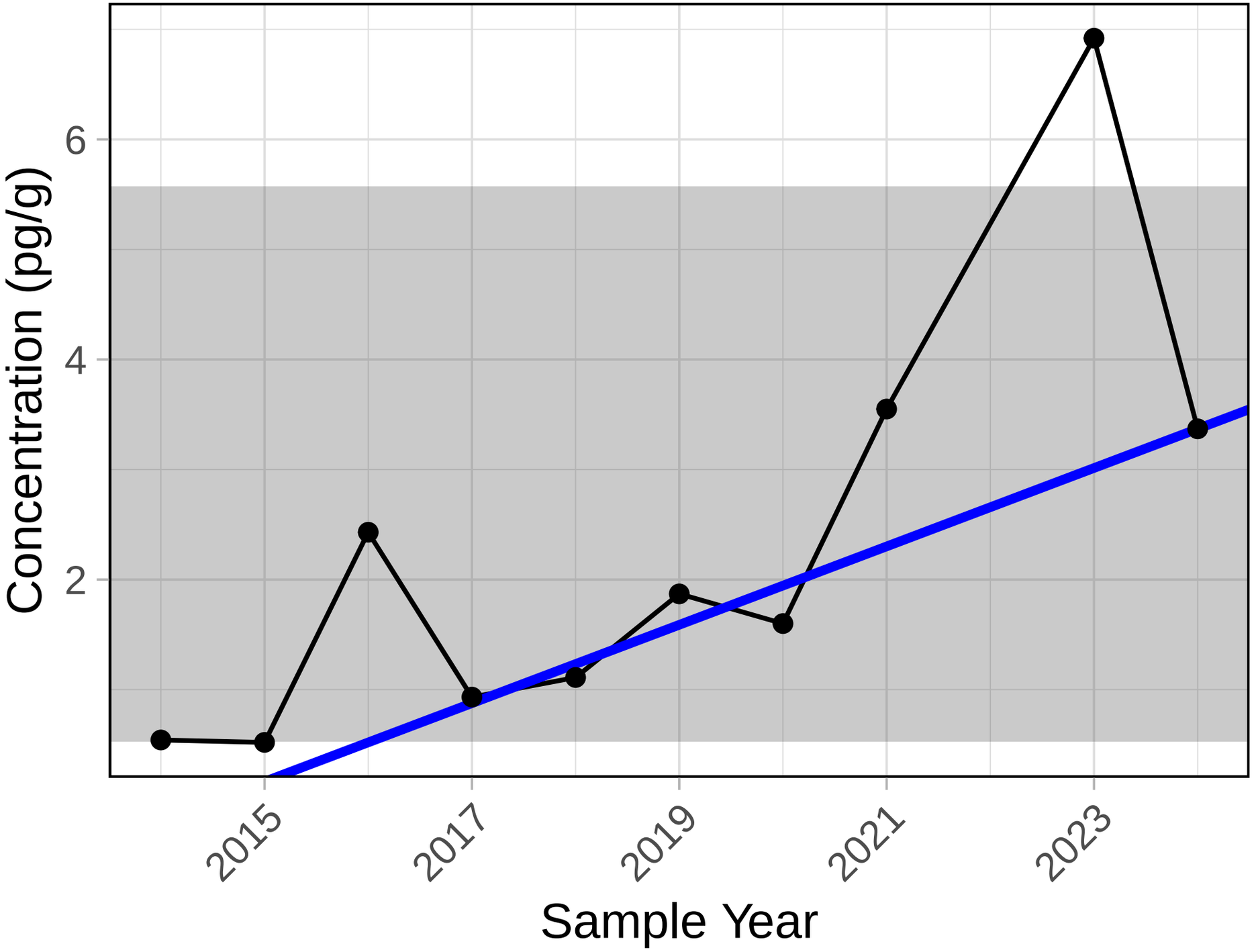
S5A Sediment



Trend significance p−value = 0.085

Total MonoCB

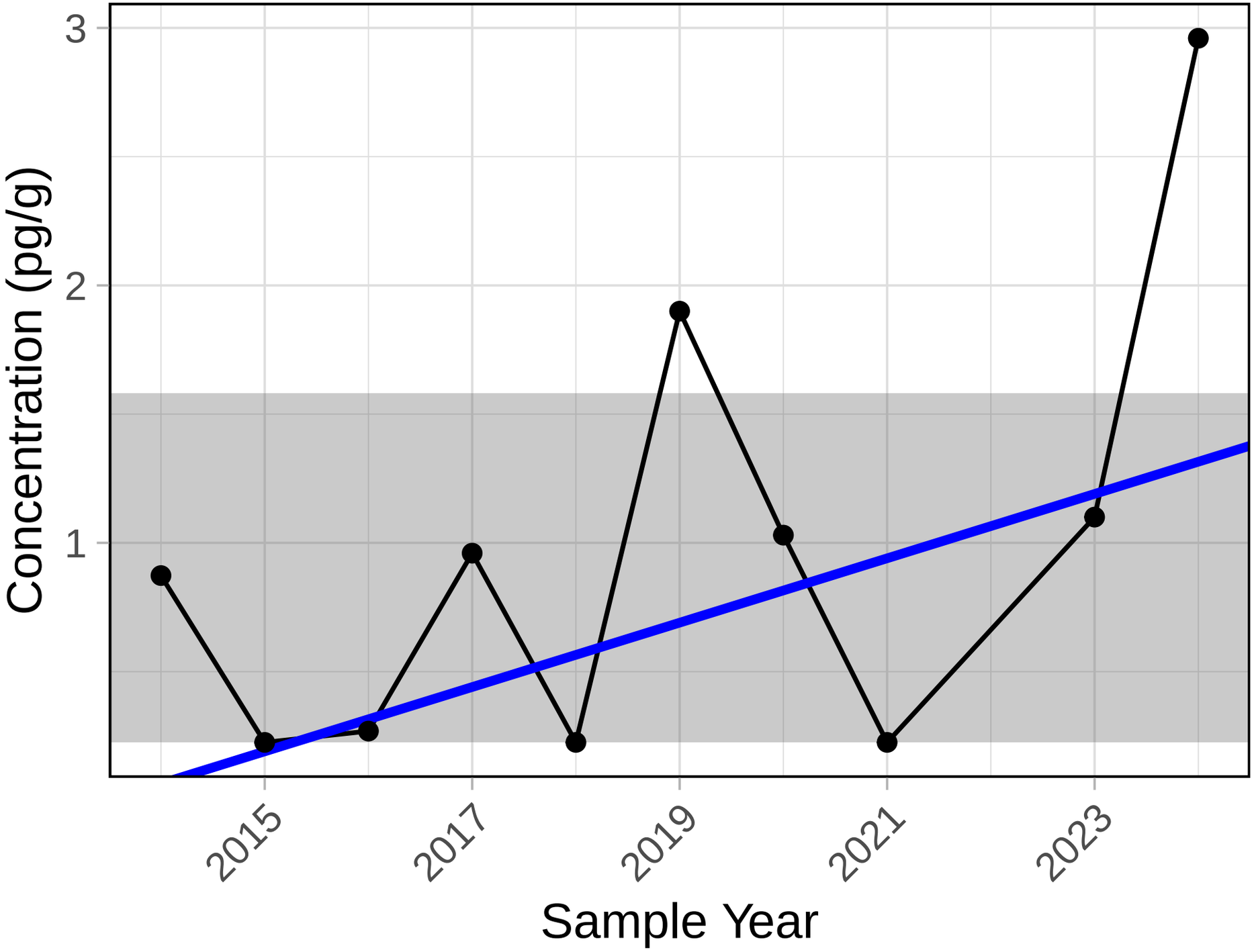
S5A Sediment



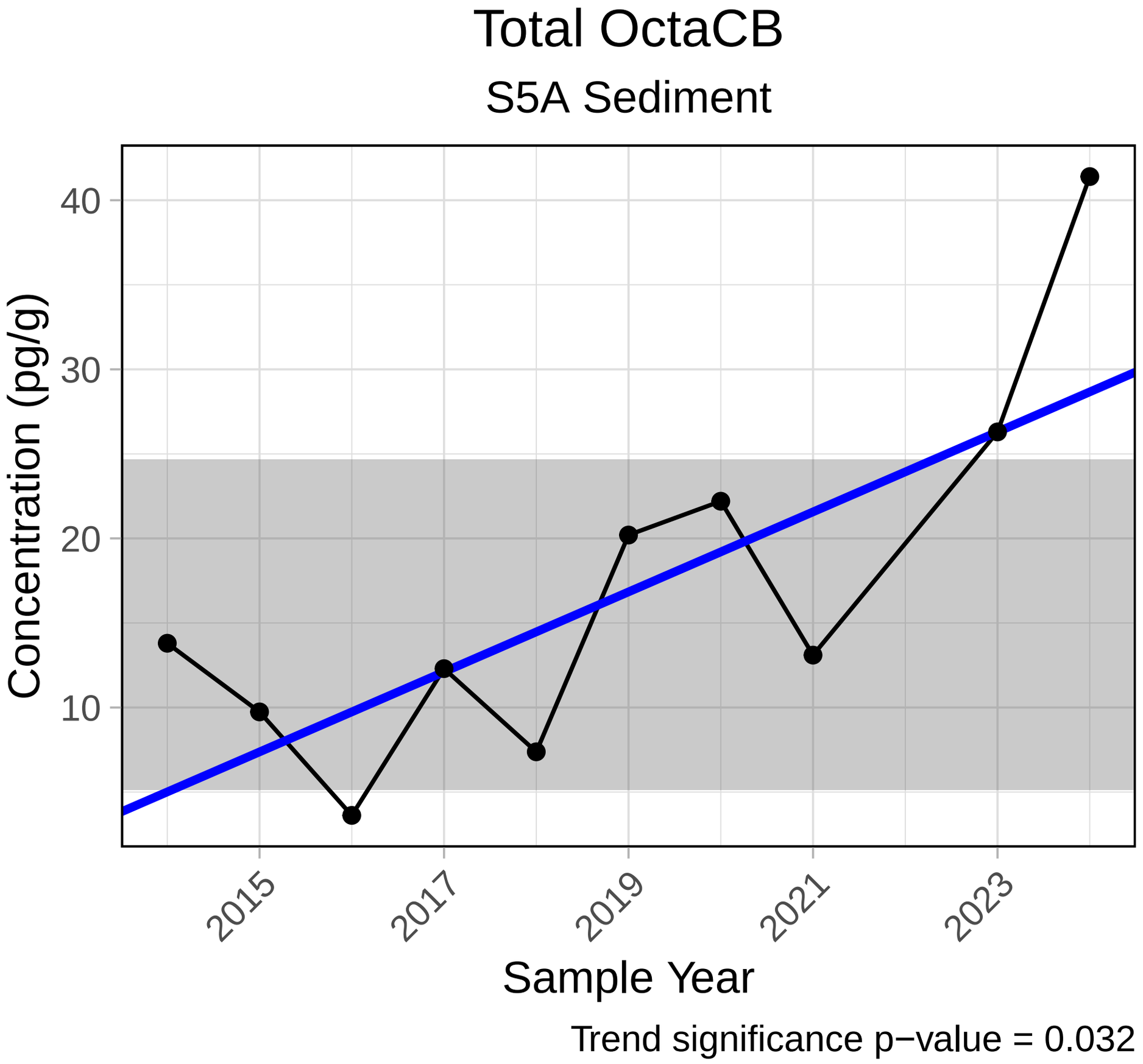
Trend significance p−value = 0.012

Total NonaCB

S5A Sediment

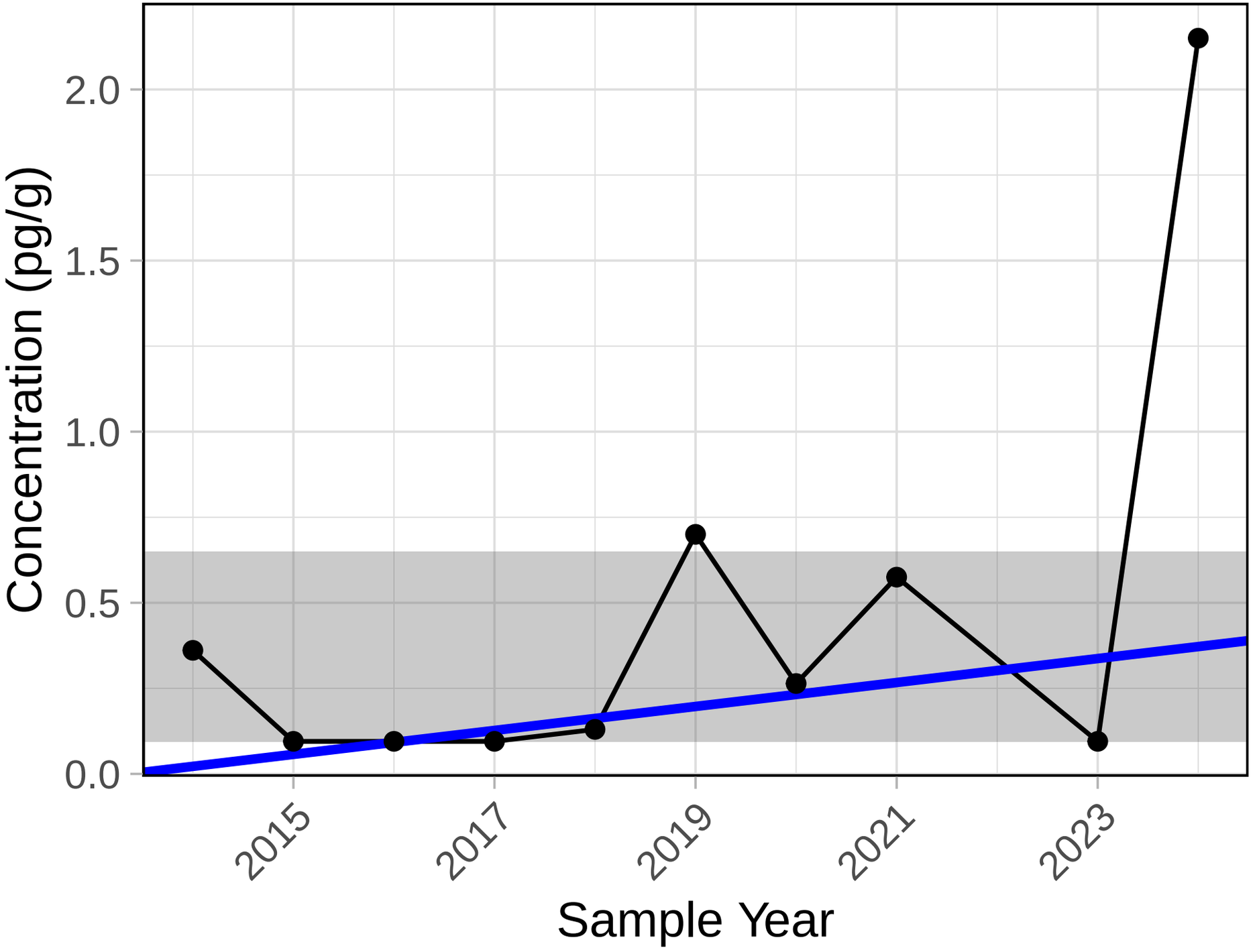


Trend significance p−value = 0.123

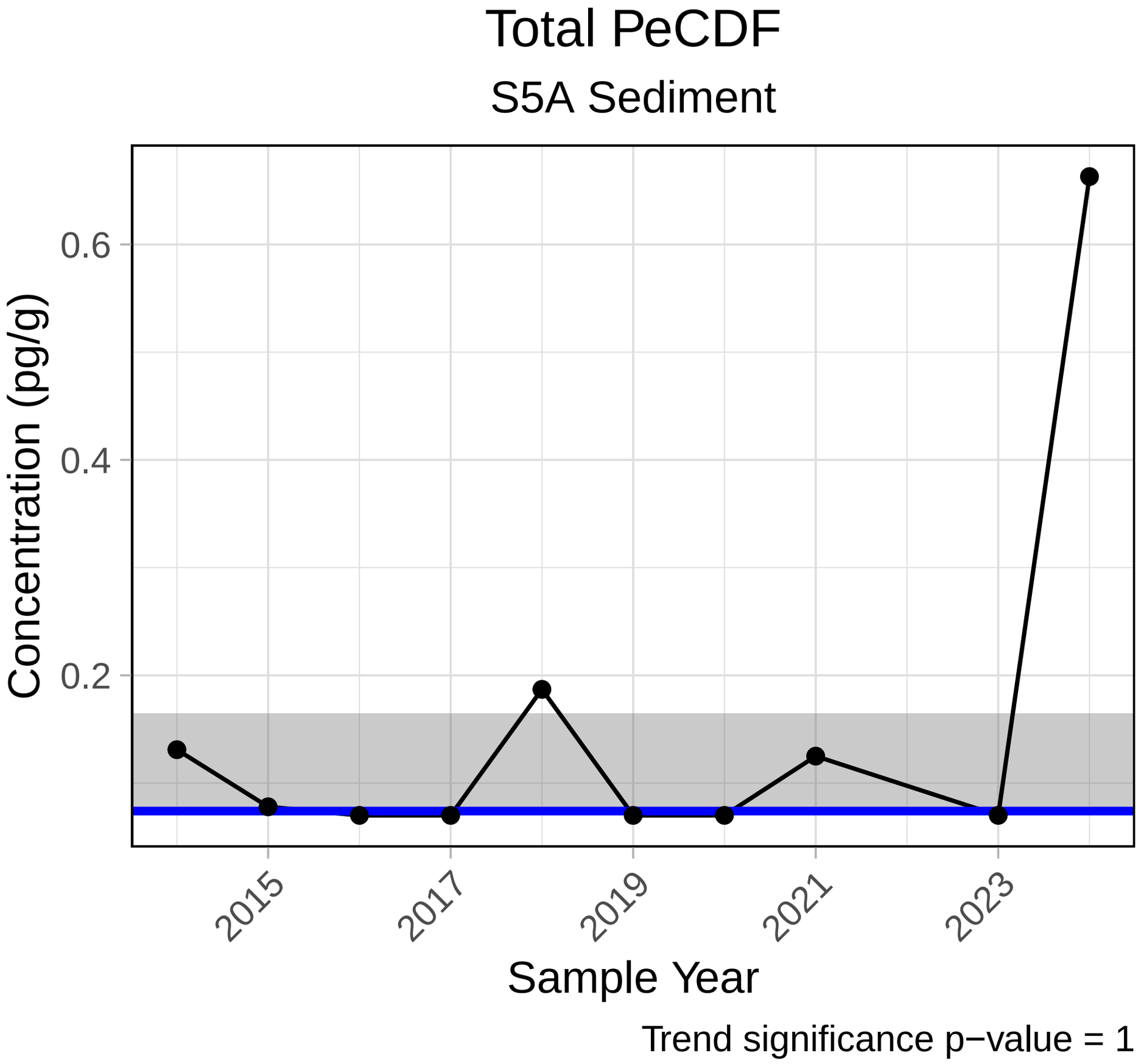

Total OctaCB
S5A Sediment
Concentration (pg/g)
40
30
20
10
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.032

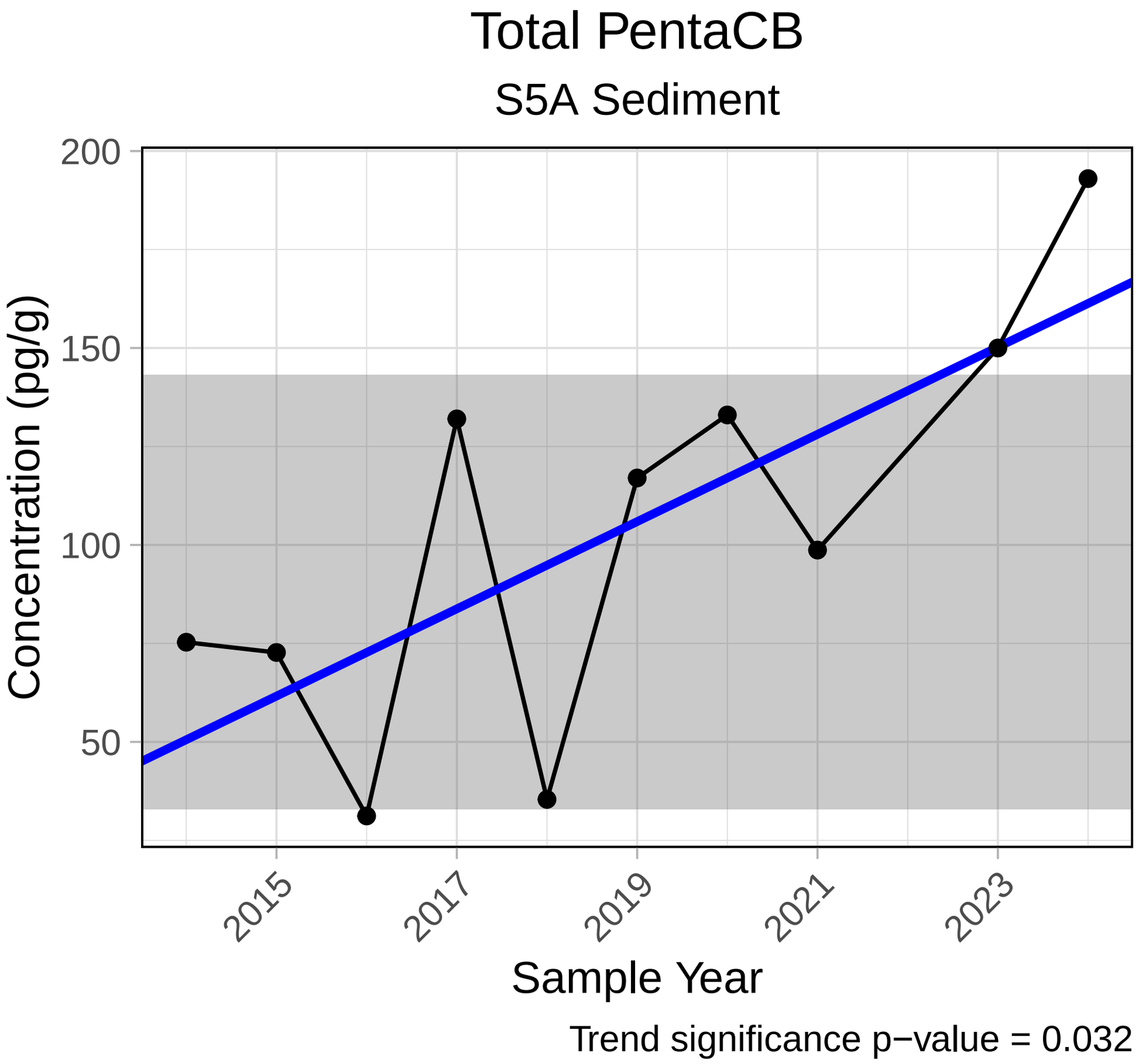
Total PeCDD

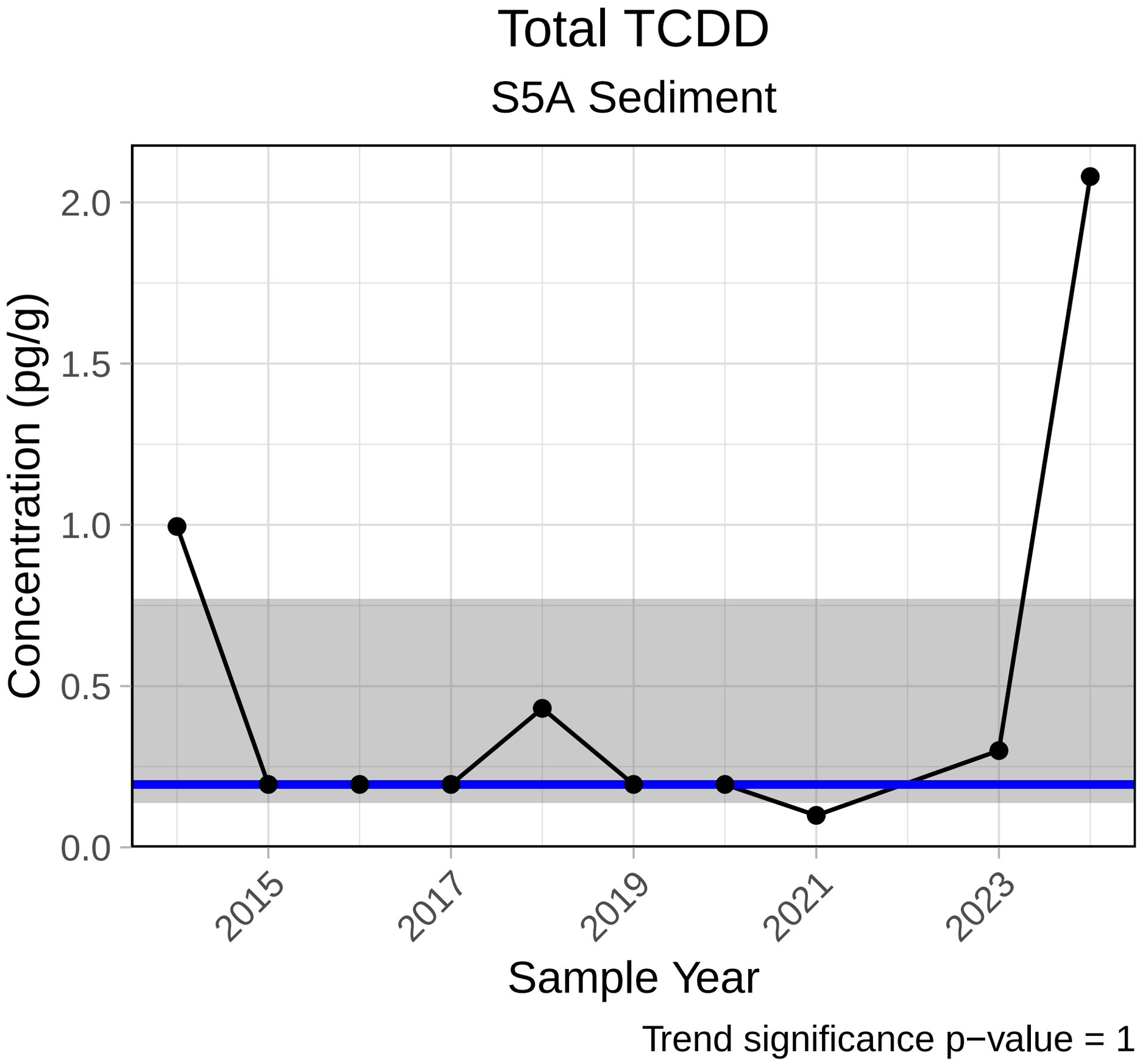
S5A Sediment

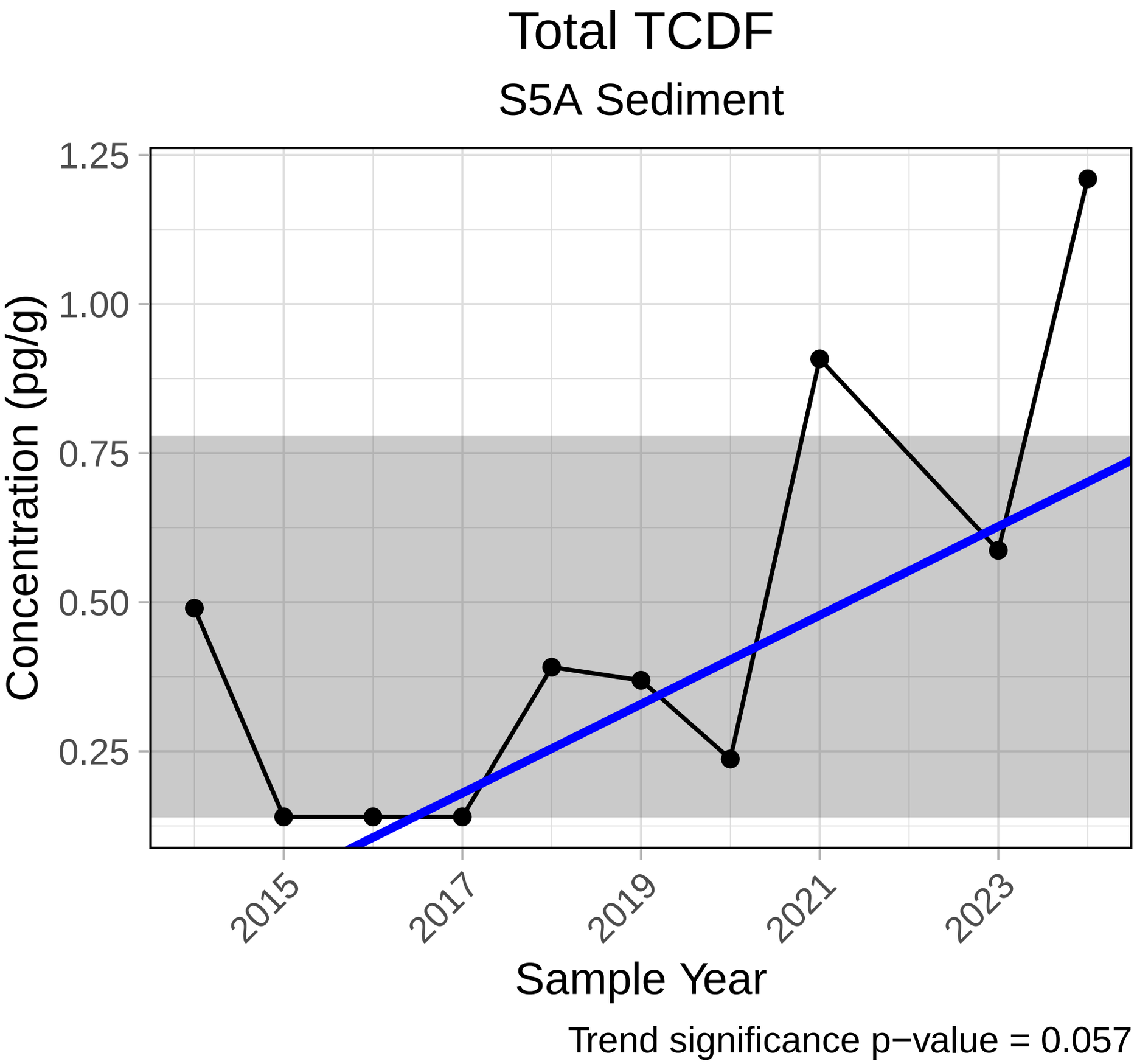


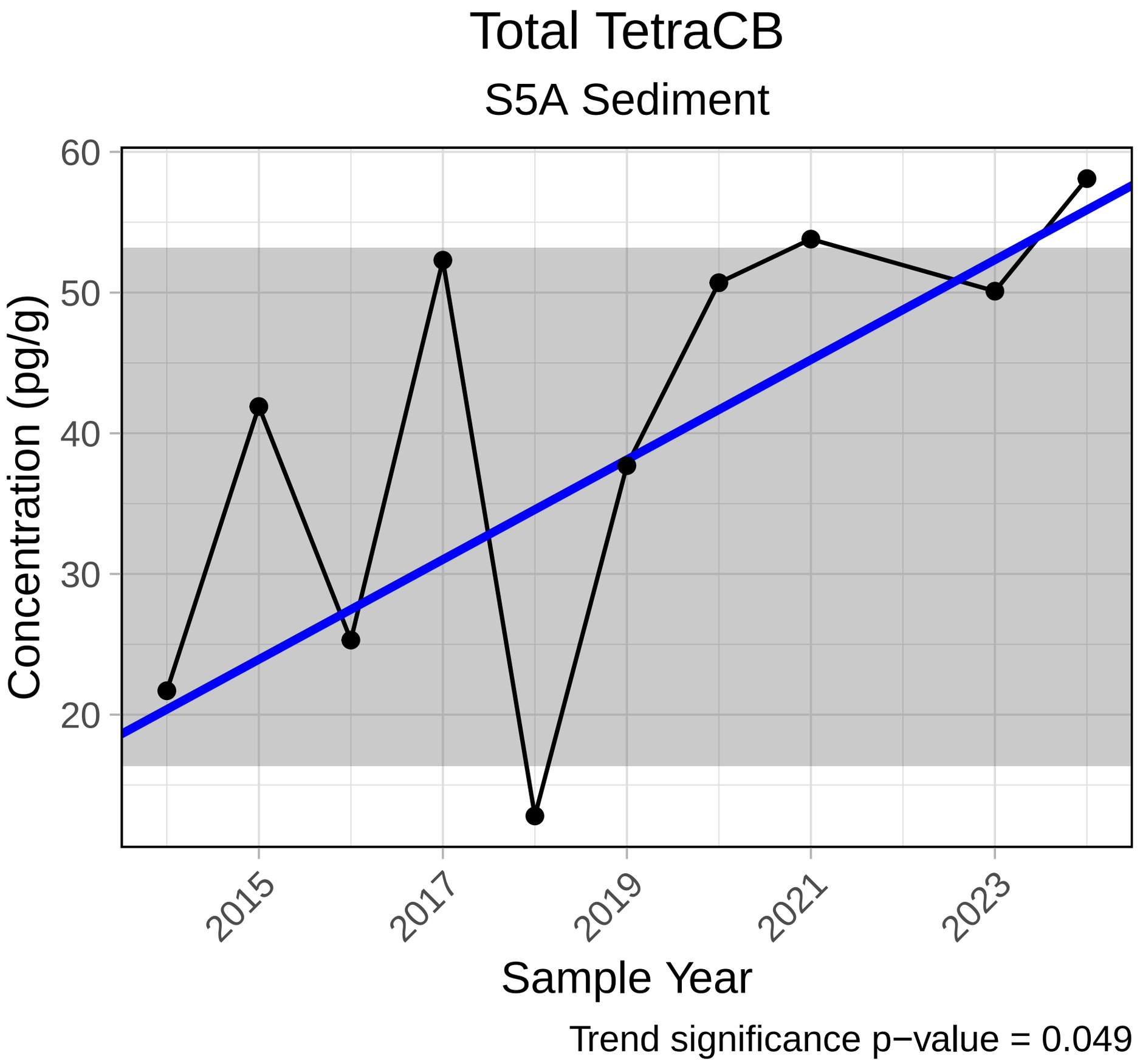
Trend significance p−value = 0.194


Total PeCDF
S5A Sediment
Concentration (pg/g)
0.6
0.4
0.2
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1


Total PentaCB
S5A Sediment
200
150
100
50
Concentration (pg/g)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.032

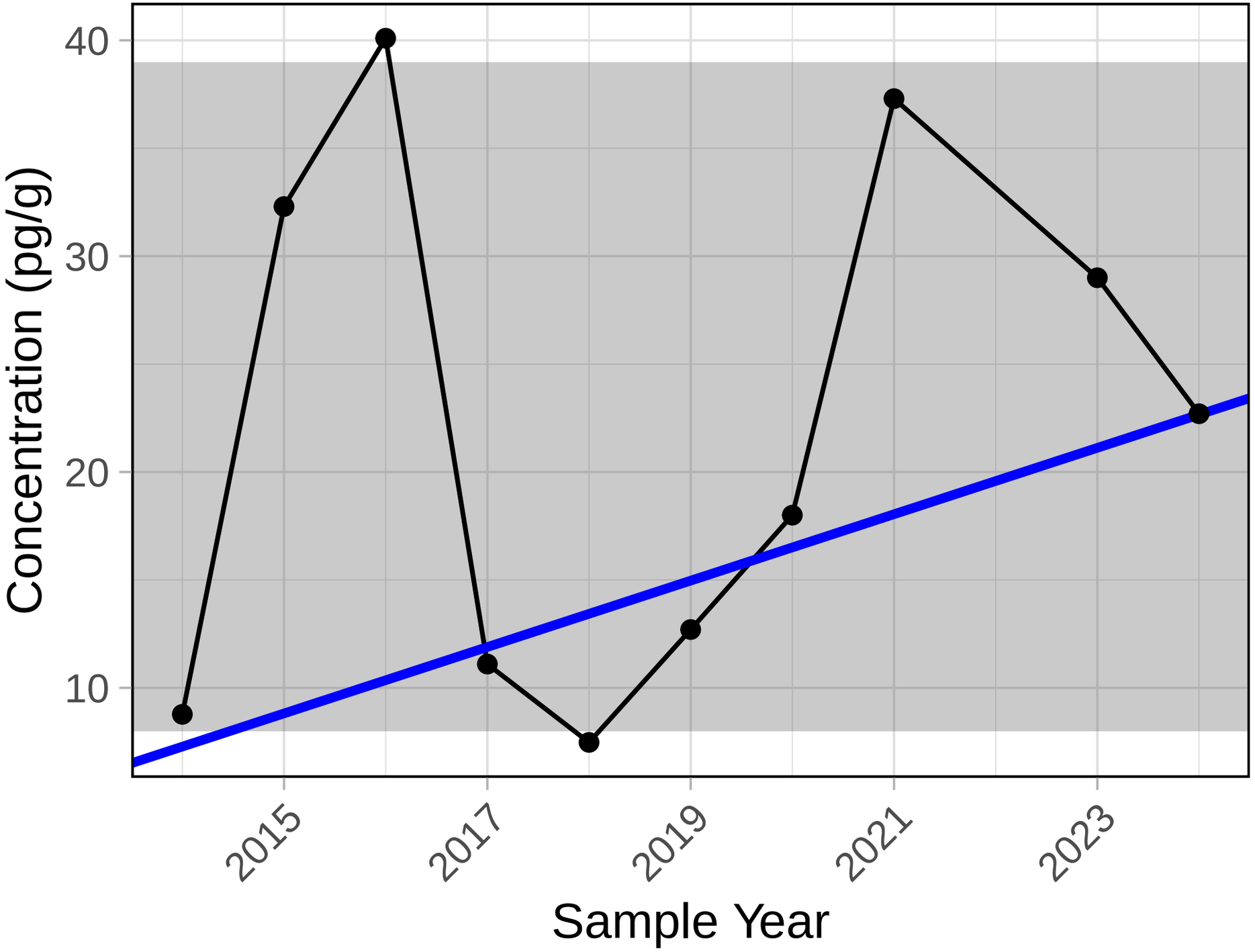

Total TCDD
S5A Sediment
Concentration (pg/g)
2.0
1.5
1.0
0.5
0.0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1


Total TCDF
S5A Sediment
1.25
1.00
0.75
0.50
0.25
Concentration (pg/g)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.057

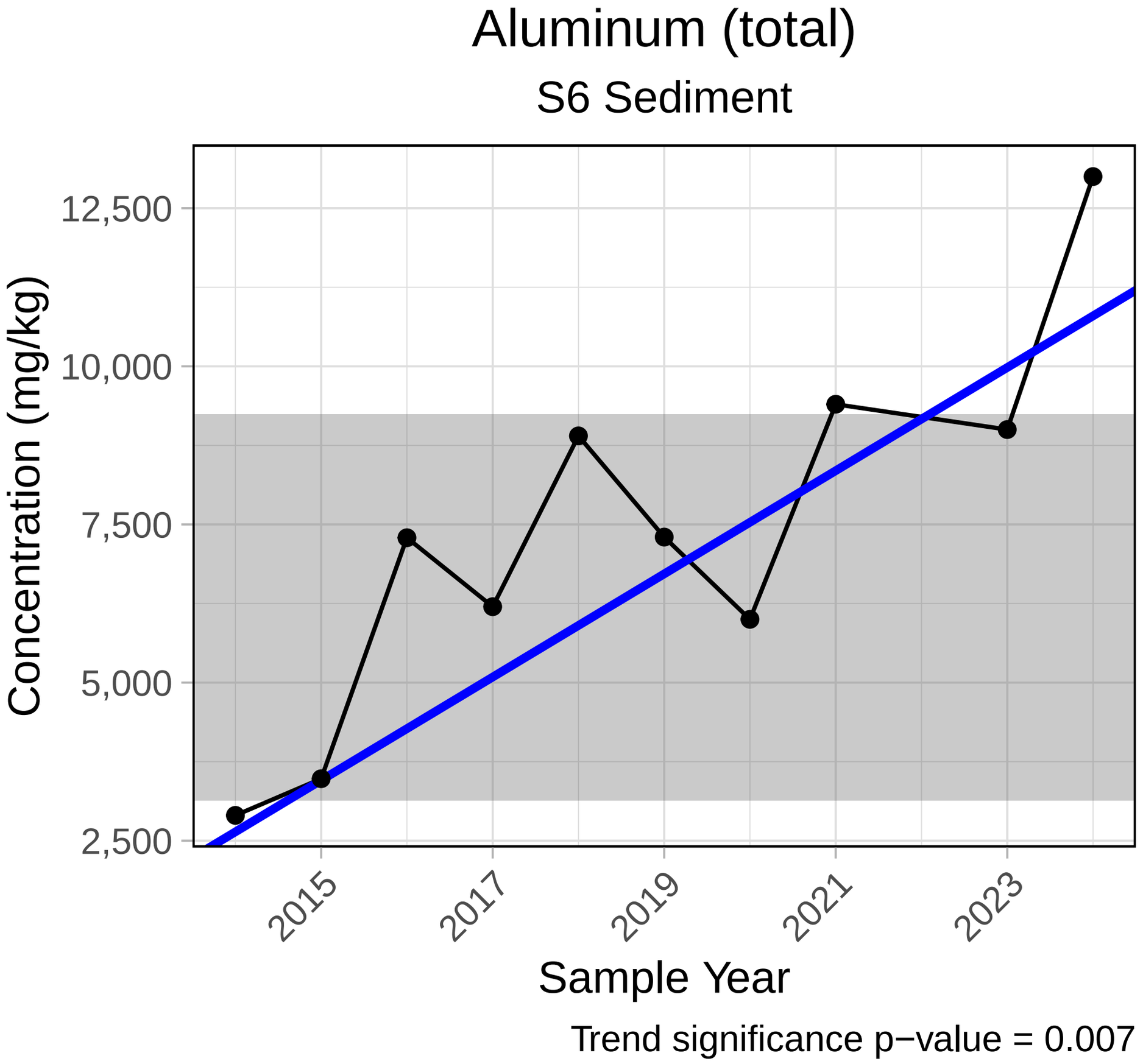

Total TetraCB
S5A Sediment
Concentration (pg/g)
60
50
40
30
20
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.049

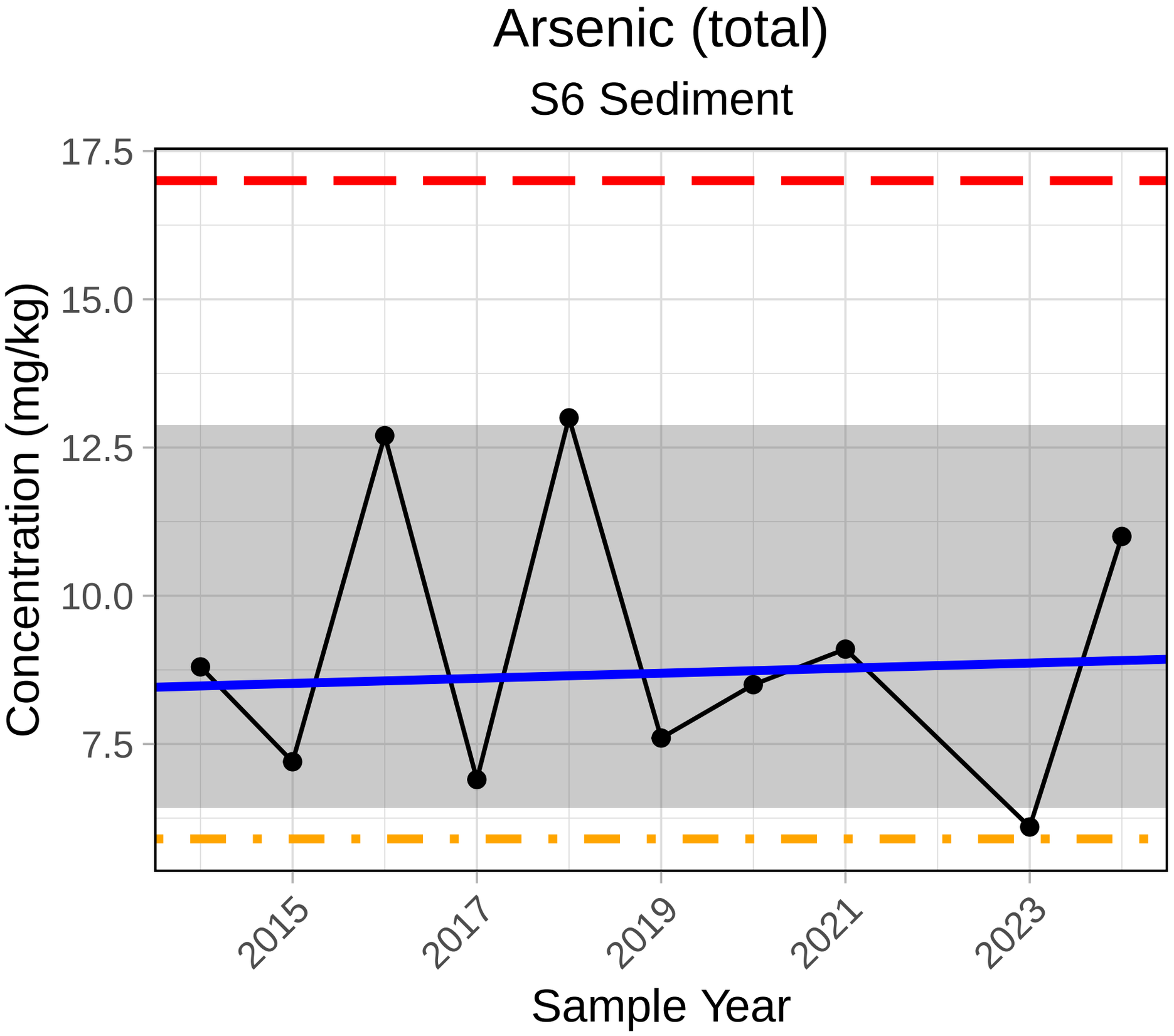
Total TriCB

S5A Sediment

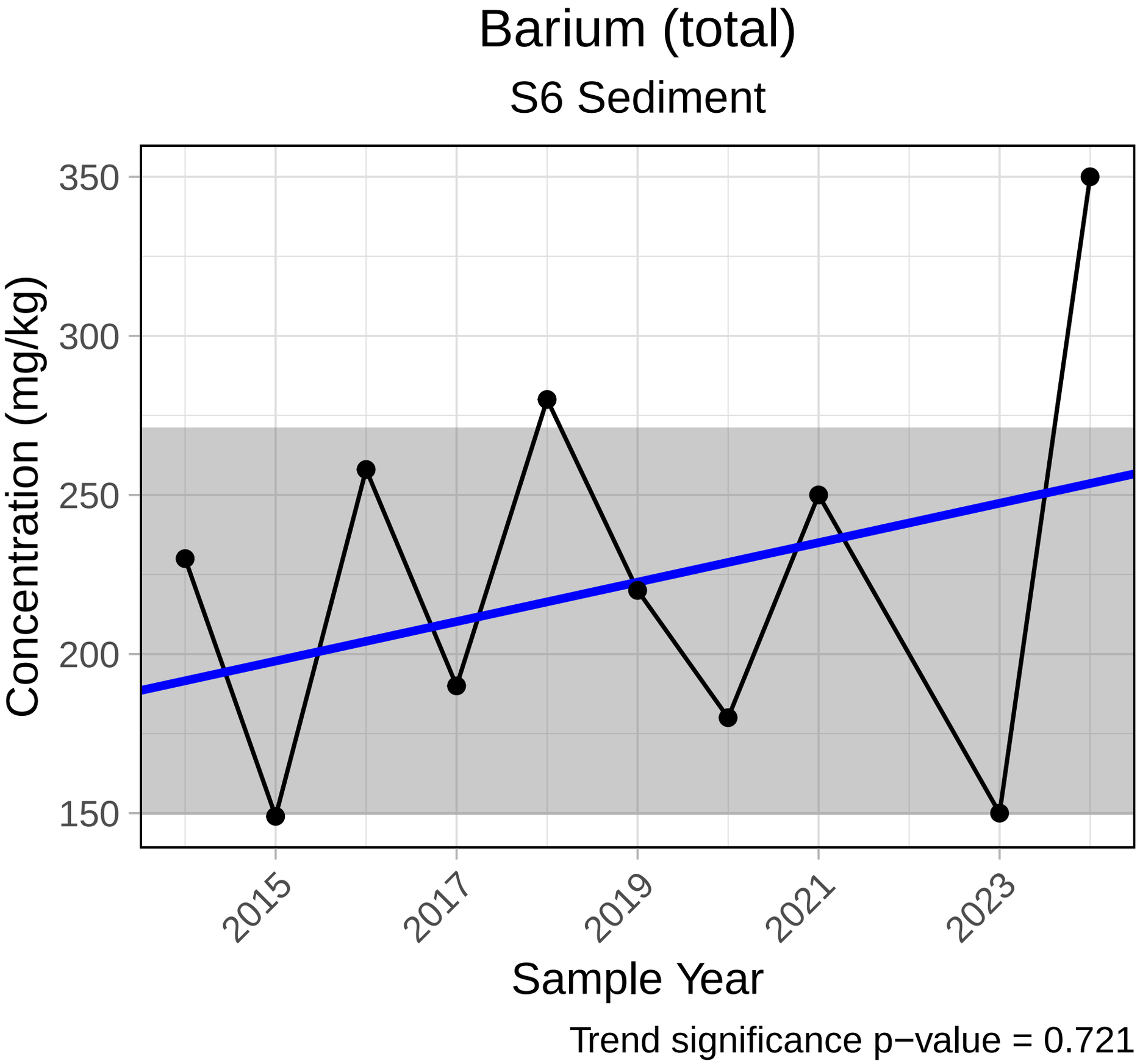


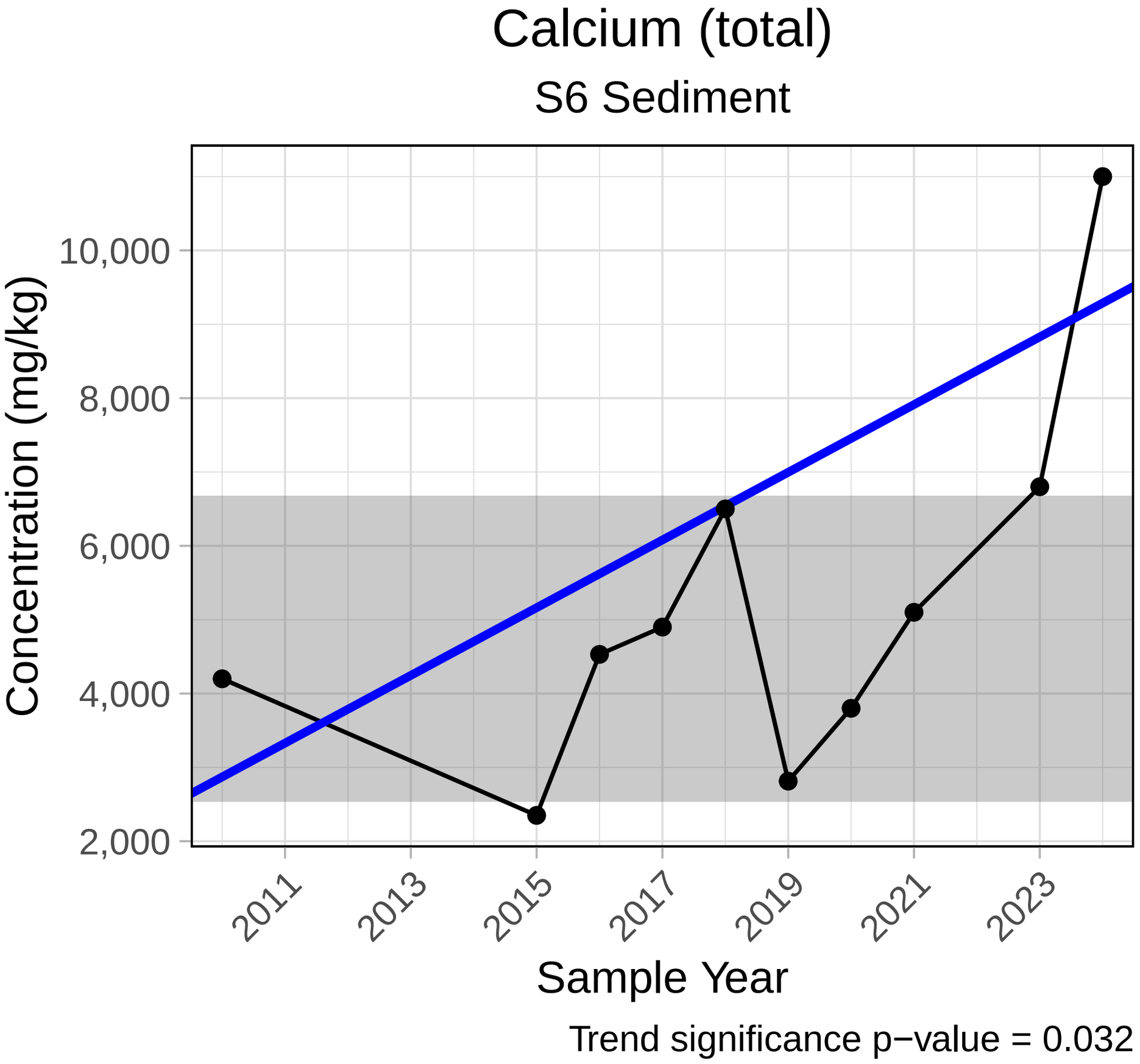
Trend significance p−value = 0.474


Aluminum (total)
S6 Sediment
Concentration (mg/kg)
12,500
10,000
7,500
5,000
2,500
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.007



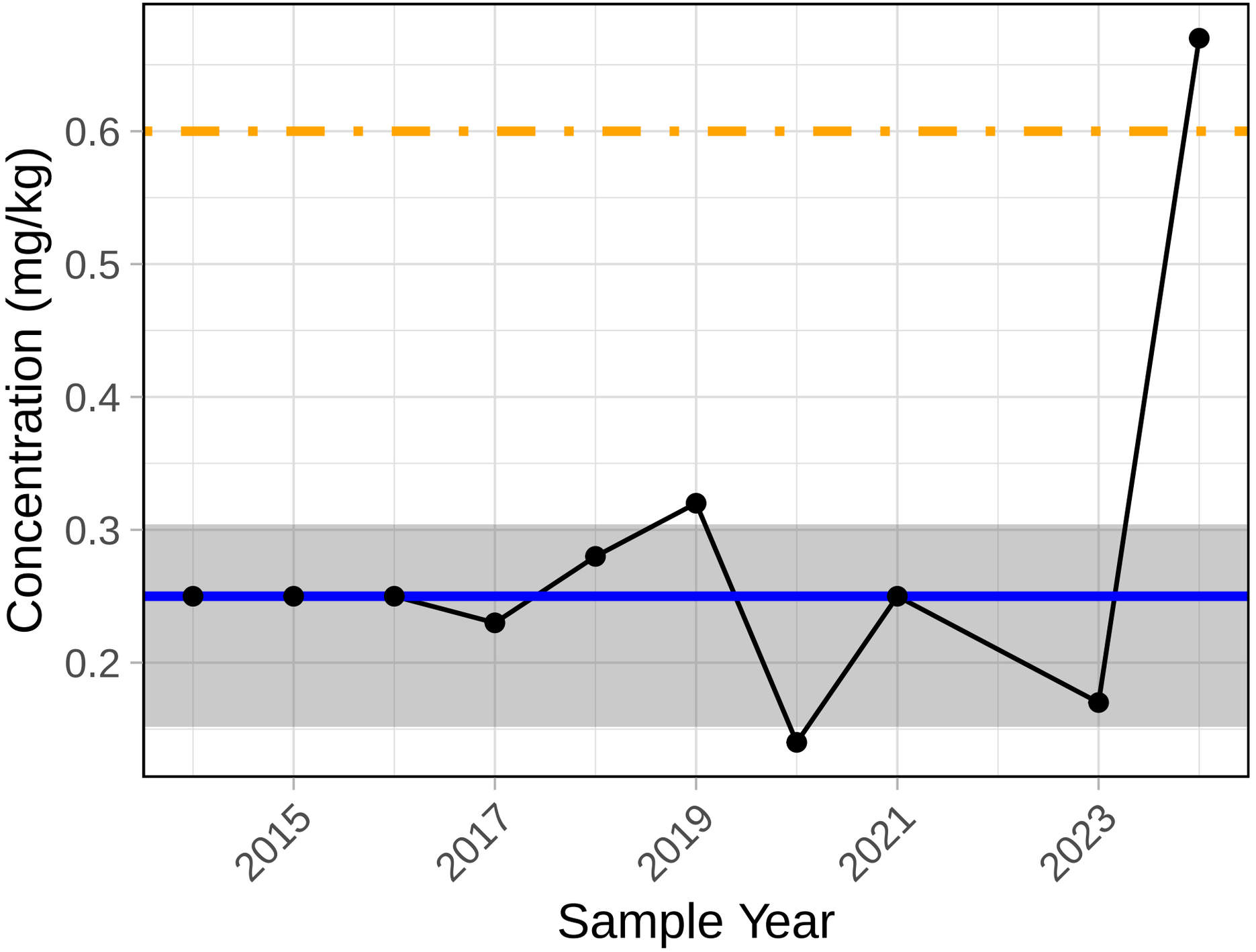
Trend significance p−value = 1
ISQG level = 5.9 mg/kg (maximum)
PEL level = 17 mg/kg (maximum)


Barium (total)
S6 Sediment
Concentration (mg/kg)
350
300
250
200
150
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.721

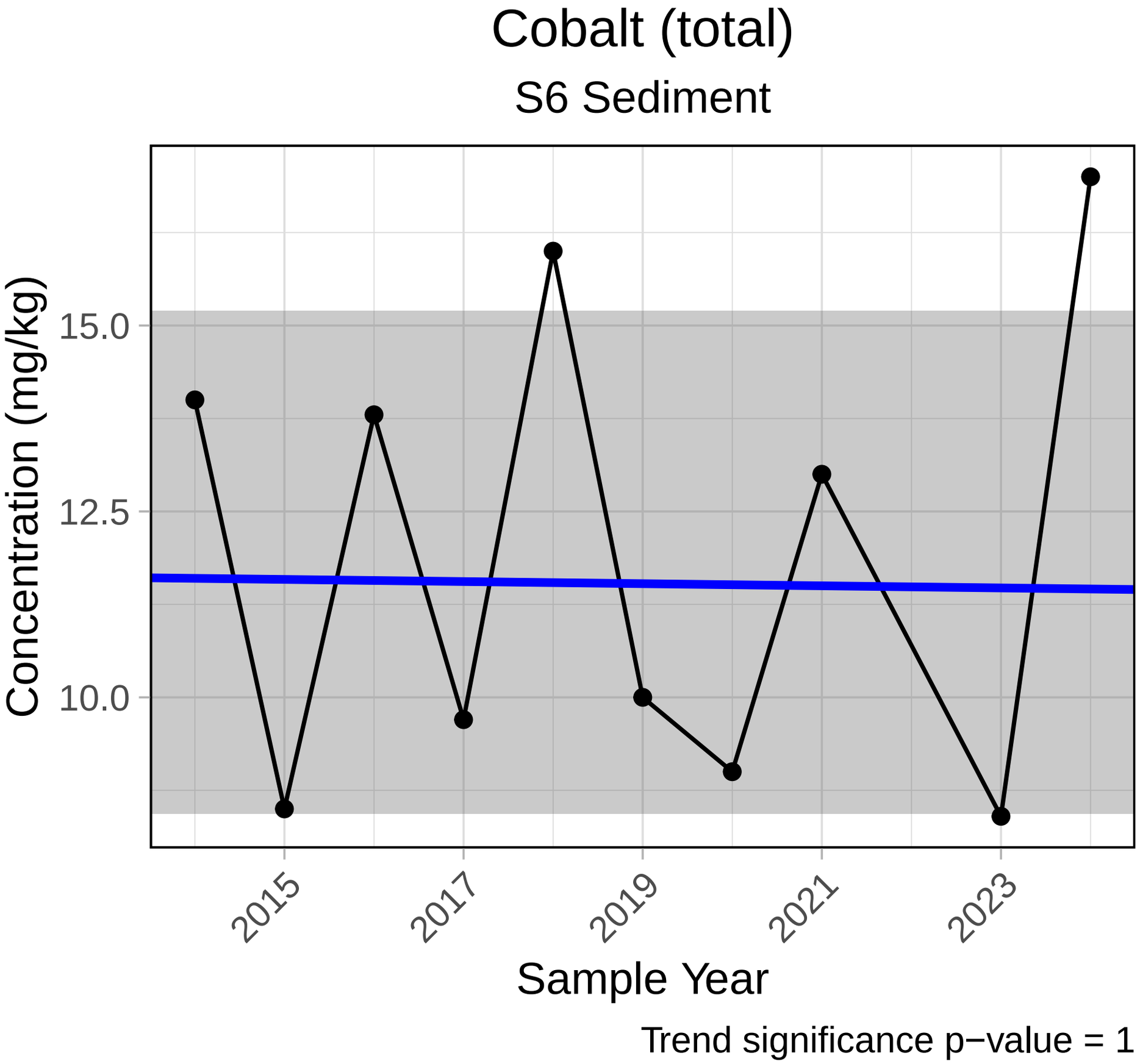

Calcium (total)
S6 Sediment
Concentration (mg/kg)
10,000
8,000
6,000
4,000
2,000
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.032

Cadmium (total)

S6 Sediment

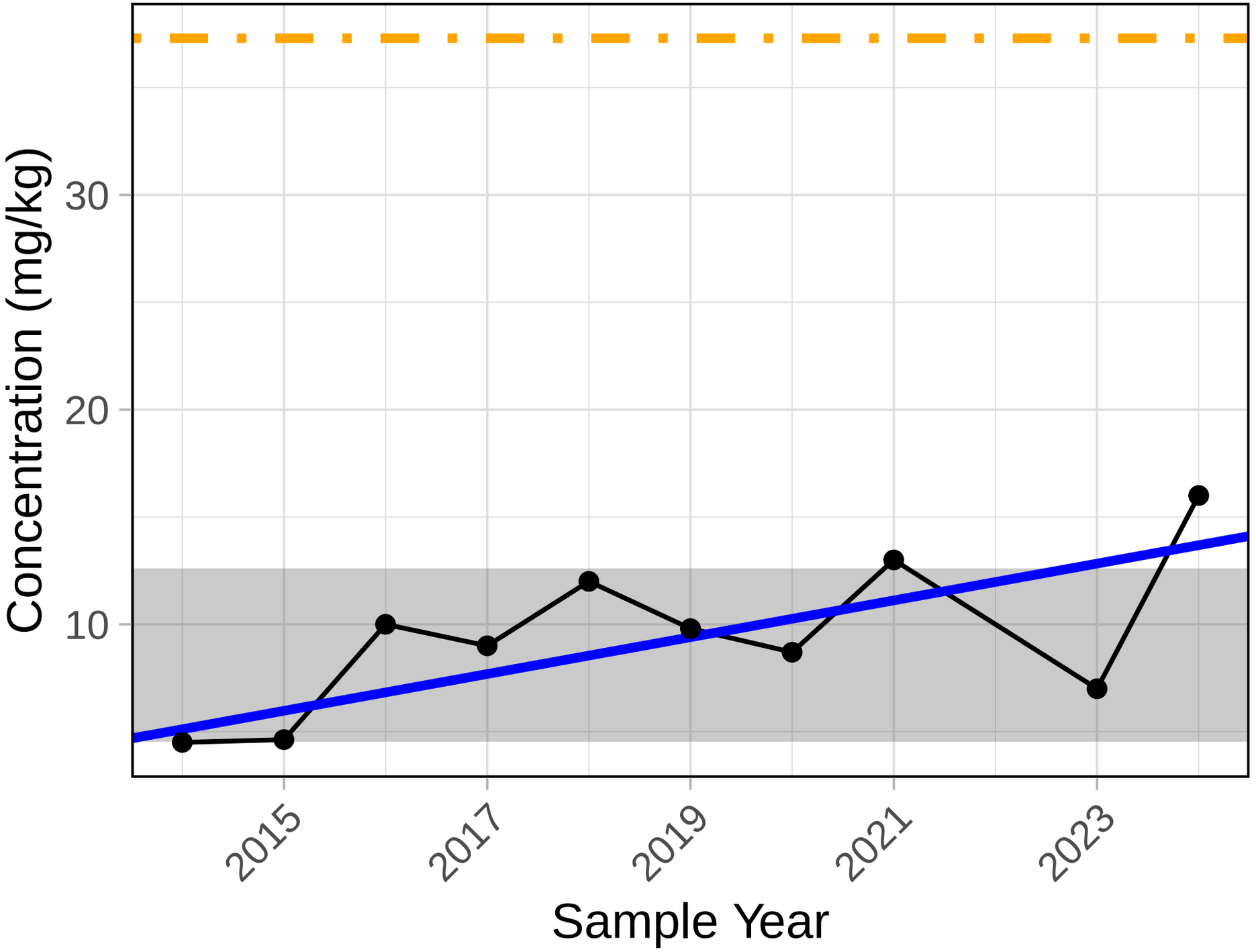


Trend significance p−value = 0.853
ISQG level = 0.6 mg/kg (maximum)
PEL level = 3.5 mg/kg (maximum)


Cobalt (total)
S6 Sediment
Concentration (mg/kg)
15.0
12.5
10.0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

Chromium (total)

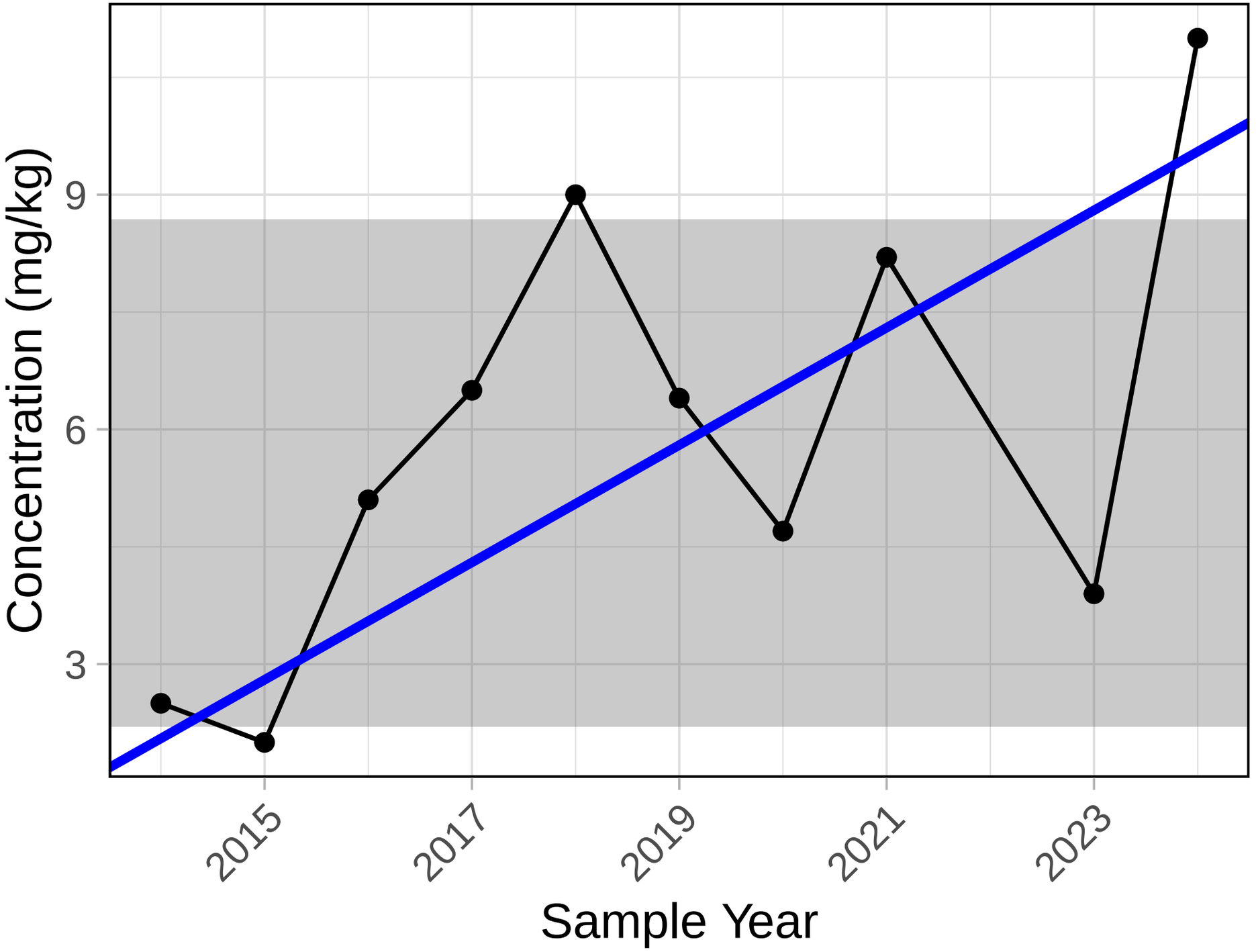
S6 Sediment



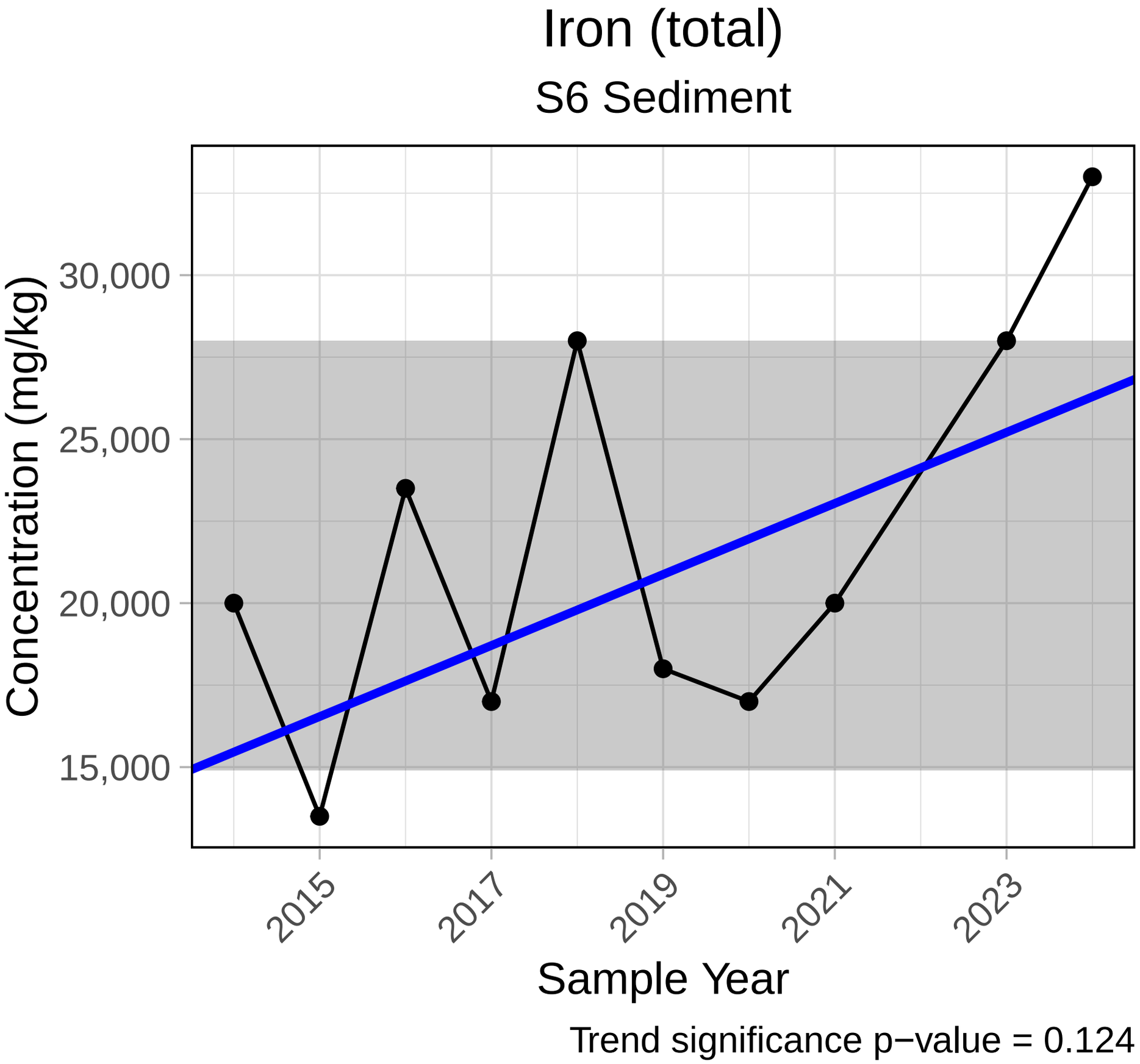
Trend significance p−value = 0.107
ISQG level = 37.3 mg/kg (maximum)
PEL level = 90 mg/kg (maximum)

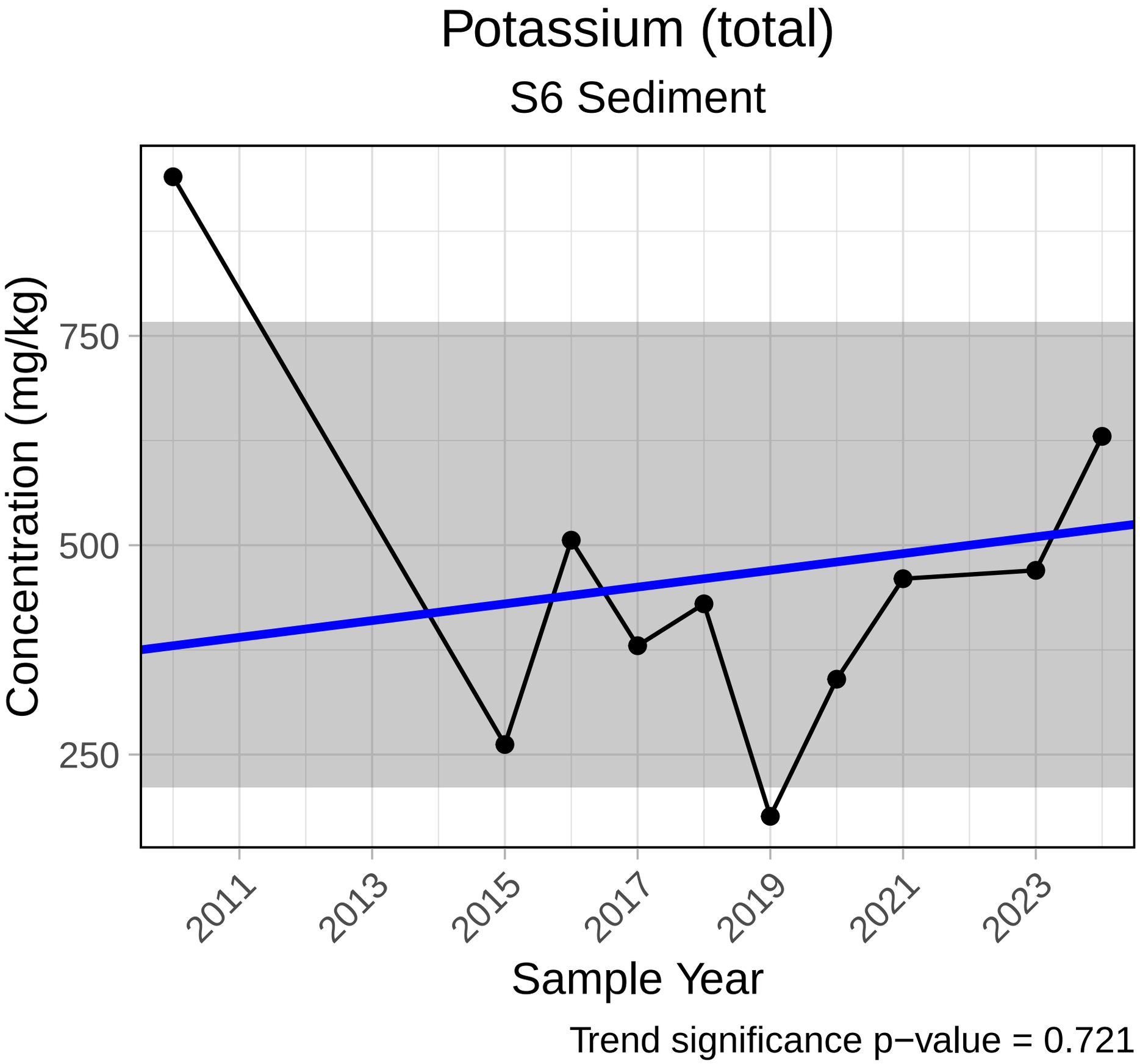
Copper (total)

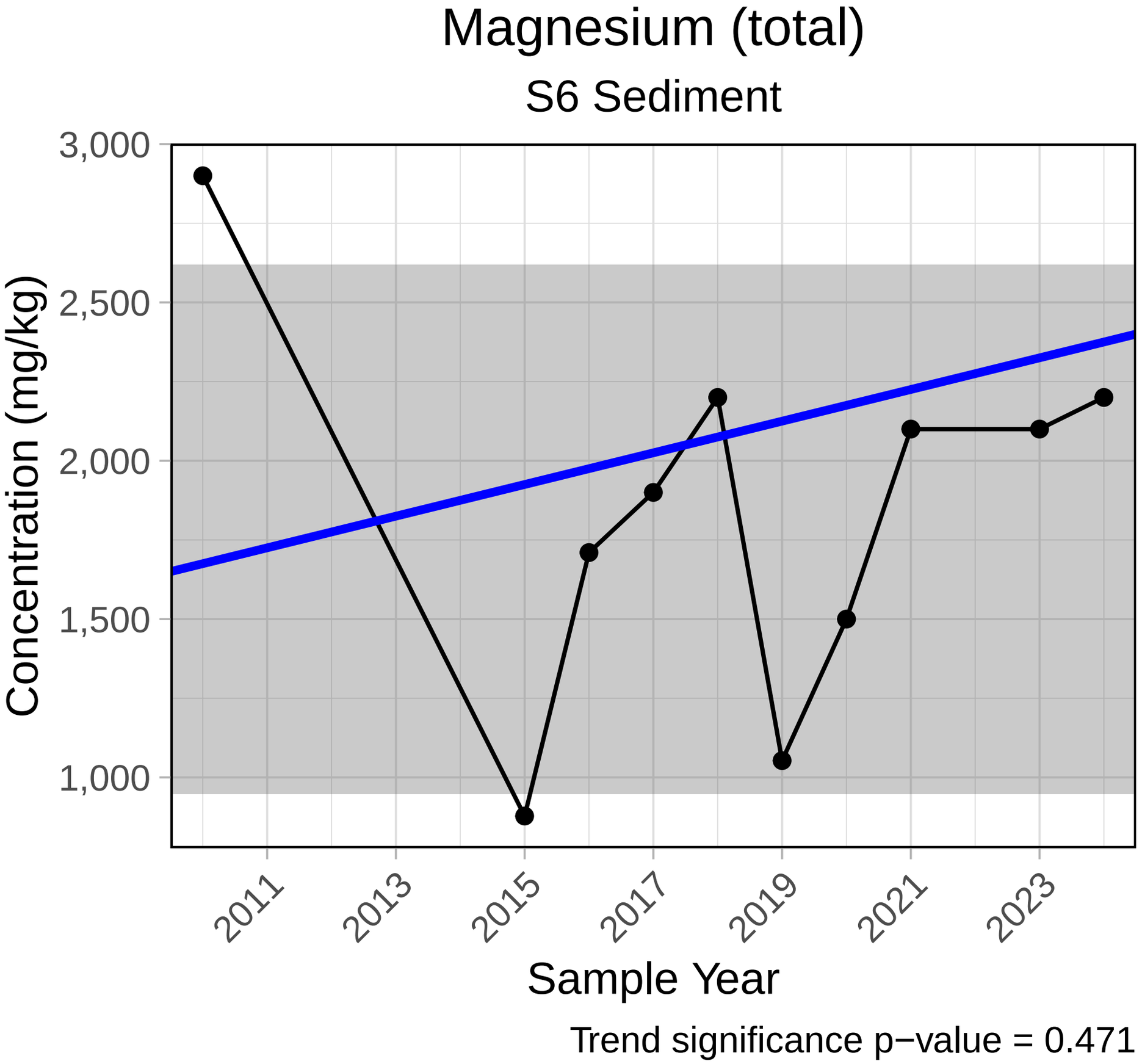
S6 Sediment



Trend significance p−value = 0.152
ISQG level = 35.7 mg/kg (maximum)
PEL level = 197 mg/kg (maximum)

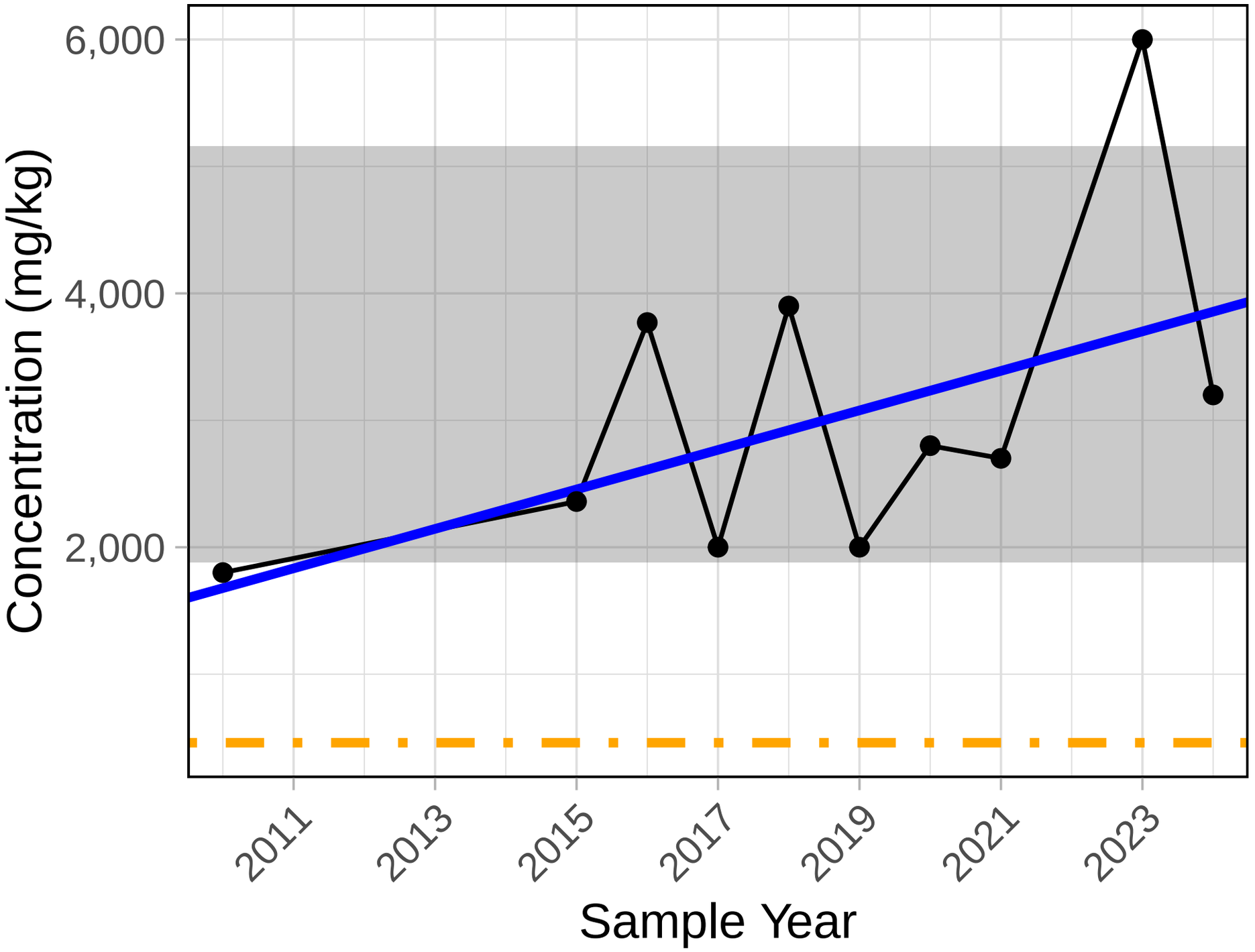

Iron (total)
S6 Sediment
Concentration (mg/kg)
30,000
25,000
20,000
15,000
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.124


Potassium (total)
S6 Sediment
Concentration (mg/kg)
750
500
250
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.721

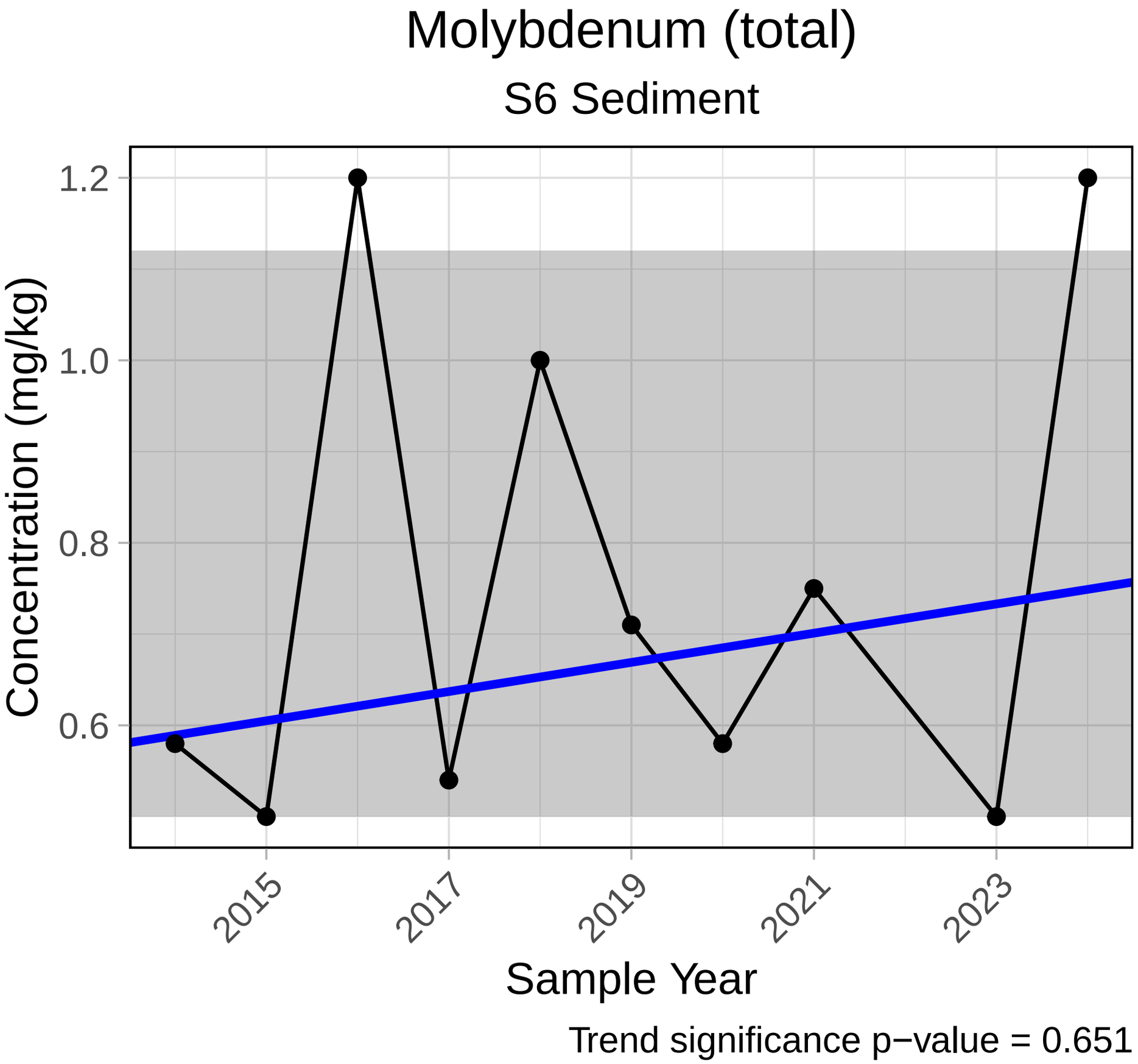

Magnesium (total)
S6 Sediment
3,000
2,500
2,000
1,500
1,000
Concentration (mg/kg)
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.471

Manganese (total)

S6 Sediment

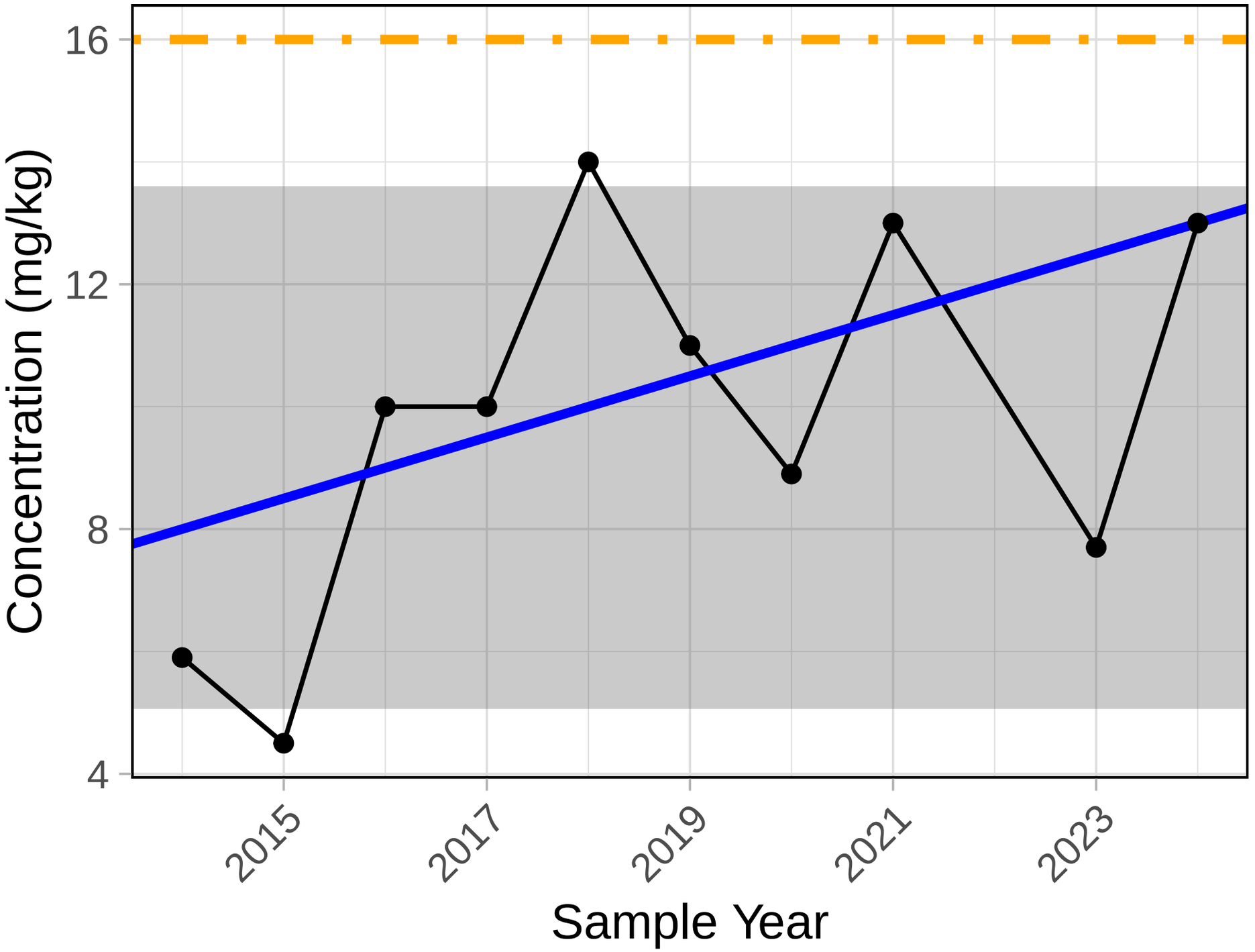


Trend significance p−value = 0.127
ISQG level = 460 mg/kg (maximum)

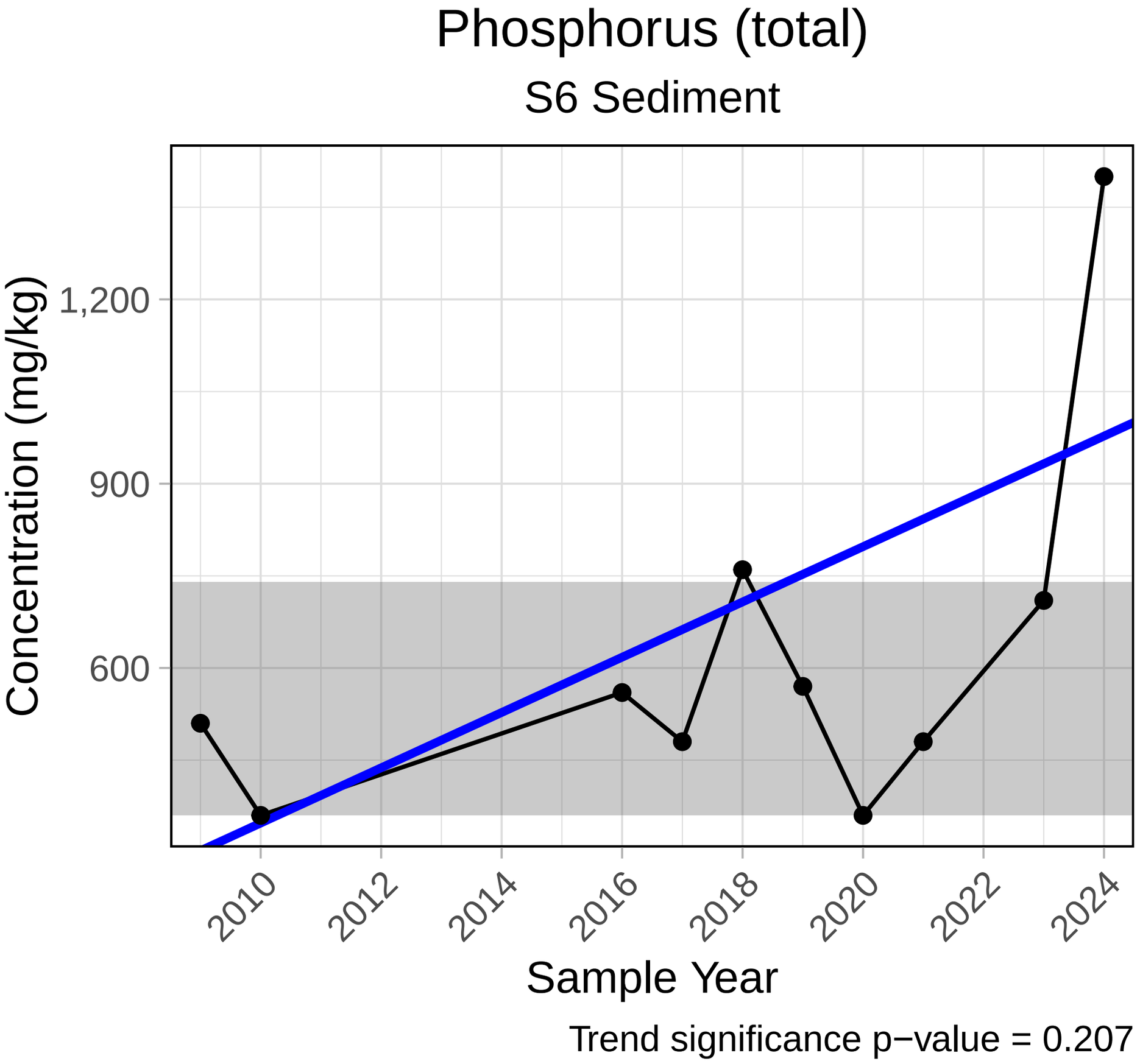

Molybdenum (total)
S6 Sediment
Concentration (mg/kg)
1.2
1.0
0.8
0.6
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.651

Nickel (total)

S6 Sediment

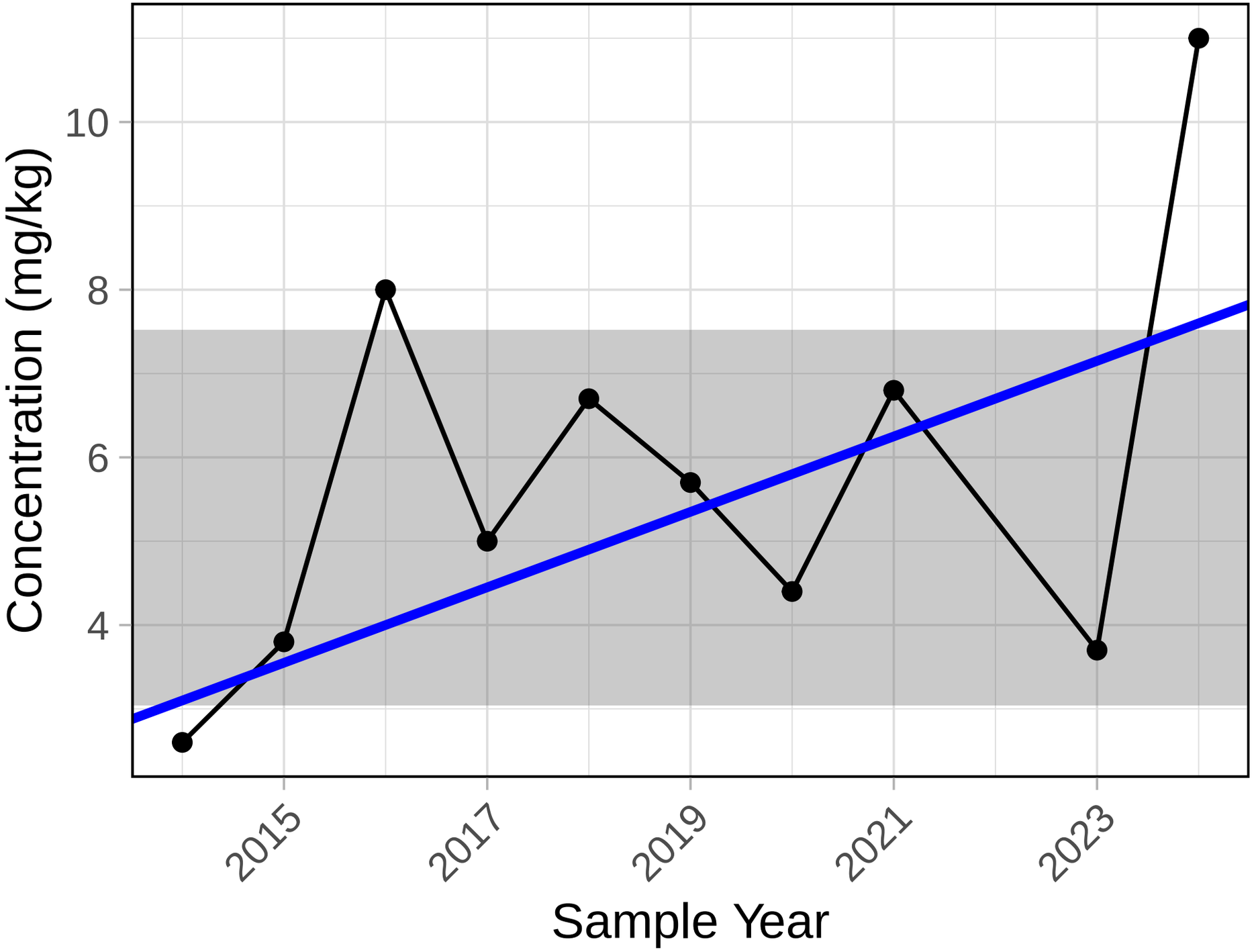


Trend significance p−value = 0.207
ISQG level = 16 mg/kg (maximum)

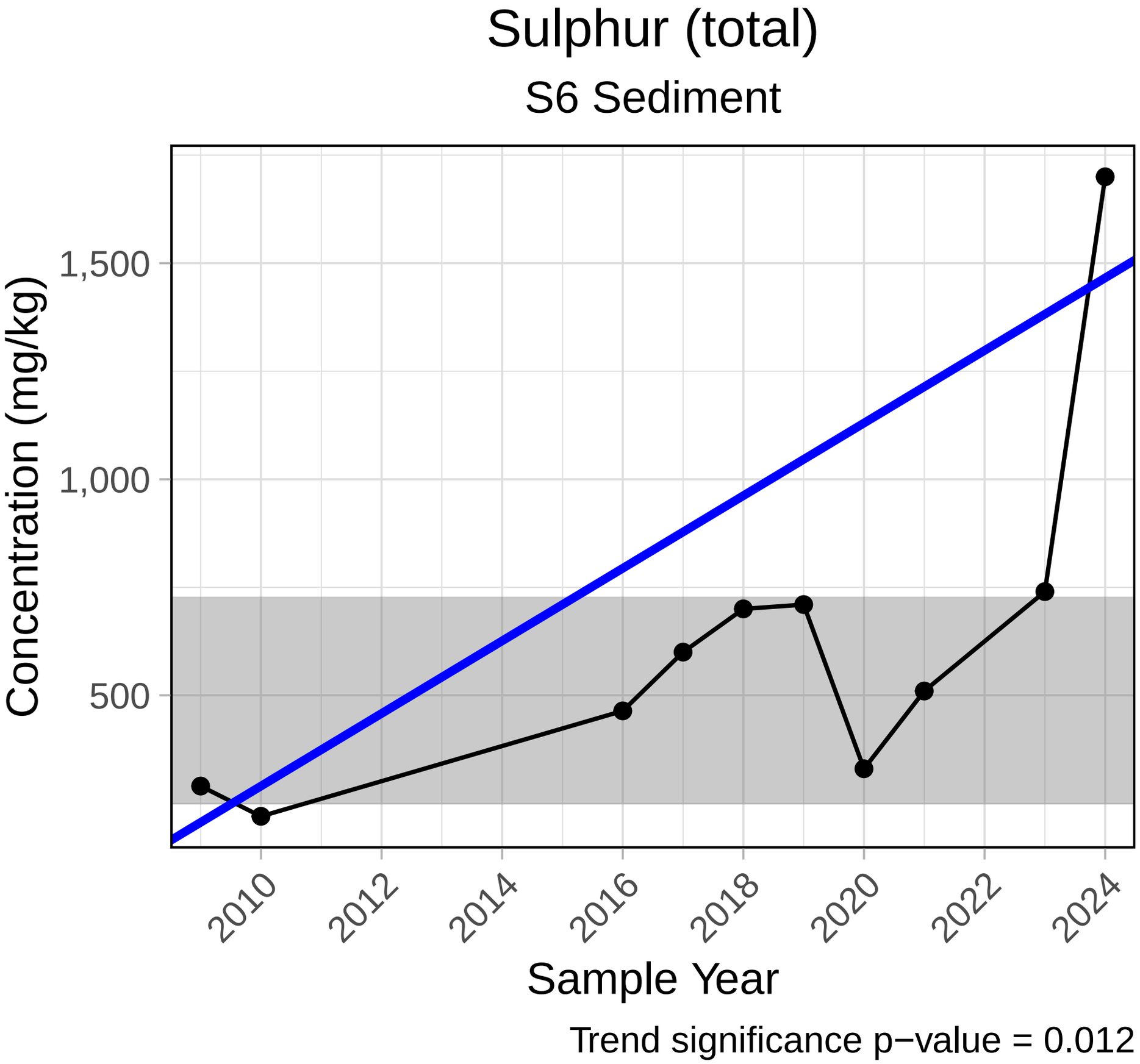

Phosphorus (total)
S6 Sediment
Concentration (mg/kg)
1,200
900
600
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.207

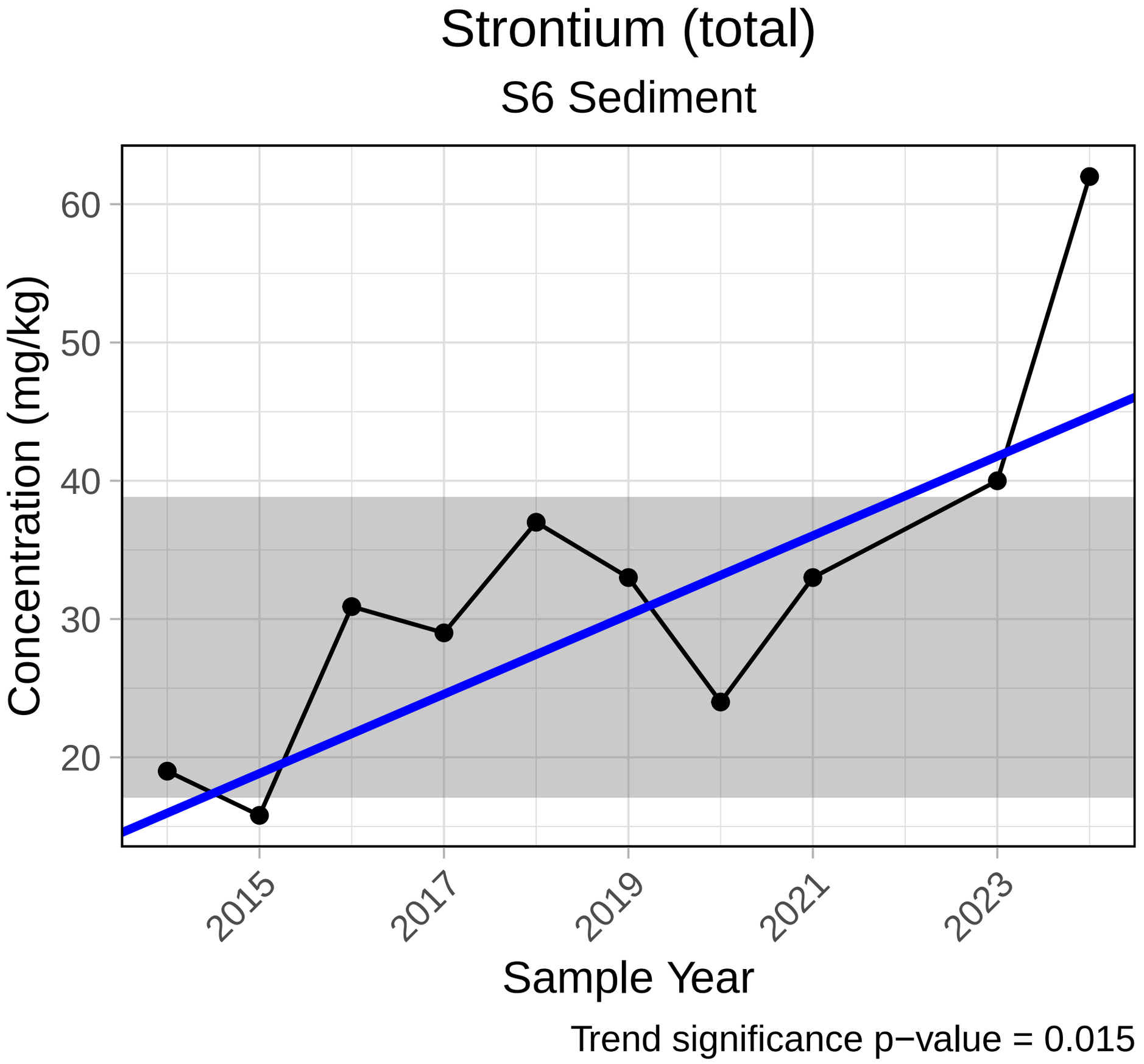
Lead (total)

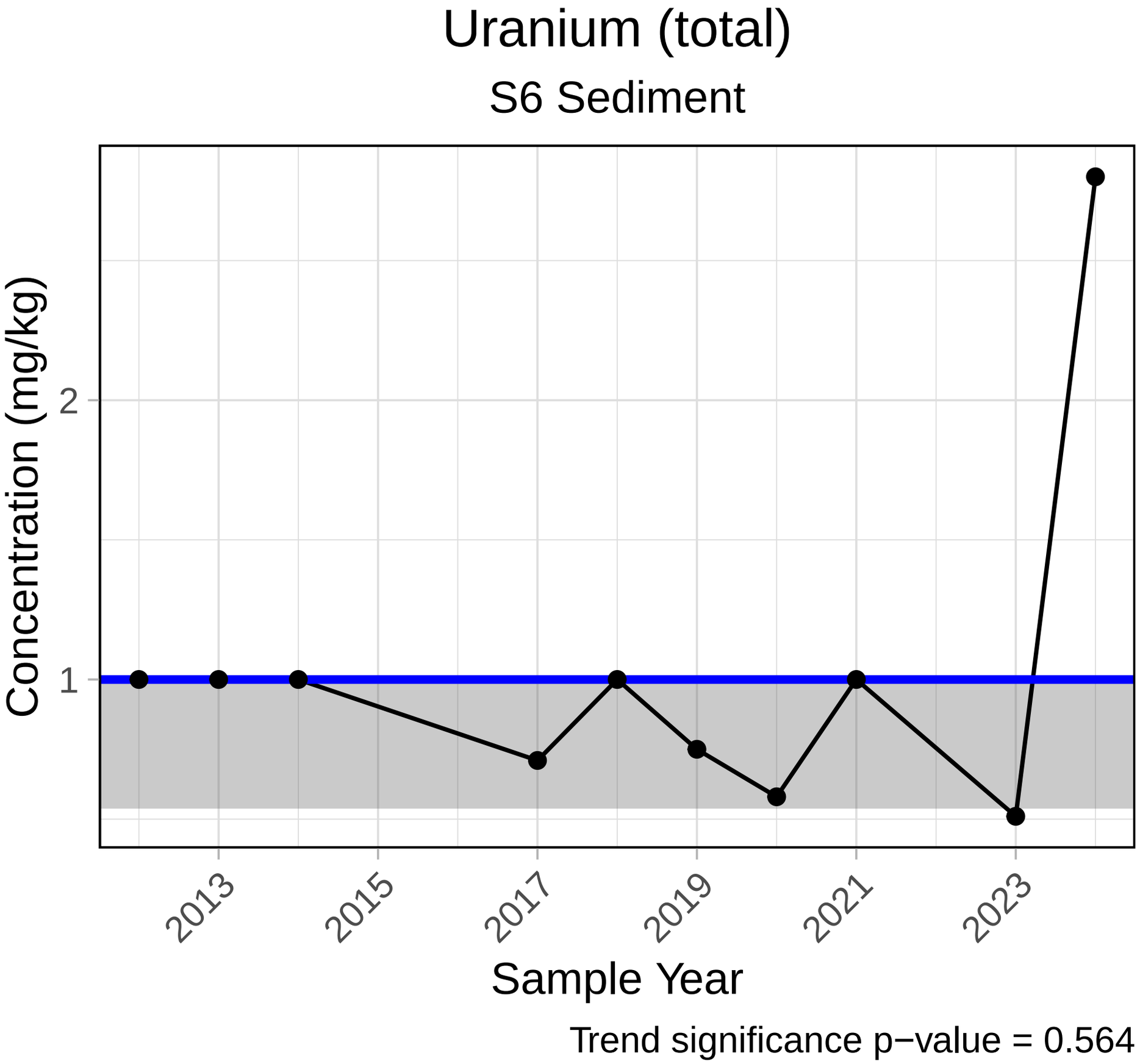
S6 Sediment



Trend significance p−value = 0.283
ISQG level = 35 mg/kg (maximum)
PEL level = 91.3 mg/kg (maximum)

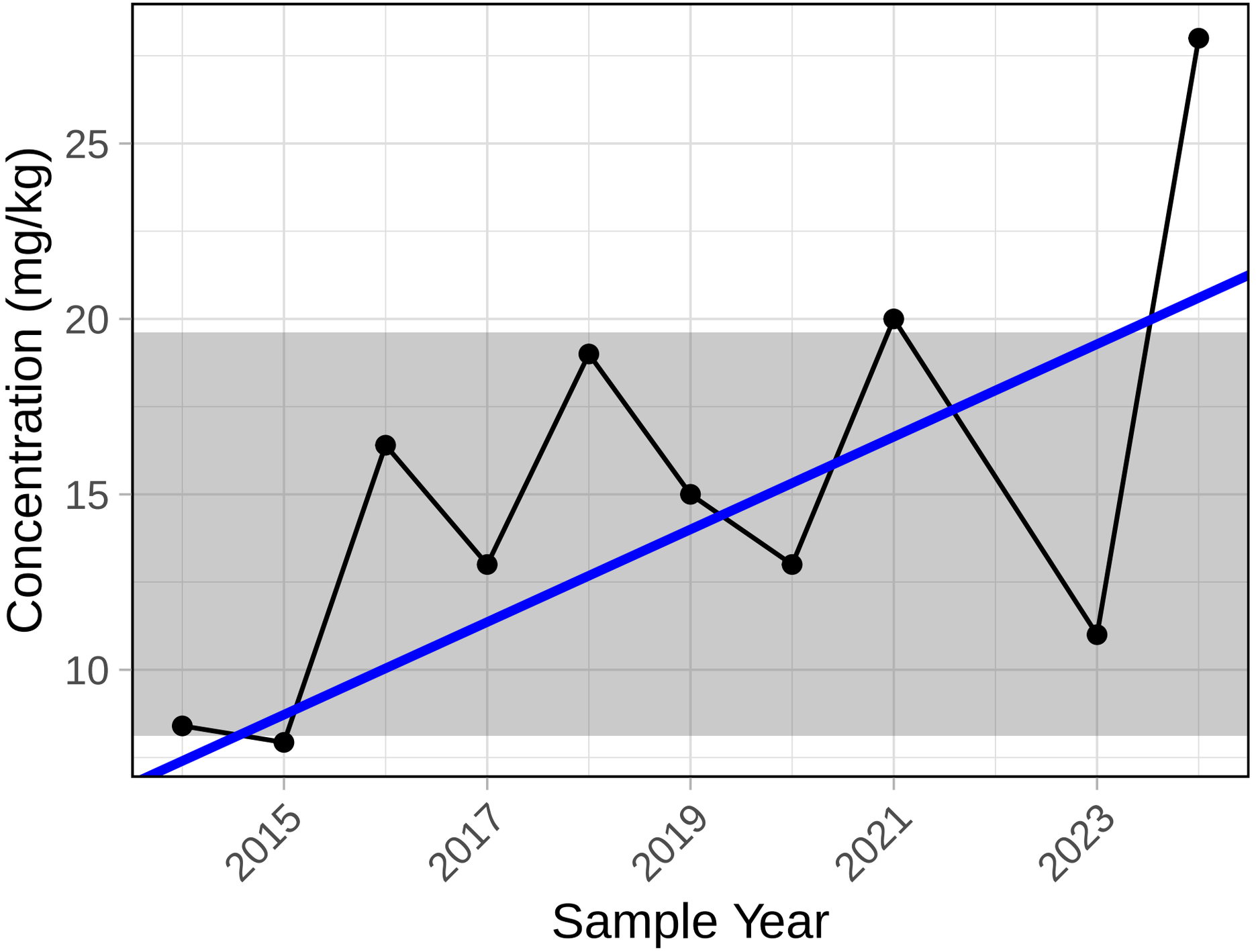

Sulphur (total)
S6 Sediment
Concentration (mg/kg)
1,500
1,000
500
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 0.012


Strontium (total)
S6 Sediment
Concentration (mg/kg)
60
50
40
30
20
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.015


Uranium (total)
S6 Sediment
Concentration (mg/kg)
2
1
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.564

Vanadium (total)

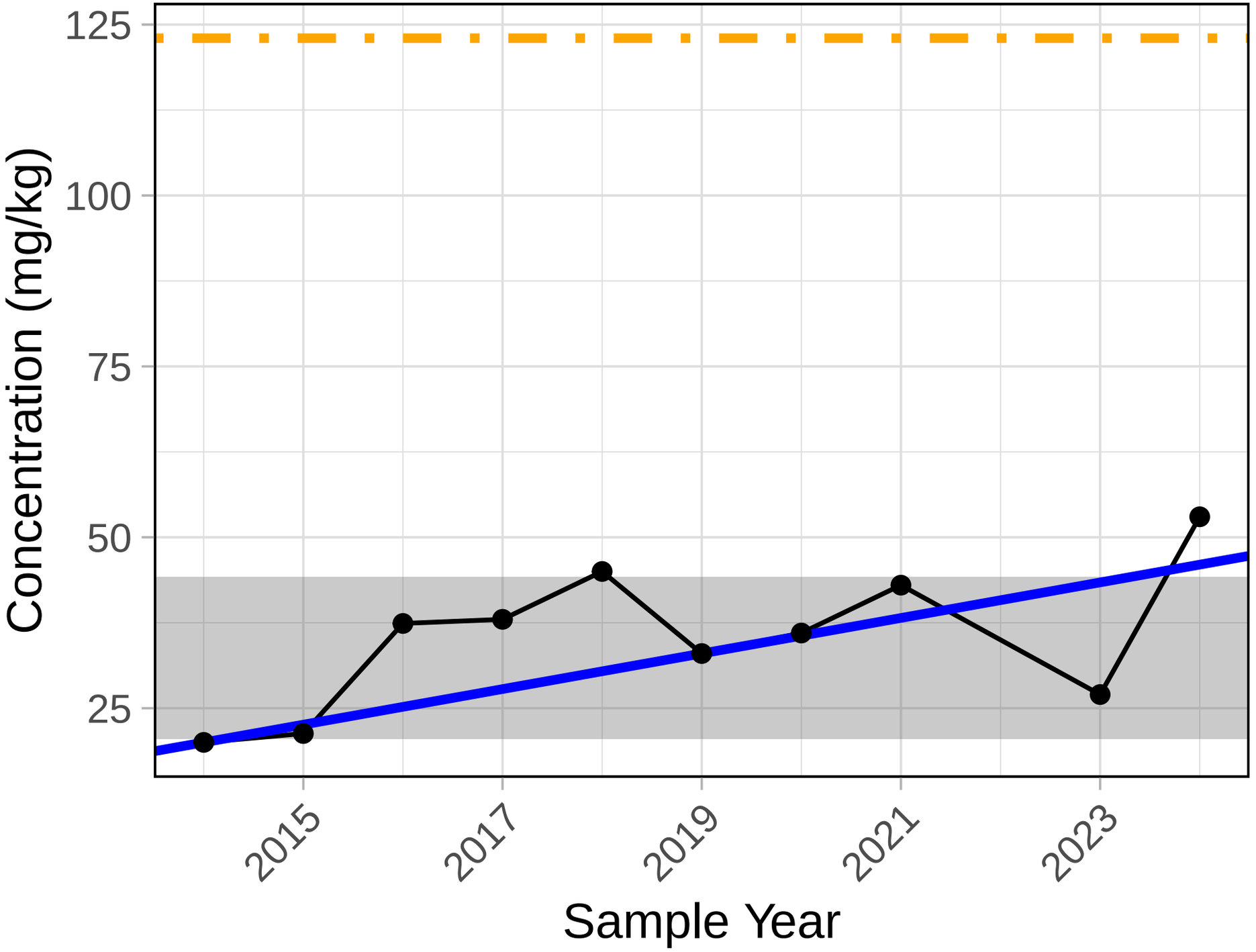
S6 Sediment



Trend significance p−value = 0.127

Zinc (total)

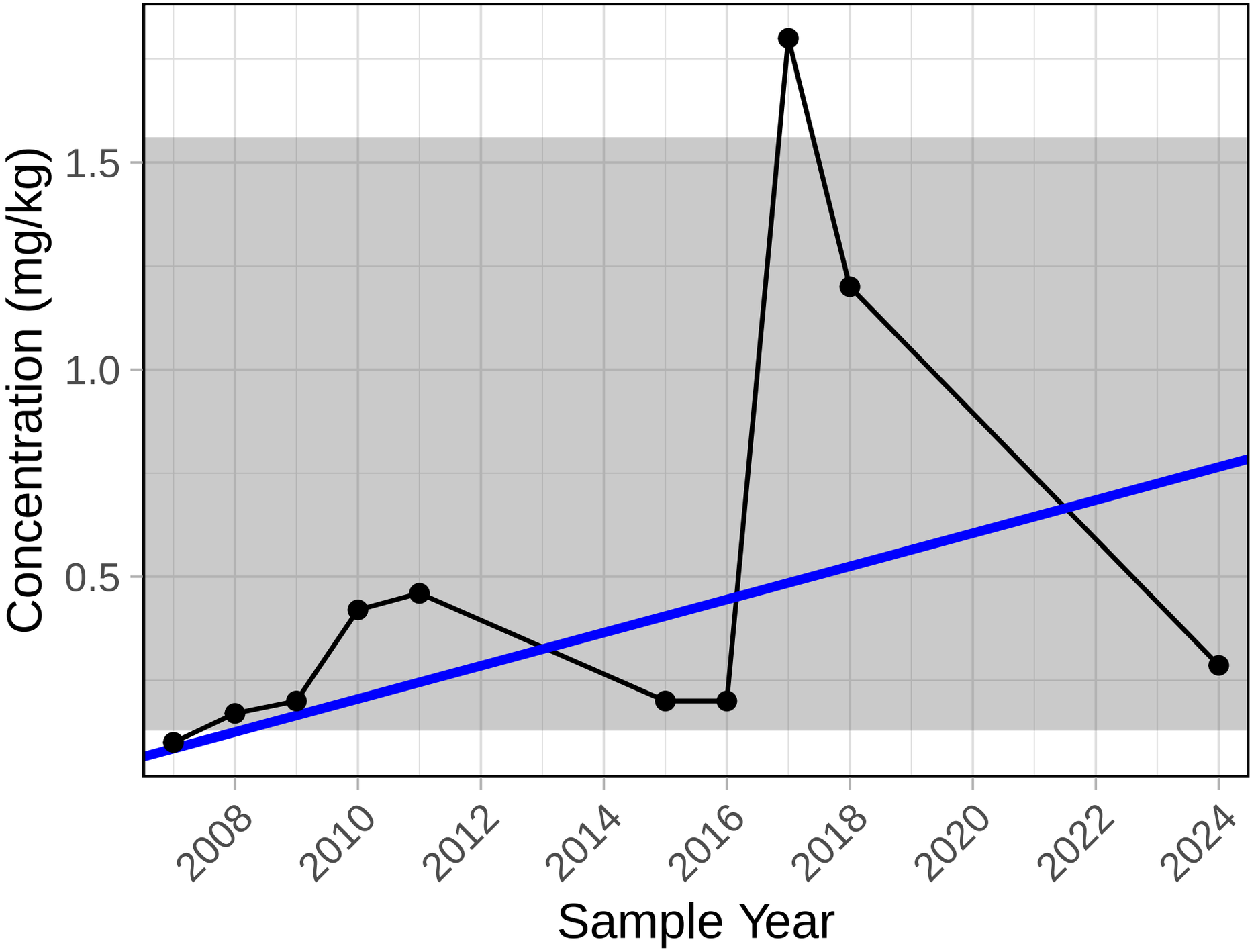
S6 Sediment



Trend significance p−value = 0.107
ISQG level = 123 mg/kg (maximum)
PEL level = 315 mg/kg (maximum)

Total Inorganic Carbon

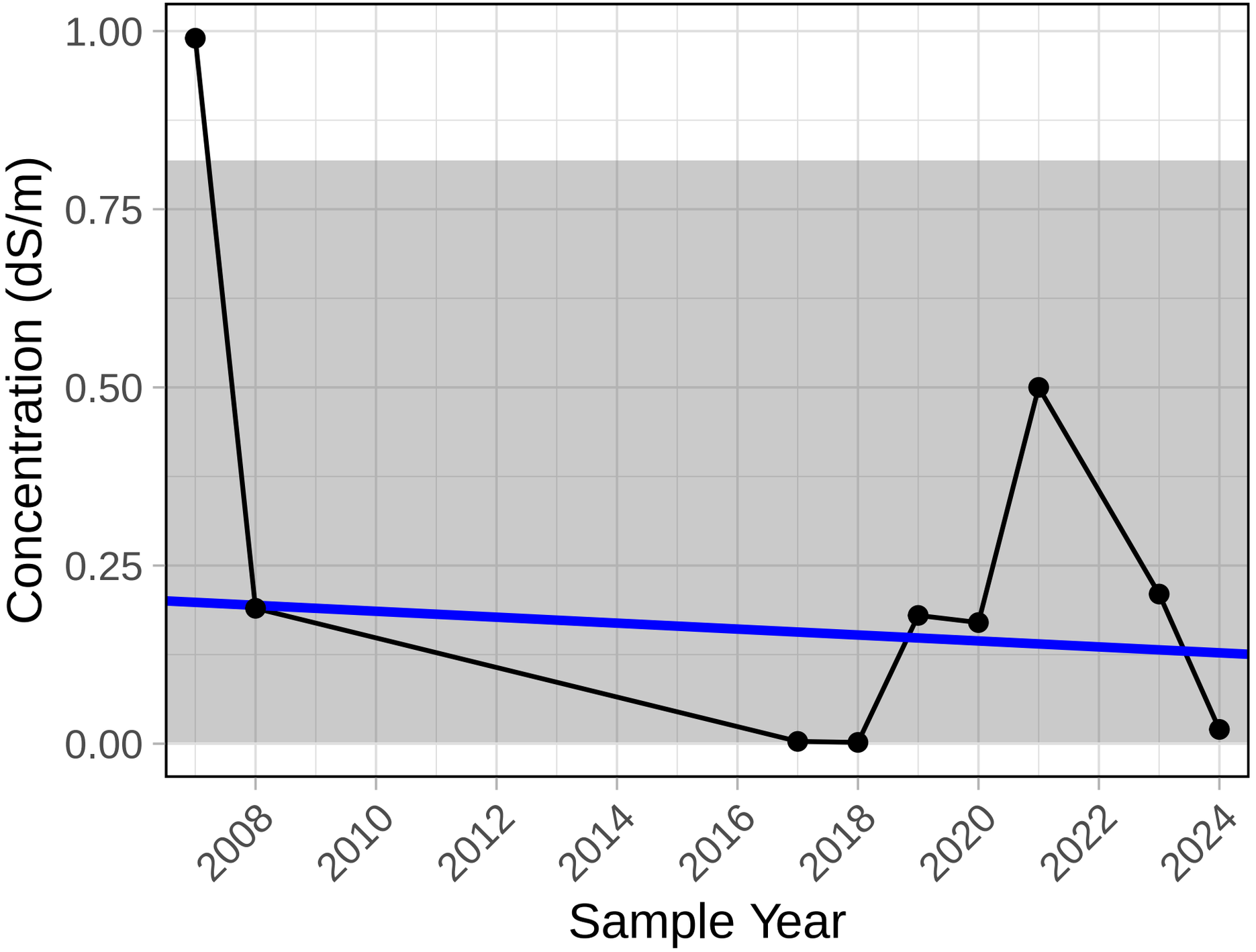
S6 Sediment



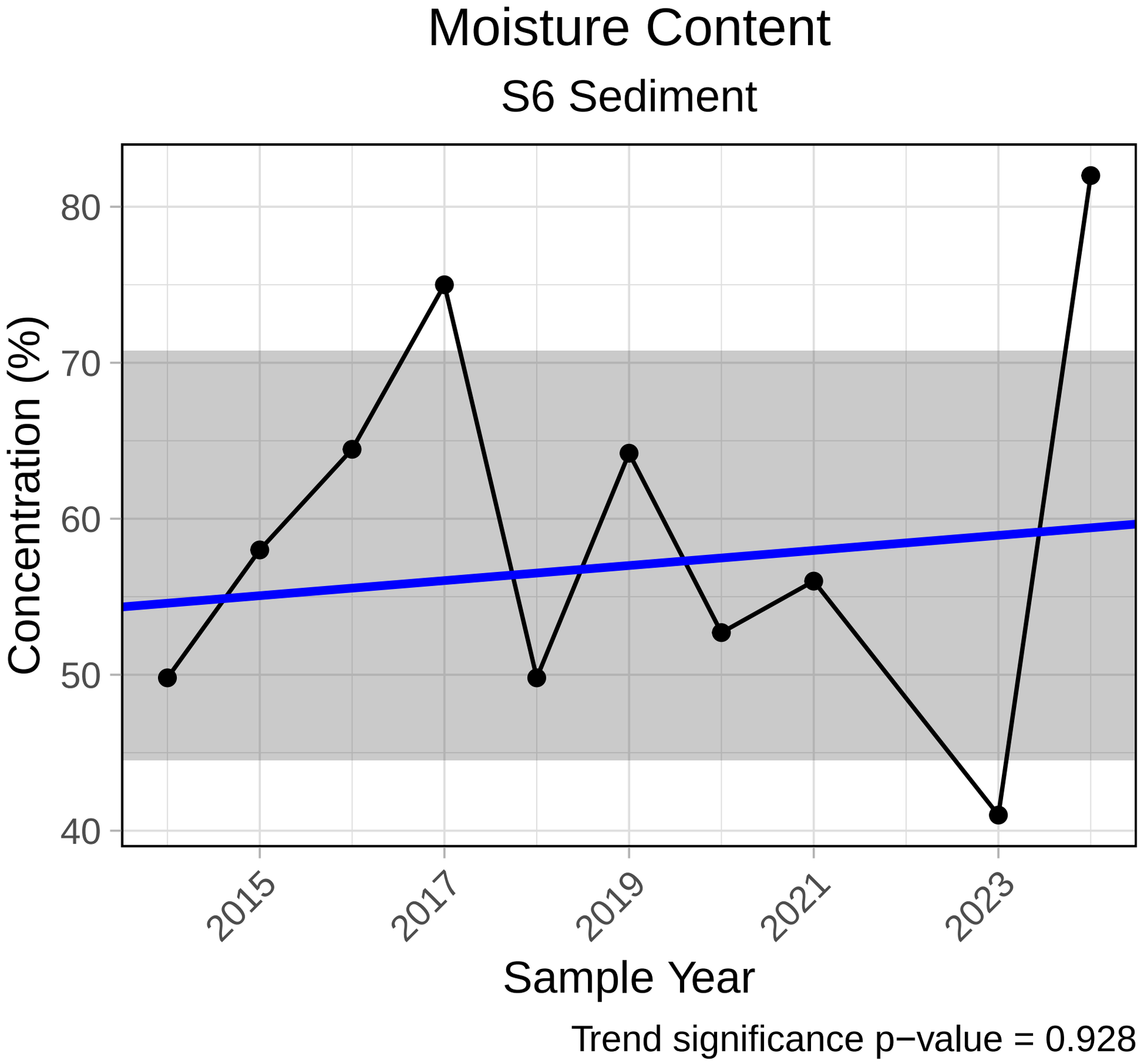
Trend significance p−value = 0.037

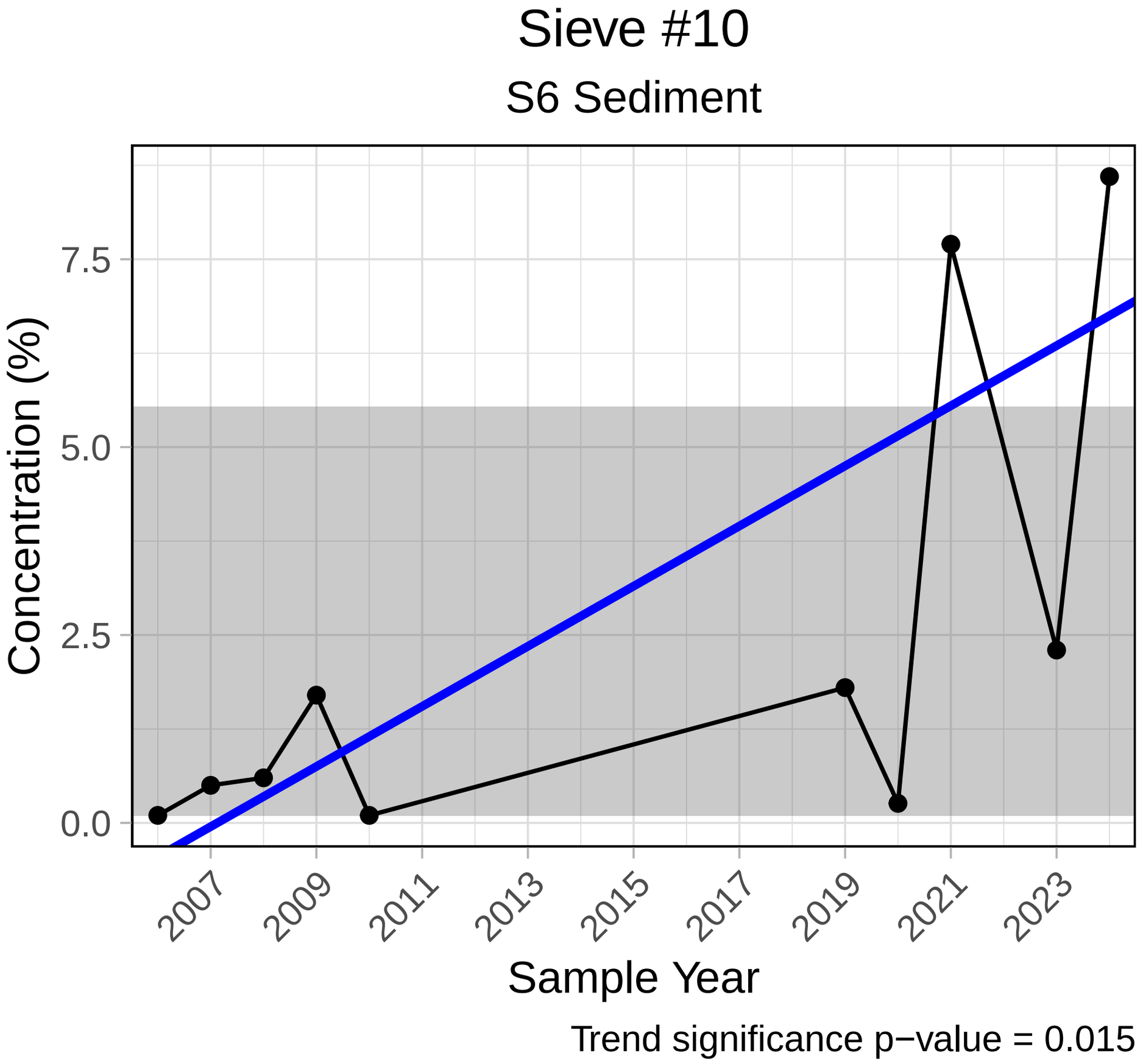
Electrical Conductivity

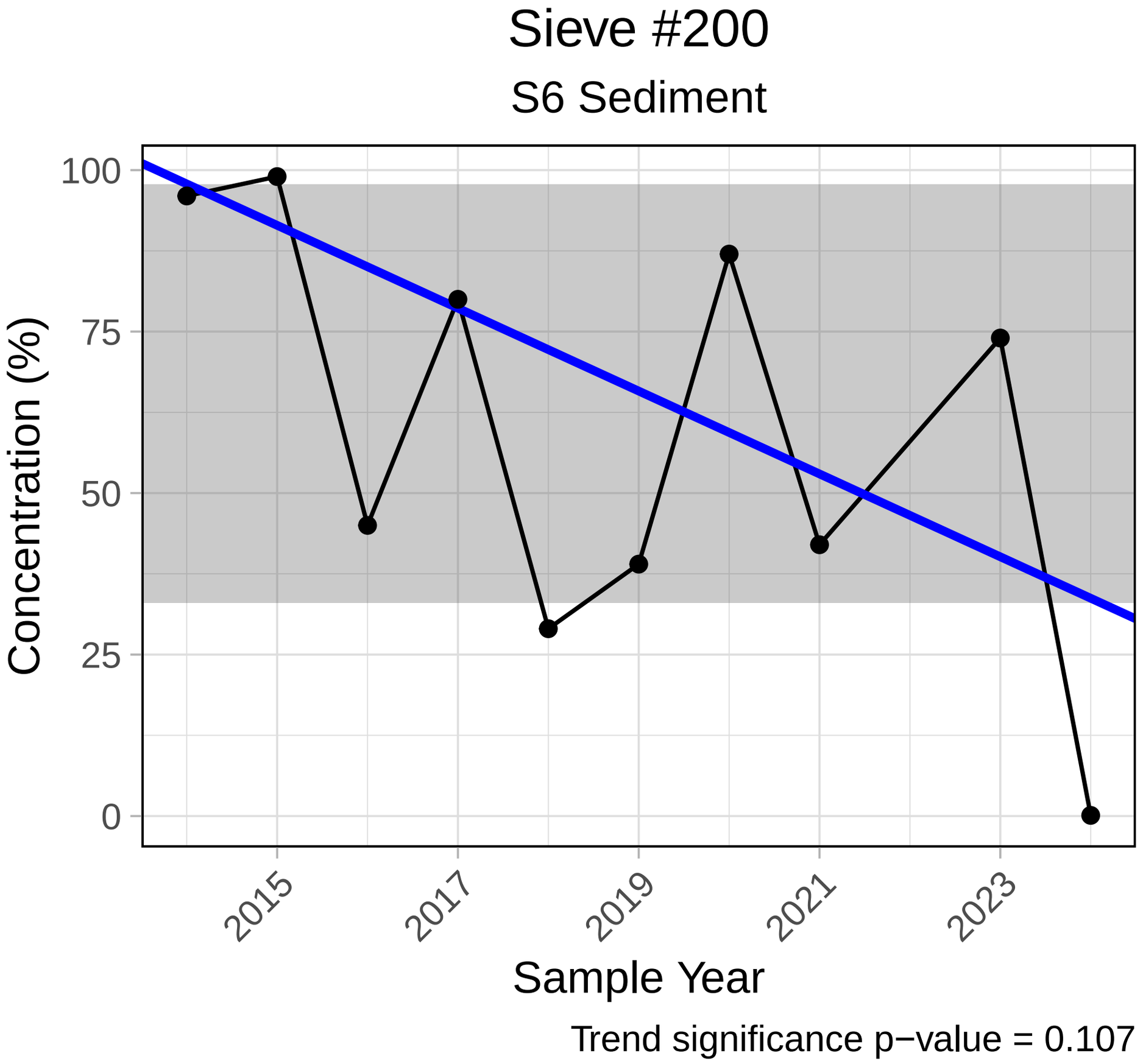
S6 Sediment

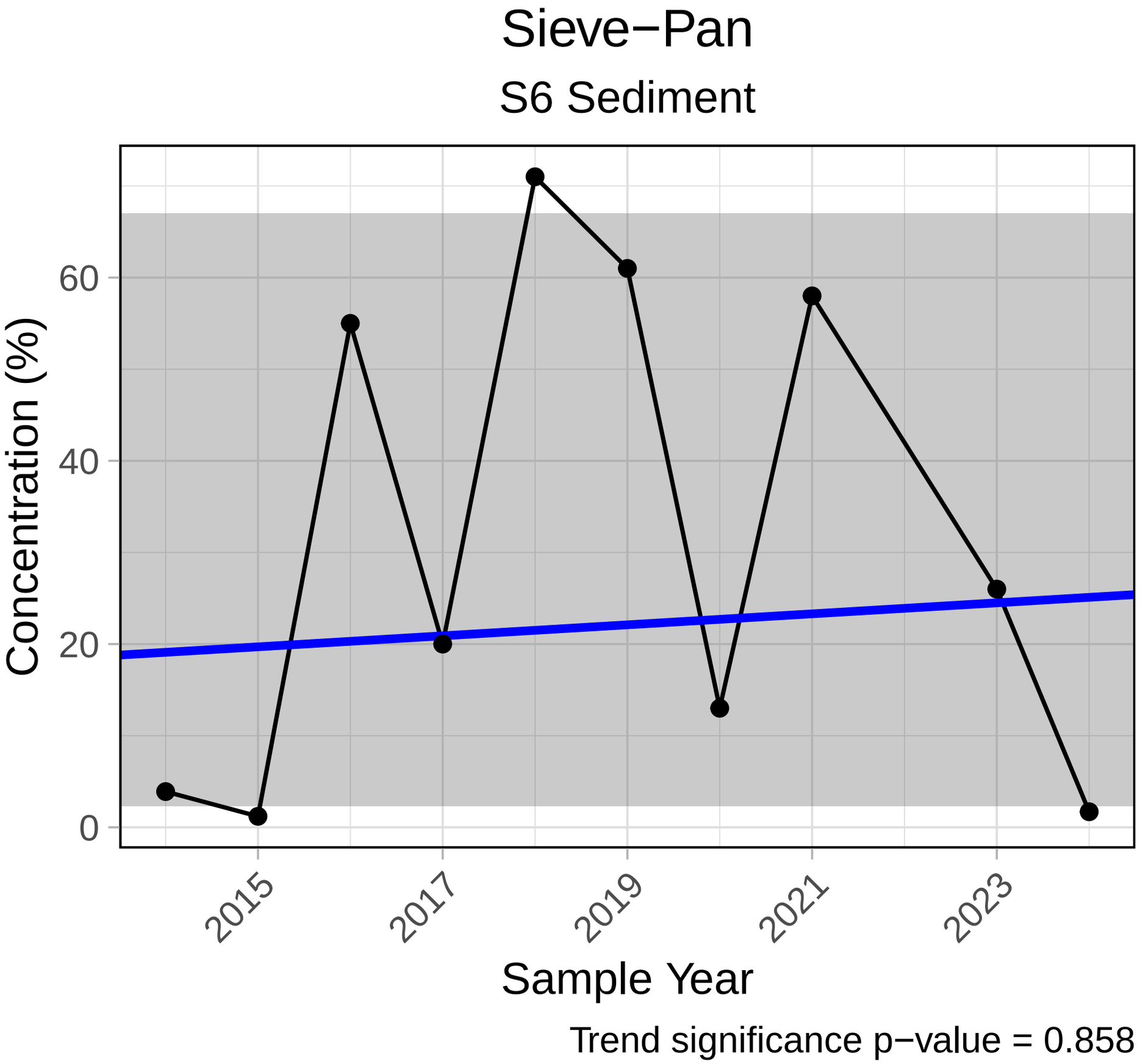


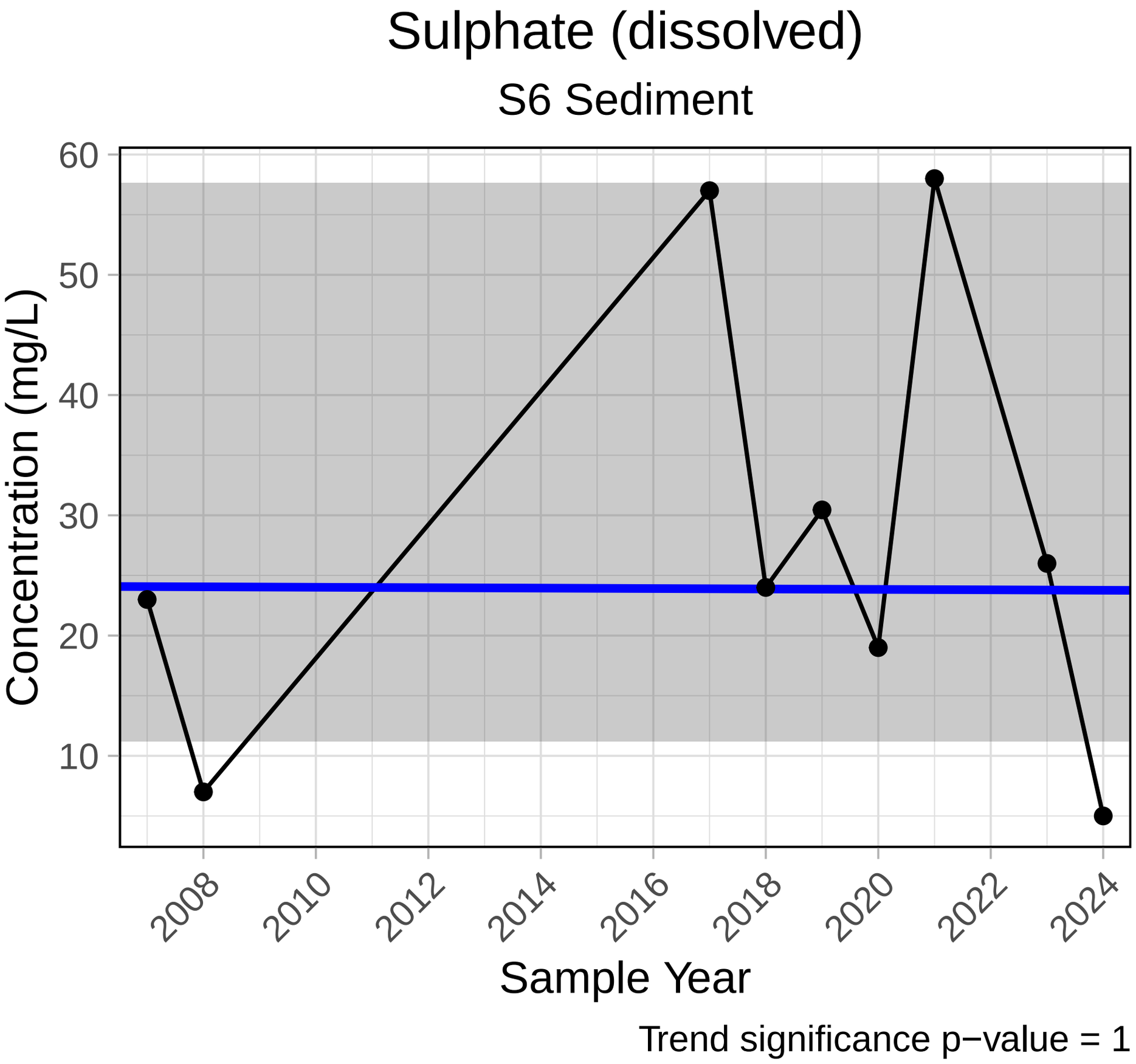
Trend significance p−value = 0.754

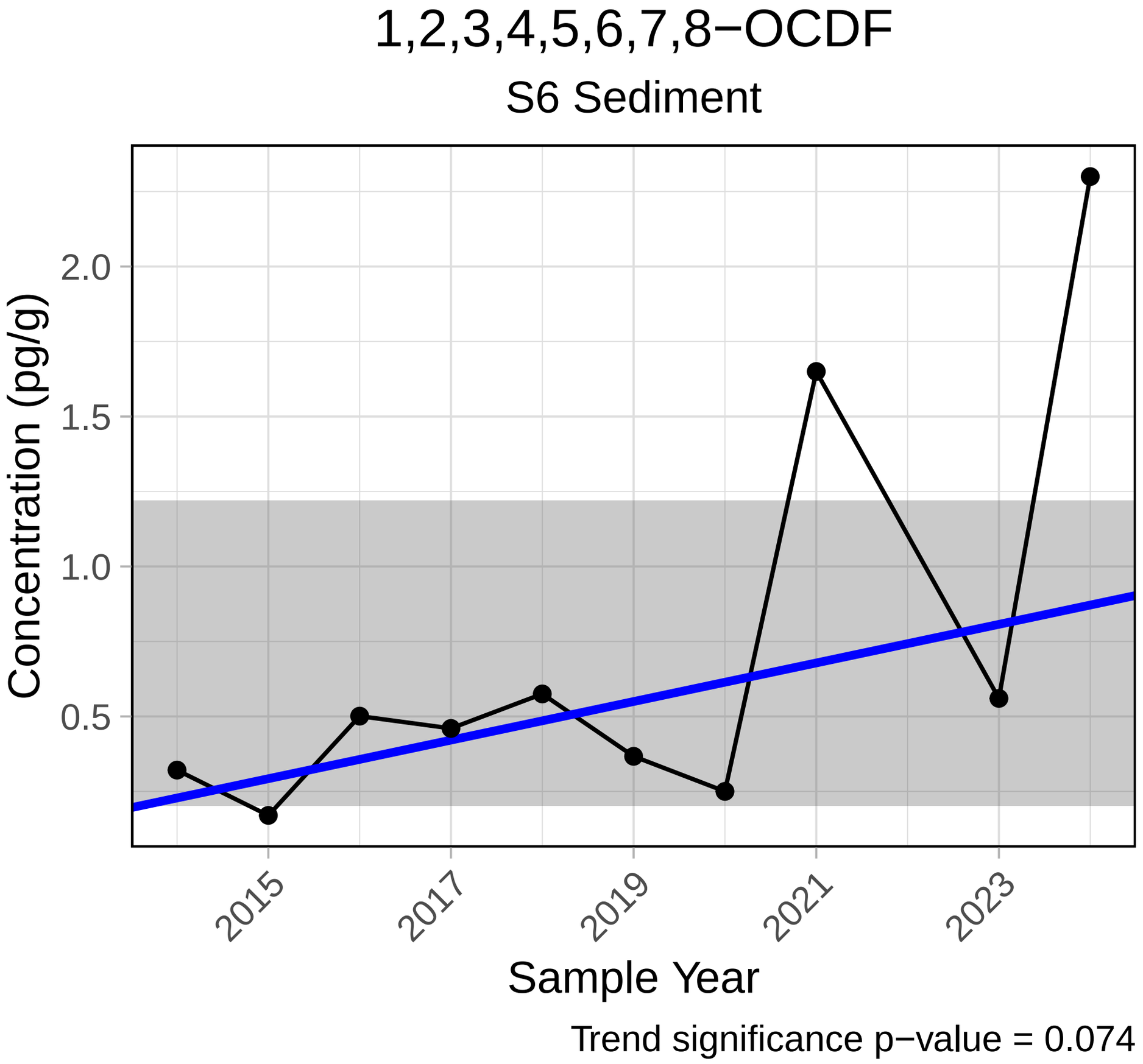

Moisture Content
S6 Sediment
Concentration (%)
80
70
60
50
40
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.928

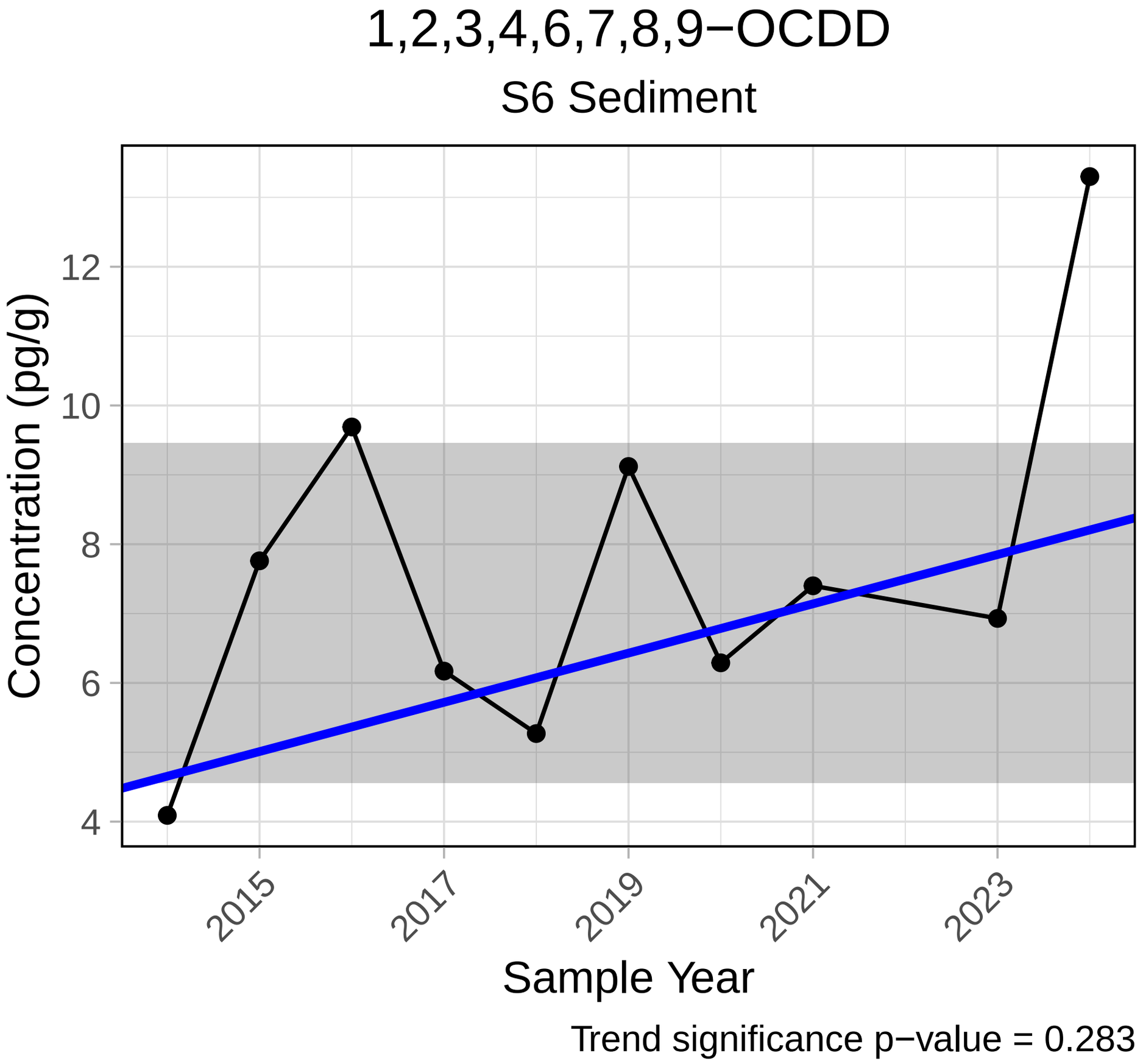

Sieve #10
S6 Sediment
Concentration (%)
7.5
5.0
2.5
0.0
2007
2009
2011
2013
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.015

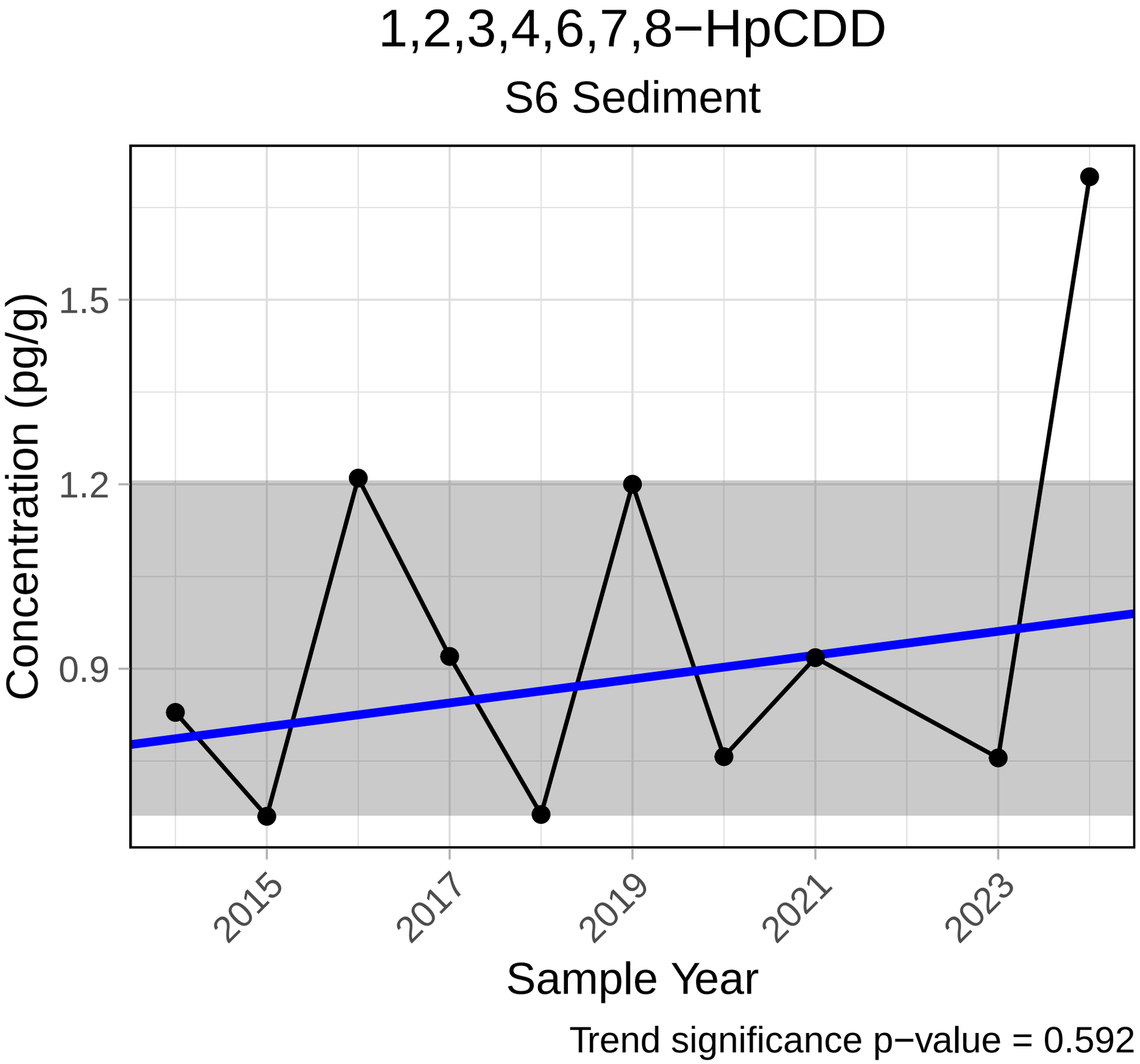

Sieve #200
S6 Sediment
Concentration (%)
100
75
50
25
0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.107

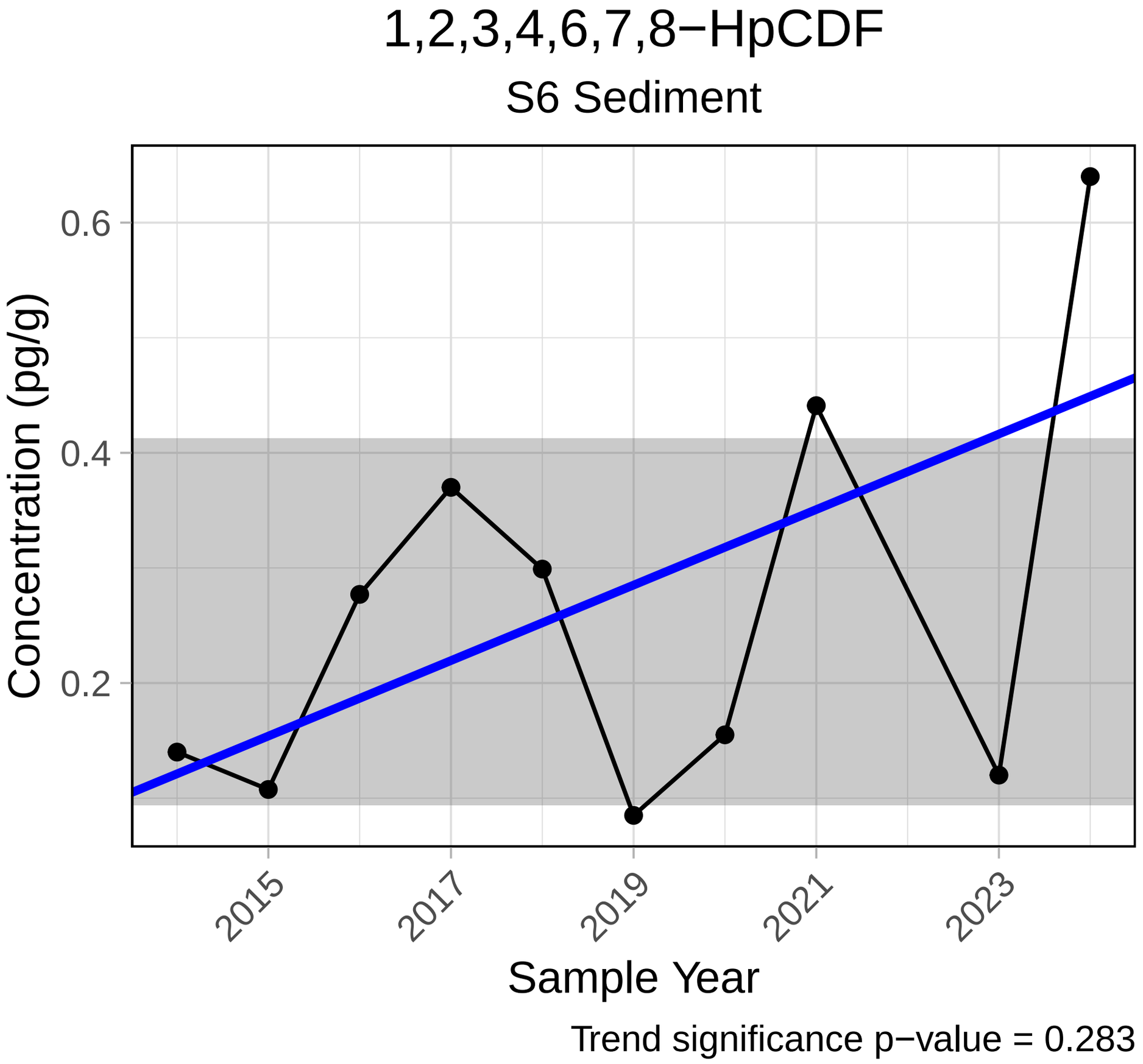

Sieve−Pan
S6 Sediment
Concentration (%)
0
20
40
60
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.858

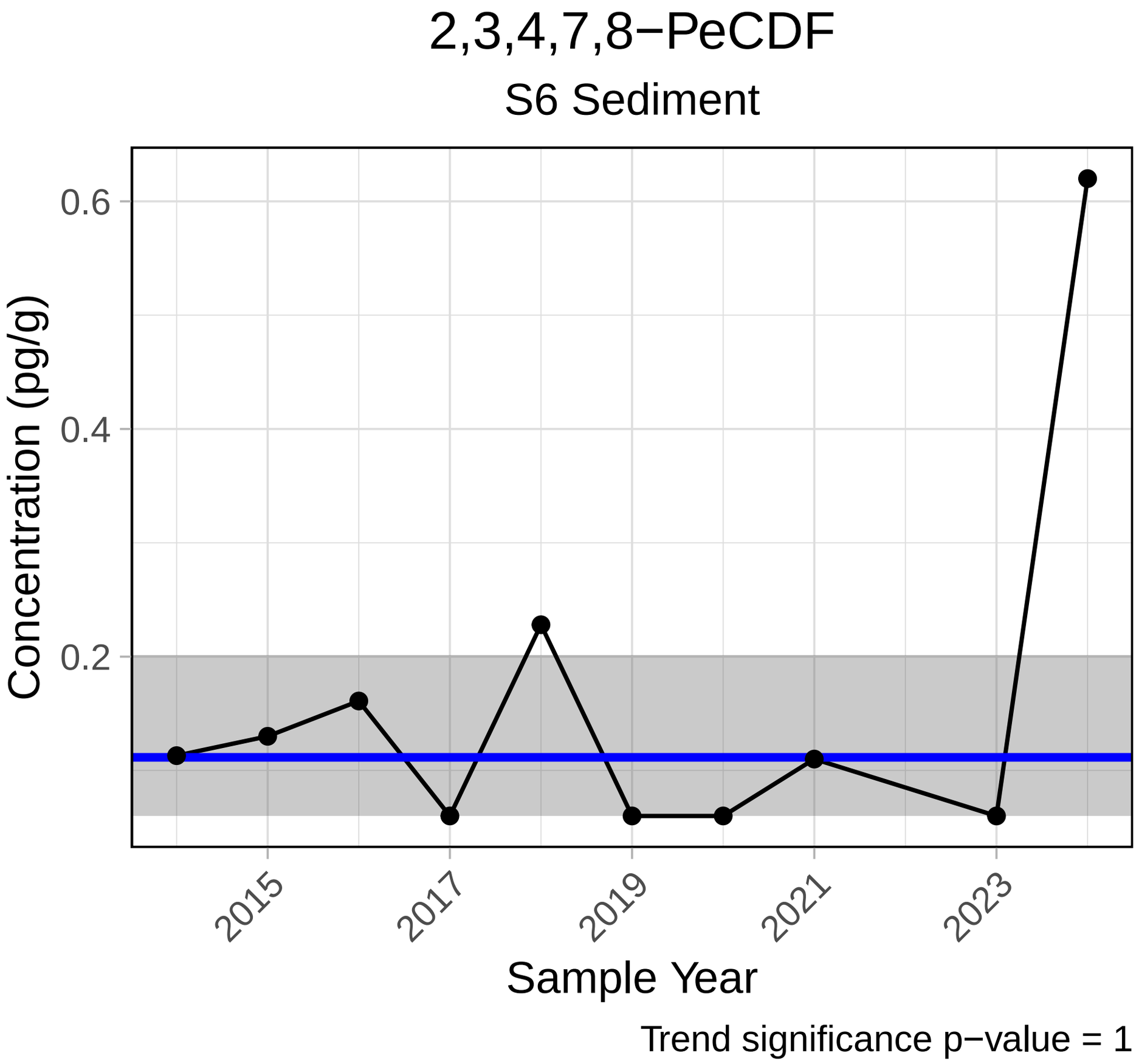

Sulphate (dissolved)
S6 Sediment
Concentration (mg/L)
60
50
40
30
20
10
2008
2010
2012
2014
2016
2018
2020
2022
2024
Sample Year
Trend significance p−value = 1

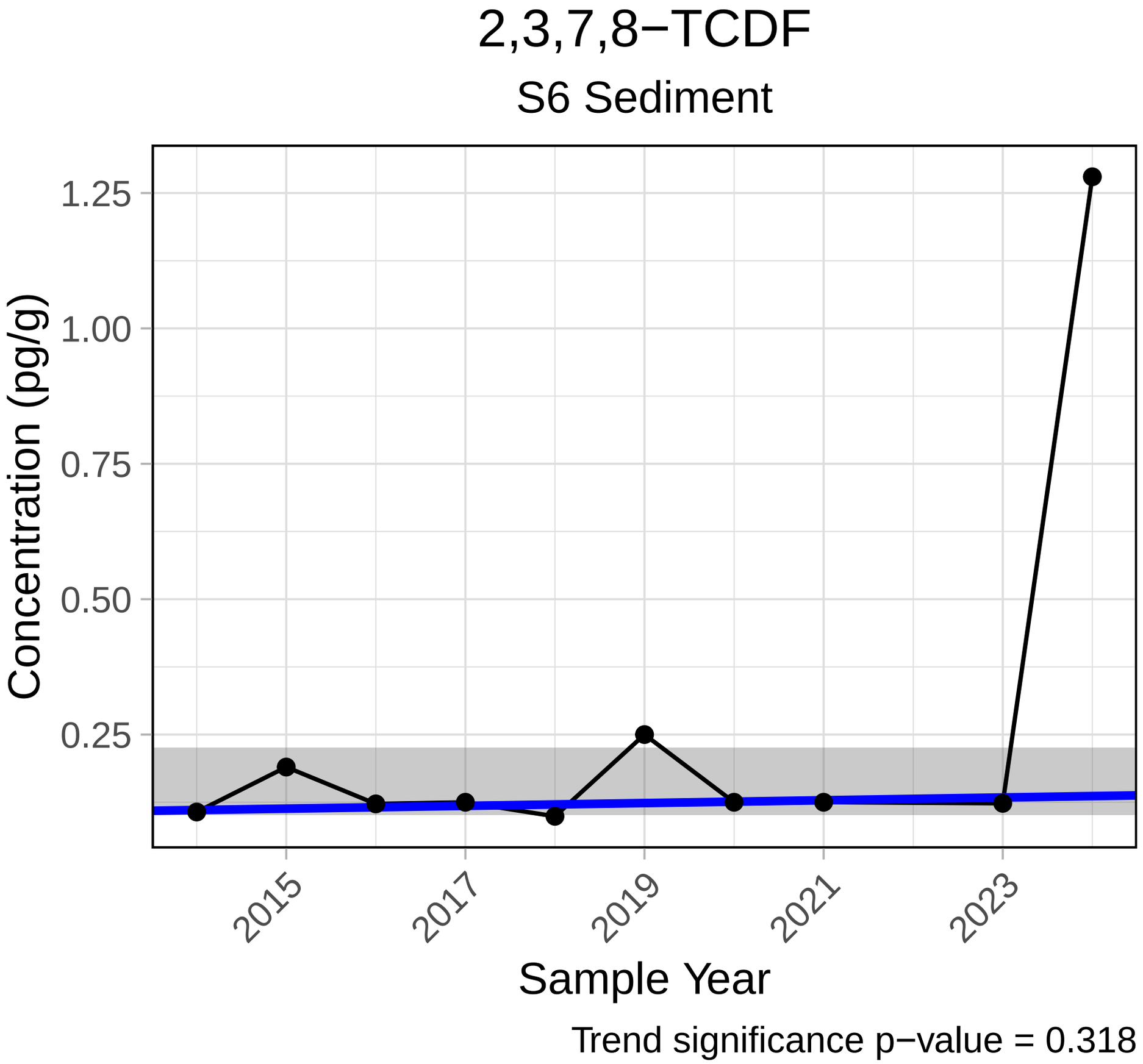

1,2,3,4,5,6,7,8−OCDF
S6 Sediment
Concentration (pg/g)
2.0
1.5
1.0
0.5
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.074

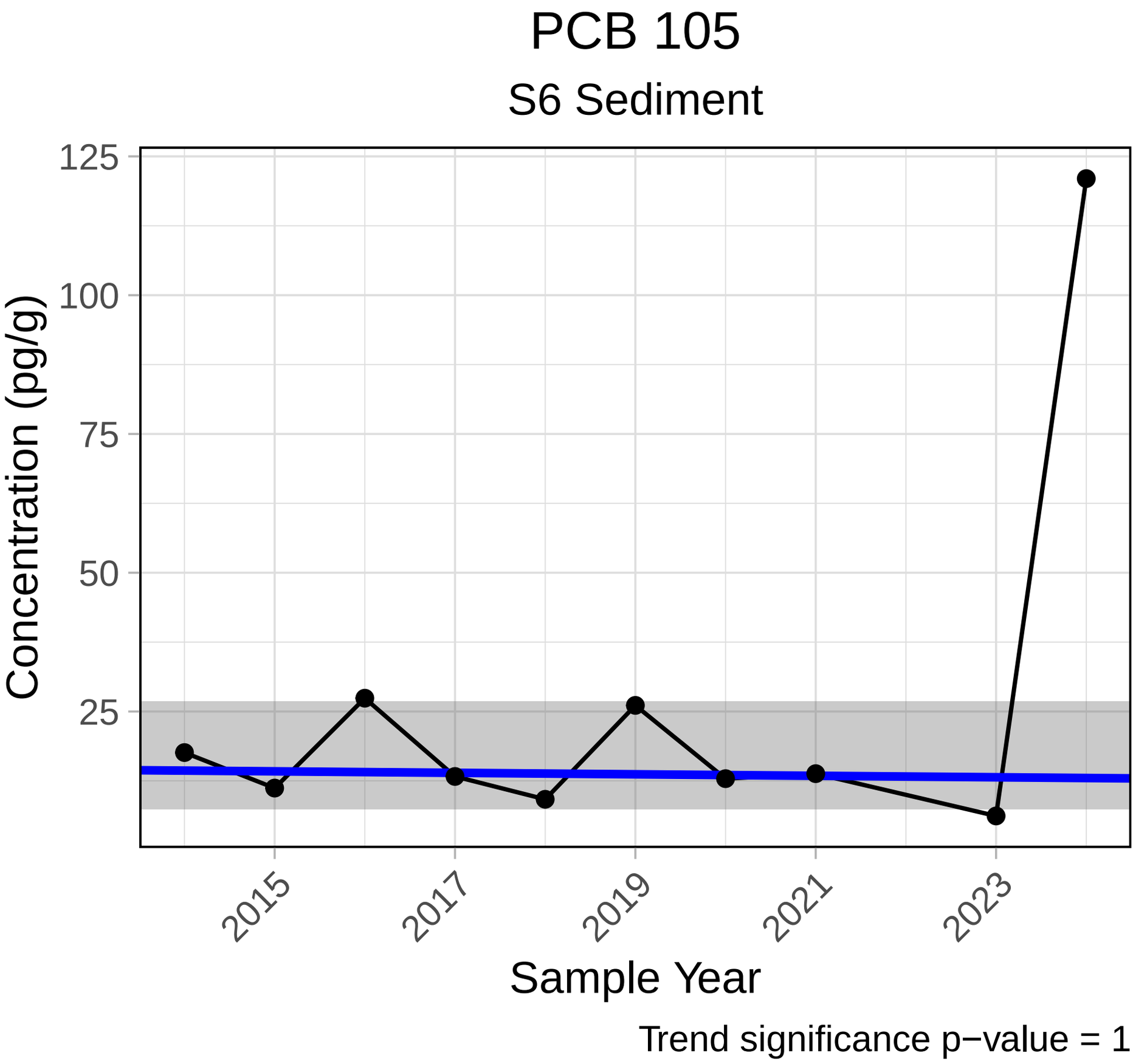

1,2,3,4,6,7,8,9−OCDD
S6 Sediment
Concentration (pg/g)
12
10
8
6
4
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.283


1,2,3,4,6,7,8−HpCDD
S6 Sediment
Concentration (pg/g)
1.5
1.2
0.9
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.592


1,2,3,4,6,7,8−HpCDF
S6 Sediment
Concentration (pg/g)
0.6
0.4
0.2
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.283

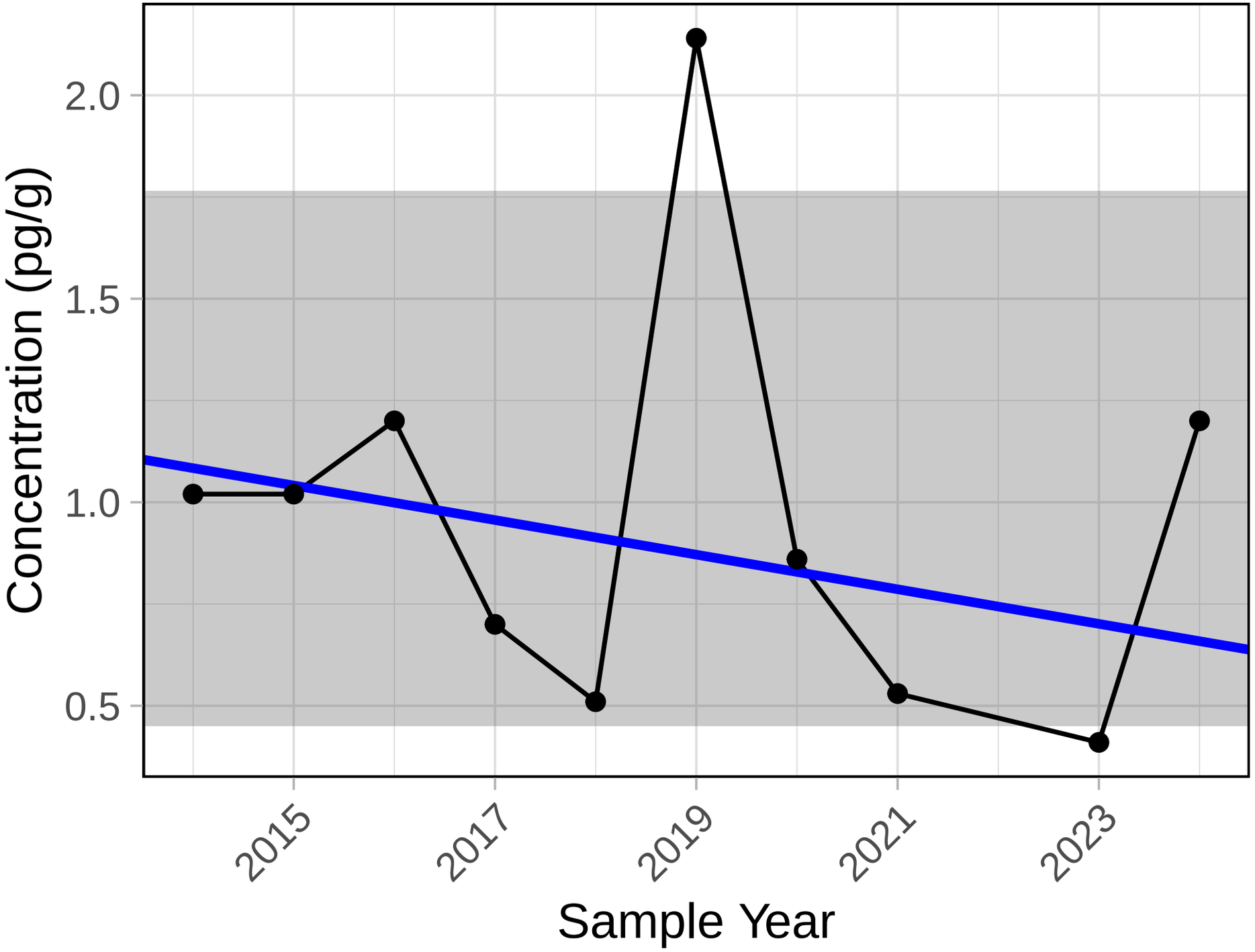

2,3,4,7,8−PeCDF
S6 Sediment
Concentration (pg/g)
0.6
0.4
0.2
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1


2,3,7,8−TCDF
S6 Sediment
Concentration (pg/g)
1.25
1.00
0.75
0.50
0.25
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.318


PCB 105
S6 Sediment
125
100
75
50
25
Concentration (pg/g)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

PCB 114

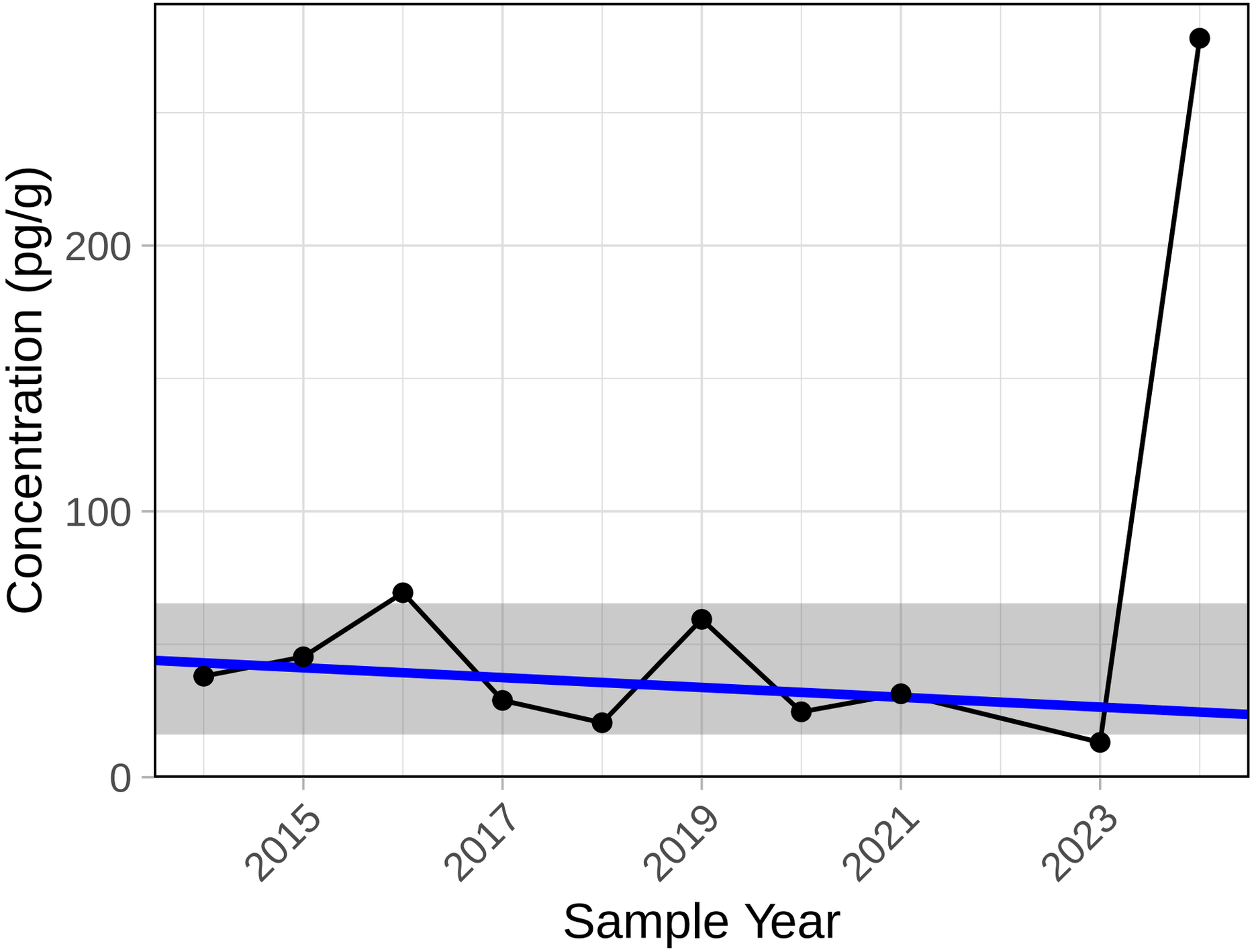
S6 Sediment



Trend significance p−value = 0.471

PCB 118

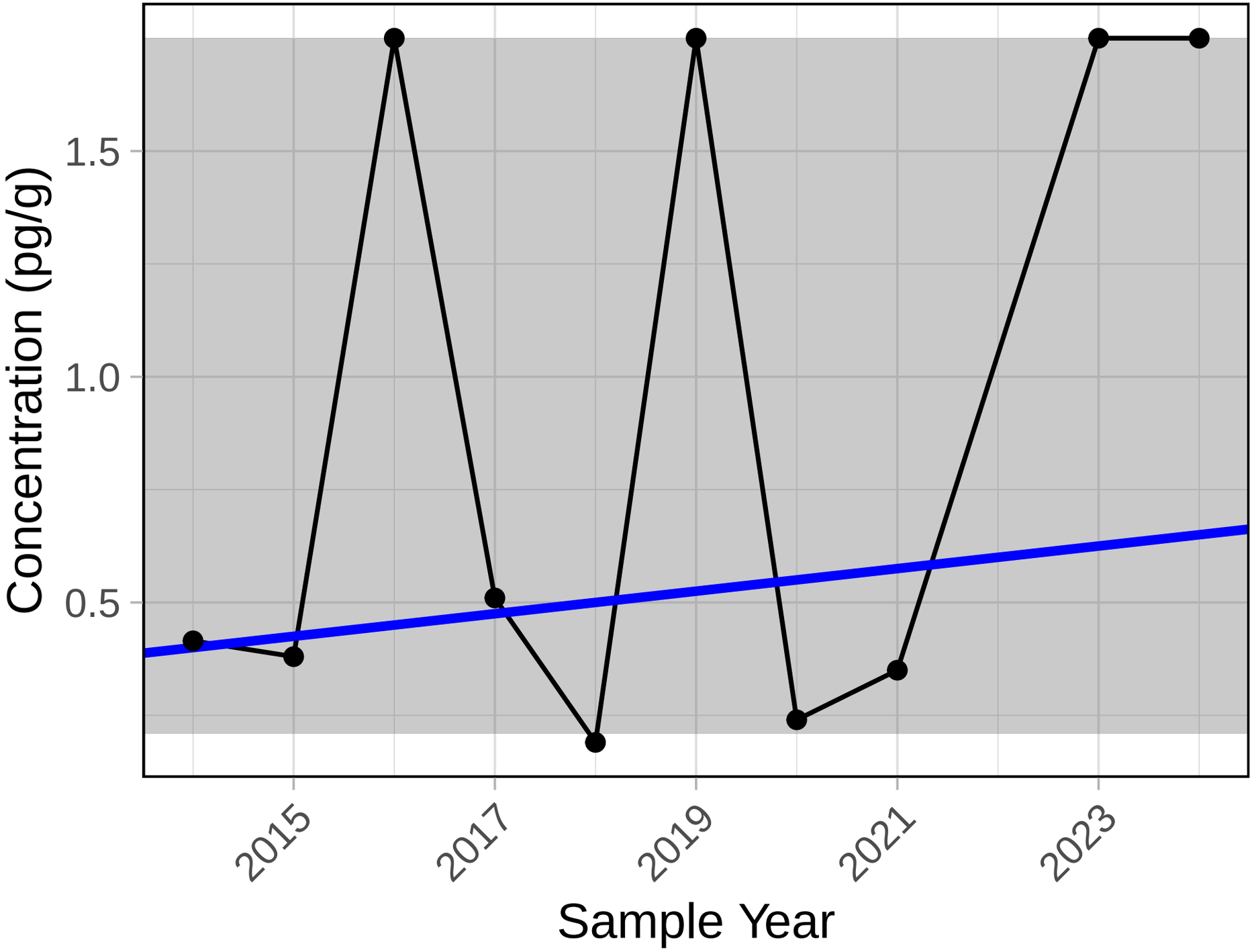
S6 Sediment



Trend significance p−value = 0.721

PCB 122

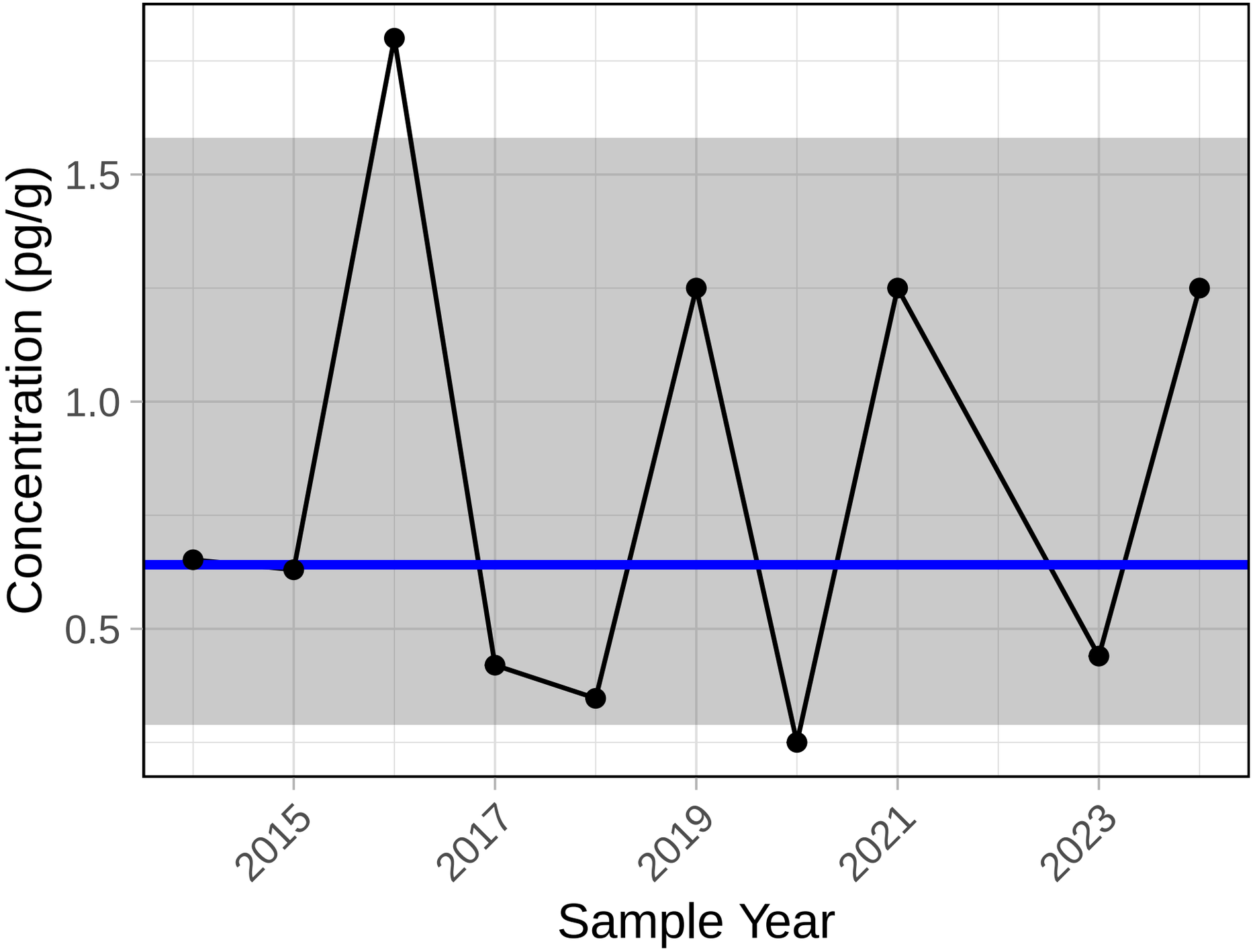
S6 Sediment



Trend significance p−value = 0.578

PCB 123

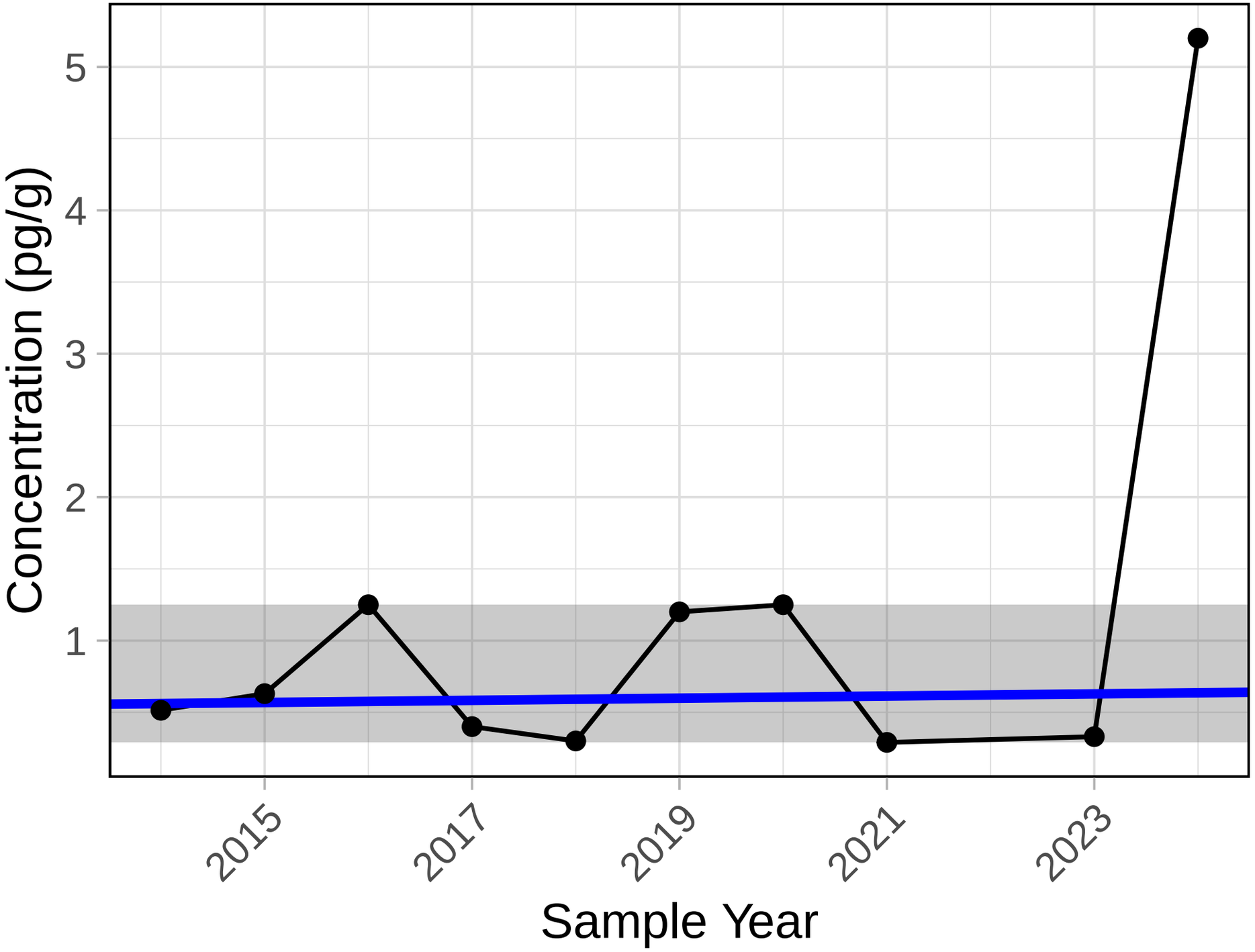
S6 Sediment



Trend significance p−value = 0.928

PCB 126

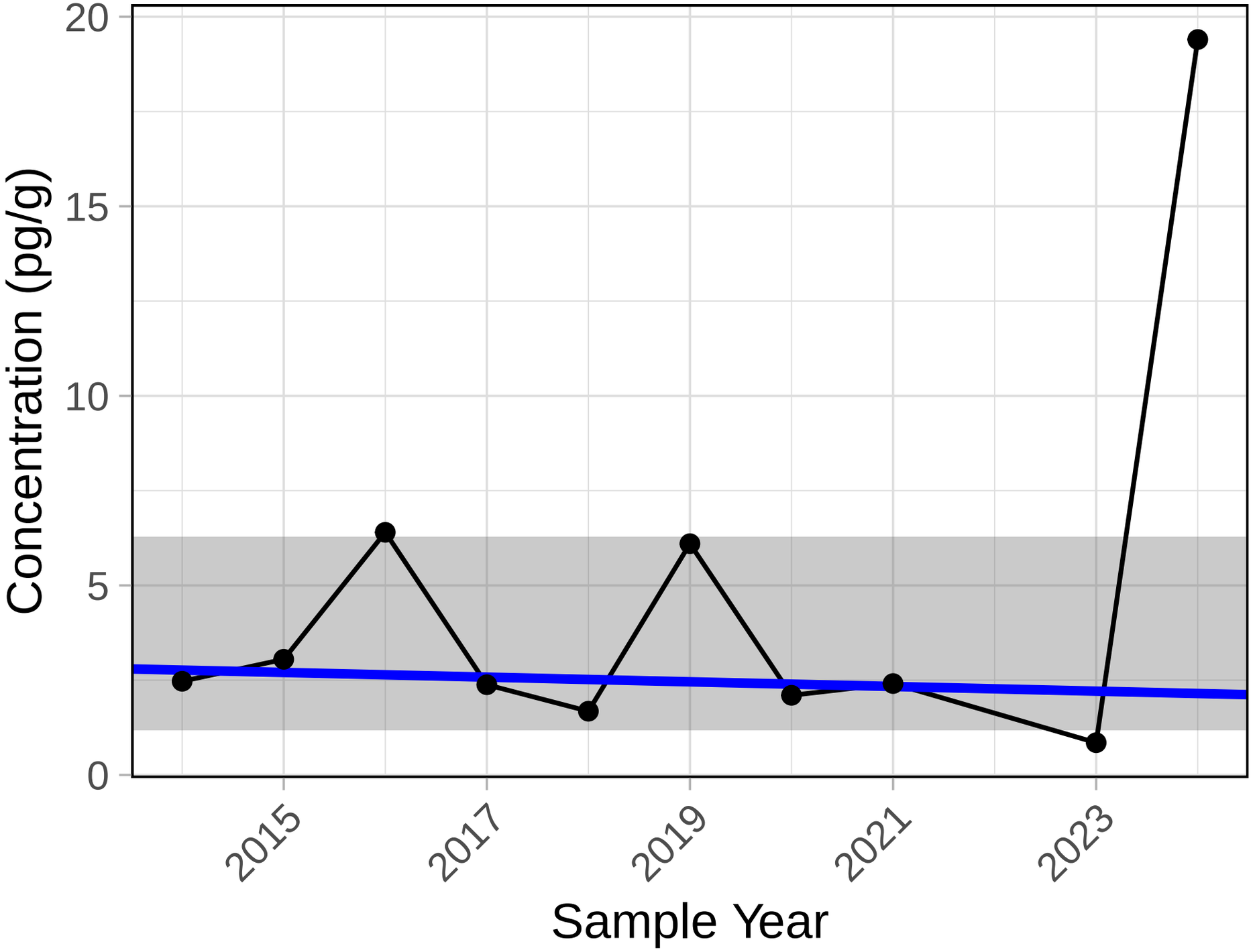
S6 Sediment



Trend significance p−value = 0.928

PCB 130

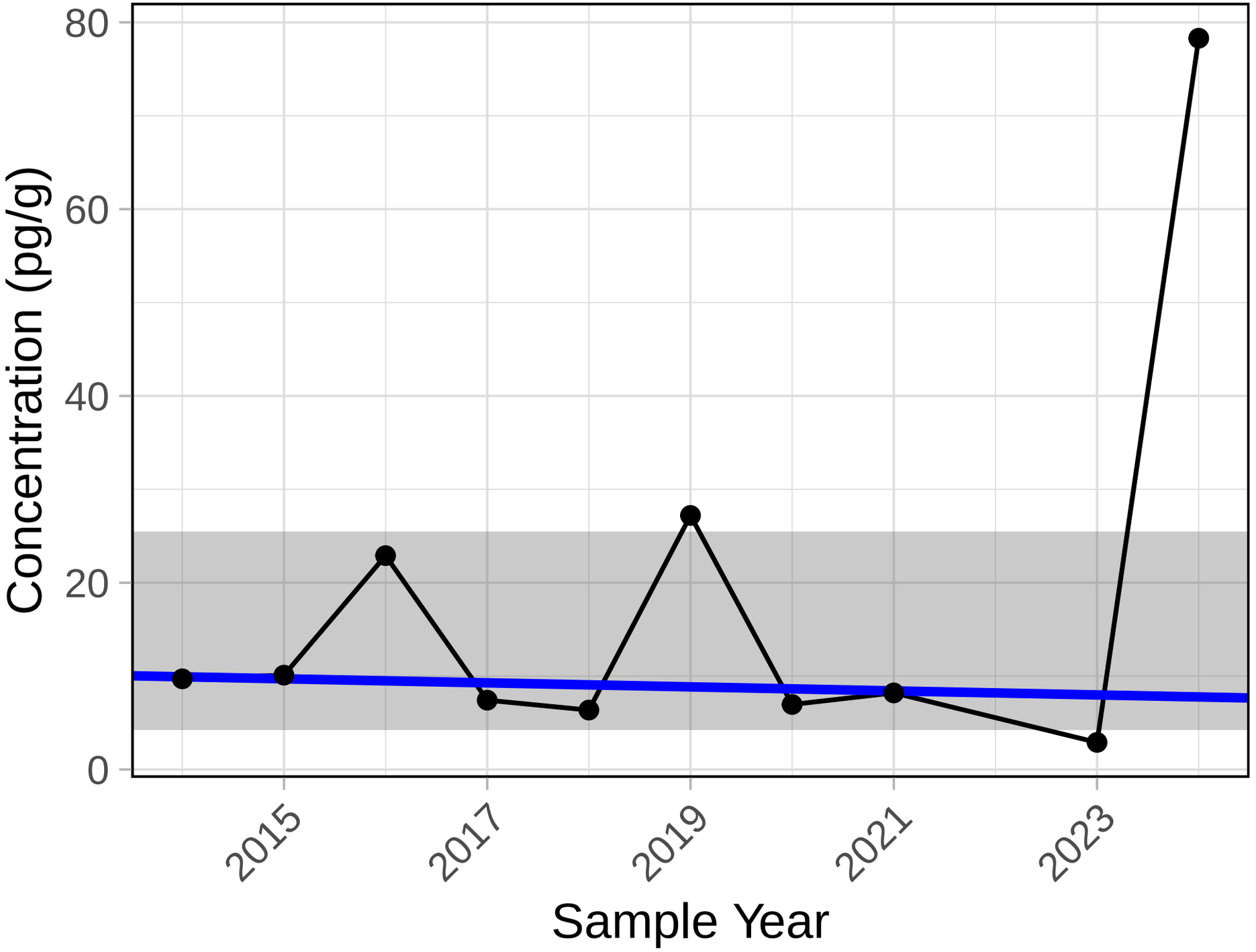
S6 Sediment



Trend significance p−value = 0.721

PCB 132

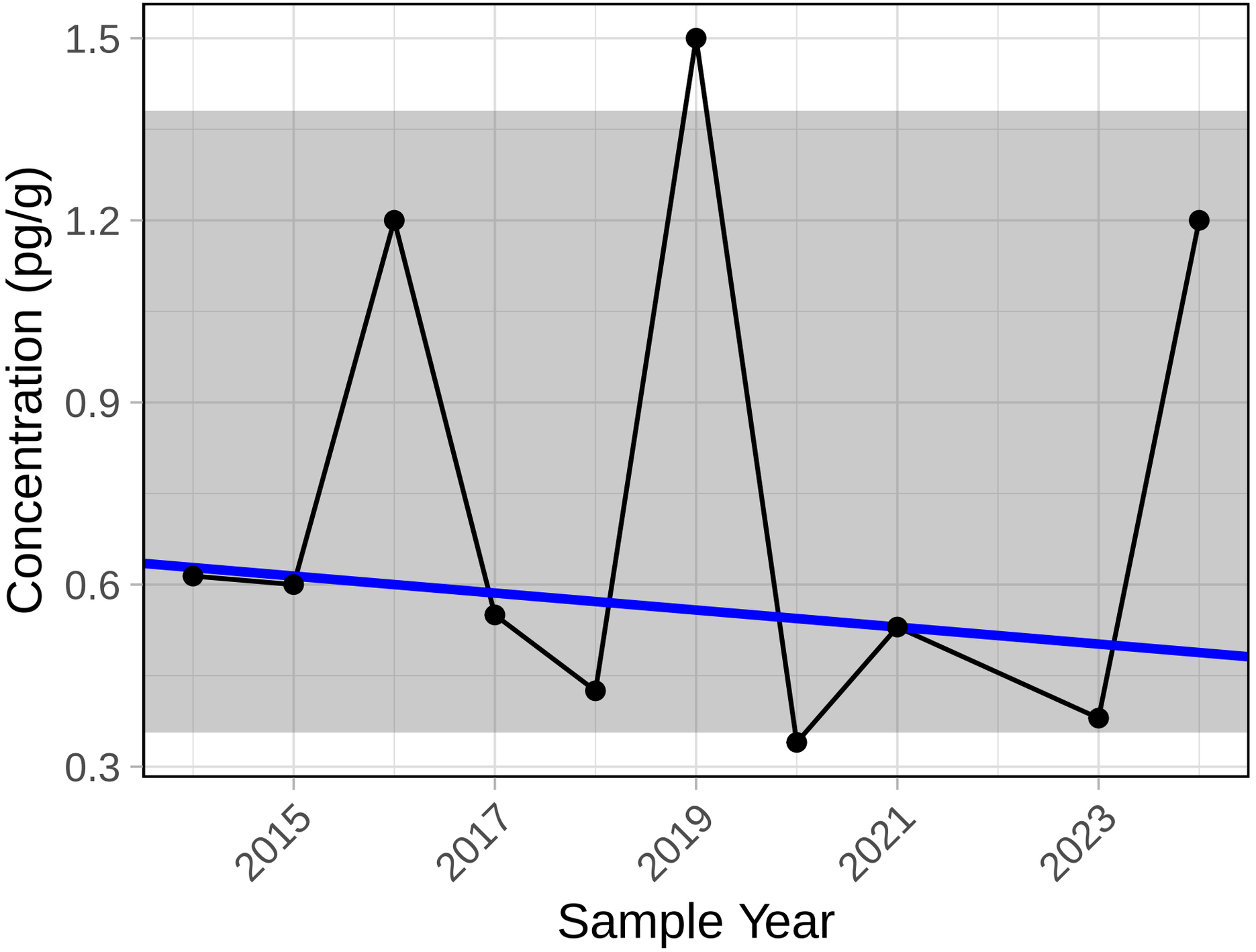
S6 Sediment



Trend significance p−value = 0.858

PCB 133

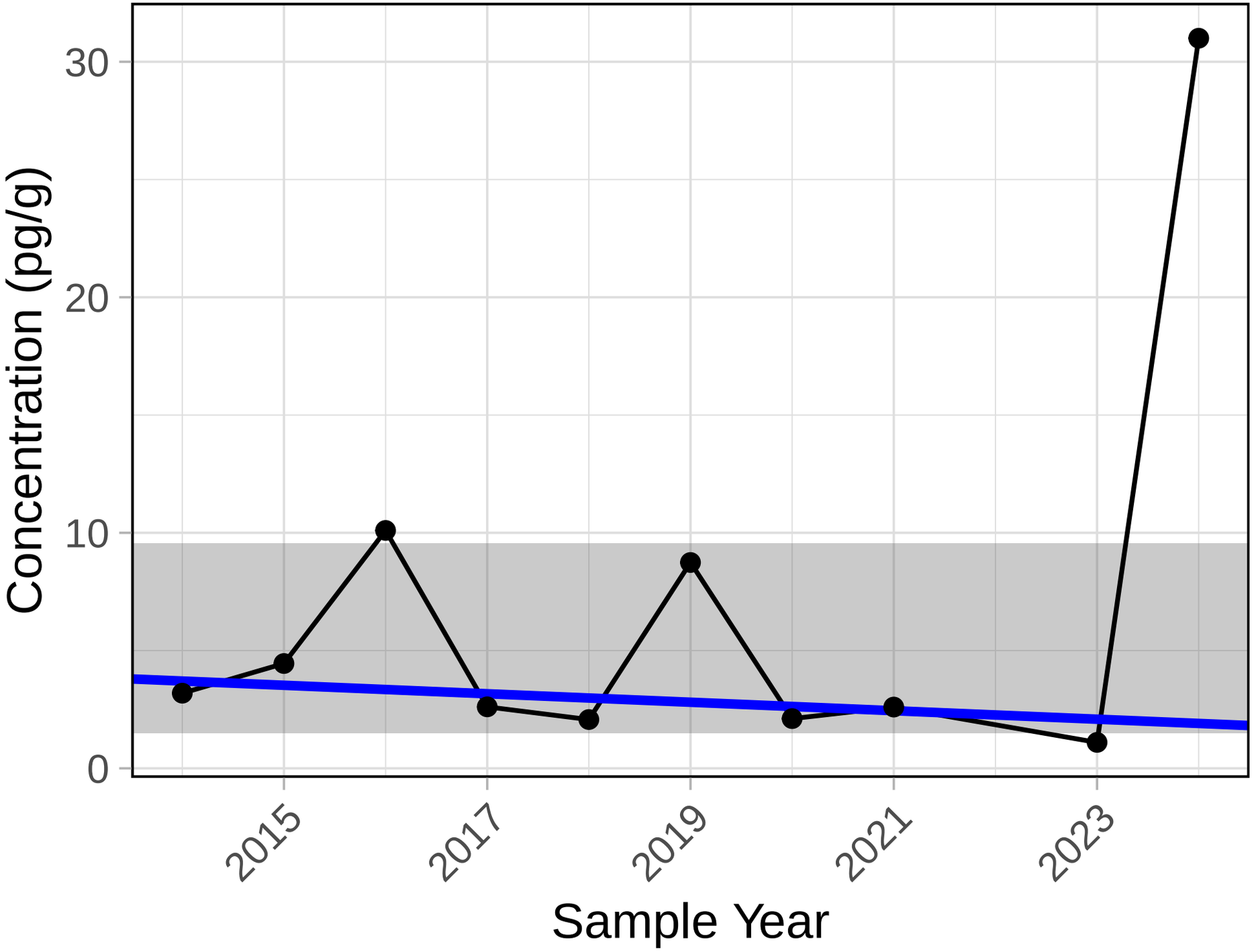
S6 Sediment



Trend significance p−value = 0.419

PCB 136

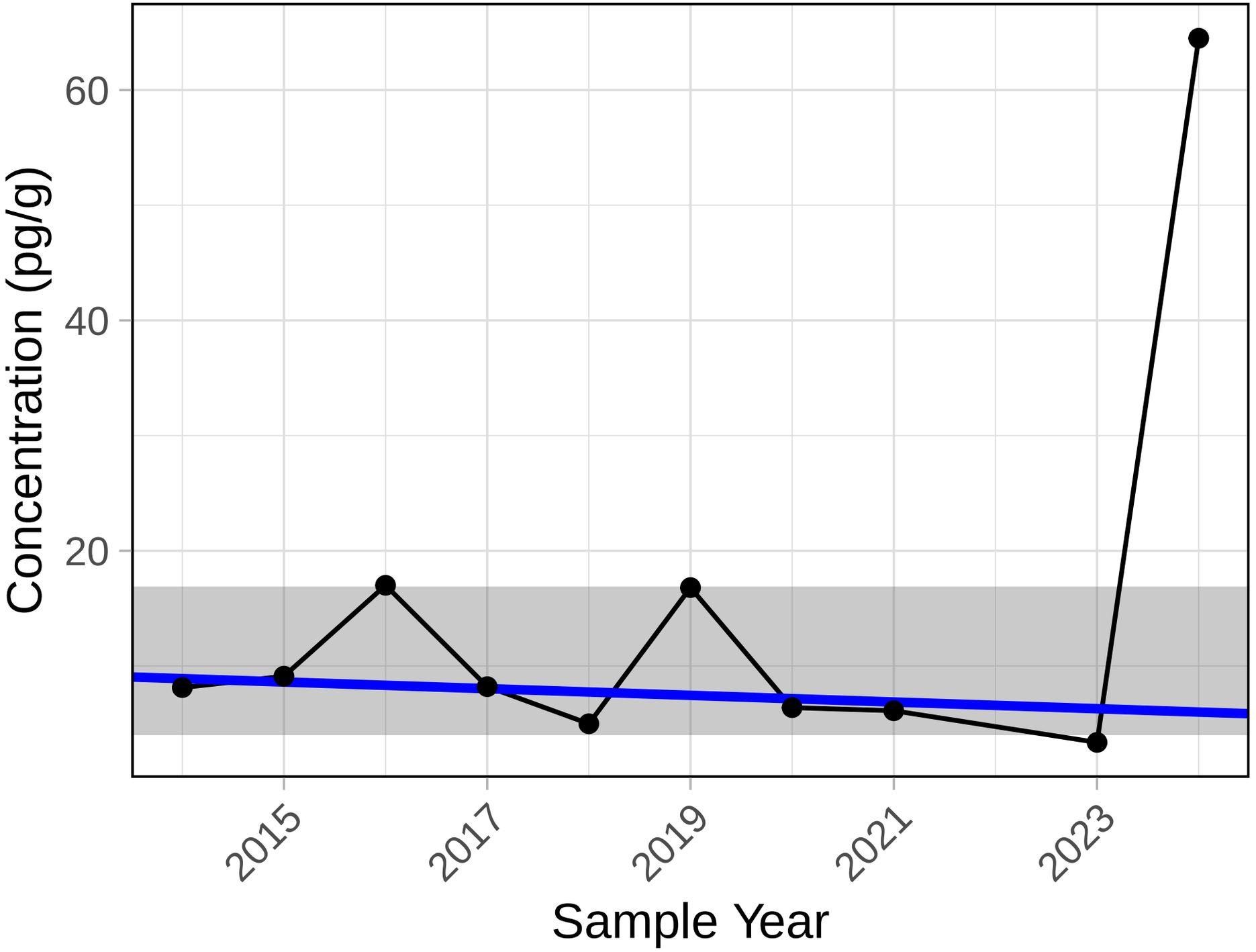
S6 Sediment



Trend significance p−value = 0.592

PCB 141

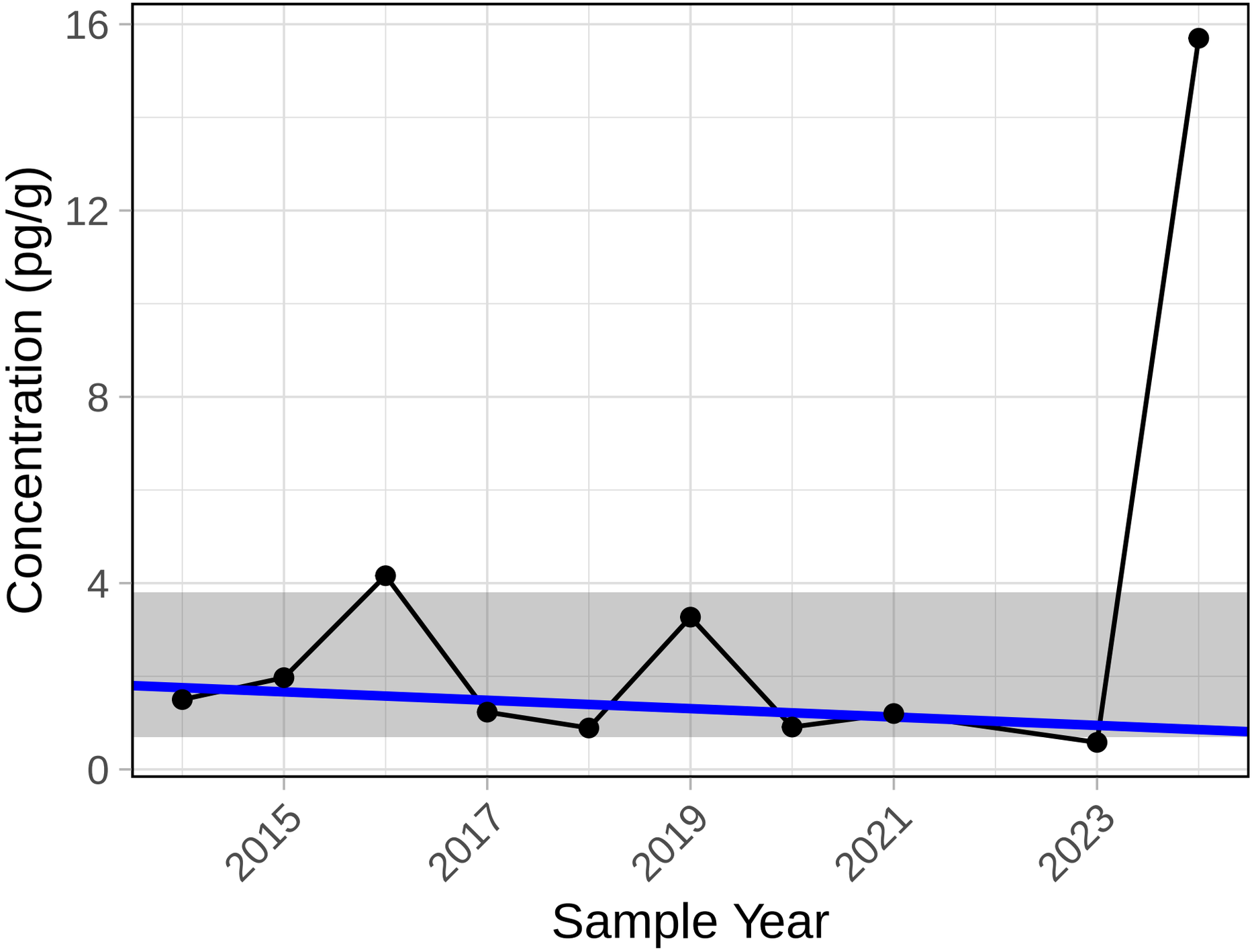
S6 Sediment



Trend significance p−value = 0.592

PCB 144

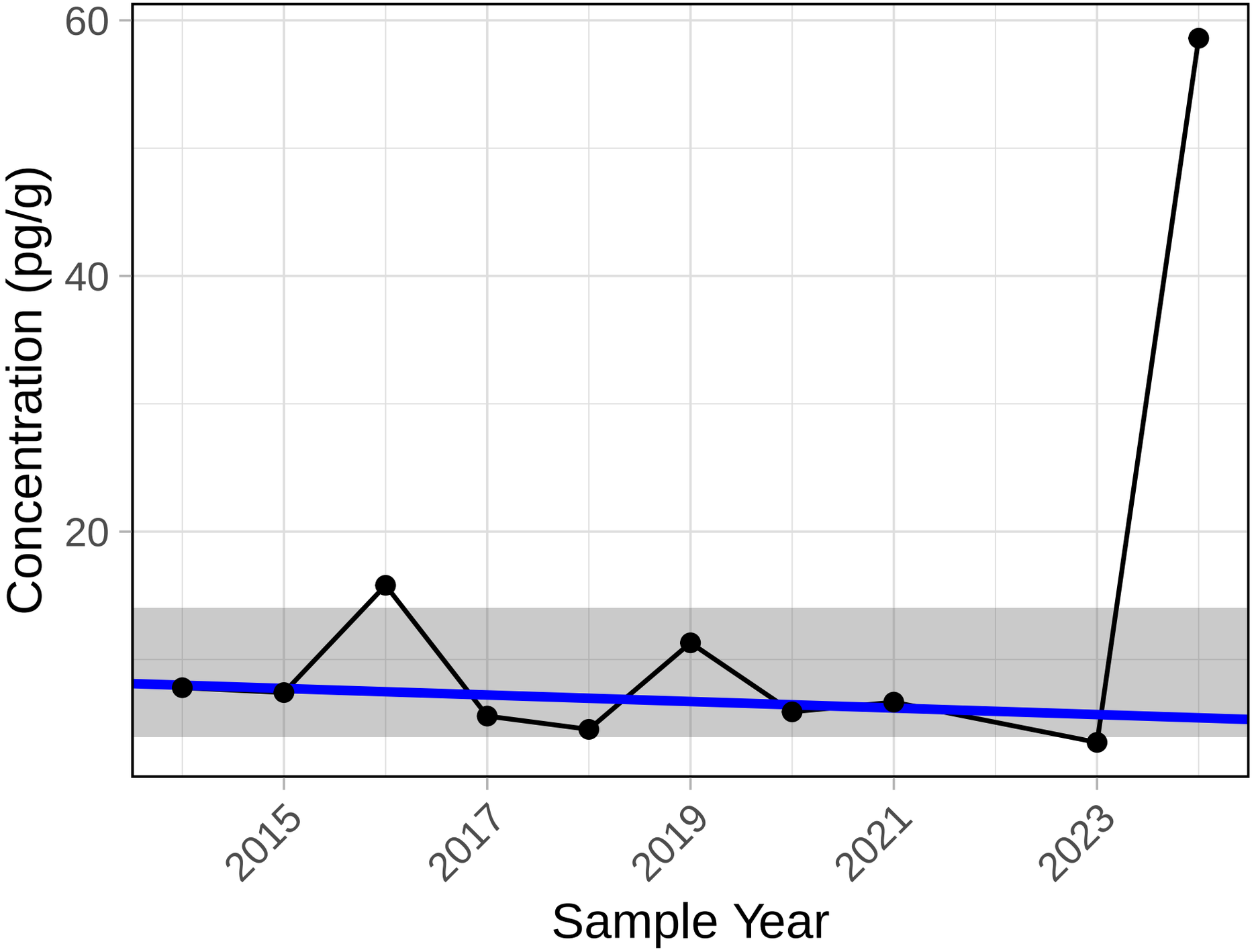
S6 Sediment



Trend significance p−value = 0.592

PCB 146

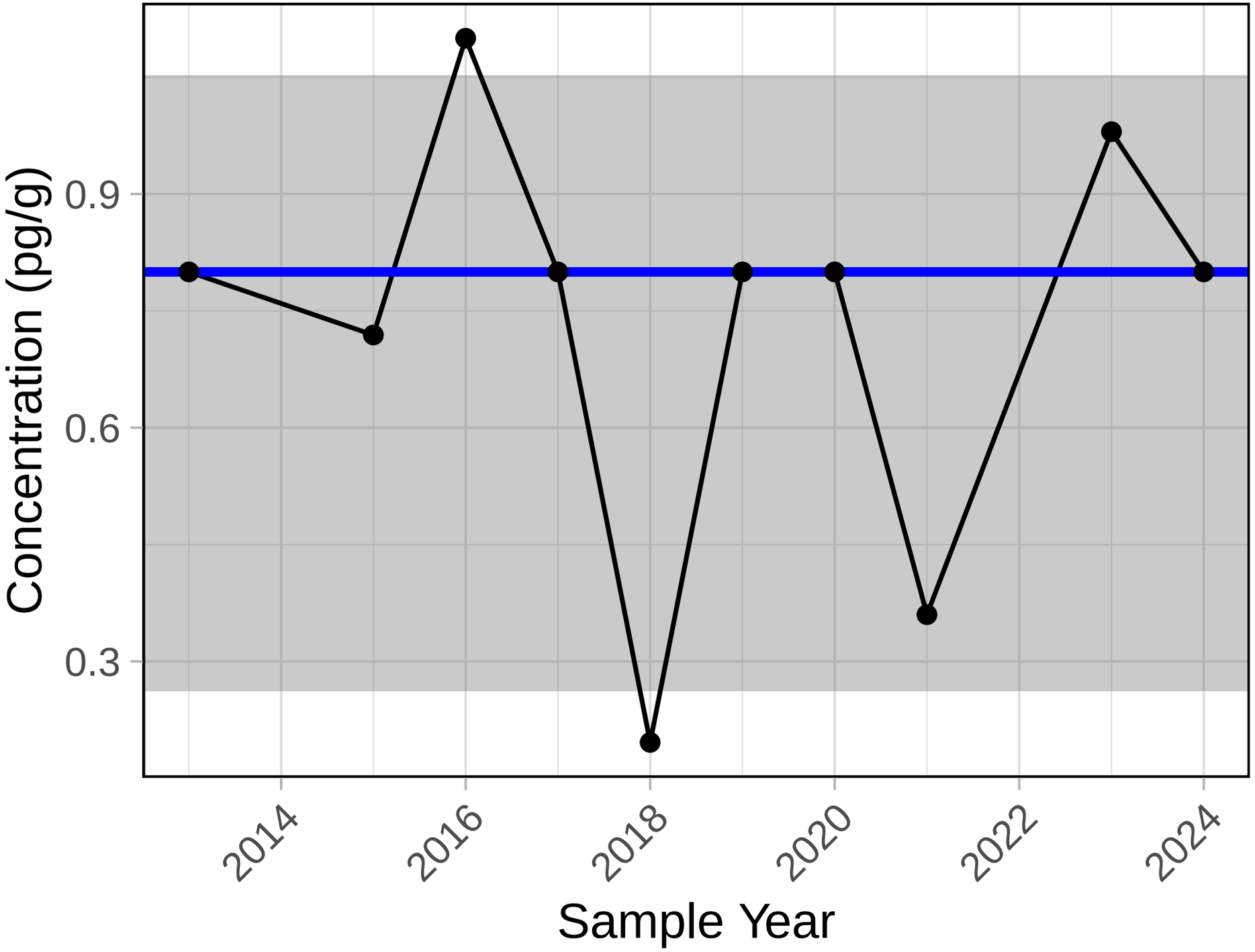
S6 Sediment



Trend significance p−value = 0.721

PCB 154

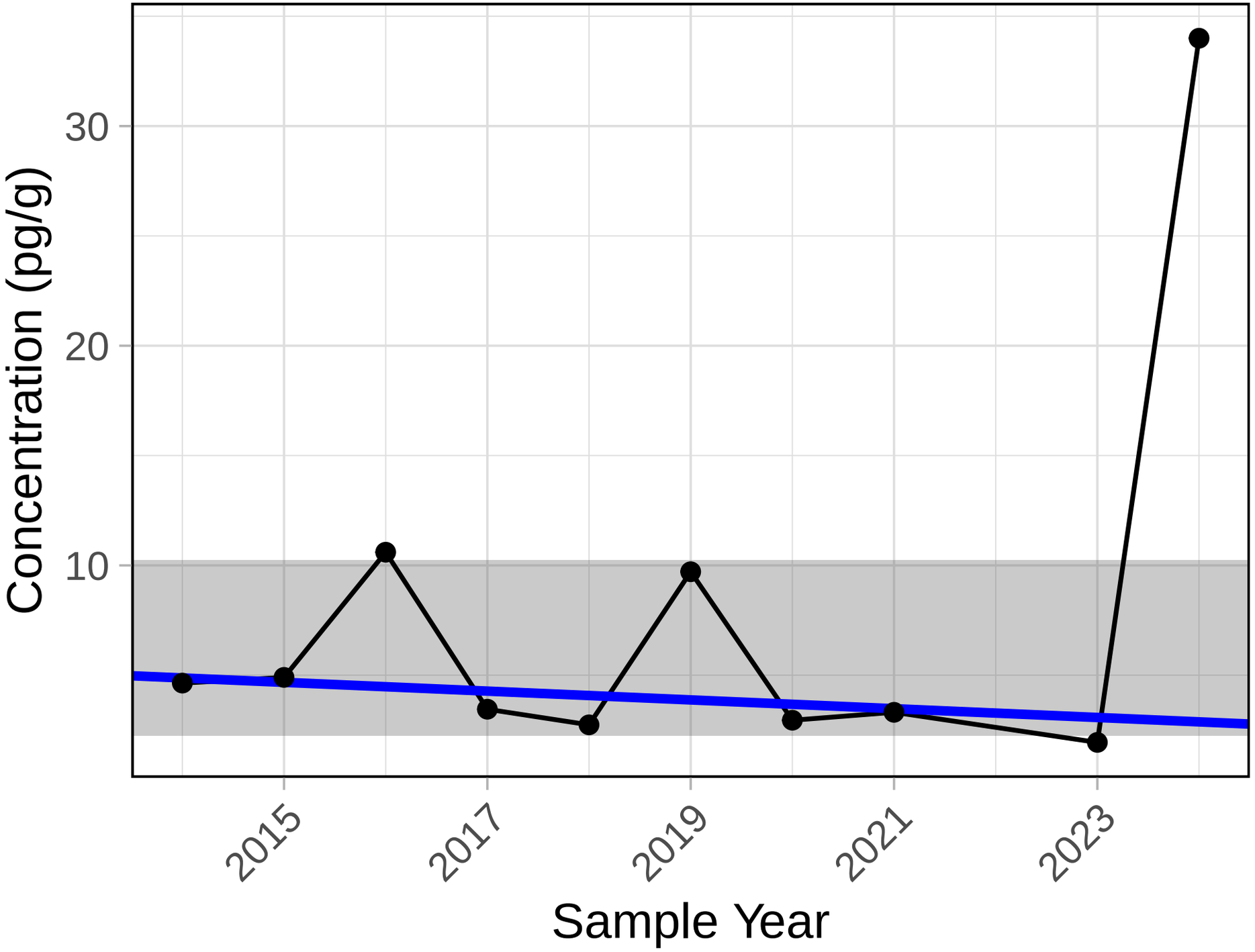
S6 Sediment



Trend significance p−value = 1

PCB 158

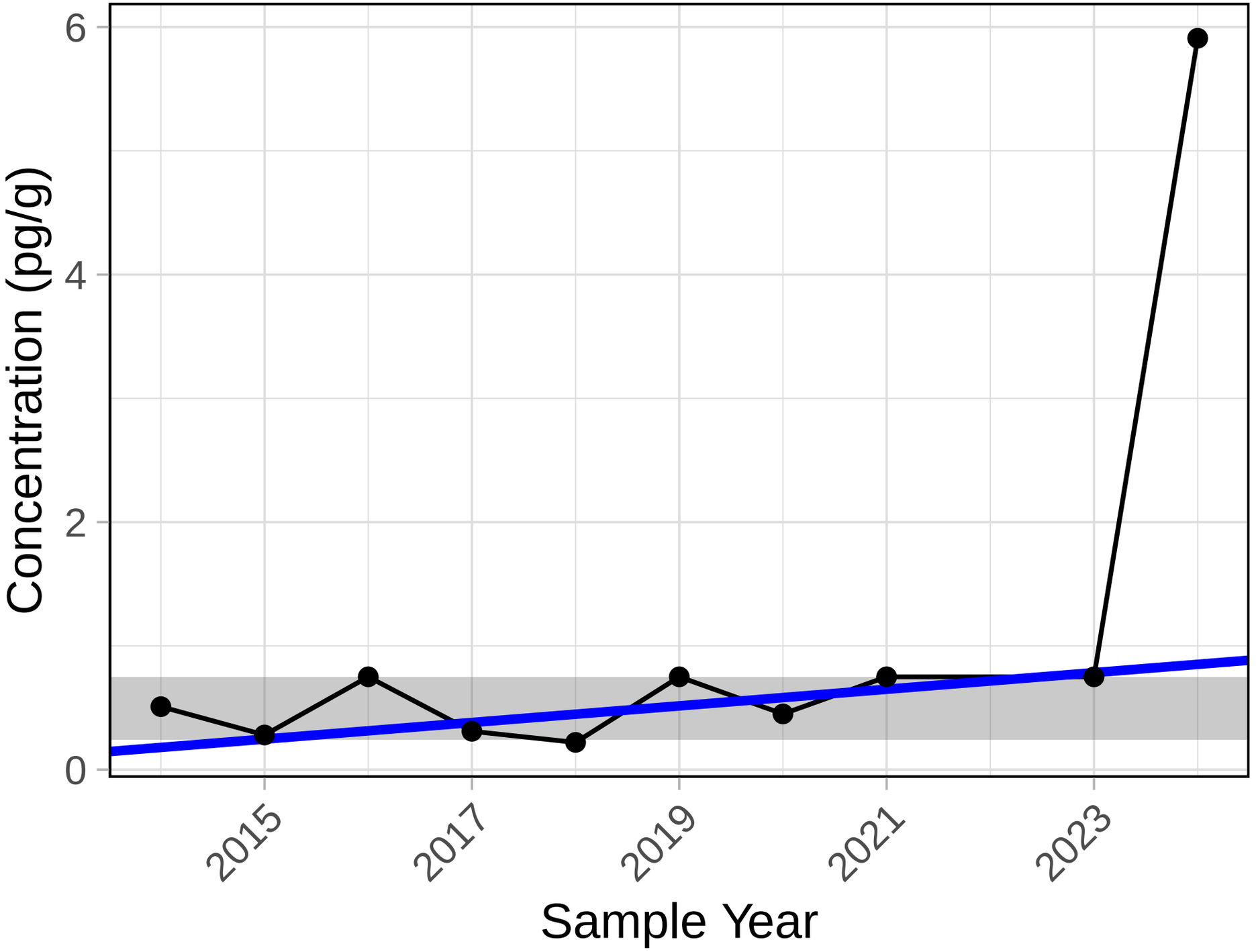
S6 Sediment



Trend significance p−value = 0.592

PCB 159

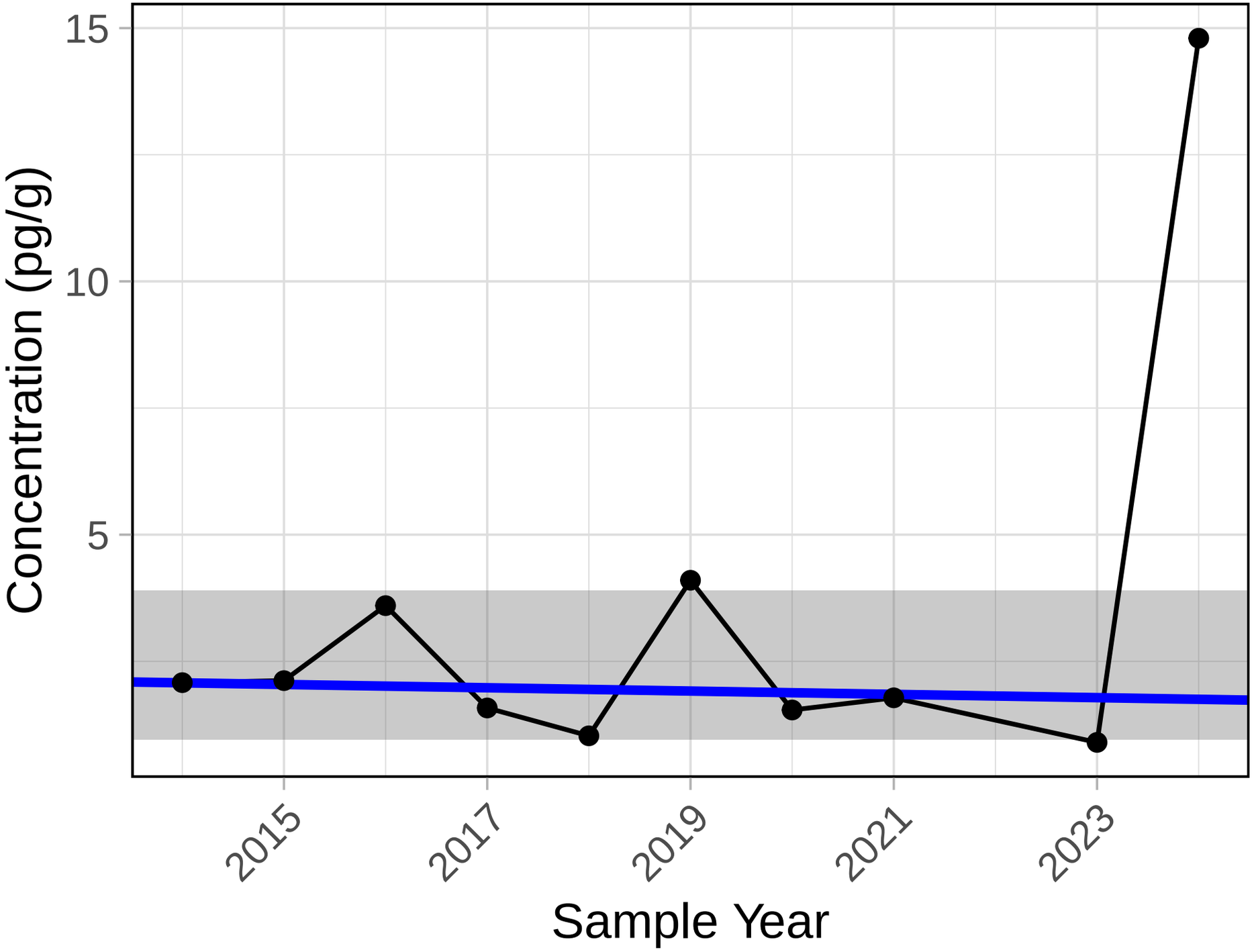
S6 Sediment



Trend significance p−value = 0.095

PCB 167

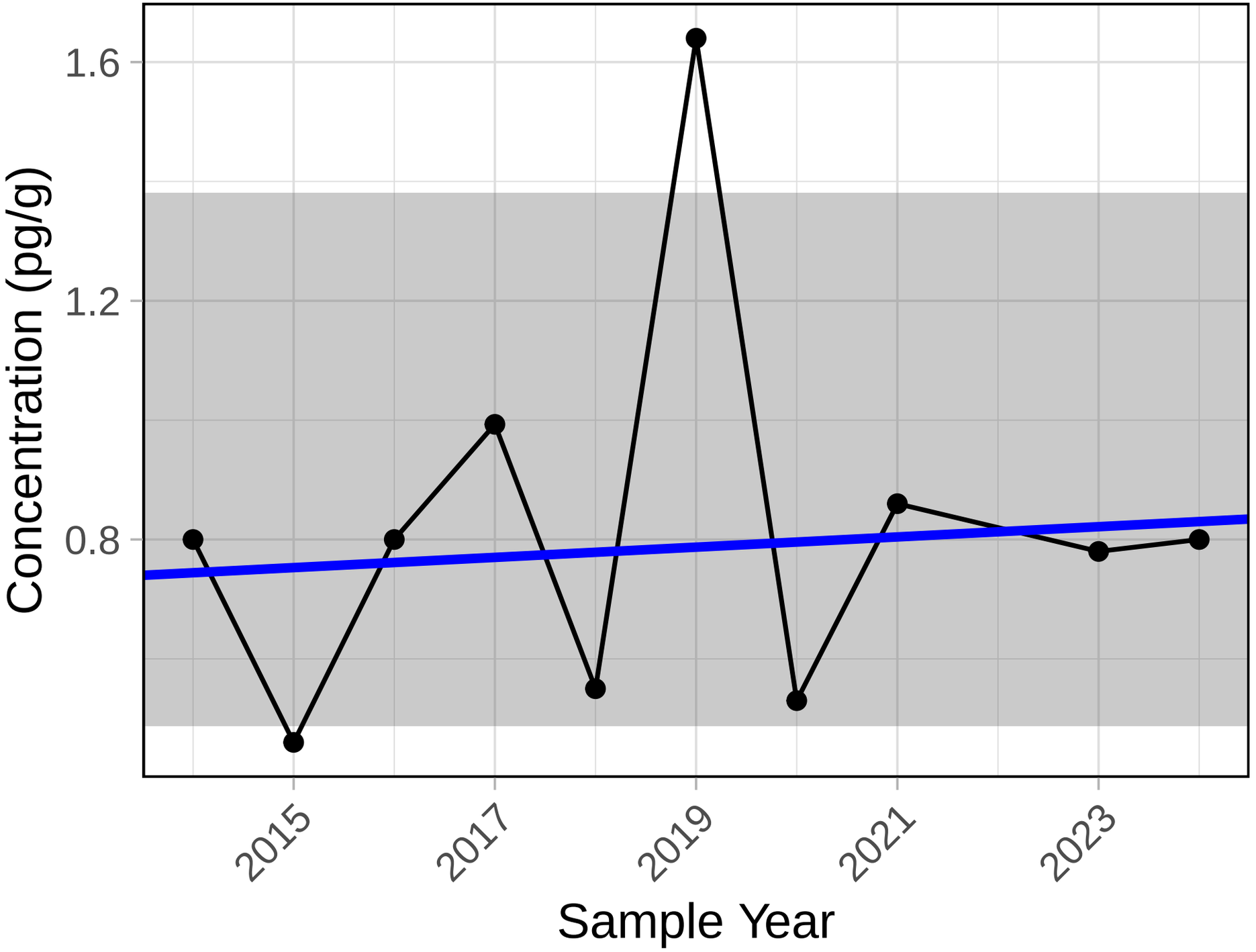
S6 Sediment



Trend significance p−value = 0.858

PCB 169

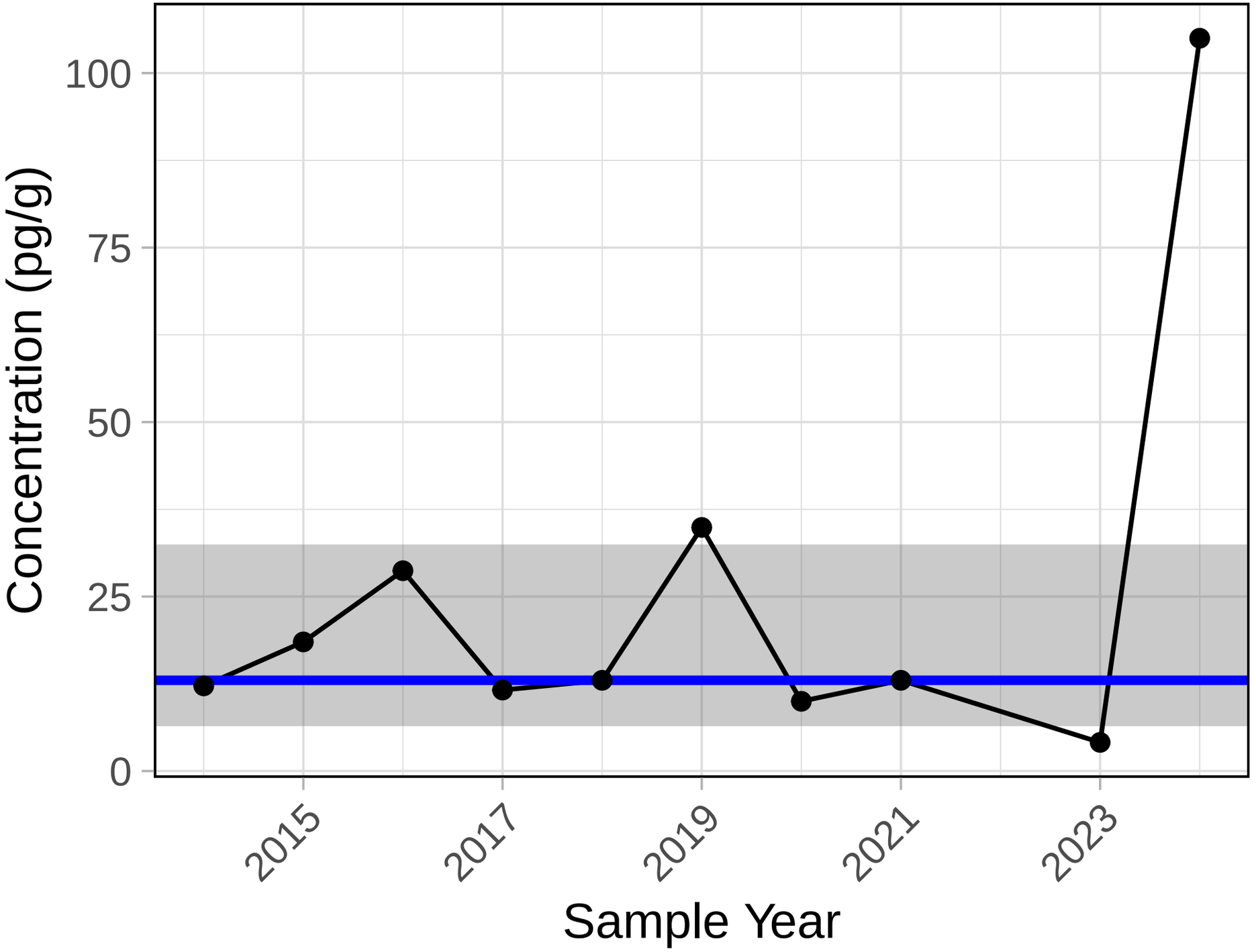
S6 Sediment



Trend significance p−value = 0.785

PCB 170

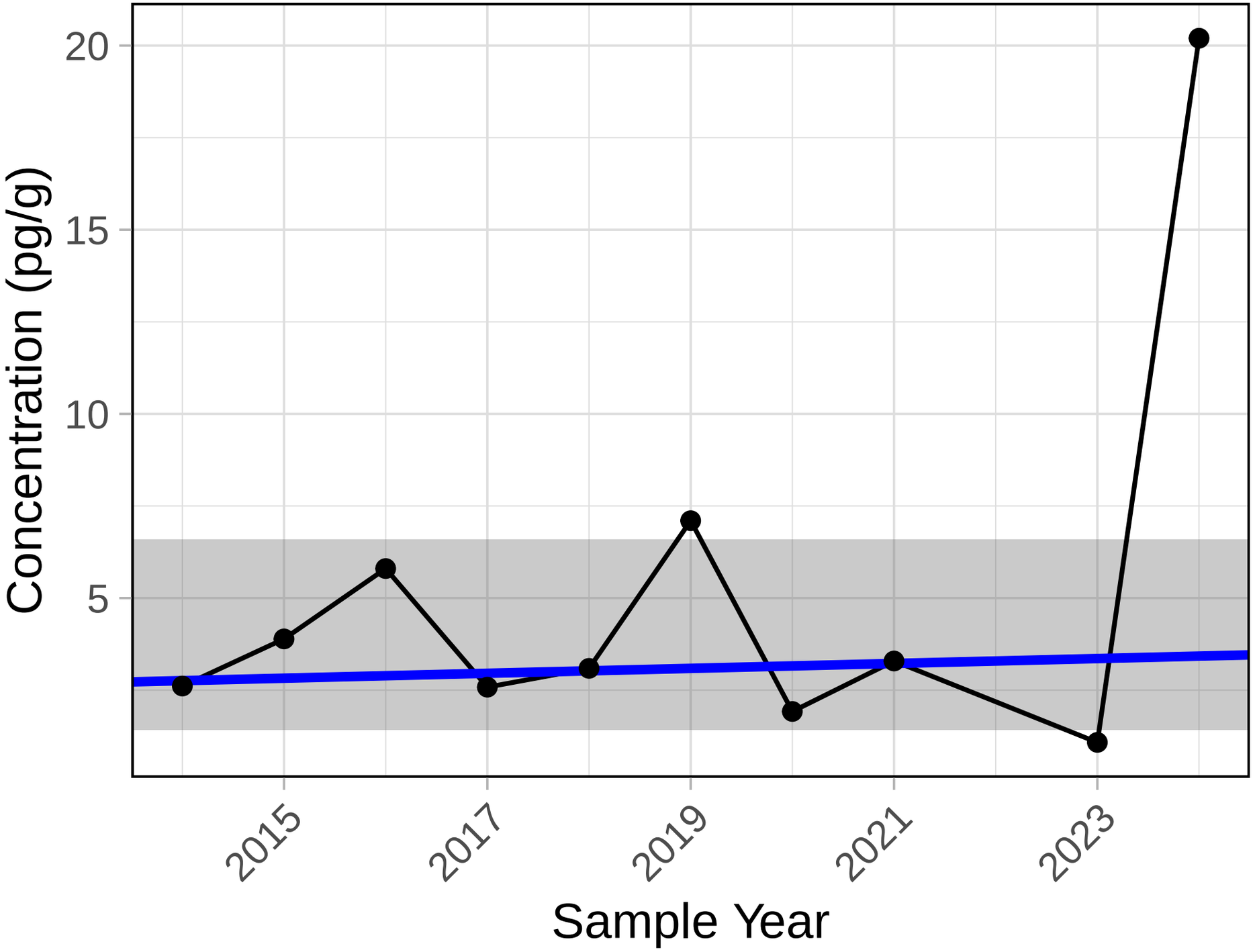
S6 Sediment



Trend significance p−value = 1

PCB 172

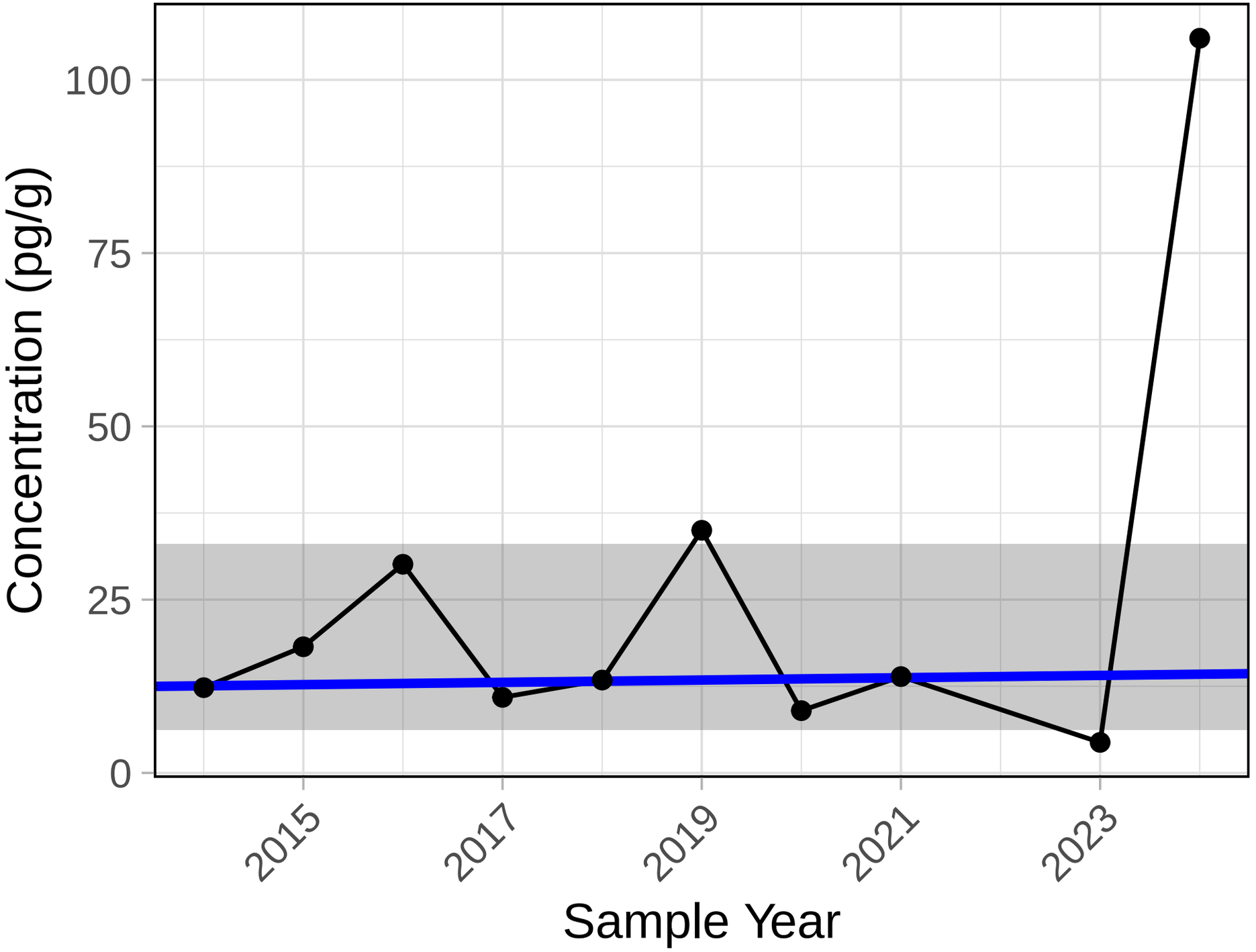
S6 Sediment



Trend significance p−value = 1

PCB 174

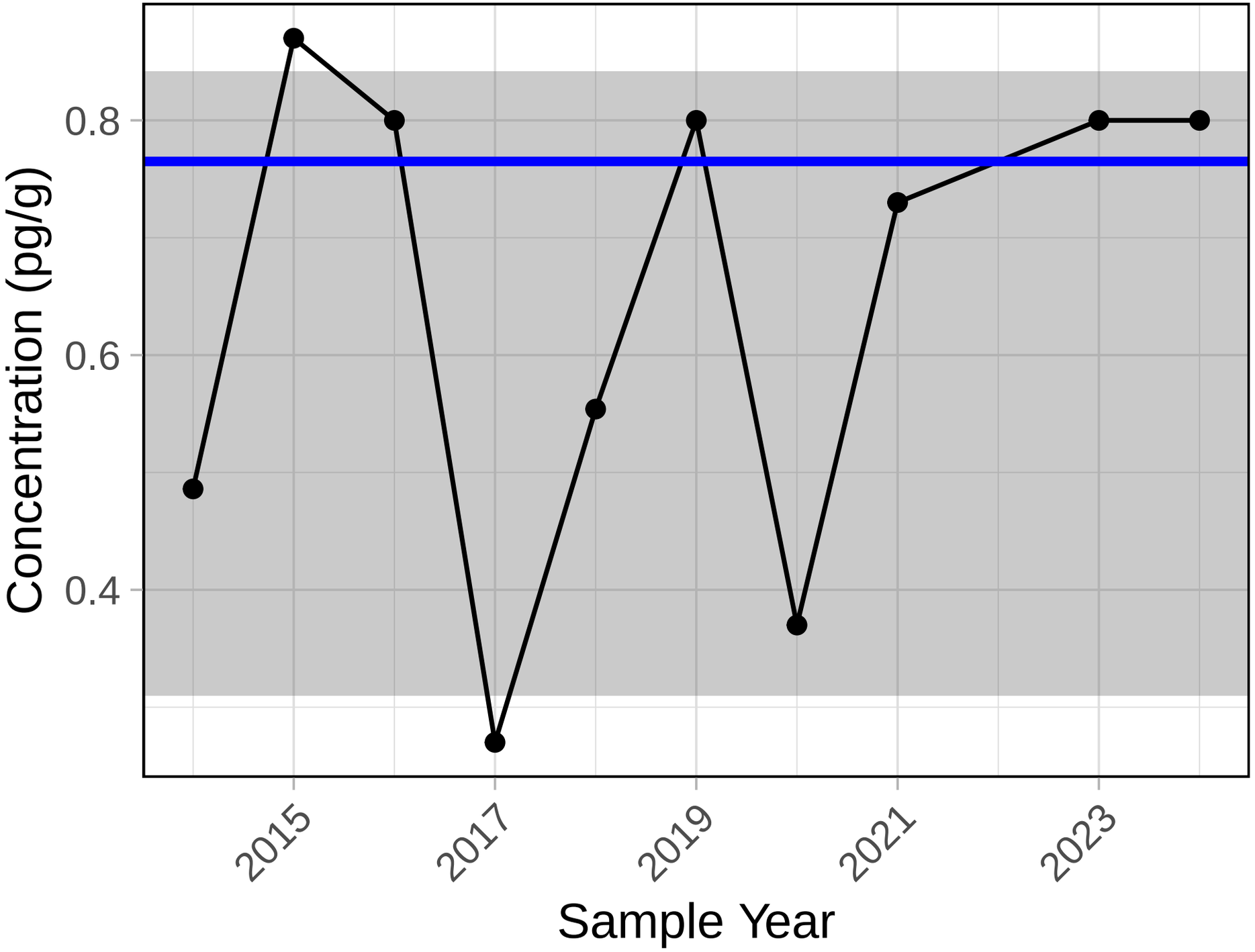
S6 Sediment



Trend significance p−value = 1

PCB 175

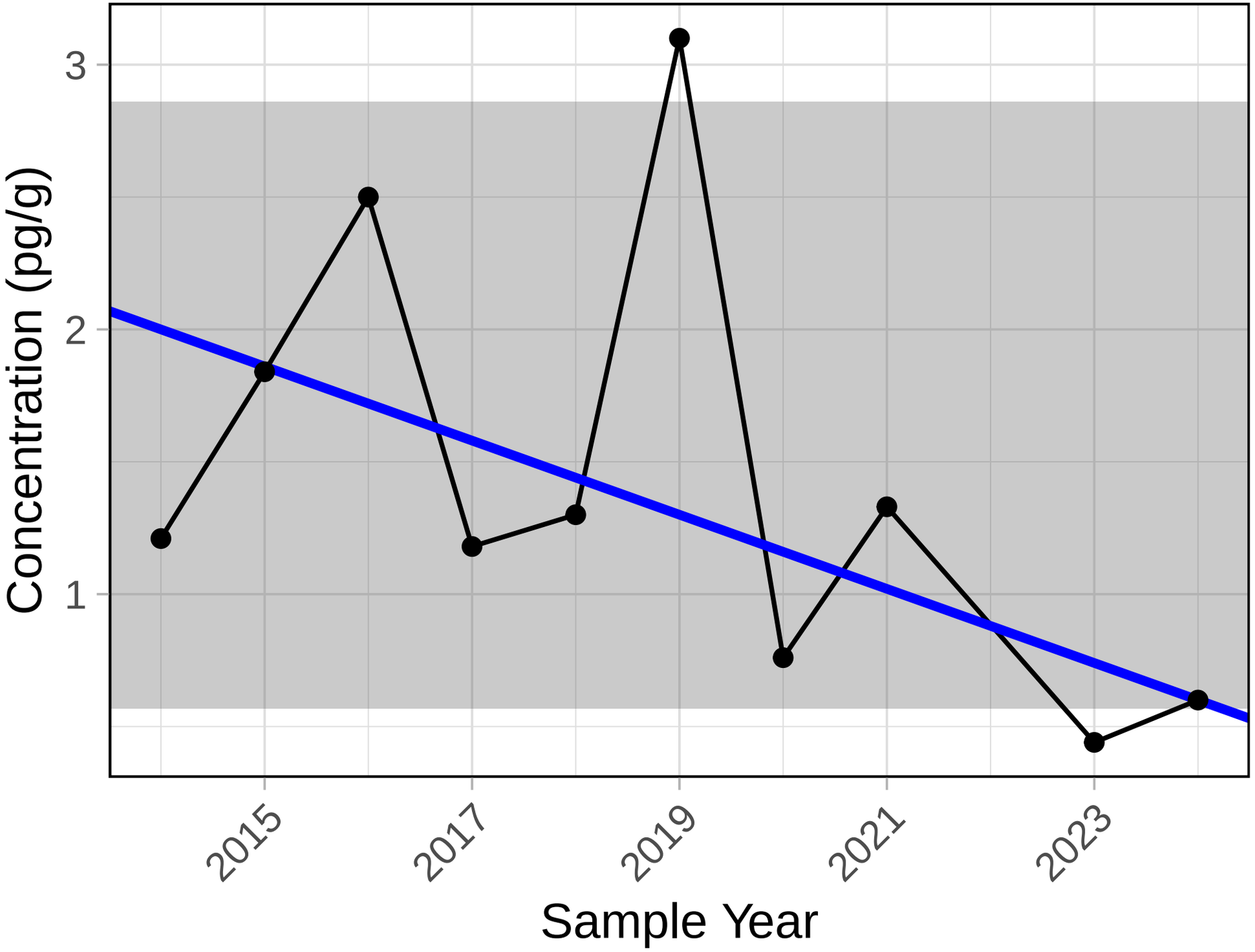
S6 Sediment



Trend significance p−value = 0.711

PCB 176

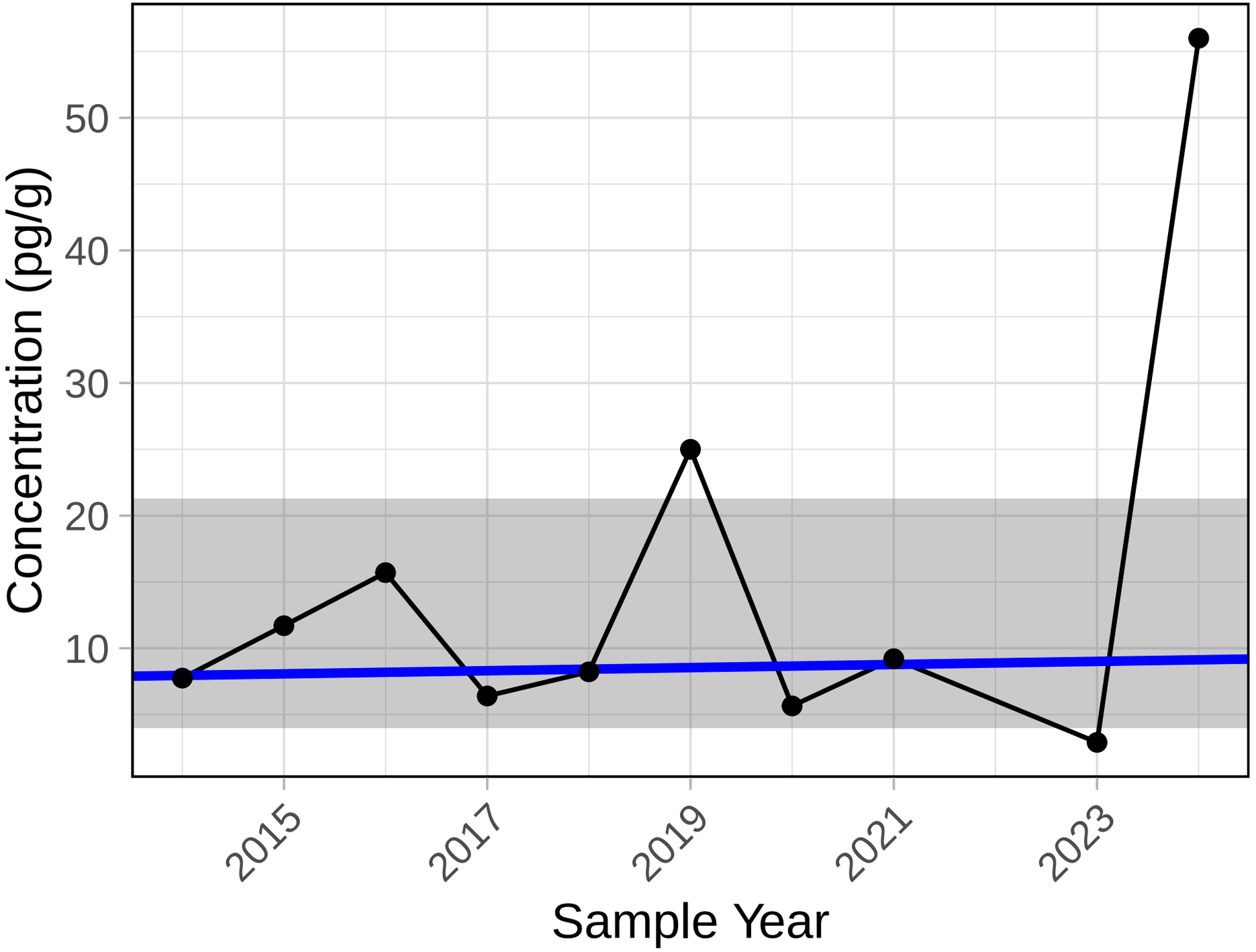
S6 Sediment



Trend significance p−value = 0.21

PCB 177

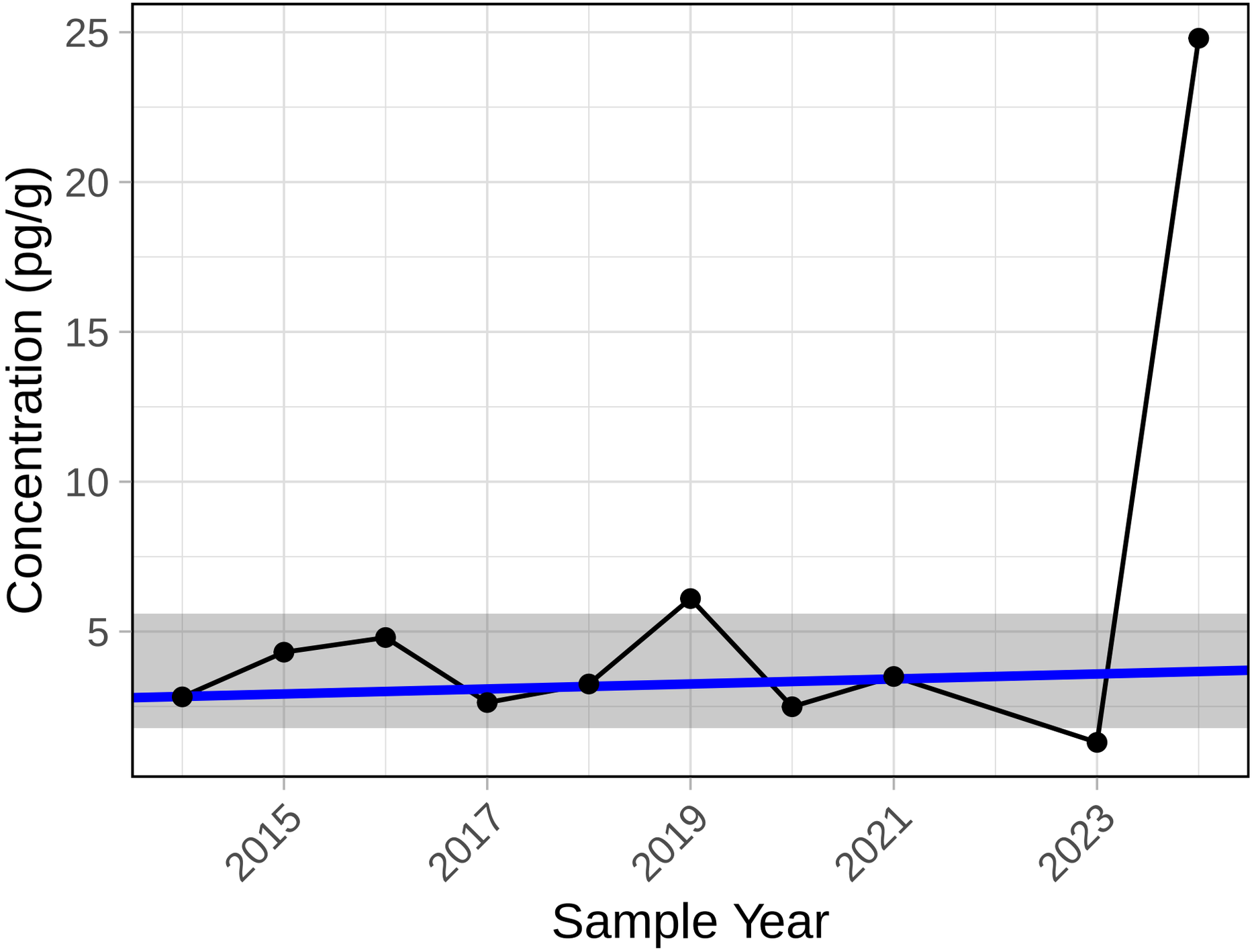
S6 Sediment



Trend significance p−value = 1

PCB 178

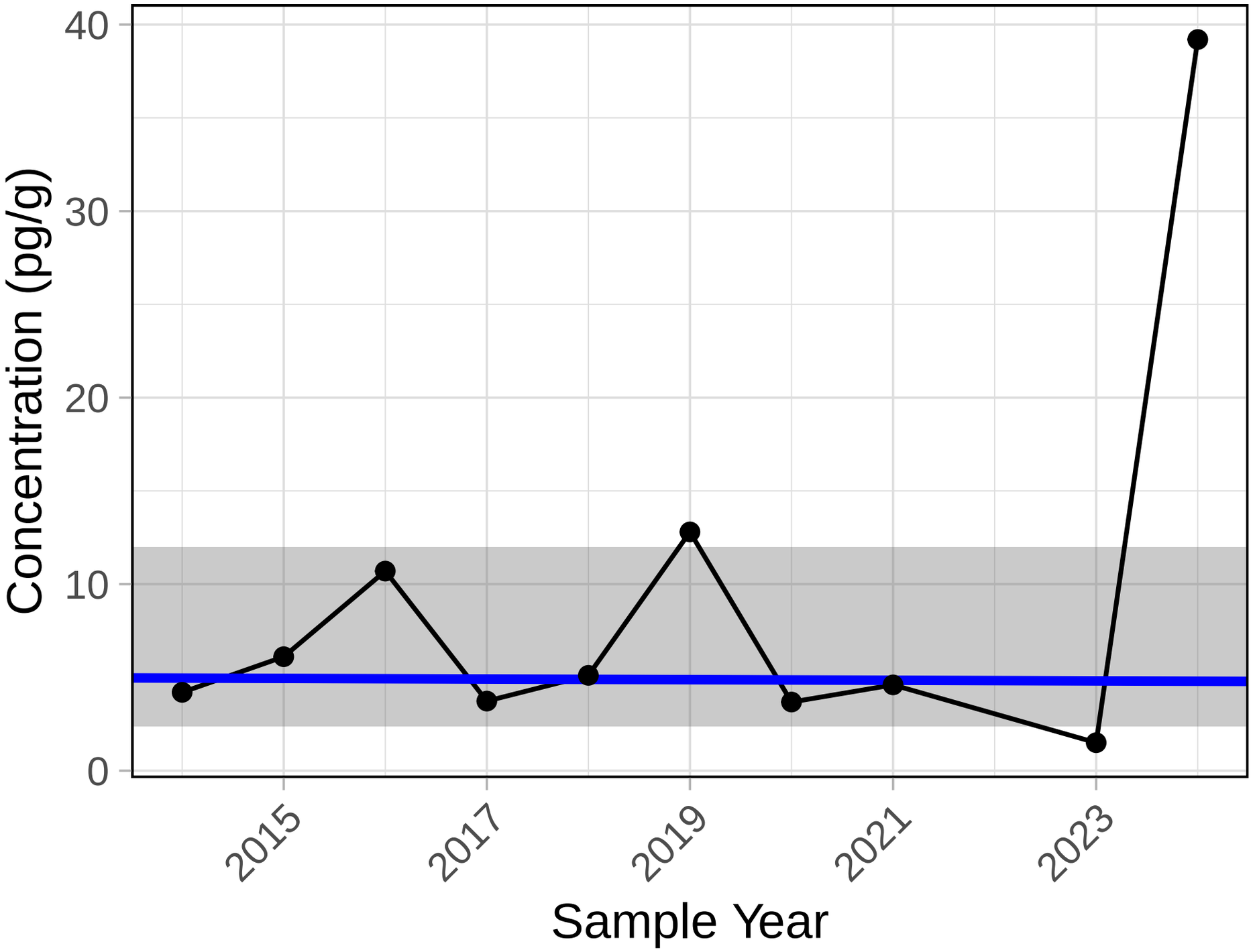
S6 Sediment



Trend significance p−value = 1

PCB 179

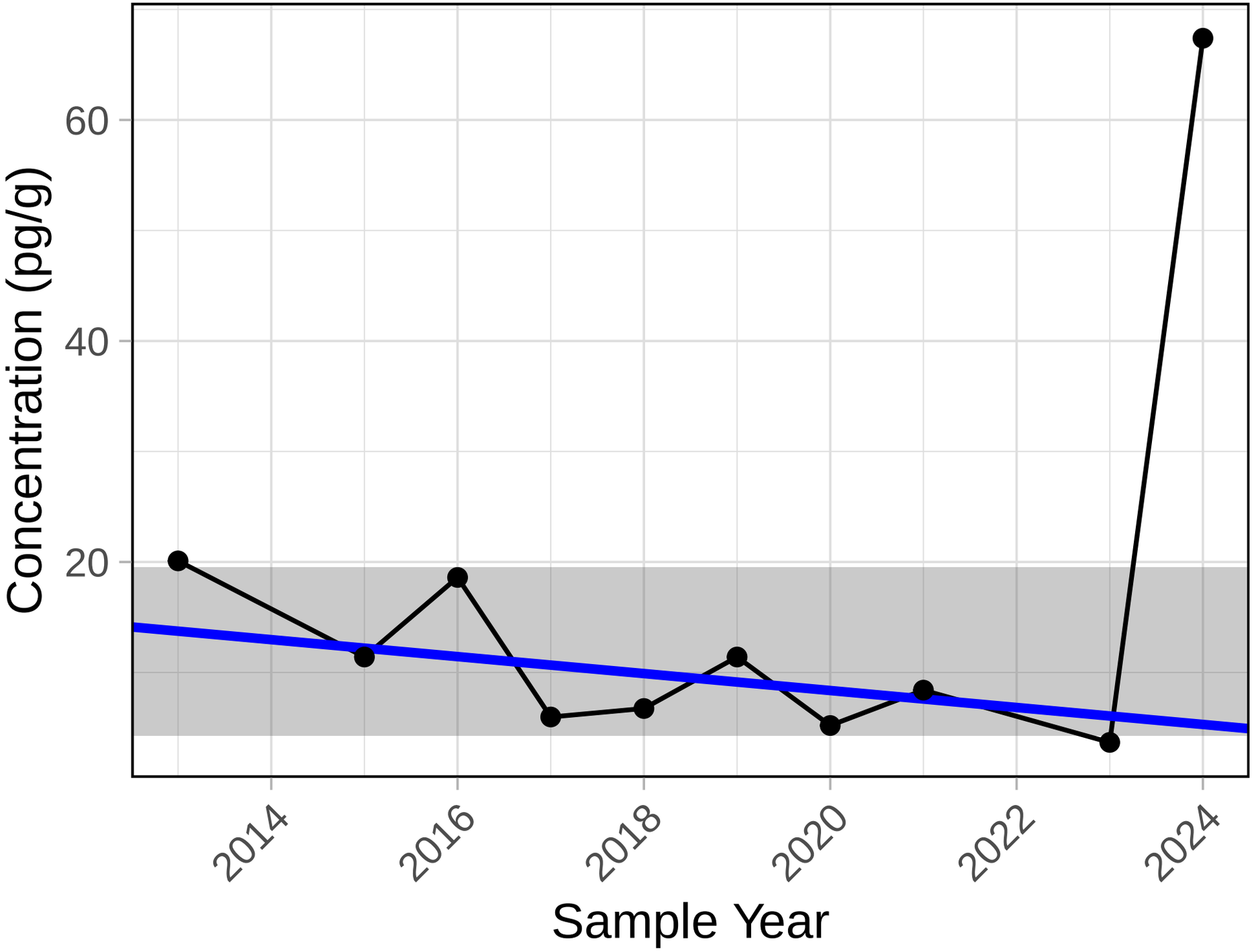
S6 Sediment



Trend significance p−value = 1

PCB 183

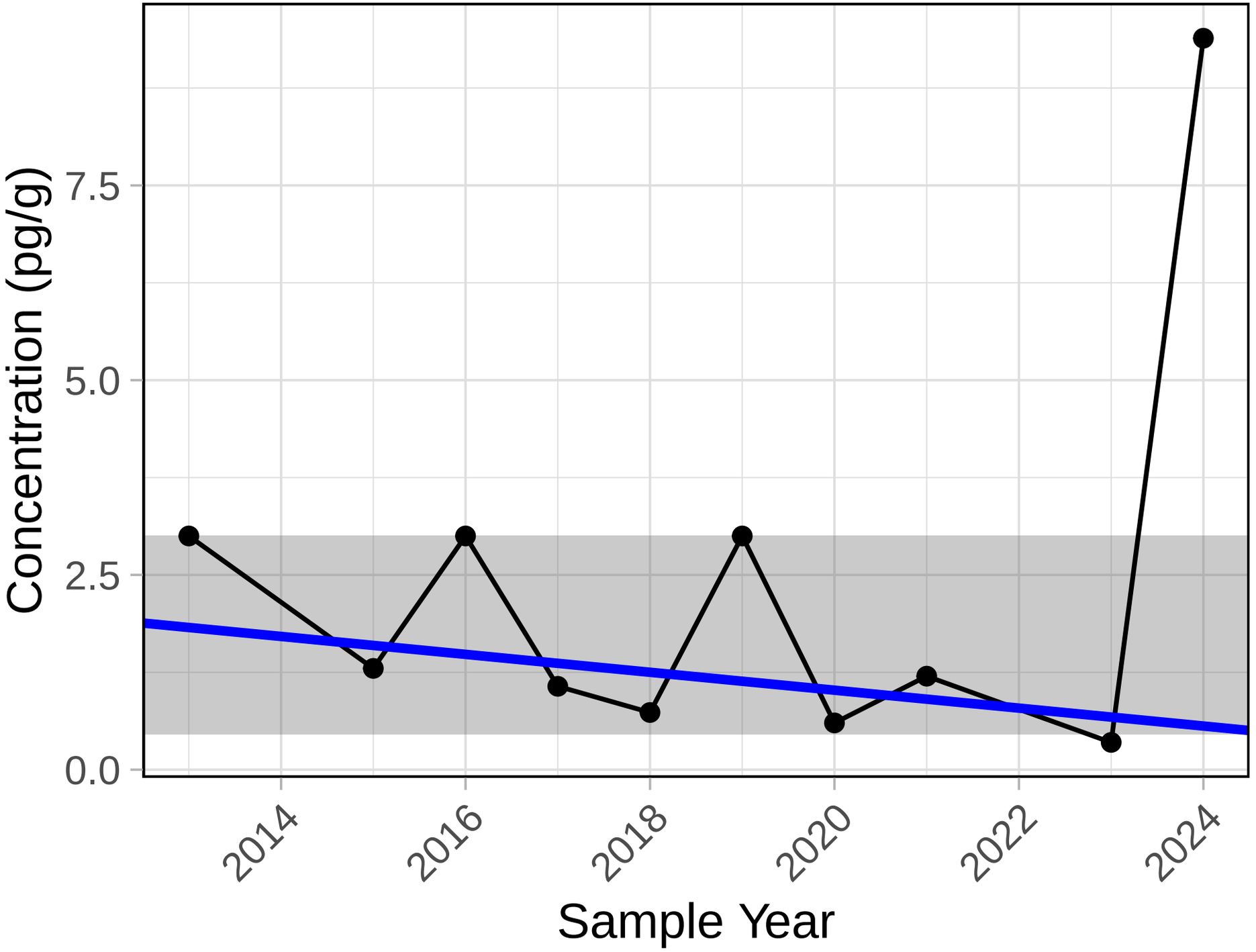
S6 Sediment



Trend significance p−value = 0.323

PCB 185

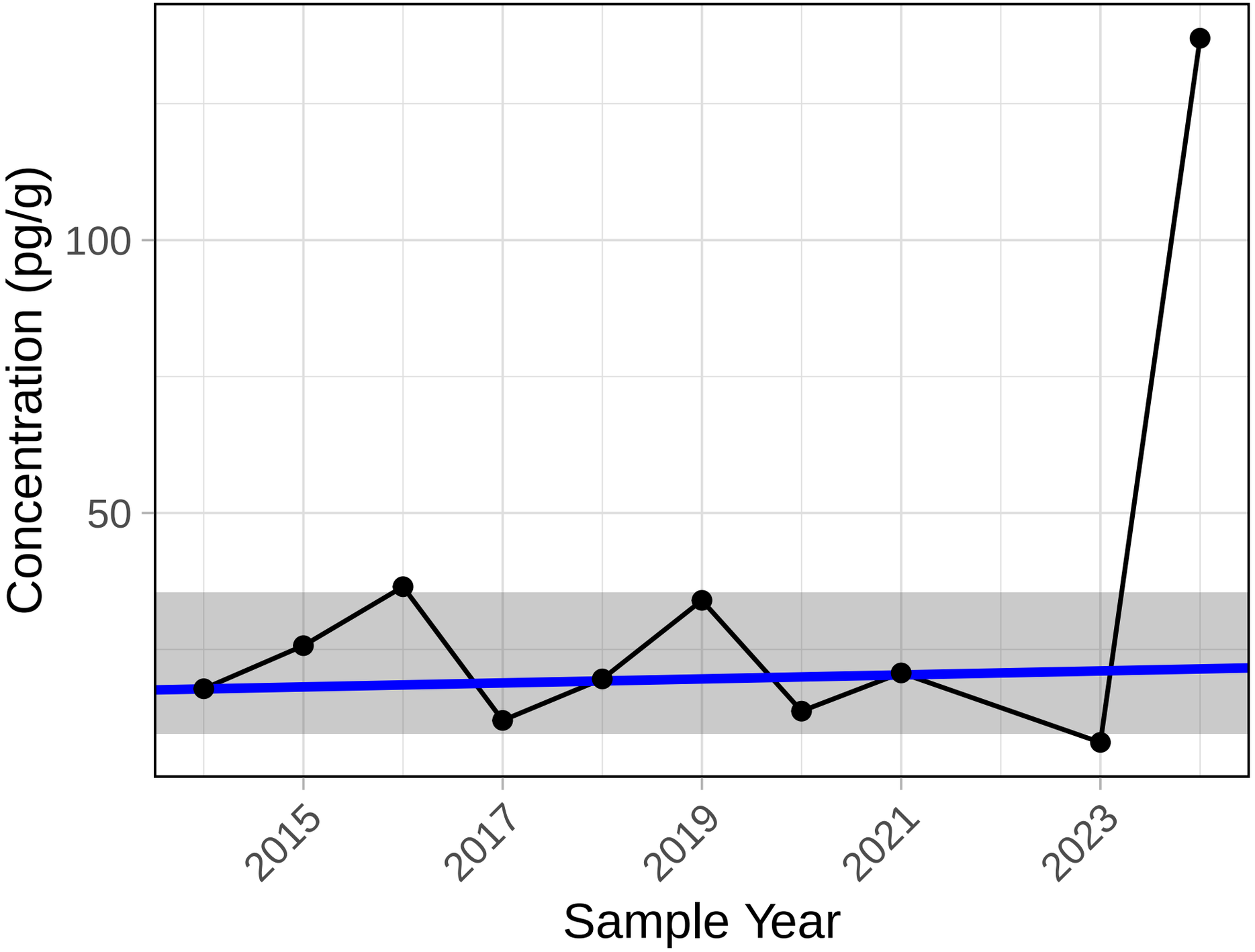
S6 Sediment



Trend significance p−value = 0.414

PCB 187

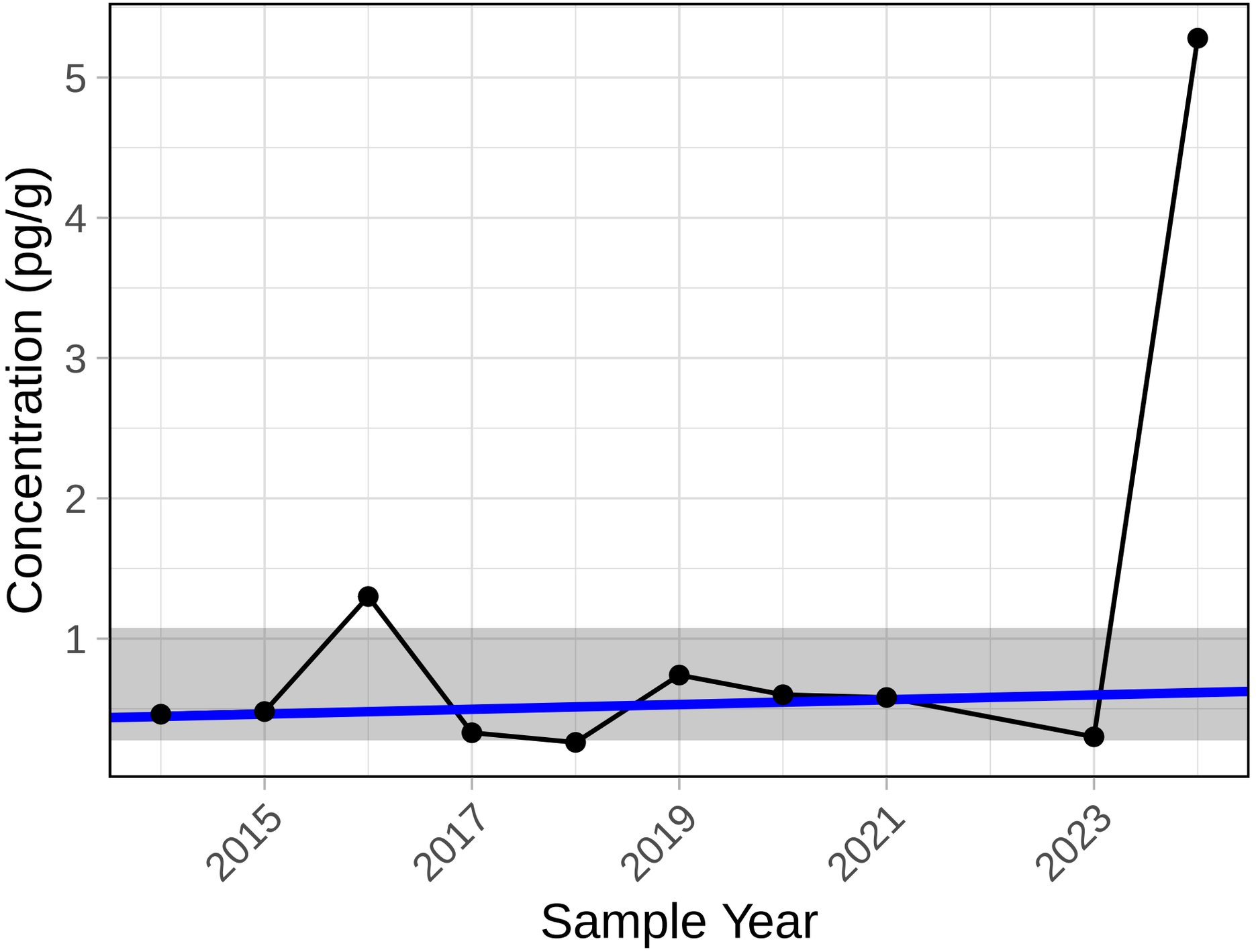
S6 Sediment



Trend significance p−value = 1

PCB 189

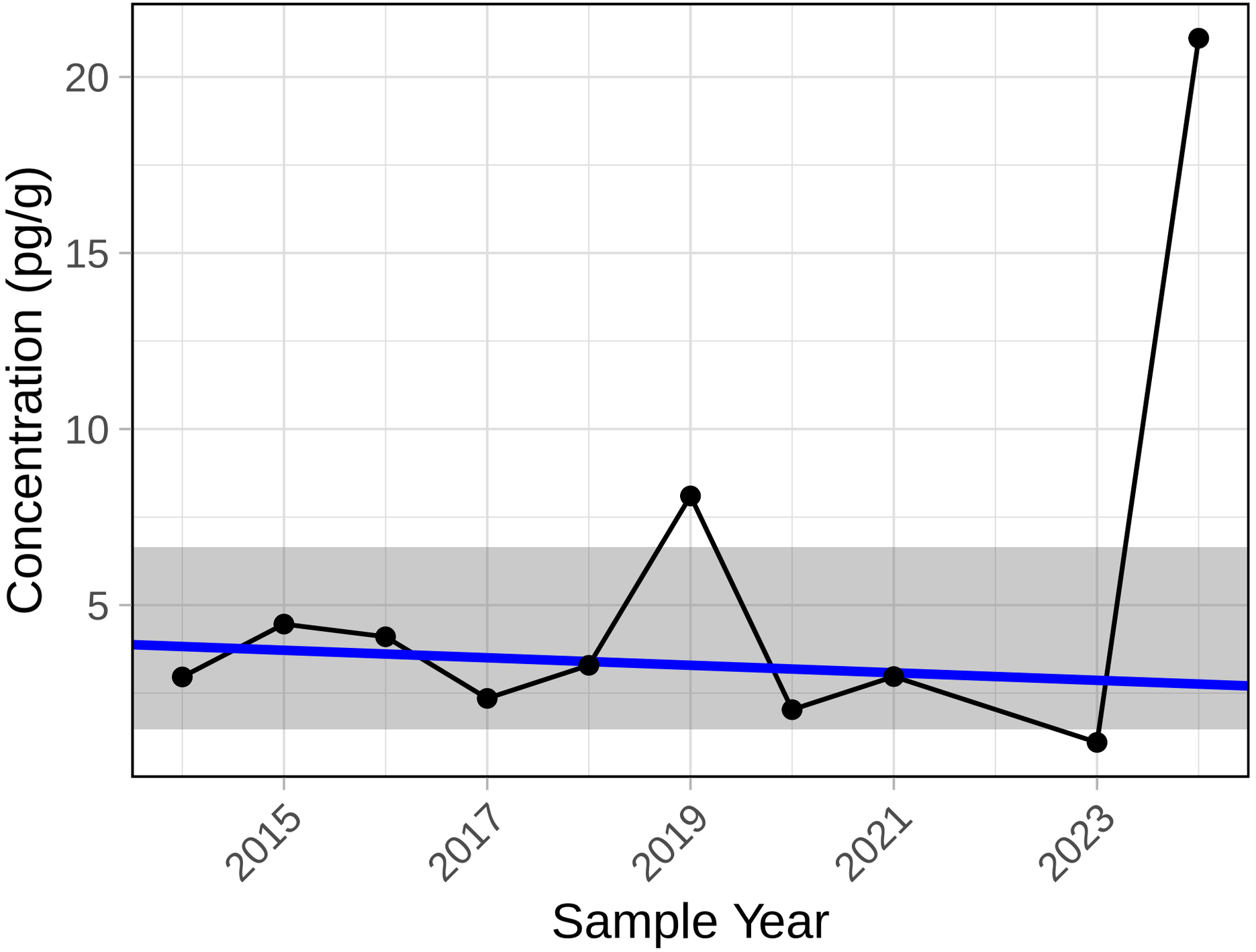
S6 Sediment



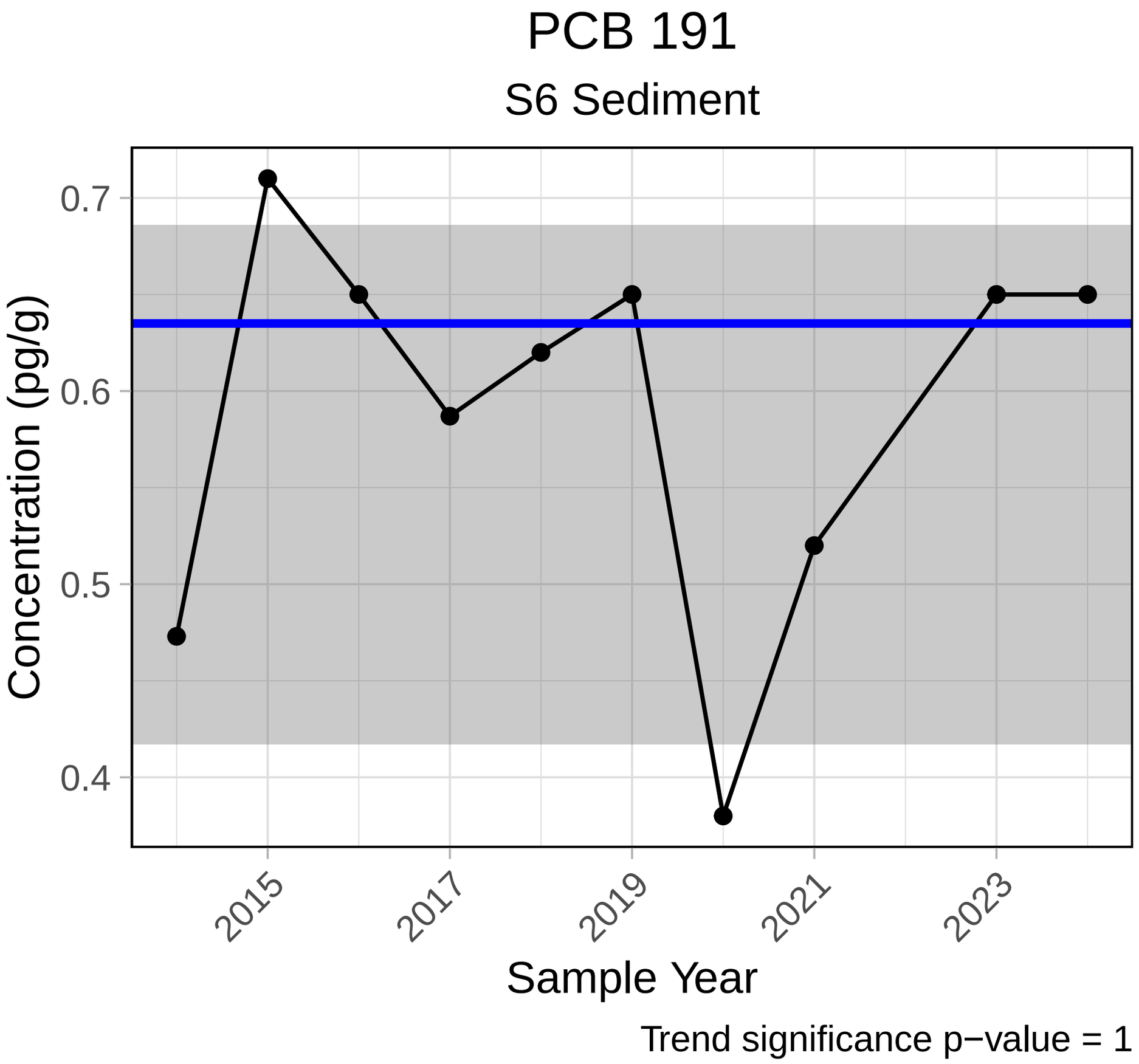
Trend significance p−value = 0.721

PCB 190

S6 Sediment

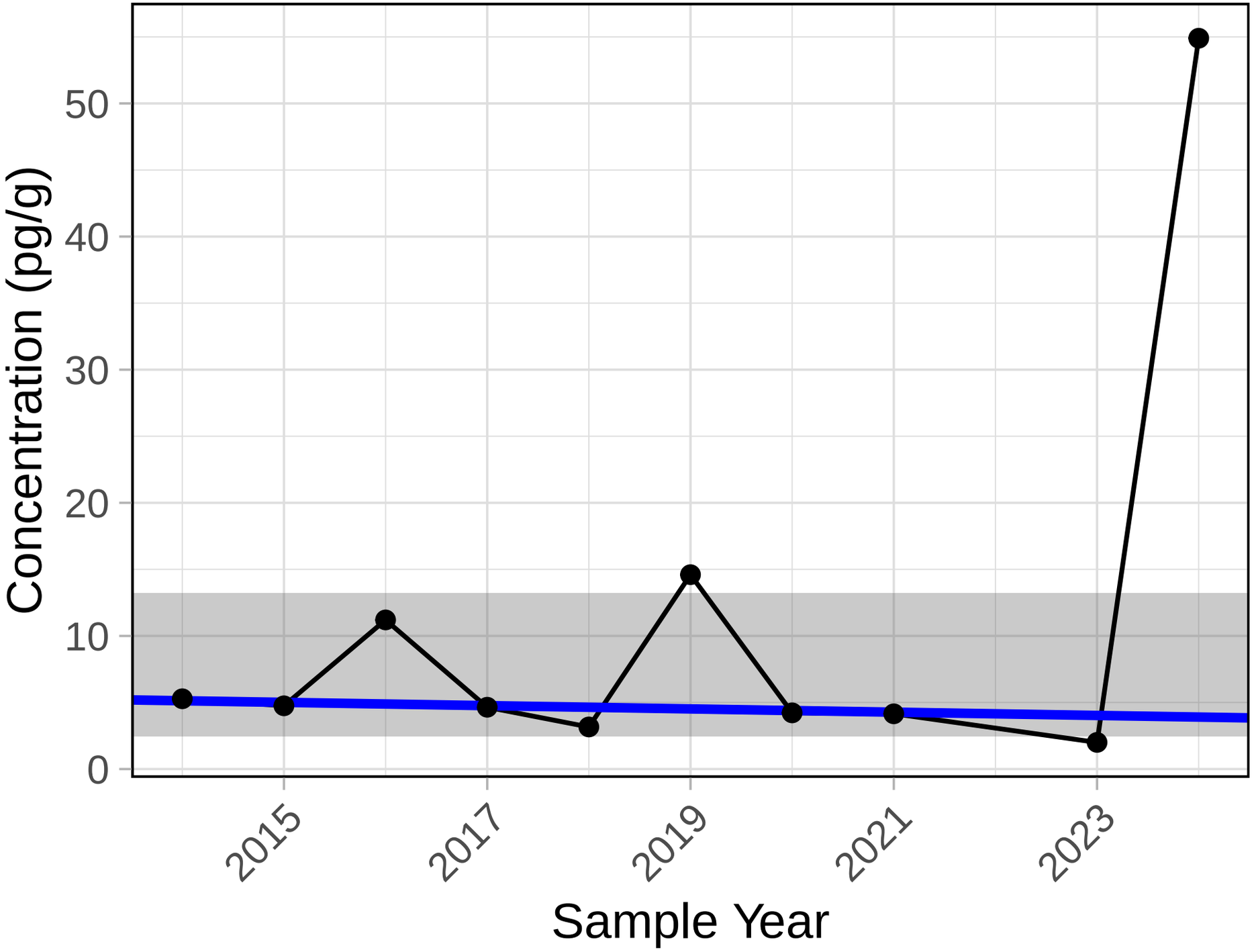


Trend significance p−value = 0.858


PCB 191
S6 Sediment
Concentration (pg/g)
0.7
0.6
0.5
0.4
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

PCB 194

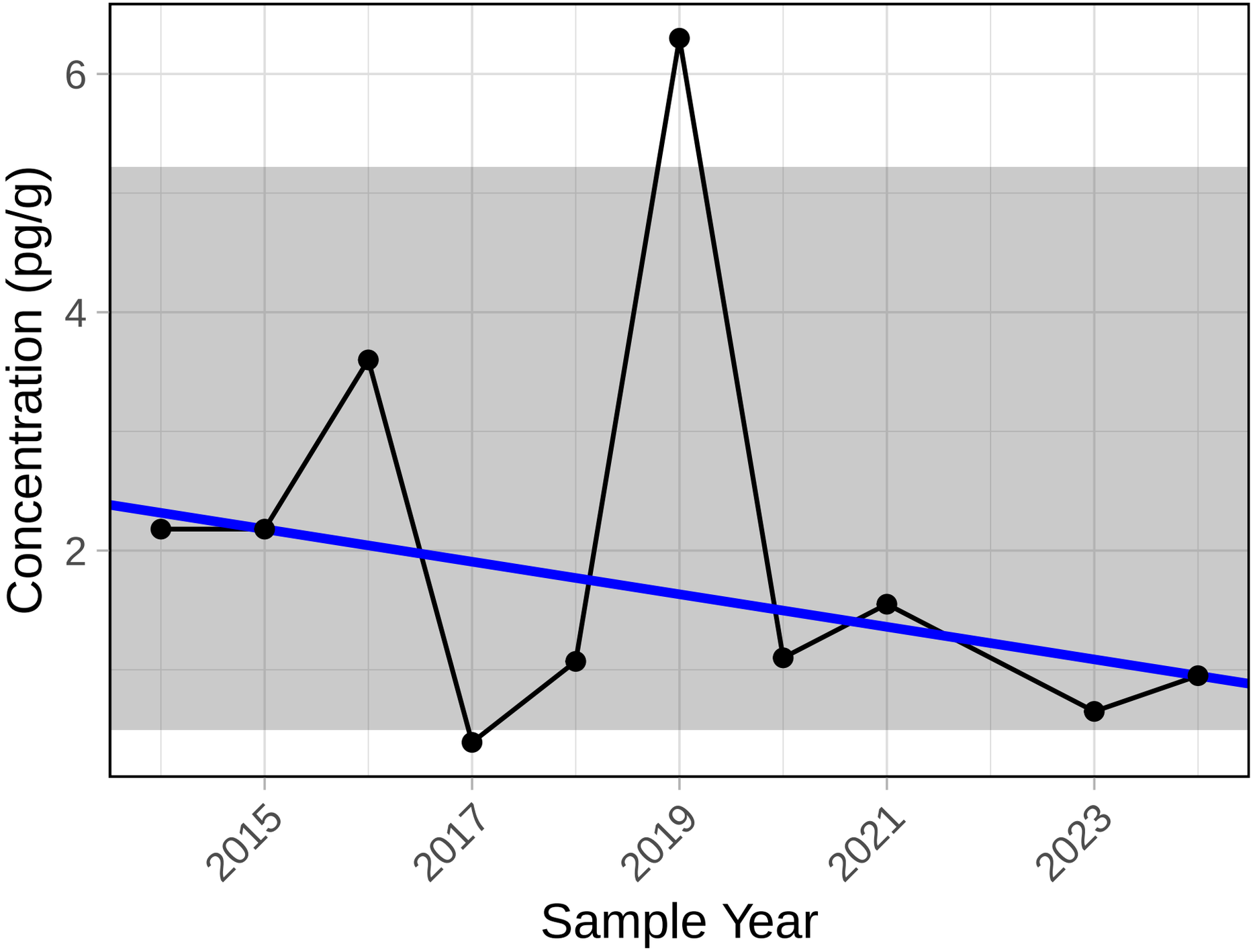
S6 Sediment



Trend significance p−value = 0.474

PCB 195

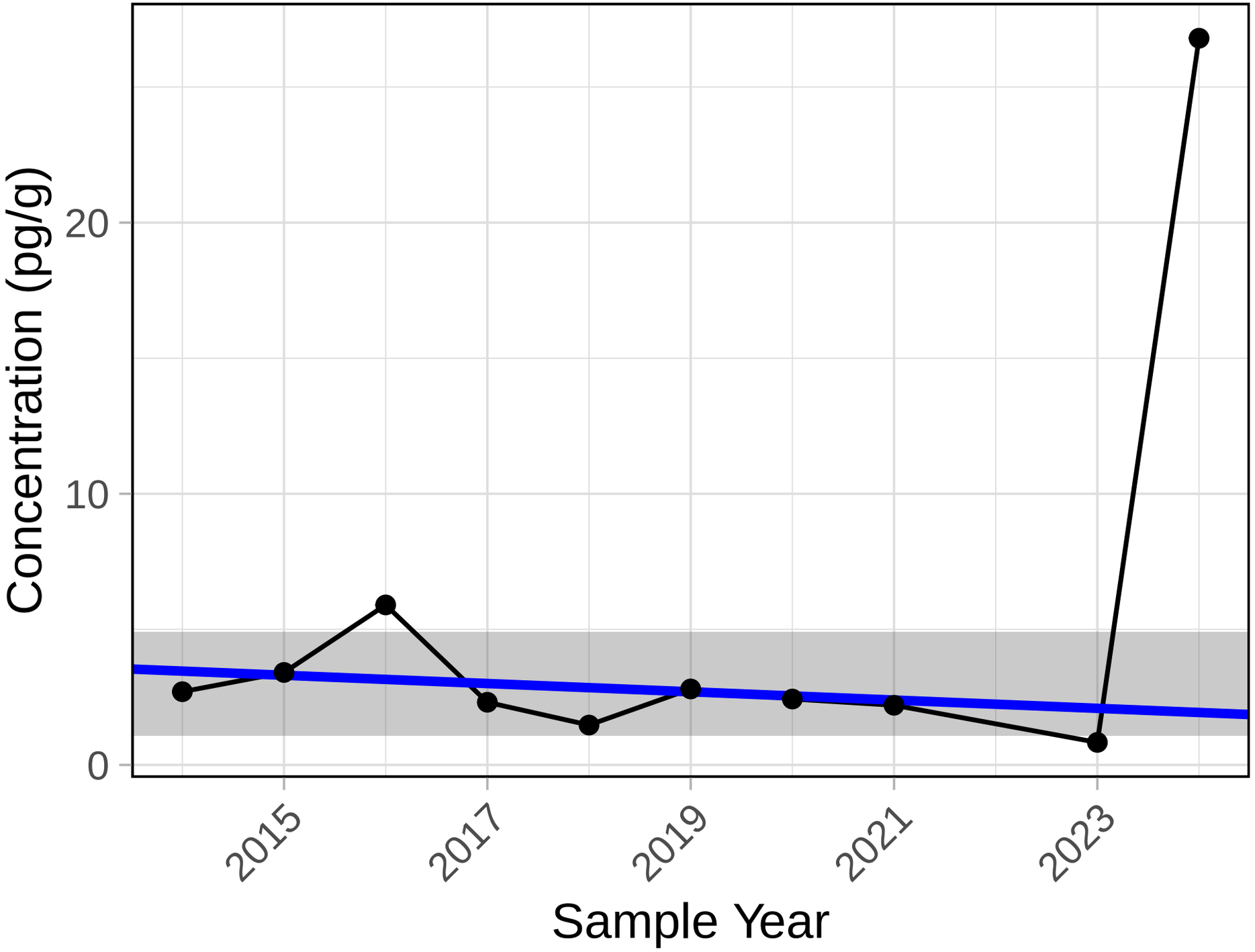
S6 Sediment



Trend significance p−value = 0.323

PCB 196

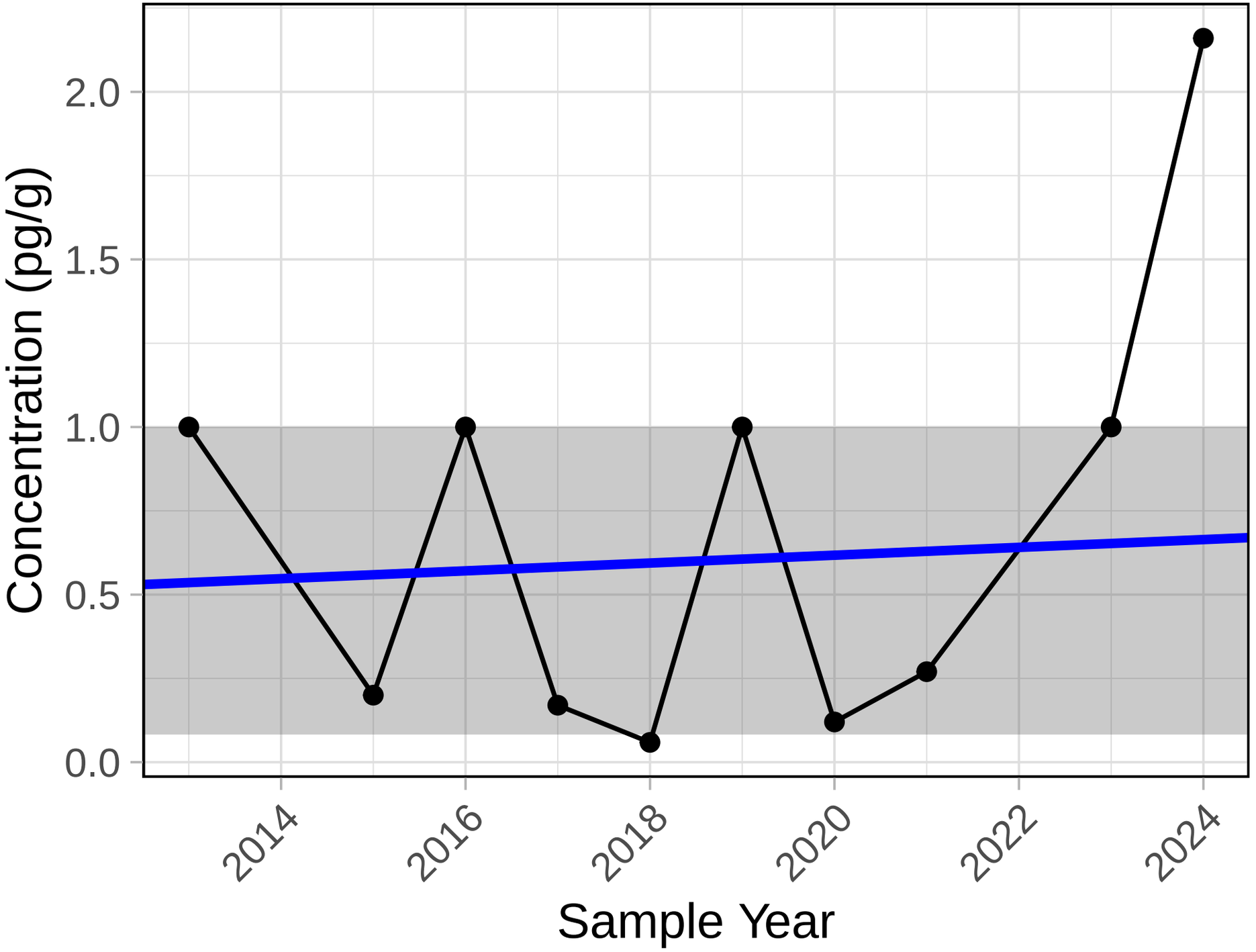
S6 Sediment



Trend significance p−value = 0.474

PCB 197

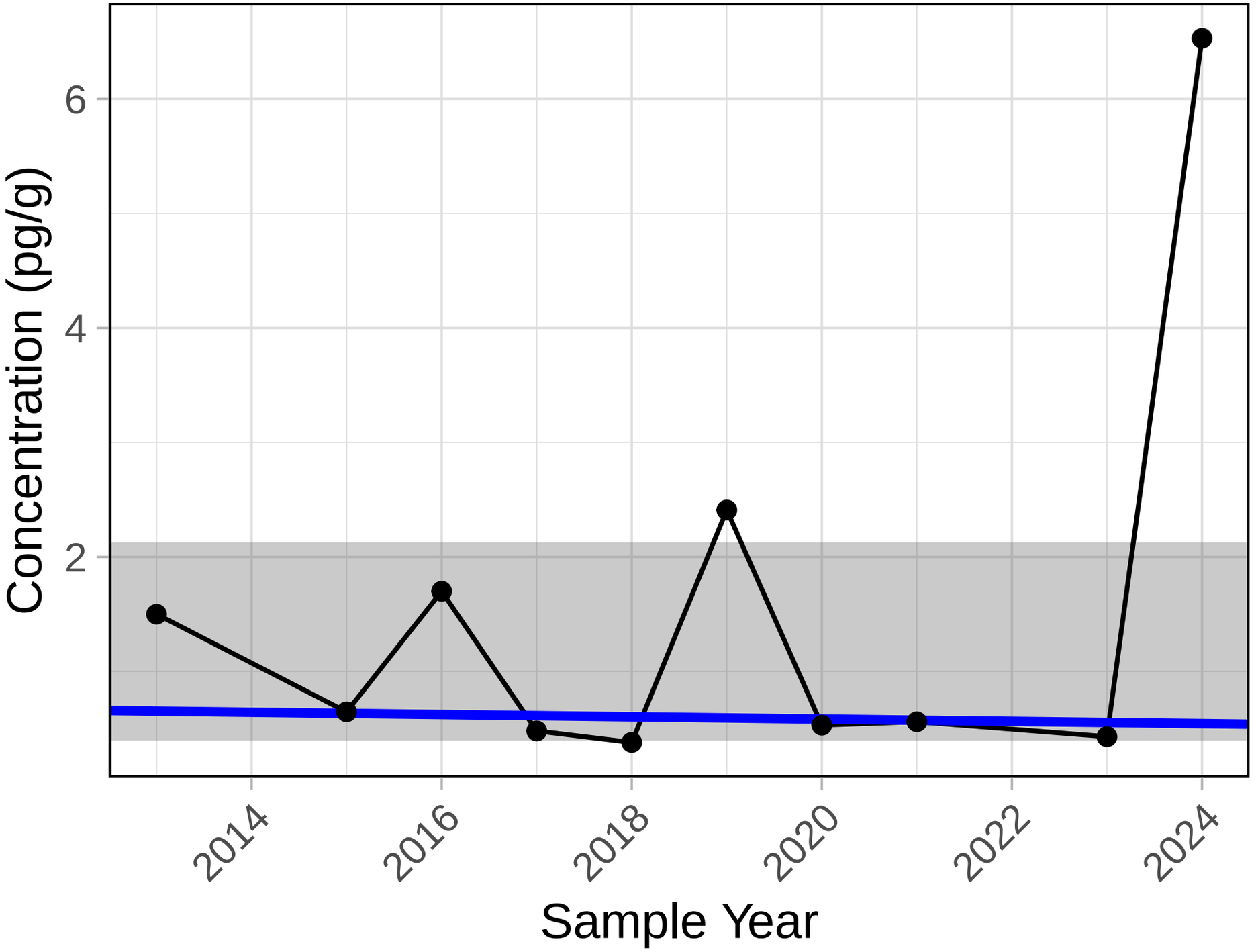
S6 Sediment



Trend significance p−value = 0.578

PCB 200

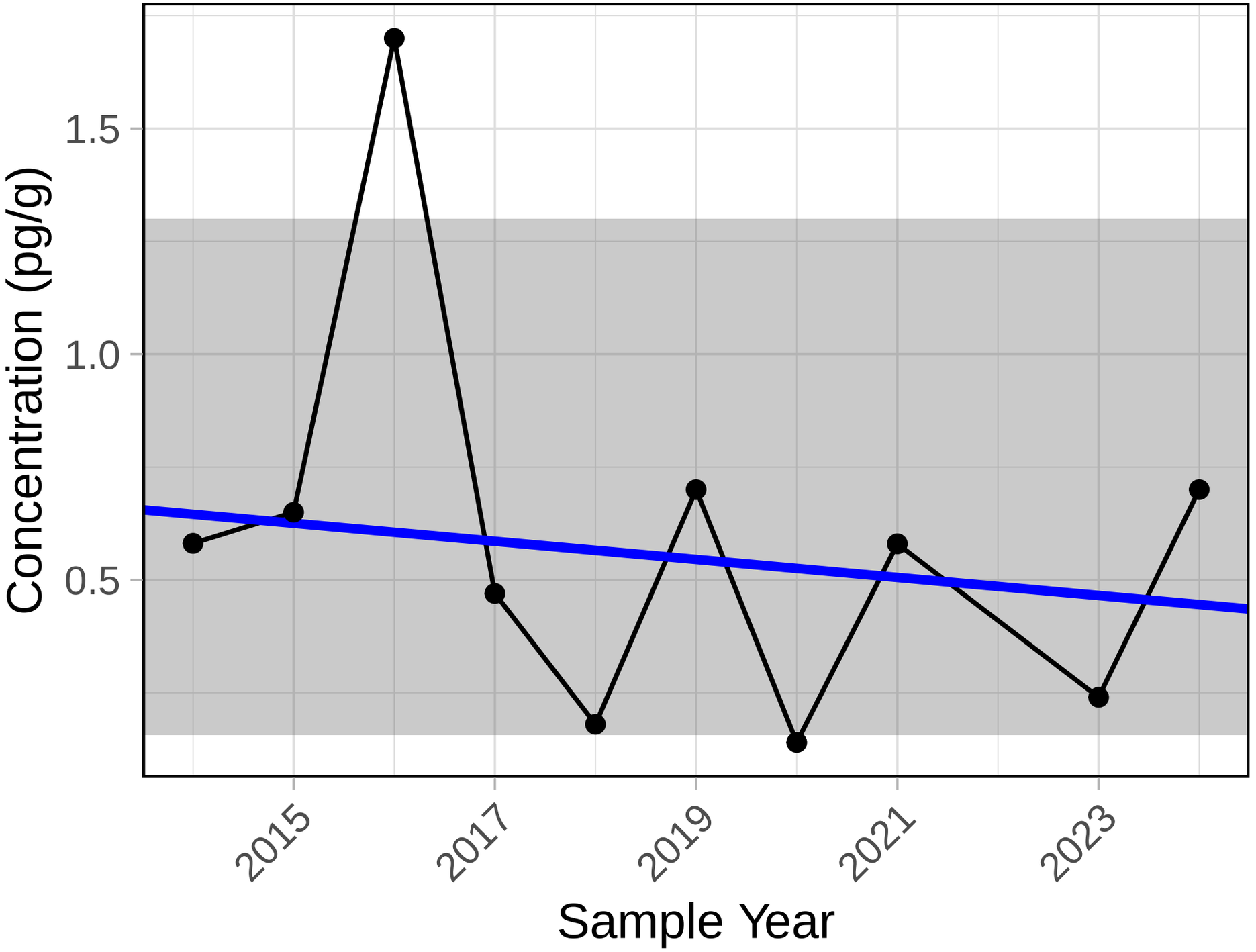
S6 Sediment



Trend significance p−value = 1

PCB 201

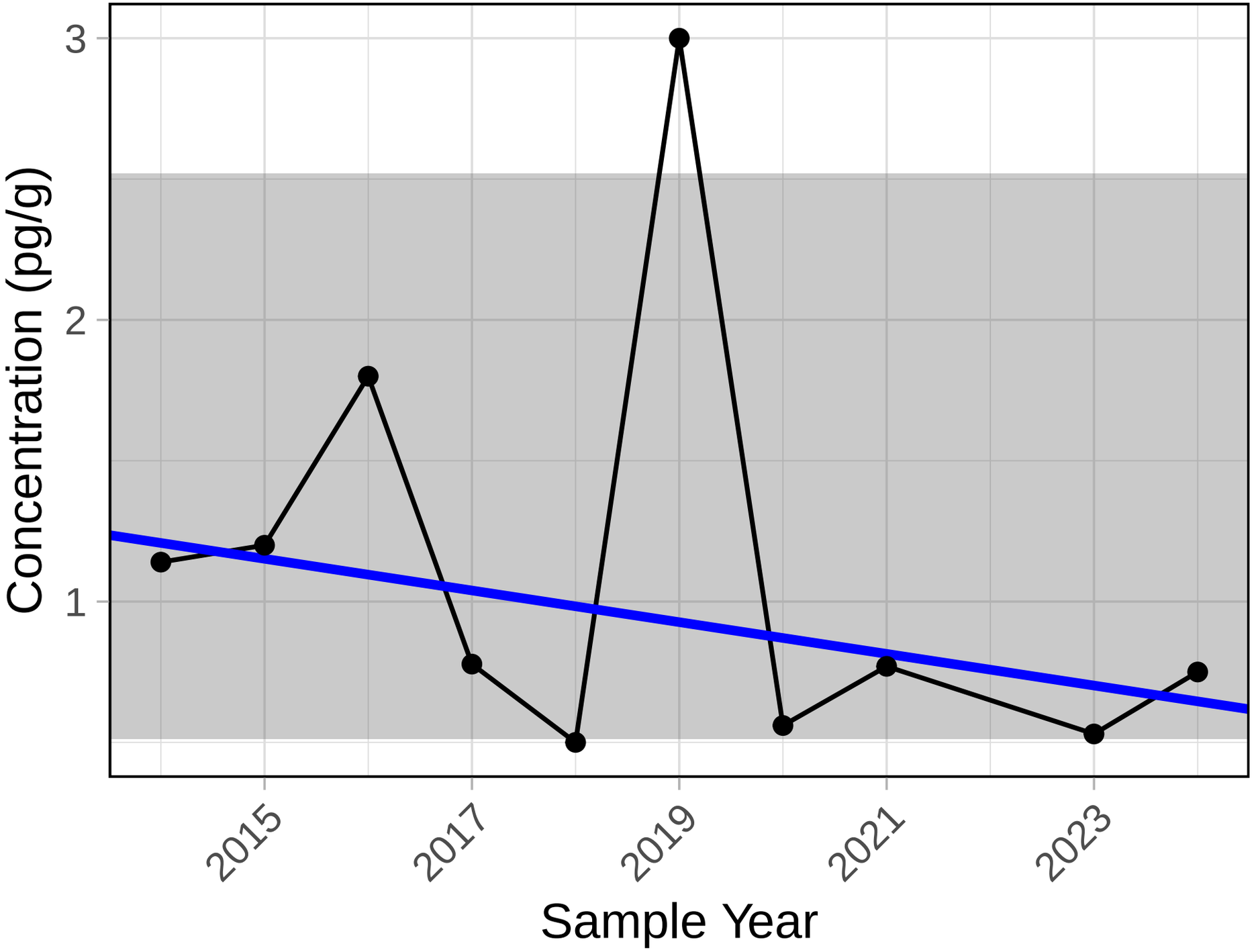
S6 Sediment



Trend significance p−value = 0.653

PCB 202

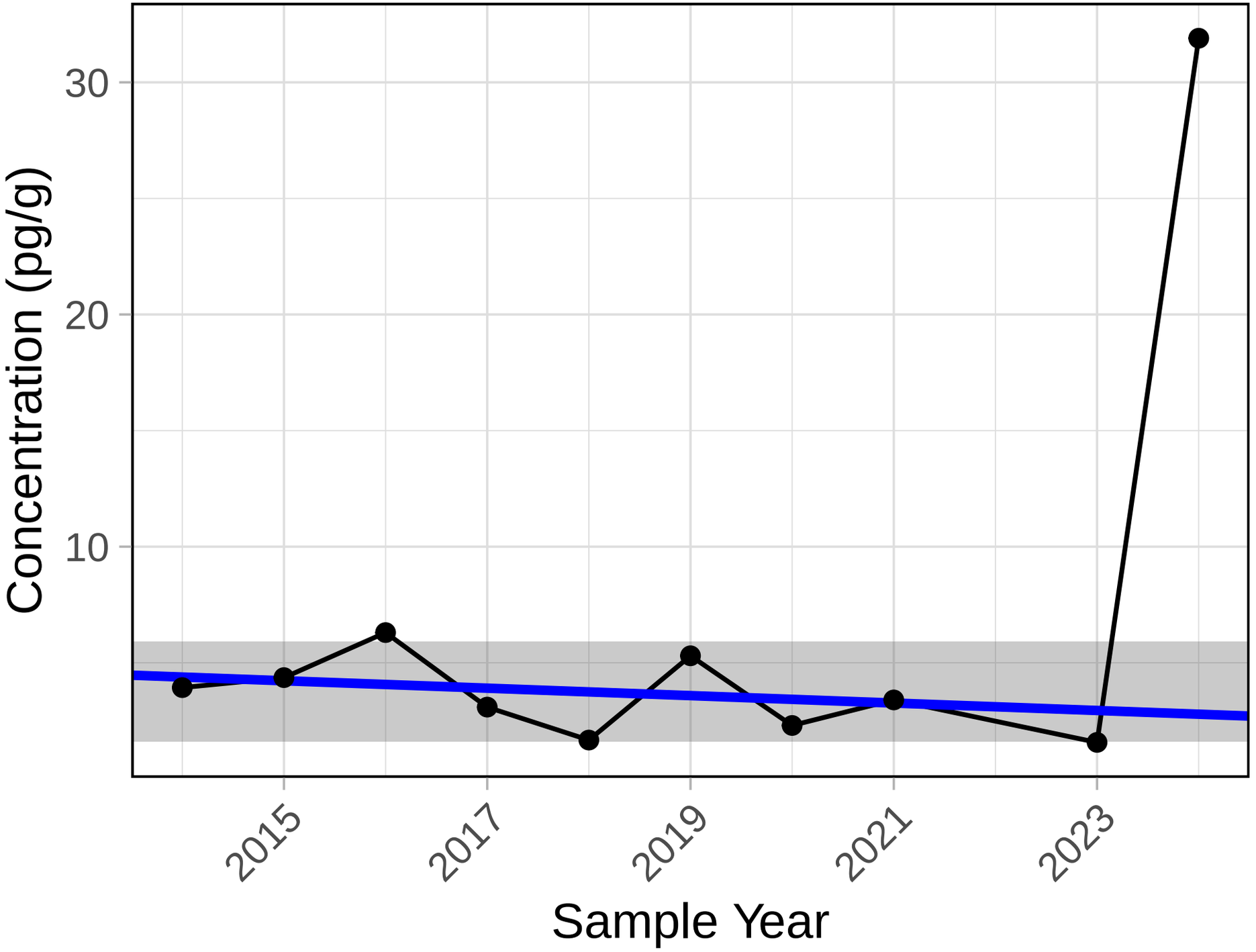
S6 Sediment



Trend significance p−value = 0.21

PCB 203

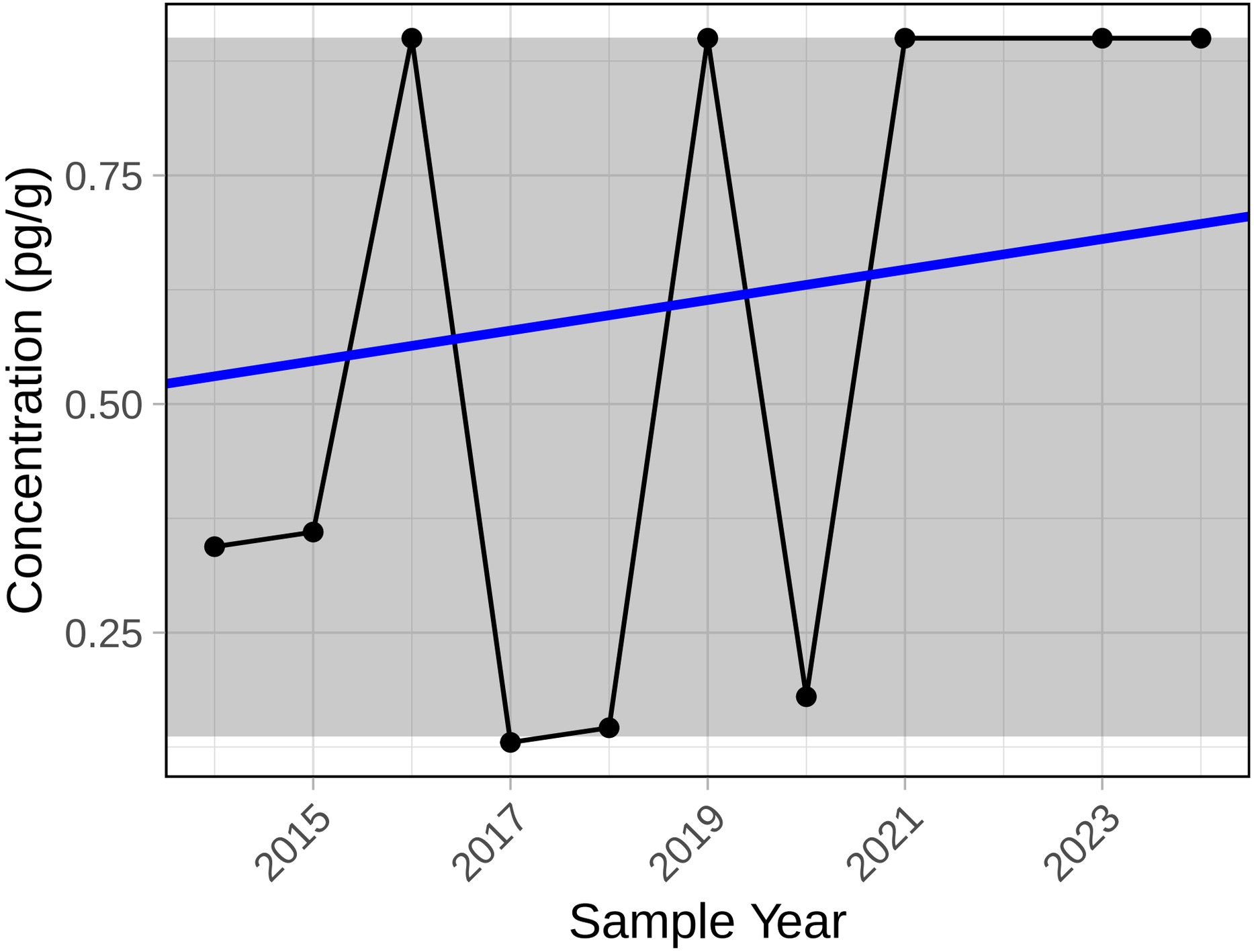
S6 Sediment



Trend significance p−value = 0.721

PCB 205

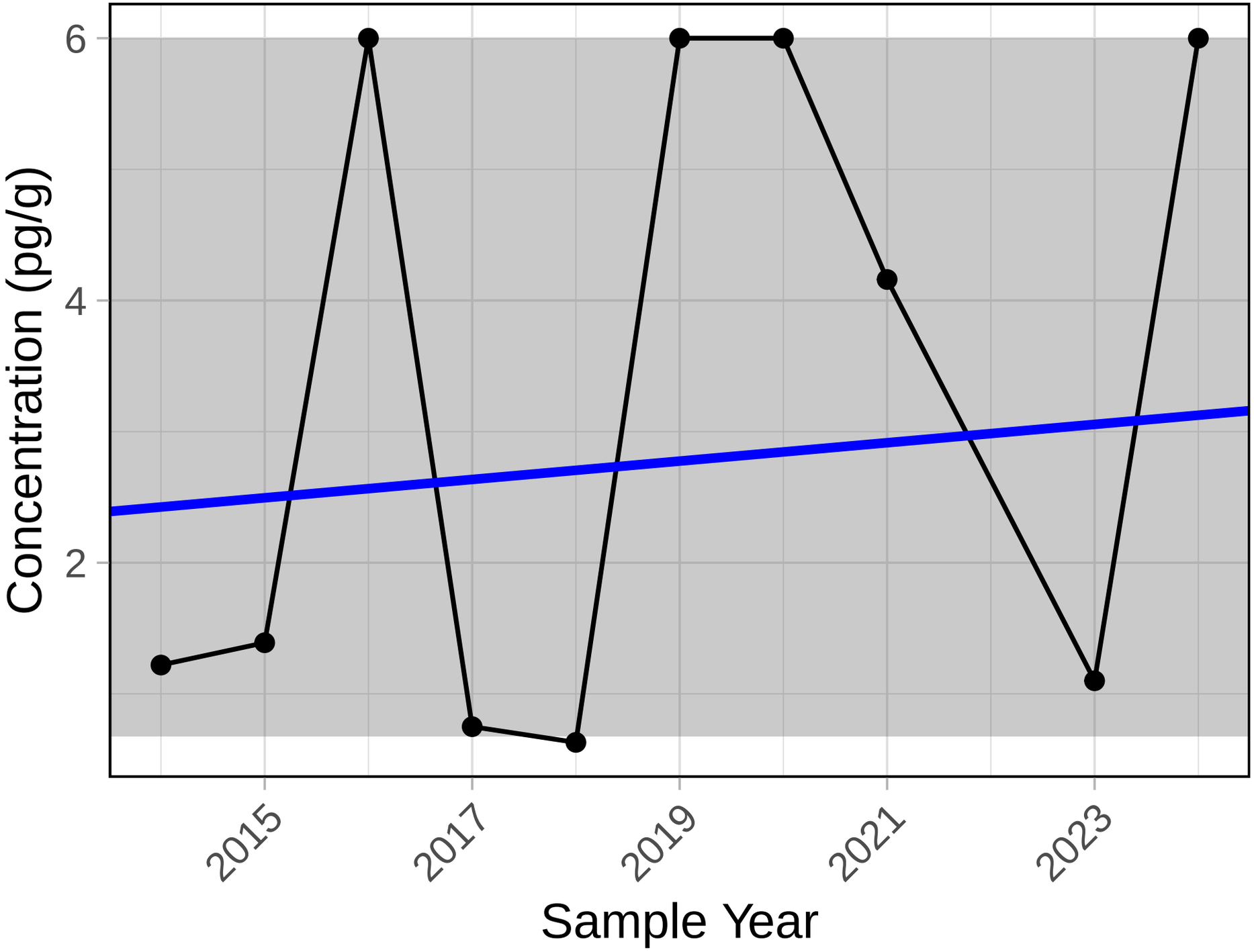
S6 Sediment



Trend significance p−value = 0.179

PCB 206

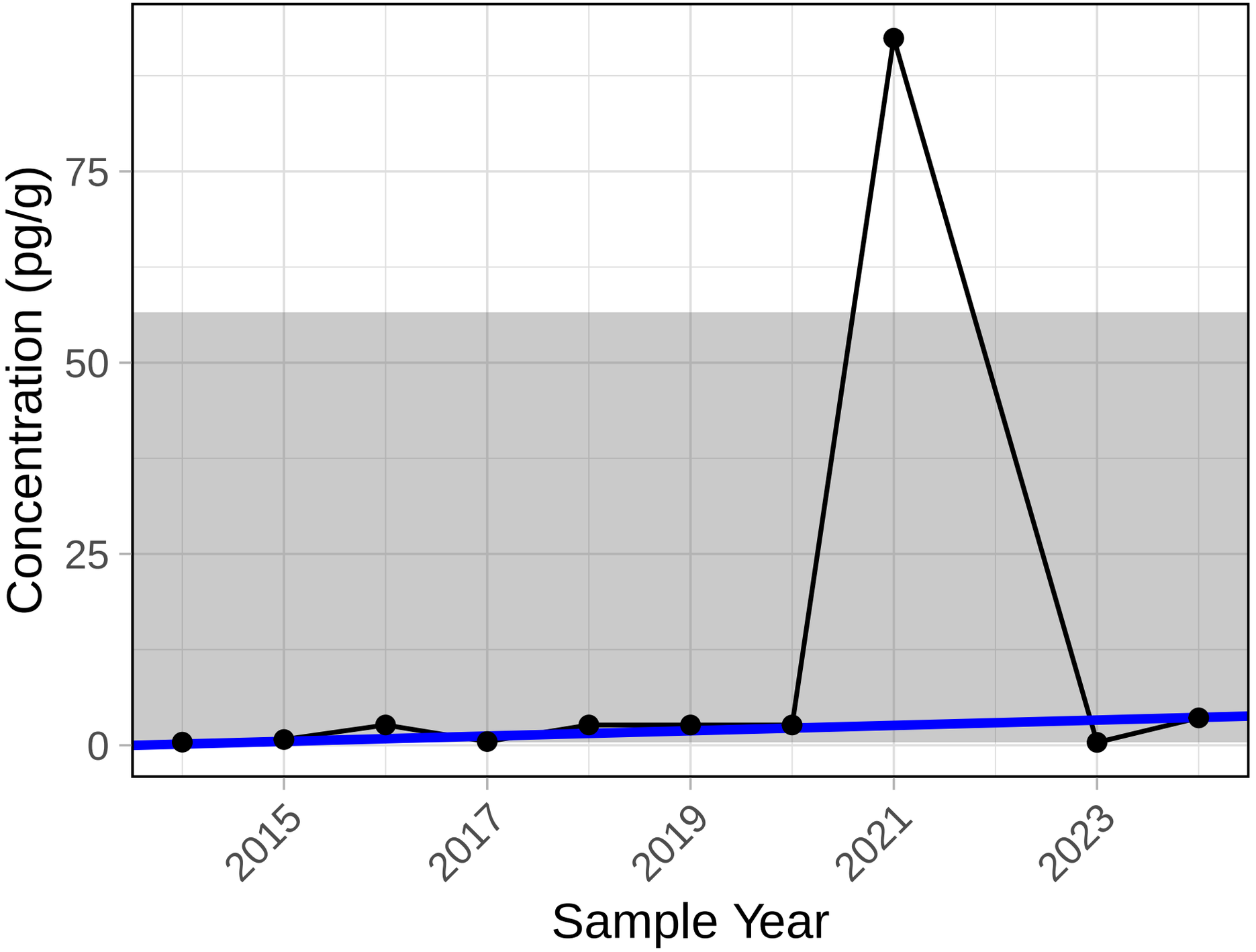
S6 Sediment



Trend significance p−value = 0.578

PCB 209

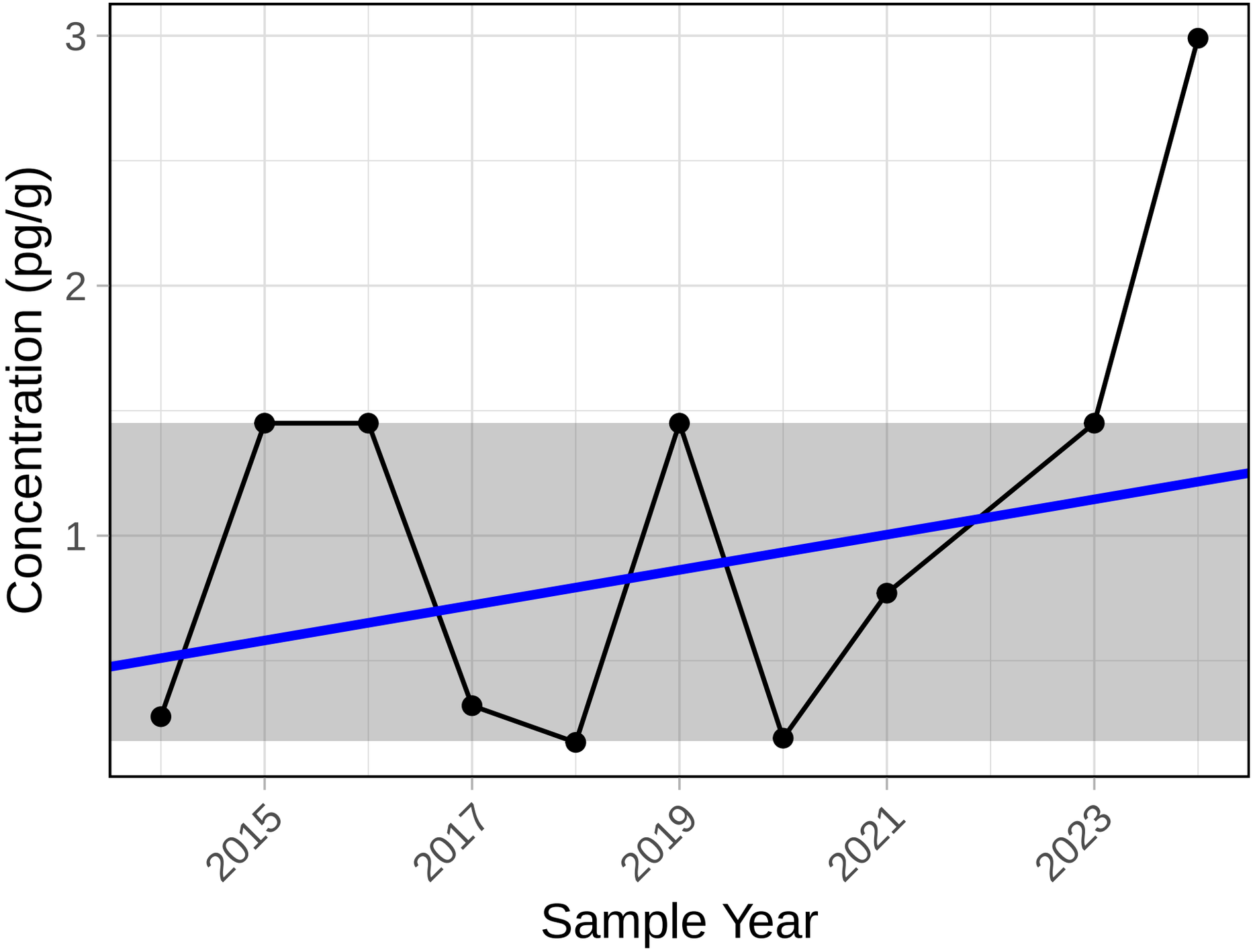
S6 Sediment



Trend significance p−value = 0.138

PCB 25

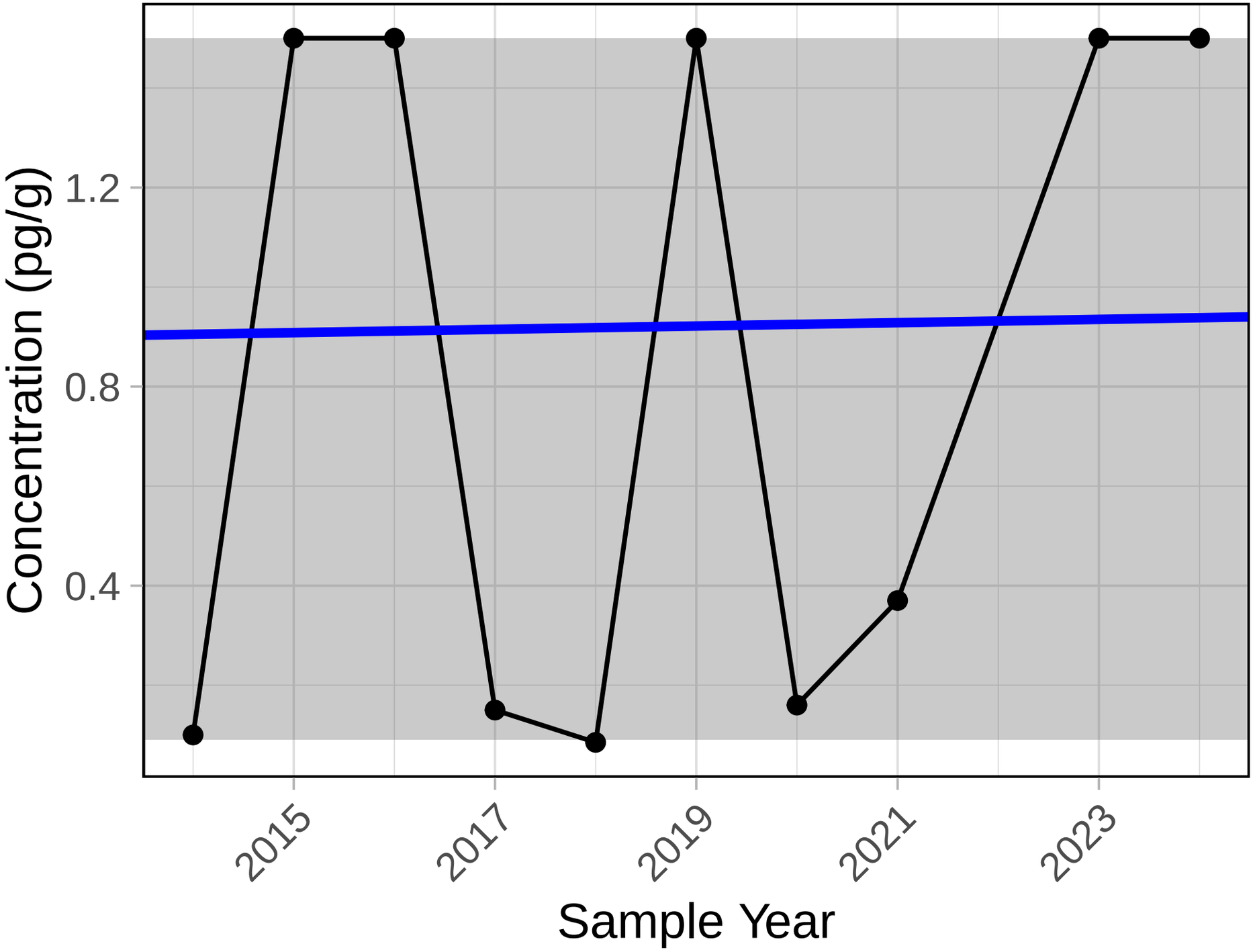
S6 Sediment



Trend significance p−value = 0.354

PCB 27

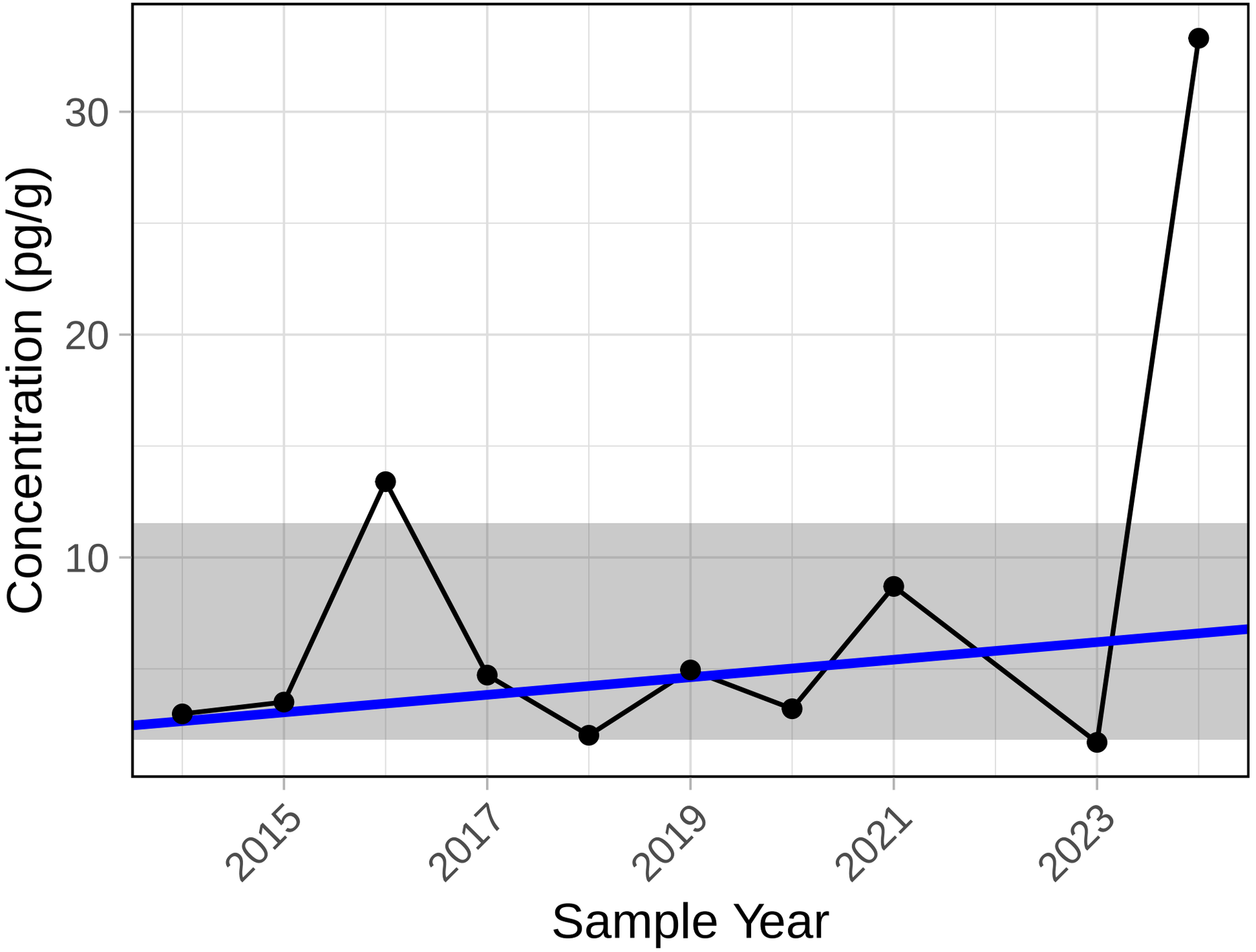
S6 Sediment



Trend significance p−value = 0.337

PCB 31

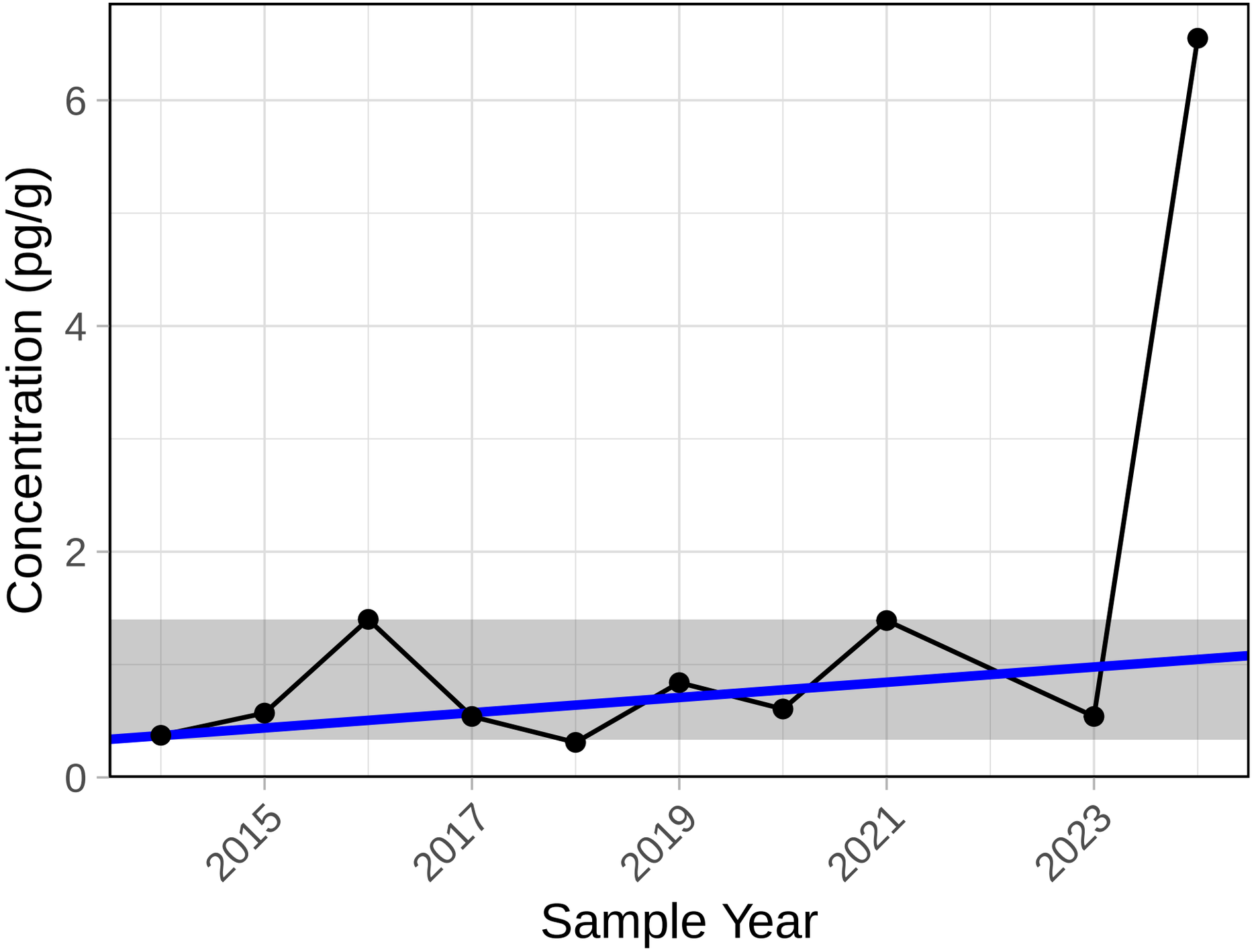
S6 Sediment



Trend significance p−value = 0.592

PCB 32

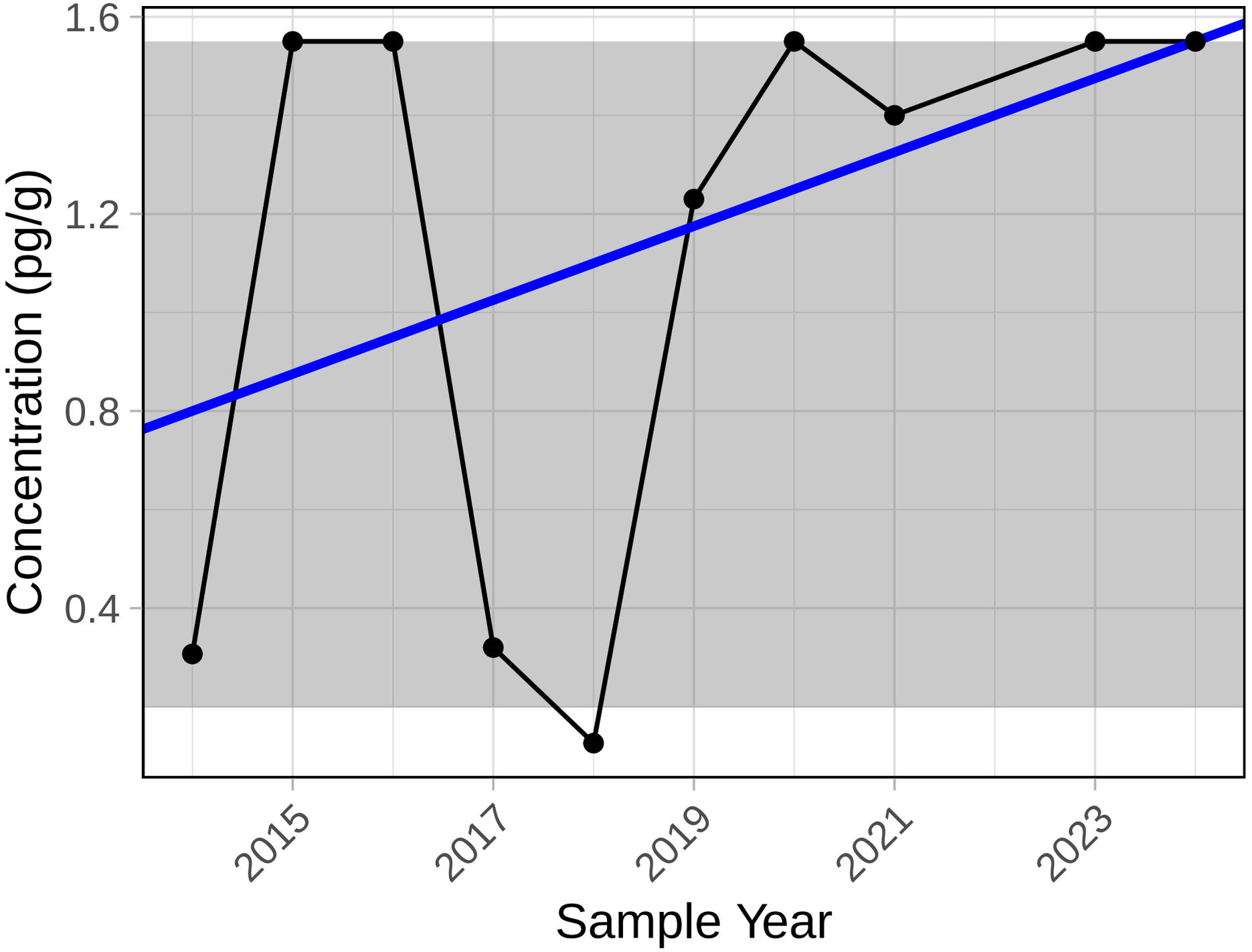
S6 Sediment



Trend significance p−value = 0.243

PCB 35

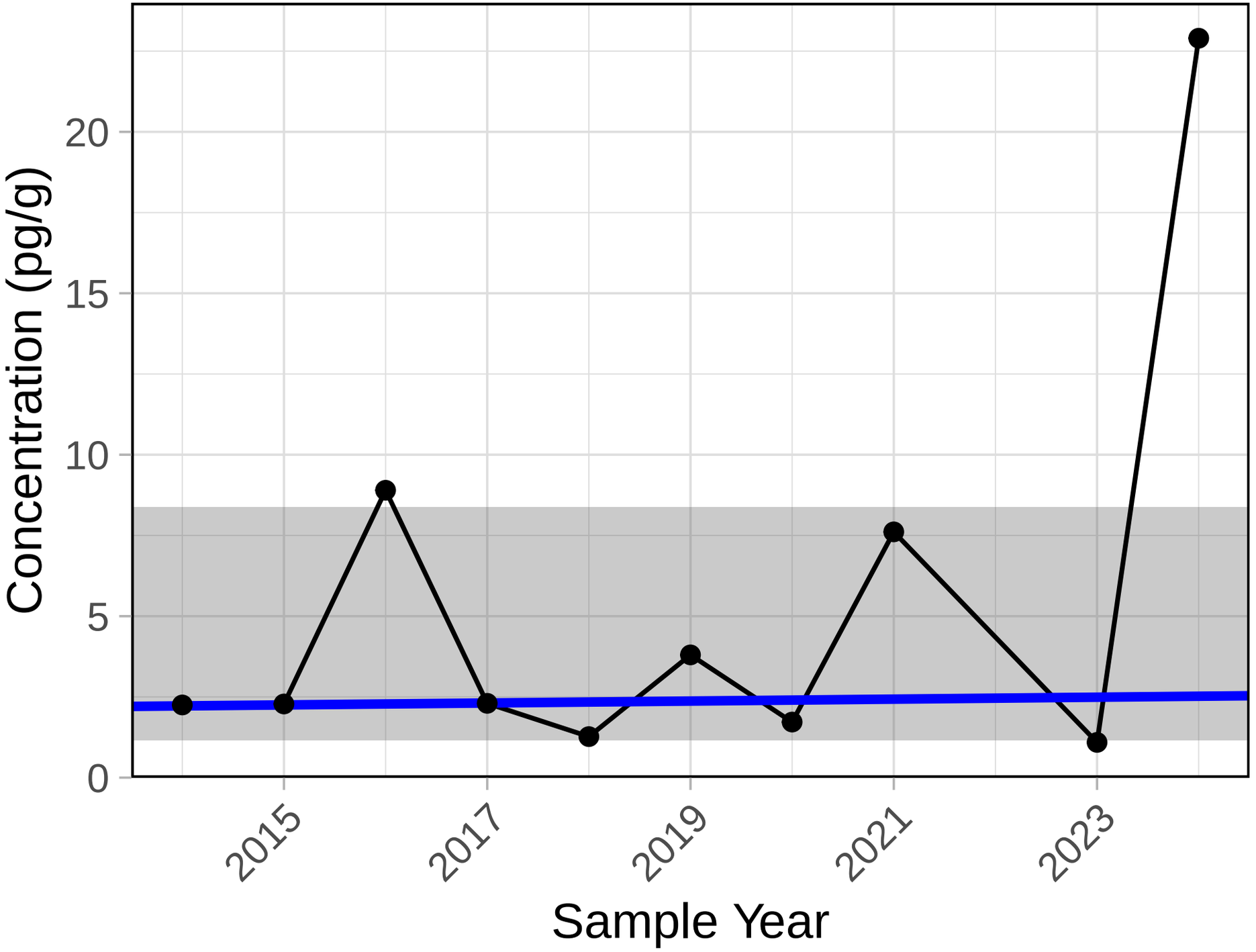
S6 Sediment



Trend significance p−value = 0.249

PCB 37

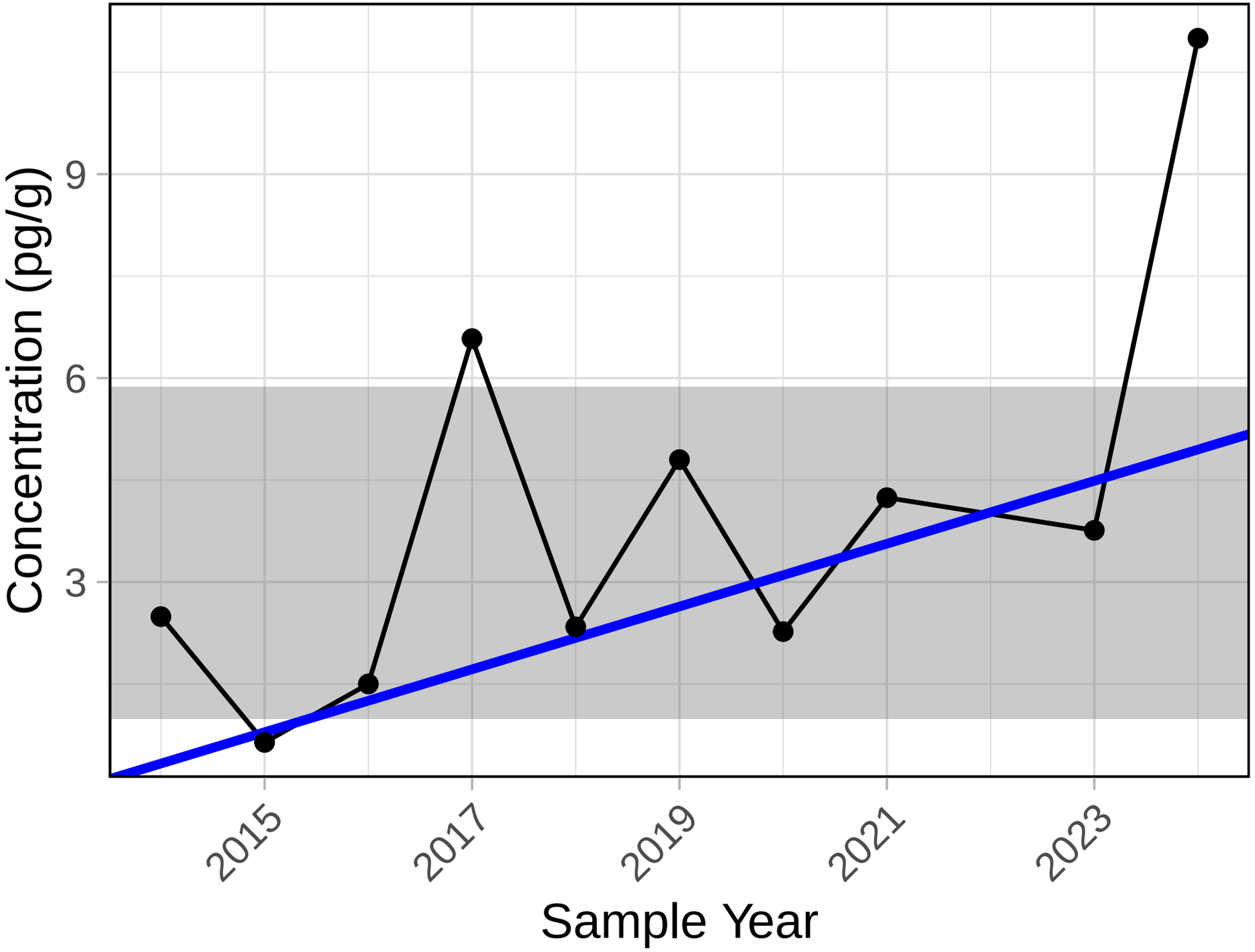
S6 Sediment



Trend significance p−value = 0.721

PCB 38

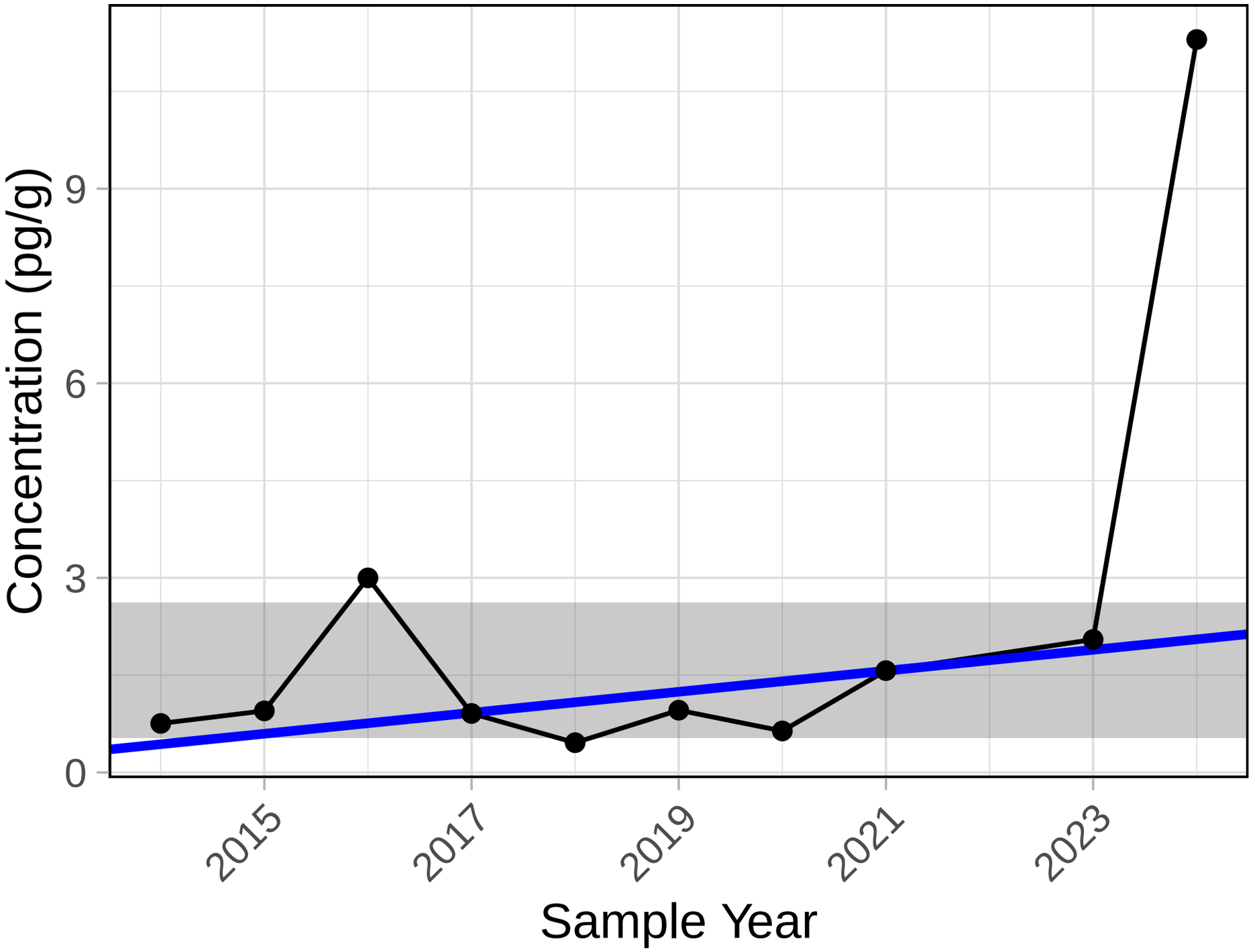
S6 Sediment



Trend significance p−value = 0.152

PCB 42

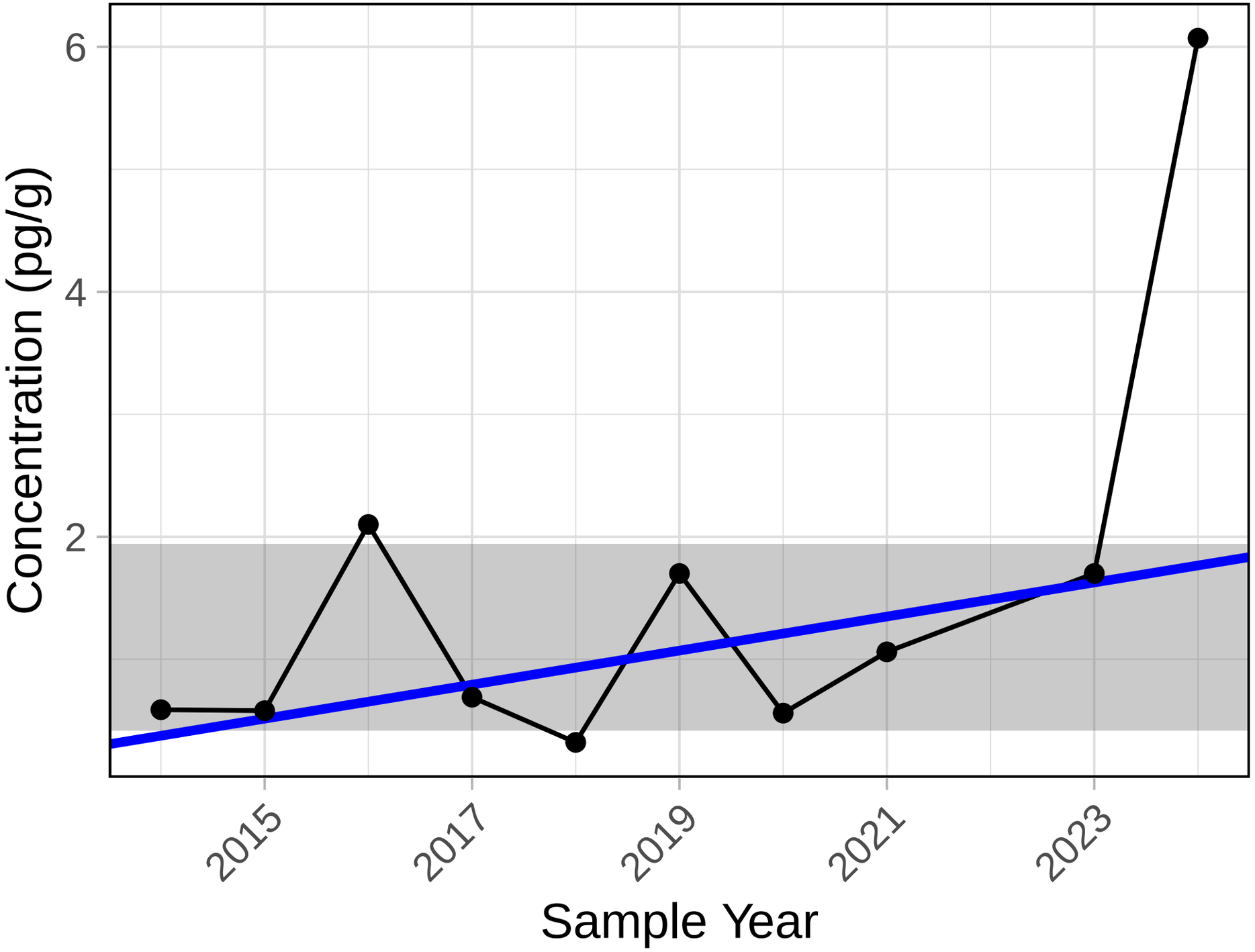
S6 Sediment



Trend significance p−value = 0.152

PCB 48

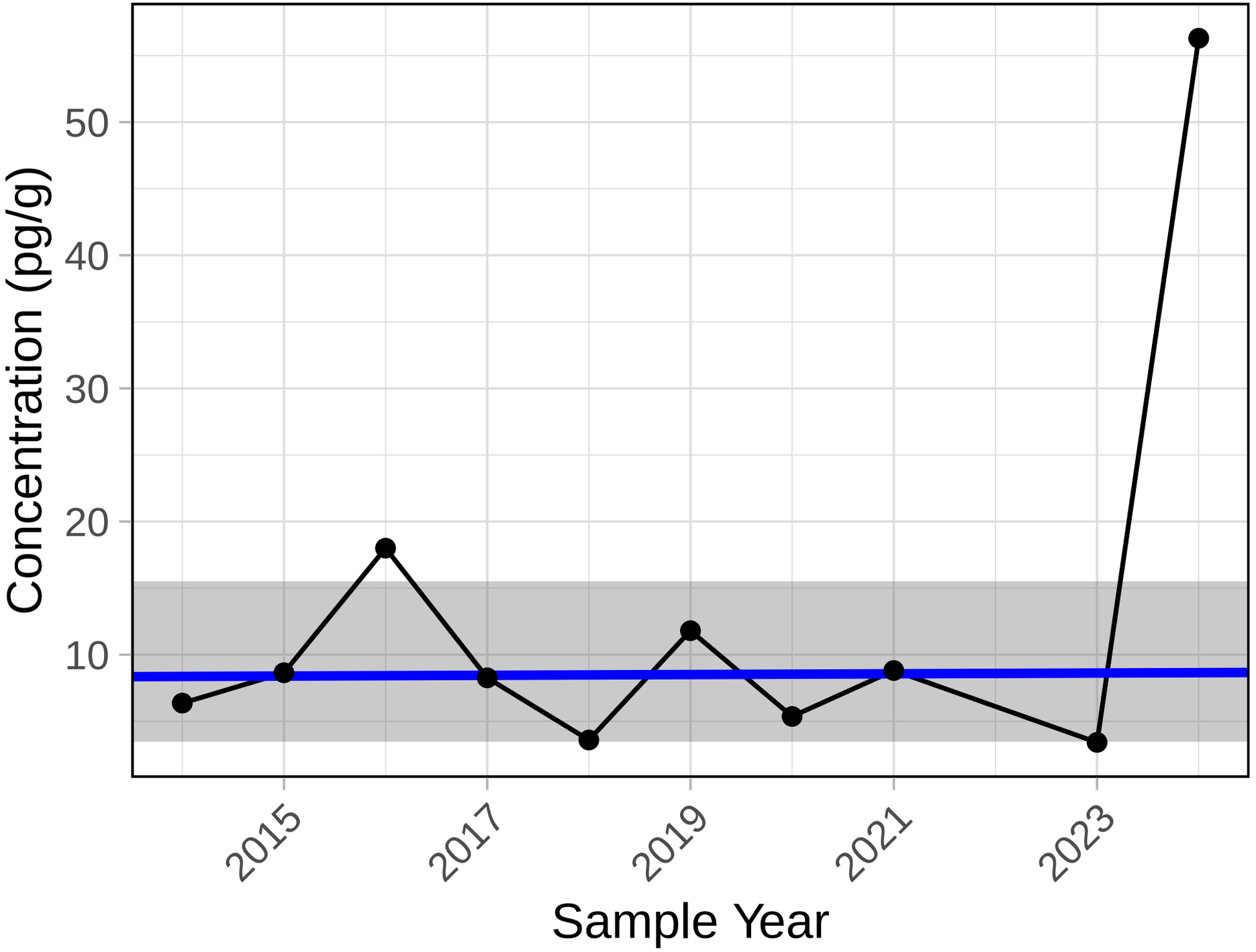
S6 Sediment



Trend significance p−value = 0.243

PCB 52

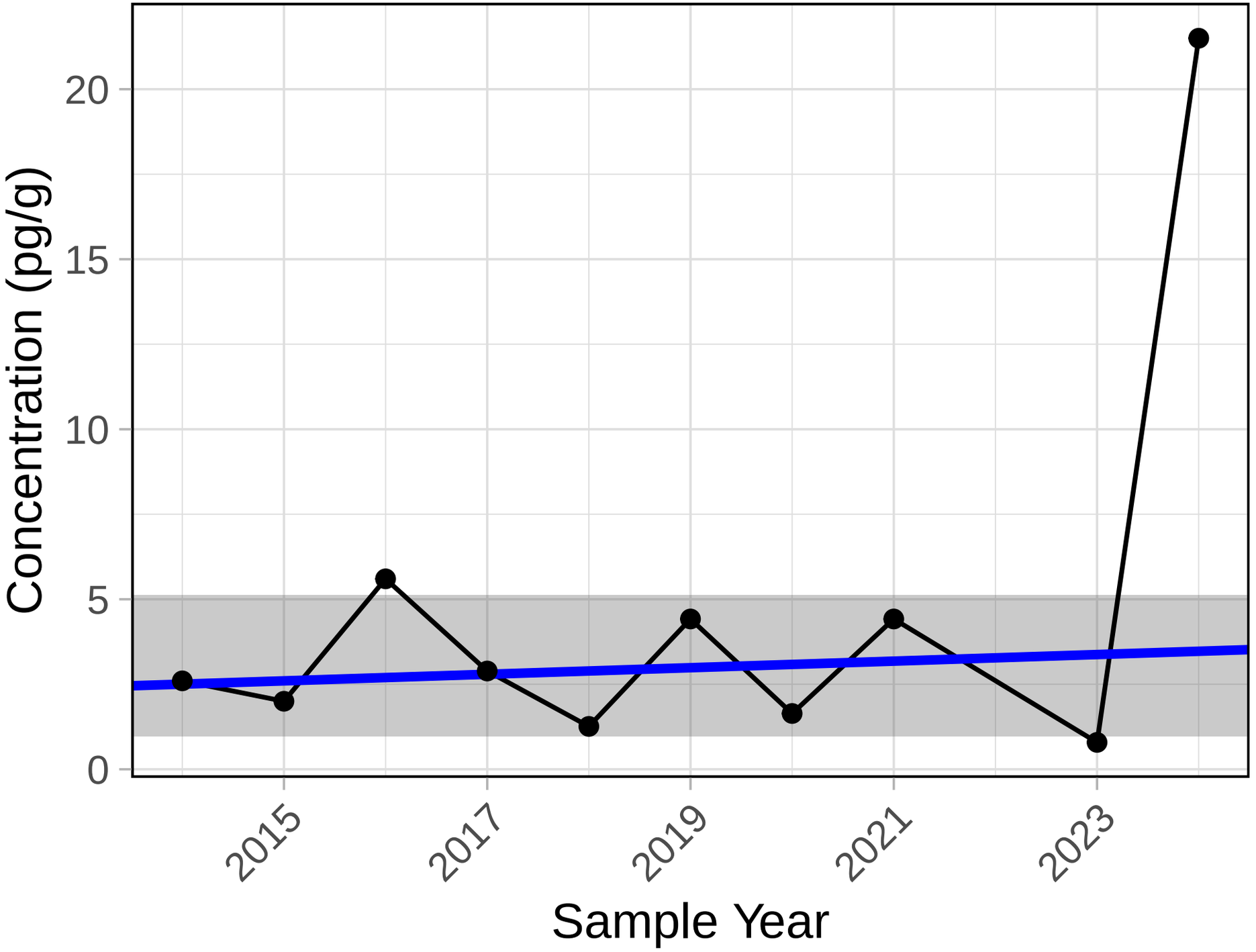
S6 Sediment



Trend significance p−value = 1

PCB 56

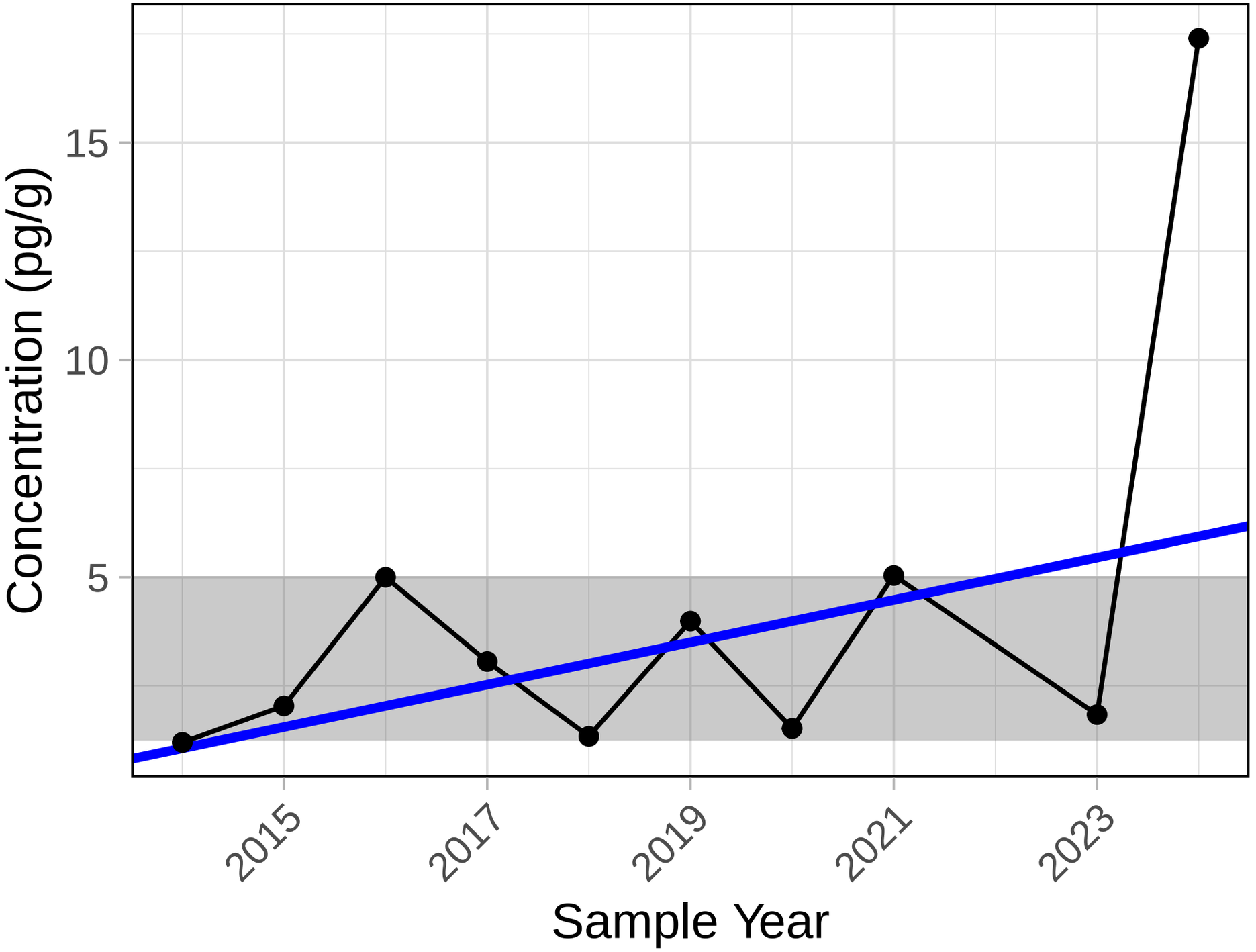
S6 Sediment



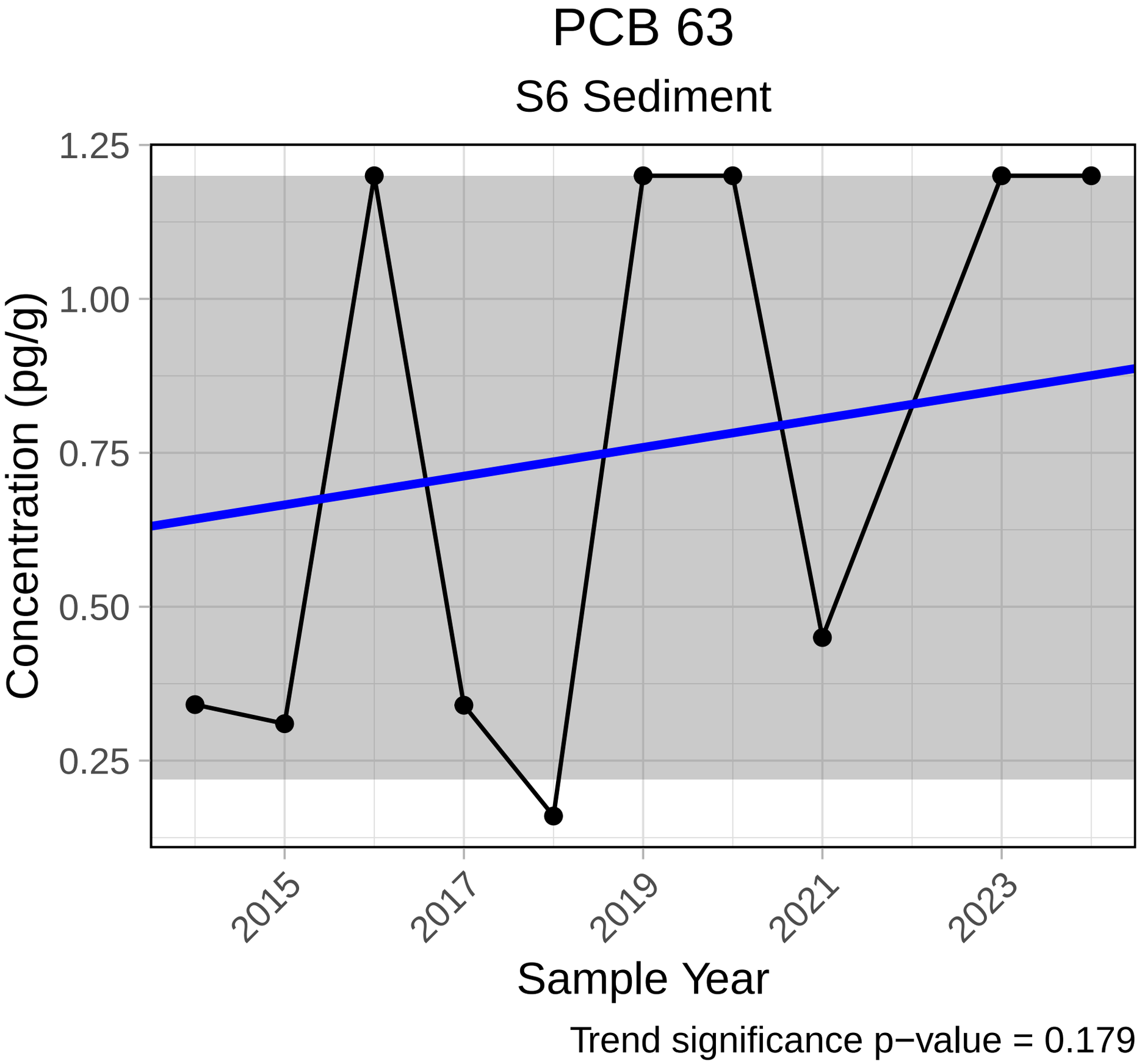
Trend significance p−value = 0.928

PCB 60

S6 Sediment

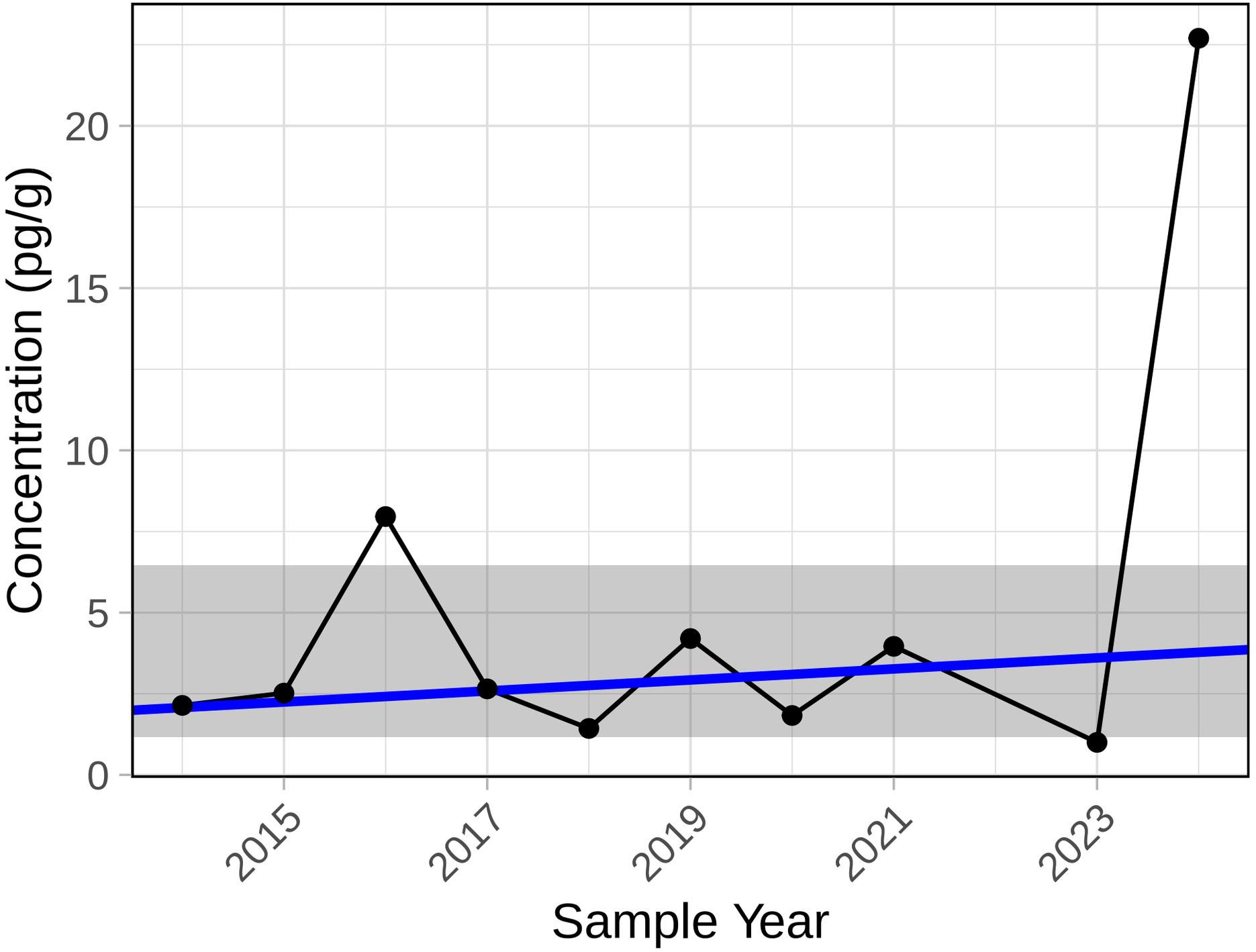


Trend significance p−value = 0.152

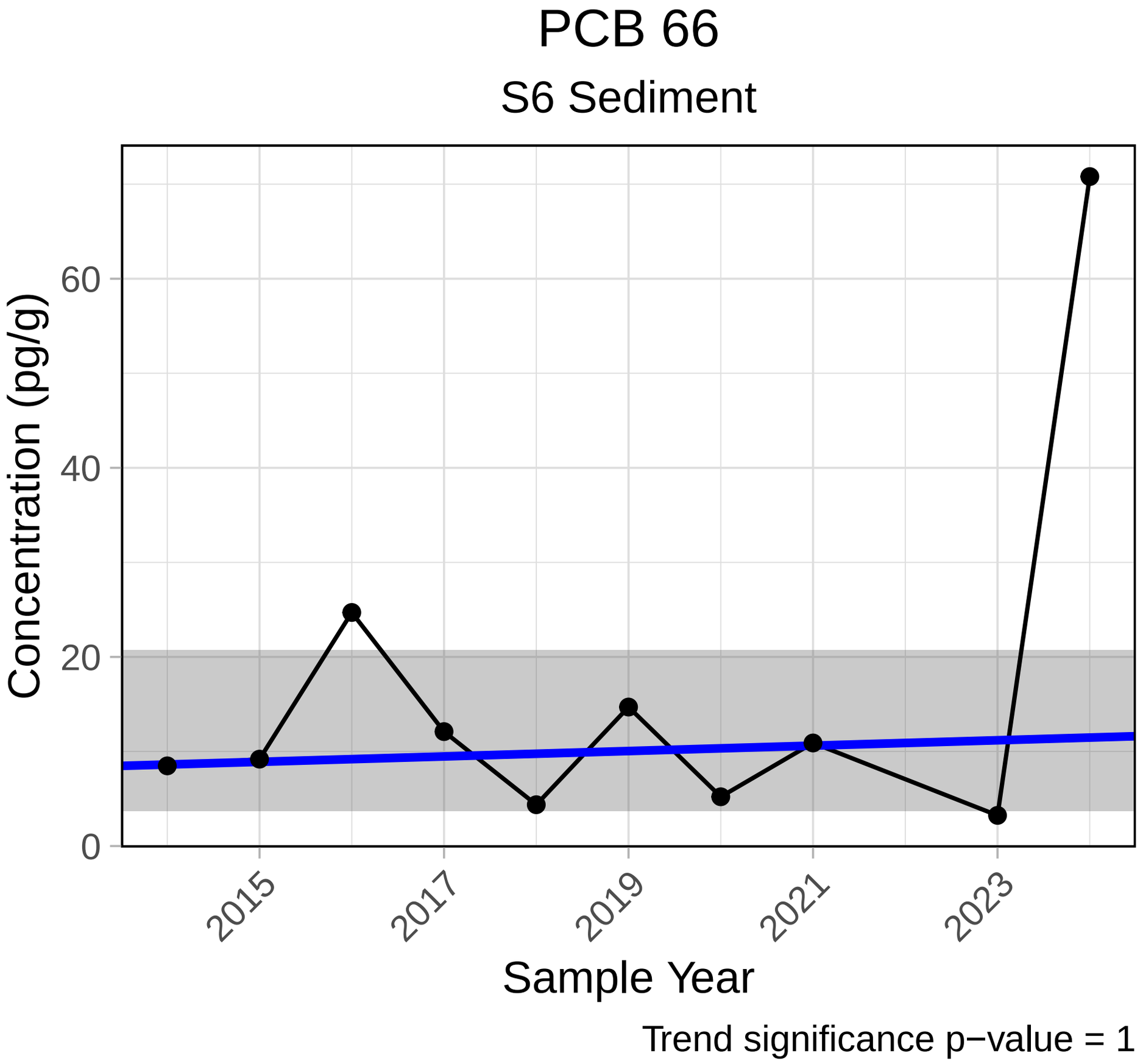

PCB 63
S6 Sediment
1.25
1.00
0.75
0.50
0.25
Concentration (pg/g)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.179

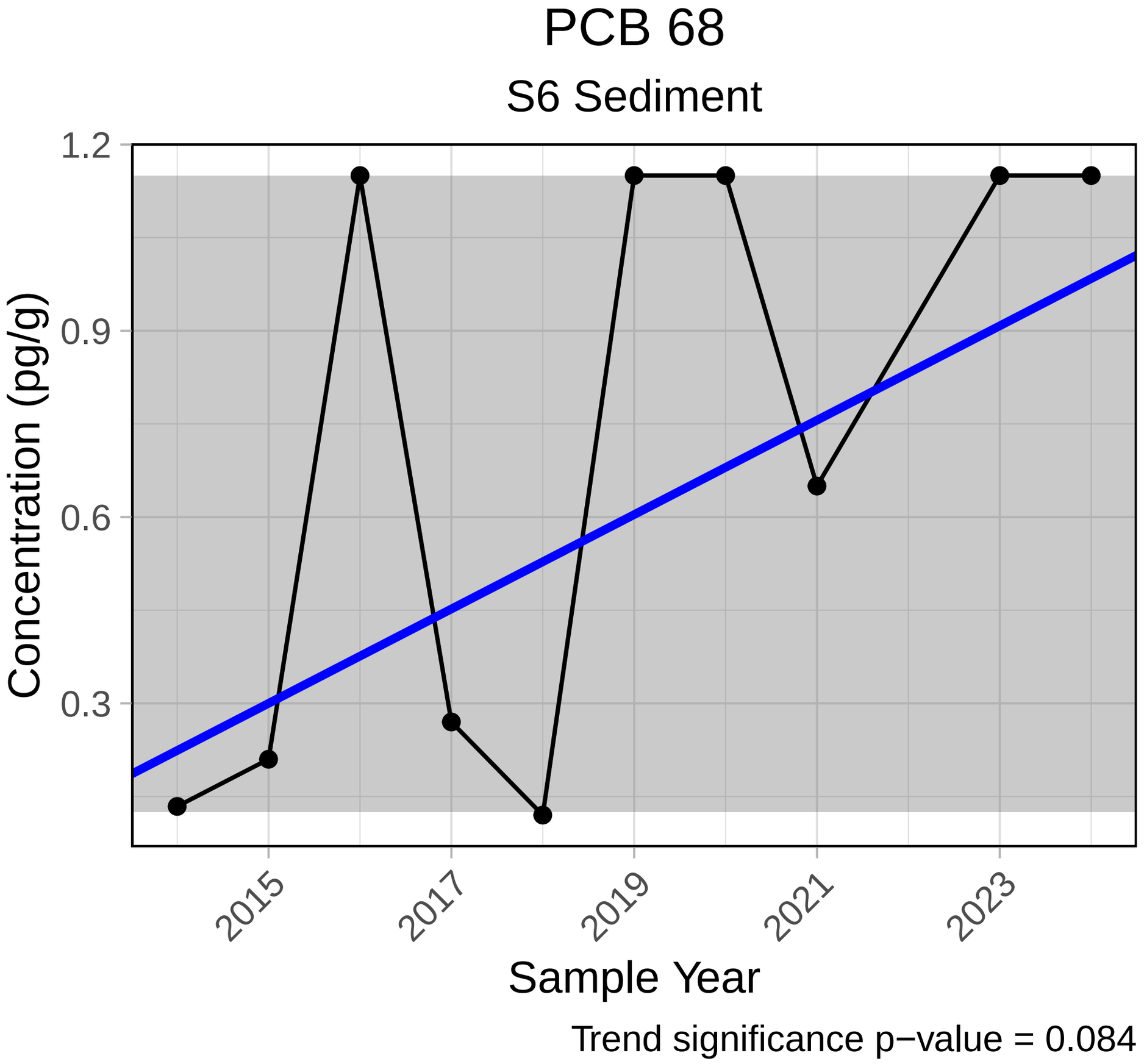
PCB 64

S6 Sediment



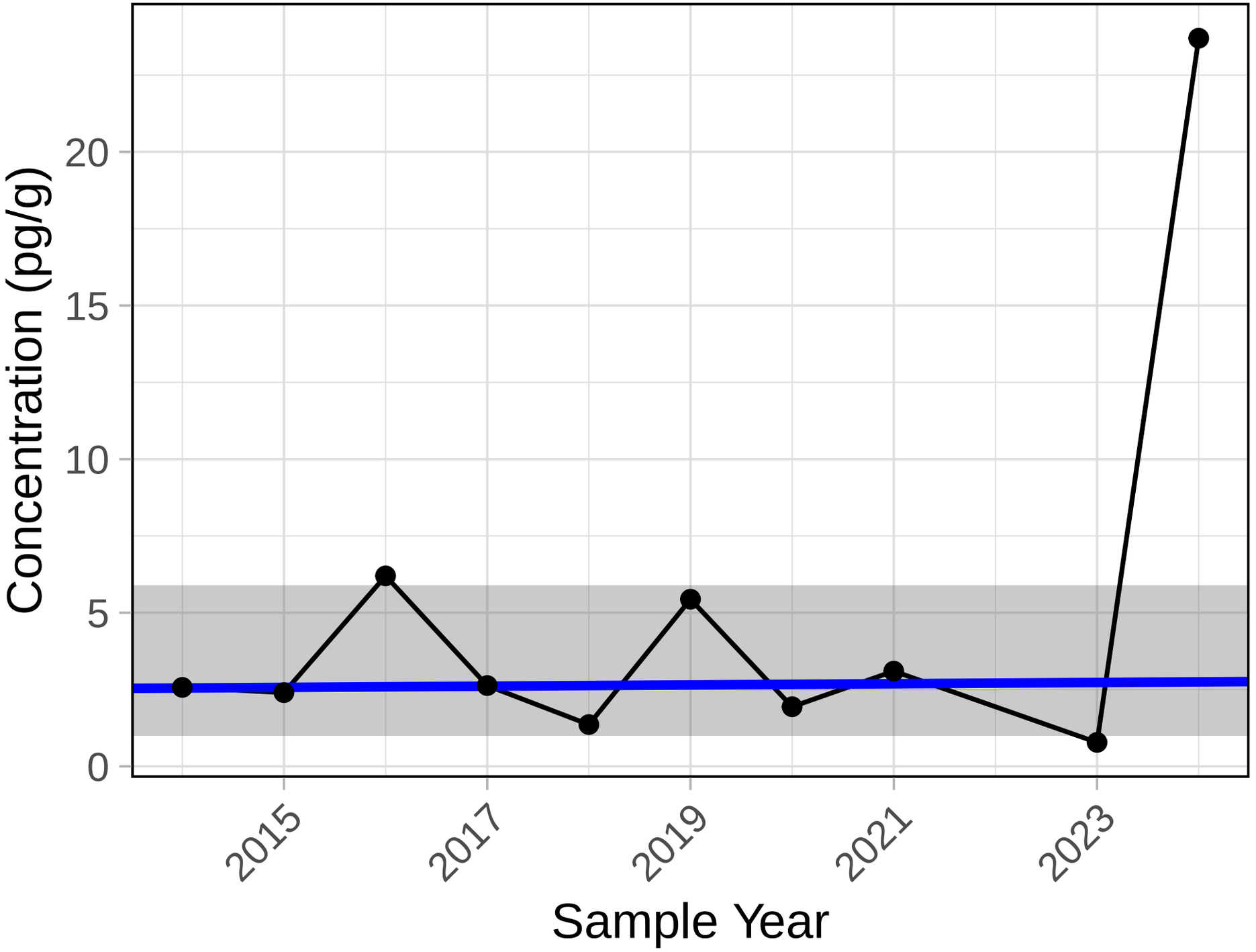
Trend significance p−value = 0.858


PCB 66
S6 Sediment
Concentration (pg/g)
0
20
40
60
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1


PCB 68
S6 Sediment
1.2
0.9
0.6
0.3
Concentration (pg/g)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.084

PCB 77

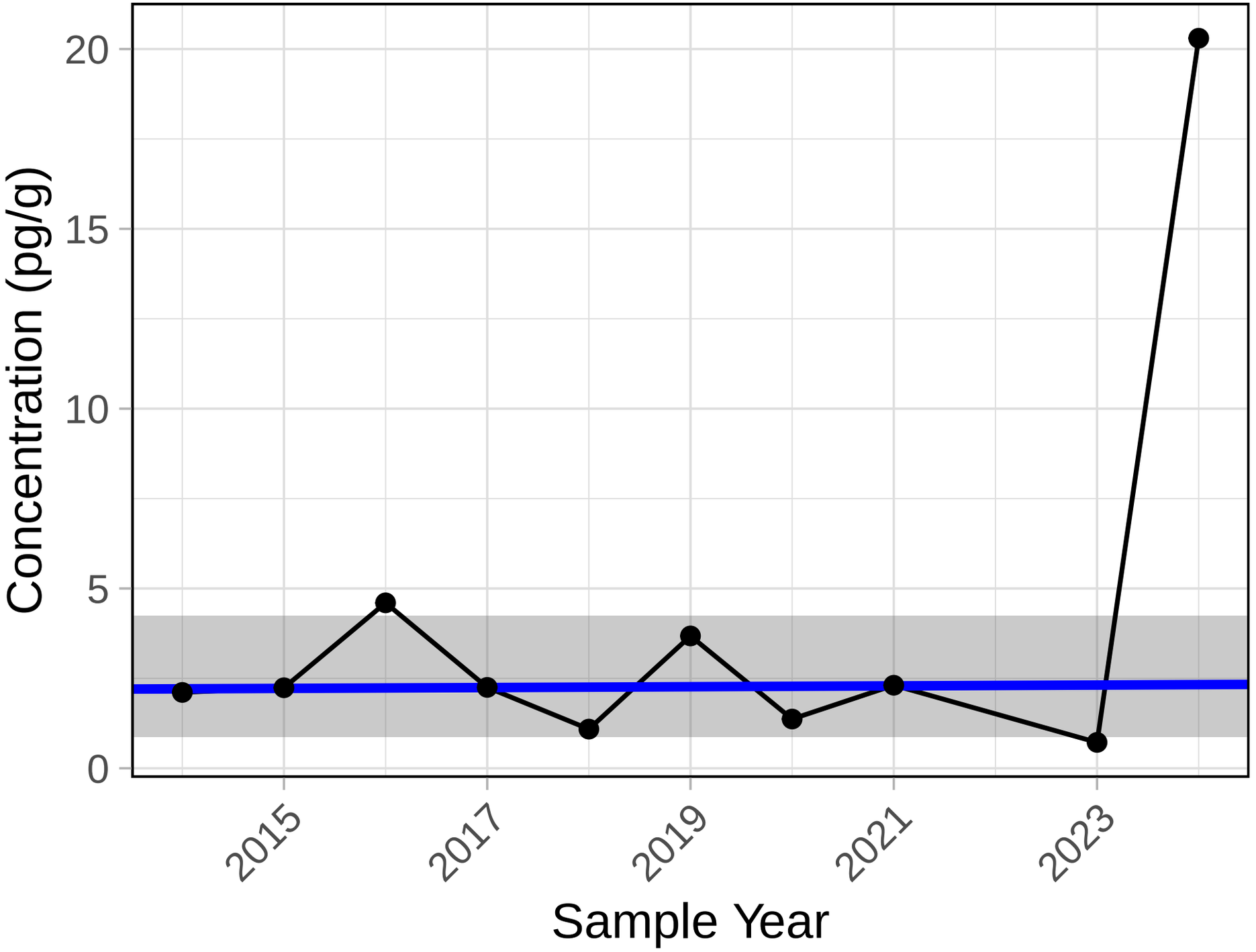
S6 Sediment



Trend significance p−value = 1

PCB 82

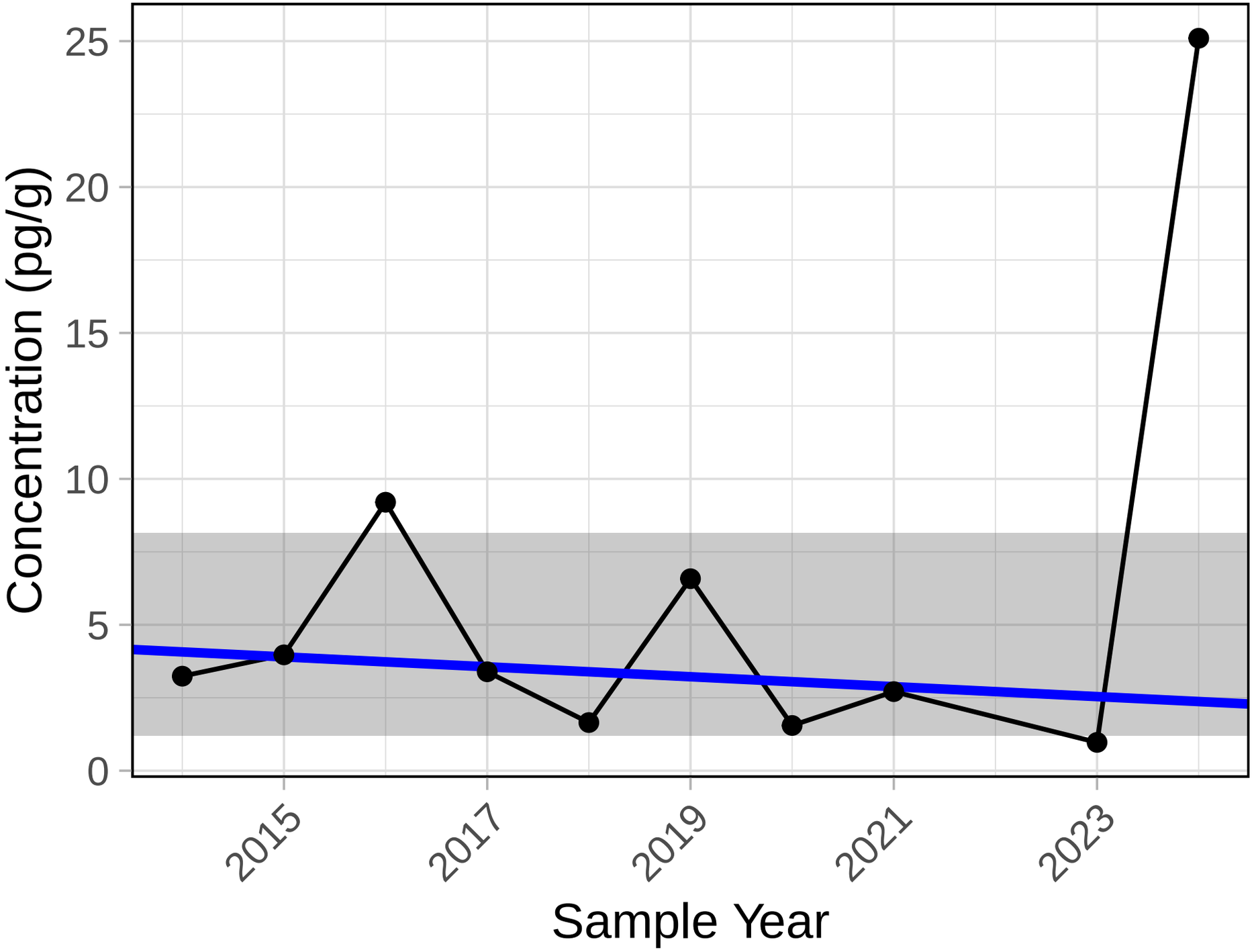
S6 Sediment



Trend significance p−value = 0.858

PCB 84

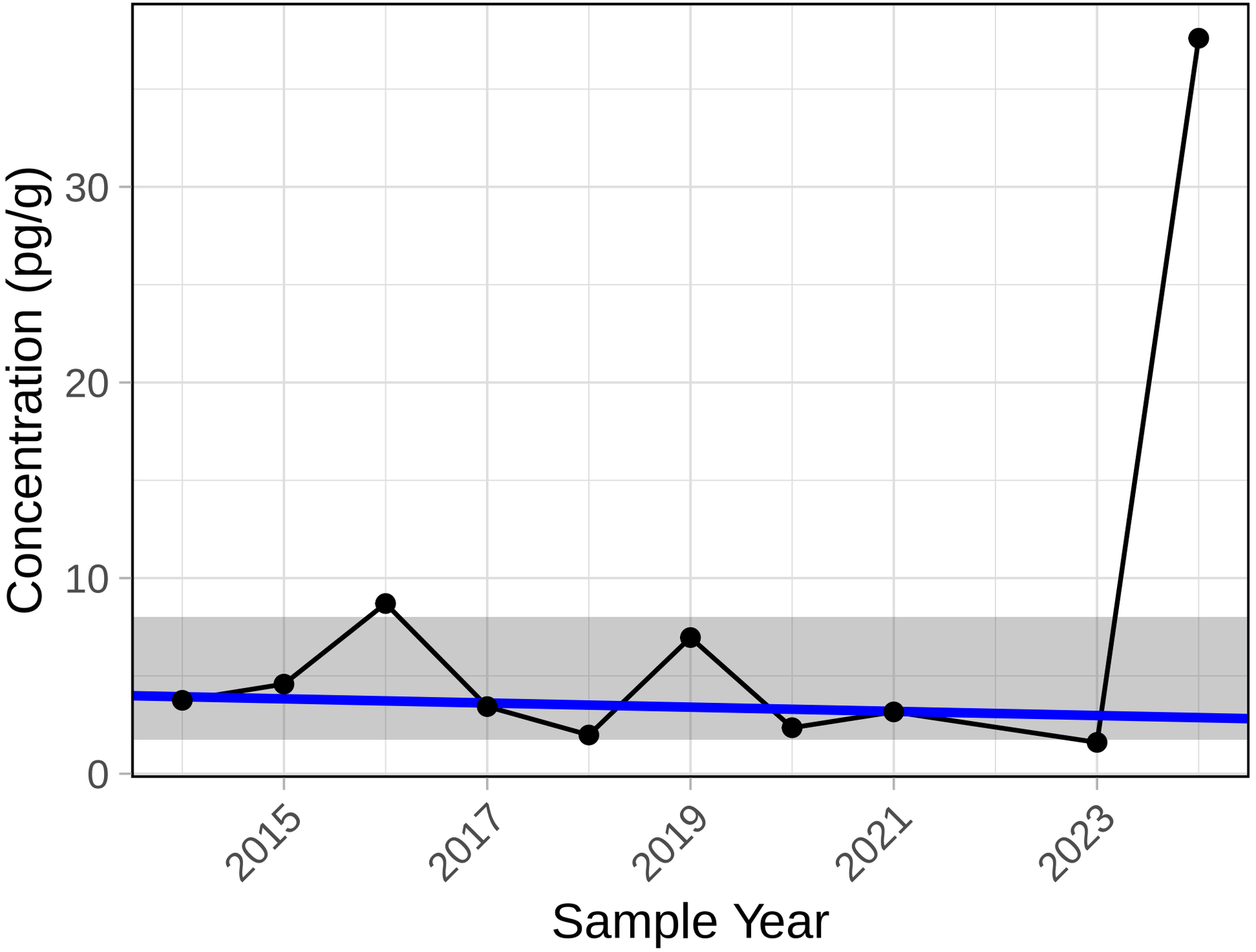
S6 Sediment



Trend significance p−value = 0.592

PCB 92

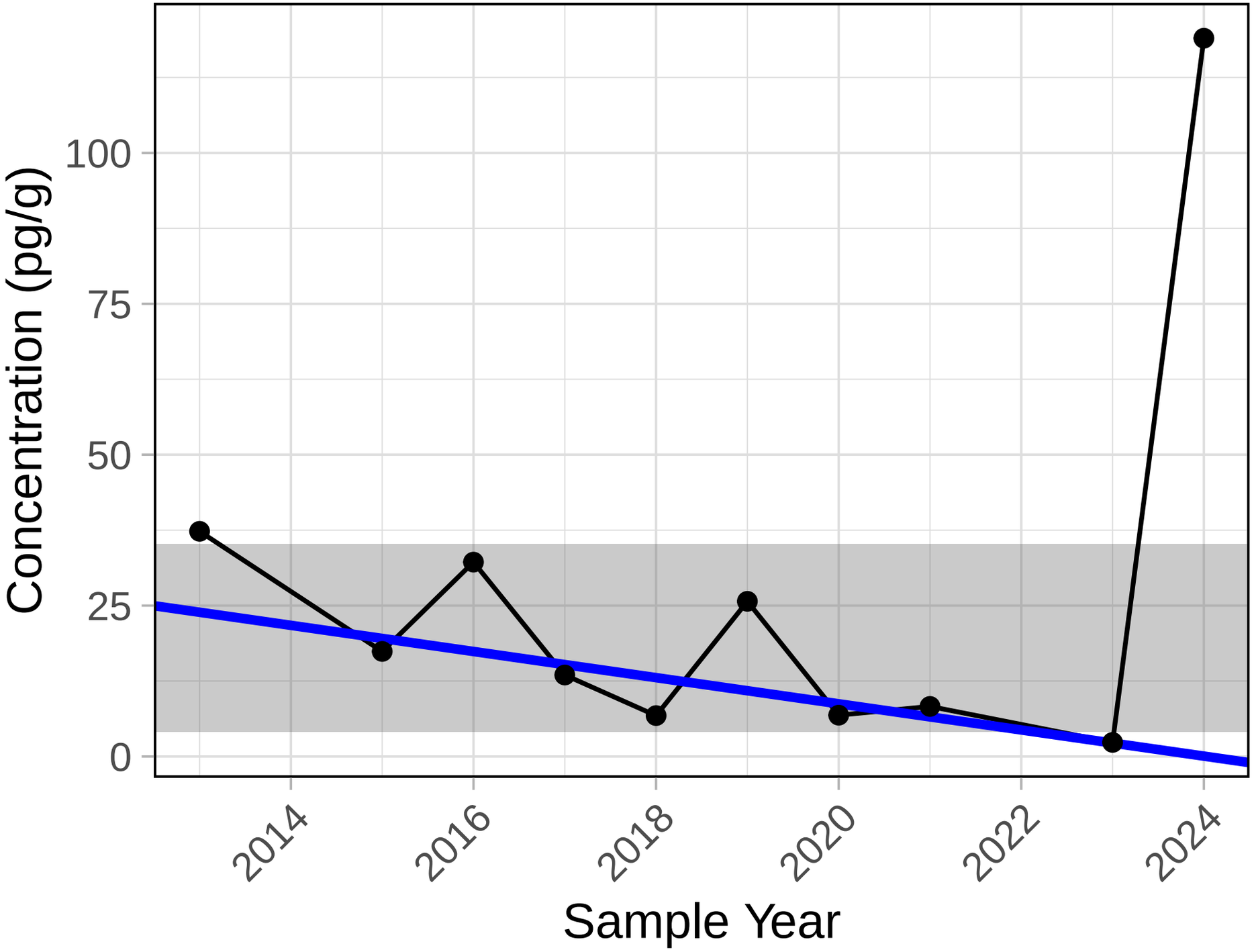
S6 Sediment



Trend significance p−value = 0.592

PCB 95

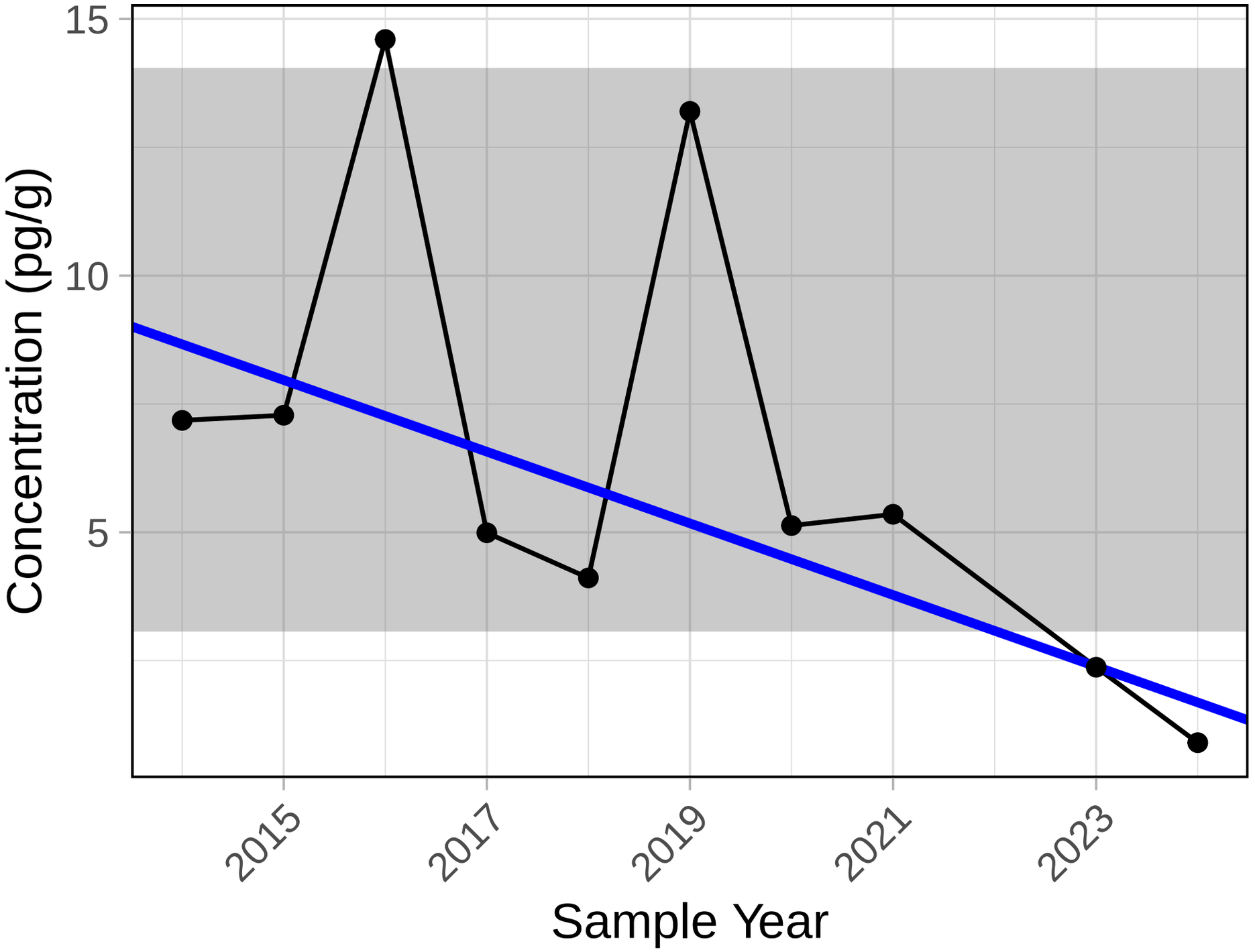
S6 Sediment



Trend significance p−value = 0.283

PCBs 128+166

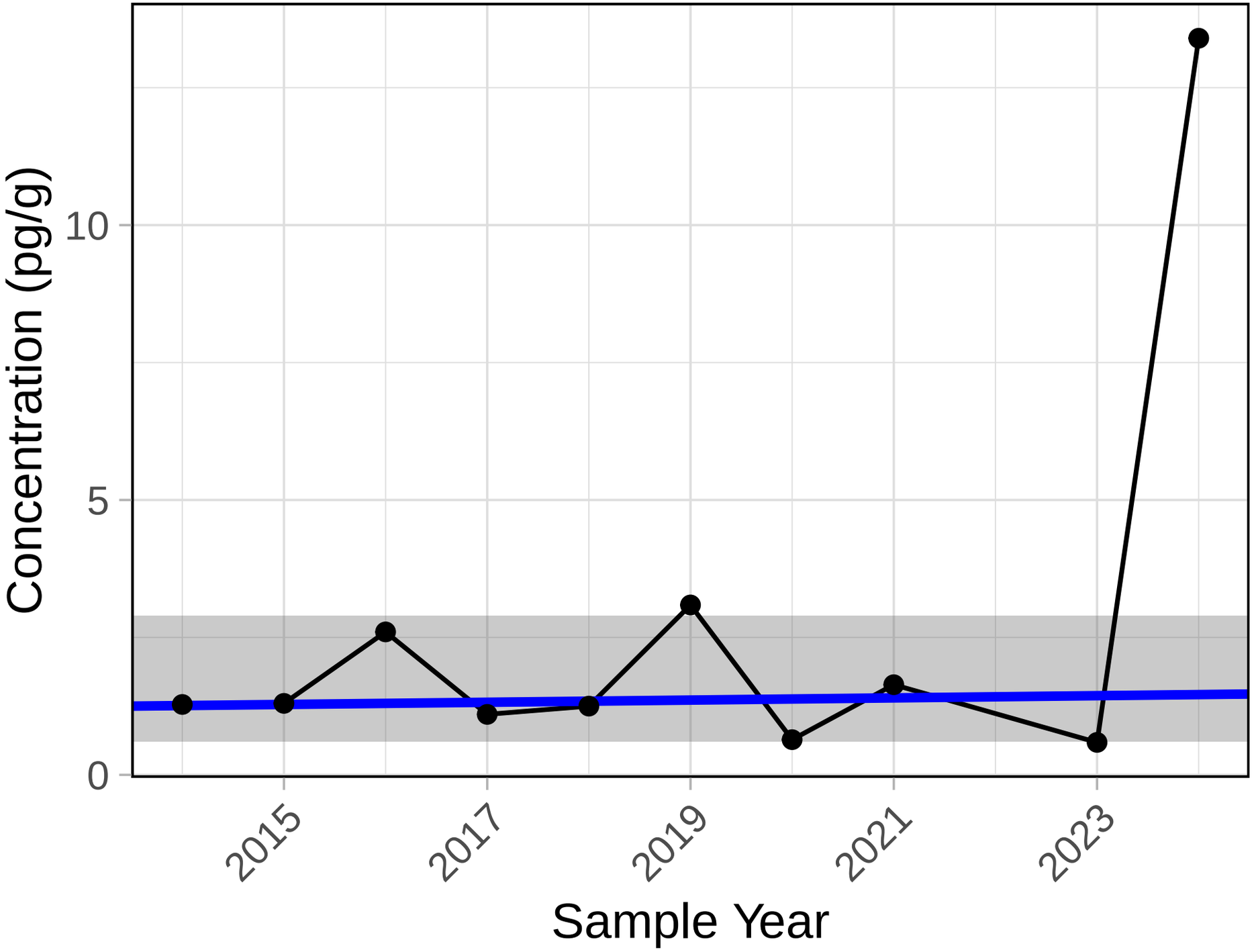
S6 Sediment



Trend significance p−value = 0.074

PCBs 134+143

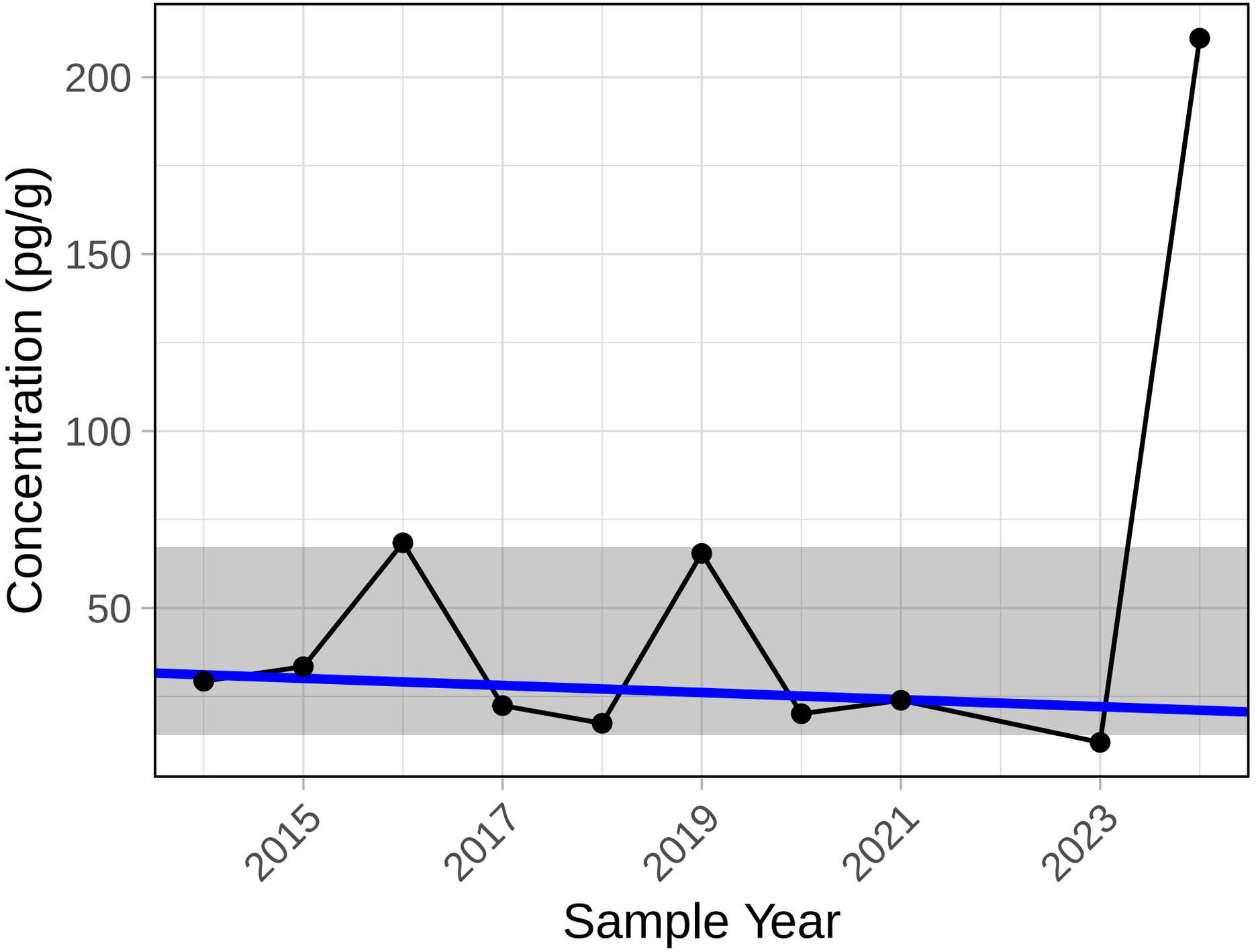
S6 Sediment



Trend significance p−value = 1

PCBs 147+149

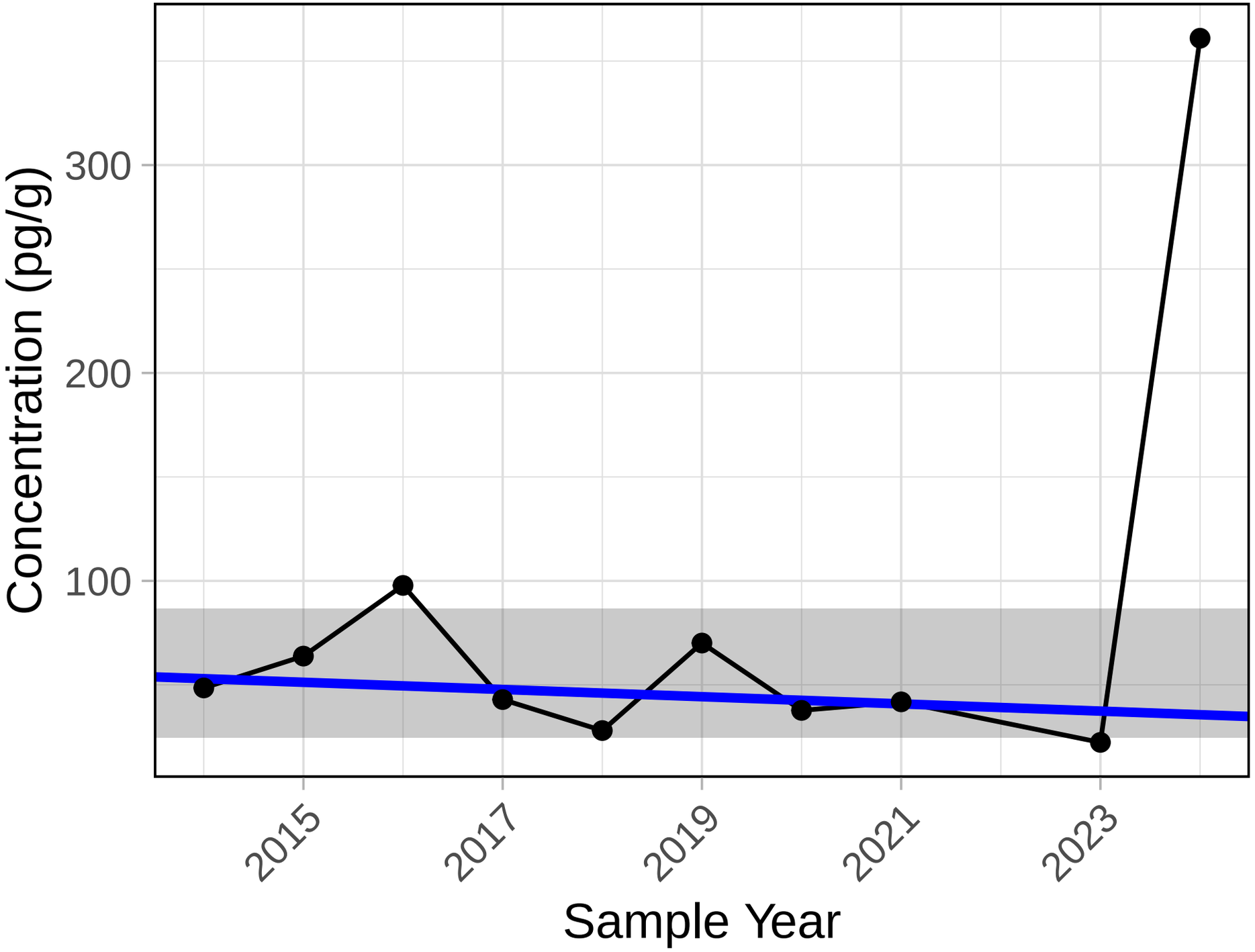
S6 Sediment



Trend significance p−value = 0.721

PCBs 153+168

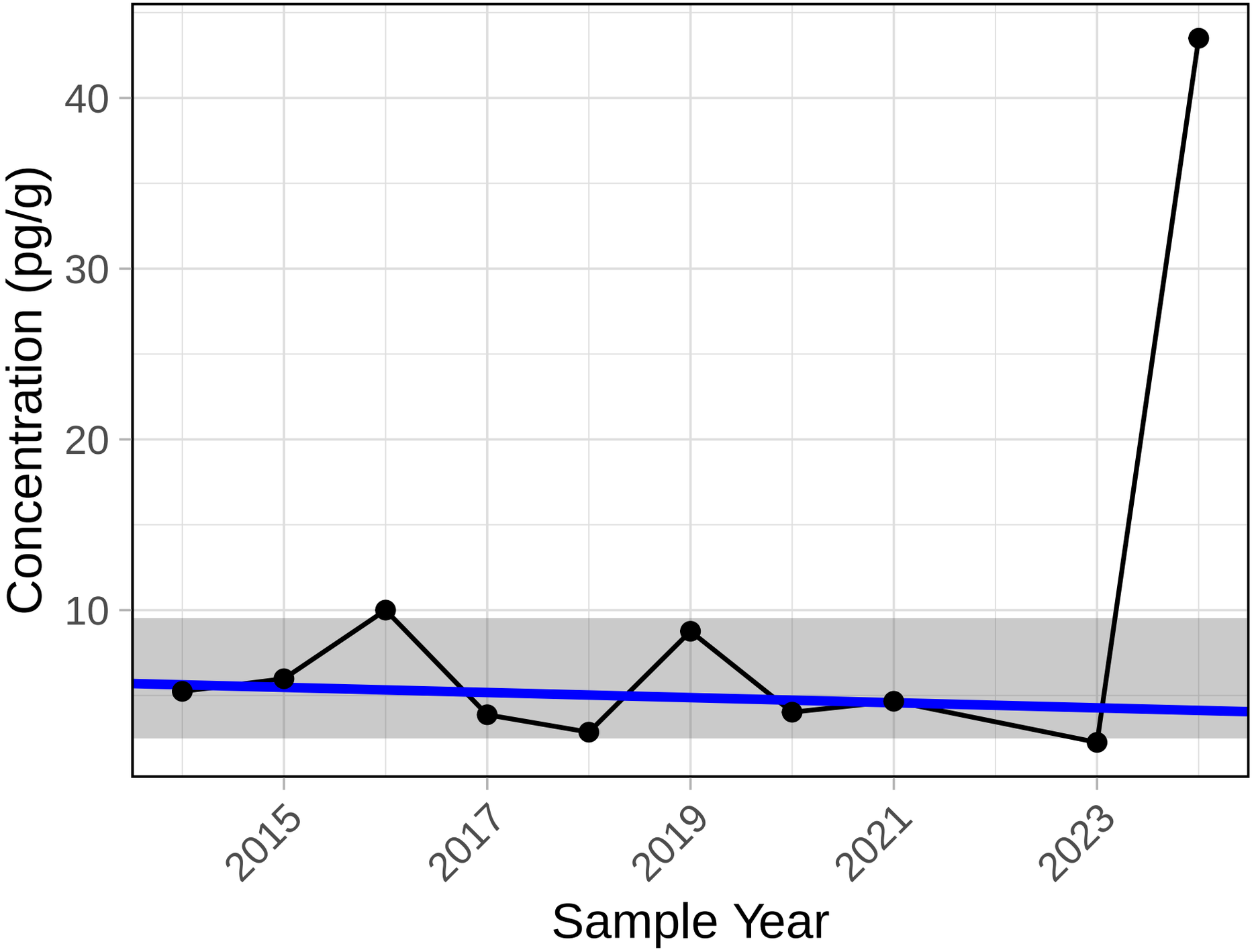
S6 Sediment



Trend significance p−value = 0.592

PCBs 156+157

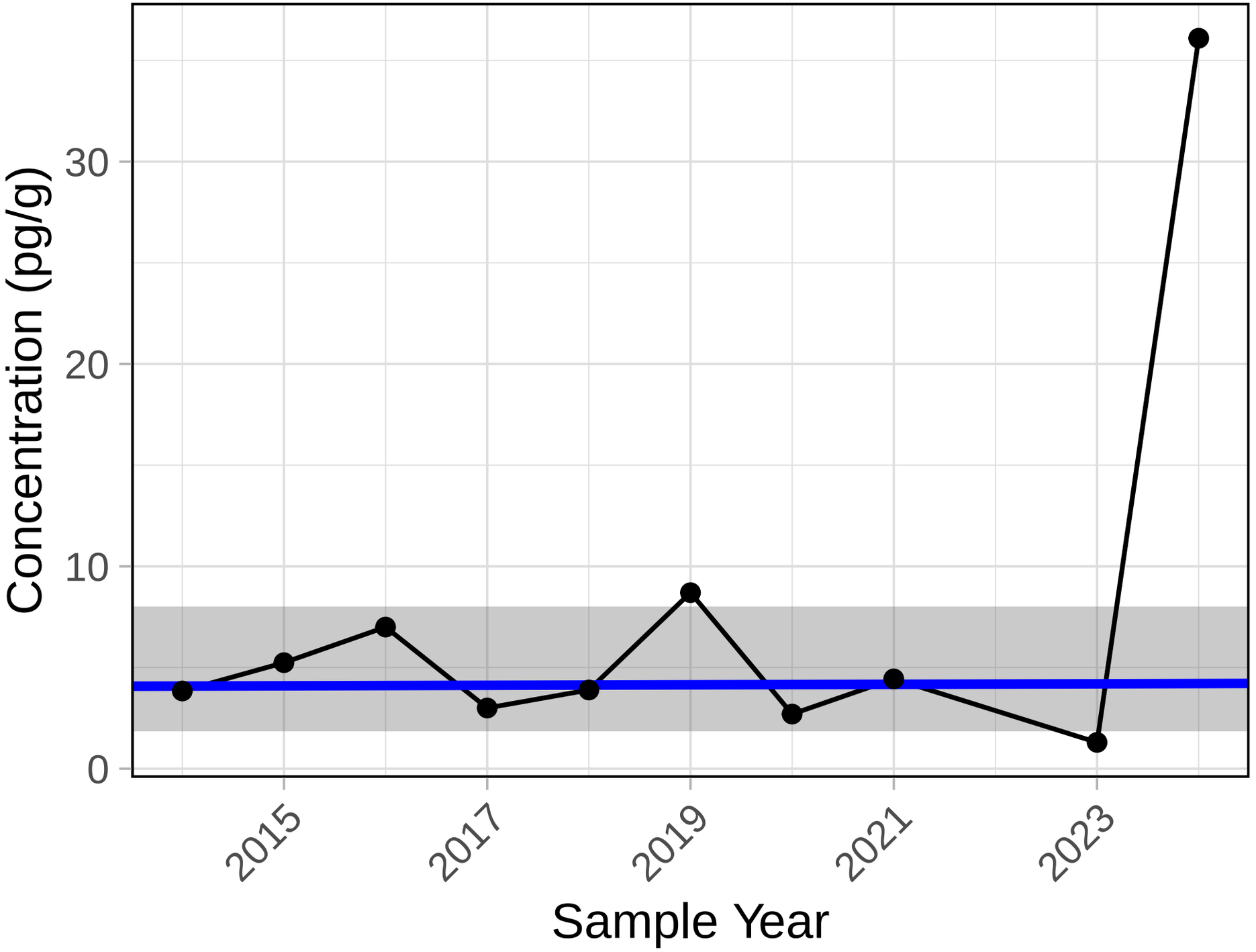
S6 Sediment



Trend significance p−value = 0.858

PCBs 171+173

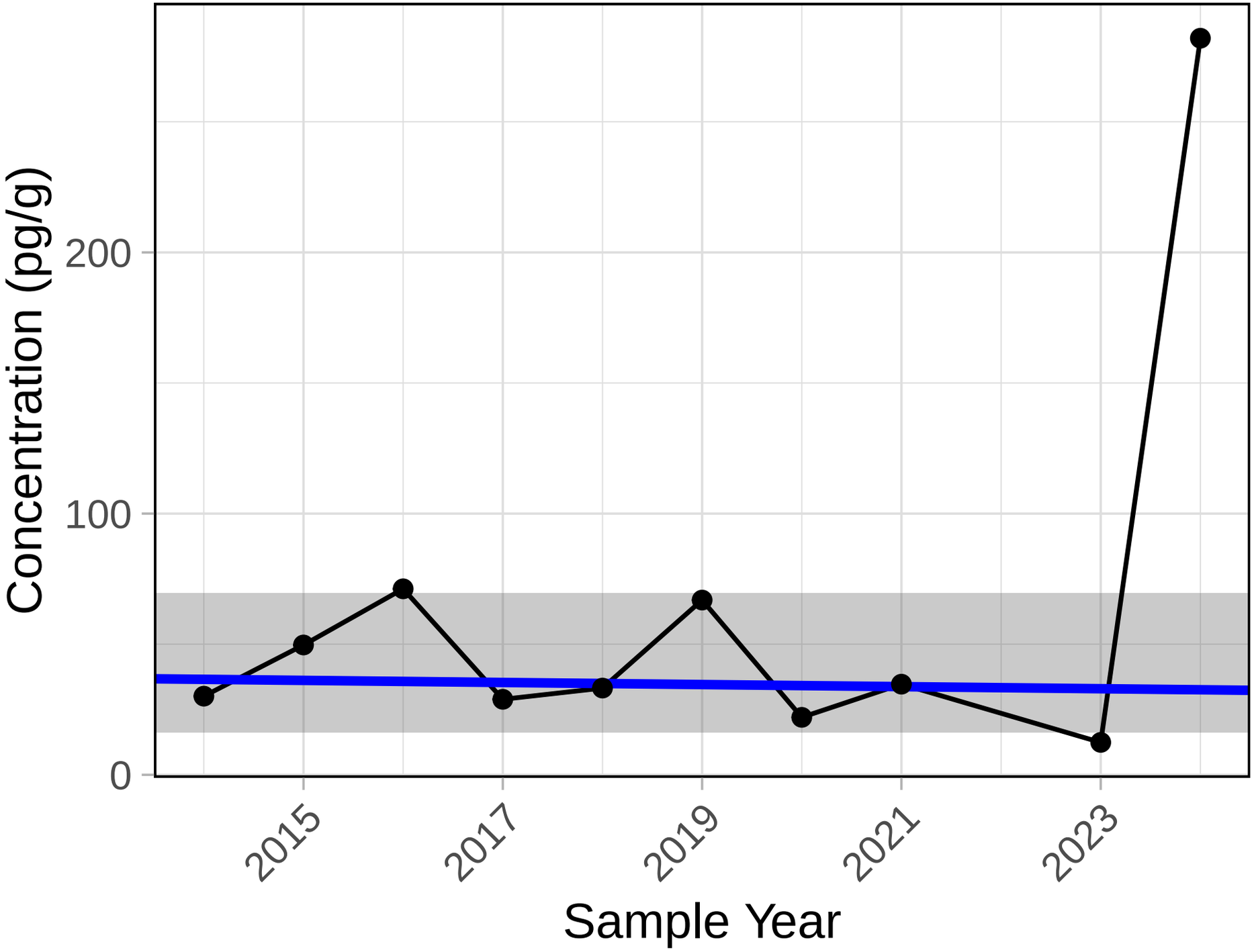
S6 Sediment



Trend significance p−value = 1

PCBs 180+193

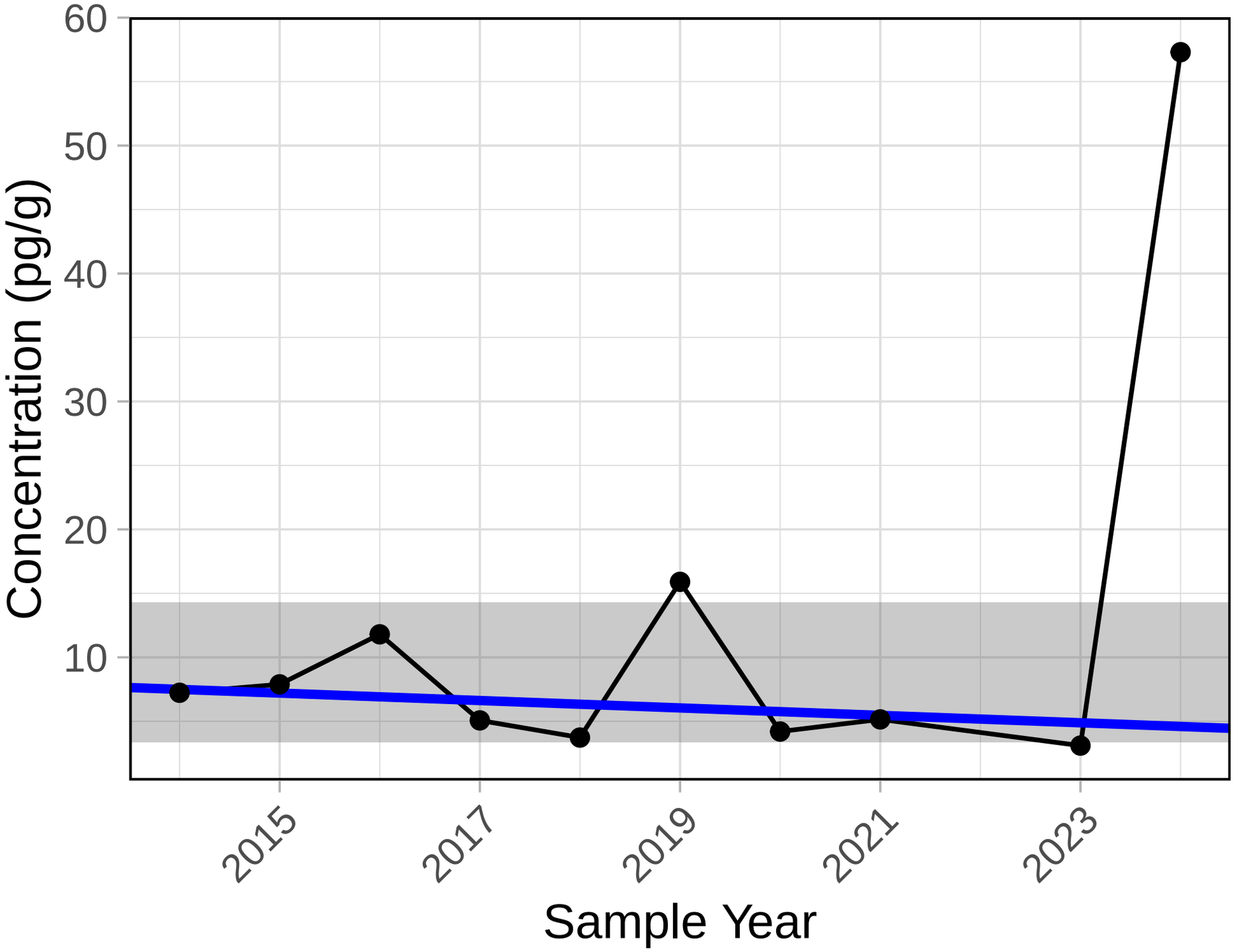
S6 Sediment



Trend significance p−value = 1

PCBs 198+199

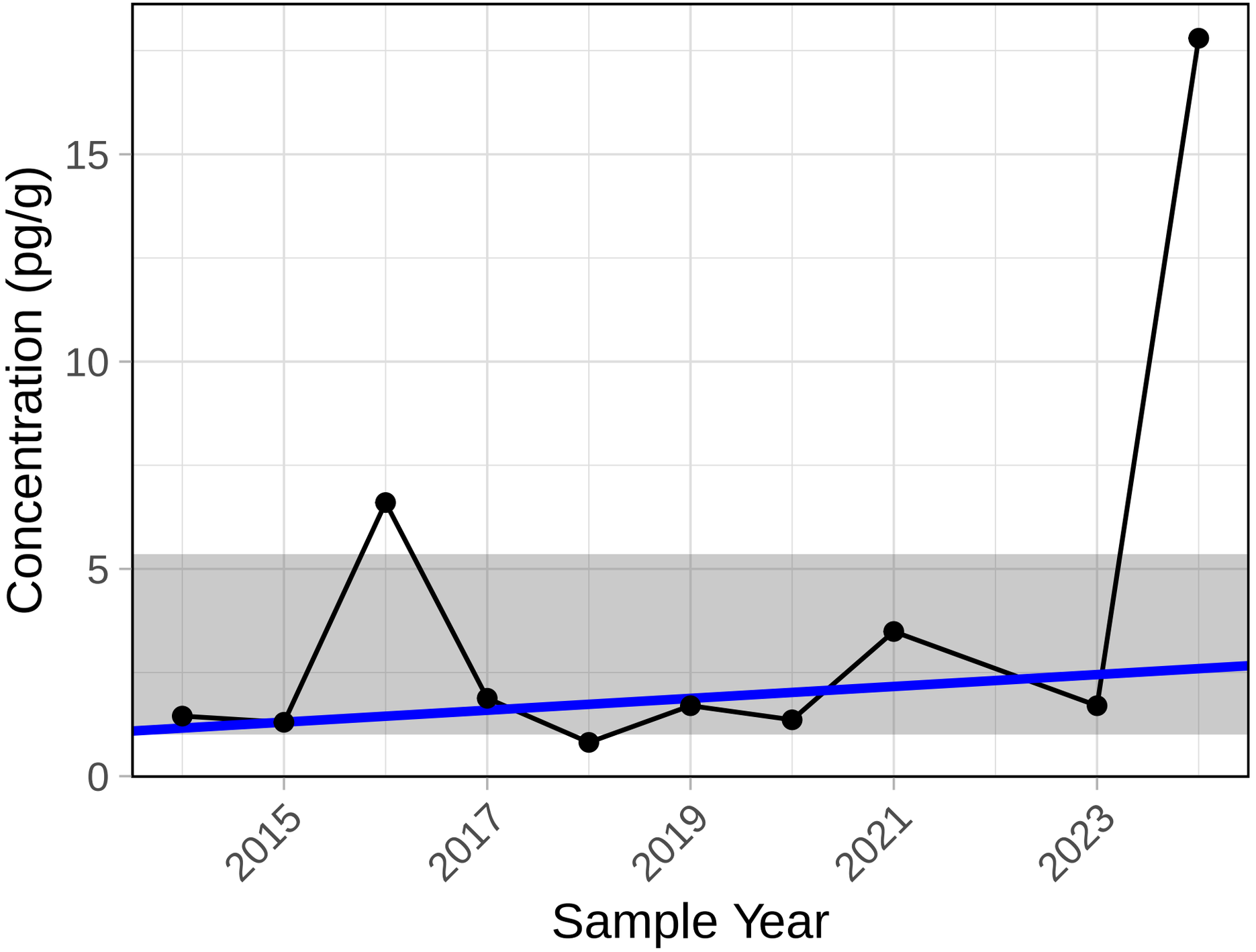
S6 Sediment



Trend significance p−value = 0.858

PCBs 41+71+40

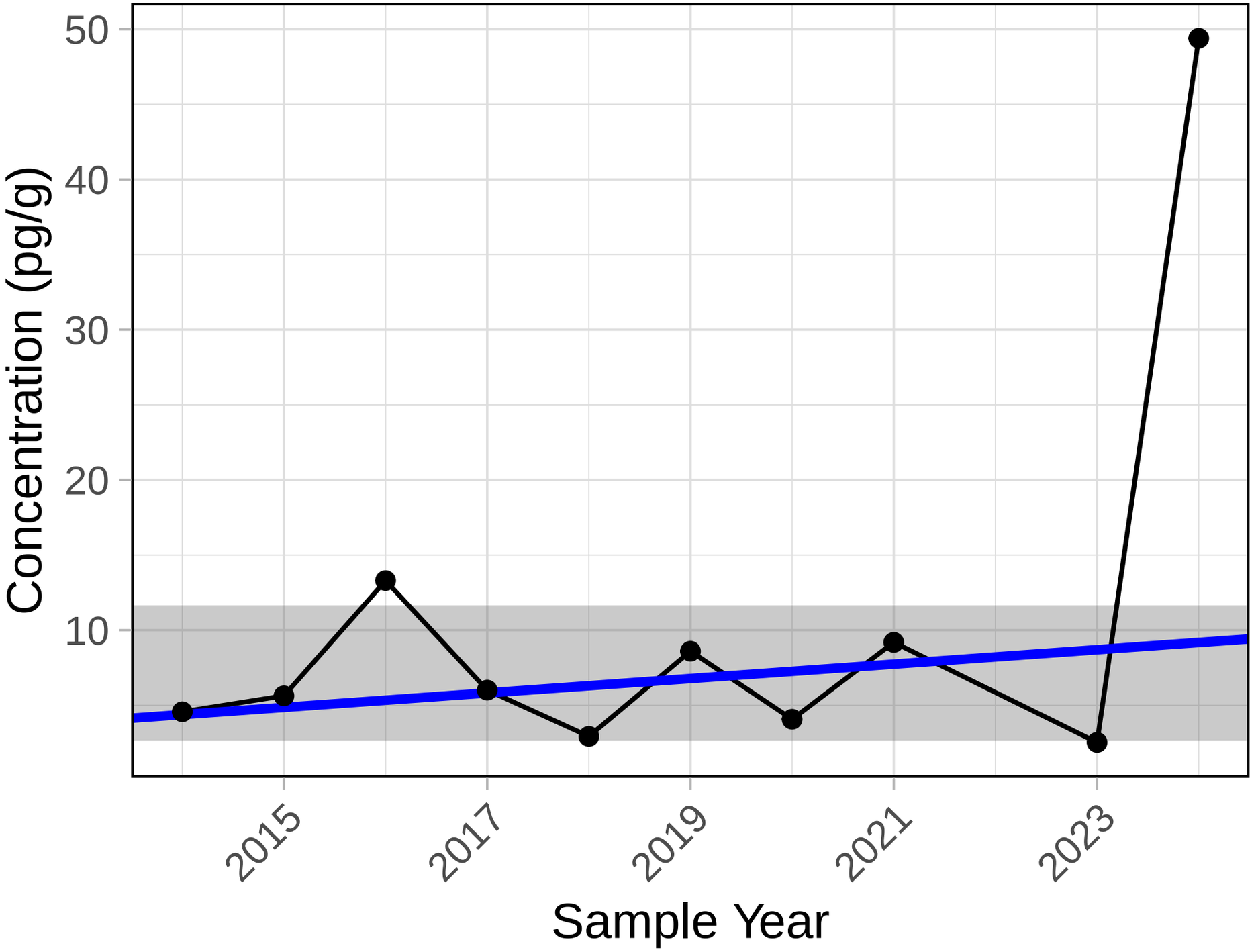
S6 Sediment



Trend significance p−value = 0.323

PCBs 44+47+65

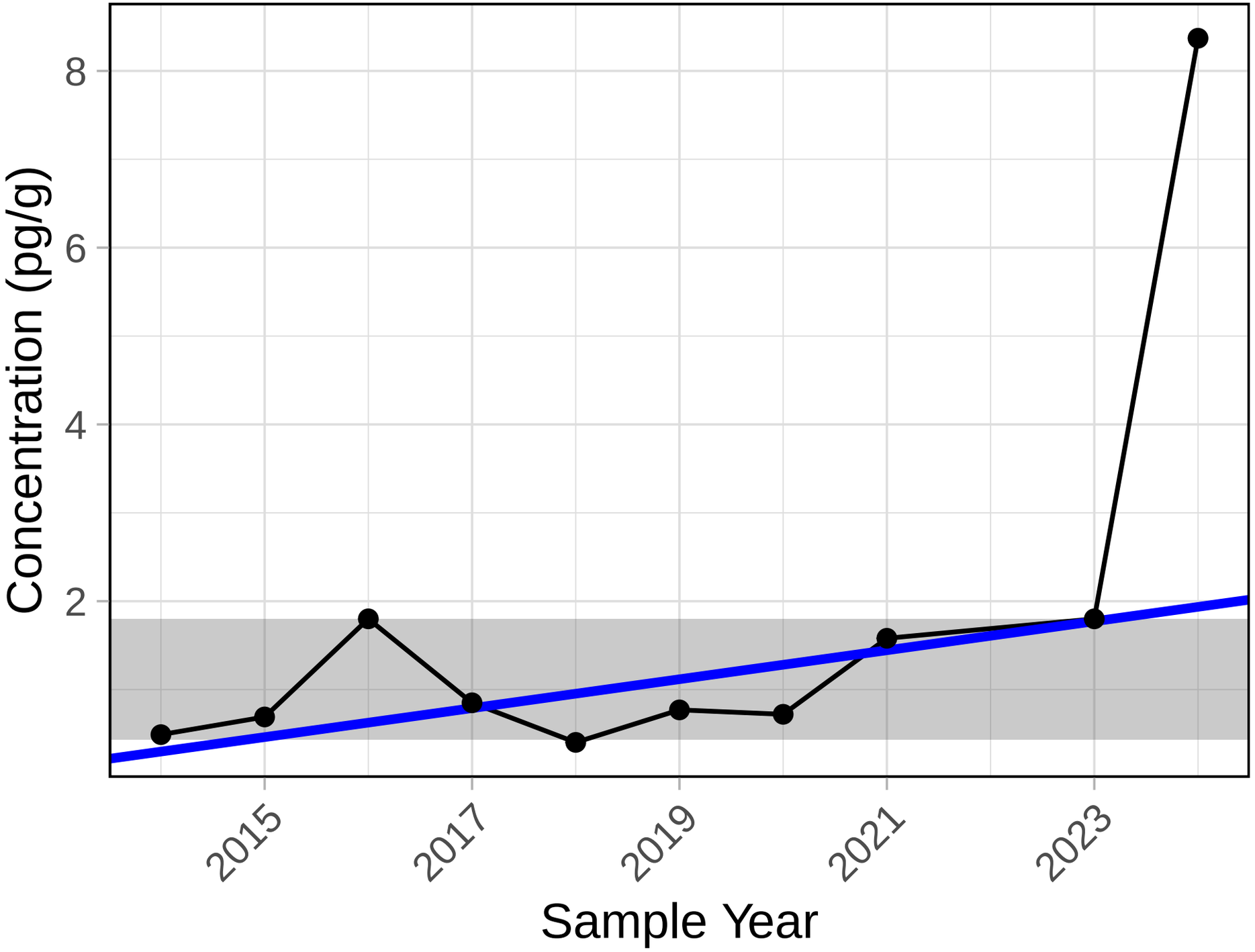
S6 Sediment



Trend significance p−value = 0.721

PCBs 45+51

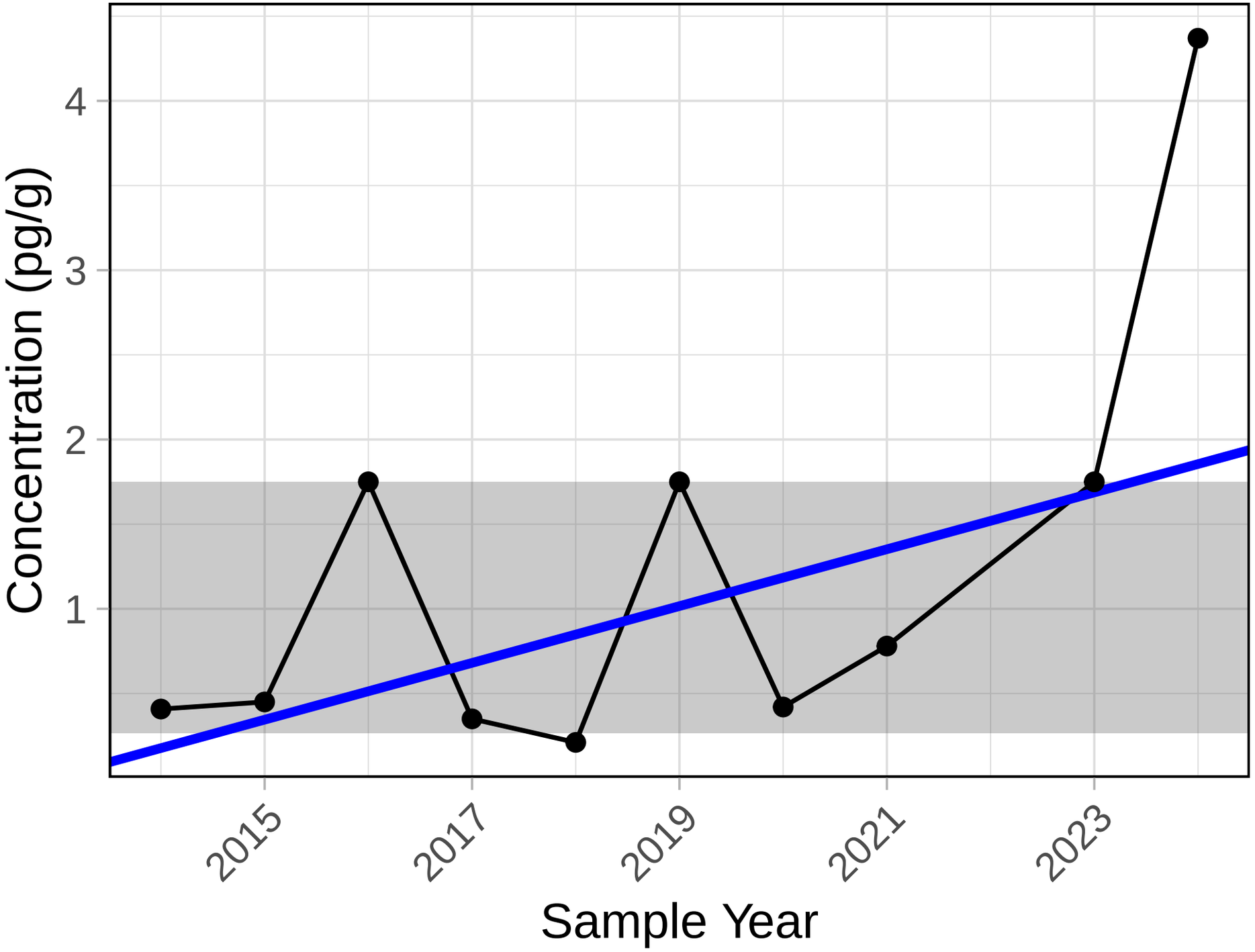
S6 Sediment



Trend significance p−value = 0.059

PCBs 50+53

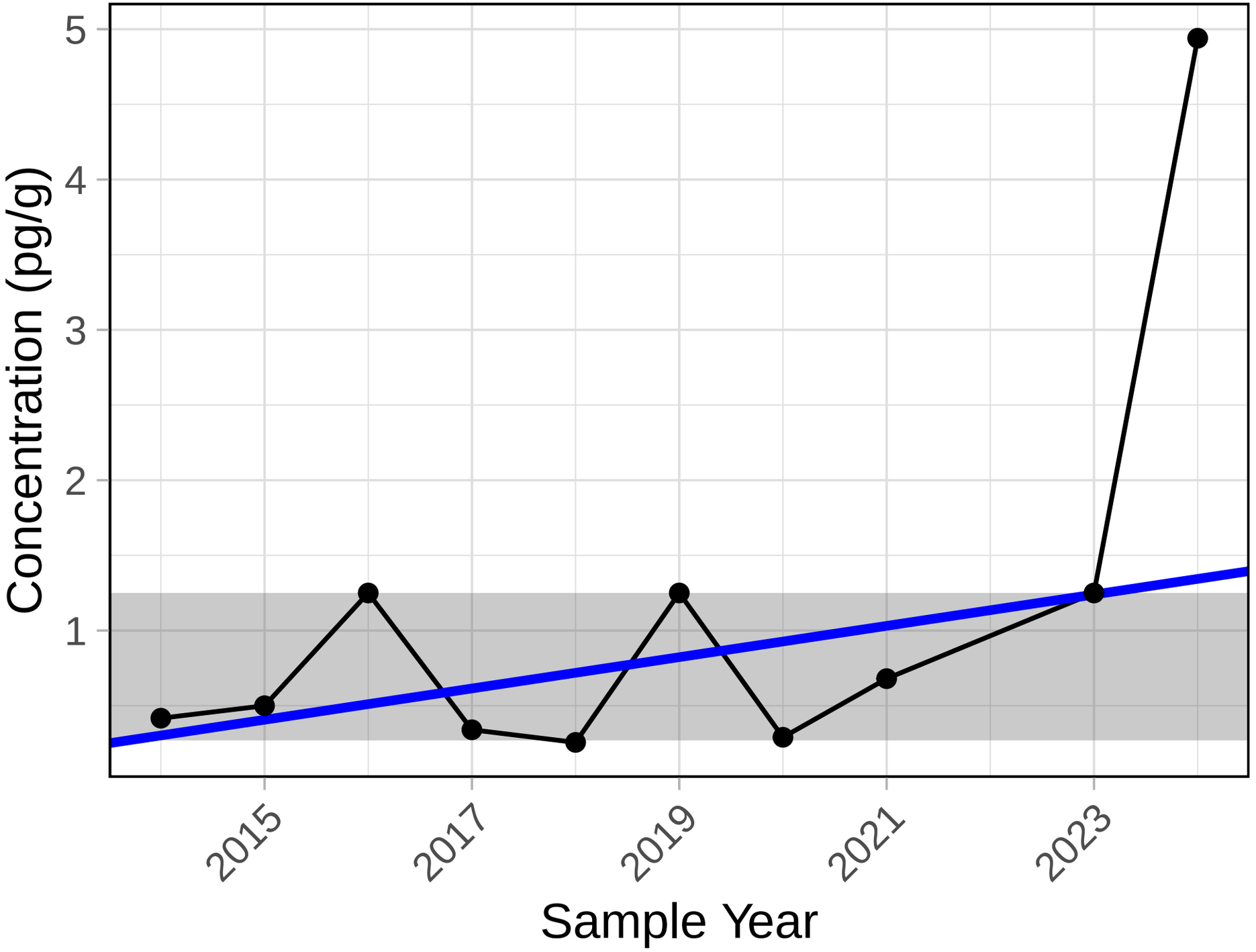
S6 Sediment



Trend significance p−value = 0.123

PCBs 59+62+75

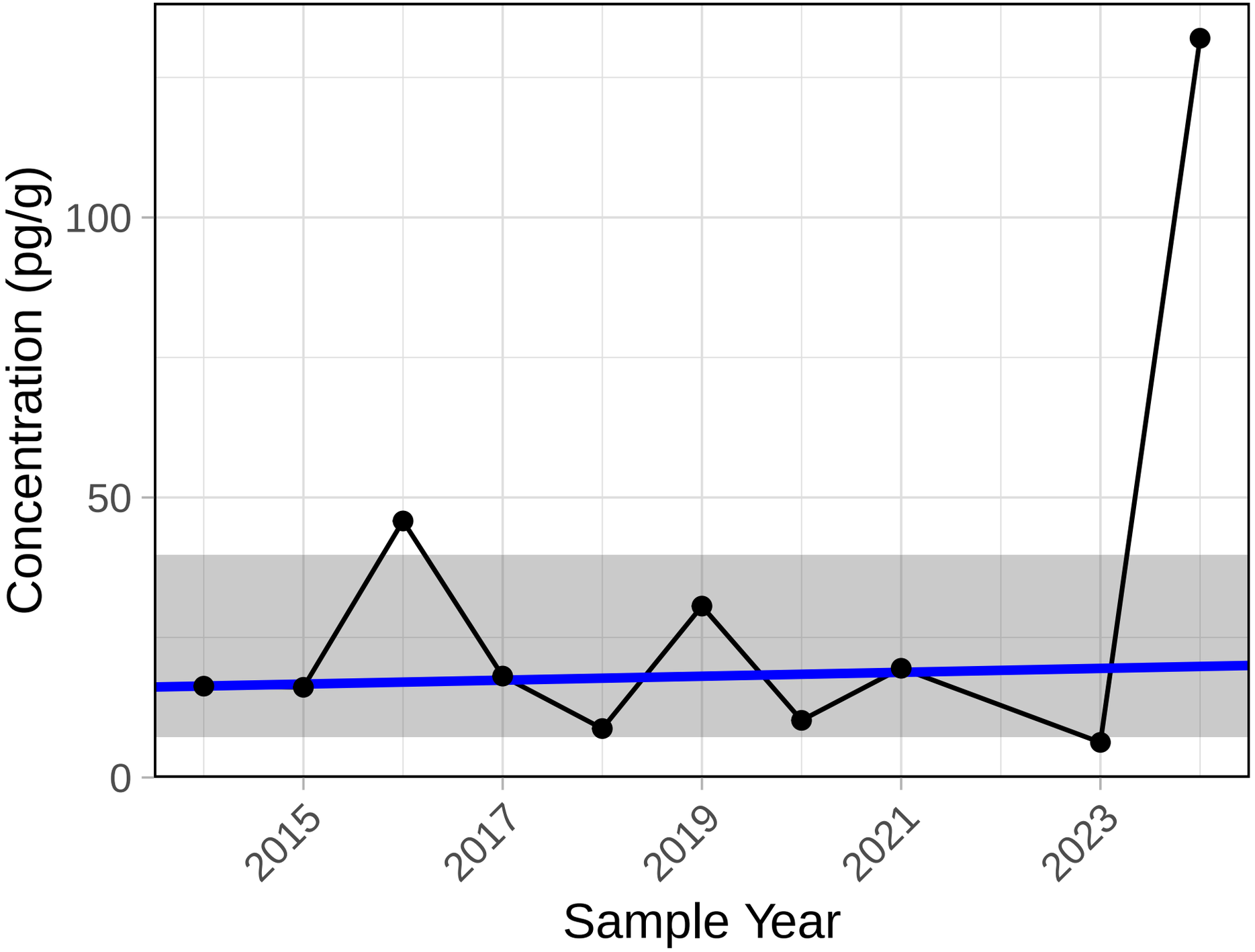
S6 Sediment



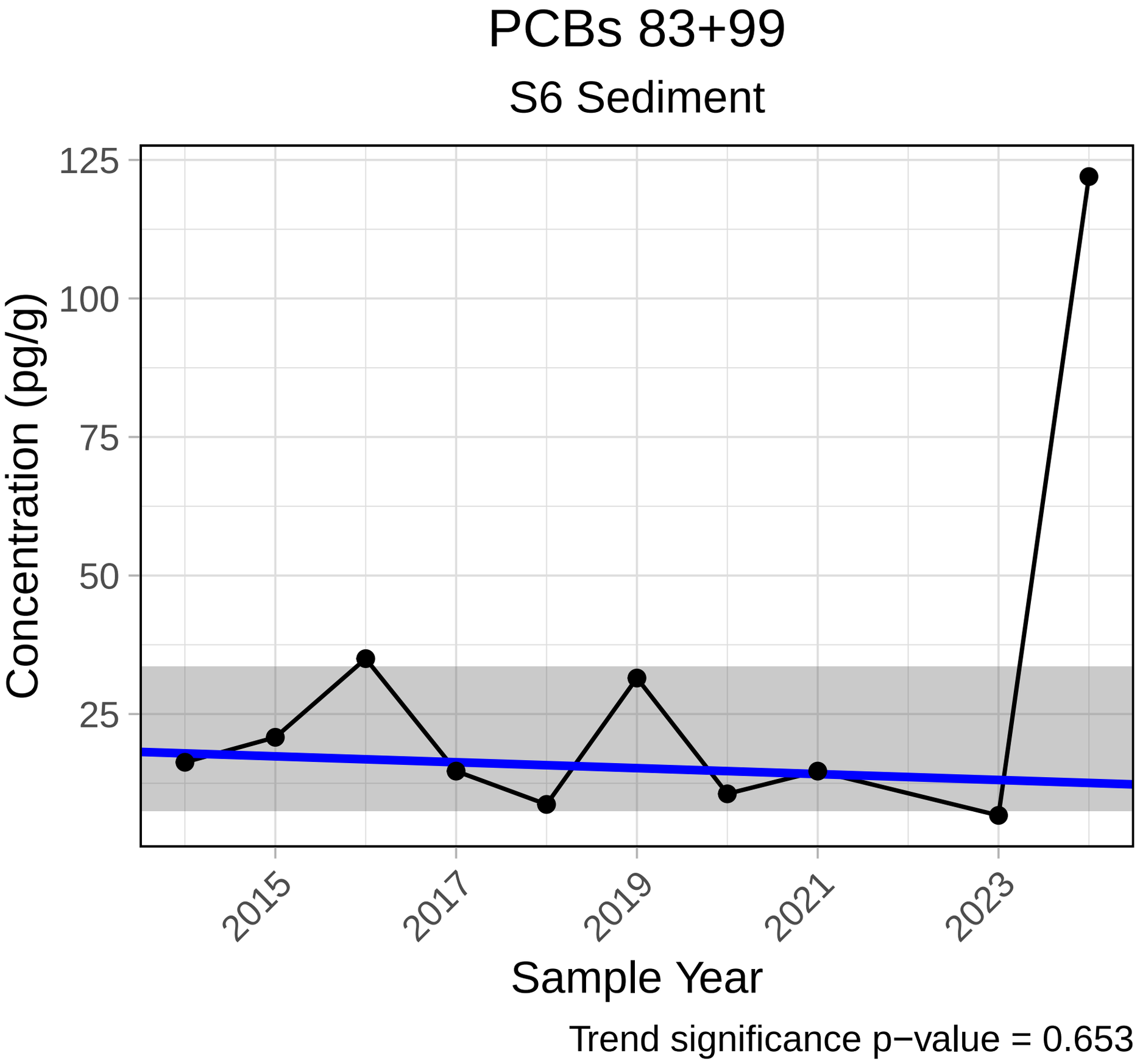
Trend significance p−value = 0.238

PCBs 70+61+74+76

S6 Sediment

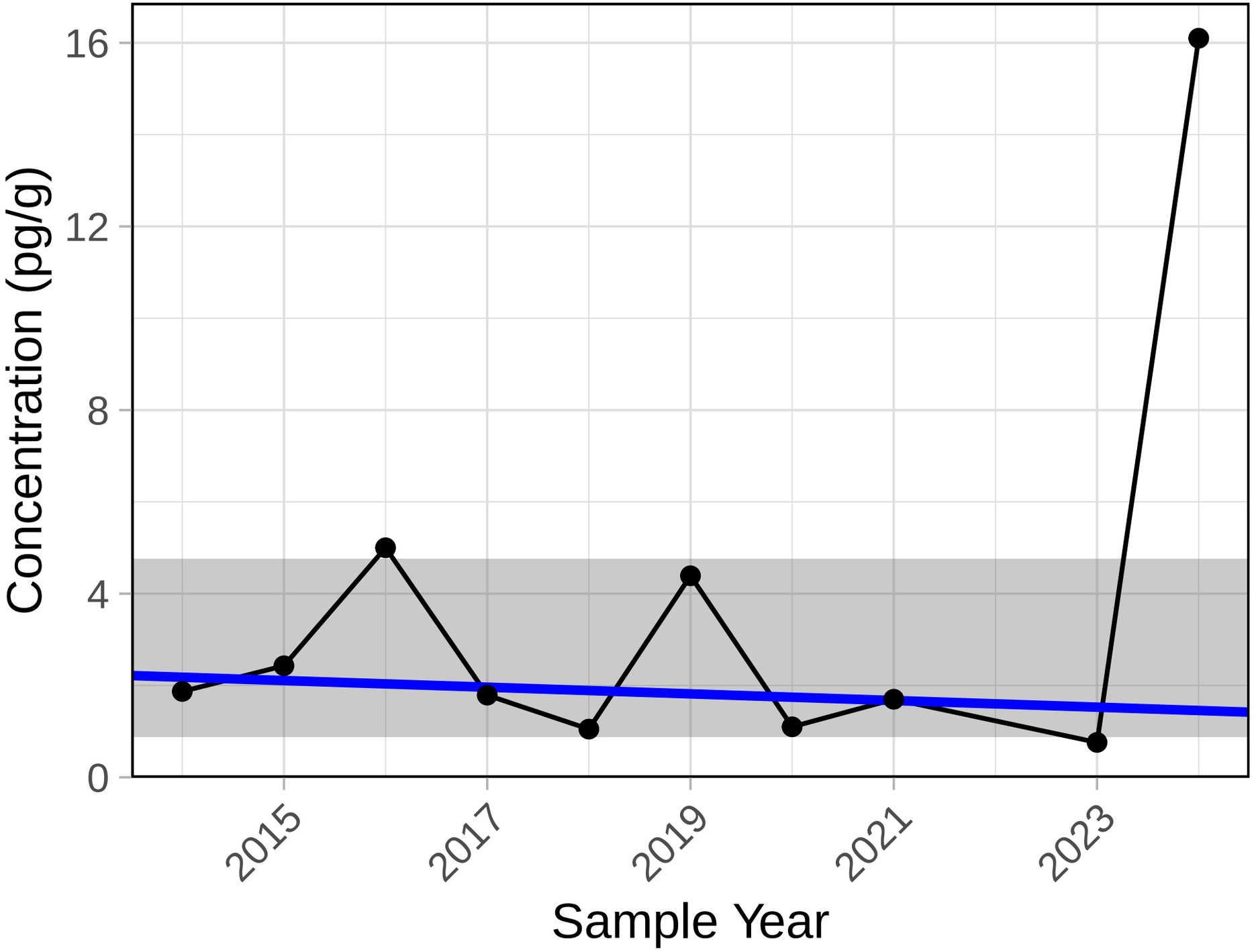


Trend significance p−value = 1

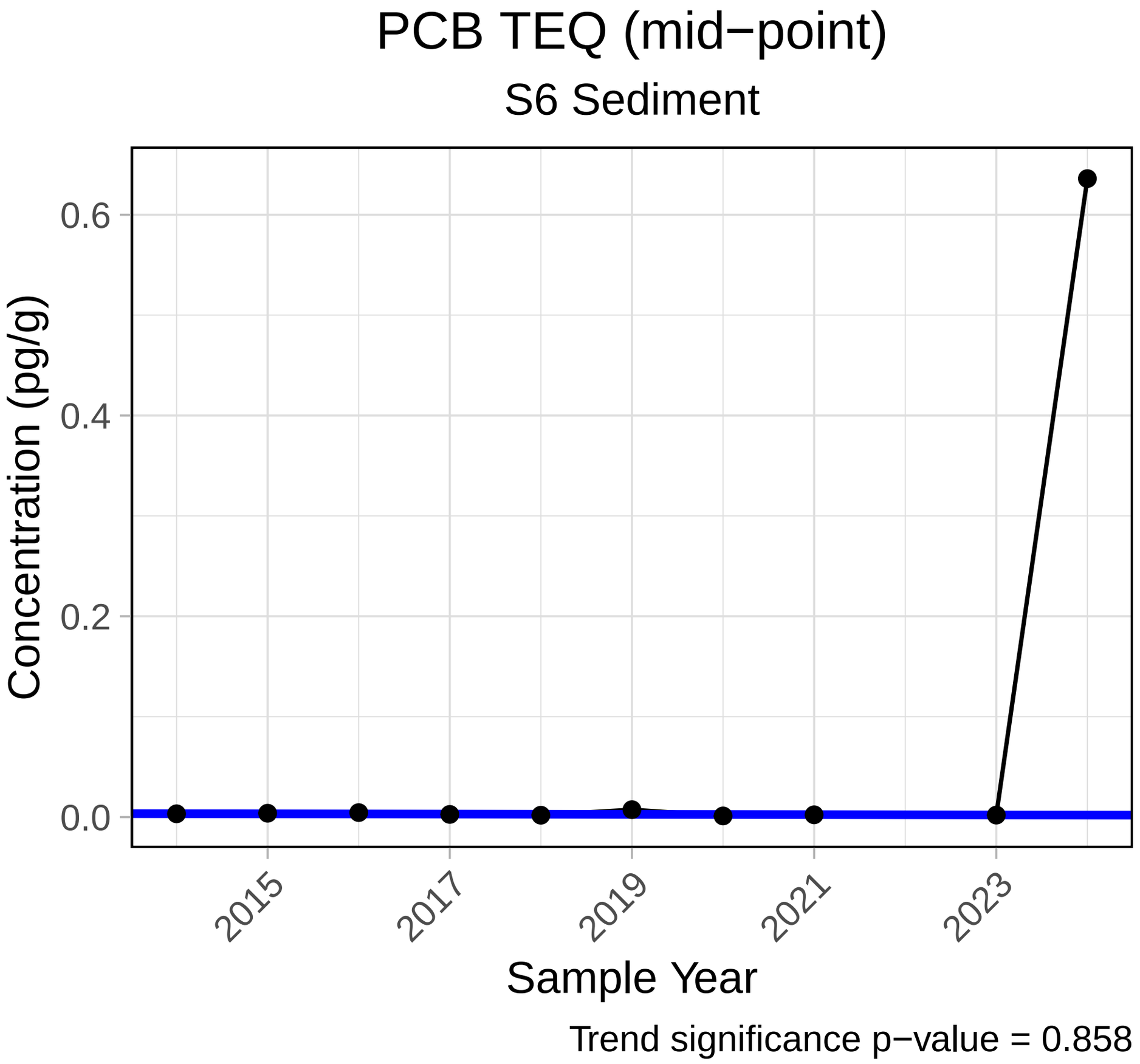

PCBs 83+99
S6 Sediment
125
100
75
50
25
Concentration (pg/g)
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.653

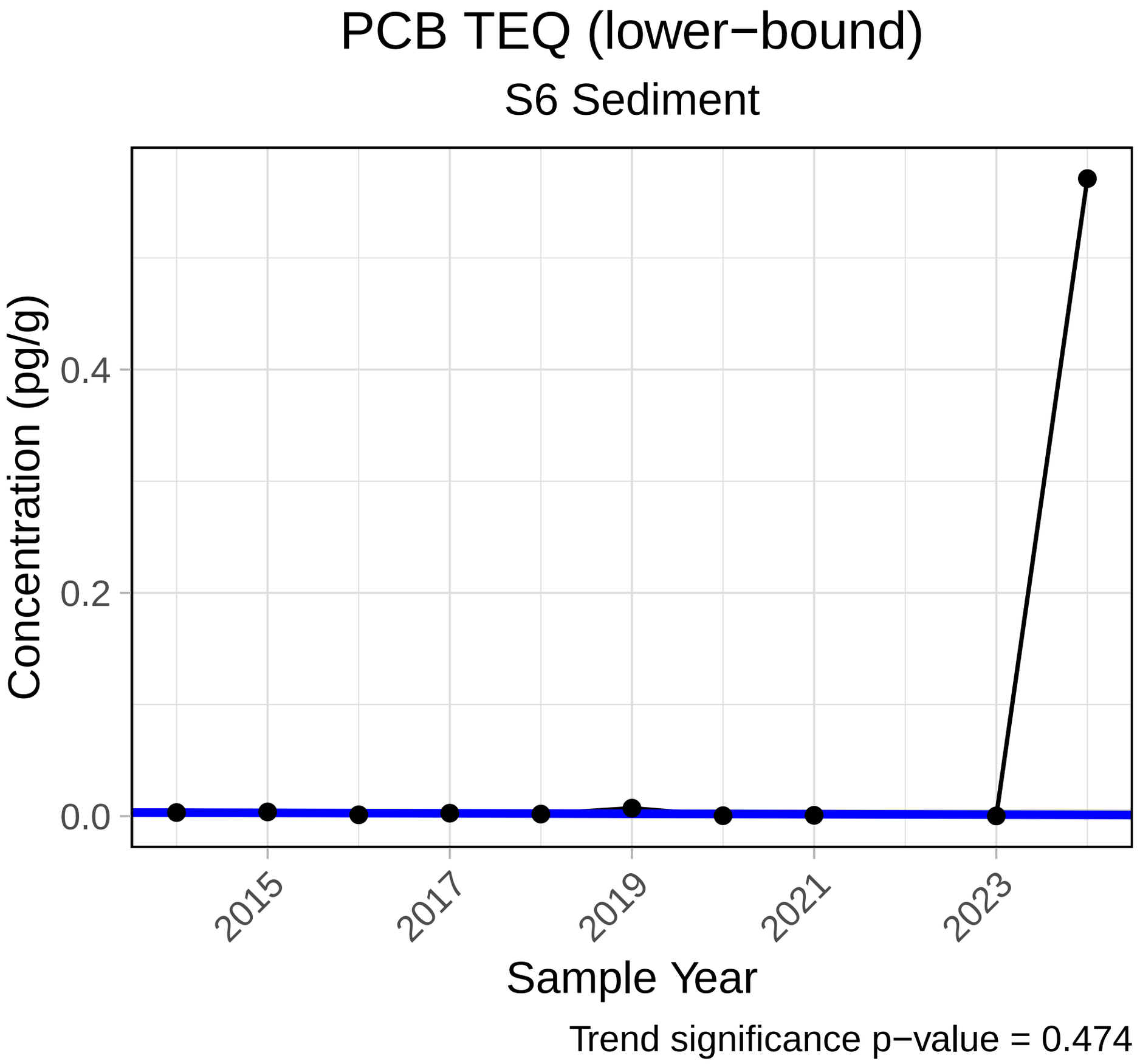
PCBs 88+91

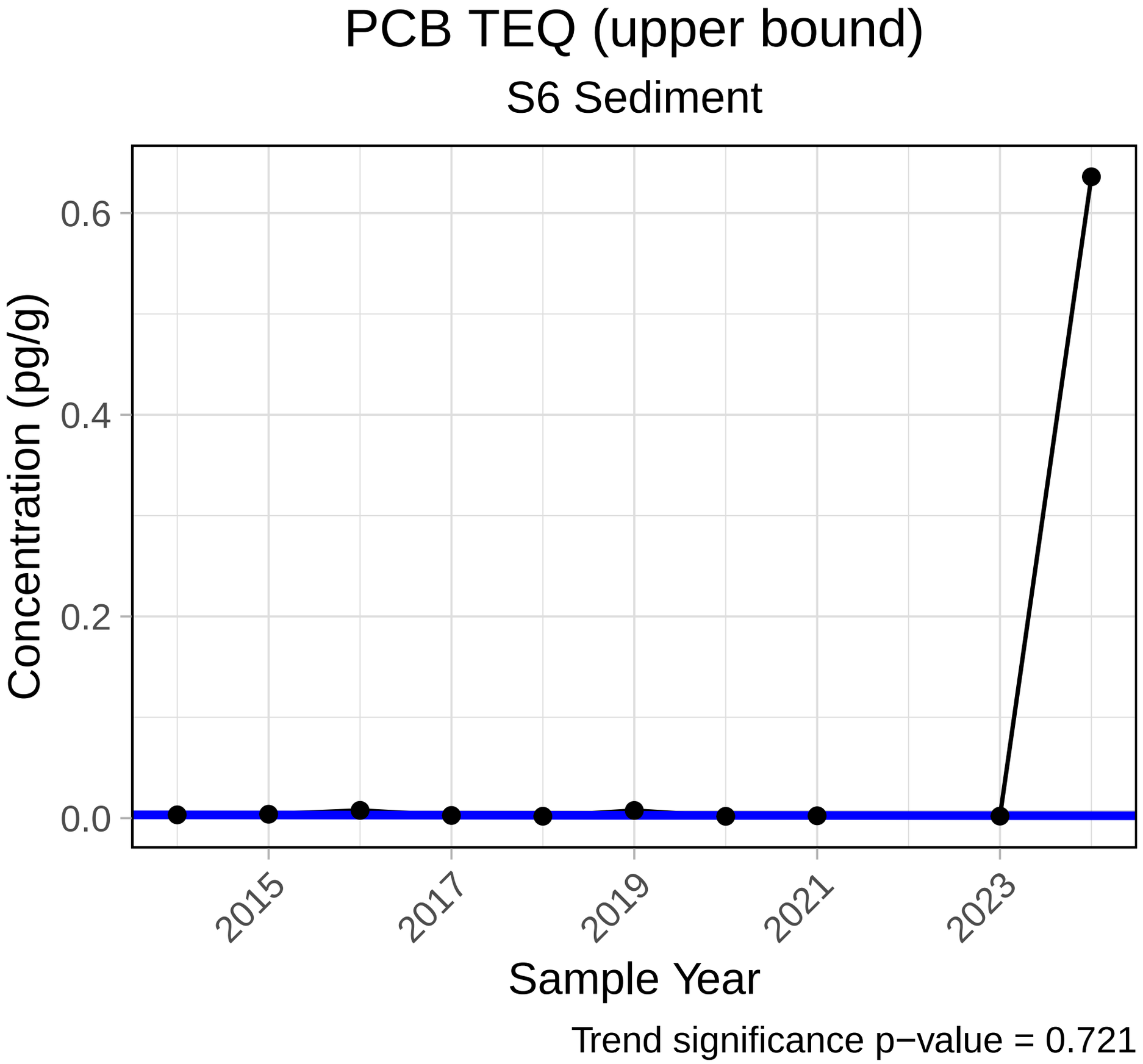
S6 Sediment



Trend significance p−value = 0.592

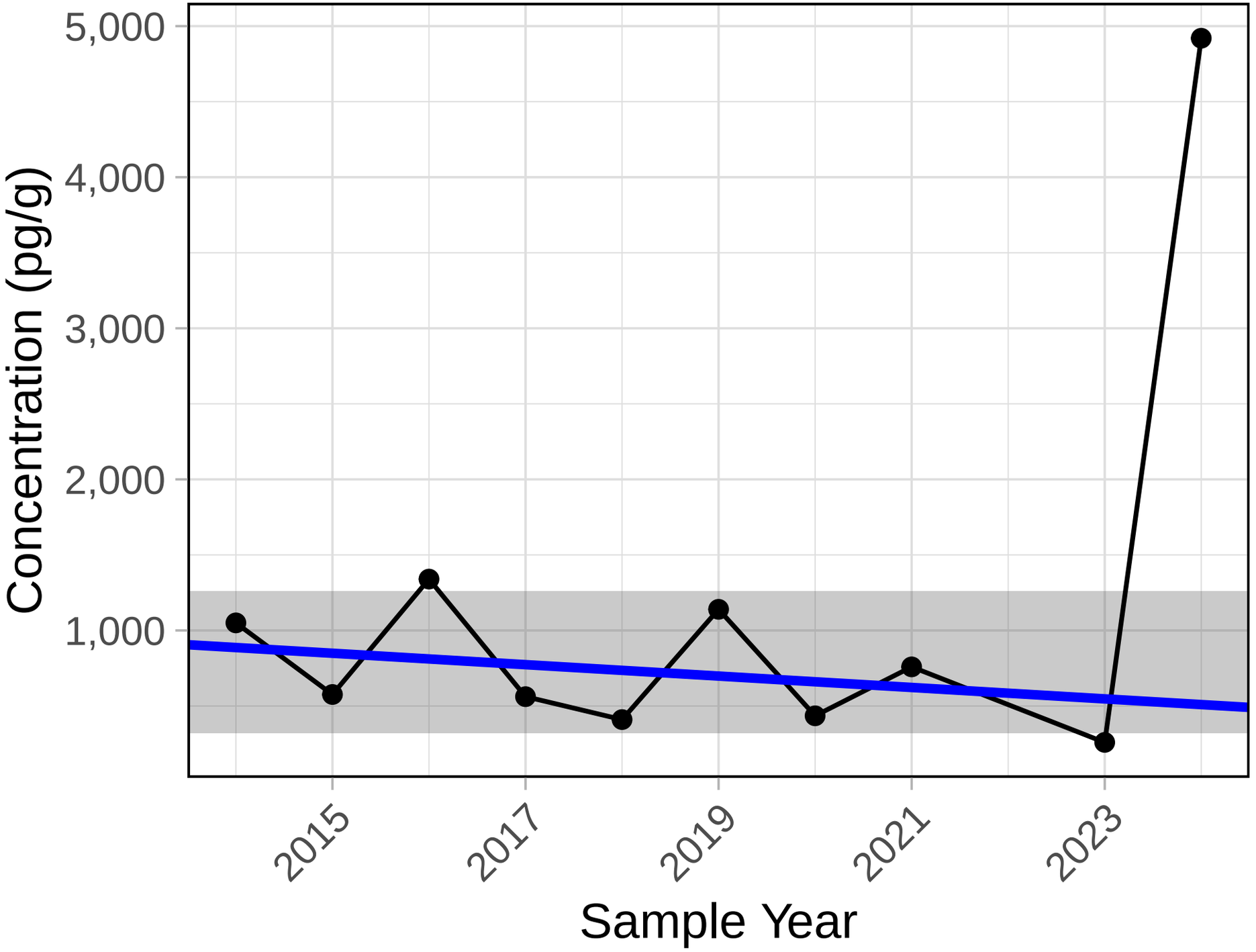

PCB TEQ (mid−point)
S6 Sediment
Concentration (pg/g)
0.6
0.4
0.2
0.0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.858


PCB TEQ (lower−bound)
S6 Sediment
Concentration (pg/g)
0.4
0.2
0.0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.474


PCB TEQ (upper bound)
S6 Sediment
Concentration (pg/g)
0.6
0.4
0.2
0.0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.721

PCB Total

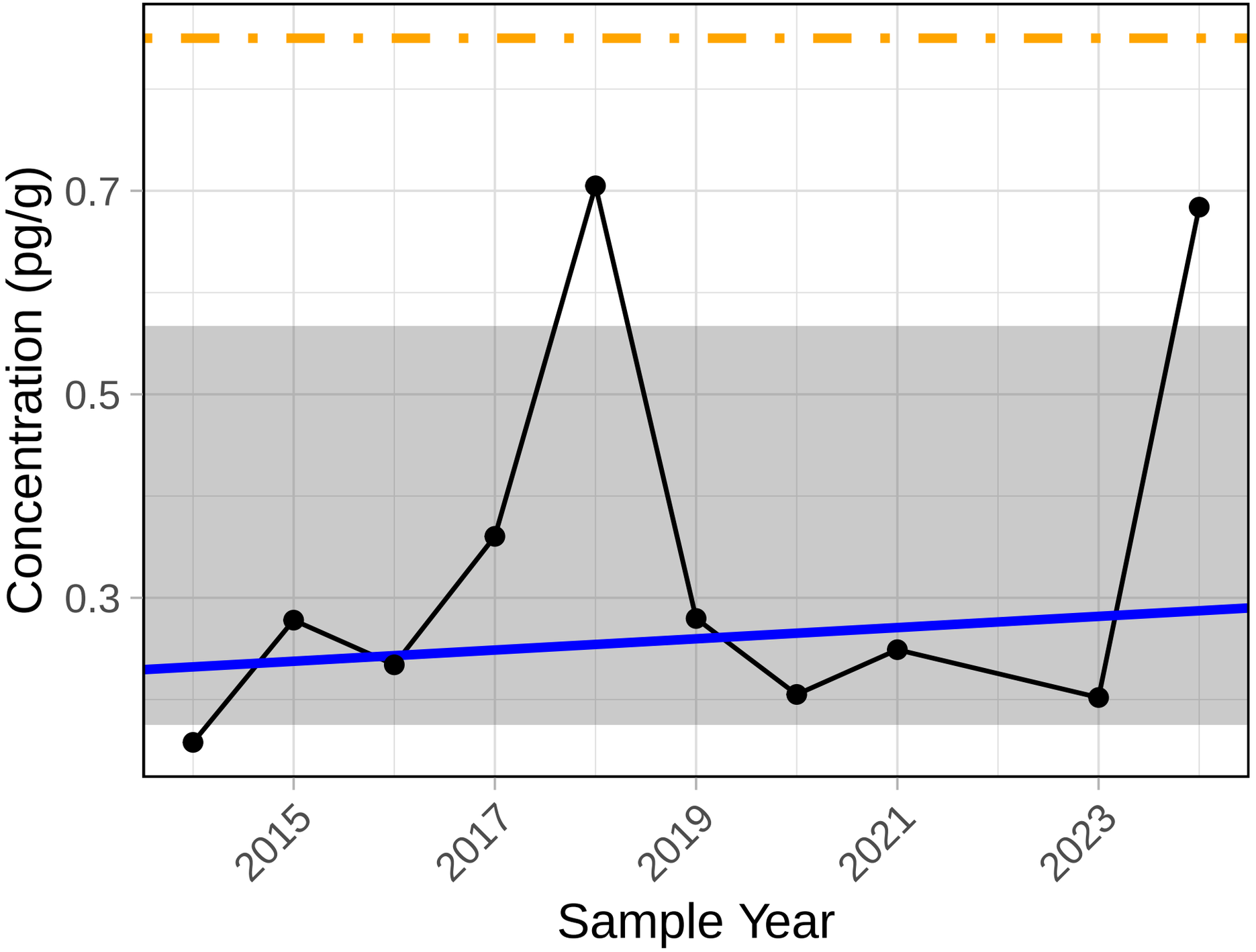
S6 Sediment



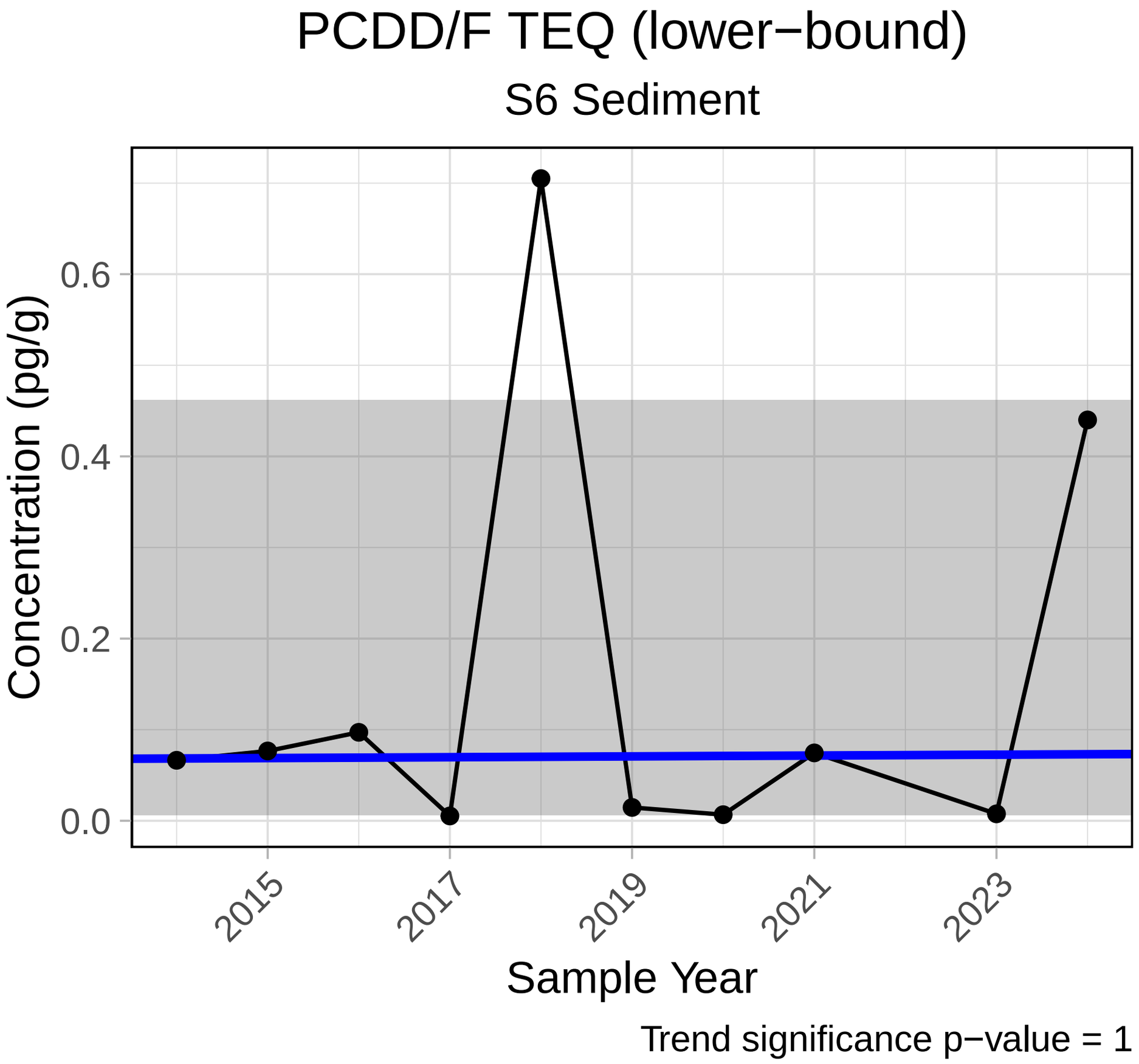
Trend significance p−value = 0.721
ISQG level = 34100 pg/g (maximum)
PEL level = 277000 pg/g (maximum)

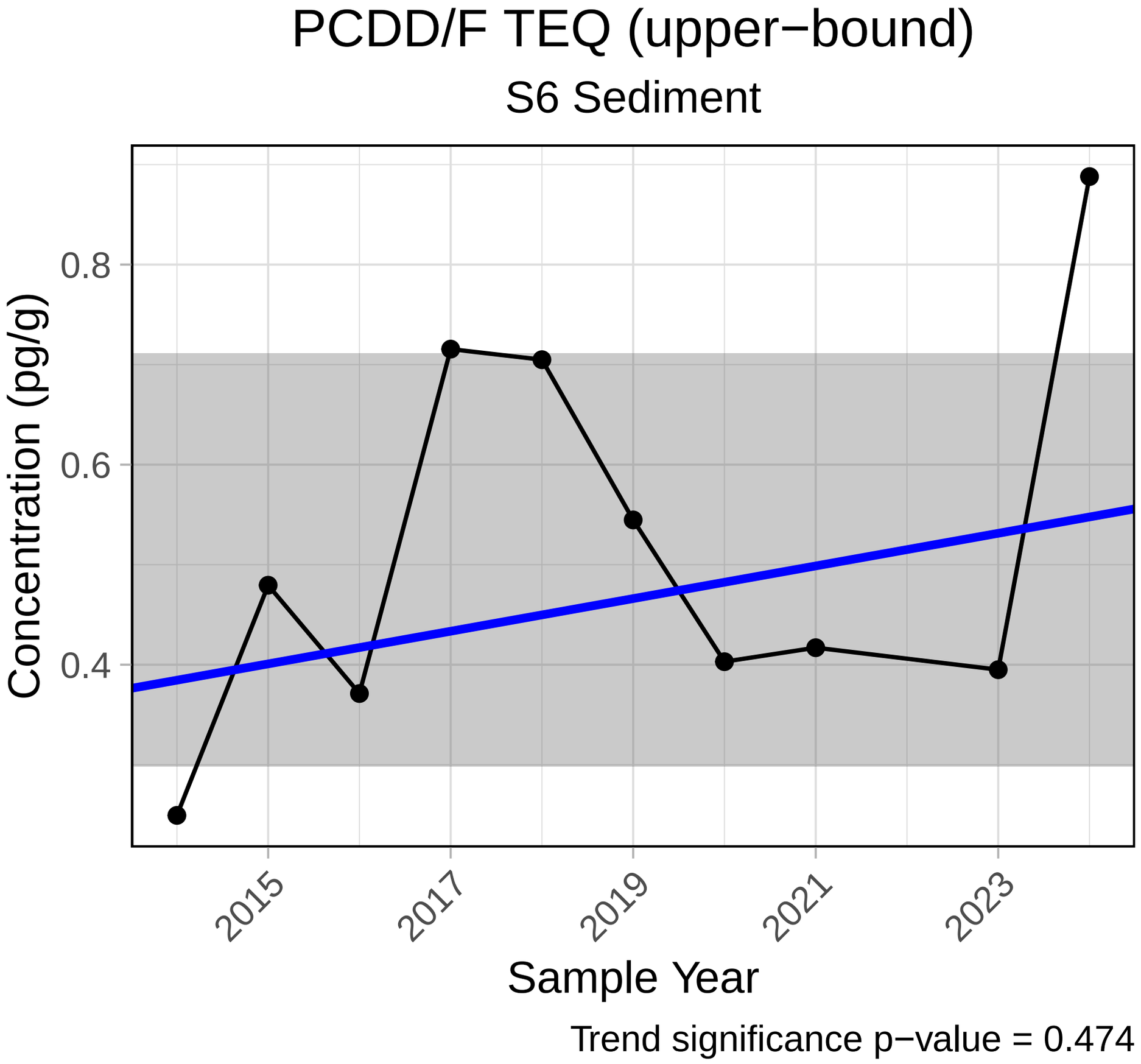
PCDD/F TEQ (mid−point)

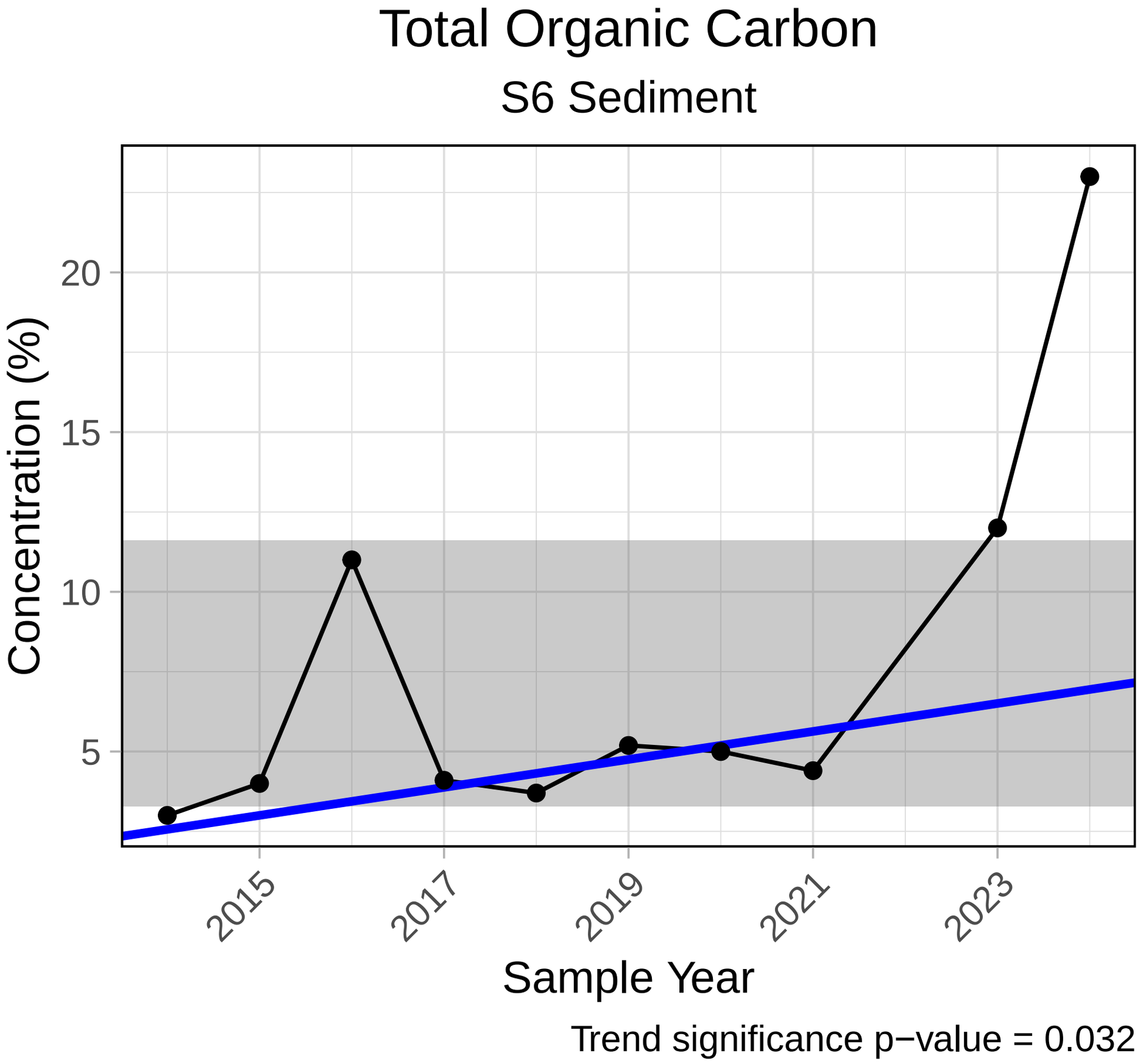
S6 Sediment

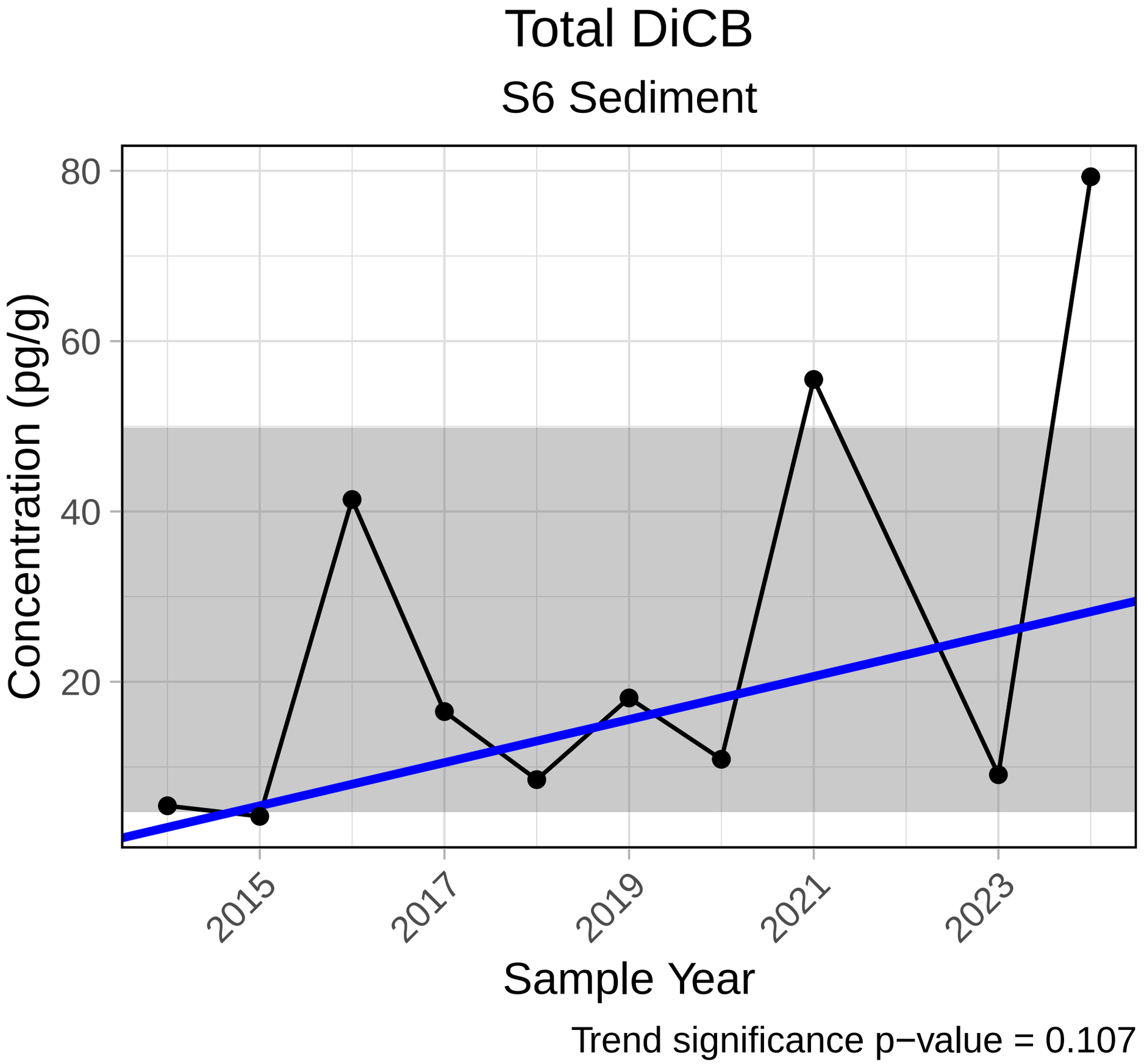


Trend significance p−value = 0.721
ISQG level = 0.85 pg/g (maximum)
PEL level = 21.5 pg/g (maximum)


PCDD/F TEQ (lower−bound)
S6 Sediment
Concentration (pg/g)
0.6
0.4
0.2
0.0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

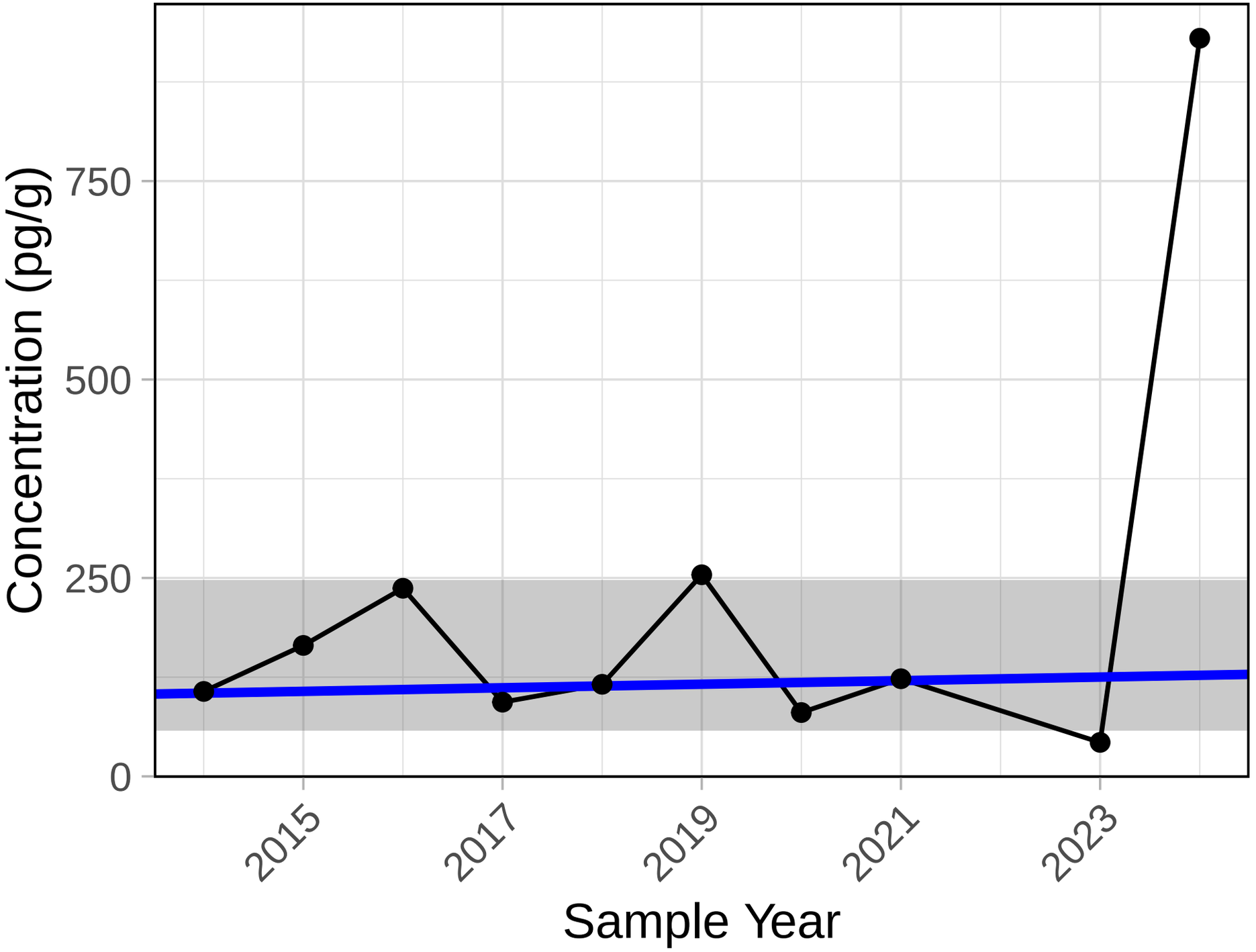

PCDD/F TEQ (upper−bound)
S6 Sediment
Concentration (pg/g)
0.8
0.6
0.4
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.474


Total Organic Carbon
S6 Sediment
Concentration (%)
20
15
10
5
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.032


Total DiCB
S6 Sediment
Concentration (pg/g)
80
60
40
20
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.107

Total HeptaCB

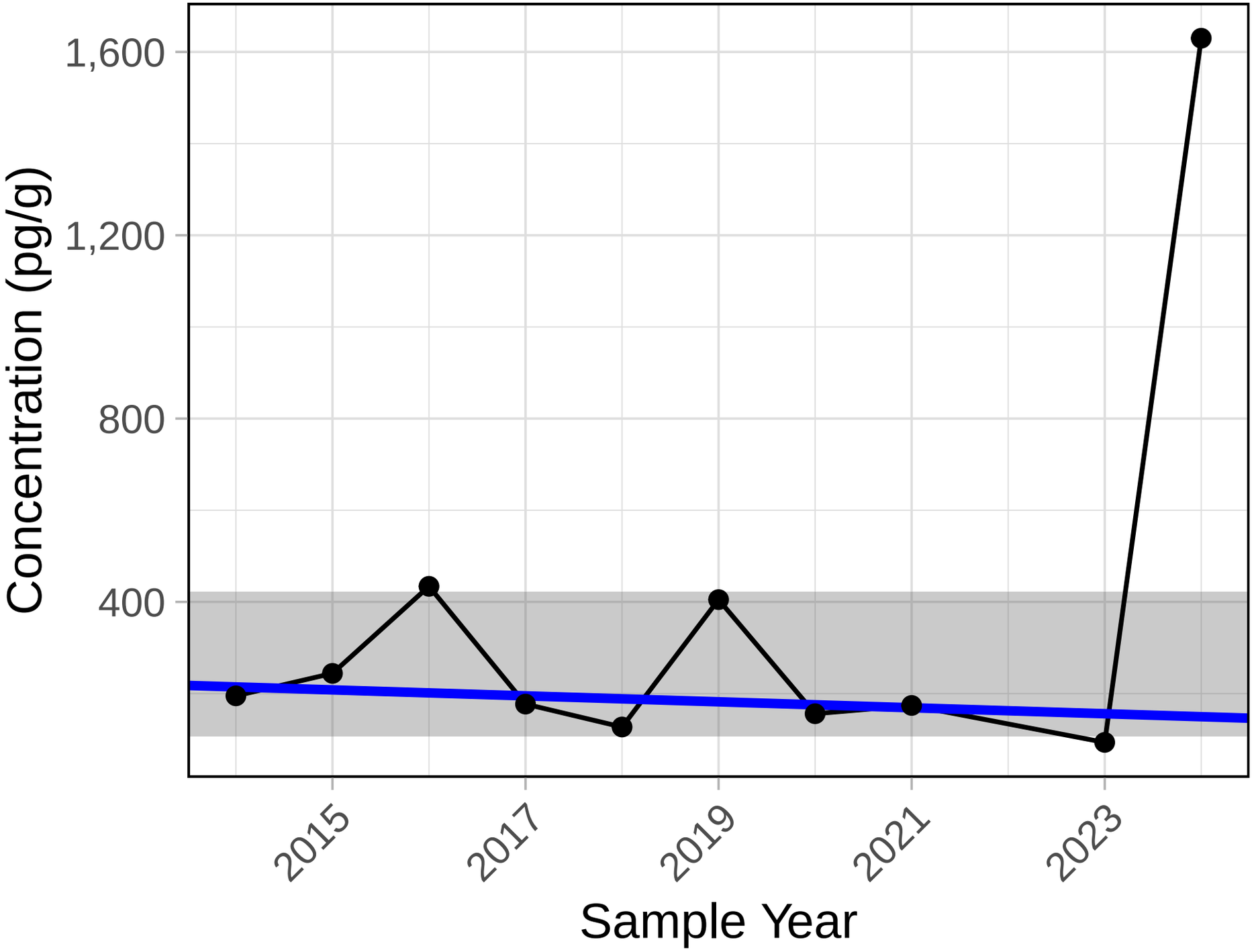
S6 Sediment



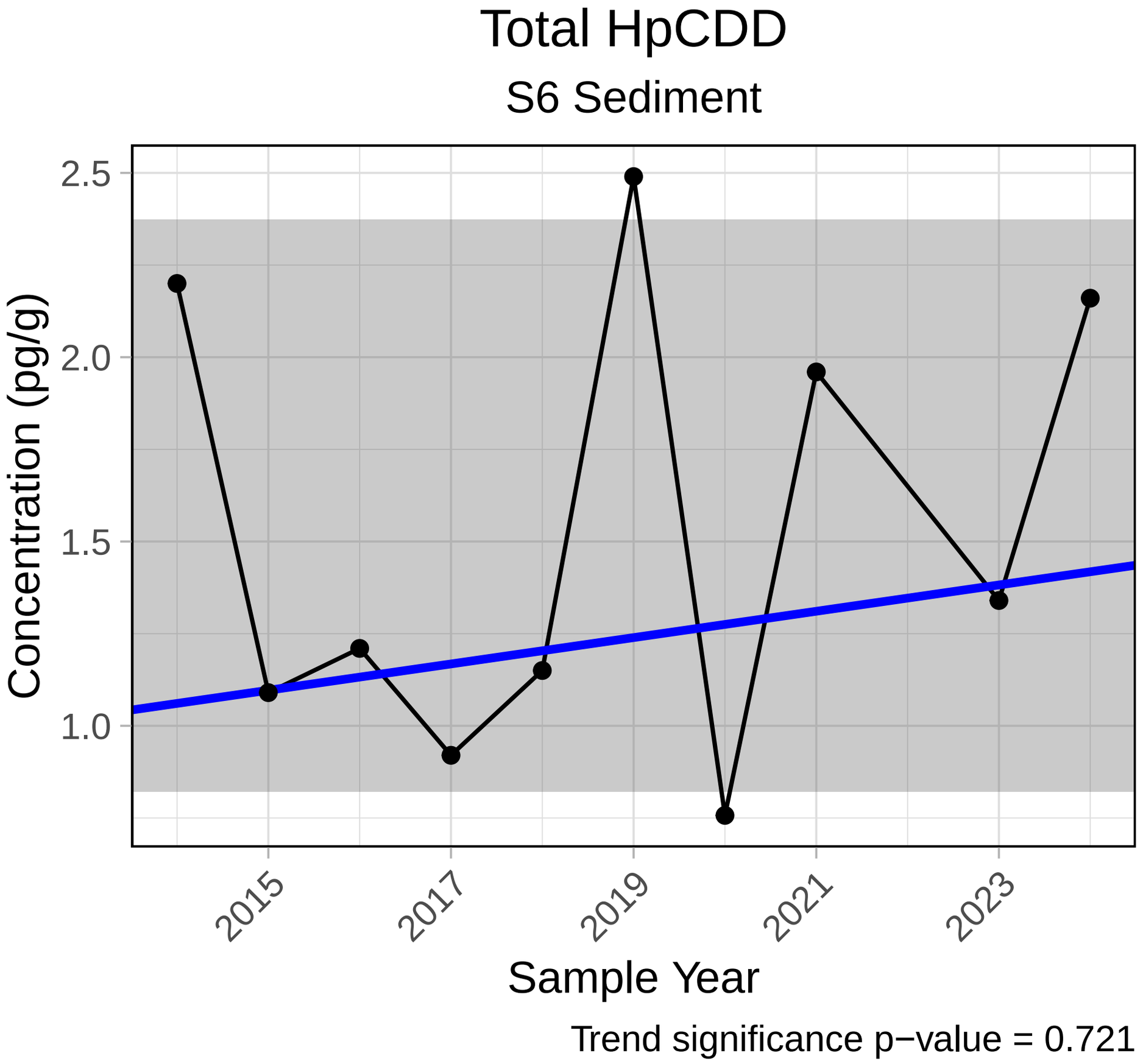
Trend significance p−value = 1

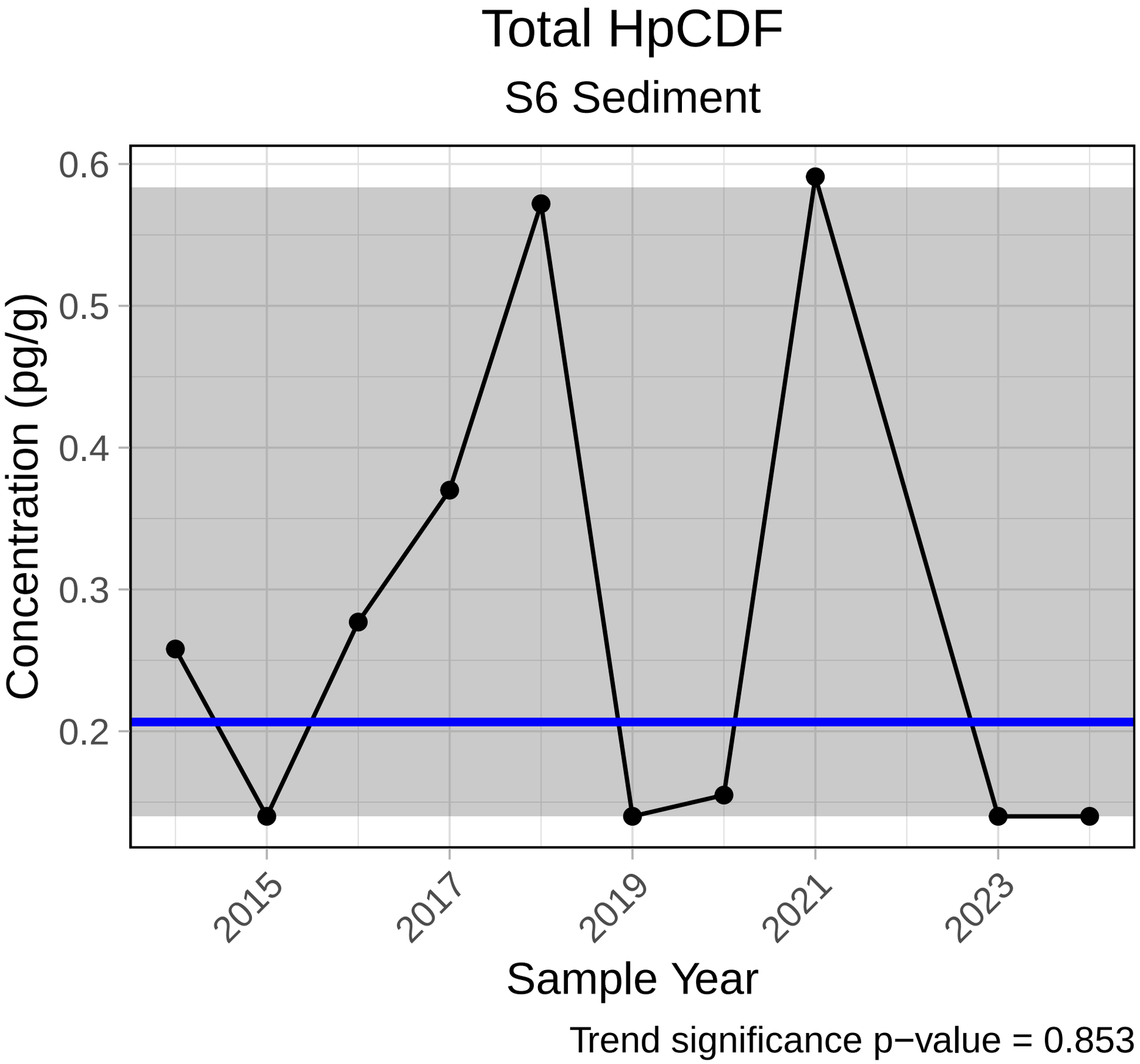
Total HexaCB

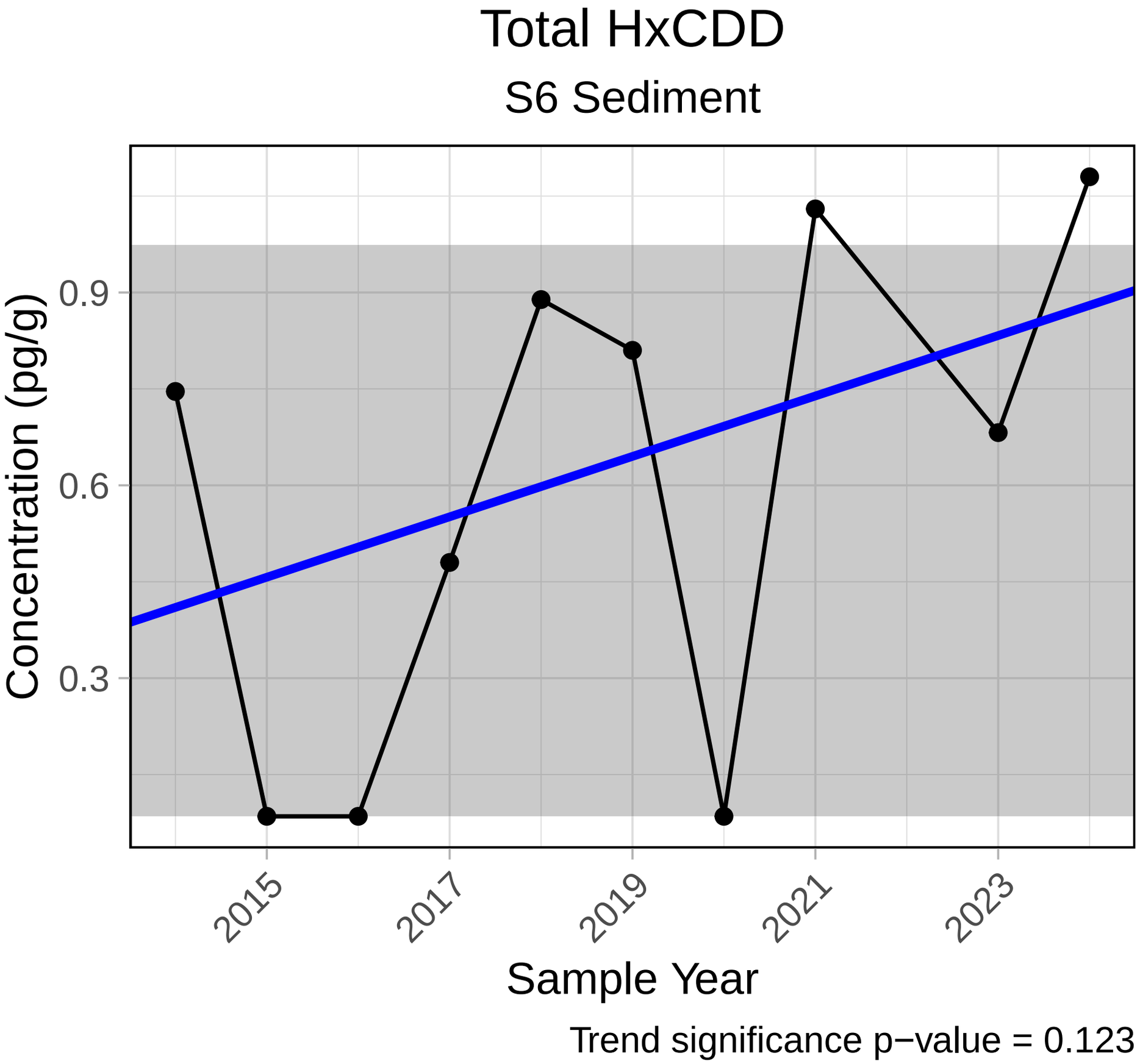
S6 Sediment



Trend significance p−value = 0.592

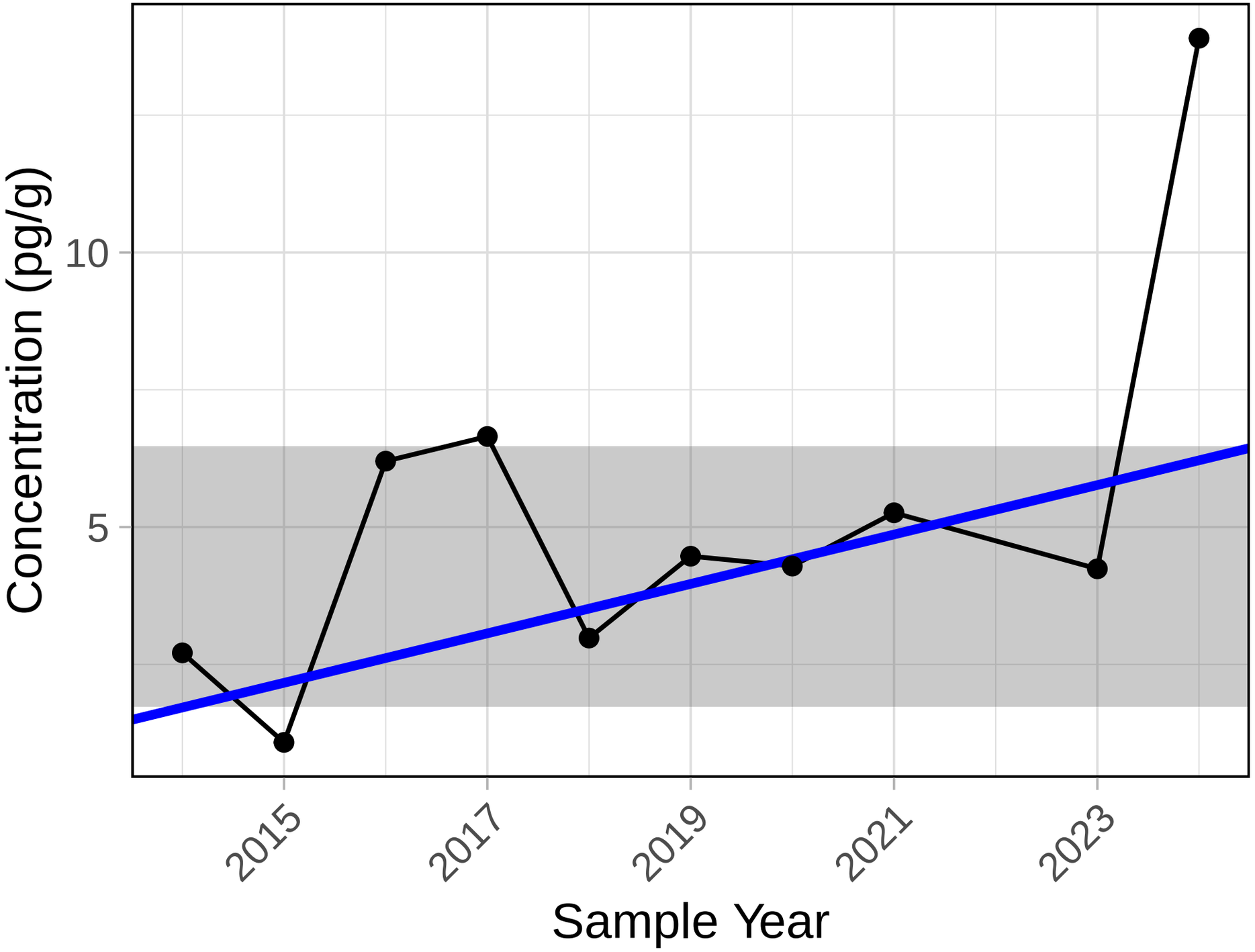

Total HpCDD
S6 Sediment
Concentration (pg/g)
2.5
2.0
1.5
1.0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.721


Total HpCDF
S6 Sediment
Concentration (pg/g)
0.6
0.5
0.4
0.3
0.2
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.853


Total HxCDD
S6 Sediment
Concentration (pg/g)
0.9
0.6
0.3
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.123

Total MonoCB

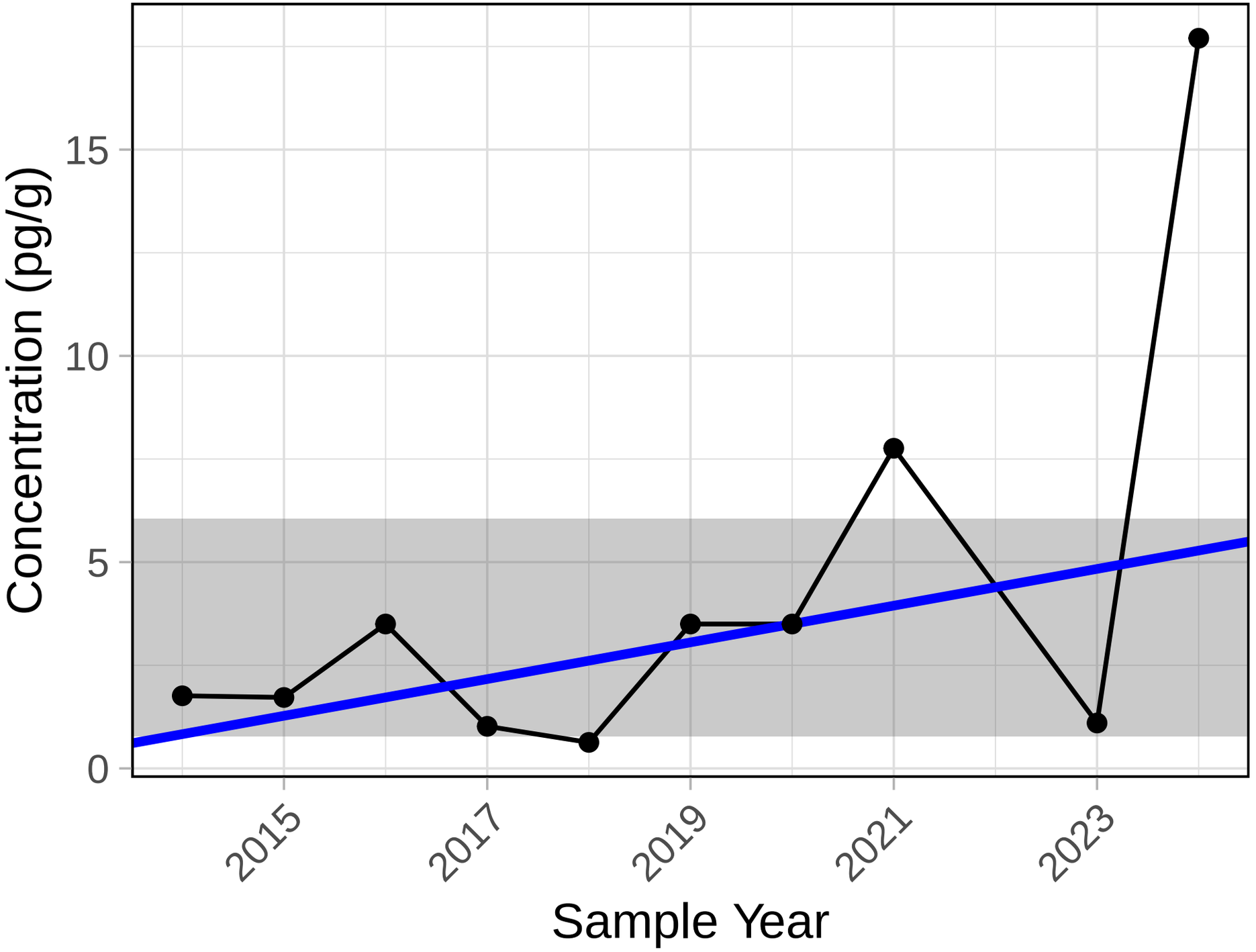
S6 Sediment



Trend significance p−value = 0.21

Total NonaCB

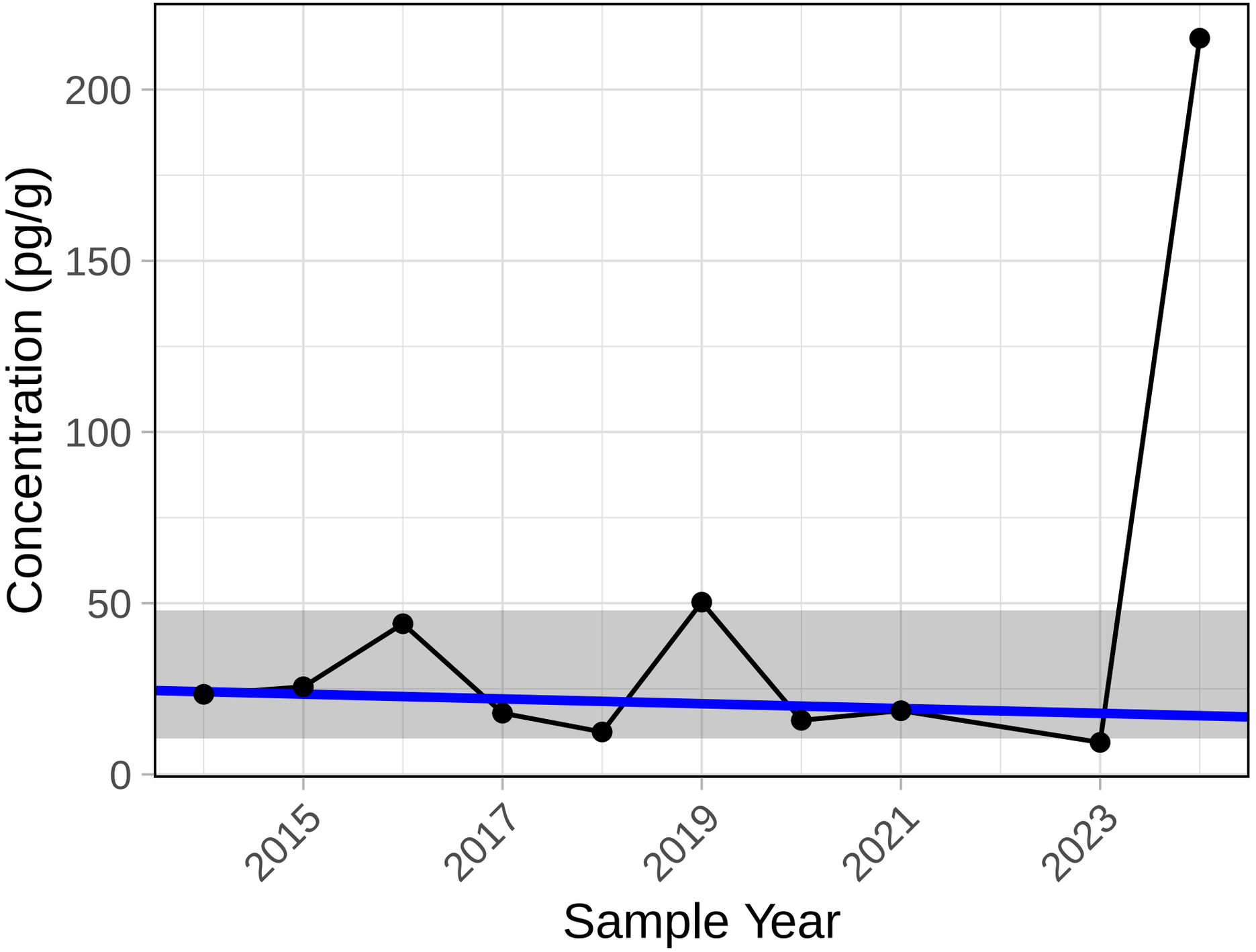
S6 Sediment



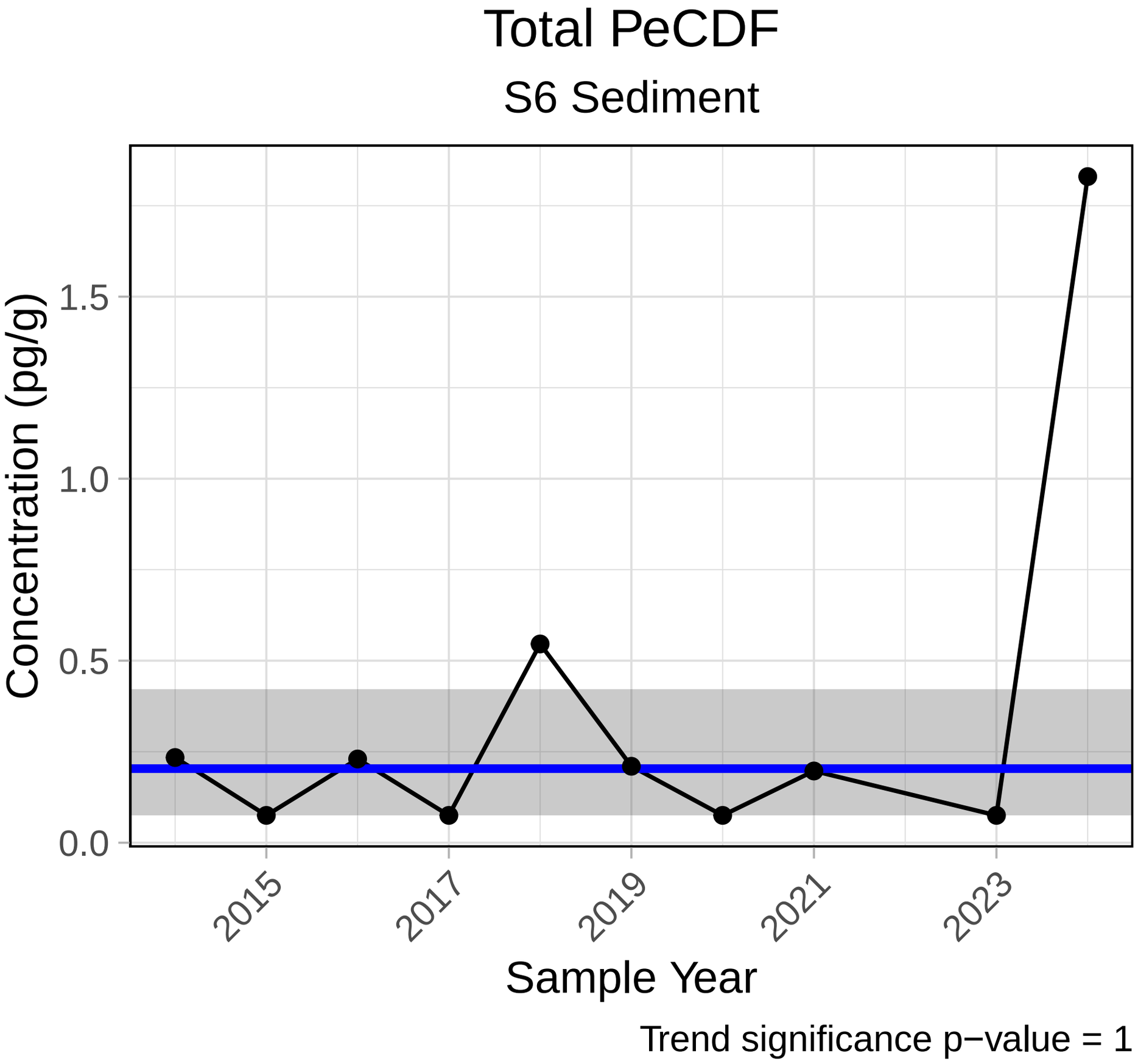
Trend significance p−value = 0.238

Total OctaCB

S6 Sediment

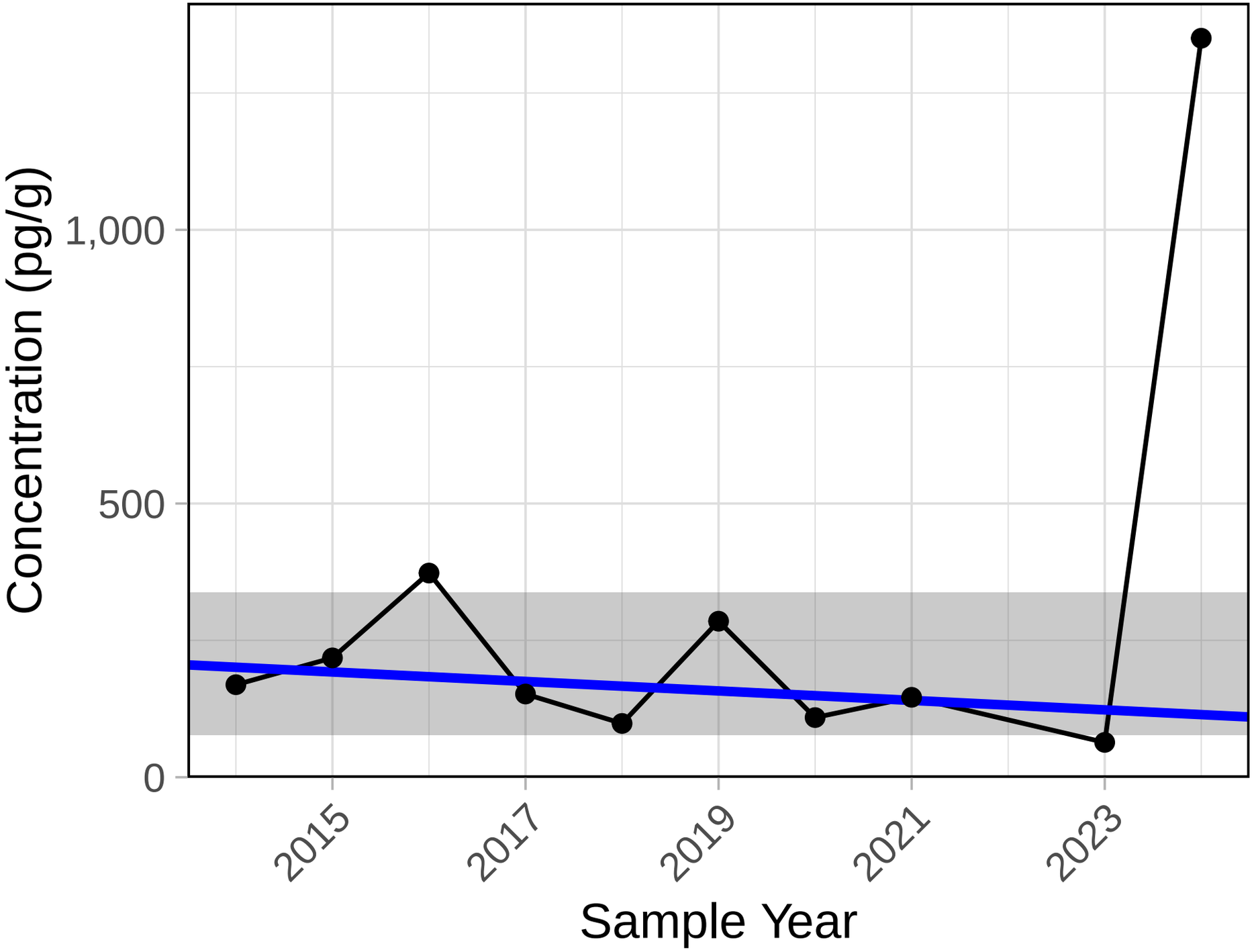


Trend significance p−value = 0.858


Total PeCDF
S6 Sediment
Concentration (pg/g)
1.5
1.0
0.5
0.0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 1

Total PentaCB

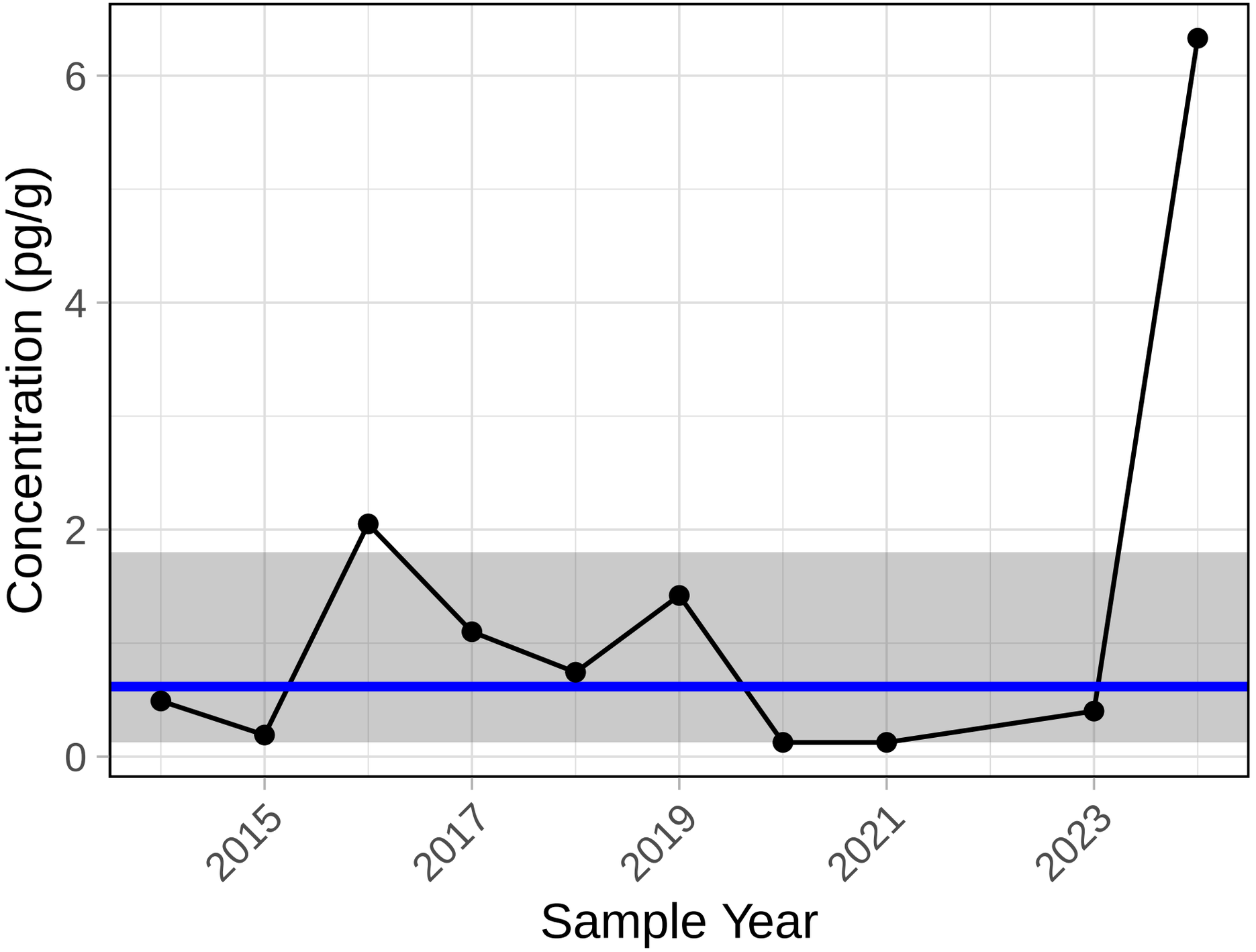
S6 Sediment



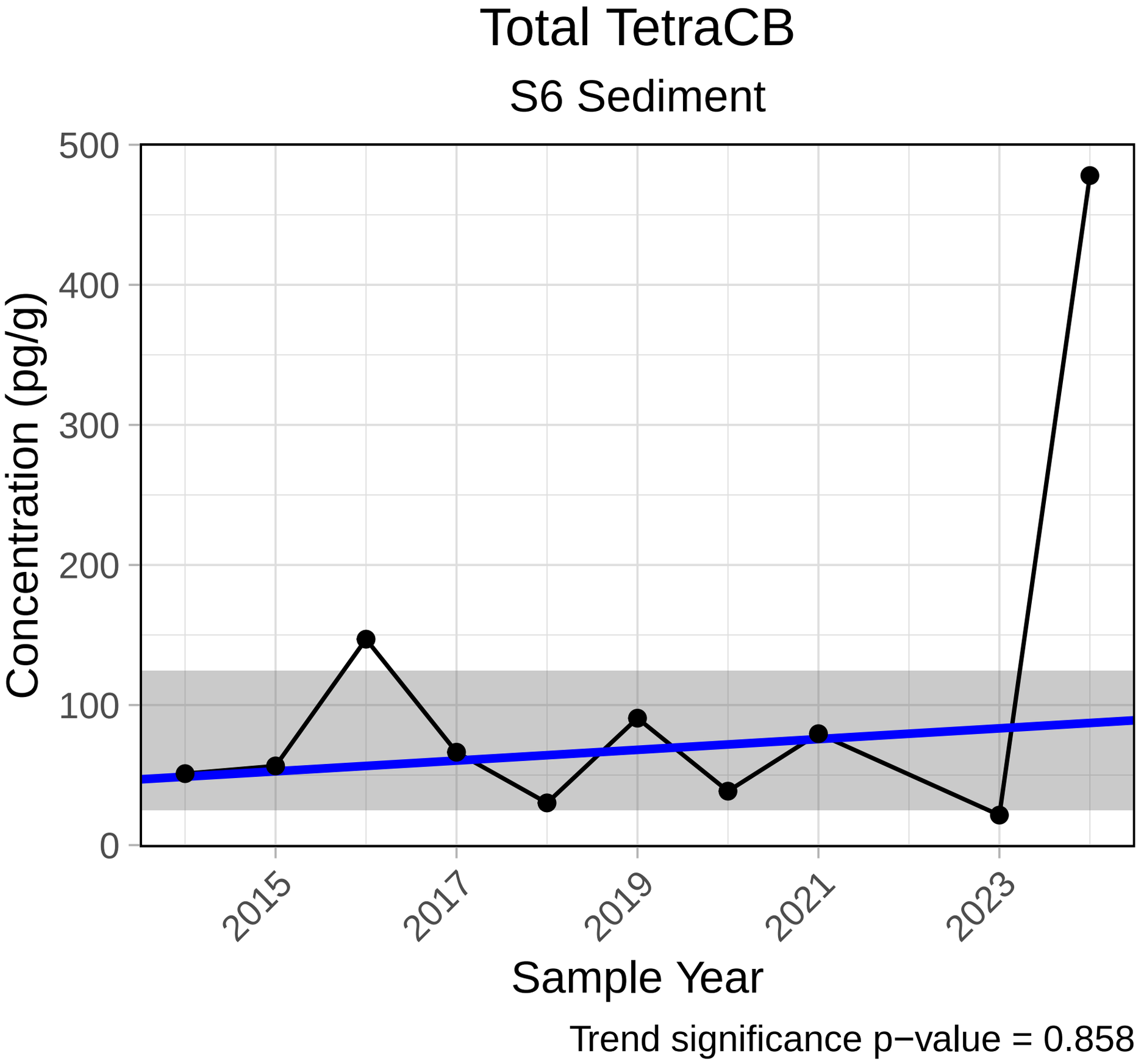
Trend significance p−value = 0.592

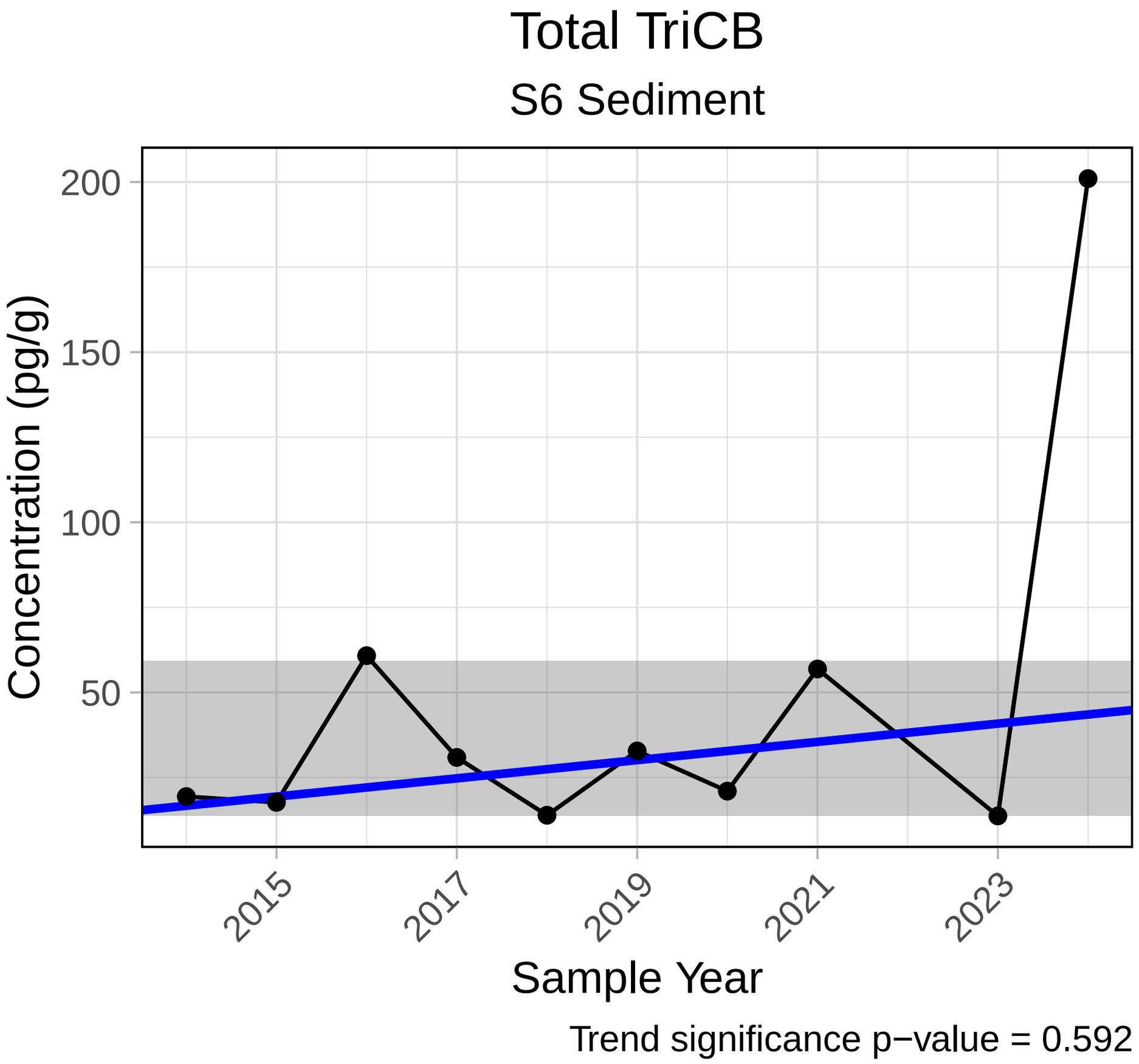
Total TCDF

S6 Sediment



Trend significance p−value = 1


Total TetraCB
S6 Sediment
Concentration (pg/g)
500
400
300
200
100
0
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.858


Total TriCB
S6 Sediment
Concentration (pg/g)
200
150
100
50
2015
2017
2019
2021
2023
Sample Year
Trend significance p−value = 0.592

Appendix 4: Laboratory Analytical Reports

ALS Canada Ltd.

right solutions.
right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **EO2405763**	Page	: 1 of 13
Client	: **CPP Environmental**	Laboratory	: ALS Environmental - Edmonton
Contact	: Theo Charette	Account Manager	: Megha Walia
Address	: 154-150 Chippewa Road Sherwood Park AB Canada T8A 6A2	Address	: 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9
Telephone	: 780 570 5818	Telephone	: +1 780 413 5227
Project	: SUEZ WQ-2024 JULY	Date Samples Received	: 13-Jul-2024 10:20
PO	: ----	Date Analysis Commenced	: 13-Jul-2024
C-O-C number	: 20-1057934	Issue Date	: 19-Jul-2024 15:49
Sampler	: VV-CL		
Site	: ----		
Quote number	: Blanket quote		
No. of samples received	: 12		
No. of samples analysed	: 12		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Alex Drake	Lab Analyst	Inorganics, Edmonton, Alberta
Daniel Nguyen	Laboratory Analyst	Metals, Edmonton, Alberta
Shruti Mudliar	Lab Analyst	Inorganics, Edmonton, Alberta
Shruti Mudliar	Lab Analyst	Metals, Edmonton, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.
Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).
Measurement Uncertainty: The reported uncertainties in this report are expanded uncertainties calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

>: greater than.
<: less than.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
IB:INT	*Ion Balance Reviewed: Imbalance is due to interference or non-measured component.*

Analytical Results

EO2405763-001

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 1

Client sampling date / time: 10-Jul-2024 13:39

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	2.42	0.50	mg/L	EC100/EO	-	18-Jul-2024	-
Conductivity	----	8.6	2.0	µS/cm	E100/EO	15-Jul-2024	15-Jul-2024	1544825
pH	----	6.30	0.10	pH units	E108/EO	15-Jul-2024	15-Jul-2024	1544824
Alkalinity, bicarbonate (as HCO3)	71-52-3	2.6	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, total (as CaCO3)	----	2.1	2.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Solids, total dissolved [TDS], calculated	----	3.4	1.0	mg/L	EC103/EO	-	16-Jul-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	13-Jul-2024	13-Jul-2024	1543689
Fluoride	16984-48-8	<0.020	0.020	mg/L	E235.F/EO	13-Jul-2024	13-Jul-2024	1543686
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	13-Jul-2024	13-Jul-2024	1543687
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	13-Jul-2024	13-Jul-2024	1543690
Sulfate (as SO4)	14808-79-8	0.33	0.30	mg/L	E235.SO4/EO	13-Jul-2024	13-Jul-2024	1543688
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	16-Jul-2024	-
Ion Balance								
Anion sum	----	<0.10	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Cation sum	----	<0.10	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Ion balance (APHA)	----	0.0	0.01	%	EC101/EO	-	16-Jul-2024	-
Ion balance (cations/anions)	----	100	0.010	%	EC101/EO	-	16-Jul-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	0.566	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Iron, dissolved	7439-89-6	0.019	0.010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Magnesium, dissolved	7439-95-4	0.245	0.0050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Manganese, dissolved	7439-96-5	0.00582	0.00010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Potassium, dissolved	7440-09-7	0.329	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Sodium, dissolved	7440-23-5	0.534	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	17-Jul-2024	1548838

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2405763-002

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 3

Client sampling date / time: 09-Jul-2024 12:07

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	9.18	0.50	mg/L	EC100/EO	-	18-Jul-2024	-
Conductivity	----	27.5	2.0	µS/cm	E100/EO	15-Jul-2024	15-Jul-2024	1544825
pH	----	5.71	0.10	pH units	E108/EO	15-Jul-2024	15-Jul-2024	1544824
Alkalinity, bicarbonate (as HCO3)	71-52-3	3.4	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826

Analytical Results

EO2405763-002

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 3

Client sampling date / time: 09-Jul-2024 12:07

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, total (as CaCO3)	----	2.8	2.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Solids, total dissolved [TDS], calculated	----	23.5	1.0	mg/L	EC103/EO	-	16-Jul-2024	-
Anions and Nutrients								
Chloride	16887-00-6	2.51	0.50	mg/L	E235.Cl/EO	13-Jul-2024	13-Jul-2024	1543689
Fluoride	16984-48-8	<0.020	0.020	mg/L	E235.F/EO	13-Jul-2024	13-Jul-2024	1543686
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	13-Jul-2024	13-Jul-2024	1543687
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	13-Jul-2024	13-Jul-2024	1543690
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	13-Jul-2024	13-Jul-2024	1543688
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	16-Jul-2024	-
Ion Balance								
Anion sum	----	0.13	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Cation sum	----	0.36	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Ion balance (APHA)	----	46.9	0.01	%	EC101/EO	-	16-Jul-2024	-
Ion balance (cations/anions)	----	277 IB:INT.	0.010	%	EC101/EO	-	16-Jul-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	2.27	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Iron, dissolved	7439-89-6	0.594	0.010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Magnesium, dissolved	7439-95-4	0.853	0.0050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Manganese, dissolved	7439-96-5	0.0232	0.00010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Potassium, dissolved	7440-09-7	0.911	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Sodium, dissolved	7440-23-5	2.11	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	17-Jul-2024	1548838

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2405763-003

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 4

Client sampling date / time: 11-Jul-2024 08:25

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	6.86	0.50	mg/L	EC100/EO	-	18-Jul-2024	-
Conductivity	----	16.0	2.0	µS/cm	E100/EO	15-Jul-2024	15-Jul-2024	1544825
pH	----	6.44	0.10	pH units	E108/EO	15-Jul-2024	15-Jul-2024	1544824
Alkalinity, bicarbonate (as HCO3)	71-52-3	5.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, total (as CaCO3)	----	4.1	2.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Solids, total dissolved [TDS], calculated	----	6.9	1.0	mg/L	EC103/EO	-	16-Jul-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	13-Jul-2024	13-Jul-2024	1543689
Fluoride	16984-48-8	<0.020	0.020	mg/L	E235.F/EO	13-Jul-2024	13-Jul-2024	1543686
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	13-Jul-2024	13-Jul-2024	1543687

Analytical Results

EO2405763-003

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 4

Client sampling date / time: 11-Jul-2024 08:25

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Anions and Nutrients								
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	13-Jul-2024	13-Jul-2024	1543690
Sulfate (as SO4)	14808-79-8	0.39	0.30	mg/L	E235.SO4/EO	13-Jul-2024	13-Jul-2024	1543688
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	16-Jul-2024	-
Ion Balance								
Anion sum	----	<0.10	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Cation sum	----	0.19	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Ion balance (APHA)	----	31.0	0.01	%	EC101/EO	-	16-Jul-2024	-
Ion balance (cations/anions)	----	190 IB:INT,	0.010	%	EC101/EO	-	16-Jul-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	1.76	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Iron, dissolved	7439-89-6	0.034	0.010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Magnesium, dissolved	7439-95-4	0.598	0.0050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Manganese, dissolved	7439-96-5	0.00131	0.00010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Potassium, dissolved	7440-09-7	0.609	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Sodium, dissolved	7440-23-5	0.768	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	17-Jul-2024	1548838

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2405763-004

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 6

Client sampling date / time: 10-Jul-2024 11:52

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	16.4	0.50	mg/L	EC100/EO	-	18-Jul-2024	-
Conductivity	----	30.5	2.0	µS/cm	E100/EO	15-Jul-2024	15-Jul-2024	1544825
pH	----	7.20	0.10	pH units	E108/EO	15-Jul-2024	15-Jul-2024	1544824
Alkalinity, bicarbonate (as HCO3)	71-52-3	17.3	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, total (as CaCO3)	----	14.2	2.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Solids, total dissolved [TDS], calculated	----	16.5	1.0	mg/L	EC103/EO	-	16-Jul-2024	-
Anions and Nutrients								
Chloride	16887-00-6	0.61	0.50	mg/L	E235.Cl/EO	13-Jul-2024	13-Jul-2024	1543689
Fluoride	16984-48-8	0.028	0.020	mg/L	E235.F/EO	13-Jul-2024	13-Jul-2024	1543686
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	13-Jul-2024	13-Jul-2024	1543687
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	13-Jul-2024	13-Jul-2024	1543690
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	13-Jul-2024	13-Jul-2024	1543688
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	16-Jul-2024	-
Ion Balance								
Anion sum	----	0.30	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Cation sum	----	0.37	0.10	meq/L	EC101/EO	-	16-Jul-2024	-

Analytical Results

EO2405763-004

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 6

Client sampling date / time: 10-Jul-2024 11:52

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Ion Balance								
Ion balance (APHA)	----	10.4	0.01	%	EC101/EO	-	16-Jul-2024	-
Ion balance (cations/anions)	----	123 IB:INT,	0.010	%	EC101/EO	-	16-Jul-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	4.96	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Iron, dissolved	7439-89-6	0.035	0.010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Magnesium, dissolved	7439-95-4	0.968	0.0050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Manganese, dissolved	7439-96-5	0.00044	0.00010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Potassium, dissolved	7440-09-7	0.386	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Sodium, dissolved	7440-23-5	0.694	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	17-Jul-2024	1548838

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2405763-005

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 5

Client sampling date / time: 10-Jul-2024 10:06

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	73.0	0.50	mg/L	EC100/EO	-	18-Jul-2024	-
Conductivity	----	214	2.0	µS/cm	E100/EO	15-Jul-2024	15-Jul-2024	1544825
pH	----	8.01	0.10	pH units	E108/EO	15-Jul-2024	15-Jul-2024	1544824
Alkalinity, bicarbonate (as HCO3)	71-52-3	88.3	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, total (as CaCO3)	----	72.4	2.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Solids, total dissolved [TDS], calculated	----	122	1.0	mg/L	EC103/EO	-	16-Jul-2024	-
Anions and Nutrients								
Chloride	16887-00-6	29.6	0.50	mg/L	E235.Cl/EO	13-Jul-2024	13-Jul-2024	1543689
Fluoride	16984-48-8	0.067	0.020	mg/L	E235.F/EO	13-Jul-2024	13-Jul-2024	1543686
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	13-Jul-2024	13-Jul-2024	1543687
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	13-Jul-2024	13-Jul-2024	1543690
Sulfate (as SO4)	14808-79-8	0.37	0.30	mg/L	E235.SO4/EO	13-Jul-2024	13-Jul-2024	1543688
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	16-Jul-2024	-
Ion Balance								
Anion sum	----	2.29	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Cation sum	----	2.37	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Ion balance (APHA)	----	1.72	0.01	%	EC101/EO	-	16-Jul-2024	-
Ion balance (cations/anions)	----	103	0.010	%	EC101/EO	-	16-Jul-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	21.8	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Iron, dissolved	7439-89-6	0.076	0.010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Magnesium, dissolved	7439-95-4	4.52	0.0050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838

Analytical Results

EO2405763-005

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 5

Client sampling date / time: 10-Jul-2024 10:06

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Manganese, dissolved	7439-96-5	0.00586	0.00010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Potassium, dissolved	7440-09-7	0.972	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Sodium, dissolved	7440-23-5	20.3	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	17-Jul-2024	1548838

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2405763-006

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Chrystina Lake

Client sampling date / time: 09-Jul-2024 08:45

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	17.5	0.50	mg/L	EC100/EO	-	18-Jul-2024	-
Conductivity	----	36.8	2.0	µS/cm	E100/EO	15-Jul-2024	15-Jul-2024	1544825
pH	----	7.52	0.10	pH units	E108/EO	15-Jul-2024	15-Jul-2024	1544824
Alkalinity, bicarbonate (as HCO3)	71-52-3	23.3	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, total (as CaCO3)	----	19.1	2.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Solids, total dissolved [TDS], calculated	----	20.0	1.0	mg/L	EC103/EO	-	16-Jul-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	13-Jul-2024	13-Jul-2024	1543689
Fluoride	16984-48-8	0.028	0.020	mg/L	E235.F/EO	13-Jul-2024	13-Jul-2024	1543686
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	13-Jul-2024	13-Jul-2024	1543687
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	13-Jul-2024	13-Jul-2024	1543690
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	13-Jul-2024	13-Jul-2024	1543688
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	16-Jul-2024	-
Ion Balance								
Anion sum	----	0.38	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Cation sum	----	0.42	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Ion balance (APHA)	----	5.00	0.01	%	EC101/EO	-	16-Jul-2024	-
Ion balance (cations/anions)	----	110	0.010	%	EC101/EO	-	16-Jul-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	5.11	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Iron, dissolved	7439-89-6	0.014	0.010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Magnesium, dissolved	7439-95-4	1.16	0.0050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Manganese, dissolved	7439-96-5	0.00020	0.00010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Potassium, dissolved	7440-09-7	0.864	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Sodium, dissolved	7440-23-5	1.18	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	17-Jul-2024	1548838

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2405763-007

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Chrystina Lake - Duplicate

Client sampling date / time: 09-Jul-2024 08:48

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	17.8	0.50	mg/L	EC100/EO	-	18-Jul-2024	-
Conductivity	----	37.3	2.0	µS/cm	E100/EO	15-Jul-2024	15-Jul-2024	1544825
pH	----	7.48	0.10	pH units	E108/EO	15-Jul-2024	15-Jul-2024	1544824
Alkalinity, bicarbonate (as HCO3)	71-52-3	23.2	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, total (as CaCO3)	----	19.0	2.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Solids, total dissolved [TDS], calculated	----	20.2	1.0	mg/L	EC103/EO	-	16-Jul-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	13-Jul-2024	13-Jul-2024	1543689
Fluoride	16984-48-8	0.025	0.020	mg/L	E235.F/EO	13-Jul-2024	13-Jul-2024	1543686
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	13-Jul-2024	13-Jul-2024	1543687
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	13-Jul-2024	13-Jul-2024	1543690
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	13-Jul-2024	13-Jul-2024	1543688
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	16-Jul-2024	-
Ion Balance								
Anion sum	----	0.38	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Cation sum	----	0.43	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Ion balance (APHA)	----	6.17	0.01	%	EC101/EO	-	16-Jul-2024	-
Ion balance (cations/anions)	----	113	0.010	%	EC101/EO	-	16-Jul-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	5.23	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Iron, dissolved	7439-89-6	0.014	0.010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Magnesium, dissolved	7439-95-4	1.16	0.0050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Manganese, dissolved	7439-96-5	0.00024	0.00010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Potassium, dissolved	7440-09-7	1.01	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Sodium, dissolved	7440-23-5	1.16	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	17-Jul-2024	1548838

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2405763-008

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Edith Lake

Client sampling date / time: 09-Jul-2024 14:42

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	9.21	0.50	mg/L	EC100/EO	-	18-Jul-2024	-
Conductivity	----	22.3	2.0	µS/cm	E100/EO	15-Jul-2024	15-Jul-2024	1544825
pH	----	7.06	0.10	pH units	E108/EO	15-Jul-2024	15-Jul-2024	1544824
Alkalinity, bicarbonate (as HCO3)	71-52-3	10.7	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826

Analytical Results

EO2405763-008

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Edith Lake

Client sampling date / time: 09-Jul-2024 14:42

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, total (as CaCO3)	----	8.8	2.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Solids, total dissolved [TDS], calculated	----	11.7	1.0	mg/L	EC103/EO	-	16-Jul-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	13-Jul-2024	13-Jul-2024	1543689
Fluoride	16984-48-8	<0.020	0.020	mg/L	E235.F/EO	13-Jul-2024	13-Jul-2024	1543686
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	13-Jul-2024	13-Jul-2024	1543687
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	13-Jul-2024	13-Jul-2024	1543690
Sulfate (as SO4)	14808-79-8	0.36	0.30	mg/L	E235.SO4/EO	13-Jul-2024	13-Jul-2024	1543688
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	16-Jul-2024	-
Ion Balance								
Anion sum	----	0.18	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Cation sum	----	0.28	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Ion balance (APHA)	----	21.7	0.01	%	EC101/EO	-	16-Jul-2024	-
Ion balance (cations/anions)	----	156 IB:INT.	0.010	%	EC101/EO	-	16-Jul-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	2.81	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Iron, dissolved	7439-89-6	0.046	0.010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Magnesium, dissolved	7439-95-4	0.533	0.0050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Manganese, dissolved	7439-96-5	0.00037	0.00010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Potassium, dissolved	7440-09-7	0.617	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Sodium, dissolved	7440-23-5	1.72	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	17-Jul-2024	1548838

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2405763-009

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Freeman Lake

Client sampling date / time: 10-Jul-2024 08:19

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	56.9	0.50	mg/L	EC100/EO	-	18-Jul-2024	-
Conductivity	----	103	2.0	µS/cm	E100/EO	15-Jul-2024	15-Jul-2024	1544825
pH	----	8.06	0.10	pH units	E108/EO	15-Jul-2024	15-Jul-2024	1544824
Alkalinity, bicarbonate (as HCO3)	71-52-3	71.8	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, total (as CaCO3)	----	58.9	2.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Solids, total dissolved [TDS], calculated	----	71.6	1.0	mg/L	EC103/EO	-	16-Jul-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	13-Jul-2024	13-Jul-2024	1543716
Fluoride	16984-48-8	0.065	0.020	mg/L	E235.F/EO	13-Jul-2024	13-Jul-2024	1543715
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	13-Jul-2024	13-Jul-2024	1543712

Analytical Results

EO2405763-009

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Freeman Lake
Client sampling date / time: 10-Jul-2024 08:19

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Anions and Nutrients								
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	13-Jul-2024	13-Jul-2024	1543713
Sulfate (as SO4)	14808-79-8	2.16	0.30	mg/L	E235.SO4/EO	13-Jul-2024	13-Jul-2024	1543714
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	16-Jul-2024	-
Ion Balance								
Anion sum	----	1.22	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Cation sum	----	1.31	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Ion balance (APHA)	----	3.56	0.01	%	EC101/EO	-	16-Jul-2024	-
Ion balance (cations/anions)	----	107	0.010	%	EC101/EO	-	16-Jul-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	17.7	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Iron, dissolved	7439-89-6	0.076	0.010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Magnesium, dissolved	7439-95-4	3.08	0.0050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Manganese, dissolved	7439-96-5	0.00225	0.00010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Potassium, dissolved	7440-09-7	0.827	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Sodium, dissolved	7440-23-5	3.39	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	17-Jul-2024	1548838

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2405763-010

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Krause Lake
Client sampling date / time: 08-Jul-2024 16:55

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	45.4	0.50	mg/L	EC100/EO	-	18-Jul-2024	-
Conductivity	----	96.5	2.0	µS/cm	E100/EO	15-Jul-2024	15-Jul-2024	1544825
pH	----	7.91	0.10	pH units	E108/EO	15-Jul-2024	15-Jul-2024	1544824
Alkalinity, bicarbonate (as HCO3)	71-52-3	57.1	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, total (as CaCO3)	----	46.8	2.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Solids, total dissolved [TDS], calculated	----	54.9	1.0	mg/L	EC103/EO	-	16-Jul-2024	-
Anions and Nutrients								
Chloride	16887-00-6	3.98	0.50	mg/L	E235.Cl/EO	13-Jul-2024	13-Jul-2024	1543716
Fluoride	16984-48-8	0.064	0.020	mg/L	E235.F/EO	13-Jul-2024	13-Jul-2024	1543715
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	13-Jul-2024	13-Jul-2024	1543712
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	13-Jul-2024	13-Jul-2024	1543713
Sulfate (as SO4)	14808-79-8	1.02	0.30	mg/L	E235.SO4/EO	13-Jul-2024	13-Jul-2024	1543714
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	16-Jul-2024	-
Ion Balance								
Anion sum	----	1.07	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Cation sum	----	1.10	0.10	meq/L	EC101/EO	-	16-Jul-2024	-

Analytical Results

EO2405763-010

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Krause Lake
Client sampling date / time: 08-Jul-2024 16:55

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Ion Balance								
Ion balance (APHA)	----	1.38	0.01	%	EC101/EO	-	16-Jul-2024	-
Ion balance (cations/anions)	----	103	0.010	%	EC101/EO	-	16-Jul-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	13.5	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Iron, dissolved	7439-89-6	0.074	0.010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Magnesium, dissolved	7439-95-4	2.85	0.0050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Manganese, dissolved	7439-96-5	0.00067	0.00010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Potassium, dissolved	7440-09-7	0.639	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Sodium, dissolved	7440-23-5	4.04	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	17-Jul-2024	1548838

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2405763-011

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Lois Lake
Client sampling date / time: 11-Jul-2024 10:23

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	24.0	0.50	mg/L	EC100/EO	-	18-Jul-2024	-
Conductivity	----	63.6	2.0	µS/cm	E100/EO	15-Jul-2024	15-Jul-2024	1544825
pH	----	7.16	0.10	pH units	E108/EO	15-Jul-2024	15-Jul-2024	1544824
Alkalinity, bicarbonate (as HCO3)	71-52-3	27.1	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, total (as CaCO3)	----	22.2	2.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Solids, total dissolved [TDS], calculated	----	38.1	1.0	mg/L	EC103/EO	-	16-Jul-2024	-
Anions and Nutrients								
Chloride	16887-00-6	5.29	0.50	mg/L	E235.Cl/EO	13-Jul-2024	13-Jul-2024	1543716
Fluoride	16984-48-8	0.044	0.020	mg/L	E235.F/EO	13-Jul-2024	13-Jul-2024	1543715
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	13-Jul-2024	13-Jul-2024	1543712
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	13-Jul-2024	13-Jul-2024	1543713
Sulfate (as SO4)	14808-79-8	0.40	0.30	mg/L	E235.SO4/EO	13-Jul-2024	13-Jul-2024	1543714
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	16-Jul-2024	-
Ion Balance								
Anion sum	----	0.60	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Cation sum	----	0.78	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Ion balance (APHA)	----	13.0	0.01	%	EC101/EO	-	16-Jul-2024	-
Ion balance (cations/anions)	----	130 IB:INT,	0.010	%	EC101/EO	-	16-Jul-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	7.06	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Iron, dissolved	7439-89-6	0.261	0.010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Magnesium, dissolved	7439-95-4	1.56	0.0050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838

Analytical Results

EO2405763-011

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Lois Lake

Client sampling date / time: 11-Jul-2024 10:23

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Manganese, dissolved	7439-96-5	0.0361	0.00010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Potassium, dissolved	7440-09-7	0.373	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Sodium, dissolved	7440-23-5	6.37	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	17-Jul-2024	1548838

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2405763-012

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Sarah Lake

Client sampling date / time: 08-Jul-2024 15:09

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	53.9	0.50	mg/L	EC100/EO	-	18-Jul-2024	-
Conductivity	----	117	2.0	µS/cm	E100/EO	15-Jul-2024	15-Jul-2024	1544825
pH	----	7.73	0.10	pH units	E108/EO	15-Jul-2024	15-Jul-2024	1544824
Alkalinity, bicarbonate (as HCO3)	71-52-3	56.4	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Alkalinity, total (as CaCO3)	----	46.2	2.0	mg/L	E290/EO	15-Jul-2024	15-Jul-2024	1544826
Solids, total dissolved [TDS], calculated	----	67.9	1.0	mg/L	EC103/EO	-	16-Jul-2024	-
Anions and Nutrients								
Chloride	16887-00-6	10.7	0.50	mg/L	E235.Cl/EO	13-Jul-2024	13-Jul-2024	1543716
Fluoride	16984-48-8	0.055	0.020	mg/L	E235.F/EO	13-Jul-2024	13-Jul-2024	1543715
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	13-Jul-2024	13-Jul-2024	1543712
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	13-Jul-2024	13-Jul-2024	1543713
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	13-Jul-2024	13-Jul-2024	1543714
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	16-Jul-2024	-
Ion Balance								
Anion sum	----	1.23	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Cation sum	----	1.41	0.10	meq/L	EC101/EO	-	16-Jul-2024	-
Ion balance (APHA)	----	6.82	0.01	%	EC101/EO	-	16-Jul-2024	-
Ion balance (cations/anions)	----	115	0.010	%	EC101/EO	-	16-Jul-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	15.3	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Iron, dissolved	7439-89-6	0.055	0.010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Magnesium, dissolved	7439-95-4	3.81	0.0050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Manganese, dissolved	7439-96-5	0.00173	0.00010	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Potassium, dissolved	7440-09-7	0.679	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Sodium, dissolved	7440-23-5	7.14	0.050	mg/L	E421/EO	17-Jul-2024	17-Jul-2024	1548838
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	17-Jul-2024	1548838

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **EO2405763**	Page	: 1 of 18
Client	: **CPP Environmental**	Laboratory	: ALS Environmental - Edmonton
Contact	: Theo Charette	Account Manager	: Megha Walia
Address	: 154-150 Chippewa Road Sherwood Park AB Canada T8A 6A2	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	: 780 570 5818	Telephone	: +1 780 413 5227
Project	: SUEZ WQ-2024 JULY	Date Samples Received	: 13-Jul-2024 10:20
PO	: ----	Issue Date	: 19-Jul-2024 15:45
C-O-C number	: 20-1057934		
Sampler	: VV-CL		
Site	: ----		
Quote number	: Blanket quote		
No. of samples received	: 12		
No. of samples analysed	: 12		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE Lois Lake	E235.Cl	11-Jul-2024	13-Jul-2024	28 days	2 days	✓	13-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Unnamed Lake 4	E235.Cl	11-Jul-2024	13-Jul-2024	28 days	2 days	✓	13-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Freeman Lake	E235.Cl	10-Jul-2024	13-Jul-2024	28 days	3 days	✓	13-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Unnamed Lake 6	E235.Cl	10-Jul-2024	13-Jul-2024	28 days	3 days	✓	13-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Unnamed Lake 1	E235.Cl	10-Jul-2024	13-Jul-2024	28 days	3 days	✓	13-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Unnamed Lake 5	E235.Cl	10-Jul-2024	13-Jul-2024	28 days	3 days	✓	13-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Chrystina Lake	E235.Cl	09-Jul-2024	13-Jul-2024	28 days	4 days	✓	13-Jul-2024	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Chrystina Lake - Duplicate	E235.Cl	09-Jul-2024	13-Jul-2024	28 days	4 days	✓	13-Jul-2024	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Edith Lake	E235.Cl	09-Jul-2024	13-Jul-2024	28 days	4 days	✓	13-Jul-2024	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Unnamed Lake 3	E235.Cl	09-Jul-2024	13-Jul-2024	28 days	4 days	✓	13-Jul-2024	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Krause Lake	E235.Cl	08-Jul-2024	13-Jul-2024	28 days	5 days	✓	13-Jul-2024	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Sarah Lake	E235.Cl	08-Jul-2024	13-Jul-2024	28 days	5 days	✓	13-Jul-2024	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Lois Lake	E235.F	11-Jul-2024	13-Jul-2024	28 days	2 days	✓	13-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Unnamed Lake 4	E235.F	11-Jul-2024	13-Jul-2024	28 days	2 days	✓	13-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Freeman Lake	E235.F	10-Jul-2024	13-Jul-2024	28 days	3 days	✓	13-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Unnamed Lake 6	E235.F	10-Jul-2024	13-Jul-2024	28 days	3 days	✓	13-Jul-2024	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Unnamed Lake 1	E235.F	10-Jul-2024	13-Jul-2024	28 days	3 days	✓	13-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Unnamed Lake 5	E235.F	10-Jul-2024	13-Jul-2024	28 days	3 days	✓	13-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Chrystina Lake	E235.F	09-Jul-2024	13-Jul-2024	28 days	4 days	✓	13-Jul-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Chrystina Lake - Duplicate	E235.F	09-Jul-2024	13-Jul-2024	28 days	4 days	✓	13-Jul-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Edith Lake	E235.F	09-Jul-2024	13-Jul-2024	28 days	4 days	✓	13-Jul-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Unnamed Lake 3	E235.F	09-Jul-2024	13-Jul-2024	28 days	4 days	✓	13-Jul-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Krause Lake	E235.F	08-Jul-2024	13-Jul-2024	28 days	5 days	✓	13-Jul-2024	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Sarah Lake	E235.F	08-Jul-2024	13-Jul-2024	28 days	5 days	✓	13-Jul-2024	28 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Lois Lake	E235.NO3	11-Jul-2024	13-Jul-2024	3 days	2 days	✓	13-Jul-2024	3 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Unnamed Lake 4	E235.NO3	11-Jul-2024	13-Jul-2024	3 days	2 days	✓	13-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Freeman Lake	E235.NO3	10-Jul-2024	13-Jul-2024	3 days	3 days	✓	13-Jul-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Unnamed Lake 6	E235.NO3	10-Jul-2024	13-Jul-2024	3 days	3 days	✓	13-Jul-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Unnamed Lake 1	E235.NO3	10-Jul-2024	13-Jul-2024	3 days	3 days	✓	13-Jul-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Unnamed Lake 5	E235.NO3	10-Jul-2024	13-Jul-2024	3 days	3 days	✓	13-Jul-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Edith Lake	E235.NO3	09-Jul-2024	13-Jul-2024	3 days	3 days	✓	13-Jul-2024	3 days	4 days	× EHTR
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Chrystina Lake	E235.NO3	09-Jul-2024	13-Jul-2024	3 days	4 days	× EHTR	13-Jul-2024	3 days	4 days	× EHTR
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Chrystina Lake - Duplicate	E235.NO3	09-Jul-2024	13-Jul-2024	3 days	4 days	× EHTR	13-Jul-2024	3 days	4 days	× EHTR
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Unnamed Lake 3	E235.NO3	09-Jul-2024	13-Jul-2024	3 days	4 days	× EHTR	13-Jul-2024	3 days	4 days	× EHTR

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Krause Lake	E235.NO3	08-Jul-2024	13-Jul-2024	3 days	4 days	✗ EHTR	13-Jul-2024	3 days	5 days	✗ EHTR
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Sarah Lake	E235.NO3	08-Jul-2024	13-Jul-2024	3 days	4 days	✗ EHTR	13-Jul-2024	3 days	5 days	✗ EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Lois Lake	E235.NO2	11-Jul-2024	13-Jul-2024	3 days	2 days	✓	13-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Unnamed Lake 4	E235.NO2	11-Jul-2024	13-Jul-2024	3 days	2 days	✓	13-Jul-2024	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Freeman Lake	E235.NO2	10-Jul-2024	13-Jul-2024	3 days	3 days	✓	13-Jul-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Unnamed Lake 6	E235.NO2	10-Jul-2024	13-Jul-2024	3 days	3 days	✓	13-Jul-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Unnamed Lake 1	E235.NO2	10-Jul-2024	13-Jul-2024	3 days	3 days	✓	13-Jul-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Unnamed Lake 5	E235.NO2	10-Jul-2024	13-Jul-2024	3 days	3 days	✓	13-Jul-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Edith Lake	E235.NO2	09-Jul-2024	13-Jul-2024	3 days	3 days	✓	13-Jul-2024	3 days	4 days	✗ EHTR

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Chrystina Lake	E235.NO2	09-Jul-2024	13-Jul-2024	3 days	4 days	✗ EHTR	13-Jul-2024	3 days	4 days	✗ EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Chrystina Lake - Duplicate	E235.NO2	09-Jul-2024	13-Jul-2024	3 days	4 days	✗ EHTR	13-Jul-2024	3 days	4 days	✗ EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Unnamed Lake 3	E235.NO2	09-Jul-2024	13-Jul-2024	3 days	4 days	✗ EHTR	13-Jul-2024	3 days	4 days	✗ EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Krause Lake	E235.NO2	08-Jul-2024	13-Jul-2024	3 days	4 days	✗ EHTR	13-Jul-2024	3 days	5 days	✗ EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Sarah Lake	E235.NO2	08-Jul-2024	13-Jul-2024	3 days	4 days	✗ EHTR	13-Jul-2024	3 days	5 days	✗ EHTR
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Lois Lake	E235.SO4	11-Jul-2024	13-Jul-2024	28 days	2 days	✓	13-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Unnamed Lake 4	E235.SO4	11-Jul-2024	13-Jul-2024	28 days	2 days	✓	13-Jul-2024	28 days	2 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Freeman Lake	E235.SO4	10-Jul-2024	13-Jul-2024	28 days	3 days	✓	13-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Unnamed Lake 6	E235.SO4	10-Jul-2024	13-Jul-2024	28 days	3 days	✓	13-Jul-2024	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE Unnamed Lake 1	E235.SO4	10-Jul-2024	13-Jul-2024	28 days	3 days	✓	13-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Unnamed Lake 5	E235.SO4	10-Jul-2024	13-Jul-2024	28 days	3 days	✓	13-Jul-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Chrystina Lake	E235.SO4	09-Jul-2024	13-Jul-2024	28 days	4 days	✓	13-Jul-2024	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Chrystina Lake - Duplicate	E235.SO4	09-Jul-2024	13-Jul-2024	28 days	4 days	✓	13-Jul-2024	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Edith Lake	E235.SO4	09-Jul-2024	13-Jul-2024	28 days	4 days	✓	13-Jul-2024	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Unnamed Lake 3	E235.SO4	09-Jul-2024	13-Jul-2024	28 days	4 days	✓	13-Jul-2024	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Krause Lake	E235.SO4	08-Jul-2024	13-Jul-2024	28 days	5 days	✓	13-Jul-2024	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Sarah Lake	E235.SO4	08-Jul-2024	13-Jul-2024	28 days	5 days	✓	13-Jul-2024	28 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Lois Lake	E421	11-Jul-2024	17-Jul-2024	180 days	6 days	✓	17-Jul-2024	180 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Unnamed Lake 4	E421	11-Jul-2024	17-Jul-2024	180 days	6 days	✓	17-Jul-2024	180 days	6 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Freeman Lake	E421	10-Jul-2024	17-Jul-2024	180 days	7 days	✓	17-Jul-2024	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Unnamed Lake 6	E421	10-Jul-2024	17-Jul-2024	180 days	7 days	✓	17-Jul-2024	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Unnamed Lake 1	E421	10-Jul-2024	17-Jul-2024	180 days	7 days	✓	17-Jul-2024	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Unnamed Lake 5	E421	10-Jul-2024	17-Jul-2024	180 days	7 days	✓	17-Jul-2024	180 days	7 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Chrystina Lake	E421	09-Jul-2024	17-Jul-2024	180 days	8 days	✓	17-Jul-2024	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Chrystina Lake - Duplicate	E421	09-Jul-2024	17-Jul-2024	180 days	8 days	✓	17-Jul-2024	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Edith Lake	E421	09-Jul-2024	17-Jul-2024	180 days	8 days	✓	17-Jul-2024	180 days	8 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid) Unnamed Lake 3	E421	09-Jul-2024	17-Jul-2024	180 days	8 days	✓	17-Jul-2024	180 days	8 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
Krause Lake	E421	08-Jul-2024	17-Jul-2024	180 days	9 days	✓	17-Jul-2024	180 days	9 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE dissolved (nitric acid)										
Sarah Lake	E421	08-Jul-2024	17-Jul-2024	180 days	9 days	✓	17-Jul-2024	180 days	9 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Lois Lake	E290	11-Jul-2024	15-Jul-2024	14 days	4 days	✓	15-Jul-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Unnamed Lake 4	E290	11-Jul-2024	15-Jul-2024	14 days	4 days	✓	15-Jul-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Freeman Lake	E290	10-Jul-2024	15-Jul-2024	14 days	5 days	✓	15-Jul-2024	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Unnamed Lake 6	E290	10-Jul-2024	15-Jul-2024	14 days	5 days	✓	15-Jul-2024	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Unnamed Lake 1	E290	10-Jul-2024	15-Jul-2024	14 days	5 days	✓	15-Jul-2024	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Unnamed Lake 5	E290	10-Jul-2024	15-Jul-2024	14 days	5 days	✓	15-Jul-2024	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Chrystina Lake	E290	09-Jul-2024	15-Jul-2024	14 days	6 days	✓	15-Jul-2024	14 days	6 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE Chrystina Lake - Duplicate	E290	09-Jul-2024	15-Jul-2024	14 days	6 days	✓	15-Jul-2024	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Edith Lake	E290	09-Jul-2024	15-Jul-2024	14 days	6 days	✓	15-Jul-2024	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Unnamed Lake 3	E290	09-Jul-2024	15-Jul-2024	14 days	6 days	✓	15-Jul-2024	14 days	6 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Krause Lake	E290	08-Jul-2024	15-Jul-2024	14 days	7 days	✓	15-Jul-2024	14 days	7 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Sarah Lake	E290	08-Jul-2024	15-Jul-2024	14 days	7 days	✓	15-Jul-2024	14 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE Lois Lake	E100	11-Jul-2024	15-Jul-2024	28 days	4 days	✓	15-Jul-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Unnamed Lake 4	E100	11-Jul-2024	15-Jul-2024	28 days	4 days	✓	15-Jul-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Freeman Lake	E100	10-Jul-2024	15-Jul-2024	28 days	5 days	✓	15-Jul-2024	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE Unnamed Lake 6	E100	10-Jul-2024	15-Jul-2024	28 days	5 days	✓	15-Jul-2024	28 days	5 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE Unnamed Lake 1	E100	10-Jul-2024	15-Jul-2024	28 days	5 days	✓	15-Jul-2024	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE Unnamed Lake 5	E100	10-Jul-2024	15-Jul-2024	28 days	5 days	✓	15-Jul-2024	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE Chrystina Lake	E100	09-Jul-2024	15-Jul-2024	28 days	6 days	✓	15-Jul-2024	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE Chrystina Lake - Duplicate	E100	09-Jul-2024	15-Jul-2024	28 days	6 days	✓	15-Jul-2024	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE Edith Lake	E100	09-Jul-2024	15-Jul-2024	28 days	6 days	✓	15-Jul-2024	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE Unnamed Lake 3	E100	09-Jul-2024	15-Jul-2024	28 days	6 days	✓	15-Jul-2024	28 days	6 days	✓
Physical Tests : Conductivity in Water										
HDPE Krause Lake	E100	08-Jul-2024	15-Jul-2024	28 days	7 days	✓	15-Jul-2024	28 days	7 days	✓
Physical Tests : Conductivity in Water										
HDPE Sarah Lake	E100	08-Jul-2024	15-Jul-2024	28 days	7 days	✓	15-Jul-2024	28 days	7 days	✓
Physical Tests : pH by Meter										
HDPE Unnamed Lake 1	E108	10-Jul-2024	15-Jul-2024	0.25 hrs	115 hrs	× EHTR-FM	15-Jul-2024	0.25 hrs	119 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Physical Tests : pH by Meter										
HDPE Unnamed Lake 6	E108	10-Jul-2024	15-Jul-2024	0.25 hrs	117 hrs	× EHTR-FM	15-Jul-2024	0.25 hrs	120 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Unnamed Lake 5	E108	10-Jul-2024	15-Jul-2024	0.25 hrs	119 hrs	× EHTR-FM	15-Jul-2024	0.25 hrs	122 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Freeman Lake	E108	10-Jul-2024	15-Jul-2024	0.25 hrs	120 hrs	× EHTR-FM	15-Jul-2024	0.25 hrs	124 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Edith Lake	E108	09-Jul-2024	15-Jul-2024	0.25 hrs	138 hrs	× EHTR-FM	15-Jul-2024	0.25 hrs	142 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Unnamed Lake 3	E108	09-Jul-2024	15-Jul-2024	0.25 hrs	141 hrs	× EHTR-FM	15-Jul-2024	0.25 hrs	144 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Chrystina Lake	E108	09-Jul-2024	15-Jul-2024	0.25 hrs	144 hrs	× EHTR-FM	15-Jul-2024	0.25 hrs	148 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Chrystina Lake - Duplicate	E108	09-Jul-2024	15-Jul-2024	0.25 hrs	144 hrs	× EHTR-FM	15-Jul-2024	0.25 hrs	148 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Krause Lake	E108	08-Jul-2024	15-Jul-2024	0.25 hrs	160 hrs	× EHTR-FM	15-Jul-2024	0.25 hrs	163 hrs	× EHTR-FM
Physical Tests : pH by Meter										
HDPE Sarah Lake	E108	08-Jul-2024	15-Jul-2024	0.25 hrs	162 hrs	× EHTR-FM	15-Jul-2024	0.25 hrs	165 hrs	× EHTR-FM

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE										
Lois Lake	E108	11-Jul-2024	15-Jul-2024	0.25 hrs	94 hrs	✗ EHTR-FM	15-Jul-2024	0.25 hrs	98 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
Unnamed Lake 4	E108	11-Jul-2024	15-Jul-2024	0.25 hrs	96 hrs	✗ EHTR-FM	15-Jul-2024	0.25 hrs	100 hrs	✗ EHTR-FM

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1544826	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1543716	2	40	5.0	5.0	✓
Conductivity in Water	E100	1544825	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1548838	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1543686	2	40	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1543712	2	40	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1543713	2	40	5.0	5.0	✓
pH by Meter	E108	1544824	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1543714	2	40	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1544826	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1543716	2	40	5.0	5.0	✓
Conductivity in Water	E100	1544825	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1548838	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1543686	2	40	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1543712	2	40	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1543713	2	40	5.0	5.0	✓
pH by Meter	E108	1544824	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1543714	2	40	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1544826	1	20	5.0	5.0	✓
Chloride in Water by IC	E235.Cl	1543716	2	40	5.0	5.0	✓
Conductivity in Water	E100	1544825	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1548838	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1543686	2	40	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1543712	2	40	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1543713	2	40	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1543714	2	40	5.0	5.0	✓
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	1543716	2	40	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1548838	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1543686	2	40	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1543712	2	40	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1543713	2	40	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1543714	2	40	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Edmonton	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Edmonton	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Chloride in Water by IC	E235.Cl ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Edmonton	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Edmonton	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Edmonton	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Edmonton	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 ALS Environmental - Edmonton	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Edmonton	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 ALS Environmental - Edmonton	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

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QUALITY CONTROL REPORT

Work Order	: **EO2405763**	Page	: 1 of 9
Client	: CPP Environmental	Laboratory	: ALS Environmental - Edmonton
Contact	: Theo Charette	Account Manager	: Megha Walia
Address	: 154-150 Chippewa Road Sherwood Park AB Canada T8A 6A2	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	: 780 570 5818	Telephone	: +1 780 413 5227
Project	: SUEZ WQ-2024 JULY	Date Samples Received	: 13-Jul-2024 10:20
PO	: ----	Date Analysis Commenced	: 13-Jul-2024
C-O-C number	: 20-1057934	Issue Date	: 19-Jul-2024 15:54
Sampler	: VV-CL		
Site	: ----		
Quote number	: Blanket quote		
No. of samples received	: 12		
No. of samples analysed	: 12		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Alex Drake	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta
Daniel Nguyen	Laboratory Analyst	Edmonton Metals, Edmonton, Alberta
Shruti Mudliar	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta
Shruti Mudliar	Lab Analyst	Edmonton Metals, Edmonton, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1544824)											
EO2405764-018	Anonymous	pH	----	E108	0.10	pH units	8.62	8.61	0.116%	3%	----
Physical Tests (QC Lot: 1544825)											
EO2405764-018	Anonymous	Conductivity	----	E100	1.0	µS/cm	650	652	0.307%	10%	----
Physical Tests (QC Lot: 1544826)											
EO2405764-018	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	388	386	0.595%	20%	----
Anions and Nutrients (QC Lot: 1543686)											
EO2405764-007	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.048	0.048	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1543687)											
EO2405764-007	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	0.082	0.083	0.0007	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1543688)											
EO2405764-007	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	13.4	13.4	0.0299%	20%	----
Anions and Nutrients (QC Lot: 1543689)											
EO2405764-007	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	13.0	13.0	0.107%	20%	----
Anions and Nutrients (QC Lot: 1543690)											
EO2405764-007	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1543712)											
GP2401300-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1543713)											
GP2401300-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1543714)											
GP2401300-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	218	219	0.474%	20%	----
Anions and Nutrients (QC Lot: 1543715)											
GP2401300-001	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.658	0.668	1.51%	20%	----
Anions and Nutrients (QC Lot: 1543716)											
GP2401300-001	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	81.8	82.0	0.276%	20%	----
Dissolved Metals (QC Lot: 1548838)											
EO2405763-001	Unnamed Lake 1	Calcium, dissolved	7440-70-2	E421	0.050	mg/L	0.566	0.548	3.11%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.019	0.019	0.0001	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.245	0.248	1.26%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00582	0.00559	4.02%	20%	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Dissolved Metals (QC Lot: 1548838) - continued											
EO2405763-001	Unnamed Lake 1	Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.329	0.325	0.004	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.534	0.525	1.61%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1544825)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1544826)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Anions and Nutrients (QCLot: 1543686)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1543687)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1543688)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1543689)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1543690)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1543712)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1543713)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1543714)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1543715)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1543716)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 1548838)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1544824)									
pH	----	E108	----	pH units	6 pH units	101	97.0	103	----
Physical Tests (QCLot: 1544825)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	94.5	90.0	110	----
Physical Tests (QCLot: 1544826)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	104	85.0	115	----
Anions and Nutrients (QCLot: 1543686)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	98.5	90.0	110	----
Anions and Nutrients (QCLot: 1543687)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	98.6	90.0	110	----
Anions and Nutrients (QCLot: 1543688)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	98.5	90.0	110	----
Anions and Nutrients (QCLot: 1543689)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	98.7	90.0	110	----
Anions and Nutrients (QCLot: 1543690)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	99.1	90.0	110	----
Anions and Nutrients (QCLot: 1543712)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	99.1	90.0	110	----
Anions and Nutrients (QCLot: 1543713)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	99.7	90.0	110	----
Anions and Nutrients (QCLot: 1543714)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	99.4	90.0	110	----
Anions and Nutrients (QCLot: 1543715)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	98.2	90.0	110	----
Anions and Nutrients (QCLot: 1543716)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.9	90.0	110	----
Dissolved Metals (QCLot: 1548838)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	106	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	105	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	108	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	106	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1548838) - continued									
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	108	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	108	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1543686)										
EO2405764-007	Anonymous	Fluoride	16984-48-8	E235.F	0.985 mg/L	1 mg/L	98.5	75.0	125	----
Anions and Nutrients (QCLot: 1543687)										
EO2405764-007	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.49 mg/L	2.5 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 1543688)										
EO2405764-007	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	96.1 mg/L	100 mg/L	96.1	75.0	125	----
Anions and Nutrients (QCLot: 1543689)										
EO2405764-007	Anonymous	Chloride	16887-00-6	E235.Cl	97.8 mg/L	100 mg/L	97.8	75.0	125	----
Anions and Nutrients (QCLot: 1543690)										
EO2405764-007	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.498 mg/L	0.5 mg/L	99.7	75.0	125	----
Anions and Nutrients (QCLot: 1543712)										
GP2401300-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.58 mg/L	2.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1543713)										
GP2401300-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.514 mg/L	0.5 mg/L	103	75.0	125	----
Anions and Nutrients (QCLot: 1543714)										
GP2401300-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1543715)										
GP2401300-001	Anonymous	Fluoride	16984-48-8	E235.F	0.999 mg/L	1 mg/L	99.9	75.0	125	----
Anions and Nutrients (QCLot: 1543716)										
GP2401300-001	Anonymous	Chloride	16887-00-6	E235.Cl	89.5 mg/L	100 mg/L	89.5	75.0	125	----
Dissolved Metals (QCLot: 1548838)										
EO2405763-002	Unnamed Lake 3	Calcium, dissolved	7440-70-2	E421	3.73 mg/L	4 mg/L	93.3	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.97 mg/L	2 mg/L	98.6	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	0.964 mg/L	1 mg/L	96.4	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	----	ND	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	4.08 mg/L	4 mg/L	102	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 - 1057934

Canada Toll Free: 1 800 668 9878

Page of

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	CPP Environmental
Contact:	Theo Charette
Phone:	780-570-5818
	Company address below will appear on the final report
Street:	154-150 Chippewa Rd
City/Province:	Sherwood Park
Postal Code:	T8A 6A2
Invoice To	Same as Report To ☐ YES ☒ NO
	Copy of Invoice with Report ☒ YES ☐ NO
Company:	
Contact:	

Reports / Recipients

Select Report Format: ☐ PDF ☒ EXCEL ☐ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax veronica@cppenv.ca

Email 2 sara@cppenv.ca

Email 3

Invoice Recipients

Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax admin@cppenv.ca

Email 2

Turnaround Time (TAT) Requested

☒ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additional fees may apply to rush requests on weekends, statutory holidays and non-routine tests

Date and Time Required for all E&P TATs: dd-mmm-yy hh:mm am/pm

For all tests with rush TATs requested, please contact your AM to confirm availability.

AFFIX ALS BARCODE LABEL HERE (ALS use only)

Project Information

ALS Account # / Quote #:	
Job #:	SUEZ WQ - 2024 JULY
PO / AFE:	
LSD:	

Oil and Gas Required Fields (client use)

AFE/Cost Center:	PO#
Major/Minor Code:	Routing Code:
Requisitioner:	
Location:	

ALS Lab Work Order # (ALS use only): EO2405763 **ALS Contact:** **Sampler:** VV-CL

Analysis Request

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Routine	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRED	SUSPECTED HAZARD (see notes)
	Unnamed Lake 1	10-07-24	13:39	Water	1	✓			
	Unnamed Lake 3	09-07-24	12:07						
	Unnamed Lake 4	11-07-24	08:25						
	Unnamed Lake 6	10-07-24	11:52						
	Unnamed Lake 5	10-07-24	10:06						
	Chrystina Lake	09/07/24	08:45						
	Chrystina Lake - Duplicate	09-07-24	08:48						
	Edith Lake	09-07-24	14:42						
	Freeman Lake	10-07-24	08:19						
	Krause Lake	08-07-24	16:55						
	Lois Lake	11-07-24	10:23						
	Sarah Lake	08-07-24	15:09						

Environmental Division
Edmonton
Work Order Reference
EO2405763
Telephone : +1 780 413 5227

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☒ NO

Are samples for human consumption/ use? ☐ YES ☒ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☒ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
6.3							

SHIPMENT RELEASE (client use)

Released by: VeronicaV. Date: 12 Jul 24 Time: 13:44

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: 12-Jul-24 Time: 1:42

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Canada Ltd.

right solutions.
right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **EO2406804**	Page	: 1 of 12
Amendment	: **1**		
Client	: **CPP Environmental**	Laboratory	: ALS Environmental - Edmonton
Contact	: Theo Charette	Account Manager	: Megha Walia
Address	: 154-150 Chippewa Road Sherwood Park AB Canada T8A 6A2	Address	: 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9
Telephone	: 780 570 5818	Telephone	: +1 780 413 5227
Project	: SUEZ WQ-August 2024	Date Samples Received	: 12-Aug-2024 14:46
PO	: ----	Date Analysis Commenced	: 12-Aug-2024
C-O-C number	: 20-1057941	Issue Date	: 09-Oct-2024 10:48
Sampler	: ----		
Site	: ----		
Quote number	: Blanket quote		
No. of samples received	: 11		
No. of samples analysed	: 11		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Alex Drake	Lab Analyst	Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Metals, Edmonton, Alberta
Brooke Miller	Laboratory Analyst	Inorganics, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Metals, Edmonton, Alberta
Ping Yeung	Team Leader - Inorganics	Inorganics, Edmonton, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.
Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).
Measurement Uncertainty: The reported uncertainties in this report are expanded uncertainties calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

>: greater than.
<: less than.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
IB:INT	*Ion Balance Reviewed: Imbalance is due to interference or non-measured component.*

Analytical Results

EO2406804-001

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 4 -

Client sampling date / time: 08-Aug-2024 13:50

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	7.55	0.50	mg/L	EC100/EO	-	14-Aug-2024	-
Conductivity	----	17.8	2.0	µS/cm	E100/EO	13-Aug-2024	13-Aug-2024	1592877
pH	----	6.52	0.10	pH units	E108/EO	13-Aug-2024	13-Aug-2024	1592876
Alkalinity, bicarbonate (as HCO3)	71-52-3	5.7	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, total (as CaCO3)	----	4.7	2.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Solids, total dissolved [TDS], calculated	----	7.7	1.0	mg/L	EC103/EO	-	13-Aug-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	12-Aug-2024	12-Aug-2024	1591788
Fluoride	16984-48-8	0.022	0.020	mg/L	E235.F/EO	12-Aug-2024	12-Aug-2024	1591787
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	12-Aug-2024	12-Aug-2024	1591785
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	12-Aug-2024	12-Aug-2024	1591786
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	12-Aug-2024	12-Aug-2024	1591784
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	13-Aug-2024	-
Ion Balance								
Anion sum	----	<0.10	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Cation sum	----	0.22	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Ion balance (APHA)	----	37.5	0.01	%	EC101/EO	-	13-Aug-2024	-
Ion balance (cations/anions)	----	220 IB:INT,	0.010	%	EC101/EO	-	13-Aug-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	2.05	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Iron, dissolved	7439-89-6	0.154	0.010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Magnesium, dissolved	7439-95-4	0.590	0.0050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Manganese, dissolved	7439-96-5	0.0249	0.00010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Potassium, dissolved	7440-09-7	0.596	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Sodium, dissolved	7440-23-5	0.732	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	13-Aug-2024	1592801

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2406804-002

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Chrystina Lake -

Client sampling date / time: 08-Aug-2024 16:45

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	16.5	0.50	mg/L	EC100/EO	-	14-Aug-2024	-
Conductivity	----	36.7	2.0	µS/cm	E100/EO	13-Aug-2024	13-Aug-2024	1592877
pH	----	7.34	0.10	pH units	E108/EO	13-Aug-2024	13-Aug-2024	1592876
Alkalinity, bicarbonate (as HCO3)	71-52-3	22.3	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878

Analytical Results

EO2406804-002

Sub-Matrix: **Water** (Matrix: **Water**)

Client sample ID: Chrystina Lake -

Client sampling date / time: 08-Aug-2024 16:45

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, total (as CaCO3)	----	18.3	2.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Solids, total dissolved [TDS], calculated	----	19.5	1.0	mg/L	EC103/EO	-	13-Aug-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	12-Aug-2024	12-Aug-2024	1591788
Fluoride	16984-48-8	0.031	0.020	mg/L	E235.F/EO	12-Aug-2024	12-Aug-2024	1591787
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	12-Aug-2024	12-Aug-2024	1591785
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	12-Aug-2024	12-Aug-2024	1591786
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	12-Aug-2024	12-Aug-2024	1591784
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	13-Aug-2024	-
Ion Balance								
Anion sum	----	0.37	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Cation sum	----	0.40	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Ion balance (APHA)	----	3.90	0.01	%	EC101/EO	-	13-Aug-2024	-
Ion balance (cations/anions)	----	108	0.010	%	EC101/EO	-	13-Aug-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	4.77	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Iron, dissolved	7439-89-6	0.048	0.010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Magnesium, dissolved	7439-95-4	1.11	0.0050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Manganese, dissolved	7439-96-5	0.0178	0.00010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Potassium, dissolved	7440-09-7	0.870	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Sodium, dissolved	7440-23-5	1.09	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	13-Aug-2024	1592801

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2406804-003

Sub-Matrix: **Water** (Matrix: **Water**)

Client sample ID: Edith Lake + Duplicate -

Client sampling date / time: 08-Aug-2024 18:30

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	8.66	0.50	mg/L	EC100/EO	-	14-Aug-2024	-
Conductivity	----	21.5	2.0	µS/cm	E100/EO	13-Aug-2024	13-Aug-2024	1592877
pH	----	7.16	0.10	pH units	E108/EO	13-Aug-2024	13-Aug-2024	1592876
Alkalinity, bicarbonate (as HCO3)	71-52-3	9.3	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, total (as CaCO3)	----	7.6	2.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Solids, total dissolved [TDS], calculated	----	10.6	1.0	mg/L	EC103/EO	-	13-Aug-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	12-Aug-2024	12-Aug-2024	1591788
Fluoride	16984-48-8	0.020	0.020	mg/L	E235.F/EO	12-Aug-2024	12-Aug-2024	1591787
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	12-Aug-2024	12-Aug-2024	1591785

Analytical Results

EO2406804-003

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Edith Lake + Duplicate -

Client sampling date / time: 08-Aug-2024 18:30

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Anions and Nutrients								
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	12-Aug-2024	12-Aug-2024	1591786
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	12-Aug-2024	12-Aug-2024	1591784
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	13-Aug-2024	-
Ion Balance								
Anion sum	----	0.15	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Cation sum	----	0.27	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Ion balance (APHA)	----	28.6	0.01	%	EC101/EO	-	13-Aug-2024	-
Ion balance (cations/anions)	----	180 IB:INT,	0.010	%	EC101/EO	-	13-Aug-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	2.66	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Iron, dissolved	7439-89-6	0.139	0.010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Magnesium, dissolved	7439-95-4	0.491	0.0050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Manganese, dissolved	7439-96-5	0.0241	0.00010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Potassium, dissolved	7440-09-7	0.595	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Sodium, dissolved	7440-23-5	1.63	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	13-Aug-2024	1592801

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2406804-004

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 3 -

Client sampling date / time: 09-Aug-2024 08:45

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	8.43	0.50	mg/L	EC100/EO	-	14-Aug-2024	-
Conductivity	----	26.7	2.0	µS/cm	E100/EO	13-Aug-2024	13-Aug-2024	1592877
pH	----	5.20	0.10	pH units	E108/EO	13-Aug-2024	13-Aug-2024	1592876
Alkalinity, bicarbonate (as HCO3)	71-52-3	2.2	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, total (as CaCO3)	----	<2.0	2.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Solids, total dissolved [TDS], calculated	----	20.6	1.0	mg/L	EC103/EO	-	13-Aug-2024	-
Anions and Nutrients								
Chloride	16887-00-6	2.16	0.50	mg/L	E235.Cl/EO	12-Aug-2024	12-Aug-2024	1591788
Fluoride	16984-48-8	0.028	0.020	mg/L	E235.F/EO	12-Aug-2024	12-Aug-2024	1591787
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	12-Aug-2024	12-Aug-2024	1591785
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	12-Aug-2024	12-Aug-2024	1591786
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	12-Aug-2024	12-Aug-2024	1591784
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	13-Aug-2024	-
Ion Balance								
Anion sum	----	<0.10	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Cation sum	----	0.34	0.10	meq/L	EC101/EO	-	13-Aug-2024	-

Analytical Results

EO2406804-004

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 3 -

Client sampling date / time: 09-Aug-2024 08:45

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Ion Balance								
Ion balance (APHA)	----	54.5	0.01	%	EC101/EO	-	13-Aug-2024	-
Ion balance (cations/anions)	----	340 IB:INT,	0.010	%	EC101/EO	-	13-Aug-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	2.07	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Iron, dissolved	7439-89-6	0.728	0.010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Magnesium, dissolved	7439-95-4	0.792	0.0050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Manganese, dissolved	7439-96-5	0.0775	0.00010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Potassium, dissolved	7440-09-7	0.817	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Sodium, dissolved	7440-23-5	1.89	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	13-Aug-2024	1592801

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2406804-005

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Sara Lake -

Client sampling date / time: 09-Aug-2024 12:30

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	46.7	0.50	mg/L	EC100/EO	-	14-Aug-2024	-
Conductivity	----	116	2.0	µS/cm	E100/EO	13-Aug-2024	13-Aug-2024	1592877
pH	----	7.38	0.10	pH units	E108/EO	13-Aug-2024	13-Aug-2024	1592876
Alkalinity, bicarbonate (as HCO3)	71-52-3	52.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, total (as CaCO3)	----	42.6	2.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Solids, total dissolved [TDS], calculated	----	66.2	1.0	mg/L	EC103/EO	-	13-Aug-2024	-
Anions and Nutrients								
Chloride	16887-00-6	11.4	0.50	mg/L	E235.Cl/EO	12-Aug-2024	12-Aug-2024	1591788
Fluoride	16984-48-8	0.071	0.020	mg/L	E235.F/EO	12-Aug-2024	12-Aug-2024	1591787
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	12-Aug-2024	12-Aug-2024	1591785
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	12-Aug-2024	12-Aug-2024	1591786
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	12-Aug-2024	12-Aug-2024	1591784
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	13-Aug-2024	-
Ion Balance								
Anion sum	----	1.18	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Cation sum	----	1.26	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Ion balance (APHA)	----	3.28	0.01	%	EC101/EO	-	13-Aug-2024	-
Ion balance (cations/anions)	----	107	0.010	%	EC101/EO	-	13-Aug-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	13.0	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Iron, dissolved	7439-89-6	0.101	0.010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Magnesium, dissolved	7439-95-4	3.46	0.0050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801

Analytical Results

EO2406804-005

Sub-Matrix:**Water**
(Matrix: **Water**)

Client sample ID: Sara Lake -
Client sampling date / time: 09-Aug-2024 12:30

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Manganese, dissolved	7439-96-5	0.0145	0.00010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Potassium, dissolved	7440-09-7	0.477	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Sodium, dissolved	7440-23-5	7.12	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	13-Aug-2024	1592801

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2406804-006

Sub-Matrix:**Water**
(Matrix: **Water**)

Client sample ID: Krause Lake -
Client sampling date / time: 09-Aug-2024 11:45

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	42.2	0.50	mg/L	EC100/EO	-	14-Aug-2024	-
Conductivity	----	87.1	2.0	µS/cm	E100/EO	13-Aug-2024	13-Aug-2024	1592877
pH	----	8.01	0.10	pH units	E108/EO	13-Aug-2024	13-Aug-2024	1592876
Alkalinity, bicarbonate (as HCO3)	71-52-3	54.3	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Alkalinity, total (as CaCO3)	----	44.5	2.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1592878
Solids, total dissolved [TDS], calculated	----	50.4	1.0	mg/L	EC103/EO	-	13-Aug-2024	-
Anions and Nutrients								
Chloride	16887-00-6	1.84	0.50	mg/L	E235.Cl/EO	12-Aug-2024	12-Aug-2024	1591788
Fluoride	16984-48-8	0.061	0.020	mg/L	E235.F/EO	12-Aug-2024	12-Aug-2024	1591787
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	12-Aug-2024	12-Aug-2024	1591785
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	12-Aug-2024	12-Aug-2024	1591786
Sulfate (as SO4)	14808-79-8	0.65	0.30	mg/L	E235.SO4/EO	12-Aug-2024	12-Aug-2024	1591784
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	13-Aug-2024	-
Ion Balance								
Anion sum	----	0.96	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Cation sum	----	0.99	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Ion balance (APHA)	----	1.54	0.01	%	EC101/EO	-	13-Aug-2024	-
Ion balance (cations/anions)	----	103	0.010	%	EC101/EO	-	13-Aug-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	12.3	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Iron, dissolved	7439-89-6	0.180	0.010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Magnesium, dissolved	7439-95-4	2.79	0.0050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Manganese, dissolved	7439-96-5	0.0188	0.00010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Potassium, dissolved	7440-09-7	0.218	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Sodium, dissolved	7440-23-5	2.92	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	13-Aug-2024	1592801

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2406804-007

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Freeman Lake -

Client sampling date / time: 09-Aug-2024 11:00

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	45.9	0.50	mg/L	EC100/EO	-	14-Aug-2024	-
Conductivity	----	97.1	2.0	µS/cm	E100/EO	13-Aug-2024	13-Aug-2024	1593253
pH	----	7.57	0.10	pH units	E108/EO	13-Aug-2024	13-Aug-2024	1593252
Alkalinity, bicarbonate (as HCO3)	71-52-3	64.7	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Alkalinity, total (as CaCO3)	----	53.0	2.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Solids, total dissolved [TDS], calculated	----	64.8	1.0	mg/L	EC103/EO	-	13-Aug-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	12-Aug-2024	12-Aug-2024	1591788
Fluoride	16984-48-8	0.067	0.020	mg/L	E235.F/EO	12-Aug-2024	12-Aug-2024	1591787
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	12-Aug-2024	12-Aug-2024	1591785
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	12-Aug-2024	12-Aug-2024	1591786
Sulfate (as SO4)	14808-79-8	2.11	0.30	mg/L	E235.SO4/EO	12-Aug-2024	12-Aug-2024	1591784
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	13-Aug-2024	-
Ion Balance								
Anion sum	----	1.11	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Cation sum	----	1.07	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Ion balance (APHA)	----	-1.83	0.01	%	EC101/EO	-	13-Aug-2024	-
Ion balance (cations/anions)	----	96.4	0.010	%	EC101/EO	-	13-Aug-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	14.1	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Iron, dissolved	7439-89-6	0.156	0.010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Magnesium, dissolved	7439-95-4	2.60	0.0050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Manganese, dissolved	7439-96-5	0.0194	0.00010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Potassium, dissolved	7440-09-7	0.736	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Sodium, dissolved	7440-23-5	2.92	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	13-Aug-2024	1592801

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2406804-008

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 6 -

Client sampling date / time: 09-Aug-2024 09:45

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	14.3	0.50	mg/L	EC100/EO	-	14-Aug-2024	-
Conductivity	----	29.9	2.0	µS/cm	E100/EO	13-Aug-2024	13-Aug-2024	1593253
pH	----	7.12	0.10	pH units	E108/EO	13-Aug-2024	13-Aug-2024	1593252
Alkalinity, bicarbonate (as HCO3)	71-52-3	15.2	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251

Analytical Results

EO2406804-008

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 6 -

Client sampling date / time: 09-Aug-2024 09:45

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, total (as CaCO3)	----	12.5	2.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Solids, total dissolved [TDS], calculated	----	14.6	1.0	mg/L	EC103/EO	-	13-Aug-2024	-
Anions and Nutrients								
Chloride	16887-00-6	0.54	0.50	mg/L	E235.Cl/EO	12-Aug-2024	12-Aug-2024	1591788
Fluoride	16984-48-8	0.031	0.020	mg/L	E235.F/EO	12-Aug-2024	12-Aug-2024	1591787
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	12-Aug-2024	12-Aug-2024	1591785
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	12-Aug-2024	12-Aug-2024	1591786
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	12-Aug-2024	12-Aug-2024	1591784
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	13-Aug-2024	-
Ion Balance								
Anion sum	----	0.27	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Cation sum	----	0.33	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Ion balance (APHA)	----	10.0	0.01	%	EC101/EO	-	13-Aug-2024	-
Ion balance (cations/anions)	----	122 IB:INT.	0.010	%	EC101/EO	-	13-Aug-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	4.20	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Iron, dissolved	7439-89-6	0.074	0.010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Magnesium, dissolved	7439-95-4	0.927	0.0050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Manganese, dissolved	7439-96-5	0.0140	0.00010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Potassium, dissolved	7440-09-7	0.346	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Sodium, dissolved	7440-23-5	0.651	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	13-Aug-2024	1592801

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2406804-009

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 1 -

Client sampling date / time: 09-Aug-2024 10:30

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	2.45	0.50	mg/L	EC100/EO	-	14-Aug-2024	-
Conductivity	----	6.6	2.0	µS/cm	E100/EO	13-Aug-2024	13-Aug-2024	1593253
pH	----	6.16	0.10	pH units	E108/EO	13-Aug-2024	13-Aug-2024	1593252
Alkalinity, bicarbonate (as HCO3)	71-52-3	2.1	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Alkalinity, total (as CaCO3)	----	<2.0	2.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Solids, total dissolved [TDS], calculated	----	2.5	1.0	mg/L	EC103/EO	-	13-Aug-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	12-Aug-2024	12-Aug-2024	1591788
Fluoride	16984-48-8	<0.020	0.020	mg/L	E235.F/EO	12-Aug-2024	12-Aug-2024	1591787
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	12-Aug-2024	12-Aug-2024	1591785

Analytical Results

EO2406804-009

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 1 -

Client sampling date / time: 09-Aug-2024 10:30

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Anions and Nutrients								
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	12-Aug-2024	12-Aug-2024	1591786
Sulfate (as SO4)	14808-79-8	0.43	0.30	mg/L	E235.SO4/EO	12-Aug-2024	12-Aug-2024	1591784
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	13-Aug-2024	-
Ion Balance								
Anion sum	----	<0.10	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Cation sum	----	<0.10	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Ion balance (APHA)	----	0.0	0.01	%	EC101/EO	-	13-Aug-2024	-
Ion balance (cations/anions)	----	100	0.010	%	EC101/EO	-	13-Aug-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	0.528	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Iron, dissolved	7439-89-6	0.047	0.010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Magnesium, dissolved	7439-95-4	0.275	0.0050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Manganese, dissolved	7439-96-5	0.00374	0.00010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Potassium, dissolved	7440-09-7	0.240	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Sodium, dissolved	7440-23-5	0.468	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	13-Aug-2024	1592801

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2406804-010

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake5 -

Client sampling date / time: 09-Aug-2024 13:45

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	63.0	0.50	mg/L	EC100/EO	-	14-Aug-2024	-
Conductivity	----	208	2.0	µS/cm	E100/EO	13-Aug-2024	13-Aug-2024	1593253
pH	----	7.59	0.10	pH units	E108/EO	13-Aug-2024	13-Aug-2024	1593252
Alkalinity, bicarbonate (as HCO3)	71-52-3	82.1	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Alkalinity, total (as CaCO3)	----	67.3	2.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Solids, total dissolved [TDS], calculated	----	112	1.0	mg/L	EC103/EO	-	13-Aug-2024	-
Anions and Nutrients								
Chloride	16887-00-6	26.8	0.50	mg/L	E235.Cl/EO	12-Aug-2024	12-Aug-2024	1591788
Fluoride	16984-48-8	0.070	0.020	mg/L	E235.F/EO	12-Aug-2024	12-Aug-2024	1591787
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	12-Aug-2024	12-Aug-2024	1591785
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	12-Aug-2024	12-Aug-2024	1591786
Sulfate (as SO4)	14808-79-8	0.31	0.30	mg/L	E235.SO4/EO	12-Aug-2024	12-Aug-2024	1591784
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	13-Aug-2024	-
Ion Balance								
Anion sum	----	2.11	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Cation sum	----	2.13	0.10	meq/L	EC101/EO	-	13-Aug-2024	-

Analytical Results

EO2406804-010

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake5 -

Client sampling date / time: 09-Aug-2024 13:45

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Ion Balance								
Ion balance (APHA)	----	0.47	0.01	%	EC101/EO	-	13-Aug-2024	-
Ion balance (cations/anions)	----	101	0.010	%	EC101/EO	-	13-Aug-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	18.6	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Iron, dissolved	7439-89-6	0.260	0.010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Magnesium, dissolved	7439-95-4	4.01	0.0050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Manganese, dissolved	7439-96-5	0.0102	0.00010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Potassium, dissolved	7440-09-7	0.807	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Sodium, dissolved	7440-23-5	19.3	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	13-Aug-2024	1592801

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2406804-011

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Lois Lake -

Client sampling date / time: 08-Aug-2024 11:01

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	21.9	0.50	mg/L	EC100/EO	-	14-Aug-2024	-
Conductivity	----	62.0	2.0	µS/cm	E100/EO	13-Aug-2024	13-Aug-2024	1593253
pH	----	6.86	0.10	pH units	E108/EO	13-Aug-2024	13-Aug-2024	1593252
Alkalinity, bicarbonate (as HCO3)	71-52-3	22.1	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Alkalinity, total (as CaCO3)	----	18.1	2.0	mg/L	E290/EO	13-Aug-2024	13-Aug-2024	1593251
Solids, total dissolved [TDS], calculated	----	34.4	1.0	mg/L	EC103/EO	-	13-Aug-2024	-
Anions and Nutrients								
Chloride	16887-00-6	5.18	0.50	mg/L	E235.Cl/EO	12-Aug-2024	12-Aug-2024	1591788
Fluoride	16984-48-8	0.051	0.020	mg/L	E235.F/EO	12-Aug-2024	12-Aug-2024	1591787
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	12-Aug-2024	12-Aug-2024	1591785
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	12-Aug-2024	12-Aug-2024	1591786
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	12-Aug-2024	12-Aug-2024	1591784
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	13-Aug-2024	-
Ion Balance								
Anion sum	----	0.51	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Cation sum	----	0.74	0.10	meq/L	EC101/EO	-	13-Aug-2024	-
Ion balance (APHA)	----	18.4	0.01	%	EC101/EO	-	13-Aug-2024	-
Ion balance (cations/anions)	----	145 IB:INT,	0.010	%	EC101/EO	-	13-Aug-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	6.27	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Iron, dissolved	7439-89-6	0.224	0.010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Magnesium, dissolved	7439-95-4	1.52	0.0050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801

Analytical Results

EO2406804-011

Sub-Matrix:**Water**
(Matrix: **Water**)

Client sample ID: Lois Lake -
Client sampling date / time: 08-Aug-2024 11:01

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Manganese, dissolved	7439-96-5	0.0315	0.00010	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Potassium, dissolved	7440-09-7	0.237	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Sodium, dissolved	7440-23-5	6.56	0.050	mg/L	E421/EO	13-Aug-2024	13-Aug-2024	1592801
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	13-Aug-2024	1592801

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **EO2406804**	Page	: 1 of 17
Amendment	: 1		
Client	: **CPP Environmental**	Laboratory	: ALS Environmental - Edmonton
Contact	: Theo Charette	Account Manager	: Megha Walia
Address	: 154-150 Chippewa Road Sherwood Park AB Canada T8A 6A2	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	: 780 570 5818	Telephone	: +1 780 413 5227
Project	: SUEZ WQ-August 2024	Date Samples Received	: 12-Aug-2024 14:46
PO	: ----	Issue Date	: 09-Oct-2024 10:48
C-O-C number	: 20-1057941		
Sampler	: ----		
Site	: ----		
Quote number	: Blanket quote		
No. of samples received	: 11		
No. of samples analysed	: 11		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Freeman Lake	E235.Cl	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Krause Lake	E235.Cl	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Sara Lake	E235.Cl	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Unnamed Lake 1	E235.Cl	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Unnamed Lake 3	E235.Cl	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Unnamed Lake 6	E235.Cl	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE										
Unnamed Lake5	E235.Cl	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE Chrystina Lake	E235.Cl	08-Aug-2024	12-Aug-2024	28 days	4 days	✓	12-Aug-2024	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Edith Lake + Duplicate	E235.Cl	08-Aug-2024	12-Aug-2024	28 days	4 days	✓	12-Aug-2024	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Lois Lake	E235.Cl	08-Aug-2024	12-Aug-2024	28 days	4 days	✓	12-Aug-2024	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Unnamed Lake 4	E235.Cl	08-Aug-2024	12-Aug-2024	28 days	4 days	✓	12-Aug-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Freeman Lake	E235.F	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Krause Lake	E235.F	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Sara Lake	E235.F	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Unnamed Lake 1	E235.F	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Unnamed Lake 3	E235.F	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Unnamed Lake 6	E235.F	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Unnamed Lake5	E235.F	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Chrystina Lake	E235.F	08-Aug-2024	12-Aug-2024	28 days	4 days	✓	12-Aug-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Edith Lake + Duplicate	E235.F	08-Aug-2024	12-Aug-2024	28 days	4 days	✓	12-Aug-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Lois Lake	E235.F	08-Aug-2024	12-Aug-2024	28 days	4 days	✓	12-Aug-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Unnamed Lake 4	E235.F	08-Aug-2024	12-Aug-2024	28 days	4 days	✓	12-Aug-2024	28 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Freeman Lake	E235.NO3	09-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Krause Lake	E235.NO3	09-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Sara Lake	E235.NO3	09-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	3 days	✓

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Unnamed Lake 1	E235.NO3	09-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Unnamed Lake 3	E235.NO3	09-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Unnamed Lake 6	E235.NO3	09-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Unnamed Lake5	E235.NO3	09-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Edith Lake + Duplicate	E235.NO3	08-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	4 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Chrystina Lake	E235.NO3	08-Aug-2024	12-Aug-2024	3 days	4 days	✗ EHTR	12-Aug-2024	3 days	4 days	✗ EHTR
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Lois Lake	E235.NO3	08-Aug-2024	12-Aug-2024	3 days	4 days	✗ EHTR	12-Aug-2024	3 days	4 days	✗ EHTR
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Unnamed Lake 4	E235.NO3	08-Aug-2024	12-Aug-2024	3 days	4 days	✗ EHTR	12-Aug-2024	3 days	4 days	✗ EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Freeman Lake	E235.NO2	09-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	3 days	✓

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC										
HDPE Krause Lake	E235.NO2	09-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE Sara Lake	E235.NO2	09-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE Unnamed Lake 1	E235.NO2	09-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE Unnamed Lake 3	E235.NO2	09-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE Unnamed Lake 6	E235.NO2	09-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE Unnamed Lake5	E235.NO2	09-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE Edith Lake + Duplicate	E235.NO2	08-Aug-2024	12-Aug-2024	3 days	3 days	✓	12-Aug-2024	3 days	4 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE Chrystina Lake	E235.NO2	08-Aug-2024	12-Aug-2024	3 days	4 days	✗ EHTR	12-Aug-2024	3 days	4 days	✗ EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE Lois Lake	E235.NO2	08-Aug-2024	12-Aug-2024	3 days	4 days	✗ EHTR	12-Aug-2024	3 days	4 days	✗ EHTR

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Nitrite in Water by IC										
HDPE Unnamed Lake 4	E235.NO2	08-Aug-2024	12-Aug-2024	3 days	4 days	✗ EHTR	12-Aug-2024	3 days	4 days	✗ EHTR
Anions and Nutrients : Sulfate in Water by IC										
HDPE Freeman Lake	E235.SO4	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Krause Lake	E235.SO4	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Sara Lake	E235.SO4	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Unnamed Lake 1	E235.SO4	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Unnamed Lake 3	E235.SO4	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Unnamed Lake 6	E235.SO4	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Unnamed Lake5	E235.SO4	09-Aug-2024	12-Aug-2024	28 days	3 days	✓	12-Aug-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Chrystina Lake	E235.SO4	08-Aug-2024	12-Aug-2024	28 days	4 days	✓	12-Aug-2024	28 days	4 days	✓

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE Edith Lake + Duplicate	E235.SO4	08-Aug-2024	12-Aug-2024	28 days	4 days	✓	12-Aug-2024	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Lois Lake	E235.SO4	08-Aug-2024	12-Aug-2024	28 days	4 days	✓	12-Aug-2024	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE Unnamed Lake 4	E235.SO4	08-Aug-2024	12-Aug-2024	28 days	4 days	✓	12-Aug-2024	28 days	4 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE Edith Lake + Duplicate	E421	08-Aug-2024	13-Aug-2024	0 hrs	111 hrs	✗ UCP	13-Aug-2024	0 hrs	111 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE Chrystina Lake	E421	08-Aug-2024	13-Aug-2024	0 hrs	113 hrs	✗ UCP	13-Aug-2024	0 hrs	113 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE Unnamed Lake 4	E421	08-Aug-2024	13-Aug-2024	0 hrs	115 hrs	✗ UCP	13-Aug-2024	0 hrs	116 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE Lois Lake	E421	08-Aug-2024	13-Aug-2024	0 hrs	118 hrs	✗ UCP	13-Aug-2024	0 hrs	118 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE Unnamed Lake5	E421	09-Aug-2024	13-Aug-2024	0 hrs	92 hrs	✗ UCP	13-Aug-2024	0 hrs	92 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE Sara Lake	E421	09-Aug-2024	13-Aug-2024	0 hrs	93 hrs	✗ UCP	13-Aug-2024	0 hrs	93 hrs	✗ UCP

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE Freeman Lake	E421	09-Aug-2024	13-Aug-2024	0 hrs	94 hrs	✗ UCP	13-Aug-2024	0 hrs	94 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE Krause Lake	E421	09-Aug-2024	13-Aug-2024	0 hrs	94 hrs	✗ UCP	13-Aug-2024	0 hrs	94 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE Unnamed Lake 1	E421	09-Aug-2024	13-Aug-2024	0 hrs	95 hrs	✗ UCP	13-Aug-2024	0 hrs	95 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE Unnamed Lake 6	E421	09-Aug-2024	13-Aug-2024	0 hrs	96 hrs	✗ UCP	13-Aug-2024	0 hrs	96 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE Unnamed Lake 3	E421	09-Aug-2024	13-Aug-2024	0 hrs	97 hrs	✗ UCP	13-Aug-2024	0 hrs	97 hrs	✗ UCP
Physical Tests : Alkalinity Species by Titration										
HDPE Freeman Lake	E290	09-Aug-2024	13-Aug-2024	14 days	4 days	✓	13-Aug-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Krause Lake	E290	09-Aug-2024	13-Aug-2024	14 days	4 days	✓	13-Aug-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Sara Lake	E290	09-Aug-2024	13-Aug-2024	14 days	4 days	✓	13-Aug-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Unnamed Lake 1	E290	09-Aug-2024	13-Aug-2024	14 days	4 days	✓	13-Aug-2024	14 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE Unnamed Lake 3	E290	09-Aug-2024	13-Aug-2024	14 days	4 days	✓	13-Aug-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Unnamed Lake 6	E290	09-Aug-2024	13-Aug-2024	14 days	4 days	✓	13-Aug-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Unnamed Lake5	E290	09-Aug-2024	13-Aug-2024	14 days	4 days	✓	13-Aug-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Chrystina Lake	E290	08-Aug-2024	13-Aug-2024	14 days	5 days	✓	13-Aug-2024	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Edith Lake + Duplicate	E290	08-Aug-2024	13-Aug-2024	14 days	5 days	✓	13-Aug-2024	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Lois Lake	E290	08-Aug-2024	13-Aug-2024	14 days	5 days	✓	13-Aug-2024	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Unnamed Lake 4	E290	08-Aug-2024	13-Aug-2024	14 days	5 days	✓	13-Aug-2024	14 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE Freeman Lake	E100	09-Aug-2024	13-Aug-2024	28 days	4 days	✓	13-Aug-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Krause Lake	E100	09-Aug-2024	13-Aug-2024	28 days	4 days	✓	13-Aug-2024	28 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE Sara Lake	E100	09-Aug-2024	13-Aug-2024	28 days	4 days	✓	13-Aug-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Unnamed Lake 1	E100	09-Aug-2024	13-Aug-2024	28 days	4 days	✓	13-Aug-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Unnamed Lake 3	E100	09-Aug-2024	13-Aug-2024	28 days	4 days	✓	13-Aug-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Unnamed Lake 6	E100	09-Aug-2024	13-Aug-2024	28 days	4 days	✓	13-Aug-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Unnamed Lake5	E100	09-Aug-2024	13-Aug-2024	28 days	4 days	✓	13-Aug-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Chrystina Lake	E100	08-Aug-2024	13-Aug-2024	28 days	5 days	✓	13-Aug-2024	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE Edith Lake + Duplicate	E100	08-Aug-2024	13-Aug-2024	28 days	5 days	✓	13-Aug-2024	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE Lois Lake	E100	08-Aug-2024	13-Aug-2024	28 days	5 days	✓	13-Aug-2024	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE Unnamed Lake 4	E100	08-Aug-2024	13-Aug-2024	28 days	5 days	✓	13-Aug-2024	28 days	5 days	✓

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Physical Tests : pH by Meter										
HDPE										
Edith Lake + Duplicate	E108	08-Aug-2024	13-Aug-2024	0.25 hrs	111 hrs	✗ EHTR-FM	13-Aug-2024	0.25 hrs	118 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
Chrystina Lake	E108	08-Aug-2024	13-Aug-2024	0.25 hrs	113 hrs	✗ EHTR-FM	13-Aug-2024	0.25 hrs	119 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
Unnamed Lake 4	E108	08-Aug-2024	13-Aug-2024	0.25 hrs	116 hrs	✗ EHTR-FM	13-Aug-2024	0.25 hrs	122 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
Lois Lake	E108	08-Aug-2024	13-Aug-2024	0.25 hrs	121 hrs	✗ EHTR-FM	13-Aug-2024	0.25 hrs	125 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
Sara Lake	E108	09-Aug-2024	13-Aug-2024	0.25 hrs	93 hrs	✗ EHTR-FM	13-Aug-2024	0.25 hrs	100 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
Krause Lake	E108	09-Aug-2024	13-Aug-2024	0.25 hrs	94 hrs	✗ EHTR-FM	13-Aug-2024	0.25 hrs	100 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
Unnamed Lake5	E108	09-Aug-2024	13-Aug-2024	0.25 hrs	94 hrs	✗ EHTR-FM	13-Aug-2024	0.25 hrs	98 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
Freeman Lake	E108	09-Aug-2024	13-Aug-2024	0.25 hrs	97 hrs	✗ EHTR-FM	13-Aug-2024	0.25 hrs	101 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
Unnamed Lake 1	E108	09-Aug-2024	13-Aug-2024	0.25 hrs	97 hrs	✗ EHTR-FM	13-Aug-2024	0.25 hrs	102 hrs	✗ EHTR-FM

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE										
Unnamed Lake 3	E108	09-Aug-2024	13-Aug-2024	0.25 hrs	97 hrs	✗ EHTR-FM	13-Aug-2024	0.25 hrs	103 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
Unnamed Lake 6	E108	09-Aug-2024	13-Aug-2024	0.25 hrs	98 hrs	✗ EHTR-FM	13-Aug-2024	0.25 hrs	102 hrs	✗ EHTR-FM

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).

UCP: Unsuitable Container and/or Preservative used (invalidates standard hold time). Maximum hold time of zero applied. Test results may be biased low / unreliable, and may not meet regulatory requirements.

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1593251	2	38	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	1591788	1	20	5.0	5.0	✓
Conductivity in Water	E100	1593253	2	38	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1592801	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1591787	1	20	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1591785	1	20	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1591786	1	20	5.0	5.0	✓
pH by Meter	E108	1593252	2	40	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1591784	1	20	5.0	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1593251	2	38	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	1591788	1	20	5.0	5.0	✓
Conductivity in Water	E100	1593253	2	38	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1592801	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1591787	1	20	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1591785	1	20	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1591786	1	20	5.0	5.0	✓
pH by Meter	E108	1593252	2	40	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1591784	1	20	5.0	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1593251	2	38	5.2	5.0	✓
Chloride in Water by IC	E235.Cl	1591788	1	20	5.0	5.0	✓
Conductivity in Water	E100	1593253	2	38	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1592801	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1591787	1	20	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1591785	1	20	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1591786	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1591784	1	20	5.0	5.0	✓
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	1591788	1	20	5.0	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1592801	1	20	5.0	5.0	✓
Fluoride in Water by IC	E235.F	1591787	1	20	5.0	5.0	✓
Nitrate in Water by IC	E235.NO3	1591785	1	20	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1591786	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1591784	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Edmonton	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Edmonton	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Chloride in Water by IC	E235.Cl ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Edmonton	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Edmonton	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Edmonton	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Edmonton	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 ALS Environmental - Edmonton	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Edmonton	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 ALS Environmental - Edmonton	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

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QUALITY CONTROL REPORT

Work Order	: **EO2406804**	Page	: 1 of 6
Amendment	: **1**		
Client	: CPP Environmental	Laboratory	: ALS Environmental - Edmonton
Contact	: Theo Charette	Account Manager	: Megha Walia
Address	: 154-150 Chippewa Road Sherwood Park AB Canada T8A 6A2	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	: 780 570 5818	Telephone	: +1 780 413 5227
Project	: SUEZ WQ-August 2024	Date Samples Received	: 12-Aug-2024 14:46
PO	: ----	Date Analysis Commenced	: 12-Aug-2024
C-O-C number	: 20-1057941	Issue Date	: 09-Oct-2024 10:48
Sampler	: ----		
Site	: ----		
Quote number	: Blanket quote		
No. of samples received	: 11		
No. of samples analysed	: 11		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Alex Drake	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Edmonton Metals, Edmonton, Alberta
Brooke Miller	Laboratory Analyst	Edmonton Inorganics, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Edmonton Metals, Edmonton, Alberta
Ping Yeung	Team Leader - Inorganics	Edmonton Inorganics, Edmonton, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 1592876)											
FC2402139-009	Anonymous	pH	----	E108	0.10	pH units	6.84	6.85	0.146%	3%	----
Physical Tests (QC Lot: 1592877)											
FC2402139-009	Anonymous	Conductivity	----	E100	2.0	µS/cm	1760	1750	0.570%	10%	----
Physical Tests (QC Lot: 1592878)											
FC2402139-009	Anonymous	Alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	488	482	1.26%	20%	----
Physical Tests (QC Lot: 1593251)											
EO2406807-012	Anonymous	Alkalinity, total (as CaCO3)	----	E290	2.0	mg/L	<2.0	<2.0	0	Diff <2x LOR	----
Physical Tests (QC Lot: 1593252)											
EO2406807-012	Anonymous	pH	----	E108	0.10	pH units	5.65	5.76	0.11	Diff <2x LOR	----
Physical Tests (QC Lot: 1593253)											
EO2406807-012	Anonymous	Conductivity	----	E100	2.0	µS/cm	<2.0	<2.0	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1591784)											
EO2406796-012	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	<0.30	<0.30	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1591785)											
EO2406796-012	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1591786)											
EO2406796-012	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1591787)											
EO2406796-012	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.100	0.095	0.005	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1591788)											
EO2406796-012	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	7.27	7.43	2.19%	20%	----
Dissolved Metals (QC Lot: 1592801)											
EO2406804-001	Unnamed Lake 4	Calcium, dissolved	7440-70-2	E421	0.050	mg/L	2.05	2.15	5.00%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.154	0.149	3.62%	20%	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.590	0.583	1.27%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.0249	0.0247	1.06%	20%	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.596	0.577	3.22%	20%	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.732	0.713	2.65%	20%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1592877)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1592878)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1593251)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1593253)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 1591784)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1591785)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1591786)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1591787)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1591788)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Dissolved Metals (QCLot: 1592801)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1592876)									
pH	----	E108	----	pH units	6 pH units	102	97.0	103	----
Physical Tests (QCLot: 1592877)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	101	90.0	110	----
Physical Tests (QCLot: 1592878)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	104	85.0	115	----
Physical Tests (QCLot: 1593251)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	104	85.0	115	----
Physical Tests (QCLot: 1593252)									
pH	----	E108	----	pH units	6 pH units	102	97.0	103	----
Physical Tests (QCLot: 1593253)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	101	90.0	110	----
Anions and Nutrients (QCLot: 1591784)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1591785)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1591786)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	95.3	90.0	110	----
Anions and Nutrients (QCLot: 1591787)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	99.7	90.0	110	----
Anions and Nutrients (QCLot: 1591788)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	102	90.0	110	----
Dissolved Metals (QCLot: 1592801)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	98.2	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	99.6	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	94.8	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	96.6	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	100	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	102	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1591784)										
EO2406796-012	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	101 mg/L	100 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1591785)										
EO2406796-012	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.56 mg/L	2.5 mg/L	102	75.0	125	----
Anions and Nutrients (QCLot: 1591786)										
EO2406796-012	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.523 mg/L	0.5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1591787)										
EO2406796-012	Anonymous	Fluoride	16984-48-8	E235.F	1.05 mg/L	1 mg/L	105	75.0	125	----
Anions and Nutrients (QCLot: 1591788)										
EO2406796-012	Anonymous	Chloride	16887-00-6	E235.Cl	101 mg/L	100 mg/L	101	75.0	125	----
Dissolved Metals (QCLot: 1592801)										
EO2406804-002	Chrystina Lake	Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.91 mg/L	2 mg/L	95.5	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0189 mg/L	0.02 mg/L	94.7	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.84 mg/L	4 mg/L	96.0	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	1.94 mg/L	2 mg/L	97.2	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 - 1057941

Canada Toll Free: 1 800 668 9878

Page of

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Environmental Division Edmonton
Work Order Reference
EO2406804

Telephone : +1 780 413 5227

Report To	Contact and company name below will appear on the final report
Company:	CPP Environmental
Contact:	Theo Charette
Phone:	780-578-5878
	Company address below will appear on the final report
Street:	154-150 Chippewa Rd.
City/Province:	Sherwood Park
Postal Code:	T8A 6A2
Invoice To	Same as Report To ☐ YES ■ NO
	Copy of Invoice with Report ■ YES ☐ NO
Company:	
Contact:	

Reports / Recipients

Select Report Format: ☒ PDF ☒ EXCEL ☐ EDD (DIGITAL)
Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A
☐ Compare Results to Criteria on Report - provide details below if box checked
Select Distribution: ☒ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax veronica@cppenv.ca
Email 2 sara@cppenv.ca
Email 3

Invoice Recipients

Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX
Email 1 or Fax admin@cppenv.ca
Email 2

Turnaround Time (TAT) Requested

☑ Routine [R] if received by 3pm M-F - no surcharges apply
☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minir
☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge min
☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge min
☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge min
☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. may apply to rush requests on weekends, statutory holidays and n

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, pl

Project Information

ALS Account # / Quote #:
Job #: SUEZ-WQ-August 2024
PO / AFE:
LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#
Major/Minor Code: Routing Code:
Requisitioner:
Location:

ALS Lab Work Order # (ALS use only):
ALS Contact: Sampler:

Analysis — Indicate Filtered (F), Preserved (P) or Filte

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Routine	SAMPLES ON HOLD	EXTENDED STORAGE RE	SUSPECTED HAZARD (see notes)
	Unnamed Lake 4	Aug8	13:50	water	1	✓			
	Chrystina Lake	Aug8	16:45		1				
	Edith Lake + Duplicate	Aug8	18:30		2				
	Unnamed Lake 3	Aug9	08:45		1				
	Sara Lake		12:30		1				
	Krause Lake		11:45		1				
	Freeman Lake		11:00		1				
	Unnamed Lake 6		09:45		1				
	Unnamed Lake 1		10:30		1				
	Unnamed Lake 5		13:45		1				
	Lois Lake	Aug 8	11:01		1				
					1				

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ■ NO
Are samples for human consumption/ use? ☐ YES ■ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☑ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED
Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO
Cooler Custody Seals Intact: ☐ YES ☒ N/A Sample Custody Seals Intact: ☐ YES ☒ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
12.4							

SHIPMENT RELEASE (client use)

Released by: Date: Time:

INITIAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: 08/12/24 Time: 2:46

FINAL SHIPMENT RECEPTION (ALS use only)

Received by: Date: Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

ALS Canada Ltd.

right solutions.
right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **EO2408892**	Page	: 1 of 13
Client	: **CPP Environmental**	Laboratory	: ALS Environmental - Edmonton
Contact	: Theo Charette	Account Manager	: Megha Walia
Address	: 154-150 Chippewa Road Sherwood Park AB Canada T8A 6A2	Address	: 9450 - 17 Avenue NW Edmonton AB Canada T6N 1M9
Telephone	: 780 570 5818	Telephone	: +1 780 413 5227
Project	: SUEZ Water Quality- October	Date Samples Received	: 08-Oct-2024 15:20
PO	: ----	Date Analysis Commenced	: 08-Oct-2024
C-O-C number	: 20-1059627	Issue Date	: 12-Oct-2024 11:00
Sampler	: ----		
Site	: ----		
Quote number	: Blanket quote		
No. of samples received	: 12		
No. of samples analysed	: 12		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Alex Drake	Lab Analyst	Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Metals, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Metals, Edmonton, Alberta
Daniel Nguyen	Laboratory Analyst	Metals, Edmonton, Alberta
Shruti Mudliar	Lab Analyst	Inorganics, Edmonton, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.
Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).
Measurement Uncertainty: The reported uncertainties in this report are expanded uncertainties calculated using a coverage factor of 2, which gives a level of confidence of approximately 95%.
Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
meq/L	milliequivalents per litre
mg/L	milligrams per litre
pH units	pH units

>: greater than.
<: less than.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Workorder Comments

Corrected sample times on -002 to -012 / corrected error in the sample ID -010 / Corrected Theo's email address

Qualifiers

Qualifier	*Description*
IB:INT	*Ion Balance Reviewed: Imbalance is due to interference or non-measured component.*

Analytical Results

EO2408892-001

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Krause Lake

Client sampling date / time: 03-Oct-2024 15:57

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	46.8	0.50	mg/L	EC100/EO	-	11-Oct-2024	-
Conductivity	----	96.4	2.0	µS/cm	E100/EO	08-Oct-2024	08-Oct-2024	1697783
pH	----	8.15	0.10	pH units	E108/EO	08-Oct-2024	08-Oct-2024	1697782
Alkalinity, bicarbonate (as HCO3)	71-52-3	56.0	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, carbonate (as CO3)	3812-32-6	1.6	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, total (as CaCO3)	----	48.5	2.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Solids, total dissolved [TDS], calculated	----	54.2	1.0	mg/L	EC103/EO	-	09-Oct-2024	-
Anions and Nutrients								
Chloride	16887-00-6	2.10	0.50	mg/L	E235.Cl/EO	08-Oct-2024	08-Oct-2024	1697730
Fluoride	16984-48-8	0.066	0.020	mg/L	E235.F/EO	08-Oct-2024	08-Oct-2024	1697727
Nitrate (as N)	14797-55-8	0.088	0.020	mg/L	E235.NO3/EO	08-Oct-2024	08-Oct-2024	1697728
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	08-Oct-2024	08-Oct-2024	1697729
Sulfate (as SO4)	14808-79-8	0.64	0.30	mg/L	E235.SO4/EO	08-Oct-2024	08-Oct-2024	1697731
Nitrate + Nitrite (as N)	----	0.0880	0.05	mg/L	EC235.N+N/EO	-	09-Oct-2024	-
Ion Balance								
Anion sum	----	1.05	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Cation sum	----	1.08	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Ion balance (APHA)	----	1.41	0.01	%	EC101/EO	-	09-Oct-2024	-
Ion balance (cations/anions)	----	103	0.010	%	EC101/EO	-	09-Oct-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	13.2	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702587
Iron, dissolved	7439-89-6	0.095	0.010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702587
Magnesium, dissolved	7439-95-4	3.37	0.0050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702587
Manganese, dissolved	7439-96-5	0.0157	0.00010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702587
Potassium, dissolved	7440-09-7	0.084	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702587
Sodium, dissolved	7440-23-5	3.25	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702587
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	10-Oct-2024	1702587

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2408892-002

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 1

Client sampling date / time: 03-Oct-2024 07:20

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	2.70	0.50	mg/L	EC100/EO	-	11-Oct-2024	-
Conductivity	----	9.3	2.0	µS/cm	E100/EO	08-Oct-2024	08-Oct-2024	1697783
pH	----	6.21	0.10	pH units	E108/EO	08-Oct-2024	08-Oct-2024	1697782
Alkalinity, bicarbonate (as HCO3)	71-52-3	2.9	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784

Analytical Results

EO2408892-002

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 1

Client sampling date / time: 03-Oct-2024 07:20

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, total (as CaCO3)	----	2.4	2.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Solids, total dissolved [TDS], calculated	----	3.6	1.0	mg/L	EC103/EO	-	09-Oct-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	08-Oct-2024	08-Oct-2024	1697730
Fluoride	16984-48-8	<0.020	0.020	mg/L	E235.F/EO	08-Oct-2024	08-Oct-2024	1697727
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	08-Oct-2024	08-Oct-2024	1697728
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	08-Oct-2024	08-Oct-2024	1697729
Sulfate (as SO4)	14808-79-8	0.31	0.30	mg/L	E235.SO4/EO	08-Oct-2024	08-Oct-2024	1697731
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	09-Oct-2024	-
Ion Balance								
Anion sum	----	<0.10	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Cation sum	----	<0.10	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Ion balance (APHA)	----	0.0	0.01	%	EC101/EO	-	09-Oct-2024	-
Ion balance (cations/anions)	----	100	0.010	%	EC101/EO	-	09-Oct-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	0.581	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Iron, dissolved	7439-89-6	0.026	0.010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Magnesium, dissolved	7439-95-4	0.303	0.0050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Manganese, dissolved	7439-96-5	0.00265	0.00010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Potassium, dissolved	7440-09-7	0.201	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Sodium, dissolved	7440-23-5	0.498	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	10-Oct-2024	1702588

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2408892-003

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Sarah Lake

Client sampling date / time: 06-Oct-2024 08:35

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	50.1	0.50	mg/L	EC100/EO	-	12-Oct-2024	-
Conductivity	----	123	2.0	µS/cm	E100/EO	08-Oct-2024	08-Oct-2024	1697783
pH	----	7.23	0.10	pH units	E108/EO	08-Oct-2024	08-Oct-2024	1697782
Alkalinity, bicarbonate (as HCO3)	71-52-3	56.1	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, total (as CaCO3)	----	46.0	2.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Solids, total dissolved [TDS], calculated	----	73.5	1.0	mg/L	EC103/EO	-	09-Oct-2024	-
Anions and Nutrients								
Chloride	16887-00-6	10.8	0.50	mg/L	E235.Cl/EO	08-Oct-2024	08-Oct-2024	1697730
Fluoride	16984-48-8	0.054	0.020	mg/L	E235.F/EO	08-Oct-2024	08-Oct-2024	1697727
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	08-Oct-2024	08-Oct-2024	1697728

Analytical Results

EO2408892-003

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Sarah Lake

Client sampling date / time: 06-Oct-2024 08:35

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Anions and Nutrients								
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	08-Oct-2024	08-Oct-2024	1697729
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	08-Oct-2024	08-Oct-2024	1697731
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	09-Oct-2024	-
Ion Balance								
Anion sum	----	1.23	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Cation sum	----	1.34	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Ion balance (APHA)	----	4.28	0.01	%	EC101/EO	-	09-Oct-2024	-
Ion balance (cations/anions)	----	109	0.010	%	EC101/EO	-	09-Oct-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	13.4	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Iron, dissolved	7439-89-6	0.129	0.010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Magnesium, dissolved	7439-95-4	4.05	0.0050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Manganese, dissolved	7439-96-5	0.00177	0.00010	mg/L	E421/EO	10-Oct-2024	11-Oct-2024	1702588
Potassium, dissolved	7440-09-7	0.869	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Sodium, dissolved	7440-23-5	7.07	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	10-Oct-2024	1702588

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2408892-004

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Lois Lake

Client sampling date / time: 05-Oct-2024 10:53

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	22.9	0.50	mg/L	EC100/EO	-	11-Oct-2024	-
Conductivity	----	68.8	2.0	µS/cm	E100/EO	08-Oct-2024	08-Oct-2024	1697783
pH	----	7.07	0.10	pH units	E108/EO	08-Oct-2024	08-Oct-2024	1697782
Alkalinity, bicarbonate (as HCO3)	71-52-3	27.6	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, total (as CaCO3)	----	22.6	2.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Solids, total dissolved [TDS], calculated	----	39.6	1.0	mg/L	EC103/EO	-	09-Oct-2024	-
Anions and Nutrients								
Chloride	16887-00-6	5.59	0.50	mg/L	E235.Cl/EO	08-Oct-2024	08-Oct-2024	1697730
Fluoride	16984-48-8	0.032	0.020	mg/L	E235.F/EO	08-Oct-2024	08-Oct-2024	1697727
Nitrate (as N)	14797-55-8	0.074	0.020	mg/L	E235.NO3/EO	08-Oct-2024	08-Oct-2024	1697728
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	08-Oct-2024	08-Oct-2024	1697729
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	08-Oct-2024	08-Oct-2024	1697731
Nitrate + Nitrite (as N)	----	0.0740	0.05	mg/L	EC235.N+N/EO	-	09-Oct-2024	-
Ion Balance								
Anion sum	----	0.62	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Cation sum	----	0.76	0.10	meq/L	EC101/EO	-	09-Oct-2024	-

Analytical Results

EO2408892-004

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Lois Lake
Client sampling date / time: 05-Oct-2024 10:53

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Ion Balance								
Ion balance (APHA)	----	10.1	0.01	%	EC101/EO	-	09-Oct-2024	-
Ion balance (cations/anions)	----	122 IB:INT,	0.010	%	EC101/EO	-	09-Oct-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	6.60	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Iron, dissolved	7439-89-6	0.289	0.010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Magnesium, dissolved	7439-95-4	1.55	0.0050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Manganese, dissolved	7439-96-5	0.0110	0.00010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Potassium, dissolved	7440-09-7	0.304	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Sodium, dissolved	7440-23-5	6.50	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	10-Oct-2024	1702588

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2408892-005

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 3
Client sampling date / time: 07-Oct-2024 08:46

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	9.40	0.50	mg/L	EC100/EO	-	11-Oct-2024	-
Conductivity	----	28.9	2.0	µS/cm	E100/EO	08-Oct-2024	08-Oct-2024	1697783
pH	----	5.43	0.10	pH units	E108/EO	08-Oct-2024	08-Oct-2024	1697782
Alkalinity, bicarbonate (as HCO3)	71-52-3	3.5	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, total (as CaCO3)	----	2.9	2.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Solids, total dissolved [TDS], calculated	----	24.3	1.0	mg/L	EC103/EO	-	09-Oct-2024	-
Anions and Nutrients								
Chloride	16887-00-6	1.82	0.50	mg/L	E235.Cl/EO	08-Oct-2024	08-Oct-2024	1697730
Fluoride	16984-48-8	0.021	0.020	mg/L	E235.F/EO	08-Oct-2024	08-Oct-2024	1697727
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	08-Oct-2024	08-Oct-2024	1697728
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	08-Oct-2024	08-Oct-2024	1697729
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	08-Oct-2024	08-Oct-2024	1697731
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	09-Oct-2024	-
Ion Balance								
Anion sum	----	0.11	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Cation sum	----	0.37	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Ion balance (APHA)	----	54.2	0.01	%	EC101/EO	-	09-Oct-2024	-
Ion balance (cations/anions)	----	336 IB:INT,	0.010	%	EC101/EO	-	09-Oct-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	2.30	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Iron, dissolved	7439-89-6	0.885	0.010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Magnesium, dissolved	7439-95-4	0.887	0.0050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588

Analytical Results

EO2408892-005

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 3

Client sampling date / time: 07-Oct-2024 08:46

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Manganese, dissolved	7439-96-5	0.0465	0.00010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Potassium, dissolved	7440-09-7	0.768	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Sodium, dissolved	7440-23-5	1.88	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	10-Oct-2024	1702588

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2408892-006

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Chrystina Lake

Client sampling date / time: 07-Oct-2024 11:05

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	16.9	0.50	mg/L	EC100/EO	-	11-Oct-2024	-
Conductivity	----	38.4	2.0	µS/cm	E100/EO	08-Oct-2024	08-Oct-2024	1697783
pH	----	7.23	0.10	pH units	E108/EO	08-Oct-2024	08-Oct-2024	1697782
Alkalinity, bicarbonate (as HCO3)	71-52-3	23.3	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Alkalinity, total (as CaCO3)	----	19.1	2.0	mg/L	E290/EO	08-Oct-2024	08-Oct-2024	1697784
Solids, total dissolved [TDS], calculated	----	20.1	1.0	mg/L	EC103/EO	-	09-Oct-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	08-Oct-2024	08-Oct-2024	1697730
Fluoride	16984-48-8	<0.020	0.020	mg/L	E235.F/EO	08-Oct-2024	08-Oct-2024	1697727
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	08-Oct-2024	08-Oct-2024	1697728
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	08-Oct-2024	08-Oct-2024	1697729
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	08-Oct-2024	08-Oct-2024	1697731
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	09-Oct-2024	-
Ion Balance								
Anion sum	----	0.38	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Cation sum	----	0.41	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Ion balance (APHA)	----	3.80	0.01	%	EC101/EO	-	09-Oct-2024	-
Ion balance (cations/anions)	----	108	0.010	%	EC101/EO	-	09-Oct-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	4.87	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Iron, dissolved	7439-89-6	0.067	0.010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Magnesium, dissolved	7439-95-4	1.15	0.0050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Manganese, dissolved	7439-96-5	0.0100	0.00010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Potassium, dissolved	7440-09-7	0.863	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Sodium, dissolved	7440-23-5	1.08	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	10-Oct-2024	1702588

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2408892-007

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 5

Client sampling date / time: 05-Oct-2024 16:20

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	64.9	0.50	mg/L	EC100/EO	-	11-Oct-2024	-
Conductivity	----	206	2.0	µS/cm	E100/EO	09-Oct-2024	09-Oct-2024	1699230
pH	----	7.69	0.10	pH units	E108/EO	09-Oct-2024	09-Oct-2024	1699229
Alkalinity, bicarbonate (as HCO3)	71-52-3	82.0	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, total (as CaCO3)	----	67.2	2.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Solids, total dissolved [TDS], calculated	----	112	1.0	mg/L	EC103/EO	-	09-Oct-2024	-
Anions and Nutrients								
Chloride	16887-00-6	27.3	0.50	mg/L	E235.Cl/EO	08-Oct-2024	08-Oct-2024	1697730
Fluoride	16984-48-8	0.064	0.020	mg/L	E235.F/EO	08-Oct-2024	08-Oct-2024	1697727
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	08-Oct-2024	08-Oct-2024	1697728
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	08-Oct-2024	08-Oct-2024	1697729
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	08-Oct-2024	08-Oct-2024	1697731
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	09-Oct-2024	-
Ion Balance								
Anion sum	----	2.12	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Cation sum	----	2.13	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Ion balance (APHA)	----	0.24	0.01	%	EC101/EO	-	09-Oct-2024	-
Ion balance (cations/anions)	----	100	0.010	%	EC101/EO	-	09-Oct-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	18.8	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Iron, dissolved	7439-89-6	0.074	0.010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Magnesium, dissolved	7439-95-4	4.36	0.0050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Manganese, dissolved	7439-96-5	0.00367	0.00010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Potassium, dissolved	7440-09-7	0.955	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Sodium, dissolved	7440-23-5	18.6	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	10-Oct-2024	1702588

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2408892-008

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Edith Lake

Client sampling date / time: 04-Oct-2024 11:08

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	8.40	0.50	mg/L	EC100/EO	-	11-Oct-2024	-
Conductivity	----	23.4	2.0	µS/cm	E100/EO	09-Oct-2024	09-Oct-2024	1699230
pH	----	6.74	0.10	pH units	E108/EO	09-Oct-2024	09-Oct-2024	1699229
Alkalinity, bicarbonate (as HCO3)	71-52-3	10.5	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228

Analytical Results

EO2408892-008

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Edith Lake

Client sampling date / time: 04-Oct-2024 11:08

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Alkalinity, total (as CaCO3)	----	8.6	2.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Solids, total dissolved [TDS], calculated	----	11.4	1.0	mg/L	EC103/EO	-	09-Oct-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	08-Oct-2024	08-Oct-2024	1697730
Fluoride	16984-48-8	<0.020	0.020	mg/L	E235.F/EO	08-Oct-2024	08-Oct-2024	1697727
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	08-Oct-2024	08-Oct-2024	1697728
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	08-Oct-2024	08-Oct-2024	1697729
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	08-Oct-2024	08-Oct-2024	1697731
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	09-Oct-2024	-
Ion Balance								
Anion sum	----	0.17	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Cation sum	----	0.27	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Ion balance (APHA)	----	22.7	0.01	%	EC101/EO	-	09-Oct-2024	-
Ion balance (cations/anions)	----	159 IB:INT.	0.010	%	EC101/EO	-	09-Oct-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	2.52	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Iron, dissolved	7439-89-6	0.272	0.010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Magnesium, dissolved	7439-95-4	0.512	0.0050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Manganese, dissolved	7439-96-5	0.00679	0.00010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Potassium, dissolved	7440-09-7	0.621	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Sodium, dissolved	7440-23-5	1.63	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	10-Oct-2024	1702588

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2408892-009

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Chrystina Lake Duplicate

Client sampling date / time: 07-Oct-2024 11:09

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	17.0	0.50	mg/L	EC100/EO	-	11-Oct-2024	-
Conductivity	----	37.7	2.0	µS/cm	E100/EO	09-Oct-2024	09-Oct-2024	1699230
pH	----	7.50	0.10	pH units	E108/EO	09-Oct-2024	09-Oct-2024	1699229
Alkalinity, bicarbonate (as HCO3)	71-52-3	23.0	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, total (as CaCO3)	----	18.9	2.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Solids, total dissolved [TDS], calculated	----	20.0	1.0	mg/L	EC103/EO	-	09-Oct-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	08-Oct-2024	08-Oct-2024	1697730
Fluoride	16984-48-8	<0.020	0.020	mg/L	E235.F/EO	08-Oct-2024	08-Oct-2024	1697727
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	08-Oct-2024	08-Oct-2024	1697728

Analytical Results

EO2408892-009

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Chrystina Lake Duplicate

Client sampling date / time: 07-Oct-2024 11:09

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Anions and Nutrients								
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	08-Oct-2024	08-Oct-2024	1697729
Sulfate (as SO4)	14808-79-8	<0.30	0.30	mg/L	E235.SO4/EO	08-Oct-2024	08-Oct-2024	1697731
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	09-Oct-2024	-
Ion Balance								
Anion sum	----	0.38	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Cation sum	----	0.41	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Ion balance (APHA)	----	3.80	0.01	%	EC101/EO	-	09-Oct-2024	-
Ion balance (cations/anions)	----	108	0.010	%	EC101/EO	-	09-Oct-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	4.86	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Iron, dissolved	7439-89-6	0.056	0.010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Magnesium, dissolved	7439-95-4	1.18	0.0050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Manganese, dissolved	7439-96-5	0.00771	0.00010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Potassium, dissolved	7440-09-7	0.881	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Sodium, dissolved	7440-23-5	1.11	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	10-Oct-2024	1702588

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2408892-010

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Coutts River

Client sampling date / time: 05-Oct-2024 12:40

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	40.3	0.50	mg/L	EC100/EO	-	11-Oct-2024	-
Conductivity	----	95.2	2.0	µS/cm	E100/EO	09-Oct-2024	09-Oct-2024	1699230
pH	----	7.52	0.10	pH units	E108/EO	09-Oct-2024	09-Oct-2024	1699229
Alkalinity, bicarbonate (as HCO3)	71-52-3	48.8	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, total (as CaCO3)	----	40.0	2.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Solids, total dissolved [TDS], calculated	----	66.0	1.0	mg/L	EC103/EO	-	09-Oct-2024	-
Anions and Nutrients								
Chloride	16887-00-6	5.16	0.50	mg/L	E235.Cl/EO	08-Oct-2024	08-Oct-2024	1697761
Fluoride	16984-48-8	0.036	0.020	mg/L	E235.F/EO	08-Oct-2024	08-Oct-2024	1697765
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	08-Oct-2024	08-Oct-2024	1697762
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	08-Oct-2024	08-Oct-2024	1697763
Sulfate (as SO4)	14808-79-8	0.52	0.30	mg/L	E235.SO4/EO	08-Oct-2024	08-Oct-2024	1697764
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	09-Oct-2024	-
Ion Balance								
Anion sum	----	0.96	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Cation sum	----	1.11	0.10	meq/L	EC101/EO	-	09-Oct-2024	-

Analytical Results

EO2408892-010

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Coutts River

Client sampling date / time: 05-Oct-2024 12:40

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Ion Balance								
Ion balance (APHA)	----	7.25	0.01	%	EC101/EO	-	09-Oct-2024	-
Ion balance (cations/anions)	----	116 IB:INT,	0.010	%	EC101/EO	-	09-Oct-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	11.2	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Iron, dissolved	7439-89-6	1.34	0.010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Magnesium, dissolved	7439-95-4	3.00	0.0050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Manganese, dissolved	7439-96-5	0.0235	0.00010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Potassium, dissolved	7440-09-7	0.760	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Sodium, dissolved	7440-23-5	5.37	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	10-Oct-2024	1702588

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2408892-011

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 6

Client sampling date / time: 04-Oct-2024 08:53

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	17.1	0.50	mg/L	EC100/EO	-	11-Oct-2024	-
Conductivity	----	36.4	2.0	µS/cm	E100/EO	09-Oct-2024	09-Oct-2024	1699230
pH	----	6.92	0.10	pH units	E108/EO	09-Oct-2024	09-Oct-2024	1699229
Alkalinity, bicarbonate (as HCO3)	71-52-3	19.5	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, total (as CaCO3)	----	16.0	2.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Solids, total dissolved [TDS], calculated	----	20.3	1.0	mg/L	EC103/EO	-	09-Oct-2024	-
Anions and Nutrients								
Chloride	16887-00-6	1.37	0.50	mg/L	E235.Cl/EO	08-Oct-2024	08-Oct-2024	1697761
Fluoride	16984-48-8	0.041	0.020	mg/L	E235.F/EO	08-Oct-2024	08-Oct-2024	1697765
Nitrate (as N)	14797-55-8	0.024	0.020	mg/L	E235.NO3/EO	08-Oct-2024	08-Oct-2024	1697762
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	08-Oct-2024	08-Oct-2024	1697763
Sulfate (as SO4)	14808-79-8	0.68	0.30	mg/L	E235.SO4/EO	08-Oct-2024	08-Oct-2024	1697764
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	09-Oct-2024	-
Ion Balance								
Anion sum	----	0.38	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Cation sum	----	0.39	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Ion balance (APHA)	----	1.30	0.01	%	EC101/EO	-	09-Oct-2024	-
Ion balance (cations/anions)	----	103	0.010	%	EC101/EO	-	09-Oct-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	5.24	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Iron, dissolved	7439-89-6	0.154	0.010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Magnesium, dissolved	7439-95-4	0.986	0.0050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588

Analytical Results

EO2408892-011

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Unnamed Lake 6

Client sampling date / time: 04-Oct-2024 08:53

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Dissolved Metals								
Manganese, dissolved	7439-96-5	0.0166	0.00010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Potassium, dissolved	7440-09-7	0.480	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Sodium, dissolved	7440-23-5	0.681	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	10-Oct-2024	1702588

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

EO2408892-012

Sub-Matrix:**Water** (Matrix: **Water**)

Client sample ID: Freeman Lake

Client sampling date / time: 04-Oct-2024 16:35

Analyte	CAS Number	Result	LOR	Unit	Method/Lab	Prep Date	Analysis Date	QCLot
Physical Tests								
Hardness (as CaCO3), dissolved	----	44.2	0.50	mg/L	EC100/EO	-	11-Oct-2024	-
Conductivity	----	89.7	2.0	µS/cm	E100/EO	09-Oct-2024	09-Oct-2024	1699230
pH	----	7.76	0.10	pH units	E108/EO	09-Oct-2024	09-Oct-2024	1699229
Alkalinity, bicarbonate (as HCO3)	71-52-3	57.5	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, carbonate (as CO3)	3812-32-6	<1.0	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, hydroxide (as OH)	14280-30-9	<1.0	1.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Alkalinity, total (as CaCO3)	----	47.1	2.0	mg/L	E290/EO	09-Oct-2024	09-Oct-2024	1699228
Solids, total dissolved [TDS], calculated	----	62.8	1.0	mg/L	EC103/EO	-	09-Oct-2024	-
Anions and Nutrients								
Chloride	16887-00-6	<0.50	0.50	mg/L	E235.Cl/EO	08-Oct-2024	08-Oct-2024	1697761
Fluoride	16984-48-8	0.053	0.020	mg/L	E235.F/EO	08-Oct-2024	08-Oct-2024	1697765
Nitrate (as N)	14797-55-8	<0.020	0.020	mg/L	E235.NO3/EO	08-Oct-2024	08-Oct-2024	1697762
Nitrite (as N)	14797-65-0	<0.010	0.010	mg/L	E235.NO2/EO	08-Oct-2024	08-Oct-2024	1697763
Sulfate (as SO4)	14808-79-8	1.40	0.30	mg/L	E235.SO4/EO	08-Oct-2024	08-Oct-2024	1697764
Nitrate + Nitrite (as N)	----	<0.0500	0.05	mg/L	EC235.N+N/EO	-	09-Oct-2024	-
Ion Balance								
Anion sum	----	0.97	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Cation sum	----	1.03	0.10	meq/L	EC101/EO	-	09-Oct-2024	-
Ion balance (APHA)	----	3.00	0.01	%	EC101/EO	-	09-Oct-2024	-
Ion balance (cations/anions)	----	106	0.010	%	EC101/EO	-	09-Oct-2024	-
Dissolved Metals								
Calcium, dissolved	7440-70-2	13.6	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Iron, dissolved	7439-89-6	0.228	0.010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Magnesium, dissolved	7439-95-4	2.49	0.0050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Manganese, dissolved	7439-96-5	0.00721	0.00010	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Potassium, dissolved	7440-09-7	0.652	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Sodium, dissolved	7440-23-5	2.62	0.050	mg/L	E421/EO	10-Oct-2024	10-Oct-2024	1702588
Dissolved metals filtration location	----	Laboratory	-	-	EP421/EO	-	10-Oct-2024	1702588

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

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QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **EO2408892**	Page	: 1 of 18
Client	: **CPP Environmental**	Laboratory	: ALS Environmental - Edmonton
Contact	: Theo Charette	Account Manager	: Megha Walia
Address	: 154-150 Chippewa Road Sherwood Park AB Canada T8A 6A2	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	: 780 570 5818	Telephone	: +1 780 413 5227
Project	: SUEZ Water Quality- October	Date Samples Received	: 08-Oct-2024 15:20
PO	: ----	Issue Date	: 12-Oct-2024 11:02
C-O-C number	: 20-1059627		
Sampler	: ----		
Site	: ----		
Quote number	: Blanket quote		
No. of samples received	: 12		
No. of samples analysed	: 12		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE Chrystina Lake	E235.Cl	07-Oct-2024	08-Oct-2024	28 days	1 days	✓	08-Oct-2024	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Chrystina Lake Duplicate	E235.Cl	07-Oct-2024	08-Oct-2024	28 days	1 days	✓	08-Oct-2024	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Unnamed Lake 3	E235.Cl	07-Oct-2024	08-Oct-2024	28 days	1 days	✓	08-Oct-2024	28 days	1 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Sarah Lake	E235.Cl	06-Oct-2024	08-Oct-2024	28 days	2 days	✓	08-Oct-2024	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Coutts River	E235.Cl	05-Oct-2024	08-Oct-2024	28 days	3 days	✓	08-Oct-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Lois Lake	E235.Cl	05-Oct-2024	08-Oct-2024	28 days	3 days	✓	08-Oct-2024	28 days	3 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Unnamed Lake 5	E235.Cl	05-Oct-2024	08-Oct-2024	28 days	3 days	✓	08-Oct-2024	28 days	3 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Chloride in Water by IC										
HDPE Edith Lake	E235.Cl	04-Oct-2024	08-Oct-2024	28 days	4 days	✓	08-Oct-2024	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Freeman Lake	E235.Cl	04-Oct-2024	08-Oct-2024	28 days	4 days	✓	08-Oct-2024	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Unnamed Lake 6	E235.Cl	04-Oct-2024	08-Oct-2024	28 days	4 days	✓	08-Oct-2024	28 days	4 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Krause Lake	E235.Cl	03-Oct-2024	08-Oct-2024	28 days	5 days	✓	08-Oct-2024	28 days	5 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE Unnamed Lake 1	E235.Cl	03-Oct-2024	08-Oct-2024	28 days	5 days	✓	08-Oct-2024	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Chrystina Lake	E235.F	07-Oct-2024	08-Oct-2024	28 days	1 days	✓	08-Oct-2024	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Chrystina Lake Duplicate	E235.F	07-Oct-2024	08-Oct-2024	28 days	1 days	✓	08-Oct-2024	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Unnamed Lake 3	E235.F	07-Oct-2024	08-Oct-2024	28 days	1 days	✓	08-Oct-2024	28 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE Sarah Lake	E235.F	06-Oct-2024	08-Oct-2024	28 days	2 days	✓	08-Oct-2024	28 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Coutts River	E235.F	05-Oct-2024	08-Oct-2024	28 days	3 days	✓	08-Oct-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Lois Lake	E235.F	05-Oct-2024	08-Oct-2024	28 days	3 days	✓	08-Oct-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Unnamed Lake 5	E235.F	05-Oct-2024	08-Oct-2024	28 days	3 days	✓	08-Oct-2024	28 days	3 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Edith Lake	E235.F	04-Oct-2024	08-Oct-2024	28 days	4 days	✓	08-Oct-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Freeman Lake	E235.F	04-Oct-2024	08-Oct-2024	28 days	4 days	✓	08-Oct-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Unnamed Lake 6	E235.F	04-Oct-2024	08-Oct-2024	28 days	4 days	✓	08-Oct-2024	28 days	4 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Krause Lake	E235.F	03-Oct-2024	08-Oct-2024	28 days	5 days	✓	08-Oct-2024	28 days	5 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE										
Unnamed Lake 1	E235.F	03-Oct-2024	08-Oct-2024	28 days	5 days	✓	08-Oct-2024	28 days	5 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Chrystina Lake	E235.NO3	07-Oct-2024	08-Oct-2024	3 days	1 days	✓	08-Oct-2024	3 days	1 days	✓

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Chrystina Lake Duplicate	E235.NO3	07-Oct-2024	08-Oct-2024	3 days	1 days	✓	08-Oct-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Unnamed Lake 3	E235.NO3	07-Oct-2024	08-Oct-2024	3 days	1 days	✓	08-Oct-2024	3 days	1 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Sarah Lake	E235.NO3	06-Oct-2024	08-Oct-2024	3 days	2 days	✓	08-Oct-2024	3 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Coutts River	E235.NO3	05-Oct-2024	08-Oct-2024	3 days	3 days	✓	08-Oct-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Lois Lake	E235.NO3	05-Oct-2024	08-Oct-2024	3 days	3 days	✓	08-Oct-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Unnamed Lake 5	E235.NO3	05-Oct-2024	08-Oct-2024	3 days	3 days	✓	08-Oct-2024	3 days	3 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Edith Lake	E235.NO3	04-Oct-2024	08-Oct-2024	3 days	4 days	✗ EHTR	08-Oct-2024	3 days	4 days	✗ EHTR
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Freeman Lake	E235.NO3	04-Oct-2024	08-Oct-2024	3 days	4 days	✗ EHTR	08-Oct-2024	3 days	4 days	✗ EHTR
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Unnamed Lake 6	E235.NO3	04-Oct-2024	08-Oct-2024	3 days	4 days	✗ EHTR	08-Oct-2024	3 days	4 days	✗ EHTR

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Krause Lake	E235.NO3	03-Oct-2024	08-Oct-2024	3 days	5 days	✗ EHTR	08-Oct-2024	3 days	5 days	✗ EHTR
Anions and Nutrients : Nitrate in Water by IC										
HDPE										
Unnamed Lake 1	E235.NO3	03-Oct-2024	08-Oct-2024	3 days	5 days	✗ EHTR	08-Oct-2024	3 days	5 days	✗ EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Chrystina Lake	E235.NO2	07-Oct-2024	08-Oct-2024	3 days	1 days	✓	08-Oct-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Chrystina Lake Duplicate	E235.NO2	07-Oct-2024	08-Oct-2024	3 days	1 days	✓	08-Oct-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Unnamed Lake 3	E235.NO2	07-Oct-2024	08-Oct-2024	3 days	1 days	✓	08-Oct-2024	3 days	1 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Sarah Lake	E235.NO2	06-Oct-2024	08-Oct-2024	3 days	2 days	✓	08-Oct-2024	3 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Coutts River	E235.NO2	05-Oct-2024	08-Oct-2024	3 days	3 days	✓	08-Oct-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Lois Lake	E235.NO2	05-Oct-2024	08-Oct-2024	3 days	3 days	✓	08-Oct-2024	3 days	3 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Unnamed Lake 5	E235.NO2	05-Oct-2024	08-Oct-2024	3 days	3 days	✓	08-Oct-2024	3 days	3 days	✓

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Edith Lake	E235.NO2	04-Oct-2024	08-Oct-2024	3 days	4 days	✗ EHTR	08-Oct-2024	3 days	4 days	✗ EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Freeman Lake	E235.NO2	04-Oct-2024	08-Oct-2024	3 days	4 days	✗ EHTR	08-Oct-2024	3 days	4 days	✗ EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Unnamed Lake 6	E235.NO2	04-Oct-2024	08-Oct-2024	3 days	4 days	✗ EHTR	08-Oct-2024	3 days	4 days	✗ EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Krause Lake	E235.NO2	03-Oct-2024	08-Oct-2024	3 days	5 days	✗ EHTR	08-Oct-2024	3 days	5 days	✗ EHTR
Anions and Nutrients : Nitrite in Water by IC										
HDPE										
Unnamed Lake 1	E235.NO2	03-Oct-2024	08-Oct-2024	3 days	5 days	✗ EHTR	08-Oct-2024	3 days	5 days	✗ EHTR
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Chrystina Lake	E235.SO4	07-Oct-2024	08-Oct-2024	28 days	1 days	✓	08-Oct-2024	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Chrystina Lake Duplicate	E235.SO4	07-Oct-2024	08-Oct-2024	28 days	1 days	✓	08-Oct-2024	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Unnamed Lake 3	E235.SO4	07-Oct-2024	08-Oct-2024	28 days	1 days	✓	08-Oct-2024	28 days	1 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Sarah Lake	E235.SO4	06-Oct-2024	08-Oct-2024	28 days	2 days	✓	08-Oct-2024	28 days	2 days	✓

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Coutts River	E235.SO4	05-Oct-2024	08-Oct-2024	28 days	3 days	✓	08-Oct-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Lois Lake	E235.SO4	05-Oct-2024	08-Oct-2024	28 days	3 days	✓	08-Oct-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Unnamed Lake 5	E235.SO4	05-Oct-2024	08-Oct-2024	28 days	3 days	✓	08-Oct-2024	28 days	3 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Edith Lake	E235.SO4	04-Oct-2024	08-Oct-2024	28 days	4 days	✓	08-Oct-2024	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Freeman Lake	E235.SO4	04-Oct-2024	08-Oct-2024	28 days	4 days	✓	08-Oct-2024	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Unnamed Lake 6	E235.SO4	04-Oct-2024	08-Oct-2024	28 days	4 days	✓	08-Oct-2024	28 days	4 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Krause Lake	E235.SO4	03-Oct-2024	08-Oct-2024	28 days	5 days	✓	08-Oct-2024	28 days	5 days	✓
Anions and Nutrients : Sulfate in Water by IC										
HDPE										
Unnamed Lake 1	E235.SO4	03-Oct-2024	08-Oct-2024	28 days	5 days	✓	08-Oct-2024	28 days	5 days	✓
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE										
Sarah Lake	E421	06-Oct-2024	10-Oct-2024	0 hrs	102 hrs	✗ UCP	10-Oct-2024	0 hrs	102 hrs	✗ UCP

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE										
Unnamed Lake 5	E421	05-Oct-2024	10-Oct-2024	0 hrs	118 hrs	✗ UCP	10-Oct-2024	0 hrs	118 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE										
Coutts River	E421	05-Oct-2024	10-Oct-2024	0 hrs	122 hrs	✗ UCP	10-Oct-2024	0 hrs	122 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE										
Lois Lake	E421	05-Oct-2024	10-Oct-2024	0 hrs	123 hrs	✗ UCP	10-Oct-2024	0 hrs	123 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE										
Freeman Lake	E421	04-Oct-2024	10-Oct-2024	0 hrs	142 hrs	✗ UCP	10-Oct-2024	0 hrs	142 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE										
Edith Lake	E421	04-Oct-2024	10-Oct-2024	0 hrs	147 hrs	✗ UCP	10-Oct-2024	0 hrs	147 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE										
Unnamed Lake 6	E421	04-Oct-2024	10-Oct-2024	0 hrs	149 hrs	✗ UCP	10-Oct-2024	0 hrs	149 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE										
Krause Lake	E421	03-Oct-2024	10-Oct-2024	0 hrs	166 hrs	✗ UCP	10-Oct-2024	0 hrs	166 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE										
Unnamed Lake 1	E421	03-Oct-2024	10-Oct-2024	0 hrs	175 hrs	✗ UCP	10-Oct-2024	0 hrs	175 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE										
Chrystina Lake	E421	07-Oct-2024	10-Oct-2024	0 hrs	75 hrs	✗ UCP	10-Oct-2024	0 hrs	75 hrs	✗ UCP

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE										
Chrystina Lake Duplicate	E421	07-Oct-2024	10-Oct-2024	0 hrs	75 hrs	✗ UCP	10-Oct-2024	0 hrs	75 hrs	✗ UCP
Dissolved Metals : Dissolved Metals in Water by CRC ICPMS										
HDPE										
Unnamed Lake 3	E421	07-Oct-2024	10-Oct-2024	0 hrs	77 hrs	✗ UCP	10-Oct-2024	0 hrs	78 hrs	✗ UCP
Physical Tests : Alkalinity Species by Titration										
HDPE										
Chrystina Lake	E290	07-Oct-2024	08-Oct-2024	14 days	1 days	✓	08-Oct-2024	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Unnamed Lake 3	E290	07-Oct-2024	08-Oct-2024	14 days	1 days	✓	08-Oct-2024	14 days	1 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Chrystina Lake Duplicate	E290	07-Oct-2024	09-Oct-2024	14 days	2 days	✓	09-Oct-2024	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Sarah Lake	E290	06-Oct-2024	08-Oct-2024	14 days	2 days	✓	08-Oct-2024	14 days	2 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Lois Lake	E290	05-Oct-2024	08-Oct-2024	14 days	3 days	✓	08-Oct-2024	14 days	3 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Coutts River	E290	05-Oct-2024	09-Oct-2024	14 days	4 days	✓	09-Oct-2024	14 days	4 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE										
Unnamed Lake 5	E290	05-Oct-2024	09-Oct-2024	14 days	4 days	✓	09-Oct-2024	14 days	4 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Alkalinity Species by Titration										
HDPE Edith Lake	E290	04-Oct-2024	09-Oct-2024	14 days	5 days	✓	09-Oct-2024	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Freeman Lake	E290	04-Oct-2024	09-Oct-2024	14 days	5 days	✓	09-Oct-2024	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Krause Lake	E290	03-Oct-2024	08-Oct-2024	14 days	5 days	✓	08-Oct-2024	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Unnamed Lake 1	E290	03-Oct-2024	08-Oct-2024	14 days	5 days	✓	08-Oct-2024	14 days	5 days	✓
Physical Tests : Alkalinity Species by Titration										
HDPE Unnamed Lake 6	E290	04-Oct-2024	09-Oct-2024	14 days	5 days	✓	09-Oct-2024	14 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE Chrystina Lake	E100	07-Oct-2024	08-Oct-2024	28 days	1 days	✓	08-Oct-2024	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE Unnamed Lake 3	E100	07-Oct-2024	08-Oct-2024	28 days	1 days	✓	08-Oct-2024	28 days	1 days	✓
Physical Tests : Conductivity in Water										
HDPE Chrystina Lake Duplicate	E100	07-Oct-2024	09-Oct-2024	28 days	2 days	✓	09-Oct-2024	28 days	2 days	✓
Physical Tests : Conductivity in Water										
HDPE Sarah Lake	E100	06-Oct-2024	08-Oct-2024	28 days	2 days	✓	08-Oct-2024	28 days	2 days	✓

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Conductivity in Water										
HDPE Lois Lake	E100	05-Oct-2024	08-Oct-2024	28 days	3 days	✓	08-Oct-2024	28 days	3 days	✓
Physical Tests : Conductivity in Water										
HDPE Coutts River	E100	05-Oct-2024	09-Oct-2024	28 days	4 days	✓	09-Oct-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Unnamed Lake 5	E100	05-Oct-2024	09-Oct-2024	28 days	4 days	✓	09-Oct-2024	28 days	4 days	✓
Physical Tests : Conductivity in Water										
HDPE Edith Lake	E100	04-Oct-2024	09-Oct-2024	28 days	5 days	✓	09-Oct-2024	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE Freeman Lake	E100	04-Oct-2024	09-Oct-2024	28 days	5 days	✓	09-Oct-2024	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE Krause Lake	E100	03-Oct-2024	08-Oct-2024	28 days	5 days	✓	08-Oct-2024	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE Unnamed Lake 1	E100	03-Oct-2024	08-Oct-2024	28 days	5 days	✓	08-Oct-2024	28 days	5 days	✓
Physical Tests : Conductivity in Water										
HDPE Unnamed Lake 6	E100	04-Oct-2024	09-Oct-2024	28 days	5 days	✓	09-Oct-2024	28 days	5 days	✓
Physical Tests : pH by Meter										
HDPE Freeman Lake	E108	04-Oct-2024	09-Oct-2024	0.25 hrs	114 hrs	✗ EHTR-FM	09-Oct-2024	0.25 hrs	120 hrs	✗ EHTR-FM

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE Edith Lake	E108	04-Oct-2024	09-Oct-2024	0.25 hrs	120 hrs	✗ EHTR-FM	09-Oct-2024	0.25 hrs	125 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE Krause Lake	E108	03-Oct-2024	08-Oct-2024	0.25 hrs	121 hrs	✗ EHTR-FM	08-Oct-2024	0.25 hrs	121 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE Unnamed Lake 6	E108	04-Oct-2024	09-Oct-2024	0.25 hrs	122 hrs	✗ EHTR-FM	09-Oct-2024	0.25 hrs	128 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE Unnamed Lake 1	E108	03-Oct-2024	08-Oct-2024	0.25 hrs	129 hrs	✗ EHTR-FM	08-Oct-2024	0.25 hrs	129 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE Chrystina Lake	E108	07-Oct-2024	08-Oct-2024	0.25 hrs	29 hrs	✗ EHTR-FM	08-Oct-2024	0.25 hrs	29 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE Unnamed Lake 3	E108	07-Oct-2024	08-Oct-2024	0.25 hrs	32 hrs	✗ EHTR-FM	08-Oct-2024	0.25 hrs	32 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE Chrystina Lake Duplicate	E108	07-Oct-2024	09-Oct-2024	0.25 hrs	48 hrs	✗ EHTR-FM	09-Oct-2024	0.25 hrs	53 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE Sarah Lake	E108	06-Oct-2024	08-Oct-2024	0.25 hrs	56 hrs	✗ EHTR-FM	08-Oct-2024	0.25 hrs	56 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE Lois Lake	E108	05-Oct-2024	08-Oct-2024	0.25 hrs	78 hrs	✗ EHTR-FM	08-Oct-2024	0.25 hrs	78 hrs	✗ EHTR-FM

Matrix: **Water**

Evaluation: ✗ = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter										
HDPE										
Unnamed Lake 5	E108	05-Oct-2024	09-Oct-2024	0.25 hrs	90 hrs	✗ EHTR-FM	09-Oct-2024	0.25 hrs	96 hrs	✗ EHTR-FM
Physical Tests : pH by Meter										
HDPE										
Coutts River	E108	05-Oct-2024	09-Oct-2024	0.25 hrs	94 hrs	✗ EHTR-FM	09-Oct-2024	0.25 hrs	100 hrs	✗ EHTR-FM

Legend & Qualifier Definitions

EHTR-FM: Exceeded ALS recommended hold time prior to sample receipt. Field Measurement recommended

EHTR: Exceeded ALS recommended hold time prior to sample receipt.

Rec. HT: ALS recommended hold time (see units).

UCP: Unsuitable Container and/or Preservative used (invalidates standard hold time). Maximum hold time of zero applied. Test results may be biased low / unreliable, and may not meet regulatory requirements.

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1697784	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	1697730	2	28	7.1	5.0	✓
Conductivity in Water	E100	1697783	2	38	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1702587	2	38	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1697727	2	24	8.3	5.0	✓
Nitrate in Water by IC	E235.NO3	1697728	2	24	8.3	5.0	✓
Nitrite in Water by IC	E235.NO2	1697729	2	24	8.3	5.0	✓
pH by Meter	E108	1697782	2	39	5.1	5.0	✓
Sulfate in Water by IC	E235.SO4	1697731	2	24	8.3	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1697784	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	1697730	2	28	7.1	5.0	✓
Conductivity in Water	E100	1697783	2	38	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1702587	2	38	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1697727	2	24	8.3	5.0	✓
Nitrate in Water by IC	E235.NO3	1697728	2	24	8.3	5.0	✓
Nitrite in Water by IC	E235.NO2	1697729	2	24	8.3	5.0	✓
pH by Meter	E108	1697782	2	39	5.1	5.0	✓
Sulfate in Water by IC	E235.SO4	1697731	2	24	8.3	5.0	✓
Method Blanks (MB)							
Alkalinity Species by Titration	E290	1697784	2	37	5.4	5.0	✓
Chloride in Water by IC	E235.Cl	1697730	2	28	7.1	5.0	✓
Conductivity in Water	E100	1697783	2	38	5.2	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1702587	2	38	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1697727	2	24	8.3	5.0	✓
Nitrate in Water by IC	E235.NO3	1697728	2	24	8.3	5.0	✓
Nitrite in Water by IC	E235.NO2	1697729	2	24	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	1697731	2	24	8.3	5.0	✓
Matrix Spikes (MS)							
Chloride in Water by IC	E235.Cl	1697730	2	28	7.1	5.0	✓
Dissolved Metals in Water by CRC ICPMS	E421	1702587	2	38	5.2	5.0	✓
Fluoride in Water by IC	E235.F	1697727	2	24	8.3	5.0	✓
Nitrate in Water by IC	E235.NO3	1697728	2	24	8.3	5.0	✓
Nitrite in Water by IC	E235.NO2	1697729	2	24	8.3	5.0	✓
Sulfate in Water by IC	E235.SO4	1697731	2	24	8.3	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Conductivity in Water	E100 ALS Environmental - Edmonton	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Edmonton	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Chloride in Water by IC	E235.Cl ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrite in Water by IC	E235.NO2 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Edmonton	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Edmonton	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Dissolved Metals in Water by CRC ICPMS	E421 ALS Environmental - Edmonton	Water	APHA 3030B/EPA 6020B (mod)	Water samples are filtered (0.45 um), preserved with nitric acid, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Hardness (Calculated)	EC100 ALS Environmental - Edmonton	Water	APHA 2340B	"Hardness (as CaCO3), dissolved" is calculated from the sum of dissolved Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations.
Ion Balance using Dissolved Metals	EC101 ALS Environmental - Edmonton	Water	APHA 1030E	Cation Sum, Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
TDS in Water (Calculation)	EC103 ALS Environmental - Edmonton	Water	APHA 1030E (mod)	Total Dissolved Solids is calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Dissolved species are used where available. Minor ions are included where data is present.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Edmonton	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Dissolved Metals Water Filtration	EP421 ALS Environmental - Edmonton	Water	APHA 3030B	Water samples are filtered (0.45 um), and preserved with HNO3.

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QUALITY CONTROL REPORT

Work Order	: **EO2408892**	Page	: 1 of 10
Client	: CPP Environmental	Laboratory	: ALS Environmental - Edmonton
Contact	: Theo Charette	Account Manager	: Megha Walia
Address	: 154-150 Chippewa Road Sherwood Park AB Canada T8A 6A2	Address	: 9450 - 17 Avenue NW Edmonton, Alberta Canada T6N 1M9
Telephone	: 780 570 5818	Telephone	: +1 780 413 5227
Project	: SUEZ Water Quality- October	Date Samples Received	: 08-Oct-2024 15:20
PO	: ----	Date Analysis Commenced	: 08-Oct-2024
C-O-C number	: 20-1059627	Issue Date	: 12-Oct-2024 11:00
Sampler	: ----		
Site	: ----		
Quote number	: Blanket quote		
No. of samples received	: 12		
No. of samples analysed	: 12		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Alex Drake	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta
Alex Drake	Lab Analyst	Edmonton Metals, Edmonton, Alberta
Dan Nguyen	Team Leader - Inorganics	Edmonton Metals, Edmonton, Alberta
Daniel Nguyen	Laboratory Analyst	Edmonton Metals, Edmonton, Alberta
Shruti Mudliar	Lab Analyst	Edmonton Inorganics, Edmonton, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1697782)											
EO2408893-008	Anonymous	pH	----	E108	0.10	pH units	7.21	7.19	0.278%	3%	----
Physical Tests (QC Lot: 1697783)											
EO2408893-008	Anonymous	Conductivity	----	E100	1.0	µS/cm	1630	1650	0.915%	10%	----
Physical Tests (QC Lot: 1697784)											
EO2408893-008	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	592	598	0.924%	20%	----
Physical Tests (QC Lot: 1699228)											
EO2408910-009	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	117	118	0.426%	20%	----
Physical Tests (QC Lot: 1699229)											
EO2408910-009	Anonymous	pH	----	E108	0.10	pH units	7.89	7.85	0.508%	3%	----
Physical Tests (QC Lot: 1699230)											
EO2408910-009	Anonymous	Conductivity	----	E100	1.0	µS/cm	346	349	0.863%	10%	----
Anions and Nutrients (QC Lot: 1697727)											
EO2408893-008	Anonymous	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.070	0.067	0.003	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1697728)											
EO2408893-008	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1697729)											
EO2408893-008	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1697730)											
EO2408893-008	Anonymous	Chloride	16887-00-6	E235.Cl	0.50	mg/L	190	191	0.151%	20%	----
Anions and Nutrients (QC Lot: 1697731)											
EO2408893-008	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	99.6	99.7	0.0451%	20%	----
Anions and Nutrients (QC Lot: 1697761)											
EO2408892-010	Coutts River	Chloride	16887-00-6	E235.Cl	0.50	mg/L	5.16	5.22	1.16%	20%	----
Anions and Nutrients (QC Lot: 1697762)											
EO2408892-010	Coutts River	Nitrate (as N)	14797-55-8	E235.NO3	0.020	mg/L	<0.020	<0.020	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1697763)											
EO2408892-010	Coutts River	Nitrite (as N)	14797-65-0	E235.NO2	0.010	mg/L	<0.010	<0.010	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1697764)											
EO2408892-010	Coutts River	Sulfate (as SO4)	14808-79-8	E235.SO4	0.30	mg/L	0.52	0.54	0.01	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1697765)											

Sub-Matrix: **Water**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Anions and Nutrients (QC Lot: 1697765) - continued											
EO2408892-010	Coutts River	Fluoride	16984-48-8	E235.F	0.020	mg/L	0.036	0.034	0.002	Diff <2x LOR	----
Dissolved Metals (QC Lot: 1702587)											
EO2408856-001	Anonymous	Calcium, dissolved	7440-70-2	E421	0.100	mg/L	185	186	0.687%	20%	----
		Iron, dissolved	7439-89-6	E421	0.020	mg/L	0.032	0.032	0.0002	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0100	mg/L	92.8	94.8	2.10%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00020	mg/L	0.00202	0.00207	2.23%	20%	----
		Potassium, dissolved	7440-09-7	E421	0.100	mg/L	2.98	2.99	0.210%	20%	----
		Sodium, dissolved	7440-23-5	E421	0.100	mg/L	150	153	2.09%	20%	----
Dissolved Metals (QC Lot: 1702588)											
EO2408892-002	Unnamed Lake 1	Calcium, dissolved	7440-70-2	E421	0.050	mg/L	0.581	0.572	1.43%	20%	----
		Iron, dissolved	7439-89-6	E421	0.010	mg/L	0.026	0.026	0.0003	Diff <2x LOR	----
		Magnesium, dissolved	7439-95-4	E421	0.0050	mg/L	0.303	0.314	3.64%	20%	----
		Manganese, dissolved	7439-96-5	E421	0.00010	mg/L	0.00265	0.00281	5.86%	20%	----
		Potassium, dissolved	7440-09-7	E421	0.050	mg/L	0.201	0.200	0.0005	Diff <2x LOR	----
		Sodium, dissolved	7440-23-5	E421	0.050	mg/L	0.498	0.497	0.001	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1697783)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1697784)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1699228)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1699230)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Anions and Nutrients (QCLot: 1697727)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1697728)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1697729)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1697730)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1697731)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1697761)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1697762)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1697763)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1697764)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1697765)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Dissolved Metals (QCLot: 1702587)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Dissolved Metals (QCLot: 1702587) - continued						
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----
Dissolved Metals (QCLot: 1702588)						
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	<0.050	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	<0.010	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	<0.0050	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	<0.00010	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	<0.050	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	<0.050	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1697782)									
pH	----	E108	----	pH units	6 pH units	102	97.0	103	----
Physical Tests (QCLot: 1697783)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	103	90.0	110	----
Physical Tests (QCLot: 1697784)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	96.1	85.0	115	----
Physical Tests (QCLot: 1699228)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	500 mg/L	96.6	85.0	115	----
Physical Tests (QCLot: 1699229)									
pH	----	E108	----	pH units	6 pH units	101	97.0	103	----
Physical Tests (QCLot: 1699230)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	95.6	90.0	110	----
Anions and Nutrients (QCLot: 1697727)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1697728)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	102	90.0	110	----
Anions and Nutrients (QCLot: 1697729)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	93.5	90.0	110	----
Anions and Nutrients (QCLot: 1697730)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	100.0	90.0	110	----
Anions and Nutrients (QCLot: 1697731)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	103	90.0	110	----
Anions and Nutrients (QCLot: 1697761)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	98.4	90.0	110	----
Anions and Nutrients (QCLot: 1697762)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1697763)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	91.9	90.0	110	----
Anions and Nutrients (QCLot: 1697764)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	98.3	90.0	110	----
Anions and Nutrients (QCLot: 1697765)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	97.9	90.0	110	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Dissolved Metals (QCLot: 1702587)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	94.6	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	98.4	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	102	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	97.3	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	101	80.0	120	----
Dissolved Metals (QCLot: 1702588)									
Calcium, dissolved	7440-70-2	E421	0.05	mg/L	50 mg/L	92.4	80.0	120	----
Iron, dissolved	7439-89-6	E421	0.01	mg/L	1 mg/L	102	80.0	120	----
Magnesium, dissolved	7439-95-4	E421	0.005	mg/L	50 mg/L	101	80.0	120	----
Manganese, dissolved	7439-96-5	E421	0.0001	mg/L	0.25 mg/L	100	80.0	120	----
Potassium, dissolved	7440-09-7	E421	0.05	mg/L	50 mg/L	96.4	80.0	120	----
Sodium, dissolved	7440-23-5	E421	0.05	mg/L	50 mg/L	101	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1697727)										
EO2408893-008	Anonymous	Fluoride	16984-48-8	E235.F	0.902 mg/L	1 mg/L	90.2	75.0	125	----
Anions and Nutrients (QCLot: 1697728)										
EO2408893-008	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	2.50 mg/L	2.5 mg/L	99.9	75.0	125	----
Anions and Nutrients (QCLot: 1697729)										
EO2408893-008	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.485 mg/L	0.5 mg/L	97.0	75.0	125	----
Anions and Nutrients (QCLot: 1697730)										
EO2408893-008	Anonymous	Chloride	16887-00-6	E235.Cl	ND mg/L	----	ND	75.0	125	----
Anions and Nutrients (QCLot: 1697731)										
EO2408893-008	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	92.8 mg/L	100 mg/L	92.8	75.0	125	----
Anions and Nutrients (QCLot: 1697761)										
EO2408892-010	Coutts River	Chloride	16887-00-6	E235.Cl	96.8 mg/L	100 mg/L	96.8	75.0	125	----
Anions and Nutrients (QCLot: 1697762)										
EO2408892-010	Coutts River	Nitrate (as N)	14797-55-8	E235.NO3	2.45 mg/L	2.5 mg/L	98.2	75.0	125	----
Anions and Nutrients (QCLot: 1697763)										
EO2408892-010	Coutts River	Nitrite (as N)	14797-65-0	E235.NO2	0.499 mg/L	0.5 mg/L	99.8	75.0	125	----
Anions and Nutrients (QCLot: 1697764)										
EO2408892-010	Coutts River	Sulfate (as SO4)	14808-79-8	E235.SO4	97.4 mg/L	100 mg/L	97.4	75.0	125	----
Anions and Nutrients (QCLot: 1697765)										
EO2408892-010	Coutts River	Fluoride	16984-48-8	E235.F	0.957 mg/L	1 mg/L	95.7	75.0	125	----
Dissolved Metals (QCLot: 1702587)										
EO2408856-002	Anonymous	Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.73 mg/L	2 mg/L	86.4	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	ND mg/L	----	ND	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.95 mg/L	4 mg/L	98.7	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----
Dissolved Metals (QCLot: 1702588)										
EO2408892-003	Sarah Lake	Calcium, dissolved	7440-70-2	E421	ND mg/L	----	ND	70.0	130	----
		Iron, dissolved	7439-89-6	E421	1.82 mg/L	2 mg/L	91.1	70.0	130	----
		Magnesium, dissolved	7439-95-4	E421	ND mg/L	----	ND	70.0	130	----
		Manganese, dissolved	7439-96-5	E421	0.0192 mg/L	0.02 mg/L	96.2	70.0	130	----
		Potassium, dissolved	7440-09-7	E421	3.15 mg/L	4 mg/L	78.7	70.0	130	----
		Sodium, dissolved	7440-23-5	E421	ND mg/L	----	ND	70.0	130	----

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 - 1059627

Canada Toll Free: 1 800 668 9878

Page of

www.alsglobal.com

Report To	Contact and company name below will appear on the final report
Company:	CPPEnvironmental
Contact:	Theo Charette
Phone:	780-578-5818
	Company address below will appear on the final report
Street:	154-150 Chippewa rd
City/Province:	Sherwood Park
Postal Code:	
Invoice To	Same as Report To ☒ YES ☐ NO
	Copy of Invoice with Report ☒ YES ☐ NO
Company:	
Contact:	

Reports / Recipients

Select Report Format: ☒ PDF ☒ EXCEL ☐ EDD (DIGITAL)

Merge QC/QCI Reports with COA ☐ YES ☐ NO ☐ N/A

☐ Compare Results to Criteria on Report - provide details below if box checked

Select Distribution: ☐ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: theo.charette@cppenv.ca

Email 2: veronica@cppenv.ca

Email 3:

Invoice Recipients

Select Invoice Distribution: ☒ EMAIL ☐ MAIL ☐ FAX

Email 1 or Fax: admin@cppenv.ca

Email 2:

Turnaround Time (TAT) Requested

☒ Routine [R] if received by 3pm M-F - no surcharges apply

☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge minimum

☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge minimum

☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge minimum

☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge minimum

☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. Additio may apply to rush requests on weekends, statutory holidays and non-rout

Date and Time Required for all E&P TATs:

For all tests with rush TATs requested, please co

Environmental Division Edmonton

Work Order Reference

EO2408892

Telephone : +1 780 413 5227

Project Information

ALS Account # / Quote #:

Job #: SUEZ Water Quality - October

PO / AFE:

LSD:

Oil and Gas Required Fields (client use)

AFE/Cost Center: PO#:

Major/Minor Code: Routing Code:

Requisitioner:

Location:

ALS Lab Work Order # (ALS use only):

ALS Contact: Sampler:

Analysis Req

Indicate Filtered (F), Preserved (P) or Filtered and

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Routine.	SAMPLES ON HOI	EXTENDED STORAGE	SUSPECTED HAZARD
	Krause Lake	Oct3	15:57	Water	1	✓			
	Unnamed Lake 1	Oct3	0720	Water	↓	↓			
	Sarah Lake	Oct6	0835	Water	↓	↓			
	Lois Lake	Oct5	1053	↓	↓	↓			
	Unnamed Lake 3	Oct7	0846	↓	↓	↓			
	Christina Lake	Oct7	1105	↓	↓	↓			
	Unnamed Lake 5	Oct5	1620	↓	↓	↓			
	Edith Lake	Oct4	1108	↓	↓	↓			
	Christina Lake Duplicate	Oct7	1109	↓	↓	↓			
	Coutts River	Oct5	1240	↓	↓	↓			
	Unnamed Lake 6	Oct4	0853	↓	↓	↓			
	Freeman Lake	Oct4	1635	↓	↓	↓			

Drinking Water (DW) Samples[1] (client use)

Are samples taken from a Regulated DW System? ☐ YES ☒ NO

Are samples for human consumption/ use? ☐ YES ☒ NO

Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☒ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
9.4							

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by: Veronica V	Date: Oct 8 2024	Time:	Received by:	Date: 08 Oct 24	Time: 5:20	Received by:	Date:	Time:

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

WHITE - LABORATORY COPY YELLOW - CLIENT COPY

AUG 2020 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a Regulated Drinking Water (DW) System, please submit using an Authorized DW COC form.

Your Project #: SUEZ WATER QUALITY 2024
Site#: SWAN HILLS. AB
Your C.O.C. #: 738522-01-01

Attention: Théo Charette

CPP ENVIRONMENTAL
154-150 CHIPPEWA ROAD
SHERWOOD PARK, AB
CANADA T8A 6A2

Report Date: 2024/10/22
Report #: R3575557
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C480872
Received: 2024/10/08, 17:02

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity @25C (pp, total), CO3,HCO3,OH (1)	5	N/A	2024/10/09	AB SOP-00005	SM 24 2320 B m
Cadmium - low level CCME (Total) (1)	3	N/A	2024/10/17		Auto Calc
Chlorophyll and Pheophytin in Water (1)	3	2024/10/17	2024/10/18	CAL SOP-00273	SM 24 10150 A, B m
Chloride/Sulphate by Auto Colourimetry (1)	5	N/A	2024/10/09	AB SOP-00020	SM24-4500-Cl/SO4-E m
Conductivity @25C (1)	5	N/A	2024/10/09	AB SOP-00005	SM 24 2510 B m
Hardness (1)	4	N/A	2024/10/10		Auto Calc
Hardness (1)	1	N/A	2024/10/11		Auto Calc
Mercury (Total) by CV (1)	3	2024/10/10	2024/10/16	AB SOP-00084	BCMOE BCLM Oct2013 m
Elements by ICP-Dissolved-Lab Filtered (1, 2)	1	N/A	2024/10/10	AB SOP-00042	EPA 6010d R5 m
Elements by ICP-Dissolved-Lab Filtered (1, 2)	4	N/A	2024/10/09	AB SOP-00042	EPA 6010d R5 m
Elements by ICP - Total (1)	3	2024/10/15	2024/10/16	AB SOP-00014 / AB SOP-00042	EPA 6010d R5 m
Elements by ICPMS - Total (1)	3	2024/10/15	2024/10/16	AB SOP-00014 / AB SOP-00043	EPA 6020b R2 m
Ion Balance (1)	4	N/A	2024/10/10		Auto Calc
Ion Balance (1)	1	N/A	2024/10/11		Auto Calc
Sum of cations, anions (1)	4	N/A	2024/10/10		Auto Calc
Sum of cations, anions (1)	1	N/A	2024/10/11		Auto Calc
Ammonia-N (Total) (1)	3	N/A	2024/10/15	AB SOP-00007	SM 24 4500 NH3 A G m
Nitrate and Nitrite (1)	5	N/A	2024/10/09		Auto Calc
NO2 (N); NO2 (N) + NO3 (N) in Water (1)	5	N/A	2024/10/09	AB SOP-00091	SM 24 4500 NO3m
Nitrate (as N) (1)	5	2024/10/09	2024/10/09		Auto Calc
pH @25°C (1, 3)	5	N/A	2024/10/09	AB SOP-00005	SM 24 4500-H+B m
Total Dissolved Solids (Filt. Residue) (1)	2	2024/10/10	2024/10/11	AB SOP-00065	SM 24 2540 C m
Total Dissolved Solids (Filt. Residue) (1)	1	2024/10/13	2024/10/15	AB SOP-00065	SM 24 2540 C m
Total Dissolved Solids (Calculated) (1)	4	N/A	2024/10/10		Auto Calc
Total Dissolved Solids (Calculated) (1)	1	N/A	2024/10/11		Auto Calc
Total Kjeldahl Nitrogen (Total) (1)	3	N/A	2024/10/15	BBY WI-00033	Auto Calc
Nitrogen (Total) (1)	3	2024/10/11	2024/10/15	AB SOP-00093	SM 24 4500-N C m
Carbon (Total Organic) (1, 4)	3	N/A	2024/10/13	AB SOP-00087	MMCW 119 1996 m
Total Phosphorus-Dissolved-Lab Filtered (1, 5)	3	2024/10/10	2024/10/10	AB SOP-00024	SM 24 4500-P A,B,F m
Total Phosphorus (1)	3	2024/10/15	2024/10/16	AB SOP-00024	SM 24 4500-P A,B,F m

Bureau Veritas Edmonton: 4326 76 Avenue NW T6B 2H8 Telephone (780)577-7100 Fax (780)450-4187

Your Project #: SUEZ WATER QUALITY 2024
Site#: SWAN HILLS. AB
Your C.O.C. #: 738522-01-01

Attention: Théo Charette

CPP ENVIRONMENTAL
154-150 CHIPPEWA ROAD
SHERWOOD PARK, AB
CANADA T8A 6A2

Report Date: 2024/10/22
Report #: R3575557
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C480872
Received: 2024/10/08, 17:02

Sample Matrix: Water
Samples Received: 5

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Total Suspended Solids (NFR) (1)	1	2024/10/10	2024/10/10	AB SOP-00061	SM 24 2540 D m
Total Suspended Solids (NFR) (1)	1	2024/10/10	2024/10/12	AB SOP-00061	SM 24 2540 D m
Total Suspended Solids (NFR) (1)	1	2024/10/12	2024/10/12	AB SOP-00061	SM 24 2540 D m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, EPA, APHA or the Quebec Ministry of Environment.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) This test was performed by Bureau Veritas Calgary, 4000 - 19 St. , Calgary, AB, T2E 6P8
(2) Dissolved > Total Imbalance: When applicable, Dissolved and Total results were reviewed and data quality meets acceptable levels unless otherwise noted.
(3) The CCME method requires pH to be analysed within 15 minutes of sampling and therefore field analysis is required for compliance. All Laboratory pH analyses in this report are reported past the CCME holding time. Bureau Veritas endeavours to analyze samples as soon as possible after receipt.
(4) TOC present in the sample should be considered as non-purgeable TOC.
(5) Dissolved Phosphorus > Total Phosphorus Imbalance: When applicable, Dissolved Phosphorus and Total Phosphorus results were reviewed and data quality meets acceptable levels unless otherwise noted.

Bureau Veritas Edmonton: 4326 76 Avenue NW T6B 2H8 Telephone (780)577-7100 Fax (780)450-4187

Your Project #: SUEZ WATER QUALITY 2024
Site#: SWAN HILLS. AB
Your C.O.C. #: 738522-01-01

Attention: Théo Charette

CPP ENVIRONMENTAL
154-150 CHIPPEWA ROAD
SHERWOOD PARK, AB
CANADA T8A 6A2

Report Date: 2024/10/22
Report #: R3575557
Version: 2 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C480872
Received: 2024/10/08, 17:02

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Chantal Vincent, Customer Solutions Representative
Email: Chantal.vincent@bureauveritas.com
Phone# (780) 577-7100
==========
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Scott Cantwell, General Manager responsible for Alberta Environmental laboratory operations.

Bureau Veritas Edmonton: 4326 76 Avenue NW T6B 2H8 Telephone (780)577-7100 Fax (780)450-4187

ROUTINE WATER -LAB FILTERED (WATER)

Bureau Veritas ID		CXK628		CXK629			CXK630		
Sampling Date		2024/10/07 11:05		2024/10/04 11:02			2024/10/05 12:40		
COC Number		738522-01-01		738522-01-01			738522-01-01		
	UNITS	**CHRYSTINA LAKE**	**QC Batch**	**EDITH LAKE**	**RDL**	**QC Batch**	**COUTTS RIVER**	**RDL**	**QC Batch**
Calculated Parameters									
Anion Sum	meq/L	0.41	B557424	0.16	N/A	B557424	0.96	N/A	B557424
Cation Sum	meq/L	0.44	B557424	0.29	N/A	B557424	1.3	N/A	B557424
Hardness (CaCO3)	mg/L	18	B557422	9.4	0.50	B557422	46	0.50	B557422
Ion Balance (% Difference)	%	NC	B557423	NC	N/A	B557423	NC	N/A	B557423
Nitrate (N)	mg/L	<0.010	B557408	<0.010	0.010	B557408	<0.010	0.010	B557408
Nitrate (NO3)	mg/L	<0.044	B557406	<0.044	0.044	B557406	<0.044	0.044	B557406
Nitrite (NO2)	mg/L	<0.033	B557406	<0.033	0.033	B557406	<0.033	0.033	B557406
Calculated Total Dissolved Solids	mg/L	21	B557425	11	10	B557425	54	10	B557425
Misc. Inorganics									
Conductivity	uS/cm	42	B557977	24	2.0	B557977	100	2.0	B557977
pH	pH	6.88	B557976	6.28	N/A	B557976	7.03	N/A	B557976
Anions									
Alkalinity (PP as CaCO3)	mg/L	<1.0	B557974	<1.0	1.0	B557974	<1.0	1.0	B557974
Alkalinity (Total as CaCO3)	mg/L	21	B557974	8.0	1.0	B557974	40	1.0	B557974
Bicarbonate (HCO3)	mg/L	25	B557974	9.7	1.0	B557974	48	1.0	B557974
Carbonate (CO3)	mg/L	<1.0	B557974	<1.0	1.0	B557974	<1.0	1.0	B557974
Hydroxide (OH)	mg/L	<1.0	B557974	<1.0	1.0	B557974	<1.0	1.0	B557974
Chloride (Cl)	mg/L	<1.0	B557764	<1.0	1.0	B557764	5.8	1.0	B558571
Sulphate (SO4)	mg/L	<1.0	B557764	<1.0	1.0	B557764	<4.0 (1)	4.0	B558571
Nutrients									
Nitrite (N)	mg/L	<0.010	B558343	<0.010	0.010	B558343	<0.010	0.010	B558343
Nitrate plus Nitrite (N)	mg/L	<0.010	B558343	<0.010	0.010	B558343	<0.010	0.010	B558343
Lab Filtered Elements									
Dissolved Calcium (Ca)	mg/L	5.3	B558026	2.8	0.30	B558600	13	0.30	B558097
Dissolved Iron (Fe)	mg/L	<0.060	B558026	0.13	0.060	B558600	1.0	0.060	B558097
Dissolved Magnesium (Mg)	mg/L	1.2	B558026	0.59	0.20	B558600	3.5	0.20	B558097
Dissolved Manganese (Mn)	mg/L	<0.0040	B558026	<0.0040	0.0040	B558600	0.025	0.0040	B558097
Dissolved Potassium (K)	mg/L	1.0	B558026	0.68	0.30	B558600	0.78	0.30	B558097
Dissolved Sodium (Na)	mg/L	1.2	B558026	1.8	0.50	B558600	6.1	0.50	B558097

RDL = Reportable Detection Limit
N/A = Not Applicable
(1) Detection limits raised due to matrix interference.

Bureau Veritas Edmonton: 4326 76 Avenue NW T6B 2H8 Telephone (780)577-7100 Fax (780)450-4187

ROUTINE WATER -LAB FILTERED (WATER)

Bureau Veritas ID		CXK630			CXK631	CXK632		
Sampling Date		2024/10/05 12:40			2024/10/04 11:08	2024/10/07 11:05		
COC Number		738522-01-01			738522-01-01	738522-01-01		
	UNITS	**COUTTS RIVER Lab-Dup**	**RDL**	**QC Batch**	**TRIP BLANK**	**FIELD BLANK**	**RDL**	**QC Batch**
Calculated Parameters								
Anion Sum	meq/L	N/A	N/A	B557424	0.0000	0.0000	N/A	B557424
Cation Sum	meq/L	N/A	N/A	B557424	0.012	0.012	N/A	B557424
Hardness (CaCO3)	mg/L	N/A	0.50	B557422	<0.50	<0.50	0.50	B557422
Ion Balance (% Difference)	%	N/A	N/A	B557423	NC	NC	N/A	B557423
Nitrate (N)	mg/L	N/A	0.010	B557408	<0.010	<0.010	0.010	B557408
Nitrate (NO3)	mg/L	N/A	0.044	B557406	<0.044	<0.044	0.044	B557406
Nitrite (NO2)	mg/L	N/A	0.033	B557406	<0.033	<0.033	0.033	B557406
Calculated Total Dissolved Solids	mg/L	N/A	10	B557425	<10	<10	10	B557425
Misc. Inorganics								
Conductivity	uS/cm	N/A	2.0	B557977	<2.0	<2.0	2.0	B557977
pH	pH	N/A	N/A	B557976	4.91	4.91	N/A	B557976
Anions								
Alkalinity (PP as CaCO3)	mg/L	N/A	1.0	B557974	<1.0	<1.0	1.0	B557974
Alkalinity (Total as CaCO3)	mg/L	N/A	1.0	B557974	<1.0	<1.0	1.0	B557974
Bicarbonate (HCO3)	mg/L	N/A	1.0	B557974	<1.0	<1.0	1.0	B557974
Carbonate (CO3)	mg/L	N/A	1.0	B557974	<1.0	<1.0	1.0	B557974
Hydroxide (OH)	mg/L	N/A	1.0	B557974	<1.0	<1.0	1.0	B557974
Chloride (Cl)	mg/L	N/A	1.0	B558571	<1.0	<1.0	1.0	B557764
Sulphate (SO4)	mg/L	N/A	4.0	B558571	<1.0	<1.0	1.0	B557764
Nutrients								
Nitrite (N)	mg/L	N/A	0.010	B558343	<0.010	<0.010	0.010	B558343
Nitrate plus Nitrite (N)	mg/L	N/A	0.010	B558343	<0.010	<0.010	0.010	B558343
Lab Filtered Elements								
Dissolved Calcium (Ca)	mg/L	13	0.30	B558097	<0.30	<0.30	0.30	B558600
Dissolved Iron (Fe)	mg/L	1.1	0.060	B558097	<0.060	<0.060	0.060	B558600
Dissolved Magnesium (Mg)	mg/L	3.5	0.20	B558097	<0.20	<0.20	0.20	B558600
Dissolved Manganese (Mn)	mg/L	0.024	0.0040	B558097	<0.0040	<0.0040	0.0040	B558600
Dissolved Potassium (K)	mg/L	0.78	0.30	B558097	<0.30	<0.30	0.30	B558600
Dissolved Sodium (Na)	mg/L	6.1	0.50	B558097	<0.50	<0.50	0.50	B558600

RDL = Reportable Detection Limit
Lab-Dup = Laboratory Initiated Duplicate
N/A = Not Applicable

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TOTAL KJELDAHL NITROGEN (TOTAL)

Bureau Veritas ID		CXK628	CXK629		CXK630		
Sampling Date		2024/10/07 11:05	2024/10/04 11:02		2024/10/05 12:40		
COC Number		738522-01-01	738522-01-01		738522-01-01		
	UNITS	**CHRYSTINA LAKE**	**EDITH LAKE**	**RDL**	**COUTTS RIVER**	**RDL**	**QC Batch**
Calculated Parameters							
Total Total Kjeldahl Nitrogen (Calc)	mg/L	0.49	0.79	0.020	1.3	0.20	B557426
Nutrients							
Total Nitrogen (N)	mg/L	0.49	0.79	0.020	1.3 (1)	0.20	B561048

RDL = Reportable Detection Limit
(1) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

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REGULATED METALS (CCME/AT1) - TOTAL

Bureau Veritas ID		CXK628	CXK629	CXK630		
Sampling Date		2024/10/07 11:05	2024/10/04 11:02	2024/10/05 12:40		
COC Number		738522-01-01	738522-01-01	738522-01-01		
	UNITS	**CHRYSTINA LAKE**	**EDITH LAKE**	**COUTTS RIVER**	**RDL**	**QC Batch**
Elements						
Total Cadmium (Cd)	ug/L	<0.020	<0.020	<0.020	0.020	B557398
Total Aluminum (Al)	mg/L	0.022	0.025	0.067	0.0030	B564490
Total Antimony (Sb)	mg/L	<0.00060	<0.00060	<0.00060	0.00060	B564490
Total Arsenic (As)	mg/L	0.00046	0.00062	0.0011	0.00020	B564490
Total Barium (Ba)	mg/L	0.032	0.020	0.034	0.010	B564463
Total Beryllium (Be)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	B564490
Total Boron (B)	mg/L	<0.020	<0.020	<0.020	0.020	B564463
Total Calcium (Ca)	mg/L	5.5	2.8	13	0.30	B564463
Total Chromium (Cr)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	B564490
Total Cobalt (Co)	mg/L	<0.00030	<0.00030	<0.00030	0.00030	B564490
Total Copper (Cu)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	B564490
Total Iron (Fe)	mg/L	0.12	0.37	1.5	0.060	B564463
Total Lead (Pb)	mg/L	<0.00020	<0.00020	0.00030	0.00020	B564490
Total Lithium (Li)	mg/L	<0.020	<0.020	<0.020	0.020	B564463
Total Magnesium (Mg)	mg/L	1.3	0.56	3.3	0.20	B564463
Total Manganese (Mn)	mg/L	0.023	0.023	0.034	0.0040	B564463
Total Molybdenum (Mo)	mg/L	0.0022	<0.00020	0.00030	0.00020	B564490
Total Nickel (Ni)	mg/L	<0.00050	<0.00050	0.0017	0.00050	B564490
Total Phosphorus (P)	mg/L	<0.10	<0.10	<0.10	0.10	B564463
Total Potassium (K)	mg/L	0.98	0.65	0.86	0.30	B564463
Total Selenium (Se)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	B564490
Total Silicon (Si)	mg/L	<0.50	<0.50	5.6	0.50	B564463
Total Silver (Ag)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	B564490
Total Sodium (Na)	mg/L	1.2	1.7	6.0	0.50	B564463
Total Strontium (Sr)	mg/L	0.026	<0.020	0.060	0.020	B564463
Total Sulphur (S)	mg/L	0.22	0.32	0.71	0.20	B564463
Total Thallium (Tl)	mg/L	<0.00020	<0.00020	<0.00020	0.00020	B564490
Total Tin (Sn)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	B564490
Total Titanium (Ti)	mg/L	<0.0010	<0.0010	0.0014	0.0010	B564490
Total Uranium (U)	mg/L	<0.00010	<0.00010	<0.00010	0.00010	B564490
Total Vanadium (V)	mg/L	<0.0010	<0.0010	<0.0010	0.0010	B564490
Total Zinc (Zn)	mg/L	<0.0030	<0.0030	<0.0030	0.0030	B564490
RDL = Reportable Detection Limit						

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Bureau Veritas Job #: C480872
Report Date: 2024/10/22

CPP ENVIRONMENTAL
Client Project #: SUEZ WATER QUALITY 2024

RESULTS OF CHEMICAL ANALYSES OF WATER

Bureau Veritas ID		CXK628			CXK629			CXK630		
Sampling Date		2024/10/07 11:05			2024/10/04 11:02			2024/10/05 12:40		
COC Number		738522-01-01			738522-01-01			738522-01-01		
	UNITS	**CHRYSTINA LAKE**	**RDL**	**QC Batch**	**EDITH LAKE**	**RDL**	**QC Batch**	**COUTTS RIVER**	**RDL**	**QC Batch**
Misc. Inorganics										
Total Organic Carbon (C)	mg/L	5.9	0.50	B563349	13	0.50	B563349	17 (1)	2.0	B563349
Total Dissolved Solids	mg/L	27 (2)	17	B563420	12	10	B558949	48	10	B558950
Total Suspended Solids	mg/L	4.1	1.0	B562718	2.9	1.0	B558943	<1.0	1.0	B559087
MISCELLANEOUS										
Chlorophyll a	ug/L	8.5	0.53	B568890	17 (3)	0.66	B568890	2.6	0.53	B568890
Chlorophyll c	ug/L	0.67	0.53	B568890	0.81 (3)	0.66	B568890	0.80	0.53	B568890
Pheophytin A	ug/L	>7.8 (4)	0.53	B568890	>14 (5)	0.66	B568890	>4.0 (4)	0.53	B568890
Nutrients										
Total Ammonia (N)	mg/L	<0.015	0.015	B560381	0.039	0.015	B560381	<0.015	0.015	B560381
Total Phosphorus (P)	mg/L	0.010	0.0030	B564983	0.021	0.0030	B564983	0.036	0.0030	B564983
Lab Filtered Nutrients										
Dissolved Phosphorus (P)	mg/L	0.0032	0.0030	B559359	<0.0030 (6)	0.0030	B559359	0.024 (6)	0.0030	B559359

RDL = Reportable Detection Limit
(1) Detection limits raised due to sample matrix.
(2) Detection limit raised based on sample volume used for analysis.
(3) Detection limit raised due to sample volume used for analysis.
(4) Sample turbidity exceeds operating range of this method. Low bias is likely.
(5) Detection limit raised due to sample volume used for analysis. Sample turbidity exceeds operating range of this method. Low bias is likely.
(6) Sample filtered and preserved past method specified hold time

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MERCURY BY COLD VAPOR (WATER)

Bureau Veritas ID		CXK628	CXK629	CXK630		
Sampling Date		2024/10/07 11:05	2024/10/04 11:02	2024/10/05 12:40		
COC Number		738522-01-01	738522-01-01	738522-01-01		
	UNITS	**CHRYSTINA LAKE**	**EDITH LAKE**	**COUTTS RIVER**	**RDL**	**QC Batch**
Elements						
Total Mercury (Hg)	ug/L	<0.0019	<0.0019	0.0030	0.0019	B559822
RDL = Reportable Detection Limit						

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	8.7°C
Package 2	6.0°C

Sample CXK629 [EDITH LAKE] : NO2 (N); NO2 (N) + NO3 (N) in Water completed within five days of sampling. Data is satisfactory for compliance purposes.
Sample filtered past method specified hold time for Chlorophyll A, C, and Pheophytin A. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample CXK630 [COUTTS RIVER] : NO2 (N); NO2 (N) + NO3 (N) in Water completed within five days of sampling. Data is satisfactory for compliance purposes.
Sample filtered past method specified hold time for Chlorophyll A, C, and Pheophytin A. Exceedance of hold time increases the uncertainty of test results but does not necessarily imply that results are compromised.

Sample CXK631 [TRIP BLANK] : NO2 (N); NO2 (N) + NO3 (N) in Water completed within five days of sampling. Data is satisfactory for compliance purposes.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B557764	HAP	Matrix Spike	Chloride (Cl)	2024/10/09		102	%	80 - 120
			Sulphate (SO4)	2024/10/09		104	%	80 - 120
B557764	HAP	Spiked Blank	Chloride (Cl)	2024/10/09		98	%	80 - 120
			Sulphate (SO4)	2024/10/09		102	%	80 - 120
B557764	HAP	Method Blank	Chloride (Cl)	2024/10/09	<1.0		mg/L	
			Sulphate (SO4)	2024/10/09	<1.0		mg/L	
B557764	HAP	RPD	Chloride (Cl)	2024/10/09	0.053		%	20
			Sulphate (SO4)	2024/10/09	0.46		%	20
B557974	AYE	Spiked Blank	Alkalinity (Total as CaCO3)	2024/10/09		97	%	80 - 120
B557974	AYE	Method Blank	Alkalinity (PP as CaCO3)	2024/10/09	<1.0		mg/L	
			Alkalinity (Total as CaCO3)	2024/10/09	<1.0		mg/L	
			Bicarbonate (HCO3)	2024/10/09	<1.0		mg/L	
			Carbonate (CO3)	2024/10/09	<1.0		mg/L	
			Hydroxide (OH)	2024/10/09	<1.0		mg/L	
B557974	AYE	RPD	Alkalinity (PP as CaCO3)	2024/10/09	NC		%	20
			Alkalinity (Total as CaCO3)	2024/10/09	0.97		%	20
			Bicarbonate (HCO3)	2024/10/09	0.97		%	20
			Carbonate (CO3)	2024/10/09	NC		%	20
			Hydroxide (OH)	2024/10/09	NC		%	20
B557976	AYE	Spiked Blank	pH	2024/10/09		100	%	97 - 103
B557976	AYE	RPD	pH	2024/10/09	0.27		%	N/A
B557977	AYE	Spiked Blank	Conductivity	2024/10/09		100	%	90 - 110
B557977	AYE	Method Blank	Conductivity	2024/10/09	<2.0		uS/cm	
B557977	AYE	RPD	Conductivity	2024/10/09	0.73		%	10
B558026	VSC	Matrix Spike	Dissolved Calcium (Ca)	2024/10/09		95	%	80 - 120
			Dissolved Iron (Fe)	2024/10/09		103	%	80 - 120
			Dissolved Magnesium (Mg)	2024/10/09		96	%	80 - 120
			Dissolved Manganese (Mn)	2024/10/09		101	%	80 - 120
			Dissolved Potassium (K)	2024/10/09		96	%	80 - 120
			Dissolved Sodium (Na)	2024/10/09		90	%	80 - 120
B558026	VSC	Spiked Blank	Dissolved Calcium (Ca)	2024/10/09		98	%	80 - 120
			Dissolved Iron (Fe)	2024/10/09		104	%	80 - 120
			Dissolved Magnesium (Mg)	2024/10/09		99	%	80 - 120
			Dissolved Manganese (Mn)	2024/10/09		101	%	80 - 120
			Dissolved Potassium (K)	2024/10/09		98	%	80 - 120
			Dissolved Sodium (Na)	2024/10/09		98	%	80 - 120
B558026	VSC	Method Blank	Dissolved Calcium (Ca)	2024/10/09	<0.30		mg/L	
			Dissolved Iron (Fe)	2024/10/09	<0.060		mg/L	
			Dissolved Magnesium (Mg)	2024/10/09	<0.20		mg/L	
			Dissolved Manganese (Mn)	2024/10/09	<0.0040		mg/L	
			Dissolved Potassium (K)	2024/10/09	<0.30		mg/L	
			Dissolved Sodium (Na)	2024/10/09	<0.50		mg/L	
B558026	VSC	RPD	Dissolved Calcium (Ca)	2024/10/09	0.39		%	20
			Dissolved Magnesium (Mg)	2024/10/09	0.45		%	20
			Dissolved Sodium (Na)	2024/10/09	0.13		%	20
B558097	S4L	Matrix Spike [CXK630-02]	Dissolved Calcium (Ca)	2024/10/09		102	%	80 - 120
			Dissolved Iron (Fe)	2024/10/09		116	%	80 - 120
			Dissolved Magnesium (Mg)	2024/10/09		108	%	80 - 120
			Dissolved Manganese (Mn)	2024/10/09		106	%	80 - 120
			Dissolved Potassium (K)	2024/10/09		103	%	80 - 120
			Dissolved Sodium (Na)	2024/10/09		103	%	80 - 120
B558097	S4L	Spiked Blank	Dissolved Calcium (Ca)	2024/10/09		99	%	80 - 120
			Dissolved Iron (Fe)	2024/10/09		114	%	80 - 120
			Dissolved Magnesium (Mg)	2024/10/09		103	%	80 - 120
			Dissolved Manganese (Mn)	2024/10/09		105	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Dissolved Potassium (K)	2024/10/09		100	%	80 - 120
			Dissolved Sodium (Na)	2024/10/09		101	%	80 - 120
B558097	S4L	Method Blank	Dissolved Calcium (Ca)	2024/10/09	<0.30		mg/L	
			Dissolved Iron (Fe)	2024/10/09	<0.060		mg/L	
			Dissolved Magnesium (Mg)	2024/10/09	<0.20		mg/L	
			Dissolved Manganese (Mn)	2024/10/09	<0.0040		mg/L	
			Dissolved Potassium (K)	2024/10/09	<0.30		mg/L	
			Dissolved Sodium (Na)	2024/10/09	<0.50		mg/L	
B558097	S4L	RPD [CXK630-02]	Dissolved Calcium (Ca)	2024/10/10	0.14		%	20
			Dissolved Iron (Fe)	2024/10/10	3.6		%	20
			Dissolved Magnesium (Mg)	2024/10/10	0.023		%	20
			Dissolved Manganese (Mn)	2024/10/10	1.2		%	20
			Dissolved Potassium (K)	2024/10/10	0.31		%	20
			Dissolved Sodium (Na)	2024/10/10	0.53		%	20
B558343	SKM	Matrix Spike	Nitrite (N)	2024/10/09		98	%	80 - 120
			Nitrate plus Nitrite (N)	2024/10/09		NC	%	80 - 120
B558343	SKM	Spiked Blank	Nitrite (N)	2024/10/09		101	%	80 - 120
			Nitrate plus Nitrite (N)	2024/10/09		105	%	80 - 120
B558343	SKM	Method Blank	Nitrite (N)	2024/10/09	<0.010		mg/L	
			Nitrate plus Nitrite (N)	2024/10/09	<0.010		mg/L	
B558343	SKM	RPD	Nitrite (N)	2024/10/09	NC		%	20
			Nitrate plus Nitrite (N)	2024/10/09	2.1		%	20
B558571	TOR	Matrix Spike	Chloride (Cl)	2024/10/09		106	%	80 - 120
			Sulphate (SO4)	2024/10/09		NC	%	80 - 120
B558571	TOR	Spiked Blank	Chloride (Cl)	2024/10/09		100	%	80 - 120
			Sulphate (SO4)	2024/10/09		99	%	80 - 120
B558571	TOR	Method Blank	Chloride (Cl)	2024/10/09	<1.0		mg/L	
			Sulphate (SO4)	2024/10/09	<1.0		mg/L	
B558571	TOR	RPD	Chloride (Cl)	2024/10/09	1.9		%	20
			Sulphate (SO4)	2024/10/09	0.0046		%	20
B558600	VSC	Matrix Spike	Dissolved Calcium (Ca)	2024/10/09		NC	%	80 - 120
			Dissolved Iron (Fe)	2024/10/09		106	%	80 - 120
			Dissolved Magnesium (Mg)	2024/10/09		106	%	80 - 120
			Dissolved Manganese (Mn)	2024/10/09		103	%	80 - 120
			Dissolved Potassium (K)	2024/10/09		103	%	80 - 120
			Dissolved Sodium (Na)	2024/10/09		102	%	80 - 120
B558600	VSC	Spiked Blank	Dissolved Calcium (Ca)	2024/10/09		100	%	80 - 120
			Dissolved Iron (Fe)	2024/10/09		106	%	80 - 120
			Dissolved Magnesium (Mg)	2024/10/09		112	%	80 - 120
			Dissolved Manganese (Mn)	2024/10/09		103	%	80 - 120
			Dissolved Potassium (K)	2024/10/09		98	%	80 - 120
			Dissolved Sodium (Na)	2024/10/09		98	%	80 - 120
B558600	VSC	Method Blank	Dissolved Calcium (Ca)	2024/10/09	<0.30		mg/L	
			Dissolved Iron (Fe)	2024/10/09	<0.060		mg/L	
			Dissolved Magnesium (Mg)	2024/10/09	<0.20		mg/L	
			Dissolved Manganese (Mn)	2024/10/09	<0.0040		mg/L	
			Dissolved Potassium (K)	2024/10/09	<0.30		mg/L	
			Dissolved Sodium (Na)	2024/10/09	<0.50		mg/L	
B558600	VSC	RPD	Dissolved Calcium (Ca)	2024/10/09	1.4		%	20
			Dissolved Iron (Fe)	2024/10/09	NC		%	20
			Dissolved Magnesium (Mg)	2024/10/09	1.1		%	20
			Dissolved Manganese (Mn)	2024/10/09	14		%	20
			Dissolved Potassium (K)	2024/10/09	2.6		%	20
			Dissolved Sodium (Na)	2024/10/09	1.3		%	20
B558943	HE1	Matrix Spike	Total Suspended Solids	2024/10/10		107	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
B558943	HE1	Spiked Blank	Total Suspended Solids	2024/10/10		94	%	80 - 120
B558943	HE1	Method Blank	Total Suspended Solids	2024/10/10	<1.0		mg/L	
B558943	HE1	RPD	Total Suspended Solids	2024/10/10	2.9		%	20
B558949	TNY	Matrix Spike	Total Dissolved Solids	2024/10/11		84	%	80 - 120
B558949	TNY	Spiked Blank	Total Dissolved Solids	2024/10/11		98	%	80 - 120
B558949	TNY	Method Blank	Total Dissolved Solids	2024/10/11	<10		mg/L	
B558949	TNY	RPD	Total Dissolved Solids	2024/10/11	2.3		%	20
B558950	HE1	Matrix Spike	Total Dissolved Solids	2024/10/11		92	%	80 - 120
B558950	HE1	Spiked Blank	Total Dissolved Solids	2024/10/11		96	%	80 - 120
B558950	HE1	Method Blank	Total Dissolved Solids	2024/10/11	<10		mg/L	
B558950	HE1	RPD	Total Dissolved Solids	2024/10/11	0		%	20
B559087	TNY	Matrix Spike	Total Suspended Solids	2024/10/12		113	%	80 - 120
B559087	TNY	Spiked Blank	Total Suspended Solids	2024/10/12		92	%	80 - 120
B559087	TNY	Method Blank	Total Suspended Solids	2024/10/12	<1.0		mg/L	
B559087	TNY	RPD	Total Suspended Solids	2024/10/12	NC		%	20
B559359	YL7	Matrix Spike	Dissolved Phosphorus (P)	2024/10/10		NC	%	80 - 120
B559359	YL7	QC Standard	Dissolved Phosphorus (P)	2024/10/10		90	%	80 - 120
B559359	YL7	Spiked Blank	Dissolved Phosphorus (P)	2024/10/10		96	%	80 - 120
B559359	YL7	Method Blank	Dissolved Phosphorus (P)	2024/10/10	<0.0030		mg/L	
B559359	YL7	RPD	Dissolved Phosphorus (P)	2024/10/10	2.4		%	20
B559822	KHU	Matrix Spike	Total Mercury (Hg)	2024/10/16		105	%	80 - 120
B559822	KHU	Spiked Blank	Total Mercury (Hg)	2024/10/16		102	%	80 - 120
B559822	KHU	Method Blank	Total Mercury (Hg)	2024/10/16	<0.0019		ug/L	
B559822	KHU	RPD	Total Mercury (Hg)	2024/10/16	NC		%	20
B560381	AFI	Matrix Spike	Total Ammonia (N)	2024/10/15		88	%	80 - 120
B560381	AFI	Spiked Blank	Total Ammonia (N)	2024/10/15		104	%	80 - 120
B560381	AFI	Method Blank	Total Ammonia (N)	2024/10/15	<0.015		mg/L	
B560381	AFI	RPD	Total Ammonia (N)	2024/10/15	3.5		%	20
B561048	YL7	Matrix Spike	Total Nitrogen (N)	2024/10/15		93	%	80 - 120
B561048	YL7	QC Standard	Total Nitrogen (N)	2024/10/15		110	%	80 - 120
B561048	YL7	Spiked Blank	Total Nitrogen (N)	2024/10/15		96	%	80 - 120
B561048	YL7	Method Blank	Total Nitrogen (N)	2024/10/15	<0.020		mg/L	
B561048	YL7	RPD	Total Nitrogen (N)	2024/10/15	1.8		%	20
B562718	DVN	Matrix Spike	Total Suspended Solids	2024/10/12		NC	%	80 - 120
B562718	DVN	Spiked Blank	Total Suspended Solids	2024/10/12		95	%	80 - 120
B562718	DVN	Method Blank	Total Suspended Solids	2024/10/12	<0.97		mg/L	
B562718	DVN	RPD	Total Suspended Solids	2024/10/12	4.9		%	20
B563349	JYU	Matrix Spike	Total Organic Carbon (C)	2024/10/13		NC	%	75 - 125
B563349	JYU	Spiked Blank	Total Organic Carbon (C)	2024/10/13		96	%	80 - 120
B563349	JYU	Method Blank	Total Organic Carbon (C)	2024/10/13	<0.50		mg/L	
B563349	JYU	RPD	Total Organic Carbon (C)	2024/10/13	3.5		%	20
B563420	TNY	Matrix Spike	Total Dissolved Solids	2024/10/15		92	%	80 - 120
B563420	TNY	Spiked Blank	Total Dissolved Solids	2024/10/15		100	%	80 - 120
B563420	TNY	Method Blank	Total Dissolved Solids	2024/10/15	<10		mg/L	
B563420	TNY	RPD	Total Dissolved Solids	2024/10/15	3.4		%	20
B564463	S4L	Matrix Spike	Total Barium (Ba)	2024/10/16		90	%	80 - 120
			Total Boron (B)	2024/10/16		92	%	80 - 120
			Total Calcium (Ca)	2024/10/16		NC	%	80 - 120
			Total Iron (Fe)	2024/10/16		120	%	80 - 120
			Total Lithium (Li)	2024/10/16		108	%	80 - 120
			Total Magnesium (Mg)	2024/10/16		NC	%	80 - 120
			Total Manganese (Mn)	2024/10/16		116	%	80 - 120
			Total Phosphorus (P)	2024/10/16		107	%	80 - 120
			Total Potassium (K)	2024/10/16		110	%	80 - 120
			Total Silicon (Si)	2024/10/16		NC	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Sodium (Na)	2024/10/16		NC	%	80 - 120
			Total Strontium (Sr)	2024/10/16		NC	%	80 - 120
			Total Sulphur (S)	2024/10/16		NC	%	80 - 120
B564463	S4L	Spiked Blank	Total Barium (Ba)	2024/10/16		101	%	80 - 120
			Total Boron (B)	2024/10/16		100	%	80 - 120
			Total Calcium (Ca)	2024/10/16		105	%	80 - 120
			Total Iron (Fe)	2024/10/16		106	%	80 - 120
			Total Lithium (Li)	2024/10/16		108	%	80 - 120
			Total Magnesium (Mg)	2024/10/16		105	%	80 - 120
			Total Manganese (Mn)	2024/10/16		107	%	80 - 120
			Total Phosphorus (P)	2024/10/16		99	%	80 - 120
			Total Potassium (K)	2024/10/16		107	%	80 - 120
			Total Silicon (Si)	2024/10/16		99	%	80 - 120
			Total Sodium (Na)	2024/10/16		103	%	80 - 120
			Total Strontium (Sr)	2024/10/16		98	%	80 - 120
			Total Sulphur (S)	2024/10/16		96	%	80 - 120
B564463	S4L	Method Blank	Total Barium (Ba)	2024/10/16	<0.010		mg/L	
			Total Boron (B)	2024/10/16	<0.020		mg/L	
			Total Calcium (Ca)	2024/10/16	<0.30		mg/L	
			Total Iron (Fe)	2024/10/16	<0.060		mg/L	
			Total Lithium (Li)	2024/10/16	<0.020		mg/L	
			Total Magnesium (Mg)	2024/10/16	<0.20		mg/L	
			Total Manganese (Mn)	2024/10/16	<0.0040		mg/L	
			Total Phosphorus (P)	2024/10/16	<0.10		mg/L	
			Total Potassium (K)	2024/10/16	<0.30		mg/L	
			Total Silicon (Si)	2024/10/16	<0.50		mg/L	
			Total Sodium (Na)	2024/10/16	<0.50		mg/L	
			Total Strontium (Sr)	2024/10/16	<0.020		mg/L	
			Total Sulphur (S)	2024/10/16	<0.20		mg/L	
B564463	S4L	RPD	Total Barium (Ba)	2024/10/16	2.5		%	20
			Total Boron (B)	2024/10/16	2.0		%	20
			Total Calcium (Ca)	2024/10/16	1.4		%	20
			Total Iron (Fe)	2024/10/16	5.1		%	20
			Total Lithium (Li)	2024/10/16	1.8		%	20
			Total Magnesium (Mg)	2024/10/16	0.49		%	20
			Total Manganese (Mn)	2024/10/16	1.3		%	20
			Total Phosphorus (P)	2024/10/16	NC		%	20
			Total Potassium (K)	2024/10/16	2.1		%	20
			Total Silicon (Si)	2024/10/16	1.2		%	20
			Total Sodium (Na)	2024/10/16	1.0		%	20
			Total Strontium (Sr)	2024/10/16	0.72		%	20
			Total Sulphur (S)	2024/10/16	0.77		%	20
B564490	KH2	Matrix Spike	Total Aluminum (Al)	2024/10/16		NC	%	80 - 120
			Total Antimony (Sb)	2024/10/16		120	%	80 - 120
			Total Arsenic (As)	2024/10/16		117	%	80 - 120
			Total Beryllium (Be)	2024/10/16		114	%	80 - 120
			Total Chromium (Cr)	2024/10/16		112	%	80 - 120
			Total Cobalt (Co)	2024/10/16		110	%	80 - 120
			Total Copper (Cu)	2024/10/16		103	%	80 - 120
			Total Lead (Pb)	2024/10/16		109	%	80 - 120
			Total Molybdenum (Mo)	2024/10/16		101	%	80 - 120
			Total Nickel (Ni)	2024/10/16		106	%	80 - 120
			Total Selenium (Se)	2024/10/16		110	%	80 - 120
			Total Silver (Ag)	2024/10/16		111	%	80 - 120
			Total Thallium (Tl)	2024/10/16		114	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Tin (Sn)	2024/10/16		96	%	80 - 120
			Total Titanium (Ti)	2024/10/16		117	%	80 - 120
			Total Uranium (U)	2024/10/16		119	%	80 - 120
			Total Vanadium (V)	2024/10/16		119	%	80 - 120
			Total Zinc (Zn)	2024/10/16		106	%	80 - 120
B564490	KH2	Spiked Blank	Total Aluminum (Al)	2024/10/16		95	%	80 - 120
			Total Antimony (Sb)	2024/10/16		99	%	80 - 120
			Total Arsenic (As)	2024/10/16		97	%	80 - 120
			Total Beryllium (Be)	2024/10/16		92	%	80 - 120
			Total Chromium (Cr)	2024/10/16		90	%	80 - 120
			Total Cobalt (Co)	2024/10/16		91	%	80 - 120
			Total Copper (Cu)	2024/10/16		91	%	80 - 120
			Total Lead (Pb)	2024/10/16		94	%	80 - 120
			Total Molybdenum (Mo)	2024/10/16		92	%	80 - 120
			Total Nickel (Ni)	2024/10/16		91	%	80 - 120
			Total Selenium (Se)	2024/10/16		94	%	80 - 120
			Total Silver (Ag)	2024/10/16		91	%	80 - 120
			Total Thallium (Tl)	2024/10/16		97	%	80 - 120
			Total Tin (Sn)	2024/10/16		93	%	80 - 120
			Total Titanium (Ti)	2024/10/16		91	%	80 - 120
			Total Uranium (U)	2024/10/16		95	%	80 - 120
			Total Vanadium (V)	2024/10/16		92	%	80 - 120
			Total Zinc (Zn)	2024/10/16		98	%	80 - 120
B564490	KH2	Method Blank	Total Aluminum (Al)	2024/10/16	<0.0030		mg/L	
			Total Antimony (Sb)	2024/10/16	<0.00060		mg/L	
			Total Arsenic (As)	2024/10/16	<0.00020		mg/L	
			Total Beryllium (Be)	2024/10/16	<0.0010		mg/L	
			Total Chromium (Cr)	2024/10/16	<0.0010		mg/L	
			Total Cobalt (Co)	2024/10/16	<0.00030		mg/L	
			Total Copper (Cu)	2024/10/16	<0.0010		mg/L	
			Total Lead (Pb)	2024/10/16	<0.00020		mg/L	
			Total Molybdenum (Mo)	2024/10/16	<0.00020		mg/L	
			Total Nickel (Ni)	2024/10/16	<0.00050		mg/L	
			Total Selenium (Se)	2024/10/16	<0.00020		mg/L	
			Total Silver (Ag)	2024/10/16	<0.00010		mg/L	
			Total Thallium (Tl)	2024/10/16	<0.00020		mg/L	
			Total Tin (Sn)	2024/10/16	<0.0010		mg/L	
			Total Titanium (Ti)	2024/10/16	<0.0010		mg/L	
			Total Uranium (U)	2024/10/16	<0.00010		mg/L	
			Total Vanadium (V)	2024/10/16	<0.0010		mg/L	
			Total Zinc (Zn)	2024/10/16	<0.0030		mg/L	
B564490	KH2	RPD	Total Aluminum (Al)	2024/10/16	25 (1)		%	20
			Total Antimony (Sb)	2024/10/16	NC		%	20
			Total Arsenic (As)	2024/10/16	12		%	20
			Total Beryllium (Be)	2024/10/16	NC		%	20
			Total Chromium (Cr)	2024/10/16	NC		%	20
			Total Cobalt (Co)	2024/10/16	1.4		%	20
			Total Copper (Cu)	2024/10/16	NC		%	20
			Total Lead (Pb)	2024/10/16	9.5		%	20
			Total Molybdenum (Mo)	2024/10/16	11		%	20
			Total Nickel (Ni)	2024/10/16	4.9		%	20
			Total Selenium (Se)	2024/10/16	NC		%	20
			Total Silver (Ag)	2024/10/16	NC		%	20
			Total Thallium (Tl)	2024/10/16	NC		%	20
			Total Tin (Sn)	2024/10/16	NC		%	20

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Total Titanium (Ti)	2024/10/16	21 (1)		%	20
			Total Uranium (U)	2024/10/16	15		%	20
			Total Vanadium (V)	2024/10/16	9.5		%	20
			Total Zinc (Zn)	2024/10/16	7.7		%	20
B564983	MAP	Matrix Spike	Total Phosphorus (P)	2024/10/16		NC	%	80 - 120
B564983	MAP	QC Standard	Total Phosphorus (P)	2024/10/16		91	%	80 - 120
B564983	MAP	Spiked Blank	Total Phosphorus (P)	2024/10/16		96	%	80 - 120
B564983	MAP	Method Blank	Total Phosphorus (P)	2024/10/16	<0.0030		mg/L	
B564983	MAP	RPD	Total Phosphorus (P)	2024/10/16	2.7		%	20
B568890	DSX	Spiked Blank	Chlorophyll a	2024/10/18		109	%	80 - 120
B568890	DSX	Method Blank	Chlorophyll a	2024/10/18	<0.53		ug/L	
			Chlorophyll c	2024/10/18	<0.53		ug/L	
			Pheophytin A	2024/10/18	<0.53		ug/L	

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

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VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

Ghayasuddin Khan, M.Sc., P.Chem., QP, Scientific Specialist, Inorganics

Sandy Yuan, M.Sc., QP, Scientific Specialist

Suwan (Sze Yeung) Fock, B.Sc., Scientific Specialist

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4326 76 Avenue NW, Edmonton, Alberta Canada T6B 2R4 Tel:(780) 577-7100 Toll-free:800-563-6266 Fax:(780) 450-4187 www.bvna.com

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#12272 CPP ENVIRONMENTAL	Company Name:	CPP Environmental	Quotation #:	C41261	Bureau Veritas Job #:	Bottle Order #:
Attention:	Théo Charette	Attention:	Veronica Valdron	P.O. #:			738522
Address:	154-150 CHIPPEWA ROAD	Address:	154-150 Chippewa Rd	Project:	SUEZ		
	SHERWOOD PARK AB T8A 6A2		Sherwood Park	Project Name:	Water Quality 2024	COC #:	Project Manager:
Tel:	(780) 964-8436 Fax: (780) 570-5820	Tel:	780 964 8436 Fax:	Site #:	Swan Hills. AB	C#738522-01-01	Chantal Vincent
Email:	theo.charette@cppenv.ca	Email:	veronica@cppenv.ca.	Sampled By:			

Regulatory Criteria:
- [ ] ATI
- [ ] CCME
- [ ] Other

Special Instructions

SAMPLES MUST BE KEPT COOL (< 10ºC) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	Ammonia-N (Total)	Carbon (Total Organic)	Mercury (Total) by CV	Regulated Metals (CCME/AT1) - Total	Total Dissolved Solids (Filt. Residue)	Total Kjeldahl Nitrogen (Total)	Total Phosphorus-Dissolved-Lab Filtered	Total Phosphorus	Total Suspended Solids (NFR)	Routine Water -Lab Filtered	# of Bottles	Comments
1		Christina Lake	Oct 7	11:05	H_2O	N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	6	
2		Edith Lake	Oct 4	11:02	H_2O	N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	6	
3		Couts River	Oct 5	12:40	H_2O	N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	6	
4																		
5																		
6	Edithlake	TRIP BLANK	Oct 4	11:08	H_2O	N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	6	
7	Christinalake	FIELD BLANK	Oct 7	11:06	H_2O	N	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	6	
8																		
9																		
10																		

med2-2024-10-284

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT:
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests..
Please note: Standard TAT for certain tests are > 5 days - contact your Project Manager for details

Job Specific Rush TAT (if applies to entire submission)
Date Required: _____
Rush Confirmation Number: _____
(call lab for #)

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
Veronica Valdron	Oct 8 '24	11:59	BRENTON MAH	2024/10/08	17:02		☐	9.9.8 / 10.6.7	☐ Yes ☑ No
			ATRAUZ LIL	2024/10/09	07:00				

7.6/7.7/7.7 Seal y
1.2/2.2/2.2 ice-y
Both

ice: yes (both)

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.
* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.
** ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

White: Bureau Veritas Yellow: Client

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2024/10/08 17:02

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CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#12272 CPP ENVIRONMENTAL	Company Name:	CPP Environmental	Quotation #:	C41261	Bureau Veritas Job #:	Bottle Order #: 738522
Attention:	Théo Charette	Attention:	Veronica Valdron	P.O. #:			
Address:	154-150 CHIPPEWA ROAD SHERWOOD PARK AB T8A 6A2	Address:	154-150 Chippewa Rd	Project:	SUEZ		
Tel:	(780) 964-8436 Fax: (780) 570-5820	Tel:	7809648486 Fax:	Project Name:	Water Quality Monitoring	COC #: C#738522-01-02	Project Manager: Chantal Vincent
Email:	theo.charette@cppenv.ca	Email:	veronica@cppenv.ca	Site #:	Swan Hills, AB		
				Sampled By:			

Regulatory Criteria:
- [ ] ATI
- [ ] CCME
- [ ] Other

Special Instructions:

SAMPLES MUST BE KEPT COOL (< 10ºC) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Metals Field Filtered ? (Y / N)	Chlorophyll and Pheophytin in Water	# of Bottles	Comments
1	Chrystina Lake	Surface-Chrystina Lake	Oct 7/24	1105	Water	N	✓	1	
2	Edith Lake	Surface-Chrystina Lake	Oct 4/24	11:02	Water	N	✓	1	
3	Coutts River	Surface-Coutts River	Oct 5/24	12:40	Water	N	✓	1	
4									
5									
6	Edith Lake	TRIP BLANK	Oct 4	11:08	Water	N	✓	1	
7	Chrystina Lake	FIELD BLANK	Oct 7	11:05	Water	N	✓	1	
8									
9									
10									

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT:
(will be applied if Rush TAT is not specified):
Standard TAT = 5-7 Working days for most tests..
Please note: Standard TAT for certain tests are > 5 days - contact your Project Manager for details

Job Specific Rush TAT (if applies to entire submission)
Date Required: _____
Rush Confirmation Number: _____ *(call lab for #)*

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only: Time Sensitive	Temperature (°C) on Receipt	Custody Seal Intact on Cooler?
Veronica Valdron	Oct 8/24	16:51	BRENTON MALL	2024/10/08	17:02		☐	9.9.8 / 10.6.7	☐ Yes ☑ No
			ATRAVIRCIII	2024/10/09	07:00				

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* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.
** ALL SAMPLES ARE HELD FOR 60 DAYS AFTER SAMPLE RECEIPT, FOR SPECIAL REQUESTS CONTACT YOUR PROJECT MANAGER

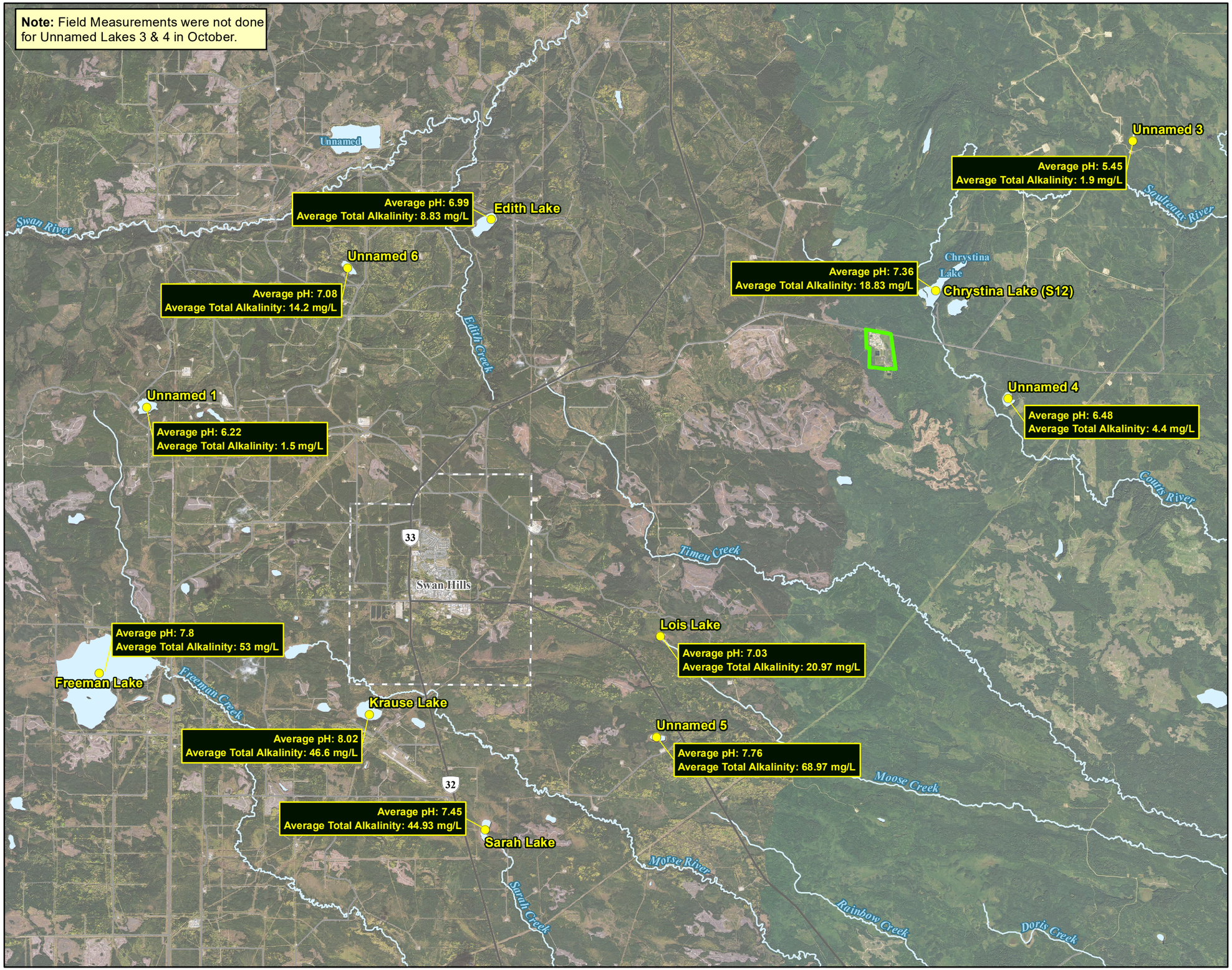
ice: yes (both)

White: Bureau Veritas Yellow: Client (both)

7.6/7.7/7.7
1.2/2.2/2.2 Seal-Y ice-Y Both.

Bureau Veritas Canada (2019) Inc.

Appendix 5: Map of pH and alkalinity in 11 lakes sampled across the region.



VEOLIA

Surface Water and
Sediment Quality Monitoring

2024
Lab Measured Lake Water Quality Results

- Sampling Station
- Swan Hills Treatment Center
- Highway
- Arterials
- Watercourse
- Waterbody
- Town

Source: Contains information licensed under the Open Government Licences – Canada and Alberta

Coordinate System: NAD 1983 10TM AEP Resource

N W E S

1:100,000

0 2 4 6 km

Date: March 7, 2025

Prepared by: S. Farrugia

CPP ENVIRONMENTAL