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# Technical Memorandum

**To:** MPCA and MDNR Staff

**From:** Barr Engineering Co.

**Subject:** Summary and Interpretation of Surface Water Quality Monitoring Data, PolyMet Mining Company

**Date:** June 29, 2007

## Introduction

This memorandum presents a statistical summary and interpretation of the water quality monitoring data that were previously submitted to the MPCA and MDNR in January 2006 as a database in RS76: Historical Surface Water Quality Data Compilation.

On October 10, 2006 a supplemental summary to this database was provided to the MPCA. The first part of this document provides an explanation of the statistical screening that was performed for the October 10th summary and addresses questions and issues put forth by the staff at MPCA on February 26, 2007.

The remainder of this document provides a summary and interpretation of the baseline water quality data in the RS76 database for incorporation into the EIS for the PolyMet NorthMet project. This summary and interpretation covers the Partridge River watershed where the NorthMet mine site is located and the Embarrass River watershed where the plant and tailings basin for the NorthMet project are located. The data from these areas represent a subset of the most relevant data in the RS76 database.

The RS 76 database includes both recent (2004 and 2006) water quality monitoring data collected as part of PolyMet's baseline monitoring program as well as historical data collected as part of previous mineral development projects or as part of general studies on regional mineral development are included in the RS76 database. A description of the origins of each data set was submitted to MDNR as PolyMet EIS document RS76 on February 6, 2006; the description is included as Appendix A to this memorandum.

## Data Screening and Statistical Calculations

The water quality monitoring data sets collected for PolyMet and Cominco were managed in Barr's Laboratory Information Management System (LIMS) and were subjected to standard operating procedures for data quality. These procedures include both analytical data review and data management verification. The first two rounds of surface water monitoring data collected by PolyMet were subject to Barr's data quality procedures. Northeast Technical Services (NTS), a Minnesota Department of Health certified laboratory, oversaw the subsequent monitoring rounds and followed quality assurance and quality control (QA/QC) in accordance with NTS's analytical laboratory QA/QC manual.

The water quality monitoring data from the Regional Copper-Nickel Study were obtained from the US EPA STORET Legacy water quality database and the US Geological Survey National Water Information System water quality database (see www.epa.gov/storet/dbtop.html and www.usgs.gov).

Several criteria were used to evaluate whether the data that passed the QA/QC review should or should not be included in this statistical analysis. The criteria were as follows:

- Data reported as zero (Regional Copper-Nickel Study) were not used because a proper reporting limit was not indicated and it was not known what a "zero" value signified.
- In a few cases, outliers of great magnitude were not used in the statistical calculations. Footnotes in the statistical summary tables indicate where outliers were omitted.
- Analytical results denoted in the data set as "estimated" were omitted.
- Data were omitted where the actual value was not known because it was not within the detection range (off scale), but were estimated as below or above a given value (this primarily applies to the hardness data collected as part of the Regional Copper Nickel Study in the 1970s). This QA/QC indicator was provided as a qualifier as part of the original data set and appears to be analogous to reporting or detection limits.
- Data points qualified as below a known detection limit were substituted with values of one-half the detection limit.
- For selected parameters in 2004, the detection limit was lowered significantly during a monitoring season with the use of more sensitive analytical methods. The "high" detection limit data were not used in the calculation of statistical summaries (all of the results were below detection). This applies to some of the 2004 data collected by PolyMet for copper, nickel, lead, palladium, platinum, and thallium.
- Regulatory staff familiar with the historical monitoring data have noted that some anomalously elevated levels of metals were reported as part of the Amax data set. As a result, statistical summaries of the data sets with Amax data were provided separately for the Amax data (denoted as the "1970s" data in the statistical summary tables) and other data (e.g., Cominco and PolyMet data collected in the 2000s).

Statistical summaries of the monitoring data for each parameter and station were included in the October 10, 2006 supplemental memorandum to the RS76 database. Monitoring data at PolyMet monitoring locations for 2006 are now included in these summaries, which are provided as Appendix B to this document. These summaries include the following parameters:

- average (mean) concentration,
- maximum concentration,
- minimum concentration,
- total number of samples collected and analyzed,
- number of samples with a parameter concentration below the detection limit,
- detection limit or range of detection limits, and
- applicable Minnesota water quality standards and criteria.

For some stations, surface water monitoring data had been collected for several years and by several independent groups. Given differences between monitoring programs, data were not available for all parameters on all monitoring dates. Monitoring data, however, were used as available and included data from different time periods, monitoring programs and monitoring stations that may have included measurements reported in different units or analyzed using different analytical methods.

There are some differences in the monitoring results at some stations over time (e.g., 1970s compared to 2000s, and 2004 compared to 2006). There are several possible reasons for the differences observed, such as improved analytical precision, different sampling crews, and climatic variability. There was extreme climatic variability during the monitoring years 1976 through 1977 (Copper-Nickel Study). Flow monitoring data for the Partridge River (USGS gauge 04016000) from 1976 through 1977 indicate the prevalence of low flow conditions during February 1976 followed by very high flows in the spring, and low flow conditions again from August 1976 through March 1977. Low, but progressively more normal flows then occurred from April 1977 through the end of the year. For the Partridge River, the discharge of groundwater and runoff from iron mining pits might have had a localized effect on the levels of some constituents in the Partridge River. Because of the above circumstances, statistical summaries are presented for each time period, as well as the whole data set.

Statistical measures (average, minimum, maximum) that do not meet applicable numeric water quality standards are discussed in the text. Theses exceedances are discussed in more detail in the summary and interpretation of data.

Outliers that were excluded from the calculation of the basic statistics were identified by visually evaluating each data group as listed in Table 1. No statistical analyses such as an outlier test were performed. Once an outlier was identified for a given parameter and for a given sampling date, it was then compared to other analytical parameters that were analyzed for the same date. If, after examining the

other parameters, it was clear that the outlier was a function of something other than normal or climatic variation, the data point was not included. For example, at site CN122, nickel was reported as less than 50 μg/L on July 22, 1976. All the other analytical results for nickel were at or below 2 ug/L. In this case, the outlier was the result of a high detection limit. A list of these outliers is included in the table that follows.

**Table 1. Outliers not used in statistical calculations.**

| Monitoring Station | Date | Parameter | Value | Units |
|---|---|---|---|---|
| PM3 | 9/20/2006 | Zinc | 52.7, 44.1 | µg/L |
| PM4 | 6/22/2004 | Lead | 12.3 | µg/L |
| PM1, PM3, PM11, PM12, | 7/11/2006 | Zinc | 29.0, 52,7, 41.2, 27.1 | µg/L |
| PM4, PM7, PM9 | 7/10/2006 | Zinc | 82.9, 82.5, 64 | µg/L |
| PM4 | 11/7/2006 | Zinc | 71.3 | µg/L |
| PM7 | 10/26/04 | Zinc | 42 | µg/L |
| PM10 | 11/15/04 | Zinc | 32.8 | µg/L |
| PM13 | 11/18/2006 | Zinc | 51.2 | µg/L |
| PM16 | 9/19/2006 | Zinc | 47.9 | µg/L |
| S1_Total and Dissolved | 9/31/1974 12/17/1975 10/7/1975 7/25/1974 | Zinc | 30T, 36D, 37D, 70D, 65D | µg/L |
| S4 | 2/21/1975 | Zinc | 30T, 60D | µg/L |
| PM7 | 8/25/2004 | Nickel | 80 | µg/L |
| CN122 | 7/22/1976 | Nickel | 50 | µg/L |
| CN122 | 9/23/1976 | Hardness | 415 | mg/L |
| CN122 | 9/23/1976 | Hardness | 426 | mg/L |
| CN127 | 7/22/1976 | Nickel | 25 | µg/L |
| CN127 | 11/16/1976 | Hardness | 892 | mg/L |
| CN127 | 1/7/1977 | Hardness | 418 | mg/L |
| PM3, PM11, PM12, PM13 | 7/11/2006 | Iron | 0.21 to 2.08 | µg/L |
| PM4, PM7, PM8, PM9, PM10, PM16 | 7/10/2006 | Iron | 0.15 to 2.03 | µg/L |
| PM13 | 11/8/2006 | Chloride | 94.8 | mg/L |
| PM13 | 11/8/2006 | Sulfate | 688 | mg/L |
| CN123 | 10/25/1976 | Hardness | 241 | mg/L |
| CN120 | 10/15/1976 | Hardness | 630 | mg/L |
| CN121 | 9/30/1976 | Hardness | 291 | mg/L |
| CN126_PM3_S1 | 9/3/1974 | Dissolved Titanium | 210 | µg/L |
| S4 | 12/5/1974 | Phenol | 0.002 | µg/L |
| CN126 | 5/14/1974 to 8/7/1974 | Dissolved Copper | several samples | µg/L |
| CN126 | 9/3/1974 | Dissolved Titanium | 210 | µg/L |
| S4 | 1/16/1975 | Selenium | 30 | µg/L |

## Summary and Interpretation of Baseline Water Quality Data in the Partridge River and Embarrass River Watersheds

### *Monitoring Sites and Locations*

Water quality monitoring data were obtained at three general locations within or near the PolyMet project area: (1) Surface water depressions where tailings basin seep water collects, (2) Embarrass River, and (3) Partridge River. The site locations are shown in Figure 1 and an interpretation of the monitoring data at each site is included in the discussion below. Historical water quality data for surface waters surrounding the proposed PolyMet project area are available from several sources and the monitoring sites are identified in Figure 1. PolyMet also initiated surface water monitoring in 2004 at 16 sites, 13 of which are in the immediate watershed areas of the proposed PolyMet project and the PolyMet and historical data will be discussed in detail in this memorandum.

Some sites are not being discussed because their use or relevance to the PolyMet project has changed or because of the nature of the site. The PM1 monitoring site is not included in this discussion because it monitors the dewatering discharge from the Peter Mitchell Pit and is not representative of surface water in the Partridge River. PM2 is also a site that will not be discussed in this memorandum, however, PM2 was listed as a monitoring site in RS63 and is within the project area. Monitoring was not intended to be performed at this site because of flooding resulting from beaver activity. However, this site was inadvertently monitored in 2004 and once in 2006, presumably because of miscommunication between Barr Engineering and the sampling crew. Data collected at PM2 can be obtained at the PolyMet project website at www.barr.com (see RS 76).

Surface water sampling data collected in 2006 at 11 PolyMet sites are also included in this statistical summary. It should be noted that monitoring was initiated in 2006 at stations (PM17 and PM18) located on Second Creek. Monitoring was initiated in 2006 because some consideration was given to Second Creek as potentially receiving a controlled discharge from the tailings basin. A controlled direct discharge to Second Creek is no longer being considered as part of the PolyMet project and hence this data is not summarized and discussed in the memorandum. The data collected at these sites can be accessed at the PolyMet project website at www.barr.com (see RS 76). A summary of the sources of data summarized and discussed in this memorandum is shown in Table 2.

**Table 2. List of monitoring locations, years monitoring was completed, and the source of the monitoring data.**

| Location | Monitoring Site | Year(s) Monitored | Source |
|---|---|---|---|
| Tailings Basin | PM7 | 2004, 2006 | PolyMet |
| | PM8 | 2004, 2006 | PolyMet |
| | PM9 | 2004, 2006 | PolyMet |
| | PM10 | 2004, 2006 | PolyMet |
| | PM11 | 2004, 2006 | PolyMet |
| Wyman Creek | PM5 | 2004 | PolyMet |
| | PM6 | 2004 | PolyMet |
| Embarrass River | CN120 | 1955 - 1963 | USGS |
| | | 1976 – 1977 | Copper-Nickel Study |
| | CN121 | 1976 | Copper-Nickel Study |
| | PM12 | 2004, 2006 | PolyMet |
| | PM13 | 2004, 2006 | PolyMet |
| Partridge River | PM1 | 2004, 2006 | PolyMet |
| | S4 | 1974 - 1976, 1978 | Amax |
| | | 2001 – 2002 | Cominco |
| | S1 CN126 PM3 | 1974 – 1978 | Amax |
| | | 2001 – 2002 | Cominco |
| | | 1976 | Copper-Nickel Study |
| | | 2004, 2006 | PolyMet |
| | PM16 | 2004, 2006 | PolyMet |
| | CN123 PM4 | 1976 – 1977 | Copper-Nickel Study |
| | | 2004, 2006 | PolyMet |
| | 4016000 CN122 | 1956 - 1966, 1979 | USGS |
| | | 1976 – 1977 | Copper-Nickel Study |
| | CN127 | 1956-1966, 1974, 1979 | USGS |
| | | 1976 to 1977 | Copper-Nickel Study |

In the Embarrass River Watershed, historical data are available from two monitoring sites: (1) CN120, which is on the Embarrass River and close to the tailings basin area and, (2) CN121 upstream from the tailings basin. Both these stations were part of the 1976-77 Regional Copper-Nickel Study. USGS data collected from 1955-63 were also added to the data set for this site. PolyMet monitoring stations include PM12, which is at the same location as CN121 and is considered a background, undisturbed site except for discharge from the Babbitt WWTP. Also included is PM13, which is downstream of CN120 and would monitor the effect of the tailings basin on Embarrass River water quality. In addition, PolyMet had five monitoring stations located in surface water depressions where seep water collects from the former LTV tailings basin. These sites include PM8 through PM10, which are former NPDES monitoring locations, PM7, which is slightly downstream to the south of the tailings basin in the Second Creek watershed, and PM11, which is downstream from PM9 and would provide an indication of water quality effects in the immediate receiving waters.

In the Wyman Creek watershed there were two PolyMet stations, PM5 and PM6. They were located upstream and downstream of an alternative location for waste rock storage. Monitoring has been discontinued at these sites because PolyMet no longer intends to use this location for stockpiles. The data from these sites will not be included in the following discussion.

In the Partridge River watershed, historical data are available from several sources. The 1976-77 Regional Copper-Nickel study had sites directly to the east of the proposed mine area (CN126), downstream from the mine area but upstream from Colby Lake (CN123), downstream from Colby Lake (CN122), and below the confluence with the St. Louis River (CN127). USGS data were available for 1956-66 and 1979 at a site next to CN122. Amax and Cominco data were available for two sites: S-1, which is the same site as CN126 and PM3, and S-4 which is located just north of the proposed mine area. PolyMet has four monitoring stations in the Partridge River watershed. PM1 is north of the mine area and is an outfall of the Peter Mitchell Pit dewatering. PM1, therefore, is not considered a baseline surface water monitoring station and is not included in this discussion. PM3 is at the same site as CN126. PM16 is further downstream and directly south of the mine area and was chosen because of its proximity to potential future mining activity. PM4 is even further downstream and is at the same location as CN123 which is located just upstream from Colby Lake.

Data from all sites during all periods are available from the database submitted as part of RS76.

***Summary and Interpretation by Parameter***

A number of parameters identified as key parameters are included for discussion here. These parameters were chosen either for their importance to overall water quality or because they may be potentially influenced by mining and processing activities of the proposed NorthMet project. Chloride, total dissolved solids (TDS), total organic carbon (TOC), sulfate, and specific conductance are discussed as general parameters relevant to water quality. Hardness is presented because of its impact on the toxicity of certain metals. Copper, nickel and zinc are known to be present in the NorthMet ore. Iron is not a product of the NorthMet project but may be an indicator of mining activity. Cadmium, cobalt, chromium and arsenic have been identified as being pollutants of concern in non-ferrous mining. Finally, mercury is discussed because of its human and ecological heath implications. These data are summarized by watershed in Appendix B (B-1 through B-4). Monitoring data from the Regional Copper-Nickel Study in 1976-77 are presented separately from the Cominco and PolyMet monitoring data in the 2000's because of the effect of a period of low flows from late 1976 to early 1977. Data available prior to 1976 were presented separately for comparison to the more recent data from the 2000's. These data from the 1950's and 60's were available only in the Partridge River watershed and only for some of the selected parameters.

Data are also presented as box plots in Figures 2 through 7. These box plots show the median (line within the box), a box encompassing the upper and lower bounds of the first quartile (contains 50 percent of the data points), and the minimum and maximum values (points above and below the box). The plots provide some indication of the central tendency and the variability of the data.

*Chloride*

In both the Partridge River and Embarrass River watersheds, all chloride concentrations were well below the Class 2B chronic aquatic life water quality standard of 230 mg/L (see Tables B-1 through B-4). For the more recent average flow years during the 2000's, average chloride levels for both rivers were approximately 5 mg/L. Average chloride for both rivers (combined) was 23.4 mg/L in the 1970s. In the 2000s, chloride levels in the surface water depressions surrounding the tailings basin averaged 22 mg/L (see Table B-3). Although the monitoring data appear to indicate that in the 1970's chloride levels were higher in the Partridge River than in the Embarrass River, chloride levels for both rivers are now largely comparable (see Figures 2a and 2b).

*Total Organic Carbon*

Total organic carbon (TOC) levels were similar in both watersheds with average values around 13-18 mg/L and maximum values of 30-33 mg/l in the 2000's (see Figure 2). Lower values were present in 1976 in the Partridge River watershed and the surface water depressions adjacent to the tailings basin had lower values than either watershed. There is no applicable water quality standard for TOC.

*Specific Conductance*

Specific conductance data are also shown in Figure 2. Specific conductance is a measure of the ionic content of water and can be a general indicator of water quality. Average specific conductance for all monitoring locations in the Partridge and Embarrass River watersheds was approximately 150 µmohs/cm in the 1950-60's, 260 µmohs/cm in the 1970s, and 235 µmohs/cm in the 2000's. The specific conductance of the Embarrass River downstream of the tailings basin (Table B-4 (c)) is currently (2000s data) higher than the specific conductance upstream from the tailings basin (Table B-4(b)). The specific conductance of surface water depressions where tailings basin seep water collects was elevated in the 2000s and is indicative of past mining activities (Table B-3). Specific conductance was higher during low flow in the Partridge River watershed (August 1976 thorough March 1977, see Table B-2) demonstrating that higher specific conductance can occur during drier years. The applicable water quality criterion

(Class 4A-Agriculture) for the Partridge and Embarrass Rivers is specific conductance of 1000 µmohs/cm.

*Hardness*

Comparative hardness data are shown in Figure 3. Hardness modifies the toxicity of certain metals in water and the water quality standards for several metals are adjusted in accordance with hardness levels. Total hardness levels can be considered similar in both watersheds with median values around 80 mg/L during the 2000's. Hardness appeared to be slightly lower in the 1950-60's. The hardness of surface water depressions where tailings basin seep water collects is elevated in comparison to surrounding surface water and is indicative of past mining activities. The currently applicable water quality criterion (Class 3B-Industrial) for the Partridge and Embarrass Rivers is a hardness of 250 mg/L. Acceptance of the proposed changes to the Minnesota Water Rules for hardness would result in a revised hardness criterion of 500 mg/L for the Partridge and Embarrass Rivers.

*Total Dissolved Solids*

Summary data for total dissolved solids for both watersheds are also shown in Figure 3. The levels of total dissolved solids in the 1950s-1960s, the 1970s, and the 2000s followed a pattern similar to specific conductance. Average total dissolved solids (TDS) levels for all sites on the Embarrass and Partridge Rivers were 121, 196, and 164 mg/L for the three time periods, respectively (Table B-4). The average value for surface water depressions where tailings basin seep water collects was 582 mg/L. The applicable water quality criterion (Class 3B-Industrial) for the Partridge and Embarrass Rivers is 700 mg/L.

*Sulfate*

Summary data for sulfate concentrations in each watershed are shown in Figure 3. Data collected in the 2000's at sites in the Embarrass River watershed downstream of the tailings basin (Table B-4 (c)) had higher sulfate levels (e.g., average value of 41 mg/L at PM13 in the 2000's) than sites in the Partridge River watershed (e.g., average of 10.3 mg/L for all sites on the Partridge River combined and only for data collected in the 2000s, see Table B-1). Historically, sulfate levels in the Embarrass River have averaged about 13 mg/L (monitoring data from the 1950s to the 1960s at CN120 - see Table B-4(a)). Data collected from 1976 and 1977 at CN123 (a site upstream of Colby Lake, see Table B-1(c)) suggest that sulfate levels in the Partridge River watershed may have been higher historically or during dry weather (average of 19 mg/L at CN123) than in more recent years. The surface water depressions adjacent to the tailings basin have had and continue to have elevated levels of sulfate (average of 137

mg/L for all tailings basin monitoring sites – see Table B-3). The currently promulgated criteria for sulfate include a 250 mg/L Class 1B secondary drinking water standard and a 10 mg/L standard if wild rice is present. The 250 mg/L drinking water standard is applicable to Colby Lake and neither the Embarrass nor the Partridge River has designated wild rice beds.

*General Data for Metals*

Statistical data summaries for metals are not as robust as for other parameters because concentrations for many samples were reported as being below the detection limit. However, most of the metals data are of high quality and are useable but simply required some additional evaluation. In many cases the limit of detection changed multiple times throughout the monitoring history at a site. For example, for the PolyMet monitoring stations, the analytical methods used for nickel and copper measurements were changed midway thorough 2004 because the concentrations of these metals were consistently below the detection limit of the earlier method.

Only total metal values are discussed here because dissolved metals were only evaluated at a few monitoring stations and only for some time periods.

In some cases, there are only enough samples above the detection limit to statistically evaluate one time period (1970's or 2000's).

*Copper, Cobalt and Zinc*

Copper, cobalt and zinc concentrations were similar for the Embarrass and Partridge River watersheds but were generally lower in surface water depressions adjacent to the tailings basin (see Figure 4). For example, average copper, cobalt and zinc concentrations were 1.3, 0.5 (all samples below detection), and 9.1 µg/L for the Embarrass River monitoring site PM13, while the concentrations were 1.0, 0.56 (nearly all samples below detection) and 9.1 µg/L for the Partridge River site PM16. Surface water depressions adjacent to the tailings basin were low in metals (e.g., copper was consistently <1 µg/L). It should be noted that the analytical method used for copper was changed part way through the PolyMet monitoring campaign in 2004 to lower the limit of detection. Samples that were below the higher limit of detection were not included in this presentation; thus the sample set for copper was reduced when calculating statistics.

Historical concentrations of copper, cobalt, and zinc in the Embarrass and the Partridge Rivers were largely comparable to the concentrations measured as part of the PolyMet monitoring campaign. For example, at Embarrass River site CN120 (monitoring from 1955 through 1963 - See Table B-4(a)),

average copper, cobalt and zinc were 3.1, 0.9, and 2.9 µg/L. At PM13 (Table B-4(a)), just downstream of CN120, average copper, cobalt, and zinc were 1.33, 0.5, and 9.12 ug/L. The zinc value at CN120 was lower than the values measured at PM13 and it appears that zinc values were slightly higher at many PolyMet stations; a reason for this is not clear. If either field or laboratory contamination were the cause of the elevated zinc values, it appears that contamination was restricted to zinc. For site S4 (monitored for Amax during the 1970s), average copper, cobalt and zinc were 1.3, 0.56, and 5.56 µg/L. For data collected at S4 in the 2000's, average copper, cobalt and zinc were 1.05, 0.1, and 3.0 µg/L. Zinc also appears to be slightly elevated for the Amax data set. Because of the high zinc values in the PolyMet and the Amax data sets, data collected at CN120 and CN123, and the 2000's data at S1 and S4, may more accurately represent the expected background levels of zinc in the Embarrass and Partridge Rivers

Overall, the concentrations of copper, cobalt, and zinc in the Partridge and Embarrass Rivers were below applicable water quality criteria (see Appendix B for applicable criteria).

*Iron*

Summary data for iron are shown in Figure 4. Iron concentrations were also similar in the two watersheds with average values around 1,400 µg/L. The surface water depressions adjacent to the tailings basin had lower concentrations of iron (average values around 400 µg/L). In the Partridge River watershed, iron concentrations were somewhat less historically when comparing sites that have both recent and historical data. For example, at site CN126 (Table B-1 (d)) the average iron concentration was 1,365 µg/L in the 1970s but the average was 1,737 µg/L in the 2000s (site re-labeled S1 for this data set). Similarly, the average concentration of iron at CN120 (sampled from 1955 through 1963, see Table B-4(a)) on the Embarrass River was 942 µg/L but was 1104 µg/L at PM13 (sampled in 2004 and 2006, see Table B-4(c)).

The historical and recent monitoring data indicate that the levels of iron in all of the waters monitored adjacent to the PolyMet project site have been and continue to be above the Class 1B secondary drinking water standard of 50 µg/L, and that the elevated concentrations of iron appear to be naturally occurring. The Class 1B secondary drinking water standard for iron is applicable to Colby Lake.

*Chromium, Cadmium and Nickel*

Figure 5 shows a summary of available data for chromium, cadmium and nickel. The average concentrations of chromium, cadmium, and nickel for all sites and monitoring periods (1950s, 1960s, 1970s, and 2000s) were generally similar for the Partridge and Embarrass Rivers. For example, the average Partridge River concentrations for chromium, cadmium, and nickel were 0.63, 0.11, and 1.19

µg/L. Average Embarrass River concentrations for chromium, cadmium, and nickel were 1.46, 0.06, and 1.43 µg/L. Surface water depressions adjacent to the tailings basin were low in metals and very near the levels in the Partridge and Embarrass Rivers (e.g., average chromium, cadmium, and nickel were 0.98, 0.1, 0.1, and 1.19 µg/L). Note that the analysis performed for nickel was changed part way through the PolyMet monitoring campaign in 2004 to lower the limit of detection. The levels of chromium, cadmium and nickel found in the Partridge and Embarrass River watersheds were below the applicable Class 2B aquatic life criteria (see Appendix B).

*Mercury and Methyl Mercury*

Figure 5 also shows a summary of available data for mercury. Mercury concentrations are presented using only data from the 2000's. Samples collected prior to 2000 were not analyzed using low level mercury detection methods and do not provide any additional value when evaluating baseline water quality. Unfortunately due to the higher detection limits used prior to the 2000's there is little historical information on mercury levels in these waters. Considering only data for which low level mercury detection limits were used, the average mercury concentration (not including below detection limit measurements) for the Embarrass (4.4 ng/L) and the Partridge River (2.6 ng/L) watershed exceeded the most limiting mercury criterion of 1.3 ng/L (Class 2B water quality standard for wildlife protection).

For the Partridge River above Colby Lake, total mercury concentrations (for values above detection limits) ranged from a low of 1.1 to a high of 6.6 ng/L, but the majority of mercury levels were between 2 and 3 ng/L. At Station S4 (the most upstream stream monitoring point), mercury concentrations ranged from 2.1 to 2.8 ng/L (a total of 4 samples averaging 2.5 ng/L – see Table B-1(h)). At CN126_PM3_S1 (see table B-1(d)), mercury concentrations ranged from 2.4 to 3.9 ng/L and at PM16 the range was 1.1 to 4.5 ng/L (a total of 13 samples, 5 were below detection limits – see Table B-1(g)). At PM4 (for values above detection limits), mercury ranged from 1.1 to 6.6 ng/L (a total of 13 samples with 8 below detection limits and an average of 3.0 ng/L – see Table B-1(c)). For the Embarrass River, total mercury (for values above detection limits) tended to range from 2 to 3 ng/L, however, there were several higher values that resulted in higher average total mercury values compared to the Partridge River. Average total mercury was 3.9 ng/L at CN121_PM12 (not including an outlier of 9.9 ng/L – see Table B-4(b)) and was 3.8 ng/L at PM13 (see Table B-4(c)). Total mercury in surface water depressions adjacent to the tailings basin ranged from 0.5 to 6.6 ng/L with most of the values in the 1 to 2 ng/L range (Table B-3).

Monitoring for methyl mercury was conducted in September and November, 2006 at selected monitoring stations. These stations were PM3, PM4 and PM16 in the Partridge River Watershed, PM12 and PM13 in the Embarrass River Watershed and PM7 and PM10 around the tailings basin in the Embarrass River

Watershed. To date, only two values have been recorded per site, so there are inadequate data to provide a statistical analysis by location or to make conclusions regarding these data. Methyl mercury concentrations in the Partridge River ranged from 0.028 to 0.300 ng/L, with an overall average of 0.125 ng/L. For the Embarrass River, methyl mercury values ranged from 0.146 to 0.323 ng/L with an average of 0.201 ng/L. The concentration of methyl mercury in surface water depressions adjacent to the tailings basin appeared to be highly variable with a range from <0.025 to 0.637 ng/L. Currently there is not a promulgated water quality criterion for methyl mercury in Minnesota surface waters.

***Summary and Interpretation by Geography***

Additional discussion of the monitoring data is provided below for individual monitoring stations. Only monitoring data from 2004 and 2006 are used in these comparisons to minimize the effect of different monitoring periods, detection limits, and quality control activities.

*Partridge River Watershed*

Figure 6 shows water quality data of individual monitoring stations in the Partridge River watershed for selected parameters. The data are arranged on the x-axis in order of distance downstream from One Hundred Mile Swamp, the headwaters of the Partridge River. It should be noted that the PM1 monitoring site is not included because it monitors the dewatering discharge from the Peter Mitchell Pit and is not representative of surface water in the Partridge River (see Figure 1). Therefore the most upstream monitoring station on the Partridge River is PM3. The water quality parameters are generally similar at all sites for all parameters evaluated in the Partridge River watershed; however, for some parameters (e.g., copper) there appeared to be a slightly increasing trend for stations further down the Partridge River. These results indicate consistent water quality in the watershed and suggest that the potential influence of the discharge from dewatering of the Peter Mitchell Pit is localized and not noteworthy at monitoring stations downstream from the pit outfall.

*Embarrass River Watershed*

Figure 7 shows water quality of individual monitoring stations in the Embarrass River watershed for selected parameters. The data are arranged on the x-axis with monitoring stations close to the tailings basin on the left (PM8 –PM10) followed by the two stations downstream from the tailings basin (PM7 and PM11) and the monitoring stations on the Embarrass River (PM12 and PM13). The right-most station on the x-axis represents undisturbed surface waters (PM12). A comparison of these locations provides an indication of the influence of the tailings basin on Embarrass River water quality. Chloride, hardness, TDS, specific conductance, and sulfate are all lower at PM11 compared to the stations directly

adjacent to the tailings basin. The surface water depressions around the tailings basin have elevated levels of all the above parameters compared to background (PM12). In addition, iron and TOC levels are lower around the tailings basin compared to background. These observations indicate that the monitoring data can be used to evaluate the existing contribution of the tailings basin to the water quality in the Embarrass River

***Summary and Interpretation With Respect to Minnesota Water Quality Standards***

Because the Partridge and Embarrass Rivers are tributaries to Lake Superior the standards in Minnesota Rules Chapter 7052 apply to both streams. Both the Embarrass and Partridge Rivers are unlisted waters, and are thus designated as Class 2B, 3B, 4A, 4B, 5, and 6 waters. The water quality monitoring data have been evaluated with respect to the most limiting applicable water quality criteria.

For the most part, if a numeric standard exists, the baseline surface water quality in the Embarrass and Partridge River was within the designated standard. Some sites, however, did have baseline measurements that exceeded certain standards on average. There are also sites for which a standard had been exceeded on one or more occasions within recent monitoring years (i.e., the 2000s data), but the average value of all measurements was within the standard. Departures from the applicable water quality standards for data collected in the 2000s are noted in Table 3. There are also some parameters that appear to have exceeded the numeric standard in the database because one half the limit of detection for the measurement was a higher value than the standard. If all measurements above the standard were recorded as one-half the detection limit, they were not included in Table 3 because the true value is unknown. In general, it can be concluded that exceedances of individual water quality criterion are isolated occurrences. Oil and grease concentrations in the Partridge River consistently exceeded the oil and grease criterion. The cause is unclear but may be related to logging or mining activity or other unknown causes.

**Table 3. Monitored values that exceeded Minnesota water quality criteria based on monitoring in the 2000s.**

| Parameter | Site | Watershed |
|---|---|---|
| *2a. Monitoring sites where a standard was exceeded on average* | | |
| Dissolved oxygen | S4 | Partridge |
| Oil and Grease | S4 | Partridge |
| | S1,PM3 | Partridge |
| Aluminum | PM4 | Partridge |
| *2a. Instances of a standard exceeded on one or more individual occasion at a monitoring station* | | |
| Dissolved Oxygen | PM16 | Partridge |
| | PM4 | Partridge |
| pH | S1 | Partridge |
| Lead | PM4 | Partridge |
| Mercury | All sites | Embarrass and Partridge |
| Turbidity | S1 | Partridge |
| Aluminum | PM12 | Embarrass |
| Zinc | PM4 | Partridge |
| | PM12 | Embarrass |

***Seasonal Summary and Interpretation***

At most stations the data record was too short to allow evaluation of seasonal water quality trends. Only two historic stations (data from the 1950's, 1960's and 1970's), had records adequate to evaluate seasonal trends. These locations are CN120 in the Partridge River watershed and station 401600 in the Embarrass River watershed. Seasons were divided into the following months: March-May (spring), June-August (summer), September-November (fall), and December-February (winter). Data for the years 1976-77, were not used in this comparison to eliminate the influence of water quality data collected during low flow conditions which occurred from August 1976 through March 1977. Box plots of this seasonal data are shown in Figure 8 and Figure 9. In general, no clear pattern emerged. The variability in the data within each season was greater than the difference between seasons and there were also fewer data available for winter months. One exception is that at CN120 in the Partridge River, TOC is elevated in spring compared to summer. Unfortunately there are no measurements available for fall or winter months for comparison.

***Summary and Interpretation of Undisturbed Waters***

The 1979 Regional Copper-Nickel study identified disturbed and undisturbed watersheds in the PolyMet project area. CN121_PM12 and CN126_PM3_S1 (see Figure 1) are the only watershed monitoring stations in the Partridge River and Embarrass River watersheds that were originally designated as

undisturbed by the Regional Copper Nickel Study. Of these two stations, only CN121_PM12 may still be considered undisturbed. Station CN126_PM3_S1 is now downstream of the outflow from the Peter Mitchell Pit and so is considered disturbed. A comparison of the overall undisturbed water quality in 1976-77, as reported in the Regional Copper-Nickel Study, and the water quality at CN121 in 1976-77 and PM12 in 2004 is shown in Table 4. Note that CN121 was part of the undisturbed waters database that was reported as part of the Regional Copper-Nickel Study.

The best comparison of changes in the water quality of undisturbed waters in the region of the PolyMet project is between the data collected at the CN121_PM12 monitoring station for two time periods (that is, CN121 data collected in the 1970s and PM12 data collected in the 2000s). The data presentation in the Copper-Nickel study gives an idea of the overall quality of undisturbed waters in Northern Minnesota. TOC, chloride, cadmium, and chromium are higher in 2004 compared to 1976-77. Specific conductance and turbidity are lower in 2004. Generally high values for calcium, chloride, and specific conductance are indicators of disturbed waters. The chloride level is slightly higher in 2004 compared to overall watershed levels 1976-77 and CN121 specifically. Calcium and specific conductance values are lower compared to the CN121 monitoring site, but higher than values for all undisturbed waters in 1976-77. These differences, however, are fairly minor. The largest difference between the two time periods is observed for cadmium but this is simply a function of different detection limits for this metal during the two monitoring period. Overall, there is very little change in the water quality of undisturbed waters between 1976 and 2004.

**Table 4. Comparison of Undisturbed Waters as Reported in the Copper Nickel Study and at Monitoring Station CN121_PM12 in 1976-1977 and 2004.**

| Parameter | Units | Undisturbed Water Quality Monitoring Sites | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | Copper-Nickel report 1976-1977 | | | CN121 only, 1976-1977 | | | PM12, 2004 | | |
| | | min | max | median | min | max | median | min | max | median |
| Hardness | mg/l | 12 | 99 | 27.1 | 7 | 93 | 50 | 18.6 | 77.1 | 36.9 |
| Specific Conductance | µmohs/cm | 24 | 524 | 55 | 48 | 275 | 176 | 37 | 166 | 94.4 |
| Total Carbon (TOC) | mg/l | 0.4 | 45 | 15 | 1.5 | 18 | 14 | 14.7 | 29.4 | 19.95 |
| Total Dissolved Solids | mg/l | | | | | | | 46 | 197 | 103 |
| Chloride | mg/l | 0.08 | 41 | 1.6 | 1.7 | 4 | 2.6 | 2.1 | 5.8 | 3.4 |
| Sulfates | mg/l | | | | 4.1 | 13 | 5 | 0.5 | 8.9 | 5.9 |
| Cadmium (Cd) | µg/l | | | | 0.015 | 0.02 | 0.015 | 0.1 | 0.1 | 0.1 |
| Cobalt (Co) | µg/l | | | | | 2.3 | | 0.5 | 0.5 | 0.5 |
| Copper (Cu) | µg/l | | | | 0.7 | 1.1 | 0.9 | 0.33 | 1.2 | 1.1 |
| Chromium (Cr III) | µg/l | | | | 0.56 | 0.65 | 0.605 | 0.5 | 2.3 | 1.45 |
| Magnesium (Mg) | mg/l | 1 | 23 | 3 | 2 | 35.5 | 6.95 | 2.6 | 7 | 4.15 |
| Mercury (Hg) | µg/l | | | | 0.25 | 0.25 | 0.25 | 0.002 | 0.0099 | 0.005 |
| Nickel (Ni) | µg/l | | | | | | | 1.1 | 2.5 | 2.5 |
| Color | | 4 | 500 | 90.2 | 45 | 190 | 90 | | | |
| Turbidity | NTU | 0.5 | 64 | 2 | 1.3 | 6.4 | 3.6 | 1 | 1.1 | 1.05 |
| Calcium | mg/l | 1.8 | 40 | 6 | 4 | 58 | 17.5 | 4.6 | 19.3 | 10.15 |
| Potassium (K) | mg/l | 0.2 | 6.2 | 0.6 | 0.2 | 2.2 | 1.4 | 0.25 | 1.1 | 0.75 |
| Sodium (Na) | mg/l | 0.2 | 19 | 1.6 | 0.6 | 6.3 | 3.75 | 2.2 | 3.4 | 3.1 |
| Silica (Si) | mg/l | 0.1 | 34 | 6.3 | 15 | 17 | 16 | | | |

**Figure 1. Map of Monitoring Stations**

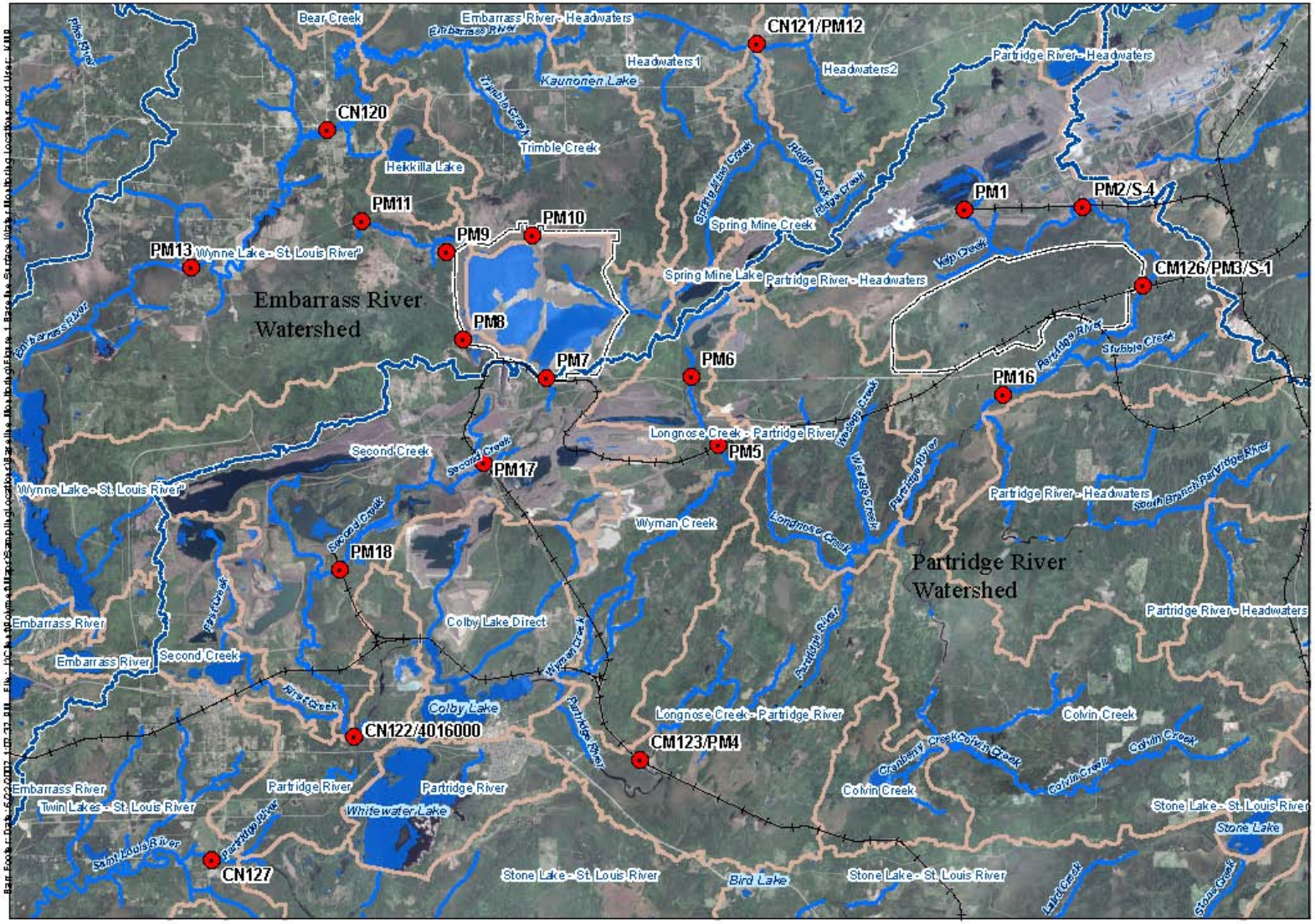
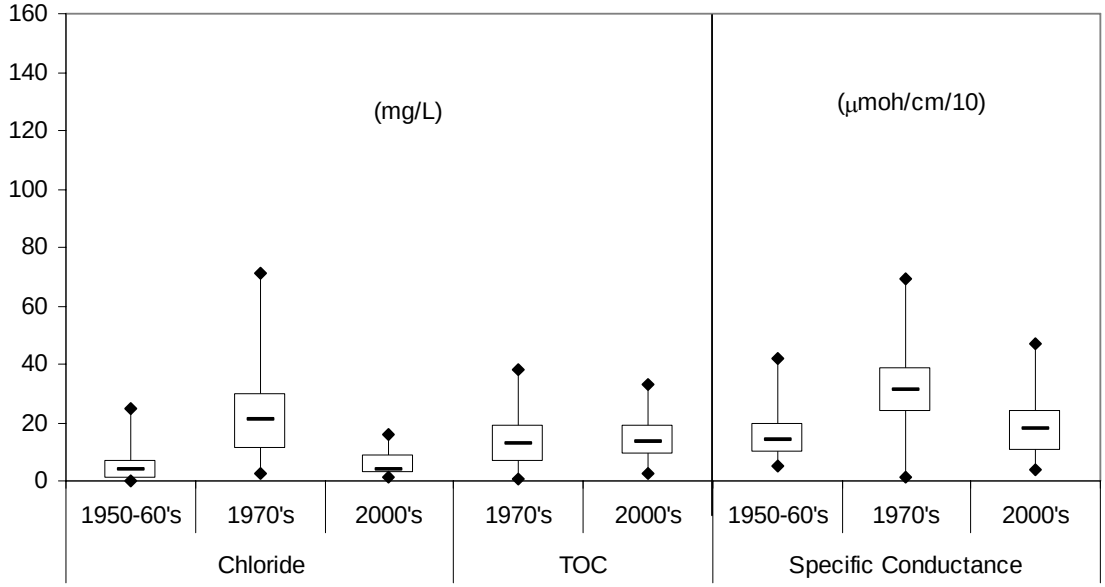



Figure 1
SURFACE WATER MONITORING LOCATIONS
PolyMet

**Partridge River Watershed**
**Chloride, TOC (mg/L) and Specific Conductance**




**Embarrass River Watershed and Tailings Basin Seeps (TB)**
**Chloride, TOC (mg/L) and Specific Conductance**

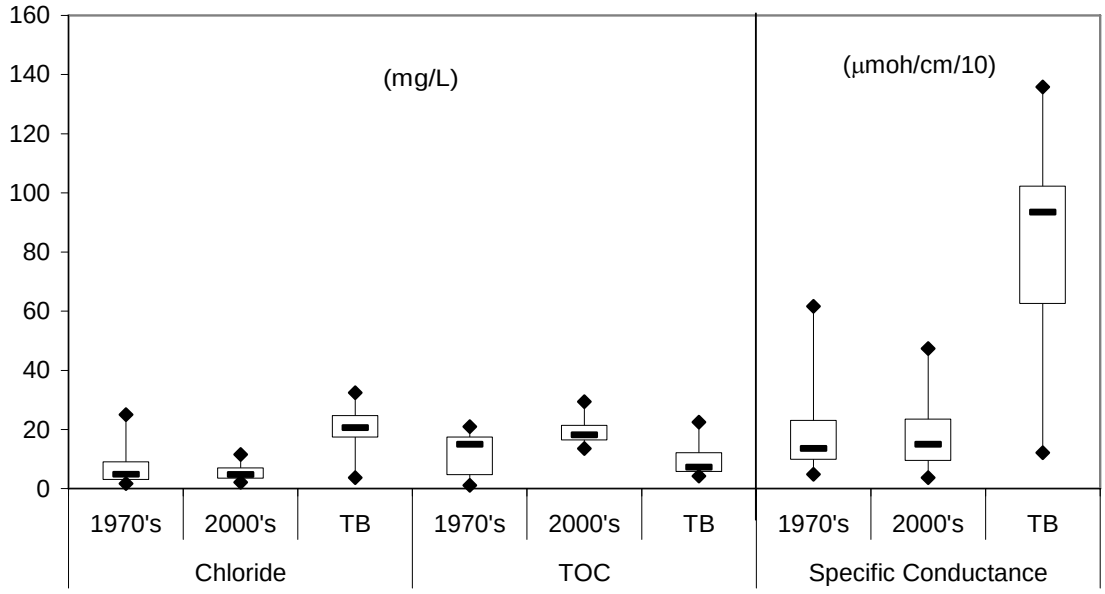



**Figure 2. Chloride, Total Organic Carbon and Specific Conductance in the Partridge River Watershed (Top) and Embarrass River Watershed (Bottom)**

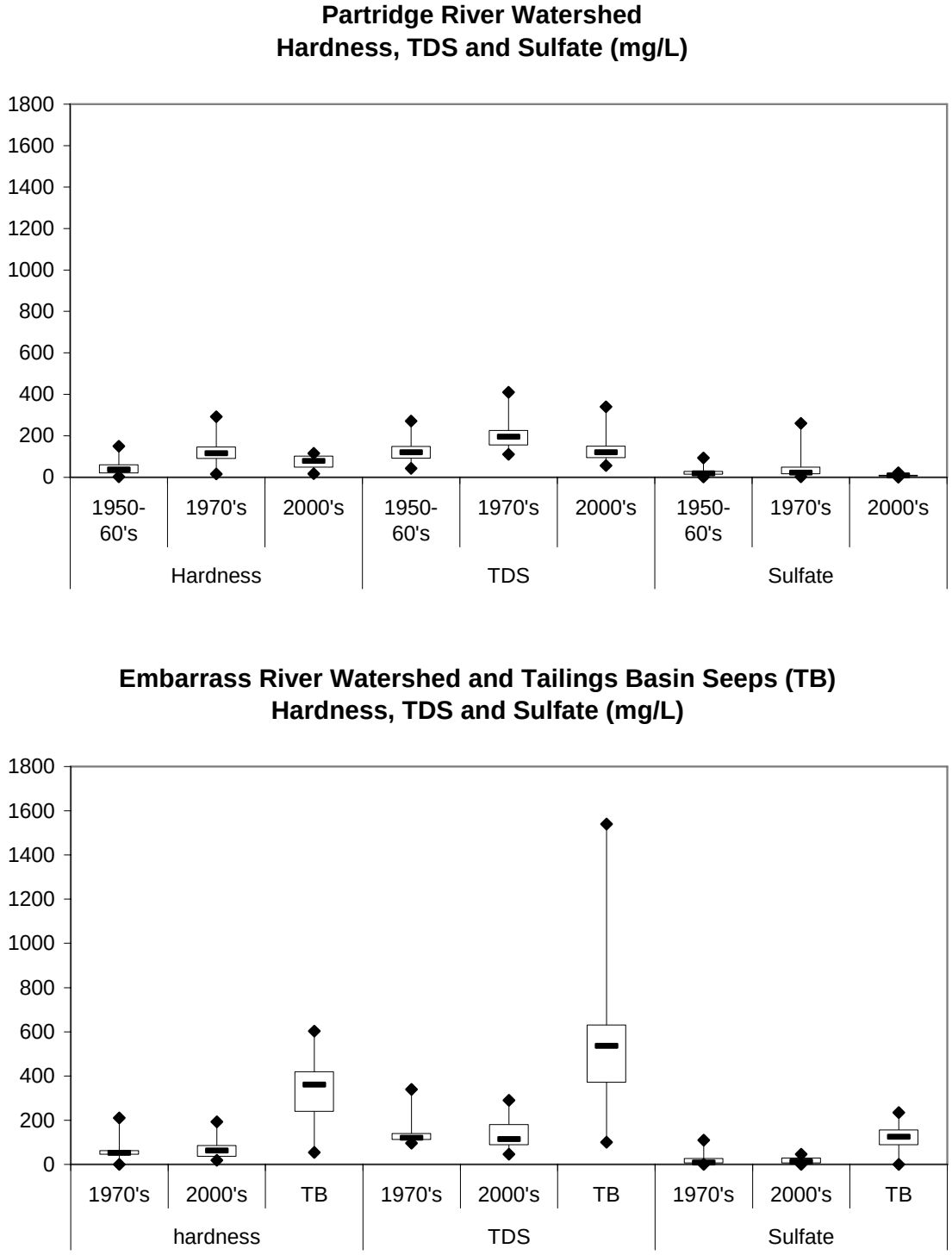



**Figure 3. Hardness, Total Dissolved Solids (TDS) and Sulfate in the Partridge River Watershed (top) and Embarrass River Watershed (bottom)**

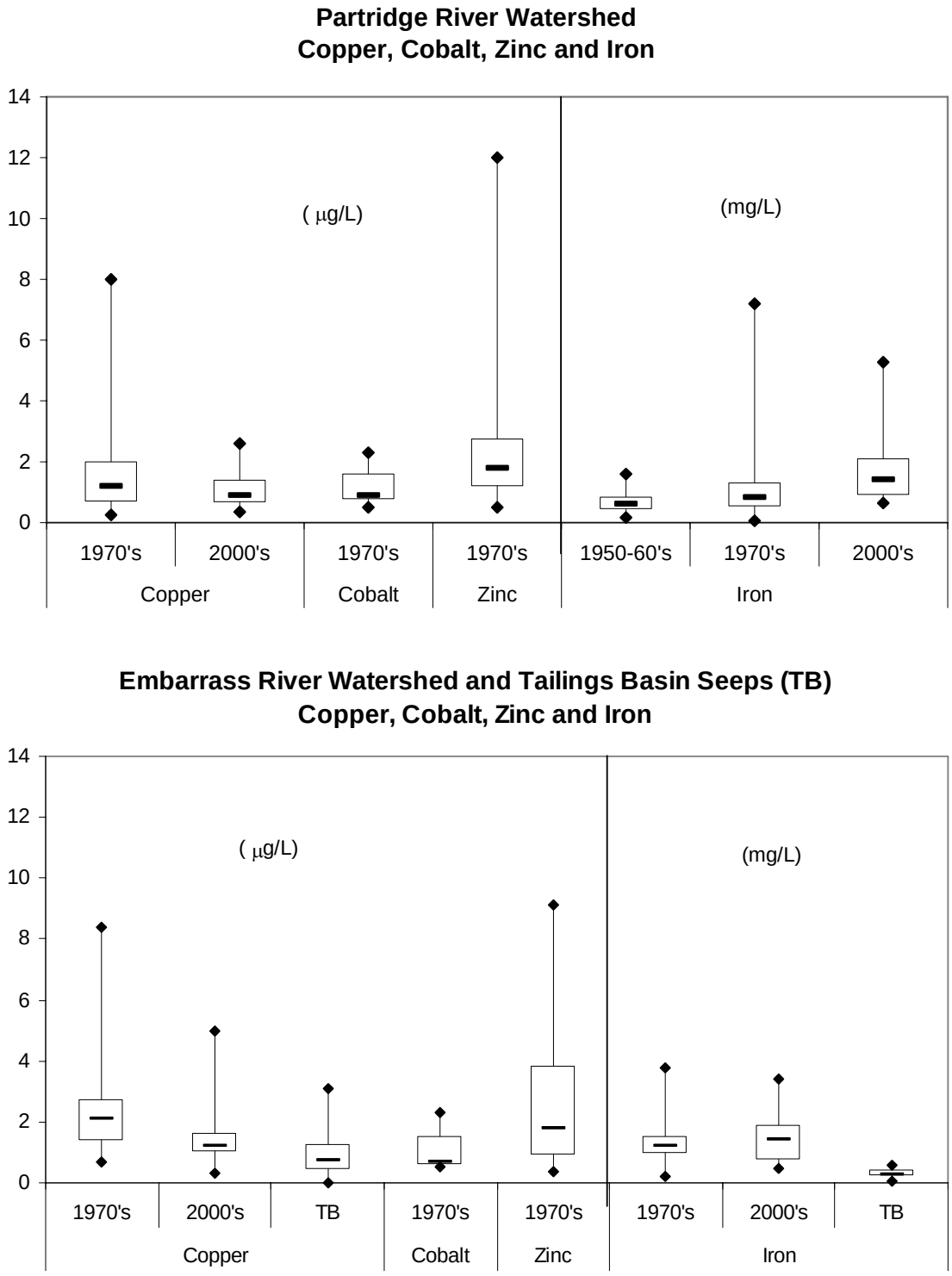



**Figure 4. Copper, Cobalt, Zinc and Iron in the Partridge River Watershed (top) and Embarrass River Watershed (bottom).**

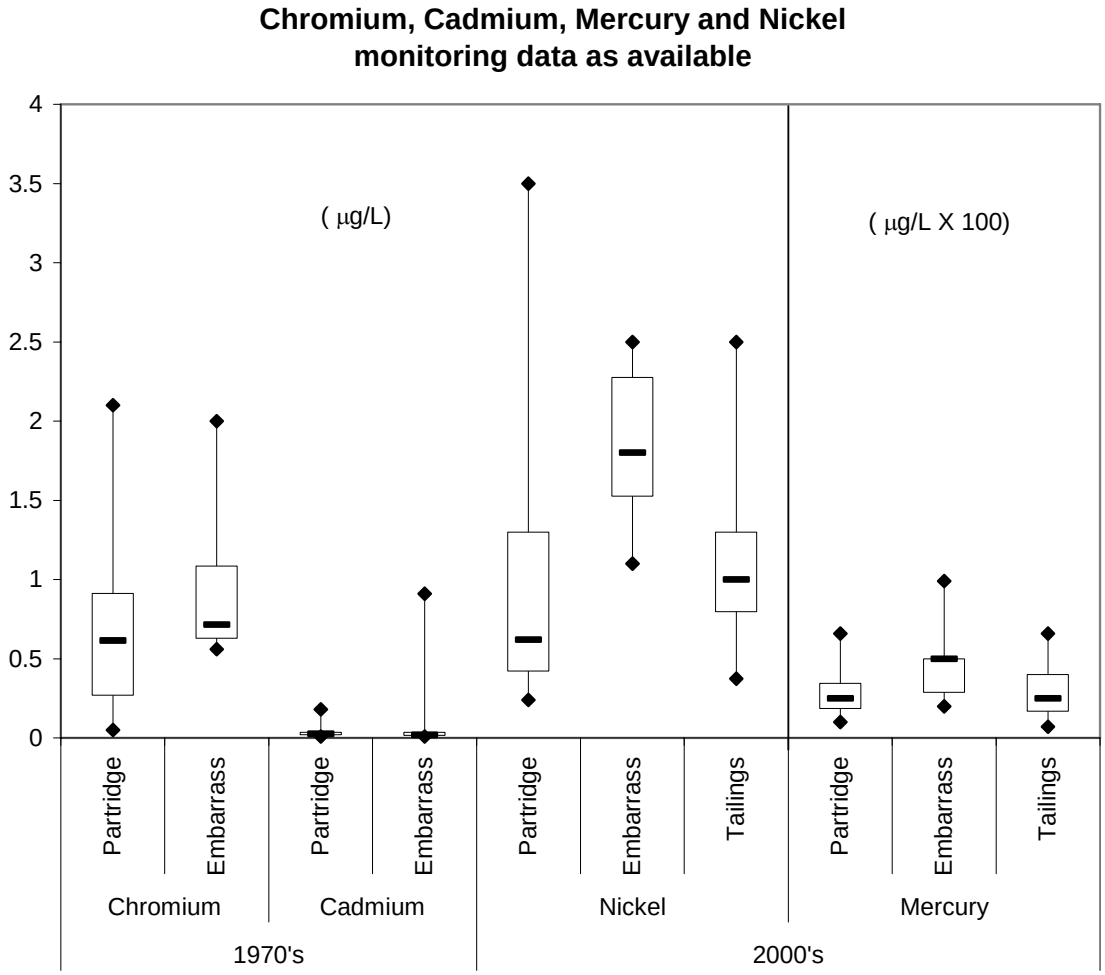



**Figure 5. Chromium, Cadmium, Nickel and Mercury in the Partridge River and Embarrass River Watersheds and in Surface Water Depressions Adjacent to the Tailings Basin.**

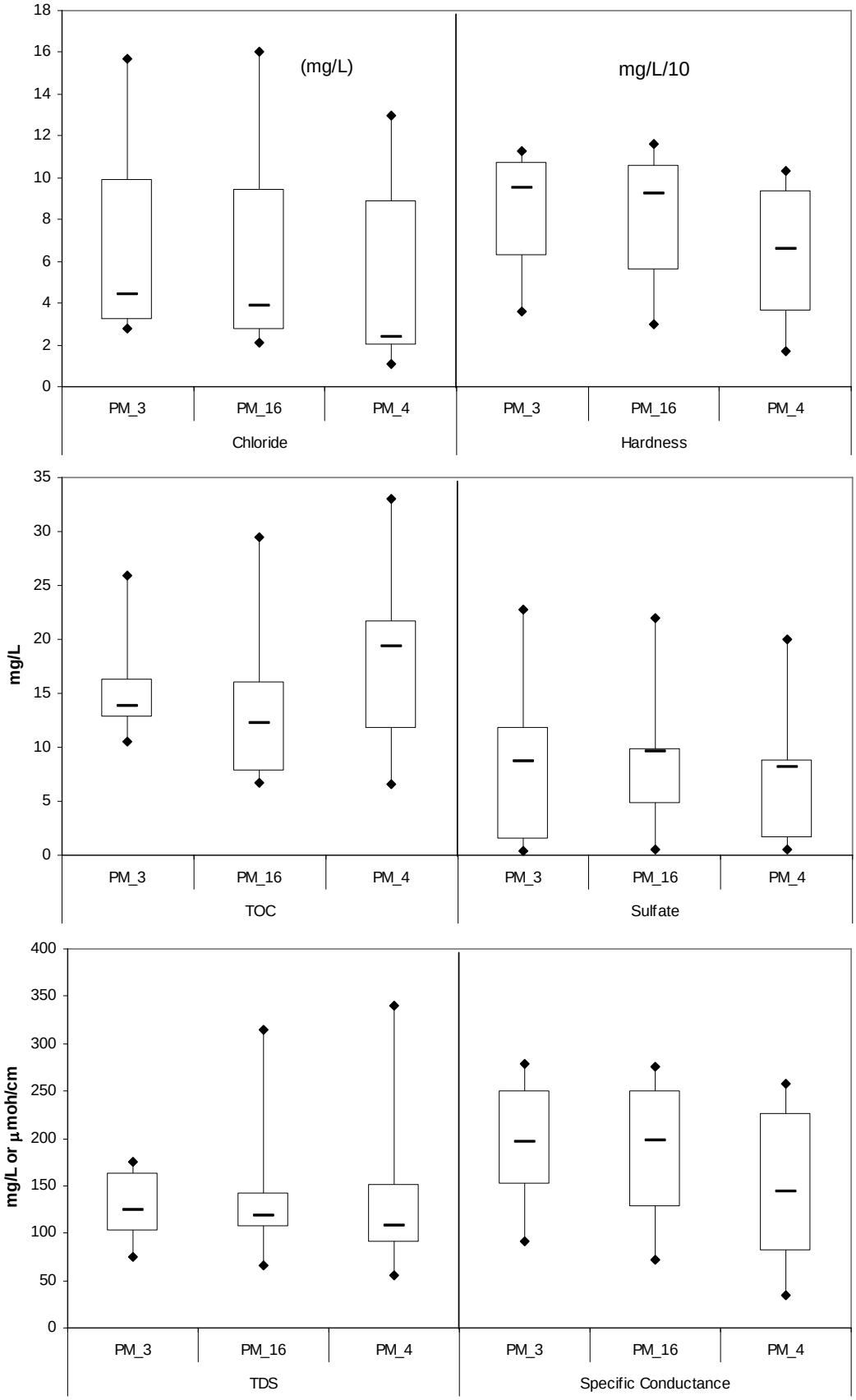



**Figure 6. Water Quality Monitoring Data in the Partridge River Watershed by Location of Monitoring Station for Select Water Quality Parameters.**

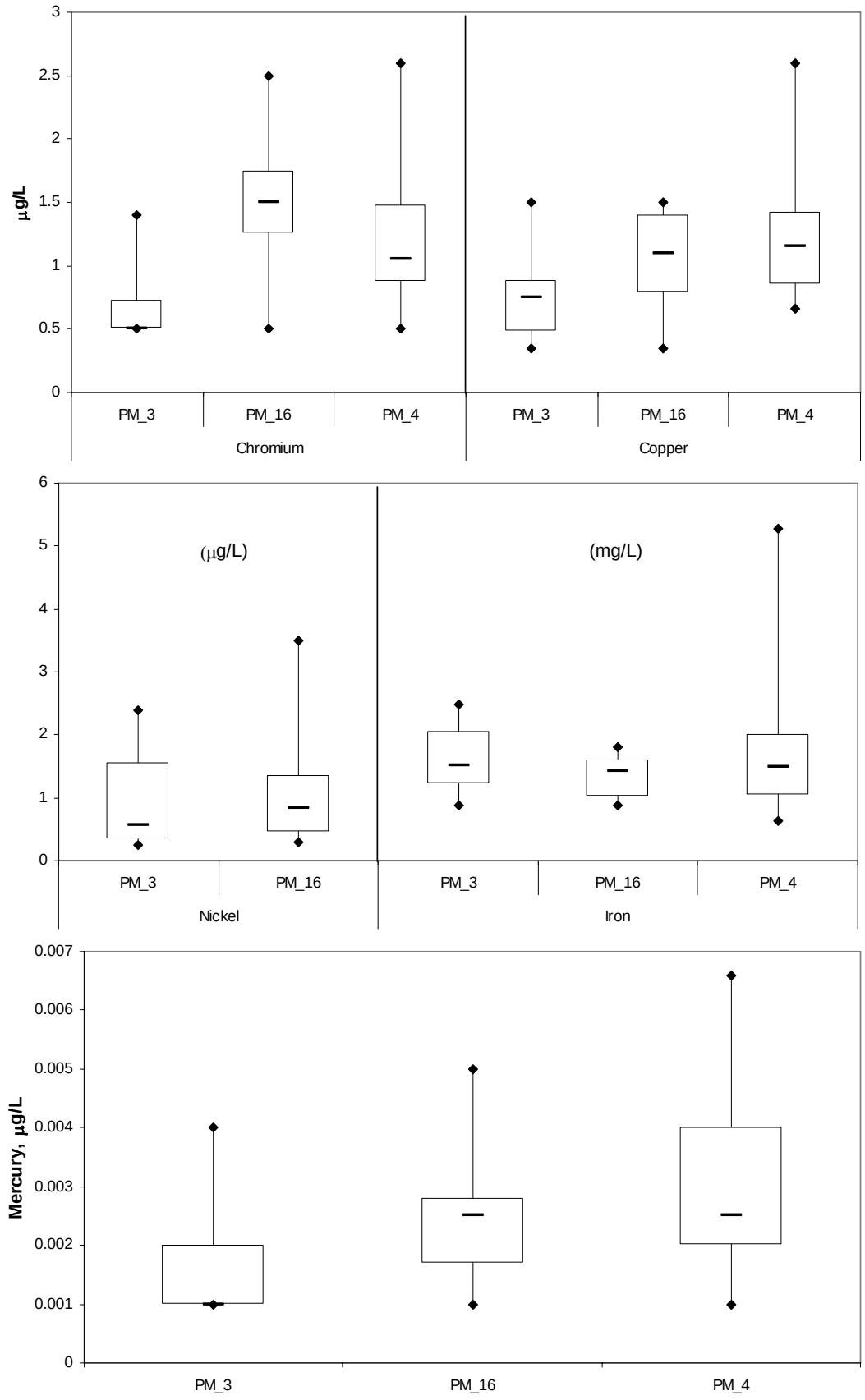



**Figure 6 Continued.**

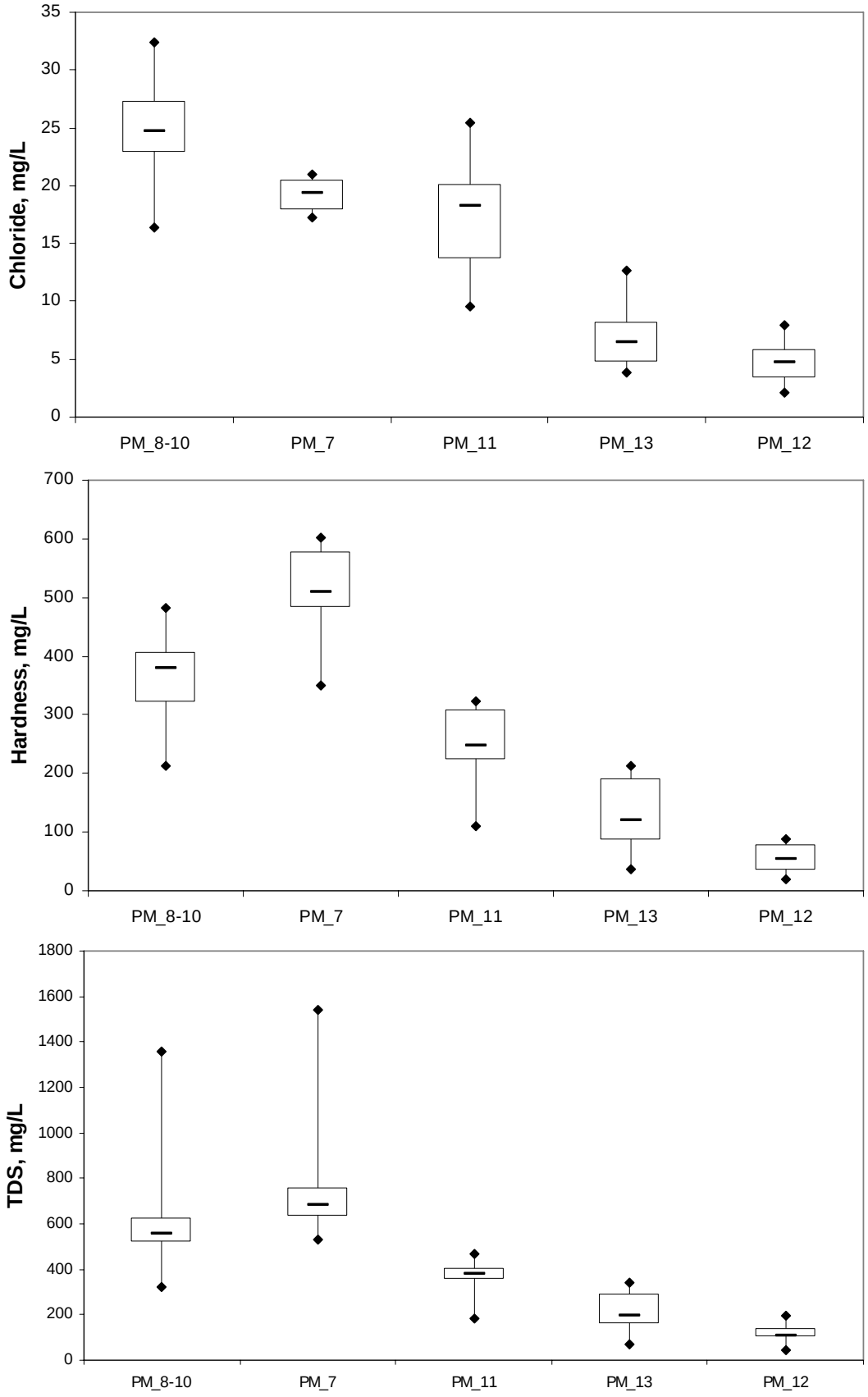



**Figure 7. Water Quality Monitoring Data in the Embarrass River Watershed by Location of Monitoring Station for Select Water Quality Parameters.**

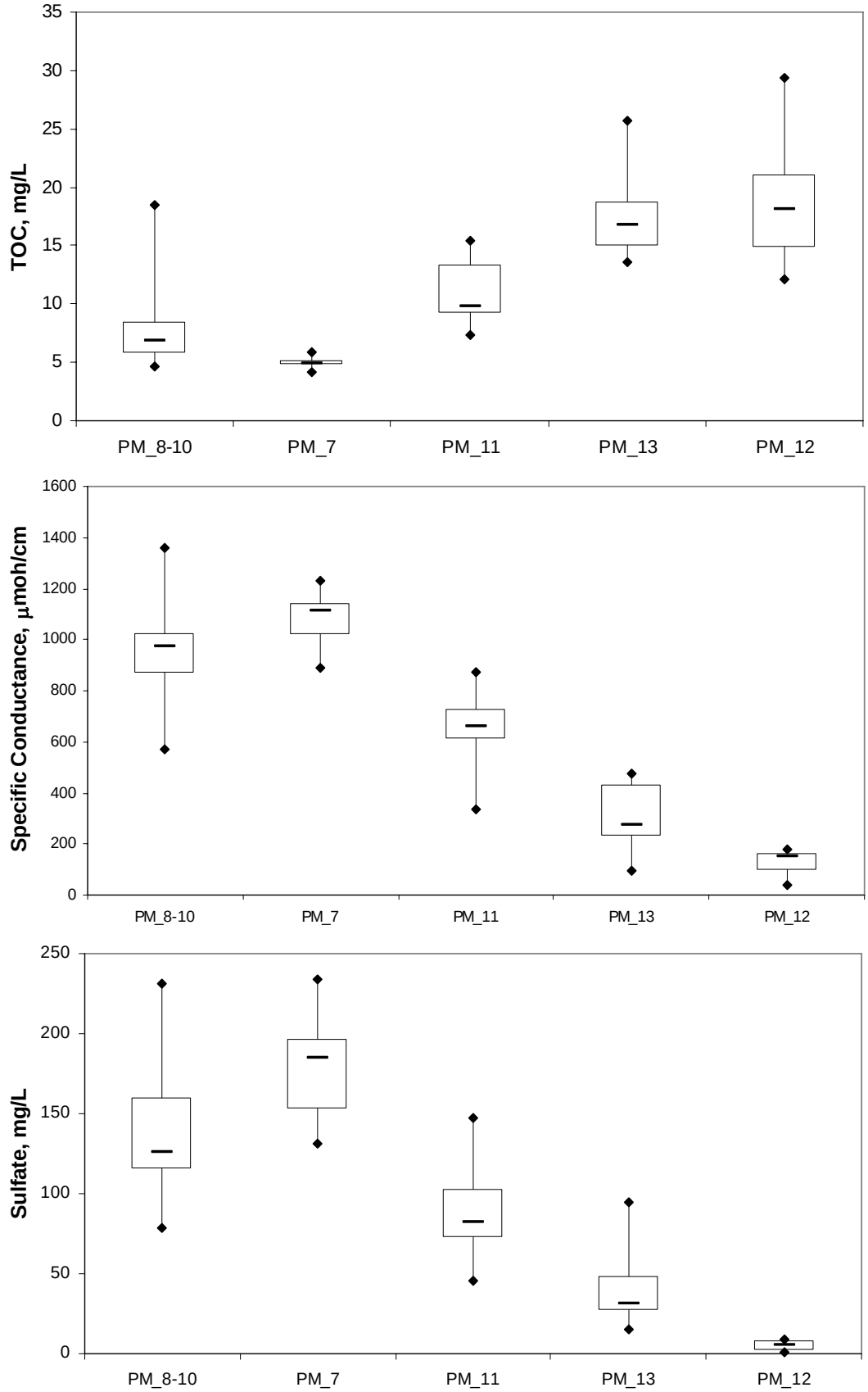



**Figure 7 Continued.**

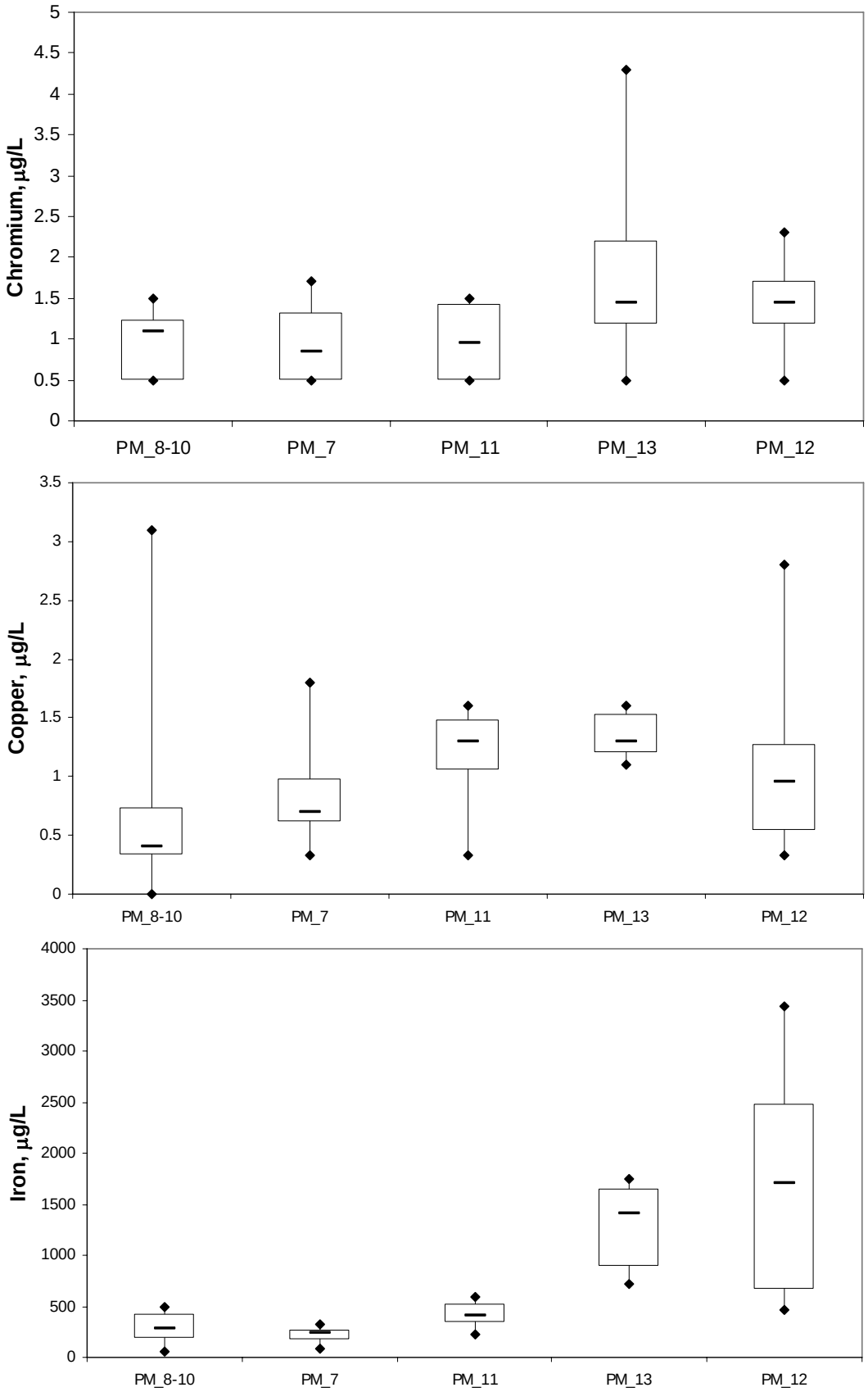
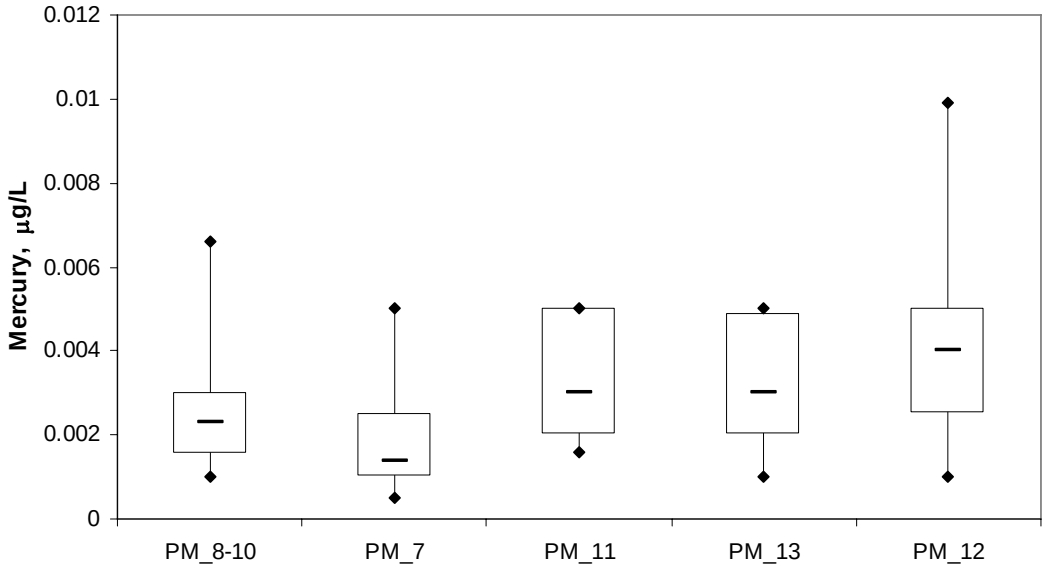
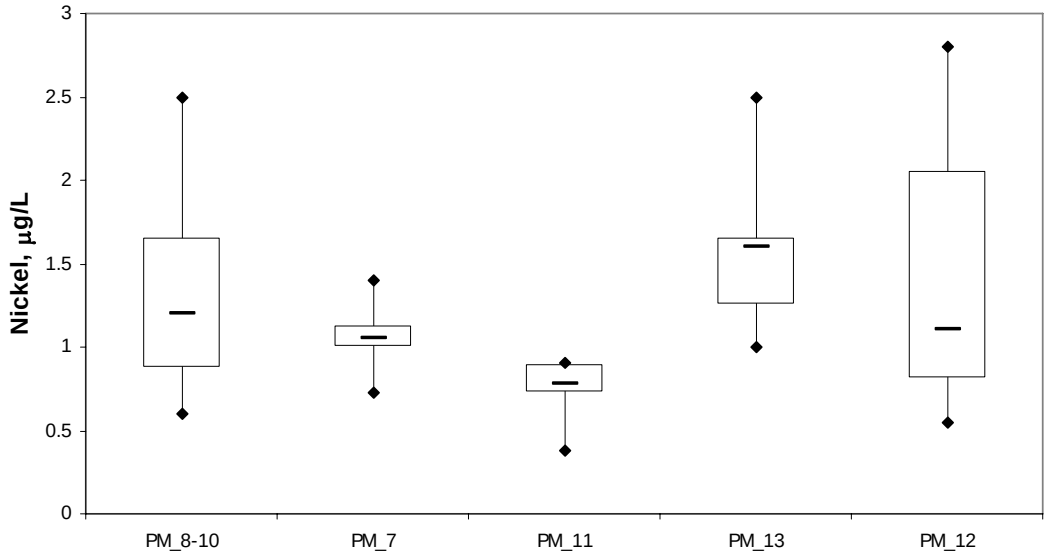



**Figure 7 Continued.**



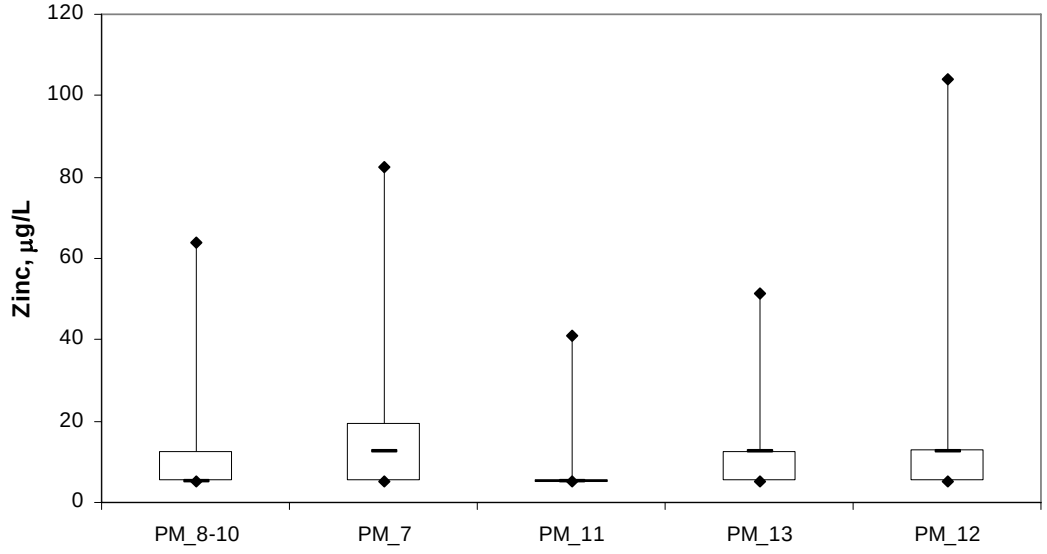




**Figure 7 Continued.**

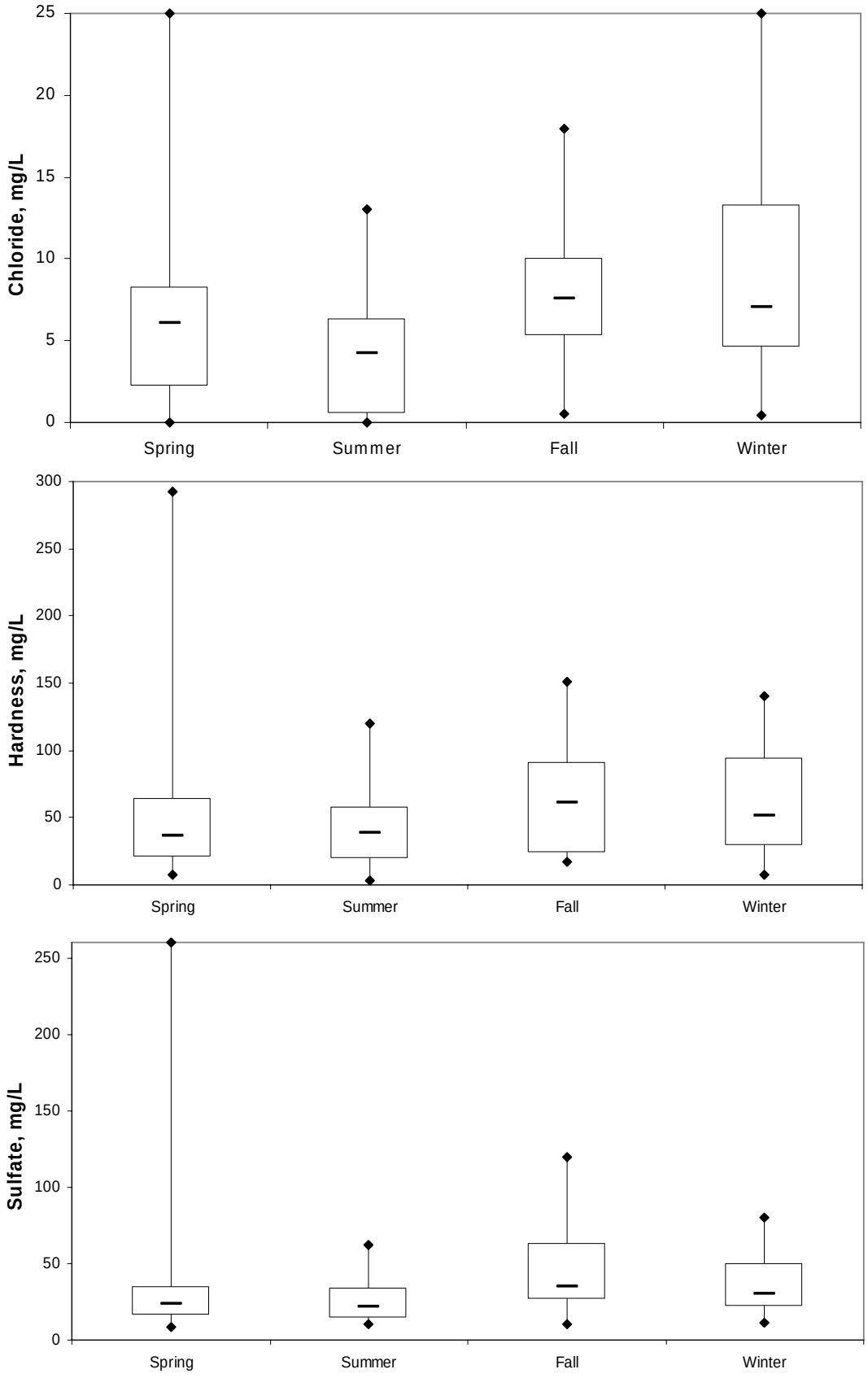



**Figure 8. Partridge River Surface Water Quality by Season**

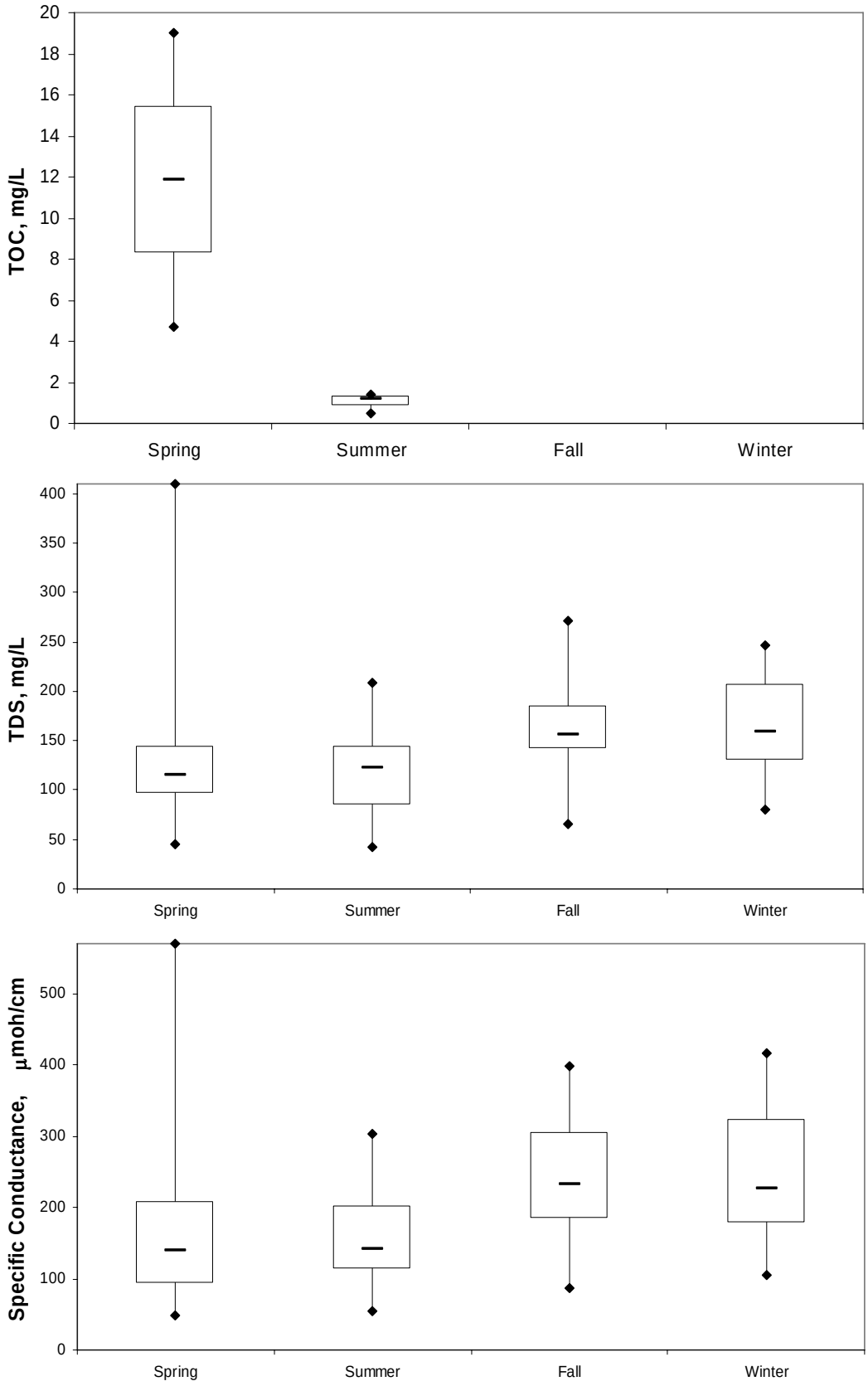



**Figure 8. Continued.**

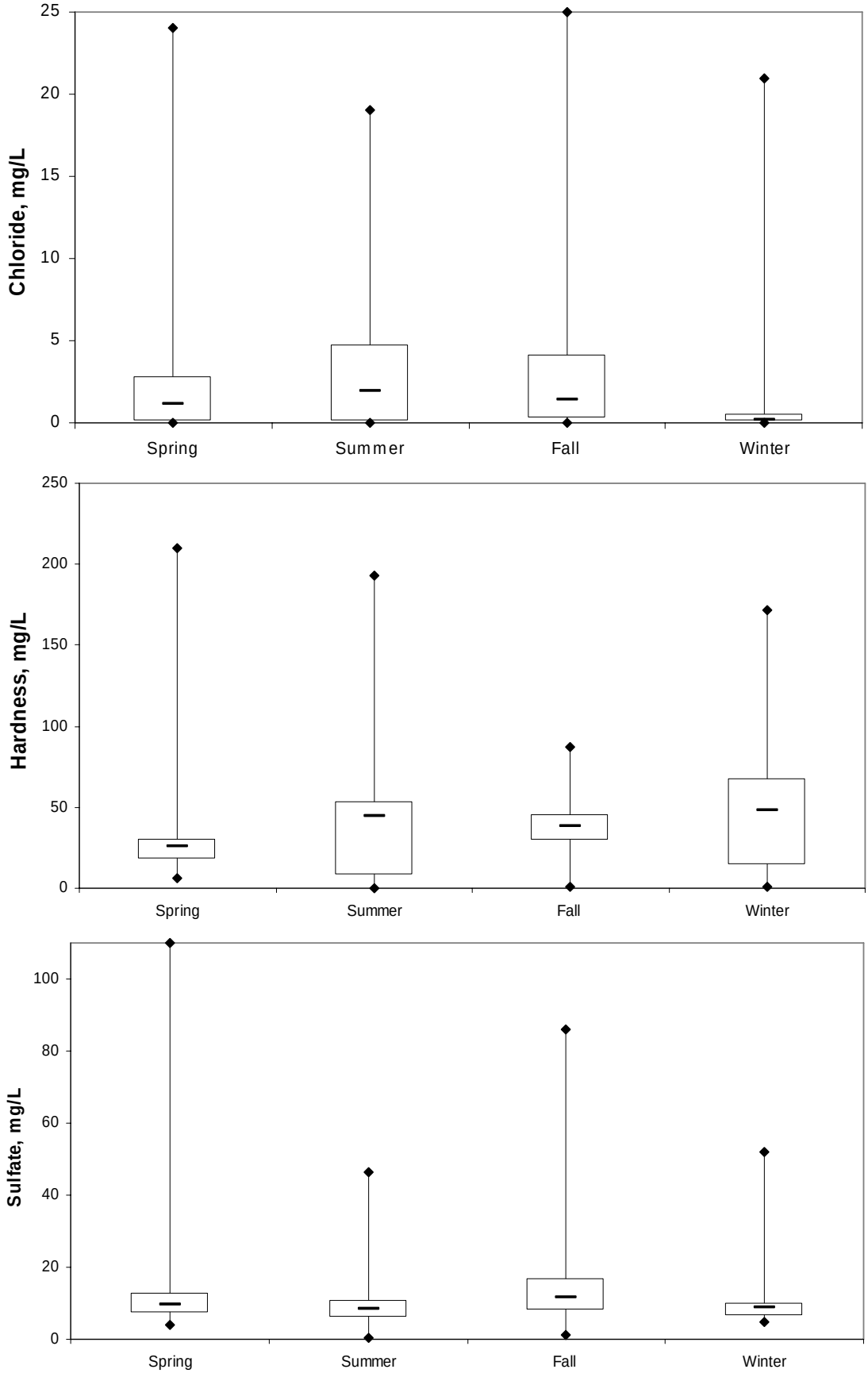



**Figure 9. Embarrass River Surface Water Quality by Season.**

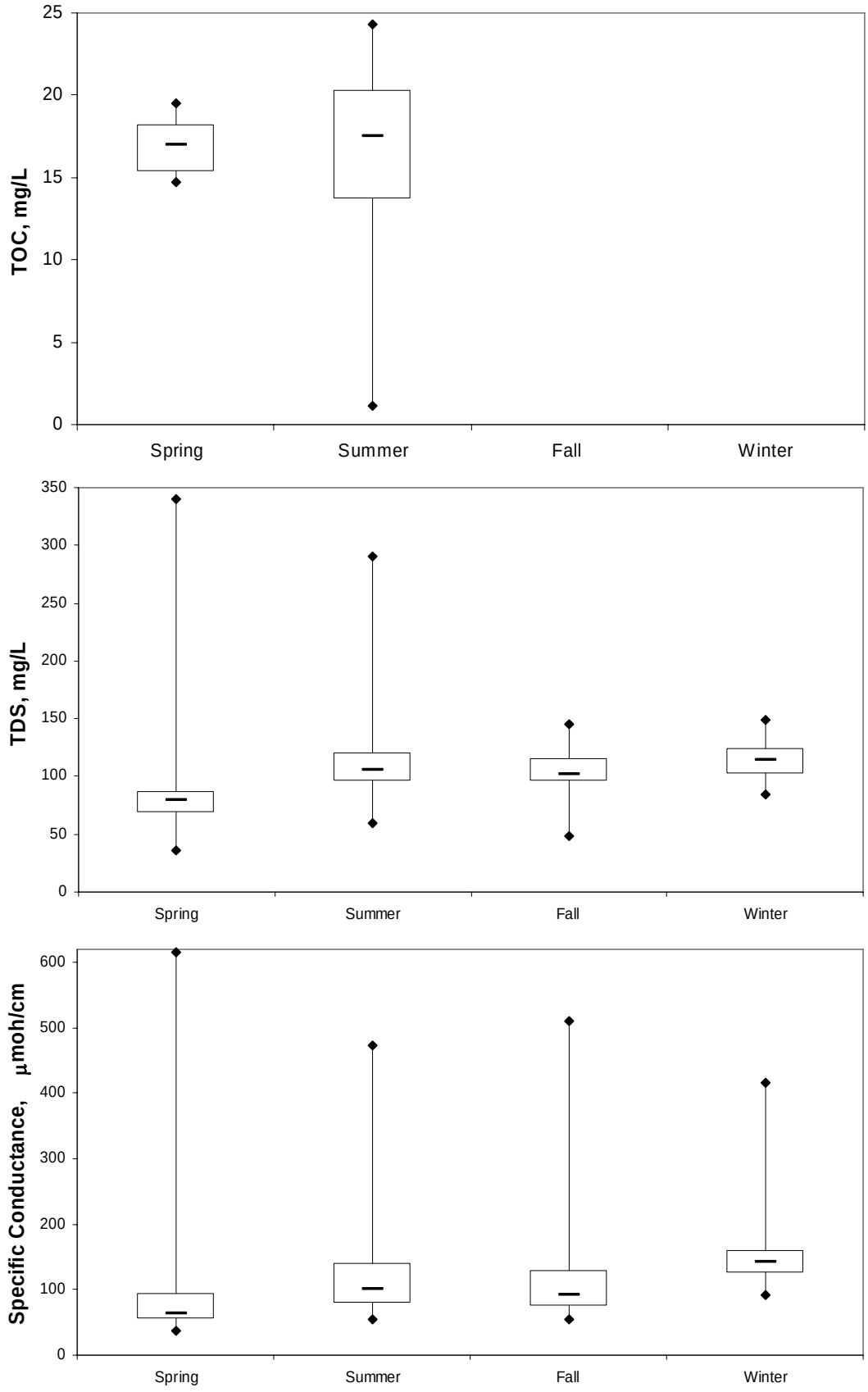



**Figure 9. Continued.**

# *Appendix A*

## *RS76: Historical Surface Water Quality Data Compilation*

**RS 76**
**Draft-01**
**February 6, 2006**

# Technical Memorandum

**To:** Surface Water Quality Data Users

**From:** Barr Engineering Company

**Subject:** Historical Surface Water Quality Data Compilation (RS76)

**Date:** January 23, 2006

The purpose of this text is to provide summary information regarding the enclosed compilation of surface water quality data from the eastern edge Mesabi Range of Northeastern Minnesota, specifically, surface water quality data in proximity to the Duluth Complex. Other reports will provide summaries of water quality monitoring data related to the Hornfels (RS77) in the Cliffs-Erie tailings basin and water quality monitoring data related to the tailings basin (RS64). Figure 1 shows the available and relevant surface water quality sample locations for which associated water quality results are contained in the enclosed deliverable. An overview of the functionality of the enclosed CD (map and results) is detailed in the final paragraphs of this memo.

The data summarized here were associated with several mining related projects in northeastern Minnesota. The data were previously submitted to the MPCA, MDNR or other public entities as a part of then ongoing mineral development projects and the information is a matter of public record. Various companies or organizations were responsible for collecting the water monitoring data. Data associated with the Regional Copper-Nickel study are also included.

The boundaries for this dataset were determined based on the physical sample location and the surface water quality data's potential relevance to PolyMet site and operations. In general, surface water quality sample locations paralleling a southwest to northeast transect along the Mesabi Range from Aurora, Minnesota to just east of Birch Lake, a distance of approximately 30 miles, were selected for inclusion.

Limitations to this dataset include capturing data that were readily available, (i.e., Barr in-house LIMS archives, easily searched USEPA and USGS sites, etc.). Other data, for example discharge monitoring data collected pursuant to NPDES permit requirements may be available from MPCA records and/or database searches, but are not included herein. Additionally, data contained in spreadsheets, previously transmitted to Barr Engineering Co. by MPCA, that could not be reproduced by direct queries of the Storet and USGS NWIS databases have not been included as confirmation of completeness and accuracy could not be ascertained. Notable occurrences of this include Storet results with the "112WRD" Agency Code (no results for this agency code could be obtained directly from Storet) and surface water quality results for Birch Lake station 690003 (no surface water quality data were obtained from the Storet query of this station/location). These limitations and notable exclusions are not exhaustive but are intended to highlight some of the difficulties searching large historical datasets. The enclosed dataset represents a good-faith effort to capture complete and relevant surface water quality data contained as a matter of public record. It is not represented to be comprehensive of all surface water quality results that may exist.

The historical surface water quality data in this dataset (and in the associated database) has been organized by location, including unique sample-specific identification numbers, their associated stream/river/lake and/or watershed locale, and their associated latitude/longitude or UTM coordinates. The following table summarizes the organizations responsible, the approximate time-frame of the monitoring and a summary of the sampling station location identifications for each group.

**Table 1**
**Timeline of Organizations Responsible for Historic Surface Water Monitoring**

| Approximate Date Range | Responsible Organization | Common Sample Location Name |
|---|---|---|
| 1974-1982 | Amax Inc. | S-1, S-2, S-3, S-6, S-7 |
| 1978- 1981 | Regional Copper-Nickel Study** | CN101 – CN129, Partridge River Locations (4016000, 4015475, south branch 4015455) |
| ~1994 | Kennecott (Amax Site Closure) | S-1, S-2, S-3, S-6, S-7 |
| 2001-2002 | Cominco | S-1, S-2, S-3, S-4, S-5, S-6, S-7 |
| 2001-2002 | Lehmann Exploration Management, Inc. | L-1, L-2, L-3, L-4, L-5 |
| 2004 | PolyMet Mining, Inc. | PM-1 through PM-16 |

** USGS NWIS database queries returned results from as far back as 1955 (this applies to Copper-Nickel Study sample IDs). These data are included as they were "readily available".

**Amax, Inc.**

In 1974, Amax began the Minnamax project to examine copper-nickel sulfide deposits. Surface water and groundwater monitoring were conducted in the area before and during this exploration. Surface water quality data associated with this project is included in this data summary and spans the period of May 1974 through 1982 (see Table 1 above).

This data was managed by Barr's Laboratory Information Management System (LIMS) following standard operating procedures for data quality, both analytical data review and data management verification. The data were retrieved from LIMS in their entirety.

**Copper-Nickel Study**

In January 1976, the Minnesota Environmental Quality Board (MEQB) initiated the Regional Copper-Nickel Study. The objectives for the study included characterizing the region in its pre-copper-nickel development state, evaluation of potential environmental, social, and economic impacts of such development as well as evaluation technologies for exploitation of the resource. This study included the collection and analysis of multiple surface water samples from multiple locations. The study results related to surface water quality were published in the Water Quality Characterization of the Copper-Nickel Water Quality Research Area, December, 1979.

Data associated with the Copper-Nickel Study were obtained from both the US EPA Storet and the USGS NWIS websites databases. The data captured via these database queries have been stream-lined as part of the uploading exercise. For example, more abstract parameters such as "gauge height" and "Altitude of land surface, feet" or chemical parameters such as "Ammonia plus organic nitrogen, water, unfiltered, milligrams per liter as nitrogen" and "Acid neutralizing capacity, water, unfiltered, fixed endpoint (pH 4.5) titration, field, milligrams per liter as calcium carbonate" that were not easily mapped to a more current analytical parameter/method, were omitted from the final dataset. A total of 2 parameters were omitted from the Storet dataset, and 17 parameters were omitted from the USGS dataset.

It is noted that while the Copper-Nickel Study was initiated in 1976, the queries of the USGS NWIS database obtained data for the CN station locations as far back as 1955. It is also noted that several of the queries of the Copper-Nickel Study data returned values of "0" (zero). This data was uploaded "as is" and has not been adjusted or interpreted further. It is unclear what a zero means, but it may indicate that the compound or parameter was in fact, analyzed for, but that result was "below the level of detection". More recent analytical data procedures report these types of results as less than "<" the method reporting limit (or MRL). No indication of the MRL was available in the database query results. Zeros may also be an artifact of data manipulation or parsing of text results during database uploading.

**Kennecott**

In 1982, the mineral rights from the Amax site returned to Kennecott from whom Amax had been subleased the mineral rights. To remove long-term environmental liability, Kennecott closed the site in 1996. Surface water samples were collected from approximately 1993 to 1994 as part of the closure process. This data is referred to as the Amax Site Closure data, acknowledging the first exploration effort on the site. Following the closure of the site, the mineral rights were transferred to the Minnesota Department of Natural Resources (MDNR). The MDNR conducted water monitoring on the site. However, this data is comprised of ground water and bog water data and therefore is not included in this surface water dataset. Cominco subsequently acquired the mineral rights for the site from the State. Cominco obtained surface water data at the site between the years of 2001 and 2002. Because Amax, Kennecott and Cominco all evaluated the same area, water samples obtained by these three parties share sampling locations as shown on Table 1 above.

This data was managed by Barr's LIMS system following standard operating procedures for data quality, both analytical data review and data management verification. The data were retrieved from LIMS in their entirety.

**Lehmann Exploration Management, Inc.**

Lehmann Exploration Management, Inc. performed baseline surface water quality monitoring in the vicinity of Birch Lake. The monitoring occurred from September 2001 and October 2002 for environmental review and permitting purposes. The locations at which surface water quality samples were obtained are presented on Table 1 (above) and are denoted with an "L" in the sample identification.

This data was managed by Barr's LIMS system following standard operating procedures for data quality, both analytical data review and data management verification. The data were retrieved from LIMS in their entirety.

**PolyMet Mining, Inc.**

PolyMet performed baseline surface water quality monitoring as part of its proposed mine development effort beginning in April 2004 and ending in November 2004. The locations at which surface water quality samples were obtained are presented on Table 1 (above) and are denoted with a "PM" in the sample identification

This data is managed by Barr's LIMS system for work associated with the PolyMet project. The first two rounds of surface water monitoring results were subject to Barr's data quality procedures, both analytical data review and data management verification. Subsequent monitoring rounds however, were overseen by PolyMet's sampling subcontractors. This data was transmitted electronically to Barr Engineering Company.

**Disk Functionality – User's Guide**

The enclosed CD contains an electronic version of the map included here as Figure 1. The map is an ARC-GIS file modified to an html index file. Use of this deliverable requires a computer with an Internet browser and Microsoft Excel. The CD has an auto-launch feature that will open the map upon loading it into the CD drive on a personal computer. The auto-launch feature is not compatible with Macintosh computers. Macintosh users will have to browse to the "html index" file to open/launch the map.

The locations (from Table 1 above) on the map are electronically linked to water quality sample results in Microsoft Excel format. Users can simply select (click) a location from the map and a Microsoft Excel file will open the associated surface water quality results for that location. Excel files present the results in separate worksheets (or tabs) for each of the different parameter groups (i.e., general parameters, measurements, metals, etc). For the protection of the dataset, all the files are read-only and will require saving to a local directory to edit or change. The map has a zoom-in, zoom-out and search features along the left-hand side of the window. Each of the Excel files contains the sample identification, cross-referenced stream/lake/creek location and source from which the data were obtained. The data is stored and managed in a Microsoft Access database to ease future management of surface water quality data requiring inclusion for this project.

# *Appendix B*

## *Statistical Summaries of Monitoring Data*

**Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

## (a) Site: 4016000

| General Parameters | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [c] |
|---|---|---|---|---|---|---|---|---|---|
| Carbonate | [a] | mg/L | | | | 0 | | | |
| Chloride | [b] | mg/L | 6.96 | 25.00 | 0.10 | 119 | 0 | | 230 |
| Carbon dioxide | | mg/L | 11.19 | 35.00 | 3.30 | 40 | 0 | | |
| Bicarbonate as HCO3 | | mg/L | 60.38 | 138.00 | 14.00 | 128 | 0 | | |
| Hardness, total | | mg/L | 49.00 | 150.00 | 3.00 | 128 | 0 | | 250 |
| Nitrogen Nitrate | | mg/L | 1.49 | 4.00 | 0.60 | 40 | 0 | | |
| Nitrate | | mg/L | 4.38 | 18.00 | 0.40 | 128 | 0 | | |
| Orthophosphate, Total | [b] | mg/L | 0.06 | 0.22 | 0.01 | 16 | 0 | | |
| Phosphate as P | | mg/L | 0.37 | 0.37 | 0.37 | 1 | 0 | | |
| Sulfate | | mg/L | 28.81 | 93.00 | 8.80 | 128 | 0 | | |
| Solids, total suspended | | mg/L | 4.00 | 4.00 | 4.00 | 1 | 0 | | |
| Solids, total dissolved | | mg/L | 138.27 | 271.00 | 43.00 | 128 | 0 | | 700 |

| Measurement | | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [c] |
|---|---|---|---|---|---|---|---|---|---|
| Color | | | 98.30 | 290.00 | 15.00 | 122 | 0 | | |
| Sodium Absorption Ratio | [b] | | 0.38 | 1.00 | 0.10 | 126 | 0 | | |
| pH | | units | 6.99 | 8.00 | 6.20 | 128 | 0 | | 6.5-9.0 |
| Specific Conductance @ 25 C | | umhos | 185.10 | 417.00 | 48.00 | 128 | 0 | | |

| Metals | | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [c] |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum | [b] | ug/L | 509.09 | 1000.00 | 100.00 | 22 | 0 | | 125 |
| Boron | | ug/L | 88.13 | 250.00 | 20.00 | 16 | 0 | | |
| Boron, dissolved | [b] | ug/L | 82.86 | 250.00 | 10.00 | 70 | 0 | | |
| Calcium, dissolved | | mg/L | 15.43 | 28.00 | 5.00 | 130 | 0 | | |
| Iron | | ug/L | 692.75 | 1600.00 | 170.00 | 91 | 0 | | |
| Potassium, dissolved | | mg/L | 2.45 | 7.20 | 0.50 | 83 | 0 | | |
| Magnesium, dissolved | | mg/L | 8.61 | 25.00 | 2.10 | 130 | 0 | | |
| Manganese | [b] | ug/L | 121.00 | 350.00 | 10.00 | 30 | 0 | | |
| Sodium dissolved | | mg/L | 8.20 | 28.00 | 0.30 | 113 | 0 | | |
| Silica, filtered | | mg/L | 10.64 | 19.00 | 4.00 | 107 | 0 | | |

[a] - All reported values are zeros
[b] - Values reported as zeros not used in calculations
[c]- Hardness dependent standards assume a hardness of 50mg/l.

**Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

## (b) Site: CN122

| General Parameters | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|
| Acidity as CaCO3 | [b] | mg/L | 5.00 | 5.00 | 5.00 | 10 | unknown | unknown | |
| Alkalinity, total | | mg/L | 67.30 | 92.00 | 38.00 | 10 | 0 | | |
| Nitrogen, ammonia as N | [ab] | mg/L | 0.09 | 0.29 | 0.005 | 11 | 4 | 0.01 | 40 |
| Carbonate | [be] | mg/L | | | | 0 | | | |
| Calcium Hardness @ CaCO3 | | mg/L | 101.40 | 200.00 | 70.00 | 5 | 0 | | |
| Chloride | | mg/L | 6.90 | 12.00 | 2.80 | 22 | 0 | | 230 |
| Cyanide | [be] | mg/L | | | | 0 | | | |
| Carbon dioxide | | mg/L | 4.78 | 11.00 | 1.30 | 12 | 0 | | |
| Chemical Oxygen Demand | | mg/L | 35.40 | 66.00 | 11.00 | 10 | 0 | | |
| Carbon, dissolved organic | | mg/L | 15.23 | 28.00 | 5.00 | 8 | 0 | | |
| Dissolved Oxygen, field | [c] | mg/L | 8.56 | 13.00 | 3.20 | 18 | 0 | | 5 |
| Fluoride | | mg/L | 0.31 | 1.40 | 0.10 | 20 | 0 | | |
| Bicarbonate as HCO3 | | mg/L | 33.25 | 66.00 | 14.00 | 12 | 0 | | |
| Hardness, total | [d] | mg/L | 137.17 | 292.00 | 58.00 | 6 | 0 | | 250 |
| Magnesium Hardness @ CaCO3 | | mg/L | 67.40 | 92.00 | 58.00 | 5 | 0 | | |
| Nitrate + Nitrite | | mg/L | 0.20 | 0.57 | 0.02 | 11 | 0 | | |
| Nitrogen Nitrate | | mg/L | 0.28 | 0.57 | 0.02 | 6 | 0 | | |
| Nitrate | | mg/L | 4.52 | 6.30 | 2.90 | 6 | 0 | | |
| Nitrogen Nitrite | [ab] | mg/L | 0.02 | 0.11 | 0.005 | 10 | 7 | 0.01 | |
| Oil and Grease | [b] | mg/L | 0.00 | 0.00 | 0.00 | 6 | unknown | | 0.5 |
| Orthophosphate, Total | | mg/L | 0.01 | 0.01 | 0.001 | 4 | 0 | | |
| Phenols, Total | | ug/L | 5.33 | 12.00 | 2.00 | 3 | 0 | | |
| Phosphorus ortho | [a] | mg/L | 0.02 | 0.06 | 0.01 | 5 | 1 | 0.01 | |
| Phosphorus total dissolved | | mg/L | 0.02 | 0.05 | 0.004 | 5 | 0 | | |
| Sulfate | | mg/L | 78.82 | 260.00 | 13.00 | 22 | 0 | | |
| Solids, total suspended | [b] | mg/L | 5.20 | 12.00 | 1.00 | 22 | 1 | 1 | |
| Carbon total | [b] | mg/L | 3.00 | 3.00 | 3.00 | 1 | 0 | | |
| Solids, total dissolved | | mg/L | 236.67 | 410.00 | 110.00 | 3 | 0 | | |
| Nitrogen total kjeldahl | | mg/L | 0.45 | 0.67 | 0.35 | 5 | 0 | | |
| Nitrogen total organic | | mg/L | 0.71 | 1.10 | 0.43 | 6 | 0 | | |
| Solids, total | | mg/L | 3.00 | 3.00 | 3.00 | 1 | 0 | | |
| Sulfide total | [b] | mg/L | 0.95 | 1.80 | 0.10 | 6 | 0 | | |
| Nitrogen unionized ammonia | | mg/L | 0.00010 | 0.00013 | 0.00007 | 5 | 0 | | |
| Carbon, total organic | | mg/L | 5.36 | 19.00 | 0.50 | 5 | 0 | | |

| Measurement | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|
| Dissolved Oxygen | | % | 84.00 | 91.00 | 76.00 | 12 | 0 | | 5 |
| Color | | | 67.95 | 150.00 | 4.00 | 22 | 0 | | |
| Gross Alpha | [a] | pCi/L | 0.20 | 0.20 | 0.20 | 2 | 2 | 0.4 | |
| Gross Beta | | pCi/L | 3.30 | 3.30 | 3.30 | 2 | 0 | | |
| Gross Beta | [a] | pCi/g | 0.30 | 0.40 | 0.20 | 2 | 1 | 0.4 | |
| pH | | su | 7.16 | 7.90 | 6.30 | 22 | 0 | | 6.5-9.0 |
| Specific Conductance @ 25 C | | umhos | 275.18 | 570.00 | 61.00 | 22 | 0 | | |
| Temperature | | deg C | 10.66 | 28.00 | -8.00 | 22 | 0 | | |
| Turbidity | | NTU | 4.40 | 13.00 | 1.30 | 22 | 0 | | 25 |

**Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

## (b) Site: CN122

| Metals | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|
| Silver | [b] | ug/L | | | | 0 | | | 1 |
| Aluminum | | ug/L | 293.93 | 800.00 | 30.00 | 15 | 0 | | 125 |
| Arsenic | [bi] | ug/L | 0.58 | 1.00 | 0.20 | 8 | 4 | 1 | 53 |
| Barium | [a] | ug/L | 43.67 | 50.00 | 31.00 | 3 | 2 | 100 | |
| Calcium | | mg/L | 45.29 | 92.00 | 4.50 | 12 | 0 | | |
| Calcium, dissolved | | mg/L | 23.67 | 27.00 | 21.00 | 3 | 0 | | |
| Cadmium | | ug/L | 0.06 | 0.18 | 0.02 | 10 | 0 | | 2.5 |
| Cadmium, dissolved | [b] | ug/L | 0.02 | 0.02 | 0.02 | 1 | 0 | | 2.27 |
| Cobalt | [b] | ug/L | 1.07 | 1.60 | 0.70 | 7 | 0 | | 5 |
| Cobalt, dissolved | | ug/L | 0.95 | 1.20 | 0.70 | 2 | 0 | | |
| Chromium | | ug/L | 0.54 | 1.00 | 0.29 | 4 | 0 | | 86 |
| Copper | | ug/L | 2.79 | 5.90 | 1.10 | 10 | 0 | | 9.3 |
| Copper, dissolved | | ug/L | 1.15 | 1.20 | 1.10 | 2 | 0 | | 8.93 |
| Iron | | ug/L | 610.91 | 1300.00 | 60.00 | 22 | 0 | | |
| Iron, dissolved | | ug/L | 142.00 | 330.00 | 20.00 | 15 | 0 | | |
| Mercury | [b] | ug/L | 0.26 | 0.32 | 0.25 | 7 | 6 | 0.5 | 0.0013 |
| Potassium | | mg/L | 1.62 | 2.31 | 1.00 | 13 | 0 | | |
| Potassium, dissolved | | mg/L | 1.50 | 1.50 | 1.50 | 1 | 0 | | |
| Magnesium | | mg/L | 25.51 | 61.00 | 3.00 | 12 | 0 | | |
| Phosphorus | | mg/L | 0.02 | 0.06 | 0.01 | 6 | 0 | | |
| Magnesium, dissolved | | mg/L | 8.43 | 10.00 | 7.00 | 3 | 0 | | |
| Manganese | | ug/L | 426.88 | 1200.00 | 30.00 | 16 | 0 | | |
| Sodium | | mg/L | 4.71 | 7.54 | 1.10 | 13 | 0 | | |
| Nickel | [d] | ug/L | 1.45 | 2.00 | 0.70 | 12 | 7 | 50 | 52 |
| Nickel, dissolved | [b] | ug/L | 1.35 | 1.60 | 1.10 | 2 | 0 | | 51.84 |
| Lead | | ug/L | 1.68 | 2.60 | 0.48 | 10 | 0 | | 3.18 |
| Lead, dissolved | | ug/L | 2.10 | 2.30 | 1.90 | 2 | 0 | | 2.52 |
| Selenium | [ai] | ug/L | 0.62 | 1.00 | 0.48 | 4 | 2 | 1 | 5 |
| Silica | | mg/L | 17.50 | 23.00 | 14.00 | 10 | 0 | | |
| Silica, filtered | | mg/L | 12.00 | 22.00 | 6.60 | 12 | 0 | | |
| Titanium | [e] | ug/L | | | | 0 | | | |
| Zinc | | ug/L | 3.46 | 12.00 | 1.10 | 10 | 0 | | 120 |

[a] - Material not quantified above detection limit. One-half of detection limit used in calculations.
[b] - Material present, but level was estimated in some samples. Data not used in calculations.
[c] - Some samples had percentages calculated instead of being measured in mg/L. These were not used in calculations.
[d] - Sample(s) were calculated and reported as extremely high. Data not used in calculations
[e] - All reported values are zeros
[f]- Hardness dependent standards assume a hardness of 100mg/l.
[g] - Most limiting criteria.
[h] - Ammonia criteria is un-ionized.
[i] - Detection limit likely changed during sampling period

**Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

## (c) Site: CN123_PM4

| General Parameters | Period | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|
| Acidity as CaCO3 | 1970s | mg/L | 5.00 | 15.00 | 0.50 | 5 | 2 | 1 | |
| [b] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 5.00 | 15.00 | 0.50 | 5 | 2 | 1 | |
| Alkalinity, total | 1970s | mg/L | 77.00 | 130.00 | 45.00 | 6 | 0 | | |
| | 2000s | mg/L | 59.93 | 103.00 | 13.00 | 13 | 0 | | |
| | Total | mg/L | 65.32 | 130.00 | 13.00 | 19 | 0 | | |
| Nitrogen, ammonia as N | 1970s | mg/L | 0.17 | 0.39 | 0.01 | 7 | 1 | 0.01 | 40 |
| [a] | 2000s | mg/L | 0.08 | 0.17 | 0.05 | 4 | 3 | 0.10 | |
| | Total | mg/L | 0.14 | 0.39 | 0.01 | 11 | 4 | 0.01-0.1 | |
| Carbonate | 1970s | mg/L | | | | 0 | | | |
| [b] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | | | | 0 | | | |
| Calcium Hardness @ CaCO3 | 1970s | mg/L | 57.50 | 75.00 | 39.00 | 4 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 57.50 | 75.00 | 39.00 | 4 | 0 | | |
| Chloride | 1970s | mg/L | 16.94 | 35.00 | 4.20 | 12 | 0 | | 230 |
| | 2000s | mg/L | 5.13 | 13.00 | 1.10 | 13 | 1 | | |
| | Total | mg/L | 10.80 | 35.00 | 1.10 | 25 | 1 | | |
| Cyanide | 1970s | mg/L | | | | 0 | | | |
| [a] | 2000s | mg/L | 10.00 | 10.00 | 10.00 | 4 | 4 | 20 | |
| | Total | mg/L | 10.00 | 10.00 | 10.00 | 4 | 4 | 20 | |
| Carbon dioxide | 1970s | mg/L | 8.65 | 13.00 | 2.70 | 6 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 8.65 | 13.00 | 2.70 | 6 | 0 | | |
| Chemical Oxygen Demand | 1970s | mg/L | 74.60 | 110.00 | 39.00 | 5 | 0 | | |
| | 2000s | mg/L | 61.57 | 88.50 | 33.00 | 7 | 0 | | |
| | Total | mg/L | 67.00 | 110.00 | 33.00 | 12 | 0 | | |
| Dissolved oxygen | 1970s | mg/L | | | | 0 | | | 5 |
| | 2000s | mg/L | 9.17 | 13.32 | 4.25 | 6 | 0 | | |
| | Total | mg/L | 9.17 | 13.32 | 4.25 | 6 | 0 | | |
| Carbon, dissolved organic | 1970s | mg/L | 18.60 | 37.00 | 9.00 | 5 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 18.60 | 37.00 | 9.00 | 5 | 0 | | |
| Dissolved Oxygen, field | 1970s | mg/L | 7.98 | 11.60 | 5.00 | 9 | 0 | | |
| [c] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 7.98 | 11.60 | 5.00 | 9 | 0 | | |
| Fluoride | 1970s | mg/L | 0.29 | 1.00 | 0.10 | 10 | 0 | | |
| [a] | 2000s | mg/L | 0.09 | 0.16 | 0.05 | 13 | 5 | 0.1 | |
| | Total | mg/L | 0.18 | 1.00 | 0.05 | 23 | 5 | 0.1 | |
| Bicarbonate as HCO3 | 1970s | mg/L | 56.83 | 101.00 | 19.00 | 6 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 56.83 | 101.00 | 19.00 | 6 | 0 | | |
| Hardness, total | 1970s | mg/L | 84.60 | 142.00 | 16.00 | 5 | 0 | | 250 |
| [d] | 2000s | mg/L | 63.38 | 103.00 | 16.90 | 13 | 0 | | |
| | Total | mg/L | 69.27 | 142.00 | 16.00 | 18 | 0 | | |
| Magnesium Hardness @ CaCO3 | 1970s | mg/L | 50.75 | 67.00 | 39.00 | 4 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 50.75 | 67.00 | 39.00 | 4 | 0 | | |
| Nitrate + Nitrite | 1970s | mg/L | 0.65 | 2.80 | 0.02 | 7 | 0 | | |
| [a] | 2000s | mg/L | 0.09 | 0.14 | 0.05 | 7 | 3 | 0.1 | |
| | Total | mg/L | 0.37 | 2.80 | 0.02 | 14 | 3 | 0.1 | |
| Nitrogen Nitrate | 1970s | mg/L | 0.31 | 0.44 | 0.09 | 3 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 0.31 | 0.44 | 0.09 | 3 | 0 | | |
| Nitrate | 1970s | mg/L | 5.90 | 6.90 | 4.60 | 3 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 5.90 | 6.90 | 4.60 | 3 | 0 | | |
| Nitrogen Nitrite | 1970s | mg/L | 0.02 | 0.09 | 0.01 | 6 | 0 | | |
| [b] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 0.02 | 0.09 | 0.01 | 6 | 0 | | |

**Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

## (c) Site: CN123_PM4

| General Parameters | Period | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|
| Oil and Grease | 1970s | mg/L | | | | 0 | | | 0.5 |
| [b] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | | | | 0 | | | |
| Orthophosphate, Total | 1970s | mg/L | 0.01 | 0.01 | 0.01 | 2 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 0.01 | 0.01 | 0.01 | 2 | 0 | | |
| Phosphorus ortho | 1970s | mg/L | 0.01 | 0.01 | 0.005 | 3 | 2 | 0.01 | |
| [a] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 0.01 | 0.01 | 0.005 | 3 | 2 | 0.01 | |
| Phosphorus total dissolved | 1970s | mg/L | 0.05 | 0.08 | 0.02 | 3 | 0 | | |
| [b] | 2000s | mg/L | 0.010 | 0.010 | 0.010 | 1 | 1.000 | 0.020 | |
| | Total | mg/L | 0.04 | 0.08 | 0.01 | 4 | 1 | 0.020 | |
| Phosphorus total | 1970s | mg/L | | | | 0 | | | |
| [a] | 2000s | mg/L | 0.07 | 0.21 | 0.05 | 11 | 9 | 0.10 | |
| | Total | mg/L | 0.07 | 0.21 | 0.05 | 11 | 9 | 0.10 | |
| Sulfate | 1970s | mg/L | 18.89 | 76.00 | 8.70 | 12 | 0 | | |
| | 2000s | mg/L | 7.24 | 20.00 | 0.50 | 13 | 2 | 1 | |
| [a] | Total | mg/L | 12.84 | 76.00 | 0.50 | 25 | 2 | 1 | |
| Solids, total suspended | 1970s | mg/L | 3.83 | 11.00 | 0.25 | 12 | 1 | 0.5 | |
| [b] | 2000s | mg/L | 5.29 | 10.00 | 2.00 | 7 | 0 | | |
| | Total | mg/L | 4.37 | 11.00 | 0.25 | 19 | 1 | 0.5 | |
| Carbon total | 1970s | mg/L | 5.50 | 22.00 | 0.50 | 4 | 3 | 1 | |
| [b] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 5.50 | 22.00 | 0.50 | 4 | 3 | 1 | |
| Solids, total dissolved | 1970s | mg/L | 175.00 | 200.00 | 150.00 | 2 | 0 | | 700 |
| | 2000s | mg/L | 127.62 | 340.00 | 56.00 | 13 | 0 | | |
| | Total | mg/L | 133.93 | 340.00 | 56.00 | 15 | 0 | | |
| Nitrogen total kjeldahl | 1970s | mg/L | 0.96 | 1.05 | 0.85 | 4 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 0.96 | 1.05 | 0.85 | 4 | 0 | | |
| Nitrogen total organic | 1970s | mg/L | 1.00 | 1.10 | 0.95 | 3 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 1.00 | 1.10 | 0.95 | 3 | 0 | | |
| Sulfide total | 1970s | mg/L | 0.26 | 0.60 | 0.00 | 5 | 0 | | |
| [b] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 0.26 | 0.60 | 0.00 | 5 | 0 | | |
| Nitrogen unionized ammonia | 1970s | mg/L | | | | 0 | | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | | | | 0 | | | |
| Carbon, total organic | 1970s | mg/L | 7.73 | 22.00 | 0.60 | 3 | 0 | | |
| | 2000s | mg/L | 18.00 | 33.00 | 6.60 | 11 | 0 | | |
| | Total | mg/L | 15.80 | 33.00 | 0.60 | 14 | 0 | | |

| Measurement | Period | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|
| Dissolved Oxygen | 1970s | % | 69.67 | 79.00 | 55.00 | 6 | 0 | | 5 |
| | 2000s | % | | | | 0 | | | |
| | Total | % | 69.67 | 79.00 | 55.00 | 6 | 0 | | |
| Color | 1970s | units | 157.08 | 280.00 | 50.00 | 12 | 0 | | |
| | 2000s | units | | | | 0 | | | |
| | Total | units | 157.08 | 280.00 | 50.00 | 12 | 0 | | |
| Flow | 1970s | cfs | | | | 0 | | | |
| [j] | 2000s | cfs | 53.16 | 286.60 | 2.70 | 13 | 0 | | |
| | Total | cfs | 53.16 | 286.60 | 2.70 | 13 | 0 | | |
| pH | 1970s | su | 7.18 | 7.70 | 6.50 | 12 | 0 | | 6.5-9.0 |
| | 2000s | su | 7.83 | 8.45 | 7.34 | 14 | 0 | | |
| | Total | su | 7.53 | 8.45 | 6.50 | 26 | 0 | | |
| Specific Conductance @ 25C | 1970s | umhos | 192.00 | 380.00 | 12.00 | 12 | 0 | | 1000 |
| | 2000s | umhos | 151.11 | 257.00 | 35.00 | 14 | 0 | | |
| | Total | umhos | 169.98 | 380.00 | 12.00 | 26 | 0 | | |

**Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

## (c) Site: CN123_PM4

| Measurement | Period | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|
| Temperature | 1970s | deg. C | 11.33 | 25.50 | 0.50 | 12 | 0 | | |
| | 2000s | deg. C | 12.68 | 24.40 | 0.90 | 13 | 0 | | |
| | Total | deg. C | 12.03 | 25.50 | 0.50 | 25 | 0 | | |
| Turbidity | 1970s | NTU | 6.92 | 17.00 | 2.00 | 12 | 0 | | 25 |
| | 2000s | NTU | 2.95 | 4.86 | 1.00 | 3 | 0 | | |
| | Total | NTU | 6.12 | 17.00 | 1.00 | 15 | 0 | | |

| Metals | Period | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|
| Silver | 1970s | ug/L | | | | 0 | | | 1 |
| [ab] | 2000s | ug/L | 0.29 | 0.50 | 0.10 | 9 | 9 | 0.2 - 1 | |
| | Total | ug/L | 0.23 | 0.50 | 0.10 | 9 | 9 | 0.2 - 1 | |
| Aluminum | 1970s | ug/L | 122.86 | 200.00 | 45.00 | 7 | 1 | 100 | 125 |
| [ai] | 2000s | ug/L | 275.54 | 1550.00 | 48.30 | 9 | 0 | | |
| | Total | ug/L | 208.74 | 1550.00 | 45.00 | 16 | 1 | 100 | |
| Arsenic | 1970s | ug/L | 0.78 | 1.00 | 0.50 | 5 | 2 | 1 | 53 |
| [a] | 2000s | ug/L | 1.00 | 1.00 | 1.00 | 4 | 4 | 2 | |
| | Total | ug/L | 0.88 | 1.00 | 0.50 | 9 | 6 | 1 - 2 | |
| Barium | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 8.78 | 20.10 | 5.00 | 4 | 3 | 10 | |
| | Total | ug/L | 8.78 | 20.10 | 5.00 | 4 | 3 | 10 | |
| Beryllium | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| | Total | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| Boron | 1970s | ug/L | | | | 0 | | | |
| [ai] | 2000s | ug/L | 35.26 | 92.00 | 17.50 | 9 | 6 | 35 - 40 | |
| | Total | ug/L | 35.26 | 92.00 | 17.50 | 9 | 6 | 35 - 40 | |
| Calcium | 1970s | mg/L | 27.82 | 74.00 | 4.90 | 6 | 0 | | |
| | 2000s | mg/L | 14.17 | 23.80 | 3.90 | 13 | 0 | | |
| | Total | mg/L | 18.48 | 74.00 | 3.90 | 19 | 0 | | |
| Calcium, dissolved | 1970s | mg/L | 14.00 | 17.00 | 11.00 | 2 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 14.00 | 17.00 | 11.00 | 2 | 2 | | |
| Cadmium | 1970s | ug/L | 0.02 | 0.03 | 0.02 | 4 | 0 | | 1.4 |
| [ab] | 2000s | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| | Total | ug/L | 0.05 | 0.10 | 0.02 | 8 | 4 | 0.2 | |
| Cadmium, dissolved | 1970s | ug/L | 0.02 | 0.02 | 0.02 | 1 | 0 | | 1.27 |
| | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 0.02 | 0.02 | 0.02 | 1 | 0 | | |
| Cobalt | 1970s | ug/L | 0.55 | 0.60 | 0.50 | 2 | 0 | | 5 |
| [abi] | 2000s | ug/L | 0.70 | 2.30 | 0.50 | 13 | 12 | 1 - 2.5 | |
| | Total | ug/L | 0.74 | 2.30 | 0.50 | 14 | 12 | 1 - 2.5 | |
| Chromium | 1970s | ug/L | 1.03 | 1.10 | 0.95 | 2 | 0 | | 86 |
| [a] | 2000s | ug/L | 1.30 | 2.60 | 0.50 | 4 | 1 | 1 | |
| | Total | ug/L | 1.21 | 2.60 | 0.50 | 6 | 1 | 1 | |
| Copper | 1970s | ug/L | 2.37 | 4.20 | 1.80 | 6 | 0 | | 5.2 |
| [ae] | 2000s | ug/L | 1.32 | 2.60 | 0.66 | 12 | 0 | | |
| | Total | ug/L | 1.67 | 4.20 | 0.66 | 18 | 0 | | |
| Iron | 1970s | ug/L | 1528.33 | 2700.00 | 560.00 | 12 | 0 | | |
| | 2000s | ug/L | 1997.14 | 5270.00 | 640.00 | 7 | 0 | | |
| | Total | ug/L | 1701.05 | 5270.00 | 560.00 | 19 | 0 | | |
| Iron, dissolved | 1970s | ug/L | 626.25 | 990.00 | 250.00 | 8 | 0 | | |
| | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 626.25 | 990.00 | 250.00 | 8 | 0 | | |
| Mercury | 1970s | ug/L | 0.2500 | 0.2500 | 0.2500 | 3 | 3 | 0.50 | 0.0013 |
| [abi] | 2000s | ug/L | 0.0030 | 0.0066 | 0.0010 | 13 | 8 | 0.002 - 0.01 | |
| | Total | ug/L | 0.0493 | 0.2500 | 0.0010 | 16 | 11 | 0.002 - 0.5 | |
| Methyl Mercury | 1970s | ug/L | | | | 0 | | | |
| | 2000s | ug/L | 0.000055 | 0.000081 | 0.000028 | 2 | 0 | | |
| | Total | ug/L | 0.000055 | 0.000081 | 0.000028 | 2 | 0 | | |
| Potassium | 1970s | ug/L | 2387.50 | 4200.00 | 900.00 | 8 | 0 | | |
| | 2000s | ug/L | 962.86 | 1740.00 | 600.00 | 7 | 0 | | |
| | Total | ug/L | 1722.67 | 4200.00 | 600.00 | 15 | 0 | | |

**Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

### (c) Site: CN123_PM4

| Metals | Period | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|
| Magnesium | 1970s | mg/L | 22.23 | 66.00 | 4.10 | 6 | 0 | | |
| | 2000s | mg/L | 7.13 | 11.00 | 2.70 | 13 | 0 | | |
| | Total | mg/L | 11.90 | 66.00 | 2.70 | 19 | 0 | | |
| Magnesium, dissolved | 1970s | mg/L | 7.45 | 9.00 | 5.90 | 2 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 7.45 | 9.00 | 5.90 | 2 | 0 | | |
| Manganese | 1970s | mg/L | 0.16 | 0.40 | 0.03 | 9 | 0 | | |
| | 2000s | mg/L | 0.20 | 0.78 | 0.03 | 7 | 0 | | |
| | Total | mg/L | 0.18 | 0.78 | 0.03 | 16 | 0 | | |
| Molybdenum | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 2.50 | 2.50 | 2.50 | 4 | 4 | 5 | |
| | Total | ug/L | 2.50 | 2.50 | 2.50 | 4 | 4 | 5 | |
| Sodium | 1970s | mg/L | 10.40 | 25.00 | 2.20 | 8 | 0 | | |
| | 2000s | mg/L | 2.90 | 8.77 | 1.20 | 9 | 0 | | |
| | Total | mg/L | 6.43 | 25.00 | 1.20 | 17 | 0 | | |
| Nickel | 1970s | ug/L | 1.00 | 1.00 | 1.00 | 2 | 0 | | 29 |
| [abe] | 2000s | ug/L | 1.47 | 3.60 | 0.46 | 11 | 0 | | |
| | Total | ug/L | 1.40 | 3.60 | 0.46 | 13 | 0 | | |
| Lead | 1970s | ug/L | 0.74 | 1.50 | 0.25 | 6 | 0 | | 1.32 |
| [aed] | 2000s | ug/L | 0.67 | 1.60 | 0.15 | 6 | 4 | 0.3 - 1 | |
| | Total | ug/L | 0.70 | 1.60 | 0.15 | 12 | 4 | 0.3 - 1 | |
| Palladium | 1970s | ug/L | | | | 0 | | | |
| [ae] | 2000s | ug/L | 0.15 | 0.15 | 0.15 | 1 | 1 | 0.30 | |
| | Total | ug/L | 0.15 | 0.15 | 0.15 | 1 | 1 | 0.30 | |
| Platinum | 1970s | ug/L | | | | 0 | | | |
| [ae] | 2000s | ug/L | 0.13 | 0.13 | 0.13 | 1 | 1 | 0.25 | |
| | Total | ug/L | 0.13 | 0.13 | 0.13 | 1 | 1 | 0.25 | |
| Antimony | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 1.50 | 1.50 | 1.50 | 4 | 4 | 3 | |
| | Total | ug/L | 1.50 | 1.50 | 1.50 | 4 | 4 | 3 | |
| Selenium | 1970s | ug/L | 0.50 | 0.50 | 0.50 | 1 | 1 | 1.00 | 5 |
| [ab] | 2000s | ug/L | 1.30 | 1.80 | 0.50 | 9 | 9 | 1 - 3.6 | |
| | Total | ug/L | 1.22 | 1.80 | 0.50 | 10 | 10 | 1 - 3.6 | |
| Silica | 1970s | mg/L | 10.88 | 29.00 | 4.10 | 6 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 10.88 | 29.00 | 4.10 | 6 | 0 | | |
| Silica, filtered | 1970s | mg/L | 9.28 | 18.00 | 5.10 | 6 | 6 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 9.28 | 18.00 | 5.10 | 6 | 6 | | |
| Strontium | 1970s | ug/L | | | | 0 | | | |
| | 2000s | ug/L | 38.88 | 67.70 | 17.30 | 4 | 0 | | |
| | Total | ug/L | 38.88 | 67.70 | 17.30 | 4 | 0 | | |
| Thallium | 1970s | ug/L | | | | 0 | | | |
| [ae] | 2000s | ug/L | 0.56 | 1.00 | 0.20 | 9 | 9 | 0.4 - 2 | |
| | Total | ug/L | 0.56 | 1.00 | 0.20 | 9 | 9 | 0.4 - 2 | |
| Titanium | 1970s | ug/L | | | | 0 | | | |
| [ab] | 2000s | ug/L | 5.00 | 5.00 | 5.00 | 1 | 1 | 10 | |
| | Total | ug/L | 5.00 | 5.00 | 5.00 | 3 | 3 | 10 | |
| Zinc | 1970s | ug/L | 1.97 | 2.80 | 1.20 | 6 | 0 | | 67 |
| [ad] | 2000s | ug/L | 10.22 | 16.30 | 5.00 | 15 | 9 | 10 - 25 | |
| | Total | ug/L | 7.62 | 16.30 | 1.20 | 21 | 9 | 10 - 25 | |

[a] - Material not quantified above detection limit. One-half of detection limit used in calculations.
[b] - Material present, but level was estimated in some samples. Data not used in calculations.
[c] - Some samples had percentages calculated instead of being measured in mg/L. These were not used in calculations.
[d] - One or more sample was reported as extremely high. Data thrown out of calculations
[e]- Detection limit lowered during the sampling period. High detection limit data not used in calculations.
[f]- Hardness dependent standards assume a hardness of 50mg/l.
[g]- Most limiting criteria.
[h]- Ammonia criteria is un-ionized.
[i] - Detection limit likely changed during sampling period.
[j] - Flow measured by cross-sectional velocity measurements.

Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.

**(d) Site: CN126_PM3_S1**

| General Parameters | Period | units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d,e,f] |
|---|---|---|---|---|---|---|---|---|---|
| Acidity as CaCO3 | 1970s | mg/L | 7.07 | 28.00 | 2.00 | 28 | 0 | | |
| [a] | 2000s | mg/L | 0.75 | 1.00 | 0.50 | 4 | 4 | 1 - 2 | |
| | Total | mg/L | 6.28 | 28.00 | 0.50 | 32 | 4 | 1 - 2 | |
| Alkalinity, total | 1970s | mg/L | 79.12 | 184.00 | 4.00 | 49 | 0 | | |
| | 2000s | mg/L | 82.18 | 151.00 | 40.00 | 17 | 0 | | |
| | Total | mg/L | 79.91 | 184.00 | 4.00 | 66 | 0 | | |
| Nitrogen, ammonia as N | 1970s | mg/L | 0.35 | 1.80 | 0.04 | 39 | 5 | 0.08-0.13 | 40 |
| [ah] | 2000s | mg/L | 0.04 | 0.05 | 0.01 | 8 | 5 | 0.02 | |
| | Total | mg/L | 0.30 | 1.80 | 0.01 | 47 | 10 | 0.02-0.13 | |
| Alkalinity, bicarbonate as CaCO3 | 1970s | mg/L | 50.00 | 50.00 | 50.00 | 1 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 50.00 | 50.00 | 50.00 | 1 | 0 | | |
| Biochemical Oxygen Demand | 1970s | mg/L | 0.50 | 0.50 | 0.50 | 1 | 1 | 1 | |
| (5-day) [a] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 0.50 | 0.50 | 0.50 | 1 | 1 | 1 | |
| Bromine, filtered | 1970s | mg/L | 5.00 | 5.00 | 5.00 | 1 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 5.00 | 5.00 | 5.00 | 1 | 0 | | |
| Alkalinity, carbonate as CaCO3 | 1970s | mg/L | | | | 0 | | | |
| [b] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | | | | 0 | | | |
| Carbonate | 1970s | ug/L | | | | 0 | | | |
| [b] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | | | | 0 | | | |
| Chloride | 1970s | mg/L | 29.48 | 71.00 | 4.00 | 52 | 0 | | 230 |
| | 2000s | mg/L | 6.11 | 15.70 | 2.80 | 17 | 0 | | |
| | Total | mg/L | 23.72 | 71.00 | 2.80 | 69 | 0 | | |
| Cyanide | 1970s | mg/L | 0.02 | 0.10 | 0.0015 | 20 | 9 | 0.003 - 0.01 | |
| [ah] | 2000s | mg/L | 0.01 | 0.01 | 0.0025 | 8 | 8 | 0.005-0.02 | |
| | Total | mg/L | 0.02 | 0.10 | 0.0015 | 28 | 17 | 0.003 - 0.02 | |
| Carbon dioxide | 1970s | mg/L | 28.25 | 96.00 | 4.40 | 4 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 28.25 | 96.00 | 4.40 | 4 | 0 | | |
| Chemical Oxygen Demand | 1970s | mg/L | 37.32 | 83.00 | 17.00 | 22 | 0 | | |
| | 2000s | mg/L | 37.98 | 62.00 | 16.50 | 11 | 0 | | |
| | Total | mg/L | 37.54 | 83.00 | 16.50 | 33 | 0 | | |
| Dissolved oxygen | 1970s | mg/L | 9.10 | 12.00 | 5.90 | 41 | 0 | | 5 |
| | 2000s | mg/L | 9.97 | 13.81 | 6.97 | 11 | 0 | | |
| | Total | mg/L | 9.28 | 13.81 | 5.90 | 52 | 0 | | |
| Dissolved Oxygen, field | 1970s | mg/L | 9.45 | 11.40 | 6.90 | 4 | 0 | | 5 |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 9.45 | 11.40 | 6.90 | 4 | 0 | | |
| Fluoride | 1970s | mg/L | 0.39 | 0.90 | 0.20 | 33 | 0 | | |
| [a] | 2000s | mg/L | 0.10 | 0.17 | 0.05 | 17 | 7 | 0.1 | |
| | Total | mg/L | 0.29 | 0.90 | 0.05 | 50 | 7 | 0.1 | |
| Freon Solubles, (Oil) | 1970s | mg/L | 1.12 | 7.00 | 0.50 | 25 | 20 | 1 | |
| [a] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 1.12 | 7.00 | 0.50 | 25 | 20 | 1 | |
| Bicarbonate as HCO3 | 1970s | mg/L | 101.50 | 151.00 | 37.00 | 4 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 101.50 | 151.00 | 37.00 | 4 | 0 | | |
| Hardness, total | 1970s | mg/L | 117.45 | 204.00 | 50.00 | 49 | 0 | | 250 |
| | 2000s | mg/L | 80.63 | 113.00 | 35.70 | 17 | 0 | | |
| | Total | mg/L | 107.97 | 204.00 | 35.70 | 66 | 0 | | |
| Surfactants MBAS | 1970s | mg/L | 0.06 | 0.06 | 0.06 | 1 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 0.06 | 0.06 | 0.06 | 1 | 0 | | |
| Nitrate + Nitrite | 1970s | mg/L | 3.49 | 9.20 | 0.39 | 13 | 0 | | |
| [ah] | 2000s | mg/L | 0.04 | 0.06 | 0.01 | 11 | 9 | 0.02 - 0.1 | |
| | Total | mg/L | 1.91 | 9.20 | 0.01 | 24 | 9 | 0.02 - 0.1 | |
| Nitrogen Nitrate | 1970s | mg/L | 2.57 | 8.80 | 0.20 | 26 | 0 | | |
| | 2000s | mg/L | 0.03 | 0.06 | 0.01 | 4 | 2 | 0.02 | |
| | Total | mg/L | 2.23 | 8.80 | 0.01 | 30 | 2 | 0.02 | |

Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.

**(d) Site: CN126_PM3_S1**

| General Parameters | Period | units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d,e,f] |
|---|---|---|---|---|---|---|---|---|---|
| Nitrogen Nitrite | 1970s | mg/L | 0.02 | 0.10 | 0.005 | 12 | 7 | 0.01 - 0.02 | |
| [ah] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 0.02 | 0.10 | 0.005 | 12 | 7 | 0.01 - 0.02 | |
| Oil and Grease | 1970s | mg/L | 4.21 | 14.00 | 0.50 | 14 | 2 | 1 | 0.5 |
| [ah] | 2000s | mg/L | 4.93 | 12.00 | 2.50 | 4 | 3 | 5-5.2 | |
| | Total | mg/L | 4.37 | 14.00 | 0.50 | 18 | 5 | 1 - 5.2 | |
| Phosphorus ortho | 1970s | mg/L | 0.03 | 0.04 | 0.01 | 12 | 9 | 0.02 - 0.05 | |
| [ah] | 2000s | mg/L | 0.004 | 0.006 | 0.003 | 4 | 3 | 0.006 | |
| | Total | mg/L | 0.020 | 0.040 | 0.003 | 16 | 12 | 0.006-0.05 | |
| Phosphorus total | 1970s | mg/L | 0.11 | 0.69 | 0.02 | 25 | 12 | 0.05-0.1 | |
| [ah] | 2000s | mg/L | 0.05 | 0.18 | 0.02 | 15 | 10 | 0.1 | |
| | Total | mg/L | 0.09 | 0.69 | 0.02 | 40 | 22 | 0.05-0.1 | |
| Phosphorus, dissolved | 1970s | mg/L | | | | 0 | | | |
| [a] | 2000s | mg/L | 0.01 | 0.01 | 0.01 | 1 | 1 | 0.02 | |
| | Total | mg/L | 0.01 | 0.01 | 0.01 | 1 | 1 | 0.02 | |
| Solids Settleable | 1970s | mg/L | 0.05 | 0.05 | 0.05 | 1 | 1 | 0.1 | |
| [a] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 0.05 | 0.05 | 0.05 | 1 | 1 | 0.1 | |
| Sulfate | 1970s | mg/L | 18.85 | 40.00 | 8.00 | 52 | 0 | | |
| [ah] | 2000s | mg/L | 8.31 | 22.70 | 0.41 | 17 | 1 | 1 | |
| | Total | mg/L | 16.25 | 40.00 | 0.41 | 69 | 1 | 1 | |
| Solids, total suspended | 1970s | mg/L | 4.22 | 22.00 | 0.50 | 37 | 2 | 1 | |
| [ah] | 2000s | mg/L | 3.47 | 7.00 | 0.50 | 11 | 3 | 1-5 | |
| | Total | mg/L | 4.05 | 22.00 | 0.50 | 48 | 5 | 1-5 | |
| Solids, total dissolved | 1970s | mg/L | 216 | 216 | 216 | 1 | 0 | | |
| | 2000s | mg/L | 125 | 176 | 75 | 17 | 0 | | |
| | Total | mg/L | 130 | 216 | 75 | 18 | 0 | | |
| Nitrogen total kjeldahl | 1970s | mg/L | 1.05 | 1.20 | 0.90 | 2 | 0 | 1 | 700 |
| [a] | 2000s | mg/L | 0.51 | 0.54 | 0.50 | 3 | 2 | 1 | |
| | Total | mg/L | 0.73 | 1.20 | 0.50 | 5 | 2 | 1 | |
| Nitrogen total organic | 1970s | mg/L | 0.67 | 1.80 | 0.10 | 19 | 3 | 0.2 - 0.5 | |
| [ah] | 2000s | mg/L | 0.30 | 0.30 | 0.30 | 1 | 0 | | |
| | Total | mg/L | 0.65 | 1.80 | 0.10 | 20 | 3 | 0.2 - 0.5 | |
| Sulfide total | 1970s | mg/L | 0.05 | 0.15 | 0.04 | 19 | 19 | 0.08 - 0.6 | |
| [ah] | 2000s | mg/L | 0.20 | 0.30 | 0.10 | 4 | 3 | 0.2-0.6 | |
| | Total | mg/L | 0.08 | 0.30 | 0.04 | 23 | 22 | 0.08 - 0.6 | |
| Carbon, total organic | 1970s | mg/L | 26.58 | 210.00 | 2.00 | 19 | 0 | | |
| [a] | 2000s | mg/L | 13.09 | 25.90 | 2.50 | 10 | 1 | 5 | |
| | Total | mg/L | 21.93 | 210.00 | 2.00 | 29 | 1 | 5 | |

| Measurement | Period | units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d,e,f] |
|---|---|---|---|---|---|---|---|---|---|
| Dissolved Oxygen | 1970s | % | 78.00 | 83.00 | 72.00 | 4 | 0 | | |
| | 2000s | % | | | | 0 | | | |
| | Total | % | 78.00 | 83.00 | 72.00 | 4 | 0 | | |
| Color | 1970s | units | 93.38 | 280.00 | 5.00 | 50 | 0 | | |
| | 2000s | units | 147.50 | 200.00 | 80.00 | 4 | 0 | | |
| | Total | units | 97.39 | 280.00 | 5.00 | 54 | 0 | | |
| Flow | 1970s | cfs | | | | 0 | | | |
| [i] | 2000s | cfs | 13.94 | 34.00 | 2.20 | 12 | 0 | | |
| | Total | cfs | 13.94 | 34.00 | 2.20 | 12 | 0 | | |
| Odor | 1970s | units | 2.00 | 2.00 | 2.00 | 1 | 0 | | |
| | 2000s | units | | | | 0 | | | |
| | Total | units | 2.00 | 2.00 | 2.00 | 1 | 0 | | |
| pH | 1970s | su | 7.27 | 8.70 | 6.20 | 106 | 0 | | 6.5-9.0 |
| | 2000s | su | 7.43 | 8.00 | 6.43 | 19 | 0 | | |
| | Total | su | 7.29 | 8.70 | 6.20 | 125 | 0 | | |
| Discharge | 1970s | cfs | 28.32 | 84.00 | 7.20 | 26 | 0 | | |
| | 2000s | cfs | 16.75 | 20.67 | 13.48 | 4 | 0 | | |
| | Total | cfs | 26.77 | 84.00 | 7.20 | 30 | 0 | | |
| Specific Conductance @ 25 C | 1970s | umhos | 328.87 | 690.00 | 130.00 | 63 | 0 | | 1000 |
| | 2000s | umhos | 194.22 | 468.87 | 92.00 | 18 | 0 | | |
| | Total | umhos | 298.95 | 690.00 | 92.00 | 81 | 0 | | |
| Bacteria, total coliforms | 1970s | col/100 ml | 20.00 | 20.00 | 20.00 | 1 | 0 | | |
| | 2000s | col/100 ml | | | | 0 | | | |
| | Total | col/100 ml | 20.00 | 20.00 | 20.00 | 1 | 0 | | |

Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.

**(d) Site: CN126_PM3_S1**

| **Measurement** | **Period** | units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d,e,f] |
|---|---|---|---|---|---|---|---|---|---|
| Temperature | 1970s | deg. C | 10.75 | 25.00 | -4.50 | 4 | 0 | | |
| | 2000s | deg. C | 11.28 | 21.60 | 1.10 | 12 | 0 | | |
| | Total | deg. C | 11.14 | 25.00 | -4.50 | 16 | 0 | | |
| Temperature | 1970s | deg. F | 47.95 | 69.00 | 32.00 | 40 | 0 | | |
| | 2000s | deg. F | 47.26 | 63.32 | 36.14 | 4 | 0 | | |
| | Total | deg. F | 47.89 | 69.00 | 32.00 | 44 | 0 | | |
| Turbidity | 1970s | NTU | 10.11 | 53.00 | 1.30 | 16 | 0 | | 25 |
| | 2000s | NTU | 5.81 | 14.23 | 2.00 | 5 | 0 | | |
| | Total | NTU | 9.08 | 53.00 | 1.30 | 21 | 0 | | |
| Turbidity | 1970s | JTU | 3.89 | 11.00 | 1.10 | 29 | 0 | | |
| | 2000s | JTU | | | | 0 | | | |
| | Total | JTU | 3.89 | 11.00 | 1.10 | 29 | 0 | | |

| **Metals** | **Period** | units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d,e,f] |
|---|---|---|---|---|---|---|---|---|---|
| Silver | 1970s | ug/L | 0.11 | 0.50 | 0.02 | 16 | 15 | 0.04 - 1 | 1 |
| [a] | 2000s | ug/L | 0.35 | 0.50 | 0.10 | 13 | 13 | 0.2 - 1 | |
| | Total | ug/L | 0.22 | 0.50 | 0.02 | 29 | 28 | 0.04 - 1 | |
| Silver, dissolved | 1970s | ug/L | 0.85 | 5.00 | 0.50 | 17 | 16 | 1 | 0.85 |
| [a] | 2000s | ug/L | 0.50 | 0.50 | 0.50 | 2 | 2 | 1 | |
| | Total | ug/L | 0.82 | 5.00 | 0.50 | 19 | 18 | 1 | |
| Aluminum | 1970s | ug/L | 76.04 | 205.00 | 0.50 | 14 | 1 | 1 | 125 |
| [ah] | 2000s | ug/L | 53.59 | 95.20 | 34.00 | 13 | 1 | 70 | |
| | Total | ug/L | 65.23 | 205.00 | 0.50 | 27 | 2 | 1 - 70 | |
| Aluminum, dissolved | 1970s | ug/L | 120.00 | 120.00 | 120.00 | 1 | 0 | | |
| [ah] | 2000s | ug/L | 29.25 | 36.00 | 15.00 | 4 | 1 | 70 | |
| | Total | ug/L | 47.40 | 120.00 | 15.00 | 5 | 1 | 70 | |
| Arsenic | 1970s | ug/L | 3.17 | 5.00 | 0.50 | 15 | 7 | 1 - 10 | 53 |
| [ah] | 2000s | ug/L | 1.06 | 2.00 | 0.50 | 8 | 6 | 1-2 | |
| | Total | ug/L | 2.43 | 5.00 | 0.50 | 23 | 13 | 1 - 10 | |
| Arsenic, dissolved | 1970s | ug/L | 9.40 | 30.00 | 5.00 | 15 | 9 | 10 | |
| [ah] | 2000s | ug/L | 0.90 | 1.30 | 0.50 | 2 | 1 | 1 | |
| | Total | ug/L | 8.40 | 30.00 | 0.50 | 17 | 10 | 1-10 | |
| Barium | 1970s | ug/L | 18.78 | 60.00 | 7.00 | 16 | 0 | | |
| [a] | 2000s | ug/L | 10.40 | 17.20 | 5.00 | 8 | 2 | 10 | |
| | Total | ug/L | 15.99 | 60.00 | 5.00 | 24 | 2 | 10 | |
| Barium, dissolved | 1970s | ug/L | 50.50 | 125.00 | 1.50 | 7 | 4 | 3 - 250 | |
| [ah] | 2000s | ug/L | 10.00 | 14.00 | 6.00 | 2 | 0 | | |
| | Total | ug/L | 41.50 | 125.00 | 1.50 | 9 | 4 | 3 - 250 | |
| Beryllium | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 0.08 | 0.10 | 0.04 | 8 | 8 | 0.08 - 0.2 | |
| | Total | ug/L | 0.08 | 0.10 | 0.04 | 8 | 8 | 0.08 - 0.2 | |
| Beryllium, dissolved | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 0.06 | 0.08 | 0.04 | 2 | 2 | 0.08 - 0.15 | |
| | Total | ug/L | 0.06 | 0.08 | 0.04 | 2 | 2 | 0.08 - 0.15 | |
| Bismuth | 1970s | ug/L | 8.60 | 33.00 | 0.20 | 4 | 0 | 0.4 | |
| [a] | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 8.60 | 33.00 | 0.20 | 4 | 0 | 0.4 | |
| Boron | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 68.69 | 104.00 | 17.50 | 10 | 1 | 35 | |
| | Total | ug/L | 68.69 | 104.00 | 17.50 | 10 | 1 | 35 | |
| Calcium | 1970s | mg/L | 29.03 | 49.00 | 13.00 | 34 | 0 | | |
| | 2000s | mg/L | 19.89 | 26.50 | 11.00 | 17 | 0 | | |
| | Total | mg/L | 25.98 | 49.00 | 11.00 | 51 | 0 | | |
| Calcium, dissolved | 1970s | mg/L | 29.00 | 31.00 | 27.00 | 2 | 0 | | |
| | 2000s | mg/L | 24.00 | 24.00 | 24.00 | 1 | 0 | | |
| | Total | mg/L | 27.33 | 31.00 | 24.00 | 3 | 0 | | |
| Cadmium | 1970s | ug/L | 0.08 | 0.60 | 0.02 | 34 | 15 | 0.04 - 0.1 | 2.5 |
| [ah] | 2000s | ug/L | 0.10 | 0.10 | 0.07 | 8 | 8 | 0.13-0.2 | |
| | Total | ug/L | 0.09 | 0.60 | 0.02 | 42 | 23 | 0.04-0.2 | |
| Cadmium, dissolved | 1970s | ug/L | 0.85 | 3.50 | 0.16 | 9 | 7 | 1.0-7 | 2.27 |
| [ah] | 2000s | ug/L | 0.08 | 0.10 | 0.07 | 2 | 2 | 0.13-0.2 | |
| | Total | ug/L | 0.71 | 3.50 | 0.07 | 11 | 9 | 0.13-7 | |

Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.

**(d) Site: CN126_PM3_S1**

| **Metals** | **Period** | units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d,e,f] |
|---|---|---|---|---|---|---|---|---|---|
| Cobalt | 1970s | ug/L | 0.50 | 0.50 | 0.50 | 29 | 29 | 1 | 5 |
| [ah] | 2000s | ug/L | 0.42 | 0.50 | 0.10 | 17 | 15 | 0.2-1 | |
| | Total | ug/L | 0.47 | 0.50 | 0.10 | 46 | 44 | 0.2-1 | |
| Cobalt, dissolved | 1970s | ug/L | 1.92 | 30.00 | 0.50 | 45 | 41 | 1 | |
| [a] | 2000s | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| | Total | ug/L | 1.77 | 30.00 | 0.10 | 49 | 45 | 0.2-1 | |
| Chromium | 1970s | ug/L | 0.65 | 1.90 | 0.05 | 16 | 4 | 0.1 - 0.2 | 49 |
| [ah] | 2000s | ug/L | 0.56 | 1.40 | 0.20 | 8 | 5 | 0.4 - 1 | |
| | Total | ug/L | 0.62 | 1.90 | 0.05 | 24 | 9 | 0.1 - 1 | |
| Chromium, hexavalent, filtered | 1970s | ug/L | 0.50 | 0.50 | 0.50 | 1 | 1 | 1 | |
| [a] | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 0.50 | 0.50 | 0.50 | 1 | 1 | 1 | |
| Chromium, dissolved | 1970s | ug/L | 4.11 | 30.00 | 0.50 | 9 | 7 | 1 - 2 | 42.14 |
| [a] | 2000s | ug/L | 0.65 | 1.10 | 0.20 | 2 | 1 | 0.4 | |
| | Total | ug/L | 3.48 | 30.00 | 0.20 | 11 | 8 | 0.4-2 | |
| Cesium, dissolved | 1970s | ug/L | 0.50 | 0.50 | 0.50 | 1 | 1 | 1 | |
| [a] | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 0.50 | 0.50 | 0.50 | 1 | 1 | 1 | |
| Copper | 1970s | ug/L | 1.31 | 8.00 | 0.25 | 35 | 1 | 0.5 | 5.2 |
| [ach] | 2000s | ug/L | 0.81 | 1.50 | 0.35 | 16 | 2 | 0.7 - 0.8 | |
| | Total | ug/L | 1.23 | 8.00 | 0.25 | 54 | 3 | 0.5 - 0.8 | |
| Copper, dissolved | 1970s | ug/L | 1.16 | 8.00 | 0.20 | 62 | 5 | 0.5 - 1 | 4.99 |
| [ah] | 2000s | ug/L | 0.98 | 2.30 | 0.40 | 4 | 2 | 0.8 | |
| | Total | ug/L | 2.79 | 30.00 | 0.20 | 66 | 7 | 0.5 - 1 | |
| Iron | 1970s | ug/L | 1365 | 7200 | 450 | 39 | 0 | | |
| | 2000s | ug/L | 1711 | 3200 | 890 | 11 | 0 | | |
| | Total | ug/L | 1441 | 7200 | 450 | 50 | 0 | | |
| Iron, dissolved | 1970s | ug/L | 719 | 1500 | 35 | 67 | 0 | | |
| | 2000s | ug/L | 1205 | 2000 | 550 | 4 | 0 | | |
| | Total | ug/L | 747 | 2000 | 35 | 71 | 0 | | |
| Gallium, dissolved | 1970s | ug/L | 5.00 | 5.00 | 5.00 | 1 | 0 | | |
| | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 5.00 | 5.00 | 5.00 | 1 | 0 | | |
| Germanium, dissolved | 1970s | ug/L | 4.00 | 4.00 | 4.00 | 1 | 0 | | |
| | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 4.00 | 4.00 | 4.00 | 1 | 0 | | |
| Mercury | 1970s | ug/L | 0.0967 | 0.3000 | 0.0500 | 15 | 12 | 0.1 - 0.2 | 0.0013 |
| [a] | 2000s | ug/L | 0.0030 | 0.0050 | 0.0010 | 17 | 9 | 0.002-0.01 | |
| | Total | ug/L | 0.0469 | 0.3000 | 0.0010 | 32 | 21 | 0.002-0.2 | |
| Mercury, dissolved | 1970s | ug/L | 0.30 | 1.00 | 0.05 | 12 | 8 | 0.1 - 0.2 | 0.0013 |
| [a] | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 0.30 | 1.00 | 0.05 | 12 | 8 | 0.1 - 0.2 | |
| Methyl Mercury | 1970s | ug/L | | | | | | | |
| | 2000s | ug/L | 0.000181 | 0.000300 | 0.0000610 | 2 | 0 | | |
| | Total | ug/L | 0.000181 | 0.000300 | 0.0000610 | | | | |
| Potassium | 1970s | mg/L | 2.51 | 4.90 | 1.00 | 31 | 0 | | |
| | 2000s | mg/L | 1.92 | 2.20 | 1.70 | 11 | 0 | | |
| | Total | mg/L | 2.36 | 4.90 | 1.00 | 42 | 0 | | |
| Potassium, dissolved | 1970s | mg/L | 5.15 | 5.80 | 4.50 | 2 | 0 | | |
| | 2000s | mg/L | 2.00 | 2.00 | 2.00 | 1 | 0 | | |
| | Total | mg/L | 4.10 | 5.80 | 2.00 | 3 | 0 | | |
| Lanthanum, dissolved | 1970s | ug/L | 5.00 | 5.00 | 5.00 | 1 | 0 | | |
| | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 5.00 | 5.00 | 5.00 | 1 | 0 | | |
| Lithium, filtered | 1970s | ug/L | 2.00 | 2.00 | 2.00 | 1 | 0 | | |
| | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 2.00 | 2.00 | 2.00 | 1 | 0 | | |
| Magnesium | 1970s | ug/L | 11900 | 23000 | 3700 | 31 | 0 | | |
| | 2000s | ug/L | 8159 | 11700 | 4400 | 17 | 0 | | |
| | Total | ug/L | 10575 | 23000 | 3700 | 48 | 0 | | |
| Magnesium, dissolved | 1970s | ug/L | 8100 | 16000 | 200 | 2 | 0 | | |
| | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 8100 | 16000 | 200 | 2 | 0 | | |
| Manganese | 1970s | ug/L | 153 | 1400 | 15 | 35 | 1 | 30 | |
| [a] | 2000s | ug/L | 181 | 430 | 48 | 11 | 0 | 30 | |
| | Total | ug/L | 160 | 1400 | 15 | 46 | 1 | 30 | |

Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.

**(d) Site: CN126_PM3_S1**

| **Metals** | **Period** | units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d,e,f] |
|---|---|---|---|---|---|---|---|---|---|
| Manganese, dissolved | 1970s | ug/L | 219 | 920 | 1 | 7 | 0 | | |
| | 2000s | ug/L | 127 | 240 | 40 | 4 | 0 | | |
| | Total | ug/L | 186 | 920 | 1 | 11 | 0 | | |
| Molybdenum | 1970s | ug/L | | | | 0 | | | |
| [ah] | 2000s | ug/L | 1.47 | 2.50 | 0.15 | 8 | 5 | 0.3 - 5 | |
| | Total | ug/L | 1.47 | 2.50 | 0.15 | 8 | 5 | 0.3 - 5 | |
| Molybdenum dissolved | 1970s | ug/L | 24.50 | 24.50 | 24.50 | 1 | 1 | 49 | |
| [a] | 2000s | ug/L | 0.39 | 0.56 | 0.15 | 4 | 1 | 0.3 | |
| | Total | ug/L | 5.21 | 24.50 | 0.15 | 5 | 2 | 0.3-49 | |
| Sodium | 1970s | mg/L | 13.81 | 33.00 | 1.30 | 35 | 0 | | |
| | 2000s | mg/L | 3.75 | 7.02 | 2.30 | 13 | 0 | | |
| | Total | mg/L | 11.08 | 33.00 | 1.30 | 48 | 0 | | |
| Sodium dissolved | 1970s | mg/L | 13.05 | 18.00 | 8.10 | 2 | 0 | | |
| | 2000s | mg/L | 4.00 | 4.00 | 4.00 | 1 | 0 | | |
| | Total | mg/L | 10.03 | 18.00 | 4.00 | 3 | 0 | | |
| Niobium dissolved | 1970s | ug/L | 0.50 | 0.50 | 0.50 | 1 | 1 | | |
| [a] | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 0.50 | 0.50 | 0.50 | 1 | 1 | | |
| Nickel | 1970s | ug/L | 1.51 | 8.00 | 0.50 | 35 | 25 | 1-4 | 29 |
| [ac] | 2000s | ug/L | 0.87 | 2.40 | 0.24 | 15 | 1 | 0.6 | |
| | Total | ug/L | 1.32 | 8.00 | 0.24 | 50 | 26 | 0.6-4 | |
| Nickel, dissolved | 1970s | ug/L | 2.18 | 15.00 | 0.50 | 71 | 48 | 1 - 10 | 28.91 |
| [a] | 2000s | ug/L | 0.30 | 0.30 | 0.30 | 4 | 4 | 0.6 | |
| | Total | ug/L | 2.08 | 15.00 | 0.30 | 75 | 52 | 0.6 - 10 | |
| Lead | 1970s | ug/L | 0.83 | 10.00 | 0.10 | 35 | 13 | 0.2 - 0.5 | 1.32 |
| [ac] | 2000s | ug/L | 0.22 | 0.45 | 0.15 | 13 | 8 | 0.3-1.0 | |
| | Total | ug/L | 0.69 | 10.00 | 0.10 | 48 | 21 | 0.2-1.0 | |
| Lead, dissolved | 1970s | ug/L | 2.15 | 28.00 | 0.10 | 47 | 23 | 0.2 - 10 | 1.04 |
| [a] | 2000s | ug/L | 0.15 | 0.15 | 0.15 | 2 | 2 | 0.2 - 10 | |
| | Total | ug/L | 2.07 | 28.00 | 0.10 | 49 | 25 | 0.2 - 10 | |
| Palladium | 1970s | ug/L | | | | 0 | | | |
| [ac] | 2000s | ug/L | 0.15 | 0.15 | 0.15 | 5 | 5 | 0.3 | |
| | Total | ug/L | 0.15 | 0.15 | 0.15 | 5 | 5 | 0.3 | |
| Palladium, dissolved | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 0.15 | 0.15 | 0.15 | 2 | 2 | 0.3 | |
| | Total | ug/L | 0.15 | 0.15 | 0.15 | 2 | 2 | 0.3 | |
| Platinum | 1970s | ug/L | | | | 0 | | | |
| [ac] | 2000s | ug/L | 0.13 | 0.13 | 0.13 | 5 | 5 | 0.25 | |
| | Total | ug/L | 0.13 | 0.13 | 0.13 | 5 | 5 | 0.25 | |
| Platinum, dissolved | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 0.13 | 0.13 | 0.13 | 2 | 2 | 0.25 | |
| | Total | ug/L | 0.13 | 0.13 | 0.13 | 2 | 2 | 0.25 | |
| Rubidium dissolved | 1970s | ug/L | 48.00 | 48.00 | 48.00 | 1 | 0 | | |
| | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 48.00 | 48.00 | 48.00 | 1 | 0 | | |
| Antimony | 1970s | ug/L | 0.70 | 2.00 | 0.20 | 4 | 2 | 0.4 | |
| [ah] | 2000s | ug/L | 1.29 | 1.50 | 0.47 | 5 | 4 | 3 | |
| | Total | ug/L | 1.03 | 2.00 | 0.20 | 9 | 6 | 0.4 - 3 | |
| Selenium | 1970s | ug/L | 2.47 | 15.00 | 0.50 | 15 | 14 | 1 - 30 | 5 |
| [a] | 2000s | ug/L | 1.34 | 5.00 | 0.25 | 13 | 13 | 0.5 - 3.6 | |
| | Total | ug/L | 1.94 | 15.00 | 0.25 | 28 | 27 | 0.5 - 30 | |
| Selenium, dissolved | 1970s | ug/L | 7.36 | 38.00 | 0.50 | 7 | 5 | 0.5 - 6 | |
| [a] | 2000s | ug/L | 0.38 | 0.50 | 0.25 | 2 | 2 | 0.5-1.0 | |
| | Total | ug/L | 5.81 | 38.00 | 0.25 | 9 | 7 | 0.5 - 6 | |
| Silica | 1970s | mg/L | 12.84 | 27.00 | 3.00 | 31 | 0 | | |
| | 2000s | mg/L | 13.10 | 19.00 | 9.40 | 4 | 0 | | |
| | Total | mg/L | 12.87 | 27.00 | 3.00 | 35 | 0 | | |
| Silica, filtered | 1970s | mg/L | 10.83 | 18.00 | 7.20 | 4 | 0 | | |
| | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 10.83 | 18.00 | 7.20 | 4 | 0 | | |
| Tin | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 0.50 | 0.50 | 0.50 | 1 | 1 | 1 | |
| | Total | ug/L | 0.50 | 0.50 | 0.50 | 1 | 1 | 1 | |

Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.

**(d) Site: CN126_PM3_S1**

| **Metals** | **Period** | units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d,e,f] |
|---|---|---|---|---|---|---|---|---|---|
| Tin dissolved | 1970s | ug/L | 2.00 | 2.00 | 2.00 | 1 | 1 | 4 | |
| [a] | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 2.00 | 2.00 | 2.00 | 1 | 1 | 4 | |
| Strontium | 1970s | ug/L | | | | 0 | | | |
| | 2000s | ug/L | 94.53 | 137.00 | 59.60 | 4 | 0 | | |
| | Total | ug/L | 94.53 | 137.00 | 59.60 | 4 | 0 | | |
| Strontium, dissolved | 1970s | ug/L | 430 | 430 | 430 | 1 | 0 | | |
| | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 430 | 430 | 430 | 1 | 0 | | |
| Thallium | 1970s | ug/L | | | | 0 | | | |
| [ach] | 2000s | ug/L | 0.17 | 0.21 | 0.10 | 9 | 9 | 0.2-0.41 | |
| | Total | ug/L | 0.17 | 0.21 | 0.10 | 9 | 9 | 0.2-0.41 | |
| Thallium dissolved | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 0.15 | 0.21 | 0.10 | 2 | 2 | 0.2 - 0.41 | |
| | Total | ug/L | 0.15 | 0.21 | 0.10 | 2 | 2 | 0.2 - 0.41 | |
| Titanium | 1970s | ug/L | 11.80 | 16.50 | 10.00 | 5 | 5 | 20 - 33 | |
| [ah] | 2000s | ug/L | 2.28 | 5.00 | 1.30 | 4 | 1 | 10 | |
| | Total | ug/L | 7.57 | 16.50 | 1.30 | 9 | 6 | 10-33 | |
| Titanium dissolved | 1970s | ug/L | | | | 0 | | | |
| [g] | 2000s | ug/L | 0.90 | 0.90 | 0.90 | 1 | 0 | | |
| | Total | ug/L | 0.90 | 0.90 | 0.90 | 1 | 0 | | |
| Vanadium | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 0.25 | 0.25 | 0.25 | 1 | 1 | 0.5 | |
| | Total | ug/L | 0.25 | 0.25 | 0.25 | 1 | 1 | 0.5 | |
| Vanadium, dissolved | 1970s | ug/L | 9.00 | 9.00 | 9.00 | 1 | 0 | | |
| | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 9.00 | 9.00 | 9.00 | 1 | 0 | | |
| Yttrium dissolved | 1970s | ug/L | 1.00 | 1.00 | 1.00 | 1 | 0 | | |
| | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 1.00 | 1.00 | 1.00 | 1 | 0 | | |
| Zinc | 1970s | ug/L | 4.44 | 11.00 | 0.50 | 34 | 17 | 1 - 10 | 67 |
| [agh] | 2000s | ug/L | 7.73 | 16.40 | 3.00 | 19 | 15 | 6 - 25 | |
| | Total | ug/L | 5.56 | 16.40 | 0.50 | 53 | 32 | 1 - 10 | |
| Zinc, dissolved | 1970s | ug/L | 5.80 | 26.00 | 0.50 | 63 | 30 | 1 - 10 | 66.06 |
| [ag] | 2000s | ug/L | 3.00 | 3.00 | 3.00 | 4 | 3 | 6 | |
| | Total | ug/L | 5.67 | 26.00 | 0.50 | 67 | 33 | 1 - 10 | |
| Zirconium dissolved | 1970s | ug/L | 2.00 | 2.00 | 2.00 | 1 | 1 | 4 | |
| [a] | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 2.00 | 2.00 | 2.00 | 1 | 1 | 4 | |

[a] - Material not quantified above detection limit. One-half of detection limit used in calculations.
[b] - All reported values are zeros.
[c] - Detection limit lowered during the sampling period. High detection limit data not used in calculations.
[d] - Hardness dependent standards assume a hardness of 50mg/l.
[e] - Most limiting criteria.
[f] - Ammonia criteria is un-ionized.
[g] - One or more sample was reported as extremely high. Data thrown out of calculations.
[h] - Detection limit likely changed during the sampling period.
[i] - Flow measured by cross-sectional velocity measurements.

**Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

## (e) Site: CN127

| General Parameters | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|
| Acidity as CaCO3 | [b] | mg/L | 9.60 | 9.60 | 9.60 | 10 | 3 | 1 | |
| Alkalinity, total | | mg/L | 107.73 | 140.00 | 50.00 | 11 | 0 | | |
| Nitrogen, ammonia as N | [abi] | mg/L | 0.13 | 0.29 | 0.01 | 12 | 3 | 0.01 - 0.05 | 40 |
| Carbonate | [e] | mg/L | | | | 0 | | | |
| Carbonate as CO3 | | mg/L | 45.44 | 76.00 | 16.00 | 9 | 0 | | |
| Calcium Hardness @ CaCO3 | | mg/L | 86.67 | 110.00 | 56.00 | 6 | 0 | | |
| Chloride | | mg/L | 4.44 | 21.00 | 0.10 | 137 | 0 | | 230 |
| Cyanide | | mg/L | 0.001 | 0.001 | 0.001 | 2 | 0 | | |
| Carbon dioxide | | mg/L | 3.89 | 12.00 | 1.30 | 12 | 0 | | |
| Chemical Oxygen Demand | | mg/L | 32.40 | 58.00 | 10.00 | 10 | 0 | | |
| Carbon, dissolved organic | | mg/L | 11.56 | 22.00 | 5.20 | 9 | 0 | | |
| Dissolved Oxygen, field | [c] | mg/L | 9.57 | 12.90 | 6.10 | 19 | 0 | | 5 |
| Fluoride | | mg/L | 0.44 | 4.00 | 0.10 | 21 | 0 | | |
| Bicarbonate as HCO3 | | mg/L | 52.51 | 148.00 | 11.00 | 127 | 0 | | |
| Hardness, total | [d] | mg/L | 44.25 | 232.00 | 5.00 | 122 | 0 | | 250 |
| Magnesium Hardness @ CaCO3 | | mg/L | 95.83 | 140.00 | 51.00 | 6 | 0 | | |
| Nitrate + Nitrite | | mg/L | 0.37 | 0.74 | 0.03 | 13 | 0 | | |
| Nitrogen Nitrate | | mg/L | 0.35 | 0.73 | 0.10 | 7 | 0 | | |
| Nitrate | | mg/L | 1.69 | 6.60 | 0.10 | 98 | 0 | | |
| Nitrogen Nitrite | [ab] | mg/L | 0.009 | 0.020 | 0.005 | 12 | 6 | 0.01 - 0.02 | |
| Oil and Grease | [b] | mg/L | 1.50 | 2.00 | 1.00 | 10 | 4 | 0.5 | 0.5 |
| Orthophosphate, Total | | mg/L | 0.02 | 0.06 | 0.003 | 4 | 0 | | |
| Phenols, Total | [b] | mg/L | 2.00 | 2.00 | 2.00 | 4 | 2 | 2 | 123 |
| Phosphate | | mg/L | 0.04 | 0.17 | 0.01 | 29 | 0 | | |
| Phosphorus, ortho | [a] | mg/L | 0.02 | 0.05 | 0.01 | 5 | 2 | 0.01 | |
| Phosphorus, total dissolved | | mg/L | 0.02 | 0.07 | 0.01 | 6 | 0 | | |
| Phosphorus | [a] | mg/L | 0.03 | 0.04 | 0.005 | 7 | 1 | 0.01 | |
| Sulfate | | mg/L | 27.79 | 180.00 | 1.40 | 137 | 0 | | |
| Solids, total suspended | [b] | mg/L | 4.10 | 9.00 | 0.80 | 24 | 1 | 0.5 | |
| Carbon total | [e] | mg/L | | | | 0 | | | |
| Solids, total dissolved | | mg/L | 114.17 | 350.00 | 52.00 | 118 | 0 | | 700 |
| Nitrogen, total kjeldahl | | mg/L | 0.50 | 0.75 | 0.21 | 6 | 0 | | |
| Nitrogen, total organic | | mg/L | 0.67 | 1.20 | 0.07 | 6 | 0 | | |
| Solids, total | | mg/L | 16.00 | 16.00 | 16.00 | 1 | 0 | | |
| Sulfide total | [b] | mg/L | 0.31 | 1.00 | 0.00 | 10 | 4 | 0.01 | |
| Nitrogen, unionized ammonia | [b] | mg/L | | | | 0 | | | |
| Carbon, total organic | | mg/L | 7.40 | 20.00 | 0.80 | 5 | 0 | | |

| Measurement | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|
| Dissolved Oxygen | | % | 85.92 | 95.00 | 73.00 | 12 | 0 | | 5 |
| Color | | | 95.61 | 210.00 | 10.00 | 125 | 0 | | |
| Gross Alpha | [a] | pCi/L | 0.20 | 0.20 | 0.20 | 2 | 2 | 0.4 | |
| Gross Beta | [a] | pCi/L | 2.65 | 5.10 | 0.20 | 2 | 1 | 0.4 | |
| Gross Beta | [a] | pCi/g | 0.20 | 0.20 | 0.20 | 2 | 2 | 0.4 | |
| Sodium Absorption Ratio | | su | 0.27 | 0.60 | 0.10 | 70 | 0 | | |
| pH | | units | 7.10 | 8.20 | 6.00 | 137 | 0 | | 6.5-9.0 |
| Specific Conductance @ 25 C | | umhos | 159.62 | 540.00 | 48.00 | 138 | 0 | | 1000 |
| Temperature | | deg. C | 10.44 | 29.00 | -7.00 | 24 | 0 | | |
| Turbidity | | NTU | 3.37 | 17.00 | 1.00 | 23 | 0 | | 25 |

**Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

### (e) Site: CN127

| **Metals** | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|
| Silver | [e] | ug/L | | | | 0 | | | 1 |
| Aluminum | | ug/L | 427.95 | 1300.00 | 24.00 | 41 | 0 | | 125 |
| Arsenic | [a] | ug/L | 1.01 | 3.00 | 0.40 | 10 | 2 | 1 | 53 |
| Barium | [ai] | ug/L | 36.00 | 50.00 | 18.00 | 4 | 2 | 100 | |
| Boron | | ug/L | 64.00 | 150.00 | 20.00 | 30 | 0 | | |
| Boron, dissolved | | ug/L | 80.71 | 760.00 | 20.00 | 70 | 0 | | |
| Calcium | | mg/L | 50.27 | 120.00 | 5.20 | 12 | 0 | | |
| Calcium, dissolved | | mg/L | 12.37 | 41.00 | 4.00 | 102 | 0 | | |
| Cadmium | [b] | ug/L | 0.02 | 0.04 | 0.01 | 10 | 0 | | 2.5 |
| Cadmium, dissolved | | ug/L | 0.02 | 0.02 | 0.02 | 1 | 0 | | 2.3 |
| Cobalt | [b] | ug/L | 1.46 | 2.30 | 0.50 | 7 | 0 | | 5 |
| Cobalt, dissolved | | ug/L | 1.60 | 1.60 | 1.60 | 1 | 0 | | |
| Chromium | | ug/L | 1.06 | 2.10 | 0.63 | 4 | 0 | | 86 |
| Copper | | ug/L | 1.99 | 3.80 | 0.50 | 11 | 0 | | 5.2 |
| Copper, dissolved | | ug/L | 1.00 | 1.00 | 1.00 | 1 | 0 | | |
| Iron | | ug/L | 620.86 | 1200.00 | 260.00 | 81 | 0 | | |
| Iron, dissolved | | ug/L | 243.13 | 580.00 | 70.00 | 16 | 0 | | |
| Mercury | [abi] | ug/L | 0.2414 | 0.2500 | 0.1900 | 7 | 6 | 0.5 | 0.0013 |
| Potassium | | mg/L | 4.16 | 8.40 | 1.30 | 14 | 0 | | |
| Potassium, dissolved | | mg/L | 1.36 | 6.40 | 0.20 | 93 | 0 | | |
| Magnesium | | mg/L | 49.12 | 150.00 | 4.40 | 12 | 0 | | |
| Magnesium, dissolved | | mg/L | 6.36 | 30.00 | 1.80 | 102 | 0 | | |
| Manganese | | ug/L | 114.60 | 720.00 | 10.00 | 55 | 0 | | |
| Manganese, dissolved | | ug/L | 50.00 | 50.00 | 50.00 | 1 | 0 | | |
| Sodium | | mg/L | 10.34 | 23.00 | 1.10 | 14 | 0 | | |
| Sodium dissolved | | mg/L | 4.02 | 13.00 | 0.50 | 114 | 0 | | |
| Nickel | [abd] | ug/L | 5.47 | 7.40 | 2.00 | 3 | 0 | | 29 |
| Nickel, dissolved | | ug/L | 1.80 | 1.80 | 1.80 | 1 | 0 | | 28.9 |
| Lead | | ug/L | 1.28 | 2.50 | 0.27 | 11 | 0 | | 1.32 |
| Lead, dissolved | | ug/L | 2.60 | 2.60 | 2.60 | 1 | 0 | | 1.04 |
| Selenium | [ab] | ug/L | 0.50 | 0.50 | 0.50 | 7 | 7 | 1 | 5 |
| Silica | | mg/L | 14.60 | 24.00 | 4.60 | 11 | 0 | | |
| Silica, filtered | | mg/L | 9.59 | 19.00 | 3.40 | 105 | 0 | | |
| Titanium | [e] | ug/L | | | | 0 | | | |
| Zinc | | ug/L | 1.55 | 4.90 | 0.50 | 11 | 0 | | 67 |

[a] - Material not quantified above detection limit. One-half of detection limit used in calculations.
[b] - Material present, but level was estimated in some samples. Data not used in calculations.
[c] - Some samples had percentages calculated instead of being measured in mg/L. These were not used in calculations.
[d] - One sample was calculated and reported as extremely high. Data thrown out of calculations
[e] - All reported values are zeros
[f]- Hardness dependent standards assume a hardness of 50mg/l.
[g]- Most limiting criteria.
[h]- Ammonia criteria is un-ionized.
[i] - Detection limit likely changed during the sampling period.

**Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

### (f) Site: PM1

| General Parameters | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d,e,f] |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, total | | mg/L | 95.71 | 106.00 | 92.00 | 9 | 0 | | |
| Nitrogen, ammonia as N | [a] | ug/L | 50.00 | 50.00 | 50.00 | 4 | 4 | 100 | 40 |
| Chloride | | mg/L | 1.59 | 1.90 | 0.90 | 9 | 0 | | 230 |
| Cyanide | [a] | ug/L | 10.00 | 10.00 | 10.00 | 4 | 4 | 20 | |
| Chemical Oxygen Demand | [ah] | mg/L | 8.39 | 24.00 | 0.50 | 7 | 2 | 1 - 10 | |
| Dissolved oxygen | | mg/L | 11.36 | 15.20 | 9.30 | 3 | 0 | | 5 |
| Fluoride | | mg/L | 0.14 | 0.17 | 0.11 | 9 | 0 | | |
| Hardness, total | | mg/L | 96.33 | 110.00 | 77.50 | 9 | 0 | | 250 |
| Nitrate + Nitrite | [a] | ug/L | 121.43 | 200.00 | 50.00 | 7 | 3 | 100 | |
| Phosphorus, dissolved | [a] | mg/L | 0.01 | 0.01 | 0.01 | 1 | 2 | 0.02 | |
| Phosphorus total | [a] | ug/L | 71.43 | 140.00 | 50.00 | 7 | 4 | 100 | |
| Sulfate | | mg/L | 22.06 | 26.10 | 19.30 | 9 | 0 | | |
| Solids, total suspended | [a] | mg/L | 1.21 | 3.00 | 0.50 | 7 | 3 | 1 | |
| Solids, total dissolved | | mg/L | 117.78 | 144.00 | 93.00 | 9 | 0 | | 700 |
| Carbon, total organic | | mg/L | 2.11 | 2.40 | 1.80 | 7 | 0 | | |

| Measurement | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d,e,f] |
|---|---|---|---|---|---|---|---|---|---|
| Flow | [b] | cfs | | | | 0 | | | |
| pH | | units | 8.35 | 8.73 | 8.00 | 10 | 0 | | 6.5-9.0 |
| Specific Conductance @ 25 C | | umhos | 231.39 | 246.90 | 214.00 | 10 | 0 | | 1000 |
| Temperature | | deg C | 13.71 | 21.40 | 4.00 | 9 | 0 | | |
| Turbidity | | NTU | 0.89 | 1.20 | 0.47 | 3 | 0 | | 25 |

| Metals | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d,e,f] |
|---|---|---|---|---|---|---|---|---|---|
| Silver | [ah] | ug/L | 0.29 | 0.50 | 0.10 | 9 | 9 | 0.20 - 1 | 1 |
| Aluminum | [ah] | ug/L | 16.91 | 33.9 | 5 | 9 | 4 | 10 - 25 | 125 |
| Arsenic | [a] | ug/L | 6.53 | 11.70 | 1.00 | 4 | 1 | 2 | 53 |
| Barium | [a] | ug/L | 5.00 | 5.00 | 5.00 | 4 | 4 | 10 | |
| Beryllium | [a] | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| Boron | | ug/L | 95.97 | 116.00 | 80.90 | 9 | 0 | | |
| Calcium | | mg/L | 24.47 | 25.90 | 23.10 | 9 | 0 | | |
| Cadmium | [a] | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | 2.5 |
| Cobalt | [a] | ug/L | 0.50 | 0.50 | 0.50 | 7 | 7 | 1 | 5 |
| Chromium | [a] | ug/L | 0.50 | 0.50 | 0.50 | 4 | 4 | 1 | 86 |
| Copper | [ac] | ug/L | 1.24 | 2.50 | 0.33 | 6 | 2 | 0.66 | 9.3 |
| Iron | [a] | ug/L | 30.00 | 50.00 | 15.00 | 6 | 2 | 30 | |
| Mercury | [ah] | ug/L | 0.0025 | 0.0050 | 0.0007 | 9 | 5 | 0.002 - 0.01 | 0.0013 |
| Potassium | | ug/L | 2654 | 3000 | 2380 | 7 | 0 | | |
| Magnesium | | ug/L | 10511 | 11000 | 10100 | 9 | 0 | | |
| Manganese | [a] | ug/L | 8.57 | 10.00 | 5.00 | 7 | 2 | 10 | |
| Molybdenum | [a] | ug/L | 2.50 | 2.50 | 2.50 | 4 | 4 | 5 | |
| Sodium | | ug/L | 4779 | 5700 | 4100 | 9 | 0 | | |
| Nickel | [ac] | ug/L | 0.54 | 1.20 | 0.30 | 5 | 3 | 0.6 | 52 |
| Lead | [ac] | ug/L | 0.18 | 0.30 | 0.15 | 5 | 5 | 0.3 | 3.18 |
| Palladium | [ac] | ug/L | 0.15 | 0.15 | 0.15 | 1 | 1 | 0.3 | |
| Platinum | [ac] | ug/L | 0.13 | 0.13 | 0.13 | 1 | 1 | 0.25 | |
| Antimony | [a] | ug/L | 1.50 | 1.50 | 1.50 | 4 | 4 | 3 | |
| Selenium | [ah] | ug/L | 1.74 | 5.00 | 0.50 | 9 | 9 | 1 - 10 | 5 |
| Strontium | | ug/L | 156.50 | 161.00 | 148.00 | 4 | 0 | | |
| Thallium | [ac] | ug/L | 0.29 | 0.63 | 0.20 | 5 | 4 | 0.4 | |
| Titanium | [a] | ug/L | 5.00 | 5.00 | 5.00 | 1 | 1 | 10 | |
| Zinc | [ag] | ug/L | 7.33 | 12.60 | 5.00 | 9 | 5 | 10 | 120 |

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[a] - Material not quantified above detection limit. One-half of detection limit used in calculations.
[b] - All reported values are zeros.
[c]- Detection limit lowered during the sampling period. High detection limit data not used in calculations.
[d]- Hardness dependent standards assume a hardness of 100mg/l.
[e]- Most limiting criteria.
[f]- Ammonia criteria is un-ionized.
[g] - One or more sample was reported as extremely high. Data thrown out of calculations.
[h] - Detection limit likely changed during the sampling period.

**Table B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

## (g) Site: PM16

| General Parameters | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [c,d,e] |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, total | | mg/L | 130.13 | 853.00 | 30.00 | 13 | 0 | | |
| Nitrogen, ammonia as N | [a] | mg/L | 0.07 | 0.14 | 0.05 | 4 | 3 | 0.1 | 40 |
| Chloride | | mg/L | 6.79 | 16.00 | 2.10 | 13 | 0 | | 230 |
| Cyanide | [a] | ug/L | 10.00 | 10.00 | 10.00 | 4 | 4 | 20 | |
| Chemical Oxygen Demand | | mg/L | 40.86 | 77.00 | 19.00 | 7 | 0 | | |
| Dissolved oxygen | | mg/L | 9.76 | 14.81 | 2.66 | 6 | 0 | | 5 |
| Fluoride | [a] | mg/L | 0.10 | 0.17 | 0.05 | 13 | 5 | 0.1 | |
| Hardness, total | | mg/L | 77.91 | 116.00 | 30.20 | 13 | 0 | | 250 |
| Nitrate + Nitrite | [a] | ug/L | 58.57 | 110.00 | 50.00 | 7 | 6 | 100 | |
| Phosphorus total | [a] | ug/L | 50.00 | 50.00 | 50.00 | 11 | 11 | 100 | |
| Sulfate | [a] | mg/L | 8.60 | 22.00 | 0.50 | 13 | 2 | 1 | |
| Solids, total suspended | [a] | mg/L | 4.14 | 11.00 | 0.50 | 7 | 2 | 1 | |
| Solids, total dissolved | | mg/L | 132.85 | 314.00 | 66.00 | 13 | 0 | | 700 |
| Carbon, total organic | | mg/L | 13.37 | 29.50 | 6.70 | 11 | 0 | | |

| Measurement | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [c,d,e] |
|---|---|---|---|---|---|---|---|---|---|
| Flow | [h] | cfs | 16.88 | 53.90 | 0.70 | 13 | 0 | | |
| pH | | units | 7.64 | 8.14 | 6.01 | 14 | 0 | | 6.5-9.0 |
| Specific Conductance @ 25 C | | umhos | 187.57 | 275.90 | 72.00 | 13 | 0 | | 1000 |
| Temperature | | deg C | 11.08 | 20.70 | 0.10 | 13 | 0 | | |
| Turbidity | | NTU | 3.06 | 4.00 | 2.00 | 3 | 0 | | 40 |

| Metals | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [c,d,e] |
|---|---|---|---|---|---|---|---|---|---|
| Silver | [ag] | ug/L | 0.29 | 0.50 | 0.10 | 9 | 9 | 0.20 - 1 | 1 |
| Aluminum | | ug/L | 71.33 | 125.00 | 12.50 | 9 | 1 | 25 | 125 |
| Arsenic | [a] | ug/L | 1.00 | 1.00 | 1.00 | 4 | 4 | 2 | 53 |
| Barium | [a] | ug/L | 5.00 | 5.00 | 5.00 | 4 | 4 | 10 | |
| Beryllium | [a] | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| Boron | [a] | ug/L | 61.13 | 109.00 | 17.50 | 9 | 1 | 35 | |
| Calcium | | mg/L | 18.89 | 27.20 | 8.90 | 13 | 0 | | |
| Cadmium | [a] | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | 1.4 |
| Cobalt | [a] | ug/L | 0.56 | 1.25 | 0.50 | 13 | 13 | 1 | 5 |
| Chromium | [a] | ug/L | 1.50 | 2.50 | 0.50 | 4 | 1 | 1 | 49 |
| Copper | [ab] | ug/L | 1.04 | 1.50 | 0.35 | 4 | 1 | 0.7 | 5.2 |
| Iron | | ug/L | 1351.43 | 1810.00 | 870.00 | 7 | 0 | | |
| Mercury | [ag] | ug/L | 0.0025 | 0.0050 | 0.0010 | 13 | 8 | 0.002 - 0.01 | 0.0013 |
| Methyl Mercury | | ug/L | 0.00014 | 0.00026 | 0.00003 | 2 | 1 | 0.000056 | |
| Potassium | [a] | ug/L | 1641.43 | 1940.00 | 1250.00 | 7 | 1 | 2500 | |
| Magnesium | | ug/L | 8130.77 | 11600.00 | 4100.00 | 13 | 0 | | |
| Manganese | | ug/L | 128.57 | 220.00 | 70.00 | 7 | 0 | | |
| Molybdenum | [a] | ug/L | 2.50 | 2.50 | 2.50 | 4 | 4 | 5 | |
| Sodium | | ug/L | 3511.11 | 7700.00 | 1900.00 | 9 | 0 | | |
| Nickel | [ab] | ug/L | 1.12 | 3.50 | 0.30 | 11 | 0 | | 29 |
| Lead | [ab] | ug/L | 0.15 | 0.15 | 0.15 | 5 | 5 | 0.3 | 1.32 |
| Palladium | [ab] | ug/L | 0.15 | 0.15 | 0.15 | 1 | 1 | 0.3 | |
| Platinum | [ab] | ug/L | 0.13 | 0.13 | 0.13 | 1 | 1 | 0.25 | |
| Antimony | [a] | ug/L | 1.50 | 1.50 | 1.50 | 4 | 4 | 3 | |
| Selenium | [ag] | ug/L | 1.30 | 1.80 | 0.50 | 9 | 9 | 1 - 3.6 | 5 |
| Strontium | | ug/L | 79.30 | 128.00 | 45.20 | 4 | 0 | | |
| Thallium | [ab] | ug/L | 0.20 | 0.20 | 0.20 | 5 | 5 | 0.4 | |
| Titanium | [a] | ug/L | 5.00 | 5.00 | 5.00 | 1 | 1 | 10 | |
| Zinc | [af] | ug/L | 9.15 | 18.10 | 5.00 | 15 | 1 | 10 | 67 |

[a] - Material not quantified above detection limit. One-half of detection limit used in calculations.
[b] - Detection limit lowered during the sampling period. High detection limit data not used in calculations.
[c] - Hardness dependent standards assume a hardness of 50mg/l.
[d] - Most limiting criteria.
[e] - Ammonia criteria is un-ionized.
[f] - One or more sample was reported as extremely high. Data thrown out of calculations
[g] - Detection limit likely changed during the sampling period.
[h] - Flow measured by cross-sectional velocity measurements.

**B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

## (h) Site: S4

| General Parameters | Period | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [b,c,d] |
|---|---|---|---|---|---|---|---|---|---|
| Acidity as CaCO3 | 1970s | mg/L | 8.10 | 16.00 | 2.00 | 21 | 0 | | |
| [a] | 2000s | mg/L | 1.00 | 2.00 | 0.50 | 4 | 0 | | |
| | Total | mg/L | 6.96 | 16.00 | 0.50 | 25 | 0 | | |
| Alkalinity, total | 1970s | mg/L | 77.68 | 156.00 | 10.00 | 40 | 0 | | |
| | 2000s | mg/L | 71.00 | 96.00 | 40.00 | 4 | 0 | | |
| | Total | mg/L | 77.07 | 156.00 | 10.00 | 44 | 0 | | |
| Nitrogen, ammonia as N | 1970s | mg/L | 0.38 | 1.40 | 0.06 | 19 | 2 | 0.11 - 1.0 | 40 |
| [af] | 2000s | mg/L | 0.04 | 0.07 | 0.01 | 4 | 1 | 0.02 | |
| | Total | mg/L | 0.32 | 1.40 | 0.01 | 23 | 3 | 0.02-1.0 | |
| Chloride | 1970s | mg/L | 28.83 | 44.00 | 14.00 | 29 | 0 | | 230 |
| | 2000s | mg/L | 2.50 | 3.00 | 2.00 | 4 | 0 | | |
| | Total | mg/L | 25.64 | 44.00 | 2.00 | 33 | 0 | | |
| Cyanide | 1970s | mg/L | 0.0189 | 0.1800 | 0.0040 | 13 | 8 | 0.01 | |
| [af] | 2000s | mg/L | 0.0025 | 0.0025 | 0.0025 | 4 | 4 | 0.01 | |
| | Total | mg/L | 0.0151 | 0.1800 | 0.0025 | 17 | 12 | 0.005-0.01 | |
| Chemical Oxygen Demand | 1970s | mg/L | 29.31 | 64.00 | 16.00 | 13 | 0 | | |
| [a] | 2000s | mg/L | 26.50 | 48.00 | 10.00 | 4 | 1 | 20 | |
| | Total | mg/L | 28.65 | 64.00 | 10.00 | 17 | 1 | 20 | |
| Dissolved oxygen | 1970s | mg/L | 6.69 | 9.80 | 3.30 | 28 | 0 | | 5 |
| | 2000s | mg/L | 4.95 | 7.75 | 1.22 | 4 | 0 | | |
| | Total | mg/L | 6.47 | 9.80 | 1.22 | 32 | 0 | | |
| Fluoride | 1970s | ug/L | 0.39 | 0.60 | 0.05 | 24 | 1 | 0.10 | |
| [a] | 2000s | mg/L | 0.08 | 0.12 | 0.05 | 4 | 2 | 0.10 | |
| | Total | mg/L | 0.34 | 0.60 | 0.05 | 28 | 3 | 0.10 | |
| Freon Solubles, (Oil) | 1970s | mg/L | 3.09 | 12.00 | 0.50 | 17 | 11 | 1 | |
| [a] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 3.09 | 12.00 | 0.50 | 17 | 11 | 1 | |
| Hardness, total | 1970s | mg/L | 115.33 | 186.00 | 40.00 | 40 | 0 | | 250 |
| | 2000s | mg/L | 75.00 | 100.00 | 46.00 | 4 | 0 | | |
| | Total | mg/L | 111.66 | 186.00 | 40.00 | 44 | 0 | | |
| Nitrate + Nitrite | 1970s | mg/L | 0.01 | 0.01 | 0.003 | 2 | 0 | | |
| [a] | 2000s | mg/L | 0.03 | 0.06 | 0.01 | 4 | 2 | 0.02 | |
| | Total | mg/L | 0.02 | 0.06 | 0.003 | 6 | 2 | 0.02 | |
| Nitrogen Nitrate | 1970s | mg/L | 0.004 | 0.01 | 0.001 | 17 | 0 | | |
| [a] | 2000s | mg/L | 0.02 | 0.04 | 0.01 | 4 | 2 | 0.02 | |
| | Total | mg/L | 0.01 | 0.04 | 0.00 | 21 | 2 | 0.02 | |
| Nitrogen Nitrite | 1970s | mg/L | 0.02 | 0.07 | 0.005 | 11 | 6 | 0.01 - 0.02 | |
| [a] | 2000s | mg/L | | | | 0 | | | |
| | Total | mg/L | 0.02 | 0.07 | 0.005 | 11 | 6 | 0.01 - 0.02 | |
| Oil and Grease | 1970s | mg/L | 1.00 | 1.00 | 1.00 | 2 | 0 | | 0.5 |
| [a] | 2000s | mg/L | 2.61 | 2.75 | 2.50 | 4 | 4 | 5 - 5.5 | |
| | Total | mg/L | 2.08 | 2.75 | 1.00 | 6 | 4 | 5 - 5.5 | |
| Phosphorus ortho | 1970s | mg/L | 0.025 | 0.040 | 0.020 | 11 | 8 | 0.05 | |
| [a] | 2000s | mg/L | 0.003 | 0.003 | 0.003 | 4 | 4 | 0.006 | |
| | Total | mg/L | 0.02 | 0.04 | 0.003 | 15 | 12 | 0.006 - 0.05 | |
| Phosphorus total | 1970s | mg/L | 0.23 | 0.50 | 0.01 | 17 | 14 | 0.01 - 0.1 | |
| [af] | 2000s | mg/L | 0.03 | 0.04 | 0.02 | 4 | 0 | | |
| | Total | mg/L | 0.19 | 0.50 | 0.01 | 21 | 14 | 0.01 - 0.1 | |
| Sulfate | 1970s | mg/L | 20.14 | 40.00 | 3.00 | 29 | 0 | | |
| | 2000s | mg/L | 7.85 | 9.00 | 6.20 | 4 | 0 | | |
| | Total | mg/L | 18.65 | 40.00 | 3.00 | 33 | 0 | | |
| Solids, total suspended | 1970s | mg/L | 3.44 | 18.00 | 1.00 | 25 | 0 | | |
| [af] | 2000s | mg/L | 3.16 | 6.00 | 1.65 | 4 | 3 | 3.3 - 5 | |
| | Total | mg/L | 3.40 | 18.00 | 1.00 | 29 | 3 | 3.3 - 5 | |
| Solids, total dissolved | 1970s | mg/L | | | | 0 | | | 700 |
| | 2000s | mg/L | 120.00 | 150.00 | 95.00 | 4 | 0 | | |
| | Total | mg/L | 120.00 | 150.00 | 95.00 | 4 | 0 | | |

**B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

## (h) Site: S4

| General Parameters | Period | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [b,c,d] |
|---|---|---|---|---|---|---|---|---|---|
| Nitrogen total kjeldahl | 1970s | mg/L | | | | 0 | | | |
| [a] | 2000s | mg/L | 0.42 | 0.50 | 0.25 | 3 | 3 | 0.5 - 1 | |
| | Total | mg/L | 0.42 | 0.50 | 0.25 | 3 | 3 | 0.5 - 1 | |
| Nitrogen total organic | 1970s | mg/L | 0.69 | 1.40 | 0.05 | 15 | 5 | 0.1 - 0.5 | |
| [af] | 2000s | mg/L | 0.32 | 0.32 | 0.32 | 1 | 0 | | |
| | Total | mg/L | 0.67 | 1.40 | 0.05 | 16 | 5 | 0.1 - 0.5 | |
| Sulfide total | 1970s | mg/L | 0.08 | 0.50 | 0.04 | 19 | 19 | 0.08 - 0.6 | |
| [af] | 2000s | mg/L | 0.14 | 0.30 | 0.08 | 4 | 4 | 0.15 | |
| | Total | mg/L | 0.09 | 0.50 | 0.04 | 23 | 23 | 0.08 - 0.6 | |
| Carbon, total organic | 1970s | mg/L | 14.45 | 26.00 | 8.00 | 11 | 0 | | |
| | 2000s | mg/L | 9.73 | 14.00 | 7.30 | 4 | 0 | | |
| | Total | mg/L | 13.19 | 26.00 | 7.30 | 15 | 0 | | |

| Measurement | Period | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [b,c,d] |
|---|---|---|---|---|---|---|---|---|---|
| Color | 1970s | units | 84.46 | 300.00 | 40.00 | 28 | 0 | | |
| | 2000s | units | 122.50 | 240.00 | 60.00 | 4 | 0 | | |
| | Total | units | 89.22 | 300.00 | 40.00 | 32 | 0 | | |
| pH | 1970s | units | 7.01 | 7.60 | 6.30 | 68 | 0 | | 6.5-9.0 |
| | 2000s | units | 6.81 | 7.70 | 6.20 | 6 | 0 | | |
| | Total | units | 7.00 | 7.70 | 6.20 | 74 | 0 | | |
| Discharge | 1970s | cfs | 11.50 | 11.50 | 11.50 | 1 | 0 | | |
| | 2000s | cfs | 11.60 | 15.12 | 6.75 | 4 | 0 | | |
| | Total | cfs | 11.58 | 15.12 | 6.75 | 5 | 0 | | |
| Specific Conductance 25 C | 1970s | umhos | 333 | 690 | 40 | 38 | 0 | | 1000 |
| | 2000s | umhos | 182 | 347 | 93 | 5 | 0 | | |
| | Total | umhos | 316 | 690 | 40 | 43 | 0 | | |
| Temperature | 1970s | deg. C | | | | 0 | 0 | | |
| | 2000s | deg. C | 11.08 | 22.10 | 2.30 | 4 | 0 | | |
| | Total | deg. C | 11.08 | 22.10 | 2.30 | 4 | 0 | | |
| Temperature | 1970s | deg. F | 45.69 | 67.00 | 32.00 | 26 | 0 | | |
| | 2000s | deg. F | | | | 0 | | | |
| | Total | deg. F | 45.69 | 67.00 | 32.00 | 26 | 0 | | |
| Turbidity | 1970s | NTU | 4.84 | 7.50 | 2.90 | 5 | 0 | | 25 |
| | 2000s | NTU | 4.62 | 9.53 | 1.72 | 3 | 0 | | |
| | Total | NTU | 4.76 | 9.53 | 1.72 | 8 | 0 | | |
| Turbidity | 1970s | JTU | 3.60 | 6.90 | 1.30 | 22 | 0 | | |
| | 2000s | JTU | | | | 0 | | | |
| | Total | JTU | 3.60 | 6.90 | 1.30 | 22 | 0 | | |

| Semivolatile Organic Compounds | Period | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [b,c,d] |
|---|---|---|---|---|---|---|---|---|---|
| Phenol | 1970s | ug/L | 2.92 | 16.00 | 1.00 | 12 | 8 | 2 | 123 |
| [a] | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 2.92 | 16.00 | 1.00 | 12 | 8 | 2 | |

| Metals | Period | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [b,c,d] |
|---|---|---|---|---|---|---|---|---|---|
| Silver | 1970s | ug/L | 0.20 | 0.50 | 0.02 | 10 | 9 | 0.04 - 1 | 1 |
| [a] | 2000s | ug/L | 0.50 | 0.50 | 0.50 | 4 | 4 | 1 | |
| | Total | ug/L | 0.29 | 0.50 | 0.02 | 14 | 13 | 0.04 - 1 | |
| Silver, dissolved | 1970s | ug/L | 0.50 | 0.50 | 0.50 | 2 | 2 | 1 | |
| [a] | 2000s | ug/L | 0.50 | 0.50 | 0.50 | 2 | 2 | 1 | |
| | Total | ug/L | 0.50 | 0.50 | 0.50 | 4 | 4 | 1 | |
| Aluminum | 1970s | ug/L | 43.61 | 83.00 | 0.50 | 9 | 1 | 1.0 | 125 |
| [a] | 2000s | ug/L | 39.75 | 73.00 | 14.00 | 4 | 1 | 70.00 | |
| | Total | ug/L | 42.42 | 83.00 | 0.50 | 13 | 2 | 1 - 70 | |

**B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

## (h) Site: S4

| Metals | Period | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [b,c,d] |
|---|---|---|---|---|---|---|---|---|---|
| Aluminum, dissolved | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 24.50 | 35.00 | 10.00 | 4 | 1 | 70 | |
| | Total | ug/L | 24.50 | 35.00 | 10.00 | 4 | 1 | 70 | |
| Arsenic | 1970s | ug/L | 3.80 | 5.00 | 1.00 | 10 | 6 | 10 | 53 |
| [a] | 2000s | ug/L | 1.08 | 1.80 | 0.50 | 4 | 2 | 1.0 | |
| | Total | ug/L | 3.02 | 5.00 | 0.50 | 14 | 8 | 1 - 10 | |
| Arsenic, dissolved | 1970s | ug/L | 5.00 | 5.00 | 5.00 | 2 | 2 | 10 | |
| [a] | 2000s | ug/L | 1.05 | 1.60 | 0.50 | 2 | 1 | 1 | |
| | Total | ug/L | 3.03 | 5.00 | 0.50 | 4 | 3 | 1 - 10 | |
| Barium | 1970s | ug/L | 14.50 | 26.00 | 9.00 | 7 | 0 | | |
| | 2000s | ug/L | 11.18 | 17.00 | 6.00 | 4 | 0 | | |
| | Total | ug/L | 13.29 | 26.00 | 6.00 | 11 | 0 | | |
| Barium, dissolved | 1970s | ug/L | 21.00 | 21.00 | 21.00 | 1 | 0 | | |
| | 2000s | ug/L | 11.00 | 16.00 | 6.00 | 2 | 0 | | |
| | Total | ug/L | 14.33 | 21.00 | 6.00 | 3 | 0 | | |
| Beryllium | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 0.07 | 0.08 | 0.04 | 4 | 0 | 0.08 - 0.15 | |
| | Total | ug/L | 0.07 | 0.08 | 0.04 | 4 | 0 | 0.08 - 0.15 | |
| Beryllium, dissolved | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 0.06 | 0.08 | 0.04 | 2 | 2 | 0.08 - 0.15 | |
| | Total | ug/L | 0.06 | 0.08 | 0.04 | 2 | 2 | 0.08 - 0.15 | |
| Boron | 1970s | ug/L | | | | 0 | | | |
| | 2000s | ug/L | 78.00 | 78.00 | 78.00 | 1 | 0 | | |
| | Total | ug/L | 78.00 | 78.00 | 78.00 | 1 | 0 | | |
| Calcium | 1970s | mg/L | 28.76 | 44.00 | 7.00 | 25 | 0 | | |
| | 2000s | mg/L | 19.25 | 26.00 | 12.00 | 4 | 0 | | |
| | Total | mg/L | 27.45 | 44.00 | 7.00 | 29 | 0 | | |
| Calcium, dissolved | 1970s | mg/L | | | | 0 | | | |
| | 2000s | mg/L | 24.000 | 24.000 | 24.000 | 1 | 0 | | |
| | Total | mg/L | 24.000 | 24.000 | 24.000 | 1 | 0 | | |
| Cadmium | 1970s | ug/L | 0.20 | 1.00 | 0.02 | 26 | 7 | 0.04 - 1 | 2.5 |
| [af] | 2000s | ug/L | 0.09 | 0.10 | 0.07 | 4 | 4 | 0.13-0.2 | |
| | Total | ug/L | 0.19 | 1.00 | 0.02 | 30 | 11 | 0.04 - 1 | |
| Cadmium, dissolved | 1970s | ug/L | 0.50 | 0.50 | 0.50 | 1 | 1 | 1 | 2.27 |
| [af] | 2000s | ug/L | 0.08 | 0.10 | 0.07 | 2 | 2 | 0.13-0.2 | |
| | Total | ug/L | 0.22 | 0.50 | 0.07 | 3 | 3 | 0.13 - 1 | |
| Cobalt | 1970s | ug/L | 0.56 | 2.00 | 0.50 | 24 | 23 | 1.00 | 5 |
| [af] | 2000s | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.20 | |
| | Total | ug/L | 0.50 | 2.00 | 0.10 | 28 | 27 | 0.2-1 | |
| Cobalt, dissolved | 1970s | ug/L | 0.65 | 2.50 | 0.50 | 26 | 26 | 1-5 | |
| [af] | 2000s | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.20 | |
| | Total | ug/L | 0.58 | 2.50 | 0.10 | 30 | 30 | 0.2 - 5 | |
| Chromium | 1970s | ug/L | 0.57 | 2.10 | 0.05 | 10 | 4 | 0.1-0.2 | 86 |
| [af] | 2000s | ug/L | 0.35 | 0.48 | 0.20 | 4 | 2 | 0.4-0.513 | |
| | Total | ug/L | 0.50 | 2.10 | 0.05 | 14 | 6 | 0.1 - 0.53 | |
| Chromium, dissolved | 1970s | ug/L | 1.00 | 1.00 | 1.00 | 1 | 1 | 2 | 73.96 |
| [af] | 2000s | ug/L | 0.80 | 1.40 | 0.20 | 2 | 1 | 0.40 | |
| | Total | ug/L | 0.87 | 1.40 | 0.20 | 3 | 2 | 0.4-2 | |
| Copper | 1970s | ug/L | 1.33 | 6.50 | 0.30 | 27 | 0 | | 9.3 |
| [af] | 2000s | ug/L | 1.05 | 2.00 | 0.40 | 4 | 2 | 0.80 | |
| | Total | ug/L | 1.30 | 6.50 | 0.30 | 31 | 2 | 0.80 | |
| Copper, dissolved | 1970s | ug/L | 0.99 | 12.00 | 0.10 | 43 | 3 | 0.2 - 1 | 8.93 |
| [af] | 2000s | ug/L | 0.40 | 0.40 | 0.40 | 4 | 4 | 0.80 | |
| | Total | ug/L | 0.94 | 12.00 | 0.10 | 47 | 7 | 0.2 - 1 | |
| Iron | 1970s | ug/L | 1085 | 2400 | 400 | 27 | 0 | | |
| | 2000s | ug/L | 1603 | 3000 | 650 | 4 | 0 | | |
| | Total | ug/L | 1152 | 3000 | 400 | 31 | 0 | | |

**B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

## (h) Site: S4

| Metals | Period | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [b,c,d] |
|---|---|---|---|---|---|---|---|---|---|
| Iron, dissolved | 1970s | ug/L | 763.10 | 2000.00 | 250.00 | 42 | 0 | | |
| | 2000s | ug/L | 955.00 | 1800.00 | 400.00 | 4 | 0 | | |
| | Total | ug/L | 779.78 | 2000.00 | 250.00 | 46 | 0 | | |
| Mercury | 1970s | ug/L | 0.1500 | 0.4000 | 0.0500 | 9 | 5 | 0.1 - 0.2 | 0.0013 |
| [af] | 2000s | ug/L | 0.0025 | 0.0028 | 0.0021 | 4 | 0 | | |
| | Total | ug/L | 0.1046 | 0.4000 | 0.0021 | 13 | 5 | 0.1 - 0.2 | |
| Mercury, dissolved | 1970s | ug/L | 1.00 | 1.00 | 1.00 | 1 | 0 | | 0.0013 |
| | 2000s | ug/L | | | | 0 | | | |
| | Total | ug/L | 1.00 | 1.00 | 1.00 | 1 | 0 | | |
| Potassium | 1970s | mg/L | 2.27 | 5.70 | 0.60 | 25 | 0 | | |
| | 2000s | mg/L | 1.78 | 1.90 | 1.60 | 4 | 0 | | |
| | Total | mg/L | 2.20 | 5.70 | 0.60 | 29 | 0 | | |
| Potassium, dissolved | 1970s | mg/L | | | | 0 | | | |
| | 2000s | mg/L | 2.00 | 2.00 | 2.00 | 1 | 0 | | |
| | Total | mg/L | 2.00 | 2.00 | 2.00 | 1 | 0 | | |
| Magnesium | 1970s | ug/L | 12016 | 19000 | 4200 | 25 | 0 | | |
| | 2000s | ug/L | 6825 | 9100 | 4200 | 4 | 0 | | |
| | Total | ug/L | 11300 | 19000 | 4200 | 29 | 0 | | |
| Manganese | 1970s | ug/L | 112.31 | 240.00 | 30.00 | 26 | 0 | | |
| | 2000s | ug/L | 168.00 | 370.00 | 51.00 | 4 | 0 | | |
| | Total | ug/L | 119.73 | 370.00 | 30.00 | 30 | 0 | | |
| Manganese, dissolved | 1970s | ug/L | 60.00 | 60.00 | 60.00 | 1 | 0 | | |
| | 2000s | ug/L | 164.25 | 370.00 | 48.00 | 4 | 0 | | |
| | Total | ug/L | 143.40 | 370.00 | 48.00 | 5 | 0 | | |
| Molybdenum | 1970s | ug/L | | | | 0 | | | |
| | 2000s | ug/L | 0.53 | 0.94 | 0.34 | 4 | 0 | | |
| | Total | ug/L | 0.53 | 0.94 | 0.34 | 4 | 0 | | |
| Molybdenum dissolved | 1970s | ug/L | | | | 0 | | | |
| | 2000s | ug/L | 0.48 | 0.77 | 0.30 | 4 | 0 | | |
| | Total | ug/L | 0.48 | 0.77 | 0.30 | 4 | 0 | | |
| Sodium | 1970s | mg/L | 14.5 | 26.0 | 3.7 | 26 | 0 | | |
| | 2000s | mg/L | 3.2 | 4.2 | 2.0 | 4 | 0 | | |
| | Total | mg/L | 13.0 | 26.0 | 2.0 | 30 | 0 | | |
| Sodium dissolved | 1970s | mg/L | | | | 0 | | | |
| | 2000s | mg/L | 3.8 | 3.8 | 3.8 | 1 | 0 | | |
| | Total | mg/L | 3.8 | 3.8 | 3.8 | 1 | 0 | | |
| Nickel | 1970s | ug/L | 1.44 | 9.00 | 0.50 | 27 | 20 | 1-4 | 52 |
| [af] | 2000s | ug/L | 0.40 | 0.68 | 0.30 | 4 | 3 | 0.60 | |
| | Total | ug/L | 1.31 | 9.00 | 0.30 | 31 | 23 | 0.6-4 | |
| Nickel, dissolved | 1970s | ug/L | 1.16 | 5.00 | 0.50 | 43 | 41 | 1-5 | 51.8 |
| [a] | 2000s | ug/L | 0.30 | 0.30 | 0.30 | 4 | 4 | 0.60 | |
| | Total | ug/L | 1.09 | 5.00 | 0.30 | 47 | 45 | 0.6-5 | |
| Lead | 1970s | ug/L | 0.56 | 3.80 | 0.10 | 27 | 11 | 0.2 - 0.5 | 3.18 |
| [a] | 2000s | ug/L | 0.15 | 0.15 | 0.15 | 4 | 4 | 0 | |
| | Total | ug/L | 0.51 | 3.80 | 0.10 | 31 | 15 | 0.2 - 0.5 | |
| Lead, dissolved | 1970s | ug/L | 0.57 | 4.00 | 0.10 | 26 | 16 | 0.2 - 0.5 | 2.52 |
| [a] | 2000s | ug/L | 0.15 | 0.15 | 0.15 | 2 | 2 | 0.30 | |
| | Total | ug/L | 0.54 | 4.00 | 0.10 | 28 | 18 | 0.2 - 0.5 | |
| Palladium | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 0.19 | 0.32 | 0.15 | 4 | 3 | 0.30 | |
| | Total | ug/L | 0.19 | 0.32 | 0.15 | 4 | 3 | 0.30 | |
| Palladium, dissolved | 1970s | ug/L | | | | 0 | | 0.30 | |
| [a] | 2000s | ug/L | 0.15 | 0.15 | 0.15 | 2 | 2 | 0.30 | |
| | Total | ug/L | 0.15 | 0.15 | 0.15 | 2 | 2 | 0.30 | |
| Platinum | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 0.13 | 0.13 | 0.13 | 4 | 4 | 0.25 | |
| | Total | ug/L | 0.13 | 0.13 | 0.13 | 4 | 4 | 0.25 | |

**B-1. Summary of Surface Water Monitoring Data Collected for the Partridge River.**

## (h) Site: S4

| Metals | Period | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [b,c,d] |
|---|---|---|---|---|---|---|---|---|---|
| Platinum, dissolved | 1970s | ug/L | | | | 0 | | 0.25 | |
| [a] | 2000s | ug/L | 0.13 | 0.13 | 0.13 | 2 | 2 | 0.25 | |
| | Total | ug/L | 0.13 | 0.13 | 0.13 | 2 | 2 | 0.25 | |
| Antimony | 1970s | ug/L | | | | 0 | 0 | | |
| [a] | 2000s | ug/L | 0.20 | 0.20 | 0.20 | 1 | 1 | 0.40 | |
| | Total | ug/L | 0.20 | 0.20 | 0.20 | 1 | 1 | 0.40 | |
| Selenium | 1970s | ug/L | 1.50 | 2.50 | 0.50 | 9 | 9 | 1-5 | 5 |
| [af] | 2000s | ug/L | 0.44 | 0.50 | 0.25 | 4 | 4 | 0.5-1 | |
| | Total | ug/L | 2.16 | 15.00 | 0.25 | 14 | 13 | 0.6-5 | |
| Selenium, dissolved | 1970s | ug/L | 34.00 | 34.00 | 34.00 | 1 | 0 | | |
| [af] | 2000s | ug/L | 0.38 | 0.50 | 0.25 | 2 | 2 | 0.5 - 1 | |
| | Total | ug/L | 11.58 | 34.00 | 0.25 | 3 | 2 | 0.5 - 1 | |
| Silica | 1970s | mg/L | 13.54 | 22.00 | 7.00 | 24 | 0 | | |
| | 2000s | mg/L | 12.43 | 18.00 | 8.70 | 4 | 0 | | |
| | Total | mg/L | 13.38 | 22.00 | 7.00 | 28 | 0 | | |
| Tin | 1970s | ug/L | | | | 0 | | | |
| [a] | 2000s | ug/L | 0.50 | 0.50 | 0.50 | 1 | 1 | 1.00 | |
| | Total | ug/L | 0.50 | 0.50 | 0.50 | 1 | 1 | 1.00 | |
| Thallium | 1970s | ug/L | | | | 0 | | | |
| [af] | 2000s | ug/L | 0.13 | 0.21 | 0.10 | 4 | 4 | 0.2 - 0.41 | |
| | Total | ug/L | 0.13 | 0.21 | 0.10 | 4 | 4 | 0.2 - 0.41 | |
| Thallium dissolved | 1970s | ug/L | | | | 0 | | | |
| [af] | 2000s | ug/L | 0.15 | 0.21 | 0.10 | 2 | 2 | 0.2 - 0.41 | |
| | Total | ug/L | 0.15 | 0.21 | 0.10 | 2 | 2 | 0.2 - 0.41 | |
| Titanium | 1970s | ug/L | 12.25 | 16.50 | 10.00 | 4 | 4 | 20 -33 | |
| [af] | 2000s | ug/L | 0.99 | 1.20 | 0.82 | 3 | 0 | | |
| | Total | ug/L | 7.43 | 16.50 | 0.82 | 7 | 4 | 20 -33 | |
| Titanium dissolved | 1970s | ug/L | | | | 0 | | | |
| | 2000s | ug/L | 0.99 | 0.99 | 0.99 | 1 | 0 | | |
| | Total | ug/L | 0.99 | 0.99 | 0.99 | 1 | 0 | | |
| Vanadium | 1970s | ug/L | | | | 0 | | 0.50 | |
| [a] | 2000s | ug/L | 0.25 | 0.25 | 0.25 | 1 | 1 | 0.50 | |
| | Total | ug/L | 0.25 | 0.25 | 0.25 | 1 | 1 | 0.50 | |
| Zinc | 1970s | ug/L | 5.56 | 18.00 | 2.50 | 26 | 15 | 5 - 10 | 120 |
| [af] | 2000s | ug/L | 3.00 | 3.00 | 3.00 | 4 | 4 | 6 | |
| | Total | ug/L | 5.21 | 18.00 | 2.50 | 30 | 19 | 5 - 10 | |
| Zinc, dissolved | 1970s | ug/L | 3.84 | 15.00 | 2.00 | 41 | 27 | 5 - 10 | 118.32 |
| [aef] | 2000s | ug/L | 3.00 | 3.00 | 3.00 | 4 | 4 | 6 | |
| | Total | ug/L | 3.76 | 15.00 | 2.00 | 45 | 31 | 5 - 10 | |

[a] - Material not quantified above detection limit. One-half of detection limit used in calculations.
[b]- Hardness dependent standards assume a hardness of 100mg/l.
[c]- Most limiting criteria.
[d]- Ammonia criteria is un-ionized.
[e] - One or more sample was reported as extremely high. Data thrown out of calculations
[f] - Detection limit likely changed during the sampling period.

**Table B-2. Summary of Surface Water Monitoring Data Collected for Wyman Creek**

## (a) Sites: PM5 and PM6

| General Parameters | Station | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL |
|---|---|---|---|---|---|---|---|---|
| Alkalinity, total | PM-5 | mg/L | 132.00 | 184.00 | 92.00 | 4 | 0 | |
| | PM-6 | mg/L | 88.50 | 138.00 | 60.00 | 4 | 0 | |
| | All Stations | mg/L | 110.25 | 184.00 | 60.00 | 8 | 0 | |
| Nitrogen, ammonia as N [a] | PM-5 | ug/L | 85.00 | 130.00 | 50.00 | 4 | 2 | 100 |
| | PM-6 | ug/L | 72.50 | 140.00 | 50.00 | 4 | 3 | 100 |
| | All Stations | ug/L | 78.75 | 140.00 | 50.00 | 8 | 5 | 100 |
| Chloride | PM-5 | mg/L | 2.00 | 2.20 | 1.80 | 4 | 0 | |
| | PM-6 | mg/L | 0.85 | 1.10 | 0.70 | 4 | 0 | |
| | All Stations | mg/L | 1.43 | 2.20 | 0.70 | 8 | 0 | |
| Cyanide [a] | PM-5 | ug/L | 10.00 | 10.00 | 10.00 | 4 | 4 | 20 |
| | PM-6 | ug/L | 2482.50 | 9900.00 | 10.00 | 4 | 3 | 20 |
| | All Stations | ug/L | 1246.25 | 9900.00 | 10.00 | 8 | 7 | 20 |
| Chemical Oxygen Demand | PM-5 | mg/L | 16.95 | 25.00 | 2.80 | 4 | 0 | 2 |
| | PM-6 | mg/L | 31.50 | 46.00 | 22.00 | 4 | 0 | 2 |
| | All Stations | mg/L | 24.23 | 46.00 | 2.80 | 8 | 0 | 2 |
| Dissolved oxygen | PM-5 | mg/L | 11.40 | 12.10 | 10.70 | 2 | 0 | |
| | PM-6 | mg/L | 8.60 | 9.30 | 7.90 | 2 | 0 | |
| | All Stations | mg/L | 10.00 | 12.10 | 7.90 | 4 | 0 | |
| Fluoride [a] | PM-5 | mg/L | 0.13 | 0.17 | 0.10 | 4 | 0 | |
| | PM-6 | mg/L | 0.13 | 0.19 | 0.05 | 4 | 1 | |
| | All Stations | mg/L | 0.13 | 0.19 | 0.05 | 8 | 1 | |
| Hardness, total | PM-5 | mg/L | 152.50 | 213.00 | 120.00 | 4 | 0 | |
| | PM-6 | mg/L | 85.60 | 136.00 | 63.20 | 4 | 0 | |
| | All Stations | mg/L | 119.05 | 213.00 | 63.20 | 8 | 0 | |
| Nitrate + Nitrite [a] | PM-5 | ug/L | 225.00 | 750.00 | 50.00 | 4 | 3 | 100 |
| | PM-6 | ug/L | 65.00 | 110.00 | 50.00 | 4 | 3 | 100 |
| | All Stations | ug/L | 145.00 | 750.00 | 50.00 | 8 | 6 | 100 |
| Phosphorus total [a] | PM-5 | ug/L | 65.00 | 110.00 | 50.00 | 4 | 3 | 100 |
| | PM-6 | ug/L | 70.00 | 130.00 | 50.00 | 4 | 3 | 100 |
| | All Stations | ug/L | 67.50 | 130.00 | 50.00 | 8 | 6 | 100 |
| Sulfate | PM-5 | mg/L | 70.58 | 85.10 | 58.90 | 4 | 0 | |
| | PM-6 | mg/L | 16.60 | 29.20 | 3.30 | 4 | 0 | |
| | All Stations | mg/L | 43.59 | 85.10 | 3.30 | 8 | 0 | |
| Solids, total suspended [a] | PM-5 | mg/L | 3.38 | 7.00 | 0.50 | 4 | 1 | 1 |
| | PM-6 | mg/L | 9.25 | 15.00 | 1.00 | 4 | 0 | |
| | All Stations | mg/L | 6.31 | 15.00 | 0.50 | 8 | 1 | 1 |
| Solids, total dissolved | PM-5 | mg/L | 231.50 | 260.00 | 204.00 | 4 | 0 | |
| | PM-6 | mg/L | 178.75 | 350.00 | 94.00 | 4 | 0 | |
| | All Stations | mg/L | 205.13 | 350.00 | 94.00 | 8 | 0 | |
| Carbon, total organic | PM-5 | mg/L | 7.55 | 11.00 | 4.00 | 4 | 0 | |
| | PM-6 | mg/L | 10.93 | 15.20 | 5.60 | 4 | 0 | |
| | All Stations | mg/L | 9.24 | 15.20 | 4.00 | 8 | 0 | |

| Measurement | Station | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL |
|---|---|---|---|---|---|---|---|---|
| Flow [d] | PM-5 | cfs | 0.79 | 2.40 | 0.04 | 4 | 0 | |
| | PM-6 | cfs | 0.10 | 0.30 | 0.00 | 3 | 0 | |
| | All Stations | cfs | 0.49 | 2.40 | 0.00 | 7 | 0 | |
| pH | PM-5 | su | 7.75 | 8.25 | 7.30 | 4 | 0 | |
| | PM-6 | su | 7.70 | 8.05 | 7.42 | 4 | 0 | |
| | All Stations | su | 7.73 | 8.25 | 7.30 | 8 | 0 | |
| Specific Conductance @ 25 C | PM-5 | umhos | 387.15 | 449.00 | 338.00 | 4 | 0 | |
| | PM-6 | umhos | 198.88 | 254.40 | 178.00 | 4 | 0 | |
| | All Stations | umhos | 293.01 | 449.00 | 178.00 | 8 | 0 | |
| Temperature | PM-5 | deg. C | 13.73 | 20.00 | 2.30 | 4 | 0 | |
| | PM-6 | deg. C | 12.23 | 18.50 | 0.50 | 4 | 0 | |
| | All Stations | deg. C | 12.98 | 20.00 | 0.50 | 8 | 0 | |
| Turbidity | PM-5 | NTU | 2.50 | 3.00 | 2.00 | 2 | 0 | |
| | PM-6 | NTU | 4.00 | 6.00 | 2.00 | 2 | 0 | |
| | All Stations | NTU | 3.25 | 6.00 | 2.00 | 4 | 0 | |

**Table B-2. Summary of Surface Water Monitoring Data Collected for Wyman Creek**

## (a) Sites: PM5 and PM6

| Metals | Station | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL |
|---|---|---|---|---|---|---|---|---|
| Silver | PM-5 | ug/L | 0.50 | 0.50 | 0.50 | 4 | 4 | 1 |
| [a] | PM-6 | ug/L | 0.50 | 0.50 | 0.50 | 4 | 4 | 1 |
| | All Stations | ug/L | 0.50 | 0.50 | 0.50 | 8 | 8 | 1 |
| Aluminum | PM-5 | ug/L | 37.13 | 90.80 | 11.90 | 4 | 0 | |
| | PM-6 | ug/L | 102.40 | 267.00 | 10.30 | 4 | 0 | |
| | All Stations | ug/L | 69.76 | 267.00 | 10.30 | 8 | 0 | |
| Arsenic | PM-5 | ug/L | 1.00 | 1.00 | 1.00 | 4 | 4 | 2 |
| [a] | PM-6 | ug/L | 1.00 | 1.00 | 1.00 | 4 | 4 | 2 |
| | All Stations | ug/L | 1.00 | 1.00 | 1.00 | 8 | 4 | 2 |
| Barium | PM-5 | ug/L | 7.40 | 14.60 | 5.00 | 4 | 3 | 10 |
| [a] | PM-6 | ug/L | 10.58 | 16.90 | 5.00 | 4 | 2 | 10 |
| | All Stations | ug/L | 8.99 | 16.90 | 5.00 | 8 | 5 | 10 |
| Beryllium | PM-5 | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 |
| [a] | PM-6 | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 |
| | All Stations | ug/L | 0.10 | 0.10 | 0.10 | 8 | 8 | 0.2 |
| Boron | PM-5 | ug/L | 56.40 | 67.90 | 43.70 | 4 | | |
| [a] | PM-6 | ug/L | 23.30 | 40.70 | 17.50 | 4 | 3 | 35 |
| | All Stations | ug/L | 39.85 | 67.90 | 17.50 | 8 | 3 | 35 |
| Calcium | PM-5 | mg/L | 29.25 | 35.40 | 24.30 | 4 | 0 | |
| | PM-6 | mg/L | 20.18 | 28.10 | 16.10 | 4 | 0 | |
| | All Stations | mg/L | 24.71 | 35.40 | 16.10 | 8 | 0 | |
| Cadmium | PM-5 | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | |
| [a] | PM-6 | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | |
| | All Stations | ug/L | 0.10 | 0.10 | 0.10 | 8 | 8 | |
| Cobalt | PM-5 | ug/L | 2.33 | 7.80 | 0.50 | 4 | 3 | 1 |
| [a] | PM-6 | ug/L | 0.50 | 0.50 | 0.50 | 4 | 4 | 1 |
| | All Stations | ug/L | 1.41 | 7.80 | 0.50 | 8 | 7 | 1 |
| Chromium | PM-5 | ug/L | 0.50 | 0.50 | 0.50 | 4 | 4 | 1 |
| [a] | PM-6 | ug/L | 1.00 | 1.60 | 0.50 | 4 | 2 | 1 |
| | All Stations | ug/L | 0.75 | 1.60 | 0.50 | 8 | 6 | 1 |
| Copper | PM-5 | ug/L | 0.40 | 0.40 | 0.40 | 2 | 2 | 0.8 |
| [ab] | PM-6 | ug/L | 0.40 | 0.40 | 0.40 | 1 | 1 | 0.8 |
| | All Stations | ug/L | 0.40 | 0.40 | 0.40 | 3 | 3 | 0.8 |
| Iron | PM-5 | ug/L | 582.50 | 1320.00 | 240.00 | 4 | 0 | |
| | PM-6 | ug/L | 2020.00 | 4480.00 | 450.00 | 4 | 0 | |
| | All Stations | ug/L | 1301.25 | 4480.00 | 240.00 | 8 | 0 | |
| Mercury | PM-5 | ug/L | 0.0021 | 0.0026 | 0.0014 | 4 | 2 | 0.004 - 0.005 |
| [af] | PM-6 | ug/L | 0.0042 | 0.0079 | 0.0003 | 4 | 1 | 0.0005 |
| | All Stations | ug/L | 0.0032 | 0.0079 | 0.0003 | 8 | 3 | 0.004-0.0005 |
| Potassium | PM-5 | ug/L | 5775.00 | 6400.00 | 4700.00 | 4 | 0 | |
| | PM-6 | ug/L | 1675.00 | 2100.00 | 1200.00 | 4 | 0 | |
| | All Stations | ug/L | 3725.00 | 6400.00 | 1200.00 | 8 | 0 | |
| Magnesium | PM-5 | ug/L | 24275.00 | 30300.00 | 19700.00 | 4 | 0 | |
| | PM-6 | ug/L | 11750.00 | 16000.00 | 9400.00 | 4 | 0 | |
| | All Stations | ug/L | 18012.50 | 30300.00 | 9400.00 | 8 | 0 | |
| Manganese | PM-5 | ug/L | 320.00 | 840.00 | 70.00 | 4 | 0 | |
| | PM-6 | ug/L | 427.50 | 760.00 | 90.00 | 4 | 0 | |
| | All Stations | ug/L | 373.75 | 840.00 | 70.00 | 8 | 0 | |
| Molybdenum | PM-5 | ug/L | 2.50 | 2.50 | 2.50 | 4 | 4 | 5 |
| [a] | PM-6 | ug/L | 2.50 | 2.50 | 2.50 | 4 | 4 | 5 |
| | All Stations | ug/L | 2.50 | 2.50 | 2.50 | 8 | 8 | 5 |
| Sodium | PM-5 | ug/L | 14725.00 | 17500.00 | 10600.00 | 4 | 0 | |
| | PM-6 | ug/L | 5075.00 | 5800.00 | 4700.00 | 4 | 0 | |
| | All Stations | ug/L | 9900.00 | 17500.00 | 4700.00 | 8 | 0 | |
| Nickel | PM-5 | ug/L | 2.50 | 2.50 | 2.50 | 4 | 4 | 5 |
| [a] | PM-6 | ug/L | 2.50 | 2.50 | 2.50 | 4 | 4 | 5 |
| | All Stations | ug/L | 2.50 | 2.50 | 2.50 | 8 | 4 | 5 |
| Lead | PM-5 | ug/L | 0.50 | 0.50 | 0.50 | 4 | 4 | 1 |
| [a] | PM-6 | ug/L | 0.50 | 0.50 | 0.50 | 4 | 4 | 1 |
| | All Stations | ug/L | 0.50 | 0.50 | 0.50 | 8 | 8 | 1 |

**Table B-2. Summary of Surface Water Monitoring Data Collected for Wyman Creek**

## (a) Sites: PM5 and PM6

| **Metals** | Station | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL |
|---|---|---|---|---|---|---|---|---|
| Palladium | PM-5 | ug/L | 12.50 | 12.50 | 12.50 | 4 | 4 | 30 |
| [a] | PM-6 | ug/L | 12.50 | 12.50 | 12.50 | 4 | 4 | 30 |
| | All Stations | ug/L | 12.50 | 12.50 | 12.50 | 8 | 8 | 30 |
| Platinum | PM-5 | ug/L | 15.63 | 25.00 | 12.50 | 4 | 4 | 25 - 50 |
| [ac] | PM-6 | ug/L | 12.50 | 12.50 | 12.50 | 4 | 4 | 25 - 50 |
| | All Stations | ug/L | 14.06 | 25.00 | 12.50 | 8 | 8 | 25 - 50 |
| Antimony | PM-5 | ug/L | 1.50 | 1.50 | 1.50 | 4 | 4 | 3 |
| [a] | PM-6 | ug/L | 1.50 | 1.50 | 1.50 | 4 | 4 | 3 |
| | All Stations | ug/L | 1.50 | 1.50 | 1.50 | 8 | 8 | 3 |
| Selenium | PM-5 | ug/L | 1.00 | 1.00 | 1.00 | 4 | 4 | 2 |
| [a] | PM-6 | ug/L | 1.00 | 1.00 | 1.00 | 4 | 4 | 2 |
| | All Stations | ug/L | 1.00 | 1.00 | 1.00 | 8 | 8 | 2 |
| Strontium | PM-5 | ug/L | 118.58 | 147.00 | 92.30 | 4 | 0 | |
| | PM-6 | ug/L | 71.18 | 101.00 | 52.30 | 4 | 0 | |
| | All Stations | ug/L | 94.88 | 147.00 | 52.30 | 8 | 0 | |
| Thallium | PM-5 | ug/L | 1.00 | 1.00 | 1.00 | 4 | 4 | 2 |
| [a] | PM-6 | ug/L | 1.00 | 1.00 | 1.00 | 4 | 4 | 2 |
| | All Stations | ug/L | 1.00 | 1.00 | 1.00 | 8 | 8 | 2 |
| Titanium | PM-5 | ug/L | 5.00 | 5.00 | 5.00 | 1 | 1 | 10 |
| [a] | PM-6 | ug/L | 5.00 | 5.00 | 5.00 | 1 | 1 | 10 |
| | All Stations | ug/L | 5.00 | 5.00 | 5.00 | 2 | 2 | 10 |
| Zinc | PM-5 | ug/L | 6.30 | 10.20 | 5.00 | 4 | 3 | 10 |
| [a] | PM-6 | ug/L | 5.00 | 5.00 | 5.00 | 4 | 4 | 10 |
| | All Stations | ug/L | 5.65 | 10.20 | 5.00 | 8 | 7 | 10 |

[a] - Material not quantified above detection limit. One-half of detection limit used in calculations.
[b ]- Detection limit lowered during the sampling period. High detection limit data not used in calculations.
[c] - Detection limit llikely changed during the sampling period.
[d] - Flow measured by cross-sectional velocity measurements.

**Table B-3. Summary of Surface Water Monitoring Data Collected for the Tailings Basin.**

## (a) Sites: PM7, PM8, PM9, PM10, and PM11

| General Parameters | Station | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d] |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, total | PM-7 | mg/L | 421.77 | 457.00 | 346.00 | 13 | 0 | | |
| | PM-8 | mg/L | 309.56 | 369.00 | 220.00 | 9 | 0 | | |
| | PM-9 | mg/L | 301.89 | 405.00 | 186.00 | 9 | 0 | | |
| | PM-10 | mg/L | 401.23 | 438.00 | 260.00 | 13 | 0 | | |
| | PM-11 | mg/L | 232.00 | 344.00 | 108.00 | 9 | 0 | | |
| | All Stations | mg/L | 345.09 | 457.00 | 108.00 | 53 | 0 | | |
| Nitrogen, ammonia as N [a] | PM-7 | ug/L | 50.00 | 50.00 | 50.00 | 4 | 4 | 100 | 40 |
| | PM-8 | ug/L | 50.00 | 50.00 | 50.00 | 4 | 4 | 100 | |
| | PM-9 | ug/L | 50.00 | 50.00 | 50.00 | 4 | 4 | 100 | |
| | PM-10 | ug/L | 50.00 | 50.00 | 50.00 | 4 | 4 | 100 | |
| | PM-11 | ug/L | 50.00 | 50.00 | 50.00 | 4 | 4 | 100 | |
| | All Stations | ug/L | 50.00 | 50.00 | 50.00 | 20 | 20 | 100 | |
| Chloride | PM-7 | mg/L | 19.25 | 21.00 | 17.20 | 13 | 0 | | 230 |
| | PM-8 | mg/L | 24.28 | 30.00 | 17.10 | 9 | 0 | | |
| | PM-9 | mg/L | 24.64 | 32.40 | 18.30 | 9 | 0 | | |
| | PM-10 | mg/L | 25.09 | 31.40 | 16.40 | 13 | 0 | | |
| | PM-11 | mg/L | 17.30 | 25.40 | 9.50 | 9 | 0 | | |
| | All Stations | mg/L | 22.12 | 32.40 | 9.50 | 53 | 0 | | |
| Cyanide [a] | PM-7 | ug/L | 10.00 | 10.00 | 10.00 | 4 | 4 | 20 | |
| | PM-8 | ug/L | 10.00 | 10.00 | 10.00 | 4 | 4 | 20 | |
| | PM-9 | ug/L | 10.00 | 10.00 | 10.00 | 4 | 4 | 20 | |
| | PM-10 | ug/L | 10.00 | 10.00 | 10.00 | 4 | 4 | 20 | |
| | PM-11 | ug/L | 10.00 | 10.00 | 10.00 | 4 | 4 | 20 | |
| | All Stations | ug/L | 10.00 | 10.00 | 10.00 | 20 | 20 | 20 | |
| Chemical Oxygen Demand [a] | PM-7 | mg/L | 10.75 | 17.00 | 1.00 | 11 | 1 | 2 | |
| | PM-8 | mg/L | 13.46 | 25.00 | 5.70 | 7 | | | |
| | PM-9 | mg/L | 26.83 | 84.40 | 5.10 | 7 | | | |
| | PM-10 | mg/L | 24.11 | 38.00 | 6.80 | 11 | | | |
| | PM-11 | mg/L | 28.29 | 48.00 | 17.00 | 7 | | | |
| | All Stations | mg/L | 20.08 | 84.40 | 1.00 | 43 | 1 | 2 | |
| Dissolved oxygen | PM-7 | mg/L | 9.65 | 12.40 | 5.07 | 6 | 0 | | 5 minimum |
| | PM-8 | mg/L | 10.50 | 10.70 | 10.30 | 2 | 0 | | |
| | PM-9 | mg/L | 9.70 | 11.70 | 7.70 | 2 | 0 | | |
| | PM-10 | mg/L | 6.45 | 10.20 | 2.37 | 6 | 0 | | |
| | PM-11 | mg/L | 9.15 | 10.55 | 6.50 | 3 | 0 | | |
| | All Stations | mg/L | 8.66 | 12.40 | 2.37 | 19 | 0 | | |
| Fluoride | PM-7 | mg/L | 3.10 | 3.70 | 2.64 | 13 | 0 | | |
| | PM-8 | mg/L | 2.47 | 3.10 | 1.60 | 9 | 0 | | |
| | PM-9 | mg/L | 1.52 | 1.90 | 1.12 | 9 | 0 | | |
| | PM-10 | mg/L | 1.90 | 2.40 | 1.00 | 13 | 0 | | |
| | PM-11 | mg/L | 1.54 | 2.20 | 0.84 | 9 | 0 | | |
| | All Stations | mg/L | 2.16 | 3.70 | 0.84 | 53 | 0 | | |
| Hardness, total | PM-7 | mg/L | 507.08 | 603.00 | 349.00 | 13 | 0 | | |
| | PM-8 | mg/L | 353.56 | 482.00 | 256.00 | 9 | 0 | | |
| | PM-9 | mg/L | 360.33 | 479.00 | 213.00 | 9 | 0 | | |
| | PM-10 | mg/L | 375.08 | 480.00 | 222.00 | 13 | 0 | | |
| | PM-11 | mg/L | 241.44 | 323.00 | 109.00 | 9 | 0 | | |
| | All Stations | mg/L | 378.60 | 603.00 | 109.00 | 53 | 0 | | |
| Nitrate + Nitrite [a] | PM-7 | ug/L | 50.00 | 50.00 | 50.00 | 7 | 7 | 100 | |
| | PM-8 | ug/L | 67.14 | 170.00 | 50.00 | 7 | 6 | 100 | |
| | PM-9 | ug/L | 60.00 | 120.00 | 50.00 | 7 | 6 | 100 | |
| | PM-10 | ug/L | 50.00 | 50.00 | 50.00 | 7 | 7 | 100 | |
| | PM-11 | ug/L | 58.57 | 110.00 | 50.00 | 7 | 6 | 100 | |
| | All Stations | ug/L | 57.14 | 170.00 | 50.00 | 35 | 32 | 100 | |
| Phosphorus total [a] | PM-7 | ug/L | 50.00 | 50.00 | 50.00 | 7 | 7 | 100 | |
| | PM-8 | ug/L | 50.00 | 50.00 | 50.00 | 7 | 7 | 100 | |
| | PM-9 | ug/L | 50.00 | 50.00 | 50.00 | 7 | 7 | 100 | |
| | PM-10 | ug/L | 62.86 | 140.00 | 50.00 | 7 | 6 | 100 | |
| | PM-11 | ug/L | 71.43 | 200.00 | 50.00 | 7 | 6 | 100 | |
| | All Stations | ug/L | 56.86 | 200.00 | 50.00 | 35 | 33 | 100 | |

**Table B-3. Summary of Surface Water Monitoring Data Collected for the Tailings Basin.**

## (a) Sites: PM7, PM8, PM9, PM10, and PM11

| General Parameters | Station | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d] |
|---|---|---|---|---|---|---|---|---|---|
| Sulfate | PM-7 | mg/L | 162.42 | 234.00 | 0.50 | 13 | 1 | 1 | |
| [a] | PM-8 | mg/L | 165.24 | 229.00 | 93.20 | 9 | | | |
| | PM-9 | mg/L | 149.44 | 231.00 | 87.00 | 9 | | | |
| | PM-10 | mg/L | 119.35 | 175.00 | 78.50 | 13 | | | |
| | PM-11 | mg/L | 87.60 | 147.00 | 45.50 | 9 | | | |
| | All Stations | mg/L | 137.43 | 234.00 | 0.50 | 53 | 1 | 1 | |
| Solids, total suspended | PM-7 | mg/L | 3.18 | 10.00 | 0.50 | 11 | 2 | 1 | |
| [a] | PM-8 | mg/L | 4.33 | 9.30 | 2.00 | 7 | 0 | | |
| | PM-9 | mg/L | 4.43 | 12.00 | 0.50 | 7 | 2 | 1 | |
| | PM-10 | mg/L | 9.55 | 55.00 | 2.00 | 11 | 0 | | |
| | PM-11 | mg/L | 2.69 | 8.00 | 0.50 | 7 | 1 | 1 | |
| | All Stations | mg/L | 5.12 | 55.00 | 0.50 | 43 | 5 | 1 | |
| Solids, total dissolved | PM-7 | mg/L | 736.92 | 1540.00 | 533.00 | 13 | 0 | | |
| | PM-8 | mg/L | 538.00 | 702.00 | 362.00 | 9 | 0 | | |
| | PM-9 | mg/L | 552.67 | 912.00 | 325.00 | 9 | 0 | | |
| | PM-10 | mg/L | 636.58 | 1360.00 | 373.00 | 12 | 0 | | |
| | PM-11 | mg/L | 358.22 | 465.00 | 186.00 | 9 | 0 | | |
| | All Stations | mg/L | 581.90 | 1540.00 | 186.00 | 52 | 0 | | |
| Carbon, total organic | PM-7 | mg/L | 4.99 | 5.90 | 4.20 | 11 | 0 | | |
| | PM-8 | mg/L | 5.80 | 6.90 | 4.60 | 7 | 0 | | |
| | PM-9 | mg/L | 9.37 | 18.50 | 5.80 | 7 | 0 | | |
| | PM-10 | mg/L | 7.31 | 9.40 | 5.60 | 11 | 0 | | |
| | PM-11 | mg/L | 11.11 | 15.40 | 7.40 | 7 | 0 | | |
| | All Stations | mg/L | 7.43 | 18.50 | 4.20 | 43 | 0 | | |

| Measurement | Station | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d] |
|---|---|---|---|---|---|---|---|---|---|
| Flow | PM-7 | cfs | 1.02 | 1.80 | 0.00 | 13 | 0 | | |
| | PM-8 | cfs | 1.00 | 2.00 | 0.00 | 9 | 0 | | |
| | PM-9 | cfs | 0.00 | 0.00 | 0.00 | 5 | 0 | | |
| | PM-10 | cfs | 0.00 | 0.00 | 0.00 | 5 | 0 | | |
| | PM-11 | cfs | 4.34 | 12.30 | 1.20 | 9 | 0 | | |
| | All Stations | cfs | 1.50 | 12.30 | 0.00 | 41 | 0 | | |
| pH | PM-7 | su | 7.98 | 8.34 | 7.48 | 14 | 0 | | 6.5-9.0 |
| | PM-8 | su | 8.02 | 8.40 | 7.77 | 10 | 0 | | |
| | PM-9 | su | 7.89 | 8.20 | 7.54 | 10 | 0 | | |
| | PM-10 | su | 7.70 | 8.30 | 7.14 | 14 | 0 | | |
| | PM-11 | su | 7.94 | 8.30 | 7.61 | 10 | 0 | | |
| | All Stations | su | 7.90 | 8.40 | 7.14 | 58 | 0 | | |
| Specific Conductance | PM-7 | umhos | 1085.21 | 1229.00 | 891.00 | 14 | 0 | | |
| @ 25 C | PM-8 | umhos | 939.50 | 1180.00 | 632.00 | 10 | 0 | | |
| | PM-9 | umhos | 872.60 | 1075.00 | 569.00 | 10 | 0 | | |
| | PM-10 | umhos | 1021.21 | 1358.00 | 603.00 | 14 | 0 | | |
| | PM-11 | umhos | 636.90 | 870.00 | 333.00 | 10 | 0 | | |
| | All Stations | umhos | 930.69 | 1358.00 | 333.00 | 58 | 0 | | |
| Temperature | PM-7 | deg. C | 10.08 | 17.90 | 2.10 | 13 | 0 | | |
| | PM-8 | deg. C | 12.93 | 22.80 | 3.70 | 9 | 0 | | |
| | PM-9 | deg. C | 11.32 | 18.70 | 0.30 | 9 | 0 | | |
| | PM-10 | deg. C | 11.07 | 18.50 | 1.60 | 13 | 0 | | |
| | PM-11 | deg. C | 12.67 | 24.40 | 1.30 | 9 | 0 | | |
| | All Stations | deg. C | 11.46 | 24.40 | 0.30 | 53 | 0 | | |
| Turbidity | PM-7 | NTU | 1.67 | 2.00 | 1.00 | 3 | 0 | | 25 |
| | PM-8 | NTU | 2.45 | 4.00 | 1.34 | 3 | 0 | | |
| | PM-9 | NTU | 1.78 | 2.35 | 1.00 | 3 | 0 | | |
| | PM-10 | NTU | 4.21 | 7.00 | 1.62 | 3 | 0 | | |
| | PM-11 | NTU | 2.17 | 3.00 | 1.20 | 3 | 0 | | |
| | All Stations | NTU | 2.45 | 7.00 | 1.00 | 15 | 0 | | |

**Table B-3. Summary of Surface Water Monitoring Data Collected for the Tailings Basin.**

## (a) Sites: PM7, PM8, PM9, PM10, and PM11

| **Metals** | Station | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d] |
|---|---|---|---|---|---|---|---|---|---|
| Silver | PM-7 | ug/L | 0.29 | 0.50 | 0.10 | 9 | 9 | 0.2 - 1.0 | 1 |
| [ae] | PM-8 | ug/L | 0.29 | 0.50 | 0.10 | 9 | 9 | 0.2 - 1.0 | |
| | PM-9 | ug/L | 0.29 | 0.50 | 0.10 | 9 | 9 | 0.2 - 1.0 | |
| | PM-10 | ug/L | 0.29 | 0.50 | 0.10 | 9 | 9 | 0.2 - 1.0 | |
| | PM-11 | ug/L | 0.29 | 0.50 | 0.10 | 9 | 9 | 0.2 - 1.0 | |
| | All Stations | ug/L | 0.29 | 0.50 | 0.10 | 45 | 45 | 0.2 - 1.0 | |
| Aluminum | PM-7 | ug/L | 20.75 | 63.70 | 5.00 | 13 | 8 | 10 - 25 | 125 |
| [ae] | PM-8 | ug/L | 20.98 | 40.70 | 5.00 | 9 | 5 | 10 - 25 | |
| | PM-9 | ug/L | 27.09 | 52.40 | 12.50 | 9 | 3 | 25 | |
| | PM-10 | ug/L | 16.68 | 51.90 | 5.00 | 13 | 9 | 10 - 25 | |
| | PM-11 | ug/L | 37.97 | 72.70 | 12.50 | 9 | 1 | 25 | |
| | All Stations | ug/L | 23.79 | 72.70 | 5.00 | 53 | 26 | 10 - 25 | |
| Arsenic | PM-7 | ug/L | 1.00 | 1.00 | 1.00 | 4 | 4 | 2 | 53 |
| [a] | PM-8 | ug/L | 3.75 | 7.20 | 1.00 | 4 | 1 | 2 | |
| | PM-9 | ug/L | 1.00 | 1.00 | 1.00 | 4 | 4 | 2 | |
| | PM-10 | ug/L | 1.00 | 1.00 | 1.00 | 4 | 4 | 2 | |
| | PM-11 | ug/L | 1.00 | 1.00 | 1.00 | 4 | 4 | 2 | |
| | All Stations | ug/L | 1.55 | 7.20 | 1.00 | 20 | 17 | 2 | |
| Barium | PM-7 | ug/L | 22.35 | 26.20 | 15.60 | 11 | 0 | | |
| | PM-8 | ug/L | 14.77 | 18.90 | 11.00 | 7 | 0 | | |
| | PM-9 | ug/L | 29.13 | 39.80 | 18.30 | 7 | 0 | | |
| | PM-10 | ug/L | 99.07 | 148.00 | 39.50 | 11 | 0 | | |
| | PM-11 | ug/L | 24.19 | 34.60 | 13.40 | 7 | 0 | | |
| | All Stations | ug/L | 42.15 | 148.00 | 11.00 | 43 | 0 | | |
| Beryllium | PM-7 | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| [a] | PM-8 | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| | PM-9 | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| | PM-10 | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| | PM-11 | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| | All Stations | ug/L | 0.10 | 0.10 | 0.10 | 20 | 20 | 0.2 | |
| Boron | PM-7 | ug/L | 239.38 | 267.00 | 198.00 | 8 | 0 | | |
| | PM-8 | ug/L | 300.00 | 382.00 | 226.00 | 4 | 0 | | |
| | PM-9 | ug/L | 333.00 | 395.00 | 242.00 | 4 | 0 | | |
| | PM-10 | ug/L | 327.00 | 397.00 | 225.00 | 8 | 0 | | |
| | PM-11 | ug/L | 214.00 | 307.00 | 129.00 | 4 | 0 | | |
| | All Stations | ug/L | 282.82 | 397.00 | 129.00 | 28 | 0 | | |
| Calcium | PM-7 | mg/L | 74.61 | 83.30 | 62.20 | 13 | 0 | | |
| | PM-8 | mg/L | 40.11 | 49.60 | 34.20 | 9 | 0 | | |
| | PM-9 | mg/L | 53.01 | 68.10 | 33.80 | 9 | 0 | | |
| | PM-10 | mg/L | 56.18 | 68.60 | 39.40 | 13 | 0 | | |
| | PM-11 | mg/L | 32.63 | 39.90 | 19.00 | 9 | 0 | | |
| | All Stations | mg/L | 53.44 | 83.30 | 19.00 | 53 | 0 | | |
| Cadmium | PM-7 | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | 1.95 |
| [a] | PM-8 | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| | PM-9 | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| | PM-10 | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| | PM-11 | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| | All Stations | ug/L | 0.10 | 0.10 | 0.10 | 20 | 20 | 0.2 | |
| Cobalt | PM-7 | ug/L | 0.50 | 0.50 | 0.50 | 7 | 7 | 1 | 5 |
| [a] | PM-8 | ug/L | 0.50 | 0.50 | 0.50 | 7 | 7 | 1 | |
| | PM-9 | ug/L | 0.50 | 0.50 | 0.50 | 7 | 7 | 1 | |
| | PM-10 | ug/L | 0.50 | 0.50 | 0.50 | 7 | 7 | 1 | |
| | PM-11 | ug/L | 0.50 | 0.50 | 0.50 | 7 | 7 | 1 | |
| | All Stations | ug/L | 0.50 | 0.50 | 0.50 | 35 | 35 | 1 | |
| Chromium | PM-7 | ug/L | 0.98 | 1.70 | 0.50 | 4 | 2 | 1 | 365.16 |
| [a] | PM-8 | ug/L | 1.05 | 1.50 | 0.50 | 4 | 1 | 1 | |
| | PM-9 | ug/L | 1.03 | 1.40 | 0.50 | 4 | 1 | 1 | |
| | PM-10 | ug/L | 0.88 | 1.30 | 0.50 | 4 | 2 | 1 | |
| | PM-11 | ug/L | 0.98 | 1.50 | 0.50 | 4 | 2 | 1 | |
| | All Stations | ug/L | 0.98 | 1.70 | 0.50 | 20 | 8 | 1 | |

**Table B-3. Summary of Surface Water Monitoring Data Collected for the Tailings Basin.**

## (a) Sites: PM7, PM8, PM9, PM10, and PM11

| **Metals** | Station | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d] |
|---|---|---|---|---|---|---|---|---|---|
| Copper | PM-7 | ug/L | 0.87 | 1.80 | 0.33 | 5 | 2 | 0.66-0.8 | 15.1 |
| [abe] | PM-8 | ug/L | 0.81 | 3.10 | 0.33 | 7 | 5 | 0.66-0.8 | |
| | PM-9 | ug/L | 0.75 | 1.50 | 0.33 | 6 | 2 | 0.66-0.8 | |
| | PM-10 | ug/L | 0.68 | 2.50 | 0.33 | 11 | 5 | 0.66-0.8 | |
| | PM-11 | ug/L | 1.17 | 1.60 | 0.33 | 6 | 2 | 0.66-3.0 | |
| | All Stations | ug/L | 0.83 | 3.10 | 0.33 | 35 | 16 | 0.66-3.0 | |
| Iron | PM-7 | ug/L | 215.73 | 324.00 | 90.00 | 11 | 0 | | |
| | PM-8 | ug/L | 321.43 | 490.00 | 130.00 | 7 | 0 | | |
| | PM-9 | ug/L | 217.14 | 300.00 | 110.00 | 7 | 0 | | |
| | PM-10 | ug/L | 309.36 | 490.00 | 60.00 | 11 | 0 | | |
| | PM-11 | ug/L | 385.71 | 590.00 | 210.00 | 7 | 0 | | |
| | All Stations | ug/L | 286.57 | 590.00 | 60.00 | 42 | 0 | | |
| Mercury | PM-7 | ug/L | 0.0019 | 0.0050 | 0.0005 | 13 | 8 | 0.004 - 0.01 | 0.0069 |
| [ae] | PM-8 | ug/L | 0.0024 | 0.0050 | 0.001 | 9 | 6 | 0.002-0.004 | |
| | PM-9 | ug/L | 0.0031 | 0.0066 | 0.0013 | 9 | 5 | 0.004 - 0.01 | |
| | PM-10 | ug/L | 0.0024 | 0.0050 | 0.001 | 13 | 7 | 0.004 | |
| | PM-11 | ug/L | 0.0034 | 0.0050 | 0.0016 | 9 | 5 | 0.004 - 0.01 | |
| | All Stations | ug/L | 0.0025 | 0.0066 | 0.0005 | 53 | 31 | 0.004-0.01 | |
| Methyl Mercury | PM-7 | ug/L | 0.000068 | 0.000124 | 0.000013 | 2 | 1 | 0.000025 | |
| | PM-8 | ug/L | | | | | | | |
| | PM-9 | ug/L | | | | | | | |
| | PM-10 | ug/L | 0.000368 | 0.000637 | 0.000098 | 2 | 0 | 0.000025 | |
| | PM-11 | ug/L | | | | | | | |
| | All Stations | ug/L | 0.000218 | 0.000637 | 0.000013 | 4 | 1 | 0.000025 | |
| Potassium | PM-7 | ug/L | 8926 | 10700 | 8000 | 11 | 0 | | |
| [a] | PM-8 | ug/L | 10829 | 13100 | 7600 | 7 | 0 | | |
| | PM-9 | ug/L | 6797 | 9100 | 4380 | 7 | 0 | | |
| | PM-10 | ug/L | 7205 | 8910 | 5000 | 11 | 0 | | |
| | PM-11 | ug/L | 5367 | 6900 | 3700 | 7 | 0 | | |
| | All Stations | ug/L | 7870 | 13100 | 3700 | 43 | 0 | | |
| Magnesium | PM-7 | ug/L | 81646 | 96000 | 62200 | 13 | 0 | | |
| | PM-8 | ug/L | 63778 | 92600 | 41300 | 9 | 0 | | |
| | PM-9 | ug/L | 58856 | 75200 | 39700 | 9 | 0 | | |
| | PM-10 | ug/L | 60000 | 75100 | 41500 | 13 | 0 | | |
| | PM-11 | ug/L | 40989 | 54300 | 19800 | 9 | 0 | | |
| | All Stations | ug/L | 62528 | 96000 | 19800 | 53 | 0 | | |
| Manganese | PM-7 | ug/L | 286.64 | 586.00 | 130.00 | 11 | 0 | | |
| | PM-8 | ug/L | 172.86 | 330.00 | 70.00 | 7 | 0 | | |
| | PM-9 | ug/L | 82.86 | 170.00 | 40.00 | 7 | 0 | | |
| | PM-10 | ug/L | 1067.82 | 2950.00 | 350.00 | 11 | 0 | | |
| | PM-11 | ug/L | 81.14 | 180.00 | 40.00 | 7 | 0 | | |
| | All Stations | ug/L | 401.33 | 2950.00 | 40.00 | 43 | 0 | | |
| Molybdenum | PM-7 | ug/L | 28.75 | 35.4 | 20.4 | 11 | 0 | | |
| | PM-8 | ug/L | 55.37 | 81.6 | 34.6 | 7 | 0 | | |
| | PM-9 | ug/L | 22.40 | 30 | 17.3 | 7 | 0 | | |
| | PM-10 | ug/L | 23.68 | 35.4 | 13 | 11 | 0 | | |
| | PM-11 | ug/L | 21.31 | 29.3 | 15.8 | 7 | 0 | | |
| | All Stations | ug/L | 29.54 | 81.6 | 13 | 43 | 0 | | |
| Sodium | PM-7 | ug/L | 52169 | 58700 | 44700 | 13 | 0 | | |
| | PM-8 | ug/L | 65256 | 83200 | 39300 | 9 | 0 | | |
| | PM-9 | ug/L | 49400 | 61400 | 35100 | 9 | 0 | | |
| | PM-10 | ug/L | 77623 | 88400 | 51300 | 13 | 0 | | |
| | PM-11 | ug/L | 41000 | 59400 | 18300 | 9 | 0 | | |
| | All Stations | ug/L | 58268 | 88400 | 18300 | 53 | 0 | | |
| Nickel | PM-7 | ug/L | 1.07 | 1.4 | 0.73 | 8 | 0 | | 283.4 |
| [abc] | PM-8 | ug/L | 1.11 | 1.7 | 0.76 | 5 | 0 | | |
| | PM-9 | ug/L | 1.06 | 2.1 | 0.6 | 5 | 0 | | |
| | PM-10 | ug/L | 1.67 | 2.5 | 0.94 | 9 | 0 | | |
| | PM-11 | ug/L | 0.74 | 0.91 | 0.375 | 5 | 1 | 0.75 | |
| | All Stations | ug/L | 1.19 | 2.5 | 0.375 | 32 | 1 | 0.75 | |
| Lead | PM-7 | ug/L | 0.18 | 0.3 | 0.15 | 5 | 5 | 0.3-0.6 | 7.69 |
| [abe] | PM-8 | ug/L | 0.18 | 0.3 | 0.15 | 5 | 5 | 0.3-0.6 | |
| | PM-9 | ug/L | 0.18 | 0.3 | 0.15 | 5 | 5 | 0.3-0.6 | |
| | PM-10 | ug/L | 0.18 | 0.3 | 0.15 | 5 | 5 | 0.3-0.6 | |
| | PM-11 | ug/L | 0.18 | 0.3 | 0.15 | 5 | 5 | 0.3-0.6 | |
| | All Stations | ug/L | 0.18 | 0.3 | 0.15 | 25 | 25 | 0.3-0.6 | |

**Table B-3. Summary of Surface Water Monitoring Data Collected for the Tailings Basin.**

## (a) Sites: PM7, PM8, PM9, PM10, and PM11

| Metals | Station | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [d] |
|---|---|---|---|---|---|---|---|---|---|
| Palladium | PM-7 | ug/L | 0.15 | 0.15 | 0.15 | 1 | 1 | 0.3 | |
| [ab] | PM-8 | ug/L | 0.15 | 0.15 | 0.15 | 1 | 1 | 0.3 | |
| | PM-9 | ug/L | 0.15 | 0.15 | 0.15 | 1 | 1 | 0.3 | |
| | PM-10 | ug/L | 0.15 | 0.15 | 0.15 | 1 | 1 | 0.3 | |
| | PM-11 | ug/L | 0.15 | 0.15 | 0.15 | 1 | 1 | 0.3 | |
| | All Stations | ug/L | 0.15 | 0.15 | 0.15 | 5 | 5 | 0.3 | |
| Platinum | PM-7 | ug/L | 0.13 | 0.13 | 0.13 | 1 | 1 | 0.25 | |
| [ab] | PM-8 | ug/L | 0.13 | 0.13 | 0.13 | 1 | 1 | 0.25 | |
| | PM-9 | ug/L | 0.13 | 0.13 | 0.13 | 1 | 1 | 0.25 | |
| | PM-10 | ug/L | 0.13 | 0.13 | 0.13 | 1 | 1 | 0.25 | |
| | PM-11 | ug/L | 0.13 | 0.13 | 0.13 | 1 | 1 | 0.25 | |
| | All Stations | ug/L | 0.13 | 0.13 | 0.13 | 5 | 5 | 0.25 | |
| Antimony | PM-7 | ug/L | 1.50 | 1.50 | 1.50 | 4 | 4 | 3 | |
| [a] | PM-8 | ug/L | 1.50 | 1.50 | 1.50 | 4 | 4 | 3 | |
| | PM-9 | ug/L | 1.50 | 1.50 | 1.50 | 4 | 4 | 3 | |
| | PM-10 | ug/L | 1.50 | 1.50 | 1.50 | 4 | 4 | 3 | |
| | PM-11 | ug/L | 1.50 | 1.50 | 1.50 | 4 | 4 | 3 | |
| | All Stations | ug/L | 1.50 | 1.50 | 1.50 | 20 | 20 | 3 | |
| Selenium | PM-7 | ug/L | 1.30 | 1.80 | 0.50 | 9 | 9 | 1.0 - 3.6 | 5 |
| [ae] | PM-8 | ug/L | 1.30 | 1.80 | 0.50 | 9 | 9 | 1.0 - 3.6 | |
| | PM-9 | ug/L | 1.30 | 1.80 | 0.50 | 9 | 9 | 1.0 - 3.6 | |
| | PM-10 | ug/L | 1.30 | 1.80 | 0.50 | 9 | 9 | 1.0 - 3.6 | |
| | PM-11 | ug/L | 1.30 | 1.80 | 0.50 | 9 | 9 | 1.0 - 3.6 | |
| | All Stations | ug/L | 1.30 | 1.80 | 0.50 | 45 | 45 | 1.0 - 3.6 | |
| Strontium | PM-7 | ug/L | 300.00 | 361.00 | 232.00 | 8 | 0 | | |
| | PM-8 | ug/L | 198.75 | 211.00 | 179.00 | 4 | 0 | | |
| | PM-9 | ug/L | 258.00 | 326.00 | 179.00 | 4 | 0 | | |
| | PM-10 | ug/L | 273.13 | 357.00 | 176.00 | 8 | 0 | | |
| | PM-11 | ug/L | 167.28 | 229.00 | 95.10 | 4 | 0 | | |
| | All Stations | ug/L | 252.90 | 361.00 | 95.10 | 28 | 0 | | |
| Thallium | PM-7 | ug/L | 0.27 | 0.54 | 0.20 | 5 | 4 | 0.4 | |
| [ab] | PM-8 | ug/L | 0.20 | 0.20 | 0.20 | 5 | 5 | 0.4 | |
| | PM-9 | ug/L | 0.20 | 0.20 | 0.20 | 5 | 5 | 0.4 | |
| | PM-10 | ug/L | 0.25 | 0.46 | 0.20 | 5 | 4 | 0.4 | |
| | PM-11 | ug/L | 0.20 | 0.20 | 0.20 | 5 | 4 | 0.4 | |
| | All Stations | ug/L | 0.22 | 0.54 | 0.20 | 25 | 22 | 0.4 | |
| Titanium | PM-7 | ug/L | 5.00 | 5.00 | 5.00 | 1 | 1 | 10 | |
| [a] | PM-8 | ug/L | 5.00 | 5.00 | 5.00 | 1 | 1 | 10 | |
| | PM-9 | ug/L | 5.00 | 5.00 | 5.00 | 1 | 1 | 10 | |
| | PM-10 | ug/L | 5.00 | 5.00 | 5.00 | 1 | 1 | 10 | |
| | PM-11 | ug/L | 5.00 | 5.00 | 5.00 | 1 | 1 | 10 | |
| | All Stations | ug/L | 5.00 | 5.00 | 5.00 | 5 | 5 | 10 | |
| Zinc | PM-7 | ug/L | 11.62 | 20.60 | 5.00 | 13 | 8 | 10 - 25 | 190.71 |
| [a] | PM-8 | ug/L | 8.13 | 12.50 | 5.00 | 9 | 5 | 10 - 25 | |
| | PM-9 | ug/L | 5.91 | 12.30 | 5.00 | 9 | 7 | 10 - 25 | |
| | PM-10 | ug/L | 9.64 | 15.40 | 5.00 | 13 | 5 | 10 - 25 | |
| | PM-11 | ug/L | 6.21 | 14.70 | 5.00 | 9 | 7 | 10 - 25 | |
| | All Stations | ug/L | 9.30 | 20.60 | 5.00 | 53 | 32 | 10 - 25 | |

[a] - Material not quantified above detection limit. One-half of detection limit used in calculations.
[b]- Detection limit lowered during the sampling period. High detection limit data not used in calculations.
[c] - One ore more samples were reported as extremely high. Data thrown out of calculations
[d]- Hardness dependent standards assume a hardness of 200mg/l.
[e] - Detection limit likely changed during sampling period.

**Table B-4. Summary of Surface Water Monitoring Data Collected for the Embarrass River.**

## (a) Site: CN120

| General Parameters | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [e,f,g] |
|---|---|---|---|---|---|---|---|---|---|
| Acidity as CaCO3 | [b] | mg/L | 11.67 | 20.00 | 5.00 | 3 | 0 | | |
| Alkalinity, total | | mg/L | 64.65 | 160.00 | 16.00 | 17 | 0 | | |
| Nitrogen, ammonia as N | [b] | mg/L | 0.30 | 1.10 | 0.01 | 10 | 0 | | 40 |
| Carbonate | | mg/L | | | | 0 | | | |
| Calcium Hardness @ CaCO3 | | mg/L | 45.60 | 100.00 | 24.00 | 15 | 0 | | |
| Chloride | | mg/L | 3.40 | 25.00 | 0.10 | 87 | 0 | | 230 |
| Cyanide | [b] | mg/L | | | | 0 | | | |
| Carbon dioxide | | mg/L | 11.72 | 40.00 | 2.10 | 42 | 0 | | |
| Chemical Oxygen Demand | | mg/L | 37.00 | 75.00 | 20.00 | 5 | 0 | | |
| Carbon, dissolved organic | | mg/L | 25.48 | 38.00 | 6.60 | 16 | 0 | | |
| Dissolved Oxygen, field | [c] | mg/L | 7.76 | 11.00 | 5.10 | 11 | 0 | | |
| Fluoride | | mg/L | 0.30 | 1.50 | 0.10 | 10 | 0 | | |
| Bicarbonate as HCO3 | | mg/L | 47.07 | 134.00 | 13.00 | 96 | 0 | | |
| Hardness, total | [d] | mg/L | 36.86 | 210.00 | 1.00 | 104 | 0 | | |
| Magnesium Hardness @ CaCO3 | | mg/L | 37.33 | 110.00 | 16.00 | 15 | 0 | | |
| Nitrate + Nitrite | [b] | mg/L | 0.19 | 0.94 | 0.02 | 17 | 0 | | |
| Nitrogen Nitrate | | mg/L | 1.42 | 4.10 | 0.03 | 38 | 0 | | |
| Nitrate | | mg/L | 3.91 | 18.00 | 0.20 | 76 | 0 | | |
| Nitrogen Nitrite | [ab] | mg/L | 0.01 | 0.02 | 0.005 | 4 | 2 | 0.01 | |
| Oil and Grease | [b] | mg/L | 1.33 | 4.00 | 0.00 | 3 | 0 | | 0.5 |
| Orthophosphate, Total | | mg/L | 0.02 | 0.02 | 0.02 | 2 | 0 | | |
| Phenols, Total | [b] | mg/L | 1.00 | 1.00 | 1.00 | 1 | 1 | 2 | |
| Phosphorus ortho | | mg/L | 0.01 | 0.02 | 0.005 | 3 | 1 | 0.01 | |
| Phosphorus total dissolved | | mg/L | 0.07 | 0.41 | 0.02 | 15 | 0 | | |
| Sulfate | | mg/L | 13.47 | 110.00 | 3.30 | 104 | 0 | | |
| Solids, total suspended | [b] | mg/L | 6.76 | 20.00 | 2.00 | 20 | 0 | | |
| Carbon total | [b] | mg/L | 1.85 | 2.10 | 1.60 | 2 | 0 | | |
| Solids, total dissolved | | mg/L | 100.50 | 340.00 | 36.00 | 103 | 0 | | |
| Nitrogen total kjeldahl | | mg/L | 1.26 | 2.90 | 0.38 | 15 | 0 | | |
| Nitrogen total organic | | mg/L | 0.96 | 0.97 | 0.95 | 2 | 0 | | |
| Solids, total | | mg/L | 9.00 | 9.00 | 9.00 | 1 | 0 | | |
| Sulfide total | [b] | mg/L | 0.57 | 0.60 | 0.50 | 1 | 0 | | |
| Nitrogen unionized ammonia | | mg/L | 0.001 | 0.01 | 0.0001 | 8 | 0 | | |
| Carbon, total organic | | mg/L | 12.70 | 21.00 | 1.10 | 3 | 0 | | |

| Measurement | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [e,f,g] |
|---|---|---|---|---|---|---|---|---|---|
| Dissolved Oxygen | | % | 70.83 | 93.00 | 56.00 | 6 | 0 | | 5 |
| Color | | | 129.20 | 450.00 | 30.00 | 98 | 0 | | |
| Gross Alpha, pCi/L | [a] | pCi/L | 0.085 | 0.085 | 0.085 | 1 | 1 | 0.17 | |
| Gross Beta, pCi/L | | pCi/L | 2.70 | 2.70 | 2.70 | 1 | 0 | | |
| Gross Beta, pCi/g | | pCi/g | 0.40 | 0.40 | 0.40 | 1 | 0 | | |
| Sodium Absorption Ratio | | | 0.15 | 0.50 | 0.10 | 75 | 0 | | |
| pH, standard units | | su | 6.87 | 8.00 | 5.90 | 113 | 0 | | 6.5-9.0 |
| Specific Conductance @ 25 C | | umhos | 115.11 | 616.00 | 40.00 | 114 | 0 | | |
| Temperature, degrees C | | deg. C | 12.73 | 22.00 | 0.00 | 22 | 0 | | |
| Turbidity, NTU | | NTU | 4.46 | 14.00 | 1.80 | 23 | 0 | | 25 |

**Table B-4. Summary of Surface Water Monitoring Data Collected for the Embarrass River.**

### (a) Site: CN120

| **Metals** | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [e,f,g] |
|---|---|---|---|---|---|---|---|---|---|
| Silver | [b] | ug/L | | | | 0 | | | 1 |
| Aluminum | | ug/L | 112.67 | 300.00 | 32.00 | 6 | 0 | | 125 |
| Arsenic | [a] | ug/L | 0.56 | 0.70 | 0.50 | 5 | 3 | 1 | 53 |
| Barium | [a] | ug/L | 57.50 | 65.00 | 50.00 | 2 | 1 | 100 | |
| Boron | | ug/L | 57.33 | 90.00 | 10.00 | 15 | 0 | | |
| Boron, dissolved | | ug/L | 67.14 | 140.00 | 10.00 | 42 | 0 | | |
| Calcium | | mg/L | 42.20 | 94.00 | 5.20 | 6 | 0 | | |
| Calcium, dissolved | | mg/L | 12.19 | 27.00 | 4.50 | 78 | 0 | | |
| Cadmium | | ug/L | 0.08 | 0.91 | 0.01 | 17 | 0 | | 1.4 |
| Cadmium, dissolved | | ug/L | 0.03 | 0.03 | 0.03 | 1 | 0 | | 1.27 |
| Cobalt | [b] | ug/L | 0.90 | 1.80 | 0.50 | 7 | 0 | | 5 |
| Chromium | | ug/L | 1.39 | 2.00 | 0.78 | 2 | 0 | | 49 |
| Copper | | ug/L | 3.11 | 8.40 | 1.00 | 17 | 0 | | 5.2 |
| Iron | | ug/L | 942.75 | 3800.00 | 120.00 | 91 | 0 | | |
| Iron, dissolved | | ug/L | 651.54 | 1500.00 | 150.00 | 13 | 0 | | |
| Mercury | [ab] | ug/L | 0.36 | 0.36 | 0.36 | 1 | 0 | | 0.0013 |
| Potassium | | mg/L | 1.59 | 3.40 | 0.30 | 12 | 0 | | |
| Potassium, dissolved | | mg/L | 0.87 | 4.00 | 0.10 | 69 | 0 | | |
| Magnesium | | mg/L | 35.15 | 96.00 | 3.00 | 6 | 4 | | |
| Phosphorus | | mg/L | 0.03 | 0.04 | 0.02 | 3 | 2 | | |
| Magnesium, dissolved | | mg/L | 3.48 | 9.90 | 1.10 | 78 | 2 | | |
| Manganese | | ug/L | 133.22 | 480.00 | 20.00 | 23 | 0 | | |
| Sodium | | mg/L | 9.90 | 27.00 | 2.50 | 12 | 0 | | |
| Sodium dissolved | | mg/L | 2.28 | 6.20 | 0.90 | 82 | 0 | | |
| Nickel | [b] | ug/L | 2.82 | 5.00 | 2.00 | 6 | 0 | | 29 |
| Lead | | ug/L | 4.39 | 66.00 | 0.15 | 17 | 0 | | 1.32 |
| Selenium | [ab] | ug/L | 0.50 | 0.50 | 0.50 | 1 | 1 | 1 | |
| Silica | | mg/L | 11.73 | 23.00 | 7.70 | 17 | 0 | | |
| Silica, filtered | | mg/L | 12.43 | 22.00 | 3.60 | 77 | 0 | | |
| Titanium | [b] | ug/L | | | | 0 | | | |
| Zinc | | ug/L | 2.91 | 9.10 | 0.38 | 17 | 0 | | 67 |

[a] - Material not quantified above detection limit. One-half of detection limit used in calculations.
[b] - Material present, but level was estimated in some samples. Data not used in calculations.
[c] - Some samples had percentages calculated instead of being measured in mg/L. These were not used in calculations.
[d] - One sample was calculated and reported as extremely high. Data thrown out of calculations
[e]- Hardness dependent standards assume a hardness of 50mg/l.
[f]- Most limiting criteria.
[g]- Ammonia criteria is un-ionized.

Table B-4. Summary of Surface Water Monitoring Data Collected for the Embarrass River.

**(b) Site: CN121_PM12**

| General Parameters | Station | Period | units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|---|
| Acidity as CaCO3 | CN121 | 1976 | mg/L | 8.33 | 15.00 | 5.00 | 3 | 0 | | |
| [b] | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 8.33 | 15.00 | 5.00 | 3 | 0 | | |
| Alkalinity, total | CN121 | 1976 | mg/L | 107.33 | 130.00 | 91.00 | 3 | 0 | | |
| | PM-12 | 2000s | mg/L | 58.57 | 152.00 | 16.00 | 13 | 0 | | |
| | All | | mg/L | 67.71 | 152.00 | 16.00 | 16 | 0 | | |
| Nitrogen, ammonia as N | CN121 | 1976 | mg/L | 23.33 | 30.00 | 10.00 | 3 | 0 | | 40 |
| [ab] | PM-12 | 2000s | mg/L | 50.00 | 50.00 | 50.00 | 4 | 4 | 100.00 | |
| | All | | mg/L | 38.57 | 50.00 | 10.00 | 7 | 4 | 100.00 | |
| Carbonate | CN121 | 1976 | mg/L | | | | 0 | | | |
| [b] | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | | | | 0 | | | |
| Calcium Hardness @ CaCO3 | CN121 | 1976 | mg/L | 59.00 | 60.00 | 58.00 | 2 | 0 | | |
| [b] | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 59.00 | 60.00 | 58.00 | 2 | 0 | | |
| Chloride | CN121 | 1976 | mg/L | 2.57 | 4.00 | 1.70 | 9 | 0 | | 230 |
| | PM-12 | 2000s | mg/L | 4.75 | 7.89 | 2.10 | 13 | 0 | | |
| | All | | mg/L | 3.86 | 7.89 | 1.70 | 22 | 0 | | |
| Cyanide | CN121 | 1976 | mg/L | | | | 0 | | | |
| [ab] | PM-12 | 2000s | mg/L | 10.00 | 10.00 | 10.00 | 4 | 4 | 20.00 | |
| | All | | mg/L | 10.00 | 10.00 | 10.00 | 4 | 4 | 20.00 | |
| Carbon dioxide | CN121 | 1976 | ug/L | 23.93 | 76.00 | 7.60 | 6 | 0 | | |
| | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 23.93 | 76.00 | 7.60 | 6 | 0 | | |
| Chemical Oxygen Demand | CN121 | 1976 | mg/L | 47.50 | 82.00 | 32.00 | 4 | 0 | | |
| | PM-12 | 2000s | mg/L | 45.80 | 63.20 | 27.00 | 7 | 0 | | |
| | All | | mg/L | 46.42 | 82.00 | 27.00 | 11 | 0 | | |
| Dissolved oxygen | CN121 | 1976 | mg/L | | | | 0 | | | 5 |
| | PM-12 | 2000s | mg/L | 7.43 | 11.80 | 3.39 | 7 | 0 | | |
| | All | | mg/L | 7.43 | 11.80 | 3.39 | 7 | 0 | | |
| Carbon, dissolved organic | CN121 | 1976 | mg/L | 25.67 | 39.00 | 10.00 | 3 | 0 | | |
| | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 25.67 | 39.00 | 10.00 | 3 | 0 | | |
| Dissolved Oxygen, field | CN121 | 1976 | mg/L | 5.87 | 9.20 | 2.50 | 7 | 0 | | |
| [c] | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 5.87 | 9.20 | 2.50 | 7 | 0 | | |
| Fluoride | CN121 | 1976 | mg/L | 0.24 | 0.80 | 0.10 | 9 | 0 | | |
| [a] | PM-12 | 2000s | mg/L | 0.12 | 0.20 | 0.05 | 13 | 3 | 0.10 | |
| | All | | mg/L | 0.17 | 0.80 | 0.05 | 22 | 3 | 0.10 | |
| Bicarbonate as HCO3 | CN121 | 1976 | mg/L | 69.00 | 141.00 | 19.00 | 6 | 0 | | |
| | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 69.00 | 141.00 | 19.00 | 6 | 0 | | |
| Hardness, total | CN121 | 1976 | mg/L | 50.00 | 93.00 | 7.00 | 2 | 0 | | |
| [d] | PM-12 | 2000s | mg/L | 55.90 | 87.20 | 18.60 | 13 | 0 | | |
| | All | | mg/L | 55.11 | 93.00 | 7.00 | 15 | 0 | | |
| Magnesium Hardness @ CaCO3 | CN121 | 1976 | mg/L | 35.50 | 36.00 | 35.00 | 2 | 0 | | |
| | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 35.50 | 36.00 | 35.00 | 2 | 0 | | |
| Nitrate + Nitrite | CN121 | 1976 | mg/L | 46.67 | 80.00 | 10.00 | 3 | 0 | | |
| [ab] | PM-12 | 2000s | mg/L | 60.00 | 120.00 | 50.00 | 7 | 6 | 100 | |
| | All | | mg/L | 56.00 | 120.00 | 10.00 | 10 | 6 | 100 | |
| Nitrogen Nitrate | CN121 | 1976 | mg/L | 0.04 | 0.08 | 0.01 | 3 | 0 | | |
| | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 0.04 | 0.08 | 0.01 | 3 | 0 | | |
| Nitrate | CN121 | 1976 | mg/L | 3.17 | 5.10 | 0.50 | 3 | 0 | | |
| | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 3.17 | 5.10 | 0.50 | 3 | 0 | | |
| Nitrogen Nitrite | CN121 | 1976 | mg/L | 0.01 | 0.01 | 0.005 | 3 | 2 | 0.01 | |
| [ab] | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 0.01 | 0.01 | 0.005 | 3 | 2 | 0.01 | |
| Oil and Grease | CN121 | 1976 | mg/L | 1.67 | 5.00 | 0.00 | 3 | 0 | | 0.5 |
| [b] | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 1.67 | 5.00 | 0.00 | 3 | 0 | | |

Table B-4. Summary of Surface Water Monitoring Data Collected for the Embarrass River.

**(b) Site: CN121_PM12**

| General Parameters | Station | | units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|---|
| Orthophosphate, Total | CN121 | 1976 | mg/L | 0.03 | 0.04 | 0.01 | 2 | 0 | | |
| | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 0.03 | 0.04 | 0.01 | 2 | 0 | | |
| Phenols, Total | CN121 | 1976 | mg/L | | | | 0 | | | 123 |
| [b] | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | | | | 0 | | | |
| Phosphorus ortho | CN121 | 1976 | mg/L | 0.01 | 0.02 | 0.01 | 3 | 0 | | |
| | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 0.01 | 0.02 | 0.01 | 3 | 0 | | |
| Phosphorus total dissolved | CN121 | 1976 | mg/L | 0.04 | 0.04 | 0.04 | 1 | 0 | | |
| | PM-12 | 2000s | mg/L | 0.01 | 0.01 | 0.01 | 1 | 1.00 | 0.02 | |
| | All | | mg/L | 0.02 | 0.04 | 0.01 | 2 | 1 | 0.02 | |
| Phosphorus total | CN121 | 1976 | mg/L | 0.06 | 0.08 | 0.03 | 3 | 0 | | |
| [a] | PM-12 | 2000s | mg/L | 0.08 | 0.22 | 0.05 | 11 | 8 | 0.10 | |
| | All | | mg/L | 0.08 | 0.22 | 0.03 | 14 | 8 | 0.10 | |
| Sulfate | CN121 | 1976 | mg/L | 6.13 | 13.00 | 4.10 | 8 | 0 | | |
| [ab] | PM-12 | 2000s | mg/L | 4.69 | 8.90 | 0.50 | 13 | 1 | 1.00 | |
| | All | | mg/L | 5.00 | 13.00 | 0.50 | 21 | 1 | 1.00 | |
| Solids, total suspended | CN121 | 1976 | mg/L | 3.44 | 5.20 | 1.20 | 9 | 0 | | |
| | PM-12 | 2000s | mg/L | 1.86 | 4.00 | 0.50 | 7 | 2 | 1.00 | |
| | All | | mg/L | 2.75 | 5.20 | 0.50 | 16 | 2 | 1.00 | |
| Carbon total | CN121 | 1976 | mg/L | | | | 0 | | | |
| [b] | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | | | | 0 | | | |
| Solids, total dissolved | CN121 | 1976 | mg/L | | | | 0 | | | 700 |
| [a] | PM-12 | 2000s | mg/L | 113.69 | 197.00 | 46.00 | 13 | 0 | | |
| | All | | mg/L | 113.69 | 197.00 | 46.00 | 13 | 0 | | |
| Nitrogen total kjeldahl | CN121 | 1976 | mg/L | 0.56 | 0.56 | 0.56 | 1 | 0 | | |
| | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 0.56 | 0.56 | 0.56 | 1 | 0 | | |
| Nitrogen total organic | CN121 | 1976 | mg/L | 0.99 | 1.10 | 0.87 | 2 | 0 | | |
| [b] | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 0.99 | 1.10 | 0.87 | 2 | 0 | | |
| Sulfide total | CN121 | 1976 | mg/L | 1.10 | 1.90 | 0.30 | 3 | 0 | | |
| [b] | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 1.10 | 1.90 | 0.30 | 3 | 0 | | |
| Nitrogen unionized ammonia | CN121 | 1976 | mg/L | | | | 0 | | | |
| | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | | | | 0 | | | |
| Carbon, total organic | CN121 | 1976 | mg/L | 11.17 | 18.00 | 1.50 | 3 | 0 | | |
| | PM-12 | 2000s | mg/L | 18.77 | 29.40 | 12.10 | 11 | 0 | | |
| | All | | mg/L | 17.14 | 29.40 | 1.50 | 14 | 0 | | |

| Measurement | Station | | units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | 2B WQS [f] |
|---|---|---|---|---|---|---|---|---|---|---|
| Dissolved Oxygen | CN121 | 1976 | % | 58.50 | 77.00 | 27.00 | 6 | 2 | | 5 |
| | PM-12 | 2000s | % | | | | 0 | | | |
| | All | | % | 58.50 | 77.00 | 27.00 | 6 | 2 | | |
| Color | CN121 | 1976 | | 89.44 | 190.00 | 45.00 | 9 | 0 | | |
| | PM-12 | 2000s | | | | | 0 | | | |
| | All | | | 89.44 | 190.00 | 45.00 | 9 | 0 | | |
| Flow | CN121 | 1976 | cfs | | | | 0 | | | |
| [j] | PM-12 | 2000s | cfs | 6.85 | 30.50 | 0.00 | 13 | 0 | | |
| | All | | cfs | 6.85 | 30.50 | 0.00 | 13 | 0 | | |
| pH | CN121 | 1976 | su | 6.92 | 7.80 | 6.40 | 9 | 0 | | 6.5-9.0 |
| | PM-12 | 2000s | su | 7.31 | 7.92 | 6.70 | 14 | 0 | | |
| | All | | su | 7.16 | 7.92 | 6.40 | 23 | 0 | | |
| Specific Conductance @ 25 C | CN121 | 1976 | umhos | 151.11 | 275.00 | 48.00 | 9 | 0 | | 1000 |
| | PM-12 | 2000s | umhos | 127.67 | 181.70 | 37.00 | 13 | 0 | | |
| | All | | umhos | 137.26 | 275.00 | 37.00 | 22 | 0 | | |
| Temperature | CN121 | 1976 | deg. C | 10.83 | 19.00 | 0.00 | 9 | 0 | | |
| | PM-12 | 2000s | deg. C | 10.83 | 20.90 | 0.50 | 13 | 0 | | |
| | All | | deg. C | 10.83 | 20.90 | 0.00 | 22 | 0 | | |

Table B-4. Summary of Surface Water Monitoring Data Collected for the Embarrass River.

**(b) Site: CN121_PM12**

| Measurement | Station | | units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|---|
| Turbidity | CN121 | 1976 | NTU | 3.62 | 6.40 | 1.30 | 9 | 0 | | 25 |
| | PM-12 | 2000s | NTU | 1.69 | 2.98 | 1.00 | 3 | 4 | | |
| | All | | NTU | 3.14 | 6.40 | 1.00 | 12 | 4 | | |

| Metals | Station | | units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|---|
| Silver | CN121 | 1976 | ug/L | 0.00 | 0.00 | 0.00 | 0 | 0 | | 1 |
| [abei] | PM-12 | 2000s | ug/L | 0.12 | 0.12 | 0.10 | 5 | 5 | 0.2 - 0.24 | |
| | All | | ug/L | 0.12 | 0.12 | 0.10 | 5 | 5 | 0.2 - 0.24 | |
| Aluminum | CN121 | 1976 | ug/L | 126.50 | 200.00 | 50.00 | 6 | 0 | | 125 |
| | PM-12 | 2000s | ug/L | 98.92 | 143.00 | 44.30 | 9 | 0 | | |
| | All | | ug/L | 109.95 | 200.00 | 44.30 | 15 | 0 | | |
| Arsenic | CN121 | 1976 | ug/L | 0.92 | 1.40 | 0.50 | 5 | 2 | 1 | 53 |
| [a] | PM-12 | 2000s | ug/L | 1.00 | 1.00 | 1.00 | 4 | 4 | 2 | |
| | All | | ug/L | 0.96 | 1.40 | 0.50 | 9 | 6 | 1 - 2 | |
| Barium | CN121 | 1976 | ug/L | 25.00 | 25.00 | 25.00 | 1 | 0 | | |
| [a] | PM-12 | 2000s | ug/L | 15.54 | 29.90 | 5.00 | 7 | 3 | 10.00 | |
| | All | | ug/L | 16.73 | 29.90 | 5.00 | 8 | 3 | 10.00 | |
| Beryllium | CN121 | 1976 | ug/L | | | | 0 | | | |
| [a] | PM-12 | 2000s | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.20 | |
| | All | | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.20 | |
| Boron | CN121 | 1976 | ug/L | | | | 0 | | | |
| [a] | PM-12 | 2000s | ug/L | 17.50 | 17.50 | 17.50 | 5 | 5 | 35.00 | |
| | All | | ug/L | 17.50 | 17.50 | 17.50 | 5 | 5 | 35.00 | |
| Calcium | CN121 | 1976 | mg/L | 27.05 | 58.00 | 4.00 | 6 | 0 | | |
| | PM-12 | 2000s | mg/L | 13.98 | 21.50 | 4.60 | 13 | 0 | | |
| | All | | mg/L | 18.11 | 58.00 | 4.00 | 19 | 0 | | |
| Calcium, dissolved | CN121 | 1976 | mg/L | 15.95 | 25.00 | 6.90 | 2 | 0 | | |
| | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 15.95 | 25.00 | 6.90 | 2 | 0 | | |
| Cadmium | CN121 | 1976 | ug/L | 0.02 | 0.02 | 0.02 | 3 | 0 | | 1.4 |
| [a] | PM-12 | 2000s | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.20 | |
| | All | | ug/L | 0.06 | 0.10 | 0.02 | 7 | 4 | 0.20 | |
| Cobalt | CN121 | 1976 | ug/L | 2.30 | 2.30 | 2.30 | 1 | 0 | | 5 |
| [ab] | PM-12 | 2000s | ug/L | 0.50 | 0.50 | 0.50 | 13 | 13 | 1.00 | |
| | All | | ug/L | 0.63 | 2.30 | 0.50 | 14 | 13 | 1.00 | |
| Chromium | CN121 | 1976 | ug/L | 0.61 | 0.65 | 0.56 | 2 | 0 | | 49 |
| [a] | PM-12 | 2000s | ug/L | 1.43 | 2.30 | 0.50 | 4 | 1 | 1.00 | |
| | All | | ug/L | 1.15 | 2.30 | 0.50 | 6 | 1 | 1.00 | |
| Copper | CN121 | 1976 | ug/L | 0.90 | 1.10 | 0.70 | 3 | 0 | | 5.2 |
| [aei] | PM-12 | 2000s | ug/L | 1.07 | 2.80 | 0.33 | 12 | 2 | 0.66-0.9 | |
| | All | | ug/L | 1.04 | 2.80 | 0.33 | 15 | 2 | 0.66-0.9 | |
| Iron | CN121 | 1976 | ug/L | 1121.11 | 1900.00 | 480.00 | 9 | 0 | | |
| | PM-12 | 2000s | ug/L | 1714.29 | 3430.00 | 460.00 | 7 | 0 | | |
| | All | | ug/L | 1380.63 | 3430.00 | 460.00 | 16 | 0 | | |
| Iron, dissolved | CN121 | 1976 | ug/L | 455.00 | 840.00 | 150.00 | 6 | 0 | | |
| | PM-12 | 2000s | ug/L | | | | 0 | | | |
| | All | | ug/L | 455.00 | 840.00 | 150.00 | 6 | 0 | | |
| Mercury | CN121 | 1976 | ug/L | 0.25 | 0.25 | 0.25 | 3 | 3 | 0.50 | 0.0013 |
| [abi] | PM-12 | 2000s | ug/L | 0.0043 | 0.0099 | 0.001 | 13 | 6 | 0.002-0.01 | |
| | All | | ug/L | 0.05 | 0.25 | 0.001 | 16 | 9 | 0.002 - 0.5 | |
| Methyl Mecury | CN121 | 1976 | ug/L | | | | | | | |
| | PM-12 | 2000s | ug/L | 0.00024 | 0.00032 | 0.00016 | 2 | 0 | | |
| | All | | ug/L | | | | | | | |
| Potassium | CN121 | 1976 | mg/L | 1255.00 | 2200.00 | 200.00 | 6 | 0 | | |
| [a] | PM-12 | 2000s | mg/L | 780.00 | 1260.00 | 250.00 | 7 | 2 | 500.00 | |
| | All | | mg/L | 999.23 | 2200.00 | 200.00 | 13 | 2 | 500.00 | |
| Magnesium | CN121 | 1976 | mg/L | 14883.33 | 35500.00 | 2000.00 | 6 | 0 | | |
| | PM-12 | 2000s | mg/L | 5482.31 | 8130.00 | 2600.00 | 13 | 0 | | |
| | All | | mg/L | 8451.05 | 35500.00 | 2000.00 | 19 | 0 | | |
| Magnesium, dissolved | CN121 | 1976 | mg/L | 5.80 | 8.80 | 2.80 | 2 | 0 | | |
| | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 5.80 | 8.80 | 2.80 | 2 | 0 | | |

Table B-4. Summary of Surface Water Monitoring Data Collected for the Embarrass River.

**(b) Site: CN121_PM12**

| **Metals** | **Station** | | units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [f,g,h] |
|---|---|---|---|---|---|---|---|---|---|---|
| Manganese | CN121 | 1976 | ug/L | 234.17 | 580.00 | 30.00 | 6 | 0 | | |
| | PM-12 | 2000s | ug/L | 162.71 | 379.00 | 20.00 | 7 | 0 | | |
| | All | | ug/L | 195.69 | 580.00 | 20.00 | 13 | 0 | | |
| Molybdenum | CN121 | 1976 | ug/L | | | | 0 | | | |
| [a] | PM-12 | 2000s | ug/L | 2.50 | 2.50 | 2.50 | 7 | 7 | 5.00 | |
| | All | | ug/L | 2.50 | 2.50 | 2.50 | 7 | 7 | 5.00 | |
| Sodium | CN121 | 1976 | ug/L | 3633.33 | 6300.00 | 600.00 | 6 | 0 | | |
| | PM-12 | 2000s | ug/L | 2998.89 | 3400.00 | 2200.00 | 9 | 0 | | |
| | All | | ug/L | 3252.67 | 6300.00 | 600.00 | 15 | 0 | | |
| Nickel | CN121 | 1976 | ug/L | 1.00 | 1.00 | 1.00 | 1 | 0 | | 29 |
| [ae] | PM-12 | 2000s | ug/L | 1.42 | 2.80 | 0.55 | 11 | 0 | | |
| | All | | ug/L | 1.39 | 2.80 | 0.55 | 12 | 0 | | |
| Nickel, dissolved | CN121 | 1976 | ug/L | | | | 0 | | | 28.9 |
| | PM-12 | 2000s | ug/L | | | | 0 | | | |
| | All | | ug/L | | | | 0 | | | |
| Lead | CN121 | 1976 | ug/L | 0.23 | 0.29 | 0.17 | 2 | 0 | | 1.32 |
| [abe] | PM-12 | 2000s | ug/L | 0.18 | 0.30 | 0.15 | 5 | 5 | 0.30 | |
| | All | | ug/L | 0.19 | 0.30 | 0.15 | 7 | 5 | 0.30 | |
| Palladium | CN121 | 1976 | ug/L | | | | 0 | | | |
| [ae] | PM-12 | 2000s | ug/L | 0.15 | 0.15 | 0.15 | 1 | 1 | 0.30 | |
| | All | | ug/L | 0.15 | 0.15 | 0.15 | 1 | 1 | 0.30 | |
| Platinum | CN121 | 1976 | ug/L | | | | 0 | | | |
| [ae] | PM-12 | 2000s | ug/L | 0.13 | 0.13 | 0.13 | 1 | 1 | 0.25 | |
| | All | | ug/L | 0.13 | 0.13 | 0.13 | 1 | 1 | 0.25 | |
| Antimony | CN121 | 1976 | ug/L | | | | 0 | | | |
| [a] | PM-12 | 2000s | ug/L | 1.50 | 1.50 | 1.50 | 4 | 4 | 3.00 | |
| | All | | ug/L | 1.50 | 1.50 | 1.50 | 4 | 4 | 3.00 | |
| Selenium | CN121 | 1976 | ug/L | 0.50 | 0.50 | 0.50 | 1 | 1 | 1.00 | 5 |
| [abi] | PM-12 | 2000s | ug/L | 1.74 | 5.00 | 0.50 | 9 | 9 | 1.0-10.0 | |
| | All | | ug/L | 1.62 | 5.00 | 0.50 | 10 | 10 | 1.0-10.0 | |
| Silica | CN121 | 1976 | mg/L | 16.00 | 17.00 | 15.00 | 3 | 0 | | |
| | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 16.00 | 17.00 | 15.00 | 3 | 0 | | |
| Silica, filtered | CN121 | 1976 | mg/L | 11.53 | 18.00 | 3.80 | 6 | 0 | | |
| | PM-12 | 2000s | mg/L | | | | 0 | | | |
| | All | | mg/L | 11.53 | 18.00 | 3.80 | 6 | 0 | | |
| Strontium | CN121 | 1976 | ug/L | | | | 0 | | | |
| | PM-12 | 2000s | ug/L | 35.23 | 61.90 | 17.60 | 4 | 0 | | |
| | All | | ug/L | 35.23 | 61.90 | 17.60 | 4 | 0 | | |
| Thallium | CN121 | 1976 | ug/L | | | | 0 | | | |
| [a] | PM-12 | 2000s | ug/L | 0.20 | 0.20 | 0.20 | 5 | 5 | 0.40 | |
| | All | | ug/L | 0.20 | 0.20 | 0.20 | 5 | 5 | 0.40 | |
| Titanium | CN121 | 1976 | ug/L | | | | 0 | | | |
| [a] | PM-12 | 2000s | ug/L | 5.00 | 5.00 | 5.00 | 1 | 1 | 10.00 | |
| | All | | ug/L | 5.00 | 5.00 | 5.00 | 1 | 1 | 10.00 | |
| Zinc | CN121 | 1976 | ug/L | 1.13 | 1.60 | 0.82 | 3 | 0 | | 67 |
| [ad] | PM-12 | 2000s | ug/L | 9.50 | 17.90 | 5.00 | 15 | 6 | 10.00 | |
| | All | | ug/L | 6.85 | 12.50 | 0.82 | 18 | 6 | 10.00 | |

[a] - Material not quantified above detection limit. One-half of detection limit used in calculations.
[b] - Material present, but level was estimated in some samples. Data not used in calculations.
[c] - Three samples had percentages calculated instead of being measured in mg/L. These were not used in calculations.
[d] - One sample was calculated and reported as extremely high. Data thrown out of calculations
[e]- Detection limit lowered during the sampling period. High detection limit data not used in calculations.
[f]- Standards for hardness dependent components assume a hardness of 50mg/l.
[g]- Most limiting criteria.
[h]- Ammonia criteria is un-ionized.
[i] - Detection limit likely changed during the sampling period.
[j] - Flow measured by cross-sectional velocity measurements.

**Table B-4. Summary of Surface Water Monitoring Data Collected for the Embarrass River.**

## (c) Site: PM13

| General Parameters | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [c,d,e] |
|---|---|---|---|---|---|---|---|---|---|
| Alkalinity, total | | mg/L | 100.94 | 174.00 | 26.00 | 13 | 0 | | |
| Nitrogen, ammonia as N | [a] | ug/L | 50.00 | 50.00 | 50.00 | 4 | 4 | 100 | 40 |
| Chloride | | mg/L | 7.04 | 12.70 | 3.80 | 12 | 4 | | 230 |
| Cyanide | [a] | ug/L | 10.00 | 10.00 | 10.00 | 4 | 4 | 20.0 | |
| Chemical Oxygen Demand | | mg/L | 39.36 | 59.00 | 21.00 | 7 | 0 | | |
| Dissolved oxygen | | mg/L | 9.17 | 12.20 | 5.73 | 7 | 0 | | 5 |
| Fluoride | | mg/L | 0.50 | 2.28 | 0.18 | 13 | 0 | | |
| Hardness, total | | mg/L | 126.84 | 214.00 | 35.60 | 13 | 0 | | |
| Nitrate + Nitrite | [a] | ug/L | 74.29 | 150.00 | 50.00 | 7 | 5 | 100 | |
| Phosphorus total | | ug/L | 61.82 | 180.00 | 50.00 | 1 | 1 | 100 | |
| Sulfate | | mg/L | 41.19 | 94.70 | 15.40 | 12 | 0 | | |
| Solids, total suspended | | mg/L | 8.71 | 13.00 | 5.00 | 7 | 0 | | |
| Solids, total dissolved | | mg/L | 211.62 | 339.00 | 68.00 | 13 | 0 | | 700 |
| Carbon, total organic | | mg/L | 17.68 | 25.70 | 13.60 | 11 | 0 | | |

| Measurement | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [c,d,e] |
|---|---|---|---|---|---|---|---|---|---|
| Flow | [h] | cfs | 56.73 | 242.80 | 7.20 | 13 | 0 | | |
| pH | | su | 7.82 | 8.60 | 7.27 | 14 | 0 | | 6.5-9.0 |
| Specific Conductance @25 C | | umhos | 302.73 | 473.80 | 94.00 | 14 | 0 | | 1000 |
| Temperature | | deg C | 11.05 | 23.00 | 1.10 | 13 | 0 | | |
| Turbidity | | NTU | 4.16 | 5.00 | 3.00 | 3 | 0 | | 25 |

| Metals | Notes | Units | Average | Maximum | Minimum | No. of Samples | Non-Detects | Value of DL | WQS [c,d,e] |
|---|---|---|---|---|---|---|---|---|---|
| Silver | [ag] | ug/L | 0.29 | 0.50 | 0.10 | 9 | 9 | 0.2 - 1 | 1 |
| Aluminum | | ug/L | 188.76 | 433 | 43.9 | 9 | 0 | | 125 |
| Arsenic | [a] | ug/L | 1.00 | 1.00 | 1.00 | 4 | 4 | 2.0 | 53 |
| Barium | | ug/L | 27.76 | 41.7 | 14.3 | 7 | 0 | | |
| Beryllium | [a] | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | |
| Boron | [a] | ug/L | 44.33 | 68.90 | 17.50 | 4 | 1 | 35.0 | |
| Calcium | | mg/L | 21.45 | 33.40 | 7.00 | 13 | 0 | | |
| Cadmium | [a] | ug/L | 0.10 | 0.10 | 0.10 | 4 | 4 | 0.2 | 2.5 |
| Cobalt | [a] | ug/L | 0.50 | 0.50 | 0.50 | 13 | 13 | 1.0 | 5 |
| Chromium | [a] | ug/L | 1.925 | 4.3 | 0.5 | 4 | 1 | 1.0 | 86 |
| Copper | [ab] | ug/L | 1.33 | 1.60 | 1.10 | 12 | 0 | | 9.3 |
| Iron | | ug/L | 1401.43 | 2080.00 | 720.00 | 7 | 0 | | 50 |
| Mercury | [ag] | ug/L | 0.0032 | 0.0050 | 0.0010 | 13 | 9 | 0.002 - 0.01 | 0.0013 |
| Methyl Mercury | | ug/L | 0.000161 | 0.000176 | 0.000146 | 2 | 0 | | |
| Potassium | | ug/L | 2314.29 | 2900.00 | 1500.00 | 7 | 0 | | |
| Magnesium | | ug/L | 18353.85 | 31600.00 | 6100.00 | 13 | 0 | | |
| Manganese | | ug/L | 109.00 | 200.00 | 30.00 | 7 | 0 | | |
| Molybdenum | [a] | ug/L | 2.50 | 2.50 | 2.50 | 7 | 7 | 5.0 | |
| Sodium | | ug/L | 12744.44 | 28300.00 | 5200.00 | 9 | 0 | | |
| Nickel | [ab] | ug/L | 1.55 | 2.50 | 1.00 | 11 | 0 | | 52 |
| Lead | [ab] | ug/L | 0.28 | 0.63 | 0.15 | 5 | 4 | 0.3 | 3.2 |
| Palladium | [ab] | ug/L | 0.15 | 0.15 | 0.15 | 1 | 1 | 0.3 | |
| Platinum | | ug/L | 0.13 | 0.13 | 0.13 | 1 | 1 | 0.3 | |
| Antimony | [a] | ug/L | 1.50 | 1.50 | 1.50 | 4 | 4 | 3.0 | |
| Selenium | [ag] | ug/L | 1.30 | 1.80 | 0.50 | 9 | 9 | 1 - 3.6 | 5 |
| Strontium | | ug/L | 58.33 | 104.00 | 29.10 | 4 | 0 | | |
| Thallium | [a] | ug/L | 0.20 | 0.20 | 0.20 | 5 | 5 | 0.4 | |
| Titanium | | ug/L | 13.00 | 13.00 | 13.00 | 1 | 0 | | |
| Zinc | [afg] | ug/L | 9.12 | 17.70 | 5.00 | 15 | 13 | 10 - 25 | 120 |

[a] - Some of all samples not quantified above detection limit. One-half of detection limit used in calculations.
[b] - Detection limit lowered during the sampling period. High detection limit data not used in calculations.
[c] - Standards for hardness dependent components assume a hardness of 100mg/l.
[d] - Most limiting criteria.
[e] - Ammonia criteria is un-ionized.
[f] - One or more sample was reported as extremely high. Data thrown out of calculations
[g] - Detection limit likely changed during the sampling period.
[h] - Flow measured by cross-sectional velocity measurements.