Appendix 26

Meadowbank and Whale Tail 2024 CREMP Report

2024 Core Receiving Environment Monitoring Program

Meadowbank Complex

Prepared for:



Agnico Eagle Mines Ltd
Meadowbank Complex
Baker Lake, NU X0C 0A0

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Azimuth Consulting Group Inc.
218-2902 West Broadway
Vancouver, B.C., V6K 2G8

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EXECUTIVE SUMMARY

This report presents findings from the 2024 Core Receiving Environment Monitoring Program (CREMP). The purpose of the CREMP is to determine if activities at Meadowbank, Whale Tail, and Baker Lake are causing changes in water quality, sediment chemistry, phytoplankton, and benthic invertebrates. Changes within the study area lakes are identified using early warning triggers and statistical analyses. The assessment uses early warning *triggers* and action *thresholds* to support management decisions within the Aquatic Effects Management Program (AEMP). The AEMP is the overarching 'umbrella' program that integrates results of individual, but related, monitoring programs to implement management actions before unacceptable adverse impacts occur to aquatic life.

Meadowbank

Results for the Meadowbank study area lakes are presented below and summarized in **Table ES-1**.

Water Quality (Limnology & Water Chemistry)

Water quality monitoring for limnology and chemistry was completed in March, April, July, August, and September 2024 according to the CREMP study design. Limnology profiles were taken at the Near-Field (NF) areas—Third Portage Lake (TPN, TPE), Second Portage Lake (SP), and Wally Lake (WAL)—in the winter months when ice conditions were safe (January, February, November, and December).

The NF areas close to the mine have higher concentrations of dissolved solids and constituent major ions such as calcium and magnesium compared to baseline/reference conditions. This observation is consistent with previous findings. While these changes to water quality are mine-related, the observed concentrations are still relatively low and there is no evidence to suggest concentrations are increasing year-over-year or that the observed concentrations would result in adverse ecological effects. Consistent with previous reporting cycles, there were no trigger exceedances in 2024 for any water quality parameters with Canadian Council of Ministers of the Environment (CCME) water quality guidelines (WQG), including metals. In the context of the assessment framework outlined in the Final Environmental Impact Statement (FEIS), the magnitude of potential effect on water quality in each of the near-field lakes in 2024 was considered *low* (i.e., less than the CCME WQGs) and consistent with the original predictions. **Routine water quality monitoring is recommended for 2025.**

Phytoplankton Community

Water samples for phytoplankton taxonomy were collected during each sampling event. From the 2024 BACI analysis, the phytoplankton community showed reductions relative to baseline for biomass at all Meadowbank stations in 2024, though the reductions were only significant at WAL. This reduction was greater than the 20% trigger. Phytoplankton richness decreased at all locations, and were significant in

the BACI analysis at all locations, though the results were above the 20% trigger at TPE, SP, and WAL. The observed fluctuations in phytoplankton richness and biomass fall within the range of historical baseline/reference conditions and are likely due to natural variability. Ultimately, the long-term phytoplankton monitoring data demonstrates that mining operations have not contributed to pervasive changes in primary productivity among the NF areas. **The trends in phytoplankton biomass and richness will be reviewed again in 2025.**

Sediment Chemistry

The 2024 sediment program focused on NF and reference areas only and consisted of routine grab sampling (particle size, total organic carbon [TOC], and organics analysis on the top 3–5 cm of sediment).

Sediment grab sampling was conducted at the NF and reference areas to support the benthic invertebrate community monitoring component of the CREMP. Sediment was analyzed for grain size and TOC. Remaining sediment was archived for chemistry analysis as per the *CREMP Plan Update* (Azimuth, 2022b). **The next sediment coring program will be conducted in August 2026 to review trends in chemistry. In 2025, grab samples will be collected to support the benthic invertebrate community sampling program.**

Benthos Community

There were no statistically significant changes to the benthic invertebrate community at Meadowbank relative to baseline/reference conditions identified by the 2024 BACI assessment, except for an increase in richness at SP during the 2021–2024 time period. Richness at SP was within the range of reference area INUG in 2024. **The trends in benthos abundance and richness will be reviewed again in 2025.**

Whale Tail

The 2024 CREMP results for the Whale Tail study area are presented below and summarized in **Table ES-2**.

Overview of the Whale Tail CREMP

Data analysis for Whale Tail study areas follows the same methods and framework as Meadowbank. 2024 was the sixth full year where most Whale Tail study area lakes were classified as *impact*. Whale Tail South (WTS) and Kangislulik Lake[1] (KAN) switched from *control* to *impact* in 2018 coinciding with construction of the Whale Tail Dike. The status of Lake A20, Lake A76, and Lake DS1 switched to *impact* in January 2019. Nemo Lake (NEM) transitioned to *impact* after July 2019.

[1] Previously referred to as Mammoth Lake (MAM).

Water Quality (Limnology & Water Chemistry)

Surface water monitoring for limnology and water chemistry were completed in March, May, July, August, and September according to the CREMP study design for the Whale Tail study area. Supplemental limnology profiles were taken at Whale Tail South (WTS), Kangislulik Lake (KAN), Nemo Lake (NEM), and Lake A20 in select winter months to verify that water quality is broadly within the range of expected values, particularly for conductivity and dissolved oxygen.

Changes in water quality in lakes downstream from the mine were predicted to occur during construction and operations. Water quality within the Whale Tail study area lakes exhibited fairly stable conditions during the baseline period. Consequently, when interpreting time series plots to examine spatial-temporal trends in water quality, the *signal* of development-related inputs was expected to be easily observed relative to the low *noise* levels of the baseline period. The following parameters have increased relative to baseline/reference conditions:

- **Ionic Compounds**. Total dissolved solids and constituent ions such as calcium, magnesium, potassium, and sodium were elevated in the NF lakes and downstream of KAN to Lake A76.
- **Nutrients**. Total Kjeldahl nitrogen, total organic carbon, and dissolved organic carbon were elevated at all areas except NEM and A76. In addition, total phosphorus was elevated at WTS. The elevated parameters are likely the result of inputs from flooded terrestrial habitats following impoundment, dewatering inputs from WTN, and the joining of WTS to A20.
- **Metals/metalloids.** Total and dissolved lithium were elevated at WTS and KAN, while total and dissolved silicon were elevated at DS1, similar to observations in 2023. These parameters do not have an effects-based guideline for the protection of freshwater aquatic life.

Of the parameters with trigger exceedances, FEIS predictions were exceeded for total alkalinity, TDS, total lithium, and several ionic compounds at WTS and KAN in one or more sampling events. Importantly, the absolute concentrations of these parameters remain *low*. Total phosphorus and arsenic at WTS and KAN were within the normal operating ranges and Level 0 water management strategy is in effect in 2025 as per the *Adaptive Management Plan*. **Routine water quality monitoring will continue in 2025 to track emerging spatial and temporal trends.**

Phytoplankton Community

Phytoplankton community sampling was completed at the same time as the water chemistry sampling program in 2024. Phytoplankton communities vary naturally throughout the year in total biomass (and density) and community composition (taxa richness). The primary stressors for the phytoplankton community include nutrients and metals in surface contact water discharged to KAN and WTS. Nutrient

loading can manifest as an increase in total biomass or a change in community structure, while increasing metals concentrations would be expected to cause lower biomass and taxa diversity.

In 2024, the BACI analysis showed no significant changes in biomass relative to baseline/reference conditions at the Whale Tail area lakes. Observed trends were variable across the areas and likely driven by natural variability. The increases in biomass observed at the NF areas in the first few years after mining, which were consistent with predictions made in the FEIS regarding increasing nutrient concentrations in these lakes (Golder, 2018), appear to have corrected and stabilized.

Taxa richness has been fairly stable at the NF areas over the past few years and generally within the historical range for each area. While statistically significant apparent decreases in phytoplankton richness were identified in the BACI analyses, these are driven in part by the stable trends at reference area INUG. PDL, the other reference area, is more consistent with the Whale Tail study area lakes.

Nutrient levels in 2024 were similar to 2023 as observed in the water chemistry data. Nutrient levels and phytoplankton responses appear to roughly align over both temporal and spatial scales. However, phytoplankton communities respond to a host of seasonal factors such as sunlight and water temperature and therefore it is difficult to distinguish between seasonal fluctuations and influence of nutrients from to mining activities.

Phytoplankton productivity, biomass and richness, as well as associated patterns in key nutrients will continue to be tracked in 2025. **Phytoplankton community monitoring is scheduled for 2025 according to the CREMP Plan.**

Sediment Chemistry

In the Whale Tail study area, sediment is naturally elevated in several metals and their concentrations can be quite variable due to spatial heterogeneity. Sediment grab sampling was conducted at the NF and reference areas to support the benthic invertebrate community monitoring component of the CREMP. Sediment was analyzed for grain size and TOC. Remaining sediment was archived for chemistry analysis as per the *CREMP Plan Update* (Azimuth, 2022b).

TOC proportions, though naturally different across the Whale Tail area lakes, have remained stable within each lake. KAN consistently has the highest proportions of TOC, while the reference lakes (INUG, PDL) have the lowest. These results reflect differences in productivity levels across the lakes. Grain size results were similar to previous years, with generally finer-grained sediment often dominated by the silt fraction.

A supplemental sediment coring program was conducted in WTS in August 2024 to assess whether chromium concentrations have increased compared to the baseline period. While sediment cores from 2023 and 2024 suggest higher chromium concentrations compared to 2017, substantial spatial

heterogeneity within the basin makes any temporal trend indistinguishable. Spatial and temporal trends for sediment chromium will be reassessed in the 2026 coring program.

The next sediment coring program will be conducted in August 2026 to review trends in chemistry. In 2025, grab samples will be collected for chemistry and to support the benthic invertebrate community sampling program.

Benthos Community

Benthic invertebrate (benthos) community structure (taxa richness) and function (abundance) in the Whale Tail study area lakes is typical of northern headwater lakes in the region (i.e., relatively low abundance and few taxa).

In 2024, total abundance in all NF areas remained within historical ranges and was generally consistent with baseline/reference conditions. Despite that, the lower abundance seen at INUG this year translated into substantial apparent increases at WTS and KAN. Similar results were observed for the longer time periods. While INUG experienced its two lowest abundance years in the past three years, the NF areas generally had higher abundance years.

Total taxa richness in most NF areas remained within historical ranges and was generally consistent with baseline/reference conditions. The main exception is KAN, which has had progressively higher taxa richness. Similar to abundance, the relatively lower richness seen at INUG over the last three or four years also translates to relatively higher richness at the Whale Tail study lakes for the corresponding time periods. The apparent increases in taxa richness in 2024 were statistically significant at KAN and NEM, as were some of the longer time periods (e.g., 47% rise at KAN, 28% rise at A20, and a 49% rise at NEM over the last 4 years).

Evidence for causality is stronger for natural variability versus mining activity. Mining activity can lead to two types of effects: adverse changes (e.g., due to direct toxicity) or stimulatory effects (e.g., due to nutrient enrichment). The apparent changes described above reflect stimulatory responses to abundance and richness, which could be related to nutrient enrichment. Mining-related nutrient enrichment should result in higher sediment TOC due to higher primary productivity. However, no increases in sediment TOC have been observed at the Whale Tail study area lakes. Instead, the substantial differences in sediment TOC among lakes likely reflect their natural capacity to respond to environmental changes. While we cannot rule out a contribution from mining activity, the evidence provides little support for mining as the main driver of the observed stimulatory effects to the benthic invertebrate community.

Additional monitoring data should help understand the cause of the increased densities observed in 2024. **Benthos community monitoring will be conducted in 2025 according to the CREMP Plan.**

Baker Lake

CREMP monitoring at Baker Lake started in 2008. Important mine-related activities in Baker Lake include barge/shipping traffic and general land-based activities associated with the tank farm area. Water quality sampling was conducted at two NF areas (BBD, BPJ) and one reference area (BAP) in Baker Lake in July, August, and September 2024. No sediment coring was done at Baker Lake in 2024.

The number of barge shipments in 2024 were down from 2021 through 2023 which reported the highest shipments since monitoring began in 2008. In 2024, two spill events occurred, prompting appropriate response measures, mitigation efforts, and thorough investigations. More information regarding the cause, water quality results, and remediation actions for the 2024 spill events can be found in the Spill Follow-up Reports submitted as per the Water License.

Water Quality

In 2024, the mean annual concentrations for all parameters were less than their respective triggers. There was no evidence of any barge-related impacts to water quality at *impact* areas in Baker Lake. **Monitoring in 2025 will follow the scope and schedule of the CREMP Plan.**

Phytoplankton Community

There were no statistically significant changes in total biomass or taxa richness at any areas in 2024. **Monitoring in 2025 will follow the scope and schedule of the CREMP Plan.**

Table ES-1. Summary of key findings from the 2024 Meadowbank CREMP.

Notes:
1. Temporal and spatial trends are outlined for monitoring components and variables that exceeded trigger or effects-based thresholds (i.e., apparent change from baseline).
2. Spatial scale ratings are: localized = small area within the lake/area; widespread = basin to whole lake.
3. Causality ratings are: low = no evidence of a mine-related source; moderate = some likelihood of a mine-related source; high = the source of the change is likely mine-related.

Monitoring Component (and report section)	**Variable**	**Temporal and Spatial Trend Assessment**[1, 2, 3]	**Annual CREMP Results Compared to FEIS Predictions** (Cumberland, 2005)
Water Chemistry Section 4.3	Conventional Parameters and Major Ions	**Spatial scale – widespread**; concentrations have increased lake-wide in Third Portage from TPE to TPN and between lakes (SP and WAL). **Temporal trend – stable**; concentrations are elevated relative to the baseline period according to the BACI analysis, no evidence of-year-over-year increases (i.e., concentrations in 2024 are similar to 2023, 2022, 2021, 2020, etc.) **Causality – high**; the spatial pattern and temporal trend of increasing concentrations in the *after* period is plausibly attributed to activities at the mine, though concentrations are consistently below effects-based thresholds for the few parameters with thresholds (**Figure 4-7**, **Figure 4-8**).	Water quality constituents without effects-based CCME thresholds were not incorporated in the magnitude ratings for assigning effects in the FEIS; however, following the intent of the FEIS magnitude ratings, constituents exceeding baseline but below concentrations associated with adverse effects were considered consistent with a *low* magnitude rating
	Nutrients	**Spatial scale – localized**; Total calcium and magnesium exceed triggers at WAL and potassium exceed triggers at TPE and SP. Alkalinity, calcium, magnesium, and TDS exceeded triggers at PDL. **Temporal trend – none**. **Causality – low**; no evidence of mine-related source.	*Low* (i.e., < CCME water quality guidelines).
	Metals	**Spatial scale – localized, silicon (Si)**; Si is elevated at INUG and SP, and potassium exceeded the trigger at TPE and SP. **Temporal trend – none.** **Causality – low**; the elevated Si at the REF station INUG as well as at SP suggest conditions are not mine related. The minor exceedance of potassium was only marginal, and was within range of previous data.	Recent temporal water quality analysis for areas in Third Portage Lake (TPE and TPN), Second Portage Lake, and Wally Lake indicates the results conform with the *low* effect rating predicted in the FEIS. This conclusion is corroborated by the phytoplankton and benthos community results, which show relatively diverse, abundant, and stable communities at the NF areas relative to baseline/reference conditions.
Phytoplankton Section 4.4	Chlorophyll-a	Concentrations in the reference area samples typically range between 0.3 and 1.7 µg/L in summer months, reflecting the oligotrophic, nutrient poor condition of these lakes; a trend that has not changed over time.	No predictions in the FEIS.
	Total Biomass	**Spatial scale – localized**; phytoplankton biomass decreased in the BACI analysis at all NF locations relative to baseline/reference conditions in 2024, though the increases were only significant at WAL. **Temporal trend – stable**; historical biomass levels for the NF areas do not show obvious visual signs of temporal trends for individual NF study areas (**Figure 4-14**). **Causality – low**; SP was the only NF area that received effluent discharge in 2024. The magnitude of the change in biomass at the NF areas TPN, SP, and WAL suggests the observed pattern of decrease in phytoplankton biomass/richness is likely annual variability in the community rather than mine-related.	The absolute biomass values at the NF are comparable to their historical values. Taking into consideration all the lines of evidence (BACI and absolute values plotted over time), there is no evidence to suggest mining operations are increasing primary productivity in the NF areas.
	Taxa Richness	**Spatial scale – localized**; phytoplankton richness significantly decreased in the BACI analysis at TPE, SP, and WAL relative to baseline/reference conditions in 2024. **Temporal trend – stable**; historical richness levels for the NF areas do not show obvious visual signs of temporal trends for individual NF study areas (**Figure 4-17**). **Causality – low**; there is no indication that mine activities are influencing taxa richness.	Taxa richness for the phytoplankton communities has been stable throughout the 'after' period (i.e., no apparent loss of community diversity). The results observed in 2024 are likely annual variability in the community rather than mine-related.
Sediment Chemistry	Metals	Grab sample results were analyzed for grain size, moisture, and TOC. Remaining sediment was archived for chemistry analysis. Grab sample results are used to support benthic invertebrate interpretation.	The FEIS noted that release of effluent (i.e., settling of TSS and altered sediment chemistry) *may impact benthos.*

Sediment Chemistry Section 4.5		Grab samples were not analyzed for chemistry in 2024. Trends will be reviewed in 2026 with the sediment coring program.	
	Hydrocarbons	Hydrocarbons are not contaminants of potential concern for the CREMP based on recent and historical results. There have been no instances of measured concentrations attributable to site-related activities during the monitoring period.	No predictions in the FEIS.
Benthos Section 4.6	Total Abundance	**Spatial scale – localized**; lower abundance (based on the BACI analysis) observed at TPN, TPE, and SP, and an increase in abundance at WAL. Changes exceed 20% effect size, but were not significant. **Temporal trend – stable**; total abundance was consistent with the range observed in baseline (**Figure 4-20**). **Causality – low**; the 'apparent' change in abundance in the BACI analysis was not significant.	The identification of potential mine-related impacts generally involves visually examining the data for spatial/temporal patterns that matched mine-related events. Changes were observed in total abundance in the BACI analyses in 2024, but the results were not significant in the BACI analysis (**Figure 4-20**).
	Total Richness	Richness continues to track higher for most areas. The benthic communities are dominated by chironomids, and the relative proportion of major taxa remains stable at all areas.	No predictions in the FEIS.

Table ES-2. Summary of key findings from the 2024 Whale Tail CREMP.

Notes:
1. Temporal and spatial trends are outlined for monitoring components and variables that exceeded trigger or effects-based thresholds (i.e., apparent change from baseline).
2. Spatial scale ratings are: localized = small area within the lake/area; widespread = basin to whole lake.
3. Causality ratings are: low = no evidence of a mine-related source; moderate = some likelihood of a mine-related source; high = the source of the change is likely mine-related.

Monitoring Component (and report Section)	**Variable**	**Temporal and Spatial Trend Assessment**[1, 2, 3]	**Monitoring Results Compared to FEIS Predictions (Golder, 2019) and AMP Thresholds**
Water Chemistry Section 5.3	Conventional Parameters and Major Ions	**Spatial scale – widespread**; the 2024 results indicated changes to WTS and KAN and to a lesser extent A20 and A76 as well as NEM which is located in a separate watershed. **Temporal trend – increasing (WTS, KAN, A20, A76); stable (NEM)**; conditions at WTS have been increasing most markedly, at KAN increases occurred but were mostly muted. Conditions at NEM have remained stable since 2019. Conditions at A20 and A76 increased in 2024 compared to 2023. **Causality – high**; these parameters have increased in the Meadowbank study area lakes and it seems likely that the apparent increase observed in the Whale Tail study area lakes in 2024 follows a similar trend and with more samples in the *after* period, it is easier to assign causality.	Water quality constituents without effects-based CCME thresholds were not incorporated in the magnitude ratings for assigning effects in the FEIS; however, following the intent of the FEIS magnitude ratings, constituents exceeding baseline but below concentrations associated with adverse effects were considered consistent with a *low* magnitude rating. FEIS predictions are for Kangislulik Lake and Whale Tail South. Monthly mean concentrations for several parameters exceeded FEIS predictions but all conform with the *low* effect rating predicted in the FEIS.
	Nutrients	**Spatial scale – widespread**; TKN exceeded the trigger at NF (WTS and KAN), MF (A20), and FF (DS1) areas. Total phosphorus only exceeded the trigger at WTS in 2024. **Temporal trend – variable**; TKN and total phosphorus decreased at WTS and A20 while they remained stable at KAN. **Causality – low**; the changes in TKN and total phosphorus concentrations were seen at the FF area, but only at one MF areas which suggests the apparent changes may be in part due to natural variability in 2024.	The yearly mean for total phosphorus at WTS and KAN fell below the FEIS predictions. The AMP Level 0 is in effect for both WTS and KAN. The full suite of CREMP water sampling is scheduled for 2025.
	TOC and DOC	**Spatial scale – widespread**; TOC and DOC exceeded the trigger at NF (WTS and KAN), MF (A20), and FF (DS1) areas. **Temporal trend – stable**; TOC and DOC at WTS, KAN, A20, and DS1 appeared to be stable in 2024 compared to 2023. **Causality – moderate**; the changes concentrations were seen at the FF area, but only at one MF areas (A20) which suggests the apparent changes may be in part due to natural variability in 2024. Natural regional factors may be at play in addition to the spatially isolated effects of mining at WTS, KAN, and A20.	No predictions in the FEIS. The observed trends may be in part due to natural variability. These parameters will be monitored in 2025.
	Metals	**Spatial scale – localized**; mean lithium concentrations exceeded the trigger value at KAN and WTS, but elevated concentrations did not extend to Lakes A20 or A76. **Temporal trend – stable**; lithium concentrations appear to be relatively stable in 2024 relative to 2023. **Causality (Figure 5-12):** **Lithium – high**; the exceedances of lithium have historically occurred at both NF locations (KAN and WTS). There is a marked increase in this parameter following the start of mining activity in 2018.	*Low* (i.e., < CCME water quality guidelines). For total arsenic, the AMP Level 0 is in effect for WTS and KAN.
Phytoplankton Section 5.4	Chlorophyll-a	**Spatial scale – localized**; chlorophyll-a in 2024 remained consistent with baseline oligotrophic conditions (<1 µg/L) across most Whale Tail area lakes, except at WTS and DS1, where slightly elevated levels were observed. There was no formal BACI analysis on this parameter. **Temporal trend – Increase (WTS, DS1), variable (KAN, A20, A76)**; the 2024 mean annual concentration of chlorophyll-a at WTS and DS1 exceeded 1 µg/L which is considered characteristic of oligotrophic systems. **Causality – moderate (WTS)**; a spatial trend did extend into other NF lake KAN or MF lake A20. Correspondence exists between elevated nutrients and chlorophyll-a at WTS, though large seasonal fluctuations make interpreting temporal trends challenging.	No predictions in the FEIS. Chlorophyll-a appears to have increased at WTS and DS1 in 2024. An increase in productivity is normally indicative of an increase in nutrient concentrations. Nutrients are discussed above with increases also influenced by natural variability in 2024. Nutrients and primary productivity in the water column will be monitored in 2025.

Monitoring Component (and report Section)	**Variable**	**Temporal and Spatial Trend Assessment**[1, 2, 3]	**Monitoring Results Compared to FEIS Predictions (Golder, 2019) and AMP Thresholds**
	Total Biomass	**Spatial scale – localized**; an increase in phytoplankton biomass was observed at KAN and A20, while a decrease was observed at WTS, A76, DS1, and NEM. **Temporal trend – increase/variable**; statistical analysis indicated no significant changes in biomass at over baseline/control. **Causality – low**; changes in biomass were variable across all Whale Tail area lakes.	No predictions in the FEIS. The changes in total biomass at the Whale Tail area lakes were variable and suggest while increases in nutrient concentrations in water from mining activities may affect phytoplankton biomass, the changes may also be attributed to natural variability. Biomass and nutrient patterns will be re-examined in 2025.
	Taxa Richness	**Spatial scale – widespread**; decreases in taxa richness were observed at all Whale Tail study area lakes, except A20. The BACI analysis showed significant decreases in taxa richness at WTS, KAN, A76, and NEM. **Temporal trend – decreasing**; richness has been variable during the *after* period (**Figure 5-18**). The apparent decreases in taxa richness coincide with the highest richness reported at reference area INUG since 2014. Therefore, the apparent decrease in richness observed at Whale Tail area lakes based on the BACI may be in part due to high taxa richness at reference area INUG. **Causality – low**; the decrease in richness relative to baseline suggests there may be influences from mining activities. However, there is uncertainty due the high richness observed at INUG in 2024 and the unclear pattern in apparent changes from NF to FF areas.	No predictions in the FEIS. Taxa richness for the phytoplankton communities has been variable throughout the *after* period, however it appears there may be a slight loss in community diversity compared to the baseline period.
Sediment Chemistry Section 5.5	Metals	**Targeted coring completed for sediment chemistry in WTS in 2024.** **Spatial scale – localized, chromium (Cr)**; Cr is elevated but appears to be more likely due to natural spatial heterogeneity rather than mining activities (**Figure 5-22**). **Temporal trend– (Cr)**; BACI was not completed in 2024. Full coring program to verify trends planned for 2026. **Causality – moderate (Cr)**; while influence of mining activities cannot be entirely ruled out, variability in Cr in sediment at WTS appears to be due to natural spatial heterogeneity.	No predictions in the FEIS for sediment chemistry.
	Hydrocarbons	Hydrocarbons are not contaminants of potential concern for the CREMP based on recent and historical results. There have been no instances of measured concentrations attributable to site-related activities during the monitoring period.	No predictions in the FEIS for sediment chemistry.
Benthos Section 5.6	Total Abundance	**Spatial scale – widespread**; in 2024 higher abundance observed at all Whale Tail area lakes. **Temporal trend – increasing**; abundance at Whale Tail area lakes increased markedly in 2024. In 2024, this increase was significant relative to baseline conditions at KAN, NEM, and DS1 (**Figure 5-23**). **Causality – moderate**; increases were observed across Whale Tail study lakes in 2024; however, this does not necessarily indicate a response to mining. Relatively lower abundance at INUG over the last three or four years translates to relatively higher abundance at the Whale Tail Lakes. Increases in mine derived nutrients could have a cascading effect on phytoplankton and in turn benthic communities, though natural limnological factors or population cycles can also influence results. Abundance will be monitored in 2025 for sustained increases at the Whale Tail area lakes.	No predictions in the FEIS.
	Total Richness	**Spatial scale – localized**; significant increases in benthic invertebrate taxa richness at KAN and NEM in 2024, at WTS in two time periods (2022-24, 2023-24), and at A20 in 2021-24 and 2022-24 compared to baseline/reference. **Temporal trend – variable;** taxa richness has been highly variable since the baseline period, though there appears to be an upward trend at KAN and NEM. **Causality – low;** the benthic communities are dominated by chironomids, and the relative proportion of major taxa remains stable at all areas. There is also little correspondence across the NF study lakes (either significant increasing trends at WTS or KAN, but not both in 2024). Relatively lower richness at INUG over the last three or four years translates to relatively higher richness at the Whale Tail Lakes.	No predictions in the FEIS.

TABLE OF CONTENTS

EXECUTIVE SUMMARY III
TABLE OF CONTENTS XIII
LIST OF FIGURES XVII
LIST OF TABLES XXI
LIST OF APPENDICES XXIII
ACKNOWLEDGEMENTS XXIV
USE & LIMITATIONS OF THIS REPORT XXV
ACRONYMS XXVI
REPORT ORGANIZATION XXVIII

1 INTRODUCTION 1
1.1 Overview of the Aquatic Monitoring Program 1
1.2 Environmental Setting 2
1.2.1 Meadowbank and Whale Tail Study Areas 2
1.2.2 Baker Lake 2
1.3 Mine Development and Operation 3
1.3.1 Meadowbank 3
1.3.2 Whale Tail 4
1.3.3 Baker Lake 4
1.4 CREMP Objectives 4
2 CREMP STUDY DESIGN 1
2.1 Overview 1
2.2 Sampling Areas 5
2.3 Monitoring Components 6
2.4 Sampling Effort 7
2.5 Data Evaluation Criteria 11
2.5.1 Water Chemistry 11
2.5.2 Sediment Chemistry 14
2.5.3 Phytoplankton and Benthos Community Variables 15
3 QUALITY ASSURANCE / QUALITY CONTROL 20
3.1 Overview of CREMP QA/QC 20
3.2 Sample Shipping and Handling 20

3.3 Water Chemistry 20
3.4 Sediment Chemistry 22
3.5 Phytoplankton Taxonomy 23
3.6 Benthos Taxonomy 23
4 MEADOWBANK 24
4.1 Overview of the Meadowbank CREMP 24
4.2 Limnology 24
4.2.1 General Observations 25
4.2.2 Temporal and Spatial Trends 25
4.3 Water Chemistry 27
4.3.1 Key Findings from the 2024 Water Chemistry Monitoring Program 28
4.3.2 Temporal and Spatial Trends 28
4.3.3 Comparison to FEIS Model Predictions 32
4.3.4 Summary and Recommendations 33
4.4 Phytoplankton Community 34
4.4.1 Key Findings from the 2024 Phytoplankton Monitoring Program 34
4.4.2 General Observations 35
4.4.3 Temporal and Spatial Trends 35
4.4.4 Summary and Recommendations 38
4.5 Sediment Chemistry 39
4.5.1 Key Findings from the 2024 Sediment Chemistry Monitoring Program 39
4.5.2 General Observations 39
4.5.3 Temporal and Spatial Trend Interpretation 40
4.5.4 Summary and Recommendations 40
4.6 Benthos Community 40
4.6.1 Key Findings from the 2024 Benthos Community Monitoring Program 40
4.6.2 General Observations 41
4.6.3 Temporal and Spatial Trends 42
4.6.4 Summary and Recommendations 44
4.7 Meadowbank Tables and Figures 45
5 WHALE TAIL 85
5.1 Overview of the Whale Tail CREMP 85
5.2 Limnology 86
5.2.1 General Observations 87
5.2.2 Temporal and Spatial Trends 88
5.3 Water Chemistry 90

5.3.1 Key Findings from the 2024 Water Chemistry Monitoring Program 90
5.3.2 Temporal and Spatial Trends 90
5.3.3 Comparison to FEIS Model Predictions 94
5.3.4 Comparison to Adaptive Management Thresholds 95
5.3.5 Summary and Recommendations 97
5.4 Phytoplankton Community 97
5.4.1 Key Findings from the 2024 Phytoplankton Monitoring Program 97
5.4.2 General Observations 98
5.4.3 Temporal and Spatial Trends 98
5.4.4 Summary and Recommendations 100
5.5 Sediment Chemistry 101
5.5.1 Key Findings from the 2024 Sediment Chemistry Monitoring Program 101
5.5.2 General Observations 101
5.5.3 Temporal and Spatial Trends 102
5.5.4 Summary and Recommendations 103
5.6 Benthos Community 104
5.6.1 Key Findings from the 2024 Benthos Community Monitoring Program 104
5.6.2 General Observations 105
5.6.3 Temporal and Spatial Trends 105
5.6.4 Summary and Recommendations 108
5.7 Whale Tail Tables and Figures 109
6 BAKER LAKE 153
6.1 Overview of the Baker Lake CREMP 153
6.2 Limnology 153
6.2.1 General Observations 153
6.2.2 Temporal and Spatial Trends 154
6.3 Water Chemistry 155
6.3.1 Key Findings from the 2024 Water Chemistry Monitoring Program 155
6.3.2 General Observations 155
6.3.3 Temporal and Spatial Trends 156
6.4 Phytoplankton Community 157
6.4.1 Key Findings from the 2024 Phytoplankton Monitoring Program 157
6.4.2 General Observations 157
6.4.3 Temporal and Spatial Trends 157
6.5 Baker Lake Tables and Figures 159
7 SCOPE OF THE 2025 CREMP 179

7.1 Meadowbank 179
7.2 Whale Tail 180
7.3 Baker Lake 180
8 REFERENCES 182

LIST OF FIGURES

Figure 2-1. Meadowbank Complex Study Area Overview. 4
Figure 2-2. Annual results-based sampling strategy rules for mid-field and far-field sampling areas. ... 10
Figure 2-3. Management response plan for the Meadowbank Mine Aquatic Environment Monitoring Program (AEMP). 17
Figure 4-1. Meadowbank study area – 2024 water quality sampling stations. 46
Figure 4-2. Meadowbank study area – 2024 sediment and benthic invertebrate monitoring areas. 47
Figure 4-3. Mean monthly field-measured temperature (°C) at 3 m depth since 2006, Meadowbank study area lakes. 49
Figure 4-4. Meadowbank – Field-measured temperature profiles, 2024. 50
Figure 4-5. Meadowbank – Field-measured dissolved oxygen profiles, 2024. 51
Figure 4-6. Meadowbank – Field-measured conductivity profiles, 2024. 52
Figure 4-7. Conventional parameters in water samples from Meadowbank study area lakes since 2006. 59
Figure 4-8. Major ions in water samples from Meadowbank study area lakes since 2006. 60
Figure 4-9. Nutrients in water samples from Meadowbank study area lakes since 2006. 61
Figure 4-10. Metals in water samples from Meadowbank study area lakes since 2006. 62
Figure 4-11. Metals in water samples from Meadowbank study lakes since 2006. 63
Figure 4-12. Flow chart showing sampling effort and frequency plan for mid-field and far-field sampling in 2024. 64
Figure 4-13. Chlorophyll-a (µg/L) in water samples from Meadowbank study area lakes since 2006. 67
Figure 4-14. Total phytoplankton biomass (mg/m^3) from Meadowbank study area lakes since 2006. 68
Figure 4-15. Phytoplankton biomass (mg/m^3) by major taxa from Meadowbank study area lakes since 2006. 69
Figure 4-16. Relative phytoplankton biomass by major taxa group from Meadowbank study area lakes since 2006. 70
Figure 4-17. Phytoplankton species richness from Meadowbank study area lakes since 2006. 71
Figure 4-18. TOC (%) in sediment from Meadowbank study lakes since 2006. 73
Figure 4-19. Sediment grain size in sediment samples from Meadowbank study lakes since 2007. 74
Figure 4-20. Benthic invertebrate total abundance (#/m^2) from Meadowbank study area lakes since 2006. 79

Figure 4-21. Benthic invertebrate abundance (#/m^2) by major taxa from Meadowbank study area lakes since 2006. 80
Figure 4-22. Benthic invertebrate relative abundance by major taxa from Meadowbank study area lakes since 2006. 81
Figure 4-23. Benthic invertebrate total richness (# taxa) from Meadowbank study area lakes since 2006. 82
Figure 4-24. Benthic invertebrate richness (# taxa) by major taxa from Meadowbank study area lakes since 2006. 83
Figure 4-25. Benthic invertebrate relative richness by major taxa from Meadowbank study area lakes since 2006. 84
Figure 5-1. Whale Tail study area – 2024 water quality sampling stations. 110
Figure 5-2. Whale Tail study area – 2024 sediment and benthic invertebrate sampling areas. 111
Figure 5-3. Whale Tail mine plan showing the location of the Whale Tail Dike and other site infrastructure. 112
Figure 5-4. Mean monthly field-measured temperature (°C) at 3 m depth since 2014, Whale Tail study area lakes. 114
Figure 5-5. Whale Tail – Field-measured temperature profiles, 2024. 115
Figure 5-6. Whale Tail – Field-measured dissolved oxygen profiles, 2024. 116
Figure 5-7. Whale Tail – Field-measured conductivity profiles, 2024. 117
Figure 5-8. Flow chart showing sampling effort and frequency plan for mid-field and far-field sampling at the Whale Tail study area lakes in 2024. 125
Figure 5-9. Conventional parameters measured in water samples from Whale Tail study area lakes since 2014. 126
Figure 5-10. Major ions (mg/L) measured in water samples from Whale Tail study area lakes since 2014. 127
Figure 5-11. Nutrient parameters measured in water samples from Whale Tail study area lakes since 2014. 128
Figure 5-12. Metals measured in water samples from Whale Tail study area lakes since 2014. 129
Figure 5-13. Metals measured in water samples from Whale Tail study area lakes since 2014. 130
Figure 5-14. Chlorophyll-a (µg/L) in water samples from Whale Tail study area lakes since 2014. 133
Figure 5-15. Total phytoplankton biomass (mg/m^3) from Whale Tail study area lakes since 2014. 134
Figure 5-16. Phytoplankton biomass (mg/m^3) by major taxa group from Whale Tail study area lakes since 2014. 135

Figure 5-17. Relative phytoplankton biomass by major taxa from Whale Tail study area lakes since 2014. 136
Figure 5-18. Phytoplankton species richness from Whale Tail study area lakes since 2014. 137
Figure 5-19. TOC (%) in sediment from the Whale Tail study area lakes. 139
Figure 5-20. Grain size composition in sediment from the Whale Tail study area lakes since 2015. 140
Figure 5-21. Chromium (mg/kg dw) in sediment samples (grab & cores) from Whale Tail study area-. 141
Figure 5-22. Chromium concentrations in sediment from Whale Tail Lake– South Basin since 2016. ... 142
Figure 5-23. Benthic invertebrate total abundance (#/m^2) from Whale Tail study area lakes since 2015. 147
Figure 5-24. Benthic invertebrate abundance (#/m^2) by major taxa group from Whale Tail study area lakes since 2015. 148
Figure 5-25. Benthic invertebrate relative abundance by major taxa from Whale Tail study area lakes since 2015. 149
Figure 5-26. Benthic invertebrate total richness (# taxa) from Whale Tail study area lakes since 2015. 150
Figure 5-27. Benthic invertebrate richness (# taxa) by major taxa group from Whale Tail study area lakes since 2015. 151
Figure 5-28. Benthic invertebrate relative richness by major taxa from Whale Tail study area lakes since 2015. 152
Figure 6-1. Baker Lake – 2024 water, sediment, and benthic invertebrate sampling areas. 160
Figure 6-2. Baker Lake barge traffic from Chesterfield Inlet since 2008. 161
Figure 6-3. Mean monthly field-measured temperature (°C) at 3 m depth since 2008, Baker Lake. 163
Figure 6-4. Baker Lake – Field-measured conductivity, dissolved oxygen, and temperature profiles, 2024. 164
Figure 6-5. Conventional parameters in water samples from Baker Lake since 2008. 167
Figure 6-6. Major ions in water samples from Baker Lake since 2008. 168
Figure 6-7. Nutrients in water samples from Baker Lake since 2008. 169
Figure 6-8. Metals in water samples from Baker Lake since 2008. 170
Figure 6-9. Metals in water samples from Baker Lake since 2008. 171
Figure 6-10. Chlorophyll-a (µg/L) in water samples from Baker Lake since 2008. 174
Figure 6-11. Total phytoplankton biomass (mg/m^3) from Baker Lake since 2008. 175
Figure 6-12. Phytoplankton biomass (mg/m^3) by major taxa from Baker Lake since 2008. 176
Figure 6-13. Relative phytoplankton biomass by major taxa from Baker Lake since 2008. 177

Figure 6-14. Phytoplankton species richness from Baker Lake since 2008..... 178

LIST OF TABLES

Table 2-1. CREMP sampling summary, 2024. 9
Table 2-2. Status of all CREMP sampling areas since 2006. 18
Table 2-3. Adaptive Management Strategy for contaminants of potential concern (COPCs) in water from Whale Tail Lake (South Basin) and Kangislulik Lake. 19
Table 4-1. Samples included in the limnology profiles in 2024. 25
Table 4-2. Assessment process for water quality parameters, Meadowbank study area lakes, 2024. . 54
Table 4-3. Water quality variables at the Meadowbank study areas for which the 2024 mean concentration exceeded the trigger. 55
Table 4-4. Results of BACI tests for selected water variables at Meadowbank study areas in 2024. 56
Table 4-5. Sampling effort and frequency assessment results for the Meadowbank study area lakes, 2024. 57
Table 4-6. Meadowbank study area FEIS screening predictions compared to 2024 mean concentrations. 58
Table 4-7. Results of the BACI test for phytoplankton variables at Meadowbank areas, 2024. 66
Table 4-8. Geometric means for total abundance and total richness, Meadowbank study lakes. 76
Table 4-9. Results of the BACI tests for benthic invertebrate abundance at Meadowbank study lakes. 77
Table 4-10. Results of the BACI tests for benthic invertebrate taxa richness at Meadowbank study area lakes. 78
Table 5-1. Samples included in the limnology profiles for the Whale Tail study area lakes in 2024. 87
Table 5-2. Maximum conductivity readings from each sampling event in Kangislulik Lake and relative percent difference (RPD) between readings from 2023 and 2024-..... 89
Table 5-3. FEIS predictions and trigger values compared to mean concentrations of total phosphorus in Kangislulik Lake and Whale Tail Lake (South Basin), 2024. 92
Table 5-4. Water chemistry data compared to AMP thresholds for total phosphorus and arsenic for Whale Tail Lake (South Basin) and Kangislulik Lake, 2023 and 2024. 96
Table 5-5. Screening process for water quality parameters, Whale Tail study area lakes, 2024. 119
Table 5-6. Water quality variables at the Whale Tail study area lakes for which 2024 mean concentrations exceeded the trigger. 120
Table 5-7. Results of BACI tests for selected water variables at the Whale Tail study area lakes in 2024. 121

Table 5-8. Sampling effort and frequency assessment results for the Whale Tail study area lakes, 2024. 123
Table 5-9. Number of monthly mean concentrations exceeding monthly FEIS screening predictions, annual mean trigger exceedances and trend directions for parameters in Kangislulik Lake and Whale Tail South in 2024. 124
Table 5-10. Results of the BACI test for phytoplankton variables at Whale Tail study area lakes, 2024. 132
Table 5-11. Geometric means for total abundance and total richness, Whale Tail study area lakes since 2015. 144
Table 5-12. Results of the BACI tests for benthic invertebrate abundance from Whale Tail study area lakes. 145
Table 5-13. Results of the BACI tests for benthic invertebrate taxa richness from Whale Tail study area lakes. 146
Table 6-1. Screening process for water quality parameters, Baker Lake, 2024. 166
Table 6-2. Results of the BACI tests for phytoplankton variables at Baker Lake areas, 2024. 173
Table 7-1. Monitoring components planned for 2024 Meadowbank, Whale Tail, and Baker Lake CREMP. 181

LIST OF APPENDICES

APPENDIX A MINE ACTIVITIES

APPENDIX B QUALITY ASSURANCE / QUALITY CONTROL ASSESSMENT

APPENDIX C WATER CHEMISTRY DATA AND SUPPLEMENTAL PLOTS

- Appendix C1 Water Chemistry – Meadowbank Study Area Lakes
- Appendix C2 Water Chemistry – Whale Tail Study Area Lakes
- Appendix C3 Water Chemistry – Baker Lake

APPENDIX D SEDIMENT CHEMISTRY DATA

- Appendix D1 Sediment Chemistry – Meadowbank Study Area Lakes
- Appendix D2 Sediment Chemistry – Whale Tail Study Area Lakes

APPENDIX E PHYTOPLANKTON TAXONOMY DATA AND SUPPLEMENTAL PLOTS

- Appendix E1 Phyto Data – Meadowbank Study Area Lakes
- Appendix E2 Phyto Data – Whale Tail Study Area Lakes
- Appendix E3 Phyto Data – Baker Lake

APPENDIX F BENTHOS TAXONOMY DATA AND SUPPLEMENTAL PLOTS

- Appendix F1 Benthos Data – Meadowbank Study Area Lakes
- Appendix F2 Benthos Data – Whale Tail Study Area Lakes

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ACRONYMS

AEMP	Aquatic effects monitoring program
AMP	Adaptive management plan
AWAR	All weather access road
BACI	Before/after control/impact
BACIP	Before/after control/impact paired
BAP	Baker Lake – Akilahaarjuk Point
BBD	Baker Lake – barge dock
BES	Baker Lake – east shore
BPJ	Baker Lake – proposed jetty
CCME	Canadian Council of Ministers of the Environment
COC	Chain of custody
COPC	Contaminant of potential concern
CREMP	Core receiving environment monitoring program
DFO	Fisheries and Oceans Canada
DI	Deionized blank
DOC	Dissolved organic carbon
DQO	Data quality objective
DW	Dry weight
EB	Equipment blank
EEM	Environmental effects monitoring
FEIS	Final environmental impact statement
FF	Far-field
FWAL	Freshwater aquatic life guidelines (e.g., CCME)
GPS	Global positioning system
INUG	Inuggugayualik Lake
ISQG	Interim sediment quality guidelines
KAN	Kangislulik Lake ([KAN]; formerly Mammoth Lake [MAM]; referred to as KAN)
LCS	Laboratory Control Sample
LOEC	Lowest Observable Effect Concentration
MDL	Method detection limit
MDMER	Metal and Diamond Mining Effluent Regulations
MF	Mid-field area
NEM	Nemo Lake

NF	Near-field
NWB	Nunavut Water Board
PAHs	Polycyclic aromatic hydrocarbons
PDL	Pipedream Lake
PEL	Probable effect level
QA/QC	Quality assurance / quality control
REF	Reference
RPD	Relative percent difference
SOP	Standard operating procedure
SP	Second Portage Lake
SQG	Sediment quality guidelines
SSWQO	Site specific water quality objective
TDS	Total dissolved solids
TE, TEFF	Tehek Lake sampling areas
TKN	Total Kjeldahl nitrogen
TOC	Total organic carbon
TSF	Tailings Storage Facility (North and South Cells)
TSS	Total suspended solids
UTM	Universal Transverse Mercator
WAL	Wally Lake
WQG	Water quality guideline
WTHR	Whale Tail Haul Road

REPORT ORGANIZATION

The 2024 Core Receiving Environment Monitoring Program (CREMP) report is organized into a main document and six appendices (A through F). An overview of the various sections of the report is provided to help guide the reader as they navigate the document.

Executive Summary provides a high-level summary of the monitoring results by study area (Meadowbank, Whale Tail, and Baker Lake).

Section 1 provides an overview of the program, including the project's environmental setting. It also outlines the pace and scope of mining development, highlighting how the program has been implemented to monitor changes in the aquatic receiving environment.

Section 2 outlines elements of the CREMP study design including sampling areas, a description of the routine monitoring components, details regarding any targeted studies conducted for a given cycle, and the statistical framework used to assess spatial and temporal changes in chemistry (water and sediment) and biological communities (phytoplankton and benthic invertebrates).

Section 3 summarizes results of the detailed quality assurance and quality control assessment (QA/QC) presented in **Appendix B**.

Section 4 (Meadowbank), **Section 5** (Whale Tail), and **Section 6** (Baker Lake) are stand-alone chapters detailing the results of the spatial and temporal trends in water quality, sediment chemistry, and biological community health (phytoplankton and benthos) specific to each study area. Figures and Tables are included at the end of each section.

Section 7 provides recommendations for the scope of the 2025 CREMP for Meadowbank, Whale Tail, and Baker Lake study areas.

1 INTRODUCTION

Agnico Eagle Mines Ltd.'s (Agnico Eagle) Meadowbank Complex is situated approximately 75 km north of the hamlet of Baker Lake, Nunavut. This Core Receiving Environment Monitoring Program (CREMP) report documents the methods and results of aquatic receiving environment monitoring activities completed at the Meadowbank Complex and Baker Lake study areas in 2024. As in previous years, this report integrates historical data to identify changes in limnology or water chemistry parameters, sediment chemistry, phytoplankton biomass, and benthic community structure associated with mine-related activities at Meadowbank (since 2006), Whale Tail (since 2018), or in Baker Lake (since 2008).

1.1 Overview of the Aquatic Monitoring Program

The aquatic monitoring program for the Meadowbank Complex has evolved since its inception in 2005. Agnico Eagle has several monitoring programs (e.g., effluent monitoring, ground water monitoring, air quality monitoring) relevant to tracking potential changes to the aquatic receiving environment surrounding the Meadowbank and Whale Tail mines. The CREMP for the Meadowbank Complex, which is the focus of this document, is described below. Details pertaining to the aquatic effects monitoring program (AEMP) are provided in Azimuth, 2022c.

Core Receiving Environment Monitoring Program

The Core Receiving Environment Monitoring Program (CREMP), introduced in the 2009 annual report as the *core monitoring program*, includes data from the CREMP dating back to 2006. The CREMP study design was reviewed and formalized in 2012 (*Core Receiving Environment Monitoring Program (CREMP): Design Document 2012*; Azimuth, 2012d), but has its origins in the AEMP (Azimuth, 2005a). The 2012 design document reviewed historical CREMP data, outlined the trigger and threshold derivation process (see **Section 2.1**), determined parameter-specific trigger and threshold values, and optimized the program's experimental design. These triggers, thresholds, and design updates have been implemented in the CREMP since 2012.

The *CREMP Plan*, a "how-to" manual for aquatic receiving environment monitoring at the Meadowbank Complex, is periodically updated to align the program with site development. The 2022 update (*CREMP 2022 Plan Update*; Azimuth, 2022b) integrated the 2015 version of the *CREMP Plan* (Azimuth, 2015b) with an addendum addressing the Whale Tail Expansion Project. The notable technical change in the 2022 version of the *CREMP Plan* is the shift in monitoring frequency for benthic invertebrates and sediment chemistry in Baker Lake, moving from annual to a three-year cycle. This change coincided with the sediment coring program starting in August 2023 and is supported by the long-term data showing stable benthic invertebrate communities relative to baseline and reference conditions.

1.2 Environmental Setting

1.2.1 Meadowbank and Whale Tail Study Areas

The Meadowbank and Whale Tail mines, collectively known as the Meadowbank Complex, are situated in the Nunavut's barren-ground central Arctic region, within the Wager Bay Plateau, an area of continuous permafrost (Campbell et al., 2012). The region contains headwater, ultra-oligotrophic/oligotrophic (nutrient poor and unproductive) lakes, positioned along the watershed boundary that separates two major drainages: the Arctic Ocean and Hudson Bay.

North of Second and Third Portage lakes, a watershed divide directs water either north to the Arctic Ocean via the Meadowbank and Back River system or south to Hudson Bay via the Quoich River system. Lakes near the Meadowbank mine (i.e., Third Portage, Second Portage, and Tehek) flow into the Quoich River system, while CREMP reference lakes (Tasirjuaraajuk Lake; aka Pipedream Lake [PDL] and Inuggugayualik [INUG]) and lakes in near Whale Tail flow north via the Meadowbank and Back River system (**Figure 2-1**).

The Meadowbank Complex landscape features rolling hills, low-growing vegetative cover, and poor soil development. Numerous lakes are interspersed among boulder fields, eskers, and bedrock outcrops, with indistinct and complex drainages. As is common of headwater lakes, the project area lakes have small drainage basins relative to their surface area. Local inflow from surrounding terrain is the predominant influence on water movement within the system. Small channels connect the lakes, although there is minimal flow between lakes except during freshet and possibly none during winter months. Movement by fish between lakes is rare, as populations remain largely isolated.

1.2.2 Baker Lake

Baker Lake receives drainage from three major river systems that drain much of the central Arctic: the Thelon River, Kazan River, and Dubawnt River (Hutchinson et al., 2018). Covering approximately 1,900 km^2, Baker Lake is situated 90 km from the mouth of the Thelon River to the narrows at the eastern end of the lake (Nunami, 2007).

Water quality in Baker Lake reflects a nutrient poor, low alkalinity, soft water Arctic Lake (Hutchinson et al., 2018). Metals concentrations in surface water are dilute throughout Baker Lake, with no reported exceedances of human health or freshwater quality guidelines. Water quality in Baker Lake is strongly influenced by freshwater inputs during freshet, with weak spatial and seasonal variability except for conductivity (Hutchinson et al., 2018).

Occasionally, deep marine-water influence in Baker Lake is detected in specific conductivity measurements. Johnson (1965) suggested three explanations for saline conditions in Baker Lake:

1. Trapped ancient seawater from isostatic rebound following glacial retreat;

2. Seawater seeping into Baker Lake near the outlet; and
3. Seawater entering Baker Lake driven by tides and storm events.

A 2015–2017 limnological study supports scenario 3 as the most likely explanation for saline water in Baker Lake. The shallow channel or sill separating Baker Lake from marine influence, combined with strong tidal currents and relatively high tidal amplitude at Chesterfield Inlet, could contribute saltwater to Baker Lake (Hutchinson et al., 2018). Conductivity readings over 1,000 µS/cm were recorded at depths between 10 and 20 m in areas further from the Thelon River's freshwater influence (Hutchinson et al., 2018). Spring freshet is postulated as a key factor that prevents saline water from accumulating in Baker Lake year-over-year.

1.3 Mine Development and Operation

An overview of the mine development for the Meadowbank Complex is provided below. A list of within-year site activities and a summary of previous CREMP results dating back to 2008 are provided in **Appendix A**.

1.3.1 Meadowbank

The construction phase of the Meadowbank mine officially started in June 2008, upon receipt of the Nunavut Water Board (NWB) A Water Licence (2AM-MEA0815; renewed to 2AM-MEA1525 in 2015, amended to 2AM-MEA1526 in 2018 and to 2AM-MEA1530 in 2020) for the project. The Fisheries and Oceans Canada (DFO) Fisheries Act Authorization (NU-03-0191) for the project was issued on July 30, 2008, thus allowing the start of in-water construction activities. Dike construction at Second Portage (East Dike) and Third Portage Lake (Bay-Goose Dike) between 2008 and 2010 allowed development of the open pit deposits. The mine officially opened on February 27, 2010, marking the start of the operations period. Five deposits were mined in the 10 years of operations: North Portage, South Portage, Bay-Goose, Vault, Phaser, and BB Phaser. Mining operation ceased in 2019 at Meadowbank Site but the mill is still in operation and processes the ore from Whale Tail mine. In addition to mill operations, key ongoing activities involve:

- In-pit tailings deposition and reclaim from Portage Pits for the entire 2024;
- East dike seepage discharge to Second Portage Lake;
- Progressive closure work on the Tailings Storage Facility (TSF);
- Bay Goose Pit *in-situ* treatment/aeration; and
- All-weather access road (AWAR) bridge repairs and maintenance.

1.3.2 Whale Tail

The Whale Tail mine is situated within the Amaruq property, a 408 km^2 exploration area on Inuit and federal crown land. The Whale Tail mine is located approximately 50 km northwest of the Meadowbank mine and is connected by a 64 km all-weather access road that was completed in 2018. The Whale Tail mine is permitted under a separate NWB license, 2AM-WTP1830, with ore being trucked to Meadowbank to take advantage of the existing infrastructure (e.g., mill, tailings storage, air strip). The Whale Tail mine is made up of three locations of active ore extraction. These include the Whale Tail Pit, IVR Pit, and the underground mine. Major in-water construction activities at Whale Tail have been completed, however key activities in 2024 included:

- Discharge from IVR attenuation pond to Kangislulik and Whale Tail South Lakes;
- Whale Tail Haul Road (WTHR) bridge repairs and maintenance; and
- Whale Tail Dike Thermal Capping.

1.3.3 Baker Lake

The hamlet of Qamani'tuaq (aka Baker Lake), located on the northwest shore of Baker Lake, serves as the entry point for fuel, equipment, and goods arriving by barge. Open-water access from Chesterfield Inlet on Hudson Bay is limited to approximately 2.5 months, typically from late July through mid-October, depending on ice conditions. Goods and fuel are typically transported from Quebec, around Labrador, and through Hudson Straight. Cargo and fuel tanker vessels moor in Chesterfield Inlet, with shallow draft vessels or barges pulled by tugs navigating the channel that connects Baker Lake with Chesterfield Inlet (Agnico Eagle, 2018). Dry goods are unloaded at a floating dock facility east of the hamlet, near CREMP sampling area BPJ. Fuel is transferred from the barges to an 80-million-liter tank farm located upgradient from the dock. Equipment, goods, and fuel are transported year-round from the hamlet to Meadowbank via the 110 km AWAR completed by Agnico Eagle in 2008.

Monitoring at Baker Lake began in 2008, coinciding with the first barge season. The number of barge trips for fuel and goods dating back to 2008 are shown in **Figure 6-2**. The other key activity in 2024 was the Water Management Infrastructure Commissioning.

1.4 CREMP Objectives

The CREMP focuses on identifying changes in limnological parameters, water and sediment chemistry, and in primary (phytoplankton) and secondary (benthic invertebrate community) aquatic producers potentially associated with mine activities. The CREMP uses temporal and spatial trend assessments with quantitative decision criteria (i.e., early warning *triggers* and action *thresholds*) to facilitate timely and objective decision-making regarding appropriate management actions. This information is

integrated annually into the Aquatic Ecosystem Monitoring Program (AEMP) for holistic environmental management and decision making.

The 2005 AEMP framework (Azimuth, 2005a) presented a receiving environment monitoring strategy consisting of two components:

1. **Core Receiving Environment Monitoring Program**

   The CREMP was designed based on our understanding of mine construction, operations, and infrastructure (e.g., dikes, effluents, stream crossings, roads, etc.) to detect mine-related effects at ecologically relevant temporal and spatial scales. The scope expanded to include Baker Lake in 2008 and Whale Tail in 2018. Updates to the program followed recommendations of the *CREMP: Design Document 2012* (Azimuth, 2012d) and more recently, the *CREMP Plan* (Azimuth, 2015b), *Whale Tail Pit Addendum* (Azimuth, 2018b), and the *CREMP Plan Update* (Azimuth, 2022b). The study design employs a before-after-control-impact (BACI) approach, incorporating exposure gradients (e.g., near-field, mid-field, far-field, and reference areas).

2. **Targeted Studies**

   Targeted studies are designed to address specific questions related to mine development during construction or operation and typically focus on narrower temporal or spatial scales. Results are integrated into the routine CREMP to provide complementary insights. Examples include monitoring during dike construction (e.g., Azimuth, 2009a), total suspended solids (TSS) effects assessments (e.g., Azimuth, 2009b), and more recent studies on the toxicity and bioavailability of metals in sediments at TPE (Azimuth, 2016; Azimuth, 2020a).

2 CREMP STUDY DESIGN

2.1 Overview

To streamline the annual report and reduce redundancy, aspects of the CREMP study design presented in the *CREMP Plan* are not repeated herein. Readers looking for details on the aspects of the study design such as sampling methods, QA/QC protocols and procedures, and data evaluation criteria are referred to Azimuth (2022b). A summary of the CREMP study design is included in this report to guide the reader.

The 2012 AEMP (Azimuth, 2012c) with updates in 2022 (Azimuth, 2022b) described a two-tiered approach (**Figure 2-3**) for evaluating changes in the monitoring components (e.g., water quality, benthos community) based on 'trigger' and 'threshold' level changes:

- **Triggers** are typically lower or more conservative than threshold values. They are early warning criteria that might lead to action. Exceedance of a trigger value does not necessarily imply that an adverse effect may be expected. The triggers may be based on absolute numbers (e.g., an increase half-way from baseline or an identified effects-based threshold) or statistical criteria (e.g., statistically significant trend that predicts threshold exceedances within 3 years).
- **Effects-based thresholds** are legal requirements, regulatory guidelines (e.g., CCME), or other discrete benchmarks, below which unacceptable adverse effects are not expected and above which adverse effects may occur. If effects-based thresholds do not exist or are not warranted for a variable, then early warning triggers will be developed without thresholds. In such cases, if triggers are exceeded then their implications can only be understood by integrating results from other AEMP monitoring programs, or, if information gaps still exist, through focused studies (e.g., risk assessment).

The initial analysis compares data to trigger values; if trigger values are exceeded, data are then compared to the applicable effects-based thresholds (if available[2]). Details regarding the derivation of trigger and threshold values for the CREMP are presented in the *CREMP: Design Document 2012* (Azimuth, 2012d).

In addition to triggers and effects-based thresholds, the results are also compared to water quality predictions developed as part of the Final Environmental Impact Statement (FEIS) process (see

[2] For water and sediment quality, effects-based thresholds were generally set to existing environmental quality guidelines. Thresholds were not derived in cases where guidelines were unavailable or when baseline concentrations naturally exceeded existing guidelines (e.g., some metals in sediment).

Section 2.5.1 for more details). The FEIS predictions provide context for whether any observed changes in water quality are consistent with expectations for the approved projects at two levels:

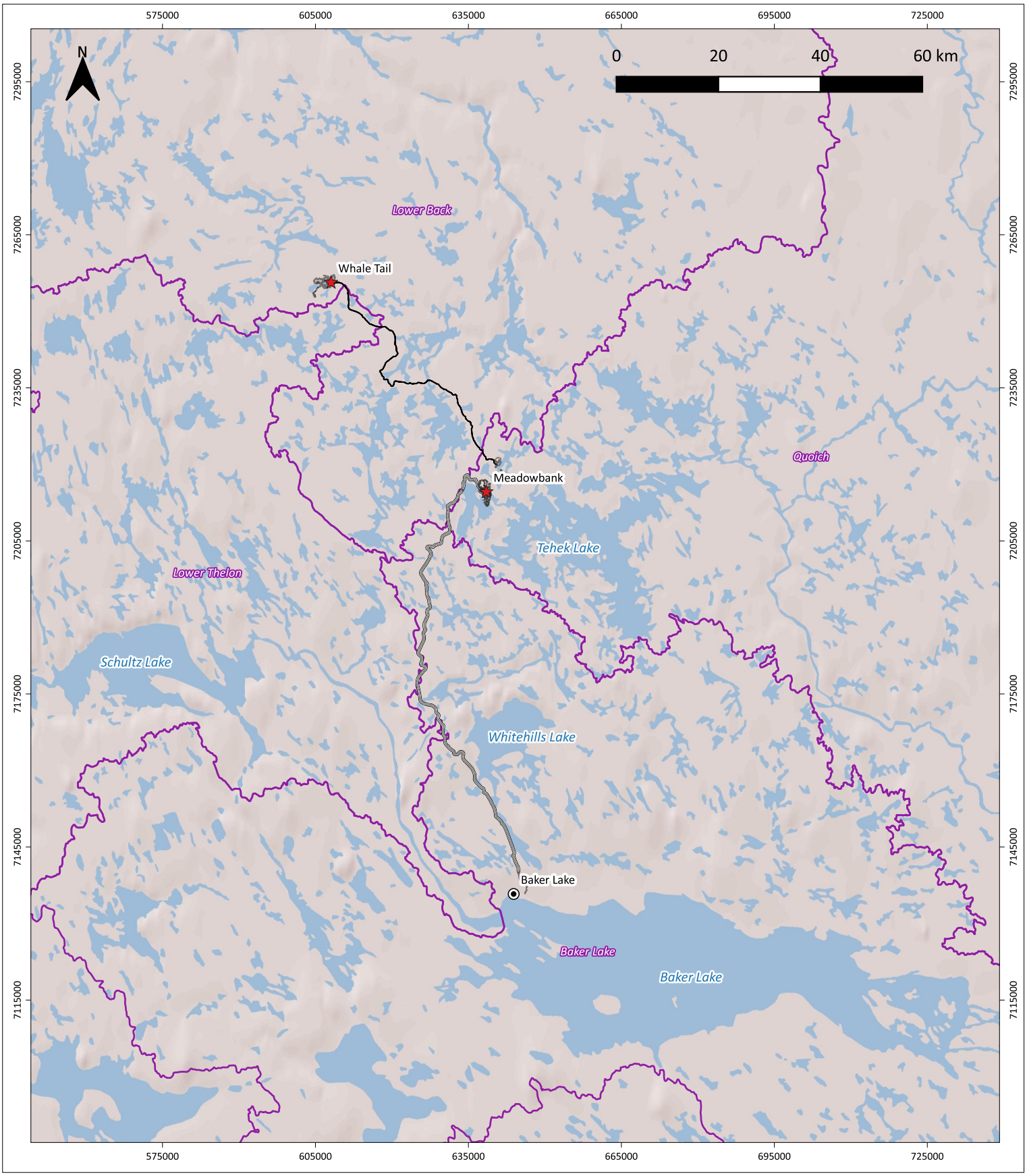
1. **Numerical predictions**. The actual concentrations predicted to occur for a suite of parameters. Given the uncertainties associated with water quality model development, these predictions are provided as a guide only; and
2. **Narrative predictions**. These were categorical predictions used to classify the expected magnitude of change, typically relative to baseline conditions and water quality guidelines (see **Section 2.5.1**).

The application of trigger and effects-based threshold values complements the spatial-temporal trends assessment initiated in the 2011 CREMP (Azimuth, 2012a), which used trend plots (each showing monitoring results since 2006) to identify patterns of change consistent with one or more of the mining activities described in **Appendix A**.

The general rationale for conducting the trend assessment followed these principles:

- **Establish Expected Conditions.** Control data, including baseline (pre-mining) data from impact areas and data from remote reference or control areas, were examined to establish expected parameter concentrations (e.g., water or sediment metals concentrations) in the absence of mining activity. Baseline data were used to infer relative spatial differences (e.g., between a NF and reference area) and reference data were used to infer regional temporal changes (e.g., the regional decrease in benthic community abundance between 2009 and 2010).
- **Compare Patterns of Change.** With expected conditions in mind, impact data (i.e., data collected at NF and MF areas after the mining-related activity began; see **Appendix A**) were visually assessed for spatial and temporal patterns, such as short-term spikes (rapid increases that return to baseline in any year) or long-term trends (gradual or rapid increases that persist) matching mining activity (e.g., the rise in TSS concentrations at SP in August 2008). Where changes were observed, their spatial and temporal extent and magnitude were characterized, determining whether they extended to MF or FF areas, and if so, at what magnitude and duration.
- **Provide Context for Magnitude of Change.** Site-specific triggers, effects-based thresholds, and FEIS predictions provided context for observed changes in CREMP monitoring parameters. When applicable, results of target studies (e.g., TSS EAS studies) were also used to help interpret changes in biological parameters and endpoints.
- **Identify Parameters for Management.** Identify parameters requiring management action on one of two levels: 1) continued trend monitoring (i.e., to follow low magnitude or weak trends), or 2) active follow-up with more detailed quantitative assessment (i.e., a targeted study to address a

potential concern). This process will emphasize issues or concerns present in this year's CREMP results.



Legend

All Weather Access Road

Mine Plan

Infrastructure

Haul Road

Regional Watersheds



AZIMUTH

Client	Agnico Eagle Mines Limited Meadowbank Division
Figure 1-1	Meadowbank Complex - Study Area Overview
Project	CREMP 2024 Meadowbank Complex

Date: February 3, 2025
Datum: NAD 83 UTM Zone 14N
Scale: 1:1,000,000
Software: QGIS Version 3.22.11-Białowieża
By: M. DiMauro, E. Franz

REFERENCES:
1. Basemap imagery from ESRI and Google.
2. Mine plan layers from Agnico Eagle.
3. Watershed boundaries and watercourse from NRCan.

2.2 Sampling Areas

The CREMP is designed to detect spatial and temporal changes in water quality, sediment chemistry, or biological communities (phytoplankton and benthos) at the scale of the lake or basin, in the case of large lakes such as Third Portage Lake. A common element for the Meadowbank and Whale Tail study designs is the use of near-field (NF), mid-field (MF) and far-field (FF) areas to provide spatial context when interpreting potential changes year-over-year. Near-field areas provide the first line of early-warning for introductions of stressors into the receiving environment. These areas are situated closest to the development, near dikes, dewatering discharge points, and proposed effluent sources. Mid-field and FF areas are located farther downstream from the NF monitoring areas and provide insights into the spatial extent of any observed changes in chemistry or biological communities closer to the source. Brief descriptions of the Meadowbank, Whale Tail, and Baker Lake study areas are provided below.

Meadowbank

There are nine sampling areas included in the Meadowbank CREMP. Third Portage Lake East Basin and North Basin (TPE and TPN), Second Portage Lake (SP), and Wally Lake (WAL) are the NF areas monitored annually for changes related to operations at the Meadowbank mine and mill. Starting in 2023, MF areas Tehek Lake (TE), the South Basin of Third Portage Lake (TPS), and FF area Tehek Lake far-field (TEFF) are monitored only if *moderate changes*[3] are detected upstream at the NF locations consistent with the strategy outline in **Section 2.4** (Azimuth, 2022b). Two reference areas are shared for the Meadowbank and Whale Tail programs: Inuggugayualik Lake (INUG) and Tasirjuaraajuk Lake (aka Pipedream Lake [PDL]). INUG has been the core reference area since formal monitoring began in 2006. PDL was added to the Meadowbank CREMP in 2009; while the absence of data at this area from 2006 to 2008 make its utility limited in the BACI statistical analyses, it provides insights into the strength of regional patterns (i.e., how well it matches INUG).

The 2024 sampling areas for the Meadowbank CREMP are shown in **Figure 4-1** (water and phytoplankton) and **Figure 4-2** (sediment and benthos).

Whale Tail

There are six lakes currently included in the Whale Tail CREMP study design. Whale Tail Lake South Basin (WTS) and Kangislulik Lake[4] (KAN) are NF areas designed to detect changes related to dike construction in Whale Tail Lake and Kangislulik Lake and discharge of treated water during operations. Nemo Lake

[3] *Moderate changes* in water quality are defined as statistically significant increases exceeding the early warning trigger for parameters with effects-based thresholds (i.e., CCME freshwater aquatic life guidelines [FWAL]).

[4] Kangislulik Lake (KAN) was previously referred to as Mammoth Lake (MAM).

(NEM) is also considered a NF area because of its proximity to the site, even though it is situated in a different watershed. MF areas are Lake A20 (upstream from WTS, but joined to WTS after flooding) and Lake A76 located downstream from KAN. Lake A76 is situated at the junction of the two flow paths leading to Lake DS1. Given its morphology and location, it represents an ideal MF exposure area for both flow paths. Lake DS1 is the FF location to provide additional context for characterizing spatial extent of effects.

The 2024 sampling areas for the Whale Tail CREMP are shown in **Figure 5-1** (water and phytoplankton) and **Figure 5-2** (sediment and benthos).

Baker Lake

There are two NF areas for the Baker Lake CREMP, one targeting the hamlet's barge landing area (Baker Barge Dock [BBD]) and the other Agnico Eagle's fuel storage facility (Baker Proposed Jetty[5] [BPJ]). The primary reference area for Baker Lake is located approximately 10 kilometers east of the hamlet along the north shore of the lake (Baker Akilahaarjuk Point [BAP]). A second reference area on the East Shore of Baker Lake (BES) between BAP and BPJ was added in 2011 to provide additional context for interpreting sediment chemistry and benthic invertebrate data. No samples for the CREMP were collected at BES in 2024 because it was not a coring year.

The 2024 sampling areas for the Baker Lake CREMP are shown in **Figure 6-1.**

2.3 Monitoring Components

Water quality, sediment quality, phytoplankton, and benthic invertebrate communities were monitored as part of the core 2024 program, following standard operating procedures (SOPs) provided in the *CREMP Plan Update* (Azimuth, 2022b). Water, limnology, and phytoplankton sampling locations were randomly selected for the Meadowbank and Baker Lake areas from within their respective lake basins. The Whale Tail study area lakes are smaller and more variable in depth compared to the Meadowbank project lakes. Fixed water quality monitoring locations are used for the Whale Tail study area lakes to avoid locations with depths less than 5m. For each full sampling event, two fixed locations were randomly selected for water quality and phytoplankton monitoring. Water sampling occurred in March, May, July, August, and September, as per the study design[6]. During winter months when ice travel is safe, a single limnology profile is taken at NF areas to verify water quality is within the range of expected conditions. In 2024, limnology-only monitoring was conducted in January, February, November, and December.

[5] Note that while a jetty was initially considered, the idea was abandoned in favour of continued use of the existing barge landing.

[6] For the May sampling event, samples were collected at the end of April and the beginning of May due to early ice melt.

Benthic invertebrate community analyses and sediment for TOC, grain size, and chemistry archival were collected from the established areas (i.e., depositional zones between 6.5 m and 9 m) in each basin/lake.

The monitoring components sampled at the various study areas in 2024 are provided in **Table 2-1**. Global Positioning System (GPS) Universal Transverse Mercator (UTM) coordinates (in NAD 83) are provided in **Appendix C** and **Appendix D** for all CREMP study areas.

Samples from the 2024 CREMP were sent to the following laboratories for analysis:

- **Water and bulk sediment chemistry**. ALS Laboratories (Burnaby, BC);
- **Phytoplankton taxonomy**. Plankton R Us Inc. (Winnipeg, MB); and
- **Benthic invertebrate taxonomy**. ZEAS Inc. (Nobleton, ON).

2.4 Sampling Effort

A results-driven sampling strategy for the Meadowbank study lakes was developed as part of the *CREMP Plan* (Azimuth, 2015b) and updated in 2022 (Azimuth, 2022b), with minor revisions in 2023 (Azimuth, 2022b). The strategy improves the CREMP efficiency by focusing monitoring on the areas most likely to be affected by mining-related activities. The annual decision framework in the *CREMP Plan Update* outlines when monitoring frequency at MF and FF areas at Meadowbank can safely be reduced (Azimuth, 2022b; **Figure 2-2**). More specifically, the framework applies to MF area TE (which is paired with upstream NF areas TPE, SP, and WAL), MF area TPS (which is paired with NF area TPN), and to FF area TEFF (which is paired with upstream MF area TE). A similar approach may be implemented at Whale Tail as more years of 'after' data become available. Until then, monitoring at Whale Tail MF and FF areas will continue at the same frequency as NF areas (i.e., five planned water chemistry/phytoplankton sampling events).

As part of the standard Meadowbank CREMP data analysis process, NF results are evaluated annually, with CREMP reporting due at the end of March following each monitoring year. NF results for a given year determine MF area monitoring requirements in the subsequent year (i.e., *Year +1*) and the Year +1 NF and MF results inform MF and FF monitoring requirements for Year +2, and so on. While the full CREMP program is conducted at each NF area annually, monitoring requirements for MF and FF areas vary based on NF and MF results, respectively. Below are the various outcomes of the CREMP data analysis and their corresponding monitoring requirements for MF and FF areas in the following year (see Azimuth, 2022b for details):

- **No changes identified**. No statistical changes above any trigger values. No further sampling required.
- **Minor changes identified**. Statistically significant changes exceeding the early warning trigger values for parameters without effects-based threshold values (i.e., trigger values are based on

the 95th percentile of the baseline distribution). No further sampling required at MF and FF areas unless moderate changes (see below) are identified in NF areas.

- **Moderate changes identified**. Statistically significant changes exceeding the early warning trigger values for parameters with effects-based thresholds (e.g., CCME water quality guidelines for water chemistry parameters). Full CREMP water sampling (all events) is required to determine if changes extend to MF area (or to FF if such changes are seen at a MF area).
- **Major changes identified**. Statistically significant changes exceeding the effects-based threshold values. Full CREMP program including sediment and biological components is required to determine if changes extend to MF area (or to FF if such changes are seen at a MF area).

Table 2-1. CREMP sampling summary, 2024.

Sampling Month[1]	Conditions	Components[2]	Meadowbank									Whale Tail						Baker Lake			
			INUG	PDL	TPN	SP	TPE	WAL	TPS	TE	TEFF	WTS	KAN	NEM	A20	A76	DS1	BAP	BES	BBD	BPJ
January	Ice	L			✓	✓	✓	✓				✓	✓	✓	✓						
February	Ice	L			✓	✓	✓	✓				✓	✓	✓	✓						
March	Ice	L,W,P	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓				
April/May	Ice	L,W,P	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓				
June	***Ice not safe***																				
July	Open-water	L,W,P	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓	✓
August	Open-water	L,W,P	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓	✓
		B,S	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓				
September	Open-water	L,W,P	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓	✓
October	***Ice not safe***																				
November	Ice	L			✓	✓	✓	✓				✓	✓	✓	✓						
December	Ice	L			✓	✓	✓	✓				✓	✓	✓	✓						

Notes:

Components: L=Limnology; W=Water chemistry; P=Phytoplankton; B=Benthic invertebrates; S=Sediment grab chemistry.

✓ = monitoring components were collected.

Area designations: C=Control; I=Impact; REF=reference (in grey shading); NF=near-field (in blue shading); MF=mid-field (in pink shading); FF=far-field (in teal shading)

Area IDs: Meadowbank and Whale Tail Reference areas: INUG = Inuggugayualik Lake; PDL = Pipedream Lake.

Meadowbank areas: TPN, TPE, TPS = Third Portage Lake – North, East, South basins; SP = Second Portage Lake; WAL = Wally Lake; TE, TEFF = Tehek Lake (Mid-field and Far-field).

Baker Lake areas: BAP, BES, BBD, BPJ=Baker Lake – Akilahaarjuk Point, East Shore, Barge Dock, Proposed Jetty.

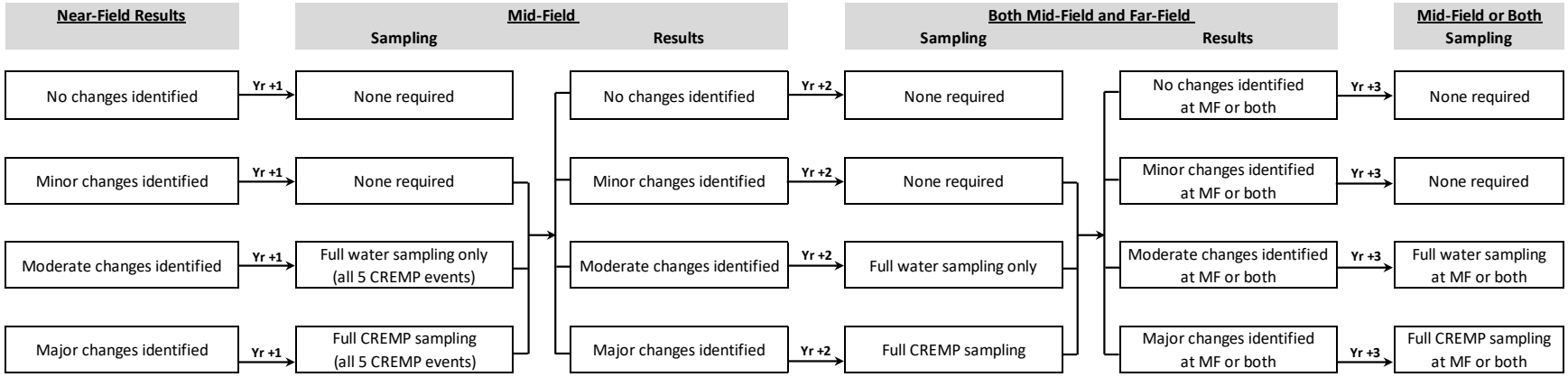
Whale Tail areas: WTS = Whale Tail Lake South Basin; KAN = Kangislulik Lake; NEM = Nemo Lake; A20 = Lake A20; A76 = Lake A76; DS1 = Lake DS1.

1. Azimuth collects samples in August, while Agnico Eagle handles sampling in remaining months. No sampling in June and October due to unsafe ice conditions. In 2024, the May water sampling program was completed at the end of April/early May due to early ice melt.

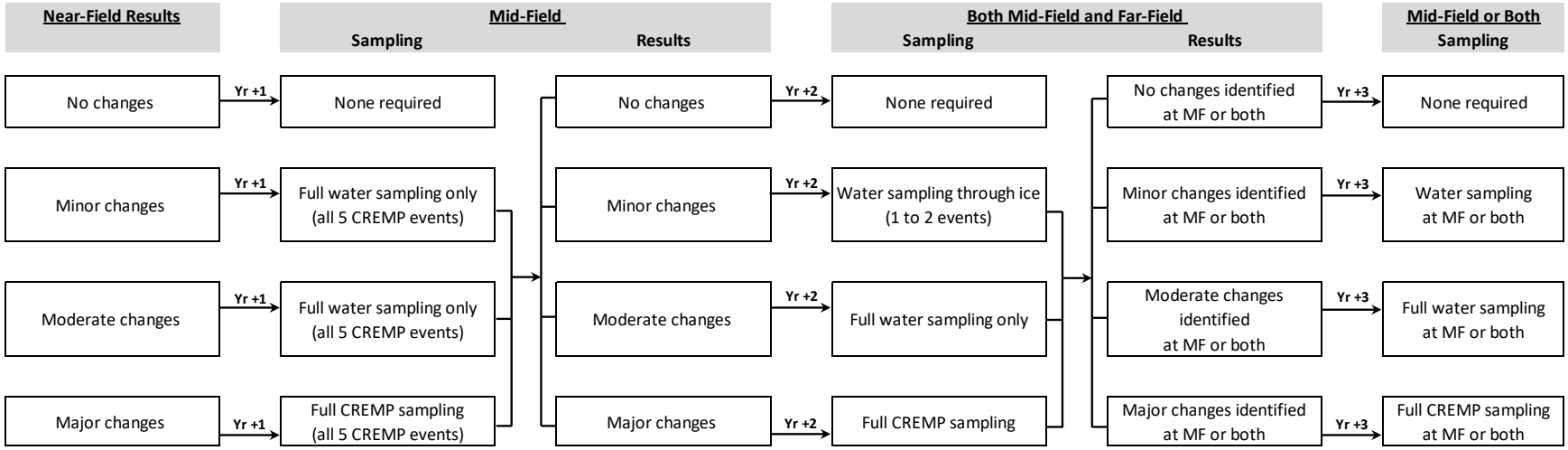
2. Phytoplankton samples collected at Meadowbank and Whale Tail lakes in winter months (March and May) are archived as per the *CREMP Plan Update* (Azimuth, 2022b).

Figure 2-2. Annual results-based sampling strategy rules for mid-field and far-field sampling areas.

Meadowbank Study Area Lakes



Whale Tail Study Area Lakes



2.5 Data Evaluation Criteria

The specific methods used to apply triggers/thresholds in the evaluation of CREMP monitoring parameters varied by study component; details are presented in the following sections. The evaluation process focused on comparisons to early warning triggers; only when triggers were exceeded were monitoring results compared to effects-based thresholds. Consequently, methods for applying numerical decision criteria focus on triggers only, but apply equally to threshold values.

2.5.1 Water Chemistry

An iterative process was used to identify water chemistry parameters of primary concern at the Meadowbank, Whale Tail, and Baker Lake project areas. For each water chemistry parameter analyzed, the yearly mean concentration for each lake or basin was compared to its respective trigger value. Parameters where the yearly mean was equal to or exceeded the trigger value were formally tested using the Before-After-Control-Impact (BACI) statistical model. In addition to BACI analysis, a trigger screening assessment was conducted to evaluate the extent of changes in water quality as a guide for decision making (see **Section 2.4**). Finally, a conservative three-step assessment process was used to identify parameters to include in the formal trend assessment to streamline the interpretation process as described in the **Initial Screening** section below. In this screening assessment, water chemistry trends were examined broadly for all parameters meeting detection limits (> 10% of samples > method detection limit [MDL]), control-impact, and mine-related criteria outlined below.

Initial Screening

Given the number of parameters routinely below laboratory MDLs (i.e., thus providing little insight for assessing mine-related changes to water quality), a conservative three-step assessment process was used to identify parameters to include in the formal trend assessment to streamline the interpretation process (the results are summarized in **Table 4-2**):

- **Overall Detection Frequency.** Only those water quality parameters that exceeded MDLs in at least 10% of the samples are included for this discussion. Because the project lakes are ultra-oligotrophic, it is normal for many parameters to be below MDLs. The temporal (and spatial) trend assessment includes data from all study years. In 2024, over half the parameters exceeded MDLs at least 10% of the time in Meadowbank lakes (58%), Whale Tail (71%), and Baker Lake (64%) study areas. These parameters are included in this discussion. Overall, the detection frequency increased slightly at Meadowbank but not at Whale Tail or Baker Lake compared to 2023.
- **Control-Impact Detection Frequency Comparison.** To avoid screening out infrequently detected parameters that were detected more often in association with mining activities, the proportion

of samples exceeding MDLs between *control* and *impact* samples was compared. The intent was to identify parameters with <10% detection frequency (i.e., those screened out above) for which the proportion of detected values increased by 0.1 or more. Based on this second screening, no parameters were added back into the trend assessment.

- **Apparent Detection Pattern Matching Mining Activity.** As a further step to avoid screening out potentially important parameters at Meadowbank and Whale Tail study area lakes, trend plots for infrequently detected parameters were used to visually identify parameters with measured values associated with periods/locations of known mining activities (see **Appendix A**). Where such patterns were observed or where parameters were measured at greater than five times the MDL at near-field sampling areas in at least one event, these parameters were added back into the trend assessment process.

Trigger Evaluation

Water quality data collected in 2024 were evaluated using a two-tiered approach (**Section 2.1**), comparing results against triggers and effects-based thresholds. For decision-making purposes, yearly mean[7] parameter concentrations were compared to the trigger values developed specifically for the Meadowbank area lakes, Wally Lake[8], Baker Lake areas, and the Whale Tail area lakes[9]. The derivation methods and a full list of triggers and effects-based thresholds for each study area are provided in the *CREMP Plan Update*[10] (Azimuth, 2022b).

Parameters with yearly means equal to, or exceeding trigger values were formally tested using a one-tailed test of the null hypothesis[11] (significance level of p=0.05) using the Before-After-Control-Impact (BACI) statistical model. The BACI model is *paired* (i.e., BACIP) when multiple *before* and *after* events are available. Across each of the study areas, the following BACI components were included in the analysis:

- **Meadowbank Study Area Lakes and Wally Lake**: In the BACI model, INUG was used as the reference (*control*) area[12], with the other areas tested as exposure (*impact*) areas. True *pre-impact* data, when both INUG and the test area had *control* ("C") status, were used for the

[7] Yearly means were calculated by first calculating the monthly mean for each parameter per area, then calculating the yearly mean on an area-specific basis. Values that were less than the MDL were conservatively set to the MDL.

[8] Separate water quality triggers were developed for Wally Lake from the other Meadowbank areas when mining activities transitioned from the North and South Portage Pits (discharge to TPN) to the Vault Lake area (discharge to WAL) in 2013.

[9] Water quality triggers specific to the Whale Tail study area lakes were developed in 2019 (Azimuth, 2020a).

[10] The CREMP plan was revised in April 2022 and was formally implemented in August 2022.

[11] The null hypothesis is that "test" area concentrations either did not change or decreased. The alternative hypothesis is that they increased.

[12] PDL and TEFF are excluded as control areas in the BACI analysis because neither area was sampled in the before period between 2006 and 2008 (i.e., limiting their utility as reference areas in the BACI model, but both providing valuable context for interpreting the strength and consistency of regional trends seen at INUG).

before data (see **Table 2-2**). Only events when both INUG and the test area were sampled in 2024 were used as the *after* data.

- **Whale Tail**: BACI analysis followed the approaches outlined for Meadowbank including INUG as the reference (*control*) area.
- **Baker Lake:** Baker Lake areas were designated as control (BAP) or impact (BPJ and BBD) when sampling started in 2008 (i.e., there was no detailed baseline sampling conducted for Baker Lake; see **Table 2-2**), so there are no true pre-impact or before data. While a spatial CI design could be used to test for differences between reference control and exposure impact areas, the design does not allow for distinguishing natural differences between areas from development-related changes. Given that no development-related changes had been identified to date, all years of data up to and including 2019 were considered in the before period, while the results since 2020 were considered after period data (i.e., allowing the more robust BACI analysis). The BACI analyses specifically looked at changes in 2024 at the two impact areas relative to previous years.

In addition to the BACI analysis, a trigger screening assessment was conducted to evaluate the extent of changes in water quality as a guide for decision making. This approach falls into the framework outlined in **Section 2.4** and involved evaluating the extent and magnitude of trigger exceedances to direct the level of sampling intensity in proceeding years.

Final Environmental Impact Statement Model Comparisons

In addition to the trigger/threshold BACI evaluation, the 2024 CREMP water quality data at Meadowbank and Whale Tail study area lakes were compared to water quality predictions developed as part of the FEIS process introduced in **Section 2.1**.

- **Meadowbank Study Area Lakes and Wally Lake.** Annual Meadowbank CREMP water quality data were compared to the maximum whole-lake average water quality modelling predictions for Third Portage, Second Portage, and Wally Lakes made during the environmental assessment process (Cumberland, 2005).
- **Whale Tail.** Monthly Whale Tail CREMP water quality data for Whale Tail Lake (South Basin) and Kangislulik Lake were compared to their respective monthly modeled water quality predictions presented in the revised FEIS for the Expansion Project (see Golder, 2019).

Although direct comparisons were made, differences in spatial focus – the CREMP at the basin scale and the water quality model at the whole-lake scale – warrants careful interpretation of any differences. To provide context, the assessment criteria from the FEIS (Cumberland, 2005) for defining the predicted magnitude of impacts to water quality will be used to interpret the screening results as follows:

- **Negligible**: water quality concentrations are similar to baseline;
- **Low**: concentrations are < 1x the CCME water quality guideline (WQG);
- **Medium**: concentrations are between 1 and 10-times the CCME WQG;
- **High**: concentrations are less than MDMER but greater than 10-times the CCME WQG; and
- **Very High**: concentrations exceed MDMER standards.

Adaptive Management Strategy

In 2021, Agnico Eagle developed an adaptive management strategy to guide water management decisions at KAN and WTS[13] for two key contaminants of potential concern (COPCs): arsenic and phosphorus. The strategy defines management actions based on 'Levels' ranging from 0 (normal operating conditions) to 4 (emergency situation), that are linked to criteria for total phosphorus and arsenic concentrations. The levels for each lake are determined by comparing concentrations of total phosphorus and arsenic to FEIS predictions (Golder, 2019) and benchmarks. The benchmarks include the CCME water quality guideline of 0.01 mg/L for total phosphorus and the site-specific water quality objective (SSWQO) of 0.025 mg/L for arsenic. The adaptive management thresholds and adaptive management strategies are summarized in **Table 2-3**. Further details of the adaptive management thresholds and management strategies is provided in Table 3 of the *Adaptive Management Plan* (AMP; Agnico Eagle, 2021).

Water quality data collected as part of the annual CREMP are used in the AMP assessment. Results of the water quality comparison to AMP thresholds are provided in **Section 5.3.4**.

2.5.2 Sediment Chemistry

Sediment grab samples at Meadowbank and Whale Tail lakes are collected annually with the benthic invertebrate samples[14]. In addition to characterizing physical conditions (e.g., grain size and organic carbon content), samples provide information on temporal changes in concentrations of metals and organics in sediment. Sediment chemistry core sampling for the CREMP is completed every three years at the same time as Environmental Effects Monitoring (EEM) sampling. The intent of the coring program is to monitor long-term trends in metals concentrations in the top layer of sediment (1.5 cm [approximately]). In sediment coring years, metals analyses from the core samples replaces metals

[13] Mitigation measures include but are not limited to targeted studies, implementing activities to prevent, stabilize or reverse a change in environmental conditions or to protect the receiving environment.

[14] The frequency of benthic invertebrate and sediment chemistry monitoring was reduced from annually to once every three years in the 2022 *CREMP Plan Update* (Azimuth, 2022b).

analyses from the grab samples. The next full sediment coring program is scheduled for 2026 (coinciding with the EEM program).

Trends in sediment chemistry are evaluated by comparing the yearly mean parameter concentrations in the core samples to the trigger[15] values applicable to the Meadowbank study area lakes, Wally Lake, and the Whale Tail study area lakes (see discussion below). Those parameters where the yearly mean is equal to or exceeds triggers are formally tested using a before-after (BA) statistical model[16]. Sediment chemistry can be quite variable over a small spatial scale within a given basin, but natural seasonal variability in sediment chemistry is assumed to be low given the low rates of natural sediment deposition in Arctic lakes (Azimuth, 2012d). The BA statistical model assumes that, in absence of mining-related inputs, annual variability in sediment chemistry is negligible.

The naturally high sediment concentrations in the Whale Tail lakes necessitated triggers that were lake specific, similar to the approach that was used to develop triggers for Wally Lake. The triggers, derived in 2019, were developed based on baseline sediment core chemistry data from 2017 and the statistical approach described in Azimuth 2012d. CCME sediment quality guidelines were used as thresholds where applicable. Triggers were set to the maximum of one of three methods for the Whale Tail lakes:

- **Method A**. The value halfway between the baseline median and the effects-based threshold (CCME ISQG),
- **Method B**. The 90th percentile of the baseline data, or
- **Method C**. The value corresponding to a 20% increase above the median value.

2.5.3 Phytoplankton and Benthos Community Variables

Trigger and threshold value development for phytoplankton and benthos communities was presented in detail in the original *CREMP Design Document* (Azimuth, 2012d). Unlike water or sediment, where environmental quality guidelines can be used to develop triggers or thresholds, there are no universal benchmarks for biological variables such as abundance, biomass or diversity. Rather, the magnitude of change or difference relative to expected conditions must be used to establish *critical effect sizes* (CES) for biological variables. Effect sizes of 20% and 50% were established as the *trigge*r and *threshold* for assessing changes in biological variables. Importantly, the terms *threshold* and *trigge*r for biological variables are not used as strictly as for water and sediment chemistry parameters for two reasons:

[15] The trigger values for the Meadowbank project lakes were updated in the 2017 CREMP report (Azimuth, 2018c).

[16] One-tailed test of the null hypothesis that concentrations are not different (or lower) in the after period relative to the before period (significance level of p=0.05); the alternate hypothesis is that concentrations have increased in relation to mining.

1. **Statistical Power**. For most biological variables, natural variability can make it difficult to statistically detect effect sizes as low as 20%. It is more realistic to detect larger effect sizes such as 50%.
2. **Causality**. Regardless of effect size, even if statistically-significant changes are documented, the cause of the change needs to be understood in order to effectively manage the situation. For the Meadowbank biological data, effect sizes exceeding 50% have been observed due to natural variability in the baseline data.

Phytoplankton Taxonomy

Total phytoplankton biomass and taxa richness are the metrics used in the BACI framework to assess changes in the phytoplankton community. The BACI analysis compares paired monthly sampling events at control area (INUG or BAP) and impact areas (i.e., NF or MF areas) over two periods (before and after), with months as the unit for temporal replication. Phytoplankton triggers and thresholds are set to relative changes of 20% and 50%, respectively. The evaluation procedure followed the same approach as water chemistry, except that since the triggers/thresholds are based on relative change over time in a parameter rather than a finite value, yearly area means were not directly comparable to triggers. The process started with BACI testing, using two-tailed tests of the null hypothesis (i.e., test areas experienced no relative change) at a significance level of $p = 0.1$.

Benthos Taxonomy

For benthos, trigger and threshold values are set to relative changes (increases or decreases of 20% and 50%) in total biomass and species richness at test areas using the BACI framework. The CREMP uses percent change rather than standard deviations which are used in EEM, to maintain a transparent (fixed) effect size that is more likely to be ecologically relevant. Statistical power increases with more *after* period years; consequently, BACI analyses for the Meadowbank and Whale Tail lakes were conducted on four *after* data period lengths: one year (2024 only), two years (2023–2024), three years (2022–2024), and four years (2021–2024). Two-tailed tests of the null hypothesis were conducted with a significance level of $p = 0.1$. Failure to reject the null hypothesis implies the endpoint (i.e., total abundance or species richness) did not change. The alternative hypothesis is that the endpoint increased or decreased. A p-value of 0.1 or less was considered significant to help improve statistical power for the benthic invertebrate endpoints.

Benthic invertebrate community monitoring was not completed at Baker Lake in 2024 as outlined in the *CREMP Plan Update* (Azimuth, 2022b). The next benthic invertebrate sampling event is planned to coincide with sediment coring in 2026.

Figure 2-3. Management response plan for the Meadowbank Mine Aquatic Environment Monitoring Program (AEMP).

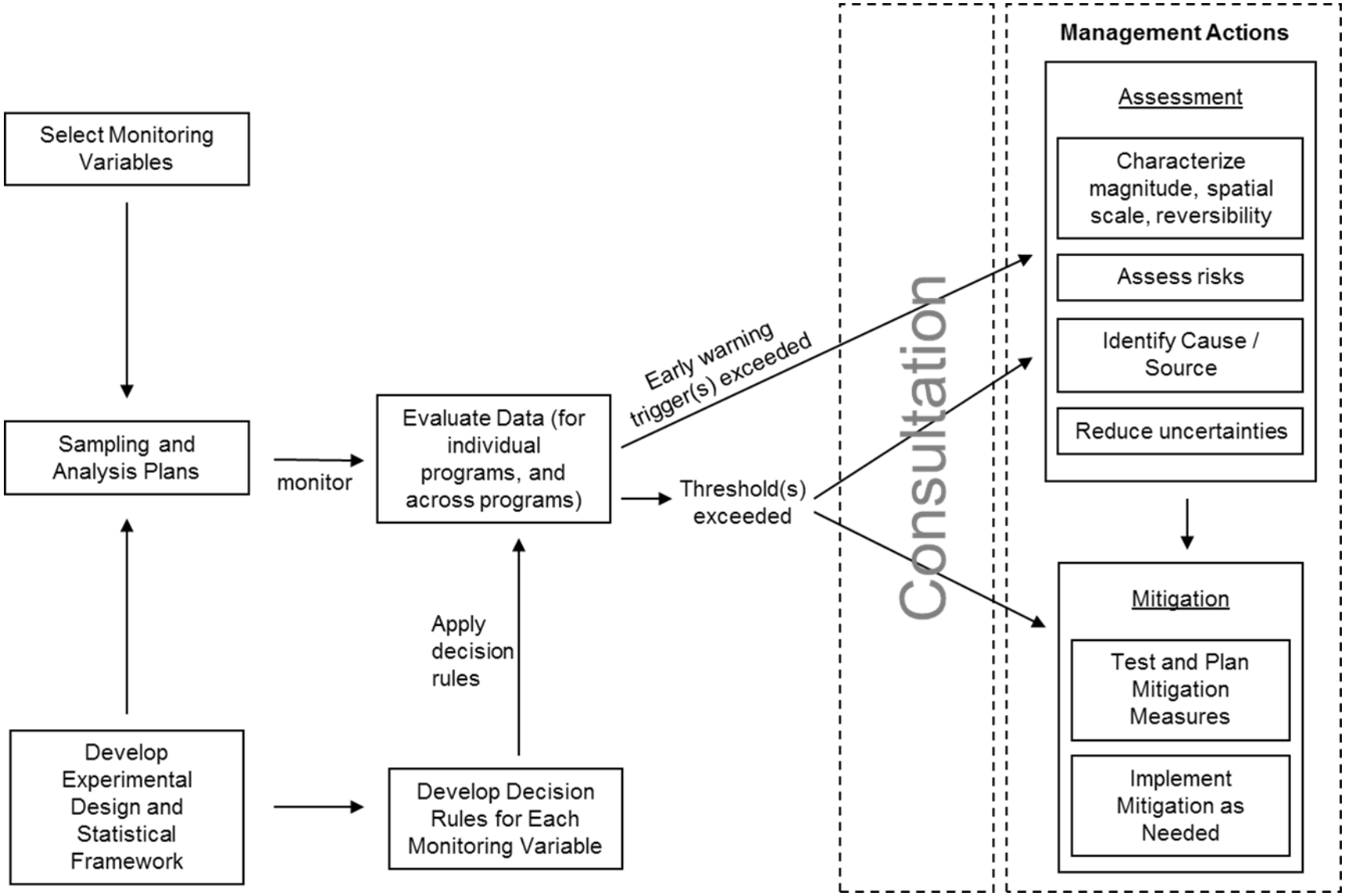


Table 2-2. Status of all CREMP sampling areas since 2006.

Meadowbank Areas										Baker Lake Areas				Whale Tail Areas					
Designation	**REF**	**REF**	**NF**	**NF**	**NF**	**NF**	**MF**	**MF**	**FF**	**REF**	**REF**	**NF**	**NF**	**NF**	**NF**	**NF**	**MF**	**MF**	**FF**
Area	**INUG**	**PDL**	**TPN**	**SP**	**TPE**	**WAL**	**TPS**	**TE**	**TEFF**	**BAP**	**BES**	**BBD**	**BPJ**	**WTS**	**KAN**	**NEM**	**A20**	**A76**	**DS1**
2006	C		C	C	C	C	C	C											
2007	C		C	C	C	C	C	C											
2008	C		C	I (Aug)	C	C	C	I (Aug)		C		I	I						
2009	C	C	I (Mar)	I	I (Aug)	C	C	I	C	C		I	I						
2010	C	C	I	I	I	C	C	I	C	C		I	I						
2011	C	C	I	I	I	C	C	I	C	C	C	I	I						
2012	C	C	I	I	I	C	C	I	C	C	C	I	I						
2013	C	C	I	I	I	I (Jul)	C	I	C	C	C	I	I						
2014	C	C	I	I	I	I	C	I	C	C	C	I	I	C	C	C			
2015	C	C	I	I	I	I	C	I	C	C	C	I	I	C	C	C			
2016	C	C	I	I	I	I	C	I	C	C	C	I	I	C	C	C	C	C	C
2017	C	C	I	I	I	I	C	I	C	C	C	I	I	C	C	C	C	C	C
2018	C	C	I	I	I	I	C	I	C	C	C	I	I	I (Aug)	I (Nov)	C	C	C	C
2019	C	C	I	I	I	I	C	I	C	C	C	I	I	I	I	I (Aug)	I	I	I
2020-2024	C	C	I	I	I	I	C	I	C	C	C	I	I	I	I	I	I	I	I

Notes:

Area designations:

C=Control; I=Impact; REF=reference (in grey shading); NF=near-field (in blue shading); MF=mid-field (in pink shading); FF=far-field (in teal shading).

Blank cells indicate the area was not part of the monitoring program that year.

Area IDs:

Meadowbank and Whale Tail Reference areas: INUG = Inuggugayualik Lake; PDL = Pipedream Lake.

Meadowbank: TPN, TPE, TPS = Third Portage Lake – North, East, South basins; SP = Second Portage Lake; WAL = Wally Lake; TE, TEFF = Tehek Lake (Mid-and Far-field).

Baker Lake: BAP = Akilahaarjuk Point; BES = Baker East Shore; BBD = Baker Barge Dock; BPJ = Baker Proposed Jetty.

Whale Tail: WTS = Whale Tail Lake South Basin; KAN = Kangislulik Lake (previously Mammoth Lake); NEM = Nemo Lake; A20 = Lake A20; A76 = Lake A76; DS1 = Lake DS1.

Table 2-3. Adaptive Management Strategy for contaminants of potential concern (COPCs) in water from Whale Tail Lake (South Basin) and Kangislulik Lake.

Adaptive Management Level*	Threshold (Total Phosphorus and Arsenic)	Management Strategy[1]
Level 0 (Normal operating condition)	Within 20% of FEIS predicted concentrations.	No changes – continue with CREMP monitoring plan.
Level 1 (Area of concern)	Concentrations equal to or greater than 20% FEIS predicted concentrations AND less than 80% of the WQG or SSWQO.	Continue with Level 0 management strategy. Analyze site wide water quantity and quality data to identify and assess cause(s) of the difference(s) and reported to the NWB. Report results of data review in annual reporting to the NWB including implications on the Water Management Plan and evaluation of potential mitigation strategies (e.g., enhance water treatment plant efficiency and reduce maximum effluent discharge concentration by 10%).
Level 2 (Area of concern)	Concentrations equal to or greater than 20% FEIS predicted concentrations AND between 80% and 100% of the WQG or SSWQO.	Continue with Level 1 management strategy. Report results of data review to the NWB in the Annual Report, including implications on the Water Management Plan and the evaluation of potential mitigation strategies (e.g., enhance water treatment plant efficiency and reduce maximum effluent discharge concentration by 20%). Move discharge location to KAN or WTS. Assess potential discharge in lakes D1 or D5 in case level 3 is reached, with approval from the NWB as per NIRB Project Certificate Conditions.
Level 3 (High risk situation)	Concentrations equal to or greater than 20% FEIS predicted concentrations AND between 100% and 120% of the WQG or SSWQO.	Continue Level 2 management strategy. Report results of data review in the Annual Report to the NWB including implications on the Water management plan and the evaluation of potential mitigation strategies (e.g., review overall water management strategy to stay within assimilative capacity of the receivers). Continue monitoring in the original receiving area to evaluate if they recover and define threshold to restart using them.
Level 4 (Emergency situation)	Concentrations equal to or greater than 20% FEIS predicted concentrations AND greater than 120% of the WQG or SSWQO.	Continue Level 3 management strategy. Report results of detailed data review in the Annual Report to the NWB, including implications on the Water management plan and the evaluation of potential mitigation strategies (e.g., move discharge location to an approved location). Continue monitoring in the original receiving area to evaluate if they recover and define thresholds to restart using them. Evaluate potential new discharge location to resume operation.

Notes:

* Agnico Eagle will consult with the NWB on the required approval process, execution, and implementation prior to initiating the adaptive management strategy items for Adaptive Management Levels 3 and 4.

[1] See Table 3 in the Adaptive Management Plan for more details on management strategies for each Adaptive Management Level (Agnico Eagle, 2021).

Acronyms

FEIS = Final environmental impact statement.

SSWQO = Site-specific water quality objective.

WQG = Water quality guideline.

3 QUALITY ASSURANCE / QUALITY CONTROL

3.1 Overview of CREMP QA/QC

The objective of quality assurance and quality control (QA/QC) is to ensure that the chemical and biological data are representative of the material or populations being sampled, are of known quality, have sufficient laboratory precision to be highly repeatable, are properly documented, and are scientifically defensible. Data quality was maintained throughout sample collection and analysis by following standardized procedures, using laboratories that are certified for all applicable methods, and employing experienced technicians.

The QA/QC program framework is outlined in the *CREMP Plan Update* (Azimuth, 2022b), which includes a description of the established SOPs. This plan serves as the basis for assessing data quality for each routine component of the CREMP (e.g., water, sediment) and was adopted for the Whale Tail mine baseline sampling program (Azimuth, 2018b). Detailed analysis of the data quality for each component is provided in **Appendix B.** Key findings from the 2024 QA/QC program are summarized in the following subsections.

3.2 Sample Shipping and Handling

Sample shipping and handling concerns documented in previous CREMP reports have largely been rectified in recent years. ALS's QA/QC summary results from each laboratory report are integrated into **Appendix B**.

The sample shipping and handling QA/QC for 2024 was comparable to 2023. In 2024, a few chain of custody (CoC) discrepancies occurred, but they were quickly rectified. The remote location of the mine in Nunavut, combined with logistical challenges and long distances for sample collection and shipping, led to exceeded hold times for certain parameters. However, the impact on the results is considered negligible.

3.3 Water Chemistry

Briefly, the standard field QA procedures for the water chemistry program required flushing the flexible tubing and pump to prevent cross-contamination between areas. Field QC procedures included collecting and analyzing field duplicates, and three types of *blank* samples: travel blanks, de-ionized water (DI) blanks, and equipment blanks. The laboratory QC program included duplicate analysis, blanks, and analysis of spike samples and laboratory control samples (LCS) to verify the accuracy and precision of the analytical method. Part of the QA assessment involved conducting two 'data reliability checks' to identify potentially anomalous data. The first data reliability check involved comparing dissolved and

total concentrations for a given parameter for each location/event combination. Samples where the dissolved concentrations were greater than the total with an RPD of more than 30% were reviewed further. The second data reliability check involved comparing paired samples located within each water body. Parameters for which the difference between the paired intra-lake samples was greater than a factor of 5 (or factor of 10 in cases where at least one of the samples was within a factor of 10 of the detection limit) were flagged for further review.

The objectives and methods for surface water QA/QC are outlined in detail in **Appendix B**. The field and laboratory QA/QC results for water chemistry for 2024 were very good and were comparable to the results from the previous year:

3. Sample integrity was acceptable in 2024. One sample broke during shipping from the mine to the laboratory, however a subsample was obtained from another bottle which allowed the analysis to be completed. Sample temperatures received at the laboratory were variable depending on season and reflect the challenges with shipping from a remote mine site. As such, hold time exceedances for parameters with short hold times were unavoidable but were not considered likely to impact data analysis and interpretation. Holding times were routinely exceeded for alkalinity, turbidity, laboratory pH, nitrate, nitrite, total dissolved solids (TDS), TSS, total and dissolved phosphorous and dissolved orthophosphate (as P). Very occasionally hold times were exceeded for cyanides (free and total), total Kjeldahl nitrogen (TKN), ammonia, dissolved mercury, TOC, DOC, and chlorophyll-a. These hold-time exceedances are not considered likely to impact data analysis and interpretation.
4. Travel blanks, which are included in every bottle shipment, showed no detectable concentrations of any parameters in 2024. Equipment (EB) blank results for 2024 were similar to previous years and indicated reliable sample handling and that systematic cross-contamination related to sampling equipment is unlikely. De-ionized (DI) water blanks detected several parameters in August and September. The August DI blank results were deemed unreliable as the blank was collected from a secondary container suspected to be contaminated. Equipment blanks (EBs) detected several parameters in 2024, as described in detail in **Appendix B**. In September, a number of parameters were detected in the DI water blank and EB. As a result, the EB results from August and September were excluded from the assessment of possible cross-contamination for those sampling events.

   In 2024, the implications of possible cross-contamination on the interpretation of the water quality data were considered inconsequential. The blank quality control assessment did not result in any *unreliable* data flags. Water chemistry results, including data that were assigned *cautionary* and *unreliable* data flags are provided in **Appendix C1** (Meadowbank), **Appendix C2** (Whale Tail), and **Appendix C3** (Baker Lake).

5. It should be noted that isolated instances of trigger exceedances for individual water chemistry parameters do not necessarily indicate a trend or even real conditions. The QA/QC program provides an added layer of context to data interpretation by highlighting those variables for which the results appear to be influenced by laboratory anomalies or cross-contamination rather than by mining activities. Overall, potential cross-contamination is considered unlikely to bias interpretation of the 2024 water quality analysis.
6. The 2024 field duplicate results were very good, with <1% of the calculated relative percent differences (RPDs) not meeting data quality objective (DQOs). This suggests that sample collection and handling in 2024 have maintained a high standard.
7. Laboratory QC results for water chemistry were also very good in 2024, with very few laboratory data quality qualifiers and none that were deemed likely to impact data interpretation.
8. The two data reliability review checks resulted in some results being flagged as *unreliable*. Overall, 99% of the results were considered reliable for use in the report. The few results that were flagged as *unreliable* were removed from formal analysis (e.g., figures and statistical analyses). Unreliable results were retained in the water chemistry tables in **Appendix C** but their *unreliable* status is clearly shown. The unreliable results are discussed further in **Appendix B**.
9. Overall, detection limits (DLs) in 2024 were consistent with previous years. In recent years, the laboratory adjusted detection limits for beryllium and chromium. The adjusted detection limits are discussed in **Appendix B**.

Unless discussed as unreliable above, the water quality QA/QC assessment verified that data are reliable for analysis and interpretation of spatial and temporal trends.

3.4 Sediment Chemistry

The sediment chemistry QA/QC assessment is comprised of field and laboratory duplicates, filter swipes for cross-contamination, a sampling equipment rinsate blank, and the QC report from ALS for sediment grab samples submitted in 2024. Key results of the sediment chemistry QA/QC, presented in **Appendix B** are as follows:

- For the sediment QA/QC samples, there were no sample integrity concerns.
- Several parameters were detected in the sediment grab equipment filter swipes. All detectable parameters were at concentrations less than 10 times the DL, except for iron and zinc. Three parameters were detected in the rinsate equipment sample including: aluminum, magnesium, and manganese. All detectable parameters were at concentrations less than 5 times the DL The QA results for the filter swipe and rinsate show the potential for cross-contamination to affect the sediment chemistry results is negligible.

- There were six grab and two core sample field duplicates collected in 2024. Out of the RPDs calculated, 95% met the DQOs for sediment cores and 98% met the DQOs for sediment grabs. For the composite sample duplicates, all RPDs met the DQOs for hydrocarbon/polycyclic aromatic hydrocarbons (PAHs) in sediment. Overall, field duplicate results indicate good field collection methods and a high degree of replicability in sampling.
- The laboratory QC results show a high degree of precision for the laboratory analysis and laboratory processing and analytical methods were consistent between sub-samples. In the few instances where a DQO was exceeded, the laboratory concluded the results were reliable and fit for use in the sediment quality assessment.

3.5 Phytoplankton Taxonomy

Field duplicate phytoplankton samples were collected during each sampling event alongside water sample duplicates. Field duplicates were collected to assess sampling variability and homogeneity. An RPD of 50% for total density and total biomass concentrations is considered acceptable. As a measure of laboratory QA/QC on the enumeration method, replicate counts are performed on 10% of the samples. Replicate samples are chosen at random and processed at different times from the original analysis to reduce biases.

Detailed analysis of the phytoplankton data quality is included in **Appendix B**. Phytoplankton QA/QC for both field and laboratory components in 2024 was good, indicating reproducible results across both sampling and taxonomic analysis process. Except for one RPD that exceeded the DQO in the field duplicates, phytoplankton taxonomy results for 2024 met project DQOs and are considered reliable for data analysis and interpretation of spatial and temporal trends.

3.6 Benthos Taxonomy

Quality assurance measures in the field involved adherence to the standardized method for collecting, sieving, and preserving samples for taxonomic identification (see **Appendix B** in Azimuth, 2015b). While field duplicates are not collected, inferences regarding within-area variability are gained by directly looking at results across replicate samples (see **Section 4.6** and **Section 5.6**). The laboratory (ZEAS) QA/QC procedures included re-sorting and re-counting 10% of the samples targeting a DQO of > 90% recovery. Percent recovery was above 95% in all re-sorted samples, with an average percent recovery of 97.3%. Details of the benthos taxonomy data quality assessment is included in **Appendix B**.

The 2024 benthos taxonomy metrics met DQOs and are considered reliable for data analysis and interpretation of spatial and temporal trends.

4 MEADOWBANK

4.1 Overview of the Meadowbank CREMP

This section summarizes the 2024 CREMP results for monitoring water quality, sediment chemistry, phytoplankton community, and benthic invertebrate communities at the Meadowbank study area lakes. Relevant figures and tables are included at the end of the section.

The CREMP monitoring plan for routine CREMP sampling years is outlined in **Section 2.3**. The 2024 CREMP focused on monitoring changes in the NF study areas in Third Portage Lake (East Basin [TPE] and North Basin [TPN]), Second Portage Lake (SP) and Wally Lake (WAL). Reference area sampling at INUG and PDL was completed concurrently with sampling at the NF areas. Beginning in 2022, routine water sampling was suspended at TE, TEFF, and TPS unless results in NF areas showed moderate changes (Azimuth, 2022b). Based on the results of the 2023 CREMP[17], no routine water sampling, sediment chemistry[18], or benthic invertebrate community sampling was required at the MF (TE, TPS) and FF (TEFF) areas in 2024 (Azimuth, 2023). CREMP sampling locations for water and sediment/benthos are shown in **Figure 4-1** and **Figure 4-2**, respectively.

4.2 Limnology

Limnology data, when compared to previous monitoring data, provide an initial assessment of whether conditions are changing within a sampling area and may require additional investigation. At least one depth profile was conducted monthly for temperature, dissolved oxygen, and conductivity from NF areas except when ice conditions were unsafe[19] (June and October). Two profiles were completed along with water sampling for chemistry and phytoplankton taxonomy in March, April, July, August, and September. Samples typically collected in May were shifted to late April due to early ice melt. Limnology profiles, without paired water chemistry or phytoplankton sampling, were also collected in January, February, November, and December. Qualitative evaluation of the limnology data was completed using plots of the deepest sample within each lake for a given event. Samples used for plotting and interpreting the 2024 limnology data are specified in **Table 4-1**.

[17] There were no trigger exceedances for parameters with effects-based thresholds at the NF areas in 2023 (Azimuth, 2024). Consistent with the adaptive monitoring strategy implemented in 2015 (summarized in Azimuth, 2022b), sediment chemistry or benthic invertebrate community sampling was not required at MF and FF areas in 2024.

[18] At the near field areas, sediment grabs were collected and analyzed for total organic carbon (TOC) and grain size. The remaining sediment was archived for chemistry as per the *CREMP Plan Update* (Azimuth, 2022b).

Table 4-1. Samples included in the limnology profiles in 2024.

Area[1]	Jan	Feb	Mar	Apr[2]	Jun	Jul	Aug	Sep	Oct	Nov	Dec
INUG			INUG-157	INUG-159	Ice not safe for travel	INUG-161	INUG-163	INUG-164	Ice not safe for travel		
PDL			PDL-122	PDL-124		PDL-125	PDL-127	PDL-129			
TPN	☑	☑	TPN-169	TPN-170		TPN-172	TPN-174	TPN-176		☑	☑
TPE	☑	☑	TPE-169	TPE-170		TPE-173	TPE-174	TPE-176		☑	☑
SP	☑	☑	SP-168	SP-171		SP-173	SP-175	SP-177		☑	☑
WAL	☑	☑	WAL-138	WAL-139		WAL-142	WAL-143	WAL-145		☑	☑

Notes:

Empty cells indicate no limnology profiles were collected, consistent with the study design.

☑ = One profile is collected from the near-field areas (and occasionally one mid-field area) in months where water sampling is not completed.

The sample IDs shown represent the deeper of the two locations sampled each month.

1. Routine water sampling at Meadowbank areas TPS, TE, and TEFF was not completed in 2024 as per the *CREMP Plan Update* (Azimuth, 2022b).
2. Ice melt occurred earlier than typical in 2024, resulting in May sampling occurring at the end of April.

4.2.1 General Observations

The ice-free season on the Meadowbank study area lakes is typically very short. Ice break-up usually occurs in mid- to late-June, while ice formation resumes in late September or early October, achieving full ice cover by late October. Maximum ice thickness in 2024 was about 1.9 m and occurred at TPN in March. Ice formation leads to an increased concentration of certain ions, such as chloride, in the water near the ice-water interface. This phenomenon, known as cryo-concentration, occurs as ice formation excludes specific ions, causing them to accumulate and elevate their concentration in the surrounding water column (Wetzel, 1983). Because the lakes are ice-covered for most of the year, gas exchange with the atmosphere is limited, although oxygen concentrations usually remain high under the ice because of the low rates of biological activity and organic decomposition (processes that consume oxygen from the water). Historically, in the winter there is a slight negative thermal stratification with water temperatures at 0°C near the ice-water interface and increasing to 3-5 °C at depth.

4.2.2 Temporal and Spatial Trends

Temperature and Dissolved Oxygen

In 2024, water temperatures and oxygen concentrations in the Meadowbank study area lakes followed similar patterns of seasonal change compared to previous monitoring cycles. Similar to previous years, surface water (3 m) temperatures in 2024 showed substantial differences between winter and summer events (**Figure 4-3**).

The maximum temperature measured during the open-water sampling events in 2024 was 16.7 °C at TPE in mid-August, which was slightly lower than in 2023 (17.3 °C). These temperatures are the highest observed since sampling began in 2006. During open-water events, maximum water temperatures may typically reach 15°C in the summer with little evidence of thermal stratification, except for brief periods (days) when there is typically only a 4°C to 5°C temperature difference. High winds maintain uniform temperature and high oxygen profiles in the water column due to vertical mixing.

Winter temperature profiles for the through-ice sampling events show a slight negative thermal stratification with water temperatures near 0°C at the ice-water interface, typically increasing to between 2°C and 4°C at depth (**Figure 4-4**). Oxygen concentrations in winter generally decrease slightly with increasing depth, with occasional values measured above theoretical limits of air saturation[20] (14.6 mg/L at 0°C; **Figure 4-5**). Oxygen concentrations in all basins are greater than 5 mg/L, and usually greater than 10 mg/L at even the lowest depths, despite nearly nine months of ice cover.

The study area lakes typically turn over by mid-July, leading to a well-mixed water column with uniform temperature and high oxygen concentrations. Water temperatures warm rapidly to reach maximum temperatures of around 15°C by late July and into August. Deeper lakes and basins, such as TPN and INUG, are typically 2°C to 3°C colder than the shallower locations, Wally Lake (WAL) and Second Portage Lake (SP). Temperatures in the 2024 depth profiles were comparable to 2023 and typical of historical temperature patterns aside from slightly warmer temperature profiles reported in August at TPE and WAL (**Figure 4-4**). There was slight stratification at TPN and TPE in July, and at PDL, TPN, and TPE in August. There was no evidence of vertical stratification from July through September in the other lakes and basins. In November, the study lakes froze and became slightly stratified, with surface waters near 0°C and bottom waters ranging up to 1.6°C at TPE. Despite the slight stratification, oxygen concentrations were high, and the water column was fully saturated in November and December (**Figure 4-5**).

Temperature and oxygen concentrations in 2024 were mostly consistent with previous years, and the seasonal patterns were typical of this Arctic area. There were no differences in these patterns between the control lakes (INUG and PDL) aside from slightly warmer temperatures in August at INUG, and the NF and MF monitoring areas, aside from slightly warmer temperatures in TPE and WAL in August compared to previous years.

[20] Photosynthesis occurring under ice can lead to DO results exceeding theoretical air saturation limits. This is due to photosynthesis producing pure oxygen, as opposed to the approximate oxygen content of 21% in air.

Conductivity

Field conductivity[21] is an indicator of stratification in the water column and is an effective way to assess changes in water quality that may be related to mining activities such as the discharge of treated water and seeps. From a monitoring perspective, uniform conductivity provides confidence that the water column is well-mixed and that a water sample collected at a discrete depth represents conditions from the surface to near the bottom of the lake. In contrast, variable conductivity in areas close to mining activity may indicate the presence of water with different chemical properties. Surface water sampling is done at 3 m below the surface, but conductivity profiles can help identify if additional samples should be collected at other depth intervals. Conductivity of oligotrophic systems with low concentrations of dissolved solids is typically less than 50 µS/cm and uniform from top to bottom in any given month, with minor seasonal fluctuations. While the overall range in conductivity is similar between ice-on (10–50 µS/cm) and ice-off (10–40 µS/cm) months, the conductivities in ice-off months are generally lower, which is consistent with cryo-concentration during progressive ice formation in winter.

Field-measured conductivity was unstratified for most of the 2024 limnology profiles. Minor fluctuations in conductivity were evident during some of the winter sampling events due to cryo-concentration (see **Figure 4-6**).

Conductivity at SP in 2024 was generally within the range of historical values dating back to 2009. Field collected conductivity at SP was typically between 20 µS/cm and 30 µS/cm prior to 2014. More recent results from 2014–2023 have trended between 30 µS/cm and 50 µS/cm. The change in laboratory reported conductivity at SP was identified in the water chemistry BACI analysis but has not been linked to any adverse effects to the biological community (see **Section 4.3** and **Figure 4-7** for more details).

Conductivity at WAL was slightly higher than in 2023, but within the range observed in previous years. WAL had higher conductivity observed in the winter months (between 45 and 55 µS/cm) compared to the summer months (between 40 and 45 µS/cm). Baseline results for WAL during the open-water period were between 30 and 40 µS/cm. As with SP, laboratory reported conductivity at WAL has been identified in the BACI analysis but has not been linked to any adverse effects to the biological community (see **Section 4.3** and **Figure 4-7** for more details).

4.3 Water Chemistry

Tabulated water quality data for 2024 are presented in **Appendix C1**. Water chemistry samples were collected simultaneously with limnology samples in March, April, July, August, and September (see

[21] Throughout this report, any discussion of *conductivity* refers to specific conductance, which is conductivity normalized to 25°C.

Section 4.2 for limnology results). The May sampling event occurred in late April in 2024 due to early ice melt.

4.3.1 Key Findings from the 2024 Water Chemistry Monitoring Program

- There are no major mining activities taking place at Meadowbank and effluent discharge only occurred at SP from October to December in 2024.
- There were no trigger exceedances for parameters with effect-based thresholds. Water quality in the Meadowbank study area lakes is safe for aquatic life.
- Mining activities have contributed to higher concentrations of dissolved solids and some major ions in the Meadowbank area lakes.

4.3.2 Temporal and Spatial Trends

Annual mean concentrations for each parameter were compared to triggers and effects-based thresholds according to the approach outlined in **Section 2.5.1**. BACI analyses were conducted for parameter/area combinations if the mean concentration for a given parameter in 2024 exceeded the trigger value.

Given the number of parameters routinely below laboratory MDLs, a conservative three-step assessment process was used to identify parameters to include in the formal trend assessment to streamline the interpretation of the results. Details of the three-step assessment process are provided in **Section 2.5.1** and the results are summarized in **Table 4-2**. The results of the water chemistry parameter assessment process are presented in **Table 4-2**; shaded parameters were retained for further analysis. Monitoring results for retained parameters show spatial trends across NF, MF, FF, and reference (REF) areas and temporal trends across all monitoring years for surface water samples collected from a depth of 3 meters , as shown in **Figure 4-7** to **Figure 4-11**. Parameters with no clear spatial or temporal trends related to mining activities or natural variability were excluded from further consideration (see **Table 4-2**). For completeness and transparency, water chemistry plots for all parameters are included in **Appendix C1**.

Parameters for which the 2024 yearly mean exceeded the trigger values in NF areas are shown in **Table 4-3**. Parameter/area trigger exceedances were similar to previous years and included measures and indicators of conductivity, hardness, alkalinity, major ions, and silicon. Potassium was added in 2024, which narrowly exceeded the trigger values at SP and TPE. Potassium parameter was included in the BACI analysis.

The results of BACI analyses for exceeding parameter/area combinations are provided in **Table 4-4**. BACI analysis results in 2024 were largely the same as last year, showing statistically significant increases ($p <$

0.05) relative to baseline/reference conditions for conductivity, hardness, major ions, and the 2024 addition of potassium.

Water chemistry results for parameters that exceeded their respective trigger values are discussed in the sections that follow.

Conventional Parameters (Conductivity, Hardness, and Alkalinity)

Conductivity and Hardness. Conductivity is a composite variable that increases in response to higher concentrations of ionic compounds such as chlorides, sulphates, carbonates, sodium, magnesium, calcium, potassium, and metallic ions. In 2024, conductivity and hardness were elevated at TPN, TPE, SP, and WAL relative to baseline/reference conditions (**Figure 4-7**).

Alkalinity. The concentrations of bicarbonate and total alkalinity were elevated in SP and WAL in 2024 relative to baseline/reference conditions. Bicarbonate (HCO_3-) typically constitutes the majority of the total alkalinity fraction in surface water with pH in the range of 6.5 to 9, which is the case at the Meadowbank area lakes. The trigger value for both bicarbonate and total alkalinity is 8.7 mg/L. Bicarbonate alkalinity at SP has consistently exceeded the trigger since 2011 and in 2024 the mean concentration at SP was 13.1 mg/L (as $CaCO_3$), which is only slightly higher than the range of 11 to 13 mg/L observed in 2016–2023. The mean annual concentrations of bicarbonate at TPE and WAL also slightly exceeded triggers, however this was within a narrow margin (by 0.2 and 0.1 mg/L, respectively) (**Table 4-3**).

From a potential-effects perspective, alkalinity measures the buffering capacity of water (i.e., how much acid can be added without changing pH) and low values are typically of concern for aquatic life. For example, the working water quality guidelines for British Columbia (BC MOE, 2017) have three categories of sensitivity to acid inputs based on alkalinity: highly sensitive (<10 mg/L), moderately sensitive (10 to 20 mg/L) and low sensitivity (>20 mg/L). Consequently, the temporal trend of slightly increasing alkalinity relative to baseline/reference conditions is unlikely to adversely affect biota at TPE, SP, or WAL and would decrease their potential sensitivity to acidic inputs (e.g., low pH snow melt and rain).

Total Dissolved Solids and Major Ions

Total Dissolved Solids. Concentrations of total dissolved solids (TDS) were elevated at WAL in 2024 relative to baseline/reference conditions but have been stable for the past several years (**Figure 4-8**). In a review of TDS toxicity to aquatic life, Weber-Scannell and Duffy (2007) recommended deriving ion-specific limits for aquatic life (i.e., rather than for TDS). However, none of the literature studies they compiled showed effects to aquatic life at TDS concentrations less than 250 mg/L and they reported the average TDS in the world's rivers was approximately 120 mg/L. There are no federal water quality

guidelines for TDS in Canada. The TDS concentrations measured WAL in 2024 ranging from around 27 to 53.5 mg/L are, therefore, very low and unlikely to pose risks to aquatic receptors.

Major Ions. Similar to 2023, concentrations of the major ions calcium and magnesium were elevated relative to baseline/reference conditions at Meadowbank study area lakes in 2024 (**Table 4-3**, **Table 4-4**, and **Figure 4-8**). At the NF areas TPN, TPE, and SP, mean 2024 concentrations were similar to 2023, except for a slight increase in total calcium and magnesium at WAL, and exceedances for potassium at TPE and SP. Mean calcium concentrations ranged from 2.6 mg/L at TPN, exceeding the trigger of 2.39 mg/L, to 5.9 mg/L at WAL, exceeding the WAL trigger of 4.9 mg/L. Magnesium concentrations ranged from 1.1 mg/L at TPN, exceeding the trigger of 0.93 mg/L to 1.8 mg/L at WAL, exceeding the trigger of 1.36 mg/L. Mean concentrations of potassium at TPE and SP were 0.59 mg/L and 0.64 mg/L, respectively, only marginally exceeding the trigger of 0.58 mg/L. While potassium concentrations were slightly elevated in 2024, the concentrations are still within the historic ranges observed at these areas. Interestingly, the general pattern of increase seen for calcium, magnesium, and potassium appear fairly consistent at both impact and control areas, which suggests that these increases are reflective of regional climatic changes rather than to mining activity.

Slight increases of these cations above triggers in the Meadowbank study lakes for the *after* period are unlikely to adversely affect biota. These major cations are essential elements, and all species of aquatic life, from algae to fish, have evolved to actively regulate their osmotic, ionic, and acid-base balance by taking up ions from their surrounding environment (Martemyanov and Mavrin, 2012). Furthermore, adverse effects on primary producers and secondary consumers (e.g., zooplankton) are more commonly associated with deficiency rather than enrichment of major cations in oligotrophic freshwater lake environments (Alstad et al., 1999). Calcium deficient waters are defined for some species of algae at concentrations <10 mg Ca/L (Wetzel, 1983) and effects on zooplankton communities are more common in freshwater lakes that are calcium-depleted because of acidification and logging (Arnott et al., 2017).

Metals

Silicon. In absence of *control* data and a threshold, an early warning trigger for silicon was derived for the Meadowbank study area lakes in 2019 based on data from all lakes (except WAL). There is evidence of temporal trends in silicon concentrations across all Meadowbank study area lakes, (i.e., peak concentrations in 2012 followed by a decrease through 2017 and have remained stable since then) including reference areas that suggest regional influence. There also appears to be differences in concentrations among lakes. This is clear at SP where concentrations have always been relatively high compared to reference area INUG yet the temporal patterns are very similar between the two areas (**Figure 4-11**). Given the similar trends observed in reference area INUG and distinct difference in concentrations among lakes, it is unlikely that elevated silicon concentrations are related to mining

activities. In 2024, the BACI result showed a statistically significant increase in total silicon at WAL (p-value >0.05) with the yearly mean concentration of 0.78 mg/L exceeding the 0.65 mg/L trigger value.

Other Metals. Concentrations of other metals (total and dissolved) were consistently low or below their respective MDLs at the NF locations in 2024 (**Appendix C1**).

None of these metals have exceeded trigger or effects-based threshold values in the formal BACI analysis. In 2024, the same metals were measured above laboratory MDLs as in previous years. There was no effluent discharge to SP in 2024 before October. These chemistry results are important to note in relation to ongoing discharge from dike seepage from the East Dike to Second Portage Lake.

Reactive Silica

The first trigger exceedance for reactive silica occurred in 2020 at WAL. The yearly mean concentrations of reactive silica have exceeded the trigger since then (**Figure 4-9**). Given that the mean concentration of reactive silica at WAL (1.6 mg/L) in 2024 was only slightly over the trigger value (1.08 mg/L) and that the exceedance occurred in a NF area that has not been exposed to any mining activity since 2020, it is unlikely mine-related and will continue to be monitored in 2025.

Long-term Trend Analysis

In addition to the routine BACI analysis, a more detailed statistical analysis of temporal changes for key physical/ionic parameters in NF areas was completed in 2021 (Azimuth, 2022a). The assessment used a mixed-effects modelling approach to compare three different long-term patterns in conductivity, hardness, calcium, magnesium, total alkalinity, and TDS, which have consistently exceeded triggers and/or FEIS predictions. The BACI analysis is designed to test for changes in parameters for a particular year relative to baseline/reference conditions; it is not designed to test for longer-term trends in key parameters over time. The mixed-effects trend analysis was conducted to provide a statistically supported understanding of long-term trends in key water chemistry parameters. While we will continue to implement the BACI analysis each year to test for changes relative to baseline/reference conditions, the mixed-effects analysis will only be repeated periodically to address specific concerns.

The analysis specifically looked at relative differences between NF areas TPN, TPE, and SP and the reference lake INUG for each of the parameters. The three patterns tested were: (1) a constant linear trend over time (*Trend* model), (2) variable, year-specific differences without an increasing trend (*Year* model), or (3) an increasing, but variable, trend during operations to a peak followed by stabilized conditions since 2014 (*Stable* model). The *Stable* model fit the data best for nearly all area-parameter combinations; the except for total alkalinity at TPN where the *Trend* model showed a slightly better fit. These results indicate that concentrations of conductivity, hardness, calcium, magnesium, total alkalinity, and TDS have generally been stable from 2014 to 2021. A full description of the long-term trend analysis and results was included in the *2021 CREMP report* (Azimuth, 2022a).

4.3.3 Comparison to FEIS Model Predictions

The CREMP continues to detect changes in some general water quality parameters related to mining activities. These changes are also reflected in higher concentrations of some parameters when compared to the model predictions in the FEIS (Cumberland, 2005). The FEIS water quality predictions are estimates of water quality changes in Third Portage Lake, Second Portage Lake, and Wally Lake, assuming different mixing scenarios and loading estimates from water releases and dike leaching:

- **Third Portage Lake.** The model for Third Portage Lake includes treated water released from the project in years 1 to 4 and long-term loading of metals from the Bay-Goose dike material. Two mixing scenarios (upper range [169 Mm^3] and mid-range [92 Mm^3] mixing) are evaluated for Third Portage Lake with and without dike leaching.
- **Second Portage Lake.** The Second Portage Lake water quality model includes loading of parameters from the Third Portage and East dikes and inflow from Third Portage and Wally lakes. Changes in water quality in Second Portage Lake were modelled for the two different mixing scenarios for water released into Third Portage Lake listed above.
- **Wally Lake.** The water quality model for Wally incorporates long-term loadings from the Vault dike and effluent releases from the Vault Attenuation Pond.

The assessment of Meadowbank water chemistry results against FEIS predictions only includes a comparison to mean concentrations (Azimuth, 2020a). The full screening results for Third Portage Lake, Second Portage Lake, and Wally Lake are summarized in **Appendix C1**. For perspective, the screening results against mean concentrations are provided in **Table 4-6**.

In 2024, the same list of parameters that exceeded the Meadowbank trigger values exceeded the concentrations predicted in the FEIS, namely hardness, total alkalinity, and ionic compounds (calcium and magnesium; **Appendix C1**). Concentrations for most metals were below the predictions for Third Portage Lake, Second Portage Lake, and Wally Lake, except for total silicon at SP and WAL. Constituents such as silicon that were not reported in the 2003 baseline dataset were assumed to not be present in the receiving environment in the FEIS mixing models (V. Bertrand, pers comm, March 30, 2020). The full suite of parameters currently included in the CREMP water quality analysis were not available in the early stages of the program, hence, the absence of concentration data for silicon during the baseline phase. As a result, the predicted silicon concentrations are an underestimate of the actual baseline concentrations. Silicon is therefore not suitable for evaluating the accuracy of the FEIS predictions (see Azimuth, 2020a).

At the time the FEIS was issued in 2005, the freshwater aquatic life guideline for cadmium was lower than the MDL for the baseline data. A thorough review of the ecological significance of the predicted cadmium concentrations was presented in the FEIS, and the probability of cadmium causing toxicity was

considered *extremely low* (Cumberland, 2005). Arsenic was also predicted to exceed the freshwater aquatic life guideline in Wally Lake (0.006 mg/L in the FEIS). Similar to cadmium, the MDL for arsenic was equal to the guideline (i.e., 0.005 mg/L) in 2005. The models were considered conservative because the MDLs were used as the baseline concentrations. The 2024 MDLs for arsenic and cadmium were 0.0001 mg/L and 0.000005 mg/L, respectively. All the samples collected from Meadowbank study area lakes in 2024 were below the MDL for cadmium, except one sample collected at TPE in March which was reported at twice the MDL (**Appendix C1**). In the case of arsenic, the concentrations are below the trigger values for the Meadowbank study area lakes and at least an order of magnitude lower than the CCME water quality guideline of 0.005 mg/L in all samples.

In 2024, the FEIS predicted the magnitude of potential effect on water quality in each of the lakes as *low* (see **Section 2.5.1** for more details on the decision criteria for effect magnitude). It is important to note that none of the parameters that exceeded trigger values or FEIS model predictions in 2024 had trigger values set in the context of effects-based threshold values (e.g., CCME water quality guidelines). Thus, CREMP water quality results are consistent with the *low* significance (i.e., <1x CCME WQG) rating applied to model predictions in the FEIS (Cumberland, 2005).

4.3.4 Summary and Recommendations

Water quality results were evaluated according to the decision criteria outlined in **Section 2.4** to determine the effort level and sampling frequency required at the MF and FF areas in 2025. The assessment strategy interprets the water quality assessment results from the NF areas in the current year (in this case 2024) to inform sampling at MF and FF areas the following year (i.e., 2025) (**Figure 4-12**).

Trigger screening results for the Meadowbank study areas are presented in **Table 4-5** according to the degree of change interpretation framework:

- no trigger exceedance,
- minor changes = trigger exceeded for parameters without effects-based thresholds,
- moderate changes = trigger exceeded for parameters with effects-based thresholds, or
- major changes = exceedance of the effects-based threshold.

The 2024 water quality results from Meadowbank area lakes do not require additional management actions as per the *CREMP Plan Update* (Azimuth, 2022b). The outcome of the assessment for sampling at NF, MF, and FF areas[22] in 2024 is summarized below.

[22] No samples were collected at MF and FF areas TPS, TE, and TEFF as per the *CREMP Plan Update* (Azimuth, 2022b).

Reference Areas

- INUG and PDL are reference areas located beyond the influence of activities at the Mine.
- Trigger exceedances of the mean concentrations were documented for total and dissolved silicon at INUG and for conductivity, hardness, alkalinity, calcium, magnesium, and TDS at PDL.
- The full CREMP program will be completed at reference areas in 2025.

Near-field (TPE, TPN, SP, and WAL)

- Trigger exceedances were documented for parameters without effects-based thresholds (i.e., conductivity, hardness, alkalinity, TDS and cations).
- The mean total and dissolved silicon concentrations exceeded the trigger in SP.
- Potassium exceeded the trigger at TPE and SP, but only narrowly, and data is within range of historic observations.
- The full CREMP program will be completed at the NF areas in 2025.

Mid-field and Far-field

- No sampling was conducted at MF and FF areas TPS, TE, and TEFF in 2024 based on the results of the 2023 CREMP and as per the *CREMP Plan Update* (Azimuth, 2023a and 2022b).
- Given there were no trigger exceedances for parameters with effects-based thresholds at the NF areas in 2024, no sampling is required at the MF and FF areas in 2025. No other sampling (e.g., sediment chemistry or benthic invertebrate community) is required at MF and FF areas in 2025.

4.4 Phytoplankton Community

In 2024, phytoplankton samples collected during winter sampling events[23] were archived as per the *CREMP Plan Update* (Azimuth, 2022b). Results of the open-water season are discussed below and did not warrant analysis of the winter phytoplankton samples.

4.4.1 Key Findings from the 2024 Phytoplankton Monitoring Program

- Chlorophyll-a concentrations at the NF areas were consistent with baseline and reference areas, with all values generally less than 1 µg/L.
- Decreases in phytoplankton biomass were observed at NF areas TPE, TPN, and WAL compared to reference area INUG, however, decreases in 2024 were likely due to environmental variability as biomass at the NF areas was consistent with historical results.

[23] Phytoplankton samples were not collected in May due to unsafe ice conditions.

- Phytoplankton taxa richness at the NF areas in 2024 was similar to previous years and to reference areas. There were small, but statistically significant, reductions in taxa richness at all NF areas. These reductions in taxa richness are likely due to environmental variability linked to the warm, dry summer rather than mining activities, particularly since effluent discharge at the Meadowbank site was limited to Second Portage Lake in 2024.

4.4.2 General Observations

The diversity in types and sizes of phytoplankton in the study lakes is large and their abundance is great. In summer, abundance typically exceeds 1 million individuals per liter with a total biomass of approximately 200 mg/m^3. Six major taxonomic groups of phytoplankton are present in the study lakes, namely blue-green algae (Cyanophyta), green algae (Chlorophyta), golden-brown algae (Chrysophyta), Diatoms, Cryptophytes, and Dinoflagellates.

Chrysophytes (golden-brown algae) are small, usually unicellular phytoplankton that are consistently the most abundant taxonomic group in the Meadowbank study area lakes. Chrysophytes also dominate phytoplankton biomass in all study area lakes, typically representing 65% or more of total phytoplankton biomass in summer samples, with smaller proportions (usually < 10% each) from the other five major groups. The dominant chrysophyte genera for the Meadowbank study area lakes are *Chrysococcus, Kephyrion, Chrysochromulina, Dinobryon,* and *Chrysolkos*. Dominant genera for the other groups are *Oocystis* for chlorophytes, *Planktolyngbya* for cyanophytes, *Cyclotella* for diatoms, *Rhodomonas* and *Cryptomonas* for cryptophytes, and *Gymnodinium* and *Peridinium* for dinoflagellates (Azimuth, 2012a, 2011b, 2010a, 2009c, 2008a, and 2008b).

Mean phytoplankton biomass in the Meadowbank study area lakes typically ranges from 100 to 250 mg/m^3 during summer with diminishing biomass in fall through winter. This range in biomass is typical for oligotrophic, central Arctic Canadian lakes. Biomass estimates from lakes sampled in the 1980s in the Kivalliq Region generally ranged between 100 and 300 mg/m^3 (McKee et al., 1989). Other studies on arctic lake phytoplankton communities have reported similar ranges of phytoplankton biomass at Snap Lake (266 mg/m^3; De Beers, 2002), Char Lake (166 mg/m^3, Kalff et al., 1975), and Spring Lake (120 mg/m^3, Welch et al., 1989).

4.4.3 Temporal and Spatial Trends

The approach for identifying potential mine-related impacts involved visually searching for temporal-spatial patterns that might be associated with mine-related activities (see **Appendix A** for details), augmented by statistical analyses of annual data to test for changes relative to baseline/reference conditions using the BACI model (see **Section 2.5.3** for details). Both methods look for evidence of temporal-spatial patterns that might be associated with the mine-related activities.

The primary metrics used in the assessment were the following:

- chlorophyll-a concentration (a surrogate for overall primary productivity),
- total biomass (mg/m^3),
- relative biomass of major taxonomic groups, and
- species richness (total # species).

Biomass, not abundance, was examined because biomass and abundance tend to be reasonably well correlated and, ultimately, biomass more accurately approximates lake productivity or food availability for zooplankton. The BACI statistical testing focused on total biomass and species richness because these reflect ecologically relevant information about the phytoplankton community (i.e., total mass of community and community composition, respectively). The trigger and threshold effect sizes for total biomass and species richness are 20% and 50%.

Expected response patterns in phytoplankton biomass and species richness are dictated by the nature of the physical and/or chemical changes caused by mine-related activities. For example, dike construction or dewatering may introduce turbidity, leading to a reduction in phytoplankton biomass/diversity. In contrast, introducing other substances, such as nitrogen associated with blasting by-products, could increase primary production. Therefore, we look for both reductions and increases (i.e., two-tailed statistical tests) in phytoplankton-related metrics coinciding with mining activities (i.e., focusing primarily on data for NF areas SP, TPE, TPN, and WAL).

An important consideration when working with phytoplankton data is the naturally high variability of control data. This potentially confounding *noise* effect can make it difficult to identify mining-related influences or *signals* at impact areas, unless the signals are quite large.

Density and biomass results for phytoplankton samples collected from the Meadowbank study lakes are provided in **Appendix E1**. The 2012 CREMP (Azimuth, 2013) provided a detailed description of historical trends in phytoplankton-related metrics. The current report emphasizes results for 2024, but retains the historical context by showing the results of all monitoring years. Trend data for chlorophyll-a, total biomass, major taxa composition, and species richness are presented from **Figure 4-13** to **Figure 4-17**. Plots for all other phytoplankton metrics are presented in **Appendix E1**. The BACI statistical test results of changes in the phytoplankton community in 2024 compared to baseline/reference conditions are provided in **Table 4-7**; key results are described below.

Chlorophyll-a

Concentrations in the reference area samples typically range between 0.11 and 0.72 µg/L in summer months, reflecting the oligotrophic, nutrient poor condition of these lakes (**Figure 4-13**). In 2024, PDL and INUG were within this range for most events. However, INUG had a late-season increase (max 1.38 µg/L) likely due to the historic rainfall volumes recorded in September.

Chlorophyll-a concentrations at the NF exposure areas TPN, TPE, SP, and WAL showed no evidence of abnormal seasonal or longer-term temporal trends (**Figure 4-13**) and remained less than 1 µg/L in 2024, which is consistent with oligotrophic conditions (Kasprzak et al. 2008).

Total Biomass

The total phytoplankton biomass results for 2024 were similar to 2017–2023. Biomass results for the summer months were comparable to historic data:

- For reference lakes, summer biomass estimates at INUG in 2024 ranged from 187 to 235 mg/m^3, which were within the range of 2023, as well as the range observed historically. The peak biomass at PDL was 215 mg/m^3 in July, which was just slightly higher than that in 2023. Overall, these results are consistent with the range of total biomass observed in previous years for the reference areas (**Figure 4-14**).
- Peak total biomass in 2024 for NF areas TPE, TPN, and WAL were all within their respective historical ranges. One notable trend observed in 2024 was a decline in biomass in August at TPE, SP, and WAL. These decreases were likely due to the warm, dry conditions in that month. Differences in depth, surface area, and catchment characteristics among lakes can amplify the effects of environmental changes in some lakes compared to others.
- BACI analysis demonstrated apparent decreases ranging from 19% to 47% at the NF areas in 2024 relative to reference area INUG. The decreases in total biomass exceeded the trigger (>20% effect size) at TPN (22%), SP (30%), and WAL (47%). Only the decrease at WAL was statistically significant (**Table 4-7**).

Major Taxa Composition

Chrysophytes tend to dominate in the study lakes in all open-water months, a pattern that has been consistent since monitoring began in 2006 (**Figure 4-15**). The continued dominance of chrysophytes provides an additional line of evidence suggesting any *potential* incremental increase in nutrients or changes in water quality has not resulted in major structural changes to the community. Among the major taxa, chlorophytes are typically the first to respond to nutrient enrichment in freshwater systems (Holmgren, 1984). The direct positive effect of nutrient enrichment on chlorophytes has been shown to have an indirect negative effect on chrysophytes, which compete with chlorophytes for nutrients (Klug and Cottingham, 2001). In the same study by Klug and Cottingham, chrysophytes were among the dominant taxa prior to artificial fertilization of the study lakes. These observations from the primary literature substantiate findings from the CREMP that the structure of the phytoplankton community is consistent with pre-development oligotrophic conditions (**Figure 4-16**).

Taxa Richness

Taxa richness was similar to previous years for the open-water season in 2024[24] (**Appendix E1**). The taxa richness at the exposure areas was similar to the reference areas and fairly consistent with previous years (**Figure 4-17**). One exception to this is the richness observed at WAL in August and September, which were the lowest values observed at this area in the open-water months. Similar to phytoplankton biomass, this change is likely related to the hot, dry conditions experienced in August that resulted in reduced biomass and richness that persisted into September despite the onset of heavy rains that month.

The estimated changes relative to baseline/reference conditions showed reductions at TPN, SP, and WAL (<20% effect size) and results from all NF stations were found to be significant (p-values <0.1; **Table 4-7**). Taxa richness appeared to be within range of historical results at most NF areas, while WAL taxa richness appears to be gradually decreasing.

4.4.4 Summary and Recommendations

The phytoplankton community taxa biomass and taxa richness data from 2024 are generally similar to previous years and largely appear within the range of historical baseline/reference conditions.

Total biomass was significantly lower at WAL, while total richness showed decreases at all NF areas relative to historical baseline/reference conditions. It is difficult to determine in a single year whether these changes are related to mining but when compared to the trends observed over the years, natural variability is considered to be the most likely driver. Notwithstanding, monitoring will continue in 2025 to verify whether future patterns are consistent with observed patterns or whether they provide stronger evidence of mine-related causality.

[24] Samples collected during the winter months were archived as per the *CREMP Plan Update* (Azimuth, 2022b).

4.5 Sediment Chemistry

4.5.1 Key Findings from the 2024 Sediment Chemistry Monitoring Program

- TOC levels varied across the Meadowbank areas, with WAL consistently exhibiting the highest proportions and TPN consistently showing the lowest.

4.5.2 General Observations

Natural sedimentation rates in the Meadowbank study lakes are considered low due to the headwater nature of the watersheds and the lack of any substantial riverine or tributary inflow. Thus, very little sediment is carried into the lakes other than what erodes off the nearby tundra during spring run-off or heavy rain events, or from dust deposition. The only site discharge in 2024 was from East Dike seepage into Second Portage Lake (**Appendix A**). Sediment results from this year's CREMP are provided in **Appendix D1**.

Based on historical bulk sampling of sediment using grab samples, we have observed reasonably large, within-basin or within-lake differences in surface sediment (i.e., top 3–5 cm) concentrations for various metals, indicating natural spatial heterogeneity driven by localized mineralization. Several processes can affect the pattern of metals distribution to sediments, including differential deposition of different grain size materials according to wind direction and speed, water depth, water currents, basin morphometry, bioturbation (i.e., vertical mixing of sediment by burrowing insect larvae), and patchy, heterogeneous distribution of metals in mineralized areas. Metals concentrations are highly dependent on grain size, with coarse grain size (i.e., sandier) typically correlating with lower metals concentrations. Therefore, our sediment programs target low energy, depositional areas that are dominated by silt/clay sediment in areas of similar water depth (6–10 m), where grain size tends to be finer and more consistent.

Sediment chemistry samples are collected using grab samplers (targeting top 3–5 cm) or coring devices (targeting top 1.5 cm). Grab samples are used to characterize the chemical and physical conditions of sediments paired with the benthic invertebrate community samples. While grab samples can provide insights into temporal changes in sediment chemistry, core samples are more sensitive and are used in the CREMP to formally test for changes in sediment chemistry related to mining. Core samples are collected every three years to match the timing of EEM studies required under the Metal and Diamond Mining Effluent Regulations (MDMER). The next coring program is planned for 2026.

In 2024, sediment grabs for sediment chemistry and habitat characteristics were completed at the NF and reference areas (**Figure 4-2**). Sediment grab samples were analyzed for moisture, total organic carbon (TOC), and grain size, and the remaining sediment was archived for chemistry as per the *CREMP Plan Update* (Azimuth, 2022b). Grain size and TOC are important sediment parameters relevant for benthic invertebrate community habitat characteristics. Grain size results were similar to previous years,

with generally finer-grained sediment often dominated by the silt fraction (**Figure 4-19**). There is an apparent difference in TOC across Meadowbank study lakes (**Figure 4-18**). WAL consistently has the highest proportions of TOC (approximately 5 to 10%), while TPN has the lowest (<5% TOC). These results reflect differences in productivity levels across the lakes, with shallow, lower-volume lakes tending to be more productive relative to deeper, high-volume lakes. In 2024, TOC concentrations across Meadowbank study area lakes were similar to previous results, with most areas having <5% TOC except WAL (7.8 to 10% in 2024).

The results for organic compounds analyzed in grab composite samples are provided in **Appendix D1**. There were no detectable concentrations of organic compounds in 2024.

An overview of the various sediment sampling programs at Meadowbank dating back to baseline sampling in 2008 is provided in **Appendix D1**.

4.5.3 Temporal and Spatial Trend Interpretation

The 2024 sediment grab particle size, TOC, and moisture content results for Meadowbank are presented in **Appendix D1**. Sediment from grab samples was archived for chemistry in 2024 as per the *CREMP Plan Update* (Azimuth, 2022b). Trends will be reviewed in 2026 with the sediment coring program.

4.5.4 Summary and Recommendations

In 2024, sediment characteristics in the Meadowbank study area lakes were analyzed to assess changes in grain size and TOC. In the Meadowbank study area, sediment grain size in 2024 was within the range observed historically, with generally finer-grained sediment often dominated by the silt fraction. TOC concentrations were similar to previous years, with the highest proportions consistently observed at WAL.

The 2024 sediment results from Meadowbank area lakes do not require additional management actions as per the *CREMP Plan Update* (Azimuth, 2022b). **Routine sediment grabs will be collected to support the benthic invertebrate community sampling program in 2025.**

4.6 Benthos Community

4.6.1 Key Findings from the 2024 Benthos Community Monitoring Program

- Total abundance at all NF stations were within their respective historical ranges and generally consistent with baseline/reference conditions. Recent temporal trends have been variable across the NF stations and not statistically significant; they are likely due to natural variability rather than mining activity.

- Taxa richness results for all NF stations were also within their historical ranges and generally consistent with baseline/reference conditions. Recent temporal trends indicate higher diversity across the NF stations, with the only statistically-significant increase occurring at SP in the 2020-2024 time period. These results are likely due to regional warming rather than mining activity.

4.6.2 General Observations

The abundance and species composition of benthic invertebrates are influenced by water depth, substrate grain size, and organic carbon. Other physical factors, such as water temperature, can influence larval development rates and, ultimately, timing of hatching for insect larvae. Consequently, even if sampling can be conducted simultaneously in all lakes (which is not practical), this would still not overcome differential timing of hatching of particular species between lakes. This is partly overcome in the CREMP by sampling during August, after most groups have emerged, but it is still a source of variability.

Benthic invertebrate communities in the Meadowbank study lakes are characterized by relatively few taxa and low abundance. Abundance is generally less than 2,000 organisms/m^2 and is often less than 1,000 organisms/m^2 at reference and exposure areas (e.g., **Table 4-8** and **Figure 4-20**). Despite abundance generally being low at the study area lakes, values above 5,000 organisms/m^2 are not uncommon, and on occasion abundance has exceeded 10,000 organisms/m^2. Relatively large total benthic invertebrate abundance values were periodically observed in samples collected prior to mine development (e.g., one replicate had 26,000 organism/m^2 at WAL in 2006) and in more recent sampling events (e.g., one replicate had 31,000 organism/m^2 at WAL in 2016). The high variability in total abundance within an area has also recently been observed at lakes sampled for the Whale Tail mine during the baseline period (i.e., the *before* period). Total abundance at Lake A76 in 2017 was between 3,000 and >24,000 organisms/m^2 (Azimuth, 2018a). Whale Tail Lake - South Basin also showed comparatively large variance in abundance in 2017, ranging from 1,800 to over 10,000 organisms/m^2. Abundance data for the Meadowbank study lakes between 2006 and 2022, as well as more recent baseline data from the Whale Tail program, demonstrates that benthos abundance is naturally variable, both spatially (i.e., among areas) and temporally (i.e., between years).

Taxa richness typically ranged from 8–14 for most area-year combinations (**Figure 4-23**). Typical of most Arctic lakes, the benthic invertebrate community has been dominated by the aquatic larval stages of insects, especially chironomids (Family Chironomidae), both in terms of abundance and taxa richness (e.g., **Figure 4-21** and **Figure 4-24**). The next most abundant group was Mollusca (clams), particularly *Cyclocalyx* / *Neopisidium* genera of the family Sphaeriidae (fingernail clams). Oligochaete worms were also relatively common in the lake sediments; generally, at least one oligochaete taxon was present at most area-year combinations.

4.6.3 Temporal and Spatial Trends

Benthic invertebrate abundance and richness results from the reference (INUG and PDL) and NF (TPE, TPN, SP, and WAL) Meadowbank study lakes in 2024 are provided in **Appendix F1** by major taxonomic group (i.e., Insecta, Mollusca, Oligochaeta, and other taxa). Geometric means of total abundance and total richness for the entire data set dating back to 2006 are provided in **Table 4-8**.

Time-series plots showing abundance and richness endpoints are presented in **Figure 4-20** to **Figure 4-25**. Below are descriptions of the endpoints, based on Environment Canada EEM guidance (2012):

- **Total abundance**. The number of individual organisms per m^2. This metric is a measure of community density.
- **Total richness**. The number of different taxa (identified to the lowest practical taxonomic level, usually species) per grab.
- Abundance of major taxa (absolute and relative abundance of each major taxon).
- Richness of major taxa (absolute and proportional richness of each major taxon).

Other benthic invertebrate community results presented in **Appendix F1** but not discussed in detail, include time-series plots of abundance and richness within each major taxon, Simpson's Diversity, and Bray-Curtis Index values.

Identifying potential mine-related impacts generally involved visually examining the data for spatial/temporal patterns that matched mine-related events. This was followed up with formal statistical analyses of the data to test for changes relative to baseline/reference conditions using the BACI model (see **Section 2.5.3** for details). The BACI comparisons involved testing for single-year (i.e., 2024) and multi-year (i.e., up to four years) trends and focused on benthic invertebrate total abundance and taxa richness. This report focuses on the 2024 results and discusses temporal and spatial trends over the last four years (i.e., dating back to 2021). As discussed in **Section 2.4**, MF (TPS and TE) and FF (TEFF) areas were not sampled in 2024. BACI model results for benthic invertebrate abundance and richness are presented in **Table 4-9** and **Table 4-10**. Key results are described below.

Total Abundance

Total abundance at INUG was lower in 2024 compared to 2023, but still within the range of historical data. INUG is the main reference area used for the BACI comparisons, so it is noteworthy that total abundance has been generally higher for INUG from 2015 to present compared to earlier years (**Table 4-8**). However, the range in abundance since monitoring began is generally lower at INUG relative to the NF areas, with maximum abundance of 2,100 organisms/m^2 (2016) relative to SP (2,796 in 2014), TPN (3,025 in 2015), TPE (5,556 in 2008), and WAL (14,253 in 2016).

Yearly total abundance is plotted in **Figure 4-20**. Visually, the plots suggest slightly lower abundance at TPN, TPE, and SP and increased abundance at WAL compared to 2023. Overall, the BACI results in **Table 4-9** show negative effect sizes (i.e., reduction) in abundances for TPN and TPE, and increased abundance at WAL compared to reference area INUG in 2024, although none of the changes are statistically significant ($p > 0.1$). The observed effect sizes exceeded the 20% trigger at TPN (-36%), TPE (-35%), and WAL (82%), but not at SP (15%); the 50% threshold was only exceeded at WAL. These results appear to be influenced by natural inter-annual variability rather than mining activities.

Interpreting the BACI analysis results can be challenging for two reasons: 1) because natural variability exists between years and areas and 2) because there is heterogeneity within areas. For example, total abundance at TPE continues to be fairly stable with relatively minor variability between years (**Figure 4-20**). However, the 2024 BACI results for total abundance at TPE in each time period assessed over the past four years showed a relative reduction ranging from 22% to 50% compared to INUG, though none of these changes were statistically significant (**Table 4-9**). These results are driven by a number of years with higher abundance at INUG rather than any actual reduction in abundance at TPE.

A further challenge is accounting for heterogeneity within sites and the influence that differing abundance in replicates can have on the yearly mean for an area. For example, in 2024, abundance at replicate TPE-4 had a low total abundance of 478 organisms/m^2 compared to replicate TPE-3 which had a high abundance of 1,522 organisms/m^2. An even larger difference between replicates was observed in 2020, where the lowest total abundance was 2,065 organisms/m^2 at replicate WAL-4 compared to the highest total abundance of 24,261 organisms/m^2 at replicate WAL-5.

In recent years, estimated effect sizes have fluctuated but generally remained small for total abundance at the Meadowbank study area lakes. In 2024, effect sizes were often > 20% (reduced or increased abundance), though not statistically significant for all *after* periods up to four years (**Table 4-9**). As discussed previously, the apparent reductions in abundance are not supported by the temporal trends for total benthic abundance for TPE shown in **Figure 4-20**. The time-series plots highlight that abundance at TPE has remained fairly consistent over the last seven years and is similar to baseline results. The apparent reduction in abundance at TPE in the BACI analysis is related to the combined effect of two factors: 1) high abundance at TPE during the baseline period and 2) increased abundance at INUG in recent years (relative to baseline). In this context, the BACI results for TPE are interpreted strictly as a *relative* reduction in abundance compared to INUG rather than an absolute reduction in benthos abundance. The BACI results, while important for identifying potential temporal changes in benthos metrics, need to be interpreted in the broader context of the absolute change in the benthos community over time. Overall, the abundance data do not suggest that there are changes to benthic invertebrate abundance in the NF areas that are attributable to mining activity.

Major Taxa Abundance

Insects were the dominant taxon with generally over 60% relative abundance followed by molluscs with roughly between 10–25% relative abundance (**Figure 4-21** and **Figure 4-22**). While there were no apparent trends in composition changes related to mining at most areas, it is notable that most peaks or valleys in total abundance over the years appear to be driven by changes in insect abundance, predominantly chironomids. Notable examples are WAL in 2020 and 2022, or TPE in 2008. Given the large inter-annual changes in total abundance, it is not unexpected to see a change in the relative dominance of major taxa groups.

Taxa Richness

Taxa richness in 2024 was generally within the range of other sampling years (**Figure 4-23**). Mean taxa values at the reference areas were 11.4 at INUG and 7.3 at PDL, which were around the mid-range of reported number of taxa since monitoring began in 2006 (INUG) and 2009 (PDL) (**Table 4-8**). Results of 2024 BACI suggested there was an apparent increase in taxa richness at all areas and in all time periods. These changes were not statistically significant (p-value >0.1), except for SP during the 2020-24 period (**Table 4-10**). Overall, taxa richness was within the range observed across all sampling years. Despite some within-year variability in taxa richness, the NF areas show either stable or increasing taxa richness.

Major Taxa Richness

Insects were dominant in terms of absolute and proportional richness (generally from 6 to 8 taxa), followed by molluscs (~ 2 taxa; **Figure 4-24** and **Figure 4-25**). The 2024 results were similar to previous years and showed that there were no apparent trends in composition related to mining.

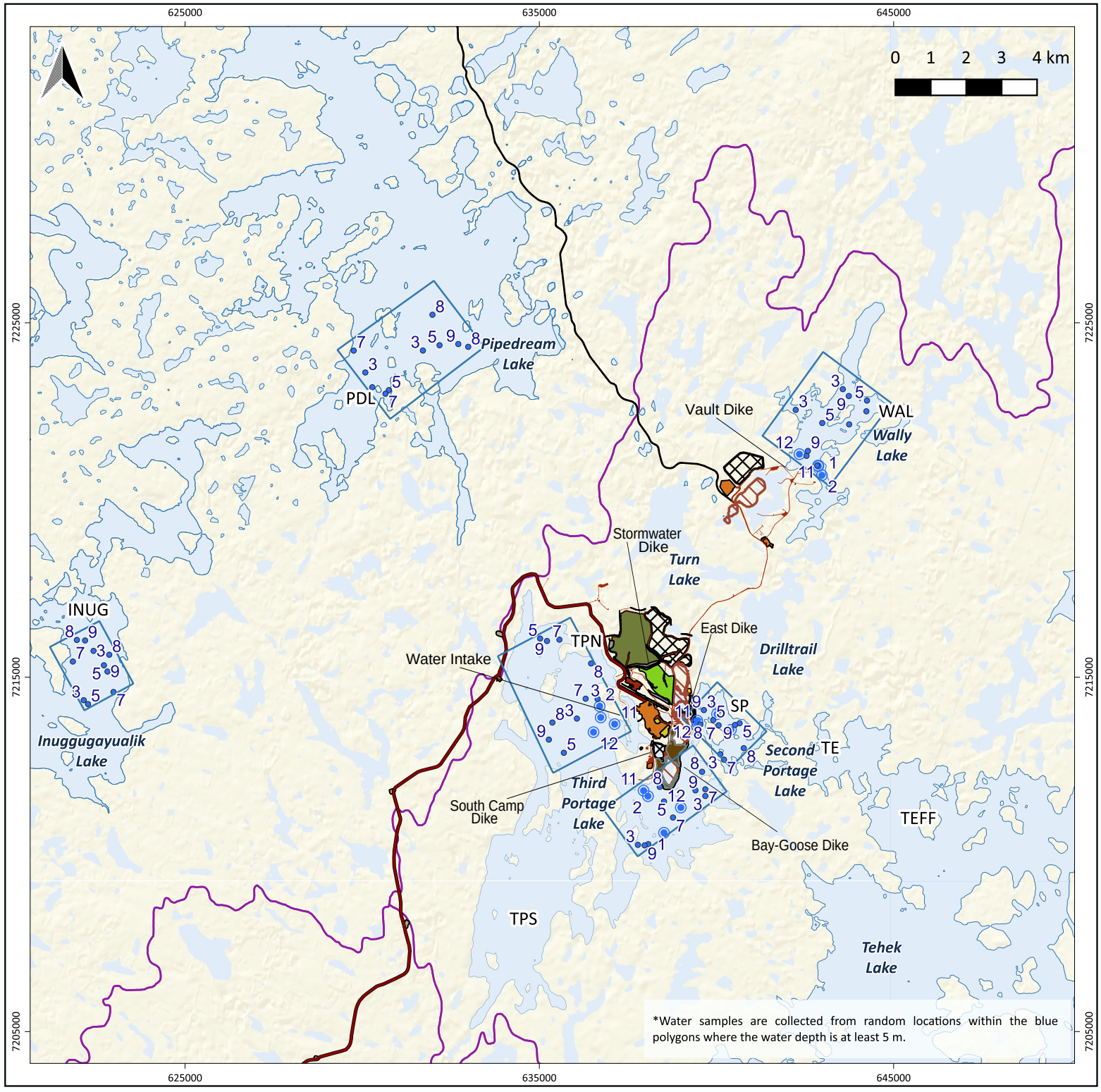
4.6.4 Summary and Recommendations

The benthic invertebrate metrics (total abundance and taxa richness) for the NF and reference areas were generally within the range reported for previous years. Furthermore, other than an apparent increase in richness at SP in the 2021-24 time period, the BACI analysis did not detect any significant changes in abundance or taxa richness in 2024, nor in the three longer-term time periods assessed (i.e., 2023-24, 2022-24, and 2021-24). There were apparent reductions in abundance at TPN, TPE, and increased abundance at WAL relative to INUG, however, the reductions were not statistically significant. Total abundance at TPE has been remarkably stable over the past 12 years. Importantly, the richness of the benthic invertebrate community at TPE is consistent with previous CREMP years, indicating the benthic community at TPE remains functionally diverse. In summary, the apparent changes in benthic community observed in 2024 are likely due to natural variability rather than to mining activities, and will continue to be monitored in 2025.

4.7 Meadowbank Tables and Figures

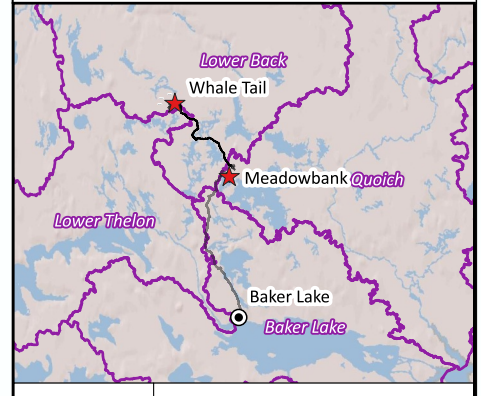
This section includes tables and figures for the Meadowbank CREMP, except for large tabulated data and figures for parameters not covered in the detailed analysis (refer to in-text references for relevant appendices). Subsections are organized by CREMP components including limnology, water chemistry, phytoplankton, sediment chemistry, and benthos.

Figure 4-1. Meadowbank Study Area - 2024 Water Quality Sampling Stations



Legend

- All Weather Access Road
- Haul Road
- Regional Watersheds
- Water Sampling Areas
- Limno
- Water *
- Facilities
- Road
- Dike
- Diversion Ditch
- Waste Dump
- Pit
- Dewatered Lake
- South Cell Tailings Storage Facility
- North Cell Tailings Storage Facility



Client	Agnico Eagle Mines Limited Meadowbank Division
Project	CREMP 2024 Meadowbank Complex

Date:	March 17, 2025
Datum:	NAD 83 UTM Zone 14N
Scale:	1:200,000
Software:	QGIS Version 3.22.11-Białowieża
By:	M. DiMauro, E. Franz

REFERENCES:
1. Basemap imagery from ESRI.
2. Mine plan and sub-watershed boundary layers from Agnico Eagle.
3. Watershed boundaries and watercourse from NRCan.

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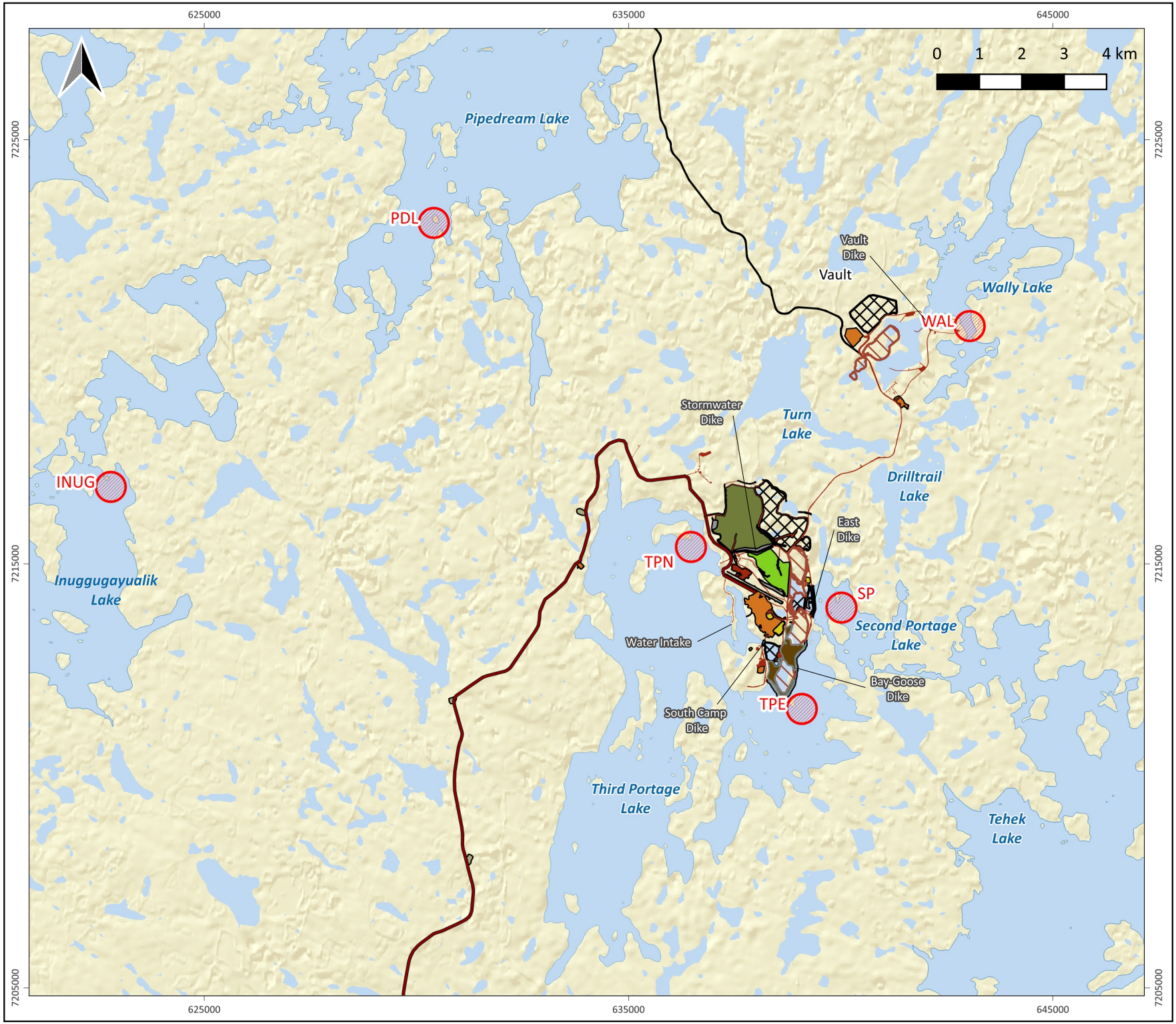


Figure 4-2. Meadowbank Study Area - 2024 Sediment and Benthic Invertebrate Monitoring Areas

- Benthic Invertebrate & Sediment Chemistry Sampling Areas
- Regional Watersheds
- All Weather Access Road
- Haul Road
- Facilities
- Road
- Dike
- Diversion Ditch
- WasteDump
- Pit
- Dewatered Lake
- South Cell Tailings Storage Facility
- North Cell Tailings Storage Facility



Client	Agnico Eagle Mines Limited Meadowbank Division
Project	CREMP 2024 Meadowbank Complex

Date:	March 17, 2025
Datum:	NAD 83 UTM Zone 14N
Scale:	1:120,000
Software:	QGIS Version 3.22.11-Białowieża

REFERENCES:
1. Basemap imagery from ESRI.
2. Mine plan and sub-watershed boundary layers from Agnico Eagle.
3. Watershed boundaries and watercourse from NRCan.

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Limnology Tables and Figures

Figure 4-3. Mean monthly field-measured temperature (°C) at 3 m depth since 2006, Meadowbank study area lakes.

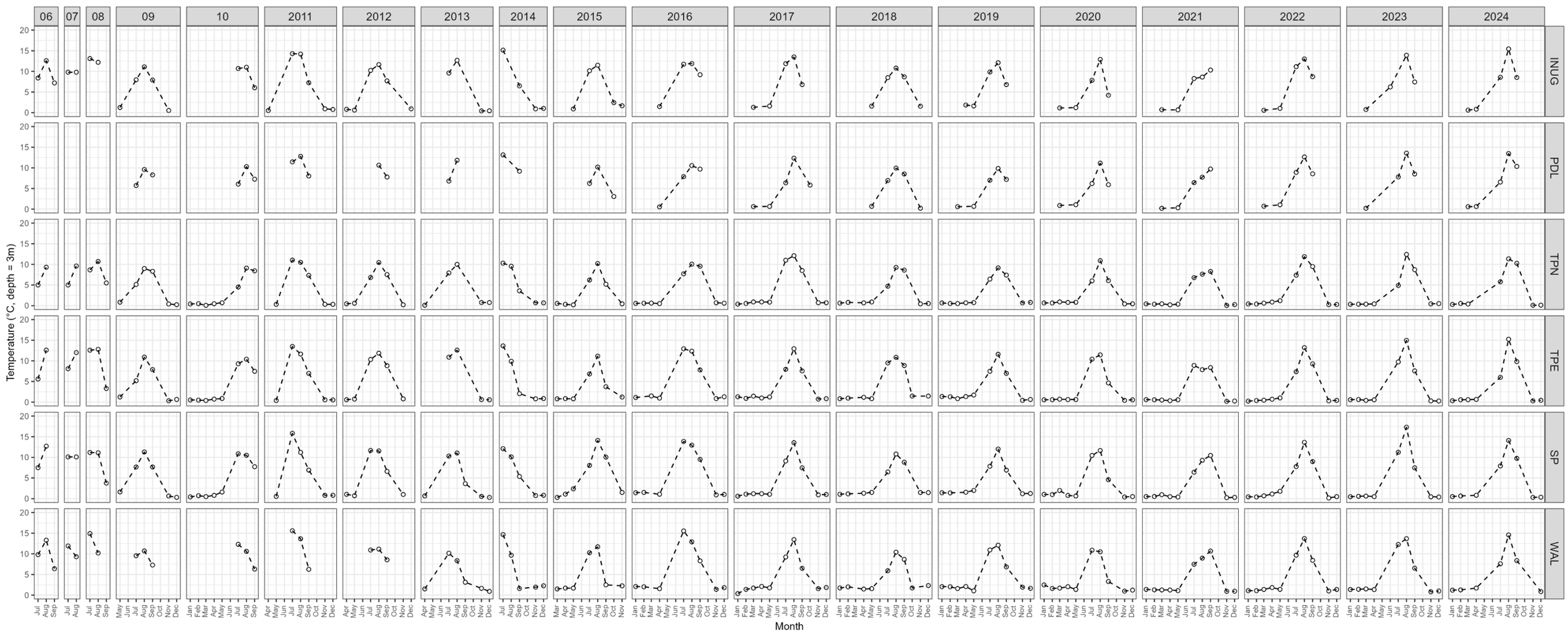


Figure 4-4. Meadowbank – Field-measured temperature profiles, 2024.

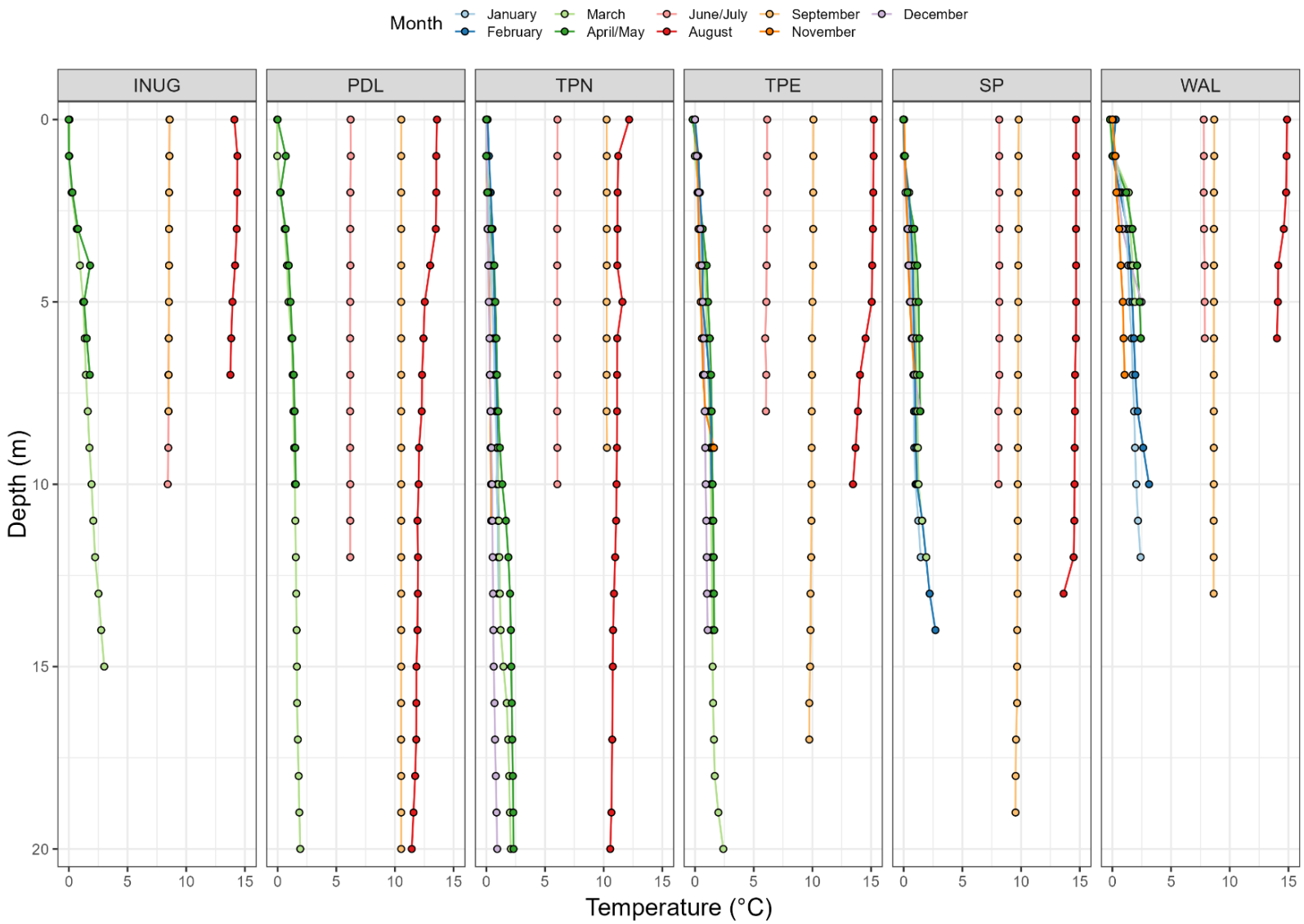


Figure 4-5. Meadowbank – Field-measured dissolved oxygen profiles, 2024.

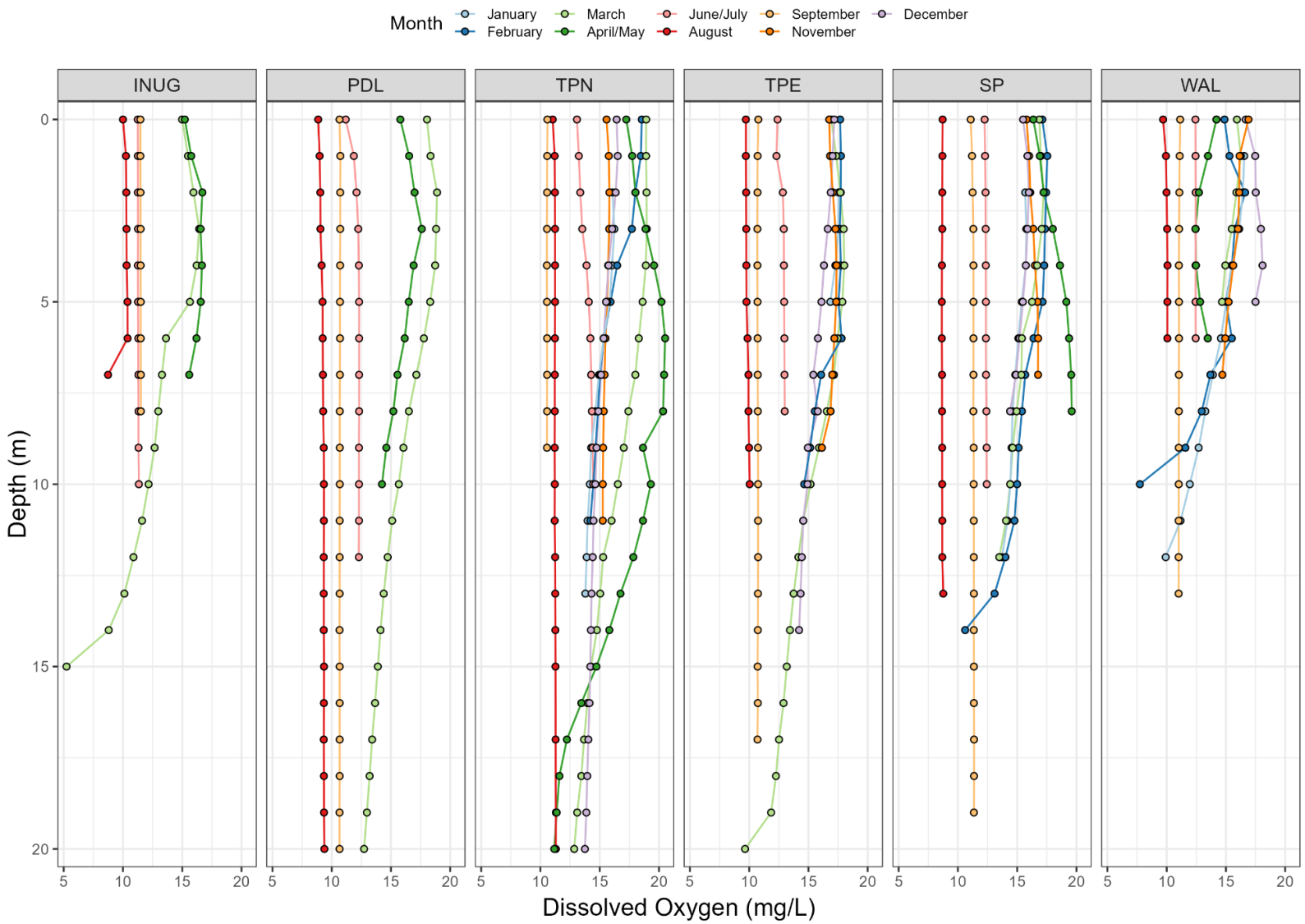
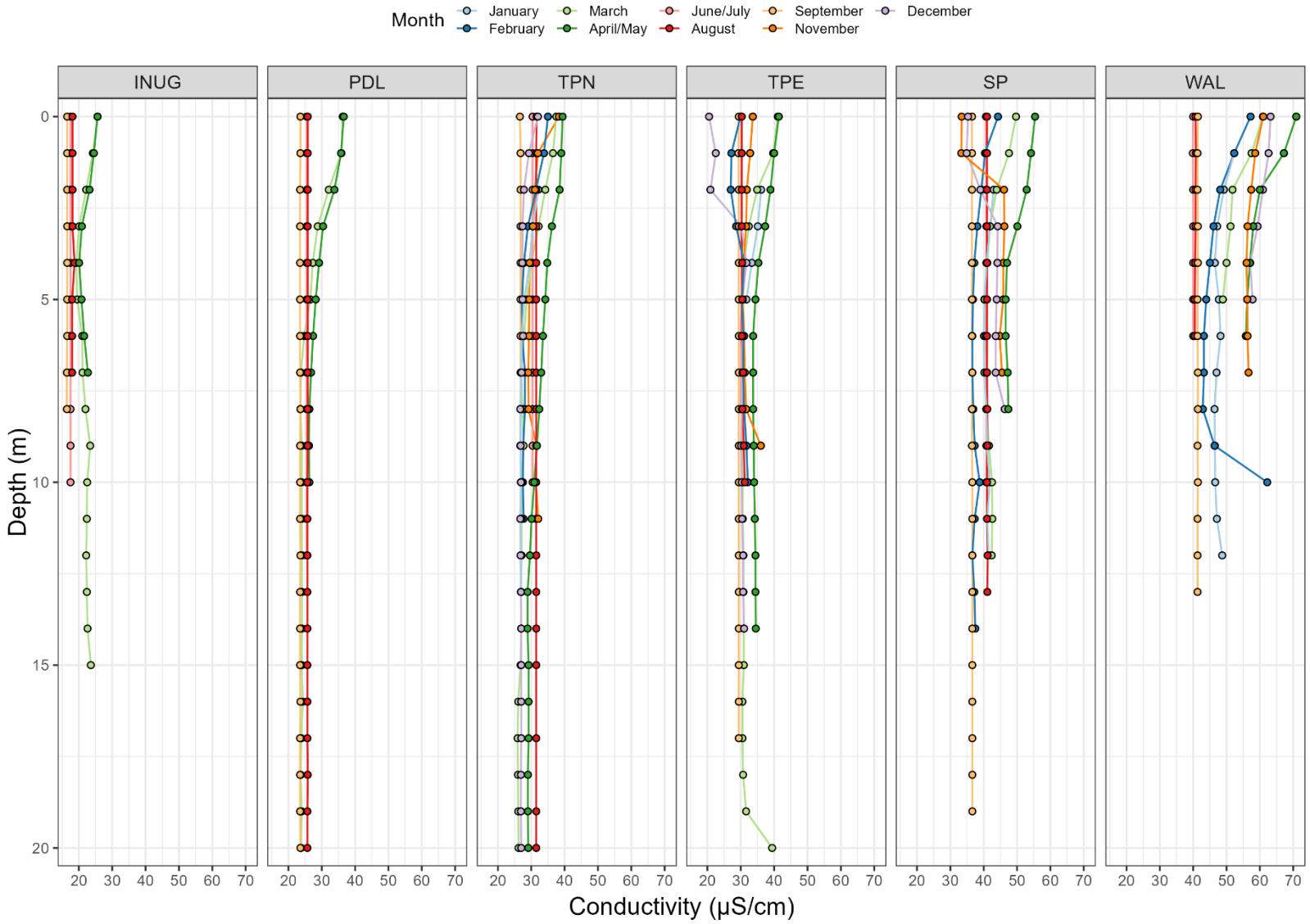


Figure 4-6. Meadowbank – Field-measured conductivity profiles, 2024.



Water Chemistry Tables and Figures

Table 4-2. Assessment process for water quality parameters, Meadowbank study area lakes, 2024.

Parameters	Trigger Exceedance[2]	Screening Level and Rule[1] 1 >DL ≥ 10% Frequency	2 C-I > 0.1 Frequency	3 Pattern = Activity
CONVENTIONALS				
Conductivity	All stations except INUG	**Yes**		
TSS	-	No	No	No
Hardness	All stations except INUG	**Yes**		
T-Alkalinity	TPE, SP, and PDL	**Yes**		
B-Alkalinity	TPE, SP, WAL, and PDL	**Yes**		
C-Alkalinity	-	No	No	No
TDS & MAJOR IONS				
TDS	All stations except INUG	**Yes**		
Calcium	All stations except INUG	**Yes**		
Chloride	-	**Yes**		
Fluoride	-	**Yes**		
Magnesium	All stations except INUG	**Yes**		
Potassium	TPE and SP	**Yes**		
Sodium	WAL	**Yes**		
Sulphate	-	**Yes**		
NUTRIENTS & OTHERS				
Ammonia-N	-	**Yes**		
Nitrate-N	-	**Yes**		
Nitrite-N	-	**Yes**		
TKN	-	**Yes**		
T-phosphorus	PDL	**Yes**		
Ortho-phosphate	-	**Yes**		
DOC	-	**Yes**		
TOC	-	**Yes**		
Reactive silica	WAL	**Yes**		
T-Cyanide	-	No	No	No
Free Cyanide	-	No	No	No

Parameters	Trigger Exceedance[2]	Screening Level and Rule[1] 1 >DL ≥ 10% Frequency	2 C-I > 0.1 Frequency	3 Pattern = Activity
TOTAL METALS				
Aluminum	-	**Yes**		
Antimony	-	No	No	No
Arsenic	-	**Yes**		
Barium	-	**Yes**		
Beryllium	-	No	No	No
Boron	-	No	No	No
Cadmium	-	No	No	No
Chromium	-	**Yes**		
Copper	-	**Yes**		
Iron	-	**Yes**		
Lead	-	No	No	No
Lithium	-	**Yes**		
Manganese	-	**Yes**		
Mercury	-	No	No	No
Molybdenum	-	**Yes**		
Nickel	-	**Yes**		
Selenium	-	No	No	No
Silicon	INUG, PDL, SP, and WAL	**Yes**		
Silver	-	No	No	No
Strontium	-	**Yes**		
Thallium	-	No	No	No
Tin	-	No	No	No
Titanium	-	No	No	No
Uranium	-	**Yes**		
Vanadium	-	No	No	No
Zinc	-	No	No	No

Parameters	Trigger Exceedance[2]	Screening Level and Rule[1] 1 >DL ≥ 10% Frequency	2 C-I > 0.1 Frequency	3 Pattern = Activity
DISSOLVED METALS				
Aluminum	-	**Yes**		
Antimony	-	No	No	No
Arsenic	-	**Yes**		
Barium	-	**Yes**		
Beryllium	-	No	No	No
Boron	-	No	No	No
Cadmium	-	No	No	No
Chromium	-	No	No	No
Copper	WAL	**Yes**		
Iron	-	No	No	No
Lead	-	No	No	No
Lithium	-	No	No	No
Manganese	-	**Yes**		
Mercury	-	No	No	No
Molybdenum	-	**Yes**		
Nickel	-	**Yes**		
Selenium	-	No	No	No
Silicon	WAL	**Yes**		
Silver	-	No	No	No
Strontium	-	**Yes**		
Thallium	-	No	No	No
Tin	-	No	No	No
Titanium	-	No	No	No
Uranium	-	**Yes**		
Vanadium	-	No	No	No
Zinc	-	No	No	No

Notes:

1. A three-step assessment process was used to identify parameters to include in the formal temporal and spatial trend assessment (**Section 2.5.1** and **Section 4.3.2**).
   Parameters were assigned a "Yes" if the following assessment was true:
(1) **>DL ≥ 10% Frequency**: parameters that exceeded MDLs in at least 10% of the samples.
(2) **C-I > 0.1 Frequency**: parameters that were detected more often in impact areas and the proportion of detected values increased by 0.1 or more.
(3) **Pattern = Activity**: additional step to avoid screening out potentially important parameters. Based on the trend plots, is there a trend for infrequently detected parameters and/or are there values > 5 x DL in at least one sampling event at NF areas?
2. Indicates that a trigger exceedance occurred at the listed Meadowbank study area lakes in one or more sampling event.

Shaded parameters are included in the temporal and spatial trend assessment.

Plots for all individual parameters are presented in **Appendix C1**.

Table 4-3. Water quality variables at the Meadowbank study areas for which the 2024 mean concentration exceeded the trigger.

Parameter	Trigger	Threshold	2024 Mean		
			TPN	TPE	SP
			NF	NF	NF
Conductivity	27.4	-	33.0	35.3	46.6
Hardness	9.5	-	11.1	12.3	18.1
TDS	19	-	20.7	21.7	27.9
Total alkalinity	8.7	-	-	8.9	13.1
HCO_3 alkalinity	8.7	-	-	8.9	13.1
Calcium	2.39	-	2.6	3.0	4.7
Potassium	0.58	-	-	0.59	0.64
Magnesium	0.93	-	1.1	1.2	1.6
T. Silicon	0.2	-	-	-	0.41
D. Silicon	0.180	-	-	-	0.36

Wally Lake

Parameter	Trigger	Threshold	2024 Mean
Conductivity	36.6	-	53.5
Hardness	16.7	-	22.2
TDS	25.3	-	36.0
Total alkalinity	17.8	-	17.9
HCO_3 alkalinity	17.8	-	17.9
Calcium	4.9	-	5.9
Magnesium	1.36	-	1.8
Sodium	0.72	-	0.74
Reactive silica	1.08	-	1.6
T. Silicon	0.65	-	0.78
D. Silicon	0.67	-	0.74

Notes:

"-" indicates no threshold available, and/or mean annual concentration was < the trigger value.
Reported mean values are all in units of mg/L except for conductivity (µS/cm).

Table 4-4. Results of BACI tests for selected water variables at Meadowbank study areas in 2024.

Parameter	Test Area	n(B)	n(A)	Estimate	SE	P-value[1]	Proportional change		
							exp(Est)	LCI	UCI
Conductivity	TPN	6	5	0.46	0.041	**< 0.001**	1.6	1.4	1.7
	TPE	8	5	0.51	0.046	**< 0.001**	1.7	1.5	1.8
	SP	5	5	0.38	0.040	**< 0.001**	1.5	1.3	1.6
Hardness	TPN	6	5	0.41	0.043	**< 0.001**	1.5	1.4	1.7
	TPE	8	5	0.50	0.048	**< 0.001**	1.7	1.5	1.8
	SP	5	5	0.38	0.046	**< 0.001**	1.5	1.3	1.6
TDS	TPN	6	5	0.31	0.11	**0.010**	1.4	1.1	1.8
	TPE	8	5	0.40	0.066	**< 0.001**	1.5	1.3	1.7
	SP	5	5	0.57	0.12	**0.00063**	1.8	1.4	2.3
Total.Alkalinity	TPE	7	5	0.35	0.049	**< 0.001**	1.4	1.3	1.6
	SP	5	5	0.30	0.052	**< 0.001**	1.3	1.2	1.5
Bicarbonate.alkalinity	TPE	7	5	0.35	0.049	**< 0.001**	1.4	1.3	1.6
	SP	5	5	0.30	0.052	**< 0.001**	1.3	1.2	1.5
Calcium	TPN	6	5	0.46	0.044	**< 0.001**	1.6	1.4	1.7
	TPE	8	5	0.55	0.050	**< 0.001**	1.7	1.5	1.9
	SP	5	5	0.39	0.049	**< 0.001**	1.5	1.3	1.6
Potassium	TPE	8	5	0.23	0.029	**< 0.001**	1.3	1.2	1.3
	SP	5	5	0.29	0.053	**< 0.001**	1.3	1.2	1.5
Magnesium	TPN	6	5	0.36	0.046	**< 0.001**	1.4	1.3	1.6
	TPE	8	5	0.42	0.048	**< 0.001**	1.5	1.4	1.7
	SP	5	5	0.36	0.045	**< 0.001**	1.4	1.3	1.6

Notes:
1. Bolded P-values are statistically significant (p <0.05).
Test area = area compared to control (INUG).
N(B) = number of paired months in the *before* period.
N(A) = number of paired months in the *after* period (i.e., in 2024).
Estimate = BACI model estimate of the 2024 change in mean for log-transformed data.
SE = standard error of the estimate.
DF = degrees of freedom.
P-value = one-tailed test of the null hypothesis (no change or a decrease in mean [opposite for lower pH trigger]).
Exp(Est.) = estimated proportional change.
LCI = lower 95% confidence interval; UCI = upper 95% confidence interval.

Table 4-5. Sampling effort and frequency assessment results for the Meadowbank study area lakes, 2024.

Areas	Area Designation	Triggers Exceeded?	Minor Changes [1]		Moderate Changes [2]		Major Changes [3]		Plan for 2025
		Yes/No	Yes/No	Parameters	Yes/No	Parameters	Yes/No	Parameters	
Sampling Strategy for Reference Areas									
INUG	Ref	Yes	Yes	T.&D. Silicon	No	-	No	-	Full CREMP (reference area)
PDL	Ref	Yes	Yes	Cond., Hard., Alkalinity (HCO_3 & Total), Ca, Mg, TDS	Yes	T. Phosphorus	No	-	Full CREMP (reference area)
Sampling Strategy for Near-field Areas									
TPE	NF	Yes	Yes	Cond., Hard., Alkalinity (HCO_3 & Total), Ca, K, Mg, TDS	No	-	No	-	Full CREMP (near-field area)
TPN	NF	Yes	Yes	Cond., Hard., Ca, Mg, TDS	No	-	No	-	Full CREMP (near-field area)
SP	NF	Yes	Yes	Cond., Hard., Alkalinity (HCO_3 & Total), Ca, K, Mg, TDS, T.&D. Silicon	No	-	No	-	Full CREMP (near-field area)
WAL	NF	Yes	Yes	Cond., Hard., Alkalinity (HCO_3 & Total), Ca, Mg, Na, TDS, Reactive silica, T.&D. Silicon	No	-	No	-	Full CREMP (near-field area)
Sampling Strategy for Mid-field and Far-field Areas									
TE	MF	-	-	-	-	-	-	-	Sampling suspended
TEFF	FF	-	-	-	-	-	-	-	Sampling suspended
TPS	MF	-	-	-	-	-	-	-	Sampling suspended

Notes:

1. Minor = exceedance of the early warning trigger values for parameters without effects-based threshold values.
2. Moderate = exceedance of the early warning trigger values for parameters with effects-based thresholds.
3. Major = exceedance of the effects-based threshold values.

NA = Routine water sampling at MF and FF areas was not required in 2024. Sampling will be conducted at MF and FF areas if monitoring data from the NF areas suggest there are "moderate" changes in water quality. See *CREMP Plan Update* for details (Azimuth, 2022b).

Table 4-6. Meadowbank study area FEIS screening predictions compared to 2024 mean concentrations.

	Meadowbank Study Area							
	FEIS Screening Prediction				2024 Annual Mean			
Parameter	**TPN**	**TPE**	**SP**	**WAL**	**TPN**	**TPE**	**SP**	**WAL**
Hardness	5.7	5.7	8.9	17.2	11.1	12.3	18.1	22.2
Total Alkalinity	4.1	4.1	7.0	13.2	-	8.9	13.1	17.9
HCO3 alkalinity	4.1	4.1	7.0	13.2	7.8	8.8	13.0	17.9
Calcium	1.3	1.3	2.3	4.7	2.6	3.0	4.7	5.9
Magnesium	0.60	0.60	0.80	1.3	1.1	1.2	1.6	1.8
Sodium	2.0	2.0	2.0	2.0	-	-	-	0.74
Silicon (T)	0.010	0.010	0.010	0.040	-	-	0.41	0.78
Silicon (D)	0.010	0.010	0.010	0.040	0.090	0.11	0.35	0.74

Notes:
Reported mean concentrations are all in units of mg/L.
"-" indicates mean annual concentration was < the trigger value.

Figure 4-7. Conventional parameters in water samples from Meadowbank study area lakes since 2006.

Note: Conductivity data from 2014 should be interpreted with caution (See Azimuth [2015c] for more details).

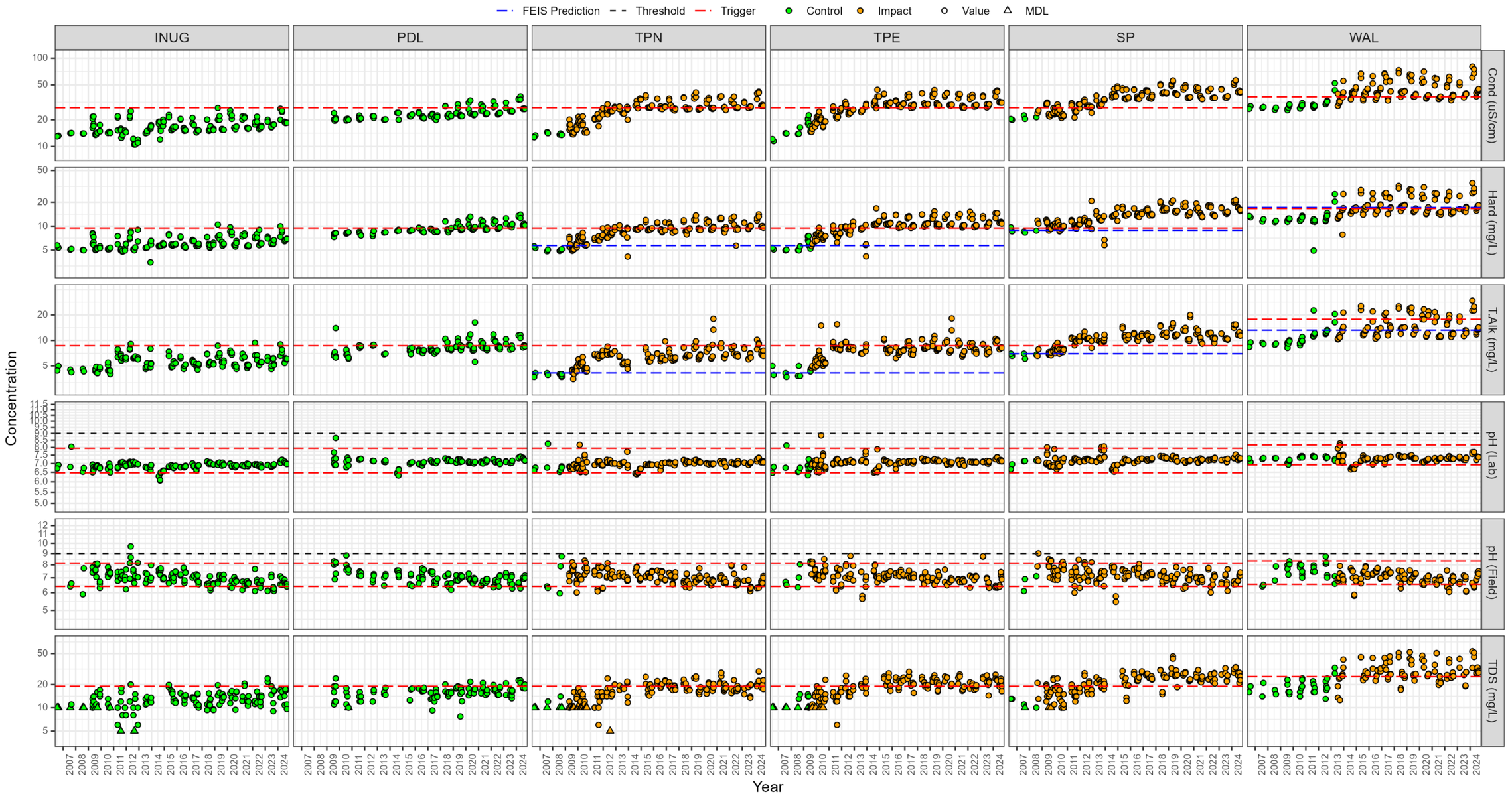


Figure 4-8. Major ions in water samples from Meadowbank study area lakes since 2006.

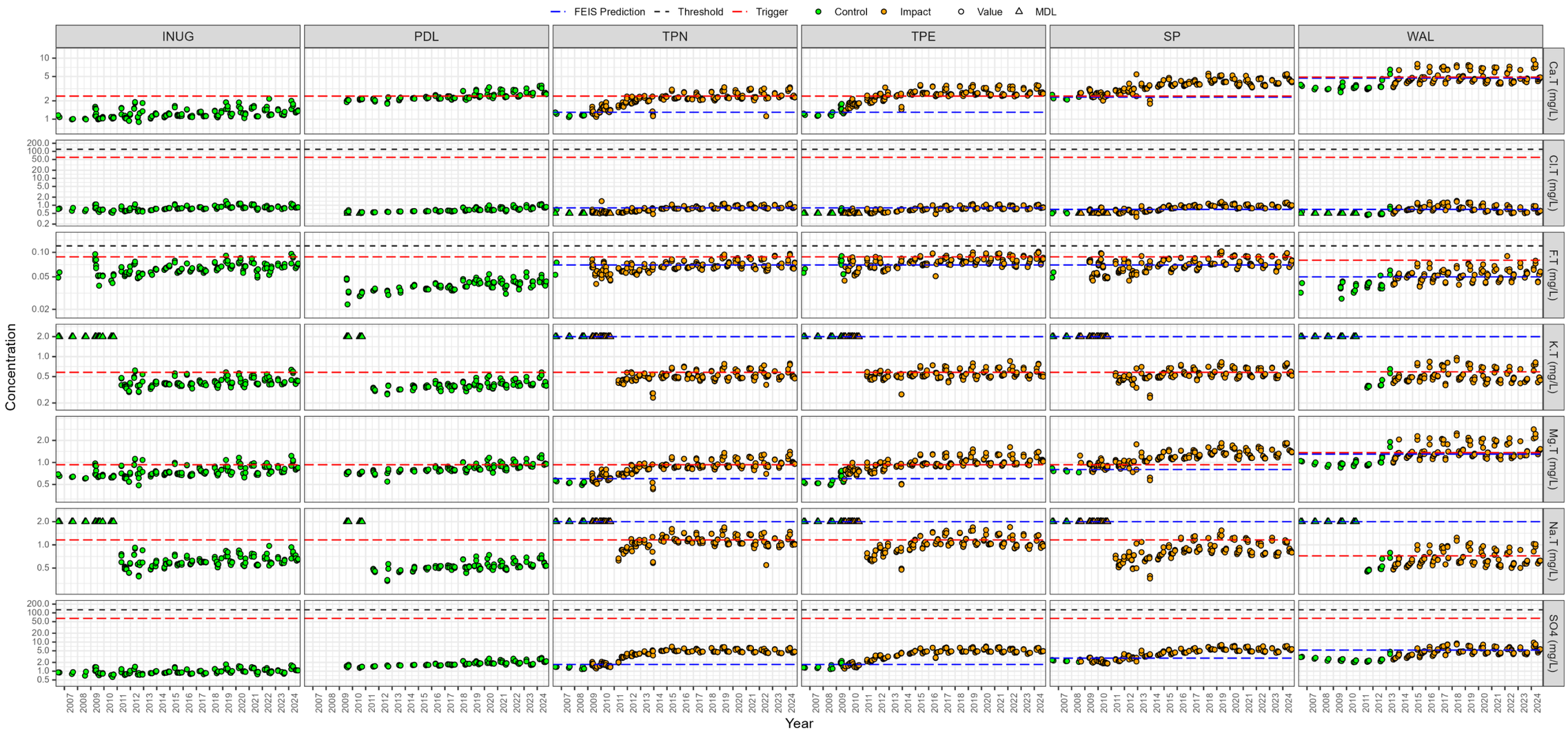


Figure 4-9. Nutrients in water samples from Meadowbank study area lakes since 2006.

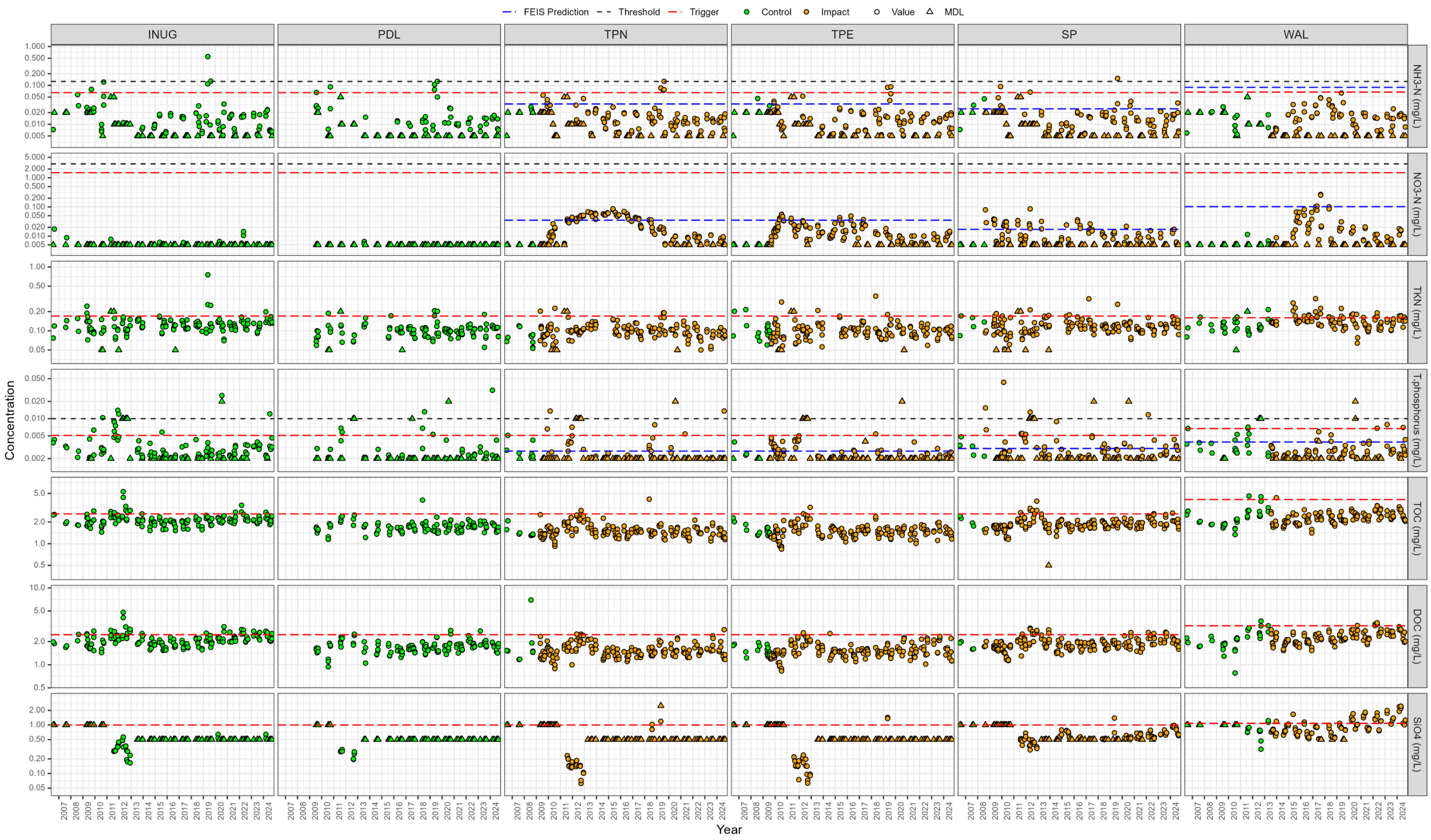


Figure 4-10. Metals in water samples from Meadowbank study area lakes since 2006.

Note: The FEIS prediction is equal to the threshold value for total arsenic at WAL.

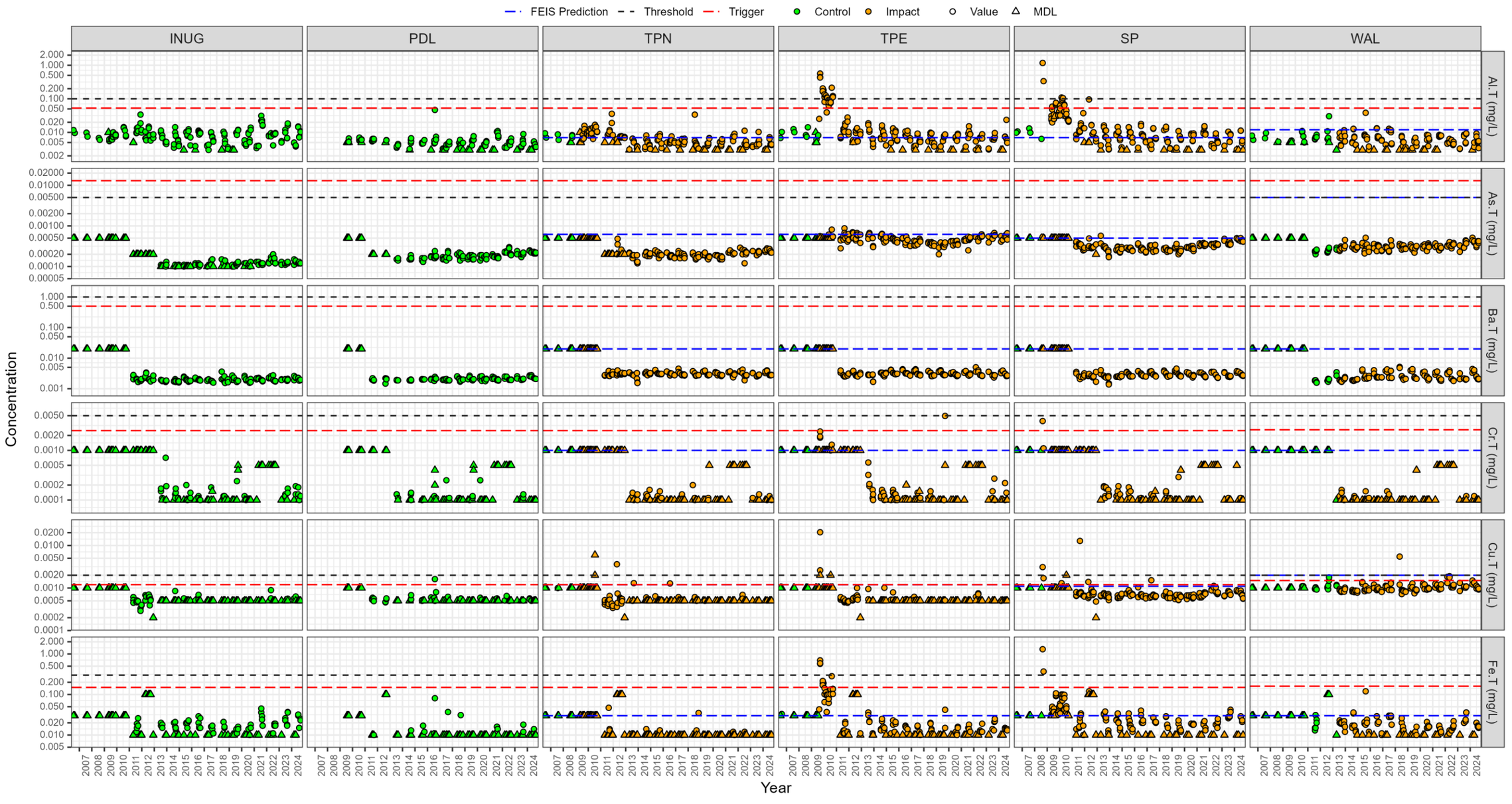


Figure 4-11. Metals in water samples from Meadowbank study lakes since 2006.

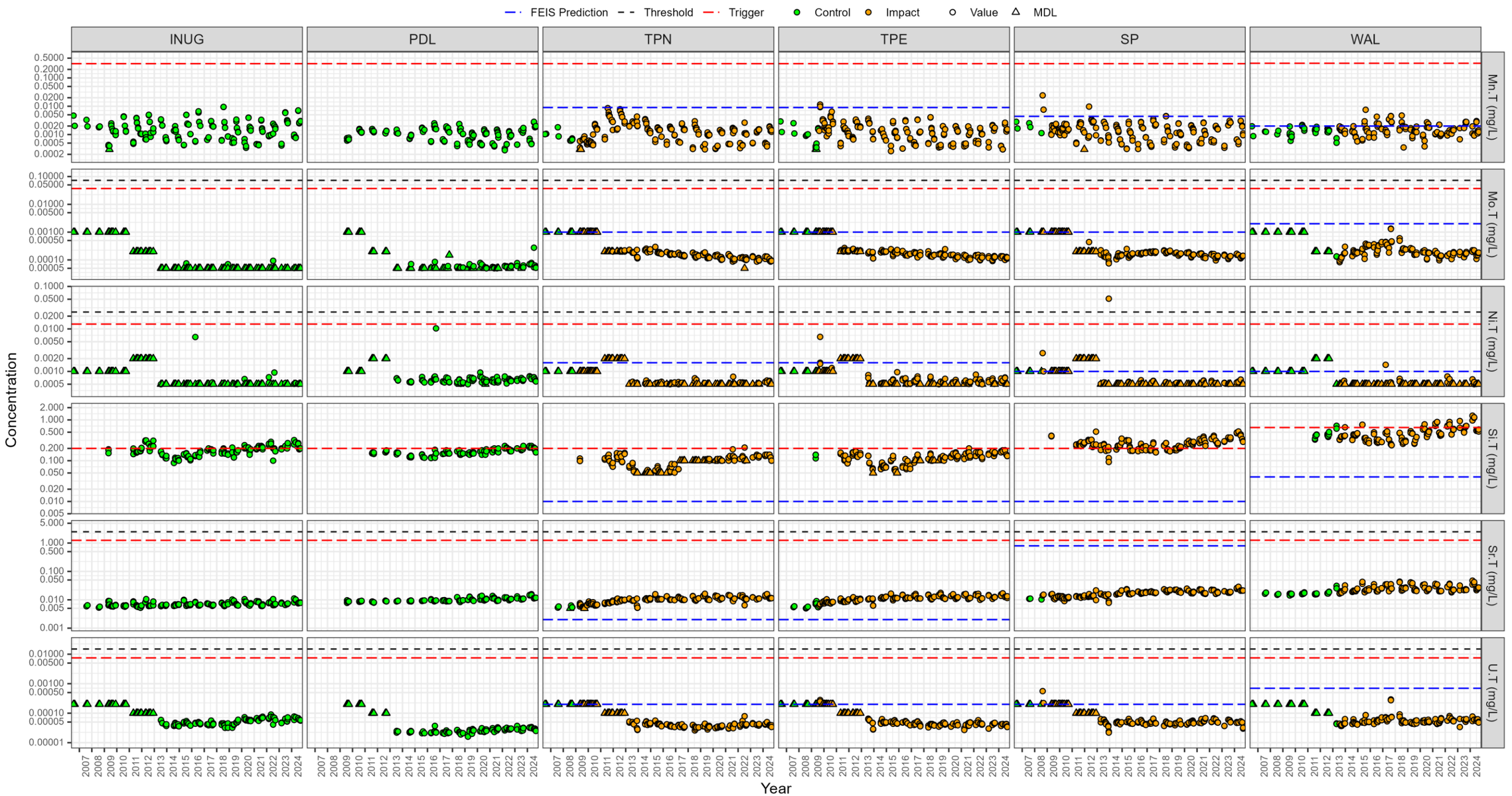
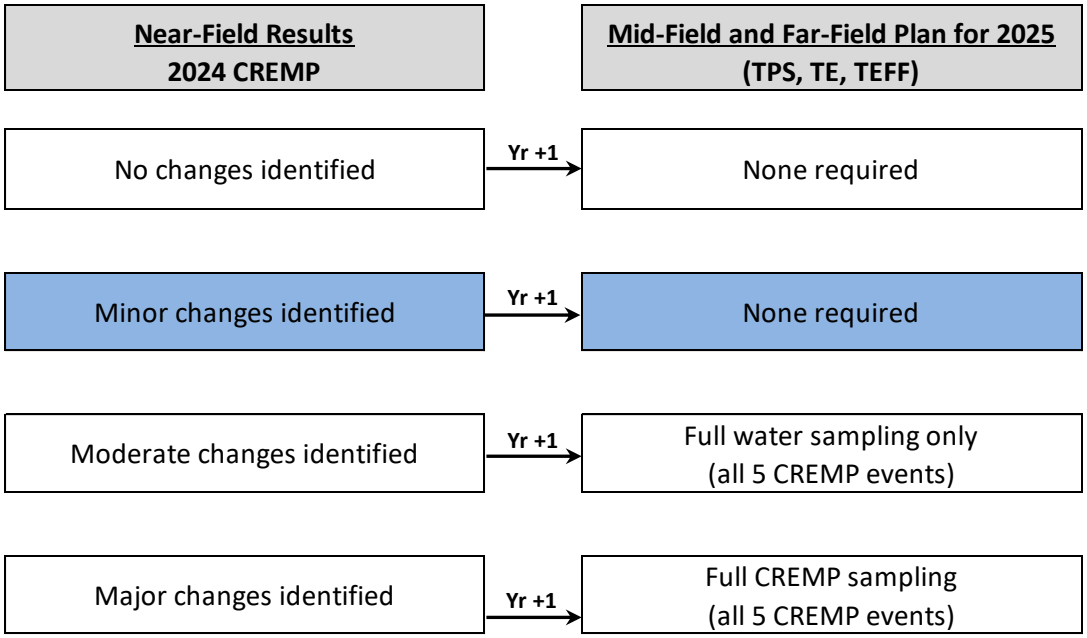


Figure 4-12. Flow chart showing sampling effort and frequency plan for mid-field and far-field sampling in 2024.

Note: Blue-shaded cells show the linkage between 2024 CREMP results and the sampling effort and frequency for mid-field and far-field sampling in 2025. *Minor changes* refer to statistically significant increased concentrations for parameters without effects-based threshold values that exceed the early warning trigger values. Refer to **Section 2.4** for more information.



Phytoplankton Tables and Figures

Table 4-7. Results of the BACI test for phytoplankton variables at Meadowbank areas, 2024.

Parameter Measured	Test Area	n(B)	n(A)	Estimate	SE	P-value*	Effect size (%)		
							ES	LCI	UCI
Total Biomass	TPN	7	3	-0.24	0.18	0.215	-22	-48	19
	TPE	8	3	-0.21	0.21	0.340	-19	-49	30
	SP	6	3	-0.36	0.25	0.192	-30	-62	26
	WAL	19	3	-0.63	0.26	**0.026**	-47	-69	-8
Taxa Richness	TPN	7	3	-0.15	0.07	**0.067**	-14	-27	1
	TPE	8	3	-0.33	0.05	**<0.001**	-28	-36	-19
	SP	6	3	-0.24	0.07	**0.010**	-21	-33	-7
	WAL	19	3	-0.42	0.08	**<0.001**	-34	-45	-22

Notes:

*** Bolded** values are P-values < 0.1.

Shaded cells indicate positive (increased) or negative (reduced) effect sizes of 20% or more.

Test area = area compared to control (INUG).

n(B) = number of months in the "before" period.

n(A) = number of months in the "after" period (i.e., in 2024).

Estimate = BACI model estimate of the 2024 change in mean for log-transformed data.

SE = standard error of the estimate.

P-value = two-tailed test of the null hypothesis of no change.

ES = estimated effect size (i.e., 100%*(exp[Estimate]-1)).

LCI = lower 95% confidence interval; UCI = upper 95% confidence interval.

Figure 4-13. Chlorophyll-a (µg/L) in water samples from Meadowbank study area lakes since 2006.

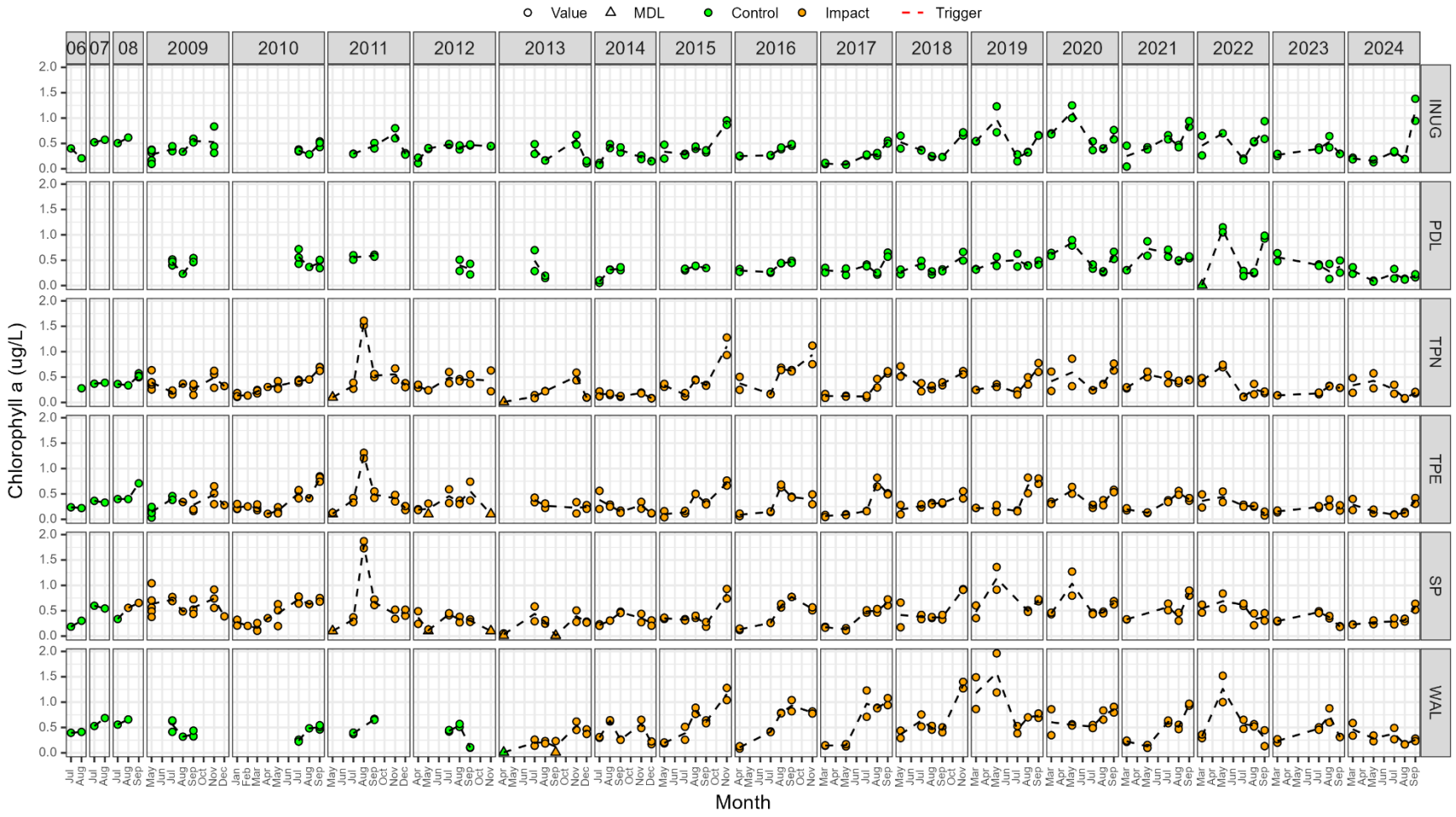


Figure 4-14. Total phytoplankton biomass (mg/m^3) from Meadowbank study area lakes since 2006.

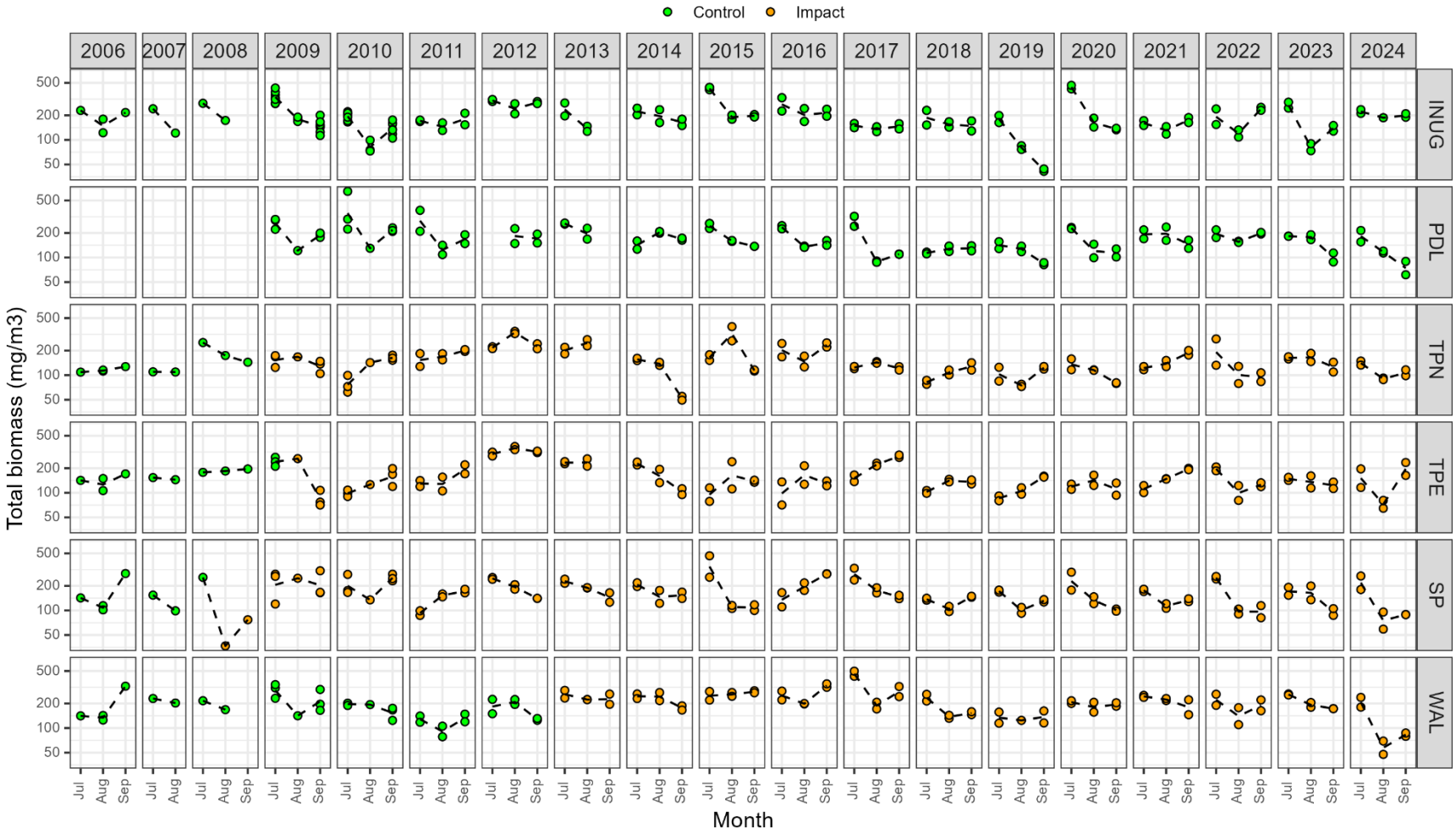


Figure 4-15. Phytoplankton biomass (mg/m^3) by major taxa from Meadowbank study area lakes since 2006.

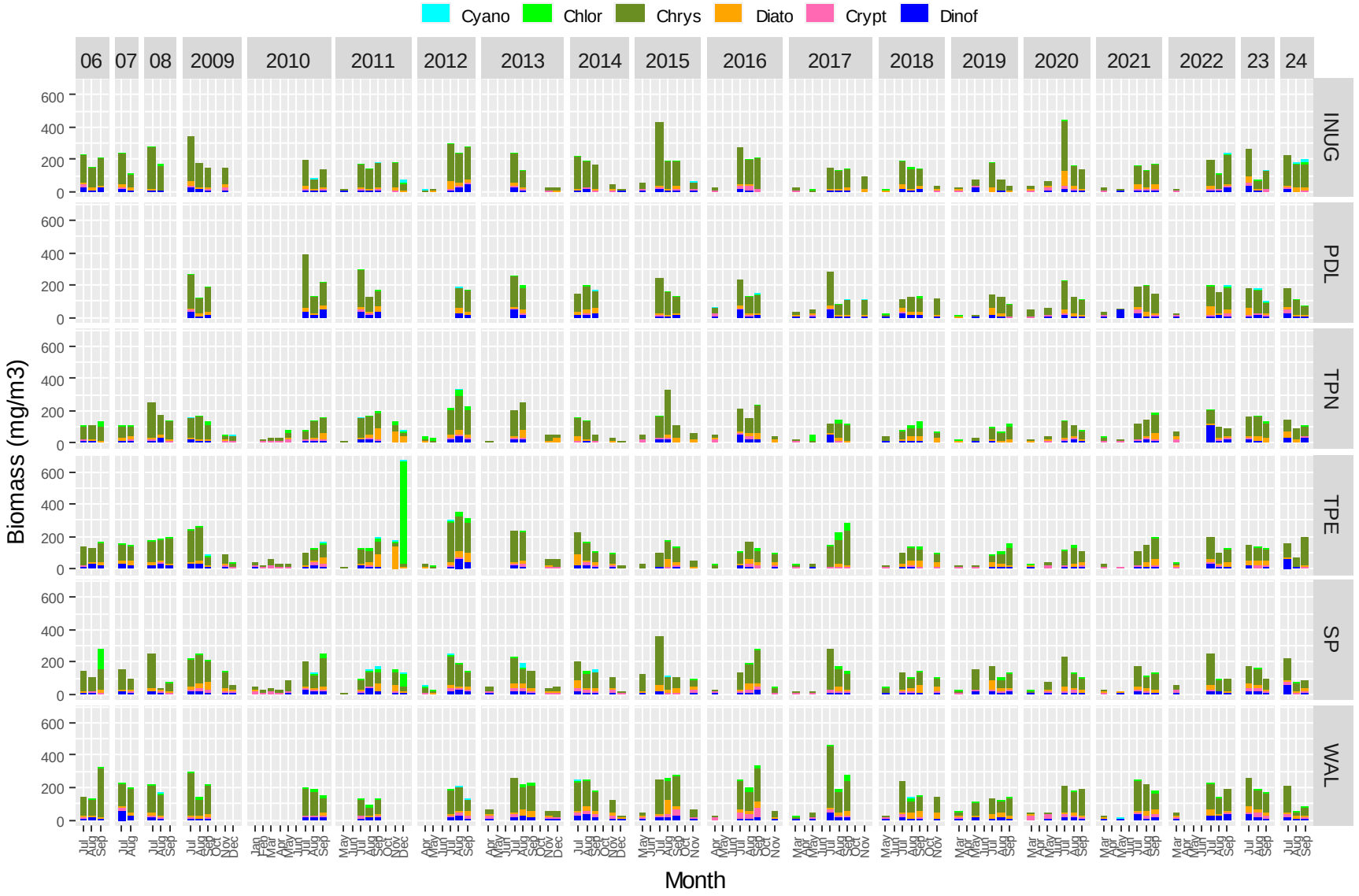


Figure 4-16. Relative phytoplankton biomass by major taxa group from Meadowbank study area lakes since 2006.

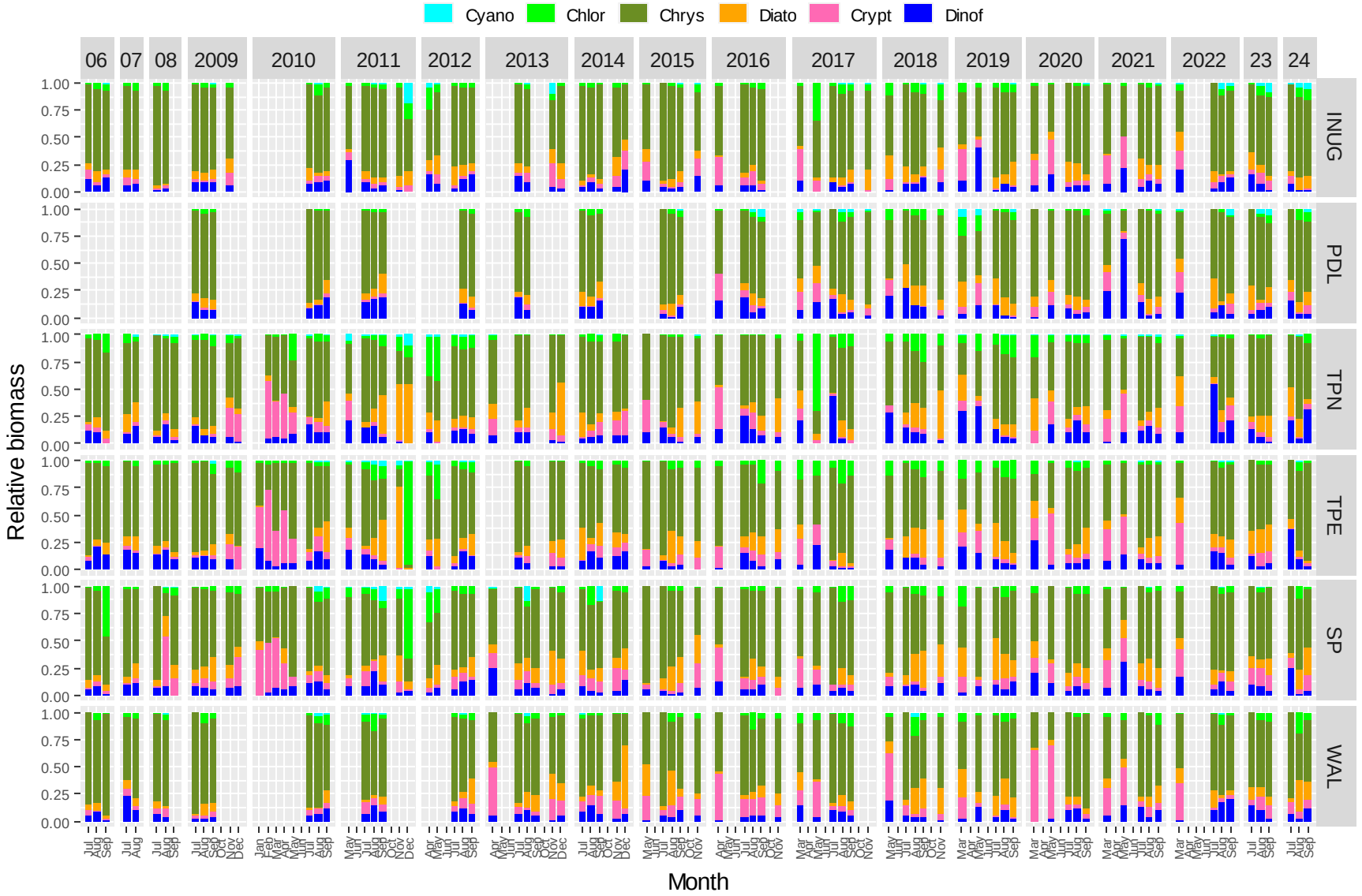
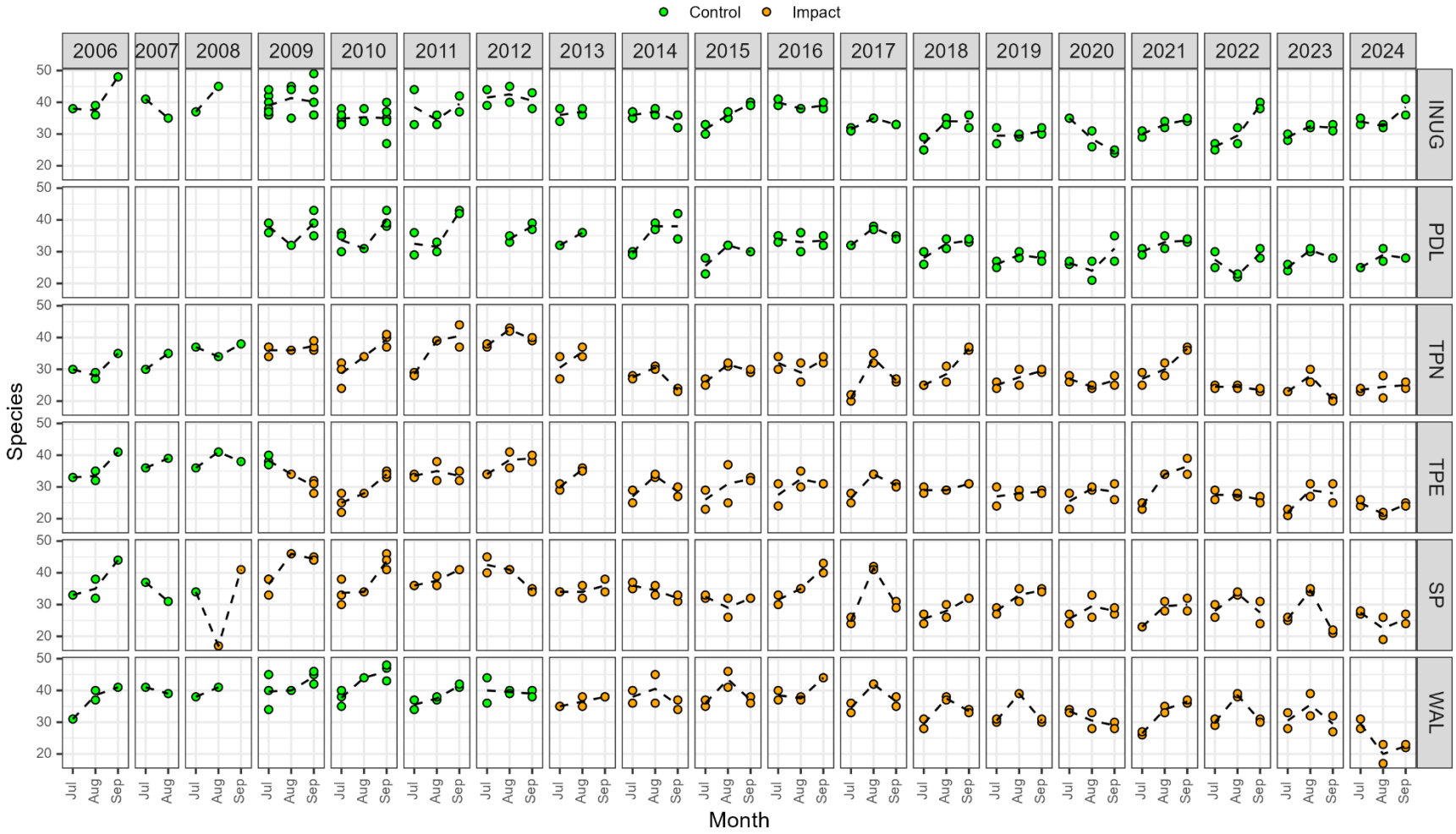


Figure 4-17. Phytoplankton species richness from Meadowbank study area lakes since 2006.



Sediment Chemistry Tables and Figures

Figure 4-18. TOC (%) in sediment from Meadowbank study lakes since 2006.

Notes: In 2021, a batch of sediment samples were not analyzed due to a sample receipt error by the laboratory. Missing results in 2021 correspond to samples that were discarded prior to analysis. No TOC was analyzed for INUG and PDL in 2022 due to high moisture content in the samples.

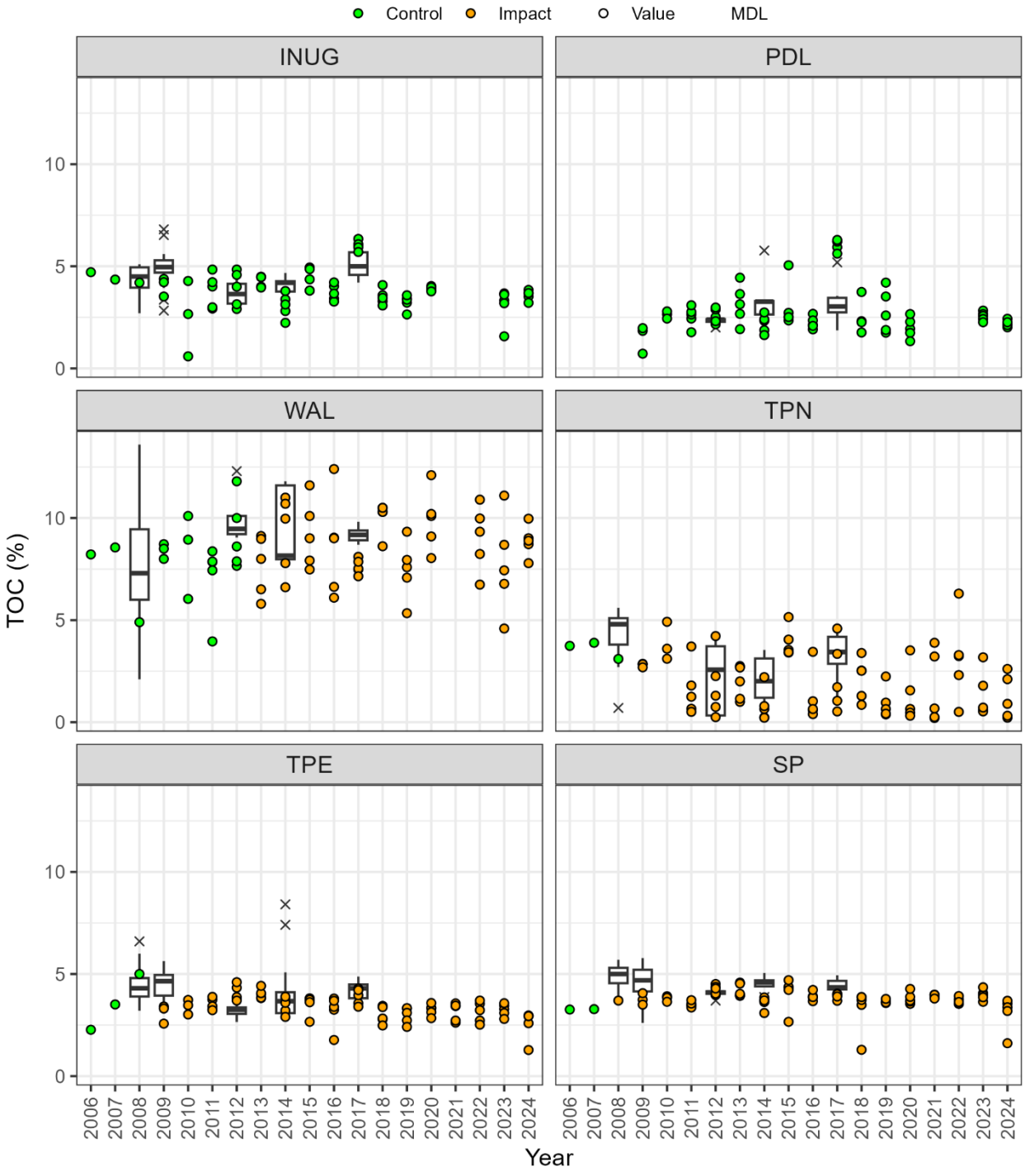
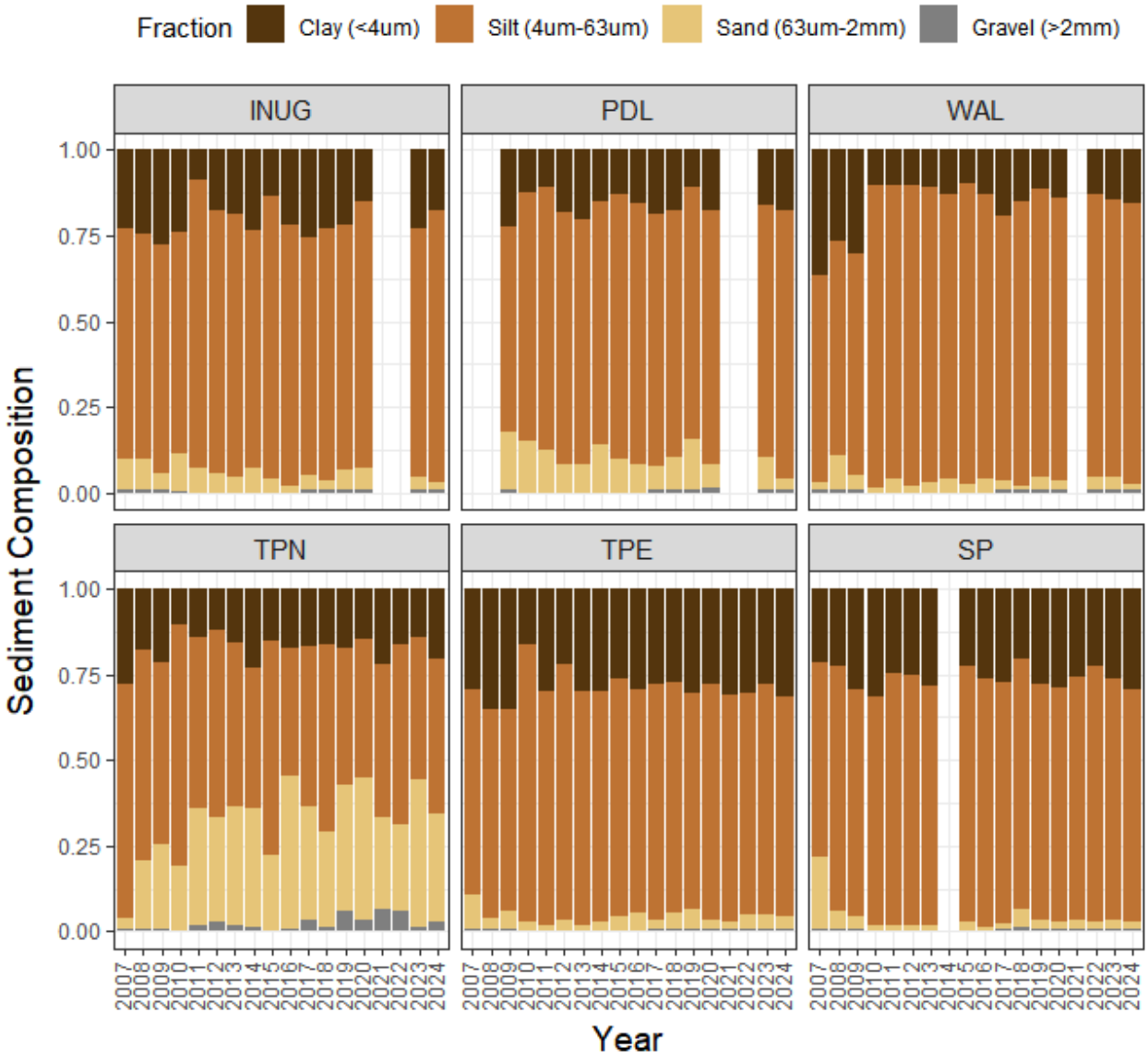


Figure 4-19. Sediment grain size in sediment samples from Meadowbank study lakes since 2007.

Notes: No grain size was analyzed for INUG and PDL in 2022 due to high moisture content in the samples. Grain size was not analyzed in WAL, PDL, or INUG in 2021 as the sediment was discarded prior to analysis (see **Appendix A2** in Azimuth, 2023a).



Benthic Invertebrate Tables and Figures

Table 4-8. Geometric means for total abundance and total richness, Meadowbank study lakes.

Geometric means for total abundance (no. of organisms/m^2)																			
Test Area	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
INUG	731 (17)	975 (14)	1300 (10)	1129 (11)	628 (18)	881 (15)	1042 (13)	1975 (3)	621 (19)	1648 (6)	2100 (1)	1712 (4)	1497 (7)	1452 (8)	2055 (2)	1398 (9)	1070 (12)	1656 (5)	843 (16)
PDL	NA	NA	NA	1522 (1)	776 (13)	927 (10)	942 (9)	1279 (3)	473 (16)	1127 (4)	1373 (2)	748 (15)	779 (12)	990 (6)	951 (8)	829 (11)	963 (7)	1045 (5)	753 (14)
WAL	12894 (2)	4357 (6)	1057 (18)	1834 (12)	1727 (14)	800 (19)	1874 (11)	1445 (17)	2222 (10)	1568 (15)	14253 (1)	4942 (5)	12035 (3)	1761 (13)	6117 (4)	1524 (16)	4065 (7)	2798 (9)	3574 (8)
TPN	NA	1359 (6)	864 (13)	1214 (8)	1029 (11)	498 (17)	1141 (9)	1407 (5)	373 (18)	3025 (1)	1696 (4)	1309 (7)	2051 (3)	594 (15)	1075 (10)	2283 (2)	917 (12)	610 (14)	522 (16)
TPE	3220 (6)	1563 (18)	5556 (1)	1663 (16)	1126 (19)	1584 (17)	3915 (2)	2244 (13)	2827 (8)	2765 (10)	2787 (9)	3147 (7)	2485 (11)	3490 (4)	3224 (5)	3505 (3)	2379 (12)	1767 (14)	1670 (15)
SP	619 (16)	842 (12)	395 (18)	771 (15)	241 (19)	563 (17)	1169 (10)	2279 (2)	2796 (1)	1927 (4)	1420 (6)	2058 (3)	1298 (8)	842 (13)	1631 (5)	1222 (9)	1055 (11)	1299 (7)	829 (14)

Geometric means for total richness (no. of taxa)																			
Test Area	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
INUG	11 (17)	12 (12)	14 (6)	14 (7)	9 (19)	11 (16)	11 (15)	16 (3)	10 (18)	13 (10)	16 (2)	14 (5)	15 (4)	14 (8)	17 (1)	13 (9)	13 (11)	12 (13)	12 (14)
PDL	NA	NA	NA	11 (1)	9 (9)	10 (5)	8 (12)	10 (3)	5 (16)	9 (6)	11 (2)	10 (4)	6 (15)	9 (10)	9 (11)	8 (14)	9 (7)	9 (8)	8 (13)
WAL	12 (8)	14 (5)	8 (18)	11 (13)	11 (16)	7 (19)	12 (9)	11 (14)	11 (12)	11 (17)	15 (3)	14 (6)	15 (2)	12 (11)	16 (1)	12 (10)	14 (7)	11 (15)	14 (4)
TPN	NA	10 (10)	8 (17)	10 (12)	11 (8)	8 (16)	11 (9)	13 (3)	6 (18)	11 (7)	13 (4)	13 (5)	13 (2)	9 (14)	10 (11)	15 (1)	12 (6)	9 (15)	9 (13)
TPE	9 (19)	11 (16)	14 (5)	12 (14)	10 (17)	10 (18)	13 (11)	14 (6)	11 (15)	15 (4)	14 (7)	13 (10)	13 (9)	16 (1)	16 (2)	15 (3)	13 (8)	13 (12)	13 (13)
SP	7 (18)	9 (15)	8 (16)	7 (17)	5 (19)	10 (14)	13 (6)	11 (10)	14 (4)	13 (5)	16 (1)	12 (7)	11 (12)	11 (11)	15 (2)	14 (3)	11 (13)	12 (8)	11 (9)

Notes:

1. Total abundance in organisms/m^2.

Rank order of abundance and richness shown in parentheses.

Red vertical lines mark the year that area designations switched from *control* to *impact*.

NA = Benthic invertebrate sampling was not completed for the given area/year.

Table 4-9. Results of the BACI tests for benthic invertebrate abundance at Meadowbank study lakes.

After Period	Test Area	n(B)	n(A)	Estimate	SE	P-value*	Effect size (%)		
							ES	LCI	UCI
2024	TPN	2	1	-0.44	0.52	0.55	-36	-100	49,039
	TPE	3	1	-0.44	0.67	0.58	-35	-96	1,042
	SP	2	1	0.14	0.31	0.73	15	-98	5,527
	WAL	7	1	0.60	0.99	0.57	82	-84	1,926
2023-24	TPN	2	2	-0.70	0.44	0.25	-50	-92	228
	TPE	3	2	-0.74	0.49	0.23	-52	-90	126
	SP	2	2	0.02	0.26	0.93	3	-66	210
	WAL	7	2	0.14	0.70	0.85	15	-78	499
2022-24	TPN	2	3	-0.51	0.39	0.29	-40	-83	109
	TPE	3	3	-0.60	0.41	0.22	-45	-82	70
	SP	2	3	0.06	0.24	0.81	7	-51	130
	WAL	7	3	0.26	0.56	0.65	30	-64	373
2021-24	TPN	2	4	-0.25	0.52	0.66	-22	-82	231
	TPE	3	4	-0.49	0.36	0.23	-39	-76	55
	SP	2	4	0.05	0.23	0.83	5	-45	101
	WAL	7	4	0.01	0.50	0.99	1	-68	215

Notes:

* **Bolded & underlined** values are P-values < 0.1.

Shaded cells indicate positive (increased) or negative (reduced) effect sizes of 20% or more.

Test area = area compared to control (INUG).

n(B) = number of years in the "before" period.

n(A) = number of years in the "after" period.

Estimate = BACI model estimate of the after-period change in mean for log-transformed data.

SE = standard error of the estimate.

P-value = two-tailed test of the null hypothesis of no change.

ES = estimated effect size (i.e., 100%*(exp[Estimate]-1)).

LCI = lower 95% confidence interval; UCI = upper 95% confidence interval.

Table 4-10. Results of the BACI tests for benthic invertebrate taxa richness at Meadowbank study area lakes.

After Period	Test Area	n(B)	n(A)	Estimate	SE	P-value*	Effect size (%)		
							ES	LCI	UCI
2024	TPN	2	1	0.14	0.29	0.72	15	-97	4,695
	TPE	3	1	0.13	0.15	0.47	14	-39	113
	SP	2	1	0.32	0.21	0.37	38	-90	1,832
	WAL	7	1	0.24	0.31	0.46	27	-40	170
2023-24	TPN	2	2	0.12	0.22	0.64	13	-56	186
	TPE	3	2	0.13	0.12	0.36	13	-22	65
	SP	2	2	0.32	0.17	0.20	38	-34	188
	WAL	7	2	0.11	0.22	0.64	11	-34	87
2022-24	TPN	2	3	0.20	0.19	0.37	22	-33	123
	TPE	3	3	0.13	0.11	0.28	14	-15	53
	SP	2	3	0.29	0.15	0.15	33	-17	113
	WAL	7	3	0.13	0.18	0.49	14	-25	72
2021-24	TPN	2	4	0.28	0.19	0.20	33	-21	123
	TPE	3	4	0.15	0.10	0.19	16	-10	50
	SP	2	4	0.32	0.14	**0.08**	37	-6	101
	WAL	7	4	0.08	0.16	0.62	8	-24	54

Notes:

* **Bolded & underlined** values are P-values < 0.1.

Shaded cells indicate positive (increased) or negative (reduced) effect sizes of 20% or more.

Test area = area compared to control (INUG).

n(B) = number of years in the "before" period.

n(A) = number of years in the "after" period.

Estimate = BACI model estimate of the after-period change in mean for log-transformed data.

SE = standard error of the estimate.

P-value = two-tailed test of the null hypothesis of no change.

ES = estimated effect size (i.e., 100%*(exp[Estimate]-1)).

LCI = lower 95% confidence interval; UCI = upper 95% confidence interval.

Figure 4-20. Benthic invertebrate total abundance (#/m^2) from Meadowbank study area lakes since 2006.

Notes: Meadowbank areas TPS, TE, and TEFF have not been sampled since 2015. For results from these areas from 2006 to 2015 see Azimuth 2021.

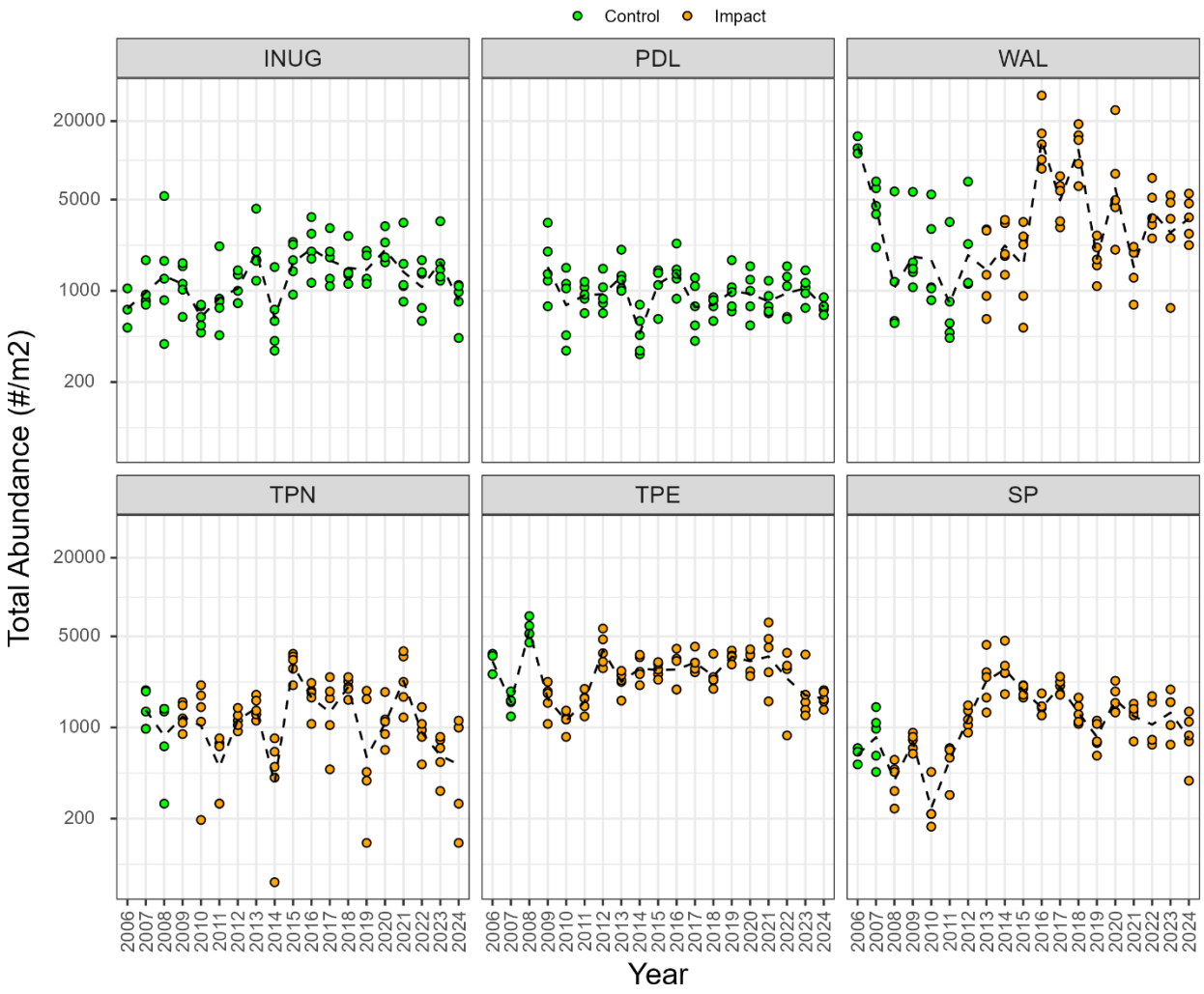


Figure 4-21. Benthic invertebrate abundance (#/m²) by major taxa from Meadowbank study area lakes since 2006.

Notes: Meadowbank areas TPS, TE, and TEFF have not been sampled since 2015. For results from these areas from 2006 to 2015 see Azimuth 2021.

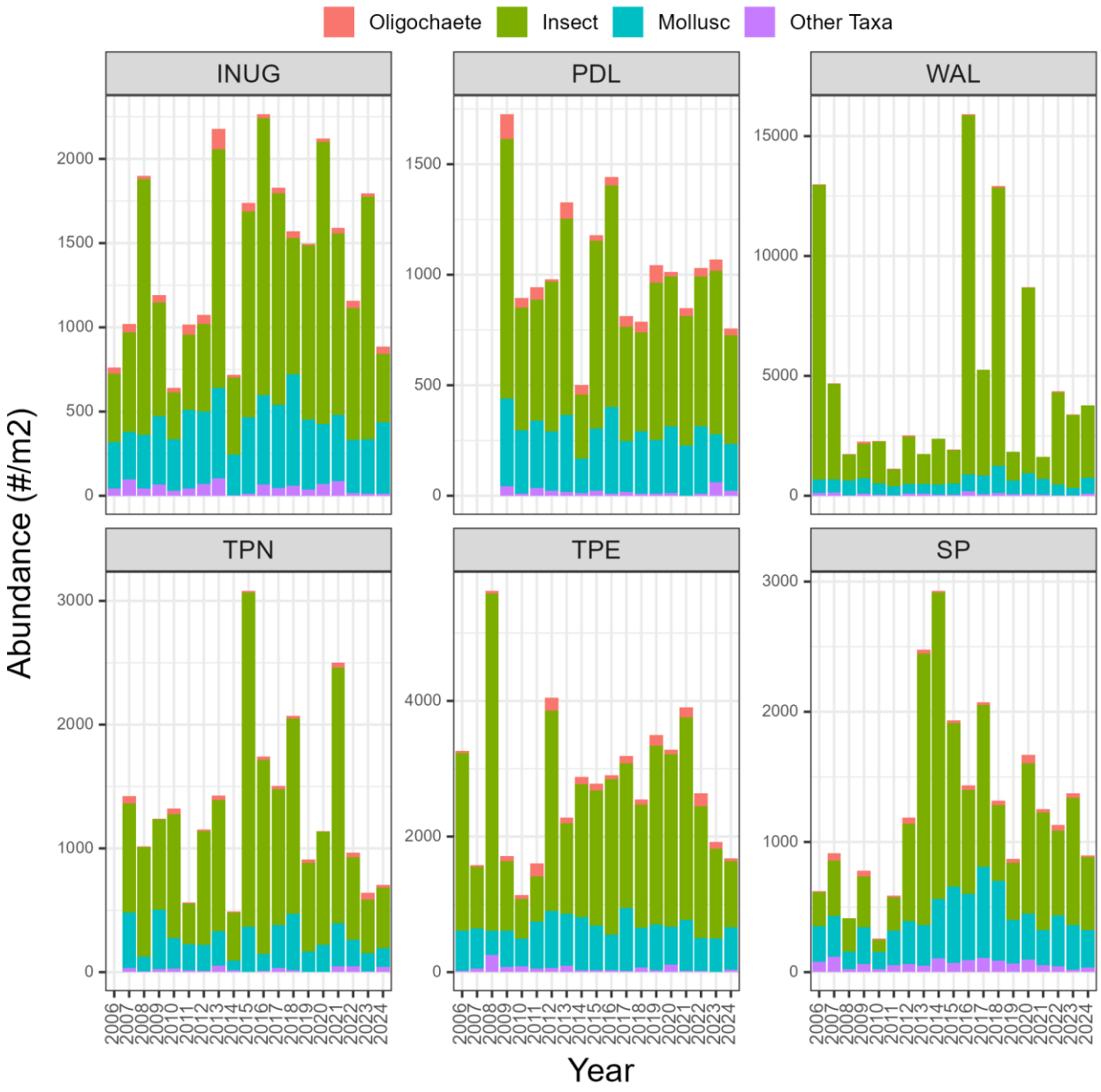


Figure 4-22. Benthic invertebrate relative abundance by major taxa from Meadowbank study area lakes since 2006.

Notes: Meadowbank areas TPS, TE, and TEFF have not been sampled since 2015. For results from these areas from 2006 to 2015 see Azimuth 2021.

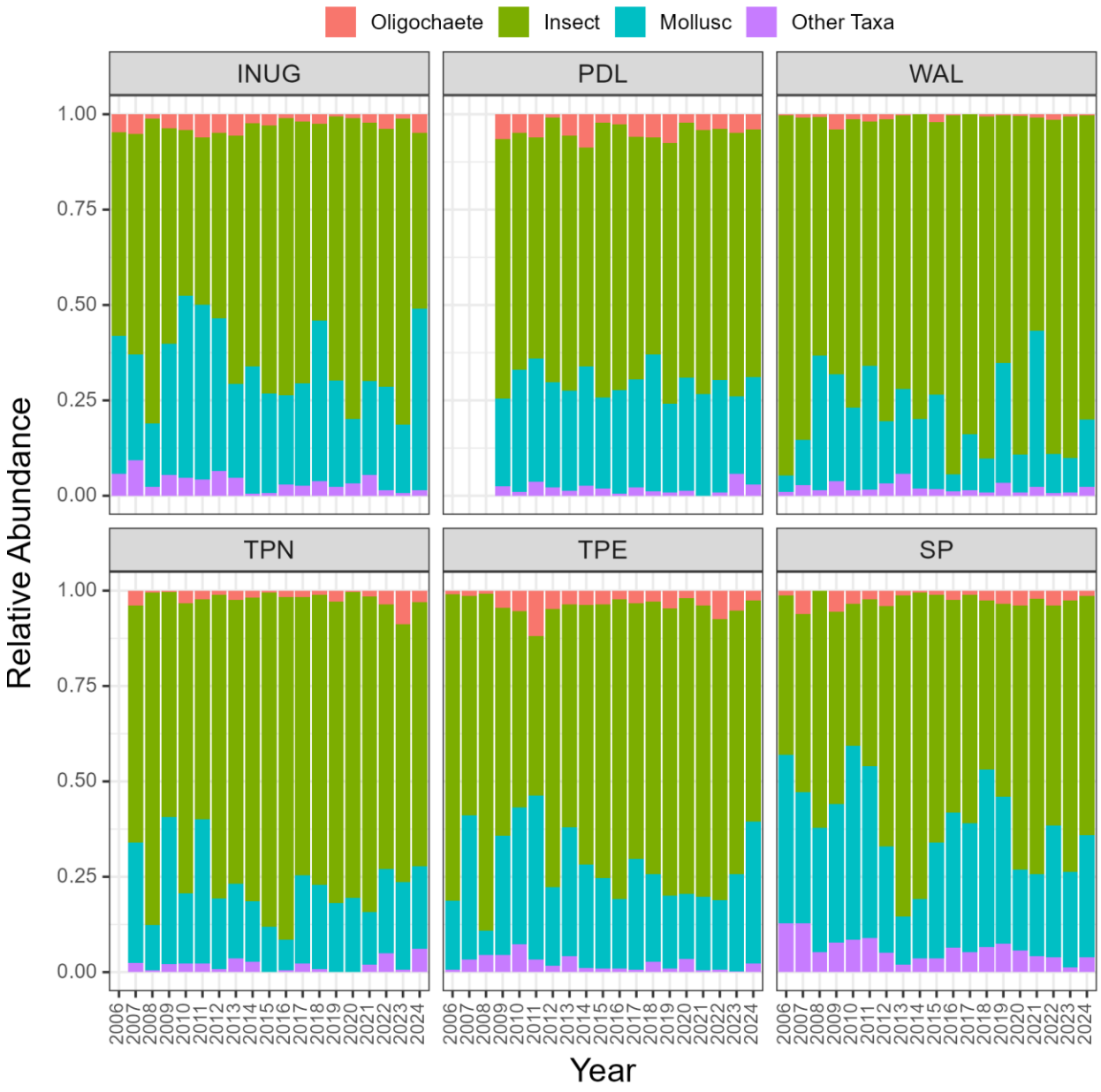


Figure 4-23. Benthic invertebrate total richness (# taxa) from Meadowbank study area lakes since 2006.

Notes: Meadowbank areas TPS, TE, and TEFF have not been sampled since 2015. For results from these areas from 2006 to 2015 see Azimuth 2021.

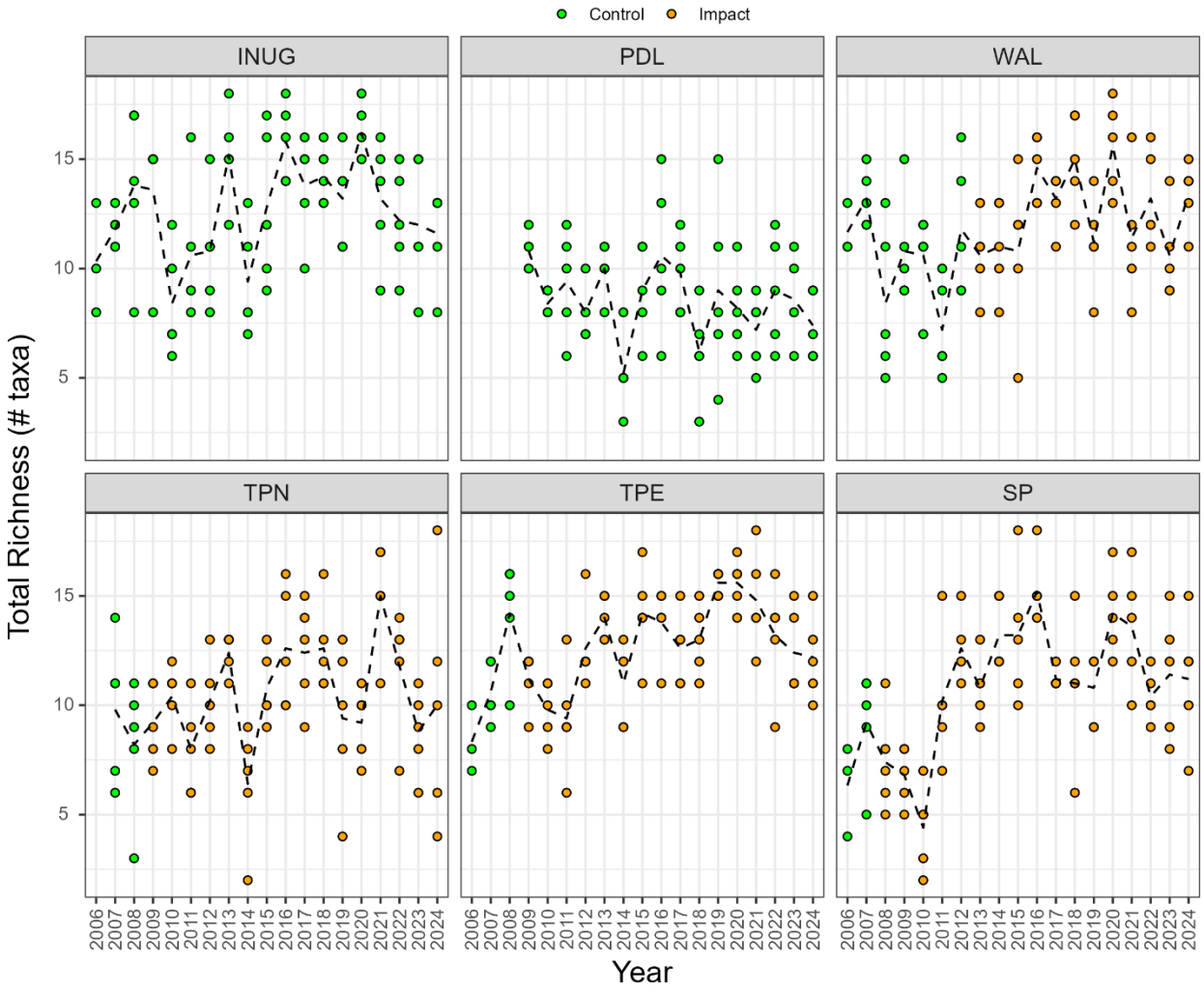


Figure 4-24. Benthic invertebrate richness (# taxa) by major taxa from Meadowbank study area lakes since 2006.

Notes: Meadowbank areas TPS, TE, and TEFF have not been sampled since 2015. For results from these areas from 2006 to 2015 see Azimuth 2021.

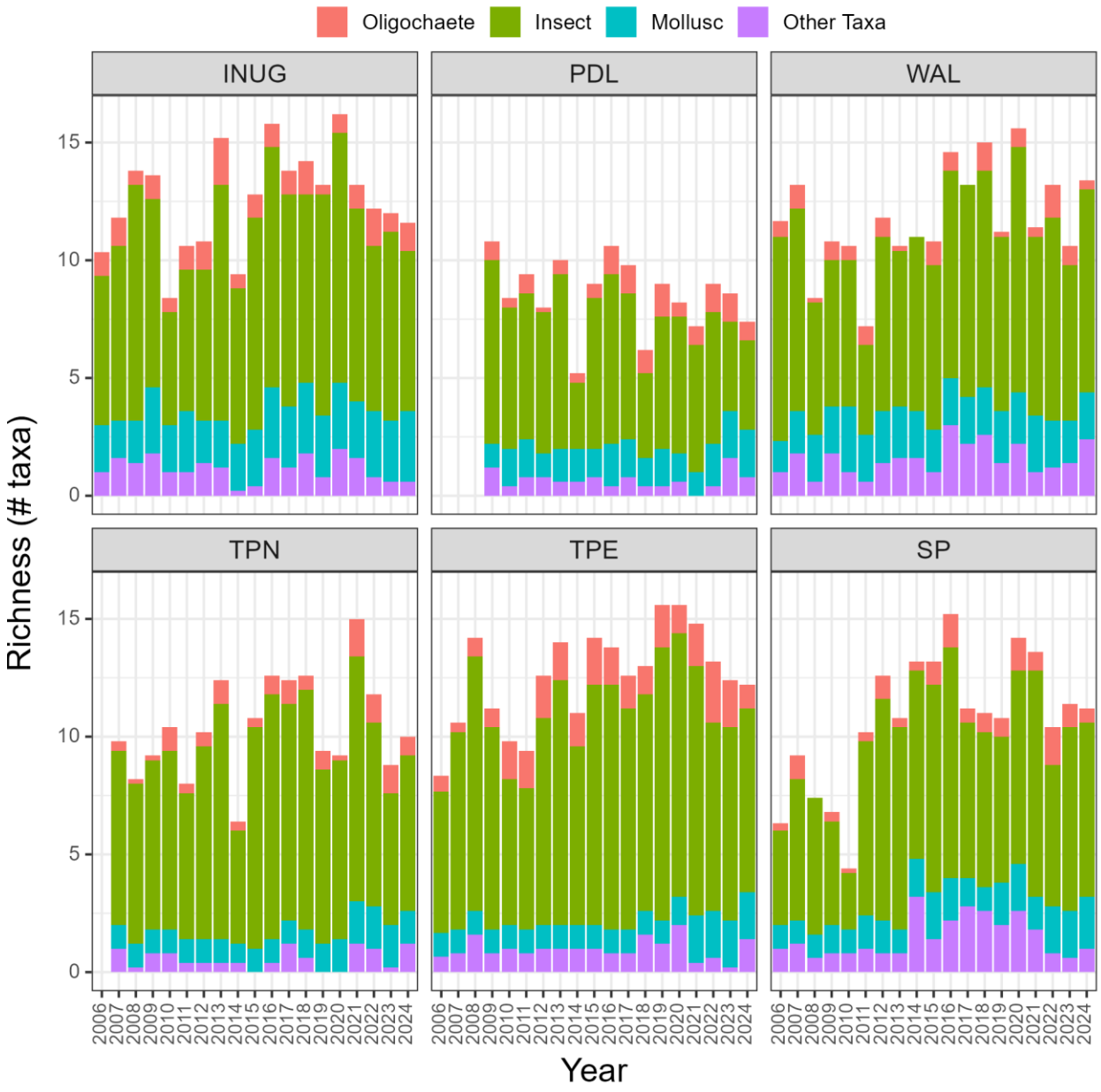
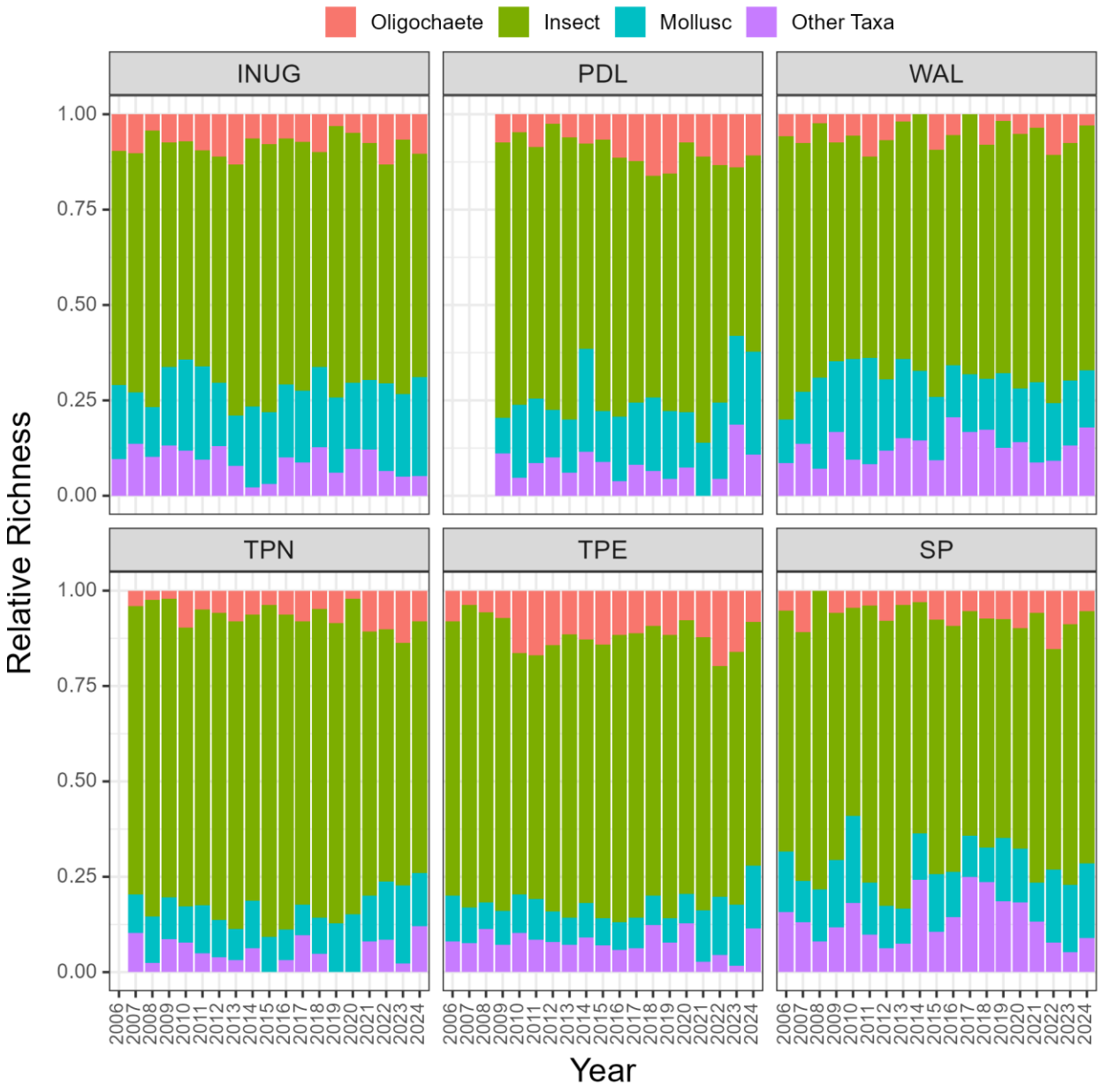


Figure 4-25. Benthic invertebrate relative richness by major taxa from Meadowbank study area lakes since 2006.

Notes: Meadowbank areas TPS, TE, and TEFF have not been sampled since 2015. For results from these areas from 2006 to 2015 see Azimuth 2021.



5 WHALE TAIL

Similar to Meadowbank, the Whale Tail mine (also part of the Meadowbank Complex) and the nearby lakes are located in Nunavut's barren-ground central Arctic region, within the Wager Bay Plateau, an area characterized by continuous permafrost (Campbell et al., 2012). A description of the Meadowbank Complex is provided in **Section 1.2.1**. The Whale Tail area lakes support healthy communities of plankton, benthos, and fish that are typical of oligotrophic Arctic lakes (Azimuth, 2005b). Biological productivity of the lakes is limited by nutrient availability, cold water, and a short growing season.

5.1 Overview of the Whale Tail CREMP

This section presents findings from the 2024 CREMP for the Whale Tail study area lakes. The scope of the 2024 program included water quality, sediment chemistry, phytoplankton community, and benthic invertebrate community monitoring. Relevant figures and tables are organized at the end of the section, by study component.

Six lakes are currently included in the study design for monitoring mining-related changes downstream of the Whale Tail mine:

- **Near-field**: Whale Tail Lake - South Basin (WTS), Kangislulik Lake[25] (KAN), and Nemo Lake (NEM);
- **Mid-field**: Lake A20 and Lake A76; and
- **Far-field**: Lake DS1.

INUG and PDL are the primary reference areas for the Whale Tail CREMP. Water sampling locations for 2024 are shown in **Figure 5-1**. Sediment and benthic invertebrate sampling areas are shown in **Figure 5-2**.

All lakes in the Whale Tail study area, except Nemo Lake, are part of the *A* Watershed, which flows southeast to northwest and drains into Amur Lake (DS1). Nemo Lake lies north of the Whale Tail mine in Watershed *C*, separated from WTS and KAN by a drainage divide to the north of Whale Tail Lake.

The construction of the Whale Tail Dike in 2018 to develop the Whale Tail Pit deposit altered the flow path and hydrology south of Whale Tail Lake. Before the dike's construction, water flowed from Lake A20 through WTS, KAN, Lake A76, and into Lake DS1. The construction of the dike and resulting changes in the local hydrology raised water levels in the south basin of Whale Tail Lake. Higher water levels flooded tributary lakes A20, A65, and A63, among others, and created an impoundment. Lake A20 is no

[25] Kangislulik Lake (KAN) was previously referred to as Mammoth Lake (MAM).

longer *upstream*, as the channel between WTS and A20 flooded. However, the connection between WTS and A20 remains shallow, and hydrostatic pressure from inflows to Lake A20 likely limits water exchange. To regulate impoundment water levels, a diversion channel was constructed in 2019-2020, allowing water to flow from the north end of Lake A20 to the south end of KAN. The changes to Whale Tail Lake and Lake A20 are shown in **Figure 5-1**.

In 2018, WTS and KAN designations changed from baseline (*control*) to *impact* areas due to the onset of construction activities. The other four lakes were unaffected by construction activities in 2018 and remained designated as *control areas*. In early 2019, Lakes A20, A76, and DS1 changed from *control* to *impact* as mine construction and mine activities continued to expand. Nemo Lake switched to *impact* after the July 2019 sampling event following heavy precipitation that necessitated dewatering AP5 (sump) onto the tundra within the Nemo Lake watershed.

A chronology of construction activities relevant for interpreting results from the Whale Tail CREMP are provided in **Appendix A**. Construction activities and onsite water management in 2024 are summarized below:

- **Whale Tail Impoundment.** Currently, seepage water is directed to the Whale Tail Attenuation Pond and managed as part of this infrastructure. In 2024, the Whale Tail Dike was thermally capped to mitigate effects from warming temperatures.
- **Effluent Discharge to Kangislulik Lake** Treated effluent meeting MDMER and Water License limits was discharged to Kangislulik Lake from July 1 to 16 and from August 4 to September 30.
- **Effluent Discharge to Whale Tail South Basin.** Treated water was discharged to WTS between April 14 and June 29 and intermittently from October 1 to November 16. During this time, water met the MDMER and Water License limits.

5.2 Limnology

Limnology data provide an initial assessment of potential changes within a sampling area that may require additional investigation. The timing of the limnology and water sampling program for Whale Tail coincided with the Meadowbank CREMP sampling program. Limnology profiles were conducted at locations shown in **Figure 5-1**. Each point shown on the map is labelled with a number corresponding to the month the profiles were collected (e.g., 1 = January). Results for each lake focus on the deepest location sampled per event; matching water chemistry sample IDs (where available) for 2024 are listed in **Table 5-1** for cross-reference.

Table 5-1. Samples included in the limnology profiles for the Whale Tail study area lakes in 2024.

Area[1]	Jan	Feb	Mar	Apr/May[2]	Jun	Jul	Aug	Sep	Oct	Nov	Dec
KAN	☑	☑	MAM-87	MAM-89	Ice not safe for travel	MAM-91	MAM-93	MAM-96	Ice not safe for travel	☑	☑
WTS	☑	☑	WTS-87	WTS-89		WTS-91	WTS-94	WTS-96		☑	☑
A20	☑	☑	A20-79	A20-82		A20-83	A20-85	A20-88		☑	☑
NEM	☑	☑	NEM-85	NEM-88		NEM-90	NEM-91	NEM-93		☑	☑
A76			A76-78	A76-80		A76-82	A76-83	A76-85			
DS1			DS1-75	DS1-77		DS1-80	DS1-81	DS1-83			

Notes:
Empty cells indicate no limnology profiles were collected, consistent with the study design.
☑ = One profile is collected from the NF areas (and occasionally one MF area) in months where water sampling is not completed.
The sample IDs shown represent the deeper of the two locations sampled each month.
1. Monitoring area KAN was previously referred to as MAM. Sample IDs still use MAM for consistency with historical data
2. Ice melt occurred earlier than typical in 2024, resulting in May sampling occurring at the end of April at Meadowbank areas and at the beginning of May at Whale Tail areas.

5.2.1 General Observations

All the lakes in the Whale Tail study area are shallow, except for DS1. Lake DS1 is the deepest lake in the study area, with a maximum recorded depth of approximately 33 m. Lakes A20, A76, and NEM have areas of steep relief, but most of the surface area is less than 15 m deep.

Like the Meadowbank study area lakes, the ice-free season is short for lakes within the Whale Tail study area. Ice break-up usually occurs during mid to late June in the region and begins to form again in October. Sampling in June and October is typically avoided due to safety concerns surrounding ice conditions; with ice melting earlier in the season in recent years, this has been expanded to include May. Surface water temperatures measured at 3 m depth typically reach a yearly high between 10°C and 15°C sometime in August before cooling in the fall (**Figure 5-4**).

Temperature, dissolved oxygen, and specific conductivity profiles for each of the 2024 sample events are shown in **Figure 5-5** to **Figure 5-7**. Profiles for reference areas INUG and PDL are included where available.

5.2.2 Temporal and Spatial Trends

Temperature and Dissolved Oxygen

Lakes in the Whale Tail study area are typically unstratified for temperature and oxygen during the open-water season due to strong winds and shallow depths. Thermal stratification, if any, is brief and water temperatures typically only differ 4°C to 5°C between surface and bottom during these times. In 2024, the strongest evidence of thermal stratification occurred at NEM in August where water temperatures differed by approximately 4.5°C between surface and bottom; this pattern was no longer evident by September (**Figure 5-5**). Temperatures in 2024 were within the range of typical observations. They decreased compared to 2023, when maximum reported temperatures were elevated at all study lakes, including reference (**Figure 5-4**).

Dissolved oxygen (DO) concentrations in 2024 were consistent with previous years, and the seasonal patterns were typical of this Arctic area (**Figure 5-6**). Further, patterns were similar between the control lakes (INUG and PDL) and the NF and MF monitoring areas. The lakes are well oxygenated throughout the year, with DO generally above 10 mg/L. In 2024, the lakes were mostly unstratified, with slight stratification observed during the spring ice-covered months: March and April. Conditions were well mixed in the summer months (July, August, and September).

Conductivity

The conductivity results from the limnology profiles collected throughout the year at Whale Tail study area lakes are shown in **Figure 5-7** and discussed below by lake.

Whale Tail Lake - South Basin. In 2024, conductivity in WTS ranged from approximately 118 to 152 µS/cm and the lake was largely unstratified across each month of sampling. The ice-covered months demonstrated the highest conductivities, which is common as the process of ice formation tends to exclude dissolved ions which effectively concentrates them in the water below the ice. The ice-free months (July to September) had similar profiles, all characterized by the lowest conductivities. Overall conductivities were comparable to 2023, with higher conductivities generally corresponding to discharging periods at WTS (April to June and October to November).

Kangislulik Lake. Prior to November 2018, conductivity in KAN was characteristically unstratified, measuring below 60 µS/cm (Azimuth, 2019a). In late 2018, the conductivity in KAN increased to 150 µS/cm, following the discharge of treated contact water into the east basin. Through 2021, there was an overall increase in conductivity with concentrations often exceeding 175 µS/cm and as high as 360 µS/cm.

In 2024, conductivities generally ranged between 130 and 280 µS/cm. Since 2020, the highest conductivities have occurred during the winter months followed by declines during open-water periods

(**Figure 5-7**). Conductivities in the winter months (January through March) were higher in 2024 compared to 2023, while the remainder of the year was comparable to 2023. The maximum conductivity readings from each sampling event in 2023 and 2024 are provided in **Table 5-2**.

Kangislulik Lake is fairly shallow and somewhat hourglass shaped, with distinct east and west basins. Water chemistry sampling and limnology profiling targets water depths greater than 5 m. To meet these requirements, samples are collected in the deeper east and west basins of the lake. This provides good spatial coverage while meeting minimum depth requirements. For paired water samples, the conductivity observed in the east basin was consistently higher than the conductivity in the west basin (**Table 5-2**). The narrow portion in the middle of the lake is relatively shallow and creates a natural sill that slows water exchange between basins, especially in winter when thick ice cover further limits water exchange. Mine influences on water quality are temporarily concentrated in the east basin near the effluent discharge point, a pattern previously confirmed by plume delineation surveys (Portt and Associates and Kilgour & Associates, 2021).

Conductivity readings in the east and west basins of Kangislulik Lake increased in 2024 compared to 2023. In 2024, conductivities in the east basin increased by 6% and in the west basin increased by 12% compared to 2023 (**Table 5-2**). These findings are corroborated by the major ion water chemistry results (**Section 5.3.2**).

Table 5-2. Maximum conductivity readings from each sampling event in Kangislulik Lake and relative percent difference (RPD) between readings from 2023 and 2024-.

Month	West Basin			East Basin		
	2023	2024	RPD	2023	2024	RPD
January	-	-	na	195	236	19%
February	200	-	na	-	279	na
March	196	244	22%	231	280	19%
April/May[1]	206	229	10%	-	276	na
July	124	130	5%	155	152	2%
August	137	147	7%	167	180	7%
September	144	164	13%	194	195	0%
November	177	-	na	193	190	1%
December	-	-	na	207	195	6%
ANNUAL MEAN[2]	**161**	**183**	**12%**	**192**	**204**	**6%**

Notes:
1. Ice melt occurred earlier than typical in 2024, resulting in May sampling occurring at the end of April at Meadowbank areas and at the beginning of May at Whale Tail areas.
2. Mean calculated only where data was available for a given month across both years.
"-" no sample collected; na = RPD not calculated.

Nemo Lake, Lake A20, Lake A76, and Lake DS1. In 2019, field conductivity measurements at NEM after August indicated an upward trend, likely in response to the temporary discharge of contact water into NEM. Since then, conductivities have shown amplified seasonal fluctuations, ranging from 100 µS/cm to 140 µS/cm by the late ice-covered period (April/May). More pronounced seasonal conductivity fluctuations appear to be a characteristic of the mine-affected lakes and can be seen to the greatest extent at WTS and KAN (**Figure 5-7**).

Nemo Lake and Lakes A20, A76, and DS1 demonstrated a much smaller seasonal range in conductivities compared to WTS and KAN. Conductivities at NEM, A20, and A76 remained close to 100 µS/cm, while DS1 remained around 40 µS/cm.

5.3 Water Chemistry

Tabulated water quality data for 2024 are presented in **Appendix C2**. Water chemistry samples were collected simultaneously with limnology samples in March, May, July, August and September (see **Section 4.2** for limnology results).

5.3.1 Key Findings from the 2024 Water Chemistry Monitoring Program

- There were no trigger exceedances for parameters with effects-based thresholds (e.g., aquatic life guidelines).
- Several parameters showed increased concentrations at NF and MF Whale Tail area lakes relative to baseline/reference conditions: major ions (TDS, Ca, Mg, K, Na, HCO_3 [alkalinity]), hardness, conductivity, nutrients (TKN, total phosphorus, TOC, and dissolved organic carbon [DOC]), lithium (at WTS and KAN), and silicon (only at DS1).
- Total phosphorus and arsenic concentrations at WTS and KAN were within the normal operating ranges in 2024 and Level 0 water management strategy is in effect in 2025 as per the *Adaptive Management Plan* (Agnico Eagle, 2021).

5.3.2 Temporal and Spatial Trends

Parameters included in the temporal and spatial trends assessment are listed in **Table 5-5**. A total of 56 parameters out of 79 (approximately 71%) were retained for further examination in 2024. Of these, all were retained because the frequency of detected concentrations exceeded 10%.

Parameters retained in the analysis are plotted in **Figure 5-9** through **Figure 5-13**. Trigger values[26] are shown on the time series plots as a red dashed line. Water quality predictions were developed as part of

[26] Refer to Appendix I in the 2019 CREMP report (Azimuth, 2020a) for a description of the methods used to establish triggers for each parameter.

the FEIS process for some parameters in Kangislulik Lake and Whale Tail Lake - South Basin (see **Section 2.5.1** and Golder, 2019); these are depicted as a blue dashed line in the plots. Water chemistry figures and raw data for all parameters, including those that were not retained for discussion based on the parameter assessment are presented in **Appendix C2**.

BACI analyses testing for changes *relative to baseline/reference* conditions were conducted for parameter/area combinations if the mean concentration in 2024 exceeded the trigger value (see **Section 2.5.1** and **Table 5-6**). BACI analysis results are presented in **Table 5-7**; these are discussed in terms of ecological significance and spatial context below, by parameter type.

Major Ions and Conventional Parameters

Major ions (dissolved salts) are the seven ionic compounds found in greatest abundance in freshwater systems. They include the cations: calcium, magnesium, potassium, and sodium; as well as the anions: chloride, bicarbonate, and sulphate. These seven ions are measured directly or included in various composite conventional measures such as, total alkalinity, conductivity, TDS, and hardness (**Figure 5-9**). Collectively, these parameters have shown the greatest proportional changes in water chemistry since mining operations began (**Table 5-7**). The most pronounced increases in major ion concentrations and associated parameters occurred at NF lakes (WTS and KAN) and to a lesser extent at NF lake NEM and MF lakes A20 and A76. The year-over-year changes were marginal or absent at FF lake DS1.

None of the major ions and conventional parameters that exceeded triggers in 2024 have effects-based thresholds (e.g., CCME water quality guidelines). As discussed in **Section 4.3.2**, major ions are essential elements, and all species of aquatic life, from algae to fish, have evolved to actively regulate their osmotic, ionic, and acid-base balance by uptake of ions from their environment (Martemyanov and Mavrin, 2012). Furthermore, in oligotrophic freshwater lake environments adverse effects on primary producers and secondary consumers (e.g., zooplankton) are more commonly associated with major cation deficiency than enrichment (Alstad et al., 1999; Arnott et al., 2017). That said, elevated concentrations can lead to effects on aquatic life (e.g., Weber-Scannell & Duffy, 2007), making it important to also monitor ecological resources such as phytoplankton and benthic invertebrates.

The only parameters in this group with effects-based thresholds are chloride, fluoride, and sulphate. Although their concentrations have increased since mining began, mean annual concentrations have not exceeded their respective triggers in any sampling area. These results indicate that mine-related changes have occurred, but are not expected to result in adverse effects to aquatic life (see similar discussion in **Section 4.3.2**).

Nutrients

Similar to 2023, mean annual concentrations of total Kjeldahl nitrogen (TKN), total phosphorus, and total and dissolved carbon (TOC and DOC) in 2024 exceeded their respective triggers (**Table 5-6**). All of these parameters were significantly ($p < 0.05$) higher at WTS in 2024 compared to baseline/reference conditions. At KAN and A20 only, TKN, TOC, and DOC were found at concentrations significantly higher than baseline/reference conditions (**Table 5-7**).

Total Phosphorus. Total phosphorus is one of the main constituents of concern for the Whale Tail mine. It is a key macronutrient for plants and is often limiting in freshwater ecosystems, making it one of the crucial nutrients for primary productivity. For total phosphorus, the CCME provides guidance for site-specific application rather than a particular effects-based guideline. While the CCME framework specifies <0.004 mg/L of total phosphorus for ultra-oligotrophic lakes, up to a 50% increase in concentrations over baseline is considered acceptable (Azimuth, 2020; see Appendix I). The 95th percentile baseline concentrations of total phosphorus for Meadowbank, Wally, Baker, and Whale Tail exceeded 0.004 mg/L. Therefore, lake-specific triggers were set to the 95th percentile baseline concentrations and the 0.01 mg/L threshold was used, which is the higher end of the range for oligotrophic lakes (CCME 2004).

The trigger was exceeded in all *impact* Whale Tail study area lakes at least once in 2024, except for A76 and NEM (**Figure 5-11**). However, only the annual mean total phosphorus concentration at WTS exceeded the trigger (**Table 5-6**) and the BACI analysis indicated the apparent changes were not statistically significant (**Table 5-7**). Since 2021, total phosphorus concentrations have been stable at WTS.

The increase in nutrients at WTS, KAN, and A20 since 2019/2020 combined with occasional exceedances in other lakes downstream is likely contributing towards an increase in primary productivity, as predicted in the FEIS (**Table 5-3**; Golder, 2018). Phosphorus is discussed further as it relates to the Adaptive Management Plan (AMP) in **Section 5.3.4**.

Table 5-3. FEIS predictions and trigger values compared to mean concentrations of total phosphorus in Kangislulik Lake and Whale Tail Lake (South Basin), 2024.

Area	2024 FEIS predictions		Trigger	2024 Mean
	Minimum	Maximum		
KAN	0.0077	0.0085	0.0045	-
WTS	0.0110	0.0120	0.0045	0.0050

Notes:

1. Reported values are all in units of mg/L.

"-" Annual mean was less than the trigger in 2024.

TOC and DOC. In 2024, TOC and DOC concentrations exceeded the triggers for nearly all samples collected in WTS, KAN, and A20. Triggers were also exceeded at least once in the other *impact* lakes (**Figure 5-9**). Mean annual concentrations exceeded the triggers (TOC trigger = 2.42 mg/L; DOC trigger = 2.43 mg/L) in WTS, KAN, A20, and DS1 (**Table 5-6**). The increases in mean TOC and DOC were only statistically significant for WTS, KAN, and A20.

The increase in TOC and DOC in WTS at the end of 2019 was likely due to flooding of terrestrial habitat from the south basin impoundment and dewatering inputs from WTN. This also explains the increases in Lake A20, which experienced flooding and has been connected to WTS since 2019. Increases in TOC/DOC at KAN and A76, located downstream of WTS, likely reflect inputs from WTS.

Since 2018, a muted increase in TOC and DOC also appears to be occurring in reference lake INUG. This pattern suggests organic carbon inputs to lakes in the region may be increasing which would also contribute to the changes observed at the mine influenced lakes. In a pan-Arctic assessment of lake DOC, Stolpmann and colleagues (2021) linked higher DOC levels to evaporation rates, lake connectivity, and permafrost extent. It is possible that regional multi-year climactic changes or climate change could contribute to broad changes in organic carbon across the study lakes over time. Parallel increases in TOC/DOC in the Meadowbank lakes may also be occurring (**Figure 4-9**). Regional changes in organic carbon are further discussed for Baker Lake in **Section 6.3.3**.

There are no effects-based thresholds for TOC or DOC, but increases in these parameters can be related to increased productivity or allochthonous carbon inputs. While changes in TOC and DOC at WTS were likely due to inputs from flooded terrestrial areas, changes observed at far-field Lake DS1 were likely due to natural inputs (e.g., terrestrial organic matter; BC MOE, 1998).

Nitrogen-containing Compounds. TKN is one of four nitrogen-containing compounds in the CREMP. It is a composite parameter that includes both organic and inorganic forms including ammonia, nitrate, nitrite, and organic nitrogen compounds. TKN does not have an effects-based threshold. The other three nitrogen-containing compounds in the CREMP have effects-based thresholds. While these compounds have increased due to mining activity; they are generally stable with all annual mean concentrations below their respective triggers. A few samples from WTS and KAN exceeded ammonia (NH_3) triggers in 2024, however these did not represent an increasing trend (**Figure 5-11**). Overall, nitrogen-containing compounds are not a concern at the Whale Tail study lakes.

Metals

A number of metals show trends of increasing concentrations associated with mining activities. These include: aluminum (Al), antimony (Sb), arsenic (As), barium (Ba), copper (Cu), iron (Fe), lithium (Li), manganese (Mn), molybdenum (Mo), nickel (Ni), selenium (Se), silicon (Si), strontium (Sr), titanium (Ti), and uranium (U) (**Figure 5-12** and **Figure 5-13**). Of these, lithium, silicon, titanium, and uranium

exceeded triggers at least once in 2024, but only lithium and silicon, which do not have effects-based thresholds, had annual mean concentration exceeding triggers (**Table 5-6**).

Lithium. The annual mean concentrations of total and dissolved lithium exceeded trigger values at WTS and KAN in 2024 (total and dissolved lithium trigger = 0.0020 mg/L). Peak concentrations occurred in 2019 and since 2022 concentrations appear to have stabilized at both lakes. The BACI analysis indicated that the change in total and dissolved lithium relative to INUG was statistically significant at both WTS and KAN (p-value <0.05).

Lithium does not have an effects-based threshold. While the US EPA has a factsheet on lithium toxicity in freshwater (MDEQ, 2008), it is not a formal water quality guideline. The factsheet includes chronic toxicity results for zooplankton (water flea *Ceriodaphnia dubia*) and fish (fathead minnow *Pimephales promelas*). The no observable effect concentration (NOEC) for a 6-day test targeting *C. dubia* reproduction was 1.97 mg/L, while 3.6 mg/L was the lowest observable effect concentration (LOEC). The NOEC for the 7-day *P. promelas* test targeting growth was 3.6 mg/L, while the LOEC was 6.9 mg/L. These toxicity test results are two to three orders of magnitude higher than the lithium concentrations observed in the Whale Tail study lakes.

Silicon. Silicon concentrations have historically been close to the trigger value for most Whale Tail study area lakes, even prior to the start of mining development (**Figure 5-12**). In 2024, total and dissolved silicon concentrations exceeded the trigger (0.57 mg/L) at WTS, KAN, and DS1. Similar to previous years, concentrations in all impact lakes were higher during the first half of the year, however, the yearly mean concentrations exceeded the trigger solely at DS1 (total = 0.64 mg/L, dissolved = 0.6 mg/L; **Table 5-6**) but the change was not statistically significant (**Table 5-7**). While there is evidence of a mining-related trend at WTS and KAN (an increase coinciding with mine development followed by a downward trend since 2020), that is not the case at DS1, where results have been fairly consistent since the baseline period.

5.3.3 Comparison to FEIS Model Predictions

Development activities and/or effluent discharge to the downstream environment have resulted in various water quality changes in the Whale Tail mine area. The FEIS water quality predictions are estimates of water quality changes in Kangislulik Lake and Whale Tail Lake (South Basin). The monthly mean results for water quality parameters were screened against the FEIS monthly predictions for KAN and WTS and a summary of exceedances is provided in **Table 5-9**. Water quality data for individual samples collected in 2024 were screened against the FEIS predictions and are tabulated in **Appendix C2**.

Often, parameters that exceed their trigger also exceed the FEIS predictions in one or more sampling events. In 2024, the yearly mean concentrations for total alkalinity, TDS, lithium, and the ionic compounds calcium, magnesium, potassium, and sodium exceeded both their respective triggers and

the monthly FEIS predictions in WTS and KAN. Of the parameters that exceeded their respective trigger values and FEIS model predictions, the absolute concentrations of these parameters remain *low*. Several COPCs (e.g., phosphorus, nitrate, arsenic) were predicted by the FEIS to exceed baseline conditions following the discharge of treated effluent into WTS and KAN. Of those parameters, phosphorus was the only COPC that was also predicted to exceed water quality guidelines (Golder, 2018).

The FEIS predicted the magnitude of potential effects on water quality in each of the lakes as *low* (i.e., <1x CCME WQG) for all parameters; see **Section 2.5.1** for more details on the decision criteria for effects magnitude). Thus, the Whale Tail study area water quality results are generally consistent with FEIS predictions.

5.3.4 Comparison to Adaptive Management Thresholds

For parameters identified as the main COPCs for the Whale Tail mine (i.e., total phosphorus and arsenic), there are associated AMP water quality thresholds that correspond to adaptive management 'Levels' as described in **Section 2.5.1**. The adaptive management thresholds and corresponding adaptive management levels and strategies that are applied at mine discharge areas WTS and KAN are summarized in **Table 2-3**. The water quality data collected as part of the annual CREMP were used to assess adaptive management levels going into 2025. The mean concentrations of paired monthly sampling results were compared to AMP thresholds. Findings are summarized in **Table 5-4** and described below.

Whale Tail South

- Mean total phosphorus concentrations remained at Level 0 for each month of sampling at WTS in 2024.
- Mean total arsenic concentrations remained at Level 0 for each sampling event at WTS in 2024.
- **Conclusion**. Level 0 is in effect for both total phosphorus and total arsenic based on the results of the September 2024 sampling event.

Kangislulik Lake

- Mean total phosphorus concentrations remained at Level 0 for each month of sampling at KAN in 2024.
- Mean total arsenic remained at Level 0 for each sampling event at KAN in 2024.
- **Conclusion**. Kangislulik Lake is within the normal operating range and Level 0 water management strategy is in effect based on the results of the September 2024 sampling event.

Table 5-4. Water chemistry data compared to AMP thresholds for total phosphorus and arsenic for Whale Tail Lake (South Basin) and Kangislulik Lake, 2023 and 2024.

Lake & Area	AMP Benchmark[1]	WTS FEIS Predictions											Whale Tail Lake South Basin (Impoundment) – Mean Monthly Concentrations (mg/L)										Current Mgmt Level
Year		2023						2024					2023						2024				
Month		Mar	May	Jul	Aug	Sep	Nov	Mar	May	Jul	Aug	Sep	Mar	May[2]	Jul	Aug	Sep	Nov	Mar	May	Jul	Aug	Sep	
Phosphorus (mg/L)	0.01	0.0081	0.0081	0.0096	0.010	0.010	0.010	0.011	0.011	0.012	0.012	0.012	0.0067	-	0.0085	0.0057	0.0058	0.0034	0.0066	0.0036	0.0064	0.0047	0.0037	Level 0
Arsenic (mg/L)	0.025	0.0094	0.0093	0.011	0.012	0.013	0.013	0.013	0.013	0.014	0.015	0.016	0.00089	-	0.00096	0.00094	0.00079	0.00092	0.00061	0.00059	0.0012	0.00082	0.00085	Level 0

Lake & Area	AMP Benchmark[1]	KAN FEIS Predictions											Kangislulik Lake – Mean Monthly Concentrations (mg/L)										Current Mgmt Level
Month		2023						2024					2023						2024				
Area-Replicate ID		Mar	May	Jul	Aug	Sep	Nov	Mar	May	Jul	Aug	Sep	Mar	May[2]	Jul	Aug	Sep	Nov	Mar	May	Jul	Aug	Sep	
Phosphorus (mg/L)	0.01	0.0075	0.0075	0.0075	0.0076	0.0076	0.0077	0.0077	0.0077	0.0083	0.0084	0.0085	0.0048	-	0.0044	0.0026	0.0041	0.0053	0.0037	0.0020	0.0043	0.0041	0.0047	Level 0
Arsenic (mg/L)	0.025	0.0063	0.0063	0.0069	0.0069	0.0071	0.0074	0.0074	0.0074	0.0086	0.0087	0.0089	0.0011	-	0.0011	0.0015	0.0014	0.00058	0.00098	0.00097	0.00090	0.0014	0.0016	Level 0

Notes:

[1] The AMP Benchmark for phosphorus guideline is the upper limit of oligotrophic status from CCME (2004); The AMP Benchmark for arsenic is the site-specific water quality objective (Golder, 2019).

[2] Samples were not collected in May 2023 due to unsafe ice conditions.

Formatting aligns with the AMP thresholds in the *Whale Tail Expansion Project – Adaptive Management Plan* (Agnico Eagle, 2021):

Level 0	Normal conditions	<= 20% FEIS predictions.
Level 1	Area of concern	>= 20% FEIS predictions AND < 80% water quality guideline.
Level 2	Area of concern	>= 20% FEIS predictions AND between 80% and 100% water quality guideline.
Level 3	High risk	>= 20% FEIS predictions AND between 100% and 120% water quality guideline.
Level 4	Emergency situation	>= 20% FEIS predictions AND > 120% water quality guideline.

5.3.5 Summary and Recommendations

Following the assessment strategy for MF and FF areas outlined in the *CREMP Plan Update* (Azimuth, 2022b), the 2024 trigger exceedances were evaluated and applied to the decision criteria outlined in **Section 2.4** to determine the effort level and sampling frequency required at the MF and FF areas in 2025. The assessment strategy interprets the water quality assessment results from the NF areas in the current year (in this case 2024) to inform sampling at MF and FF areas the following year (i.e., 2025) (**Figure 5-8**).

A summary of the trigger screening results for the Whale Tail study areas are presented in **Table 5-8** according to their corresponding degree of change based on mean annual concentrations:

- no trigger exceedance,
- minor changes = trigger exceeded for parameters without effects-based thresholds,
- moderate changes = trigger exceeded for parameters with effects-based thresholds, or
- major changes = exceedance of the effects-based threshold.

In 2024, observed water quality differences and trigger exceedances classified as *minor changes* (**Table 5-8**). The 2024 water quality results from Whale Tail area lakes do not require additional management actions as per the *CREMP Plan Update* and *Adaptive Management Plan* (Azimuth, 2022b, Agnico Eagle, 2021). **Routine water quality monitoring will continue in 2025 to track emerging spatial and temporal trends.**

5.4 Phytoplankton Community

Since mid-2018, areas WTS and KAN have been classified as *impact* areas. Areas A20, A76, and DS1 were classified as *impact* areas since early 2019, and NEM switched to *impact* in August 2019[27]. In 2024, winter phytoplankton samples collected in March and May were archived as per the *CREMP Plan Update* (Azimuth, 2022b). Phytoplankton collected at the reference and Whale Tail area lakes during open-water sampling in July, August, and September were analyzed.

5.4.1 Key Findings from the 2024 Phytoplankton Monitoring Program

- Chlorophyll-a concentrations in 2024 remained consistent with baseline oligotrophic conditions (<1 µg/L) across most Whale Tail area lakes, except at WTS and DS1, where slightly elevated levels were observed. It is important to note that chlorophyll-a is only an indicator of

[27] Baseline phytoplankton taxonomy data for the Whale Tail study area lakes was summarized in (Azimuth, 2018b). The baseline report focused on describing the dominant species and seasonal variability in taxonomy metrics (e.g., biomass and richness) within and between areas.

phytoplankton productivity; phytoplankton biomass (see next bullet) is a more direct measure of primary productivity.

- In 2024, the BACI analysis showed no significant changes in biomass relative to baseline/reference conditions at the Whale Tail area lakes. Observed trends were variable across the areas and likely driven by natural variability. The increases in biomass observed at the NF areas in the first few years after mining, which were consistent with predictions made in the FEIS regarding increasing nutrient concentrations in these lakes (Golder, 2018), appear to have corrected and stabilized.
- Taxa richness has been fairly stable at the NF areas over the past few years and generally within the historical range for each area. While statistically significant apparent decreases in phytoplankton richness were identified in the BACI analyses, these are driven in part by the stable trends at reference area INUG. PDL, the other reference area, is more consistent with the Whale Tail study area lakes.
- Nutrient levels in 2024 were similar to 2023 as observed in the water chemistry data (**Section 5.3.2**). Nutrient levels and phytoplankton responses appear to roughly align over both temporal and spatial scales. However, phytoplankton communities respond to a host of seasonal factors such as sunlight and water temperature and therefore it is difficult to distinguish between seasonal fluctuations and influence of nutrients from to mining activities.

5.4.2 General Observations

The general description of phytoplankton taxa in Meadowbank project lakes (**Section 4.4**) applies equally to the lakes within the Whale Tail study area. Six major taxonomic groups of phytoplankton are present in the Whale Tail study lakes. These are blue-green algae (Cyanophyta), green algae (Chlorophyta), golden-brown algae (Chrysophyta), diatoms (Bacillariophyta), cryptophytes (Cryptophyta), and dinoflagellates (Dinoflagellata). Species composition varies throughout the year depending on water temperature, nutrient concentration, time of year, water clarity, amount of sunlight, and predation by zooplankton. In general, the biomass of the phytoplankton community during the baseline period or at the reference areas was comprised predominately of chrysophytes (golden-brown algae; **Figure 5-16**).

5.4.3 Temporal and Spatial Trends

The approach to identify potential mine-related impacts involved two key methods: (1) visually examining temporal-spatial patterns potentially associated with mine-related activities (described in **Section 5.1** and summarized in **Appendix A**), and (2) performing statistical analyses of the 2024 data using the BACI model to test for changes relative to baseline/reference conditions (details in

Section 2.5.3). Both methods look for evidence of temporal-spatial patterns that might be associated with the mine-related activities.

The metrics used to assess changes in the community were chlorophyll-a (**Figure 5-14**), total phytoplankton biomass (**Figure 5-15** to **Figure 5-17**), and species richness (**Figure 5-18**). Tabulated phytoplankton community data from 2024 and supplemental plots of major taxa biomass (mg/m^3) and density (mg/L) are included in **Appendix E2**. The 2024 BACI statistical test results for changes in the phytoplankton community (total biomass and total species richness) relative to baseline/reference conditions are presented in **Table 5-10** and key results are discussed below.

Chlorophyll-a

Chlorophyll-a is an indicator of primary productivity and is often used as a surrogate for phytoplankton biomass. Given the direct measure of total phytoplankton biomass (see below), statistical analysis is not completed for chlorophyll-a. The time series plots provided in **Figure 5-14** show that chlorophyll-a concentrations in the latter half of 2024 were slightly higher at WTS and A20 than in baseline samples. In 2024, the mean annual concentration of chlorophyll-a at each Whale Tail study lake was equal to or less than 1 µg/L, except at DS1 (1.2 µg/L). Chlorophyll-a concentrations around 1 µg/L are considered characteristic of oligotrophic systems (Kasprzak et al., 2008). At NEM, chlorophyll-a concentrations were less than 1 µg/L in all except one sample. At KAN and Lake A76, chlorophyll-a concentrations fluctuated around 1 µg/L. At far-field Lake DS1, chlorophyll-a concentrations ranged from 0.5 µg/L to 2.8 µg/L. In 2024, chlorophyll-a concentrations in the Whale Tail area lakes were generally representative of baseline trophic status in the lakes. Possible factors influencing the patterns of chlorophyll-a and phytoplankton biomass are discussed in more detail below.

Total Biomass

Time series plots for total phytoplankton biomass (mg/m^3) during the open-water period (July–September) are provided in **Figure 5-15**[28]. The largest contributor to community biomass at each of the study lakes were chrysophytes, except at KAN and A76 where diatoms dominated in 2024 (**Figure 5-16** and **Figure 5-17**).

The BACI analyses (see **Section 2.5.3** for details) tests for changes in metrics *relative to baseline/reference* conditions; results are provided in **Table 5-10**. None of the 2024 results were statistically significant and the trend directions were mixed, with apparent increases at KAN and A20 and

[28] The time series plot uses a log-scale for total biomass as mg/m^3. This is a common approach for data that ranges broadly within or across years. While the approach reduces emphasis on extreme values, it could also lessen the appearance of certain mine-related trends.

apparent decreases at the rest of the areas. The mixed trend results at the NF areas suggests that the changes are likely due to natural variability rather than to mining activity.

The increases in phytoplankton biomass identified at NF and MF areas in the first few years of mining activities, which were consistent with predictions made in the FEIS regarding increasing nutrient concentrations in these lakes (Golder, 2018), appear to have corrected and stabilized in recent years (**Figure 5-15**).

Major Taxa Composition

The number of taxa varies by season, with a more diverse community typically present during the open-water season than when ice covers the lakes. Typically, more than 30 different species of phytoplankton are present during the open-water season (**Figure 5-16**). Chrysophytes dominated the community at most Whale Tail study lakes except for at KAN and A76 in August and September when diatoms were the dominant taxa (**Figure 5-17**). During the baseline period, diatoms made up a small proportion of the community at KAN and WTS. The underlying shift to the higher proportion of diatoms at these areas in recent years is hard to tease apart, although mining activity cannot be ruled out. Other factors, such as the warmer summer conditions experienced in the last few years, may also be playing a part.

Taxa Richness

Taxa richness in 2024 was generally similar to previous years at all Whale Tail lakes (**Figure 5-18**), with the NF areas tracking within their respective historical ranges and baseline/reference conditions. That said, the BACI analyses identified statistically-significant ($p < 0.1$) apparent decreases in taxa richness at WTS, KAN, A76, and NEM. The apparent changes at KAN (-34%), A76 (-31%), and NEM (- 23%) exceeded the trigger (increase or decrease of 20%), but did not exceed the threshold (increase or decrease of 50%). These apparent changes appear to be driven in part by the stable trends at reference area INUG. PDL, the other reference area, is more consistent with the Whale Tail study area lakes. Further discussion related to the ecological significance of these results is presented in the summary below.

5.4.4 Summary and Recommendations

The increased phytoplankton biomass seen at the NF areas in the first few years, which were consistent with FEIS predictions (Golder, 2018), appears to have corrected and stabilized over the past few years. Taxa richness has also been fairly stable over the past few years. While statistically significant apparent decreases in phytoplankton richness were identified in the BACI analyses, these are driven in part by the stable trends at reference area INUG. PDL, the other reference area, is more consistent with the Whale Tail study area lakes. Further, none of these moderate changes in taxa richness at the NF areas exceeded the threshold (50% change) outlined in the *CREMP Plan Update* (Azimuth, 2022b).

The observed patterns in phytoplankton taxa richness and biomass suggest a combination of mining influence and natural variability. As outlined in **Section 5.3**, mining-related changes in water quality have been documented in all NF and MF Whale Tail area lakes. In oligotrophic systems, nutrients are typically a limiting factor for phytoplankton growth, so any inputs can lead to changes in productivity. Since mining began, increases in nutrient levels at WTS, KAN, and A20 have generally corresponded with increased phytoplankton biomass.

According to the FEIS, phosphorus and nitrate levels at WTS and KAN are predicted to increase until 2026 before declining. Consequently, phytoplankton biomass is expected to increase over the next two years of CREMP sampling. Although FEIS predictions are limited to WTS and KAN, these nutrient effects were expected to extend into the MF lakes.

Phytoplankton productivity, biomass, and richness, as well as associated patterns in key nutrients, will continue to be monitored in 2025.

The Whale Tail phytoplankton program will follow the same schedule as the routine water quality monitoring component of the program in 2025.

5.5 Sediment Chemistry

5.5.1 Key Findings from the 2024 Sediment Chemistry Monitoring Program

A supplemental sediment coring program was conducted in WTS in August 2024 to assess whether chromium concentrations have increased compared to the baseline period. While sediment cores from 2023 and 2024 suggest higher chromium concentrations compared to 2017, substantial spatial heterogeneity within the basin makes any temporal trend indistinguishable. Spatial and temporal trends for sediment chromium will be reassessed in the 2026 coring program.

5.5.2 General Observations

For interpreting sediment results, the Whale Tail study area lakes (KAN, NEM, A20, A76, DS1) were considered *impact* starting in 2019 except for WTS, which was designated as *impact* in 2018.

In 2024, sediment grab samples were collected from all Whale Tail area lakes and analyzed for moisture content, total organic carbon (TOC), grain size, and selected organic compounds (**Figure 5-2**). The remaining sediment was archived for chemistry as per the *CREMP Plan Update* (Azimuth, 2022b). The 2024 sediment results are discussed below and tabulated data are provided in **Appendix D2**.

Total organic carbon and grain size are important sediment parameters relevant for benthic invertebrate community habitat characteristics. Results from 2024 were the following:

- **Total Organic Carbon**. Since 2015, there is no evidence of an increasing trend in TOC at any of the study lakes (**Figure 5-19**). TOC varies slightly between years, but has remained remarkably stable within each of the Whale Tail area lakes. What is apparent, is the difference in TOC across the study lakes. KAN consistently has the highest proportions of TOC, while the reference lakes (INUG, PDL) have the lowest. These results reflect differences in productivity levels across the lakes, with shallow, lower-volume lakes tending to be more productive relative to deeper, high-volume lakes.
- **Grain Size**. Grain size results were similar to previous years, with generally finer-grained sediment often dominated by the silt fraction (**Figure 5-20**).

Composite grab samples were analyzed for hydrocarbons; the results are provided in **Appendix D2**. All parameters with CCME screening values were below both detection limits and Probable Effects Levels (PEL). The results from 2024 verify that hydrocarbons are not a COPC at the Meadowbank or Whale Tail study area lakes.

5.5.3 Temporal and Spatial Trends

In 2024, sediment core samples (top 1.5 cm) were collected from 25 locations throughout WTS to assess whether construction of the Whale Tail Dike in 2018 has contributed to higher chromium concentrations. Spatial and temporal trends were evaluated by mapping sediment chromium concentrations in cores collected in 2017, 2020, 2023, and 2024 and comparing the results (**Figure 5-22**). The results are discussed below.

- In 2017, 10 sediment cores were collected in a relatively small area (~100 diameter) where the water depth ranged from 7.6 to 9.2 m. Chromium concentrations in this area ranged from 56.6 to 76.3 mg/kg.
- Following construction of the Whale Tail Dike and subsequent flooding of the area to the south, the water elevation in WTS increased approximately 2 m compared to the baseline period. Because sediment cores are co-located with the benthic invertebrate community stations (8 m ± 1.5 m), the 2023 sediment cores were collected from different locations compared to 2017. Chromium concentrations in 2020 were similar to 2017 ranging from 60.9 to 78.3 mg/kg, whereas chromium concentrations in 2023 were higher and more variable than in 2017, ranging from 70.6 to 184 mg/kg. In 2023, high spatial heterogeneity was evident in 'paired' sediment cores that were collected approximately 10 m apart (**Figure 5-22**).
- The results of the 2024 sediment coring program confirmed that chromium concentrations are highly spatially variable throughout WTS, ranging from 41 to 113 mg/kg. Some of the 2024 coring stations were close to those that were sampled in 2017, 2020, and 2023. Across years, spatial

heterogeneity appears to be the major contributor to the 'apparent' interannual variability in chromium concentrations observed in WTS (**Figure 5-21**).

5.5.4 Summary and Recommendations

In the Whale Tail study area, sediment is naturally elevated in several metals and their concentrations can be quite variable due to localized spatial heterogeneity. Based on core chemistry data from 2017, 2020, 2023, and 2024, any increasing temporal trend in sediment chromium concentrations is difficult to distinguish from natural spatial heterogeneity.

The 2024 sediment chemistry results from Whale Tail area lakes do not require additional management actions as per the *CREMP Plan Update* (Azimuth, 2022b). **The next sediment coring program will be conducted in August 2026 to review trends in chemistry. In 2025, grab samples will be collected to support the benthic invertebrate community sampling program.**

5.6 Benthos Community

The benthic community results are presented and discussed in this section. Supplemental information (e.g., plots at the major taxonomic group level since baseline sampling began) is provided in **Appendix F2**.

5.6.1 Key Findings from the 2024 Benthos Community Monitoring Program

The analysis of the benthic invertebrate community data focused on two key metrics: total abundance and total taxa richness. The BACI statistical analysis tests for changes relative to baseline/reference conditions for four time periods: the current year, last two years, last three years, and last four years. Key findings for 2024 were as follows:

- Overall, the Whale Tail study area lakes' benthic community had higher abundance and richness than the two reference areas, particularly INUG. This means that the BACI analysis could identify apparent changes even when trends are stable at the impact areas. This needs to be kept in mind when interpreting the BACI results.
- Total abundance at the NF areas remained within historical ranges and was generally consistent with baseline/reference conditions. Despite that, the lower abundance seen at INUG this year translated into substantial apparent increases at WTS (192%) and KAN (288%). Similar results were observed for the longer time periods. While INUG experienced its two lowest abundance years in the past three years, the NF areas generally had higher abundance years.
- Total taxa richness in most NF areas remained within historical ranges and was generally consistent with baseline/reference conditions. The main exception is KAN, which has had progressively higher taxa richness. Similar to abundance, the relatively lower richness seen at INUG over the last three or four years also translates to relatively higher richness at the Whale Tail study lakes for the corresponding time periods. The apparent increases in taxa richness in 2024 were statistically significant at KAN and NEM, as were some of the longer time periods (e.g., 47% rise at KAN, 28% rise at A20, and a 49% rise at NEM over the last 4 years).
- Evidence for causality is stronger for natural variability *versus* mining activity. Mining activity can lead to two types of effects: adverse changes (e.g., due to direct toxicity) or stimulatory effects (e.g., due to nutrient enrichment). The apparent changes described above reflect stimulatory responses to abundance and richness, which could be related to nutrient enrichment. Mining-related nutrient enrichment should result in higher sediment organic carbon (TOC) due to higher primary productivity. However, no increases in sediment TOC have been observed at the Whale Tail study area lakes. Instead, the substantial differences in sediment TOC among lakes likely reflect their natural capacity to respond to environmental changes. While we cannot rule out a

contribution from mining activity, the evidence provides little support for mining as the main driver of the observed stimulatory effects to the benthic invertebrate community.

5.6.2 General Observations

Benthic invertebrate (benthos) abundance in the Whale Tail study area can vary annually within individual lakes, however, multiple years of baseline data help characterize this variability. In contrast, richness tends to be relatively stable year-over-year. While the relative proportions of different taxa may vary, the number of total taxa was consistent throughout the baseline period and early construction in the Whale Tail study area. Abundance (organisms/m^2) and richness (number of unique taxa) is characteristic of depositional areas in northern, low productivity lakes, where chironomids (insects from subfamilies Chironominae and Tanypodinae) and fingernail clams (Sphaeriidae) dominate.

5.6.3 Temporal and Spatial Trends

The methods and approaches used to assess benthos community metrics described for the Meadowbank CREMP were also applied to the Whale Tail study area. Changes in benthos total abundance and richness were evaluated in 2024 using the BACI study design outlined in **Section 2.5.3**. Dike construction in 2018 was the major mining event responsible for the transition of the Whale Tail lakes from *control* to *impact* due to the proximity of construction activities to the lakes (**Table 2-2**).

Time-series plots showing total abundance and richness endpoints were also used to assess spatial and temporal trends for the Whale Tail lakes (**Figure 5-23** to **Figure 5-28**). Potential mine-related impacts were identified by visually examining the data for spatial and temporal patterns aligned with mining-related events. This was augmented with statistical analyses using the BACI model to test for changes in total abundance and taxa richness relative to baseline/reference conditions (see **Section 2.5.3**). The key results are summarized below.

Total Abundance

Total benthos abundance is highly variable within the Whale Tail area lakes and among years (**Table 5-11**). In 2022 and 2023, the NF lakes showed the highest abundance since monitoring began in 2015; however, in 2024 the mean total abundance at all NF areas were within or near their respective historical ranges and generally consistent with baseline/reference conditions (**Table 5-11**). While the NF areas generally had higher abundance in the past three years, the reference lake INUG experienced its two lowest abundance years. Mean total abundance in the reference lakes in 2024 was at its lowest (INUG) and second lowest (PDL) since 2015.

In a BACI context[29], where change is measured relative to baseline/reference conditions, lower abundance at the reference area in a given year may appear as a relative increase at NF and MF lakes if their abundance remained stable. We refer to such cases as *apparent* changes (increases or decreases). In 2024, there were large (61–288%) apparent increases in benthic invertebrate abundance at all Whale Tail area lakes (**Table 5-12**, **Figure 5-23**). For all time periods, there were significant (p-value <0.1) increases in benthic invertebrate abundance at KAN and NEM compared to baseline/reference. In 2024, there was a significant increase at DS1 (p = 0.07). In 2021-24, 2022-24, and 2023-24, there were significant increases at WTS (p-value <0.1). In 2022-24, there was a significant increase at A20 (p-value = 0.09).

In 2024, mean total abundance went from 5,047 to 3,155 organisms/m^2 at WTS, from 9,285 to 6,895 organisms/m^2 at KAN and from 5,087 to 4,644 organisms/m^2 at NEM. Mean total abundance increased from 3,192 to 5,048 organisms/m^2 at A76. During the baseline period, mean abundance ranged from 3,050 to 4,236 organisms/m^2 at KAN and 1,675 to 3,546 organisms/m^2 at WTS.

The observed increase in total abundance in recent years at Whale Tail area lakes may be influenced by natural variability, particularly regional climate trends such as higher water temperatures (Azimuth, 2024). While increases in nutrients (**Section 5.3.2**) and primary productivity (**Section 5.4.3**) have been observed in water, they have not resulted in notable changes in sediment TOC (**Section 5.5**), an important factor influencing benthic communities (Hyland et al., 2005; Pearson and Rosenburg, 1978). The stability of TOC concentrations in sediment across monitoring years suggests that mining-related nutrient enrichment is not a primary driver of the apparent changes in abundance (**Figure 5-20**). Moreover, benthic densities in 2021, under similar nutrient and productivity conditions, were among the lowest recorded, further indicating environmental factors may be driving changes in benthic abundance. Continued monitoring will help understand the causes of increased density observed in 2022–2024.

Major Taxa Abundance

Insects were the dominant taxon with generally over 50% relative abundance followed by molluscs with roughly between 15–40% relative abundance (**Figure 5-24** and **Figure 5-25**). This pattern dominated at all Whale Tail areas except WTS, where molluscs were dominant (65%) followed by insects (30%). In recent years, changes in WTS have included a relative increase in mollusc abundance compared to previous years. There were no apparent trends in composition changes related to mining at the other Whale Tail areas. Given the large inter-annual changes in total abundance, it is not unexpected to see a change in the relative dominance of major taxa groups.

[29] Note that the BACI analysis was run as a two-tailed test, to better define the significance of enriching effects (**Section 2.5.3**)

Taxa Richness

In 2024, total taxa richness in most NF areas was within their respective historical ranges and generally consistent with baseline/reference conditions. The main exception is KAN, which has had progressively higher taxa richness. In 2024, there were large (29–61%) apparent increases in taxa richness at NF areas WTS, KAN, and NEM. Lakes A20, A76, and DS1 showed small increases (3-19%). In 2024, the BACI analysis found significant changes in benthic invertebrate taxa richness at KAN and NEM (p-values <0.1; **Table 5-13**). In other time periods, there were significant (p-value <0.1) increases in benthic invertebrate taxa richness at WTS (2022-24 and 2023-24), at A20 (2021-24 and 2022-24), and at KAN and NEM (2021-24, 2022-24, 2023-24) compared to baseline/reference. In 2024, the effect sizes were slightly higher than the threshold (reduced or increased by 50%) for the two statistically significant changes observed at Whale Tail area lakes (i.e., for KAN and NEM which increased by ~60%). While there may be some influence of mining activities at NF areas, the results can likely be attributed to natural variability.

Major Taxa Richness

The taxa observed in Meadowbank lakes were also documented during the baseline period for Whale Tail lakes. Taxa richness in Whale Tail lakes typically ranges from 10 to 20 taxa (**Figure 5-26**), with insects dominating both the number of taxa (**Figure 5-27**) and their proportion of total sample richness (**Figure 5-28**). Molluscs are the second most dominant group in terms of species count and relative richness.

Insects were dominant in terms of absolute and proportional richness (generally from 6 to 11 taxa), followed by molluscs (2-3 taxa; **Figure 5-27** and **Figure 5-28**). In 2024, there were less oligochaetes and other taxa at A20 compared to previous years. For the other Whale Tail area lakes, the 2024 results were similar to previous years and showed that there were no apparent trends in composition related to mining.

Causality

Evidence for causality is stronger for natural variability versus mining activity. Mining activity can lead to two types of effects: adverse changes (e.g., due to direct toxicity) or stimulatory effects (e.g., due to nutrient enrichment). The apparent changes described above reflect stimulatory responses to abundance and richness, so could be related to nutrient enrichment. From the perspective of the benthic community, mining-related nutrient enrichment should ultimately translate into higher sediment TOC concentrations due to higher primary productivity. However, as discussed in the sediment chemistry results (**Section 5.5.2**), increases in sediment TOC have not been observed at the Whale Tail study area lakes in response to mining activity. That said, there are substantial differences in sediment TOC among lakes that likely reflects their long-term ability to respond to naturally varying conditions affecting primary productivity, both in the water column and in littoral zone sediments. At the low TOC

end (e.g., generally <5%) are both reference areas (INUG and PDL) and DS1, all larger, deeper lakes. In contrast, KAN has the highest sediment TOC concentrations (~10%), followed by NEM and A76 (~7.5%) and WTS and A20 (~5%); these lakes are smaller and shallower. Thus, while we cannot rule out a contribution from mining activity, the available evidence provides little support for that as the main driver of the observed stimulatory effects to the benthic invertebrate community.

5.6.4 Summary and Recommendations

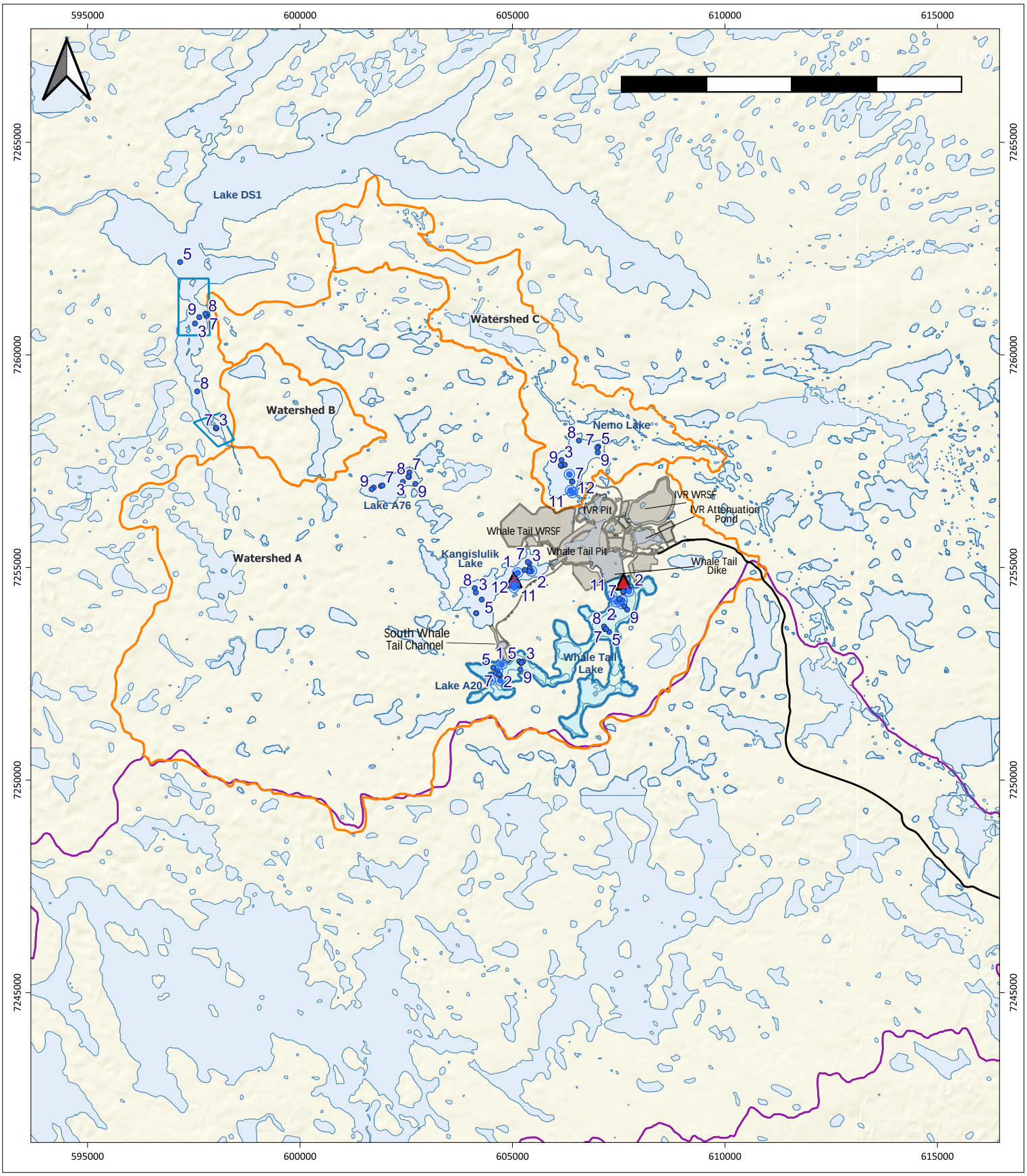
Total abundance at all NF areas were within their respective historical ranges and generally consistent with baseline/reference conditions. Significant increases in benthic invertebrate abundance were observed at KAN and NEM across all time periods compared to baseline/reference. In 2021-24, 2022-24 and 2023-24, there were significant increases at WTS. In 2022-24 there was a significant increase at A20. In 2024, there was a significant increase at DS1. While nutrient inputs from mining activities may influence benthic abundance, distinguishing effects from mining related changes and environmental variability remains challenging.

For taxa richness, increases were observed at WTS, KAN, NEM and to a lesser extent at A20, A76, and DS1. Significant increases were observed at WTS in 2022-24 and 2023-24, at KAN and NEM all time periods, and at A20 in 2021-24 and 2022-24 compared to baseline/reference. Although episodic nutrient enrichment and increased phytoplankton production have been observed in the water column (**Section 5.4.3**), no corresponding increases in sediment TOC have occurred to suggest that these changes in benthic parameters are driven by an enrichment effect (**Figure 5-20**).

Overall, the apparent changes in the benthic community in 2024 are more likely attributed to natural variability rather than mining activity. **Continued monitoring in 2025 will help further understand the causality of apparent changes in the benthic community**.

5.7 Whale Tail Tables and Figures

This section includes tables and figures for the Whale Tail study areas, except for large tabulated data and figures for parameters not covered in the detailed analysis (refer to in-text references for relevant appendices). Subsections are organized by CREMP components including limnology, water chemistry, phytoplankton, sediment chemistry, and benthos.



Legend

- Kangislulik & Whale Tail Lake Diffusers
- Haul Road
- Water Sampling Areas in Lake DS1
- Impoundment Area
- Amaruq Watersheds
- Regional Watersheds
- Limno
- Water *

Note:
* Water samples are collected from fixed monitoring locations in the project lakes where the water depth is at least 5 m.



AZIMUTH

Client	Agnico Eagle Mines Limited Meadowbank Division
Figure 5-1	Whale Tail Study Area - 2024 Water Quality Sampling Stations
Project	CREMP 2024 Meadowbank Complex

Date: March 17, 2025
Datum: NAD 83 UTM Zone 14N
Scale: 1:120,000
Software: QGIS Version 3.22.11-Białowieża
By: M. DiMauro, E. Franz

REFERENCES:
1. Basemap imagery from ESRI.
2. Mine plan and sub-watershed boundary layers from Agnico Eagle.
3. Watershed boundaries and watercourse from NRCan.

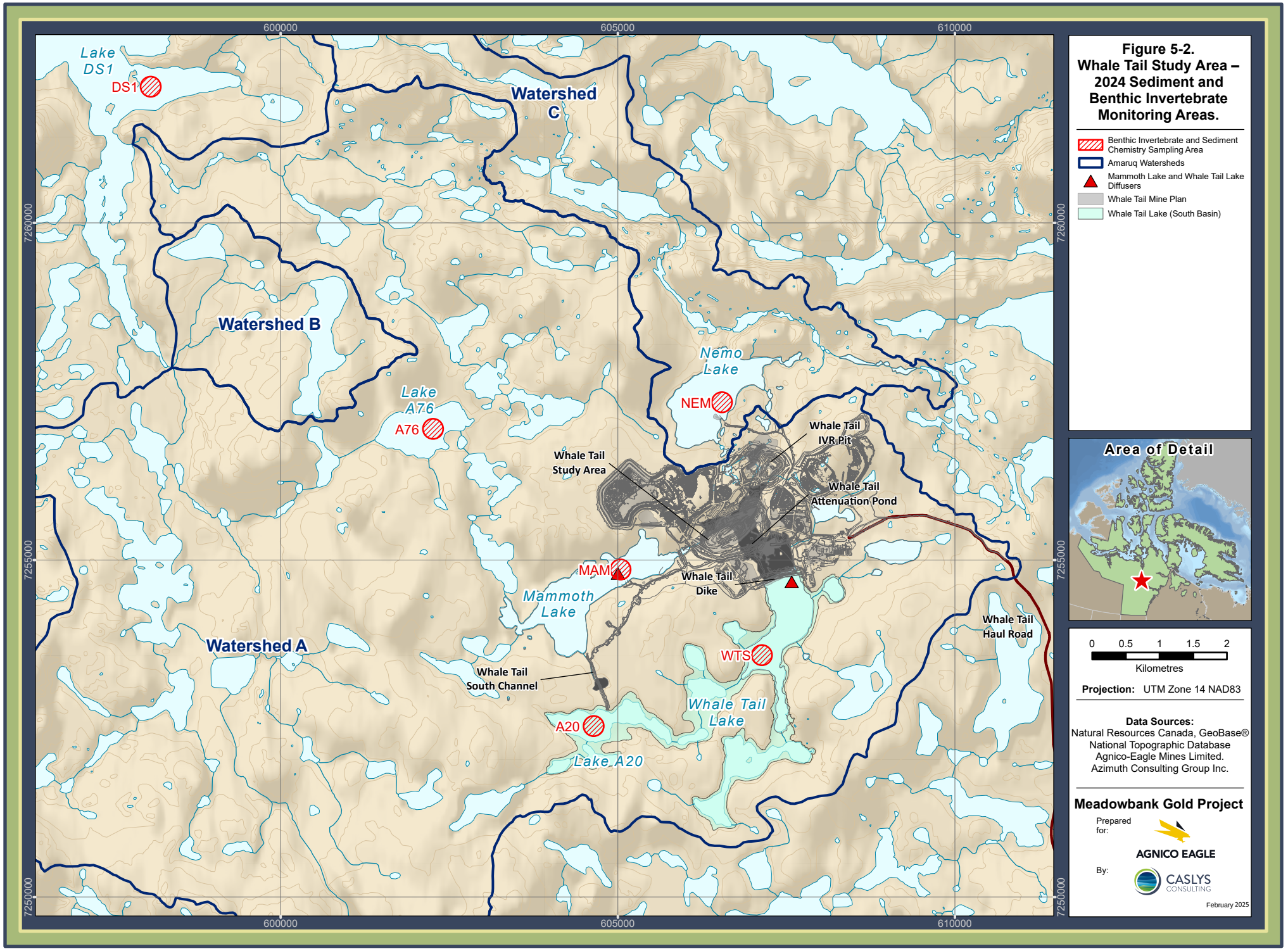


Figure 5-2.
Whale Tail Study Area – 2024 Sediment and Benthic Invertebrate Monitoring Areas.

- Benthic Invertebrate and Sediment Chemistry Sampling Area
- Amaruq Watersheds
- Mammoth Lake and Whale Tail Lake Diffusers
- Whale Tail Mine Plan
- Whale Tail Lake (South Basin)

Area of Detail

0 0.5 1 1.5 2
Kilometres

Projection: UTM Zone 14 NAD83

Data Sources:
Natural Resources Canada, GeoBase® National Topographic Database
Agnico-Eagle Mines Limited.
Azimuth Consulting Group Inc.

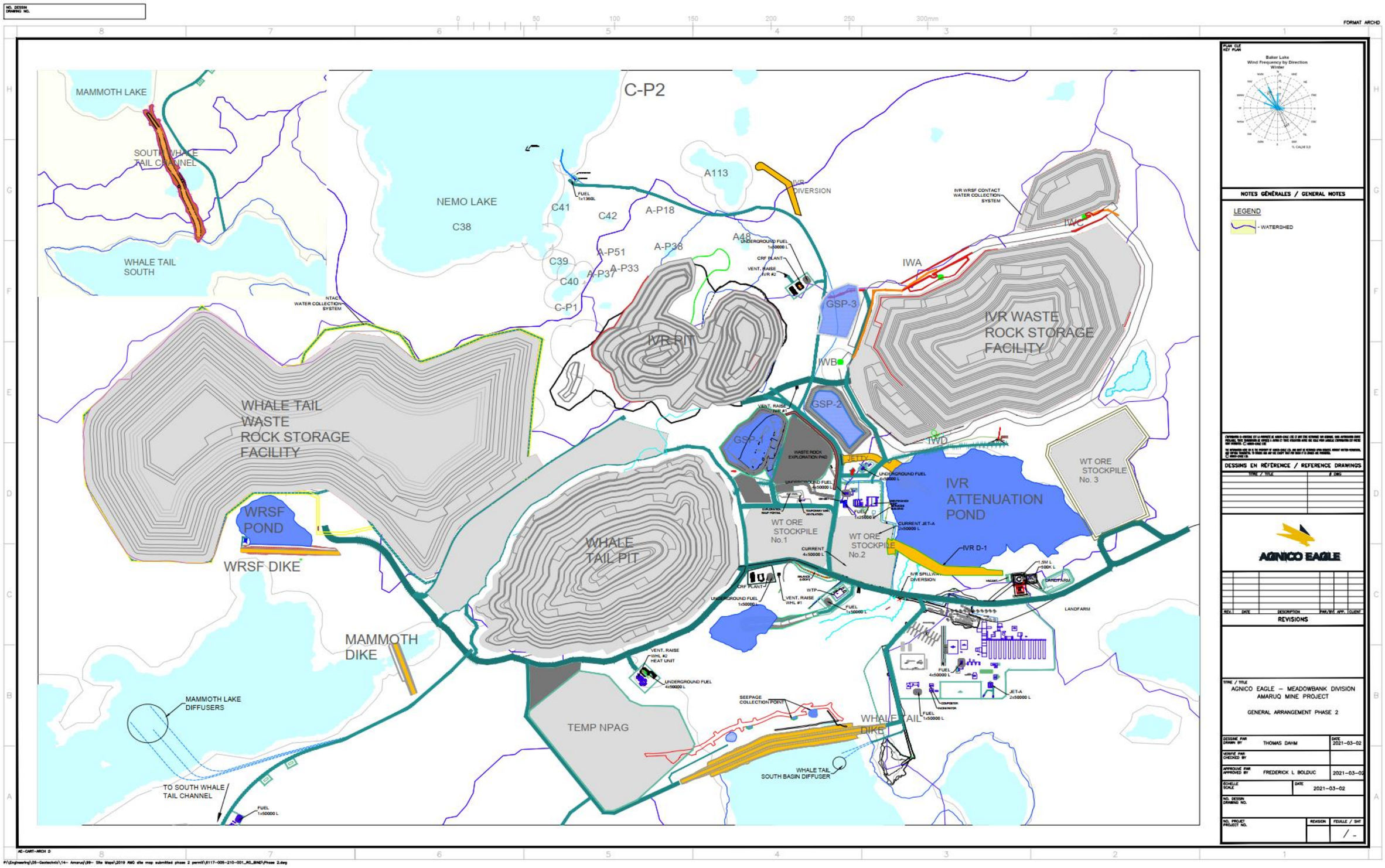
Meadowbank Gold Project

Prepared for: AGNICO EAGLE

By: CASLYS CONSULTING

February 2025

Figure 5-3. Whale Tail mine plan showing the location of the Whale Tail Dike and other site infrastructure.



Limnology Tables and Figures

Figure 5-4. Mean monthly field-measured temperature (°C) at 3 m depth since 2014, Whale Tail study area lakes.

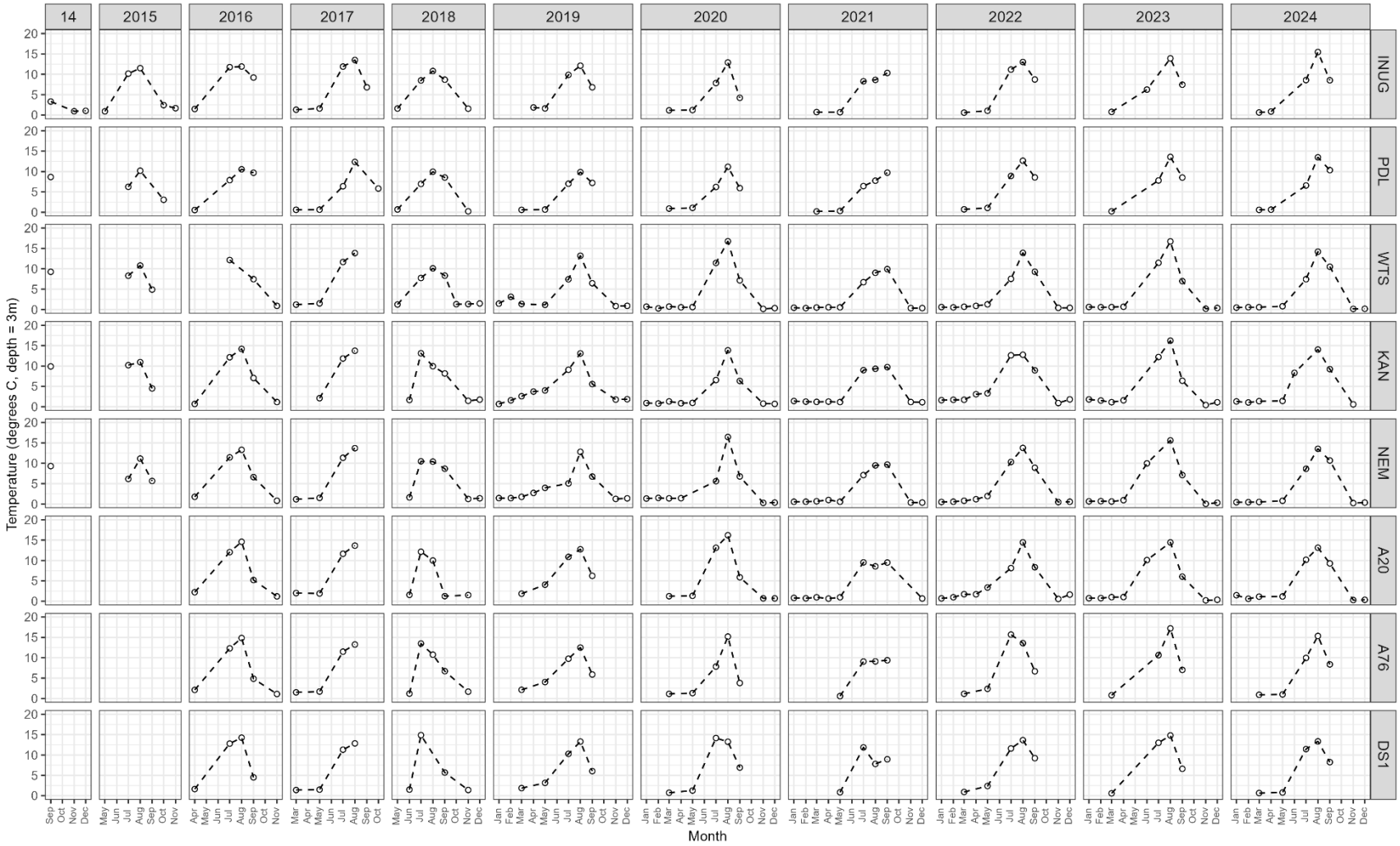


Figure 5-5. Whale Tail – Field-measured temperature profiles, 2024.

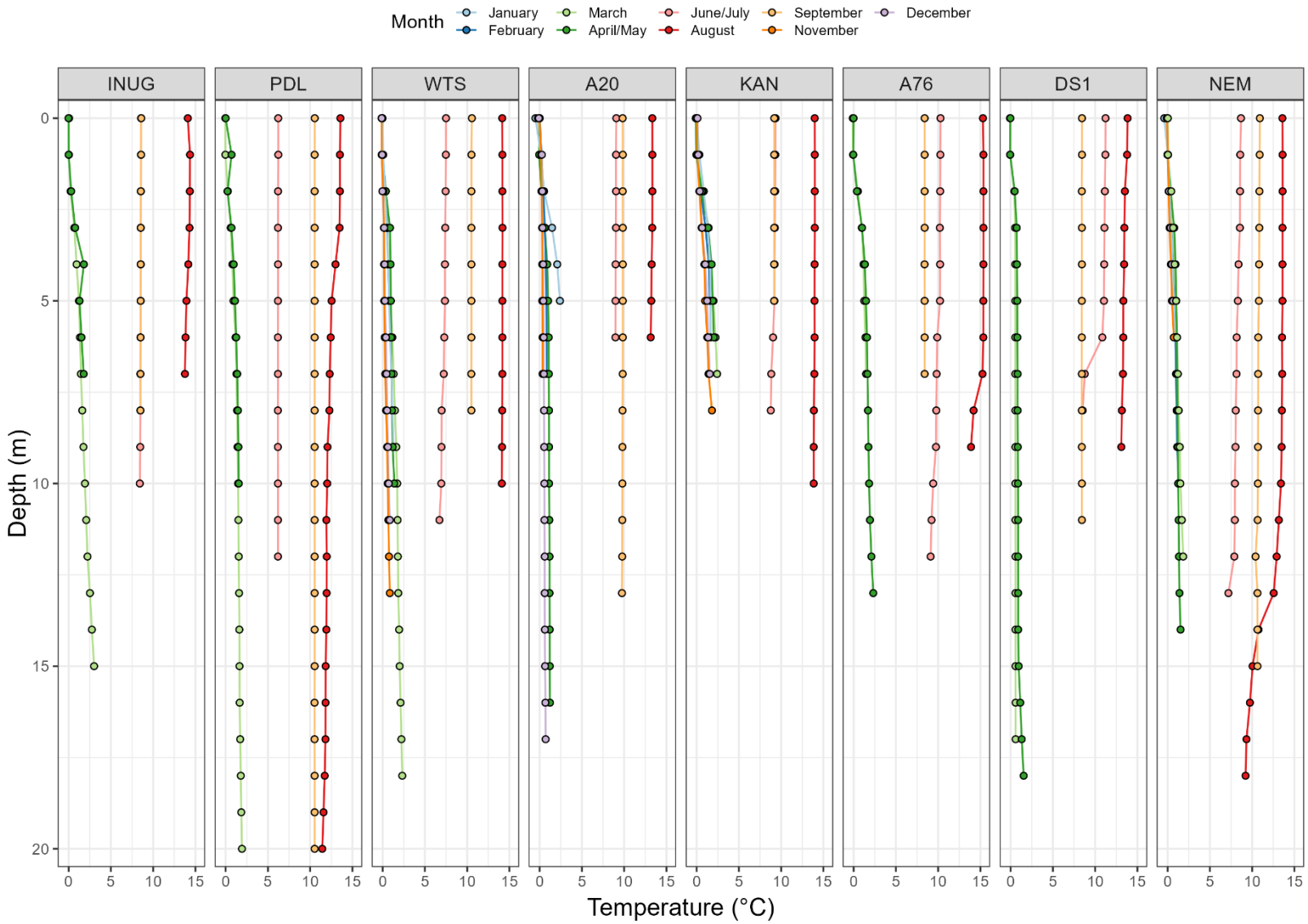


Figure 5-6. Whale Tail – Field-measured dissolved oxygen profiles, 2024.

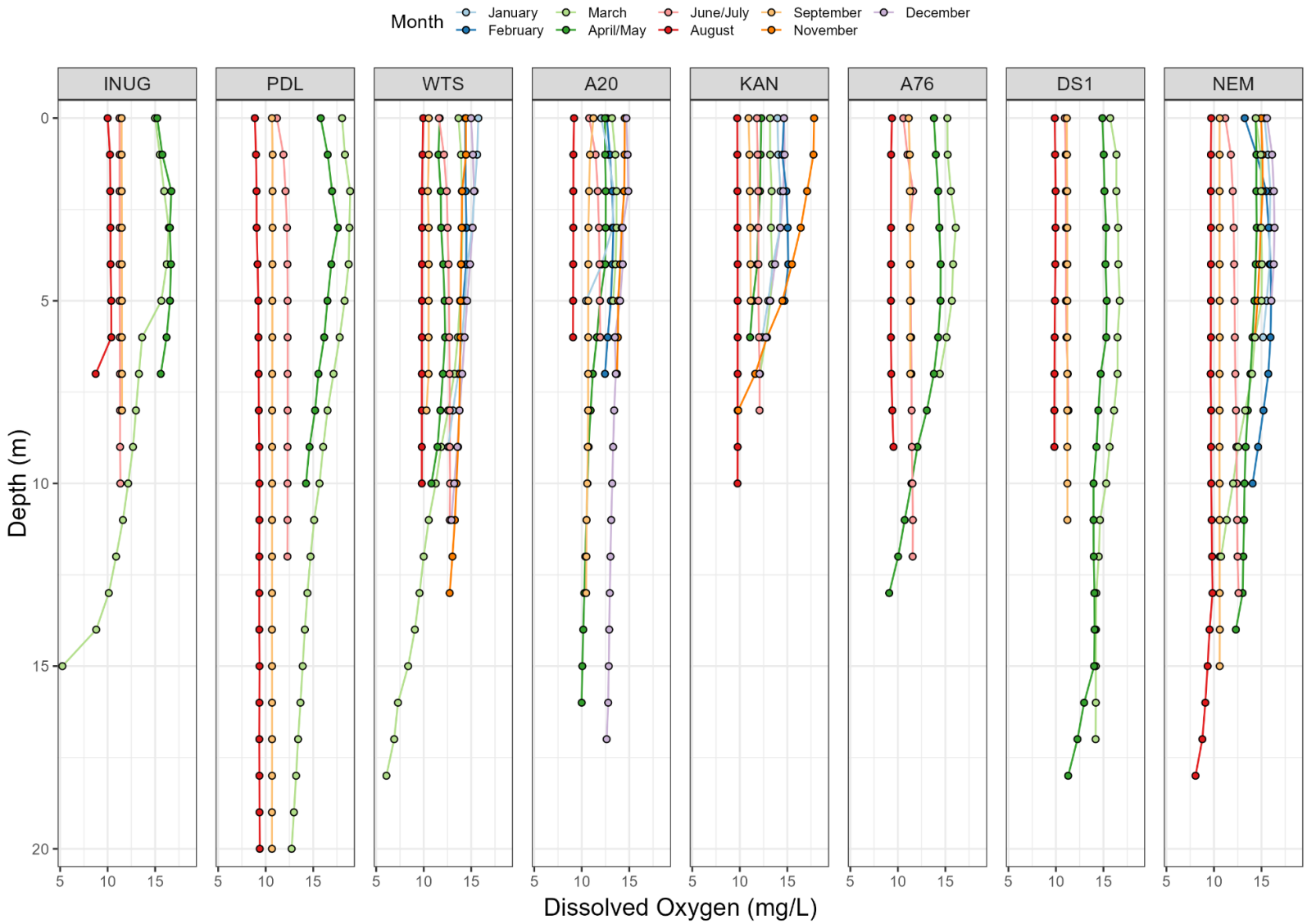
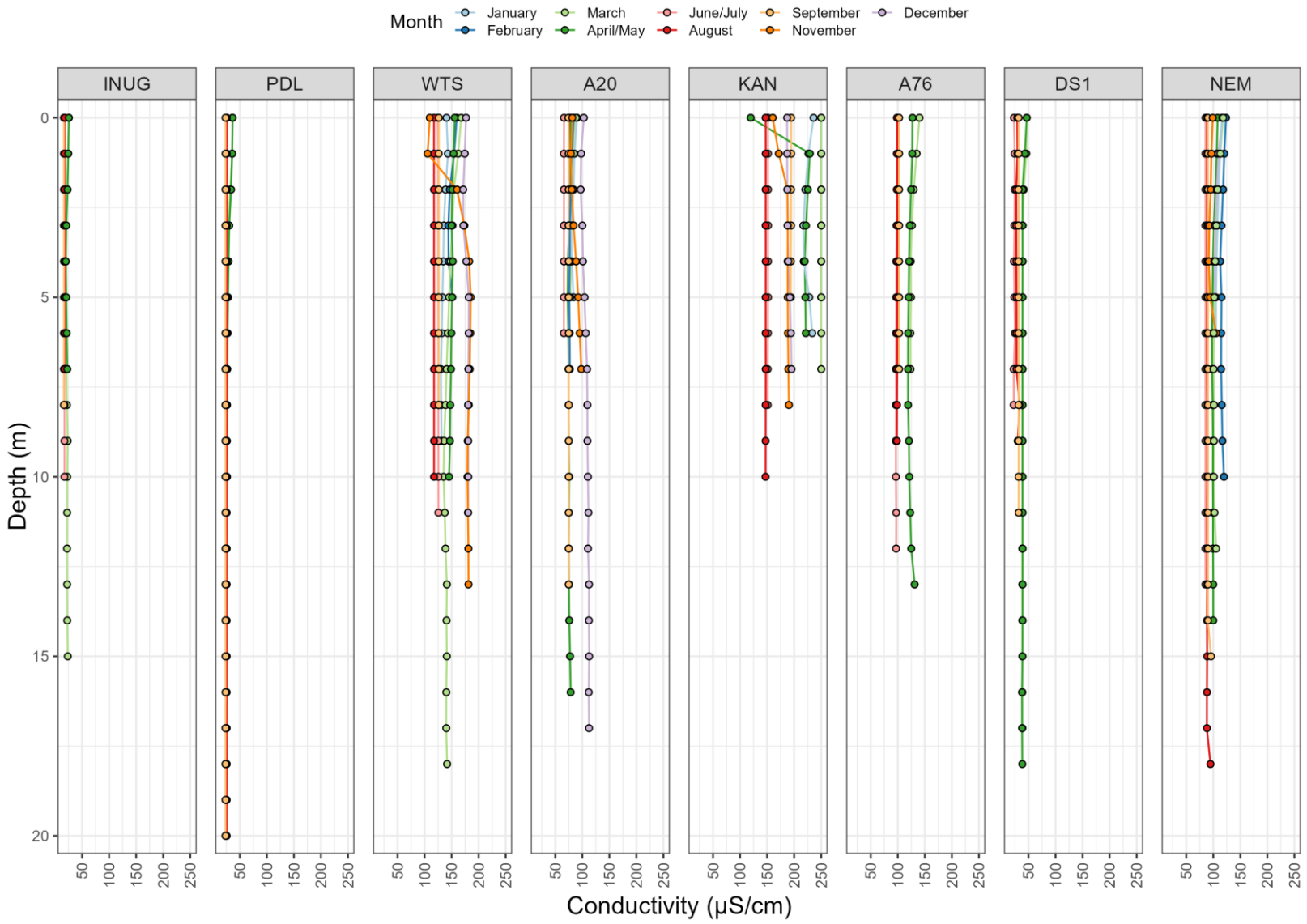


Figure 5-7. Whale Tail – Field-measured conductivity profiles, 2024.



Water Chemistry Tables and Figures

Table 5-5. Screening process for water quality parameters, Whale Tail study area lakes, 2024.

Parameters	Trigger Exceedance[2]	Screening Level and Rule[1] 1 >DL ≥ 10% Frequency	2 C-I > 0.1 Frequency	3 Pattern = Activity
CONVENTIONALS				
Conductivity	All stations except DS1	**Yes**		
TSS	-	**Yes**		
Hardness	All stations except DS1	**Yes**		
T-Alkalinity	All stations except DS1	**Yes**		
B-Alkalinity	All stations except DS1	**Yes**		
C-Alkalinity	-	No	No	No
TDS & MAJOR IONS				
TDS	All stations except DS1	**Yes**		
Calcium	All stations except DS1	**Yes**		
Chloride	-	**Yes**		
Fluoride	-	**Yes**		
Magnesium	All stations except DS1	**Yes**		
Potassium	All stations except DS1	**Yes**		
Sodium	All stations	**Yes**		
Sulphate	-	**Yes**		
NUTRIENTS & OTHERS				
Ammonia-N	-	**Yes**		
Nitrate-N	-	**Yes**		
Nitrite-N	-	**Yes**		
TKN	All stations except NEM and A76	**Yes**		
T-phosphorus	WTS	**Yes**		
Ortho-phosphate	-	**Yes**		
DOC	All stations except NEM and A76	**Yes**		
TOC	All stations except NEM and A76	**Yes**		
Reactive silica	-	**Yes**		
T-Cyanide	-	No	No	No
Free Cyanide	-	No	No	No

Parameters	Trigger Exceedance[2]	Screening Level and Rule[1] 1 >DL ≥ 10% Frequency	2 C-I > 0.1 Frequency	3 Pattern = Activity
TOTAL METALS				
Aluminum	-	**Yes**		
Antimony	-	**Yes**		
Arsenic	-	**Yes**		
Barium	-	**Yes**		
Beryllium	-	No	No	No
Boron	-	No	No	No
Cadmium	-	No	No	No
Chromium	-	**Yes**		
Copper	-	**Yes**		
Iron	-	**Yes**		
Lead	-	No	No	No
Lithium	WTS and KAN	**Yes**		
Manganese	-	**Yes**		
Mercury	-	No	No	No
Molybdenum	-	**Yes**		
Nickel	-	**Yes**		
Selenium	-	**Yes**		
Silicon	DS1	**Yes**		
Silver	-	No	No	No
Strontium	-	**Yes**		
Thallium	-	No	No	No
Tin	-	No	No	No
Titanium	INUG, WTS, DS1, NEM	**Yes**		
Uranium	-	**Yes**		
Vanadium	-	No	No	No
Zinc	-	No	No	No

Parameters	Trigger Exceedance[2]	Screening Level and Rule[1] 1 >DL ≥ 10% Frequency	2 C-I > 0.1 Frequency	3 Pattern = Activity
DISSOLVED METALS				
Aluminum	-	**Yes**		
Antimony	-	**Yes**		
Arsenic	-	**Yes**		
Barium	-	**Yes**		
Beryllium	-	No	No	No
Boron	-	No	No	No
Cadmium	-	No	No	No
Chromium	-	**Yes**		
Copper	-	**Yes**		
Iron	-	**Yes**		
Lead	-	**Yes**		
Lithium	WTS and KAN	**Yes**		
Manganese	-	**Yes**		
Mercury	-	No	No	No
Molybdenum	-	**Yes**		
Nickel	-	**Yes**		
Selenium	-	No	No	No
Silicon	DS1	**Yes**		
Silver	-	No	No	No
Strontium	-	**Yes**		
Thallium	-	No	No	No
Tin	-	No	No	No
Titanium	-	No	No	No
Uranium	-	**Yes**		
Vanadium	-	No	No	No
Zinc	A20, WTS, and NEM	**Yes**		

Notes:

1. A three-step assessment process was used to identify parameters to include in the formal temporal and spatial trend assessment (**Section 2.5.1** and **Section 4.3.2**).
   Parameters were assigned a "Yes" if the following assessment was true:

(1) **>DL ≥ 10% Frequency**: parameters that exceeded MDLs in at least 10% of the samples.
(2) **C-I > 0.1 Frequency**: parameters that were detected more often in impact areas and the proportion of detected values increased by 0.1 or more.
(3) **Pattern = Activity**: additional step to avoid screening out potentially important parameters. Based on the trend plots, is there a trend for infrequently detected parameters and/or are there values > 5 x DL in at least one sampling event at NF areas?

2. Indicates that a trigger exceedance occurred at the listed Whale Tail study area lakes in one or more sampling event.

Shaded parameters are included in the temporal and spatial trend assessment.

Plots for all individual parameters are presented in **Appendix C2**.

Table 5-6. Water quality variables at the Whale Tail study area lakes for which 2024 mean concentrations exceeded the trigger.

Parameter	Trigger	Threshold	2024 Mean					
			WTS	KAN	NEM	A20	A76	DS1
			NF	NF	NF	MF	MF	FF
Conventionals								
Conductivity	48.6	-	135	192	95.6	81.4	111	-
Hardness	17.4	-	49.1	70.6	36.9	29.4	41.0	-
HCO_3 alkalinity	9.6	-	21.8	25.5	14.8	15.6	17.0	-
Total alkalinity	9.6	-	21.8	25.5	14.8	15.6	17.0	-
TDS & Major Ions								
TDS	38.5	-	89.7	142	71.9	54.1	76.5	-
Calcium	4.6	-	13.2	20.2	10.5	7.8	11.2	-
Magnesium	1.4	-	3.9	4.9	2.6	2.4	3.2	-
Potassium	0.84	-	3.3	4.4	1.8	1.9	2.5	-
Sodium	0.97	-	3.0	3.7	1.0	2.0	2.2	1.5
Nutrients								
TKN	0.17	-	0.26	0.26	-	0.21	-	0.18
Total phosphorus	0.0045	0.01	0.0050	-	-	-	-	-
TOC	2.4	-	3.2	2.6	-	2.9	-	2.8
DOC	2.4	-	3.3	2.7	-	2.9	-	2.7
Metals								
Lithium (T)	0.0020	-	0.0022	0.0030	-	-	-	-
Silicon (T)	0.57	-	-	-	-	-	-	0.64
Lithium (D)	0.0020	-	0.0023	0.0031	-	-	-	-
Silicon (D)	0.57	-	-	-	-	-	-	0.60

Notes:
"-" indicates mean annual concentration was < the trigger value.
Reported mean values are all in units of mg/L except for conductivity (µS/cm).

Table 5-7. Results of BACI tests for selected water variables at the Whale Tail study area lakes in 2024.

Parameter	Test Area	n(B)	n(A)	Estimate	SE	P-value[1]	Proportional change exp(Est)	LCI	UCI
Conventionals									
Conductivity	WTS	14	5	1.3	0.14	**< 0.001**	3.8	2.8	5.2
	KAN	15	5	1.4	0.15	**< 0.001**	3.9	2.8	5.4
	A20	13	5	1.4	0.064	**< 0.001**	4.2	3.7	4.8
	A76	13	5	0.97	0.084	**< 0.001**	2.6	2.2	3.1
	NEM	20	5	1.0	0	**< 0.001**	2.8	2.8	2.8
Hardness	WTS	14	5	1.4	0.13	**< 0.001**	3.9	2.9	5.2
	KAN	15	5	1.4	0.15	**< 0.001**	4.0	2.9	5.4
	A20	13	5	1.5	0.069	**< 0.001**	4.4	3.8	5.1
	A76	13	5	0.98	0.076	**< 0.001**	2.7	2.3	3.1
	NEM	20	5	1.1	0	**< 0.001**	2.9	2.9	2.9
HCO_3 alkalinity	WTS	13	5	1.3	0.051	**< 0.001**	3.7	3.3	4.1
	KAN	14	5	1.3	0.069	**< 0.001**	3.8	3.3	4.4
	A20	13	5	0.87	0.073	**< 0.001**	2.4	2.0	2.8
	A76	13	5	0.73	0.046	**< 0.001**	2.1	1.9	2.3
	NEM	19	5	0.44	0.046	**< 0.001**	1.6	1.4	1.7
Total alkalinity	WTS	13	5	1.3	0.051	**< 0.001**	3.7	3.3	4.1
	KAN	14	5	1.3	0.069	**< 0.001**	3.8	3.3	4.4
	A20	13	5	0.87	0.073	**< 0.001**	2.4	2.0	2.8
	A76	13	5	0.73	0.046	**< 0.001**	2.1	1.9	2.3
	NEM	19	5	0.44	0.046	**< 0.001**	1.6	1.4	1.7
Nutrients & Others									
TKN	WTS	13	5	0.47	0.093	**< 0.001**	1.6	1.3	2.0
	KAN	14	5	0.50	0.10	**< 0.001**	1.7	1.3	2.1
	A20	13	5	0.46	0.12	**< 0.001**	1.6	1.2	2.0
	DS1	13	5	0.059	0.096	0.28	1.1	0.86	1.3
Total phosphorus	WTS	14	5	0.34	0.26	0.10	1.4	0.82	2.4
TOC	WTS	14	5	0.26	0.054	**< 0.001**	1.3	1.2	1.4
	KAN	15	5	0.16	0.069	**0.016**	1.2	1.0	1.4
	A20	13	5	0.36	0.070	**< 0.001**	1.4	1.2	1.7
	DS1	13	5	0.068	0.070	0.17	1.1	0.92	1.2
DOC	WTS	14	5	0.19	0.049	**< 0.001**	1.2	1.1	1.3
	KAN	15	5	0.15	0.072	**0.024**	1.2	1.0	1.4
	A20	13	5	0.30	0.074	**< 0.001**	1.3	1.1	1.6
	DS1	13	5	0.0076	0.077	0.46	1.0	0.86	1.2
TDS & Major Ions									
TDS	WTS	13	5	1.3	0.19	**< 0.001**	3.7	2.5	5.5
	KAN	14	5	1.5	0.21	**< 0.001**	4.3	2.8	6.7
	A20	13	5	1.3	0.14	**< 0.001**	3.5	2.6	4.7
	A76	13	5	1.0	0.13	**< 0.001**	2.8	2.1	3.8
	NEM	19	5	1.2	0.12	**< 0.001**	3.5	2.7	4.5
Calcium	WTS	14	5	1.4	0.18	**< 0.001**	3.9	2.7	5.7
	KAN	15	5	1.4	0.18	**< 0.001**	4.1	2.8	6.0
	A20	13	5	1.5	0.077	**< 0.001**	4.4	3.8	5.2
	A76	13	5	1.0	0.079	**< 0.001**	2.7	2.3	3.2
	NEM	20	5	1.3	0	**< 0.001**	3.5	3.5	3.5
Magnesium	WTS	14	5	1.3	0.10	**< 0.001**	3.7	2.9	4.6
	KAN	15	5	1.3	0.11	**< 0.001**	3.6	2.8	4.6
	A20	13	5	1.4	0.081	**< 0.001**	4.1	3.5	4.9
	A76	13	5	0.87	0.063	**< 0.001**	2.4	2.1	2.7
	NEM	20	5	0.64	0.040	**< 0.001**	1.9	1.7	2.1
Potassium	WTS	14	5	1.8	0.11	**< 0.001**	6.0	4.8	7.6
	KAN	15	5	1.7	0.11	**< 0.001**	5.4	4.3	6.8
	A20	13	5	1.5	0.095	**< 0.001**	4.3	3.5	5.3
	A76	13	5	1.1	0.067	**< 0.001**	3.0	2.6	3.4
	NEM	20	5	0.92	0.058	**< 0.001**	2.5	2.2	2.8
Sodium	WTS	14	5	1.4	0.082	**< 0.001**	4.0	3.4	4.8
	KAN	15	5	1.5	0.096	**< 0.001**	4.6	3.8	5.6
	A20	13	5	0.97	0.089	**< 0.001**	2.6	2.2	3.2
	A76	13	5	1.00	0.063	**< 0.001**	2.7	2.4	3.1
	DS1	13	5	0.34	0.12	**0.0056**	1.4	1.1	1.8
	NEM	20	5	0.49	0.049	**< 0.001**	1.6	1.5	1.8
Metals									
T. Lithium	WTS	14	5	0.71	0.065	**< 0.001**	2.0	1.8	2.3
	KAN	15	5	0.81	0.16	**< 0.001**	2.3	1.6	3.1
T. Silicon	DS1	13	5	-0.15	0.20	0.77	0.86	0.57	1.3
D. Lithium	WTS	14	5	0.79	0.039	**< 0.001**	2.2	2.0	2.4
	KAN	15	5	0.89	0.15	**< 0.001**	2.4	1.8	3.3
D. Silicon	DS1	13	5	-0.090	0.23	0.65	0.91	0.56	1.5

Notes:

1. **Bolded** p-values are statistically significant ($p < 0.05$).

Test area = impact area compared to control area (INUG).

n(B) = number of paired months in the "before" period.

n(A) = number of paired months in the “after” period (i.e., in 2024).
Estimate = BACI model estimate of the 2024 change in mean for log-transformed data.
SE = standard error of the estimate.
P-value = one-tailed test of the null hypothesis (no change or a decrease in mean [opposite for lower pH trigger]).
Exp(Est) = estimated proportional change.
LCI = lower 95% confidence interval; UCI = upper 95% confidence interval.

Table 5-8. Sampling effort and frequency assessment results for the Whale Tail study area lakes, 2024.

Areas	Area Designation	Triggers Exceeded?	Minor Changes [1]		Moderate Changes [2]		Major Changes [3]		Plan for 2025
		Yes/No	Yes/No	Parameters	Yes/No	Parameters	Yes/No	Parameters	
Sampling Strategy for Near-field Areas									
WTS	NF	Yes	Yes	Cond., Hard., TDS, Alkalinity (HCO_3 & Total), TKN, T.Phosphorus, TOC, DOC, Ca, Mg, K, Na, T. & D Lithium	No	-	No	-	Full CREMP (near-field area)
KAN	NF	Yes	Yes	Cond., Hard., TDS, Alkalinity (HCO_3 & Total), TKN, TOC, DOC, Ca, Mg, K, Na, T. & D Lithium	No	-	No	-	Full CREMP (near-field area)
NEM	NF	Yes	Yes	Cond., Hard., TDS, Alkalinity (HCO_3 & Total), Ca, Mg, K, Na	No	-	No	-	Full CREMP (near-field area)
Sampling Strategy for Mid-field and Far-field Areas									
A20	MF	Yes	Yes	Cond., Hard., TDS, Alkalinity (HCO_3 & Total), TKN, TOC, DOC, Ca, Mg, K, Na	No	-	No	-	Full water sampling
A76	MF	Yes	Yes	Cond., Hard., TDS, Alkalinity (HCO_3 & Total), Ca, Mg, K, Na	No	-	No	-	Full water sampling
DS1	FF	Yes	Yes	Na, TKN, TOC, DOC, T. & D. Silicon	No	-	No	-	Full water sampling

Notes:

1. Minor = exceedance of the early warning trigger values for parameters without effects-based threshold values.
2. Moderate = exceedance of the early warning trigger values for parameters with effects-based thresholds.
3. Major = exceedance of the effects-based threshold values.

Table 5-9. Number of monthly mean concentrations exceeding monthly FEIS screening predictions, annual mean trigger exceedances and trend directions for parameters in Kangislulik Lake and Whale Tail South in 2024.

	Number of Monthly Exceedances of FEIS Predictions [1]		Annual Mean Exceeds Trigger		Direction of Change [2]	
Parameter	**Whale Tail South**	**Kangislulik Lake**	**Whale Tail South**	**Kangislulik Lake**	**Whale Tail South**	**Kangislulik Lake**
Conventionals						
Total Alkalinity	5	5	**Yes**	**Yes**	=	↑
TDS & Major Ions						
TDS	5	5	**Yes**	**Yes**	↓	=
Chloride	5	5	No	No	=	↑
Fluoride	5	5	No	No	↑	=
Calcium	5	5	**Yes**	**Yes**	=	↑
Potassium	5	5	**Yes**	**Yes**	=	↑
Magnesium	5	5	**Yes**	**Yes**	↑	=
Sodium	2	5	**Yes**	**Yes**	=	=
Sulphate	5	5	No	No	=	↑
Nutrients						
Ammonia (as N)	0	0	No	No	↑	↑
Nitrate (as N)	0	2	No	No	↓	↑
Total Phosphorus	0	0	**Yes**	No	↓	↑
Total Metals						
Aluminum	3	3	No	No	↑	↓
Antimony	0	5	No	No	=	↑
Arsenic	0	0	No	No	=	↑
Barium	5	5	No	No	=	=
Chromium	2	1	No	No	↓	=
Iron	1	0	No	No	↑	↑
Lithium	5	5	**Yes**	**Yes**	↓	↑
Molybdenum	4	4	No	No	=	↑
Nickel	0	0	No	No	=	↑
Strontium	5	5	No	No	=	=
Uranium	0	1	No	No	↓	=
Total	**67**	**76**	-	-		

Notes:

1 In all cases, five months of data were available.

2 Qualitative direction of trend at the end of 2024 sampling.

Shaded values indicate parameter exceeded FEIS prediction during all 2024 monthly sampling events.

Bolded and underlined values indicate yearly mean exceeded trigger.

Bolded arrows indicate parameter concentrations appeared to be increasing in last sampling events of 2024.

Figure 5-8. Flow chart showing sampling effort and frequency plan for mid-field and far-field sampling at the Whale Tail study area lakes in 2024.

Note: Blue-shaded cells show the linkage between 2024 CREMP results and the sampling effort and frequency for mid-field and far-field sampling in 2025. *Moderate changes* refer to statistically significant increased concentrations for parameters with effects-based threshold values that exceed the early warning trigger values. Refer to **Section 2.4** for more information.

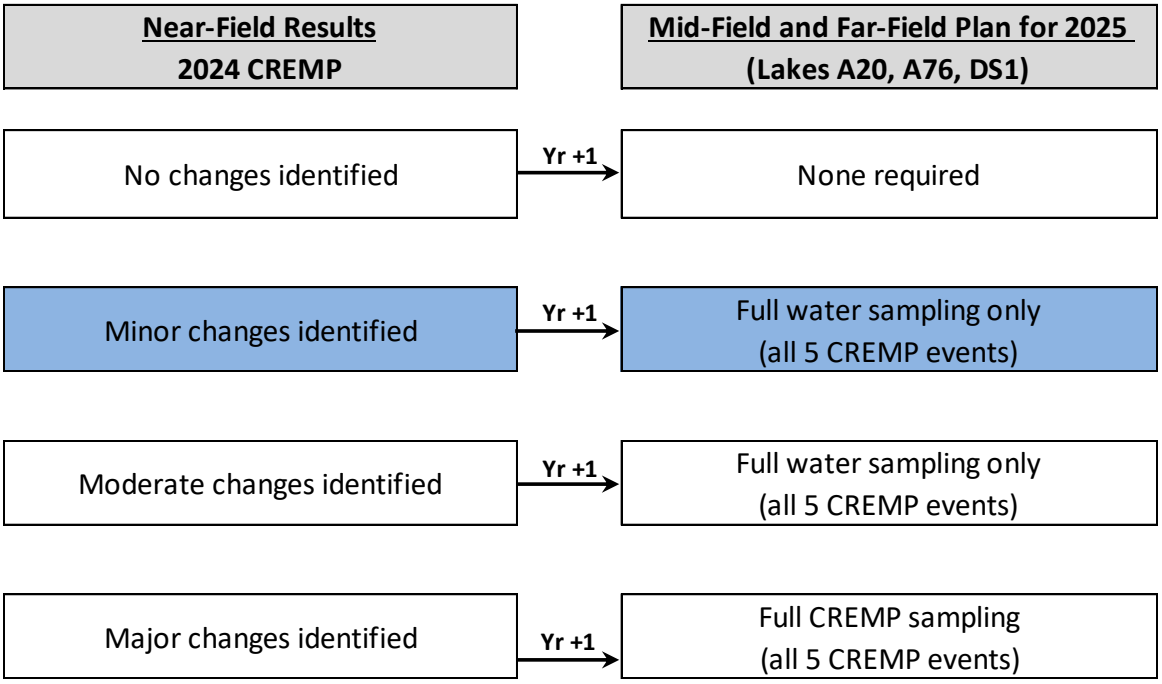


Figure 5-9. Conventional parameters measured in water samples from Whale Tail study area lakes since 2014.

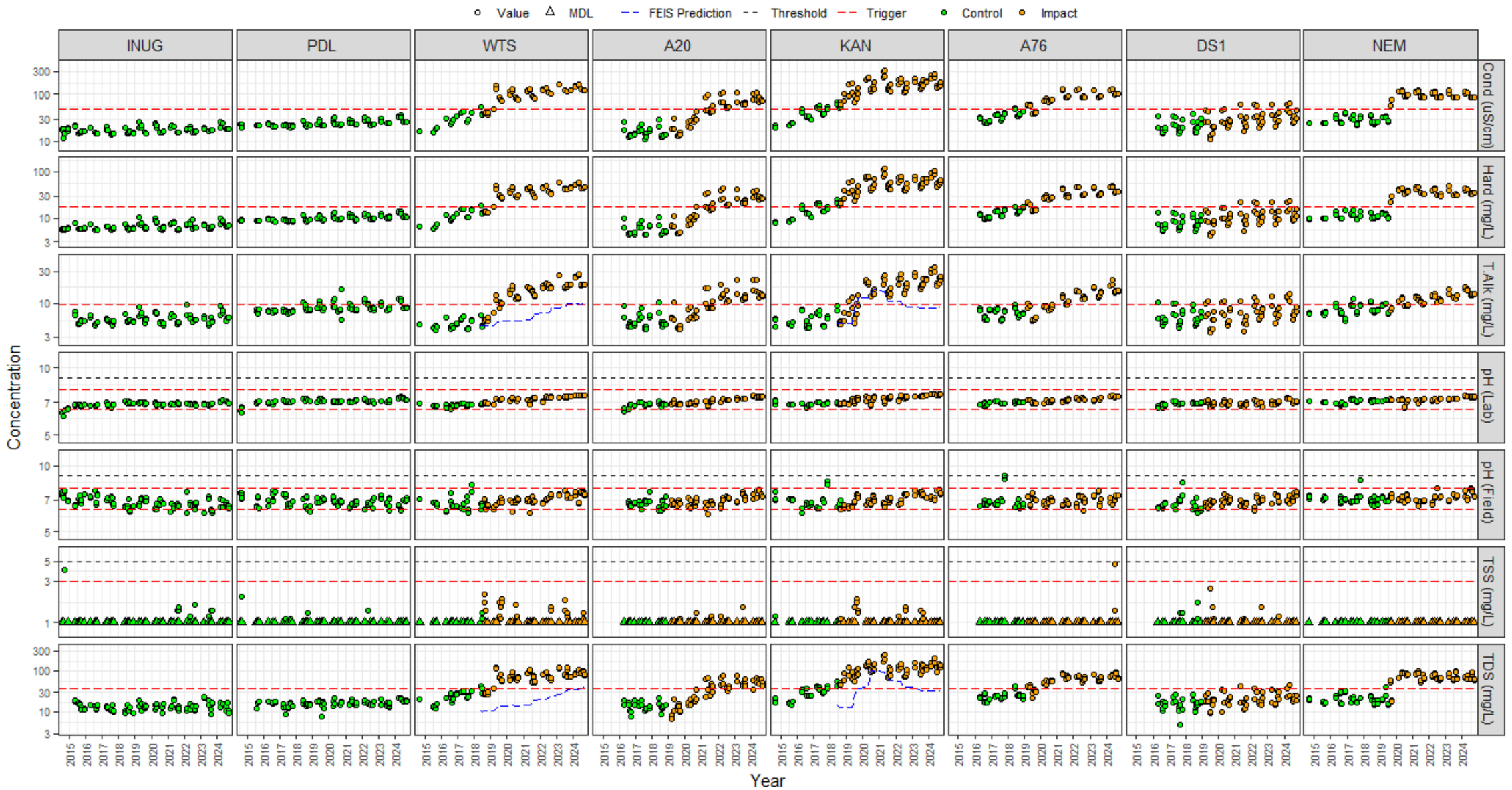


Figure 5-10. Major ions (mg/L) measured in water samples from Whale Tail study area lakes since 2014.

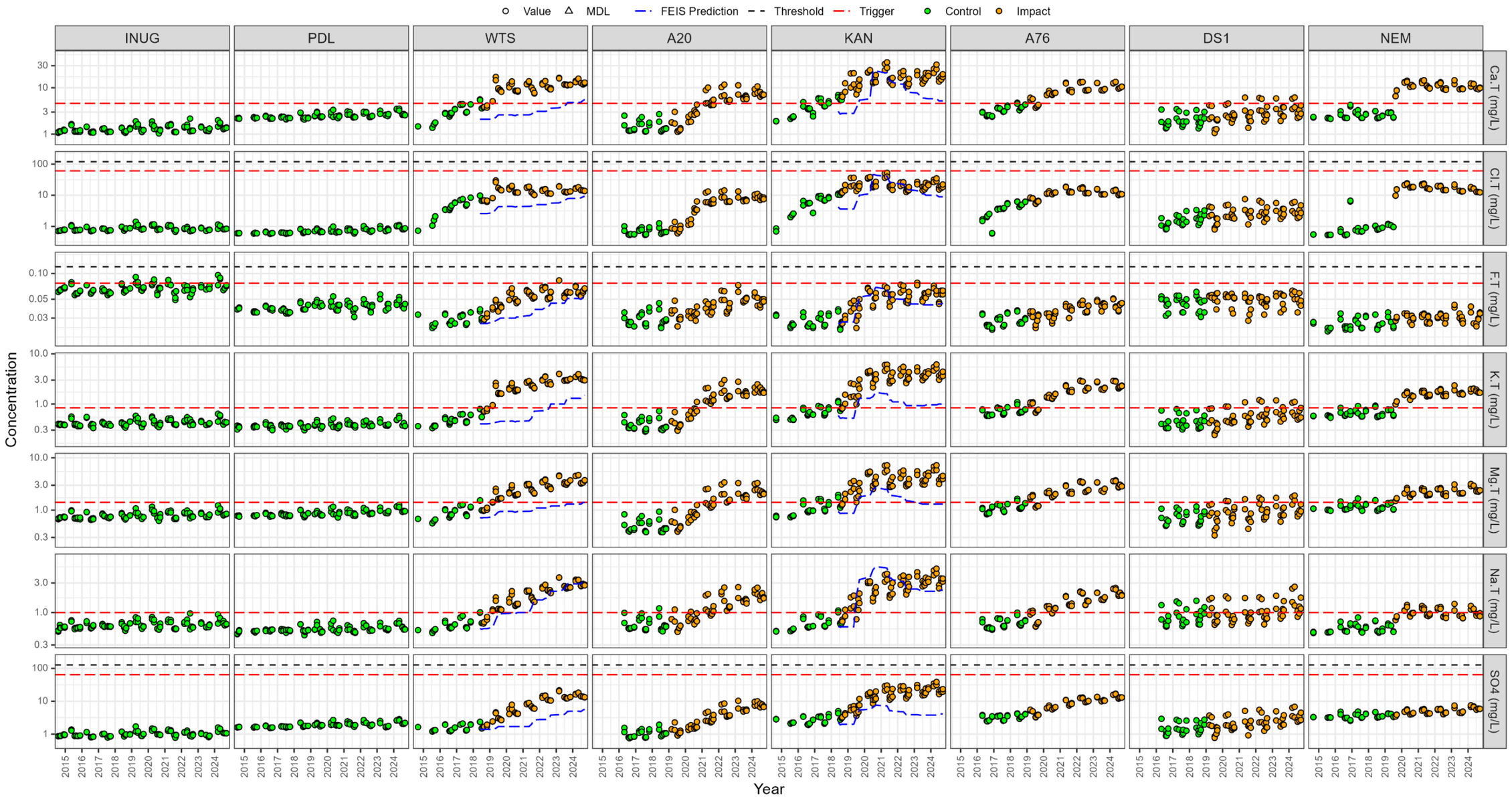


Figure 5-11. Nutrient parameters measured in water samples from Whale Tail study area lakes since 2014.

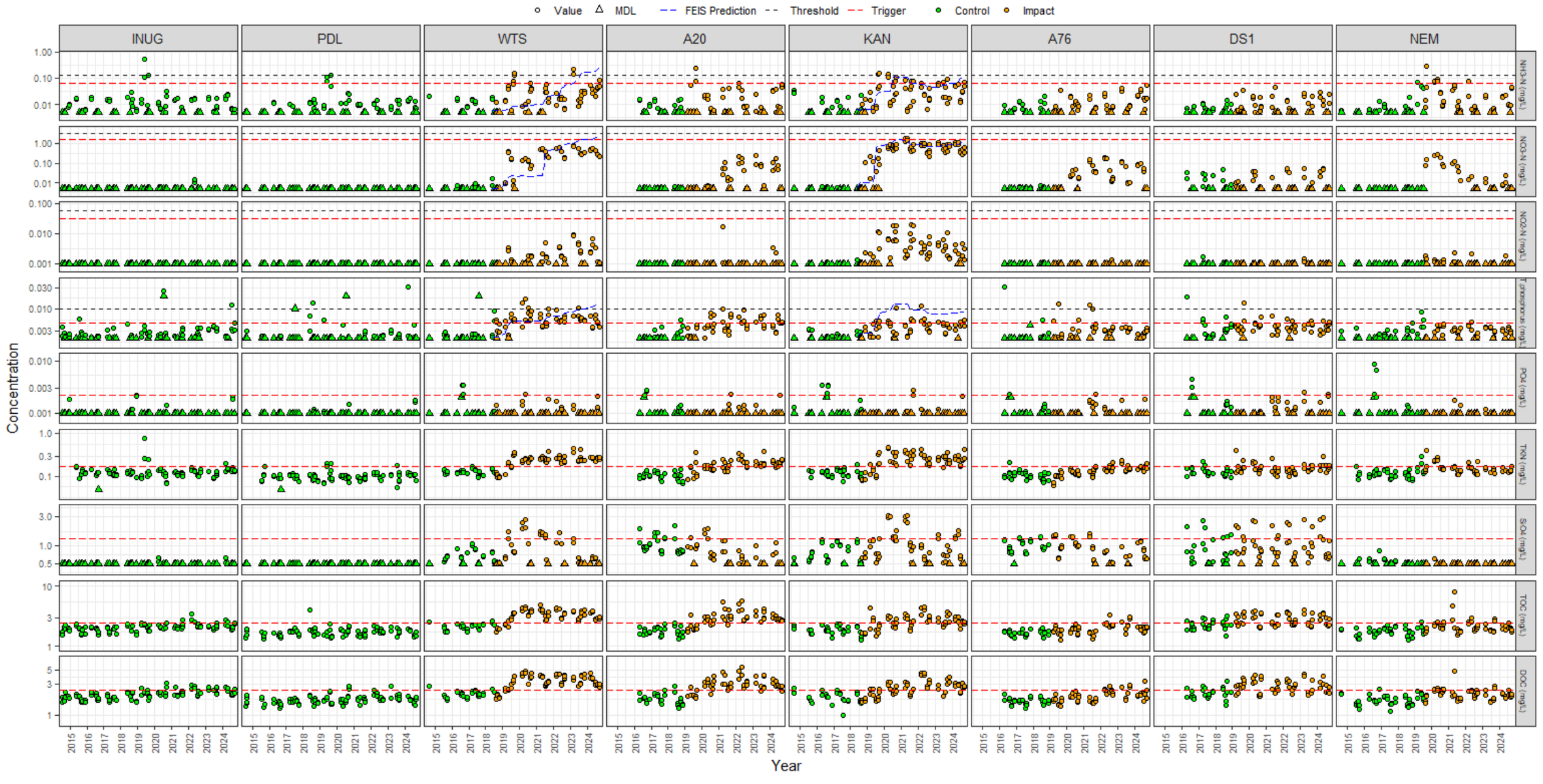


Figure 5-12. Metals measured in water samples from Whale Tail study area lakes since 2014.

Note: The detection limit for total chromium was adjusted from 0.0001 mg/L to 0.0005 mg/L for samples collected since May 2021.

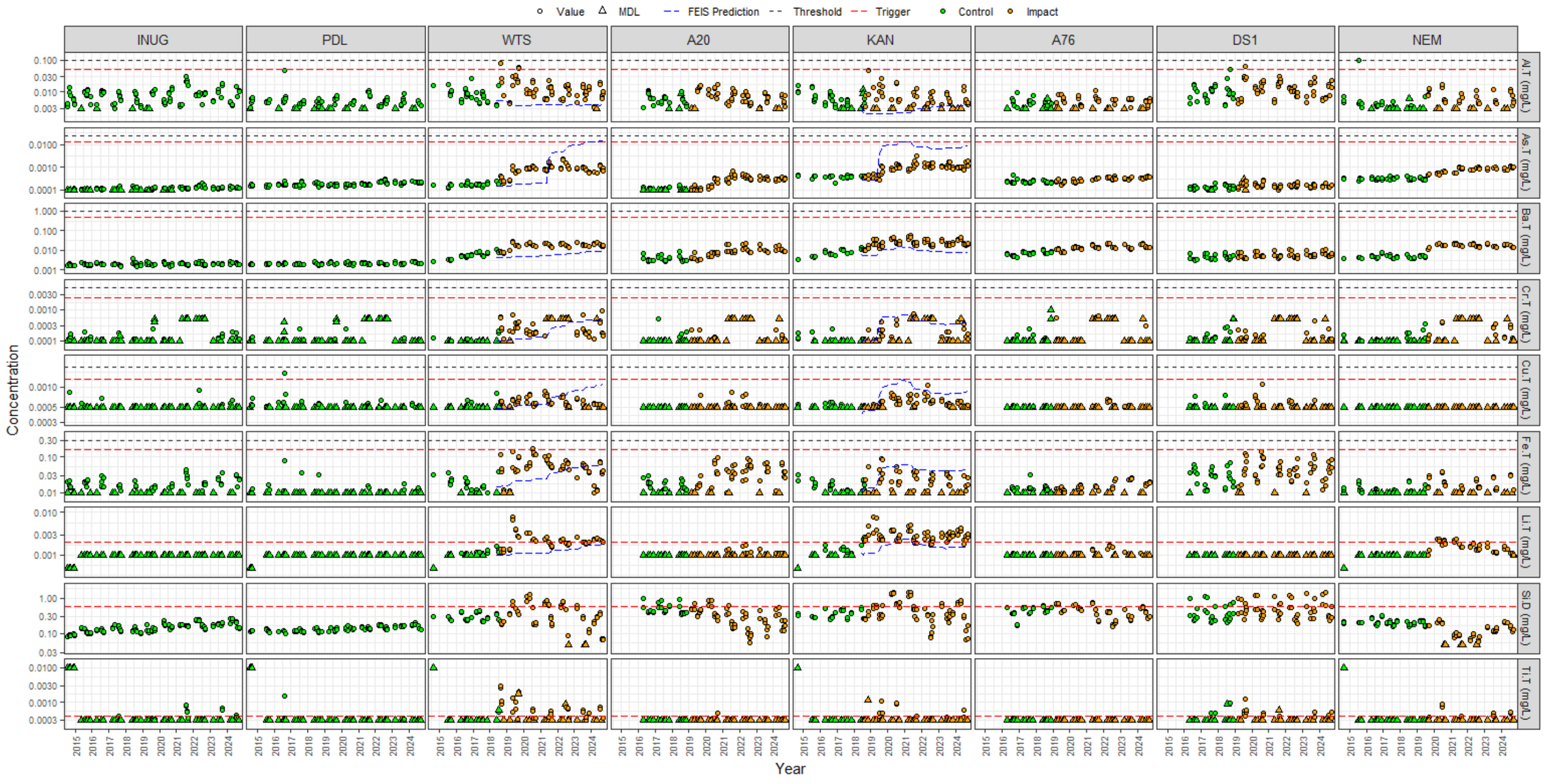
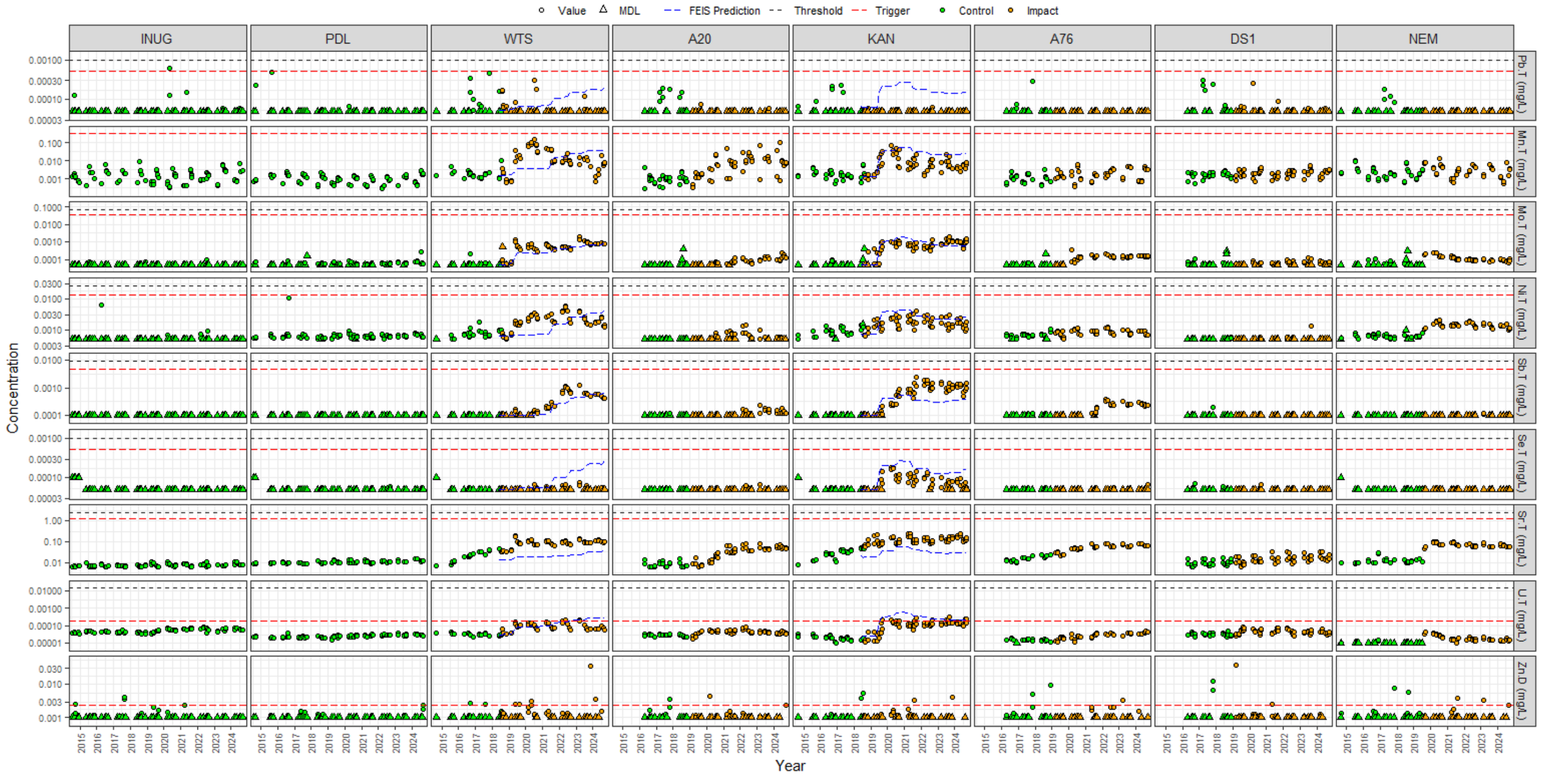


Figure 5-13. Metals measured in water samples from Whale Tail study area lakes since 2014.



Phytoplankton Tables and Figures

Table 5-10. Results of the BACI test for phytoplankton variables at Whale Tail study area lakes, 2024.

Parameter Measured	Test Area	n(B)	n(A)	Estimate	SE	P-value*	Effect size (%)		
							ES	LCI	UCI
Total Biomass	WTS	15	3	-0.17	0.39	0.669	-16	-63	92
	KAN	16	3	0.23	0.62	0.718	26	-66	368
	A20	14	3	0.43	0.60	0.487	53	-57	453
	A76	14	3	-0.37	0.58	0.526	-31	-80	135
	DS1	14	3	-0.24	0.66	0.720	-21	-81	219
	NEM	21	3	-0.08	0.50	0.877	-7	-67	159
Taxa Richness	WTS	15	3	-0.22	0.11	**0.069**	-19	-36	2
	KAN	16	3	-0.42	0.22	**0.066**	-34	-58	3
	A20	14	3	0.00	0.22	0.998	0	-37	60
	A76	14	3	-0.38	0.20	**0.082**	-31	-55	6
	DS1	14	3	-0.14	0.17	0.430	-13	-40	26
	NEM	21	3	-0.26	0.15	**0.089**	-23	-43	4

Notes:

*** Bolded** values are P-values < 0.1.

Shaded cells indicate positive (increased) or negative (reduced) effect sizes of 20% or more.

Test area = area compared to control (INUG).

n(B) = number of months in the "before" period.

n(A) = number of months in the "after" period (i.e., in 2024).

Estimate = BACI model estimate of the 2024 change in mean for log-transformed data.

SE = standard error of the estimate.

P-value = two-tailed test of the null hypothesis of no change.

ES = estimated effect size (i.e., 100%*(exp[Estimate]-1)).

LCI = lower 95% confidence interval; UCI = upper 95% confidence interval.

Figure 5-14. Chlorophyll-a (µg/L) in water samples from Whale Tail study area lakes since 2014.

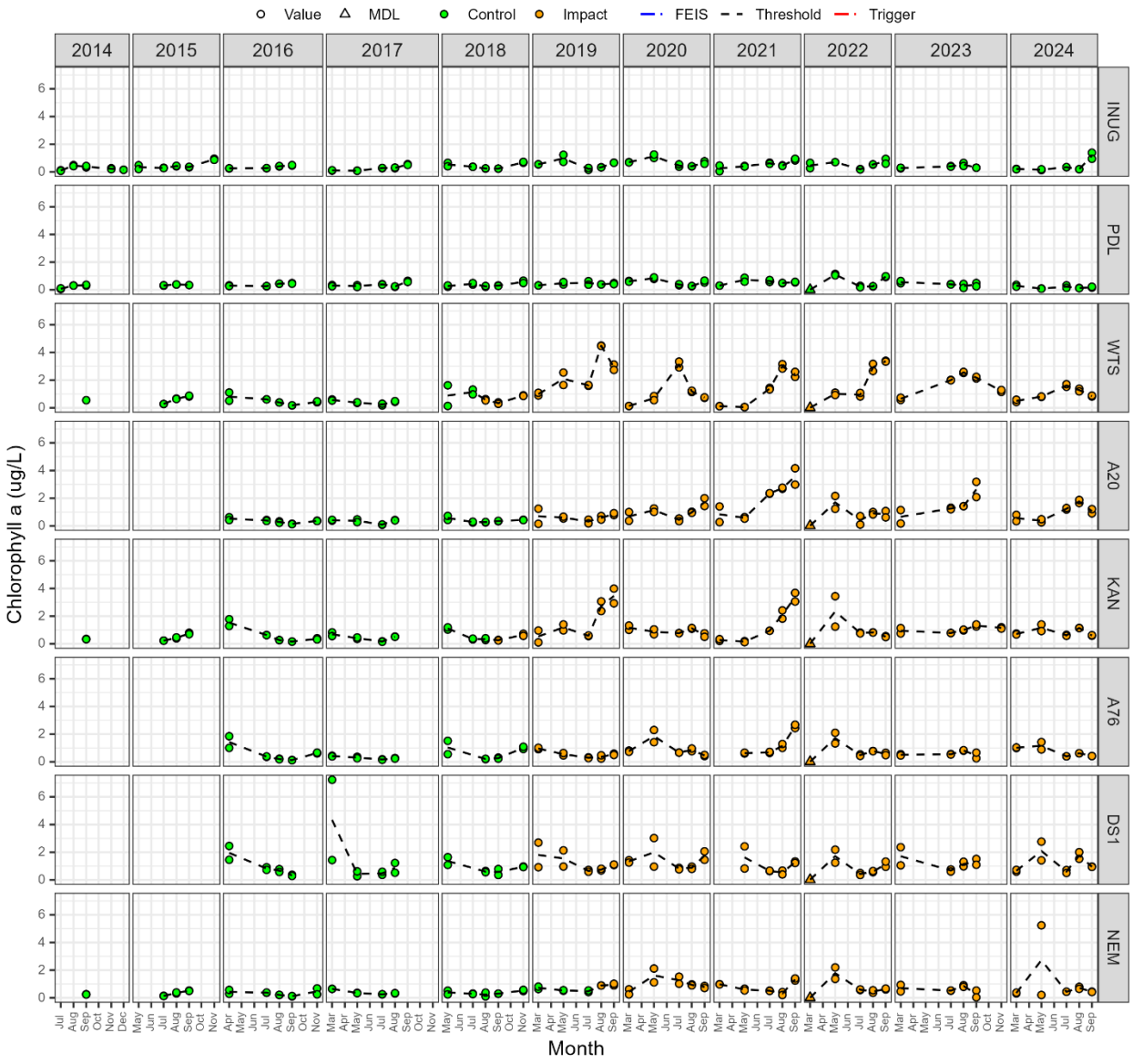


Figure 5-15. Total phytoplankton biomass (mg/m³) from Whale Tail study area lakes since 2014.

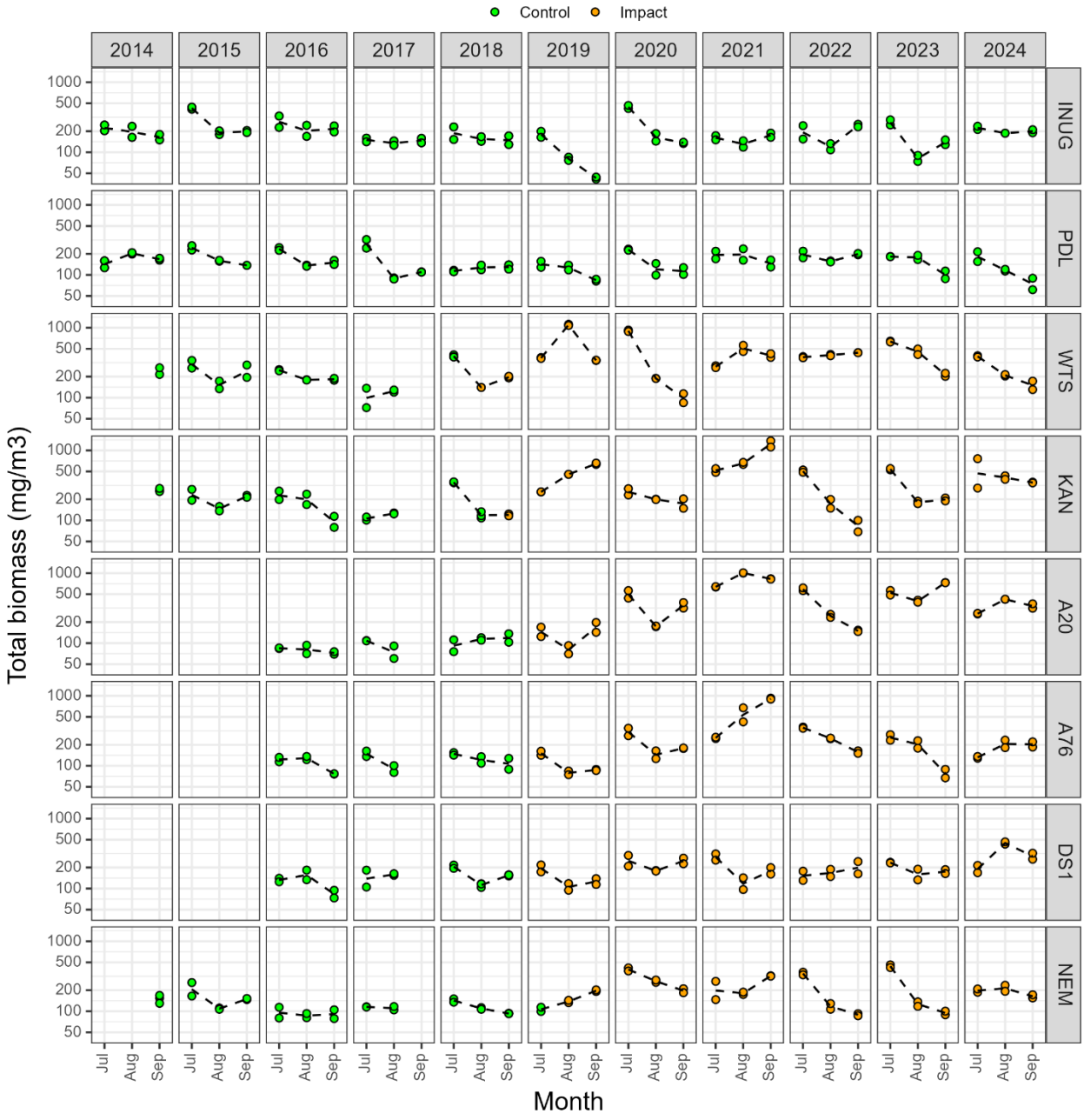


Figure 5-16. Phytoplankton biomass (mg/m³) by major taxa group from Whale Tail study area lakes since 2014.



Figure 5-17. Relative phytoplankton biomass by major taxa from Whale Tail study area lakes since 2014.

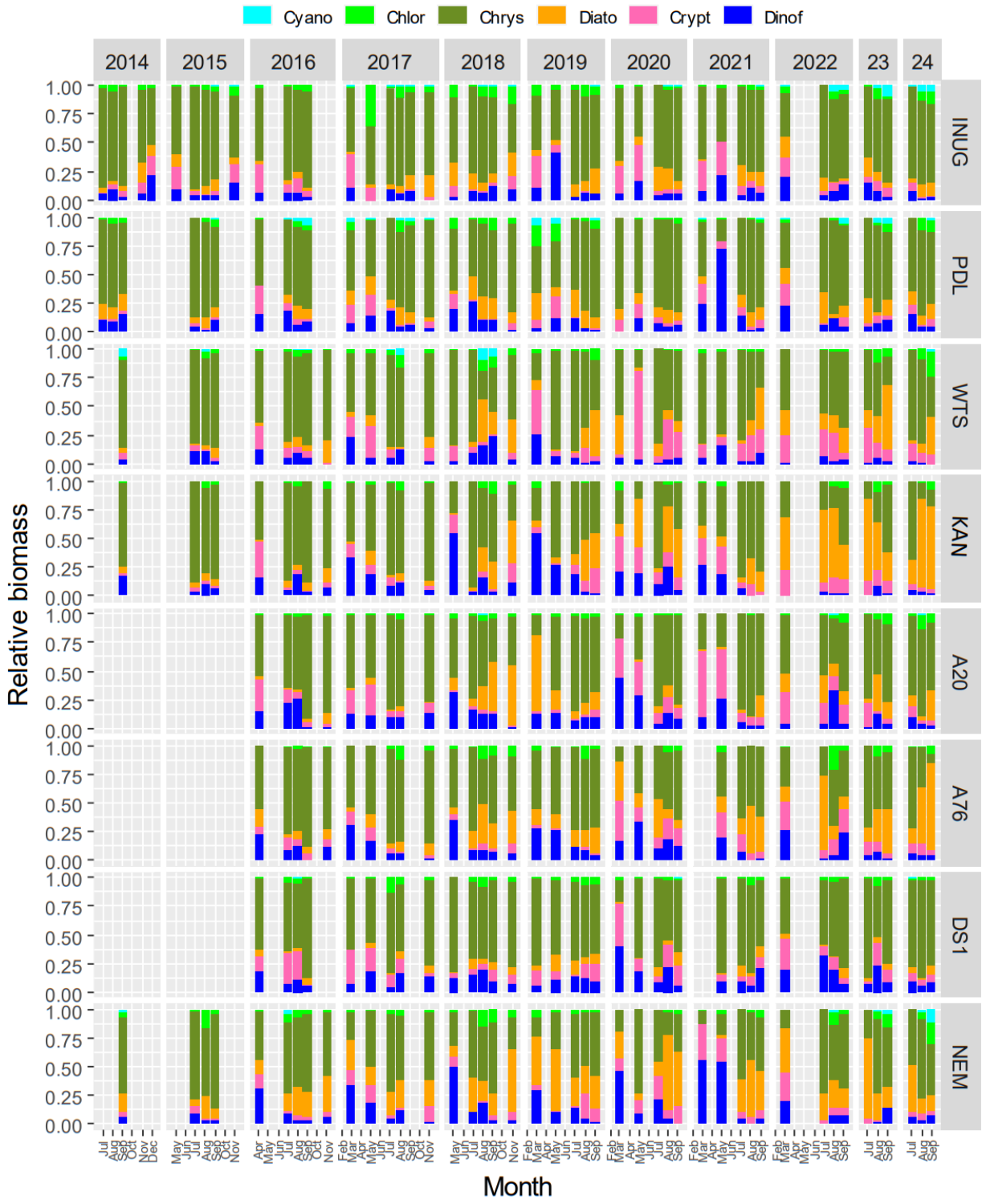
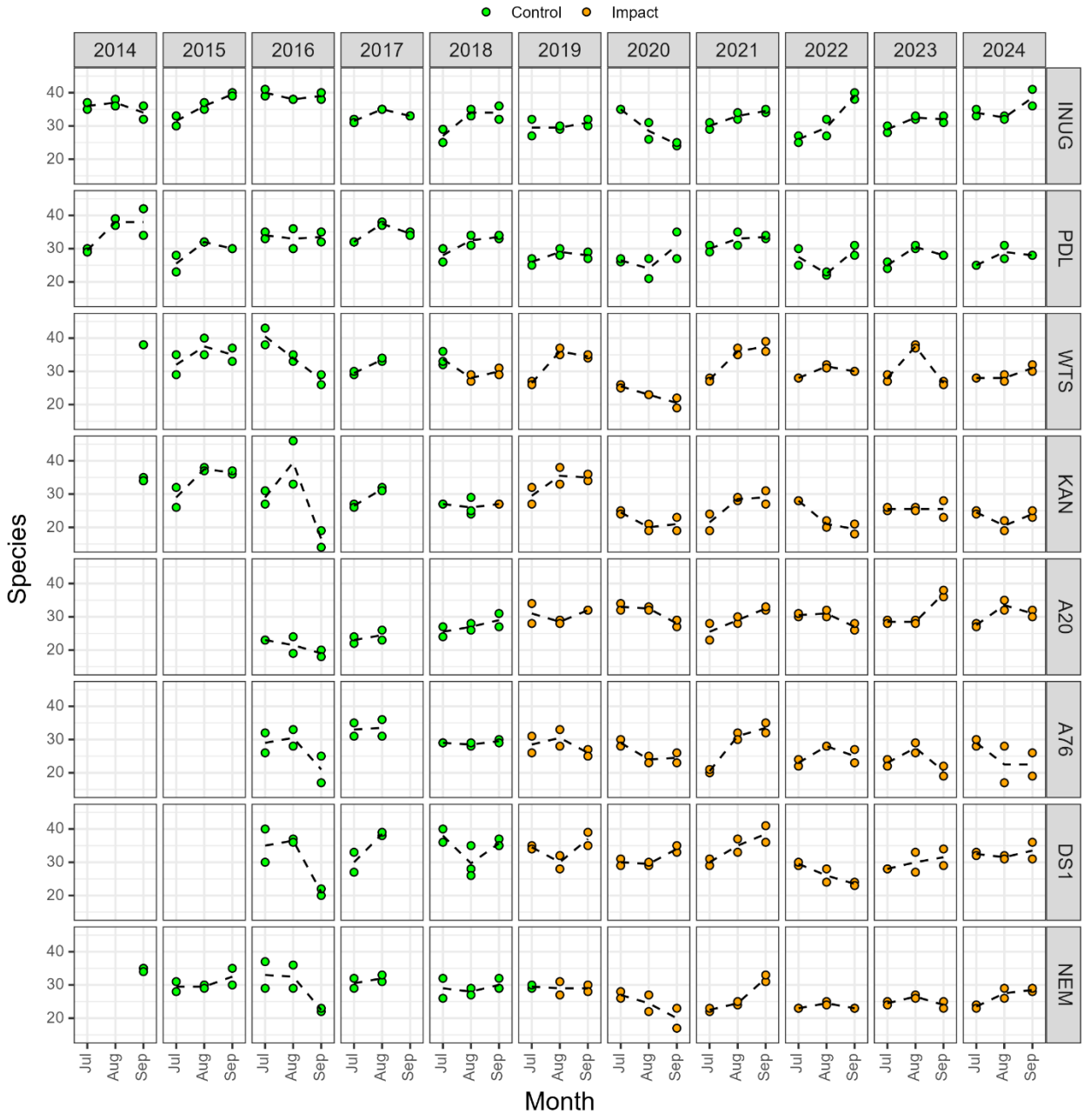


Figure 5-18. Phytoplankton species richness from Whale Tail study area lakes since 2014.



Sediment Chemistry Tables and Figures

Figure 5-19. TOC (%) in sediment from the Whale Tail study area lakes.

Note: In 2021, a batch of sediment samples were not analyzed due to a sample receipt error by the laboratory. Missing results in 2021 correspond to samples that were discarded prior to analysis. No TOC was analyzed for INUG, PDL, and A76 in 2022 due to high moisture content in the samples (See Azimuth, 2022a for details).

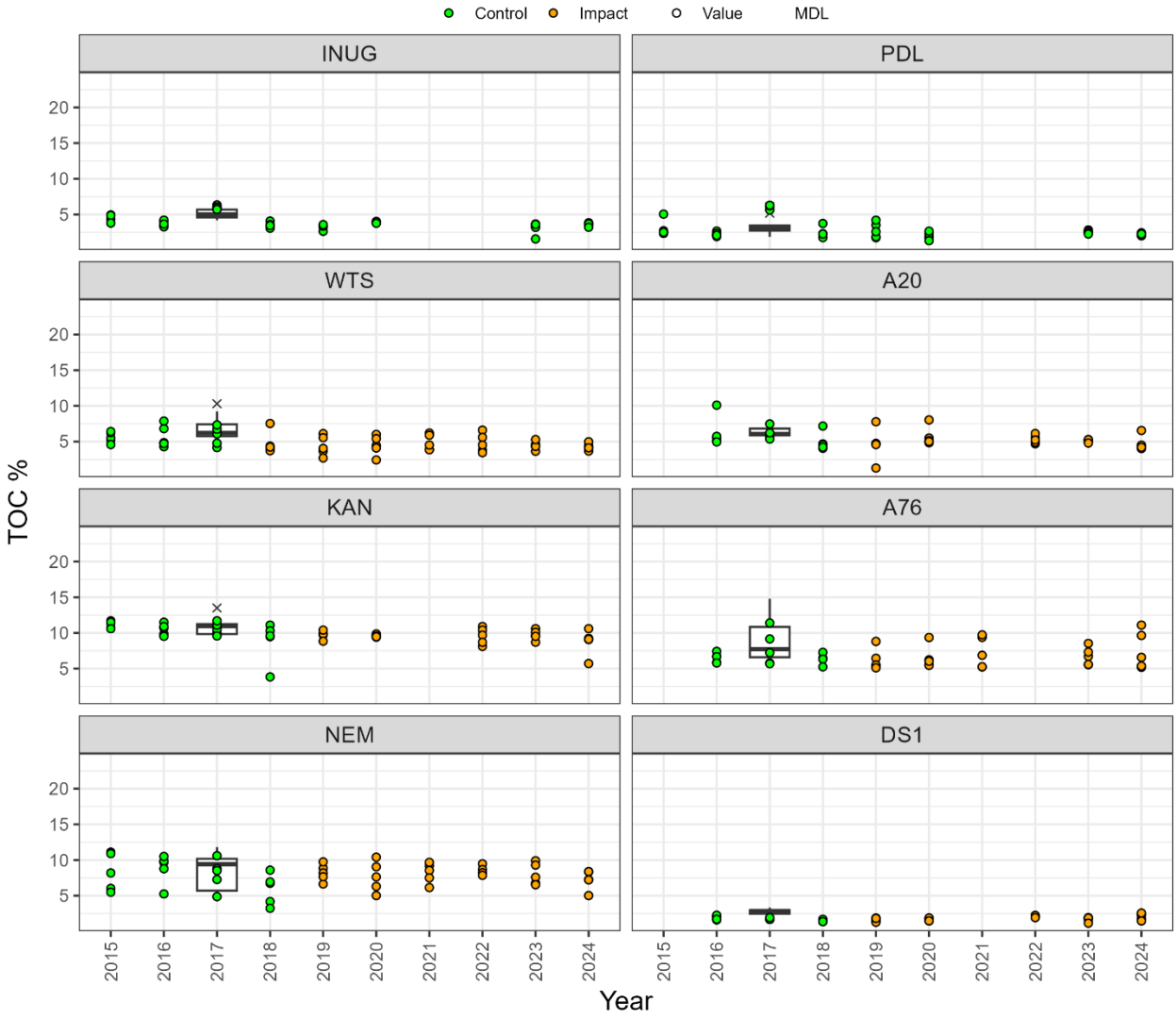


Figure 5-20. Grain size composition in sediment from the Whale Tail study area lakes since 2015.

Note: There are missing results for 2021, because a batch of sediment samples were inadvertently discarded prior to analysis due to a sample receipt error by the laboratory (See Azimuth, 2022a for details). In 2022, samples collected at INUG, PDL, and A76 had high water content so grain size composition could not be completed.

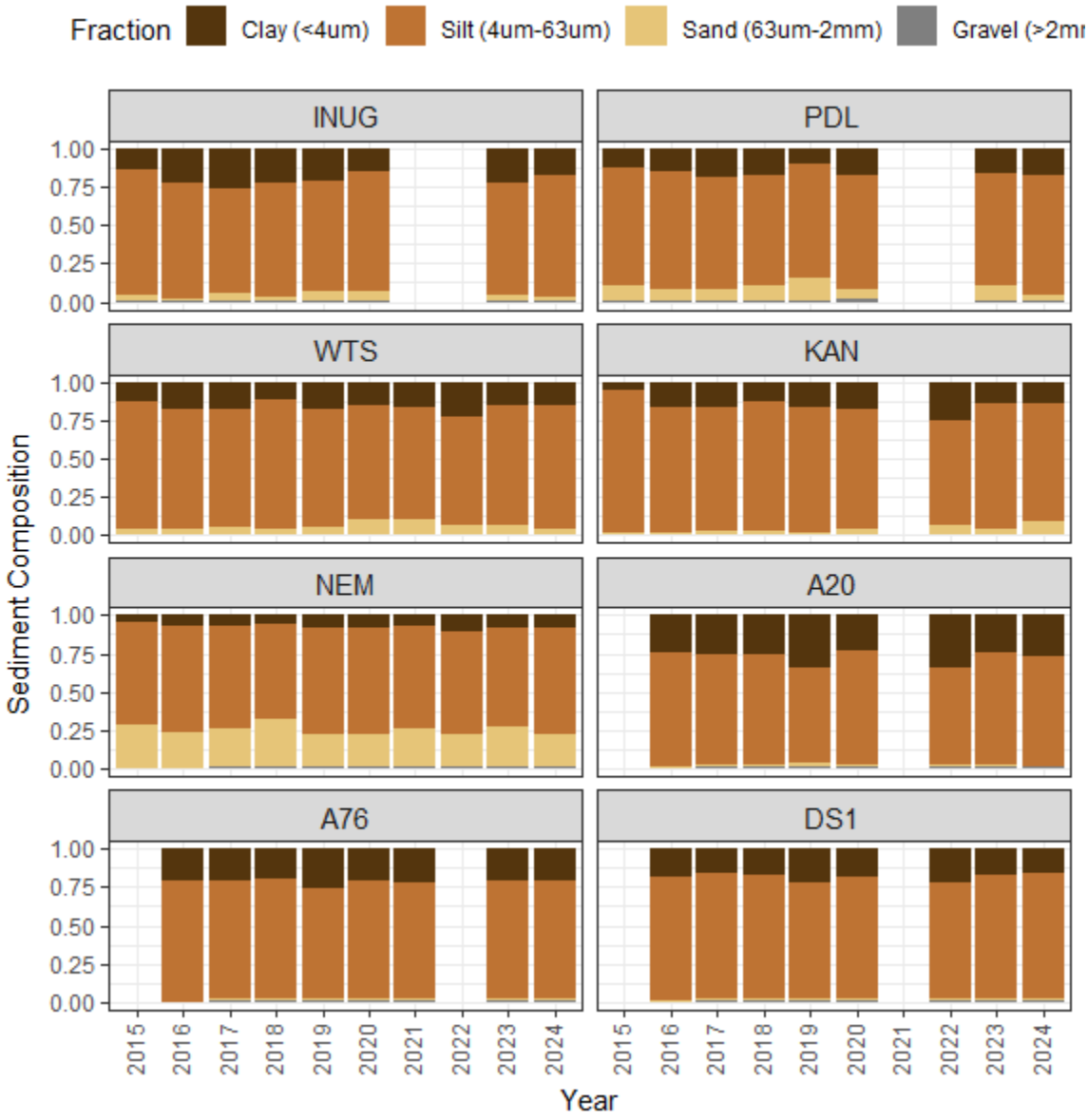
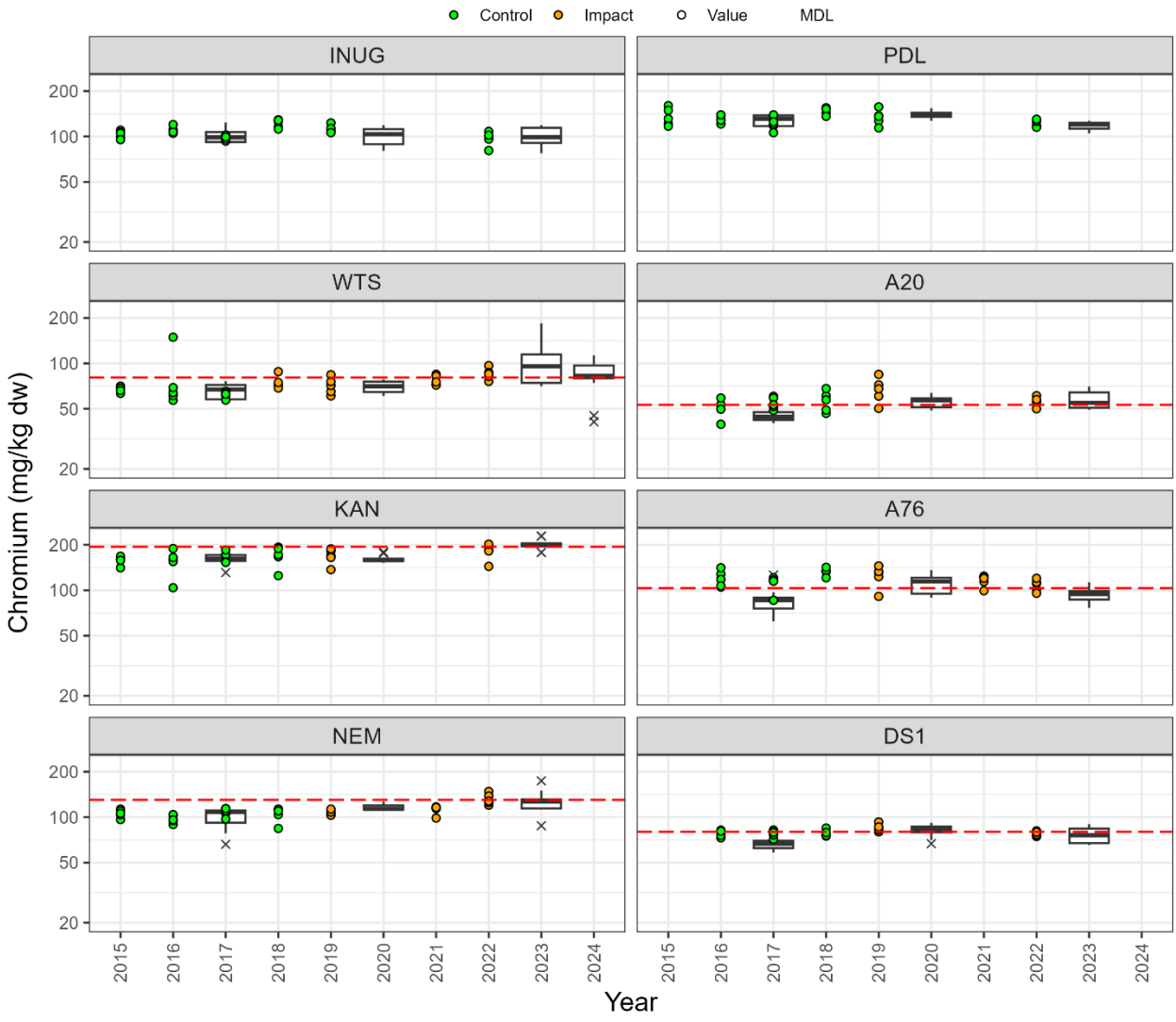
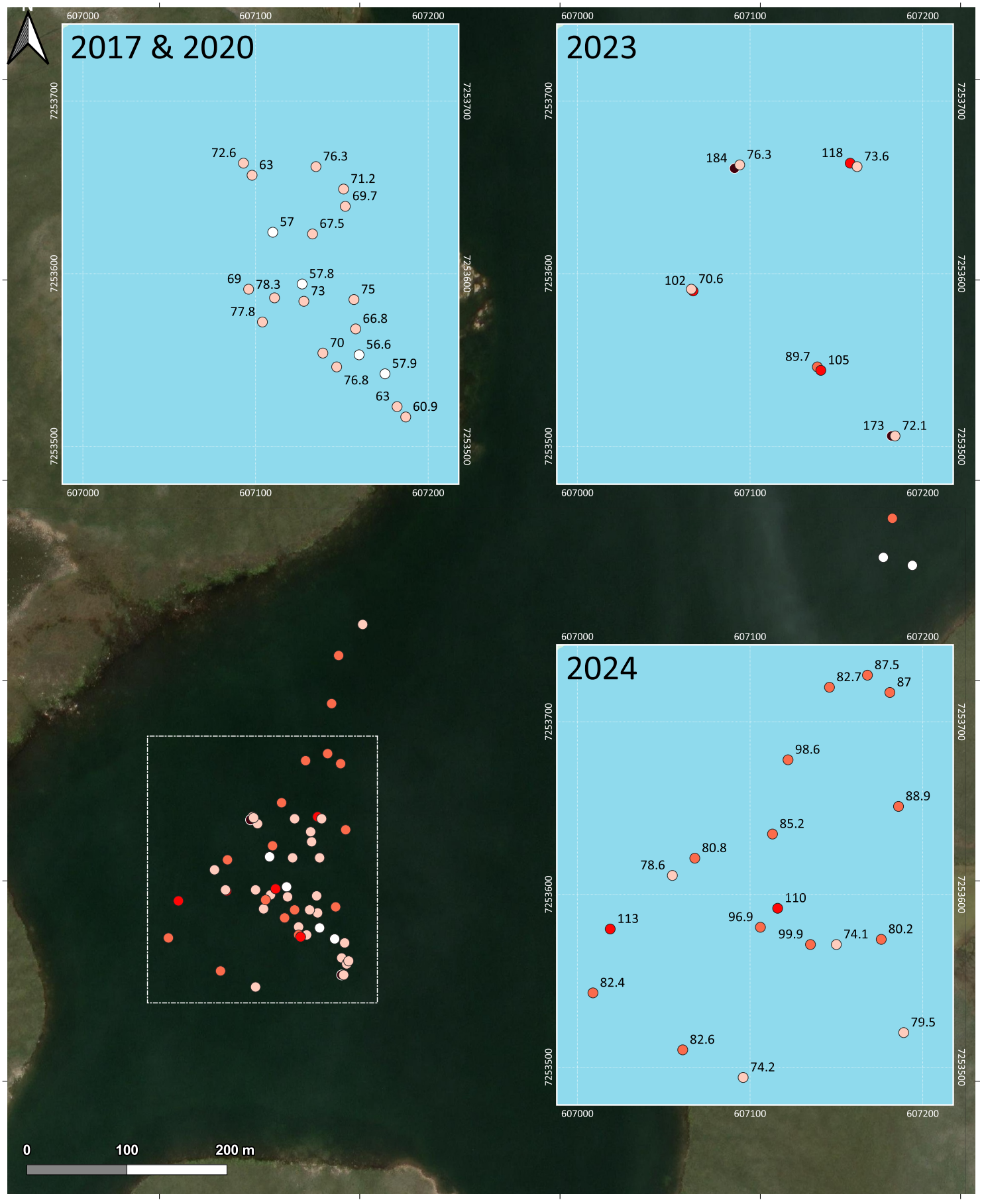


Figure 5-21. Chromium (mg/kg dw) in sediment samples (grab & cores) from Whale Tail study area-.

Note: The red dashed line represents the trigger value for the Whale Tail study area lakes. Cores samples = box and whisker. Box and whisker plots are interpreted as follows: horizontal line in the box = median concentration, upper and lower margins = upper (75th) and lower (25th) percentile concentrations or the interquartile range, vertical lines extend to either the maximum and/or minimum concentrations or up to 1.5 times the interquartile range, with 'x's for any points outside that range. There are missing results for 2021, because a batch of sediment samples were inadvertently discarded prior to analysis due to a sample receipt error by the laboratory (See Azimuth, 2022a for details).





Sediment Chromium (mg/kg dw)

- 40-60 mg/kg
- 60-80 mg/kg
- 80-100 mg/kg
- 100-120 mg/kg
- >120 mg/kg

- top 1.5 cm of sediment cores
- the chromium concentration (mg/kg dw) for each core is shown next to the point



AZIMUTH

Figure 5-22
Chromium concentrations in sediment cores collected from the South Basin of Whale Tail Lake in 2017, 2020, 2023, and 2024

2024 CREMP
Meadowbank Complex

Date: February 20, 2025
Datum: NAD 83 UTM Zone 14N
Scale: Main map (5,000); inset (2,900)
Software: QGIS version 3.22.11-Białowieża
Produced by: E. Franz

REFERENCES:
1. Aerial imagery from ESRI (July 19, 2024)
2. Sample coordinates from Azimuth

Benthic Invertebrate Tables and Figures

Table 5-11. Geometric means for total abundance and total richness, Whale Tail study area lakes since 2015.

Geometric means for total abundance (no. of organisms/m^2)											
Control/Impact	Test Area	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Control	INUG	1648 (5)	2100 (1)	1712 (3)	1497 (6)	1452 (7)	2056 (2)	1398 (8)	1070 (9)	1656 (4)	843 (10)
	PDL	1127 (2)	1373 (1)	748 (10)	779 (8)	990 (4)	951 (6)	829 (7)	963 (5)	1045 (3)	753 (9)
Impact	WTS	1675 (10)	2102 (8)	3546 (4)	4005 (3)	2757 (6)	2356 (7)	1911 (9)	5017 (2)	5047 (1)	3155 (5)
	KAN	3964 (7)	3050 (10)	4236 (6)	3444 (9)	7235 (3)	6133 (5)	3878 (8)	13066 (1)	9285 (2)	6896 (4)
	A20	NA	2562 (6)	4246 (2)	2793 (4)	2546 (7)	2662 (5)	2146 (9)	3353 (3)	4274 (1)	2420 (8)
	A76	NA	2525 (8)	6312 (2)	3094 (5)	2823 (6)	2794 (7)	2269 (9)	12072 (1)	3192 (4)	5048 (3)
	DS1	NA	3090 (3)	1919 (8)	2564 (6)	2205 (7)	2619 (5)	3095 (2)	2969 (4)	1822 (9)	3112 (1)
	NEM	2897 (6)	2744 (7)	1712 (10)	2708 (8)	5278 (1)	3945 (5)	2374 (9)	4619 (4)	5087 (2)	4644 (3)

Geometric means for total richness (no. of taxa)											
Control/Impact	Test Area	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Control	INUG	13 (7)	16 (2)	14 (4)	15 (3)	14 (5)	17 (1)	13 (6)	13 (8)	12 (9)	12 (10)
	PDL	9 (3)	11 (1)	10 (2)	6 (10)	9 (6)	9 (7)	8 (9)	9 (4)	9 (5)	8 (8)
Impact	WTS	15 (6)	15 (5)	15 (8)	18 (1)	13 (9)	15 (7)	11 (10)	15 (4)	17 (2)	16 (3)
	KAN	13 (10)	14 (9)	15 (6)	15 (8)	15 (7)	19 (1)	17 (5)	18 (4)	19 (3)	19 (2)
	A20	NA	14 (7)	13 (8)	15 (5)	15 (6)	18 (1)	17 (2)	16 (4)	16 (3)	12 (9)
	A76	NA	16 (4)	17 (2)	15 (8)	15 (7)	17 (3)	15 (6)	18 (1)	14 (9)	15 (5)
	DS1	NA	12 (6)	15 (2)	14 (4)	14 (5)	10 (9)	11 (8)	16 (1)	15 (3)	11 (7)
	NEM	12 (8)	12 (6)	10 (10)	10 (9)	12 (7)	13 (5)	14 (3)	13 (4)	15 (1)	14 (2)

Notes:

1. Total abundance in organisms/m^2.

Rank order of abundance and richness shown in parentheses.

Red vertical lines mark the year that station designations switched from *control* to *impact*.

NA = Benthic invertebrate sampling was not completed for the given station/year.

Table 5-12. Results of the BACI tests for benthic invertebrate abundance from Whale Tail study area lakes.

After Period	Test Area	n(B)	n(A)	Estimate	SE	P-value*	Effect Size (%)		
							ES	LCI	UCI
2024	WTS	3	1	1.07	0.47	0.15	192	-61	2099
	KAN	4	1	1.36	0.33	**0.03**	288	37	1000
	A20	3	1	0.48	0.37	0.32	61	-67	689
	A76	3	1	1.05	0.59	0.22	186	-77	3519
	DS1	3	1	0.96	0.27	**0.07**	161	-18	729
	NEM	4	1	1.35	0.31	**0.02**	286	43	944
2023-24	WTS	3	2	0.97	0.32	**0.06**	164	-5	628
	KAN	4	2	1.17	0.25	**0.01**	221	61	539
	A20	3	2	0.43	0.27	0.21	53	-35	260
	A76	3	2	0.49	0.49	0.39	62	-66	666
	DS1	3	2	0.36	0.39	0.43	43	-59	392
	NEM	4	2	1.06	0.28	**0.02**	188	34	520
2022-24	WTS	3	3	1.08	0.27	**0.02**	194	39	523
	KAN	4	3	1.36	0.24	**0.002**	291	111	623
	A20	3	3	0.47	0.21	**0.09**	60	-11	190
	A76	3	3	0.89	0.53	0.17	142	-44	949
	DS1	3	3	0.46	0.31	0.21	59	-33	277
	NEM	4	3	1.08	0.22	**0.004**	193	67	413
2021-24	WTS	3	4	0.83	0.38	**0.08**	128	-13	500
	KAN	4	4	1.09	0.31	**0.01**	197	38	542
	A20	3	4	0.32	0.26	0.27	37	-29	165
	A76	3	4	0.60	0.52	0.30	82	-53	602
	DS1	3	4	0.46	0.27	0.15	58	-22	220
	NEM	4	4	0.85	0.27	**0.02**	134	21	354

Notes:

* **Bolded & underlined** values are P-values < 0.1.

Shaded cells indicate positive (increased) or negative (reduced) effect sizes of 20% or more.

Test area = area compared to control (INUG).

n(B) = number of years in the "before" period.

n(A) = number of years in the "after" period.

Estimate = BACI model estimate of the after-period change in mean for log-transformed data.

SE = standard error of the estimate.

P-value = two-tailed test of the null hypothesis of no change.

ES = estimated effect size (i.e., 100%*(exp[Estimate]-1)).

LCI = lower 95% confidence interval; UCI = upper 95% confidence interval.

Table 5-13. Results of the BACI tests for benthic invertebrate taxa richness from Whale Tail study area lakes.

After Period	Test Area	n(B)	n(A)	Estimate	SE	P-value*	Effect Size (%)		
							ES	LCI	UCI
2024	WTS	3	1	0.26	0.14	0.20	29	-28	131
	KAN	4	1	0.47	0.12	**0.03**	61	9	137
	A20	3	1	0.10	0.13	0.52	10	-36	90
	A76	3	1	0.17	0.13	0.32	19	-32	110
	DS1	3	1	0.03	0.17	0.86	3	-50	113
	NEM	4	1	0.47	0.13	**0.03**	60	7	139
2023-24	WTS	3	2	0.28	0.11	**0.08**	32	-6	85
	KAN	4	2	0.46	0.10	**0.01**	58	21	106
	A20	3	2	0.20	0.10	0.14	23	-12	71
	A76	3	2	0.14	0.12	0.33	15	-21	66
	DS1	3	2	0.17	0.16	0.35	19	-28	94
	NEM	4	2	0.47	0.09	**0.01**	59	23	107
2022-24	WTS	3	3	0.24	0.09	**0.064**	27	-2	64
	KAN	4	3	0.43	0.08	**0.003**	54	25	90
	A20	3	3	0.23	0.10	**0.07**	26	-4	64
	A76	3	3	0.19	0.11	0.15	21	-10	62
	DS1	3	3	0.23	0.14	0.18	26	-15	86
	NEM	4	3	0.43	0.08	**0.003**	53	24	89
2021-24	WTS	3	4	0.13	0.12	0.34	14	-17	56
	KAN	4	4	0.39	0.08	**0.002**	47	22	78
	A20	3	4	0.24	0.09	**0.04**	28	1	61
	A76	3	4	0.15	0.10	0.20	16	-10	51
	DS1	3	4	0.14	0.14	0.38	15	-21	66
	NEM	4	4	0.40	0.08	**0.002**	49	23	80

Notes:

* **Bolded & underlined** values are P-values < 0.1.

Shaded cells indicate positive (increased) or negative (reduced) effect sizes of 20% or more.

Test area = area compared to control (INUG).

n(B) = number of years in the "before" period.

n(A) = number of years in the "after" period.

Estimate = BACI model estimate of the after-period change in mean for log-transformed data.

SE = standard error of the estimate.

P-value = two-tailed test of the null hypothesis of no change.

ES = estimated effect size (i.e., 100%*(exp[Estimate]-1)).

LCI = lower 95% confidence interval; UCI = upper 95% confidence interval.

Figure 5-23. Benthic invertebrate total abundance (#/m^2) from Whale Tail study area lakes since 2015.

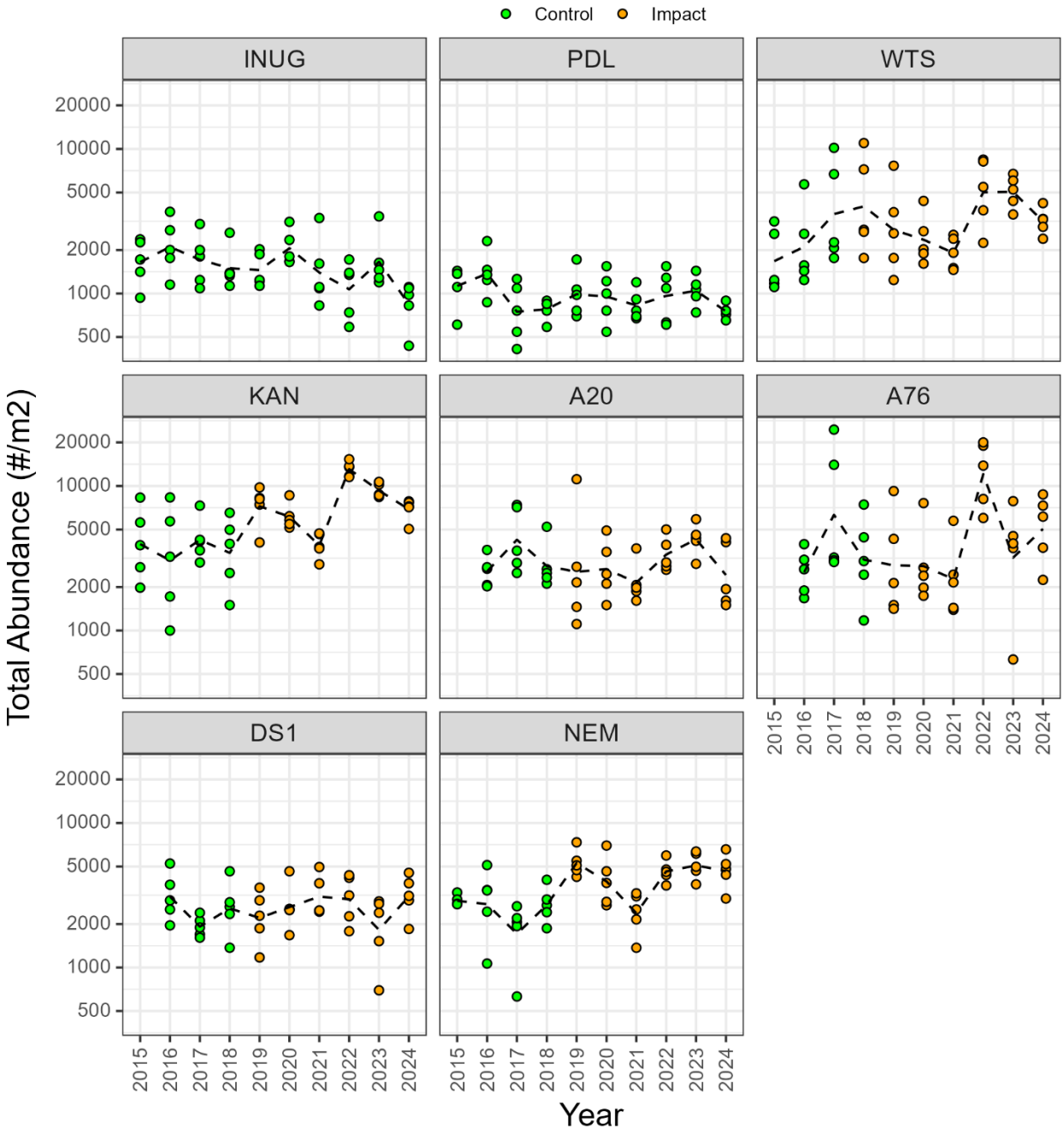


Figure 5-24. Benthic invertebrate abundance (#/m²) by major taxa group from Whale Tail study area lakes since 2015.

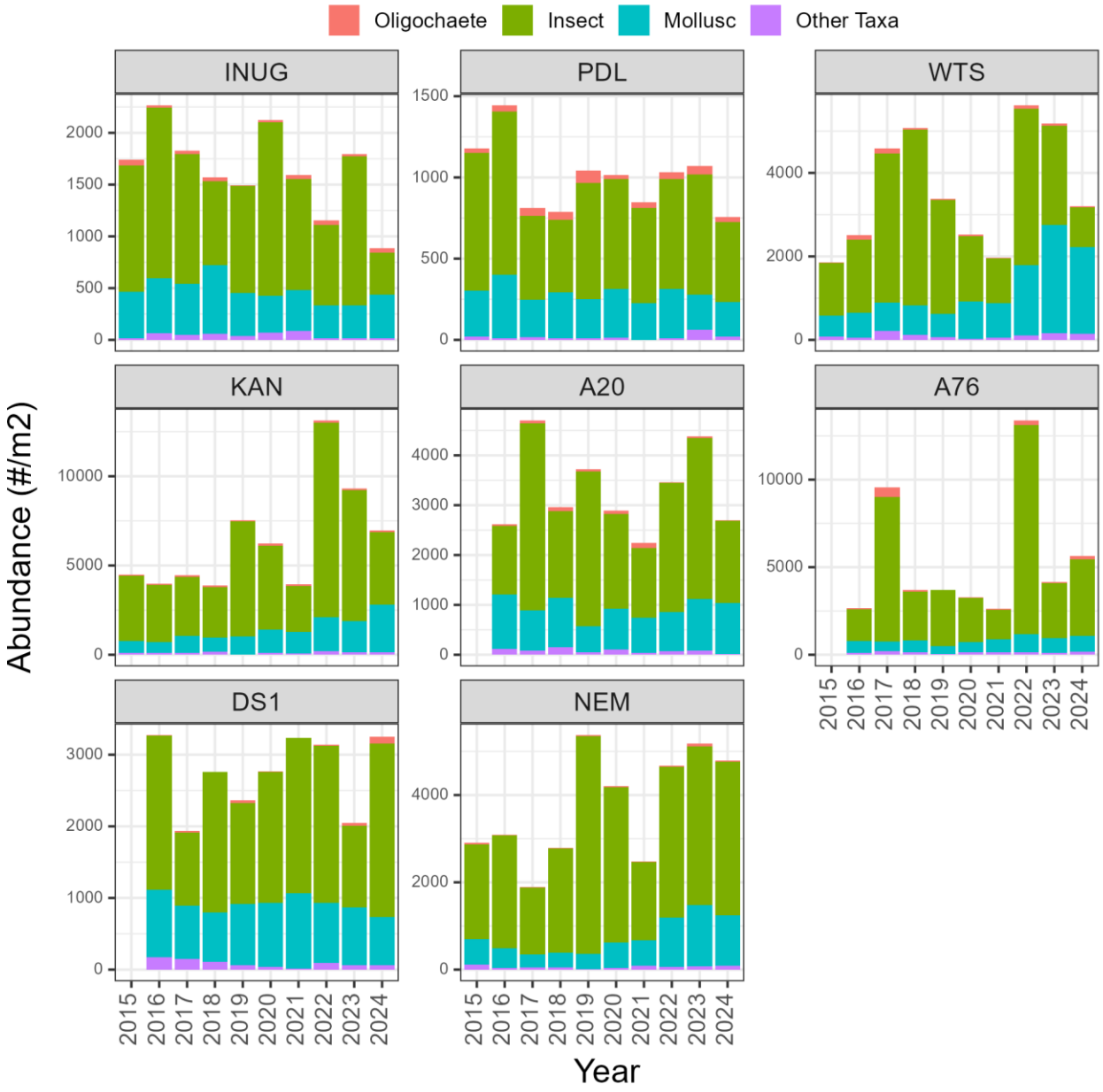


Figure 5-25. Benthic invertebrate relative abundance by major taxa from Whale Tail study area lakes since 2015.

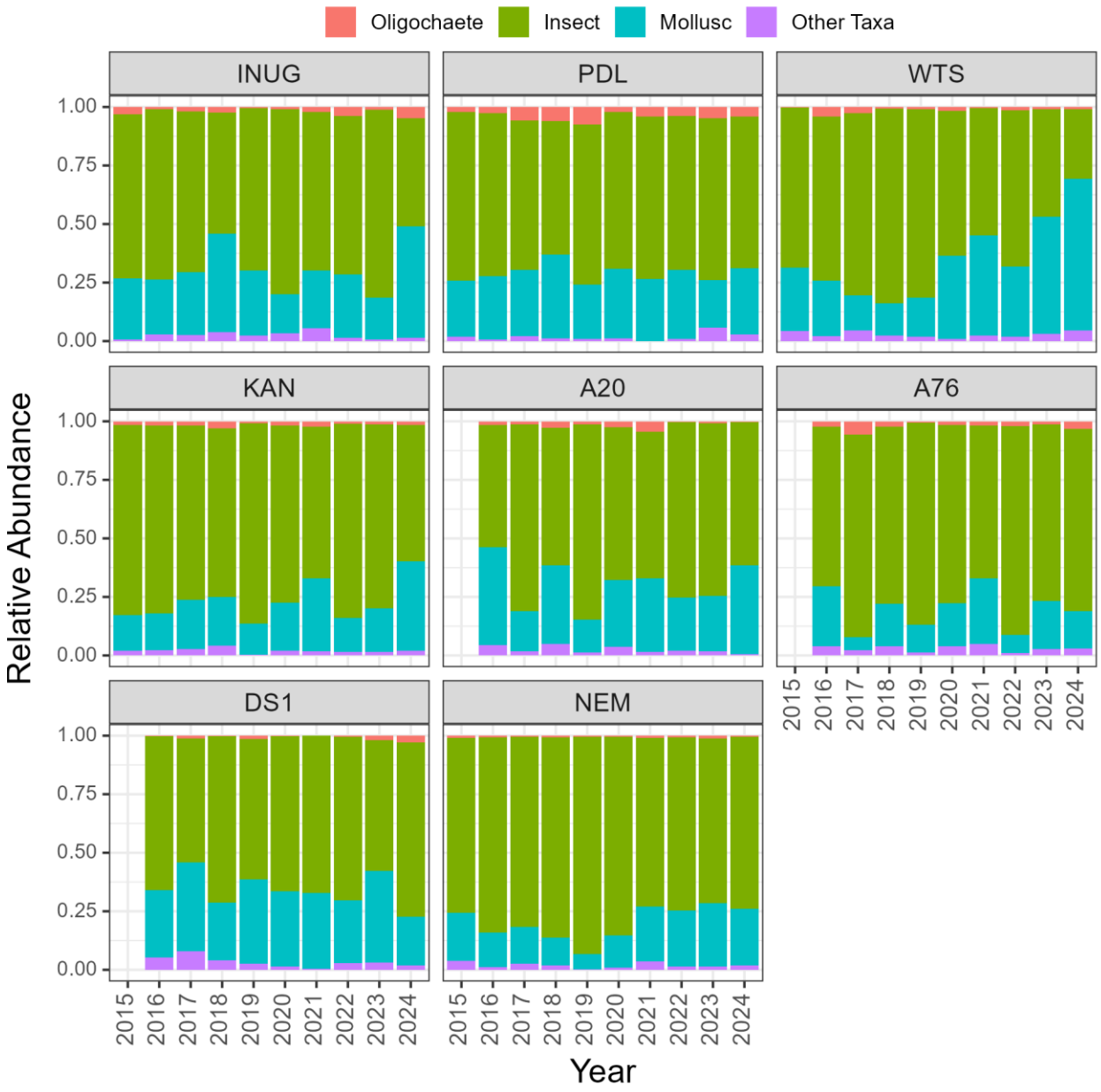


Figure 5-26. Benthic invertebrate total richness (# taxa) from Whale Tail study area lakes since 2015.

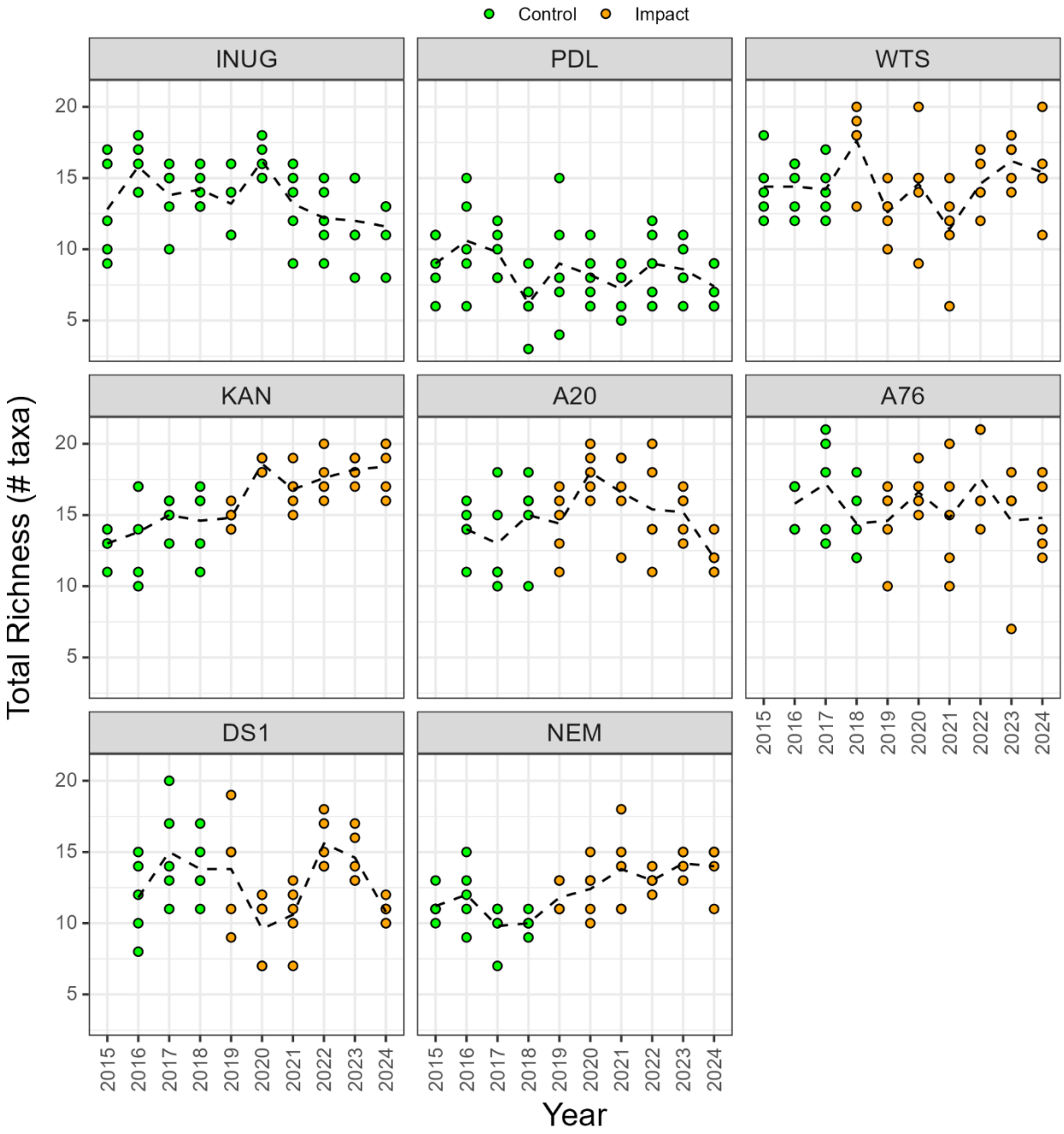


Figure 5-27. Benthic invertebrate richness (# taxa) by major taxa group from Whale Tail study area lakes since 2015.

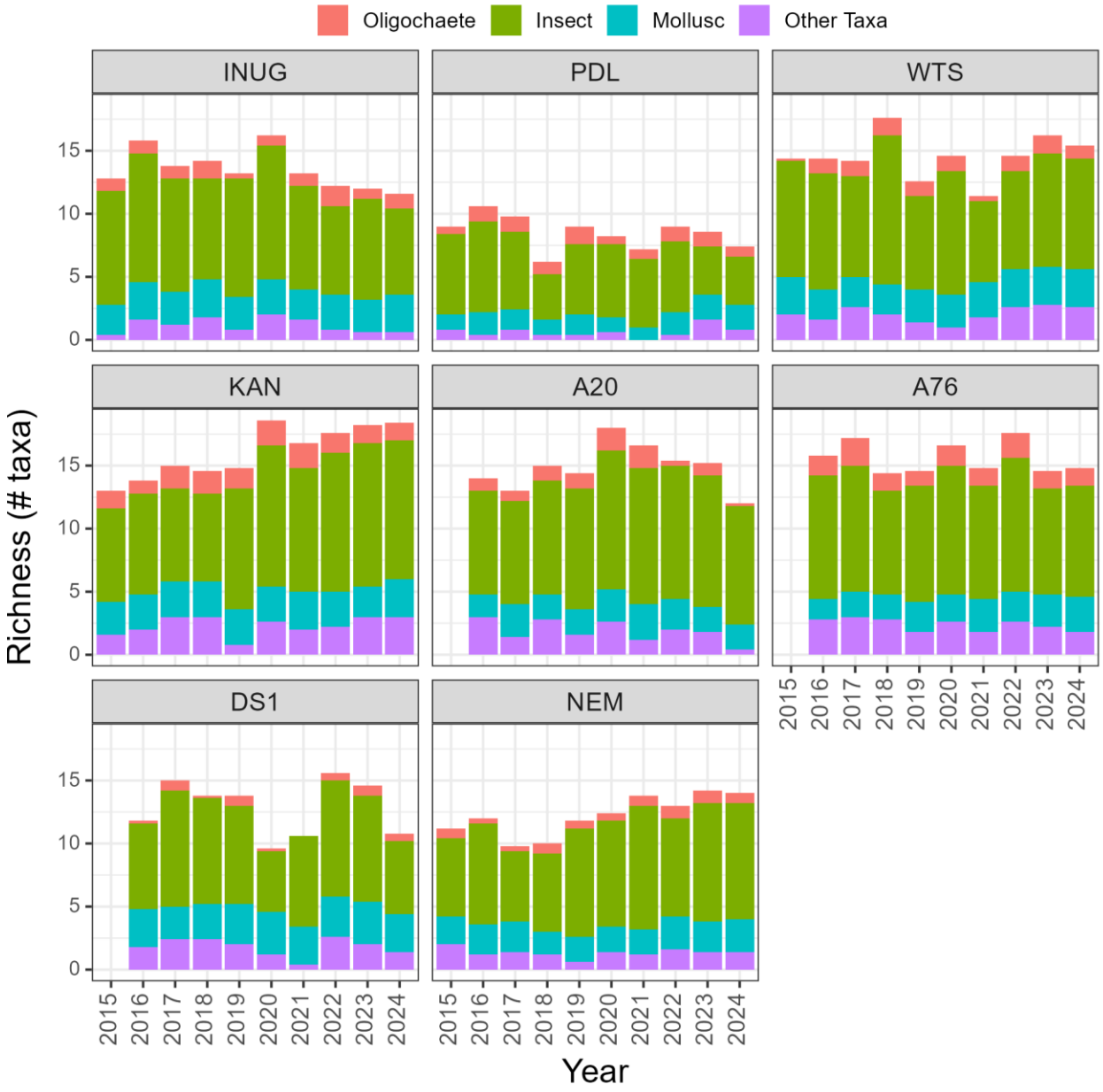
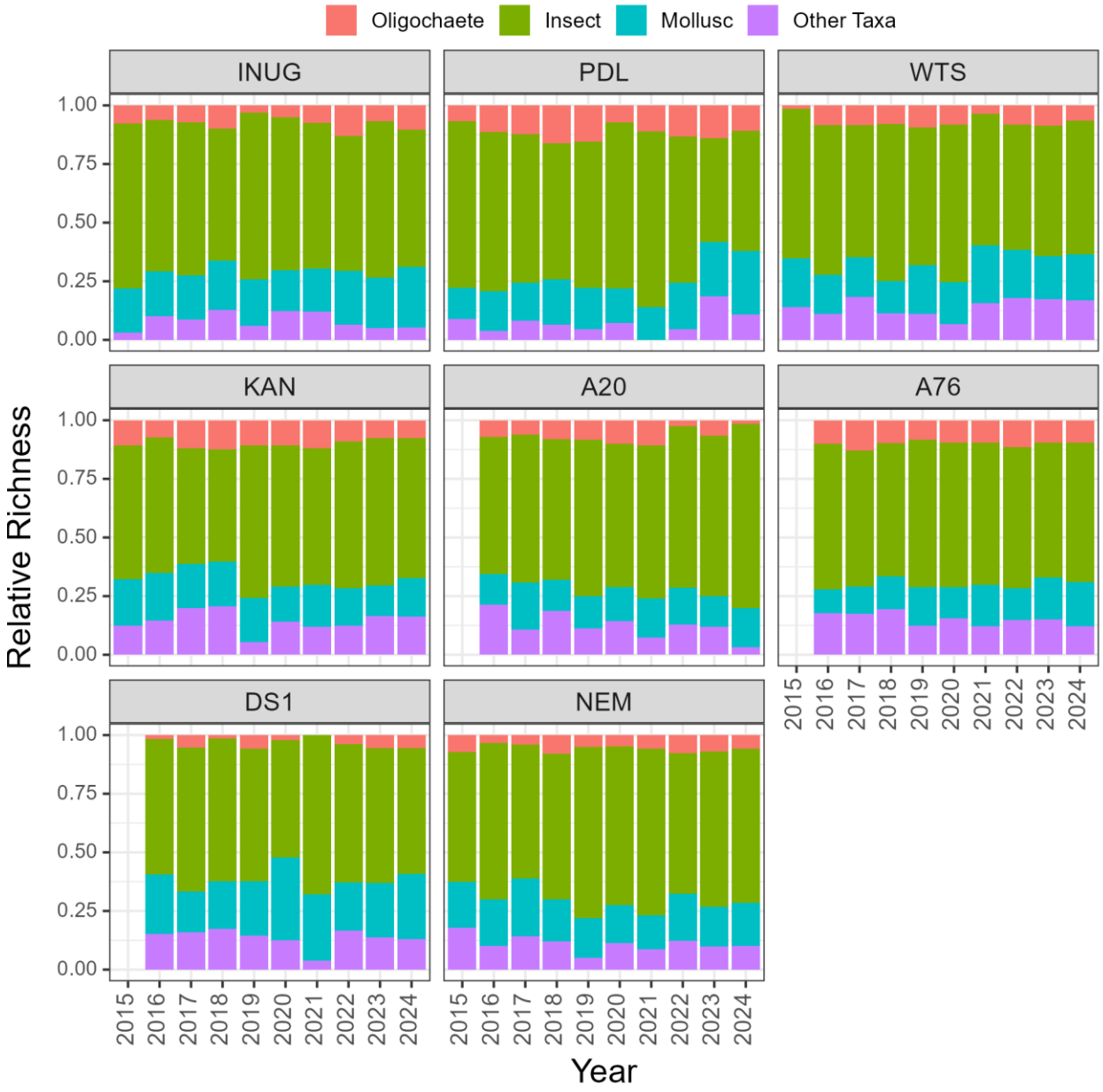


Figure 5-28. Benthic invertebrate relative richness by major taxa from Whale Tail study area lakes since 2015.



6 BAKER LAKE

6.1 Overview of the Baker Lake CREMP

This section summarizes the 2024 CREMP results for water chemistry and the phytoplankton community in Baker Lake. No sediment chemistry or benthos sampling was completed in 2024 as per the *CREMP Plan Update* (Azimuth, 2022b).

Baker Lake monitoring was added to the core program in 2008 to ensure activities related primarily to barge traffic and shipping in the area were tracked (**Appendix A**). There are two near-field impact areas, one targeting the hamlet's barge landing area (BBD) and the other Agnico Eagle's fuel storage facility (BPJ). The initial (since 2008) reference area (BAP) is several kilometers to the east of the hamlet along the north shore of the lake. A second reference area (BES) was added in 2011 to provide a broader perspective on temporal patterns in sediment chemistry and benthic community structure, although it is not monitored for water quality or phytoplankton communities. Sampling locations are shown in **Figure 6-1**.

Barge trips from Chesterfield Inlet to Baker Lake in 2024 numbered 28 for general cargo and 28 for fuel (**Figure 6-2**). With the expansion at the Whale Tail mine, traffic increased in 2018 and 2019 compared to previous years (e.g., from < 40 in 2016 and 2017 to ~ 55 in 2018). Trips were lower in 2024 compared to years 2021 to 2023.

Since monitoring began in 2008, there has been no evidence that barge traffic or other Agnico Eagle activities impact water, sediment, phytoplankton, or benthic communities in Baker Lake. As such, sediment chemistry and benthos sampling now occur every three years, aligning with the EEM program. The most recent sediment chemistry and benthos sampling was in 2023, with the next event scheduled for 2026.

6.2 Limnology

6.2.1 General Observations

Baker Lake is large with much greater wind fetch than the Meadowbank or Whale Tail study area lakes and has a unique set of limnological characteristics. Factors that contribute to the unique limnology include the lake's proximity to the tidally-influenced Chesterfield Inlet, the influence of the Thelon River, and deep water that is naturally elevated in dissolved solids. These natural complexities interact, leading to the *competing* influences of Thelon River water, which is less-saline and Baker Lake water, which is more-saline. Freshet on the Thelon River coupled with shifts in north/south wind speed and direction lead to variable degrees of horizontal and vertical mixing of the water column. When sampling near the north shore, these factors may combine to confound the detection of potential subtle changes in water

quality related to barge activity, with the *signal* getting lost in the *noise* of natural variability in this dynamic location.

Parameters associated with more-saline or higher conductivity water that appears to be present in deep water (>10–15 m) and which demonstrate considerable fluctuations within and between years include conductivity, hardness, calcium, chloride, magnesium, sodium, and TDS. Other parameters that have a high level of natural variability and appear to be correlated with these deep-water parameters in Baker Lake include ammonia, nitrate, TKN, total phosphorus, and sulphate. A deep limnology survey was conducted in August 2012 to explore this situation specifically. While it provided a single *snapshot* of this dynamic limnological process, all parameters measured (temperature, conductivity, dissolved oxygen, pH, total dissolved solids, and salinity) showed a strong and abrupt stratification from 8–12 m depth at areas BBD 1 and 2, and BPJ. For example, conductivity increased from less than 20 µS/cm in shallow near-shore water to over 200 µS/cm between 8 and 12 m depth, depending on location. Conductivity remained uniformly high down to the maximum sampled depth (40 m). This indicates that measurements from any event will reflect the relative influence of the deeper, brackish Baker Lake water and the less-saline Thelon River water on the day of the event. Ultimately, wind-induced currents and vertical mixing are important factors dictating the relative influence of the less-saline Thelon River water versus the more-saline Baker Lake water. Stronger winds enhance turbulence, promoting gas exchange in the mixed layer and redistributing heat, nutrients, and dissolved oxygen more evenly by disrupting the thermocline. Conversely, weaker winds limit mixing to surface layers, allowing stratification to persist.

6.2.2 Temporal and Spatial Trends

In addition to the Thelon-Baker influence, several other factors have the potential to affect limnology. Seasonal barge traffic is the major mine-related activity in the area, occurring during the summer months when Baker Lake is ice-free. The hamlet of Baker Lake's sewage lagoons and landfill are situated in a watershed that discharges seasonally into Baker Lake between BBD and BPJ. And locally, propeller wash may cause vertical mixing in very discrete areas when there is active traffic. Otherwise, except for spills and occasional discharge from commercial vessels etc., no other activities have the potential to alter limnological parameters.

Limnological conditions at Baker Lake are similar to the Meadowbank study area lakes, except that water temperatures are cooler, typically reaching no more than 10°C in mid-summer. Mean temperatures at all Baker locations ranged between 2.89 and 14.3°C (**Figure 6-3**).

In 2024, summer stratification was visible to varying degrees at each of the Baker Lake sampling areas. The conductivity measured in July was elevated at BAP and BPJ (maximum measurements reaching 748 and 846 µS/cm, respectively), however it was within historical ranges at BBD, the location in closest

proximity to the influence of the less-saline Thelon River. Elevated conductivity was observed to a lesser extent at all three stations in August, particularly at BAP, which is the furthest from the Thelon River influence and had the lowest depths. This pattern was far less apparent in September, with elevated conductivity only present at BAP. Each location's proximity to the Thelon River drives these thermal and saline stratification patterns, which were similar to previous years but more pronounced in 2024. In July and August, the warmer freshwater transitioned to colder saline water over a thermocline at approximately 6 m, with a secondary transition just after 10 m. This pattern progressively diminishes moving away from the river mouth at BPJ and BAP, a trend particularly evident in August (**Figure 6-4**).

6.3 Water Chemistry

6.3.1 Key Findings from the 2024 Water Chemistry Monitoring Program

- In 2024, the mean annual concentrations for all parameters were less than their respective triggers. Therefore, no BACI analysis was completed for Baker Lake in 2024.

6.3.2 General Observations

As discussed in **Section 6.2**, Baker Lake is large and exposed to high winds and wind-generated currents. Adding to the complexity, monitoring areas along the north shore are exposed to two different water masses: the less-saline Thelon River, which discharges into Baker Lake at its western end, and the saline-influenced deeper water in Baker Lake. Depending on wind speed and direction, water from these two sources (e.g., individually or mixed) can strongly influence some surface water chemistry parameters (conductivity, salts, and dissolved solids). Consequently, certain parameters can display pronounced spatial (horizontal and vertical) and temporal variability. This variability is evident mainly in the *conventional* parameters (described above); in contrast, concentrations of metals in the Baker Lake samples are typically below laboratory MDLs.

In 2024, there were two spill events that prompted appropriate response measures, mitigation efforts, and thorough investigations. On June 12th 2024, a turbid water runoff release occurred from the Marshalling Facilities towards the shore of Baker Lake. The visible plumes in Baker Lake were mostly contained within a few meters from the shoreline, after which the water appeared clear based on visual field observations. Water samples were taken to analyze for TSS and for toxicity testing. Silt fences and woodchip-log booms were utilized to intercept flows, while maritime curtains were used the contain the TSS plume in the receiving environment.

On September 8th 2024, heavy rains resulted in a turbid flow of heavy water running from the Marshalling Facilities to the shore of Baker Lake creating apparent plumes of TSS along the shore adjacent to the barge dock. Water samples in the lake on the west side of the dock were taken for analysis for TSS, as well as for toxicity testing. Woodchip-log or straw-log booms were deployed and a

rock fill berm was placed in the flow path of the runoff, to control the transportation of sediments. Over the next week, inspections and monitoring of the area was performed by environmental staff. During the monitoring, the TSS control measures were monitored, repaired and added, if needed.

More information regarding the cause, water quality results, and remediation actions for the 2024 spill events can be found in the Spill Follow-up Reports submitted as per the Water License.

6.3.3 Temporal and Spatial Trends

CREMP monitoring results since 2008 were used to assess temporal and spatial trends related to mining activities (**Appendix A**). The general rationale for assessing these trends discussed in **Section 2.5.1** was tailored slightly for the water chemistry assessment in Baker Lake, as described below.

Baker Lake water chemistry results for 2024, screened against site-specific triggers and effects-based thresholds, are tabulated in **Appendix C3**. Most water quality parameters in Baker Lake, similar to the results for the Meadowbank study lakes, are routinely below laboratory MDLs. Data screening for Baker Lake followed the same methodology as Meadowbank and Whale Tail (**Section 2.5.1**) except that matching patterns in mining activity was not conducted as it is not relevant to this study area.

The results for all parameters that were screened into the assessment process are summarized in **Table 6-1** and shown in **Figure 6-5** through **Figure 6-9**. In each figure, the red dashed line indicates the Baker Lake trigger value for that parameter[30]. Parameters excluded from the trend assessment were assumed to have no spatial or temporal trends related to barge activities or natural variability and were removed from further consideration; for transparency, plots for these parameters are provided in **Appendix C3**.

There were no exceedances in 2024 (**Figure 6-7** and **Appendix C3**). In recent years, TOC and DOC have been above the trigger, and were only slightly below at all three areas (BBD, BPJ, BAP) in 2024. Since 2008, annual patterns in TOC/DOC concentrations have been notably similar between reference and exposure locations. The common patterns suggest that the carbon parameters are being influenced by regional environmental factors. If local anthropogenic activities were impacting TOC/DOC a distinct signature would be expected at impact areas (BBD, BPJ) compared to the reference area BAP.

Mean annual TOC/DOC concentrations have increased at all three Baker Lake sampling areas since 2018 and more broadly since sampling began in 2008, indicating a long-term increasing trend. Similar patterns also exist between Baker Lake and the Meadowbank study area lakes (**Figure 4-9**).

Inversely to TOC/DOC concentrations, pH (field measured) appears to show a decreasing trend since 2009 across all Baker Lake areas (**Figure 6-5**). A similar pattern can be seen at the Meadowbank

[30] See Appendix I in the 2019 CREMP report (Azimuth, 2020a) for details on trigger updates and derivation for Baker Lake.

reference lakes (INUG and PDL; **Figure 4-7**) and even at lakes close to mining activities where alkalinity has stabilized (e.g. WAL; **Figure 4-7**). The increases of TOC/DOC observed at Baker Lake and across the broader region are likely unrelated to mining activity and may be influencing regional trends in pH.

There are no follow-up measures for management beyond routine CREMP water quality sampling during the open-water season.

6.4 Phytoplankton Community

6.4.1 Key Findings from the 2024 Phytoplankton Monitoring Program

- There were no statistically significant changes in total biomass or taxa richness any stations.
- The phytoplankton community in Baker Lake was similar to previous years and has not exhibited any changes attributable to Agnico Eagle's activities in Baker Lake.

6.4.2 General Observations

The phytoplankton community of Baker Lake is relatively similar to the Meadowbank study area lakes, despite some seasonal differences in water quality due to the competing influences of less saline water from the Thelon River and more saline water from the deeper portion of Baker Lake (see **Section 6.2**). Taxonomic composition and biomass in Baker Lake were similar to the Meadowbank study lakes, with chrysophytes (golden algae, e.g., *Chrysococcus, Kephyrion, Dinobryon*) having been the dominant taxonomic group since monitoring began in 2008. Mean summer phytoplankton biomass in Baker Lake is generally similar to the Meadowbank study area lakes, reaching a maximum between 200 to 300 mg/m^3.

6.4.3 Temporal and Spatial Trends

Sampling at the Baker Lake areas is only conducted during the summer open-water period, which coincides with barge activity. Because of Baker Lake's large size, it is unlikely that barge traffic (in the absence of a substantial fuel or chemical spill) could influence the phytoplankton community of the whole lake.

The 2024 density and biomass results for phytoplankton are tabulated in **Appendix E3**. The BACI model statistical test results comparing 2024 data to baseline/reference conditions are provided in **Table 6-2**. Major findings at Baker Lake areas in 2024 for chlorophyll-a (not included in BACI), total biomass, taxa richness, and major taxa group composition (not included in BACI) were as follows:

- **Chlorophyll-a.** Concentrations at reference area BAP historically ranged between 0.4 to 1.5 µg/L (**Figure 6-10**). In 2024, the range and pattern of chlorophyll-a concentrations at the three Baker Lake areas were similar relative to previous years. Though concentrations appear to have generally declined since 2021, they remain within historical ranges.

- **Total biomass.** Annual biomass patterns generally co-vary across areas. In 2024, the lowest biomass was observed in July at BAP and BBD. While this pattern has been observed in previous years, it is more typical for the lowest biomass to occur in September. At BPJ, biomass levels were similar in July and September, with a slight decrease in September. While lower biomass was evident in July, biomass in August was among the highest ever recorded at BBD and was higher than average at BAP (**Figure 6-11** to **Figure 6-13**). Biomass at BPJ in August was within the normal range. There were no statistically significant changes in total biomass or taxa richness at any area (**Table 6-2**).
- **Major taxa composition.** There were no apparent differences in relative composition of phytoplankton communities between BAP and impact areas BBD and BPJ in 2024 (**Figure 6-13**). In August 2024, cryptophyte biomass was slightly higher at BAP, relative to BBD and BPJ, however the biomass distribution was very comparable. Chrysophytes are typically the dominant taxa in all sampling areas, and in 2024 comprised 53 to 67% of the total phytoplankton biomass in each area. Diatoms made up 14 to 26%, while cryptophytes made up 10 to 14%. The remainder of the biomass is made up of chlorophytes and dinoflagellates (**Appendix E3**).
- **Taxa richness.** Richness in Baker Lake phytoplankton samples was generally higher than 2023 results, but comparable to historical ranges at both the impact and reference areas (**Figure 6-14**). There were no statistically significant changes in total biomass or taxa richness any areas (**Table 6-2**).

Phytoplankton biomass will continue to be monitored for potential temporal trends, but no follow-up measures other than routine monitoring is recommended for 2025.

6.5 Baker Lake Tables and Figures

This section includes tables and figures for the Baker Lake CREMP, except for large tabulated data and figures for parameters not covered in the detailed analysis (refer to in-text references for relevant appendices). Subsections are organized by CREMP components including limnology, water chemistry and phytoplankton.

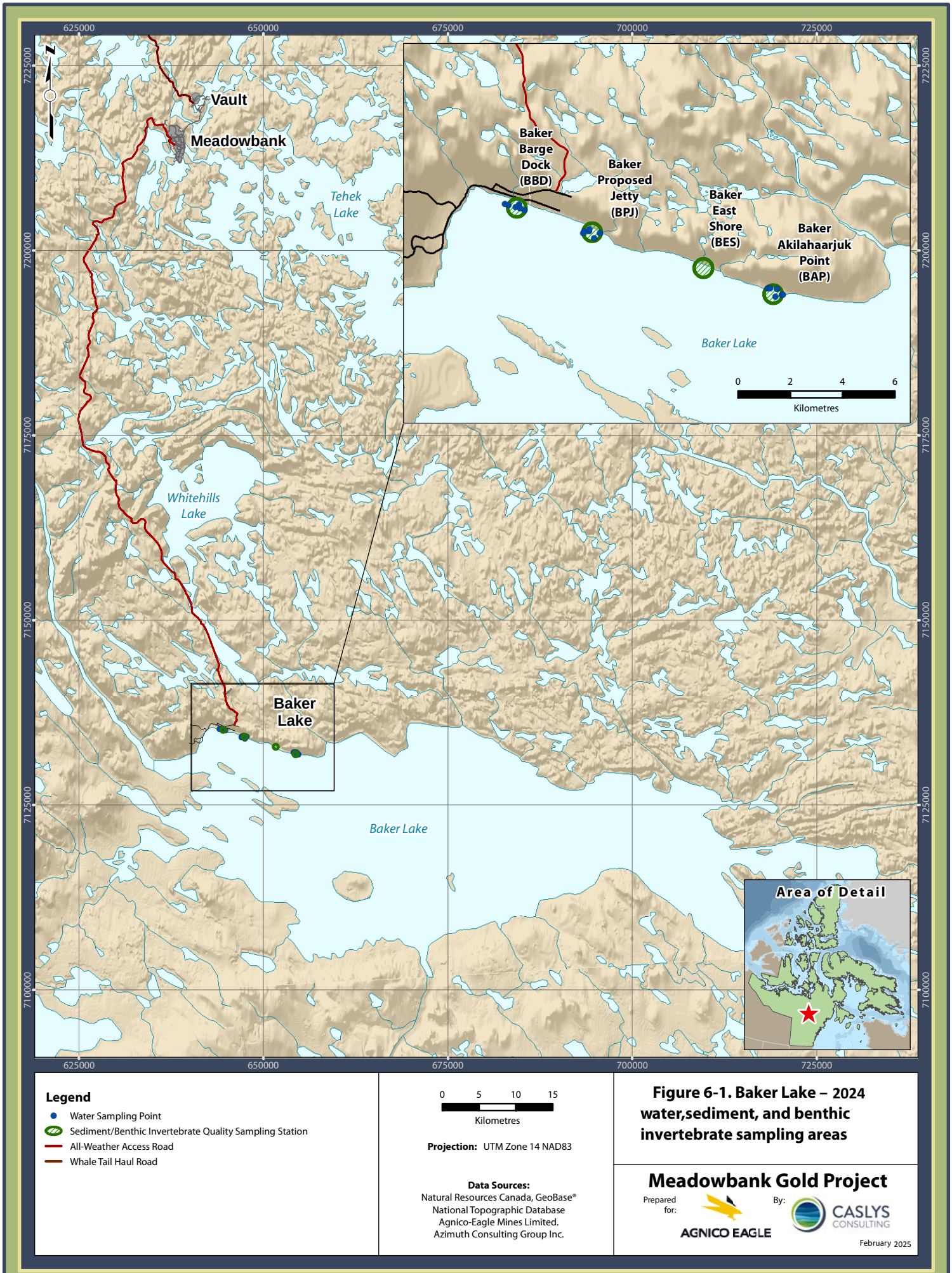
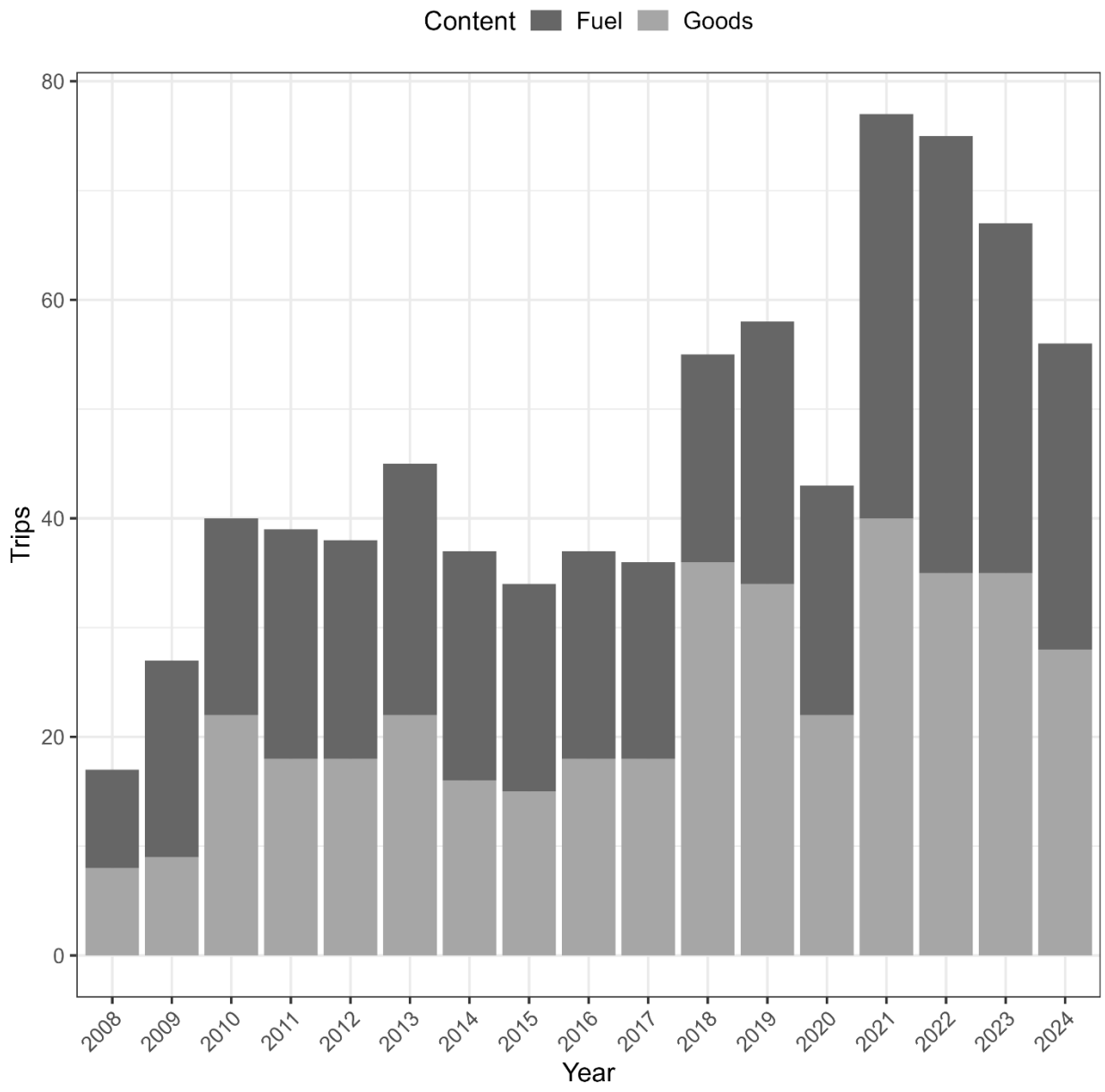

625000
650000
675000
700000
725000
7225000
7200000
7175000
7150000
7125000
7100000
N
Vault
Meadowbank
Tehek Lake
Whitehills Lake
Baker Lake
Baker Lake
Baker Barge Dock (BBD)
Baker Proposed Jetty (BPJ)
Baker East Shore (BES)
Baker Akilahaarjuk Point (BAP)
Baker Lake
0 2 4 6
Kilometres
Area of Detail
Legend
Water Sampling Point
Sediment/Benthic Invertebrate Quality Sampling Station
All-Weather Access Road
Whale Tail Haul Road
0 5 10 15
Kilometres
Projection: UTM Zone 14 NAD83
Data Sources:
Natural Resources Canada, GeoBase®
National Topographic Database
Agnico-Eagle Mines Limited.
Azimuth Consulting Group Inc.
Figure 6-1. Baker Lake – 2024 water,sediment, and benthic invertebrate sampling areas
Meadowbank Gold Project
Prepared for:
AGNICO EAGLE
By:
CASLYS CONSULTING
February 2025

Figure 6-2. Baker Lake barge traffic from Chesterfield Inlet since 2008.



Limnology Tables and Figures

Figure 6-3. Mean monthly field-measured temperature (°C) at 3 m depth since 2008, Baker Lake.

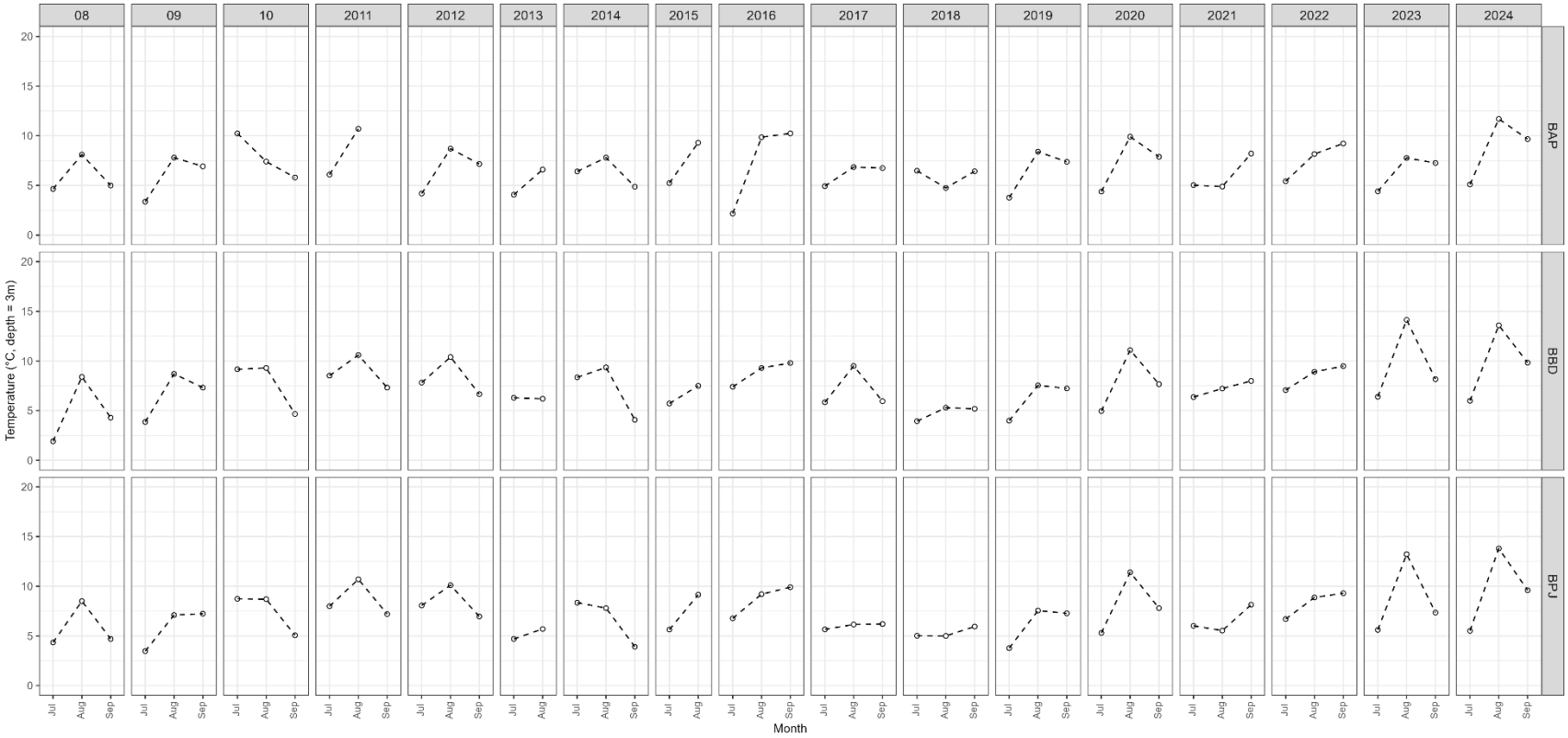
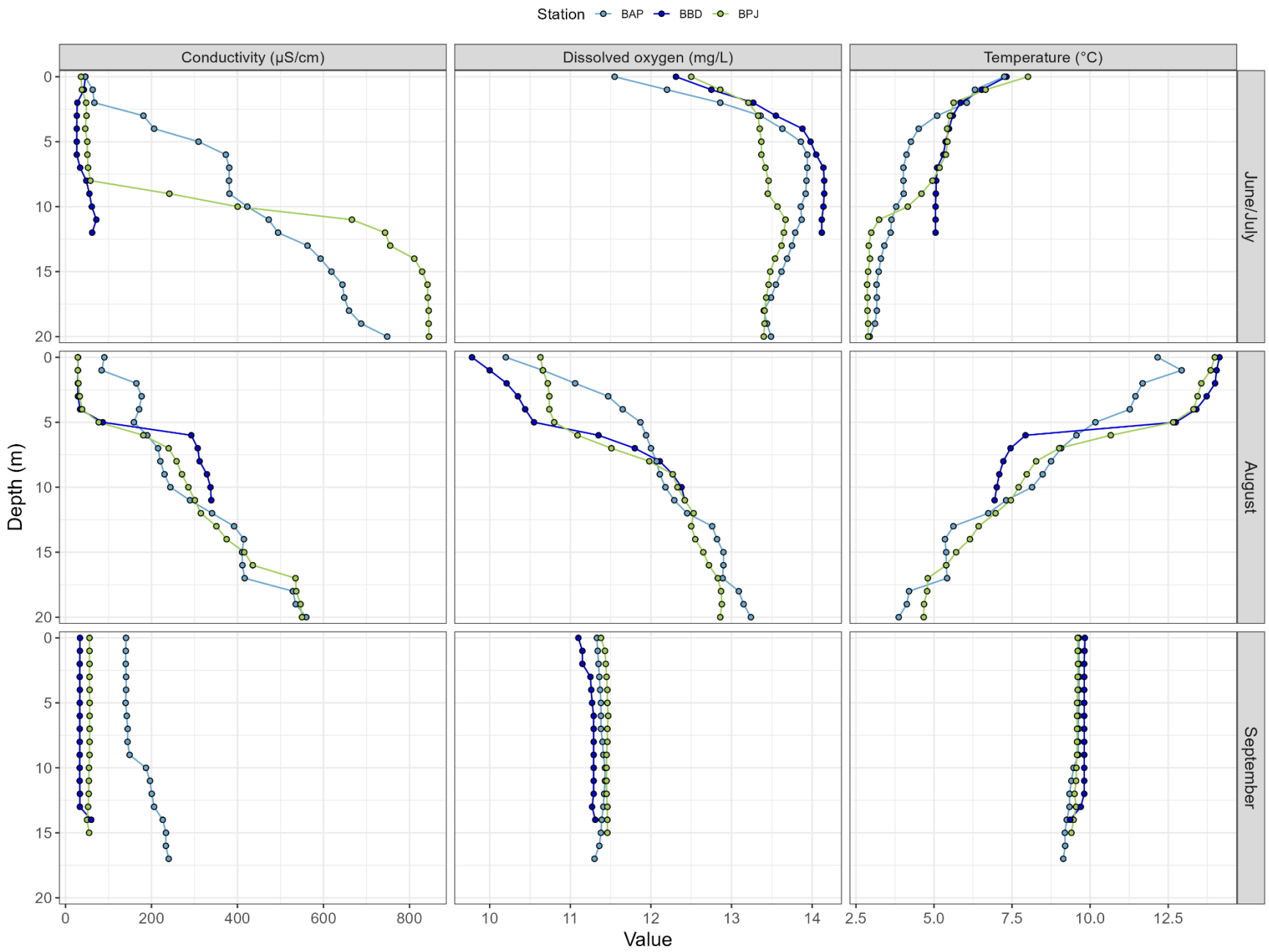


Figure 6-4. Baker Lake – Field-measured conductivity, dissolved oxygen, and temperature profiles, 2024.

Note: Only the field measured values up to 20 m depth shown in figure.



Water Chemistry Tables and Figures

Table 6-1. Screening process for water quality parameters, Baker Lake, 2024.

Parameters	Trigger Exceedance[2]	Screening Level and Rule[1] 1 >DL ≥ 10% Frequency	2 C-I > 0.1 Frequency
CONVENTIONALS			
Conductivity	-	**Yes**	
TSS	-	**Yes**	
Hardness	-	**Yes**	
T-Alkalinity	-	**Yes**	
B-Alkalinity	-	**Yes**	
C-Alkalinity	-	No	No
pH-Field	BAP, BPJ	**Yes**	
pH-Lab	-	**Yes**	
MAJOR IONS			
TDS	-	**Yes**	
Calcium	-	**Yes**	
Chloride	-	**Yes**	
Fluoride	-	**Yes**	
Magnesium	-	**Yes**	
Potassium	-	**Yes**	
Sodium	-	**Yes**	
Sulphate	-	**Yes**	
NUTRIENTS & OTHERS			
Ammonia-N	-	**Yes**	
Nitrate-N	-	**Yes**	
Nitrite-N	-	No	No
TKN	BAP	**Yes**	
T-Phosphorus	BPJ	**Yes**	
Ortho-phosphate	-	**Yes**	
DOC	BAP, BBD, BPJ	**Yes**	
TOC	BAP, BBD, BPJ	**Yes**	
Reactive Silica	-	**Yes**	
T-Cyanide	*Not measured since 2019*		
Free Cyanide	*Not measured since 2019*		

Parameters	Trigger Exceedance[2]	Screening Level and Rule[1] 1 >DL ≥ 10% Frequency	2 C-I > 0.1 Frequency
TOTAL METALS			
Aluminum	-	**Yes**	
Antimony	-	No	No
Arsenic	-	**Yes**	
Barium	-	**Yes**	
Beryllium	-	No	No
Boron	-	**Yes**	
Cadmium	-	No	No
Chromium	-	**Yes**	
Copper	-	**Yes**	
Iron	-	**Yes**	
Lead	-	No	No
Lithium	-	**Yes**	
Manganese	-	**Yes**	
Mercury	-	No	No
Molybdenum	-	**Yes**	
Nickel	-	No	No
Selenium	-	No	No
Silicon	-	**Yes**	
Silver	-	No	No
Strontium	-	**Yes**	
Thallium	-	No	No
Tin	-	No	No
Titanium	-	**Yes**	
Uranium	-	**Yes**	
Vanadium	-	No	No
Zinc	-	No	No

Parameters	Trigger Exceedance[2]	Screening Level and Rule[1] 1 >DL ≥ 10% Frequency	2 C-I > 0.1 Frequency
DISSOLVED METALS			
Aluminum	-	**Yes**	
Antimony	-	No	No
Arsenic	-	**Yes**	
Barium	-	**Yes**	
Beryllium	-	No	No
Boron	-	**Yes**	
Cadmium	-	No	No
Chromium	-	No	No
Copper	-	**Yes**	
Iron	-	**Yes**	
Lead	-	No	No
Lithium	-	**Yes**	
Manganese	-	**Yes**	
Mercury	-	No	No
Molybdenum	-	**Yes**	
Nickel	-	No	No
Selenium	-	No	No
Silicon	-	**Yes**	
Silver	-	No	No
Strontium	-	**Yes**	
Thallium	-	No	No
Tin	-	No	No
Titanium	-	No	No
Uranium	-	**Yes**	
Vanadium	-	No	No
Zinc	-	No	No

Notes:

1. A three-step assessment process was used to identify parameters to include in the formal temporal and spatial trend assessment (**Section 2.5.1** and **Section 4.3.2**).
   Parameters were assigned a "Yes" if the following assessment was true:

(1) **>DL ≥ 10% Frequency**: parameters that exceeded MDLs in at least 10% of the samples.
(2) **C-I > 0.1 Frequency**: parameters that were detected more often in impact areas and the proportion of detected values increased by 0.1 or more.
(3) **Pattern = Activity**: additional step to avoid screening out potentially important parameters. Based on the trend plots, is there a trend for infrequently detected parameters and/or are there values > 5 x DL in at least one sampling event at NF areas?

2. Indicates that a trigger exceedance occurred at the listed Baker Lake study areas in one or more sampling event.

Shaded parameters are included in the temporal and spatial trend assessment.

Figure 6-5. Conventional parameters in water samples from Baker Lake since 2008.

Note: Laboratory-measured conductivity data from 2014 should be interpreted with caution, particularly at low concentrations (see Azimuth, 2015c for details).

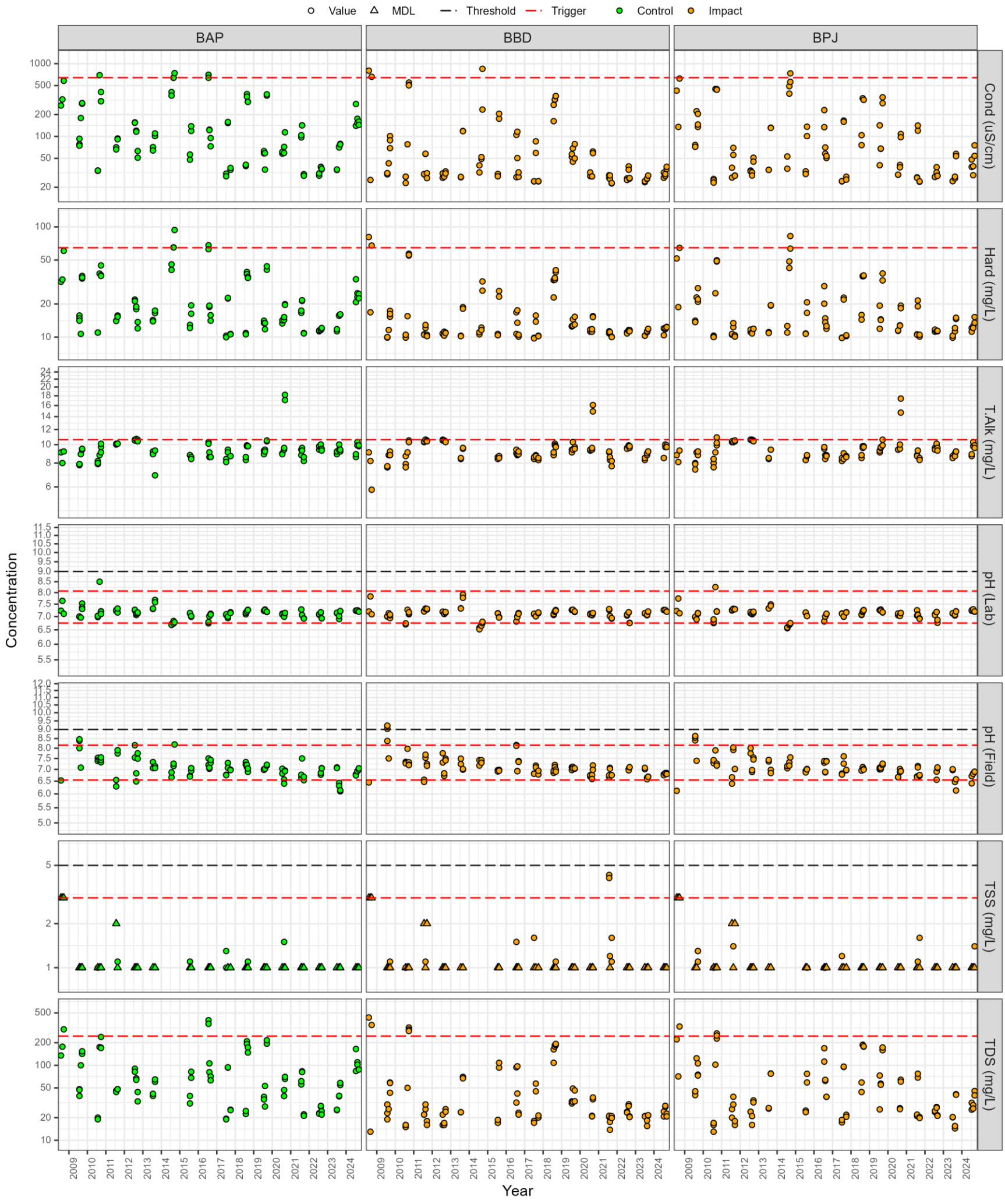


Figure 6-6. Major ions in water samples from Baker Lake since 2008.

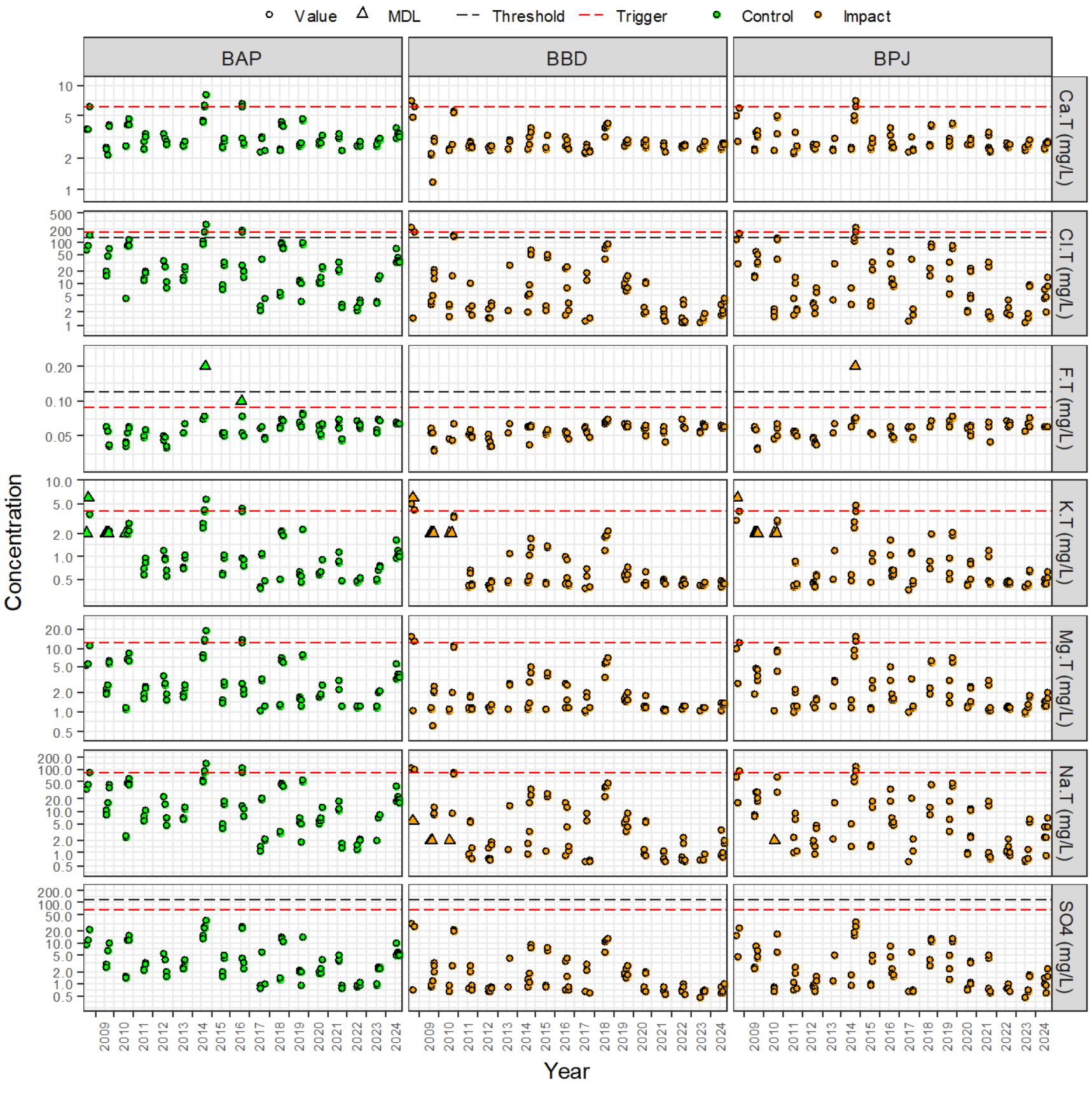


Figure 6-7. Nutrients in water samples from Baker Lake since 2008.

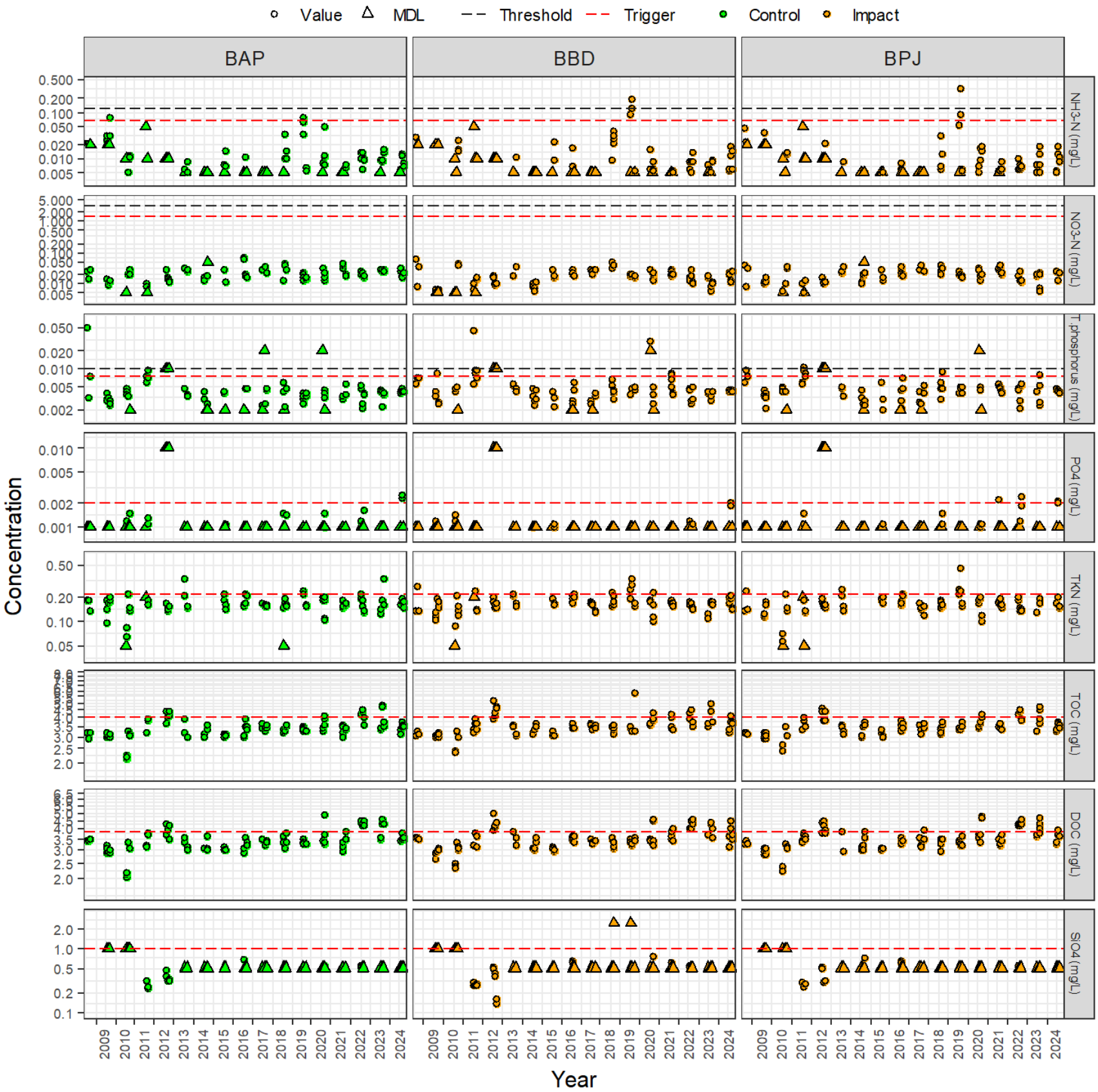


Figure 6-8. Metals in water samples from Baker Lake since 2008.

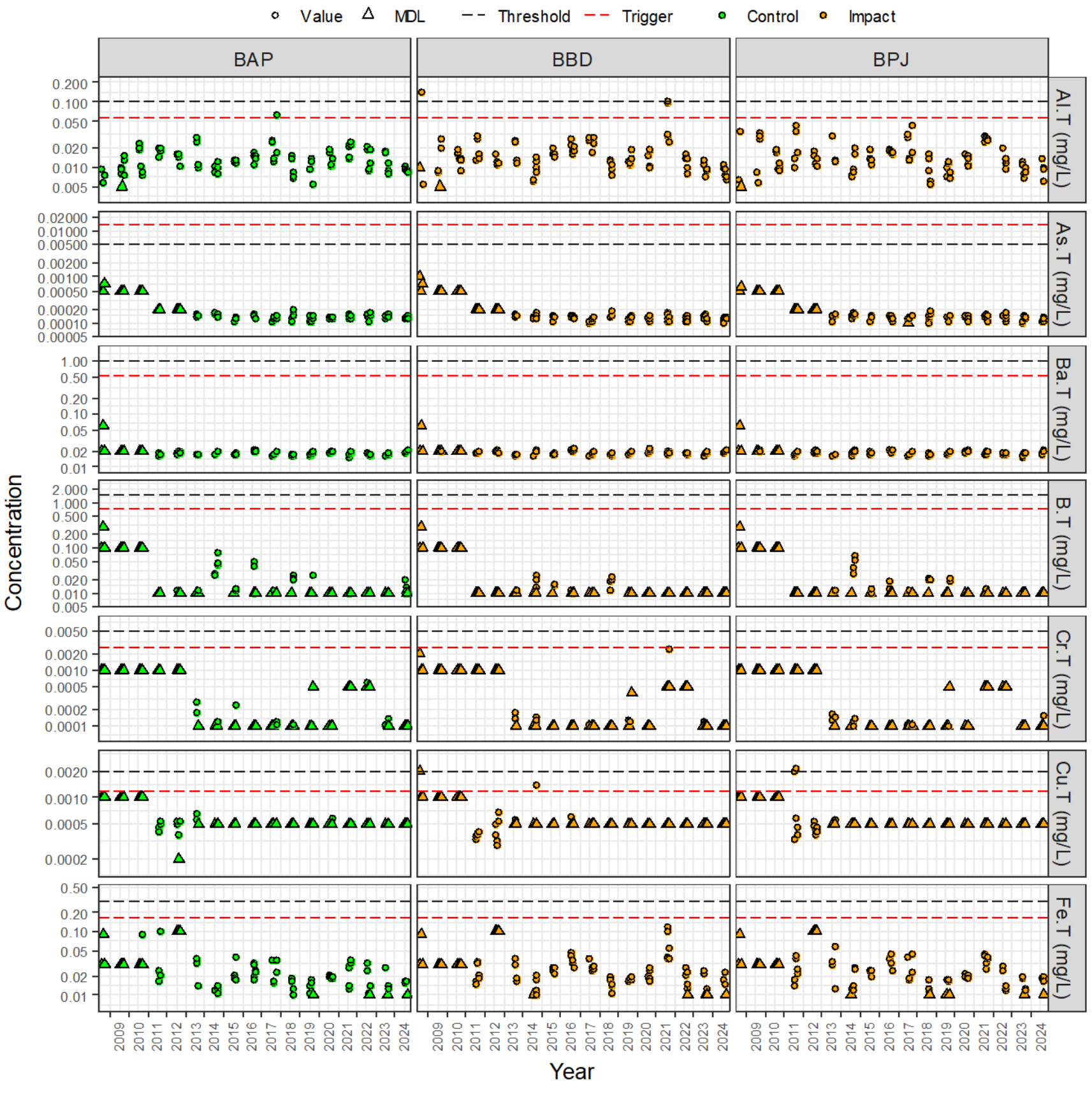
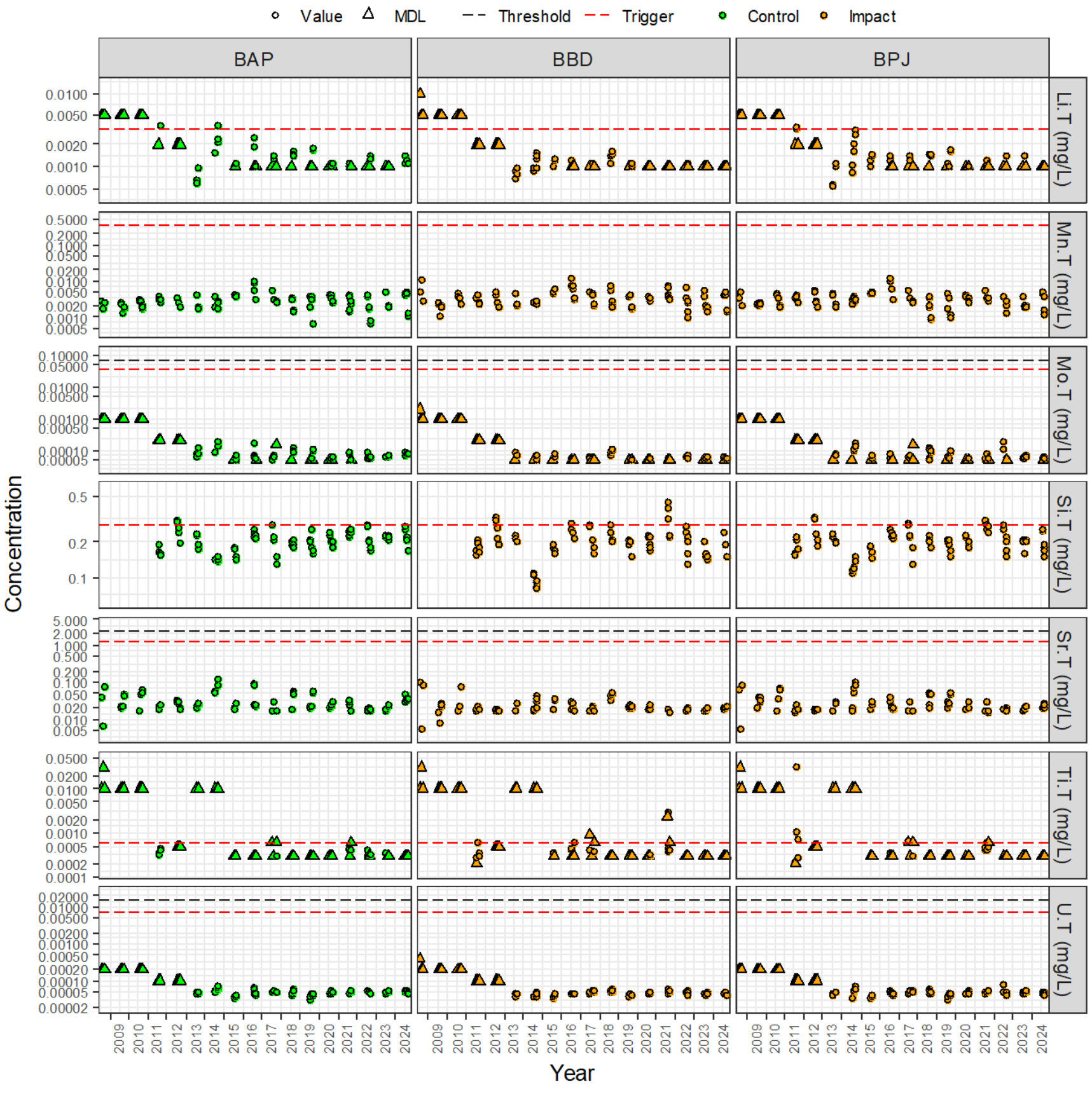


Figure 6-9. Metals in water samples from Baker Lake since 2008.



Phytoplankton Tables and Figures

Table 6-2. Results of the BACI tests for phytoplankton variables at Baker Lake areas, 2024.

Parameter Measured	Test Area	n(B)	n(A)	Estimate	SE	P-value*	Effect Size (%)		
							ES	LCI	UCI
Total Biomass	BBD	45	3	-0.02	0.25	0.925	-2	-41	62
	BPJ	45	3	-0.07	0.17	0.684	-7	-34	32
Taxa Richness	BBD	45	3	-0.09	0.06	0.186	-8	-20	4
	BPJ	45	3	-0.06	0.05	0.276	-6	-16	5

Notes:

*** Bolded** values are P-values <0.1.

Shaded cells indicate positive (increased) or negative (reduced) effect sizes of 20% or more.

Test area = area compared to control (BAP).

n(B) = number of months in the "before" period.

n(A) = number of months in the "after" period (i.e., in 2024).

Estimate = BACI model estimate of the 2024 change in mean for log-transformed data.

SE = standard error of the estimate.

P-value = two-tailed test of the null hypothesis of no change.

ES = estimated effect size (i.e., 100%*(exp[Estimate]-1)).

LCI = lower 95% confidence interval; UCI = upper 95% confidence interval.

Figure 6-10. Chlorophyll-a (µg/L) in water samples from Baker Lake since 2008.

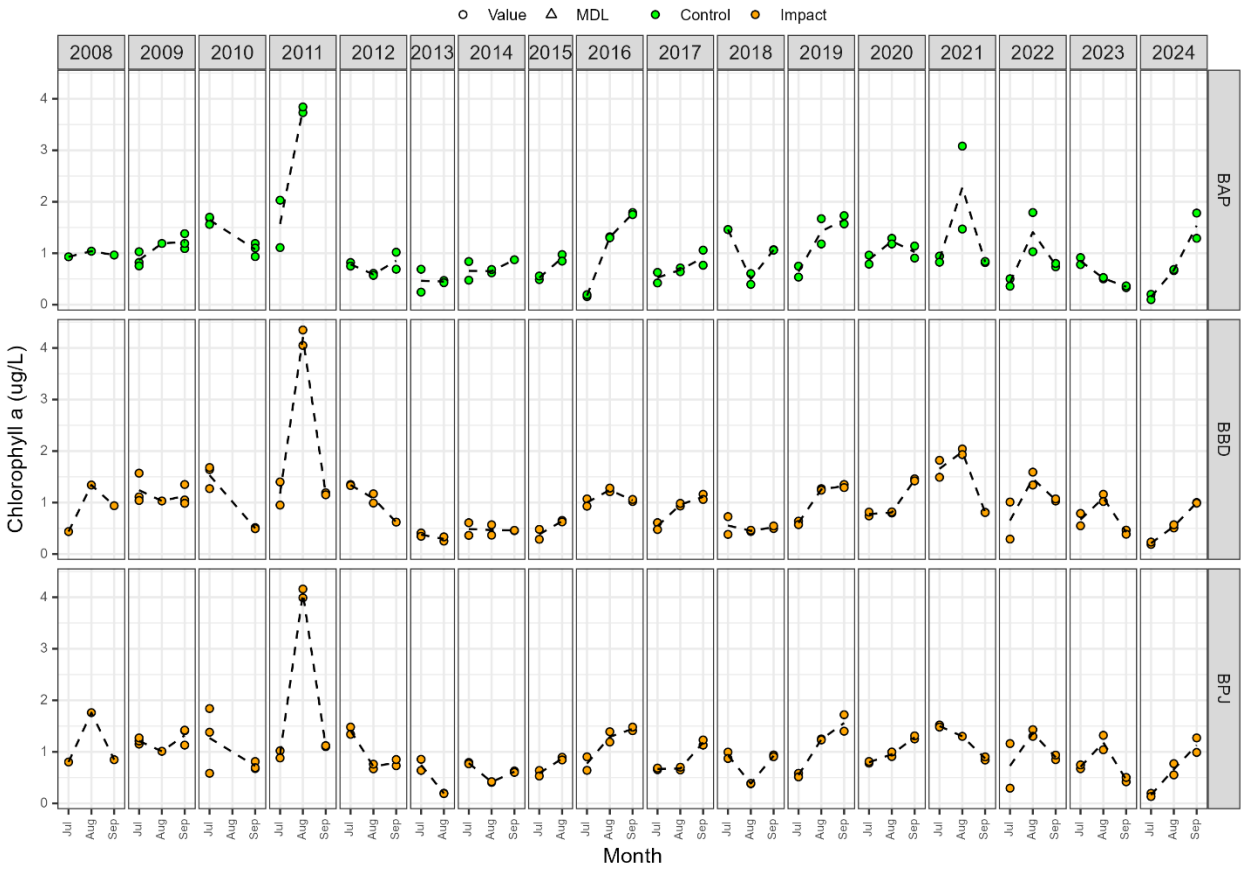


Figure 6-11. Total phytoplankton biomass (mg/m^3) from Baker Lake since 2008.

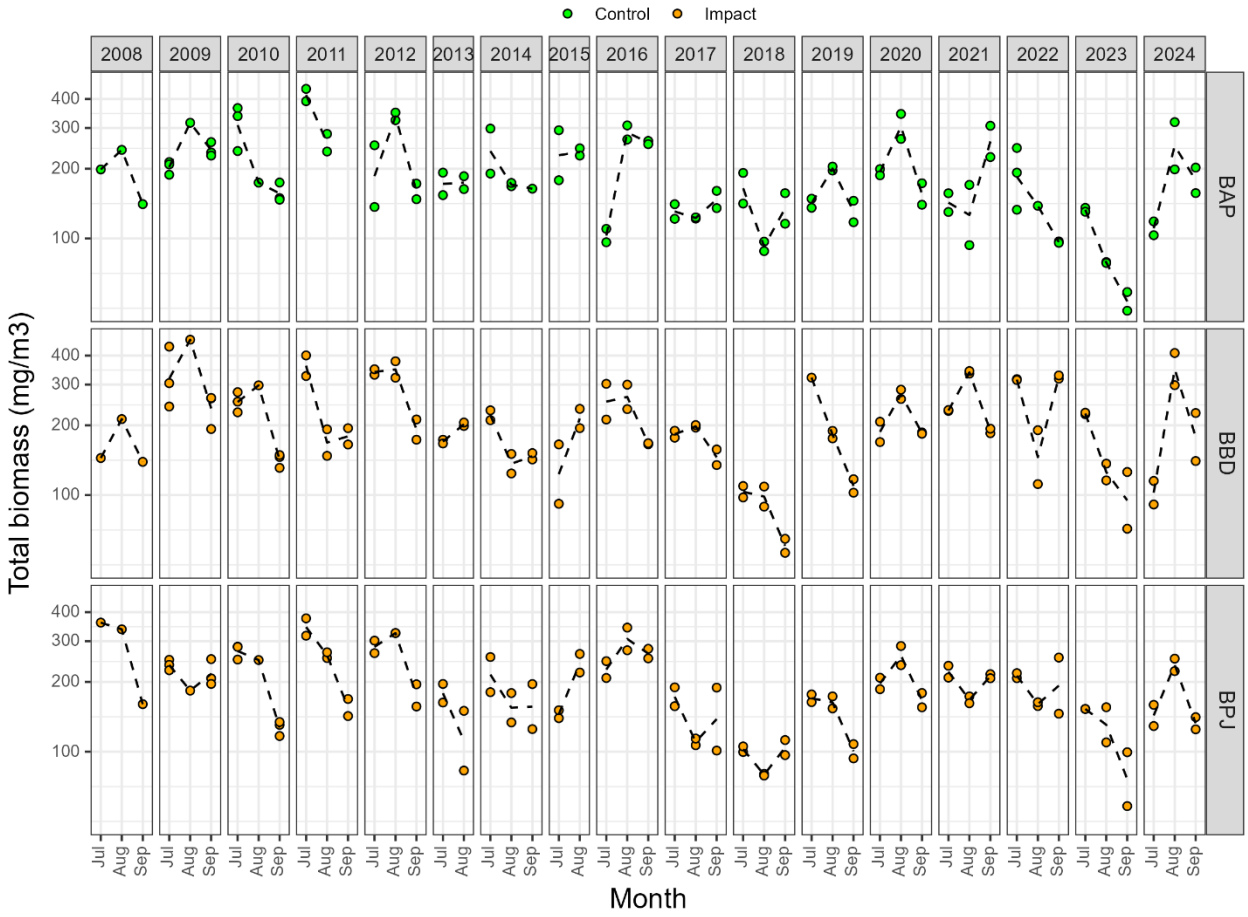


Figure 6-12. Phytoplankton biomass (mg/m^3) by major taxa from Baker Lake since 2008.

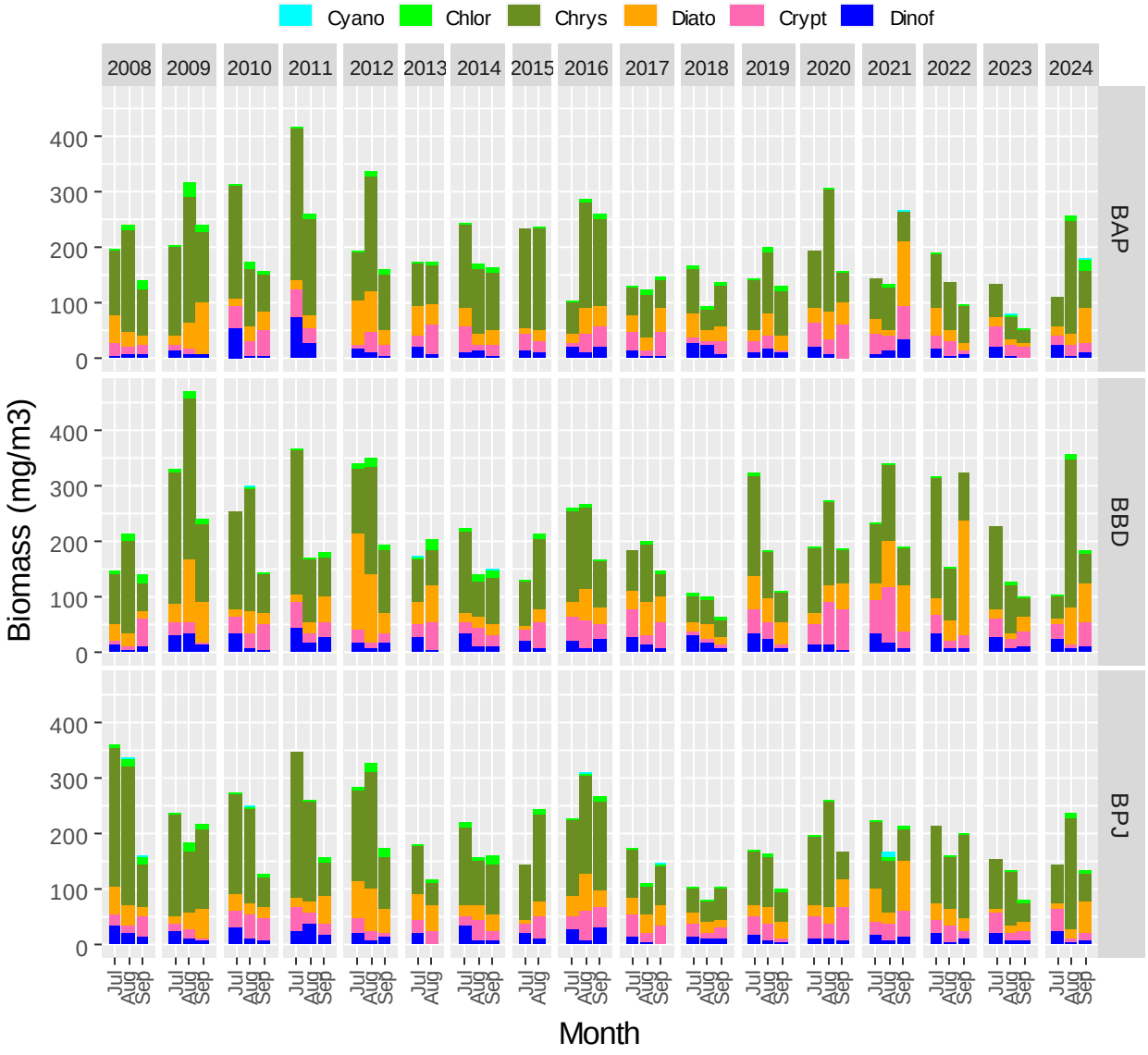


Figure 6-13. Relative phytoplankton biomass by major taxa from Baker Lake since 2008.

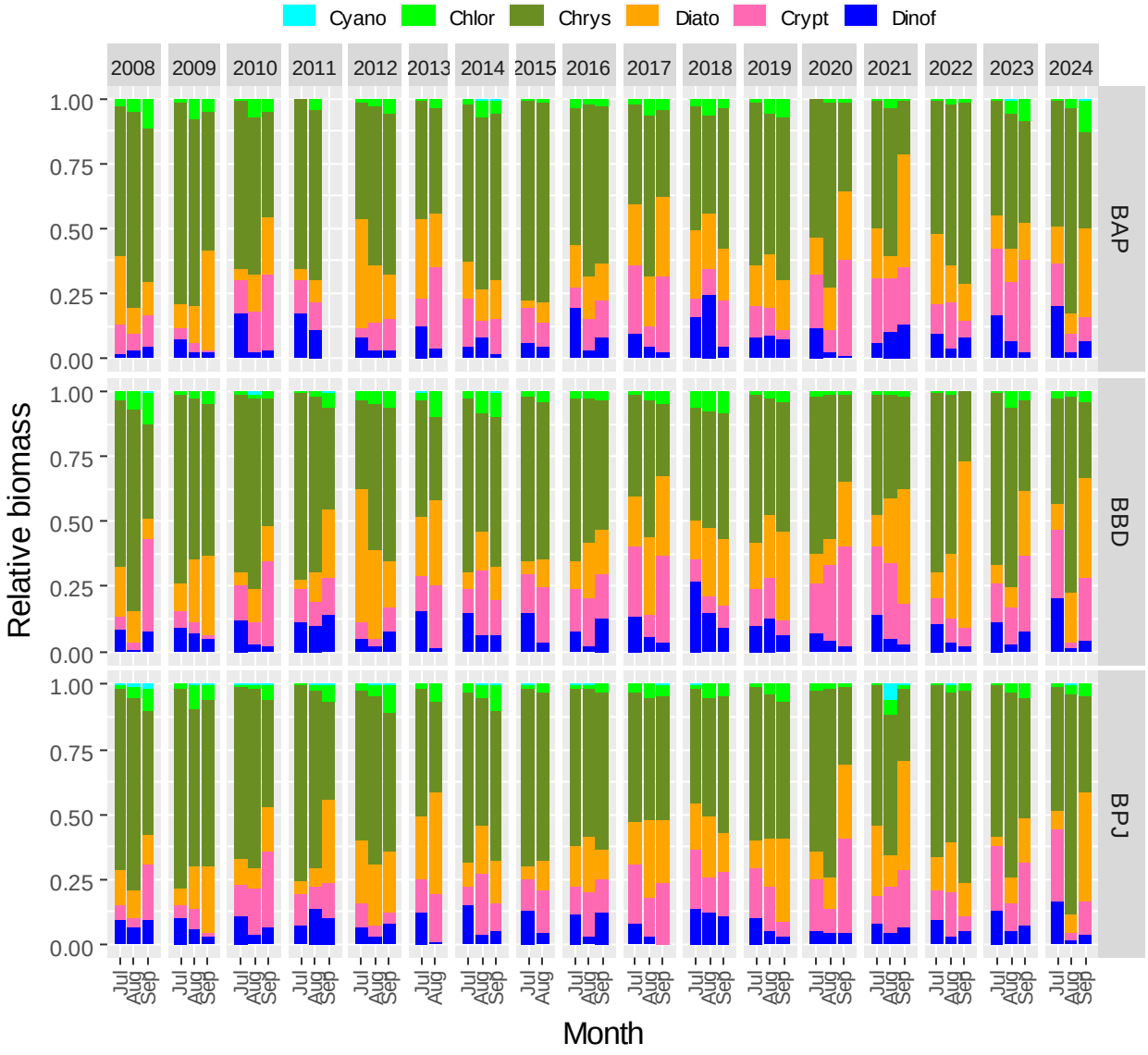
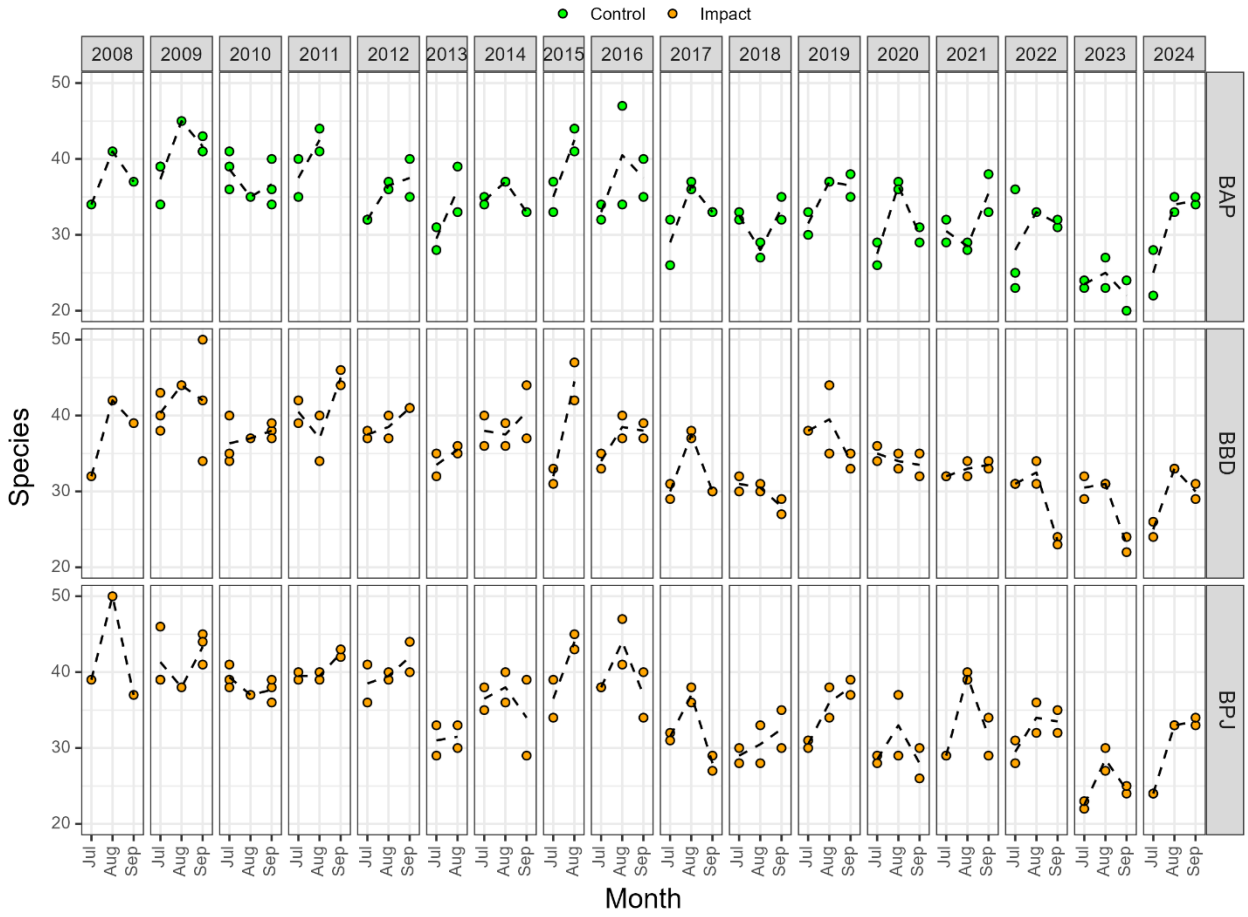


Figure 6-14. Phytoplankton species richness from Baker Lake since 2008.



7 SCOPE OF THE 2025 CREMP

The CREMP focuses on identifying changes in limnology, water, and sediment chemistry, and primary (phytoplankton) and secondary (benthic invertebrate community) aquatic producers that may be associated with mine development activities. This is accomplished by applying a temporal/spatial trend assessment that includes applying quantitative decision criteria (i.e., early warning *triggers* and action *thresholds*) to facilitate making immediate and objective decisions about appropriate management actions. CREMP results are integrated annually into the Aquatic Ecosystem Monitoring Program (AEMP) for holistic environmental management and decision making. Recommendations for the scope of the 2025 CREMP are provided for Meadowbank, Whale Tail, and Baker Lake based on the 2024 monitoring results discussed in **Sections 4**, **5**, and **6**, respectively.

7.1 Meadowbank

Based on the 2024 results and the annual decision framework for the sampling strategy (**Section 2.4**), the components and schedule for the 2025 CREMP for the Meadowbank study area is summarized in **Table 7-1**. The scope of work proposed for 2025 includes:

- **Water quality**. Water sampling for three open-water and two through-ice sampling events at the NF and reference areas. Through-ice limnology and water chemistry sampling at TPS, TE, and TEFF will continue to be suspended unless monitoring data from NF areas suggest there are "moderate changes" in water quality[31]. In addition, contingency water samples may need to be collected during the limnology-only, through-ice sampling event(s) at the NF areas, if anomalous *in-situ* limnology results are observed.
- **Phytoplankton**. Routine sampling at the NF areas, at the same time as the three open-water and two through-ice sampling events. Winter phytoplankton samples will be archived and may be submitted for analysis depending on the results from the open-water sampling events. Sampling at MF and FF areas is not required.
- **Sediment chemistry**. Sediment chemistry samples will be collected by grab sampler with benthos samples at all NF and reference areas.
- **Benthos**. Routine benthos samples and supporting habitat data (TOC and grain size) will be collected by grab sampler at the NF and reference areas.

[31] "Moderate changes" in water quality are defined as statistically significant increases exceeding the early warning trigger for parameters with effects-based thresholds (i.e., CCME FWAL).

7.2 Whale Tail

Timing of the field sampling at the Whale Tail study area lakes matches the schedule for Meadowbank because of share-reference area sampling at INUG and PDL. The frequency of sampling and study components at each area are outlined in **Table 7-1**. The scope of work proposed for Whale Tail study area lakes in 2025 includes:

- **Water quality**. The full CREMP program (through-ice and open-water) at the NF, MF, FF, and reference areas. Through-ice limnology profiles are recommended at KAN, WTS, and NEM in the months when water sampling is not completed. In addition, contingency water samples may need to be collected during the limnology-only, through-ice sampling event(s), if anomalous *in-situ* limnology results are observed.
- **Phytoplankton**. Routine sampling at the same time as the three open-water and two through-ice sampling events. Winter phytoplankton samples will be archived and may be submitted for analysis depending on the results from the open-water sampling events.
- **Sediment chemistry**. Sediment chemistry samples will be collected by grab sampler with benthos at all Whale Tail areas and reference areas.
- **Benthos**. Benthos samples and supporting habitat data (TOC and grain size) will be collected by grab sampler at the Whale Tail study area lakes and reference areas on the same schedule as the Meadowbank study area lakes. Sampling at NF areas (WTS and KAN) to monitor for changes in the community due to construction and discharge. Sampling at NEM to monitor potential changes related to the temporary authorized discharge into the Nemo Lake watershed in 2019. Sampling at A20 to monitor potential changes related to the connectivity with WTS since the impoundment. Sampling at areas A76 and DS1 to provide more information on the range of normal conditions to support future BACI-style analysis.

7.3 Baker Lake

The scope of the 2025 Baker Lake CREMP is presented in **Table 7-1**. Monthly water quality monitoring is planned for July, August, and September consistent with previous years. Sediment chemistry and benthos monitoring is not planned for 2025, but is scheduled for August 2026. Sediment chemistry and benthos monitoring frequency for this area occurs on a three-year cycle as per the *CREMP Plan Update* (Azimuth, 2022b).

Table 7-1. Monitoring components planned for 2024 Meadowbank, Whale Tail, and Baker Lake CREMP.

Sampling Month[1]	Conditions	Components[2]	Meadowbank[3]									Whale Tail						Baker Lake			
			INUG	PDL	TPN	SP	TPE	WAL	TPS	TE	TEFF	WTS	KAN	NEM	A20	A76	DS1	BAP	BES	BBD	BPJ
January	Ice	L			✓	✓	✓	✓				✓	✓	✓	✓						
February	Ice	L			✓	✓	✓	✓				✓	✓	✓	✓						
March	Ice	L,W,P	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓				
April	Ice	L			✓	✓	✓	✓				✓	✓	✓	✓						
May	Ice	L,W,P	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓				
June	***Ice not safe***																				
July	Open-water	L,W,P	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓	✓
August	Open-water	L,W,P	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓	✓
		B,S	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓				
September	Open-water	L,W,P	✓	✓	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓		✓	✓
October	***Ice not safe***																				
November	Ice	L			✓	✓	✓	✓				✓	✓	✓	✓						
December	Ice	L			✓	✓	✓	✓				✓	✓	✓	✓						

Notes:

✓ = monitoring components were collected.

Area designations: C=Control; I=Impact; REF=reference (in grey shading); NF=near-field (in blue shading); MF=mid-field (in pink shading); FF=far-field (in teal shading)

Area IDs:

Meadowbank and Whale Tail Reference areas: INUG = Inuggugayualik Lake; PDL = Pipedream Lake.

Meadowbank areas: TPN, TPE, TPS = Third Portage Lake – North, East, South basins; SP = Second Portage Lake; WAL = Wally Lake;

TE, TEFF = Tehek Lake (Mid-field and Far-field).

Whale Tail areas: WTS = Whale Tail Lake South Basin; KAN/MAM = Kangislulik Lake; NEM = Nemo Lake; A20 = Lake A20; A76 = Lake A76; DS1 = Lake DS1.

Baker Lake areas: BAP, BES, BBD, BPJ=Baker Lake – Akilahaarjuk Point, East Shore, Barge Dock, Proposed Jetty.

1. Azimuth collects samples in August, while Agnico handles sampling in remaining months. No sampling in June and October due to unsafe ice conditions.
2. Components: L=Limnology; W=Water chemistry; P=Phytoplankton; B=Benthic invertebrates; S=Sediment grab chemistry.
   Phytoplankton samples collected at Meadowbank lakes in winter months (March and May) are archived as per the *CREMP Plan Update*.
   Limnology – 1 limno depth profile should be collected at key near-field areas during the winter months; water chemistry will also be collected if profiling shows unusual results.
   Water Chemistry – 2 replicate samples from 3 m depth and limno profiles at each area.
   Phytoplankton – 2 replicate samples from 3 m depth; same areas as limno.
   Sediment – 1 composite of grabs for organics (LEPH, HEPH, PAH (low), Mineral Oil and Grease); 5 replicates for grab physical (TOC, grain size, moisture); 10 replicates for core chemistry (metals, TOC, moisture).
   Benthos – 5 replicate samples (2 grab composite/sample); same areas as sediment.
3. Monitoring at MF and FF areas TPE, TE, and TEFF is only required if *moderate* changes are detected upstream at the NF areas consistent with the *CREMP Plan Update* (Azimuth, 2022b).

8 REFERENCES

The references section is organized into three sections: Annual CREMP Reports, guidance documents related to the CREMP, and other literature cited in the report, including peer-reviewed studies and technical reports.

Annual CREMP Reports and Baseline Studies

Azimuth. 2024. 2023 Core Receiving Environment Monitoring Program, Meadowbank Complex. Report prepared by Azimuth Consulting Group, Vancouver, BC for Agnico Eagle Mines Ltd., Baker Lake, NU. March 2024.

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APPENDICES

APPENDIX A
MINE ACTIVITIES

LIST OF TABLES

Table A-1. Chronology of major mine development and operational activities, along with corresponding receiving environment findings since 2008. 2

Mine Activity Overview

A list of within-year site activities and a summary of previous Core Receiving Monitor Environment Program (CREMP) results dating back to 2008 are provided in **Table A-1**. This historical overview provides valuable context for understanding the temporal trends and environmental outcomes associated with the Meadowbank Complex and Baker Lake.

Table A-1. Chronology of major mine development and operational activities at the Meadowbank Complex and Baker Lake, along with corresponding receiving environment findings since 2008.

Note: The summary provided here pertains to Meadowbank (since 2008) and Whale Tail (since 2018) study areas.

Year	Major Mine-Related Activities	Receiving Environment Overview
2008	• Major in-water construction activities included the East Dike (located in Second Portage Lake) and the Western Channel Dike (located between Third Portage Lake and Second Portage Lake); the closest CREMP sampling area to these activities was the Second Portage Lake area (SP). • Other site-related activities included rock crushing, road building, pit blasting, ground preparation, and infrastructure construction. • Barge traffic increases in Baker Lake to support construction.	• As described in detail elsewhere (Azimuth, 2009a; 2009b), East Dike construction led to a sedimentation event that extended through Second Portage Lake (SP) to Tehek Lake (TE). The potential impact of construction-related sediment releases to the aquatic environment was the focus of the four-year EAS study (Azimuth, 2009b, 2010d, 2011a, 2012c).
2009	• Dewatering discharges (i.e., impounded Second Portage Lake water with TSS) were directed primarily into the north basin of Third Portage Lake (TPN), but also into Second Portage Lake (March to July and Oct to Dec, 2009). • Bay-Goose Dike construction started in late July 2009. • Most of the site preparation and road infrastructure was completed in 2009. • North Portage Pit was the primary focus of blasting and mine operations. • Barge traffic increases in Baker Lake.	• Despite several precautions, storm winds broke the Bay-Goose Dike turbidity barrier containment system, leading to another sedimentation event in late August. • Elevated TSS (and other parameters) was primarily restricted to east basin of Third Portage Lake (TPE) and to a minor extent into SP and TE. The implications of the release were assessed in the EAS study (see above).
2010	• Bay-Goose Dike construction completed using additional mitigation measures. • Mine officially opened on 27 Feb 2010, marking the start of the operations period. • Pit development focused on North Portage and South Portage pits • Waste rock to rock storage facility (RSF). Tailings to impoundment area (TIA). Contact water from operations not discharged to receiving environment. • Dewatering of SP impoundment to TPN continued, with discharge now subject to MMER • Barge traffic increases in Baker Lake.	• Bay-Goose Dike construction leads to less-pronounced sedimentation event in TPE and extends through SP to TE; EAS studies continue. • TPN (dewatering) TSS concentrations generally consistent with baseline conditions.
2011	• Mining operations focus on North Portage and South Portage pits. • Waste rock to rock storage facility (RSF). Tailings to impoundment area (TIA). • Construction activities limited to mine footprint. • Dewatering of SP and TPE to TPN continued, with treatment added to reduce fine sediment and turbidity. • Barge traffic stabilizes in Baker Lake.	• TPN focus of routine EEM study - no mine-related effects detected (Azimuth, 2012e). • TPN TSS concentrations consistent with baseline. • The TSS EAS targeting dike construction sedimentation events completed.
2012	• SP and TPE dewatering discharges to TPN finished by spring. Diffuser installed and effluent (mix of residual Bay-Goose water, contact water, East Dike seepage and run-off) discharge to TPN commences; treatment (for fine sediment, turbidity) continues. • North cell non-contact water diversion ditches completed in August (intercepting run-off prior to the tailings and waste rock areas and diverting to NP2 and Dogleg ponds). • Vault access road constructed and site preparation activities for the Vault Pit and Vault Dike commence. • Barge traffic remains stable in Baker Lake; 200-L diesel spill occurs, but cleaned up successfully.	• TPN TSS concentrations generally consistent with baseline. • Minor mine-related trends identified for several water chemistry parameters at near-field areas: conductivity, sulphate and total dissolved solids. • Spill-related monitoring shows no traces of hydrocarbons in Baker Lake.
2013	• Effluent discharge to TPN continued. • Fishout activity in Vault lake was completed. • Vault lake was dewatered into Wally Lake (ongoing) and did not require TSS treatment. • Minor construction modifications to north cell diversion ditches completed. • Completion of the Airstrip extension (18m) into Third Portage Lake in March. • Seepage from Rock Storage Facility (ST-16) through the road into NP2 identified (additional monitoring in NP2 to evaluate near-shore water quality).	• TPN TSS concentrations consistent with baseline. • Minor mine-related trends identified for several water chemistry parameters at near-field areas: alkalinity, conductivity, calcium and total dissolved solids. • TPE sediment chromium concentrations were elevated above trigger value; better spatial coverage needed to reduce uncertainty in 2014.

Year	Major Mine-Related Activities	Receiving Environment Overview
2014	• Effluent discharge to TPN from the Portage Attenuation Pond occurred only from June 10 to July 5. Discharge to TPN is now complete. The former Portage Attenuation Pond has now become the South Cell for tailings deposition. • EEM Cycle 2 Study Design was conducted at the end of August through the beginning of September (no TPN discharge at this time). • Vault Dewatering into Wally Lake from June 20 to 29 (now complete); discharge from Vault Attenuation Pond into Wally Lake from July 24 to August 14. No TSS treatment for Vault Discharge. • New discharge into Second Portage Lake during all of 2014 (except from May 3 to July 28): two seepage collection points (North and South) are situated on west side of the East Dike to collect seepage through dike from SP. Water is pumped from both collection points, which are connected together before discharging back into Second Portage Lake through a diffuser. No TSS treatment for East Dike Discharge. • No seepage water from Rock Storage Facility (ST-16) reaching the NP2 Lake in 2014. • Commercial mining in Vault Pit started at the beginning of 2014. No major construction or modifications in 2014.	• Minor mine-related trends identified for a number of water chemistry parameters at near-field areas: conductivity, hardness, Ca/Mg/K/Na and total dissolved solids. • Temporal trend in TPE sediment chromium confirmed in coring study; targeted study recommended for 2015.
2015	• No discharge to TPN in 2015. • Vault discharge to Wally from July 7 to September 10. No TSS treatment needed. • East dike (North-South) discharge to SP all year except from June 16 to August 10. Discharge was stopped for increasing TSS levels as no treatment is available for this location. The discharge from East Dike that was not directed to 2PL was discharged in the Portage Pit and then pumped to the South Cell TSF (Tailings Storage Facility). • No seepage water from Rock Storage Facility to NP-2. Monitoring ongoing. • Habitat Compensation Monitoring Program (HCMP) work completed for TP, SP and Dogleg lakes and at water crossing R02 along the all weather access road (AWAR). • One incident of elevated TSS from Vault road culverts to NP-1, early June, during freshet. Barriers installed. No impacts observed to Dogleg Lake.	• Minor mine-related trends identified for a number of water chemistry parameters at near-field areas: conductivity, hardness, Ca/Mg/K/Na and total dissolved solids. Parameters with effects-based thresholds (e.g., CCME water quality criteria) were below their respective trigger values in 2016. • Targeted sediment bioavailability and toxicity testing was completed at TPE. Toxicity test results on *Chironomus dilutus* and *Hyalella azteca*, combined with sequential extraction tests on the sediment, indicated current chromium concentrations at TPE are unlike to adversely affect the benthic invertebrate community. Continued monitoring was recommended for 2016, but addition target studies were not recommended for 2016. • Phytoplankton and benthic invertebrate community results for the impact areas were within the range of reference/baseline conditions.
2016	• Vault discharge to Wally from June to September. No TSS treatment needed. • East dike (North-South) discharge to SP all year. • No seepage water from Rock Storage Facility to NP-2. Monitoring ongoing. • Phaser lake dewatering - August 26 to September 10 and September 15 to October 4. • Phaser Lake fishout from August 13 to 31 and September 10 to 25. • No Goose Pit reflooding activities. • Pit E and pushback assessment. • Mining focused on Vault Pit and Pit A. • Amaruq exploration road construction (km 25 at end of 2016).	• Minor mine-related trends identified for a number of water chemistry parameters at near-field areas: conductivity, hardness, Ca/Mg/K/Na and total dissolved solids. • Similar trend of elevated chromium in sediment grab samples from TPE, but the concentrations appear stable relative to those measured in 2015. • Phytoplankton and benthic invertebrate community results for the impact areas were within the range of reference/baseline conditions.
2017	• Vault discharge to Wally from June to October. No TSS treatment needed. • East dike (North-South) discharge to SP all year except from May 12 to September 5. Discharge was also stopped from September 23 to October 29. Discharge was stopped for increasing TSS levels as no treatment is available for this location. The discharge from East Dike that was not directed to SP was discharged in the Portage Pit and then pumped to the South Cell TSF (Tailings Storage Facility). • No seepage water from Rock Storage Facility to NP-2. Monitoring ongoing. • No Goose Pit reflooding activities. • Mining focused on Vault Pit and Pit A, Pit E, and Phaser Pit. • Amaruq exploration road completed. • Phaser Pit started in November. • HCMP work completed for TP, SP and Dogleg lakes and at water crossing R02 along the AWAR. • One incident of elevated TSS from Vault road to NP-1, early June, during freshet. Barriers installed. No impacts observed to Dogleg Lake.	• Minor mine-related trends identified for a number of water chemistry parameters at near-field areas: conductivity, hardness, Ca/Mg/K/Na and total dissolved solids. Parameters with effects-based thresholds (e.g., CCME water quality criteria) were below their respective trigger values in 2017. • Phytoplankton and benthic invertebrate community results for the impact areas were within the range of reference/baseline conditions. • Core chemistry was analyzed for all study areas in 2017. Chromium in TPE and Arsenic in WAL were flagged for follow-up assessment in 2018 based on BACI results.

Year	Major Mine-Related Activities	Receiving Environment Overview
2018	*Meadowbank* • East dike (North-South) discharge to SP all year except from June 4 to August 21. Discharge was stopped for increasing TSS levels as no treatment is available for this location. The discharge from East Dike that was not directed to SP was discharged in the Portage Pit and then pumped to the South Cell TSF (Tailings Storage Facility). • No seepage water from Rock Storage Facility to NP-2; monitoring ongoing. • No Goose Pit reflooding activities. • Mining focused on Vault Pit and Pit A, Pit E and Phaser Pit. • No discharge to Wally in 2018.	• Minor mine-related trends identified for a number of water chemistry parameters at near-field areas: conductivity, hardness, Ca/Mg/K/Na and total dissolved solids. Parameters with effects-based thresholds (e.g., CCME water quality criteria) were below their respective trigger values in 2018. • Phytoplankton and benthic invertebrate community results for the impact areas were within the range of reference/baseline conditions. • Core chemistry was collected for TPE and WAL to follow-up on 2017 results. The 2018 results showed an overall improvement though concentrations for Chromium in TPE and Arsenic in WAL remain slightly above background concentrations.
	Whale Tail • Whale Tail Dike Construction began on July 27. • Whale Tail Pit commencement of Quarry 2 began in September. • Freshwater intake from Nemo Lake started on October 28. • Whale Tail North fishout August 13 - September 28. • Newterra Wastewater treatment system at AMQ operational in March. • Crusher activities started on the waste rock storage facility (WRSF) on October 21. • Quarry 2 overburden stripping. • Snow removal in preparation of dike construction near Kangislulike Lake (WRSF dike and Kangislulik Dike).	• 2018 was a transition year for the Whale Tail Mine study area. Only WTS was considered *impact* from August onwards and impacts to water quality, sediments, and biota were not found for 2018.
2019	*Meadowbank* • East dike (North-South) discharge to SP was stopped on March 30. Restarted on November 13. • No seepage water from Rock Storage Facility to NP-2; monitoring ongoing. • Goose Pit water transfer from South Cell to Goose started on June 11. • In-pit disposal started at Bay-Goose in July. • End of mine production at Phaser Pit, BB Phaser Pit, Vault (Q1), and Pit E (Q4). • No discharge to Wally in 2019. • Addition of tank infrastructure at Baker Lake (1 tank, containment for 2).	• Study focused on monitoring changes in the near field study areas in TPE, SP and WAL. • Targeted bioavailability studies conducted at TPE. • Limnology results were consistent with previous years. • Minor mine-related trends identified for a number of water chemistry parameters at near-field areas: conductivity, hardness, Ca/Mg/K/Na, total silicon and total dissolved solids. • Phytoplankton community results for the impact areas showed an increase in biomass and taxa richness in 2019 compared to 2018. • Benthic invertebrate community results for the impact areas were within the range of reference/baseline conditions. • Core chemistry was collected for TPE to follow-up on 2018 results. Results were comparable to 2018 with concentrations of chromium in TPE still slightly above background concentrations. In 2019, concentrations of zinc in one core sample exceeded the trigger and threshold values.
	Whale Tail • Mining from the Whale Tail Pit (WTP) began in 2019. • Dewatering/Diversion pumping into Whale Tail Lake South Basin (WTS) started April 1 and is ongoing. • Dewatering of Whale Tail Lake North Basin (WTN) to WTS occurred from April 1 to April 9, May 3 to May 17 and again from May 24 to May 29. • Dewatering/Diversion pumping into Kangislulik Lake (KAN) started June 22 and ended November 18. • Higher than expected precipitation in June and July required additional water management. • NE Dike impoundment pumped to AP5 and through to Nemo watershed June 21 to September 27. • Dewatering of WTN to KAN occurred from June 22 to June 30 and August 1 to October 26. • Water transfer from Quarry 1 pond to KAN August 26 to October 23. • Water seep from WTS through dike pumped back into WTS from October 4 to November 2, and November 7 to 16. • Dewatering of WTN to WTS through WTP November 7 is ongoing. • Whale Tail Dike Grouting project started on November 14 is ongoing. • Pumping from WTS to KAN occurred October 24 to December 9. • Lake A45 dewatering to the tundra near KAN shoreline occurred from November 25 to November 27. • Construction in the South Whale Tail Channel (SWTC) between A20 and KAN began around December 1.	• 2019 was a transition year for the Whale Tail study area when most lakes switched designation from *control* to *impact*. • Minor mine-related trends identified for 16 water chemistry parameters at WTS. • Phytoplankton community results for WTS and KAN showed an increase in biomass in 2019 compared to 2018. • Benthic invertebrate community results for the impact areas were within the range of baseline conditions. • Sediment chemistry results for 2019 were generally consistent with previous years and showed no indications of construction-related changes.

Year	Major Mine-Related Activities	Receiving Environment Overview
2020	*Meadowbank* • East Dike seepage discharge to SP was stopped on June 5 and restarted on October 23. • No seepage water from Portage RSF to NP2; monitoring ongoing. • Tailings discharge to Goose Pit up to July 2020 and the in-pit deposition started at Pit E started in August. • Reclaim water set up in Pit A completed in October. • No discharge to Wally in 2020.	• Study focused on monitoring changes in the near field study areas in TPN, TPE, SP and WAL. • Limnology results were consistent with previous years. • Minor mine-related trends identified for a number of water chemistry parameters at near-field areas: conductivity, hardness, Ca/Mg, TDS, and alkalinity. Other minor trends were identified for reactive silica, total & dissolved silicon, and dissolved zinc which were not mine-related. • Phytoplankton community results for the impact areas showed a slight decrease in biomass and an increase in taxa richness in 2020 compared to 2019. • The sediment coring program focused on NF and reference areas only. The mean sediment concentrations exceeded the trigger for arsenic at WAL, for chromium at TPE, and for zinc at SP and TPE. Concentrations were similar or less than those in 2019. • Benthic invertebrate community data for impact areas were within the range of reference/baseline conditions.
	Whale Tail • South Whale Tail Channel (SWTC) Construction between Lake A20 and Kangislulik Lake is completed. • Whale Tail Dike Remedial Grouting Project January 11 to March 25. • WRSF Dike Mitigation Work from April 8 to April 28. • NE Dike dismantling occurred in September. • IVR Diversion construction. • Temporary diffuser installation in WTS occurred in October. • Fishout occurred from August 1 to September 8. • Dewatering of fishout lakes and installation of dewatering line from July to September. • Construction of IVR Ring Road and IVR Waste Dump in September. • Mining from IVR Pit began September 20. • IVR Attenuation Pond jetty occurred in October. • Dewatering completed and WTN became attenuation pond on May 20. • Water transfer from WTN to WTS from January 1 to January 26, February 11 to February 23, February 29 to March 8, March 15 to March 22, March 30 to April 3, April 15 to April 20, April 25 to April 30, and May 7 to May 15. • Water transfer from Quarry 1 to KAN from April 13 to April 15 and April 25 to April 29. • Water transfer from attenuation pond to KAN from May 20 to May 28, June 14 to July 5, July 7 to July 22, July 25 to August 5, August 7 to September 20, September 15 to October 7. • Water transfer from attenuation pond to WTS from May 28 to June 16 and October 12 to November 1, November 6 to December 2, December 5 to December 14, December 27 to December 31.	• All Whale Tail study area lakes designated as *impact* in 2020. • Minor mine-related trends identified for about 18 water chemistry parameters at WTS and KAN, about 10 parameters at NEM, and 2-7 parameters at the MF/FF areas. • Phytoplankton community results for WTS and KAN showed a decrease in biomass and total species in 2020 compared to 2019. • Sediment chemistry results showed exceedances of As, Cr and Cu in 2020; however, it is uncertain whether these changes are related to mining activities. • Benthic invertebrate community results for the impact areas were within the range of baseline conditions.
2021	*Meadowbank* • East Dike seepage discharge to SPL (MMER-3) stopped on May 6 and restarted on December 9. • No seepage water from Portage RSF to NP2; monitoring ongoing. • Tailings discharge to Pit E all year long, with a hiatus in July and August when tailings were discharged in the North Cell. • Reclaim water from Pit A all year. • Reclaim water from Pit E ongoing November to December. • Aerial application of dust suppression on the Tailings Storage Facility in August. • No discharge to Wally Lake or Third Portage Lake in 2021.	• Overall, results from NF areas were consistent with the previous 5 years demonstrating stabilization since mine activities ceased. • Minor water chemistry trigger exceedances identified for physical/ionic parameters (conductivity, hardness, TDS, alkalinity Ca/Mg/K) at NF areas TPN, TPE, SP, and WAL. Minor trigger exceedances for Si and reactive silica at SP and WAL respectively. • Long-term trend analysis on physical/ionic parameters supported the hypothesis that concentrations had increased during mine activity (2009-2013) and have now stabilized since 2014. • Phytoplankton community results for the impact areas showed a slight increase in biomass and taxa richness in 2021 compared to 2020. • Only sediment grabs were collected in 2021. A laboratory error resulted in a subset of the grab samples that were collected in 2021 to be discarded prior to analysis. Sediment chemistry results for samples that were analyzed showed no mining related temporal and spatial patterns. Sediment concentrations for a few replicates at TPE and SP exceeded the trigger for Cr (TPE only) and Zn. Concentrations were similar to 2020. • Benthic invertebrate community data for impact areas were within the range of reference/baseline conditions.
2021	*Whale Tail* • First year of operation - IVR diversion ditch.	• Greatest magnitude of exceedances at NF area KAN where physical/ionic parameters (conductivity, hardness, TDS, alkalinity Ca/Mg/K), anions/nutrients (TKN, reactive silica), metals (Li and Si), and TOC/DOC exceeded triggers.

Year	Major Mine-Related Activities	Receiving Environment Overview
	• Construction of IVR Dike D1. • Commissioning of IVR attenuation pond. • Excavation IVR West Pit began October 22. • Start of IVR WRSF. • Discharge to WTS through MDMER-5 between March 1 and June 8. • Discharge to WTS through MDMER-11 between January 1 to February 13, June 6 to June 17 and October 2 to November 23. • Discharge to KAN through MDMER-7 between June 9 and September 28. • Discharge to KAN through MDMER-8 between June 18 and August 26.	• Increasing mine influence on MF areas A76 (down gradient of KAN) and A20 (inundated in summer 2019 and now connected to NF area WTS) where physical/ionic and TOC/DOC trigger exceedances occur, in addition to a threshold exceedance for P. • Phytoplankton community results for KAN, A76, and A20 showed an increase in biomass in 2021 compared to 2020. Taxa richness was similar to 2020. • A laboratory oversight upon sample receipt resulted in a subset of the grab samples that were collected in 2021 to be discarded prior to analysis. Sediment chemistry results for samples that were analyzed showed trigger exceedances in individual replicates for As, Cr, Cu, and Zn in 2021. Formal statistical assessment is planned for the next coring event in 2023. • Benthic invertebrate community results for the impact areas were within the range of baseline conditions.
2022	*Meadowbank* • Construction of additional 3.3ML fuel tank, completed in January 2023. • All Weather Access Road bridge repair/ maintenance ongoing (at KM 62 and 69). • East Dike seepage discharge to SPL (MMER-3) from January 1 to January 25, from April 7 to April 30, and from November 20 until the end of the year. • Reclaim water from Pit A from January 1 to mid-April. • Reclaim water from Pit E from mid-April until the end of 2022. • Aerial application of dust suppression on the Tailings Storage Facility in August. • Tailings discharge to Pit E all year long. • No discharge to Wally or Third Portage Lake in 2022.	• Overall, results from NF areas were consistent with the previous six years demonstrating stabilization since mine activities ceased. • Minor water chemistry trigger exceedances were identified for physical/ionic parameters (conductivity, alkalinity, hardness, TDS, Ca/Mg/K) at one or more NF areas TPN, TPE, SP, and WAL. Minor trigger exceedances identified for reactive silica at WAL and total and dissolved silicon at SP. • Phytoplankton community results for the impact areas in 2022 showed that total biomass was higher than reference/baseline conditions, though results were not statistically significant. Only slight changes reported for taxa richness compared to baseline/reference. • Sediment grabs were collected in 2022 and analyzed for grain size, and TOC. Remaining sediment was archived for chemistry analysis. The next sediment coring program to review trends in chemistry is planned for August 2023. • Benthic invertebrate community data for impact areas were within the range of reference/baseline conditions except for taxa richness at SP in the 2019-2022 time period which showed an apparent increase relative to reference/baseline conditions.
	Whale Tail • Commercial production from the underground mine began in 2022. • Landfarm construction completed on September 30. • Discharge to WTS through MDMER-11: sporadic in January, February and April, from May 22 to June 16, and from October 3 to October 29. • Discharge to KAN through MDMER-8 between June 16 and September 20. • Construction of a thermal berm at the West abutment of Whale Tail Dike (upstream) from September 24 to September 30.	• Greatest magnitude of exceedances at MF area A20 where physical/ionic parameters (conductivity, hardness, TDS, alkalinity, Ca/Mg/K/Na), anions/nutrients (TKN, total phosphorus), and TOC/DOC exceeded triggers. Only metals that exceeded the trigger in 2022 were lithium at NF area KAN and titanium at WTS. Total phosphorus, a parameter with an effects-based threshold exceeded the trigger at WTS, KAN, and A20. • Increasing mine influence on MF areas A76 (downgradient of KAN) and A20 (inundated in summer 2019 and now connected to NF area WTS). • Phytoplankton community results for WTS, KAN, A20, and A76 showed an increase in biomass in 2022 compared to reference/baseline, but results were not significant. Taxa richness was similar to 2021. • Sediment chemistry results for samples that were analyzed showed trigger exceedances in individual replicates for As, Cu, Cd, and Zn in 2022. Formal statistical assessment is planned for the next coring event in 2023. • Benthic invertebrate abundance and taxa richness increased at KAN and NEM compared to baseline/reference. Taxa richness also increased compared to baseline/reference at A20, however only in some of the time periods assessed.
2023	*Meadowbank* • All Weather Access Road bridge repair from March 31 to April 11 at KM 8 and bridge repair at KM 69 ongoing. • Tailings discharge to Pit E all year except in August and September when it was discharged to South Cell. • Pit A discharge to Goose Pit from September 22 to October 6 and from October 15 to November 7. • East Dike seepage discharge to SPL (MMER-3) from January 1 to April 29. • Reclaim water from Pit E from January to mid-June and from mid-September to December. • Reclaim water from Pit A from mid-June to mid-September. • Resurfacing Airstrip from July 7 to 14. • Resurfacing SD1/SD2, East Dike, and Goose Dike in 2023. • Ditch capping at RF1 and RF2. • No seepage water from Portage RSF to NP2; monitoring ongoing. • No discharge to Wally Lake in 2023.	• Overall, results from NF areas were consistent with the previous seven years demonstrating stabilization since mine activities ceased. • Minor water chemistry trigger exceedances were identified for physical/ionic parameters (conductivity, alkalinity, hardness, TDS, Ca/Mg) at one or more NF areas TPN, TPE, SP, and WAL. Minor trigger exceedance for TKN at TPE and for total and dissolved silicon at SP. Minor trigger exceedances identified for reactive silica and total silicon at WAL. • Phytoplankton community results for the impact areas showed that total biomass was higher than reference/baseline conditions, though results were not statistically significant. Only slight changes reported for taxa richness compared to baseline/reference. Small reduction at TPE was found to be statistically significant though taxa richness still within range of baseline/reference. • The sediment coring program focused on NF and reference areas only. The mean sediment concentrations exceeded the trigger for chromium at TPE. Concentrations were less than those in 2020.

Year	Major Mine-Related Activities	Receiving Environment Overview
2023		• Benthic invertebrate community data for impact areas were within the range of reference/baseline conditions except for taxa richness at SP in the 2020-2023 time period which showed an apparent increase relative to reference/baseline conditions.
	Whale Tail • Effluent water sent to IVR-1 Pit from October to December. • Landfarm became operational in 2023. • Discharge to WTS through MDMER-11: sporadic from January 8 to 15, February 20 to 27, March 19 to 24, April 10 to 15, April 24, April 26 to 29, May 10 to 22, September 18 and19, and October 8 to 11. • Discharge to Kangislulik Lake MDMER-8 from June 4 to July 7, July 16 to 18, July 21 to 22, August 6 to 18 and September 3 to 14. • Discharge to Kangislulik Lake MDMER-7 from June 11 to 28. • Whale Tail Dike Thermal Berm construction upstream from April 12 to 17.	• Greatest magnitude of exceedances at MF area A20 where physical/ionic parameters (conductivity, hardness, TDS, alkalinity, Ca/Mg/K/Na), anions/nutrients (TKN, total phosphorus), and TOC/DOC exceeded triggers. Only metals that exceeded the trigger in 2023 were lithium at NF areas KAN and WTS and dissolved silicon at FF area DS1. • Increasing mine influence on MF areas A76 (downgradient of KAN) and A20 (inundated in summer 2019 and now connected to NF area WTS). • Phytoplankton community results for WTS, KAN, A20, and NEM showed an increase in biomass in 2023 compared to reference/baseline with statistically significant results at WTS and A20. Taxa richness showed slight decreases at all areas in 2023. • Sediment chemistry results showed exceedances of As and Cr at WTS, KAN, and A20 in 2023. Copper exceeded the trigger slightly at A20 in 2023. • Benthic invertebrate abundance increased at KAN and NEM compared to baseline/reference in all time periods assessed. Benthos abundance increased at WTS in the 2022-2023 time period. Taxa richness also increased compared to baseline/reference at KAN, A20, and NEM in most time periods assessed. Taxa richness increased at DS1 compared to baseline/reference in the 2022-2023 time period.
2024	*Meadowbank* • In-pit tailings deposition and reclaim from Portage Pits. • East dike seepage discharge to Second Portage Lake. • Progressive closure work on TSF. • Bay Goose Pit *in-situ* treatment/aeration. • Seepage observed on west side of assay lab road on May 20. • Turbid water runoff release from the Marshalling Facilities into Baker Lake on June 6 and September 8. • On September 20, during a routine freshet inspection of the Diversion Ditches, a turbid plume of water was observed at the exit of the diversion ditch where it meets the shores of Third Portage Lake and NP2 Lake. • No discharge to Wally Lake in 2024. • Some AWAR bridge repairs and maintenance. • Chesterfield Inlet to Baker Lake barge trips included 28 for general cargo and 28 for fuel.	• Overall, results from NF areas were consistent with the previous eight years demonstrating stabilization since mine activities ceased. • Minor water chemistry trigger exceedances were identified for physical/ionic parameters (conductivity, alkalinity, hardness, TDS, Ca/Mg) at one or more NF areas TPN, TPE, SP, and WAL. Minor trigger exceedance for total silicon at SP. Minor trigger exceedances identified for reactive silica and total silicon at WAL. • Phytoplankton community results for the impact areas showed that total biomass decreased compared to previous years, and was statistically significant at WAL compared to reference/baseline. Similarly, there were small but significant decreases in taxa richness at NF areas compared to baseline/reference. • Sediment grabs were collected in 2024 and analyzed for grain size and TOC. Remaining sediment was archived for chemistry analysis. The next sediment coring program to review trends in chemistry is planned for August 2026. • Benthic invertebrate community data for impact areas were within the range of reference/baseline conditions except for taxa richness at SP in the 2021-2024 time period which showed an apparent increase relative to reference/baseline conditions.
	Whale Tail • Discharge from IVR attenuation pond to Kangislulik Lake and Whale Tail Lake – South Basin. • Some Whale Tail Haul Road (WTHR) bridge repairs and maintenance. • Whale Tail Dike Thermal Capping. • Effluent discharged to Kangislulik Lake from July 1 to 16 and from August 1 to September 30. • Treated water discharged to WTS between April 14 to June 29 and intermittently from October 1 to November 16.	• Several parameters showed increased concentrations at NF and MF Whale Tail area lakes relative to baseline/reference conditions: major ions (TDS, Ca, Mg, K, Na, HCO_3 [alkalinity]), hardness, conductivity, nutrients (TKN, total phosphorus, TOC, and dissolved organic carbon [DOC]). Only metals that exceeded the trigger in 2024 were lithium at NF areas KAN and WTS and dissolved silicon at FF area DS1. • Increasing mine influence on MF areas A76 (downgradient of KAN) and A20 (inundated in summer 2019 and now connected to NF area WTS). • Phytoplankton community results showed no significant changes in biomass relative to baseline conditions at the Whale Tail area lakes. Taxa richness showed slight decreases at all areas in 2024, with significant decreases at WTS, KAN, A76, and NEM. • Results from a targeted coring program in WTS showed that chromium sediment concentrations are spatially heterogeneous and the apparent increase in sediment concentrations relative to baseline conditions is most likely explained by natural spatial heterogeneity • Benthic invertebrate abundance and taxa richness increased at all Whale Tail area lakes compared to baseline/reference. Significant increases in benthic invertebrate taxa richness were observed at WTS in two of the time periods (2022-24, 2023-24), at KAN and NEM in all time periods, and at A20 in two of the time periods (2021-24 and 2022-24) compared to baseline/reference.

APPENDIX B
QUALITY ASSURANCE / QUALITY CONTROL ASSESSMENT

TABLE OF CONTENTS

B.1 INTRODUCTION 1
B.1.1 Quality Assurance / Quality Control 1
B.1.2 Overview 3
B.2 WATER CHEMISTRY 5
B.2.1 Methods 5
B.2.1.1 Field 5
B.2.1.2 Laboratory 6
B.2.1.3 Data Reliability Check 6
B.2.2 Results and Discussion 7
B.2.3 Water Chemistry QA/QC Summary 11
B.3 SEDIMENT 12
B.3.1 Field Methods 12
B.3.2 Laboratory Methods 13
B.3.3 Sediment Chemistry 13
B.4 PHYTOPLANKTON 15
B.4.1 Field Methods 15
B.4.2 Laboratory Methods 16
B.4.3 Results and Discussion 16
B.4.4 Phytoplankton QA/QC Summary 16
B.5 BENTHIC INVERTEBRATES 17
B.5.1 Field QA/QC 17
B.5.2 Laboratory QC 17
B.6 REFERENCES 18
TABLES 19

LIST OF TABLES

Table B-1. Sample submission and integrity QA/QC summary for the water and phytoplankton for all CREMP study areas, 2024. 20
Table B-2. Field QA/QC summary for the water and chlorophyll-a at CREMP study areas, 2024. 21
Table B-3. Laboratory QC summary for the water, chlorophyll-a, and sediment for all CREMP study areas, 2024. 22
Table B-4. Laboratory detection limits and blanks (travel, de-ionized, and equipment) for all CREMP study areas, 2024. 23
Table B-5. Water quality field duplicate results for all CREMP study areas in 2024. 24
Table B-6. Swipe chemistry data for sediment grab analyses, 2024. 28
Table B-7. Field duplicate results for the sediment cores collected in 2024. 29
Table B-8. Field duplicate results for the sediment grabs collected in 2024. 30
Table B-9. QA/QC results for sediment grab sample hydrocarbon and PAH analyses, 2024. 33
Table B-10. Parameters that exceeded the DQOs for the sediment field duplicates in 2024. 34
Table B-11. Field QA/QC data for phytoplankton for all CREMP study areas, 2024. 35
Table B-12. Laboratory QA/QC data for phytoplankton for all CREMP study areas, 2024. 37
Table B-13. Percent recovery of benthic invertebrate samples for all CREMP study areas, 2024. 38

B.1 INTRODUCTION

B.1.1 Quality Assurance / Quality Control

The objective of quality assurance and quality control (QA/QC) is to ensure that the chemical and biological data are representative of the material or populations being sampled, are of known quality, have sufficient laboratory precision to be highly repeatable, are properly documented, and are scientifically defensible. Data quality was maintained throughout sample collection and analysis by following standardized procedures, using laboratories that are certified for all applicable methods, and employing experienced technicians.

Quality assurance and quality control practices are briefly described here.

- *Quality Assurance* (QA) are the practices used to collect scientifically defensible samples meeting pre-defined data quality objectives (DQOs). For example, employing experienced field staff, standard operating procedures (SOPs), field data sheets, and certified laboratories.
- *Quality Control* (QC) are measures taken to verify that the specific DQOs are met.
- The QA/QC program is completed by technicians at Meadowbank and Whale Tail to ensure consistency and help identify site-specific as they arise. The QA/QC program is completed at each area to refine the sample procedures and QA/QC protocols and ensure consistency between Meadowbank and Whale Tail Environment teams. An overview of the QA/QC program for each component is provided below; refer to the *CREMP 2022 Plan Update* (Azimuth, 2022) for a complete description.

The QA/QC results presented below for the 2024 CREMP program are summarized in **Section 3** of the main report.

Sample Integrity

The first step in the QC program involved documenting any issues with the sample submission. This step applies to all sampling components (e.g., water chemistry, sediment chemistry, phytoplankton, benthic invertebrates). ALS Environmental was the analytical laboratory used for water and sediment chemistry and who reported concerns surrounding sample submission as “Sample Integrity” issues in the Sample receipt confirmation (SRC) email after the samples were received. Plankton-R-Us Inc. (phytoplankton) and Zaranko Environmental Assessment Services (ZEAS; benthic invertebrates) also reported sample integrity concerns via email.

For ALS reports, sample integrity issues were typically recorded for one of three reasons: (1) samples were damaged during transport, (2) the temperature inside the cooler was above 10°C when received

by the laboratory, or (3) the recommended hold time was exceeded before analysis. Sample integrity issues do not necessarily mean the data were unreliable; rather, they help us make an informed decision on whether the results warrant closer scrutiny before being included in the report.

Data Quality Objectives - Duplicates

Quality control results of the laboratory and field duplicates were assessed by measuring the relative percent difference (RPD) as a percentage between original and duplicate measurements. The RPD serves as a measure of precision by the laboratory and the magnitude of variability between original and field duplicate samples, respectively. The variability in field duplicates may be attributed to sampling procedures but may also be attributed to natural conditions (i.e., spatial heterogeneity in the sampling media). The equation used to calculate the RPD is:

$$RPD = \frac{(A - B)}{(\frac{A + B}{2})} x\ 100$$

where: A = analytical result; B = duplicate result.

Laboratory duplicate DQOs were parameter-specific and depended on the concentration in the sample. Laboratory duplicates were completed for water chemistry, sediment chemistry, phytoplankton, and benthic invertebrates. Field duplicate samples were collected for water and sediment chemistry, and phytoplankton. DQOs for the duplicate samples are discussed below.

The DQOs for field duplicates are equal to 1.5 times the laboratory RPDs. The laboratory RPDs for water and sediment chemistry for most parameters is 20% and the DQOs for field duplicate samples were ±30%. For parameters without a laboratory RPD DQO (e.g., for chlorophyll-a where the laboratory does not run duplicates), the field duplicate DQO was set to ±40% by default. Field DQOs were adjusted above laboratory RPD levels to reflect that field duplicates are inherently more variable compared to laboratory duplicates. This is partly because field duplicate samples are collected from a large sample volume (i.e., the lake or stream) as opposed to a small, well mixed sample volume (i.e., the single sample container in the laboratory). The use of a 1.5 times multiplier for field duplicates is based on guidance from the Canadian Council of Ministers of the Environment (CCME) that states that acceptance limits for field-based QC are broader than laboratory QC and are typically 1.5 to 2 times the laboratory QC limits (CCME, 2016).

The uncertainty in concentrations increases near to the detection limit and the acceptance criteria are relaxed for parameters measured greater than 5-times the DL. For parameters with concentrations measured at less than 5-times the DL, the DQO is an absolute difference between duplicates < 2-times the DL (referred to in the tables as DIFF).

The RPD and DIFF values may be either positive or negative and ideally should provide a mix of the two, clustered around zero. RPDs and DIFF values are not calculated when one of the samples (i.e., either A or B above) is below detection and the other is not. If an RPD or DIFF value falls outside the field duplicate DQO it is flagged for review. The importance of reduced precision becomes more important when concentrations are near regulatory guidelines (CCME, 2016). Laboratory precision is reduced close to the DLs as smaller concentrations of parameters per volume tends to magnify variability between the original sample and the duplicate. These occurrences were still flagged, however, given the inherent analytical effects on precision, they were not weighted as heavily unless unusual RPD patterns were observed (e.g., relatively high percentage of RPD values not meeting DQOs or very high RPD values). Parameter concentrations that were greater than 10X DL and did not meet the DQOs were given more weight in the QA/QC assessment.

Phytoplankton DQOs did not change in 2024. The laboratory did not calculate RPD values though they did run duplicate samples. The DQOs for phytoplankton laboratory duplicates were less than ±25% RPD and for field duplicates were less than ±50% RPD.

There were no benthic invertebrate field duplicates and RPDs were not calculated for laboratory duplicates. For laboratory duplicates, ZEAS calculated the re-sort and re-count percent recovery (the difference between the original sorting and a second sorting from the same sample) with DQOs of 90% or better.

B.1.2 Overview

QA/QC procedures consisted of careful field collection and sample handling, collecting field duplicate samples and analyzing laboratory replicates and standard reference materials. A discussion of sample shipping and handling procedures is provided upfront, followed by a discussion of the results pertaining to the various components of the CREMP.

Sample Shipping and Handling

Sample shipping and handling concerns documented in previous CREMP reports have largely been rectified in recent years. The Meadowbank and Whale Tail Environment departments plan water sampling events to minimize the amount of time that samples are in transit between Site, Val d'Or, and ALS in Burnaby. The remote location of the mine will always present challenges with some parameters meeting recommended hold times but the effect of slightly exceeding hold times on the quality of the results is considered negligible. Correspondence with the laboratory regarding hold time exceedance has not led to establishing definitive benchmarks for data quality. ALS recommends using *professional judgement* when interpreting chemistry data for parameters that exceeded hold times for analysis.

In 2024, there were a few discrepancies between samples submitted and the chain of custodies (CoCs) but most were rectified without impacting the analytical results. **Table B-1** summarizes the sample integrity observations (e.g., broken sample containers, mislabeled containers), the temperature in the shipping coolers upon arrival to the laboratory, and the parameters that exceeded their recommended hold times for analysis.

The target temperature for samples arriving at ALS is between 5°C and 10°C. The temperatures reported in 2024 ranged from a low of 13°C in March to a high of 24°C in July. Temperatures in the winter events (March and May) were higher than previous years while temperatures in the open-water events (July, August and September) were similar to past years and reflect the ambient temperatures. The effect on preserved samples is considered negligible, but for chlorophyll-a samples, the increase in temperature means samples may have arrived thawed. Keeping the chlorophyll-a samples frozen is a recurring challenge for this program given the logistics of shipping samples from Nunavut to Vancouver in a timely fashion.

Only one total mercury sample bottle was broken in 2024. Total mercury was analyzed from a subsample obtained from the total metals sample bottle.

There were several incidents of CoC discrepancies – mislabeled samples or samples either submitted and not included on the CoC or included on the CoC but not submitted. CoC discrepancies were identified and forwarded to CREMP project managers immediately after the laboratory received the samples. As such, these types of errors were often rectified shortly after ALS received the samples. The discrepancies are listed in **Table B-1**.

Recommended hold times were provided by the laboratory for water quality parameters. The times varied from a low of 0.25 days for pH to six months for metals. Hold times for water samples were routinely exceeded for alkalinity, turbidity, laboratory pH, ammonia, total Kjeldahl nitrogen (TKN), nitrate, nitrite, total dissolved solids (TDS), total suspended solids (TSS), total and dissolved organic carbon, dissolved orthophosphate (as P), and cyanides (free and total). Hold times for sediments were exceeded for pH, mercury, and polycyclic aromatic hydrocarbons (PAHs) and petroleum hydrocarbons (PHCs). Samples were generally shipped very soon after collection and the distances and logistics make it impossible to meet short hold times. However, it is highly unlikely that results were affected for those parameters where hold times were not met in 2024.

B.2 WATER CHEMISTRY

B.2.1 Methods

B.2.1.1 Field

The standard field QA procedures required flushing the flexible tubing and pump to prevent cross-contamination between areas. Field QC procedures included collecting and analyzing field duplicates, and three types of *blank* samples: travel blanks, de-ionized water (DI) blanks, and equipment blanks.

- **Travel blank (TB)**. Detects contamination from transport and handling. A sealed bottle of certified DI water from ALS is returned to the lab unopened.
- **De-ionized (DI) water blank**. DI blanks, also known as field blanks, assess contamination from field handling and environmental exposure. DI water provided by ALS is poured into a sample bottle at the field site, mimicking sample collection.
- **Equipment blank (EB)**. Equipment blanks assess contamination from sampling equipment (i.e., pump and tubing). DI water provided by ALS is circulated through the pump and tubing and collected in a sample bottle. Filtered parameters are processed using the syringes and filters provided by the laboratory.

Collecting blank samples requires careful planning, attention to detail, focus on the importance of cleanliness. Collecting blank samples also provides an opportunity to assess the effectiveness of QA procedures.

Results from the equipment and travel blanks were examined for detectable concentrations of any measured parameters. If a parameter was detected in both the DI water blank and the equipment blank, and the concentration in the equipment blank was equal to or lower than that in the DI blank, the results were considered unreliable for assessing potential cross-contamination within the same sampling event.

Sample results were then compared to parameter concentrations in the equipment blank. Results measuring less than five times the equipment blank concentration were flagged for potential cross-contamination. In the QA/QC assessment, flagged results were assigned either a cautionary flag or an unreliable flag:

- **Cautionary flags** were applied when a parameter was detected in the blank, but the potential impact of cross-contamination was minor (e.g., results were consistent with historical data); and

- **Unreliable flags** were assigned to results deemed unrepresentative of actual water quality (e.g., elevated metal concentrations in a sample that were not observed in other replicate samples collected during the same event).

The water chemistry data with *cautionary* and *unreliable* data flags are provided in **Appendix C** for clarity on which results were examined further and/or excluded from decision-making.

B.2.1.2 Laboratory

ALS is accredited by the Canadian Association for Laboratory Accreditation Inc. (CALA). Performance evaluations are conducted under CALA's accreditation program for laboratory methods, protocols, and QC samples. There are four types of QC samples components of the water chemistry laboratory QC program to assess analytical precision, bias, and completeness:

Laboratory Duplicate. Duplicates provide insight into the precision of laboratory analyses. The laboratory randomly chose samples to re-run as duplicates. Duplicate aliquots were taken from the same sample and run through the laboratory analytical process. The difference between the concentrations in the two samples is a measure of the variability associated with duplicate analyses of the same sample in the laboratory.

Method Blank (MB). Samples were analyzed to assess potential background interference or contamination in the analytical system that could cause elevated concentrations or false positives. An parameter-free matrix, such as de-ionized water, underwent the entire analytical process to demonstrate that the analytical system did not introduce contamination.

Matrix Spike (MS) / Matrix Duplicate (MD). A known amount of a compound that is chemically similar to the target parameter, was added to samples to ascertain any matrix effects on recoveries and to determine the accuracy and precision of the method in this matrix.

Laboratory Control Sample (LCS). An LCS is a well-characterized sample with known parameters and concentrations. An LCS may be reference material (i.e., certified reference material) containing certified amounts of target parameters. The percent recovery of target parameters in the LCS was compared to established control limits to assess whether the methodology was under control and if the laboratory could produce accurate and precise measurements at the required reporting limit.

Laboratory QC results are included in each laboratory report for CREMP water quality samples.

B.2.1.3 Data Reliability Check

Part of the QA assessment involved conducting two 'data reliability checks' to identify potentially anomalous data:

- **Dissolved vs Total Comparison.** Dissolved and total concentrations for a given parameter were compared for each location/event combination. Samples where the dissolved concentrations were greater than the total with an RPD of more than 30% were reviewed further.
- **Paired Samples from Same Area/Event.** Concentrations from the paired samples located within each water body (lake or basin) were compared. Parameters for which the difference between the paired intra-lake samples was greater than a factor of 5 (or factor of 10 in cases where at least one of the samples was within a factor of 10 of the DL) were flagged for further review.

Similar to the assessment of blanks discussed above, cases where these checks showed data as being questionable but still useable resulted in their being flagged as "cautionary"; cases where the data were clearly anomalous resulted in their being flagged as "unreliable".

B.2.2 Results and Discussion

Field duplicates, laboratory duplicates, and blank samples were analyzed as part of the QA/QC program in each sampling event in 2024. The blank results and field duplicate samples have been fully integrated for all CREMP study areas. Similar to previous years, to better identify potential QA/QC weakness, each team (i.e., Meadowbank Environment and Whale Tail Environment) took turns collecting blank samples, and the field duplicate samples were split evenly between the Meadowbank/Baker Lake study areas and the Whale Tail study area. This approach ensured both teams were familiar with the QA/QC process and better appreciated the nuances of sample collection and handling methods. Blank sample collection, particularly equipment blank samples, required careful planning, attention to detail, focus on the importance of cleanliness, and generally provided an opportunity to assess QA procedures.

Results of the QA/QC analysis are discussed below, along with a discussion on the implications of the QA/QC assessment on the 2024 sample results.

Travel Blanks

Travel blank results are summarized in **Table B-2** and complete results are provided in **Table B-4**. Travel blanks were included in every bottle shipment and stored in a cool place. There were no detectable concentrations of parameters in the travel blanks.

De-ionized Blanks

De-ionized (DI) blanks with the full suite of analyses were submitted for each sampling event in 2024; results are reported in **Table B-4**.

In the DI blanks, there were detectable concentrations of parameters in August and September. The results from August were deemed *unreliable* as the blank was collected from a secondary container suspected to be contaminated. In September, several parameters were detected in the DI blank,

including ammonia, TKN, total and dissolved barium, total and dissolved calcium, total and dissolved lead, total magnesium, total and dissolved sodium, total and dissolved strontium, and total and dissolved zinc.

Equipment Blanks

Several parameters were detected for at least one of the EBs submitted in 2024; results are provided in **Table B-4**. Parameters detected in the EB sample summarized for each sampling event herein:

- **March**. Dissolved organic carbon and lead;
- **April/May**. Total lead, total manganese, and dissolved lead;
- **July**. Turbidity, total aluminum, total and dissolved barium, total chromium, total iron, total lead, total and dissolved magnesium, total manganese, and total titanium;
- **August**. Total and dissolved copper were detected in both the EB and the DI blank samples. Since the parameters were detected in both the EB and the DI blanks samples the blank results were not used to determine the potential for cross-contamination in the August sample results; and
- **September**. Ammonia, TKN, total barium, total calcium, total and dissolved copper, total lead, total sodium, total strontium, and total and dissolved zinc. Since the parameters were detected in both the EB and the DI blank samples, the blank results were excluded from assessing potential cross-contamination in the September sample results.

The implications of possible cross-contamination on the interpretation of the water quality data was considered inconsequential for all sampling events. The blank quality control assessment did not result in any *unreliable* data flags. Water chemistry data that were assigned *cautionary* and *unreliable* data flags are provided in **Appendix C**.

Field Duplicates

One field duplicate was collected for approximately every 10 samples (i.e., 10% of the total number of samples). In 2024, there was a combined total of 20 duplicates collected between the Meadowbank Lakes, Baker Lake, and the Whale Tail Lakes, corresponding to approximately 15% of the total number of water samples (n=138). Across all CREMP study areas, four field duplicates were collected in each sampling event. The results of the field duplicate assessment are provided in **Table B-5**.

As mentioned in **Section B.1.1**, the DQOs for field duplicates were set at 1.5 times the laboratory RPD for each parameter unless no RPD was available, in which case a default of 40% was used. The laboratory RPD for water chemistry is 20% for most parameters; therefore, the DQOs for field duplicates

were less than ±30%. In 2024, 8 out of 594 calculated RPDs[1] did not meet the DQOs, accounting for less than 1% of the field duplicate comparisons (**Table B-5**). This suggests that sample collection and sample handling in 2024 have maintained a high standard.

Laboratory QC Samples

The results of the laboratory QC assessment from ALS[2] are provided in **Table B-3**. The various components of the QA assessment are provided to help make informed decisions when interpreting the data. The QA program was comprised of four main elements:

- **Laboratory Duplicates.** The laboratory DQO for most parameters was an RPD of less than 20%. All laboratory duplicates met the DQOs for water chemistry in 2024.
- **Method blanks (MB).** The MB was a blank matrix sample that was taken through the entire analytical procedure to test variability in the analytical method and report any bias in the analysis. MB results were equal to the limit of reporting (LOR or DL[3] as termed here). MB qualifiers were either:
    - "B" – MB exceeded ALS DQO. Associated sample results which were less than DL or greater than 5X blank levels were considered reliable.
    - "MB-LOR" – MB exceeded ALS DQO. DLs were adjusted for samples with positive hits below 5x blank levels.
- For most sample analyses, there were no flags or very few flags (e.g., one or two parameters in a sample may have been flagged with a "B" in the method blank results). However, the few cases with DQO flags for MB samples were reviewed; the results did not affect the interpretation of the water quality data.
- **Matrix Spike (MS).** MS recovery is periodically flagged in the QC assessment due to high concentrations of the parameter in the sample. These instances are generally rare, and typically

[1] See **Section B.1.2** for a description on how RPD values are not calculated when either the parent sample or the duplicate are below detection limits.

[2] The COA from ALS may include data qualifiers that relate to the sample "batch". The sample batch may include samples that are from other projects and the qualifiers included in the COA may relate to those and not the CREMP samples. In general, this does not impact the assessment of laboratory QA; however, in some instances, particularly for sediment laboratory duplicates, data qualifiers in the COA related to sample heterogeneity may not relate to CREMP samples. The Microsoft Excel® report that accompanies the COA includes tabs with detailed assessments of laboratory QA that are project specific and can be reviewed in conjunction with the COAs.

[3] The DL is sometimes referred to as the MDL (method detection limit) in this appendix and the main report.

associated with parameters such as major cations (e.g., magnesium) or certain metals with detected results (e.g., strontium in 2020).

- **Laboratory Control Samples (LCS) / Certified Reference Material (CRM) / Internal Reference Material (IRM).** There were three exceedances of DQOs for the laboratory control samples in 2024.

Data Reliability Check

The two sample review checks resulted in some results being flagged as *unreliable* (see below). These data were removed from formal analysis in the main report (e.g., figures and statistical analyses); they are retained in the water chemistry tables provided in **Appendix C** but their *unreliable* status is clearly shown.

Dissolved Copper

In 2024, dissolved copper was detected at concentrations higher than the trigger throughout the Meadowbank lakes (including INUG) in April. Additionally, dissolved copper concentrations at A20 exceeded the trigger in September. These results were flagged as *unreliable* during the QC screening for the following reasons:

- The majority of total copper concentrations were below detection limits in 2024. Dissolved copper concentrations were up to 135 times greater than the detection limit. The laboratory flagged the dissolved copper results with a DTC qualifier, indicating measurement uncertainty.
- The difference in dissolved copper concentrations between the paired intra-lake samples was greater than a factor of 5 for a few samples collected in April.

Dissolved Tin

In 2024, dissolved tin was detected at concentrations higher than the trigger in multiple sampling events throughout the Meadowbank complex. Dissolved tin exceeded the trigger at Meadowbank lakes INUG, SP, TPN, and WAL in May, SP and TPE in July, and PDL in September. Dissolved tin exceeded the trigger at the Whale Tail lakes A20 and A76 in September. These results were flagged as *unreliable* during the QC screening for the following reasons:

- Total tin concentrations were all below detection limits in 2024. Dissolved tin concentrations were up to 10.7 times greater than the detection limit. ALS flagged the dissolved tin results with a DTC qualifier, indicating measurement uncertainty.

Dissolved Zinc

In 2024, for the first time, dissolved zinc concentrations exceeded the trigger in samples from all Whale Tail area lakes and multiple sampling events. However, these results were flagged as *unreliable* during the QC screening for the following reasons:

- Total zinc concentrations were nearly all below detection limits in 2024. Dissolved zinc concentrations were up to 92 times greater than the detection limit. ALS flagged most of the dissolved zinc results with a DTC qualifier, indicating measurement uncertainty.
- Azimuth's internal screening also found most dissolved zinc results from the Whale Tail area lakes to be *unreliable* due to high relative percent differences (RPDs) between total and dissolved zinc measurements, often exceeding 100%—well above the 30% threshold.
- Finally, dissolved zinc concentrations did not align with mining activities. The highest dissolved zinc concentrations were reported at FF area DS1.

Other Dissolved Metals

There were other dissolved metals that exceeded the trigger and were flagged as *unreliable* in a few samples during the QC screening assessment including aluminum, lead, cadmium, chromium, and selenium. The laboratory flagged the results with a DTC qualifier, indicating measurement uncertainty. Results that were flagged as *unreliable* are provided in **Appendix C**.

Detection Limits

Overall, detection limits (DLs) in 2024 were consistent with previous years. In recent years, the laboratory has adjusted detection limits for the following parameters:

- **Beryllium.** The DL increased from 0.00002 to 0.0001 mg/L in 2018 due to method re-validation. The revised DL remains below the lowest available Canadian quality guideline (Pers. Comm. Brent Mack, ALS November 28, 2022). Beryllium has consistently remained below DL since baseline and is not a parameter of concern for the Site. The revised DL is also below the trigger and threshold values for the Meadowbank, Whale Tail, and Baker Lake study areas, ensuring sufficient sensitivity to detect changes beryllium concentrations. The 2024 results for beryllium were less than the revised DL.
- **Chromium.** The DL increased from 0.0001 to 0.0005 mg/L in May 2021 due to method re-validation (Pers. Comm. Brent Mack, ALS November 28, 2022). Chromium has been detected during operations and the revised DL was higher than those detected concentrations. Therefore, to improve detection, we requested low-level chromium analysis (DL = 0.0001 mg/L) in 2023. In 2024, there were a few samples with chromium concentrations above the DL at NF areas and reference areas (INUG and PDL).

B.2.3 Water Chemistry QA/QC Summary

The field and laboratory QA/QC results for the 2024 water chemistry were acceptable with most of the results meeting the DQOs of the study.

Sample Integrity. Sample integrity was good in 2024. As is typical for most northern mining operations, sample temperatures occasionally exceeded 10°C during transit to ALS. Hold-times were also routinely exceeded for parameters with recommended hold-times less than seven days.

Detection Limits. Detection limits in 2024 were consistent with previous years.

Blanks. The 2024 blank results confirmed reliable sample handling and negligible risk of cross-contamination from the pump, tubing, syringes, and filters. Very few parameters were detected in blank samples from most events. Parameters were likely detected in the August DI blank because of contamination of the DI water poured into a second container. In September, a number of parameters were detected in the DI and equipment blanks. Therefore, the EB blank results from August and September were not used to determine the implication of possible cross-contamination for those sampling events.

Overall, approximately 5% of parameters were assigned cautionary flags for one or more samples. Despite the assigned cautionary flags, potential cross-contamination is considered unlikely to bias interpretation of the 2024 water quality analysis.

Field Duplicates. 99% of the field duplicate RPDs met their DQOs in 2024, indicating the sampling and analysis procedures consistently produce repeatable (precise) results.

Laboratory QC Assessment. Water quality data were typically within the laboratory DQOs. In the few instances where a DQO was exceeded, the laboratory concluded the results were reliable and fit for use in the water quality assessment.

Data Reliability Checks. The two data reliability review checks resulted some results being flagged as *unreliable*. Overall, 99% of the results were considered reliable for use in the report. The few results that were flagged as *unreliable* were not included in statistical analyses or figures in main report. Unreliable results are clearly flagged in the water chemistry tables in **Appendix C**.

B.3 SEDIMENT

Field duplicates, and rinsate samples were analyzed as part of the QA/QC program in the August sediment sampling event. The results of the QA/QC analysis and their implications on the sample results are discussed below.

B.3.1 Field Methods

Field QA consisted of taking care between sampling areas by rinsing and cleaning the sampling gear for sediment grabs (Petite Ponar grab, stainless steel bowls, and spoons) using site water and phosphate-

free cleaning detergent, to avoid the possibility of cross-contamination. Field QC measures included collecting and analyzing field duplicates, filter swipes and a sampling equipment rinsate blank.

A filter swipe sample consisted of an ashless filter (QA/QC Filter) that was wiped over the pre-cleaned stainless-steel bowl and spoon and Petite Ponar to assess the cleaning procedures in the field. The significance of any metal detected on this filter was evaluated by comparing the detected amount on the filter to the minimum amount measured in the sediment samples. Where comparisons were required, the concentration of metals originating from any sampling equipment was estimated by dividing the amount detected on the filter (weight) by the surface area of two Petite Ponar grab samplers (assuming a thickness of 3 cm was collected from each) multiplied by the density of sediment (assumed to be 2 g/cm^3)[4].

In 2024, along with the filter swipe, a rinsate sample was collected at one area. Sampling equipment, i.e., petite ponar, spoons and bowls, were washed with Liquinox^{TM} soap and lake water as per the standard operating procedures. Then, the rinsate sample was collected by washing down the equipment with DI water, which was collected in sample bottles. The rinsate sample was submitted for metals analysis along with the other sediment samples. Concentrations of metals in the rinsate were compared against five times their analytical detection limit to assess potential sample contamination related to equipment.

B.3.2 Laboratory Methods

Laboratory duplicates were analyzed for sediment chemistry parameters similar to water chemistry parameters. The full list of laboratory DQOs for each parameter are presented in the SOP appended to the *CREMP 2022 Plan Update* (Azimuth, 2022).

B.3.3 Sediment Chemistry

Filter Swipes and Rinsate

Filter swipes were collected for various pieces of the sampling gear to quantify potential metals cross-contamination for sediment samples. Ashless filters were wiped on the various sampling gear including the stainless-steel spoons and bowls, and the Petite Ponar, and analyzed for metals (µg/filter). The ashless filters themselves can sometimes pose a problem if they contain any trace metals. The filter swipe product used for the CREMP since 2018 is GhostWipes. Certain metals have been detected on the

[4] Certain metals have been detected on blank filter swipes and should be used with caution when doing field QC for metals (Pers. Comm. Brent Mack from ALS Laboratory, 2023). Starting in 2024, the laboratory will provide metals-free swabs for analyzing the standard list of metals.

GhostWipes and should be used with caution when doing field QC for metals (Pers. Comm. Brent Mack from ALS Laboratory, 2023).

Several parameters were detected on the grab equipment filter swipe including: barium, chromium, iron, magnesium, manganese, and zinc **Table B-6**. When comparing the amount of each metal on the filters to the concentration in the sediment samples, the potential percent contribution from the swipe was less than 0.03% of the concentration present in the samples for all detected parameters.

Three parameters were detected in the rinsate equipment sample including: aluminum, magnesium, and manganese. All detectable parameters were at concentrations less than 5 times the DL.

The QA results for the filter swipe and rinsate show the potential for cross-contamination to affect the sediment chemistry results is negligible.

Field Duplicates

Six grab sample field duplicates were collected for moisture content, TOC, and particle size. For cores collected from WTS, two field duplicates were collected for metals, moisture content, and pH. Additionally, two composite field duplicates were collected for moisture content, hydrocarbon and PAH chemistry. The field duplicates for core samples are provided in **Table B-7** (moisture content, pH, and metals). The field duplicates for grab samples are provided in **Table B-8** (moisture content, particle size, and TOC), and **Table B-9** (hydrocarbons and PAHs). The DQOs for sediment samples are outlined in **Section B.1.1**. Generally, the RPD limits were 1.5 times the laboratory RPDs unless no RPD was provided in which case a default DQO of ±40% was applied. RPDs are also calculated on particle size and moisture content where default DQOs of 40% and 30% were applied.

In 2024, only 4 parameters did not meet DQOs for sediment cores, equal to 5% of the field duplicate comparisons (**Table B-10**). For sediment grabs, 1 parameter did not meet DQOs, equal to 2% of the field duplicate comparisons. For composite grab samples all parameters met the DQOs. The field duplicate results indicate high precision for most parameters and the effect of the exceedances on interpreting data in the CREMP is negligible.

Laboratory QC Samples

Laboratory QC for sediment samples included laboratory duplicates, method blanks, matrix spikes, and reference material. The summary for the laboratory QC is provided in **Table B-3**.

The laboratory QC assessment completed by ALS indicated the 2024 sediment quality data were typically within the established DQOs. In the few instances where a DQO was exceeded, the laboratory concluded the results were reliable and fit for use in the sediment quality assessment.

B.4 PHYTOPLANKTON

The phytoplankton QA/QC assessment included the Meadowbank, Baker Lake, and Whale Tail study areas. Three to four field duplicate samples were collected during each sampling event. Samples from the under-ice events (i.e., March and November) were archived as per the *CREMP 2022 Plan Update* (Azimuth, 2022). For total density and total biomass, RPDs were calculated between the original sample and the duplicate for both field and laboratory duplicates. While RPDs were also calculated for major taxa groups, these results were not relied on for QC purposes because small differences in abundance/biomass between the original and the duplicate tend to cause large differences in the RPD. As such, for field and laboratory duplicates, we evaluated the data quality based on total density and total biomass.

Results of the RPD analysis for all these parameters are presented in **Table B-11** (field) and **Table B-12** (laboratory) and are discussed below.

B.4.1 Field Methods

Water samples for phytoplankton were collected during monthly sampling events. Sampling gear was thoroughly rinsed between sampling areas to ensure that there was no inadvertent introduction (i.e., cross-contamination) from one area to another. Water samples were stored in a cooler with ice packs until returning to the camp. Water samples were processed back at camp within 6 hours of sampling. Processing involved preserving 50 mL of water with Lugol's iodine solution for phytoplankton taxonomy. The samples were stored in dark containers at room temperature.

Sample Shipping and Handling

The phytoplankton samples for taxonomy arrived at Plankton R Us (Winnipeg) without any sample integrity concerns.

Field Duplicates

Quality control implemented during the 2024 sampling events included collecting duplicate phytoplankton samples using the same methods and timing as the corresponding field samples.

Four field duplicate phytoplankton samples were collected per sampling event alongside water sample duplicates. Duplicate samples were submitted *blind* to the laboratory to assess sampling variability and homogeneity. For field duplicates, an RPD of 50% for total density and biomass concentrations is considered acceptable. Relative percent differences (RPDs) were calculated for total density and biomass, as well as for major taxa groups. However, RPDs calculated for major taxa groups were not relied on for QC purposes due to the potential for small differences in abundance or biomass between

the original and the duplicate to cause large differences in the RPD. Therefore, data quality was evaluated based on total density and total biomass.

B.4.2 Laboratory Methods

Samples collected for taxonomic analysis of phytoplankton were submitted to Plankton-R-Us Inc., a reputable taxonomic laboratory. Overall, the reliability of the analytical results is considered high.

The first step in the QC program involves documenting any issues with the sample submission. This step applies to all sampling components. Plankton-R-Us reports sample integrity concerns via email. In 2024, there were no sample integrity concerns.

As a measure of laboratory QA/QC on the enumeration method, replicate counts are to be performed on 10% of the samples. In 2024, a total of 11 laboratory replicates (12 % of the total number of samples) were analyzed. Replicate samples are randomly chosen and processed at different times from the original analysis to reduce bias. The laboratory replicate is a new aliquot (10 mL) from the sample jar and is counted in the same manner as the original aliquot (10 mL) taken from the jar. An RPD of 25% for total density and biomass concentrations is considered acceptable for laboratory replicates.

B.4.3 Results and Discussion

Field duplicates – There was one RPD that did not meet the DQO for total biomass and total density: DS1-84 in September, 2024. Less RPDs exceeded the DQO in 2024 compared to 2023. All other RPDs in 2024 for total biomass and total density were below 50% indicating good replicability in sample collection. Variability is expected in field collected phytoplankton samples and is mitigated in the study design by collecting two discrete samples from each sampling area. Therefore, the RPD exceedances are not expected to impact the findings of this report. See **Table B-11** for the field duplicate results, including RPDs calculated for major taxa groups.

Laboratory duplicates – In 2024, all laboratory RPDs for total density and total biomass met the DQOs. See **Table B-12** for the laboratory duplicate results, including RPDs calculated for major taxa groups.

B.4.4 Phytoplankton QA/QC Summary

Phytoplankton laboratory QA/QC in 2024 was good and overall results of the QA/QC analysis were similar to previous years. This indicates very good replicability and sample handling in the field and in the laboratory.

B.5 BENTHIC INVERTEBRATES

Standard procedures were used to collect phytoplankton and benthic invertebrate samples (Azimuth, 2022). Sampling gear was thoroughly rinsed between sampling areas to ensure that there was no inadvertent introduction (i.e., cross-contamination) of biota from one area to another.

B.5.1 Field QA/QC

Field replicates (5 per area) were collected for benthic invertebrates to determine natural variability and heterogeneity. Replicates were collected at least 20 m apart from one another within the defined sampling areas.

B.5.2 Laboratory QC

ZEAS re-sorted and re-counted approximately 10% of the samples, targeting greater than 90% recovery between the original and re-sorted sample.

No field duplicate samples were collected for benthic invertebrates. Laboratory replicate counts were performed on approximately 10% of all samples. Replicate samples were chosen at random and processed at different times from the original analysis to reduce bias. Percent recovery was above 95% in all re-sorted samples, with an average percent recovery of 97.3% (**Table B-13**). These results suggest that the majority of individual organisms are recovered by the taxonomist during enumeration. As in previous years, the reference collection of benthic taxa for this project has been maintained.

There were no QA/QC concerns for benthic invertebrates in 2024.

B.6 REFERENCES

Azimuth. 2022. Core Receiving Environment Monitoring Program (CREMP): 2022 Plan Update. Report prepared by Azimuth Consulting Group, Vancouver, BC for Agnico Eagle Mines Ltd., Baker Lake, NU. April, 2022.

Azimuth. 2015. Core Receiving Environment Monitoring Program (CREMP): 2015 Plan Update. Report prepared by Azimuth Consulting Group, Vancouver, BC for Agnico Eagle Mines Ltd., Baker Lake, NU. November, 2015.

Canadian Council of Ministers of the Environment (CCME). 2016. Guidance Manual for Environmental Site Characterization in Support of Environmental and Human Health Risk Assessment. PN 1557.

TABLES

Table B-1. Sample submission and integrity QA/QC summary for the water and phytoplankton for all CREMP study areas, 2024.

Event [1]	Lab ID(s)	Parameters Measured	Sample Integrity Observations	Temperature (°C)	Hold-time Exceedances
March	VA24A5006 VA24A6012 VA24A4997 VA24A5461 VA24A6007	All parameters	Amendment (15/04/2024): This report has been amended following changes to the analytical data reported. The quality system is being utilised to resolve this issue. The specific data affected includes the Total P result for sample ALS ID -6.	13, 14, 15	pH, Turbidity, TSS, TDS, Alkalinity, Ammonia, TKN, Nitrite, Nitrate, T.Phosphorus, T.&D.Phosphorus, D. O-OP4, TOC and DOC. See lab reports.
May	VA24B0323 VA24B0466	All parameters	Sample PDL-124: Cherry white container for dissolved arsenic speciation not received at laboratory, but requested on COC/ analytical request form; subsample cannot be obtained from other containers to meet request. The requested analysis cannot be performed. Sample INUG-158 DUP: 15 ml chloro A vial received but not listed on submitted COC / analytical request form. Water sample container will be logged in as per other samples in the submission. For sample May Dup-2 no chloro A vial received, analysis deleted.	14, 15, 16, 17, 18	pH, Turbidity, TSS, TDS, Alkalinity, Nitrite, Nitrate, D. O-OP4, Ammonia, TKN, T.Phosphorus, T.&D.Phosphorus, TOC and DOC. Total and Free Cyanide. See lab reports.
July	VA24B6821 VA24B6824 VA24B7099 VA24B7134 VA24B7135 VA24B7634	All parameters	Labeling Issue: on COC sample name" JULY_3" but on bottles sample name " JULY DUP- 3" Container sample ID does not match COC. Sample will be identified as per COC notation. Received speciated Selenium bottles for all samples when testing was not requested; bottles will be placed on hold. Both T-Hg and D-Hg were marked as preserved on the COC and containers as well but upon checking mercury samples were found unpreserved, so both dissolved mercury and dissolved metal will be placed on hold until the confirmation of filtration information, please confirm the filtration information provided on the COC and containers for D-Hg and D-metal, to proceed with testing. Sample #11(A76-82): Both nutrients containers marked as total, considered one as dissolved nutrient based on black dot on lid as per other samples.	20, 21, 22, 23, 24	pH, Turbidity, TSS, TDS, Alkalinity, Nitrite, Nitrate, Ammonia, TKN, T.Phosphorus, T.&D.Phosphorus, and D. O-OP4, TOC and DOC. Total and Free Cyanide. See lab reports.
August	VA24C1018 VA24C1019 VA24C1467 VA24C2044	Water chemistry	Amendment (03/09/2024): This report has been amended following minor LIMS report formatting corrections (sample ids and dates for ALS IDs -7 to -9). All analysis results are as per the previous report. Amendment (09/09/2024): This report has been amended as a result of a request to change sample identification numbers for VA24C1018-009 from "AUG-DUP-3" to "AUG-DUP-5". All analysis results are as per the previous report. Sample #8 & 9 (TPN-174 & TPN-175): Received two extra sample named as TPN-174 & TPN-175 both dated as 09-Aug-24. These sample are logged in for analysis as per other samples in COC. Sample #7 (AUG-DUP-1): Received 1X T-Hg and 1X D-Hg vials, both not marked for preservation and D-Hg also not marked for filtration. Upon checking for pH both came out to be preserved and as mentioned in COC for D-Hg to be filtered and preserved, vials are labelled and treated as per COC as T-Hg to be preserved and D-Hg as filtered and preserved. Received 1X D-Met bottle not marked for filtration, labelled and treated as per COC as Filtered. Sample #6 (WAL-144): Received 1X General bottle instead of two as mentioned in COC. Sample #14 (TRAVEL BLANK): No container received for Metals and Hg. Analysis could not be conducted for metals and Hg. Arrived in separate batch of samples). Sample(012) TPE-175 (013) TPE-175 both named same on COC, but on tube one labeled as TPE-174 and one TPE-175. Sample will be identified as per COC.	12, 14, 16, 20, 21	pH, Turbidity, TSS, TDS, Alkalinity, Nitrite, Nitrate, Total Phosphorus, Total Dissolved Phosphorus, D. O-OP4, Ammonia, TKN, Total and Free Cyanide and Total Organic Carbon, Chl-a. See lab reports.
	VA24C1918 VA24C2443	Sediment Chemistry	Samples (TPN)1-5: CoC lists 2 containers, but only received 1; proceed with analyses as indicated, sufficient sample provided. Samples (WAL, PDL, NEM, WTS, MAM, A20, A76, DS1) 1-5: CoC lists 1 container, but received 2; proceed with analyses. Samples (TPE)1-5: container IDs have TPN, but already have samples (TPN)1-5. Sampling date on one set of bags matches TPE on CoC, samples will be identified as per CoC. Samples Grab-DUP-1, Grab-DUP-2: container IDs have AUG-DUP instead of Grab-DUP, but sampling date matches CoC. Samples will be identified as per CoC. Samples TPN -1 to TPN-COMP, INUG-1 to INUG-COMP, COMP-DUP-1, COMP-DUP-2, have sampling year on COC 2023 but on bags 2024. PSAL: Sample 001-003, 005, 007-011, 013-015, 017, 022, 025, 031-035, 037-041, 043-47, 049-053, 055-059, 061-067, 069, 070, 073-077: Limited sample was available for PSA (100g minimum is standard). Measurement Uncertainty for PSA results may be higher than usual.	15, 16, 17, 20	pH, Hg, PHCs, PAHs. See lab reports.
September	VA24C4308 VA24C5723 VA24C3430 VA24C4068 VA24C5721 VA24C6403	All parameters	Sample (002) TPE-177 Dissolved mercury vial not received at laboratory, instead of received two total mercury vials. Analysis will be transfer to plastic dissolved metals bottle to meet request. Test results may be qualified in the CoA. Sample #21 & #22 (Sept DUP-3 & Sept DUP-4): Received 2 extra samples which were not listed on CoC. Samples are logged in as per other samples in CoC. Sample A20-87, T. Hg bottle broken in transit. Analysis assigned to total metals bottle. Amendment (18/10/2024): This report has been amended and re-released to allow the reporting of additional analytical data.	7, 17, 18, 20	pH, Turbidity, TSS, TDS, Nitrite, Nitrate, Ammonia, TKN, T.Phosphorus, T.D.Phosphorus, D. O-OP4, Total and Free Cyanide, D.Hg, DOC, TOC and Chl-a. See lab reports.

Acronyms

CoA = Certifacte of analysis
CoC = Chain of custody
Chl-a = Chlorophyll-a
CN = Cyanide
DI = De-ionized water blank
DOC = Dissolved organic carbon
D. O-PO4 = Dissolved Orthophosphate
EB = Equipment blank
PSA = Particle size analysis
PTFE = Polytetrafluoroethylene
MeHg = Methylmercury
TB = Travel blank
TDS = Total dissolved solids
TKN = Total Kjeldahl nitrogen
T.Hg = Total mercury
TOC = Total organic carbon
TSS = Total suspended solids

Table B-2. Field QA/QC summary for the water and chlorophyll-a at CREMP study areas, 2024.

Chlorophyll-a field duplicate samples were collected at the same time as surface water field duplicates; chlorophyll-a was not analyzed in the blanks.

Event	Field QC summary [1]			
	Travel Blank	DI Blank	Equipment Blank	Duplicates
March	None	None	2 results failed to meet DQO; see lab reports.	3 results failed to meet DQO; see lab reports.
April/May	None	None	3 results failed to meet DQO; see lab reports.	None
July	None	None	None	None
August	None	N/A [2]	2 results failed to meet DQO; see lab reports.	9 results failed to meet DQO; see lab reports.
September	None	None	None	None

Notes:
1 - For more details on parameters that failed to meet DQOs, see lab reports.
2 - DI water for DI Blank taken from a secondary container suspected to be contaminated. Results deemed unreliable.
N/A = No field QC sample collected during this sampling event.
DQO = Data quality objective.

Table B-3. Laboratory QC summary for the water, chlorophyll-a, and sediment for all CREMP study areas, 2024.

Event	Laboratory QC Summary [1]				
	Detection Limits	Duplicates	Method Blanks	Matrix Spike	LCS / CRM
March	None	None	None	None	None
April/May	None	None	None	None; Some parameters had spike levels too low to confidently quantify them relative to existing concentrations in sample.	None
July	None	None	None	None	1 result failed to meet QC objectives (MES data qualifier)
August	None	None	3 results failed to meet QC objectives	None; Some parameters had spike levels too low to confidently quantify them relative to existing concentrations in sample.	2 results did not meet QC objectives (MES data qualifiers)
August (Sediment)	DLHM for some PAHs	None	1 result failed to meet QC objectives	None	None
September	None	None	None	None	None

Notes:

[1] Data qualifiers referring to laboratory QC methods (e.g., Method Blanks, Matrix Spikes, and LCS/CRM) are flagged here.

B = Method Blank exceeds ALS DQO. All associated sample results are at least 5 times greater than blank levels and are considered reliable.

DLHM = Detection limit adjusted: Sample has high moisture content.

DQO = Data quality objectives.

LCS / CRM = laboratory control sample / certified reference material.

MES = Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).

PAH = Polycyclic aromatic hydrocarbons.

Table B-4. Laboratory detection limits and blanks (travel, de-ionized, and equipment) for all CREMP study areas, 2024.

Month		March				May				July				August				September			
Blank (Travel, DI, or EB)		Travel Blank	DI Blank	Equip. Blank		Travel Blank	DI Blank	Equip. Blank		Travel Blank	DI Blank	Equip. Blank		Travel Blank	DI Blank [1]	Equip. Blank		Travel Blank	DI Blank	Equip. Blank	
Date	Detection	14-Mar-2024	15-Mar-2024	16-Mar-2024	Detection	05-May-2024	05-May-2024	05-May-2024	Detection	12-Jul-2024	15-Jul-2024	14-Jul-2024	Detection	18-Aug-2024	18-Aug-2024	20-Aug-2024	Detection	17-Sep-2024	05-Sep-2024	05-Sep-2024	
ALS Sample ID	Limits	VA24A6007-004	VA24A6007-005	VA24A6007-006	Limits	VA24B0323-017	VA24B0323-015	VA24B0323-016	Limits	VA24B7634-013	VA24B7634-012	VA24B7634-011	Limits	VA24C1467-014	VA24C1467-013	VA24C2044-025	Limits	VA24C5723-011	VA24C4308-013	VA24C4308-014	
Media		Water	Water	Water		Water	Water	Water		Water	Water	Water		Water	Water	Water		Water	Water	Water	
Physical Tests																					
Conductivity (µS/cm)	2.0	*<2.0*	*<2.0*	*<2.0*	2.0	*<2.0*	*<2.0*	*<2.0*	2.0	*<2.0*	*<2.0*	*<2.0*	2.0	*<2.0*	**3.5**	*<2.0*	2.0	*<2.0*	*<2.0*	*<2.0*	
Alkalinity, Bicarbonate	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	
Alkalinity, Carbonate	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	
Alkalinity, Hydroxide	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	
Alkalinity, Total	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	
Hardness (mg/L), Dissolved	0.60	*<0.60*	*<0.60*	*<0.60*	0.60	*<0.60*	*<0.60*	*<0.60*	0.60	*<0.60*	*<0.60*	*<0.60*	0.60	-	*<0.60*	*<0.60*	0.60	*<0.60*	*<0.60*	*<0.60*	
Hardness (as $CaCO_3$), from total Ca/Mg	0.60	*<0.60*	*<0.60*	*<0.60*	0.60	*<0.60*	*<0.60*	*<0.60*	0.60	*<0.60*	*<0.60*	*<0.60*	0.60	-	*<0.60*	*<0.60*	0.60	*<0.60*	*<0.60*	*<0.60*	
Total Dissolved Solids (mg/L)	3.0	*<3.0*	*<3.0*	*<3.0*	3.0	*<3.0*	*<3.0*	*<3.0*	3.0	*<3.0*	*<3.0*	*<3.0*	3.0	*<3.0*	*<3.0*	*<3.0*	3.0	*<3.0*	*<3.0*	*<3.0*	
Total Suspended Solids (mg/L)	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	1.0	*<1.0*	*<1.0*	*<1.0*	
Turbidity (NTU)	0.10	*<0.10*	*<0.10*	*<0.10*	0.10	*<0.10*	*<0.10*	*<0.10*	0.10	*<0.10*	*<0.10*	**0.21**	0.10	*<0.10*	*<0.10*	*<0.10*	0.10	*<0.10*	*<0.10*	*<0.10*	
pH (Laboratory)	0.10	5.5	5.5	5.6	0.10	5.5	5.5	5.5	0.10	5.8	6.0	6.1	0.10	5.6	6.0	5.7	0.10	5.2	5.7	5.7	
Anions and Nutrients (mg/L)																					
Ammonia, Total (as N)	0.0050	*<0.0050*	*<0.0050*	*<0.0050*	0.0050	*<0.0050*	*<0.0050*	*<0.0050*	0.0050	*<0.0050*	*<0.0050*	*<0.0050*	0.0050	*<0.0050*	0.076	*<0.0050*	0.0050	*<0.0050*	0.076	0.067	
Bromide (Br)	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	
Chloride (Cl)	0.10	*<0.10*	*<0.10*	*<0.10*	0.10	*<0.10*	*<0.10*	*<0.10*	0.10	*<0.10*	*<0.10*	*<0.10*	0.10	*<0.50*	*<0.50*	*<0.10*	0.10	*<0.10*	*<0.10*	*<0.10*	
Fluoride (F)	0.020	*<0.020*	*<0.020*	*<0.020*	0.020	*<0.020*	*<0.020*	*<0.020*	0.020	*<0.020*	*<0.020*	*<0.020*	0.020	*<0.020*	*<0.020*	*<0.020*	0.020	*<0.020*	*<0.020*	*<0.020*	
Total Kjeldahl Nitrogen	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	**0.085**	*<0.050*	0.050	*<0.050*	**0.066**	**0.073**	
Nitrate (as N)	0.0050	*<0.0050*	*<0.0050*	*<0.0050*	0.0050	*<0.0050*	*<0.0050*	*<0.0050*	0.0050	*<0.0050*	*<0.0050*	*<0.0050*	0.0050	*<0.0050*	*<0.0050*	*<0.0050*	0.0050	*<0.0050*	*<0.0050*	*<0.0050*	
Nitrite (as N)	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	
Orthophosphate-Dissolved (as P)	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	
Phosphorus (P)-Total	0.0020	*<0.0020*	*<0.0020*	*<0.0020*	0.0020	*<0.0020*	*<0.0020*	*<0.0020*	0.0020	*<0.0020*	*<0.0020*	*<0.0020*	0.0020	*<0.0020*	*<0.0020*	*<0.0020*	0.0020	*<0.0020*	*<0.0020*	*<0.0020*	
Phosphorus (P)-Total Dissolved	0.0020	*<0.0020*	*<0.0020*	*<0.0020*	0.0020	*<0.0020*	*<0.0020*	*<0.0020*	0.0020	*<0.0020*	*<0.0020*	*<0.0020*	0.0020	*<0.0020*	*<0.0020*	*<0.0020*	0.0020	*<0.0020*	*<0.0020*	*<0.0020*	
Reactive Silica (as SiO_2)	0.50	*<0.50*	*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	
Sulfate (SO_4)	0.30	*<0.30*	*<0.30*	*<0.30*	0.30	*<0.30*	*<0.30*	*<0.30*	0.30	*<0.30*	*<0.30*	*<0.30*	0.30	*<0.30*	**0.5**	*<0.30*	0.30	*<0.30*	*<0.30*	*<0.30*	
Cyanides (mg/L)																					
Free Cyanide	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	-	-	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	-	-	-	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	
Total Cyanide	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	-	-	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	-	-	-	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	
Organic / Inorganic Carbon (mg/L)																					
Dissolved Organic Carbon	0.50	*<0.50*	*<0.50*	**0.67**	0.50	*<0.50*	*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	
Total Organic Carbon	0.50	*<0.50*	*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	
Total Metals (mg/L)																					
Aluminum	0.0030	*<0.0030*	*<0.0030*	*<0.0030*	0.0030	*<0.0030*	*<0.0030*	*<0.0030*	0.0030	**0.0055**	*<0.0030*	**0.0276**	0.0030	-	**0.0031**	*<0.0030*	0.0030	*<0.0030*	*<0.0030*	*<0.0030*	
Antimony	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	-	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	
Arsenic	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	-	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	
Barium	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	**0.00053**	0.00010	-	**0.00028**	*<0.00010*	0.00010	*<0.00010*	**0.00018**	**0.00014**	
Beryllium	0.00010	*<0.000100*	*<0.000100*	*<0.000100*	0.00010	*<0.000100*	*<0.000100*	*<0.000100*	0.00010	*<0.000100*	*<0.000100*	*<0.000100*	0.00010	-	*<0.000100*	*<0.000100*	0.00010	*<0.000100*	*<0.000100*	*<0.000100*	
Bismuth	0.000050	*<0.000050*	*<0.000050*	*<0.000050*	0.000050	*<0.000050*	*<0.000050*	*<0.000050*	0.000050	*<0.000050*	*<0.000050*	*<0.000050*	0.000050	-	*<0.000050*	*<0.000050*	0.000050	*<0.000050*	*<0.000050*	*<0.000050*	
Boron	0.010	*<0.010*	*<0.010*	*<0.010*	0.010	*<0.010*	*<0.010*	*<0.010*	0.010	*<0.010*	*<0.010*	*<0.010*	0.010	-	*<0.010*	*<0.010*	0.010	*<0.010*	*<0.010*	*<0.010*	
Cadmium	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	-	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	
Calcium	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	-	**0.183**	*<0.050*	0.050	*<0.050*	**0.083**	*<0.050*	
Cesium	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	0.000010	-	*<0.000010*	*<0.000010*	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	
Chromium	0.00050	*<0.00010*	*<0.00010*	*<0.00010*	0.00050	*<0.00050*	*<0.00050*	*<0.00050*	0.00050	*<0.00010*	*<0.00010*	*<0.00010*	0.00050	-	*<0.00010*	*<0.00010*	0.00050	*<0.00010*	*<0.00010*	*<0.00010*	
Cobalt	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	-	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	
Copper	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	-	0.0045	**0.0019**	0.00020	*<0.00020*	**0.00187**	**0.00048**	
Iron	0.010	*<0.010*	*<0.010*	*<0.010*	0.010	*<0.010*	*<0.010*	*<0.010*	0.010	*<0.010*	*<0.010*	*<0.010*	0.010	-	*<0.010*	*<0.010*	0.010	*<0.010*	*<0.010*	*<0.010*	
Lead	0.000050	*<0.000050*	*<0.000050*	*<0.000050*	0.000050	*<0.000050*	*<0.000050*	**0.00011**	0.000050	*<0.000050*	*<0.000050*	*<0.000050*	0.000050	-	0.00070	*<0.000050*	0.000050	*<0.000050*	**0.000216**	*<0.000050*	
Lithium	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	-	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	
Magnesium	0.0050	*<0.0050*	*<0.0050*	*<0.0050*	0.0050	*<0.0050*	*<0.0050*	*<0.0050*	0.0050	*<0.0050*	*<0.0050*	**0.007**	0.0050	-	**0.0152**	*<0.0050*	0.0050	*<0.0050*	*<0.0050*	*<0.0050*	
Manganese	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	-	**0.00029**	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	
Mercury	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	0.000005	-	*<0.0000050*	*<0.0000050*	0.000005	*<0.0000050*	*<0.0000050*	*<0.0000050*	
Molybdenum	0.000050	*<0.000050*	*<0.000050*	*<0.000050*	0.000050	*<0.000050*	*<0.000050*	*<0.000050*	0.000050	*<0.000050*	*<0.000050*	*<0.000050*	0.000050	-	*<0.000050*	*<0.000050*	0.000050	*<0.000050*	*<0.000050*	*<0.000050*	
Nickel	0.00050	*<0.00050*	*<0.00050*	*<0.00050*	0.00050	*<0.00050*	*<0.00050*	*<0.00050*	0.00050	*<0.00050*	*<0.00050*	*<0.00050*	0.00050	-	**0.00075**	*<0.00050*	0.00050	*<0.00050*	*<0.00050*	*<0.00050*	
Phosphorus	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	-	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	
Potassium	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	-	**0.075**	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	
Rubidium	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	-	*<0.00020*	*<0.00020*	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	
Selenium	0.000050	*<0.000050*	*<0.000050*	*<0.000050*	0.000050	*<0.000050*	*<0.000050*	*<0.000050*	0.000050	*<0.000050*	*<0.000050*	*<0.000050*	0.000050	-	*<0.000050*	*<0.000050*	0.000050	*<0.000050*	*<0.000050*	*<0.000050*	
Silicon	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	-	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	
Silver	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	0.000010	-	*<0.000010*	*<0.000010*	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	
Sodium	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	*<0.050*	*<0.050*	*<0.050*	0.050	-	**0.2**	*<0.050*	0.050	*<0.050*	**0.075**	*<0.050*	
Strontium	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	-	**0.00111**	*<0.00020*	0.00020	*<0.00020*	**0.00054**	*<0.00020*	
Sulfur	0.50	*<0.50*	*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	0.50	-	*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	
Tellurium	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	-	*<0.00020*	*<0.00020*	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	
Thallium	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	0.000010	-	*<0.000010*	*<0.000010*	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	
Thorium	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	-	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	
Tin	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	-	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	
Titanium	0.00030	*<0.00030*	*<0.00030*	*<0.00030*	0.00030	*<0.00030*	*<0.00030*	*<0.00030*	0.00030	*<0.00030*	*<0.00030*	*<0.00030*	0.00030	-	*<0.00030*	*<0.00030*	0.00030	*<0.00030*	*<0.00030*	*<0.00030*	
Tungsten	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	0.00010	-	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	
Uranium	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	0.000010	-	*<0.000010*	*<0.000010*	0.000010	*<0.000010*	*<0.000010*	*<0.000010*	
Vanadium	0.00050	*<0.00050*	*<0.00050*	*<0.00050*	0.00050	*<0.00050*	*<0.00050*	*<0.00050*	0.00050	*<0.00050*	*<0.00050*	*<0.00050*	0.00050	-	*<0.00050*	*<0.00050*	0.00050	*<0.00050*	*<0.00050*	*<0.00050*	
Zinc	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	-	0.022	*<0.0010*	0.0010	*<0.0010*	**0.0069**	**0.0024**	
Zirconium	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	0.00020	-	*<0.00020*	*<0.00020*	0.00020	*<0.00020*	*<0.00020*	*<0.00020*	
Speciated Metals (µg/L)																					
Arsenate (As V)	0.020	*<0.020*	-	-		-	-	-	0.020	-	-	-	0.020	-	-	-	0.020	-	-	-	
Arsenite (As III)	0.020	*<0.020*	-	-		-	-	-	0.020	-	-	-	0.020	-	-	-	0.020	-	-	-	
Arsenobetaine (AsB)	0.050	*<0.050*	-	-		-	-	-	0.050	-	-	-	0.050	-	-	-	0.050	-	-	-	
Dimethylarsinic Acid (DMA)	0.020	*<0.020*	-	-		-	-	-	0.020	-	-	-	0.020	-	-	-	0.020	-	-	-	
Monomethylarsonic Acid (MMA)	0.020	*<0.020*	-	-		-	-	-	0.020	-	-	-	0.020	-	-	-	0.020	-	-	-	

Notes:

1 - DI water for DI Blank mistakenly taken from a secondary container suspected to be contaminated. Results deemed unreliable.

Bolded Travel, DI, or Equipment Blank concentration exceeds laboratory DLs but < 10x DL.

Shaded Travel, DI, or Equipment Blank concentration is > 10x DL.

Italicized numbers are below detection limits.

"-" analyte not measured

Table B-5. Water quality field duplicate results for all CREMP study areas in 2024.

Month		Relative Percent Difference DQOs			March DUP-1 (PDL-121)					March DUP-2 (INUG-156)					March DUP-3 (NEM-85)					March DUP-4 (WTS-87)				
Station					PDL-121	DUP				INUG-156	DUP				NEM-85	DUP				WTS-87	DUP			
Date Sampled					09-Mar-2024	09-Mar-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	14-Mar-2024	14-Mar-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	04-Mar-2024	04-Mar-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	04-Mar-2024	04-Mar-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome
ALS Sample ID	Units	Lab	Field	March DLs	VA24A5461-005	VA24A5461-007				VA24A6007-001	VA24A6007-003				VA24A5006-001 VA24A6012-001	VA24A5006-009 VA24A6012-009				VA24A5006-003 VA24A6012-003	VA24A5006-010 VA24A6012-010			
Parameter					Water	Water				Water	Water				Water	Water				Water	Water			
Physical Tests																								
Conductivity	µS/cm	10	15	2.0	34.7	33	RPD	5.0	Pass RPD	26.7	26.4	RPD	1.1	Pass RPD	105	105	RPD	0	Pass RPD	152	150	RPD	1.3	Pass RPD
Alkalinity, Bicarbonate		20	30	1.0	11.5	11.3	RPD	1.8	Pass RPD	9.0	8.9	RPD	1.1	Pass RPD	16.2	15.9	RPD	1.9	Pass RPD	25.8	26	RPD	-0.800	Pass RPD
Alkalinity, Carbonate		20	30	1.0	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL
Alkalinity, Hydroxide		20	30	1.0	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL
Alkalinity, Total (as $CaCO_3$)	mg/L	20	30	1.0	11.5	11.3	RPD	1.8	Pass RPD	9.0	8.9	RPD	1.1	Pass RPD	16.2	15.9	RPD	1.9	Pass RPD	25.8	26	RPD	-0.800	Pass RPD
Hardness (mg/L), Dissolved	-		40	0.60	13.4	13.2	RPD	1.5	Pass RPD	10	10.0	RPD	0.3	Pass RPD	41.2	41.7	RPD	-1.20	Pass RPD	56.5	56.4	RPD	0.2	Pass RPD
Hardness (as $CaCO_3$), from total Ca/Mg			40	0.60	13.2	13	RPD	1.5	Pass RPD	10	10.3	RPD	-3.00	Pass RPD	38.3	39.1	RPD	-2.10	Pass RPD	53.6	53.7	RPD	-0.200	Pass RPD
Total Dissolved Solids	mg/L		40	1.0	22.6	20.4	RPD	10.2	Pass RPD	17	17.6	RPD	-3.50	Pass RPD	68.3	66.3	RPD	3	Pass RPD	86	93.3	RPD	-8.10	Pass RPD
Total Suspended Solids	mg/L		40	3.0	*<1.0*	*<1.0*	<DL	<DL	<DL	1.0	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL
Turbidity	NTU	15	23	0.10	0.18	0.19	DIFF	-0.010000	Pass Diff	0.15	*<0.10*	<DL	<DL	<DL	*<0.10*	*<0.10*	<DL	<DL	<DL	0.12	*<0.10*	<DL	<DL	<DL
pH (Laboratory)	pH		40	0.10	7.4	7.3	RPD	0.40	Pass RPD	7.1	7.2	RPD	-0.300	Pass RPD	7.4	7.5	RPD	-0.300	Pass RPD	7.6	7.6	RPD	-0.700	Pass RPD
Anions and Nutrients																								
Ammonia, Total (as N)	mg/L	20	30	0.0050	0.014	0.014	DIFF	-0.000400	Pass Diff	0.020	0.021	DIFF	-0.0006	Pass Diff	0.020	0.020	DIFF	0.0006	Pass Diff	0.055	0.056	RPD	-0.700	Pass RPD
Bromide (Br)	mg/L	20	30	0.050	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	0.11	0.099	DIFF	0.008	Pass Diff	0.17	0.18	DIFF	-0.01	Pass Diff
Chloride (Cl)	mg/L	20	30	0.10	1.0	0.99	RPD	2.0	Pass RPD	1.2	1.2	RPD	0	Pass RPD	16.3	16.2	RPD	0.6	Pass RPD	16.9	16.9	RPD	0	Pass RPD
Fluoride (F)	mg/L	20	30	0.020	0.046	0.042	DIFF	0.0040	Pass Diff	0.096	0.097	DIFF	-0.001	Pass Diff	0.035	0.034	DIFF	0.001	Pass Diff	0.072	0.070	DIFF	0.002	Pass Diff
Total Kjeldahl Nitrogen	mg/L	20	30	0.050	0.12	0.12	DIFF	0	Pass Diff	0.20	0.18	DIFF	0.02	Pass Diff	0.13	0.14	DIFF	-0.008	Pass Diff	0.29	0.30	RPD	-5.50	Pass RPD
Nitrate (as N)	mg/L	20	30	0.0050	*<0.0050*	*<0.0050*	<DL	<DL	<DL	*<0.0050*	*<0.0050*	<DL	<DL	<DL	0.0074	0.0079	DIFF	-0.00005	Pass Diff	0.46	0.47	RPD	-0.900	Pass RPD
Nitrite (as N)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	0.0025	0.0028	DIFF	-0.0003	Pass Diff
Orthophosphate-Dissolved (as P)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL
Phosphorus (P)-Total	mg/L	20	30	0.0020	0.0023	*<0.0020*	<DL	<DL	<DL	0.0023	0.0062	DIFF	-0.0039	Pass Diff	0.0033	0.0026	DIFF	0.0007	Pass Diff	0.0067	0.0043	DIFF	0.0024	Pass Diff
Phosphorus (P)-Total Dissolved	mg/L	25	38	0.0020	*<0.0020*	*<0.0020*	<DL	<DL	<DL	*<0.0020*	*<0.0020*	<DL	<DL	<DL	*<0.0020*	*<0.0020*	<DL	<DL	<DL	0.0031	0.0032	DIFF	-0.0001	Pass Diff
Silica, Reactive (as SiO2)	mg/L	20	30	0.50	*<0.50*	*<0.50*	<DL	<DL	<DL	0.64	0.64	DIFF	0	Pass Diff	*<0.50*	*<0.50*	<DL	<DL	<DL	0.51	0.52	DIFF	-0.01	Pass Diff
Sulfate (SO4)	mg/L	20	30	0.30	2.6	2.5	RPD	2.4	Pass RPD	1.6	1.6	RPD	-0.600	Pass RPD	6.7	6.7	RPD	0.3	Pass RPD	16.7	16.7	RPD	0	Pass RPD
Cyanides																								
Cyanide, Free	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL			DIFF	0	Pass Diff			DIFF	0	Pass Diff
Cyanide, Total	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL			DIFF	0	Pass Diff			DIFF	0	Pass Diff
Organic / Inorganic Carbon																								
Dissolved Organic Carbon	mg/L	20	30	0.50	1.9	2.0	DIFF	-0.040000	Pass Diff	2.7	2.6	RPD	2.3	Pass RPD	2.1	1.9	DIFF	0.15	Pass Diff	3.8	3.8	RPD	-2.10	Pass RPD
Total Organic Carbon	mg/L	20	30	0.50	1.9	2.0	DIFF	-0.030000	Pass Diff	2.7	3.0	RPD	-8.40	Pass RPD	1.9	2.1	DIFF	-0.130	Pass Diff	3.6	3.8	RPD	-4.60	Pass RPD
Total Metals																								
Aluminum (Al)-Total	mg/L	20	30	0.0030	*<0.0030*	*<0.0030*	<DL	<DL	<DL	0.0048	0.020	DIFF	-0.0151	Fail	*<0.0030*	*<0.0030*	<DL	<DL	<DL	0.0035	0.0033	DIFF	0.0002	Pass Diff
Antimony (Sb)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	0.00058	0.00058	RPD	0	Pass RPD
Arsenic (As)-Total	mg/L	20	30	0.00010	0.00025	0.00023	DIFF	0.0000020	Pass Diff	0.00015	0.00014	DIFF	0.00001	Pass Diff	0.00080	0.00079	RPD	1.3	Pass RPD	0.00060	0.00061	RPD	-1.70	Pass RPD
Barium (Ba)-Total	mg/L	20	30	0.00010	0.0027	0.0026	RPD	5.3	Pass RPD	0.0026	0.0028	RPD	-6.30	Pass RPD	0.018	0.018	RPD	0	Pass RPD	0.023	0.023	RPD	0.4	Pass RPD
Beryllium (Be)-Total	mg/L	20	30	0.00010	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL
Bismuth (Bi)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Boron (B)-Total	mg/L	20	30	0.010	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL
Cadmium (Cd)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL
Calcium (Ca)-Total	mg/L	20	30	0.050	3.4	3.3	RPD	2.7	Pass RPD	2.0	2.0	RPD	-0.500	Pass RPD	10.6	10.9	RPD	-2.80	Pass RPD	14	14.1	RPD	-0.700	Pass RPD
Chromium (Cr)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	0.00012	DIFF	-0.00001	Pass Diff	0.00014	0.00015	DIFF	-0.00001	Pass Diff	0.00012	0.00014	DIFF	-0.00002	Pass Diff
Cobalt (Co)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Copper (Cu)-Total	mg/L	20	30	0.00050	0.00057	0.00051	DIFF	0.000060	Pass Diff	0.00057	0.00059	DIFF	-2E-05	Pass Diff	*<0.00050*	*<0.00050*	<DL	<DL	<DL	0.00058	0.00056	DIFF	2E-05	Pass Diff
Iron (Fe)-Total	mg/L	20	30	0.010	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	0.016	0.015	DIFF	0.001	Pass Diff
Lead (Pb)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Lithium (Li)-Total	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	0.0014	0.0014	DIFF	0	Pass Diff	0.0023	0.0023	DIFF	0	Pass Diff
Magnesium (Mg)-Total	mg/L	20	30	0.0050	1.2	1.2	RPD	0.90	Pass RPD	1.2	1.3	RPD	-4.00	Pass RPD	2.9	2.9	RPD	0	Pass RPD	4.5	4.5	RPD	0.4	Pass RPD
Manganese (Mn)-Total	mg/L	20	30	0.00010	0.00071	0.00067	RPD	5.8	Pass RPD	0.00084	0.00084	RPD	0	Pass RPD	0.0012	0.0013	RPD	-4.00	Pass RPD	0.0014	0.0014	RPD	2.8	Pass RPD
Mercury (Hg)-Total	µg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL
Molybdenum (Mo)-Total	mg/L	20	30	0.000050	0.000069	0.000067	DIFF	0.0000002	Pass Diff	0.000051	*<0.000050*	<DL	<DL	<DL	0.000091	0.000088	DIFF	3E-06	Pass Diff	0.00077	0.00078	RPD	-0.400	Pass RPD
Nickel (Ni)-Total	mg/L	20	30	0.00050	0.00077	0.00073	DIFF	0.000040	Pass Diff	0.00051	0.00055	DIFF	-0.00004	Pass Diff	0.0014	0.0013	DIFF	6E-05	Pass Diff	0.0017	0.0017	DIFF	0	Pass Diff
Phosphorus (P)-Total	mg/L	20	30	0.050	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL
Potassium (K)-Total	mg/L	20	30	0.050	0.48	0.47	RPD	1.3	Pass RPD	0.64	0.67	RPD	-4.80	Pass RPD	1.8	1.8	RPD	-1.70	Pass RPD	3.5	3.5	RPD	-1.40	Pass RPD
Selenium (Se)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	0.000053	*<0.000050*	<DL	<DL	<DL
Silicon (Si)-Total	mg/L	20	30	0.10	0.21	0.22	DIFF	-0.010000	Pass Diff	0.32	0.31	DIFF	0.01	Pass Diff	0.22	0.20	DIFF	0.02	Pass Diff	0.25	0.25	DIFF	0	Pass Diff
Silver (Ag)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL
Sodium (Na)-Total	mg/L	20	30	0.050	0.67	0.66	RPD	1.4	Pass RPD	0.93	0.98	RPD	-4.60	Pass RPD	1.1	1.1	RPD	5.5	Pass RPD	3.4	3.2	RPD	6.4	Pass RPD
Strontium (Sr)-Total	mg/L	20	30	0.00020	0.014	0.015	RPD	-2.10	Pass RPD	0.011	0.011	RPD	-2.70	Pass RPD	0.063	0.065	RPD	-4.10	Pass RPD	0.11	0.11	RPD	0	Pass RPD
Sulfur (S)-Total	mg/L	20	30	0.50	0.74	0.75	DIFF	-0.010000	Pass Diff	*<0.50*	*<0.50*	<DL	<DL	<DL	2.1	1.9	DIFF	0.18	Pass Diff	5.4	5.5	RPD	-0.500	Pass RPD
Thallium (Tl)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL
Tin (Sn)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Titanium (Ti)-Total	mg/L	20	30	0.00030	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL
Tungsten (W)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Uranium (U)-Total	mg/L	20	30	0.000010	0.000032	0.000031	DIFF	0.0000001	Pass Diff	0.000077	0.000081	RPD	-5.10	Pass RPD	0.000013	0.000014	DIFF	-0.0000001	Pass Diff	0.000065	0.000067	RPD	-3.00	Pass RPD
Vanadium (V)-Total	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL
Zinc (Zn)-Total	mg/L	20	30	0.0030	*<0.0030*	*<0.0030*	<DL	<DL	<DL	*<0.0030*	*<0.0030*	<DL	<DL	<DL	*<0.0030*	*<0.0030*	<DL	<DL	<DL	*<0.0030*	*<0.0030*	<DL	<DL	<DL
Zirconium (Zr)-Total	mg/L	20	30	0.00020	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL
Dissolved Metals																								
Aluminum (Al)-Dissolved	mg/L	20	30	0.0010	*<0.0010*	0.0027	<DL	<DL	<DL	0.0029	0.0038	DIFF	-0.0009	Pass Diff	*<0.0010*	*<0.0010*	<DL	<DL	<DL	0.0025	0.0030	DIFF	-0.0005	Pass Diff
Antimony (Sb)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	0.00056	0.00057	RPD	-1.80	Pass RPD
Arsenic (As)-Dissolved	mg/L	20	30	0.00010	0.00022	0.00022	DIFF	0	Pass Diff	0.00014	0.00015	DIFF	-0.00001	Pass Diff	0.00076	0.00073	RPD	4	Pass RPD	0.00057	0.00056	RPD	1.8	Pass RPD
Barium (Ba)-Dissolved	mg/L	20	30	0.00010	0.0027	0.0027	RPD	1.1	Pass RPD	0.0027	0.0027	RPD	-1.50	Pass RPD	0.018	0.018	RPD	2.8	Pass RPD	0.022	0.023	RPD	-3.10	Pass RPD
Beryllium (Be)-Dissolved	mg/L	20	30	0.00010	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL
Bismuth (Bi)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Boron (B)-Dissolved	mg/L	20	30	0.010	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL
Cadmium (Cd)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL
Calcium (Ca)-Dissolved	mg/L	20	30	0.050	3.5	3.4	RPD	2.6	Pass RPD	2.0	1.9	RPD	2.1	Pass RPD	11.7	11.9	RPD	-1.70	Pass RPD	14.9	14.9	RPD	0	Pass RPD
Chromium (Cr)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	0.00013	<DL	<DL	<DL	0.00011	0.00024	DIFF	-0.00013	Pass Diff	0.00012	*<0.00010*	<DL	<DL	<DL	0.00011	0.00014	DIFF	-0.00003	Pass Diff
Cobalt (Co)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Copper (Cu)-Dissolved	mg/L	20	30	0.00020	0.00058	0.00058	DIFF	0	Pass Diff	0.00057	0.00056	DIFF	0.00001	Pass Diff	0.00030	0.00030	DIFF	0	Pass Diff	0.00054	0.00056	DIFF	-2E-05	Pass Diff
Iron (Fe)-Dissolved	mg/L	20	30	0.010	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	0.012	<DL	<DL	<DL
Lead (Pb)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Lithium (Li)-Dissolved	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	0.0014	0.0014	DIFF	0	Pass Diff	0.0024	0.0023	DIFF	1E-04	Pass Diff
Magnesium (Mg)-Dissolved	mg/L	20	30	0.0050	1.2	1.1	RPD	0.90	Pass RPD	1.2	1.3	RPD	-0.800	Pass RPD	2.9	2.9	RPD	-0.300	Pass RPD	4.7	4.7	RPD	0.4	Pass RPD
Manganese (Mn)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	0.00023	<DL	<DL	<DL	0.00029	0.00033	DIFF	-0.00004	Pass Diff	0.00020	0.00019	DIFF	0.00001	Pass Diff	0.00077	0.00083	RPD	-7.50	Pass RPD
Mercury (Hg)-Dissolved	µg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL
Molybdenum (Mo)-Dissolved	mg/L	20	30	0.000050	0.000076	0.000061	DIFF	0.000015	Pass Diff	*<0.000050*	*<0.000050*	<DL	<DL	<DL	0.000095	0.000098	DIFF	-3E-06	Pass Diff	0.00073	0.00074	RPD	-1.40	Pass RPD
Nickel (Ni)-Dissolved	mg/L	20	30	0.00050	0.00071	0.00076	DIFF	-0.000050	Pass Diff	0.00054	0.00057	DIFF	-0.00003	Pass Diff	0.0013	0.0013	DIFF	0	Pass Diff	0.0017	0.0017	DIFF	2E-05	Pass Diff
Phosphorus (P)-Dissolved	mg/L	20	30	0.050	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL
Potassium (K)-Dissolved	mg/L	20	30	0.050	0.49	0.48	RPD	0.60	Pass RPD	0.62	0.62	RPD	-0.200	Pass RPD	2.0	2.0	RPD	1.5	Pass RPD	3.9	3.9	RPD	0	Pass RPD
Selenium (Se)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Silicon (Si)-Dissolved	mg/L	20	30	0.050	0.17	0.18	DIFF	-0.008000	Pass Diff	0.27	0.26	RPD	6.8	Pass RPD	0.21	0.20	DIFF	0.006	Pass Diff	0.22	0.24	DIFF	-0.022	Pass Diff
Silver (Ag)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL
Sodium (Na)-Dissolved	mg/L	20	30	0.050	0.69	0.67	RPD	2.1	Pass RPD	0.94	0.94	RPD	0.2	Pass RPD	1.1	1.1	RPD	0	Pass RPD	3.4	3.3	RPD	2.4	Pass RPD
Strontium (Sr)-Dissolved	mg/L	20	30	0.00020	0.015	0.014	RPD	2.8	Pass RPD	0.011	0.011	RPD	0	Pass RPD	0.069	0.070	RPD	-2.20	Pass RPD	0.12	0.12	RPD	-0.900	Pass RPD
Sulfur (S)-Dissolved	mg/L	20	30	0.50	0.79	0.80	DIFF	-0.010000	Pass Diff	0.56	0.53	DIFF	0.03	Pass Diff	2.2	2.4	DIFF	-0.270	Pass Diff	5.3	5.6	RPD	-4.60	Pass RPD
Thallium (Tl)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL
Tin (Sn)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Titanium (Ti)-Dissolved	mg/L	20	30	0.00030	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL
Tungsten (W)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Uranium (U)-Dissolved	mg/L	20	30	0.000010	0.000032	0.000030	DIFF	0.0000002	Pass Diff	0.000071	0.000072	RPD	-1.40	Pass RPD	0.000015	0.000013	DIFF	0.000002	Pass Diff	0.000060	0.000061	RPD	-1.70	Pass RPD
Vanadium (V)-Dissolved	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL
Zinc (Zn)-Dissolved	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	0.014	0.0047	DIFF	0.0088	Fail	0.0035	0.0073	DIFF	-0.0038	Fail
Zirconium (Zr)-Dissolved	mg/L	20	40	0.00020	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL
Speciated Metals																								
Arsenate (As V)	µg/L	20	30	0.020	0.058	0.046	DIFF	0.012	Pass Diff	*<0.020*	*<0.020*	<DL	<DL	<DL	0.45	0.43	RPD	5.5	Pass RPD	0.28	0.28	RPD	-1.80	Pass RPD
Arsenite (As III)	µg/L	20	30	0.020	0.043	0.050	DIFF	-0.007000	Pass Diff	*<0.020*	*<0.020*	<DL	<DL	<DL

Table B-5. Water quality field duplicate results for all CREMP study areas in 2024.

Month		Relative Percent Difference DQOs			May DUP-1 (TPN-171)					May DUP-2 (INUG-158)					May DUP-3 (A20-82)					May DUP-4 (DS1-77)				
Station					TPN-171	DUP				INUG-158	DUP				A20-82	DUP				DS1-77	DUP			
Date Sampled	Units			May DLs	26-Apr-2024	26-Apr-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	29-Apr-2024	29-Apr-2024	Field Dup	Result [b]	Outcome	04-May-2024	04-May-2024	Field Dup	Result [b]	Outcome	05-May-2024	05-May-2024	Field Dup	Result [b]	Outcome
ALS Sample ID		Lab	Field		VA24B0466-008	VA24B0466-013				VA24B0466-001	VA24B0466-014				VA24B0323-002	VA24B0323-013				VA24B0323-011	VA24B0323-014			
Parameter					Water	Water				Water	Water				Water	Water				Water	Water			
Physical Tests																								
Conductivity	µS/cm	10	15	2.0	40.6	40.4	RPD	0.5	Pass RPD	24.5	24.4	RPD	0.4	Pass RPD	78.9	78.7	RPD	0.3	Pass RPD	41	41.2	RPD	-0.500	Pass RPD
Alkalinity, Bicarbonate		20	30	1.0	9.0	9.2	RPD	-2.20	Pass RPD	7.2	7.5	RPD	-4.10	Pass RPD	15.1	15	RPD	0.7	Pass RPD	10.9	10.8	RPD	0.9	Pass RPD
Alkalinity, Carbonate		20	30	1.0	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL
Alkalinity, Hydroxide		20	30	1.0	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL
Alkalinity, Total (as $CaCO_3$)	mg/L	20	30	1.0	9.0	9.2	RPD	-2.20	Pass RPD	7.2	7.5	RPD	-4.10	Pass RPD	15.1	15	RPD	0.7	Pass RPD	10.9	10.8	RPD	0.9	Pass RPD
Hardness (mg/L), Dissolved	-		40	0.60	13.6	13.6	RPD	0	Pass RPD	8.6	8.7	RPD	-1.30	Pass RPD	27.9	27.8	RPD	0.4	Pass RPD	15.7	15.2	RPD	3.2	Pass RPD
Hardness (as $CaCO_3$), from total Ca/Mg			40	0.60	13.2	13.3	RPD	-0.800	Pass RPD	8.4	8.4	RPD	-0.500	Pass RPD	29.5	28.7	RPD	2.7	Pass RPD	15.8	15.6	RPD	1.3	Pass RPD
Total Dissolved Solids	mg/L		40	1.0	22.4	24	RPD	-6.90	Pass RPD	16.2	18.2	RPD	-11.60	Pass RPD	51.5	48.2	RPD	6.6	Pass RPD	25.9	25	RPD	3.5	Pass RPD
Total Suspended Solids	mg/L		40	3.0	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL
Turbidity	NTU	15	23	0.10	*<0.10*	*<0.10*	<DL	<DL	<DL	*<0.10*	*<0.10*	<DL	<DL	<DL	0.16	0.12	DIFF	0.04	Pass Diff	0.17	0.17	DIFF	0	Pass Diff
pH (Laboratory)	pH		40	0.10	7.3	7.3	RPD	-0.300	Pass RPD	7.2	7.2	RPD	-0.1	Pass RPD	7.4	7.4	RPD	-0.300	Pass RPD	7.3	7.3	RPD	-0.1	Pass RPD
Anions and Nutrients																								
Ammonia, Total (as N)	mg/L	20	30	0.0050	0.015	0.015	DIFF	0.0008	Pass Diff	0.024	0.023	DIFF	0.0009	Pass Diff	0.040	0.039	RPD	1.3	Pass RPD	0.0095	*<0.0050*	<DL	<DL	<DL
Bromide (Br)	mg/L	20	30	0.050	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	0.085	0.088	DIFF	-0.003	Pass Diff	*<0.050*	*<0.050*	<DL	<DL	<DL
Chloride (Cl)	mg/L	20	30	0.10	1.1	1.1	RPD	0.9	Pass RPD	1.0	1.0	RPD	1	Pass RPD	8.2	8.2	RPD	-0.1	Pass RPD	2.6	2.6	RPD	1.1	Pass RPD
Fluoride (F)	mg/L	20	30	0.020	0.093	0.094	DIFF	-0.001	Pass Diff	0.086	0.087	DIFF	-0.001	Pass Diff	0.042	0.041	DIFF	0.001	Pass Diff	0.050	0.049	DIFF	0.001	Pass Diff
Total Kjeldahl Nitrogen	mg/L	20	30	0.050	0.11	0.11	DIFF	0.001	Pass Diff	0.15	0.16	DIFF	-0.012	Pass Diff	0.19	0.19	DIFF	-0.007	Pass Diff	0.29	0.15	DIFF	0.141	Fail
Nitrate (as N)	mg/L	20	30	0.0050	0.0065	0.0064	DIFF	1E-04	Pass Diff	*<0.0050*	*<0.0050*	<DL	<DL	<DL	0.056	0.10	DIFF	-58.60	Fail	0.052	1.6	RPD	185	RPD
Nitrite (as N)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	0.0024	0.0029	DIFF	-0.0005	Pass Diff	*<0.0010*	*<0.0010*	<DL	<DL	<DL
Orthophosphate-Dissolved (as P)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL
Phosphorus (P)-Total	mg/L	20	30	0.0020	*<0.0020*	*<0.0020*	<DL	<DL	<DL	*<0.0020*	*<0.0020*	<DL	<DL	<DL	0.0026	0.0022	DIFF	0.0004	Pass Diff	0.0051	0.0021	DIFF	0.003	Pass Diff
Phosphorus (P)-Total Dissolved	mg/L	25	38	0.0020	*<0.0020*	*<0.0020*	<DL	<DL	<DL	*<0.0020*	*<0.0020*	<DL	<DL	<DL	*<0.0020*	*<0.0020*	<DL	<DL	<DL	*<0.0020*	*<0.0020*	<DL	<DL	<DL
Silica, Reactive (as SiO2)	mg/L	20	30	0.50	*<0.50*	*<0.50*	<DL	<DL	<DL	*<0.50*	*<0.50*	<DL	<DL	<DL	0.76	0.75	DIFF	0.01	Pass Diff	1.3	1.3	DIFF	-0.01	Pass Diff
Sulfate (SO4)	mg/L	20	30	0.30	6.2	6.1	RPD	0.5	Pass RPD	1.4	1.4	DIFF	0	Pass Diff	7.4	7.5	RPD	-0.700	Pass RPD	3.2	3.2	RPD	0.9	Pass RPD
Cyanides																								
Cyanide, Free	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL
Cyanide, Total	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL
Organic / Inorganic Carbon																								
Dissolved Organic Carbon	mg/L	20	30	0.50	1.7	1.7	DIFF	-0.01	Pass Diff	2.3	2.5	DIFF	-0.190	Pass Diff	2.8	2.8	RPD	0.7	Pass RPD	3.0	3.1	RPD	-1.000	Pass RPD
Total Organic Carbon	mg/L	20	30	0.50	1.5	1.6	DIFF	-0.1	Pass Diff	2.2	2.4	DIFF	-0.180	Pass Diff	2.9	2.8	RPD	2.1	Pass RPD	3.7	3.2	RPD	15	Pass RPD
Total Metals																								
Aluminum (Al)-Total	mg/L	20	30	0.0030	*<0.0030*	*<0.0030*	<DL	<DL	<DL	0.0038	0.0044	DIFF	-0.0006	Pass Diff	*<0.0030*	*<0.0030*	<DL	<DL	<DL	0.0069	0.0071	DIFF	-0.0002	Pass Diff
Antimony (Sb)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	0.00012	0.00012	DIFF	0	Pass Diff	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Arsenic (As)-Total	mg/L	20	30	0.00010	0.00026	0.00028	DIFF	-0.00002	Pass Diff	0.00013	0.00012	DIFF	1E-05	Pass Diff	0.00027	0.00026	DIFF	0.00001	Pass Diff	0.00021	0.00022	DIFF	-0.00001	Pass Diff
Barium (Ba)-Total	mg/L	20	30	0.00010	0.0038	0.0037	RPD	3.7	Pass RPD	0.0023	0.0023	RPD	-1.30	Pass RPD	0.011	0.011	RPD	0	Pass RPD	0.0061	0.0062	RPD	-0.800	Pass RPD
Beryllium (Be)-Total	mg/L	20	30	0.00010	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL
Bismuth (Bi)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Boron (B)-Total	mg/L	20	30	0.010	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL
Cadmium (Cd)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL
Calcium (Ca)-Total	mg/L	20	30	0.050	3.2	3.2	RPD	-0.600	Pass RPD	1.7	1.7	RPD	0	Pass RPD	7.8	7.6	RPD	2.5	Pass RPD	3.8	3.8	RPD	0.3	Pass RPD
Chromium (Cr)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	0.00019	0.00013	DIFF	0.00006	Pass Diff	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL
Cobalt (Co)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Copper (Cu)-Total	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	<DL	<DL	<DL	0.00063	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	0.00052	0.00053	DIFF	-0.00001	Pass Diff
Iron (Fe)-Total	mg/L	20	30	0.010	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	0.016	0.017	DIFF	-0.001	Pass Diff
Lead (Pb)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Lithium (Li)-Total	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL
Magnesium (Mg)-Total	mg/L	20	30	0.0050	1.3	1.3	RPD	-1.60	Pass RPD	1.0	1.0	RPD	-1.000	Pass RPD	2.5	2.4	RPD	3.7	Pass RPD	1.5	1.5	RPD	1.3	Pass RPD
Manganese (Mn)-Total	mg/L	20	30	0.00010	0.00038	0.00040	DIFF	-0.00002	Pass Diff	0.00081	0.00077	RPD	5.1	Pass RPD	0.00080	0.00072	RPD	10.5	Pass RPD	0.0012	0.0013	RPD	-3.20	Pass RPD
Mercury (Hg)-Total	µg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL
Molybdenum (Mo)-Total	mg/L	20	30	0.000050	0.00013	0.00010	DIFF	3E-05	Pass Diff	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	0.000072	0.000076	DIFF	-0.000004	Pass Diff
Nickel (Ni)-Total	mg/L	20	30	0.00050	0.00055	0.00058	DIFF	-0.00003	Pass Diff	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	0.00052	<DL	<DL	<DL
Phosphorus (P)-Total	mg/L	20	30	0.050	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL
Potassium (K)-Total	mg/L	20	30	0.050	0.75	0.76	RPD	-1.10	Pass RPD	0.56	0.58	RPD	-1.90	Pass RPD	1.9	1.9	RPD	2.1	Pass RPD	0.58	0.59	RPD	-1.40	Pass RPD
Selenium (Se)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Silicon (Si)-Total	mg/L	20	30	0.10	0.14	0.15	DIFF	-0.01	Pass Diff	0.28	0.28	DIFF	0	Pass Diff	0.38	0.36	DIFF	0.02	Pass Diff	0.61	0.62	RPD	-1.60	Pass RPD
Silver (Ag)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL
Sodium (Na)-Total	mg/L	20	30	0.050	1.4	1.4	RPD	-0.700	Pass RPD	0.78	0.79	RPD	-2.20	Pass RPD	2.0	1.9	RPD	1.5	Pass RPD	1.3	1.3	RPD	-0.800	Pass RPD
Strontium (Sr)-Total	mg/L	20	30	0.00020	0.016	0.016	RPD	2.5	Pass RPD	0.0095	0.0099	RPD	-3.70	Pass RPD	0.051	0.050	RPD	2.8	Pass RPD	0.014	0.014	RPD	-1.40	Pass RPD
Sulfur (S)-Total	mg/L	20	30	0.50	2.2	2.1	DIFF	0.03	Pass Diff	*<0.50*	0.50	<DL	<DL	<DL	2.6	2.5	DIFF	0.06	Pass Diff	0.95	1.0	DIFF	-0.09	Pass Diff
Thallium (Tl)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL
Tin (Sn)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Titanium (Ti)-Total	mg/L	20	30	0.00030	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL
Tungsten (W)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Uranium (U)-Total	mg/L	20	30	0.000010	0.000050	0.000051	DIFF	-1E-06	Pass Diff	0.000071	0.000072	RPD	-1.40	Pass RPD	0.000033	0.000031	DIFF	0.000002	Pass Diff	0.000064	0.000063	RPD	1.6	Pass RPD
Vanadium (V)-Total	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL
Zinc (Zn)-Total	mg/L	20	30	0.0030	*<0.0030*	*<0.0030*	<DL	<DL	<DL	*<0.0030*	*<0.0030*	<DL	<DL	<DL	0.019	0.022	RPD	-13.40	Pass RPD	*<0.0030*	*<0.0030*	<DL	<DL	<DL
Zirconium (Zr)-Total	mg/L	20	30	0.00020	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL
Dissolved Metals																								
Aluminum (Al)-Dissolved	mg/L	20	30	0.0010	0.0020	*<0.0010*	<DL	<DL	<DL	0.0019	0.0019	DIFF	0	Pass Diff	*<0.0010*	*<0.0010*	<DL	<DL	<DL	0.0053	0.0049	DIFF	0.0004	Pass Diff
Antimony (Sb)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	0.00011	0.00010	DIFF	0.00001	Pass Diff	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Arsenic (As)-Dissolved	mg/L	20	30	0.00010	0.00052	0.00044	DIFF	8E-05	Pass Diff	0.00023	0.00029	DIFF	-0.00006	Pass Diff	0.00025	0.00025	DIFF	0	Pass Diff	0.00020	0.00018	DIFF	0.00002	Pass Diff
Barium (Ba)-Dissolved	mg/L	20	30	0.00010	0.0038	0.0037	RPD	2.1	Pass RPD	0.0023	0.0022	RPD	2.2	Pass RPD	0.010	0.010	RPD	0	Pass RPD	0.0059	0.0061	RPD	-3.70	Pass RPD
Beryllium (Be)-Dissolved	mg/L	20	30	0.00010	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL
Bismuth (Bi)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Boron (B)-Dissolved	mg/L	20	30	0.010	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL
Cadmium (Cd)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL
Calcium (Ca)-Dissolved	mg/L	20	30	0.050	3.3	3.3	RPD	1.5	Pass RPD	1.7	1.7	RPD	-3.50	Pass RPD	7.6	7.5	RPD	1.5	Pass RPD	3.8	3.6	RPD	3.8	Pass RPD
Chromium (Cr)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL
Cobalt (Co)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Copper (Cu)-Dissolved	mg/L	20	30	0.00020	0.0049	0.0036	RPD	31.1	Fail	0.0029	0.0022	RPD	29	Pass RPD	0.00033	0.00033	DIFF	0	Pass Diff	0.00055	0.00056	DIFF	-1E-05	Pass Diff
Iron (Fe)-Dissolved	mg/L	20	30	0.010	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	0.014	0.014	DIFF	0	Pass Diff
Lead (Pb)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Lithium (Li)-Dissolved	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL
Magnesium (Mg)-Dissolved	mg/L	20	30	0.0050	1.3	1.3	RPD	0.9	Pass RPD	1.1	1.1	RPD	0.9	Pass RPD	2.2	2.2	RPD	-1.80	Pass RPD	1.5	1.5	RPD	1.3	Pass RPD
Manganese (Mn)-Dissolved	mg/L	20	30	0.00010	0.00054	0.00045	DIFF	0.00009	Pass Diff	0.00045	0.00052	DIFF	-0.00007	Pass Diff	0.0012	0.0011	RPD	7.9	Pass RPD	0.00088	0.00084	RPD	4.7	Pass RPD
Mercury (Hg)-Dissolved	µg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL
Molybdenum (Mo)-Dissolved	mg/L	20	30	0.000050	0.00013	0.00014	DIFF	-7E-06	Pass Diff	*<0.000050*	*<0.000050*	<DL	<DL	<DL	0.000078	0.000086	DIFF	-0.000008	Pass Diff	0.000070	0.000092	DIFF	-0.000022	Pass Diff
Nickel (Ni)-Dissolved	mg/L	20	30	0.00050	0.0020	0.0014	DIFF	0.00058	Pass Diff	0.00073	0.00081	DIFF	-0.00008	Pass Diff	*<0.00050*	*<0.00050*	<DL	<DL	<DL	0.00050	*<0.00050*	<DL	<DL	<DL
Phosphorus (P)-Dissolved	mg/L	20	30	0.050	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL
Potassium (K)-Dissolved	mg/L	20	30	0.050	0.71	0.73	RPD	-2.40	Pass RPD	0.54	0.55	RPD	-3.10	Pass RPD	1.9	1.9	RPD	-0.500	Pass RPD	0.63	0.62	RPD	2.7	Pass RPD
Selenium (Se)-Dissolved	mg/L	20	30	0.000050	0.000053	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Silicon (Si)-Dissolved	mg/L	20	30	0.050	0.11	0.11	DIFF	0.007	Pass Diff	0.23	0.24	DIFF	-0.016	Pass Diff	0.34	0.36	RPD	-6.80	Pass RPD	0.63	0.61	RPD	3.1	Pass RPD
Silver (Ag)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL
Sodium (Na)-Dissolved	mg/L	20	30	0.050	1.4	1.4	RPD	-2.10	Pass RPD	0.80	0.84	RPD	-4.00	Pass RPD	1.9	1.9	RPD	-0.500	Pass RPD	1.3	1.3	RPD	3	Pass RPD
Strontium (Sr)-Dissolved	mg/L	20	30	0.00020	0.015	0.015	RPD	0	Pass RPD	0.0096	0.0098	RPD	-1.80	Pass RPD	0.048	0.048	RPD	-0.200	Pass RPD	0.015	0.015	RPD	-4.70	Pass RPD
Sulfur (S)-Dissolved	mg/L	20	30	0.50	2.1	2.1	DIFF	0.07	Pass Diff	0.56	*<0.50*	<DL	<DL	<DL	2.6	2.3	DIFF	0.25	Pass Diff	1.1	1.0	DIFF	0.09	Pass Diff
Thallium (Tl)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL
Tin (Sn)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	0.00029	0.00093	DIFF	-0.00064	Fail	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Titanium (Ti)-Dissolved	mg/L	20	30	0.00030	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL
Tungsten (W)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Uranium (U)-Dissolved	mg/L	20	30	0.000010	0.000040	0.000038	DIFF	0.000002	Pass Diff	0.000059	0.000056	RPD	5.2	Pass RPD	0.000034	0.000031	DIFF	0.000003	Pass Diff	0.000059	0.000060	RPD	-1.70	Pass RPD
Vanadium (V)-Dissolved	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL
Zinc (Zn)-Dissolved	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	0.0014	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL
Zirconium (Zr)-Dissolved	mg/L	40	30	0.00020	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL
Speciated Metals																								
Arsenate (As V)	µg/L	20	30	0.020	-	-	<DL	<DL	<DL	*<0.020*	*<0.020*	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL
Arsenite (As III)	µg/L	20	30	0.020	-	-	<DL	<DL	<DL	*<0.020*	0.021	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL
Arsenobetaine (AsB)	µg/L	20	30	0.050	-	-	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL
Dimethylarsinic Acid (DMA)	µg/L	20	30	0.020	-	-	<DL	<DL	<DL	*<0.020*	*<0.

Table B-5. Water quality field duplicate results for all CREMP study areas in 2024.

Month		Relative Percent Difference DQOs			July DUP-1 (TPE-172)					July DUP-2 (WAL-141)					July DUP-3 (WTS-92)					July DUP-4 (A76-82)				
Station					TPE-172	DUP-1				WAL-141	DUP-2				WTS-92	DUP-3				A76-82	DUP-4			
Date Sampled	Units			July DLs	02-Jul-2024	02-Jul-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	03-Jul-2024	03-Jul-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	01-Jul-2024	01-Jul-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	09-Jul-2024	09-Jul-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome
ALS Sample ID		Lab	Field		VA24B6824-003	VA24B6824-001				VA24B6824-007	VA24B6824-002				VA24B6821-004	VA24B6821-009				VA24B7135-011	VA24B7135-012			
Parameter					Water	Water				Water	Water				Water	Water				Water	Water			
Physical Tests																								
Conductivity	µS/cm	10	15	2.0	32.1	32.7	RPD	-1.90	Pass RPD	36.9	38.2	RPD	-3.50	Pass RPD	129	126	RPD	2.4	Pass RPD	99.7	100	RPD	-0.300	Pass RPD
Alkalinity, Bicarbonate		20	30	1.0	7.9	8.1	RPD	-2.50	Pass RPD	11.8	11.8	RPD	0	Pass RPD	19	18.9	RPD	0.5	Pass RPD	14.7	14.7	RPD	0	Pass RPD
Alkalinity, Carbonate		20	30	1.0	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*
Alkalinity, Hydroxide		20	30	1.0	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*
Alkalinity, Total (as $CaCO_3$)	mg/L	20	30	1.0	7.9	8.1	RPD	-2.50	Pass RPD	11.8	11.8	RPD	0	Pass RPD	19	18.9	RPD	0.5	Pass RPD	14.7	14.7	RPD	0	Pass RPD
Hardness (mg/L), Dissolved	-		40	0.60	10.6	11.1	RPD	-4.60	Pass RPD	15.6	15.4	RPD	1.3	Pass RPD	43.6	42.9	RPD	1.6	Pass RPD	36.8	35.8	RPD	2.8	Pass RPD
Hardness (as $CaCO_3$), from total Ca/Mg			40	0.60	11.2	10.9	RPD	2.7	Pass RPD	15.7	16.4	RPD	-4.40	Pass RPD	45.1	45.8	RPD	-1.50	Pass RPD	35.6	35.8	RPD	-0.600	Pass RPD
Total Dissolved Solids	mg/L		40	1.0	19.8	20	RPD	-1.000	Pass RPD	27.4	25.6	RPD	6.8	Pass RPD	90.5	91.5	RPD	-1.10	Pass RPD	71	74.3	RPD	-4.50	Pass RPD
Total Suspended Solids	mg/L		40	3.0	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	4.7	60.5	DIFF	-55.80	Fail
Turbidity	NTU	15	23	0.10	0.19	0.19	DIFF	0	Pass Diff	0.19	0.22	DIFF	-0.03	Pass Diff	0.60	0.62	RPD	-3.30	Pass RPD	0.17	0.18	DIFF	-0.01	Pass Diff
pH (Laboratory)	pH		40	0.10	7.2	7.2	RPD	0.3	Pass RPD	7.2	7.3	RPD	-1.90	Pass RPD	7.6	7.6	RPD	0.1	Pass RPD	7.4	7.4	RPD	0	Pass RPD
Anions and Nutrients																								
Ammonia, Total (as N)	mg/L	20	30	0.0050	0.0059	0.0080	DIFF	-0.0021	Pass Diff	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*	0.020	0.021	DIFF	-0.0009	Pass Diff	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*
Bromide (Br)	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	0.17	0.17	DIFF	0.002	Pass Diff	0.11	0.11	DIFF	-0.002	Pass Diff
Chloride (Cl)	mg/L	20	30	0.10	0.80	0.80	RPD	0	Pass RPD	0.53	0.53	RPD	0	Pass RPD	14.5	14.5	RPD	0	Pass RPD	10.4	10.5	RPD	-1.000	Pass RPD
Fluoride (F)	mg/L	20	30	0.020	0.073	0.074	DIFF	-0.001	Pass Diff	0.044	0.044	DIFF	0	Pass Diff	0.054	0.055	DIFF	-0.001	Pass Diff	0.037	0.038	DIFF	-0.001	Pass Diff
Total Kjeldahl Nitrogen	mg/L	20	30	0.050	0.089	0.084	DIFF	0.005	Pass Diff	0.14	0.14	DIFF	0.001	Pass Diff	0.22	0.20	DIFF	0.021	Pass Diff	0.13	0.14	DIFF	-0.006	Pass Diff
Nitrate (as N)	mg/L	20	30	0.0050	0.013	0.013	DIFF	-0.0004	Pass Diff	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*	0.44	0.44	RPD	0.5	Pass RPD	0.054	0.056	RPD	-3.60	Pass RPD
Nitrite (as N)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	0.0033	0.0033	DIFF	0	Pass Diff	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Orthophosphate-Dissolved (as P)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Total	mg/L	20	30	0.0020	0.0023	0.0022	DIFF	1E-04	Pass Diff	0.0070	0.0038	DIFF	0.0032	Pass Diff	0.0070	0.0060	DIFF	0.001	Pass Diff	0.0021	0.0020	DIFF	1E-04	Pass Diff
Phosphorus (P)-Total Dissolved	mg/L	25	38	0.0020	*<0.0020*	*<0.0020*	*<DL*	*<DL*	*<DL*	0.0022	*<0.0020*	*<DL*	*<DL*	*<DL*	0.0036	0.0028	DIFF	0.0008	Pass Diff	*<0.0020*	*<0.0020*	*<DL*	*<DL*	*<DL*
Silica, Reactive (as SiO2)	mg/L	20	30	0.50	*<0.50*	*<0.50*	*<DL*	*<DL*	*<DL*	1.1	1.1	DIFF	-0.01	Pass Diff	0.64	0.60	DIFF	0.04	Pass Diff	0.82	0.82	DIFF	0	Pass Diff
Sulfate (SO4)	mg/L	20	30	0.30	4.8	4.7	RPD	0.2	Pass RPD	4.4	4.4	RPD	-0.500	Pass RPD	14.1	14.1	RPD	0	Pass RPD	12.5	12.6	RPD	-0.800	Pass RPD
Cyanides																								
Cyanide, Free	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	-	-	*<DL*	*<DL*	*<DL*	-	-	*<DL*	*<DL*	*<DL*
Cyanide, Total	mg/L	20	30	0.0010	*<0.0010*	0.0039	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	-	-	*<DL*	*<DL*	*<DL*	-	-	*<DL*	*<DL*	*<DL*
Organic / Inorganic Carbon																								
Dissolved Organic Carbon	mg/L	20	30	0.50	1.2	1.3	DIFF	-0.09	Pass Diff	2.5	2.2	DIFF	0.23	Pass Diff	2.9	3.1	RPD	-8.40	Pass RPD	1.6	1.8	DIFF	-0.220	Pass Diff
Total Organic Carbon	mg/L	20	30	0.50	1.4	1.8	DIFF	-0.430	Pass Diff	2.3	2.1	DIFF	0.23	Pass Diff	2.8	2.8	RPD	-0.700	Pass RPD	1.7	1.9	DIFF	-0.270	Pass Diff
Total Metals																								
Aluminum (Al)-Total	mg/L	20	30	0.0030	0.0075	0.0066	DIFF	0.0009	Pass Diff	0.0092	0.0080	DIFF	0.0012	Pass Diff	0.017	0.019	RPD	-11.00	Pass RPD	0.0050	0.0057	DIFF	-0.0007	Pass Diff
Antimony (Sb)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	0.00051	0.00049	DIFF	2E-05	Pass Diff	0.00025	0.00024	DIFF	0.00001	Pass Diff
Arsenic (As)-Total	mg/L	20	30	0.00010	0.00058	0.00059	RPD	-1.70	Pass RPD	0.00030	0.00025	DIFF	0.00005	Pass Diff	0.0012	0.0012	RPD	2.6	Pass RPD	0.00037	0.00034	DIFF	0.00003	Pass Diff
Barium (Ba)-Total	mg/L	20	30	0.00010	0.0032	0.0030	RPD	4.9	Pass RPD	0.0024	0.0023	RPD	3.4	Pass RPD	0.020	0.020	RPD	0	Pass RPD	0.015	0.015	RPD	4	Pass RPD
Beryllium (Be)-Total	mg/L	20	30	0.00010	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Total	mg/L	20	30	0.010	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*
Cadmium (Cd)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Total	mg/L	20	30	0.050	2.7	2.7	RPD	1.1	Pass RPD	4.2	4.5	RPD	-6.50	Pass RPD	12.6	12.7	RPD	-0.800	Pass RPD	9.6	9.8	RPD	-1.60	Pass RPD
Chromium (Cr)-Total	mg/L	20	30	0.00010	0.00022	0.00011	DIFF	0.00011	Pass Diff	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	0.00038	0.00037	DIFF	0.00001	Pass Diff	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	0.00010	0.00012	DIFF	-0.00002	Pass Diff	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Copper (Cu)-Total	mg/L	20	30	0.00050	0.00053	*<0.00050*	*<DL*	*<DL*	*<DL*	0.00097	0.00090	DIFF	7E-05	Pass Diff	0.00056	*<0.00050*	*<DL*	*<DL*	*<DL*	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*
Iron (Fe)-Total	mg/L	20	30	0.010	0.015	0.014	DIFF	0.001	Pass Diff	0.020	0.022	DIFF	-0.002	Pass Diff	0.069	0.070	RPD	-1.40	Pass RPD	0.016	0.017	DIFF	-0.001	Pass Diff
Lead (Pb)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Lithium (Li)-Total	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	0.0022	0.0023	DIFF	-1E-04	Pass Diff	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Magnesium (Mg)-Total	mg/L	20	30	0.0050	1.1	1.0	RPD	3.8	Pass RPD	1.3	1.3	RPD	0.8	Pass RPD	3.3	3.4	RPD	-3.30	Pass RPD	2.8	2.8	RPD	1.4	Pass RPD
Manganese (Mn)-Total	mg/L	20	30	0.00010	0.0023	0.0024	RPD	-4.30	Pass RPD	0.0030	0.0029	RPD	4.4	Pass RPD	0.020	0.021	RPD	-1.90	Pass RPD	0.0041	0.0041	RPD	-1.20	Pass RPD
Mercury (Hg)-Total	µg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Molybdenum (Mo)-Total	mg/L	20	30	0.000050	0.00011	0.00010	DIFF	0.000010	Pass Diff	0.00011	0.00010	DIFF	0.000004	Pass Diff	0.00093	0.00093	RPD	-0.400	Pass RPD	0.00015	0.00016	DIFF	-0.000008	Pass Diff
Nickel (Ni)-Total	mg/L	20	30	0.00050	0.00072	0.00075	DIFF	-0.00003	Pass Diff	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	0.0024	0.0024	DIFF	0	Pass Diff	0.00095	0.00091	DIFF	0.00004	Pass Diff
Phosphorus (P)-Total	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Total	mg/L	20	30	0.050	0.53	0.53	RPD	0.4	Pass RPD	0.41	0.41	RPD	1	Pass RPD	3.2	3.2	RPD	-2.50	Pass RPD	2.1	2.1	RPD	2.8	Pass RPD
Selenium (Se)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	0.000058	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Silicon (Si)-Total	mg/L	20	30	0.10	0.18	0.17	DIFF	0.01	Pass Diff	0.56	0.54	RPD	3.6	Pass RPD	0.43	0.45	DIFF	-0.02	Pass Diff	0.44	0.45	DIFF	-0.01	Pass Diff
Silver (Ag)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Total	mg/L	20	30	0.050	0.98	0.96	RPD	2.1	Pass RPD	0.58	0.60	RPD	-4.80	Pass RPD	2.7	2.7	RPD	-0.400	Pass RPD	2.0	1.9	RPD	3.6	Pass RPD
Strontium (Sr)-Total	mg/L	20	30	0.00020	0.013	0.013	RPD	1.6	Pass RPD	0.022	0.021	RPD	2.3	Pass RPD	0.10	0.10	RPD	0	Pass RPD	0.066	0.062	RPD	5.7	Pass RPD
Sulfur (S)-Total	mg/L	20	30	0.50	1.7	1.6	DIFF	0.16	Pass Diff	1.5	1.2	DIFF	0.3	Pass Diff	4.3	4.5	RPD	-6.40	Pass RPD	4.7	4.9	RPD	-3.70	Pass RPD
Thallium (Tl)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Tin (Sn)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Total	mg/L	20	30	0.00030	*<0.00030*	*<0.00030*	*<DL*	*<DL*	*<DL*	*<0.00030*	*<0.00030*	*<DL*	*<DL*	*<DL*	0.00065	0.00076	DIFF	-0.00011	Pass Diff	*<0.00030*	*<0.00030*	*<DL*	*<DL*	*<DL*
Tungsten (W)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Uranium (U)-Total	mg/L	20	30	0.000010	0.000041	0.000041	DIFF	0	Pass Diff	0.000054	0.000052	RPD	3.8	Pass RPD	0.000096	0.000097	RPD	-1.000	Pass RPD	0.000042	0.000040	DIFF	2E-06	Pass Diff
Vanadium (V)-Total	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*
Zinc (Zn)-Total	mg/L	20	30	0.0030	*<0.0030*	*<0.0030*	*<DL*	*<DL*	*<DL*	*<0.0030*	*<0.0030*	*<DL*	*<DL*	*<DL*	*<0.0030*	*<0.0030*	*<DL*	*<DL*	*<DL*	*<0.0030*	*<0.0030*	*<DL*	*<DL*	*<DL*
Zirconium (Zr)-Total	mg/L	20	30	0.00020	*<0.00020*	*<0.00020*	*<DL*	*<DL*	*<DL*	*<0.00020*	*<0.00020*	*<DL*	*<DL*	*<DL*	*<0.00020*	*<0.00020*	*<DL*	*<DL*	*<DL*	*<0.00020*	*<0.00020*	*<DL*	*<DL*	*<DL*
Dissolved Metals																								
Aluminum (Al)-Dissolved	mg/L	20	30	0.0010	0.0016	0.0032	DIFF	-0.0016	Pass Diff	0.0097	0.0070	RPD	32.3	Fail	0.0082	0.0033	DIFF	0.0049	Fail	0.0023	0.0020	DIFF	0.0003	Pass Diff
Antimony (Sb)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	0.00051	0.00049	DIFF	2E-05	Pass Diff	0.00023	0.00022	DIFF	0.00001	Pass Diff
Arsenic (As)-Dissolved	mg/L	20	30	0.00010	0.00061	0.00065	RPD	-6.30	Pass RPD	0.00030	0.00034	DIFF	-4E-05	Pass Diff	0.0010	0.00097	RPD	4	Pass RPD	0.00028	0.00027	DIFF	1E-05	Pass Diff
Barium (Ba)-Dissolved	mg/L	20	30	0.00010	0.0028	0.0033	RPD	-14.90	Pass RPD	0.0024	0.0024	RPD	0.8	Pass RPD	0.019	0.019	RPD	0	Pass RPD	0.015	0.016	RPD	-2.60	Pass RPD
Beryllium (Be)-Dissolved	mg/L	20	30	0.00010	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Dissolved	mg/L	20	30	0.010	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*
Cadmium (Cd)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Dissolved	mg/L	20	30	0.050	2.6	2.7	RPD	-3.80	Pass RPD	4.1	4.1	RPD	1.5	Pass RPD	12.2	12	RPD	1.7	Pass RPD	10.3	10	RPD	3	Pass RPD
Chromium (Cr)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	0.00035	0.00016	DIFF	0.00019	Pass Diff	0.00020	0.00012	DIFF	0.00008	Pass Diff	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Copper (Cu)-Dissolved	mg/L	20	30	0.00020	0.00061	0.0012	DIFF	-0.00061	Fail	0.00090	0.00088	DIFF	2E-05	Pass Diff	0.00046	0.00042	DIFF	0.00004	Pass Diff	0.00042	0.00039	DIFF	0.00003	Pass Diff
Iron (Fe)-Dissolved	mg/L	20	30	0.010	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	0.020	0.014	DIFF	0.006	Pass Diff	0.034	0.025	DIFF	0.009	Pass Diff	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*
Lead (Pb)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	0.00019	0.00037	DIFF	-0.0001184	Fail	*<0.000050*	0.00014	*<DL*	*<DL*	*<DL*
Lithium (Li)-Dissolved	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	0.0022	0.0023	DIFF	-1E-04	Pass Diff	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Magnesium (Mg)-Dissolved	mg/L	20	30	0.0050	1.0	1.1	RPD	-5.80	Pass RPD	1.3	1.3	RPD	0	Pass RPD	3.2	3.2	RPD	0.9	Pass RPD	2.7	2.6	RPD	1.9	Pass RPD
Manganese (Mn)-Dissolved	mg/L	20	30	0.00010	0.0021	0.0022	RPD	-5.20	Pass RPD	0.0027	0.0024	RPD	11.8	Pass RPD	0.015	0.015	RPD	0.7	Pass RPD	0.0017	0.0018	RPD	-7.50	Pass RPD
Mercury (Hg)-Dissolved	µg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Molybdenum (Mo)-Dissolved	mg/L	20	30	0.000050	0.00015	0.00011	DIFF	0.000039	Pass Diff	0.00011	0.00010	DIFF	0.000004	Pass Diff	0.00091	0.00091	RPD	-0.700	Pass RPD	0.00016	0.00015	DIFF	6E-06	Pass Diff
Nickel (Ni)-Dissolved	mg/L	20	30	0.00050	0.0010	0.0011	DIFF	-0.00011	Pass Diff	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	0.0021	0.0021	DIFF	0.00001	Pass Diff	0.00085	0.00087	DIFF	-2E-05	Pass Diff
Phosphorus (P)-Dissolved	mg/L	20	30	0.050	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Dissolved	mg/L	20	30	0.050	0.50	0.57	RPD	-13.20	Pass RPD	0.43	0.42	RPD	1.7	Pass RPD	2.8	2.9	RPD	-1.10	Pass RPD	2.3	2.3	RPD	1.8	Pass RPD
Selenium (Se)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Silicon (Si)-Dissolved	mg/L	20	30	0.050	0.13	0.12	DIFF	0.008	Pass Diff	0.51	0.49	RPD	2.4	Pass RPD	0.36	0.36	RPD	-1.10	Pass RPD	0.40	0.38	RPD	4.4	Pass RPD
Silver (Ag)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Dissolved	mg/L	20	30	0.050	0.91	1.1	RPD	-14.40	Pass RPD	0.58	0.57	RPD	1.9	Pass RPD	2.6	2.6	RPD	-1.60	Pass RPD	1.9	1.8	RPD	0.5	Pass RPD
Strontium (Sr)-Dissolved	mg/L	20	30	0.00020	0.012	0.012	RPD	-0.800	Pass RPD	0.021	0.021	RPD	0.5	Pass RPD	0.095	0.097	RPD	-1.90	Pass RPD	0.062	0.061	RPD	2.6	Pass RPD
Sulfur (S)-Dissolved	mg/L	20	30	0.50	1.4	1.6	DIFF	-0.230	Pass Diff	1.5	1.5	DIFF	0.07	Pass Diff	4.8	4.6	RPD	4.4	Pass RPD	3.9	3.8	RPD	2.6	Pass RPD
Thallium (Tl)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Tin (Sn)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Dissolved	mg/L	20	30	0.00030	*<0.00030*	*<0.00030*	*<DL*	*<DL*	*<DL*	0.00041	0.00032	DIFF	0.00009	Pass Diff	0.00032	*<0.00030*	*<DL*	*<DL*	*<DL*	*<0.00030*	*<0.00030*	*

Table B-5. Water quality field duplicate results for all CREMP study areas in 2024.

Month		Relative Percent Difference DQOs			August DUP-1 (WAL-144)					August DUP-2 (SP-174)					August DUP-3 (WTS-94)					August DUP-4 (MAM-93)				
Station					WAL-144	AUG-DUP-1				SP-174	AUG-DUP-2				WTS-94	AUG-DUP-3				MAM-93	AUG-DUP-4			
Date Sampled					09-Aug-2024	09-Aug-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	14-Aug-2024	14-Aug-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	14-Aug-2024	14-Aug-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	15-Aug-2024	15-Aug-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome
ALS Sample ID	Units	Lab	Field	August DLs	VA24C1019-006	VA24C1019-007				VA24C2044-002	VA24C2044-003				VA24C1467-010	VA24C1467-011				VA24C1467-005	VA24C1467-012			
Parameter					Water	Water				Water	Water				Water	Water				Water	Water			
Physical Tests																								
Conductivity	µS/cm	10	15	2.00	43.3	43.8	RPD	-1.10	Pass RPD	42.3	42.7	RPD	-0.900	Pass RPD	120	120	RPD	0	Pass RPD	144	144	RPD	0	Pass RPD
Alkalinity, Bicarbonate		20	30	1.00	13.7	13.8	RPD	-0.700	Pass RPD	11.7	11.7	RPD	0	Pass RPD	19.0	18.9	RPD	0.5	Pass RPD	19.8	19.9	RPD	-0.500	Pass RPD
Alkalinity, Carbonate		20	30	1.00	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*
Alkalinity, Hydroxide		20	30	1.00	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*
Alkalinity, Total (as $CaCO_3$)	mg/L	20	30	1.00	13.7	13.8	RPD	-0.700	Pass RPD	11.7	11.7	RPD	0	Pass RPD	19.0	18.9	RPD	0.5	Pass RPD	19.8	19.9	RPD	-0.500	Pass RPD
Hardness (mg/L), Dissolved	-		40	0.600	18.3	18.2	RPD	0.5	Pass RPD	16.0	15.5	RPD	3.2	Pass RPD	43.4	42.6	RPD	1.9	Pass RPD	53.0	52.1	RPD	1.7	Pass RPD
Hardness (as $CaCO_3$), from total Ca/Mg			40	0.600	18.0	18.2	RPD	-1.10	Pass RPD	16.4	16.1	RPD	1.8	Pass RPD	43.8	43.5	RPD	0.7	Pass RPD	53.4	53.1	RPD	0.6	Pass RPD
Total Dissolved Solids	mg/L		40	3.00	33.1	29.2	RPD	12.5	Pass RPD	21.0	28.3	RPD	-29.60	Pass RPD	95.7	100	RPD	-4.40	Pass RPD	122	124	RPD	-1.60	Pass RPD
Total Suspended Solids	mg/L		40	1.00	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	1.30	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	1.10	*<DL*	*<DL*	*<DL*
Turbidity	NTU	15	23	0.100	0.160	0.140	DIFF	0.02	Pass Diff	0.200	0.180	DIFF	0.02	Pass Diff	0.290	0.280	DIFF	0.01	Pass Diff	0.420	0.410	DIFF	0.01	Pass Diff
pH (Laboratory)	pH		40	0.100	7.41	7.42	RPD	-0.1	Pass RPD	7.27	7.30	RPD	-0.400	Pass RPD	7.53	7.50	RPD	0.4	Pass RPD	7.58	7.58	RPD	0	Pass RPD
Anions and Nutrients																								
Ammonia, Total (as N)	mg/L	20	30	0.00500	0.0140	0.00560	DIFF	0.0084	Pass Diff	0.0200	0.0152	DIFF	0.0048	Pass Diff	0.0448	0.0212	DIFF	0.0236	Fail	0.0287	0.0134	DIFF	0.0153	Fail
Bromide (Br)	mg/L	20	30	0.0500	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	0.144	0.141	DIFF	0.003	Pass Diff	0.181	0.184	DIFF	-0.003	Pass Diff
Chloride (Cl)	mg/L	20	30	0.100	0.580	0.600	RPD	-3.40	Pass RPD	0.920	0.920	RPD	0	Pass RPD	14.2	14.1	RPD	0.7	Pass RPD	17.1	17.2	RPD	-0.600	Pass RPD
Fluoride (F)	mg/L	20	30	0.0200	0.0530	0.0520	DIFF	0.001	Pass Diff	0.0750	0.0750	DIFF	0	Pass Diff	0.0630	0.0640	DIFF	-0.001	Pass Diff	0.0570	0.0580	DIFF	-0.001	Pass Diff
Total Kjeldahl Nitrogen	mg/L	20	30	0.0500	0.164	0.140	DIFF	0.024	Pass Diff	0.130	0.127	DIFF	0.003	Pass Diff	0.258	0.226	DIFF	0.032	Pass Diff	0.232	0.256	DIFF	-0.024	Pass Diff
Nitrate (as N)	mg/L	20	30	0.00500	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*	*<0.0050*	*<0.0050*	*<DL*	*<DL*	*<DL*	0.266	0.265	RPD	0.4	Pass RPD	0.267	0.270	RPD	-1.10	Pass RPD
Nitrite (as N)	mg/L	20	30	0.00100	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	0.00120	0.00130	DIFF	-0.0001	Pass Diff	0.00190	0.00190	DIFF	0	Pass Diff
Orthophosphate-Dissolved (as P)	mg/L	20	30	0.00100	0.00230	0.00280	DIFF	-0.0005	Pass Diff	0.00160	*<0.0010*	*<DL*	*<DL*	*<DL*	0.00130	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*
Phosphorus (P)-Total	mg/L	20	30	0.00200	0.00290	0.00270	DIFF	0.0002	Pass Diff	0.00280	0.00250	DIFF	0.0003	Pass Diff	0.00470	0.00460	DIFF	0.0001	Pass Diff	0.00410	0.00350	DIFF	0.0006	Pass Diff
Phosphorus (P)-Total Dissolved	mg/L	25	38	0.00200	*<0.0020*	0.00950	*<DL*	*<DL*	*<DL*	*<0.0020*	0.00230	*<DL*	*<DL*	*<DL*	0.00200	0.00210	DIFF	-1E-04	Pass Diff	0.00210	*<0.0020*	*<DL*	*<DL*	*<DL*
Silica, Reactive (as SiO2)	mg/L	20	30	0.500	1.01	1.02	DIFF	-0.01	Pass Diff	0.650	0.640	DIFF	0.01	Pass Diff	*<0.50*	*<0.50*	*<DL*	*<DL*	*<DL*	*<0.50*	*<0.50*	*<DL*	*<DL*	*<DL*
Sulfate (SO4)	mg/L	20	30	0.300	5.24	5.25	RPD	-0.200	Pass RPD	5.26	5.23	RPD	0.6	Pass RPD	13.8	13.8	RPD	0	Pass RPD	19.1	19.4	RPD	-1.60	Pass RPD
Cyanides																								
Cyanide, Free	mg/L	20	30	0.00100	-	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	-	-	*<DL*	*<DL*	*<DL*	-	-	*<DL*	*<DL*	*<DL*
Cyanide, Total	mg/L	20	30	0.00100	-	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	-	-	*<DL*	*<DL*	*<DL*	-	-	*<DL*	*<DL*	*<DL*
Organic / Inorganic Carbon																								
Dissolved Organic Carbon	mg/L	20	30	0.500	2.65	2.10	DIFF	0.55	Pass Diff	2.01	2.06	DIFF	-0.05	Pass Diff	2.98	2.89	RPD	3.1	Pass RPD	2.71	2.50	DIFF	0.21	Pass Diff
Total Organic Carbon	mg/L	20	30	0.500	2.14	2.10	DIFF	0.04	Pass Diff	2.19	2.37	DIFF	-0.180	Pass Diff	2.93	2.94	RPD	-0.300	Pass RPD	2.60	2.46	DIFF	0.14	Pass Diff
Total Metals																								
Aluminum (Al)-Total	mg/L	20	30	0.00300	0.00540	0.00580	DIFF	-0.0004	Pass Diff	0.00480	0.00500	DIFF	-0.0002	Pass Diff	0.00620	0.00710	DIFF	-0.0009	Pass Diff	0.00450	0.00600	DIFF	-0.0015	Pass Diff
Antimony (Sb)-Total	mg/L	20	30	0.000100	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	0.000430	0.000440	DIFF	-0.00001	Pass Diff	0.000820	0.000810	RPD	1.2	Pass RPD
Arsenic (As)-Total	mg/L	20	30	0.000100	0.000420	0.000420	DIFF	0	Pass Diff	0.000450	0.000460	DIFF	-0.00001	Pass Diff	0.000770	0.000810	RPD	-5.10	Pass RPD	0.00118	0.00124	RPD	-5.00	Pass RPD
Barium (Ba)-Total	mg/L	20	30	0.000100	0.00211	0.00264	RPD	-22.30	Pass RPD	0.00280	0.00274	RPD	2.2	Pass RPD	0.0168	0.0168	RPD	0	Pass RPD	0.0181	0.0182	RPD	-0.600	Pass RPD
Beryllium (Be)-Total	mg/L	20	30	0.000020	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Total	mg/L	20	30	0.0100	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*
Cadmium (Cd)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Total	mg/L	20	30	0.0500	4.79	4.78	RPD	0.2	Pass RPD	4.19	4.15	RPD	1	Pass RPD	12.0	11.9	RPD	0.8	Pass RPD	15.0	15.0	RPD	0	Pass RPD
Chromium (Cr)-Total	mg/L	20	30	0.000100	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	0.000940	0.000210	DIFF	0.00073	Fail	*<0.00010*	0.000150	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Total	mg/L	20	30	0.000100	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Copper (Cu)-Total	mg/L	20	30	0.000500	0.00104	0.00105	DIFF	-0.00001	Pass Diff	0.000700	0.000650	DIFF	0.00005	Pass Diff	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*
Iron (Fe)-Total	mg/L	20	30	0.0100	0.0160	0.0150	DIFF	0.001	Pass Diff	0.0210	0.0200	DIFF	0.001	Pass Diff	0.0380	0.0370	DIFF	0.001	Pass Diff	0.0110	0.0150	DIFF	-0.004	Pass Diff
Lead (Pb)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Lithium (Li)-Total	mg/L	20	30	0.00100	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	0.00210	0.00210	DIFF	0	Pass Diff	0.00220	0.00210	DIFF	0.0001	Pass Diff
Magnesium (Mg)-Total	mg/L	20	30	0.00500	1.48	1.51	RPD	-2.00	Pass RPD	1.43	1.40	RPD	2.1	Pass RPD	3.37	3.35	RPD	0.6	Pass RPD	3.88	3.81	RPD	1.8	Pass RPD
Manganese (Mn)-Total	mg/L	20	30	0.000100	0.00110	0.00117	RPD	-6.20	Pass RPD	0.00207	0.00204	RPD	1.5	Pass RPD	0.00755	0.00729	RPD	3.5	Pass RPD	0.00374	0.00498	RPD	-28.40	Pass RPD
Mercury (Hg)-Total	µg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Molybdenum (Mo)-Total	mg/L	20	30	0.000050	0.000179	0.000175	DIFF	4E-06	Pass Diff	0.000132	0.000135	DIFF	-3E-06	Pass Diff	0.000812	0.000810	RPD	0.2	Pass RPD	0.000838	0.000814	RPD	2.9	Pass RPD
Nickel (Ni)-Total	mg/L	20	30	0.000500	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	0.00130	0.00129	DIFF	0.00001	Pass Diff	0.000890	0.000990	DIFF	-0.0001	Pass Diff
Phosphorus (P)-Total	mg/L	20	30	0.0500	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Total	mg/L	20	30	0.0500	0.486	0.492	RPD	-1.20	Pass RPD	0.594	0.587	RPD	1.2	Pass RPD	3.01	3.03	RPD	-0.700	Pass RPD	3.52	3.53	RPD	-0.300	Pass RPD
Selenium (Se)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Silicon (Si)-Total	mg/L	20	30	0.100	0.540	0.560	RPD	-3.60	Pass RPD	0.330	0.320	DIFF	0.01	Pass Diff	0.100	0.110	DIFF	-0.01	Pass Diff	0.100	0.140	DIFF	-0.04	Pass Diff
Silver (Ag)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Total	mg/L	20	30	0.0500	0.611	0.622	RPD	-1.80	Pass RPD	0.836	0.829	RPD	0.8	Pass RPD	2.84	2.88	RPD	-1.40	Pass RPD	3.23	3.15	RPD	2.5	Pass RPD
Strontium (Sr)-Total	mg/L	20	30	0.000200	0.0248	0.0235	RPD	5.4	Pass RPD	0.0211	0.0209	RPD	1	Pass RPD	0.0924	0.0968	RPD	-4.70	Pass RPD	0.113	0.112	RPD	0.9	Pass RPD
Sulfur (S)-Total	mg/L	20	30	0.500	1.82	1.89	DIFF	-0.07	Pass Diff	1.84	1.62	DIFF	0.22	Pass Diff	4.55	4.62	RPD	-1.50	Pass RPD	6.42	6.26	RPD	2.5	Pass RPD
Thallium (Tl)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Tin (Sn)-Total	mg/L	20	30	0.000100	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Total	mg/L	20	30	0.000300	*<0.00030*	*<0.00030*	*<DL*	*<DL*	*<DL*	*<0.00030*	*<0.00030*	*<DL*	*<DL*	*<DL*	*<0.00030*	*<0.00030*	*<DL*	*<DL*	*<DL*	*<0.00030*	*<0.00030*	*<DL*	*<DL*	*<DL*
Tungsten (W)-Total	mg/L	20	30	0.000100	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Uranium (U)-Total	mg/L	20	30	0.000010	0.000062	0.000065	RPD	-4.70	Pass RPD	0.000047	0.000048	DIFF	-0.000001	Pass Diff	0.000071	0.000072	RPD	-1.40	Pass RPD	0.000165	0.000162	RPD	1.8	Pass RPD
Vanadium (V)-Total	mg/L	20	30	0.000500	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*
Zinc (Zn)-Total	mg/L	20	30	0.00300	*<0.0030*	0.00700	*<DL*	*<DL*	*<DL*	*<0.0030*	*<0.0030*	*<DL*	*<DL*	*<DL*	0.0231	*<0.0030*	*<DL*	*<DL*	*<DL*	*<0.0030*	*<0.0030*	*<DL*	*<DL*	*<DL*
Zirconium (Zr)-Total	mg/L	20	30	0.000200	*<0.00020*	*<0.00020*	*<DL*	*<DL*	*<DL*	*<0.00020*	*<0.00020*	*<DL*	*<DL*	*<DL*	*<0.00020*	*<0.00020*	*<DL*	*<DL*	*<DL*	*<0.00020*	*<0.00020*	*<DL*	*<DL*	*<DL*
Dissolved Metals																								
Aluminum (Al)-Dissolved	mg/L	20	30	0.00100	0.00390	0.00350	DIFF	0.0004	Pass Diff	0.00340	0.00420	DIFF	-0.0008	Pass Diff	0.00220	0.00260	DIFF	-0.0004	Pass Diff	0.00240	0.00220	DIFF	0.0002	Pass Diff
Antimony (Sb)-Dissolved	mg/L	20	30	0.000100	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	0.000420	0.000420	DIFF	0	Pass Diff	0.000810	0.000790	RPD	2.5	Pass RPD
Arsenic (As)-Dissolved	mg/L	20	30	0.000100	0.000420	0.000380	DIFF	0.00004	Pass Diff	0.000440	0.000430	DIFF	0.00001	Pass Diff	0.000730	0.000690	RPD	5.6	Pass RPD	0.00106	0.00105	RPD	0.9	Pass RPD
Barium (Ba)-Dissolved	mg/L	20	30	0.000100	0.00209	0.00215	RPD	-2.80	Pass RPD	0.00257	0.00253	RPD	1.6	Pass RPD	0.0167	0.0160	RPD	4.3	Pass RPD	0.0185	0.0172	RPD	7.3	Pass RPD
Beryllium (Be)-Dissolved	mg/L	20	30	0.000020	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*	*<0.000100*	*<0.000100*	*<DL*	*<DL*	*<DL*
Bismuth (Bi)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Boron (B)-Dissolved	mg/L	20	30	0.0100	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*
Cadmium (Cd)-Dissolved	mg/L	20	30	0.000005	*<0.000005*	*<0.000005*	*<DL*	*<DL*	*<DL*	*<0.000005*	*<0.000005*	*<DL*	*<DL*	*<DL*	0.000024	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Calcium (Ca)-Dissolved	mg/L	20	30	0.0500	4.94	4.91	RPD	0.6	Pass RPD	4.19	4.05	RPD	3.4	Pass RPD	12.0	11.8	RPD	1.7	Pass RPD	15.1	14.8	RPD	2	Pass RPD
Chromium (Cr)-Dissolved	mg/L	20	30	0.000100	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	0.000100	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Cobalt (Co)-Dissolved	mg/L	20	30	0.000100	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Copper (Cu)-Dissolved	mg/L	20	30	0.000200	0.000920	0.000930	DIFF	-0.00001	Pass Diff	0.000650	0.000640	DIFF	1E-05	Pass Diff	0.000390	0.000370	DIFF	0.00002	Pass Diff	0.000400	0.000420	DIFF	-0.00002	Pass Diff
Iron (Fe)-Dissolved	mg/L	20	30	0.0100	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*	*<0.010*	0.0110	*<DL*	*<DL*	*<DL*	*<0.010*	*<0.010*	*<DL*	*<DL*	*<DL*
Lead (Pb)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	0.000055	0.000170	DIFF	-0.000115	Fail	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*
Lithium (Li)-Dissolved	mg/L	20	30	0.00100	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	*<0.0010*	*<0.0010*	*<DL*	*<DL*	*<DL*	0.00210	0.00210	DIFF	0	Pass Diff	0.00220	0.00220	DIFF	0	Pass Diff
Magnesium (Mg)-Dissolved	mg/L	20	30	0.00500	1.46	1.44	RPD	1.4	Pass RPD	1.34	1.32	RPD	1.5	Pass RPD	3.26	3.20	RPD	1.9	Pass RPD	3.72	3.67	RPD	1.4	Pass RPD
Manganese (Mn)-Dissolved	mg/L	20	30	0.000100	0.000330	0.000290	DIFF	0.00004	Pass Diff	0.000510	0.000540	RPD	-5.70	Pass RPD	0.00118	0.00110	RPD	7	Pass RPD	0.000640	0.000610	RPD	4.8	Pass RPD
Mercury (Hg)-Dissolved	µg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*	*<0.0000050*	*<0.0000050*	*<DL*	*<DL*	*<DL*
Molybdenum (Mo)-Dissolved	mg/L	20	30	0.000050	0.000182	0.000174	DIFF	0.000008	Pass Diff	0.000117	0.000136	DIFF	-0.000019	Pass Diff	0.000823	0.000774	RPD	6.1	Pass RPD	0.000802	0.000794	RPD	1	Pass RPD
Nickel (Ni)-Dissolved	mg/L	20	30	0.000500	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	*<0.00050*	*<0.00050*	*<DL*	*<DL*	*<DL*	0.00120	0.00120	DIFF	0	Pass Diff	0.000960	0.000900	DIFF	0.00006	Pass Diff
Phosphorus (P)-Dissolved	mg/L	20	30	0.0500	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*	*<0.050*	*<0.050*	*<DL*	*<DL*	*<DL*
Potassium (K)-Dissolved	mg/L	20	30	0.0500	0.495	0.491	RPD	0.8	Pass RPD	0.519	0.514	RPD	1	Pass RPD	3.11	3.05	RPD	1.9	Pass RPD	3.56	3.49	RPD	2	Pass RPD
Selenium (Se)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	*<0.000050*	*<0.000050*	*<DL*	*<DL*	*<DL*	0.000050	*<0.000050*	*<DL*	*<DL*	*<DL*
Silicon (Si)-Dissolved	mg/L	20	30	0.0500	0.491	0.473	RPD	3.7	Pass RPD	0.269	0.282	RPD	-4.70	Pass RPD	0.0740	0.0620	DIFF	0.012	Pass Diff	0.0670	0.0710	DIFF	-0.004	Pass Diff
Silver (Ag)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Sodium (Na)-Dissolved	mg/L	20	30	0.0500	0.647	0.640	RPD	1.1	Pass RPD	0.844	0.836	RPD	1	Pass RPD	2.90	2.85	RPD	1.7	Pass RPD	3.13	3.08	RPD	1.6	Pass RPD
Strontium (Sr)-Dissolved	mg/L	20	30	0.000200	0.0257	0.0254	RPD	1.2	Pass RPD	0.0189	0.0195	RPD	-3.10	Pass RPD	0.0938	0.0918	RPD	2.2	Pass RPD	0.111	0.111	RPD	0	Pass RPD
Sulfur (S)-Dissolved	mg/L	20	30	0.500	1.51	1.42	DIFF	0.09	Pass Diff	1.67	1.89	DIFF	-0.220	Pass Diff	4.33	4.57	RPD	-5.40	Pass RPD	6.16	6.21	RPD	-0.800	Pass RPD
Thallium (Tl)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*	*<0.000010*	*<0.000010*	*<DL*	*<DL*	*<DL*
Tin (Sn)-Dissolved	mg/L	20	30	0.000100	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*	*<0.00010*	*<0.00010*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Dissolved	mg/L	20	30	0.000300	*<0.00030*	*<0.00030*	*<DL*	*<DL*	*<DL*	*<0.00030*	*<0.00030*	*<DL*

Table B-5. Water quality field duplicate results for all CREMP study areas in 2024.

Month		Relative Percent Difference DQOs			September DUP-1 (A20-88)					September DUP-2 (DS1-84)					September DUP-3 (TPN-176)					September DUP-4 (PDL-130)				
Station					A20-88	DUP-1				DS1-84	DUP-2				TPN-176	Sept DUP-3				PDL-130	Sept DUP-4			
Date Sampled					03-Sep-2024	03-Sep-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	19-Sep-2024	19-Sep-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	05-Sep-2024	05-Sep-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	06-Sep-2024	06-Sep-2024	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome
ALS Sample ID	Units	Lab	Field	September DLs	VA24C3430-004 VA24C6403-006	VA24C3430-005 VA24C6403-013				VA24C5721-004 VA24C6403-002	VA24C5721-005 VA24C6403-014				VA24C4308-003	VA24C4308-004				VA24C4308-009	VA24C4308-010			
Parameter					Water	Water				Water	Water				Water	Water				Water	Water			
Physical Tests																								
Conductivity	µS/cm	10	15	2.0	71.7	71	RPD	1	Pass RPD	47	46.9	RPD	0.2	Pass RPD	28.7	28.7	RPD	0	Pass RPD	26.6	26.7	RPD	-0.400	Pass RPD
Alkalinity, Bicarbonate		20	30	1.0	13.1	13.2	RPD	-0.800	Pass RPD	8.9	8.5	RPD	4.6	Pass RPD	7.6	6.8	RPD	11.1	Pass RPD	8.5	8.5	RPD	0	Pass RPD
Alkalinity, Carbonate		20	30	1.0	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL
Alkalinity, Hydroxide		20	30	1.0	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL
Alkalinity, Total (as $CaCO_3$)	mg/L	20	30	1.0	13.1	13.2	RPD	-0.800	Pass RPD	8.9	8.5	RPD	4.6	Pass RPD	7.6	6.8	RPD	11.1	Pass RPD	8.5	8.5	RPD	0	Pass RPD
Hardness (mg/L), Dissolved	-		40	0.60	26.2	26.5	RPD	-1.10	Pass RPD	15.5	15.6	RPD	-0.600	Pass RPD	9.5	9.7	RPD	-1.10	Pass RPD	10.4	10.4	RPD	0	Pass RPD
Hardness (as $CaCO_3$), from total Ca/Mg			40	0.60	26	26.5	RPD	-1.90	Pass RPD	15.7	16	RPD	-1.90	Pass RPD	9.6	9.6	RPD	0.3	Pass RPD	10.3	10.4	RPD	-1.000	Pass RPD
Total Dissolved Solids	mg/L		40	3.0	43	44.3	RPD	-3.00	Pass RPD	25.6	26.4	RPD	-3.10	Pass RPD	22.7	19.6	RPD	14.7	Pass RPD	17.9	19	RPD	-6.00	Pass RPD
Total Suspended Solids	mg/L		40	1.0	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL	*<1.0*	*<1.0*	<DL	<DL	<DL
Turbidity	NTU	15	23	0.10	0.24	0.33	DIFF	-0.09	Pass Diff	0.82	0.68	RPD	18.7	Pass RPD	0.17	0.13	DIFF	0.04	Pass Diff	0.18	0.19	DIFF	-0.01	Pass Diff
pH (Laboratory)	pH		40	0.10	7.4	7.4	RPD	-0.1	Pass RPD	7.1	7.1	RPD	0.1	Pass RPD	7.1	7.1	RPD	0.6	Pass RPD	7.2	7.2	RPD	0.3	Pass RPD
Anions and Nutrients																								
Ammonia, Total (as N)	mg/L	20	30	0.0050	0.057	0.0092	DIFF	0.0478	Fail	0.024	0.012	DIFF	0.0118	Fail	0.0067	0.0070	DIFF	-0.0003	Pass Diff	*<0.0050*	0.0074	<DL	<DL	<DL
Bromide (Br)	mg/L	20	30	0.050	0.080	0.081	DIFF	-0.001	Pass Diff	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL
Chloride (Cl)	mg/L	20	30	0.10	7.5	7.6	RPD	-0.700	Pass RPD	4.8	4.8	RPD	0	Pass RPD	0.86	0.85	RPD	1.2	Pass RPD	0.87	0.86	RPD	1.2	Pass RPD
Fluoride (F)	mg/L	20	30	0.020	0.047	0.049	DIFF	-0.002	Pass Diff	0.042	0.042	DIFF	0	Pass Diff	0.075	0.073	DIFF	0.002	Pass Diff	0.044	0.043	DIFF	0.001	Pass Diff
Total Kjeldahl Nitrogen	mg/L	20	30	0.050	0.25	0.22	DIFF	0.029	Pass Diff	0.18	0.17	DIFF	0.008	Pass Diff	0.082	0.083	DIFF	-0.001	Pass Diff	0.081	0.087	DIFF	-0.006	Pass Diff
Nitrate (as N)	mg/L	20	30	0.0050	*<0.0050*	*<0.0050*	<DL	<DL	<DL	*<0.0050*	*<0.0050*	<DL	<DL	<DL	*<0.0050*	*<0.0050*	<DL	<DL	<DL	*<0.0050*	*<0.0050*	<DL	<DL	<DL
Nitrite (as N)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL
Orthophosphate-Dissolved (as P)	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL
Phosphorus (P)-Total	mg/L	20	30	0.0020	0.0049	0.0043	DIFF	0.0006	Pass Diff	0.0049	0.0043	DIFF	0.0006	Pass Diff	*<0.0020*	*<0.0020*	<DL	<DL	<DL	*<0.0020*	*<0.0020*	<DL	<DL	<DL
Phosphorus (P)-Total Dissolved	mg/L	25	38	0.0020	0.0025	0.0020	DIFF	0.0005	Pass Diff	0.0026	0.0026	DIFF	0	Pass Diff	*<0.0020*	*<0.0020*	<DL	<DL	<DL	*<0.0020*	*<0.0020*	<DL	<DL	<DL
Silica, Reactive (as SiO2)	mg/L	20	30	0.50	*<0.50*	*<0.50*	<DL	<DL	<DL	1.2	1.2	DIFF	0.02	Pass Diff	*<0.50*	*<0.50*	<DL	<DL	<DL	*<0.50*	*<0.50*	<DL	<DL	<DL
Sulfate (SO4)	mg/L	20	30	0.30	6.7	6.8	RPD	-1.000	Pass RPD	4.5	4.5	RPD	0.4	Pass RPD	4.7	4.6	RPD	0.4	Pass RPD	2.2	2.2	RPD	0.9	Pass RPD
Cyanides																								
Cyanide, Free	mg/L	20	30	0.0010	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL
Cyanide, Total	mg/L	20	30	0.0010	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL
Organic / Inorganic Carbon																								
Dissolved Organic Carbon	mg/L	20	30	0.50	2.4	2.7	DIFF	-0.380	Pass Diff	2.7	3.2	RPD	-18.60	Pass RPD	1.2	1.2	DIFF	-0.07	Pass Diff	1.9	1.6	DIFF	0.24	Pass Diff
Total Organic Carbon	mg/L	20	30	0.50	2.6	2.7	RPD	-1.50	Pass RPD	2.8	2.8	RPD	0.4	Pass RPD	1.1	1.2	DIFF	-0.03	Pass Diff	1.5	1.3	DIFF	0.2	Pass Diff
Total Metals																								
Aluminum (Al)-Total	mg/L	20	30	0.0030	0.0034	0.0033	DIFF	1E-04	Pass Diff	0.023	0.024	RPD	-4.80	Pass RPD	0.0042	0.0044	DIFF	-0.0002	Pass Diff	0.0037	0.0031	DIFF	0.0006	Pass Diff
Antimony (Sb)-Total	mg/L	20	30	0.00010	0.00012	0.00011	DIFF	0.00001	Pass Diff	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Arsenic (As)-Total	mg/L	20	30	0.00010	0.00030	0.00030	DIFF	0	Pass Diff	0.00016	0.00015	DIFF	0.00001	Pass Diff	0.00022	0.00021	DIFF	0.000001	Pass Diff	0.00022	0.00023	DIFF	0.000001	Pass Diff
Barium (Ba)-Total	mg/L	20	30	0.00010	0.0086	0.0087	RPD	-1.30	Pass RPD	0.0068	0.0068	RPD	0.9	Pass RPD	0.0028	0.0027	RPD	3.9	Pass RPD	0.0021	0.0021	RPD	2.4	Pass RPD
Beryllium (Be)-Total	mg/L	20	30	0.000010	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL
Bismuth (Bi)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Boron (B)-Total	mg/L	20	30	0.010	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL
Cadmium (Cd)-Total	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL
Calcium (Ca)-Total	mg/L	20	30	0.050	7.1	7.2	RPD	-2.40	Pass RPD	4.2	4.3	RPD	-2.40	Pass RPD	2.3	2.3	RPD	0	Pass RPD	2.6	2.6	RPD	-2.30	Pass RPD
Chromium (Cr)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	0.00012	0.00012	DIFF	0	Pass Diff	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Cobalt (Co)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Copper (Cu)-Total	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL
Iron (Fe)-Total	mg/L	20	30	0.010	0.026	0.026	DIFF	0	Pass Diff	0.087	0.087	RPD	0	Pass RPD	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL
Lead (Pb)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Lithium (Li)-Total	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL
Magnesium (Mg)-Total	mg/L	20	30	0.0050	2.0	2.1	RPD	-1.50	Pass RPD	1.3	1.3	RPD	-0.800	Pass RPD	0.96	0.95	RPD	0.9	Pass RPD	0.95	0.95	RPD	0.5	Pass RPD
Manganese (Mn)-Total	mg/L	20	30	0.00010	0.0077	0.0076	RPD	1	Pass RPD	0.0033	0.0034	RPD	-2.10	Pass RPD	0.0013	0.0013	RPD	-4.70	Pass RPD	0.0020	0.0019	RPD	5.2	Pass RPD
Mercury (Hg)-Total	µg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL
Molybdenum (Mo)-Total	mg/L	20	30	0.000050	0.00012	0.00014	DIFF	-0.000018	Pass Diff	0.000074	0.000073	DIFF	1E-06	Pass Diff	0.000095	0.000096	DIFF	-1E-06	Pass Diff	0.000052	0.000058	DIFF	-0.000006	Pass Diff
Nickel (Ni)-Total	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	0.00058	0.00060	DIFF	-2E-05	Pass Diff
Phosphorus (P)-Total	mg/L	20	30	0.050	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL
Potassium (K)-Total	mg/L	20	30	0.050	1.7	1.7	RPD	-2.40	Pass RPD	0.84	0.85	RPD	-1.10	Pass RPD	0.47	0.46	RPD	1.5	Pass RPD	0.37	0.37	RPD	-1.40	Pass RPD
Selenium (Se)-Total	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Silicon (Si)-Total	mg/L	20	30	0.10	0.22	0.21	DIFF	0.01	Pass Diff	0.63	0.62	RPD	1.6	Pass RPD	0.10	0.11	DIFF	-0.01	Pass Diff	0.16	0.16	DIFF	0	Pass Diff
Silver (Ag)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL
Sodium (Na)-Total	mg/L	20	30	0.050	1.7	1.8	RPD	-2.90	Pass RPD	1.7	1.7	RPD	0.6	Pass RPD	1.0	0.97	RPD	5.7	Pass RPD	0.54	0.53	RPD	0.6	Pass RPD
Strontium (Sr)-Total	mg/L	20	30	0.00020	0.047	0.046	RPD	2.6	Pass RPD	0.022	0.023	RPD	-1.80	Pass RPD	0.012	0.011	RPD	0.9	Pass RPD	0.012	0.012	RPD	-0.800	Pass RPD
Sulfur (S)-Total	mg/L	20	30	0.50	2.4	2.4	DIFF	-0.01	Pass Diff	1.5	1.4	DIFF	0.13	Pass Diff	1.5	1.6	DIFF	-0.09	Pass Diff	0.81	0.80	DIFF	0.01	Pass Diff
Thallium (Tl)-Total	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL
Tin (Sn)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Titanium (Ti)-Total	mg/L	20	30	0.00030	*<0.00030*	*<0.00030*	<DL	<DL	<DL	0.00052	0.00041	DIFF	0.00011	Pass Diff	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL
Tungsten (W)-Total	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Uranium (U)-Total	mg/L	20	30	0.000010	0.000032	0.000033	DIFF	-0.000001	Pass Diff	0.000042	0.000041	DIFF	1E-06	Pass Diff	0.000039	0.000035	DIFF	0.000004	Pass Diff	0.000025	0.000025	DIFF	0	Pass Diff
Vanadium (V)-Total	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL
Zinc (Zn)-Total	mg/L	20	30	0.0030	*<0.0030*	*<0.0030*	<DL	<DL	<DL	*<0.0030*	*<0.0030*	<DL	<DL	<DL	*<0.0030*	*<0.0030*	<DL	<DL	<DL	*<0.0030*	*<0.0030*	<DL	<DL	<DL
Zirconium (Zr)-Total	mg/L	20	30	0.00020	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL
Dissolved Metals																								
Aluminum (Al)-Dissolved	mg/L	20	30	0.0010	0.0010	0.0013	DIFF	-0.0003	Pass Diff	0.011	0.0092	RPD	14.1	Pass RPD	0.0045	0.0027	DIFF	0.0018	Pass Diff	0.0014	0.0013	DIFF	0.0001	Pass Diff
Antimony (Sb)-Dissolved	mg/L	20	30	0.00010	0.00011	0.00011	DIFF	0	Pass Diff	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Arsenic (As)-Dissolved	mg/L	20	30	0.00010	0.00025	0.00027	DIFF	-0.00002	Pass Diff	0.00013	0.00015	DIFF	-0.00002	Pass Diff	0.00022	0.00020	DIFF	0.00002	Pass Diff	0.00018	0.00021	DIFF	-0.00003	Pass Diff
Barium (Ba)-Dissolved	mg/L	20	30	0.00010	0.0087	0.0084	RPD	3.3	Pass RPD	0.0065	0.0067	RPD	-3.80	Pass RPD	0.0026	0.0027	RPD	-3.70	Pass RPD	0.0021	0.0022	RPD	-1.90	Pass RPD
Beryllium (Be)-Dissolved	mg/L	20	30	0.000010	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL	*<0.000100*	*<0.000100*	<DL	<DL	<DL
Bismuth (Bi)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Boron (B)-Dissolved	mg/L	20	30	0.010	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL
Cadmium (Cd)-Dissolved	mg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL
Calcium (Ca)-Dissolved	mg/L	20	30	0.050	7.1	7.2	RPD	-1.30	Pass RPD	4.0	4.0	RPD	0.7	Pass RPD	2.4	2.4	RPD	-0.400	Pass RPD	2.7	2.7	RPD	-0.700	Pass RPD
Cobalt (Co)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Copper (Cu)-Dissolved	mg/L	20	30	0.00020	0.00028	0.00026	DIFF	0.00002	Pass Diff	0.00035	0.00033	DIFF	0.00002	Pass Diff	0.00038	0.00049	DIFF	-0.00011	Pass Diff	0.00092	0.0015	DIFF	-0.00059	Fail
Iron (Fe)-Dissolved	mg/L	20	30	0.010	*<0.010*	*<0.010*	<DL	<DL	<DL	0.032	0.026	DIFF	0.006	Pass Diff	*<0.010*	*<0.010*	<DL	<DL	<DL	*<0.010*	*<0.010*	<DL	<DL	<DL
Lead (Pb)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Lithium (Li)-Dissolved	mg/L	20	30	0.0010	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL	*<0.0010*	*<0.0010*	<DL	<DL	<DL
Magnesium (Mg)-Dissolved	mg/L	20	30	0.0050	2.1	2.1	RPD	-0.500	Pass RPD	1.3	1.4	RPD	-3.00	Pass RPD	0.89	0.91	RPD	-2.20	Pass RPD	0.91	0.90	RPD	0.4	Pass RPD
Manganese (Mn)-Dissolved	mg/L	20	30	0.00010	0.00078	0.00085	RPD	-8.60	Pass RPD	0.00070	0.00076	RPD	-8.20	Pass RPD	0.00070	0.00083	RPD	-17.00	Pass RPD	0.00041	0.00043	DIFF	-0.00002	Pass Diff
Mercury (Hg)-Dissolved	µg/L	20	30	0.000005	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL	*<0.0000050*	*<0.0000050*	<DL	<DL	<DL
Molybdenum (Mo)-Dissolved	mg/L	20	30	0.000050	0.00013	0.00013	DIFF	-1E-06	Pass Diff	0.000080	0.000088	DIFF	-8E-06	Pass Diff	0.00010	0.00014	DIFF	-0.000043	Pass Diff	0.000055	*<0.000050*	<DL	<DL	<DL
Nickel (Ni)-Dissolved	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	0.00061	0.00063	DIFF	-2E-05	Pass Diff
Phosphorus (P)-Dissolved	mg/L	20	30	0.050	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL	*<0.050*	*<0.050*	<DL	<DL	<DL
Potassium (K)-Dissolved	mg/L	20	30	0.050	1.6	1.6	RPD	1.2	Pass RPD	0.89	0.92	RPD	-3.50	Pass RPD	0.51	0.53	RPD	-3.70	Pass RPD	0.42	0.43	RPD	-2.10	Pass RPD
Selenium (Se)-Dissolved	mg/L	20	30	0.000050	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL	*<0.000050*	*<0.000050*	<DL	<DL	<DL
Silicon (Si)-Dissolved	mg/L	20	30	0.050	0.17	0.16	DIFF	0.005	Pass Diff	0.60	0.59	RPD	1.2	Pass RPD	0.070	0.073	DIFF	-0.003	Pass Diff	0.13	0.13	DIFF	0.001	Pass Diff
Silver (Ag)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	0.000015	0.000026	DIFF	-0.000011	Pass Diff
Sodium (Na)-Dissolved	mg/L	20	30	0.050	1.8	1.8	RPD	1.1	Pass RPD	2.0	2.0	RPD	-1.000	Pass RPD	0.96	0.99	RPD	-2.90	Pass RPD	0.56	0.56	RPD	0.5	Pass RPD
Strontium (Sr)-Dissolved	mg/L	20	30	0.00020	0.047	0.048	RPD	-1.10	Pass RPD	0.022	0.022	RPD	0	Pass RPD	0.011	0.011	RPD	-0.900	Pass RPD	0.012	0.011	RPD	4.4	Pass RPD
Sulfur (S)-Dissolved	mg/L	20	30	0.50	2.3	2.5	DIFF	-0.180	Pass Diff	1.4	1.5	DIFF	-0.05	Pass Diff	1.4	1.6	DIFF	-0.190	Pass Diff	0.64	0.76	DIFF	-0.120	Pass Diff
Thallium (Tl)-Dissolved	mg/L	20	30	0.000010	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL	*<0.000010*	*<0.000010*	<DL	<DL	<DL
Tin (Sn)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Titanium (Ti)-Dissolved	mg/L	20	30	0.00030	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL	*<0.00030*	*<0.00030*	<DL	<DL	<DL
Tungsten (W)-Dissolved	mg/L	20	30	0.00010	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL	*<0.00010*	*<0.00010*	<DL	<DL	<DL
Uranium (U)-Dissolved	mg/L	20	30	0.000010	0.000028	0.000029	DIFF	-0.000001	Pass Diff	0.000034	0.000033	DIFF	1E-06	Pass Diff	0.000034	0.000035	DIFF	-1E-06	Pass Diff	0.000021	0.000022	DIFF	-0.000001	Pass Diff
Vanadium (V)-Dissolved	mg/L	20	30	0.00050	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL	*<0.00050*	*<0.00050*	<DL	<DL	<DL
Zinc (Zn)-Dissolved	mg/L	20	30	0.0010	0.0023	0.038	DIFF	-0.0355	Fail	0.017	0.063	RPD	-116.90	Fail	*<0.0010*	*<0.0010*	<DL	<DL	<DL	0.0018	0.0025	DIFF	-0.0007	Pass Diff
Zirconium (Zr)-Dissolved	mg/L	20	40	0.00020	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL	*<0.00020*	*<0.00020*	<DL	<DL	<DL
Speciated Metals																								
Arsenate (As V)	µg/L	20	30	0.020	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL
Arsenite (As III)	µg/L	20	30	0.020	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL
Arsenobetaine (AsB)	µg/L	20	30	0.050	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL
Dimethylarsinic Acid (DMA)	µg/L	20	30	0.020	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL	-	-	<DL	<DL	<DL
Monomethylarsonic Acid (MMA)	µg/L	20	30

Table B-6. Swipe chemistry data for sediment grab analyses, 2024.

			Equipment QC Samples [1]	
			Rinsate-1 (mg/L)	Swipe-1 (µg/sample)
	Swipe DLs (µg)	Rinsate DLs (mg/L)	SWAB	FILTER
			19-Aug-2024	19-Aug-2024
Analyte		ALS Sample ID	VA24C1918-001	VA24C1918-002
Total Metals (µg)				
Aluminum	20	0.0030	**0.0051**	*<20*
Antimony	20	0.0001	*<0.00010*	*<20*
Arsenic	20	0.0001	*<0.00010*	*<20*
Barium	1.0	0.0001	*<0.00010*	**2.5**
Beryllium	0.50	0.0000	*<0.000020*	*<0.50*
Bismuth	20	0.0001	*<0.000050*	*<20*
Boron		0.010	*<0.010*	-
Cadmium	1.0	0.0000	*<0.0000050*	*<1.0*
Calcium	200	0.050	*<0.050*	*<200*
Cesium		0.0000	*<0.000010*	-
Chromium	2.0	0.0005	*<0.00050*	**9.7**
Cobalt	1.0	0.0001	*<0.00010*	*<1.0*
Copper	1.0	0.0005	*<0.00050*	*<1.0*
Iron	3.0	0.010	*<0.010*	43
Lead	0.40	0.0001	*<0.000050*	*<0.40*
Lithium	1.0	0.0010	*<0.0010*	*<1.0*
Magnesium	100	0.0050	**0.0088**	**120**
Manganese	0.50	0.0001	**0.0003**	**0.56**
Molybdenum	3.0	0.0001	*<0.000050*	*<3.0*
Nickel	5.0	0.0005	*<0.00050*	*<5.0*
Phosphorus	30	0.050	*<0.050*	*<30*
Potassium	200	0.050	*<0.050*	*<200*
Rubidium		0.0002	*<0.00020*	-
Selenium	20	0.0001	*<0.000050*	*<20*
Silicon		0.10	*<0.10*	-
Silver	1.0	0.0000	*<0.000010*	*<1.0*
Sodium	400	0.050	*<0.050*	*<400*
Strontium	0.50	0.0002	*<0.00020*	*<0.50*
Sulfur		0.50	*<0.50*	-
Tellurium		0.0002	*<0.00020*	-
Thallium	20	0.0000	*<0.000010*	*<20*
Thorium		0.0001	*<0.00010*	-
Tin	3.0	0.0001	*<0.00010*	*<3.0*
Titanium	1.0	0.0003	*<0.00030*	*<1.0*
Tungsten		0.0001	*<0.00010*	-
Uranium		0.0000	*<0.000010*	-
Vanadium	3.0	0.0005	*<0.00050*	*<3.0*
Zinc	0.50	0.0030	*<0.0030*	31
Zirconium		0.0002	*<0.00020*	-

Notes:

Bold Filter Swipes **concentration exceeds laboratory DLs, but < 10x DL.**

Shaded Filter Swipes concentration is > 10x DL.

"-" analyte not measured

Table B-7. Field duplicate results for the sediment cores collected in 2024.

Month	Units	Relative Percent Difference DQOs (%)		August DLs	SC-DUP-1 (WTS-SC-6)					SC-DUP-2 (WTS-SC-14)				
Station					WTS-SC-6	SC-DUP-1	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	WTS-SC-14	SC-DUP-2	Field Dup	Result [b]	Outcome
Date Sampled					15-Aug-2024	18-Aug-2024				17-Aug-2024	2024-08-17			
ALS Sample ID		Lab	Field		VA24C2443-086	VA24C2443-106				VA24C2443-094	VA24C2443-107			
Parameter					Sediment	Sediment				Sediment	Sediment			
Physical Tests														
Moisture (%)	%	20	30	0.25	79.6	85.1	RPD	-6.7	Pass RPD	82.8	81.2	RPD	2	Pass RPD
pH (Laboratory)	pH units	5.0	7.5	0.10	6.0	5.9	RPD	2.5	Pass RPD	5.5	5.3	RPD	3.2	Pass RPD
Total Metals														
Aluminum (Al)-Total	mg/kg	40	60	50	16400	18200	RPD	-10	Pass RPD	18300	16900	RPD	8	Pass RPD
Antimony (Sb)-Total	mg/kg	30	45	0.10	0.43	0.39	DIFF	0.040	Pass Diff	0.30	0.23	DIFF	0.07	Pass Diff
Arsenic (As)-Total	mg/kg	30	45	0.10	155	109	RPD	34.8	Pass RPD	59.6	178	RPD	-99.7	Fail
Barium (Ba)-Total	mg/kg	40	60	0.50	114	125	RPD	-9.2	Pass RPD	164	130	RPD	23.1	Pass RPD
Beryllium (Be)-Total	mg/kg	30	45	0.10	1.4	1.5	RPD	-4.2	Pass RPD	1.3	1.3	RPD	1.5	Pass RPD
Bismuth (Bi)-Total	mg/kg	30	45	0.20	0.54	0.60	DIFF	-0.060000	Pass Diff	0.62	0.55	DIFF	0.07	Pass Diff
Boron (B)-Total	mg/kg	30	45	5.0	5.9	7.2	DIFF	-1.3	Pass Diff	6.6	7.0	DIFF	-0.4	Pass Diff
Cadmium (Cd)-Total	mg/kg	30	45	0.020	0.25	0.24	RPD	4.5	Pass RPD	0.25	0.21	RPD	16.9	Pass RPD
Calcium (Ca)-Total	mg/kg	30	45	50	3280	4780	RPD	-37	Pass RPD	2820	2360	RPD	17.8	Pass RPD
Chromium (Cr)-Total	mg/kg	30	45	0.50	82.6	89.1	RPD	-7.6	Pass RPD	80.2	69.1	RPD	14.9	Pass RPD
Cobalt (Co)-Total	mg/kg	30	45	0.10	18.2	13.8	RPD	27.5	Pass RPD	34.6	29.2	RPD	16.9	Pass RPD
Copper (Cu)-Total	mg/kg	30	45	0.50	37.6	38.9	RPD	-3.4	Pass RPD	40.6	37.1	RPD	9	Pass RPD
Iron (Fe)-Total	mg/kg	30	45	50	91600	67300	RPD	30.6	Pass RPD	69700	98200	RPD	-33.9	Pass RPD
Lead (Pb)-Total	mg/kg	40	60	0.50	13.6	14.3	RPD	-5.0	Pass RPD	14	12.3	RPD	12.9	Pass RPD
Lithium (Li)-Total	mg/kg	30	45	2.0	14.9	16.1	RPD	-7.7	Pass RPD	17.1	15.7	RPD	8.5	Pass RPD
Magnesium (Mg)-Total	mg/kg	30	45	20	6880	7210	RPD	-4.7	Pass RPD	7220	6300	RPD	13.6	Pass RPD
Manganese (Mn)-Total	mg/kg	30	45	1.0	2360	1390	RPD	51.7	Fail	4760	2590	RPD	59	Fail
Mercury (Hg)-Total	mg/kg	40	60	0.0050	0.057	0.056	RPD	2.8	Pass RPD	0.061	0.054	RPD	12	Pass RPD
Molybdenum (Mo)-Total	mg/kg	40	60	0.10	5.5	5.2	RPD	6.0	Pass RPD	3.8	6.7	RPD	-55	Pass RPD
Nickel (Ni)-Total	mg/kg	30	45	0.50	68	65.6	RPD	3.6	Pass RPD	87.7	74.2	RPD	16.7	Pass RPD
Phosphorus (P)-Total	mg/kg	30	45	50	977	1040	RPD	-6.2	Pass RPD	854	1430	RPD	-50.4	Fail
Potassium (K)-Total	mg/kg	40	60	100	2020	2560	RPD	-24	Pass RPD	2380	2300	RPD	3.4	Pass RPD
Selenium (Se)-Total	mg/kg	30	45	0.20	0.57	0.70	DIFF	-0.130000	Pass Diff	0.61	0.62	DIFF	-0.01	Pass Diff
Silver (Ag)-Total	mg/kg	40	60	0.10	0.20	0.23	DIFF	-0.030000	Pass Diff	0.27	0.28	DIFF	-0.01	Pass Diff
Sodium (Na)-Total	mg/kg	40	60	50	130	174	DIFF	-44	Pass Diff	156	146	DIFF	10	Pass Diff
Strontium (Sr)-Total	mg/kg	40	60	0.50	35.7	40.5	RPD	-13	Pass RPD	31.9	28.8	RPD	10.2	Pass RPD
Sulfur (S)-Total	mg/kg	30	45	1000	*<1000*	*<1000*	*<DL*	*<DL*	*<DL*	*<1000*	1000	*<DL*	*<DL*	*<DL*
Thallium (Tl)-Total	mg/kg	30	45	0.050	0.17	0.20	DIFF	-0.028000	Pass Diff	0.25	0.22	DIFF	0.029	Pass Diff
Tin (Sn)-Total	mg/kg	40	60	2.0	*<2.0*	*<2.0*	*<DL*	*<DL*	*<DL*	*<2.0*	*<2.0*	*<DL*	*<DL*	*<DL*
Titanium (Ti)-Total	mg/kg	40	60	1.0	315	437	RPD	-32	Pass RPD	384	372	RPD	3.2	Pass RPD
Tungsten (W)-Total	mg/kg	30	45	0.50	*<0.50*	*<0.50*	*<DL*	*<DL*	*<DL*	*<0.50*	*<0.50*	*<DL*	*<DL*	*<DL*
Uranium (U)-Total	mg/kg	30	45	0.050	10.6	11.7	RPD	-9.9	Pass RPD	11.9	11	RPD	7.9	Pass RPD
Vanadium (V)-Total	mg/kg	30	45	0.20	25.2	28.4	RPD	-12	Pass RPD	26.7	24.2	RPD	9.8	Pass RPD
Zinc (Zn)-Total	mg/kg	30	45	2.0	84	91.2	RPD	-8.2	Pass RPD	89.4	82.6	RPD	7.9	Pass RPD
Zirconium (Zr)-Total	mg/kg	30	45	1.0	1.8	1.5	DIFF	0.30	Pass Diff	1.4	1.4	DIFF	0	Pass Diff

Notes:

[a] Field Dup Methods are based on the concentrations:

RPD = relative percent difference is used to compare field duplicates when the measured concentration is > 5x the DL

DIFF = when concentrations < 5* DL

[b] Results refer to the RPD or absolute difference in concentration

DQO for RPDs is < Field RPD values

DQO for DIFF is < 2x the DL

Italicized numbers are below detection limits.

Table B-8. Field duplicate results for the sediment grabs collected in 2024.

Month	Units	Relative Percent Difference DQOs (%)		August DLs	DUP-1 (WAL-2)					DUP-2 (INUG-4)				
Station					WAL-2	Grab-DUP-1	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	INUG-4	Grab-DUP-2	Field Dup	Result [b]	Outcome
Date Sampled					09-Aug-2024	09-Aug-2024				10-Aug-2024	10-Aug-2024			
ALS Sample ID		Lab	Field		VA24C2443-008	VA24C2443-073				VA24C2443-034	VA24C2443-074			
Parameter					Sediment	Sediment				Sediment	Sediment			
Physical Tests														
Moisture (%)	%	20	30	0.25	87.9	83	RPD	5.7	Pass RPD	77	80.4	RPD	-4.3	Pass RPD
pH (Laboratory)	pH units	5.0	7.5	0.10	6.4	6.1	RPD	5.3	Pass RPD	5.1	5.3	RPD	-2.3	Pass RPD
Particle Size														
Gravel (>2mm)	%	-	40	1.0	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*
Sand (2.0mm - 0.063mm)	%	-	40	1.0	1.2	1.4	DIFF	-0.200000	Pass Diff	*<1.0*	1.0	*<DL*	*<DL*	*<DL*
Silt (0.063mm - 0.004mm)	%	-	40	1.0	82.7	84.6	RPD	-2.3	Pass RPD	84.3	83.5	RPD	1	Pass RPD
Clay (<0.004mm)	%	-	40	1.0	16.1	14	RPD	14	Pass RPD	15.3	15.5	RPD	-1.3	Pass RPD
Organic / Inorganic Carbon														
Carbon, total organic [TOC]	%	20	30	0.050	8.7	8.6	RPD	1.9	Pass RPD	3.7	3.7	RPD	-1.1	Pass RPD
Total Metals														
Mercury (Hg)-Total	mg/kg	20	30	0.0050	-	-	-	-	-	0.021	0.025	DIFF	-0.0043	Pass Diff

Notes:

[a] Field Dup Methods are based on the concentrations:

RPD = relative percent difference is used to compare field duplicates when the measured concentration is > 5x the DL

DIFF = when concentrations < 5* DL

[b] Results refer to the RPD or absolute difference in concentration

DQO for RPDs is < Field RPD values

DQO for DIFF is < 2x the DL

Italicized numbers are below detection limits.

Table B-8. Field duplicate results for the sediment grabs collected in 2024.

Month	Units	Relative Percent Difference DQOs (%)		August DLs	DUP-3 (TPE-5)					DUP-4 (NEM-5)					
Station					TPE-5	Grab-DUP-3	Field Dup	Result [b]	Outcome	August DLs	NEM-5	Grab-DUP-4	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome
Date Sampled					12-Aug-2024	12-Aug-2024					16-Aug-2024	16-Aug-2024			
ALS Sample ID		Lab	Field		VA24C2443-017	VA24C2443-075					VA24C2443-041	VA24C2443-076			
Parameter					Sediment	Sediment					Sediment	Sediment			
Physical Tests															
Moisture (%)	%	20	30	0.25	80.1	81.2	RPD	-1.4	Pass RPD	0.25	88.3	90.3	RPD	-2.2	Pass RPD
pH (Laboratory)	pH units	5.0	7.5	0.10	5.7	5.6	RPD	1.6	Pass RPD	0.10	6.2	6.1	RPD	2.4	Pass RPD
Particle Size															
Gravel (>2mm)	%	-	40	1.0	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	1.0	*<1.0*	23.1	*<DL*	*<DL*	*<DL*
Sand (2.0mm - 0.063mm)	%	-	40	1.0	5.1	3.5	DIFF	1.6	Pass Diff	1.0	20.7	10.1	RPD	68.8	Fail
Silt (0.063mm - 0.004mm)	%	-	40	1.0	69.4	72.9	RPD	-4.9	Pass RPD	1.0	70.8	60.8	RPD	15.2	Pass RPD
Clay (<0.004mm)	%	-	40	1.0	25.5	23.6	RPD	7.7	Pass RPD	1.0	8.5	6.0	RPD	34.5	Pass RPD
Organic / Inorganic Carbon															
Carbon, total organic [TOC]	%	20	30	0.050	2.9	3.0	RPD	-0.7	Pass RPD	0.050	7.2	8.6	RPD	-17	Pass RPD
Total Metals															
Mercury (Hg)-Total	mg/kg	20	30	0.0050	-	-	-	-	-	0.0050	-	-	-	-	-

Notes:

[a] Field Dup Methods are based on the concentrations:

RPD = relative percent difference is used to compare field duplicates when the measured concentration is > 5x the DL

DIFF = when concentrations < 5* DL

[b] Results refer to the RPD or absolute difference in concentration

DQO for RPDs is < Field RPD values

DQO for DIFF is < 2x the DL

Italicized numbers are below detection limits.

Table B-8. Field duplicate results for the sediment grabs collected in 2024.

Month	Units	Relative Percent Difference DQOs (%)		August DLs	DUP-5 (WTS-5)					DUP-6 (TPN-2)				
Station					WTS-5	Grab-DUP-5	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome	TPN-2	Grab-DUP-6	Field Dup Method [a]	Result [b] (RPD or Diff)	Outcome
Date Sampled					15-Aug-2024	15-Aug-2024				09-Aug-2024	09-Aug-2024			
ALS Sample ID		Lab	Field		VA24C2443-047	VA24C2443-077				VA24C2443-020	VA24C2443-078			
Parameter					Sediment	Sediment				Sediment	Sediment			
Physical Tests														
Moisture (%)	%	20	30	0.25	79.3	78.8	RPD	0.6	Pass RPD	71.5	75.8	RPD	-5.8	Pass RPD
pH (Laboratory)	pH units	5.0	7.5	0.10	5.5	5.4	RPD	1.6	Pass RPD	5.3	5.4	RPD	-0.9	Pass RPD
Particle Size														
Gravel (>2mm)	%	-	40	1.0	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*	*<1.0*	*<1.0*	*<DL*	*<DL*	*<DL*
Sand (2.0mm - 0.063mm)	%	-	40	1.0	1.9	1.8	DIFF	0.1	Pass Diff	25.5	24.7	RPD	3.2	Pass RPD
Silt (0.063mm - 0.004mm)	%	-	40	1.0	80.6	83.1	RPD	-3.1	Pass RPD	58.3	59.8	RPD	-2.5	Pass RPD
Clay (<0.004mm)	%	-	40	1.0	17.5	15.1	RPD	14.7	Pass RPD	16.2	15.5	RPD	4.4	Pass RPD
Organic / Inorganic Carbon														
Carbon, total organic [TOC]	%	20	30	0.050	4.1	4.2	RPD	-2.2	Pass RPD	2.1	2.2	RPD	-3.7	Pass RPD
Total Metals														
Mercury (Hg)-Total	mg/kg	20	30	0.0050	0.046	0.047	RPD	-2.8	Pass RPD	-	-	-	-	-

Notes:

[a] Field Dup Methods are based on the concentrations:

RPD = relative percent difference is used to compare field duplicates when the measured concentration is > 5x the DL

DIFF = when concentrations < 5* DL

[b] Results refer to the RPD or absolute difference in concentration

DQO for RPDs is < Field RPD values

DQO for DIFF is < 2x the DL

Italicized numbers are below detection limits.

Table B-9. QA/QC results for sediment grab sample hydrocarbon and PAH analyses, 2024.

Analyte	Detection Limits	Lab DQO Values	Field DQO Values[1]	COMP-DUP-1			COMP-DUP-2		
				DS1-COMP	Dup[2]	RPD (%)	WTS-COMP	Dup	RPD (%)
Date Sampled				16-Aug-2024	16-Aug-2024		15-Aug-2024	15-Aug-2024	
ALS Sample ID				VA24C2443-072	VA24C2443-079		VA24C2443-048	VA24C2443-080	
Physical Parameters									
Moisture (%)	*0.25*	20	30	72.1	71.9	0	83	84	-1.7
Aggregate Organics (mg/kg)									
Mineral Oil and Grease	*500*	<1000	1500	*<500*	*<500*	-	*<500*	*<500*	-
Hydrocarbons (mg/kg)									
EPH (10-19)	*200*	<400	600	*<210*	*<210*	-	*<360*	*<410*	-
EPH (19-32)	*200*	<400	600	*<210*	*<210*	-	*<360*	*<410*	-
LEPH	*200*	<400	600	*<210*	*<210*	-	*<360*	*<410*	-
HEPH	*200*	<400	600	*<210*	*<210*	-	*<360*	*<410*	-
Hydrocarbons Surrogates (%)									
2-Bromobenzotrifluoride	*5.8*	60-140	17.4	83.5	85.5	-2.4	85	86	-1.0
Polycyclic Aromatic Hydrocarbons (mg/kg)									
acenaphthene	*0.005*	<0.01	0.015	*<0.0104*	*<0.0107*	-	*<0.0180*	*<0.0207*	-
acenaphthylene	*0.005*	<0.01	0.015	*<0.0104*	*<0.0107*	-	*<0.0180*	*<0.0207*	-
acridine	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
anthracene	*0.004*	<0.008	0.012	*<0.0104*	*<0.0107*	-	*<0.0180*	*<0.0207*	-
benz(a)anthracene	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
benzo(a)pyrene	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
benzo(b+j)fluoranthene	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
benzo(b+j+k)fluoranthene	*0.015*	<0.03	0.045	*<0.015*	*<0.016*	-	*<0.025*	*<0.030*	-
benzo(g,h,i)perylene	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
benzo(k)fluoranthene	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
chrysene	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
dibenz(a,h)anthracene	*0.005*	<0.01	0.015	*<0.0104*	*<0.0107*	-	*<0.0180*	*<0.0207*	-
fluoranthene	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
fluorene	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
indeno(1,2,3-c,d)pyrene	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
methylnaphthalene, 1-	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
methylnaphthalene, 2-	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
naphthalene	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
phenanthrene	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
pyrene	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
quinoline	*0.01*	<0.02	0.03	*<0.010*	*<0.011*	-	*<0.018*	*<0.021*	-
PAH Surrogates (%)									
acridine-d9	*0.1*	35	52.5	95.6	92.9	2.9	92	95	-3.9
chrysene-d12	*0.1*	35	52.5	78.9	80.3	-1.8	84	85	-0.1
naphthalene-d8	*0.1*	40	60	98.6	98.7	-0.1	101	105	-3.9
phenanthrene-d10	*0.1*	35	52.5	108	106	1.9	110	112	-1.8

Notes:

[1] The DQO for field duplicates is an RPD 1.5x the laboratory DQO or 1.5x twice the DL when lab DQOs are "<" values.

[2] Field Dup grab samples are homogenized duplicates - the original and duplicate samples were split from the same homogenized bowl of sediment.

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

RPDs are only calculated when both samples are above detection.

Bold RPDs **RPD values exceeded but < 10 x MDL.**

Shaded RPDs RPD values exceeded and > 10 x MDL.

Italicized numbers are below detection limits.

Table B-10. Parameters that exceeded the DQOs for the sediment field duplicates in 2024.

Sample ID	Duplicate	Parameters that exceeded DQOs	DQO based on[a]
Cores			
WTS-SC-6	SC-DUP-1	Manganese	**RPD**
WTS-SC-14	SC-DUP-2	Arsenic	**RPD**
		Manganese	**RPD**
		Phosphorus	**RPD**
Grabs			
TPN-2	Grab-DUP-6	Sand	**RPD**

Notes:

[a] RPD DQO is <30% difference between duplicate samples (applicable when concentrations are > 5-times DL). DIFF DQO is a difference between duplicate samples of < 2-times the DL.

Table B-11. Field QA/QC data for phytoplankton for all CREMP study areas.

Area-Replicate	Date	Phytoplankton Biomass (mg/m^3)								Taxa Richness
		Cyanophyte	Chlorophyte	Euglenophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL	
TPE - 172	2-Jul-24	0	0.45	0	90	14	2.7	89	196	24
DUP - 1	2-Jul-24	0	0.25	0	88	17	7.5	30	142	20
RPD (%)			**57**		2.2	-15	**-95**	**100**	32	18
WAL - 141	3-Jul-24	0	2.0	0	133	8.9	21	16	181	28
DUP - 2	3-Jul-24	0.035	1.1	0	175	5.9	29	64	275	27
RPD (%)		NA	**57**		-28	41	-33	**-119**	-42	3.6
WTS - 92	1-Jul-24	0	2.5	0	301	7.9	59	11	381	28
DUP - 3	1-Jul-24	0	1.6	0	317	8.6	59	10.0	396	27
RPD (%)			44		-5.3	-7.9	0.43	6.2	-3.9	3.6
A76 - 82	9-Jul-24	0	2.7	0	89	24	13	7.7	136	30
DUP - 4	9-Jul-24	0	2.8	0	127	21	11	9.2	171	27
RPD (%)			-3.8		-35	14	10	-18	-23	11
WAL - 144	9-Aug-24	0	9.2	0	23	13	1.6	1.1	48	17
DUP - 1	9-Aug-24	0.033	14	0	14	12	0.77	5.9	46	26
RPD (%)		NA	-43		**51**	6.8	**71**	**-136**	2.6	-42
SP - 174	14-Aug-24	0.24	9.3	0	64	16	4.5	1.8	96	26
DUP - 2	14-Aug-24	0.038	11	0	46	25	6.6	5.9	94	23
RPD (%)		**145**	-15		33	-42	-37	**-106**	2.0	12
WTS - 94	14-Aug-24	0.31	13	0	171	11	15	3.3	214	27
DUP - 3	13-Aug-24	0.72	14	0	118	11	16	8.4	169	26
RPD (%)		**-81**	-8.4		36	-1.2	-2.5	**-86**	24	3.8
MAM - 93	15-Aug-24	0	4.8	0	59	337	20	13	433	19
DUP - 4	15-Aug-24	0	6.5	0	52	302	16	7.5	384	20
RPD (%)			-30		11	11	20	**56**	12	-5.1
A20 - 88	3-Sep-24	0	33	0	187	127	14	3.5	364	30
DUP - 1	3-Sep-24	0.033	39	0	182	107	19	10	358	33
RPD (%)		NA	-18		2.8	17	-29	**-99**	1.8	-9.5
DS1 - 84	19-Sep-24	0.96	7.4	0	238	26	26	21	320	36
DUP - 2	19-Sep-24	0	11	0	650	33	34	24	752	30
RPD (%)		NA	-35		**-93**	-24	-26	-13	**-81**	18
TPN - 176	5-Sep-24	0.048	8.7	0	48	3.8	4.5	33	99	24
DUP - 3	5-Sep-24	0.10	11	0	73	3.5	1.9	33	123	23
RPD (%)		**-71**	-24		-41	7.1	**80**	0	-22	4.3
PDL - 130	6-Sep-24	2.8	11	0	56	13	4.6	2.9	90	28
DUP - 4	6-Sep-24	3.0	7.4	0	41	2.9	1.6	8.0	64	28
RPD (%)		-9.9	35		30	**125**	**94**	**-93**	33	0

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

Bolded RPD values exceed 50%.

RPDs have not been calculated for cases where one or both of the samples is "0".

Table B-11. Field QA/QC data for phytoplankton for all CREMP study areas.

Area-Replicate	Phytoplankton Density (cells/L)							
	Cyanophyte	Chlorophyte	Euglenophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	**TOTAL**
TPE - 172	0	14,968	0	1,099,168	143,696	8,184	12,784	1,278,800
DUP - 1	0	21,952	0	999,392	97,992	57,472	5,200	1,182,008
RPD (%)		-38		9.5	38	**-150**	**84**	7.9
WAL - 141	0	79,024	0	1,539,208	87,440	92,008	2,600	1,800,280
DUP - 2	200	50,288	0	2,216,688	67,872	103,392	1,600	2,440,040
RPD (%)	NA	44		-36	25	-12	48	-30
WTS - 92	0	57,672	0	3,420,800	112,040	138,160	2,200	3,730,872
DUP - 3	0	71,840	0	3,615,568	139,408	176,864	2,000	4,005,680
RPD (%)		-22		-5.5	-22	-25	9.5	-7.1
A76 - 82	0	179,600	0	1,811,768	137,344	53,688	1,600	2,184,000
DUP - 4	0	193,968	0	1,926,912	244,304	26,352	1,800	2,393,336
RPD (%)		-7.7		-6.2	**-56**	**68**	-12	-9.1
WAL - 144	0	625,008	0	517,248	126,528	7,584	200	1,276,568
DUP - 1	200	1,494,272	0	337,648	124,728	400	1,000	1,958,248
RPD (%)	NA	**-82**		42	1.4	**180**	**-133**	-42
SP - 174	600	1,652,720	0	697,248	141,096	22,552	200	2,514,416
DUP - 2	200	899,400	0	488,712	359,216	3,800	1,200	1,752,528
RPD (%)	**100**	**59**		35	**-87**	**142**	**-143**	36
WTS - 94	2,000	395,320	0	2,774,624	293,024	35,136	600	3,500,704
DUP - 3	4,800	352,016	0	1,533,792	389,184	102,576	1,000	2,383,368
RPD (%)	**-82**	12		**58**	-28	**-98**	-50	38
MAM - 93	0	114,944	0	323,880	9,925,104	45,120	1,800	10,410,848
DUP - 4	0	158,248	0	337,848	8,697,840	49,704	1,600	9,245,240
RPD (%)		-32		-4.2	13	-9.7	12	12
A20 - 88	0	797,624	0	1,919,944	1,833,648	21,768	700	4,573,684
DUP - 1	200	833,744	0	1,992,584	1,685,768	44,920	2,000	4,559,216
RPD (%)	NA	-4.4		-3.7	8.4	**-69**	**-96**	0.32
DS1 - 84	28,736	187,584	0	2,248,408	356,464	35,152	3,200	2,859,544
DUP - 2	0	324,880	0	9,494,664	392,416	101,208	3,600	10,316,768
RPD (%)	NA	**-54**		**-123**	-9.6	**-97**	-12	**-113**
TPN - 176	200	575,920	0	361,800	109,360	23,152	400	1,070,832
DUP - 3	200	963,856	0	441,824	45,504	14,968	400	1,466,752
RPD (%)	0	**-50**		-20	**82**	43	0	-31
PDL - 130	14,800	740,352	0	546,384	182,800	23,152	600	1,508,088
DUP - 4	16,784	346,432	0	474,744	67,856	7,784	1,400	915,000
RPD (%)	-13	**72**		14	**92**	**99**	**-80**	49

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

Bolded RPD values exceed 50%.

RPDs have not been calculated for cases where one or both of the samples is "0".

Table B-12. Laboratory QA/QC data for phytoplankton for all CREMP study areas, 2024.

Area-Replicate	Date	Phytoplankton Biomass (mg/m^3)								Taxa Richness	Simpson's Diversity	Phytoplankton Density (cells/L)							
		Cyanophyte	Chlorophyte	Euglenophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL			Cyanophyte	Chlorophyte	Euglenophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
A20 - 87	3-Sep-24	0.18	24	0	212	51	16	13	315	32	0.90	1,000	632,792	0	2,073,824	774,152	29,552	2,400	3,513,720
A20 - 87R	3-Sep-24	0.11	26	0	218	47	19	7.0	316	27	0.90	600	560,752	0	2,107,744	697,528	51,504	1,400	3,419,528
RPD (%)		50	-7.5		-2.8	7.8	-14	**56**	-0.32	17	0.79	50	12		-1.6	10	**-54**	**53**	2.7
A76 - 83	13-Aug-24	0	3.1	0	40	105	20	13	182	17	0.25	0	107,760	0	373,568	3,724,528	77,840	2,000	4,285,696
A76 - 83R	13-Aug-24	0	3.0	0	45	101	18	11	177	22	0.26	0	64,656	0	423,856	3,352,160	43,520	1,800	3,885,992
RPD (%)			3.9		-11	4.2	11	23	2.4	-26	-7.2		50		-13	11	**57**	11	9.8
BAP - 92	14-Jul-24	0	2.4	0	59	19	14	24	119	28	0.82	0	93,592	0	1,171,792	140,112	67,856	3,400	1,476,752
BAP - 92R	14-Jul-24	0	1.8	0	51	6.6	21	32	113	26	0.81	0	72,040	0	1,308,288	120,360	119,344	3,200	1,623,232
RPD (%)			29		14	**98**	-44	-26	5.2	7.4	0.54		26		-11	15	**-55**	6.1	-9.5
BBD - 95	9-Sep-24	0	4.9	0	24	69	30	13	140	29	0.88	0	136,696	0	352,616	278,272	210,736	800	979,120
BBD - 95R	9-Sep-24	0	3.2	0	25	71	34	4.7	138	27	0.88	0	136,496	0	316,896	282,872	246,256	200	982,720
RPD (%)			42		-6.2	-2.9	-12	**91**	1.6	7.1	-0.27		0.15		11	-1.6	-16	**120**	-0.37
BPJ - 93	12-Aug-24	0.32	7.7	0	217	17	5.0	5.1	252	33	0.84	28,936	223,504	0	2,110,328	97,856	2,800	800	2,464,224
BPJ - 93R	12-Aug-24	1.1	11	0	213	12	5.0	5.3	248	33	0.82	114,944	209,536	0	2,047,472	68,120	16,168	1,000	2,457,240
RPD (%)		**-113**	-38		1.9	33	-0.13	-3.6	1.7	0	2.3	**-120**	6.5		3.0	36	**-141**	-22	0.28
NEM - 90	4-Jul-24	0	1.6	0	84	97	9.5	16	208	23	0.85	0	7,384	0	1,192,376	503,992	25,352	1,600	1,730,704
NEM - 90R	4-Jul-24	0	0.94	0	88	98	14	19	219	26	0.84	0	28,736	0	1,207,944	540,896	34,136	1,800	1,813,512
RPD (%)			**52**		-4.5	-1.4	-35	-14	-5.2	-12	1.0		**-118**		-1.3	-7.1	-30	-12	-4.7
NEM - 93	2-Sep-24	19	29	0	73	23	2.7	9.2	155	28	0.89	146,040	625,408	0	705,232	511,464	8,384	400	1,996,928
NEM - 93R	2-Sep-24	18	31	0	71	23	1.4	14	159	30	0.87	167,176	697,648	0	655,544	620,024	800	800	2,141,992
RPD (%)		2.6	-9.0		2.5	-0.86	**63**	-44	-2.8	-6.9	1.6	-13	-11		7.3	-19	**165**	**-67**	-7.0
PDL - 127	11-Aug-24	0.58	16	0	88	3.6	0	5.9	114	27	0.79	3,400	316,296	0	1,122,304	75,240	0	1,000	1,518,240
PDL - 127R	11-Aug-24	0.34	19	0	83	3.4	2.3	5.5	114	27	0.87	2,000	251,440	0	813,992	38,720	7,984	1,000	1,115,136
RPD (%)		**52**	-19		5.7	4.2	**NA**	7.0	0.042	0	-9.8	**52**	23		32	**64**	**NA**	0	31
TPN - 175	9-Aug-24	0.28	0.76	0	66	16	2.0	3.3	88	21	0.87	1,400	179,600	0	577,120	209,736	7,784	600	976,240
TPN - 175R	9-Aug-24	0.31	3.9	0	71	12	3.7	3.0	94	27	0.88	2,000	265,808	0	504,480	124,928	2,000	600	899,816
RPD (%)		-7.5	**-135**		-8.3	34	**-60**	12	-5.9	-25	-1.4	-35	-39		13	**51**	**118**	0	8.1
TPN - 176	5-Sep-24	0.048	8.7	0	48	3.8	4.5	33	99	24	0.89	200	575,920	0	361,800	109,360	23,152	400	1,070,832
TPN - 176R	5-Sep-24	0.14	7.3	0	47	3.1	4.3	29	91	21	0.89	600	583,104	0	447,208	145,880	36,720	400	1,213,912
RPD (%)		**-100**	17		3.4	19	5.2	12	7.9	13	-0.06301	**-100**	-1.2		-21	-29	-45	0	-13
WTS - 91	1-Jul-24	0	1.3	0	316	9.7	60	11	398	28	0.58	200	575,920	0	361,800	109,360	23,152	400	1,070,832
WTS - 91R	1-Jul-24	0	0.71	0	318	8.9	61	11	399	27	0.56	600	583,104	0	447,208	145,880	36,720	400	1,213,912
RPD (%)			**58**		-0.69	7.8	-1.1	1.6	-0.35	3.6	2.5	**-100**	-1.2		-21	-29	-45	0	-13

Notes:

RPD = Relative Percent Difference (%) = ((original - duplicate) / (original + duplicate)/2) x 100.

Bolded RPD values exceed 25%.

RPDs have not been calculated for cases where one or both of the samples is "0".

Table B-13. Percent recovery of benthic invertebrate samples for all CREMP study areas, 2024.

Area-Replicate	Number of Organisms Recovered	Number of Organisms in Re-sort	Percent Recovery
A20-5	104	104	100.0%
INUG-4	53	53	100.0%
MAM-2	394	402	98.0%
NEM-5	168	174	96.6%
PDL-2	34	36	94.4%
TPN-3	75	76	98.7%
WAL-2	221	234	94.4%
WTS-3	211	219	96.3%
		Average % Recovery	97.3%

Notes:

1. All samples were sorted in their entirety.
2. Pupae were not counted toward total number of taxa unless they were the sole representative of their taxa group.
3. Immatures were not counted toward total number of taxa unless they were the sole representative of their taxa group.
4. The exceptions to this rule are immature Tubificidae with and without hairs. Immature oligochaetes are counted as taxa as the probability of the immature being a unique taxa is high.
5. Indeterminates are unique taxa that could not be identified further for various reasons (e.g., small, damaged).

APPENDIX C
WATER CHEMISTRY DATA AND SUPPLEMENTAL PLOTS

Appendix C1
Water Chemistry – Meadowbank Study Area Lakes

LIST OF TABLES

Table C1-1. Water quality results from the Meadowbank study area lakes, 2024. 1
Table C1-2. Water quality results screened against FEIS predicted concentrations for Third Portage Lake, 2024. 7
Table C1-3. Water quality results screened against FEIS predicted concentrations for Second Portage Lake, 2024. 9
Table C1-4. Water quality results screened against FEIS predicted concentrations for Wally Lake, 2024. 10
Table C1-5. Water and phytoplankton sampling location coordinates (GPS, UTM, NAD83) for the Meadowbank CREMP, 2024. 11

LIST OF FIGURES

Note: Water quality results in Meadowbank study area lakes dating as far back as the start of baseline sampling in 2006 are shown in each figure.

Figure C1-1. Laboratory-measured conductivity (µS/cm). 15
Figure C1-2. Laboratory-measured hardness (mg/L). 16
Figure C1-3. Field-measured pH. 17
Figure C1-4. Laboratory-measured pH. 18
Figure C1-5. Total dissolved solids (TDS; mg/L). 19
Figure C1-6. Total suspended solids (TSS; mg/L). 20
Figure C1-7. Carbonate alkalinity (mg/L). 21
Figure C1-8. Bicarbonate alkalinity (mg/L). 22
Figure C1-9. Total alkalinity (mg/L). 23
Figure C1-10. Ammonia-N (mg/L). 24
Figure C1-11. Chloride (mg/L). 25
Figure C1-12. Fluoride (mg/L). 26
Figure C1-13. Nitrate-N (mg/L) 27
Figure C1-14. Nitrite-N (mg/L) 28
Figure C1-15. Total Kjeldahl Nitrogen (TKN; mg/L). 29
Figure C1-16. Total phosphorus (mg/L). 30

Figure C1-17. Ortho-phosphate (mg/L). 31
Figure C1-18. Reactive silica (mg/L). 32
Figure C1-19. Sulphate (mg/L). 33
Figure C1-20. Dissolved Organic Carbon (DOC; mg/L). 34
Figure C1-21. Total Organic Carbon (TOC; mg/L). 35
Figure C1-22. Total aluminum (mg/L). 36
Figure C1-23. Total antimony (mg/L). 37
Figure C1-24. Total arsenic (mg/L). 38
Figure C1-25. Total barium (mg/L). 39
Figure C1-26. Total beryllium (mg/L). 40
Figure C1-27. Total boron (mg/L). 41
Figure C1-28. Total cadmium (mg/L). 42
Figure C1-29. Total calcium (mg/L). 43
Figure C1-30. Total chromium (mg/L). 44
Figure C1-31. Total copper (mg/L). 45
Figure C1-32. Total iron (mg/L). 46
Figure C1-33. Total lead (mg/L). 47
Figure C1-34. Total lithium (mg/L). 48
Figure C1-35. Total magnesium (mg/L). 49
Figure C1-36. Total manganese (mg/L). 50
Figure C1-37. Total mercury (mg/L). 51
Figure C1-38. Total molybdenum (mg/L). 52
Figure C1-39. Total nickel (mg/L). 53
Figure C1-40. Total potassium (mg/L). 54
Figure C1-41. Total selenium (mg/L). 55
Figure C1-42. Total silicon (mg/L). 56
Figure C1-43. Total silver (mg/L). 57
Figure C1-44. Total sodium (mg/L). 58
Figure C1-45. Total strontium (mg/L). 59
Figure C1-46. Total thallium (mg/L). 60
Figure C1-47. Total tin (mg/L). 61

Figure C1-48. Total titanium (mg/L). 62
Figure C1-49. Total uranium (mg/L). 63
Figure C1-50. Total vanadium (mg/L). 64
Figure C1-51. Total zinc (mg/L). 65
Figure C1-52. Total cyanide (mg/L). 66
Figure C1-53. Free cyanide (mg/L). 67
Figure C1-54. Dissolved aluminum (mg/L). 68
Figure C1-55. Dissolved antimony (mg/L). 69
Figure C1-56. Dissolved arsenic (mg/L). 70
Figure C1-57. Dissolved barium (mg/L). 71
Figure C1-58. Dissolved beryllium (mg/L). 72
Figure C1-59. Dissolved boron (mg/L). 73
Figure C1-60. Dissolved cadmium (mg/L). 74
Figure C1-61. Dissolved copper (mg/L). 75
Figure C1-62. Dissolved chromium (mg/L). 76
Figure C1-63. Dissolved iron (mg/L). 77
Figure C1-64. Dissolved lead (mg/L). 78
Figure C1-65. Dissolved lithium (mg/L). 79
Figure C1-66. Dissolved manganese (mg/L). 80
Figure C1-67. Dissolved molybdenum (mg/L). 81
Figure C1-68. Dissolved mercury (mg/L). 82
Figure C1-69. Dissolved nickel (mg/L). 83
Figure C1-70. Dissolved selenium (mg/L). 84
Figure C1-71. Dissolved silicon (mg/L). 85
Figure C1-72. Dissolved silver (mg/L). 86
Figure C1-73. Dissolved strontium (mg/L). 87
Figure C1-74. Dissolved thallium (mg/L). 88
Figure C1-75. Dissolved tin (mg/L). 89
Figure C1-76. Dissolved titanium (mg/L). 90
Figure C1-77. Dissolved uranium (mg/L). 91
Figure C1-78. Dissolved vanadium (mg/L). 92

Figure C1-79. Dissolved zinc (mg/L). 93

TABLES

Table C1-1. Water quality results from the 2024 CREMP, Meadowbank study area lakes.

Lake & Area		Meadowbank Screening Values[2]			Inuggugayualik Lake (INUG)									
Month					March	March	April/May	April/May	July	July	August	August	September	September
Area-Replicate ID					INUG-156	INUG-157	INUG-158	INUG-159	INUG-160	INUG-161	INUG-162	INUG-163	INUG-164	INUG-165
Date		Triggers			14-Mar-2024	14-Mar-2024	29-Apr-2024	29-Apr-2024	12-Jul-2024	12-Jul-2024	10-Aug-2024	10-Aug-2024	17-Sep-2024	17-Sep-2024
Time					11:50	11:15	00:00	00:00	14:00	14:30	15:40	14:48	13:05	13:40
ALS Sample ID	Aquatic Life Guideline[1]	Meadowbank	Wally Lake	Thresholds	VA24A6007-001	VA24A6007-002	VA24B0466-001	VA24B0466-002	VA24B7634-001	VA24B7634-002	VA24C1019-003 VA24C2044-011	VA24C1019-004 VA24C2044-014	VA24C5723-001	VA24C5723-002
Field Measurements (Surface 3m)														
Dissolved Oxygen (mg/L)					19	16	17	17	11	11	10	10	11	12
Specific Conductivity (µS/cm)					21	20	21	21	18	18	18	18	17	31
pH	6.5 - 9.0	6.4-8.15	6.54 - 8.34	6.5 - 9.0	6.5	7.1	7.0	6.5	6.9	6.7	6.6	6.5	6.5	**6.4**
Temperature (°C)					0.57	0.67	0.85	0.77	8.6	8.5	15	14	8.5	8.5
Physical Tests (mg/L)														
Conductivity (µS/cm)		27	37		27	20	25	25	19	19	18	18	19	19
Alkalinity - Bicarbonate		8.7	18		**9.0**	6.6	7.2	7.8	5.5	5.4	6.2	6.1	6.0	6.1
Alkalinity - Carbonate		2.0	2.0		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total (as $CaCO_3$)		8.7	18		**9.0**	6.6	7.2	7.8	5.5	5.4	6.2	6.1	6.0	6.1
Hardness (as CaCO3), dissolved		9.5	17		**10**	7.6	8.6	9.2	6.7	6.6	6.7	6.7	6.6	6.7
Hardness (as CaCO3), from total Ca/Mg					10	7.4	8.4	8.8	6.6	6.5	6.7	6.7	7.0	6.9
Total Dissolved Solids (TDS)		19	25		17	14	16	16	11	14	17	17	11	9.6
Total Suspended Solids (TSS)		3.0	3.0	5.0	1.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Turbidity (NTU)					0.15	0.11	*<0.10*	0.12	0.51	0.56	0.27	0.32	0.33	0.29
pH (Laboratory)	6.47-7.95	6.47-7.95	6.92 - 8.17	6.5 - 9.0	7.1	7.0	7.2	7.2	7.1	7.1	7.0	7.0	7.0	7.0
Anions and Nutrients (mg/L)														
Ammonia (as N)[3]	***equation***	0.065	0.067	0.13	0.020	0.016	0.024	0.023	0.0072	0.0067	0.0064	0.0066	*<0.0050*	0.0065
Bromide					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Chloride	120	60	60	120	1.2	0.83	1.0	1.1	0.81	0.82	0.82	0.81	0.84	0.84
Fluoride	0.12	0.088	0.080	0.12	**0.096**	0.073	0.086	**0.089**	0.064	0.064	0.068	0.067	0.071	0.073
Total Kjeldahl Nitrogen		0.17	0.16		**0.20**	0.14	0.15	0.16	0.14	0.13	0.17	0.15	0.13	0.14
Nitrate (as N)	3.0	1.5	1.5	3.0	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.06	0.031	0.031	0.060	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Ortho Phosphate (as P)		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0020	0.0019	*<0.0010*	*<0.0010*
Phosphorus (P) - Total	0.01	0.0051	0.0067	0.010	0.0023	0.0022	*<0.0020*	0.0021	0.0033	**0.012**	0.0030	0.0029	0.0032	0.0046
Phosphorus (P) - Total Diss.					*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*
Reactive Silica (as SiO_2)		1.0	1.1		0.64	0.53	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Sulphate (SO_4)		65	65	128	1.6	1.2	1.4	1.5	1.1	1.1	1.1	1.1	1.1	1.1
Cyanides (mg/L)														
Free Cyanide	0.005				*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-
Total Cyanide					*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon		2.5	3.2		2.7	2.7	2.3	**2.6**	2.1	2.2	2.0	2.1	**2.5**	2.2
Total Organic Carbon		2.6	4.1		**2.7**	2.3	2.2	2.5	1.8	2.1	1.9	2.1	2.4	2.4
Total Metals (mg/L)														
Aluminum[3]	***equation***	0.053	0.053	0.10	0.0048	0.0050	0.0038	0.0041	0.015	0.014	0.0074	0.0071	0.011	0.010
Antimony		0.0046	0.0046	0.0090	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.005	0.0026	0.0026	0.0050	0.00015	0.00011	0.00013	0.00014	0.00012	0.00012	0.00012	0.00013	0.00012	0.00012
Barium		0.50	0.50	1.0	0.0026	0.0019	0.0023	0.0024	0.0023	0.0022	0.0019	0.0018	0.0019	0.0020
Beryllium		0.00012	0.00012	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.76	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	0.00002	0.00002	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		2.4	4.9		2.0	1.5	1.7	1.8	1.3	1.3	1.3	1.3	1.4	1.4
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium[4]	0.001	0.0025	0.0026	0.0050	*<0.00010*	*<0.00010*	0.00019	0.00013	0.00018	0.00013	*<0.00010*	0.00010	0.00012	0.00012
Cobalt	0.00077			0.00077	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0012	0.0015	0.0020	0.00057	*<0.00050*	0.00063	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.15	0.16	0.30	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.030	0.032	0.015	0.015	0.025	0.023
Lead[3]	***equation***	0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00006	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.93	1.4		**1.2**	0.90	**1.0**	**1.1**	0.81	0.79	0.82	0.82	0.84	0.85
Manganese[3]	***equation***	0.32	0.33	***See note 3***	0.00084	0.00099	0.00081	0.00076	0.0069	0.0071	0.0025	0.0027	0.0030	0.0029
Mercury	0.000026	0.00002	0.00002	0.00003	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.037	0.037	0.073	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Nickel[3]	***equation***	0.013	0.013	0.025	0.00051	*<0.00050*	*<0.00050*	0.00053	0.00051	0.00051	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus		0.0051	0.0067	0.0040	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.58	0.59		**0.64**	0.44	0.56	**0.60**	0.39	0.39	0.43	0.44	0.43	0.43
Rubidium					0.00087	0.00062	0.00082	0.00079	0.00060	0.00063	0.00055	0.00063	0.00056	0.00060
Selenium	0.001	0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00006	*<0.000050*
Silicon		0.20	0.65		**0.32**	**0.25**	**0.28**	**0.28**	**0.27**	**0.26**	0.19	0.20	0.20	0.20
Silver	0.0001	0.00013	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1.2	0.72		0.93	0.67	0.78	0.82	0.73	0.67	0.62	0.63	0.64	0.65
Strontium		1.25	1.26	2.5	0.011	0.0081	0.0095	0.010	0.0075	0.0077	0.0080	0.0079	0.0080	0.0078
Sulfur					*<0.50*	*<0.50*	*<0.50*	0.51	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Thallium	0.0008	0.00041	0.00041	0.00080	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin		0.00020	0.00020		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00060	0.00060		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	0.00042	0.00038	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Uranium	0.015	0.0075	0.0075	0.015	0.00008	0.00006	0.00007	0.00007	0.00007	0.00007	0.00006	0.00006	0.00006	0.00006
Vanadium		0.060	0.060	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc				0.0040	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Dissolved Metals (mg/L)														
Aluminum[3]	***equation***	0.026	0.026	0.050	0.0029	0.0041	0.0019	0.0021	0.0032	0.0037	0.0043	0.0036	0.0028	0.0027
Antimony		0.0046	0.0046	0.0090	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic		0.0026	0.0026	0.0050	0.00014	0.00010	0.00023	0.00050	*<0.00010*	*<0.00010*	0.00011	*<0.00010*	*<0.00010*	*<0.00010*
Barium		0.50	0.50	1.0	0.0027	0.0020	0.0023	0.0023	0.0020	0.0020	0.0018	0.0018	0.0018	0.0019
Beryllium		0.00012	0.00012	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron		0.76	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium		0.00002	0.00002	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		2.4	4.9		2.0	1.5	1.7	1.8	1.3	1.3	1.4	1.4	1.3	1.3
Chromium		0.00026	0.00026	0.0050	0.00011	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt				0.00077	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper		0.0012	0.0015	0.0020	0.00057	0.00040	~~0.0039~~	~~0.0026~~	0.00036	0.00038	0.00034	0.00041	0.00037	0.00036
Iron		0.16	0.16	0.30	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead		0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.93	1.4		**1.2**	0.93	**1.1**	**1.1**	0.82	0.81	0.81	0.79	0.82	0.83
Manganese[3]	***equation***	0.32	0.33	***See note 3***	0.00029	0.00026	0.00045	0.00086	0.0042	0.0041	0.0012	0.00081	0.00053	0.00065
Mercury		0.00002	0.00002	0.00003	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum		0.037	0.037	0.073	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Nickel		0.013	0.013	0.025	0.00054	*<0.00050*	0.00073	0.0010	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.58	0.59		**0.62**	0.44	0.54	0.58	0.40	0.40	0.44	0.43	0.43	0.43
Selenium		0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.18	0.67		**0.27**	**0.20**	**0.23**	**0.26**	**0.22**	**0.20**	0.15	0.15	0.14	0.15
Silver		0.00013	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1.2	0.72		0.94	0.69	0.80	0.86	0.62	0.61	0.65	0.64	0.69	0.70
Strontium		1.3	1.3	2.5	0.011	0.0083	0.0096	0.010	0.0072	0.0073	0.0077	0.0078	0.0078	0.0078
Sulfur					0.56	*<0.50*	0.56	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Thallium		0.00041	0.00041	0.00080	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin		0.00020	0.00020		*<0.00010*	*<0.00010*	~~0.00029~~	0.00019	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00060	0.00060		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Uranium		0.0075	0.0075	0.015	0.00007	0.00006	0.00006	0.00007	0.00006	0.00005	0.00005	0.00005	0.00004	0.00004
Vanadium		0.060	0.060	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[3]	***equation***	0.0018	0.0024	***See note 3***	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Plant Pigments (µg/L)														
Chlorophyll a					0.22	0.19	0.13	0.19	0.33	0.35	0.19	0.19	1.4	0.94

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.
2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d) and updated in 2019. A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the CREMP: 2022 Plan Update (Azimuth, 2022b) for more details.
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

123 Bolded concentrations exceed the trigger value.
123 Bolded and shaded concentrations also exceed the threshold value.
Italicized numbers are below detection limits.
underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.3** for details).
~~strikethrough~~ = results flagged as unreliable in the QC assessment.
"-" not analyzed/not sampled.

Table C1-1. Water quality results from the 2024 CREMP, Meadowbank study area lakes.

Lake & Area		Meadowbank Screening Values[2]			Pipe Dream Lake (PDL)									
Month					March	March	April/May	April/May	July	July	August	August	September	September
Area-Replicate ID	Aquatic Life Guideline[1]				PDL-121	PDL-122	PDL-123	PDL-124	PDL-125	PDL-126	PDL-127	PDL-128	PDL-129	PDL-130
Date		Triggers		Thresholds	08-Mar-2024	08-Mar-2024	30-Apr-2024	30-Apr-2024	12-Jul-2024	12-Jul-2024	11-Aug-2024	11-Aug-2024	06-Sep-2024	06-Sep-2024
Time					10:45	11:20	00:00	00:00	12:15	12:45	09:48	10:34	10:15	10:50
ALS Sample ID		Meadowbank	Wally Lake		VA24A5461-005 VA24A6007-014	VA24A5461-006 VA24A6007-015	VA24B0466-003	VA24B0466-004	VA24B7634-003	VA24B7634-004	VA24C1019-001 VA24C2044-019	VA24C1019-002 VA24C2044-021	VA24C4308-008	VA24C4308-009
Field Measurements (Surface 3m)														
Dissolved Oxygen (mg/L)					19	19	18	17	12	12	9.1	9.0	11	11
Specific Conductivity (µS/cm)					29	29	34	30	26	25	26	26	24	24
pH	6.5 - 9.0	6.4-8.15	6.54 - 8.34	6.5 - 9.0	6.5	6.7	**6.3**	**6.3**	7.0	7.0	6.9	6.9	7.2	7.0
Temperature (°C)					0.64	0.60	0.60	0.69	6.2	6.9	13	14	11	10
Physical Tests (mg/L)														
Conductivity (µS/cm)		27	37		**35**	**34**	**37**	**34**	27	27	27	26	27	27
Alkalinity - Bicarbonate		8.7	18		**12**	**12**	**12**	**11**	8.4	8.3	**8.8**	**8.8**	8.7	8.5
Alkalinity - Carbonate		2.0	2.0		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total (as $CaCO_3$)		8.7	18		**12**	**12**	**12**	**11**	8.4	8.3	**8.8**	**8.8**	8.7	8.5
Hardness (as CaCO3), dissolved		9.5	17		**13**	**13**	**15**	**13**	**11**	**10**	**11**	**11**	**10**	**10**
Hardness (as CaCO3), from total Ca/Mg					13	14	14	13	10	10	11	11	10	10
Total Dissolved Solids (TDS)		19	25		**23**	**23**	**23**	**21**	18	18	**20**	**19**	**20**	18
Total Suspended Solids (TSS)		3.0	3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Turbidity (NTU)					0.18	0.14	*<0.10*	*<0.10*	0.18	0.20	0.16	0.15	0.19	0.18
pH (Laboratory)	6.47-7.95	6.47-7.95	6.92 - 8.17	6.5 - 9.0	7.4	7.3	7.4	7.4	7.3	7.3	7.2	7.2	7.2	7.2
Anions and Nutrients (mg/L)														
Ammonia (as N)[3]	***equation***	0.065	0.067	0.13	0.014	0.015	0.017	0.017	*<0.0050*	*<0.0050*	0.014	0.0077	0.0071	*<0.0050*
Bromide					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Chloride	120	60	60	120	1.0	1.1	1.1	1.0	0.83	0.81	0.81	0.81	0.86	0.87
Fluoride	0.12	0.088	0.080	0.12	0.046	0.043	0.053	0.049	0.042	0.041	0.040	0.039	0.044	0.044
Total Kjeldahl Nitrogen		0.17	0.16		0.12	0.12	0.12	0.11	0.11	0.11	0.11	0.11	0.082	0.081
Nitrate (as N)	3.0	1.5	1.5	3.0	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.06	0.031	0.031	0.060	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Ortho Phosphate (as P)		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0016	0.0018	*<0.0010*	*<0.0010*
Phosphorus (P) - Total	0.01	0.0051	0.0067	0.010	0.0023	~~0.031~~	*<0.0020*	*<0.0020*	0.0042	0.0022	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*
Phosphorus (P) - Total Diss.					*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.0022	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*
Reactive Silica (as SiO_2)		1.0	1.1		*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Sulphate (SO_4)		65	65	128	2.6	2.6	2.9	2.6	2.1	2.1	2.1	2.1	2.2	2.2
Cyanides (mg/L)														
Free Cyanide	0.005				*<0.0010*	-	*<0.0050*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-
Total Cyanide					*<0.0010*	-	*<0.0050*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon		2.5	3.2		1.9	2.0	1.8	1.7	1.5	1.6	1.8	1.4	1.7	1.9
Total Organic Carbon		2.6	4.1		1.9	1.9	1.9	1.8	1.5	1.4	1.5	1.5	1.7	1.5
Total Metals (mg/L)														
Aluminum[3]	***equation***	0.053	0.053	0.10	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	0.0051	0.0054	0.0043	0.0044	0.0037	0.0037
Antimony		0.0046	0.0046	0.0090	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.005	0.0026	0.0026	0.0050	0.00025	0.00024	0.00023	0.00022	0.00021	0.00023	0.00021	0.00022	0.00021	0.00022
Barium		0.50	0.50	1.0	0.0027	0.0026	0.0028	0.0025	0.0022	0.0022	0.0021	0.0022	0.0021	0.0021
Beryllium		0.00012	0.00012	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.76	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	0.00002	0.00002	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		2.4	4.9		**3.4**	**3.5**	**3.6**	**3.2**	**2.6**	**2.6**	**2.6**	**2.7**	**2.6**	**2.6**
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium[4]	0.001	0.0025	0.0026	0.0050	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt	0.00077			0.00077	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0012	0.0015	0.0020	0.00057	0.00054	0.00051	0.00050	0.00052	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.15	0.16	0.30	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.011	0.014	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead[3]	***equation***	0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.93	1.4		**1.2**	**1.2**	**1.3**	**1.1**	0.93	0.93	**0.96**	**0.97**	**0.96**	**0.95**
Manganese[3]	***equation***	0.32	0.33	***See note 3***	0.00071	0.00060	0.00048	0.00046	0.0027	0.0028	0.0019	0.0018	0.0019	0.0020
Mercury	0.000026	0.00002	0.00002	0.00003	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.037	0.037	0.073	0.00007	0.00007	0.00008	0.00007	0.00028	0.00005	0.00006	0.00006	0.00006	0.00005
Nickel[3]	***equation***	0.013	0.013	0.025	0.00077	0.00075	0.00073	0.00066	0.00073	0.00072	0.00061	0.00065	0.00060	0.00058
Phosphorus		0.0051	0.0067	0.0040	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.58	0.59		0.48	0.48	0.58	0.52	0.37	0.37	0.41	0.42	0.36	0.37
Rubidium					0.00062	0.00063	0.00070	0.00067	0.00050	0.00051	0.00051	0.00054	0.00049	0.00048
Selenium	0.001	0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.20	0.65		**0.21**	**0.23**	**0.23**	**0.21**	**0.21**	0.20	0.18	0.20	0.16	0.16
Silver	0.0001	0.00013	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1.2	0.72		0.67	0.68	0.74	0.67	0.59	0.58	0.54	0.53	0.54	0.54
Strontium		1.25	1.26	2.5	0.014	0.015	0.016	0.015	0.012	0.011	0.012	0.012	0.012	0.012
Sulfur					0.74	0.78	1.0	0.99	0.65	0.69	0.70	0.86	0.68	0.81
Thallium	0.0008	0.00041	0.00041	0.00080	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin		0.00020	0.00020		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00060	0.00060		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Uranium	0.015	0.0075	0.0075	0.015	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003
Vanadium		0.060	0.060	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc				0.0040	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Dissolved Metals (mg/L)														
Aluminum[3]	***equation***	0.026	0.026	0.050	*<0.0010*	0.0012	0.0012	0.0027	0.0018	0.0011	0.0018	0.0016	0.0021	0.0014
Antimony		0.0046	0.0046	0.0090	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic		0.0026	0.0026	0.0050	0.00022	0.00023	0.00024	0.00021	0.00019	0.00018	0.00018	0.00020	0.00023	0.00018
Barium		0.50	0.50	1.0	0.0027	0.0026	0.0028	0.0025	0.0023	0.0020	0.0020	0.0020	0.0021	0.0021
Beryllium		0.00012	0.00012	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron		0.76	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium		0.00002	0.00002	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		2.4	4.9		**3.5**	**3.4**	**3.7**	**3.3**	**2.7**	**2.6**	**2.7**	**2.8**	**2.7**	**2.7**
Chromium		0.00026	0.00026	0.0050	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00013	*<0.00010*	*<0.00010*	0.00012	*<0.00010*
Cobalt				0.00077	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper		0.0012	0.0015	0.0020	0.00058	0.00054	0.00052	0.00050	0.00046	0.00048	0.00041	0.00039	0.00079	0.00092
Iron		0.16	0.16	0.30	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead		0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.93	1.4		**1.2**	**1.2**	**1.3**	**1.2**	**1.0**	**0.95**	0.90	0.90	0.90	0.91
Manganese[3]	***equation***	0.32	0.33	***See note 3***	*<0.00010*	0.00011	0.00015	0.00014	0.0015	0.0015	0.00062	0.00064	0.00088	0.00041
Mercury		0.00002	0.00002	0.00003	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum		0.037	0.037	0.073	0.00008	0.00008	0.00007	0.00007	0.00027	0.00007	0.00005	0.00006	0.00006	0.00006
Nickel		0.013	0.013	0.025	0.00071	0.00069	0.00075	0.00067	0.00068	0.00065	0.00058	0.00055	0.00065	0.00061
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.58	0.59		0.49	0.49	0.56	0.50	0.42	0.39	0.39	0.41	0.41	0.42
Selenium		0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.18	0.67		0.17	**0.19**	**0.21**	0.18	0.17	0.17	0.14	0.14	0.13	0.13
Silver		0.00013	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	0.00002
Sodium		1.2	0.72		0.69	0.69	0.76	0.67	0.57	0.53	0.54	0.54	0.55	0.56
Strontium		1.3	1.3	2.5	0.015	0.015	0.015	0.014	0.011	0.011	0.011	0.012	0.011	0.012
Sulfur					0.79	0.70	0.84	0.82	0.64	0.86	*<0.50*	*<0.50*	0.72	0.64
Thallium		0.00041	0.00041	0.00080	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin		0.00020	0.00020		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	~~0.00047~~	*<0.00010*
Titanium		0.00060	0.00060		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Uranium		0.0075	0.0075	0.015	0.00003	0.00003	0.00003	0.00003	0.00002	0.00003	0.00002	0.00002	0.00002	0.00002
Vanadium		0.060	0.060	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[3]	***equation***	0.0018	0.0024	***See note 3***	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	~~0.0023~~	0.0018
Plant Pigments (µg/L)														
Chlorophyll a					0.36	0.23	0.10	0.079	0.33	0.14	0.14	0.12	0.16	0.22

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.
2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d) and updated in 2019. A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the CREMP: 2022 Plan Update (Azimuth, 2022b) for more details.
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

123 Bolded concentrations exceed the trigger value.
123 Bolded and shaded concentrations also exceed the threshold value.
Italicized numbers are below detection limits.
underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.3** for details).
~~strikethrough~~ = results flagged as unreliable in the QC assessment.
"-" not analyzed/not sampled.

Table C1-1. Water quality results from the 2024 CREMP, Meadowbank study area lakes.

Lake & Area		Meadowbank Screening Values[2]			Third Portage Lake - East Basin (TPE)									
Month					March	March	April/May	April/May	July	July	August	August	September	September
Area-Replicate ID					TPE-168	TPE-169	TPE-170	TPE-171	TPE-172	TPE-173	TPE-174	TPE-175	TPE-176	TPE-177
Date		Triggers			08-Mar-2024	08-Mar-2024	26-Apr-2024	26-Apr-2024	02-Jul-2024	02-Jul-2024	12-Aug-2024	12-Aug-2024	05-Sep-2024	05-Sep-2024
Time					14:00	15:00	00:00	00:00	11:30	11:45	09:30	10:00	15:10	15:40
ALS Sample ID	Aquatic Life Guideline[1]	Meadowbank	Wally Lake	Thresholds	VA24A5461-003 VA24A6007-011	VA24A5461-004 VA24A6007-012	VA24B0466-009	VA24B0466-010	VA24B6824-003	VA24B6824-004	VA24C1018-010 VA24C2044-012	VA24C1018-011 VA24C2044-013	VA24C4308-001	VA24C4308-002
Field Measurements (Surface 3m)														
Dissolved Oxygen (mg/L)					20	18	17	17	13	13	9.8	9.7	11	11
Specific Conductivity (µS/cm)					39	32	37	38	31	30	30	30	29	29
pH	6.5 - 9.0	6.4-8.15	6.54 - 8.34	6.5 - 9.0	**6.4**	**6.3**	**6.3**	**6.4**	**6.5**	**6.4**	7.2	7.4	7.0	6.9
Temperature (°C)					0.27	0.60	0.66	0.77	5.9	6.1	15	15	10	9.6
Physical Tests (mg/L)														
Conductivity (µS/cm)		27	37		**42**	**37**	**43**	**42**	**32**	**32**	**31**	**31**	**32**	**31**
Alkalinity - Bicarbonate		8.7	18		**11**	**9.4**	**10**	**9.9**	7.9	7.9	8.2	8.3	8.3	8.2
Alkalinity - Carbonate		2.0	2.0		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total (as $CaCO_3$)		8.7	18		**11**	**9.4**	**10**	**9.9**	7.9	7.9	8.2	8.3	8.3	8.2
Hardness (as CaCO3), dissolved		9.5	17		**15**	**13**	**15**	**15**	**11**	**11**	**11**	**11**	**11**	**11**
Hardness (as CaCO3), from total Ca/Mg					15	13	15	15	11	11	11	11	11	11
Total Dissolved Solids (TDS)		19	25		**27**	**24**	**23**	**23**	**20**	19	**24**	**22**	16	**19**
Total Suspended Solids (TSS)		3.0	3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Turbidity (NTU)					*<0.10*	0.15	*<0.10*	*<0.10*	0.19	0.19	0.15	0.22	0.30	0.21
pH (Laboratory)	6.47-7.95	6.47-7.95	6.92 - 8.17	6.5 - 9.0	7.3	7.3	7.4	7.4	7.2	7.1	7.2	7.2	7.1	7.1
Anions and Nutrients (mg/L)														
Ammonia (as N)[3]	***equation***	0.065	0.067	0.13	0.016	0.014	0.017	0.018	0.0059	0.0081	0.020	0.017	*<0.0050*	0.0078
Bromide					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Chloride	120	60	60	120	1.0	0.89	1.1	1.0	0.80	0.79	0.81	0.81	0.84	0.82
Fluoride	0.12	0.088	0.080	0.12	**0.095**	0.083	**0.10**	**0.099**	0.073	0.071	0.081	0.082	0.086	0.083
Total Kjeldahl Nitrogen		0.17	0.16		0.11	0.10	0.11	0.11	0.089	0.094	0.12	0.10	0.076	0.081
Nitrate (as N)	3.0	1.5	1.5	3.0	0.0086	0.0070	0.0099	0.013	0.013	0.015	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.06	0.031	0.031	0.060	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Ortho Phosphate (as P)		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Phosphorus (P) - Total	0.01	0.0051	0.0067	0.010	0.0023	*<0.0020*	*<0.0020*	*<0.0020*	0.0023	0.0025	*<0.0020*	0.0026	*<0.0020*	*<0.0020*
Phosphorus (P) - Total Diss.					*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.064	*<0.0020*	*<0.0020*
Reactive Silica (as SiO_2)		1.0	1.1		*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Sulphate (SO_4)		65	65	128	6.1	5.4	6.3	6.2	4.8	4.7	4.8	4.8	4.9	4.9
Cyanides (mg/L)														
Free Cyanide	0.005				*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-
Total Cyanide					*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon		2.5	3.2		1.6	1.3	1.7	1.6	1.2	1.4	1.5	2.2	1.1	1.1
Total Organic Carbon		2.6	4.1		1.7	1.4	1.4	1.6	1.4	1.6	1.3	1.4	1.2	1.2
Total Metals (mg/L)														
Aluminum[3]	***equation***	0.053	0.053	0.10	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	0.0075	0.0074	0.024	0.0064	0.0056	0.0049
Antimony		0.0046	0.0046	0.0090	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.005	0.0026	0.0026	0.0050	0.00056	0.00041	0.00046	0.00045	0.00058	0.00054	0.00054	0.00054	0.00066	0.00046
Barium		0.50	0.50	1.0	0.0036	0.0032	0.0037	0.0039	0.0032	0.0030	0.0027	0.0026	0.0026	0.0027
Beryllium		0.00012	0.00012	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.76	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	0.00002	0.00002	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		2.4	4.9		**3.6**	**3.2**	**3.5**	**3.5**	**2.7**	**2.7**	**2.8**	**2.8**	**2.7**	**2.6**
Cesium					0.00002	0.00001	0.00001	0.00001	0.00001	0.00001	0.00002	0.00002	0.00002	0.00001
Chromium[4]	0.001	0.0025	0.0026	0.0050	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00022	0.00010	0.00014	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt	0.00077			0.00077	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0012	0.0015	0.0020	0.00050	*<0.00050*	*<0.00050*	*<0.00050*	0.00053	*<0.00050*	0.00052	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.15	0.16	0.30	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.015	0.014	0.014	0.014	0.014	0.013
Lead[3]	***equation***	0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.93	1.4		**1.4**	**1.2**	**1.4**	**1.4**	**1.1**	**1.0**	**1.1**	**1.1**	**1.1**	**1.0**
Manganese[3]	***equation***	0.32	0.33	***See note 3***	0.00040	0.00039	0.00030	0.00030	0.0023	0.0026	0.0015	0.0013	0.0015	0.0015
Mercury	0.000026	0.00002	0.00002	0.00003	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.037	0.037	0.073	0.00014	0.00012	0.00014	0.00013	0.00011	0.00010	0.00012	0.00013	0.00011	0.00012
Nickel[3]	***equation***	0.013	0.013	0.025	0.00068	0.00054	0.00059	0.00061	0.00072	0.00070	0.00051	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus		0.0051	0.0067	0.0040	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.58	0.59		**0.67**	**0.59**	**0.78**	**0.76**	0.53	0.51	0.54	0.52	0.54	0.50
Rubidium					0.0011	0.00088	0.0010	0.0012	0.00091	0.00082	0.00082	0.00093	0.00094	0.00085
Selenium	0.001	0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.20	0.65		0.17	0.16	0.18	0.17	0.18	0.18	0.14	0.14	0.13	0.13
Silver	0.0001	0.00013	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1.2	0.72		**1.3**	1.1	**1.3**	**1.3**	0.98	0.91	1.0	1.0	0.96	0.97
Strontium		1.25	1.26	2.5	0.016	0.014	0.017	0.017	0.013	0.013	0.013	0.013	0.012	0.013
Sulfur					1.8	1.6	2.2	2.3	1.7	1.6	1.5	1.4	1.8	1.7
Thallium	0.0008	0.00041	0.00041	0.00080	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin		0.00020	0.00020		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00060	0.00060		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Uranium	0.015	0.0075	0.0075	0.015	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00003
Vanadium		0.060	0.060	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc				0.0040	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Dissolved Metals (mg/L)														
Aluminum[3]	***equation***	0.026	0.026	0.050	*<0.0010*	0.0010	*<0.0010*	0.0010	0.0016	0.0028	0.0027	0.0029	0.0014	0.0020
Antimony		0.0046	0.0046	0.0090	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic		0.0026	0.0026	0.0050	0.00050	0.00038	0.00066	0.00056	0.00061	0.00078	0.00051	0.00046	0.00045	0.00039
Barium		0.50	0.50	1.0	0.0037	0.0032	0.0038	0.0039	0.0028	0.0029	0.0027	0.0025	0.0026	0.0026
Beryllium		0.00012	0.00012	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron		0.76	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium		0.00002	0.00002	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		2.4	4.9		**3.7**	**3.1**	**3.6**	**3.6**	**2.6**	**2.6**	**2.7**	**2.8**	**2.7**	**2.8**
Chromium		0.00026	0.00026	0.0050	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt				0.00077	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper		0.0012	0.0015	0.0020	0.00044	0.00044	~~0.0059~~	~~0.0041~~	0.00061	0.00084	0.00037	0.00041	0.00040	0.00037
Iron		0.16	0.16	0.30	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead		0.00053	0.00053	0.0010	*<0.000050*	0.00024	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.93	1.4		**1.3**	**1.2**	**1.4**	**1.4**	**1.0**	**1.0**	**1.0**	**1.0**	**1.0**	**1.00**
Manganese[3]	***equation***	0.32	0.33	***See note 3***	0.00014	0.00013	0.00054	0.00037	0.0021	0.0031	0.00078	0.00077	0.00052	0.00061
Mercury		0.00002	0.00002	0.00003	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum		0.037	0.037	0.073	0.00014	0.00011	0.00013	0.00011	0.00015	0.00010	0.00011	0.00013	0.00011	0.00011
Nickel		0.013	0.013	0.025	0.00061	0.00053	0.0016	0.0012	0.0010	0.0014	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.58	0.59		**0.67**	**0.60**	**0.75**	**0.75**	0.50	0.53	0.55	0.55	0.54	0.55
Selenium		0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.18	0.67		0.13	0.12	0.15	0.13	0.13	0.13	0.096	0.091	0.080	0.082
Silver		0.00013	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1.2	0.72		**1.3**	**1.2**	**1.4**	**1.4**	0.91	0.93	0.98	0.99	0.96	0.95
Strontium		1.3	1.3	2.5	0.017	0.015	0.017	0.016	0.012	0.012	0.012	0.012	0.012	0.012
Sulfur					1.9	1.7	2.0	1.9	1.4	1.4	1.3	1.4	1.6	1.5
Thallium		0.00041	0.00041	0.00080	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin		0.00020	0.00020		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	~~0.00025~~	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00060	0.00060		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Uranium		0.0075	0.0075	0.015	0.00004	0.00004	0.00003	0.00003	0.00004	0.00004	0.00004	0.00004	0.00003	0.00003
Vanadium		0.060	0.060	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[3]	***equation***	0.0018	0.0024	***See note 3***	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Plant Pigments (µg/L)														
Chlorophyll a					0.40	0.18	0.12	0.19	0.097	0.084	0.14	0.11	0.42	0.30

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.
2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d) and updated in 2019. A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the CREMP: 2022 Plan Update (Azimuth, 2022b) for more details.
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

123 Bolded concentrations exceed the trigger value.
123 Bolded and shaded concentrations also exceed the threshold value.
Italicized numbers are below detection limits.
underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.3** for details).
~~strikethrough~~ = results flagged as unreliable in the QC assessment.
"-" not analyzed/not sampled.

Table C1-1. Water quality results from the 2024 CREMP, Meadowbank study area lakes.

Lake & Area		Meadowbank Screening Values[2]			Third Portage Lake - North Basin (TPN)									
Month					March	March	May	May	July	July	August	August	September	September
Area-Replicate ID	Aquatic Life Guideline[1]				TPN-168	TPN-169	TPN-170	TPN-171	TPN-172	TPN-173	TPN-174	TPN-175	TPN-176	TPN-177
Date		Triggers		Thresholds	07-Mar-2024	07-Mar-2024	26-Apr-2024	26-Apr-2024	09-Jul-2024	09-Jul-2024	09-Aug-2024	09-Aug-2024	05-Sep-2024	05-Sep-2024
Time					12:40, 14:00	13:00, 14:30	00:00	00:00	09:35	10:00	00:00	00:00	13:50	14:30
ALS Sample ID		Meadowbank	Wally Lake		VA24A5461-001 VA24A6007-009	VA24A5461-002 VA24A6007-010	VA24B0466-007	VA24B0466-008	VA24B7099-001	VA24B7099-002	VA24C1019-008 VA24C2044-022	VA24C1019-009 VA24C2044-016	VA24C4308-003	VA24C4308-005
Field Measurements (Surface 3m)														
Dissolved Oxygen (mg/L)					18	19	19	18	14	13	11	11	11	11
Specific Conductivity (µS/cm)					30	36	36	34	30	30	32	32	27	27
pH	6.5 - 9.0	6.4-8.15	6.54 - 8.34	6.5 - 9.0	**6.3**	**6.3**	**6.3**	**6.3**	6.8	6.7	6.6	6.6	7.1	7.0
Temperature (°C)					0.49	0.39	0.43	0.47	6.0	5.5	11	12	10	10
Physical Tests (mg/L)														
Conductivity (µS/cm)		27	37		**34**	**40**	**42**	**41**	**29**	**29**	**30**	**29**	**29**	**29**
Alkalinity - Bicarbonate		8.7	18		7.9	**10**	**9.3**	**9.0**	7.4	6.9	6.7	6.8	7.6	6.6
Alkalinity - Carbonate		2.0	2.0		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total (as $CaCO_3$)		8.7	18		7.9	**10**	**9.3**	**9.0**	7.4	6.9	6.7	6.8	7.6	6.6
Hardness (as CaCO3), dissolved		9.5	17		**12**	**13**	**18**	**14**	**9.6**	9.5	**10**	**9.8**	**9.5**	**9.7**
Hardness (as CaCO3), from total Ca/Mg					12	13	14	13	10	9.9	9.8	10	9.6	9.6
Total Dissolved Solids (TDS)		19	25		**20**	19	**30**	**22**	18	19	**19**	**20**	**23**	18
Total Suspended Solids (TSS)		3.0	3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Turbidity (NTU)					0.20	*<0.10*	*<0.10*	*<0.10*	0.12	0.14	0.15	0.14	0.17	0.15
pH (Laboratory)	6.47-7.95	6.47-7.95	6.92 - 8.17	6.5 - 9.0	7.1	7.3	7.3	7.3	7.1	7.1	7.1	7.1	7.1	7.1
Anions and Nutrients (mg/L)														
Ammonia (as N)[3]	***equation***	0.065	0.067	0.13	0.011	0.013	0.012	0.015	*<0.0050*	*<0.0050*	0.015	0.0079	0.0067	0.019
Bromide					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Chloride	120	60	60	120	0.92	1.0	1.2	1.1	0.80	0.79	0.80	0.80	0.86	0.86
Fluoride	0.12	0.088	0.080	0.12	0.074	0.080	**0.096**	**0.093**	0.064	0.064	0.064	0.063	0.075	0.074
Total Kjeldahl Nitrogen		0.17	0.16		0.085	0.099	0.11	0.11	0.080	0.077	0.10	0.10	0.082	0.085
Nitrate (as N)	3.0	1.5	1.5	3.0	0.0056	0.0054	0.0083	0.0065	0.0084	0.0094	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.06	0.031	0.031	0.060	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Ortho Phosphate (as P)		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	0.0014	*<0.0010*	*<0.0010*
Phosphorus (P) - Total	0.01	0.0051	0.0067	0.010	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	**0.014**	*<0.0020*	*<0.0020*
Phosphorus (P) - Total Diss.					*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.0024	*<0.0020*	0.036	*<0.0020*	*<0.0020*
Reactive Silica (as SiO_2)		1.0	1.1		*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Sulphate (SO_4)		65	65	128	5.2	5.7	6.3	6.2	4.4	4.3	4.4	4.4	4.7	4.7
Cyanides (mg/L)														
Free Cyanide	0.005				-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*
Total Cyanide					-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon		2.5	3.2		1.5	1.6	2.0	1.7	1.4	1.3	1.2	**2.9**	1.2	1.4
Total Organic Carbon		2.6	4.1		1.3	1.6	1.6	1.5	1.2	1.2	1.2	1.4	1.1	1.2
Total Metals (mg/L)														
Aluminum[3]	***equation***	0.053	0.053	0.10	0.0031	*<0.0030*	*<0.0030*	*<0.0030*	0.0072	0.0064	0.0043	0.0045	0.0042	0.0044
Antimony		0.0046	0.0046	0.0090	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.005	0.0026	0.0026	0.0050	0.00023	0.00025	0.00028	0.00026	0.00025	0.00027	0.00022	0.00024	0.00022	0.00022
Barium		0.50	0.50	1.0	0.0033	0.0037	0.0040	0.0038	0.0029	0.0028	0.0027	0.0028	0.0028	0.0028
Beryllium		0.00012	0.00012	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.76	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	0.00002	0.00002	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		2.4	4.9		**2.9**	**3.1**	**3.3**	**3.2**	2.3	2.3	2.3	**2.4**	2.3	2.3
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium[4]	0.001	0.0025	0.0026	0.0050	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	0.00012	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt	0.00077			0.00077	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0012	0.0015	0.0020	*<0.00050*	*<0.00050*	0.00051	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.15	0.16	0.30	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead[3]	***equation***	0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00009	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.93	1.4		**1.1**	**1.2**	**1.4**	**1.3**	**1.0**	**0.99**	**0.98**	**0.98**	**0.96**	**0.95**
Manganese[3]	***equation***	0.32	0.33	***See note 3***	0.00051	0.00046	0.00045	0.00038	0.0019	0.0018	0.0013	0.0016	0.0013	0.0014
Mercury	0.000026	0.00002	0.00002	0.00003	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.037	0.037	0.073	0.00011	0.00013	0.00013	0.00013	0.00010	0.00011	0.00009	0.00009	0.00010	0.00009
Nickel[3]	***equation***	0.013	0.013	0.025	0.00057	0.00056	0.00061	0.00055	0.00060	0.00058	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus		0.0051	0.0067	0.0040	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.58	0.59		0.58	**0.65**	**0.79**	**0.75**	0.52	0.49	0.50	0.50	0.47	0.47
Rubidium					0.00091	0.00097	0.0011	0.00098	0.00082	0.00077	0.00074	0.00071	0.00071	0.00072
Selenium	0.001	0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.20	0.65		0.13	0.14	0.14	0.14	0.14	0.14	0.12	0.12	0.10	0.10
Silver	0.0001	0.00013	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1.2	0.72		**1.2**	**1.3**	**1.5**	**1.4**	1.0	1.0	1.0	1.0	1.0	1.0
Strontium		1.25	1.26	2.5	0.013	0.015	0.016	0.016	0.011	0.011	0.011	0.012	0.012	0.011
Sulfur					1.8	1.9	2.0	2.2	1.5	1.9	1.4	1.4	1.5	1.5
Thallium	0.0008	0.00041	0.00041	0.00080	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin		0.00020	0.00020		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00060	0.00060		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Uranium	0.015	0.0075	0.0075	0.015	0.00004	0.00004	0.00005	0.00005	0.00004	0.00004	0.00004	0.00004	0.00004	0.00003
Vanadium		0.060	0.060	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc				0.0040	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Dissolved Metals (mg/L)														
Aluminum[3]	***equation***	0.026	0.026	0.050	*<0.0010*	0.0011	0.0018	0.0020	0.0021	0.0026	0.0029	0.0020	0.0045	0.0018
Antimony		0.0046	0.0046	0.0090	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic		0.0026	0.0026	0.0050	0.00021	0.00022	0.00079	0.00052	0.00022	0.00020	0.00020	0.00022	0.00022	0.00021
Barium		0.50	0.50	1.0	0.0033	0.0035	0.0040	0.0038	0.0027	0.0027	0.0028	0.0027	0.0026	0.0027
Beryllium		0.00012	0.00012	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron		0.76	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium		0.00002	0.00002	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		2.4	4.9		**2.9**	**3.1**	**4.9**	**3.3**	2.3	2.3	**2.5**	**2.4**	2.4	2.4
Chromium		0.00026	0.00026	0.0050	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt				0.00077	*<0.00010*	*<0.00010*	~~**0.0015**~~	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper		0.0012	0.0015	0.0020	0.00038	0.00043	~~**0.027**~~	~~**0.0049**~~	0.00037	0.00036	0.00038	0.00037	0.00038	0.00044
Iron		0.16	0.16	0.30	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead		0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00006	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.93	1.4		**1.1**	**1.2**	**1.4**	**1.3**	0.92	0.92	**0.95**	0.90	0.89	0.92
Manganese[3]	***equation***	0.32	0.33	***See note 3***	0.00012	0.00019	0.00064	0.00054	0.0013	0.0013	0.0013	0.0010	0.00070	0.00086
Mercury		0.00002	0.00002	0.00003	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum		0.037	0.037	0.073	0.00012	0.00012	0.00042	0.00013	0.00010	0.00008	0.00009	0.00009	0.00010	0.00009
Nickel		0.013	0.013	0.025	*<0.00050*	0.00055	0.0098	0.0020	0.00051	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	0.059	*<0.050*	*<0.050*	*<0.050*
Potassium		0.58	0.59		0.57	**0.65**	**1.4**	**0.71**	0.48	0.49	**0.59**	0.51	0.51	0.53
Selenium		0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	~~**0.00075**~~	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.18	0.67		0.098	0.10	0.11	0.11	0.094	0.097	0.077	0.078	0.070	0.071
Silver		0.00013	0.00013	0.00025	*<0.000010*	*<0.000010*	0.00002	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1.2	0.72		1.2	**1.3**	**3.5**	**1.4**	0.94	0.93	1.0	0.97	0.96	0.98
Strontium		1.3	1.3	2.5	0.013	0.015	0.025	0.015	0.010	0.0100	0.011	0.011	0.011	0.011
Sulfur					1.8	1.8	4.7	2.1	1.5	1.4	1.2	1.3	1.4	1.7
Thallium		0.00041	0.00041	0.00080	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin		0.00020	0.00020		*<0.00010*	*<0.00010*	~~**0.00021**~~	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00020	*<0.00010*	*<0.00010*
Titanium		0.00060	0.00060		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Uranium		0.0075	0.0075	0.015	0.00004	0.00005	0.00006	0.00004	0.00003	0.00003	0.00003	0.00003	0.00003	0.00003
Vanadium		0.060	0.060	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[3]	***equation***	0.0018	0.0024	***See note 3***	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0013	*<0.0010*	*<0.0010*	*<0.0010*
Plant Pigments (µg/L)														
Chlorophyll a					0.48	0.19	0.57	0.28	0.35	0.17	0.072	0.087	0.18	0.21

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.
2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d) and updated in 2019. A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the CREMP: 2022 Plan Update (Azimuth, 2022b) for more details.
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

123 Bolded concentrations exceed the trigger value.
123 Bolded and shaded concentrations also exceed the threshold value.
Italicized numbers are below detection limits.
underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.3** for details).
~~strikethrough~~ = results flagged as unreliable in the QC assessment.
"-" not analyzed/not sampled.

Table C1-1. Water quality results from the 2024 CREMP, Meadowbank study area lakes.

Lake & Area		Meadowbank Screening Values[2]			Second Portage Lake (SP)									
Month					March	March	April/May	April/May	July	July	August	August	September	September
Area-Replicate ID					SP-168	SP-169	SP-170	SP-171	SP-172	SP-173	SP-174	SP-175	SP-176	SP-177
Date	Aquatic Life Guideline[1]	Triggers		Thresholds	09-Mar-2024	09-Mar-2024	27-Apr-2024	27-Apr-2024	03-Jul-2024	02-Jul-2024	14-Aug-2024	14-Aug-2024	08-Sep-2024	08-Sep-2024
Time					15:30, 16:15	14:00, 16:00	00:00	00:00	11:30	11:30	09:30	09:05	13:15	13:45
ALS Sample ID		Meadowbank	Wally Lake		VA24A4997-001 VA24A6007-007	VA24A4997-002 VA24A6007-008	VA24B0466-005	VA24B0466-006	VA24B6824-008 VA24C2044-004	VA24B6824-005	VA24C2044-002	VA24C2044-001	VA24C4308-011	VA24C4308-012
Field Measurements (Surface 3m)														
Dissolved Oxygen (mg/L)					17	18	15	18	12	12	8.7	8.7	11	11
Specific Conductivity (µS/cm)					42	46	49	50	42	41	41	41	36	37
pH	6.5 - 9.0	6.4-8.15	6.54 - 8.34	6.5 - 9.0	6.5	6.8	6.6	6.6	6.8	6.8	7.2	7.1	7.2	7.4
Temperature (°C)					0.73	0.72	0.81	0.90	7.7	8.2	14	15	9.7	9.8
Physical Tests (mg/L)														
Conductivity (µS/cm)		27	37		**50**	**53**	**56**	**56**	**42**	**41**	**42**	**43**	**41**	**42**
Alkalinity - Bicarbonate		8.7	18		**14**	**15**	**15**	**15**	**12**	**12**	**12**	**13**	**11**	**11**
Alkalinity - Carbonate		2.0	2.0		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total (as $CaCO_3$)		8.7	18		**14**	**15**	**15**	**15**	**12**	**12**	**12**	**13**	**11**	**11**
Hardness (as CaCO3), dissolved		9.5	17		**21**	**23**	**22**	**21**	**17**	**16**	**16**	**16**	**16**	**16**
Hardness (as CaCO3), from total Ca/Mg					20	21	20	21	17	17	16	16	16	16
Total Dissolved Solids (TDS)		19	25		**28**	**32**	**34**	**33**	**28**	**26**	**21**	**28**	**25**	**23**
Total Suspended Solids (TSS)		3.0	3.0	5.0	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Turbidity (NTU)					0.34	0.11	*<0.10*	*<0.10*	0.26	0.40	0.20	0.20	0.22	0.20
pH (Laboratory)	6.47-7.95	6.47-7.95	6.92 - 8.17	6.5 - 9.0	7.3	7.4	7.5	7.5	7.2	7.4	7.3	7.3	7.3	7.3
Anions and Nutrients (mg/L)														
Ammonia (as N)[3]	***equation***	0.065	0.067	0.13	0.018	0.013	0.017	0.018	*<0.0050*	*<0.0050*	0.020	0.035	0.0067	0.0061
Bromide					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Chloride	120	60	60	120	1.2	1.2	1.3	1.3	1.1	1.0	0.92	0.91	0.98	1.0
Fluoride	0.12	0.088	0.080	0.12	0.086	**0.091**	**0.097**	**0.098**	0.066	0.066	0.075	0.071	0.080	0.079
Total Kjeldahl Nitrogen		0.17	0.16		0.17	0.13	0.13	0.15	0.12	0.12	0.13	0.15	0.087	0.11
Nitrate (as N)	3.0	1.5	1.5	3.0	0.016	0.013	0.017	0.017	0.0055	0.0062	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.06	0.031	0.031	0.060	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Ortho Phosphate (as P)		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0016	*<0.0010*	*<0.0010*	*<0.0010*
Phosphorus (P) - Total	0.01	0.0051	0.0067	0.010	*<0.0020*	*<0.0020*	*<0.0020*	0.0043	0.0034	0.0032	0.0028	0.0028	0.0020	*<0.0020*
Phosphorus (P) - Total Diss.					*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*
Reactive Silica (as SiO_2)		1.0	1.1		0.90	0.96	0.98	0.90	0.86	0.80	0.65	0.66	0.60	0.63
Sulphate (SO_4)		65	65	128	6.7	7.1	7.2	7.3	5.7	5.7	5.3	5.2	5.7	5.7
Cyanides (mg/L)														
Free Cyanide	0.005				*<0.0010*	-	-	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-
Total Cyanide					*<0.0010*	-	-	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon		2.5	3.2		2.3	1.9	2.2	2.1	1.9	1.8	2.0	2.0	1.6	1.7
Total Organic Carbon		2.6	4.1		**2.7**	2.1	2.1	2.1	2.0	2.1	2.2	1.9	1.6	1.7
Total Metals (mg/L)														
Aluminum[3]	***equation***	0.053	0.053	0.10	*<0.0030*	0.0031	*<0.0030*	*<0.0030*	0.011	0.011	0.0048	0.0056	*<0.0030*	*<0.0030*
Antimony		0.0046	0.0046	0.0090	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.005	0.0026	0.0026	0.0050	0.00050	0.00049	0.00045	0.00048	0.00042	0.00050	0.00045	0.00043	0.00041	0.00041
Barium		0.50	0.50	1.0	0.0033	0.0038	0.0036	0.0036	0.0030	0.0032	0.0028	0.0027	0.0026	0.0027
Beryllium		0.00012	0.00012	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.76	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	0.00002	0.00002	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		2.4	4.9		**5.1**	**5.4**	**5.2**	**5.5**	**4.5**	**4.4**	**4.2**	**4.2**	**4.0**	**4.2**
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium[4]	0.001	0.0025	0.0026	0.0050	*<0.00050*	*<0.00050*	*<0.00010*	*<0.00010*	*<0.00010*	0.00011	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt	0.00077			0.00077	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0012	0.0015	0.0020	0.00084	0.00089	0.00084	0.00086	0.00087	0.00075	0.00070	0.00067	0.00056	0.00057
Iron	0.3	0.15	0.16	0.30	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.028	0.029	0.021	0.023	*<0.010*	*<0.010*
Lead[3]	***equation***	0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.93	1.4		**1.7**	**1.8**	**1.8**	**1.8**	**1.5**	**1.5**	**1.4**	**1.4**	**1.4**	**1.4**
Manganese[3]	***equation***	0.32	0.33	***See note 3***	0.00065	0.00067	0.00046	0.00056	0.0030	0.0031	0.0021	0.0019	0.0011	0.00095
Mercury	0.000026	0.00002	0.00002	0.00003	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.037	0.037	0.073	0.00015	0.00017	0.00015	0.00015	0.00011	0.00012	0.00013	0.00014	0.00014	0.00014
Nickel[3]	***equation***	0.013	0.013	0.025	*<0.00050*	0.00055	0.00058	0.00056	0.00064	0.00064	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus		0.0051	0.0067	0.0040	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.58	0.59		**0.71**	**0.75**	**0.76**	**0.79**	0.55	0.57	**0.59**	**0.60**	0.52	0.52
Rubidium					0.0011	0.0011	0.0011	0.0011	0.00084	0.00090	0.00088	0.00081	0.00084	0.00086
Selenium	0.001	0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.20	0.65		**0.47**	**0.49**	**0.51**	**0.52**	**0.44**	**0.41**	**0.33**	**0.34**	**0.30**	**0.29**
Silver	0.0001	0.00013	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1.2	0.72		1.1	1.2	1.1	1.1	0.82	0.90	0.84	0.82	0.80	0.79
Strontium		1.25	1.26	2.5	0.024	0.026	0.026	0.029	0.021	0.021	0.021	0.022	0.021	0.021
Sulfur					2.2	2.5	2.6	2.7	1.6	1.8	1.8	1.8	1.8	1.7
Thallium	0.0008	0.00041	0.00041	0.00080	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin		0.00020	0.00020		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00060	0.00060		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Uranium	0.015	0.0075	0.0075	0.015	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00003	0.00003
Vanadium		0.060	0.060	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc				0.0040	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Dissolved Metals (mg/L)														
Aluminum[3]	***equation***	0.026	0.026	0.050	0.0018	0.0029	0.0013	0.0011	0.0028	0.0024	0.0034	0.0023	0.0015	0.0017
Antimony		0.0046	0.0046	0.0090	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic		0.0026	0.0026	0.0050	0.00045	0.00050	0.00063	0.00059	0.00040	0.00041	0.00044	0.00038	0.00038	0.00036
Barium		0.50	0.50	1.0	0.0032	0.0036	0.0038	0.0037	0.0031	0.0031	0.0026	0.0024	0.0026	0.0025
Beryllium		0.00012	0.00012	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron		0.76	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium		0.00002	0.00002	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		2.4	4.9		**5.3**	**5.8**	**5.5**	**5.5**	**4.3**	**4.2**	**4.2**	**4.3**	**4.2**	**4.3**
Chromium		0.00026	0.00026	0.0050	*<0.00050*	*<0.00050*	~~**0.00059**~~	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt				0.00077	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper		0.0012	0.0015	0.0020	0.00080	0.00090	~~**0.0030**~~	~~**0.0041**~~	0.00071	0.00067	0.00065	0.00066	0.00058	0.00058
Iron		0.16	0.16	0.30	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead		0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.93	1.4		**1.9**	**2.0**	**1.9**	**1.9**	**1.4**	**1.4**	**1.3**	**1.4**	**1.4**	**1.3**
Manganese[3]	***equation***	0.32	0.33	***See note 3***	0.00029	0.00040	0.00067	0.00050	0.0021	0.0020	0.00051	0.00044	0.00056	0.00051
Mercury		0.00002	0.00002	0.00003	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum		0.037	0.037	0.073	0.00016	0.00016	0.00017	0.00016	0.00011	0.00011	0.00012	0.00013	0.00013	0.00014
Nickel		0.013	0.013	0.025	0.00055	0.00061	0.0015	0.0011	0.00060	0.00058	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.58	0.59		**0.70**	**0.75**	**0.77**	**0.74**	0.57	0.56	0.52	0.52	**0.61**	**0.59**
Selenium		0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.18	0.67		**0.44**	**0.46**	**0.45**	**0.46**	**0.39**	**0.35**	**0.27**	**0.28**	**0.25**	**0.26**
Silver		0.00013	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1.2	0.72		1.1	1.2	**1.2**	1.1	0.81	0.82	0.84	0.84	0.86	0.82
Strontium		1.3	1.3	2.5	0.025	0.027	0.026	0.026	0.021	0.020	0.019	0.020	0.021	0.021
Sulfur					2.0	2.3	2.2	2.2	1.7	1.8	1.7	2.0	1.7	2.0
Thallium		0.00041	0.00041	0.00080	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin		0.00020	0.00020		*<0.00010*	*<0.00010*	~~**0.0011**~~	~~**0.00028**~~	~~**0.0011**~~	0.00012	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00060	0.00060		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Uranium		0.0075	0.0075	0.015	0.00004	0.00005	0.00005	0.00004	0.00004	0.00004	0.00005	0.00005	0.00003	0.00004
Vanadium		0.060	0.060	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[3]	***equation***	0.0018	0.0024	***See note 3***	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Plant Pigments (µg/L)														
Chlorophyll a					0.23	0.22	0.23	0.31	0.23	0.35	0.29	0.34	0.64	0.52

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.
2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d) and updated in 2019. A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the CREMP: 2022 Plan Update (Azimuth, 2022b) for more details.
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

123 Bolded concentrations exceed the trigger value.
123 Bolded and shaded concentrations also exceed the threshold value.
Italicized numbers are below detection limits.
underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.3** for details).
~~strikethrough~~ = results flagged as unreliable in the QC assessment.
"-" not analyzed/not sampled.

Table C1-1. Water quality results from the 2024 CREMP, Meadowbank study area lakes.

Lake & Area		Meadowbank Screening Values[2]			Wally Lake (WAL)									
Month					March	March	April/May	April/May	July	July	August	August	September	September
Area-Replicate ID	Aquatic Life Guideline[1]				WAL-137	WAL-138	WAL-139	WAL-140	WAL-141	WAL-142	WAL-143	WAL-144	WAL-145	WAL-146
Date		Triggers		Thresholds	08-Mar-2024	08-Mar-2024	27-Apr-2024	27-Apr-2024	03-Jul-2024	03-Jul-2024	09-Aug-2024	09-Aug-2024	05-Sep-2024	05-Sep-2024
Time					14:30	15:00	00:00	00:00	15:30	16:00	15:19	16:20	11:05	11:35
ALS Sample ID		Meadowbank	Wally Lake		VA24A5461-008 VA24A6007-017	VA24A5461-009 VA24A6007-018	VA24B0466-011	VA24B0466-012	VA24B6824-007	VA24B6824-006	VA24C1019-005 VA24C2044-020	VA24C1019-006 VA24C2044-024	VA24C4308-006	VA24C4308-007
Field Measurements (Surface 3m)														
Dissolved Oxygen (mg/L)					18	15	12	12	12	12	10	10	11	11
Specific Conductivity (µS/cm)					70	51	58	66	37	40	41	42	41	42
pH	6.5 - 9.0	6.4-8.15	6.54 - 8.34	6.5 - 9.0	6.6	6.6	**6.3**	**6.4**	6.8	6.9	7.1	7.4	7.5	7.3
Temperature (°C)					1.3	1.5	1.7	2.1	7.4	7.8	15	15	8.7	8.4
Physical Tests (mg/L)														
Conductivity (µS/cm)		27	37		**80**	**61**	**68**	**75**	**37**	**41**	**42**	**43**	**44**	**45**
Alkalinity - Bicarbonate		8.7	18		**30**	**23**	**23**	**25**	12	13	13	14	14	14
Alkalinity - Carbonate		2.0	2.0		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide					*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total (as $CaCO_3$)		8.7	18		**30**	**23**	**23**	**25**	12	13	13	14	14	14
Hardness (as CaCO3), dissolved		9.5	17		**33**	**25**	**28**	**32**	16	**17**	**18**	**18**	**19**	**18**
Hardness (as CaCO3), from total Ca/Mg					35	26	27	30	16	17	17	18	18	18
Total Dissolved Solids (TDS)		19	25		**54**	**33**	**45**	**52**	**27**	**28**	**30**	**33**	**30**	**29**
Total Suspended Solids (TSS)		3.0	3.0	5.0	*<1.0*	*<1.0*	~~*<1.0*~~	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Turbidity (NTU)					0.16	0.17	*<0.10*	*<0.10*	0.19	0.17	0.16	0.16	0.17	0.22
pH (Laboratory)	6.47-7.95	6.47-7.95	6.92 - 8.17	6.5 - 9.0	7.7	7.6	7.7	7.7	7.2	7.2	7.4	7.4	7.4	7.4
Anions and Nutrients (mg/L)														
Ammonia (as N)[3]	***equation***	0.065	0.067	0.13	0.017	0.016	0.019	0.017	*<0.0050*	*<0.0050*	0.016	0.014	*<0.0050*	0.0085
Bromide					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Chloride	120	60	60	120	0.94	0.75	0.85	0.93	0.53	0.55	0.58	0.58	0.62	0.62
Fluoride	0.12	0.088	0.080	0.12	0.064	0.061	0.073	0.079	0.044	0.043	0.054	0.053	0.058	0.058
Total Kjeldahl Nitrogen		0.17	0.16		**0.17**	0.15	**0.17**	**0.17**	0.14	0.11	0.16	**0.16**	0.15	0.14
Nitrate (as N)	3.0	1.5	1.5	3.0	0.018	0.011	0.015	0.016	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.06	0.031	0.031	0.060	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Ortho Phosphate (as P)		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	**0.0026**	**0.0023**	*<0.0010*	*<0.0010*
Phosphorus (P) - Total	0.01	0.0051	0.0067	0.010	0.0024	0.0021	0.0023	*<0.0020*	**0.0070**	0.0033	0.0026	0.0029	0.0023	0.0043
Phosphorus (P) - Total Diss.					*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.0022	0.0024	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*
Reactive Silica (as SiO_2)		1.0	1.1		**2.4**	**1.9**	**2.2**	**2.4**	1.1	**1.1**	1.0	1.0	**1.3**	**1.3**
Sulphate (SO_4)		65	65	128	9.6	6.9	7.5	8.4	4.4	4.9	5.1	5.2	5.6	5.7
Cyanides (mg/L)														
Free Cyanide	0.005				*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-
Total Cyanide					*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-	*<0.0010*	-
Organic / Inorganic Carbon (mg/L)														
Dissolved Organic Carbon		2.5	3.2		3.1	2.9	2.8	2.9	2.5	2.1	2.0	2.7	2.0	2.0
Total Organic Carbon		2.6	4.1		3.3	3.0	2.8	3.0	2.3	2.5	2.2	2.1	2.1	2.1
Total Metals (mg/L)														
Aluminum[3]	***equation***	0.053	0.053	0.10	*<0.0030*	*<0.0030*	0.0037	0.0050	0.0092	0.0075	0.0050	0.0054	0.0055	0.0034
Antimony		0.0046	0.0046	0.0090	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.005	0.0026	0.0026	0.0050	0.00051	0.00044	0.00039	0.00042	0.00030	0.00033	0.00040	0.00042	0.00038	0.00042
Barium		0.50	0.50	1.0	0.0044	0.0033	0.0036	0.0041	0.0024	0.0025	0.0021	0.0021	0.0020	0.0021
Beryllium		0.00012	0.00012	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.76	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	0.00002	0.00002	0.00004	*<0.0000050*	*<0.0000050*	0.00001	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		2.4	4.9		**9.3**	**6.9**	**7.1**	**7.9**	4.2	4.5	4.6	4.8	4.7	4.9
Cesium					*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium[4]	0.001	0.0025	0.0026	0.0050	*<0.00010*	*<0.00010*	*<0.00010*	0.00012	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt	0.00077			0.00077	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0012	0.0015	0.0020	0.0015	0.0012	0.0013	0.0013	0.00097	0.0011	0.0010	0.0010	0.00092	0.00096
Iron	0.3	0.15	0.16	0.30	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.020	0.020	0.017	0.016	0.015	0.016
Lead[3]	***equation***	0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.93	1.4		**2.8**	**2.1**	**2.2**	**2.5**	1.3	**1.4**	**1.5**	**1.5**	**1.5**	**1.5**
Manganese[3]	***equation***	0.32	0.33	***See note 3***	0.0019	0.0011	0.0010	0.00092	0.0030	0.0028	0.0014	0.0011	0.0014	0.0012
Mercury	0.000026	0.00002	0.00002	0.00003	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.037	0.037	0.073	0.00022	0.00020	0.00021	0.00022	0.00011	0.00014	0.00015	0.00018	0.00018	0.00018
Nickel[3]	***equation***	0.013	0.013	0.025	0.00065	*<0.00050*	0.00050	0.00056	*<0.00050*	0.00051	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus		0.0051	0.0067	0.0040	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.58	0.59		**0.75**	**0.61**	**0.76**	**0.82**	0.41	0.41	0.49	0.49	0.44	0.44
Rubidium					0.0010	0.00096	0.0010	0.0011	0.00068	0.00061	0.00072	0.00072	0.00071	0.00068
Selenium	0.001	0.00053	0.00053	0.0010	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.20	0.65		**1.3**	**0.97**	**1.1**	**1.2**	0.56	0.54	0.55	0.54	0.52	0.58
Silver	0.0001	0.00013	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1.2	0.72		**1.0**	**0.82**	**0.95**	**1.0**	0.58	0.57	0.62	0.61	0.62	0.63
Strontium		1.25	1.26	2.5	0.047	0.034	0.037	0.042	0.022	0.024	0.024	0.025	0.027	0.027
Sulfur					3.1	2.3	2.8	2.8	1.5	1.7	1.6	1.8	1.7	1.8
Thallium	0.0008	0.00041	0.00041	0.00080	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin		0.00020	0.00020		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00060	0.00060		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Uranium	0.015	0.0075	0.0075	0.015	0.00008	0.00005	0.00006	0.00006	0.00005	0.00006	0.00006	0.00006	0.00005	0.00005
Vanadium		0.060	0.060	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc				0.0040	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Dissolved Metals (mg/L)														
Aluminum[3]	***equation***	0.026	0.026	0.050	0.0015	*<0.0010*	0.0012	0.0011	0.0097	0.0054	0.0029	0.0039	0.0024	0.0012
Antimony		0.0046	0.0046	0.0090	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic		0.0026	0.0026	0.0050	0.00050	0.00038	0.00052	0.00049	0.00030	0.00033	0.00033	0.00042	0.00035	0.00036
Barium		0.50	0.50	1.0	0.0044	0.0031	0.0038	0.0042	0.0024	0.0024	0.0020	0.0021	0.0021	0.0021
Beryllium		0.00012	0.00012	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth					*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron		0.76	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium		0.00002	0.00002	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		2.4	4.9		**8.8**	**6.8**	**7.3**	**8.3**	4.1	4.5	4.8	**4.9**	**5.0**	4.9
Chromium		0.00026	0.00026	0.0050	~~**0.0026**~~	*<0.00010*	*<0.00010*	*<0.00010*	~~**0.00035**~~	0.00011	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt				0.00077	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper		0.0012	0.0015	0.0020	0.0015	0.0011	~~**0.0063**~~	~~**0.0044**~~	0.00090	0.0011	0.00090	0.00092	0.0010	0.00091
Iron		0.16	0.16	0.30	0.011	*<0.010*	*<0.010*	*<0.010*	0.020	0.013	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead		0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0020	0.0020		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.93	1.4		**2.8**	**2.0**	**2.4**	**2.7**	1.3	1.4	**1.4**	**1.5**	**1.5**	**1.5**
Manganese[3]	***equation***	0.32	0.33	***See note 3***	0.0013	0.00062	0.00070	0.00050	0.0027	0.0021	0.00035	0.00033	0.00041	0.00040
Mercury		0.00002	0.00002	0.00003	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum		0.037	0.037	0.073	0.00025	0.00019	0.00017	0.00021	0.00011	0.00014	0.00016	0.00018	0.00016	0.00017
Nickel		0.013	0.013	0.025	0.0022	*<0.00050*	0.00077	0.00086	*<0.00050*	0.00051	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus					*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.58	0.59		**0.73**	**0.61**	**0.74**	**0.79**	0.43	0.42	0.48	0.50	0.49	0.49
Selenium		0.00053	0.00053	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.18	0.67		**1.2**	**0.97**	**1.1**	**1.1**	0.51	0.49	0.49	0.49	0.54	0.55
Silver		0.00013	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1.2	0.72		**1.0**	**0.82**	**1.00**	**1.1**	0.58	0.57	0.63	0.65	0.64	0.64
Strontium		1.3	1.3	2.5	0.047	0.034	0.036	0.040	0.021	0.023	0.025	0.026	0.025	0.024
Sulfur					3.0	2.2	2.4	2.5	1.5	1.5	1.2	1.5	1.8	1.8
Thallium		0.00041	0.00041	0.00080	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin		0.00020	0.00020		*<0.00010*	*<0.00010*	~~**0.00022**~~	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00060	0.00060		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	0.00041	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Uranium		0.0075	0.0075	0.015	0.00008	0.00006	0.00005	0.00005	0.00005	0.00006	0.00006	0.00006	0.00005	0.00005
Vanadium		0.060	0.060	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[3]	***equation***	0.0018	0.0024	***See note 3***	0.0012	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Plant Pigments (µg/L)														
Chlorophyll a					0.59	0.34	0.23	0.34	0.27	0.49	0.17	0.17	0.28	0.23

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.
2. Trigger and threshold values were developed in *CREMP Design Document 2012* (Azimuth, 2012d) and updated in 2019. A number of thresholds were derived from methods (or sources) other than CCME guidelines. Refer to the CREMP: 2022 Plan Update (Azimuth, 2022b) for more details.
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

123 Bolded concentrations exceed the trigger value.
123 Bolded and shaded concentrations also exceed the threshold value.
Italicized numbers are below detection limits.
underline = results were given a cautionary flag in the QC assessment (refer to **Section 3.3** for details).
~~strikethrough~~ = results flagged as unreliable in the QC assessment.
"-" not analyzed/not sampled.

Table C1-2. Water quality results screened against FEIS predicted concentrations for Third Portage Lake, 2024.

Lake and Area		Simulated Maximum Whole Lake Concentration (mg/L) Third Portage Lake[2]				Third Portage Lake East Basin (TPE)									
Area-Replicate ID	CCME (2012)	Upper Mixing Estimate (169 Mm^3)		Mid-range Mixing Estimate (92 Mm^3)		TPE-168	TPE-169	TPE-170	TPE-171	TPE-173	TPE-172	TPE-174	TPE-175	TPE-176	TPE-177
Depth (m)	Guideline[1]	Without Dike Leaching	With Dike Leaching	Without Dike Leaching	With Dike Leaching	3	3	3	3	3	3	3	3	3	3
Date						08-Mar-2024	08-Mar-2024	26-Apr-2024	26-Apr-2024	02-Jul-2024	02-Jul-2024	12-Aug-2024	12-Aug-2024	05-Sep-2024	05-Sep-2024
Physical Tests (mg/L)															
Alkalinity - Total (as CaCO3)		4.1	4.1	4.2	4.2	***11***	***9.4***	***10***	***9.9***	***7.9***	***7.9***	***8.2***	***8.3***	***8.3***	***8.2***
Hardness (as CaCO3), dissolved		5.7	6.0	6.0	6.4	***15***	***13***	***15***	***15***	***11***	***11***	***11***	***11***	***11***	***11***
Anions and Nutrients (mg/L)															
Ammonia (as N)[3]	***equation***	0.033	0.033	0.050	0.050	0.016	0.014	0.017	0.018	0.0059	0.0081	0.020	0.017	*<0.0050*	0.0078
Chloride	120	0.80	0.80	1.0	1.1	**1.0**	0.89	**1.1**	**1.0**	0.80	0.79	0.81	0.81	0.84	0.82
Fluoride	0.12	0.070	0.080	0.070	0.090	***0.095***	**0.083**	***0.10***	***0.099***	**0.073**	**0.071**	**0.081**	**0.082**	**0.086**	**0.083**
Nitrate (as N)	3.0	0.035	0.036	0.057	0.059	0.0086	0.0070	0.0099	0.013	0.013	0.015	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Ortho Phosphate (as P)		0.0022	0.0022	0.0024	0.0024	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Phosphorus (P) - Total	0.0040	0.0027	0.0029	0.0032	0.0035	0.0023	*<0.0020*	*<0.0020*	*<0.0020*	0.0023	0.0025	*<0.0020*	0.0026	*<0.0020*	*<0.0020*
Sulphate (SO_4)		1.7	1.7	2.0	2.0	***6.1***	***5.4***	***6.3***	***6.2***	***4.8***	***4.7***	***4.8***	***4.8***	***4.9***	***4.9***
Total Metals (mg/L)															
Aluminum[3]	***equation***	0.0070	0.0090	0.0070	0.010	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	**0.0075**	**0.0074**	***0.024***	0.0064	0.0056	0.0049
Antimony		0.00056	0.00057	0.00060	0.00062	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.0050	0.00062	0.00062	0.00072	0.00072	0.00056	0.00041	0.00046	0.00045	0.00058	0.00054	0.00054	0.00054	0.00066	0.00046
Barium		0.020	0.022	0.020	0.023	0.0036	0.0032	0.0037	0.0039	0.0032	0.0030	0.0027	0.0026	0.0026	0.0027
Beryllium		0.0010	0.0010	0.0010	0.0010	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth		0.10	0.10	0.10	0.10	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.00001	0.00001	0.00001	0.00001	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	<0.000051	<0.000051	<0.000052	<0.000052	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		1.3	1.4	1.5	1.5	***3.6***	***3.2***	***3.5***	***3.5***	***2.7***	***2.7***	***2.8***	***2.8***	***2.7***	***2.6***
Chromium[4]	0.001	0.0010	0.0010	0.0010	0.0010	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00022	0.00010	0.00014	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt		0.0040	0.0013	0.00040	0.0017	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0012	0.0012	0.0013	0.0013	0.00050	*<0.00050*	*<0.00050*	*<0.00050*	0.00053	*<0.00050*	0.00052	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.030	0.030	0.030	0.030	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.015	0.014	0.014	0.014	0.014	0.013
Lead[3]	***equation***	0.00060	0.00060	0.00060	0.00070	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0050	0.0050	0.0050	0.0050	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.60	0.60	0.60	0.70	***1.4***	***1.2***	***1.4***	***1.4***	***1.1***	***1.0***	***1.1***	***1.1***	***1.1***	***1.0***
Manganese[3]		0.0090	0.052	0.015	0.072	0.00040	0.00039	0.00030	0.00030	0.0023	0.0026	0.0015	0.0013	0.0015	0.0015
Mercury	0.000026	0.00005	0.00005	0.00005	0.00005	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.0010	0.0010	0.0010	0.0010	0.00014	0.00012	0.00014	0.00013	0.00011	0.00010	0.00012	0.00013	0.00011	0.00012
Nickel[3]	***equation***	0.0016	0.0016	0.0020	0.0021	0.00068	0.00054	0.00059	0.00061	0.00072	0.00070	0.00051	*<0.00050*	*<0.00050*	*<0.00050*
Potassium		2.0	2.1	2.0	2.1	0.67	0.59	0.78	0.76	0.53	0.51	0.54	0.52	0.54	0.50
Selenium	0.001	0.0010	0.0010	0.0010	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.010	0.080	0.020	0.12	***0.17***	***0.16***	***0.18***	***0.17***	***0.18***	***0.18***	***0.14***	***0.14***	***0.13***	***0.13***
Silver	0.0001	0.00002	0.00002	0.00002	0.00002	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		2.0	2.0	2.0	2.1	1.3	1.1	1.3	1.3	0.98	0.91	1.0	1.0	0.96	0.97
Strontium		0.0020	0.0050	0.0040	0.0070	***0.016***	***0.014***	***0.017***	***0.017***	***0.013***	***0.013***	***0.013***	***0.013***	***0.012***	***0.013***
Thallium	0.0008	0.00020	0.00020	0.00020	0.00020	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Uranium	0.015	0.00020	0.00020	0.00020	0.00030	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004	0.00003
Vanadium		0.030	0.030	0.030	0.030	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc [3]	***equation***	0.011	0.011	0.015	0.015	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2016.

2. Whole lake data are given for a range of mixing conditions, representing mid-range and upper mixing estimate for the north basin discharge location. The model includes treated water releases from the project (Years 1 to 4), and long-term substance loading due to leaching from the Bay-Goose dike (Cumberland, 2005).

3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

4. Chromium CCME guideline is for Cr VI.

Formatting for indicating the parameters that exceed the model predictions in the FEIS:

Upper-range Mixing Estimate (169 Mm^3):

- Shaded cells = concentrations exceed the prediction "Without Dike Leaching."
- Bordered cells = concentrations exceed the prediction "With Dike Leaching."

Mid-range Mixing Estimate (92 Mm^3):

- **Bold** = concentrations exceed the prediction "Without Dike Leaching."
- ***Bold italicized*** = concentrations exceed the prediction "With Dike Leaching."

Italicized numbers are below detection limits.

"-" not analyzed/not sampled.

Table C1-2. Water quality results screened against FEIS predicted concentrations for Third Portage Lake, 2024.

Lake and Area		Simulated Maximum Whole Lake Concentration (mg/L) Third Portage Lake[2]				Third Portage Lake North Basin (TPN)									
Area-Replicate ID	CCME (2012)	Upper Mixing Estimate (169 Mm^3)		Mid-range Mixing Estimate (92 Mm^3)		TPN-168	TPN-169	TPN-171	TPN-170	TPN-172	TPN-173	TPN-174	TPN-175	TPN-176	TPN-177
Depth (m)	Guideline[1]	Without Dike Leaching	With Dike Leaching	Without Dike Leaching	With Dike Leaching	3	3	3	3	3	3	3	3	3	3
Date						07-Mar-2024	07-Mar-2024	26-Apr-2024	26-Apr-2024	09-Jul-2024	09-Jul-2024	09-Aug-2024	09-Aug-2024	05-Sep-2024	05-Sep-2024
Physical Tests (mg/L)															
Alkalinity - Total (as CaCO3)		4.1	4.1	4.2	4.2	***7.9***	***10***	***9.3***	***9.0***	***7.4***	***6.9***	***6.7***	***6.8***	***7.6***	***6.6***
Hardness (as CaCO3), dissolved		5.7	6.0	6.0	6.4	***12***	***13***	***18***	***14***	***9.6***	***9.5***	***10***	***9.8***	***9.5***	***9.7***
Anions and Nutrients (mg/L)															
Ammonia (as N)[3]	***equation***	0.033	0.033	0.050	0.050	0.011	0.013	0.012	0.015	*<0.0050*	*<0.0050*	0.015	0.0079	0.0067	0.019
Chloride	120	0.80	0.80	1.0	1.1	0.92	**1.0**	***1.2***	***1.1***	0.80	0.79	0.80	0.80	0.86	0.86
Fluoride	0.12	0.070	0.080	0.070	0.090	**0.074**	**0.080**	***0.096***	***0.093***	0.064	0.064	0.064	0.063	**0.075**	**0.074**
Nitrate (as N)	3.0	0.035	0.036	0.057	0.059	0.0056	0.0054	0.0083	0.0065	0.0084	0.0094	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Ortho Phosphate (as P)		0.0022	0.0022	0.0024	0.0024	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0010	0.0014	*<0.0010*	*<0.0010*
Phosphorus (P) - Total	0.0040	0.0027	0.0029	0.0032	0.0035	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	***0.014***	*<0.0020*	*<0.0020*
Sulphate (SO_4)		1.7	1.7	2.0	2.0	***5.2***	***5.7***	***6.3***	***6.2***	***4.4***	***4.3***	***4.4***	***4.4***	***4.7***	***4.7***
Total Metals (mg/L)															
Aluminum[3]	***equation***	0.0070	0.0090	0.0070	0.010	0.0031	*<0.0030*	*<0.0030*	*<0.0030*	**0.0072**	0.0064	0.0043	0.0045	0.0042	0.0044
Antimony		0.00056	0.00057	0.00060	0.00062	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.0050	0.00062	0.00062	0.00072	0.00072	0.00023	0.00025	0.00028	0.00026	0.00025	0.00027	0.00022	0.00024	0.00022	0.00022
Barium		0.020	0.022	0.020	0.023	0.0033	0.0037	0.0040	0.0038	0.0029	0.0028	0.0027	0.0028	0.0028	0.0028
Beryllium		0.0010	0.0010	0.0010	0.0010	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth		0.10	0.10	0.10	0.10	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.00001	0.00001	0.00001	0.00001	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	<0.000051	<0.000051	<0.000052	<0.000052	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		1.3	1.4	1.5	1.5	***2.9***	***3.1***	***3.3***	***3.2***	***2.3***	***2.3***	***2.3***	***2.4***	***2.3***	***2.3***
Chromium[4]	0.001	0.0010	0.0010	0.0010	0.0010	*<0.00010*	*<0.00010*	0.00010	*<0.00010*	*<0.00010*	0.00012	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt		0.0040	0.0013	0.00040	0.0017	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0012	0.0012	0.0013	0.0013	*<0.00050*	*<0.00050*	0.00051	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.030	0.030	0.030	0.030	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead[3]	***equation***	0.00060	0.00060	0.00060	0.00070	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00009	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0050	0.0050	0.0050	0.0050	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.60	0.60	0.60	0.70	***1.1***	***1.2***	***1.4***	***1.3***	***1.0***	***0.99***	***0.98***	***0.98***	***0.96***	***0.95***
Manganese[3]		0.0090	0.052	0.015	0.072	0.00051	0.00046	0.00045	0.00038	0.0019	0.0018	0.0013	0.0016	0.0013	0.0014
Mercury	0.000026	0.00005	0.00005	0.00005	0.00005	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.0010	0.0010	0.0010	0.0010	0.00011	0.00013	0.00013	0.00013	0.00010	0.00011	0.00009	0.00009	0.00010	0.00009
Nickel[3]	***equation***	0.0016	0.0016	0.0020	0.0021	0.00057	0.00056	0.00061	0.00055	0.00060	0.00058	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Potassium		2.0	2.1	2.0	2.1	0.58	0.65	0.79	0.75	0.52	0.49	0.50	0.50	0.47	0.47
Selenium	0.001	0.0010	0.0010	0.0010	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.010	0.080	0.020	0.12	***0.13***	***0.14***	***0.14***	***0.14***	***0.14***	***0.14***	**0.12**	**0.12**	**0.10**	**0.10**
Silver	0.0001	0.00002	0.00002	0.00002	0.00002	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		2.0	2.0	2.0	2.1	1.2	1.3	1.5	1.4	1.0	1.0	1.0	1.0	1.0	1.0
Strontium		0.0020	0.0050	0.0040	0.0070	***0.013***	***0.015***	***0.016***	***0.016***	***0.011***	***0.011***	***0.011***	***0.012***	***0.012***	***0.011***
Thallium	0.0008	0.00020	0.00020	0.00020	0.00020	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Uranium	0.015	0.00020	0.00020	0.00020	0.00030	0.00004	0.00004	0.00005	0.00005	0.00004	0.00004	0.00004	0.00004	0.00004	0.00003
Vanadium		0.030	0.030	0.030	0.030	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc [3]	***equation***	0.011	0.011	0.015	0.015	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2016.

2. Whole lake data are given for a range of mixing conditions, representing mid-range and upper mixing estimate for the north basin discharge location. The model includes treated water releases from the project (Years 1 to 4), and long-term substance loading due to leaching from the Bay-Goose dike (Cumberland, 2005).

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4. Chromium CCME guideline is for Cr VI.

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Upper-range Mixing Estimate (169 Mm^3):

- Shaded cells = concentrations exceed the prediction "Without Dike Leaching."
- Bordered cells = concentrations exceed the prediction "With Dike Leaching."

Mid-range Mixing Estimate (92 Mm^3):

- **Bold** = concentrations exceed the prediction "Without Dike Leaching."
- ***Bold italicized*** = concentrations exceed the prediction "With Dike Leaching."

Italicized numbers are below detection limits.

"-" not analyzed/not sampled.

Table C1-3. Water quality results screened against FEIS predicted concentrations for Second Portage Lake, 2024.

Lake and Area		Simulated Maximum Whole Lake Concentration (mg/L) Second Portage Lake[2]				Second Portage Lake (SP)									
Area-Replicate ID	CCME (2012)	Upper Mixing Estimate (169 Mm^3)		Mid-range Mixing Estimate (92 Mm^3)		SP-168	SP-169	SP-171	SP-170	SP-172	SP-173	SP-174	SP-175	SP-176	SP-177
Depth (m)	Guideline[1]	Without Dike Leaching	With Dike Leaching	Without Dike Leaching	With Dike Leaching	3	3	3	3	3	3	3	3	3	3
Date						09-Mar-2024	09-Mar-2024	27-Apr-2024	27-Apr-2024	03-Jul-2024	02-Jul-2024	14-Aug-2024	14-Aug-2024	08-Sep-2024	08-Sep-2024
Physical Tests (mg/L)															
Alkalinity - Total		7.0	7.0	7.0	7.0	14	15	15	15	12	12	12	13	11	11
Hardness (as CaCO3), dissolved		8.9	8.9	8.9	8.9	21	23	22	21	17	16	16	16	16	16
Anions and Nutrients (mg/L)															
Ammonia (as N)[3]	***equation***	0.025	0.025	0.031	0.031	0.018	0.013	0.017	0.018	*<0.0050*	*<0.0050*	0.020	0.035	0.0067	0.0061
Chloride	120	0.70	0.70	0.80	0.80	1.2	1.2	1.3	1.3	1.1	1.0	0.92	0.91	0.98	1.0
Fluoride	0.120	0.070	0.071	0.070	0.071	0.086	0.091	0.097	0.098	0.066	0.066	0.075	**0.071**	0.080	0.079
Nitrate (as N)	3.0	0.017	0.017	0.025	0.025	0.016	0.013	0.017	0.017	0.0055	0.0062	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Ortho Phosphate (as P)		0.0030	0.0030	0.0030	0.0030	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0016	*<0.0010*	*<0.0010*	*<0.0010*
Phosphorus (P) - Total	0.0040	0.0030	0.0030	0.0031	0.0031	*<0.0020*	*<0.0020*	*<0.0020*	0.0043	0.0034	0.0032	0.0028	0.0028	0.0020	*<0.0020*
Sulphate (SO_4)		2.8	2.8	2.8	2.8	6.7	7.1	7.2	7.3	5.7	5.7	5.3	5.2	5.7	5.7
Total Metals (mg/L)															
Aluminum[3]	***equation***	0.0070	0.0070	0.0070	0.0070	*<0.0030*	0.0031	*<0.0030*	*<0.0030*	0.011	0.011	0.0048	0.0056	*<0.0030*	*<0.0030*
Antimony		0.00050	0.00050	0.00050	0.00050	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.0050	0.00050	0.00050	0.00060	0.00060	0.00050	0.00049	0.00045	0.00048	0.00042	0.00050	0.00045	0.00043	0.00041	0.00041
Barium		0.020	0.020	0.020	0.020	0.0033	0.0038	0.0036	0.0036	0.0030	0.0032	0.0028	0.0027	0.0026	0.0027
Beryllium		0.0010	0.0010	0.0010	0.0010	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth		0.10	0.10	0.10	0.10	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.00001	0.00001	0.00001	0.00001	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	<0.000050	<0.000050	<0.000051	<0.000051	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		2.3	2.3	2.3	2.3	5.1	5.4	5.2	5.5	4.5	4.4	4.2	4.2	4.0	4.2
Chromium[4]	0.001	0.0010	0.0010	0.0010	0.0010	*<0.00050*	*<0.00050*	*<0.00010*	*<0.00010*	*<0.00010*	0.00011	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt		0.00030	0.00040	0.00030	0.00040	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0011	0.0011	0.0011	0.0011	0.00084	0.00089	0.00084	0.00086	0.00087	0.00075	0.00070	0.00067	0.00056	0.00057
Iron	0.3	0.030	0.030	0.030	0.030	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.028	0.029	0.021	0.023	*<0.010*	*<0.010*
Lead[3]	***equation***	0.00090	0.00090	0.00090	0.00090	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0050	0.0050	0.0050	0.0050	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		0.80	0.80	0.80	0.80	1.7	1.8	1.8	1.8	1.5	1.5	1.4	1.4	1.4	1.4
Manganese[3]		0.0044	0.0067	0.0066	0.0089	0.00065	0.00067	0.00046	0.00056	0.0030	0.0031	0.0021	0.0019	0.0011	0.00095
Mercury	0.000026	0.00005	0.00005	0.00005	0.00005	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.0010	0.0010	0.0010	0.0010	0.00015	0.00017	0.00015	0.00015	0.00011	0.00012	0.00013	0.00014	0.00014	0.00014
Nickel[3]	***equation***	0.0010	0.0010	0.0010	0.0010	*<0.00050*	0.00055	0.00058	0.00056	0.00064	0.00064	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus						*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		2.0	2.0	2.0	2.0	0.71	0.75	0.76	0.79	0.55	0.57	0.59	0.60	0.52	0.52
Selenium	0.001	0.0010	0.0010	0.0010	0.0010	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.010	0.010	0.010	0.010	0.47	0.49	0.51	0.52	0.44	0.41	0.33	0.34	0.30	0.29
Silver	0.0001	0.00001	0.00001	0.00001	0.00001	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		2.0	2.0	2.0	2.0	1.1	1.2	1.1	1.1	0.82	0.90	0.84	0.82	0.80	0.79
Thallium	0.0008	0.00020	0.00020	0.00020	0.00020	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin						*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium						*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Uranium	0.015	0.00020	0.00020	0.00020	0.00020	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00005	0.00003	0.00003
Vanadium		0.030	0.030	0.030	0.030	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[3]	***equation***	0.0070	0.0070	0.0090	0.0090	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Zirconium						*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2016.

2. The Second Portage Lake water quality model includes substance loading from the Third Portage and East dikes and inflow from Third Portage and Wally lakes. Changes in water quality in Second Portage Lake were modelled for two different mixing scenarios of water releases into Third Portage Lake (Cumberland, 2005).

3. "***equation*** " means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.

4. Chromium CCME guideline is for Cr VI.

Formatting for indicating the parameters that exceed the model predictions in the FEIS:

Upper-range Mixing Estimate (169 Mm^3):

- Shaded cells = concentrations exceed the prediction "Without Dike Leaching."
- Bordered cells = concentrations exceed the prediction "With Dike Leaching."

Mid-range Mixing Estimate (92 Mm^3):

- **Bold** = concentrations exceed the prediction "Without Dike Leaching."
- ***Bold italicized*** = concentrations exceed the prediction "With Dike Leaching."

Italicized numbers are below detection limits.

"-" not analyzed/not sampled.

Table C1-4. Water quality results screened against FEIS predicted concentrations for Wally Lake, 2024.

Lake and Area		Simulated Maximum Whole Lake Concentration (mg/L) Wally Lake[2]		Wally Lake (WAL)									
Area-Replicate ID	**CCME (2012) Guideline[1]**	Without Dike Leaching	With Dike Leaching	WAL-137	WAL-138	WAL-139	WAL-140	WAL-141	WAL-142	WAL-143	WAL-144	WAL-145	WAL-146
Depth (m)				3	3	3	3	3	3	3	3	3	3
Date				08-Mar-2024	08-Mar-2024	27-Apr-2024	27-Apr-2024	03-Jul-2024	03-Jul-2024	09-Aug-2024	09-Aug-2024	05-Sep-2024	05-Sep-2024
Physical Tests (mg/L)													
Alkalinity - Total		13	13	**30**	**23**	**23**	**25**	12	13	**13**	**14**	**14**	**14**
Hardness (as CaCO3), dissolved		17	17	**33**	**25**	**28**	**32**	16	17	**18**	**18**	**19**	**18**
Anions and Nutrients (mg/L)													
Ammonia (as N)[3]	***equation***	0.089	0.089	0.017	0.016	0.019	0.017	*<0.0050*	*<0.0050*	0.016	0.014	*<0.0050*	0.0085
Chloride	120	0.70	0.70	**0.94**	**0.75**	**0.85**	**0.93**	0.53	0.55	0.58	0.58	0.62	0.62
Fluoride	0.12	0.050	0.050	**0.064**	**0.061**	**0.073**	**0.079**	0.044	0.043	**0.054**	**0.053**	**0.058**	**0.058**
Nitrate (as N)	3.0	0.10	0.10	0.018	0.011	0.015	0.016	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.060			*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Ortho Phosphate (as P)		0.0030	0.0030	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0026	0.0023	*<0.0010*	*<0.0010*
Phosphorus (P) - Total	0.0040	0.0039	0.0040	0.0024	0.0021	0.0023	*<0.0020*	**0.0070**	0.0033	0.0026	0.0029	0.0023	**0.0043**
Sulphate (SO_4)		5.3	5.3	**9.6**	**6.9**	**7.5**	**8.4**	4.4	4.9	5.1	5.2	**5.6**	**5.7**
Total Metals (mg/L)													
Aluminum[3]	***equation***	0.012	0.013	*<0.0030*	*<0.0030*	0.0037	0.0050	0.0092	0.0075	0.0050	0.0054	0.0055	0.0034
Antimony		0.00090	0.00090	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.0050	0.0050	0.0060	0.00051	0.00044	0.00039	0.00042	0.00030	0.00033	0.00040	0.00042	0.00038	0.00042
Barium		0.020	0.020	0.0044	0.0033	0.0036	0.0041	0.0024	0.0025	0.0021	0.0021	0.0020	0.0021
Beryllium		0.0010	0.0010	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth		0.10	0.10	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.00001	0.00001	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	0.00018	0.00019	*<0.0000050*	*<0.0000050*	0.00001	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		4.7	4.7	**9.3**	**6.9**	**7.1**	**7.9**	4.2	4.5	4.6	**4.8**	**4.7**	**4.9**
Chromium[4]	0.0010	0.0010	0.0010	*<0.00010*	*<0.00010*	*<0.00010*	0.00012	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt		0.00030	0.00030	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0020	0.0020	0.0015	0.0012	0.0013	0.0013	0.00097	0.0011	0.0010	0.0010	0.00092	0.00096
Iron	0.30	0.030	0.030	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.020	0.020	0.017	0.016	0.015	0.016
Lead[3]	***equation***	0.00070	0.00070	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.0050	0.0050	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		1.3	1.3	**2.8**	**2.1**	**2.2**	**2.5**	1.3	**1.4**	**1.5**	**1.5**	**1.5**	**1.5**
Manganese[3]		0.0020	0.0020	0.0019	0.0011	0.0010	0.00092	**0.0030**	**0.0028**	0.0014	0.0011	0.0014	0.0012
Mercury	0.00003	0.00010	0.00010	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.0020	0.0020	0.00022	0.00020	0.00021	0.00022	0.00011	0.00014	0.00015	0.00018	0.00018	0.00018
Nickel[3]	***equation***	0.0010	0.0010	0.00065	*<0.00050*	0.00050	0.00056	*<0.00050*	0.00051	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Potassium		2.0	2.0	0.75	0.61	0.76	0.82	0.41	0.41	0.49	0.49	0.44	0.44
Selenium	0.0010	0.0010	0.0010	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.040	0.040	**1.3**	**0.97**	**1.1**	**1.2**	**0.56**	**0.54**	**0.55**	**0.54**	**0.52**	**0.58**
Silver	0.00010	0.00002	0.00002	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		2.0	2.0	1.0	0.82	0.95	1.0	0.58	0.57	0.62	0.61	0.62	0.63
Thallium	0.00080	0.00020	0.00020	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Uranium	0.015	0.00070	0.00070	0.00008	0.00005	0.00006	0.00006	0.00005	0.00006	0.00006	0.00006	0.00005	0.00005
Zinc[3]	***equation***	0.013	0.013	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2016.
2. Preliminary modelling of whole lake water quality in the receiving environment water bodies incorporates long-term loadings from the Vault dike and effluent releases from the Vault Attenuation pond (Cumberland, 2005).
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. Ammonia and aluminum guidelines vary with pH; cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

Formatting for indicating the parameters that exceed the model predictions in the FEIS:

- **Bold** = concentrations exceed the prediction "Without Dike Leaching."
- ***Bold italicized*** = concentrations exceed the prediction "With Dike Leaching."

Italicized numbers are below detection limits.

"-" not analyzed/not sampled.

Table C1-5. Water and phytoplankton sampling location coordinates (GPS, UTM, NAD83) for the Meadowbank CREMP, 2024.

Area[1]	Area Type[2]	Area-Replicate	Water & Phytoplankton (Monthly)				
			Month	Depth (m)	Zone	Easting	Northing
TPE	NF	TPE-limno	January	6.0	14W	638521	7210606
		TPE-limno	February	10.4	14W	638069	7211639
		TPE-limno	November	7.6	14W	637944	7211794
		TPE-limno	December	14.7	14W	638996	7211318
		TPE-168	March	5.1	14W	639688	7211644
		TPE-169	March	20 +	14W	637784	7210265
		TPE-170	April	14.5	14W	638078	7210285
		TPE-171	April	6.4	14W	638521	7211489
		TPE-172	July	5.2	14W	639687	7211833
		TPE-173	July	8.4	14W	638776	7211036
		TPE-174	August	10.7	14W	638401	7211901
		TPE-175	August	9.2	14W	639596	7212327
		TPE-176	September	17.6	14W	639409	7211803
		TPE-177	September	16.9	14W	637973	7210251
TPN	NF	TPN-limno	January	13.1	14W	636735	7213860
		TPN-limno	February	12.3	14W	636705	7214178
		TPN-limno	November	11.8	14W	637127	7213672
		TPN-limno	December	>20	14W	636531	7213445
		TPN-168	March	14.6	14W	636062	7213828
		TPN-169	March	1.9	14W	636647	7214381
		TPN-170	April	>20	14W	635024	7216087
		TPN-171	April	10.4	14W	635693	7212863
		TPN-172	July	10.8	14W	635568	7216056
		TPN-173	July	9.6	14W	636309	7214389
		TPN-174	August	27.3	14W	635370	7213717
		TPN-175	August	12.4	14W	636463	7215384
		TPN-176	September	9.1	14W	635270	7213235
		TPN-177	September	7.2	14W	635218	7216078
SP	NF	SP-limno	January	12.2	14W	640018	7213953
		SP-limno	February	14.3	14W	640412	7213511
		SP-limno	November	7.8	14W	639467	7213699
		SP-limno	December	8.8	14W	639458	7213772
		SP-168	March	12.9	14W	640068	7214068
		SP-169	March	7.2	14W	640111	7212823
		SP-170	April	5.6	14W	639910	7213787
		SP-171	April	8.0	14W	640655	7213697
		SP-172	July	8.1	14W	640062	7213640
		SP-173	July	10.9	14W	640215	7212670

Area[1]	Area Type[2]	Area-Replicate	**Water & Phytoplankton** (Monthly)				
			Month	**Depth (m)**	**Zone**	**Easting**	**Northing**
		SP-174	August	7.5	14W	639545	7213660
		SP-175	August	13.7	14W	640773	721993
		SP-176	September	7.4	14W	639647	7214068
		SP-177	September	19.3	14W	640526	7213648
WAL	NF	WAL-limno	January	12.7	15W	360820	7220774
		WAL-limno	February	10.5	15W	360957	7220510
		WAL-limno	November	7.7	15W	360872	7220793
		WAL-limno	December	5.0	15W	360382	7221162
		WAL-137	March	1.7	15W	360395	7222416
		WAL-138	March	5.8	15W	361775	7222872
		WAL-139	April	5.9	15W	362423	7222486
		WAL-140	April	5.9	15W	361106	7221976
		WAL-141	July	5.3	15W	361859	7221866
		WAL-142	July	6.7	15W	360850	7220795
		WAL-143	August	7.8	15W	362378	7222187
		WAL-144	August	6.8	15W	360577	7221096
		WAL-145	September	13.3	14W	361926	7222663
		WAL-146	September	6.6	14W	360528	7221930
INUG	Ref	INUG-156	March	7.6	14W	622139	7214347
		INUG-157	March	15	14W	622416	7215739
		INUG-158	April	5.9	14W	622260	7214238
		INUG-159	April	7.3	14W	622709	7215333
		INUG-160	July	8.1	14W	622980	7214579
		INUG-161	July	10.3	14W	621832	7215439
		INUG-162	August	7.1	14W	622859	7215630
		INUG-163	August	7.4	14W	621946	7216048
		INUG-164	September	8.6	14W	622809	7215156
		INUG-165	September	7.3	14W	622177	7216033
PDL	Ref	PDL-121	March	12.4	14W	630089	7223596
		PDL-122	March	>20	14W	631715	7224215
		PDL-123	April	10.2	14W	630752	7223098
		PDL-124	April	11.0	14W	632184	7224365
PDL	Ref	PDL-125	July	12.7	14W	6296760	7224213
		PDL-126	July	5.8	14W	630658	7222996
		PDL-127	August	24	14W	631984	7225225
		PDL-128	August	16.5	14W	632994	7224320
		PDL-129	September	7.2	14W	632714	7224398
		PDL-130	September	9.8	14W	630285	7223179

Notes:

1. Area IDs are as follows: TPE, TPN =Third Portage Lake - East, North basins; SP=Second Portage Lake; INUG=Inuggugayualik Lake; WAL=Wally Lake; PDL=Pipedream Lake

2. Area types: NF=near-field; MF=mid-field; FF=far-field; Ref=reference.

FIGURES

Figure C1-1. Laboratory-measured conductivity (µS/cm).

Note: Conductivity data from 2014 should be interpreted with caution. See Azimuth (2015) for more details.

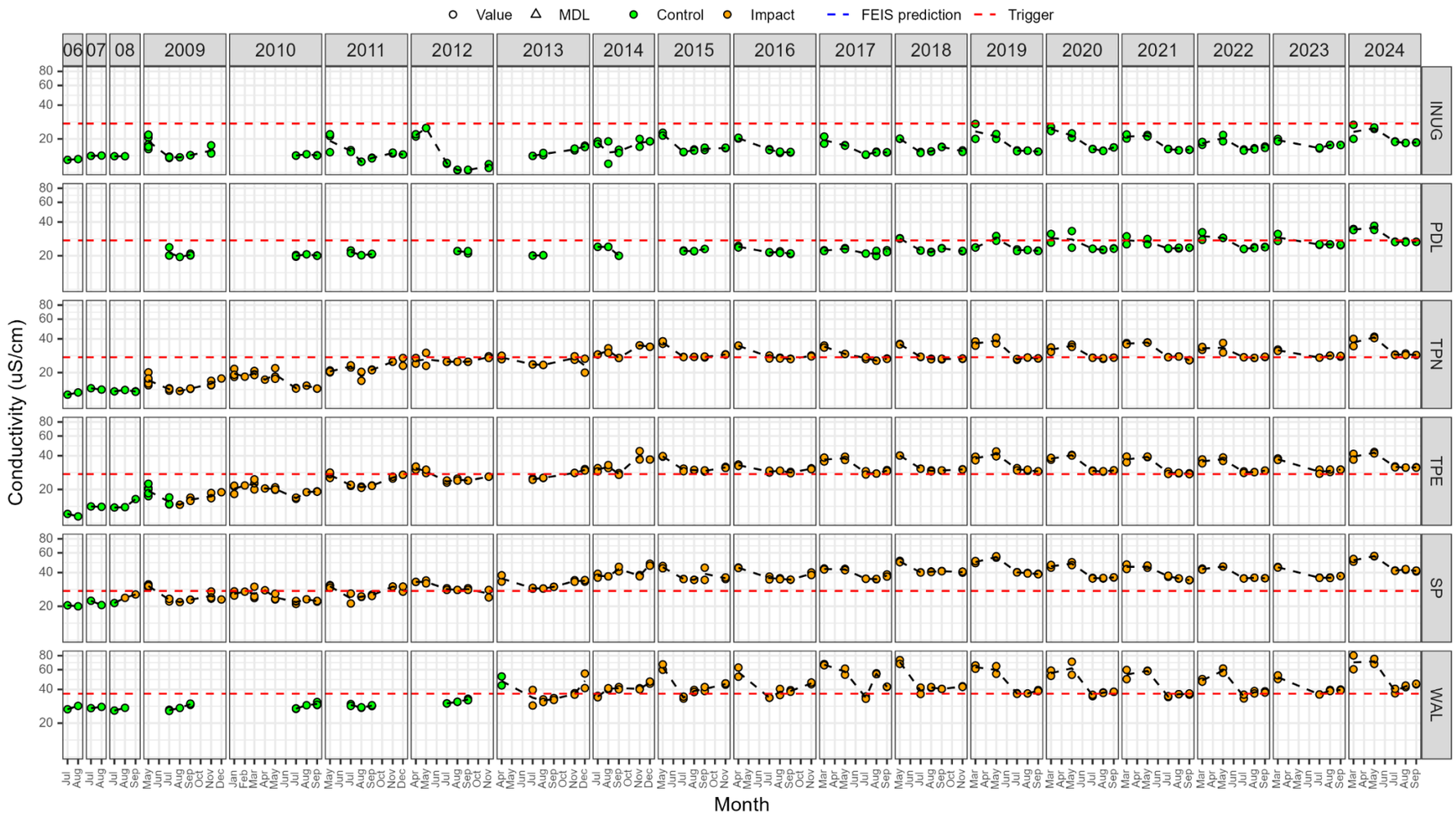


Figure C1-2. Laboratory-measured hardness (mg/L).

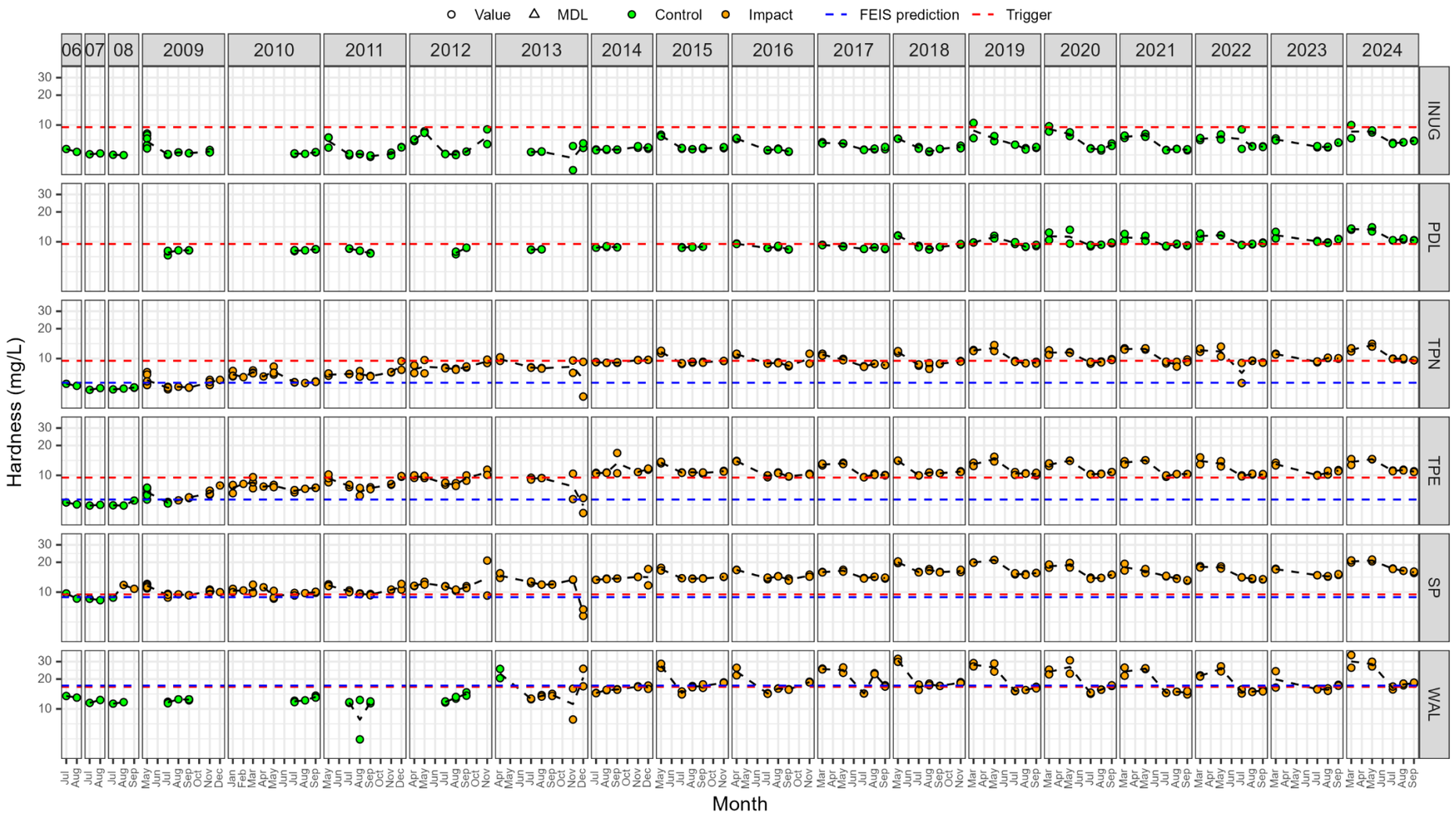


Figure C1-3. Field-measured pH.

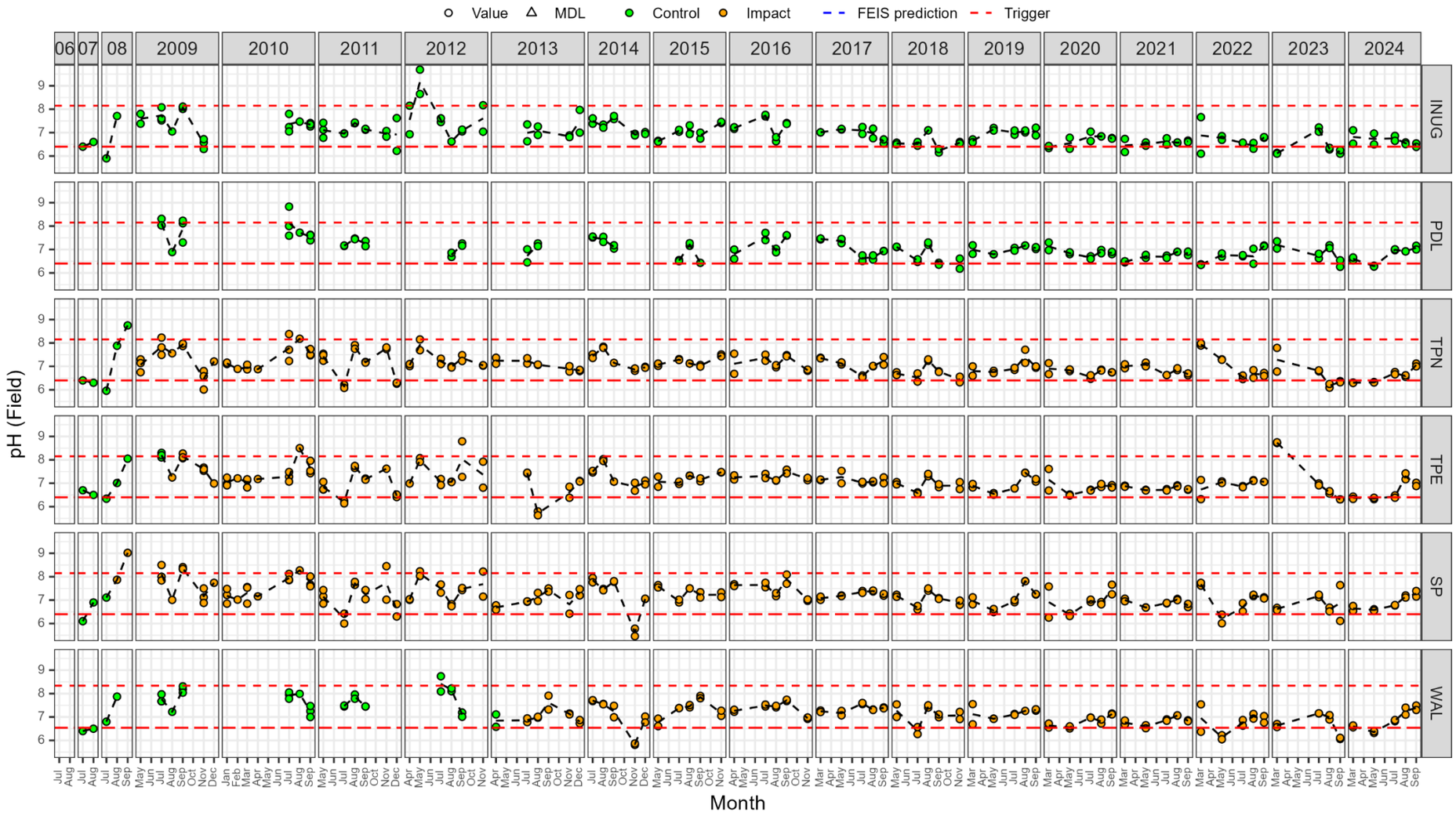


Figure C1-4. Laboratory-measured pH.

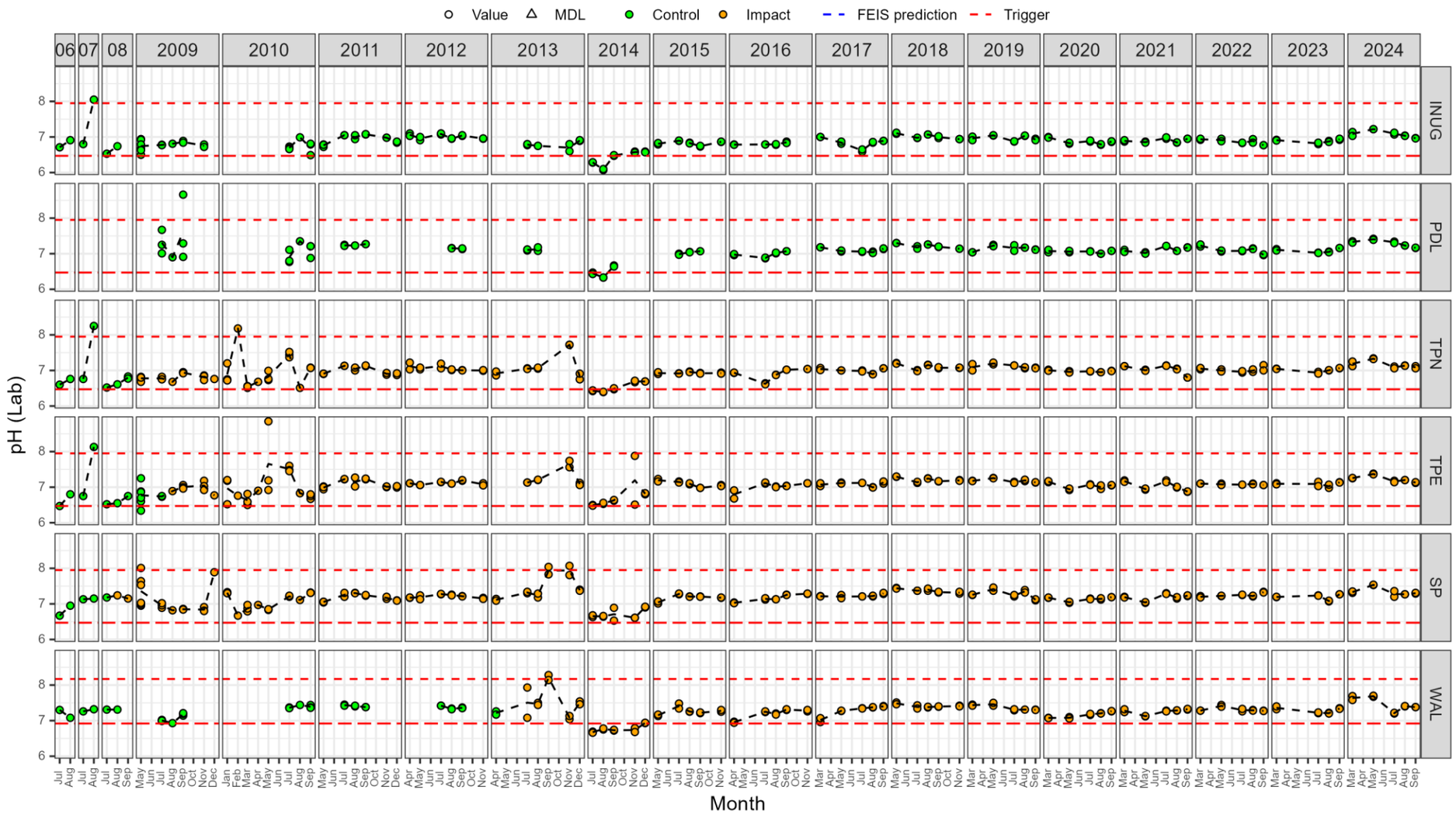


Figure C1-5. Total dissolved solids (TDS; mg/L).

Note: TDS data from 2014 were removed due to data quality concerns. See Azimuth (2015) for more details.

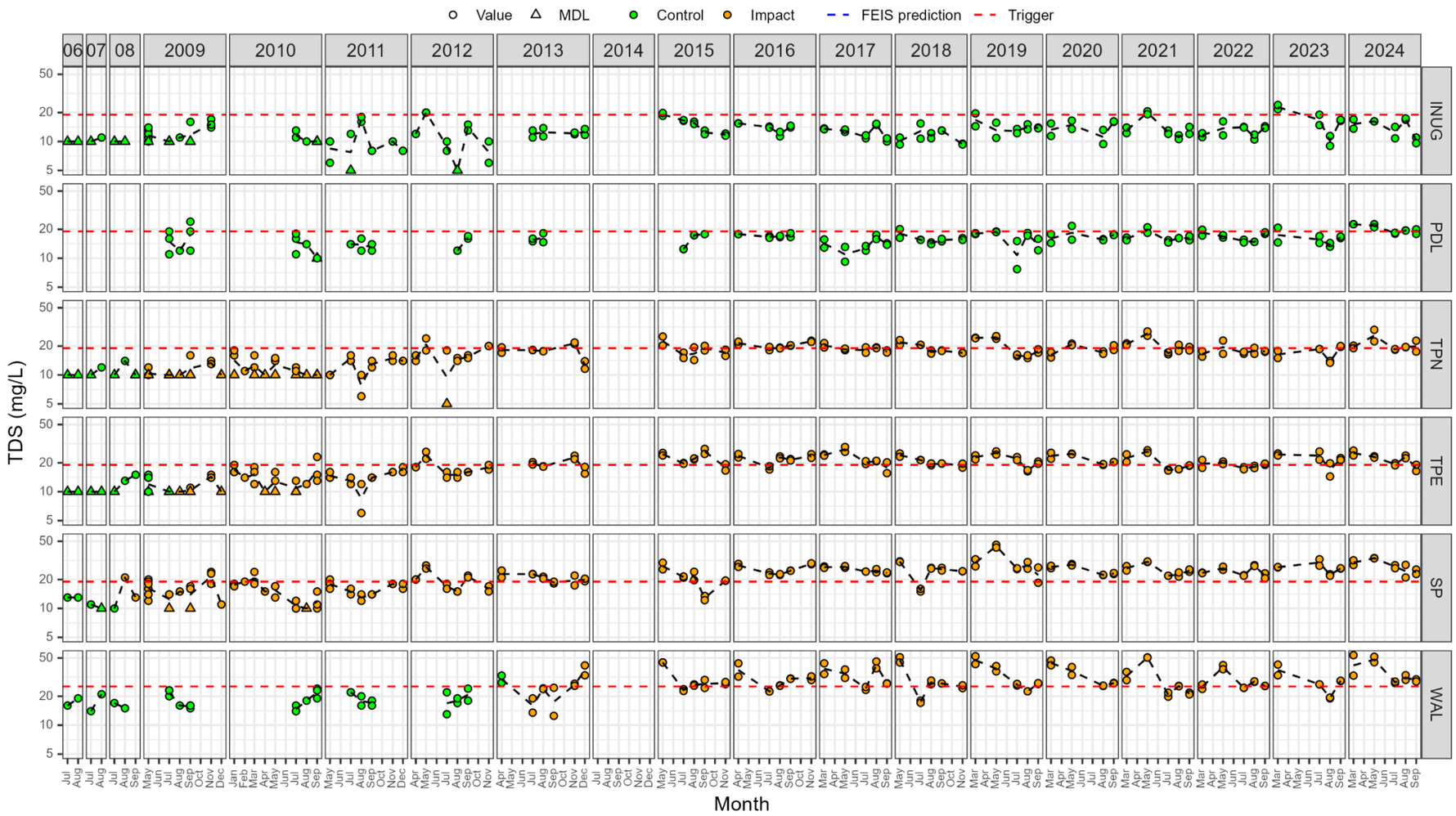


Figure C1-6. Total suspended solids (TSS; mg/L).

Note: TDS data from 2014 were removed due to data quality concerns. See Azimuth (2015) for more details.

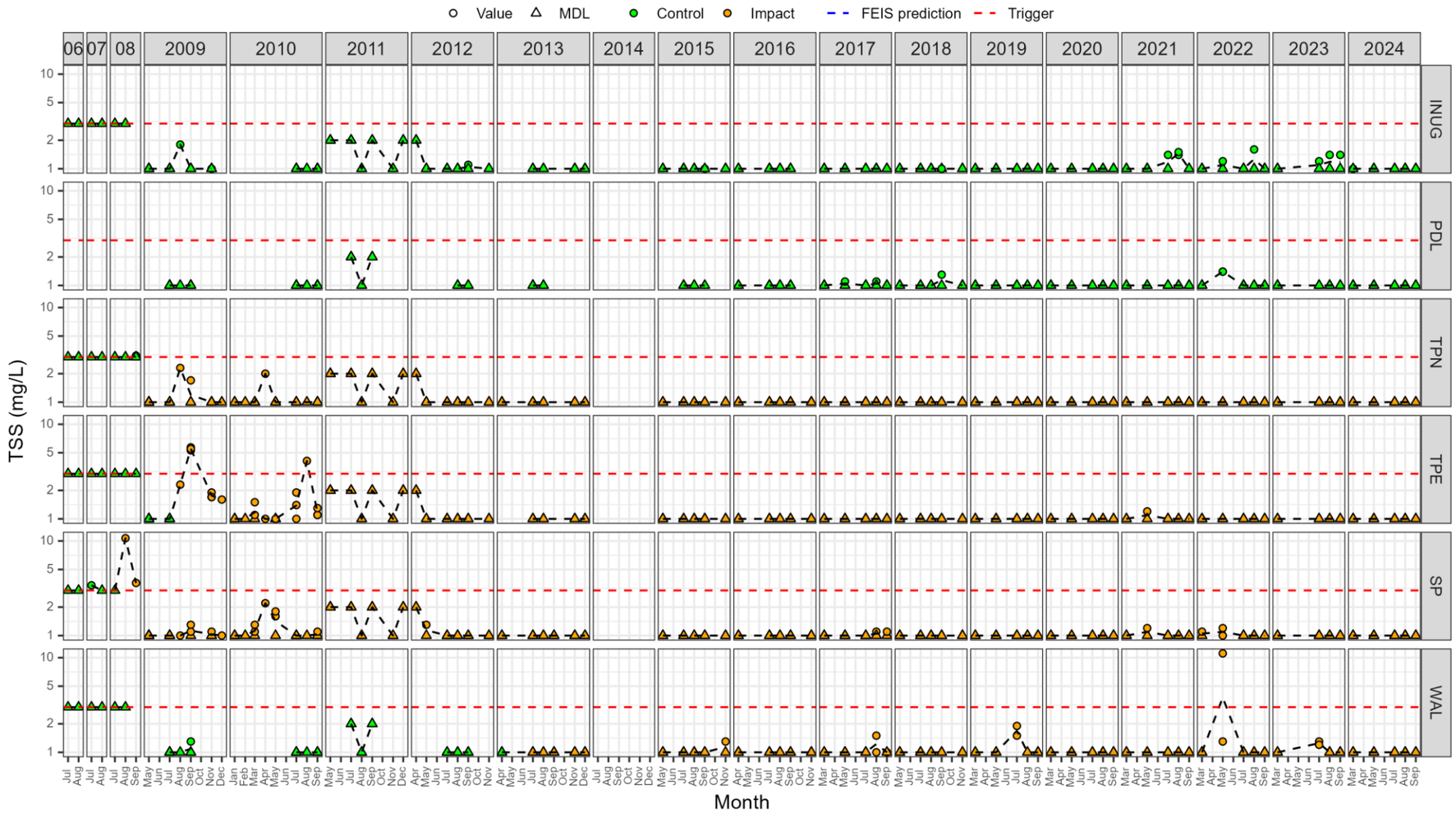


Figure C1-7. Carbonate alkalinity (mg/L).

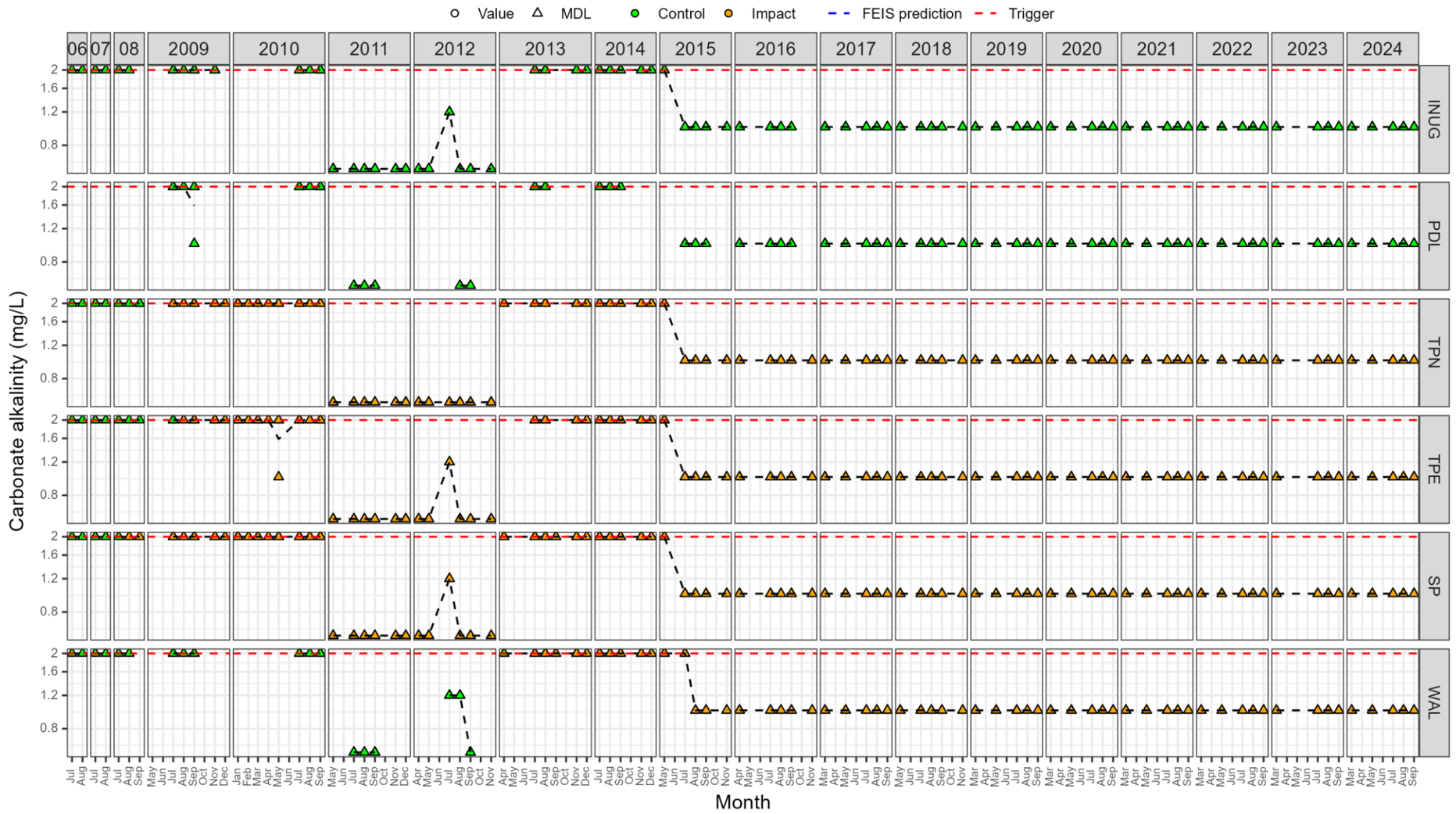


Figure C1-8. Bicarbonate alkalinity (mg/L).

Note: Bicarbonate alkalinity data from 2014 were removed due to data quality concerns. See Azimuth (2015) for more details.

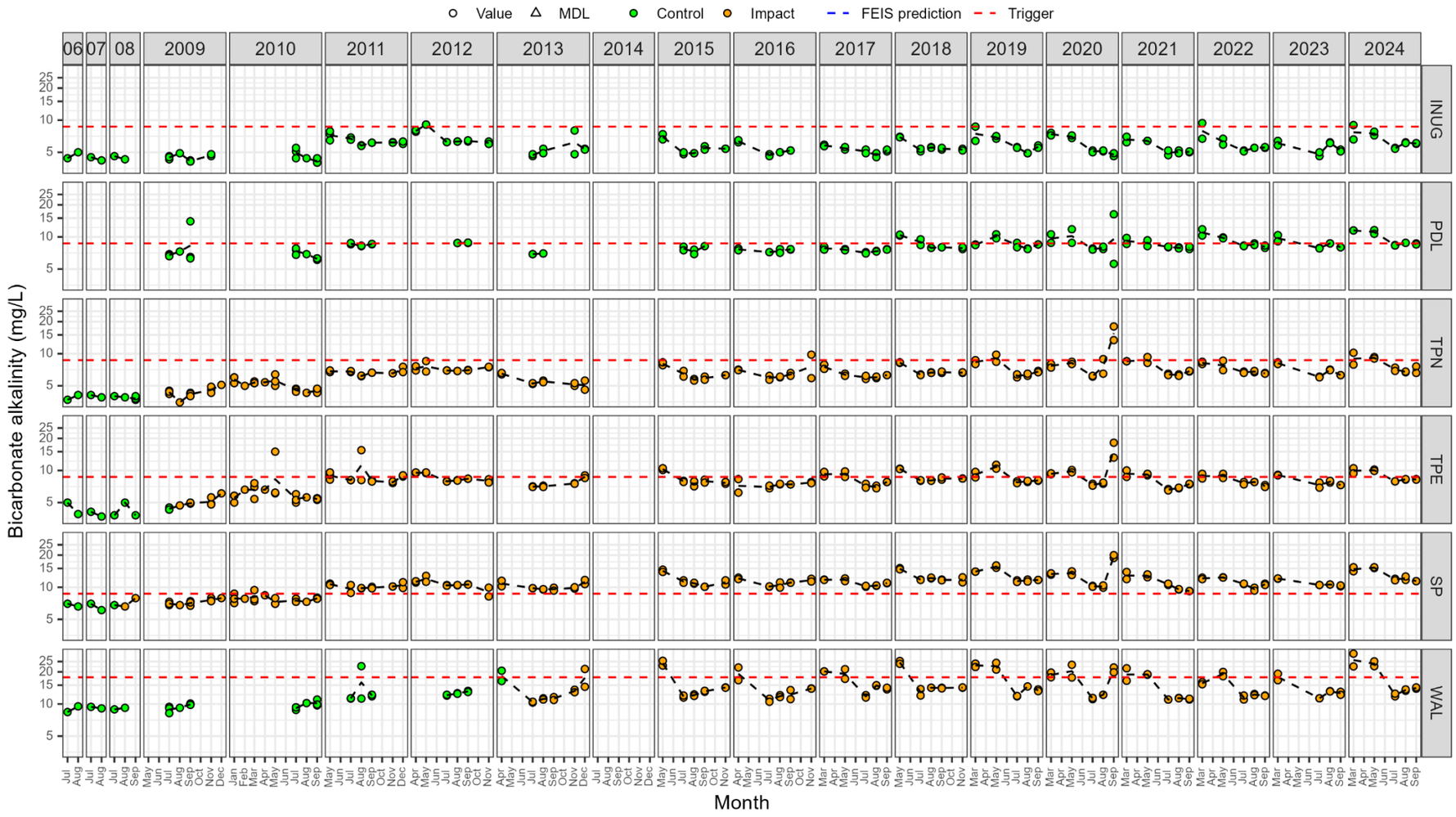


Figure C1-9. Total alkalinity (mg/L).

Note: Total alkalinity data from 2014 were removed due to data quality concerns. See Azimuth (2015) for more details.

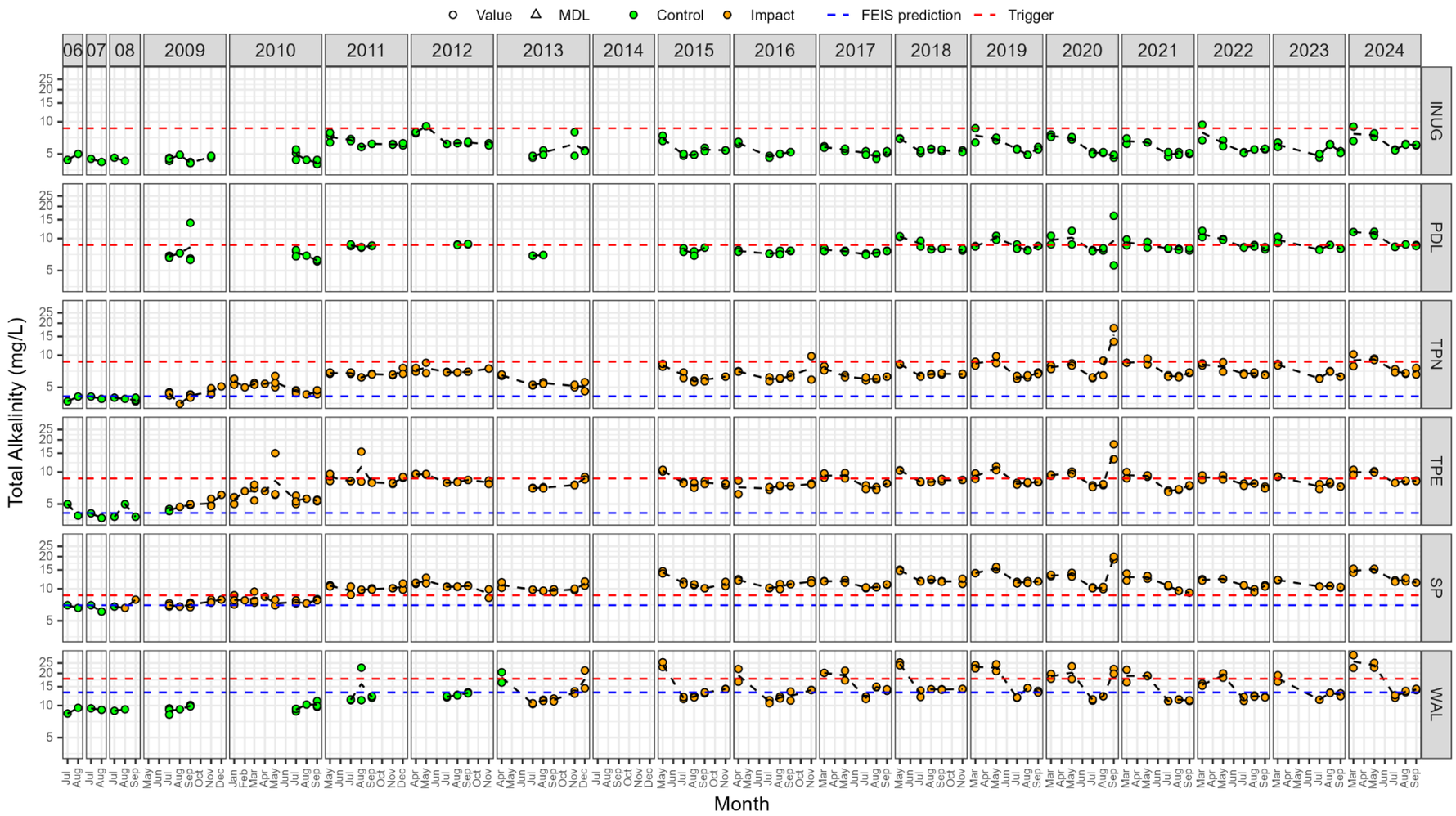


Figure C1-10. Ammonia-N (mg/L).

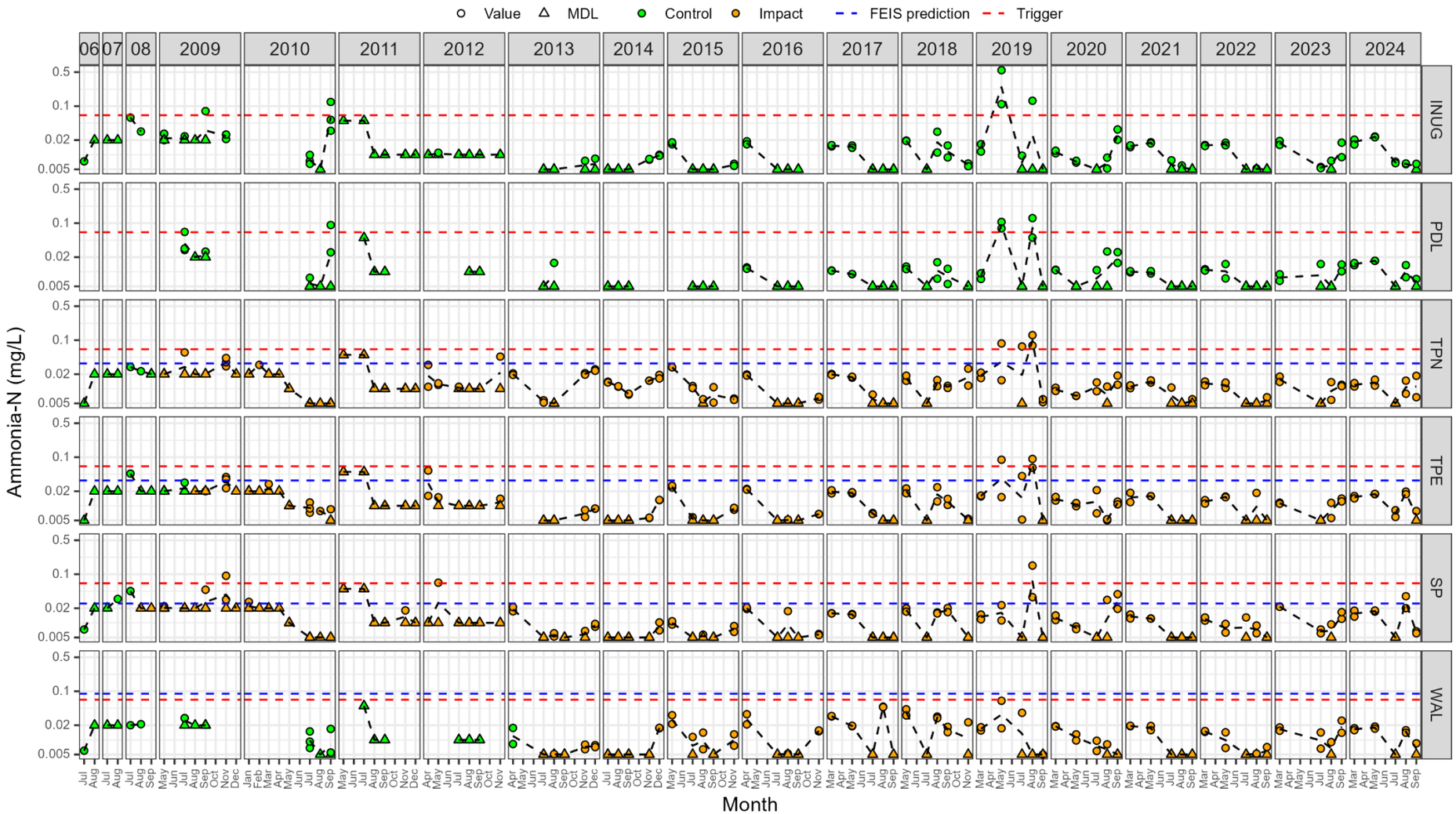


Figure C1-11. Chloride (mg/L).

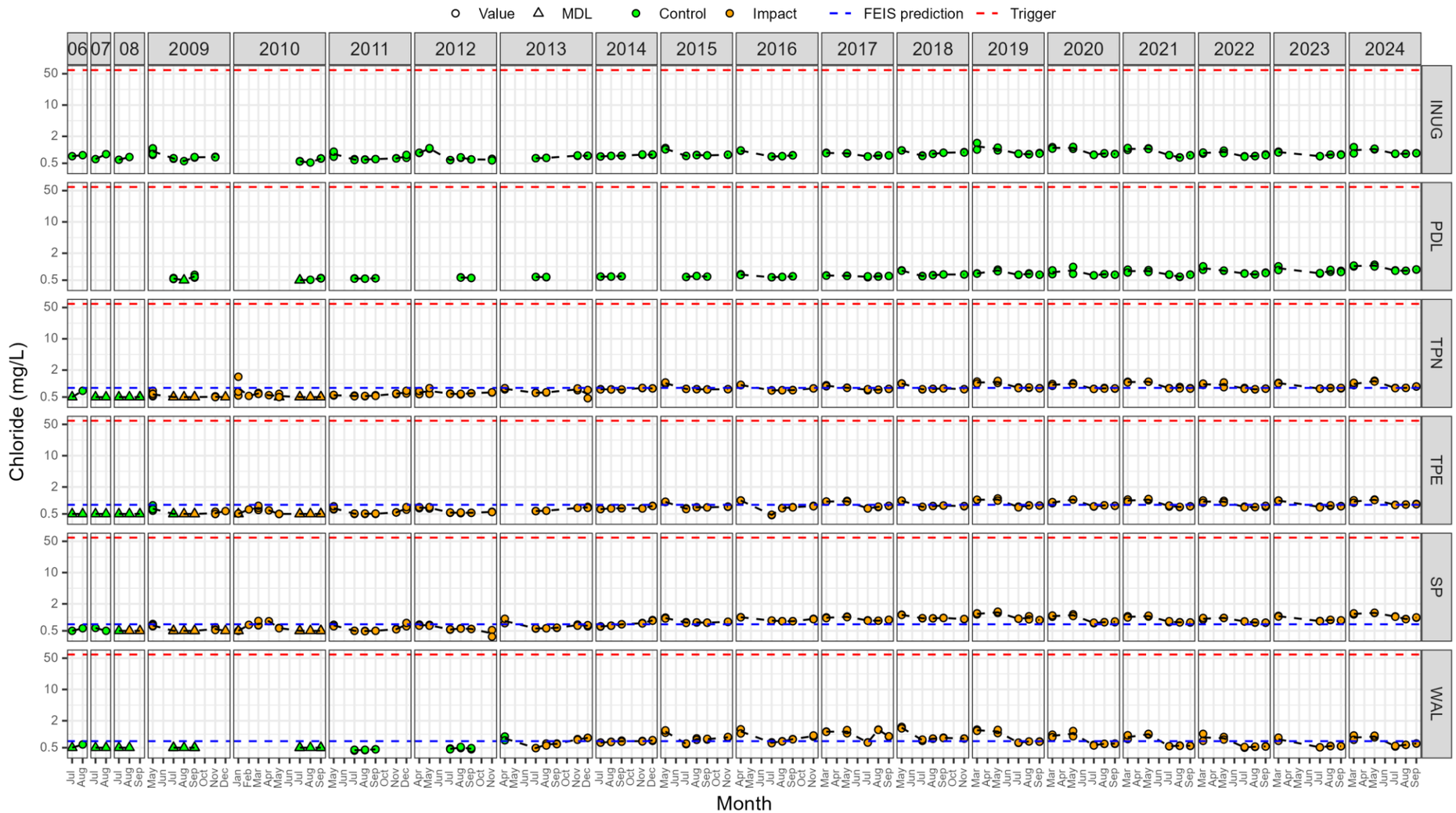


Figure C1-12. Fluoride (mg/L).

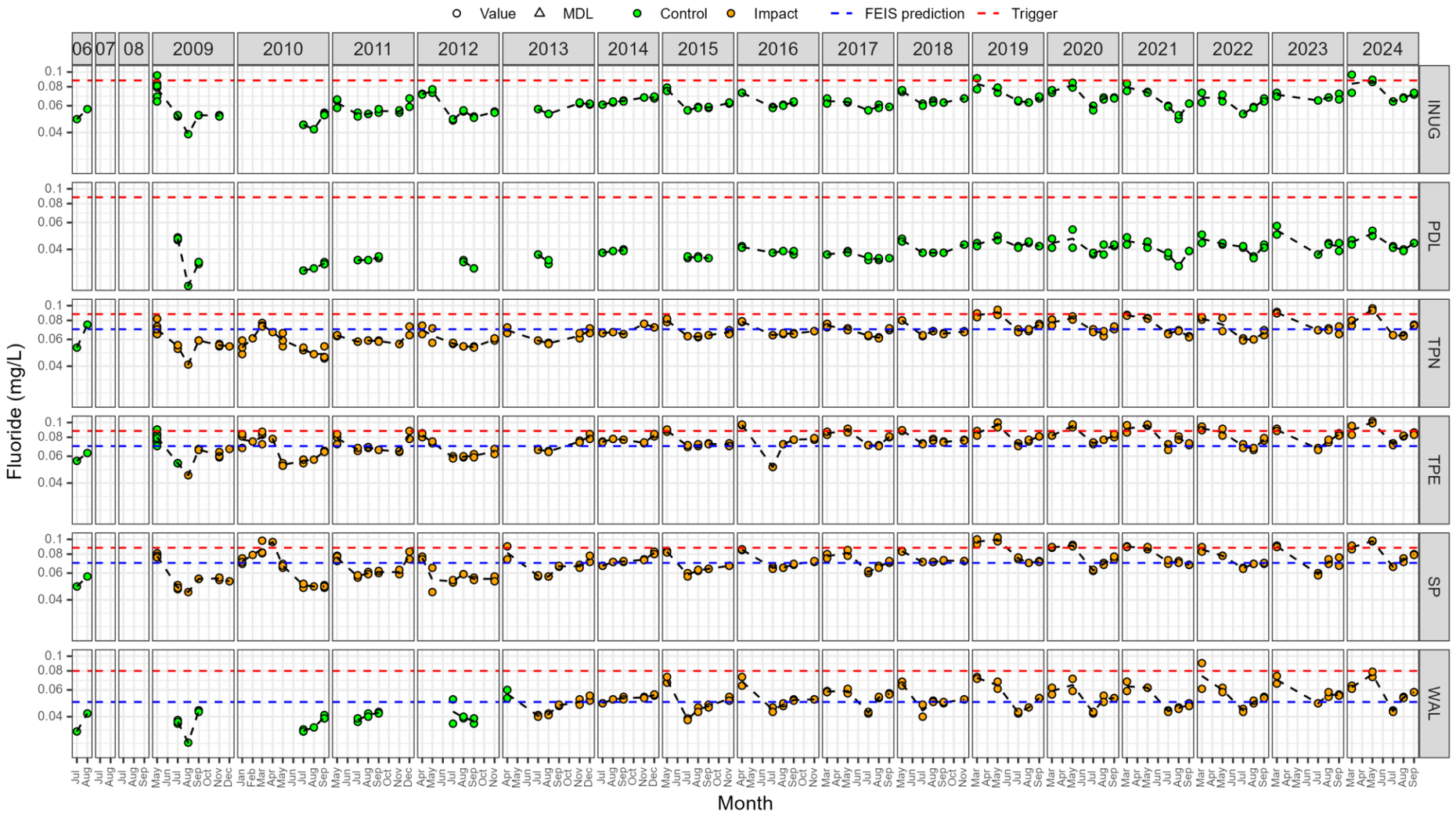


Figure C1-13. Nitrate-N (mg/L).

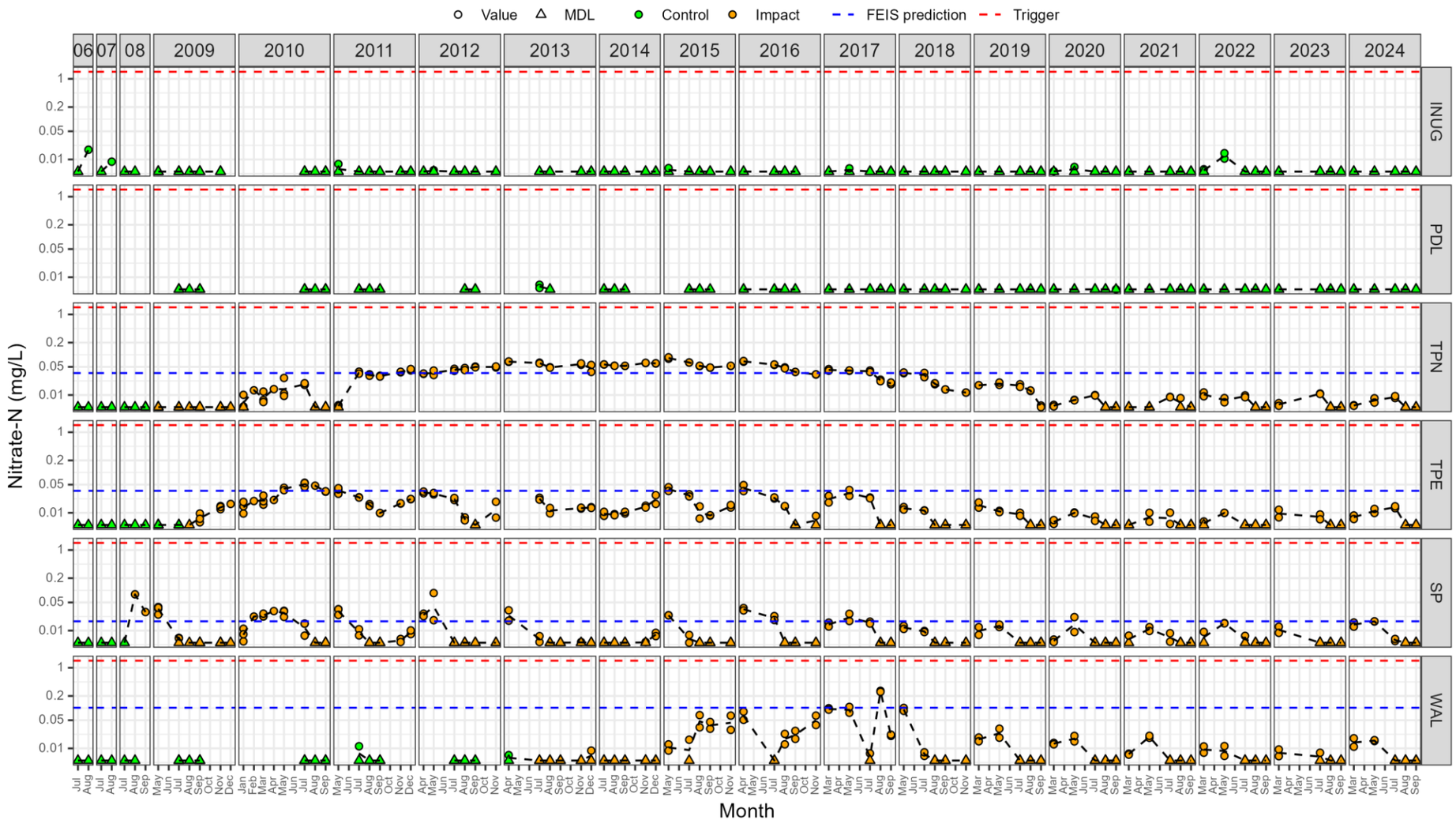


Figure C1-14. Nitrite-N (mg/L).

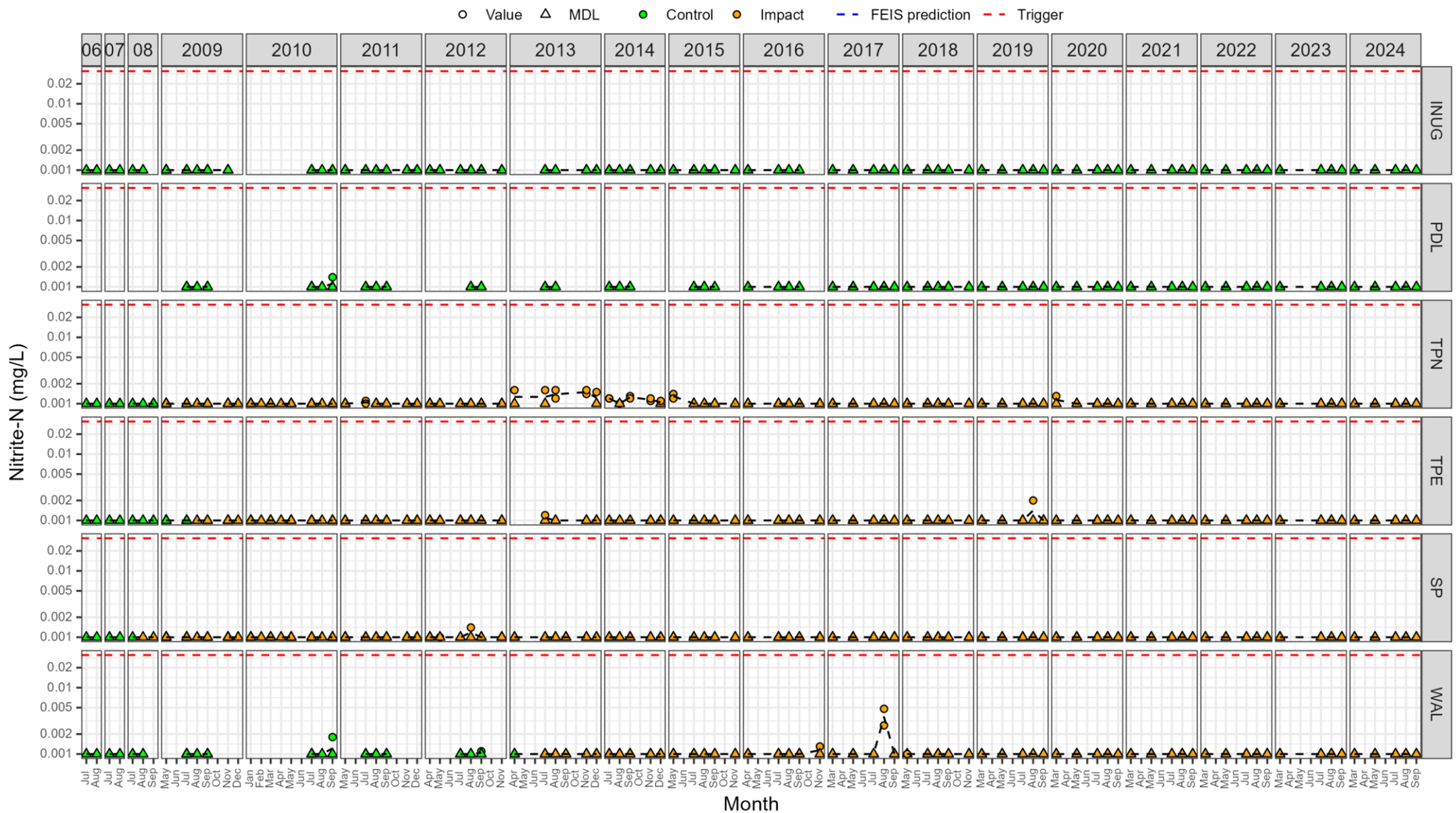


Figure C1-15. Total Kjeldahl Nitrogen (TKN; mg/L).

Note: TKN data from 2014 were removed due to data quality concerns. See Azimuth (2015) for more details.

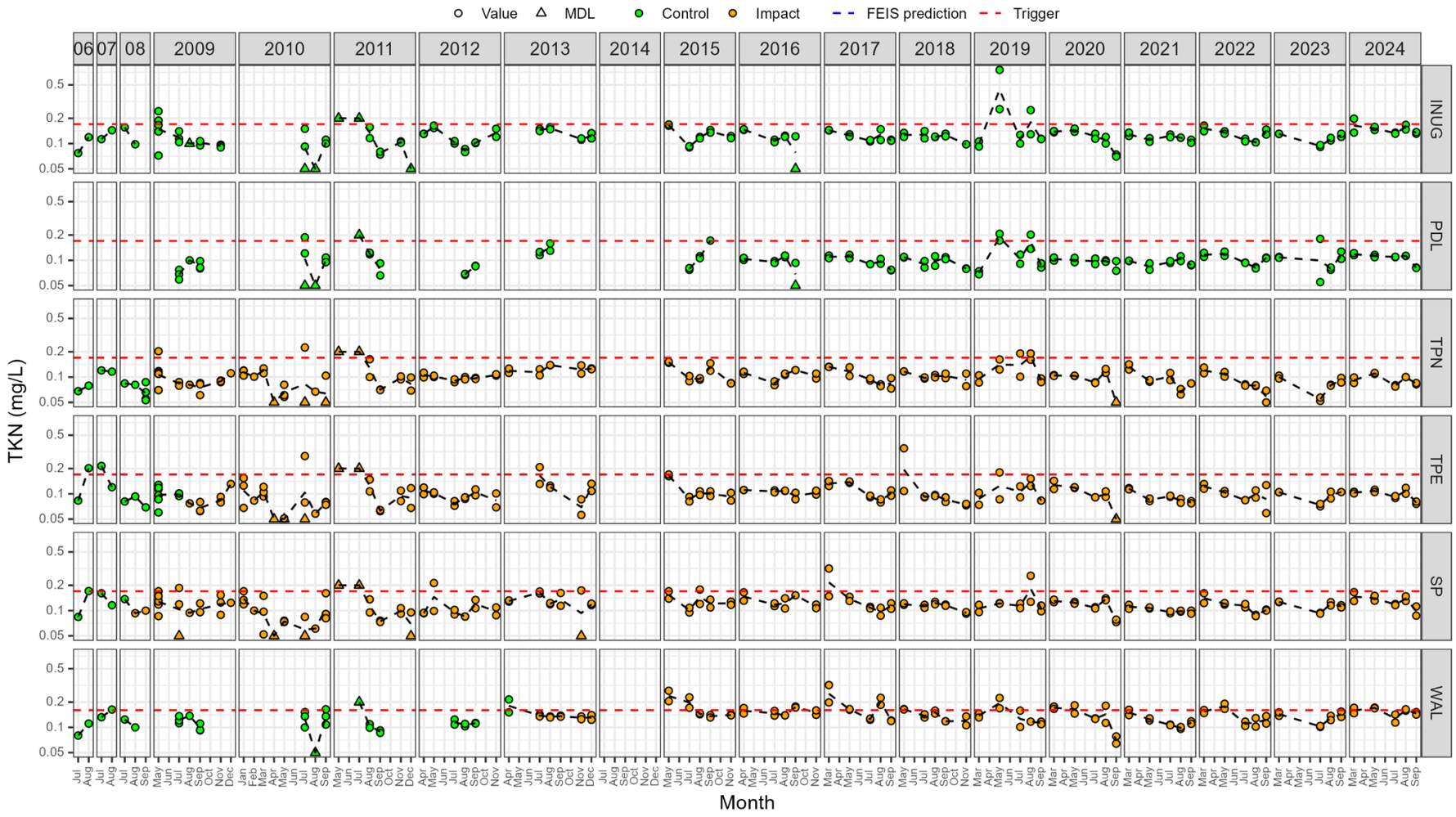


Figure C1-16. Total phosphorus (mg/L).

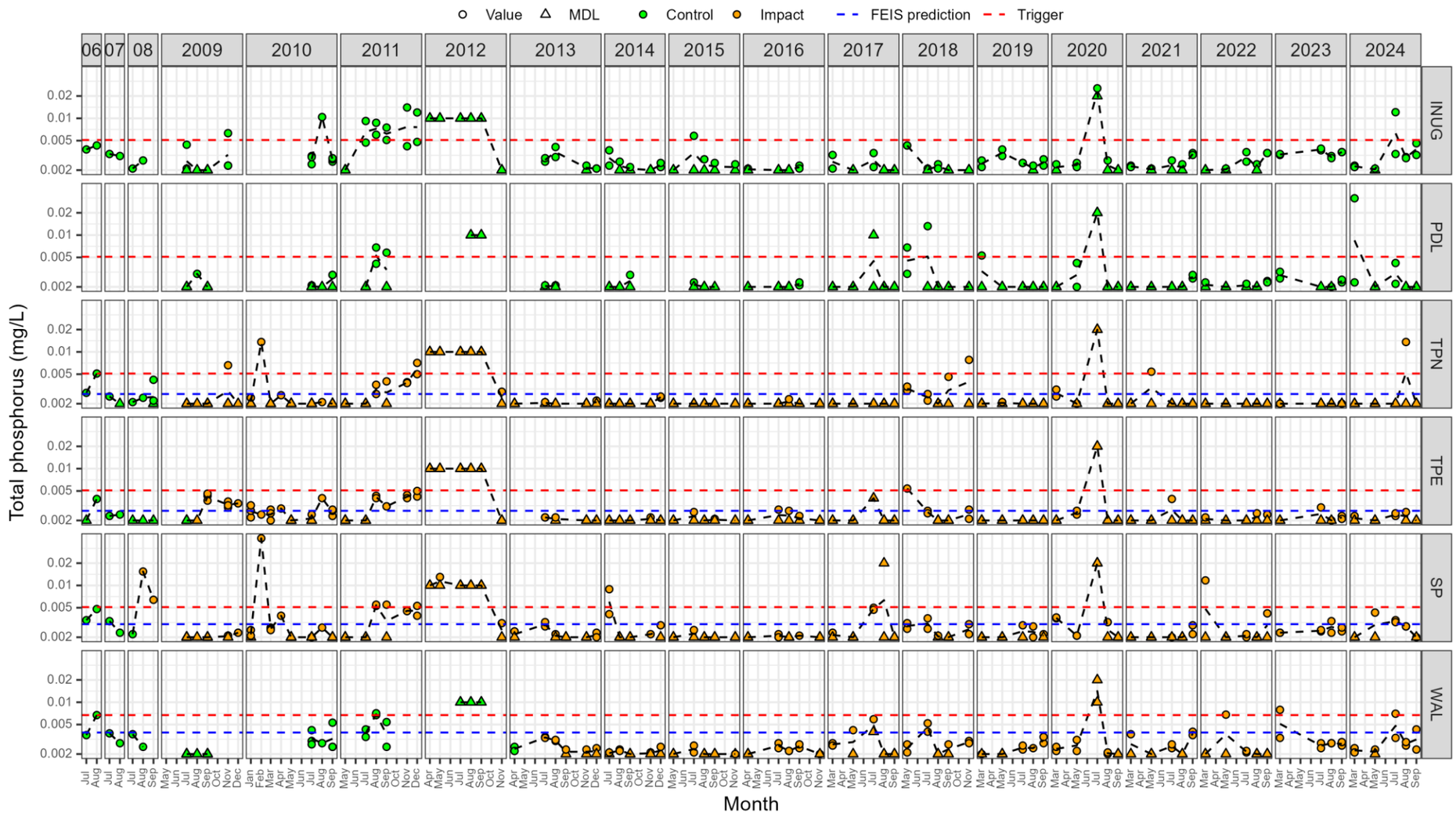


Figure C1-17. Ortho-phosphate (mg/L).

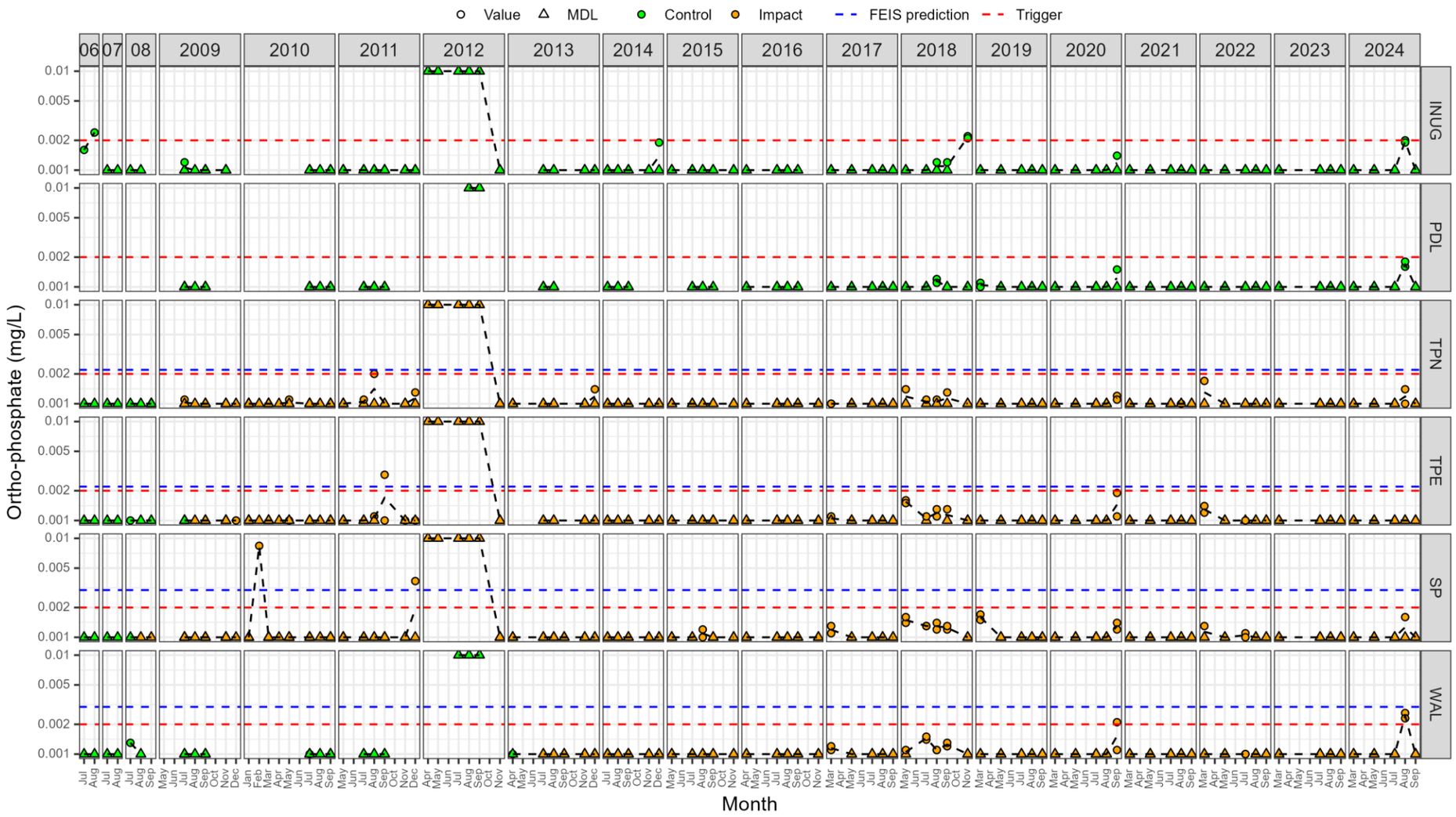


Figure C1-18. Reactive silica (mg/L).

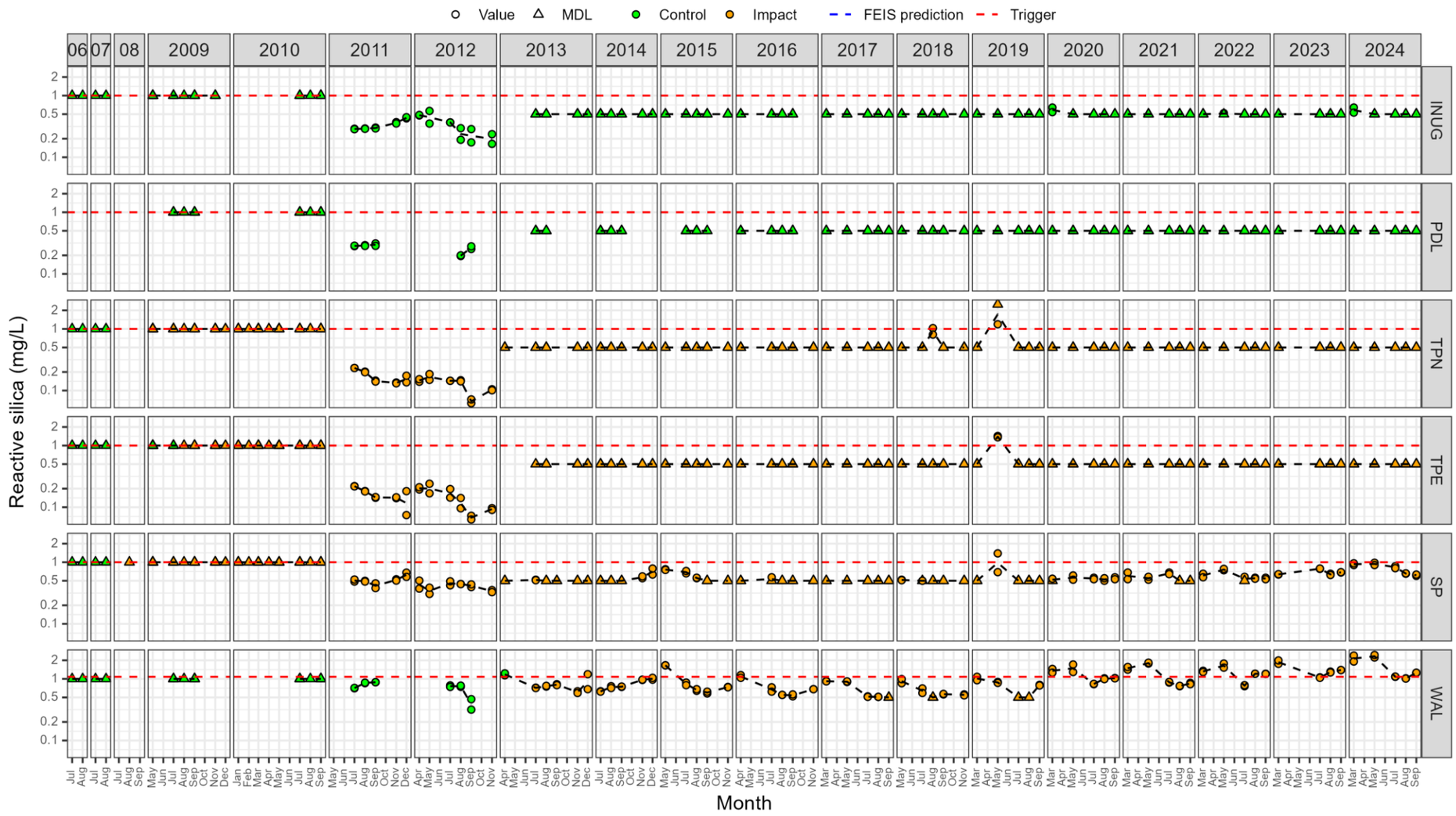


Figure C1-19. Sulphate (mg/L).

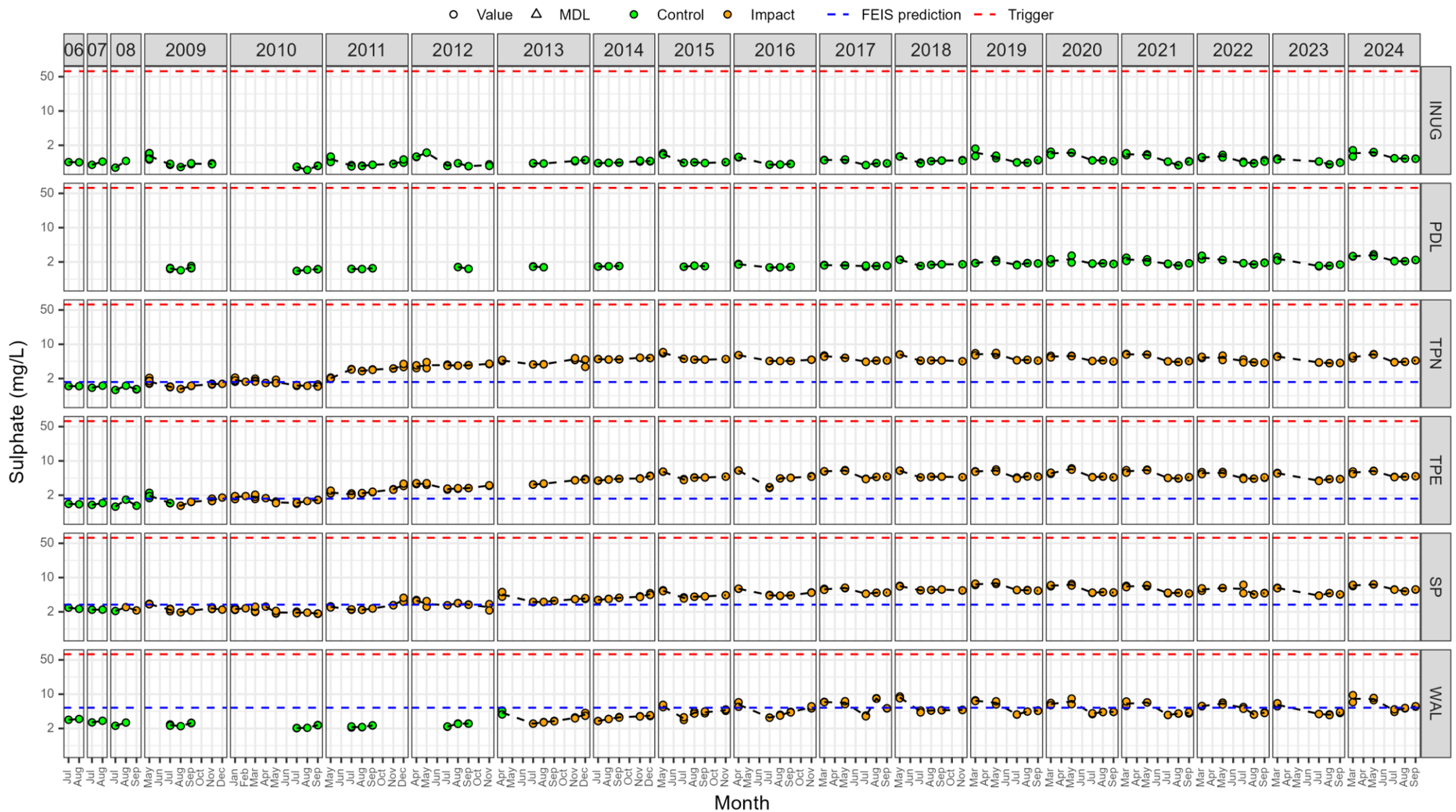


Figure C1-20. Dissolved Organic Carbon (DOC; mg/L).

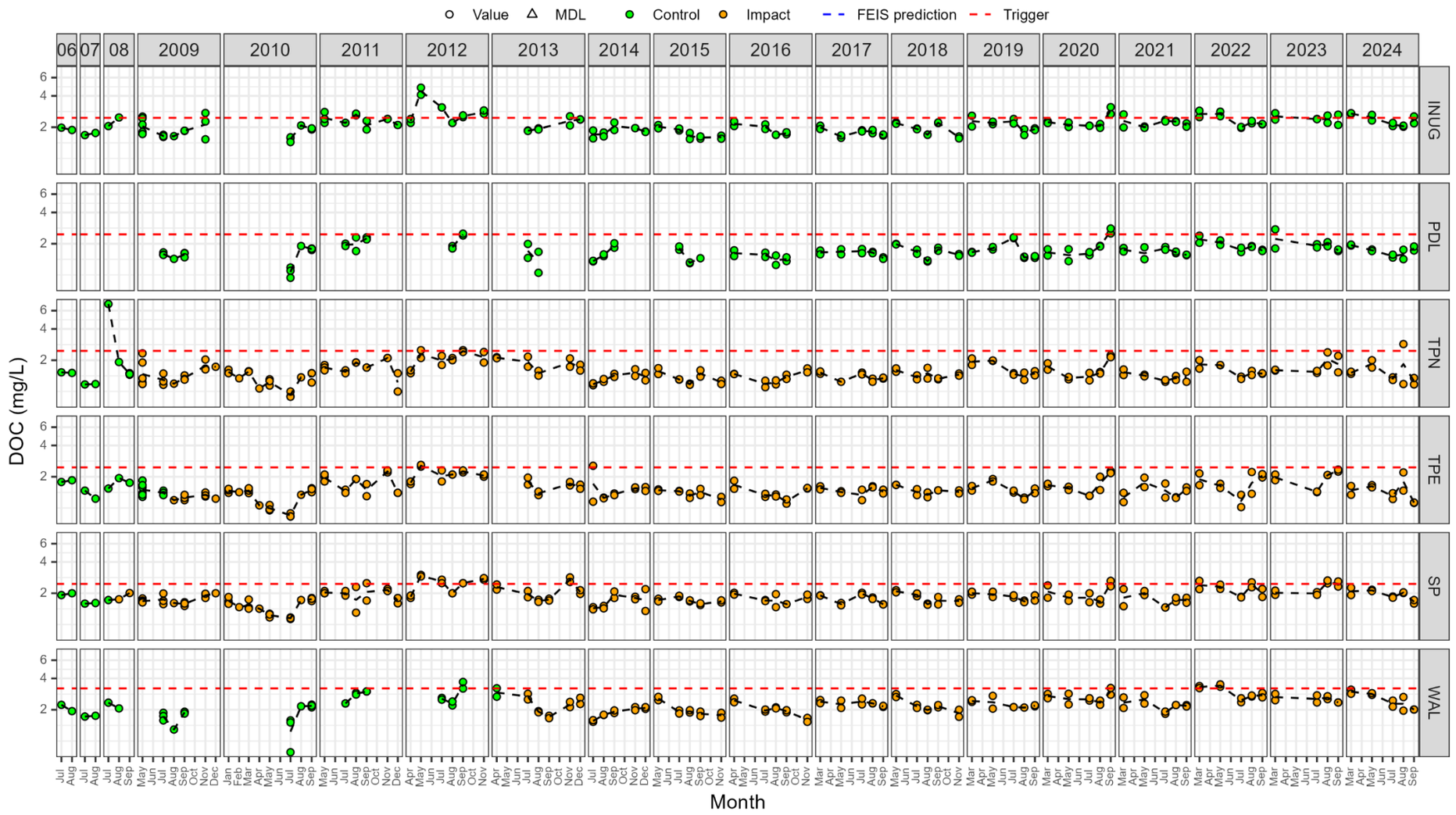


Figure C1-21. Total Organic Carbon (TOC; mg/L).

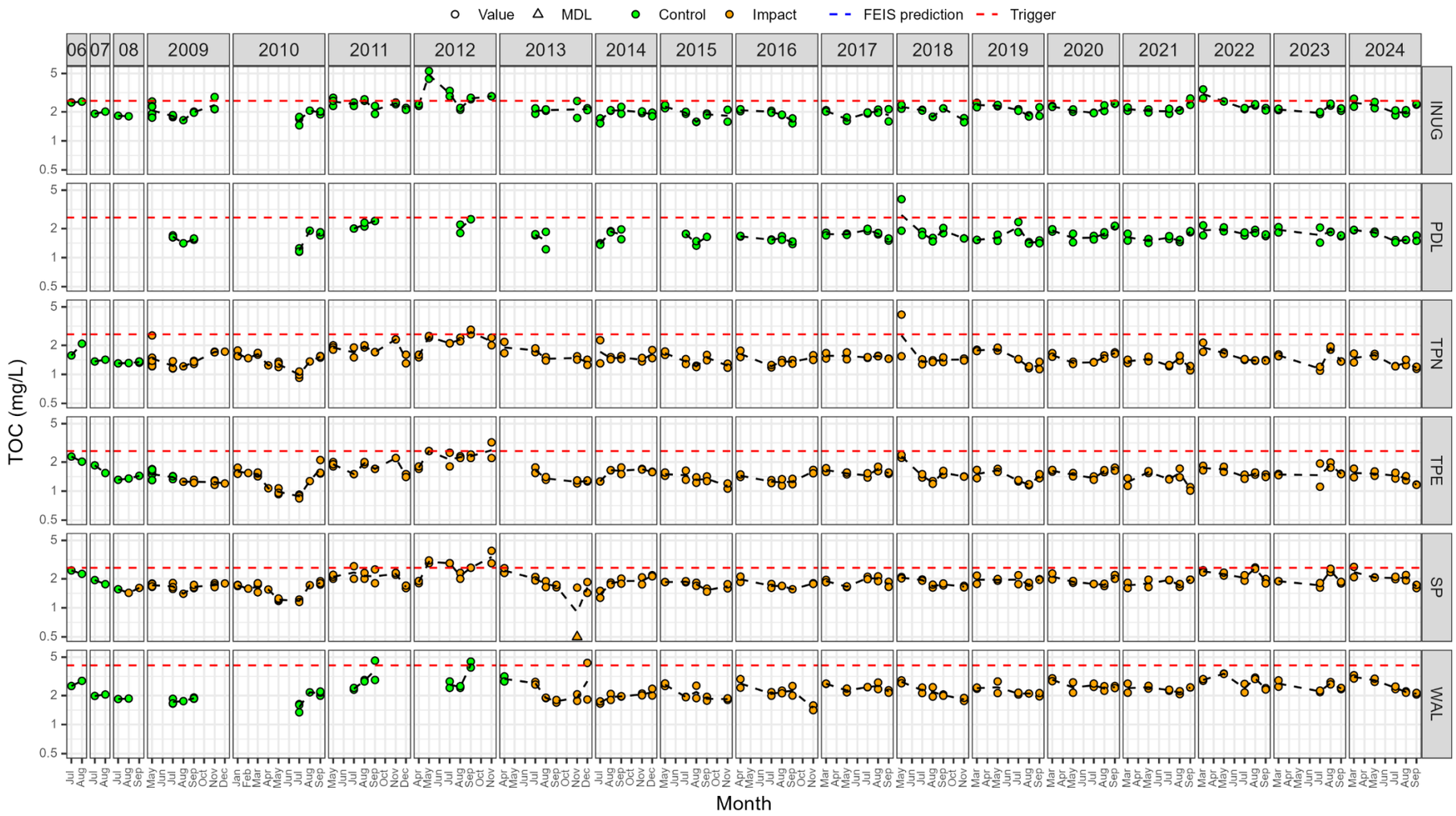


Figure C1-22. Total aluminum (mg/L).

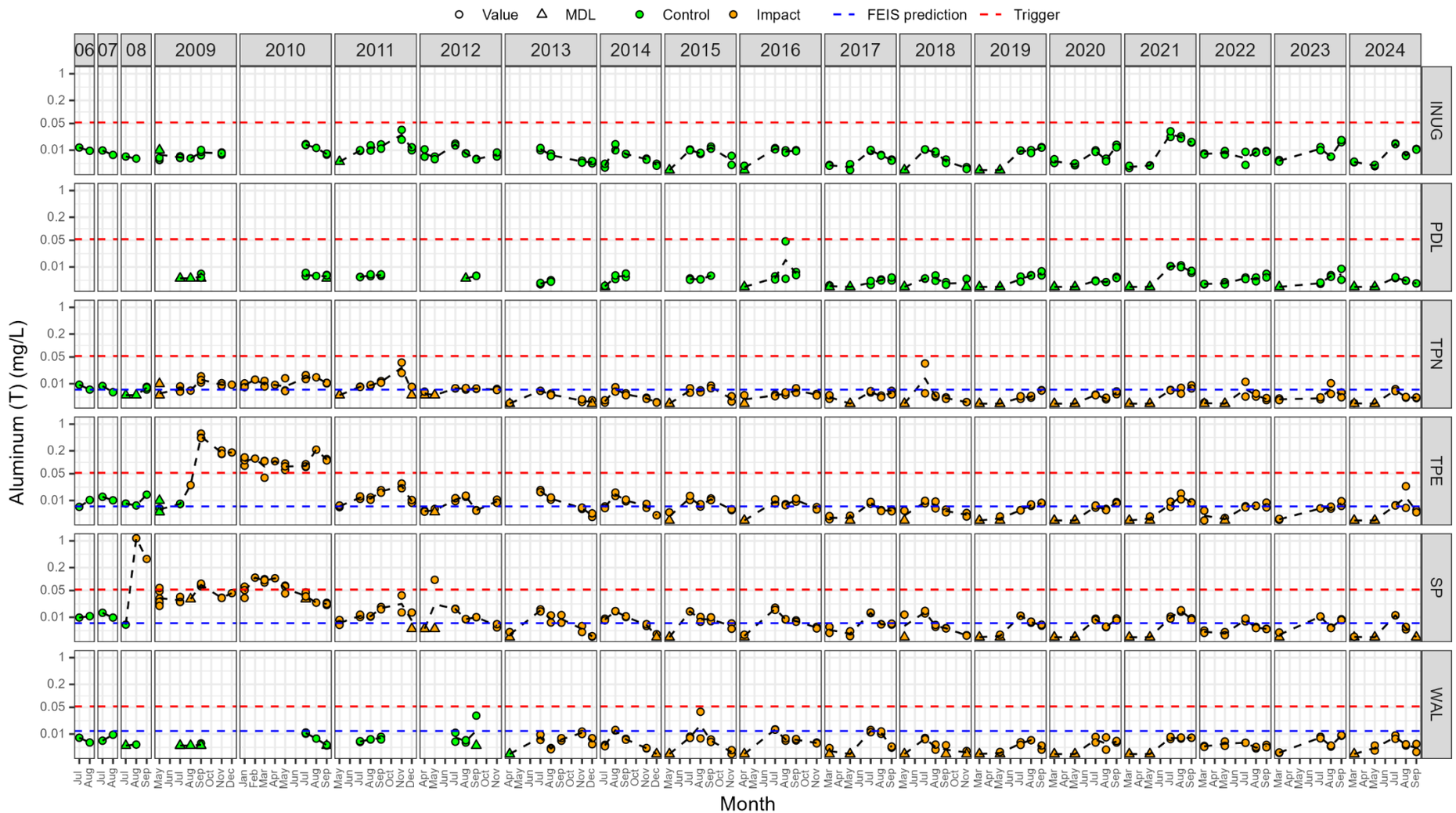


Figure C1-23. Total antimony (mg/L).

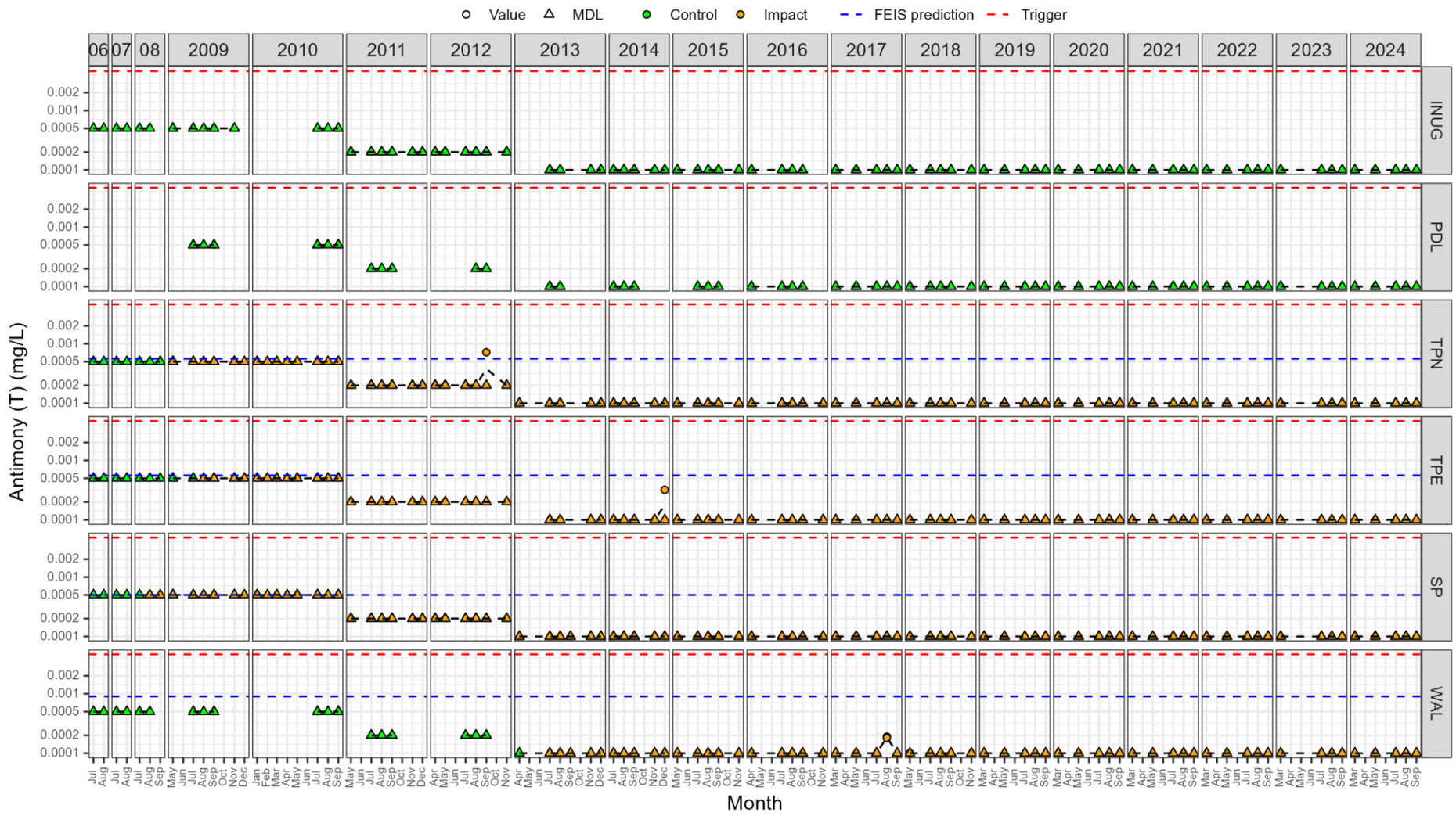


Figure C1-24. Total arsenic (mg/L).

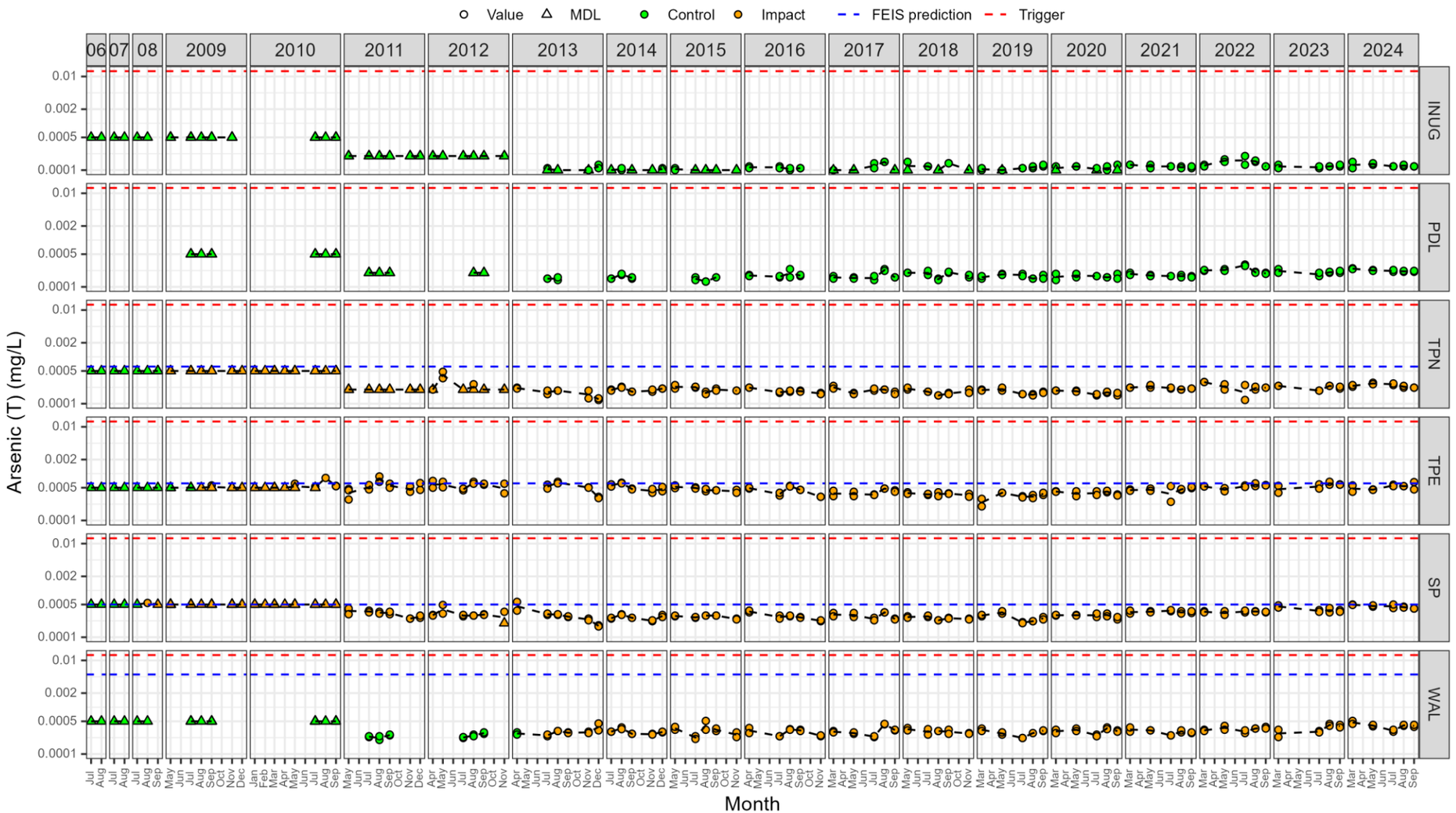


Figure C1-25. Total barium (mg/L).

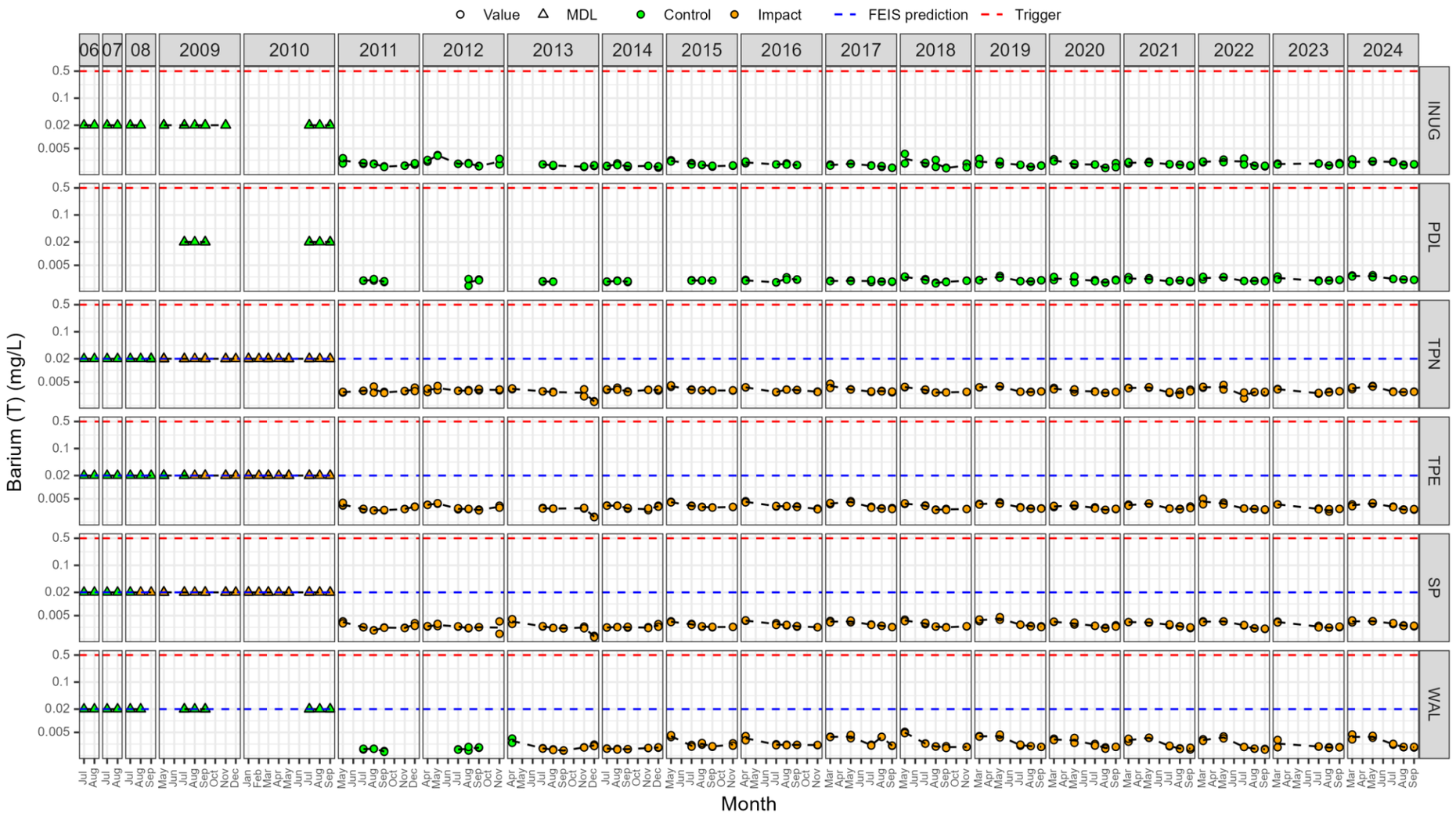


Figure C1-26. Total beryllium (mg/L).

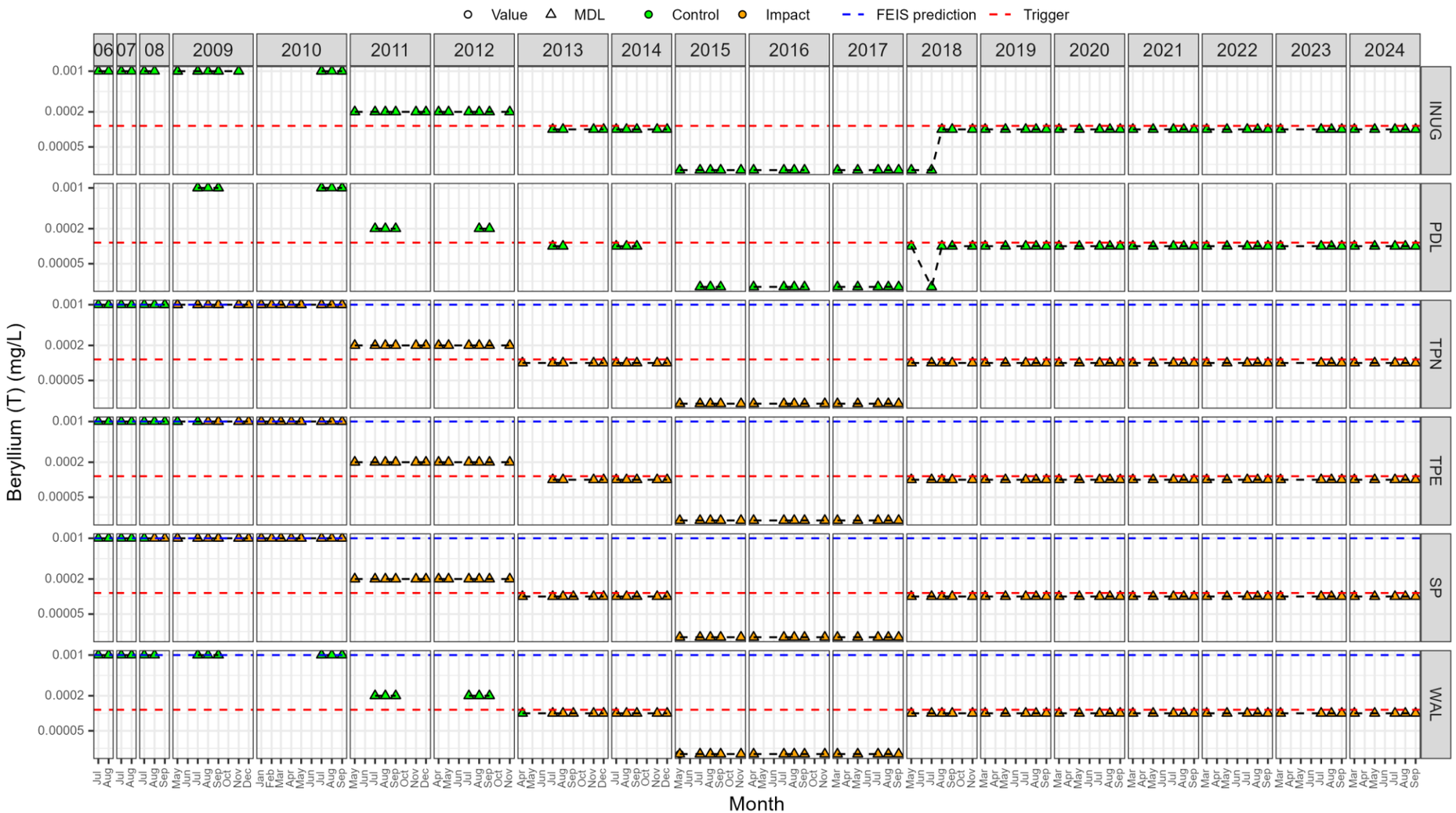


Figure C1-27. Total boron (mg/L).



Figure C1-28. Total cadmium (mg/L).

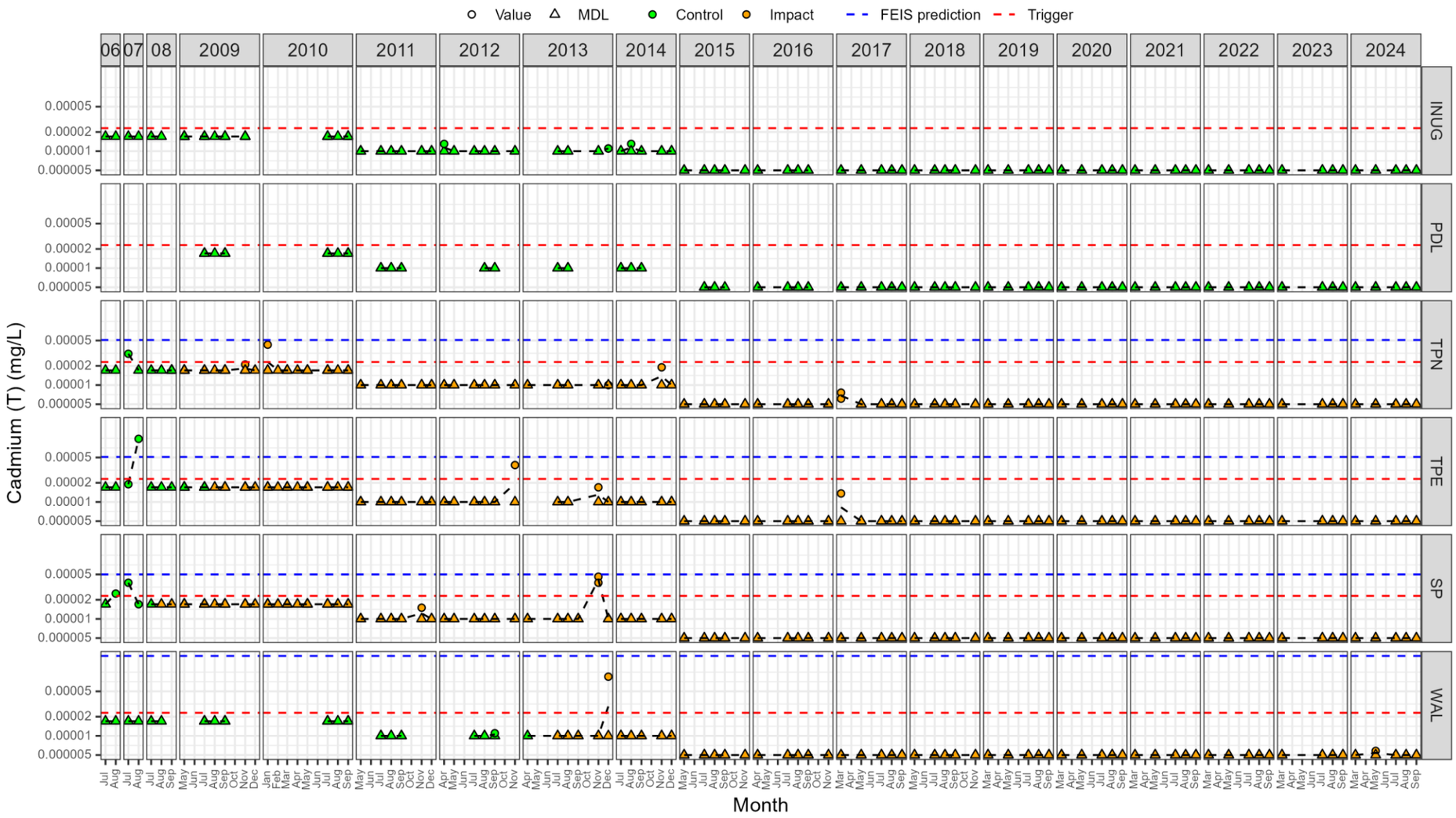


Figure C1-29. Total calcium (mg/L).

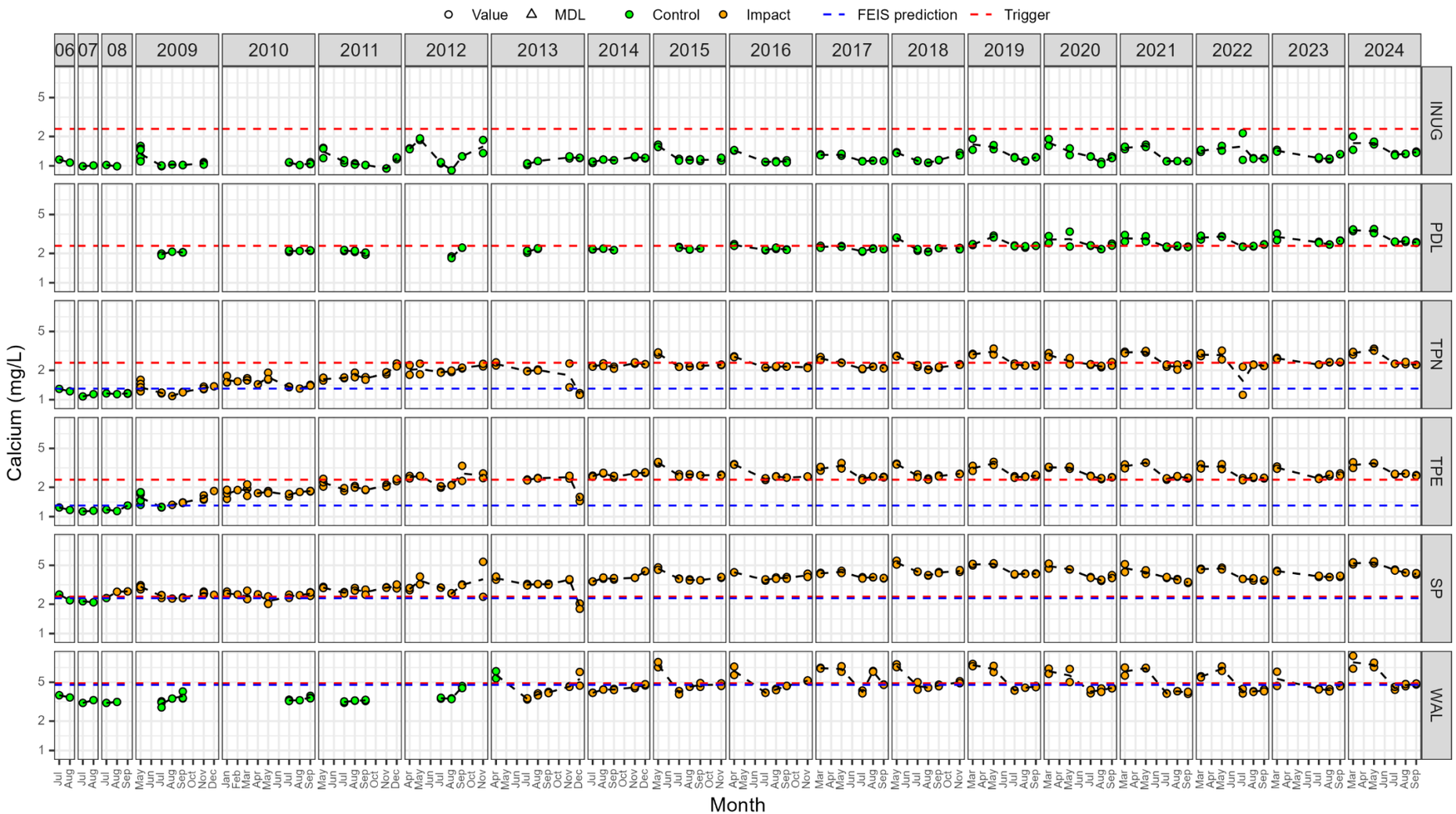


Figure C1-30. Total chromium (mg/L).

Note: The detection limit for total chromium was adjusted from 0.0001 mg/L to 0.0005 mg/L for samples collected in since May 2021.

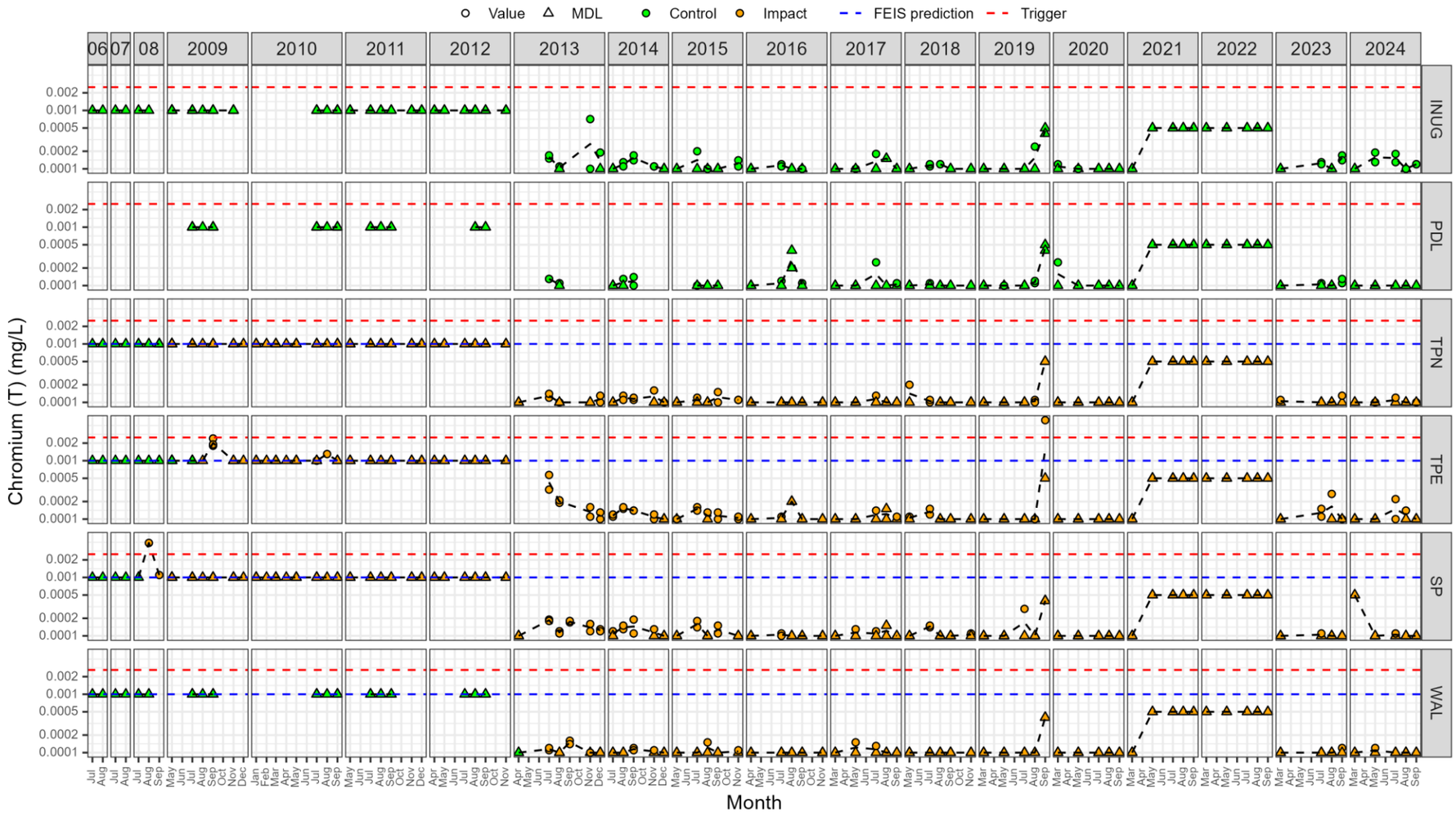


Figure C1-31. Total copper (mg/L).

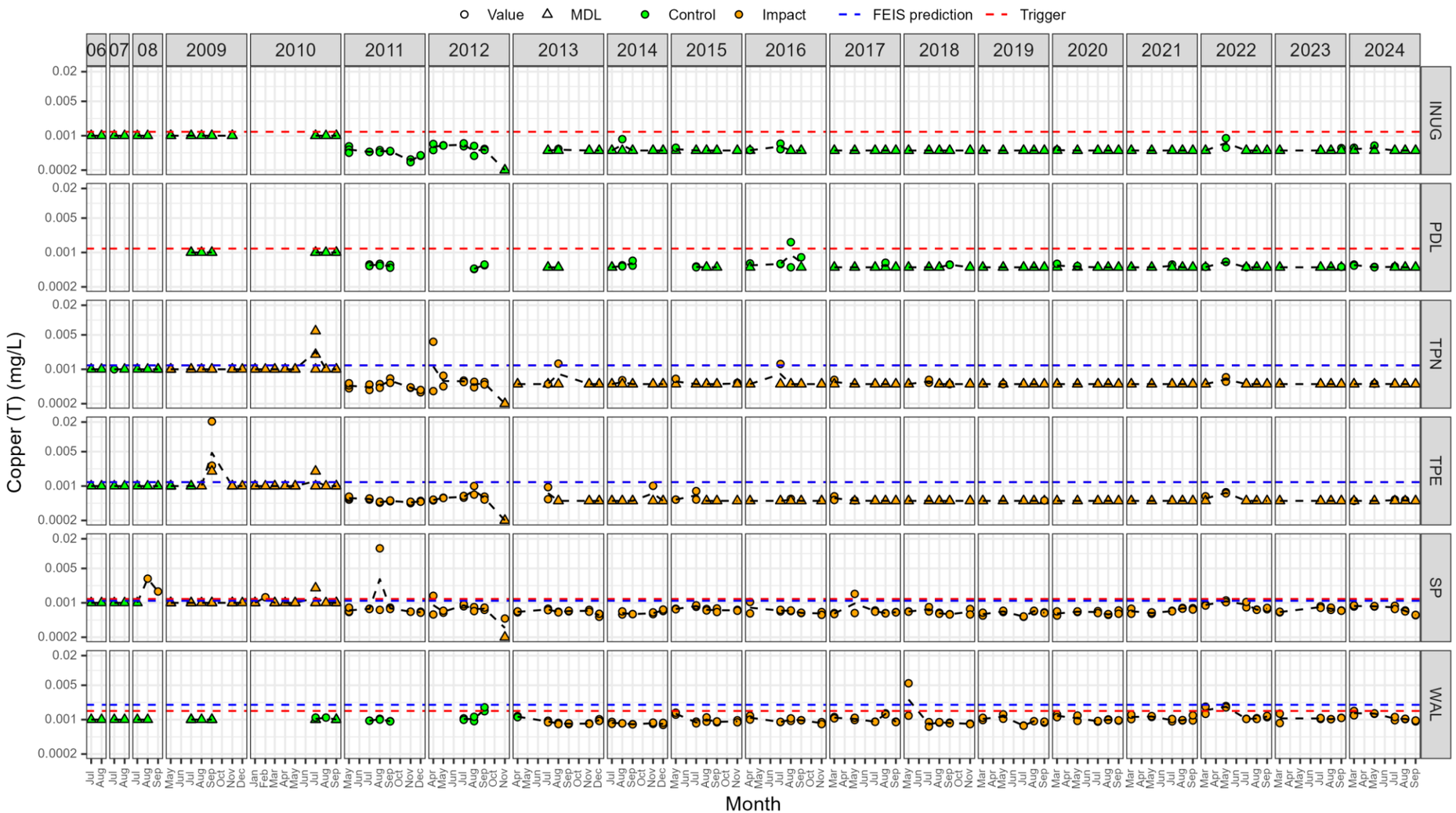


Figure C1-32. Total iron (mg/L).

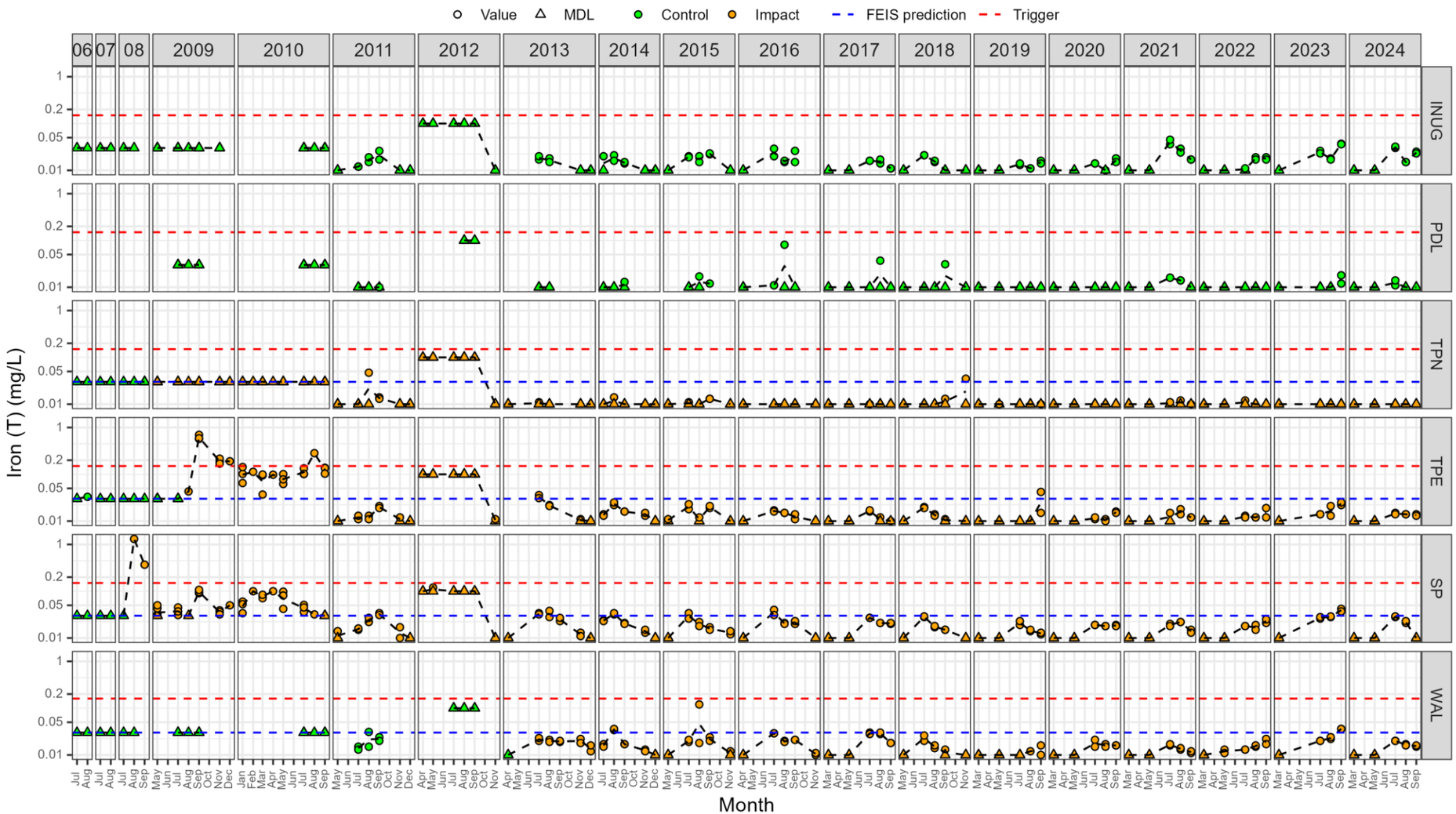


Figure C1-33. Total lead (mg/L).

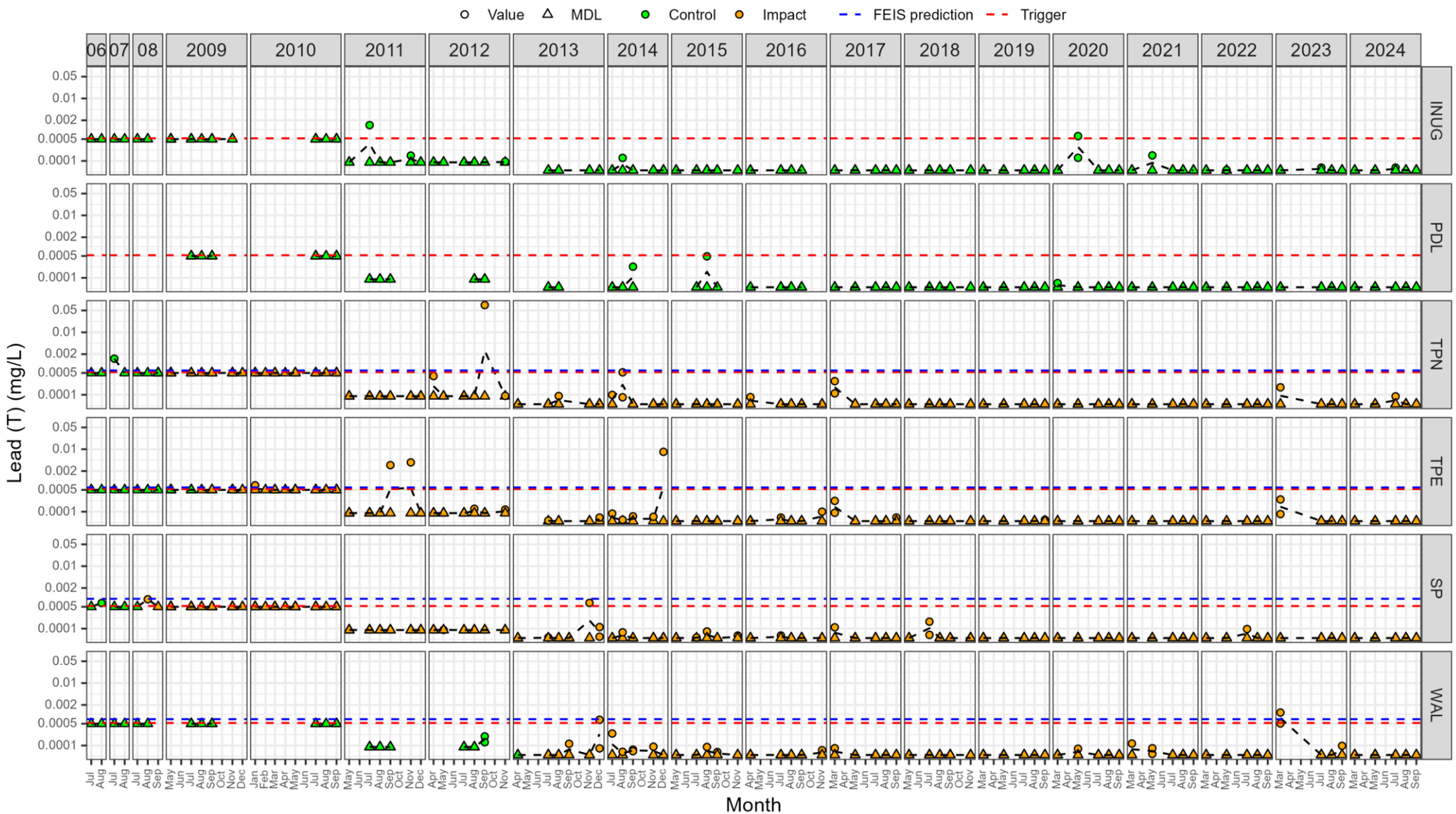


Figure C1-34. Total lithium (mg/L).

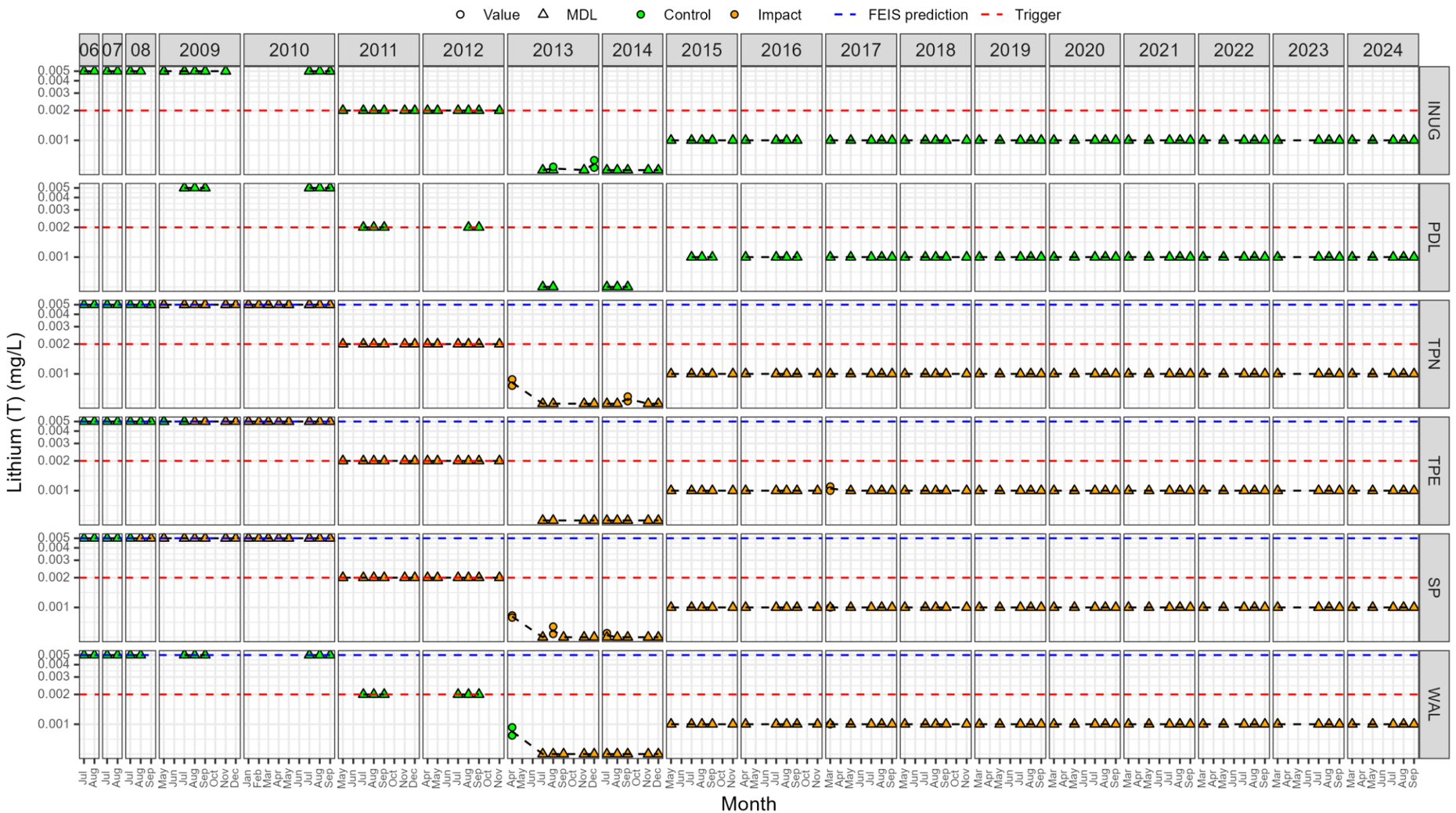


Figure C1-35. Total magnesium (mg/L).

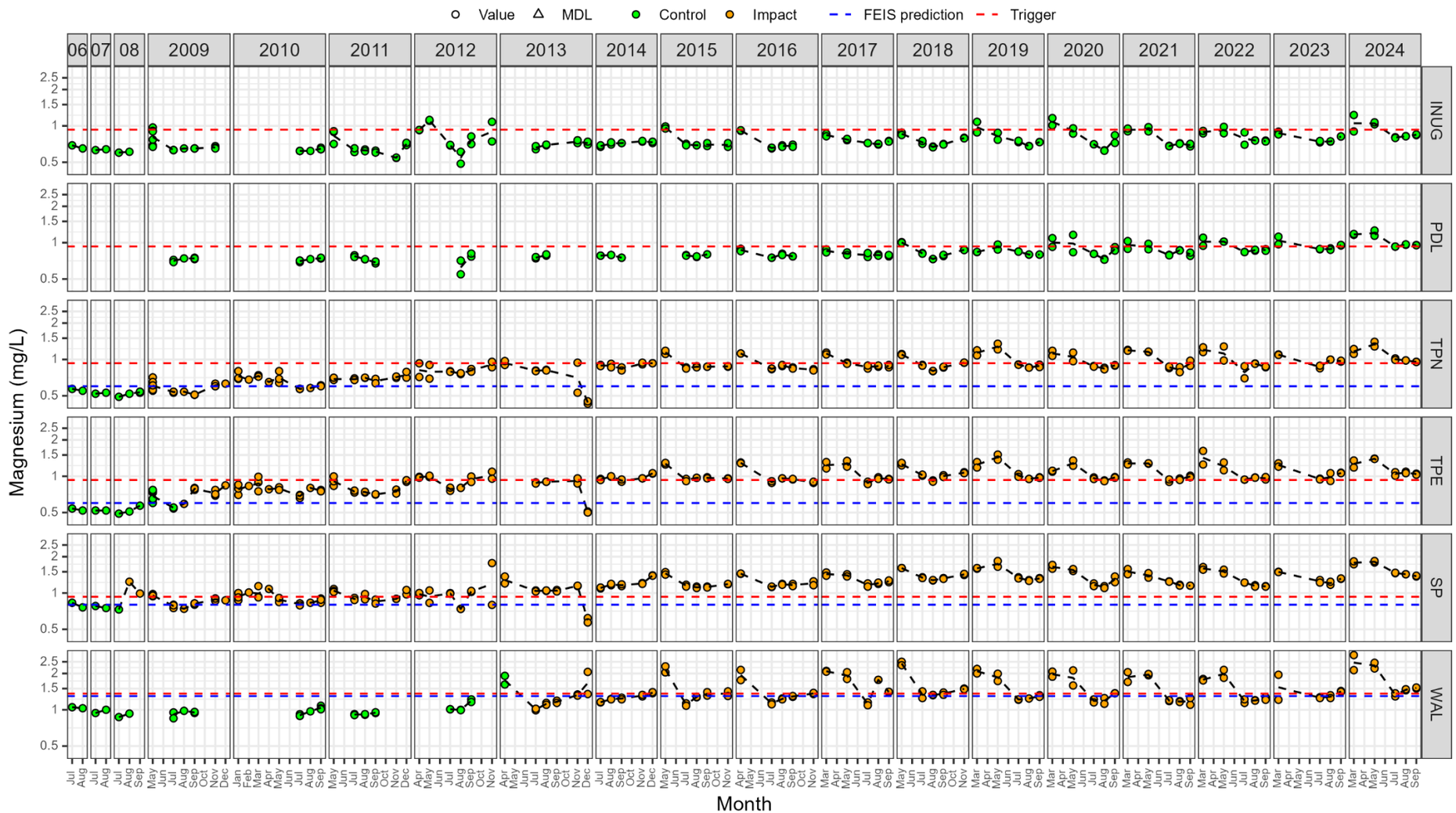


Figure C1-36. Total manganese (mg/L).

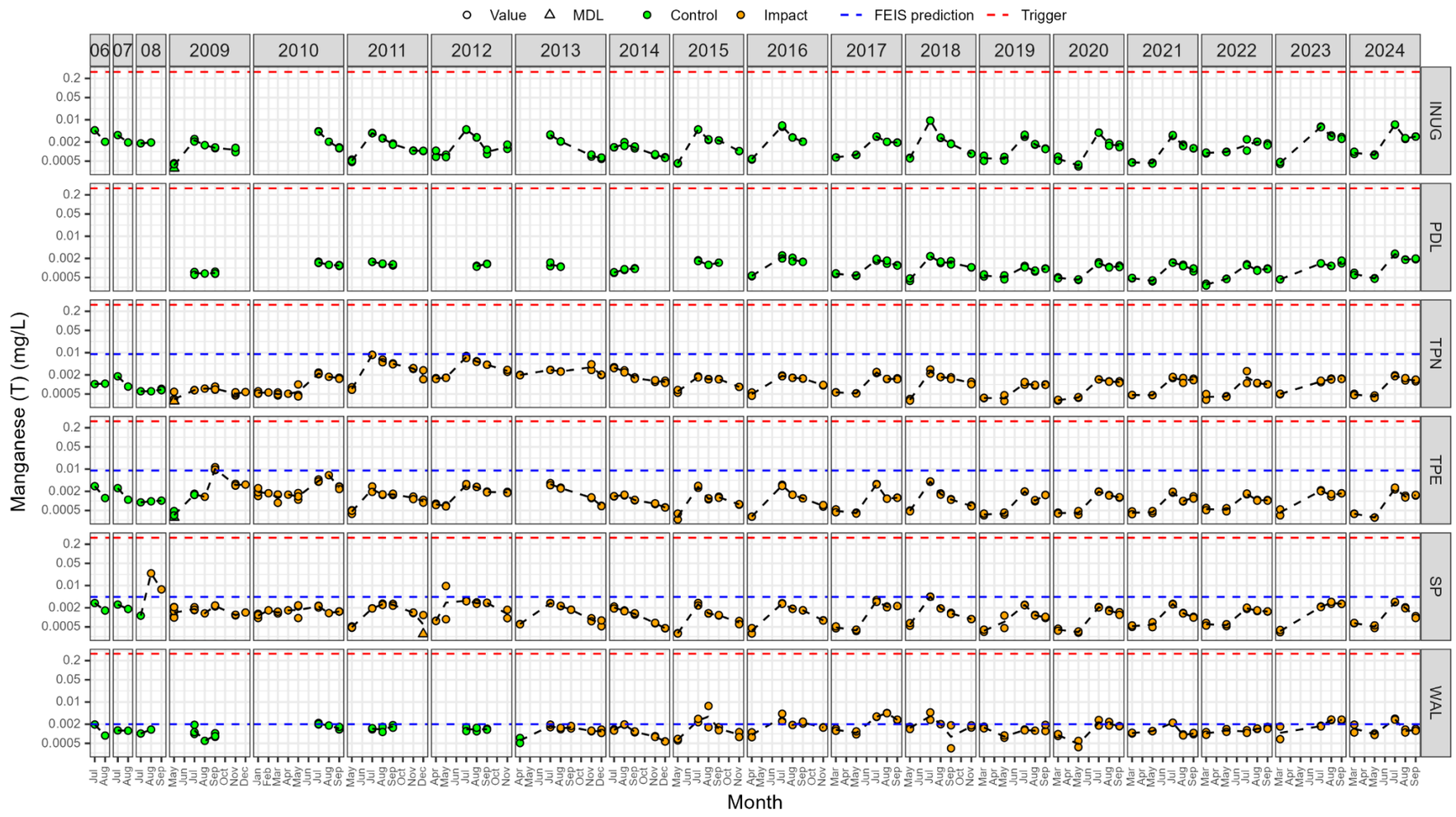


Figure C1-37. Total mercury (mg/L).

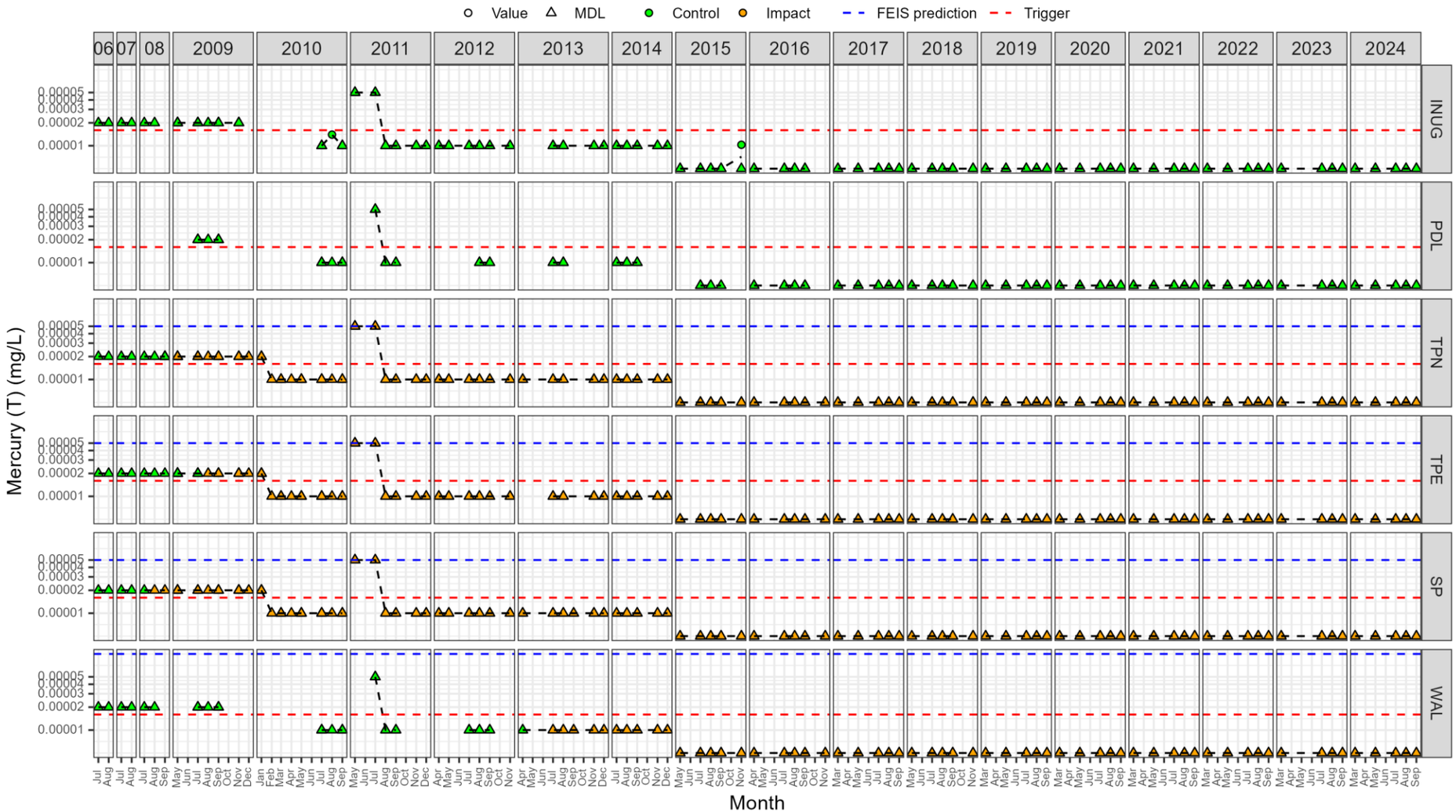


Figure C1-38. Total molybdenum (mg/L).

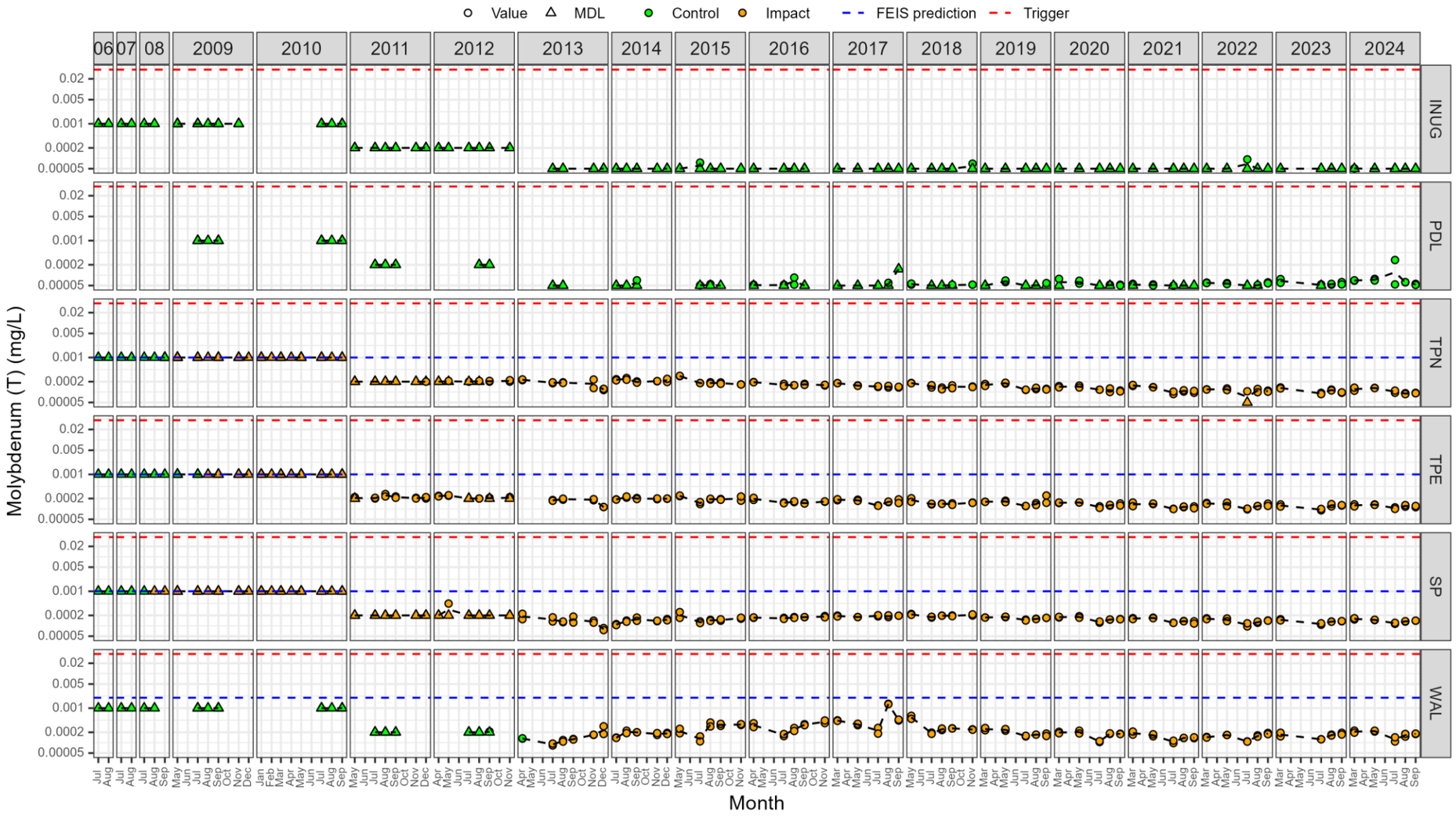


Figure C1-39. Total nickel (mg/L).

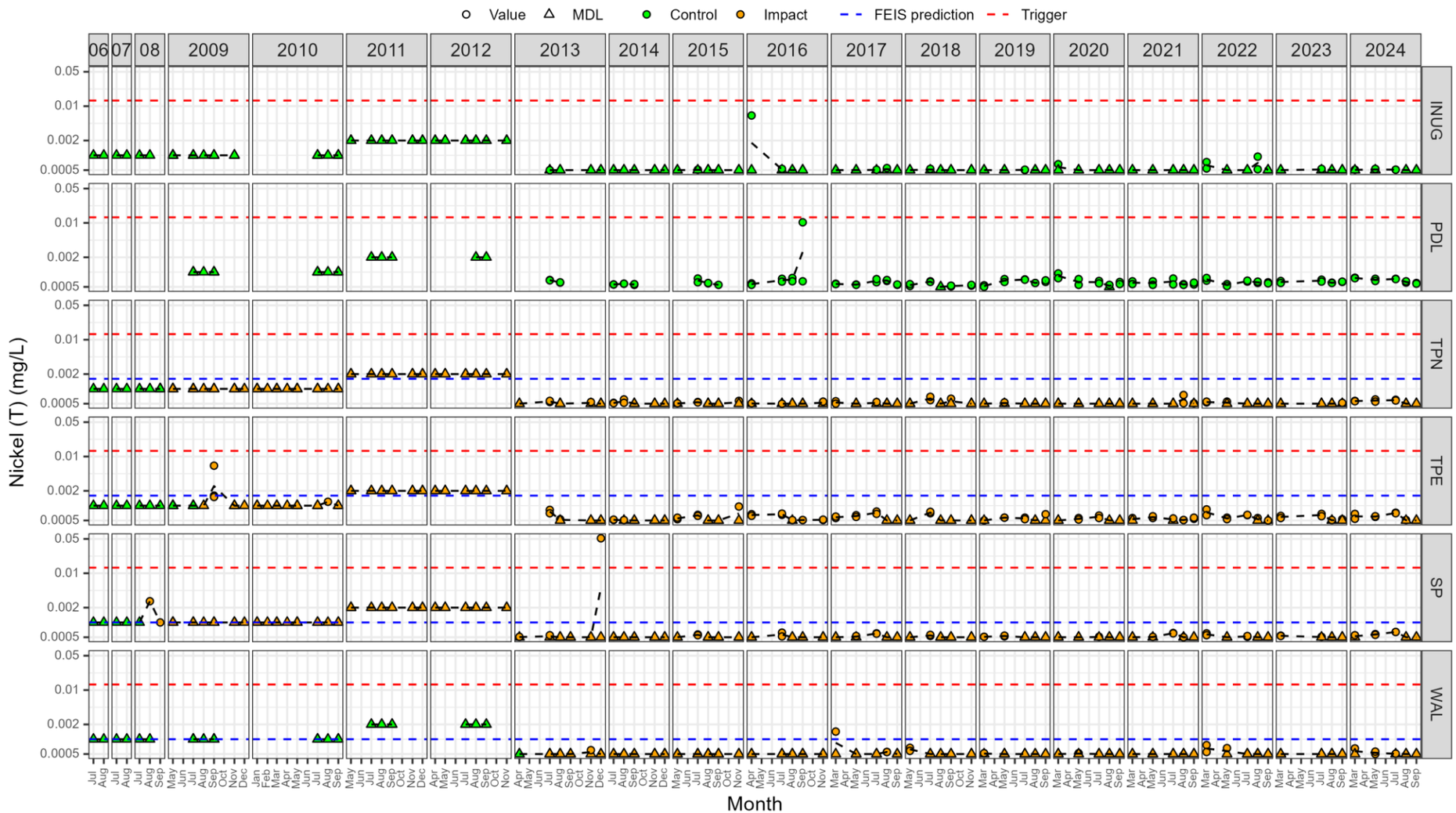


Figure C1-40. Total potassium (mg/L).

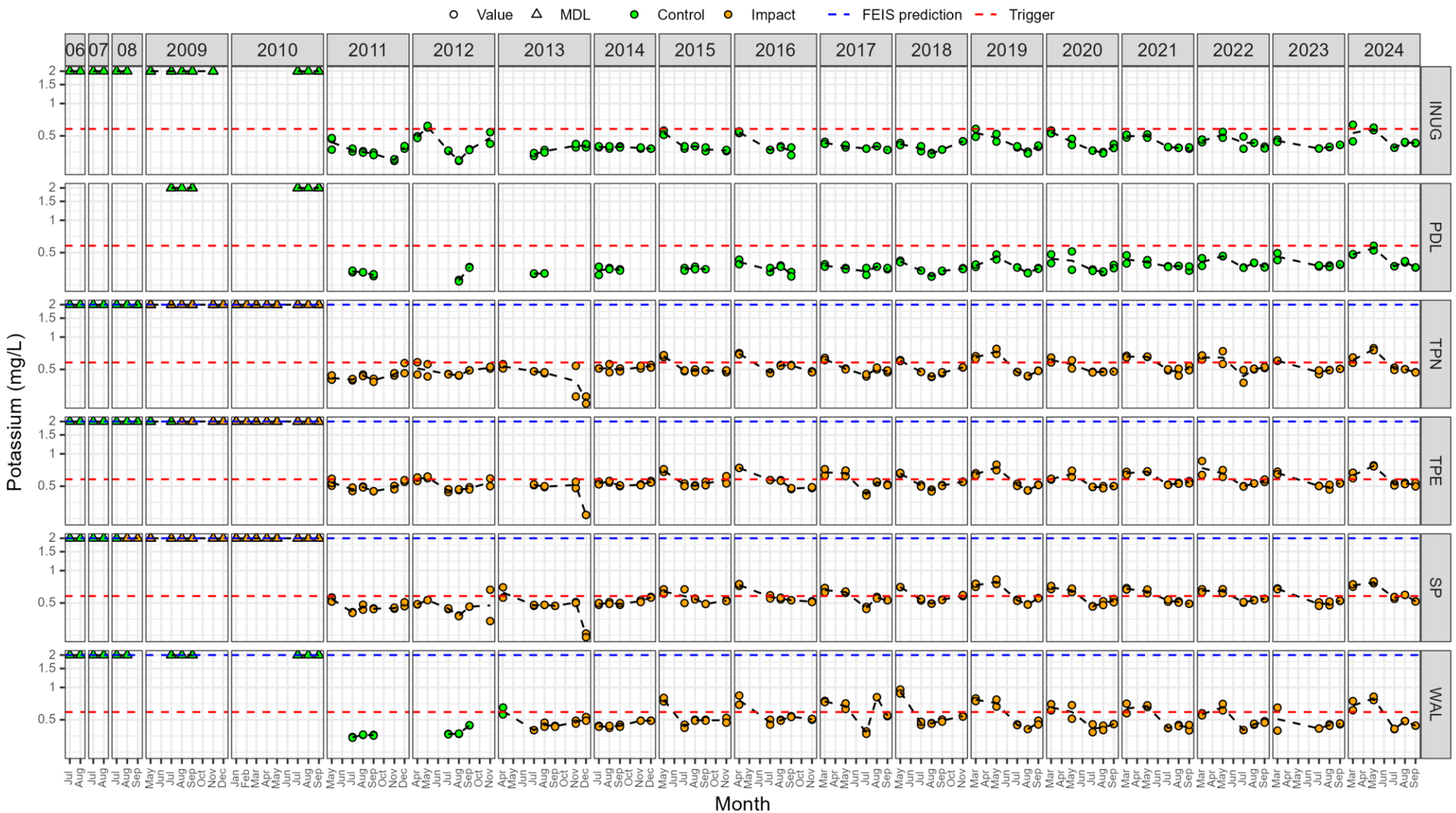


Figure C1-41. Total selenium (mg/L).



Figure C1-42. Total silicon (mg/L).

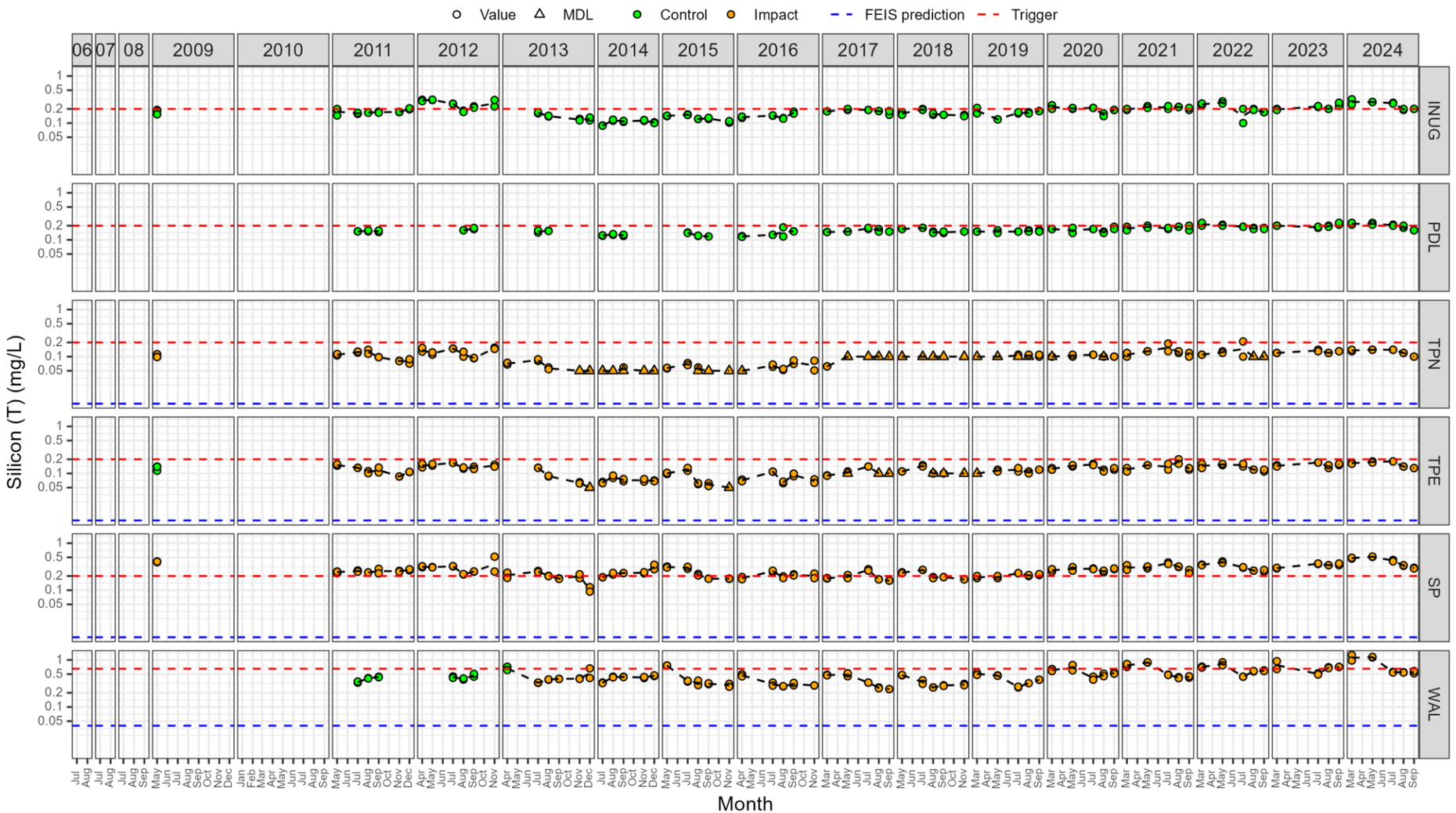


Figure C1-43. Total silver (mg/L).

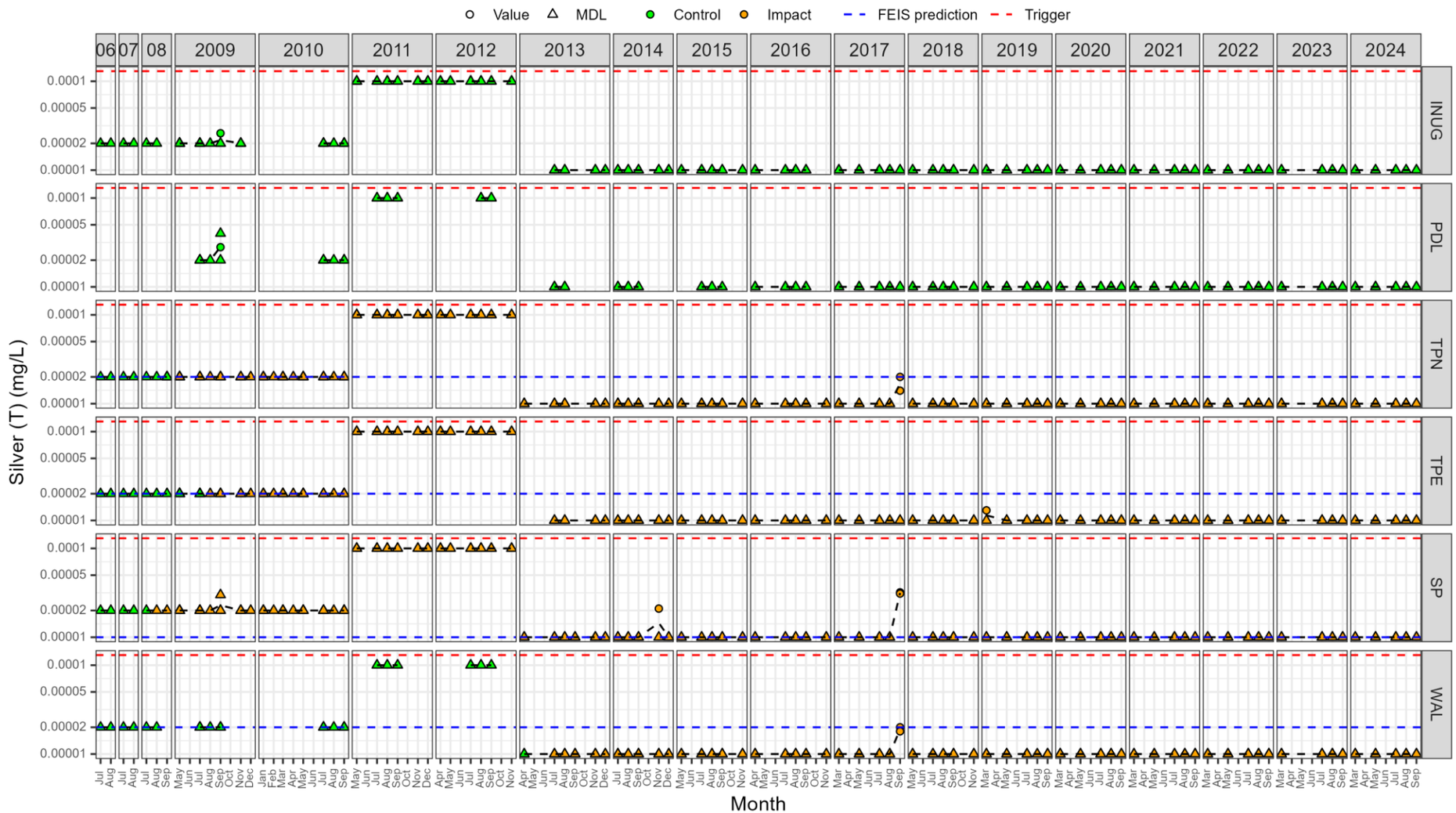


Figure C1-44. Total sodium (mg/L).

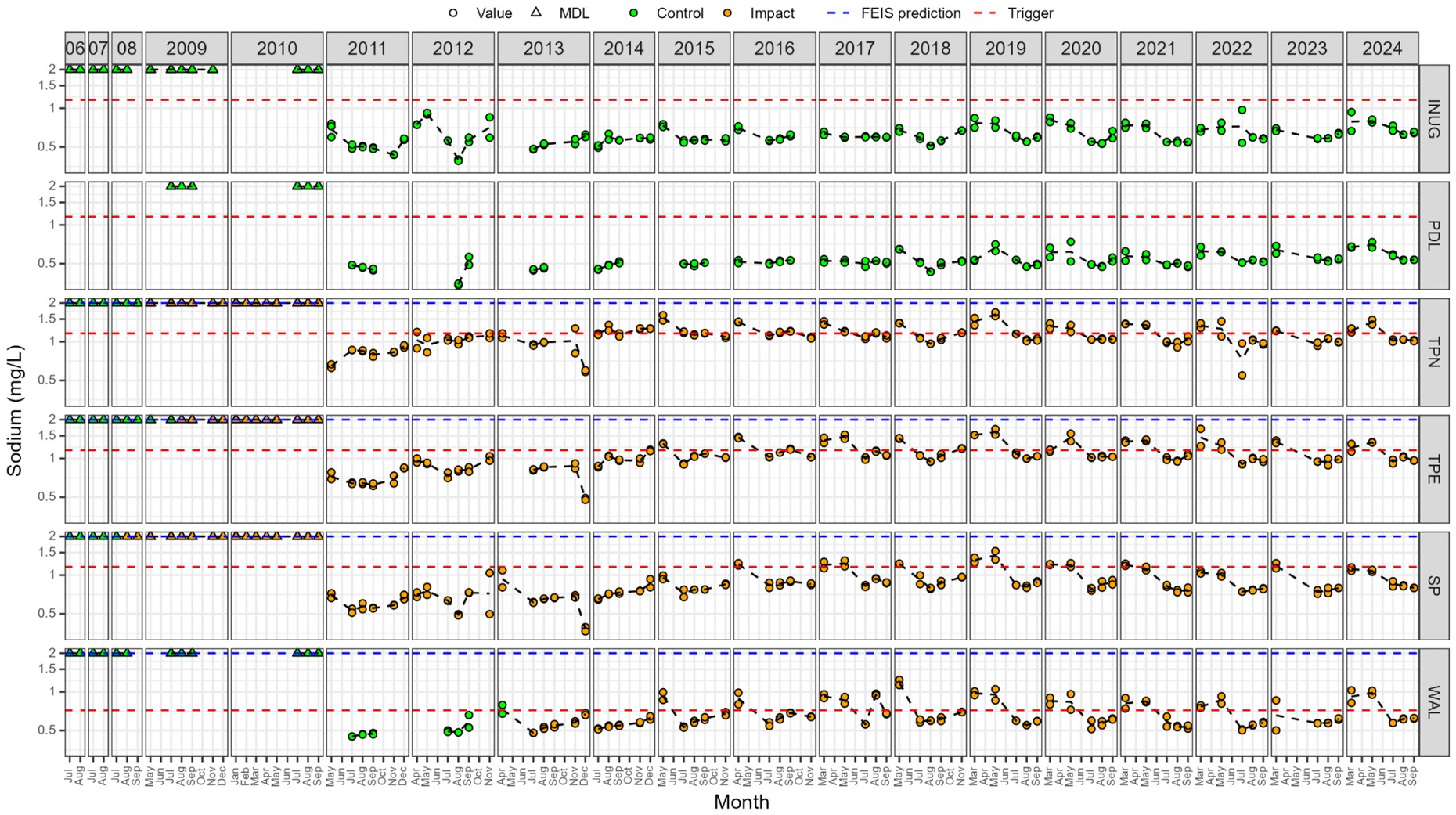


Figure C1-45. Total strontium (mg/L).

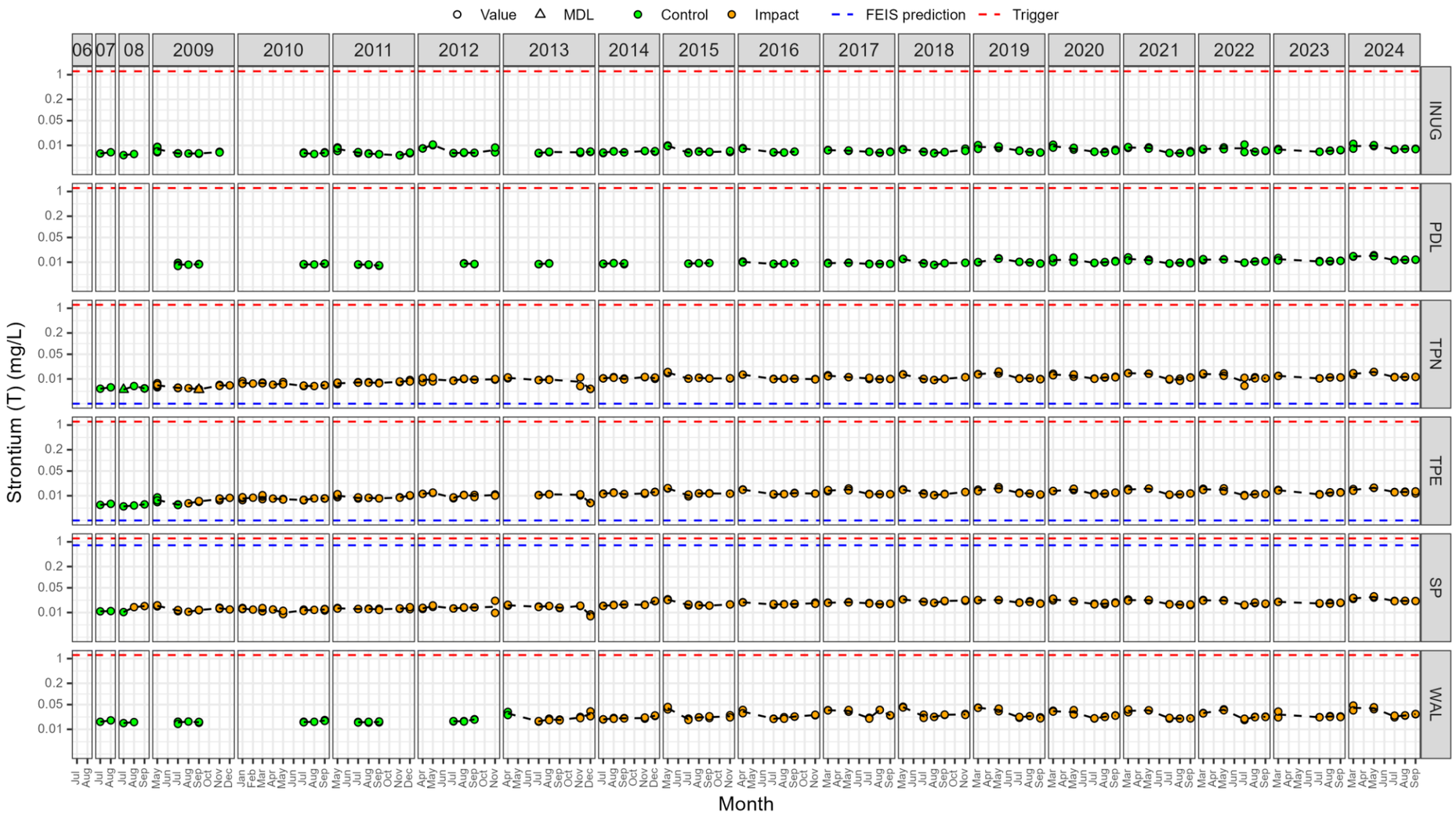


Figure C1-46. Total thallium (mg/L).

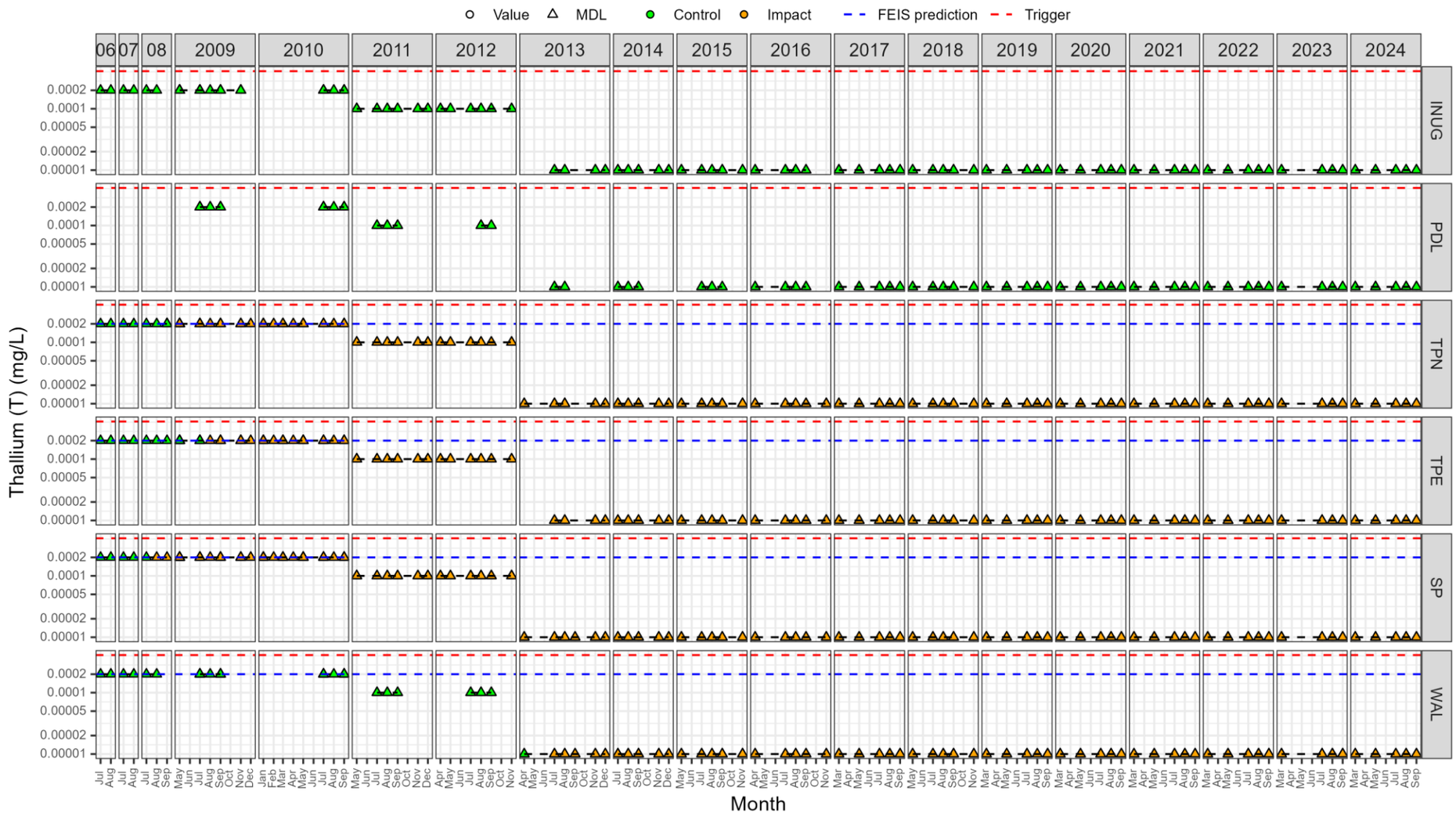


Figure C1-47. Total tin (mg/L).

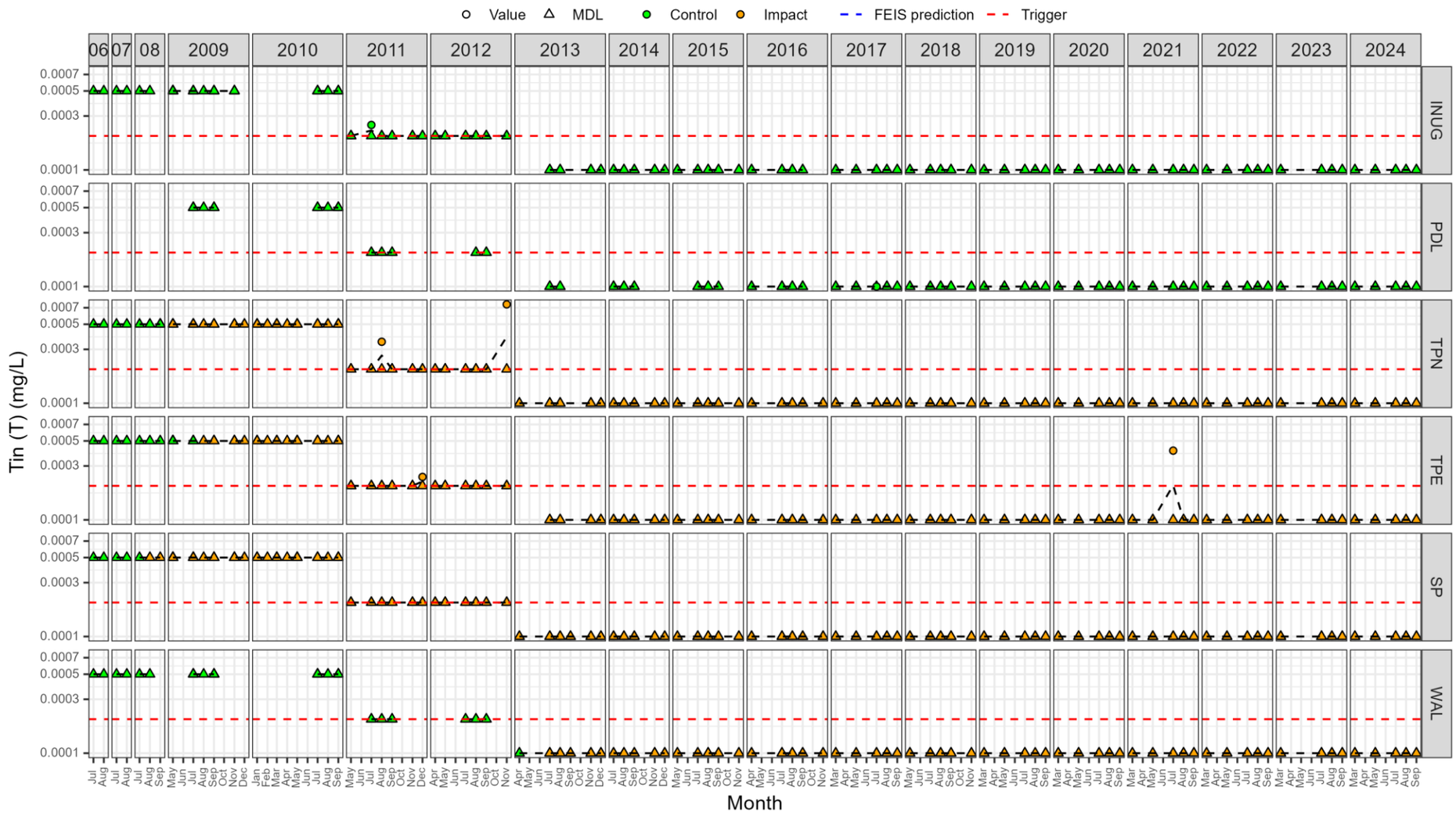


Figure C1-48. Total titanium (mg/L).

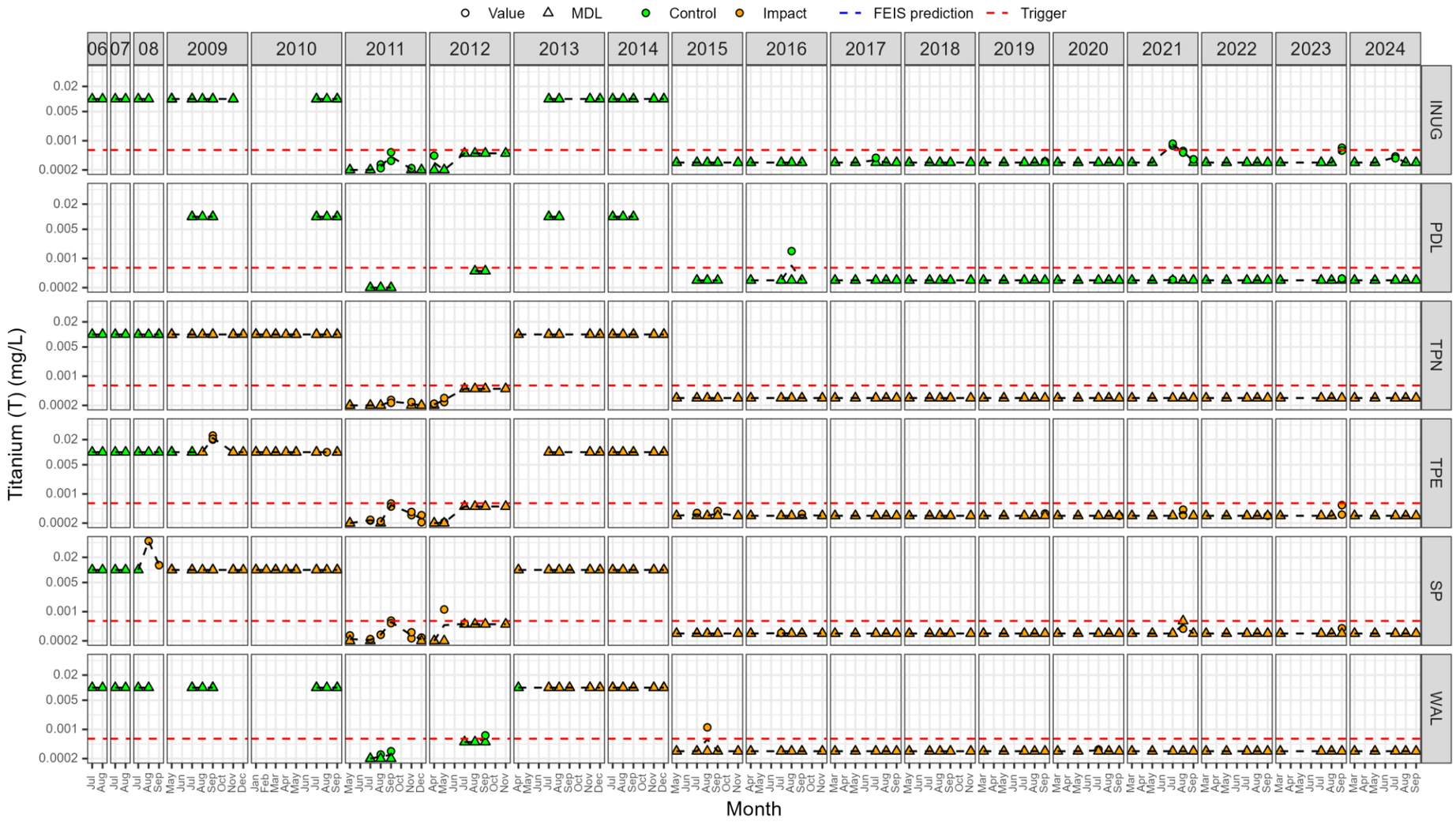


Figure C1-49. Total uranium (mg/L).

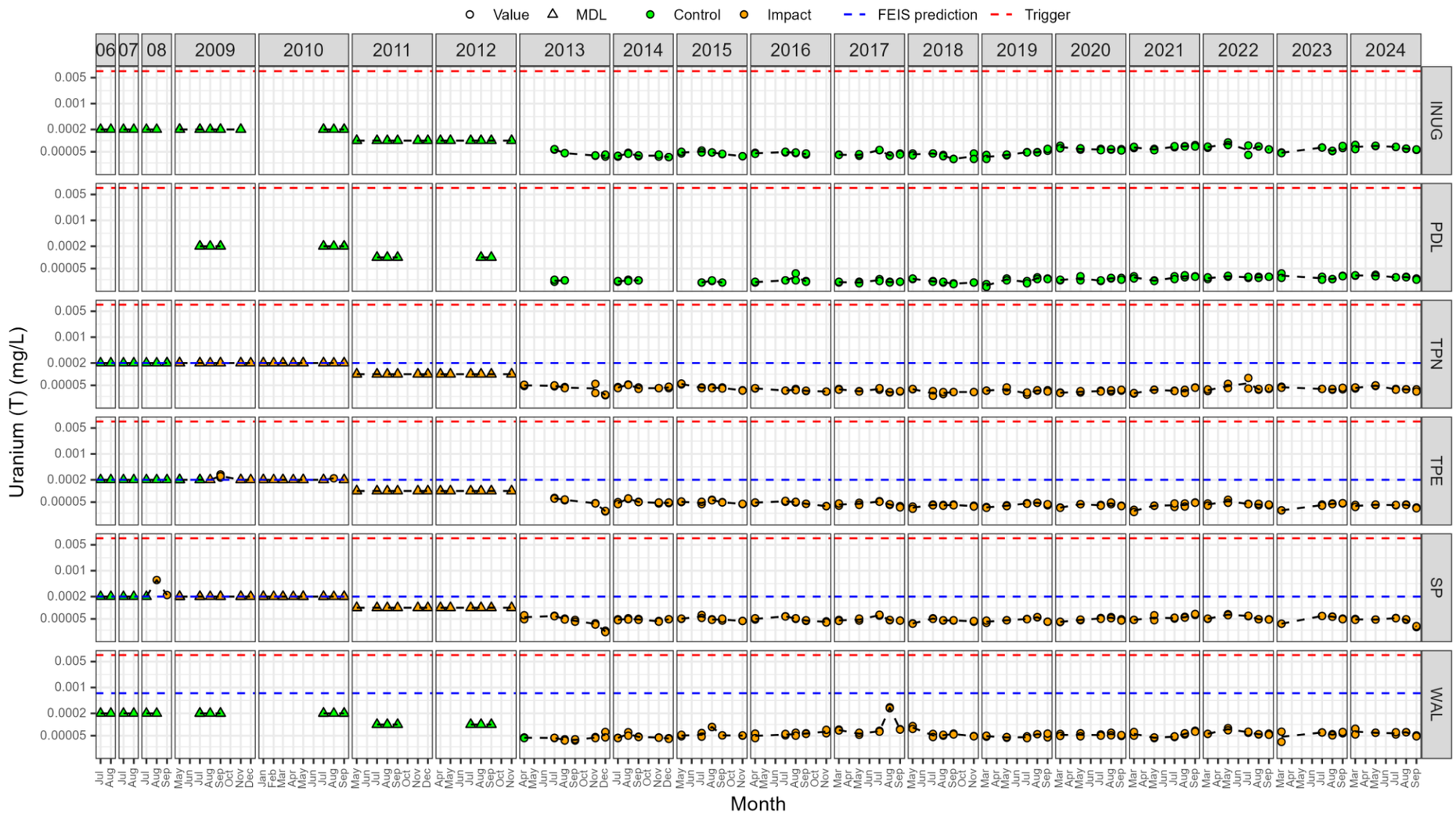


Figure C1-50. Total vanadium (mg/L).

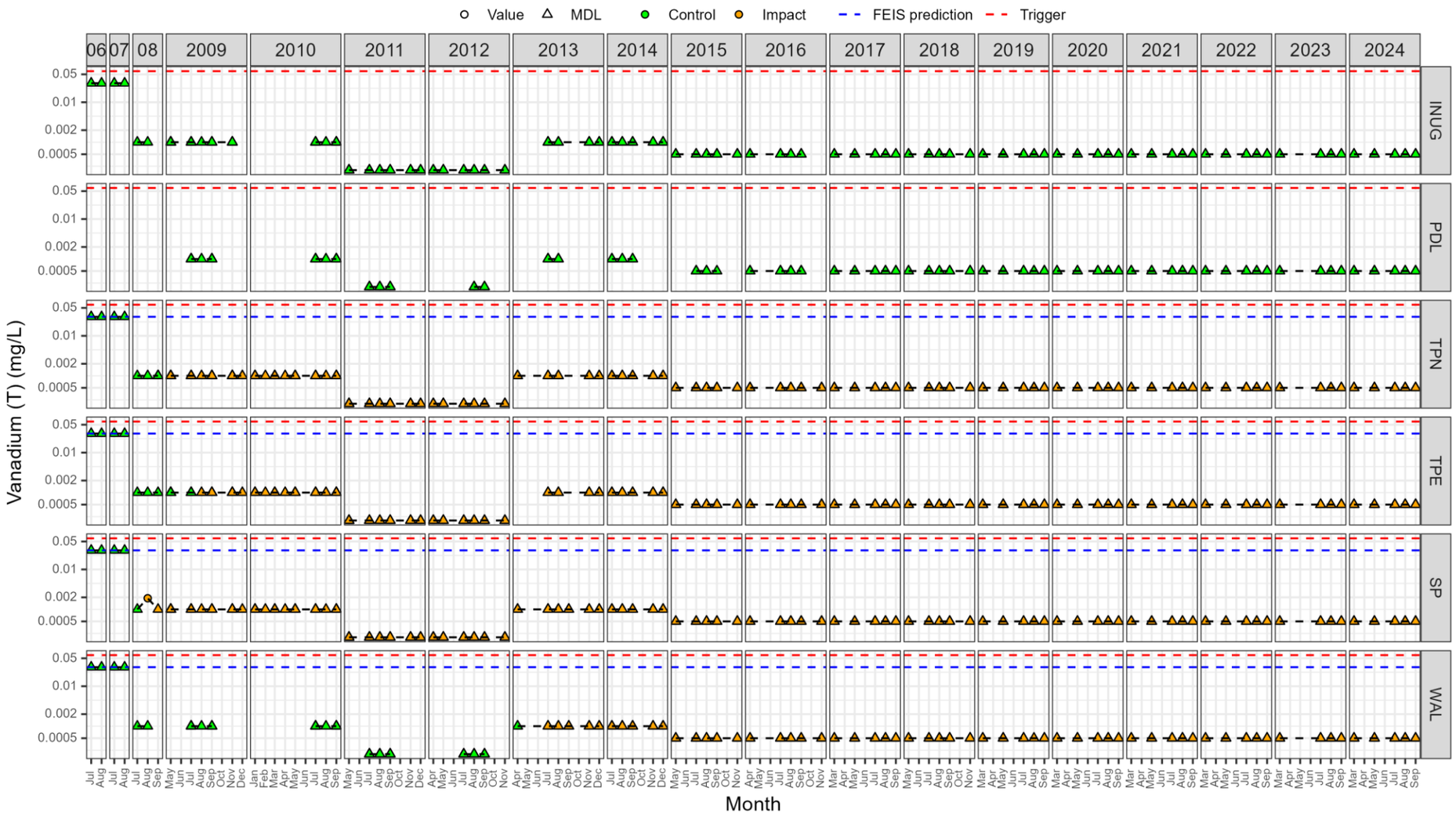


Figure C1-51. Total zinc (mg/L).

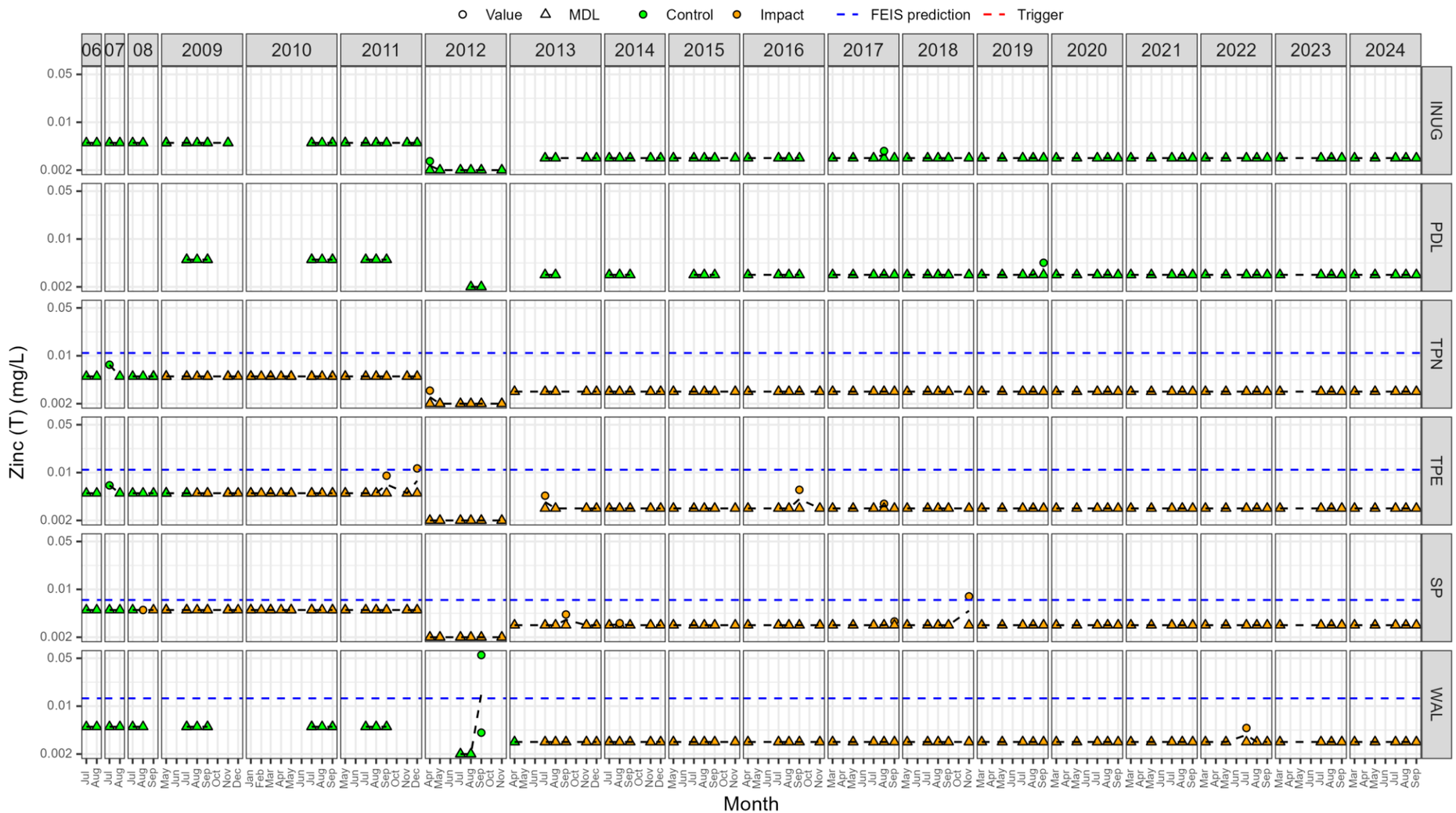


Figure C1-52. Total cyanide (mg/L).

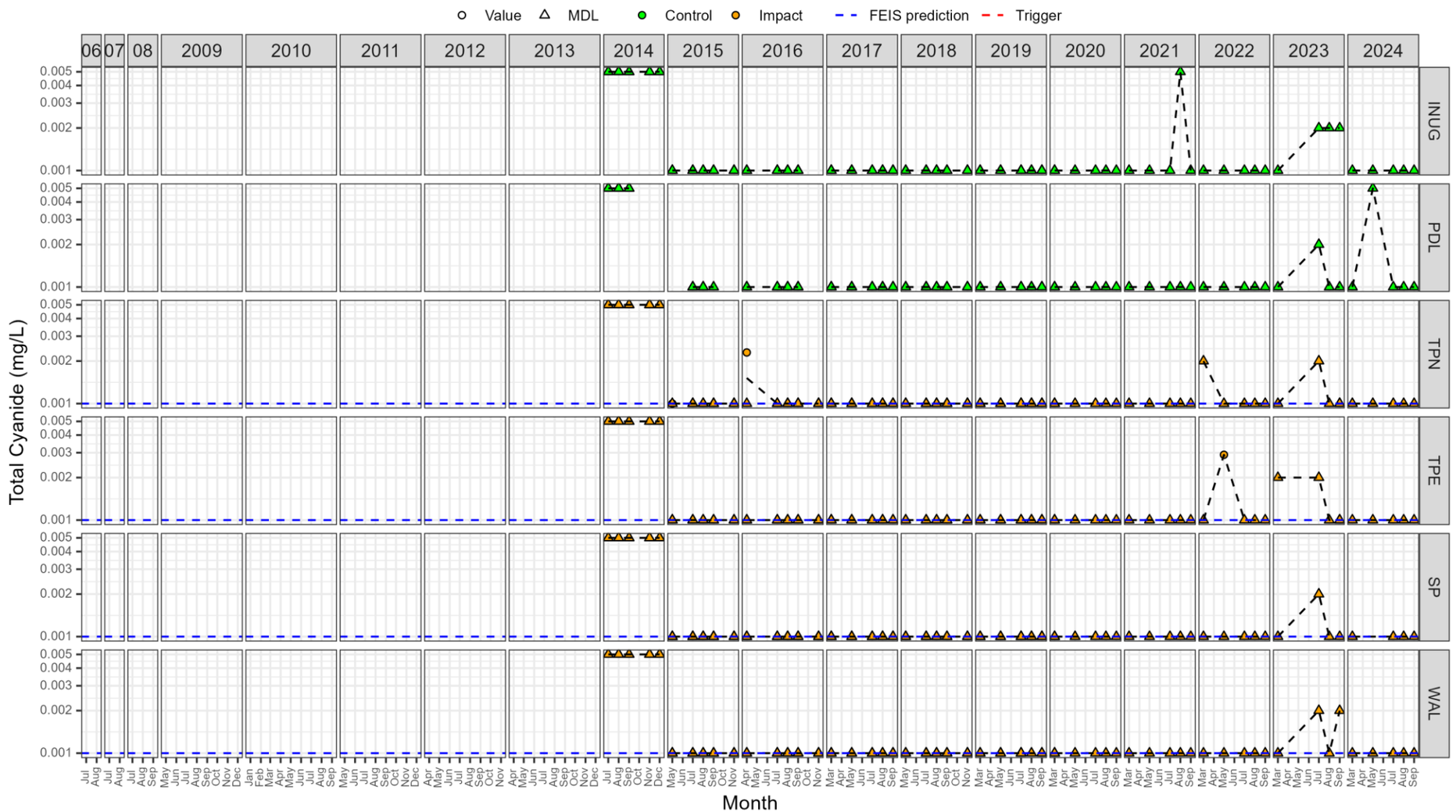


Figure C1-53. Free cyanide (mg/L).

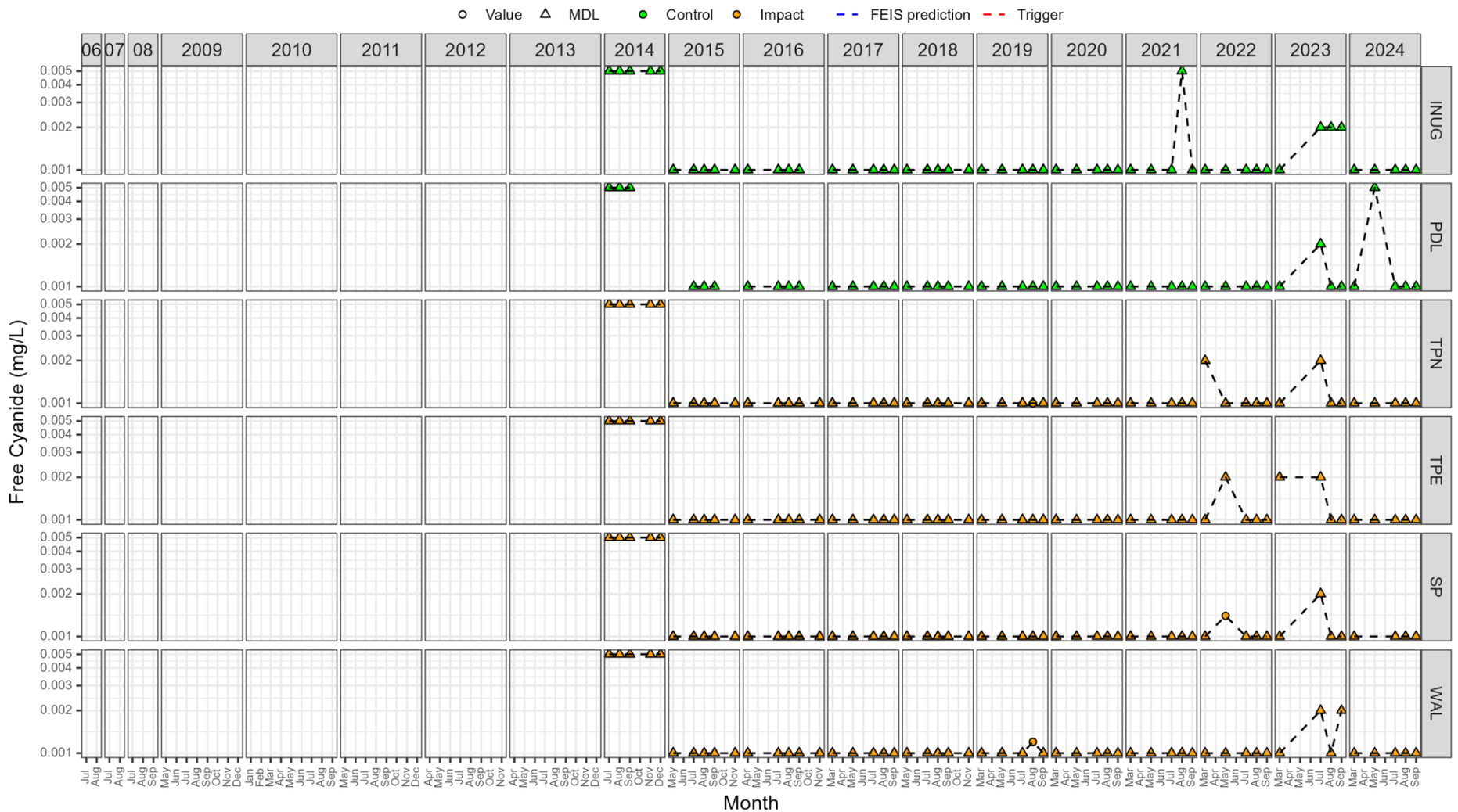


Figure C1-54. Dissolved aluminum (mg/L).

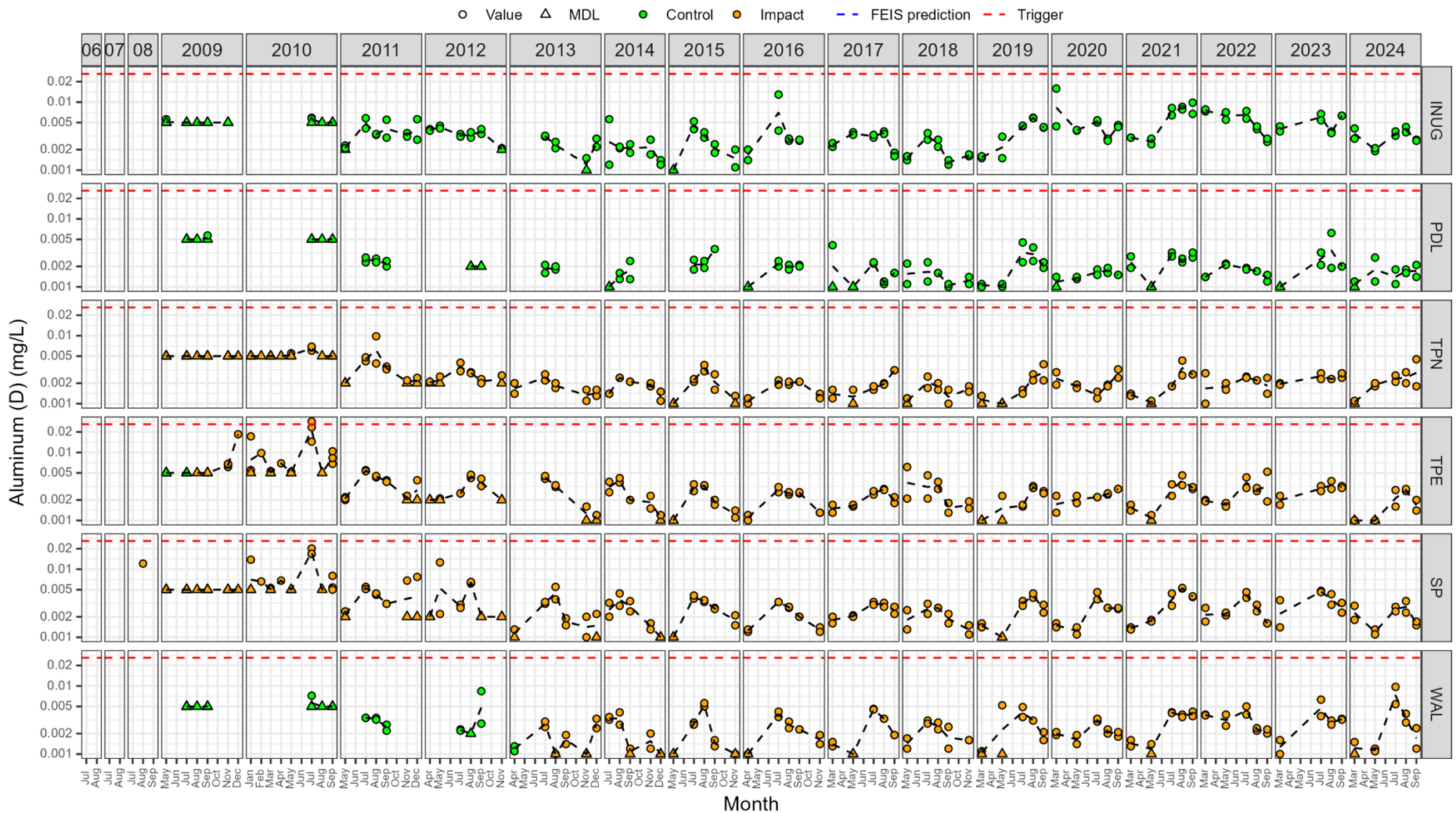


Figure C1-55. Dissolved antimony (mg/L).

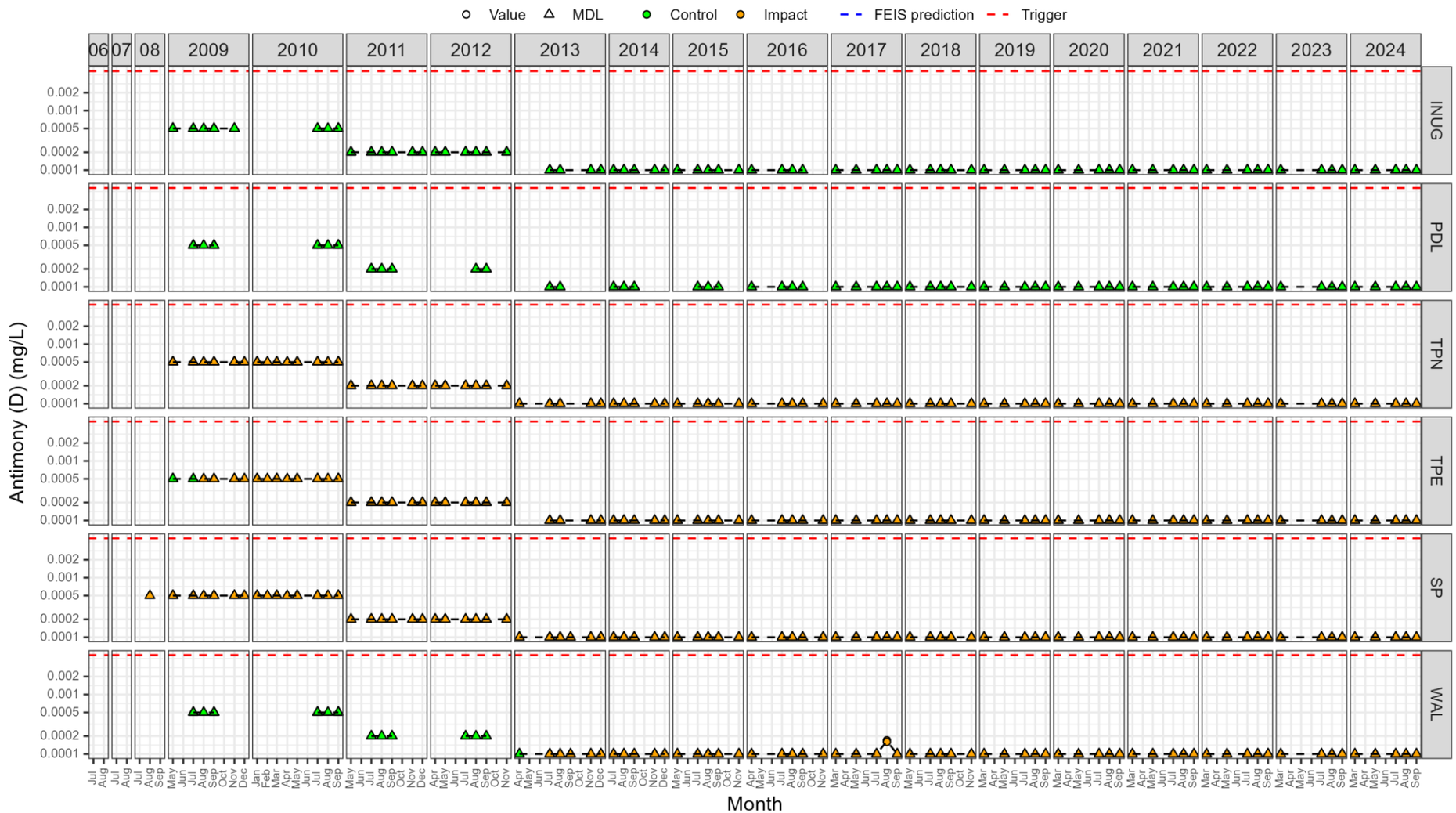


Figure C1-56. Dissolved arsenic (mg/L).

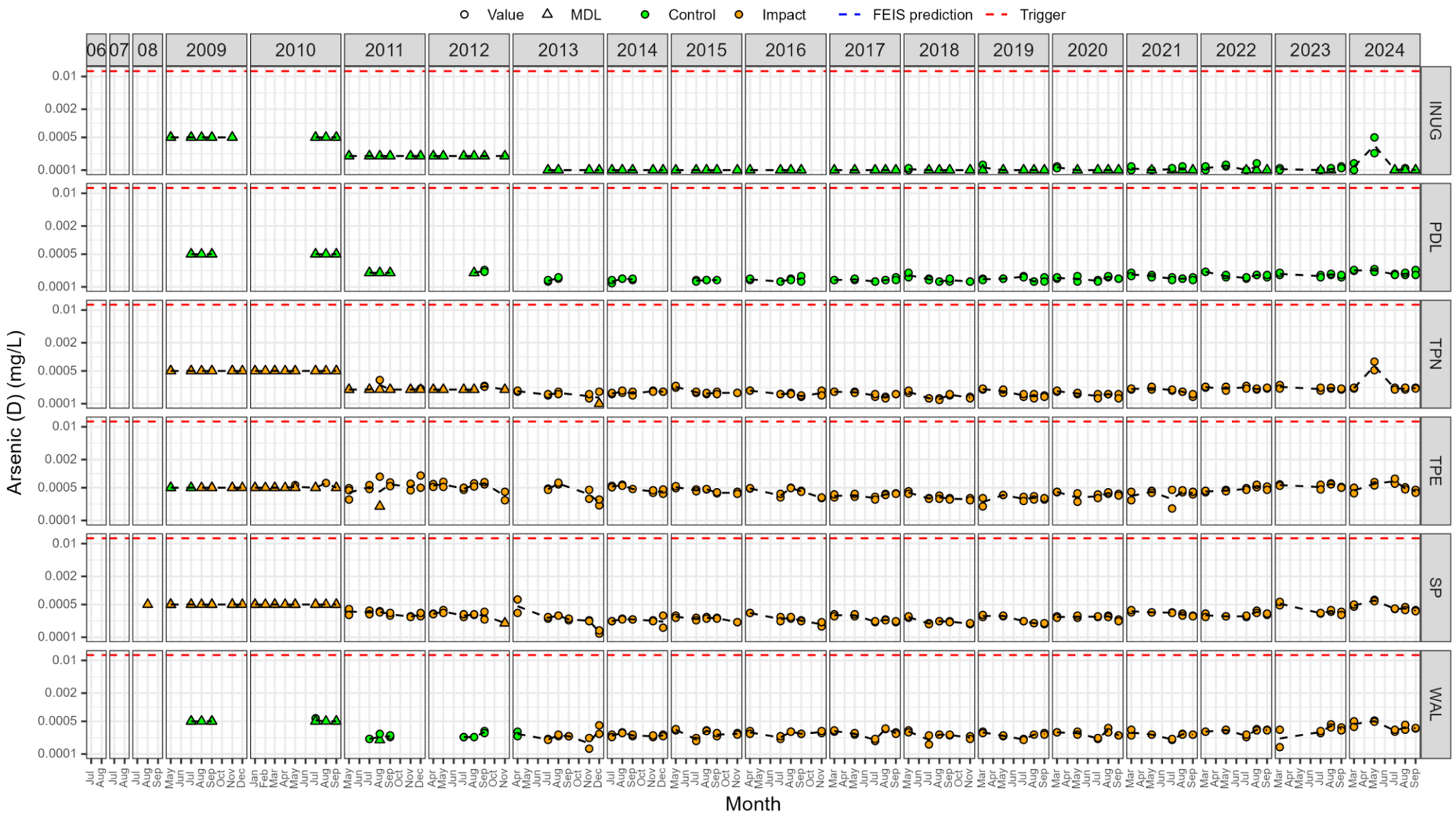


Figure C1-57. Dissolved barium (mg/L).

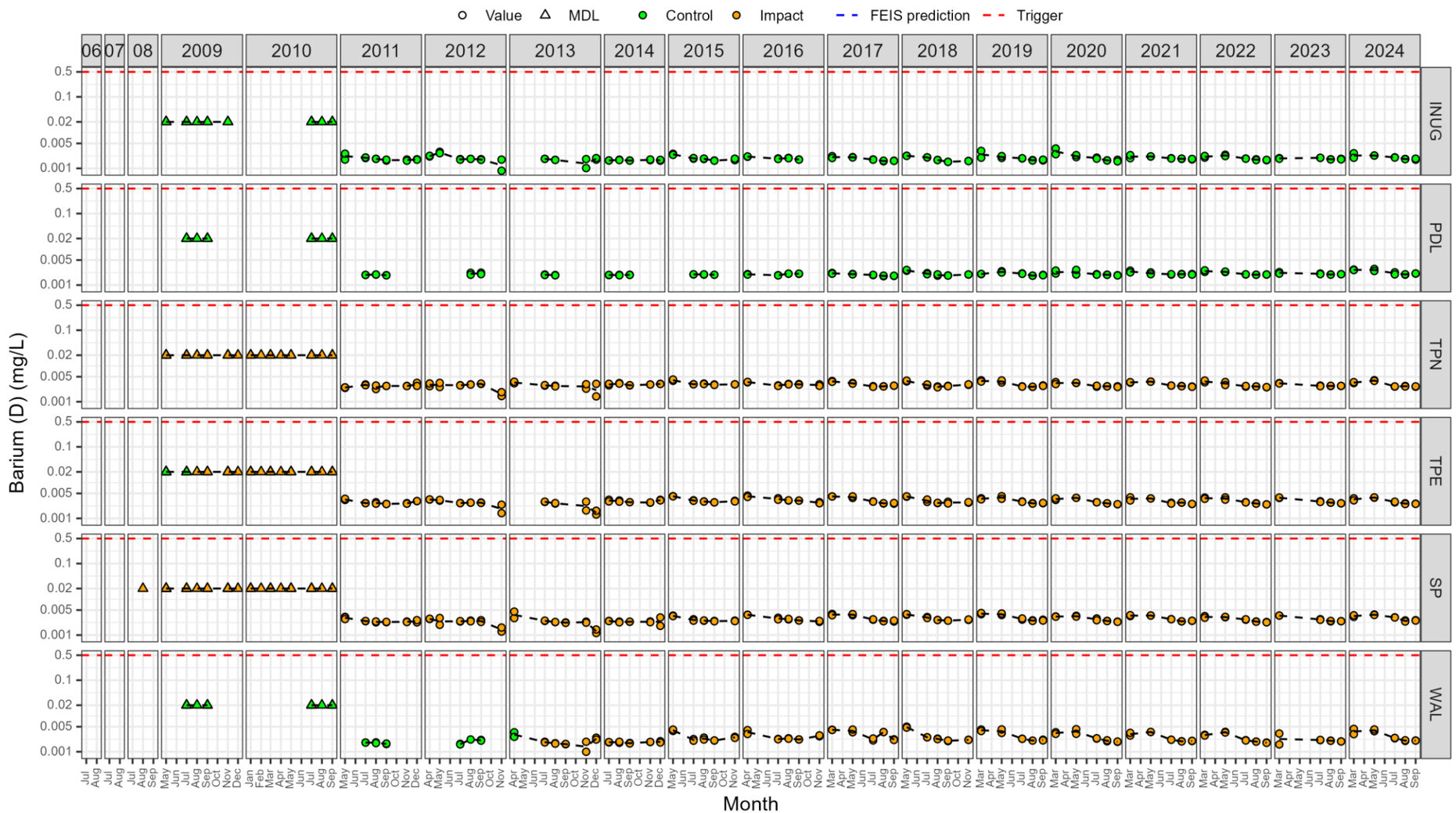


Figure C1-58. Dissolved beryllium (mg/L).

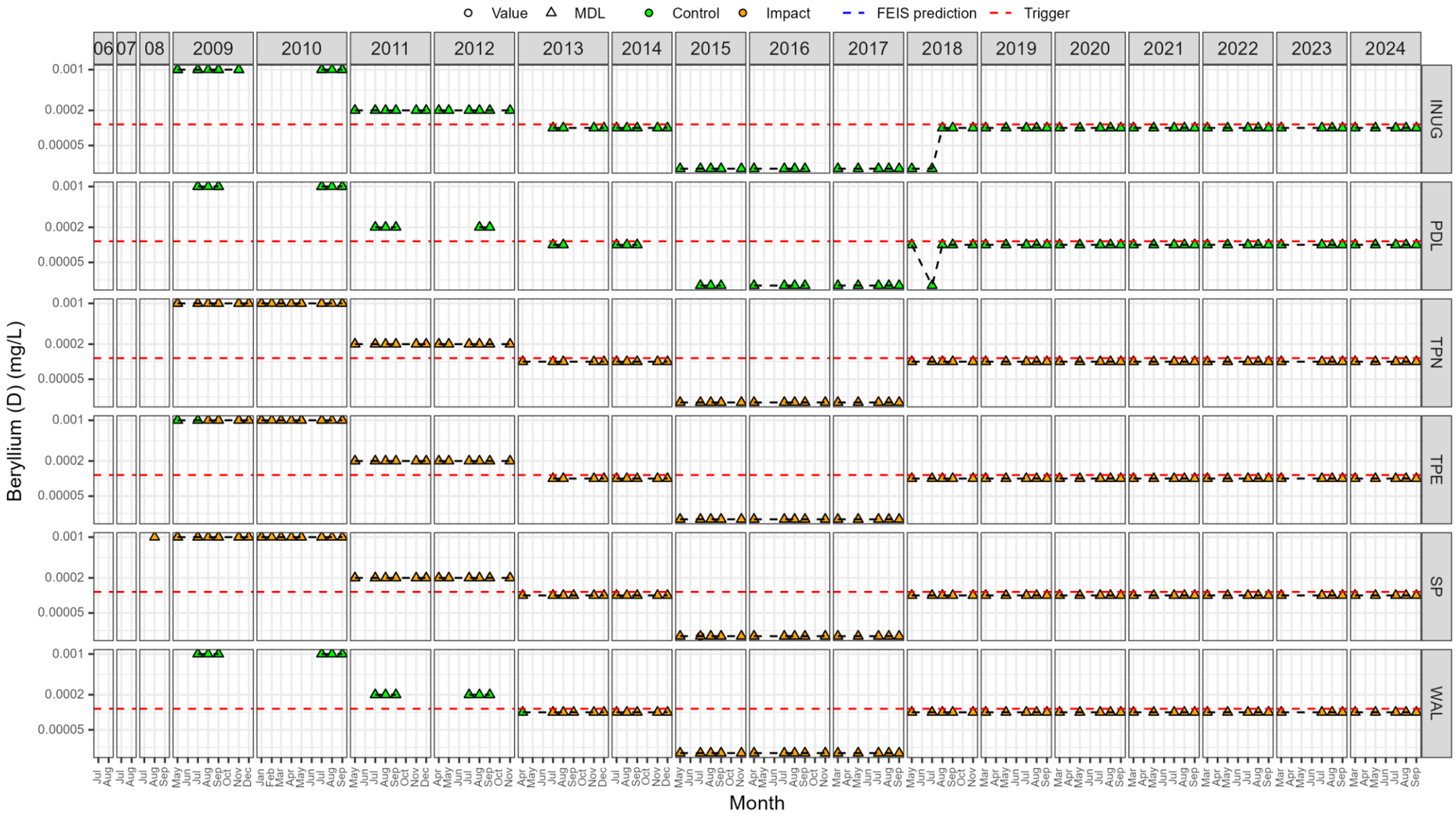


Figure C1-59. Dissolved boron (mg/L).

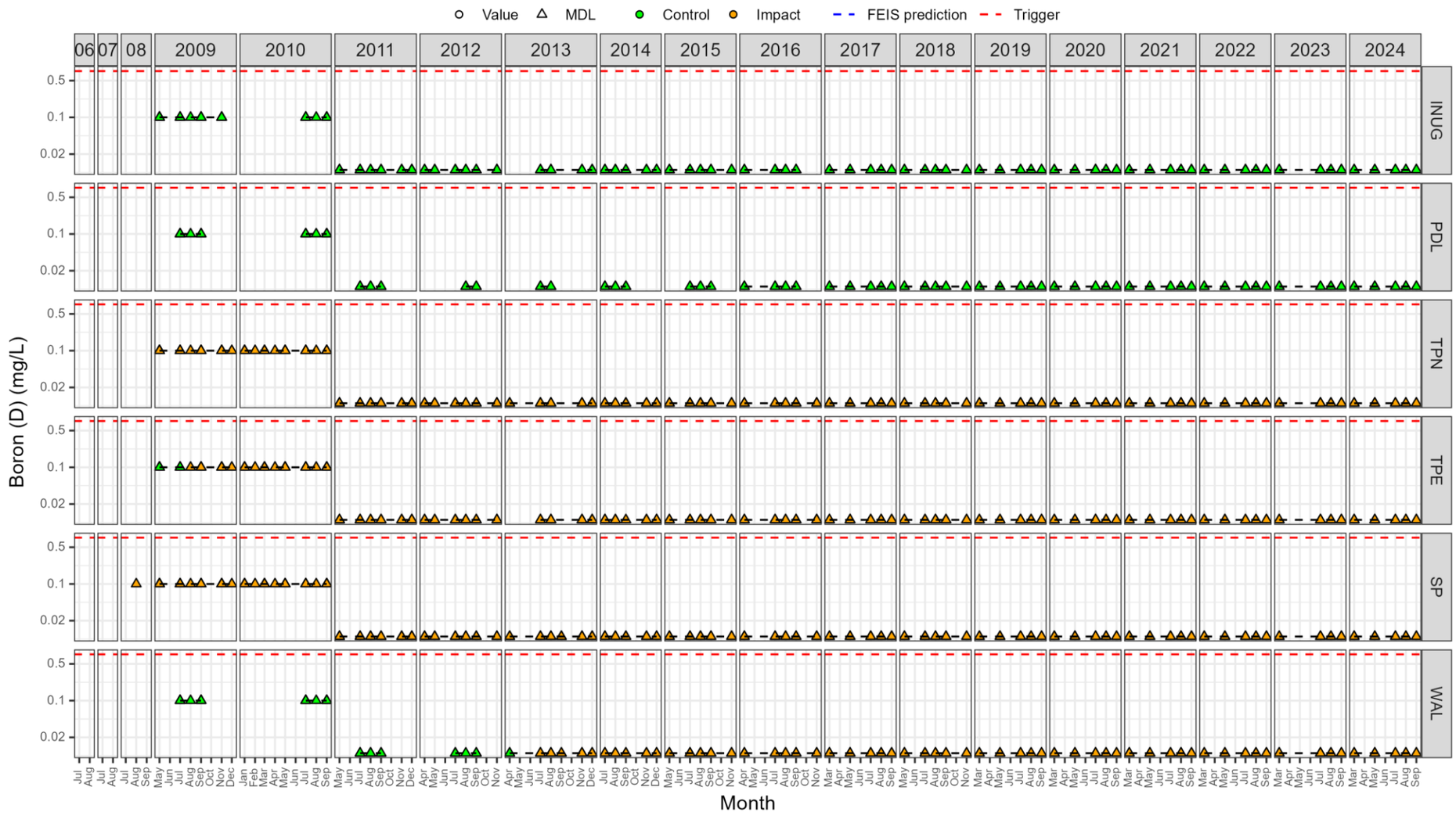


Figure C1-60. Dissolved cadmium (mg/L).

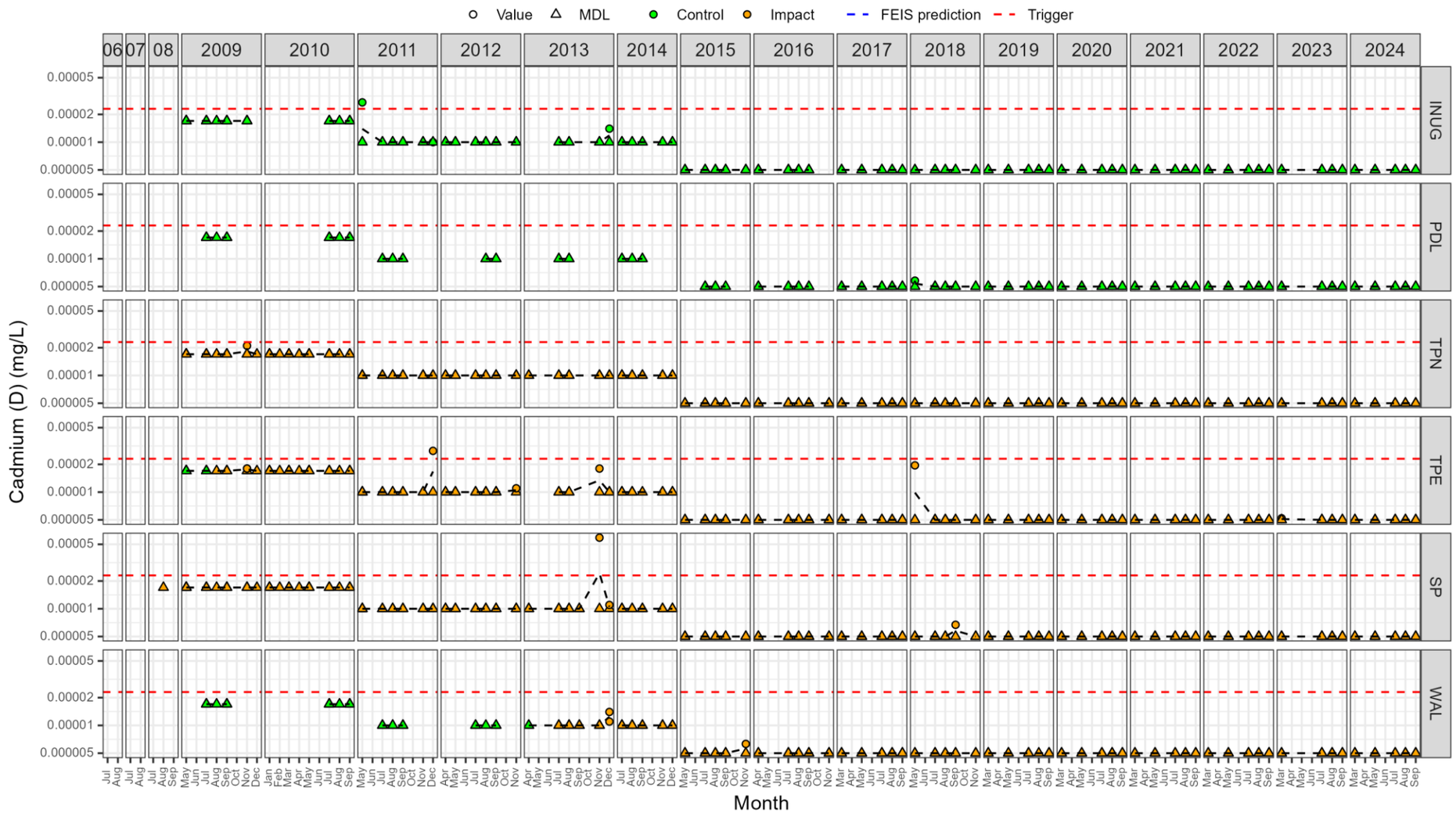


Figure C1-61. Dissolved copper (mg/L).

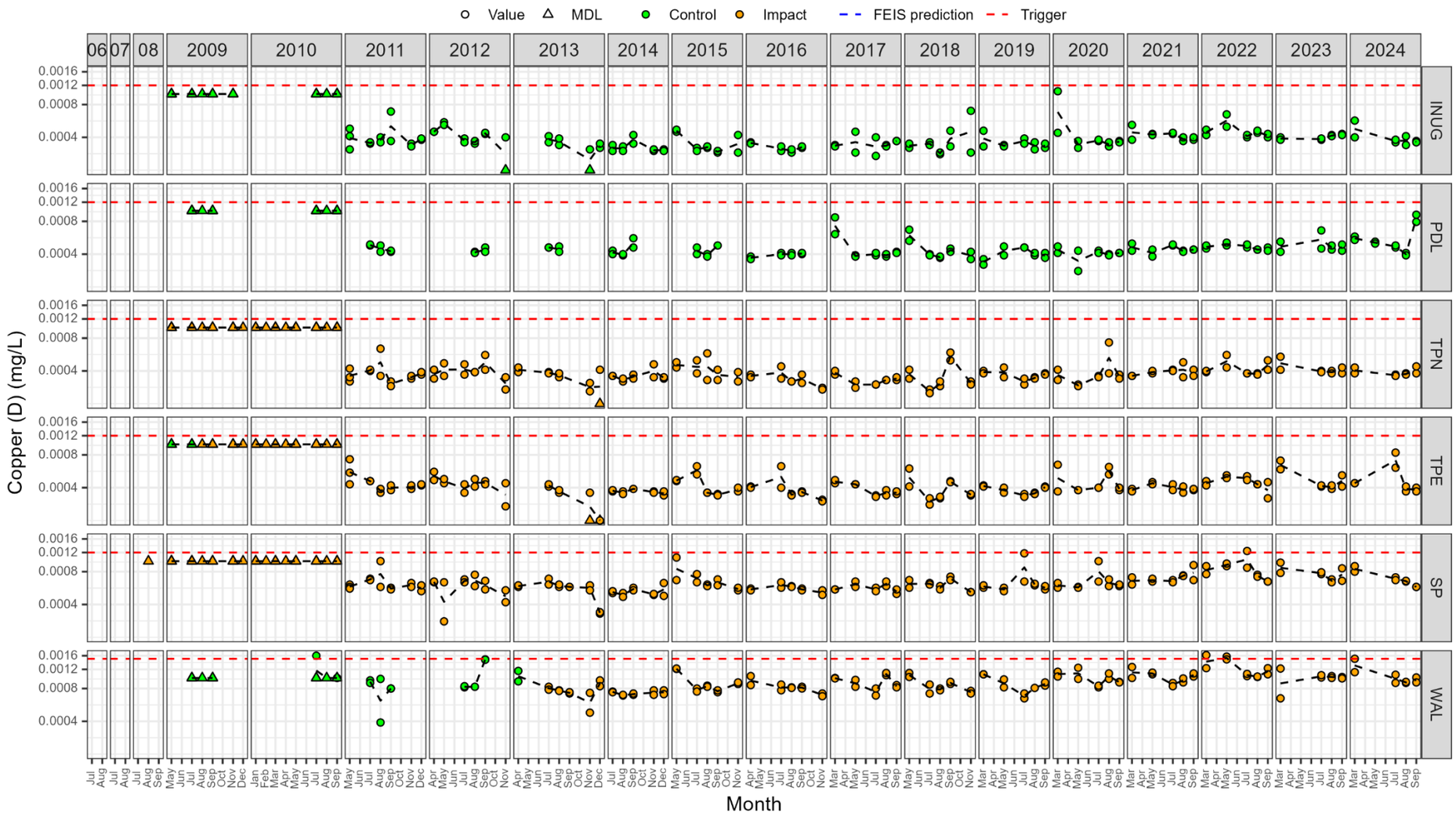


Figure C1-62. Dissolved chromium (mg/L).

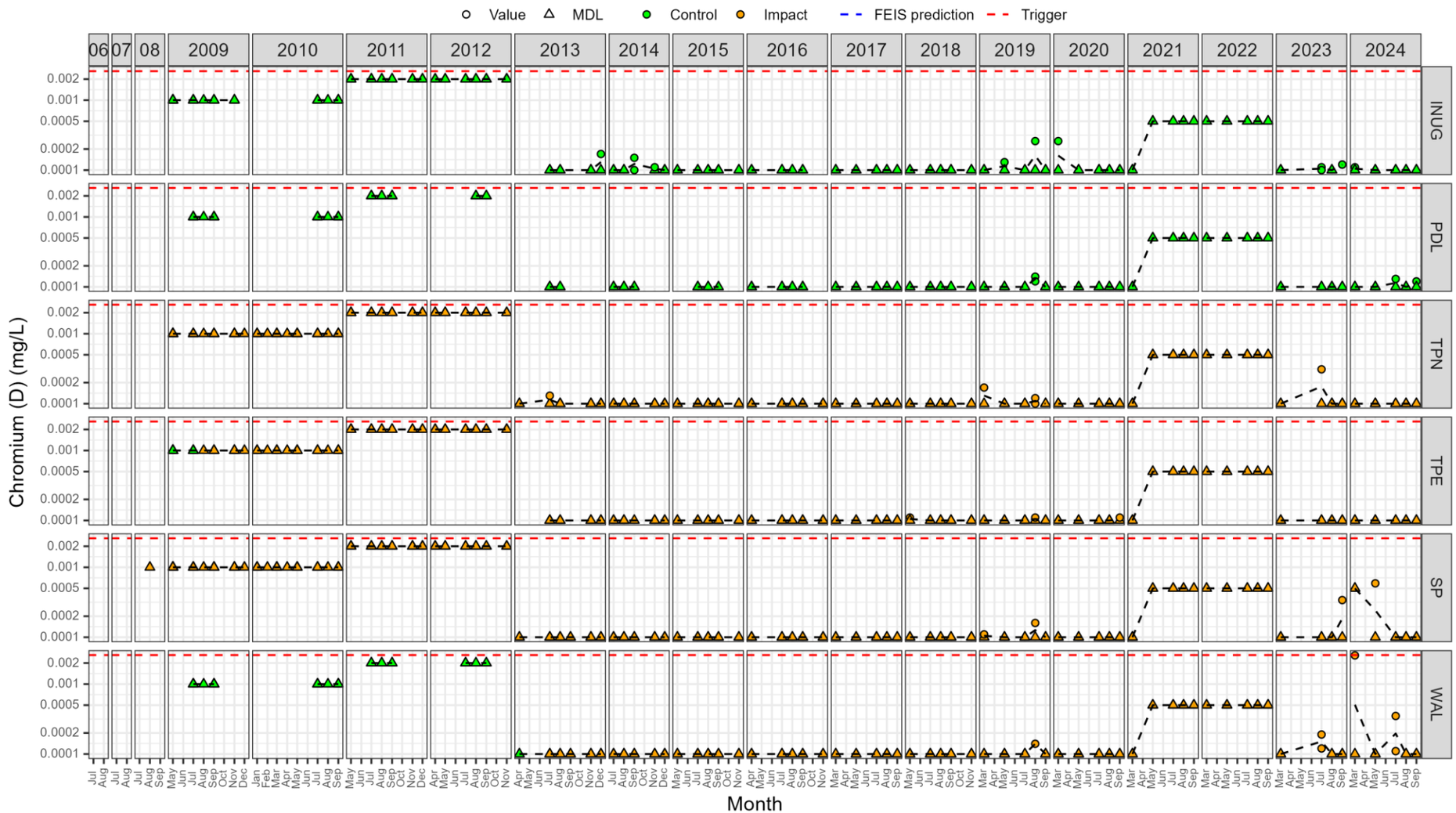


Figure C1-63. Dissolved iron (mg/L).

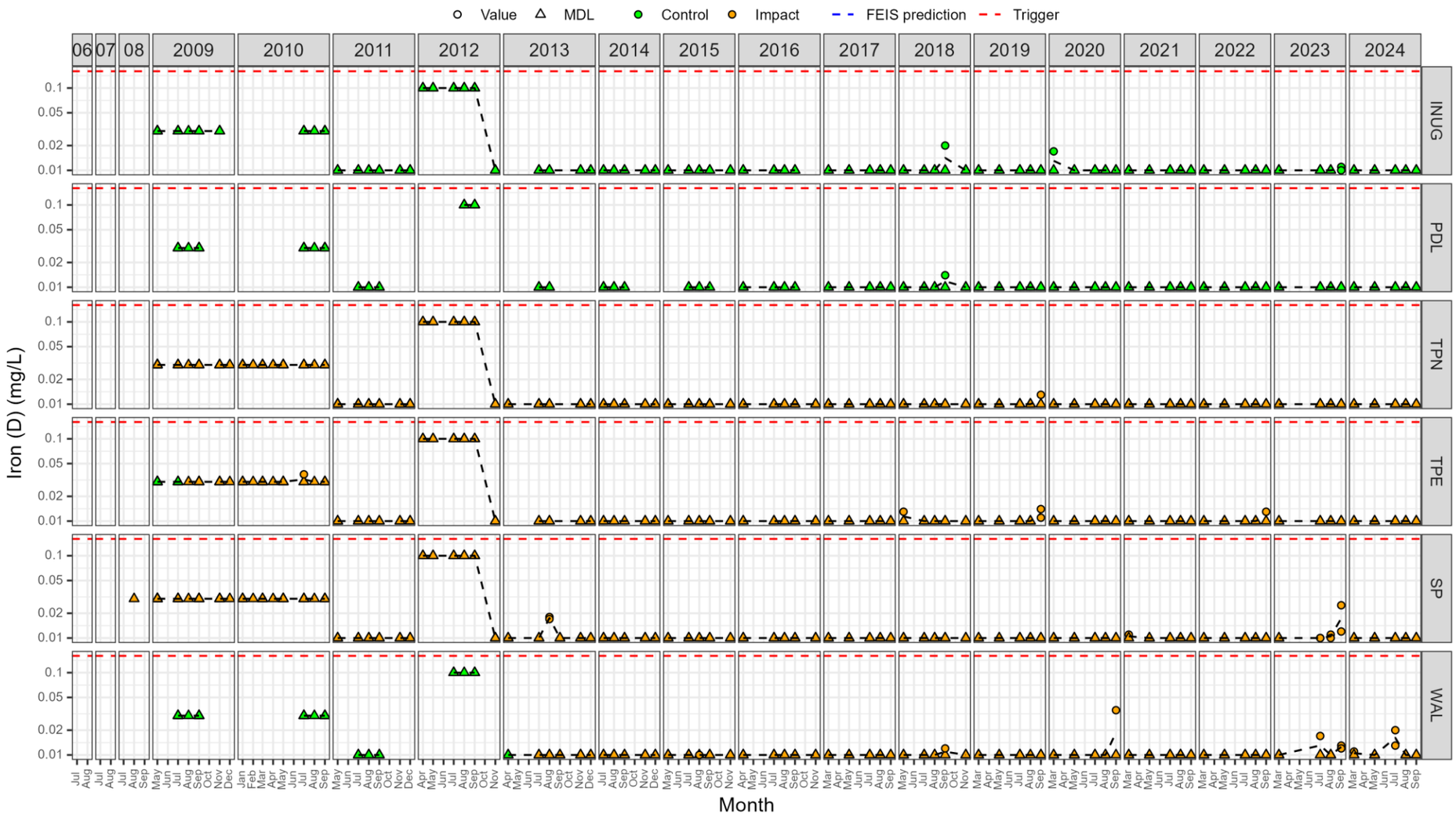


Figure C1-64. Dissolved lead (mg/L).

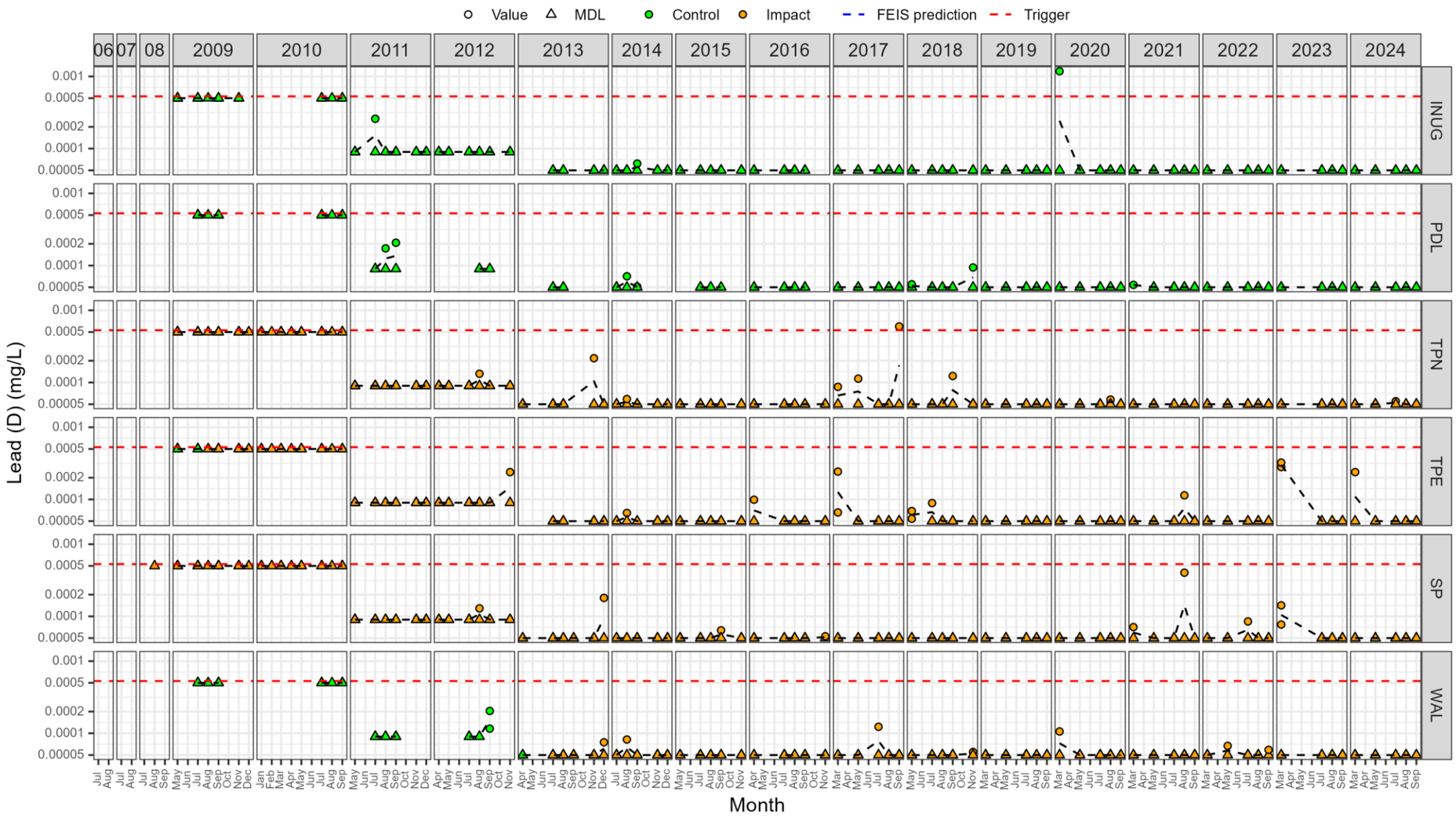


Figure C1-65. Dissolved lithium (mg/L).

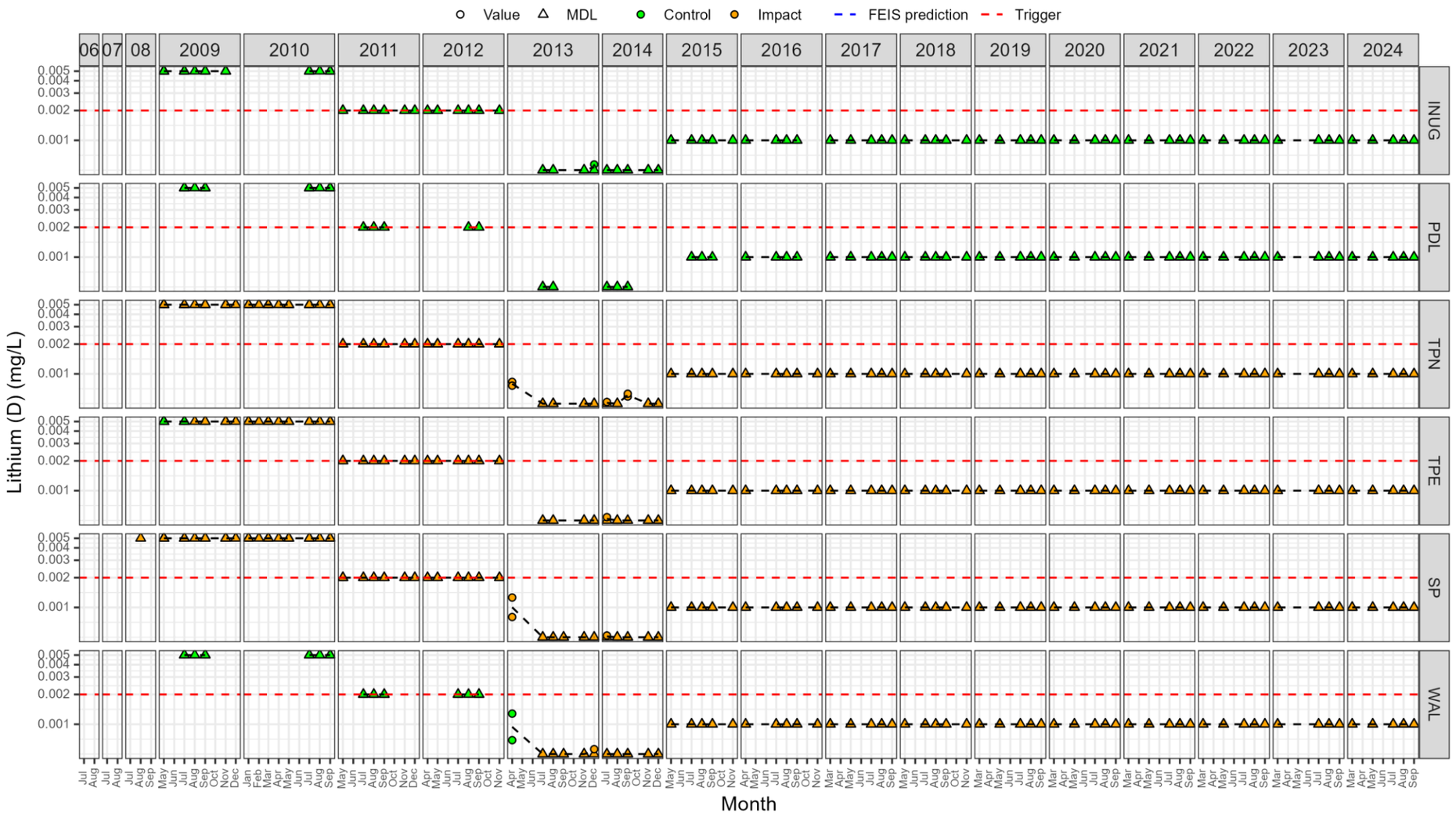


Figure C1-66. Dissolved manganese (mg/L).

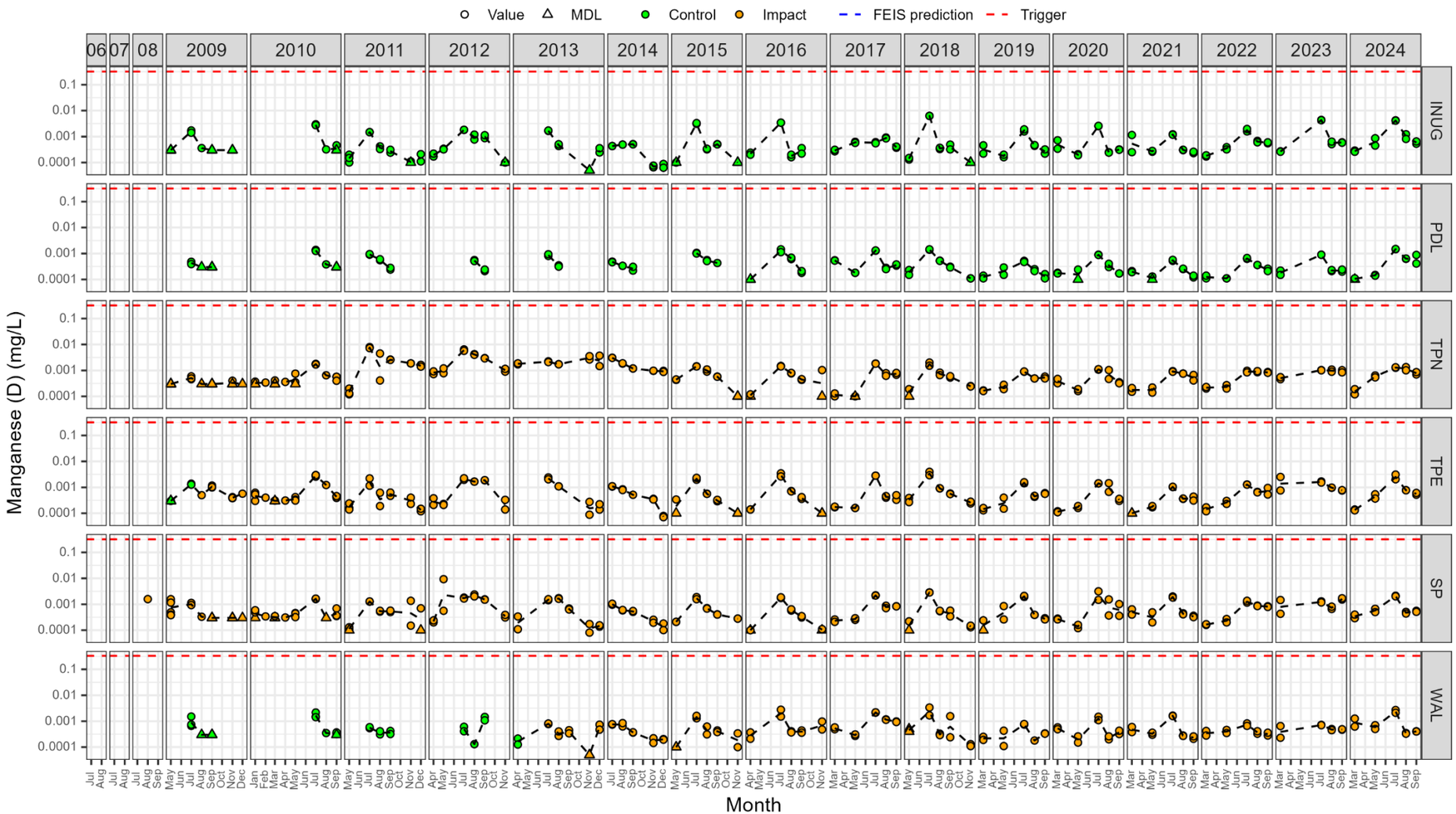


Figure C1-67. Dissolved molybdenum (mg/L).

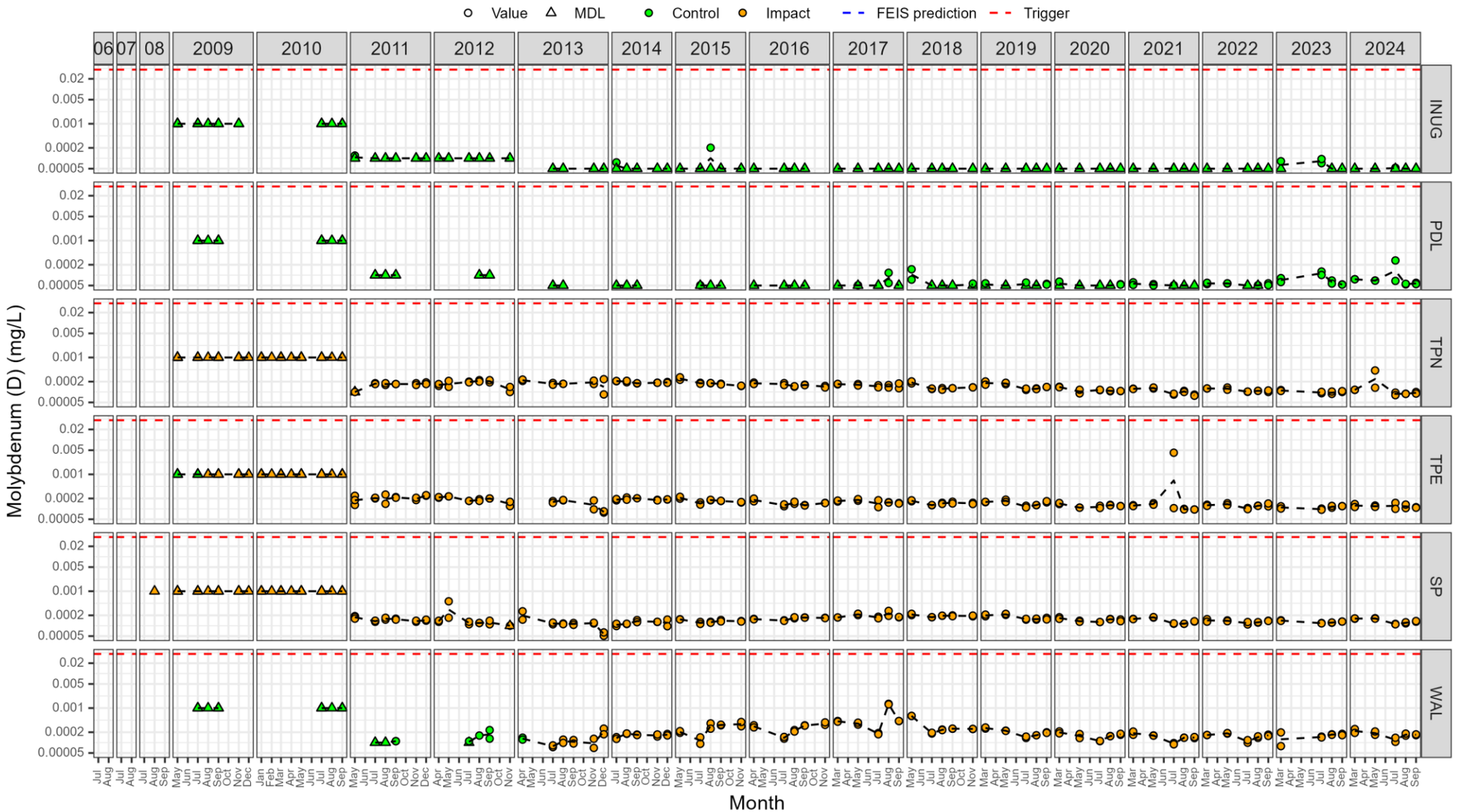


Figure C1-68. Dissolved mercury (mg/L).



Figure C1-69. Dissolved nickel (mg/L).

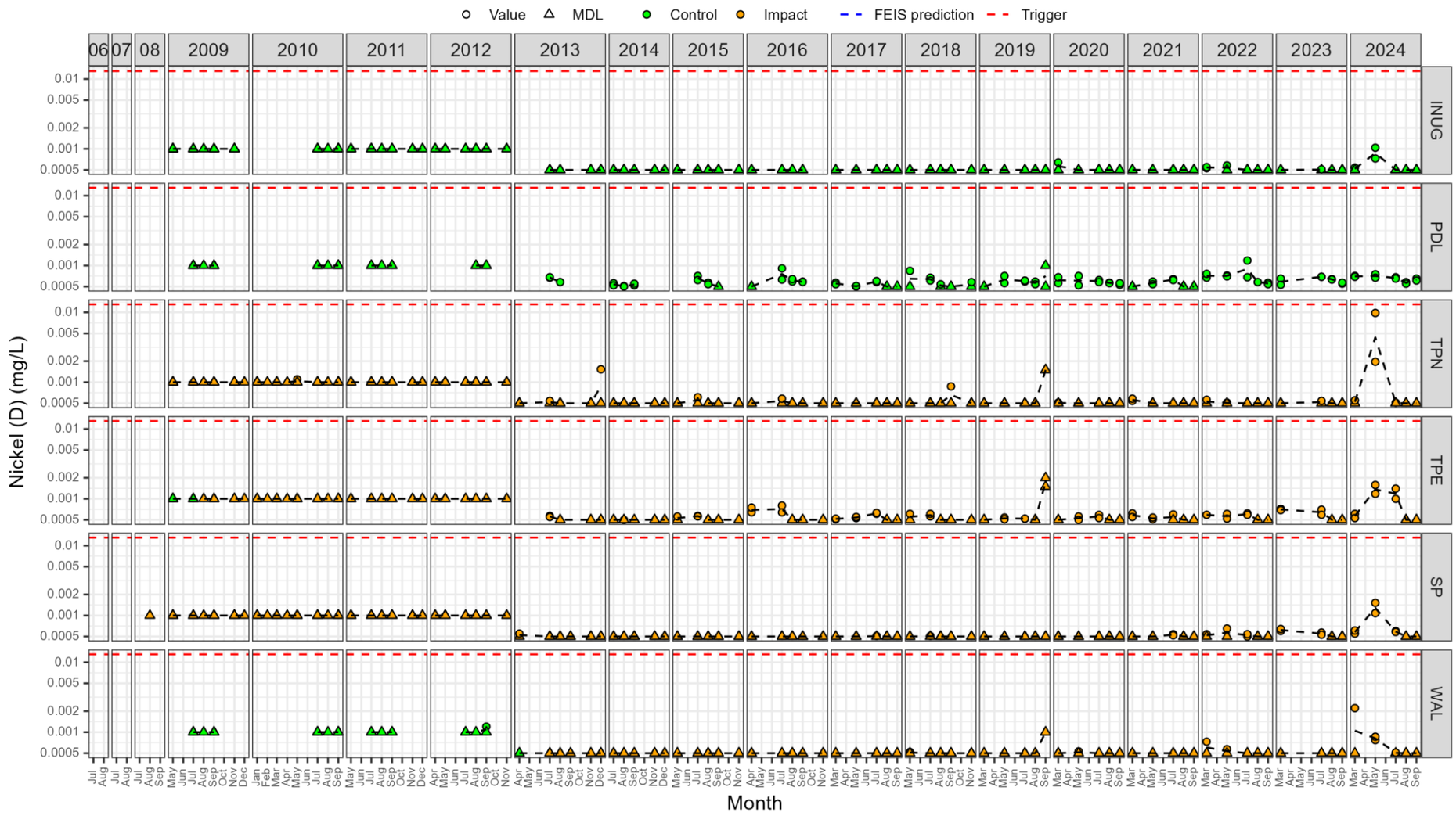


Figure C1-70. Dissolved selenium (mg/L).

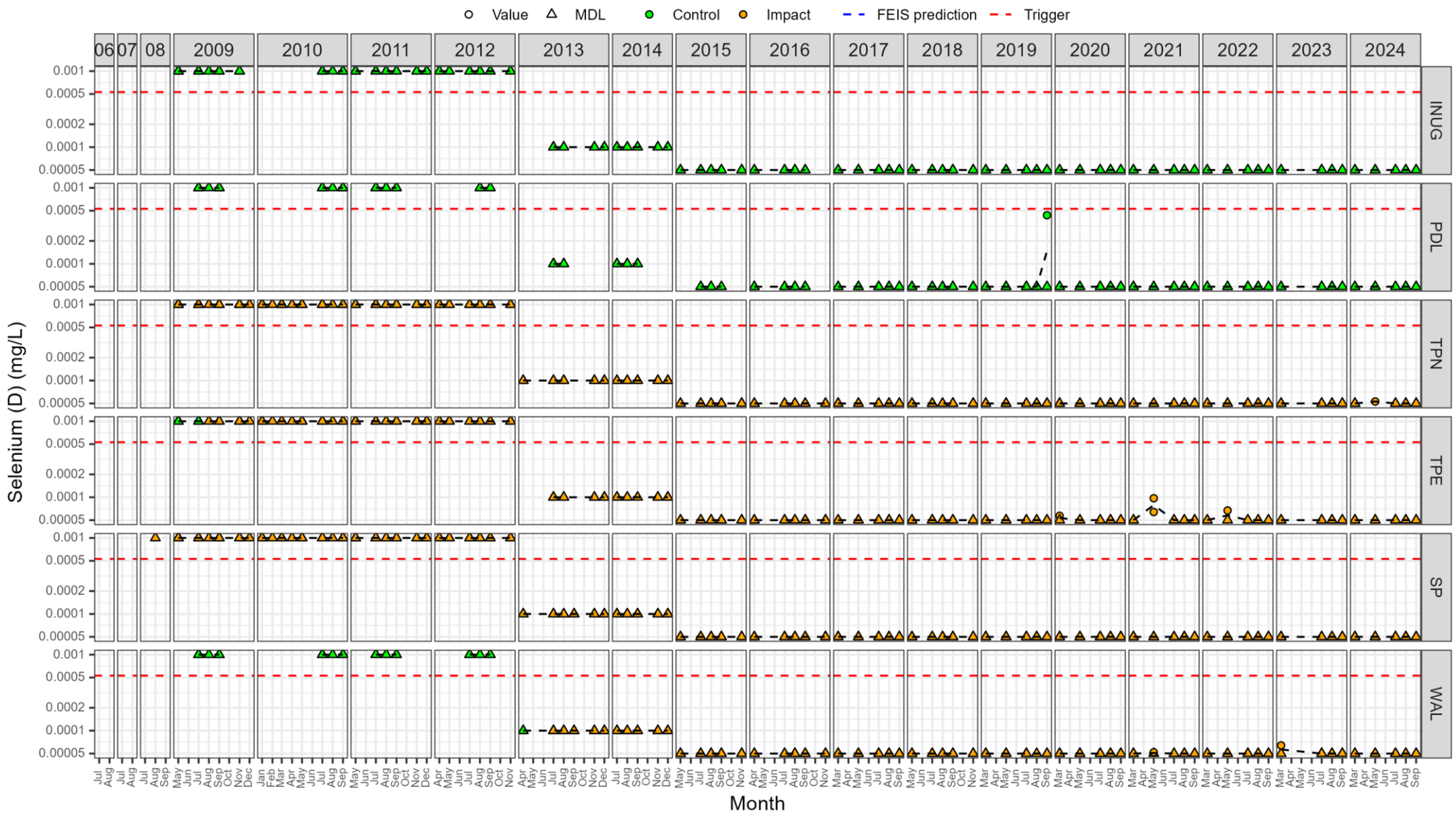


Figure C1-71. Dissolved silicon (mg/L).

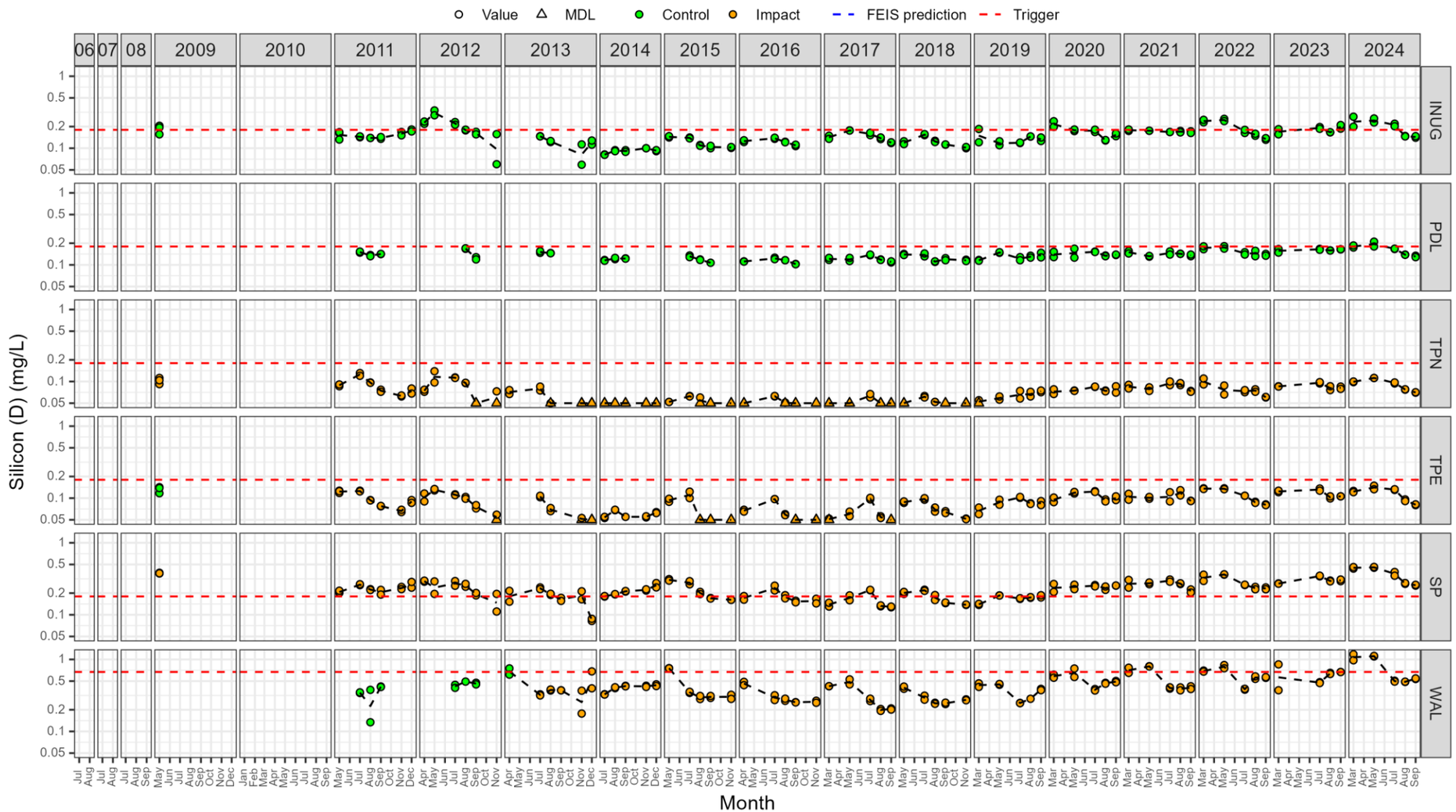


Figure C1-72. Dissolved silver (mg/L).

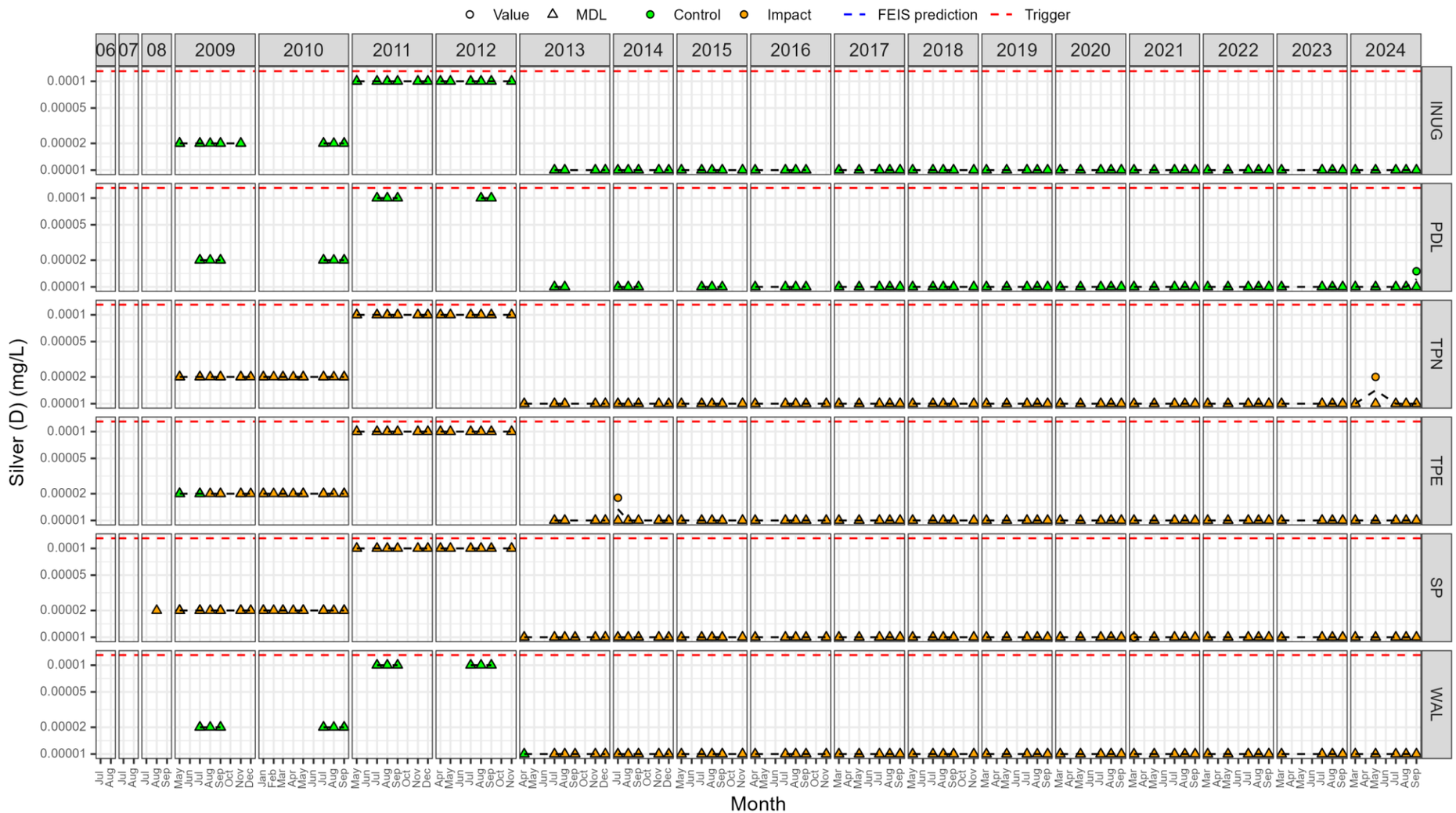


Figure C1-73. Dissolved strontium (mg/L).

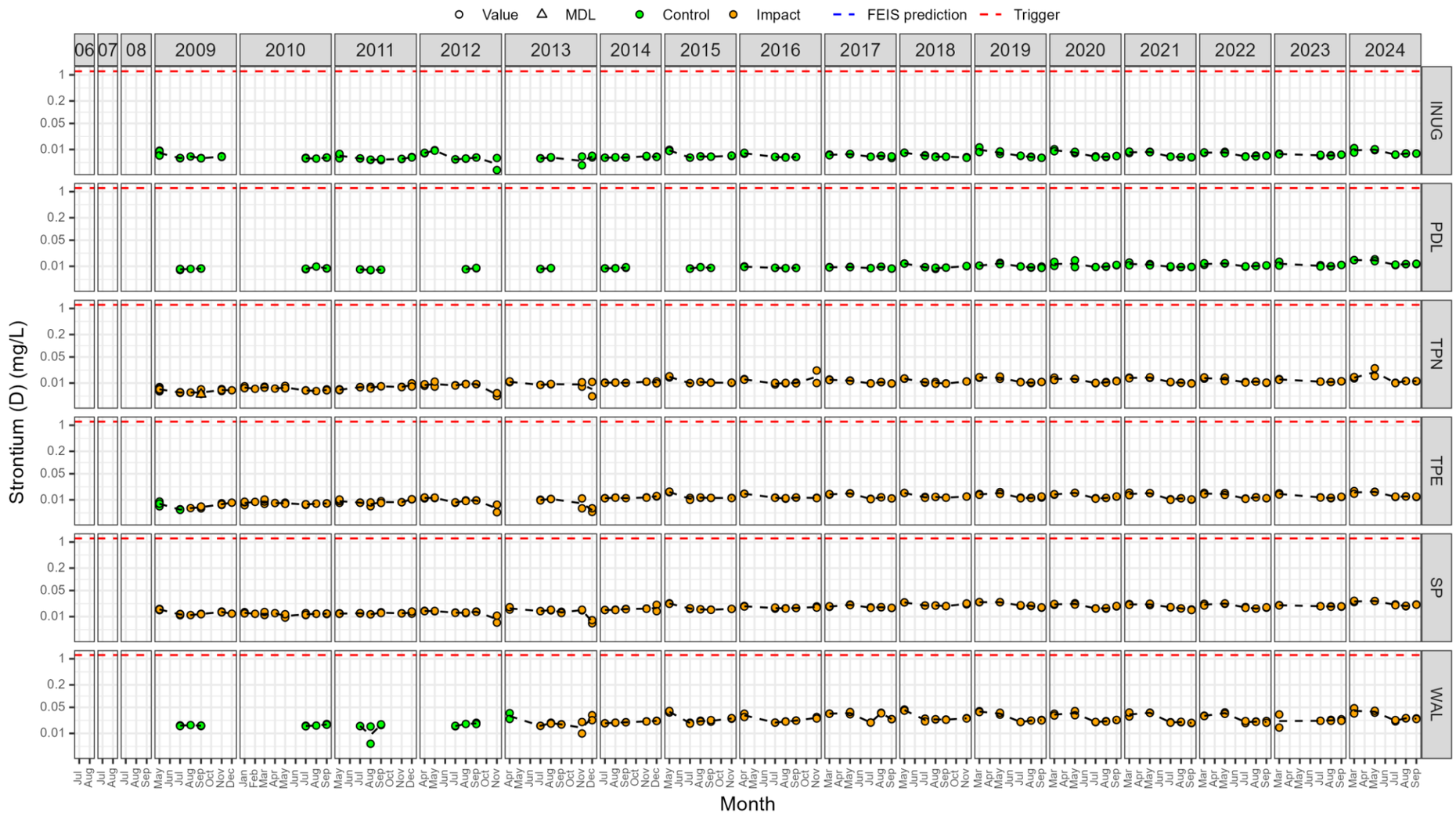


Figure C1-74. Dissolved thallium (mg/L).

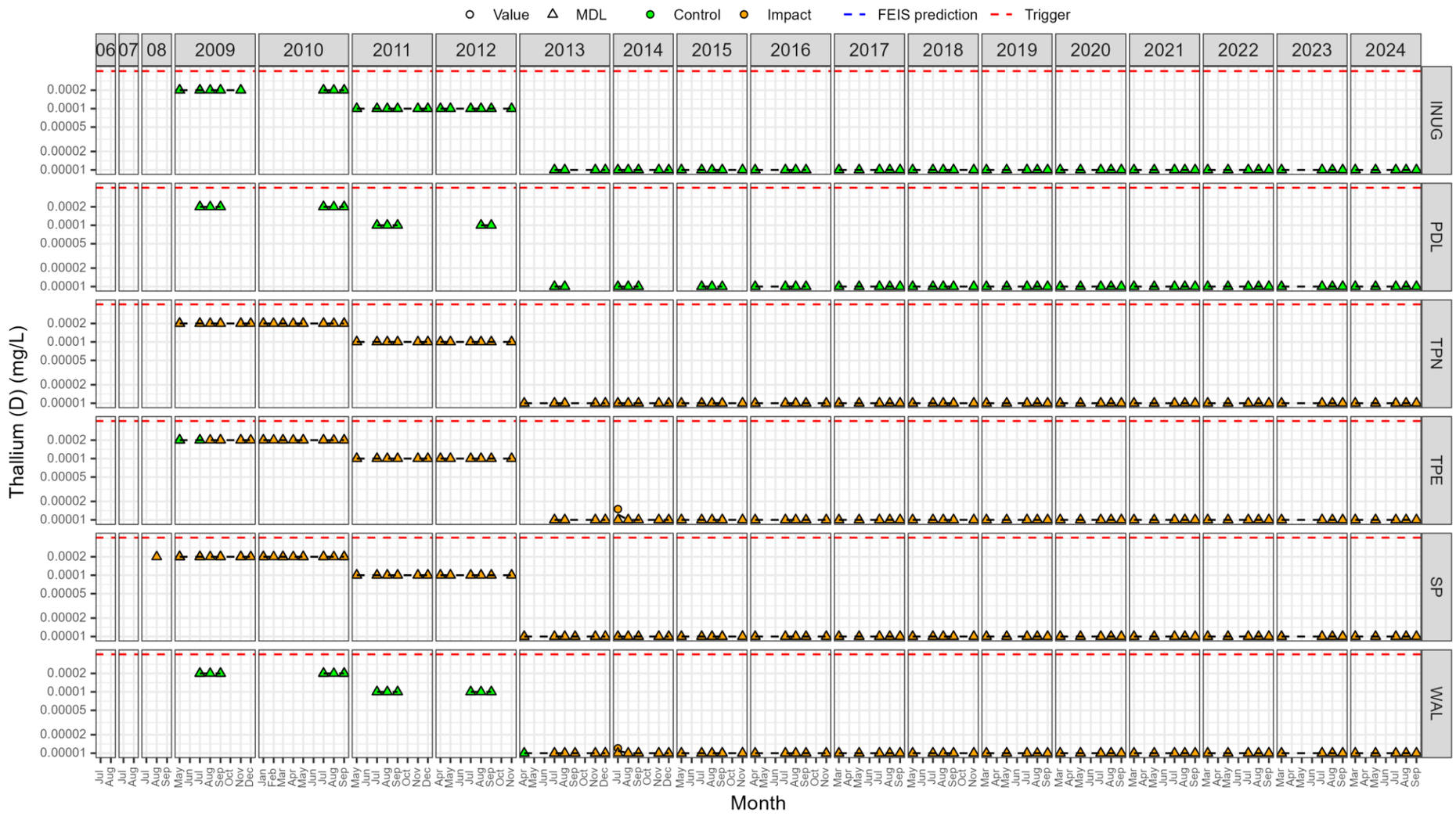


Figure C1-75. Dissolved tin (mg/L).

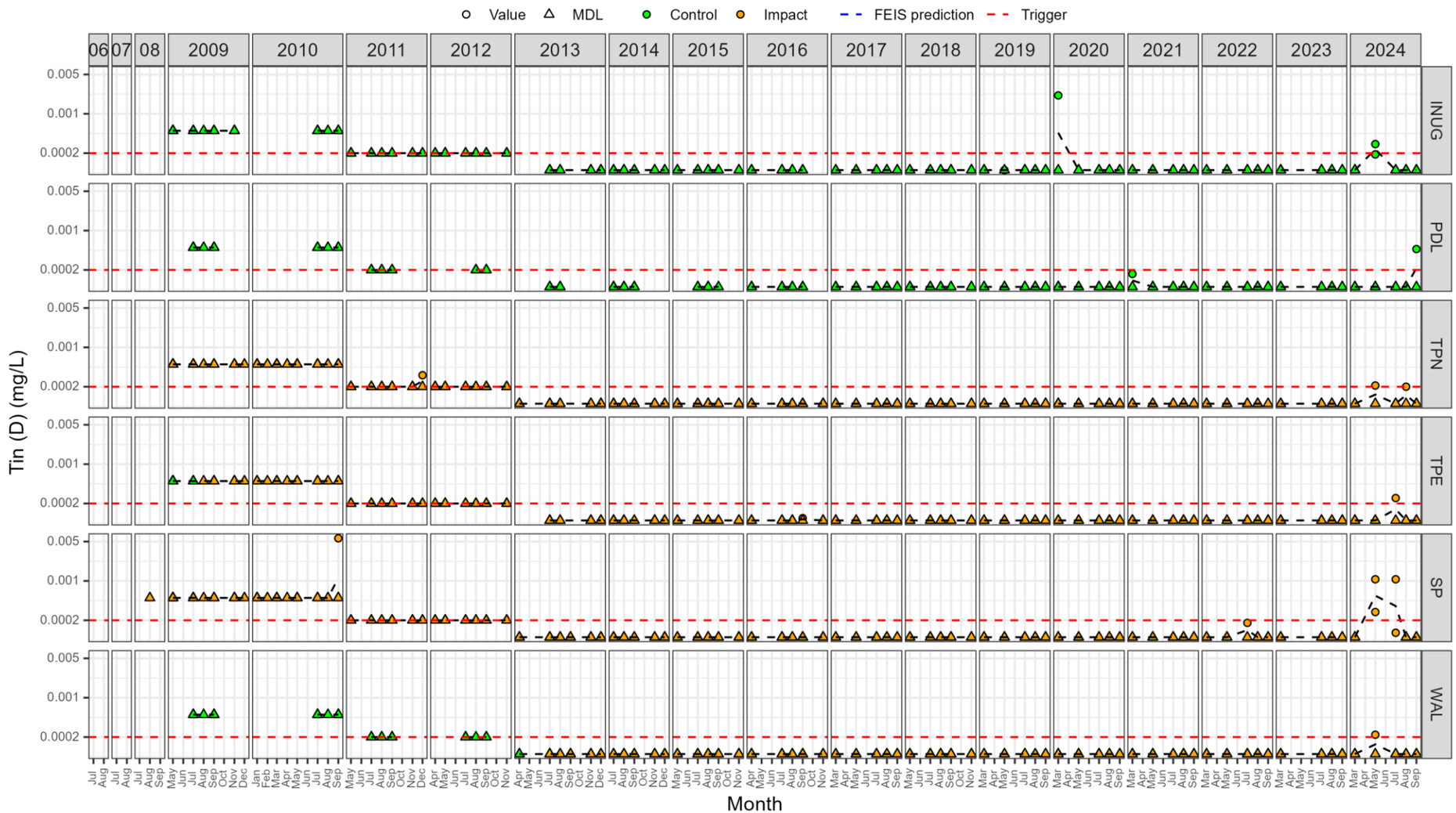


Figure C1-76. Dissolved titanium (mg/L).

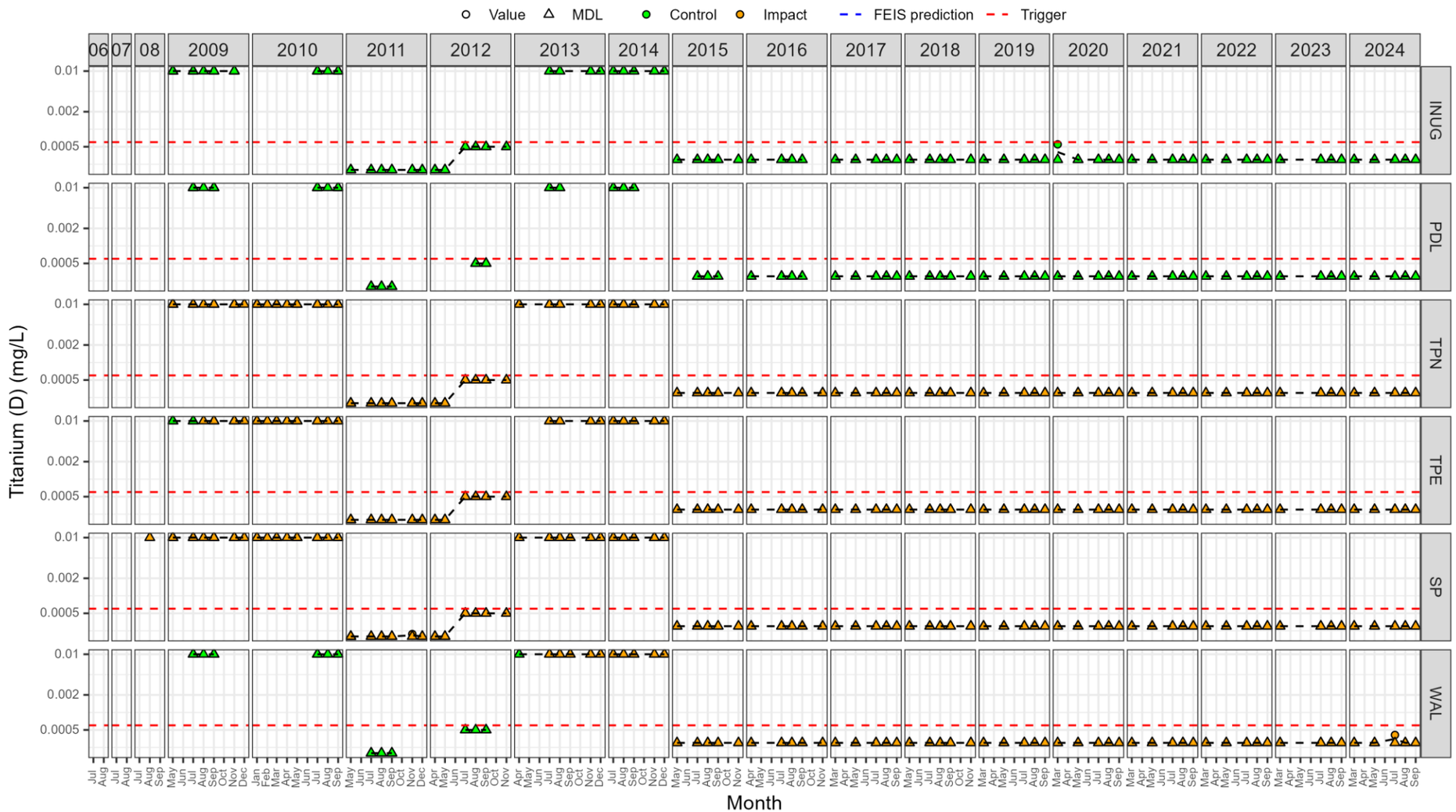


Figure C1-77. Dissolved uranium (mg/L).

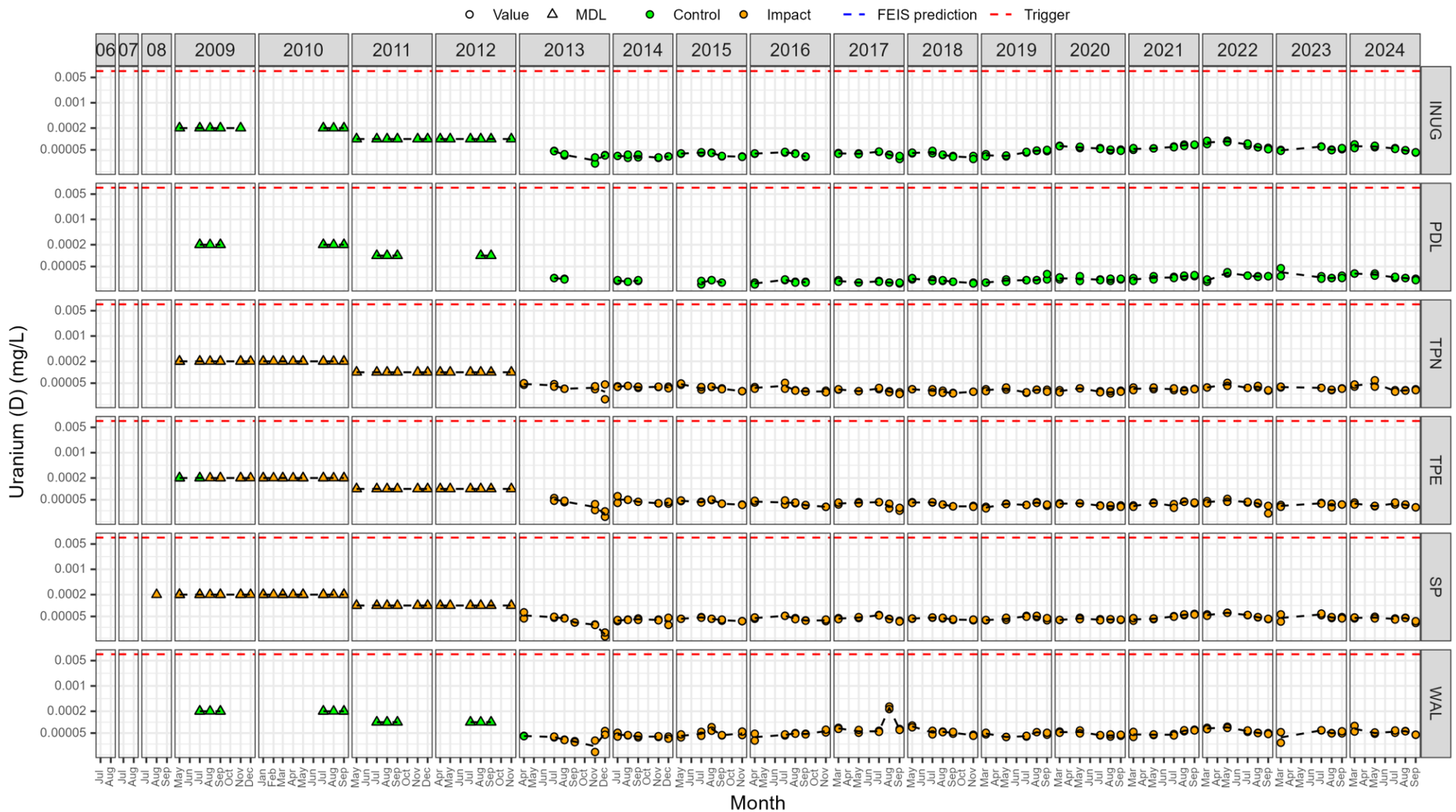


Figure C1-78. Dissolved vanadium (mg/L).

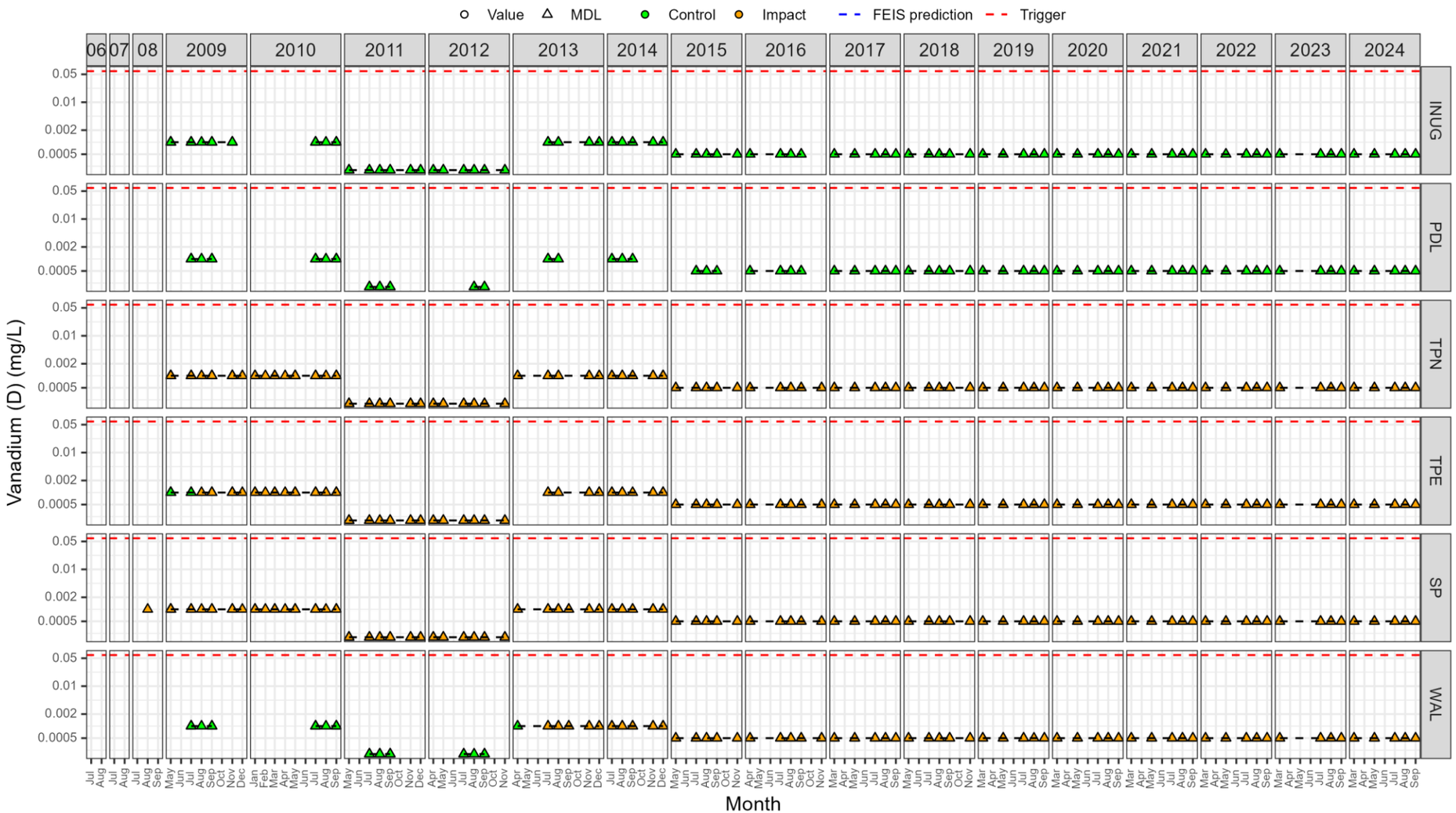
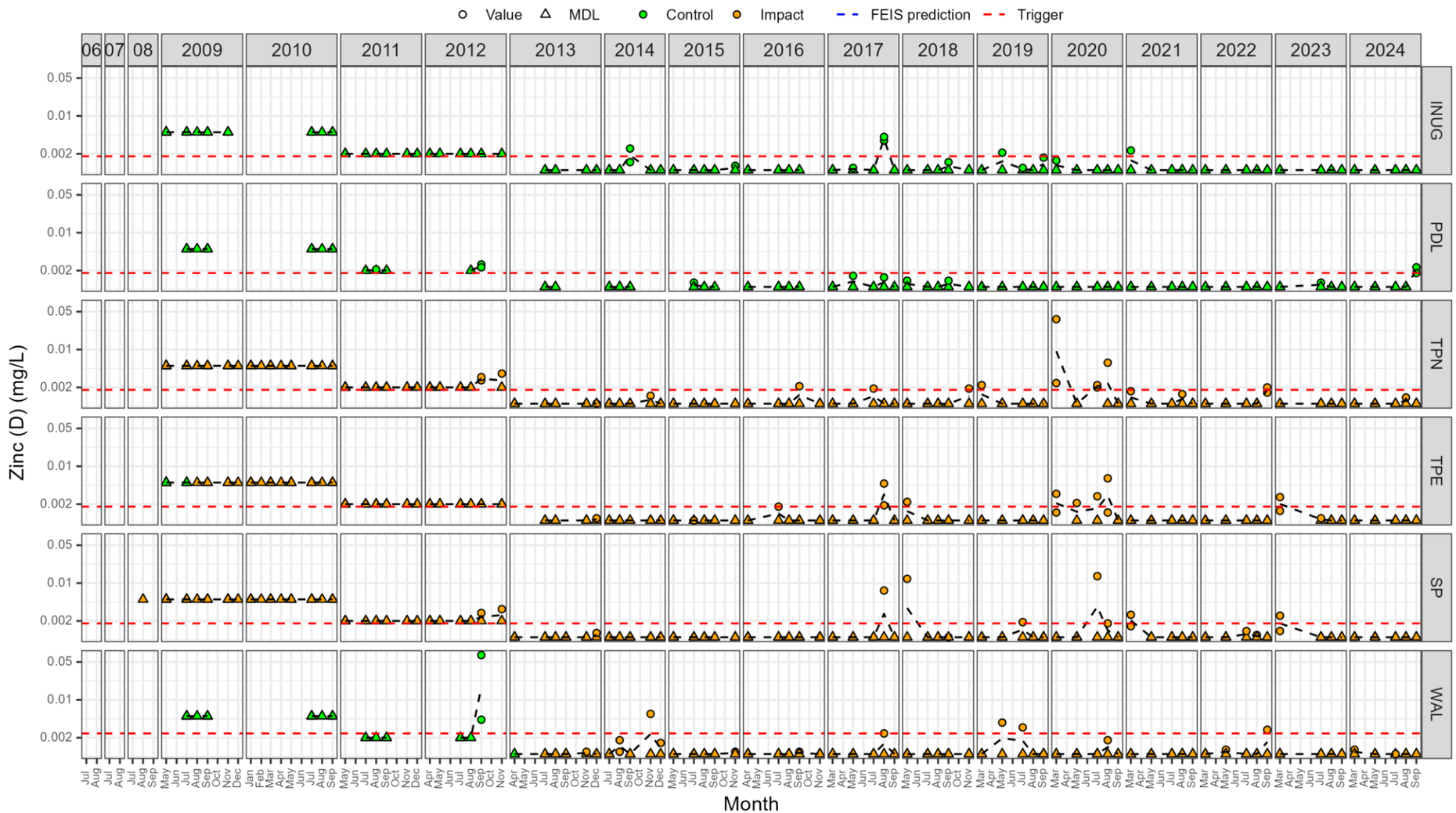


Figure C1-79. Dissolved zinc (mg/L).



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Azimuth. 2015. Core Receiving Environment Monitoring Program (CREMP) 2014, Meadowbank Mine. Report prepared by Azimuth Consulting Group, Vancouver, BC for Agnico Eagle Mines Ltd., Baker Lake, NU. March, 2015.

Appendix C2
Water Chemistry – Whale Tail Study Area Lakes

LIST OF TABLES

Table C2-1. Water quality results from the Whale Tail study area lakes, 2024. 1
Table C2-2. Water quality results screened against FEIS predicted concentrations for Whale Tail Lake – South Basin, 2024. 7
Table C2-3. Water quality results screened against FEIS predicted concentrations for Kangislulik Lake, 2024. 9
Table C2-4. Water and phytoplankton sampling location coordinates (GPS, UTM, NAD83) for the Whale Tail CREMP, 2024. 10

LIST OF FIGURES

Notes: Water quality results in Whale Tail study area lakes since baseline sampling in 2014 are shown. No cyanide (free or total) has been collected in Whale Tail study area lakes since 2019.

Figure C2-1. Laboratory-measured conductivity (µS/cm). 13
Figure C2-2. Laboratory-measured hardness (mg/L). 14
Figure C2-3. Field-measured pH. 15
Figure C2-4. Laboratory-measured pH. 16
Figure C2-5. Total suspended solids (TSS; mg/L). 17
Figure C2-6. Total dissolved solids (TDS; mg/L). 18
Figure C2-7. Carbonate alkalinity (mg/L). 19
Figure C2-8. Bicarbonate alkalinity (mg/L). 20
Figure C2-9. Total alkalinity (mg/L). 21
Figure C2-10. Ammonia-N (mg/L). 22
Figure C2-11. Chloride (mg/L). 23
Figure C2-12. Fluoride (mg/L). 24
Figure C2-13. Nitrate-N (mg/L). 25
Figure C2-14. Nitrite-N (mg/L). 26
Figure C2-15. Total Kjeldahl Nitrogen (TKN; mg/L). 27
Figure C2-16. Total phosphorous (mg/L). 28
Figure C2-17. Ortho-phosphate (mg/L). 29
Figure C2-18. Reactive silica (mg/L). 30

Figure C2-19. Sulphate (mg/L). 31
Figure C2-20. Dissolved organic carbon (DOC; mg/L). 32
Figure C2-21. Total organic carbon (TOC; mg/L). 33
Figure C2-22. Total aluminum (mg/L). 34
Figure C2-23. Total antimony (mg/L). 35
Figure C2-24. Total arsenic (mg/L). 36
Figure C2-25. Total barium (mg/L). 37
Figure C2-26. Total beryllium (mg/L). 38
Figure C2-27. Total boron (mg/L). 39
Figure C2-28. Total cadmium (mg/L). 40
Figure C2-29. Total calcium (mg/L). 41
Figure C2-30. Total chromium (mg/L). 42
Figure C2-31. Total copper (mg/L). 43
Figure C2-32. Total iron (mg/L). 44
Figure C2-33. Total lead (mg/L). 45
Figure C2-34. Total lithium (mg/L). 46
Figure C2-35. Total manganese (mg/L). 47
Figure C2-36. Total magnesium (mg/L). 48
Figure C2-37. Total mercury (mg/L). 49
Figure C2-38. Total molybdenum (mg/L). 50
Figure C2-39. Total nickel (mg/L). 51
Figure C2-40. Total potassium (mg/L). 52
Figure C2-41. Total selenium (mg/L). 53
Figure C2-42. Total silicon (mg/L). 54
Figure C2-43. Total silver (mg/L). 55
Figure C2-44. Total sodium (mg/L). 56
Figure C2-45. Total strontium (mg/L). 57
Figure C2-46. Total thallium (mg/L). 58
Figure C2-47. Total tin (mg/L). 59
Figure C2-48. Total titanium (mg/L). 60
Figure C2-49. Total uranium (mg/L). 61

Figure C2-50. Total vanadium (mg/L). 62
Figure C2-51. Total zinc (mg/L). 63
Figure C2-52. Dissolved aluminum (mg/L). 64
Figure C2-53. Dissolved antimony (mg/L). 65
Figure C2-54. Dissolved arsenic (mg/L). 66
Figure C2-55. Dissolved barium (mg/L). 67
Figure C2-56. Dissolved beryllium (mg/L). 68
Figure C2-57. Dissolved boron (mg/L). 69
Figure C2-58. Dissolved cadmium (mg/L). 70
Figure C2-59. Dissolved chromium (mg/L). 71
Figure C2-60. Dissolved copper (mg/L). 72
Figure C2-61. Dissolved iron (mg/L). 73
Figure C2-62. Dissolved lead (mg/L) 74
Figure C2-63. Dissolved lithium (mg/L). 75
Figure C2-64. Dissolved manganese (mg/L). 76
Figure C2-65. Dissolved mercury (mg/L). 77
Figure C2-66. Dissolved molybdenum (mg/L). 78
Figure C2-67. Dissolved nickel (mg/L). 79
Figure C2-68. Dissolved selenium (mg/L). 80
Figure C2-69. Dissolved silicon (mg/L). 81
Figure C2-70. Dissolved silver (mg/L). 82
Figure C2-71. Dissolved strontium (mg/L). 83
Figure C2-72. Dissolved thallium (mg/L). 84
Figure C2-73. Dissolved tin (mg/L). 85
Figure C2-74. Dissolved titanium (mg/L). 86
Figure C2-75. Dissolved uranium (mg/L). 87
Figure C2-76. Dissolved vanadium (mg/L). 88
Figure C2-77. Dissolved zinc (mg/L). 89

TABLES

Table C2-1. Water quality results from the Whale Tail study area lakes, 2024.

Lake & Area		WTP Screening Values[2]		Whale Tail Lake South Basin (WTS; Impoundment)									
Month	Aquatic Life Guideline[1]			March	March	May	May	July	July	August	August	September	September
Area-Replicate ID				WTS-87	WTS-88	WTS-89	WTS-90	WTS-91	WTS-92	WTS-93	WTS-94	WTS-95	WTS-96
Date		Triggers	Thresholds	04-Mar-2024	04-Mar-2024	04-May-2024	04-May-2024	01-Jul-2024	01-Jul-2024	14-Aug-2024	14-Aug-2024	19-Sep-2024	19-Sep-2024
Time				14:00	13:30	16:05	16:37	16:25	16:05	12:50	12:05	13:35	14:10
ALS Sample ID				VA24A5006-003 VA24A6012-003	VA24A5006-003 VA24A6012-003	VA24B0323-007	VA24B0323-008	VA24B6821-003	VA24B6821-004	VA24C1467-009	VA24C1467-010	VA24C4068-001 VA24C6403-007	VA24C4068-002 VA24C6403-008
Field Measurements (3 m)													
Dissolved Oxygen (mg/L)				14.1	14.0	11.8	12.9	12.5	12.6	9.9	9.8	10.5	10.5
Specific Conductivity (µS/cm)				152	146	150	149	125	125	118	118	126	126
pH	6.5 - 9.0			7.4	7.7	6.8	6.8	7.5	7.7	7.6	7.5	7.4	7.5
Temperature (°C)				0.52	0.61	0.87	0.74	7.4	7.5	14.2	14.2	10.5	10.5
Physical Tests (mg/L)													
Conductivity (µS/cm)		48.6		**152**	**145**	**155**	**160**	**130**	**129**	**120**	**120**	**120**	**120**
Alkalinity - Bicarbonate		9.60		**26**	**25**	**27**	**27**	**18.7**	**19.0**	**18.8**	**19.0**	**19.2**	**19.1**
Alkalinity - Carbonate		2.0		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide				*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total (as $CaCO_3$)		9.61		**26**	**25**	**27**	**27**	**18.7**	**19.0**	**18.8**	**19.0**	**19.2**	**19.1**
Hardness (as CaCO3), dissolved		17.4		**57**	**55**	**56**	**56**	**44**	**44**	**42**	**43**	**45**	**45**
Hardness (as CaCO3), from total Ca/Mg				54	51	57	59	45	45	43	44	46	48
Total Dissolved Solids		38.5		**86**	**85**	**87**	**104**	**93**	**91**	**100**	**96**	**77**	**80**
Total Suspended Solids		3	5	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1.1	1.3	*<1.0*	*<1.0*
Turbidity (NTU)				0.12	*<0.10*	0.13	*<0.10*	0.70	0.60	0.25	0.29	0.28	0.17
pH (Laboratory)	6.5 - 9.0	6.57-7.97	6.5-9.0	7.6	7.6	7.6	7.6	7.6	7.6	7.5	7.5	7.6	7.6
Anions and Nutrients (mg/L)													
Ammonia (as N)[3]	***equation***	0.065	0.126	0.055	0.056	0.026	0.039	0.035	0.020	0.041	0.045	0.052	**0.082**
Bromide				0.17	0.17	0.20	0.20	0.17	0.17	0.14	0.14	0.15	0.16
Chloride	120	60.4	120	16.9	16.2	17.6	18.2	14.6	14.5	14.1	14.2	13.7	13.8
Fluoride	0.12	0.077	0.12	0.072	0.070	0.058	0.060	0.056	0.054	0.060	0.063	0.066	0.067
Total Kjeldahl Nitrogen		0.17		**0.29**	**0.29**	**0.26**	**0.27**	**0.23**	**0.22**	**0.29**	**0.26**	**0.25**	**0.28**
Nitrate (as N)	3	1.5	3	0.46	0.44	0.56	0.57	0.45	0.44	0.27	0.27	0.23	0.23
Nitrite (as N)	0.06	0.031	0.06	0.0025	0.0023	0.0044	0.0067	0.0035	0.0033	0.0012	0.0012	*<0.0010*	0.0011
Ortho Phosphate (as P)		0.0022		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0021	0.0013	*<0.0010*	*<0.0010*
Phosphorus (P)-Total	0.01	0.0045	0.01	**0.0067**	**0.0065**	0.0034	0.0037	**0.0057**	**0.0070**	**0.0046**	**0.0047**	0.0036	0.0037
Phosphorus (P)-Total Diss.				0.0031	0.0028	0.0026	0.0029	0.0026	0.0036	*<0.0020*	0.0020	*<0.0020*	*<0.0020*
Reactive Silica (as SiO_2)		1.33		0.51	*<0.50*	0.67	0.60	0.61	0.64	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Sulphate (SO_4)		64.8	128	16.7	16.1	17.7	18.2	14.2	14.1	13.8	13.8	13.2	13.3
Organic / Inorganic Carbon (mg/L)													
Dissolved Organic Carbon		2.43		**3.8**	**4.4**	**3.5**	**3.7**	**3.2**	**2.9**	**2.9**	**3.0**	**2.7**	**3.0**
Total Organic Carbon		2.42		**3.6**	**3.7**	**3.8**	**3.8**	**2.9**	**2.8**	**3.0**	**2.9**	**2.9**	**3.1**
Total Metals (mg/L)													
Aluminum[3]	***equation***	0.052	0.1	0.0035	0.0032	*<0.0030*	*<0.0030*	0.020	0.017	0.0080	0.0062	0.0091	0.010
Antimony		0.0046	0.009	0.00058	0.00058	0.00058	0.00057	0.00049	0.00051	0.00043	0.00043	0.00042	0.00041
Arsenic	0.005	0.013	0.025	0.00060	0.00062	0.00058	0.00059	0.0012	0.0012	0.00086	0.00077	0.00097	0.00072
Barium		0.5	1	0.023	0.021	0.025	0.025	0.020	0.020	0.017	0.017	0.017	0.017
Beryllium		0.000115	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth				*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	0.000023	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		4.6		**14.0**	**13.2**	**15.2**	**15.7**	**12.6**	**12.6**	**11.8**	**12.0**	**12.3**	**12.9**
Cesium				0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002
Chromium[4]	0.001	0.0025	0.005	0.00012	0.00012	*<0.00050*	*<0.00050*	0.00043	0.00038	0.00018	0.00094	0.00017	0.00015
Cobalt				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00011	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0013	0.002	0.00058	0.00056	0.00056	0.00056	*<0.00050*	0.00056	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.16	0.3	0.016	0.010	0.012	0.011	0.073	0.069	0.035	0.038	0.041	0.042
Lead[3]	***equation***	0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.002		**0.0023**	**0.0022**	**0.0024**	**0.0025**	**0.0022**	**0.0022**	**0.0021**	**0.0021**	0.0020	0.0020
Magnesium		1.41		**4.5**	**4.5**	**4.6**	**4.7**	**3.2**	**3.3**	**3.4**	**3.4**	**3.7**	**3.7**
Manganese[3]		0.32	***See note 3***	0.0014	0.00072	0.0032	0.0017	0.021	0.020	0.0056	0.0076	0.0072	0.0078
Mercury	0.000026	0.000016	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.037	0.073	0.00077	0.00081	0.00080	0.00078	0.00089	0.00093	0.00082	0.00081	0.00080	0.00075
Nickel[3]	***equation***	0.013	0.025	0.0017	0.0017	0.0018	0.0018	0.0026	0.0024	0.0014	0.0013	0.0015	0.0013
Phosphorus		0.0045	0.004	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.84		**3.5**	**3.5**	**3.8**	**3.9**	**3.2**	**3.2**	**3.1**	**3.0**	**3.0**	**3.0**
Rubidium				0.0057	0.0055	0.0057	0.0060	0.0044	0.0045	0.0047	0.0048	0.0046	0.0045
Selenium	0.001	0.00053	0.001	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00006	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.61		0.25	0.21	0.32	0.29	0.44	0.43	0.11	0.10	0.12	0.12
Silver	0.00025	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1		**3.4**	**3.2**	**3.4**	**3.4**	**2.7**	**2.7**	**2.9**	**2.8**	**2.8**	**2.8**
Strontium		1.26	2.5	0.11	0.11	0.12	0.12	0.100	0.10	0.093	0.092	0.100	0.094
Sulfur				5.4	5.3	5.8	5.9	4.2	4.3	4.6	4.6	4.4	4.2
Tellurium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium	0.0008	0.00013	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin		0.033		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00041		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	0.00071	0.00065	*<0.00030*	*<0.00030*	0.00035	0.00034
Tungsten				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium	0.015	0.0002	0.015	0.00007	0.00007	0.00007	0.00007	0.00010	0.00010	0.00007	0.00007	0.00006	0.00006
Vanadium		0.0006	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc	0.03	0.0075	***See note 3***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	**0.023**	*<0.0030*	*<0.0030*
Zirconium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Dissolved Metals (mg/L)													
Aluminum[3]		0.026	0.05	0.0025	0.0027	0.0024	0.0022	0.0034	0.0082	0.0024	0.0022	0.0043	0.0025
Antimony		0.005	0.009	0.00056	0.00057	0.00054	0.00057	0.00052	0.00051	0.00041	0.00042	0.00041	0.00041
Arsenic		0.013	0.025	0.00057	0.00055	0.00054	0.00058	0.00095	0.0010	0.00072	0.00073	0.00068	0.00067
Barium		0.5	1	0.022	0.020	0.025	0.025	0.018	0.019	0.016	0.017	0.018	0.018
Beryllium		0.000115	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth				*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron		0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium		0.000023	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	~~0.000024~~	*<0.0000050*	*<0.0000050*
Calcium		4.6		**14.9**	**14.6**	**15.0**	**15.0**	**12.4**	**12.2**	**11.7**	**12.0**	**12.2**	**12.1**
Cesium				0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002	0.00002
Chromium		0.0026	0.005	0.00011	0.00015	*<0.00050*	*<0.00050*	0.00012	0.00020	*<0.00010*	0.00010	*<0.00010*	*<0.00010*
Cobalt				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper		0.0012	0.002	0.00054	0.00055	0.00059	0.00058	0.00043	0.00046	0.00038	0.00039	0.00037	0.00036
Iron		0.16	0.3	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.025	0.034	*<0.010*	*<0.010*	0.014	0.012
Lead		0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	0.00015	0.00024	0.00019	0.00014	0.00006	0.00032	*<0.000050*
Lithium		0.002		**0.0024**	**0.0023**	**0.0025**	**0.0026**	**0.0022**	**0.0022**	**0.0021**	**0.0021**	**0.0023**	**0.0022**
Magnesium		1.41		**4.7**	**4.4**	**4.5**	**4.6**	**3.2**	**3.2**	**3.1**	**3.3**	**3.6**	**3.6**
Manganese[3]		0.32	***See note 3***	0.00077	0.00043	0.00094	0.00099	0.015	0.015	0.00033	0.0012	0.00093	0.00074
Mercury		0.000016	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum		0.037	0.073	0.00073	0.00075	0.00072	0.00076	0.00096	0.00091	0.00082	0.00082	0.00076	0.00075
Nickel		0.013	0.025	0.0017	0.0017	0.0018	0.0018	0.0021	0.0021	0.0012	0.0012	0.0012	0.0011
Phosphorus				*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.84		**3.9**	**3.7**	**4.2**	**4.2**	**2.9**	**2.8**	**3.0**	**3.1**	**3.0**	**3.0**
Rubidium				0.0059	0.0053	0.0060	0.0062	0.0045	0.0044	0.0044	0.0043	0.0046	0.0045
Selenium		0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	0.00006	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.57		0.22	0.19	0.31	0.28	0.38	0.36	0.066	0.074	0.073	0.067
Silver		0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1		**3.4**	**3.2**	**3.4**	**3.5**	**2.6**	**2.6**	**2.8**	**2.9**	**2.8**	**2.7**
Strontium		1.26	2.5	0.12	0.11	0.11	0.11	0.099	0.095	0.093	0.094	0.092	0.092
Sulfur				5.3	5.3	6.0	6.4	4.5	4.8	4.6	4.3	4.6	4.4
Tellurium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium		0.00041	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin		0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.0006		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	0.00032	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium		0.0075	0.015	0.00006	0.00007	0.00006	0.00006	0.00009	0.00009	0.00007	0.00007	0.00005	0.00005
Vanadium		0.06	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[3]	***equation***	0.0023	***See note 3***	**0.0035**	*<0.0010*	*<0.0010*	~~0.0396~~	~~0.0314~~	0.0016	~~0.011~~	~~0.017~~	~~0.027~~	~~0.048~~
Zirconium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Speciated Metals (µg/L)													
Arsenate (As V)				0.28	-	-	-	-	-	-	-	-	-
Arsenite (As III)				0.038	-	-	-	-	-	-	-	-	-
Arsenobetaine (AsB)				*<0.050*	-	-	-	-	-	-	-	-	-
Dimethylarsinic Acid (DMA)				*<0.020*	-	-	-	-	-	-	-	-	-
Monomethylarsonic Acid (MMA)				0.020	-	-	-	-	-	-	-	-	-
Plant Pigments (µg/L)													
Chlorophyll-a				0.42	0.59	0.79	0.82	1.5	1.7	1.4	1.2	0.82	0.89

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.
2. Trigger and threshold values are presented in *CREMP 2015 Plan Update* (Azimuth, 2015b). A number of thresholds were derived from methods (or sources) other than CCME guidelines - see Azimuth (2015b) for details.
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

123 Bolded values exceed the trigger.
123 Bold and shaded values exceed the threshold.
Italicized numbers are below detection limits.
underline = results were given a cautionary flag in the QC assessment (refer to **Appendix B** for details).
~~strikethrough~~ = results flagged as unreliable in the QC assessment (refer to **Appendix B** for details).
* Kangislulik Lake (KAN) previously referred to as Mammoth Lake (MAM). Acronym MAM still being used in tables and figures.

Table C2-1. Water quality results from the Whale Tail study area lakes, 2024.

Lake & Area		WTP Screening Values[2]		Kangislulik Lake (KAN/MAM)*									
Month	Aquatic Life Guideline[1]			March	March	May	May	July	July	August	August	September	September
Area-Replicate ID				MAM-87	MAM-88	MAM-89	MAM-90	MAM-91	MAM-92	MAM-93	MAM-94	MAM-95	MAM-96
Date				05-Mar-2024	05-Mar-2024	04-May-2024	04-May-2024	30-Jun-2024	30-Jun-2024	15-Aug-2024	15-Aug-2024	19-Sep-2024	19-Sep-2024
Time		Triggers	Thresholds	14:00	13:30	10:20	10:50	16:05	14:35	14:50	15:50	14:30	14:00
ALS Sample ID				VA24A5006-005 VA24A6012-005	VA24A5006-006 VA24A6012-006	VA24B0323-003	VA24B0323-004	VA24B6821-005	VA24B6821-006	VA24C1467-005	VA24C1467-006	VA24C6403-009 VA24C3430-001	VA24C6403-010 VA24C3430-002
Field Measurements (3 m)													
Dissolved Oxygen (mg/L)				13.3	13.1	11.9	11.7	12.0	12.3	9.8	9.7	11.1	11.1
Specific Conductivity (µS/cm)				261	222	222	273	152	130	147	169	164	194
pH	6.5 - 9.0			7.0	7.3	7.1	7.0	7.7	7.8	7.8	7.8	7.5	7.6
Temperature (°C)				1.4	1.3	1.4	1.5	9.3	7.4	14.0	14.1	9.3	9.2
Physical Tests (mg/L)													
Conductivity (µS/cm)		48.6		**257**	**217**	**228**	**276**	**156**	**134**	**144**	**164**	**156**	**184**
Alkalinity - Bicarbonate		9.60		**33**	**28**	**29**	**35**	**19.6**	**18.0**	**19.8**	**24**	**23**	**25**
Alkalinity - Carbonate		2.0		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide				*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total (as $CaCO_3$)		9.61		**33**	**28**	**29**	**35**	**19.6**	**18.0**	**19.8**	**24**	**23**	**25**
Hardness (as CaCO3), dissolved		17.4		**95**	**81**	**85**	**100**	**53**	**43**	**53**	**61**	**59**	**72**
Hardness (as CaCO3), from total Ca/Mg				91	76	86	108	55	47	53	63	59	68
Total Dissolved Solids		38.5		**162**	**132**	**163**	**208**	**119**	**97**	**122**	**151**	**124**	**141**
Total Suspended Solids		3	5	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Turbidity (NTU)				0.11	*<0.10*	*<0.10*	0.14	0.36	0.33	0.42	0.40	0.34	0.30
pH (Laboratory)	6.5 - 9.0	6.57-7.97	6.5-9.0	7.7	7.6	7.6	7.7	7.6	7.5	7.6	7.6	7.6	7.7
Anions and Nutrients (mg/L)													
Ammonia (as N)[3]	***equation***	0.065	0.126	0.056	0.048	0.060	0.058	0.015	0.012	0.029	0.032	0.049	**0.068**
Bromide				0.35	0.28	0.32	0.41	0.21	0.18	0.18	0.22	0.21	0.26
Chloride	120	60.4	120	32	26	28	35	18.1	15.3	17.1	19.9	18.4	22
Fluoride	0.12	0.077	0.12	0.072	0.067	0.057	0.063	0.046	0.044	0.057	0.063	0.057	0.063
Total Kjeldahl Nitrogen		0.17		**0.29**	**0.24**	**0.24**	**0.31**	**0.17**	**0.19**	**0.23**	**0.24**	**0.27**	**0.43**
Nitrate (as N)	3	1.5	3	1.1	0.85	0.92	1.2	0.44	0.34	0.27	0.49	0.33	0.65
Nitrite (as N)	0.06	0.031	0.06	0.0042	0.0026	*<0.0010*	0.0021	0.0013	*<0.0010*	0.0019	0.0046	0.0013	0.0032
Ortho Phosphate (as P)		0.0022		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0021	*<0.0010*	*<0.0010*
Phosphorus (P)-Total	0.01	0.0045	0.01	0.0041	0.0032	*<0.0020*	*<0.0020*	0.0039	**0.0047**	0.0041	0.0041	**0.0055**	0.0038
Phosphorus (P)-Total Diss.				0.0021	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.0021	*<0.0020*	0.0021	0.0022
Reactive Silica (as SiO_2)		1.33		**1.4**	1.3	**1.5**	**1.8**	0.62	0.68	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Sulphate (SO_4)		64.8	128	35	29	31	39	20	16.5	19.1	22	19.6	23
Organic / Inorganic Carbon (mg/L)													
Dissolved Organic Carbon		2.43		3.1	2.8	**3.0**	**2.9**	2.1	2.3	**2.7**	**3.1**	**2.7**	**2.8**
Total Organic Carbon		2.42		**3.0**	**2.7**	**2.5**	**3.1**	2.0	2.3	**2.6**	**2.6**	2.4	**2.5**
Total Metals (mg/L)													
Aluminum[3]	***equation***	0.052	0.1	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	0.015	0.011	0.0045	0.0056	0.0040	0.0048
Antimony		0.0046	0.009	0.0013	0.0010	0.0011	0.0014	0.00069	0.00050	0.00082	0.0013	0.00093	0.0015
Arsenic	0.005	0.013	0.025	0.0010	0.00092	0.00094	0.0010	0.0010	0.00076	0.0012	0.0017	0.0012	0.0020
Barium		0.5	1	0.036	0.031	0.035	0.046	0.024	0.020	0.018	0.021	0.020	0.023
Beryllium		0.000115	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth				*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.76	1.5	0.011	*<0.010*	0.010	0.013	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	0.000023	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		4.6		**25**	**21**	**25**	**32**	**15.9**	**13.6**	**15.0**	**17.9**	**17.1**	**19.6**
Cesium				0.00002	0.00002	0.00002	0.00003	0.00002	0.00001	0.00002	0.00002	0.00002	0.00003
Chromium[4]	0.001	0.0025	0.005	*<0.00010*	0.00042	*<0.00050*	*<0.00050*	0.00035	0.00024	*<0.00010*	0.00014	0.00012	0.00017
Cobalt				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0013	0.002	0.00061	0.00058	0.00053	0.00062	0.00051	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	0.00054
Iron	0.3	0.16	0.3	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.030	0.029	0.011	0.016	0.017	0.026
Lead[3]	***equation***	0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.002		**0.0038**	**0.0030**	**0.0036**	**0.0044**	**0.0022**	0.0018	**0.0022**	**0.0028**	**0.0026**	**0.0031**
Magnesium		1.41		**6.8**	**5.8**	**5.8**	**7.2**	**3.8**	**3.2**	**3.9**	**4.3**	**3.9**	**4.5**
Manganese[3]		0.32	***See note 3***	0.0049	0.0038	0.0025	0.0043	0.0062	0.0056	0.0037	0.0040	0.0060	0.0079
Mercury	0.000026	0.000016	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.037	0.073	0.0012	0.00097	0.00093	0.0011	0.00055	0.00040	0.00084	0.0013	0.00098	0.0016
Nickel[3]	***equation***	0.013	0.025	0.0022	0.0016	0.0017	0.0024	0.0014	0.0012	0.00089	0.0014	0.0011	0.0017
Phosphorus		0.0045	0.004	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.84		**5.5**	**4.6**	**5.1**	**6.2**	**3.7**	**3.1**	**3.5**	**4.1**	**3.6**	**4.4**
Rubidium				0.0068	0.0063	0.0065	0.0077	0.0042	0.0037	0.0048	0.0054	0.0048	0.0055
Selenium	0.001	0.00053	0.001	0.00009	0.00008	0.00007	0.00009	0.00007	*<0.000050*	*<0.000050*	0.00007	0.00006	*<0.000050*
Silicon		0.61		**0.69**	**0.65**	**0.76**	**0.86**	0.35	0.38	0.10	0.14	0.12	0.25
Silver	0.00025	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1		**4.8**	**4.0**	**4.3**	**5.1**	**2.8**	**2.5**	**3.2**	**3.6**	**3.2**	**3.5**
Strontium		1.26	2.5	0.20	0.16	0.19	0.23	0.12	0.099	0.11	0.14	0.12	0.16
Sulfur				11.2	9.3	10.3	12.8	6.7	5.0	6.4	7.2	6.6	8.0
Tellurium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium	0.0008	0.00013	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin		0.033		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00041		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	0.00058	0.00038	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium	0.015	0.0002	0.015	0.00017	0.00013	0.00014	0.00016	0.00013	0.00010	0.00017	**0.00025**	0.00016	**0.00026**
Vanadium		0.0006	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc	0.03	0.0075	***See note 3***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Zirconium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Dissolved Metals (mg/L)													
Aluminum[3]		0.026	0.05	*<0.0010*	0.0011	0.0012	*<0.0010*	0.0040	0.0022	0.0024	0.0028	0.0018	0.0015
Antimony		0.005	0.009	0.0013	0.0011	0.0011	0.0013	0.00068	0.00051	0.00081	0.0012	0.00093	0.0015
Arsenic		0.013	0.025	0.0010	0.00086	0.00086	0.00095	0.00091	0.00068	0.0011	0.0015	0.0011	0.0017
Barium		0.5	1	0.038	0.029	0.034	0.043	0.021	0.020	0.019	0.021	0.020	0.025
Beryllium		0.000115	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth				*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron		0.76	1.5	0.011	*<0.010*	0.010	0.012	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium		0.000023	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		4.6		**27**	**23**	**25**	**29**	**15.0**	**12.0**	**15.1**	**17.4**	**16.2**	**20**
Cesium				0.00002	0.00002	0.00002	0.00002	0.00002	0.00001	0.00002	0.00002	0.00002	0.00003
Chromium		0.0026	0.005	*<0.00010*	*<0.00010*	*<0.00050*	*<0.00050*	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper		0.0012	0.002	0.00057	0.00051	0.00052	0.00059	0.00047	0.00040	0.00040	0.00044	0.00047	0.00051
Iron		0.16	0.3	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead		0.00053	0.001	*<0.000050*	0.00010	0.00024	0.00007	0.00009	*<0.000050*	*<0.000050*	0.00005	0.00008	*<0.000050*
Lithium		0.002		**0.0040**	**0.0035**	**0.0038**	**0.0047**	**0.0022**	0.0018	**0.0022**	**0.0027**	**0.0026**	**0.0032**
Magnesium		1.41		**6.9**	**5.7**	**5.6**	**6.9**	**3.7**	**3.2**	**3.7**	**4.3**	**4.5**	**5.2**
Manganese[3]		0.32	***See note 3***	0.00034	0.00030	0.00072	0.0014	0.0038	0.0032	0.00064	0.0015	0.00094	0.0025
Mercury		0.000016	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum		0.037	0.073	0.0011	0.00096	0.00096	0.0010	0.00054	0.00041	0.00080	0.0013	0.00094	0.0016
Nickel		0.013	0.025	0.0021	0.0015	0.0016	0.0023	0.0013	0.0011	0.00096	0.0015	0.0011	0.0017
Phosphorus				*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.84		**5.9**	**4.9**	**5.2**	**6.1**	**3.3**	**2.9**	**3.6**	**4.1**	**3.8**	**4.7**
Rubidium				0.0071	0.0059	0.0066	0.0077	0.0040	0.0037	0.0045	0.0053	0.0050	0.0060
Selenium		0.00053	0.001	0.00007	0.00006	0.00006	0.00009	*<0.000050*	*<0.000050*	0.00005	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.57		**0.74**	**0.68**	**0.72**	**0.86**	0.29	0.32	0.067	0.12	0.075	0.17
Silver		0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1		**4.9**	**4.1**	**4.3**	**5.2**	**2.8**	**2.5**	**3.1**	**3.6**	**3.4**	**3.8**
Strontium		1.26	2.5	0.21	0.18	0.18	0.22	0.12	0.096	0.11	0.13	0.12	0.16
Sulfur				11.9	9.3	10.8	13.7	6.5	5.5	6.2	7.1	6.7	8.1
Tellurium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium		0.00041	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin		0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.0006		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium		0.0075	0.015	0.00016	0.00013	0.00013	0.00015	0.00013	0.00009	0.00015	0.00024	0.00015	0.00024
Vanadium		0.06	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[3]	***equation***	0.0023	***See note 3***	~~0.010~~	~~0.039~~	~~0.037~~	~~0.031~~	~~0.016~~	~~0.014~~	*<0.0010*	~~0.006~~	~~0.026~~	~~0.063~~
Zirconium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Speciated Metals (µg/L)													
Arsenate (As V)				0.52	-	-	-	-	-	-	-	-	-
Arsenite (As III)				0.076	-	-	-	-	-	-	-	-	-
Arsenobetaine (AsB)				*<0.050*	-	-	-	-	-	-	-	-	-
Dimethylarsinic Acid (DMA)				0.12	-	-	-	-	-	-	-	-	-
Monomethylarsonic Acid (MMA)				0.043	-	-	-	-	-	-	-	-	-
Plant Pigments (µg/L)													
Chlorophyll-a				0.74	0.68	1.4	0.93	0.65	0.58	1.2	1.1	0.59	0.63

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.
2. Trigger and threshold values are presented in *CREMP 2015 Plan Update* (Azimuth, 2015b). A number of thresholds were derived from methods (or sources) other than CCME guidelines - see Azimuth (2015b) for details.
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

123 Bolded values exceed the trigger.
123 Bold and shaded values exceed the threshold.
Italicized numbers are below detection limits.
underline = results were given a cautionary flag in the QC assessment (refer to **Appendix B** for details).
~~strikethrough~~ = results flagged as unreliable in the QC assessment (refer to **Appendix B** for details).
* Kangislulik Lake (KAN) previously referred to as Mammoth Lake (MAM). Acronym MAM still being used in tables and figures.

Table C2-1. Water quality results from the Whale Tail study area lakes, 2024.

Lake & Area		WTP Screening Values[2]		Lake A20 (A20; Impoundment)									
Month	Aquatic Life Guideline[1]			March	March	May	May	July	July	August	August	September	September
Area-Replicate ID				A20-79	A20-80	A20-81	A20-82	A20-83	A20-84	A20-85	A20-86	A20-87	A20-88
Date				05-Mar-2024	05-Mar-2024	04-May-2024	04-May-2024	04-Jul-2024	04-Jul-2024	18-Aug-2024	18-Aug-2024	19-Sep-2024	19-Sep-2024
Time		Triggers	Thresholds	09:30	09:20	10:00	09:15	14:20	14:50	09:05	09:30	16:40	16:01
ALS Sample ID				VA24A5006-007 VA24A6012-007	VA24A5006-008 VA24A6012-008	VA24B0323-001	VA24B0323-002	VA24B6821-001	VA24B6821-002	VA24C1467-001	VA24C1467-002	VA24C3430-003 VA24C6403-005	VA24C3430-004 VA24C6403-006
Field Measurements (3 m)													
Dissolved Oxygen (mg/L)				13.7	12.4	11.4	12.5	11.8	11.3	9.1	9.0	11.3	10.7
Specific Conductivity (µS/cm)				80	103	102	75	66	82	75	80	78	75
pH	6.5 - 9.0			7.4	7.1	7.1	7.7	7.8	7.8	7.4	7.5	7.2	7.2
Temperature (°C)				0.64	1.6	1.8	0.60	9.0	11.3	13.3	13.0	8.7	9.8
Physical Tests (mg/L)													
Conductivity (µS/cm)		48.6		**79**	**102**	**106**	**79**	**68**	**85**	**72**	**76**	**75**	**72**
Alkalinity - Bicarbonate		9.60		**15.6**	**22**	**23**	**15.1**	**12.3**	**14.3**	**13.3**	**14.0**	**12.9**	**13.1**
Alkalinity - Carbonate		2.0		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide				*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total (as $CaCO_3$)		9.61		**15.6**	**22**	**23**	**15.1**	**12.3**	**14.3**	**13.3**	**14.0**	**12.9**	**13.1**
Hardness (as CaCO3), dissolved		17.4		**29**	**38**	**37**	**28**	**23**	**29**	**25**	**26**	**45**	**26**
Hardness (as CaCO3), from total Ca/Mg				28	36	40	30	24	30	26	27	26	26
Total Dissolved Solids		38.5		36	**58**	**70**	**52**	**48**	**62**	**59**	**62**	**53**	**43**
Total Suspended Solids		3	5	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Turbidity (NTU)				*<0.10*	0.13	0.30	0.16	0.42	0.42	0.33	0.35	0.28	0.24
pH (Laboratory)	6.5 - 9.0	6.57-7.97	6.5-9.0	7.4	7.5	7.5	7.4	7.4	7.4	7.4	7.4	7.4	7.4
Anions and Nutrients (mg/L)													
Ammonia (as N)[3]	***equation***	0.065	0.126	0.034	0.034	0.0052	0.040	0.0087	*<0.0050*	0.0078	*<0.0050*	0.045	0.057
Bromide				0.081	0.11	0.11	0.085	0.074	0.10	0.077	0.084	0.082	0.080
Chloride	120	60.4	120	8.2	10.5	11.1	8.2	7.1	9.2	7.8	8.6	8.5	7.5
Fluoride	0.12	0.077	0.12	0.054	0.060	0.052	0.042	0.040	0.043	0.046	0.050	0.050	0.047
Total Kjeldahl Nitrogen		0.17		**0.21**	**0.24**	0.17	**0.19**	0.17	**0.22**	**0.19**	**0.22**	**0.24**	**0.25**
Nitrate (as N)	3	1.5	3	0.044	0.11	0.17	0.056	0.048	0.079	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.06	0.031	0.06	*<0.0010*	0.0034	*<0.0010*	0.0024	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Ortho Phosphate (as P)		0.0022		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0022	*<0.0010*	*<0.0010*
Phosphorus (P)-Total	0.01	0.0045	0.01	0.0037	0.0040	0.0028	0.0026	**0.0072**	**0.0057**	**0.0046**	0.0045	**0.0046**	**0.0049**
Phosphorus (P)-Total Diss.				0.0024	0.0027	*<0.0020*	*<0.0020*	0.0023	0.0026	*<0.0020*	*<0.0020*	0.0026	0.0025
Reactive Silica (as SiO_2)		1.33		0.71	0.71	1.1	0.76	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Sulphate (SO_4)		64.8	128	7.4	9.6	10.0	7.4	6.6	8.6	7.4	8.0	7.0	6.7
Organic / Inorganic Carbon (mg/L)													
Dissolved Organic Carbon		2.43		3.1	**3.6**	**3.3**	**2.8**	**2.8**	**2.9**	**2.7**	**2.8**	**2.8**	2.4
Total Organic Carbon		2.42		**2.9**	**3.5**	**3.2**	**2.9**	**2.6**	**2.9**	**2.8**	**2.8**	**2.7**	**2.6**
Total Metals (mg/L)													
Aluminum[3]	***equation***	0.052	0.1	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	0.0074	0.0083	0.0043	0.0049	0.0075	0.0034
Antimony		0.0046	0.009	0.00012	0.00015	0.00012	0.00012	0.00012	0.00018	0.00012	0.00014	0.00012	0.00012
Arsenic	0.005	0.013	0.025	0.00026	0.00030	0.00032	0.00027	0.00035	0.00039	0.00029	0.00028	0.00033	0.00030
Barium		0.5	1	0.010	0.015	0.018	0.011	0.0099	0.011	0.0087	0.0093	0.0091	0.0086
Beryllium		0.000115	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth				*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	0.000023	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		4.6		**7.4**	**9.3**	**10.7**	**7.8**	**6.4**	**8.1**	**6.9**	**7.3**	**7.1**	**7.1**
Cesium				*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium[4]	0.001	0.0025	0.005	*<0.00010*	0.00023	*<0.00050*	*<0.00050*	0.00013	0.00016	*<0.00010*	*<0.00010*	0.00011	*<0.00010*
Cobalt				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0013	0.002	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.16	0.3	*<0.010*	0.011	*<0.010*	*<0.010*	0.060	0.069	0.028	0.040	0.039	0.026
Lead[3]	***equation***	0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.002		*<0.0010*	0.0011	0.0011	*<0.0010*	*<0.0010*	0.0011	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		1.41		**2.4**	**3.2**	**3.3**	**2.5**	**2.0**	**2.4**	**2.1**	**2.2**	**2.1**	**2.0**
Manganese[3]		0.32	***See note 3***	0.0014	0.039	0.10	0.00080	0.011	0.0093	0.0058	0.0082	0.0069	0.0077
Mercury	0.000026	0.000016	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.037	0.073	0.00009	0.00010	0.00008	0.00010	0.00012	0.00023	0.00017	0.00014	0.00013	0.00012
Nickel[3]	***equation***	0.013	0.025	*<0.00050*	0.00057	0.00059	*<0.00050*	*<0.00050*	0.00053	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus		0.0045	0.004	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.84		**1.7**	**2.1**	**2.5**	**1.9**	**1.7**	**2.1**	**1.8**	**1.9**	**1.8**	**1.7**
Rubidium				0.0025	0.0031	0.0033	0.0026	0.0022	0.0029	0.0027	0.0028	0.0024	0.0022
Selenium	0.001	0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.61		0.36	0.47	0.57	0.38	0.26	0.16	0.18	0.20	0.20	0.22
Silver	0.00025	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1		**2.1**	**2.4**	**2.5**	**2.0**	**1.6**	**1.9**	**1.9**	**2.1**	**1.8**	**1.7**
Strontium		1.26	2.5	0.049	0.065	0.069	0.051	0.044	0.059	0.048	0.053	0.051	0.047
Sulfur				2.3	3.1	3.2	2.6	2.1	2.7	2.3	2.6	2.5	2.4
Tellurium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium	0.0008	0.00013	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin		0.033		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00041		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium	0.015	0.0002	0.015	0.00003	0.00004	0.00004	0.00003	0.00004	0.00005	0.00004	0.00005	0.00004	0.00003
Vanadium		0.0006	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc	0.03	0.0075	***See note 3***	*<0.0030*	*<0.0030*	*<0.0030*	**0.019**	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Zirconium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Dissolved Metals (mg/L)													
Aluminum[3]		0.026	0.05	*<0.0010*	0.0014	*<0.0010*	*<0.0010*	0.0020	0.0027	0.0018	0.0025	~~0.16~~	0.0010
Antimony		0.005	0.009	0.00011	0.00013	0.00012	0.00011	0.00011	0.00018	0.00011	0.00012	0.00012	0.00011
Arsenic		0.013	0.025	0.00023	0.00028	0.00028	0.00025	0.00029	0.00033	0.00028	0.00021	0.00034	0.00025
Barium		0.5	1	0.010	0.015	0.017	0.010	0.0093	0.010	0.0081	0.0087	0.015	0.0087
Beryllium		0.000115	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth				*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron		0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.013	*<0.010*
Cadmium		0.000023	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		4.6		**7.5**	**9.6**	**9.9**	**7.6**	**6.2**	**7.9**	**6.6**	**7.1**	**14.3**	**7.1**
Cesium				*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium		0.0026	0.005	*<0.00010*	*<0.00010*	*<0.00050*	*<0.00050*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00039	*<0.00010*
Cobalt				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper		0.0012	0.002	0.00032	0.00039	0.00036	0.00033	0.00027	0.00029	0.00025	0.00024	~~0.0017~~	0.00028
Iron		0.16	0.3	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.020	0.028	*<0.010*	0.011	0.033	*<0.010*
Lead		0.00053	0.001	*<0.000050*	*<0.000050*	0.00008	*<0.000050*	0.00010	0.00007	*<0.000050*	0.00015	0.00052	*<0.000050*
Lithium		0.002		*<0.0010*	0.0011	0.0011	*<0.0010*	*<0.0010*	0.0012	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		1.41		**2.5**	**3.3**	**3.0**	**2.2**	**1.9**	**2.3**	**2.0**	**2.1**	**2.2**	**2.1**
Manganese[3]		0.32	***See note 3***	0.00065	0.035	0.094	0.0012	0.0039	0.0017	0.00069	0.0010	0.0036	0.00078
Mercury		0.000016	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum		0.037	0.073	0.00009	0.00008	0.00009	0.00008	0.00013	0.00021	0.00014	0.00015	0.00018	0.00013
Nickel		0.013	0.025	*<0.00050*	0.00054	0.00056	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	0.00073	*<0.00050*
Phosphorus				*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.84		**1.9**	**2.4**	**2.5**	**1.9**	**1.6**	**1.9**	**1.7**	**1.8**	**1.8**	**1.6**
Rubidium				0.0025	0.0031	0.0033	0.0024	0.0022	0.0029	0.0024	0.0025	0.0025	0.0024
Selenium		0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.57		0.32	0.47	0.55	0.34	0.23	0.13	0.13	0.16	0.24	0.17
Silver		0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1		**1.9**	**2.5**	**2.5**	**1.9**	**1.6**	**1.8**	**1.9**	**1.9**	**2.1**	**1.8**
Strontium		1.26	2.5	0.051	0.066	0.067	0.048	0.044	0.056	0.047	0.051	0.052	0.047
Sulfur				2.5	3.3	3.4	2.6	2.3	3.1	2.4	2.6	3.6	2.3
Tellurium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium		0.00041	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin		0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	~~0.00098~~	*<0.00010*
Titanium		0.0006		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	0.00040	*<0.00030*
Tungsten				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium		0.0075	0.015	0.00003	0.00004	0.00004	0.00003	0.00003	0.00005	0.00004	0.00004	0.00004	0.00003
Vanadium		0.06	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[3]	***equation***	0.0023	***See note 3***	~~0.014~~	*<0.0010*	~~0.015~~	*<0.0010*	~~0.036~~	~~0.018~~	~~0.006~~	~~0.077~~	~~0.039~~	0.0023
Zirconium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	0.00032	*<0.00020*
Speciated Metals (µg/L)													
Arsenate (As V)				-	0.060	-	-	-	-	-	-	-	-
Arsenite (As III)				-	0.029	-	-	-	-	-	-	-	-
Arsenobetaine (AsB)				-	*<0.050*	-	-	-	-	-	-	-	-
Dimethylarsinic Acid (DMA)				-	*<0.020*	-	-	-	-	-	-	-	-
Monomethylarsonic Acid (MMA)				-	*<0.020*	-	-	-	-	-	-	-	-
Plant Pigments (µg/L)													
Chlorophyll-a				0.79	0.34	0.25	0.48	1.2	1.3	1.7	1.9	0.90	1.2

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.
2. Trigger and threshold values are presented in *CREMP 2015 Plan Update* (Azimuth, 2015b). A number of thresholds were derived from methods (or sources) other than CCME guidelines - see Azimuth (2015b) for details.
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

123 Bolded values exceed the trigger.
123 Bold and shaded values exceed the threshold.
Italicized numbers are below detection limits.
underline = results were given a cautionary flag in the QC assessment (refer to **Appendix B** for details).
~~strikethrough~~ = results flagged as unreliable in the QC assessment (refer to **Appendix B** for details).
* Kangislulik Lake (KAN) previously referred to as Mammoth Lake (MAM). Acronym MAM still being used in tables and figures.

Table C2-1. Water quality results from the Whale Tail study area lakes, 2024.

Lake & Area		WTP Screening Values[2]		Lake A76 (A76)									
Month	Aquatic Life Guideline[1]			March	March	May	May	July	July	August	August	September	September
Area-Replicate ID				A76-77	A76-78	A76-79	A76-80	A76-81	A76-82	A76-83	A76-84	A76-85	A76-86
Date				15-Mar-2024	15-Mar-2024	05-May-2024	05-May-2024	09-Jul-2024	09-Jul-2024	12-Aug-2024	12-Aug-2024	19-Sep-2024	19-Sep-2024
Time		Triggers	Thresholds	15:10	14:07	14:30	14:05	16:08	15:40	13:30	14:00	12:15	12:45
ALS Sample ID				VA24A6012-013	VA24A6012-014	VA24B0323-009	VA24B0323-010	VA24B7135-010	VA24B7135-011	VA24C1018-007	VA24C1018-008	VA24C5721-001 VA24C6403-003	VA24C5721-002 VA24C6403-004
Field Measurements (3 m)													
Dissolved Oxygen (mg/L)				15.4	16.1	14.6	14.4	11.4	11.3	9.3	9.2	11.3	11.3
Specific Conductivity (µS/cm)				67	126	125	122	97	98	99	99	102	102
pH	6.5 - 9.0			7.1	6.8	6.7	6.7	7.2	7.0	7.3	7.4	7.3	7.4
Temperature (°C)				0.85	0.97	1.0	0.99	9.7	10.2	15.4	15.3	8.4	8.3
Physical Tests (mg/L)													
Conductivity (µS/cm)		48.6		**122**	**122**	**132**	**128**	**97**	**100**	**101**	**101**	**102**	**103**
Alkalinity - Bicarbonate		9.60		**18.7**	**18.4**	**22**	**19.5**	**14.5**	**14.7**	**15.6**	**15.2**	**15.2**	**15.8**
Alkalinity - Carbonate		2.0		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide				*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total (as $CaCO_3$)		9.61		**18.7**	**18.4**	**22**	**19.5**	**14.5**	**14.7**	**15.6**	**15.2**	**15.2**	**15.8**
Hardness (as CaCO3), dissolved		17.4		**46**	**46**	**47**	**45**	**35**	**37**	**37**	**37**	**36**	**37**
Hardness (as CaCO3), from total Ca/Mg				46	46	48	48	35	36	38	37	38	38
Total Dissolved Solids		38.5		**72**	**73**	**84**	**76**	**75**	**71**	**96**	**88**	**68**	**64**
Total Suspended Solids		3	5	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1.4	**4.7**	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Turbidity (NTU)				*<0.10*	*<0.10*	*<0.10*	*<0.10*	0.23	0.17	0.31	0.23	0.43	0.38
pH (Laboratory)	6.5 - 9.0	6.57-7.97	6.5-9.0	7.5	7.5	7.5	7.5	7.4	7.4	7.5	7.5	7.4	7.4
Anions and Nutrients (mg/L)													
Ammonia (as N)[3]	***equation***	0.065	0.126	0.022	0.024	0.033	0.038	0.018	*<0.0050*	0.015	0.0068	0.057	0.017
Bromide				0.14	0.14	0.15	0.16	0.11	0.11	0.12	0.12	0.11	0.11
Chloride	120	60.4	120	13.8	13.9	15.1	14.5	10.1	10.4	11.1	11.1	10.8	10.8
Fluoride	0.12	0.077	0.12	0.051	0.050	0.041	0.040	0.036	0.037	0.044	0.043	0.045	0.045
Total Kjeldahl Nitrogen		0.17		0.15	0.15	0.16	**0.17**	0.16	0.13	**0.17**	0.16	**0.21**	0.16
Nitrate (as N)	3	1.5	3	0.087	0.078	0.094	0.092	0.038	0.054	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.06	0.031	0.06	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Ortho Phosphate (as P)		0.0022		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0019	0.0019	*<0.0010*	*<0.0010*
Phosphorus (P)-Total	0.01	0.0045	0.01	*<0.0020*	0.0025	*<0.0020*	*<0.0020*	0.0027	0.0021	0.0027	0.0028	0.0034	0.0030
Phosphorus (P)-Total Diss.				*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.0020	*<0.0020*	*<0.0020*	*<0.0020*
Reactive Silica (as SiO_2)		1.33		1.1	1.1	1.2	1.2	0.91	0.82	0.62	0.67	0.62	0.61
Sulphate (SO_4)		64.8	128	15.8	15.7	17.0	16.6	12.0	12.5	13.1	13.1	13.1	13.0
Organic / Inorganic Carbon (mg/L)													
Dissolved Organic Carbon		2.43		1.9	2.0	2.2	2.0	2.2	1.6	**3.3**	2.1	1.8	2.4
Total Organic Carbon		2.42		2.1	2.1	2.1	1.9	2.1	1.7	1.7	2.0	2.0	2.1
Total Metals (mg/L)													
Aluminum[3]	***equation***	0.052	0.1	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	0.0052	0.0050	0.0032	0.0036	0.0060	0.0049
Antimony		0.0046	0.009	0.00029	0.00029	0.00027	0.00026	0.00022	0.00025	0.00023	0.00023	0.00023	0.00024
Arsenic	0.005	0.013	0.025	0.00034	0.00033	0.00034	0.00030	0.00033	0.00037	0.00040	0.00037	0.00037	0.00036
Barium		0.5	1	0.020	0.019	0.022	0.020	0.015	0.015	0.014	0.014	0.015	0.015
Beryllium		0.000115	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth				*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	0.000023	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		4.6		**12.4**	**12.6**	**13.2**	**13.4**	**9.6**	**9.6**	**10.0**	**10.0**	**10.6**	**10.5**
Cesium				*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	0.00001	0.00001	*<0.000010*	*<0.000010*
Chromium[4]	0.001	0.0025	0.005	*<0.00010*	*<0.00010*	*<0.00050*	*<0.00050*	0.00030	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0013	0.002	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.16	0.3	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.018	0.016	0.018	0.018	0.020	0.019
Lead[3]	***equation***	0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.002		0.0011	0.0011	0.0010	0.0010	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		1.41		**3.6**	**3.6**	**3.7**	**3.6**	**2.7**	**2.8**	**3.1**	**3.0**	**2.9**	**2.9**
Manganese[3]		0.32	***See note 3***	0.00073	0.00079	0.00084	0.00070	0.0050	0.0041	0.0034	0.0036	0.0033	0.0032
Mercury	0.000026	0.000016	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.037	0.073	0.00016	0.00016	0.00016	0.00016	0.00014	0.00015	0.00017	0.00016	0.00015	0.00016
Nickel[3]	***equation***	0.013	0.025	0.00092	0.00090	0.00095	0.00091	0.00093	0.00095	0.00070	0.00073	0.00066	0.00066
Phosphorus		0.0045	0.004	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.84		**2.9**	**2.9**	**2.9**	**2.8**	**2.0**	**2.1**	**2.2**	**2.2**	**2.3**	**2.3**
Rubidium				0.0031	0.0029	0.0032	0.0031	0.0024	0.0025	0.0024	0.0025	0.0025	0.0024
Selenium	0.001	0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00007	*<0.000050*
Silicon		0.61		0.57	0.55	0.59	0.57	0.47	0.44	0.32	0.31	0.35	0.33
Silver	0.00025	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1		**2.4**	**2.4**	**2.5**	**2.4**	**1.9**	**2.0**	**2.1**	**2.1**	**1.9**	**1.9**
Strontium		1.26	2.5	0.078	0.077	0.080	0.080	0.064	0.066	0.065	0.065	0.065	0.065
Sulfur				5.0	5.2	5.5	5.4	4.6	4.7	4.3	4.3	4.6	4.3
Tellurium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium	0.0008	0.00013	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin		0.033		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00041		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium	0.015	0.0002	0.015	0.00004	0.00004	0.00003	0.00004	0.00004	0.00004	0.00005	0.00005	0.00005	0.00004
Vanadium		0.0006	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc	0.03	0.0075	***See note 3***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Zirconium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Dissolved Metals (mg/L)													
Aluminum[3]		0.026	0.05	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	0.0042	0.0023	0.0017	0.0018	0.0012	0.0017
Antimony		0.005	0.009	0.00028	0.00027	0.00026	0.00027	0.00020	0.00023	0.00023	0.00024	0.00021	0.00021
Arsenic		0.013	0.025	0.00029	0.00032	0.00031	0.00032	0.00025	0.00028	0.00037	0.00035	0.00031	0.00032
Barium		0.5	1	0.019	0.019	0.021	0.020	0.015	0.015	0.014	0.014	0.014	0.014
Beryllium		0.000115	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth				*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron		0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium		0.000023	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		4.6		**12.5**	**12.6**	**12.7**	**12.4**	**9.6**	**10.3**	**10.3**	**10.3**	**9.8**	**10.0**
Cesium				*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	0.00001	*<0.000010*	*<0.000010*	*<0.000010*
Chromium		0.0026	0.005	*<0.00010*	*<0.00010*	*<0.00050*	*<0.00050*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper		0.0012	0.002	0.00041	0.00040	0.00042	0.00039	0.00040	0.00042	0.00041	0.00035	0.00035	0.00036
Iron		0.16	0.3	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.010	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead		0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00026	*<0.000050*	0.00016	0.00013	*<0.000050*	*<0.000050*
Lithium		0.002		0.0010	0.0011	0.0011	0.0011	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		1.41		**3.6**	**3.6**	**3.6**	**3.5**	**2.7**	**2.7**	**2.7**	**2.7**	**2.8**	**2.8**
Manganese[3]		0.32	***See note 3***	0.00023	0.00024	0.00022	0.00016	0.0023	0.0017	0.00068	0.00065	0.00086	0.00070
Mercury		0.000016	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum		0.037	0.073	0.00015	0.00017	0.00016	0.00015	0.00014	0.00016	0.00018	0.00018	0.00016	0.00014
Nickel		0.013	0.025	0.00092	0.00092	0.00095	0.00091	0.00086	0.00085	0.00066	0.00064	0.00061	0.00062
Phosphorus				*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.84		**2.8**	**2.7**	**3.0**	**2.9**	**2.2**	**2.3**	**2.2**	**2.3**	**2.3**	**2.3**
Rubidium				0.0028	0.0029	0.0031	0.0031	0.0024	0.0025	0.0024	0.0024	0.0025	0.0025
Selenium		0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.57		0.52	0.50	**0.58**	0.55	0.42	0.40	0.29	0.28	0.30	0.30
Silver		0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1		**2.4**	**2.3**	**2.5**	**2.3**	**1.8**	**1.9**	**2.0**	**2.0**	**2.1**	**2.1**
Strontium		1.26	2.5	0.078	0.078	0.079	0.077	0.061	0.062	0.069	0.067	0.063	0.062
Sulfur				5.1	5.1	5.8	5.7	3.5	3.9	3.7	3.9	4.3	4.7
Tellurium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium		0.00041	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin		0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00011	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	~~0.0004~~
Titanium		0.0006		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium		0.0075	0.015	0.00003	0.00004	0.00003	0.00003	0.00004	0.00004	0.00004	0.00004	0.00004	0.00004
Vanadium		0.06	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[3]	***equation***	0.0023	***See note 3***	0.0016	~~0.029~~	*<0.0010*	*<0.0010*	~~0.020~~	~~0.009~~	~~0.030~~	~~0.031~~	*<0.0010*	*<0.0010*
Zirconium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Speciated Metals (µg/L)													
Arsenate (As V)				0.037	-	-	-	-	-	-	-	-	-
Arsenite (As III)				0.11	-	-	-	-	-	-	-	-	-
Arsenobetaine (AsB)				*<0.050*	-	-	-	-	-	-	-	-	-
Dimethylarsinic Acid (DMA)				*<0.020*	-	-	-	-	-	-	-	-	-
Monomethylarsonic Acid (MMA)				*<0.020*	-	-	-	-	-	-	-	-	-
Plant Pigments (µg/L)													
Chlorophyll-a				1.00	1.0	0.89	1.4	0.39	0.40	0.61	0.62	0.42	0.42

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.
2. Trigger and threshold values are presented in *CREMP 2015 Plan Update* (Azimuth, 2015b). A number of thresholds were derived from methods (or sources) other than CCME guidelines - see Azimuth (2015b) for details.
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

123 Bolded values exceed the trigger.
123 Bold and shaded values exceed the threshold.
Italicized numbers are below detection limits.
underline = results were given a cautionary flag in the QC assessment (refer to **Appendix B** for details).
~~strikethrough~~ = results flagged as unreliable in the QC assessment (refer to **Appendix B** for details).
* Kangislulik Lake (KAN) previously referred to as Mammoth Lake (MAM). Acronym MAM still being used in tables and figures.

Table C2-1. Water quality results from the Whale Tail study area lakes, 2024.

Lake & Area		WTP Screening Values[2]		Lake DS1									
Month	Aquatic Life Guideline[1]			March	March	May	May	July	July	August	August	September	September
Area-Replicate ID				DS1-75	DS1-76	DS1-77	DS1-78	DS1-79	DS1-80	DS1-81	DS1-82	DS1-83	DS1-84
Date				15-Mar-2024	15-Mar-2024	05-May-2024	05-May-2024	09-Jul-2024	09-Jul-2024	17-Aug-2024	17-Aug-2024	19-Sep-2024	19-Sep-2024
Time		Triggers	Thresholds	13:00	12:30	09:55	12:25	14:00	14:30	17:40	17:00	11:15	10:25
ALS Sample ID				VA24A6012-011	VA24A6012-012	VA24B0323-011	VA24B0323-012	VA24B7134-001	VA24B7134-002	VA24C1467-007	VA24C1467-008	VA24C5721-003 VA24C6403-001	VA24C5721-004 VA24C6403-002
Field Measurements (3 m)													
Dissolved Oxygen (mg/L)				16.6	16.9	15.3	16.0	10.8	11.1	10.0	9.8	11.2	11.5
Specific Conductivity (µS/cm)				39	64	39	64	31	24	28	37	32	47
pH	6.5 - 9.0			6.9	7.0	7.3	6.7	7.2	6.9	7.4	7.5	7.3	7.6
Temperature (°C)				0.53	0.79	0.72	0.86	11.8	11.1	13.5	13.2	8.4	8.1
Physical Tests (mg/L)													
Conductivity (µS/cm)		48.6		45	**62**	41	**67**	31	25	36	27	32	47
Alkalinity - Bicarbonate		9.60		**12.2**	**12.9**	**10.9**	**13.6**	6.7	5.6	7.4	6.5	7.4	8.9
Alkalinity - Carbonate		2.0		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide				*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total (as $CaCO_3$)		9.61		**12.2**	**12.9**	**10.9**	**13.6**	6.7	5.6	7.4	6.5	7.4	8.9
Hardness (as CaCO3), dissolved		17.4		14.3	**22**	15.7	**23**	10.6	8.3	11.8	9.1	10.7	15.5
Hardness (as CaCO3), from total Ca/Mg				14.0	22	15.8	23	10.6	8.7	12.4	9.3	10.8	15.7
Total Dissolved Solids		38.5		24	37	26	**47**	22	18.7	26	21	19.4	26
Total Suspended Solids		3	5	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Turbidity (NTU)				0.10	0.18	0.17	0.16	0.38	0.36	0.30	0.35	0.48	0.82
pH (Laboratory)	6.5 - 9.0	6.57-7.97	6.5-9.0	7.3	7.2	7.3	7.3	7.0	7.0	7.2	7.1	7.1	7.1
Anions and Nutrients (mg/L)													
Ammonia (as N)[3]	***equation***	0.065	0.126	0.019	0.029	0.0095	0.015	*<0.0050*	*<0.0050*	0.0053	*<0.0050*	0.011	0.024
Bromide				*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Chloride	120	60.4	120	3.1	5.6	2.6	6.1	2.7	1.9	3.4	2.0	2.7	4.8
Fluoride	0.12	0.077	0.12	0.063	0.057	0.050	0.061	0.035	0.050	0.045	0.059	0.048	0.042
Total Kjeldahl Nitrogen		0.17		0.14	**0.18**	**0.29**	**0.18**	**0.18**	0.13	0.16	0.15	0.17	**0.18**
Nitrate (as N)	3	1.5	3	0.021	0.039	0.052	0.048	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.06	0.031	0.06	*<0.0010*	0.0011	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Ortho Phosphate (as P)		0.0022		*<0.0010*	0.0016	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	**0.0023**	0.0021	*<0.0010*	*<0.0010*
Phosphorus (P)-Total	0.01	0.0045	0.01	0.0024	0.0031	**0.0051**	0.0027	0.0038	0.0031	0.0040	0.0032	0.0043	**0.0049**
Phosphorus (P)-Total Diss.				0.0021	0.0024	*<0.0020*	*<0.0020*	*<0.0020*	0.0020	0.0021	*<0.0020*	0.0026	0.0026
Reactive Silica (as SiO_2)		1.33		**1.4**	**2.7**	1.3	**2.9**	0.72	0.63	0.74	0.60	0.65	1.2
Sulphate (SO_4)		64.8	128	3.5	6.3	3.2	6.8	2.8	2.4	3.6	2.5	2.7	4.5
Organic / Inorganic Carbon (mg/L)													
Dissolved Organic Carbon		2.43		2.6	3.2	**3.0**	**4.0**	2.2	**2.9**	2.2	2.3	2.2	**2.7**
Total Organic Carbon		2.42		**2.7**	**3.3**	**3.7**	**3.5**	2.4	**3.0**	2.2	2.2	2.3	**2.8**
Total Metals (mg/L)													
Aluminum[3]	***equation***	0.052	0.1	0.0064	0.0053	0.0069	0.0060	0.017	0.015	0.0078	0.0078	0.014	0.023
Antimony		0.0046	0.009	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.005	0.013	0.025	0.00015	0.00014	0.00021	0.00020	0.00014	0.00014	0.00013	0.00014	0.00016	0.00016
Barium		0.5	1	0.0066	0.0098	0.0061	0.011	0.0050	0.0053	0.0055	0.0048	0.0053	0.0068
Beryllium		0.000115	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth				*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	0.000023	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		4.6		3.5	**5.8**	3.8	**6.2**	2.8	2.2	3.3	2.4	2.8	4.2
Cesium				*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium[4]	0.001	0.0025	0.005	0.00014	*<0.00010*	*<0.00050*	*<0.00050*	0.00024	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	0.00012
Cobalt				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0013	0.002	*<0.00050*	*<0.00050*	0.00052	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.16	0.3	0.012	0.021	0.016	0.024	0.076	0.044	0.054	0.036	0.050	0.087
Lead[3]	***equation***	0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00006	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.002		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		1.41		1.3	**1.8**	**1.5**	**1.9**	0.88	0.76	0.99	0.84	0.95	1.3
Manganese[3]		0.32	***See note 3***	0.00092	0.0014	0.0012	0.0020	0.0026	0.0028	0.0029	0.0024	0.0028	0.0033
Mercury	0.000026	0.000016	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.037	0.073	0.00006	0.00009	0.00007	0.00007	0.00006	*<0.000050*	*<0.000050*	*<0.000050*	0.00005	0.00007
Nickel[3]	***equation***	0.013	0.025	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus		0.0045	0.004	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.84		0.68	**1.1**	0.58	**1.1**	0.56	0.49	0.73	0.51	0.54	0.84
Rubidium				0.00079	0.0012	0.00087	0.0012	0.00070	0.00066	0.00090	0.00077	0.00079	0.0010
Selenium	0.001	0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.61		**0.71**	**1.3**	0.61	**1.4**	0.40	0.33	0.34	0.29	0.35	**0.63**
Silver	0.00025	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1		**1.5**	**2.4**	**1.3**	**2.6**	**1.1**	0.86	**1.3**	0.96	**1.2**	**1.7**
Strontium		1.26	2.5	0.019	0.031	0.014	0.032	0.015	0.013	0.018	0.012	0.015	0.022
Sulfur				1.2	2.1	0.95	2.0	1.1	0.93	1.1	0.86	0.91	1.5
Tellurium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium	0.0008	0.00013	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin		0.033		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00041		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	0.00042	*<0.00030*	*<0.00030*	*<0.00030*	0.00035	**0.00052**
Tungsten				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium	0.015	0.0002	0.015	0.00005	0.00004	0.00006	0.00004	0.00004	0.00004	0.00003	0.00004	0.00004	0.00004
Vanadium		0.0006	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc	0.03	0.0075	***See note 3***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Zirconium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Dissolved Metals (mg/L)													
Aluminum[3]		0.026	0.05	0.0040	0.0043	0.0053	0.0042	0.0079	0.0082	0.0027	0.0038	0.0048	0.011
Antimony		0.005	0.009	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic		0.013	0.025	0.00015	0.00016	0.00020	0.00018	*<0.00010*	*<0.00010*	0.00010	0.00012	0.00014	0.00013
Barium		0.5	1	0.0069	0.0099	0.0059	0.011	0.0052	0.0052	0.0050	0.0044	0.0051	0.0065
Beryllium		0.000115	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth				*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron		0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium		0.000023	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		4.6		3.6	**5.9**	3.8	**6.0**	2.9	2.2	3.2	2.4	2.7	4.0
Cesium				*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Chromium		0.0026	0.005	*<0.00010*	*<0.00010*	*<0.00050*	*<0.00050*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper		0.0012	0.002	0.00041	0.00051	0.00055	0.00053	0.00027	0.00026	0.00027	0.00026	0.00029	0.00035
Iron		0.16	0.3	*<0.010*	0.011	0.014	0.016	0.040	0.018	0.012	0.010	0.011	0.032
Lead		0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	0.00009	0.00027	0.00008	0.00010	*<0.000050*	*<0.000050*
Lithium		0.002		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Magnesium		1.41		1.3	**1.8**	**1.5**	**1.9**	0.84	0.70	0.94	0.78	0.97	1.3
Manganese[3]		0.32	***See note 3***	0.00051	0.0033	0.00088	0.0019	0.0017	0.0017	0.00047	0.00040	0.00032	0.00070
Mercury		0.000016	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum		0.037	0.073	0.00006	0.00008	0.00007	0.00007	0.00006	*<0.000050*	0.00005	0.00006	0.00010	0.00008
Nickel		0.013	0.025	*<0.00050*	*<0.00050*	0.00050	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Phosphorus				*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.84		0.67	**1.0**	0.63	**1.2**	0.60	0.46	0.71	0.50	0.56	**0.89**
Rubidium				0.00075	0.0013	0.00083	0.0013	0.00073	0.00062	0.00081	0.00069	0.00076	0.0011
Selenium		0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.57		**0.66**	**1.3**	**0.63**	**1.4**	0.33	0.28	0.31	0.24	0.29	**0.60**
Silver		0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1		**1.5**	**2.5**	**1.3**	**2.7**	**1.1**	0.84	**1.2**	0.94	**1.3**	**2.0**
Strontium		1.26	2.5	0.018	0.030	0.015	0.030	0.015	0.012	0.017	0.012	0.015	0.022
Sulfur				1.2	2.0	1.1	2.2	0.73	0.51	1.3	0.84	0.88	1.4
Tellurium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium		0.00041	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin		0.0002		*<0.00010*	0.00017	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.0006		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium		0.0075	0.015	0.00004	0.00004	0.00006	0.00004	0.00003	0.00004	0.00002	0.00003	0.00003	0.00003
Vanadium		0.06	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[3]	***equation***	0.0023	***See note 3***	0.0013	*<0.0010*	*<0.0010*	*<0.0010*	~~0.035~~	~~0.026~~	~~0.025~~	~~0.046~~	~~0.092~~	~~0.017~~
Zirconium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Speciated Metals (µg/L)													
Arsenate (As V)				-	0.022	-	-	-	-	-	-	-	-
Arsenite (As III)				-	*<0.020*	-	-	-	-	-	-	-	-
Arsenobetaine (AsB)				-	*<0.050*	-	-	-	-	-	-	-	-
Dimethylarsinic Acid (DMA)				-	*<0.020*	-	-	-	-	-	-	-	-
Monomethylarsonic Acid (MMA)				-	*<0.020*	-	-	-	-	-	-	-	-
Plant Pigments (µg/L)													
Chlorophyll-a				0.59	0.72	1.4	2.8	0.71	0.50	1.5	2.0	0.96	0.94

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.
2. Trigger and threshold values are presented in *CREMP 2015 Plan Update* (Azimuth, 2015b). A number of thresholds were derived from methods (or sources) other than CCME guidelines - see Azimuth (2015b) for details.
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

123 Bolded values exceed the trigger.
123 Bold and shaded values exceed the threshold.
Italicized numbers are below detection limits.
underline = results were given a cautionary flag in the QC assessment (refer to **Appendix B** for details).
~~strikethrough~~ = results flagged as unreliable in the QC assessment (refer to **Appendix B** for details).
* Kangislulik Lake (KAN) previously referred to as Mammoth Lake (MAM). Acronym MAM still being used in tables and figures.

Table C2-1. Water quality results from the Whale Tail study area lakes, 2024.

Lake & Area		WTP Screening Values[2]		Nemo Lake (NEM)									
Month	Aquatic Life Guideline[1]			March	March	May	May	July	July	August	August	September	September
Area-Replicate ID				NEM-85	NEM-86	NEM-87	NEM-88	NEM-89	NEM-90	NEM-91	NEM-92	NEM-93	NEM-94
Date				04-Mar-2024	04-Mar-2024	04-May-2024	04-May-2024	04-Jul-2024	04-Jul-2024	16-Aug-2024	16-Aug-2024	19-Sep-2024	19-Sep-2024
Time		Triggers	Thresholds	10:00	09:20	13:50	14:20	11:15	11:45	14:20	14:35	15:29	15:01
ALS Sample ID				VA24A5006-001 VA24A6012-001	VA24A5006-002 VA24A6012-002	VA24B0323-005	VA24B0323-006	VA24B6821-007	VA24B6821-008	VA24C1467-003	VA24C1467-004	VA24C4068-003 VA24C6403-011	VA24C4068-004 VA24C6403-012
Field Measurements (3 m)													
Dissolved Oxygen (mg/L)				15.0	17.6	1.4	14.5	11.8	12.1	9.7	9.7	10.6	10.7
Specific Conductivity (µS/cm)				106	119	103	101	86	86	89	89	90	90
pH	6.5 - 9.0			7.7	7.3	7.1	7.0	7.9	7.8	7.8	7.6	7.2	7.3
Temperature (°C)				0.65	0.49	0.81	0.78	8.7	8.6	13.6	13.5	10.9	10.5
Physical Tests (mg/L)													
Conductivity (µS/cm)		48.6		**105**	**118**	**108**	**107**	**89**	**88**	**85**	**85**	**87**	**86**
Alkalinity - Bicarbonate		9.60		**16.2**	**17.6**	**16.1**	**15.8**	**13.8**	**13.4**	**13.4**	**13.8**	**13.8**	**13.8**
Alkalinity - Carbonate		2.0		*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Hydroxide				*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Alkalinity - Total (as $CaCO_3$)		9.61		**16.2**	**17.6**	**16.1**	**15.8**	**13.8**	**13.4**	**13.4**	**13.8**	**13.8**	**13.8**
Hardness (as CaCO3), dissolved		17.4		**41**	**47**	**40**	**39**	**33**	**33**	**32**	**33**	**34**	**34**
Hardness (as CaCO3), from total Ca/Mg				38	44	42	42	34	33	33	33	35	34
Total Dissolved Solids		38.5		**68**	**74**	**75**	**66**	**70**	**66**	**84**	**93**	**61**	**64**
Total Suspended Solids		3	5	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Turbidity (NTU)				*<0.10*	*<0.10*	*<0.10*	0.11	0.38	0.34	0.16	0.17	0.17	0.30
pH (Laboratory)	6.5 - 9.0	6.57-7.97	6.5-9.0	7.4	7.5	7.5	7.5	7.4	7.4	7.4	7.4	7.4	7.4
Anions and Nutrients (mg/L)													
Ammonia (as N)[3]	***equation***	0.065	0.126	0.020	0.019	0.022	0.023	0.0091	0.010	0.0092	*<0.0050*	0.043	0.045
Bromide				0.11	0.12	0.11	0.11	0.087	0.086	0.077	0.077	0.089	0.091
Chloride	120	60.4	120	16.3	18.3	16.6	16.3	12.9	12.8	12.7	12.7	12.4	12.4
Fluoride	0.12	0.077	0.12	0.035	0.041	0.026	0.026	0.026	0.024	0.030	0.029	0.035	0.034
Total Kjeldahl Nitrogen		0.17		0.13	0.16	0.14	0.14	0.13	0.13	0.13	0.14	**0.17**	0.17
Nitrate (as N)	3	1.5	3	0.0074	0.0086	0.024	0.011	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*	*<0.0050*
Nitrite (as N)	0.06	0.031	0.06	*<0.0010*	*<0.0010*	0.0018	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Ortho Phosphate (as P)		0.0022		*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*	*<0.0010*
Phosphorus (P)-Total	0.01	0.0045	0.01	0.0033	0.0030	*<0.0020*	0.0025	0.0036	0.0033	0.0029	0.0027	*<0.0020*	*<0.0020*
Phosphorus (P)-Total Diss.				*<0.0020*	0.0022	*<0.0020*	*<0.0020*	*<0.0020*	*<0.0020*	0.0028	*<0.0020*	*<0.0020*	*<0.0020*
Reactive Silica (as SiO_2)		1.33		*<0.50*	*<0.50*	0.50	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Sulphate (SO_4)		64.8	128	6.7	7.5	7.0	6.7	5.6	5.6	6.0	6.0	5.9	5.9
Organic / Inorganic Carbon (mg/L)													
Dissolved Organic Carbon		2.43		2.1	2.2	1.9	1.8	2.0	**2.5**	2.1	1.9	2.0	2.1
Total Organic Carbon		2.42		1.9	2.2	2.2	1.9	2.0	**2.4**	2.0	1.9	1.8	1.9
Total Metals (mg/L)													
Aluminum[3]	***equation***	0.052	0.1	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	0.012	0.010	0.0078	0.0037	0.0052	0.0047
Antimony		0.0046	0.009	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic	0.005	0.013	0.025	0.00080	0.00090	0.00078	0.00076	0.0011	0.0011	0.00098	0.0010	0.0010	0.0010
Barium		0.5	1	0.018	0.020	0.020	0.020	0.018	0.017	0.015	0.014	0.014	0.014
Beryllium		0.000115	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth				*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	1.5	0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium[3]	***equation***	0.000023	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		4.6		**10.6**	**12.4**	**12.1**	**12.0**	**9.6**	**9.6**	**9.4**	**9.3**	**10.1**	**9.8**
Cesium				0.00001	0.00002	0.00002	0.00001	0.00002	0.00002	0.00002	0.00001	0.00002	0.00002
Chromium[4]	0.001	0.0025	0.005	0.00014	0.00013	*<0.00050*	*<0.00050*	0.00034	0.00026	0.00013	*<0.00010*	0.00011	*<0.00010*
Cobalt				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper[3]	***equation***	0.0013	0.002	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.3	0.16	0.3	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.031	0.030	*<0.010*	*<0.010*	0.012	0.012
Lead[3]	***equation***	0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.002		0.0014	0.0016	0.0014	0.0014	0.0011	0.0011	0.0011	0.0011	*<0.0010*	0.0010
Magnesium		1.41		**2.9**	**3.2**	**2.9**	**2.9**	**2.4**	**2.3**	**2.3**	**2.3**	**2.4**	**2.4**
Manganese[3]		0.32	***See note 3***	0.0012	0.0014	0.00054	0.00069	0.0078	0.0077	0.0016	0.0015	0.0037	0.0033
Mercury	0.000026	0.000016	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.073	0.037	0.073	0.00009	0.00011	0.00009	0.00010	0.00008	0.00007	0.00008	0.00007	0.00010	0.00009
Nickel[3]	***equation***	0.013	0.025	0.0014	0.0015	0.0013	0.0013	0.0016	0.0015	0.0011	0.0010	0.0011	0.0012
Phosphorus		0.0045	0.004	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*
Potassium		0.84		**1.8**	**2.0**	**2.0**	**2.0**	**1.9**	**1.8**	**1.7**	**1.7**	**1.7**	**1.7**
Rubidium				0.0031	0.0036	0.0032	0.0033	0.0029	0.0027	0.0028	0.0029	0.0028	0.0028
Selenium	0.001	0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.61		0.22	0.24	0.24	0.24	0.20	0.22	0.14	0.15	0.18	0.17
Silver	0.00025	0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1		**1.1**	**1.3**	**1.1**	**1.2**	0.95	0.89	0.94	0.95	0.98	0.87
Strontium		1.26	2.5	0.063	0.076	0.072	0.067	0.057	0.056	0.056	0.054	0.055	0.055
Sulfur				2.1	2.5	2.1	2.1	1.7	1.8	2.3	2.0	1.8	1.8
Tellurium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium	0.0008	0.00013	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin		0.033		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.00041		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	0.00050	0.00054	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium	0.015	0.0002	0.015	0.00001	0.00002	0.00001	0.00001	0.00002	0.00002	0.00002	0.00001	0.00002	0.00002
Vanadium		0.0006	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc	0.03	0.0075	***See note 3***	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*
Zirconium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Dissolved Metals (mg/L)													
Aluminum[3]		0.026	0.05	*<0.0010*	*<0.0010*	0.0010	0.0022	0.0025	0.0028	0.0027	0.0024	0.0021	0.0021
Antimony		0.005	0.009	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Arsenic		0.013	0.025	0.00076	0.00085	0.00079	0.00071	0.00095	0.00095	0.00095	0.00092	0.00091	0.00093
Barium		0.5	1	0.018	0.020	0.019	0.019	0.016	0.016	0.014	0.014	0.015	0.015
Beryllium		0.000115	0.00013	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth				*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron		0.76	1.5	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium		0.000023	0.00004	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium		4.6		**11.7**	**13.3**	**11.3**	**11.3**	**9.5**	**9.5**	**9.3**	**9.5**	**9.8**	**9.7**
Cesium				0.00002	0.00002	0.00002	0.00002	0.00002	0.00001	0.00002	0.00002	0.00002	0.00002
Chromium		0.0026	0.005	0.00012	0.00011	*<0.00050*	*<0.00050*	*<0.00010*	0.00011	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Cobalt				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper		0.0012	0.002	0.00030	0.00032	0.00032	0.00046	0.00027	0.00028	0.00026	0.00024	0.00022	0.00024
Iron		0.16	0.3	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Lead		0.00053	0.001	*<0.000050*	0.00006	*<0.000050*	*<0.000050*	0.00009	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium		0.002		0.0014	0.0016	0.0015	0.0014	0.0011	0.0011	0.0011	0.0011	0.0011	0.0011
Magnesium		1.41		**2.9**	**3.3**	**2.8**	**2.7**	**2.3**	**2.3**	**2.1**	**2.2**	**2.2**	**2.4**
Manganese[3]		0.32	***See note 3***	0.00020	0.00047	0.00015	0.00022	0.0051	0.0053	0.00091	0.00060	0.00058	0.00054
Mercury		0.000016	0.000026	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum		0.037	0.073	0.00010	0.00010	0.00009	0.00010	0.00008	0.00007	0.00007	0.00007	0.00010	0.00011
Nickel		0.013	0.025	0.0013	0.0015	0.0013	0.0013	0.0014	0.0014	0.00096	0.0010	0.00099	0.00099
Phosphorus				*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	*<0.050*	0.074	*<0.050*	*<0.050*	*<0.050*
Potassium		0.84		**2.0**	**2.3**	**2.1**	**2.1**	**1.7**	**1.7**	**1.7**	**1.8**	**1.6**	**1.7**
Rubidium				0.0032	0.0035	0.0033	0.0032	0.0027	0.0029	0.0027	0.0028	0.0027	0.0028
Selenium		0.00053	0.001	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silicon		0.57		0.21	0.22	0.21	0.20	0.15	0.17	0.12	0.12	0.13	0.13
Silver		0.00013	0.00025	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium		1		**1.1**	**1.3**	**1.2**	**1.1**	0.89	0.89	0.92	0.96	0.91	0.95
Strontium		1.26	2.5	0.069	0.079	0.067	0.064	0.055	0.056	0.054	0.056	0.053	0.055
Sulfur				2.2	2.4	2.3	2.4	1.8	1.9	1.8	1.9	2.1	2.1
Tellurium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Thallium		0.00041	0.0008	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Thorium				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Tin		0.0002		*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Titanium		0.0006		*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*	*<0.00030*
Tungsten				*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium		0.0075	0.015	0.00002	0.00002	0.00001	0.00001	0.00002	0.00002	0.00001	0.00001	0.00002	0.00001
Vanadium		0.06	0.12	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc[3]	***equation***	0.0023	***See note 3***	~~0.014~~	~~0.027~~	*<0.0010*	*<0.0010*	~~0.013~~	*<0.0010*	0.0023	~~0.005~~	~~0.017~~	~~0.015~~
Zirconium				*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*	*<0.00020*
Speciated Metals (µg/L)													
Arsenate (As V)				0.45	-	-	-	-	-	-	-	-	-
Arsenite (As III)				0.039	-	-	-	-	-	-	-	-	-
Arsenobetaine (AsB)				*<0.050*	-	-	-	-	-	-	-	-	-
Dimethylarsinic Acid (DMA)				0.024	-	-	-	-	-	-	-	-	-
Monomethylarsonic Acid (MMA)				0.047	-	-	-	-	-	-	-	-	-
Plant Pigments (µg/L)													
Chlorophyll-a				0.32	0.38	0.21	~~5.2~~	0.44	0.44	0.80	0.65	0.45	0.42

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Water Quality Guidelines for the Protection of Aquatic Life, 1999, updated up to 2018.
2. Trigger and threshold values are presented in *CREMP 2015 Plan Update* (Azimuth, 2015b). A number of thresholds were derived from methods (or sources) other than CCME guidelines - see Azimuth (2015b) for details.
3. "***equation***" means that CCME guidelines (or thresholds) are calculated based on an equation which is either pH or hardness dependent. The ammonia and aluminum guidelines vary with pH; the cadmium, copper, lead, manganese, nickel and zinc guidelines vary with hardness.
4. Chromium CCME guideline is for Cr VI.

123 Bolded values exceed the trigger.
123 Bold and shaded values exceed the threshold.
Italicized numbers are below detection limits.
underline = results were given a cautionary flag in the QC assessment (refer to **Appendix B** for details).
~~strikethrough~~ = results flagged as unreliable in the QC assessment (refer to **Appendix B** for details).
* Kangislulik Lake (KAN) previously referred to as Mammoth Lake (MAM). Acronym MAM still being used in tables and figures.

Table C2-2. Water quality results screened against FEIS predicted concentrations for Whale Tail Lake – South Basin, 2024.

Lake & Area	WTS FEIS Predictions					Whale Tail Lake South Basin (Impoundment)							
Month						March	March	July	July	August	August	September	September
Area-Replicate ID						WTS-87	WTS-88	WTS-91	WTS-92	WTS-93	WTS-94	WTS-95	WTS-96
Date						04-Mar-2024	04-Mar-2024	01-Jul-2024	01-Jul-2024	14-Aug-2024	14-Aug-2024	19-Sep-2024	19-Sep-2024
Time	March	May	July	August	September	14:00	13:30	16:25	16:05	12:50	12:05	13:35	14:10
ALS Sample ID						VA24A5006-003 VA24A6012-003	VA24A5006-003 VA24A6012-003	VA24B6821-003	VA24B6821-004	VA24C1467-009	VA24C1467-010	VA24C4068-001 VA24C6403-007	VA24C4068-002 VA24C6403-008
Physical Tests (mg/L)													
Alkalinity - Total (as CaCO3)	10.0	10.0	9.7	10.0	11.0	**26**	**25**	**18.7**	**19.0**	**18.8**	**19.0**	**19.2**	**19.1**
Total Dissolved Solids	36	36	38	41	43	**86**	**85**	**93**	**91**	**100**	**96**	**77**	**80**
Anions and Nutrients (mg/L)													
Ammonia (as N)	0.17	0.18	0.19	0.22	0.25	0.055	0.056	0.035	0.020	0.041	0.045	0.052	0.082
Chloride	7.9	7.9	8.3	8.9	9.3	**16.9**	**16.2**	**14.6**	**14.5**	**14.1**	**14.2**	**13.7**	**13.8**
Fluoride	0.051	0.051	0.050	0.053	0.055	**0.072**	**0.070**	**0.056**	**0.054**	**0.060**	**0.063**	**0.066**	**0.067**
Nitrate (as N)	1.6	1.6	1.9	2.0	2.1	0.46	0.44	0.45	0.44	0.27	0.27	0.23	0.23
Phosphorus (P)-Total	0.011	0.011	0.012	0.012	0.012	0.0067	0.0065	0.0057	0.0070	0.0046	0.0047	0.0036	0.0037
Sulphate (SO_4)	5.0	5.0	4.9	5.4	5.7	**16.7**	**16.1**	**14.2**	**14.1**	**13.8**	**13.8**	**13.2**	**13.3**
Total Metals (mg/L)													
Aluminum	0.0040	0.0041	0.0038	0.0039	0.0039	0.0035	0.0032	**0.020**	**0.017**	**0.0080**	**0.0062**	**0.0091**	**0.010**
Antimony	0.00058	0.00058	0.00056	0.00063	0.00067	0.00058	0.00058	0.00049	0.00051	0.00043	0.00043	0.00042	0.00041
Arsenic	0.013	0.013	0.014	0.015	0.016	0.00060	0.00062	0.0012	0.0012	0.00086	0.00077	0.00097	0.00072
Barium	0.0085	0.0085	0.0083	0.0088	0.0091	**0.023**	**0.021**	**0.020**	**0.020**	**0.017**	**0.017**	**0.017**	**0.017**
Beryllium	0.00002	0.00002	0.00002	0.00002	0.00003	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth	0.00005	0.00005	0.00005	0.00005	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	0.046	0.046	0.044	0.049	0.052	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium	0.00001	0.00001	0.00001	0.00001	0.00001	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium	4.8	4.8	4.9	5.3	5.6	**14.0**	**13.2**	**12.6**	**12.6**	**11.8**	**12.0**	**12.3**	**12.9**
Chromium	0.00049	0.00049	0.00047	0.00052	0.00055	0.00012	0.00012	0.00043	0.00038	0.00018	**0.00094**	0.00017	0.00015
Cobalt	0.00035	0.00035	0.00034	0.00037	0.00040	*<0.00010*	*<0.00010*	0.00011	0.00010	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper	0.0010	0.0011	0.0010	0.0011	0.0011	0.00058	0.00056	*<0.00050*	0.00056	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Iron	0.059	0.059	0.059	0.061	0.063	0.016	0.010	**0.073**	**0.069**	0.035	0.038	0.041	0.042
Lead	0.00018	0.00018	0.00017	0.00019	0.00020	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium	0.0017	0.0017	0.0017	0.0018	0.0018	**0.0023**	**0.0022**	**0.0022**	**0.0022**	**0.0021**	**0.0021**	**0.0020**	**0.0020**
Magnesium	1.3	1.3	1.3	1.4	1.4	**4.5**	**4.5**	**3.2**	**3.3**	**3.4**	**3.4**	**3.7**	**3.7**
Manganese	0.037	0.037	0.036	0.040	0.044	0.0014	0.00072	0.021	0.020	0.0056	0.0076	0.0072	0.0078
Mercury	0.00001	0.00001	0.00001	0.00001	0.00001	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.00070	0.00070	0.00070	0.00076	0.00080	**0.00077**	**0.00081**	**0.00089**	**0.00093**	**0.00082**	**0.00081**	**0.00080**	**0.00075**
Nickel	0.0036	0.0036	0.0035	0.0041	0.0045	0.0017	0.0017	0.0026	0.0024	0.0014	0.0013	0.0015	0.0013
Potassium	1.3	1.3	1.3	1.4	1.5	**3.5**	**3.5**	**3.2**	**3.2**	**3.1**	**3.0**	**3.0**	**3.0**
Selenium	0.00023	0.00023	0.00022	0.00025	0.00028	0.00005	*<0.000050*	*<0.000050*	0.00006	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Silver	0.00002	0.00002	0.00002	0.00002	0.00002	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium	2.9	2.9	2.9	3.2	3.3	**3.4**	**3.2**	2.7	2.7	2.9	2.8	2.8	2.8
Strontium	0.032	0.032	0.032	0.035	0.037	**0.11**	**0.11**	**0.100**	**0.10**	**0.093**	**0.092**	**0.100**	**0.094**
Thallium	0.00001	0.00001	0.00001	0.00001	0.00001	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin	0.00012	0.00012	0.00012	0.00012	0.00013	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium	0.00027	0.00027	0.00027	0.00029	0.00030	0.00007	0.00007	0.00010	0.00010	0.00007	0.00007	0.00006	0.00006
Vanadium	0.00080	0.00080	0.00076	0.00082	0.00085	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc	0.0021	0.0021	0.0021	0.0023	0.0024	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	**0.023**	*<0.0030*	*<0.0030*

Notes:

Formatting for indicating the parameters that exceed the model predictions in the FEIS:

123 Bolded values exce Bolded values exceed FEIS by < 10X.

123 Bold and shaded va Bold and shaded values exceed the FEIS by ≥ 10X.

Italicized numbers are below detection limits.

"-" not analyzed/not sampled.

Table C2-3. Water quality results screened against FEIS predicted concentrations for Kangislulik Lake, 2023.

Lake & Area	MAM/KAN FEIS Predictions					Kangislulik Lake*									
Month						March	March	May	May	July	July	August	August	September	September
Area-Replicate ID						MAM-87	MAM-88	MAM-89	MAM-90	MAM-91	MAM-92	MAM-93	MAM-94	MAM-95	MAM-96
Date						05-Mar-2024	05-Mar-2024	04-May-2024	04-May-2024	30-Jun-2024	30-Jun-2024	15-Aug-2024	15-Aug-2024	19-Sep-2024	19-Sep-2024
Time	March	May	July	August	September	14:00	13:30	10:20	10:50	16:05	14:35	14:50	15:50	14:30	14:00
ALS Sample ID						VA24A5006-005 VA24A6012-005	VA24A5006-006 VA24A6012-006	VA24B0323-003	VA24B0323-004	VA24B6821-005	VA24B6821-006	VA24C1467-005	VA24C1467-006	VA24C6403-009 VA24C3430-001	VA24C6403-010 VA24C3430-002
Physical Tests (mg/L)															
Alkalinity - Total (as $CaCO_3$)	8.5	8.5	8.6	8.7	8.8	**33**	**28**	**29**	**35**	**19.6**	**18.0**	**19.8**	**24**	**23**	**25**
Total Dissolved Solids	33	33	33	33	33	**162**	**132**	**163**	**208**	**119**	**97**	**122**	**151**	**124**	**141**
Anions and Nutrients (mg/L)															
Ammonia (as N)	0.064	0.064	0.097	0.098	0.10	0.056	0.048	0.060	0.058	0.015	0.012	0.029	0.032	0.049	0.068
Chloride	10.0	10.0	8.9	8.9	8.9	**32**	**26**	**28**	**35**	**18.1**	**15.3**	**17.1**	**19.9**	**18.4**	**22**
Fluoride	0.043	0.043	0.044	0.044	0.045	**0.072**	**0.067**	**0.057**	**0.063**	**0.046**	0.044	**0.057**	**0.063**	**0.057**	**0.063**
Nitrate (as N)	0.84	0.84	1.1	1.1	1.1	**1.1**	**0.85**	**0.92**	**1.2**	0.44	0.34	0.27	0.49	0.33	0.65
Phosphorus (P)-Total	0.0077	0.0077	0.0083	0.0084	0.0085	0.0041	0.0032	*<0.0020*	*<0.0020*	0.0039	0.0047	0.0041	0.0041	0.0055	0.0038
Sulphate (SO_4)	3.8	3.8	4.0	4.1	4.1	**35**	**29**	**31**	**39**	**20**	**16.5**	**19.1**	**22**	**19.6**	**23**
Total Metals (mg/L)															
Aluminum	0.0037	0.0037	0.0037	0.0038	0.0038	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	**0.015**	**0.011**	**0.0045**	**0.0056**	**0.0040**	**0.0048**
Antimony	0.00035	0.00035	0.00039	0.00039	0.00040	**0.0013**	**0.0010**	**0.0011**	**0.0014**	**0.00069**	**0.00050**	**0.00082**	**0.0013**	**0.00093**	**0.0015**
Arsenic	0.0074	0.0074	0.0086	0.0087	0.0089	0.0010	0.00092	0.00094	0.0010	0.0010	0.00076	0.0012	0.0017	0.0012	0.0020
Barium	0.0079	0.0079	0.0079	0.0079	0.0080	**0.036**	**0.031**	**0.035**	**0.046**	**0.024**	**0.020**	**0.018**	**0.021**	**0.020**	**0.023**
Beryllium	0.00002	0.00002	0.00002	0.00002	0.00002	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*	*<0.000100*
Bismuth	0.00005	0.00005	0.00005	0.00005	0.00005	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Boron	0.035	0.035	0.036	0.036	0.036	0.011	*<0.010*	0.010	0.013	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*	*<0.010*
Cadmium	0.00001	0.00001	0.00001	0.00001	0.00001	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Calcium	5.8	5.8	5.2	5.2	5.2	**25**	**21**	**25**	**32**	**15.9**	**13.6**	**15.0**	**17.9**	**17.1**	**19.6**
Chromium	0.00035	0.00035	0.00037	0.00037	0.00037	*<0.00010*	**0.00042**	*<0.00050*	*<0.00050*	0.00035	0.00024	*<0.00010*	0.00014	0.00012	0.00017
Cobalt	0.00025	0.00025	0.00027	0.00027	0.00027	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Copper	0.00082	0.00082	0.00084	0.00085	0.00086	0.00061	0.00058	0.00053	0.00062	0.00051	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	0.00054
Iron	0.042	0.042	0.044	0.044	0.045	*<0.010*	*<0.010*	*<0.010*	*<0.010*	0.030	0.029	0.011	0.016	0.017	0.026
Lead	0.00014	0.00014	0.00015	0.00015	0.00015	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*	*<0.000050*
Lithium	0.0015	0.0015	0.0015	0.0015	0.0015	**0.0038**	**0.0030**	**0.0036**	**0.0044**	**0.0022**	**0.0018**	**0.0022**	**0.0028**	**0.0026**	**0.0031**
Magnesium	1.3	1.3	1.3	1.3	1.3	**6.8**	**5.8**	**5.8**	**7.2**	**3.8**	**3.2**	**3.9**	**4.3**	**3.9**	**4.5**
Manganese	0.023	0.023	0.025	0.025	0.026	0.0049	0.0038	0.0025	0.0043	0.0062	0.0056	0.0037	0.0040	0.0060	0.0079
Mercury	0.00001	0.00001	0.00001	0.00001	0.00001	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*	*<0.0000050*
Molybdenum	0.00058	0.00058	0.00057	0.00057	0.00058	**0.0012**	**0.00097**	**0.00093**	**0.0011**	0.00055	0.00040	**0.00084**	**0.0013**	**0.00098**	**0.0016**
Nickel	0.0023	0.0023	0.0025	0.0026	0.0026	0.0022	0.0016	0.0017	**0.0024**	0.0014	0.0012	0.00089	0.0014	0.0011	0.0017
Potassium	0.96	0.96	1.0	1.0	1.1	**5.5**	**4.6**	**5.1**	**6.2**	**3.7**	**3.1**	**3.5**	**4.1**	**3.6**	**4.4**
Selenium	0.00014	0.00014	0.00016	0.00016	0.00016	0.00009	0.00008	0.00007	0.00009	0.00007	*<0.000050*	*<0.000050*	0.00007	0.00006	*<0.000050*
Silver	0.00001	0.00001	0.00002	0.00002	0.00002	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Sodium	2.2	2.2	2.3	2.3	2.3	**4.8**	**4.0**	**4.3**	**5.1**	**2.8**	**2.5**	**3.2**	**3.6**	**3.2**	**3.5**
Strontium	0.028	0.028	0.028	0.029	0.029	**0.20**	**0.16**	**0.19**	**0.23**	**0.12**	**0.099**	**0.11**	**0.14**	**0.12**	**0.16**
Thallium	0.00001	0.00001	0.00001	0.00001	0.00001	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*	*<0.000010*
Tin	0.00011	0.00011	0.00011	0.00012	0.00012	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*	*<0.00010*
Uranium	0.00021	0.00021	0.00021	0.00021	0.00021	0.00017	0.00013	0.00014	0.00016	0.00013	0.00010	0.00017	**0.00025**	0.00016	**0.00026**
Vanadium	0.00067	0.00067	0.00068	0.00069	0.00070	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*	*<0.00050*
Zinc	0.0017	0.0017	0.0017	0.0018	0.0018	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*	*<0.0030*

Notes:

Formatting for indicating the parameters that exceed the model predictions in the FEIS:

123 Bolded values exce Bolded values exceed FEIS by < 10X.

123 Bold and shaded va Bold and shaded values exceed the FEIS by ≥ 10X.

Italicized numbers are below detection limits.

"-" not analyzed/not sampled.

* Previously referred to as Mammoth Lake (MAM). Acronyms MAM or KAN used interchangeably.

Table C2-4. Water and phytoplankton sampling location coordinates (GPS, UTM, NAD83) for the Whale Tail CREMP, 2024.

Area[1]	Area Type[2]	Area-Replicate	Water & Phytoplankton (Monthly)				
			Month	Depth (m)	Zone	Easting	Northing
WTS	NF	WTS-87	March	18.3	14W	607376	7253849
		WTS-88	March	6.2	14W	607607	7254422
		WTS-89	May	10.85	14W	607274	7253485
		WTS-90	May	7.45	14W	607638	7254078
		WTS-91	July	11.2	14W	607518	7254258
		WTS-92	July	10.5	14W	607173	7253550
		WTS-93	August	7.5	14W	607607	7254438
		WTS-94	August	10.5	14W	607154	7253611
		WTS-95	September	6.25	14W	607696	7254008
		WTS-96	September	7.99	14W	607203	7253553
KAN	NF	MAM-87	March	7.8	14W	605393	7255097
		MAM-88	March	6.8	14W	604137	7254410
		MAM-89	May	7.4	14W	604273	7254244
		MAM-90	May	5.4	14W	605403	7254983
		MAM-91	July	8.45	14W	605359	7255129
		MAM-92	July	5.6	14W	604145	7253925
		MAM-93	August	10.03	14W	604110	7254513
		MAM-94	August	5.63	14W	605394	7254910
		MAM-95	September	5.02	14W	604145	7253925
		MAM-96	September	5.98	14W	605285	7254940
A20	MF	A20-79	March	5.35	14W	604697	7252460
		A20-80	March	5.28	14W	605251	7252790
		A20-81	May	5.6	14W	605157	7252791
		A20-82	May	16.5	14W	604546	7252645
		A20-83	July	6.52	14W	604605	7252513
		A20-84	July	5.2	14W	605205	7252748
		A20-85	August	6.11	14W	604685	7252485
		A20-86	August	6.4	14W	605210	7252762
		A20-87	September	5.5	14W	605183	7252601
		A20-88	September	13.88	14W	604484	7252480
A76	MF	A76-77	March	6.64	14W	602420	7257014
		A76-78	March	7.69	14W	601901	7256915
		A76-79	May	11.15	14W	601732	7256880
		A76-80	May	13.8	14W	602555	7257139
		A76-81	July	5.38	14W	601938	7256930
		A76-82	July	12.42	14W	602572	7257236
		A76-83	August	14.4	14W	602561	7257130

Area[1]	Area Type[2]	Area-Replicate	Water & Phytoplankton (Monthly)				
			Month	Depth (m)	Zone	Easting	Northing
		A76-84	August	14.9	14W	602548	7257133
		A76-85	September	7.6	14W	602711	7256966
		A76-86	September	7.1	14W	601682	7256840
DS1	FF	DS1-75	March	17.51	14W	597525	7260738
		DS1-76	March	8.5	14W	598023	7258281
		DS1-77	May	18.65	14W	597176	7262183
		DS1-78	May	9.1	14W	598028	7258274
		DS1-79	July	7.67	14W	598016	7258278
		DS1-80	July	8.91	14W	597796	7260913
		DS1-81	August	9.2	14W	597771	7260969
		DS1-82	August	6	14W	597579	7259142
		DS1-83	September	11.2	14W	597627	7260888
		DS1-84	September	6.5	14W	598024	7258285
NEM	NF	NEM-85	March	12.76	14W	606152	7257527
		NEM-86	March	8.3	14W	606401	7257018
		NEM-87	May	10.45	14W	606229	7257414
		NEM-88	May	14.4	14W	607018	7257843
		NEM-89	July	8.65	14W	606408	7257020
		NEM-90	July	13.83	14W	606992	7257819
		NEM-91	August	18	14W	606561	7257985
		NEM-92	August	9.7	14W	606146	7257387
		NEM-93	September	15.03	14W	607005	7257707
		NEM-94	September	6.04	14W	606133	7257405

Notes:

1. Area IDs are as follows: WTS =Whale Tail South; KAN = Kangislulik Lake ([KAN]; formerly Mammoth Lake [MAM]; referred to as KAN); A20 = Lake A20; A76= Lake A76; DS1= Lake DS1, NEM = Nemo Lake

2. Area types: NF=near-field; MF=mid-field; FF=far-field; Ref=reference.

FIGURES

Figure C2-1. Laboratory-measured conductivity (µS/cm).

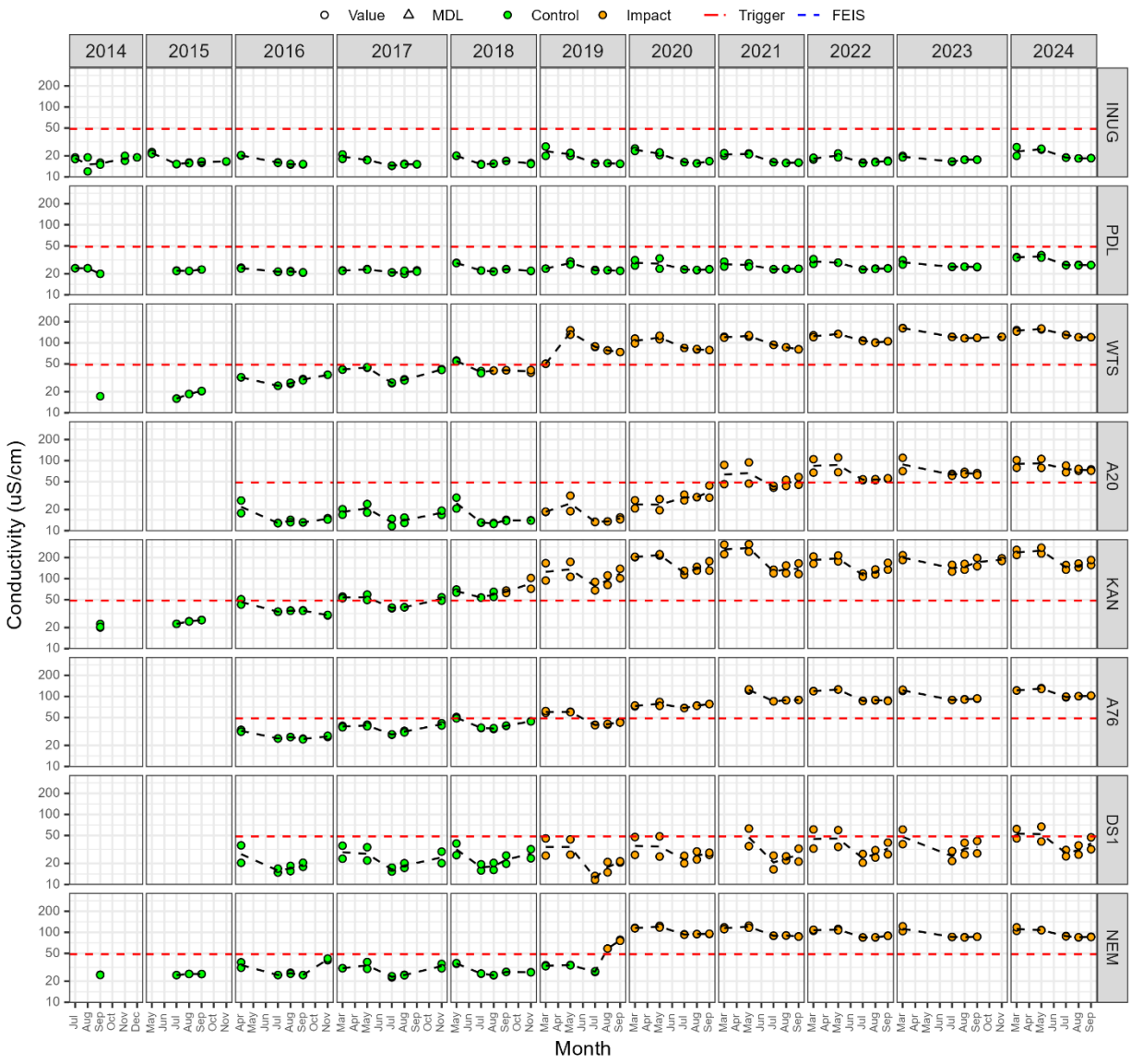


Figure C2-2. Laboratory-measured hardness (mg/L).

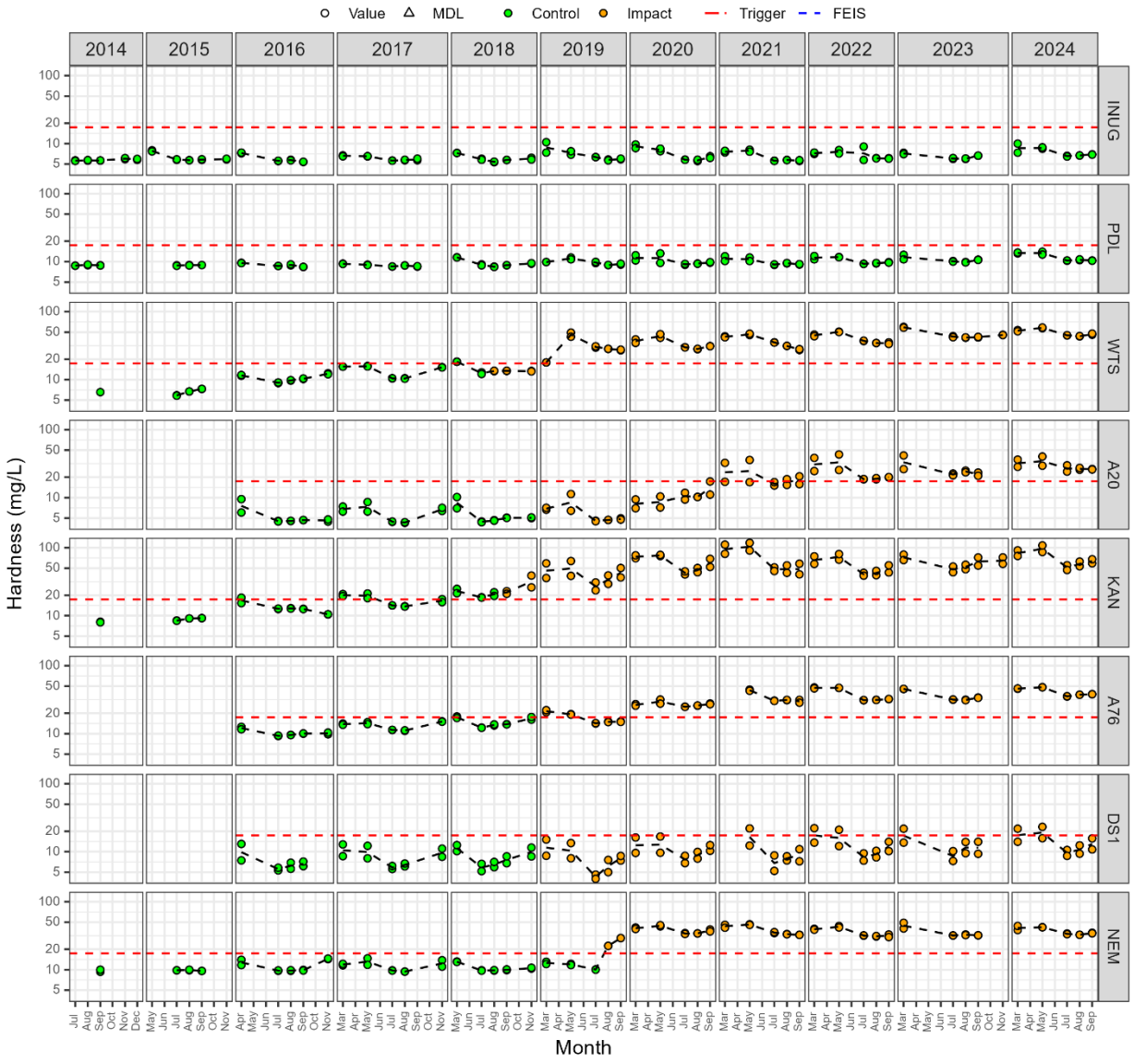


Figure C2-3. Field-measured pH.

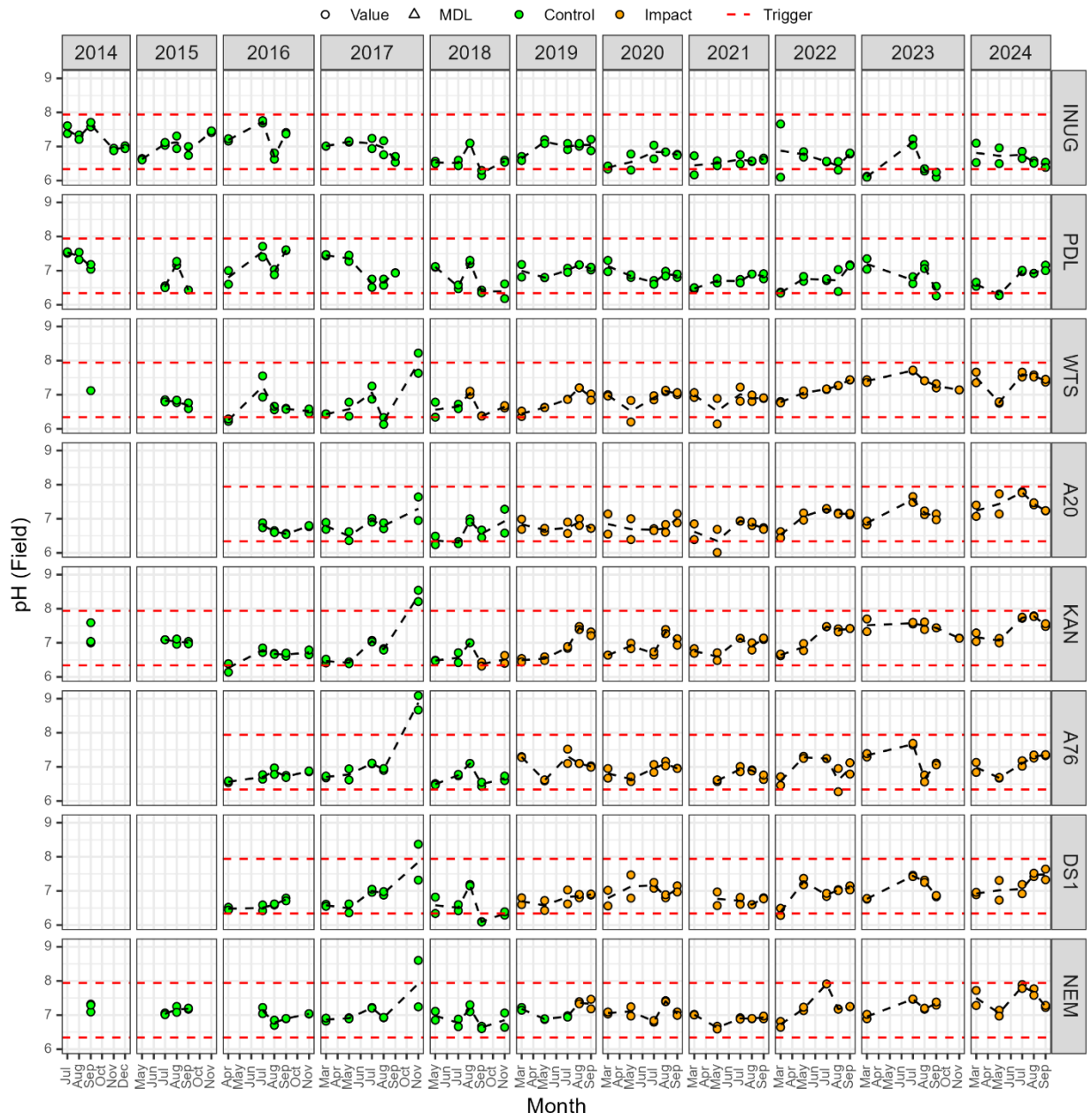


Figure C2-4. Laboratory-measured pH.

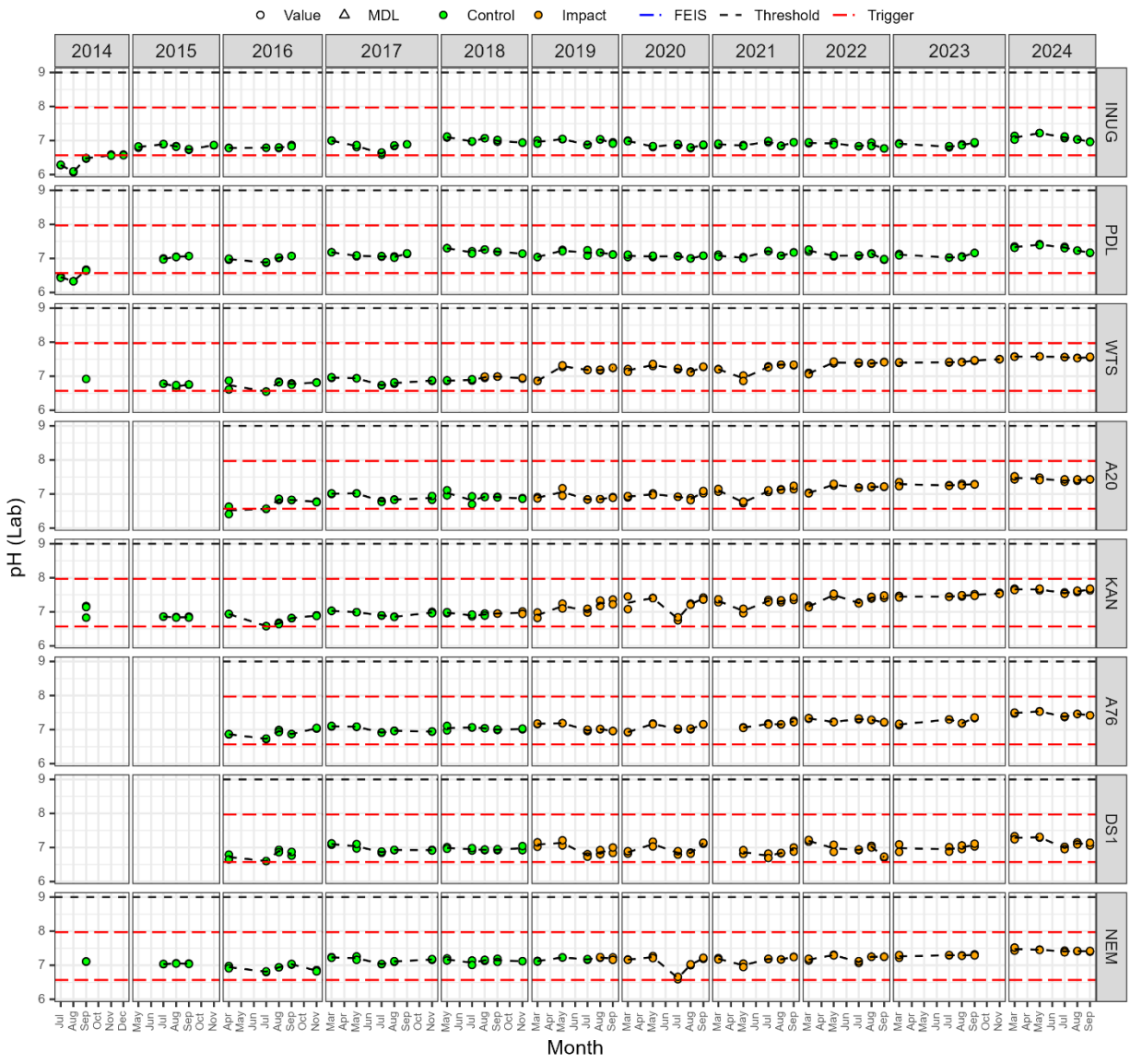


Figure C2-5. Total suspended solids (TSS; mg/L).

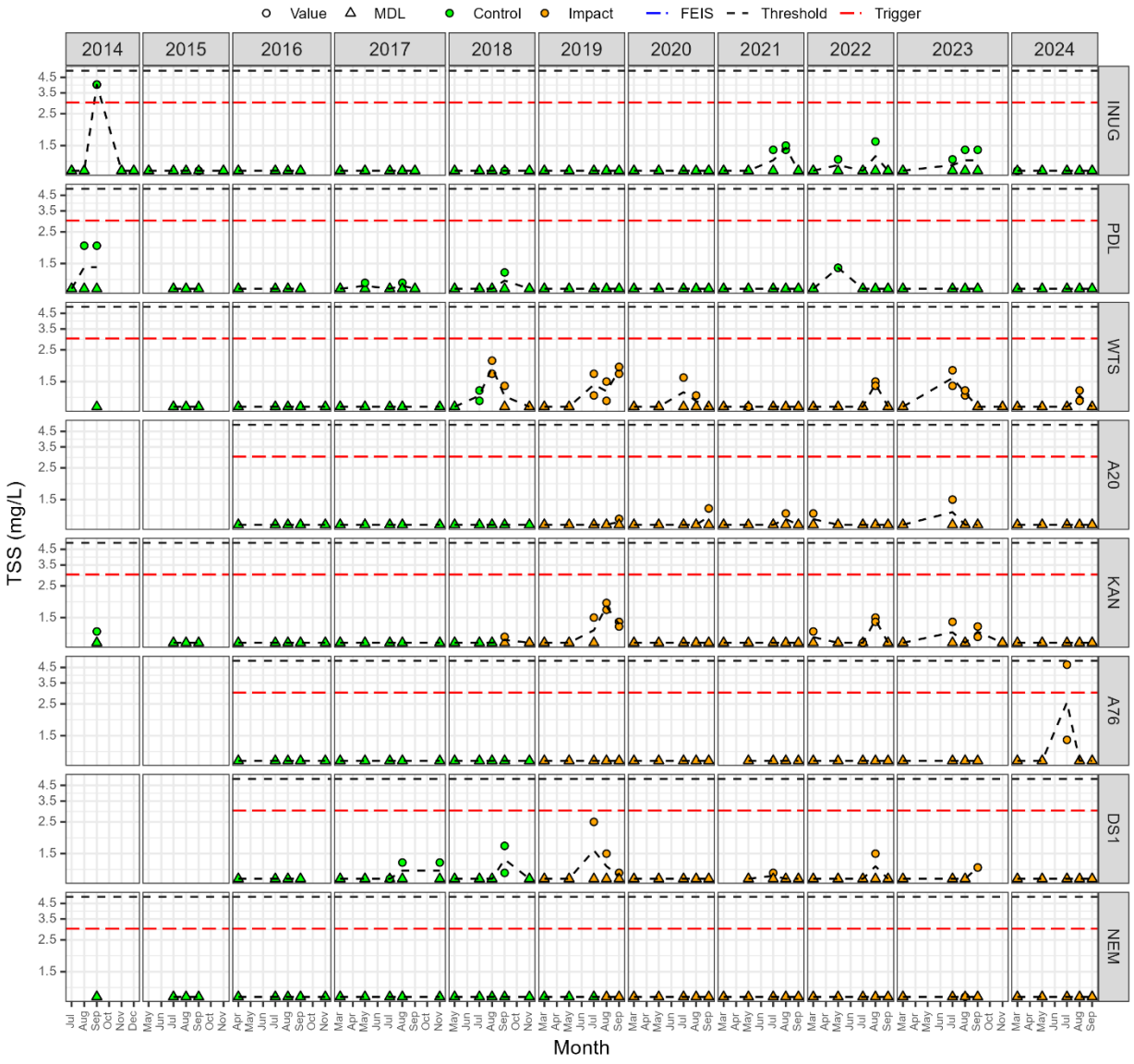


Figure C2-6. Total dissolved solids (TDS; mg/L).

Note: TDS data from 2014 were removed due to data quality concerns. See Azimuth (2015c) for more details.

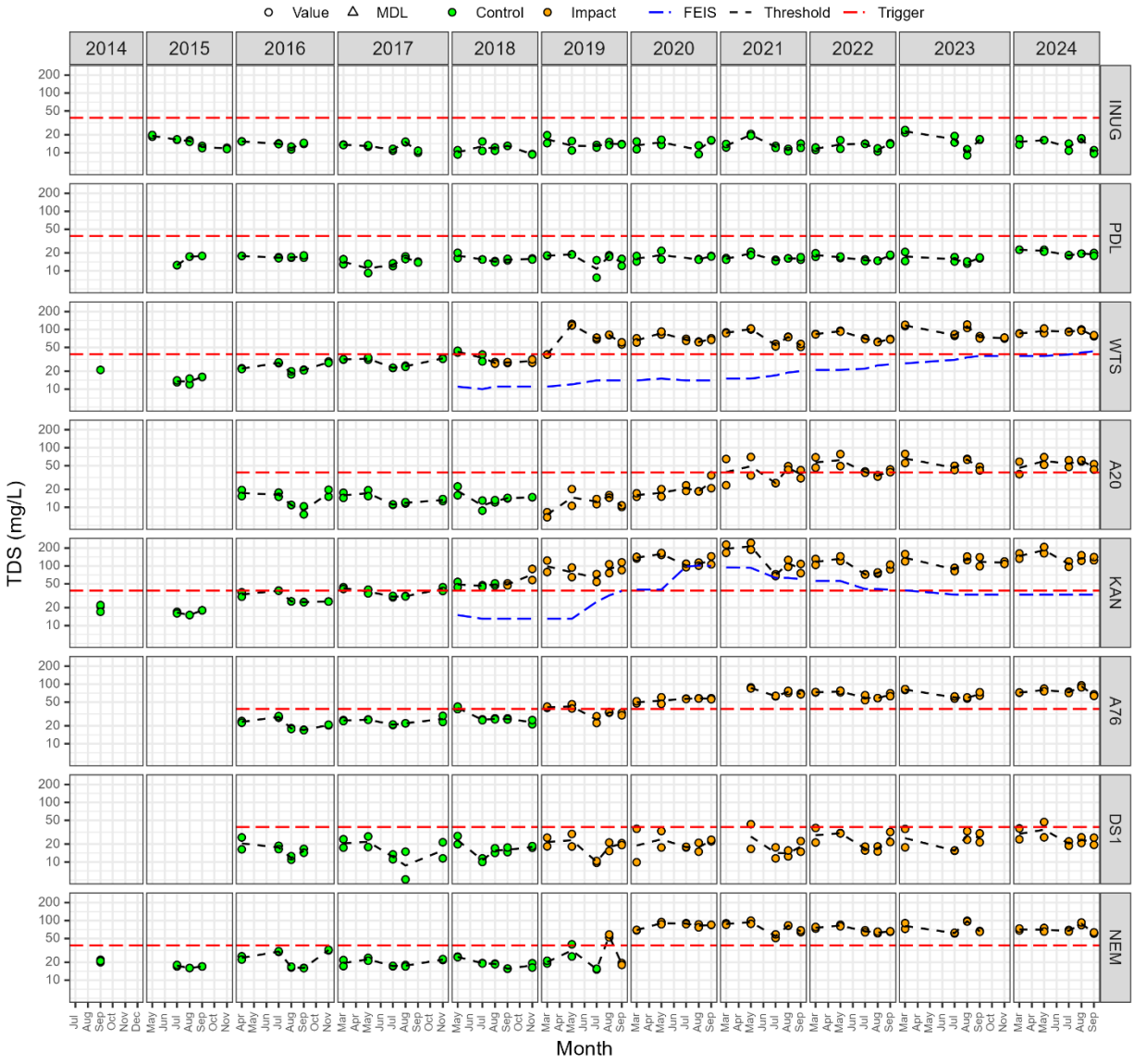


Figure C2-7. Carbonate alkalinity (mg/L).

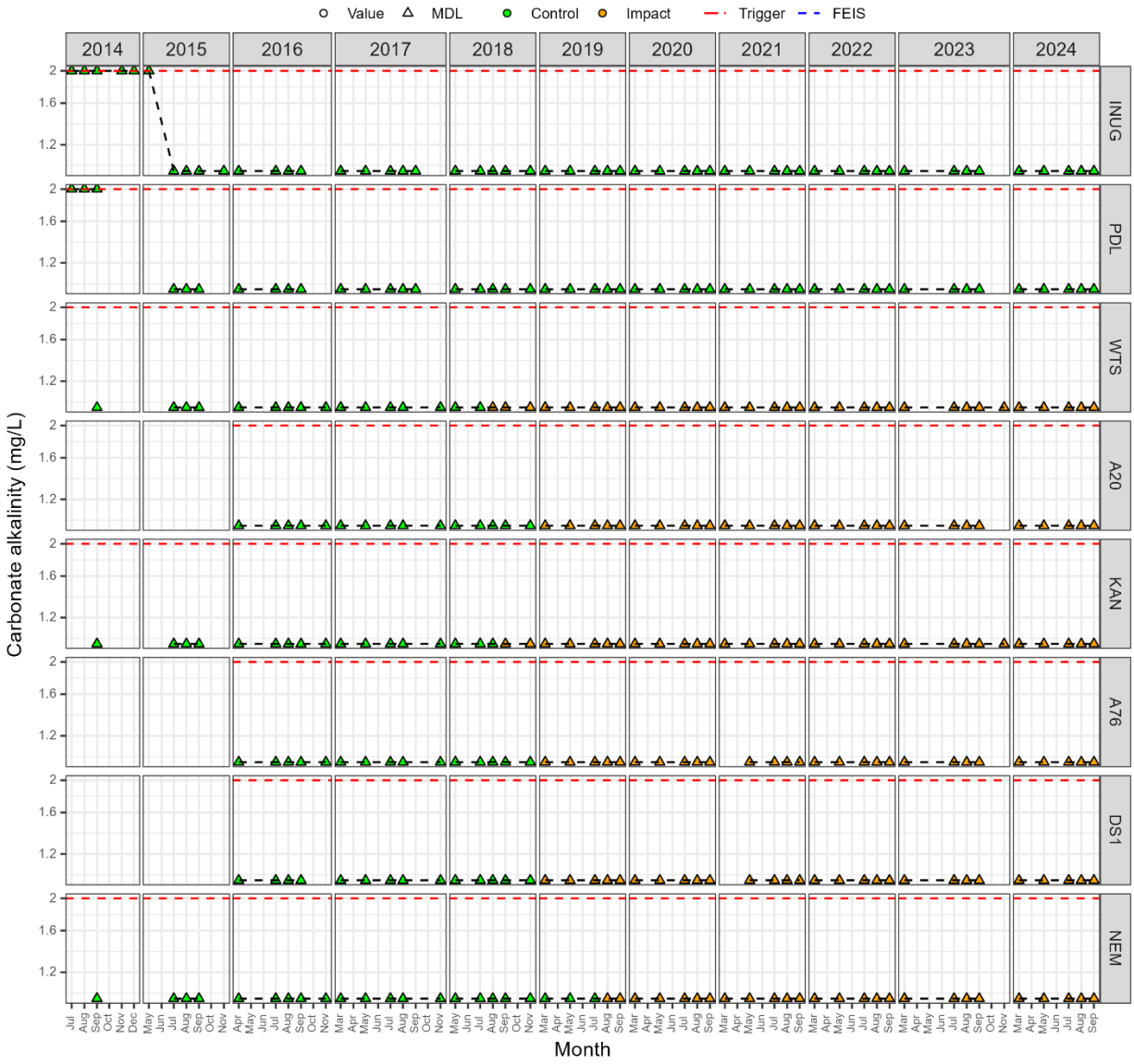


Figure C2-8. Bicarbonate alkalinity (mg/L).

Note: Bicarbonate alkalinity data from 2014 were removed due to data quality concerns. See Azimuth (2015c) for more details.

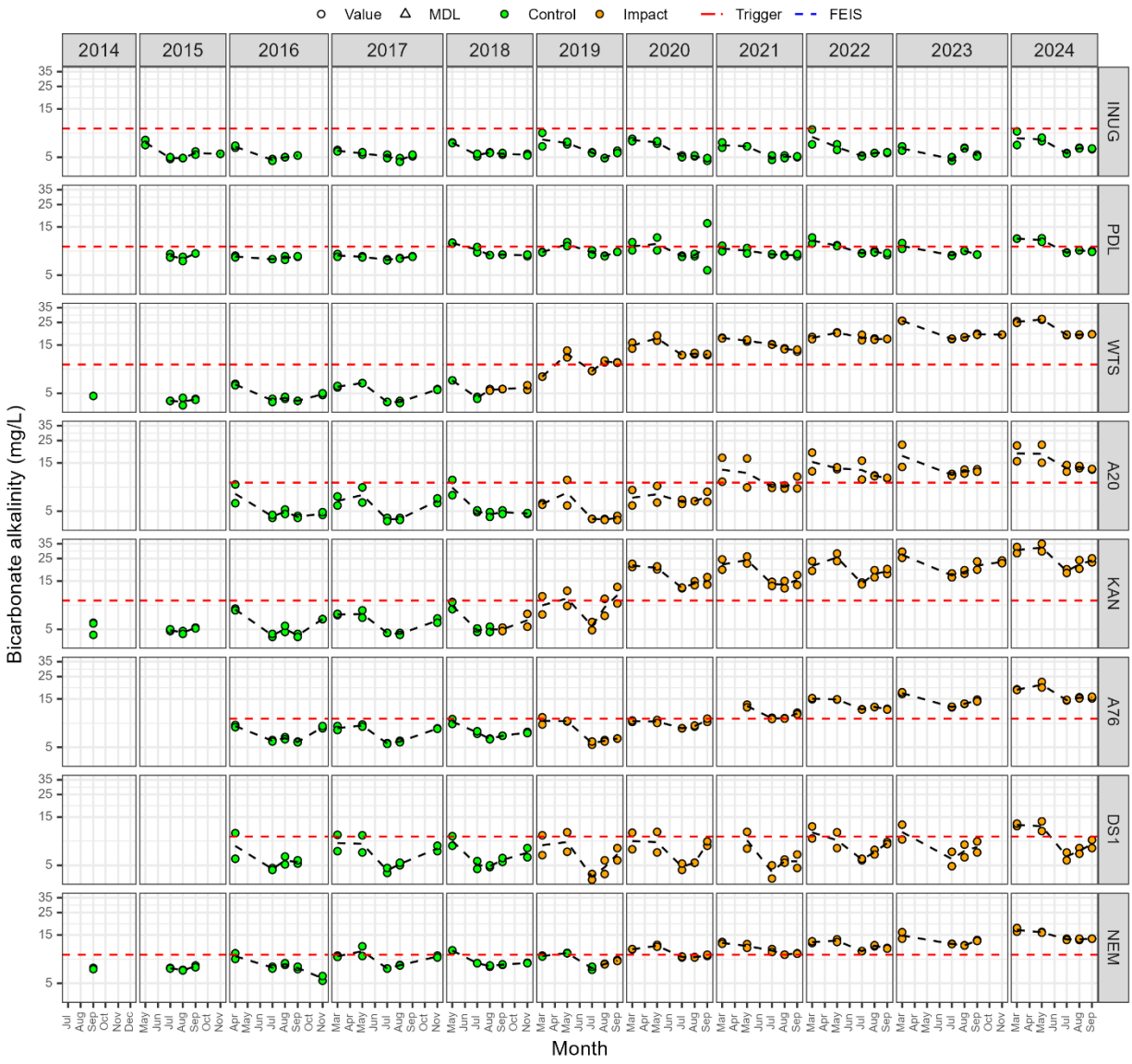


Figure C2-9. Total alkalinity (mg/L).

Note: Total alkalinity data from 2014 were removed due to data quality concerns. See Azimuth (2015c) for more details.

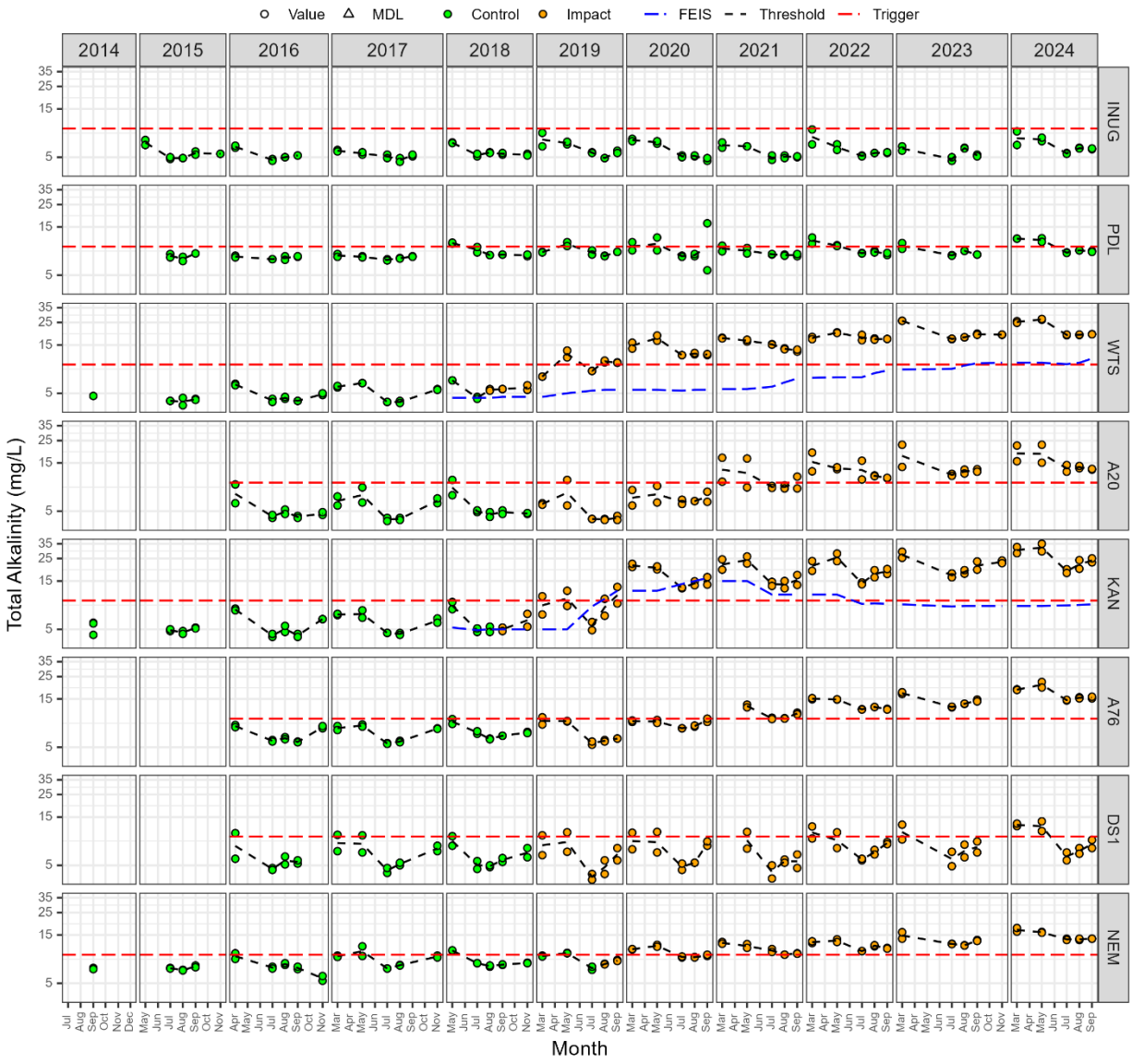


Figure C2-10. Ammonia-N (mg/L).

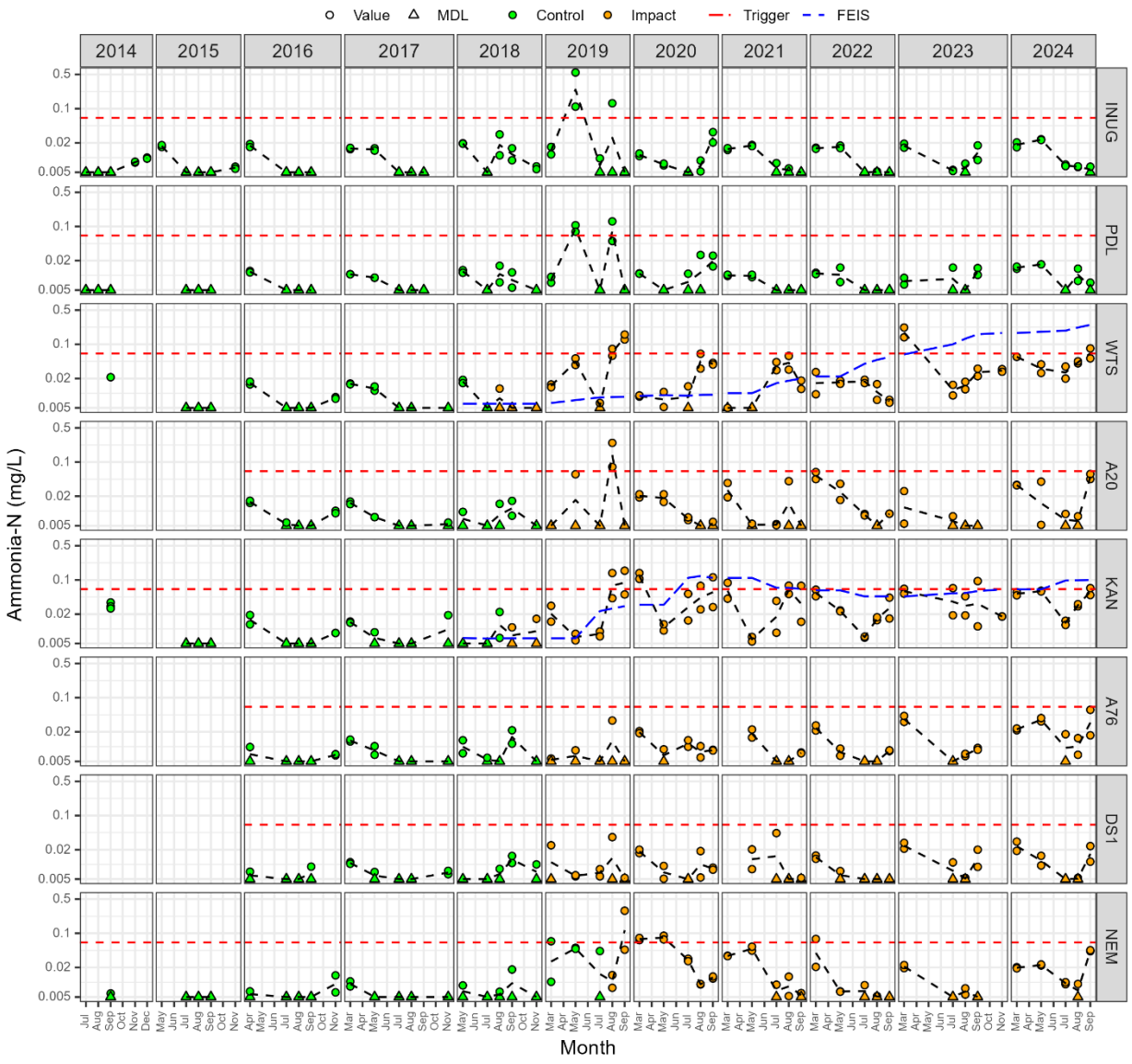


Figure C2-11. Chloride (mg/L).

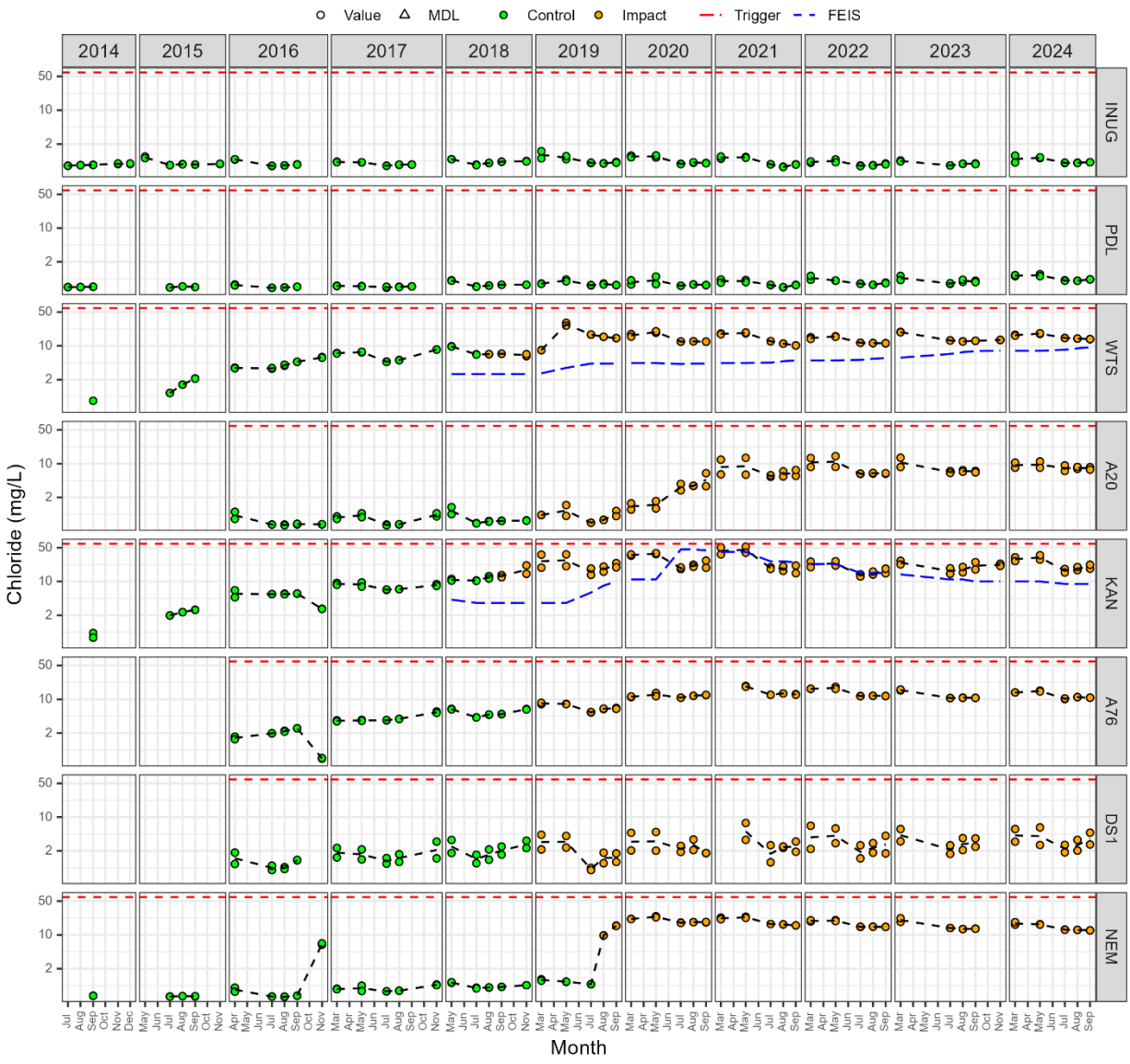


Figure C2-12. Fluoride (mg/L).

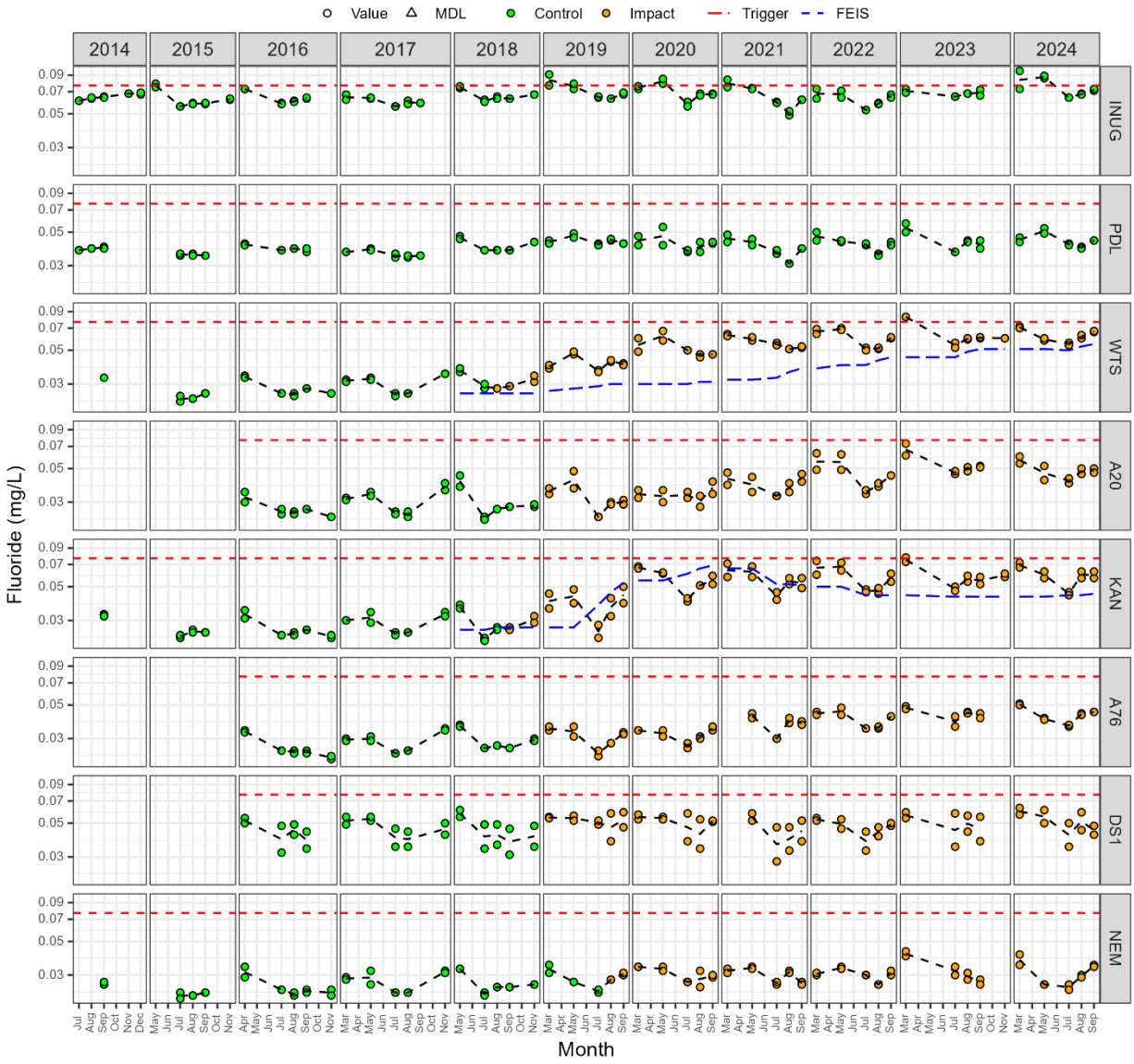


Figure C2-13. Nitrate-N (mg/L).

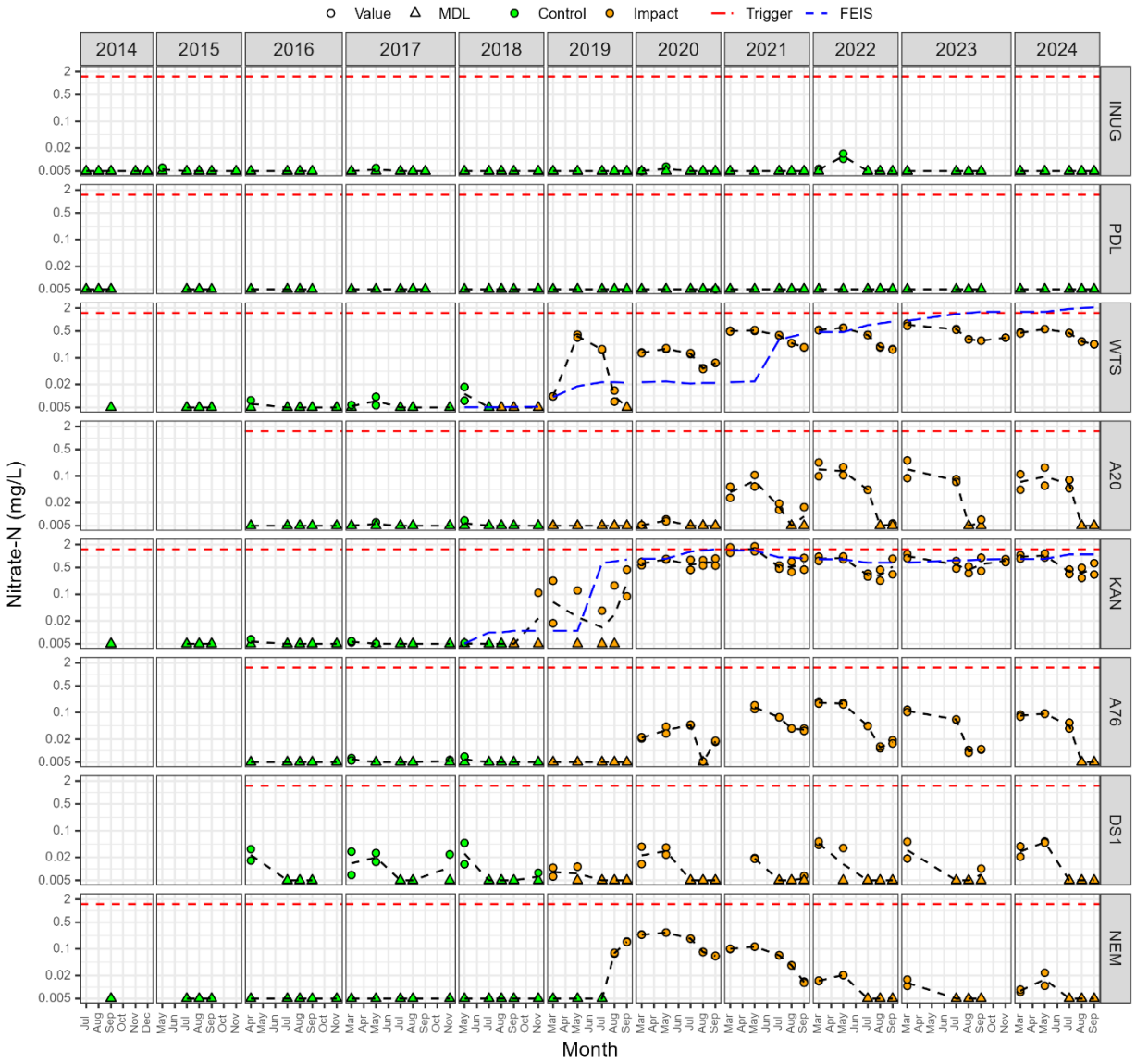


Figure C2-14. Nitrite-N (mg/L).

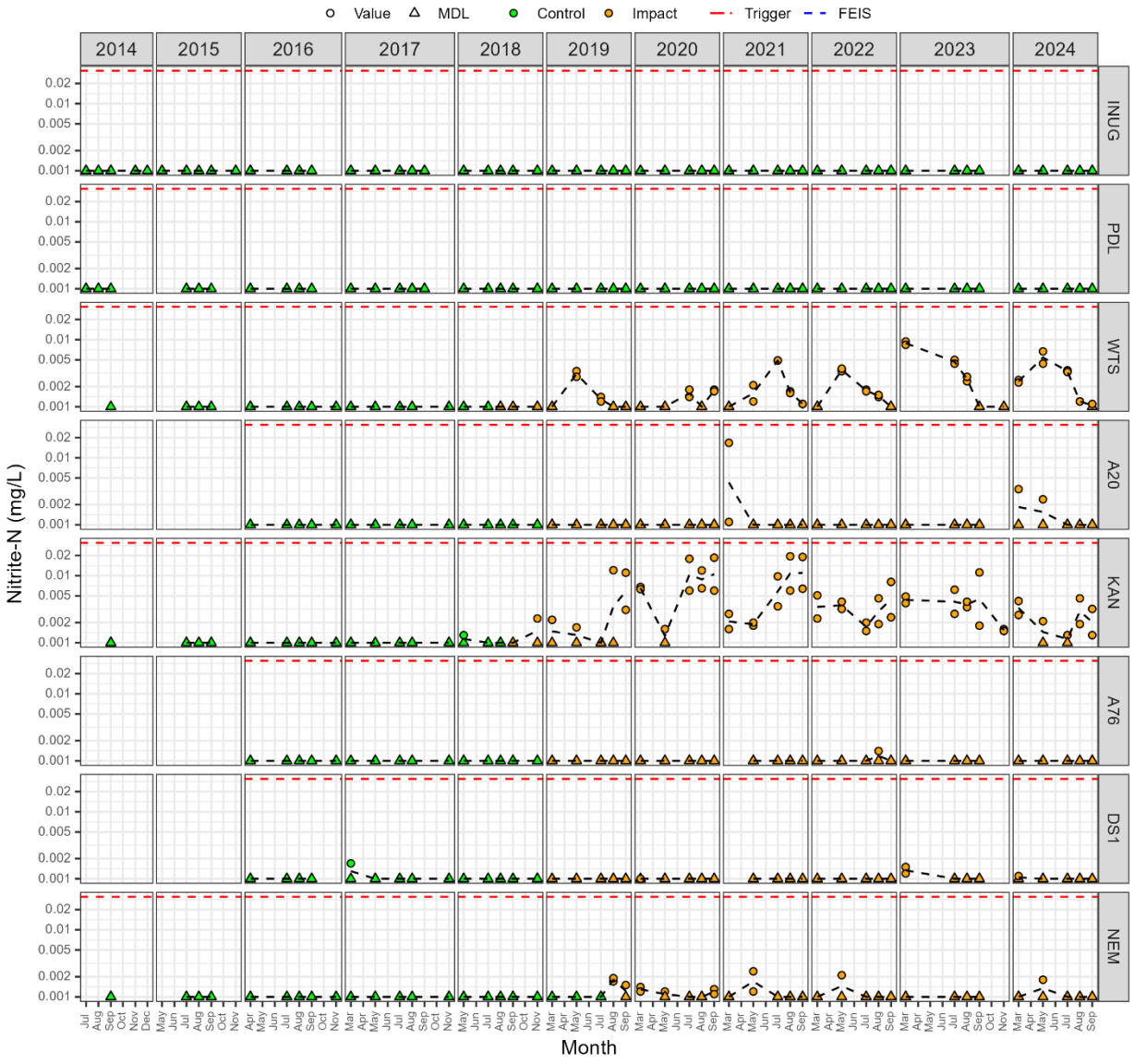


Figure C2-15. Total Kjeldahl Nitrogen (TKN; mg/L).

Note: TKN data from 2014 were removed due to data quality concerns. See Azimuth (2015c) for more details.

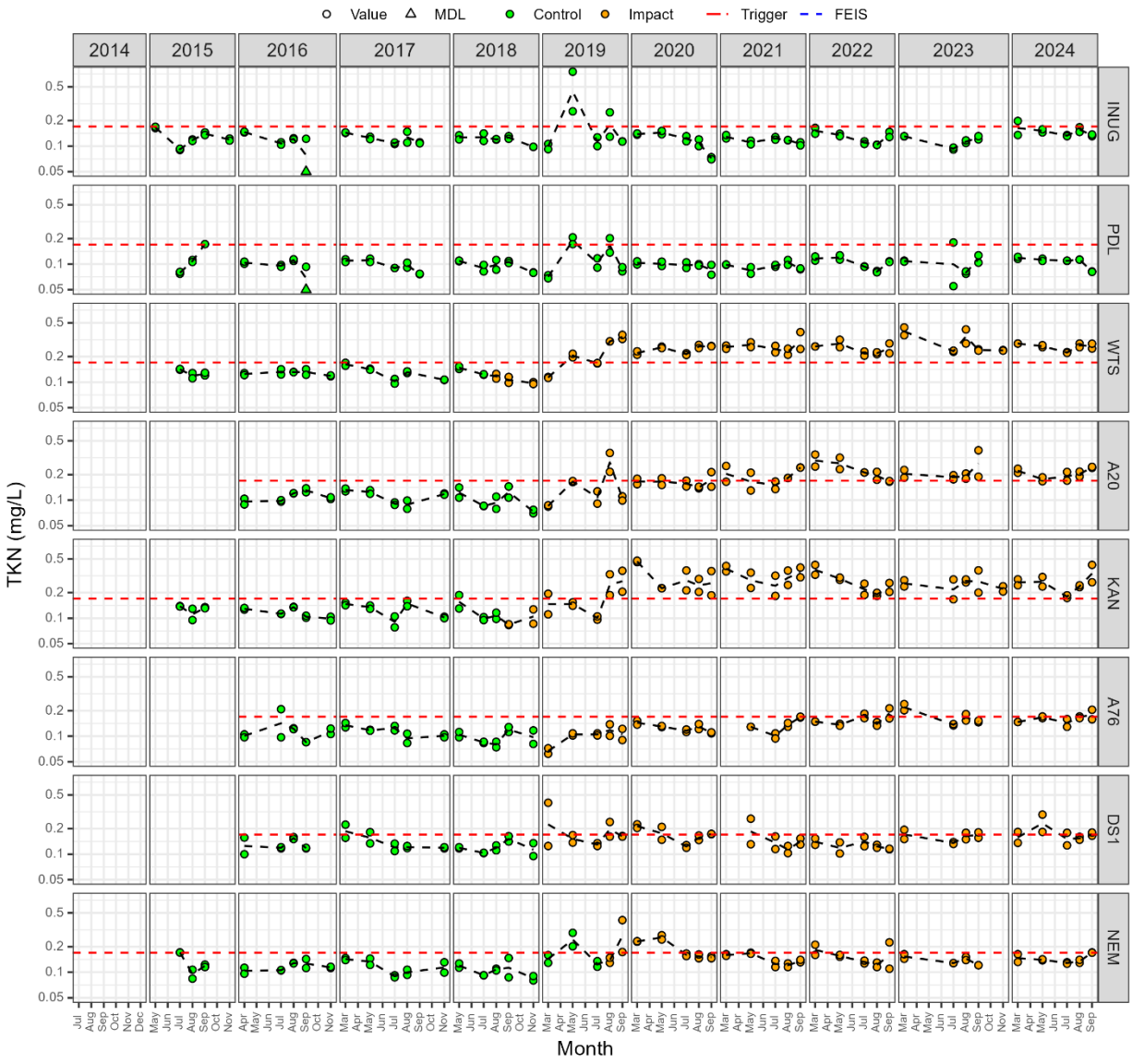


Figure C2-16. Total phosphorous (mg/L).

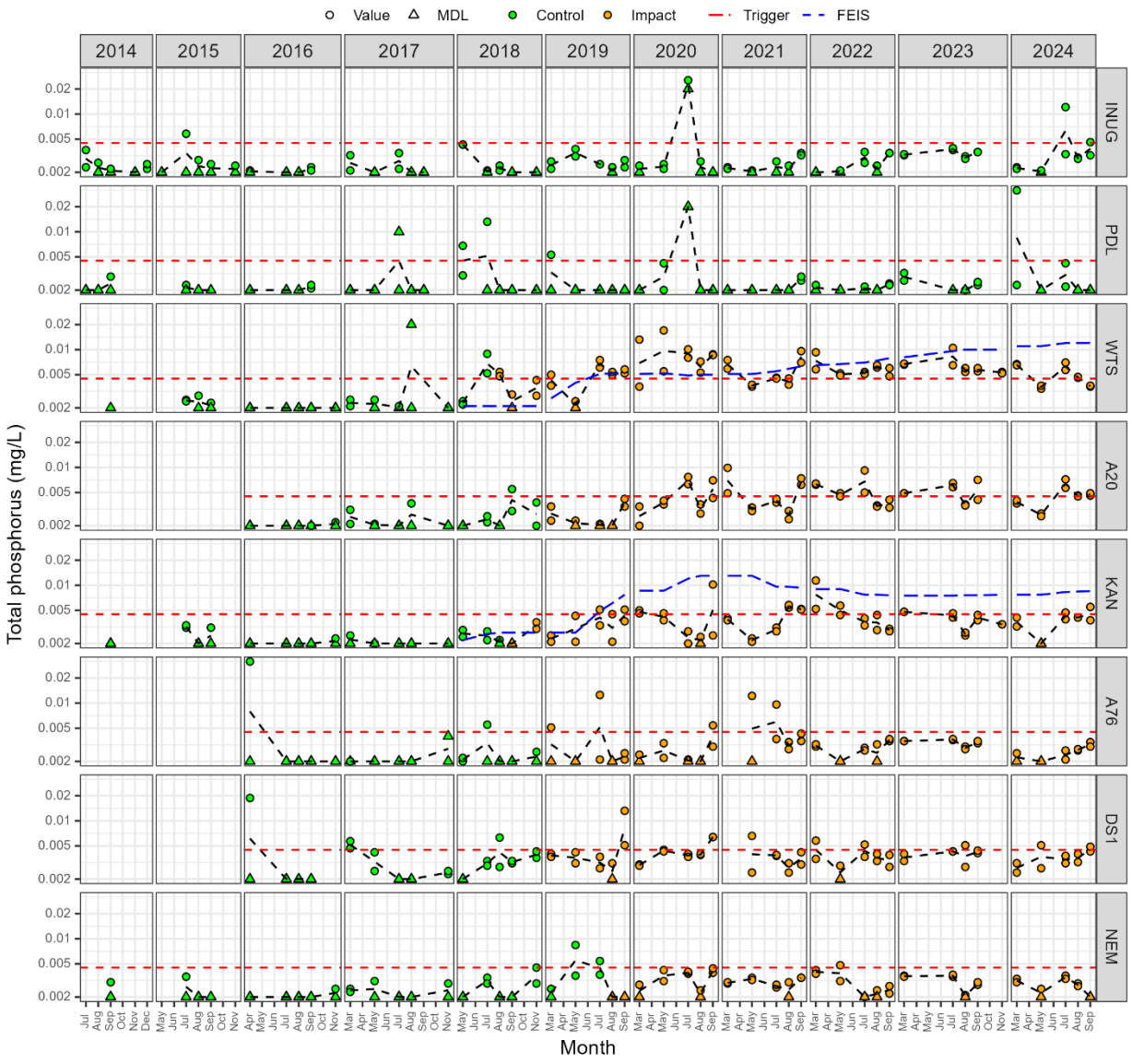


Figure C2-17. Ortho-phosphate (mg/L).

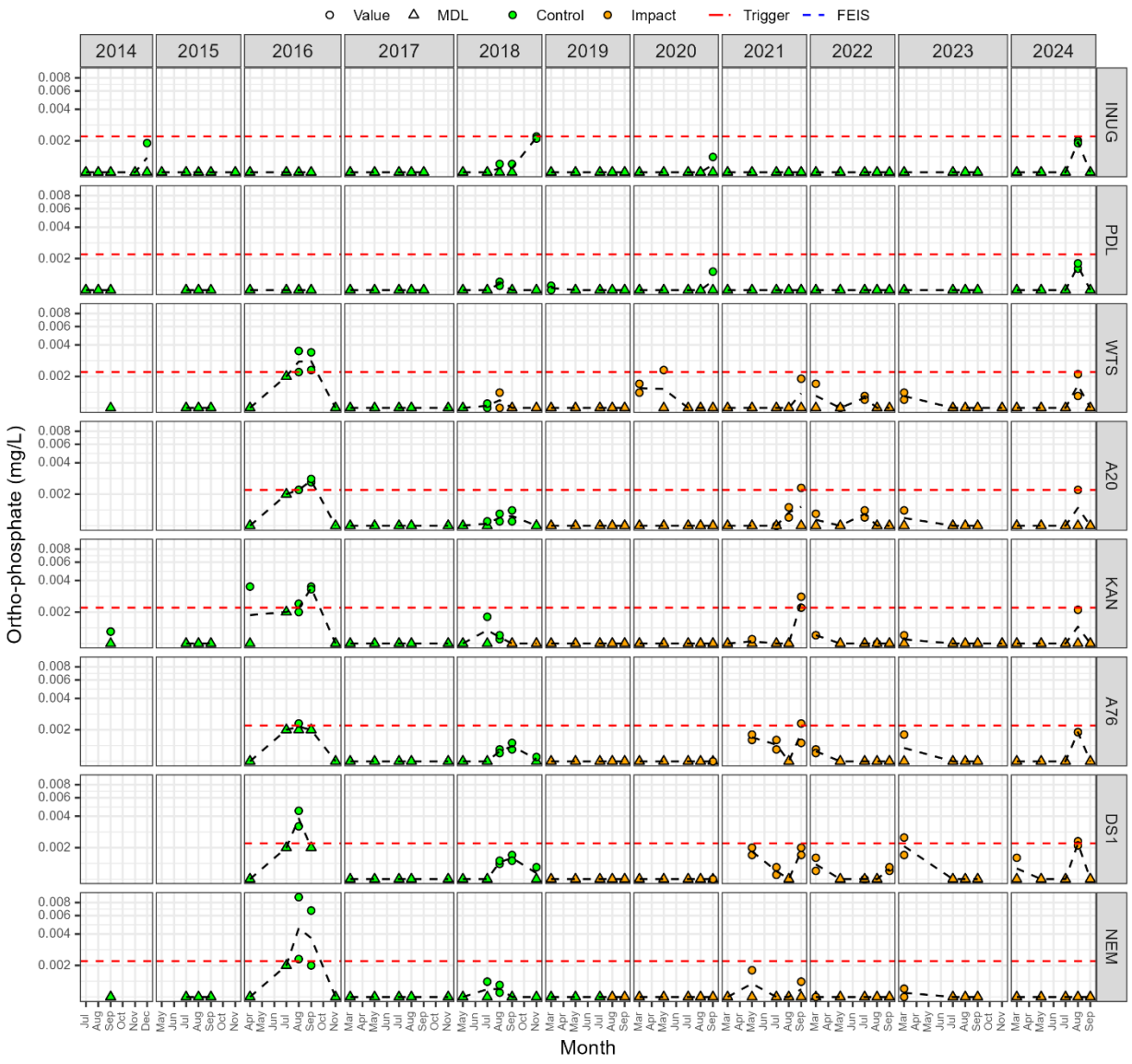


Figure C2-18. Reactive silica (mg/L).

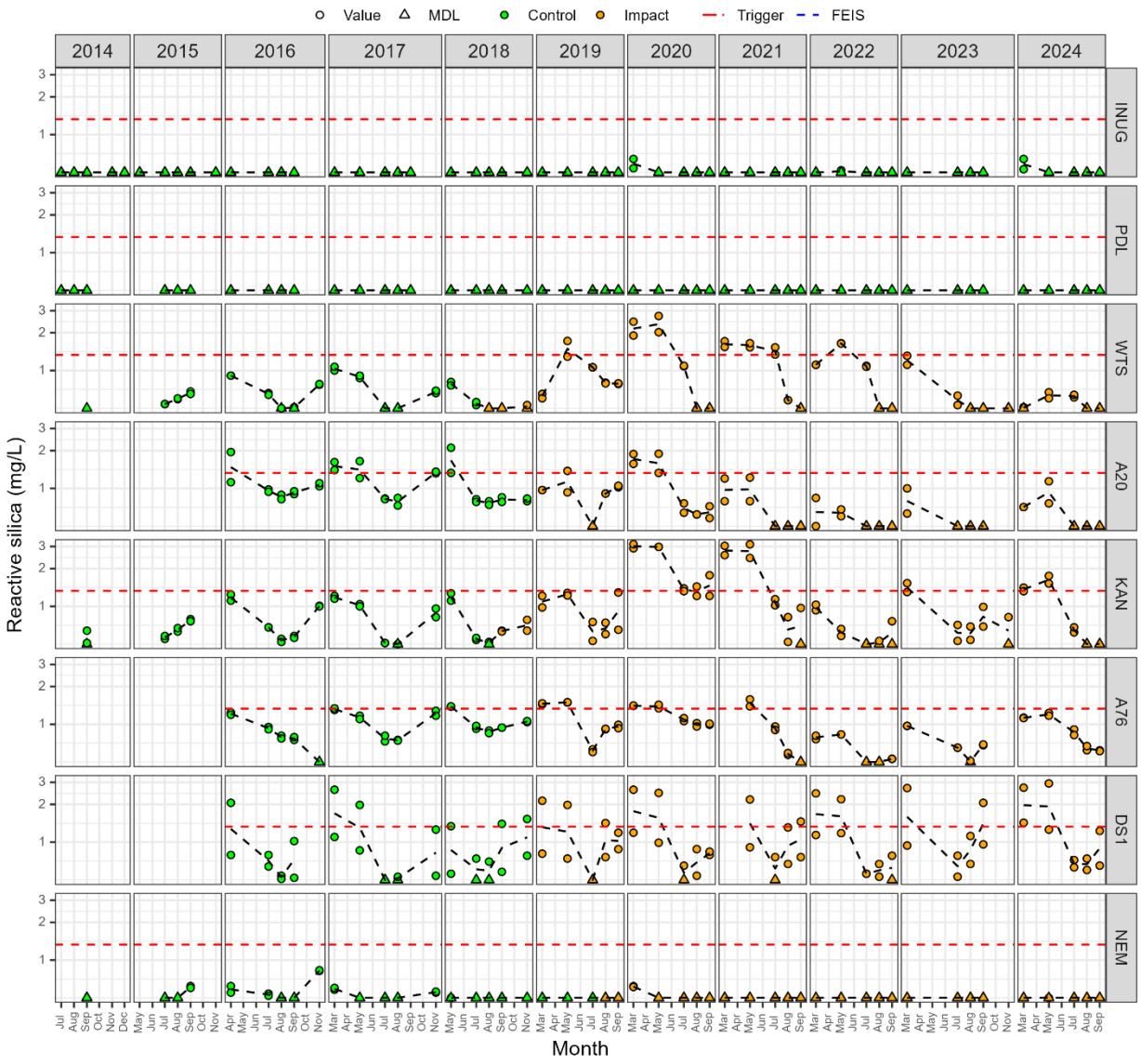


Figure C2-19. Sulphate (mg/L).

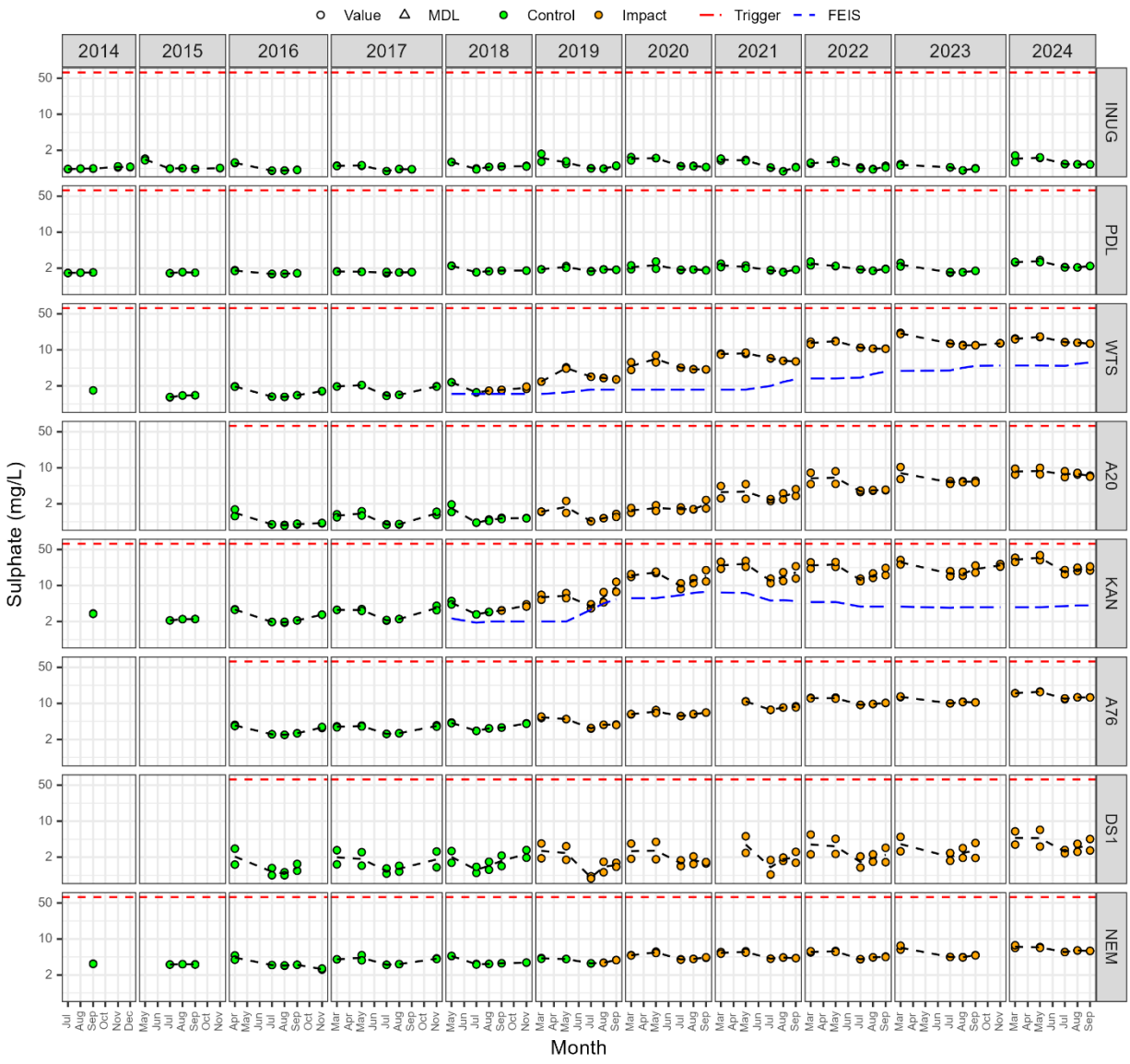


Figure C2-20. Dissolved organic carbon (DOC; mg/L).

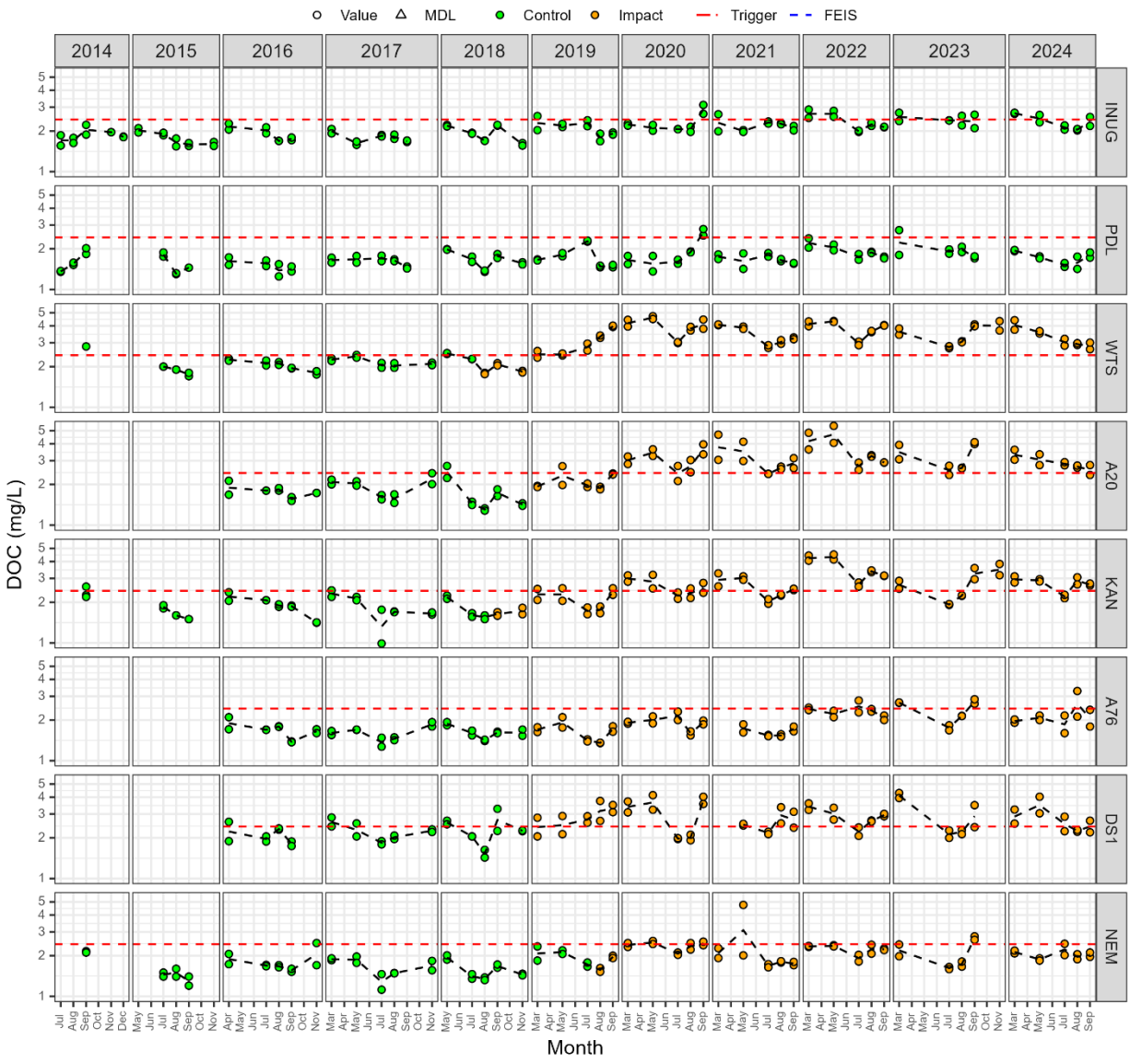


Figure C2-21. Total organic carbon (TOC; mg/L).

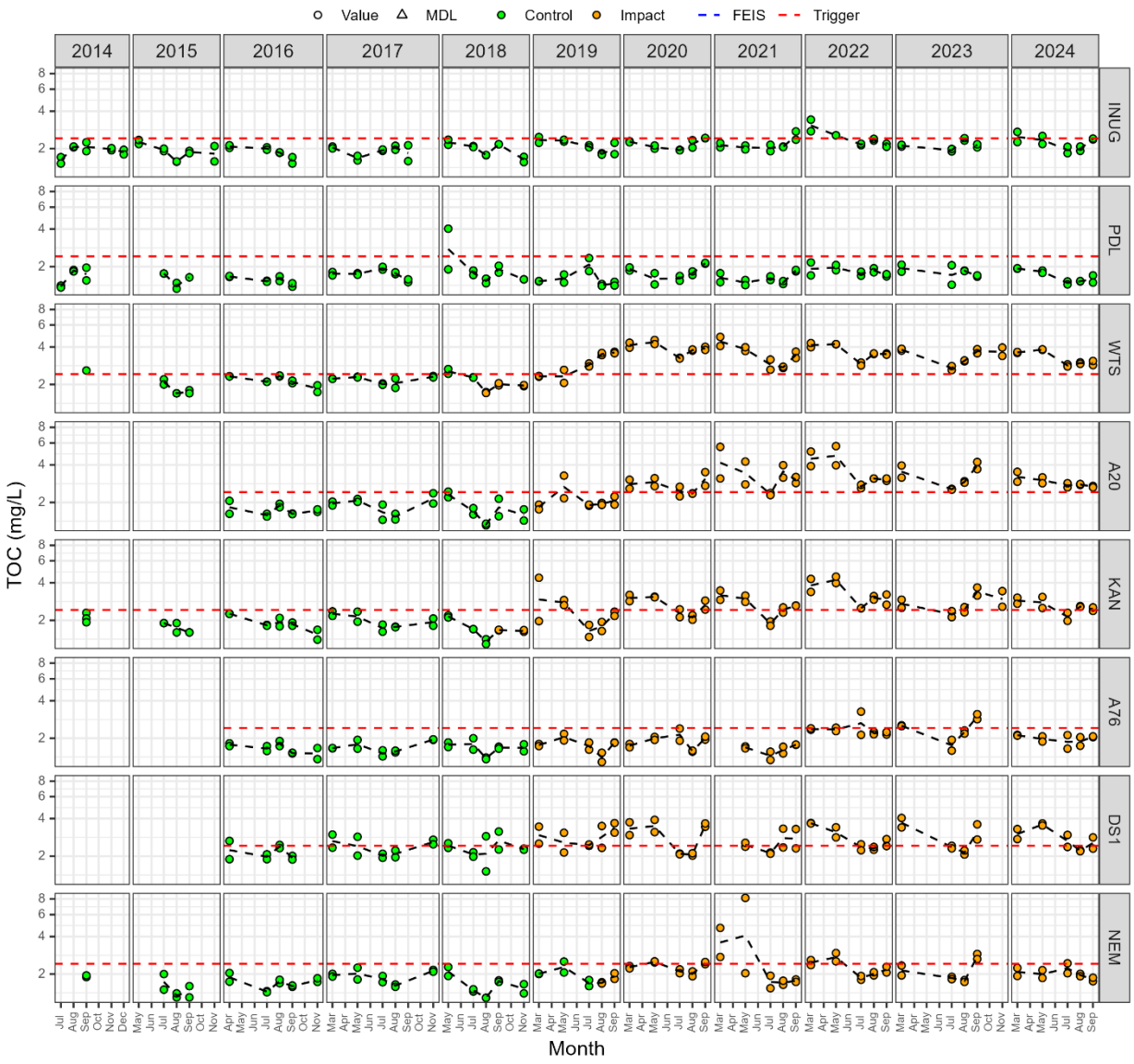


Figure C2-22. Total aluminum (mg/L).

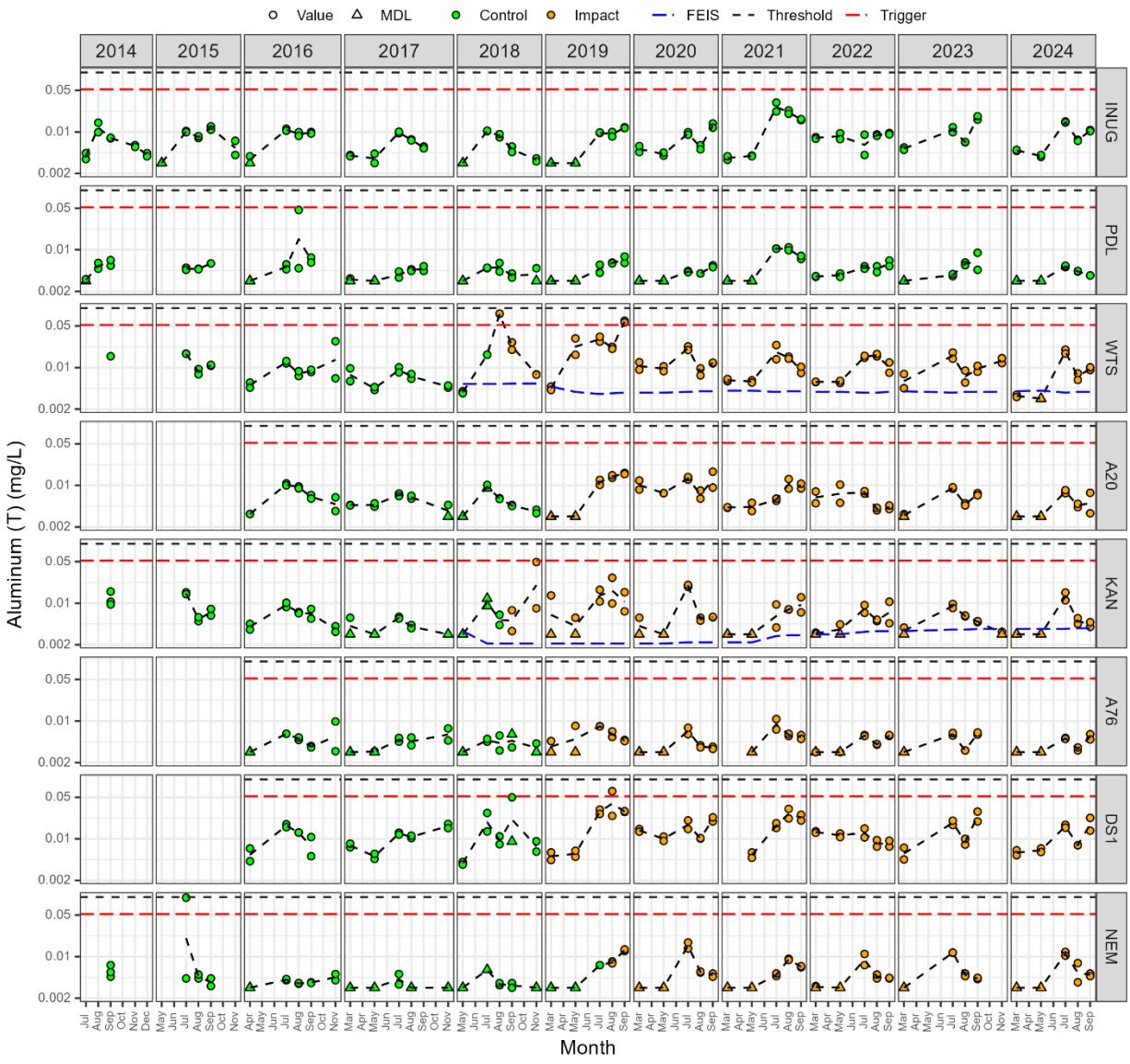


Figure C2-23. Total antimony (mg/L).

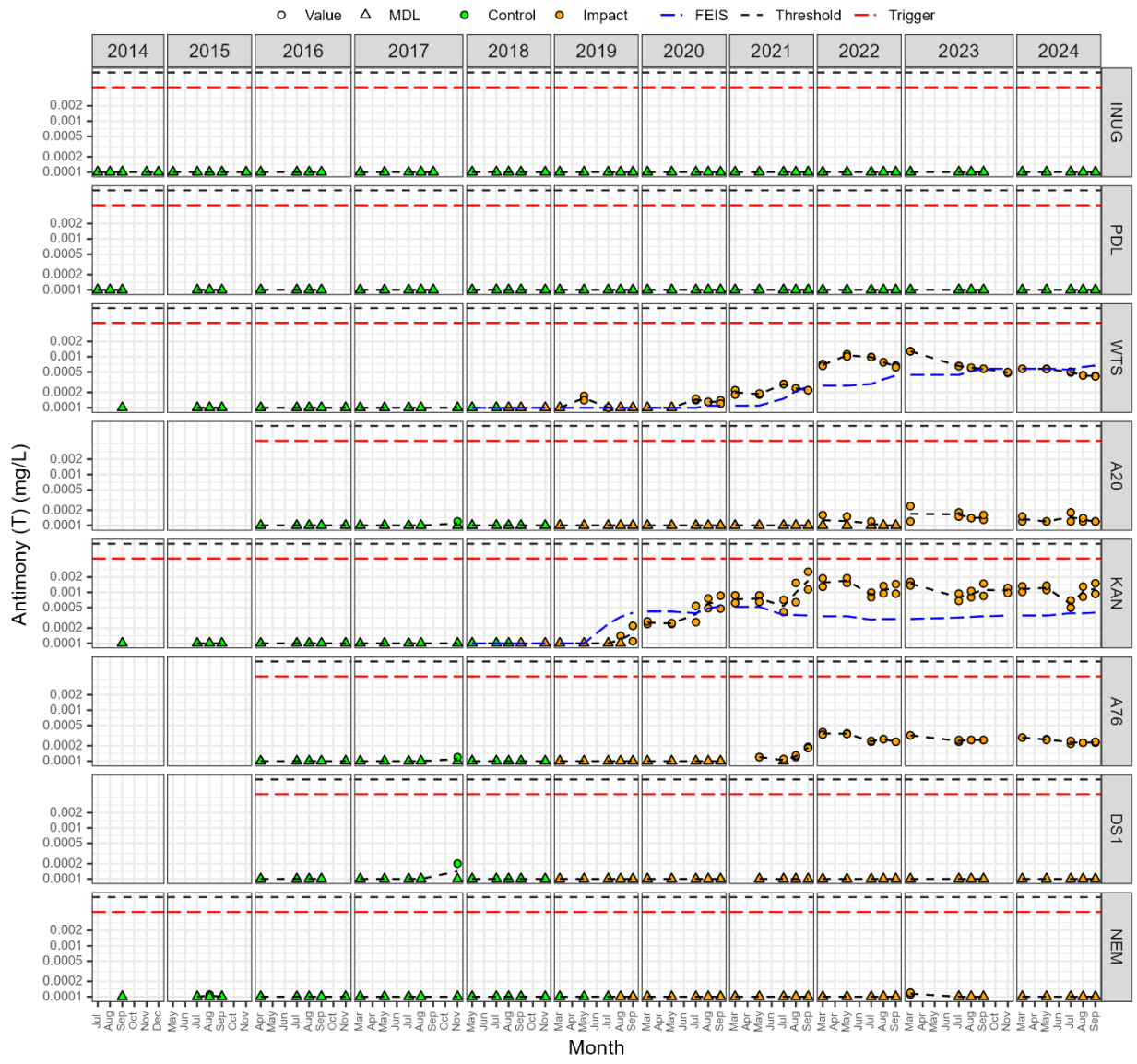


Figure C2-24. Total arsenic (mg/L).

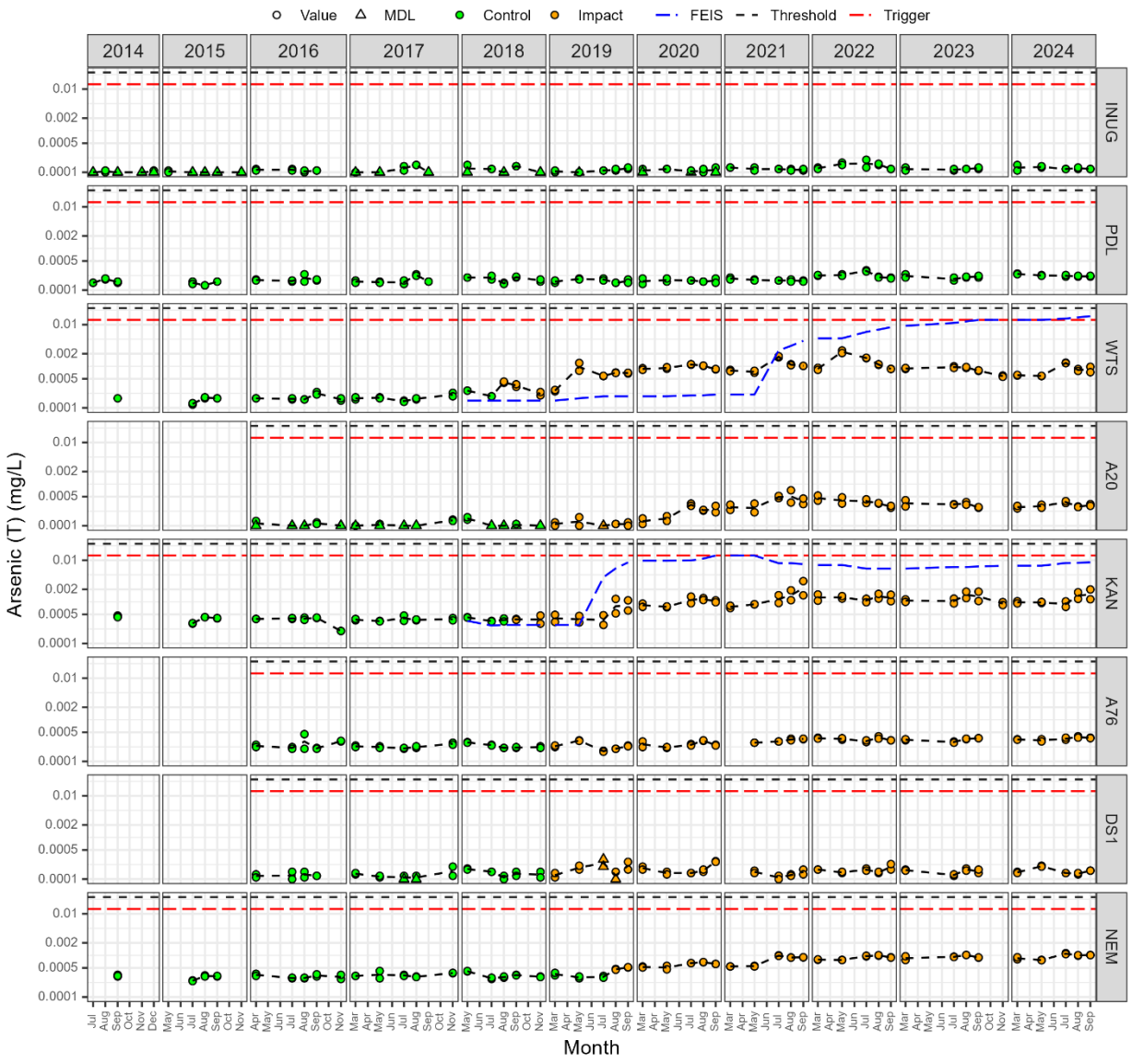


Figure C2-25. Total barium (mg/L).

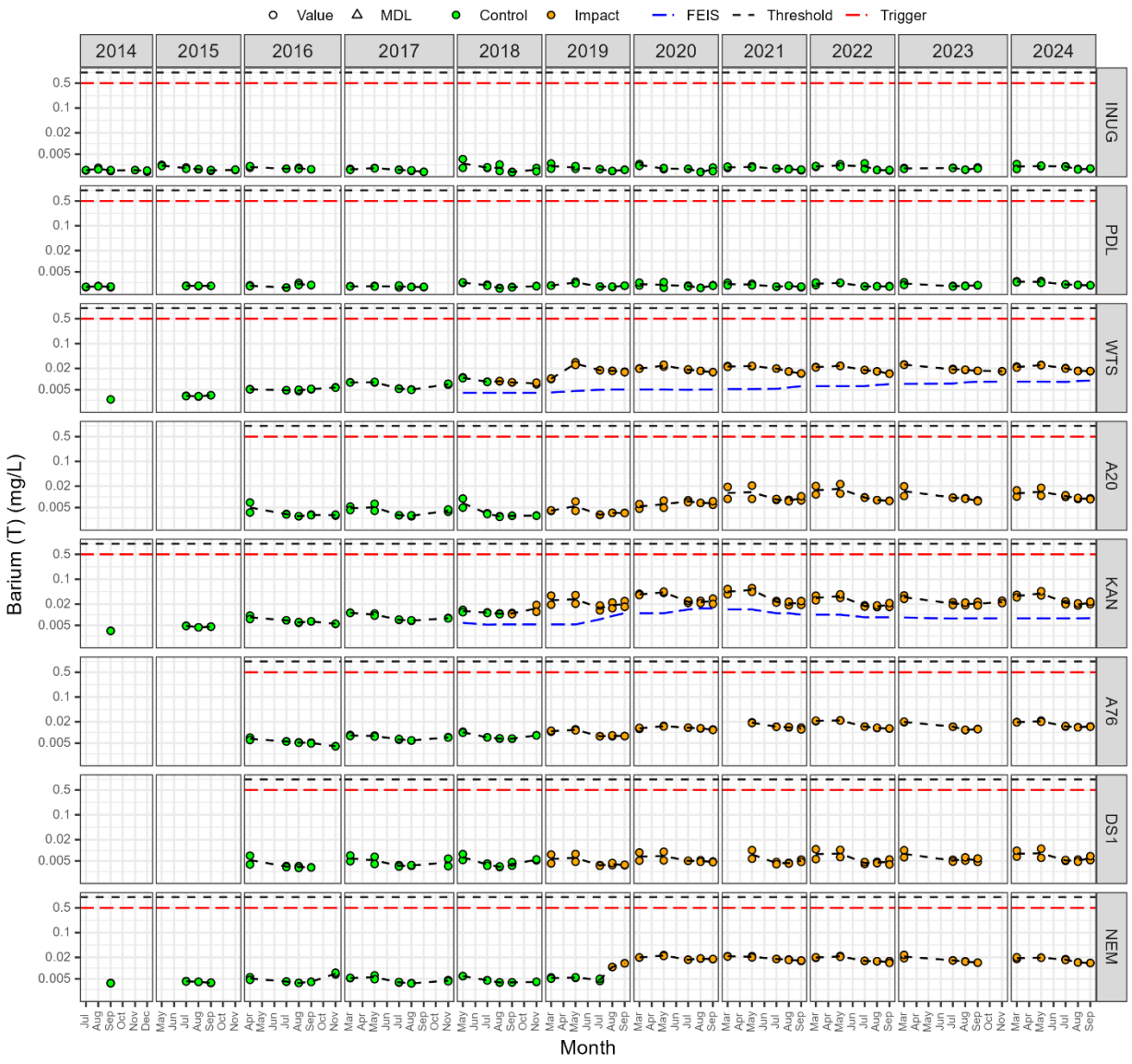


Figure C2-26. Total beryllium (mg/L).

Note: Detection limits for beryllium were revised in 2018 due to method re-validation and analysis at the lower detection limit is no longer available at ALS (Pers. Comm. Brent Mack, ALS November 28, 2022).

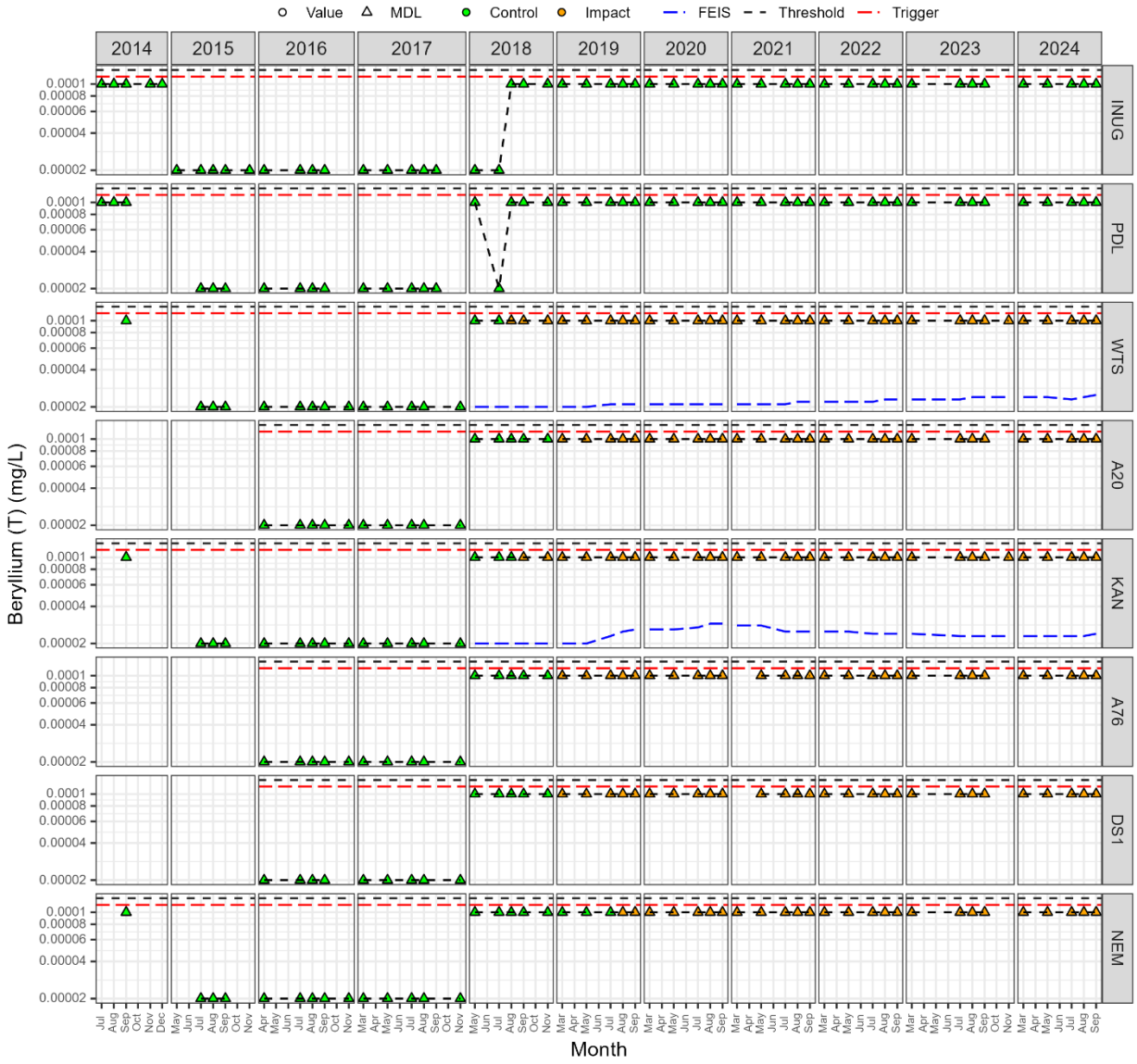


Figure C2-27. Total boron (mg/L).

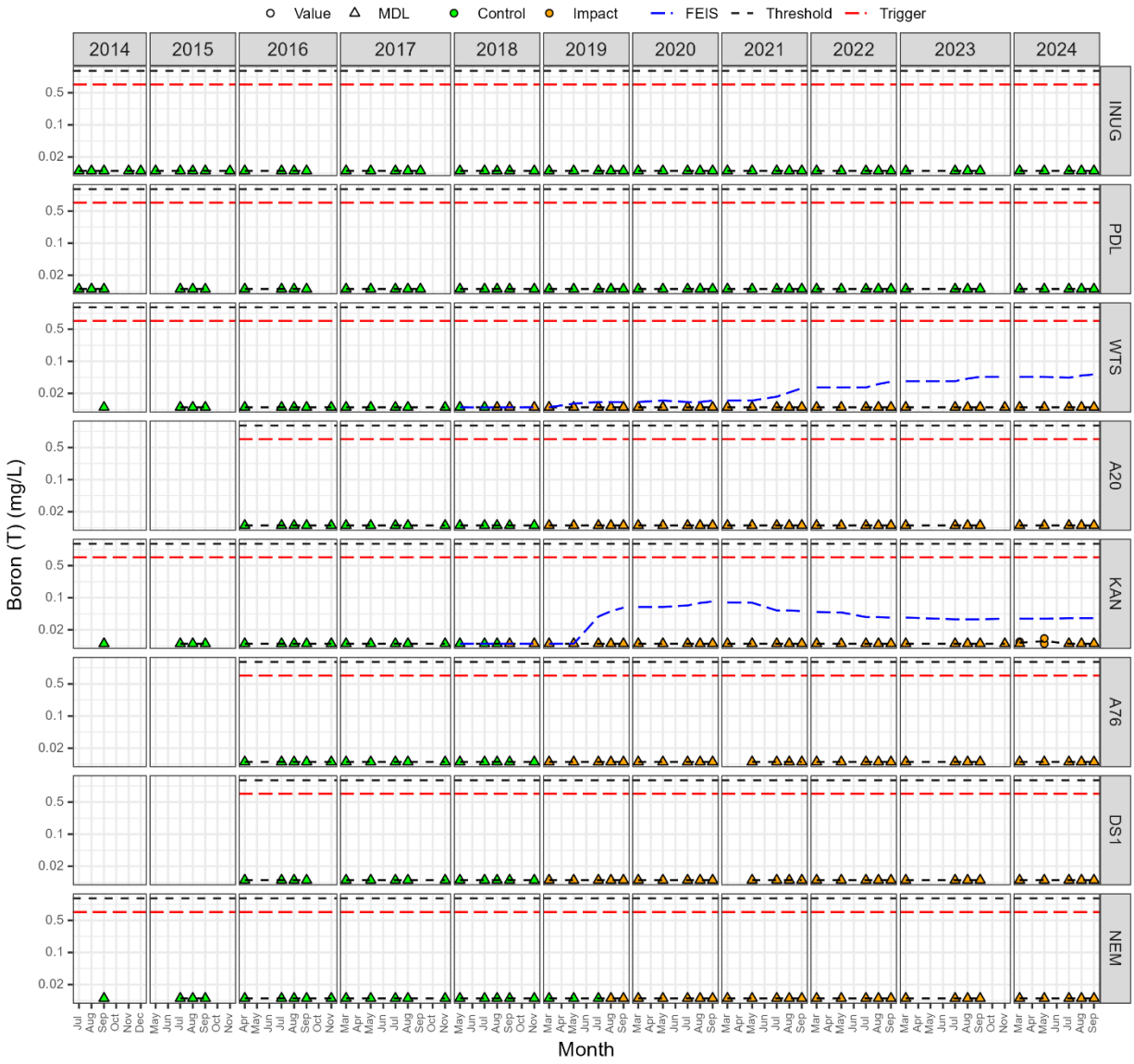


Figure C2-28. Total cadmium (mg/L).

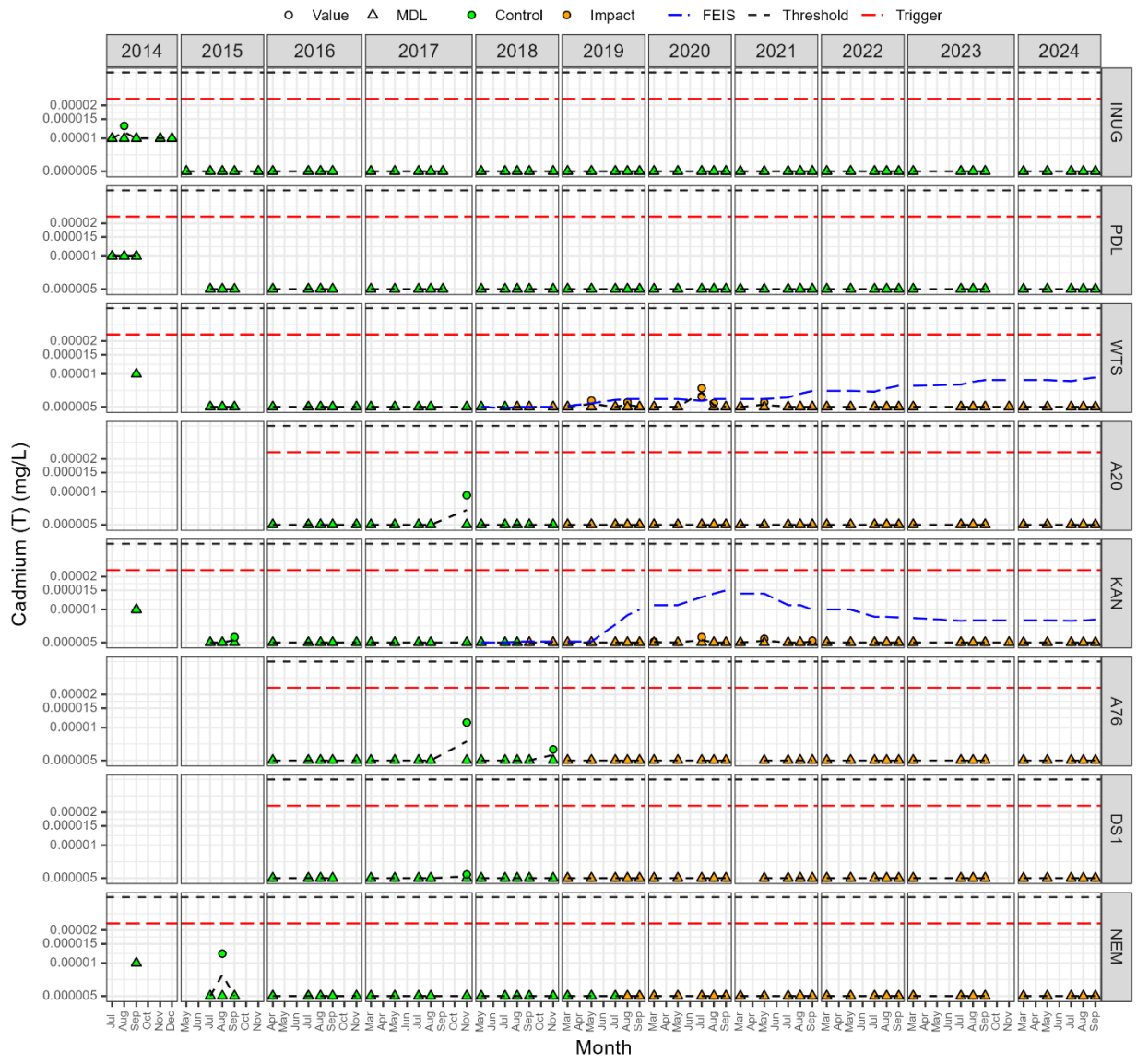


Figure C2-29. Total calcium (mg/L).

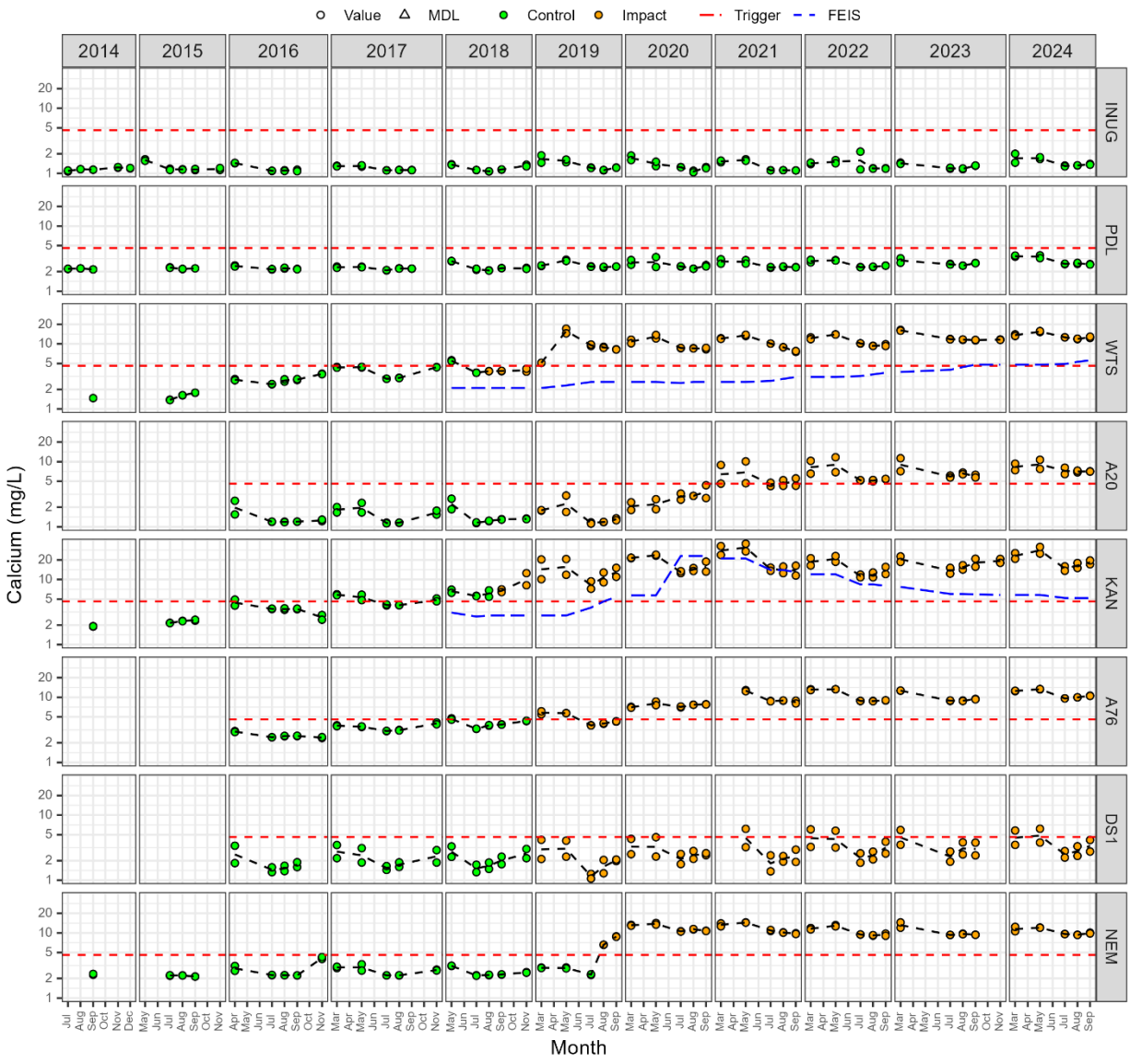


Figure C2-30. Total chromium (mg/L).

Note: The detection limit was revised in 2021 due to method re-validation (Pers. Comm. Brent Mack, ALS November 28, 2022). Low-level chromium analysis is available at a cost and was requested for samples starting in 2024.

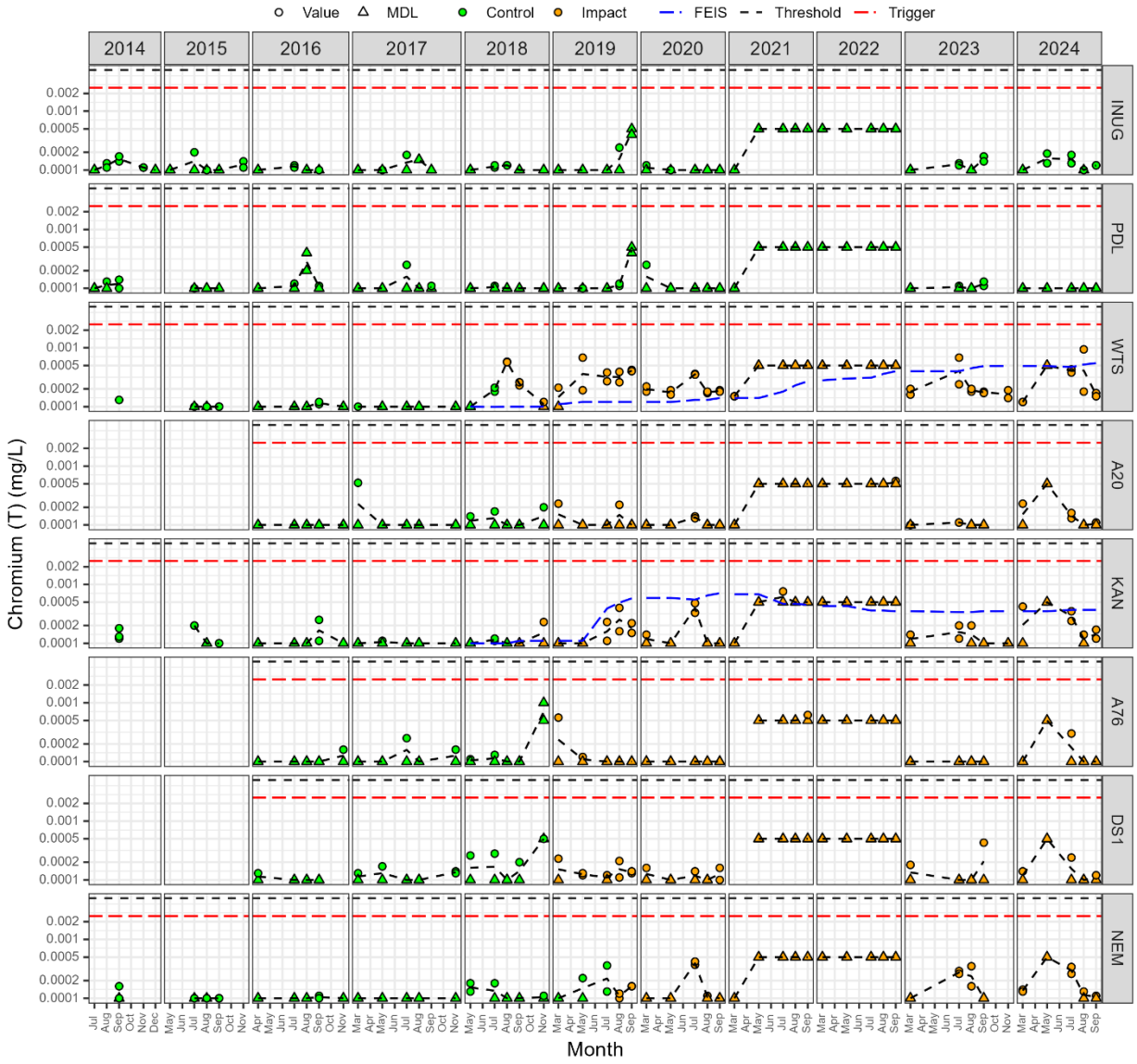


Figure C2-31. Total copper (mg/L).

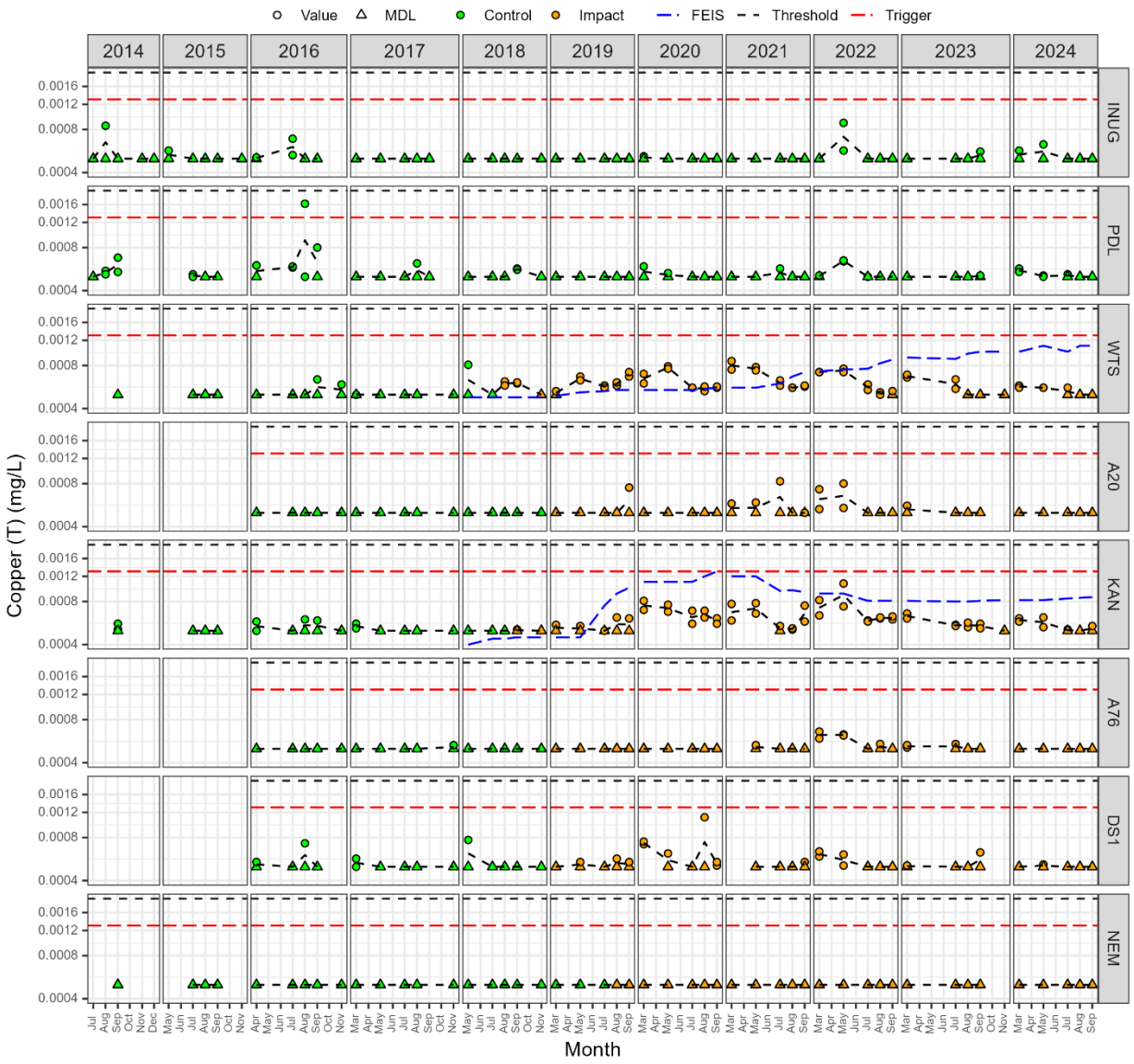


Figure C2-32. Total iron (mg/L).

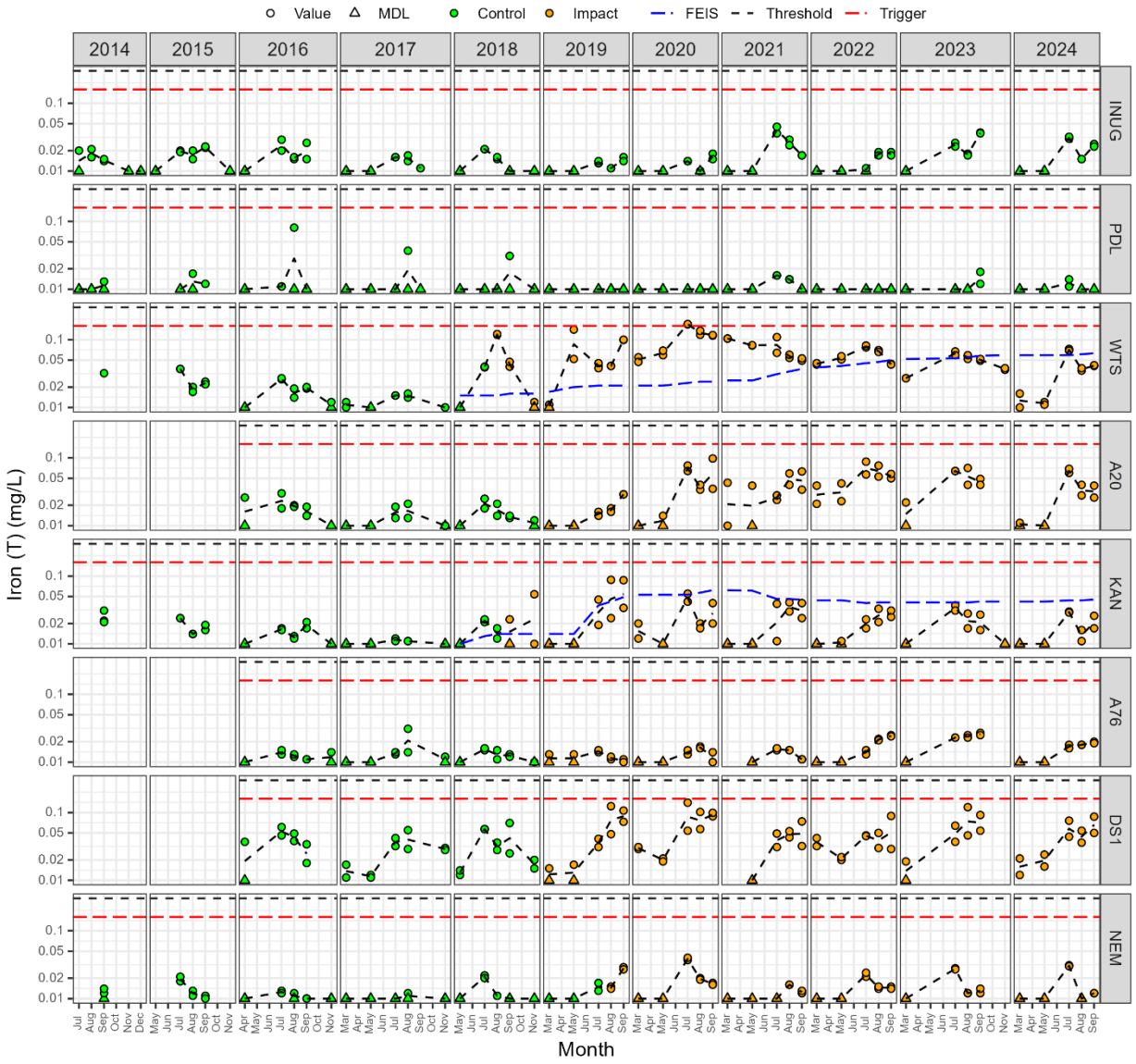


Figure C2-33. Total lead (mg/L).

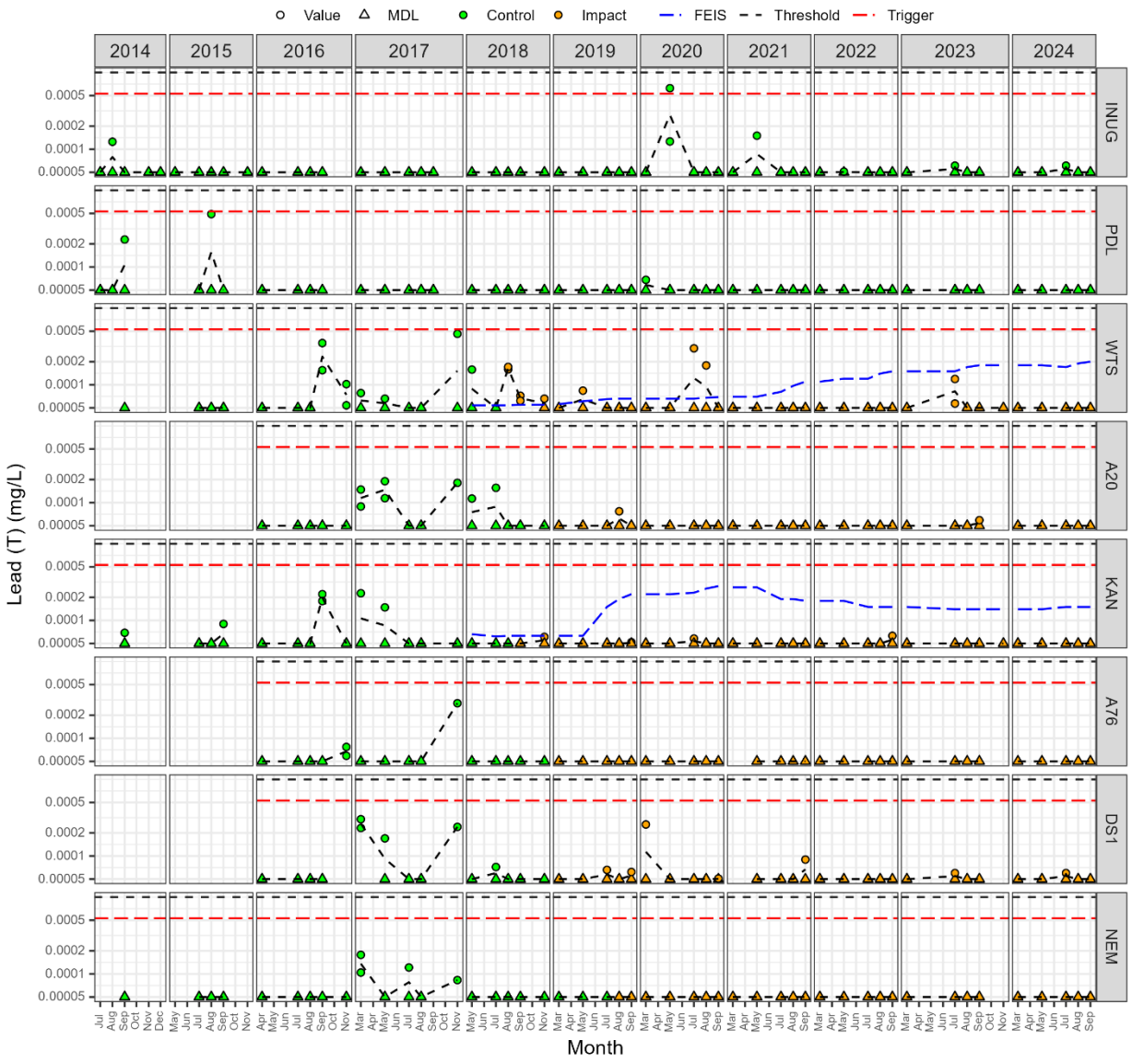


Figure C2-34. Total lithium (mg/L).

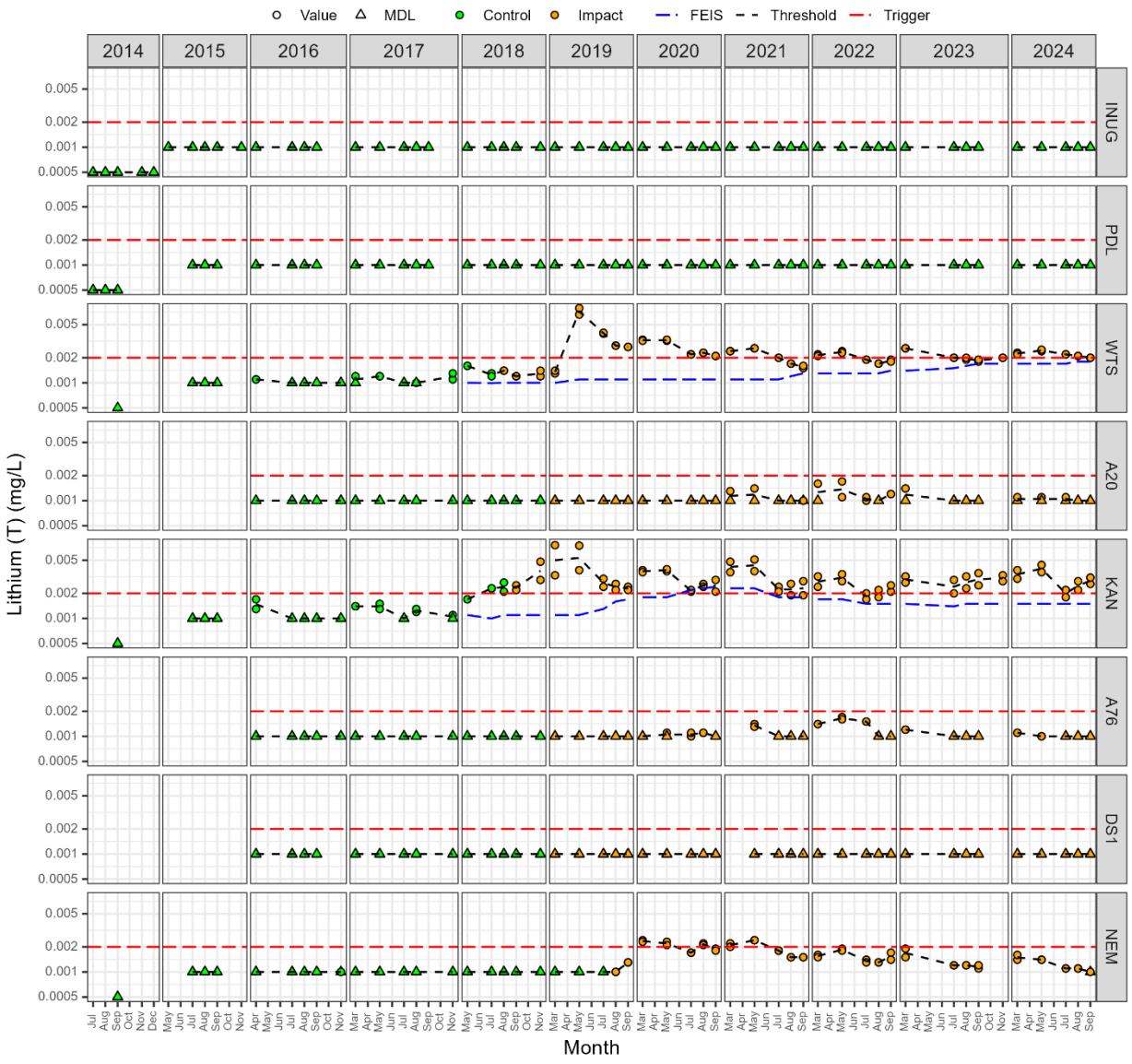


Figure C2-35. Total manganese (mg/L).

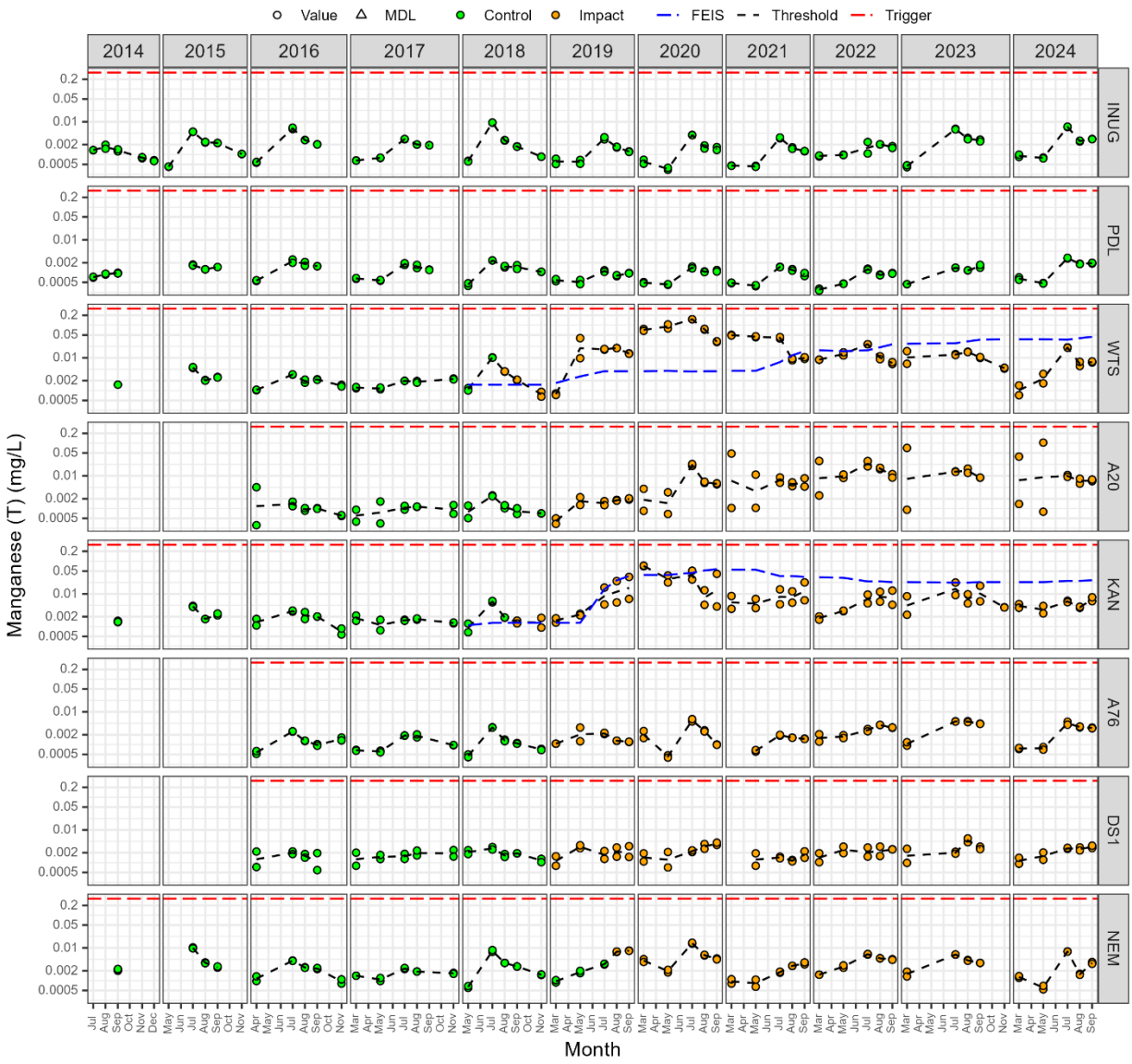


Figure C2-36. Total magnesium (mg/L).

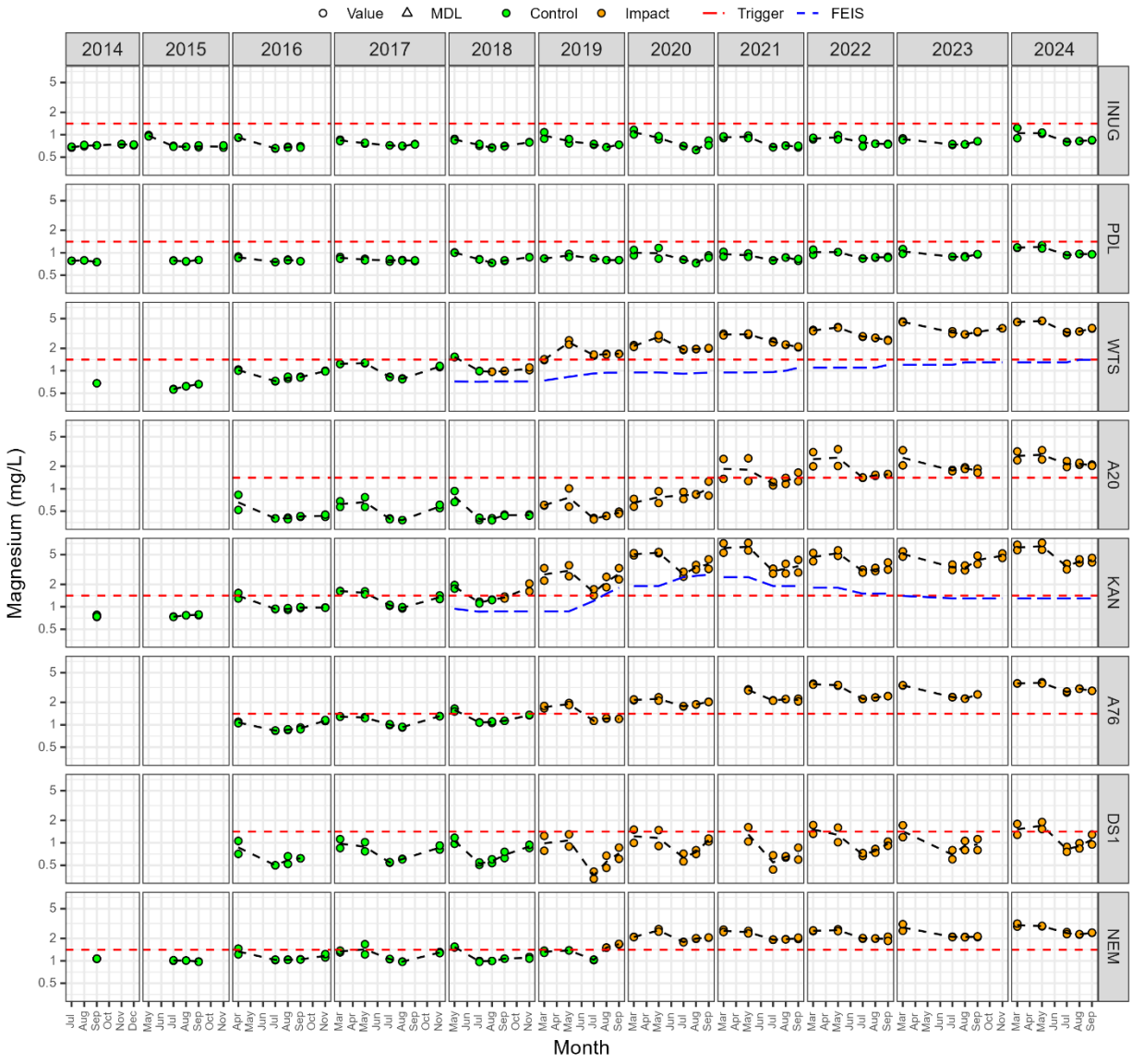


Figure C2-37. Total mercury (mg/L).

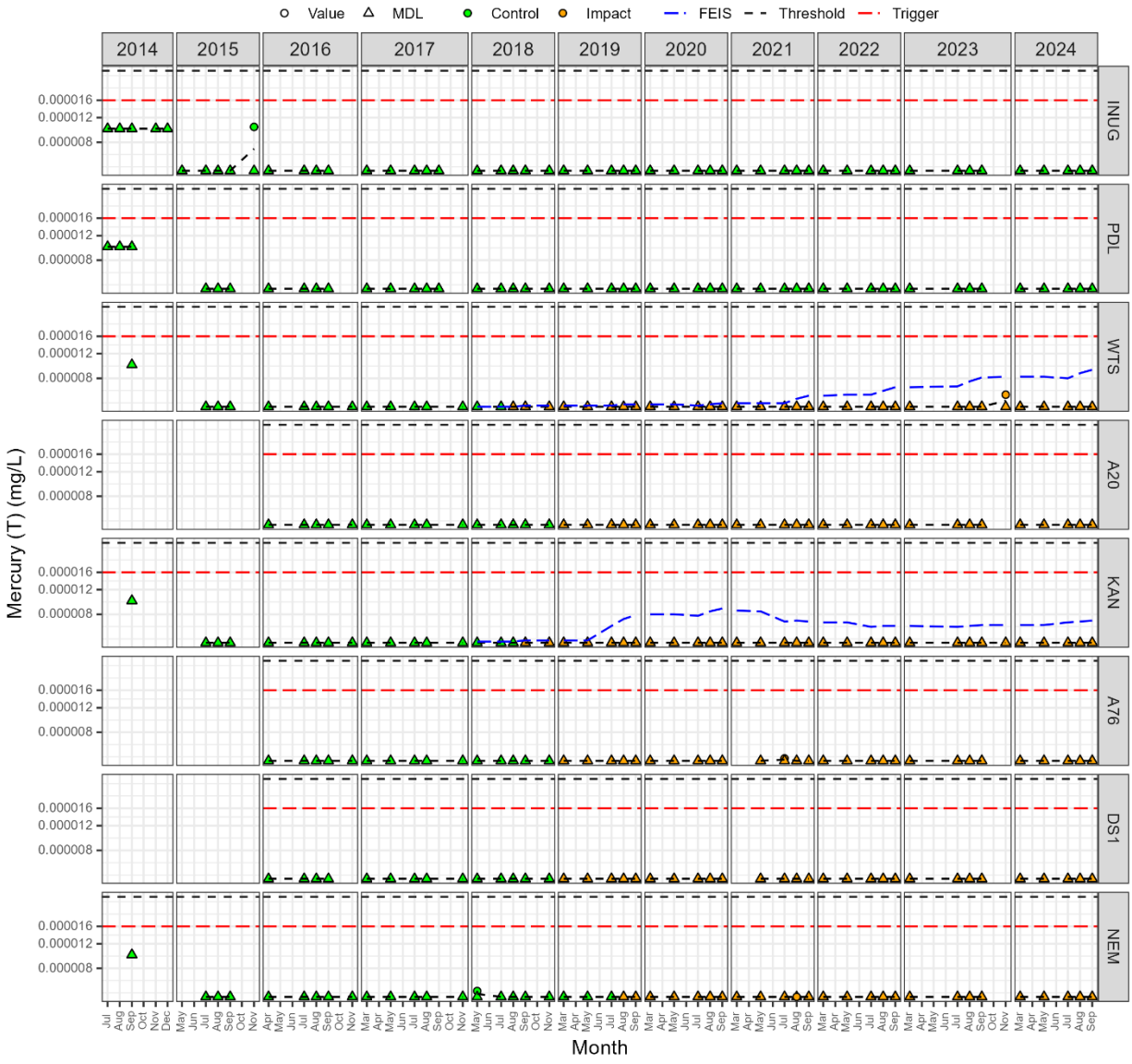


Figure C2-38. Total molybdenum (mg/L).

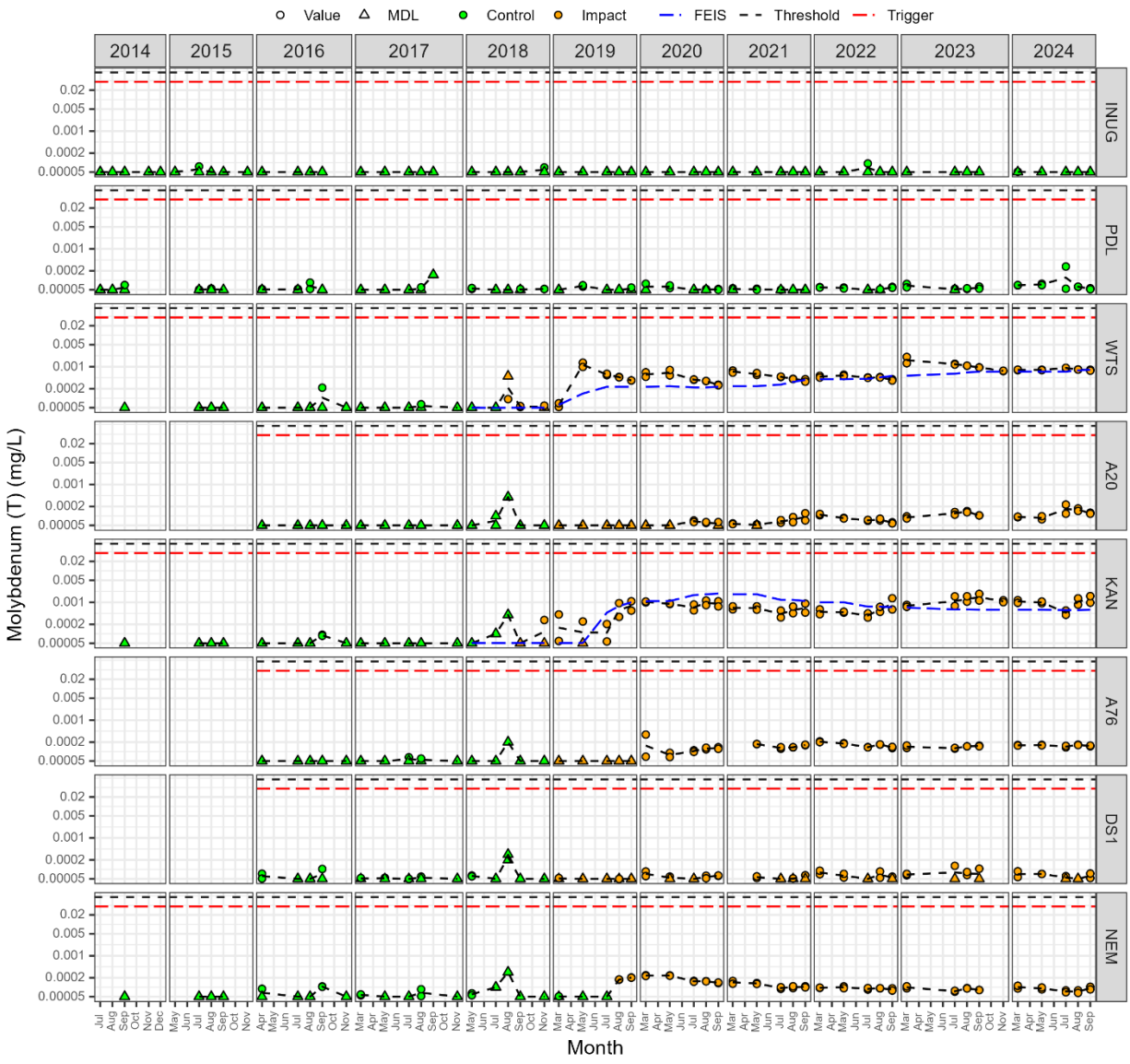


Figure C2-39. Total nickel (mg/L).

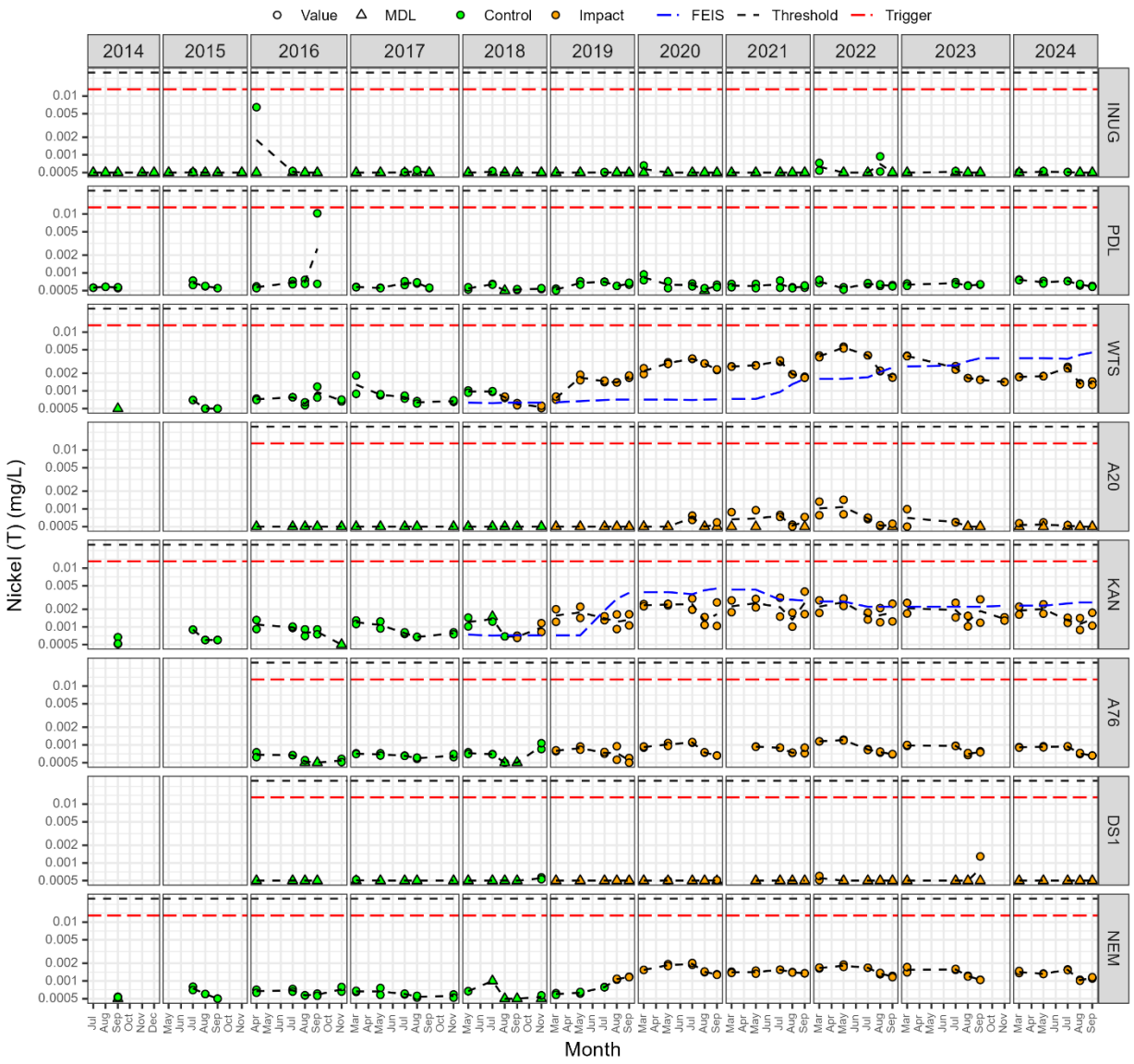


Figure C2-40. Total potassium (mg/L).

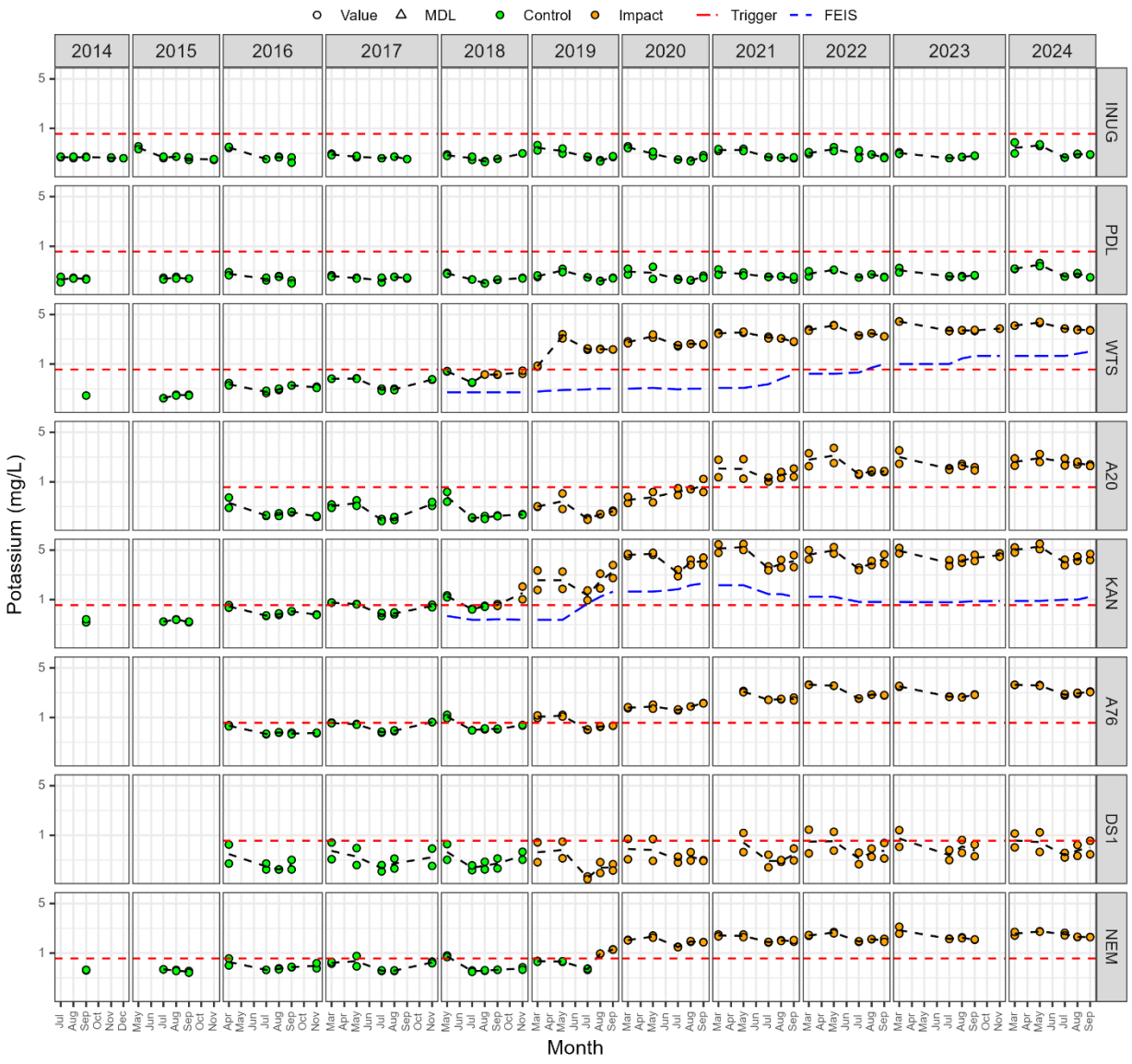


Figure C2-41. Total selenium (mg/L).

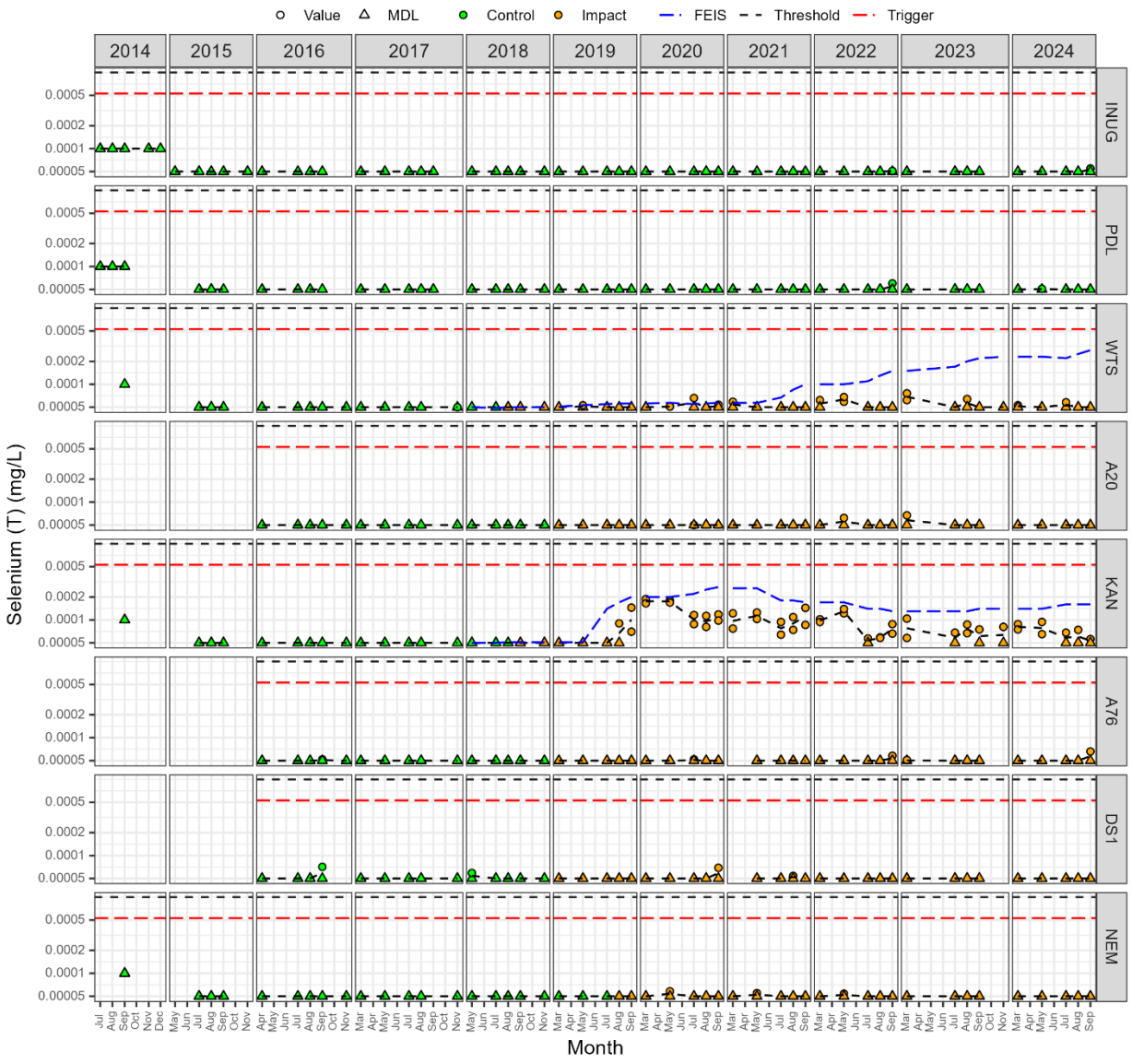


Figure C2-42. Total silicon (mg/L).

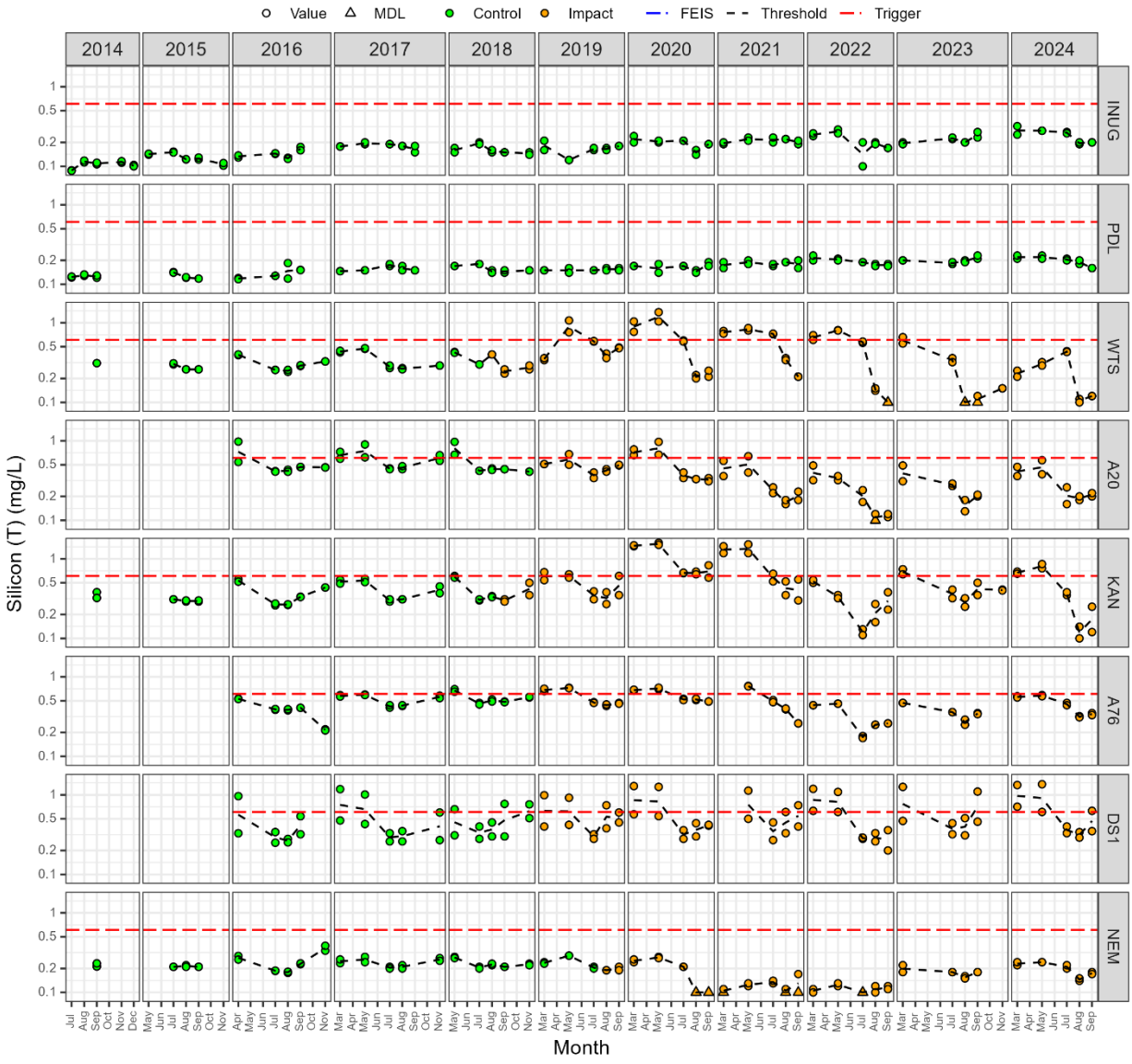


Figure C2-43. Total silver (mg/L).

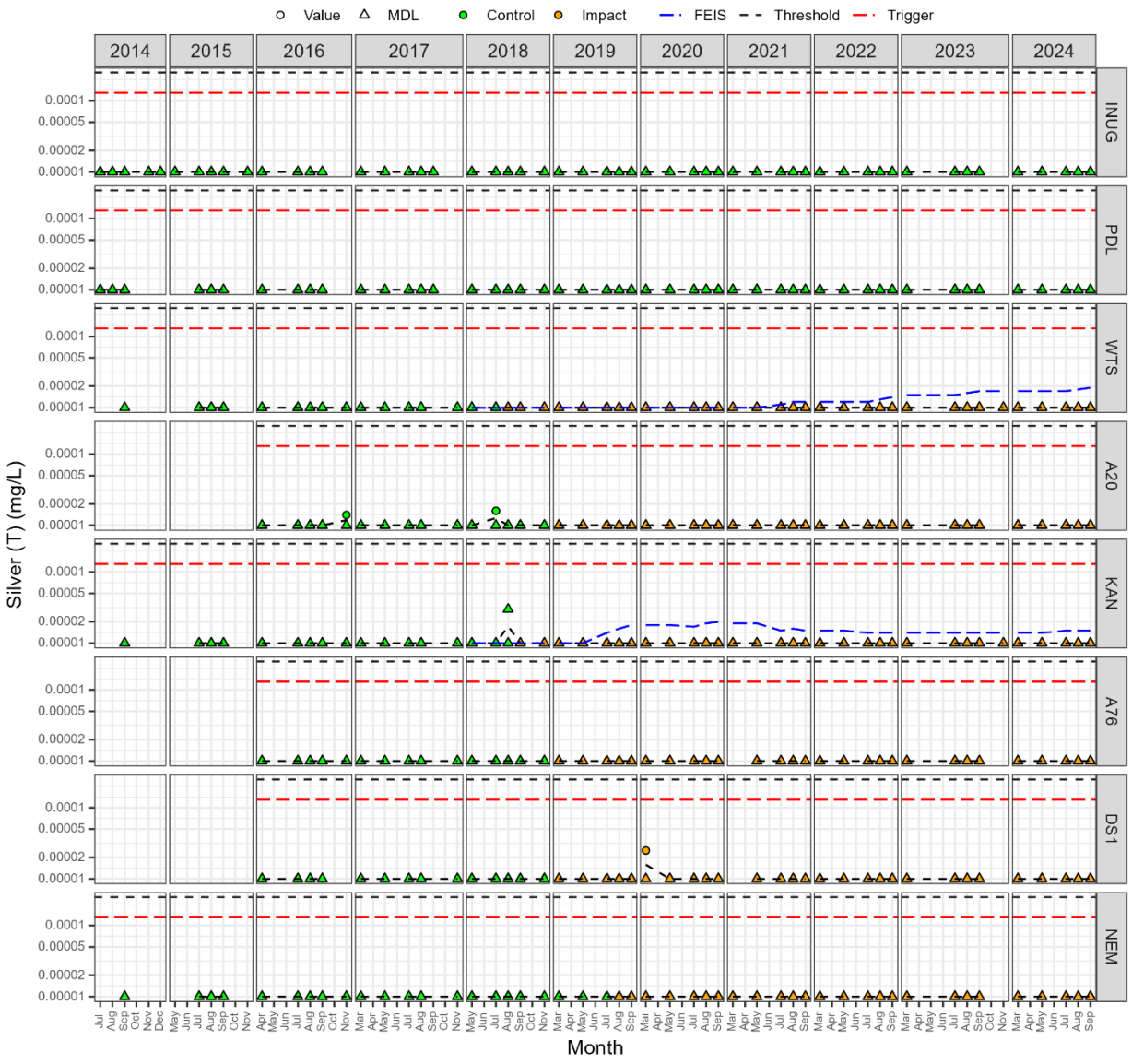


Figure C2-44. Total sodium (mg/L).

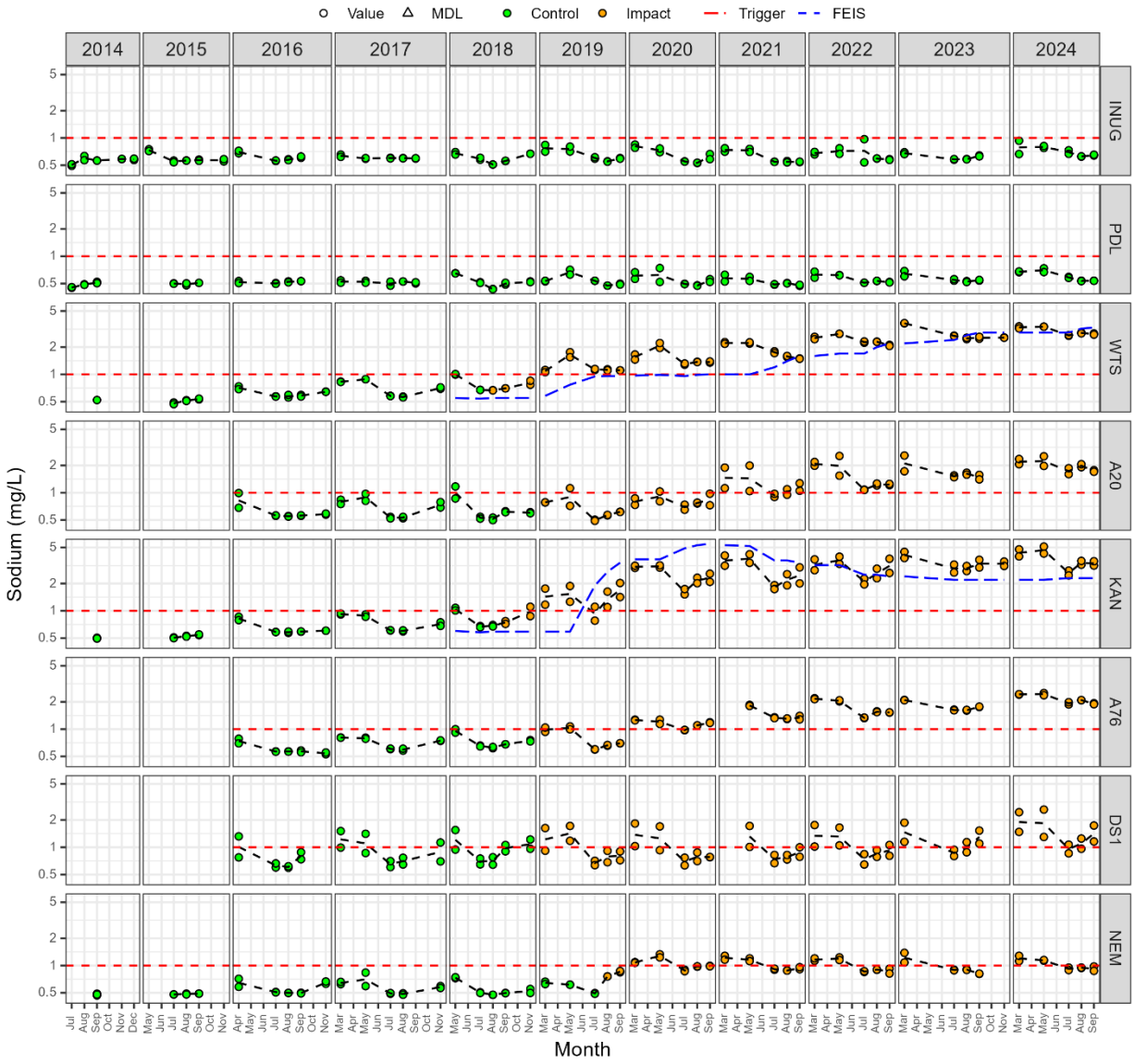


Figure C2-45. Total strontium (mg/L).

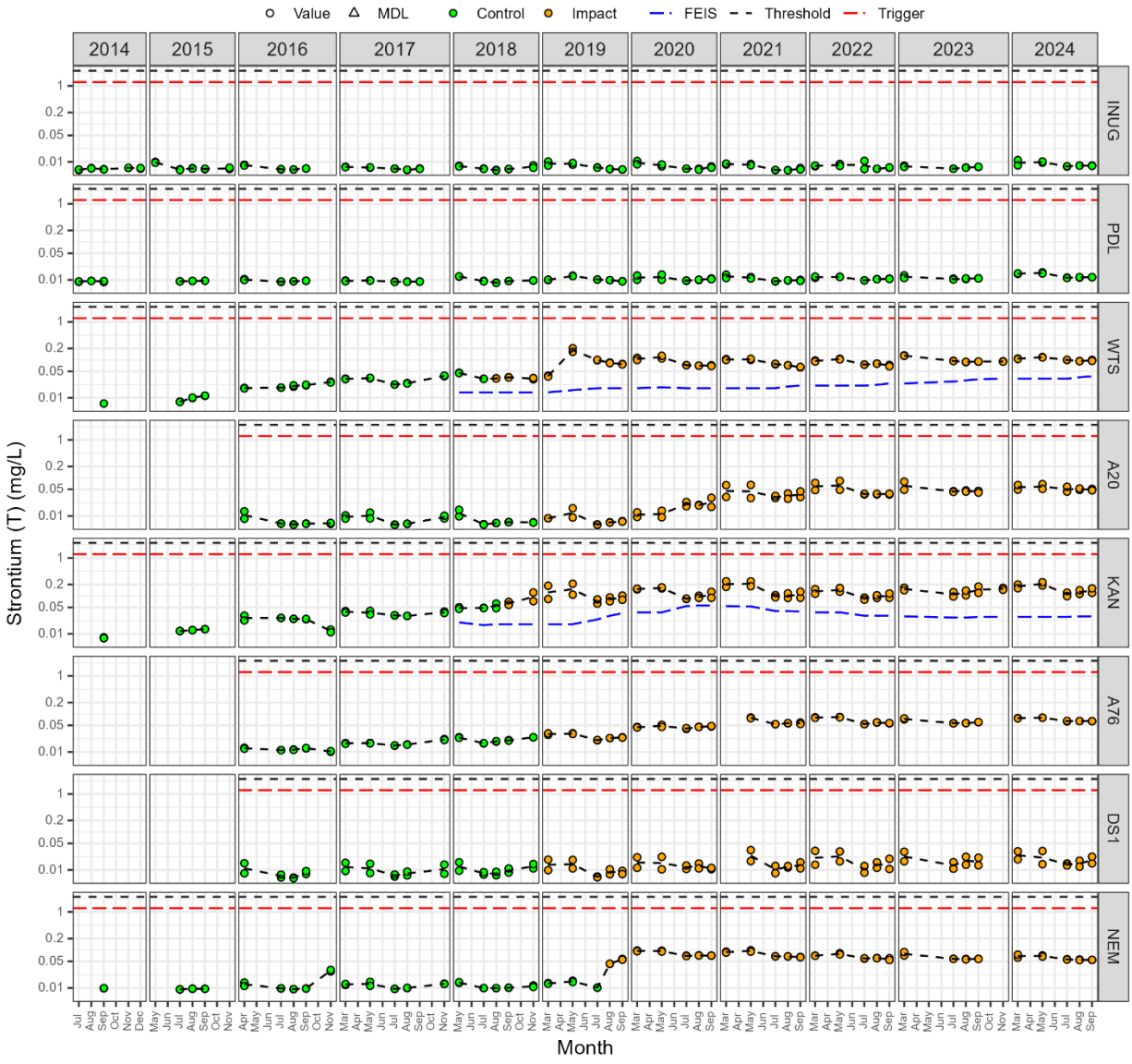


Figure C2-46. Total thallium (mg/L).

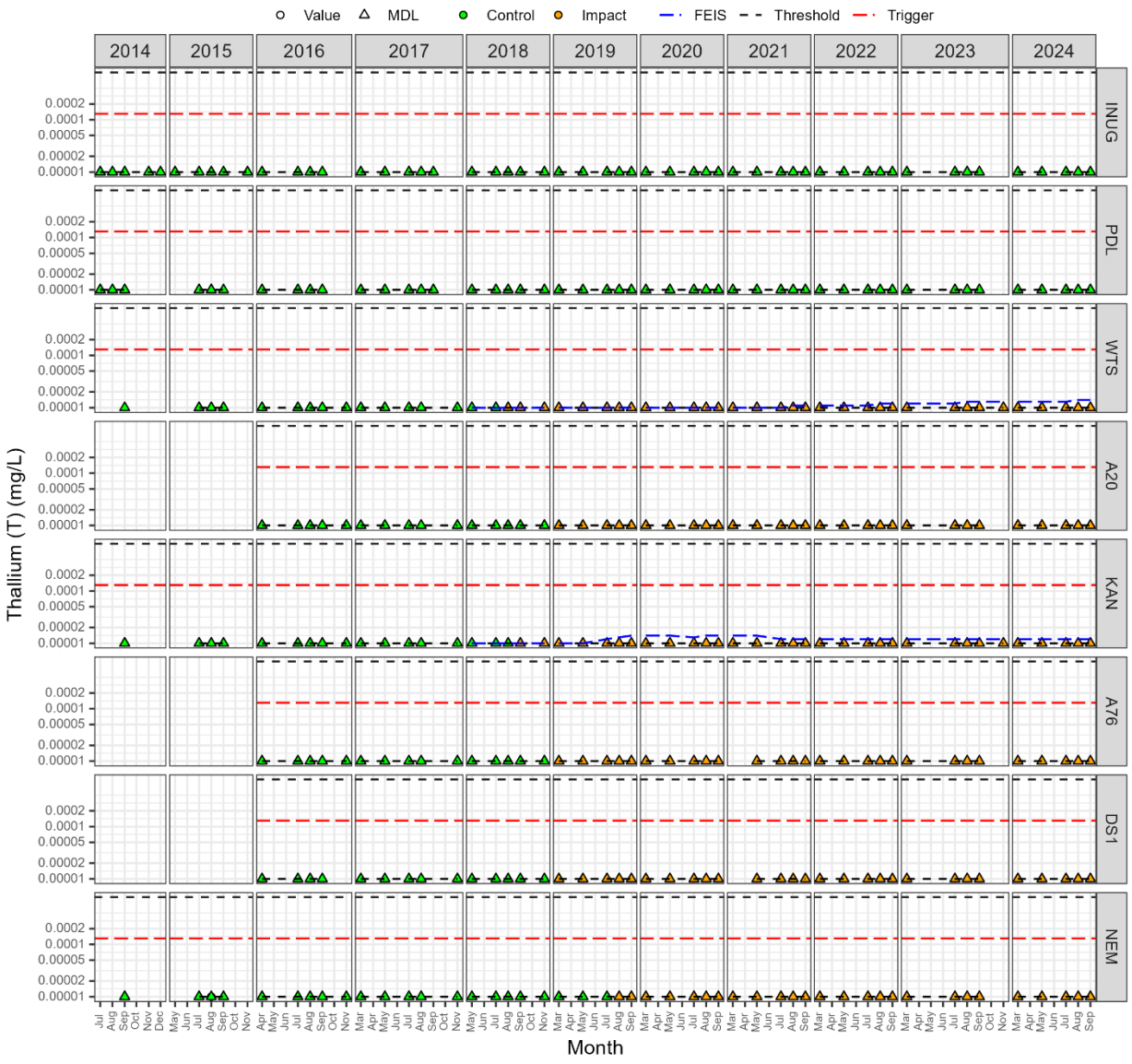


Figure C2-47. Total tin (mg/L).

Note: Trigger value (0.033 mg/L) not shown as it is much higher than reported values.

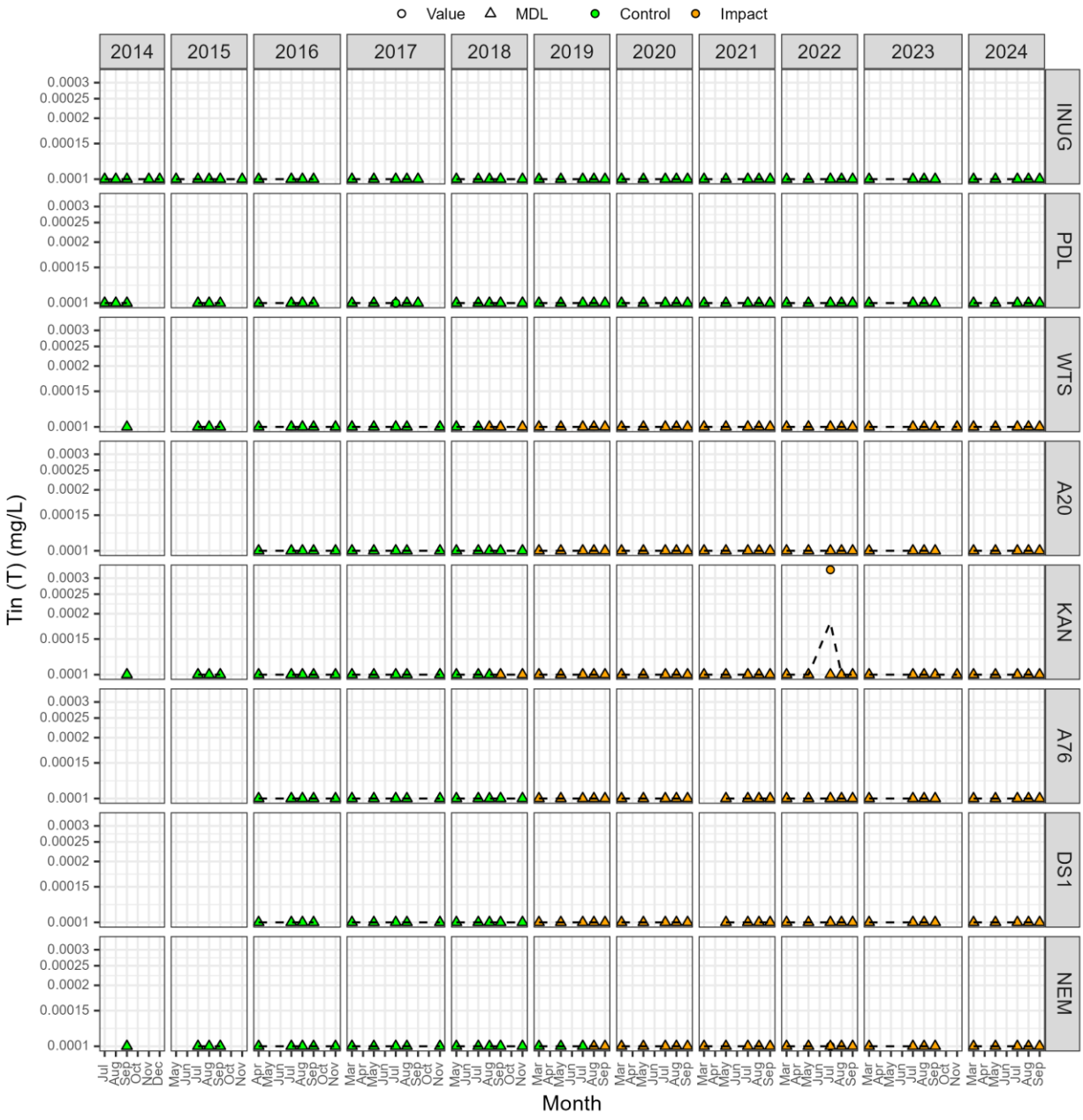


Figure C2-48. Total titanium (mg/L).

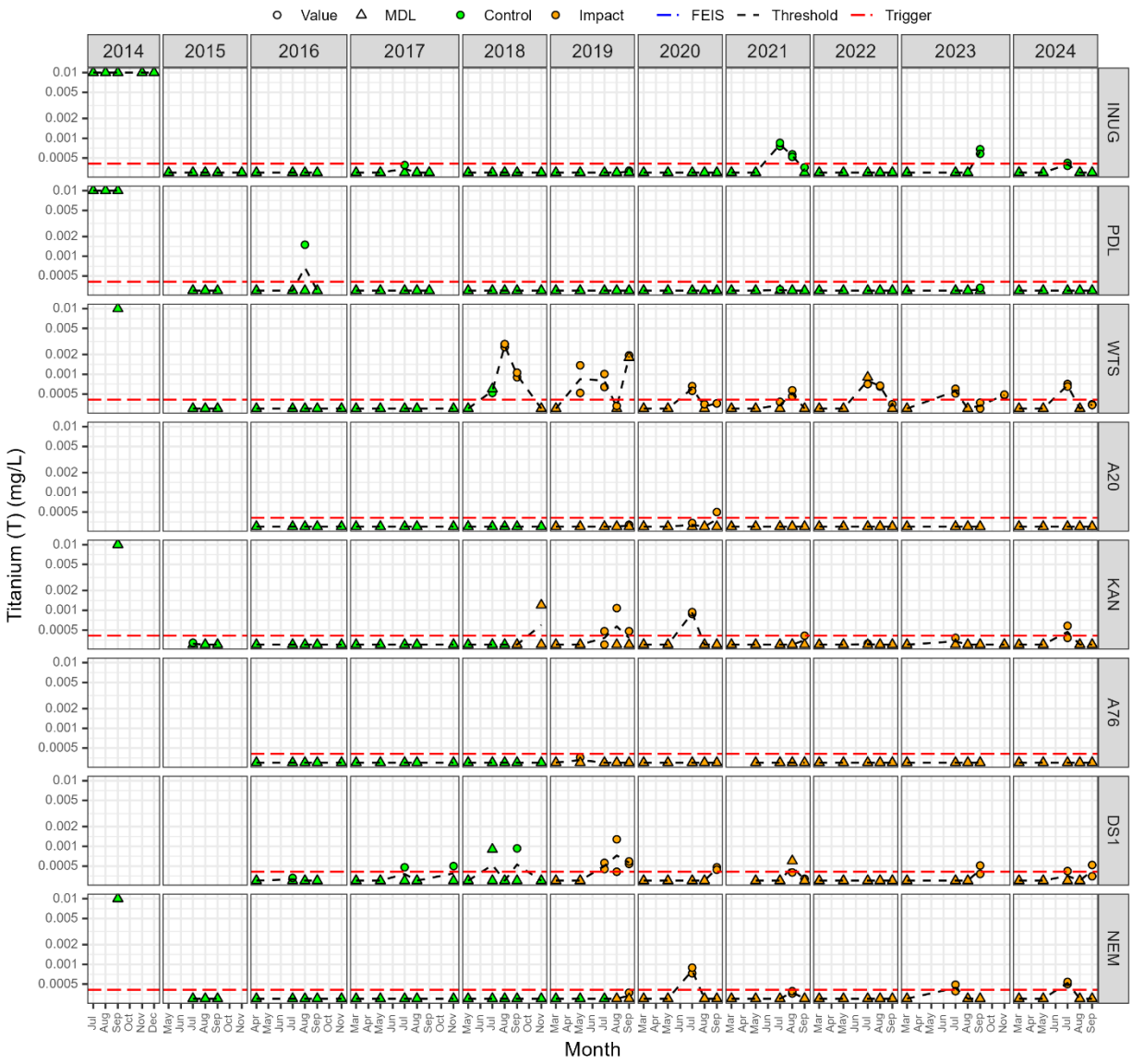


Figure C2-49. Total uranium (mg/L).

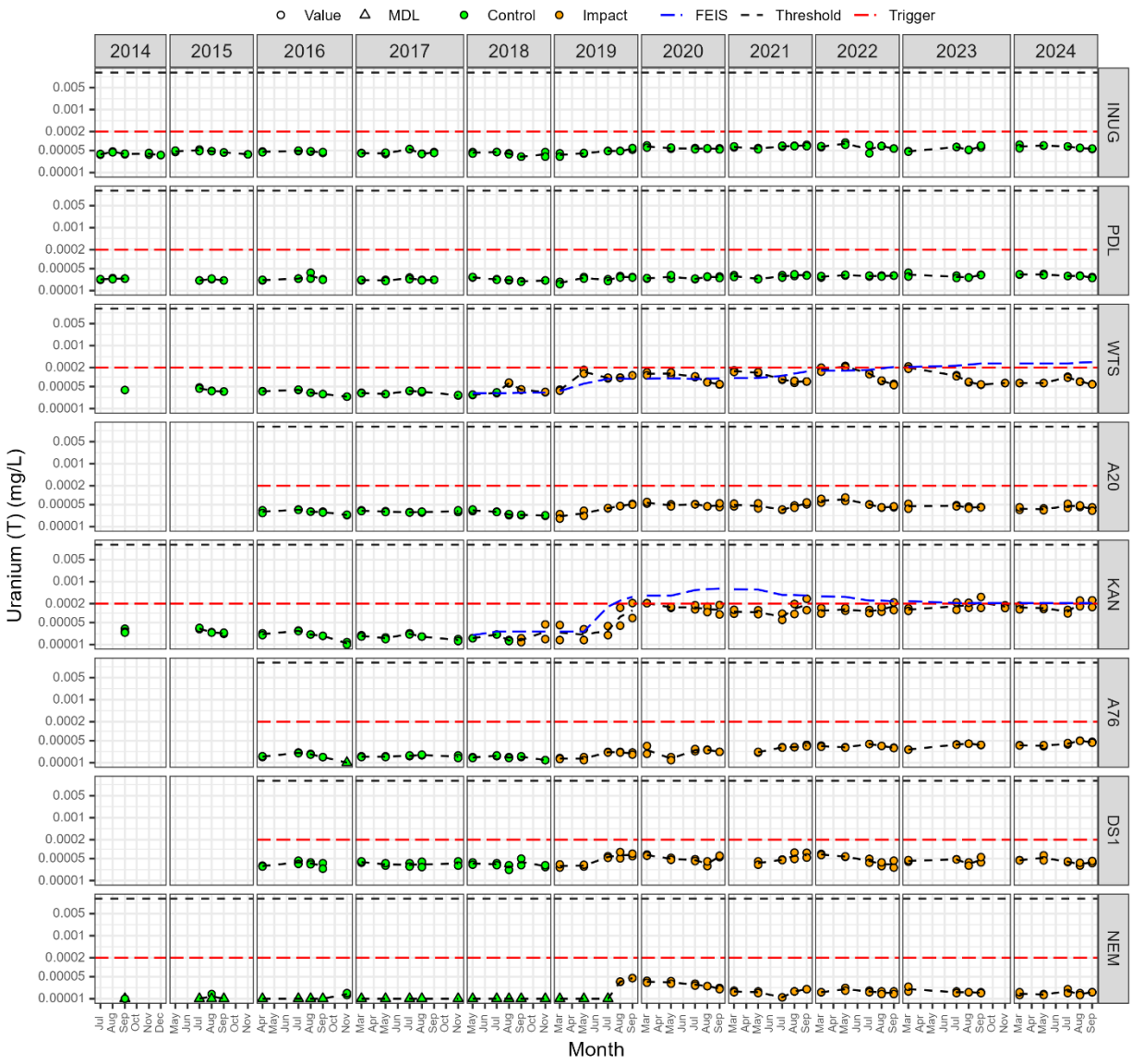


Figure C2-50. Total vanadium (mg/L).

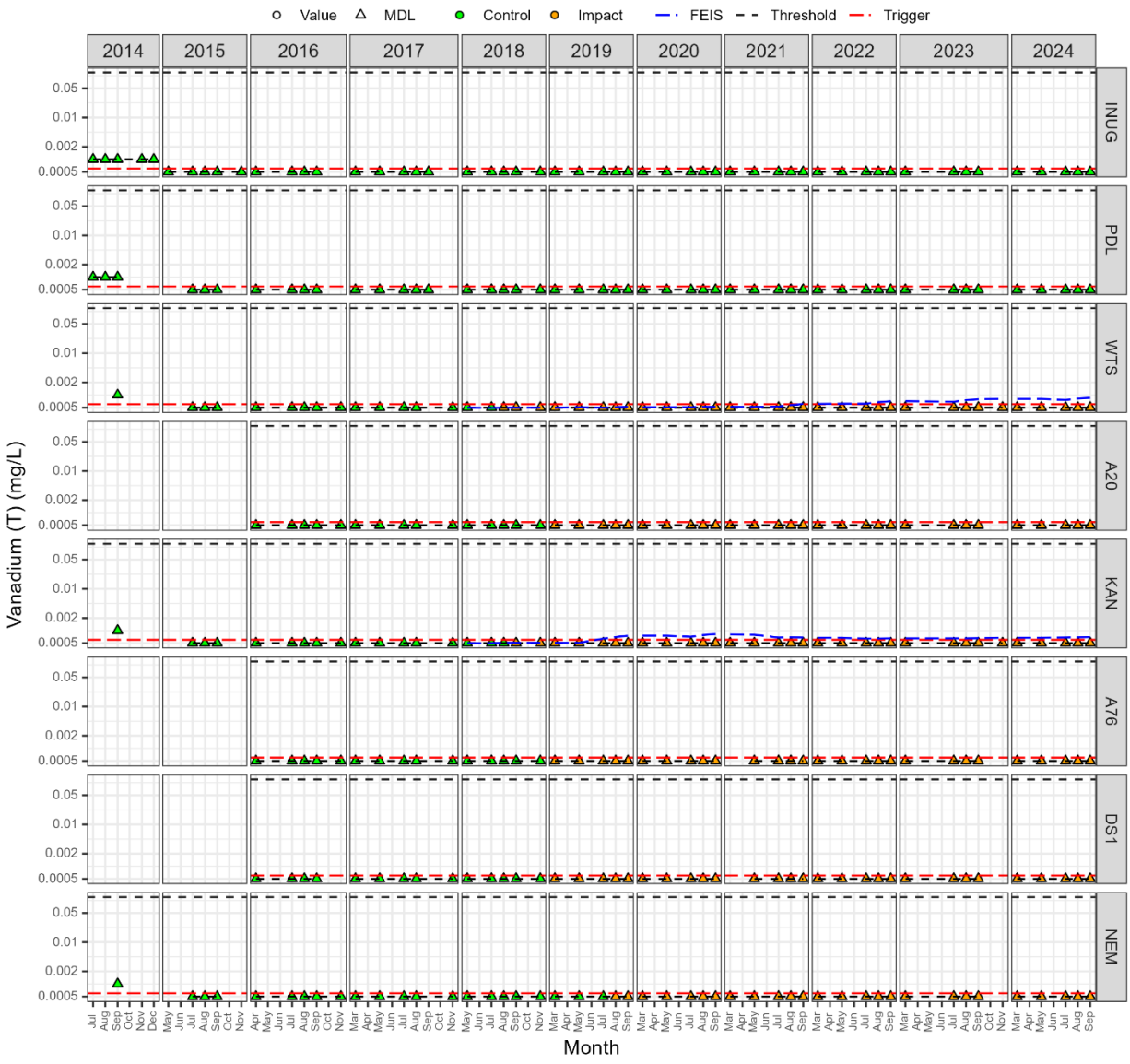


Figure C2-51. Total zinc (mg/L).

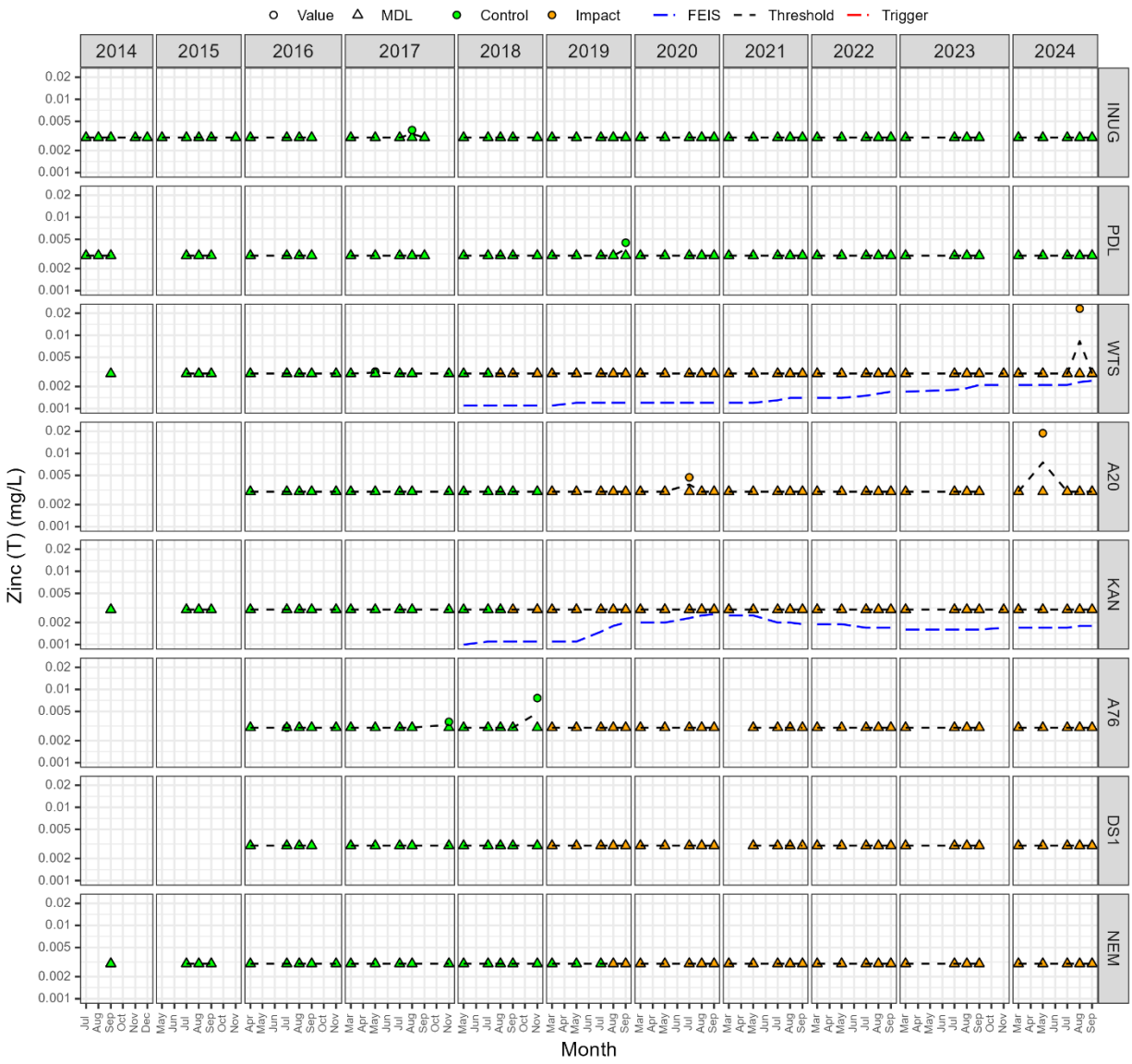


Figure C2-52. Dissolved aluminum (mg/L).

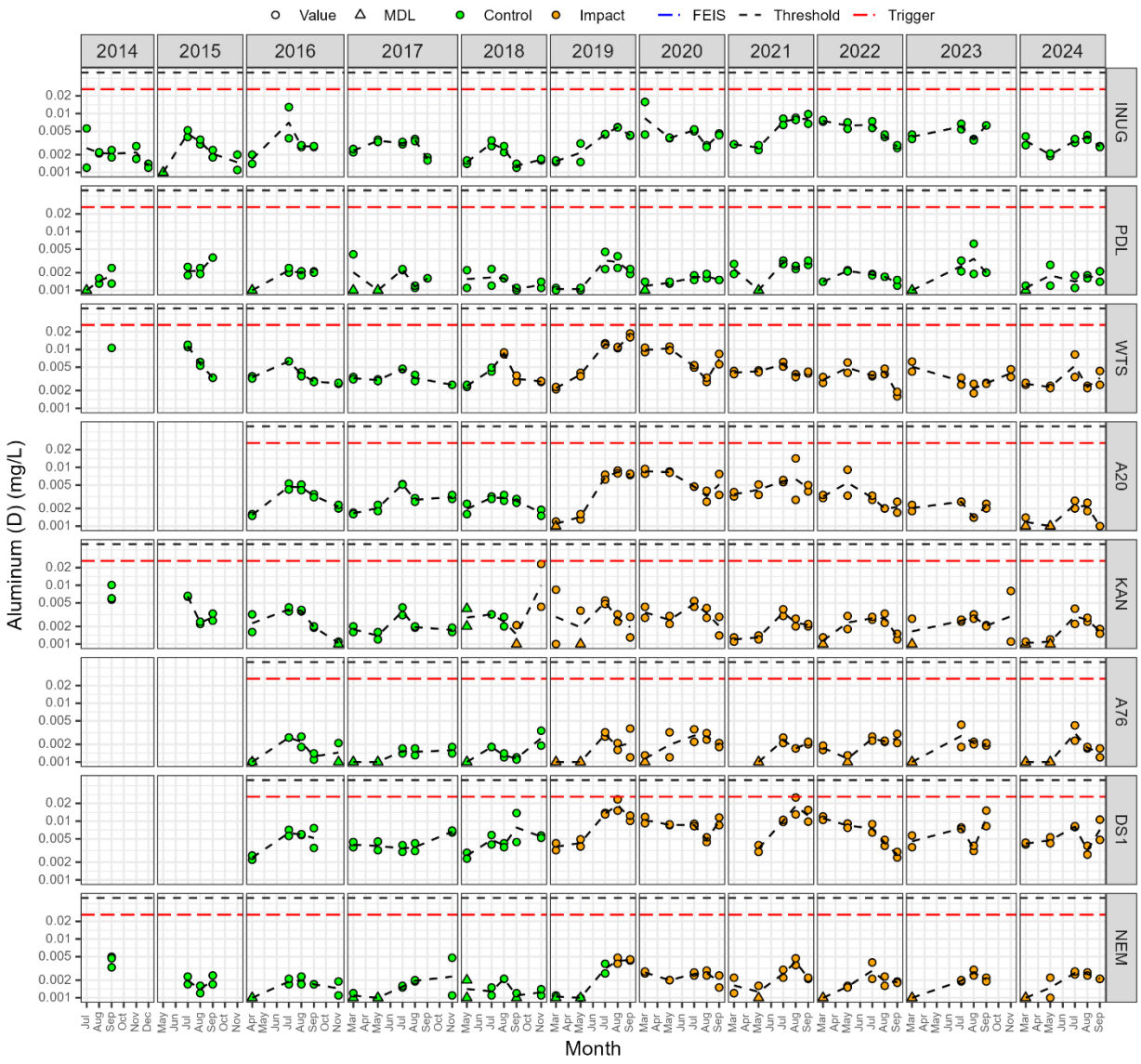


Figure C2-53. Dissolved antimony (mg/L).

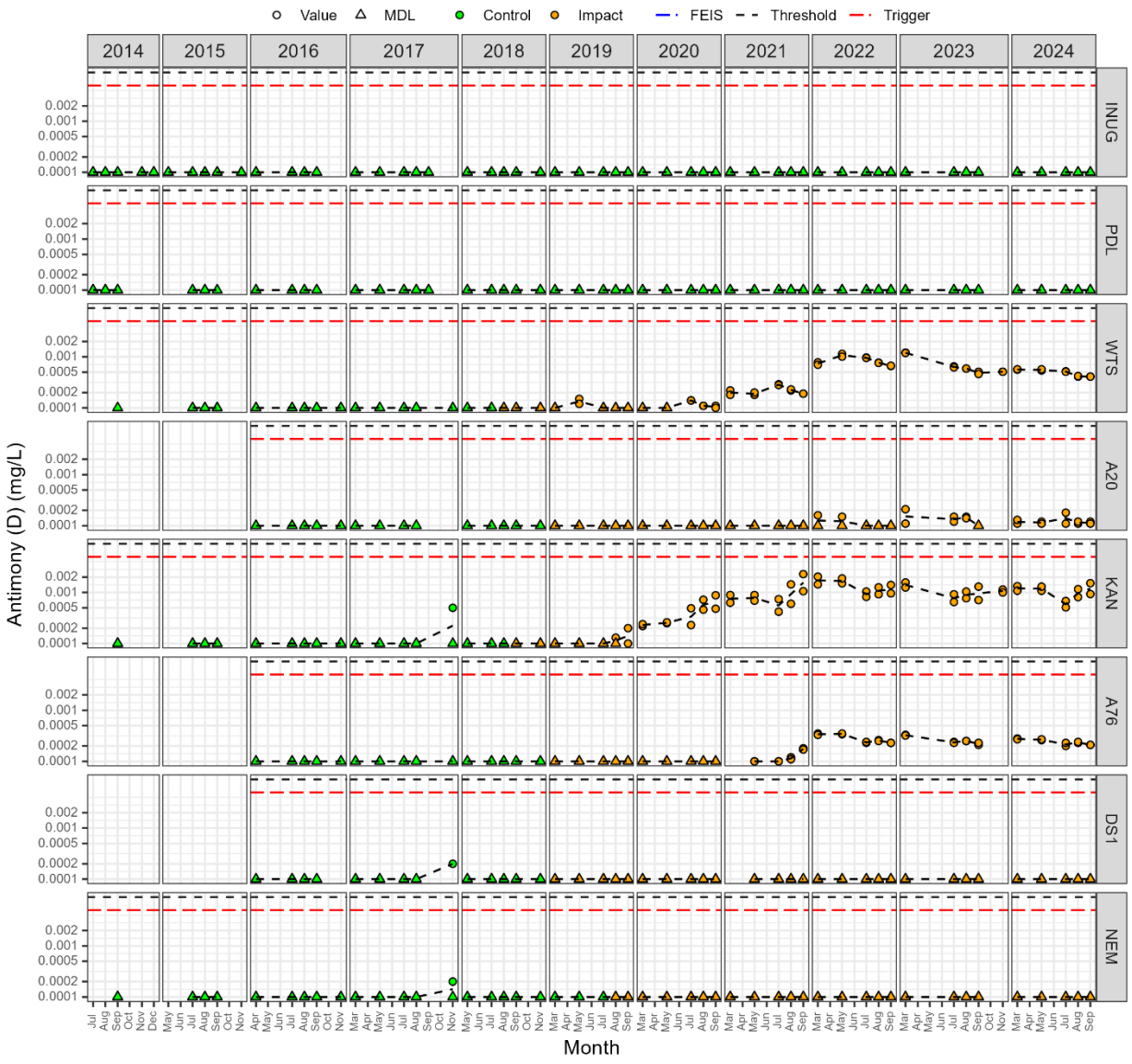


Figure C2-54. Dissolved arsenic (mg/L).

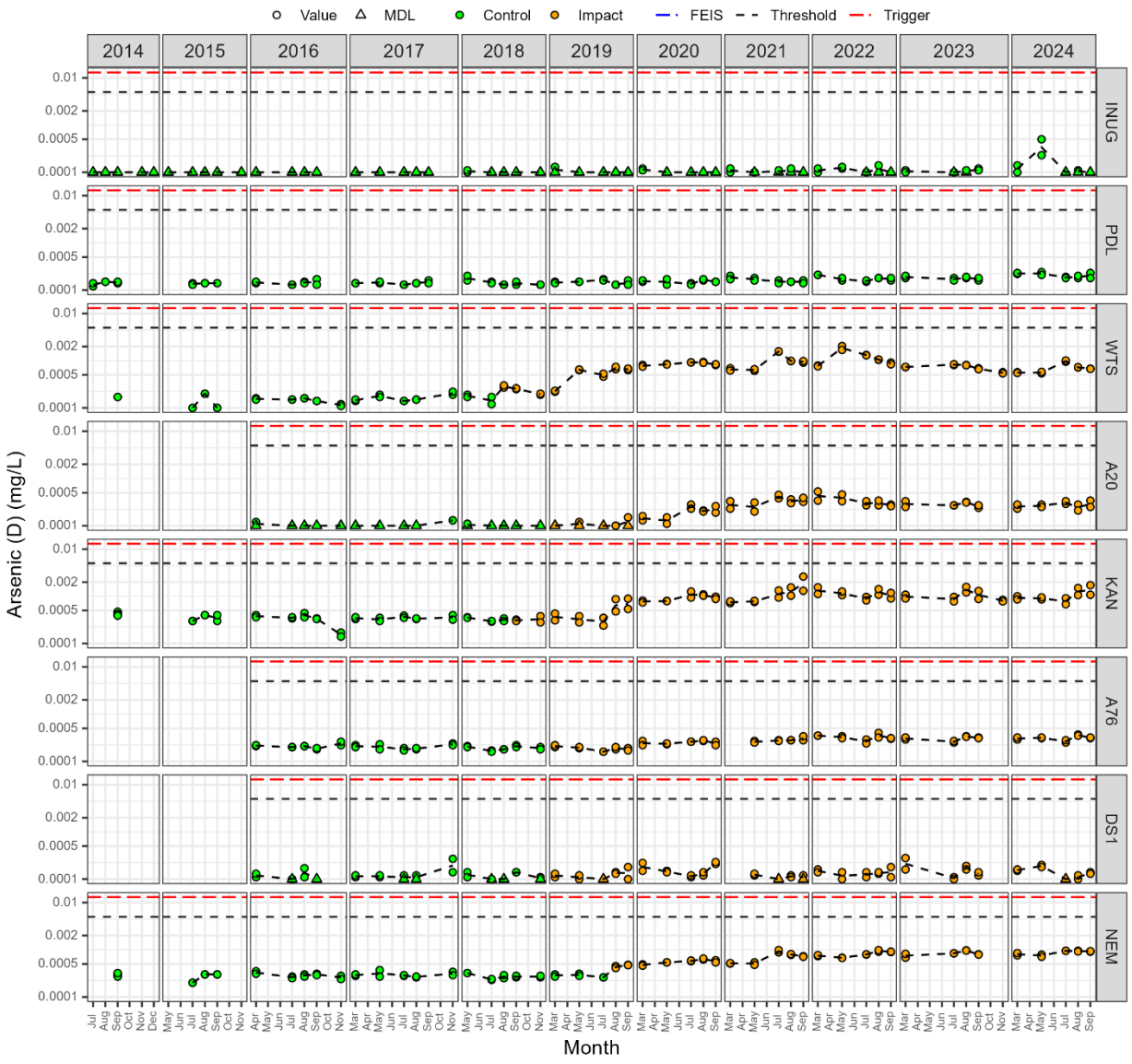


Figure C2-55. Dissolved barium (mg/L).

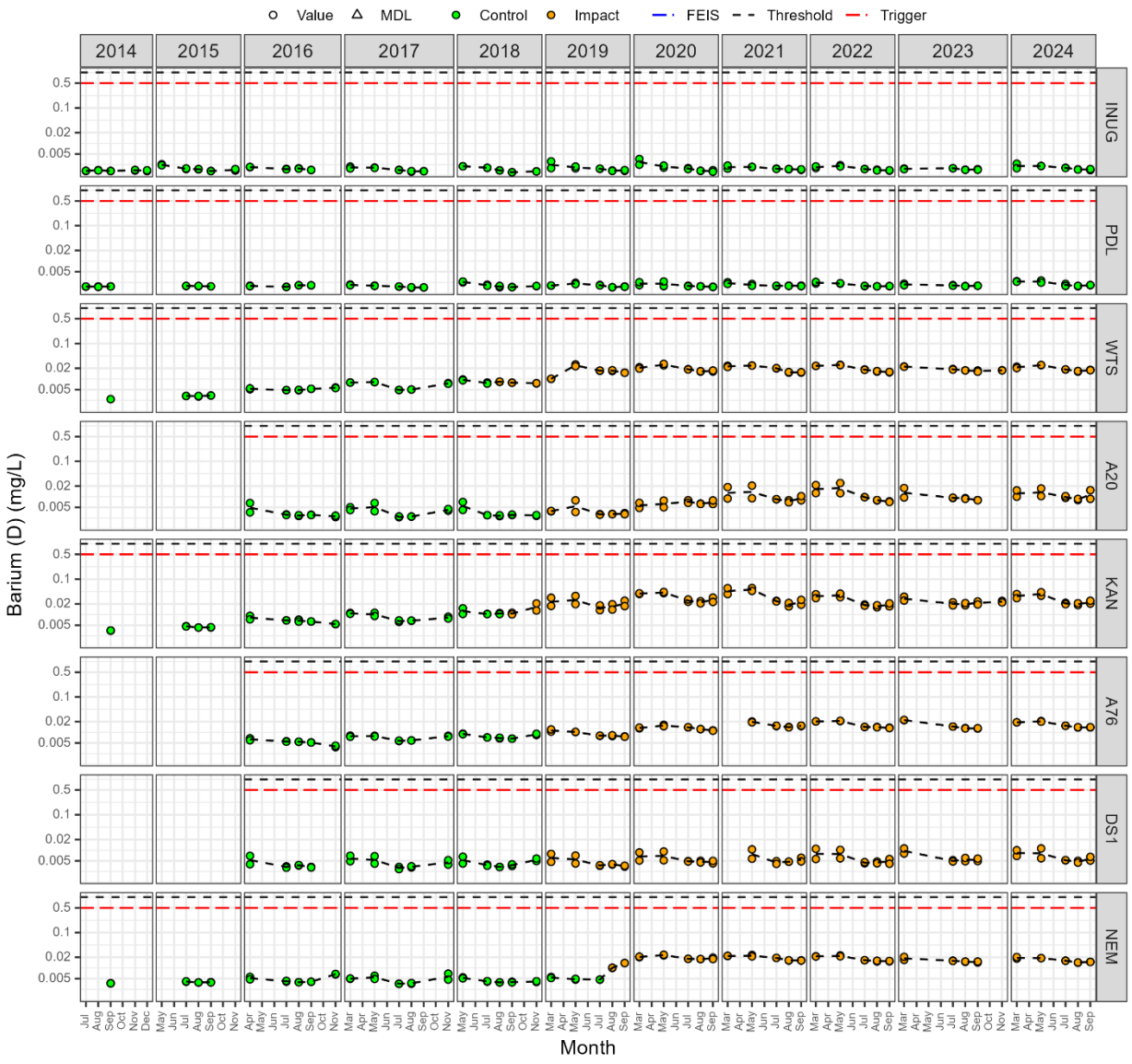


Figure C2-56. Dissolved beryllium (mg/L).

Note: Detection limits for beryllium were revised in 2018 due to method re-validation and analysis at the lower detection limit is no longer available at ALS (Pers. Comm. Brent Mack, ALS November 28, 2022).

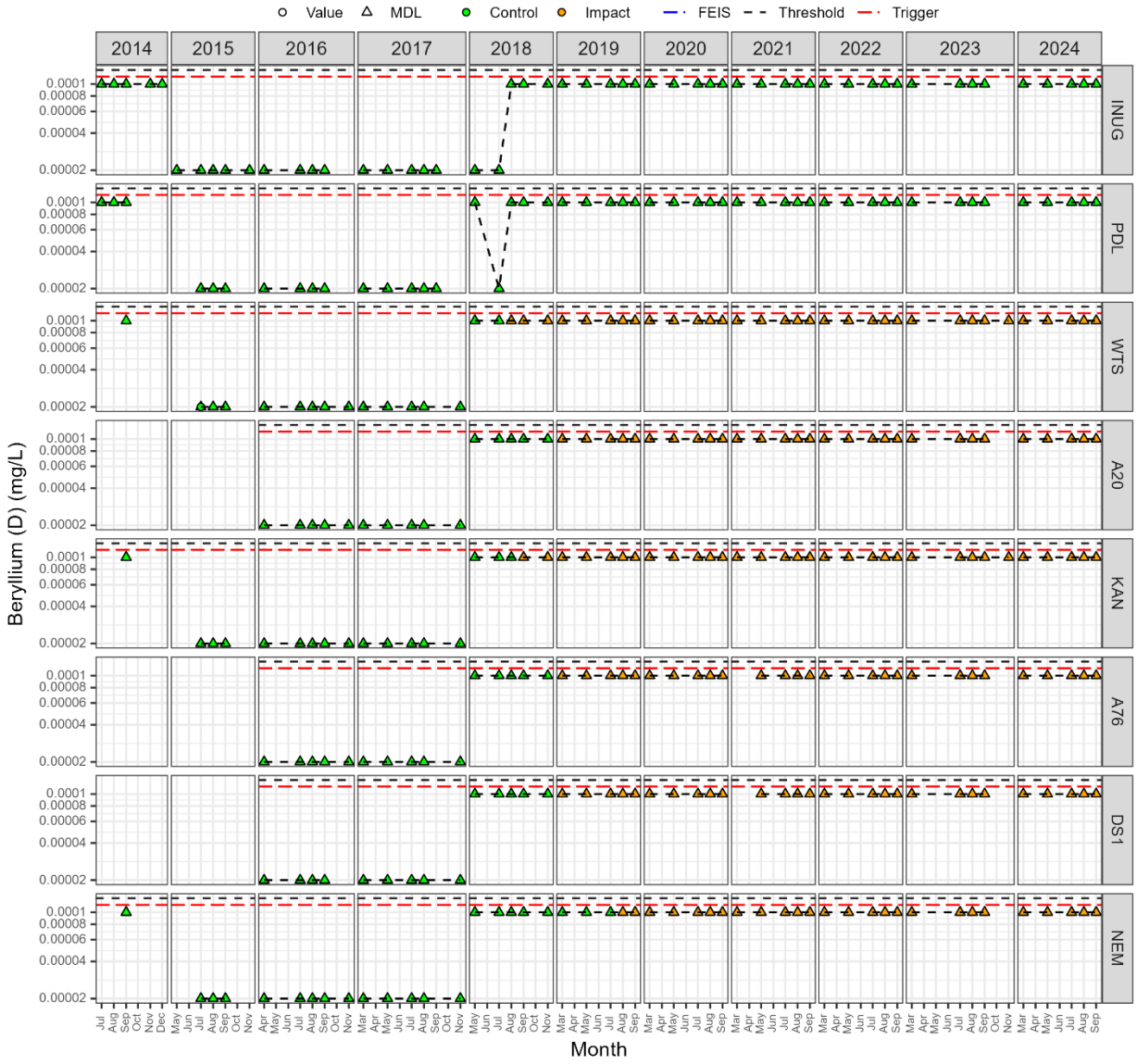


Figure C2-57. Dissolved boron (mg/L).

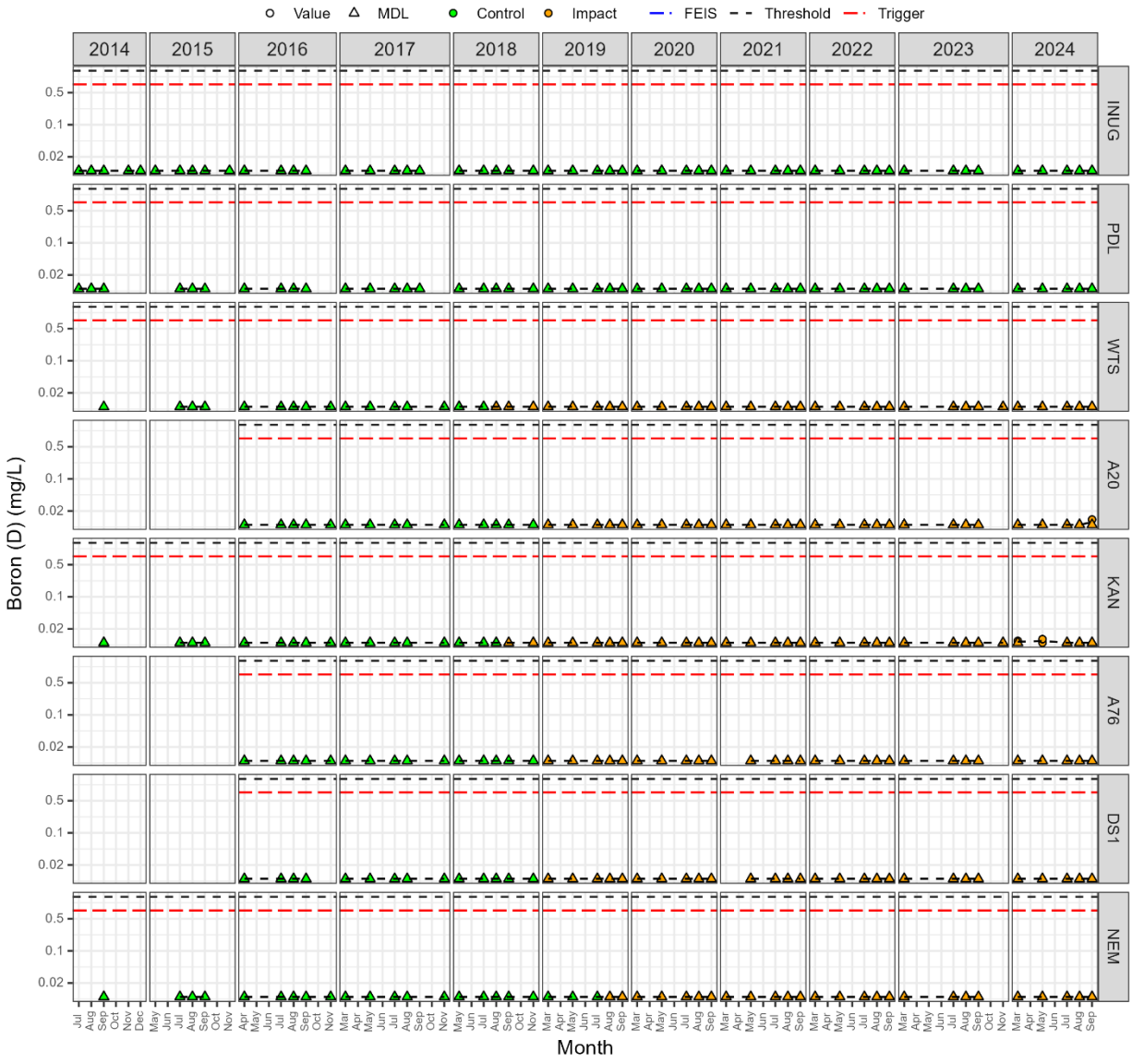


Figure C2-58. Dissolved cadmium (mg/L).

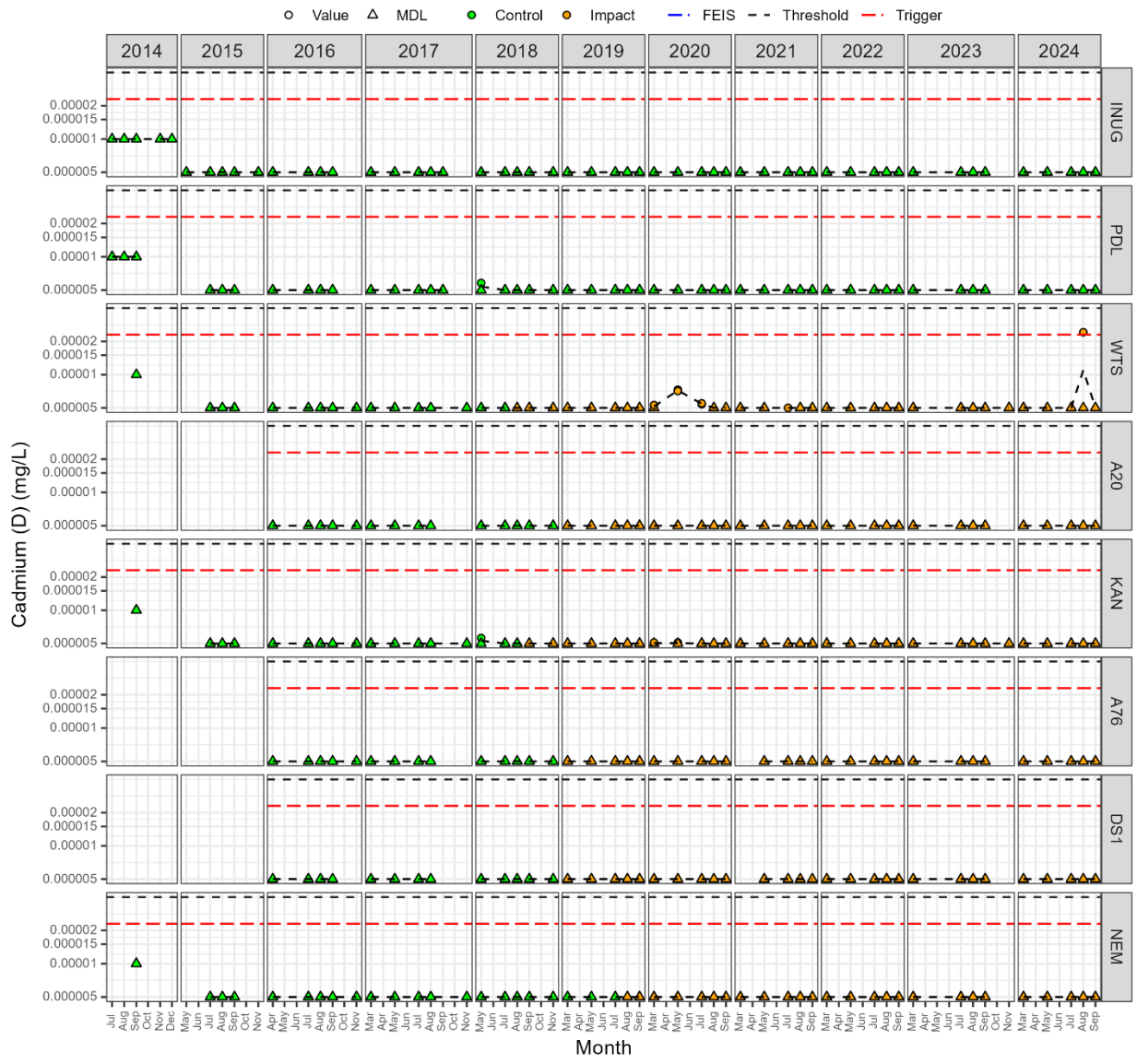


Figure C2-59. Dissolved chromium (mg/L).

Note: The detection limit was revised in 2021 due to method re-validation (Pers. Comm. Brent Mack, ALS November 28, 2022). Low-level chromium analysis is available at a cost and was requested for samples starting in 2023.

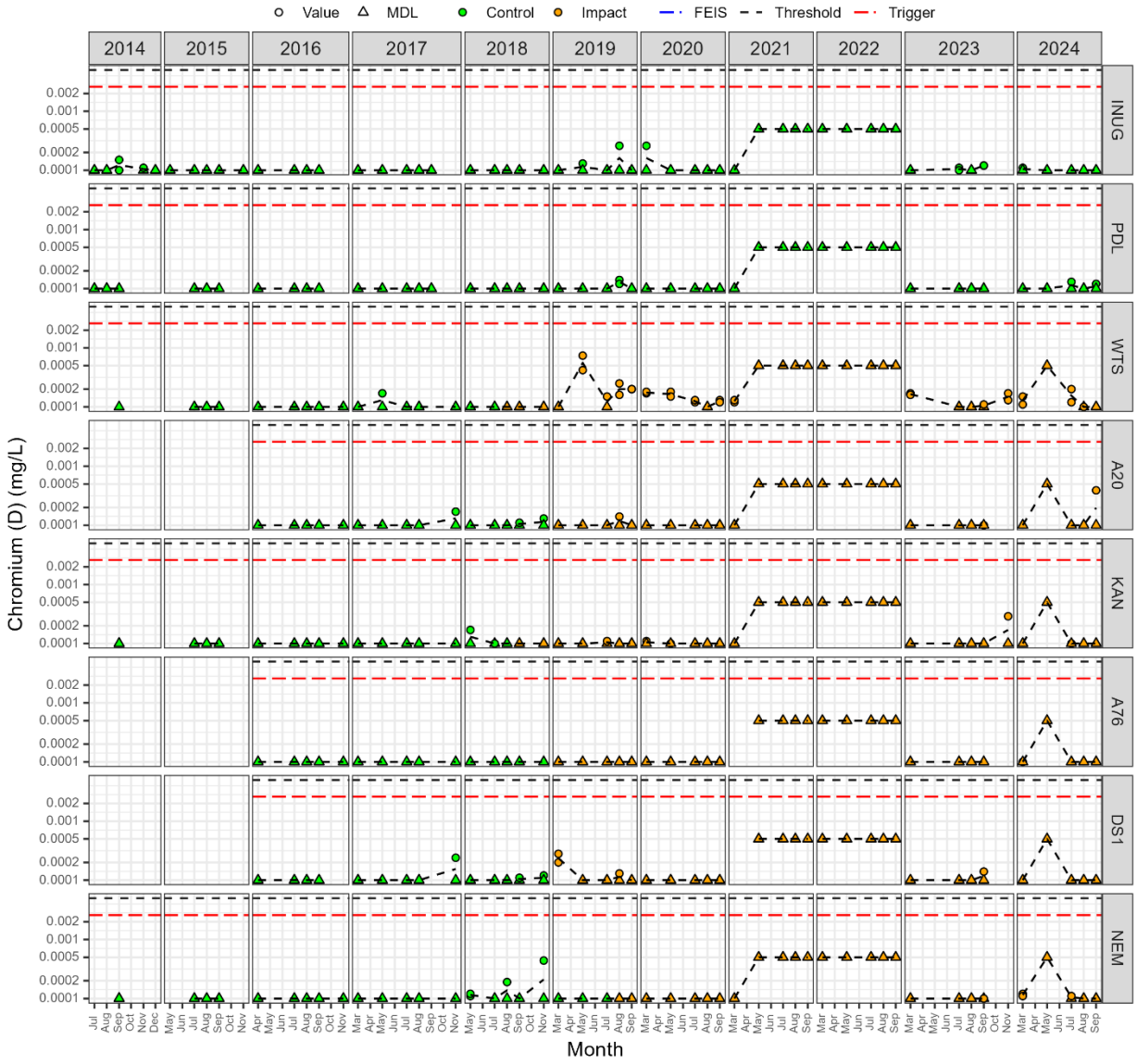


Figure C2-60. Dissolved copper (mg/L).

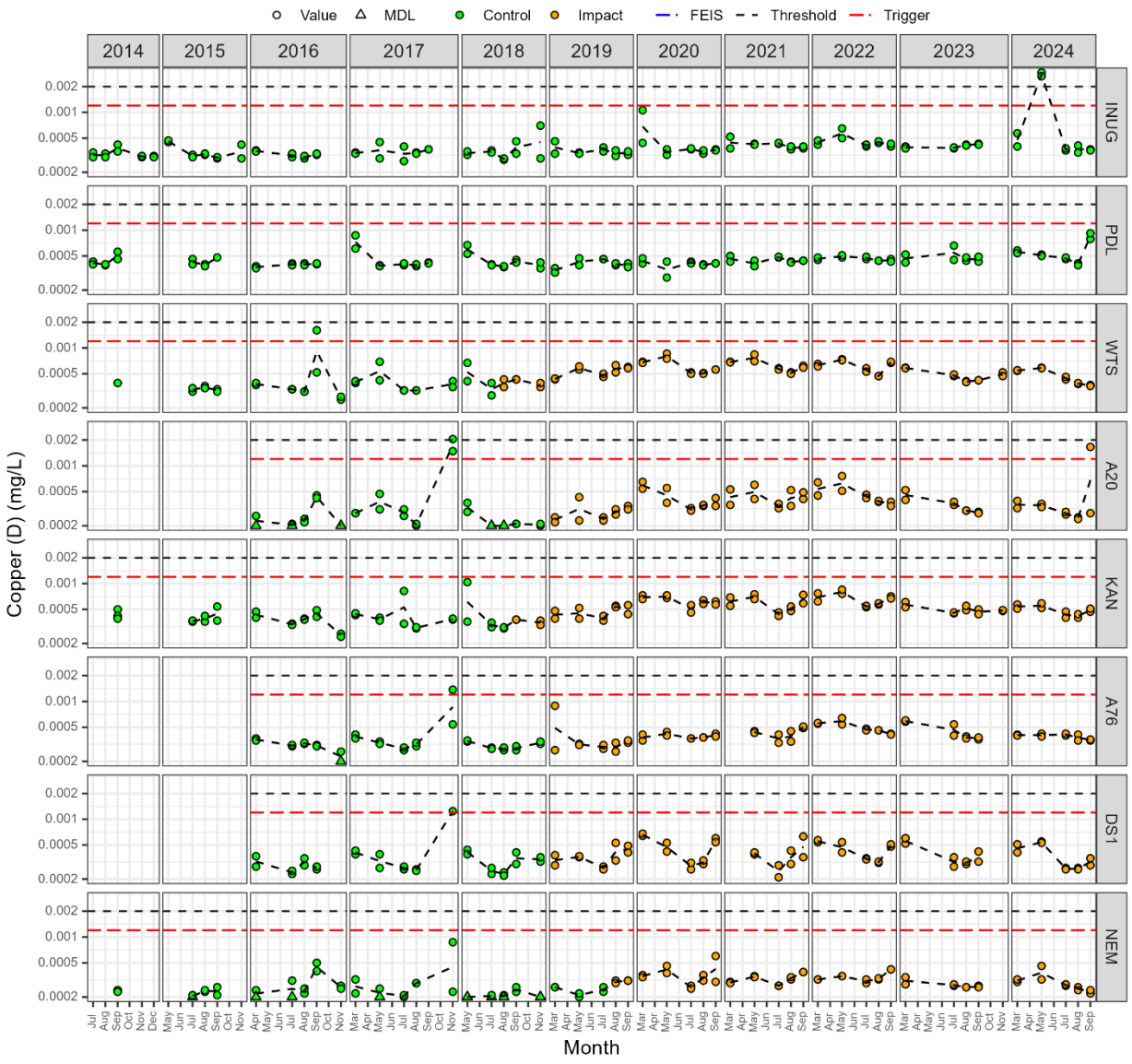


Figure C2-61. Dissolved iron (mg/L).

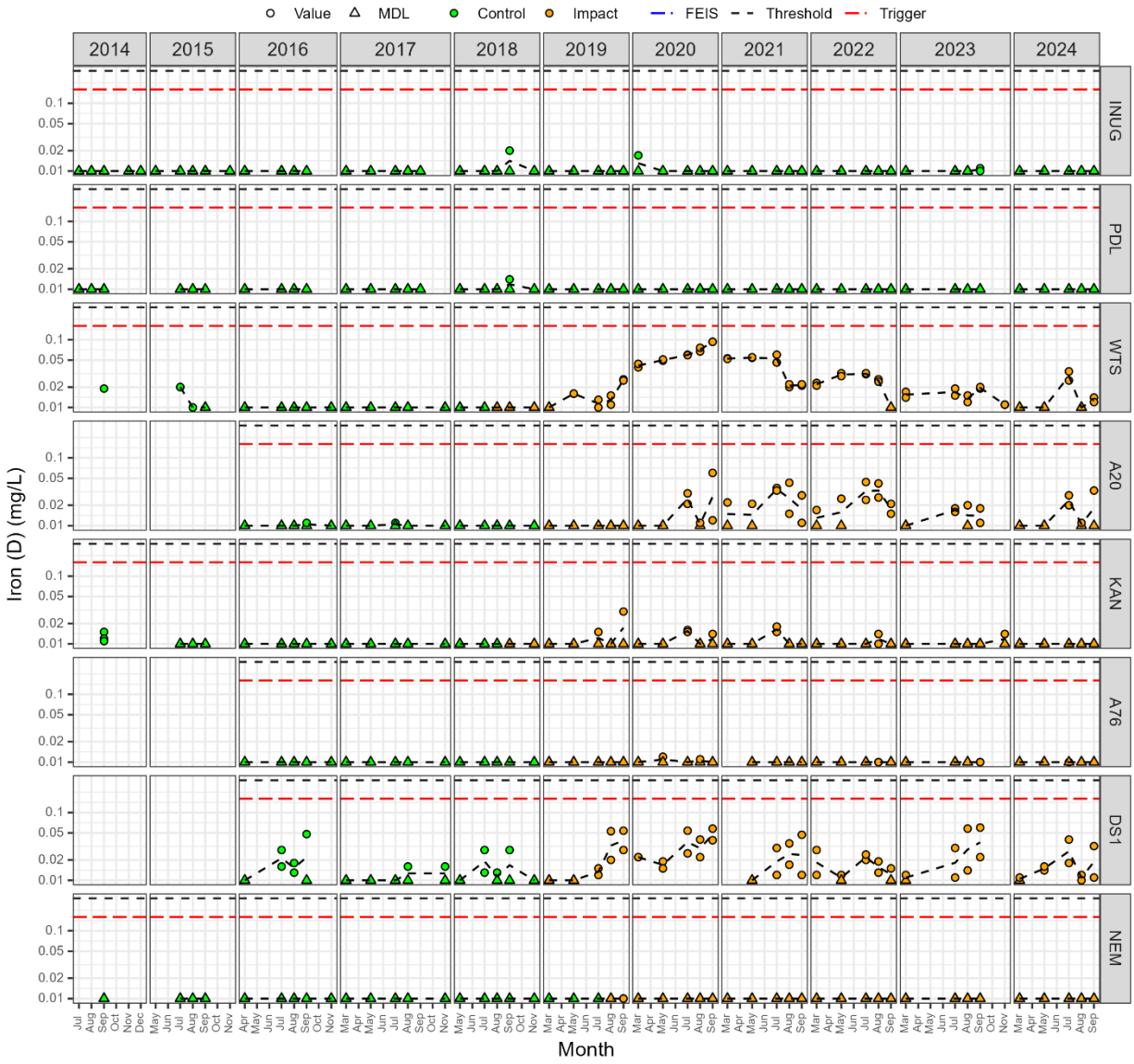


Figure C2-62. Dissolved lead (mg/L).

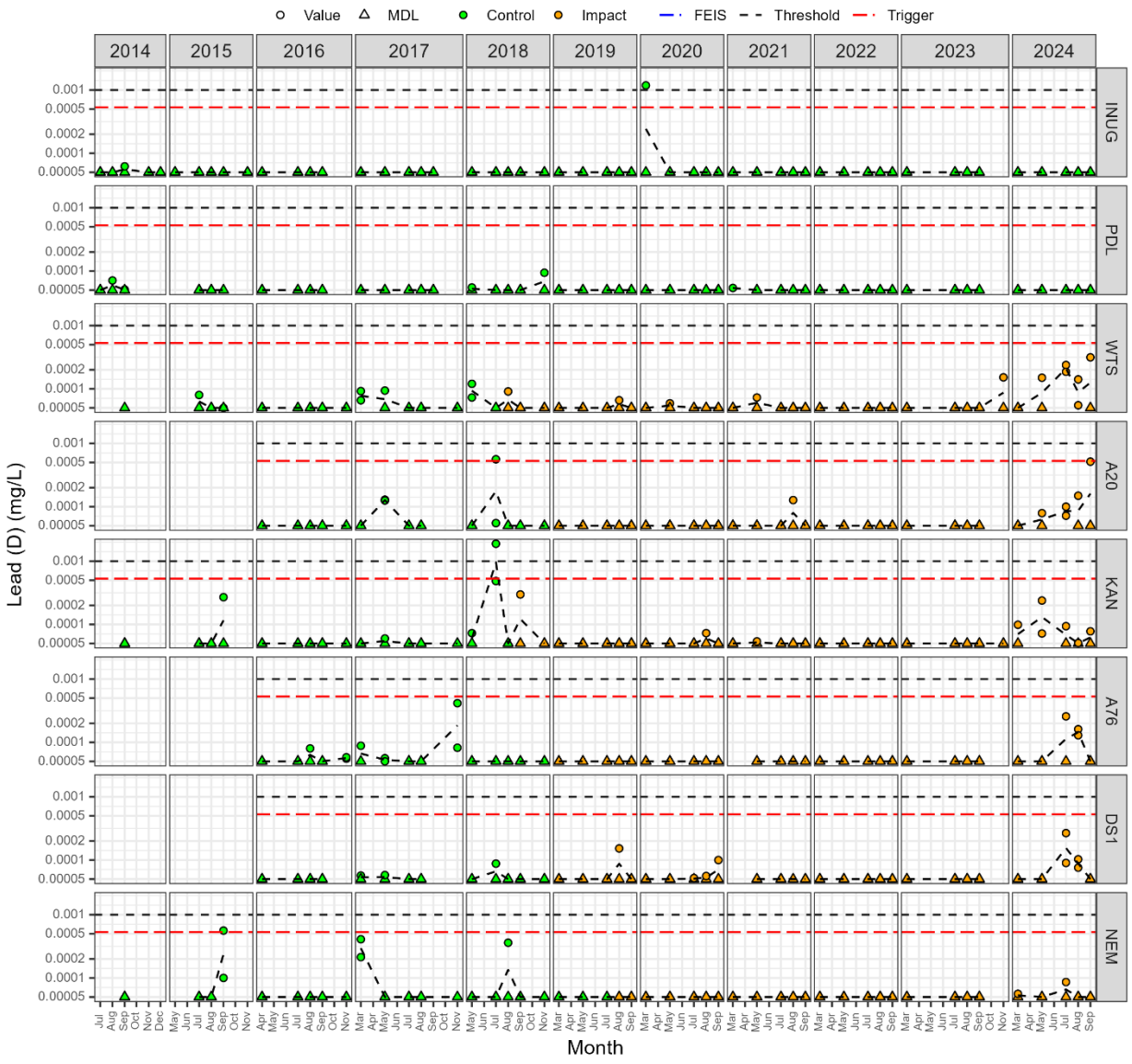


Figure C2-63. Dissolved lithium (mg/L).

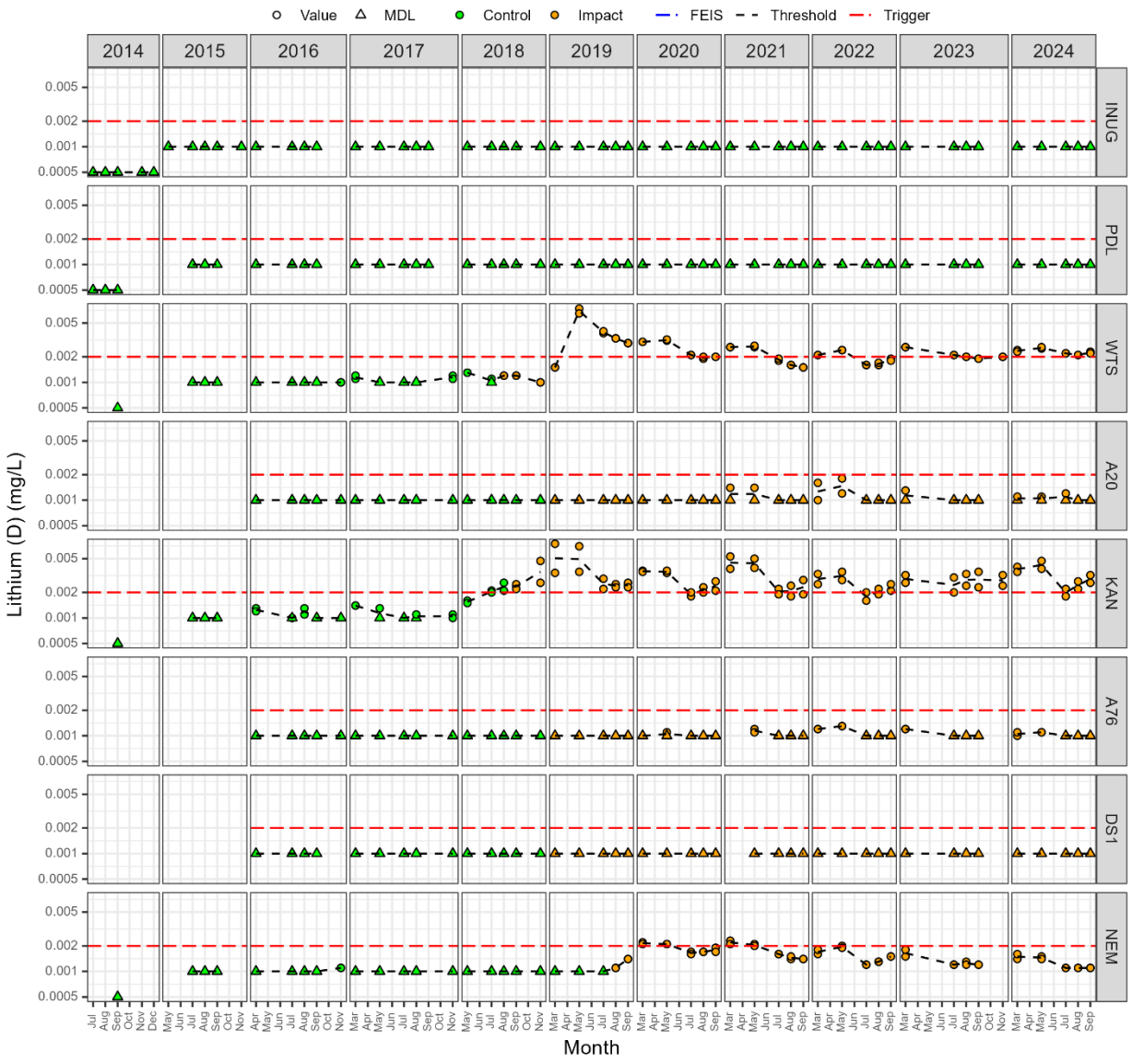


Figure C2-64. Dissolved manganese (mg/L).

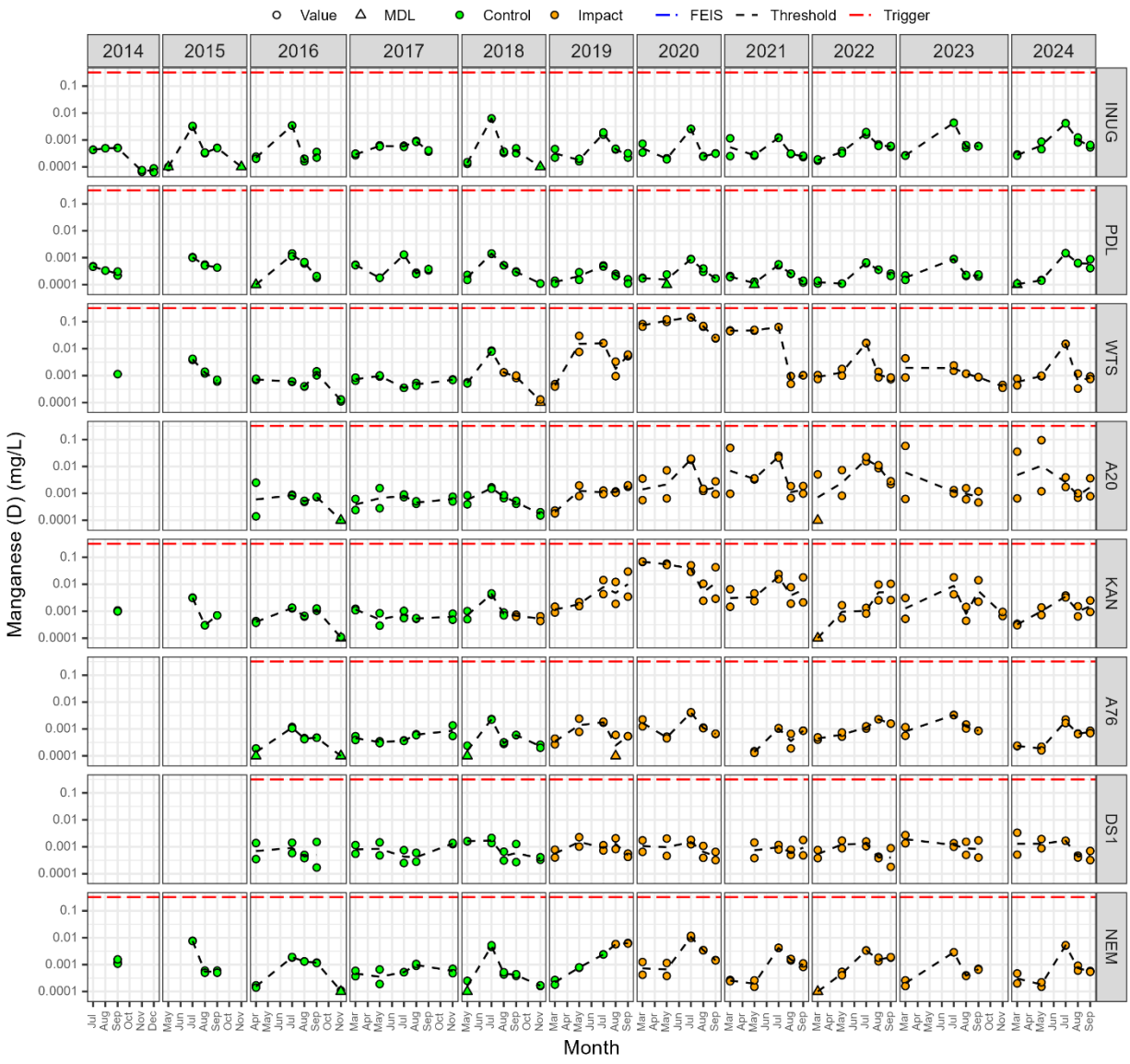


Figure C2-65. Dissolved mercury (mg/L).

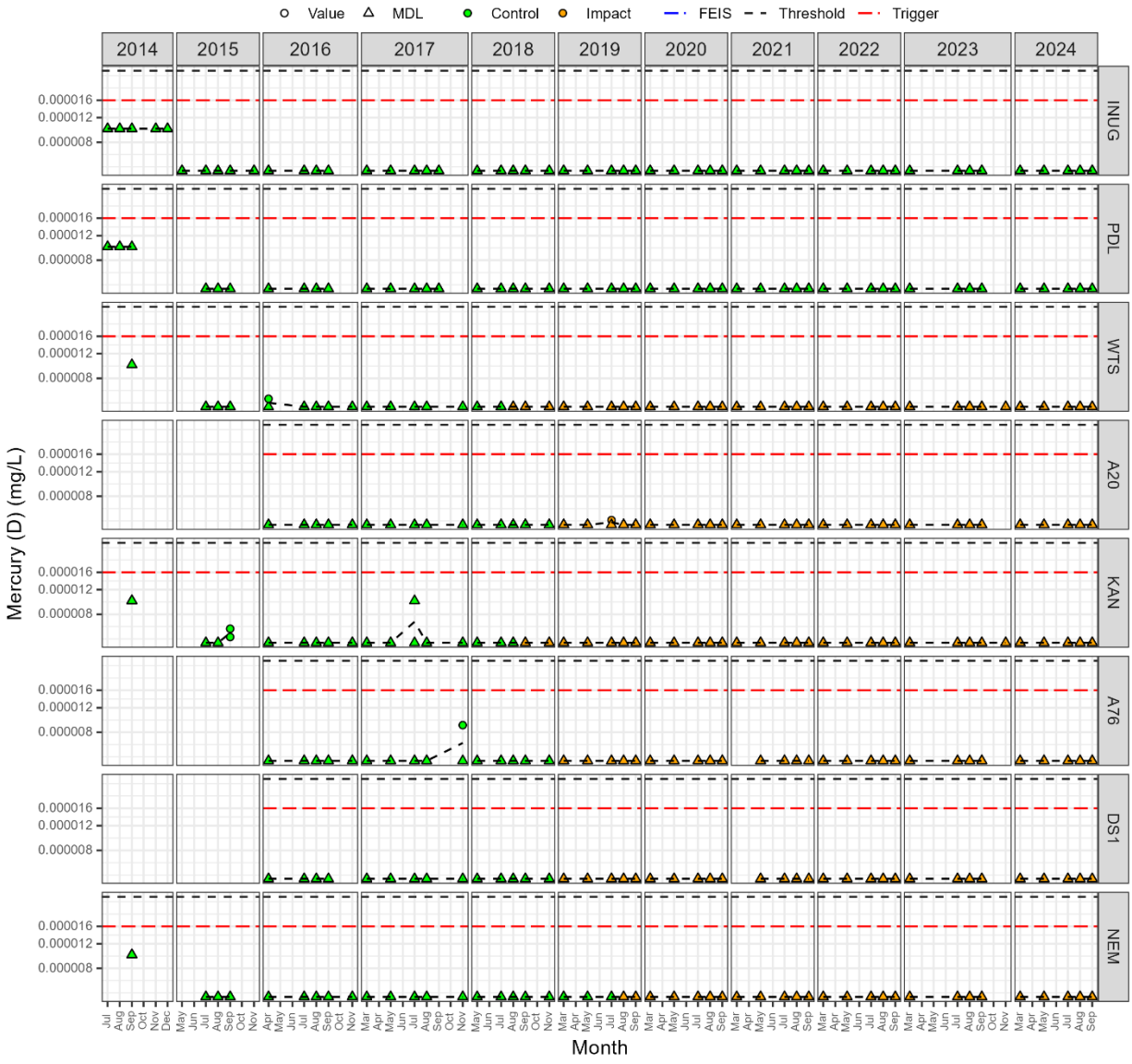


Figure C2-66. Dissolved molybdenum (mg/L).

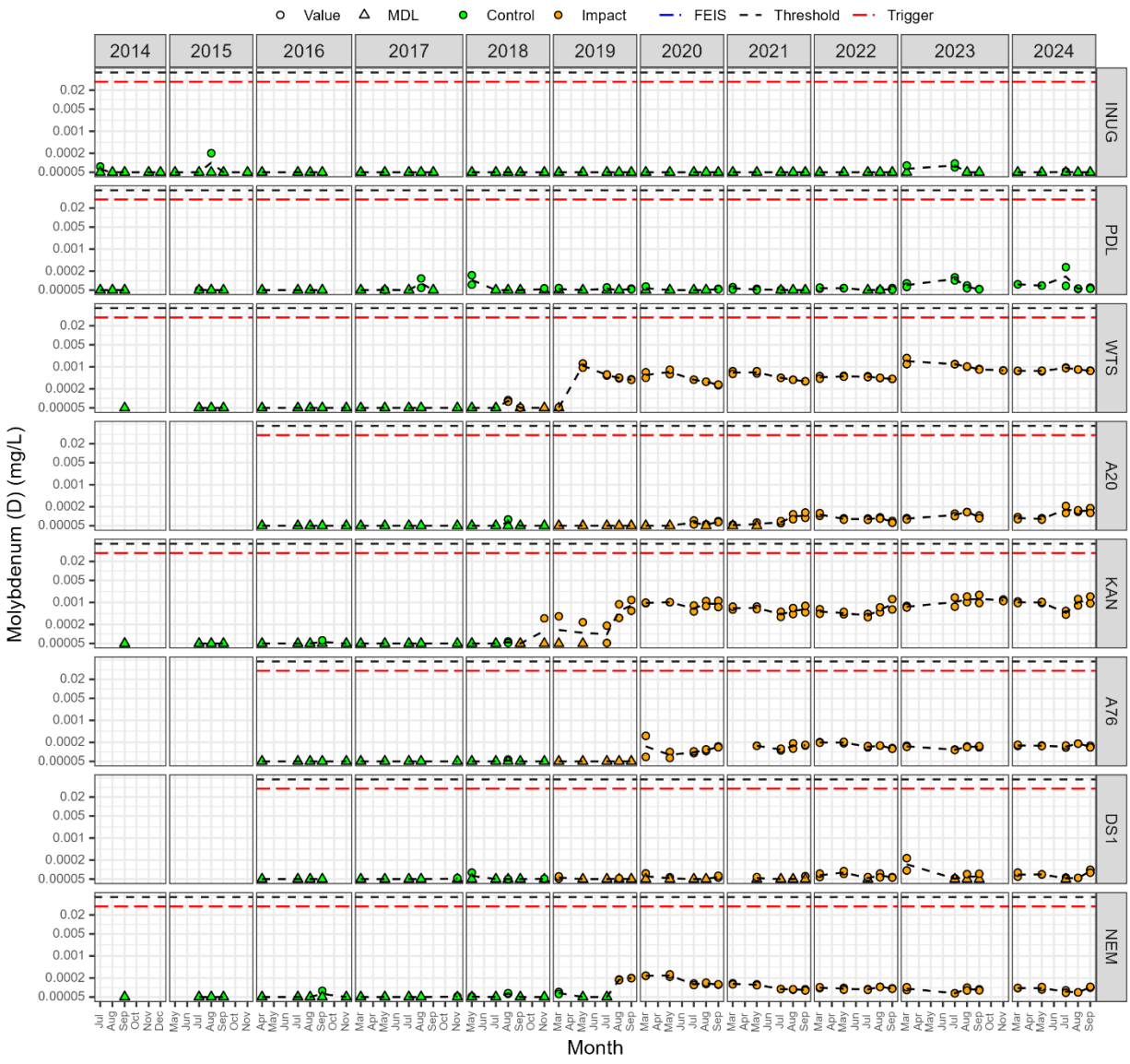


Figure C2-67. Dissolved nickel (mg/L).

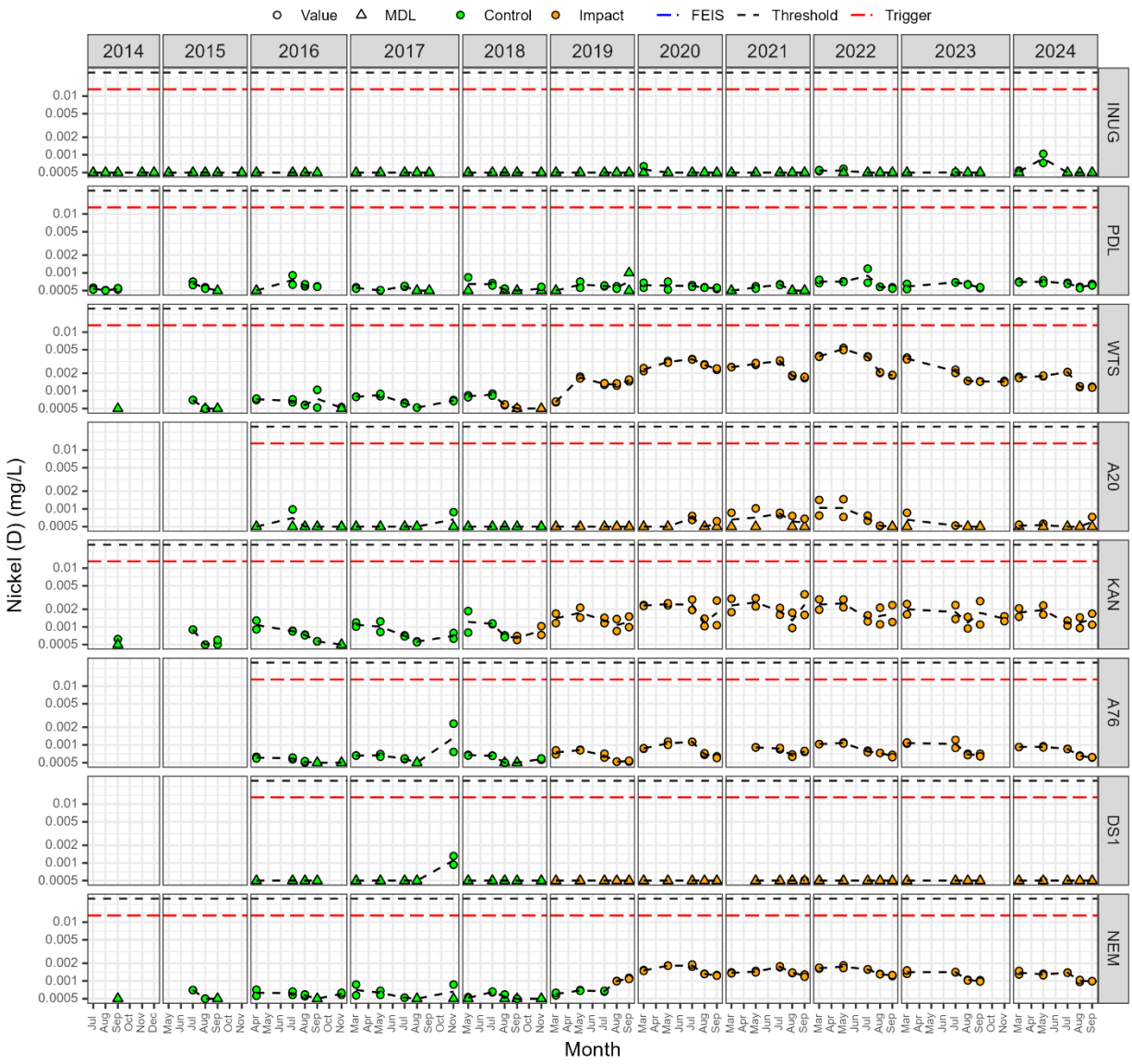


Figure C2-68. Dissolved selenium (mg/L).

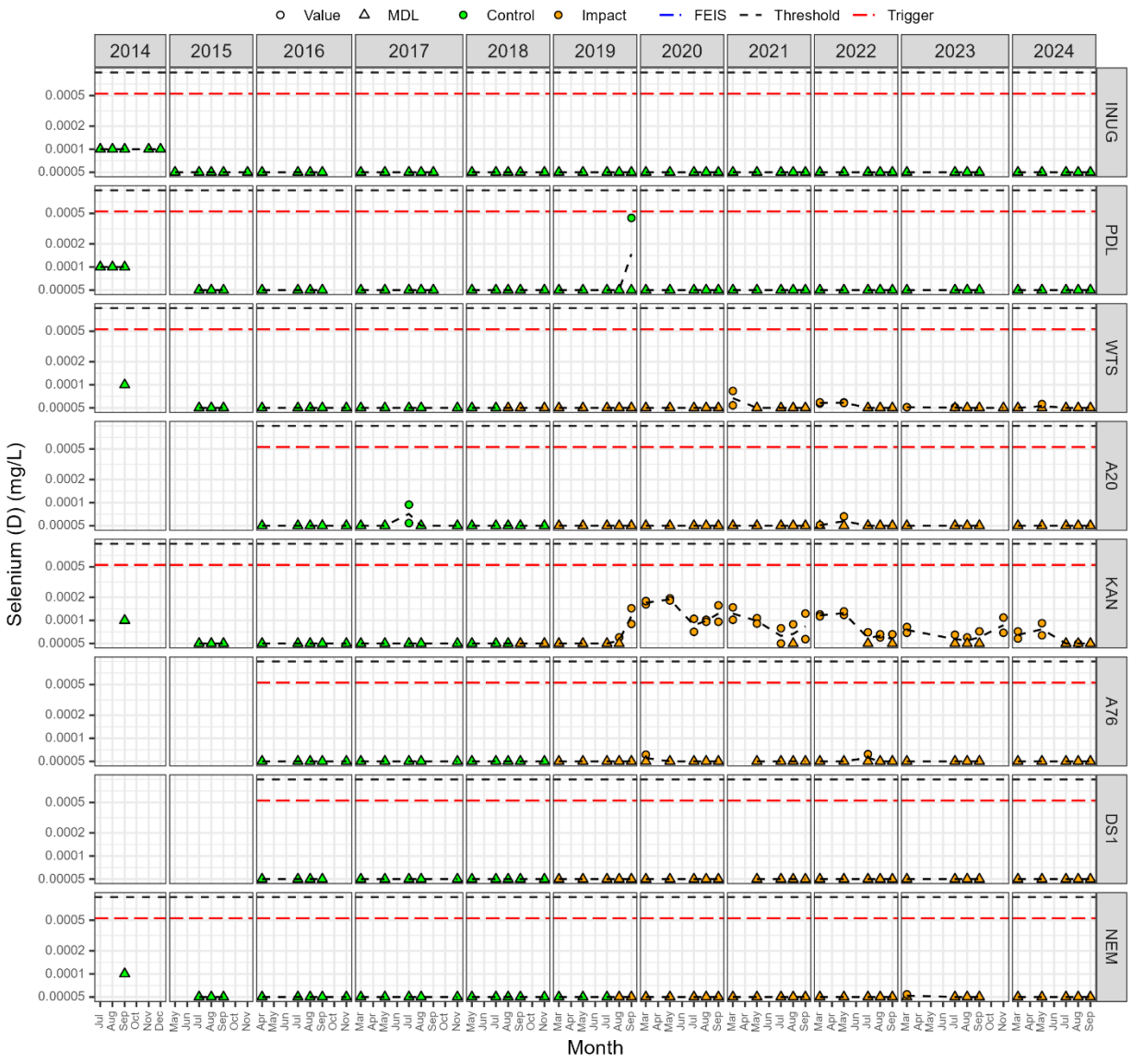


Figure C2-69. Dissolved silicon (mg/L).

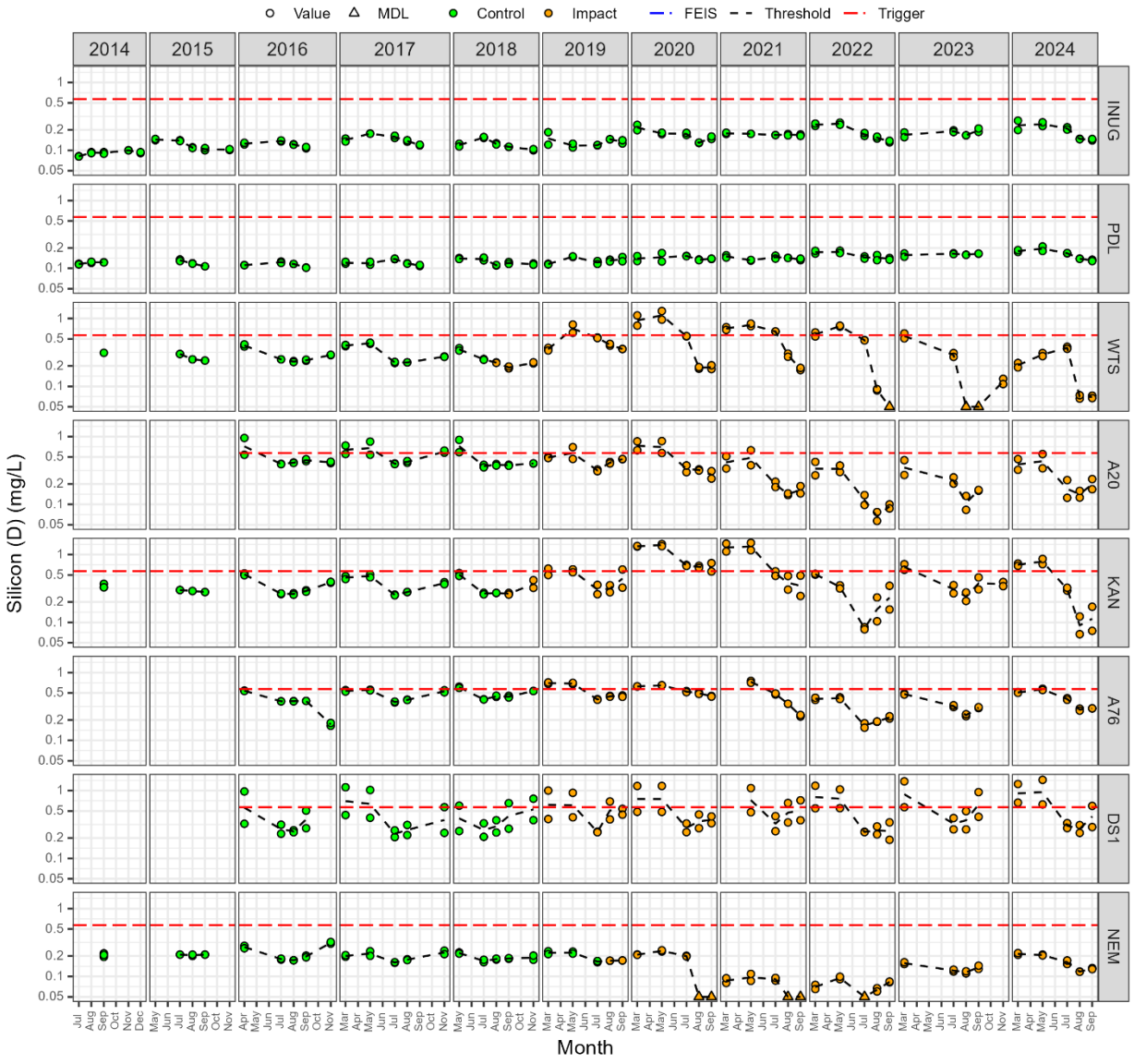


Figure C2-70. Dissolved silver (mg/L).

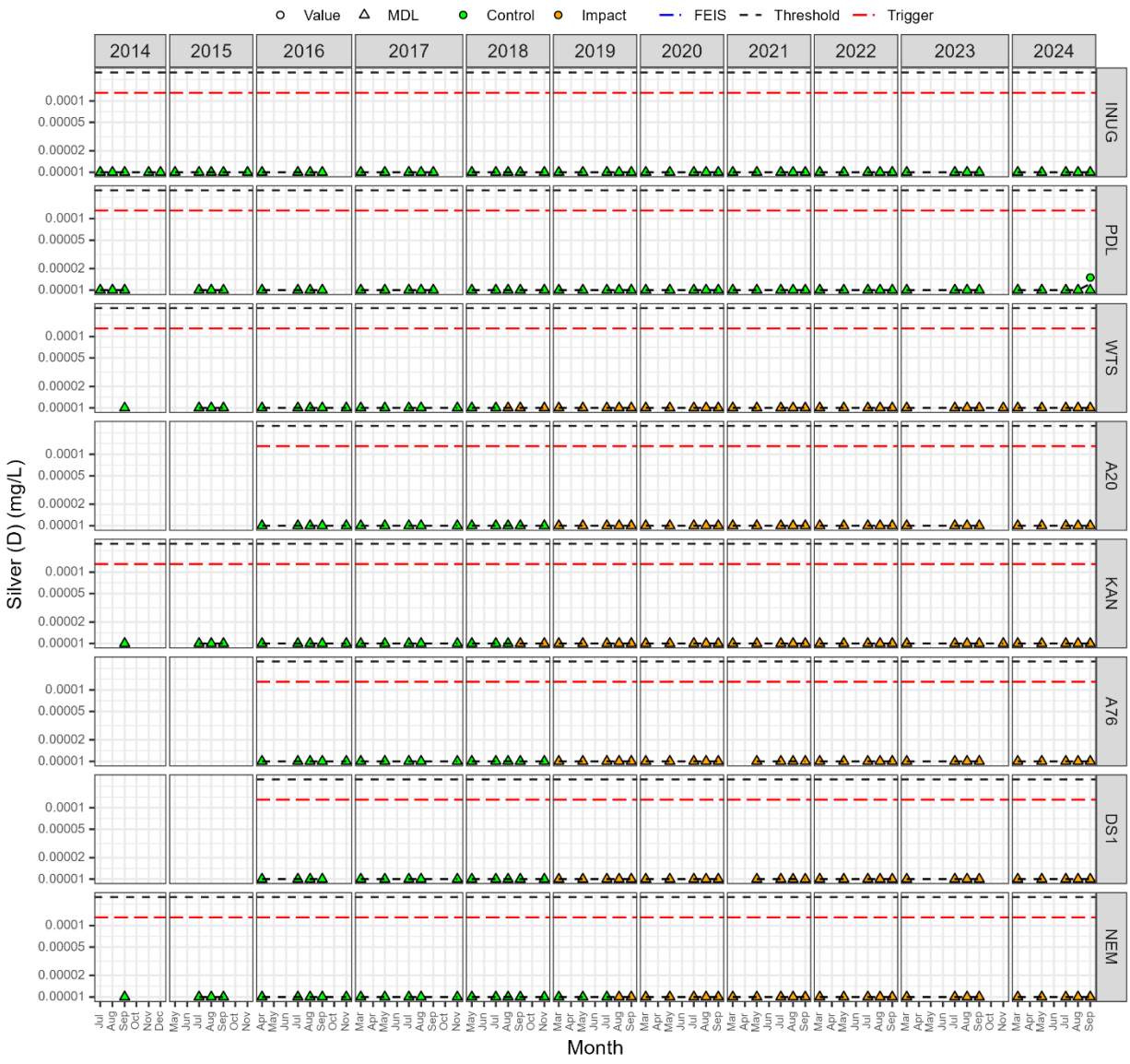


Figure C2-71. Dissolved strontium (mg/L).

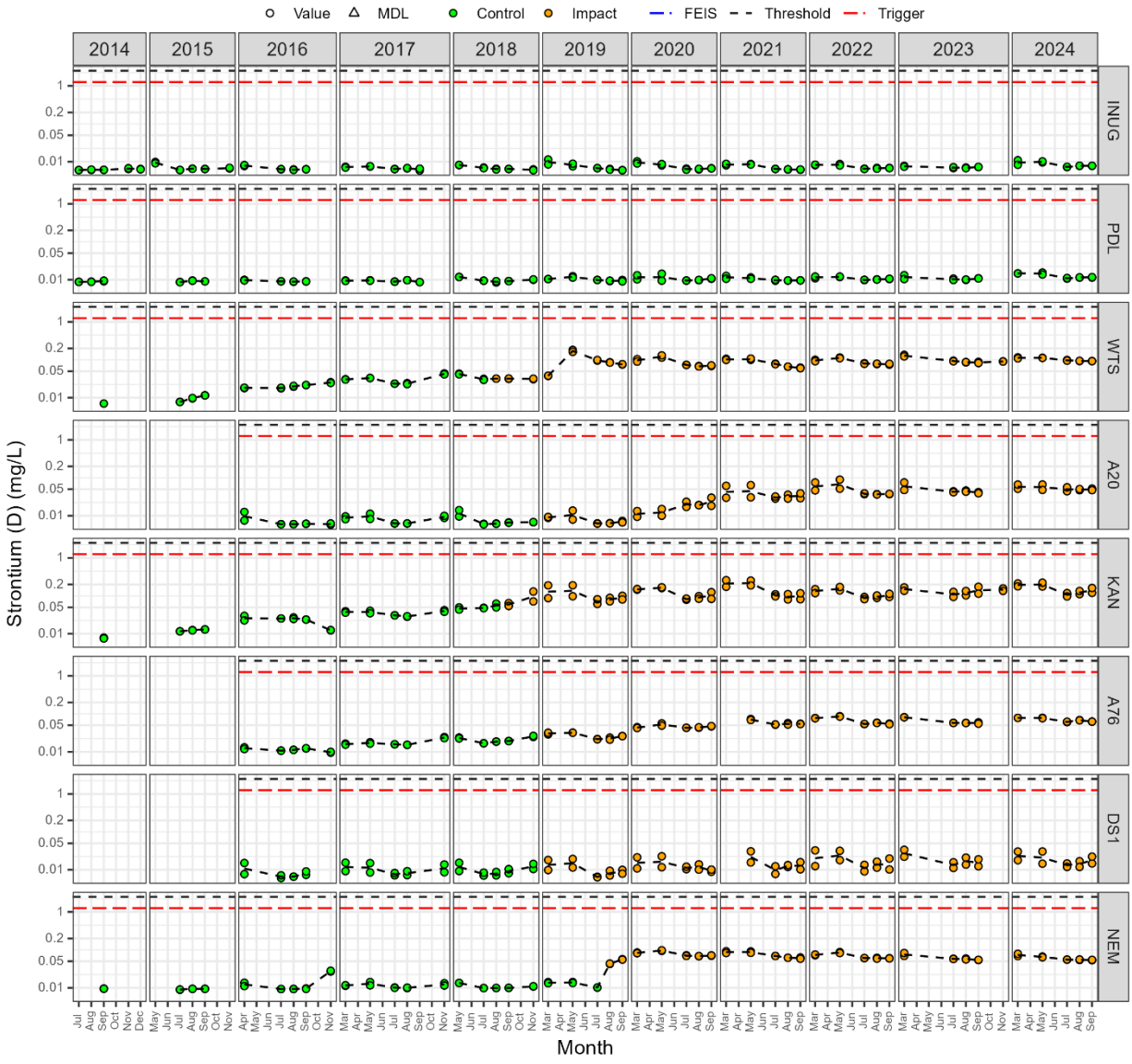


Figure C2-72. Dissolved thallium (mg/L).

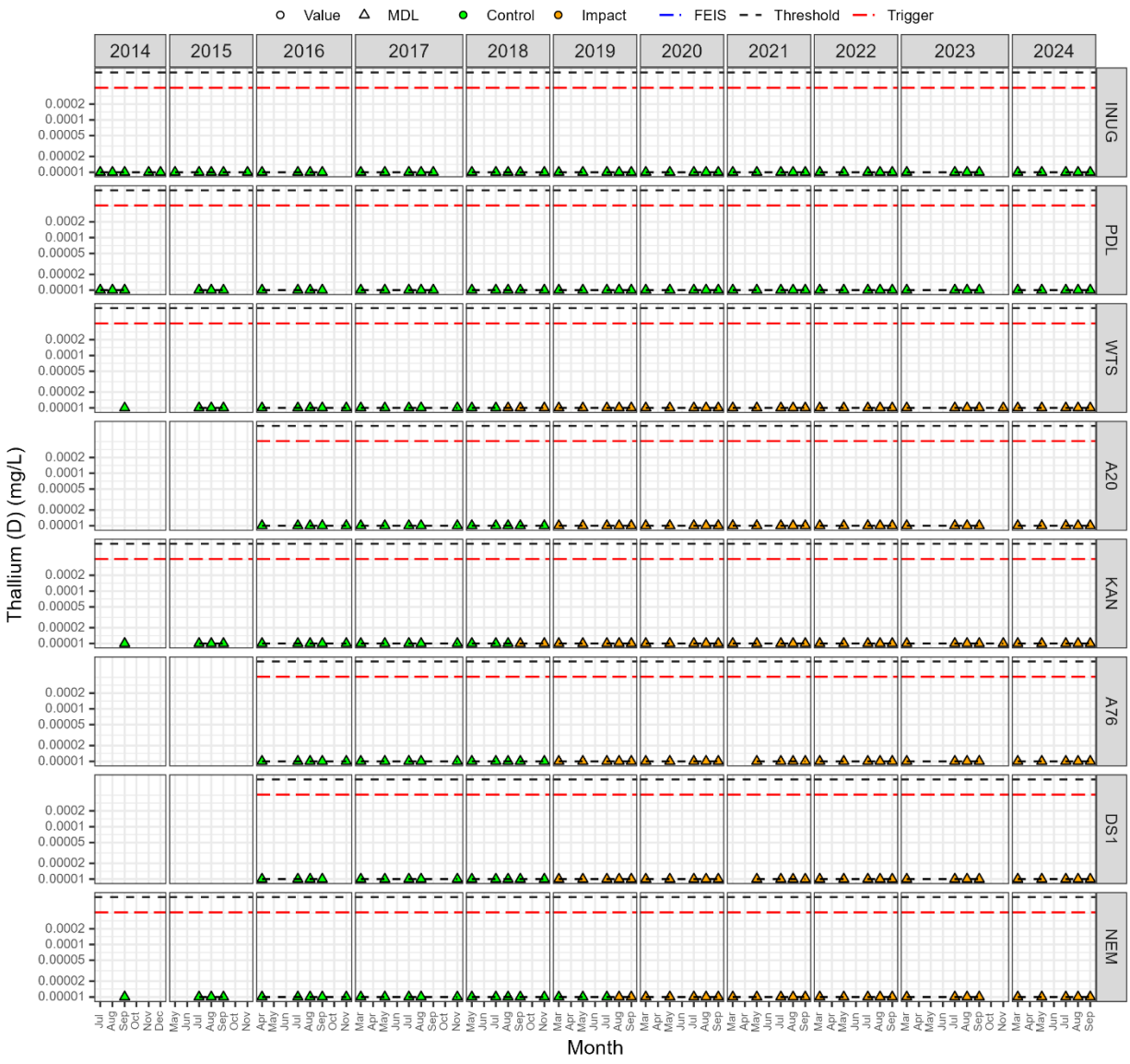


Figure C2-73. Dissolved tin (mg/L).



Figure C2-74. Dissolved titanium (mg/L).



Figure C2-75. Dissolved uranium (mg/L).

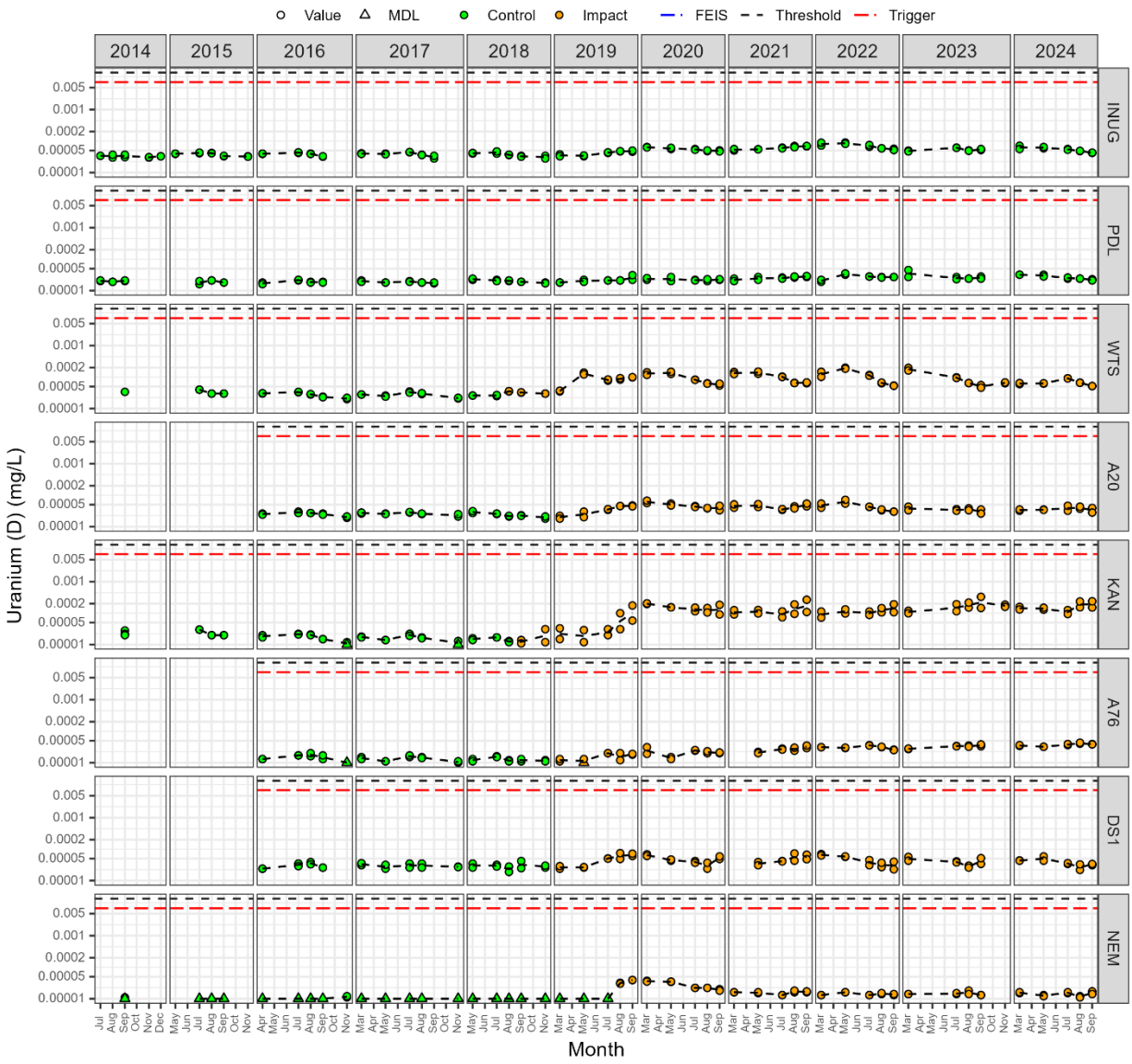


Figure C2-76. Dissolved vanadium (mg/L).

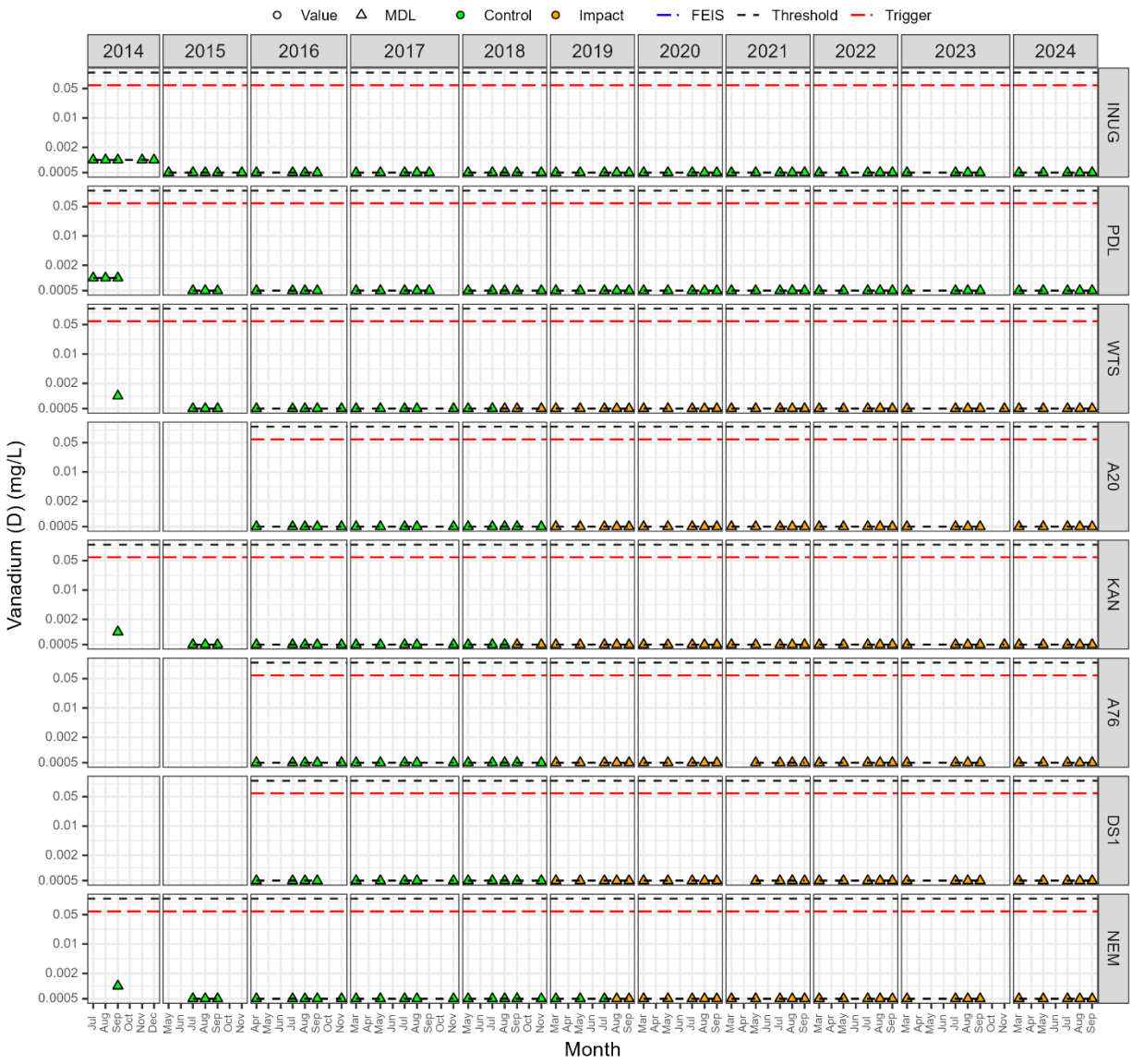
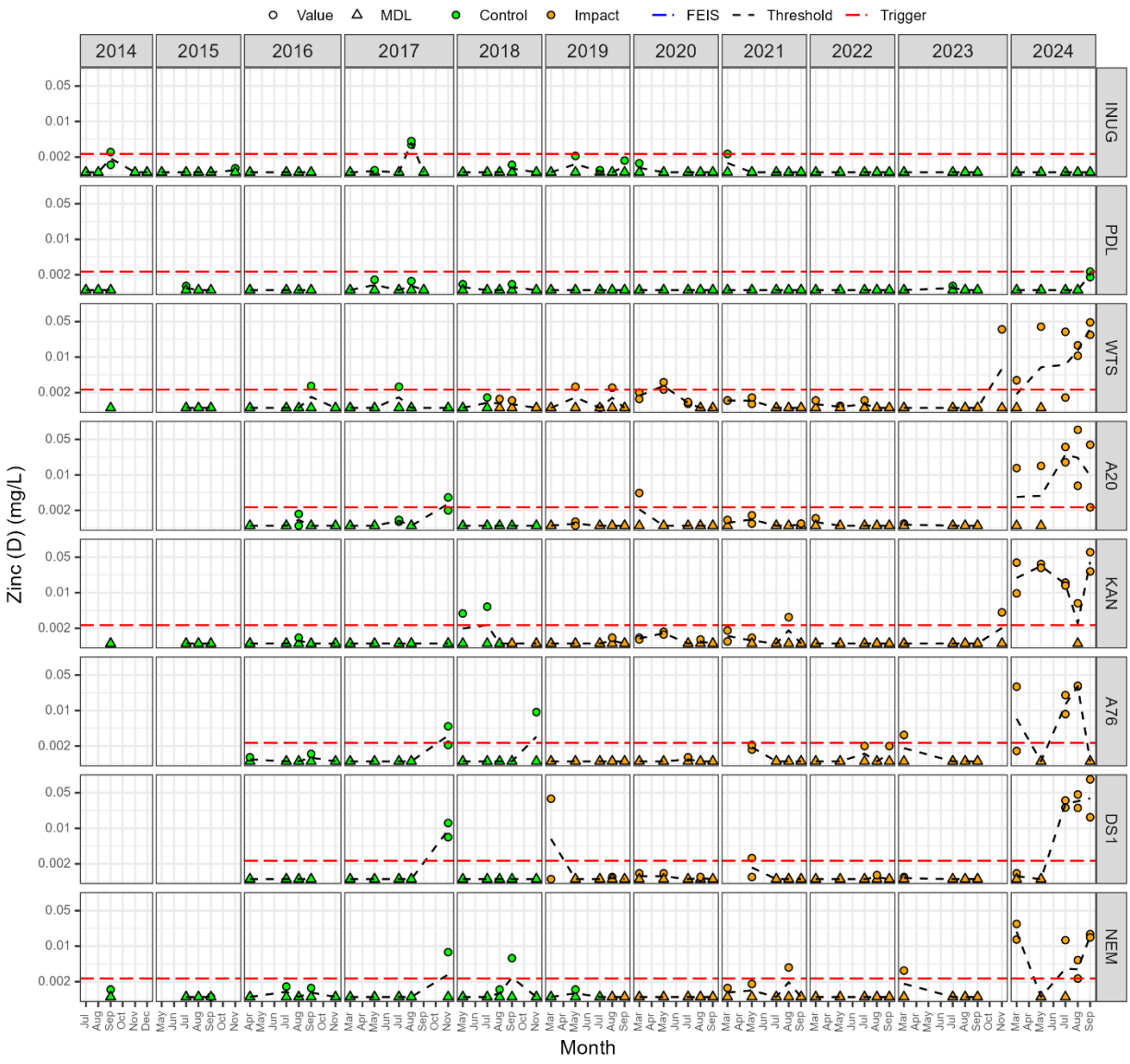


Figure C2-77. Dissolved zinc (mg/L).



Appendix C3
Water Chemistry – Baker Lake

LIST OF TABLES

Table C3-1. Water quality results from Baker Lake, 2024 1
Table C3-2. Water and phytoplankton sampling location coordinates (GPS, UTM, NAD83) from Baker Lake, 2024. 1

LIST OF FIGURES

Note: Water quality results in Baker Lake study areas since 2008 are shown in each figure.

Figure C3-1. Laboratory-measured conductivity (µS/cm). 3
Figure C3-2. Laboratory-measured hardness (mg/L). 4
Figure C3-3. Field-measured pH. 5
Figure C3-4. Laboratory-measured pH. 6
Figure C3-5. Total dissolved solids (TDS; mg/L). 7
Figure C3-6. Total suspended solids (TSS; mg/L). 8
Figure C3-7. Carbonate alkalinity (mg/L). 9
Figure C3-8. Bicarbonate alkalinity (mg/L). 10
Figure C3-9. Total alkalinity (mg/L). 11
Figure C3-10. Ammonia-N (mg/L) 12
Figure C3-11. Chloride (mg/L). 13
Figure C3-12. Fluoride (mg/L). 14
Figure C3-13. Nitrate-N (mg/L). 15
Figure C3-14. Nitrite-N (mg/L). 16
Figure C3-15. Total Kjeldahl Nitrogen (TKN; mg/L). 17
Figure C3-16. Ortho-phosphate (mg/L). 18
Figure C3-17. Total phosphorous (mg/L). 19
Figure C3-18. Reactive silica (mg/L). 20
Figure C3-19. Sulphate (mg/L). 21
Figure C3-20. Dissolved organic carbon (DOC; mg/L). 22
Figure C3-21. Total organic carbon (TOC; mg/L). 23
Figure C3-22. Total aluminum (mg/L) 24
Figure C3-23. Total antimony (mg/L). 25
Figure C3-24. Total arsenic (mg/L). 26

Figure C3-25. Total barium (mg/L). 27
Figure C3-26. Total beryllium (mg/L)..... 28
Figure C3-27. Total boron (mg/L). 29
Figure C3-28. Total cadmium (mg/L). 30
Figure C3-29. Total calcium (mg/L)..... 31
Figure C3-30. Total chromium (mg/L). 32
Figure C3-31. Total copper (mg/L)..... 33
Figure C3-32. Total iron (mg/L). 34
Figure C3-33. Total lead (mg/L). 35
Figure C3-34. Total lithium (mg/L). 36
Figure C3-35. Total magnesium (mg/L). 37
Figure C3-36. Total manganese (mg/L). 38
Figure C3-37. Total mercury (mg/L). 39
Figure C3-38. Total molybdenum (mg/L). 40
Figure C3-39. Total nickel (mg/L)..... 41
Figure C3-40. Total potassium (mg/L). 42
Figure C3-41. Total selenium (mg/L). 43
Figure C3-42. Total silicon (mg/L). 44
Figure C3-43. Total silver (mg/L). 45
Figure C3-44. Total sodium (mg/L). 46
Figure C3-45. Total strontium (mg/L). 47
Figure C3-46. Total thallium (mg/L)..... 48
Figure C3-47. Total tin (mg/L)..... 49
Figure C3-48. Total titanium (mg/L). 50
Figure C3-49. Total uranium (mg/L). 51
Figure C3-50. Total vanadium (mg/L). 52
Figure C3-51. Total zinc (mg/L)..... 53
Figure C3-52. Dissolved aluminum (mg/L). 54
Figure C3-53. Dissolved antimony (mg/L). 55
Figure C3-54. Dissolved arsenic (mg/L). 56
Figure C3-55. Dissolved barium (mg/L). 57

Figure C3-56. Dissolved beryllium (mg/L). 58
Figure C3-57. Dissolved boron (mg/L). 59
Figure C3-58. Dissolved cadmium (mg/L). 60
Figure C3-59. Dissolved chromium (mg/L). 61
Figure C3-60. Dissolved copper (mg/L). 62
Figure C3-61. Dissolved iron (mg/L). 63
Figure C3-62. Dissolved lead (mg/L). 64
Figure C3-63. Dissolved lithium (mg/L). 65
Figure C3-64. Dissolved manganese (mg/L). 66
Figure C3-65. Dissolved mercury (mg/L). 67
Figure C3-66. Dissolved molybdenum (mg/L). 68
Figure C3-67. Dissolved nickel (mg/L). 69
Figure C3-68. Dissolved selenium (mg/L). 70
Figure C3-69. Dissolved silicon (mg/L). 71
Figure C3-70. Dissolved silver (mg/L). 72
Figure C3-71. Dissolved strontium (mg/L). 73
Figure C3-72. Dissolved thallium (mg/L). 74
Figure C3-73. Dissolved tin (mg/L). 75
Figure C3-74. Dissolved titanium (mg/L). 76
Figure C3-75. Dissolved uranium (mg/L). 77
Figure C3-76. Dissolved vanadium (mg/L). 78
Figure C3-77. Dissolved zinc (mg/L). 79

TABLES

Table C3–1. Water quality results from Baker Lake, 2024.

Lake & Area				Baker Lake - Akilahaarjuk Point (BAP)						Baker Lake - Barge Dock (BBD)						Baker Lake - Proposed Jetty (BPJ)					
Month	Aquatic Life Guideline[1]	Baker Lake Screening Values[2]		July	July	August	August	September	September	July	July	August	August	September	September	July	July	August	August	September	September
Area-Replicate ID				BAP-91	BAP-92	BAP-93	BAP-94	BAP-95	BAP-96	BBD-91	BBD-92	BBD-93	BBD-94	BBD-95	BBD-96	BPJ-91	BPJ-92	BPJ-93	BPJ-94	BPJ-95	BPJ-96
Date		Triggers	Thresholds	14-Jul-2024	14-Jul-2024	12-Aug-2024	12-Aug-2024	09-Sep-2024	09-Sep-2024	14-Jul-2024	14-Jul-2024	12-Aug-2024	12-Aug-2024	09-Sep-2024	09-Sep-2024	14-Jul-2024	14-Jul-2024	12-Aug-2024	12-Aug-2024	09-Sep-2024	09-Sep-2024
Time				14:15	14:35	12:20	13:21	11:35	11:15	15:10	15:30	15:30	16:00	13:00	13:30	13:40	13:15	14:28	14:55	12:45	12:05
ALS Sample ID				VA24B7634-009	VA24B7634-010	VA24C1018-001	VA24C1018-002	VA24C4308-019	VA24C4308-020	VA24B7634-005	VA24B7634-006	VA24C1018-003	VA24C1018-004	VA24C4308-015	VA24C4308-016	VA24B7634-007	VA24B7634-008	VA24C1018-005	VA24C1018-006	VA24C4308-017	VA24C4308-018
Field Measurements (3 m)																					
Dissolved Oxygen (mg/L)				13.4	13.5	11.5	11.5	11.4	11.4	13.6	13.5	10.4	10.4	11.2	11.3	13.4	13.3	10.7	10.7	11.4	11.5
Specific Conductivity (µS/cm)				181	300	177	150	141	142	26.3	21.1	28.9	27.8	29.8	33.0	54	48.8	37.2	33.2	65	56
pH	6.5 - 9.0	6.50 - 8.32	6.5 - 9.0	6.8	6.7	6.9	6.9	7.0	7.1	6.8	6.8	6.8	6.8	6.8	6.8	6.7	6.4	6.8	6.8	6.9	6.9
Temperature (°C)				5.1	5.8	11.45	11.93	9.7	9.7	5.6	6.4	13.73	13.45	9.9	9.8	5.5	5.5	13.80	13.44	9.6	9.6
Physical Tests (mg/L)																					
Conductivity (µS/cm)		642		140	279	175	153	160	144	27	31.8	28.7	30.4	35.8	38.3	48.1	38.1	38.9	29.3	76	54
Alkalinity - Bicarbonate				8.6	8.9	10.3	9.9	9.8	9.9	8.5	8.5	9.7	10	9.9	9.7	8.7	8.9	9.8	10.3	9.9	9.6
Alkalinity - Carbonate		2.0		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity - Hydroxide		10.6		<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Alkalinity - Total (as $CaCO_3$)		10.6		8.6	8.9	10.3	9.9	9.8	9.9	8.5	8.5	9.7	10	9.9	9.7	8.7	8.9	9.8	10.3	9.9	9.6
Hardness (as CaCO3), dissolved		65		18.7	33.8	24.4	22.9	22.9	21.7	10.6	11.3	11.5	11.7	12.2	12.6	12.7	11.5	12.4	11.7	15.6	14.2
Hardness (as CaCO3), from total Ca/Mg				20.8	33.5	25	23.1	24.6	22.5	10.4	12	11.8	12.1	12.4	12.3	12.1	11.2	12.6	12.1	15.2	13.5
Total Dissolved Solids (TDS)		245		84	165	110	102	88	88	20.8	24.2	27.9	28.8	22.6	20.8	31.6	25.6	29.4	26.5	45.3	39.7
Total Suspended Solids (TSS)		3.0	5.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	**1.4**	<1.0
Turbidity (NTU)				0.35	0.27	0.23	0.25	0.36	0.45	0.29	0.37	0.24	0.30	0.28	0.34	0.35	0.31	0.23	0.27	0.31	0.25
pH (Laboratory)	6.5 - 9.0	6.75-8.05	6.5 - 9.0	7.2	7.2	7.2	7.3	7.2	7.2	7.3	7.3	7.2	7.3	7.2	7.2	7.2	7.3	7.3	7.3	7.2	7.2
Anions and Nutrients (mg/L)																					
Ammonia (as N)[3]	***equation***	0.066	0.13	0.0060	<0.0050	0.013	0.012	0.0083	0.0070	0.0055	0.0060	0.019	0.012	0.0060	0.015	0.0056	0.0051	0.013	0.018	0.011	0.0088
Bromide				0.10	0.23	0.14	0.12	0.12	0.11	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	0.051	<0.050
Chloride	120	169	120	32.1	71	41.2	35.4	36.7	32.4	1.7	3.0	1.8	2.2	3.5	4.3	7.4	4.5	4.6	2.0	14.3	8.6
Fluoride	0.12	0.088	0.12	0.063	0.066	0.063	0.063	0.064	0.064	0.060	0.062	0.060	0.059	0.060	0.060	0.061	0.061	0.060	0.060	0.061	0.061
Total Kjeldahl Nitrogen		0.22		0.16	0.16	0.18	0.19	0.15	0.18	0.17	0.20	0.20	0.21	0.15	0.14	0.17	0.17	0.20	0.20	0.15	0.15
Nitrate (as N)	3.0	1.5	3.0	0.026	0.032	0.019	0.016	0.022	0.023	0.023	0.020	0.013	0.011	0.025	0.024	0.025	0.024	0.013	0.013	0.023	0.023
Nitrite (as N)	0.060	0.031	0.060	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Ortho Phosphate (as P)		0.0020		<0.0010	<0.0010	**0.0023**	**0.0026**	<0.0010	<0.0010	<0.0010	<0.0010	0.0020	**0.0019**	<0.0010	<0.0010	<0.0010	<0.0010	**0.0021**	0.0020	<0.0010	<0.0010
Phosphorus (P) - Total	0.010	0.0075	0.010	0.0041	0.0038	0.0046	0.0042	0.0041	0.0040	0.0042	0.0044	0.0044	0.0044	0.0044	0.0041	0.0043	0.0045	0.0044	0.0041	0.0042	0.0038
Phosphorus (P) - Total Diss.				0.0022	0.012	0.0023	0.0020	<0.0020	<0.0020	0.0022	0.0025	0.0023	0.0036	0.0021	0.0024	0.0032	0.0026	0.0025	0.0027	0.0027	0.0025
Reactive Silica (as SiO_2)		1.0		<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50
Sulphate (SO_4)		66	128	4.9	10.4	6.1	5.2	5.6	4.9	0.59	0.79	0.58	0.62	0.85	0.96	1.4	0.97	0.92	0.58	2.4	1.6
Organic / Inorganic Carbon (mg/L)																					
Dissolved Organic Carbon		3.9		3.4	3.4	3.4	3.8	3.4	3.6	3.2	3.6	**4.5**	**4.0**	3.5	3.7	3.3	3.3	3.7	**3.9**	3.6	3.7
Total Organic Carbon		4.0		3.3	3.1	3.5	3.8	3.6	3.5	3.2	3.3	**4.1**	3.7	3.8	3.7	3.3	3.4	3.8	3.7	3.6	3.4
Total Metals (mg/L)																					
Aluminum[4]	***equation***	0.056	0.10	0.010	0.0091	0.0089	0.0088	0.0086	0.0082	0.0099	0.011	0.0075	0.0094	0.0064	0.0071	0.013	0.013	0.010	0.0091	0.0060	0.0059
Antimony		0.0046	0.0090	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic	0.0050	0.0026	0.0050	0.00012	0.00012	0.00013	0.00012	0.00014	0.00012	0.00012	0.00010	0.00013	0.00013	0.00013	0.00012	0.00011	0.00011	0.00013	0.00011	0.00013	0.00012
Barium		0.51	1.0	0.018	0.018	0.020	0.019	0.021	0.021	0.018	0.018	0.019	0.020	0.021	0.021	0.018	0.018	0.020	0.021	0.021	0.020
Beryllium		0.00012	0.00013	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	1.5	0.75	1.5	0.010	0.019	0.013	0.011	0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium[3]	***equation***	0.00002	0.00004	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium		6.2		**3.0**	**3.8**	**3.5**	**3.5**	**3.5**	**3.4**	**2.5**	**2.5**	**2.7**	**2.7**	**2.8**	**2.9**	**2.6**	**2.5**	**2.8**	**2.7**	**3.0**	**2.9**
Cesium				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium		0.00026	0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper		0.0011	0.0020	0.00026	0.00024	0.00027	0.00028	0.00026	0.00026	0.00024	0.00026	0.00025	0.00024	0.00027	0.00025	0.00024	0.00025	0.00029	0.00025	0.00027	0.00027
Iron		0.16	0.30	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead		0.00053	0.0010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium		0.0022	0.096	**0.0010**	**0.0014**	**0.0012**	**0.0013**	**0.0012**	**0.0012**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	**0.0010**	<0.0010	
Magnesium		12.44		**2.8**	**5.9**	**3.8**	**3.5**	**3.4**	**3.2**	**1.1**	**1.2**	**1.2**	**1.2**	**1.3**	**1.3**	**1.5**	**1.3**	**1.2**	**2.0**	**1.7**	
Manganese[4]		0.34	***equation***	**0.0028**	**0.0027**	**0.00039**	**0.00039**	**0.00030**	**0.00036**	**0.0024**	**0.0025**	**0.00046**	**0.00058**	**0.00079**	**0.00085**	**0.0031**	**0.0032**	**0.00036**	**0.00035**	**0.00059**	**0.00045**
Mercury		0.00002	0.00003	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum		0.037	0.073	**0.00007**	**0.00009**	**0.00008**	**0.00008**	**0.00008**	**0.00007**	<0.00050	<0.00050	**0.00006**	**0.00006**	<0.00050	<0.00050	<0.00050	<0.00050	**0.00005**	**0.00006**	**0.00007**	
Nickel		0.013	0.025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium		3.9		**0.91**	**1.7**	**1.2**	**1.2**	**1.2**	**1.1**	**0.41**	**0.45**	**0.44**	**0.46**	**0.49**	**0.51**	**0.54**	**0.47**	**0.50**	**0.45**	**0.72**	**0.64**
Rubidium				**0.00095**	**0.0012**	**0.0010**	**0.00097**	**0.0010**	**0.00096**	**0.00083**	**0.00086**	**0.00079**	**0.00079**	**0.00077**	**0.00079**	**0.00078**	**0.00078**	**0.00082**	**0.00082**	**0.00083**	**0.00086**
Selenium		0.00053	0.0010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon		0.25		**0.21**	**0.22**	**0.16**	**0.17**	**0.13**	**0.14**	**0.21**	**0.21**	**0.14**	**0.14**	**0.11**	**0.11**	**0.21**	**0.21**	**0.15**	**0.16**	**0.12**	**0.12**
Silver		0.00013	0.00025	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium		89		**14.6**	**37.4**	**22.4**	**19.5**	**20**	**17.7**	**0.83**	**2.0**	**0.77**	**1.0**	**1.7**	**2.1**	**4.5**	**2.3**	**2.4**	**0.87**	**7.5**	**5.2**
Strontium		1.3	2.5	**0.028**	**0.045**	**0.037**	**0.036**	**0.035**	**0.033**	**0.018**	**0.019**	**0.021**	**0.021**	**0.021**	**0.022**	**0.021**	**0.019**	**0.022**	**0.021**	**0.025**	**0.024**
Sulfur				**1.4**	**3.3**	**1.8**	**1.3**	**1.3**	**1.8**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.59**	<0.50	<0.50	<0.50	**0.72**	**0.64**
Tellurium				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium		0.00041	0.00080	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin		0.00020		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	**0.00012**	<0.00010	<0.00010
Titanium		0.00060		<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium		0.0075	0.015	**0.00004**	**0.00005**	**0.00005**	**0.00004**	**0.00004**	**0.00004**	**0.00004**	**0.00004**	**0.00004**	**0.00004**	**0.00005**	**0.00004**	**0.00004**	**0.00004**	**0.00004**	**0.00005**	**0.00005**	**0.00004**
Vanadium		0.060	0.12	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc[3]		0.0042	***equation***	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010
Zirconium				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Dissolved Metals (mg/L)																					
Aluminum[4]		0.027	0.050	0.0050	0.0049	0.0054	0.0046	0.0045	0.0048	0.0047	0.0060	0.0043	0.0052	0.0048	0.0063	0.0063	0.0045	0.0047	0.0049	0.0044	0.0039
Antimony		0.0046	0.0090	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Arsenic		0.00026	0.0050	**0.00010**	<0.00010	**0.00012**	**0.00010**	**0.00011**	**0.00011**	<0.00010	<0.00010	**0.00011**	<0.00010	**0.00010**	**0.00011**	<0.00010	<0.00010	**0.00010**	<0.00010	**0.00011**	**0.00010**
Barium		0.51	1.0	**0.017**	**0.017**	**0.019**	**0.020**	**0.020**	**0.020**	**0.017**	**0.017**	**0.019**	**0.019**	**0.020**	**0.020**	**0.017**	**0.017**	**0.019**	**0.019**	**0.021**	**0.020**
Beryllium		0.00012	0.00013	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100	<0.000100
Bismuth				<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Boron	0.75		1.5	<0.010	<0.010	**0.012**	**0.010**	**0.011**	**0.010**	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Cadmium		0.00002	0.00004	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Calcium		6.2		**3.0**	**3.8**	**3.5**	**3.5**	**3.5**	**3.4**	**2.5**	**2.5**	**2.7**	**2.7**	**2.8**	**2.9**	**2.6**	**2.5**	**2.8**	**2.7**	**3.0**	**2.9**
Cesium				<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Chromium		0.00026	0.0050	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Cobalt				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Copper		0.0011	0.0020	**0.00026**	**0.00024**	**0.00027**	**0.00028**	**0.00026**	**0.00026**	**0.00024**	**0.00026**	**0.00025**	**0.00024**	**0.00027**	**0.00025**	**0.00024**	**0.00025**	**0.00029**	**0.00025**	**0.00027**	**0.00027**
Iron		0.16	0.30	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010	<0.010
Lead		0.00053	0.0010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Lithium		0.0022	0.096	**0.0010**	**0.0014**	**0.0012**	**0.0013**	**0.0012**	**0.0012**	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	**0.0010**	<0.0010
Magnesium		12.44		**2.8**	**5.9**	**3.8**	**3.5**	**3.4**	**3.2**	**1.1**	**1.2**	**1.2**	**1.2**	**1.3**	**1.3**	**1.5**	**1.3**	**1.2**	**1.2**	**2.0**	**1.7**
Manganese[4]		0.34	***equation***	**0.0028**	**0.0027**	**0.00039**	**0.00039**	**0.00030**	**0.00036**	**0.0024**	**0.0025**	**0.00046**	**0.00058**	**0.00079**	**0.00085**	**0.0031**	**0.0032**	**0.00036**	**0.00035**	**0.00059**	**0.00045**
Mercury		0.00002	0.00003	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050	<0.0000050
Molybdenum		0.037	0.073	**0.00007**	**0.00009**	**0.00008**	**0.00008**	**0.00008**	**0.00007**	<0.00050	<0.00050	**0.00006**	**0.00006**	<0.00050	<0.00050	<0.00050	<0.00050	**0.00005**	**0.00006**	**0.00007**	
Nickel		0.013	0.025	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Phosphorus				<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050	<0.050
Potassium		3.9		**0.91**	**1.7**	**1.2**	**1.2**	**1.2**	**1.1**	**0.41**	**0.45**	**0.44**	**0.46**	**0.49**	**0.51**	**0.54**	**0.47**	**0.50**	**0.45**	**0.72**	**0.64**
Rubidium				**0.00095**	**0.0012**	**0.0010**	**0.00097**	**0.0010**	**0.00096**	**0.00083**	**0.00086**	**0.00079**	**0.00079**	**0.00077**	**0.00079**	**0.00078**	**0.00078**	**0.00082**	**0.00082**	**0.00083**	**0.00086**
Selenium		0.00053	0.0010	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050	<0.000050
Silicon		0.25		**0.21**	**0.22**	**0.16**	**0.17**	**0.13**	**0.14**	**0.21**	**0.21**	**0.14**	**0.14**	**0.11**	**0.11**	**0.21**	**0.21**	**0.15**	**0.16**	**0.12**	**0.12**
Silver		0.00013	0.00025	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Sodium		89		**14.6**	**37.4**	**22.4**	**19.5**	**20**	**17.7**	**0.83**	**2.0**	**0.77**	**1.0**	**1.7**	**2.1**	**4.5**	**2.3**	**2.4**	**0.87**	**7.5**	**5.2**
Strontium		1.3	2.5	**0.028**	**0.045**	**0.037**	**0.036**	**0.035**	**0.033**	**0.018**	**0.019**	**0.021**	**0.021**	**0.021**	**0.022**	**0.021**	**0.019**	**0.022**	**0.021**	**0.025**	**0.024**
Sulfur				**1.4**	**3.3**	**1.8**	**1.3**	**1.3**	**1.8**	<0.50	<0.50	<0.50	<0.50	<0.50	<0.50	**0.59**	<0.50	<0.50	<0.50	**0.72**	**0.64**
Tellurium				<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020	<0.00020
Thallium		0.00041	0.00080	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010	<0.000010
Thorium				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Tin		0.00020		<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	**0.00012**	<0.00010	<0.00010
Titanium		0.00060		<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030	<0.00030
Tungsten				<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010	<0.00010
Uranium		0.0075	0.015	**0.00004**	**0.00005**	**0.00005**	**0.00004**	**0.00004**	**0.00004**	**0.00004**	**0.00004**	**0.00004**	**0.00004**	**0.00005**	**0.00004**	**0.00004**	**0.00004**	**0.00004**	**0.00005**	**0.00005**	**0.00004**
Vanadium		0.060	0.12	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050	<0.00050
Zinc[3]		0.0042	***equation***	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010	<0.0010

Table C3-2. Water and phytoplankton sampling location coordinates (GPS, UTM, NAD83) from Baker Lake, 2024.

Area[1]	Area Type[2]	Area-Replicate	Water & Phytoplankton (Monthly)				
			Month	Depth (m)	Zone	Easting	Northing
BAP	Ref	BAP-91	July	26.7	15W	363620	7130984
		BAP-92	July	34.8	15W	362944	7131103
		BAP-93	August	20.5	15W	364346	7130731
		BAP-94	August	23	15W	362954	7131474
		BAP-95	September	>17	15W	363638	7131008
		BAP-96	September	17	15W	364241	7130970
BBD	NF	BBD-91	July	12.6	14W	644669	7135165
		BBD-92	July	8.06	14W	644058	7135439
		BBD-93	August	11.3	14W	644626	7135200
		BBD-94	August	8.5	14W	643959	7135338
		BBD-95	September	12.3	14W	644617	7135175
		BBD-96	September	14.28	14W	643906	7135191
BPJ	NF	BPJ-91	July	13.79	15W	357237	7134224
		BPJ-92	July	23	15W	356702	7134169
		BPJ-93	August	11.3	15W	357198	7134060
		BPJ-94	August	11.3	15W	356513	7133878
		BPJ-95	September	12.7	15W	357390	7133937
		BPJ-96	September	>15	15W	356716	7133413

Notes:

1. Area IDs are as follows: BAP = Baker Lake – Akilahaarjuk Point; BBD = Baker Lake – barge dock; BPJ= Baker Lake – proposed jetty

2. Area types: NF=near-field; Ref=reference.

FIGURES

Figure C3-1. Laboratory-measured conductivity (µS/cm).

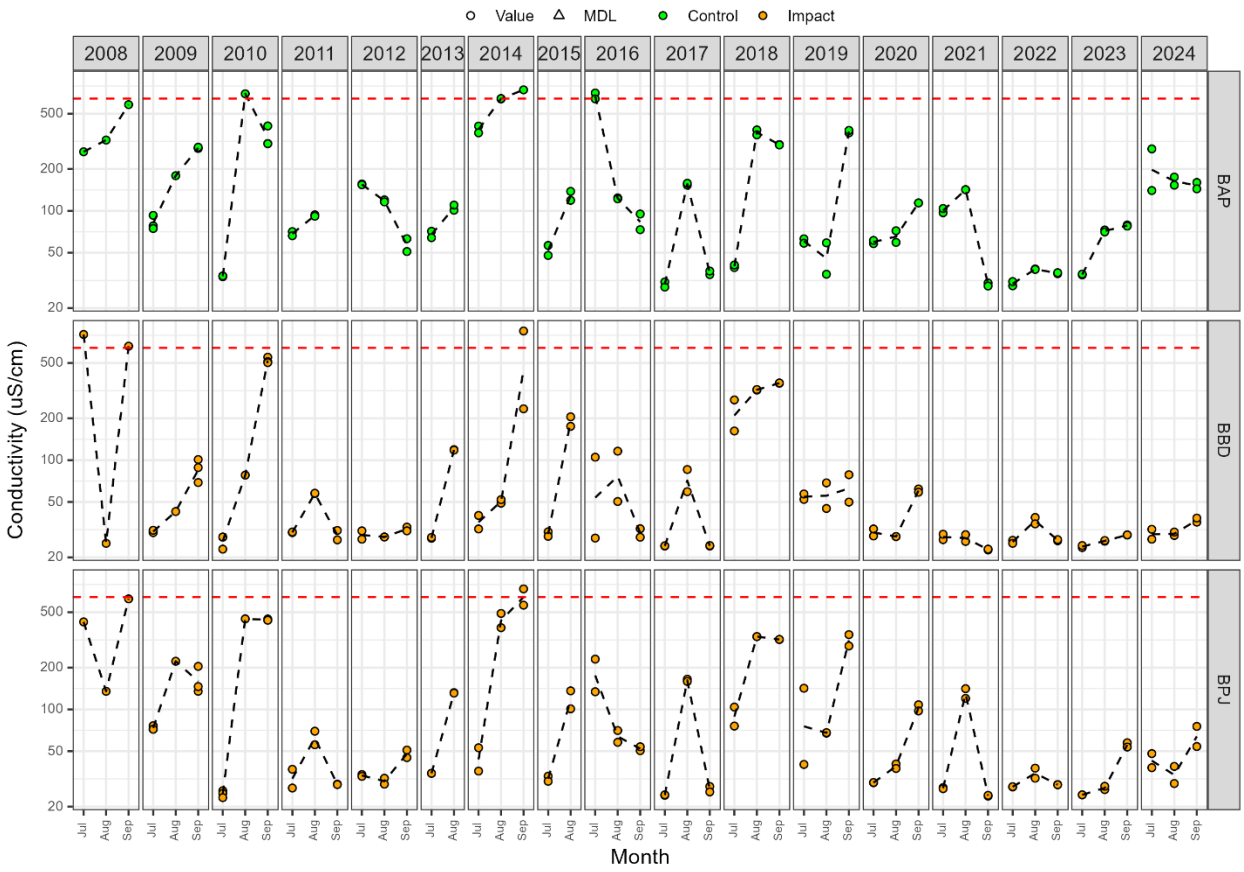


Figure C3-2. Laboratory-measured hardness (mg/L).

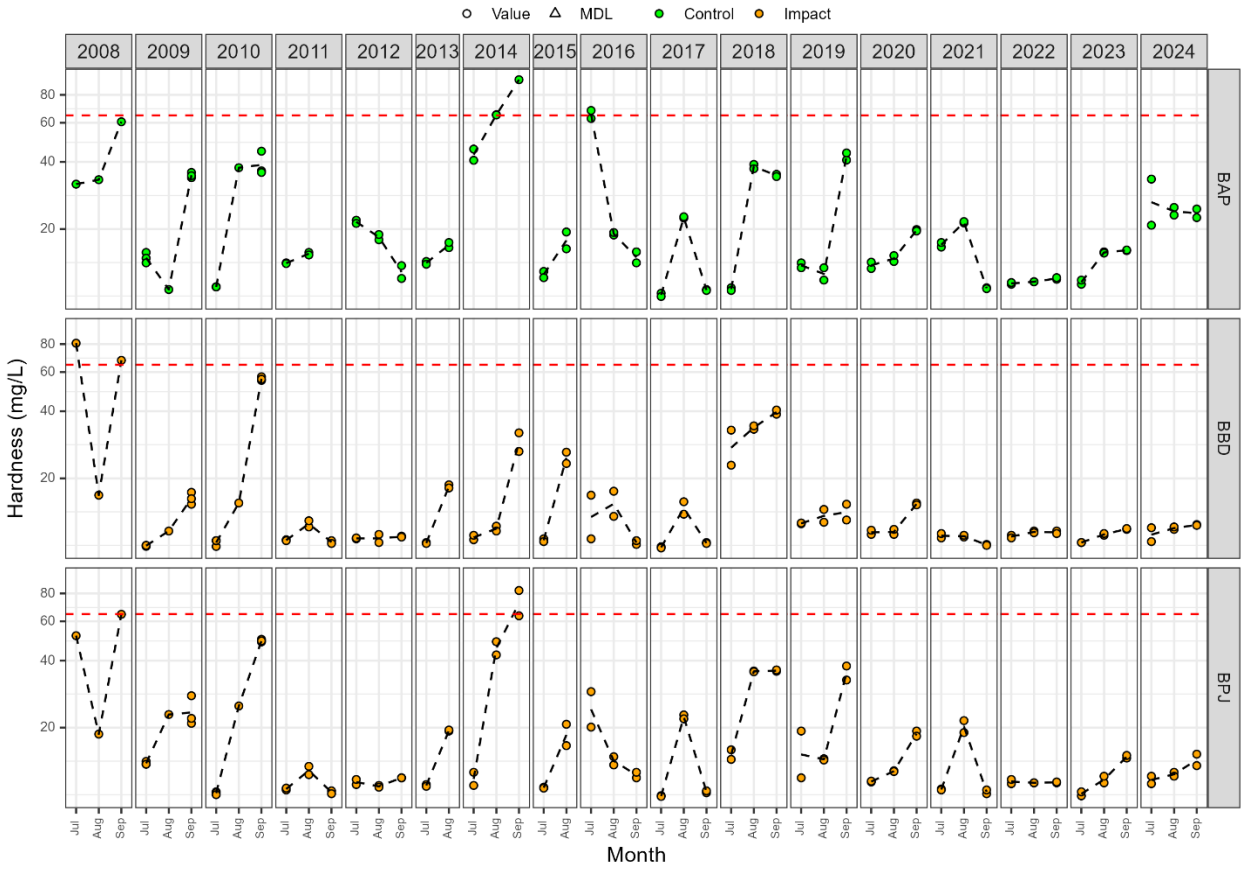


Figure C3-3. Field-measured pH.

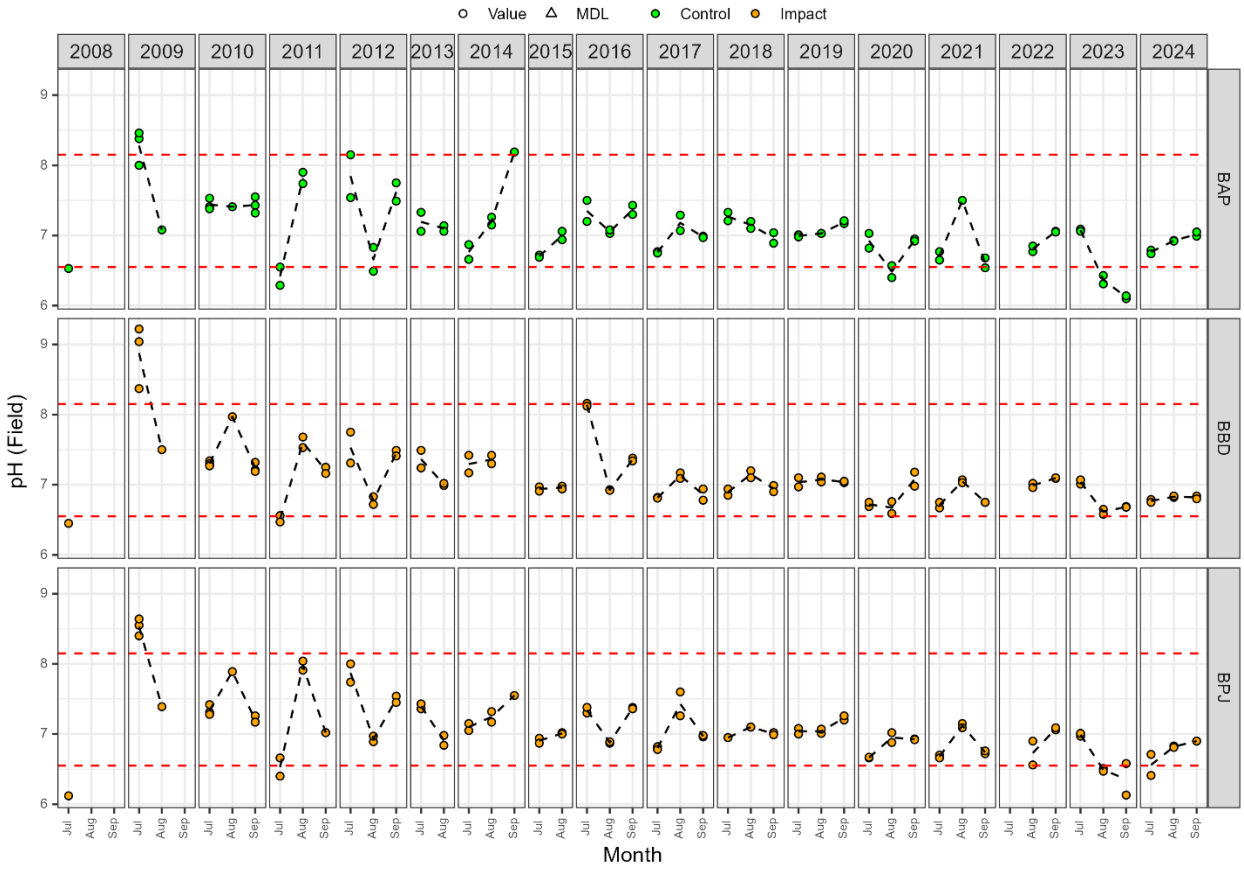


Figure C3-4. Laboratory-measured pH.

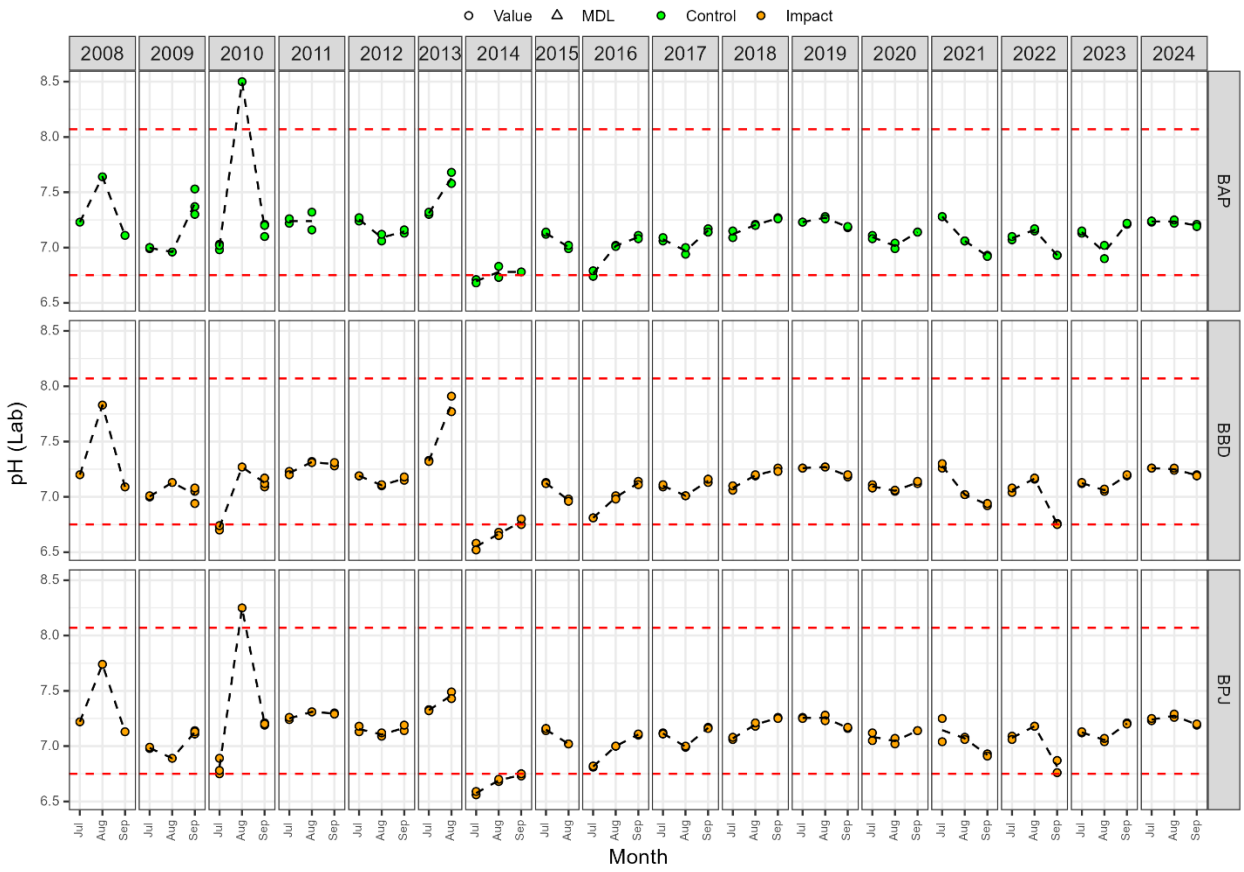


Figure C3-5. Total dissolved solids (TDS; mg/L).

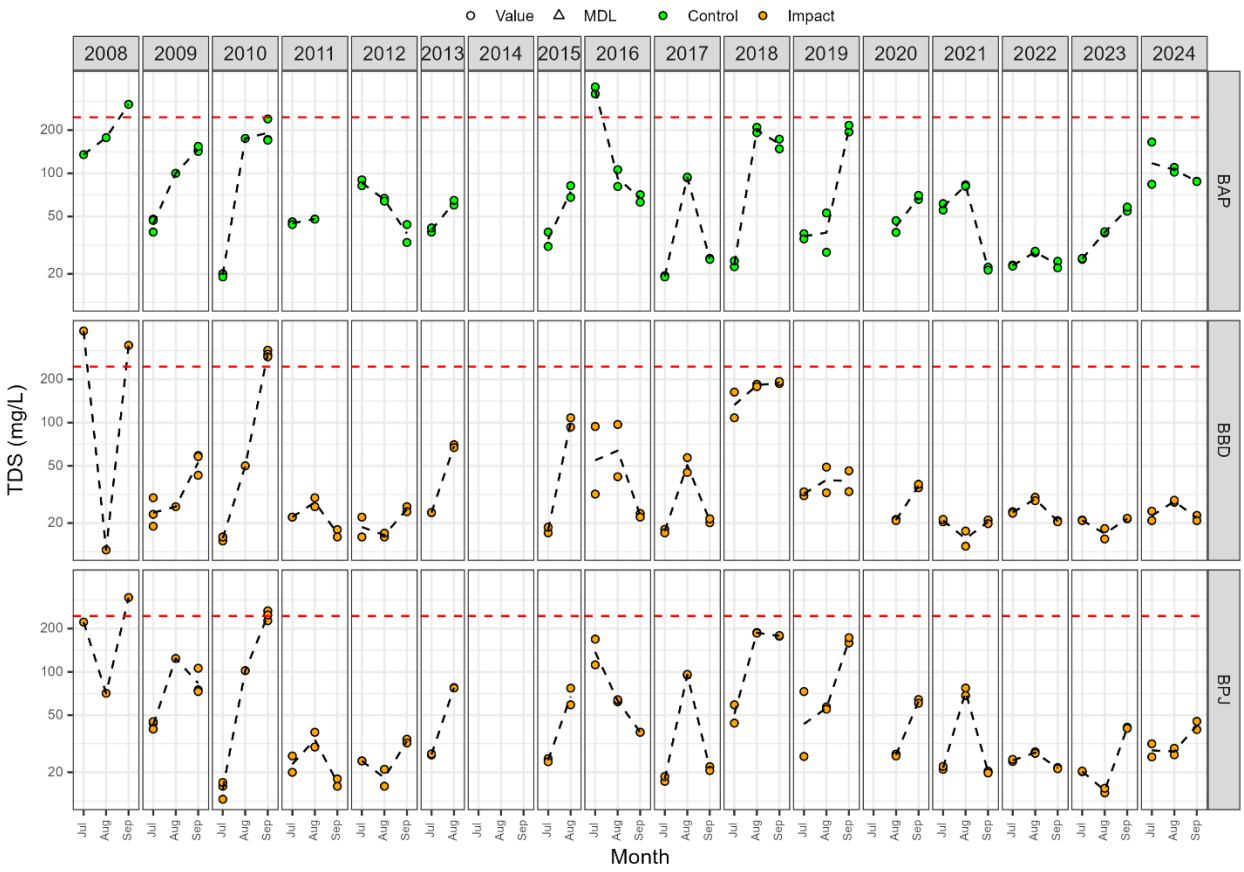


Figure C3-6. Total suspended solids (TSS; mg/L).

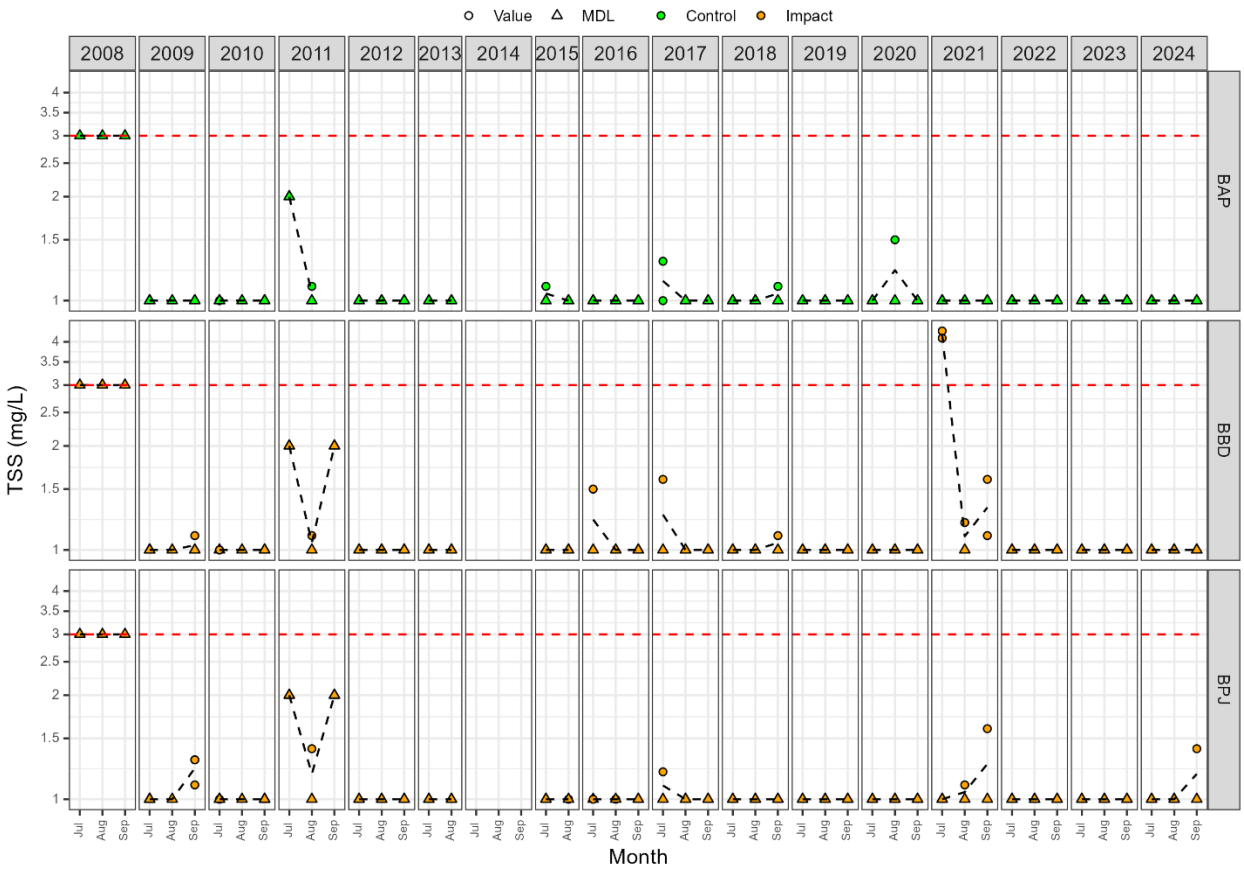


Figure C3-7. Carbonate alkalinity (mg/L).

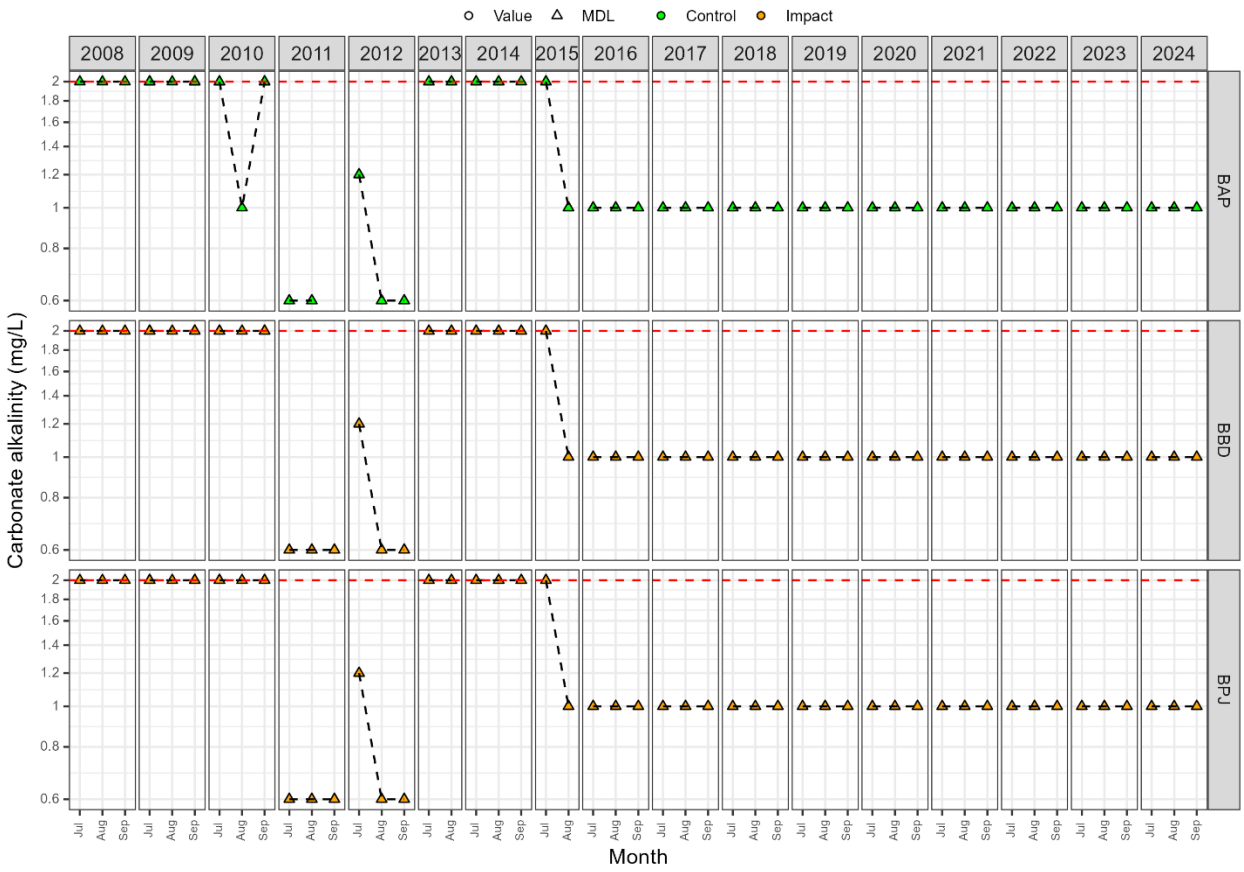


Figure C3-8. Bicarbonate alkalinity (mg/L).

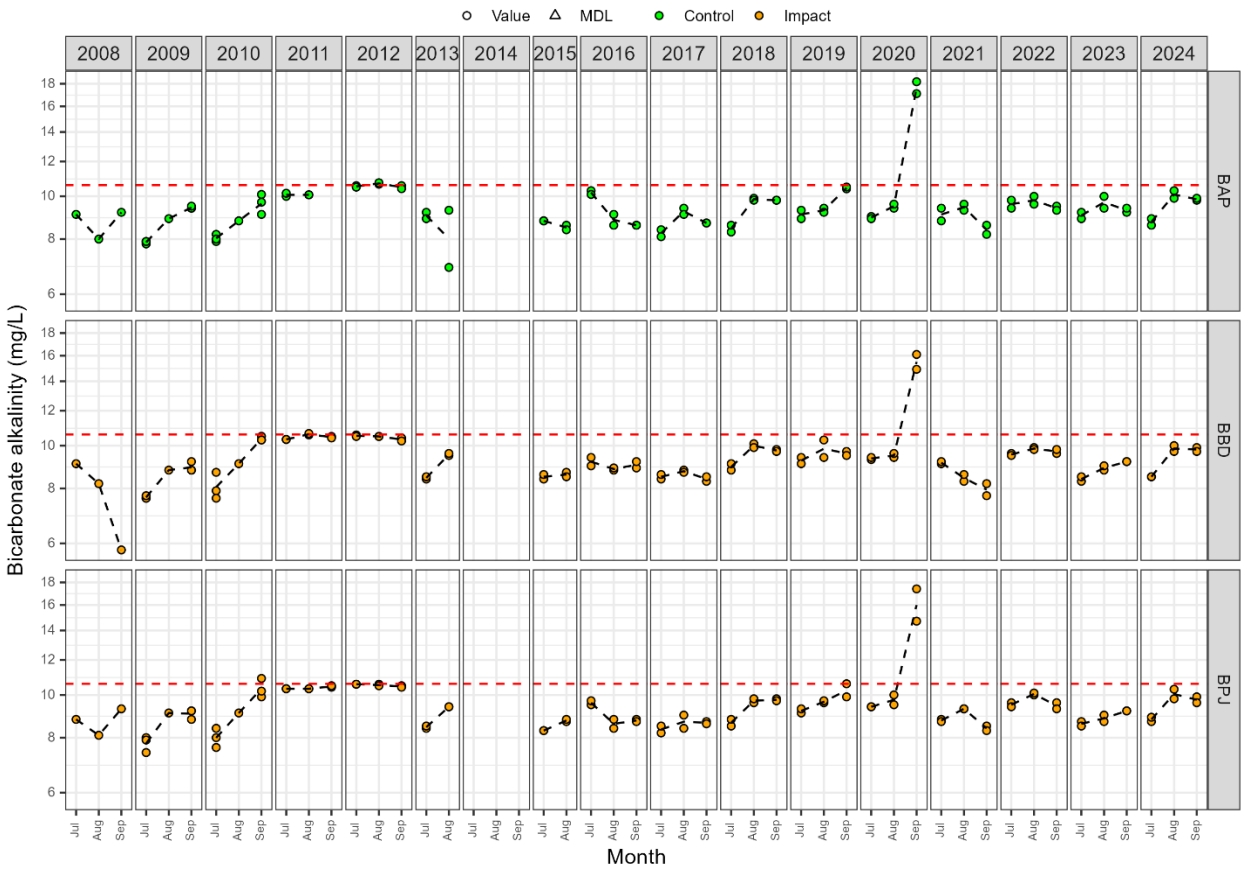


Figure C3-9. Total alkalinity (mg/L).

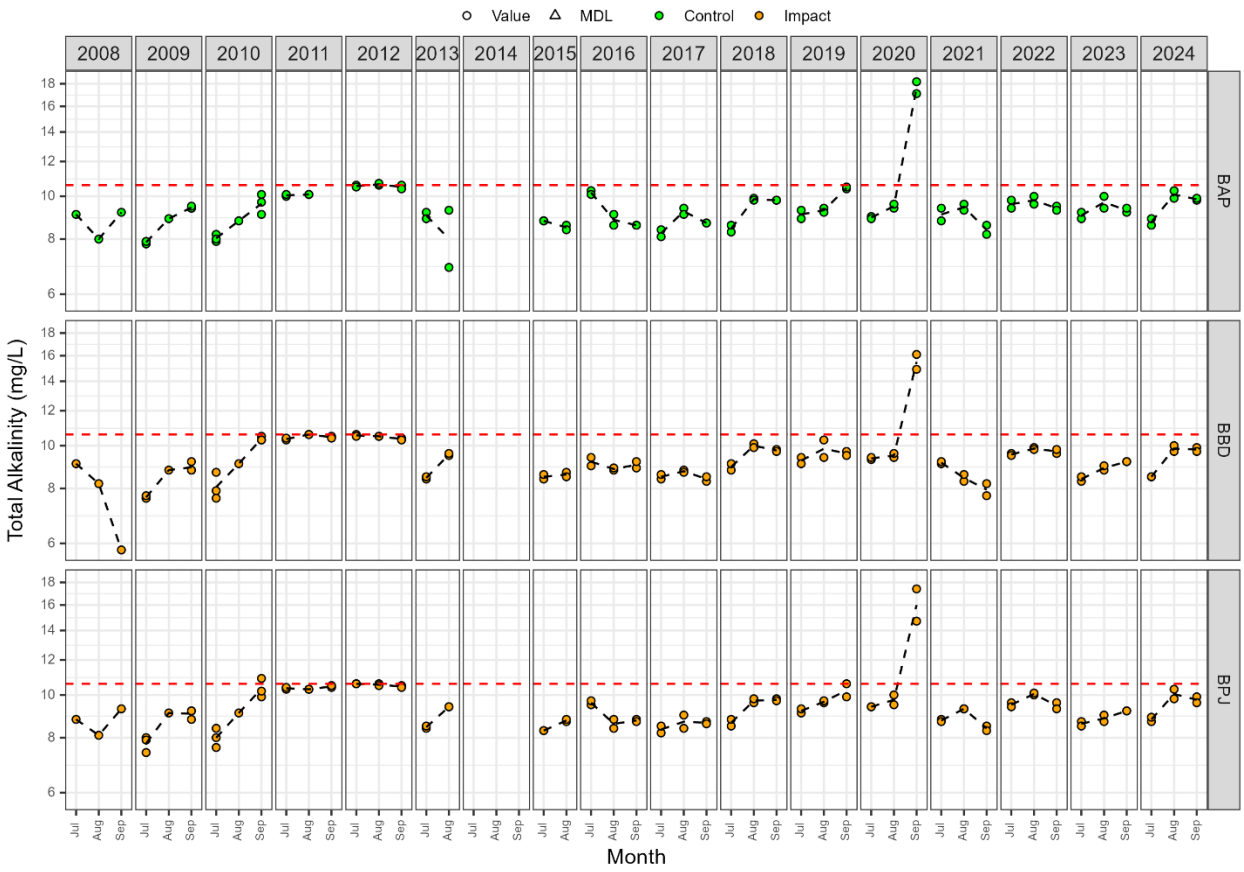


Figure C3-10. Ammonia-N (mg/L).

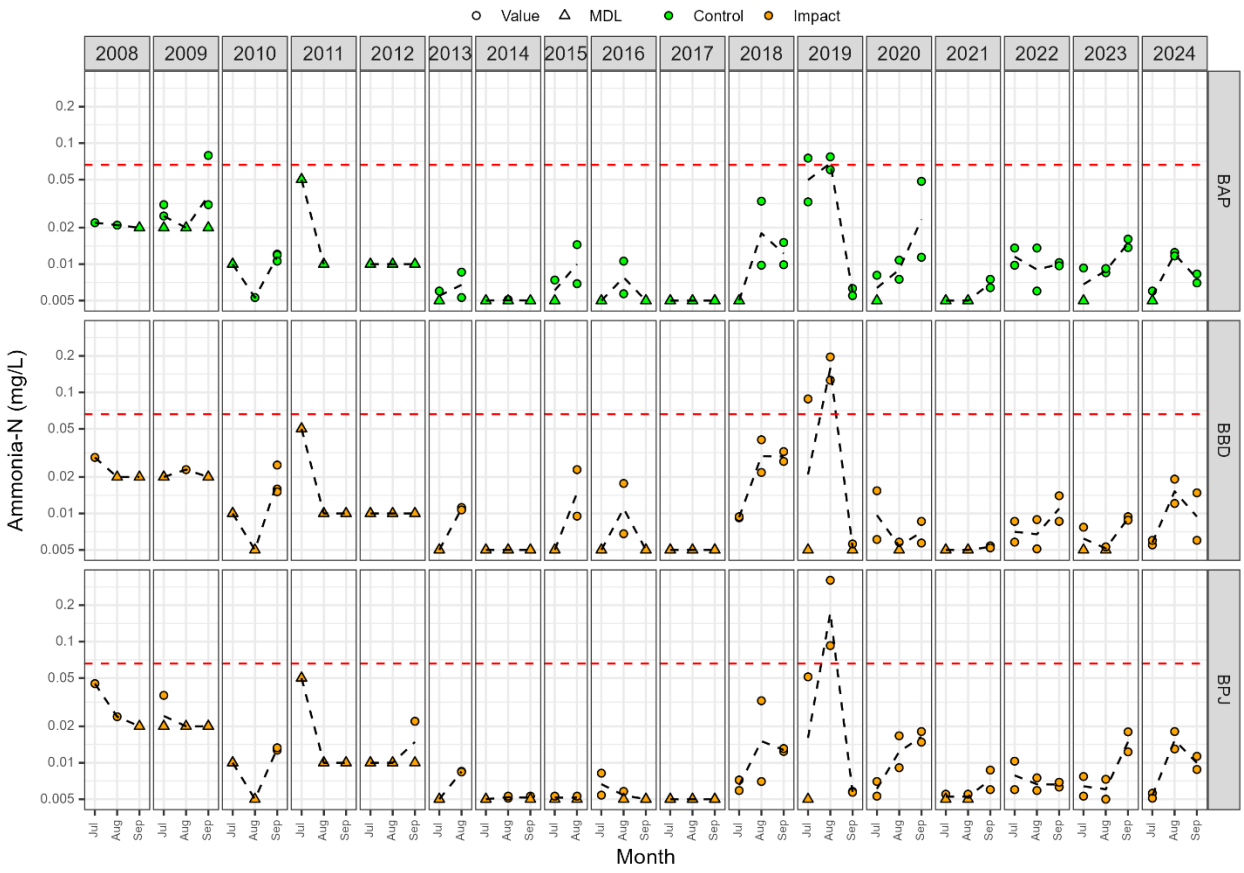


Figure C3-11. Chloride (mg/L).

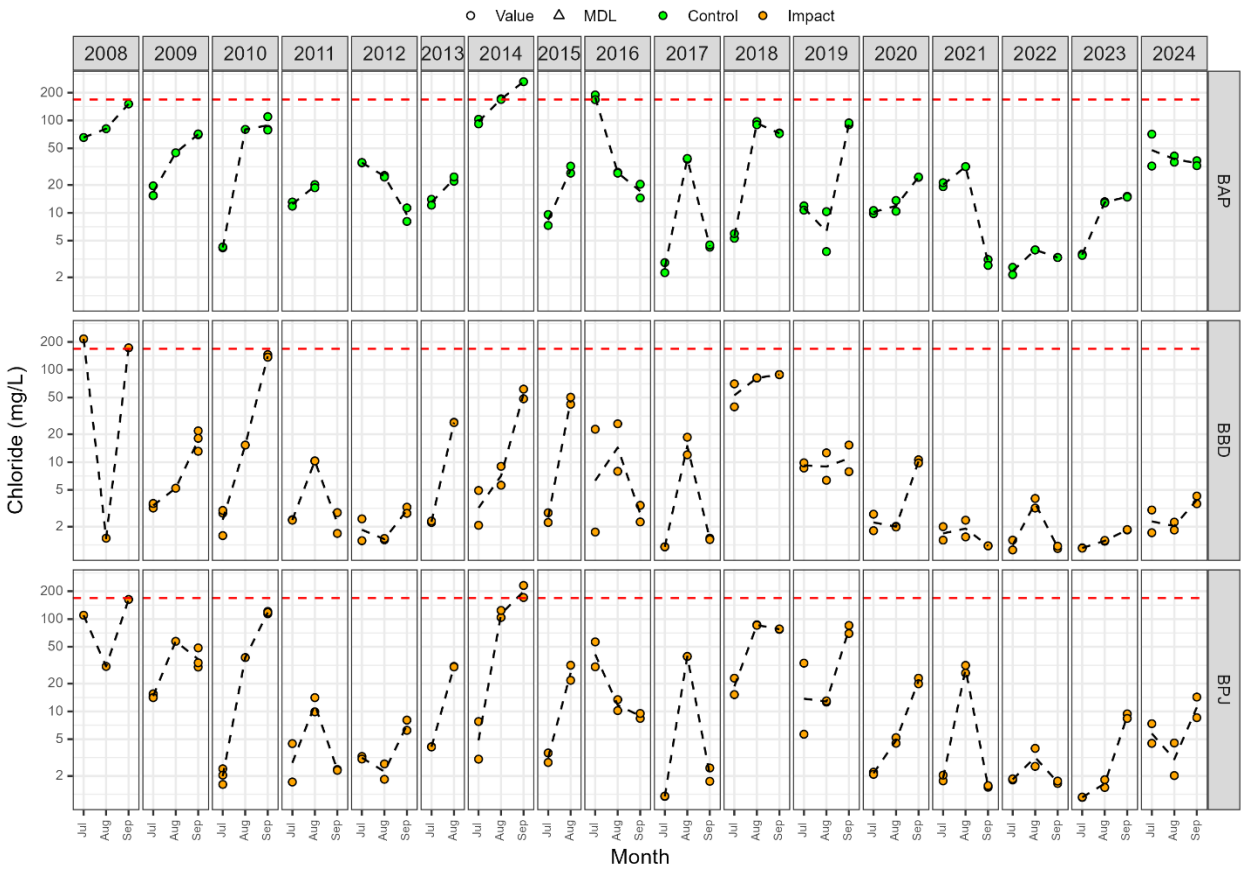


Figure C3-12. Fluoride (mg/L).

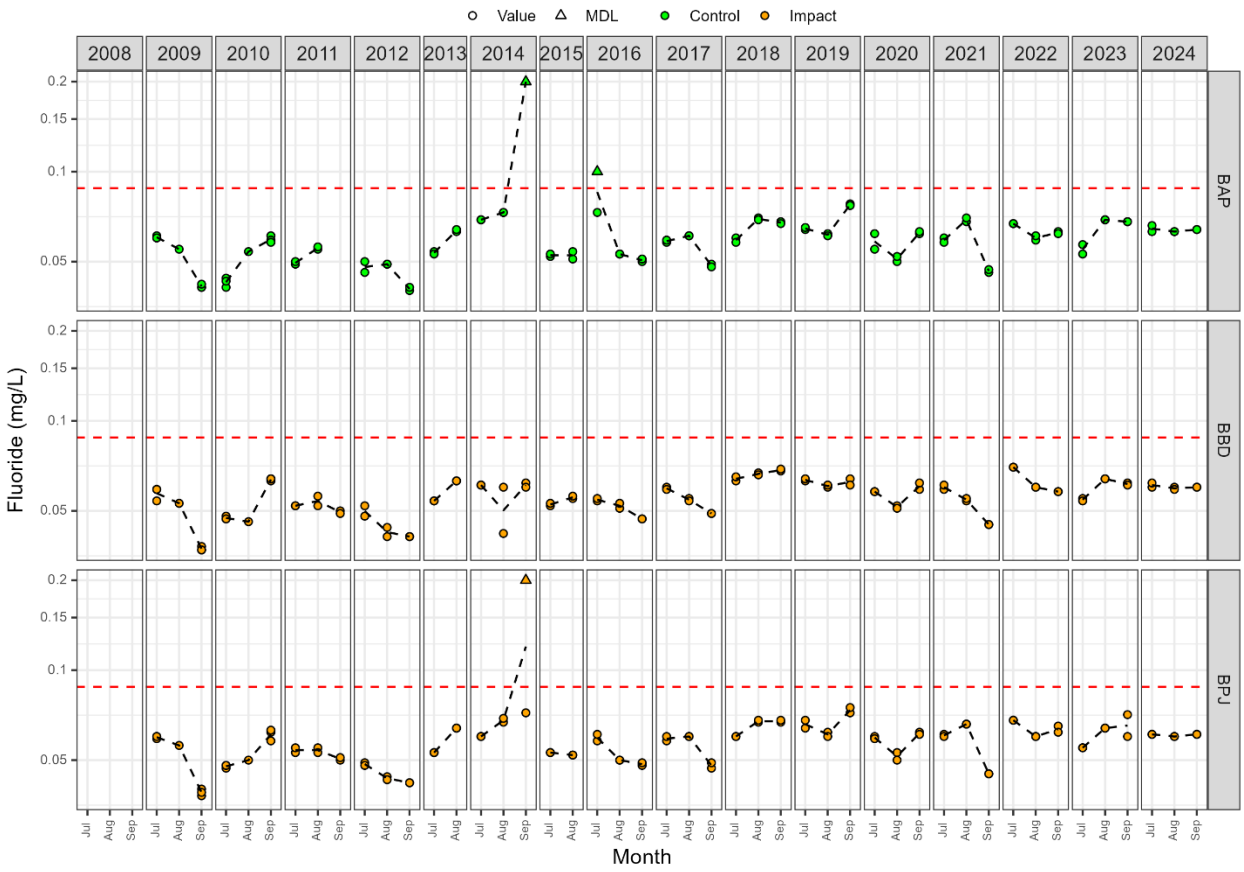


Figure C3-13. Nitrate-N (mg/L).

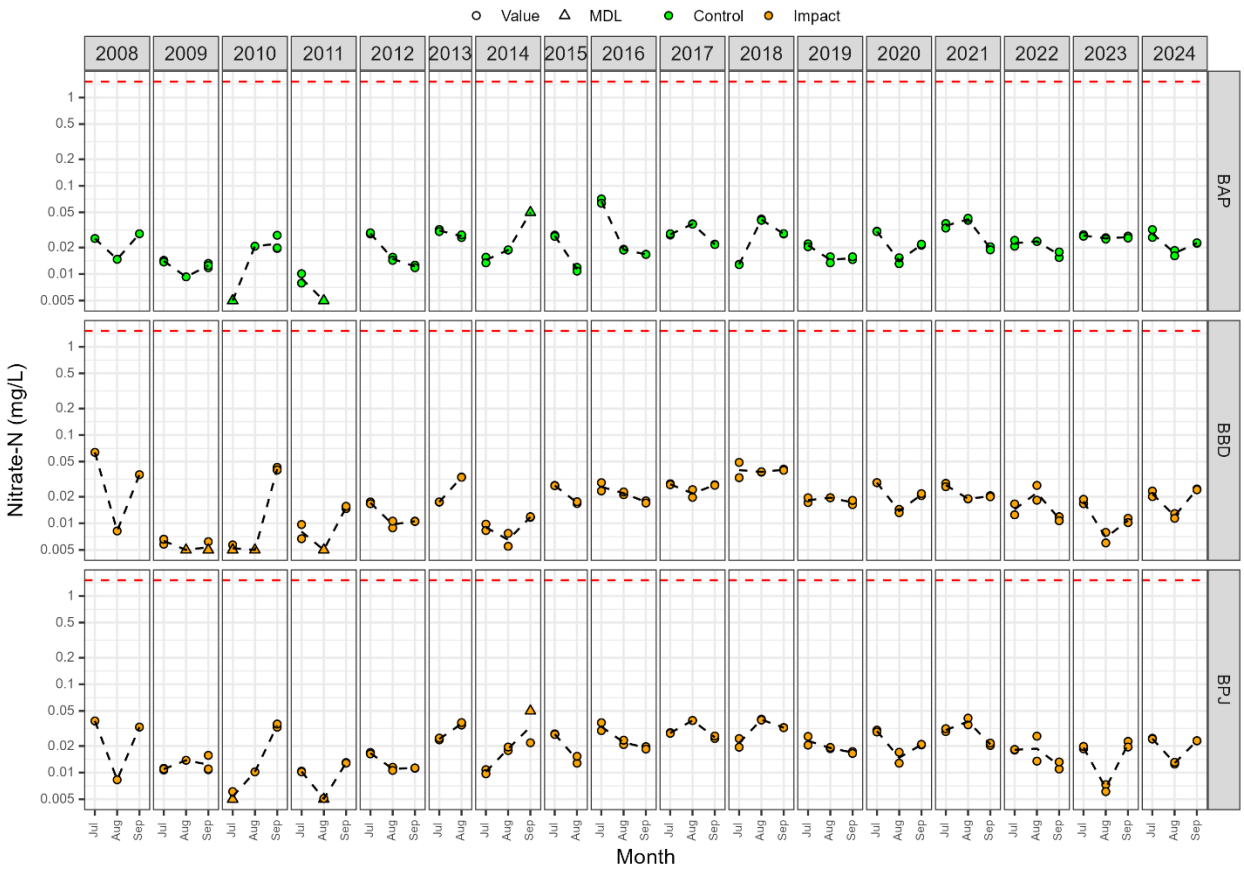


Figure C3-14. Nitrite-N (mg/L).

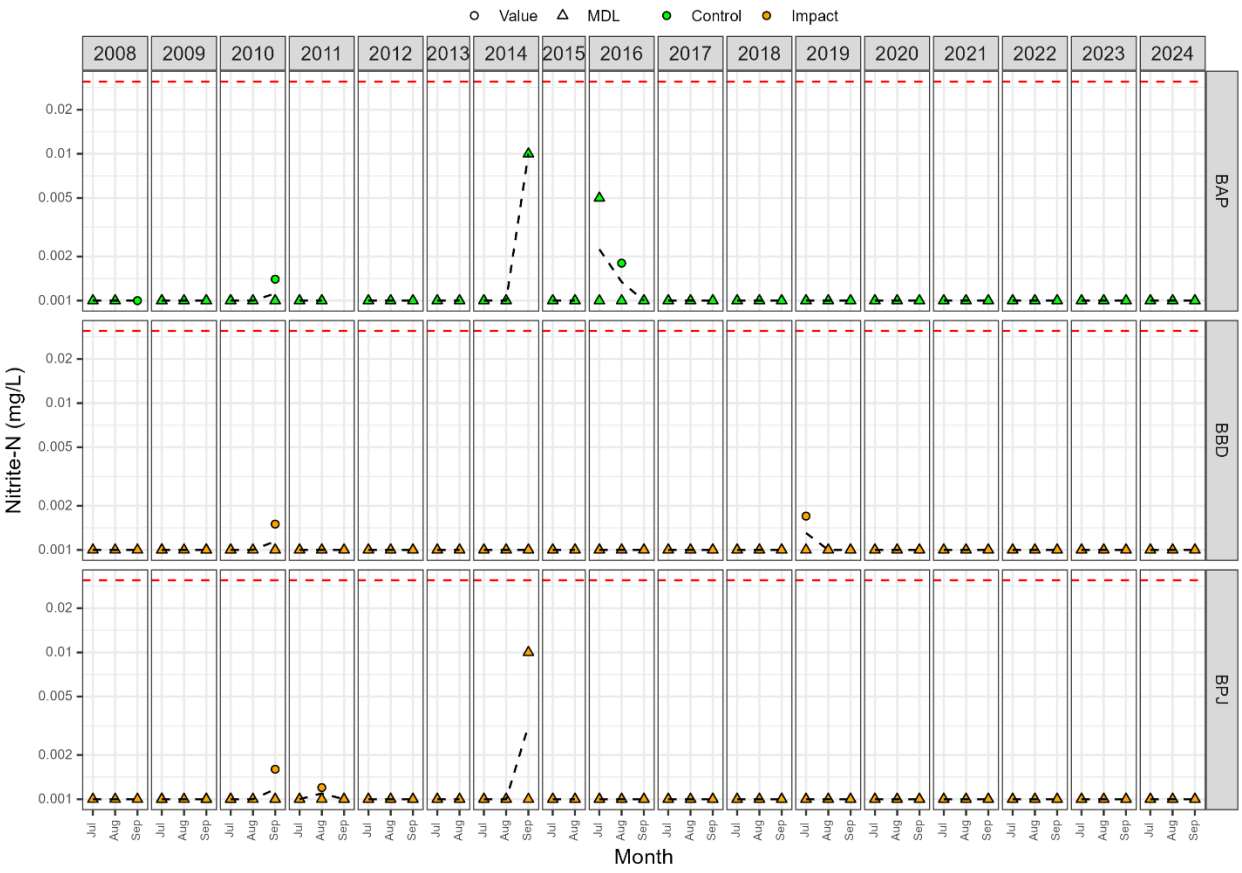


Figure C3-15. Total Kjeldahl Nitrogen (TKN; mg/L).

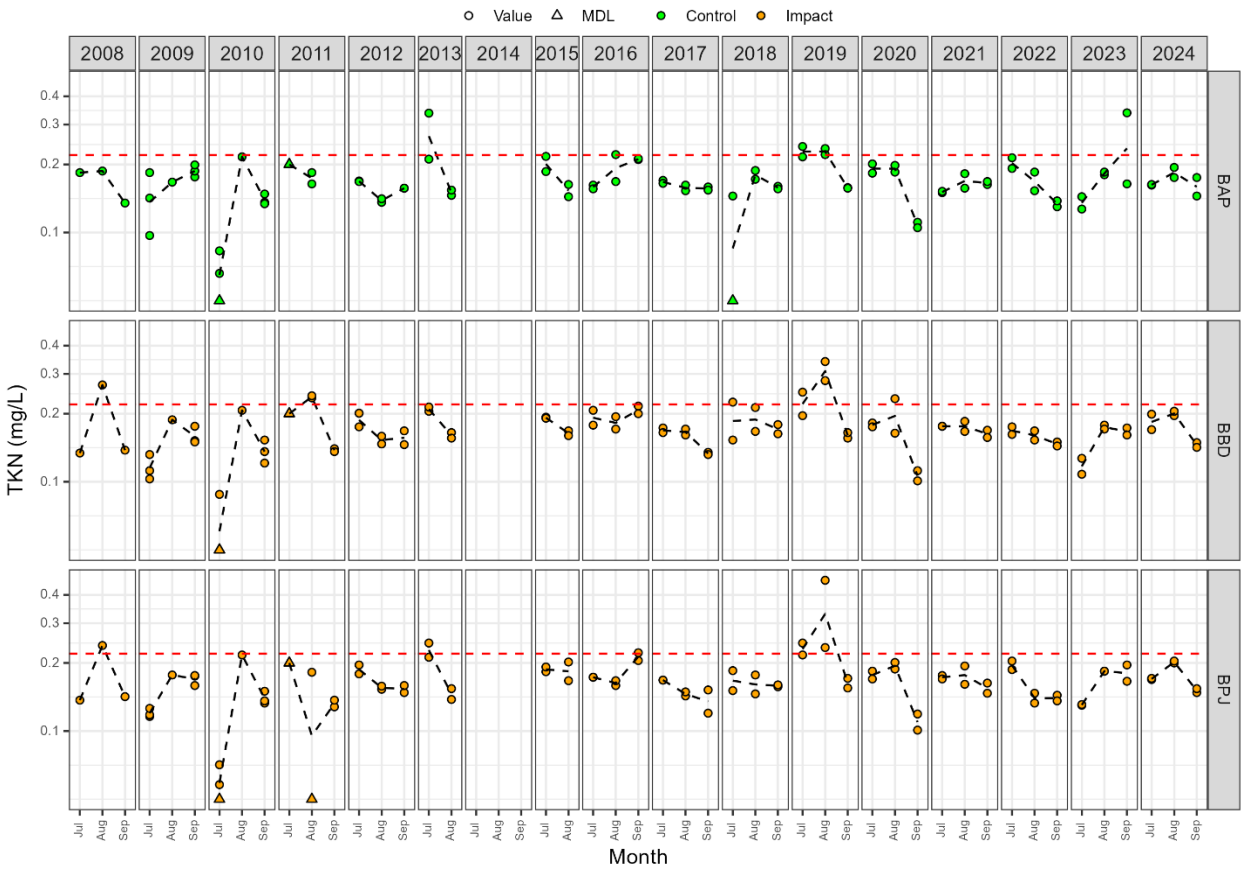


Figure C3-16. Ortho-phosphate (mg/L).

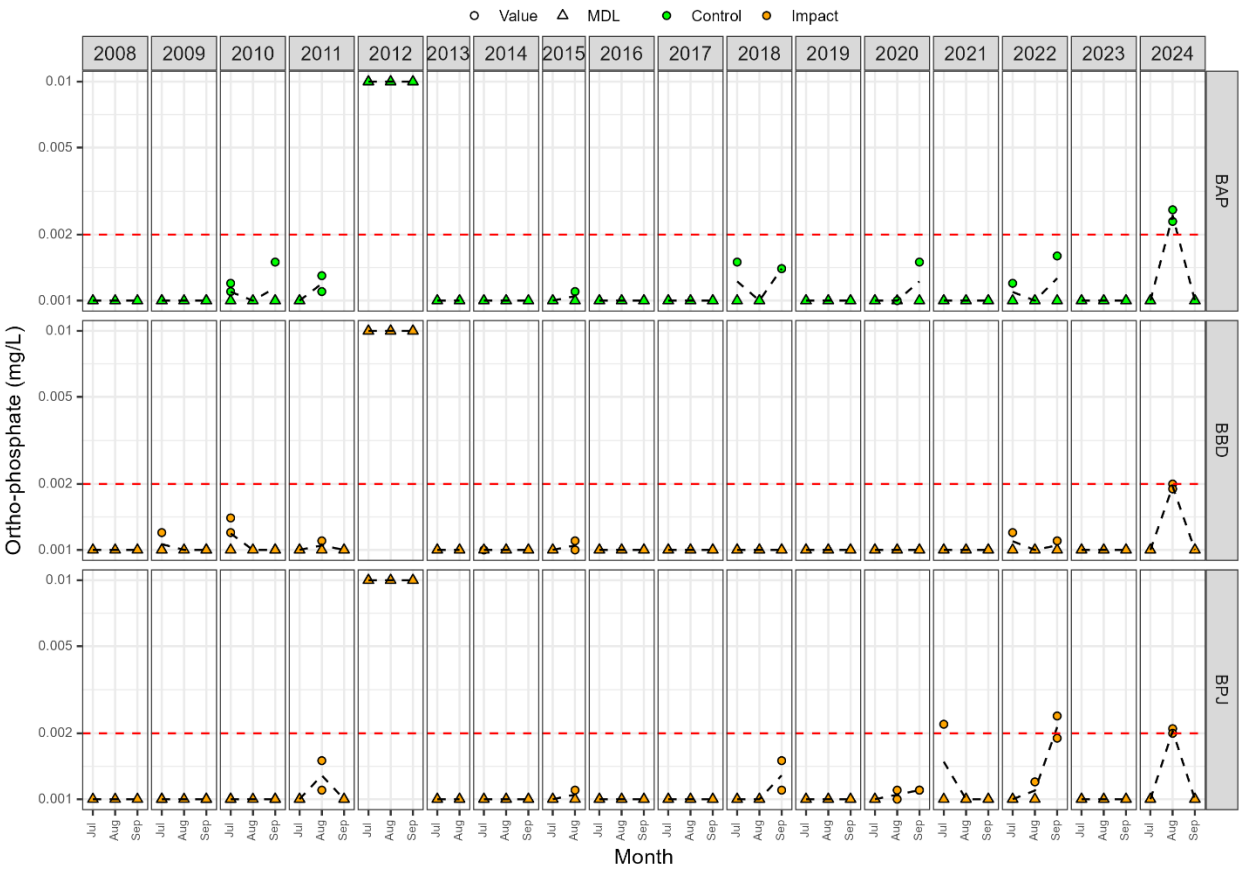


Figure C3-17. Total phosphorous (mg/L).

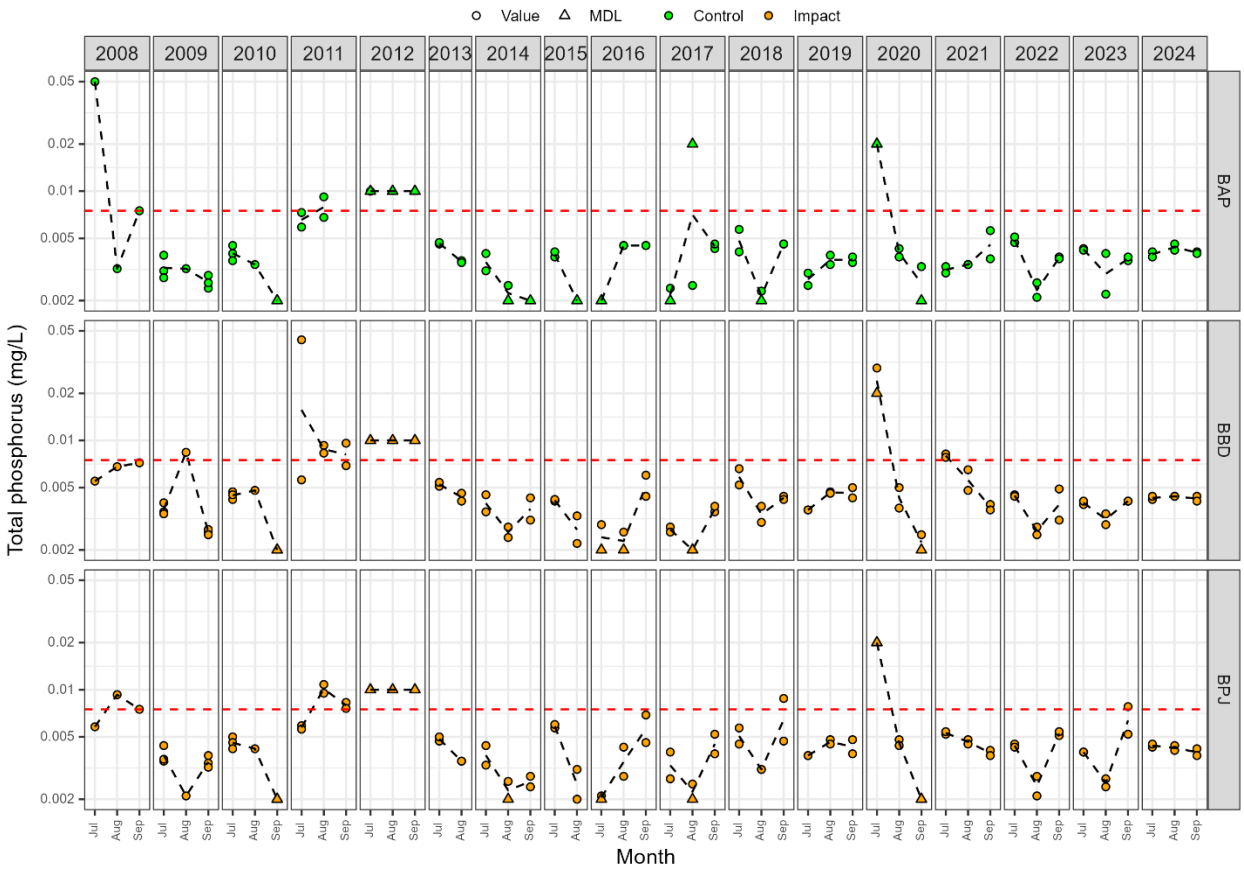


Figure C3-18. Reactive silica (mg/L).

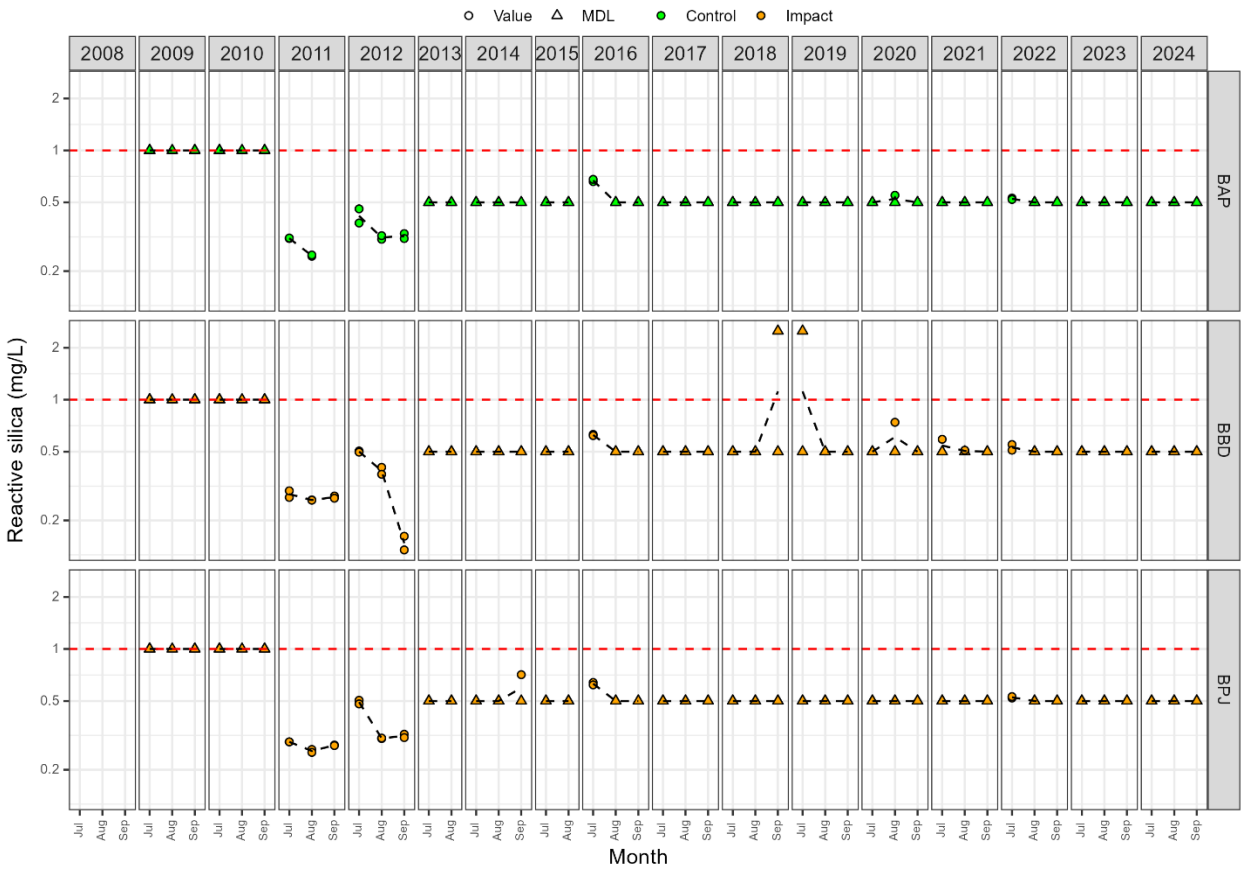


Figure C3-19. Sulphate (mg/L).

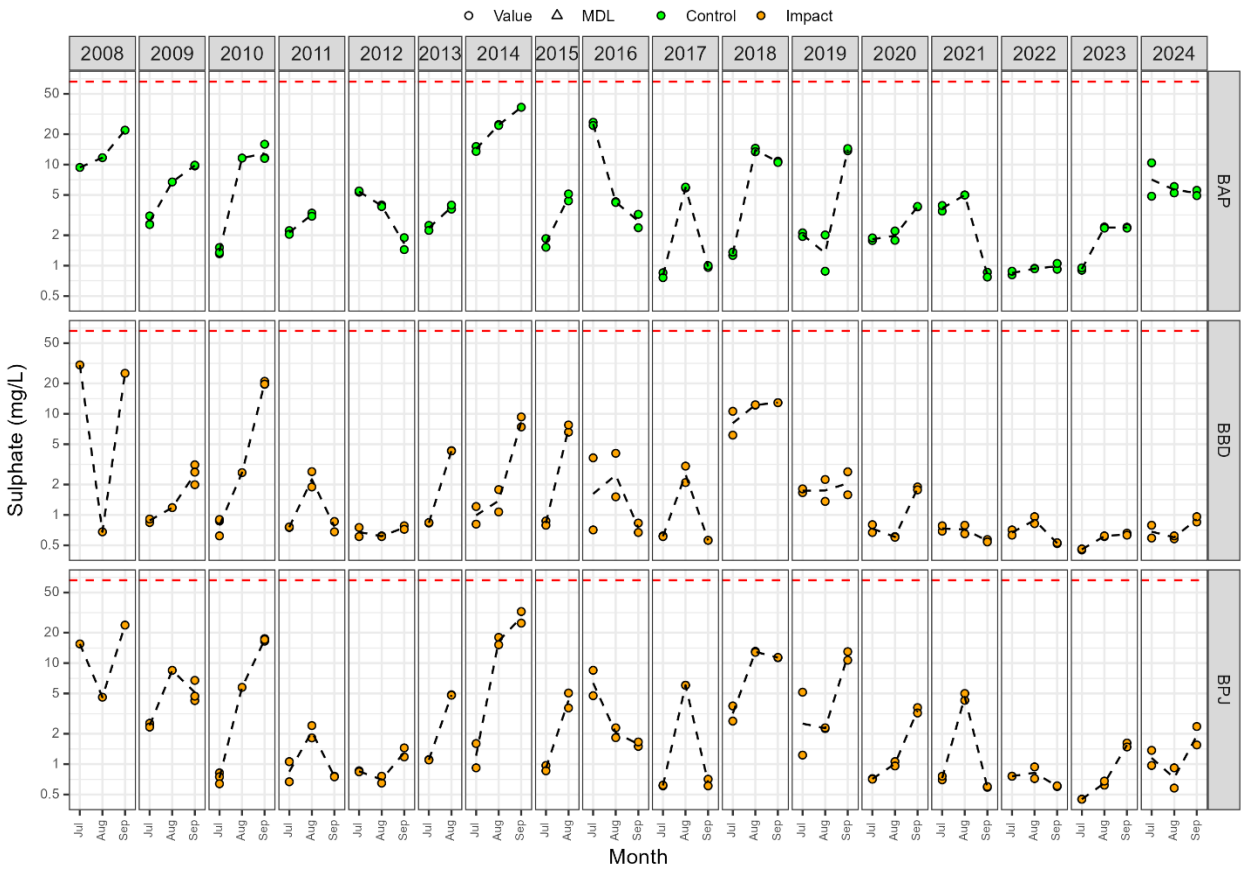


Figure C3-20. Dissolved organic carbon (DOC; mg/L).

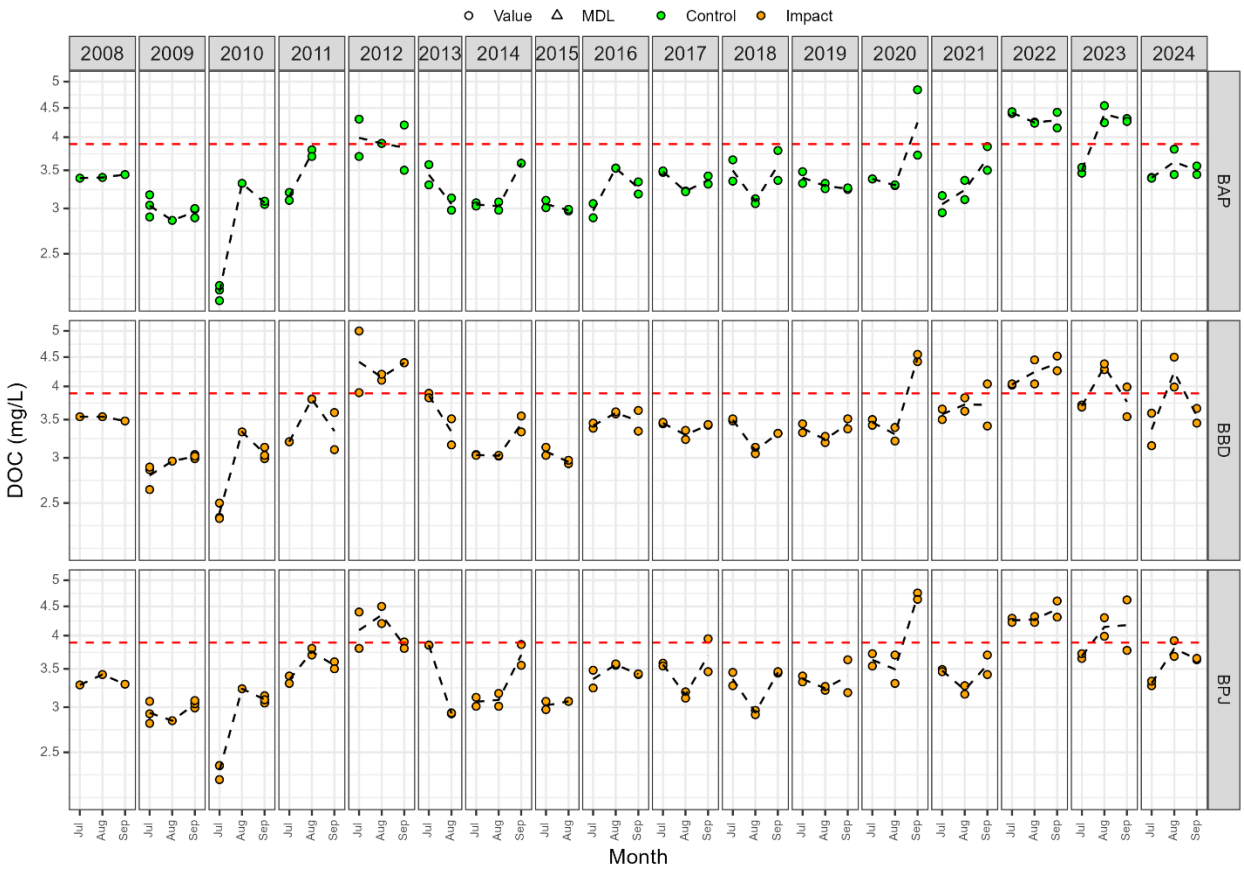


Figure C3-21. Total organic carbon (TOC; mg/L).

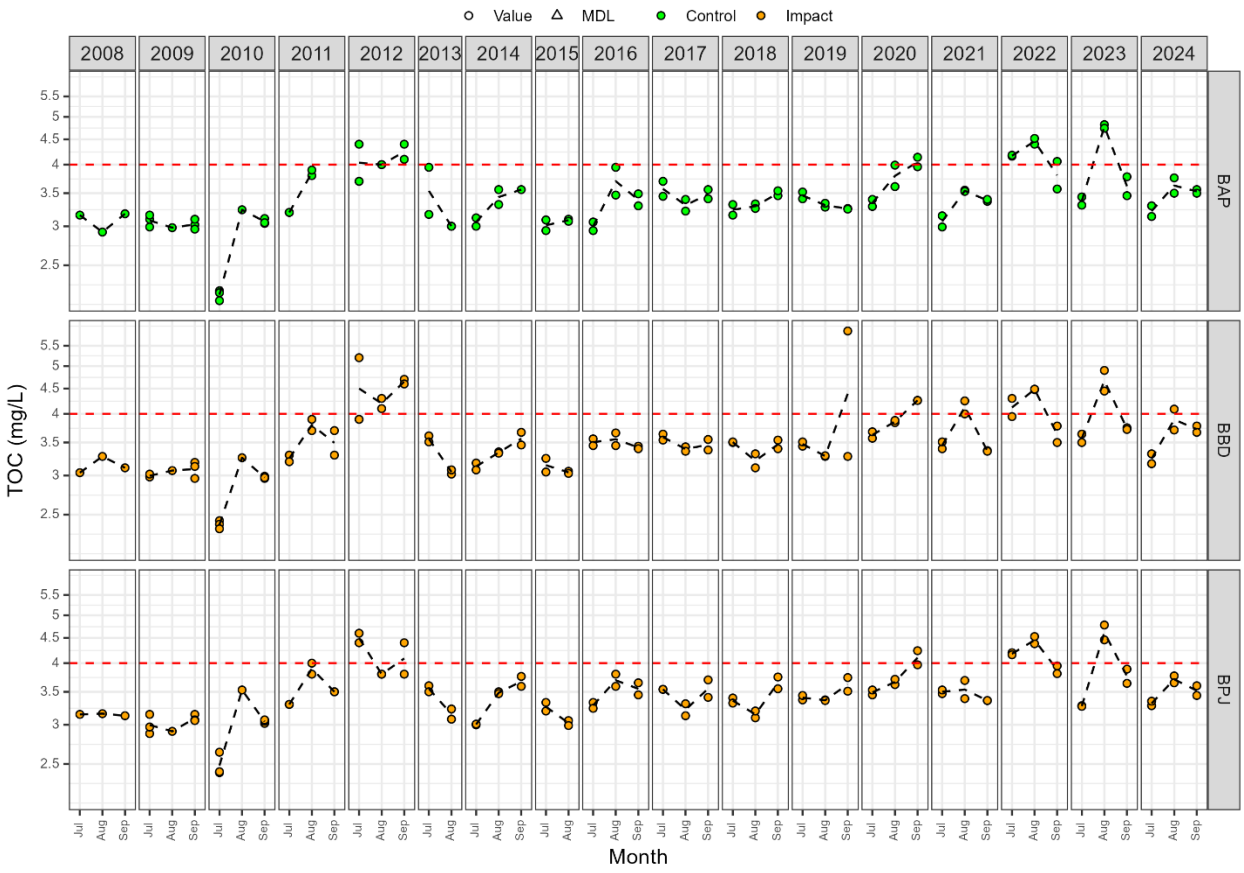


Figure C3-22. Total aluminum (mg/L).

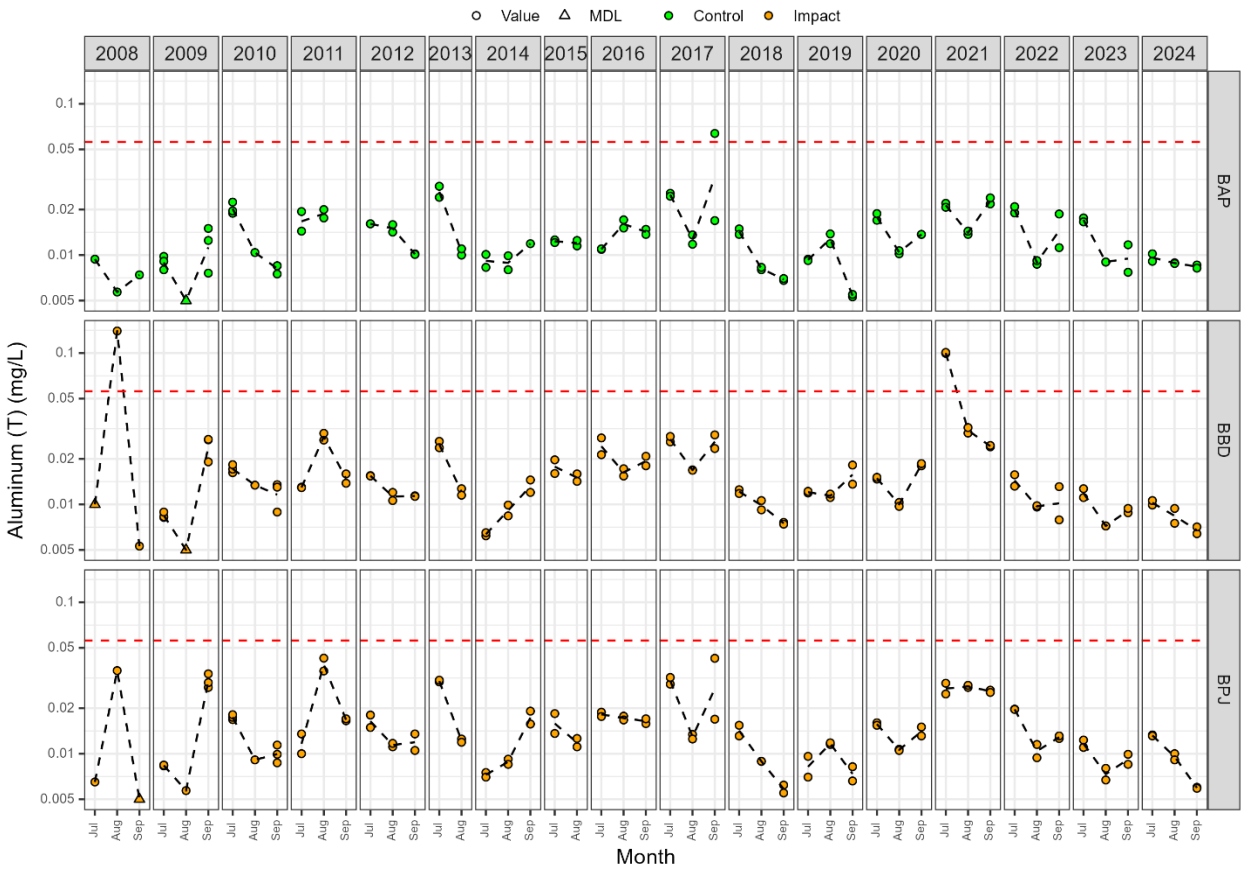


Figure C3-23. Total antimony (mg/L).

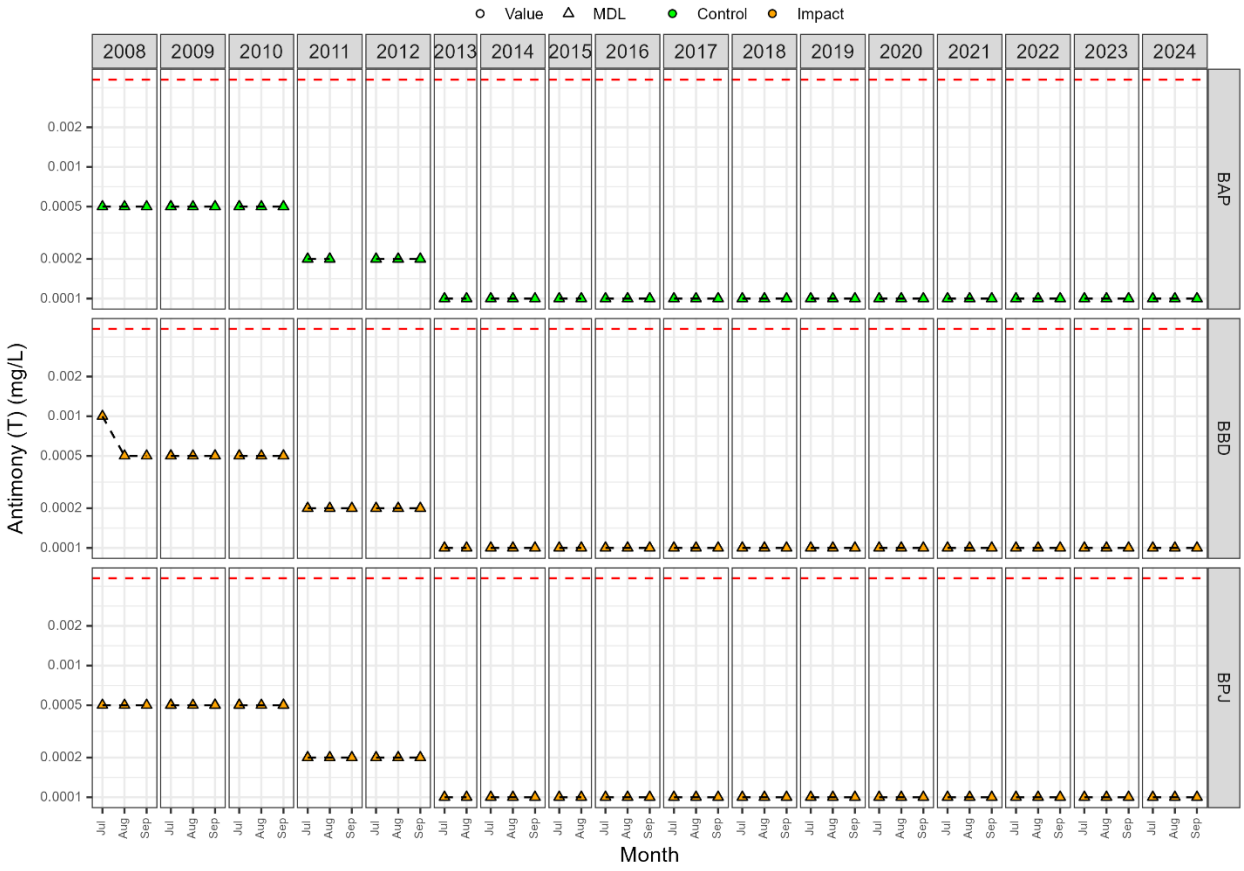


Figure C3-24. Total arsenic (mg/L).

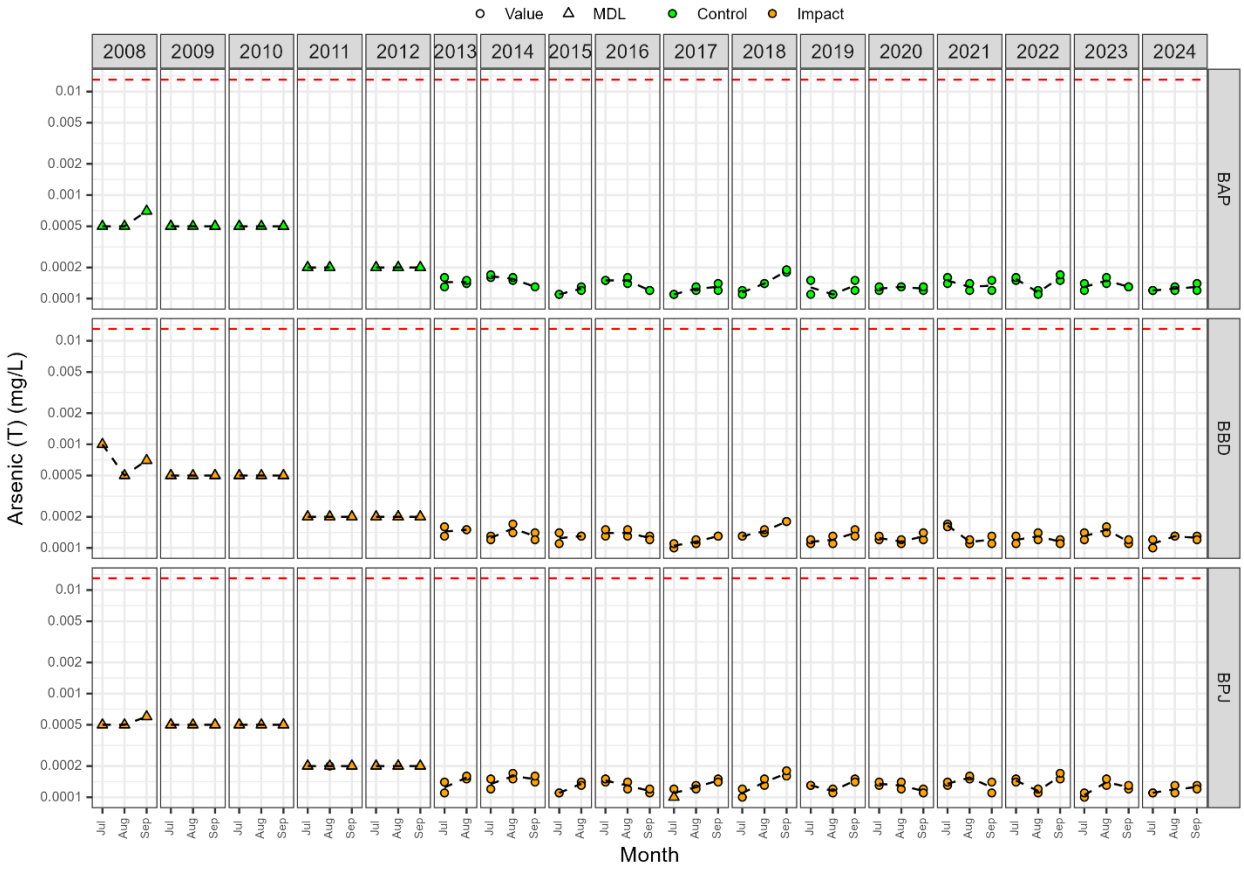


Figure C3-25. Total barium (mg/L).

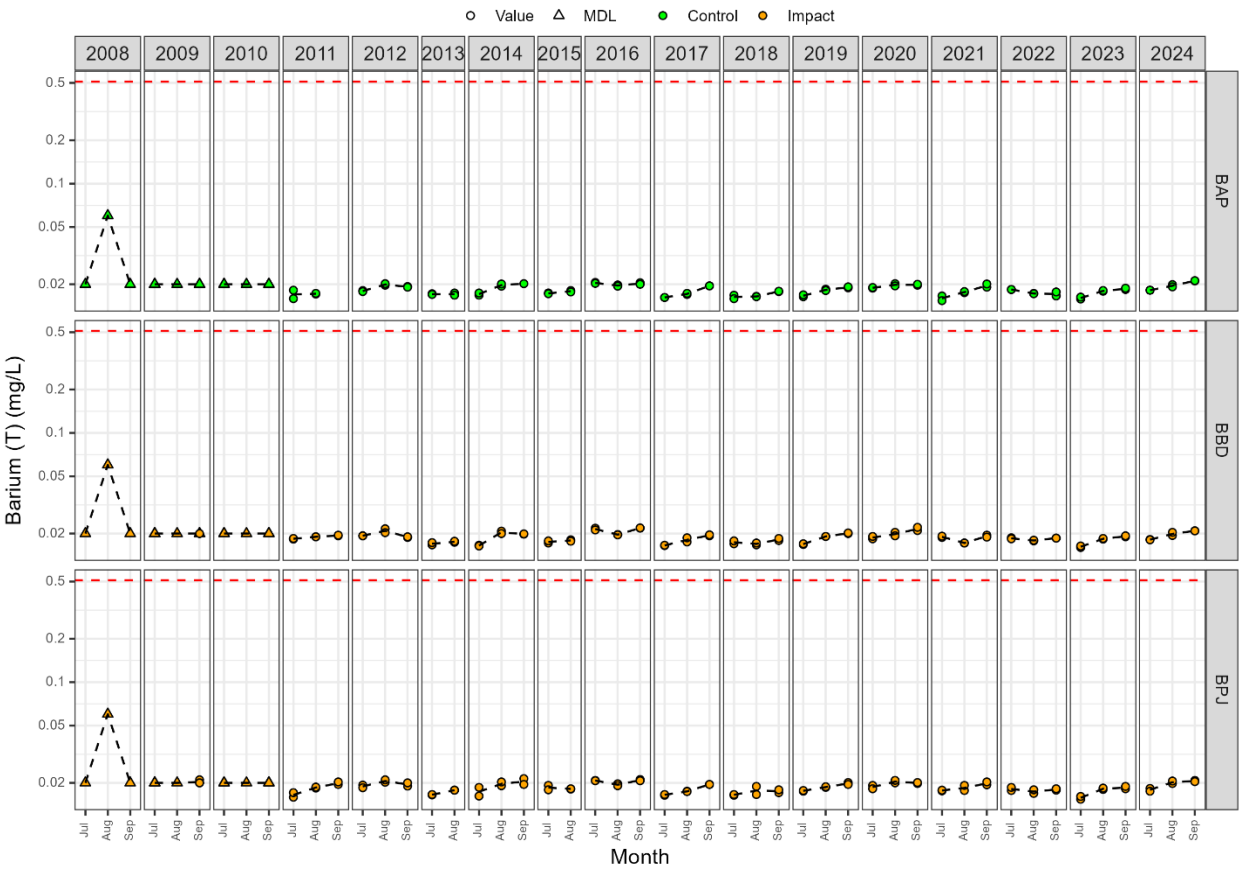


Figure C3-26. Total beryllium (mg/L).

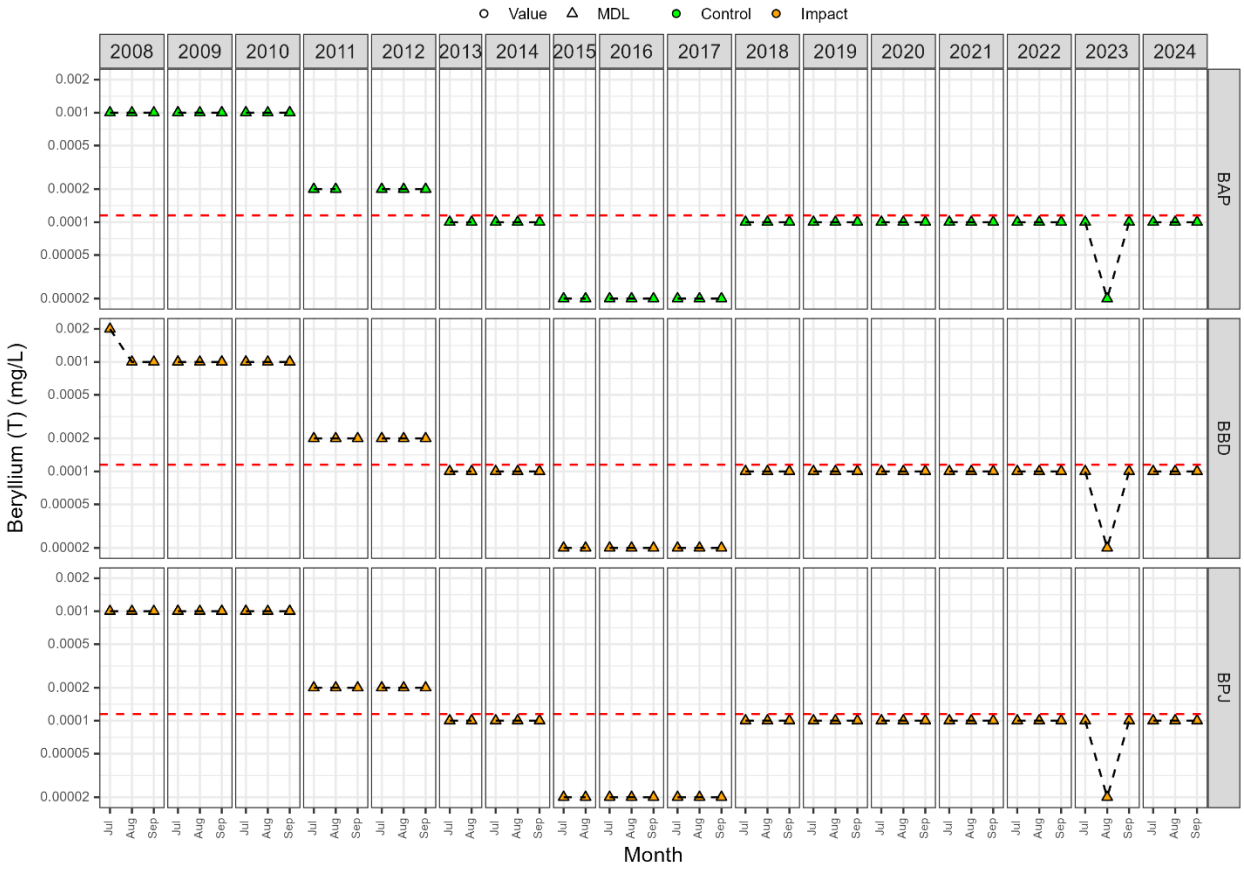


Figure C3-27. Total boron (mg/L).

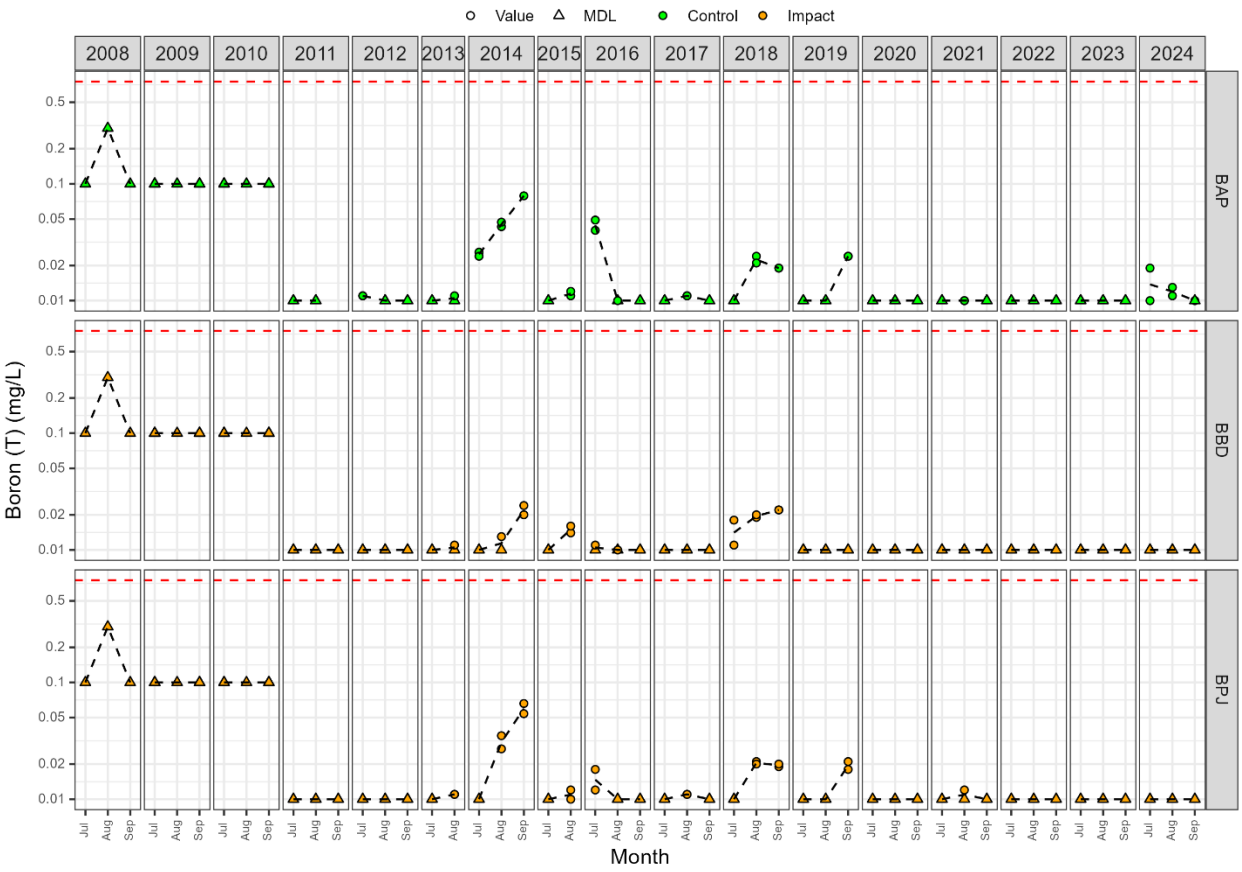


Figure C3-28. Total cadmium (mg/L).

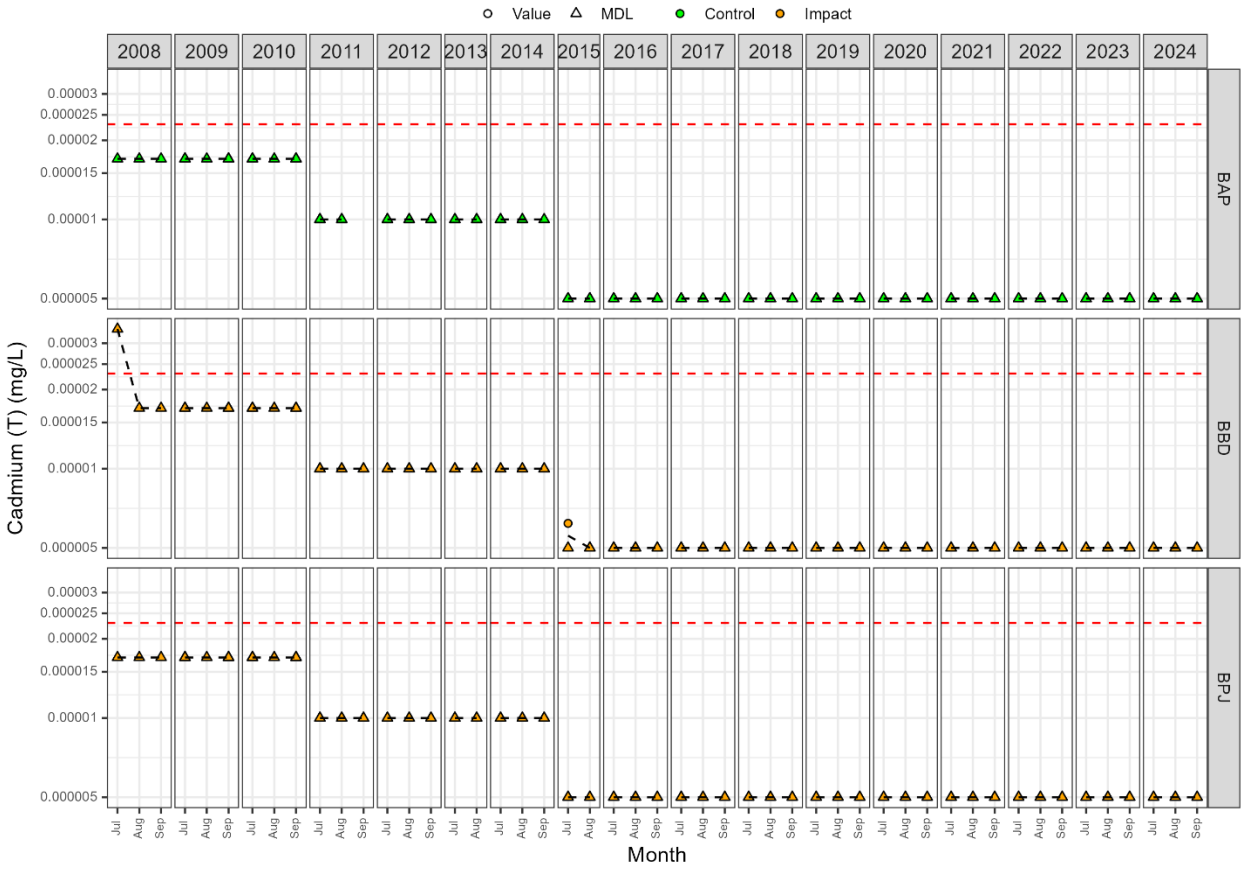


Figure C3-29. Total calcium (mg/L).

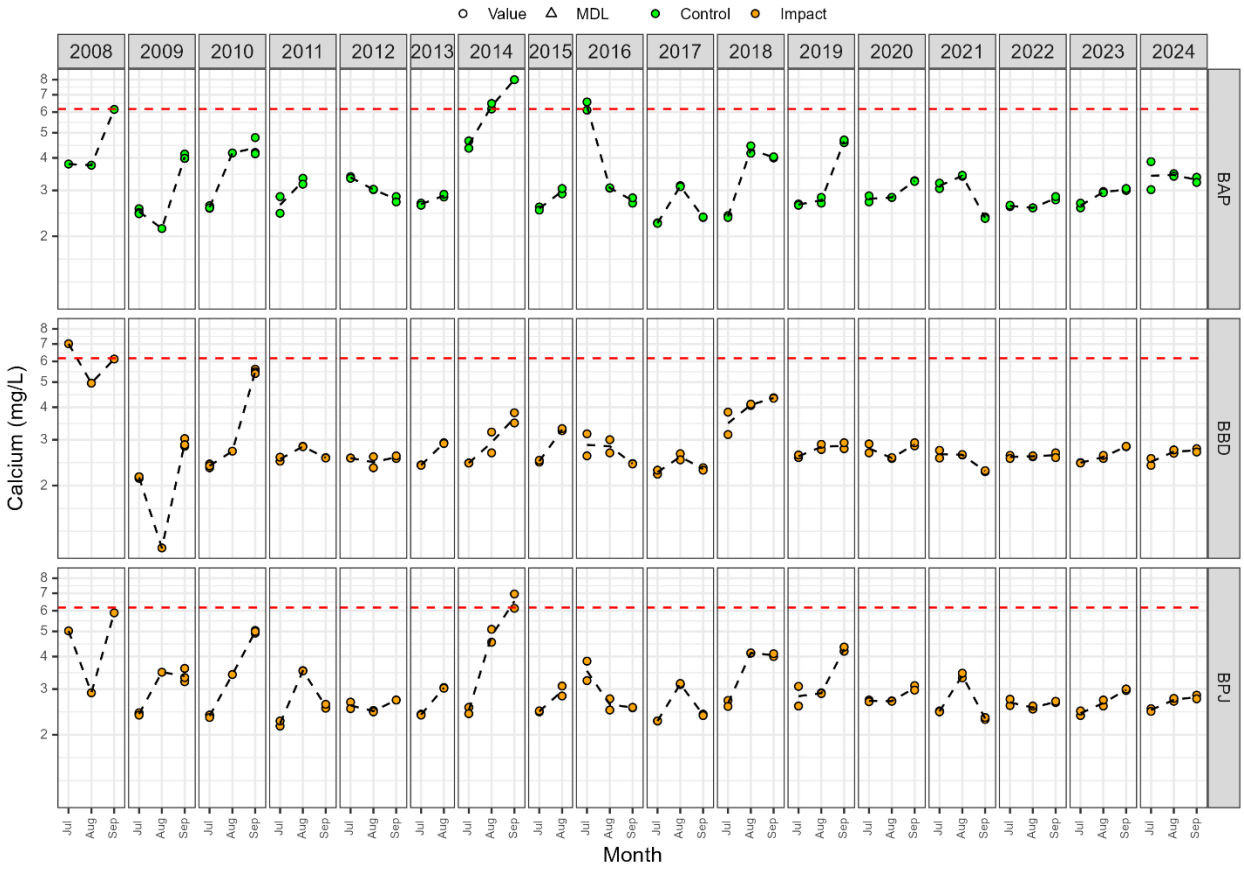


Figure C3-30. Total chromium (mg/L).

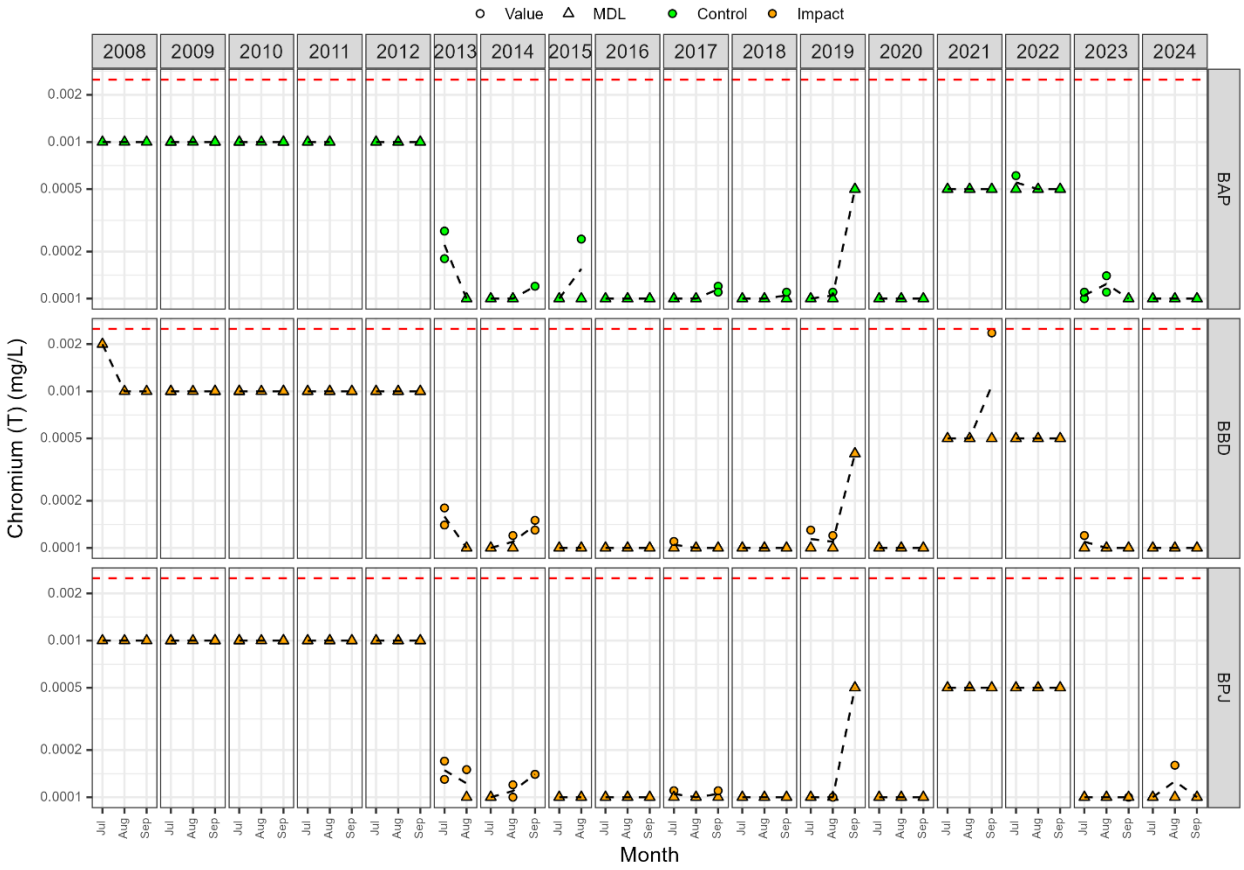


Figure C3-31. Total copper (mg/L).

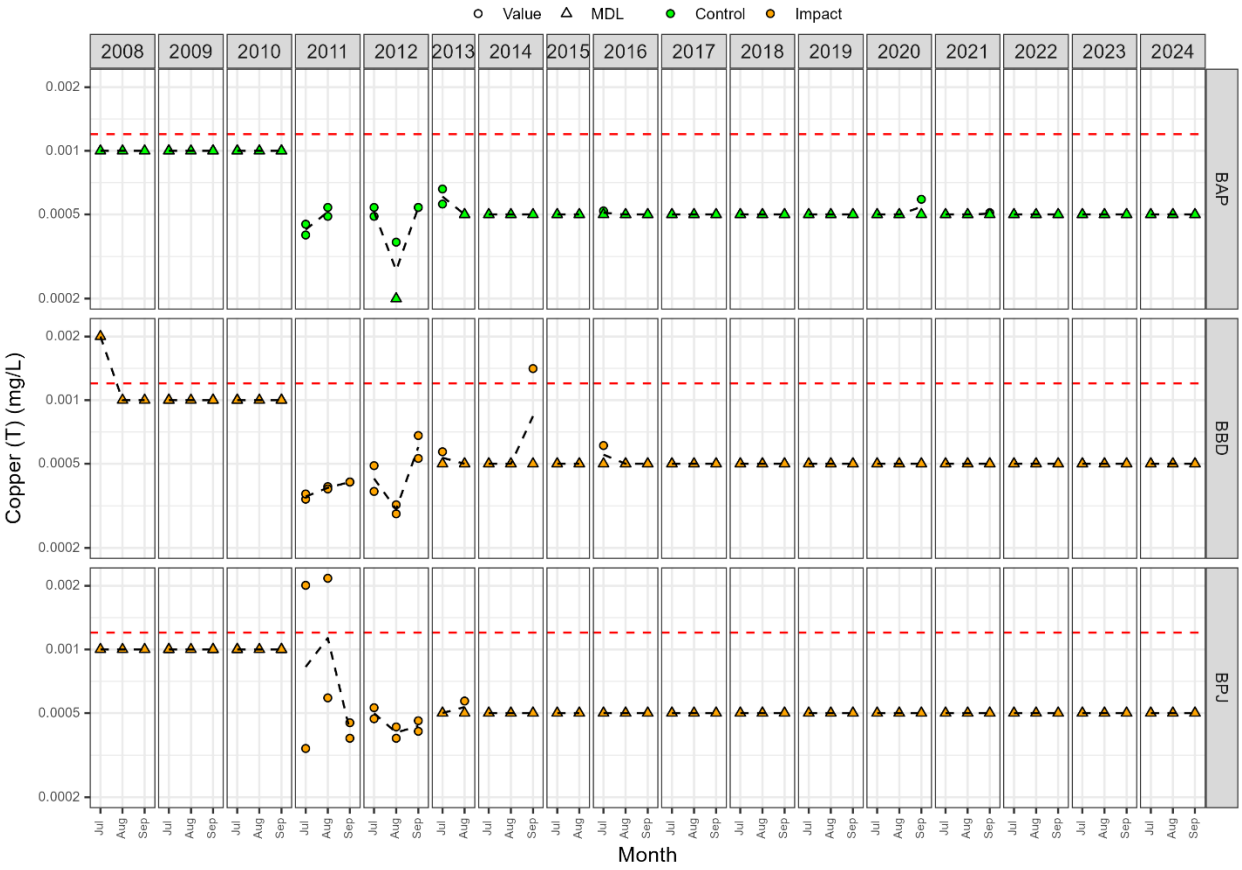


Figure C3-32. Total iron (mg/L).

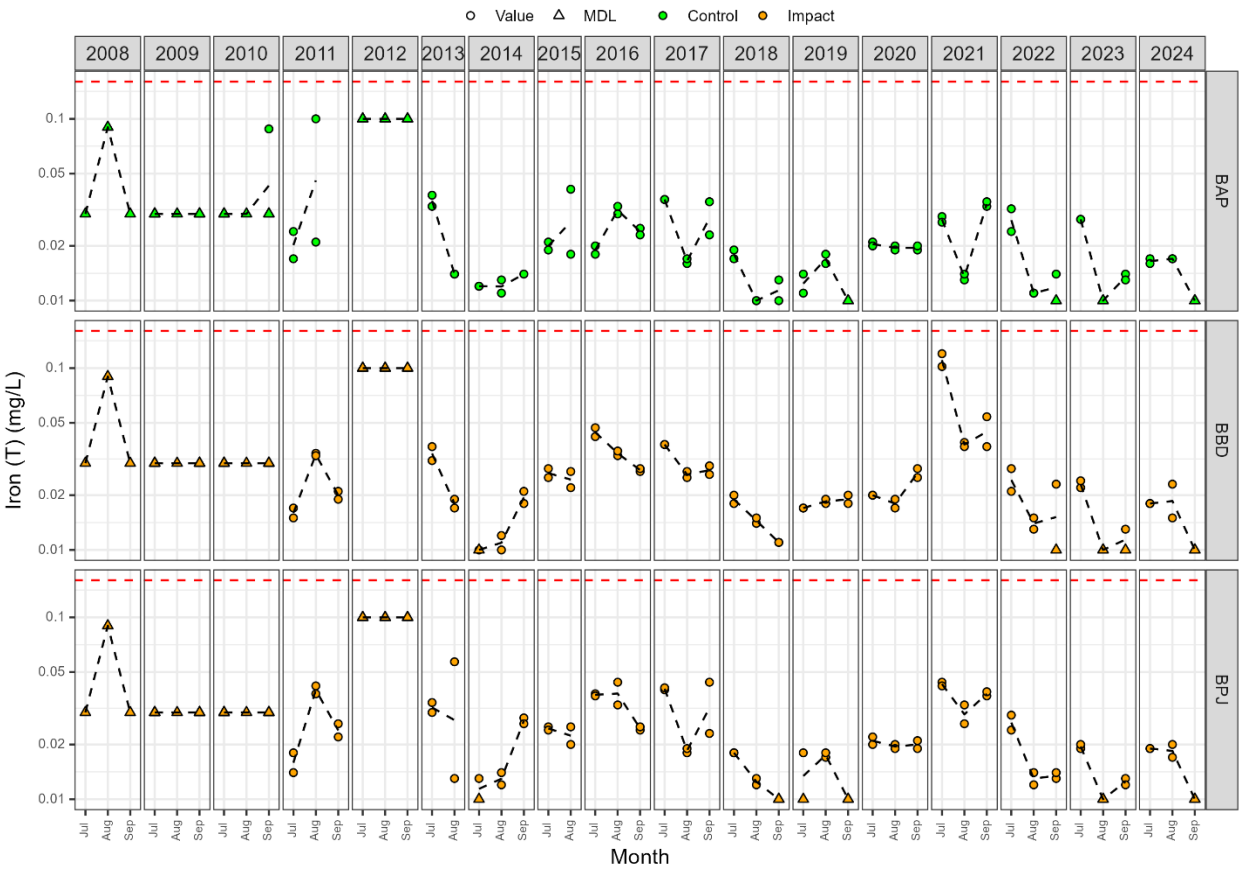


Figure C3-33. Total lead (mg/L).

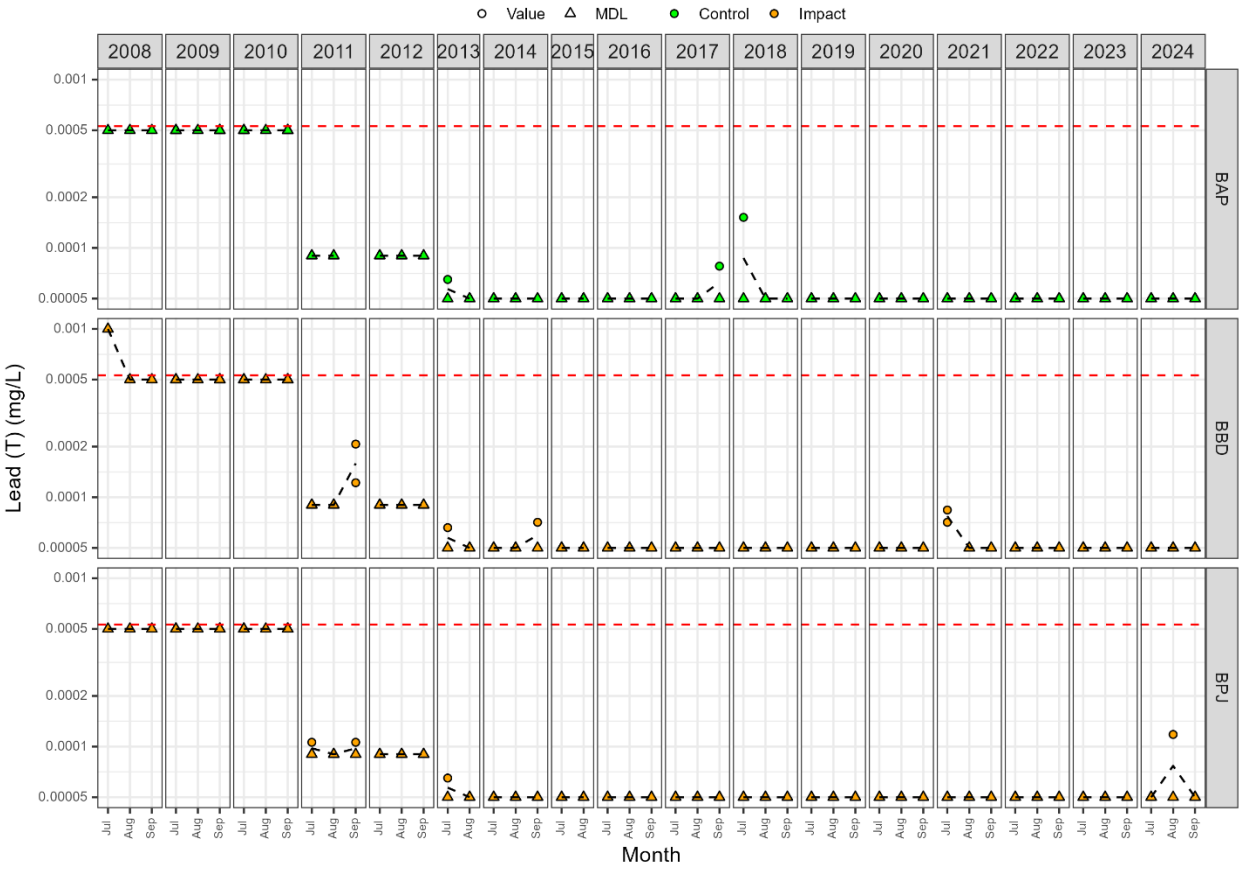


Figure C3-34. Total lithium (mg/L).

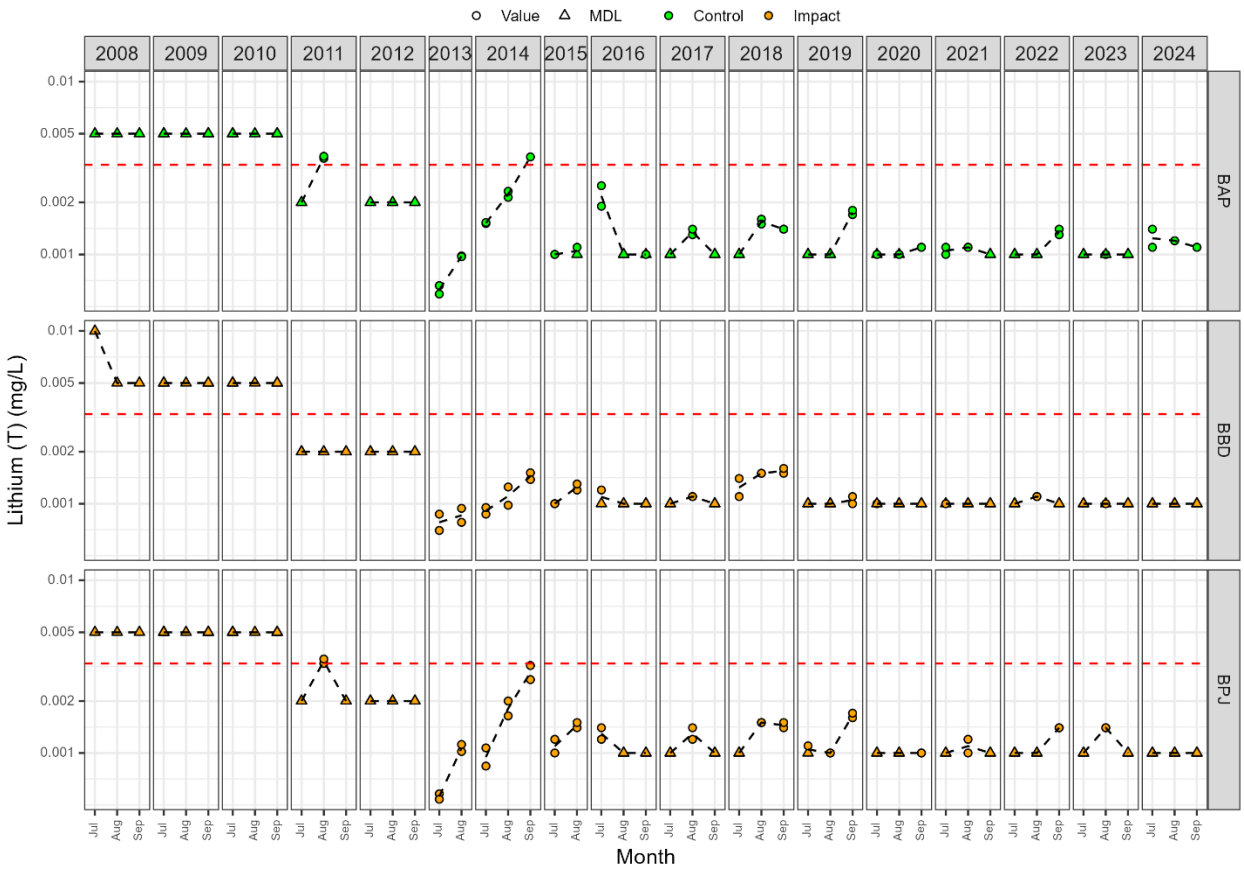


Figure C3-35. Total magnesium (mg/L).

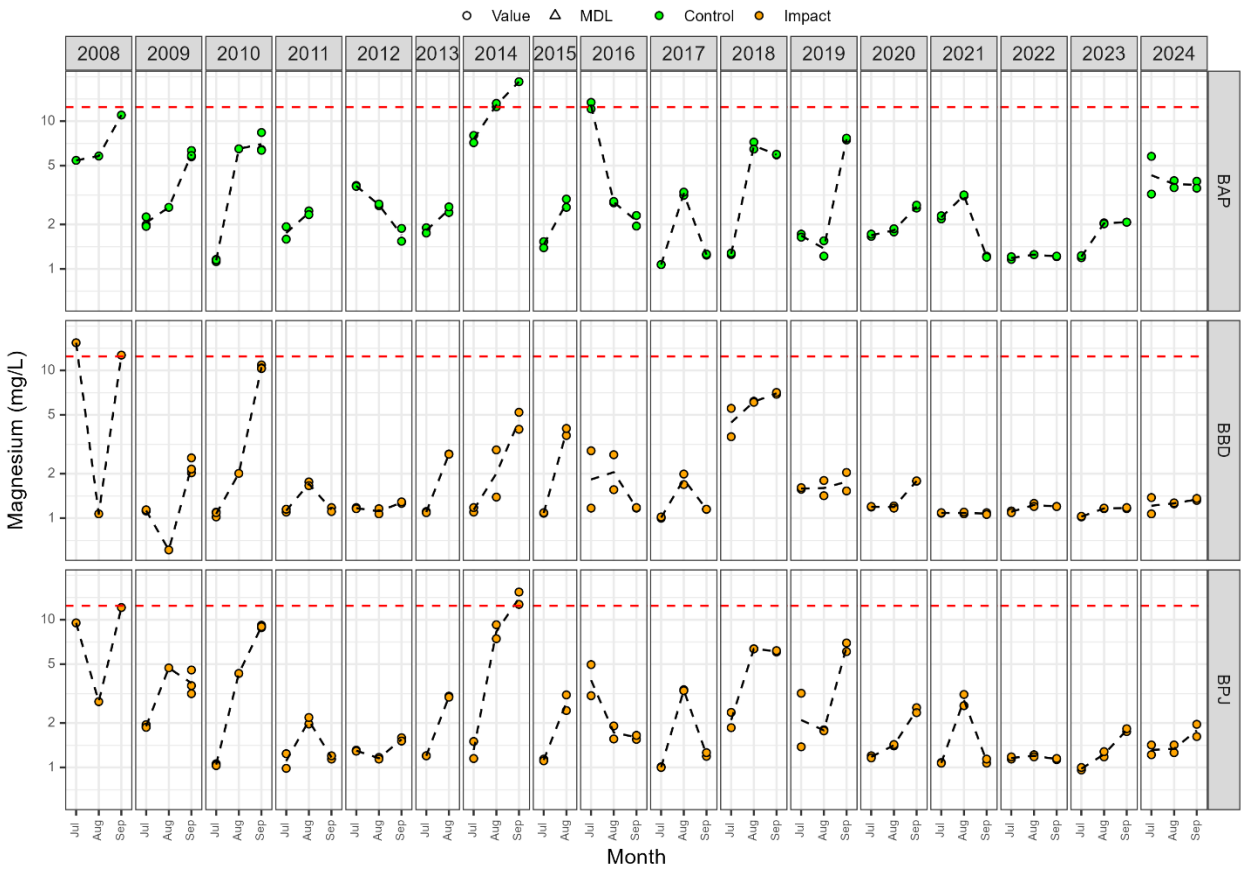


Figure C3-36. Total manganese (mg/L).

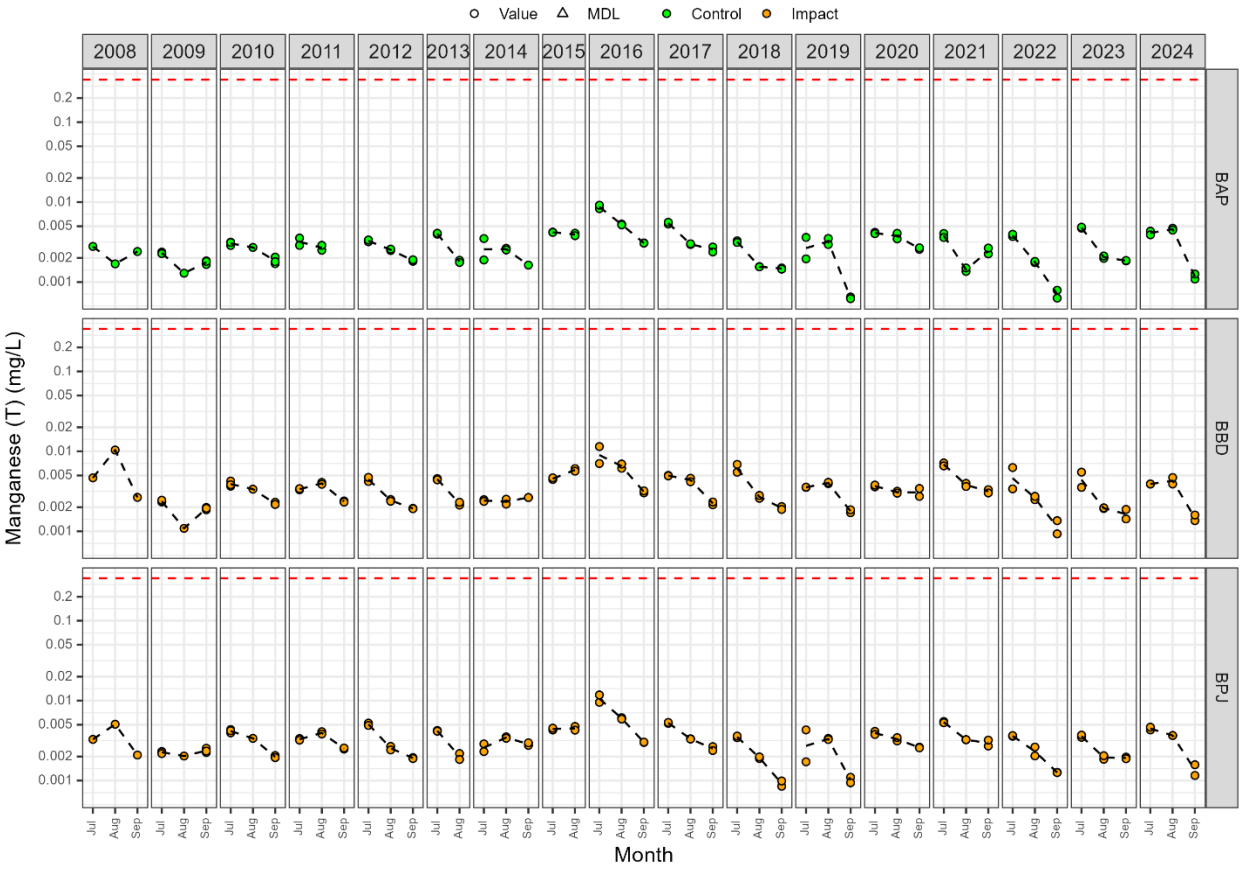


Figure C3-37. Total mercury (mg/L).

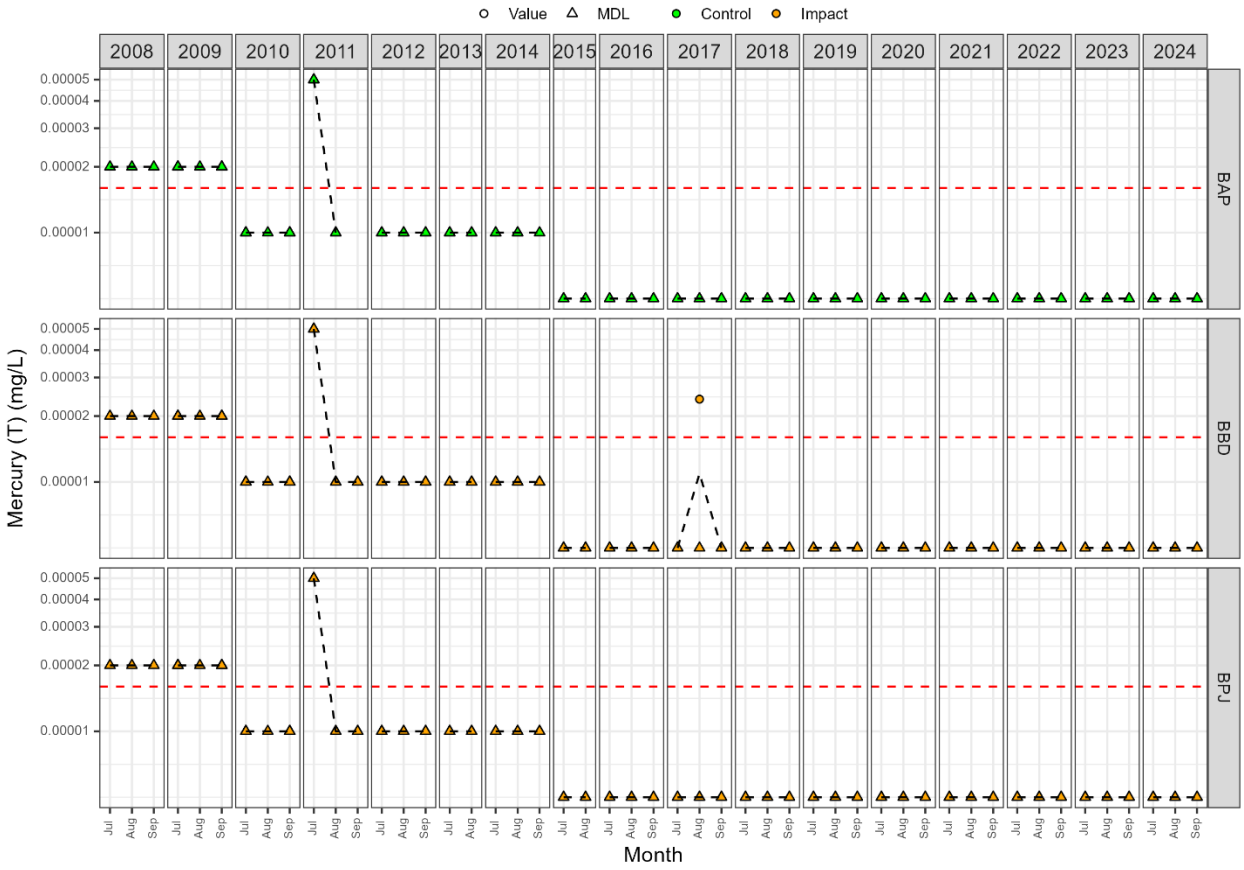


Figure C3-38. Total molybdenum (mg/L).

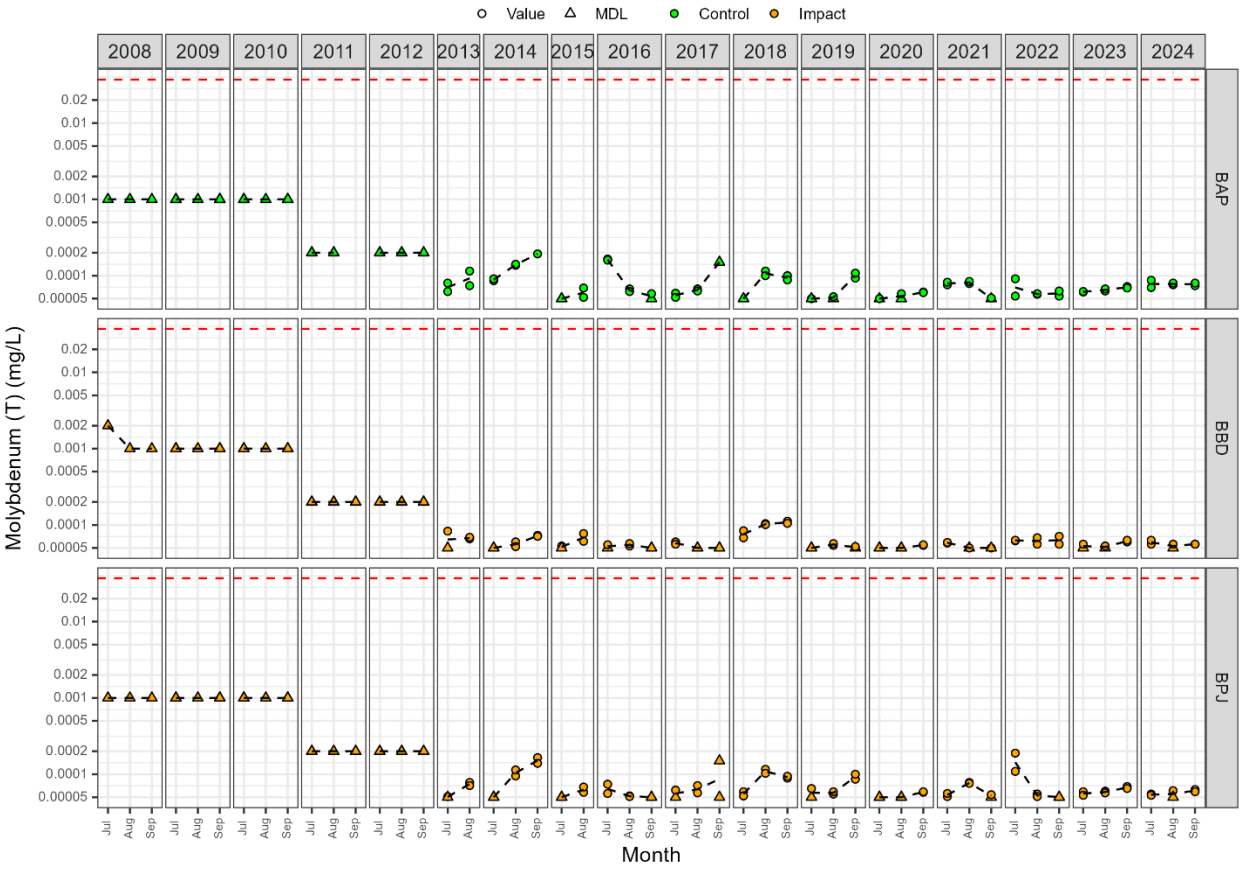


Figure C3-39. Total nickel (mg/L).

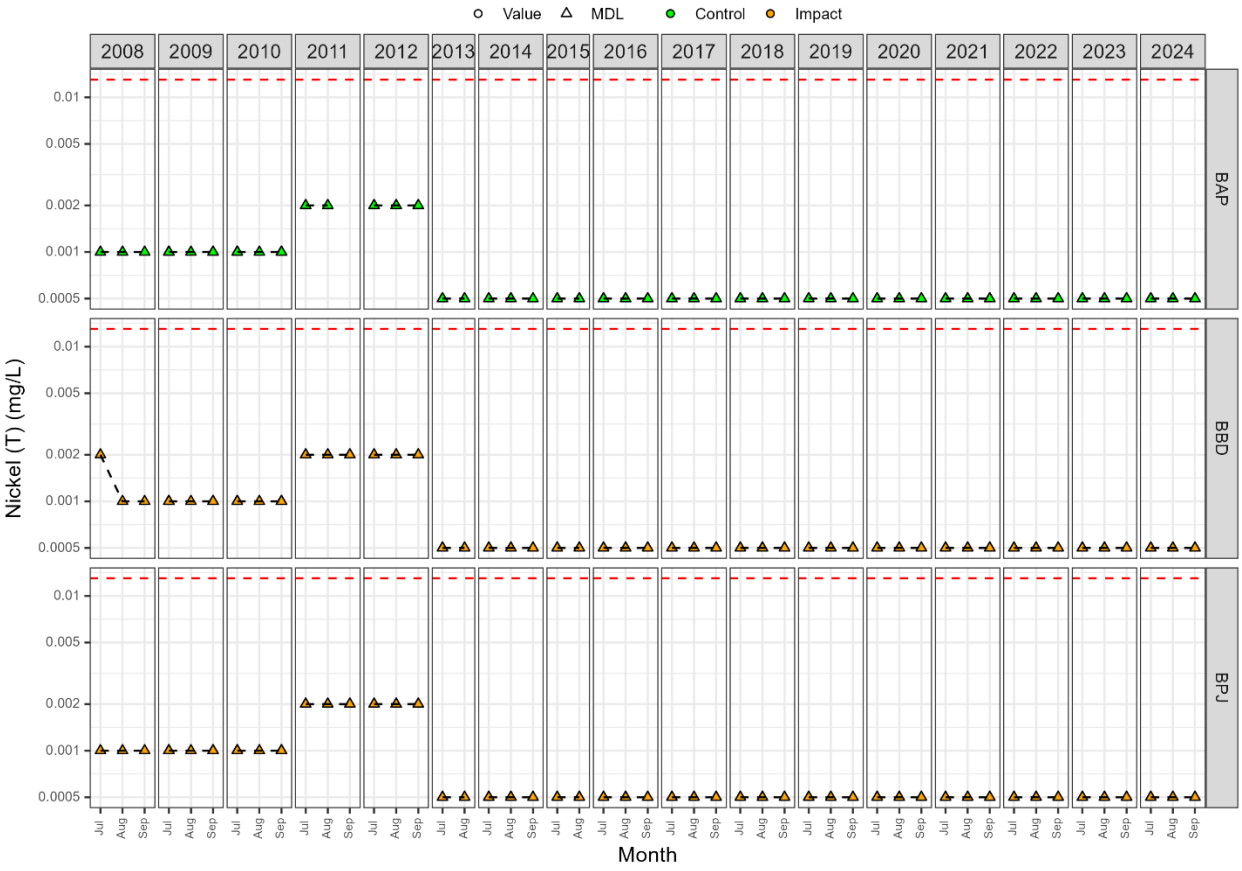


Figure C3-40. Total potassium (mg/L).

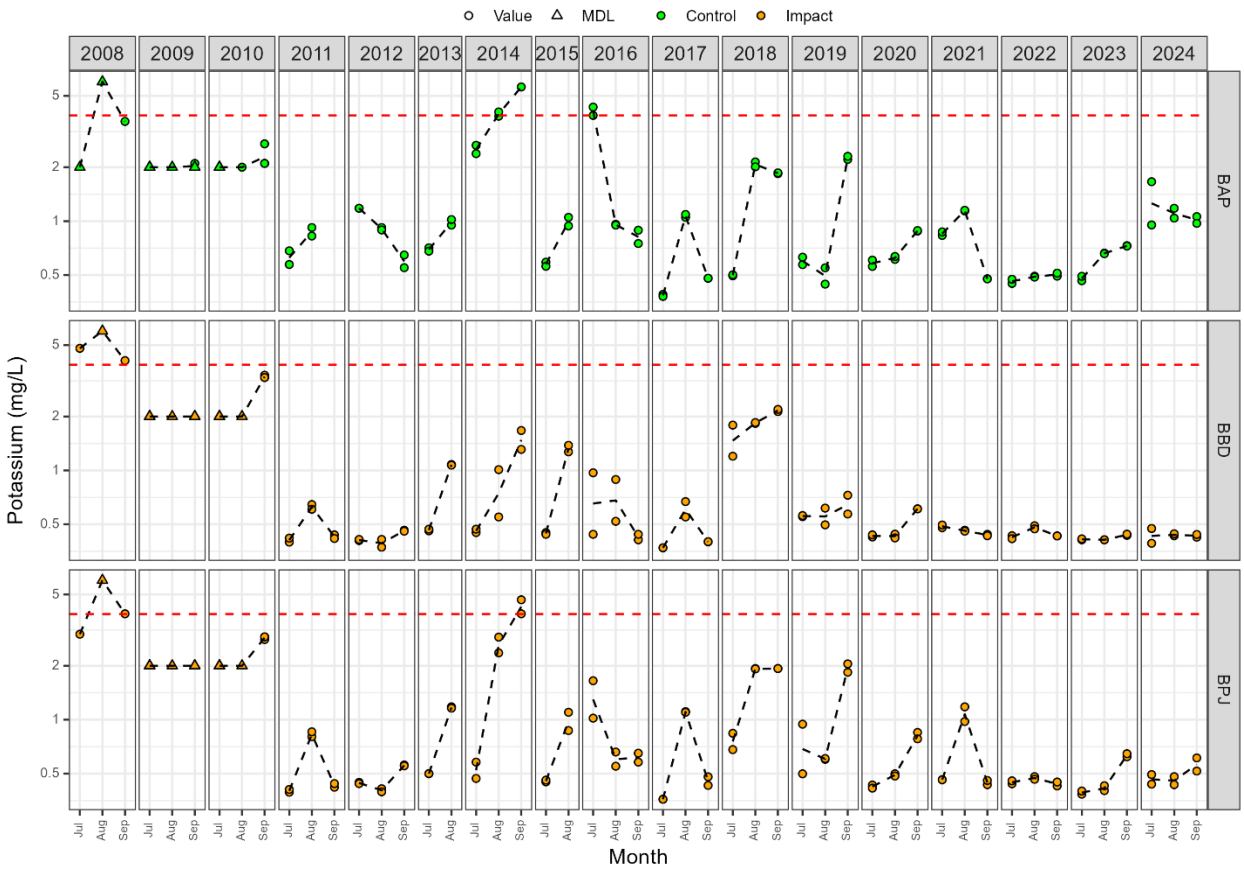


Figure C3-41. Total selenium (mg/L).

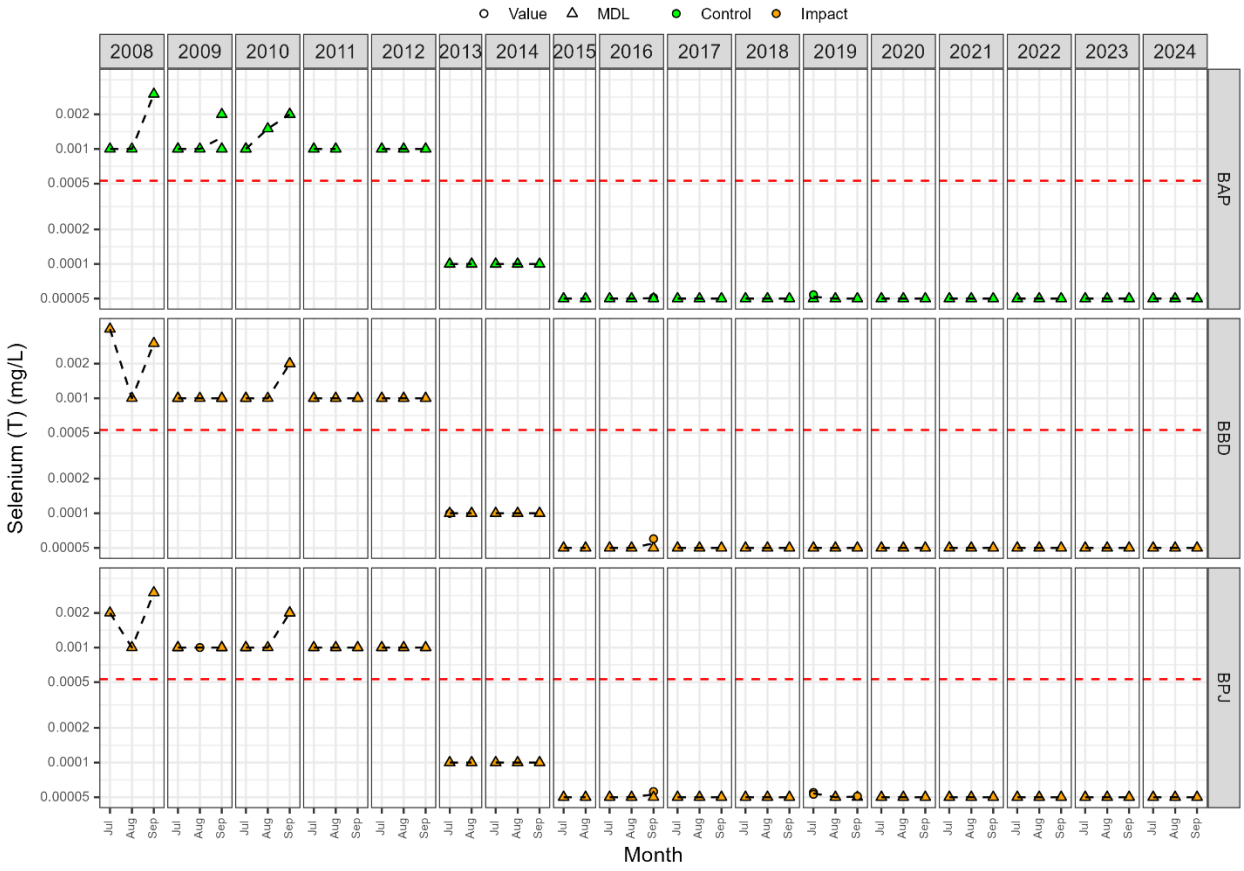


Figure C3-42. Total silicon (mg/L).

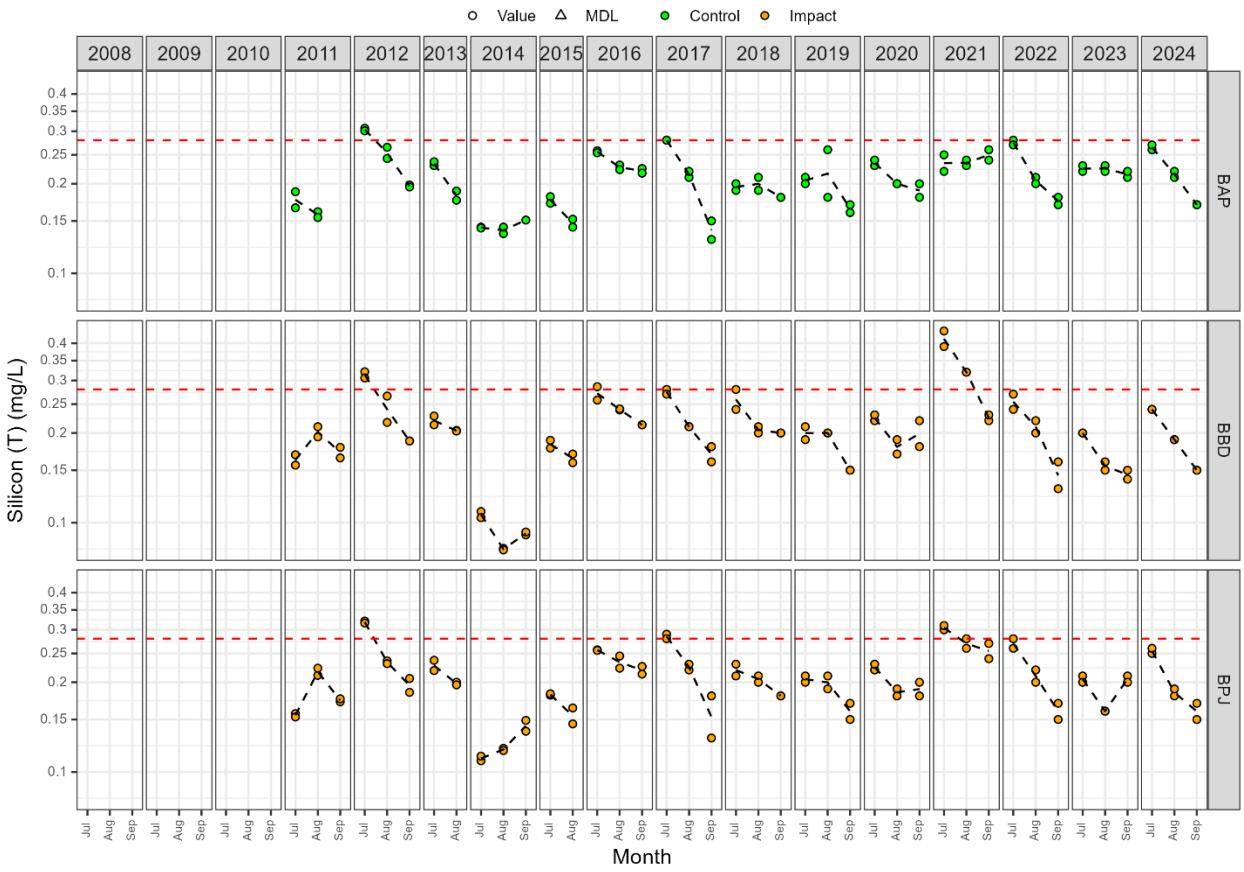


Figure C3-43. Total silver (mg/L).

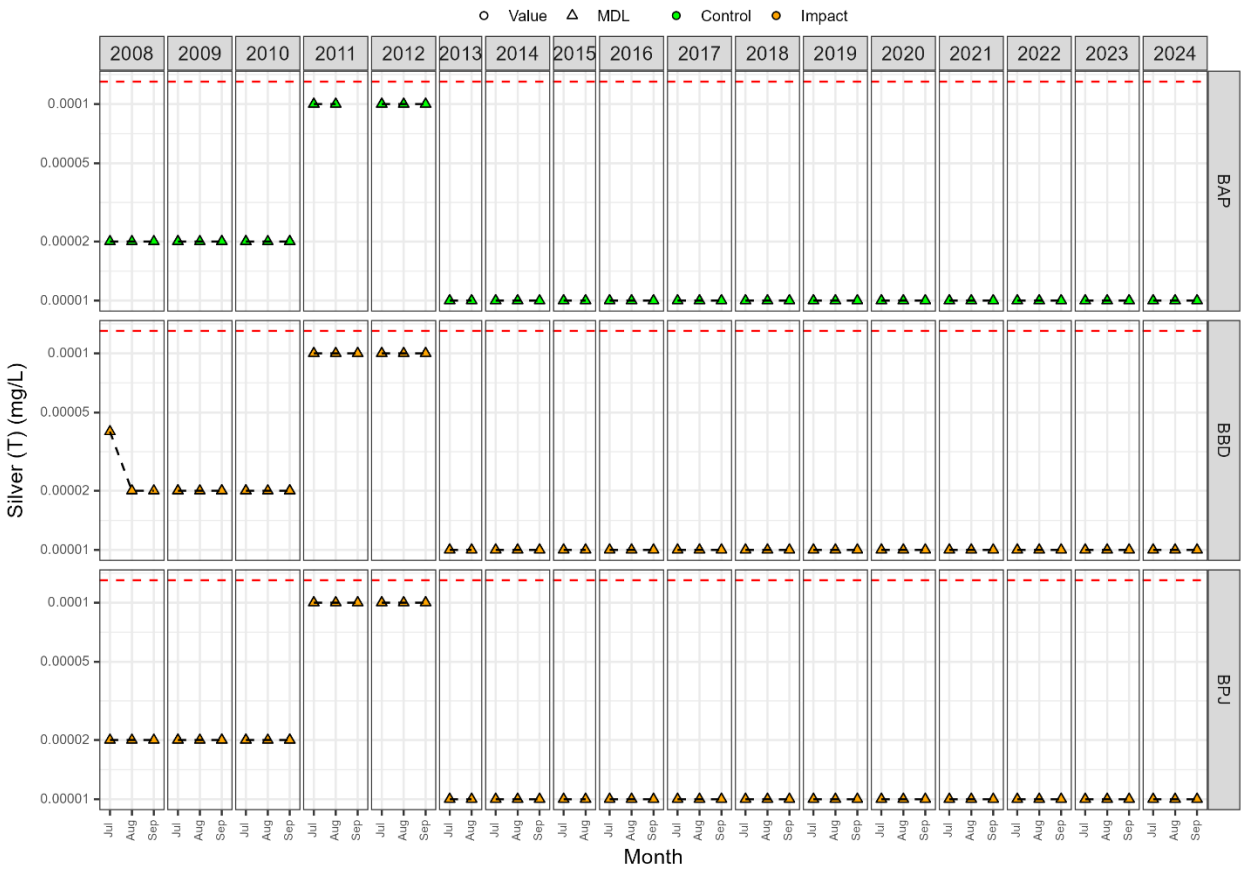


Figure C3-44. Total sodium (mg/L).

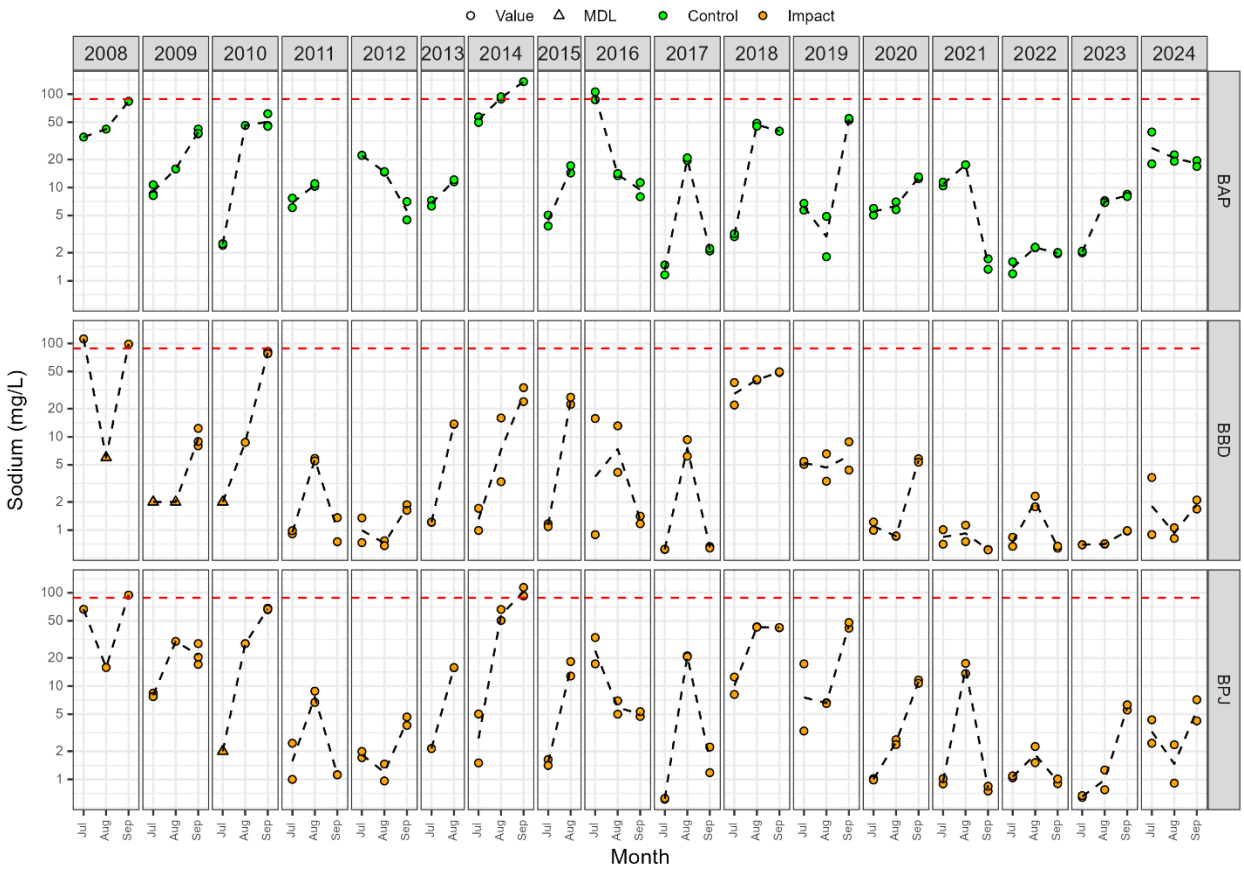


Figure C3-45. Total strontium (mg/L).

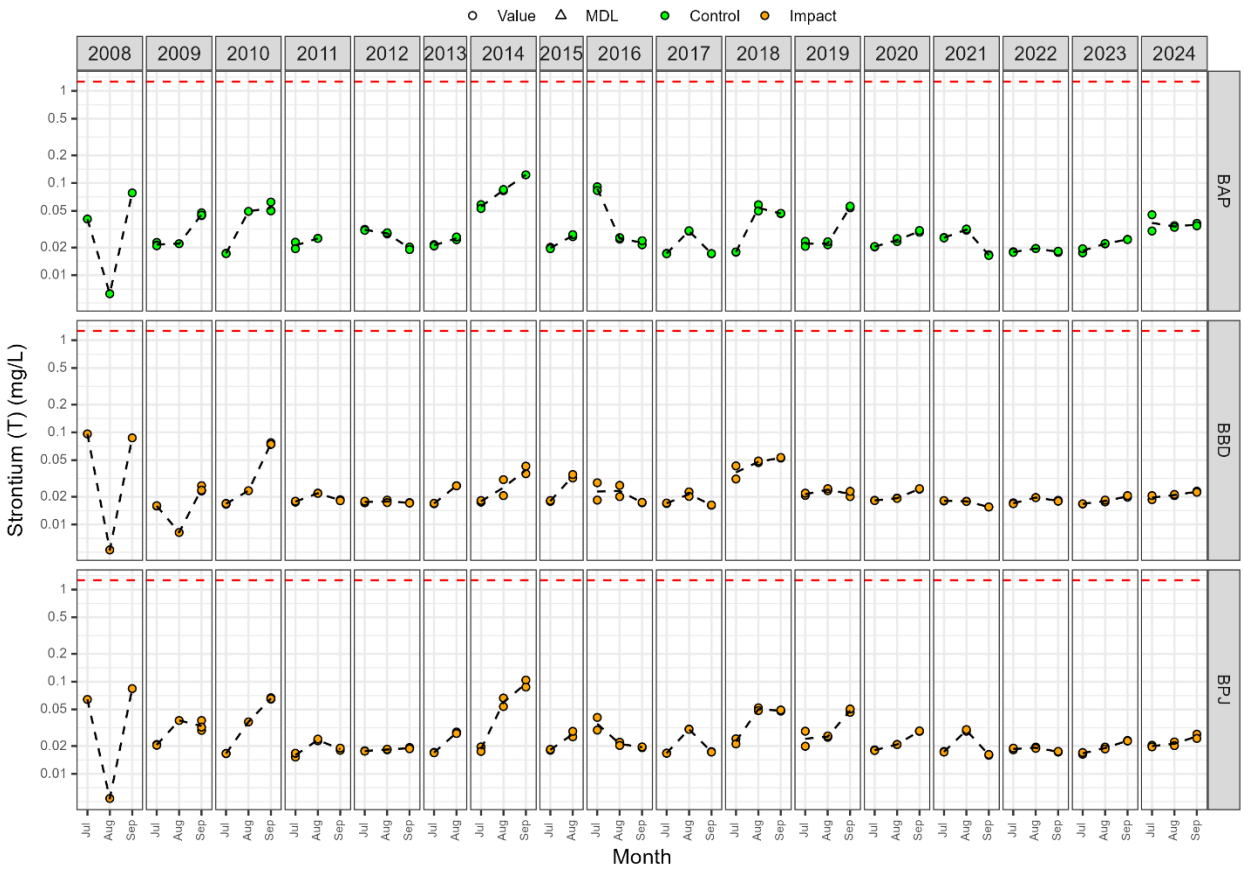


Figure C3-46. Total thallium (mg/L).

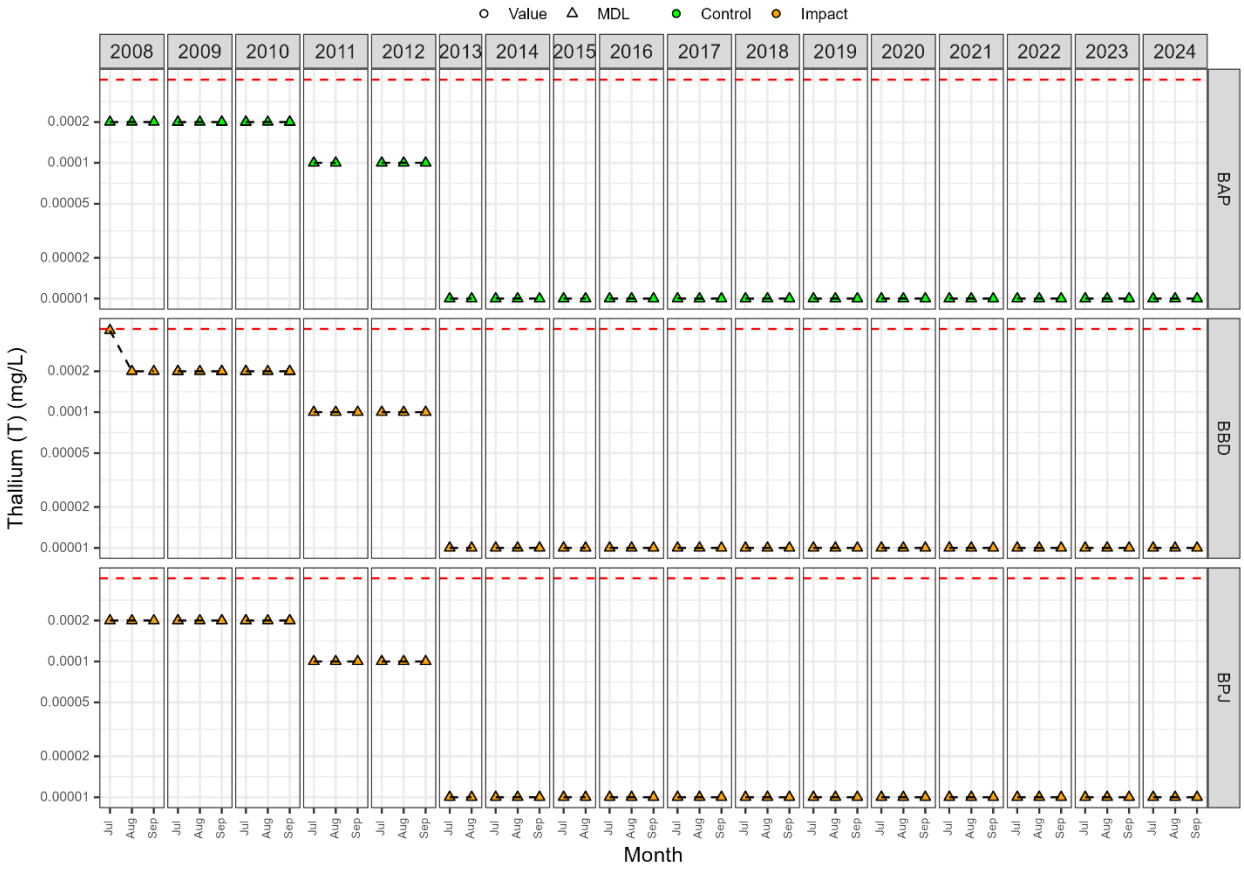


Figure C3-47. Total tin (mg/L).

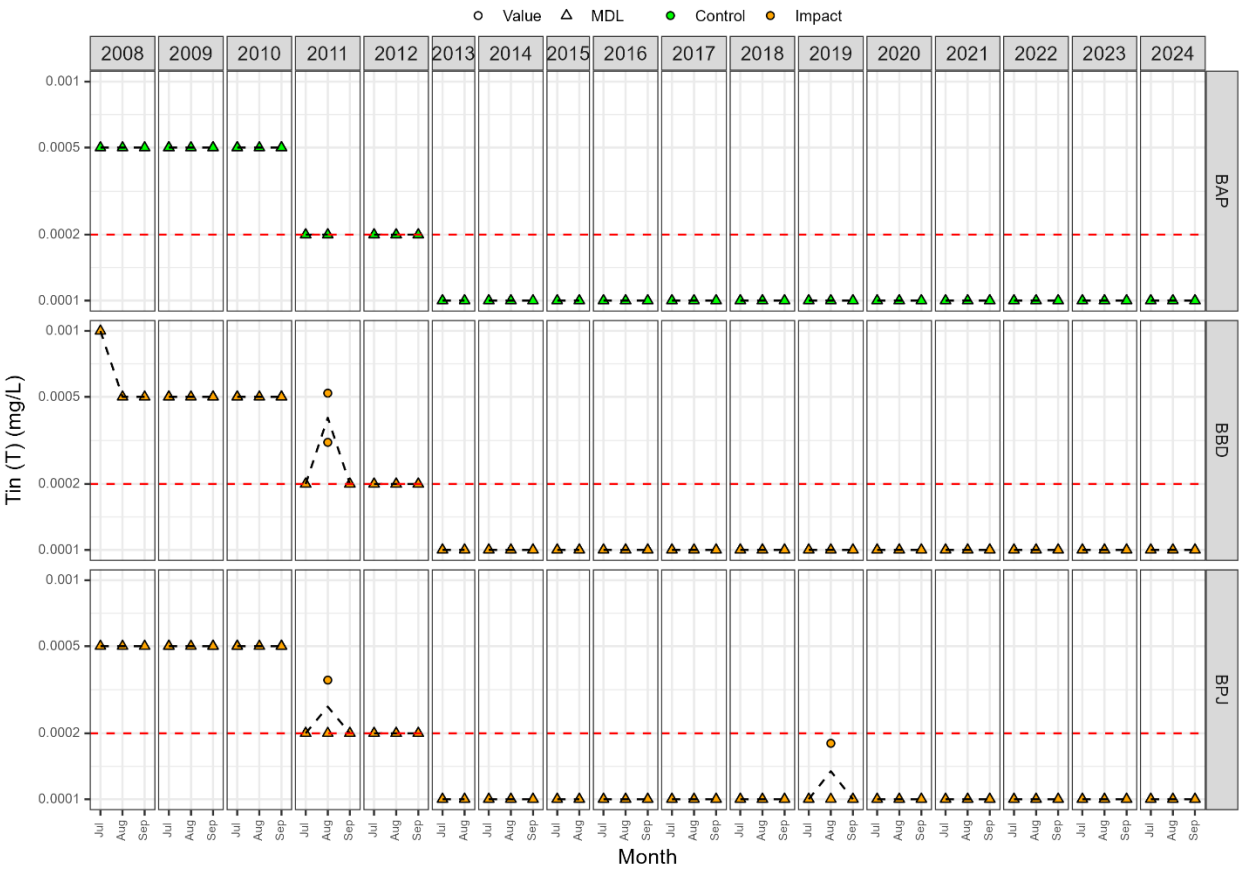


Figure C3-48. Total titanium (mg/L).

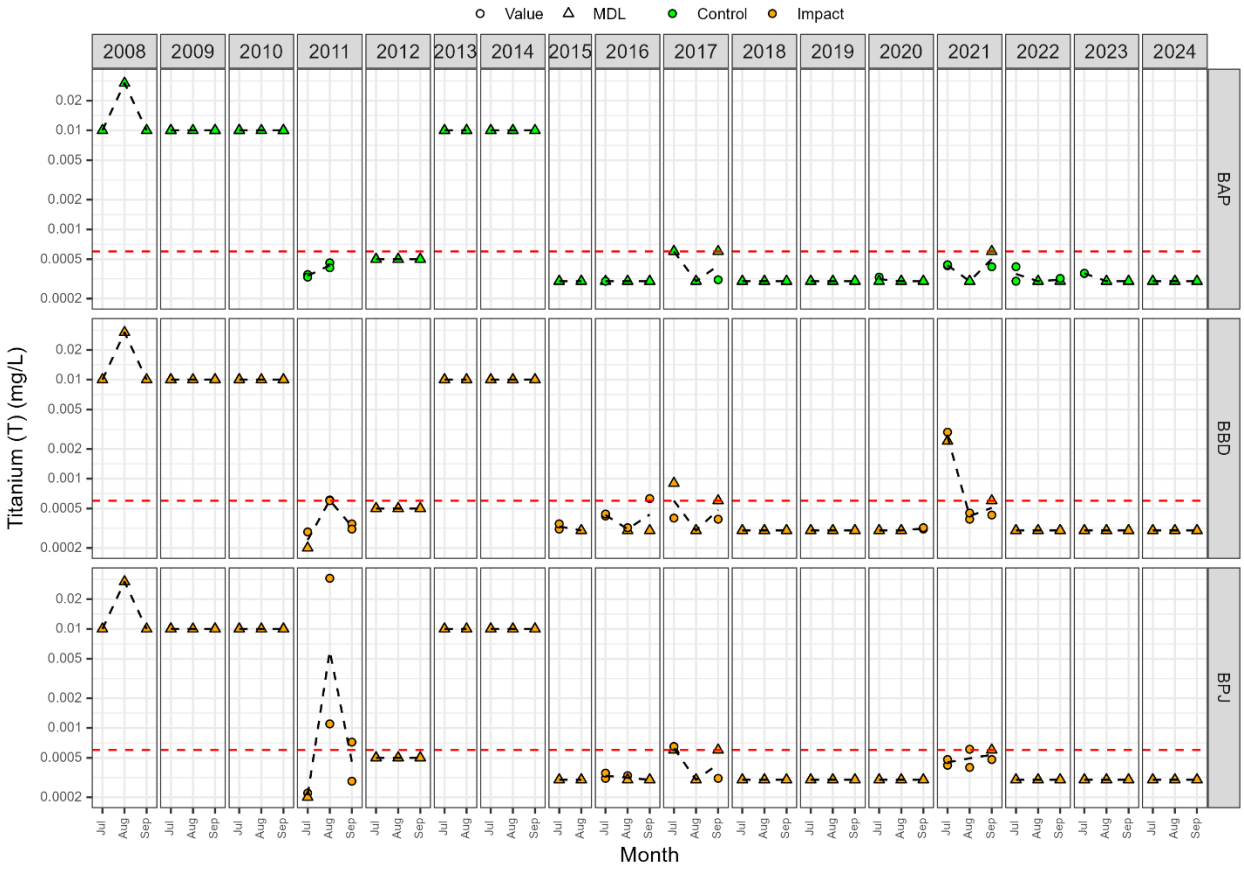


Figure C3-49. Total uranium (mg/L).

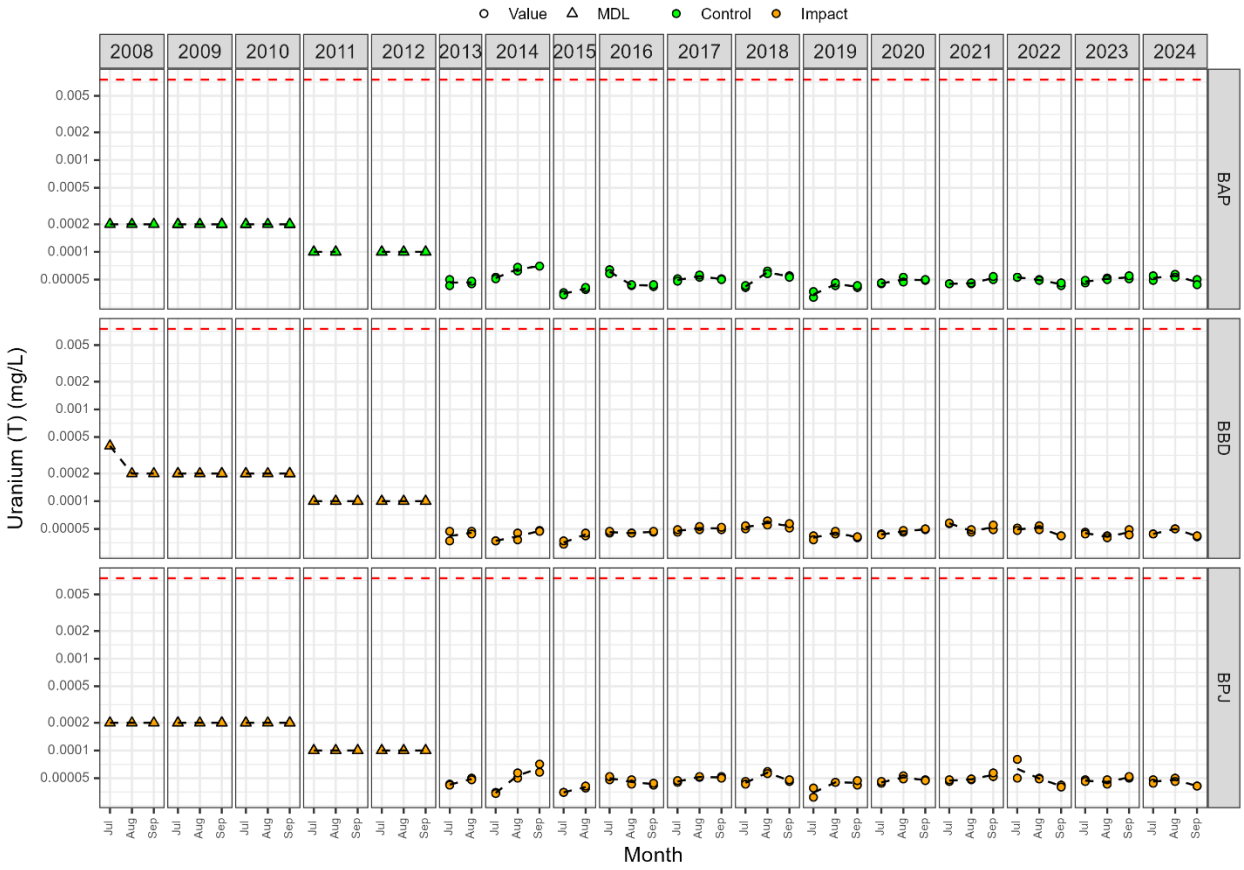


Figure C3-50. Total vanadium (mg/L).

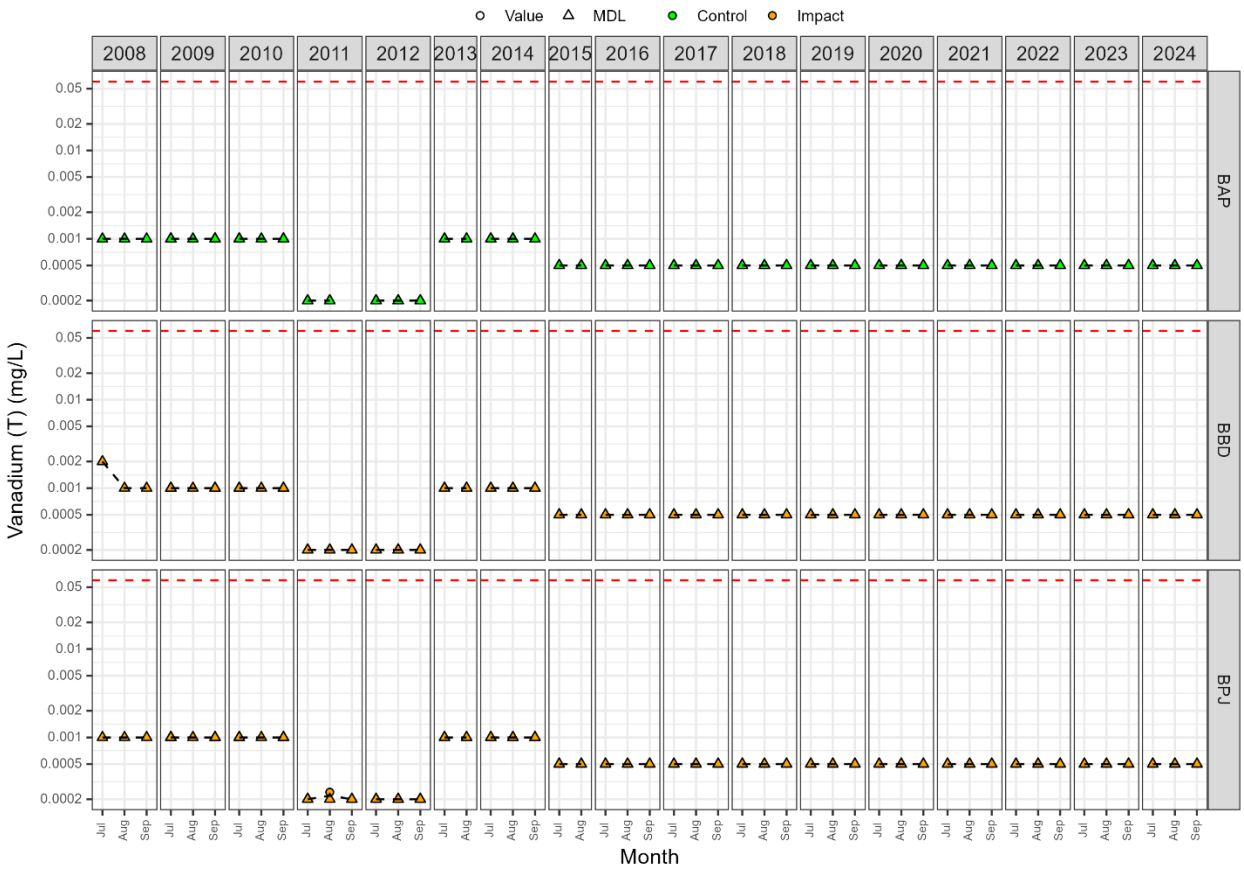


Figure C3-51. Total zinc (mg/L).

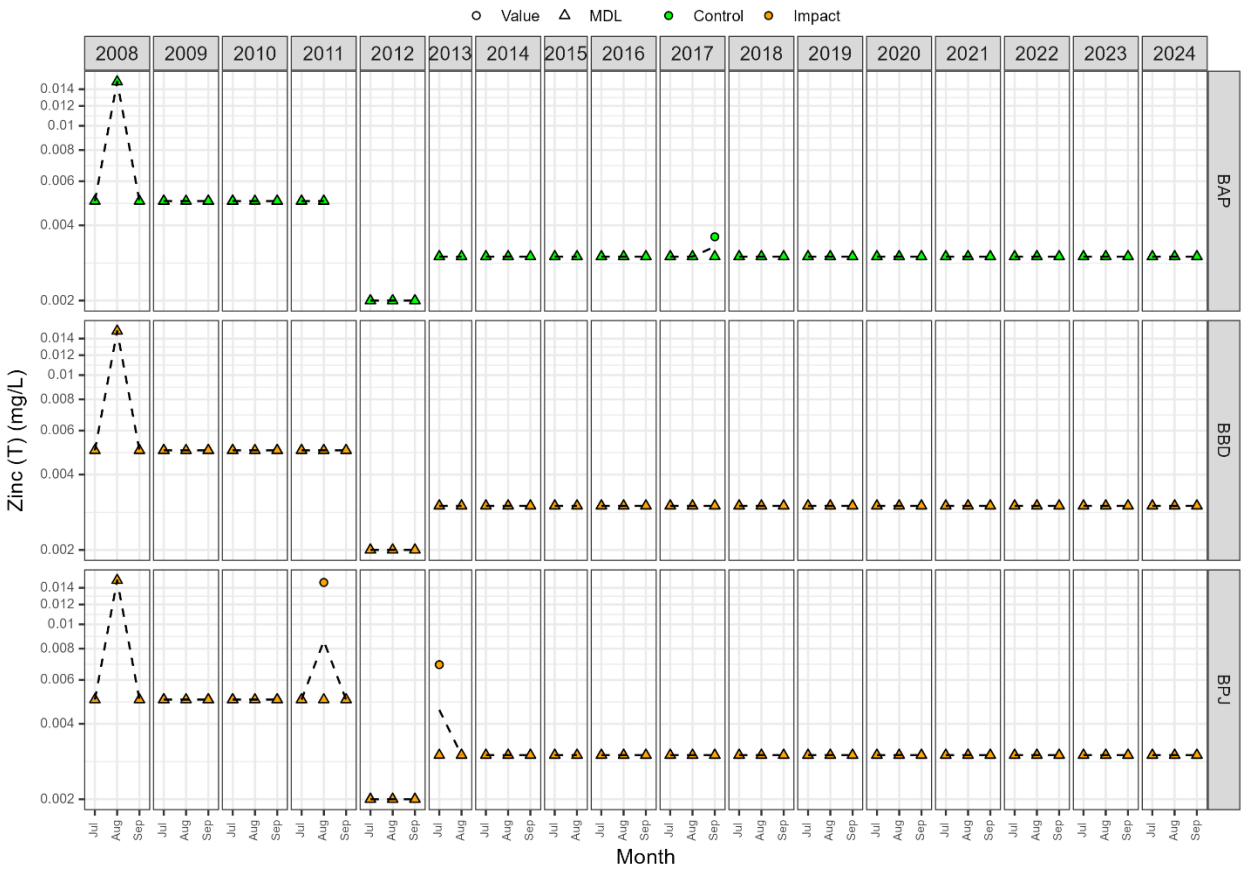


Figure C3-52. Dissolved aluminum (mg/L).

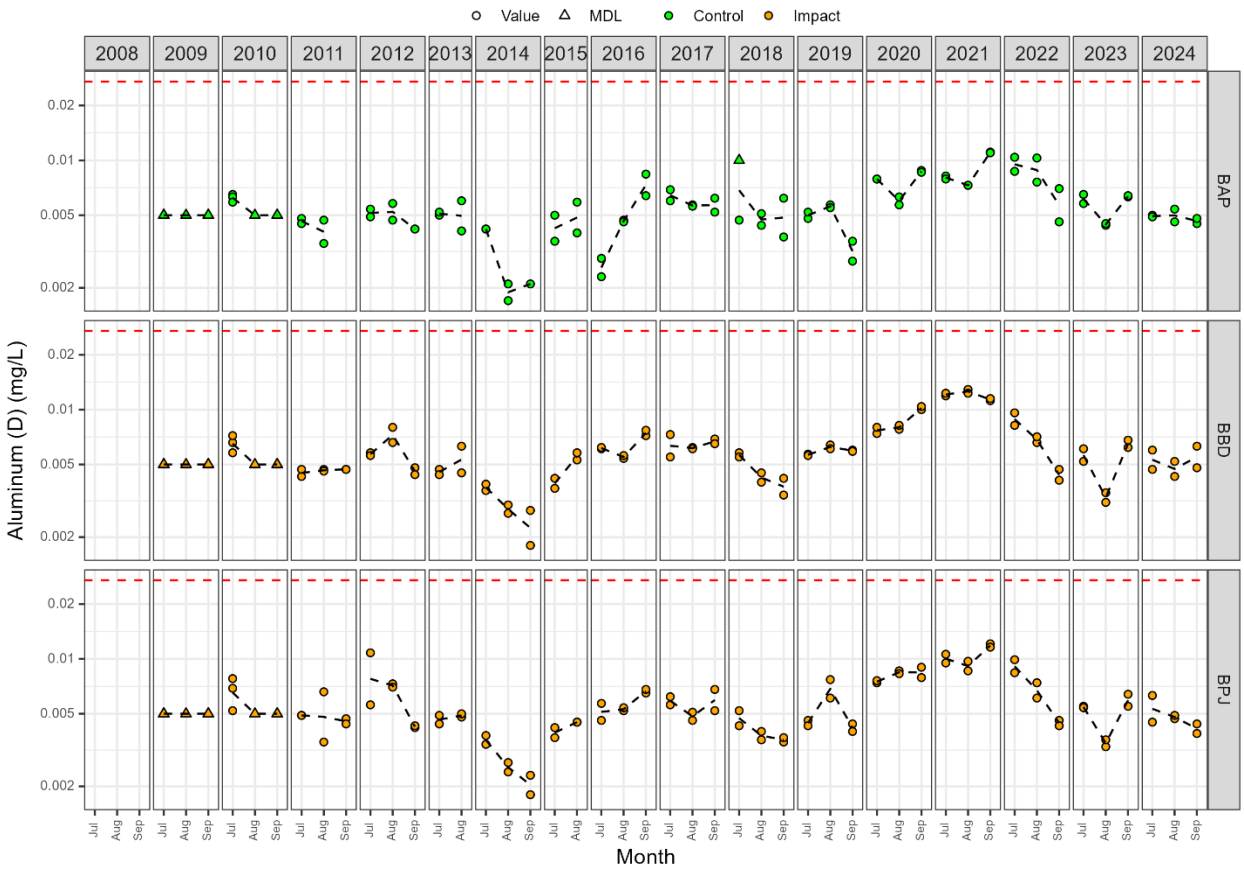


Figure C3-53. Dissolved antimony (mg/L).

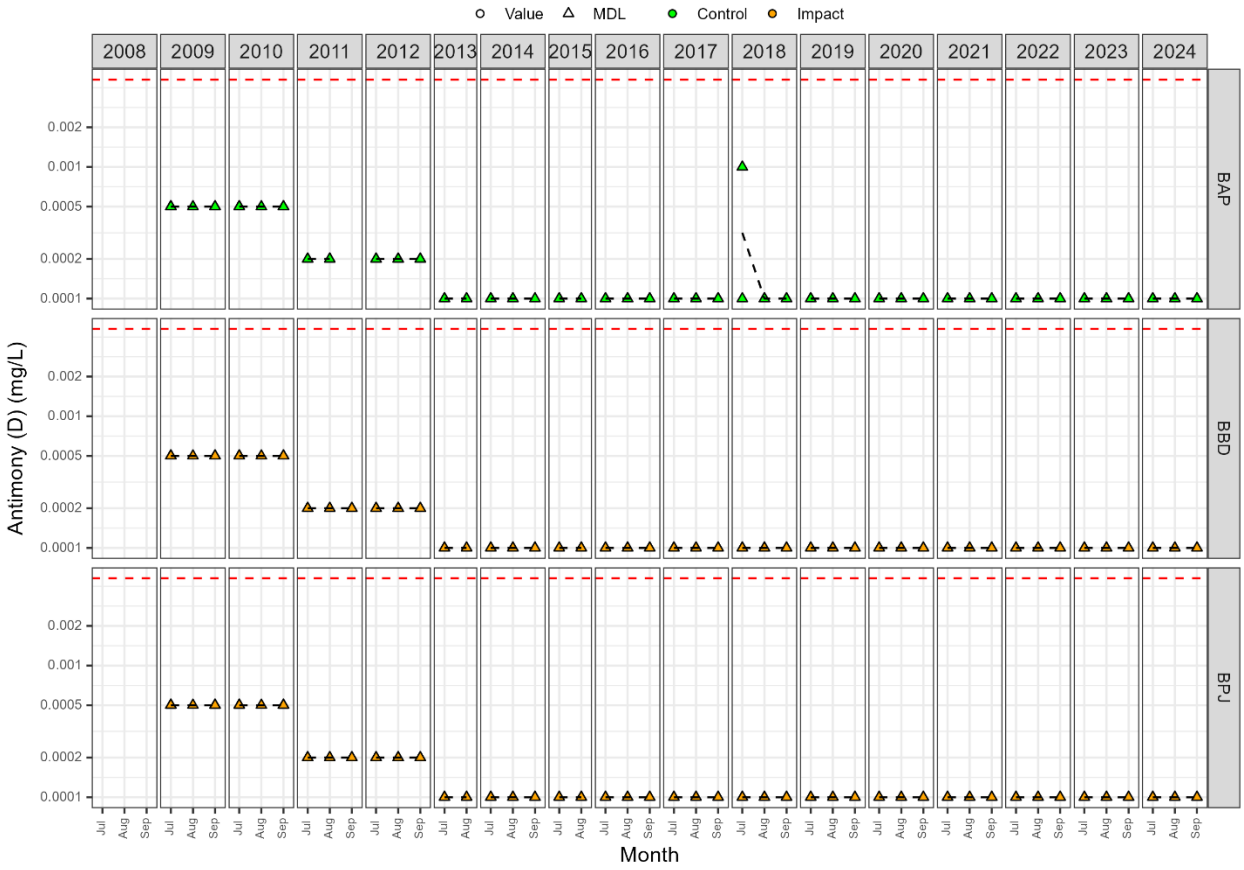


Figure C3-54. Dissolved arsenic (mg/L).

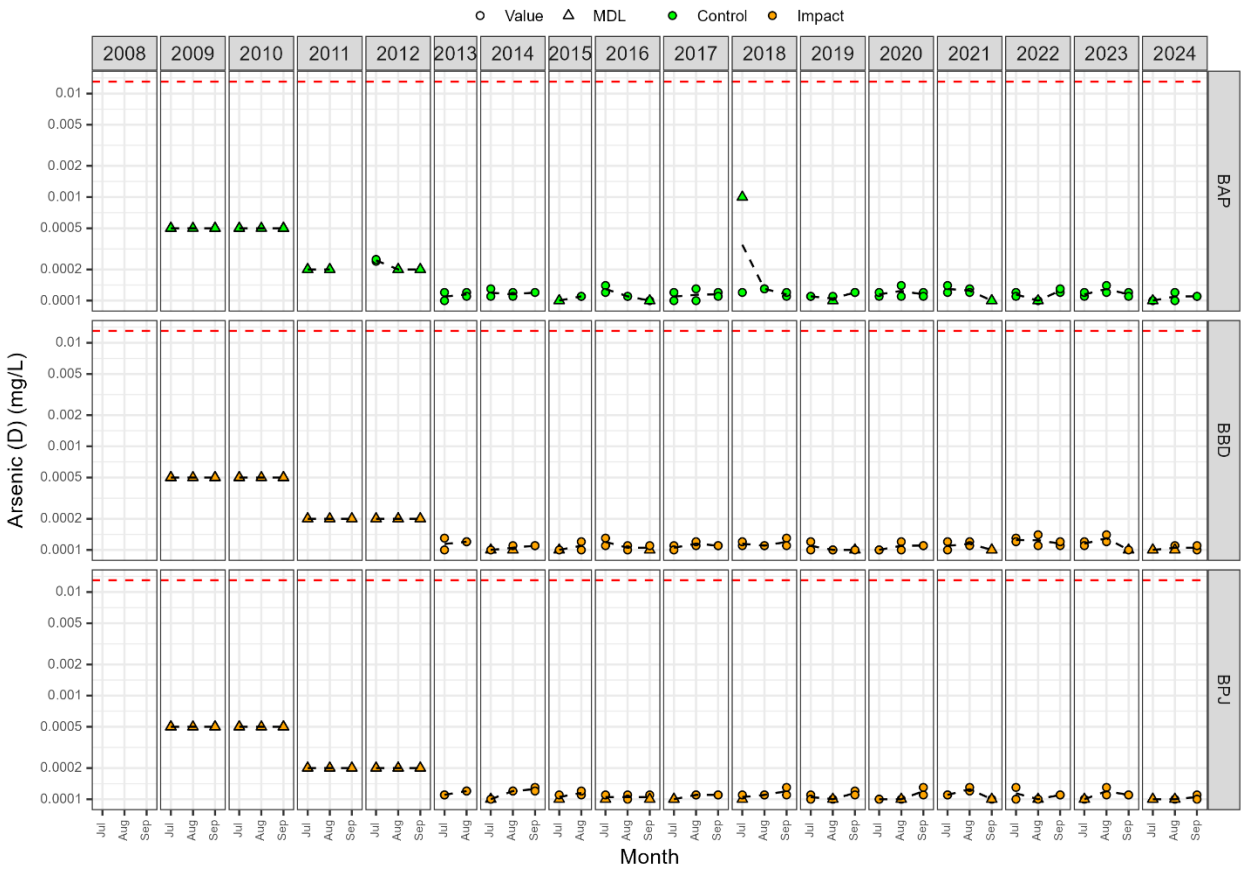


Figure C3-55. Dissolved barium (mg/L).

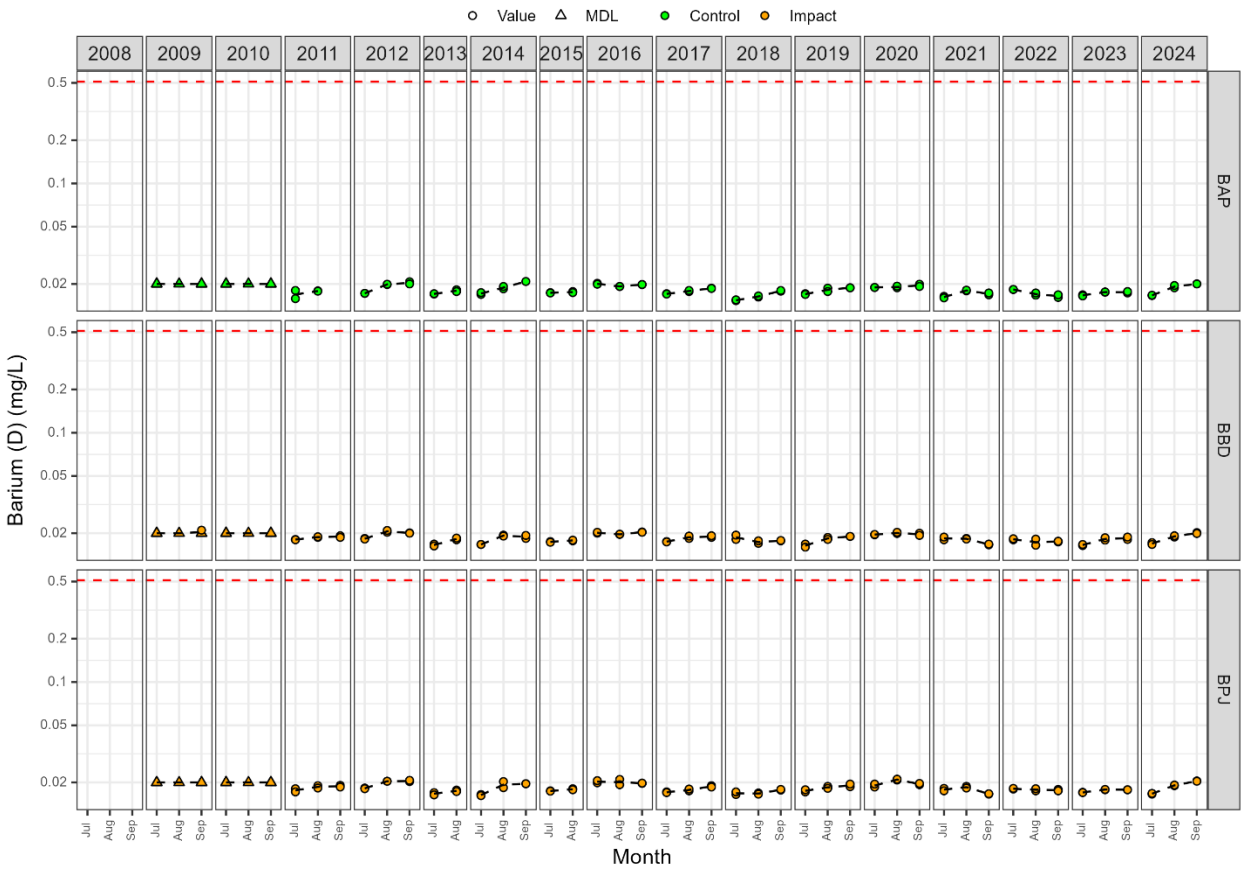


Figure C3-56. Dissolved beryllium (mg/L).

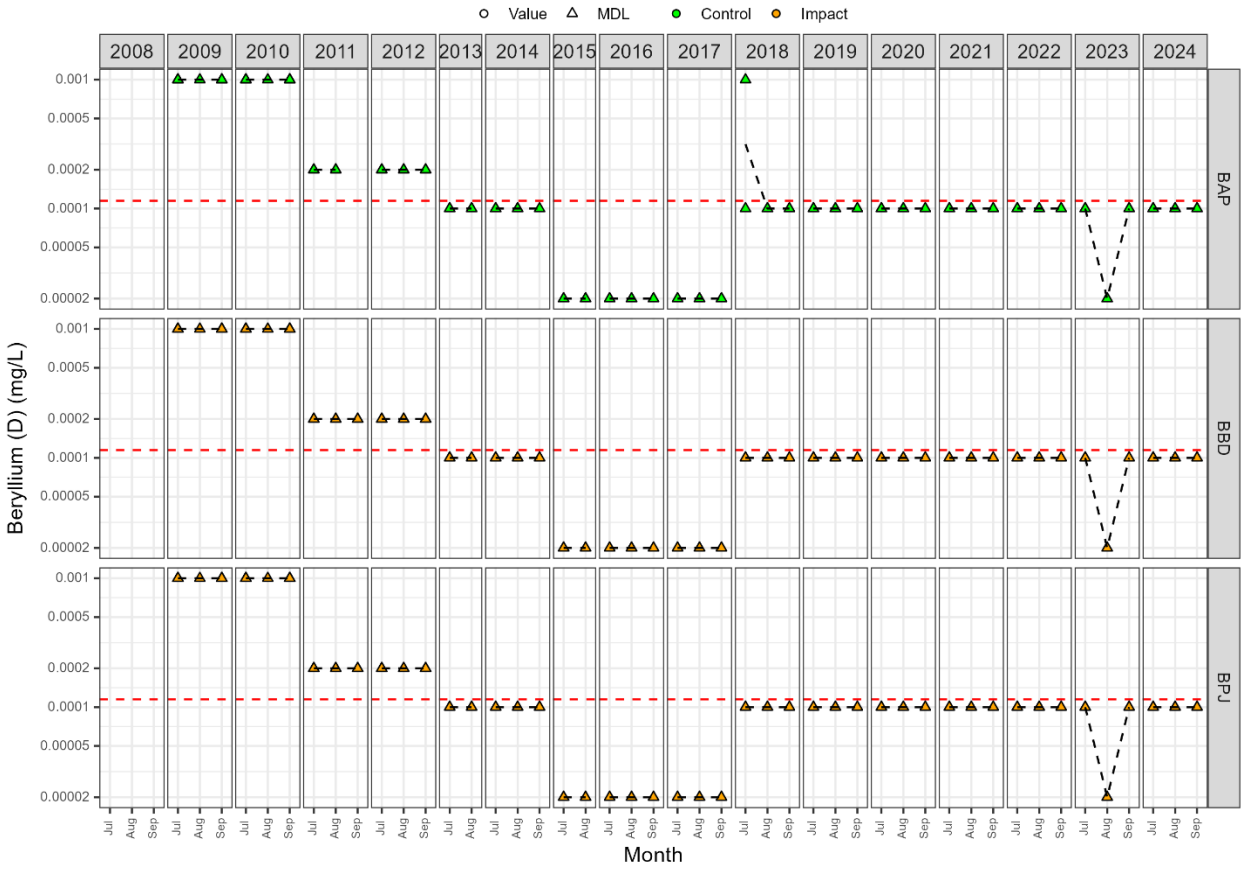


Figure C3-57. Dissolved boron (mg/L).

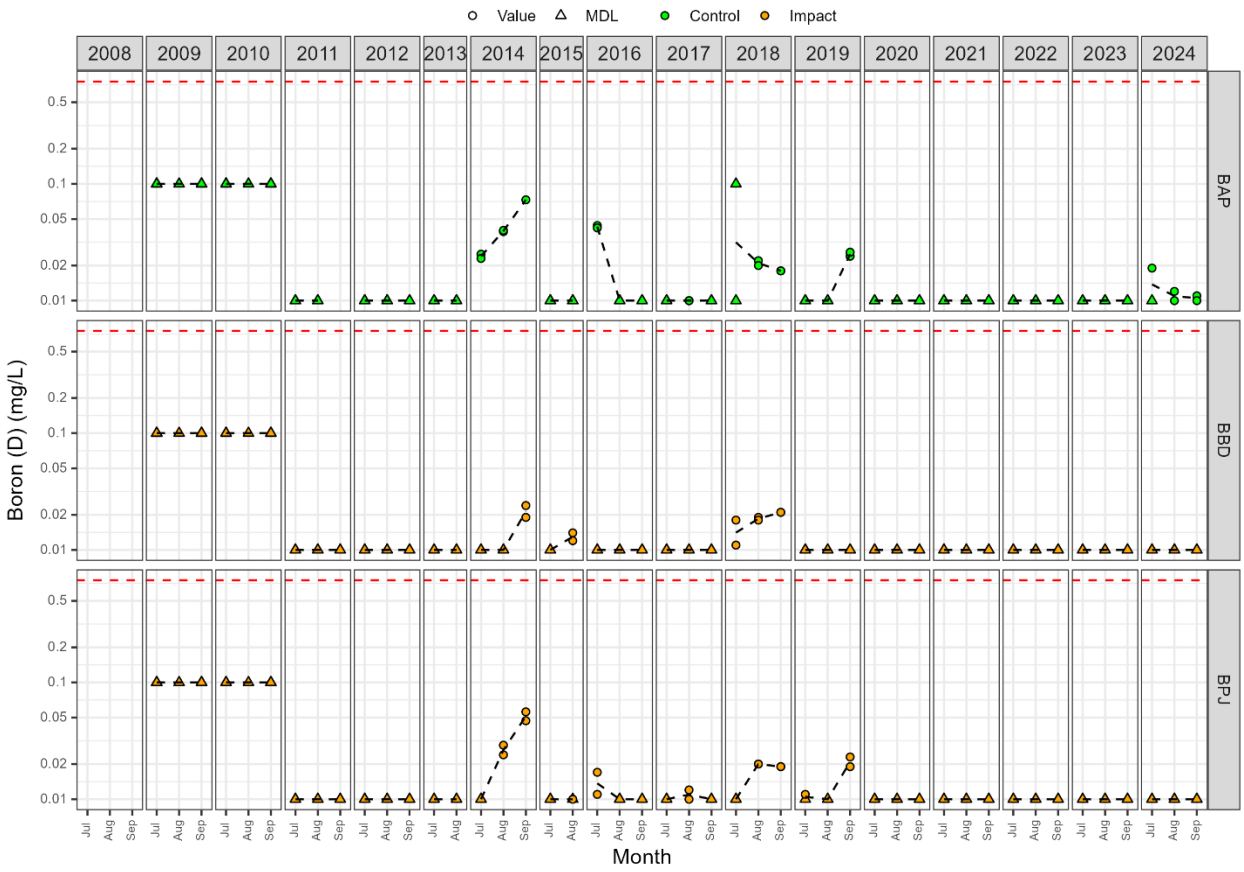


Figure C3-58. Dissolved cadmium (mg/L).

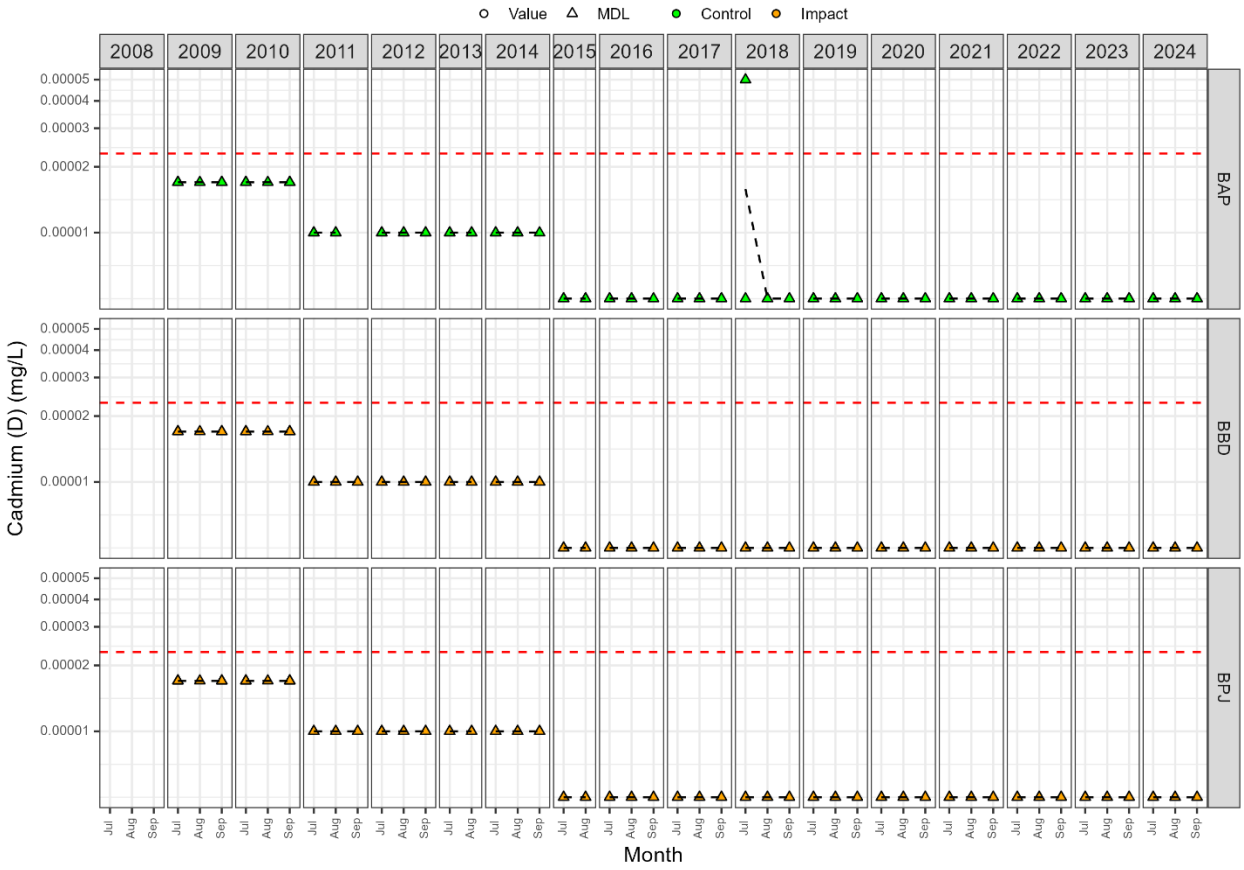


Figure C3-59. Dissolved chromium (mg/L).

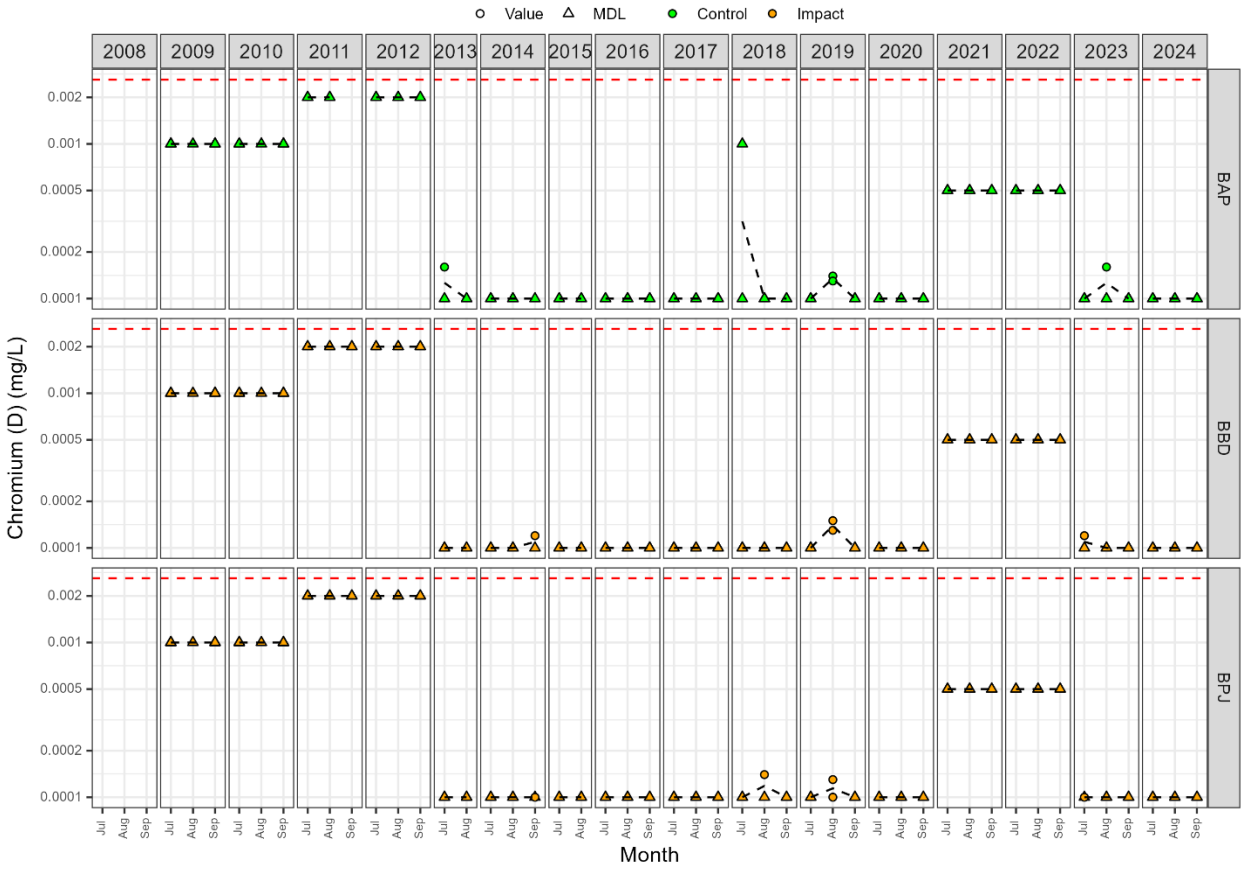


Figure C3-60. Dissolved copper (mg/L).

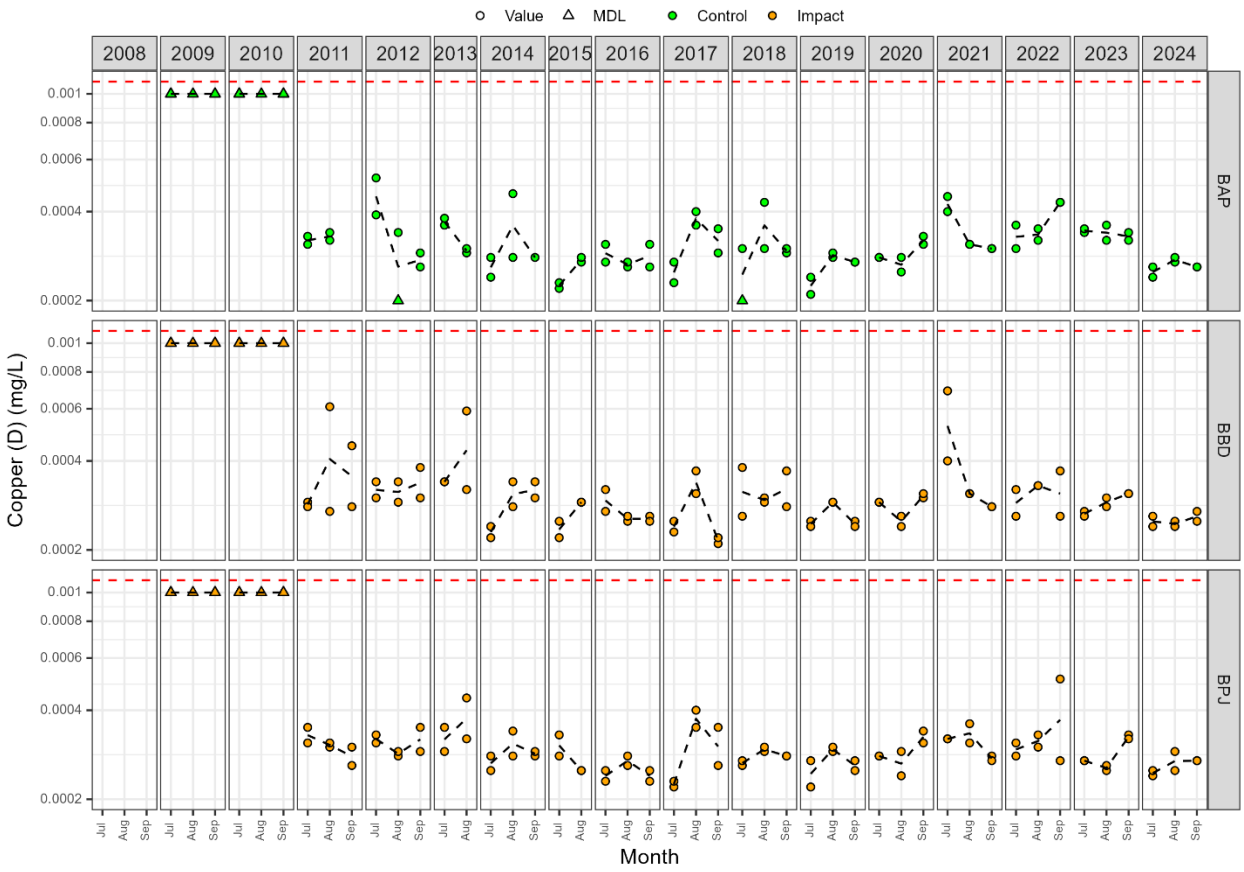


Figure C3-61. Dissolved iron (mg/L).

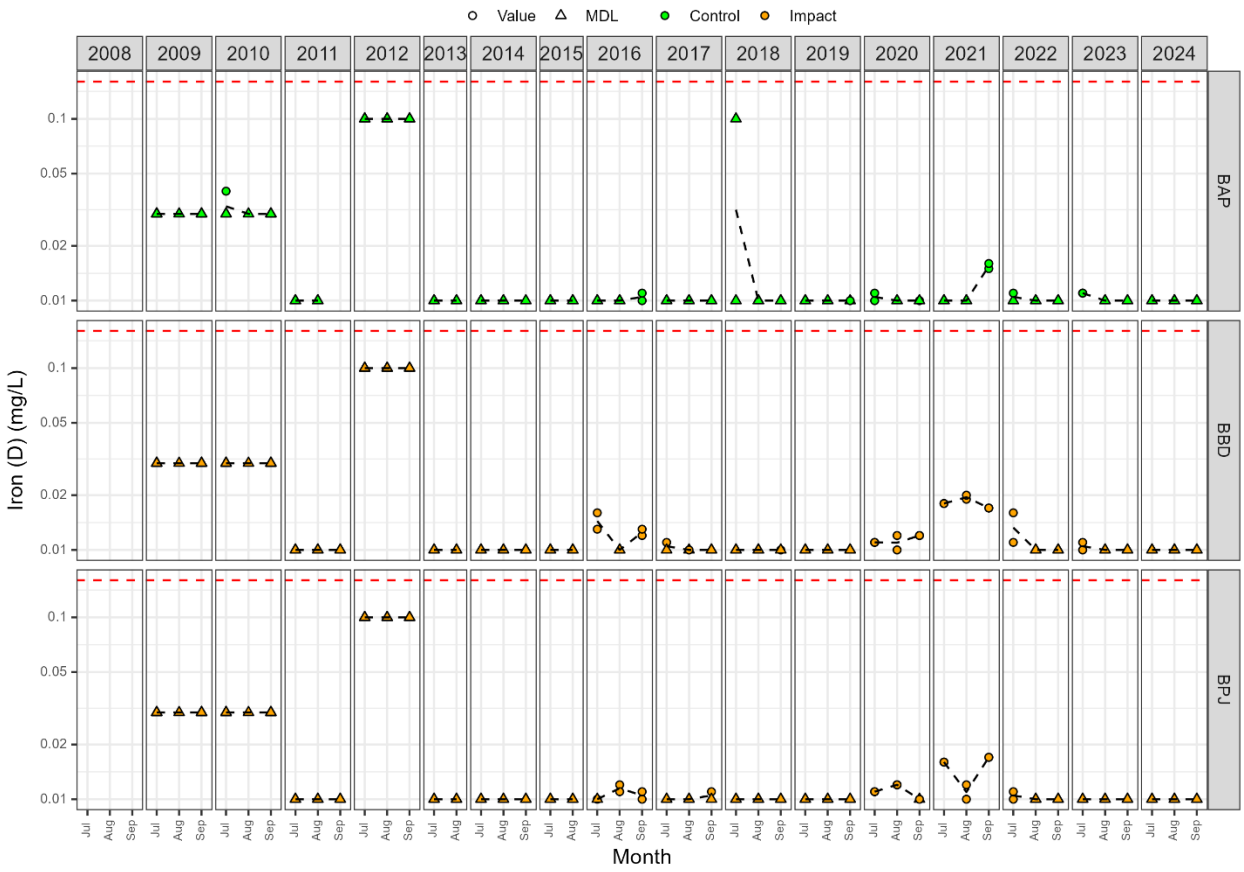


Figure C3-62. Dissolved lead (mg/L).

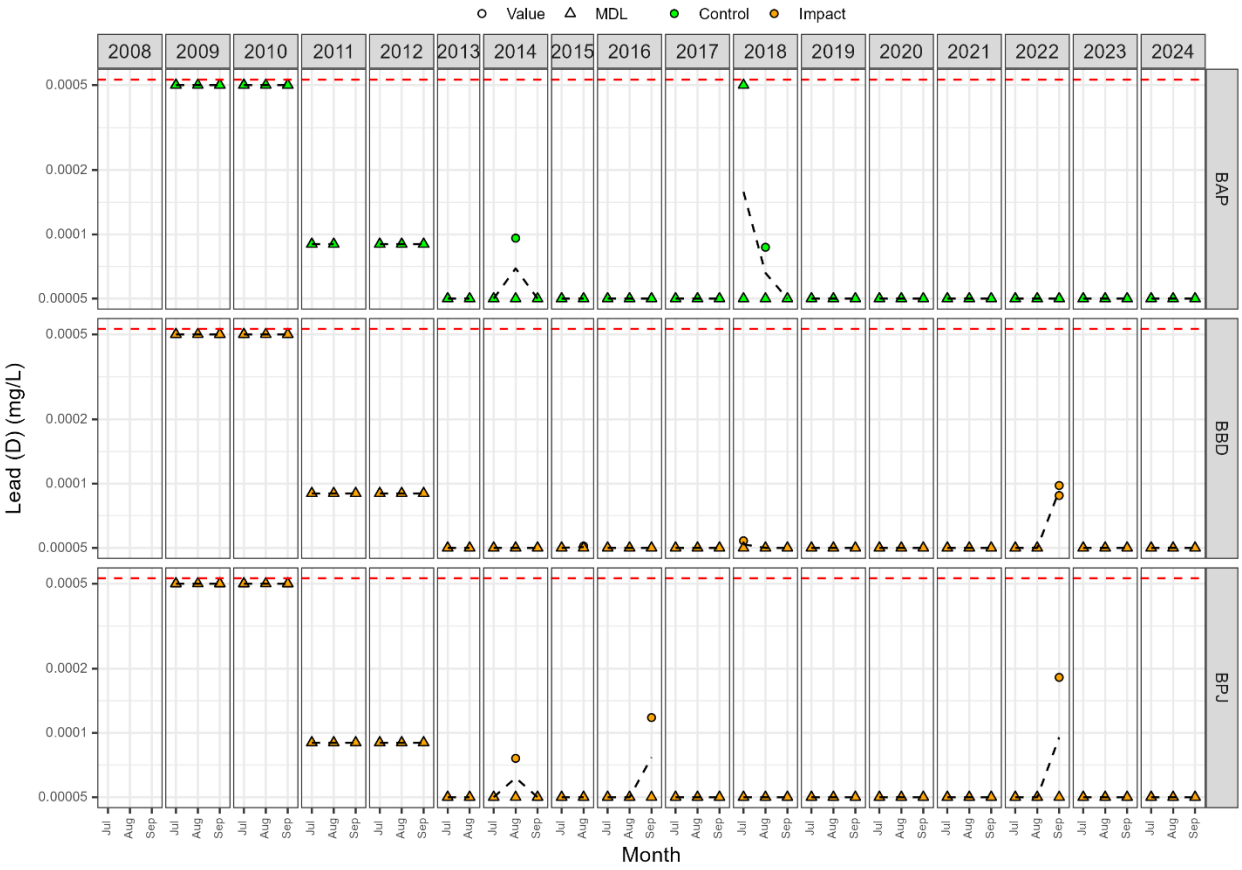


Figure C3-63. Dissolved lithium (mg/L).

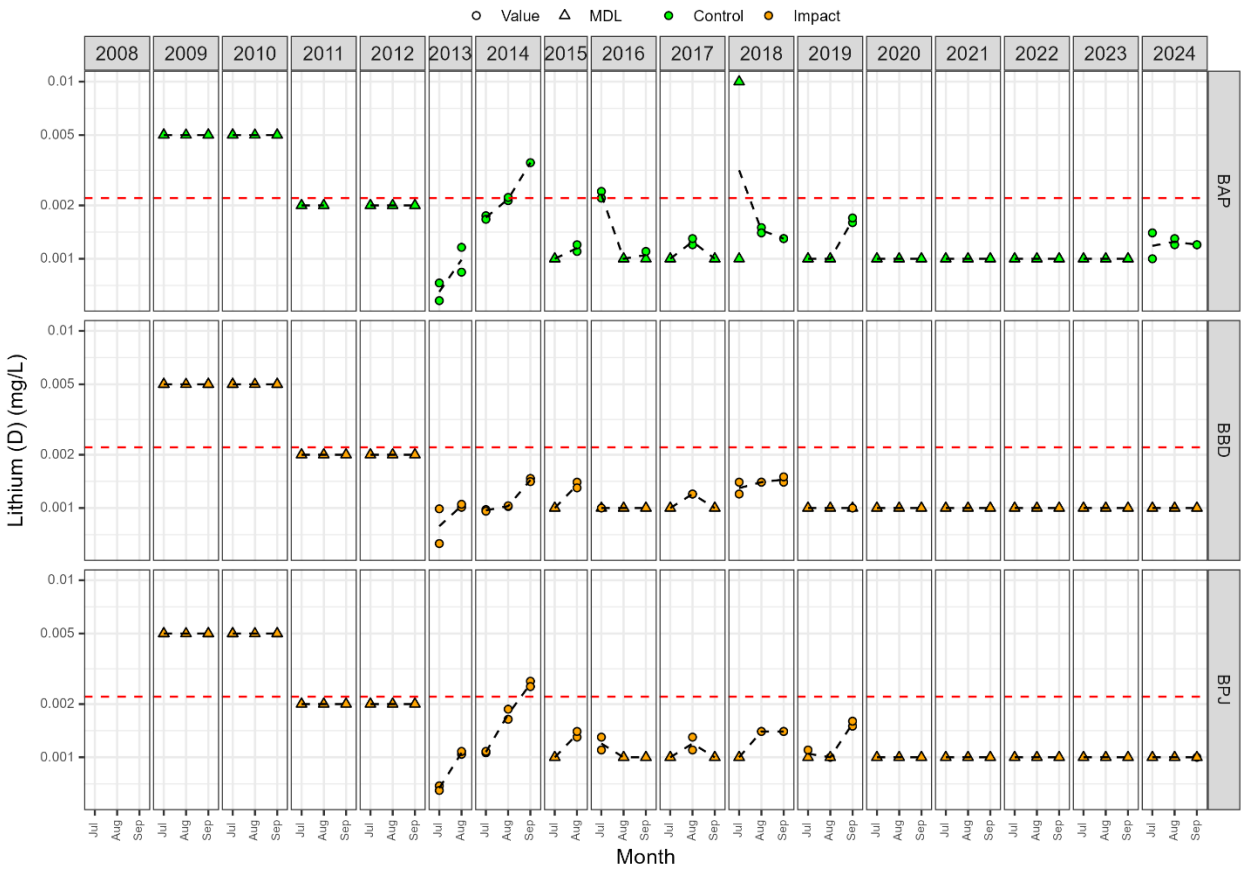


Figure C3-64. Dissolved manganese (mg/L).

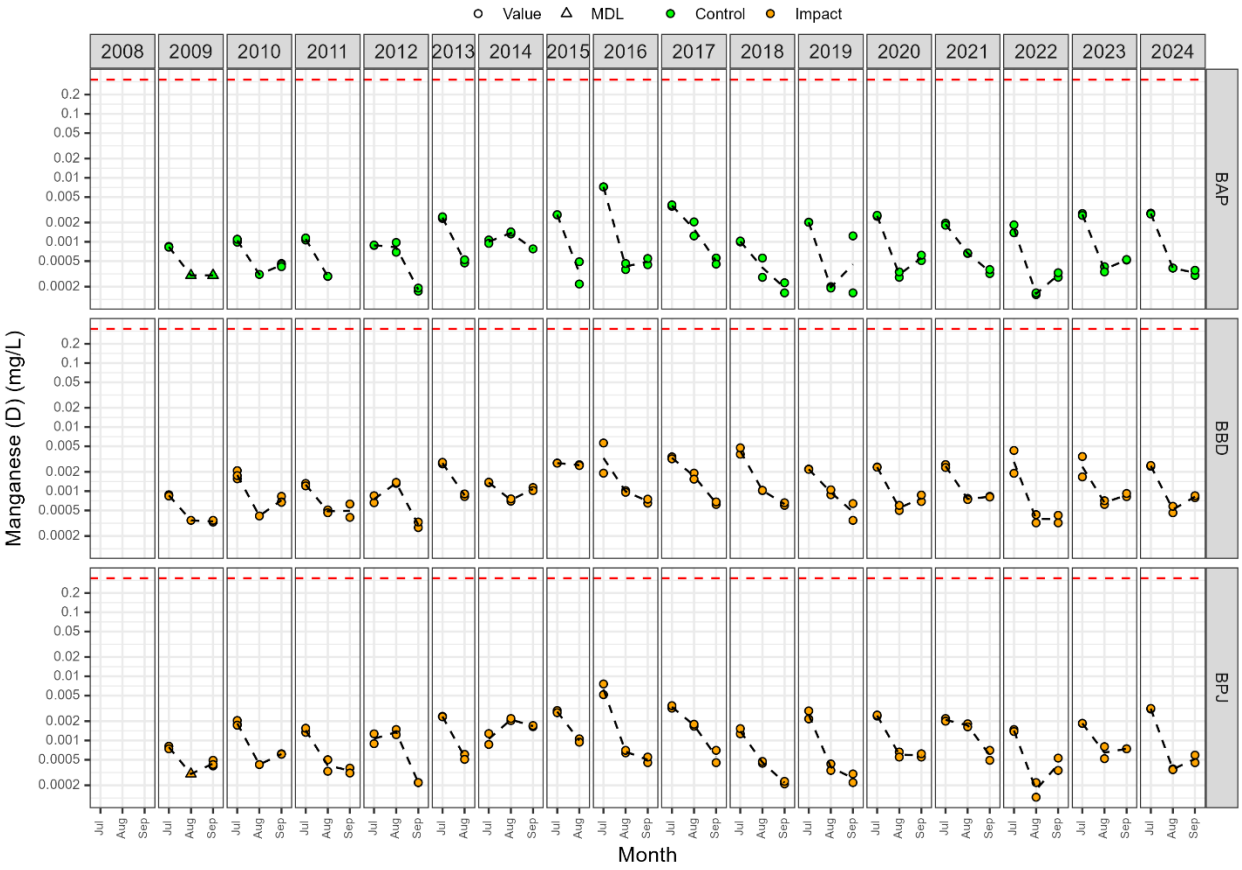


Figure C3-65. Dissolved mercury (mg/L).

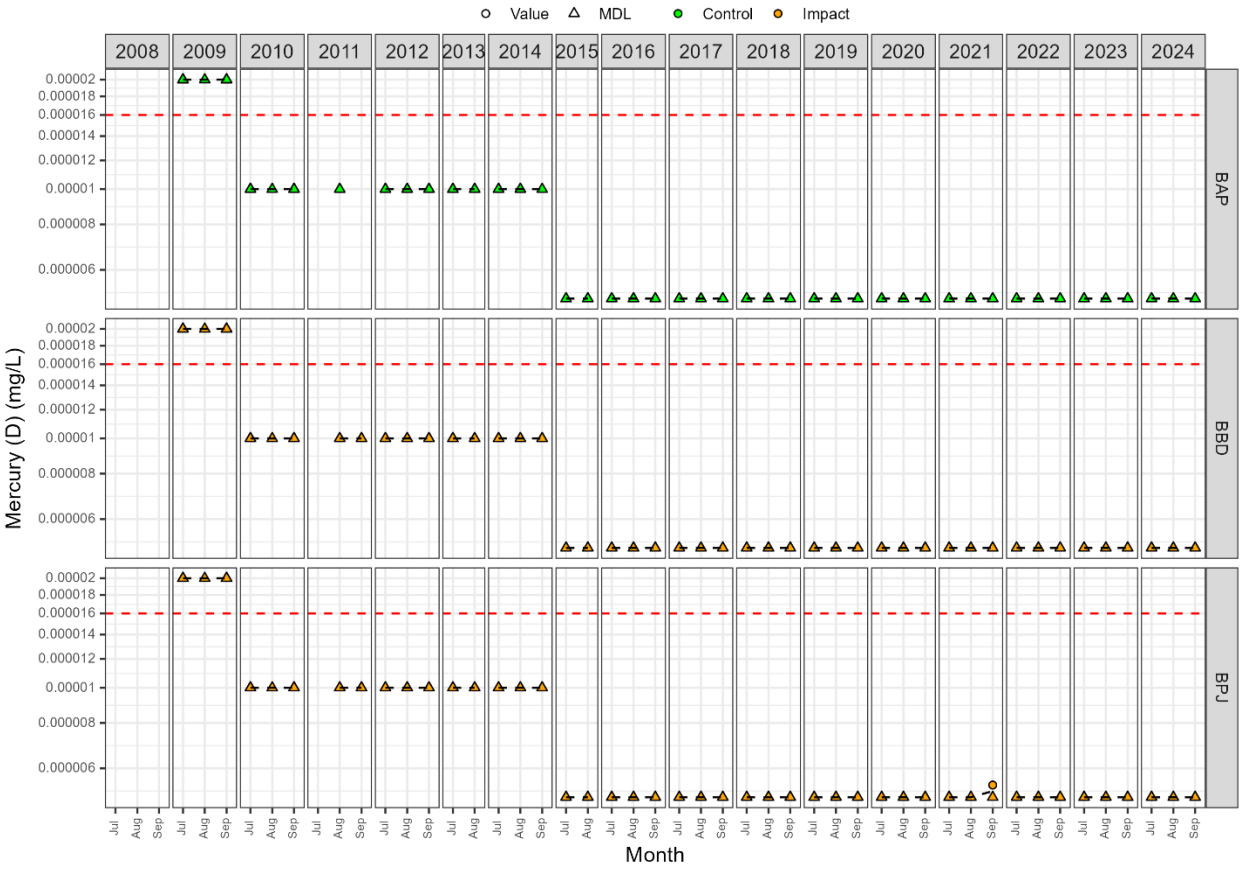


Figure C3-66. Dissolved molybdenum (mg/L).

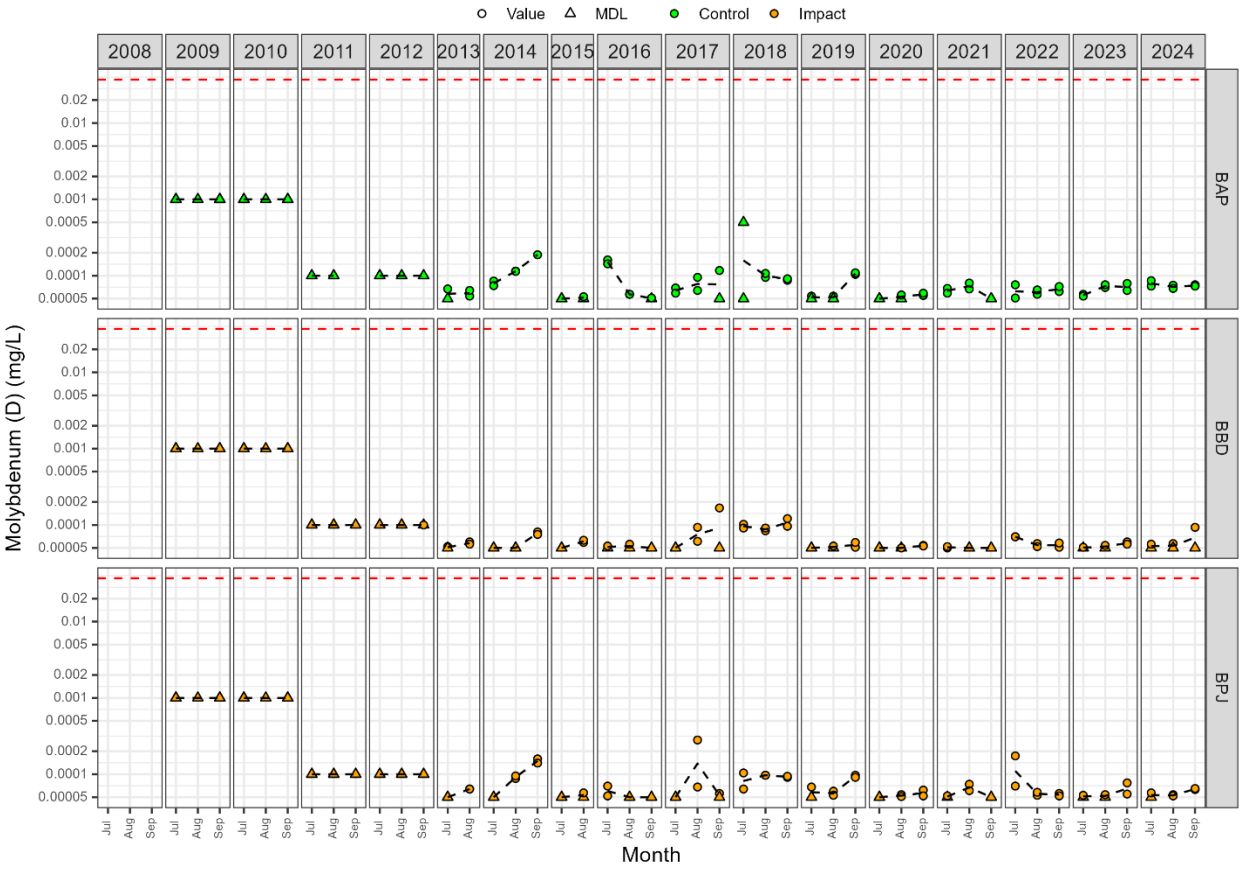


Figure C3-67. Dissolved nickel (mg/L).

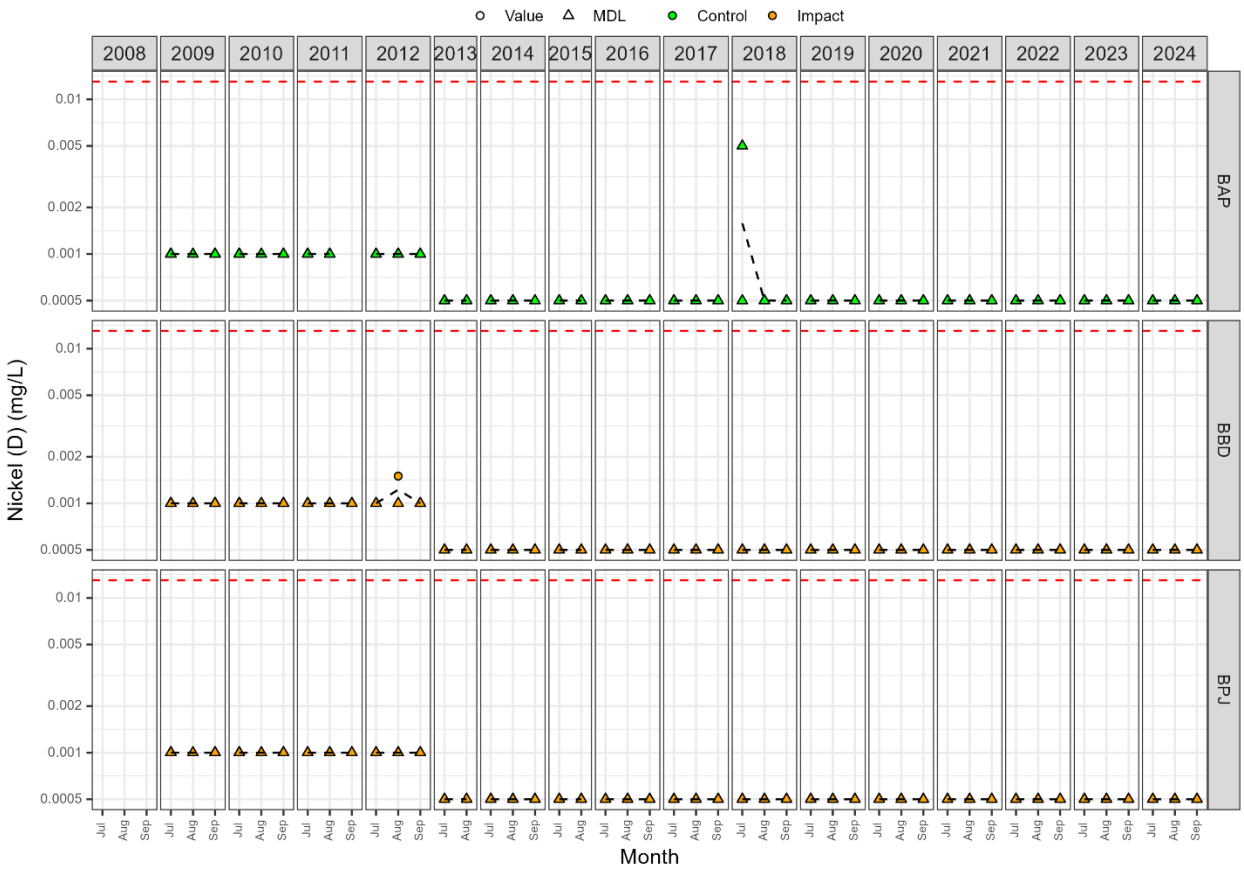


Figure C3-68. Dissolved selenium (mg/L).

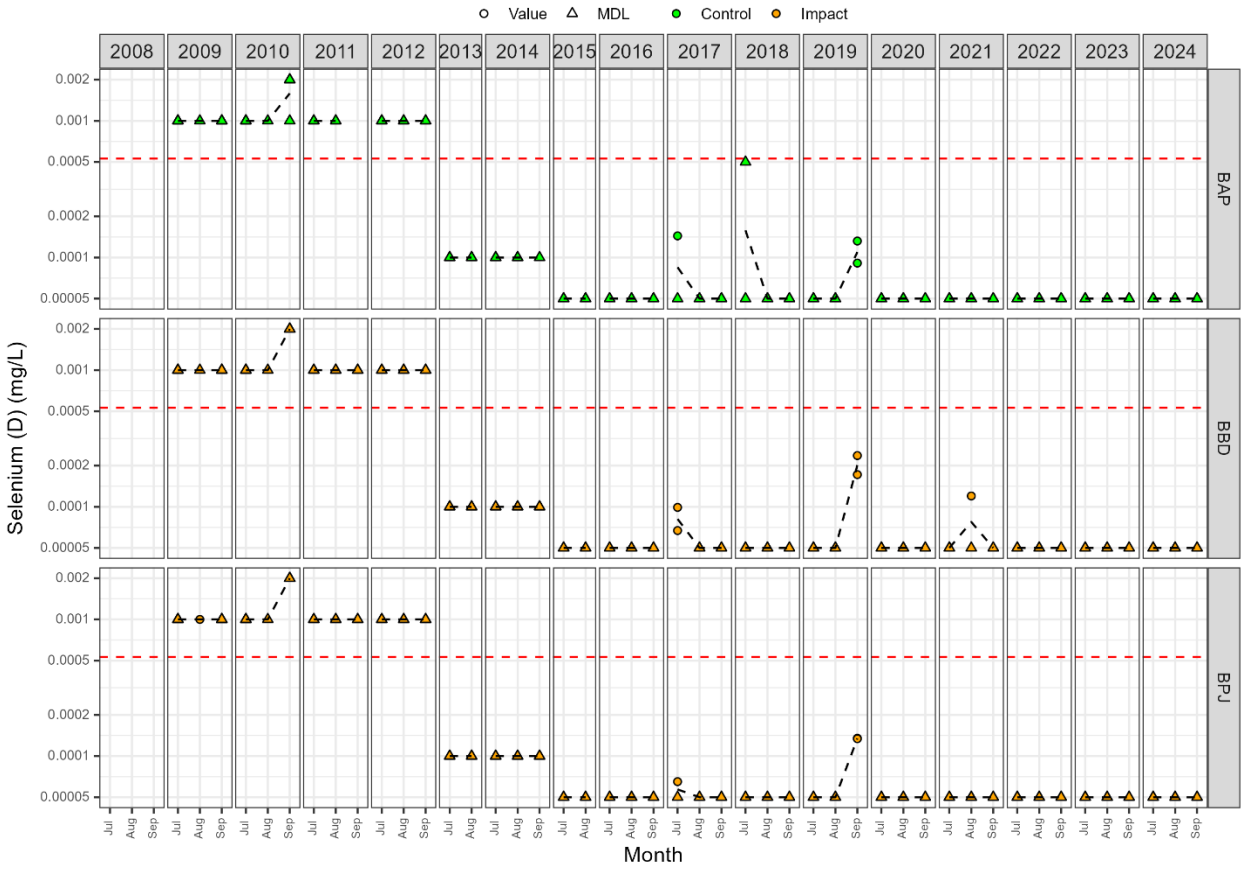


Figure C3-69. Dissolved silicon (mg/L).

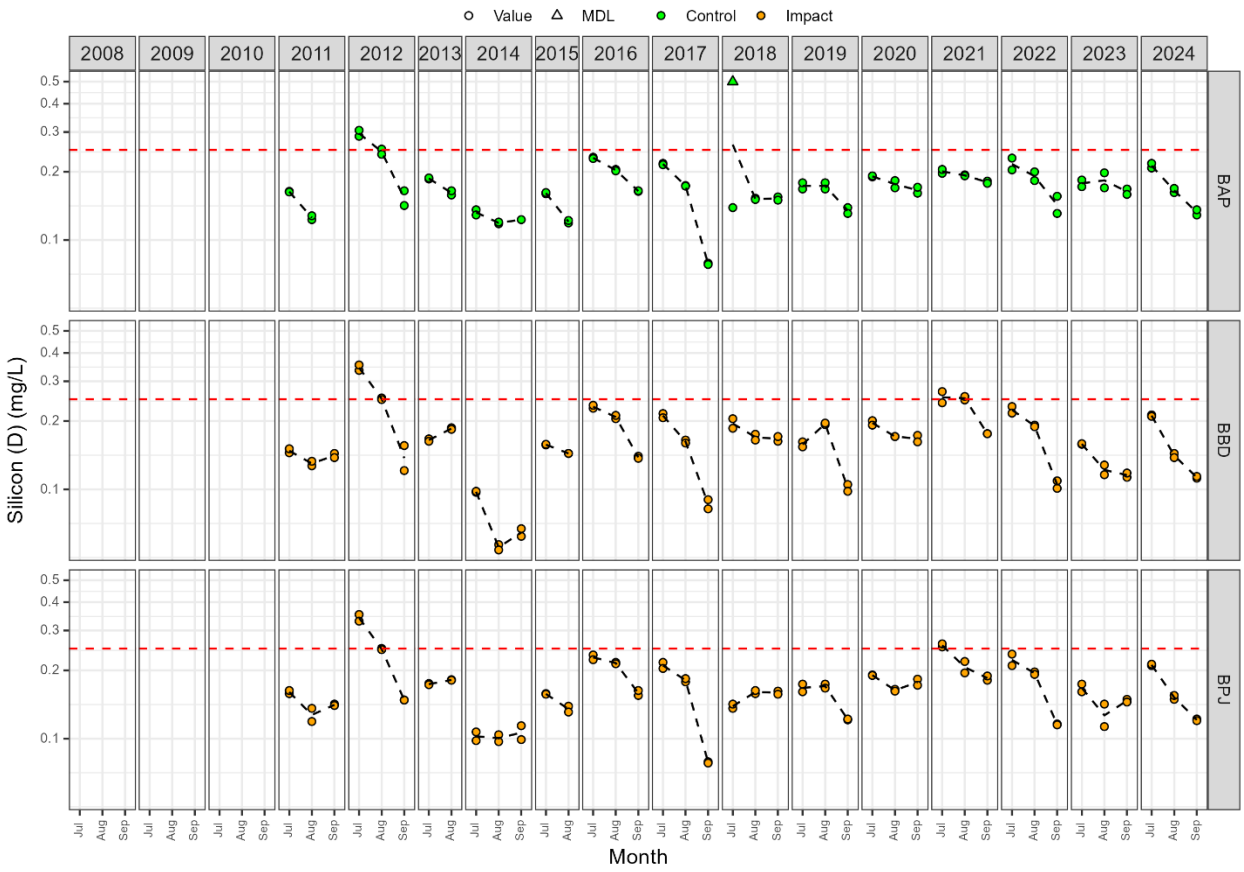


Figure C3-70. Dissolved silver (mg/L).

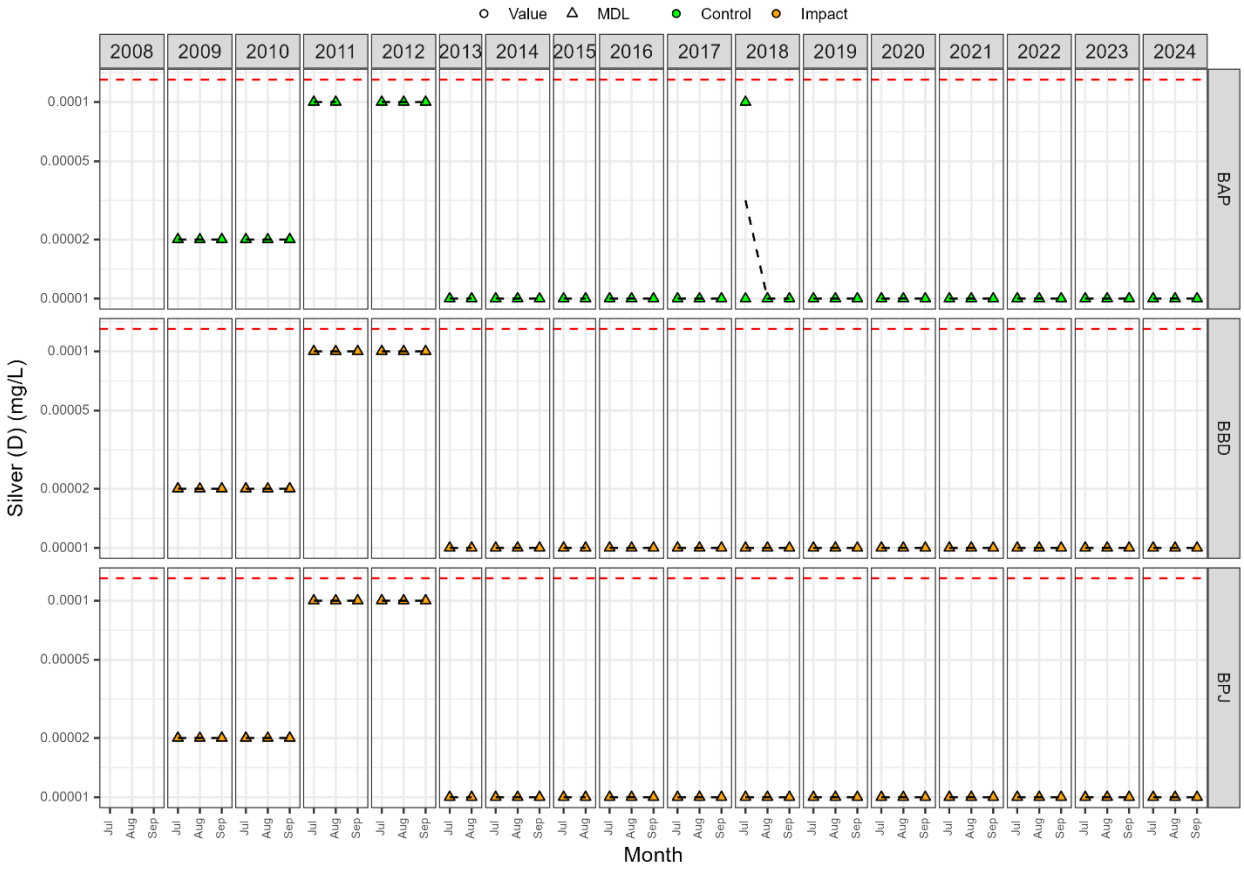


Figure C3-71. Dissolved strontium (mg/L).

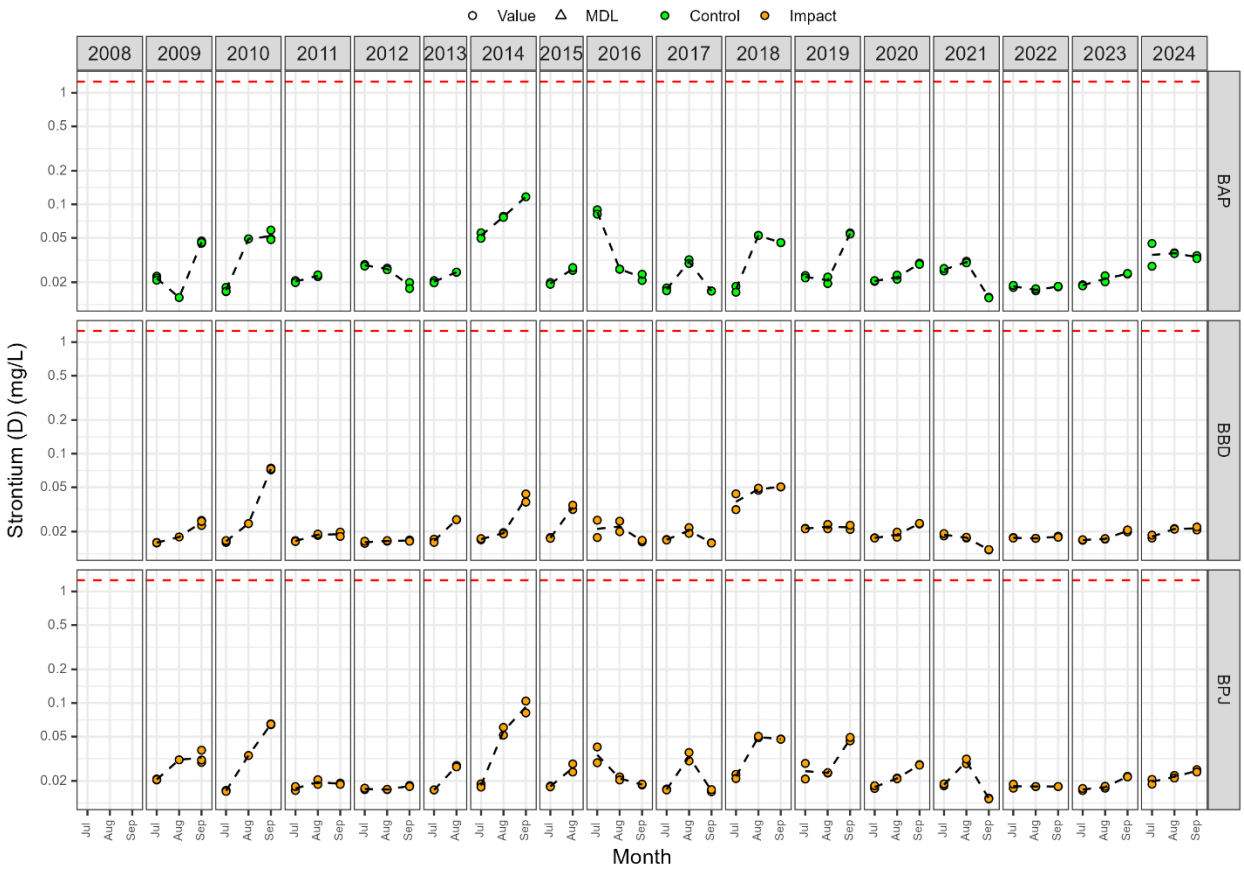


Figure C3-72. Dissolved thallium (mg/L).

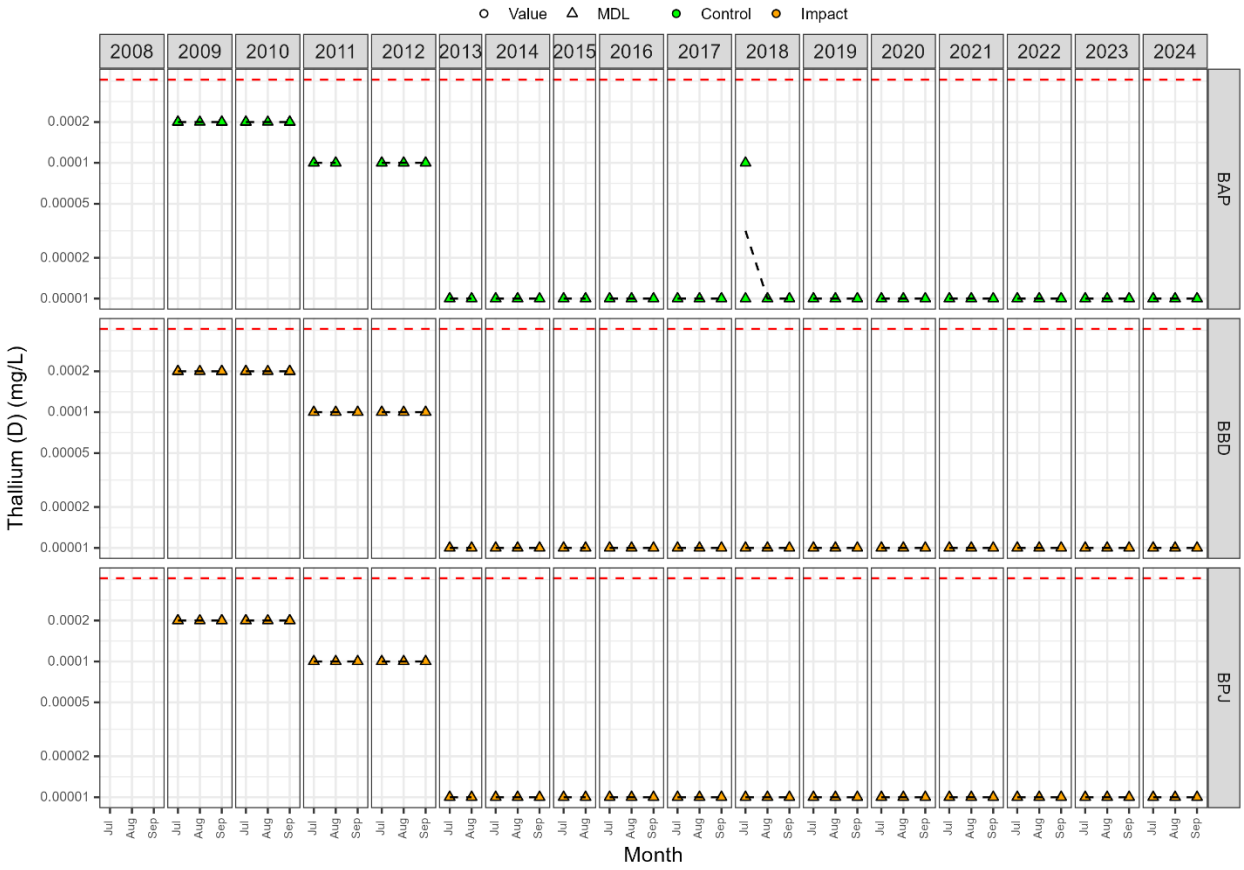


Figure C3-73. Dissolved tin (mg/L).

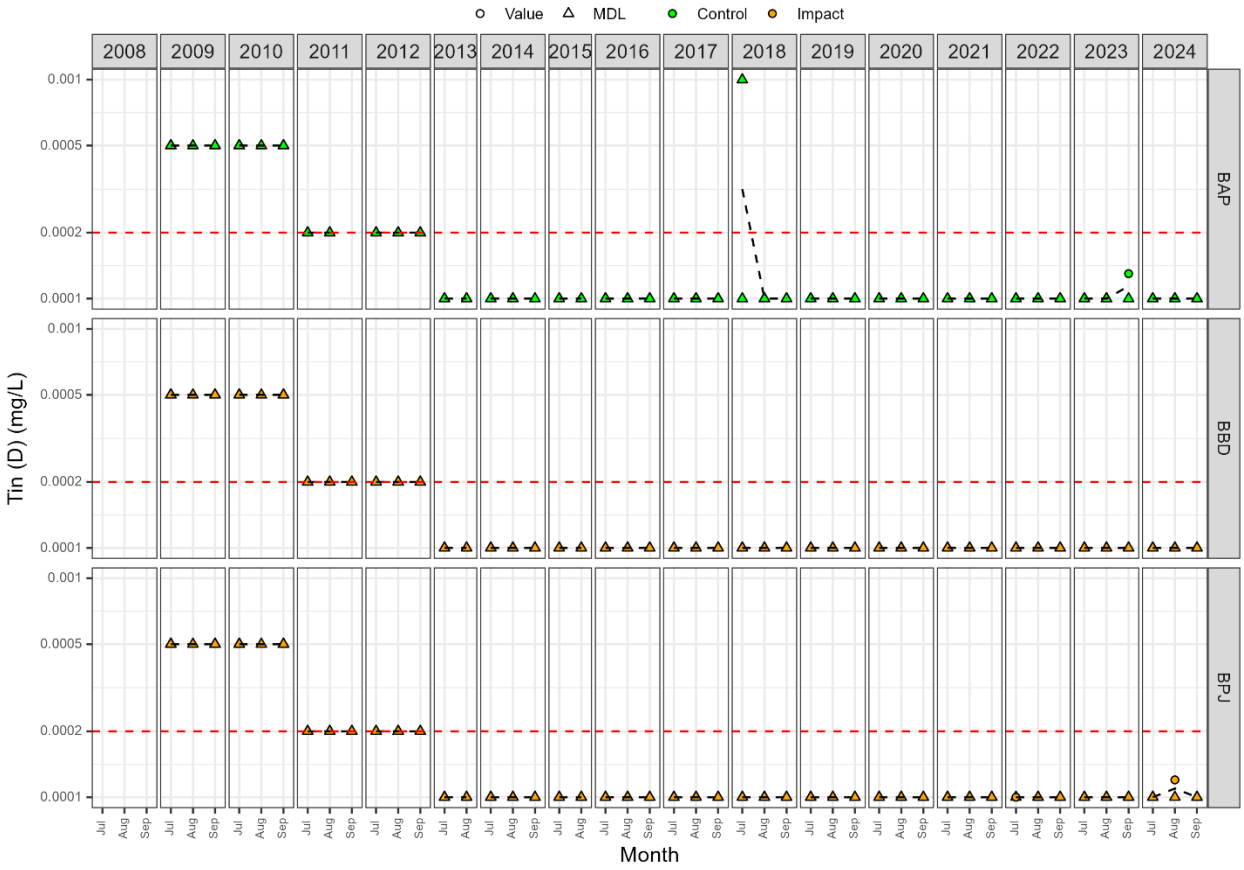


Figure C3-74. Dissolved titanium (mg/L).

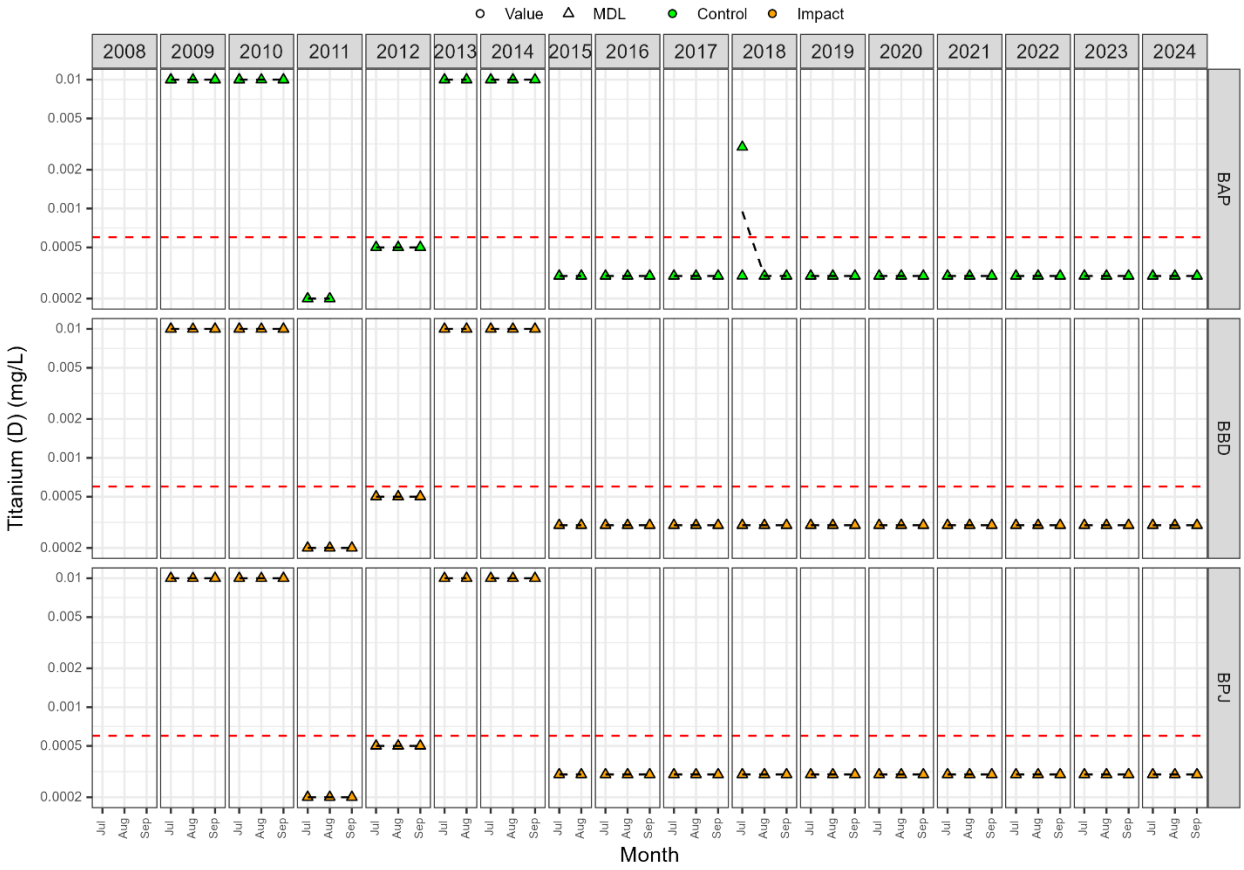


Figure C3-75. Dissolved uranium (mg/L).

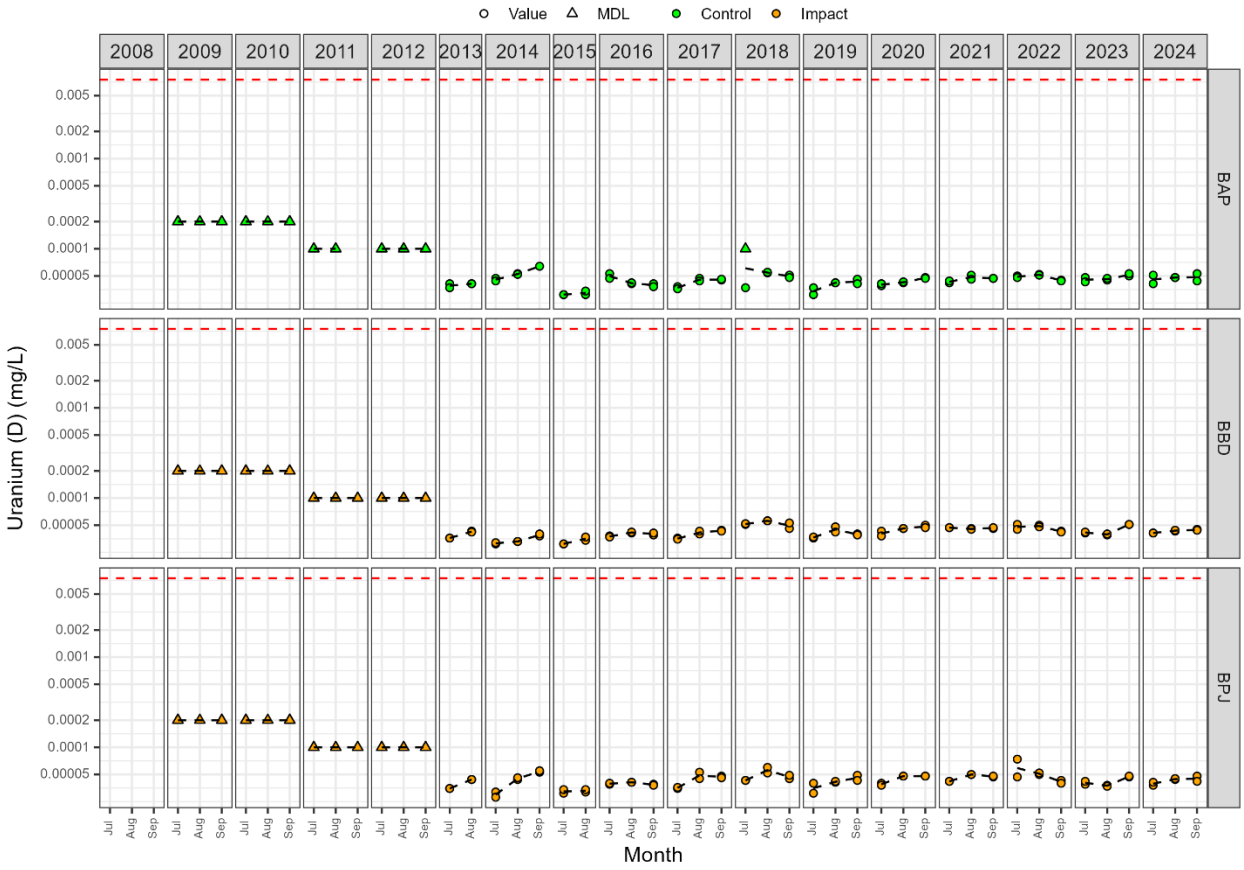


Figure C3-76. Dissolved vanadium (mg/L).

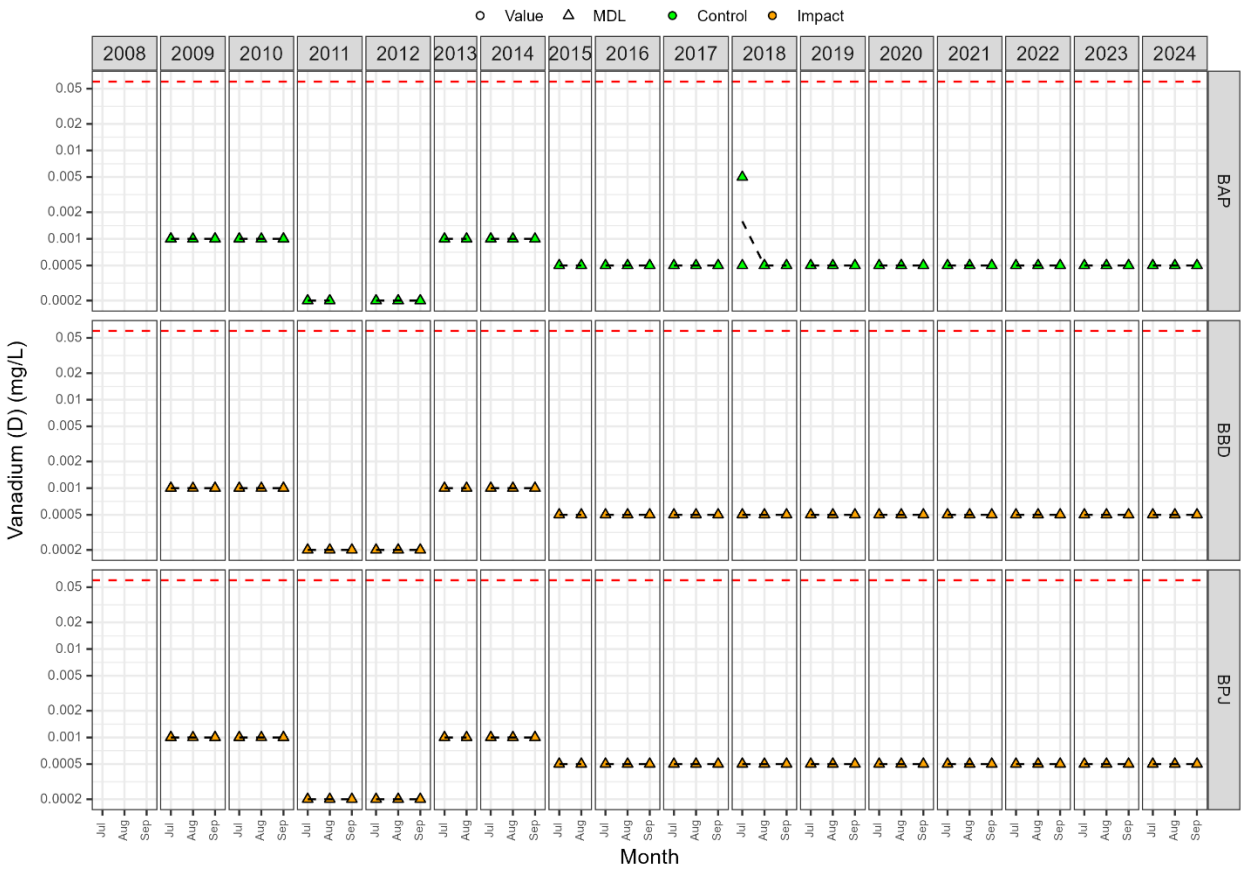
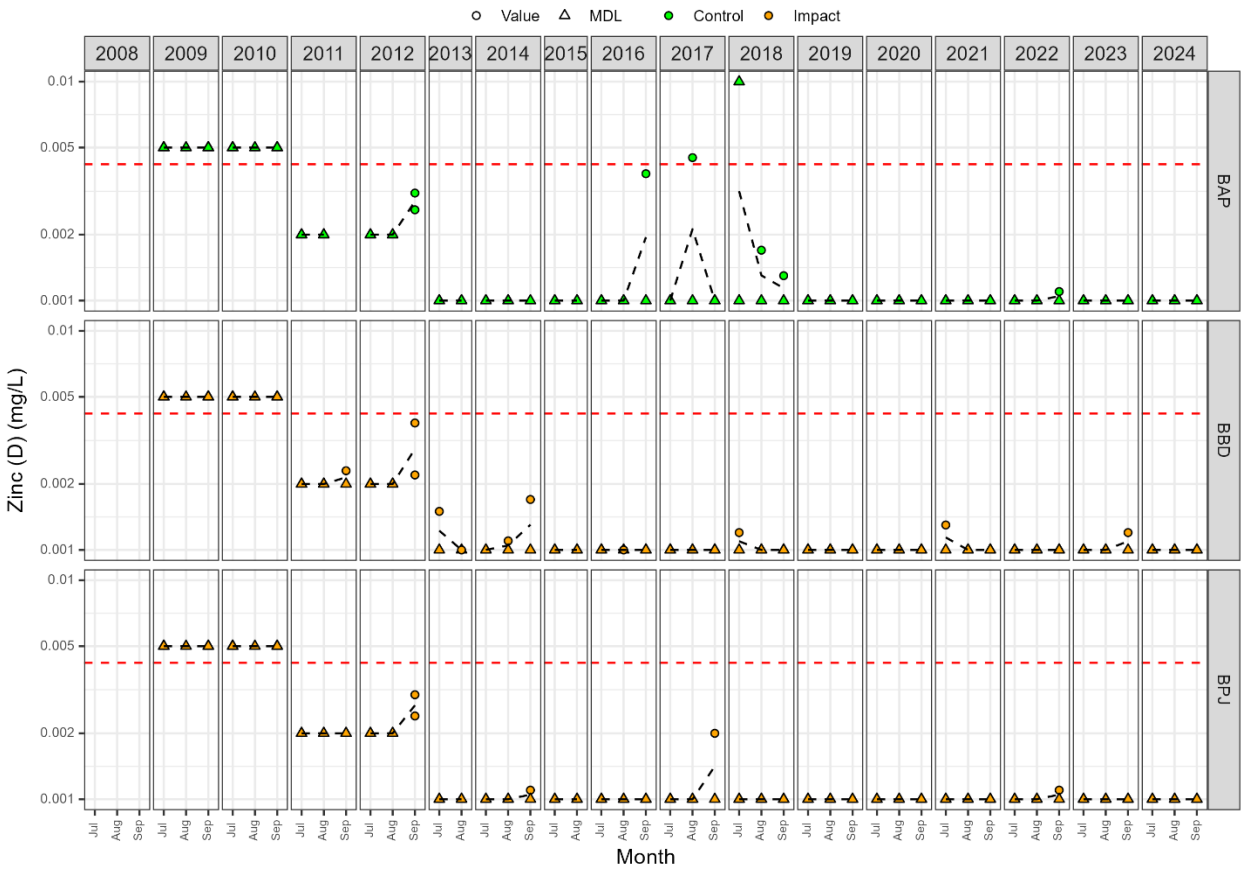


Figure C3-77. Dissolved zinc (mg/L).



APPENDIX D
SEDIMENT CHEMISTRY DATA

Appendix D1
Sediment Chemistry – Meadowbank Study Area Lakes

LIST OF TABLES

Table D1-1. Sediment grab results, Meadowbank study lakes, 2024. 5

Table D1-2. Hydrocarbon and PAH results for composite sediment grabs at Meadowbank study area lakes, 2024. 7

SEDIMENT PROGRAM OVERVIEW

Below is an overview of the various sediment sampling programs at Meadowbank dating back to baseline sampling in 2008:

- **2008** – Baseline coring was conducted in July 2008 prior to onset of East Dike construction to characterize baseline surface metals concentrations at all monitoring areas.
- **2009** – The 2009 coring program was implemented to monitor potential changes to surface sediment chemistry that may have occurred as a result of the East Dike sedimentation event in August 2008. The 2009 study was conducted only at SP, TE, TPE, and INUG. TPE and INUG were used as the reference areas for SP and TE.
- **2010 to 2013** – The 2010 to 2013 sediment grab sampling programs covered all NF, MF, and FF Meadowbank study lakes as well as the reference areas INUG and PDL. Sediment coring was completed as part of the 2012 program.
- **2014** – The 2014 program was advanced a year ahead to align with EEM program. It covered all Meadowbank study lakes, sampling areas, and reference areas. Additional sampling was completed at TPE in 2014 to help assess whether the apparent changes in sediment chromium concentrations were related to spatially biased sampling or were a real temporal trend. Two zones in TPE were targeted for coring: the zone sampled initially in 2008 and 2009 (prior to dike construction; TPE-B) and the zone sampled in 2010 (TPE). Results from this analysis helped inform the design of the targeted chromium bioavailability study conducted at TPE in 2015.
- **2015** – The routine 2015 sediment sampling program was limited to the NF study lakes in accordance with the new approach outlined in the *CREMP Plan* (Azimuth, 2015b). In addition to routine sampling, a targeted bioavailability and toxicity testing program was completed on TPE sediments to help determine whether the apparent increase in chromium concentrations adversely affects the benthic invertebrate community. Sediment grab samples were collected from two zones in TPE and from the reference areas. Samples were analyzed for total metals and other conventional parameters, as per the routine CREMP program, and sequential extraction testing was performed to determine the bioavailability of sediment chromium. Bulk sediment was sent to a toxicity testing laboratory where two tests were run using *Chironomus dilutus* and *Hyalella azteca.*
- **2016** – Sediment sampling in 2016 was limited to grab sampling at the Meadowbank study lakes.
- **2017** – Sediment grab and core sampling was completed at all Meadowbank study area lakes. Samples were spaced throughout each basin. Grabs for chemistry and benthic invertebrates were collected at the same location. Core samples were opportunistically collected from some

of the grab sampling locations. The remaining replicates were spaced throughout the basin in areas with the targeted depth and substrate composition.

- **2018** – Sediment grab sampling at the Meadowbank study lakes was conducted concurrently with the benthic invertebrate community sampling locations. Targeted studies were conducted at TPE and WAL to follow up on recommendations in the 2017 CREMP (Azimuth, 2018c). The 2017 CREMP study found that chromium concentrations in the sediments at TPE and the arsenic concentrations at WAL appeared elevated compared to pre-development baseline concentrations. Sediment coring (10 replicates per location[1]) was conducted to verify the 2017 results, and toxicity testing was conducted following the method used in 2015.
- **2019** – Sediment grab sampling was completed at the Meadowbank study lakes concurrently with benthic invertebrate community sampling. The targeted bioavailability study completed in 2018 indicated lower mean chromium concentrations at TPE than were observed in 2017 but appeared to confirm that concentrations were higher than before-impact concentrations. Another year of coring was completed at TPE to provide three consecutive years of chemistry data to evaluate temporal changes in sediment chromium concentrations. Sediment coring at WAL in 2018 confirmed there are no temporal changes in sediment metals at WAL attributable to activities at the mine; no follow-up was completed in 2019.
- **2020** – Sediment grab and core sampling was completed at the NF and reference areas only. Samples were spaced throughout each basin. Grabs for chemistry and benthic invertebrates were collected at the same location. Core samples were opportunistically collected from some of the grab sampling locations. The remaining replicates were spaced throughout the basin in areas with the targeted depth and substrate composition. Targeted studies focusing on chromium in sediment at TPE were completed in 2019 and concluded that, while concentrations of chromium have increased relative to the baseline period and are most likely mining-related, current concentrations of chromium in sediment and porewater do not pose risks to the benthos at TPE.
- **2021** – Sediment grab sampling was completed at the NF and reference areas only. Samples were spaced throughout each basin. Grabs for chemistry and benthic invertebrates were collected at the same location. In 2021, due to a laboratory error, some of the sediment samples were discarded prior finalizing the request for analysis. As such, only one batch of sediment samples was analyzed which included the NF areas at Meadowbank (SP, TPE, and TPN [only

[1] A "replicate" is a discrete core sample following the standard operating procedure (SOP) in Azimuth 2015b.

grain size]). Samples from reference areas INUG and PDL, and from NF area WAL were accidentally discarded by the laboratory prior to analysis (See **Appendix A** and **Appendix C2** in the 2021 CREMP report for details, Azimuth 2022a).

- **2022** – Sediment grab sampling was conducted at the NF and reference areas. The NF study lake sediment was analyzed for grain size and total organic carbon (TOC) with the remaining sediment archived for chemistry. Full chemistry analysis was performed for the reference lakes (INUG and PDL), however due to elevated moisture content, grain size analysis could not be performed.
- **2023** – Sediment core and grab sampling were conducted at the NF and reference areas. Sediment grab samples for habitat characteristics were analyzed for moisture, TOC and grain size; composite grab samples for chemistry were analyzed for aggregate organics, hydrocarbons, and polycyclic aromatic hydrocarbons (PAHs). Sediment core samples were analyzed for moisture, pH, and total metals.
- **2024** – Sediment grabs were collected at the NF and reference areas. Sediment was analyzed for grain size and TOC; composite grab samples for chemistry were analyzed for aggregate organics, hydrocarbons, and PAHs. The remaining sediment was archived for chemistry as per the *CREMP Plan Update* (Azimuth, 2022b).

TABLES

Table D1-1. Sediment grab results, Meadowbank study lakes, 2024.

Lake & Basin	Inuggugayualik Lake (INUG)					Pipedream Lake (PDL)					Third Portage Lake - East Basin (TPE)				
Area-Replicate ID	**INUG-1**	**INUG-2**	**INUG-3**	**INUG-4**	**INUG-5**	**PDL-1**	**PDL-2**	**PDL-3**	**PDL-4**	**PDL-5**	**TPE-1**	**TPE-2**	**TPE-3**	**TPE-4**	**TPE-5**
Date	10-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24
ALS Sample ID	VA24C2443-031	VA24C2443-032	VA24C2443-033	VA24C2443-034	VA24C2443-035	VA24C2443-025	VA24C2443-026	VA24C2443-027	VA24C2443-028	VA24C2443-029	VA24C2443-013	VA24C2443-014	VA24C2443-015	VA24C2443-016	VA24C2443-017
Physical Tests															
Moisture (%)	83	81	82	77	78	73	75	74	75	73	80	83	83	65	80
pH	5.3	5.4	5.3	5.1	5.4	6.2	5.9	6.0	5.9	5.8	5.7	5.7	6.1	5.9	5.7
Particle Size (%)															
clay (<0.004mm)	16	21	18	15	20	19	20	18	18	15	33	33	32	37	26
silt (0.063mm - 0.004mm)	83	77	81	84	75	79	77	80	78	80	66	66	67	55	69
sand (2.0mm - 0.063mm)	*<1.0*	2.0	1.5	*<1.0*	5.5	2.7	2.9	2.0	3.9	4.4	1.3	1.2	1.1	8.5	5.1
gravel (>2mm)	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Organic Carbon															
TOC (% dw)	3.8	3.5	3.7	3.7	3.2	2.4	2.2	2.0	2.1	2.3	2.6	3.0	2.9	1.3	2.9

Notes:
Italicized numbers are below detection limits.

Table D1-1. Sediment grab results, Meadowbank study lakes, 2024.

Lake & Basin	Third Portage Lake - North Basin (TPN)					Second Portage Lake (SP)					Wally Lake (WAL)				
Area-Replicate ID	**TPN-1**	**TPN-2**	**TPN-3**	**TPN-4**	**TPN-5**	**SP-1**	**SP-2**	**SP-3**	**SP-4**	**SP-5**	**WAL-1**	**WAL-2**	**WAL-3**	**WAL-4**	**WAL-5**
Date	9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	19-Aug-24	19-Aug-24	19-Aug-24	19-Aug-24	19-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24
ALS Sample ID	VA24C2443-019	VA24C2443-020	VA24C2443-021	VA24C2443-022	VA24C2443-023	VA24C2443-001	VA24C2443-002	VA24C2443-003	VA24C2443-004	VA24C2443-005	VA24C2443-007	VA24C2443-008	VA24C2443-009	VA24C2443-010	VA24C2443-011
Physical Tests															
Moisture (%)	27	72	53	79	26	82	82	83	70	82	92	88	89	91	91
pH	5.9	5.3	5.8	5.7	6.3	5.4	5.2	5.4	6.0	5.3	6.2	6.4	6.2	6.6	6.3
Particle Size (%)															
clay (<0.004mm)	34	16	7.6	19	29	23	27	31	40	26	13	16	17	16	19
silt (0.063mm - 0.004mm)	38	58	33	61	37	74	72	68	56	73	86	83	83	81	80
sand (2.0mm - 0.063mm)	18	26	59	20	35	2.6	1.1	1.6	3.6	1.4	1.0	1.2	*<1.0*	3.7	*<1.0*
gravel (>2mm)	11	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Organic Carbon															
TOC (% dw)	0.22	2.1	0.90	2.6	0.32	3.6	3.7	3.4	1.6	3.2	10.0	8.7	9.0	7.8	8.9

Notes:
Italicized numbers are below detection limits.

Table D1-2. Hydrocarbon and PAH results for composite sediment grabs at Meadowbank study area lakes, 2024.

Area-Replicate ID	CCME Sediment Quality Guidelines[1]		INUG-COMP	PDL-COMP	TPE-COMP	TPN-COMP	SP-COMP	WAL-COMP
Date			10-Aug-2024	11-Aug-2024	12-Aug-2024	09-Aug-2024	18-Aug-2024	09-Aug-2024
ALS Sample ID	ISQG	PEL	VA24C2443-036	VA24C2443-030	VA24C2443-018	VA24C2443-024	VA24C2443-006	VA24C2443-012
Physical Parameters								
Moisture (%)	-	-	82	79	81	49	82	91
Aggregate Organics (mg/kg)								
Mineral Oil and Grease	-	-	*<500*	720	*<500*	*<500*	600	1270
Hydrocarbons (mg/kg)								
EPH10-19	-	-	*<330*	*<290*	*<320*	*<200*	*<320*	*<640*
EPH19-32	-	-	*<330*	*<290*	*<320*	*<200*	*<320*	*<640*
LEPH	-	-	*<330*	*<290*	*<320*	*<200*	*<320*	*<640*
HEPH	-	-	*<330*	*<290*	*<320*	*<200*	*<320*	*<640*
Polycyclic Aromatic Hydrocarbons (mg/kg)								
Acenaphthene	0.0067	0.089	*<0.0185*	*<0.0142*	*<0.0162*	*<0.0058*	*<0.0160*	*<0.0356*
Acenaphthylene	0.0059	0.13	*<0.0185*	*<0.0142*	*<0.0162*	*<0.0058*	*<0.0160*	*<0.0356*
Acridine	-	-	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Anthracene	0.047	0.25	*<0.0185*	*<0.0142*	*<0.0162*	*<0.0058*	*<0.0160*	*<0.0356*
Benz(a)anthracene	0.032	0.39	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Benzo(a)pyrene	0.032	0.78	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Benzo(b+j)fluoranthene	-	-	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Benzo(b+j+k)fluoranthene	-	-	*<0.025*	*<0.020*	*<0.023*	*<0.015*	*<0.023*	*<0.051*
Benzo(g,h,i)perylene	-	-	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Benzo(k)fluoranthene	-	-	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Chrysene	0.057	0.86	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Dibenz(a,h)anthracene	0.0062	0.14	*<0.0185*	*<0.0142*	*<0.0162*	*<0.0058*	*<0.0160*	*<0.0356*
Fluoranthene	0.11	2.36	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Fluorene	0.021	0.144	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Indeno(1,2,3-c,d)pyrene	-	-	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Methylnaphthalene, 1-	-	-	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Methylnaphthalene, 2-	0.020	0.20	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Naphthalene	0.035	0.39	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Phenanthrene	0.042	0.52	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Pyrene	0.053	0.88	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
Quinoline	-	-	*<0.018*	*<0.014*	*<0.016*	*<0.010*	*<0.016*	*<0.036*
PAH Surrogates (%)								
Acridine-d9	-	-	90	84	87	114	86	89
Chrysene-d12	-	-	78	84	88	118	88	90
Naphthalene-d8	-	-	95	101	104	125	104	108
Phenanthrene-d10	-	-	96	97	99	125	101	104

Notes:

1. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002.

ISQG = Interim freshwater Sediment Quality Guideline; PEL = probable effect level concentration

Bolded concentrations exceed the ISQG guideline.

Italicized numbers are below detection limits.

Appendix D2
Sediment Chemistry – Whale Tail Study Area Lakes

LIST OF TABLES

Table D2-1. Sediment core chemistry results, Whale Tail study lakes, 2024. 1
Table D2-2. Sediment grab results, Whale Tail study lakes, 2024. 2
Table D2-3. Hydrocarbon and PAH results for composite sediment grabs at Whale Tail study area lakes, 2024. 5

SEDIMENT PROGRAM OVERVIEW

Below is an overview of the various sediment sampling programs at Whale Tail dating back to baseline sampling in 2015:

- **2015** – Baseline grab sampling was conducted at the NF lakes WTS, MAM, and NEM to characterize TOC, grain size, and baseline metals concentrations. A composite sample from each of the study lakes was also analyzed for hydrocarbons and PAHs. These analyses were conducted for each of the study lakes during each year of sampling to present.
- **2016** – Baseline grab sampling was expanded to include the MF lakes A20, A76, and DS1 along with the continued sampling at the NF lakes.
- **2017** – Baseline coring results in 2017 were used to established trigger concentrations in each of the Whale Tail study lakes in anticipation of future mine developments. Unlike Meadowbank in which trigger values were applied over multiple lakes in the study area, at the Whale Tail lakes sediment chemistry was too heterogeneous to apply triggers over broad spatial scales. Instead, lake specific triggers were derived.
- **2018** – NF lake WTS moved to the "Impact" category following dike construction at Whale Tail Lake which began on July 27. All other Whale Tail lakes remained in the "Control" category. Sampling conducted via grab sampling.
- **2019** – All of the NF and MF Whale Tail study lakes were characterized as "Impact". Sampling conducted via grab sampling.
- **2020** – Core sampling was conducted across the Whale Tail study lakes with results formally compared to lake specific triggers. Increases in mean concentrations of arsenic, chromium, and copper were found in some study lakes, however there was evidence that the observed concentrations may have been due to natural spatial heterogeneity. Findings were considered preliminary until further coring data is available during the 2023 coring cycle.
- **2021** – Grab sampling was conducted throughout the Whale Tail study lakes. In 2021, due to a laboratory error, some of the sediment samples were discarded prior finalizing the request for analysis. As such, results were missing for MAM, A20, and DS1.
- **2022** – Grab sampling was conducted throughout the Whale Tail study lakes. Concentrations of metals were generally similar to results from the baseline period and early operations.
- **2023** – Sediment core and grab sampling were conducted at the Whale Tail study lakes. Sediment grab samples for habitat characteristics were analyzed for moisture, total organic carbon (TOC), and grain size; composite grab samples for chemistry were analyzed for aggregate

organics, hydrocarbons, and polycyclic aromatic hydrocarbons (PAHs). Sediment core samples were analyzed for moisture, pH, and total metals.

- **2024** – Grabs were collected throughout the Whale Tail study lakes, and 25 sediment cores were collected throughout the WTS basin. The focused coring program was done in response to concern that chromium concentrations were increasing within WTS. Sediment grab samples for habitat characteristics were analyzed for moisture, TOC, and grain size; composite grab samples for chemistry were analyzed for aggregate organics, hydrocarbons, and polycyclic aromatic hydrocarbons (PAHs). Sediment core samples were analyzed for moisture, pH, and total metals.

TABLES

Table D2-1. Sediment core chemistry results, Whale Tail Lake - South Basin, 2024.

Lake & Basin	Screening Criteria				Whale Tail Lake - South Basin (WTS)									
Area-Replicate ID	CCME[1]		Thresholds[3] (All Lakes)	WTS Triggers	WTS-SC-1	WTS-SC-2	WTS-SC-3	WTS-SC-4	WTS-SC-5	WTS-SC-6	WTS-SC-7	WTS-SC-8	WTS-SC-9	WTS-SC-10
Date					15-Aug-2024	15-Aug-2024	15-Aug-2024	15-Aug-2024	15-Aug-2024	15-Aug-2024	15-Aug-2024	15-Aug-2024	17-Aug-2024	17-Aug-2024
Time					00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
ALS Sample ID	ISQG	PEL			VA24C2443-081	VA24C2443-082	VA24C2443-083	VA24C2443-084	VA24C2443-085	VA24C2443-086	VA24C2443-087	VA24C2443-088	VA24C2443-089	VA24C2443-090
Physical Tests														
Moisture (%)					83	82	83	87	85	80	83	81	89	87
pH					6.0	5.5	5.3	6.3	6.2	6.0	5.5	5.3	6.2	5.5
Total Metals (mg/kg dw)														
Aluminum					19100	15600	14300	18300	17800	16400	17400	17100	18400	18100
Antimony					0.56	0.42	0.52	0.44	0.54	0.43	0.32	0.33	0.41	0.50
Arsenic*	5.9	17	5.9	83.1	38	**442**	**455**	17	25	**155**	**234**	**236**	14	26
Barium					124	117	116	125	130	114	108	132	122	114
Beryllium					1.5	1.2	1.2	1.3	1.2	1.4	1.5	1.4	1.4	1.3
Bismuth					0.59	0.51	0.48	0.49	0.48	0.54	0.59	0.57	0.52	0.55
Boron					9.4	8.1	6.8	9.4	9.1	5.9	6.8	7.4	11	9.4
Cadmium*	0.60	3.5	0.60	0.93	0.19	0.27	0.29	0.30	0.30	0.25	0.20	0.36	0.45	0.36
Calcium					3760	4170	3290	4180	4860	3280	2820	2930	4220	3910
Chromium*	37	90	37	80.6	**100**	74	80	**97**	**110**	**83**	79	**81**	**85**	**99**
Cobalt					12	15	18	9.6	12	18	15	17	9.7	11
Copper*	36	197	36	48.5	42	36	35	40	38	38	41	41	40	39
Iron					41600	168000	156000	24100	26600	91600	121000	108000	21900	30300
Lead	35	91	35	24.0	16	13	13	13	13	14	13	14	15	15
Lithium					19	14	14	21	20	15	15	16	20	17
Magnesium					8120	6460	6530	8260	8530	6880	6860	6870	7640	8120
Manganese					825	1870	2000	452	832	2360	1300	1980	288	397
Mercury	0.17	0.49	0.17	0.123	0.073	0.069	0.069	0.062	0.065	0.057	0.052	0.062	0.082	0.10
Molybdenum					4.7	6.8	6.3	2.3	3.0	5.5	7.0	5.8	2.3	3.6
Nickel					68	63	68	69	72	68	69	82	71	73
Phosphorus					875	3500	2990	660	692	977	1950	1950	644	771
Potassium					2540	2080	1880	2440	2360	2020	2250	2260	2550	2540
Selenium					0.58	0.72	0.65	0.48	0.42	0.57	0.77	0.77	0.56	0.56
Silver					0.30	0.25	0.22	0.32	0.31	0.20	0.24	0.26	0.35	0.34
Sodium					186	152	134	177	178	130	145	155	193	187
Strontium					39	42	39	37	40	36	31	34	40	39
Sulfur					1100	*<1000*	1400	1700	1700	*<1000*	*<1000*	1200	2200	2600
Thallium					0.20	0.17	0.17	0.18	0.18	0.17	0.19	0.22	0.19	0.19
Tin					*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*
Titanium					424	358	333	406	362	315	375	368	403	426
Tungsten					*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Uranium					12	9.9	9.1	11	10	11	12	12	12	11
Vanadium					30	23	23	26	27	25	27	26	26	28
Zinc*	123	315	123	196	94	80	81	81	77	84	94	97	91	96
Zirconium					1.6	2.1	1.7	2.6	2.7	1.8	1.8	2.2	3	2.6

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002.
   ISQG = interim sediment quality guideline; PEL = probable effect level
2. Trigger and threshold values for Whale Tail lakes were developed for the 2019 CREMP, using baseline data collected in 2017 (Azimuth, 2020).
3. Thresholds are set equal to CCME ISQG guidelines, where available.

* CCME guideline not used as threshold value because threshold value would be lower than trigger value.

123 Bolded concentrations exceed the lake specific trigger.

123 Bolded and shaded concentrations also exceed the threshold if threshold is greater than lake specific trigger.

Italicized numbers are below detection limits.

Table D2-1. Sediment core chemistry results, Whale Tail Lake - South Basin, 2024.

Lake & Basin	Screening Criteria			Whale Tail Lake - South Basin (WTS)														
Area-Replicate ID	CCME[1]		Thresholds[3]	WTS-SC-11	WTS-SC-12	WTS-SC-13	WTS-SC-14	WTS-SC-15	WTS-SC-16	WTS-SC-17	WTS-SC-18	WTS-SC-19	WTS-SC-20	WTS-SC-21	WTS-SC-22	WTS-SC-23	WTS-SC-24	WTS-SC-25
Date				17-Aug-2024	17-Aug-2024	17-Aug-2024	17-Aug-2024	17-Aug-2024	17-Aug-2024	17-Aug-2024	17-Aug-2024	17-Aug-2024	17-Aug-2024	18-Aug-2024	18-Aug-2024	18-Aug-2024	18-Aug-2024	18-Aug-2024
Time			(All Lakes)	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00	00:00
ALS Sample ID	ISQG	PEL		VA24C2443-091	VA24C2443-092	VA24C2443-093	VA24C2443-094	VA24C2443-095	VA24C2443-096	VA24C2443-097	VA24C2443-098	VA24C2443-099	VA24C2443-100	VA24C2443-101	VA24C2443-102	VA24C2443-103	VA24C2443-104	VA24C2443-105
Physical Tests																		
Moisture (%)				87	78	78	83	81	83	76	83	81	87	78	50	47	79	83
pH				4.9	5.4	5.9	5.5	5.9	5.7	5.9	5.5	5.3	5.7	6.4	6.1	6.3	5.5	5.6
Total Metals (mg/kg dw)																		
Aluminum				18400	17300	15500	18300	18800	18200	21700	15600	19500	14100	16200	7640	8800	18900	17000
Antimony				0.66	0.44	0.39	0.30	0.42	0.39	0.26	0.46	0.24	0.51	0.53	0.19	0.18	0.38	0.41
Arsenic*	5.9	17	5.9	44	**236**	55	60	**84**	81	**107**	**208**	58	**474**	26	15	37	**113**	**156**
Barium				93	121	84	164	117	102	113	154	91	192	103	36	42	102	110
Beryllium				1.5	1.5	1.2	1.3	1.6	1.6	1.7	1.3	1.8	1.2	1.1	0.51	0.74	1.6	1.5
Bismuth				0.57	0.58	0.49	0.62	0.58	0.60	0.73	0.49	0.62	0.47	0.44	*<0.20*	0.23	0.63	0.59
Boron				9.1	6.4	5.7	6.6	6.3	7.1	6.7	6.4	6.6	5.6	7.2	*<5.0*	*<5.0*	6.4	5.5
Cadmium*	0.60	3.5	0.60	0.30	0.27	0.14	0.25	0.20	0.15	0.070	0.29	0.18	0.34	0.15	0.086	0.21	0.19	0.19
Calcium				3300	3160	3540	2820	3970	3070	2600	3110	2560	3210	4380	1600	1450	3480	3230
Chromium*	37	90	37	**113**	**82**	74	80	**102**	**88**	**83**	**81**	78	**81**	**100**	45	41	**89**	**87**
Cobalt				14	21	13	35	16	17	11	24	18	19	11	9.3	13	15	16
Copper*	36	197	36	40	40	34	41	41	41	49	36	45	36	30	12	17	42	39
Iron				44600	127000	48400	69700	65300	71300	64400	123000	51200	172000	28900	18000	31000	74800	90000
Lead	35	91	35	15	14	12	14	14	14	16	12	14	12	13	6.4	7.8	15	14
Lithium				17	16	15	17	18	17	21	14	18	12	17	9.2	8.9	18	16
Magnesium				8260	7080	6700	7220	8080	7440	8460	6660	7070	6180	7620	3940	3750	7330	6950
Manganese				430	1940	953	4760	2090	1690	625	3240	443	5140	619	880	1760	1090	1400
Mercury	0.17	0.49	0.17	0.066	0.055	0.040	0.061	0.052	0.049	0.033	0.054	0.032	0.069	0.049	0.015	0.016	0.048	0.051
Molybdenum				4.9	5.9	3.6	3.8	5.2	4.9	6.2	4.8	5.4	7.2	2.9	1.3	2.2	5.2	5.2
Nickel				85	80	53	88	70	60	63	93	65	90	66	29	45	61	61
Phosphorus				814	1370	652	854	1340	957	1080	1540	1030	2380	647	228	374	1430	1570
Potassium				2420	2140	1920	2380	2380	2410	3100	2100	2480	1790	2210	920	970	2410	2170
Selenium				0.55	0.66	0.40	0.61	0.59	0.60	0.38	0.60	0.48	0.75	0.37	*<0.20*	0.26	0.68	0.89
Silver				0.29	0.21	0.19	0.27	0.19	0.17	0.15	0.19	0.14	0.22	0.19	*<0.10*	*<0.10*	0.20	0.24
Sodium				177	143	124	156	150	148	155	137	144	130	149	53	*<50*	200	154
Strontium				34	36	33	32	35	33	32	34	31	38	38	20	18	35	34
Sulfur				3000	1200	*<1000*	*<1000*	*<1000*	1000	*<1000*	*<1000*	*<1000*	1100	*<1000*	*<1000*	*<1000*	1300	1200
Thallium				0.21	0.18	0.15	0.25	0.20	0.18	0.19	0.22	0.21	0.20	0.17	0.098	0.11	0.21	0.18
Tin				*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*	*<2.0*
Titanium				452	361	396	384	384	425	593	404	505	283	455	463	368	420	346
Tungsten				*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*	*<0.50*
Uranium				13	12	9.8	12	12	12	20	9.8	14	9.4	8.6	3.9	6.5	13	12
Vanadium				29	27	25	27	29	28	34	25	29	22	26	13	14	28	26
Zinc*	123	315	123	105	100	78	89	91	88	94	92	96	89	78	35	45	95	91
Zirconium				3.4	2	1.4	1.4	2	1.4	4.1	1.4	2	2.3	2.2	1.2	1.1	1.9	3.3

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002.
ISQG = interim sediment quality guideline; PEL = probable effect level
2. Trigger and threshold values for Whale Tail lakes were developed for the 2019 CREMP, using baseline data collected in 2017 (Azimuth, 2020).
3. Thresholds are set equal to CCME ISQG guidelines, where available.
* CCME guideline not used as threshold value because threshold value would be lower than trigger value.

123 Bolded concentrations exceed the lake specific trigger.

123 Bolded and shaded concentrations also exceed the threshold if threshold is greater than lake specific trigger.

Italicized numbers are below detection limits.

Table D2-2. Sediment grab results, Whale Tail study lakes, 2024.

Lake & Basin	Lake A20 (Impoundment)					Whale Tail Lake - South Basin (WTS)				
Area-Replicate ID	**A20-1**	**A20-2**	**A20-3**	**A20-4**	**A20-5**	**WTS-1**	**WTS-2**	**WTS-3**	**WTS-4**	**WTS-5**
Date	18-Aug-2024	18-Aug-2024	18-Aug-2024	18-Aug-2024	18-Aug-2024	15-Aug-2024	15-Aug-2024	15-Aug-2024	15-Aug-2024	15-Aug-2024
ALS Sample ID	VA24C2443-055	VA24C2443-056	VA24C2443-057	VA24C2443-058	VA24C2443-059	VA24C2443-043	VA24C2443-044	VA24C2443-045	VA24C2443-046	VA24C2443-047
Physical Tests										
Moisture (%)	85	85	89	83	86	83	72	84	83	79
pH	5.3	5.4	5.8	5.9	5.1	5.8	5.7	5.5	5.5	5.5
Particle Size (%)										
clay (<0.004mm)	30	24	26	29	30	17	14	16	16	18
silt (0.063mm - 0.004mm)	69	76	74	71	70	81	79	83	83	81
sand (2.0mm - 0.063mm)	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	2.3	6.9	1.4	1.1	1.9
gravel (>2mm)	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Organic Carbon										
TOC (% dw)	4.0	4.3	6.6	4.5	4.2	4.1	3.7	4.4	5.0	4.1
Total Metals (mg/kg dw)										
Mercury	0.038	0.040	0.048	0.036	0.041	0.041	0.039	0.053	0.060	0.046

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002.

* Previously referred to as Mammoth Lake (MAM).

Table D2-2. Sediment grab results, Whale Tail study lakes, 2024.

Lake & Basin	Kangislulik Lake (KAN)*					Lake A76				
Area-Replicate ID	MAM-1	MAM-2	MAM-3	MAM-4	MAM-5	A76-1	A76-2	A76-3	A76-4	A76-5
Date	18-Aug-2024	18-Aug-2024	18-Aug-2024	18-Aug-2024	18-Aug-2024	13-Aug-2024	13-Aug-2024	13-Aug-2024	13-Aug-2024	13-Aug-2024
ALS Sample ID	VA24C2443-049	VA24C2443-050	VA24C2443-051	VA24C2443-052	VA24C2443-053	VA24C2443-061	VA24C2443-062	VA24C2443-063	VA24C2443-064	VA24C2443-065
Physical Tests										
Moisture (%)	90	91	89	82	88	91	87	83	92	88
pH	5.9	5.8	6.0	6.1	6.0	5.8	5.2	5.2	5.7	5.7
Particle Size (%)										
clay (<0.004mm)	18	15	15	10	17	22	23	20	21	18
silt (0.063mm - 0.004mm)	82	85	84	53	80	78	77	80	79	82
sand (2.0mm - 0.063mm)	*<1.0*	*<1.0*	*<1.0*	37	3.6	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
gravel (>2mm)	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Organic Carbon										
TOC (% dw)	11	9.1	9.2	5.7	9.1	9.7	5.2	5.4	11	6.6
Total Metals (mg/kg dw)										
Mercury	0.083	0.070	0.069	0.051	0.088	-	-	-	-	-

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002.

* Previously referred to as Mammoth Lake (MAM).

Table D2-2. Sediment grab results, Whale Tail study lakes, 2024.

Lake & Basin	Lake DS1					Nemo Lake (NEM)				
Area-Replicate ID	**DS1-1**	**DS1-2**	**DS1-3**	**DS1-4**	**DS1-5**	**NEM-1**	**NEM-2**	**NEM-3**	**NEM-4**	**NEM-5**
Date	16-Aug-2024	16-Aug-2024	16-Aug-2024	16-Aug-2024	16-Aug-2024	16-Aug-2024	16-Aug-2024	16-Aug-2024	16-Aug-2024	16-Aug-2024
ALS Sample ID	VA24C2443-067	VA24C2443-068	VA24C2443-069	VA24C2443-070	VA24C2443-071	VA24C2443-037	VA24C2443-038	VA24C2443-039	VA24C2443-040	VA24C2443-041
Physical Tests										
Moisture (%)	71	66	74	74	63	89	78	85	77	88
pH	6.4	6.5	6.5	6.3	6.1	6.2	6.1	6.1	6.3	6.2
Particle Size (%)										
clay (<0.004mm)	16	15	14	16	18	8.9	4.7	9.6	8.0	8.5
silt (0.063mm - 0.004mm)	84	85	85	84	80	79	53	79	70	71
sand (2.0mm - 0.063mm)	*<1.0*	*<1.0*	*<1.0*	*<1.0*	1.4	13	42	12	22	21
gravel (>2mm)	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*	*<1.0*
Organic Carbon										
TOC (% dw)	2.5	1.7	2.3	2.6	1.5	8.4	5.0	8.4	7.3	7.2
Total Metals (mg/kg dw)										
Mercury	-	-	-	-	-	-	-	-	-	-

Notes:

1. CCME (Canadian Council of Ministers of the Environment) Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002.

* Previously referred to as Mammoth Lake (MAM).

Table D2-3. Hydrocarbon and PAH results for composite sediment grabs at Whale Tail study area lakes, 2024.

Area-Replicate ID	CCME Sediment Quality Guidelines[1]		Lowest Detection Limit	A20-COMP	WTS-COMP	MAM-COMP	A76-COMP	DS1-COMP	NEM-COMP
Date				18-Aug-2024	15-Aug-2024	18-Aug-2024	13-Aug-2024	16-Aug-2024	16-Aug-2024
Time	ISQG	PEL		00:00	00:00	00:00	00:00	00:00	00:00
ALS Sample ID				VA24C2443-060	VA24C2443-048	VA24C2443-054	VA24C2443-066	VA24C2443-072	VA24C2443-042
Physical Parameters									
Moisture (%)	-	-	0.25	88	83	90	89	72	90
Aggregate Organics (mg/kg)									
Mineral Oil and Grease	-	-	500	*<500*	*<500*	*<500*	*<500*	*<500*	*<500*
Hydrocarbons (mg/kg)									
EPH10-19	-	-	200	*<530*	*<360*	*<600*	*<540*	*<210*	*<570*
EPH19-32	-	-	200	*<530*	*<360*	*<600*	*<540*	*<210*	*<570*
LEPH	-	-	200	*<530*	*<360*	*<600*	*<540*	*<210*	*<570*
HEPH	-	-	200	*<530*	*<360*	*<600*	*<540*	*<210*	*<570*
Polycyclic Aromatic Hydrocarbons (mg/kg)									
Acenaphthene	0.0067	0.089	0.005	*<0.0246*	*<0.0180*	*<0.0301*	*<0.0271*	*<0.0104*	*<0.0286*
Acenaphthylene	0.0059	0.13	0.005	*<0.0246*	*<0.0180*	*<0.0301*	*<0.0271*	*<0.0104*	*<0.0286*
Acridine	-	-	0.010	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Anthracene	0.047	0.25	0.004	*<0.0246*	*<0.0180*	*<0.0301*	*<0.0271*	*<0.0104*	*<0.0286*
Benz(a)anthracene	0.032	0.39	0.01	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Benzo(a)pyrene	0.032	0.78	0.01	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Benzo(b+j)fluoranthene	-	-	0.010	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Benzo(b+j+k)fluoranthene	-	-	0.015	*<0.035*	*<0.025*	*<0.042*	*<0.038*	*<0.015*	*<0.041*
Benzo(g,h,i)perylene	-	-	0.010	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Benzo(k)fluoranthene	-	-	0.010	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Chrysene	0.057	0.86	0.01	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Dibenz(a,h)anthracene	0.0062	0.14	0.005	*<0.0246*	*<0.0180*	*<0.0301*	*<0.0271*	*<0.0104*	*<0.0286*
Fluoranthene	0.11	2.36	0.01	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Fluorene	0.021	0.144	0.01	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Indeno(1,2,3-c,d)pyrene	-	-	0.010	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Methylnaphthalene, 1-	-	-	0.010	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Methylnaphthalene, 2-	0.020	0.20	0.01	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Naphthalene	0.035	0.39	0.01	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Phenanthrene	0.042	0.52	0.01	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Pyrene	0.053	0.88	0.01	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
Quinoline	-	-	0.010	*<0.025*	*<0.018*	*<0.030*	*<0.027*	*<0.010*	*<0.029*
PAH Surrogates (%)									
Acridine-d9	-	-	0.010	90	92	119	90	96	93
Chrysene-d12	-	-	0.010	79	84	124	80	79	82
Naphthalene-d8	-	-	0.010	97	101	129	97	99	99
Phenanthrene-d10	-	-	0.010	96	110	129	107	108	108

Notes:

1. Canadian Sediment Quality Guidelines for the Protection of Aquatic Life, 1999, updated in 2002.
   ISQG = Interim freshwater Sediment Quality Guideline; PEL = probably effect level concentration

Bolded concentrations exceed the ISQG guideline.

Italicized numbers are below detection limits.

APPENDIX E
PHYTOPLANKTON TAXONOMY DATA AND SUPPLEMENTAL PLOTS

Appendix E1
Phyto Data – Meadowbank Study Area Lakes

LIST OF TABLES – APPENDIX E1

Table E1-1. Phytoplankton density (cells/L), biomass (mg/m^3), and diversity by major taxa group, Meadowbank study lakes, 2024. 1

LIST OF FIGURES – APPENDIX E1

Figure E1-1. Cyanophyte biomass (mg/m^3) from Meadowbank study area lakes since 2006..... 2
Figure E1-2. Chlorophyte biomass (mg/m^3) from Meadowbank study area lakes since 2006..... 3
Figure E1-3. Chrysophyte biomass (mg/m^3) from Meadowbank study area lakes since 2006. 4
Figure E1-4. Diatom biomass (mg/m^3) from Meadowbank study area lakes since 2006. 5
Figure E1-5. Cryptophyte biomass (mg/m^3) from Meadowbank study area lakes since 2006..... 6
Figure E1-6. Dinoflagellate biomass (mg/m^3) from Meadowbank study area lakes since 2006. 7
Figure E1-7. Phytoplankton density (cells/L) by major taxa group from Meadowbank study area lakes since 2006. 8
Figure E1-8. Relative phytoplankton density by major taxa group from Meadowbank study area lakes since 2006. 9
Figure E1-9. Cyanophyte density (cells/L) from Meadowbank study area lakes since 2006..... 10
Figure E1-10. Chlorophyte density (cells/L) from Meadowbank study area lakes since 2006. 11
Figure E1-11. Chrysophyte density (cells/L) from Meadowbank study area lakes since 2006..... 12
Figure E1-12. Diatoms density (cells/L) from Meadowbank study area lakes since 2006..... 13
Figure E1-13. Cryptophytes density (cells/L) from Meadowbank study area lakes since 2006. 14
Figure E1-14. Dinoflagellates density (cells/L) from Meadowbank study area lakes since 2006. 15
Figure E1-15. Simpsons' Diversity for the phytoplankton community from Meadowbank study area lakes since 2006. 16

Table E1-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Meadowbank study lakes, 2024.

Area-Replicate	Date	Phytoplankton Biomass (mg/m^3)								Taxa Richness	Simpson's Diversity	Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Euglenophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL			Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
Inuggugayualik Lake																		
INUG - 160	12-Jul-24	0.71	2.2	0	164	11	16	18	212	33	0.81	3,200	21,752	1,965,280	117,360	9,000	2,600	2,119,192
INUG - 161	12-Jul-24	2.7	2.2	0	190	10	15	16	235	35	0.87	25,752	15,168	1,599,896	155,680	8,200	2,200	1,806,896
INUG - 162	10-Aug-24	8.4	17	0	136	24	0.87	1.1	187	33	0.87	63,920	711,216	1,985,584	221,320	21,552	200	3,003,792
INUG - 163	10-Aug-24	10	15	0	138	18	0.71	4.5	187	32	0.88	51,736	532,816	1,957,648	246,256	400	800	2,789,656
INUG - 164	17-Sep-24	14	22	0	127	21	4.7	1.8	190	36	0.92	77,504	619,024	1,330,640	261,640	29,336	400	2,318,544
INUG - 165	17-Sep-24	9.2	18	0	150	25	2.0	5.2	210	41	0.93	51,952	483,328	1,403,080	222,320	7,784	1,000	2,169,464
Percent Biomass or Density		***3.7***	***6.3***	***<0.1***	***74***	***9.0***	***3.2***	***3.8***				***1.9***	***17***	***72***	***8.6***	***0.54***	***<0.1***	
Pipedream Lake																		
PDL - 125	12-Jul-24	0.32	0.58	0	100	19	16	19	155	25	0.82	1,800	115,144	1,501,672	218,552	88,608	2,800	1,928,576
PDL - 126	12-Jul-24	0.51	0.51	0	141	19	17	37	215	25	0.84	3,000	79,424	1,377,560	181,464	56,288	6,400	1,704,136
PDL - 127	11-Aug-24	0.58	16	0	88	3.6	0	5.9	114	27	0.79	3,400	316,296	1,122,304	75,240	0	1,000	1,518,240
PDL - 128	11-Aug-24	0.51	9.3	0	87	17	1.4	4.8	120	31	0.89	3,000	318,296	827,360	269,008	800	800	1,419,264
PDL - 129	6-Sep-24	1.4	4.2	0	40	6.8	6.2	2.9	62	28	0.87	7,400	223,304	489,312	210,936	30,936	600	962,488
PDL - 130	6-Sep-24	2.8	11	0	56	13	4.6	2.9	90	28	0.89	14,800	740,352	546,384	182,800	23,152	600	1,508,088
Percent Biomass or Density		***0.80***	***5.4***	***<0.1***	***68***	***10***	***6.0***	***9.6***				***0.37***	***20***	***65***	***13***	***2.2***	***0.13***	
Third Portage Lake - East Basin																		
TPE - 172	2-Jul-24	0	0.45	0	90	14	2.7	89	196	24	0.63	0	14,968	1,099,168	143,696	8,184	12,784	1,278,800
TPE - 173	2-Jul-24	0	0.96	0	77	9.8	4.5	24	116	26	0.76	0	144,280	1,126,104	88,824	29,136	10,584	1,398,928
TPE - 174	12-Aug-24	0.17	5.5	0	51	3.1	2.2	2.9	65	21	0.63	1,000	991,592	440,040	95,992	1,200	400	1,530,224
TPE - 175	12-Aug-24	1.3	7.1	0	55	5.0	1.2	11	81	22	0.63	115,744	991,592	264,040	109,360	600	1,800	1,483,136
TPE - 176	5-Sep-24	0.27	5.1	0	219	2.4	2.8	5.9	235	25	0.87	1,200	316,696	1,284,184	102,376	1,600	600	1,706,656
TPE - 177	5-Sep-24	0.29	5.3	0	137	6.8	8.7	5.2	163	24	0.87	1,200	424,456	785,688	403,504	32,336	400	1,647,584
Percent Biomass or Density		***0.23***	***2.9***	***<0.1***	***73***	***4.9***	***2.6***	***16***				***1.3***	***32***	***55***	***10***	***0.81***	***0.29***	
Third Portage Lake - North Basin																		
TPN - 172	9-Jul-24	0	0.44	0	57	53	5.2	33	149	23	0.83	0	29,536	764,104	380,768	2,800	4,400	1,181,608
TPN - 173	9-Jul-24	0	0.55	0	78	22	6.0	27	133	24	0.79	0	22,752	1,354,392	202,368	9,984	11,184	1,600,680
TPN - 174	9-Aug-24	0.031	2.2	0	71	14	1.1	4.4	92	28	0.90	200	136,696	489,712	183,200	600	800	811,208
TPN - 175	9-Aug-24	0.28	0.76	0	66	16	2.0	3.3	88	21	0.87	1,400	179,600	577,120	209,736	7,784	600	976,240
TPN - 176	5-Sep-24	0.048	8.7	0	48	3.8	4.5	33	99	24	0.89	200	575,920	361,800	109,360	23,152	400	1,070,832
TPN - 177	5-Sep-24	0	7.7	0	62	4.4	9.0	33	116	26	0.88	0	446,008	464,976	46,104	59,872	400	1,017,360
Percent Biomass or Density		***<0.1***	***3.0***	***<0.1***	***56***	***17***	***4.1***	***20***				***<0.1***	***21***	***60***	***17***	***1.6***	***0.27***	
Second Portage Lake																		
SP - 172	3-Jul-24	0	0.076	0	138	5.7	25	11	180	27	0.79	0	200	1,751,712	70,472	134,312	2,000	1,958,696
SP - 173	3-Jul-24	0	0.38	0	136	11	20	97	264	28	0.77	0	14,368	1,721,576	95,008	91,208	3,200	1,925,360
SP - 174	14-Aug-24	0.24	9.3	0	64	16	4.5	1.8	96	26	0.60	600	1,652,720	697,248	141,096	22,552	200	2,514,416
SP - 175	14-Aug-24	0	7.8	0	38	11	1.6	0	59	19	0.75	0	855,096	438,624	184,200	7,584	0	1,485,504
SP - 176	8-Sep-24	0	4.8	0	57	18	7.5	2.2	89	27	0.89	0	359,400	956,072	340,648	24,752	600	1,681,472
SP - 177	8-Sep-24	0	2.0	0	37	27	17	5.6	89	24	0.82	0	280,576	604,056	343,048	50,704	800	1,279,184
Percent Biomass or Density		***<0.1***	***3.1***	***<0.1***	***60***	***12***	***9.8***	***15***				***<0.1***	***29***	***57***	***11***	***3.1***	***<0.1***	
Wally Lake																		
WAL - 141	3-Jul-24	0	2.0	0	133	8.9	21	16	181	28	0.83	0	79,024	1,539,208	87,440	92,008	2,600	1,800,280
WAL - 142	3-Jul-24	0	1.1	0	194	8.9	22	12	238	31	0.75	0	29,136	2,264,592	55,904	138,896	2,400	2,490,928
WAL - 143	9-Aug-24	0	13	0	28	21	4.5	2.2	69	23	0.86	0	784,056	581,904	158,064	22,552	400	1,546,976
WAL - 144	9-Aug-24	0	9.2	0	23	13	1.6	1.1	48	17	0.87	0	625,008	517,248	126,528	7,584	200	1,276,568
WAL - 145	5-Sep-24	0.40	5.9	0	38	15	6.6	13	79	22	0.89	7,184	302,328	337,648	176,816	24,352	1,400	849,728
WAL - 146	5-Sep-24	0	6.6	0	57	10	9.3	4.5	87	23	0.85	0	266,408	625,008	17,568	32,736	200	941,920
Percent Biomass or Density		***<0.1***	***5.4***	***<0.1***	***67***	***11***	***9.3***	***6.9***				***<0.1***	***23***	***66***	***7.0***	***3.6***	***<0.1***	
All Locations		***1.1***	***4.5***	***<0.1***	***68***	***10***	***5.5***	***11***				***0.74***	***23***	***63***	***11***	***1.9***	***0.13***	

Figure E1-1. Cyanophyte biomass (mg/m^3) from Meadowbank study area lakes since 2006.

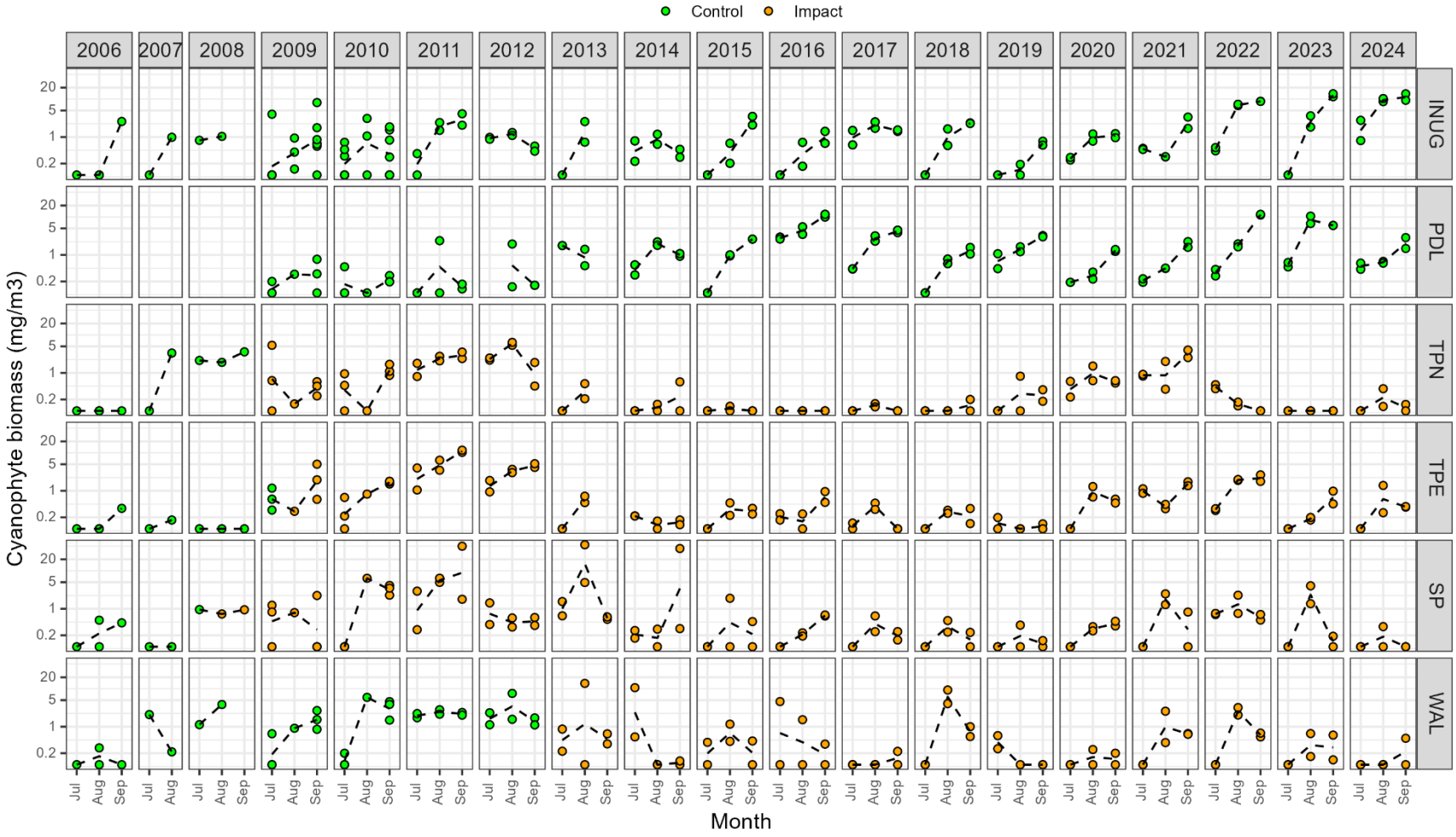


Figure E1-2. Chlorophyte biomass (mg/m^3) from Meadowbank study area lakes since 2006.

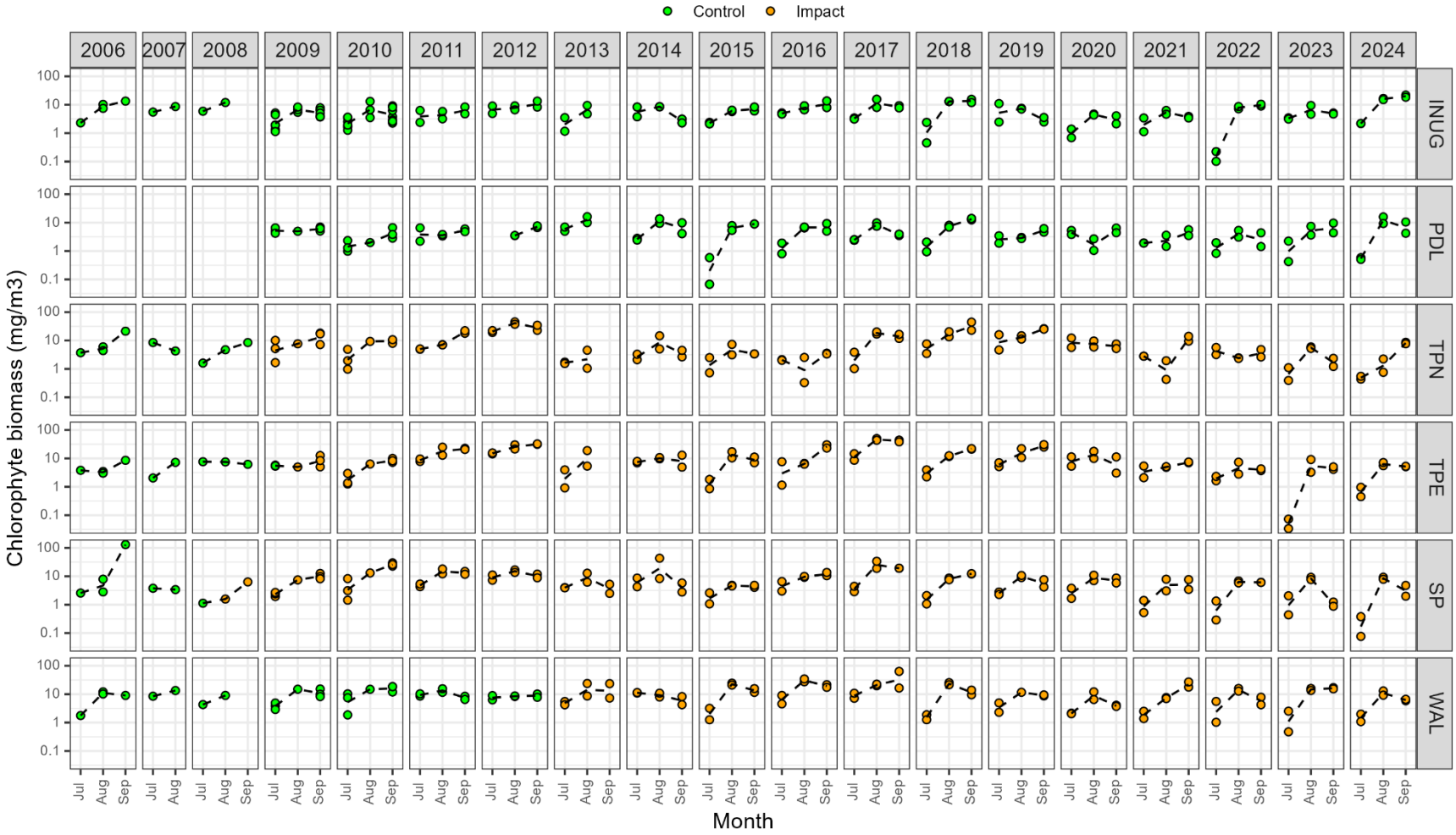


Figure E1-3. Chrysophyte biomass (mg/m^3) from Meadowbank study area lakes since 2006.

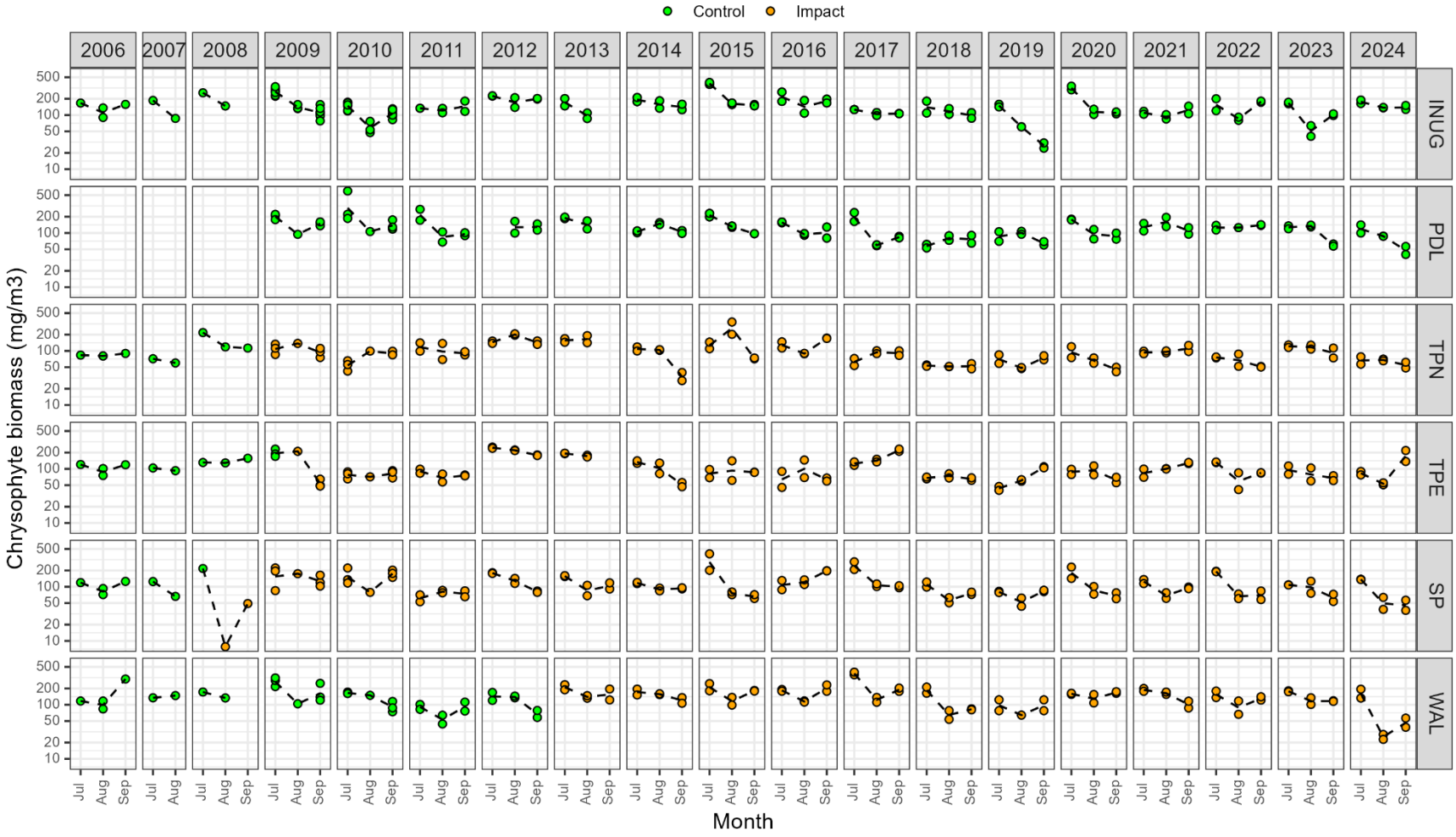


Figure E1-4. Diatom biomass (mg/m^3) from Meadowbank study area lakes since 2006.

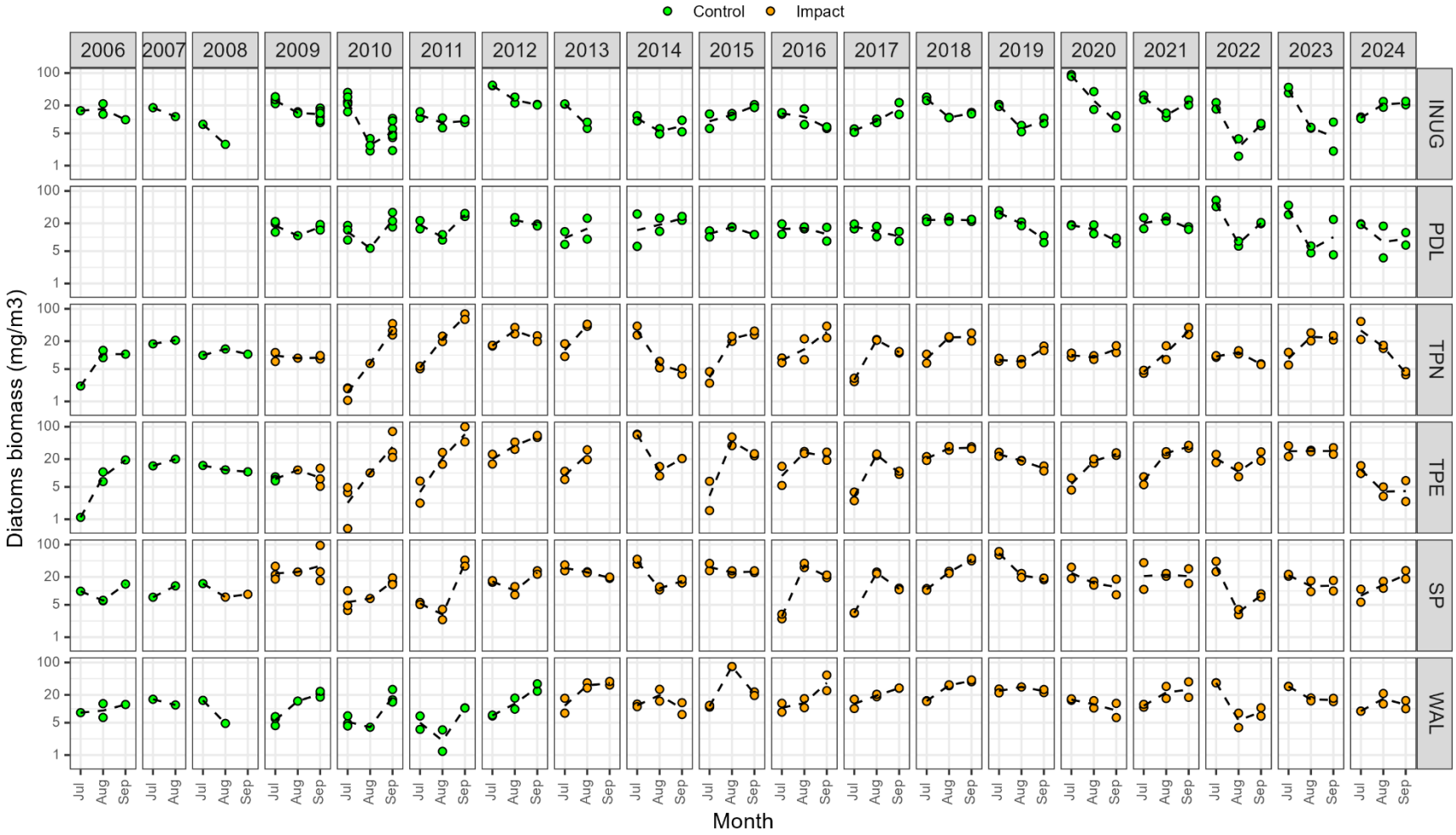


Figure E1-5. Cryptophyte biomass (mg/m^3) from Meadowbank study area lakes since 2006.

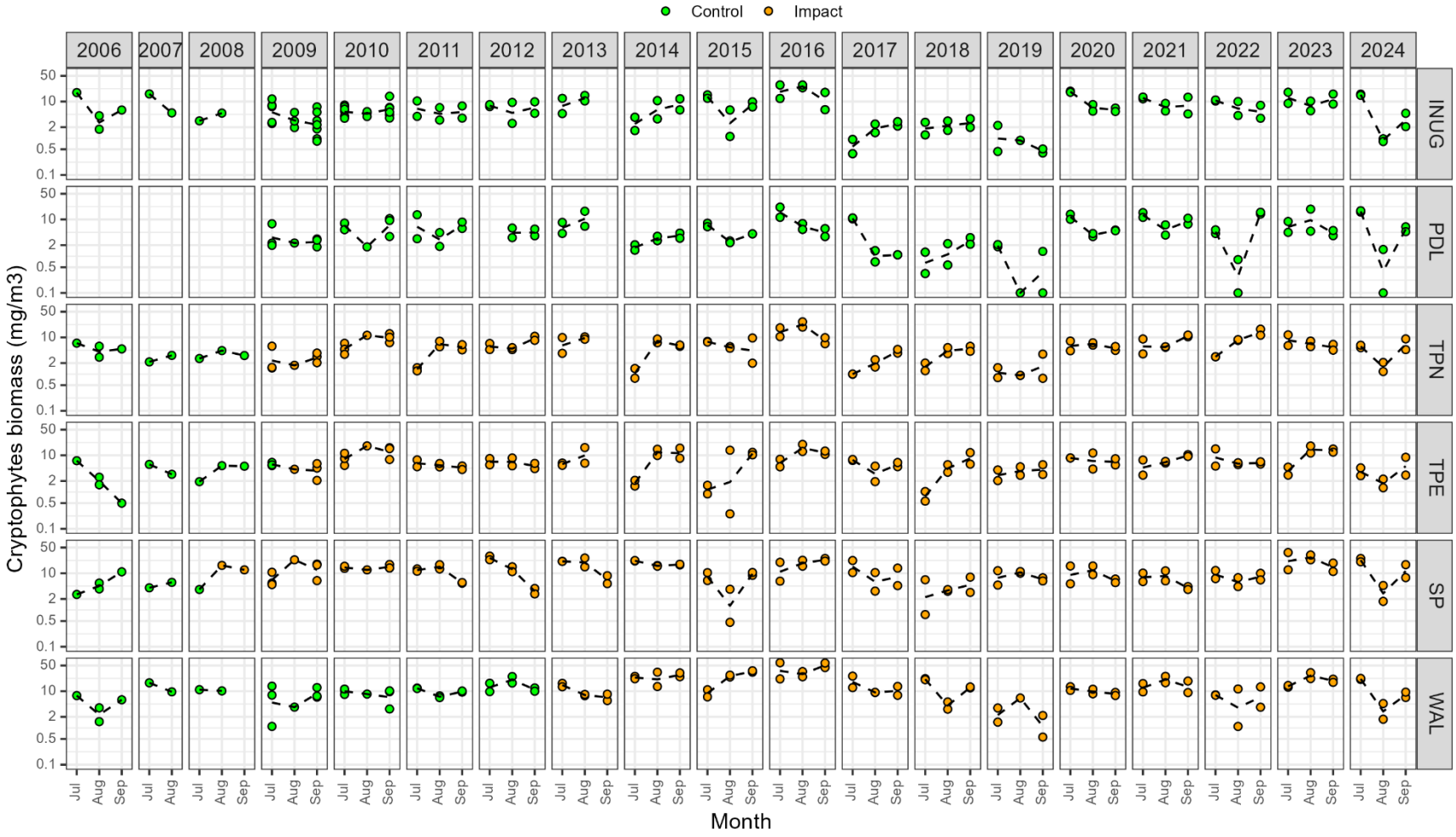


Figure E1-6. Dinoflagellate biomass (mg/m^3) from Meadowbank study area lakes since 2006.

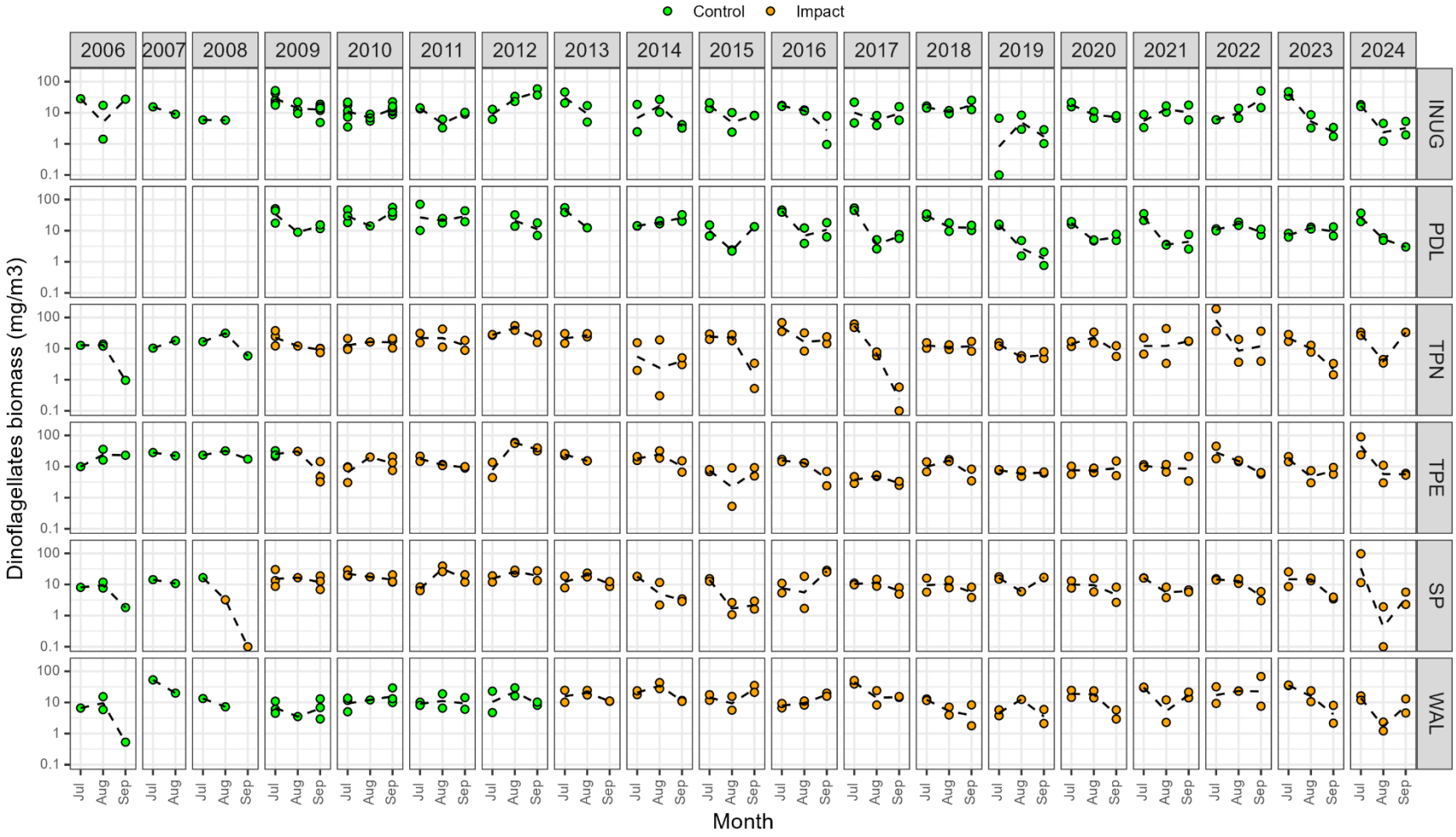


Figure E1-7. Phytoplankton density (cells/L) by major taxa group from Meadowbank study area lakes since 2006.

Note: High chlorophyll value in December 2011 at TPE omitted.

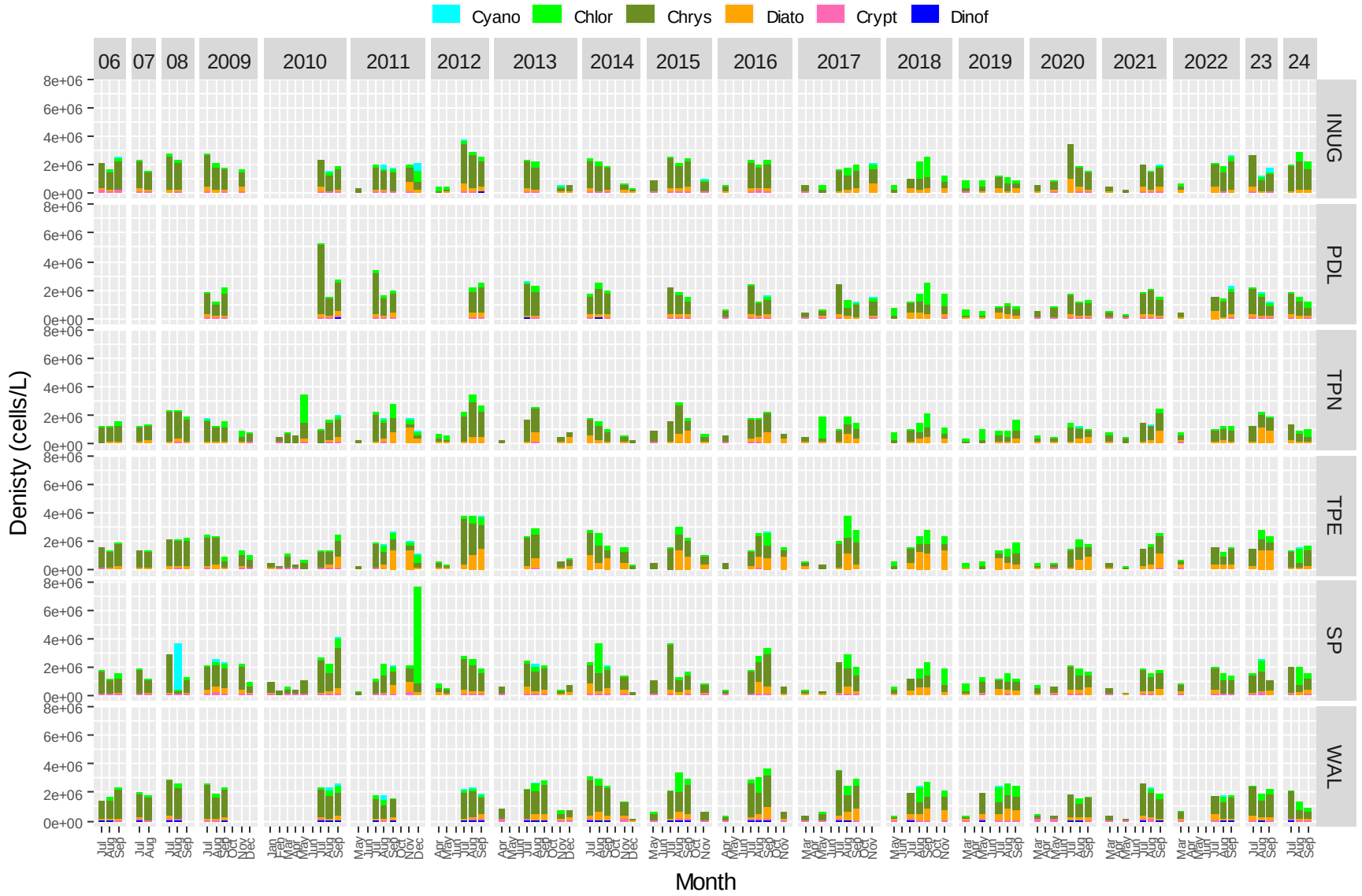


Figure E1-8. Relative phytoplankton density by major taxa group from Meadowbank study area lakes since 2006.

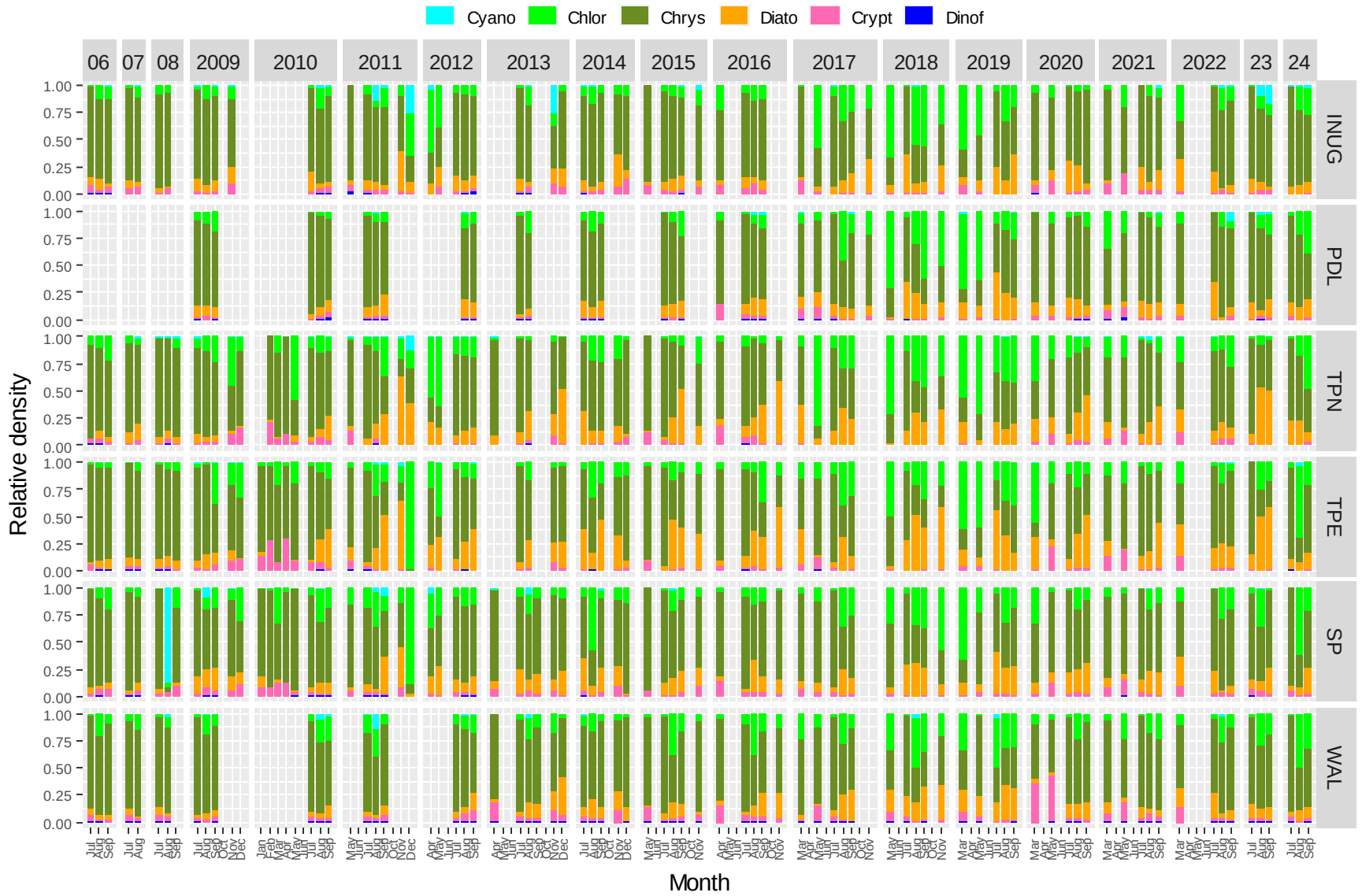


Figure E1-9. Cyanophyte density (cells/L) from Meadowbank study area lakes since 2006.

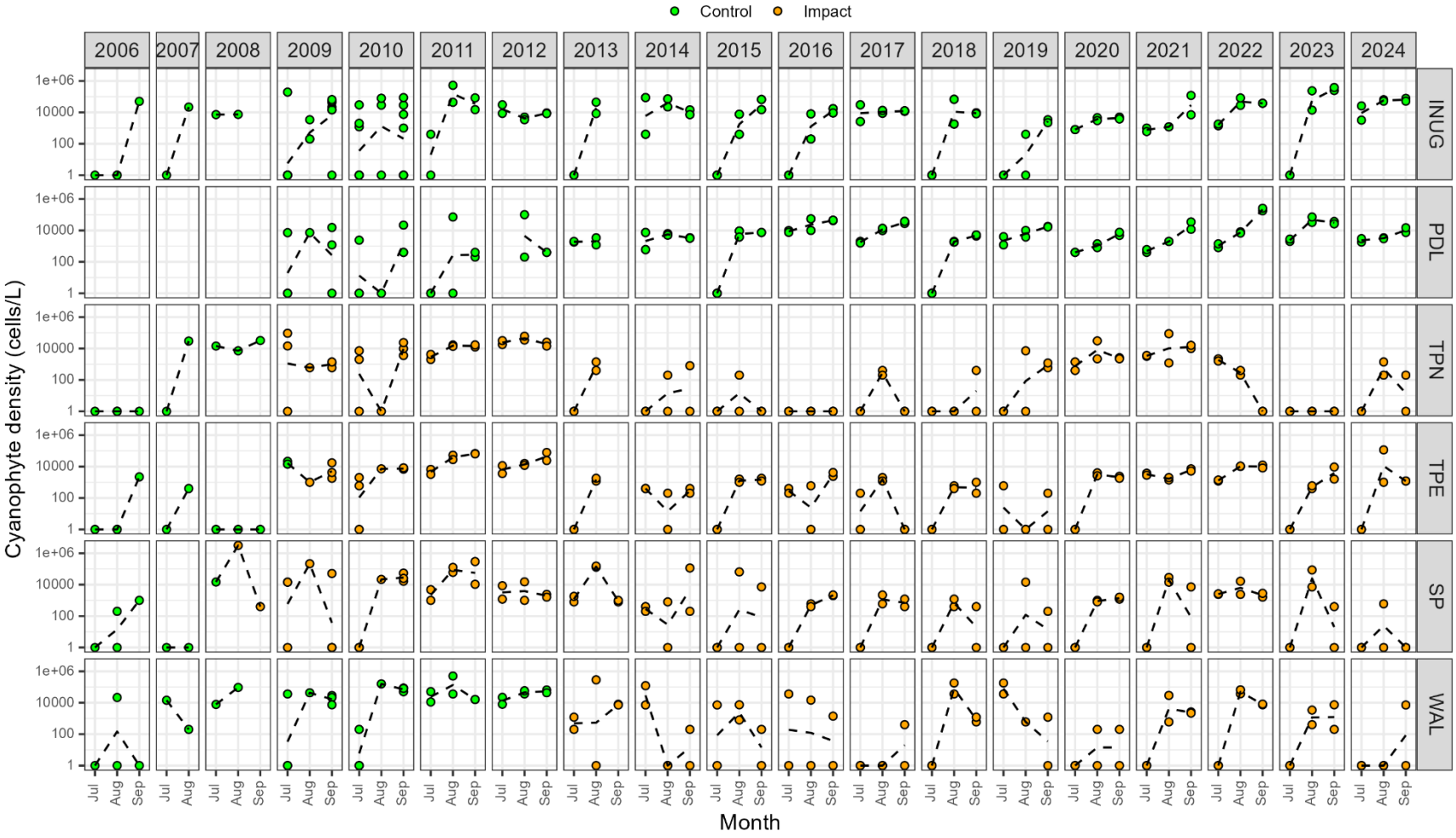


Figure E1-10. Chlorophyte density (cells/L) from Meadowbank study area lakes since 2006.

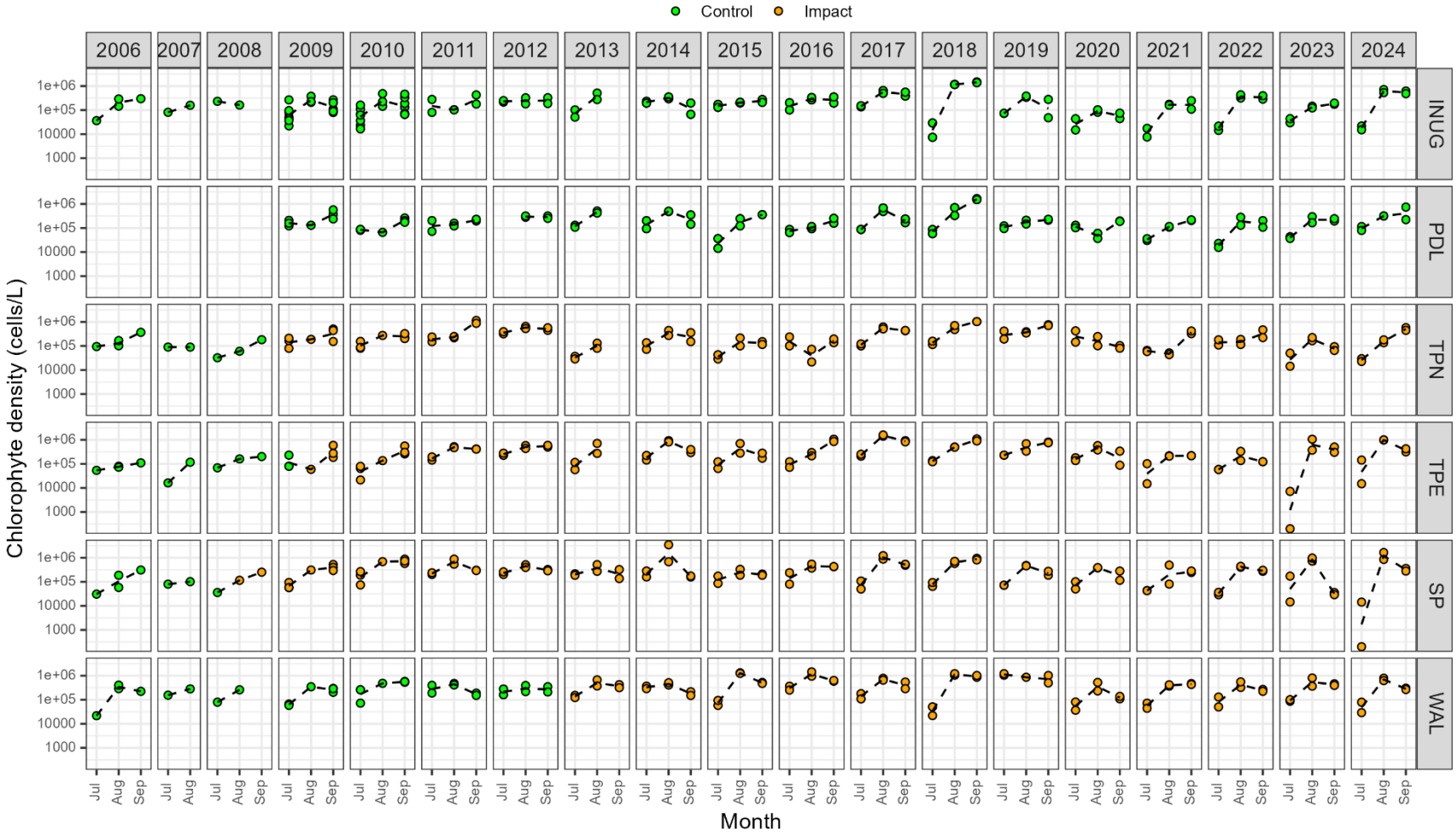


Figure E1-11. Chrysophyte density (cells/L) from Meadowbank study area lakes since 2006.

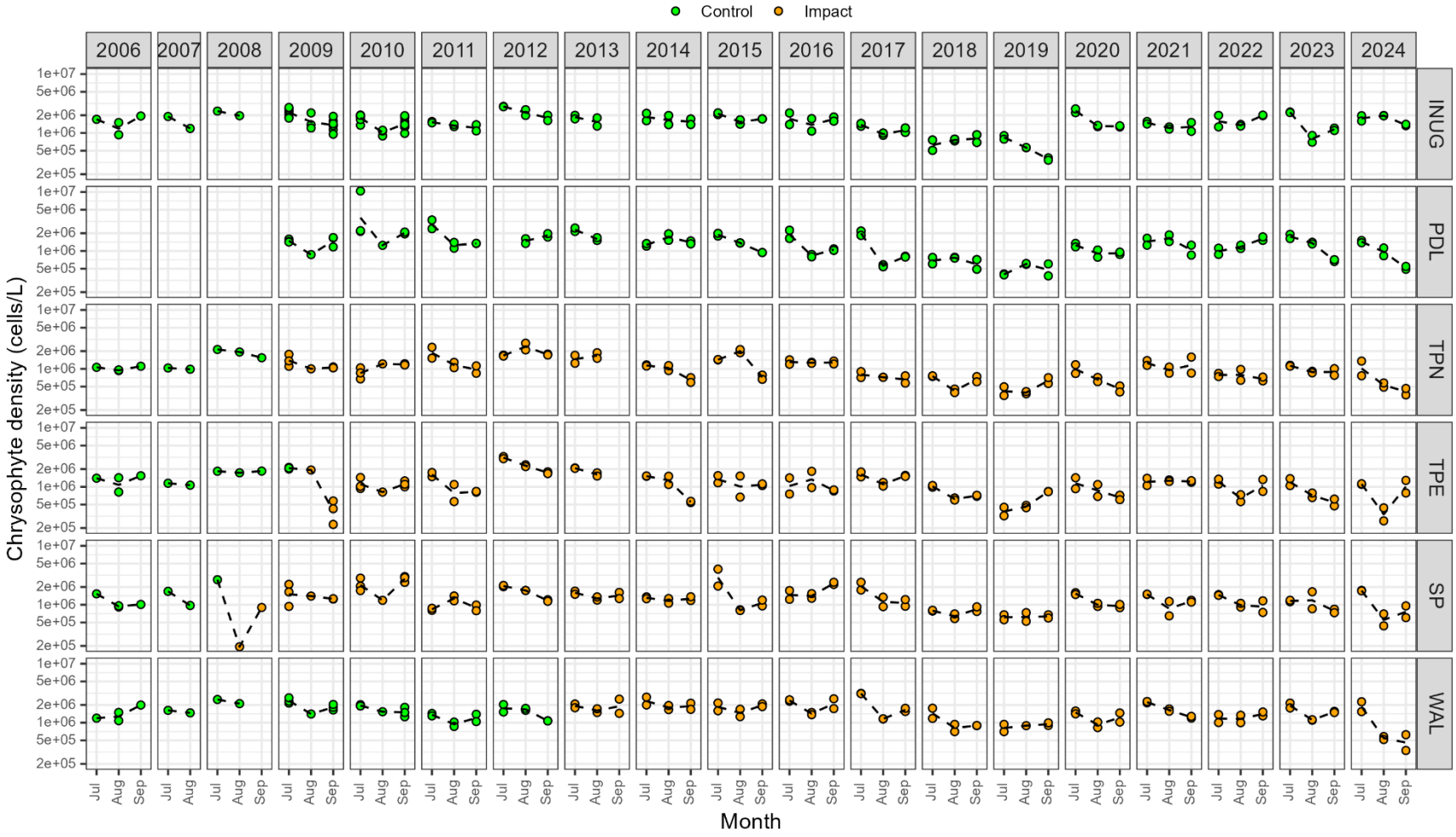


Figure E1-12. Diatoms density (cells/L) from Meadowbank study area lakes since 2006.

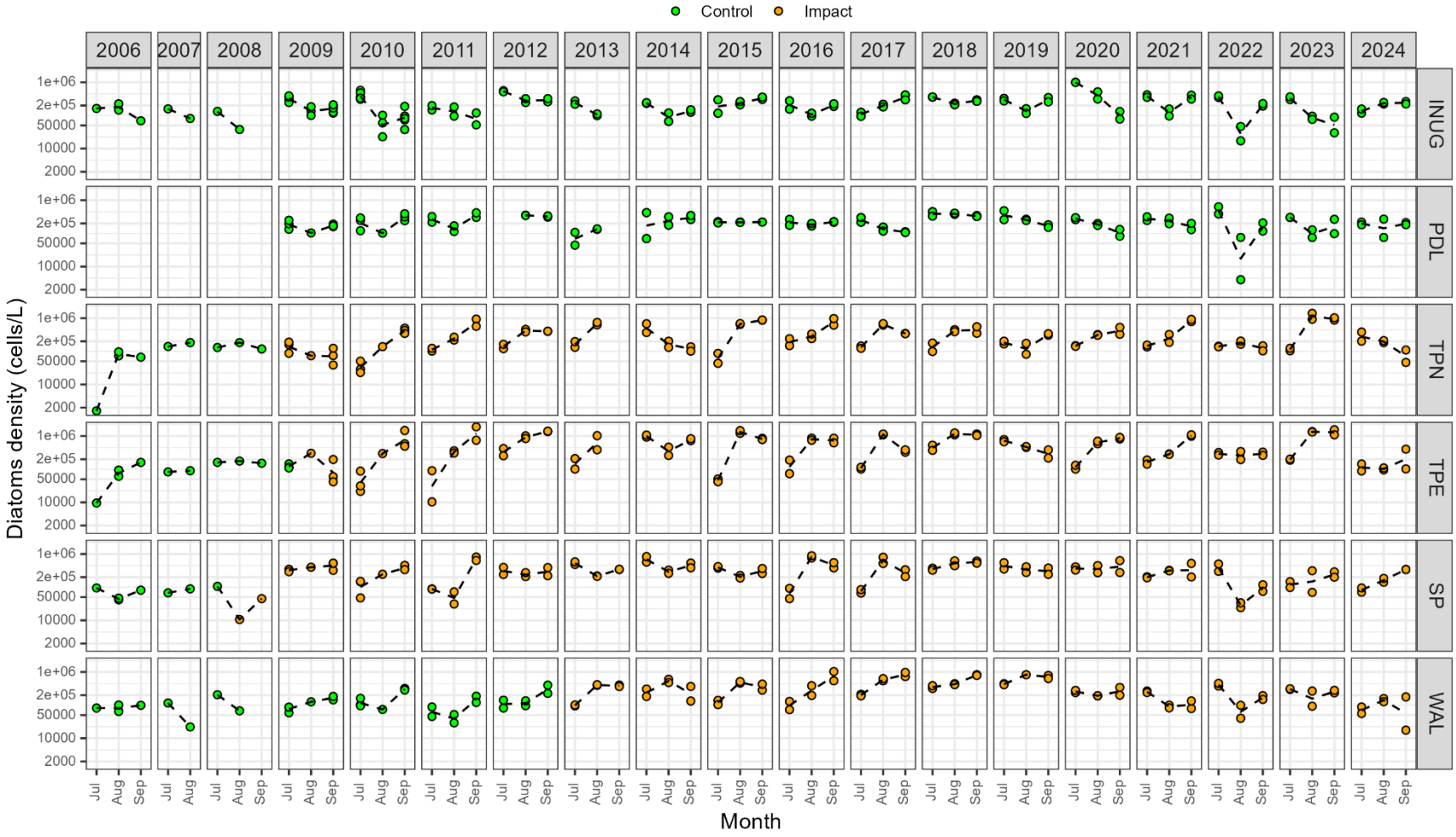


Figure E1-13. Cryptophytes density (cells/L) from Meadowbank study area lakes since 2006.

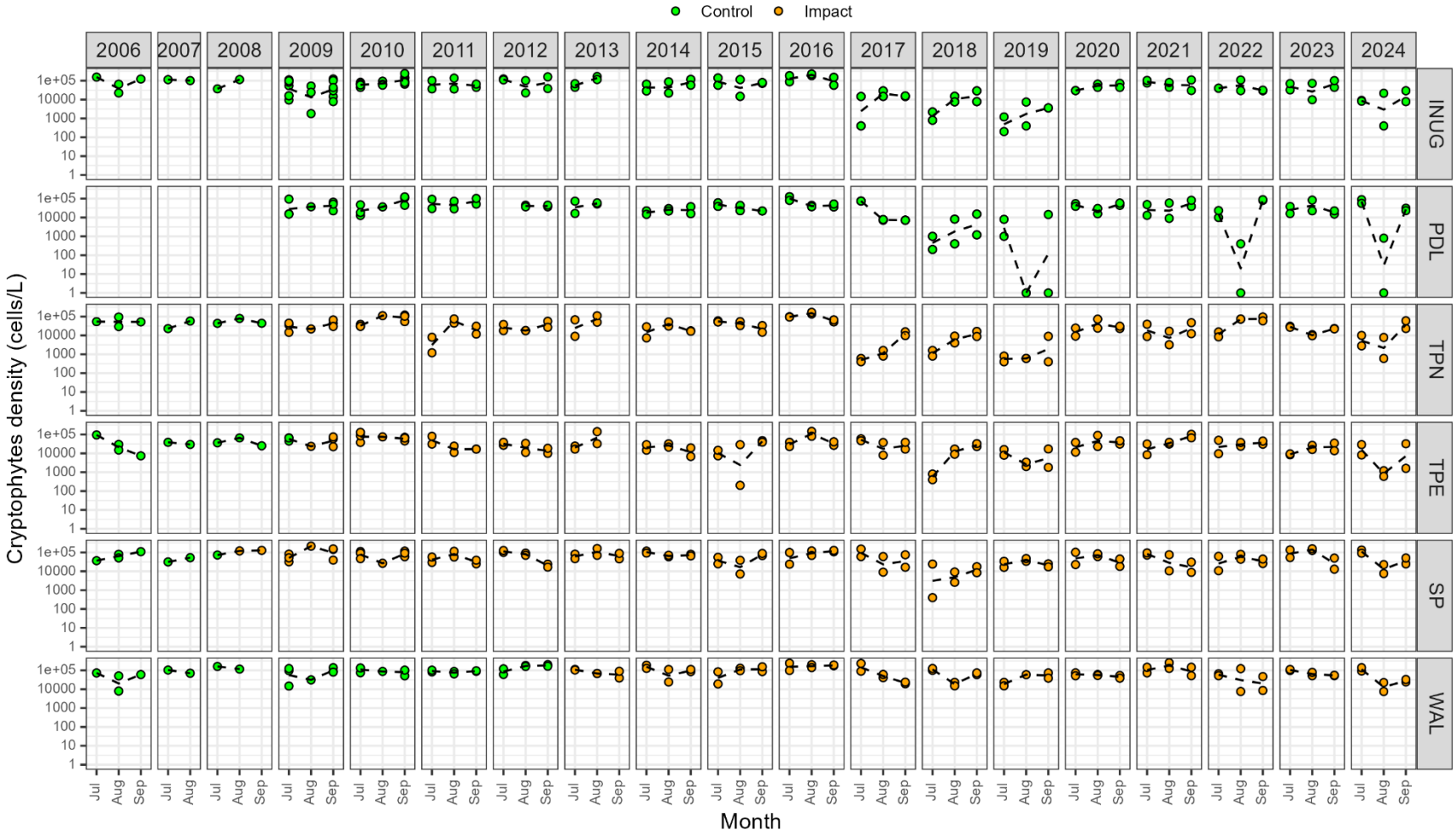


Figure E1-14. Dinoflagellates density (cells/L) from Meadowbank study area lakes since 2006.

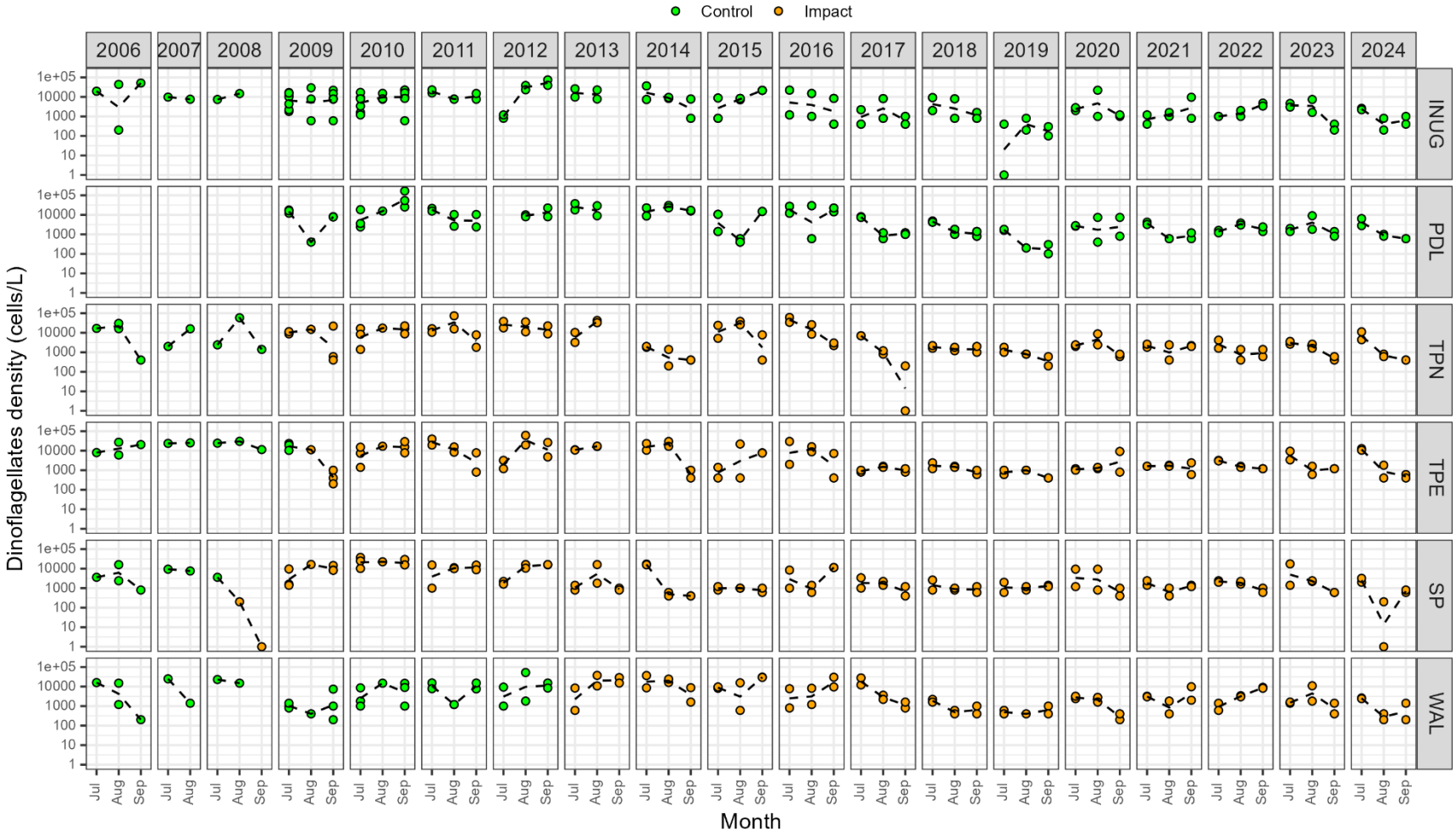
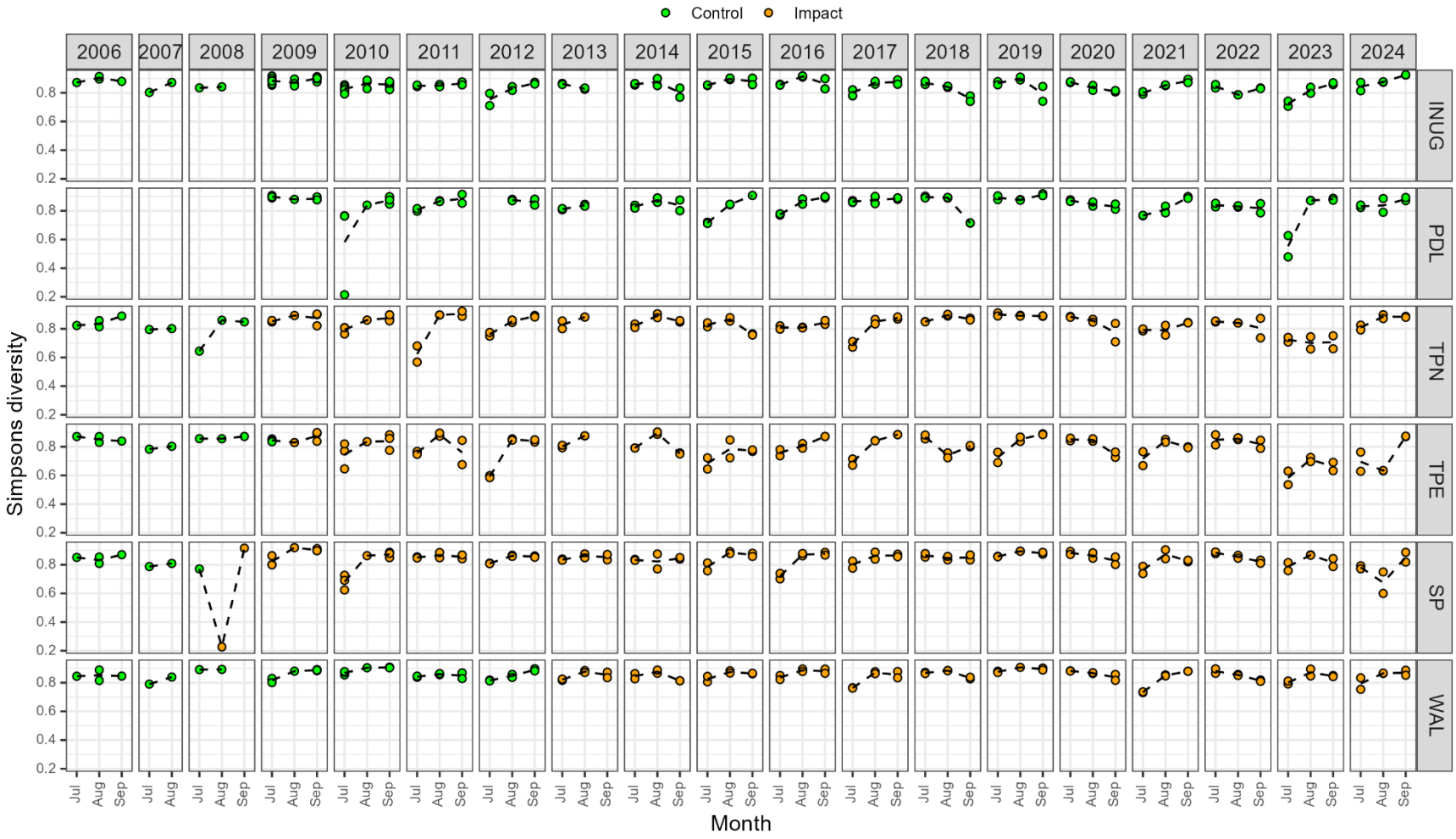


Figure E1-15. Simpsons' Diversity for the phytoplankton community from Meadowbank study area lakes since 2006.



Appendix E2
Phyto Data – Whale Tail Study Area Lakes

LIST OF TABLES – APPENDIX E2

Table E2-1. Phytoplankton density (cells/L), biomass (mg/m^3), and diversity by major taxa group, Whale Tail study area lakes, 2024. 1

LIST OF FIGURES – APPENDIX E2

Figure E2-1. Cyanophyte biomass (mg/m^3) from Whale Tail study area lakes since 2014. 2
Figure E2-2. Chlorophyte biomass (mg/m^3) from Whale Tail study area lakes since 2014. 3
Figure E2-3. Chrysophyte biomass (mg/m^3) from Whale Tail study area lakes since 2014. 4
Figure E2-4. Diatoms biomass (mg/m^3) from Whale Tail study area lakes since 2014. 5
Figure E2-5. Cryptophytes biomass (mg/m^3) from Whale Tail study area lakes since 2014. 6
Figure E2-6. Dinoflagellates biomass (mg/m^3) from Whale Tail study area lakes since 2014. 7
Figure E2-7. Phytoplankton density (cells/L) by major taxa group from Whale Tail study area lakes since 2014. 8
Figure E2-8. Relative phytoplankton density by major taxa group from Whale Tail study area lakes since 2014. 9
Figure E2-9. Cyanophyte density (cells/L) from Whale Tail study area lakes since 2014. 10
Figure E2-10. Chlorophyte density (cells/L) from Whale Tail study area lakes since 2014. 11
Figure E2-11. Chrysophyte density (cells/L) from Whale Tail study area lakes since 2014. 12
Figure E2-12. Diatoms density (cells/L) from Whale Tail study area lakes since 2015. 13
Figure E2-13. Cryptophytes density (cells/L) from Whale Tail study area lakes since 2015. 14
Figure E2-14. Dinoflagellates density (cells/L) from Whale Tail study area lakes since 2014. 15
Figure E2-15. Simpsons' Diversity for the phytoplankton community from Whale Tail study area lakes since 2014. 16

Table E2-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Whale Tail study lakes, 2024.

Area-Replicate	Date	Phytoplankton Biomass (mg/m^3)							Taxa Richness	Simpson's Diversity	Phytoplankton Density (cells/L)						
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL			Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
Kangislulik Lake (KAN) *																	
MAM - 91	30-Jun-24	0	2.3	603	109	33	14	761	25	0.37	0	86,208	9,219,304	712,680	171,432	2,600	10,192,224
MAM - 92	30-Jun-24	0	1.9	126	105	31	26	290	24	0.82	0	57,472	2,061,640	666,376	123,944	17,968	2,927,400
MAM - 93	15-Aug-24	0	4.8	59	337	20	13	433	19	0.23	0	114,944	323,880	9,925,104	45,120	1,800	10,410,848
MAM - 94	15-Aug-24	0.057	10	48	307	12	9.1	387	22	0.25	400	287,960	280,176	9,160,216	33,936	2,200	9,764,888
MAM - 95	3-Sep-24	0	23	52	260	15	1.8	352	23	0.41	0	611,040	380,952	7,716,632	8,800	400	8,717,824
MAM - 96	3-Sep-24	0	27	51	246	13	7.0	344	25	0.48	0	1,049,064	474,744	7,337,864	7,200	1,800	8,870,672
Percent Density or Biomass		***<0.1***	***2.7***	***37***	***53***	***4.8***	***2.8***				***<0.1***	***4.3***	***25***	***70***	***0.77***	***<0.1***	
Nemo Lake																	
NEM - 89	4-Jul-24	0	0.92	104	67	4.8	10	187	24	0.86	0	36,120	1,207,544	376,264	9,384	1,200	1,630,512
NEM - 90	4-Jul-24	0	1.6	84	97	9.5	16	208	23	0.85	0	7,384	1,192,376	503,992	25,352	1,600	1,730,704
NEM - 91	16-Aug-24	6.5	13	161	30	20	4.5	235	26	0.87	31,200	618,424	1,523,808	550,984	138,096	800	2,863,312
NEM - 92	16-Aug-24	6.6	12	130	32	1.6	10	193	29	0.87	36,784	489,712	1,431,216	487,928	7,584	2,000	2,455,224
NEM - 93	2-Sep-24	19	29	73	23	2.7	9.2	155	28	0.89	146,040	625,408	705,232	511,464	8,384	400	1,996,928
NEM - 94	2-Sep-24	20	34	71	24	7.7	17	172	29	0.90	220,064	754,320	848,112	453,992	59,072	1,000	2,336,560
Percent Density or Biomass		***4.5***	***7.8***	***54***	***24***	***4.0***	***5.8***				***3.3***	***19***	***53***	***22***	***1.9***	***<0.1***	
Whale Tail South																	
WTS - 91	1-Jul-24	0	1.3	316	9.7	60	11	398	28	0.58	0	57,472	3,458,520	96,888	137,760	2,400	3,753,040
WTS - 92	1-Jul-24	0	2.5	301	7.9	59	11	381	28	0.56	0	57,672	3,420,800	112,040	138,160	2,200	3,730,872
WTS - 93	14-Aug-24	0.92	24	138	21	16	3.3	204	29	0.87	6,000	689,864	1,682,856	617,904	82,624	600	3,079,848
WTS - 94	14-Aug-24	0.31	13	171	11	15	3.3	214	27	0.79	2,000	395,320	2,774,624	293,024	35,136	600	3,500,704
WTS - 95	2-Sep-24	2.8	33	60	60	16	0.67	172	32	0.79	12,400	1,192,744	1,115,520	1,872,104	55,488	200	4,248,456
WTS - 96	2-Sep-24	3.8	34	43	43	6.4	0	131	30	0.82	16,800	1,444,584	993,592	1,713,008	10,184	0	4,178,168
Percent Density or Biomass		***0.52***	***7.2***	***69***	***10***	***12***	***1.9***				***0.17***	***17***	***60***	***21***	***2.0***	***<0.1***	
Lake A20																	
A20 - 83	4-Jul-24	0	7.4	177	25	25	27	261	28	0.87	0	266,008	2,238,240	554,280	33,752	3,400	3,095,680
A20 - 84	4-Jul-24	0	5.3	186	24	31	19	266	27	0.85	0	150,864	2,277,960	448,704	50,320	3,200	2,931,048
A20 - 85	18-Aug-24	2.0	63	308	23	9.3	16	422	35	0.87	174,216	1,308,488	3,359,928	370,816	32,336	3,200	5,248,984
A20 - 86	18-Aug-24	2.6	51	330	12	18	10	424	32	0.87	245,056	1,157,024	3,991,120	235,304	77,440	2,000	5,707,944
A20 - 87	3-Sep-24	0.18	24	212	51	16	13	315	32	0.90	1,000	632,792	2,073,824	774,152	29,552	2,400	3,513,720
A20 - 88	3-Sep-24	0	33	187	127	14	3.5	364	30	0.88	0	797,624	1,919,944	1,833,648	21,768	700	4,573,684
Percent Density or Biomass		***0.23***	***8.9***	***68***	***13***	***5.5***	***4.3***				***1.7***	***17***	***63***	***17***	***0.98***	***<0.1***	
Lake A76																	
A76 - 81	9-Jul-24	0	3.2	94	15	6.4	9.2	128	28	0.83	0	222,704	1,704,608	134,544	16,768	1,800	2,080,424
A76 - 82	9-Jul-24	0	2.7	89	24	13	7.7	136	30	0.81	0	179,600	1,811,768	137,344	53,688	1,600	2,184,000
A76 - 83	13-Aug-24	0	3.1	40	105	20	13	182	17	0.25	0	107,760	373,568	3,724,528	77,840	2,000	4,285,696
A76 - 84	13-Aug-24	0.86	5.5	98	101	21	6.3	233	28	0.55	86,208	158,048	948,288	2,826,128	44,720	1,400	4,064,792
A76 - 85	19-Sep-24	0	11	7.7	153	7.7	6.5	185	19	0.23	0	229,888	172,416	4,090,912	4,400	1,000	4,498,616
A76 - 86	19-Sep-24	0	21	25	154	10.0	11	220	26	0.33	0	359,400	201,152	3,778,000	32,936	600	4,372,088
Percent Density or Biomass		***<0.1***	***4.3***	***33***	***51***	***7.2***	***5.0***				***0.40***	***5.9***	***24***	***68***	***1.1***	***<0.1***	
Lake DS1																	
DS1 - 79	9-Jul-24	2.2	1.6	128	8.8	16	12	169	33	0.82	215,520	22,352	2,007,936	24,568	56,488	1,600	2,328,464
DS1 - 80	9-Jul-24	0	3.8	166	12	9.9	22	214	32	0.84	0	65,056	2,160,200	106,392	65,856	10,784	2,408,288
DS1 - 81	17-Aug-24	0.034	8.1	362	10	22	30	432	32	0.75	200	280,376	3,083,736	75,056	26,368	6,400	3,472,136
DS1 - 82	17-Aug-24	1.3	5.5	414	1.1	28	14	464	31	0.52	7,184	202,352	3,944,816	11,984	129,928	3,000	4,299,264
DS1 - 83	19-Sep-24	0.10	5.0	198	22	16	21	262	31	0.82	200	94,192	2,171,168	229,968	56,888	2,800	2,555,216
DS1 - 84	19-Sep-24	0.96	7.4	238	26	26	21	320	36	0.86	28,736	187,584	2,248,408	356,464	35,152	3,200	2,859,544
Percent Density or Biomass		***0.24***	***1.7***	***81***	***4.3***	***6.4***	***6.5***				***1.4***	***4.8***	***87***	***4.5***	***2.1***	***0.16***	
All Locations Relative Density or Biomass (%)		***0.68***	***5.2***	***57***	***26***	***6.4***	***4.2***				***0.82***	***9.9***	***46***	***42***	***1.3***	***<0.1***	

Note:
*Kangislulik Lake (KAN) was formerly Mammoth Lake (MAM).

Figure E2-1. Cyanophyte biomass (mg/m^3) from Whale Tail study area lakes since 2014.

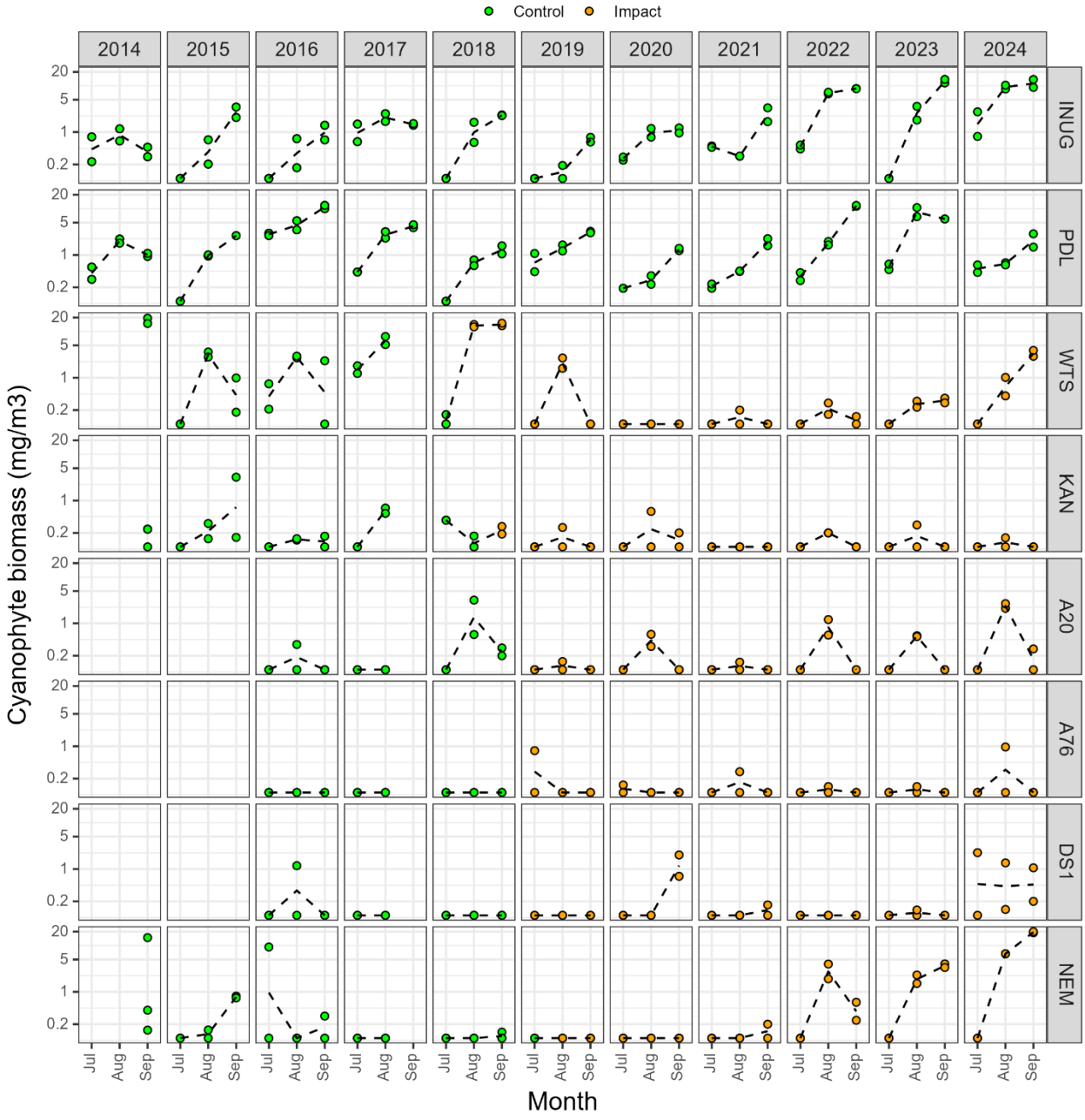


Figure E2-2. Chlorophyte biomass (mg/m^3) from Whale Tail study area lakes since 2014.

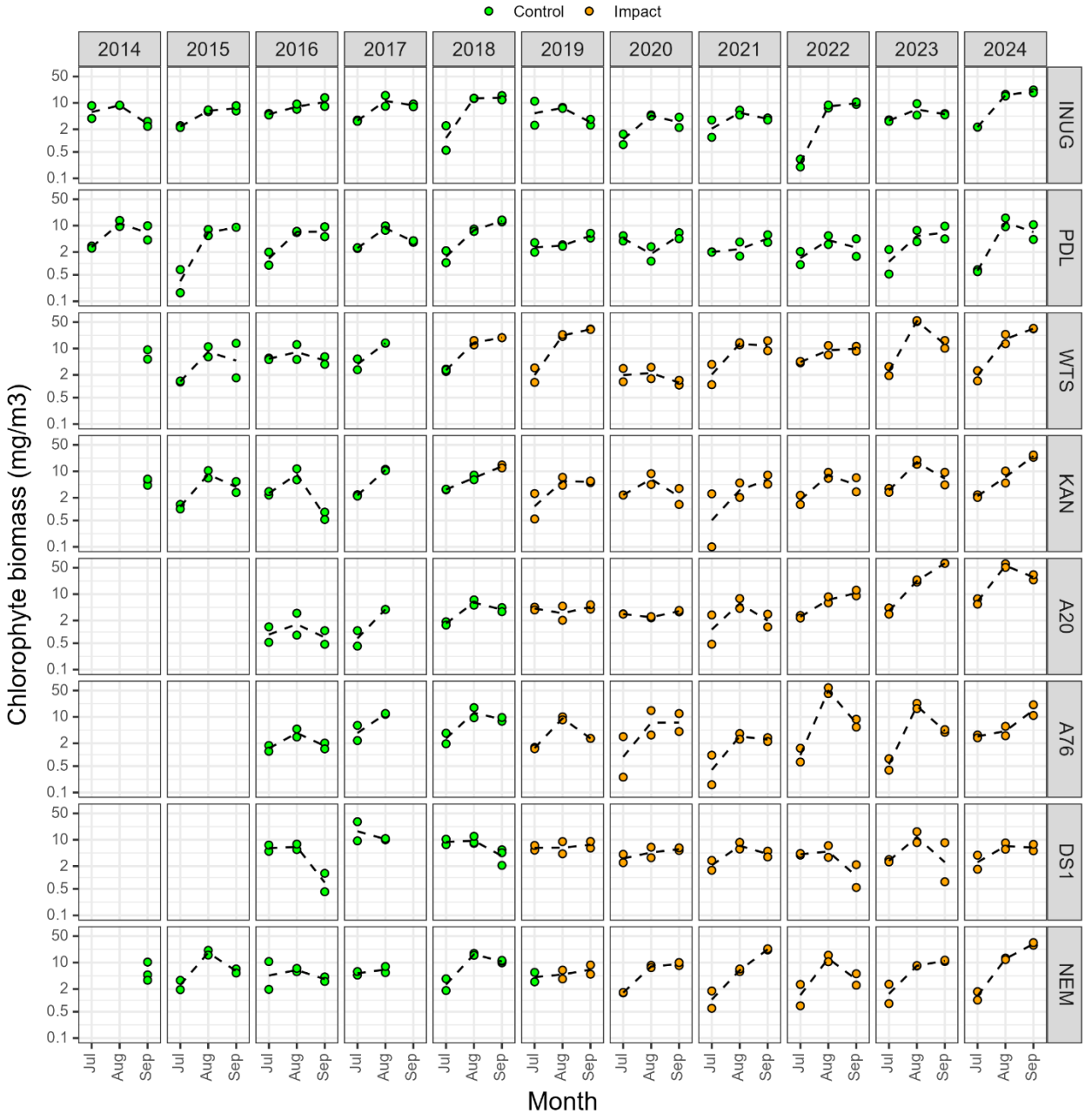


Figure E2-3. Chrysophyte biomass (mg/m^3) from Whale Tail study area lakes since 2014.

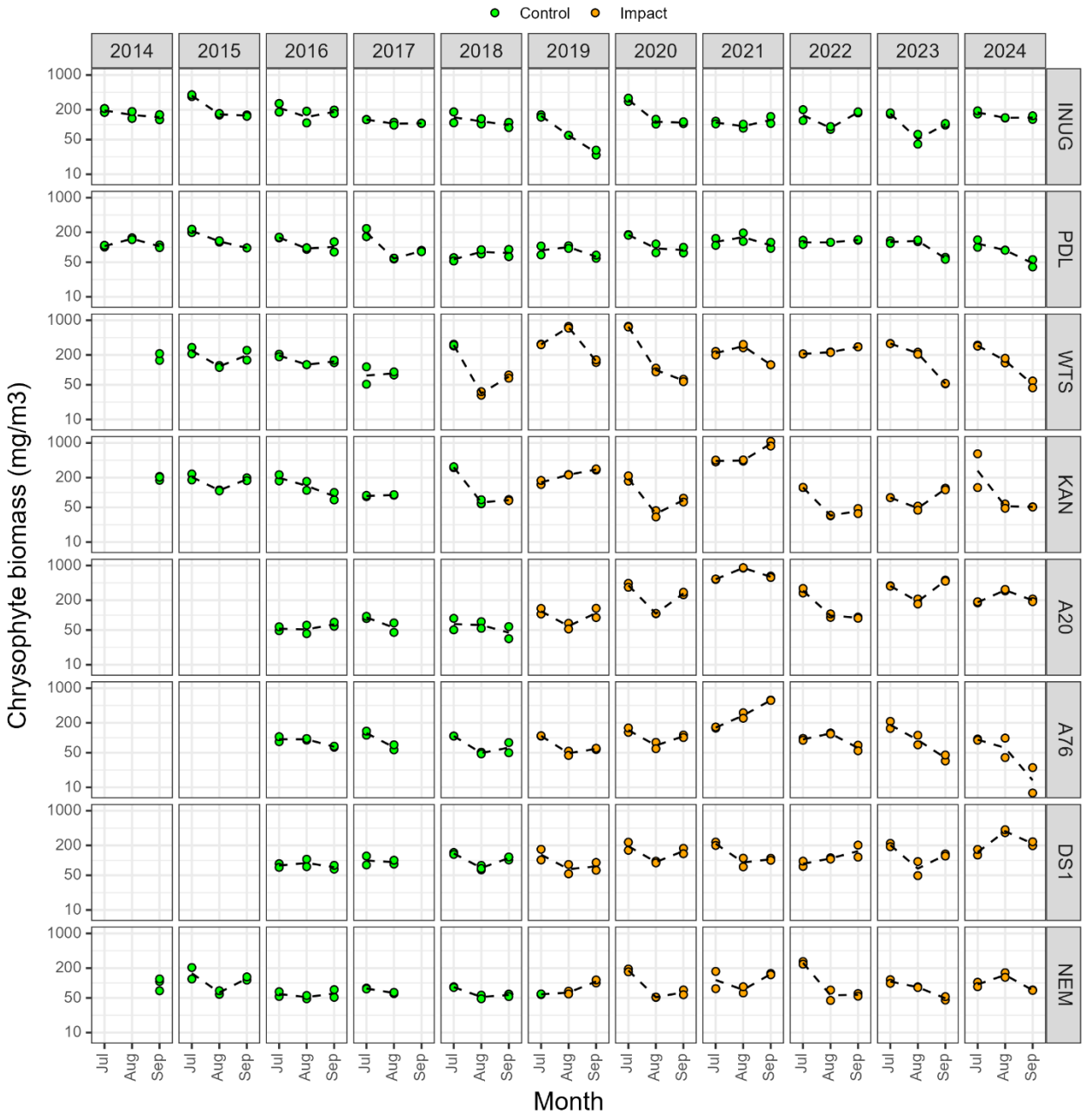


Figure E2-4. Diatoms biomass (mg/m^3) from Whale Tail study area lakes since 2014.

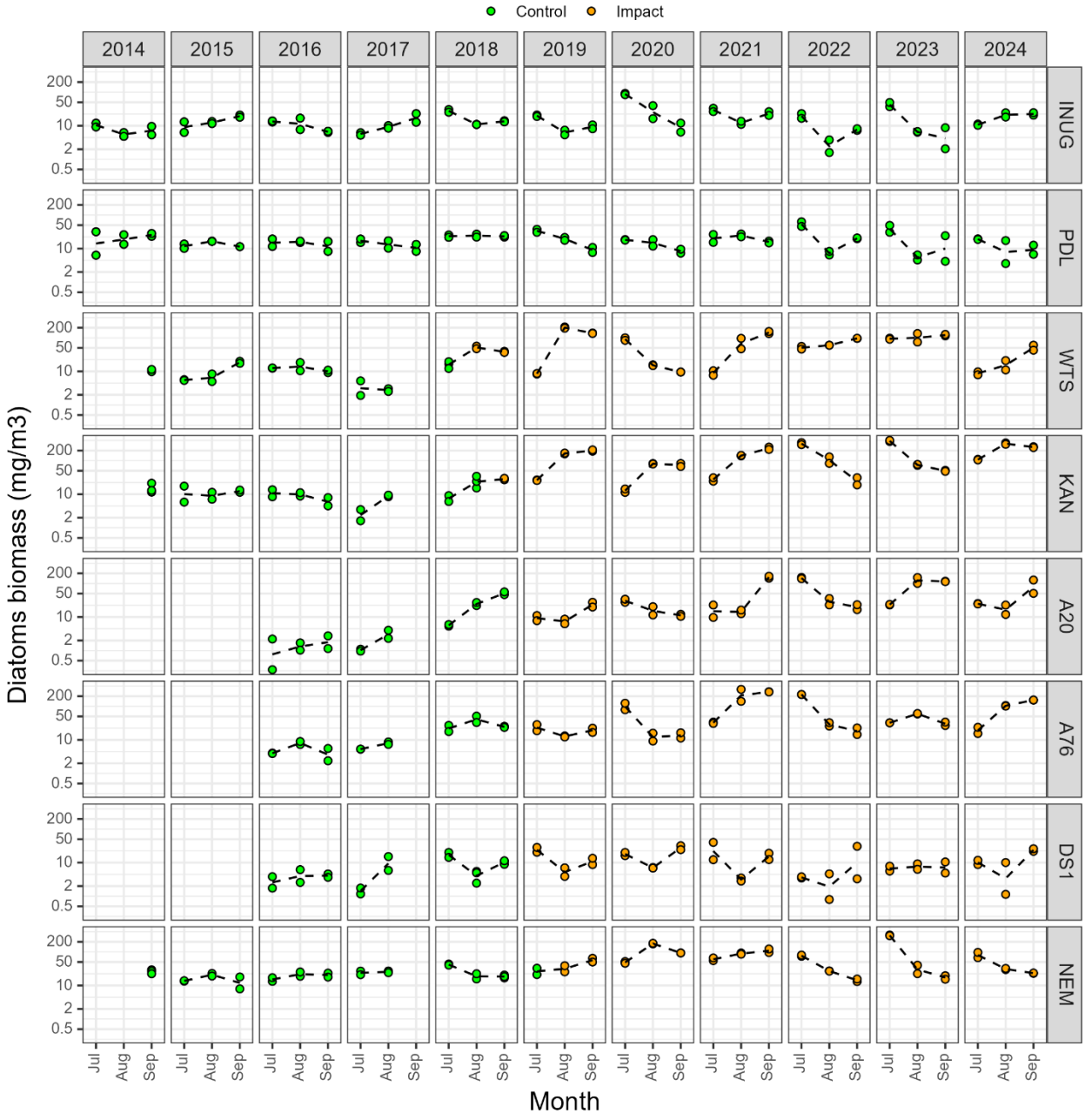


Figure E2-5. Cryptophytes biomass (mg/m^3) from Whale Tail study area lakes since 2014.

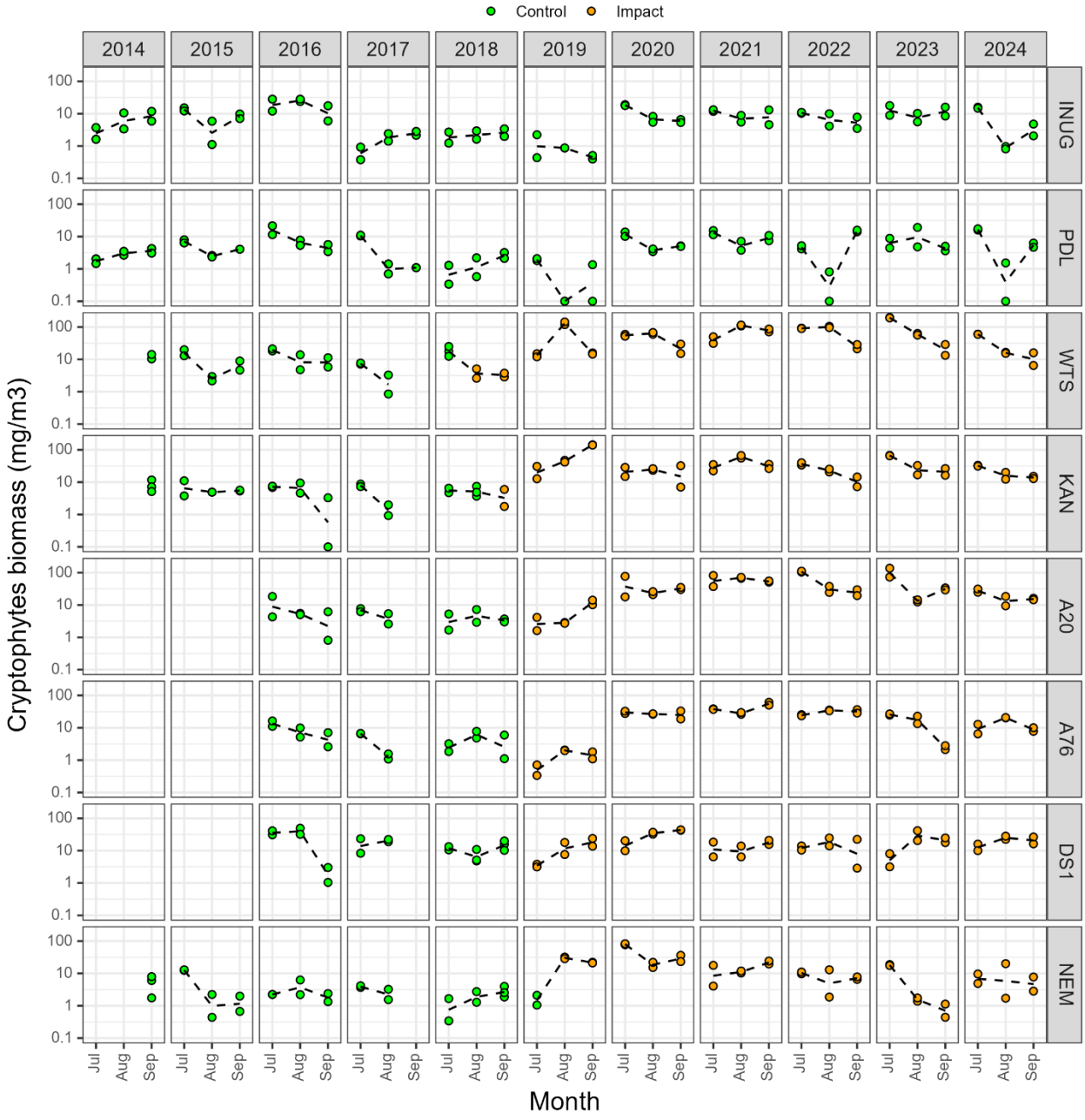


Figure E2-6. Dinoflagellates biomass (mg/m^3) from Whale Tail study area lakes since 2014.

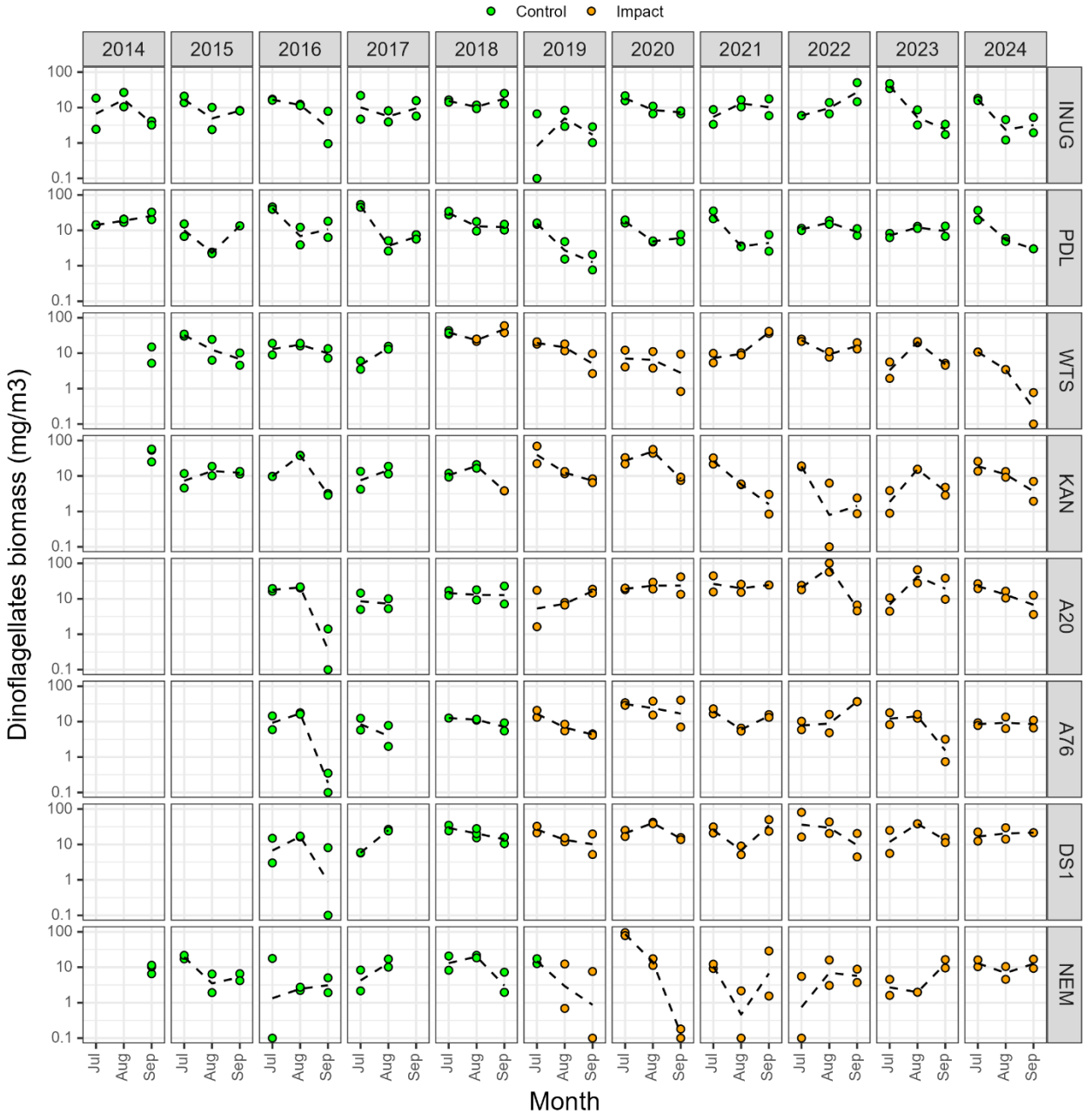


Figure E2-7. Phytoplankton density (cells/L) by major taxa group from Whale Tail study area lakes since 2014.

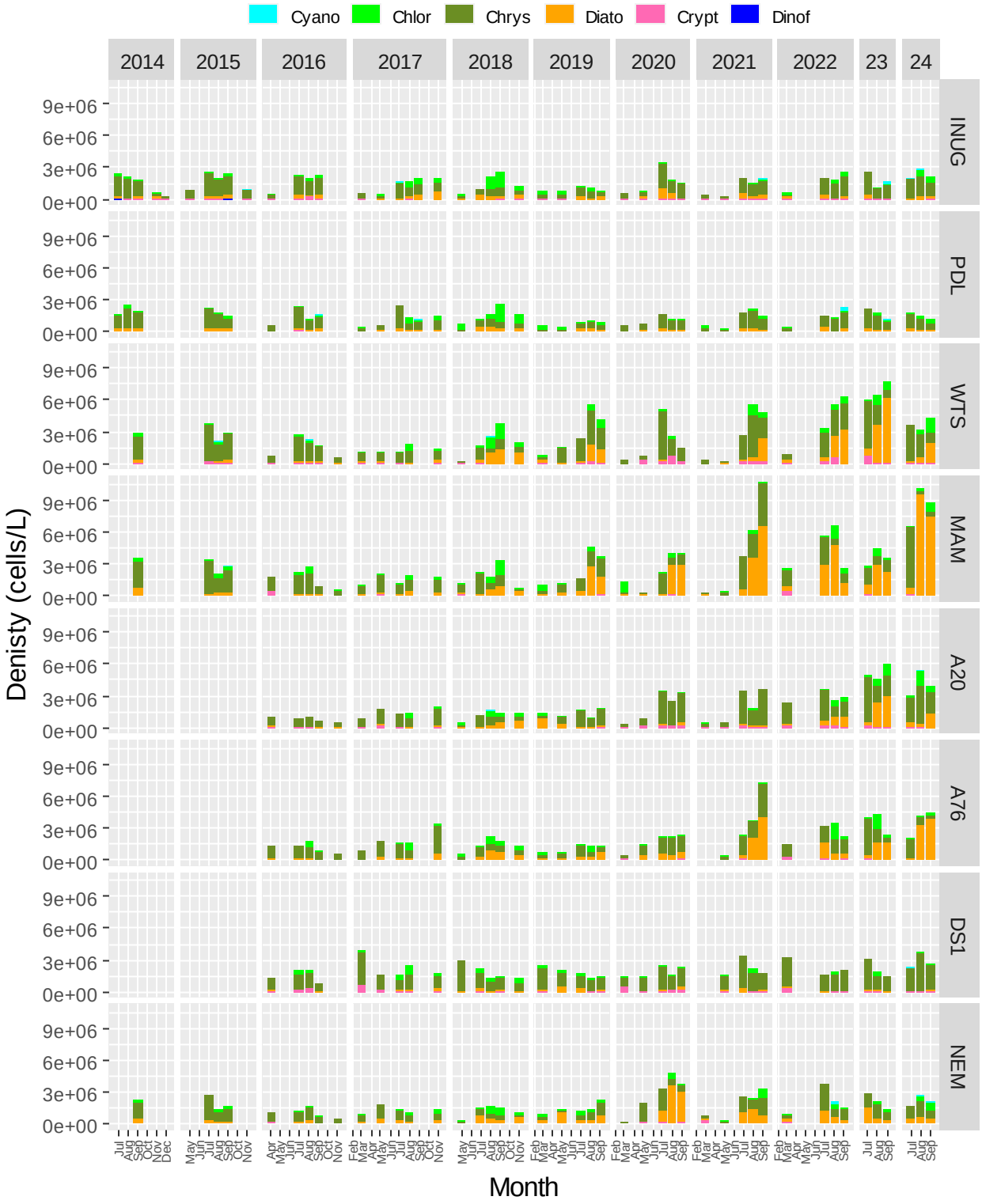


Figure E2-8. Relative phytoplankton density by major taxa group from Whale Tail study area lakes since 2014.

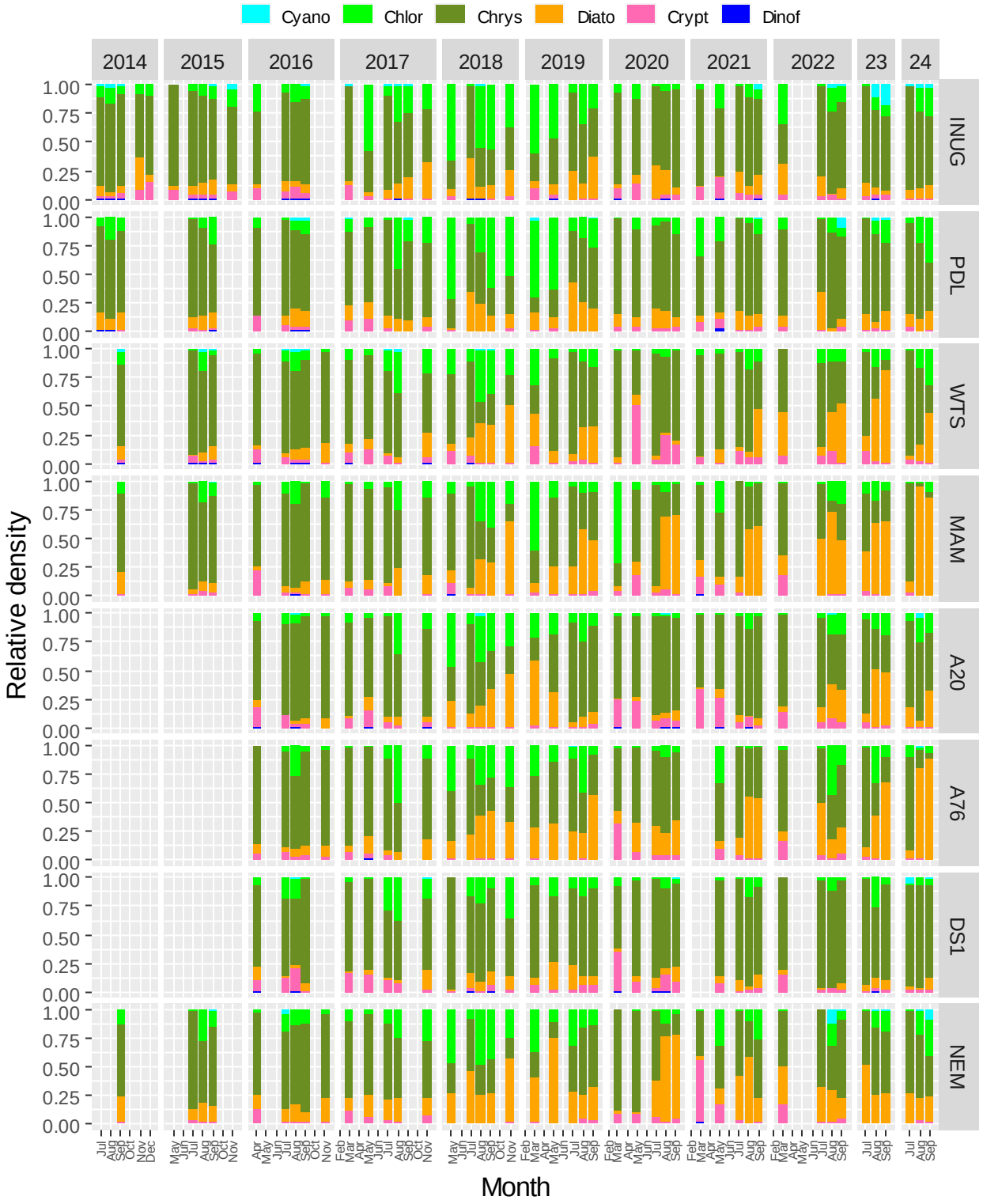


Figure E2-9. Cyanophyte density (cells/L) from Whale Tail study area lakes since 2014.

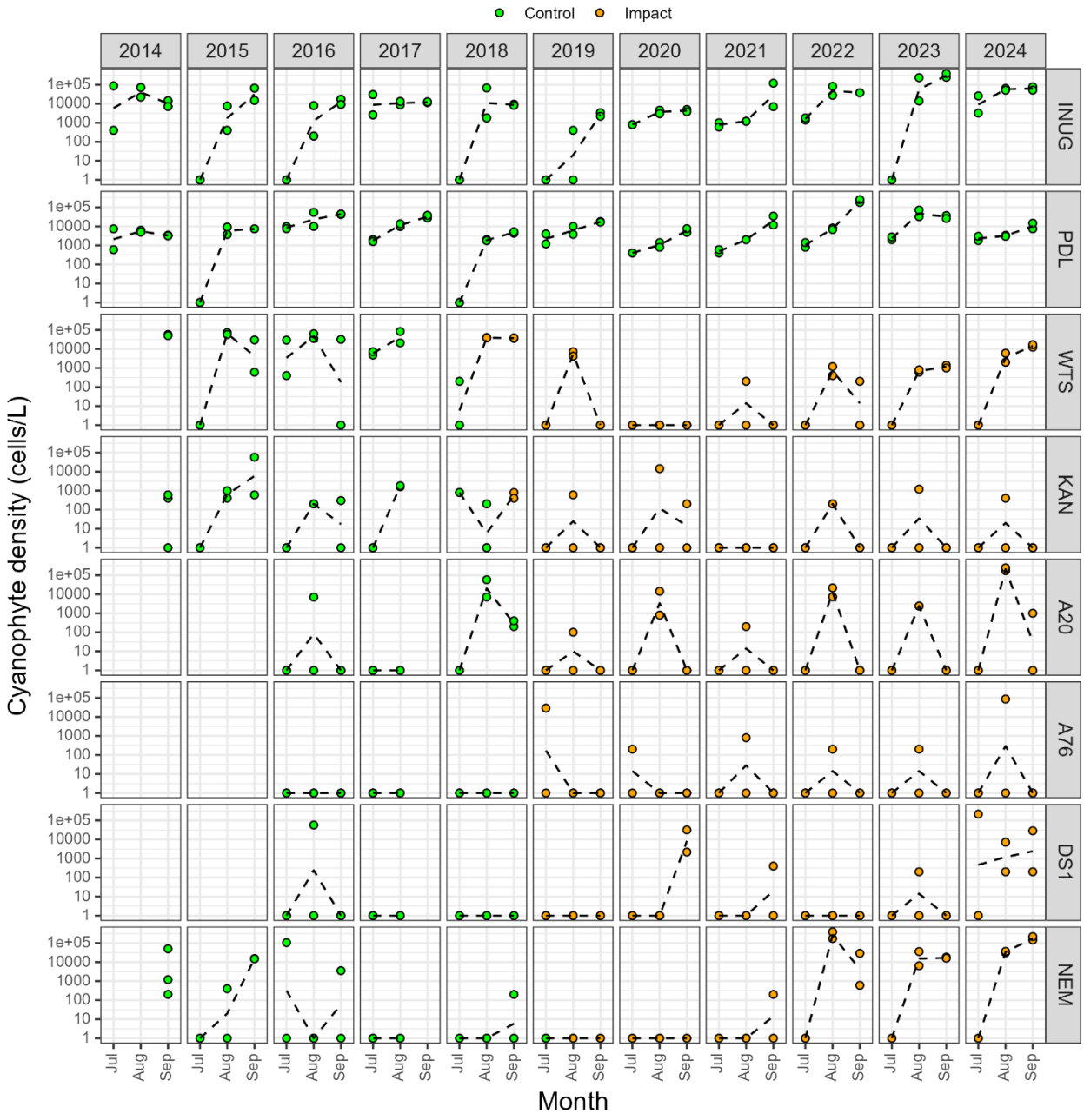


Figure E2-10. Chlorophyte density (cells/L) from Whale Tail study area lakes since 2014.

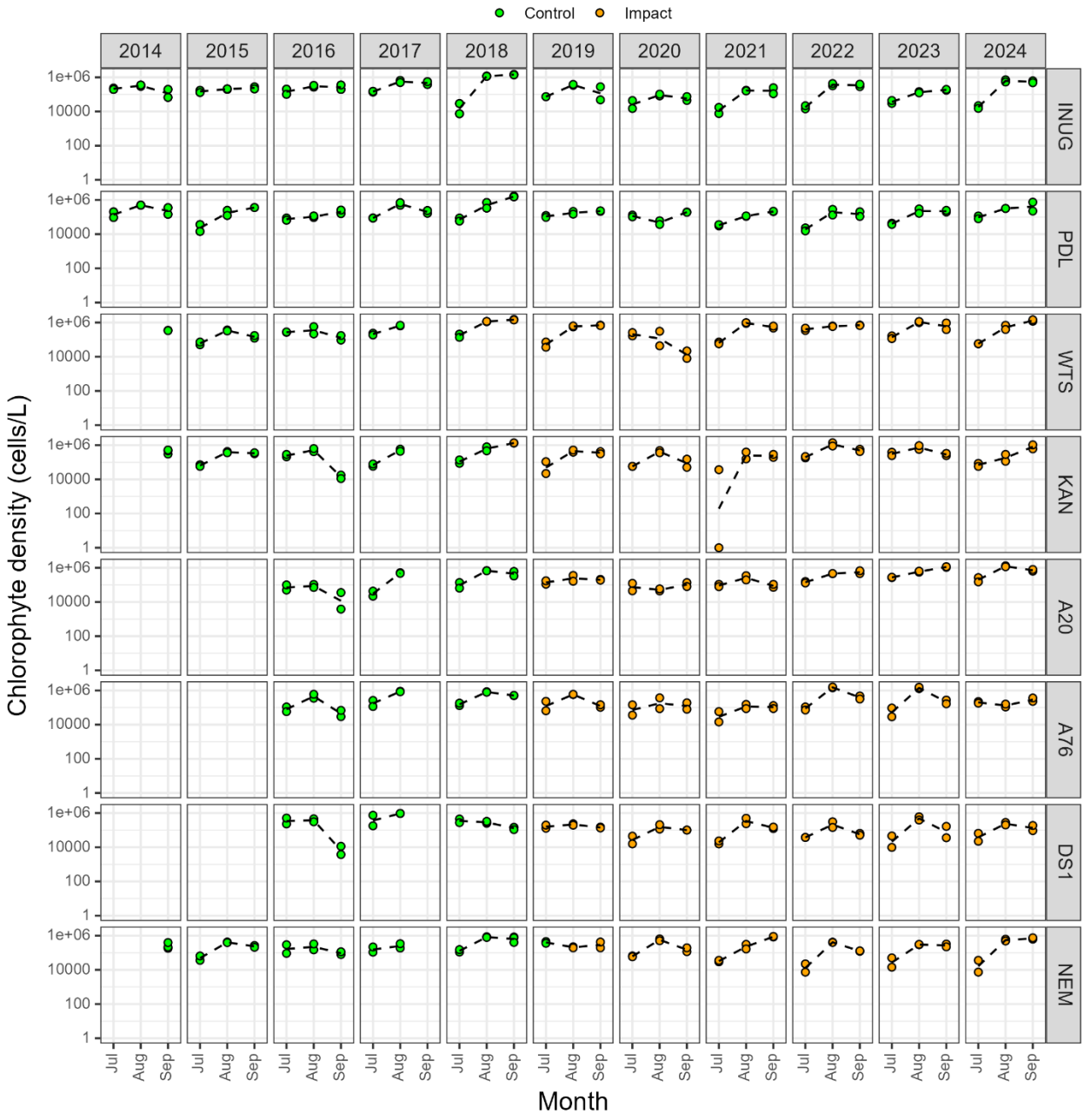


Figure E2-11. Chrysophyte density (cells/L) from Whale Tail study area lakes since 2014.

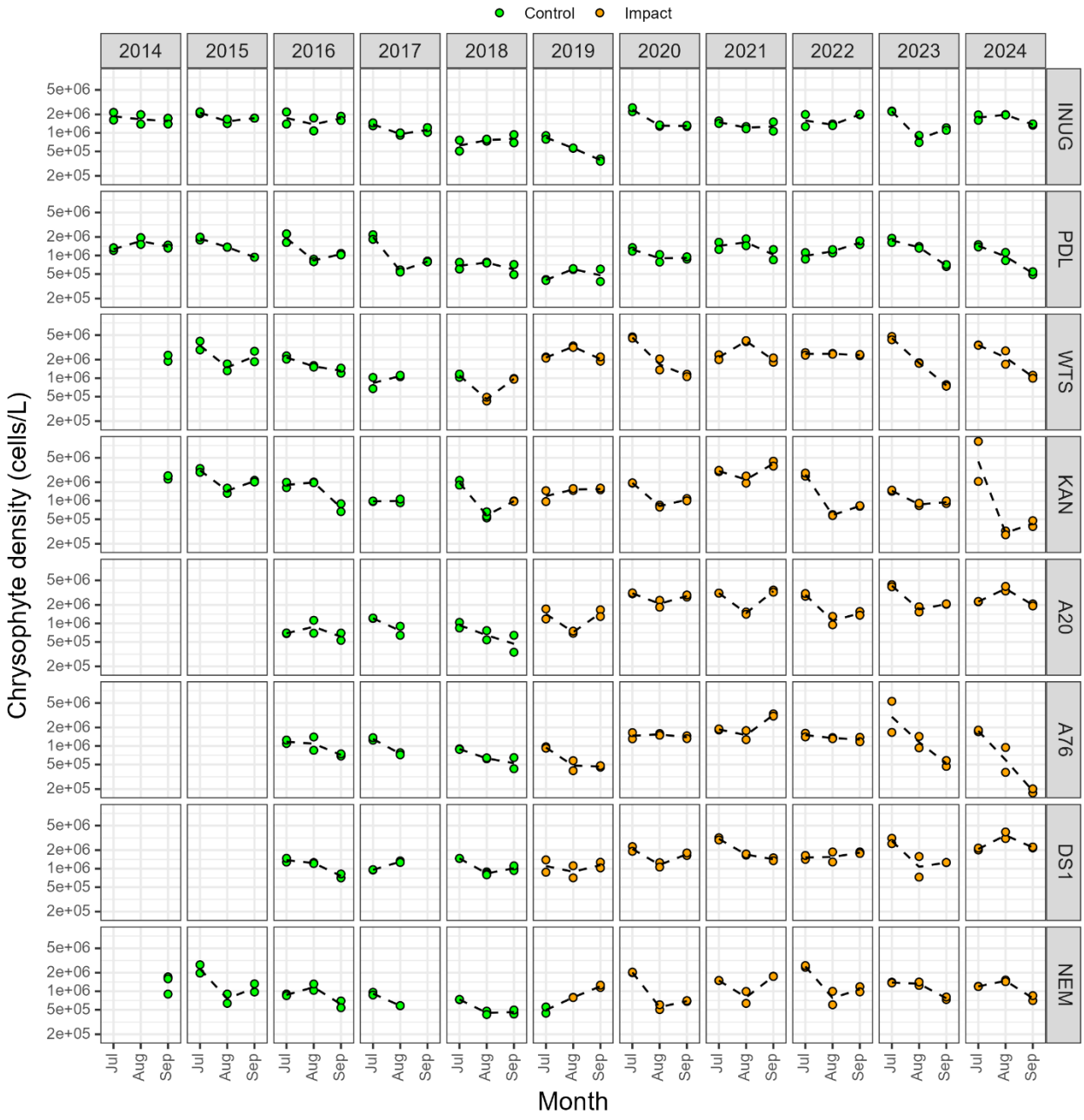


Figure E2-12. Diatoms density (cells/L) from Whale Tail study area lakes since 2015.

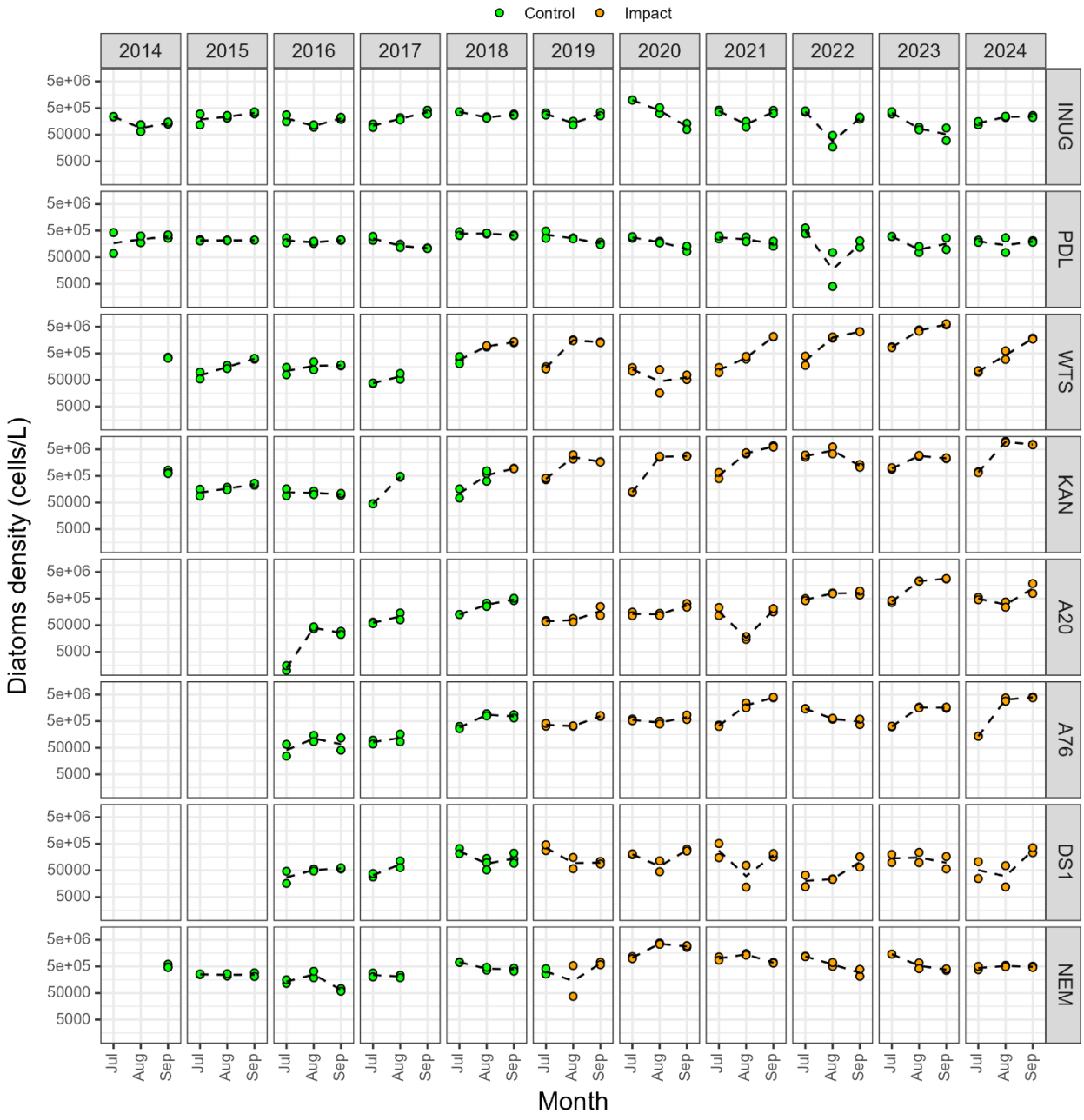


Figure E2-13. Cryptophytes density (cells/L) from Whale Tail study area lakes since 2015.

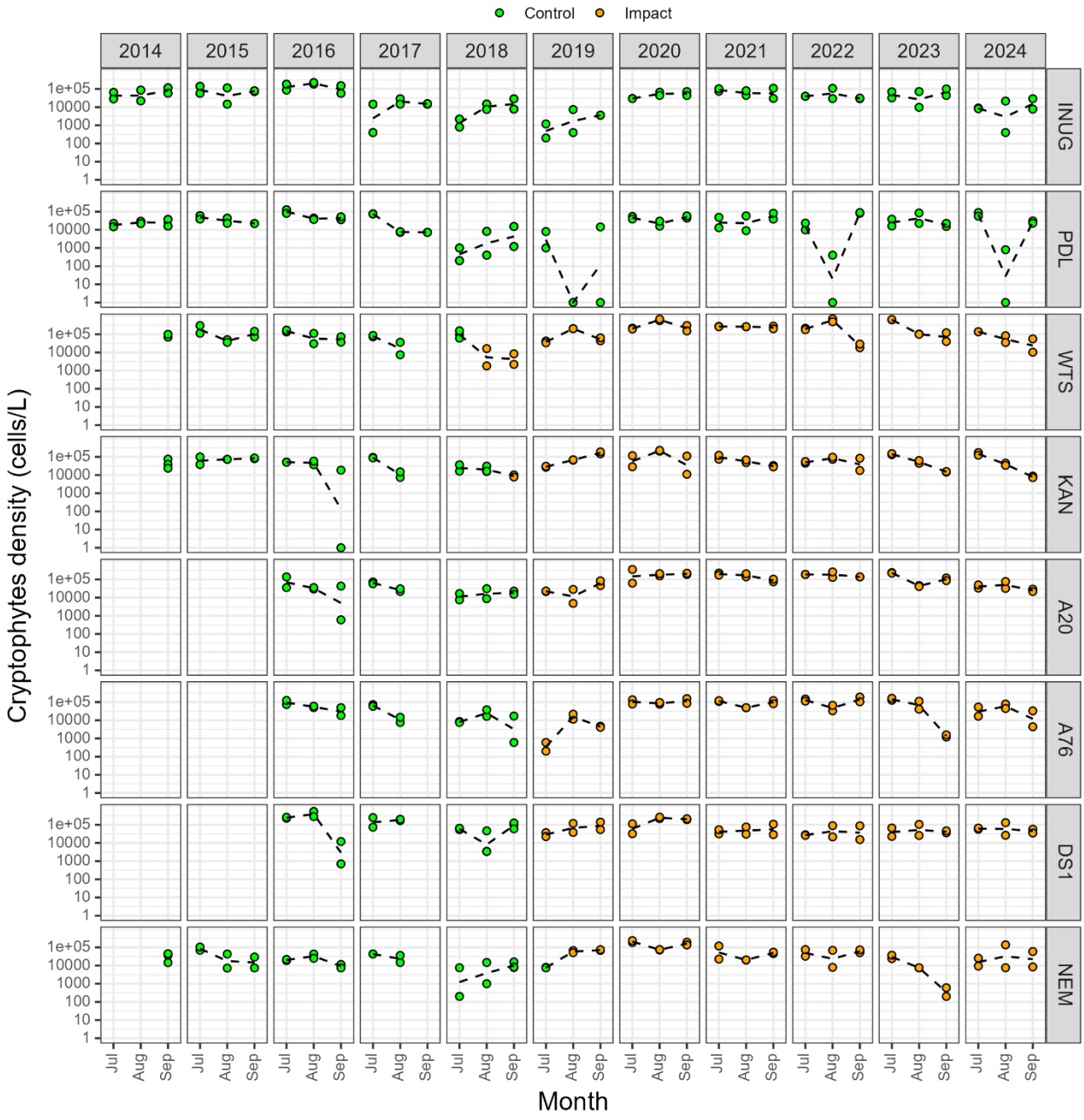


Figure E2-14. Dinoflagellates density (cells/L) from Whale Tail study area lakes since 2014.

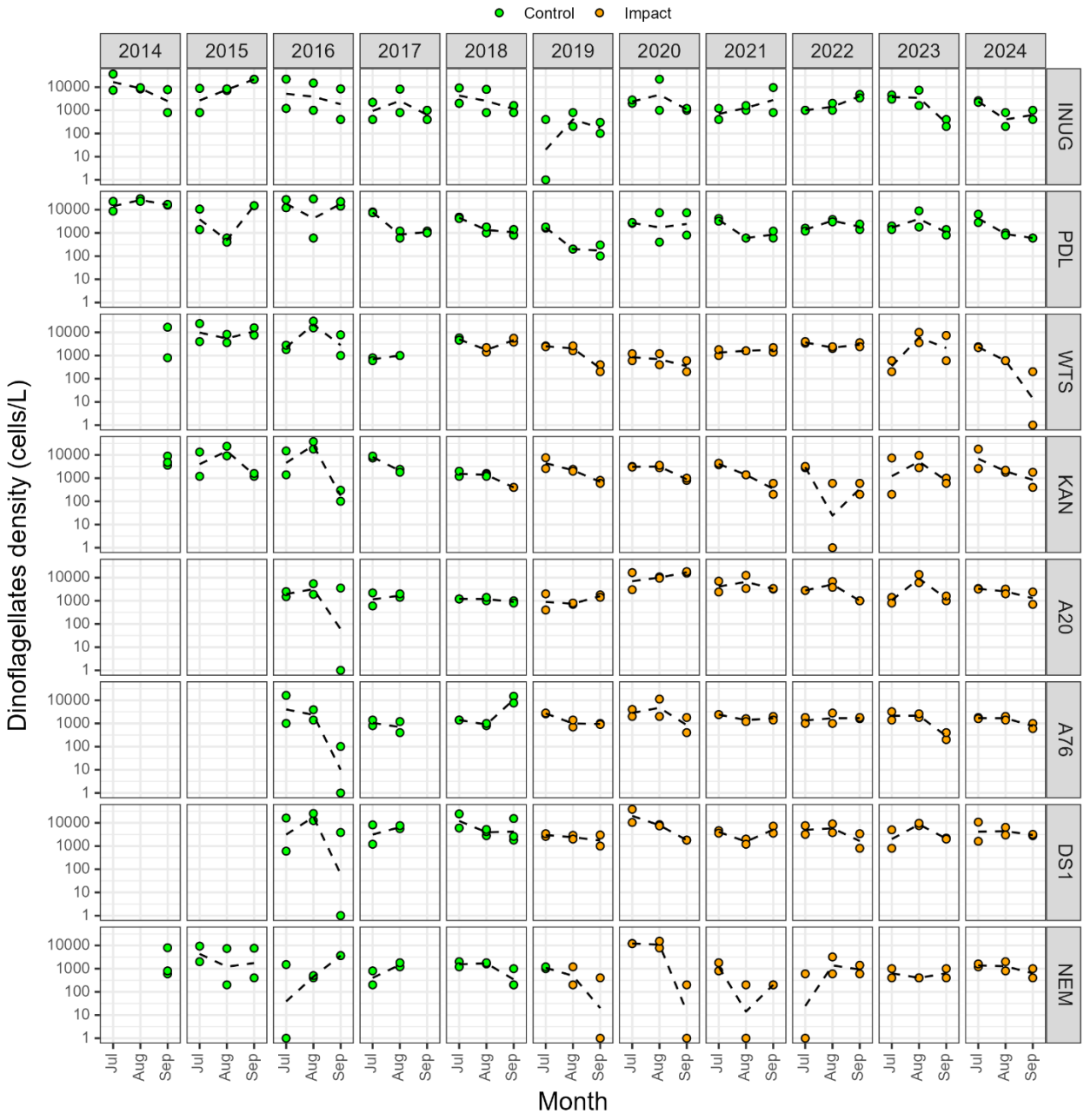
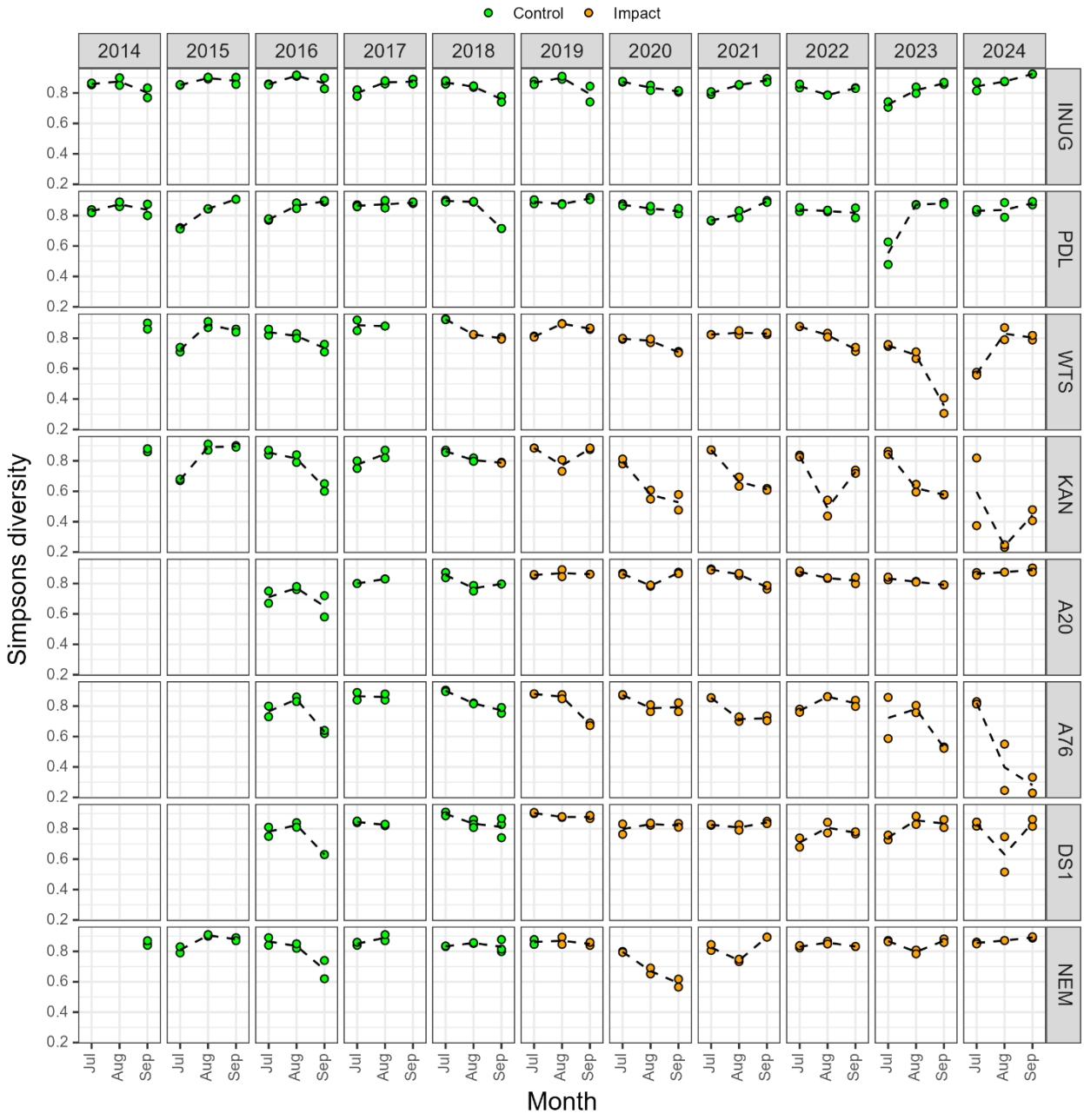


Figure E2-15. Simpsons' Diversity for the phytoplankton community from Whale Tail study area lakes since 2014.



Appendix E3
Phyto Data – Baker Lake

LIST OF TABLES – APPENDIX E3

Table E3-1. Phytoplankton density (cells/L), biomass (mg/m^3), and diversity by major taxa group, Baker Lake, 2024. 1

LIST OF FIGURES – APPENDIX E3

Figure E3-1. Cyanophyte biomass (mg/m^3) from Baker Lake since 2008. 2
Figure E3-2. Chlorophyte biomass (mg/m^3) from Baker Lake since 2008. 3
Figure E3-3. Chrysophyte biomass (mg/m^3) from Baker Lake since 2008. 4
Figure E3-4. Diatoms biomass (mg/m^3) from Baker Lake since 2008. 5
Figure E3-5. Cryptophytes biomass (mg/m^3) from Baker Lake since 2008. 6
Figure E3-6. Dinoflagellates biomass (mg/m^3) from Baker Lake since 2008. 7
Figure E3-7. Phytoplankton density (cells/L) by major taxa group from Baker Lake since 2008. 8
Figure E3-8. Relative phytoplankton density by major taxa group from Baker Lake since 2008. 9
Figure E3-9. Cyanophyte density (cells/L) from Baker Lake since 2008. 10
Figure E3-10. Chlorophyte density (cells/L) from Baker Lake since 2008. 11
Figure E3-11. Chrysophyte density (cells/L) from Baker Lake since 2008. 12
Figure E3-12. Diatoms density (cells/L) from Baker Lake since 2008. 13
Figure E3-13. Cryptophytes density (cells/L) from Baker Lake since 2008. 14
Figure E3-14. Dinoflagellate density (cells/L) from Baker Lake since 2008. 15
Figure E3-15. Simpsons' Diversity for the phytoplankton community from Baker Lake since 2008. 16

Table E3-1. Phytoplankton density (cells/L), biomass (mg/m3), and diversity by major taxa group, Baker Lake, 2024.

Area-Replicate	Date	Phytoplankton Biomass (mg/m^3)							Taxa Richness	Simpson's Diversity	Phytoplankton Density (cells/L)							
		Cyanophyte	Chlorophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL			Cyanophyte	Chlorophyte	Euglenophyte	Chrysophyte	Diatom	Cryptophyte	Dinoflagellate	TOTAL
Baker Akilahaarjuk Point																		
BAP - 91	14-Jul-24	0	0	49	13	22	21	103	22	0.83	0	0	0	998,976	116,360	105,976	2,800	1,224,112
BAP - 92	14-Jul-24	0	2	59	19	14	24	119	28	0.82	0	93,592	0	1,171,792	140,112	67,856	3,400	1,476,752
BAP - 93	12-Aug-24	2	11	140	22	20	4	199	35	0.88	600	309,112	0	1,679,288	148,624	131,512	400	2,269,536
BAP - 94	12-Aug-24	0	6	266	22	17	6	318	33	0.87	0	186,984	0	2,348,000	151,408	110,560	1,000	2,797,952
BAP - 95	9-Sep-24	2	7	77	43	12	17	157	34	0.90	600	294,744	0	770,688	189,528	73,240	1,200	1,330,000
BAP - 96	9-Sep-24	1	37	57	79	22	6	202	35	0.86	600	1,113,920	0	591,288	167,776	139,496	1,200	2,014,280
Percent Density or Biomass		***0.45***	***5.8***	***59***	***18***	***9.6***	***7.1***				***<0.1***	***18***	***<0.1***	***68***	***8.2***	***5.7***	***<0.1***	
Baker Barge Dock																		
BBD - 91	14-Jul-24	0	4	36	7	26	18	91	24	0.81	200	79,024	0	727,184	91,608	147,680	2,800	1,048,496
BBD - 92	14-Jul-24	0	2	47	14	28	24	115	26	0.82	0	79,024	200	913,368	86,224	135,312	4,200	1,218,328
BBD - 93	12-Aug-24	1	8	276	120	4	2	410	33	0.82	200	186,784	0	2,942,872	160,128	29,536	400	3,319,920
BBD - 94	12-Aug-24	0	7	259	13	12	7	298	33	0.83	0	194,168	0	2,670,480	108,824	80,224	600	3,054,296
BBD - 95	9-Sep-24	0	5	24	69	30	13	140	29	0.88	0	136,696	0	352,616	278,272	210,736	800	979,120
BBD - 96	9-Sep-24	0	11	83	73	58	1	226	31	0.90	0	481,328	0	1,057,648	317,792	446,608	400	2,303,776
Percent Density or Biomass		***<0.1***	***2.9***	***57***	***23***	***12***	***5.0***				***<0.1***	***9.7***	***<0.1***	***73***	***8.7***	***8.8***	***<0.1***	
Baker Proposed Jetty																		
BPJ - 91	14-Jul-24	0	1	68	5	37	18	129	24	0.81	0	21,552	0	776,272	18,568	226,904	9,584	1,052,880
BPJ - 92	14-Jul-24	0	1	71	16	42	29	159	24	0.83	0	79,024	0	999,376	53,104	229,904	4,800	1,366,208
BPJ - 93	12-Aug-24	0	8	217	17	5	5	252	33	0.84	28,936	223,504	0	2,110,328	97,856	2,800	800	2,464,224
BPJ - 94	12-Aug-24	1	10	185	18	6	2	223	33	0.86	200	481,528	0	2,084,776	221,368	43,704	400	2,831,976
BPJ - 95	9-Sep-24	0	8	65	50	14	4	141	33	0.90	200	309,112	0	698,448	125,408	107,760	600	1,241,528
BPJ - 96	9-Sep-24	0	4	33	61	20	6	125	34	0.89	200	108,960	200	532,816	250,352	137,896	1,200	1,031,624
Percent Density or Biomass		***0.14***	***3.2***	***62***	***16***	***12***	***6.2***				***0.30***	***12***	***<0.1***	***72***	***7.7***	***7.5***	***0.17***	
All Locations Relative Density or Biomass (%)		***0.22***	***3.9***	***59***	***19***	***11***	***6.0***				***<0.1***	***13***	***<0.1***	***71***	***8.2***	***7.4***	***0.11***	

Figure E3-1. Cyanophyte biomass (mg/m^3) from Baker Lake since 2008.

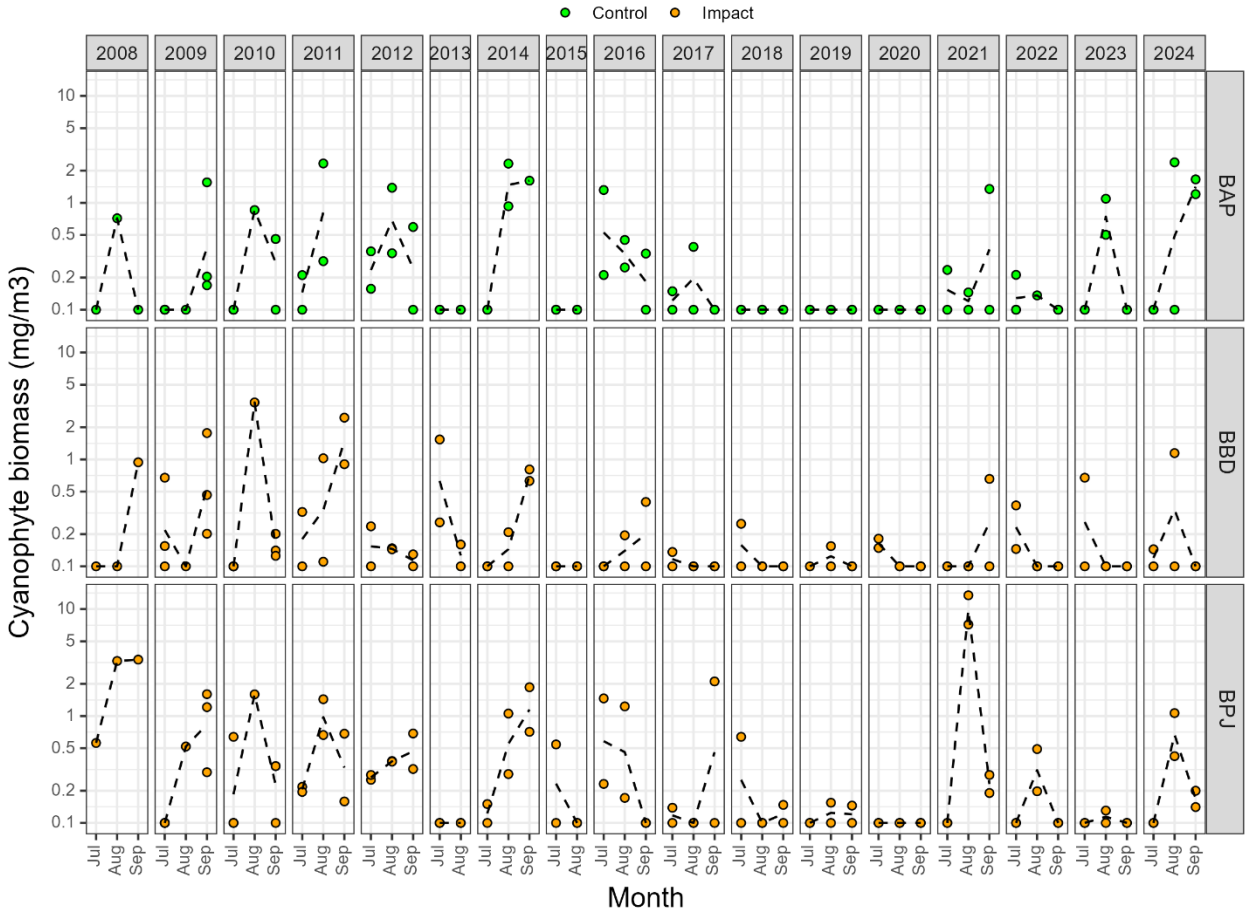


Figure E3-2. Chlorophyte biomass (mg/m^3) from Baker Lake since 2008.

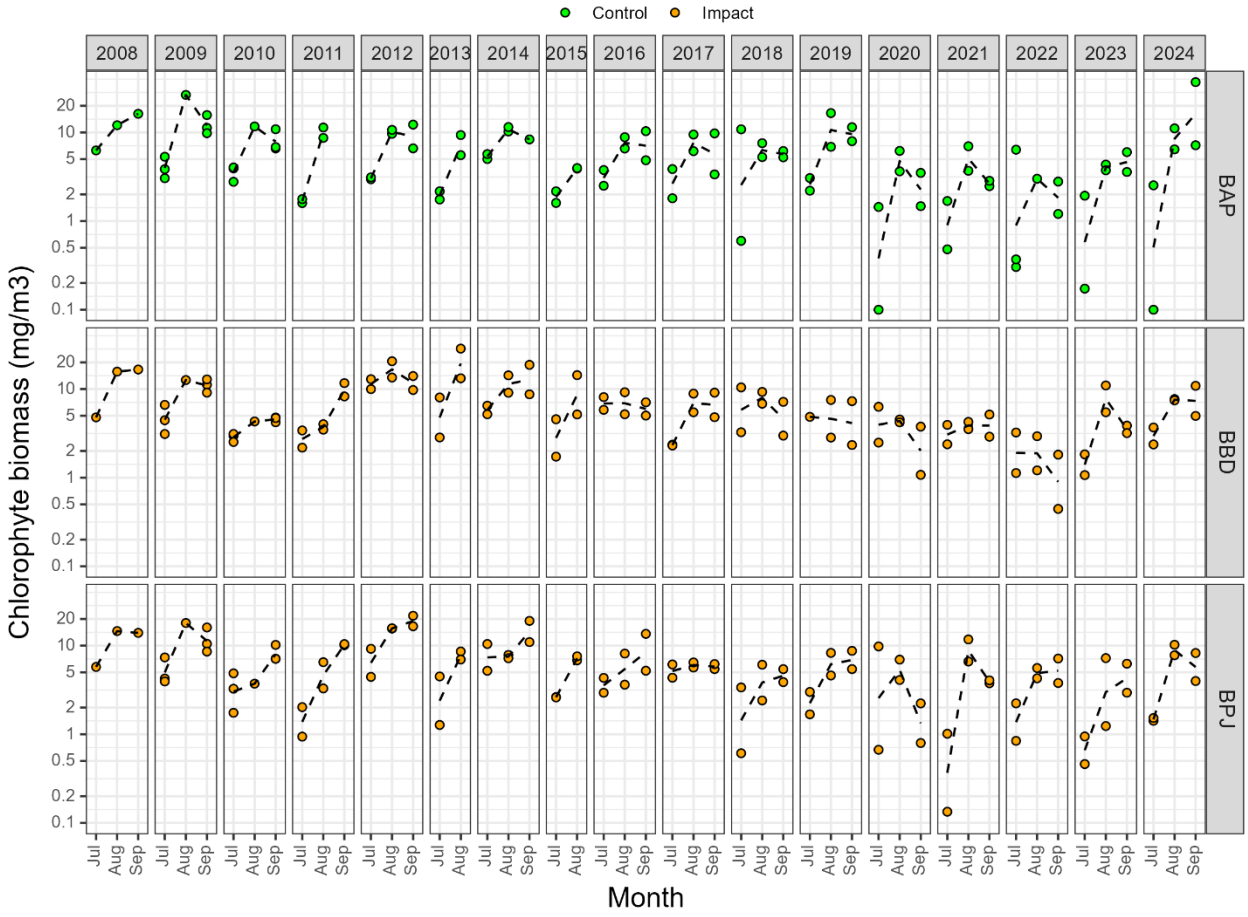


Figure E3-3. Chrysophyte biomass (mg/m^3) from Baker Lake since 2008.

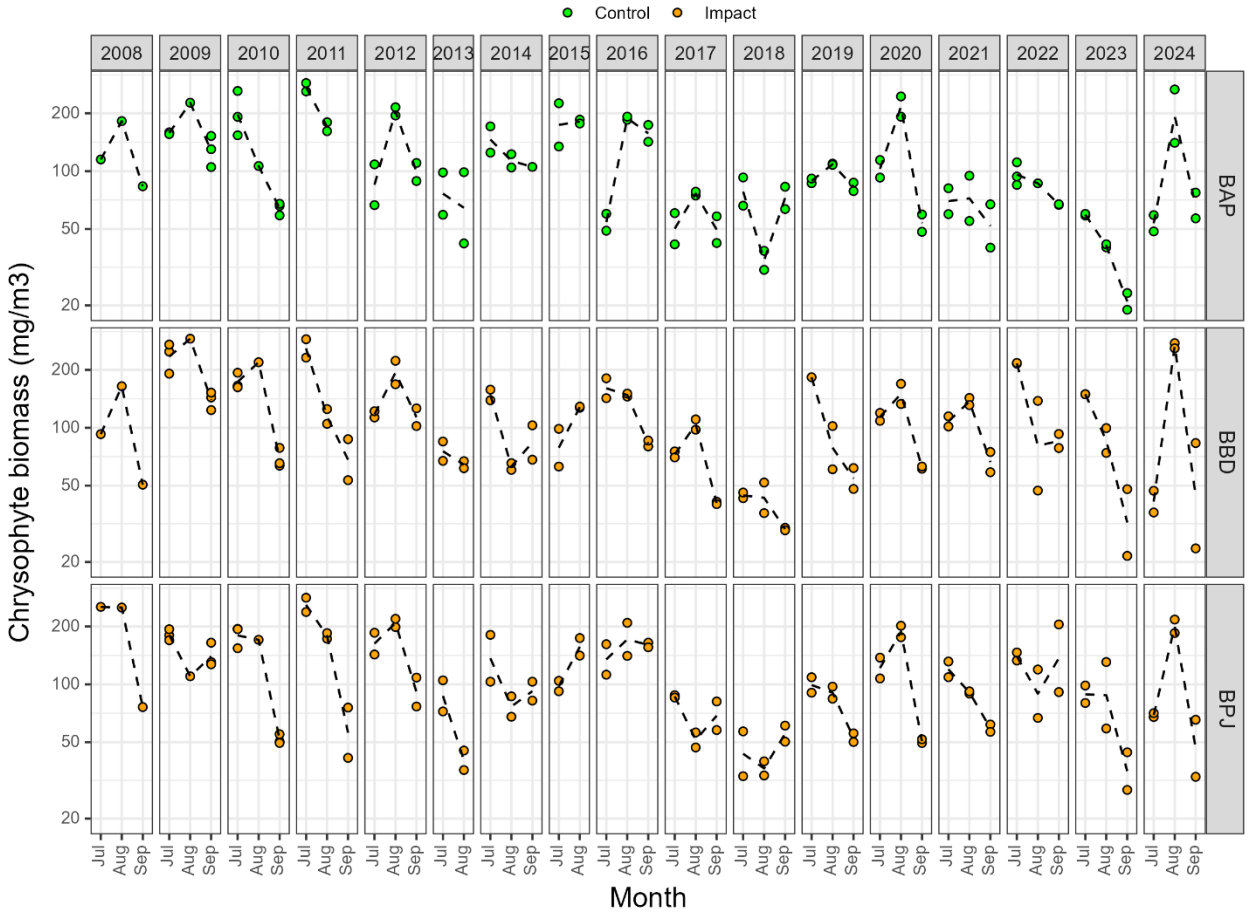


Figure E3-4. Diatoms biomass (mg/m^3) from Baker Lake since 2008.

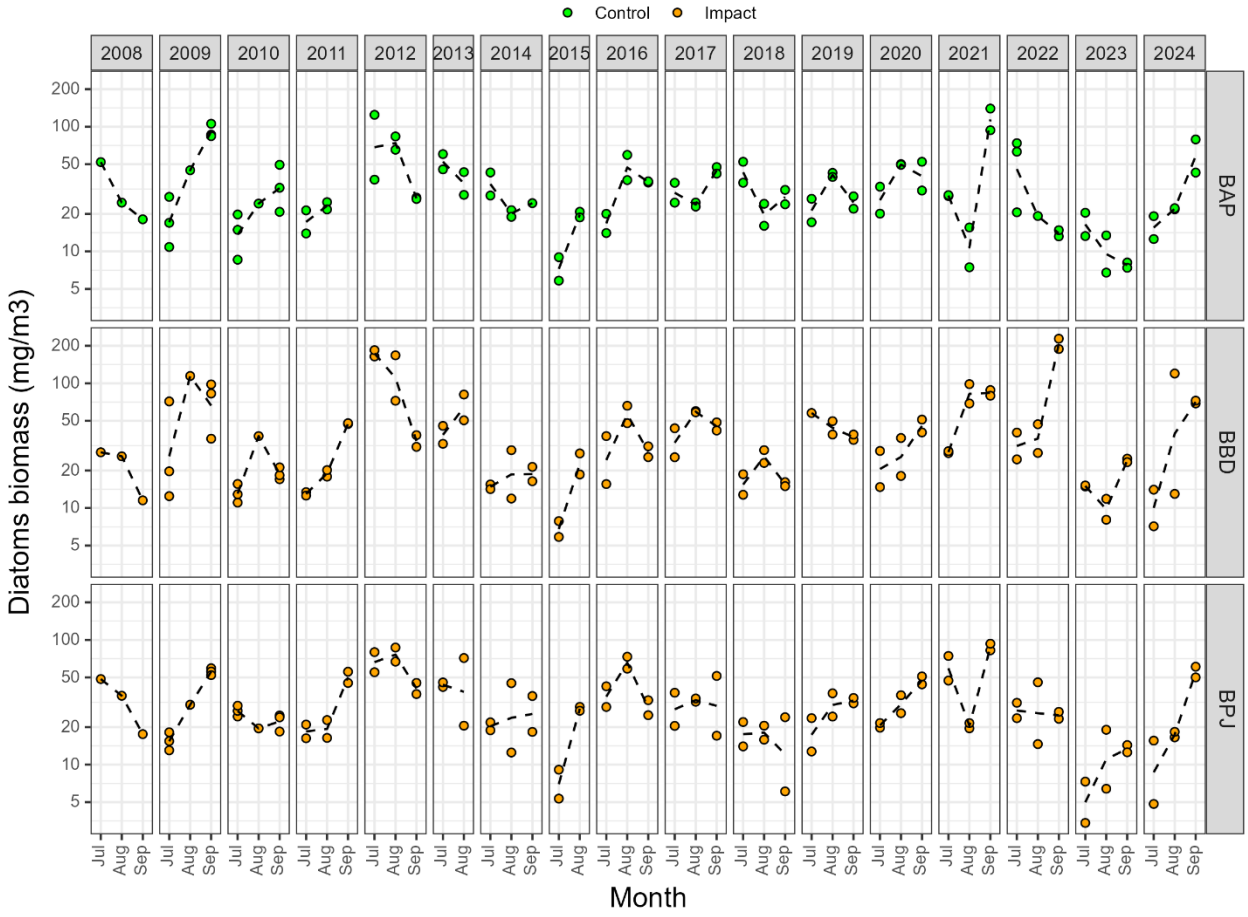


Figure E3-5. Cryptophytes biomass (mg/m^3) from Baker Lake since 2008.

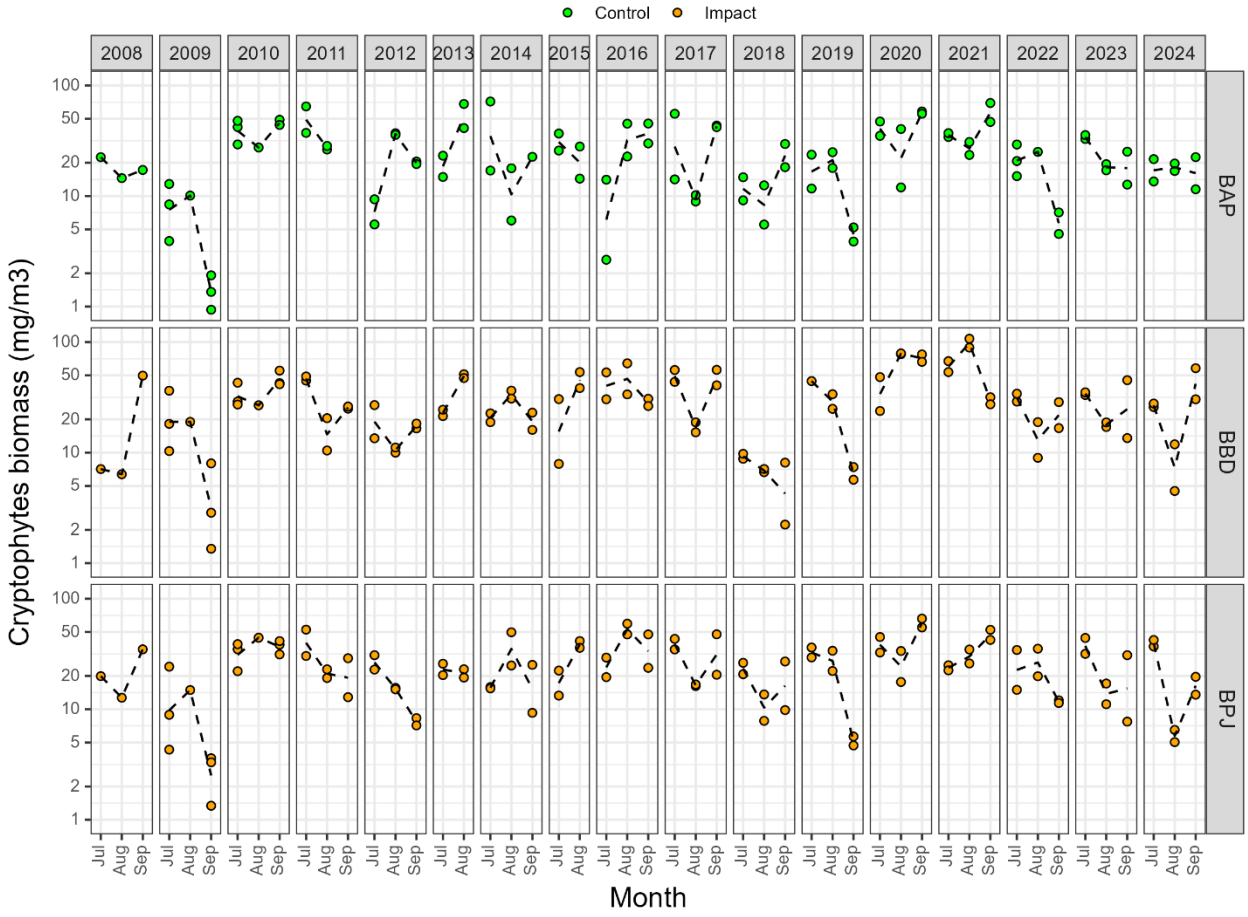


Figure E3-6. Dinoflagellates biomass (mg/m^3) from Baker Lake since 2008.

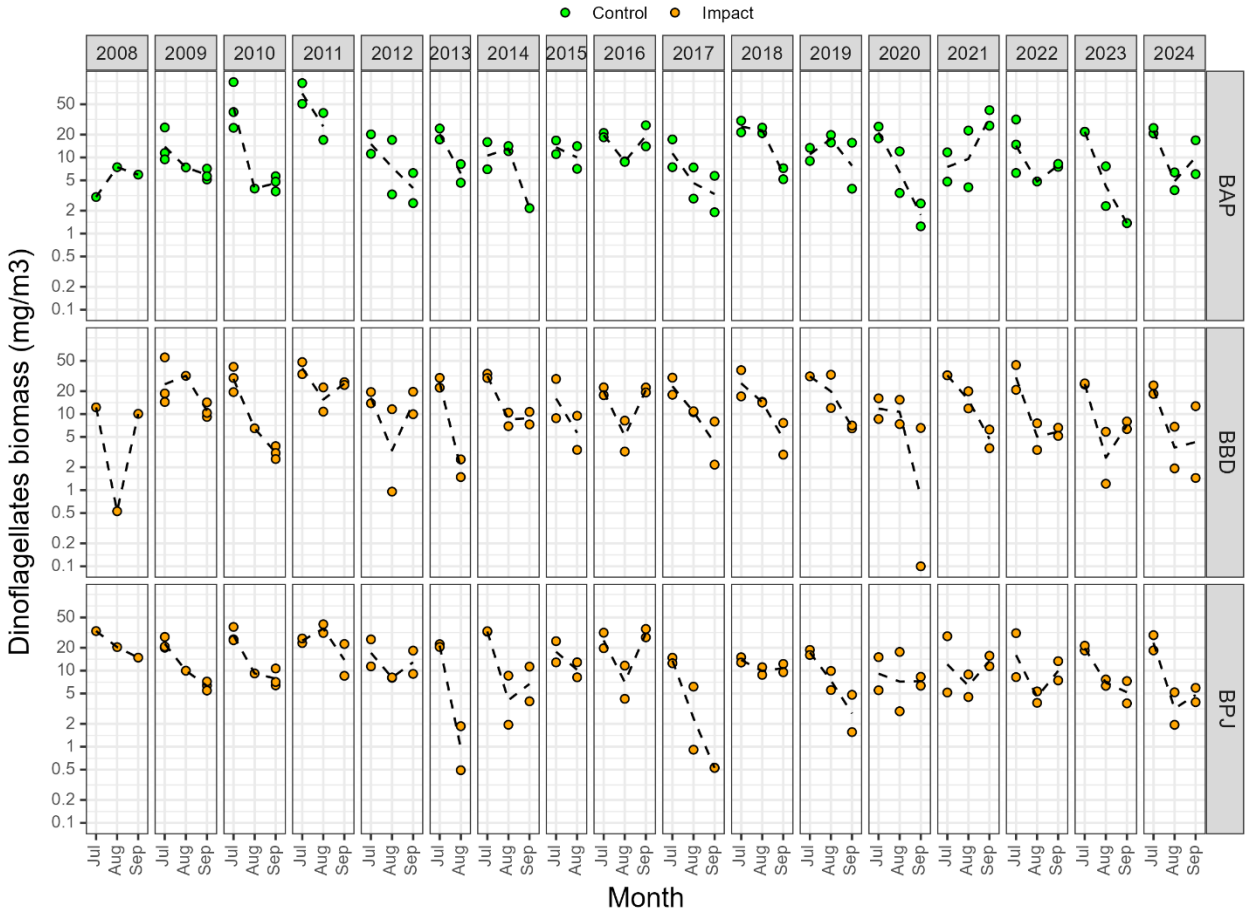


Figure E3-7. Phytoplankton density (cells/L) by major taxa group from Baker Lake since 2008.

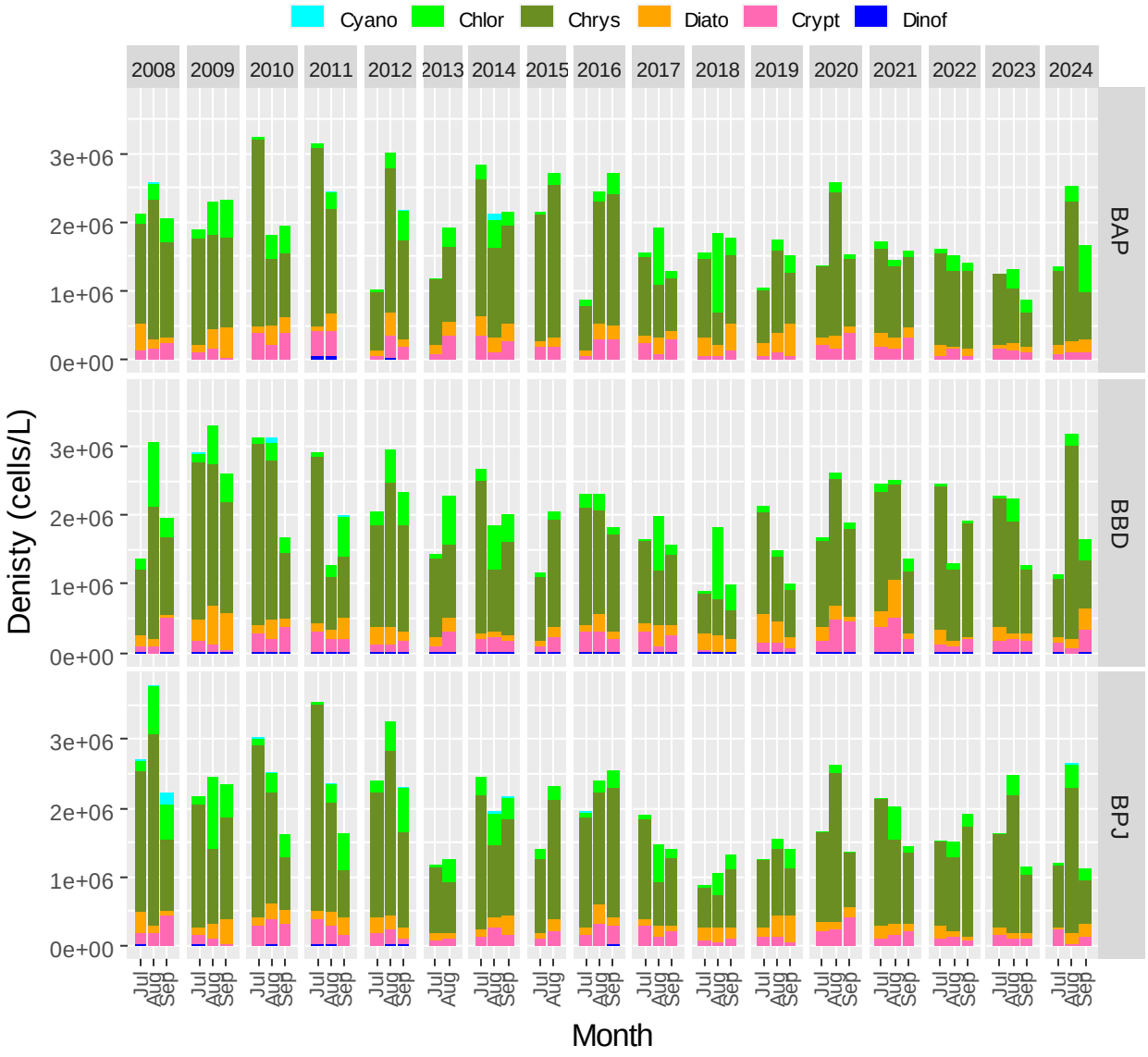


Figure E3-8. Relative phytoplankton density by major taxa group from Baker Lake since 2008.

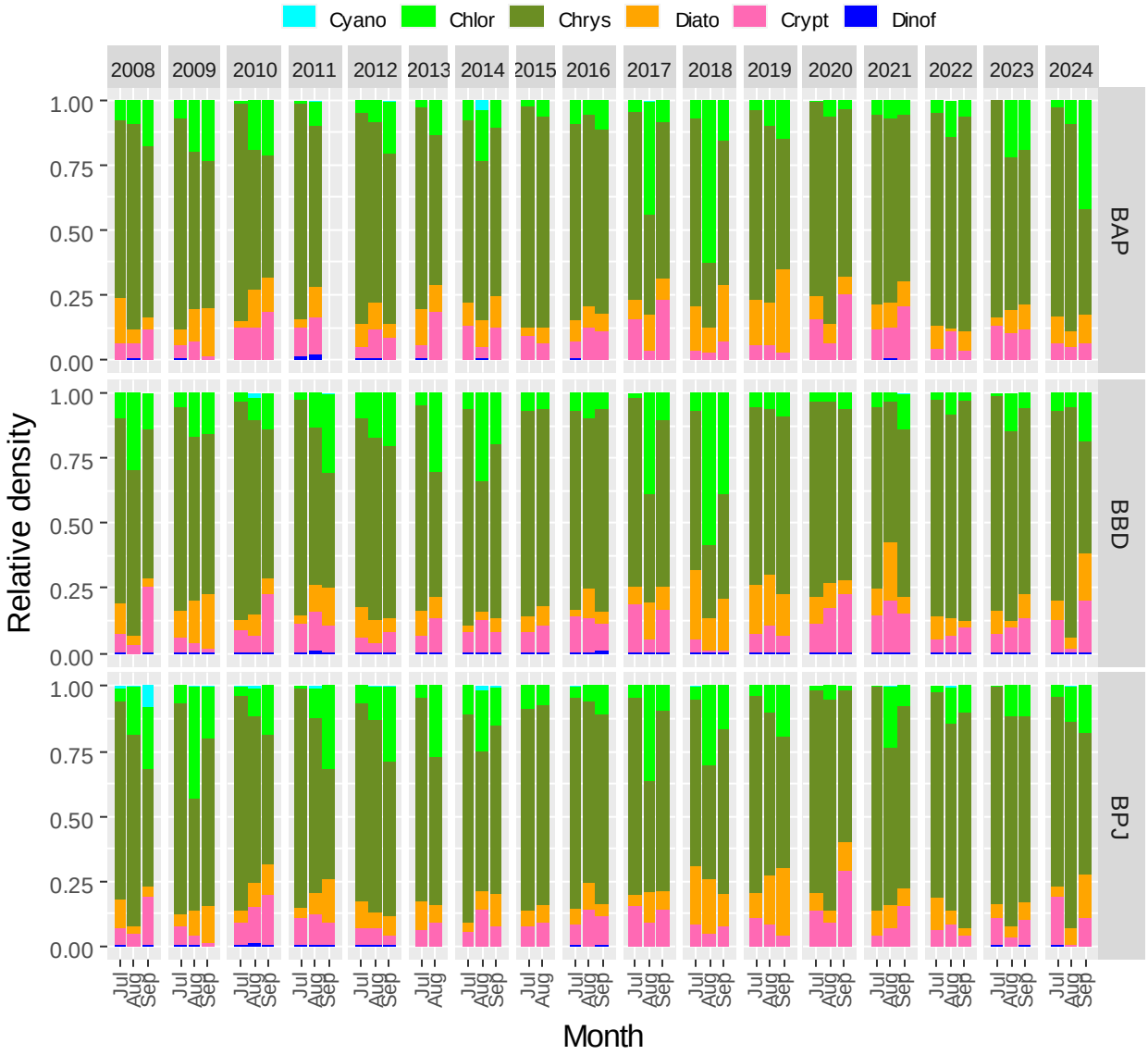


Figure E3-9. Cyanophyte density (cells/L) from Baker Lake since 2008.

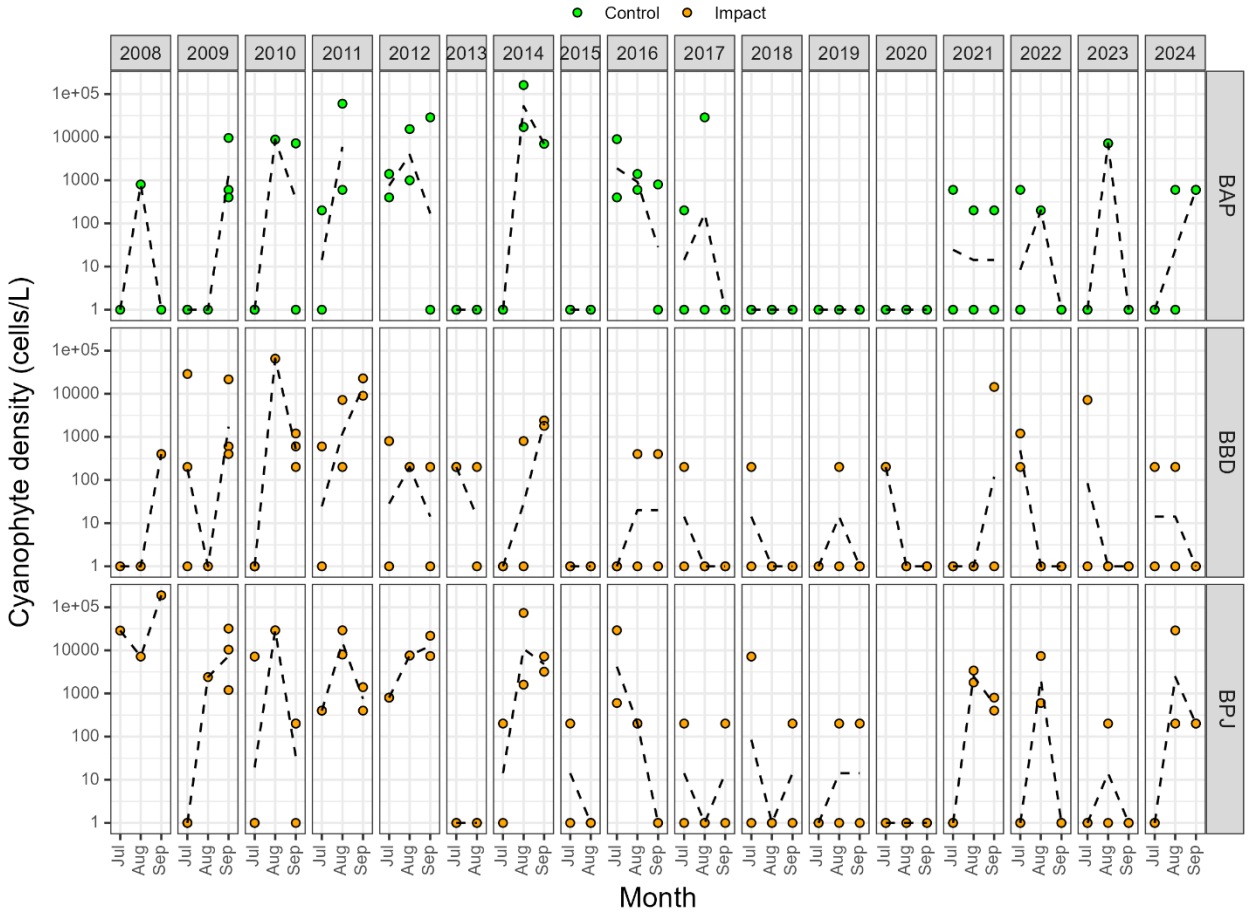


Figure E3-10. Chlorophyte density (cells/L) from Baker Lake since 2008.

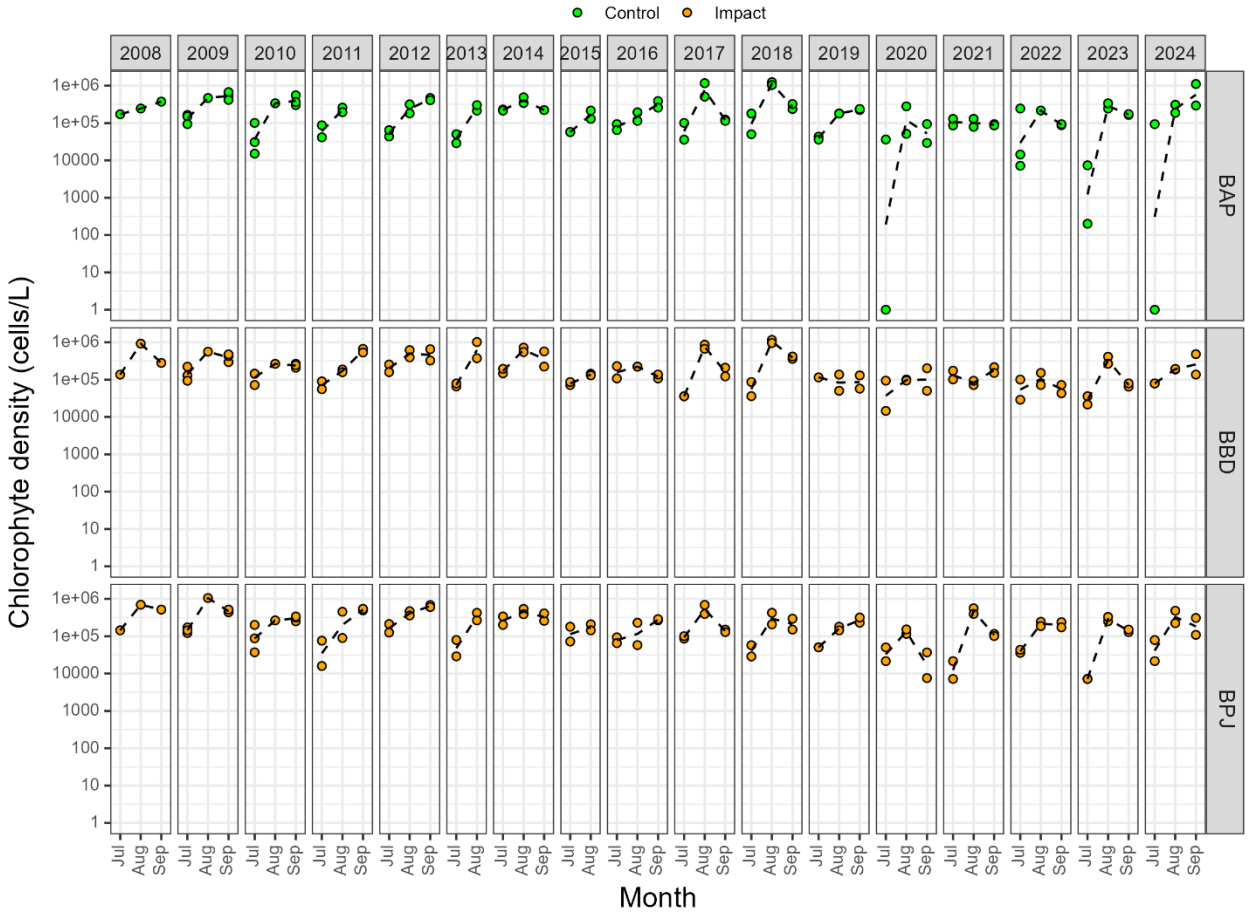


Figure E3-11. Chrysophyte density (cells/L) from Baker Lake since 2008.

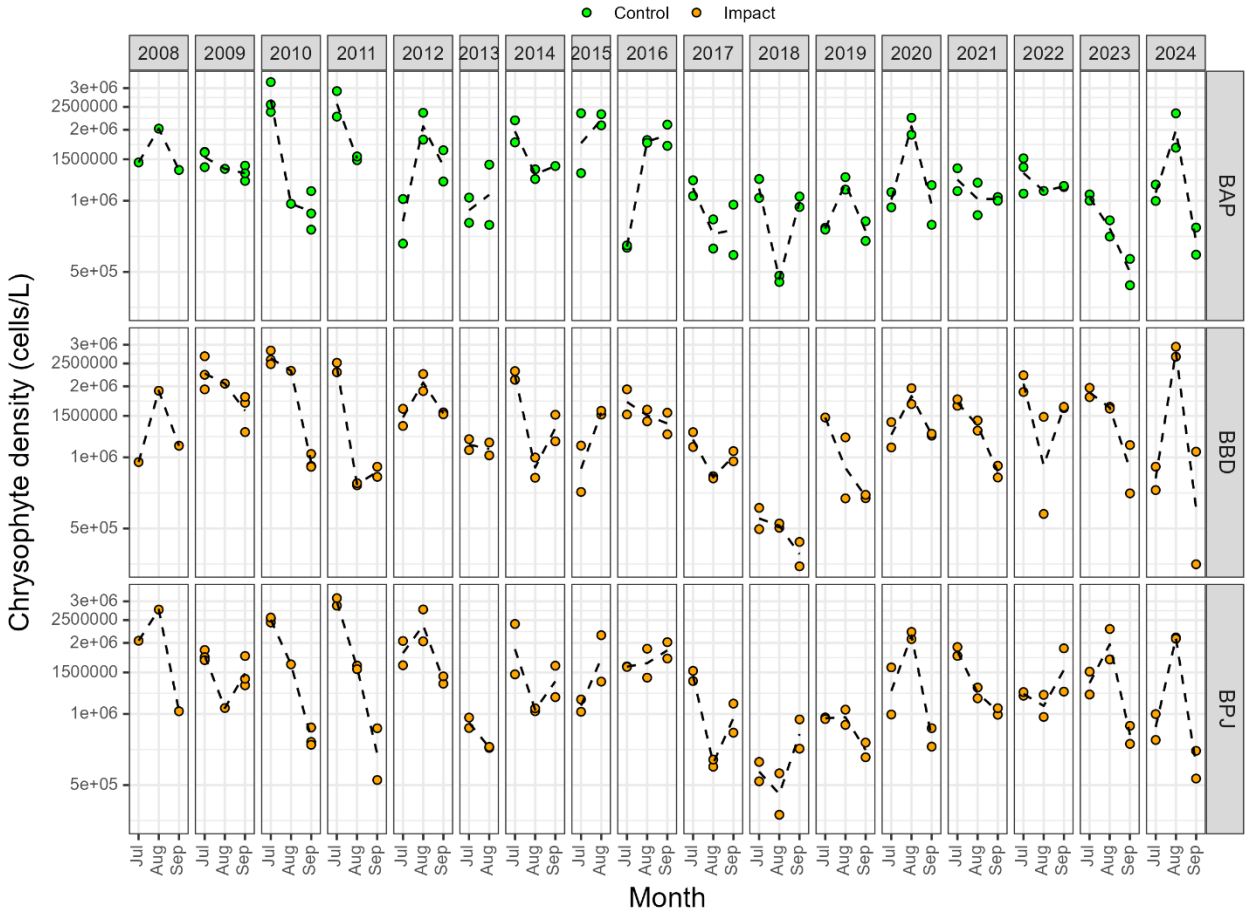


Figure E3-12. Diatoms density (cells/L) from Baker Lake since 2008.

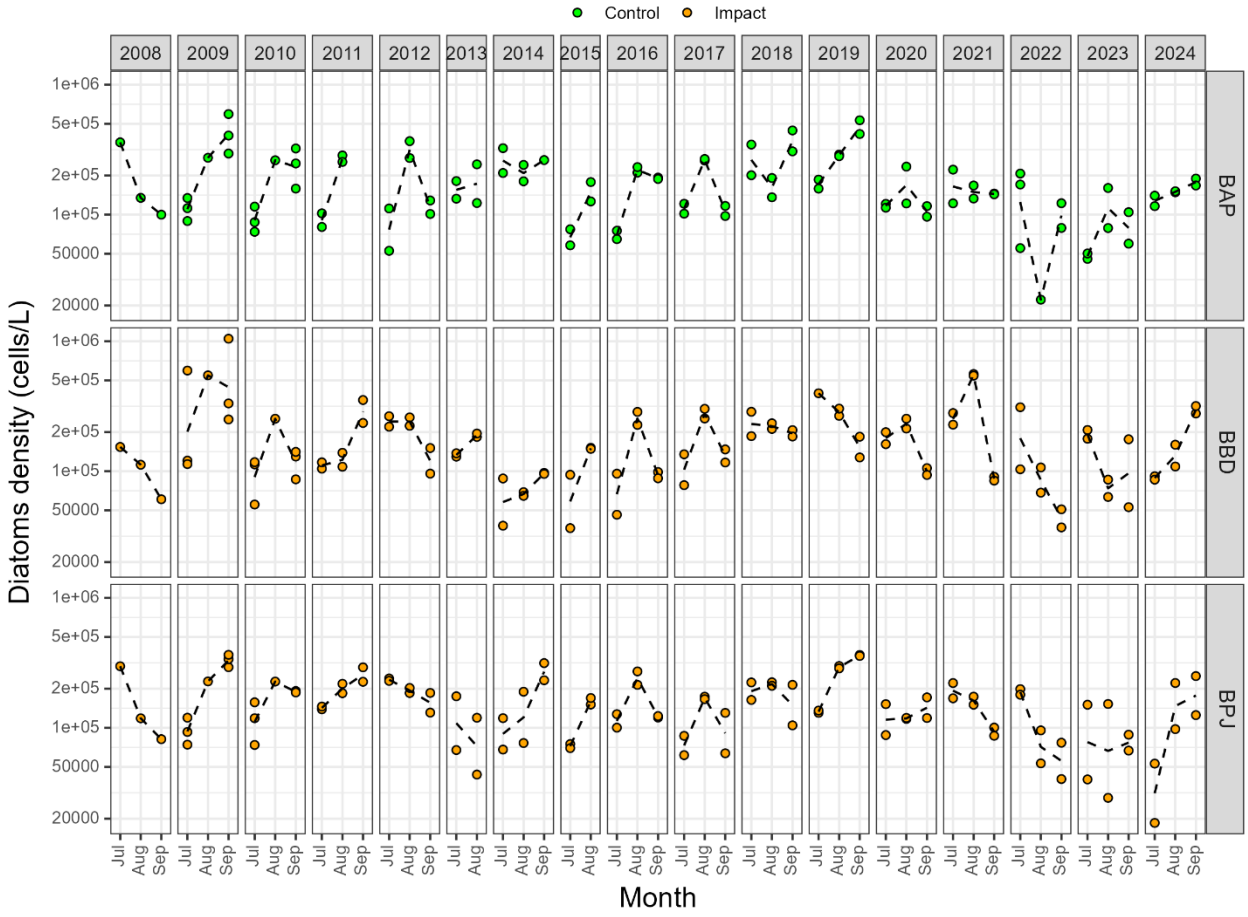


Figure E3-13. Cryptophytes density (cells/L) from Baker Lake since 2008.

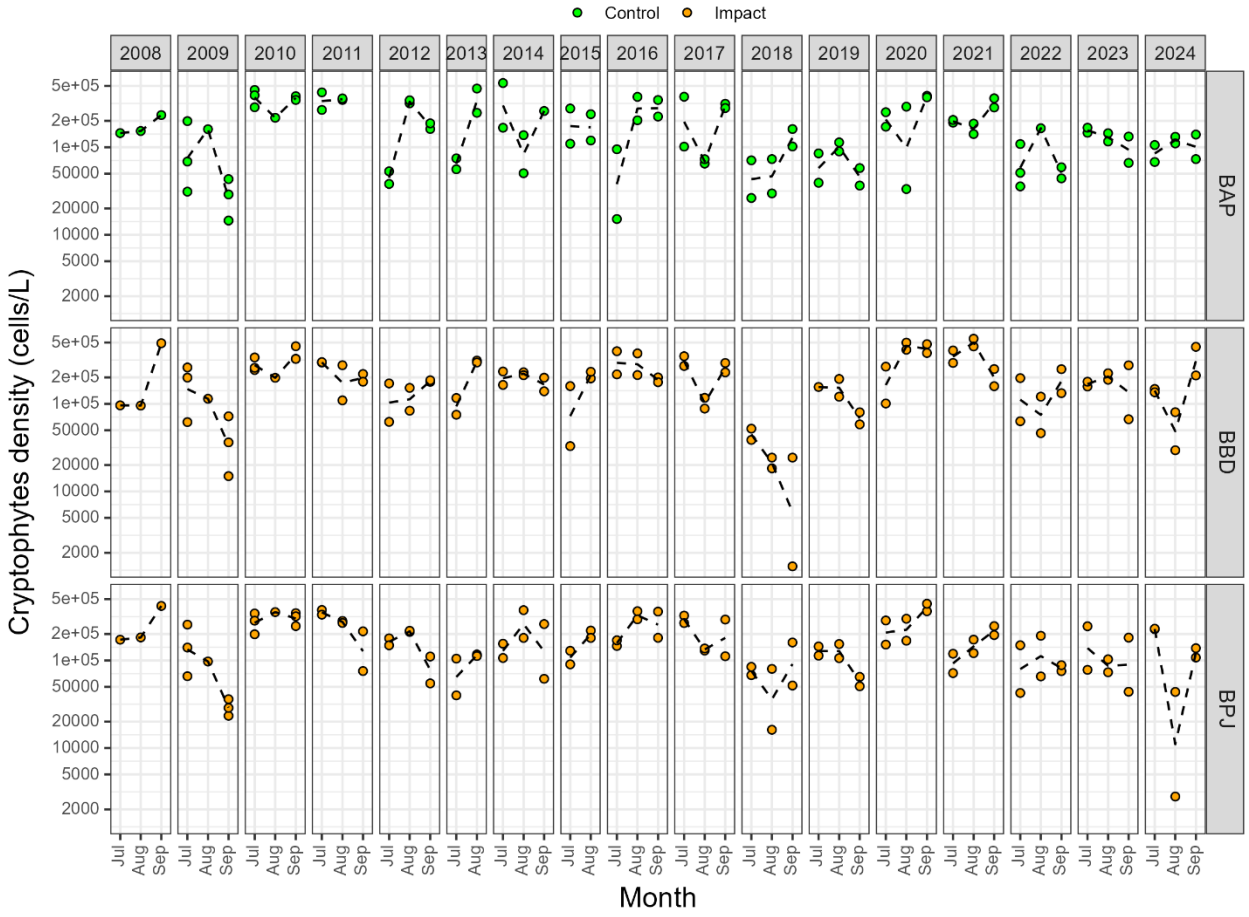


Figure E3-14. Dinoflagellate density (cells/L) from Baker Lake since 2008.

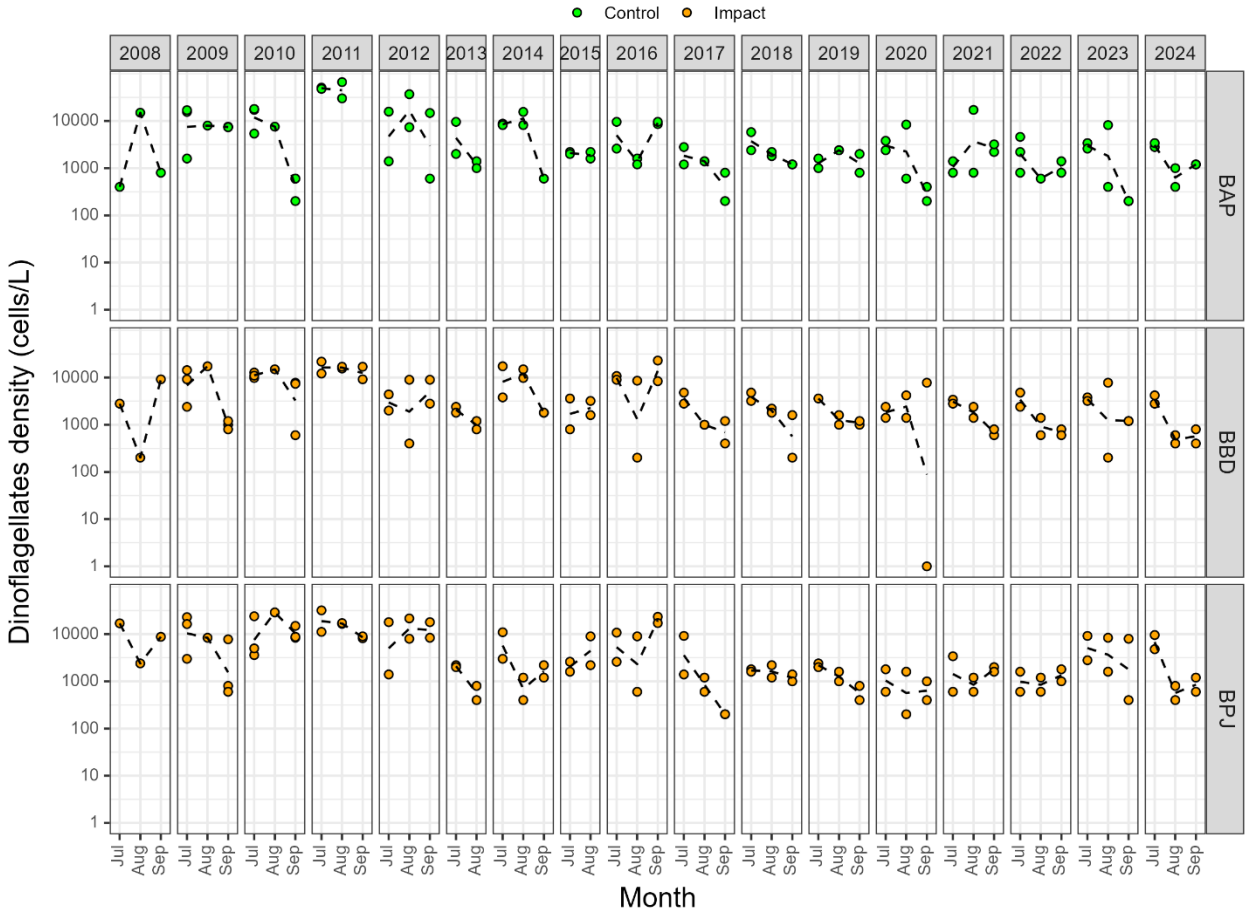
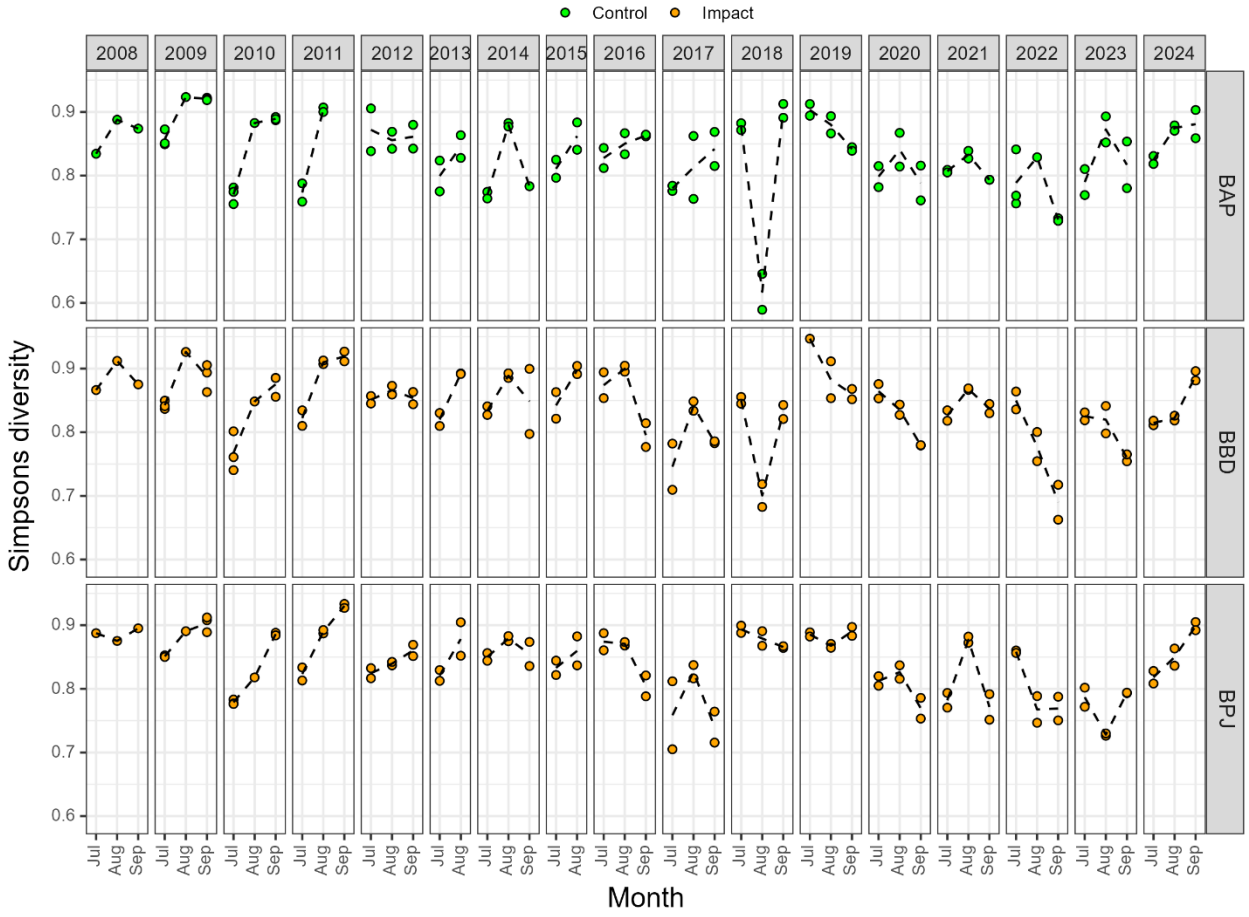


Figure E3-15. Simpsons' Diversity for the phytoplankton community from Baker Lake since 2008.



APPENDIX F
BENTHOS TAXONOMY DATA AND SUPPLEMENTAL PLOTS

Appendix F1
Benthos Data – Meadowbank Study Area Lakes

LIST OF TABLES – APPENDIX F1

Table F1-1. Benthic invertebrate abundance (#/m^2) and richness (# taxa) by major taxa group, Meadowbank study area lakes, 2024. 1
Table F1-2. Raw benthic invertebrate data from the Meadowbank study area lakes, 2024. 2

LIST OF FIGURES – APPENDIX F1

Figure F1-1. Oligochaete abundance (#/m^2) from Meadowbank lakes since 2006. 5
Figure F1-2. Insect abundance (#/m^2) from Meadowbank lakes since 2006. 6
Figure F1-3. Mollusc abundance (#/m^2) from Meadowbank lakes since 2006. 7
Figure F1-4. Other taxa abundance (#/m^2) from Meadowbank lakes since 2006. 8
Figure F1-5. Oligochaete richness (# of taxa) from Meadowbank lakes since 2006. 9
Figure F1-6. Insect richness (# of taxa) from Meadowbank lakes since 2006. 10
Figure F1-7. Mollusc richness (# of taxa) from Meadowbank lakes since 2006. 11
Figure F1-8. Other taxa richness (# of taxa) from Meadowbank lakes since 2006. 12
Figure F1-9. Simpsons' Diversity for the benthic invertebrate community at the Meadowbank lakes since 2006. 13
Figure F1-10. Bray-Curtis Index for the benthic invertebrate community at the Meadowbank lakes since 2006. 14

Table F1-1. Benthic invertebrate abundance (#/m2) and richness (# taxa) by major taxa group, Meadowbank study area lakes, 2024.

Area-Replicate	Date	Depth (m)	Abundance (#/m^2)					Richness (# taxa)					Simpson's Diversity	Bray-Curtis Index
			Oligochaetes	Insects	Molluscs	Other Taxa[1]	TOTAL	Oligochaetes	Insects	Molluscs	Other Taxa[1]	TOTAL		
Inuggugayualik Lake														
INUG-1	10-Aug-24	8.3	43	370	413	0	826	1	9	3	0	13	0.90	0.16
INUG-2	10-Aug-24	7.7	43	87	283	22	435	2	2	3	1	8	0.78	0.33
INUG-3	10-Aug-24	8.0	43	630	261	43	978	1	7	3	2	13	0.90	0.28
INUG-4	10-Aug-24	8.7	65	522	522	0	1,109	1	7	3	0	11	0.89	0.21
INUG-5	10-Aug-24	8.9	22	435	630	0	1,087	1	9	3	0	13	0.88	0.21
Area Mean			***43***	***409***	***422***	***13***	***887***	***1.2***	***6.8***	***3.0***	***0.6***	***11.6***	***0.87***	***0.24***
Pipedream Lake														
PDL-1	11-Aug-24	8.7	22	587	239	43	891	1	4	2	2	9	0.76	0.21
PDL-2	11-Aug-24	8.6	0	587	152	22	761	0	3	2	1	6	0.76	0.30
PDL-3	11-Aug-24	7.3	0	413	261	43	717	0	6	2	1	9	0.86	0.13
PDL-4	11-Aug-24	7.9	109	543	109	0	761	2	3	2	0	7	0.81	0.30
PDL-5	11-Aug-24	8.6	22	326	304	0	652	1	3	2	0	6	0.78	0.18
Area Mean			***30***	***491***	***213***	***21.7***	***757***	***0.8***	***3.8***	***2.0***	***0.8***	***7.4***	***0.79***	***0.22***
Second Portage Lake														
SP-1	19-Aug-24	7.8	22	935	326	43	1,326	1	11	2	1	15	0.89	0.28
SP-2	19-Aug-24	8.1	22	804	239	43	1,109	1	8	2	1	12	0.87	0.30
SP-3	19-Aug-24	8.7	0	500	261	22	783	0	7	2	1	10	0.90	0.21
SP-4	19-Aug-24	6.9	0	174	196	22	391	0	4	2	1	7	0.75	0.28
SP-5	19-Aug-24	7.8	22	391	413	43	870	1	7	3	1	12	0.86	0.23
Area Mean			***13***	***561***	***287***	***35***	***896***	***0.6***	***7.4***	***2.2***	***1.0***	***11.2***	***0.85***	***0.26***
Third Portage Lake - East Basin														
TPE-1	12-Aug-24	7.9	22	1,087	457	22	1,587	1	8	2	1	12	0.86	0.33
TPE-2	12-Aug-24	8.6	22	1,087	543	0	1,652	1	7	2	0	10	0.83	0.42
TPE-3	12-Aug-24	7.6	43	1,522	348	22	1,935	1	9	2	1	13	0.85	0.46
TPE-4	12-Aug-24	8.7	0	478	783	109	1,370	0	6	2	3	11	0.82	0.47
TPE-5	12-Aug-24	8.4	130	696	1,000	43	1,870	2	9	2	2	15	0.84	0.48
Area Mean			***43***	***974***	***626***	***39***	***1,683***	***1.0***	***7.8***	***2.0***	***1.4***	***12.2***	***0.84***	***0.43***
Third Portage Lake - North Basin														
TPN-1	9-Aug-24	8	0	239	0	22	261	0	5	0	1	6	0.91	0.35
TPN-2	9-Aug-24	9	65	565	348	22	1,000	2	7	2	1	12	0.89	0.12
TPN-3	9-Aug-24	6.8	43	565	239	152	1,000	2	11	2	3	18	0.94	0.23
TPN-4	9-Aug-24	8.5	0	957	152	22	1,130	0	7	2	1	10	0.63	0.44
TPN-5	9-Aug-24	7.4	0	109	22	0	130	0	3	1	0	4	0.87	0.47
Area Mean			***22***	***487***	***152***	***43***	***704***	***0.8***	***6.6***	***1.4***	***1.2***	***10.0***	***0.85***	***0.32***
Wally Lake														
WAL-1	9-Aug-24	8.9	0	4,652	826	87	5,565	0	8	2	3	13	0.82	0.76
WAL-2	9-Aug-24	8.7	22	3,696	870	87	4,674	1	9	2	2	14	0.76	0.73
WAL-3	9-Aug-24	8.5	0	1,370	783	87	2,239	0	6	2	3	11	0.80	0.53
WAL-4	9-Aug-24	9	0	2,261	370	109	2,739	0	11	2	2	15	0.80	0.62
WAL-5	9-Aug-24	9	22	3,065	500	65	3,652	1	9	2	2	14	0.74	0.70
Area Mean			***9***	***3,009***	***670***	***87***	***3,774***	***0.4***	***8.6***	***2.0***	***2.4***	***13.4***	***0.79***	***0.67***

Notes:

1. "Other taxa" includes flatworms (Turbellaria) and arthropods (Acalyptonotidae, Hygrobatidae, Lebertiidae, Oxidae, Pionidae, Harpacticoida, O. Notostraca, and Gammaracanthidae).

Table F1-2. Raw benthic invertebrate data from the Meadowbank study area lakes 2024.

Program	Meadowbank									
Location	Inuggugayualik Lake					Pipedream Lake				
Station	INUG					PDL				
Control/Impact?	Control					Control				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	10-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24	10-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24	11-Aug-24
Sample Depth (m)	8.3	7.7	8.0	8.7	8.9	8.7	8.6	7.3	7.9	8.6
ROUNDWORMS										
P. Nemata	2	2	-	-	2	3	1	-	1	2
FLATWORMS										
P. Platyhelminthes										
Cl. Turbellaria										
indeterminate	-	-	-	-	-	-	-	-	-	-
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Naididae										
S.F. Naidinae										
Nais	-	-	-	-	-	-	-	-	-	-
S.F. Tubificinae										
Tasserkidrilus americanus	-	-	-	-	-	-	-	-	-	-
immatures with hair chaetae	2	1	-	-	-	-	-	-	2	-
S.F. Rhyacodrilinae										
Rhyacodrilus coccineus	-	-	-	-	-	-	-	-	-	-
F. Lumbriculidae										
Lumbriculus	-	1	2	3	1	1	-	-	3	1
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
F. Acalyptonotidae										
Acalyptonotus	-	-	-	-	-	1	-	-	-	-
F. Axonopsidae										
?Neobrachypoda	-	-	-	-	-	-	-	-	-	-
F. Lebertiidae										
Lebertia	-	-	1	-	-	-	1	2	-	-
F. Oxidae										
Oxus	-	1	-	-	-	1	-	-	-	-
F. Pionidae										
indeterminate	-	-	-	-	-	-	-	-	-	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	2	3	6	2	5	2	-	6	-	2
FAIRY SHRIMPS										
O. Notostraca										
Lepidurus arcticus	-	-	1	-	-	-	-	-	-	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
immature	-	-	-	-	-	-	-	-	-	-
F. Apataniidae										
Apatania	-	-	-	-	-	-	-	-	-	-
F. Limnephilidae										
Grensia praeterita	1	-	-	-	-	-	-	-	-	-
pupae	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	**3**	**-**	**4**	**3**	**3**	**-**	**1**	**2**	**1**	**-**
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	-	-	-	-	-	-	-	-	-	-
Corynocera ambigua	1	-	-	-	-	-	-	-	-	-
Dicrotendipes	-	-	-	-	-	-	-	-	-	-
Micropsectra	1	-	10	4	2	-	-	-	-	-
Microtendipes	1	-	-	4	2	-	-	-	-	-
Paratanytarsus	-	-	-	1	1	-	-	-	-	-
Sergentia	-	-	-	-	-	-	-	-	-	-
Stictochironomus	3	-	-	1	5	5	13	4	9	6
Tanytarsus	1	-	2	-	1	-	-	-	-	-
S.F. Diamesinae										
Protanypus	1	-	1	3	1	-	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	-	-	2	2	2	-	-	-	-	-
Cricotopus	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	-	-	2	-	-	-	-	1	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	-	-	-	-	-	-	-	-	-	-
Psectrocladius	-	-	-	-	-	3	-	1	3	-
Zalutschia	-	-	-	-	-	-	-	1	-	-
Orthocladiinae Genus "Greenland"	-	-	-	-	-	-	-	-	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-
S.F. Prodiamesinae										
Monodiamesa	3	2	6	-	2	1	2	1	-	1
S.F. Tanypodinae										
Ablabesmyia	-	-	-	-	-	-	-	-	-	-
Procladius	2	2	2	6	1	18	11	9	12	8
Thienemannimyia complex	-	-	-	-	-	-	-	-	-	-
F. Empididae										
Chelifera/Metachela	-	-	-	-	-	-	-	-	-	-
MOLLUSCS										
P. Mollusca										
SNAILS										
Cl. Gastropoda										
F. Valvatidae										
Valvata lewisi	-	-	-	-	-	-	-	-	-	-
Valvata	-	-	-	-	-	-	-	-	-	-
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium/Cyclocalyx	6	9	4	11	7	3	3	5	3	10
Pisidium (Cyclocalyx/Neopisidium)	9	3	7	9	10	8	4	7	2	4
Sphaerium nitidum	4	1	1	4	12	-	-	-	-	-
TOTAL NUMBER OF ORGANISMS	42	25	51	53	57	46	36	39	36	34
TOTAL NUMBER OF TAXA [a]	15	10	14	12	15	11	7	10	8	8
[a] Bold entries excluded from taxa count										
R (Richness) - totals [2,3]										
Total	13	8	13	11	13	9	6	9	7	6
Oligochaete	1	2	1	1	1	1	0	0	2	1
Insect	9	2	7	7	9	4	3	6	3	3
Mollusc	3	3	3	3	3	2	2	2	2	2
Other[4]	0	1	2	0	0	2	1	1	0	0
Abundance (raw) - totals [5,6]										
Total	38	20	45	51	50	41	35	33	35	30
Oligochaete	2	2	2	3	1	1	0	0	5	1
Insect	17	4	29	24	20	27	27	19	25	15
Mollusc	19	13	12	24	29	11	7	12	5	14
Other[4]	0	1	2	0	0	2	1	2	0	0
N (Abundance) - #/m²										
Total	826	435	978	1,109	1,087	891	761	717	761	652
Oligochaete	43	43	43	65	22	22	0	0	109	22
Insect	370	87	630	522	435	587	587	413	543	326
Mollusc	413	283	261	522	630	239	152	261	109	304
Other[4]	0	22	43	0	0	43	22	43	0	0

Notes:

1. Benthic invertebrate count data shown in this table are from composite of two grabs sieved to 500 µm.
2. Richness totals exclude P. Nemata, Cl. Ostracoda, indeterminates (O. Acarina, F. Lumbriculidae), immatures (S.F. Tubificinae, O. Acarina), and pupae.
3. Pupae and immatures (bolded values) are excluded from the richness totals if other life stages are present in the replicate sample.
4. Other Taxa include: Cl. Turbellaria, F. Acalyptonotidae, F. Hygrobatidae, F. Lebertiidae, F. Oxidae, F. Pionidae, O. Harpacticoida, O. Notostraca, and F. Gammaracanthidae.
5. Abundance totals exclude P. Nemata and Cl. Ostracoda.
6. Raw abundance from two grabs (grab area = 0.023 m^2).

Table F1-2. Raw benthic invertebrate data from the Meadowbank study area lakes 2024.

Program	Meadowbank									
Location	Second Portage Lake					Third Portage Lake - East Basin				
Station	SP					TPE				
Control/Impact?	Impact					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	19-Aug-24	19-Aug-24	19-Aug-24	19-Aug-24	19-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24	12-Aug-24
Sample Depth (m)	7.8	8.1	8.7	6.9	7.8	7.9	8.6	7.6	8.7	8.4
ROUNDWORMS										
P. Nemata	-	-	3	1	1	-	-	1	4	2
FLATWORMS										
P. Platyhelminthes										
Cl. Turbellaria										
indeterminate	-	-	-	-	-	-	-	1	1	-
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Naididae										
S.F. Naidinae										
Nais	-	-	-	-	-	-	-	-	-	-
S.F. Tubificinae										
Tasserkidrilus americanus	-	-	-	-	-	-	-	-	-	-
immatures with hair chaetae	1	1	-	-	-	-	-	-	-	-
S.F. Rhyacodrilinae										
Rhyacodrilus coccineus	-	-	-	-	-	-	-	2	-	5
F. Lumbriculidae										
Lumbriculus	-	-	-	-	1	1	1	-	-	1
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
F. Acalyptonotidae										
Acalyptonotus	-	-	-	-	-	-	-	-	2	-
F. Axonopsidae										
?Neobrachypoda	-	-	-	-	-	-	-	-	-	-
F. Lebertiidae										
Lebertia	-	-	-	-	-	-	-	-	-	1
F. Oxidae										
Oxus	2	2	1	1	2	1	-	-	2	1
F. Pionidae										
indeterminate	-	-	-	-	-	-	-	-	-	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	2	-	1	-	-	75	52	76	28	54
FAIRY SHRIMPS										
O. Notostraca										
Lepidurus arcticus	-	-	-	-	-	-	-	-	-	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
immature	-	-	-	-	-	-	-	-	-	-
F. Apataniidae										
Apatania	-	-	-	-	-	-	-	-	-	-
F. Limnephilidae										
Grensia praeterita	-	-	-	-	-	-	-	-	-	-
pupae	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	**-**	**1**	**-**	**-**	**-**	**3**	**1**	**3**	**1**	**2**
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	-	-	-	-	-	-	-	-	-	-
Corynocera ambigua	-	-	-	-	-	-	-	-	-	-
Dicrotendipes	-	-	-	-	-	-	-	-	-	-
Micropsectra	12	12	4	-	1	3	1	3	3	5
Microtendipes	9	5	5	-	-	-	-	-	-	-
Paratanytarsus	1	2	3	-	1	17	22	22	7	8
Sergentia	-	-	-	-	-	-	-	-	-	-
Stictochironomus	4	2	2	1	6	7	6	22	2	2
Tanytarsus	1	1	3	-	-	-	-	-	-	-
S.F. Diamesinae										
Protanypus	1	-	1	-	1	-	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	1	-	-	-	-	-	-	-	-	-
Cricotopus	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	-	-	-	-	-	1	6	6	5	5
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	-	-	-	-	-	-	-	-	-	-
Psectrocladius	-	1	-	-	1	1	-	1	-	-
Zalutschia	1	-	-	-	-	-	-	1	-	1
Orthocladiinae Genus "Greenland"	-	-	-	-	-	-	-	2	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-
S.F. Prodiamesinae										
Monodiamesa	3	2	-	1	-	3	2	-	-	1
S.F. Tanypodinae										
Ablabesmyia	-	-	-	-	-	-	-	-	-	-
Procladius	9	11	5	5	6	14	11	5	2	3
Thienemannimyia complex	1	-	-	1	2	-	1	5	2	3
F. Empididae										
Chelifera/Metachela	-	-	-	-	-	1	-	-	-	2
MOLLUSCS										
P. Mollusca										
SNAILS										
Cl. Gastropoda										
F. Valvatidae										
Valvata lewisi	-	-	-	-	-	-	-	-	-	-
Valvata	-	-	-	-	-	-	-	-	-	-
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium/Cyclocalyx	4	6	6	1	12	13	8	4	17	18
Pisidium (Cyclocalyx/Neopisidium)	11	5	6	8	6	8	17	12	19	28
Sphaerium nitidum	-	-	-	-	1	-	-	-	-	-
TOTAL NUMBER OF ORGANISMS	63	51	40	19	41	148	128	166	95	142
TOTAL NUMBER OF TAXA [a]	16	12	12	8	13	13	11	15	13	17
[a] Bold entries excluded from taxa count										
R (Richness) - totals [2,3]										
Total	15	12	10	7	12	12	10	13	11	15
Oligochaete	1	1	0	0	1	1	1	1	0	2
Insect	11	8	7	4	7	8	7	9	6	9
Mollusc	2	2	2	2	3	2	2	2	2	2
Other[4]	1	1	1	1	1	1	0	1	3	2
Abundance (raw) - totals [5,6]										
Total	61	51	36	18	40	73	76	89	63	86
Oligochaete	1	1	0	0	1	1	1	2	0	6
Insect	43	37	23	8	18	50	50	70	22	32
Mollusc	15	11	12	9	19	21	25	16	36	46
Other[4]	2	2	1	1	2	1	0	1	5	2
N (Abundance) - #/m²										
Total	1,326	1,109	783	391	870	1,587	1,652	1,935	1,370	1,870
Oligochaete	22	22	0	0	22	22	22	43	0	130
Insect	935	804	500	174	391	1,087	1,087	1,522	478	696
Mollusc	326	239	261	196	413	457	543	348	783	1,000
Other[4]	43	43	22	22	43	22	0	22	109	43

Notes:

1. Benthic invertebrate count data shown in this table are from composite of two grabs sieved to 500 µm.
2. Richness totals exclude P. Nemata, Cl. Ostracoda, indeterminates (O. Acarina, F. Lumbriculidae), immatures (S.F. Tubificinae, O. Acarina), and pupae.
3. Pupae and immatures (bolded values) are excluded from the richness totals if other life stages are present in the replicate sample.
4. Other Taxa include: Cl. Turbellaria, F. Acalyptonotidae, F. Hygrobatidae, F. Lebertiidae, F. Oxidae, F. Pionidae, O. Harpacticoida, O. Notostraca, and F. Gammaracanthidae.
5. Abundance totals exclude P. Nemata and Cl. Ostracoda.
6. Raw abundance from two grabs (grab area = 0.023 m^2).

Table F1-2. Raw benthic invertebrate data from the Meadowbank study area lakes 2024.

Program	Meadowbank									
Location	Third Portage Lake - North Basin					Wally Lake				
Station	TPN					WAL				
Control/Impact?	Impact					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24	9-Aug-24
Sample Depth (m)	8	9	6.8	8.5	7.4	8.9	8.7	8.5	9	9
ROUNDWORMS										
P. Nemata	2	1	7	2	2	-	1	-	3	1
FLATWORMS										
P. Platyhelminthes										
Cl. Turbellaria										
indeterminate	-	-	4	-	-	2	2	-	3	2
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Naididae										
S.F. Naidinae										
Nais	-	-	-	-	-	-	-	-	-	-
S.F. Tubificinae										
Tasserkidrilus americanus	-	-	-	-	-	-	-	-	-	-
immatures with hair chaetae	-	-	-	-	-	-	-	-	-	-
S.F. Rhyacodrilinae										
Rhyacodrilus coccineus	-	1	1	-	-	-	-	-	-	-
F. Lumbriculidae										
Lumbriculus	-	2	1	-	-	-	1	-	-	1
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
F. Acalyptonotidae										
Acalyptonotus	-	1	1	1	-	-	-	-	-	-
F. Axonopsidae										
?Neobrachypoda	-	-	-	-	-	-	-	-	-	-
F. Lebertiidae										
Lebertia	1	-	-	-	-	1	2	1	2	-
F. Oxidae										
Oxus	-	-	2	-	-	1	-	2	-	1
F. Pionidae										
indeterminate	-	-	-	-	-	-	-	-	-	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	2	4	23	5	-	58	18	8	14	15
FAIRY SHRIMPS										
O. Notostraca										
Lepidurus arcticus	-	-	-	-	-	-	-	1	-	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
immature	-	-	-	-	-	-	-	-	-	-
F. Apataniidae										
Apatania	-	-	-	-	-	-	-	-	-	-
F. Limnephilidae										
Grensia praeterita	-	-	1	-	-	-	-	-	-	-
pupae	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	**1**	**3**	**5**	**3**	**-**	**4**	**10**	**6**	**2**	**-**
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	-	-	-	-	-	8	6	-	1	-
Corynocera ambigua	-	-	-	-	-	80	93	26	46	77
Dicrotendipes	-	-	-	-	-	-	-	-	-	-
Micropsectra	1	1	5	-	-	-	-	-	27	6
Microtendipes	-	-	-	-	-	-	-	-	-	6
Paratanytarsus	-	-	-	2	-	45	3	1	6	7
Sergentia	-	-	-	-	-	-	-	-	-	-
Stictochironomus	3	6	2	31	2	27	27	20	8	27
Tanytarsus	-	-	-	-	-	37	11	1	-	7
S.F. Diamesinae										
Protanypus	-	-	-	-	-	-	-	-	-	1
S.F. Orthocladiinae										
Abiskomyia	-	-	-	-	-	-	-	-	-	-
Cricotopus	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	2	1	1	1	-	-	2	-	1	-
Mesocricotopus	-	-	1	-	-	-	-	-	-	-
Paracladius	-	-	1	-	-	-	-	-	-	-
Psectrocladius	2	4	1	3	-	2	-	1	1	-
Zalutschia	-	1	3	1	-	-	-	-	-	-
Orthocladiinae Genus "Greenland"	-	-	-	-	-	-	-	-	-	-
indeterminate	-	-	-	-	1	-	-	-	-	-
S.F. Prodiamesinae										
Monodiamesa	-	-	1	-	2	1	1	-	1	-
S.F. Tanypodinae										
Ablabesmyia	-	-	-	-	-	-	2	-	1	1
Procladius	2	8	4	2	-	10	15	8	9	9
Thienemannimyia complex	-	2	1	-	-	-	-	-	1	-
F. Empididae										
Chelifera/Metachela	-	-	-	1	-	-	-	-	-	-
MOLLUSCS										
P. Mollusca										
SNAILS										
Cl. Gastropoda										
F. Valvatidae										
Valvata lewisi	-	-	-	-	-	-	-	-	-	-
Valvata	-	-	-	-	-	-	-	-	-	-
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium/Cyclocalyx	-	6	5	5	-	32	35	31	15	21
Pisidium (Cyclocalyx/Neopisidium)	-	10	6	2	1	6	5	5	2	2
Sphaerium nitidum	-	-	-	-	-	-	-	-	-	-
TOTAL NUMBER OF ORGANISMS	16	51	76	59	8	314	234	111	143	184
TOTAL NUMBER OF TAXA [a]	8	14	20	13	5	14	16	12	17	16
[a] Bold entries excluded from taxa count										
R (Richness) - totals [2,3]										
Total	6	12	18	10	4	13	14	11	15	14
Oligochaete	0	2	2	0	0	0	1	0	0	1
Insect	5	7	11	7	3	8	9	6	11	9
Mollusc	0	2	2	2	1	2	2	2	2	2
Other[4]	1	1	3	1	0	3	2	3	2	2
Abundance (raw) - totals [5,6]										
Total	12	46	46	52	6	256	215	103	126	168
Oligochaete	0	3	2	0	0	0	1	0	0	1
Insect	11	26	26	44	5	214	170	63	104	141
Mollusc	0	16	11	7	1	38	40	36	17	23
Other[4]	1	1	7	1	0	4	4	4	5	3
N (Abundance) - #/m²										
Total	261	1,000	1,000	1,130	130	5,565	4,674	2,239	2,739	3,652
Oligochaete	0	65	43	0	0	0	22	0	0	22
Insect	239	565	565	957	109	4,652	3,696	1,370	2,261	3,065
Mollusc	0	348	239	152	22	826	870	783	370	500
Other[4]	22	22	152	22	0	87	87	87	109	65

Notes:

1. Benthic invertebrate count data shown in this table are from composite of two grabs sieved to 500 µm.
2. Richness totals exclude P. Nemata, Cl. Ostracoda, indeterminates (O. Acarina, F. Lumbriculidae), immatures (S.F. Tubificinae, O. Acarina), and pupae.
3. Pupae and immatures (bolded values) are excluded from the richness totals if other life stages are present in the replicate sample.
4. Other Taxa include: Cl. Turbellaria, F. Acalyptonotidae, F. Hygrobatidae, F. Lebertiidae, F. Oxidae, F. Pionidae, O. Harpacticoida, O. Notostraca, and F. Gammaracanthidae.
5. Abundance totals exclude P. Nemata and Cl. Ostracoda.
6. Raw abundance from two grabs (grab area = 0.023 m^2).

Figure F1-1. Oligochaete abundance (#/m^2) from Meadowbank lakes since 2006.

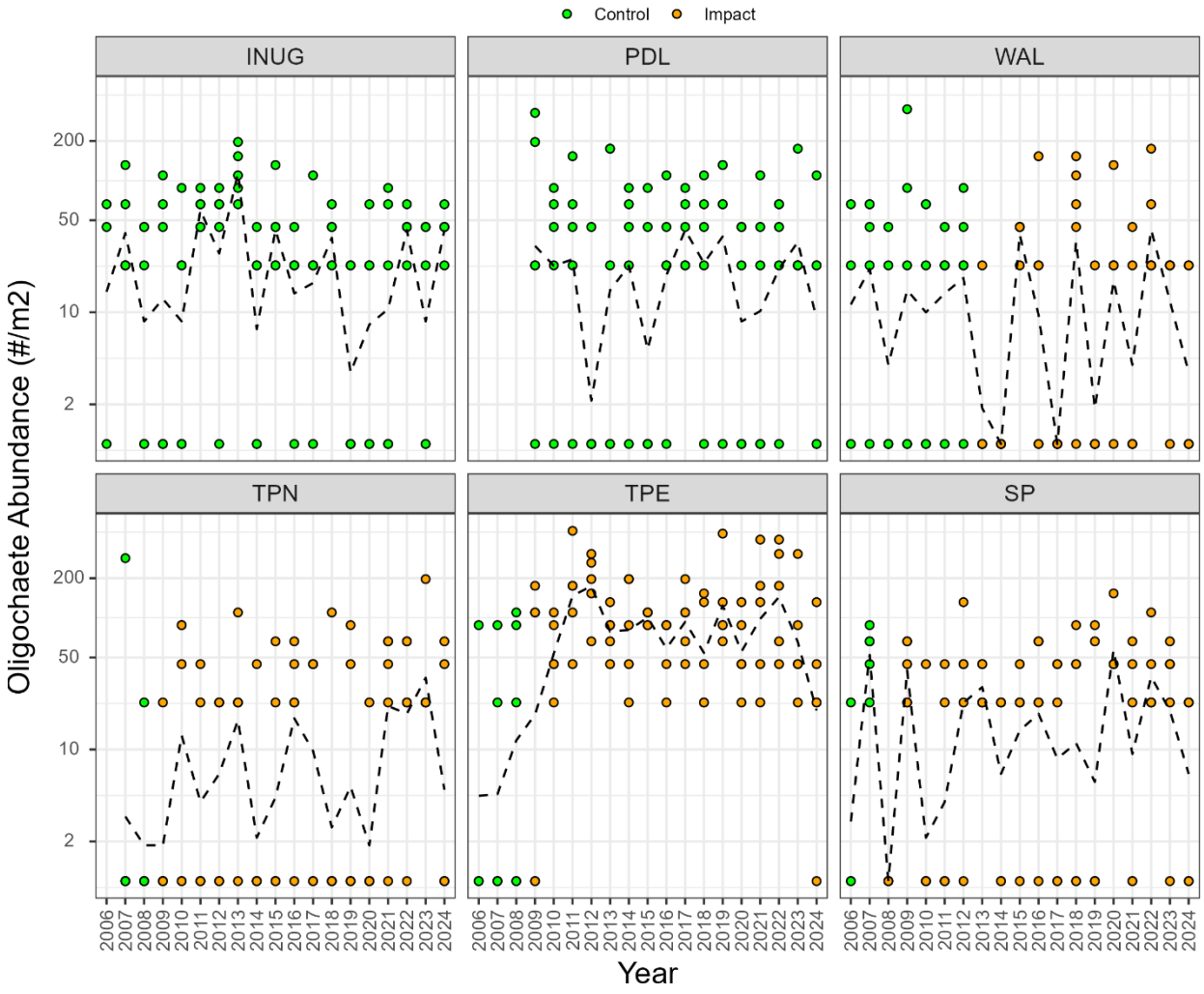


Figure F1-2. Insect abundance (#/m^2) from Meadowbank lakes since 2006.

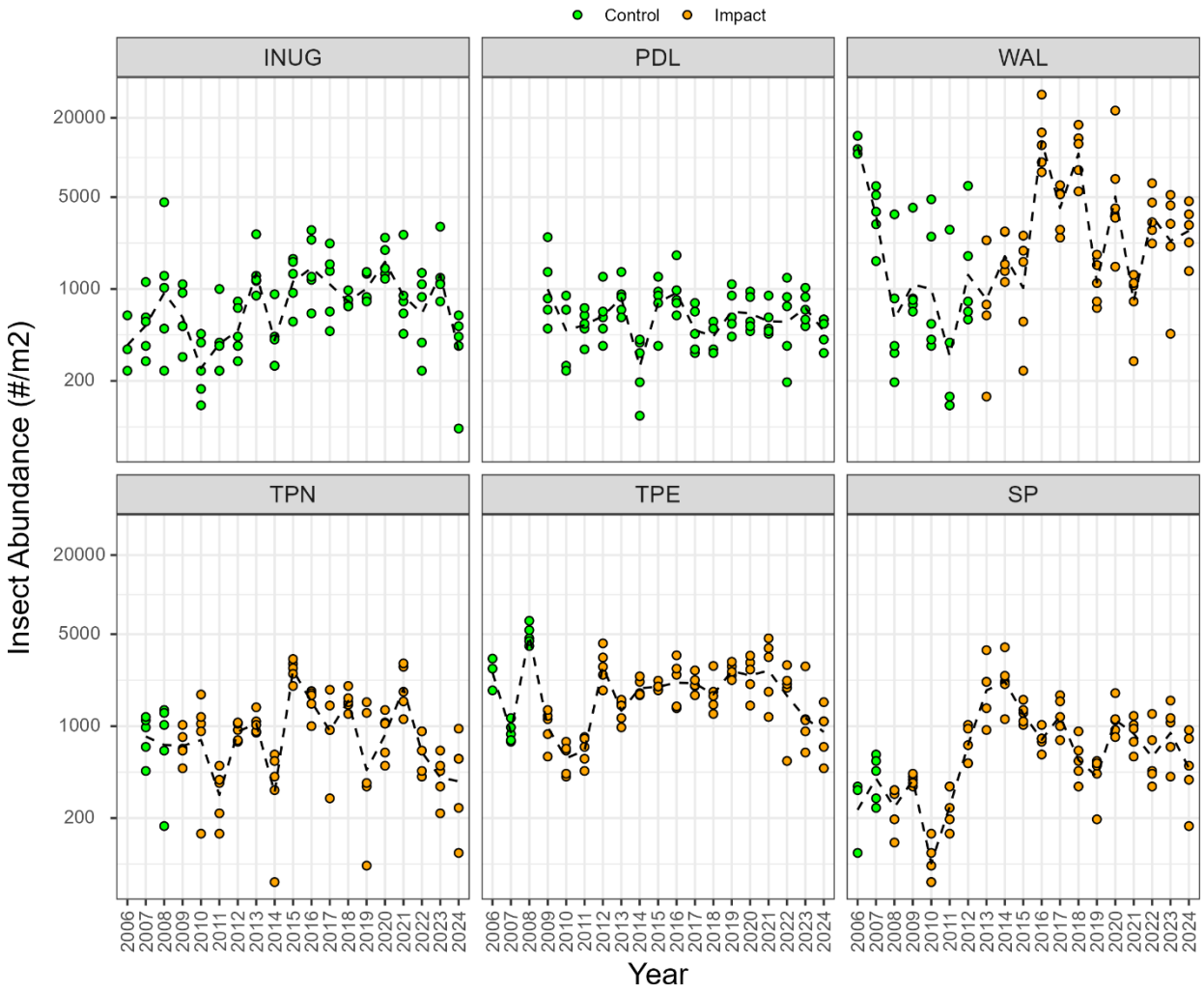


Figure F1-3. Mollusc abundance (#/m^2) from Meadowbank lakes since 2006.

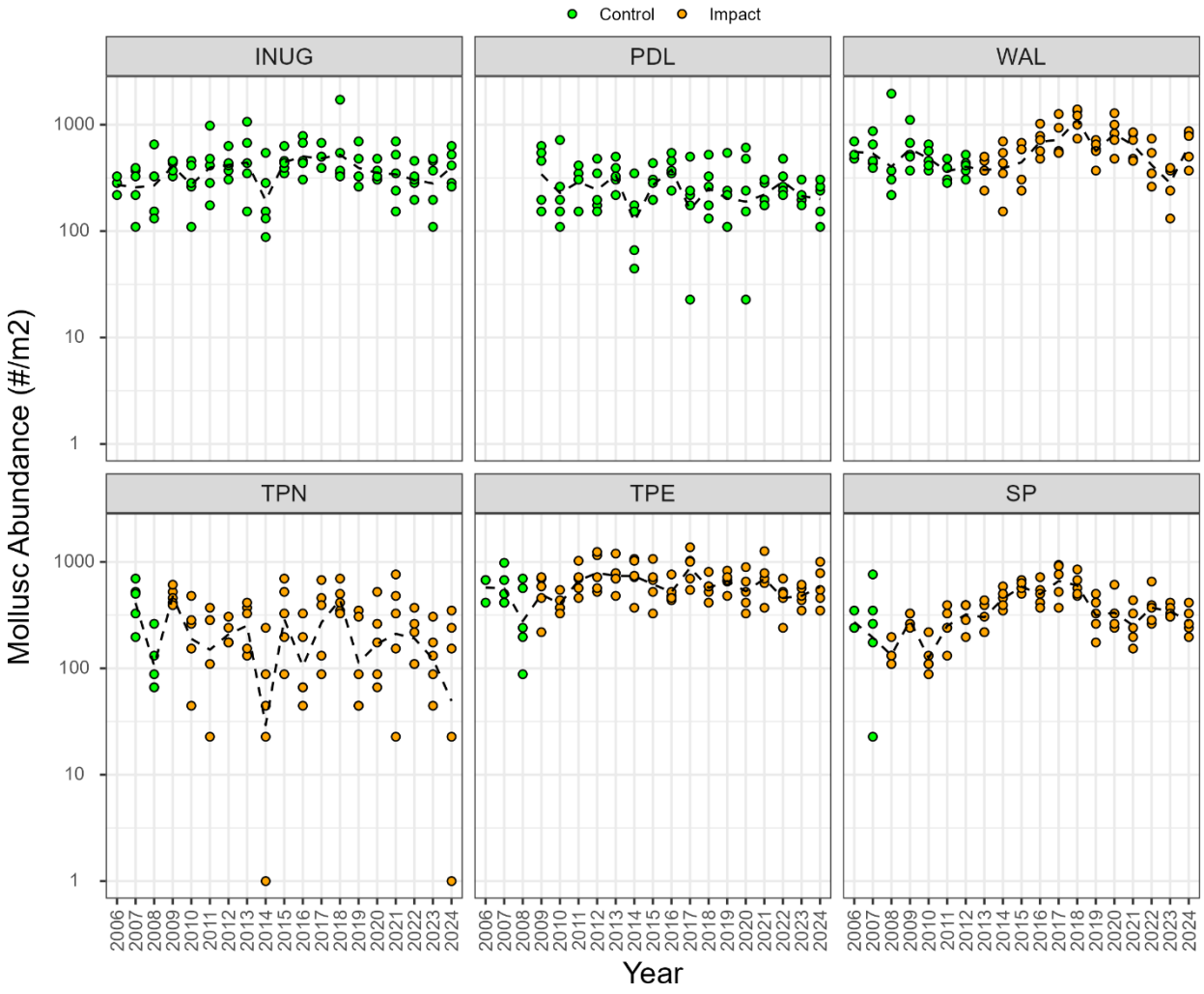


Figure F1-4. Other taxa abundance (#/m^2) from Meadowbank lakes since 2006.

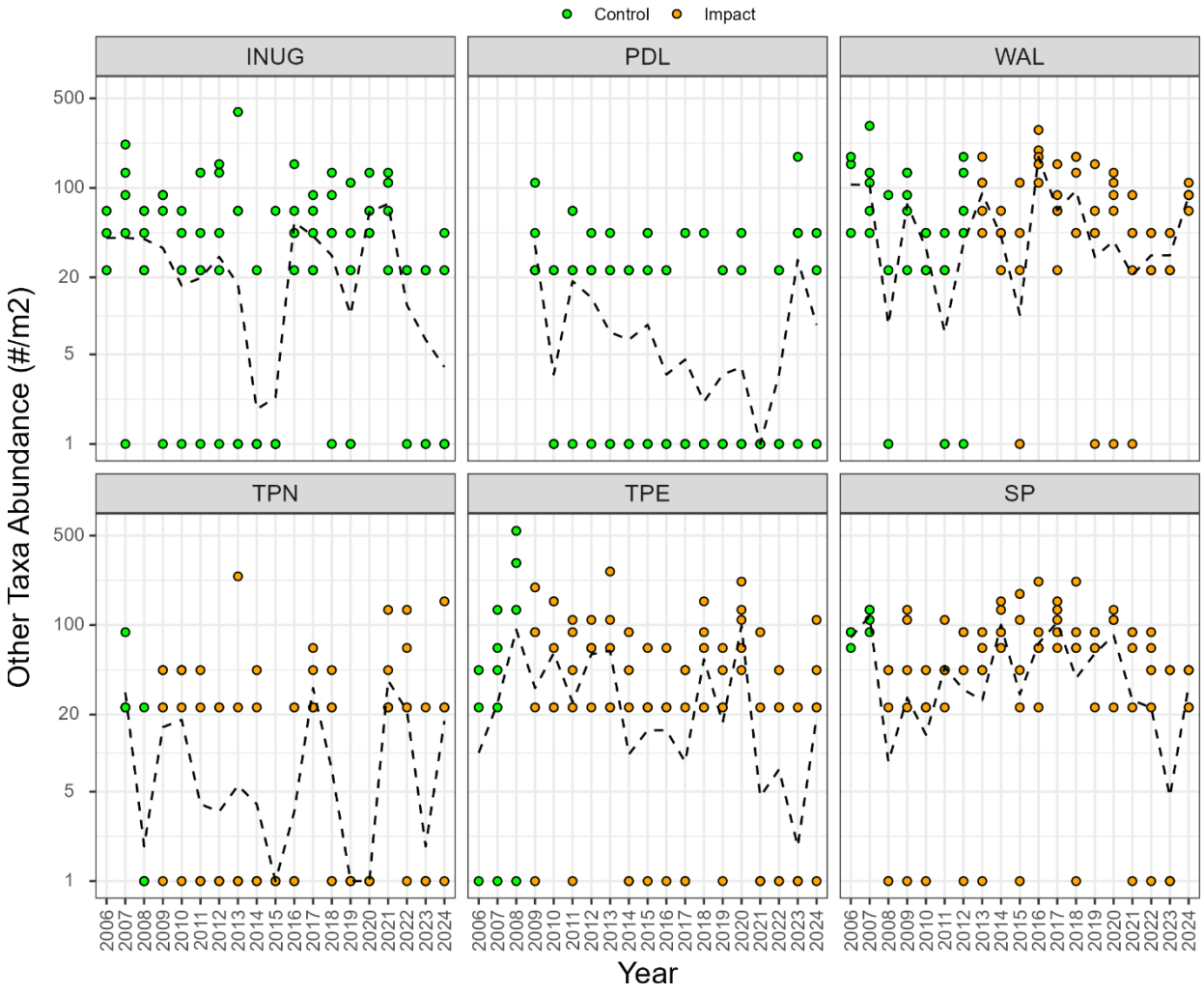


Figure F1-5. Oligochaete richness (# of taxa) from Meadowbank lakes since 2006.

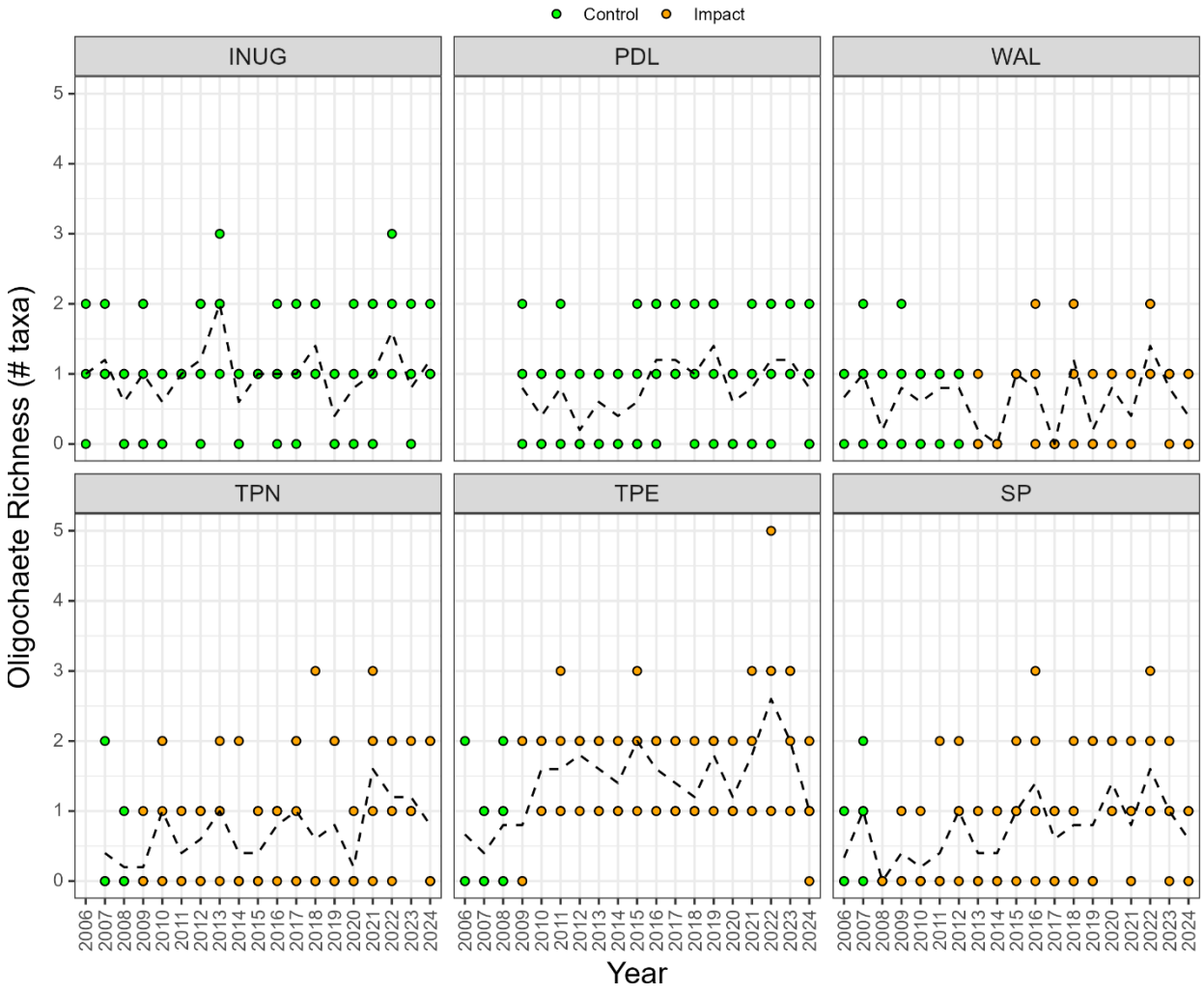


Figure F1-6. Insect richness (# of taxa) from Meadowbank lakes since 2006.

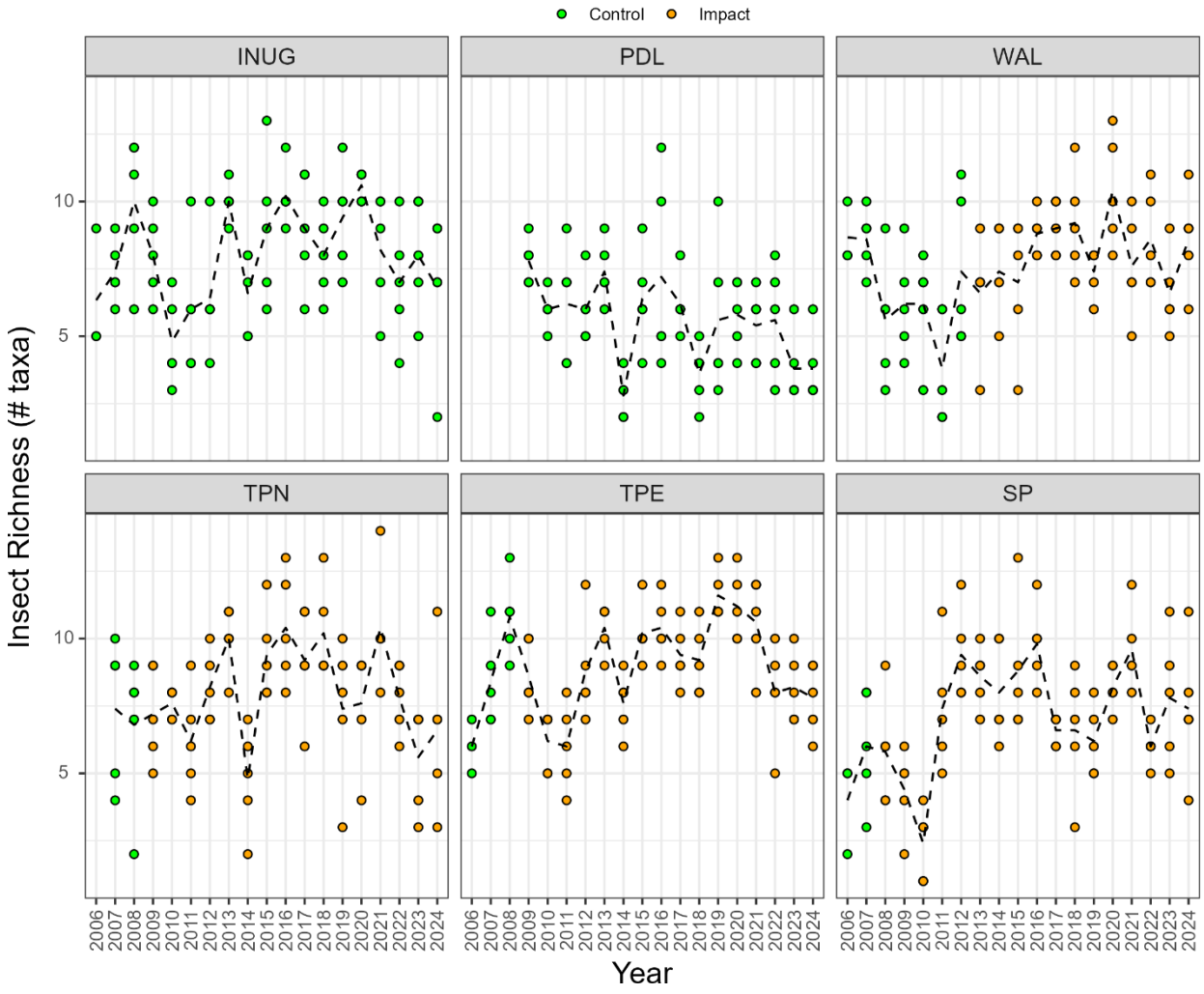


Figure F1-7. Mollusc richness (# of taxa) from Meadowbank lakes since 2006.

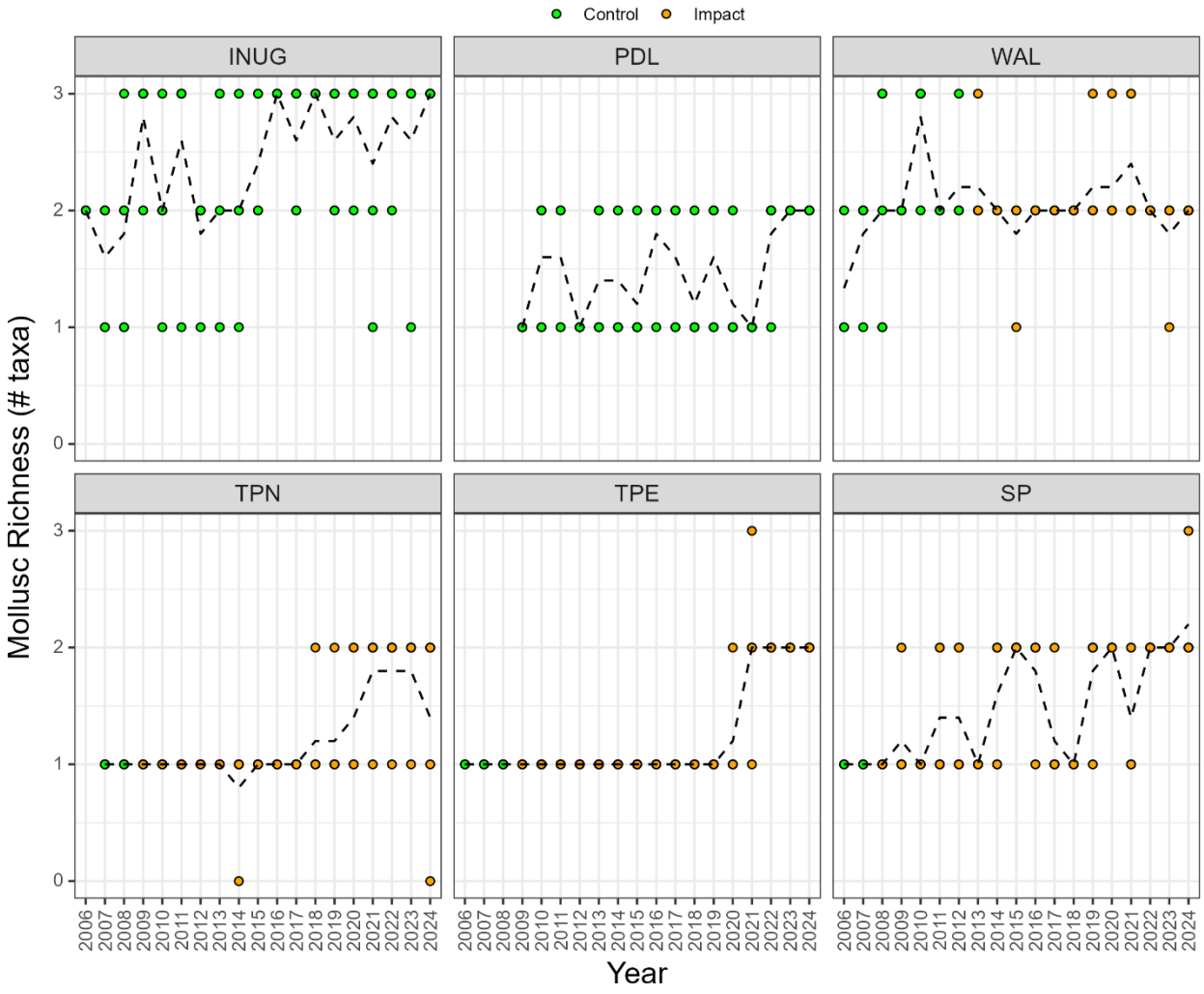


Figure F1-8. Other taxa richness (# of taxa) from Meadowbank lakes since 2006.

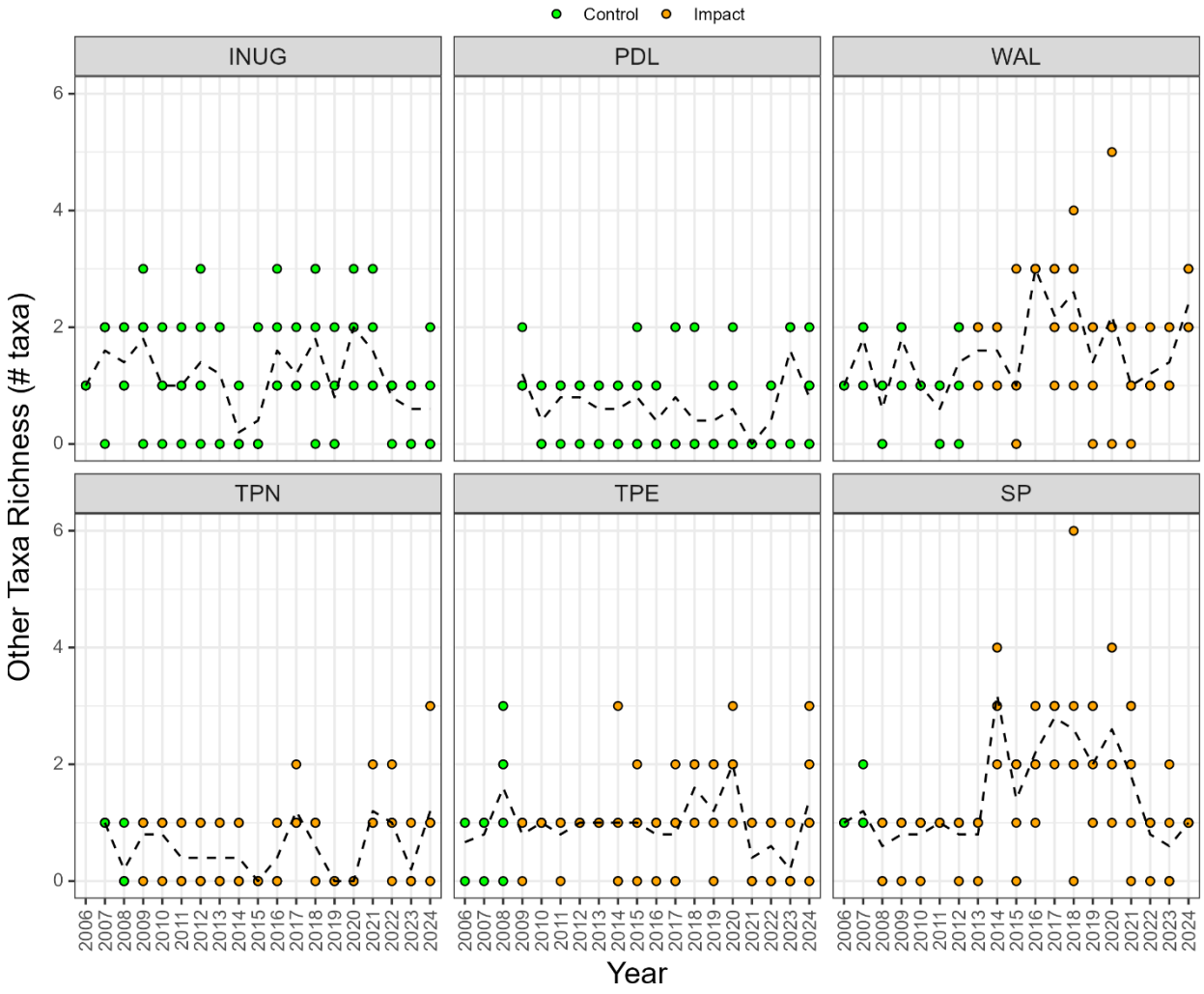


Figure F1-9. Simpsons' Diversity for the benthic invertebrate community at the Meadowbank lakes since 2006.

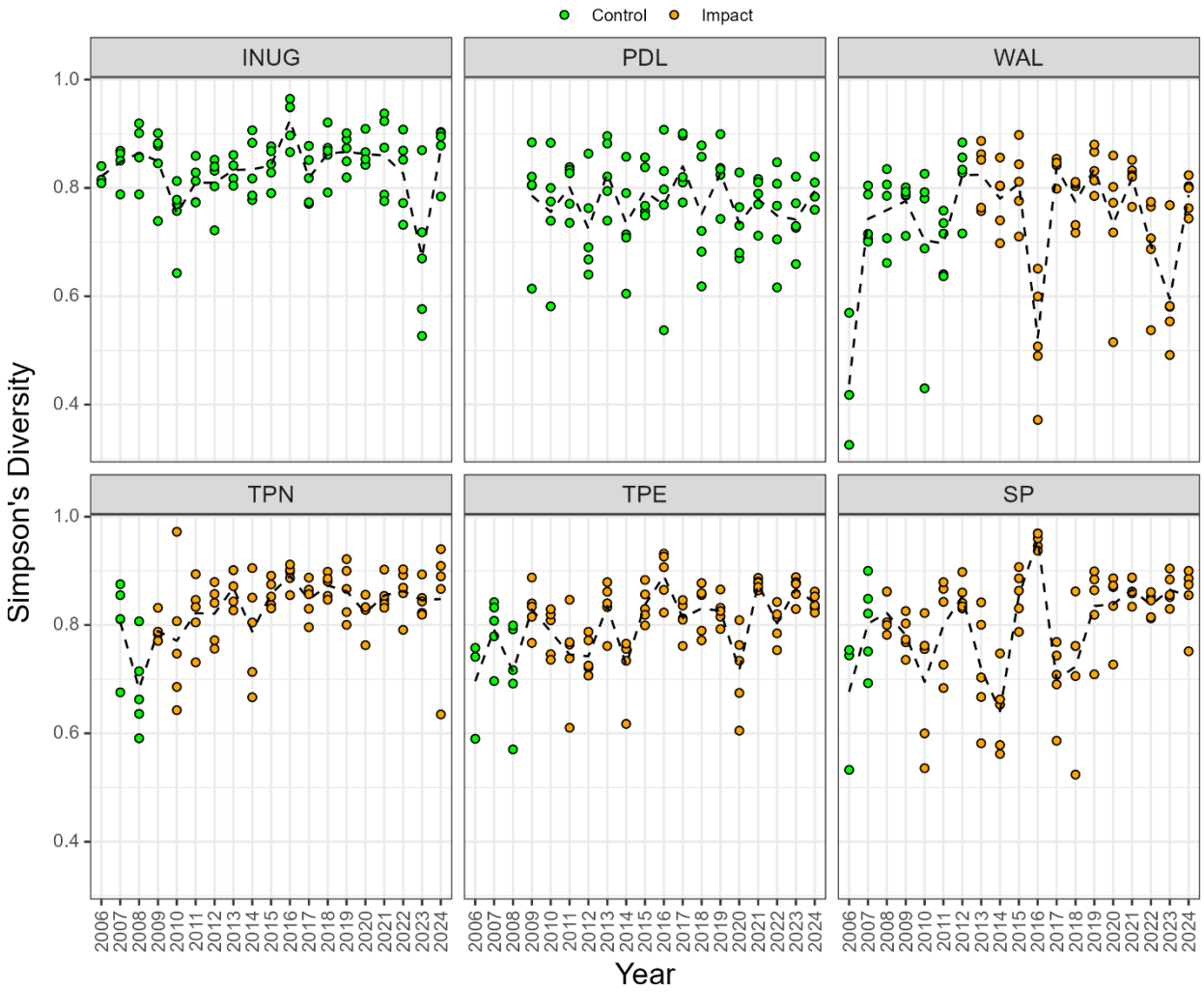
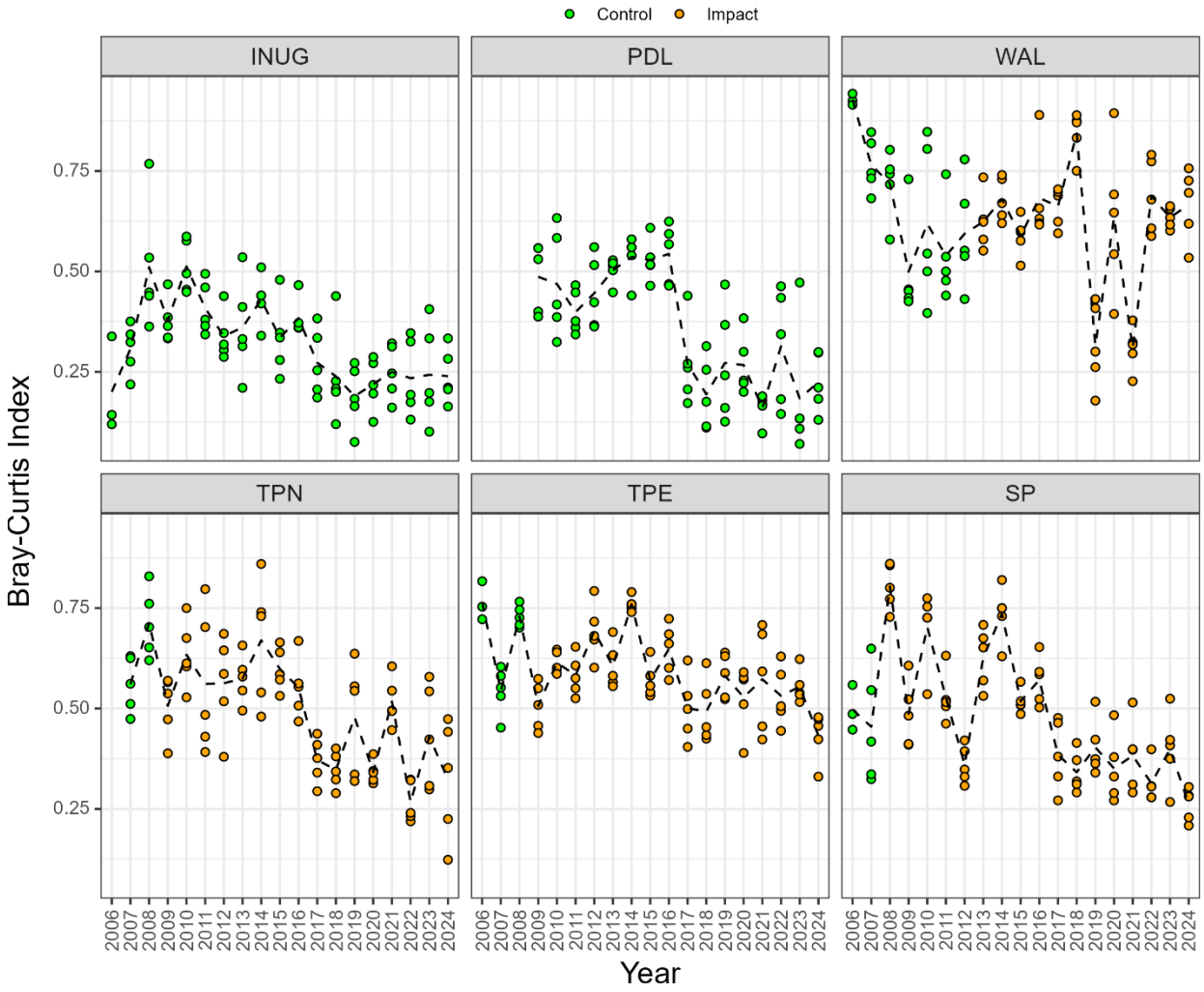


Figure F1-10. Bray-Curtis Index for the benthic invertebrate community at the Meadowbank lakes since 2006.



Appendix F2
Benthos Data – Whale Tail Study Area Lakes

LIST OF TABLES – APPENDIX F2

Table F2-1. Benthic invertebrate abundance (#/m^2) and richness (# taxa) by major taxa group, Whale Tail study area lakes, 2024. 1
Table F2-2. Raw benthic invertebrate data from the Whale Tail study area lakes 2024. 2

LIST OF FIGURES – APPENDIX F2

Figure F2-1. Oligochaete abundance (#/m^2) from the Whale Tail study lakes since 2015. 5
Figure F2-2. Insect abundance (#/m^2) from the Whale Tail study lakes since 2015. 6
Figure F2-3. Mollusc abundance (#/m^2) from the Whale Tail study lakes since 2015. 7
Figure F2-4. Other taxa abundance (#/m^2) from the Whale Tail study lakes since 2015. 8
Figure F2-5. Oligochaete richness (# of taxa) from the Whale Tail study lakes since 2015. 9
Figure F2-6. Insect richness (# of taxa) from the Whale Tail study lakes since 2015. 10
Figure F2-7. Mollusc richness (# of taxa) from the Whale Tail study lakes since 2015. 11
Figure F2-8. Other taxa richness (# of taxa) from the Whale Tail study lakes since 2015. 12
Figure F2-9. Simpson's Diversity for the benthic invertebrate community at the Whale Tail study lakes since 2015. 13
Figure F2-10. Bray-Curtis Index for the benthic invertebrate community at the Whale Tail study lakes since 2015. 14

Table F2-1. Benthic invertebrate abundance (#/m2) and richness (# taxa) by major taxa group, Whale Tail study area lakes, 2024.

Area-Replicate	Date	Depth (m)	Abundance (#/m^2)					Richness (# taxa)					Simpson's Diversity	Bray-Curtis Index
			Oligochaetes	Insects	Molluscs	Other Taxa[1]	TOTAL	Oligochaetes	Insects	Molluscs	Other Taxa[1]	TOTAL		
Whale Tail Lake - South Basin (WTS)														
WTS-1	15-Aug-24	8.9	0	630	1,739	22	2,391	0	7	3	1	11	0.78	0.57
WTS-2	15-Aug-24	8.8	43	848	3,109	217	4,217	1	9	3	3	16	0.78	0.64
WTS-3	15-Aug-24	8.8	43	1,543	1,609	87	3,283	1	9	3	2	15	0.85	0.57
WTS-4	15-Aug-24	8.2	65	978	2,043	174	3,261	3	11	3	3	20	0.78	0.60
WTS-5	15-Aug-24	8.6	0	761	1,913	217	2,891	0	8	3	4	15	0.83	0.52
	Area Mean		***30.4***	***952***	***2,083***	***143***	***3,209***	***1.0***	***8.8***	***3.0***	***2.6***	***15.4***	***0.80***	***0.58***
Kangislulik Lake (KAN)*														
MAM-1	18-Aug-24	8.4	87	2,935	1,913	109	5,043	1	11	3	4	19	0.80	0.72
MAM-2	18-Aug-24	7.8	22	5,957	1,826	22	7,826	1	11	3	1	16	0.80	0.81
MAM-3	18-Aug-24	7.5	65	5,391	2,174	43	7,674	1	11	3	2	17	0.81	0.79
MAM-4	18-Aug-24	8.3	283	2,196	4,391	348	7,217	2	11	3	4	20	0.82	0.78
MAM-5	18-Aug-24	8.5	109	3,848	3,022	152	7,130	2	11	3	4	20	0.86	0.76
	Area Mean		***113***	***4,065***	***2,665***	***135***	***6,978***	***1.4***	***11.0***	***3.0***	***3.0***	***18.4***	***0.82***	***0.77***
Lake A20														
A20-1	18-Aug-24	8.3	0	848	1,065	22	1,935	0	9	2	1	12	0.82	0.49
A20-2	18-Aug-24	8.5	0	3,087	1,000	0	4,087	0	9	2	0	11	0.65	0.74
A20-3	18-Aug-24	8.2	0	3,348	1,000	0	4,348	0	9	2	0	11	0.84	0.74
A20-4	18-Aug-24	8.5	0	522	1,087	0	1,609	0	10	2	0	12	0.72	0.48
A20-5	18-Aug-24	8.5	43	435	978	43	1,500	1	10	2	1	14	0.79	0.47
	Area Mean		***9***	***1,648***	***1,026***	***13***	***2,696***	***0.2***	***9.4***	***2.0***	***0.4***	***12.0***	***0.76***	***0.58***
Lake A76 [2]														
A76-1	13-Aug-24	-	130	6,261	913	0	7,304	2	7	3	0	12	0.65	0.82
A76-2	13-Aug-24	-	22	5,152	870	87	6,130	1	11	3	2	17	0.78	0.77
A76-3	13-Aug-24	-	43	3,109	587	0	3,739	2	8	3	0	13	0.78	0.66
A76-4	13-Aug-24	-	696	6,000	1,435	609	8,739	1	11	2	4	18	0.77	0.85
A76-5	13-Aug-24	-	22	1,391	696	130	2,239	1	7	3	3	14	0.88	0.49
	Area Mean		***183***	***4,383***	***900***	***165***	***5,630***	***1.4***	***8.8***	***2.8***	***1.8***	***14.8***	***0.77***	***0.72***
Lake DS1														
DS1-1	16-Aug-24	9.4	130	2,043	609	130	2,913	2	4	3	3	12	0.67	0.64
DS1-2	16-Aug-24	8.0	0	2,478	565	87	3,130	0	5	3	2	10	0.60	0.68
DS1-3	16-Aug-24	8.2	0	3,043	696	87	3,826	0	7	2	2	11	0.67	0.69
DS1-4	16-Aug-24	7.5	348	3,348	826	0	4,522	1	6	3	0	10	0.61	0.73
DS1-5	16-Aug-24	9.5	0	1,174	674	0	1,848	0	7	4	0	11	0.73	0.55
	Area Mean		***95.7***	***2,417***	***674***	***61***	***3,248***	***0.6***	***5.8***	***3.0***	***1.4***	***10.8***	***0.66***	***0.66***
Nemo Lake (NEM)														
NEM-1	16-Aug-24	6.6	43	4,391	1,957	174	6,565	1	10	3	1	15	0.85	0.75
NEM-2	16-Aug-24	9.3	22	3,196	1,478	109	4,804	1	9	3	2	15	0.87	0.69
NEM-3	16-Aug-24	10.7	22	3,457	804	109	4,391	1	10	2	2	15	0.82	0.69
NEM-4	16-Aug-24	8.0	0	4,304	848	43	5,196	0	10	3	1	14	0.78	0.73
NEM-5	16-Aug-24	6.5	*43*	*2,239*	*696*	*22*	*3,000*	*1*	*7*	*2*	*1*	*11*	*0.86*	*0.60*
	Area Mean		***26***	***3,517***	***1,157***	***91***	***4,791***	***0.8***	***9.2***	***2.6***	***1.4***	***14.0***	***0.84***	***0.69***

Notes:

1. "Other taxa" includes flatworms (Turbellaria) and arthropods (Acalyptonotidae, Hygrobatidae, Lebertiidae, Oxidae, Pionidae, Harpacticoida, O. Notostraca, and Gammaracanthidae).
2. Depths at A76 were not recorded in 2024 due to a malfunction with the depth sounder.

* Kangislulik Lake (KAN) was previously referred to as Mammoth Lake (MAM).

Table F2-2. Raw benthic invertebrate data from the Whale Tail study area lakes, 2024.

Program	Whale Tail									
Location	Lake A20					Lake A76				
Station	A20					A76				
Control/Impact?	Impact					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	18-Aug-24	18-Aug-24	18-Aug-24	18-Aug-24	18-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24	13-Aug-24
Sample Depth (m)	8.3	8.5	8.2	8.5	8.5	-	-	-	-	-
ROUNDWORMS										
P. Nemata	2	-	4	-	3	-	7	2	38	1
FLATWORMS										
P. Platyhelminthes										
Cl. Turbellaria										
indeterminate	-	-	-	-	-	-	-	-	-	4
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Naididae										
S.F. Naidinae										
Nais	-	-	-	-	-	-	-	-	32	-
S.F. Tubificinae										
Tasserkidrilus americanus	-	-	-	-	-	-	-	-	-	-
immatures with hair chaetae	-	-	-	-	-	2	1	-	-	-
S.F. Rhyacodrilinae										
Rhyacodrilus coccineus	-	-	-	-	2	4	-	1	-	1
F. Lumbriculidae										
Lumbriculus	-	-	-	-	-	-	-	1	-	-
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
F. Acalyptonotidae										
Acalyptonotus	-	-	-	-	2	-	3	-	-	-
F. Axonopsidae										
?Neobrachypoda	-	-	-	-	-	-	-	-	2	-
F. Lebertiidae										
Lebertia	-	-	-	-	-	-	1	-	22	1
F. Oxidae										
Oxus	1	-	-	-	-	-	-	-	-	1
F. Pionidae										
indeterminate	-	-	-	-	-	-	-	-	2	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	2	-
SEED SHRIMPS										
Cl. Ostracoda	24	27	54	23	32	32	42	30	112	42
FAIRY SHRIMPS										
O. Notostraca										
Lepidurus arcticus	-	-	-	-	-	-	-	-	-	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
immature	-	-	-	-	-	-	-	-	-	-
F. Apataniidae										
Apatania	-	-	-	-	-	-	-	-	-	-
F. Limnephilidae										
Grensia praeterita	-	-	-	-	-	-	-	-	-	-
pupae	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	1	1	-	1	1	-	2	1	4	-
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	2	-
Cladotanytarsus	-	-	-	-	1	-	1	-	-	-
Corynocera ambigua	5	7	44	2	2	188	85	73	172	20
Dicrotendipes	-	-	-	1	-	-	1	-	2	-
Micropsectra	13	105	54	4	4	42	97	22	8	20
Microtendipes	1	-	-	-	-	-	1	-	-	-
Paratanytarsus	3	1	12	4	2	30	19	14	32	7
Sergentia	-	-	-	-	-	-	-	-	4	-
Stictochironomus	8	3	12	3	3	2	1	4	-	-
Tanytarsus	1	14	10	1	1	4	17	12	30	2
S.F. Diamesinae										
Protanypus	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	1	-	2	1	-	-	-	-	-	-
Cricotopus	-	-	-	-	1	-	-	-	-	-
Heterotrissocladius	-	-	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	-	-	-	-	-	-	-	-	-	-
Psectrocladius	-	1	-	1	-	-	-	-	2	-
Zalutschia	-	-	-	-	-	-	-	-	2	-
Orthocladiinae Genus "Greenland"	-	-	-	-	-	-	-	-	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-
S.F. Prodiamesinae										
Monodiamesa	-	3	-	-	1	4	1	3	-	3
S.F. Tanypodinae										
Ablabesmyia	-	-	2	-	-	-	-	-	4	1
Procladius	5	4	2	4	2	18	9	12	14	11
Thienemannimyia complex	1	3	16	2	2	-	3	2	-	-
F. Empididae										
Chelifera/Metachela	-	-	-	-	-	-	-	-	-	-
MOLLUSCS										
P. Mollusca										
SNAILS										
Cl. Gastropoda										
F. Valvatidae										
Valvata lewisi	-	-	-	-	-	-	-	-	-	-
Valvata	-	-	-	-	-	-	-	-	-	-
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium/Cyclocalyx	27	27	28	14	23	26	12	14	4	10
Pisidium (Cyclocalyx/Neopisidium)	22	19	18	36	22	14	23	11	-	16
Sphaerium nitidum	-	-	-	-	-	2	5	2	62	6
TOTAL NUMBER OF ORGANISMS	115	215	258	97	104	368	331	204	552	146
TOTAL NUMBER OF TAXA [a]	14	12	13	13	16	13	19	15	20	16
[a] Bold entries excluded from taxa count										
R (Richness) - totals [2,3]										
Total	12	11	11	12	14	12	17	13	18	14
Oligochaete	0	0	0	0	1	2	1	2	1	1
Insect	9	9	9	10	10	7	11	8	11	7
Mollusc	2	2	2	2	2	3	3	3	2	3
Other[4]	1	0	0	0	1	0	2	0	4	3
Abundance (raw) - totals [5,6]										
Total	89	188	200	74	69	336	282	172	402	103
Oligochaete	0	0	0	0	2	6	1	2	22	1
Insect	39	142	154	24	20	288	237	143	276	64
Mollusc	49	46	46	50	45	42	40	27	66	32
Other[4]	1	0	0	0	2	0	4	0	28	6
N (Abundance) - #/m²										
Total	1,935	4,087	4,348	1,609	1,500	7,304	6,130	3,739	8,739	2,239
Oligochaete	0	0	0	0	43	130	22	43	696	22
Insect	848	3,087	3,348	522	435	6,261	5,152	3,109	6,000	1,391
Mollusc	1,065	1,000	1,000	1,087	978	913	870	587	1,435	696
Other[4]	22	0	0	0	43	0	87	0	609	130

Notes:

1. Benthic invertebrate count data shown in this table are from composite of two grabs sieved to 500 µm.
2. Richness totals exclude P. Nemata, Cl. Ostracoda, indeterminates (O. Acarina, F. Lumbriculidae), immatures (S.F. Tubificinae, O. Acarina), and pupae.
3. Pupae and immatures (bolded values) are excluded from the richness totals if other life stages are present in the replicate sample.
4. Other Taxa include: Cl. Turbellaria, F. Acalyptonotidae, F. Hygrobatidae, F. Lebertiidae, F. Oxidae, F. Pionidae, O. Harpacticoida, O. Notostraca, and F. Gammaracanthidae.
5. Abundance totals exclude P. Nemata and Cl. Ostracoda.
6. Raw abundance from two grabs (grab area = 0.023 m²).

Table F2-2. Raw benthic invertebrate data from the Whale Tail study area lakes, 2024.

Program	Whale Tail									
Location	Lake DS1					Kangislulik Lake				
Station	DS1					KAN				
Control/Impact?	Impact					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	16-Aug-24	16-Aug-24	16-Aug-24	16-Aug-24	16-Aug-24	18-Aug-24	18-Aug-24	18-Aug-24	18-Aug-24	18-Aug-24
Sample Depth (m)	9.4	8.0	8.2	7.5	9.5	8.4	7.8	7.5	8.3	8.5
ROUNDWORMS										
P. Nemata	16	50	26	50	12	-	1	2	5	3
FLATWORMS										
P. Platyhelminthes										
Cl. Turbellaria										
indeterminate	2	-	-	-	-	2	-	-	6	4
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Naididae										
S.F. Naidinae										
Nais	4	-	-	16	-	-	-	-	-	-
S.F. Tubificinae										
Tasserkidrilus americanus	-	-	-	-	-	-	-	-	-	-
immatures with hair chaetae	-	-	-	-	-	-	-	-	-	-
S.F. Rhyacodrilinae										
Rhyacodrilus coccineus	-	-	-	-	-	-	-	-	6	1
F. Lumbriculidae										
Lumbriculus	2	-	-	-	-	4	1	3	7	4
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
F. Acalyptonotidae										
Acalyptonotus	-	2	-	-	-	-	-	1	7	1
F. Axonopsidae										
?Neobrachypoda	-	-	-	-	-	-	-	-	-	-
F. Lebertiidae										
Lebertia	2	-	2	-	-	1	-	-	1	1
F. Oxidae										
Oxus	2	2	-	-	-	1	1	1	2	1
F. Pionidae										
indeterminate	-	-	2	-	-	1	-	-	-	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	2	2	4	14	2	60	41	34	68	51
FAIRY SHRIMPS										
O. Notostraca										
Lepidurus arcticus	-	-	-	-	-	-	-	-	-	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
immature	-	-	-	2	-	-	-	-	-	-
F. Apataniidae										
Apatania	-	-	-	-	1	-	-	-	-	-
F. Limnephilidae										
Grensia praeterita	-	-	-	-	-	-	-	-	-	-
pupae	-	-	-	-	-	-	-	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	2	-	-	-	1	-	-	1	-	1
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	-	-	-	-	-	-	-	-	-	-
Corynocera ambigua	-	-	-	-	-	83	121	115	33	53
Dicrotendipes	6	-	4	-	1	-	1	1	3	1
Micropsectra	-	-	2	-	-	11	91	75	14	58
Microtendipes	-	2	-	-	-	8	3	11	3	7
Paratanytarsus	74	88	96	126	36	2	13	9	7	2
Sergentia	-	-	-	-	-	-	-	-	-	-
Stictochironomus	-	16	14	6	2	3	7	9	4	12
Tanytarsus	-	-	2	-	1	8	21	9	10	19
S.F. Diamesinae										
Protanypus	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	-	-	-		-	3	1	1	2	3
Cricotopus	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	2	-	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	-	-	-	-	-	-	-	-	-	-
Psectrocladius	-	-	2	-	-	1	-	-	-	-
Zalutschia	-	-	-	-	-	-	-	-	-	-
Orthocladiinae *Genus "Greenland"*	-	-	-	-	-	-	-	-	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-
S.F. Prodiamesinae										
Monodiamesa	-	-	-	-	-	12	6	3	10	11
S.F. Tanypodinae										
Ablabesmyia	-	-	-	8	-	-	-	-	-	-
Procladius	10	6	20	8	11	3	3	5	1	5
Thienemannimyia complex	-	2	-	4	-	1	7	9	14	5
F. Empididae										
Chelifera/Metachela	-	-	-	-	1	-	-	-	-	-
MOLLUSCS										
P. Mollusca										
SNAILS										
Cl. Gastropoda										
F. Valvatidae										
Valvata lewisi	-	-	-	20	1	-	-	-	-	-
Valvata	2	2	-	-	-	-	-	-	-	-
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium/Cyclocalyx	12	18	18	10	6	57	46	57	124	63
Pisidium (Cyclocalyx/Neopisidium)	14	6	14	8	23	19	15	22	28	8
Sphaerium nitidum	-	-	-	-	1	12	23	21	50	68
TOTAL NUMBER OF ORGANISMS	152	196	206	272	99	292	402	389	405	382
TOTAL NUMBER OF TAXA [a]	14	12	13	12	13	20	18	19	22	22
[a] Bold entries excluded from taxa count										
R (Richness) - totals [2,3]										
Total	12	10	11	10	11	19	16	17	20	20
Oligochaete	2	0	0	1	0	1	1	1	2	2
Insect	4	5	7	6	7	11	11	11	11	11
Mollusc	3	3	2	3	4	3	3	3	3	3
Other[4]	3	2	2	0	0	4	1	2	4	4
Abundance (raw) - totals [5,6]										
Total	134	144	176	208	85	232	360	353	332	328
Oligochaete	6	0	0	16	0	4	1	3	13	5
Insect	94	114	140	154	54	135	274	248	101	177
Mollusc	28	26	32	38	31	88	84	100	202	139
Other[4]	6	4	4	0	0	5	1	2	16	7
N (Abundance) - #/m²										
Total	2,913	3,130	3,826	4,522	1,848	5,043	7,826	7,674	7,217	7,130
Oligochaete	130	0	0	348	0	87	22	65	283	109
Insect	2,043	2,478	3,043	3,348	1,174	2,935	5,957	5,391	2,196	3,848
Mollusc	609	565	696	826	674	1,913	1,826	2,174	4,391	3,022
Other[4]	130	87	87	0	0	109	22	43	348	152

Notes:

1. Benthic invertebrate count data shown in this table are from composite of two grabs sieved to 500 µm.
2. Richness totals exclude P. Nemata, Cl. Ostracoda, indeterminates (O. Acarina, F. Lumbriculidae), immatures (S.F. Tubificinae, O. Acarina), and pupae.
3. Pupae and immatures (bolded values) are excluded from the richness totals if other life stages are present in the replicate sample.
4. Other Taxa include: Cl. Turbellaria, F. Acalyptonotidae, F. Hygrobatidae, F. Lebertiidae, F. Oxidae, F. Pionidae, O. Harpacticoida, O. Notostraca, and F. Gammaracanthidae.
5. Abundance totals exclude P. Nemata and Cl. Ostracoda.
6. Raw abundance from two grabs (grab area = 0.023 m²).

Table F2-2. Raw benthic invertebrate data from the Whale Tail study area lakes, 2024.

Program	Whale Tail									
Location	Nemo Lake					Whale Tail Lake - South Basin				
Station	NEM					WTS				
Control/Impact?	Impact					Impact				
Replicate	1	2	3	4	5	1	2	3	4	5
Date	16-Aug-24	16-Aug-24	16-Aug-24	16-Aug-24	16-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24	15-Aug-24
Sample Depth (m)	6.6	9.3	10.7	8.0	6.5	8.9	8.8	8.8	8.2	8.6
ROUNDWORMS										
P. Nemata	-	4	4	3	7	2	4	1	1	3
FLATWORMS										
P. Platyhelminthes										
Cl. Turbellaria										
indeterminate	-	-	1	2	1	-	3	1	-	3
ANNELIDS										
P. Annelida										
WORMS										
Cl. Oligochaeta										
F. Naididae										
S.F. Naidinae										
Nais	-	-	-	-	-	-	-	-	-	-
S.F. Tubificinae										
Tasserkidrilus americanus	-	-	-	-	-	-	-	1	-	-
immatures with hair chaetae	-	-	-	-	-	-	2	1	1	-
S.F. Rhyacodrilinae										
Rhyacodrilus coccineus	-	-	-	-	-	-	-	-	1	-
F. Lumbriculidae										
Lumbriculus	2	1	1	-	2	-	-	-	1	-
ARTHROPODS										
P. Arthropoda										
MITES										
Cl. Arachnida										
O. Acarina										
F. Acalyptonotidae										
Acalyptonotus	8	3	4	-	-	-	-	3	5	3
F. Axonopsidae										
?Neobrachypoda	-	-	-	-	-	-	-	-	-	-
F. Lebertiidae										
Lebertia	-	2	-	-	-	1	4	-	2	2
F. Oxidae										
Oxus	-	-	-	-	-	-	3	-	1	2
F. Pionidae										
indeterminate	-	-	-	-	-	-	-	-	-	-
HARPACTICOIDS										
O. Harpacticoida	-	-	-	-	-	-	-	-	-	-
SEED SHRIMPS										
Cl. Ostracoda	49	28	14	26	29	23	92	67	53	55
FAIRY SHRIMPS										
O. Notostraca										
Lepidurus arcticus	-	-	-	-	-	-	-	-	-	-
INSECTS										
Cl. Insecta										
CADDISFLIES										
O. Trichoptera										
immature	-	-	1	-	-	-	-	-	-	-
F. Apataniidae										
Apatania	-	-	-	-	-	-	-	-	-	-
F. Limnephilidae										
Grensia praeterita	-	-	-	-	-	-	-	-	-	-
pupae	-	-	-	1	-	-	1	-	-	-
TRUE FLIES										
O. Diptera										
MIDGES										
F. Chironomidae										
chironomid pupae	1	-	-	-	1	-	-	-	2	1
S.F. Chironominae										
Chironomus	-	-	-	-	-	-	-	-	-	-
Cladotanytarsus	-	-	-	-	-	-	-	-	2	-
Corynocera ambigua	13	24	42	48	31	3	4	4	1	5
Dicrotendipes	4	-	-	-	-	-	-	-	1	-
Micropsectra	85	53	65	94	22	6	11	12	21	3
Microtendipes	9	3	5	8	2	5	2	13	1	2
Paratanytarsus	4	6	4	3	1	3	1	1	2	6
Sergentia	-	-	-	-	-	-	-	-	-	-
Stictochironomus	36	18	17	21	12	-	9	10	1	6
Tanytarsus	17	17	7	2	15	6	3	10	5	3
S.F. Diamesinae										
Protanypus	-	-	-	-	-	-	-	-	-	-
S.F. Orthocladiinae										
Abiskomyia	-	-	-	-	-	-	-	2	3	-
Cricotopus	-	-	-	-	-	-	-	-	-	-
Heterotrissocladius	-	1	-	-	-	-	-	-	-	-
Mesocricotopus	-	-	-	-	-	-	-	-	-	-
Paracladius	-	-	-	-	-	-	-	-	-	-
Psectrocladius	2	-	-	-	-	1	-	-	-	-
Zalutschia	-	-	-	-	-	-	-	-	-	-
Orthocladiinae *Genus "Greenland"*	-	-	-	-	-	-	-	-	-	-
indeterminate	-	-	-	-	-	-	-	-	-	-
S.F. Prodiamesinae										
Monodiamesa	-	-	1	1	-	-	2	1	1	3
S.F. Tanypodinae										
Ablabesmyia	-	-	-	-	-	-	-	-	-	-
Procladius	27	23	13	17	19	5	6	18	5	6
Thienemannimyia complex	4	2	4	3	-	-	-	-	-	-
F. Empididae										
Chelifera/Metachela	-	-	-	-	-	-	-	-	-	-
MOLLUSCS										
P. Mollusca										
SNAILS										
Cl. Gastropoda										
F. Valvatidae										
Valvata lewisi	-	-	-	-	-	-	-	-	-	-
Valvata	-	-	-	-	-	-	-	-	-	-
CLAMS										
Cl. Bivalvia										
F. Sphaeriidae										
Pisidium/Cyclocalyx	59	33	24	22	23	44	73	47	60	41
Pisidium (Cyclocalyx/Neopisidium)	19	31	13	14	9	21	50	15	28	34
Sphaerium nitidum	12	4	-	3	-	15	20	12	6	13
TOTAL NUMBER OF ORGANISMS	351	253	220	268	174	135	290	219	204	191
TOTAL NUMBER OF TAXA [a]	16	17	17	16	13	13	18	18	22	17
[a] Bold entries excluded from taxa count										
R (Richness) - totals [2,3]										
Total	15	15	15	14	11	11	16	15	20	15
Oligochaete	1	1	1	0	1	0	1	1	3	0
Insect	10	9	10	10	7	7	9	9	11	8
Mollusc	3	3	2	3	2	3	3	3	3	3
Other[4]	1	2	2	1	1	1	3	2	3	4
Abundance (raw) - totals [5,6]										
Total	302	221	202	239	138	110	194	151	150	133
Oligochaete	2	1	1	0	2	0	2	2	3	0
Insect	202	147	159	198	103	29	39	71	45	35
Mollusc	90	68	37	39	32	80	143	74	94	88
Other[4]	8	5	5	2	1	1	10	4	8	10
N (Abundance) - #/m²										
Total	6,565	4,804	4,391	5,196	3,000	2,391	4,217	3,283	3,261	2,891
Oligochaete	43	22	22	0	43	0	43	43	65	0
Insect	4,391	3,196	3,457	4,304	2,239	630	848	1,543	978	761
Mollusc	1,957	1,478	804	848	696	1,739	3,109	1,609	2,043	1,913
Other[4]	174	109	109	43	22	22	217	87	174	217

Notes:

1. Benthic invertebrate count data shown in this table are from composite of two grabs sieved to 500 µm.
2. Richness totals exclude P. Nemata, Cl. Ostracoda, indeterminates (O. Acarina, F. Lumbriculidae), immatures (S.F. Tubificinae, O. Acarina), and pupae.
3. Pupae and immatures (bolded values) are excluded from the richness totals if other life stages are present in the replicate sample.
4. Other Taxa include: Cl. Turbellaria, F. Acalyptonotidae, F. Hygrobatidae, F. Lebertiidae, F. Oxidae, F. Pionidae, O. Harpacticoida, O. Notostraca, and F. Gammaracanthidae.
5. Abundance totals exclude P. Nemata and Cl. Ostracoda.
6. Raw abundance from two grabs (grab area = 0.023 m^2).

Figure F2-1. Oligochaete abundance (#/m^2) from the Whale Tail study lakes since 2015.

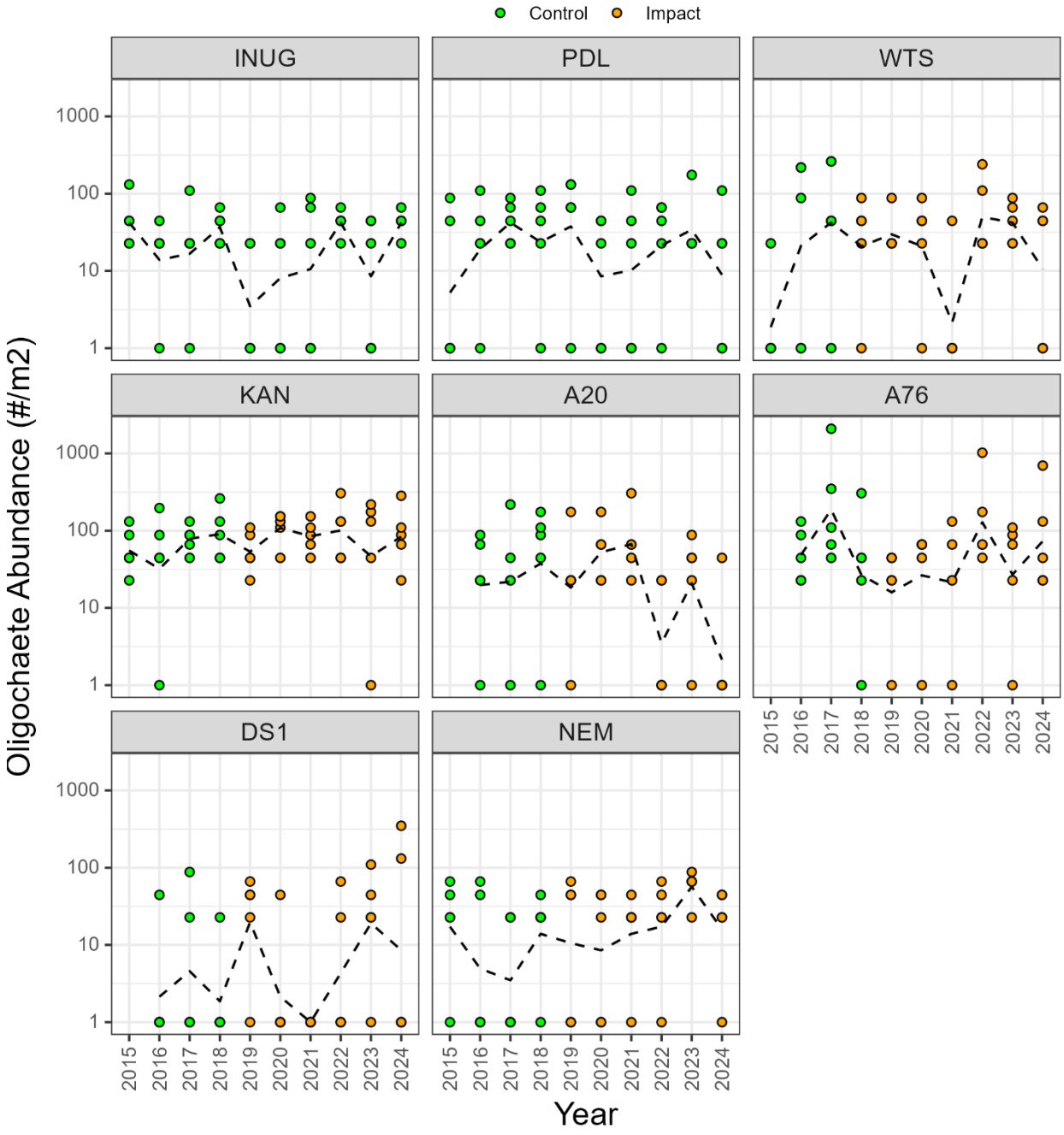


Figure F2-2. Insect abundance (#/m^2) from the Whale Tail study lakes since 2015.

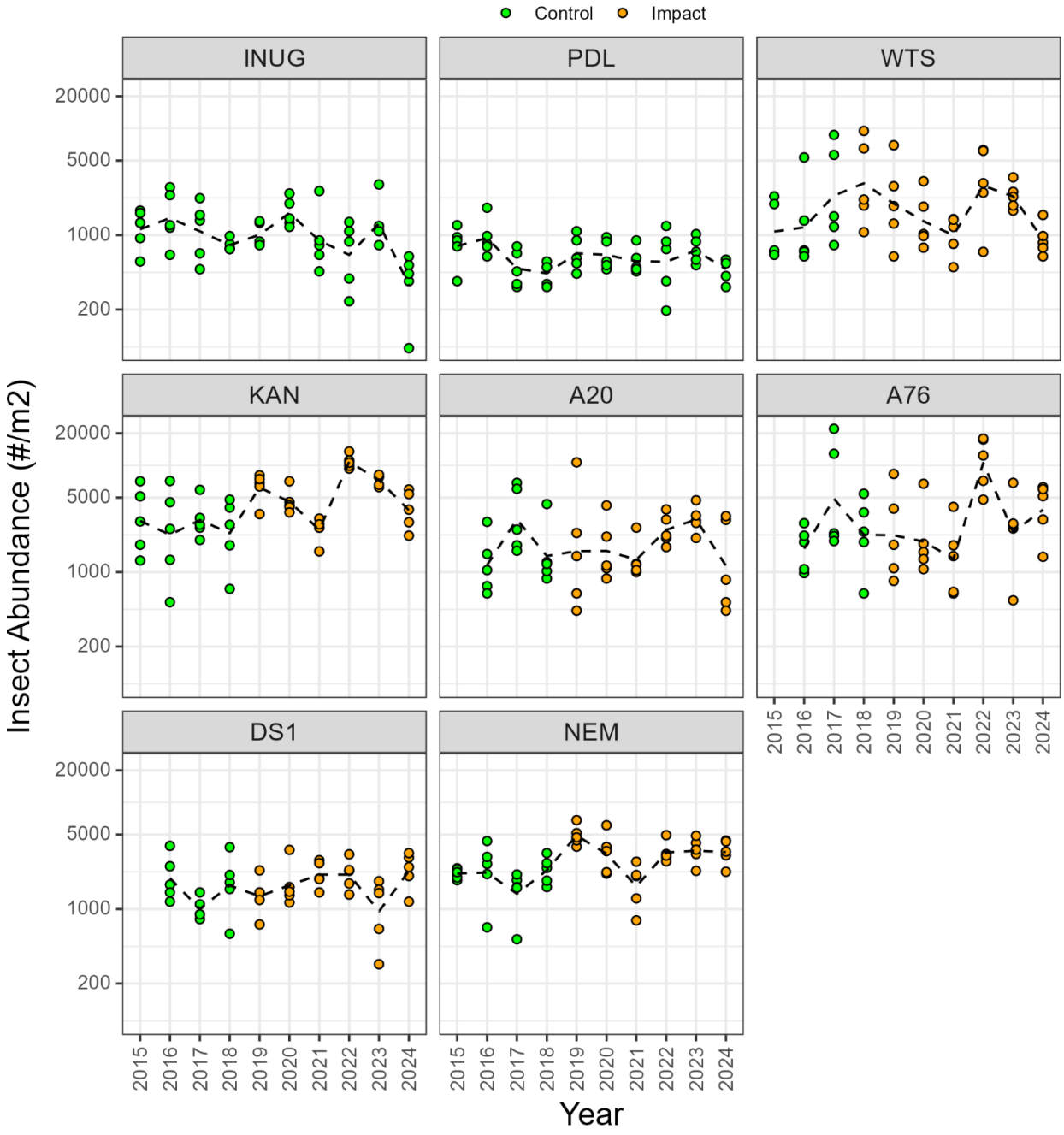


Figure F2-3. Mollusc abundance (#/m^2) from the Whale Tail study lakes since 2015.

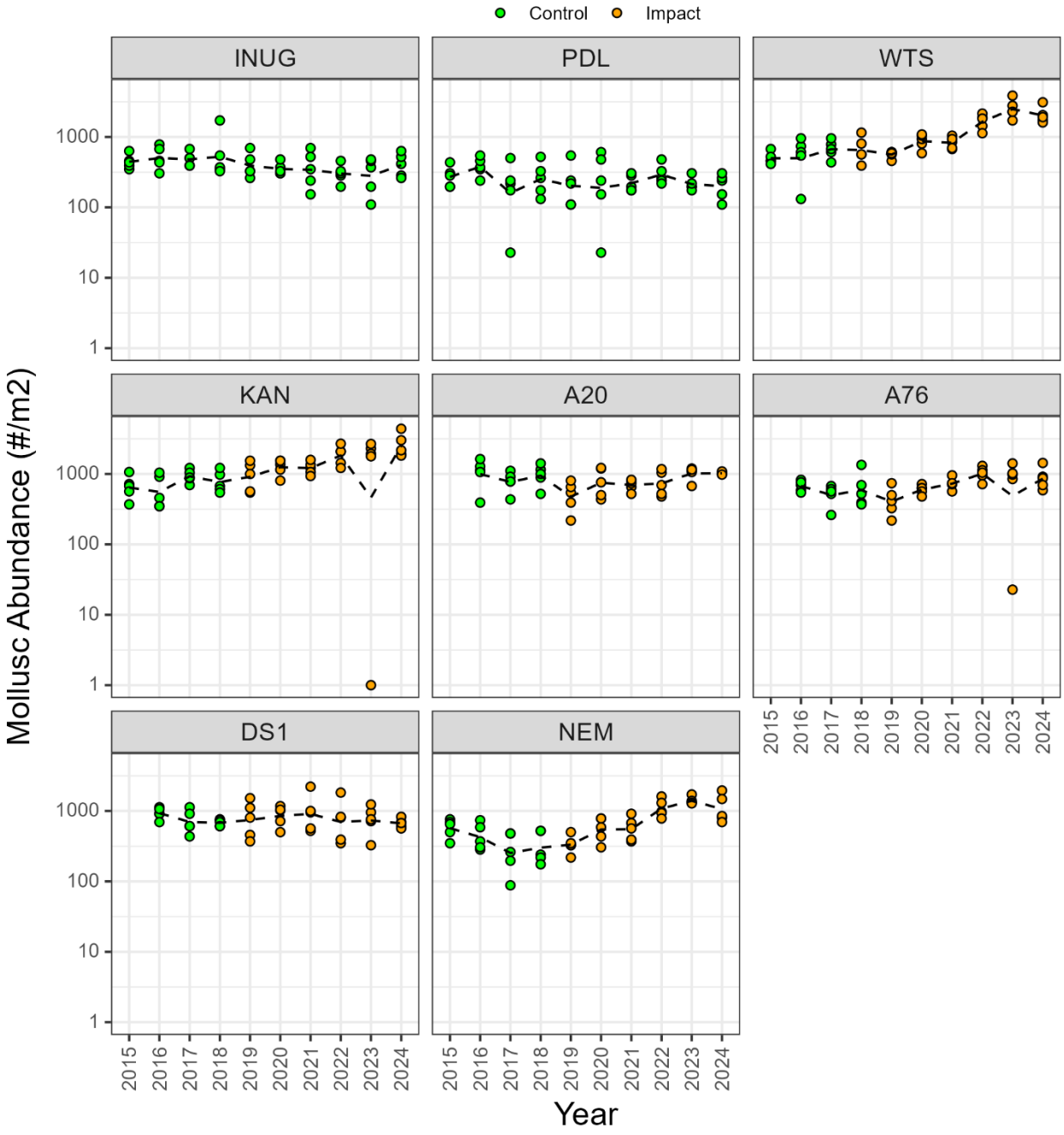


Figure F2-4. Other taxa abundance (#/m^2) from the Whale Tail study lakes since 2015.

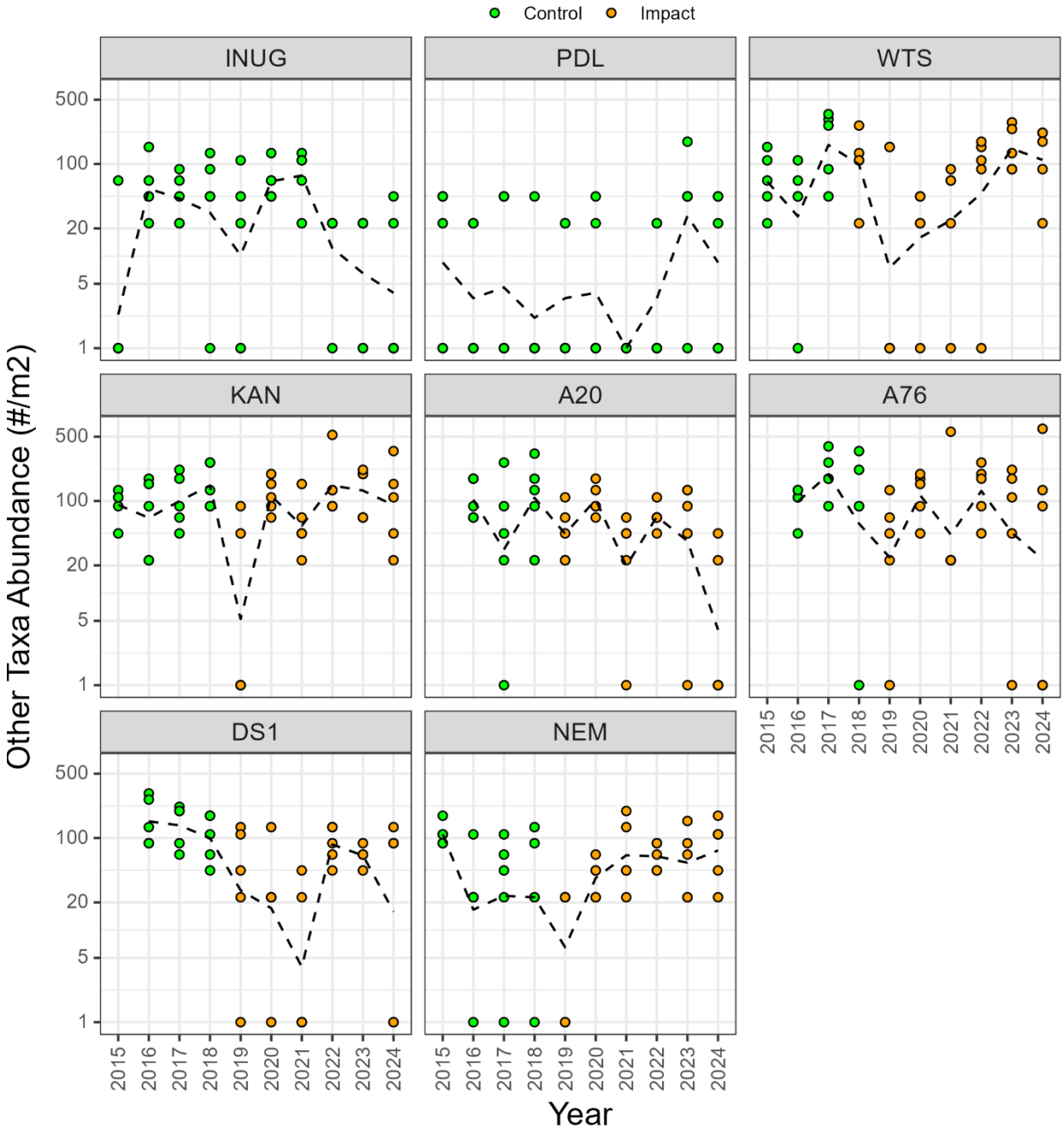


Figure F2-5. Oligochaete richness (# of taxa) from the Whale Tail study lakes since 2015.

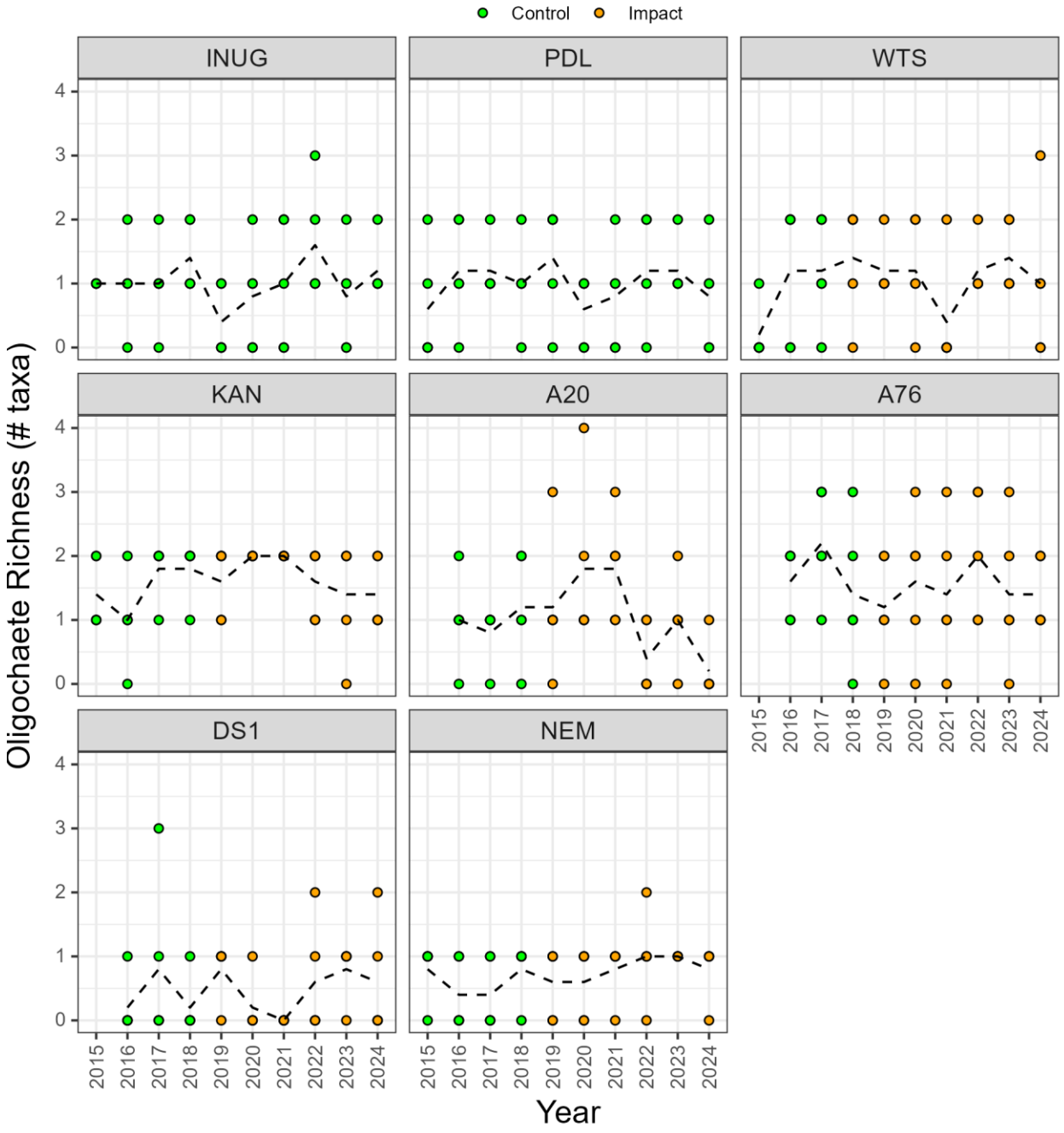


Figure F2-6. Insect richness (# of taxa) from the Whale Tail study lakes since 2015.

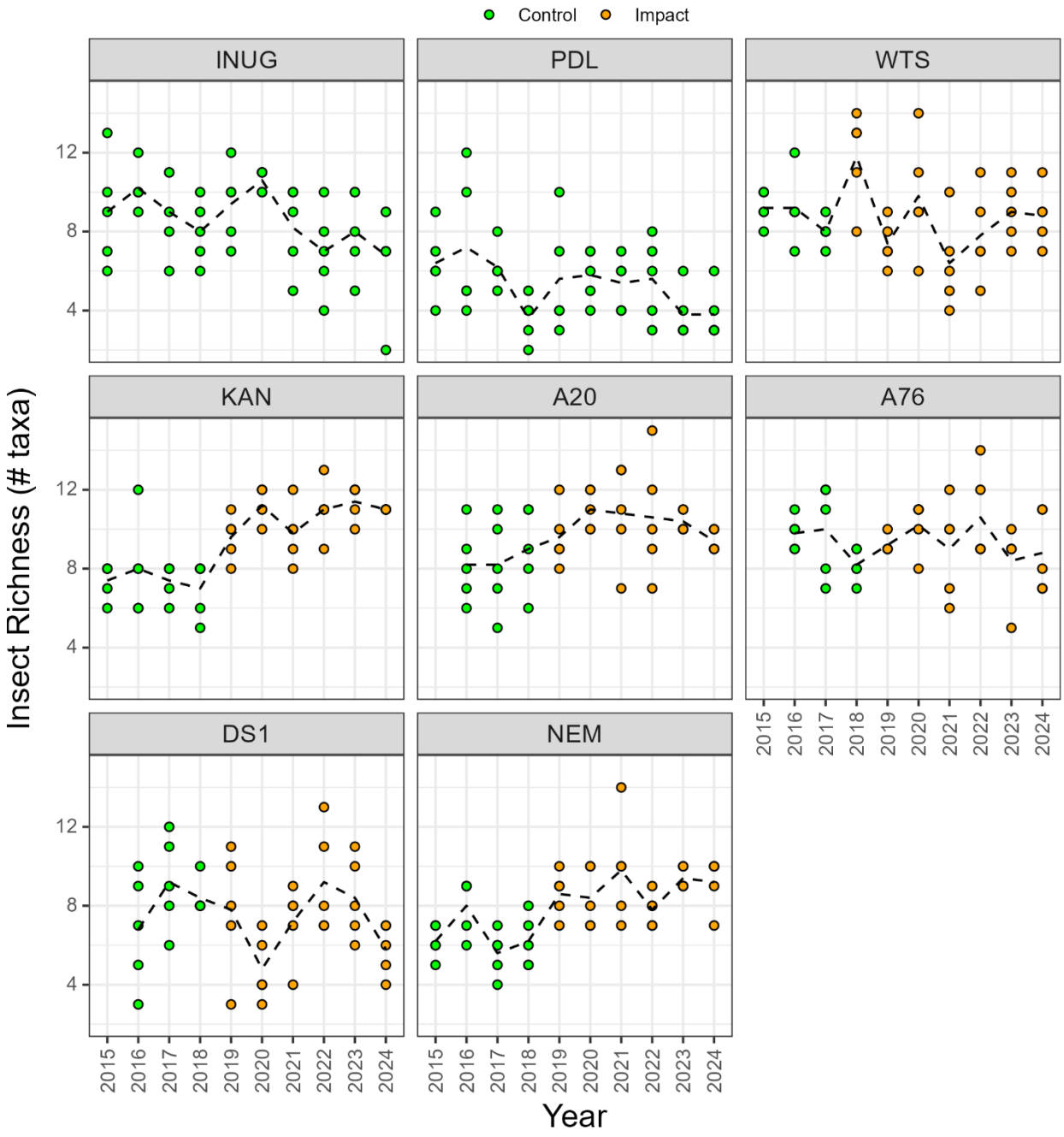


Figure F2-7. Mollusc richness (# of taxa) from the Whale Tail study lakes since 2015.

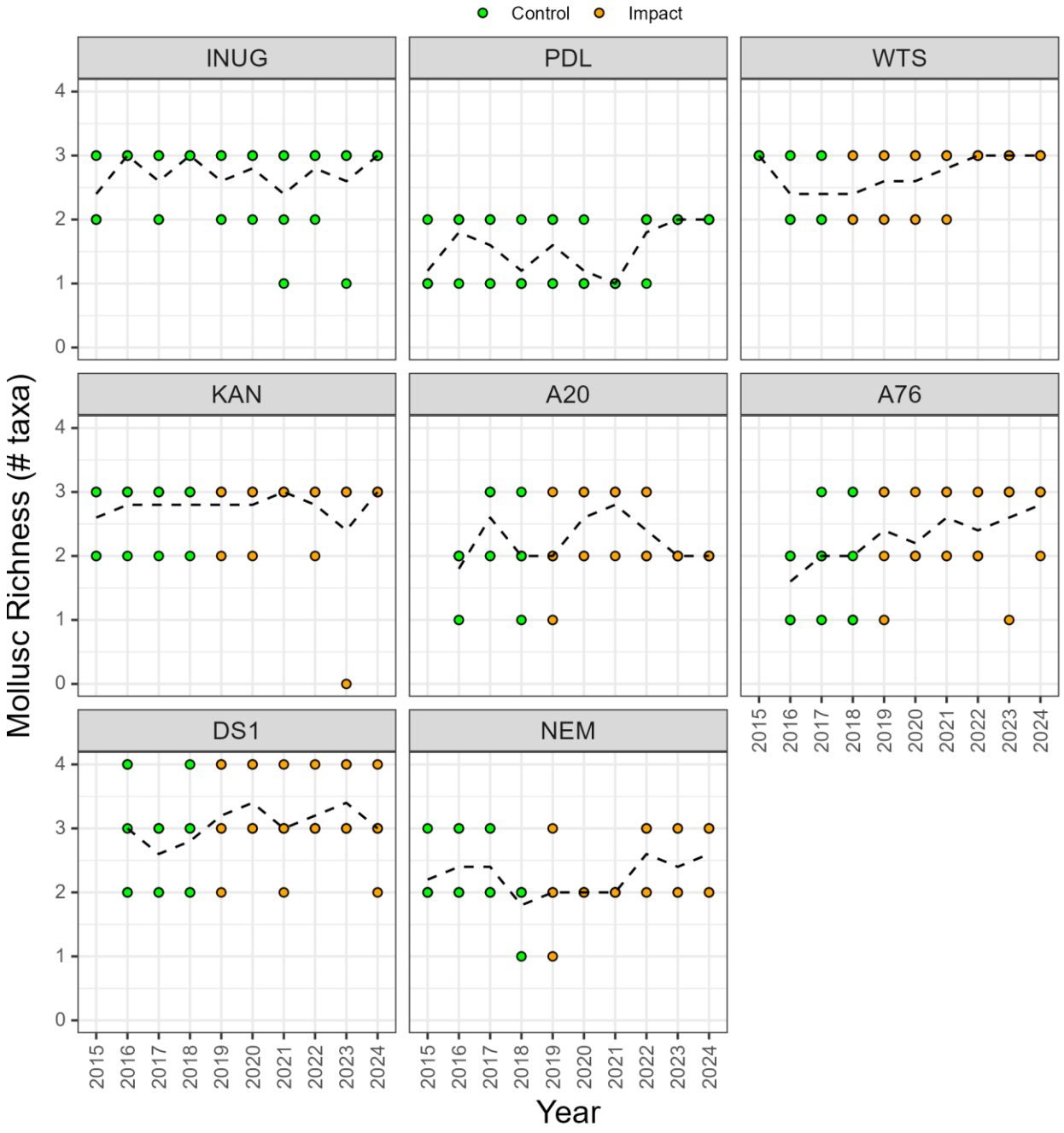


Figure F2-8. Other taxa richness (# of taxa) from the Whale Tail study lakes since 2015.

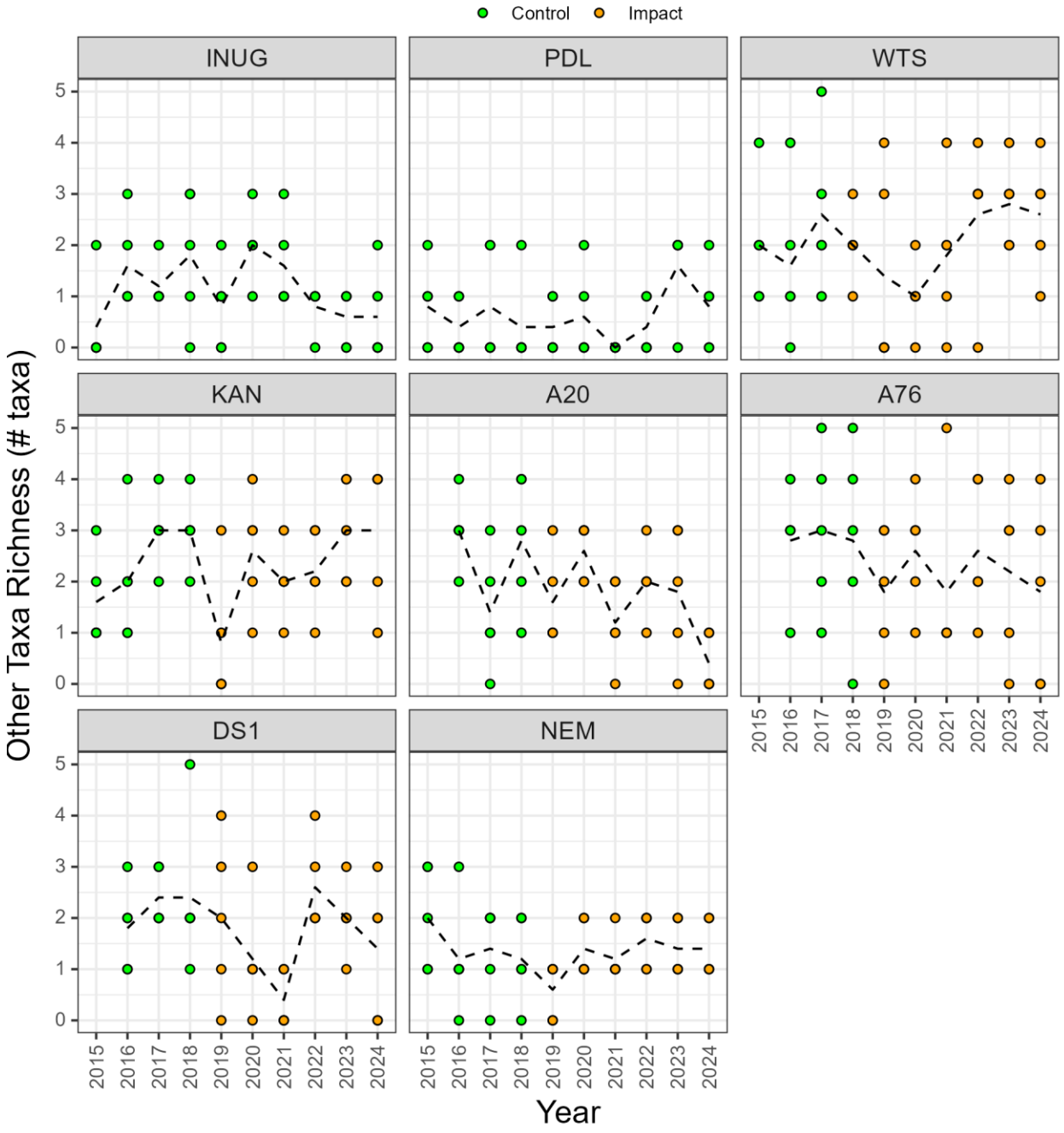


Figure F2-9. Simpson's Diversity for the benthic invertebrate community at the Whale Tail study lakes since 2015.

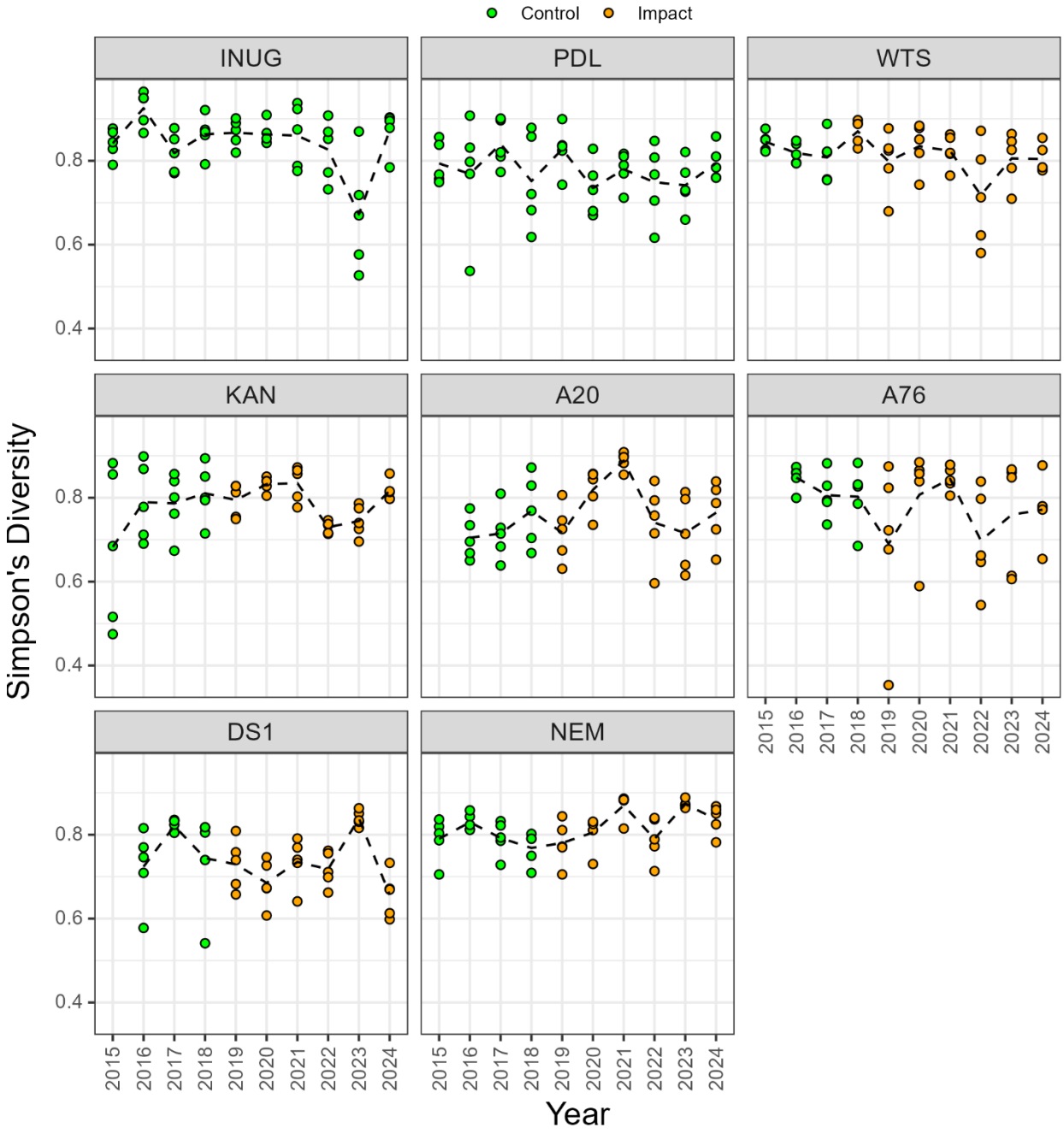


Figure F2-10. Bray-Curtis Index for the benthic invertebrate community at the Whale Tail study lakes since 2015.

