December 25th, 2019
Sophia Granchinho
Manager Impact Assessment
Nunavut Impact Review Board
P.O. Box 534
Arviat, NU
X0C 0E0

Re: Agnico Eagle's response to the NIRB's 2018-2019 Annual Monitoring Report for the Meadowbank Gold Project and the Whale Tail Pit Project with Board's Recommendations

Dear Sophia Granchinho,

The following information are intended to address the NIRB's recommendations regarding an updated Post-Environmental Assessment Monitoring Program (PEAMP) for Meadowbank (03MN107) as requirement in the letter:

- Nunavut Impact Review Board – October 25, 2019: The Nunavut Impact Review Board's 2018-2019 Annual Monitoring Report for the Meadowbank Gold Project and the Whale Tail Pit Project with Board's Recommendations

Should you have any questions or require further information, please do not hesitate to contact us at the below.

Regards,

Agnico Eagle Mines Limited – Meadowbank Division

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Environment Superintendent

1 2018 Post Environmental Assessment Monitoring Program – Meadowbank Site

1.1 Purpose

According to Appendix D of Meadowbank's NIRB Project Certificate, the Post-Environmental Assessment Monitoring Program (PEAMP) is a conceptual program designed "*to work as an instrument of the proponent's overall monitoring efforts and should provide feedback to the NIRB and other agencies regarding ongoing project monitoring*." The goal of the PEAMP is to provide the NIRB and other regulatory agencies information on how actual environmental and socioeconomic effects of the Meadowbank mine site compare to impacts predicted in the Final Environmental Impact Statement (FEIS; Cumberland, 2005).

The objectives of the PEAMP as specified in Appendix D of the Project Certificate are to:

a) Measure the relevant effects of the project on the ecosystemic and socioeconomic environment(s). These effects may be measured through biophysical and socioeconomic monitoring programs undertaken by the Proponent or by other means as described in the Project Certificate;
b) Assess the accuracy of the predictions made within the FEIS;
c) Evaluate the effectiveness of project monitoring procedures and plans;
d) Identify impacts requiring additional mitigation or adaptive management; and
e) Provide relevant data and information to support regional monitoring initiatives where feasible.

Based on comments from the NIRB on Agnico's 2017 and 2018 PEAMP reports, and discussions by phone with NIRB representatives in November 2019, Agnico has revised the PEAMP to also more specifically address the following NIRB recommendations to:

1) Include a discussion that references the baseline and previous years' monitoring data and identifies any trends for each valued ecosystem component where an effect has been observed. Include this information in table and graphic format in order to clearly demonstrate what is being observed.

2) Identify instances where original and/or amended impact predictions can no longer be supported based on project experience to date and include an analysis of the effectiveness of management and mitigation strategies currently employed.

Agnico recognizes the following recommendation, but asserts at this time that it is not a requirement of the PEAMP according to the Project Certificate:

3) Include a summary of lessons learned from the Project to date which can be applied to both updating existing project plans and to any of Agnico Eagle's other planned or ongoing projects as applicable.

1.2 PEAMP Evaluation

To fulfill Items A through D described in Appendix D of the Meadowbank Project Certificate, and in support of NIRB Recommendations 1 and 2 described above, a PEAMP evaluation has been carried out for each valued ecosystem component (VEC) identified in the FEIS. A conceptual model of the PEAMP evaluation process is provided in Figure 1.1. This process involves five components, described below. After an initial

review of the FEIS to identify and summarize impact predictions for the current project phase (Part 1), Parts 2 – 5 are repeated on an annual basis to form the evaluation.

Part 1: For each VEC, predicted residual impacts are summarized for the current project phase (operations). Residual impacts are those occurring after planned mitigation measures are implemented. A summary of the FEIS-planned mitigation measures for each VEC is provided along with a description of implementation in the current monitoring year. This description will be updated in subsequent years, and used to inform discussions when monitoring results indicate residual impacts are exceeding predictions (Part 3). Only predicted residual impacts for which monitoring was recommended in the FEIS are summarized in Step 1, since the PEAMP program focuses on evaluating monitoring results in relation to impact predictions.

Part 2: For each predicted impact, current-year results of the associated monitoring programs are reviewed and summarized. Future results will be added to these tables to ensure historical trends can be observed, even when predicted impacts are not exceeded in a given year.

Part 3: When current monitoring results do not support an impact prediction (i.e. current-year measured impacts are outside of the range of predicted impacts), a trend analysis is conducted to review baseline and all monitoring data to date. A discussion of those results is provided.

Part 4: Previously reported trend analyses are updated, regardless of current year monitoring results. In this way, discussions and trend analyses will be presented in the PEAMP moving forward for all instances where impact predictions have historically been exceeded on one or more occasions.

Part 5: Where monitoring results indicate that impact predictions can no longer be supported, a review of current mitigation and monitoring methods will be provided, along with a description of the adaptive management approaches that will be implemented to reduce or better assess actual impacts.

Figure 1.1. Conceptual model of the PEAMP evaluation process.

For each VEC, the completed PEAMP evaluation is presented in Sections 1.2.1 – 1.2.6, below, according to the six categories of assessment included in the EIS (Aquatic Environment, Wildlife and Terrestrial Environment, Noise Quality, Air Quality, Permafrost, and Socio-Economics).

References for the location of the original impact predictions, monitoring plans, and mitigation within the Project FEIS are provided in Appendix A.

It should be noted that the monitoring programs as described in the FEIS were developed at a conceptual level to assist in evaluating the overall potential impacts of the project. These were supporting documents in the FEIS and assisted in informing predictions, establishing regulatory limits, and forecasting management and mitigation actions to assist in the impact prediction process. Monitoring plans and sampling locations have since undergone changes and revisions to reflect actual mine operations. These differences are taken into account and identified when making comparisons to FEIS predictions.

1.2.1 Aquatic Environment PEAMP Evaluation

Key mine development activities that could result in changes to the aquatic receiving environment include: East Dike construction (2008), Bay-Goose Dike construction (2009-10), dewatering of both lakes and impoundments (2009-11, 2013), effluent discharge (2012 to present), and general site-related mining activities that mostly generate dust (e.g., rock crushing, blasting, ore and waste hauling; 2008 to present).

Within the FEIS, impacts to the aquatic environment potentially generated through these activities are described for water quantity, water quality, and fish/fish habitat. Predicted and measured residual impacts for each of these areas are described below.

1.2.1.1 Water Quantity

1.2.1.1.1 *Parts 1 & 2:* Summary of Predicted and Measured Residual Impacts

A summary of predictions for impacts to surface water quantity (Cumberland, 2005; Table B4.2) and the accuracy of these predictions in 2018 (measured impacts) are provided in Table 1.1. Cells are highlighted in grey when measured impacts exceed predictions for the current year. A historical trend analysis and discussion are provided for those observations in Section 1.2.1.1.2. Future results will be added to that section to ensure historical trends can be observed, even when predicted impacts are not exceeded in a given year.

Table 1.1. Predicted and measured impacts to water quantity. Measured impacts exceeding or potentially exceeding predictions are shaded grey and further discussed in Section 1.2.1.1.2. **Impact prediction not well defined – trend analysis provided in Section 1.2.1.1.2.

Potential Impact	Potential Cause(s)	Proposed Monitoring	Actual Monitoring	Predicted Impact	Measured Impact (2018)
Altered (reduced) water levels in Third Portage Lake	Potentially high seepage rates (from lakes into pits)	Monitor pit seepage rates	Lake levels monitored	No change in lake level (FEIS modeled range = 133.82 – 134.19 masl)	133.55 – 133.86 masl (average = 133.67 masl) – see Section 1.2.1.1.2
	Freshwater consumption (Third Portage Lake)	Monitor freshwater use	Freshwater use monitored	0.53 M m^3/yr (Year 5 – 8; FEIS) NWB renewed water license and approved 2.35 Mm^3/yr until 2017 and 9.12 Mm^3/yr in 2018 through to expiry of license.	1,027,159 m^3
	Discharge from Portage Attenuation Pond	Monitor discharge volumes and timing	Discharge volumes monitored	458,400 m^3/yr (max)	No discharge in 2018
	Non-contact water diverted from Second Portage Lake drainage into TPL	Monitor discharge volumes of non-contact water	Lake levels monitored	No change in lake level (modeled range = 133.82 – 134.19 masl)	133.55 – 133.86 masl (average = 133.67 masl) – see Section 1.2.1.1.2
Altered water levels in Second Portage Lake	Potentially high seepage rates (from lakes into pits)	Monitor pit seepage rates	Lake levels monitored	Dike seepage rates predicted at 10^{-2} – 10^{-4} L/s/m of dike; Minor effect on lake level (baseline = 133.1 masl)**	132.86 – 133.10 masl (average = 132.96 masl)**
	Non-contact water diverted from Second Portage Lake drainage	Monitor discharge volumes of non-contact water	Lake levels monitored	Minor effect on lake level (baseline = 133.1 masl)**	132.86 – 133.10 masl (average = 132.96 masl)**
Increased water levels in Wally Lake	Discharge from Attenuation Pond	Monitor discharge rates	Monitored discharge rates	Minimal increase in water levels** Total average annual discharge is approximately 456,450 m^3 during open water months	No discharge; Measured water levels 139.25 - 139.66 masl (avg. = 139.41 masl) are within the range of background values**

1.2.1.1.2 *Parts 3 & 4:* Discussion

Where impacts are exceeded or potentially exceeded based on monitoring results (as identified in Parts 1 & 2, above), a discussion is provided here.

1. Changes in Lake Levels

FEIS Prediction: Third Portage Lake - no change in lake levels (modeled range = 133.82 – 134.19 masl). Second Portage/Wally Lake – minor change in lake levels (not quantitative).

Discussion:

Third Portage Lake

Water usage predictions were made during the FEIS to predict potential impacts to water levels in Third Portage Lake, Second Portage Lake, and Wally Lake. Modeling predicted the natural range of water levels in Third Portage Lake to be 133.82 – 134.19 masl, and the impact assessment indicated that this range would not be exceeded (Physical Environment Impact Assessment Report, 2005). Although these values accounted for 1-in-100 yr precipitation or drought events, prior to operation, water levels were already below this range when monitoring began (prior to any significant freshwater consumption) in 2009 (133.5 masl). Pumping rates of freshwater from Third Portage Lake remained well within license limits in 2018, and water levels do not appear to have changed significantly since monitoring began (2009) (see Figure 1.2). Therefore, the Project does not appear to be having a significant impact on water quantity, rather baseline water levels may not have been well defined in the initial impact assessment.

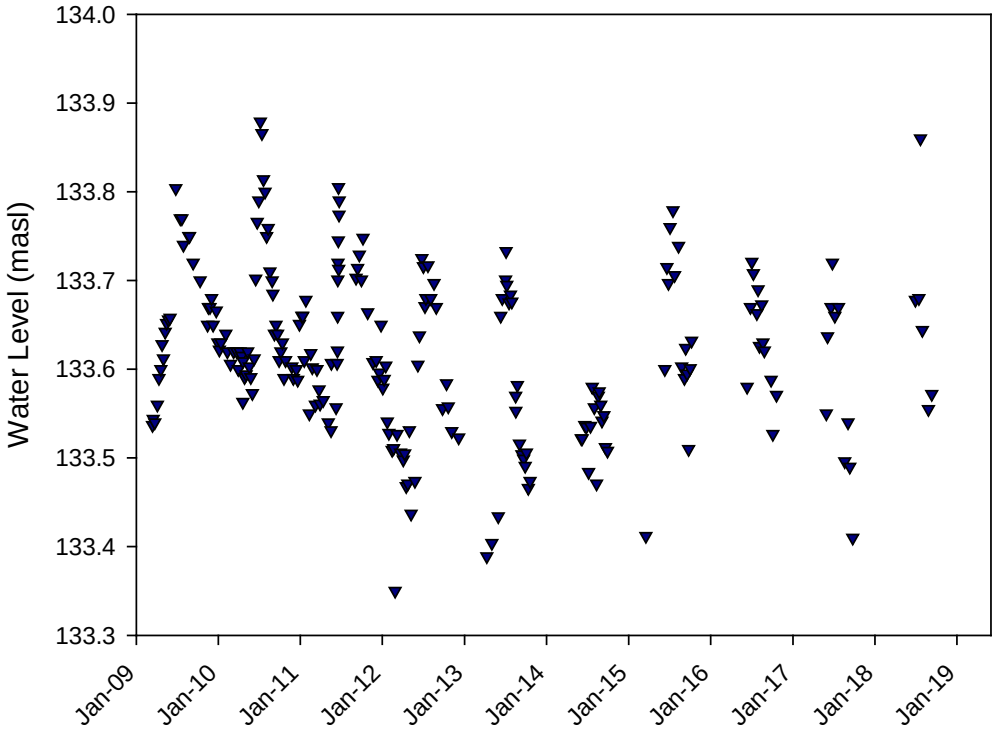


Figure 1.2. Measured water levels in Third Portage Lake (2009 – 2018).

Second Portage Lake

For Second Portage Lake, the FEIS predicted a “minor” effect on water levels. Since that prediction is not quantitative, historical measurements are reviewed here to identify any apparent trends that might arise. Although only one measurement of baseline water levels in Second Portage Lake was reported from 2005 in the FEIS (133.1 masl), making comparisons difficult, measured water levels since 2013 (when monitoring was required to begin) appear to be within this range (Figure 1.3).

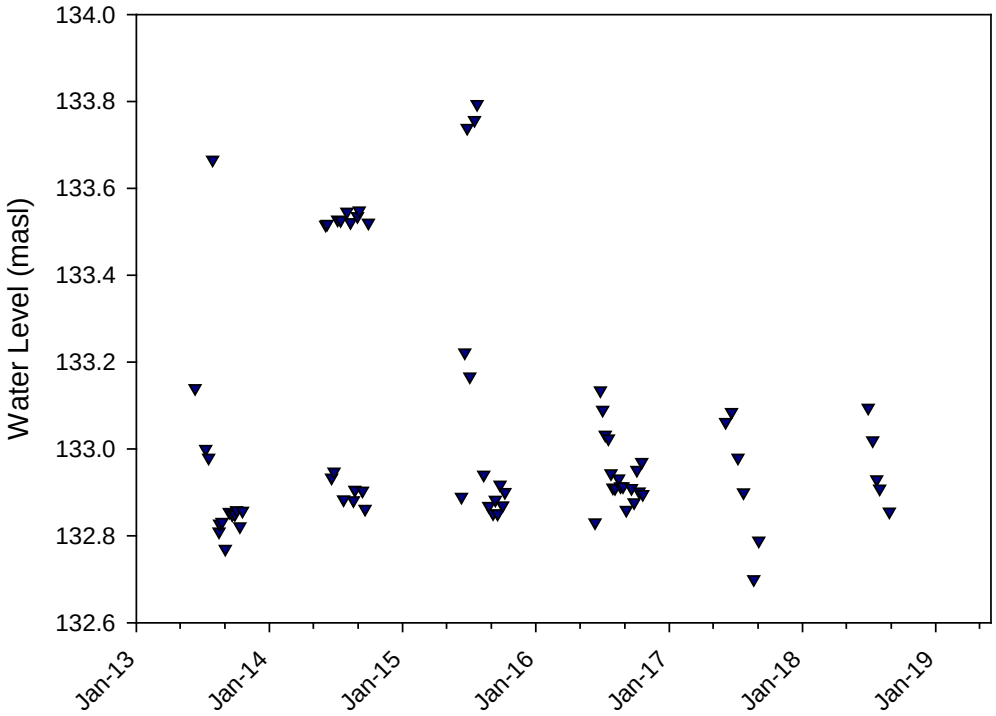


Figure 1.3. Measured water levels in Second Portage Lake (2013-2018).

Wally Lake

For Wally Lake, the FEIS predicted a “minimal” increase in water levels. Since that prediction is not quantitative, historical measurements are reviewed here to identify any apparent trends that might arise. No baseline measurements are available for Wally Lake, but since monitoring was required to begin in 2013, no clear upward or downward trends are observed (Figure 1.4).

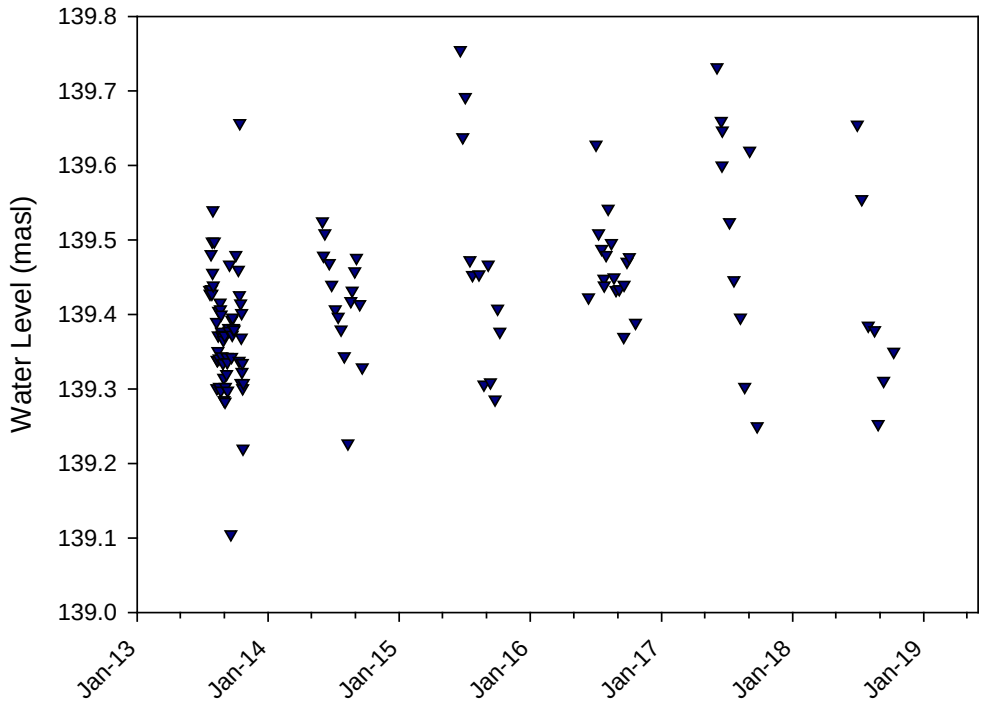


Figure 1.4. Measured water levels in Wally Lake (2013-2018).

1.2.1.1.3 *Part 5:* Effectiveness of Monitoring and Mitigation, and Adaptive Management

Although FEIS predictions for changes to water quantity were rarely quantitative, the monitoring programs being implemented at the Meadowbank site are able to measure changes in receiving environment water levels. Monitoring programs are therefore considered effective.

A summary of the FEIS-planned mitigation measures for surface water quantity along with a commentary on implementation in 2018 is provided in Table 1.2. Mitigation measures related to water quality and fish and fish habitat are provided in Section 1.2.1.2.3 and 1.2.1.3.3, respectively.

Table 1.2. Mitigation measures described in the FEIS to reduce impacts of the project to water quantity and commentary on current implementation.

Planned Mitigation Measure (FEIS, Section 4.24.2.5)	Implementation
Reducing the intake of fresh water from the neighboring lakes by recycling and reusing water where practicable	**Yes** - Meadowbank continues to recycle reclaim water for mill usage. In 2018, reclaim water usage was more than double freshwater intake (2018 Annual Report; Section 4.1.1)

Since no exceedances of FEIS predictions or updated license limits occurred, existing mitigation measures are considered to be effective as designed, and no adaptive management measures are proposed for 2019.

1.2.1.2 Water Quality

1.2.1.2.1 *Parts 1 & 2:* Summary of Predicted and Measured Residual Impacts

Aspects of the mine that were identified in the FEIS as potentially leading to significant impacts to water quality during operations (Cumberland, 2005; Table B5.2) are summarized Table 1.3, along with results of the monitoring programs aimed at assessing these impacts. This assessment focuses on comparing current measured effects with predicted impacts described in the Physical Environment Impact Assessment Report (2005) for receiving environment water quality. Associated monitoring programs are the CREMP and effluent monitoring under the MDMER.

The 2018 CREMP report (2018 Annual Report; Appendix 31) provides a comprehensive assessment of water quality monitoring for the receiving environment, with analysis of inter-annual trends, and a comparison to site-specific trigger values and FEIS predictions. Those results are summarized and referenced here. Complete results of effluent monitoring under the MDMER are provided in Section 8.3 of the 2018 Annual Report.

Overall, the FEIS predicted a “low” impact on the receiving environment water quality, which was designated by <1x change in CCME Water Quality Guidelines (CWQG), and no exceedances of MDMER/NWB Water License criteria. Monitoring results are compared to those predictions in Table 1.3 below. If exceedances occurred, cells are highlighted in grey and a discussion is provided in Section 1.2.1.2.2.

In addition, annual Meadowbank CREMP water chemistry data were compared to the maximum whole-lake average water quality modelling predictions for Third Portage, Second Portage, and Wally Lakes made in the FEIS (see 2018 CREMP report; Appendix 31). Exceedances of these model predictions are noted in Table 1.3, and a full discussion is provided in Section 1.2.1.2.2.

Table 1.3. Predicted and measured impacts to water quality. Measured impacts exceeding or potentially exceeding predictions are shaded grey and further discussed in Section 1.2.1.2.2.

Potential Impact	Potential Cause(s)	Proposed Monitoring	Monitoring Conducted	Predicted Impact	Measured Impact (2018)
Impaired Wally Lake water quality	Vault attenuation pond effluent discharge; dike leaching	Effluent and receiving environment monitoring	Receiving environment: CREMP water quality monitoring	CREMP results <CWQG except arsenic and cadmium.	CREMP results all <CWQG
				Measured concentrations within model predictions	Some exceedances of model predictions* - see Section 1.2.1.2.2
			Effluent monitored under MDMER, NWB Water License	Effluent: <MMER	No effluent discharged
Impaired Second Portage Lake water quality	Portage Attenuation pond effluent discharge; dike leaching; (East Dike seepage)	Effluent and receiving environment monitoring	Receiving environment: CREMP water quality monitoring	CREMP results <CWQG except cadmium	CREMP results all <CWQG
				Measured concentrations within model predictions	Some exceedances of model predictions*- see Section 1.2.1.2.2
			Effluent monitored under MDMER, NWB Water License	Effluent: <MMER, Water License	Effluent: <MDMER and Water License Criteria
Impaired Third Portage Lake water quality	Portage Attenuation pond effluent; dike leaching	Effluent and receiving environment monitoring	Receiving environment: CREMP water quality monitoring No effluent monitoring required.	CREMP results <CWQG except cadmium	CREMP results all <CWQG
				Measured concentrations within model predictions	Some exceedances of model predictions*- see Section 1.2.1.2.2

1.2.1.2.2 *Parts 3 & 4:* Discussion

Where impacts are exceeded or potentially exceeded based on monitoring results (as identified in Parts 1 & 2, above), a discussion is provided here.

1. FEIS Model Predictions for Water Quality

FEIS Prediction: Concentrations <CCME water quality guidelines; "low" magnitude of effects.

Discussion: As described in the 2018 CREMP Report, a number of measured parameters without CCME criteria exceeded FEIS water quality model predictions when these individual values are compared directly. However, the difference in spatial focus (i.e., the CREMP at the basin scale and the water quality model at the whole-lake scale) warrants caution interpreting any differences. To that end, the assessment criteria outlined in the FEIS for defining the predicted magnitude of impacts to water quality was used to provide the appropriate context for interpreting measured water quality results in comparison to FEIS water quality model predictions 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 guidelines
- **High**: concentrations are less than MDMER but greater than 10-times the CCME guidelines
- **Very High**: concentrations exceed MDMER standards

Where results exceeded FEIS water quality model predictions but did not exceed CCME water quality guidelines, CREMP thresholds, or otherwise determined adverse effects levels (as detailed below), they were still considered to have a "low" magnitude of impact, consistent with general FEIS predictions.

In 2018, parameters with results commonly exceeding concentrations predicted in the FEIS water quality model were: ionic compounds (calcium and magnesium), hardness, and total alkalinity. Historical results for these constituents are shown in Figures 1.5 – 1.8 (from 2018 CREMP Report, Section 4.7). These water quality constituents do not have CCME guidelines and therefore the magnitude of significance was not explicitly predicted in the FEIS. Previous review of the literature suggests that the observed concentrations of these parameters are well below levels of concern for aquatic life (see discussion in 2018 CREMP Report, Section 4.3.2; p. 49 – 51). Therefore, following the intent of the FEIS magnitude ratings, these constituents would be considered consistent with a "low" magnitude of impact, because measured values regularly exceed baseline concentrations but are below concentrations associated with adverse effects. However, Agnico Eagle is also committing to a more detailed assessment of the significance of changes in these water quality parameters in 2019 (see Adaptive Management, Section 1.2.1.2.3 below).

Chloride, fluoride, nitrate, and sulphate also exceeded the FEIS predictions for Third Portage Lake, Second Portage Lake, and Wally Lake in at least one sample in 2018. However, no results exceeded available CCME guidelines (chloride, fluoride, nitrate) or effects-based CREMP thresholds (sulphate), so these constituents are also considered to represent a "low" magnitude of impact. Historical results for these parameters are provided in Figures 1.9 – 1.12.

Most metals were below the FEIS model predicted concentrations except for silicon (all three lakes), strontium (Third Portage Lake) and isolated instances of aluminum, copper, iron, manganese, and silver. For silicon, no CCME guidelines, CREMP triggers or thresholds are available. Historical results for this parameter are provided in Figure 1.13. Measured concentrations in the Meadowbank project lakes (i.e., <0.1 to 0.48 mg/L) fall well within range observed in surface water elsewhere in Canada (0.01 mg/L to 0.24 mg/L in the Atlantic regions and 0.3 mg/L to 25.4 mg/L in the Pacific regions – CCME, 2008). Silicon does not have a water quality guideline in Canada, but CCME (2008) notes that it is the second most abundant element in the earth's crust and is considered an essential micronutrient for some aquatic organisms (e.g., diatoms). While this information suggests that the ecological implications of the concentrations currently found at Meadowbank would be negligible, Agnico Eagle is committing to a more detailed assessment of the significance of changes in other water quality parameters as described above (e.g., calcium, magnesium, hardness, and total alkalinity) and will include silicon (see Adaptive Management, Section 1.2.1.2.3 below). Strontium consistently exceeded the model predictions for Third Portage Lake, but importantly did not exceed the CREMP trigger (95th percentile of baseline) indicating current strontium concentrations are representative of pre-development conditions. Historical results for strontium are provided in Figure 1.14. While occasional measurements of aluminum, copper, iron, manganese and silver also exceeded FEIS water quality modelling predictions, no measurements exceeded CREMP trigger values (95th centile of baseline) or CCME guidelines, so these constituents are also considered to be consistent with a "low" magnitude of impact. Historical results for these parameters are provided in Figures 1.15 – 1.19.

Based on these analyses, overall, CREMP water quality results were determined to be consistent with the "low" significance (i.e., <1x CCME WQG) rating applied to model predictions in the FEIS.

Figures of historical results for all other water quality parameters measured under the CREMP are provided in the 2018 CREMP Report (Appendix 31 of the 2018 Annual Report - Section 4.7 and Appendix B1, Figures B1-1 – B1-34).

Figure 1.5 Total calcium (mg/L) in water samples from Meadowbank study lakes since 2006. Note: The red dashed line = CREMP trigger value.

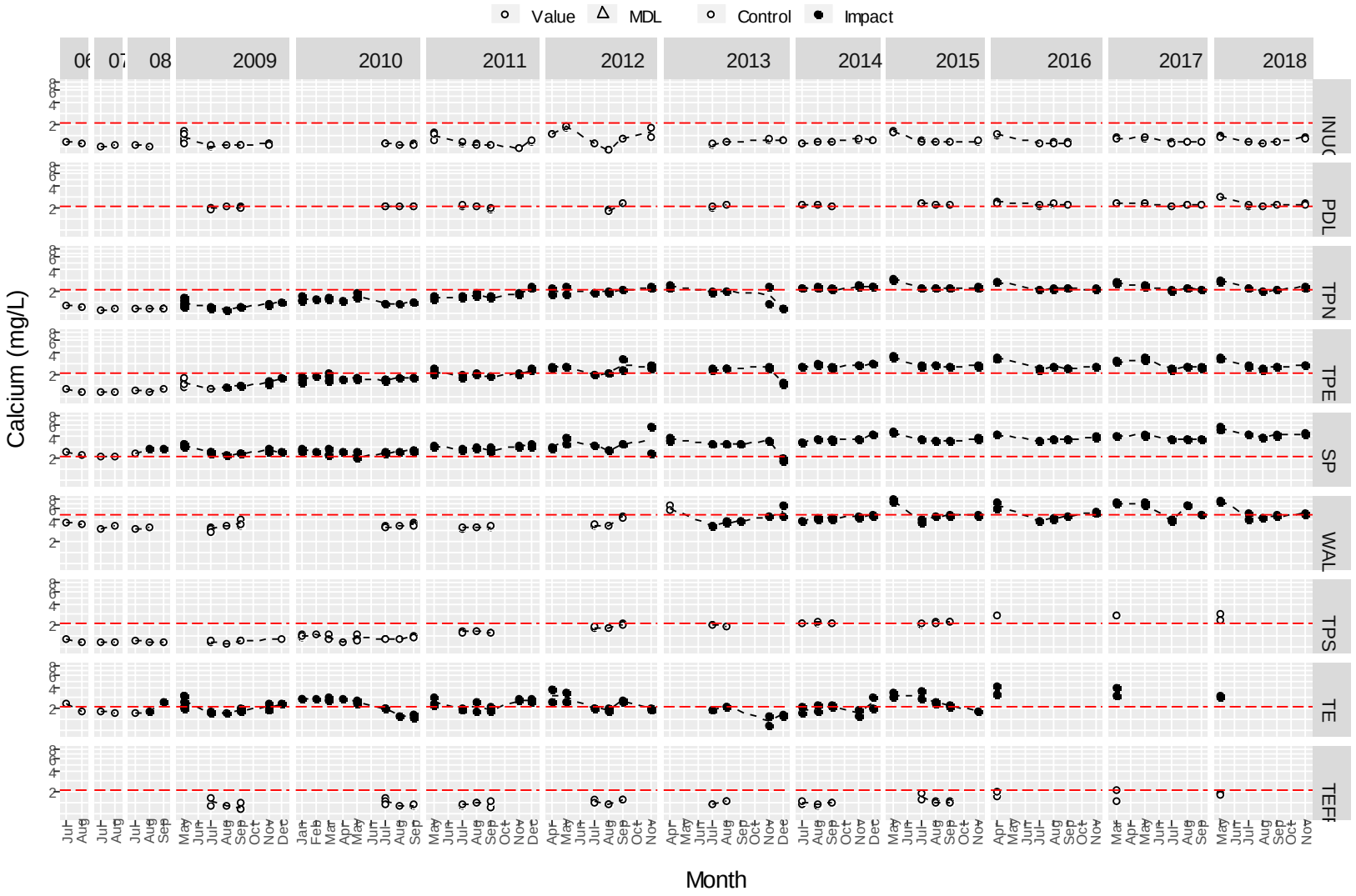


Figure 1.6. **Total magnesium (mg/L) in water samples from Meadowbank study lakes since 2006. Note: The red dashed line = CREMP trigger value.**

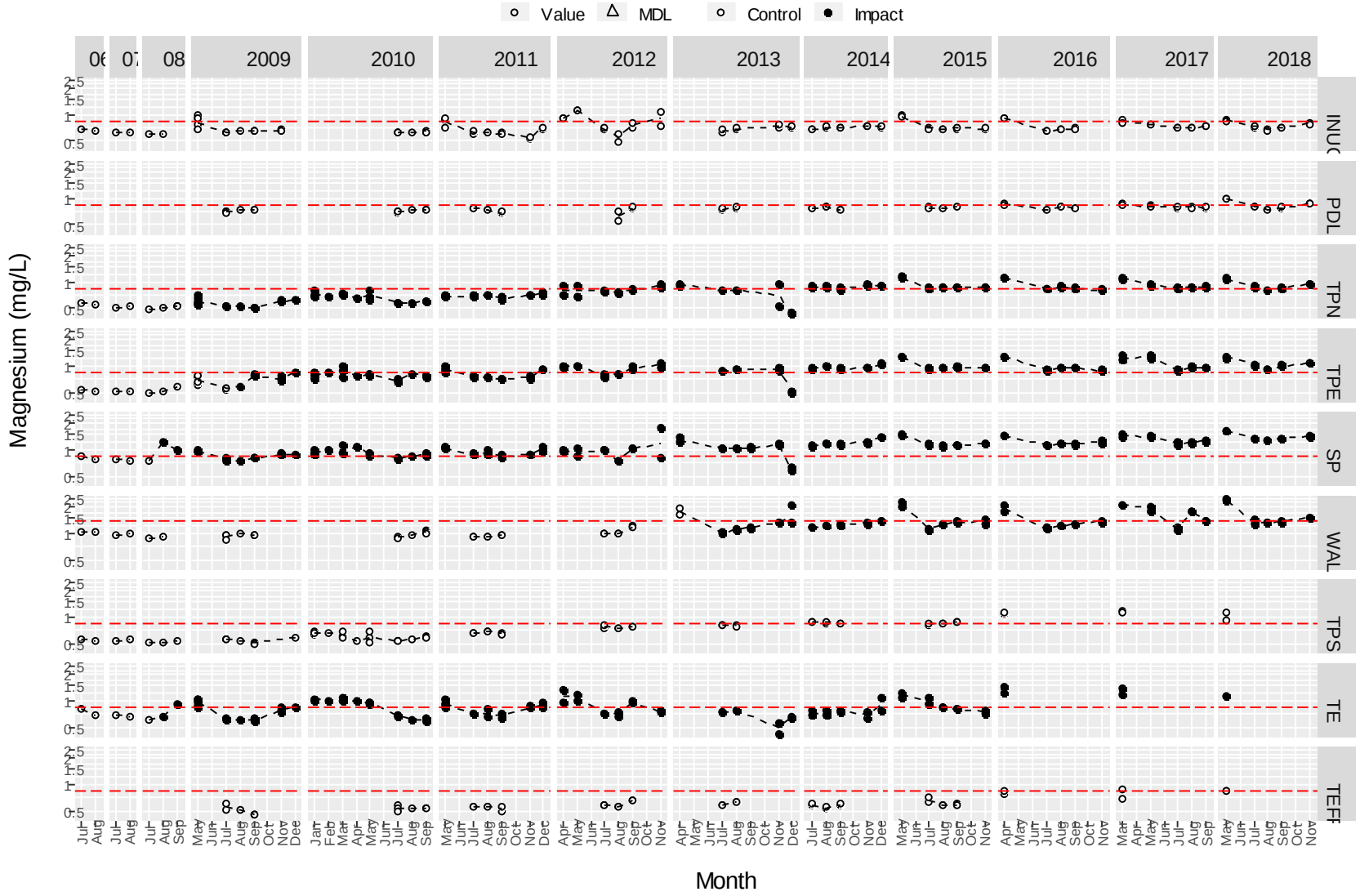


Figure 1.7. Laboratory-measured hardness (mg/L) in water samples from Meadowbank Study lakes since 2006. Note: The red dashed line = CREMP trigger value.

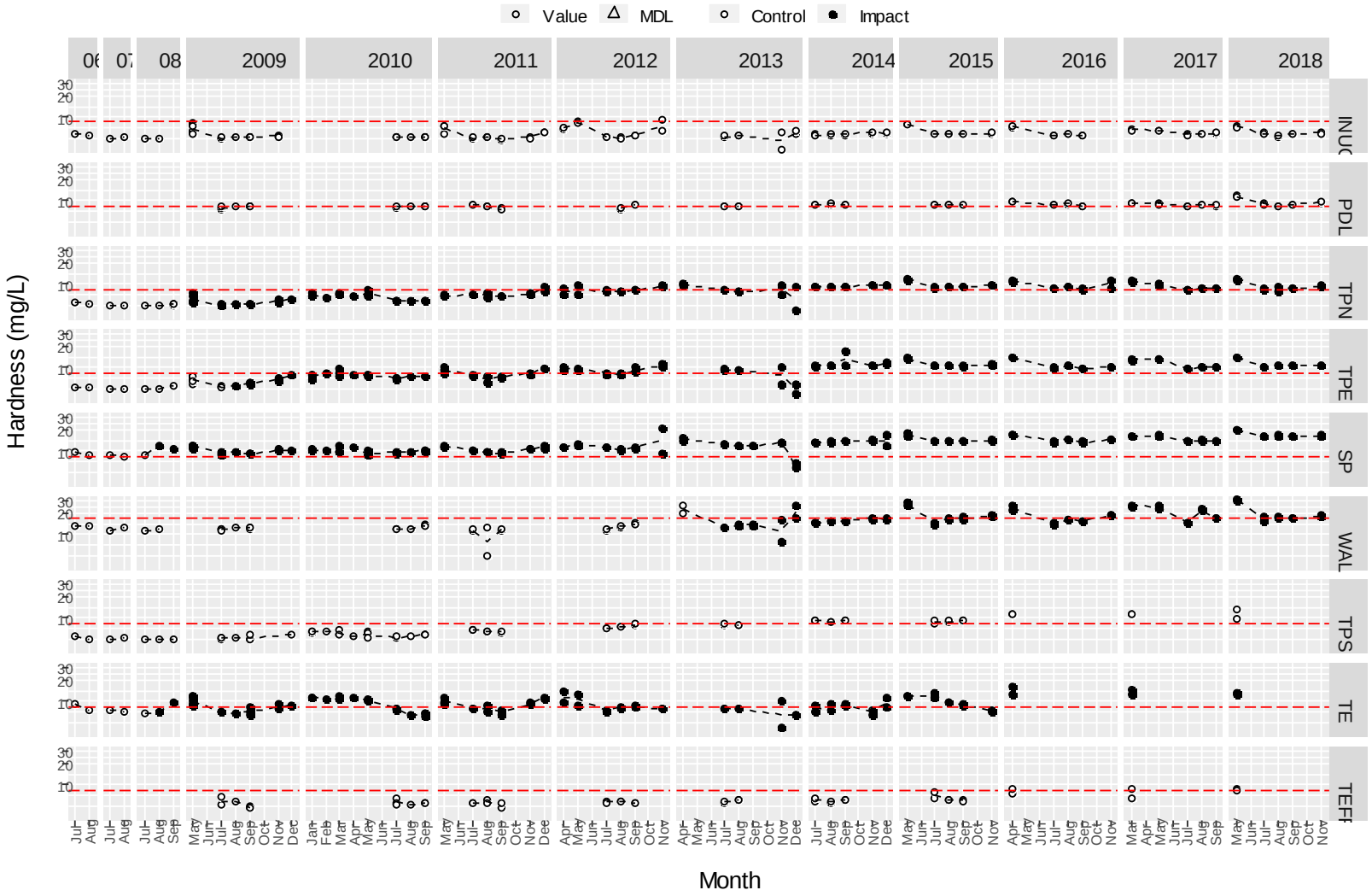


Figure 1.8. Total alkalinity (mg/L) in water samples from Meadowbank study lakes since 2006. Note: The red dashed line = CREMP trigger value.

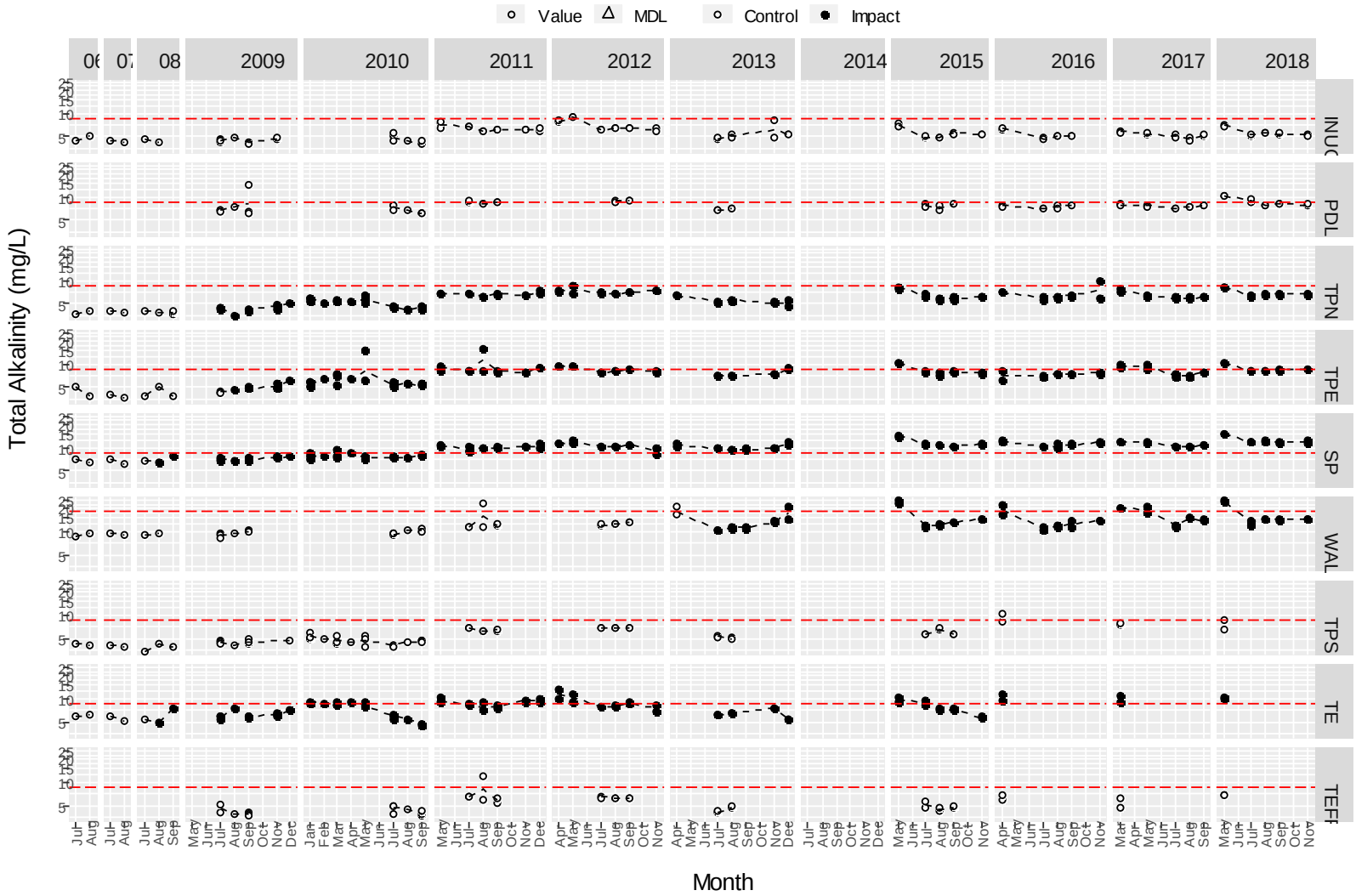


Figure 1.9. **Chloride (mg/L) in water samples from Meadowbank study lakes since 2006. Note: The red dashed line = CREMP trigger value.**

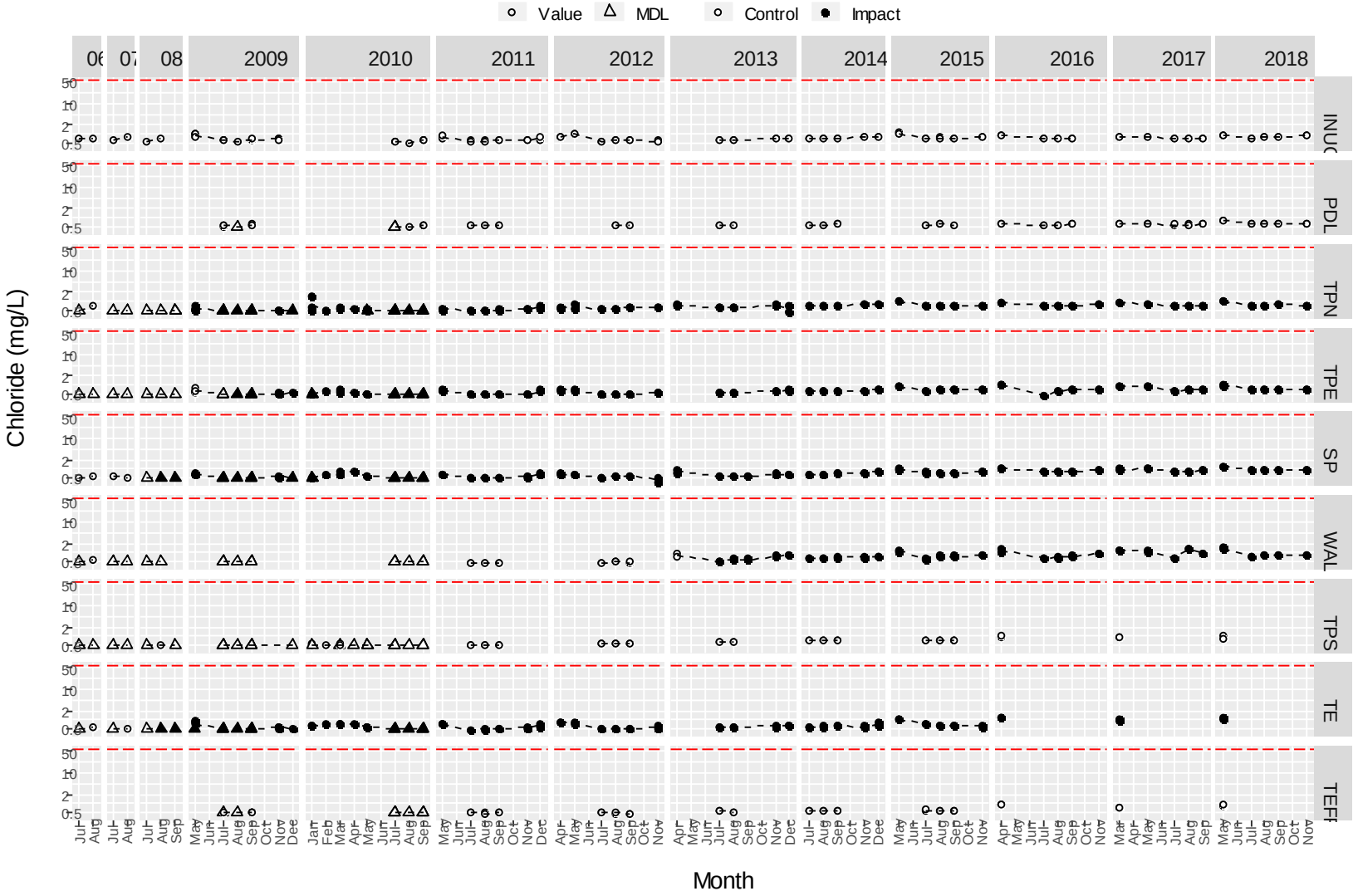


Figure 1.10. Fluoride (mg/L) in water samples from Meadowbank study lakes since 2006. Note: No CREMP trigger value shown due to scale. No exceedances have occurred.

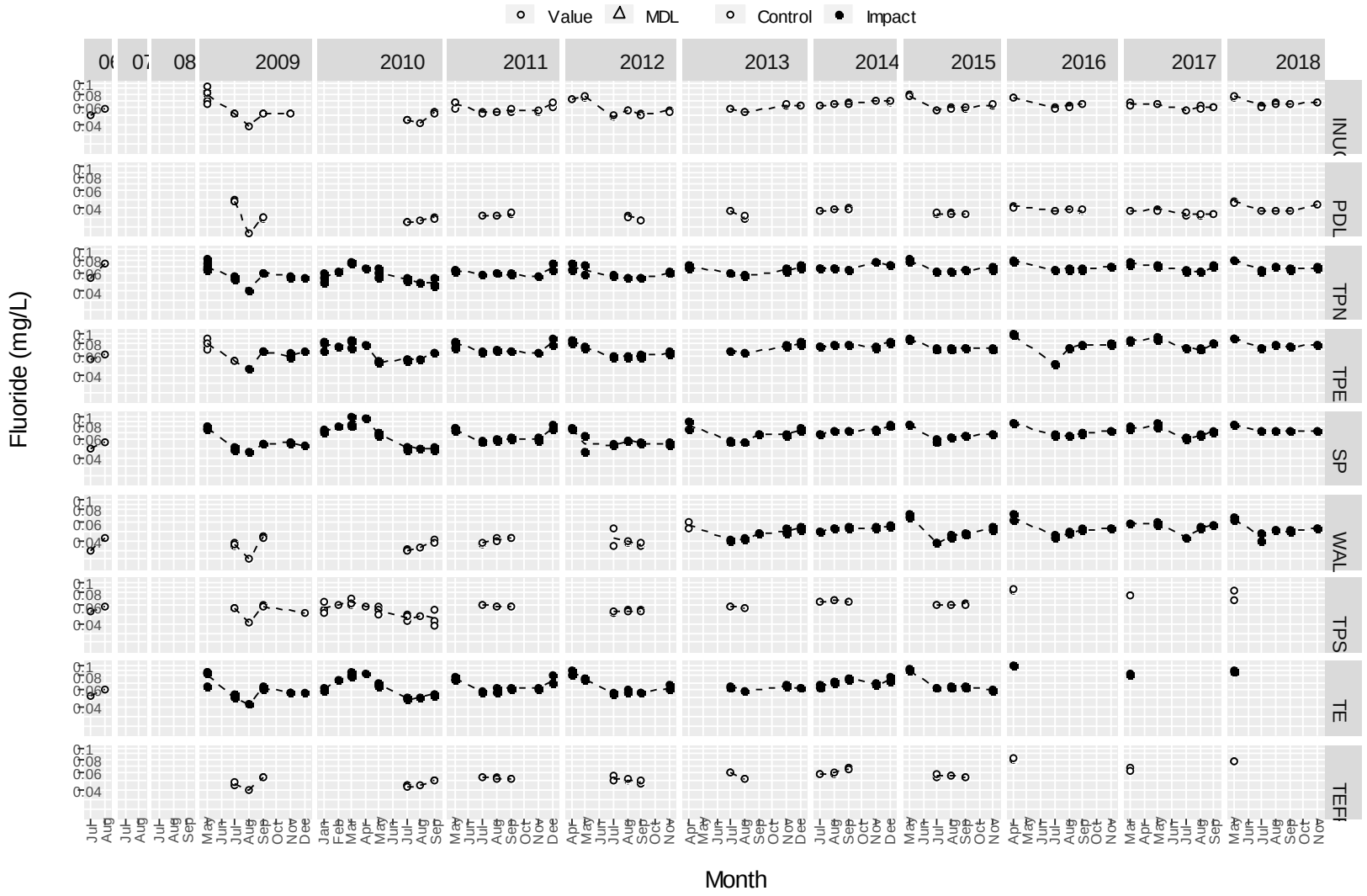


Figure 1.11. **Nitrate-N (mg/L) in water samples from Meadowbank study lakes since 2006. Note: The red dashed line = CREMP trigger value**

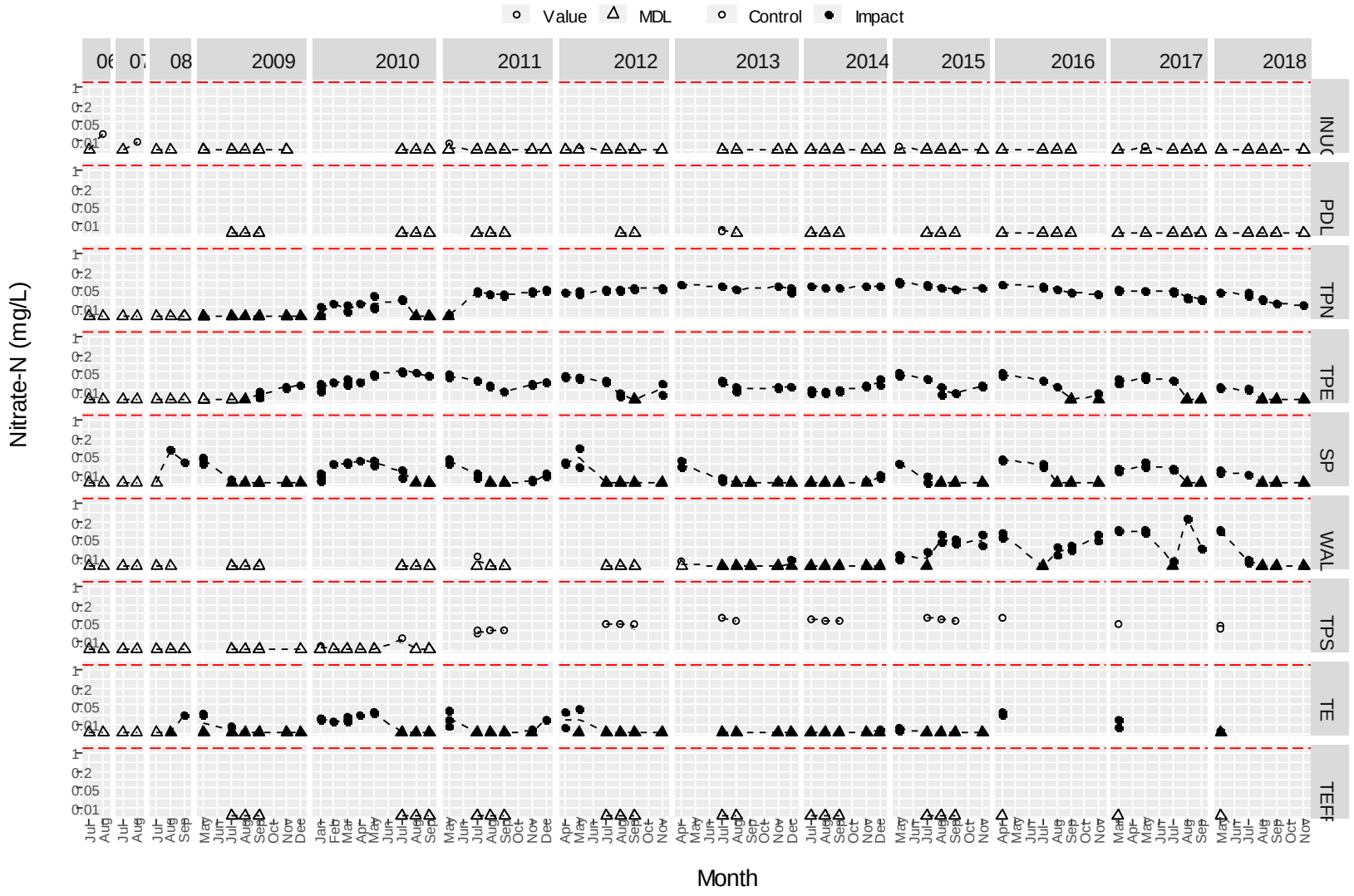


Figure 1.12. **Sulphate (mg/L) in water samples from Meadowbank study lakes since 2006. Note: The red dashed line = CREMP trigger value.**

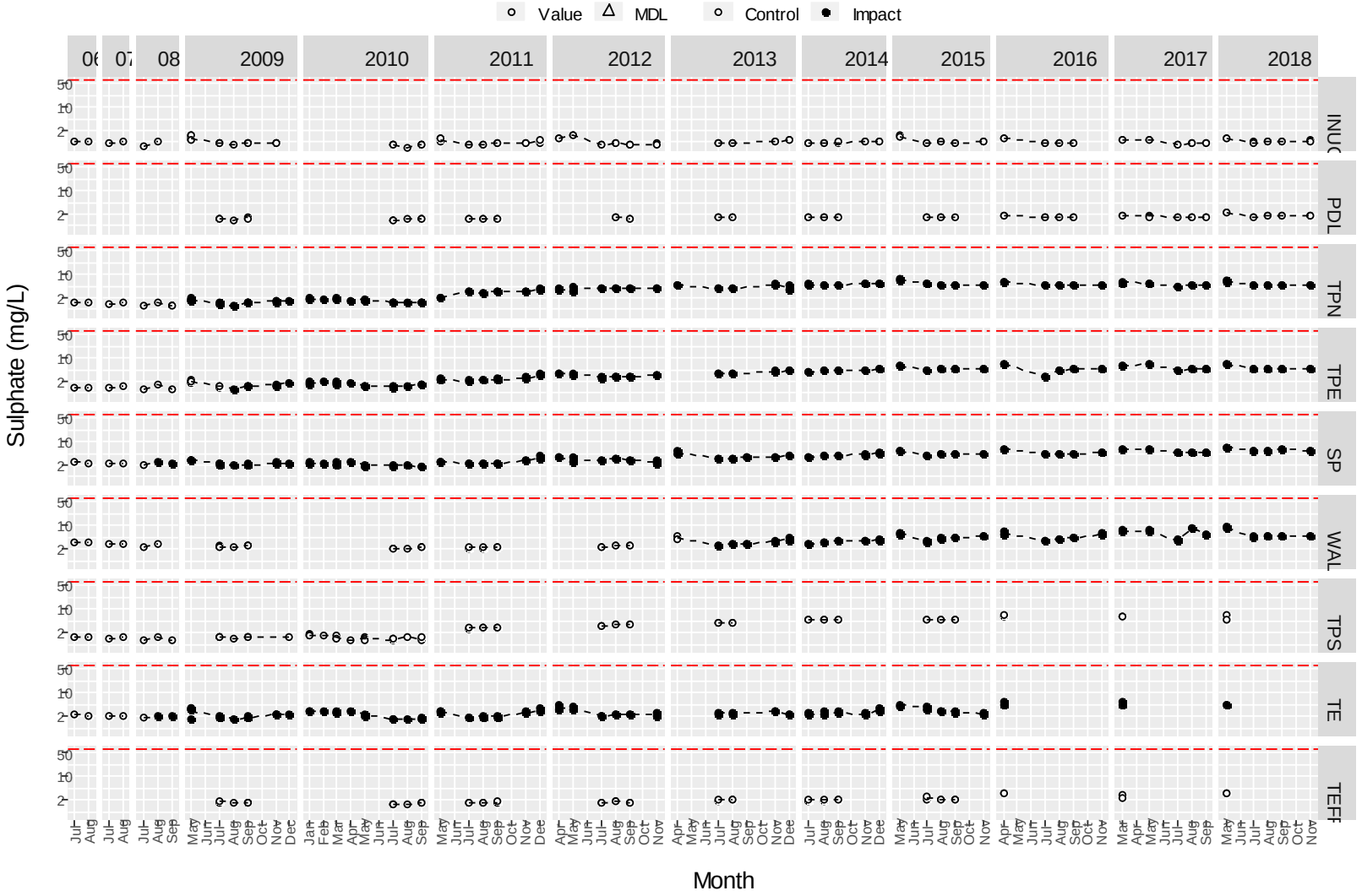


Figure 1.13. Total silicon (mg/L) in water samples from Meadowbank study lakes since 2006. Note: No CCME guidelines, CREMP triggers or thresholds are available.

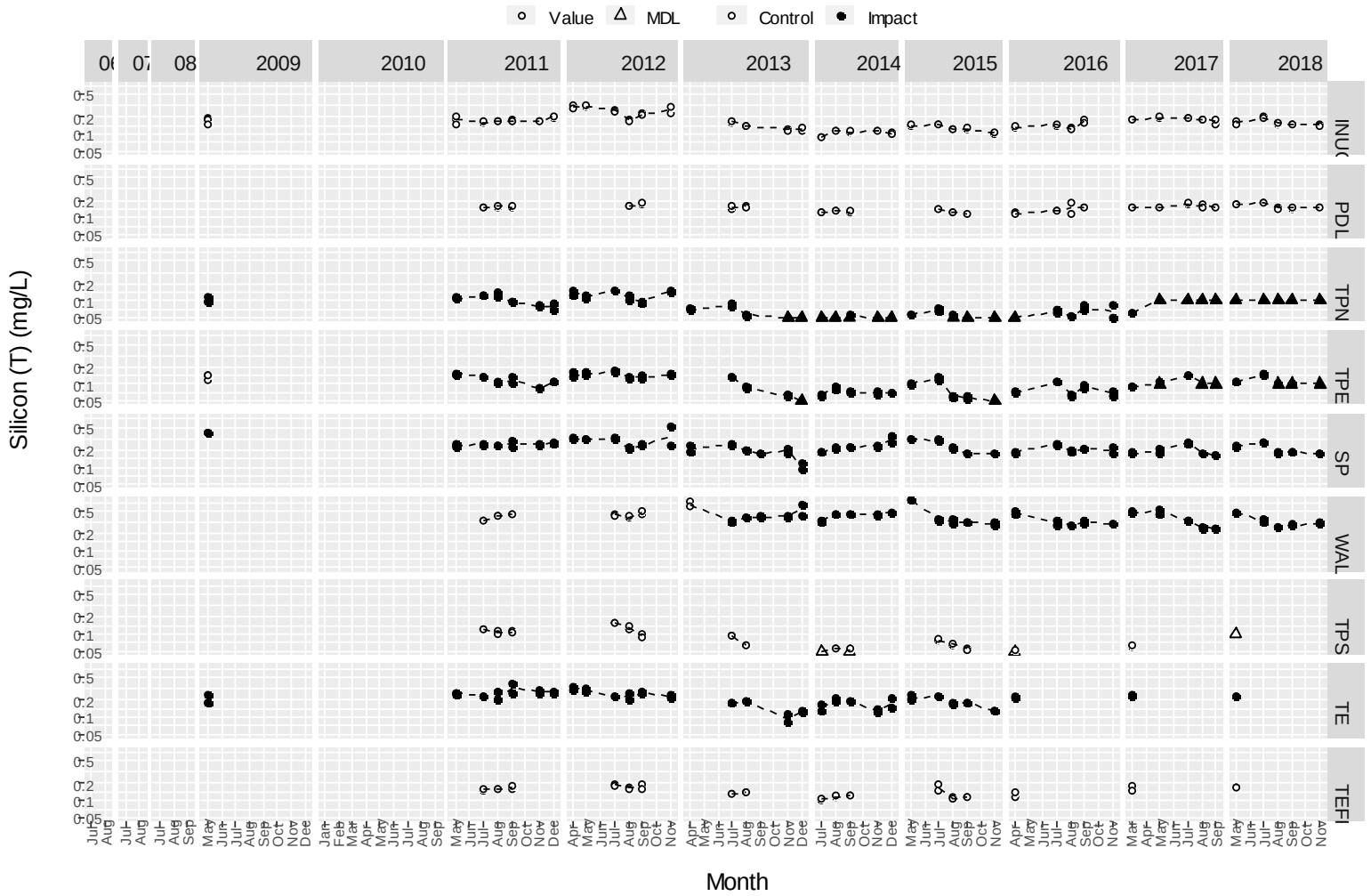


Figure 1.14. Total strontium (mg/L) in water samples from Meadowbank study lakes since 2006. Note: The red dashed line = CREMP trigger value.

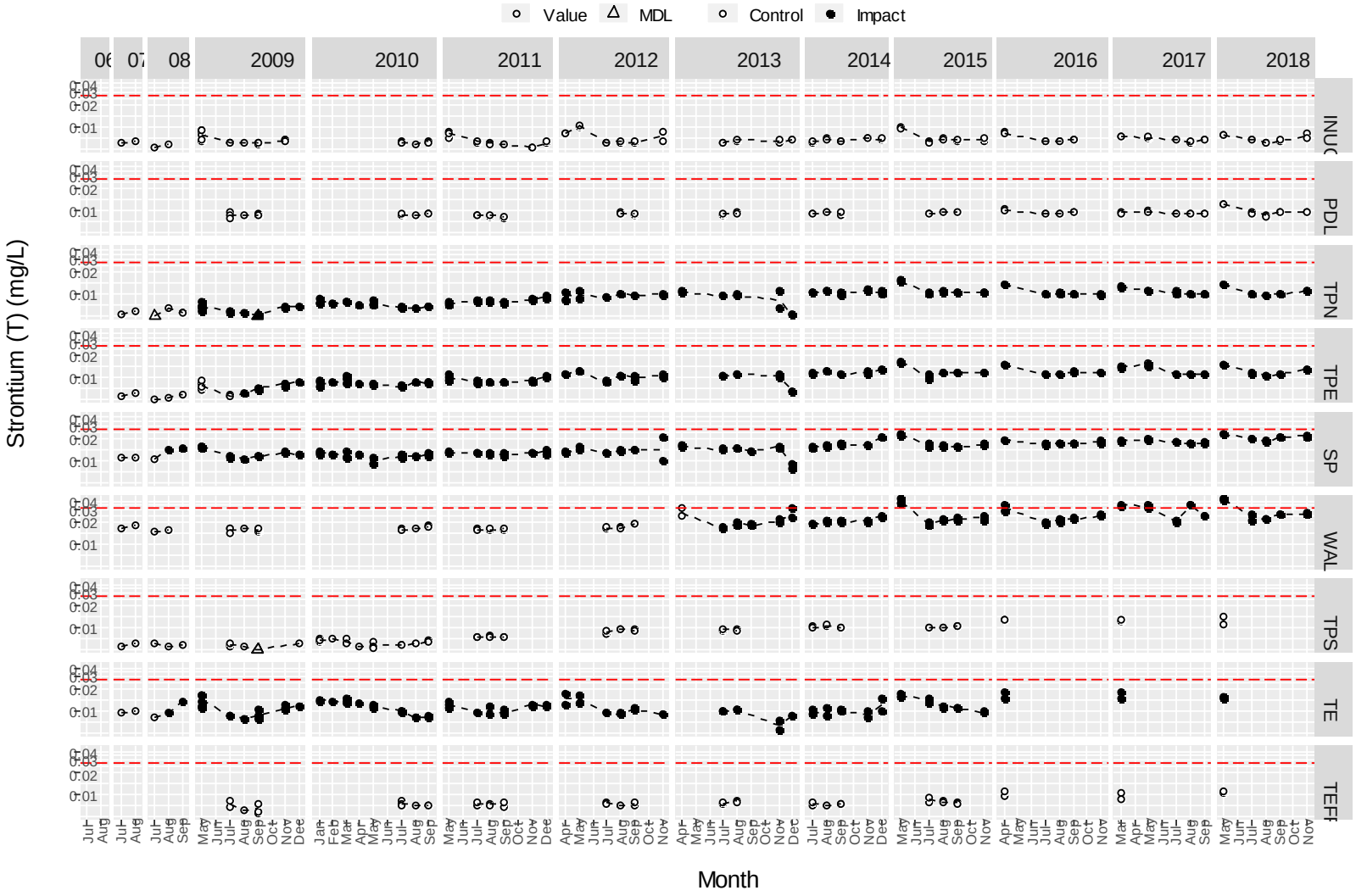


Figure 1.15. Total aluminum (mg/L) in water samples from Meadowbank study lakes since 2006. Note: The red dashed line = CREMP trigger value.

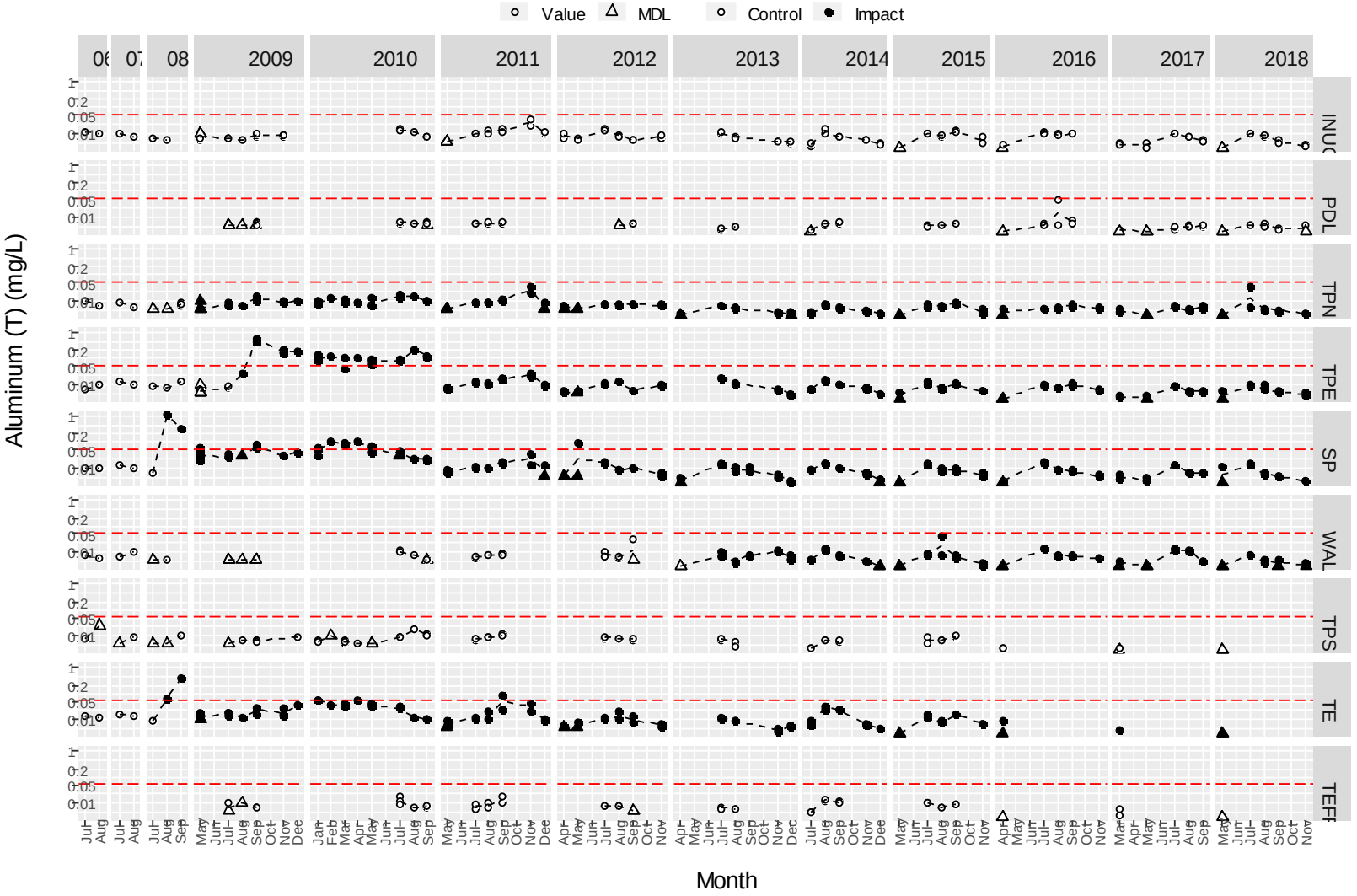


Figure 1.16. **Total copper (mg/L) in water samples from Meadowbank study lakes since 2006. Note: The red dashed line = CREMP trigger value.**

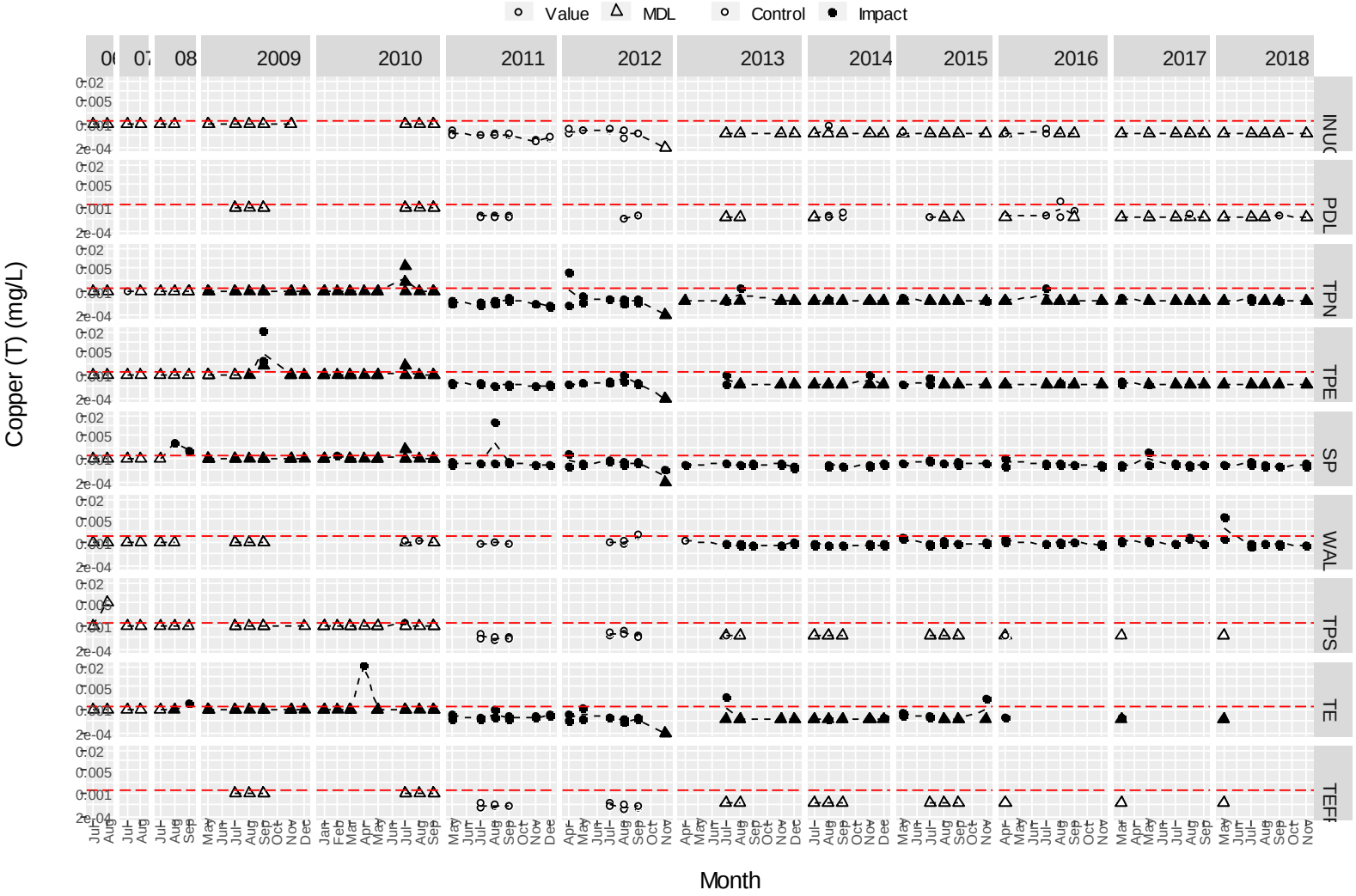


Figure 1.17. Total iron (mg/L) in water samples from Meadowbank study lakes since 2006. Note: The red dashed line = CREMP trigger value.

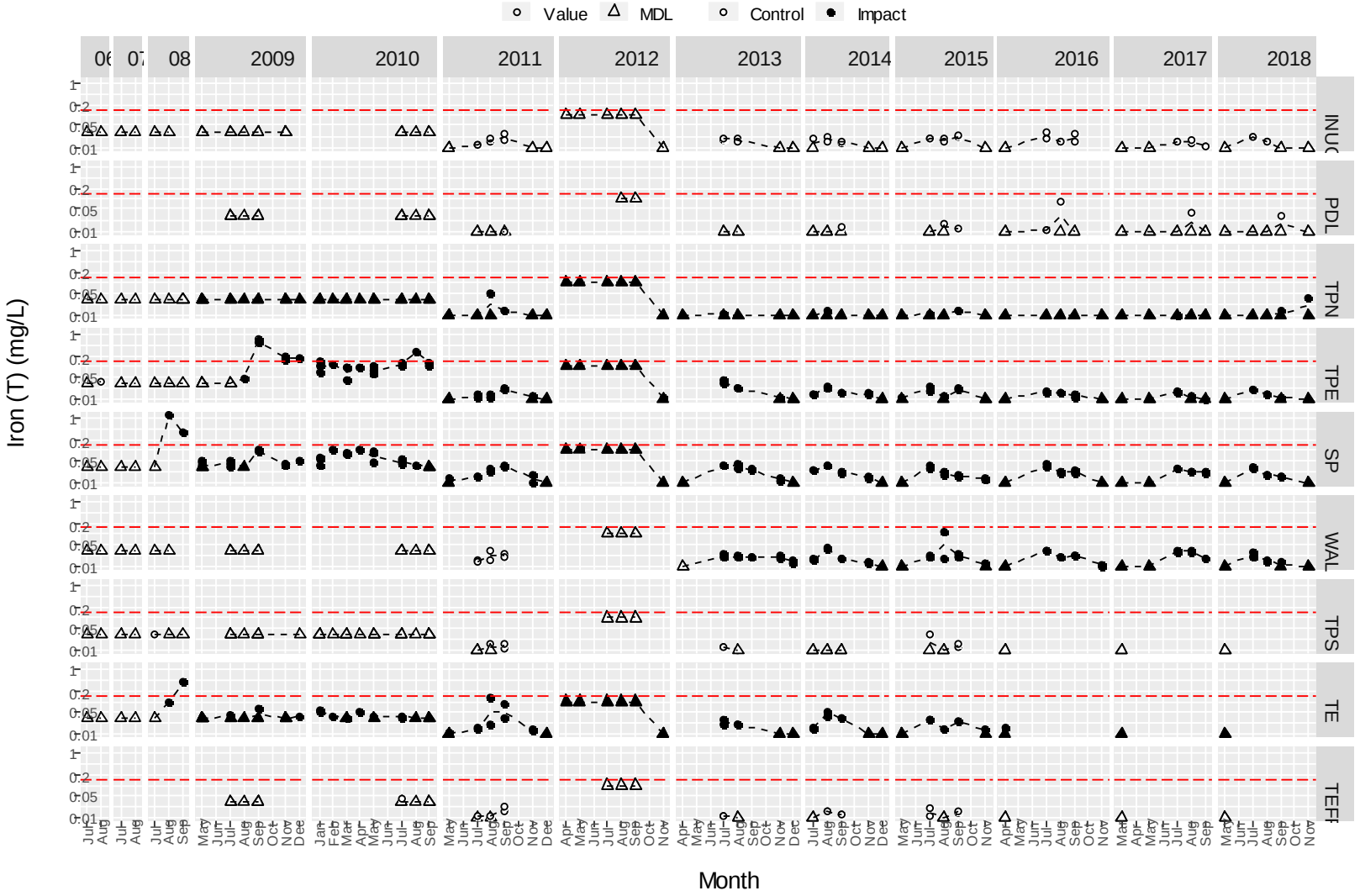


Figure 1.18. **Total manganese (mg/L) in water samples from Meadowbank study lakes since 2006. Note: The red dashed line = CREMP trigger value.**

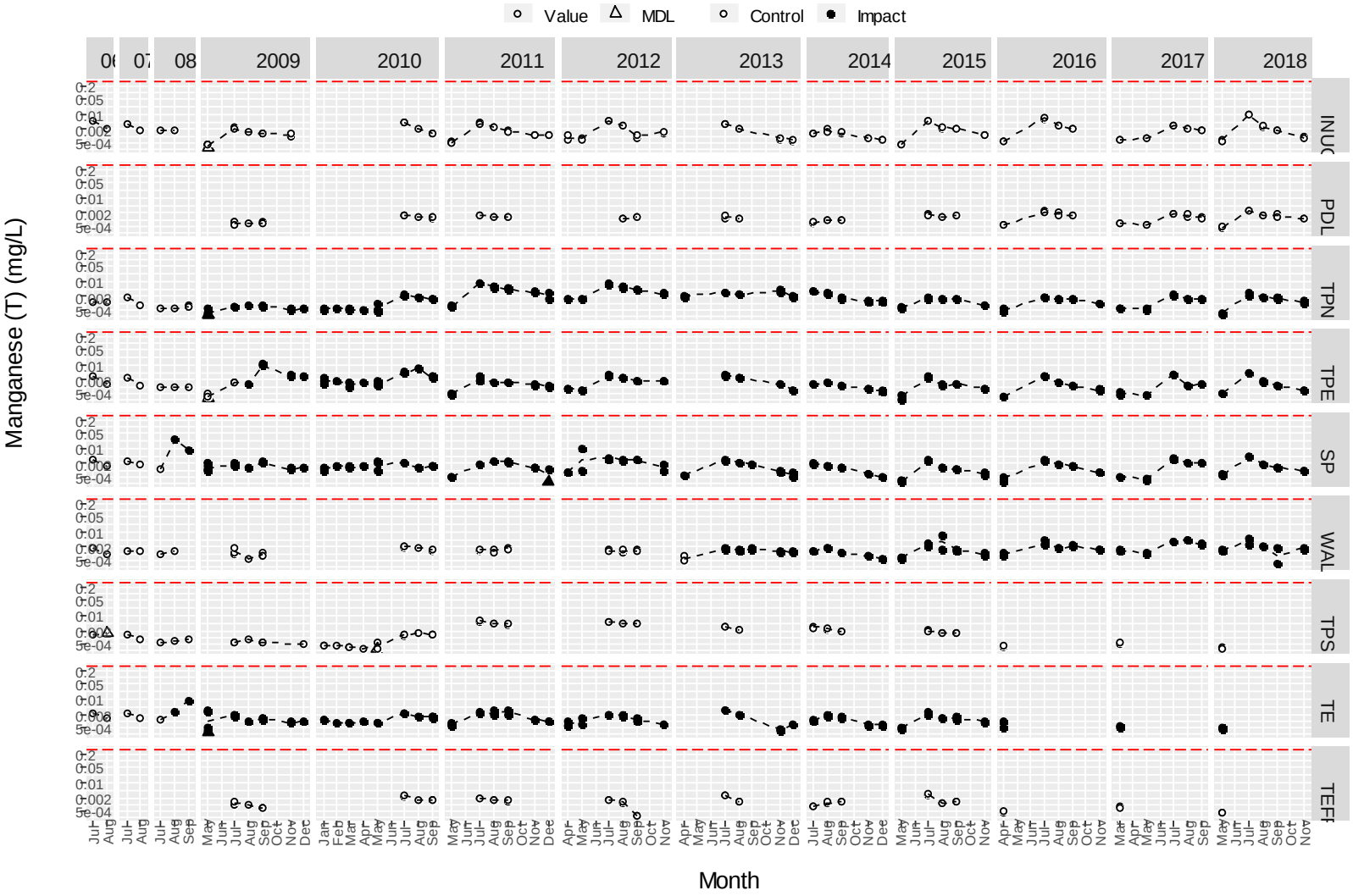
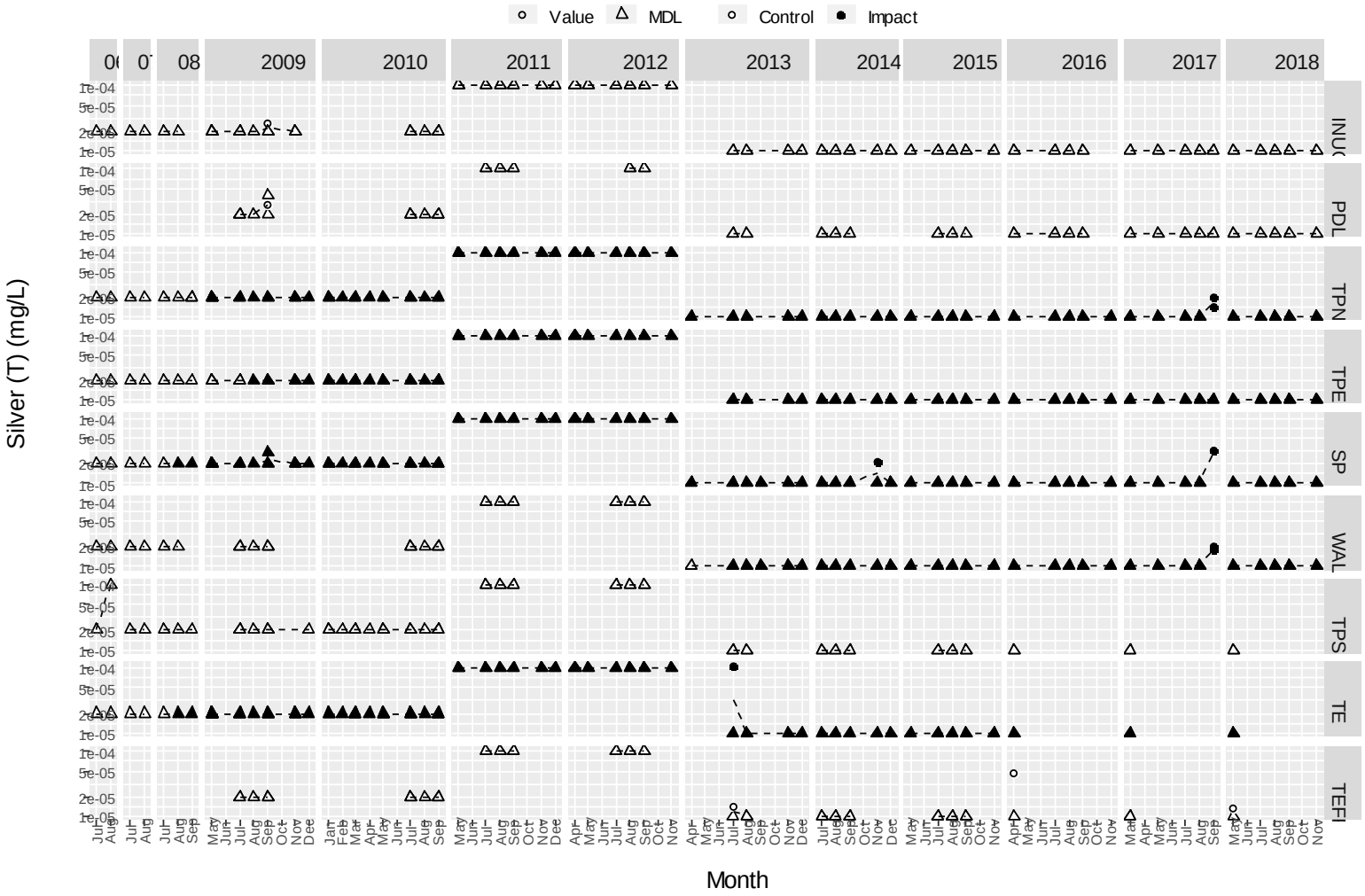


Figure 1.19. Total silver (mg/L) in water samples from Meadowbank study lakes since 2006. Note: No CREMP trigger value shown due to scale. No exceedances have occurred.



1.2.1.2.3 *Part 5:* Effectiveness of Monitoring and Mitigation, and Adaptive Management

Based on the results in Table 1.3, current monitoring programs are able to address all FEIS impacts for which monitoring was recommended (i.e. monitoring is considered effective).

A summary of the FEIS-planned mitigation measures for surface water quality, along with a commentary on implementation in 2018 is provided in Table 1.4. Mitigation measured related to water quantity, and fish and fish habitat are provided in Section 1.2.1.1.3 and 1.2.1.3.3, respectively, though some overlap may occur.

Table 1.4. Mitigation measures described in the FEIS to reduce impacts of the project to water quality, and commentary on current implementation.

Planned Mitigation Measure (FEIS, Section 4.24.2.5)	**Implementation**
Implementing measures to avoid the contact of clean runoff water with areas affected by the mine or mining activities	**Yes** - Management of non-contact water occurs through use of established diversion ditches, which are monitored according to NWB Water License requirements (Section 8.5.3.1.2).
Collecting, transporting, and treating mine water, camp sewage, and runoff water that comes into contact with project activities, as necessary	**Yes** - A comprehensive management program for site contact water and sewage is ongoing as described in Section 8.5.3. Monitoring occurs according to NWB Water License requirements.
Managing potentially acid-generating or metal-leaching materials	**Yes** – Waste rock analysis and management according to acid-generating and metal-leaching potential is described in Section 5.1.
Monitoring quality of discharges	**Yes** – minesite effluent is monitored according to NWB/MDMER criteria, as described in Section 8.3.
Adjusting management practices if monitoring results indicate discharge quality does not meet discharge criteria	**Yes** – in cases where discharge criteria are not met, discharge is ceased until results are within acceptable limits. E.g. Section 8.3.1.3
Winter culvert installation	**N/A –** item not constructed in 2018
Sediment control (e.g. use of geotextile for Baker Lake marine barge landing facility)	**N/A –** item not constructed in 2018
Use of riprap to stabilize shorelines around culverts and anchor pipes	**N/A –** item not constructed in 2018
Treatment of effluent discharge	**Yes** – minesite effluent is monitored according to NWB/MDMER criteria, as described in Section 8.3, and treated as required for TSS prior to release
Discharge only during open water, not under ice (Attenuation Pond discharge to Third Portage Lake)	**N/A** - Attenuation pond discharge is no longer occurring

Historically and in 2018, a number of water quality parameters without regulatory guidelines exceeded CREMP trigger values. Preliminary analyses indicate a “low” magnitude of impact and therefore no exceedance of overall FEIS predictions (Section 1.2.1.2.2). However, in line with a standard adaptive management approach, Agnico Eagle is committing to a more detailed assessment of the significance of changes in these water quality parameters in 2019 (see Section 4.21 of Agnico Eagle response to comments on the 2018 Annual Report; letter to NIRB sent July 5, 2019). If it is determined through that detailed assessment that FEIS predictions can no longer be supported, and therefore mitigation measures associated with water quality impacts (Table 1.4) are determined not to be effective, a discussion on changes to mitigation will be initiated.

As an additional adaptive management measure, Agnico is also committing to developing CREMP triggers for those elements which are exceeding FEIS water quality model predictions (e.g. silicon in 2018), but for which no CCME guidelines or CREMP triggers already exist.

1.2.1.3 Fish and Fish Habitat

1.2.1.3.1 *Parts 1 & 2:* Summary of Predicted and Measured Residual Impacts

In addition to water quality and quantity, monitoring programs were developed to address the impacts of mining activities to fish and fish habitat. These are primarily guided by Fish Habitat Offsetting Plans and No Net Loss Plans (NNLP) and associated aquatics monitoring (e.g. CREMP, Habitat Compensation Monitoring Plan, blast monitoring). Results of these programs are summarized in relation to FEIS predictions for impacts to fish and fish habitat (Cumberland, 2005; Table B13.2) in Table 1.5, below.

Table 1.5. Predicted and measured impacts to fish and fish habitat. Measured impacts exceeding or potentially exceeding predictions are shaded grey and further discussed in Section 1.2.1.3.2.

Potential Impact	Potential Cause(s)	Proposed Monitoring	Monitoring Conducted	Predicted Impact in FEIS	Observed Impacts (2018)
Loss/impairment of fish habitat	Construction of temporary and permanent in-water features (e.g. TSF, dikes, pits).	Monitoring of compensation features per NNLP (targeted studies under AEMP for dike "pore water" (interstitial water) quality, periphyton growth, fish use).	Not required in 2018	Dikes will provide a medium for lower trophic growth; habitat for non-spawning life functions except Goose Island dike where spawning may occur.	N/A
	Construction of barge facility in Baker Lake	Annual monitoring of shoreline stability and integrity (proposed 2016)	CREMP monitoring at Baker Lake barge dock	Negligible impact	No impacts of barge activity on water quality, sediment quality, phytoplankton, benthic invertebrates observed to date (CREMP)
Reduced fish egg survival	Metals and particulates from dike leachate, effluent, and road dust. Blasting	Dike leachate: Targeted studies under AEMP ("pore water" (interstitial water) sampling during year 1 Effluent: Water quality monitoring under MMER. Dust: Whole-lake water quality under CREMP Blasting: Blast monitoring	Dike leachate: Not required in 2018 Effluent: MDMER monitoring Dust: Whole-lake water quality under CREMP Blasting: Blast monitoring	Dike leachate: Dissolved metals may reduce fish egg survival and larval development during overwinter incubation. Effluent: < MMER (2002) regulations Dust (whole-lake water quality under CREMP): negligible ecological effect, <CWQG for aquatic life (CCME) except cadmium (TPL), and	Dike leachate: N/A Effluent: < MDMER Dust (whole-lake water quality under CREMP): CREMP results <CWQG. Blasting: No exceedances of DFO overpressure guideline (50 kPa); no exceedances of PPV guideline (13 mm/s)

Potential Impact	Potential Cause(s)	Proposed Monitoring	Monitoring Conducted	Predicted Impact in FEIS	Observed Impacts (2018)
				arsenic and cadmium (Wally Lake) Blasting: Most blasts will not exceed DFO overpressure guideline (50 kPa); no exceedances of PPV guideline (13 mm/s)	
Mortality of fish and fish eggs	Blasting	Blast monitoring	Blast monitoring	Most blasts will not exceed DFO overpressure guideline (50 kPa); no exceedances of PPV guideline (13 mm/s)	No exceedances of DFO overpressure guideline (50 kPa); no exceedances of PPV guideline (13 mm/s)
	Worker fishing in project area, despite no-fishing policy; increased fishing in area due to AWAR	Worker fishing: Staff interviews AWAR fishing: Creel survey	Worker fishing: None AWAR fishing: Next monitoring in 2019	Unknown	Worker fishing: Not assessed AWAR fishing: N/A
	Accidental spills (e.g. fuel)	Event-based monitoring; spill emergency response plan	Spill Contingency Plan: All spills reported to Environment Department; monitoring spills during site inspections	Not defined	No offsite impact to any watercourses as a result of spills in 2018.
Fish stress, behavioral changes, avoidance	Increased concentrations of dissolved metals and	Dust: Whole-lake water quality monitoring under CREMP	Dust: Whole-lake water quality under CREMP	Dust (whole-lake water quality under CREMP): negligible ecological effect; <CWQG for aquatic	Dust (whole-lake water quality under CREMP): CREMP results <CWQG,

Potential Impact	Potential Cause(s)	Proposed Monitoring	Monitoring Conducted	Predicted Impact in FEIS	Observed Impacts (2018)
	TSS from dust and effluent discharge	Effluent: Monitoring under MMER program	Effluent: MDMER monitoring	life (CCME) except cadmium (TPL), and arsenic and cadmium (Wally Lake) Effluent: < MMER criteria	no exceedance of TSS trigger. Effluent: < MDMER
Impaired lower trophic levels (incl. loss of phytoplankton, periphyton and benthos)	Leaching of metals (from dikes)	Targeted studies under AEMP ("pore water" sampling; periphyton sampling) during year 1	Not required in 2018	Dike faces will provide a medium for periphyton growth	N/A
	Sedimentation through dust/particulate dispersion (road dust, wind dispersal, terrain disturbance) and effluent discharge	Water quality monitoring through CREMP	CREMP (water quality, sediment, and lower trophic level monitoring)	Negligible ecological effect; CREMP results <CWQG for aquatic life (CCME) except cadmium (TPL), and arsenic and cadmium (Wally Lake)	CREMP results <CWQG, no mine-related impairment of phytoplankton, benthic invertebrate communities. Some exceedances of CREMP sediment thresholds. See Section 1.2.1.3.2.
		Effluent MMER monitoring	Effluent MDMER monitoring	Settling of TSS and altered sediment chemistry may impact benthos.	Effluent < MDMER
Increased fish biomass	Release of nutrients in treated sewage	Nutrients, chlorophyll a, and phytoplankton monitoring through CREMP in TPL	Nutrients, chlorophyll a, and phytoplankton monitoring through CREMP in TPL	Increase in nitrogen concentrations; change in phytoplankton species in TPL	N/A - Treated sewage is disposed of in TSF, so potential for impact is removed.

Potential Impact	Potential Cause(s)	Proposed Monitoring	Monitoring Conducted	Predicted Impact in FEIS	Observed Impacts (2018)
Impaired fish passage along AWAR streams	Culvert installation	AWAR Fish Monitoring Report: (targeted monitoring study under AEMP - hoop nets at culvert crossings only; 1 year minimum)	Not required – program complete in 2011 after 5 years	Negligible residual impact on fish and their movements within streams and channels	N/A

1.2.1.3.2 *Parts 3 & 4:* Discussion

Where impacts are exceeded or potentially exceeded based on monitoring results (as identified in Parts 1 & 2, above), a discussion is provided here.

1. *Exceedance of CREMP sediment thresholds*

FEIS Prediction: Negligible ecological effect on lower trophic levels.

Discussion: Historical and 2018 CREMP results have indicated a potential for mine-related sediment toxicity in one receiving environment location (TPE). In 2018, results of targeted studies (whole-sediment toxicity tests for benthic invertebrates) and routine analyses (benthic community field surveys) were integrated in a weight-of-evidence assessment to determine potential for toxicity to benthic invertebrate communities, and whether any impairment of lower trophic levels may be occurring, which would not be in keeping with impact predictions.

Summary of Routine CREMP Analyses:

Chromium concentrations at TPE increased steadily between 2009 and 2013. The suspected cause of the increase is ultramafic rock used to construct the Bay-Goose Dike in 2009 and 2010. Chromium exceeded the trigger value in 2018, but the concentrations were less than those reported in 2017. Figure 1.20 shows the results of sediment chromium analyses at TPE since baseline studies began. Natural sedimentation rates in these lakes are low, and the lower reported chromium concentrations in 2018 (which were also seen in 2016) suggest chromium concentrations can vary significantly over a small spatial area. There is conclusive evidence that chromium has increased in the sediments at TPE relative to the baseline period; however, high annual variability in chromium concentrations observed between 2017 and 2018 suggests concentrations have stabilized.

Summary of Targeted Studies:

Targeted studies were also completed at TPE in 2018 to further assess mining-related changes to sediment chromium concentrations at TPE. A bioavailability study conducted in 2015 showed low metals availability and low toxicity. The 2015 sediment toxicity test was repeated in 2018. Key findings from the 2018 study are:

1. The amphipod test showed substantial effects to survival, but these were not correlated to sediment chromium concentrations. The cause of impaired survival in TPE sediments is unclear, but the results suggest other exposure pathways (e.g., porewater) or stressors (e.g., physical or chemical; not chromium) may be responsible for the toxicity seen in 2018. Confounding the assessment is the fact that three of the five replicates in the amphipod test had complete mortality, while one had 100% survival.
2. The chironomid test did not show any effects to survival at TPE in 2018, but did have reduced growth (-21%) relative to the field controls (INUG/PDL). Given their dominance in the benthic invertebrate communities of the Meadowbank study lakes, the chironomid toxicity test results are considered more ecologically relevant for this site than amphipod test results.

Weight-of-Evidence Analysis:

Given the statistically-significant effects to larval midge (*C. dilutus*; reduced growth) and amphipods (*H. azteca*; reduced survival and growth) in the laboratory toxicity tests, a weight of evidence (WOE) approach was used to conduct an integrated assessment of sediment chemistry, metals bioavailability (sediment toxicity) and benthic invertebrate community results to determine whether there are unacceptable risks to the benthic community at TPE.

Chemistry – The increasing trend in sediment chromium observed at TPE since the onset of construction for the Bay Goose Dike appeared to stabilize in 2018 (grab and core data; Figure 1.20. Given the limited input of natural sedimentation in these headwater lakes, the variable results seen since 2014 suggest the influence of spatial heterogeneity (e.g., there is no other mechanism to explain the apparent decreases seen in 2016 and 2018). While chromium concentrations at TPE were fairly similar to the PDL reference lake (which has naturally elevated chromium) in 2018, both are much higher than the CCME Probable Effects Level (PEL; CCME 2002). Overall, uncertainty remains regarding sediment metal bioavailability at TPE despite the appearance of stabilizing chromium concentrations (discussed in the next section on Toxicity).

Toxicity – The two toxicity tests were evaluated as separate lines of evidence in the WOE assessment. Chironomids are ubiquitous in northern lakes, and therefore *C. dilutus* is a more ecologically relevant test species a than *H. azteca* for extrapolating effects in the lab to conclusions on the health of the benthos at TPE. Relative to the field control treatments (INUG and PDL), chironomids exposed to sediment from TPE exhibited a ~21% reduction in growth during the 10-d test. There was no difference in growth when TPE was compared to the lab control, implying the reference sediments were a better medium for growth than the laboratory control sediment. There was no adverse effect on survival. There were significant reductions in amphipod survival (70%) and growth (40%) at TPE in the 14-d amphipod test relative to the field control groups. There was no apparent correlation between bulk sediment chromium concentrations and lower survival (and growth) among the various treatments (Figure 1.21), suggesting that bulk sediment chemistry are not accurately characterizing metals bioavailability. While effects to amphipods, which are not present in the benthic community in the Meadowbank study area lakes, may not be ecologically relevant for TPE, these test results provide insight into the range of responses for different species based on current conditions.

Benthos Community – A detailed discussion on the benthic invertebrate community results for TPE can be found in Section 4.6.2 of the 2018 CREMP Report. While an apparent reduction in total abundance was identified in the BACI analyses, the results were considered a BACI artefact as abundance has been consistently trending within the baseline range (Figure 1.22). More importantly, there has also been no evidence of reduced taxa richness at TPE (Figure 1.23), which would typically be expected with metals-related impacts as sensitive species disappear. Taxa richness from 2015 to 2018 was at the upper end of the range reported since 2006 (Table 1.6).

Conclusion of the Weight-of-Evidence Analysis:

Chromium concentrations at TPE, while exceeding the CREMP trigger, appear to have stabilized relative to the recent increasing temporal trend. Sediment toxicity testing, however, suggested that sediment metals may be more bioavailable in 2018 than the 2015 study found. The amphipod test, while less ecologically

relevant to the Meadowbank region, showed substantial effects to survival that were not correlated to sediment chromium concentrations, suggesting that other exposure pathways (e.g., porewater) or stressors (e.g., physical or chemical) may be responsible for the toxicity seen in 2018. While there was some reduced growth seen in the chironomid test in 2018, the lack of effects to survival combined with the stable benthos community at TPE suggest that current concentrations of chromium or other metals at TPE are not currently posing risks to the TPE benthic community. That said, there are uncertainties regarding the exact cause of the observed effects to *H. azteca* survival in 2018 that warrant follow-up in 2019 to provide added assurance that bioavailability is not changing at TPE. Supplemental studies to address these uncertainties are discussed in Section 1.2.1.3.3.

Figure 1.20. **Total chromium (mg/kg) in sediment samples (grabs & cores) from Meadowbank project lakes since 2006. Note: Grab samples = dots; Core samples = box and whisker. The red dash line represents CREMP trigger values.**

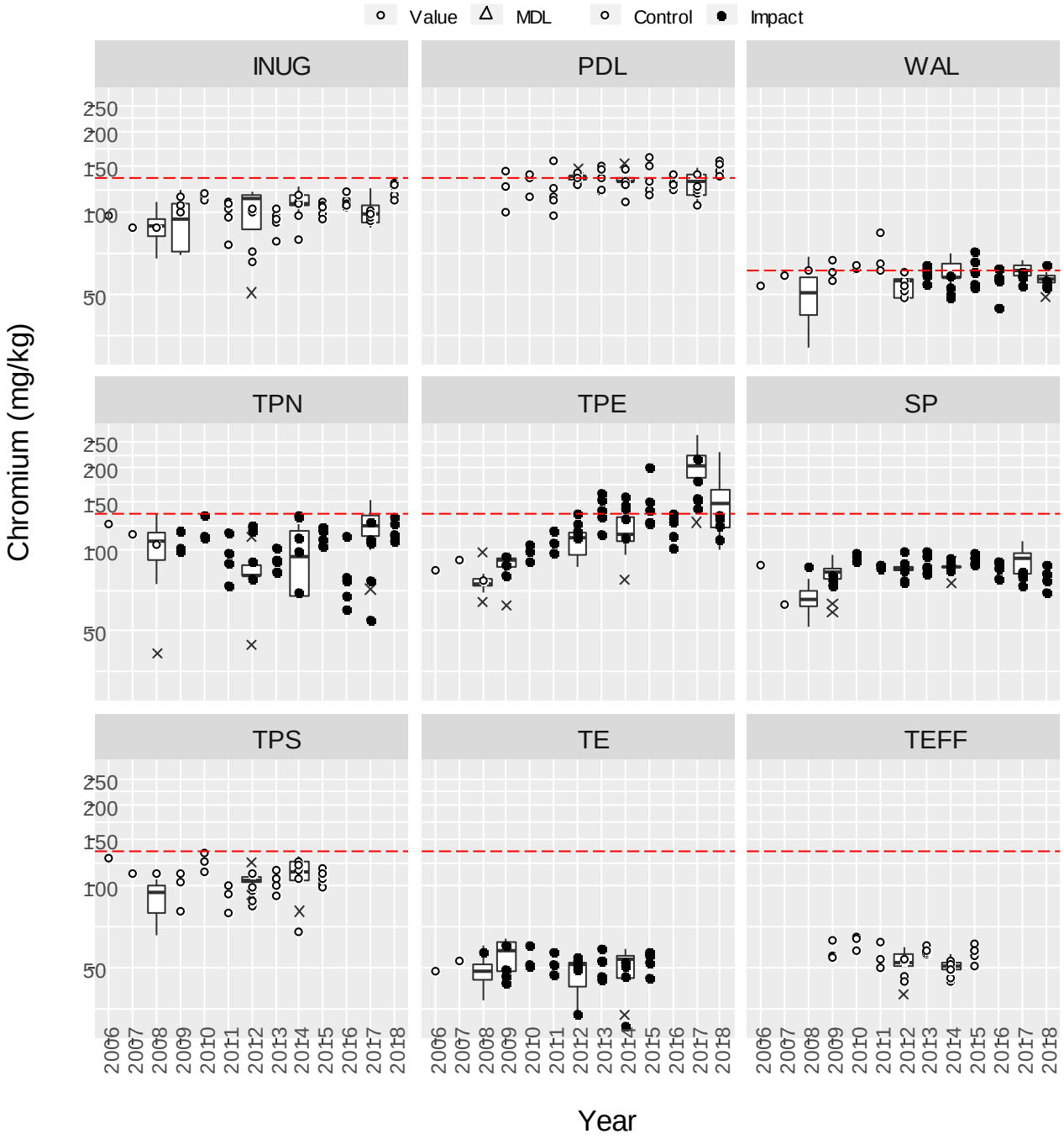


Figure 1.21. **Growth and survival relative to sediment chromium concentrations for the *Hyalella azteca* sediment toxicity test.**

Note: **The red line represents the trigger value for chromium (135 mg/kg; CCME sediment quality guidelines are ISQG = 37.3 mg/kg; PEL = 90 mg/kg).**

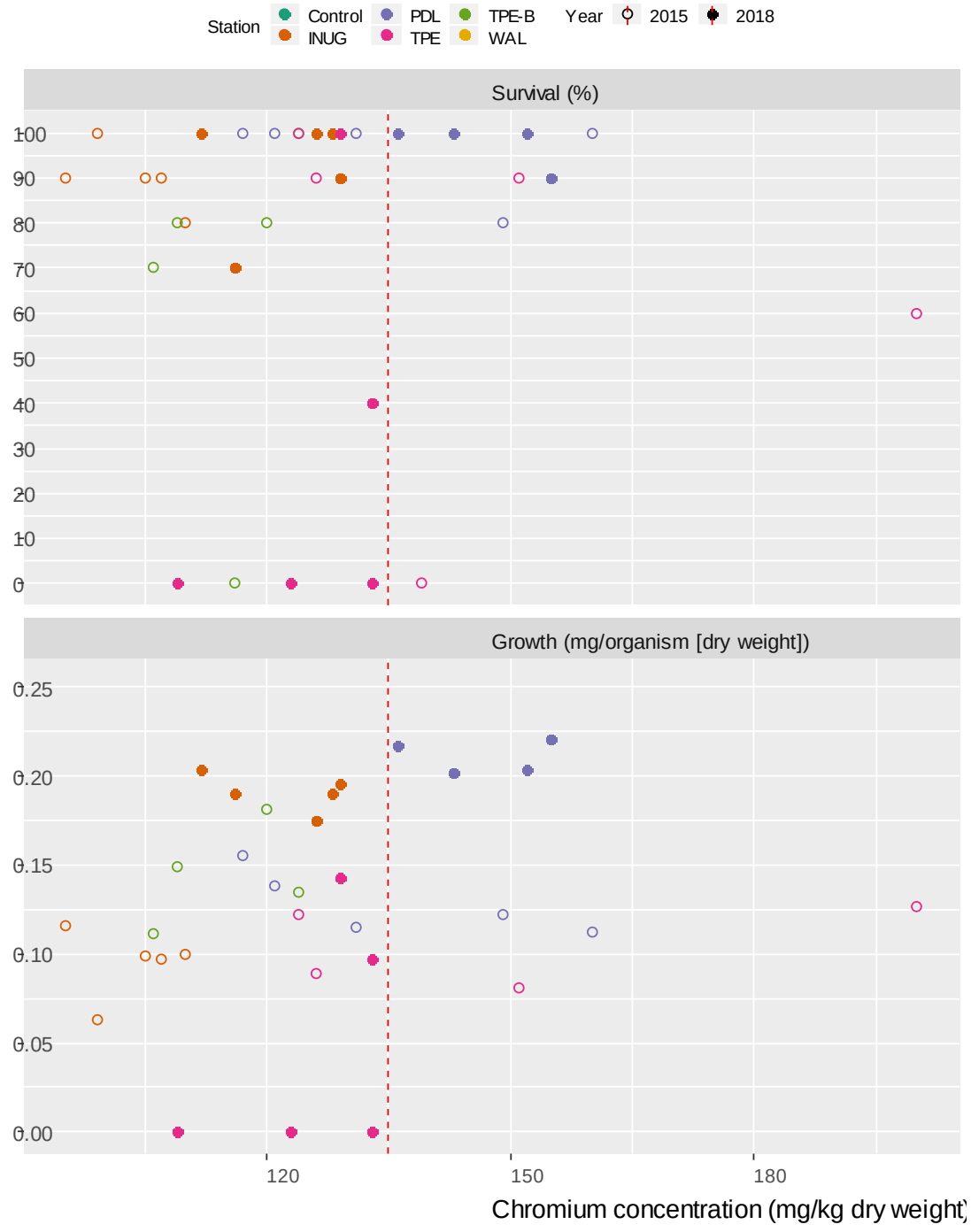


Figure 1.22. Benthic invertebrate total abundance (#/m²) from Meadowbank study area lakes since 2006.

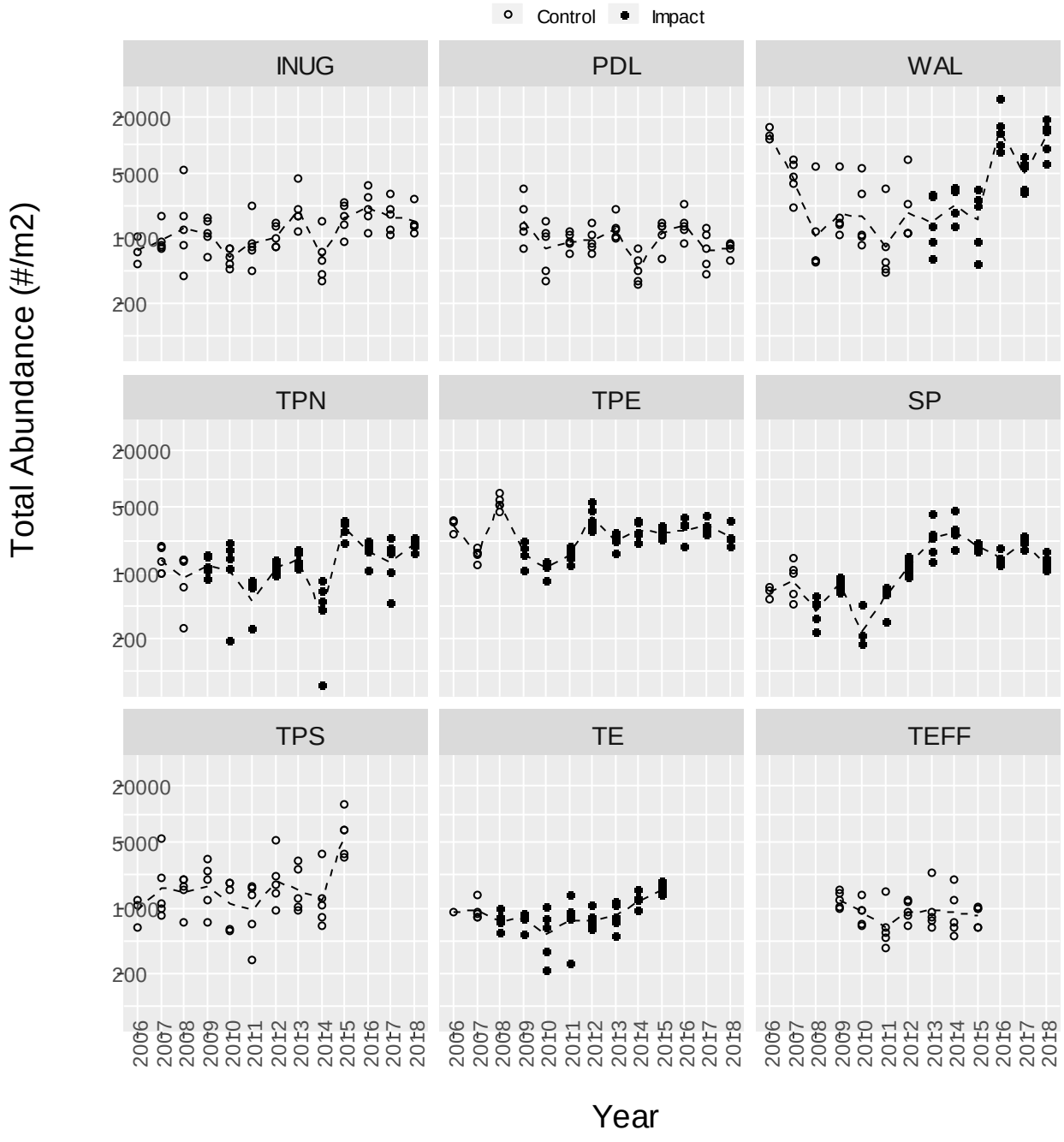


Figure 1.23. Benthic invertebrate total richness (# taxa) from Meadowbank study area lakes since 2006.

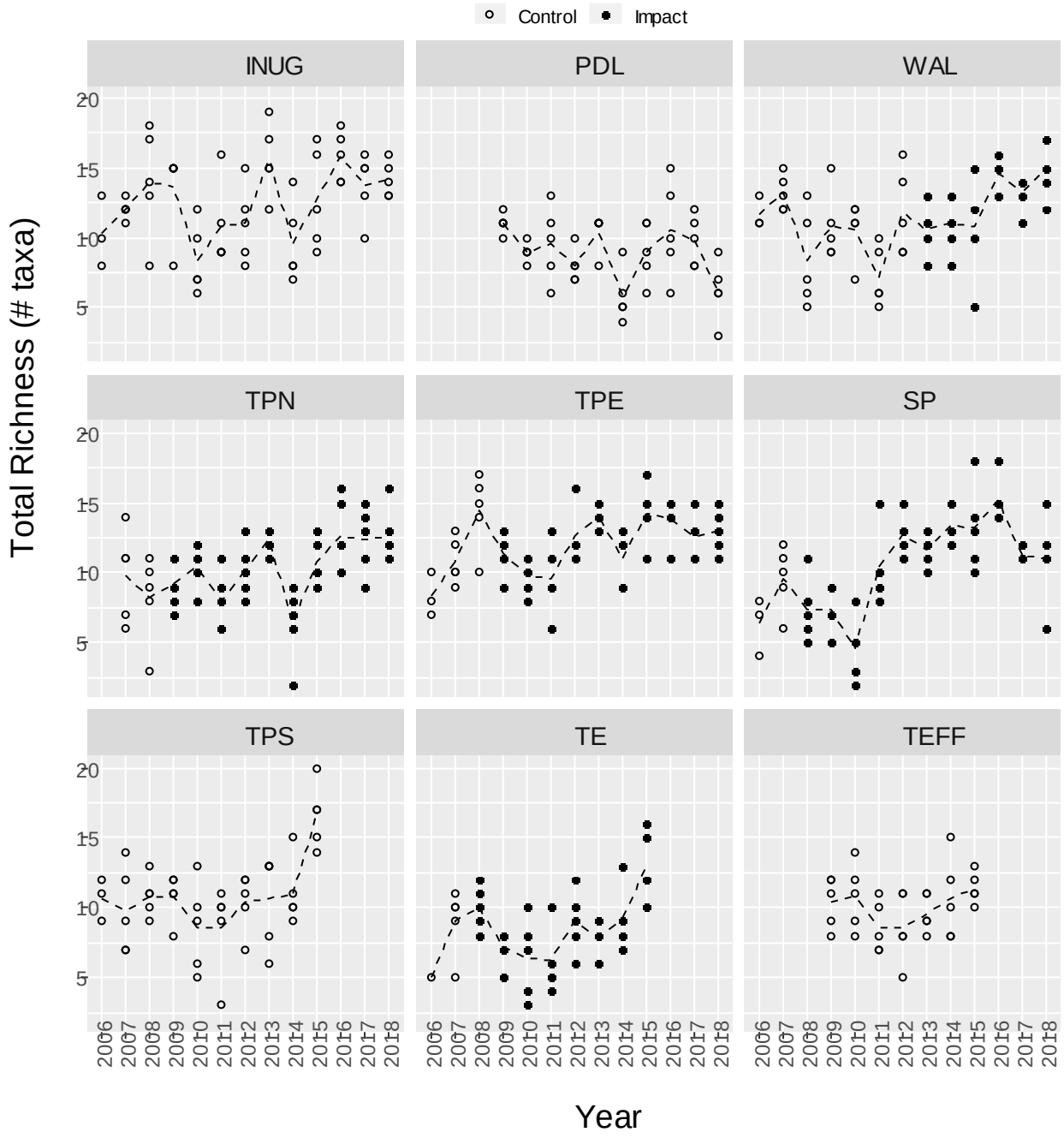


Table 1.6. Geometric means for total abundance and total richness, Meadowbank study lakes.

Geometric means for Total abundance[1]													
Station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
INUG	731 (11)	975 (9)	1300 (6)	1129 (7)	628 (12)	881 (10)	1042 (8)	1975 (2)	621 (13)	1648 (4)	2100 (1)	1712 (3)	1497 (5)
PDL	NA	NA	NA	1522 (1)	776 (8)	927 (6)	942 (5)	1279 (3)	473 (10)	1127 (4)	1373 (2)	748 (9)	779 (7)
WAL	12894 (2)	4357 (5)	1057 (12)	1834 (8)	1727 (9)	800 (13)	1874 (7)	1445 (11)	2222 (6)	1568 (10)	14253 (1)	4942 (4)	12035 (3)
TPN	NA	1359 (5)	864 (10)	1214 (7)	1029 (9)	498 (11)	1141 (8)	1407 (4)	373 (12)	3025 (1)	1696 (3)	1309 (6)	2051 (2)
TPE	3220 (3)	1563 (12)	5556 (1)	1663 (10)	1126 (13)	1584 (11)	3915 (2)	2244 (9)	2827 (5)	2765 (7)	2787 (6)	3147 (4)	2485 (8)
SP	619 (10)	842 (8)	395 (12)	771 (9)	241 (13)	563 (11)	1169 (7)	2279 (2)	2796 (1)	1927 (4)	1420 (5)	2058 (3)	1298 (6)
TPS	935 (9)	1597 (4)	1501 (6)	1714 (3)	1130 (8)	932 (10)	1932 (2)	1581 (5)	1217 (7)	5939 (1)	NA	NA	NA
TE	913 (4)	930 (3)	743 (8)	757 (6)	517 (10)	725 (9)	747 (7)	819 (5)	1158 (2)	1548 (1)	NA	NA	NA
TEFF	NA	NA	NA	1215 (1)	886 (5)	615 (7)	921 (3)	955 (2)	891 (4)	816 (6)	NA	NA	NA
Geometric means for Total richness													
Station	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
INUG	10.1 (10)	12 (7)	13.5 (4)	13.2 (5)	8.1 (12)	10.5 (9)	10.7 (8)	15.4 (2)	9.3 (11)	12.4 (6)	15.7 (1)	13.6 (3)	14.2 (3)
PDL	NA	NA	NA	11 (1)	9 (6)	9.3 (5)	7.9 (8)	10.3 (2)	5.6 (9)	8.8 (7)	10.1 (3)	9.7 (4)	5.8 (9)
WAL	11.6 (4)	13.1 (2)	7.9 (11)	10.6 (7)	10.4 (9)	6.9 (12)	11.5 (5)	10.5 (8)	10.8 (6)	10.2 (10)	14.5 (1)	13.1 (2)	14.9 (1)
TPN	NA	9.3 (7)	7.5 (10)	9.1 (8)	10.3 (5)	7.8 (9)	10.1 (6)	12.4 (1)	5.7 (11)	10.7 (4)	12.4 (1)	12.2 (3)	12.5 (1)
TPE	8.2 (12)	10.7 (9)	14.2 (1)	11.3 (7)	9.7 (10)	9.3 (11)	12.5 (5)	14 (3)	10.9 (8)	14.1 (2)	13.7 (4)	12.5 (5)	12.9 (5)
SP	6.1 (11)	9.3 (8)	7.1 (10)	7.2 (9)	4.1 (12)	10.2 (7)	12.7 (4)	11.6 (5)	13.3 (2)	12.9 (3)	15.1 (1)	11.2 (6)	10.5 (7)
TPS	10.6 (5)	9.4 (8)	10.7 (3)	10.7 (3)	8.1 (9)	7.8 (10)	10.2 (6)	10.1 (7)	10.8 (2)	16.5 (1)	NA	NA	NA
TE	5 (10)	8.7 (5)	9.9 (2)	7.1 (7)	5.8 (9)	5.9 (8)	8.8 (4)	7.7 (6)	9 (3)	12.8 (1)	NA	NA	NA
TEFF	NA	NA	NA	10.3 (3)	10.6 (2)	8.5 (6)	8.3 (7)	9.5 (5)	10.3 (3)	11.4 (1)	NA	NA	NA

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.

1.2.1.3.3 *Part 5:* Effectiveness of Monitoring and Mitigation, and Adaptive Management

In 2018, monitoring was able to address all potential causes of impacts identified in the FEIS (i.e. monitoring was considered effective), except worker fishing. While the FEIS proposed staff interviews to assess any fishing being conducted despite a strict no-fishing policy onsite, in practice it has become clear that interviews are not required. To the best of knowledge, no cases of fishing by workers in contravention to the policy have ever been observed or reported. Despite the lack of formal monitoring, it is clear that this is not a significant source of potential impacts to area fish populations.

A summary of the FEIS-planned mitigation measures related to fish and fish habitat, along with a commentary on implementation in 2018 is provided in Table 1.7. Mitigation measured specifically related to water quantity and water quality are provided in Sections 1.2.1.1.3 and 1.2.1.2.3, respectively, though some overlap may occur.

Table 1.7. Mitigation measures described in the FEIS to reduce impacts of the project to fish and fish habitat, and commentary on current implementation.

Planned Mitigation Measure (FEIS, Section 4.24.2.5)	Implementation
Winter culvert installation	**N/A –** item not constructed in 2018
Sediment control (e.g. use of geotextile for Baker Lake marine barge landing facility)	**N/A –** item not constructed in 2018
Use of properly sized screens for freshwater intake	**N/A –** item not constructed in 2018
Use of riprap to stabilize shorelines around culverts and anchor pipes	**N/A –** item not constructed in 2018
Modification of the external surface of containment dikes	**Yes** - As described in the 2006 NNLP, dike faces below the water surface are constructed from low metal leaching iron formation rock. Dikes are capped with ultramafic rock above the water surface to minimize the potential for metals leaching.
Enhancement and improvement of connecting channels between lakes to enhance fish movement	No longer planned under updated DFO Fisheries Act Authorization NU-03-0191.3 (2013)
Treatment of effluent discharge	**Yes** – minesite effluent is monitored according to NWB/MDMER criteria, as described in Section 8.3, and treated as required for TSS prior to release
Discharge only during open water, not under ice (Attenuation Pond discharge to Third Portage Lake)	**N/A** - Attenuation pond discharge is no longer occurring
Construction of fish habitat compensation features (according to DFO Fisheries Act Authorization NU-03-0191.3, 2013)	**Yes** – construction of fish habitat compensation features as described in this document is ongoing. Monitoring is described in Section 8.8

Historical and 2018 CREMP results have indicated a potential for mine-related sediment toxicity in one receiving environment location (TPE), likely originating from ultramafic rock used to construct the Bay-Goose Dike in 2009-2010 (see 2014 CREMP Report for initial investigation and discussion). Since that time, various studies have been ongoing to confirm the source and potential for toxicity. In 2018, results of targeted studies (whole-sediment toxicity tests for benthic invertebrates) and routine analyses (benthic community field surveys) were integrated in a weight-of-evidence (WOE) assessment to determine potential for toxicity to benthic invertebrate communities, and whether any impairment of lower trophic levels may be occurring, which would not be in keeping with impact predictions. Through this WOE, it was found that concentrations of chromium or other metals at TPE are not currently posing risks to the TPE benthic community, and therefore impact predictions remain supported.

However, supplemental investigations are planned to help understand the cause of the observed toxicity in whole-sediment laboratory tests observed in 2018. In addition to a repeat of the routine sediment coring program in 2019, and continued analysis of trends in benthic invertebrate abundance and richness at TPE, sediment toxicity testing (chironomid and amphipod tests) at TPE will be repeated in 2019 with the addition of porewater sampling to try to determine the cause of the reduced chironomid growth and amphipod survival in TPE sediments. These supplemental monitoring actions will be undertaken at the recommendation of Agnico's CREMP consultant to better understand risks to the benthic invertebrate community at TPE. If it is determined at any point through these ongoing targeted studies that impairment of lower trophic levels is occurring (i.e.an impact prediction is no longer supported), further discussions will be presented on the effectiveness of related mitigation measures and any recommended changes.

1.2.2 Terrestrial and Wildlife Environment PEAMP Evaluation

1.2.2.1 *Parts 1 & 2:* Summary of Predicted and Measured Residual Impacts

The 2018 Wildlife Monitoring Summary Report (2018 Annual Report, Appendix 45) provides a complete assessment of wildlife monitoring programs and a comparison to predictions of impacts made during the FEIS process. However, results are also summarized here.

For each VEC, a summary of predicted impacts and the accuracy of those predictions (observed impacts) as determined through various monitoring programs are provided in Table 1.8. Thresholds for the implementation of adaptive management, as developed in the Terrestrial Ecosystem Management Plan (a component of the FEIS), were used in this comparison because most impact predictions in the Terrestrial Ecosystem Impact Assessment were qualitative (other than loss of habitat area).

Overall, two Terrestrial Ecosystem Monitoring Program thresholds were exceeded or potentially exceeded in 2018 (onsite waterfowl mortalities; and sensory disturbance of caribou). Those impacts are further discussed in Section 1.2.2.2.

Table 1.8. Predicted and measured impacts to terrestrial VECs, according to the 2018 Wildlife Monitoring Summary Report (2018 Annual Report, Appendix 45). Measured impacts exceeding or potentially exceeding impact predictions/thresholds are shaded grey and further discussed in Section 1.2.2.2.

Potential Impact	Potential Cause(s)	Proposed Monitoring Methods	Monitoring Conducted (2018)	Threshold/ Prediction	Measured Impact(2018)
Vegetation (Wildlife Habitat)					
Habitat Loss	Mine site footprint, pits, roads, water management and collection systems	Ground Surveys, Mapping, GIS Analysis	Ground Surveys, Mapping, GIS Analysis	Mine Site – 1531 ha + 5% AWAR – 281 ha + 5%	Mine Site - 1,129 ha (73.7%) AWAR – 173 ha (61.6%)
Habitat Degradation by Contamination	Dust from roads, TSF, airstrip	Vegetation and Soil Samples (SLRA)	Not required in 2018	No excess mine-related risk	N/A
Ungulates					
Sensory Disturbance	Avoidance due to noise and activity (roads, airstrip, mine site)	Ground Surveys, Satellite-collaring	Satellite-collaring data; Road surveys; Daily and weekly pit and mine-site ground surveys; Incidental wildlife reporting; Motion sensing cameras	Avoidance of habitat more than 500 m from site; 1000 m from AWAR	Deflections noted when Caribou approach the road. Delayed crossing of roads. See Section 1.2.2.2.
Vehicle Collisions	Vehicular or air traffic collisions	Ground surveys, Collision Reporting System	Ground surveys, Collision Reporting System, AWAR Road Surveys	One mortality per year	None
Habitat Loss and Degradation	Mine site footprint, pits, roads, water	Ground Surveys, Mapping, GIS Analysis	Ground Surveys, Mapping, GIS Analysis	Growing – 531 ha of High Suitability Habitat + 10%	Growing – 372 ha (70%) Winter – 280 ha (68.8%)

Potential Impact	Potential Cause(s)	Proposed Monitoring Methods	Monitoring Conducted (2018)	Threshold/ Prediction	Measured Impact(2018)
	management and collection systems			Winter – 407 ha of High Suitability Habitat + 10%	
Hunting by Baker Lake Residents	Improved access to hunting along the AWAR	Hunter Harvest Study	Not conducted – resumed in 2019	< 20% increase of historical harvest activities within the RSA; no significant impact to herds	N/A
Other Mine-related Mortality	Falling into pits, TSF or other means	Ground surveys	Ground surveys	One mortality per year	No mine-related mortalities
Exposure to Contaminated Water or Vegetation	Consumption of contaminated dust deposited on vegetation	Vegetation and Soil Samples (SLRA)	Not required in 2018	No excess mine-related risk	N/A
Predatory Mammals					
Project-related Mortality	Vehicular or air traffic collisions, falling into pits, TSF or other means	Ground Surveys, Collision Reporting System	Ground Surveys, Collision Reporting System, AWAR Road Surveys	One mortality per year for large predatory mammals	One wolverine dispatched
Small Mammals					
Project-related Mortality	Vehicular or air traffic collisions, falling into pits, TSF or other means	Ground Surveys, Collision Reporting System	Ground Surveys, AWAR Road Surveys	Mortality of 100 individuals per year	Two artic hare mortalities along the AWAR
Habitat Loss and Degradation	Mine site footprint, pits, roads, water management and collection systems	Ground Surveys, Mapping, GIS Analysis	No monitoring as of 2018	No threshold as of 2018	N/A
Exposure to Contaminated Water or Vegetation	Consumption of contaminated dust deposited on vegetation	Vegetation and Soil Samples	Not required in 2018	No excess mine-related risk	N/A

Potential Impact	Potential Cause(s)	Proposed Monitoring Methods	Monitoring Conducted (2018)	Threshold/ Prediction	Measured Impact(2018)
Raptors					
Healthy Prey Populations	Mine Footprint, dust and exhaust, noise (road, airstrip, mine site, Baker Lake barge area)	Vegetation and Soil Samples; PRISM plot surveys; ELC habitat mapping	Vegetation and Soil Samples	Thresholds are qualitative, and can be achieved through management and maintenance of vegetation and healthy prey communities.	N/A
Disturbance of Nesting Raptors	Noise and Activity	Active Nest Monitoring	Active Nest Monitoring	One nest failure per year	Threshold not exceeded
Project-related Mortality	Vehicle/ bird collisions	Ground Surveys, Collision Reporting System	Ground Surveys, AWAR Road Surveys, Collision Reporting System	One mortality per year	Threshold not exceeded
Waterbirds					
Disturbance of Nesting Waterfowl	Noise and Activity; dewatering	Waterfowl Nest Surveys	Waterfowl Nest Surveys; Ground Surveys	One nest failure per year	Threshold not exceeded
Habitat Loss and Degradation	Mine site footprint, pits, roads, water management and collection systems	Ground Surveys, Mapping, GIS Analysis	No monitoring as of 2018	No threshold as of 2018	N/A
Exposure to Contaminated Water or Vegetation	Mine site dust; Secondary containment structures and tailings storage facilities	Vegetation and Soil Samples	Not required in 2018	No excess mine-related risk	N/A
Project-related Mortality	Vehicle/ bird collisions	Ground Surveys, Collision Reporting System	Ground Surveys, AWAR Road Surveys	One mortality per year	Threshold not exceeded
Project-related Mortality	Mine site-related mortality	Surveys	Daily and weekly pit and mine-site ground surveys	One mortality per year	Two Long-tailed ducks found dead onsite. See Section 1.2.2.2.

Potential Impact	Potential Cause(s)	Proposed Monitoring Methods	Monitoring Conducted (2018)	Threshold/ Prediction	Measured Impact(2018)
Other Breeding Birds					
Project-related Mortality	Vehicle/ bird collisions	Ground Surveys, Collision Reporting System	Ground Surveys, AWAR Road Surveys	50 project-related mortalities per year	Threshold not exceeded
Habitat Loss and Degradation	Mine site footprint, pits, roads, water management and collection systems	Ground Surveys, Mapping, GIS Analysis	Not required in 2018	No excess mine-related risk	N/A
Exposure to Contaminated Water or Vegetation	Mine site dust	Vegetation and Soil Samples	Not required in 2018	No excess mine-related risk	N/A
Changes in Breeding Bird Populations	Mine Footprint, dewatering dust and exhaust, noise (road, airstrip, mine site, Baker Lake barge area)	Breeding Bird Prism Plots and Transects	Next scheduled for 2019	For PRISM plots, threshold is > 20% from control plots. For transect surveys, threshold is reduced use beyond 100 m of road centerline.	N/A

1.2.2.2 *Parts 3 & 4:* Discussion

Where impacts are exceeded or potentially exceeded based on monitoring results (as identified in Parts 1 & 2, above), a discussion is provided here.

1. Sensory Disturbance of Ungulates

FEIS Prediction/TEMP Threshold: Avoidance of habitat will not occur more than 500 m from site; 1000 m from AWAR.

***Discussion*:** Potential disruption of caribou movements due to the Meadowbank AWAR was first reported in 2015. Analysis of the data are ongoing in consultation with the GN and Meadowbank's Terrestrial Advisory Group (TAG) to evaluate impacts. In 2017, a study was initiated to determine the Zone of Influence (ZOI) of the Meadowbank Mine, as it relates to caribou. In collaboration with Agnico Eagle staff, Golder biologists and statisticians worked to determine the ZOI, and evaluate if it is affecting a large number of individuals. It was predicted that reduced use of preferred habitats should reduce herd size (from lower survival and reproduction). Data analysis was completed and hypotheses were tested, documents were provided to regulators and reviewed, presentations were made at the GeoScience Forum and publications are expected in the near term. This project continues to be discussed by the TAG.

In 2018, review of caribou data lead to a TAG project to explore the link between caribou road crossings and road closures. Most 2018 Caribou activity was observed during the spring migration requiring numerous road closures and restrictions along the Meadowbank AWAR and the haul roads. The roads were also observed to be deflecting many of the collared Caribou during the spring, late summer, and fall seasons. Although 2017 collar data showed fewer road-related effects, 2015 and 2016 collar data also observed that the AWAR appeared to be altering natural movement patterns of collared Caribou. Results of this study are expected to be presented to the TAG in 2019, and the goal is to incorporate them into monitoring and management plans moving forward.

Overall, Agnico Eagle and regulatory agencies are committed to conducting more detailed analyses of Caribou monitoring data, satellite collar data, hunter harvest activity, and other potential influences on Caribou movement and migration to adaptively manage and minimize project-related effects on Caribou. When complete, results of these analyses will help to determine whether the impact prediction related to sensory disturbance of ungulates is no longer supported. If monitoring studies or associated analyses indicate that predicted impacts are being exceeded, mitigation measures will be further reviewed and adapted as feasible. Current mitigation measures related to the terrestrial environment, including caribou, are described in the Terrestrial Ecosystem Management Plan (December, 2018), Appendix 51 of the 2018 Annual Report.

2. Project-Related Mortality of Waterbirds

FEIS Prediction/TEMP Threshold: No more than 1 mortality/year.

Discussion: Since onsite waterbird mortality occurred beyond FEIS thresholds in 2018 (death of two ducks after apparently flying into a building), an assessment of historical trends for this component was conducted (see Table 1.9). Based on this data, there is no clear trend towards increasing mortalities of waterbirds on

the Meadowbank site. Since the threshold of one mortality per year has only been exceeded twice in eight years (two mortalities each time), and on average, annual mortalities do not exceed the threshold, these results do not represent a significant departure from impact predictions.

Table 1.9. Historical waterbird mortalities at the Meadowbank site. The annual threshold is one mortality.

Year	Waterbird Mortalities	Cause/Notes
2011	0	-
2012	0	-
2013	0	-
2014	0	-
2015	2	Dead duck found outside a building. Dead Canada Goose found in the tailings pond.
2016	1	Dead juvenile Merganser duck was caught in gill nets during the Phaser Lake fish-out program.
2017	0	-
2018	2	Two ducks killed after apparently flying into a building.

1.2.2.3 *Part 5:* Effectiveness of Monitoring and Mitigation, and Adaptive Management

Based on the results in Table 1.8, current monitoring programs are able to address all FEIS impacts for which monitoring was recommended (i.e. monitoring is considered effective).

FEIS-planned mitigation measures to limit impacts of the Project on terrestrial wildlife were originally described in the Terrestrial Ecosystem Management Plan (October 2005). This plan was most recently updated in December 2018 (2018 Annual Report; Appendix 51) so all mitigation measures as described in that document (Tables 4, and 6 – 10) were relevant and in practice in 2018.

Adaptive management approaches related to potential impact prediction exceedances are described below. Recent general adaptive management also includes development of Meadowbank's Terrestrial Advisory Group (TAG) in 2018. This group includes representatives from the GN, KIA, Baker Lake HTO, and Agnico. The aim of the group is to review and provide input into monitoring and management initiatives related to the terrestrial environment (also see Section 1.3 – Contributions to Regional Monitoring).

1. Sensory Disturbance of Ungulates

Current mitigation measures related to the terrestrial environment, including caribou, are described in the Terrestrial Ecosystem Management Plan (December, 2018), Appendix 51 of the 2018 Annual Report. As described in that document, mitigation measures have been recently updated (2018) through the permitting review process for the Whale Tail Pit Project.

Supplemental studies and analyses of caribou data are ongoing in consultation with the GN and TAG to understand and quantify potential sensory disturbance of caribou. If monitoring studies or associated analyses indicate that predicted impacts are being exceeded, mitigation measures will be further reviewed and adapted as feasible.

2. Project-Related Mortality of Waterbirds

Since historical averages of project-related mortalities of waterbirds at the Meadowbank site do not differ significantly from impact predictions, and no clear trends towards increasing mortalities are evident, no adaptive management or changes to mitigation measures are planned in 2019.

1.2.3 Noise PEAMP Evaluation

1.2.3.1 *Parts 1 & 2:* Summary of Predicted and Measured Residual Impacts

While noise generation was predicted in the FEIS for many minesite components, a significant environmental effect of noise (disturbance of wildlife; reduced habitat effectiveness) requiring monitoring was determined in association with pit development, tailings handling and the mill (Cumberland, 2005; Table B3.2). Monitoring sites were established around the site and along access roads, as described in the site's Noise Monitoring Plan.

Table 1.10, below, compares FEIS predictions for area sound levels (Cumberland, 2005 – Noise Impact Assessment) with the results of monitoring conducted in 2018 (measured sound levels). Since the potential impacts of Project-related noise were all identified as wildlife disturbance, the accuracy of these predictions is also monitored through the terrestrial environment monitoring programs, as discussed in Section 1.2.2.

Although only one impact prediction was exceeded in 2018 for one monitoring location, a discussion and historical trend analysis of noise levels for all sites are provided in Section 1.2.3.2.

Table 1.10. Predicted and measured sound levels for the Meadowbank site. *Values estimated from sound level contour plots in Cumberland, 2005 – Noise Impact Assessment. **For the R5 location (all-weather access road station), predictions were made in the FEIS regarding the maximum 1-hr L_{eq} value only. Measured impacts exceeding or potentially exceeding predictions are shaded grey and further discussed in Section 1.2.3.2.

Project Component	Potential Impact	Proposed Monitoring	Monitoring Station	FEIS Predicted Value (dBA)*	2018 Monitoring Dates	2018 Measured Value	
						$L_{eq, day}$ 7am-11pm (dBA)	$L_{eq, night}$ 11pm-7am (dBA)
Portage Pit	Moderate and high noise levels from blasting, drilling, TSF berm construction and material handling will disturb wildlife and result in reduced habitat effectiveness	Monitor noise levels and behavioral responses of wildlife	R1	58-63	Jun 27 - 29	37.7	36.0
Goose Island Pit					Jul 18 - 20	45.2	38.0
Vault Pit			R2	58-63	Jun 29 - Jul 2	42.0	35.1
Borrow Pits					Jul 23 - 25	36.3	38.3
Tailings Facilities			R3	49-53	Jul 9 - 12	36.2	41.6
Mine Plant & Facilities			R4	58-63	Jul 2 - 5	58.9	48.5
					Jul 25 - 27	34.8	39.8
			R5	All 1 hr L_{eqs} < 57**	Jul 5 - 7	All <57	All <57
					Jul 16 - 18	1 @ 58	All <57

1.2.3.2 *Parts 3 & 4:* Discussion

Where impacts are exceeded or potentially exceeded based on monitoring results (as identified in Parts 1 & 2, above), a discussion is provided here.

1. Noise Levels at R5

***FEIS Prediction*:** For station R5, FEIS predictions assumed that all one-hour Leq values would not exceed 57 dBA.

***Discussion*:** In 2018, this prediction was exceeded for one of the 22 monitored hours, with a Leq of 58 dBA (4-5pm hour, July 16). The dataset was reviewed, and sound levels were generally well below 57 dBA during the monitoring period (Leq daytime of 49.5 dBA). Within the 4-5pm hour, two peaks above the predicted hourly Leq value occurred, lasting a total of 6 minutes. It is possible these were due to animal interference or a helicopter fly-over. Since the exceedance only occurred for one of twenty-two time-points and was not audibly different from the predicted value (<3 dBA difference), the event was not investigated further.

However, 24-h Leq measurements since 2009 were reviewed for all monitoring stations to understand if any trends towards increasing noise levels above FEIS predictions are occurring for any location on site (Figure 1.24). The upper level of predicted values is shown for R1 – R4. No prediction with respect to a 24h Leq was made for R5. As shown in this figure, there is no clear trend towards increasing sound levels at any site, with the highest sound levels generally occurring in 2012. Although no predictions were made regarding the 24-h Leq for R5, a decreasing trend is seen for noise levels at this station since 2012. Further analysis of trends over time for different averaging times is presented in the 2018 Noise Monitoring Report (2018 Annual Report to NIRB, Appendix 44).

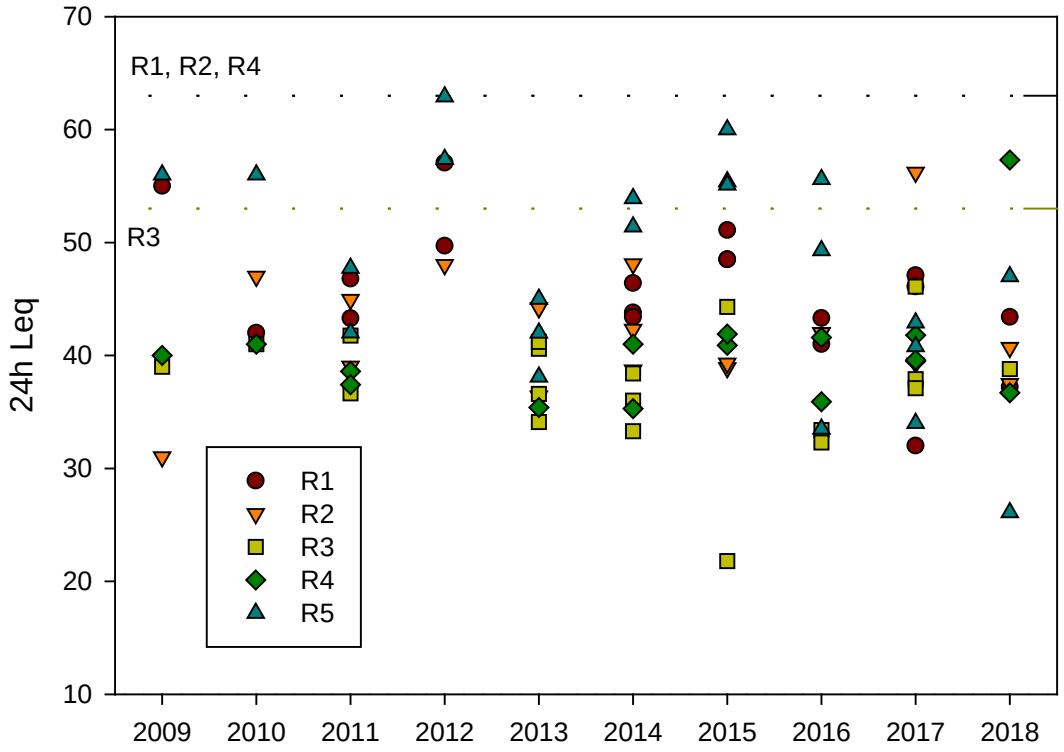


Figure 1.24. L_{eq} values calculated from filtered data for 24 h averaging times at locations R1 – R5 on the Meadowbank site in surveys from 2009 - 2018. Dashed lines indicate maximum predicted sound levels in the FEIS for each location (24-h L_{eq} was not predicted for R5).

1.2.3.3 Part 5: Effectiveness of Monitoring and Mitigation, and Adaptive Management

Based on the results in Table 1.10, current monitoring programs are able to address all FEIS impacts for which monitoring was recommended (i.e. monitoring is considered effective).

FEIS-planned mitigation measures to limit impacts of the Project on area noise levels were originally described in the Air Quality and Noise Management Plan (October 2005). This plan was most recently updated in June 2018 (2018 Annual Report; Appendix 51) so mitigation measures as described in that document were relevant and in practice in 2018. Measures are generally consistent between the FEIS version and updated management plan.

A summary of the mitigation measures in place to ensure impacts to area noise levels are minimized is provided in Table 1.11.

Table 1.11. Mitigation measures described in the Noise Abatement and Monitoring Plan (June, 2018) to reduce impacts of the project on area noise levels.

Noise Source	Planned Mitigation Measure (Noise Abatement and Monitoring Plan, June 2018)
Road traffic (mine site, AWAR) and Haul Roads operation	• During maintenance, check that noise abatement devices are in good order (e.g., brakes, exhaust mufflers, engine hoods) • Enforce speed limits • Use shallow slopes for haul road • Educate truck drivers about the characteristics of diesel engines (i.e., that the flat torque characteristic allows ascending an incline in a higher gear, which is a less noisy operation) • Keep road surfaces in good repair to reduce tire noise • Avoid prolonged idling • Avoid trucking operation during night time on access road, when possible
Air traffic (Meadowbank)	• Avoid low altitude flights (not lower than 610 m in sensitive bird/wildlife areas), except on take-off and landing • Restrict air traffic to daytime hours except for emergencies
Impact equipment (pile drivers, jack hammers, drills, pneumatic tools)	Avoid operating numerous pneumatic tools at the same time, and spread operation throughout working periods
Stationary equipment (compressors, generators, pumps)	Keep equipment in good condition
Blasting	• Use delays, both surface and down hole • Preference for daytime blasting • Blasting in depressed pits (normal production practice)
Outdoor material handling equipment (crushers, concrete mixers, cranes)	• Place crushers in sheltered/enclosed locations if possible • Maintain equipment in good working condition • Turn equipment off when not in use if practicable
Earth moving equipment (trucks, loaders, dozers, scrapers)	• Aim to restrict equipment age so only newer, more efficient machinery will operate onsite • Operate equipment within specification and capacity (i.e., don't overload machines) • Use noise abatement accessories such as sound hood and mufflers
Primary plant facilities (gyratory primary crusher, SAG mill, ball mill, power plant)	• Provide building with walls absorbing noise • Maintain equipment on a regular basis, replace worn parts, lubricate as required • Provide diesel plant units with efficient intakes and exhaust silencers • Use conveyor system with low noise output, paying particular attention to rollers • Enclose conveyors where necessary
Utilities and services	• Ensure that a rotating biological contactor treatment system operates quietly • Dump solid waste behind barriers

Since departures from noise impact predictions were not substantial in 2018, and there are no clear trends towards increasing noise levels around the Meadowbank site, no associated changes to noise monitoring or management programs are planned in 2019.

1.2.4 Air Quality PEAMP Evaluation

1.2.4.1 *Parts 1 & 2:* Summary of Predicted and Measured Residual Impacts

In order to estimate potential impacts of the Project on air quality, modeling exercises were conducted as a component of the FEIS to determine emission rates and dispersion of various criteria air contaminants from different sources (Air Quality Impact Assessment, Cumberland, 2005).

This included modeling emissions of three size fractions of suspended particulates ($PM_{2.5}$, PM_{10} and TSP) originating from the TSF, WRSF, and ore stockpile, for 24h and annual averaging times. Deposition rates for dust from these sources were also calculated ($g/m^2/30d$). While maximum ground level concentrations were described in the FEIS document for all size fractions, contour plots were only provided for TSP and deposition rates (Air Quality Impact Assessment, Cumberland, 2005).

In addition, modeling was conducted for criteria pollutants (CO, NO_2, SO_2, PM_{10}, and $PM_{2.5}$) emitted from the power plant and mobile sources for 1h, 24h and annual averaging times, and concentration contour plots were provided for these analyses.

The main monitoring program for air quality recommended in the FEIS was only static dustfall, which is being continuously monitored at four locations around the minesite. In addition, Agnico Eagle conducts monitoring of TSP, PM_{10}, $PM_{2.5}$ and NO_2, in accordance with the current Air Quality and Dustfall Monitoring Plan. Carbon monoxide and sulphur dioxide are not required to be monitored as part of the program developed by Agnico Eagle in consultation with regulatory agencies.

Based on available FEIS modelling results, the following predicted values were able to be compared to measured values: NO_2 (annual average), $PM_{2.5}$, and PM_{10}. Monitoring results for these parameters are considered adequately comparable to FEIS predictions, since modelling included all reasonably significant emission sources for these parameters. FEIS predictions for TSP and dust deposition (30 d rate) were not compared to field measurements (i.e. monitoring results) since only emissions from three specific point sources were required to be modeled (TSF, WRSF, ore stockpile). For reference, all results for TSP and dustfall monitoring are provided in the 2018 Air Quality and Dustfall Monitoring Report (Appendix 39), along with comparisons to regulatory guidelines and historical measurements.

Even for those measured parameters which are comparable to FEIS predictions (NO_2, $PM_{2.5}$, PM_{10}), it should still be noted that while field monitoring captures emissions from all sources at once, as well as background sources, the FEIS presents modeled outputs from combinations of specific sources as described above. Therefore, accuracy of these quantitative predictions cannot specifically be assessed through field monitoring. However, if measured concentrations or deposition rates are lower than predicted values, it can be concluded that FEIS predictions are not being exceeded. In some cases, as described below, measured or estimated background concentrations were able to be added to predicted values to facilitate the comparison.

The following specific methods were used:

- Modeled values for suspended particulates and deposition rates were obtained for the active two air quality monitoring locations (DF-1 and DF-2) from the FEIS Air Quality Impact Assessment Figures 6.2 – 6.24. PM_{10} values were derived from Figures 6.7 and 6.8, based on references in the text (Table 6.1), although these figures are labelled as SP. Model values for a TSF size of 960x560m were used in the comparison.

- A recent impact assessment for the Whale Tail Pit project at Meadowbank calculated background values for $PM_{2.5}$ of 6.7 and 3.6 µg/m^3 for 24-h and annual averaging times, respectively (Whale Tail Pit EIS, Appendix 4-A). No background data was available for other size classes of suspended particulates, but these $PM_{2.5}$ values were added to predicted concentrations of $PM_{10}$for the comparison, since $PM_{2.5}$ forms a subset of PM_{10}.

- For NO_2, modeling results were only provided in the FEIS for the maximum predicted ground-level concentration, which occurred adjacent to the power plant. The closest NO_2 monitoring station (DF-2) is at a distance of approximately 1 km southwest (cross-wind) from this location.

Table 1.12 summarizes the predicted residual impacts to air quality and results of comparable monitoring conducted in 2018.

Despite the generally conservative nature of these comparisons, no exceedances occurred for NO_2, $PM_{2.5}$, or PM_{10}. In addition, GHG emissions were below the predicted value.

Table 1.12. Predicted and measured impacts to air quality for the Meadowbank site. Measured impacts exceeding or potentially exceeding predictions are shaded grey and further discussed in Section 1.2.4.2. *Addition of background values described above in Section 1.2.4.1.

Project Component	Potential Impact	Proposed Monitoring (FEIS)	Monitoring Conducted (2018)	Max. Predicted Value (FEIS) + Est. Partial Background*	Measured Value (2018)
Dike construction	Generation of dust during placement of dike material	Static dustfall	N/A (no dikes constructed)	-	-
Dewatering	Generation of dust from exposed lake sediment	Static dustfall	Static dustfall, NO_2 (four locations) and suspended particulates (two locations)	NO_2 (ppb; annual avg.) = 4.97 $PM_{2.5}$ (µg/m^3; 24 h avg.): DF-1: 20+6.7 = 26.7 DF-2: 10+6.7 = 16.7 $PM_{2.5}$ (µg/m^3; annual avg.) DF-1: 1+3.6 = 4.6 DF-2: 0.5+3.6 = 4.1 PM_{10} (µg/m^3; 24 h avg.): DF-1: 20+6.7 = 26.7 DF-2: 40+6.7 = 46.7	NO_2 (ppb; annual avg.; DF-2) = 1.81 $PM_{2.5}$ (µg/m^3; 24 h avg.): DF-1: 0/16 samples > 26.7 DF-2: 0/45 samples > 16.7 $PM_{2.5}$ (µg/m^3; annual avg.) DF-1: 0.2 DF-2: 1.4 PM_{10} (µg/m^3; 24 h avg.): DF-1: 0/16 samples > 26.7 DF-2: 0/45 samples >46.7
Pits	Generation of dust and gases from blasting, excavation etc.	Static dustfall			
Waste Rock Facility and Tailings Storage Facility	Generation of dust from material deposited on waste rock pile or tailings	Static dustfall			
Onsite Roads and Traffic, Airstrip	Generation of dust and emissions from use of roads and airstrip	Static dustfall			
Mine Plant and Facilities	Release of pollutants from incineration	Report emissions	GHG emissions reported	190,768 t CO_2 equivalent	186,122 t CO_2 equivalent

1.2.4.2 *Parts 3 & 4:* Discussion

Where impacts are exceeded or potentially exceeded based on monitoring results (as identified in Parts 1 & 2, above), a discussion would be provided here.

However, where quantitative comparisons to field monitoring results were feasible, no exceedances of air quality impact predictions occurred in 2018.

Nevertheless, in further response to NIRB comments requesting a discussion of whether the predictions in the Final Environmental Impact Statement may have potentially underestimated the amount of dust produced on the mine site including along the all weather access road (AWAR), Agnico has offered the following response (Agnico Eagle's response to the NIRB's 2018-2019 Annual Monitoring Report for the Meadowbank Gold Project and the Whale Tail Pit Project with Board's Recommendations, Section 1.1.3, November 25, 2019):

The modelled predictions of fugitive dust emissions from the mine site, or any unpaved haul road generally should not be considered definitive. Rather, these predictions should be considered as a tool to be used to evaluate the potential for dust deposition to occur in the vicinity of the haul roads and fugitive dust generating activity locations. The methodology used to evaluate the dustfall deposition rate and ambient concentrations in the FEIS remains consistent with methods being used today in air quality assessments. The emissions from traffic were quantified using the industry-standard emission factors presented in the US EPA AP-42 Chapter 13.2.2: Un-paved Roads, which considers vehicle traffic parameters (number and size of vehicles) and road surface parameters (silt content and natural mitigation) and follow-on predictions were made using standard models and methodology. The fleet was estimated using the best available information.

If the input parameters to the model were to change, it could reasonably be assumed that a commensurate change in the predicted deposition rates next to the roads and other fugitive dust sources could be expected. With this context considered, there is no reason to suggest that the FEIS predictions underestimated fugitive dust deposition rates.

The above notwithstanding, of the compounds that are routinely evaluated by air quality assessors, the one with arguably the highest level of uncertainty is likely fugitive dust deposition. One of the considerations to be mindful of is that the standard emission factors used consider particles in the size range of approximately 30 microns (µm) in aerodynamic diameter and smaller. Dustfall, measured in the collection jars, often contains particles considerably larger than 30 µm. What this means in practice is that when dustfall deposition rates are measured and found to be lower than the modelled predictions, the modelled predictions can be considered exceptionally conservative as they have not included the largest particles and still over-predict the measured values. If there was a standard method to calculate the largest particle size emission rates and include them in the modelling, neither of which is possible using methods available then or now, the predicted values would be higher.

The Board is asked to consider the dust (airborne and deposited) monitoring results in their full context, which shows the vast majority of the data being widely compliant with the applicable guidance with only a

few outliers and no trend toward increasing concentrations or deposition rates. The Board is also asked to consider the extensive monitoring results as a whole when evaluating the ongoing applicability of the modelling results and to give priority to the monitoring results above the modelling predictions. For dust evaluation in particular, there is more certainty in the monitoring than in the modelling.

Considering all of the above and based on a careful re-evaluation of the modelling and assumptions used to make predictions for dust deposition and ambient particulate concentrations, Agnico assert that the modelling methods and results can continue to be relied on to provide guidance on dust management for the Project including the associated roads.

1.2.4.3 Effectiveness of Monitoring and Mitigation, and Adaptive Management

A summary of the planned mitigation measures for air quality (per Air Quality and Noise Management Plan, 2005) is provided in Table 1.13, along with a commentary on current implementation.

Table 1.13. Mitigation measures described in the Air Quality and Noise Management Plan (October, 2005) to reduce impacts of the project on area air quality, and commentary on current implementation.

Emission Source	**Planned Mitigation Measure** (Air Quality and Noise Management Plan, 2005)	**Implementation**
Plant Production Facilities	Select the diesel power plant engines with low NOx emissions to prevent ozone formation and with low hydrocarbon emissions to lower GHG emissions	- NA
	Use low sulphur content diesel fuel to mitigate SO2 emissions	- Use of summer fuel
	Collect and vent any process emissions (flotation, CIP circuit, carbon treatment, gold refining, and cyanide detoxification) into the atmosphere	- All process enclosed in the mill facility except leach tank
	Design all stacks using good engineering practice (including accessible sampling ports and Adequate height) to ensure the required dispersion to meet ambient air quality objectives	- Design to meet engineering practice
	Implement fleet maintenance program to ensure that all diesel-powered equipment will operate efficiently, thereby reducing air emissions	- Preventive maintenance per manufacture recommendation
	Install dust filters at the primary crusher building and at fine grinding facilities (SAG mill and ball mill) and provide dust suppression equipment (dust covers, sonic sprays, etc.)	- Filter installed at major dust generating equipment
	Install enclosure of feed conveyor to avoid fugitive emissions during windy weather	- All conveyer are enclosed
	Provide crushed ore stockpile enclosure to limit any dust to indoor environment	- Enclosed in a dome
Transportation	Impose vehicle speed limit on Vault haul road to mitigate fugitive dust and reduce engine emissions	- Speed limit enforcement on Vault Haul Road and AWAR

Emission Source	Planned Mitigation Measure (Air Quality and Noise Management Plan, 2005)	Implementation
	Apply dust suppressants (water, calcium chloride) to haul and service roads during dry weather to mitigate fugitive dust	- Dust suppressant applied on mine site and roads
	To reduce vehicle emissions, do not let motors idle, except when necessary	- No idle policy implemented - Application of the policy followed by Environment Department - Reminder of the policy sent as needed to all employees
	Upgrade road-surfacing materials using local coarse rocky aggregates	- Mine site road surfaced with NPAG waste rock material
Blasting & Waste Disposal	Limit blasting to calm days or use delay blasting technique; natural mitigation to take place when mining pits are from 85 to 175 m below the ground level; ore and waste to be coarse run-of-mine muck not prone to generating excessive dust	- Blasting follow the approved Blast Monitoring Program
	Cover dewatered tailings with non-potentially acid-generating (non-PAG) aggregates to control wind erosion	- Progressive reclamation of the North Cell Tailings Pond ongoing with a cover of NPAG material
Miscellaneous	Provide pressure valves to control fuel vapor fugitive emissions from the storage tanks	- Installed at all locations
	Use water spray instead of pneumatic flushing while cleaning equipment and working areas when temperature is above the freezing point	- All machine cleaning is done inside shop (wash bay)
	Use site-generated mineral material (dirt, aggregate, etc.) to cover disposed solid waste at the waste dump	- Waste dump is located in the Portage Waste Rock Facility and is covered with waste rock created by mining activities
	Select waste incinerator with build-in emission control system (secondary combustion chamber, catalytic converter, etc.) and install a stack to disperse emissions to concentrations below ambient air quality objectives	- Construction of the incinerator included a secondary combustion chamber. - Annual testing of the incinerator stack to confirm compliance with applicable limit
	Apply vegetation cover on stripped areas and long-term stockpiles	- Natural revegetation to occur during the reclamation phase - Revegetation option to be considered in the final Closure Plan

Since no exceedances of impact predictions occurred, no adaptive management actions or supplemental monitoring programs are planned for 2019.

1.2.5 Permafrost PEAMP Evaluation

1.2.5.1 *Parts 1 & 2:* Summary of Predicted and Measured Residual Impacts

A summary of predicted residual impacts to permafrost (after mitigation), as described in the FEIS (Cumberland, 2005; Table B1.2), and results of monitoring being conducted to assess the accuracy of these predictions is provided in Table 1.14 below. A complete description of monitoring results is provided in the 2018 Geotechnical Inspection Report (Appendix 7), which reviewed instrument data collected between September 2017 and August 2018.

In general, degradation of permafrost was predicted in association with the construction of mine buildings, and development of permafrost was predicted in association with dikes, TSF, and WRSF construction. Predictions are typically related to closure-phase impacts. Therefore, results of monitoring to date are presented here to demonstrate progress, but validity of the prediction (i.e. whether or not the prediction is supported by the monitoring data) cannot be determined at this time.

Table 1.14. Comparison of permafrost monitoring results with impacts predicted in the Project FEIS (Cumberland, 2005). Measured impacts exceeding or potentially exceeding predictions are shaded grey and further discussed in Section 1.2.5.2.

Potential Impact	Potential Cause(s)	Proposed Monitoring	Monitoring Conducted (2018)	Predicted Impact in FEIS	Observed Impacts (2018)
Permafrost aggradation and stabilization of new active layer in dikes	Dike design	Monitor ground temperatures; monitor slopes; monitor sub-permafrost pore pressures (tailings dike)	Ground temperature monitoring (thermistors)	Net increase in permafrost distribution and/or decrease in ground temperatures.	East Dike, Bay-Goose Dike, South Camp Dike: similar to historical trends, partially frozen foundations. Vault Dike: frozen foundation Central Dike: similar to historical trends, partially frozen foundation SD1&2: frozen foundations; SD3,4,5: partially frozen foundations; Stormwater Dike: partially frozen foundation
Permafrost changes in Second Portage Lake (2PL) NW arm area	Dewatering, reclaim and attenuation pond filling, and tailings deposition	Representative monitoring of ground temperatures; assessment of anticipated ice entrapment (i.e. ground ice development)	Thermistor monitoring in TSF (thermistors NC-T1, NC-T2, NC-17-01 through 08)	Net increase in permafrost distribution and/or decrease in ground temperatures	Thermistors indicate tailings are not completely frozen.
Permafrost changes in Third Portage Lake (TPL) north central shoreline	Portage pit development	Assessment of suspected ground ice development in conjunction with permafrost aggradation. Assessment of ground ice	None	Net increase in permafrost distribution and/or decrease in ground temperatures	General increase in permafrost aggradation due to structures; permafrost is developed in part of the Portage Pit and

Potential Impact	Potential Cause(s)	Proposed Monitoring	Monitoring Conducted (2018)	Predicted Impact in FEIS	Observed Impacts (2018)
and Portage Pit area		content of select shoreline polygons.			Goose Pit walls, under the Goose Dike.
Permafrost changes in waste rock area	Construction of waste rock facility	Internal and foundation temperatures to be monitored	Thermistor monitoring of internal and foundation temperatures	Fall, winter and spring placement will continue to bury the natural ground surface and permafrost will aggrade into the waste rock where a new and temporary active layer will form. Placement of lifts on natural ground in the summer may continue to cause temporary and localized deepening of the active layer, warming of near surface permafrost and possible subsidence, particularly in low lying areas.	Frozen ground conditions under the Portage RSF for all thermistor locations. Rockfill temperature below 0 °C for at least 10m above ground surface for all instruments.
Potential settlement of buildings	Loss of permafrost under heated structures	Ground temperature measurements where there is a need to monitor foundation temperatures	None	Net decrease in permafrost distribution and/or increase in ground temperatures	No ground temperature measurements have been undertaken at or near buildings on site. To date there has been no observed thawing of foundations.
Permafrost changes below pipelines	Stabilization of permafrost temperature and active layer thickness	Monitor pipeline alignment for potential permafrost degradation	None	Minor and undifferentiated net gain or loss of permafrost	No ground temperature measurements but no observations of thawing due to pipelines.

1.2.5.2 *Parts 3 & 4:* Discussion

Permafrost conditions continue to be monitored, but since final impact predictions relate to the closure/post-closure phase, no commentary on potential exceedances is made at this time.

Nevertheless, to help demonstrate the current status towards achieving these predictions, historical trends for all thermal monitoring results are provided in Appendix 21 of the 2018 Annual Report.

1.2.5.3 *Part 5:* Effectiveness of Monitoring and Mitigation, and Adaptive Management

No changes to permafrost monitoring programs are planned in 2019.

A summary of the planned mitigation measures for permafrost during the current operations phase of the project (FEIS Physical Environment Impact Assessment Report (2005), Table C.2) along with implementation in 2018 is provided in Table 1.15. Mitigation measures proposed for operations-phase components which have already occurred (e.g. dewatering) or those associated with design-phase planning are not included.

No adaptive management measures are planned at this time.

Table 1.15. Mitigation measures described in the FEIS, Appendix B (October, 2005) to reduce impacts of the project on permafrost, and commentary on current implementation.

Project Component	Planned Mitigation Measure (FEIS Section 4.24.2.4)	Implementation
Waste Rock Storage	Schedule placement of waste rock on thaw-sensitive polygons during winter months, possibly in conjunction with proactive measures to enhance ground chilling prior to placement (e.g. snow removal and/or compaction); use flatter side slopes	- Annual geotechnical inspection completed by third party - Annual revision of the Waste Rock and Tailings Management Plan
Tailings Storage Facility	Management of ice entrapment	- Follow up done on ice entrapment and best practices
Ditches (roads, airstrip, contact water)	Silt fences as required to manage sediment loss; rock aprons as required to slow the rate of thaw penetration and stabilize the underlying soils	- Silt fences not required as of yet
Freshwater intake & pipeline	Use insulated pipe with heat tracing; elevate pipeline across thaw sensitive terrain	- Insulated pipe insulated and elevated (freshwater line)
Discharge facilities & pipeline	Use insulated pipe with heat tracing; elevate pipeline across thaw sensitive terrain	- Insulated pipe insulated and elevated
Non-contact diversion facilities	Silt fences as required to manage sediment loss; rock aprons as required to slow the rate of thaw penetration and stabilize the underlying soils	- Silt fences not required as of yet
Vault access road culverts (Turn Lake)	Maintenance, as required, to restore smooth grade where thaw settlement is a problem; avoid culverts in areas susceptible to thaw settlement	- No maintenance as required

1.2.6 Socio-Economic PEAMP Evaluation

A comprehensive assessment of socio-economic indicators, comparison to FEIS predictions, and review of management/mitigation measures is provided in the 2017 Socio-Economic Monitoring Report (2018 Annual Report to NIRB, Appendix 58; July 2018). Since the annual Socio-Economic Monitoring Report is released in July, the previous year's report is the most recent document available for use in the PEAMP. Data from that report are summarized here in the context of the PEAMP requirements.

1.2.6.1 *Parts 1 & 2:* Summary of Predicted and Measured Residual Impacts

Based on results of the 2017 Socio-Economic Monitoring Report (July, 2018) the accuracy of Project impacts as predicted in the FEIS (Cumberland, 2005; Table B15.2) is assessed for each identified valued socio-economic component (VSEC) in Table 1.17. All VSECs are interpreted along with trends since construction phase. When specific impact predictions were made in relation to a monitoring metric, and measured impacts that are trending outside of those predictions in the post-development period (red arrow) further discussion is provided in Section 1.2.6.2.

Table 1.16. Key for Table 1.17.

Time horizon	Direction	Value
Pre-dev: trend prior to the operation / construction phase of the project (2010) **Post-dev**: trend from the onset of operation of Meadowbank (2010). **Last year**: movement from 2016 to 2017	↑ Increasing ↓ Decreasing → Remaining stable **/** No discernable trend **N/A** Not applicable	■ **Positive**: change in indicator towards the achievement of the desired impact or goal ■ **Negative**: change in indicator away from the achievement of the desired impact or goal ■ **Neutral**: no observed change in indicator with regard to the achievement of the desired impact or goal

Table 1.17. Summary of FEIS predictions for socio-economic VSECs, observed trends, and interpretation of monitoring results in comparison to FEIS predictions. Measured impacts that are trending outside of predictions in the post-development period (red arrow) are further discussed in Section 1.2.6.2.

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
VSEC 1. EMPLOYMENT						
"The potential impacts of employment are likely to take some time to gain full momentum, and overall are considered of high magnitude, positive, long term and of high significance, specifically to those individuals and their families who are able to benefit." (Cumberland Resources, 2006, pg. 120)	1.1 Total project employment (Agnico Eagle & contractors)					
	Project employment (permanent, temporary, on-call & contractor)	"It is expected that the construction phase workforce will average 160 and peak at 310, and the operation phase workforce is estimated at 370."	N/A	→	↓	The total Meadowbank employee figures to date have significantly exceeded the values predicted in the FEIS for employment at the mine, largely due to an expansion of the project scale from the initial Cumberland project proposal.
	1.2 Project Inuit employment (Agnico Eagle)					
	Project Agnico Eagle employment (Inuit & non-Inuit)					Meadowbank Agnico Eagle Inuit FTEs have been holding relatively steady for the past 3 years (221, 221 and 218), representing between 28% and 29%

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
	Inuit FTEs		N/A	→	→	of the total Agnico Eagle workforce. Contractor Inuit employment over the same time timeframe increased from 25 to 48 – though this may be a result of better tracking in 2017 where FTES are used compared with employment numbers in prior years.
	Inuit FTE rate		N/A	→	→	
	Project contractor employment (Inuit & non-Inuit)					
	Employees / FTEs		N/A	→	↑	
	Inuit employee / FTE rate		N/A	↓	↑	
	1.3 Project Agnico Eagle employment by Kivalliq community					
	Project employment by Kivalliq community		N/A	↑	↑	In 2017, over half (53%) of Meadowbank's Kivalliq-based employees were from Baker Lake. Additionally, Arviat supplies a large and increasing proportion of Agnico Eagle's Inuit workforce, reaching a high of 70 employees in 2017. Employees from the remaining Kivalliq communities (Chesterfield Inlet, Coral Harbour, Whale Cove and Naujaat) rose in each community, increasing cumulatively from 26 employees to 44 between 2016 and 2017.
	1.4 Project employment by gender					
	Project employment (gender)					Agnico Eagle female employment at Meadowbank has been steadily increasing since 2013, from a low of 10% up to 20%. It is at its highest level since
	employees		N/A	↑	↑	

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
	rate		N/A	↑	↑	the mine began production and has now surpassed the Canadian mining sector average of 17%.
	1.5 Project turnover					
	Project turnover (Inuit & non-Inuit)		N/A	↓	↓	The turnover rate for Meadowbank permanent Inuit employees remained stable in 2017 at 28%, while temporary employee turnover rate is showing signs of stabilizing near 50% following a drop from 2010 to 2014. 2017 saw a large increase in turnover in Meadowbank employees from Coral Harbor and Naujaat, with nearly as many employees leaving as were working there when the annual snapshot was taken (just over for Coral Harbor at 109% and just under at Naujaat at 92%).
	Agnico Eagle Inuit employee turnover by reason		N/A	↓	↓	
	Percent turnover by community		N/A	↑	↑	
VSEC 2. INCOME						
"The potential impacts of increased income are considered of high magnitude, positive, long-term and of high significance, particularly to those individuals and their families who are able to benefit. It is expected that overall community effects, moderate in significance, are likely to be most experienced in Baker Lake, as most direct employment will	2.1 Income paid to projects' Inuit employees					
	Income paid to Agnico Eagle project Inuit employees	"Direct project wages paid to people in Kivalliq Region, primarily Baker Lake, could exceed $4 M annually"	N/A	↑	→	Income paid to Inuit employees for the Meadowbank project in 2017 was $18.1M, significantly exceeding FEIS predictions
	2.2 Income by Kivalliq community					

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
occur here." (Cumberland Resources Ltd., 2006, p. 121)	Median employment income of tax filers by Kivalliq community		↑	↑	N/A	The most recent data available for this indicator is from 2015. Median employment income has increased gradually overall in the Kivalliq region since 2006, with no significant inflection (i.e. change in growth rate) since 2010. Among the Kivalliq communities with highest levels of Meadowbank employment (Baker Lake, Rankin Inlet, and Arviat), only Rankin Inlet shows a significant increase in the income growth rate when comparing the 2006-2010 period to the 2010-2015 period.
VSEC 3. CONTRACT EXPENDITURES						
The potential impacts of employment are likely to take some time to gain full momentum, and overall are considered of high magnitude, positive, long term and of high significance, specifically to those individuals and their families who are able to benefit." (Cumberland Resources Ltd., 2006, p. 121)	3.1 Contract expenditures					
	Contract expenditures on NTI-registered businesses					In 2017, $213M and 55% of expeditures for the Meadowbank project were to NTI-registered businesses.
	NTI expenditures		N/A	↑	↑	
	Proportion NTI		N/A	↑	→	
	2017 NTI-registered business expenditures by Nunavut community		N/A	N/A	N/A	In 2017, $94M was spent on Rankin Inlet businesses, $70M on Baker Lake businesses, $46M on Iqaluit-based businesses, and a small proportion on Arviat-based businesses.
	Contract expenditure on Nunavut-based businesses					In 2017, $271M and 70% of expeditures for the Meadowbank project were to Nunavut-based businesses.
	Nunavut-based expenditures		N/A	↑	↑	

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
	Proportion Nunavut-based		N/A	/	↑	
	Contract expenditures from Meadowbank on Baker Lake-based businesses	"With continuing preferential contracting, local business participation in the project is expected to grow with time." (Cumberland Resources Ltd., 2006, p. 7)	N/A	↓	↑	Meadowbank expenditures on Baker Lake-based businesses continued a 2-year upward trend in 2017, corresponding with construction activities. The proportion of contract expenditures has risen by $43M over the past two years in Baker Lake, although this is still less than when Meadowbank began operation. This suggests that spending has diversified to other communities across the territory.
VSEC 4. EDUCATION AND TRAINING						
"The potential impacts of education and training are considered of medium magnitude, positive, long term and of high significance, specifically to those individuals and their families who are able to benefit." (Cumberland Resources Ltd., 2006, p. 121)	4.1 Investment in school-based initiatives					
	Agnico Eagle investments in school-based initiatives	"Cumberland and KIA will address the need for a broader based project education and training initiatives [sic] to assist those who wish to develop skills that will position them for project employment. This education and training initiatives [sic] will also include an element to address motivational issues around getting children through high school. Such measures would be intended to	N/A	↓	↑	Up until 2014, Agnico Eagle contributed approximately $284K/year to a variety of school-based initiatives. With the expiry of the MOU with the Department of Education in 2015, these contributions dropped to $39K. They remained unchanged in 2016 and rose to $55K in 2017 due to a doubling of scholarship funding.

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
		contribute to encouraging a commitment to education on the part of youth." (Cumberland Resources Ltd., 2006, p. 121)				
	4.2 Secondary school graduation by region					
	Secondary school graduation rate by region		↑	↑	N/A	The graduation rate in Kivalliq region fluctuates from year to year, though shows an overall upward trend that began in 2008. Rates have been at all-time highs for the region, and consistently higher than those in the other two regions, since 2010.
	4.3 Project training and education					
	Agnico Eagle investments in mine training and education programs	"Cumberland and KIA will address the need for broader based project education and training initiatives to assist those who wish to develop skills that will position them for project employment."	N/A	→	↓	From 2014 to 2016, there was a consistent level of investment by Agnico Eagle (~$2.3M/year) in external mine training programs (e.g. Kivalliq Mine Training Society). In 2017, this dropped to $195K as the KMTS lost their federal funding; the future of the organization is currently uncertain.
	Average mandatory training hours provided to Agnico Eagle Inuit employees		N/A	↑	→	In 2017, mandatory training hours remain fairly stable at Meadowbank, indicative of steady rates of turnover.

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
	Average specific training hours provided to Agnico Eagle Inuit employees	(Cumberland Resources Ltd., 2006, p. 121)	N/A	↑	↓	Specific training hours declined at Meadowbank from 84 hours / Inuit FTE in 2015, down to 51 hours in 2017. Annual fluctuations in the number of training hours largely reflect changing demand for additional positions and so are not considered negative or positive.
	Participation in career and skills programs		N/A	/	↓	Participants in TASK week and graduates from the Arviat Diamond Drillers and Welders Program had remained steady until last year, decreasing by 12 and 11 respectively. Meadowbank's Haul Truck Driver Program also saw a decline in 2017 from 34 to 26 participants. These fluctuations could be explained by the success of each program as well as changing demand for specific skills at Meadowbank.
	Meadowbank pre-apprenticeship and apprenticeship participation by type		N/A	↑	↑	The number of Inuit apprenticeships increased by 3 in 2017. In addition to the number of Inuit participants, the apprenticeship program has seen growth over the past 4 years in diversity, moving from two offered programs in 2013 to seven in 2017.
	4.4 Project employment by skill level					
	Project Agnico Eagle Inuit employees by skill-level		N/A	↑	↑	2017 has seen an increase in Inuit employees at higher skill levels, with the total number of skilled, management and professional employees rising from 6 in 2016 to 15 in 2017.

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
VSEC 5. CULTURE AND TRADITIONAL LIFESTYLE						
"There is potential for both negative and positive impacts, of any magnitude, on traditional ways of life, which could be of high significance. Any net impact, since it would be an impact of cultural change, would be long term and continue beyond the life of the project. The impact would be experienced primarily in Baker Lake." (Cumberland Resources Ltd., 2006, p. 123)	5.1 Perceptions of culture and traditional lifestyle					
	Self-reported effect of project on culture and traditional activities		N/A	N/A	N/A	Data currently unavailable.
	5.2 Culture and traditional lifestyle					
	Proportion of total population identifying Inuktitut as their mother tongue by community		→	↓	N/A	The proportion of the population identifying Inuktitut as their mother tongue has remained relatively stable in the smaller Kivalliq communities from 2006 to 2016, but has declined in Rankin Inlet, Baker Lake, and Chesterfield Inlet (by 10 to 18 percentage points) over this period.
	Use of AWAR by community	"The project will not significantly restrict access to or productivity of lands used for traditional activity." (Cumberland Resources Ltd., 2006, p. 122)	N/A	↑	↓	The Agnico Eagle-owned and operated all-weather access road (AWAR) that connects Baker Lake to the Meadowbank mine is accessible to the communities for hunting purposes. Community members accessed the road 2366 times in 2015, 1874 times in 2016, and 1716 times in 2017.
	5.3 Country food use at project					
	Country food kitchen usage		N/A	→	→	Meadowbank has maintained its practice of offering meals including char, muskox, and caribou

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
						(approximately 4,500 meals/year, or one per month per employee, since 2011).
	Country food night events		N/A	→	↓	The number of country food events held at Meadowbank decreased from 14 in 2016 to 4 in 2017 – largely due to a lack of country food availability. Turnout for these events has averaged 36 attendees per event in 2016 and 43 in 2017.
VSEC 6. POPULATION DEMOGRAPHICS						
"The potential impacts of migration are complex and are likely to have both positive and negative components, but of low magnitude. Any effects of migration are long term but are likely to be low significance. It is not likely that migration to any other community than Baker Lake would be significant." (Cumberland Resources Ltd., 2006, p. 126)	6.1 Employee migration					
	Project Agnico Eagle Inuit employees residing outside Nunavut	The Meadowbank FEIS suggests that in-migration of Southerners to Baker Lake would be the primary concern.				There has been a gradual increase in the number of Inuit Meadowbank workers who now reside in outside of Nunavut, from 7 in 2011 to 21 in 2015 (or 7% of the Inuit workforce), though this number has remained stable in 2016 and 2017. The FEIS predicts both "positive and negative components" of migration but does not refer to migration out of Nunavut.
	Total Inuit employees		N/A	↑	→	
	Proportion of Inuit to Non-Inuit employees		N/A	↑	→	
	6.2 Population estimates in Kivalliq communities					
	Population estimates of Kivalliq communities	The Meadowbank FEIS states that "it is not likely that migration to any other community than Baker Lake would be significant", but does not provide any specific predictions on changes				Yearly population estimates do not indicate an increase in the population growth rate of Baker Lake or of other communities with significant Meadowbank employment (Arviat, Rankin Inlet) since the mine opened, or relative to other communities in the region. If other factors (births and deaths) are assumed constant, the population data does not suggest significant migration to
	Estimates in communities		↑	↑	↑	
	Annual percent change		→	→	→	

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
		to populations in Kivalliq communities.				Baker Lake (or other communities with high Meadowbank employment).
VSEC 7. INDIVIDUAL AND COMMUNITY WELLNESS						
Potential impacts on individual and community wellness are complex, far reaching, and given human nature, difficult to predict with certainty. Individual and community wellness is intimately associated with potential impacts on traditional ways of life as discussed above. In addition, however, individual decisions on the use of increased income, household management in relation to rotational employment, migration, public health and safety, disturbance particularly during the construction phase, and Cumberland's support for community initiatives are being negotiated in the IIBA are [sic] the other drivers that have the potential to effect [sic] individual and community wellness." (Cumberland Resources Ltd., 2006, p. 123)	7.1 Agnico Eagle Programs					
	Agnico Eagle wellness programs offerings & utilization by project employees		N/A	/	/	Meadowbank has a number of ongoing programs that offer readiness, counselling and support services to employees and their families. Due to difficulties in assessing participation in counselling programs (in part due to privacy issues), no trends can be drawn on employee targeted program utilization. Program utilization offered to communities has increased over the past two years – largely due to the new Mandatory Training (Site Readiness) and Work Readiness programs.
	Agnico Eagle wellness programs offerings & utilization by community members		N/A	↑	↑	
	7.2 Perceptions of health & wellness					
	Self-reported effect of project on health & wellness		N/A	N/A	N/A	Data for this metric is currently unavailable.
	7.3 Criminal violations					
	Criminal violations per hundred people by Kivalliq community		↑	→	N/A	Total criminal violation rates in Baker Lake and Rankin Inlet reached historic high levels in 2011 and 2012, following the opening of Meadowbank. Recent data (2017) indicates a continuing downward trend (since 2012) in criminal violations in Baker Lake, along with those in Arviat. However, Rankin Inlet and Chesterfield Inlet have seen sharp
	Criminal violations per hundred people by type (Baker Lake, Rankin Inlet, Chesterfield Inlet)					

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
	Baker Lake		→	↓	↓	rises in criminal violations over the past one to two years.
	Rankin Inlet		→	↓	↑	
	Chesterfield Inlet		↑	→	↑	
	7.4 Health centre visits					
	Health centre/clinic visits by Kivalliq community by reason for visit	"The potential public health and safety impacts of the project, of unknown magnitude, are negative, and, because there is such high impact at the individual level in the event that a risk is realized, the effects must be considered long term and of high significance." (Cumberland Resources Ltd., 2006, p. 126)	N/A	N/A	N/A	Data for this metric is currently unavailable.
	7.5 Housing					
	Persons on waitlist for public housing by community		/	/	/	The number of persons on a waitlist for housing has been increasing in Baker Lake and Arviat steadily since 2010. Rankin Inlet has seen a substantial decrease in wait lists over this same period. This may be the result of additional

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
						construction of private dwellings as an economic center for the region.
	7.6 Food security					
	Food security by region or community		N/A	N/A	N/A	Data for this metric is currently unavailable.
	7.7 Suicide					
	Suicides per 10,000 people by region		/	/	/	There is a persistent and territory-wide suicide crisis in Nunavut. The factors contributing to suicide are numerous and complex, so it is difficult to assess impacts of Meadowbank on suicide rates. Community suicide rates (e.g. for Baker Lake) are highly variable from year to year. Trends are more apparent in long-term and/or regional data.
VSEC 8. HEALTH AND SAFETY						
The FEIS considers both the health and safety of workers and the public and recognizes that one may affect the other. “Health and safety of workers and the population at large is subject to legislation and perhaps more importantly to best practices. Health and safety training also has applications in personal life – workers often not only use new	8.1 Health and safety training					
	Average (per FTE) mandatory training hours provided to Agnico Eagle Inuit employees		N/A	/	→	A steady increase in overall mandatory training hours for full-time employees has occurred at both Meadowbank from 2015 to 2017. None of the data collected permits an assessment of the impacts of Agnico Eagle’s projects and their programs on the general health status of workers and their families.
	8.2 Health and safety on-site					

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
health and safety training on-the-job, but also at home in the course of daily tasks." (Cumberland Resources Ltd., 2006, p. 126)	Average (per-FTE) visits by project Agnico Eagle employees to clinic for work-related or other reasons		N/A	↓	→	For the Meadowbank site there was a slight decrease in visits to Agnico Eagle clinics for work-related injuries in 2017. Overall, the number of clinic visits has been fairly stable since 2012.
	Project combined lost-time and light duty accident frequency (per 200,000 person-hours)		N/A	↓	↑	Lost-time and light duty accident frequency decreased for four years in a row up to 2015 but increased in 2016 (from .57 to .72) and in 2017 to 1.62.
VSEC 9. COMMUNITY INFRASTRUCTURE AND SERVICES						
The impacts on social services and infrastructure, of low to medium magnitude, are considered largely positive in the medium term and of moderate significance. There is some potential for closure to have a negative impact on social service delivery." (Cumberland Resources Ltd., 2006, p. 128)	9.1 Use of GN health services					
	Kivalliq community health centre visits per capita	"Increased employment and business opportunities will result in increased income, a measure of economic security, capacity building that will contribute to employability over the long term, and improved self-image of employees and their families. This could result in reducing dependence on government social services." (Cumberland Resources Ltd., 2006, p. 128)	↓	↑	N/A	Per capita health centre visits in communities with the most Agnico Eagle employees (Baker Lake, Rankin Inlet, and Arviat) are beginning to show an upward trend, most notably in Baker Lake and Arviat. The number of employees referred to their community health care centres for personal or work-related reasons ranges from 14 to 58 people per year, though it is difficult to draw a relationship between changes in this indicator and use of GN Health Services.
	Persons transported from site to access health services (province & Nunavut)		N/A	↑	↓	
	Incidents requiring use of GN health services		N/A	/	↓	

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
	9.2 Use of public infrastructure					
	Estimates of use of public physical infrastructure directly related to Project (airports, port, meeting facilities, roads)	"The impacts on social services and infrastructure, of low to medium magnitude, are considered largely positive in the medium term and of moderate significance. There is some potential for closure to have a negative impact on social service delivery." (Cumberland Resources Ltd., 2006, p. 128)	N/A	N/A	N/A	The use of public physical infrastructure by Meadowbank and its employees consists primarily of the use of airports and has been relatively consistent since operation began in 2010. There are no indications of significant positive or negative impacts on this infrastructure.
	All-weather access road (AWAR)		N/A	/	↓	
	9.3 Social assistance					
	Per capita social assistance expenditures by community		↓	/	N/A	Despite declines from historical highs, social assistance data does not show a clear correlation between mine-related employment and social assistance requirements in Baker Lake or Arviat. Data suggests that both expenditures and percentage of households receiving social assistance have been declining in Rankin Inlet since Meadowbank opened.
	Percentage of households receiving social assistance by community		↓	↓	↓	

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
VSEC 10. NUNAVUT ECONOMY						
"The economic impacts on the economy of Nunavut, of high magnitude, are positive over the medium term and of high significance, particularly during the construction phase." (Cumberland Resources Ltd., 2006, p. 129)	10.1 Royalties and taxes					
	Project compensation, royalties and taxes paid		N/A	↑	↑	Cumulative project royalties, taxes and other payments paid by Agnico Eagle to the GN, GoC, NTI and KIA increased at both Meadowbank and Meliadine in 2017. At Meadowbank this is largely due to IIBA payments to the KIA following 2017 agreements.
	10.2 Trade balance					
	Nunavut trade balance		↓	↑	N/A	Nunavut's net exports have increased steadily since 2008, following a dramatic increase in the trade deficit from 2006 to 2008 that was linked to the construction activities at Meadowbank. Since Meadowbank began operations in 2010, Nunavut's net exports have increased by approximately $131M.
	10.3 Nunavut GDP					
	Nunavut GDP by all industries and mining, quarrying and oil & gas	"The results indicate that during the construction phase, the project would contribute $120.3 M to the GDP of Nunavut … During the operations phase, the annual contribution to GDP would be $35.5M…" (Cumberland	↑	↑	↑	Coinciding with Meadowbank becoming operational, Nunavut's GDP has grown at an average of 6% annually from 2009 to 2017. A sharp increase of 12% occurred in 2017.
	Nunavut GDP by all industries and mining, quarrying and oil & gas		↓	↑	↑	According to the Conference Board of Canada, Meadowbank has been a driver of Nunavut's GDP growth, both during the construction of the mine and since production began in 2010.

Sector and Overarching FEIS Prediction	Metric	Specific FEIS Prediction	Meadowbank Trends			Interpretation
			Pre-dev	Post-dev	Last year	
		Resources, 2006, p. 119)	□	□	□	The 12% increase observed over the past year may in part be attributed to construction activities at Meliadine and Whale Tail, most notably a large increase in contract expenditures for the two construction projects.

1.2.6.2 *Parts 3 & 4:* Discussion

For each VSEC metric with a specific FEIS prediction that has experienced a negative trend (away from the predicted goal/impact) in the post-development period, a trend analysis and discussion is provided here, from the 2017 Socio-Economic Monitoring Report (Appendix 57; Aglu-Stratos Inc., 2018). That report further provides trend analyses and discussions for every metric assessed in Table 1.17, above.

1. Contract Expenditures from Meadowbank on Baker Lake-Based Businesses

FEIS Prediction: "With continuing preferential contracting, local business participation in the project is expected to grow with time." (Cumberland Resources Ltd., 2006, p. 7)

Discussion: Agnico Eagle's contract expenditures on Nunavut-based businesses (which includes NTI-registered businesses; Figure 1.26) more than doubled in 2017 from $216M to $511M, amounting to 70% of the total contract expenditures. The proportion of contract expenditure spending on Nunavut-based businesses remained relatively stable at 59% over this time period across the two projects. This increase in expenditures on Nunavut-based businesses above those on NTI-based businesses reflects additional spending on businesses located in the territory but which are not registered as Inuit firms through NTI – either because they do not meet the criteria or have not registered for other reasons. Meadowbank expenditures on Baker Lake-based businesses continued a 2-year upward trend in 2017, corresponding with construction at Whale Tail. Contract expenditures are still lower in Baker Lake than when Meadowbank opened, suggesting that spending has diversified to other communities across the territory.

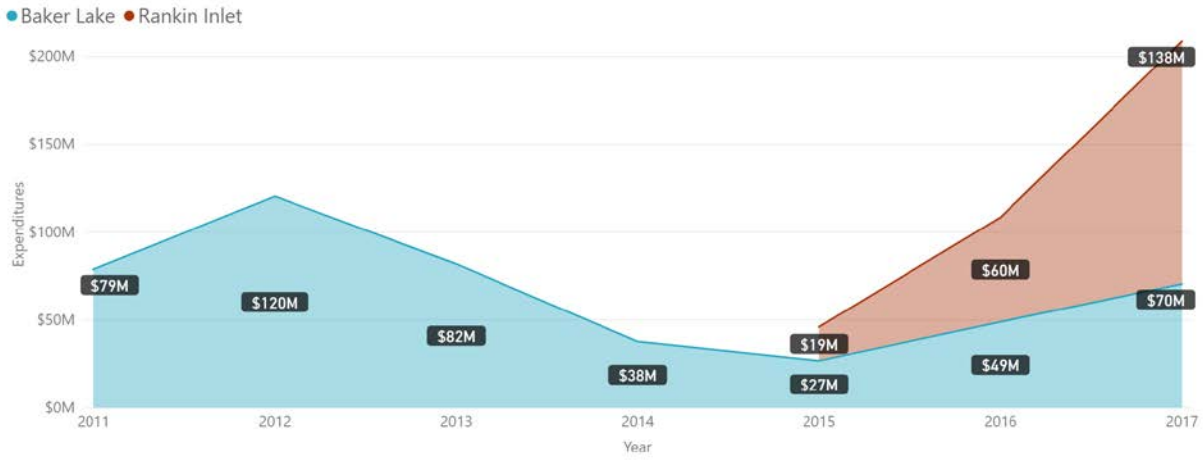


Figure 1.25. Contract expenditures from Meadowbank on Baker Lake-based businesses and from Meliadine on Rankin Inlet-based businesses.

2. Agnico Eagle Investments in School-Based Initiatives

***FEIS Prediction*:** "Cumberland and KIA will address the need for a broader based project education and training initiatives [sic] to assist those who wish to develop skills that will position them for project employment. This education and training initiatives [sic] will also include an element to address motivational issues around getting children through high school. Such measures would be intended to contribute to encouraging a commitment to education on the part of youth." (Cumberland Resources Ltd., 2006, p. 121)

***Discussion*:** Table 1.18 shows Agnico Eagle's investments in a range of school-based initiatives from 2010 to 2017. The MOU with the Department of Education expired in 2015. In September 2017, Agnico Eagle and the Government of Nunavut established a Memorandum of Understanding that identifies 10 priority areas for collaboration, including education. Up until 2014, Agnico Eagle made total annual contributions of approximately $284,000/year to a variety of school-based initiatives with the goals of: building interest in math, science and mining among school-aged children; motivating students with scholarships and career opportunities; and increasing educational outcomes overall in the Kivalliq region. Since the expiry of the MOU with the Department of Education in 2015, total contributions have been significantly lower ($39,000), rising to $55,000 in 2017 due to a doubling of scholarship funding.

Table 1.18. Agnico Eagle investments in school-based initiatives.

Agnico Investments	2010	2011	2012	2013	2014	2015	2016	2017	Total
Scholarships	$14K	$14K	$14K	$14K	$14K	$14K	$14K	$30K	**$128K**
MOU with GN Department of Education		$175K	$175K	$175K	$175K				**$700K**
Mining Matters Science Program		$90K	$80K	$70K	$70K				**$310K**
Kivalliq Science Educators Community Programs		$15K	$15K	$25K	$25K	$25K	$25K	$25K	**$155K**
Total	**$14K**	**$294K**	**$284K**	**$284K**	**$284K**	**$39K**	**$39K**	**$55K**	**$1,293K**

1.2.6.3 *Part 5:* Effectiveness of Monitoring and Mitigation, and Adaptive Management

Overall, existing monitoring programs are able to address the FEIS predictions (Table 1.17), so these monitoring measures are considered to be effective.

A summary of the planned mitigation measures for socio-economic impacts for the operations phase (per FEIS, Appendix B, Table B.15-2) along with implementation in 2018 is provided in Table 1.19.

Table 1.19. Mitigation measures described in the FEIS to reduce impacts of the project on socio-economic VECs, and commentary on current implementation.

VSEC	Planned Mitigation Measure (FEIS, Appendix B, Table B.15-2)	Implementation (unless indicated, reference to 2017 Socio-Economic Monitoring Report, Appendix 57)
Employment, training, and business opportunities	Preferential employment and contracting	**Yes -** Table 2
	Preferential hiring	**Yes -** Table 2
	Preferential procurement	**Yes** - Table 2 & Table 3
	Education and training initiatives	**Yes -** Table 2 & Table 3
	Education initiatives directed at specific concern around youth and their future in a mixed economy	**Yes -** Table 2
Traditional ways of life	Allowing use of project winter road to traditional land users	**Yes** – Section 9.2
	Income and workforce management practices that value and provide opportunity for traditional activity	**Yes** – Table 5
	Workforce management and community initiatives in support of traditional activity	**Yes** – Table 5
Individual and community wellness	Assistance to individuals experiencing problems and their families, zero tolerance policies	**Yes** – Table 6
	Short rotations	**Yes –** Workforce Barriers Study (Appendix 61)
	Workforce management best practice, including codes of conduct, rotation to point of hire, etc.	**Yes –** Workforce Barriers Study (Appendix 61) and monitored through the IIBA
	Driver training, public education to reduce potential for traffic accidents	**Yes** - Driver training is part of Mandatory Training, public education to reduce potential for traffic accidents is done through annual AWAR public meetings
	Operations best practice to minimize emergencies, emergency response planning in the event of an emergency	**Yes** – Table 7
	Support for community wellness initiatives	**Yes** – Table 6
Infrastructure and social services	Employment at good wages	**Yes** – Table 2
	Avoidance of sites of heritage significance, protocol in place in event that new sites are identified	**Yes** – Socioeconomic and Archaeology Management Plan **Yes** – Always conduct archeology studies or consultation of previous archaeology studies before construction to confirm present or not of heritage sites. Mitigation

VSEC	Planned Mitigation Measure (FEIS, Appendix B, Table B.15-2)	Implementation (unless indicated, reference to 2017 Socio-Economic Monitoring Report, Appendix 57)
		measure to be implemented as per the consultant recommendation and Government of Nunavut.

Planned adaptive management measures to address departures from impact predictions are described below for each instance identified in Section 1.2.6.2 (from the 2017 Socio-Economic Monitoring Report (July, 2018)).

1. Contract Expenditures from Meadowbank on Baker Lake-Based Businesses

The IIBA acts as the primary vehicle for increasing the level of Inuit participation in contracting. A description of all existing mitigation and management initiatives is provided in the 2017 Socio-Economic Monitoring Report (July, 2018), and those related to contracting are identified in Table 1.20, below. Adaptive management actions or changes to these mitigation initiatives identified for 2018 are highlighted.

Table 1.20. Agnico Eagle Contracting and Business Opportunities Management and Mitigation Initiatives

Initiative	Purpose / Description / Outcomes
Agnico Eagle Nunavut IIBA Procurement Process	Through the implementation of the Meliadine IIBA in 2015, Agnico Eagle moved to a prequalification procurement process, which requires all suppliers to prequalify in categories in order to submit a tender. Additionally, NTI-registered companies are eligible for preference points. This process replaces the Inuit Business Opportunities Initiative. In 2017 with the signing of the IIBAs for Meadowbank and Whale Tail, as well as the revision of the Meliadine IIBA, all three sites followed the new procurement process. and Whale Tail).
IIBA Pre-qualification Assistance, Workshops and Entrepreneurial Training	As per the IIBAs, Agnico provides workshops and assistance to Inuit Firms to promote and facilitate their access to Agnico Eagle's business opportunities as well as entrepreneurial training and support to Inuit businesses. In 2017, Agnico Eagle partook in a number of activities to achieve the objectives of these requirements, including a workshop at the 2017 Kivalliq Trade Show in Rankin Inlet on prequalification and tendering, one-on-one contract management support, and supporting a CPA Canada Financial Training for businesses in Rankin Inlet on financial statements and money management and growth. **In 2018, Agnico Eagle is expanding its offerings in workshops and assistance through on-line and in-person lessons and trainings to interested businesses, and regular information and resources through a quarterly e-newsletter for businesses.**
Inuit Arts and Crafts	In 2017, Agnico Eagle invited local Arts and Crafts vendors at both sites to showcase work and sell to interested employees. Ivalu came to Meliadine during the site Pakallak Tyme festivals, and Jessie Oonark came to Meadowbank before Christmas. Both vendors visited their respective site twice to see both crews. In 2017 Agnico Eagle and KIA worked on developing a list of Inuit arts and crafts dealers. **In 2018 a strategy will be developed to facilitate internal purchasing (for gifts or prizes, for example). Agnico is also considering ways to include Agnico employees who are also artists in the strategy.**

2. Agnico Eagle Investments in School-Based Initiatives

Agnico Eagle offers a number of programs to increase general educational and skills attainment among Kivalliq residents as well as training, career development and upward mobility programs for existing employees. The complete description of management and mitigation measures related to education and training is provided in Table 4 of the 2017 Socio Economic Monitoring Report. Those related to investments in school-based initiatives are provided in Table 1.21, below. No specific adaptive management measures are planned for 2018, but a number of these programs are continuing to be developed, or are newly implemented and results may not yet be apparent.

Table 1.21. Agnico Eagle Employment, Education and Training Management and Mitigation Initiatives Related to Investments in School-Based Initiatives.

Program	Purpose / Description / Outcomes
MOU with Department of Education	A Memorandum of Understanding was first signed in April 2012 to establish a strengthened partnership between the Government of Nunavut Department of Education and Agnico Eagle, with a focus on increasing the number of students in the Kivalliq region who are able to successfully transition from high school to trades and mining-related career opportunities. This work involved *Mining Matters*, a branch of the Prospectors and Developers Association of Canada (PDAC) that is dedicated to bringing knowledge and awareness about Canada's geology and mineral resources to students and educators. In 2013, Agnico Eagle and the *Mining Matters* group participated with the GN Department of Education, Curriculum Review Services to assist in a review of the Earth Sciences Curriculum of Nunavut Schools. During 2014, Agnico Eagle continued to sponsor the Mining Matters program as part of the MOU with Education. Agnico Eagle continued to pursue a renewed MOU with the Department of Education through 2016. In September 2017, Agnico Eagle and the Government of Nunavut established a Memorandum of Understanding that identifies 10 priority areas for collaboration, including education.
Kivalliq Science Educations Community	In 2017, Agnico Eagle once again invested $25,000 for the 2017-2018 regional Math Camp, Science Camp and Kivalliq Science Fair programs operated by the Kivalliq Science Educators Community. The regional science camp was organized in Chesterfield Inlet and the weeklong program included a mix of traditional, cultural and educational studies related to sciences. The program provides science credits to participants.

Program	Purpose / Description / Outcomes
Summer Student Employment Program	Agnico's companywide policy offers summer employment programs to the children of all Agnico employees (both Inuit and non-Inuit) that are undertaking postsecondary education. Summer job opportunities were also offered to Inuit students who are participating in post-secondary activity, even if they had no family relative working at the mine. Historically, there have been no applications to Agnico Eagle's Summer Student program by the children of Inuit employees. The program will continue to be offered in 2018. In 2017, Agnico advertised a summer student program to attract Inuit post-secondary students from Kivalliq communities, including students enrolled in trades with the Nunavut Arctic College and with the Nunavut Sivuniksavut program. This program was offered and advertised in each Kivalliq Community. The posting attracted three eligible applicants, of which all were contacted. Two applicants declined the offer and one accepted but later resigned before starting employment. At the 2018 Socio-Economic Monitoring Committee (SEMC) meeting, the GN Department of Finance expressed that it was sometimes difficult to place summer student applicants. Agnico Eagle is open to working with the GN in potentially placing eligible and interested Inuit summer students at the projects, who can otherwise not be accommodated with the GN.
Arviat Community Training Programs	In 2011, the Hamlet of Arviat proposed a partnership to invest in a community-based drilling school that would provide Inuit with the skills needed to work in diamond drilling. With advice and support from Agnico Eagle, the Hamlet brought together a range of partners to acquire the drilling equipment, develop the curriculum, and operate the training program. Government training agencies, the KIA, and drilling companies provided partnership investments. In 2013, the program offering was expanded to include a Welder's Helper program. Agnico Eagle invested $195,000 in the Arviat training programs in the 2017-2018 funding year. Over the past 5 years the program has graduated 65 trained driller's helpers, all of whom have found employment. In 2017-2018 funding year, the Mechanical Welding Program graduated 6 students.
Apprenticeship Training ('Apprenticeship Program' and 'Pre-Apprenticeship Program')	The Apprenticeship Program combines on-the-job learning and in-school technical instruction to allow Inuit employees the opportunity to be educated and trained in the trade of their choice. By the end of the program, the apprentice is able to challenge their Certificate of Qualification (COQ) to become a Journeyperson and will also have the opportunity to challenge their Red Seal Exams. Currently, we offer seven (7) trades: cook, carpenter, millwright, electrician, heavy duty equipment technician, welder, and plumber. In 2015, two (2) employees completed their apprenticeship training within Agnico and in 2016, two (2) employees completed their apprenticeship training within the company. As of the end of 2017, there were 16 apprentices and pre-apprentices. There were no graduates for the 2017 year, but since the program takes time to complete, we are expecting to have three (3) graduates in the next two (2) years.

Program	Purpose / Description / Outcomes
TASK Week	The Trades Awareness Skills and Knowledge Week (TASK Week) was initiated in 2012 and has evolved in its structure through the years. TASK week is now a full week program that allows students to focus on one trade for the entire week. TASK week is also aligned with Agnico's IIBA commitment Schedule C, 16, by promoting the mine industry through career awareness and co-operating with educational authorities in the implementation of mining sector content in schools. TASK Week is a joint initiative between Jonah Amitnaaq Secondary School (JASS) and Agnico Eagle, and has active cooperation from other authorities and businesses each year. The 2017 TASK Week was held in Baker Lake from May 8th to May 12th and saw 58 senior high school students from JASS participate. Six (6) trades were features: Mechanics, Welding, Electrical, Culinary Arts, Hairdressing, and Environmental Studies (which included Work Readiness training). In 2017 Agnico again brought trainers and apprentices/tradespeople from Meadowbank, including four of Meadowbank's Inuit apprentices/Red Seal, all from Baker Lake. Agnico believes that having students exposed to role models from their community has a positive impact on participants in the program.
Financial Literacy Training	In collaboration with CPA Canada, in 2017 a Financial Literacy training course was delivered at Meadowbank mine site. The need for financial literacy training was identified through the Baker Lake Wellness Plan. The training overviews why financial literacy is important, savings vehicles, budgeting, and goal setting. The training was held twice at Meadowbank with 33 participants, including Inuit participants. Modified Financial Literacy trainings were also held in Baker Lake, both at a public community session as well as delivery to grades 7-9 & 12 at the Jonah Amitnaaq Seconary School. Basic financial literacy training is also included in the Work Readiness program. Agnico has also had preliminary discussions with the Nunavut Housing Corporation to include financial literacy information on site, on subjects like rent scales or home savings programs. Agnico Eagle plans to continue offering opportunities at both mine sites to improve financial literacy in 2018 in collaboration with Sunlife Financial.

1.3 Contributions to Regional Monitoring

In fulfillment of Item E in Appendix D of the Project Certificate, a description of Meadowbank's investments in regional monitoring initiatives, academic research studies and ongoing data sharing programs is provided in Table 1.22. These are programs in addition to publication of compliance-related onsite monitoring results. They contribute to the general advancement of environmental management in the North, and help ensure continued optimization of environmental mitigation and monitoring programs at Meadowbank and elsewhere.

Table 1.22. Contributions of the Meadowbank Division to regional monitoring initiatives, academic research studies, and ongoing data sharing programs. Any related changes to Meadowbank's onsite monitoring and mitigation plans are described.

Program Type	Program Title	Contribution/Program Summary	Dates of Agnico Involvement
Multi-Stakeholder Advisory Groups	Terrestrial Advisory Group	To reach consensus on research projects, needs for future monitoring and research, gain approval and ensure consistent endpoints of success, a Terrestrial Advisory Group (TAG) was created.	2017 - present
	Meadowbank Fisheries Research Advisory Group	Created to oversee the implementation of fisheries research projects related to offsetting for Whale Tail Pit, the Meadowbank Fisheries Research Advisory Group (MFRAG) meets annually and provides a forum for input and recommendations on these studies. Members are: DFO, HTO, KIA, appointed external advisor, and AEM.	2019 - present
Regional Monitoring Studies	GN Caribou Collaring Program	Meadowbank continues to contribute to the GN DOE caribou collaring program which started in 2008. Seven deployments, with a total of 117 collars, have been completed in the area around Baker Lake since Agnico Eagle became involved in the collaring program. In 2017, Agnico Eagle finalized discussions with the GN and entered into a renewed Memorandum of Understanding (MOU) to commit to another term contribution in support of the regional GN caribou monitoring program. This agreement will continue to assist the GN- DOE- Wildlife branch in directing the implementation, data analysis and management of caribou populations in the Kivalliq region.	2008 - present
	ZOI Study	In 2017, in collaboration with Agnico Eagle staff, Golder biologists and statisticians worked to determine a zone of influence (ZOI) for the Meadowbank mine, or evaluate if it is affecting a large number of individuals. It is predicted that reduced use of preferred habitats should reduce herd size (from lower survival and reproduction). Data analysis was completed and hypotheses were tested, documents were provided to	

Program Type	Program Title	Contribution/Program Summary	Dates of Agnico Involvement
		regulators and reviewed, presentations were made at the GeoScience Forum and publications are expected in the near term. This project continues to be reviewed by the TAG.	
	Caribou Road Crossing Study	In 2018, review of caribou data lead to a TAG project to explore the link between caribou road crossings and road closures. Results are expected to be presented to the TAG in 2019, and used to inform ongoing monitoring and mitigation.	
Academic Research Programs	Whale Tail Complementary Measures Suite	Suite of six research programs related to fish and fish habitat in the Meadowbank region. Included in Agnico's Fish Habitat Offsetting Plan for the Whale Tail Pit project. Projected total contributions from Agnico of $1.6 M. Further information in: Fish Habitat Offsetting Plan for Whale Tail Pit, Appendix C (May, 2018).	2018 – 2034 (est).
	Baker Lake Wastewater Study	Industry partner in NSERC CRD project "Validating Environmental and Human Health Improvements Associated with Wastewater Treatment Upgrades in Arctic Communities". Total contributions from Agnico of $590,000.	2019 – 2023
	Arctic Raptors	Collaboration with Dr. Alastair Franke/Arctic Raptors to conduct annual raptor monitoring at the Meadowbank and Meliadine sites. The Arctic Raptors program has been monitoring raptor populations in the Arctic since the 1980s.	2015 - present
	Migratory Bird Ecology and Effectiveness of Deterrents	As part of commitments made during the permitting process for Whale Tail Pit, Agnico is funding and facilitating a study on effectiveness of deterrents for minimizing impacts of flooding on nesting waterbirds in the Amaruq area (Dr. Erica Nol, Trent University; Dr. Paul Smith, ECCC). Total contributions from Agnico are $120,000 plus in kind support. As part of these contributions, Agnico has also agreed to support a study on ecology and nest site selection factors for area waterbirds (Dr. Erica Nol, Trent University).	2018 - 2020

Program Type	Program Title	Contribution/Program Summary	Dates of Agnico Involvement
		Finally, results of these studies will also contribute to the ArcticNet funded study “Modernizing Ecosystem Monitoring to Support Sustainable Development in the Eastern Canadian Arctic” (Dr. Paul Smith, ECCC; Dr. Christina Semeniuk, University of Windsor). This project uses advanced technology to track birds' movements across the Eastern Arctic, and behaviour in relation to human development and disturbance. Results will inform environmental impact mitigation efforts by industry, and simultaneously, contribute to national and international efforts to conserve Arctic biodiversity.	
Other Information Sharing Programs	DFO Fishout Database	Agnico contributes raw data files from all fishout programs to DFO’s Fishout Database.	2009 – 2018 (last fishout program)

Appendix A – FEIS References for Impact Predictions and Mitigation Measure

Table A- 1. Summary of FEIS VECs, and references for the predictions, management and mitigative measures.

VEC	Summary of Potential Impacts	Reference for Impact Predictions	Reference for Management and Mitigative Measures
Surface water quantity	Reduced water level and flow in receiving lakes	FEIS, Section 4.21.2.3 FEIS App B, Table B4	FEIS, Section 4.24.2.5
Surface water quality	Contamination of receiving lakes	FEIS, Section 4.21.2.3 FEIS App B, Table B5 FEIS App E FEIS - WQ	FEIS, Section 4.24.2.5
Fish populations	Direct impacts through blasting. Indirect impacts through habitat changes.	FEIS, Section 4.21.2.7 FEIS App B, Table B13	FEIS, Section 4.24.2.3
Fish habitat	Direct impacts through habitat destruction or alteration. Indirect impacts through introduction of contaminants.	FEIS, Section 4.21.2.7 FEIS App B, Table B14	FEIS, Section 4.24.2.3 NNLP (2006, 2012)
Vegetation (wildlife habitat)	Removal of plant cover, abrasion/grading, salt, dust, grey water release	FEIS, Section 4.21.2.4 FEIS App B, Table B6	FEIS, Section 4.24.2.1 TEMP (2018)
Ungulates	Habitat loss, mortality	FEIS, Section 4.21.2.5 FEIS App B, Table B7	FEIS, Section 4.24.2.2 TEMP (2018)
Predatory mammals	Habitat loss, mortality	FEIS, Section 4.21.2.5 FEIS App B, Table B8	FEIS, Section 4.24.2.2 TEMP (2018)
Small mammals	Habitat loss, mortality	FEIS, Table 4.24 FEIS App B, Table B9	FEIS, Section 4.24.2.2 TEMP (2018)
Raptors	Habitat loss, mortality	FEIS, Section 4.21.2.6 FEIS App B, Table B10	FEIS, Section 4.24.2.2 TEMP (2018) FEIS App B, Table B10

VEC	Summary of Potential Impacts	Reference for Impact Predictions	Reference for Management and Mitigative Measures
Waterfowl	Habitat loss, ingestion of contaminants, mortality	FEIS, Section 4.21.2.6 FEIS App B, Table B11	FEIS, Section 4.24.2.2 TEMP (2018)
Other breeding birds	Habitat loss, mortality	FEIS, Section 4.21.2.6 FEIS App B, Table B12	FEIS, Section 4.24.2.2 TEMP (2018)
Air Quality	Contamination of aquatic environment by dust. Contamination of terrestrial environment by dust. Poor air quality. Odours may attract scavengers. Production of greenhouse gases, other gaseous contaminants and particulate matter.	FEIS, Section 4.21.2.2 FEIS App B, Table B2	FEIS, Section 4.24.2.3 AQNMP (2005)
Noise	General disturbance of wildlife as a result of regular noises (behavioral changes, displacement). Reduced habitat effectiveness.	FEIS, Section 4.21.2.2 FEIS App B, Table B3	Noise Abatement and Monitoring Plan, June 2018
Permafrost	Thaw instability. Changes in permafrost depth in various areas (increase/decrease). Ice entrapment in tailings/reclaim.	FEIS, Section 4.21.2.1 FEIS App B, Table B1	FEIS Appendix B, Table B2.2
Traditional Ways of Life (personal and community)	Reduced access to land. Reduction in traditional activities including harvesting. Undervaluing traditional ways and loss of knowledge.	FEIS Section 4.21.4.4 FEIS App B, Table B15	FEIS Section 4.24.3 FEIS App B, Table B15
Employment, Training, and Business Opportunities	Financial expenditures of $23 million annually for 10 years. Employment of at least 60 workers. Goods and services contracts for local businesses. Overall increased economic activity, including indirect and induced effects.	FEIS Section 4.21.4.3 FEIS App B, Table B15	FEIS Section 4.24.3 FEIS App B, Table B15

VEC	Summary of Potential Impacts	Reference for Impact Predictions	Reference for Management and Mitigative Measures
	Increased capacity of local labour force to participate in formal economy. Increase in interest of school on part of youth. Increased individual, family, and community wellness.		
Wellness (personal and community)	Poor financial decision making. Increased income disparity. Increased public health and safety risks. Stress from rotational employment. Increased traffic accidents and emergencies. Disturbance by project activities.	FEIS Section 4.21.4.5 FEIS App B, Table B15	FEIS Section 4.24.3 FEIS App B, Table B15
Infrastructure and social services	Shortage of housing and other infrastructure. Increased demand for social services.	FEIS Section 4.21.4.6 FEIS App B, Table B15	FEIS Section 4.24.3 FEIS App B, Table B15
Sites of heritage significance	Potential degradation of historically significant sites.	FEIS Section 4.21.4.7 FEIS App B, Table B15	FEIS Section 4.24.3 FEIS App B, Table B15
Contributions to economy of Nunavut and Canada	$92M annually during operations phase.	FEIS Section 4.21.4.8	None