North/South Consultants Inc.

83 Scurfield Blvd.
Winnipeg, MB R3Y 1G4
Tel: (204) 284-3366
Fax: (204) 477-4173
Email: mcooley@nscons.ca
Web: www.nscons.ca

AQUATIC EFFECTS MONITORING PROGRAM DESIGN PLAN VERSION 5.1 – PLAIN LANGUAGE BRIEFING AND TECHNICAL REVIEW COMMENTS

Technical Memorandum # 367-20-01

DRAFT

Prepared for:

Environmental Monitoring Advisory Board (EMAB)
P.O. Box 2577
Yellowknife, NT
X1A 2P9

Prepared by:

North/South Consultants Inc.

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1.0 INTRODUCTION AND SCOPE OF WORK

Diavik Diamond Mines (2012) Inc. (DDMI; "Diavik") submitted the Aquatic Effects Monitoring Program (AEMP) Design Plan Version 5.1 ("Design Plan Report"; report dated October, 2019) to the Wek'eezhii Land and Water Board (WLWB) on October 11, 2019 (Golder 2019a). The WLWB distributed the report for review on November 26, 2019. Revisions to the AEMP Design Plan Report presented in Version 5.1 included changes to address Directives outlined by the WLWB in its March 25, 2019 Decision following its review of AEMP Design Plan Version 5.0 (Golder 2018a), the 2014 to 2016 Aquatic Effects Re-evaluation Report (Golder 2018b), and the 2017 AEMP Annual Report (Golder 2018c).

The Environmental Advisory Board (EMAB) requested that North/South Consultants Inc. (NSC) undertake a technical review of AEMP Design Plan v. 5.1. The Scope of Work provided by EMAB indicated the review should evaluate:

- How well the revised Design Plan addresses EMAB recommendations on Design Plan 5.0;
- Changes since Design Plan 5.0;
- Whether the following engagement issues (as discussed at the September 11 EMAB Board Meeting) were addressed satisfactorily, and any recommended revisions:
    - Slimy sculpin survival metrics;
    - Lake trout study trigger;
    - Phytoplankton/eutrophication;
    - Plankton and benthic invertebrates; and
- Any additional recommendations for changes to Design Plan 5.0.

As a detailed review of AEMP Design Plan v. 5.0 was previously conducted (see NSC 2018a and 2019a), the review of AEMP Design Plan v. 5.1 focused upon changes to the report, notably in relation to the key comments previously identified and discussed as noted above.

Section 2.0 provides a brief overview of the background reviews and comments produced in relation to AEMP Design Plan v. 5.0. Section 3.0 presents a plain language briefing of key comments and recommendations relating to AEMP Design Plan v. 5.1. Detailed technical review comments and recommendations are provided in Table 1 and in the Excel comments template as required for submission to the WLWB.

2.0 BACKGROUND

NSC conducted a technical review of the AEMP Design Plan Report v. 5.0 (Golder 2018a) for EMAB, with final comments submitted to EMAB on July 18, 2018 (NSC 2018a). Following the public review process, which included the comments provided by NSC (2018a), responses to comments and subsequent information requests (IRs) in relation to the report were submitted, as follows:

- DDMI provided responses to reviewer comments received through the public review process on August 14, 2018 (the WLWB document [dated February 19, 2019] "Review Summary and Attachments" containing reviewers comments, responses from DDMI [dated August 14, 2018], and attachments regarding follow-up and responses from DDMI in February 2019; WLWB 2019a);
- the WLWB submitted an IR to DDMI on November 23, 2018 (WLWB 2018) in relation to the responses provided by DDMI;
- DDMI submitted a response to the WLWB IR on December 12, 2018 (DDMI 2018);
- the WLWB submitted a follow-up IR for DDMI on February 5, 2019 (WLWB 2019b);
- DDMI submitted a response to the WLWB IR on February 14, 2019 (DDMI 2019); and
- the WLWB submitted its reason for decision with respect to approval of the Version 5.0 of the AEMP Design Plan on March 25, 2019 (WLWB 2019b).

NSC was requested to provide a follow-up review presenting a discussion of key NSC comments and associated Diavik responses, notably in relation to proposed changes to biological action levels (NSC 2019a). A meeting was held September 9, 2019 with representatives from EMAB, NSC, Diavik, and Golder to discuss the key comments and attempt to reach resolution.

3.0 PLAIN LANGUAGE OVERVIEW

A number of comments submitted by NSC to EMAB on the previous version (version 5.0) of the Design Plan Report were addressed in version 5.1., including EMAB comments 101, 103, 104, 107, 108, 009, 110, 111, 115, 117, 120, 121, 122, and 125.

The following provides a general, plain language overview of NSC's key comments and recommendations respecting the Design Plan Report v. 5.1. Key NSC/EMAB comments that were either not addressed or where additional clarification is requested, or key comments respecting new changes or updates in v. 5.1, are summarized below. Detailed technical comments are presented in Table 1.

3.1 ADDITIONAL MONITORING IN INTERIM YEARS

EMAB had previously commented on the proposed changes to the study design in relation to the sampling frequency for phytoplankton (EMAB Comment #114). DDMI has proposed to increase the frequency of sampling algae, from every 3 years to every year, at the mid-field sites. DDMI notes: "This change gives the AEMP the ability to look at potential effects on plankton in the main body of the lake on an annual basis" (page PLS-3).

As noted in EMAB Comment #114, NSC agrees this addition is an improvement to the program. However, NSC had also suggested expanding the program to include annual sampling for eutrophication variables, including nutrients, chlorophyll *a* (an indicator of the amount of algae in the water column), and potentially plankton (to measure effects on the numbers of different types of species), at far-field sites.

Version 5.1 of the Design Document includes the addition of two sites (one station will be located in the northern channel, on the east side of the East Island in Lac de Gras, and the other will be located on the far west side of the lake, between the FFA and FFB sampling areas) and deletion of two sites (two stations located in Lac du Sauvage). Diavik proposes to include annual monitoring for water quality, variables used as indicators of eutrophication, and plankton variables at one of the new proposed sites (FFD-1), as well as one of the existing FF sites (FF1-2).

These proposed changes will allow for better delineation of effects on an annual basis when FF sites are not sampled. These additions are beneficial as the spatial extent of effects on eutrophication variables measured during interim years (i.e., when FF sites were not sampled) has been challenged by the lack of sampling beyond site MF1-5 (i.e., effects were observed to extend up the end of the MF-1 transect for some parameters in some interim years; e.g., 2018).

As noted by Diavik, the addition of the two sites (Station FFD-2 located between the FFB and FFA areas and FFD-1 between the FF1 and MF3 areas) in MF3 and MF1 transects will improve

the spatial coverage and ability to define effects spatially. As noted in previous review comments (e.g., NSC 2016, 2018b), the lack of sampling at FF sites 2 out of 3 years has meant that the spatial extent of effects on eutrophication indicators has not been adequately defined in some years. For example, the spatial extent of effects for both total nitrogen and chlorophyll *a* extended to the edge of MF sites in 2014 (Golder 2016).

Additionally, Diavik provided clarification of how data for stations LDS-4 and LDG-48 will be incorporated into data analysis and interpretation within the eutrophication indicators component in the Design Plan v. 5.1. While not noted in Appendix B, Table B-1, the explanation provided relates to EMAB Comment #113.

The additional text is appreciated and is informative. However, it is reiterated that inclusion of the results for site LDG-48 in the evaluation of the spatial extent of effects in interim years would be useful. It is understood that in interim years when FF sites are not sampled that inclusion of this site in the analysis would mean that spatial extent of effects would be derived with gaps in data between sites MF3-7 and FFD-1 and the lake outlet at site LDG-48. However, in the event that metrics measured at site LDG-48 exceed the triggers (above the normal range), the available information would suggest a larger area of the lake was affected than solely based on the MF data alone.

Recommendation: Provide clarification and discussion of incorporation of results from site LDG-48 in defining the spatial extent of effects for eutrophication variables.

3.2 PLANKTON: INFLOW AND OUTFLOW

EMAB had commented on the lack of sampling for phytoplankton at the lake inflow and outflow sites in the review of Design Document v. 5.0 (EMAB Comment #115). Diavik has added sampling for phytoplankton at the outlet of Lac de Gras (site LDG-48) and two sites in Lac du Sauvage (LDS-1 and LDS-2), which addresses EMAB Comment #115.

The Design Plan v. 5.1 indicates that zooplankton will not be monitored at the lake outlet (LDG-48) due to habitat and flow conditions. It is also noted that zooplankton will not be monitored at the two remaining sites in Lac du Sauvage (LDS-1 and LDS-4). The report notes that site LDS-4 (the narrows) is shallow with flowing water and is thus dissimilar to Lac de Gras sites. This rationale is reasonable, however, there is no explanation provided for the lack of sampling for zooplankton at site LDS-1. If conditions are similarly unsuitable at this site as identified for the other two sites, are either of the two sites that Diavik has proposed to drop from the AEMP (LDS-2 and LDS-3) suitable for zooplankton monitoring?

Recommendation: Please provide clarification as to why zooplankton will not be monitored at site LDS-1 and a description of the suitability of sites LDS-2 and LDS-3 for monitoring this component.

3.3 LAKE TROUT: FISH HEALTH SURVEY TRIGGER

In a review of Design Plan v. 5.0, NSC had provided a comment relating to proposed changes to the triggers for the Lake Trout health survey (see EMAB Comment #116). This issue was also discussed with Diavik as part of the engagement issues follow-up.

In brief, NSC had raised a concern that the proposed revision results in a substantive reduction in the sensitivity of the trigger for conducting a Lake Trout health study. The change proposed is to increase the level of effect observed in the Slimy Sculpin monitoring results required to trigger a Lake Trout study (from an Action Level 2 to and Action Level 3 exceedance). In addition, changes to the Action Levels have been proposed which further increase the threshold required to trigger this study.

In Design Plan v. 4.1, a significant difference in a variable indicative of a toxicological effect at the mid-field (MF) area relative to the far-field (FF) areas was sufficient to trigger a Lake Trout survey. Under the proposed gradient sampling design (Design Plan v. 5.1), the trigger for this study is now an exceedance of Action Level 3, which is defined as an exceedance of the critical effect size (CES) **and** the normal range **and** the effect is observed in two consecutive sampling periods (which would amount to 6 years as the Slimy Sculpin program is conducted every 3 years).

NSC reiterates the concerns identified above with respect to the proposed changes to the Action Levels and the associated trigger for requiring a Lake Trout health study.

Most significantly, the results of the power analyses conducted on fish health metrics indicated low power to detect differences for some metrics – notably weight and condition (see Section 3.12 for a detailed discussion). Given these results, the trigger for a Lake Trout health survey should be reconsidered.

Recommendation: Leave the trigger for a Lake Trout Health survey at Action Level 2 as in previously approved AEMP Designs. Provide a discussion on the level of effect on Slimy Sculpin health that could be detected by the current program and therefore the conditions in which a Lake Trout health survey may be triggered by the proposed action level framework.

3.4 LAKE TROUT: MERCURY SURVEY TRIGGER

Page 26 indicates: "The specific timing of a Lake Trout fish health survey would be defined in an AEMP Response Plan, which would be implemented as and when approved by the WLWB. It is possible that such a program would be limited to a non-lethal tissue chemistry sampling program (e.g., for mercury analyses from tissue plugs) or could be a lethal fish health survey, dependent on the Action Level trigger which initiated the study. **The mercury in Lake Trout survey would only occur if the small-bodied fish tissue chemistry results indicate an increasing trend in mercury due to the Mine.** Additional sampling of biological components may be required if an

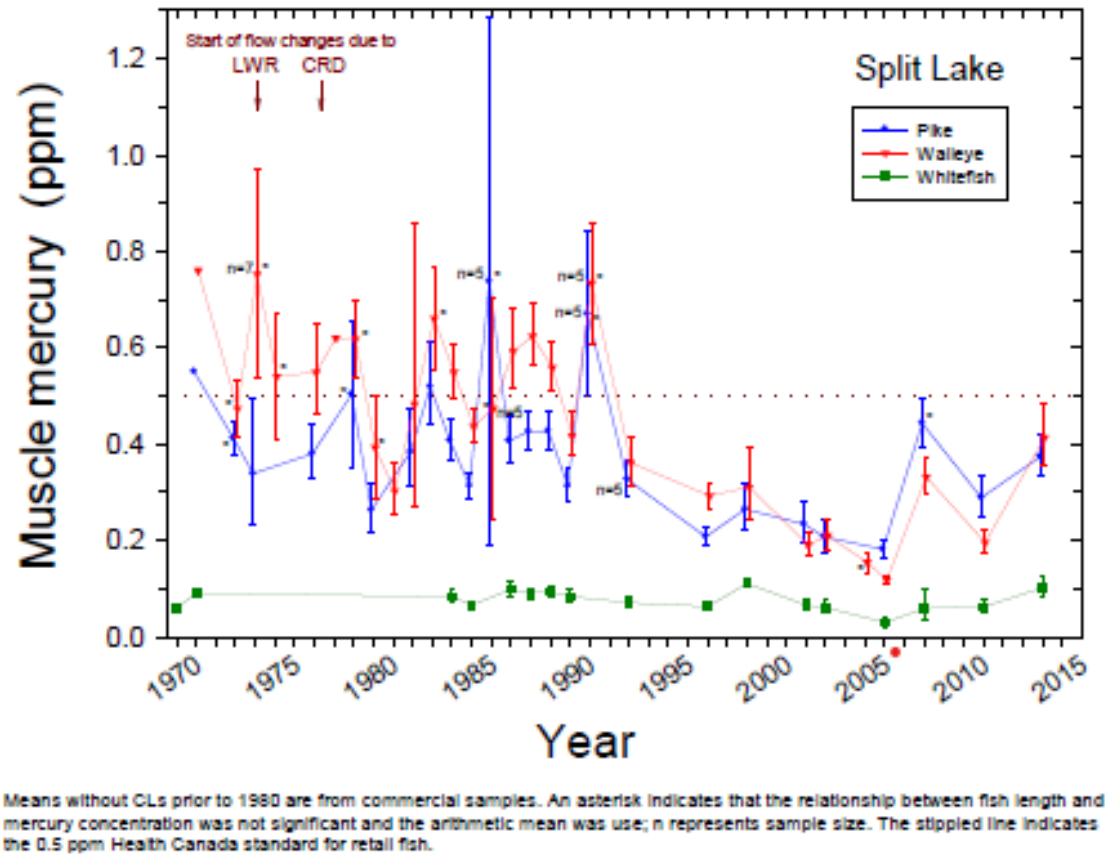
Action Level in the Response Framework (Section 5.0) is triggered. For example, at Action Level 1, the follow-up action for biological components is confirmation of the effect. The specific timing of a follow-up study, however, would be defined in an AEMP Response Plan (Section 7.5), which would be implemented as and when approved by the WLWB." (bolding added)

Table 5.2-4 Action Levels for Biological Effects (page 89) does not include any reference to fish mercury and associated triggers for a Lake Trout mercury survey. It is unclear in the Design Plan v. 5.1 what triggers will be applied to determine when a Lake Trout mercury study is required, as the general discussion appears to apply primarily to a trigger for a fish health study.

Regardless, as previously commented, the use of a sculpin mercury (or health) study for identifying when Lake Trout should be surveyed may not be appropriate. Several reasons why this approach is problematic include fundamental biological differences between the species (sculpin are short-lived and eat primarily invertebrates while trout are piscivorous and long-lived and therefore inherently accumulate higher concentrations of mercury), and perhaps most importantly, that monitoring mercury in fish using sculpin does not address the fundamental objective of the fish tissue monitoring, as described in the Design Plan: "The objective of the AEMP fish tissue chemistry survey is to determine whether effluent discharged from the Mine has altered fish in such a way as to limit their use by humans." It is also noted that due to a lack of baseline data, it cannot be determined if mercury in sculpin increased after the mine was constructed.

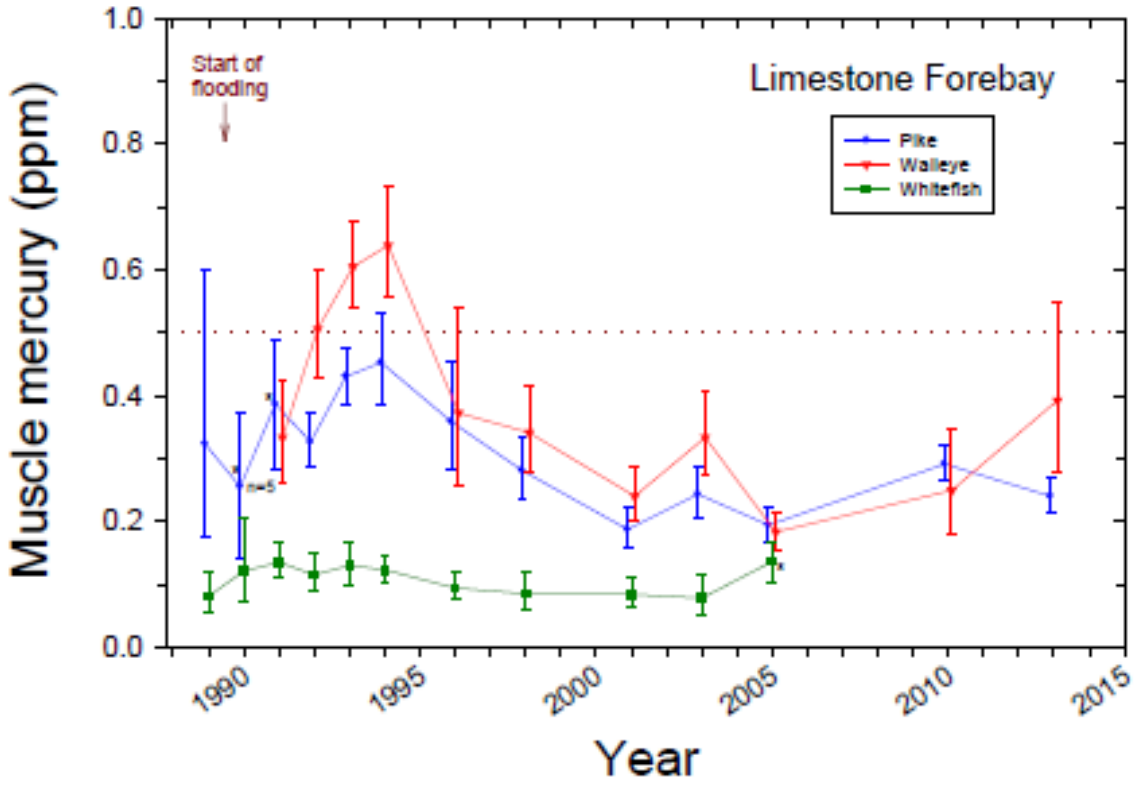
Lastly, changes or trends in fish mercury concentrations are not always reflected - or strongly apparent - in fish occupying a lower trophic position such as benthivores. Long-term mercury monitoring results for some waterbodies in Manitoba show a lack of a spike in mercury concentrations in Lake Whitefish (a benthivore) when peaks were observed in the predatory species (Northern Pike and Walleye; Manitoba and Manitoba Hydro 2012). Two examples are provided below in Figures 1-2. These examples demonstrate that use of a benthivore as a general indicator of mercury concentrations or trends in piscivorous fish may not be effective or appropriate in all cases. Additionally, benthic-feeding fish often do not contain mercury concentrations above the Health Canada standard for retail fish (0.5 µg/g) which is commonly used as a benchmark for defining human consumption risks.

We reiterate our concern with respect to this approach, though acknowledge that the WLWB has accepted Diavik's proposal to apply this approach with respect to the trigger for conducting a Lake Trout mercury survey.



Means without CLs prior to 1980 are from commercial samples. An asterisk indicates that the relationship between fish length and mercury concentration was not significant and the arithmetic mean was use; n represents sample size. The stippled line indicates the 0.5 ppm Health Canada standard for retail fish.

Figure 1. Mean (95% Confidence Limits [CL]) Length Standardized Muscle Mercury Concentrations of Northern Pike, Walleye, and Lake Whitefish from Split Lake for 1969-2013. From Manitoba and Manitoba Hydro (2015).



An asterisk indicates that the relationship between fish length and mercury concentration was not significant and the arithmetic mean was used; n represents sample size. The mean of 0.62 ppm for three Walleye in 1989 is not shown. The stippled line indicates the 0.5 ppm Health Canada standard for retail fish.

Figure 2. Mean (95% Confidence Limits [CL]) Length Standardized Muscle Mercury Concentrations of Northern Pike, Walleye, and Lake Whitefish from the Limestone Forebay for 1989-2013. From Manitoba and Manitoba Hydro (2015).

Recommendation: Please provide a clear description of the triggers that would be applied for requiring undertaking of a mercury in Lake Trout study. Clarify the differences between a Lake Trout Health Survey and a Lake Trout Mercury Survey including methodology and analysis. Clarify the difference between triggers required to initiate a Lake Trout Health Survey versus a Lake Trout Mercury Survey.

3.5 SLIMY SCULPIN: SURVIVAL METRICS AND ANALYSIS

Design Plan v. 5.1 has added length-frequency distribution as a measurement endpoint for the fish health component and indicated it will be included in the overall interpretation of effects for fish health, along with catch-per-unit-effort (CPUE), instead of age (which was removed as part of the AEMP design [Version 5.0]).

The Design Plan document indicates that these data will be evaluated qualitatively, including examining differences among areas. It is also noted that these metrics will be considered in the

weight-of-evidence (WOE) assessment but would not be included in the response framework. It is further indicated: "Should population-level effects (e.g., missing size class[es]) be observed in the length-frequency assessment, the length-frequency distributions will be considered alongside the other AEMP results (e.g., water quality and lower trophic level biological responses) and the overall conclusions and recommendations for the fish health component, not just the overall WOE, will be made inclusive of the evidence provided by the CPUE and length-frequency data."

It is later indicated that length-frequency distributions would be compared between sites using the Kolmogorov-Smirnov statistical test. Environment Canada (2012) recommends this analysis method for non-lethal fish surveys, though they note it is not very sensitive. Inclusion of a quantitative statistical comparison for this metric would be of benefit for assessing differences, but would also allow for inclusion in the action level assessment. It is noted, as was noted in previous comments (EMAB Comment #119 and 124), that with the omission of age data from the program, length-frequency distributions serve as the only indicator of fish survival.

Furthermore, it is not clear exactly how CPUE and length-frequency data will be used to determine what action (if any) is warranted as there are no action levels, benchmarks, or normal ranges for these metrics.

Recommendation: Add length-frequency histograms to the action level assessment. Provide clarification whether length-frequency histograms and CPUE metrics will be assessed for changes over time, as well as spatial comparisons within a given year.

3.6 SLIMY SCULPIN: DEFORMITIES, EROSION, LESIONS, AND TUMOURS (DELTS)

NSC had previously recommended the addition of fish abnormalities monitoring results to the WOE assessment (EMAB Comment #123). Diavik responded: "It is not appropriate to include fish abnormalities in the WOE assessment. It is not a valid line of evidence, as measured, to directly determine if there is a toxicological or nutrient-related Mine effect. These endpoints will continue to be reported and discussed as part of the fish program."

NSC notes that measures of fish abnormalities including deformities, erosion, lesions, and tumours (DELTs) are relatively common metrics applied in fish health monitoring programs and have been used as indicators of toxicological effects and/or contaminant exposure in numerous studies. Some examples include: Ohio Environmental Protection Agency (1987); the Lake Erie Lakewide Management Plan (Baumann et al. 2000); and the USGS National Water-Quality Assessment Program (Moulton et al. 2002). Given that the WOE framework incorporates professional judgement, this metric could be incorporated even if a more quantitative approach is not feasible.

Recommendation: NSC reiterates the recommendation to incorporate DELTs into the WOE assessment.

3.7 SLIMY SCULPIN: TISSUE SURVEY POWER

Mercury concentrations in Slimy Sculpin will be used to trigger a Lake Trout fish mercury survey if an increasing trend due to the mine is detected. However, there was no power analysis conducted on metal concentrations, including mercury, in Slimy Sculpin. Similar to requests to assess the power of other biological metrics, can Diavik comment on the power of the Slimy Sculpin tissue monitoring to detect a statistical difference? Can Diavik also provide a discussion on the adequacy of the sample design in terms of the total number of samples and the number of sub-samples pooled for composite analysis?

Recommendation: Provide an analysis of the power of the Slimy Sculpin metals data to detect trends.

3.8 SLIMY SCULPIN: TISSUE SURVEY SCHEDULE

It is unclear whether a Slimy Sculpin tissue metals survey would be undertaken during each monitoring cycle (i.e., every 3 years), including in the event that a lethal Slimy Sculpin health survey were not completed in a monitoring cycle due to a move to a reduced monitoring frequency.

Recommendation: Clarify if the sculpin mercury sampling program would still be conducted in the event that the sculpin health survey was not undertaken (i.e., if no effects observed in 2 consecutive cycles).

3.9 PLANKTON AND BENTHIC MACROINVERTEBRATE METRICS

DDMI (Golder 2019a) has proposed changes (deletions) to the list of metrics to be included in the Action Level assessment for plankton and BMI as follows:

"The effect indicators were specified for each component, and were adjusted as follows:

- For plankton, both phytoplankton and zooplankton were listed for clarity.
- Richness was removed from the plankton Action Level definitions, because although it is expected to decrease under toxic conditions, little is known about the relative sensitivity of this endpoint to toxicity related effects versus nutrient-related effects, whereas declines in biomass are expected to respond predictably to toxic conditions, in a downward direction.
- Community indices (i.e., dominance, Simpson's diversity index, Simpson's evenness index, Bray-Curtis index, percent Chironomidae) were removed from the benthic invertebrate list of endpoints, because they are non-directional, and will respond in the same direction under nutrient enrichment or toxicological impairment. The remaining

endpoints are expected to respond predictably to toxic conditions, in a downward direction." (pages 87-88)

The proposed deletion of metrics from the Action Level Assessment was discussed with Diavik in engagement consultations. NSC had noted that exclusion of richness and reliance solely on overall abundance of plankton for action level assessment may reduce the effectiveness or sensitivity of the overall program.

With respect to benthic macroinvertebrate community metrics, inclusion of Simpson's diversity index, Simpson's evenness index, Bray-Curtis index, and percent Chironomidae are commonly included in BMI monitoring programs; two of these metrics (Simpson's evenness index, Bray-Curtis index) are required to be included and reported as part of the Metal and Diamond Mining Effluent Regulations (MDMERs; Government of Canada 2002). The MDMERs, which are referenced by Diavik in the revisions to the Action Levels for biological components, do not require a pre-defined understanding of the direction of effect or the ability to discriminate between causes. Rather, the MDMERs include a provision to undertake an investigation of cause (IOC) study when biological effects are observed and confirmed in two monitoring cycles – a trigger similar to Action Level 3.

In response to comments provided by Environment and Climate Change Canada (ECCC; see Comments #5 and 6), DDMI noted that the above metrics "will be analyzed as part of the routine AEMP data analysis and weight-of-evidence assessment, and will be considered as supporting information when evaluating the ecological relevance of Action Level triggers and for developing response plans."

NSC agrees these metrics should be retained but further suggests that they be incorporated into the Action Level assessment. The lack of a mechanism to respond to observed changes/effects within the Response Framework could result in fundamental changes to the communities without an associated management response.

Recommendation: Retain the plankton and BMI metrics that have been proposed to be deleted from the Action Level Assessment.

3.10 ADDITION OF ACTION LEVELS FOR TOTAL PHOSPHORUS

Design Plan v. 5.1 has included the addition of a benchmark for total phosphorus (TP) as part of the eutrophication monitoring/assessment. The proposed benchmark (10 µg/L) was selected based on consideration of reference condition concentrations of TP in Lac de Gras and the Canadian Council of Ministers of the Environment (CCME) phosphorus guidance framework for management of freshwater systems (CCME 1999; updated to 2019). The benchmark that is proposed was based on the CCME trigger of maintaining trophic status (i.e., maintaining TP concentrations in the oligotrophic trophic category, where the upper range is defined as 10 µg/L

by the CCME). Diavik notes that the Environmental Impact Statement (EIS) had identified a benchmark of 5 µg/L for TP but that this is not appropriate as the normal range of TP concentrations exceeds this value (open-water season normal range = 2.0-5.0 µg/L and ice-cover season normal range = 2.0-5.3 µg/L).

Diavik previously described why application of the second trigger identified in the CCME phosphorus guidance framework (i.e., that TP should not increase by more than 50% relative to background; Golder 2018b). However, an effects benchmark had not been identified previously.

As Golder (2018b) noted, the CCME guidance framework does not specify the statistic to be applied when developing triggers or benchmarks based on "background" conditions. While it is acknowledged the upper boundary of the normal range for TP exceeds the boundary between the CCME ultra-oligotrophic (< 4 µg/L) and oligotrophic (4-10 µg/L) trophic categories, the median background concentrations of TP are within the ultra-oligotrophic category (3.3 and 3.6 µg/L in the open-water and ice-cover seasons, respectively). It is acknowledged that in the natural environment there are no discrete, quantitative boundaries that can be applied across all systems as trophic condition is a continuum, and therefore the use of single values to define a trophic condition is problematic. However, defining the effects benchmark at 10 µg/L of TP represents an approximate three-fold difference from the median background conditions and is twice the significance threshold applied in the EIS.

Recommendation: Ideally, maintain the benchmark of 5 µg/L Total Phosphorus that Diavik set in the CSR to maintain Lac de Gras' ultra-oligotrophic status. Given that this level does not fit the current response framework, consider revisiting this component of the framework. If it is accepted that the benchmark must be revised, any revised benchmark should not exceed 7.5 µg/L, which represents the mid-point between the upper and lower boundary of the CCME oligotrophic category (4-10 µg/L).

3.11 POWER ANALYSES: PLANKTON

The power analysis for zooplankton and phytoplankton biomass metrics indicates relatively low power to detect change relative to the reference condition. Given these results, it would seem appropriate to examine, at a minimum, the power to detect changes in chlorophyll *a* (the other indicator of phytoplankton abundance incorporated in the AEMP).

Recommendation: Conduct a power analysis of chlorophyll a to determine if this metric is more sensitive to detecting change (relative to reference conditions). If it is more sensitive, incorporate into assessment for the toxicological impairment pathway.

3.12 POWER ANALYSES: BENTHIC INVERTEBRATES AND FISH

The power analysis for benthic invertebrates indicates relatively low power to detect differences relative to the reference condition for the action level trigger of 2 x standard deviation (SD) of the

reference condition. Similarly, low power was identified for several fish metrics - notably for total weight (e.g., power to detect a 25% reduction relative to the reference condition for total weight was 0.28 and 0.31 for females and males, respectively). Given these results, the AEMP is not sufficiently sensitive to detect the levels of change identified in the Action Level assessment for some key metrics. This questions the ability of the program to adequately apply the action level triggers and thus associated management responses. Further, the relatively low power for several fish metrics may affect the ability of the program to trigger an Action Level 3 response, and therefore, the trigger for the conduct of a Lake Trout health survey (which is predicated upon a critical effect size for Slimy Sculpin being exceeded).

Recommendation: Given the results of the power analyses, re-evaluate the program and suggest modifications to ensure the program is adequately designed to facilitate comparisons to action level triggers (e.g., increasing sample sizes).

Table 1. Technical review comments and recommendations on the AEMP Design Plan v. 5.1.

TOPIC	COMMENT	RECOMMENDATION
Section 3.4.1, Sampling Design and Locations, Sampling Design, page 20 and Section 3.4.2 Sampling Locations, page 21	Version 5.1 of the Design Plan indicates that the program has largely reverted to the previous (v. 4.1) study design in terms of the locations of monitoring sites. Key changes to sampling sites include the addition of two sites (one station will be located in the northern channel, on the east side of the East Island in Lac de Gras, and the other will be located on the far west side of the lake, between the FFA and FFB sampling areas) and deletion of two sites (two stations located in Lac du Sauvage). As noted by Diavik, the addition of the two sites (Station FFD-2 located between the FFB and FFA areas and FFD-1 between the FF1 and MF3 areas) in MF3 and MF1 transects will improve the spatial coverage and ability to define effects spatially.	None. Proposed additions strengthen the program.
Section 3.4.1, Sampling Design and Locations, Sampling Design, pages 20-21	Diavik proposed to remove two stations from the AEMP (stations LDS-2 and LDS-3) both of which are located within Lac du Sauvage. Diavik notes that the AEMP will continue to sample one station in Lac du Sauvage and one station at the narrows between Lac de Gras and Lac du Sauvage. Given the latter commitment and that monitoring results have not been incorporated into reporting in the past, deletion of these two sites appears to reasonable.	None.
Section 3.4.2, Sampling Design and Locations, Sampling Locations, pages 21-22	Diavik has added sampling for phytoplankton at the outlet of Lac de Gras (site LDG-48) and two sites in Lac du Sauvage (LDS-1 and LDS-2). NSC had previously recommended this addition in the review of v. 5.0 (see EMAB comment #115).	None. Previous recommendation was adopted (EMAB Comment #115).
Section 3.4.2, Sampling Design and Locations, Sampling Locations, page 21	The Design Document v. 5.1 indicates that zooplankton will not be monitored at the lake outlet (LDG-48) due to habitat and flow conditions. It is also noted that zooplankton will not be monitored at the two remaining sites in Lac du Sauvage (LDS-1 and LDS-4). The report notes that site LDS-4 (the narrows) is shallow with flowing water and is thus dissimilar to Lac de Gras sites. This rationale is reasonable, however, there is no explanation provided for not sampling for zooplankton at site LDS-1. If conditions are similarly unsuitable at this site as identified for the other two sites, are either of the two sites that Diavik has proposed to drop from the AEMP (LDS-2 and LDS-3) suitable for zooplankton monitoring?	Provide a rationale for the lack of zooplankton sampling at site LDS-1 and a description of the suitability of sites LDS-2 and LDS-3 for monitoring this component.

TOPIC	COMMENT	RECOMMENDATION
Section 3.5, Sampling Schedule, page 25	Diavik proposes to include annual monitoring for water quality, variables used as indicators of eutrophication, and plankton variables at one of the new proposed sites (FFD-1), as well as one of the existing FF sites (FF1-2). This proposed change will allow for better delineation of effects on an annual basis when FF sites are not sampled. This addition is beneficial as the spatial extent of effects on eutrophication variables measured during interim years (i.e., when FF sites were not sampled) has been challenged by the lack of sampling beyond site MF1-5 (i.e., effects were observed to extend up the end of the MF-1 transect for some parameters in some interim years; e.g., 2018).	None. Proposed additions strengthen the program.
Section 3.5, Study Design, Sampling Schedule, page 25	NSC had provided a comment relating to proposed changes to the triggers for the Lake Trout health survey (see EMAB Comment #116) in the review of version 5.0. This issue was also discussed with Diavik as part of the engagement issues followup. In brief, NSC had raised a concern that the proposed revision results in a substantive reduction in the sensitivity of the trigger for conducting a Lake Trout health study. The change proposed is to increase the level of effect observed in the Slimy Sculpin monitoring results required to trigger a Lake Trout study (from an Action Level 2 to and Action Level 3 exceedance). In addition, changes to the Action Levels have been proposed which further increase the threshold required to trigger this study. In Design Plan v. 4.1, a significant difference in a variable indicative of a toxicological effect at the mid-field (MF) area relative to the far-field (FF) areas was sufficient to trigger a Lake Trout survey. Under the proposed gradient sampling design (Design Plan v. 5.1), the trigger for this study is now an exceedance of Action Level 3, which is defined as an exceedance of the critical effect size (CES) and the normal range and the effect is observed in two consecutive sampling periods (which would amount to 6 years as the Slimy Sculpin program is conducted every 3 years). NSC reiterates the concerns identified above with respect to the proposed changes to the Action Levels and the associated trigger for requiring a Lake Trout health study. Most significantly, the results of the power analyses conducted on fish health metrics indicated low power to detect differences for some metrics – notably weight and condition (see later comment for a detailed discussion). Given these results, the trigger for a Lake Trout health survey should be reconsidered.	Leave the trigger for a Lake Trout Health survey at Action Level 2 as in previously approved AEMP Designs. Provide a discussion on the level of effect on Slimy Sculpin health that could be detected by the current program and therefore the conditions in which a Lake Trout health survey may be triggered by the proposed action level framework.

TOPIC	COMMENT	RECOMMENDATION
Section 3.5, Study Design, Sampling Schedule, page 25	The Design Document v. 5.1 indicates that a comprehensive lethal fish health and tissue survey for Slimy Sculpin will be undertaken every six years if Action Level 2 is not triggered or every three years otherwise. The text should be clarified that it is the Action Level 2 that is specified in Version 5.1 and not previous versions of the design document, or that data collected under the previous design version will be analysed using the v. 5.1 criteria.	Add clarification that data collected in previous applicable monitoring cycle will be analysed using the v. 5.1 Action Level criteria.
Section 3.5, Sampling Schedule, pages 25-26	Diavik has proposed to reduce the sampling frequency for the comprehensive Slimy Sculpin survey from every 3 years to every six years in the event that Action Level 2 is not triggered for 2 consecutive sampling events. Relative abundance surveys would continue to be conducted every 3 years. A reduced frequency of monitoring as proposed is consistent with the Metal and Diamond Mining Effluent Regulations (MDMERs) which indicate that monitoring frequency may be reduced from every 3 years to every 6 years if no effects on the fish population are observed in 2 consecutive monitoring cycles. Effects on fish populations are also similarly defined (i.e., using a CES) as per the v. 5.1 design document.	It is appropriate to reduce monitoring frequency if effects are not observed in two consecutive cycles and is consistent with MDMER requirements. No recommendations provided.

TOPIC	COMMENT	RECOMMENDATION
	Version 5.1 of the Design Document indicates that a Lake Trout health survey would only be conducted in the event that an Action Level 3 for the Slimy Sculpin survey fish health endpoints were observed. Action Level 3 is defined as: "Effect indicators (a) statistically significantly different from mean of reference dataset, with an effect size equal to or above the critical effect size defined by EEM, that is indicative of an impairment to fish health AND Observed in two consecutive sampling events AND Beyond the normal range(b)." (page 89). Page 26 indicates: "The specific timing of a Lake Trout fish health survey would be defined in an AEMP Response Plan, which would be implemented as and when approved by the WLWB. It is possible that such a program would be limited to a non-lethal tissue chemistry sampling program (e.g., for mercury analyses from tissue plugs) or could be a lethal fish health survey, dependent on the Action Level trigger which initiated the study. The mercury in Lake Trout survey would only occur if the small-bodied fish tissue chemistry results indicate an increasing trend in mercury due to the Mine. Additional sampling of biological components may be required if an Action Level in the Response Framework (Section 5.0) is triggered. For example, at Action Level 1, the follow-up action for biological components is confirmation of the effect. The specific timing of a follow-up study, however, would be defined in an AEMP Response Plan (Section 7.5), which would be implemented as and when approved by the WLWB." Table 5.2-4 Action Levels for Biological Effects (page 89) does not include any reference to fish mercury and associated triggers for a Lake Trout mercury survey. It is unclear in the Design Plan v. 5.1 what triggers will be applied to determine when a Lake Trout mercury study is required, as the general discussion appears to apply primarily to a trigger for a fish health study. Regardless, as previously commented, the use of a sculpin mercury (or health) study for identifying when Lake Trout should be surveyed may not be appropriate. Several reasons why this approach is problematic include fundamental biological differences between the species (sculpin are short-lived and eat primarily invertebrates while trout are piscivorous and long-lived and therefore inherently accumulate higher concentrations of mercury), and perhaps most importantly, that monitoring mercury in fish using sculpin does not address the fundamental objective of the fish tissue monitoring, as described in the Design Plan: "The objective of the AEMP fish tissue chemistry survey is to determine whether effluent discharged from the Mine has altered fish in such a way as to limit their use by humans." It is also noted that due to a lack of baseline data, it cannot be determined if mercury in sculpin increased after the mine was constructed. Lastly, changes or trends in fish mercury concentrations are not always reflected - or strongly apparent - in fish occupying a lower trophic position such as benthivores. Long-term mercury monitoring results for some waterbodies in Manitoba show a lack of a spike in mercury concentrations in Lake Whitefish (a benthivore) when peaks were observed in	Please provide a clear description of the triggers that would be applied for requiring undertaking

TOPIC	COMMENT	RECOMMENDATION
Section 4.2.2.1, Dust Deposition, Field Methods Snow Cores, page 33 and section 4.2.2.2, Dustfall gauges	Diavik provided clarification on the numbers and types quality assurance/quality control (QA/QC) samples for the snow and dustfall surveys, in response to EMAB Comment #111.	None. Revision addresses EMAB Comment #111.
Section 4.4.4, Sediment Quality, Data Analysis and Intepretation, page 51	NSC had previously commented (EMAB Comment #112) on the approach for analysis of trends in sediment qualtiy variables using data that are normalized for total organic carbon (TOC) or percent fines. In response to EMAB Comment #112, Diavik noted that: "Trend analysis on raw sediment quality data is not planned. Despite some fluctuations over time, there was no evident temporal trend in TOC and % fines. Mine-related effects were not expected or observed in these variables. Hence, trend analysis was focused on normalized data to minimize the effects of supporting variables fluctuating over time. Trend analysis on raw data would be influenced by the background variation in TOC and % fines, which interfere with the evaluation of mine-related effects on sediment quality." As previously noted, NSC agrees that normalization of data is valid and appropriate for trend analysis but is predicated upon the assumption that there are no mine-related effects on the supporting variables (i.e., TOC and percent fines).	Conduct statistical analyses (temporal and spatial trends) on supporting variables (TOC and percent fines) to confirm no mine-related effects on these metrics. If a mine-related effect is noted, this should be incorporated into analysis and interpretation of sediment quality monitoring results.
Section 4.5.4, Eutrophication Indicators, Data Analysis and Interpretation, pages 53-54	Diavik provided clarification of how data for stations LDS-4 and LDG-48 will be incorporated into data analysis and interpretation within the eutrophication indicators component. While not noted in Appendix B, Table B-1, the explanation provided relates to EMAB comment #113. The additional text is appreciated and is informative. However, it is reiterated that inclusion of the results for site LDG-48 in the evaluation of the spatial extent of effects in interim years would be useful. It is understood that in interim years when FF sites are not sampled that inclusion of this site in the analysis would mean that spatial extent of effects would be derived with gaps in data between MF3-7 and FFD-1 and the lake outlet at site LDG-48. However, in the event that metrics measured at site LDG-48 exceed the triggers (above the normal range), the available information would suggest a larger area of the lake was affected than solely based on the MF data alone.	Provide clarification and discussion of incorporation of results from site LDG-48 in defining the spatial extent of effects.

TOPIC	COMMENT	RECOMMENDATION
Section 4.5.4, Eutrophication Indicators, Data Analysis and Interpretation, page 54	"The spatial extent of Mine effects will be determined by comparing the concentrations of TP, TN, chlorophyll a, the biomass of zooplankton, and the biovolume of phytoplankton in each sampling area to the normal range (as defined in the AEMP Reference Conditions Report Version 1.4 [Golder 2019b]). To provide the most conservative view of effluent effects, the depth with the greatest extent of effects will be selected for this evaluation. Both seasons (i.e., ice-cover and open-water) will be evaluated." (page 53) Presentation of open-water and ice-cover season results separately addresses a previous comment/recommendation provided by NSC in a review of the 2017 AEMP Annual Report (NSC 2018b).	None. Change addresses previous NSC comment.
Section 4.8.4, Fish Health, Data Analysis and Interpretation, pages 64-65	Catch-per-unit-effort and length-frequency distributions have been added to the fish health assessment (non-lethal and lethal surveys). The Design document indicates that these data will be evaluated qualitatively, including examining differences among areas. It is also noted that these metrics will be considered in the weight-of-evidence (WOE) assessment but would not be included in the response framework. It is further indicated: "Should population-level effects (e.g., missing size class[es]) be observed in the length-frequency assessment, the length-frequency distributions will be considered alongside the other AEMP results (e.g., water quality and lower trophic level biological responses) and the overall conclusions and recommendations for the fish health component, not just the overall WOE, will be made inclusive of the evidence provided by the CPUE and length-frequency data." It is later indicated that length-frequency distributions would be compared between sites using the Kolmogorov-Smirnov test. Environment Canada (2012) recommends this analysis method for non-lethal fish surveys, though they note it is not very sensitive. Inclusion of a quantitative statistical comparison for this metric would be of benefit for assessing differences, but would also allow for inclusion in the action level assessment. It is noted, as was noted in previous comments, that with the omission of age data from the program, length-frequency distributions serve as the only indicator of fish survival. Furthermore, it is not clear exactly how CPUE and length-frequency data will be used to determine what action (if any) is warranted as there are no action levels, benchmarks, or normal ranges for these metrics.	Add length-frequency histograms to the action level assessment. Provide clarification whether length-frequency histograms and CPUE metrics will be assessed for changes over time, as well as spatial comparisons within a given year.
Section 4.8.4, Fish Health, Data Analysis and Interpretation, page 65	Diavik has provided additional detail and explanation on how fish health data will be analysed. The additional information provided addresses EMAB comments #120 and 125.	None. Additions address EMAB comments 120 and 125.

TOPIC	COMMENT	RECOMMENDATION
Section 4.9.1, Fish Tissue Chemistry, Background, page 67	Mercury concentrations in Slimy Sculpin will be used to trigger a Lake Trout fish mercury survey if an increasing trend due to the mine is detected. However, there was no power analysis conducted on metal concentrations, including mercury, in Slimy Sculpin. Similar to requests to assess the power of other biological metrics, can Diavik comment on the power of the Slimy Sculpin tissue monitoring to detect a statistical difference? Can Diavik also provide a discussion on the adequacy of the sample design in terms of the total number of samples and the number of sub-samples pooled for composite analysis?	Provide an analysis of the power of the Slimy Sculpin metals data to detect trends.
Section 4.9.3, Fish Tissue Chemistry, Laboratory Methods, page 68	NSC had previously suggested (EMAB Comment #118) selecting tissue samples to be submitted to Flett Research for inter-laboratory comparisons of mercury across a range of fish lengths. Diavik had noted in response that this would be added to the next version of the Design Document but also noted that tissue volume/weight requirements may affect what samples are available to be submitted. This change does not appear to have been added to v. 5.1.	Consider adding text as suggested.
Section 4.10, Weight of Evidence Framework, pages 69-74	NSC had previously recommended the addition of fish abnormalities monitoring results to the WOE assessment (EMAB Comment #123). Diavik responded: "It is not appropriate to include fish abnormalities in the WOE assessment. It is not a valid line of evidence, as measured, to directly determine if there is a toxicological or nutrient-related Mine effect. These endpoints will continue to be reported and discussed as part of the fish program." NSC notes that measures of fish abnormalities including deformities, erosion, lesions, and tumours (DELTs) are relatively common metrics applied in fish health monitoring programs and have been used as indicators of toxicological effects and/or contaminant exposure in numerous studies. Some examples include: Ohio Environmental Protection Agency (1987); the Lake Erie Lakewide Management Plan (Baumann et al. 2000); and the USGS National Water-Quality Assessment Program (Moulton et al. 2002). Given that the WOE framework incorporates professional judgement, this metric could be incorporated even if a more quantitative approach is not feasible.	NSC reiterates the recommendation to incorporate DELTs into the WOE assessment.
Section 4.10.2.1, Weight of Evidence Framework, Lines of Evidence and Measurement Endpoints, Tables 4.10-1 and 4.10-2, page 72	Length-frequency distributions were added to the lines of evidence that will be considered in the weight-of-evidence (WOE) assessment and benthic invertebrate (BMI) density was added as an exposure endpoint for the fish community assessment of the nutrient enrichment pathway. This was done in response to comments provided by EMAB (EMAB Comments #104 and 122).	None. Additions are noted and appreciated.

TOPIC	COMMENT	RECOMMENDATION
Section 5.2.4, Response Framework, Biological Components, pages 87-88	DDMI (Golder 2019a) has proposed changes (deletions) to the list of metrics to be included in the Action Level assessment for plankton and BMI. Specifically, they propose to remove richness from the plankton Action Level definitions," because although it is expected to decrease under toxic conditions, little is known about the relative sensitivity of this endpoint to toxicity related effects versus nutrient-related effects, whereas declines in biomass are expected to respond predictably to toxic conditions, in a downward direction." and several BMI community metrics (i.e., dominance, Simpson's diversity index, Simpson's evenness index, Bray-Curtis index, percent Chironomidae) "because they are non-directional, and will respond in the same direction under nutrient enrichment or toxicological impairment. The remaining endpoints are expected to respond predictably to toxic conditions, in a downward direction." (pages 87-88) The proposed deletion of metrics from the Action Level Assessment was discussed with Diavik in engagement consultations. NSC had noted that exclusion of richness and reliance solely on overall abundance of plankton for action level assessment may reduce the effectiveness or sensitivity of the overall program. With respect to benthic macroinvertebrate community metrics, inclusion of Simpson's diversity index, Simpson's evenness index, Bray-Curtis index, and percent Chironomidae are commonly included in BMI monitoring programs; two of these metrics (Simpson's evenness index, Bray-Curtis index) are required to be included and reported as part of the Metal and Diamond Mining Effluent Regulations (MDMERs; Government of Canada 2002). The MDMERs, which are referenced by Diavik in the revisions to the Action Levels for biological components, do not require a pre-defined understanding of the direction of effect or the ability to discriminate between causes. Rather, the MDMERs include a provision to undertake an investigation of cause (IOC) study when biological effects are observed and confirmed in two monitoring cycles – a trigger similar to Action Level 3. In response to comments provided by Environment and Climate Change Canada (ECCC; see Comments #5 and 6), DDMI noted that the above metrics "will be analyzed as part of the routine AEMP data analysis and weight-of-evidence assessment, and will be considered as supporting information when evaluating the ecological relevance of Action Level triggers and for developing response plans." NSC agrees these metrics should be retained but further suggests that they be incorporated into the Action Level assessment. The lack of a mechanism to respond to observed changes/effects within the Response Framework could result in fundamental changes to the communities without an associated management response.	Retain the plankton and BMI metrics that have been proposed to be deleted from the Action Level Assessment.

TOPIC	COMMENT	RECOMMENDATION
Section 5.3.3, Effects Benchmarks, Eutrophication Indicators, page 94	Design Plan v. 5.1 has included the addition of a benchmark for total phosphorus (TP) as part of the eutrophication monitoring/assessment. The proposed benchmark (10 µg/L) was selected based on consideration of reference condition concentrations of TP in Lac de Gras and the Canadian Council of Ministers of the Enviroment (CCME) phosphorus guidance framework for management of freshwater systems (CCME 1999; updated to 2019). The benchmark that is proposed was based on the CCME trigger of maintaining trophic status (i.e., maintaining TP concentrations in the oligotrophic trophic category, where the upper range is defined as 10 µg/L by the CCME). Diavik notes that the Environmental Impact Statement (EIS) had identified a benchmark of 5 µg/L for TP but that this is not appropriate as the normal range of TP concentrations exceeds this value (open-water season normal range = 2.0-5.0 µg/L and ice-cover season normal range = 2.0-5.3 µg/L). The Comprehensive Study Report states "In the absence of CCME guidelines for the protection of aquatic life for total phosphorus, Diavik established a site-specific threshold of 0.005 mg/L to maintain the ultra-oligotrophic nature of trophic (productivity) status in Lac de Gras. Up to 20% of the surface area of Lac de Gras is expected to exceed this threshold during peak operations. Phosphorus concentrations in the remainder of the lake are predicted to remain slightly below the threshold. Levels would decline to background levels after closure. The precise effects of increased trophic status cannot be predicted, but could include increased, algae growth, increases in fish growth rates, improvements in fish health and increases in the abundance of some aquatic species and a decline in the abundance of others. Diavik also completed additional assessment of phosphorus following discussions at technical sessions to incorporate higher baseline values to total phosphorus concentrations and determined no change in original predictions." The goal of protecting Lac de Gras' ultra-oligotrophic status is clear in the CSR, and any benchmark should strive to address this.Diavik previously described why application of the second trigger identified in the CCME phosphorus guidance framework (i.e., that TP should not increase by more than 50% relative to background; Golder 2018b). However, an effects benchmark had not been identified previously. As Golder (2018b) noted, the CCME guidance framework does not specify the statistic to be applied when developing triggers or benchmarks based on "background" conditions. While it is acknowledged the upper boundary of the normal range for TP exceeds the boundary between the CCME ultra-oligotrophic (< 4 µg/L) and oligotrophic (4-10 µg/L) trophic categories, the median background concentrations of TP are within the ultra-oligotrophic category (3.3 and 3.6 µg/L in the open-water and ice-cover seasons, respectively). It is acknowledged that in the natural environment there are no discrete, quantitative boundaries that can be applied across all systems as trophic condition is a continuum, and therefore the use of single values to define a trophic condition is problematic. However, defining the effects benchmark at 10 µg/L of TP represents an approximate three-fold difference from the median background conditions and is twice the significance threshold applied in the EIS.	Ideally, maintain the benchmark of 5 µg/L Total Phosphorus that Diavik set in the CSR to maintain Lac de Gras' ultra-oligotrophic status. Given that this level does not fit the current response framework, consider revisiting this component of the framework. If it is accepted that the benchmark must be revised, any revised benchmark should not exceed 7.5 µg/L, which represents the mid-point between the upper and lower boundary of the CCME oligotrophic category (4-10 µg/L).

TOPIC	COMMENT	RECOMMENDATION
Appendix C, Power Analysis of the Statistical Methods Applied to the Current and Proposed Action Levels, Section 2.0, Methods, page 2	The text reads: "Critical effect sizes (CES) of 2 SD for benthos and plankton follow the CES values recommended for benthos data analysis in the federal environmental effects monitoring (EEM) program for metal mines (Environment Canada 2012). Critical effect sizes of 10% and 25% for fish also follow the EEM-recommended CES values (the former for condition and the latter for weight, relative gonad weight, and relative liver weight)." The current MDMER, which apply to the Diavik Diamond Mine, specify CESs for benthos and fish.	Update reference to the current MDMER.
Appendix C, Power Analysis of the Statistical Methods Applied to the Current and Proposed Action Levels, Section 3.1, Results, Plankton, pages 3-4	The power analysis for zooplankton and phytoplankton biomass metrics indicates relatively low power to detect change relative to the reference condition. Given these results, it would seem appropriate to examine, at a minimum, the power to detect changes in chlorophyll a (the other indicator of phytoplankton abundance incorporated in the AEMP).	Conduct a power analysis of chlorophyll a to determine if this metric is more sensitive to detecting change (relative to reference conditions). If it is more sensitive, incorporate into assessment for the toxicological impairment pathway.
Appendix C, Power Analysis of the Statistical Methods Applied to the Current and Proposed Action Levels, Sections 3.2 and 3.3, Results, Benthic Invertebrates and Fish, pages 4-7	The power analysis for benthic invertebrates indicates relatively low power to detect differences relative to the reference condition for the action level trigger of 2 x standard deviation (SD) of the reference condition. Similarly, low power was identified for several fish metrics - notably for total weight (e.g., power to detect a 25% reduction relative to the reference condition for total weight was 0.28 and 0.31 for females and males, respectively). Given these results, the AEMP is not sufficiently sensitive to detect the levels of change identified in the Action Level assessment for some key metrics. This questions the ability of the program to adequately apply the action level triggers and thus associated management responses. Further, the relatively low power for several fish metrics may affect the ability of the program to trigger an Action Level 3 response, and therefore, the trigger for the conduct of a Lake Trout health survey (which is predicated upon a critical effect size for Slimy Sculpin being exceeded).	Given the results of the power analyses, re-evaluate the program and suggest modifications to ensure the program is adequately designed to facilitate comparisons to action level triggers (e.g., increasing sample sizes).
Section 3.5, Sampling Schedule, pages 25-26	It is unclear whether a Slimy Sculpin tissue metals survey would be undertaken during each monitoring cycle (i.e., every 3 years), including in the event that a lethal Slimy Sculpin health survey were not completed in a monitoring cycle due to a move to a reduced monitoring frequency (i.e., change in monitoring frequency as described in row 11).	Clarify if the sculpin mercury sampling program would still be conducted in the event that the sculpin health survey was not undertaken (i.e., if no effects observed in 2 consecutive cycles).

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