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AQUATIC EFFECTS MONITORING PROGRAM ANNUAL 2020 REPORT – PLAIN LANGUAGE BRIEFING AND TECHNICAL REVIEW COMMENTS

Technical Memorandum # 367-21-04

Prepared for:

Environmental Monitoring Advisory Board (EMAB)
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PLAIN LANGUAGE SUMMARY

The Environmental Monitoring Advisory Board (EMAB) requested a technical review of the 2020 Aquatic Effects Monitoring Program (AEMP) Annual Report for the Diavik Diamond Mines (2012) Inc. (DDMI; "Diavik") Project. This review included looking at:

- How well previous EMAB comments and recommendations were addressed and incorporated
- Appropriateness of sampling timing and frequency
- Quality of data
- Methods used to analyze data
- Discussion and implication of results
- Defensibility of conclusions and recommendations
- New issues that may indicate environmental change over time
- Potential project-related effects
- Action levels reached and adequacy of proposed follow-up
- Adaptive management responses
- Include recommendations on improvements to monitoring/management actions for EMAB's consideration

Key comments and recommendations include:

- **Dust Deposition**: detailed analyses only included for some metals that are measured in the snow surveys;
    - **Recommendation**: include detailed analysis for other metals – particularly those that were elevated in the water and/or sediment.
- **Effluent and Water Quality – Water Temperature**: Diavik has suggested that fish may grow more slowly in the Nearfield area of Lac de Gras because of lower water temperature. However, the report does not describe how or if effluent affects water temperature;
    - **Recommendation**: include an assessment of effects of effluent on water temperature in the Nearfield area of Lac de Gras.
- **Effluent and Water Quality – Ammonia Data Quality**: there are ongoing issues with the quality of the ammonia measurements in water samples;

- **Recommendation**: include some additional tests to try to identify the source of the issues with the ammonia data quality.

- **Plankton and Eutrophication Indicators – Phytoplankton Data Comparability**: a new laboratory was used to measure the types and amounts of phytoplankton (algae) in samples collected from Lac de Gras in 2020. A special study showed that the new and previous labs produced different results for the same samples. These differences can affect the ability to look at changes in the lake over time and the way in which the results are interpreted (action level assessment). The report recommended dropping one of the variables (richness) because of the differences observed between labs;

  - **Recommendation 1**: keep all of the algae metrics.

  - **Recommendation 2**: re-calculate the normal ranges for phytoplankton.

  - **Recommendation 3**: provide a description of how trend analyses and comparisons between years will be done.

  - **Recommendation 4**: look into options to change the study design and/or action level evaluations.

  - **Recommendation 5**: use the same methodologies as the previous lab.

  - **Recommendation 6**: include some additional comparisons between labs.

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1.0 BACKGROUND AND SCOPE OF WORK

Diavik Diamond Mines (2012) Inc. (DDMI) submitted the 2020 Aquatic Effects Monitoring Program (AEMP) Annual Report in accordance with Part J, Item 8 of Water Licence W2015L2-0001 (Golder 2021). The report was distributed for review by the Wek'eezhii Land and Water Board (WLWB) on June 17, 2021.

North/South Consultants Inc. (NSC) conducted a technical review of the 2020 AEMP Annual Report for the Environmental Monitoring Advisory Board (EMAB). The following aquatic environment components were reviewed by NSC personnel with technical knowledge and expertise in each of the areas: dust; effluent and water chemistry; plankton; and eutrophication indicators. As 2020 was as interim monitoring year, other components (i.e., sediment quality, benthic invertebrates, and fish) sampled in 2019 were not monitored in 2020. As directed by EMAB in their Scope of Work for the review, the following points were considered:

- Diavik responses to previous North/South recommendations
- Appropriateness of sampling timing and frequency
- Quality of data collected
- Methods used to analyze data
- Adequacy of discussion of results
- Implications of results
- Defensibility of conclusions and recommendations
- Emerging issues that may indicate environmental change over time
- Potential project-related effects
- Action levels reached and adequacy of proposed follow-up
- Adaptive management responses
- Include recommendations on improvements to monitoring/management actions for EMAB's consideration

Section 2 provides a summary of the key review comments, along with recommendations for consideration by EMAB. Detailed technical review comments and recommendations are provided in Table 1 and in the Excel comments template as required for submission to the WLWB (separate excel spreadsheet file).

2.0 KEY COMMENTS

The following sections present a brief overview of key comments in relation to the points identified by EMAB for evaluation during the review of the 2020 AEMP Annual Report, and any additional review comments and recommendations borne from this review.

The following sections present key comments for discussion by EMAB members and refer to:

- Dust Deposition: Substances of Interest (SOIs);
- Effluent and Water Quality: Effects on Water Temperature;
- Effluent and Water Quality: Ammonia Data Quality; and
- Plankton and Eutrophication Indicators: Phytoplankton Data Comparability.

The technical review comments (Table 1) include additional detailed comments.

2.1 DUST DEPOSITION

2.1.1 Substances Of Interest

The snow chemistry results presented and discussed in the report are limited to those for which there are Effluent Quality Criteria and phosphorus. As noted in a review of the 2017-2019 Aquatic Effects Re-evaluation Report (AERER; NSC 2021a), the results that are analysed and presented should include parameters that were identified as Substances of Interest (SOIs) in the water and sediment quality components.

Seven water quality variables (boron, cobalt, iron, lead, thallium, tin, and zinc) were added to the list of SOIs for water quality as they triggered Criterion 4 (the median value in the MF exceeded two times the median value of the normal range). This criterion is intended to provide a means for identifying substances that may be elevated in the Midfield (MF) area due to dust or combined effects of dust and effluent.

Only two of these variables (lead and zinc) are discussed in the dust deposition report. Even for those two variables, the results presented and discussed are limited to concentrations of metals in snow samples and no discussion of deposition rates is provided. If the objective is to monitor for dust effects in the aquatic environment, it would be appropriate to include an assessment of the same SOIs identified in the water quality component in the dust component.

Recommendation: The dust deposition assessment should include an assessment of all parameters identified as SOIs in the water quality and/or sediment quality assessments.

2.2 EFFLUENT AND WATER QUALITY

2.2.1 Effects Of Effluent On Water Temperature

There are no temperature data provided for the effluent quality or mixing zone SNP Stations. NSC provided a recommendation to examine the effects of effluent on water temperature in the Nearfield (NF) area in the review of the 2017-2019 AERER (NSC 2021a); differences in fish health metrics have been attributed to habitat differences, including differences in water temperature in previous reports. It is noted that temperature profile data are included for the NF, MF, and Farfield (FF) sites in the report.

Recommendation: Include temperature monitoring data for effluent and the mixing zone SNP Stations. Assess/discuss potential effects of effluent discharge on water temperature in the receiving environment. If data are insufficient to assess potential effects, recommend collecting additional information in future monitoring.

2.2.2 Ammonia Data Quality

There are ongoing issues with the quality of results for ammonia in water; this issue has been the focus of several studies to try to identify and ideally eliminate the issue. EMAB Comment #8 from the 2019 AEMP Annual Report review recommended that some additional investigations be undertaken in the 2020 AEMP. The recommendation was to add analysis of ammonia in preserved and unpreserved samples at both laboratories to assist with confirming the utility of the 2019 data set as well as provide information for potential options moving forward.

DDMI responded that the 2020 program had already been completed at that time and indicated that these suggestions for additional analysis would not be helpful.

An ammonia investigation was undertaken in 2020 and it identified issues with the quality of data from BV labs for the winter (due to contamination from the preservative and potentially other sources) and the ALS results were used. In the open-water season samples were submitted to BV labs without preservative (to control for sample contamination from this source) but it was concluded that the ALS results should be used for reporting.

The results of the detailed inter-laboratory comparisons done by BV Labs did not reach a firm conclusion regarding the ongoing issues with the ammonia analyses. BV Labs did recommend submitting samples without preservative going forward. We reiterate our previous recommendation to examine preserved and unpreserved samples at both labs concurrently to provide additional information on potential issues.

Recommendation: We reiterate the recommendation provided in comments on the 2019 AEMP review (EMAB Comment #8) which was to analyse ammonia in preserved and unpreserved

samples at both laboratories concurrently. This would assist with confirming the utility of the 2020 data set (and previous data) as well as provide information for potential options moving forward.

2.3 PLANKTON AND EUTROPHICATION INDICATORS

2.3.1 Phytoplankton Data Comparability

Phytoplankton analyses (composition and biomass) for the 2020 samples were conducted by a new taxonomist. It had been previously noted that a change in taxonomist in 2013 resulted in differences in phytoplankton results and the normal ranges for phytoplankton metrics were recalculated using the 2013 to account for these differences.

A study was undertaken as part of the 2020 AEMP to examine the effects of changing taxonomists on phytoplankton results (i.e., biases or inter-laboratory differences). This study entailed re-analysis of five phytoplankton samples from 2017 by the current taxonomist (Biologica) and comparing the results to those reported by the previous (Eco-Logic) taxonomist.

This study revealed substantive differences between the two laboratories, most notably in relation to measurements of richness and biomass of certain groups (chlorophytes, cyanobacteria, and dinoflagellates). The report notes that differences in methods used may have contributed to the observed differences between the laboratories. It is evident that there is greater variability between labs than within the current laboratory; this can be seen by comparing the results presented in Attachment A and B in the 2020 AEMP report, as summarized in Figure 1 below.

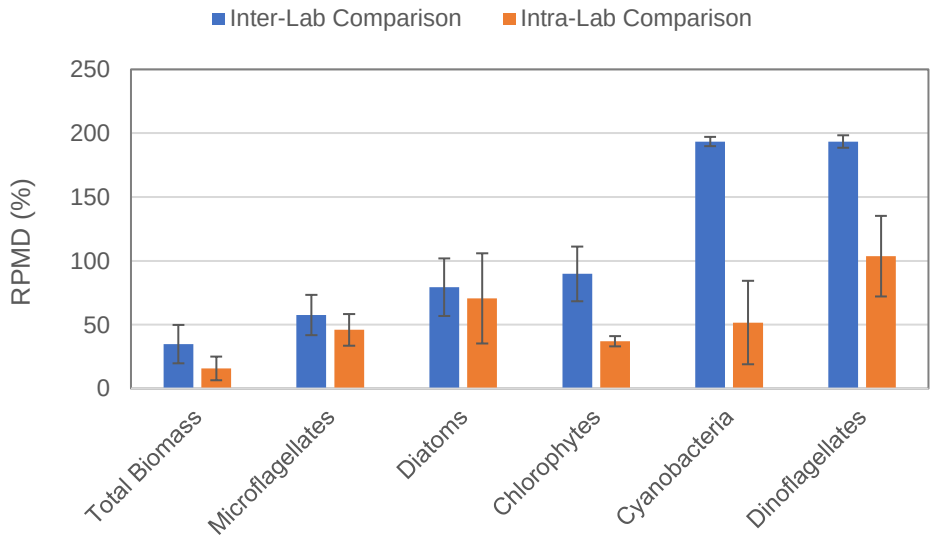

Figure 1. Comparison of mean±standard error of relative percent mean difference (RPMD) values derived from comparisons of results between labs and within the current lab.

The inter-laboratory comparisons indicate substantive issues with: (1) use/appropriateness of the normal ranges for phytoplankton; and (2) making comparisons over time. These issues affect the ability to apply the current action level triggers, to calculate the spatial extent of effects, and to track changes over time.

The AEMP suggests either dropping richness from the action level assessment or recalculating the normal range to account for the higher richness reported by the current taxonomist. It is noted that other issues were observed in the study which indicate that re-calculation of normal ranges should be done for all metrics.

It is also unclear how data will be treated over the period of monitoring as there have now been four different laboratories used to analyse phytoplankton samples since 2002. Assuming results are not comparable among the labs, different normal ranges should be applied for each dataset and any temporal comparisons would need to be qualified or corrected to account for these differences.

Laboratory	Years
Bio-Limno Research & Consulting, Inc.	2002-2012
Eco-Logic Ltd.	2013-2017
Advanced Eco solutions	2018-2019
Biologica Environmental Services, Ltd.	2020

Recommendation 1: Retain the richness metric in the action level assessment.

Recommendation 2: Recalculate the normal ranges for phytoplankton metrics (all metrics).

Recommendation 3: Provide a description of how temporal trends and comparisons between years will be done given the issues with comparability of data sets.

Recommendation 4: Investigate options for modifications to the study design and/or action level evaluations to account for issues with changes in taxonomists over time.

Recommendation 5: Use the same methodologies as the previous taxonomist (Eco-logic) moving forward.

Recommendation 6: Recommend further analysis comparing lab results through examination of additional samples - in particular, if the normal range is adjusted to account for the differences in richness or other metrics between the labs. Recommend analysing split samples at the same (current) lab for the 2017 samples to further explore relative variability of within and between lab differences. Include a comparison of relative percent mean differences (RPMDs) for richness for the split samples vs. the inter-laboratory comparisons to examine relative variability.

3.0 DETAILED TECHNICAL REVIEW COMMENTS

Detailed technical review comments and recommendations are provided in the following Table 1.

Table 1. Technical review comments and recommendations on the 2020 AEMP Annual Report.

TOPIC	COMMENT	RECOMMENDATION
Appendix I, Dust Deposition Report, Executive Summary, p. i	The executive summary (p. i) indicates: "Although it is expected that fugitive dust generation is higher during snow-free periods because of exposed road surfaces, the difference between the summer and winter dustfall rate was generally minor with the summer rate being higher at most sites (e.g., Dust 1 rate was 596 mg/dm^2/y in the summer and 164 mg/dm^2/y in the winter), while some sites recorded a higher winter dustfall rate (e.g., Dust 2A rate was 298 mg/dm^2/y in the summer and322 mg/dm^2/y in the winter)." This is the only location in the appendix where seasonality of dust deposition is mentioned. Since the report pools data collected from the snow surveys - which inherently measure dust deposition in winter only - with the dust gauge survey results, a detailed review of the seasonality of the dust data set is critical. From examination o the data presented in Appendix B, it appears that 10 of the 14 sites had equal or higher rates of deposition in "summer" - differences ranging up to >3 times the winter rates.Deposition rates for the open-water season and ice-cover season for each site should be presented in a table format. Although raw data are provided in appendices, there is insufficient information presented in the appendix to determine how the above "summer" and "winter" rates were calculated. NSC had also requested this information in the review of the 2019 AEMP (EMAB Comment #3). The response provided by DDMI: "Feb 10: Seasonal dust deposition rates are provided in tabular format in Appendix B (Dustfall Gauge Analytical Results) of Appendix I (Dust Deposition Report), as cited in Section 3.1 of the 2019 AEMP Annual Report." did not provide the requested information.	Please provide estimates of dust deposition for the summer and winter periods separately for each site in a table format.
Appendix I, Dust Deposition Report, Section 2.1, Methodology, Dustfall Gauges, p. 2-5, Figure 2-1.	The figure (2-1) uses different site IDs than used in the text of the report. For example, Section 3.4 (p. 3-19) states: "The SS2 transect stations (SS2-1, SS2-2, SS2-3 and SS2-4), in addition to station SS1-5 all recorded low dustfall rates. Stations SS2-4, SS1-5 and SS3-5 recorded lower dustfall rates than the control sites SSC-2 and SSC-3, indicating that the rates at these two control sites may not be representative of background values, suggesting that dustfall rates at the control sites are potentially affected by the Project." However, the map showing sampling sites (Figure 2-1) does not show any sites with the IDs SSC-2 and SSC-3. It is unclear what sites are referred to here.	Correct the appendix to use consistent sampling site IDs in text, tables, and figures.

TOPIC	COMMENT	RECOMMENDATION
Appendix I, Dust Deposition Report, Section 3.1, Results, Dustfall, p. 3-11, Figure 3.1-5	Figure 3.1-5 presents annual dust deposition rates for the period of 2002-2020 as a box plot. It is unclear what data are included in the figure.	Add a clarification of what data are represented in Figure 3.1-5.
Appendix I, Dust Deposition Report, Section 3.3, Results, Snow Water Chemistry, p. 3-13 to 3-19	The snow chemistry results presented and discussed in the report are limited to those for which there are Effluent Quality Criteria and phosphorus. As noted in a review of the 2017-2019 AERER (NSC 2021a), the results that are analysed and presented should include parameters that were identified as Substances of Interest (SOIs) in the water and sediment quality components.	The dust deposition assessment should include an assessment of all parameters identified as SOIs in the water quality and/or sediment quality assessments.
Appendix I, Dust Deposition Report, Section 3.3, Results, Snow Water Chemistry, p. 3-13 to 3-19	The snow chemistry results are presented as concentrations in figures and in Table 3-1. However, the rates of deposition of nutrients and metals should be presented - similar to the way results were reported in the 2017-2019 AERER (e.g., Section 3.3.1.2, p. 44-46).	Present snow chemistry results as mg/m2/year in a table and/or figures.
Appendix I, Dust Deposition Report, Section 3.3, Results, Snow Water Chemistry, p. 3-14 to 3-18, Figures 3.3-1 to 3.3-4	The figures 3.3-1 to 3.3-4 present snow water chemistry results arranged into categories of distance from the mine and an undefined category referred to as "AEMP". It is unclear what the data are that are plotted under the "AEMP" label.	Clarify what AEMP refers to in Figures 3.3-1 to 3.3-4.

TOPIC	COMMENT	RECOMMENDATION
Dust Deposition, General Comment	NSC had previously recommended in the review of the 2019 AEMP that Diaivk retain the new, more distant control-assessment sites in long-term monitoring and apply these data as reference sites in future analyses. (EMAB Comment #2). DDMI indicated in the 2017-2019 AERER that: "The current number and location of the dustfall and snow water monitoring locations are sufficient to evaluate both the spatial and the temporal trends of dust deposition (e.g., Figure 3-11 and 3-18); nutrient deposition (Figure 3-12 to 3-15 and 3-19); and metal deposition (Figures 3-16, 3-17 and 3-20) in the vicinity of the Mine. In 2019, four new control-assessment locations were added to the dust monitoring program and analyses showed no significant differences between dust deposition rates measured at the control-assessment locations and measured at the snow control stations over years. Consequently, no additional monitoring locations are recommended at this time." (p. 656-657; Golder 2020). NSC appears to have misinterpreted this statement in the 2017-2019 AERER and our review of the AERER to mean that NSC's recommendation was accepted and that the sites were retained; this appears however, to be an incorrect interpretation as these new control-assessment sites were not sampled in 2020:	Reinstate monitoring at the four control-assessment sites.
Appendix II, Effluent and Water Chemistry Report, Section 3.1, Results, Substances of Interest, p. 23	Seven water quality variables (boron, cobalt, iron, lead, thallium, tin, and zinc) were added to the list of SOIs as they triggered Criterion 4, which requires the median value in the MF to exceed two times the median value of the normal range. This is intended to provide a means for identifying substances that may be elevated in the MF area due to dust or combined effects of dust and effluent. Only two of these variables (lead and zinc) are discussed in the dust deposition report and even for those two variables, the results presented and discussed are limited to concentrations of metals in snow samples and no discussion of deposition rates is provided (see comment above). If the objective is to monitor for dust effects in the aquatic environment, it would be appropriate to include an assessment of the same SOIs identified in the water quality component in the dust component.	Include all SOIs identified in the water quality assessment through Criterion 4 (i.e., links to dust) in the dust deposition report results and discussion.
Appendix II, Effluent and Water Chemistry Report, Section 3.7, Results, Effects From Dust Deposition, p. 103	The report recommends discontinuing analysis of dust deposition effects on water quality in Lac de Gras in future reporting.:	Recommend retaining this assessment in reporting and including more direct links with the dust deposition assessment in reporting.

TOPIC	COMMENT	RECOMMENDATION
Appendix II, Effluent and Water Chemistry Report, Excel Data File "AppII_WQ_AttD1-2_SNP_RawData	There are no temperature data provided for the effluent quality or mixing zone SNP Stations. NSC provided a recommendation to examine the effects of effluent on water temperature in the NF; differences in fish health metrics have been attributed to habitat differences, including differences in water temperature in previous reports (NSC 2021a). It is noted that temperature profile data are included for the NF, MF, and FF sites in the report.	Include temperature monitoring data for effluent and the mixing zone SNP Stations. Assess/discuss. potential effects of effluent discharge on water temperature in the receiving environment. If data are insufficient to assess potential effects, recommend collecting additional information in future monitoring.
Attachment B, QA/QC Methods and Results, p. B-13 to B-15 & Annex A and B	There are ongoing issues with the quality of results for ammonia in water; this issue has been the focus of several studies to try to identify and ideally eliminate the issue. EMAB Comment #8 from the 2019 AEMP Annual Report review recommended that some additional investigations be undertaken in the 2020 AEMP. The recommendation was to add analysis of ammonia in preserved and unpreserved samples at both laboratories to assist with confirming the utility of the 2019 data set as well as provide information for potential options moving forward.DDMI responded that the 2020 program had already been completed at that time and also indicated that these suggestions for additional analysis would not be helpful.An ammonia investigation was undertaken in 2020 and it identified issues with the quality of data from BV labs for the winter (due to contamination from the preservative) and the ALS results were used. In the open-water season samples were submitted to BV labs without preservative (to control for sample contamination from this source) but it was concluded that the ALS results were recommended for reporting.The results of the detailed inter-laboratory comparisons done by BV Labs did not reach a firm conclusion regarding the ongoing issues with the ammonia analyses. BV Labs did recommend submitting samples without preservative going forward. We reiterate our previous recommendation to examine preserved and unpreserved samples at both labs concurrently to provide additional information on potential issues.	We reiterate the recommendation provided in comments on the 2019 AEMP review (EMAB Comment #8) which was to analyse ammonia in preserved and unpreserved samples at both laboratories concurrently. This would assist with confirming the utility of the 2020 data set (and previous data) as well as provide information for potential options moving forward.

TOPIC	COMMENT	RECOMMENDATION
Appendix XI, Plankton Report, Section 1.3, Results, Phytoplankton Community, Phytoplankton Taxonomic Richness and Biomass, p. 12	The report provides recommendations to either drop phytoplankton richness from the Action Level evaluation, or the normal range for phytoplankton richness be adjusted to reflect the difference between taxonomists, by shifting it upwards by an appropriate number based on the difference between taxonomists. Richness should continue to be included in the action level evaluation and the latter recommendation (retain the metric but re-calculate the normal range for richness) should be accepted. Furthermore, the difference in results observed between the different taxonomists (the 2020 taxonomist and the taxonomist(s) used in 2013 when the normal range was derived; see Attachment A), re-calculation of the normal range for all phytoplankton metrics should be undertaken. It is agreed that making spatial comparisons within the lake in the same year (i.e., 2020) is reasonable as all samples were analysed by the same taxonomist. However, if the normal range is not corrected moving forward there will be limited ability to analyse phytoplankton data. It is also unclear how temporal trends will be conducted in the future given the recognized differences in results relating to a change in taxonomist.	1. Recommend retaining the richness metric in the action level assessment. 2. Recommend recalculating the normal ranges for phytoplankton metrics (all metrics). 3. Recommend providing a description of how temporal trends and comparisons between years will be done given the issues with comparability of data sets.
Appendix XI, Plankton Report, Attachment A, Section 1.3, Results, Phytoplankton Taxonomist Comparison, p. A-1 to A-14	The comparisons between taxonomists were completed on 5 samples and showed large differences (>50% RPMD) for most measurements/metrics and in some cases very large (>100% RPMD) differences. This comparison confirms that the use of the current normal ranges for phytoplankton metrics are not appropriate. These substantive differences also suggest that the ability to compare results over time (with different labs) is problematic and possibly not feasible; the large differences imply that the program would be incapable of detecting relatively large changes over time.Comparing RPMDs derived from intra-lab (Attachment A) and inter-lab (Attachment B) indicates that on average biomass measurements were relatively similar for total biomass, microflagellates, and diatoms, but larger differences were noted for chlorophytes,dinoflagellates, and cyanobacteria. Further, there was a greater range (particularly maximum) RPMD values for the inter-laboratory comparisons than observed for the inter-laboratory QC.Collectively, these data, though limited, indicate normal ranges should be revisited, an approach for comparing data over time, and potentially a new study design/analysis approach may be required to track changes over time.	1. Recommend recalculating the normal ranges for phytoplankton metrics (all metrics).2. Recommend providing a description of how temporal trends and comparisons between years will be done given the issues with comparability of data sets.3. Investigate options for modifications to the study design and/or action level evaluations to account for issues with changes in taxonomists over time.

TOPIC	COMMENT	RECOMMENDATION
Appendix XI, Plankton Report, Attachment A, Section 1.3, Results, Phytoplankton Taxonomist Comparison, Methods, p. A-2	The report indicates that differences in duration of settling times used by the two taxonomists may have affected comparability of the data sets (numbers and types of species encountered in the samples). It may be most effective to try to replicate the methods of the last taxonomist (Eco-logic), including settling durations, to attempt to minimize differences and effects on results.	Use the same methodologies as the previous taxonomist (Eco-logic) moving forward.
Appendix XI, Plankton Report, Attachment A, Section 1.3, Results, Phytoplankton Taxonomist Comparison, Results, p. A-3	The report indicates that comparisons of results between the taxonomists indicated greater similarity for microflagellates and chlorophyte counts (abundance) than other major groups. The report further states that these groups comprised the majority of the total phytoplankton abundance. "On average, microflagellates and chlorophytes accounted for the majority of the total abundance in the samples analyzed by both Eco-logic (average: 77%) and Biologica (average: 73%)." The reported higher agreement for the dominant groups is then used as evidence of similarities between the taxonomists overall: "These results suggest that although there were notable differences in reported abundances by the two taxonomists for some major phytoplankton groups, the data for total phytoplankton abundance and abundances of two major groups that account for a large proportion of total abundance are comparable." However, this statement is not an accurate representation of the results of the taxonomist comparisons. While microflagellates were the dominant group in both sets of results (63 and 61%), the next most dominant taxa differed between the two labs (diatoms =21 % from Eco-logic and cyanobacteria = 24% from Biologica). Chlorophytes were not the second most dominant groups in either dataset.	Correct the text and interpretation of the results to accurately reflect dominant groups between the two sets of results.

TOPIC	COMMENT	RECOMMENDATION
Appendix XI, Plankton Report, Attachment A, Section 1.3, Results, Phytoplankton Taxonomist Comparison, Results, p. A-8	Substantive differences in species richness were observed in the inter-laboratory comparisons; more genera (high richness) were identified by Biologica. Further, the dominant genus differed between the two labs; the dominant genus identified by Biologica was not identified at all as being present by Eco-logic. These observations further question the comparability of data between the labs and therefore ability to track changes over time or to use the normal ranges for comparisons and within the action level evaluation.	Recommend further analysis comparing lab results through examination of additional samples - in particular, if the normal range is adjusted to account for the differences in richness between the labs. Recommend analysing split samples at the same (current) lab for the 2017 samples to further explore relative variability of within and between lab differences. Include a comparison of RPMDs for richness for the split samples vs. the inter-laboratory comparisons to examine relative variability.
Appendix XIII, Eutrophication Indicators Report, Section 1.3, Introduction, Scope and Approach, p. 9	The report indicates that a value of TN (480 ug/L) was omitted from the calculation of the extent of effects and instead the value for TKN (150 ug/L) was used. The report notes that there was a large discrepancy between the TN and TKN, DKN, and TDN results indicating it is likely inaccurate. We agree with omitting this suspect value and note that the other nitrogen data support the use of an alternate value since calculated TN is 140 ug/L TKN + <1 mg N/L nitrate/nitrite ≈ 150 mg/L. However, it is noted that it is DKN that was 150 ug/L - the measurement for TKN was lower (140 ug/L) according to the raw excel data file provided. Suggest using the higher of the two values to be conservative.	Use the value for DKN (150 ug/L) for calculation of the extent of effects for this data point. Provide a description of the analytical method for TN.

TOPIC	COMMENT	RECOMMENDATION
Appendix XIII, Eutrophication Indicators Report, Section 3.2.6, Results, Extent of Effects, p. 58, Figure 3-32	Figure 3-32 presents the extent of effects (as a percent of lake surface area) for nutrients and plankton over the period of 2007-2020. This is a useful figure. However, it is unclear how the values for total phytoplankton biomass were generated and therefore if they can appropriately be compared. Specifically, the normal range for this parameter was calculated using the 2013 dataset. This was done because of the change in lab/taxonomist that occurred in 2013 and acknowledges there may be issues with comparing data pre- and post-2012. It is unclear if the values presented in Figure 3-32 were calculated using the current normal range (which is based on measurements from a different taxonomist) or using a normal range derived from the 2007-2010 dataset. Comparing the 2020 data to the existing normal range is also problematic as discussed in previous comments.	Please clarify how the 2007-2010 phytoplankton biomass extent of effects values were calculated (i.e., what normal range was used as the basis of the comparison). Add any necessary qualifiers to the text to identify any potential caveats regarding making direct comparisons using results generated by different taxonomists.
Appendix XIII, Eutrophication Indicators Report, Attachment E, Figure E-1	Figure E-1 presents the extent of effects for TN in Lac de Gras but the figure caption indicates the results are from 2019.	Confirm Figure E-1 presents results from 2020 and correct the figure caption.

4.0 REFERENCES

Golder. 2021. Diavik Diamond Mines (2012) Inc. Aquatic Effects Monitoring Program 2020 Annual Report. Submitted to Diavik Diamond Mines (2012) Inc. Yellowknife, NT, March, 2021.

Golder. 2020a. Diavik Diamond Mines (2012) Inc. Aquatic Effects Monitoring Program 2019 Annual Report. Submitted to Diavik Diamond Mines (2012) Inc. Yellowknife, NT, October 27, 2020.

Golder. 2020b. Diavik Diamond Mines (2012) Inc. 2017 to 2019 Aquatic Effects Re-Evaluation Report for the Diavik Diamond Mine, Northwest Territories. Submitted to Diavik Diamond Mines (2012) Inc. Yellowknife, NT, December, 2020.

North/South Consultants Inc. (NSC). 2021a. 2017-2019 Aquatic Effects Aquatic Effects Re-Evaluation Report – Plain language briefing and technical review comments. Prepared for the Environmental Monitoring Advisory Board. Technical Memorandum # 367-21-03. July 19, 2021.

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