

ENVIRONMENTAL MONITORING ADVISORY BOARD FOR THE DIAVIK MINE

Working with *the* People *for the* Environment



ANNUAL 2016
2017
REPORT



ENVIRONMENTAL MONITORING ADVISORY BOARD FOR THE DIAVIK MINE

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REPORT CARD ON THE ENVIRONMENT

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At the beginning of the Project (1998-1999), Diavik went through an Environmental Assessment to learn more about the water, vegetation, air, fish, and wildlife in the area. All of this information was documented in the Comprehensive Study Report where Diavik also made predictions about environmental changes that would happen as a result of the mine. This report card gives an overall picture about how much the environment has changed at Diavik, and how in line the changes are with predictions.

WATER

Water quality is within licence limits and predictions. Diavik exceeded its Total Suspended Solids limit on one day in 2016 during construction of the A21 dike.

Lac de Gras is experiencing mild nutrient enrichment in parts of the lake based on chlorophyll *a* measurements. Nutrient enrichment can lead to increases in lake productivity, but can also have negative consequences due to increased oxygen consumption in the system. The extent of the area affected has shown large, variable increases above normal in recent years (25% of the lake in 2013, 42% in 2014, 10% in 2015 and 43% in 2016). This is beyond the predicted extent of effect, which was 20% of the lake.

A recent study by Diavik shows the main source of phosphorus in Lac de Gras is likely from dustfall not mine effluent, although the portion of airborne phosphorus available for nutrient enrichment of the lake is not known. The amount of dustfall in Lac de Gras may also be underestimated because Diavik only included winter dustfall data in the analysis. EMAB recommended that Diavik modify this program so that it can give accurate estimates of phosphorus loadings into Lac de Gras year round.

FISH

Small organisms living in the water are useful and easy-to-measure indicators of aquatic health. Benthics live on the lake-bottom, and zooplankton live in the water. There are more benthics closer to the mine compared to further away, however species diversity has not changed between these two areas. There has also been a slight change in types of zooplankton that live close to the mine. These changes suggest that increased nutrients in Lac de Gras from Diavik Mine's effluent are affecting benthics and zooplankton that live there.

Fish, plankton, and benthics in Lac de Gras are showing some health effects related to the mine.

EMAB will continue to monitor developments in this possible trend.

Community participants in Diavik's fish palatability study, last done in 2015, say taste and texture of fish in Lac de Gras have not changed.

Mercury levels in Lake Trout have been variable in Lac de Gras since the beginning of the mine, and in some cases, have been above consumption limits for sport and subsistence fisheries set by Health Canada. Mercury levels in fish in many other lakes in the NWT are increasing, and mercury has not been detected in Diavik's effluent, so this effect cannot necessarily be linked to Diavik. EMAB continues to monitor changes in mercury levels in fish in Lac de Gras; however Diavik requested a change to the AEMP and will no longer sample trout for mercury unless slimy sculpin, an early warning indicator species, show effects.

WILDLIFE

Diavik monitors caribou, grizzly bear, wolverine, raptors and the vegetation they feed on. Wildlife populations, besides caribou, are stable and effects are within or below predictions. The average population size of Bathurst caribou dropped from 349,000 in 1996 to





Photo courtesy of Diavik Diamond Mine

Brown Lake

about 19,000 in 2016. The cause of this decline is still not well understood – some other herds have also been declining but not as quickly. Community members have expressed concern that the mines have contributed to this effect.

The Zone of Influence for caribou has been much larger than predicted and EMAB recommended that Diavik consider what operational changes it can make to reduce the Zone of Influence; Diavik has not proposed any changes.

Two of Diavik's wildlife monitoring programs are on hold: caribou aerial surveys (since 2012), and wolverine hair snagging (since 2014), pending analysis and direction from ENR. Grizzly hair snagging will end in 2017 and is also waiting direction from ENR.

Caribou behavior data have not been analyzed since 2011 because Diavik determined there has not been enough near-mine data collected. EMAB is concerned with the increasing amount of time since data was last analyzed for these studies, and feels Diavik is not adequately answering some of the questions and objectives that need to be addressed through the life of the project.

AIR

Diavik studies air quality at the mine by measuring the amount of dust that falls out in Lac de Gras and on land, and with high-volume air samplers. Lac de Gras experienced increased dust levels near the A21 dike as construction activity for A21 occurred. This will likely

continue with above-ground mining of A21 starting in 2018. Snow core samples from Lac de Gras showed that some control areas had higher levels of dustfall than areas closer to the mine; EMAB has asked Diavik to consider other sources of dustfall that may be causing this.

Diavik's 2016 Vegetation and Lichen Monitoring Program showed that there is less lichen cover in areas close to the mine compared to further away. This is likely because vegetation close to the mine experience higher levels of dustfall than areas far from the mine.

Diavik's air quality report showed that total suspended particulate emissions were generally within GNWT guidelines in 2014 and 2015, with one exceedance in 2015. However, there were a number of days where data was not collected, and many issues with the data quality and methodology that put the data collected into question. EMAB recommended that a formal assessment of the Total Suspended Particulate program take place as soon as possible and identified a number of specific concerns about the current program. Diavik has not responded to this recommendation. The 2016 report will be reviewed this coming year.

CLOSURE

Diavik's plan is to close certain parts of the mine that it no longer uses so they can monitor the performance of the closure design while they are still operating at site. The North Country Rock Pile is the first part of the mine that Diavik is closing. They submitted a revised North Country Rock Pile closure plan after the WLWB sent the first one back for further community engagement. EMAB's concerns with the revised plan still include: quality of water running off the waste rock pile, safety of wildlife using the pile, lack of revegetation planning, lack of planning for long-term maintenance



and monitoring, the effects of climate warming on rock pile stability and runoff, and rationale for the security estimate. EMAB would like Diavik to address all our concerns in the plan before they begin closure activities on the North Country Rock Pile.

Diavik also submitted an updated closure plan for all mine site components. EMAB will be reviewing this plan in 2017-18.

Type III waste rock, which could produce acid leading to contaminated runoff, is supposed to be kept within the North Country Rock Pile, where it will be contained under a protective cover. Diavik misclassified some Type III waste rock (potentially acid-generating) as Type I (non acid-generating) starting in 2014, and has been using it in construction activities around the mine since then. The WLWB asked Diavik to assess the situation to report how this will affect mine closure. EMAB will monitor Diavik's assessment and activities to find the acidic rock and make sure it is handled properly.

ABOUT US



EMAB Closure Workshop, February 2017

HOW EMAB WAS FORMED

EMAB exists because of the Environmental Agreement (EA) for the Diavik Diamond Mine. The EA came into effect in March 2000. It was signed by five Aboriginal Parties, the Federal and Territorial governments and Diavik. EMAB is the environmental watchdog organization that came out of the Environmental Assessment to make sure the environment around Diavik remains protected. The EA states EMAB will work independently and at arm's length from Diavik and the other Parties who signed the agreement.

WHY THE EA IS IMPORTANT

The EA is a legal contract between the Parties. It says what Diavik and the Parties must do to minimize environmental effects of the mine. The EA says Diavik must meaningfully involve the Aboriginal Parties in environmental monitoring at Diavik mine. This includes the use of Traditional Knowledge and Inuit Qaujimajatuqangit (TK/IQ). Finally, the EA sets out EMAB's mandate.

WHAT EMAB DOES

EMAB was set up in 2001 and is in its 16th year of operations. EMAB's mandate is split up into four main areas:

1. Oversight and Monitoring
2. Aboriginal and Community Involvement
3. Communications
4. Leadership and Governance

WHO ARE WE?

There are eight Parties to the EA. Each Party appoints one Director to the Board. EMAB has two staff members:

- Executive Director
- Environmental Specialist

As a result of devolution, Canada and the GNWT are taking steps to revise the EA to reflect their changed roles. Canada has delegated its authority regarding the EA to the Government of the Northwest Territories (GNWT) in the meantime.

WHERE WE ARE LOCATED?

Our office is in downtown Yellowknife at 5006 Franklin Avenue, suite 204 on the 2nd floor of the 50/50 Mini Mall.

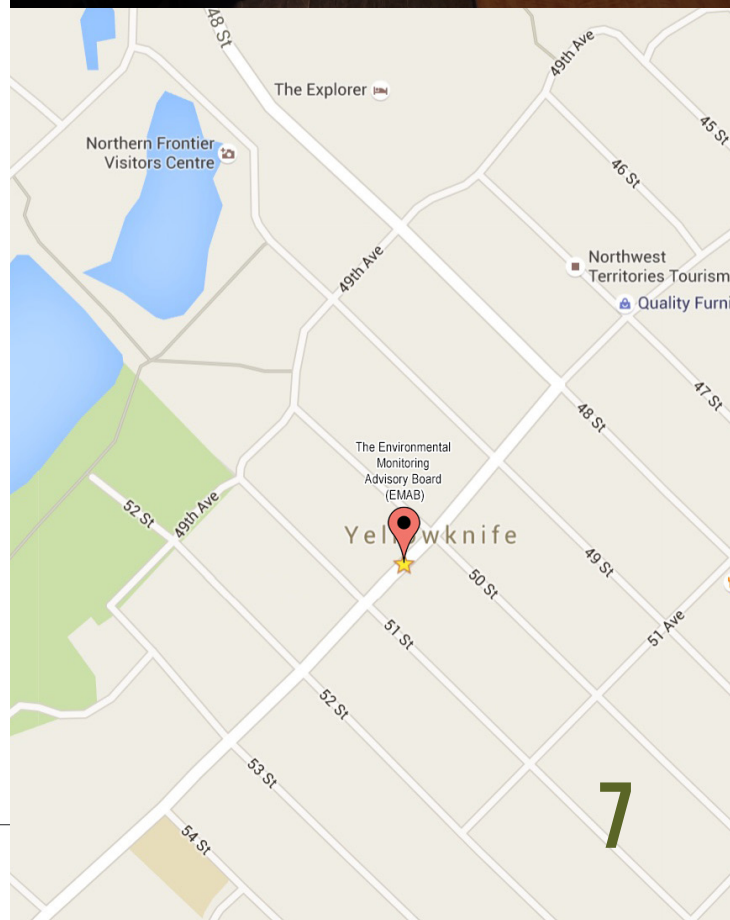
Phone: **867-766-3682**

Email: **emab1@northwestel.net**

Website: **www.emab.ca**



EMAB Closure Workshop, February 2017

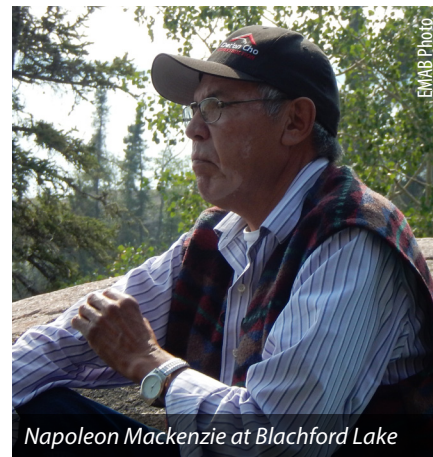


CHAIRMAN'S MESSAGE

"We have been engaging more often with Parties and the Affected Communities."

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EMAB Photo



Napoleon Mackenzie at Blachford Lake

It is an honour to deliver this message to the Parties to the Environmental Agreement, my fellow Board members and all those who are interested in following the important work that the Environmental Monitoring Advisory Board undertakes in monitoring the environmental effects of the Diavik mine.

I am very pleased that we now have a consistent team of board and staff, which I credit for accomplishing a huge amount of work in 2016-17. This last year has been one of the busiest in EMAB's history.

We have been engaging more often with Parties and the Affected Communities. We provided them with all our reviews, comments and recommendations on the many environmental reports and plans related to the mine to help them develop their own comments.

We were able to give updates to organizations that represent the Parties, including one in the community of Kugluktuk. We plan to hold community updates with each Aboriginal Party in the coming year.

The Board values input from Parties and communities in carrying out reviews and making recommendations; we always welcome any comments. This year we hosted a community workshop on the state of closure and closure planning at Diavik. We heard the community representatives' vision of how the mine should look when closure is complete, and their concerns about achieving their vision. During our site visit we saw hundreds of caribou near the mine, a sign that many viewed as hopeful for the area and the people who use it.

Board and staff visited the mine in September 2016 to see for themselves the changes that are going on there. Familiarity with the mine helped Board members to review the many monitoring reports and management plans on wildlife, water, closure, air quality, and community engagement, and to make more informed comments and recommendations to regulators and Diavik. We also tracked the construction of the A21 dike and the related issues of Diavik's request to amend the Total Suspended Solids limit in its water licence, and its

challenge to the Inspector's directive about Total Suspended Solids exceedances. We took leadership to assess the criteria Diavik was proposing to measure the adequacy of closure, and we recommended improvements.

We were able to reach agreement with Diavik on our 2017-19 budget this year. The budget is significantly less than previous years. We will be carefully assessing the effects of this reduced budget on our activities this year.

We also updated our strategic plan to reflect the changes that EMAB has gone through in the last few years: the changes to staff structure and roles, with greater emphasis on technical review; as well as the TK Panel transition to management by Diavik.

We launched our re-designed website – emab.ca - at the end of the year and encourage everyone to visit. We are looking forward to hearing any comments or ideas users might have.

On behalf of EMAB members and staff I would like to thank the Parties and community members for their interest, commitment and support for our work. We are looking forward to another good year, and working with you to protect the environment around the mine.

Napoleon Mackenzie, Chair



WHAT HAVE WE DONE THIS YEAR?

EMAB works with the people of the Affected Communities to help protect the environment around the Diavik mine.

This is a summary of our activities in 2016-17, with more detail on the following pages. Readers can also visit our website: EMAB.CA.

GOVERNANCE: The Board updated the strategic plan to reflect changes in EMAB's priorities, focus and structure as well as reduced resources. The emphasis continues on undertaking more technical reviews of Diavik's plans and reports, and providing these to the Parties for their information and use in making their own interventions to regulators. It also emphasizes the changed role of the TK Panel and EMAB's role in working with the panel. It emphasizes the need for tracking collection and use of TK/IQ by Diavik.

COMMUNITY INVOLVEMENT: EMAB held one community update meeting in 2016-17 in Kugluktuk, and updated two groups linked with the Parties. EMAB looks forward to providing community updates to each Party in 2017-18. EMAB organized a workshop on closure of the Diavik mine with participants from each Aboriginal Party.

BUDGET: EMAB reached agreement with Diavik on the next two-year budget for 2017-19. EMAB's budget for next year is \$487,140, more than \$100,000 less than the previous year.

OPERATIONS: EMAB's budget was \$634,651 in 2016-17. There were no staff changes from the previous year.



Community update in Kugluktuk, Nunavut in May 2016

REVIEWING REPORTS: In 2016-17 EMAB reviewed 19 reports from Diavik, most of which were also reviewed by technical experts. These reports are required by the water licence, fisheries authorizations and the EA. EMAB focuses on reports that are in our priority areas (water, air, wildlife, closure and TK/IQ).

COMMUNICATIONS: EMAB's website – emab.ca - has been re-designed to improve usability. We continue to produce an annual report accessible online through our website and in print. We also updated our poster and brochure.

BOARD MEETINGS: The Board met 13 times in 2016-17; six face-to-face meetings and seven conference calls. Board Members visited Diavik mine site in the fall.

The Board membership was the same in 2016-17 as 2015-16 providing valuable consistency and experience. The only change was Napoleon Mackenzie taking over the Chair at the September Annual General Meeting (AGM).

WHAT DO WE DO?

REVIEW Diavik's monitoring programs and reports with the help of technical experts

PROVIDE comments and recommendations to Diavik, the regulators and Parties to the EA

EVALUATE Diavik and regulators to make sure commitments are kept

PARTICIPATE in the regulatory process as a reviewer and intervenor

ADDRESS regulatory gaps including wildlife management, air quality and securities

COMMUNICATE through workshops, community information sessions, our website and annual report

ASSESS Diavik's use of TK/IQ in environmental monitoring program design

SUPPORT participation of Aboriginal Peoples in monitoring Diavik

LISTEN to community concerns and bring those forward to Diavik

WHO ARE WE?

There are eight parties to the Environmental Agreement. Each party appoints a member to the Board.



Napoleon Mackenzie,
Chair
YDFN



Charlie Catholique,
Vice Chair
LKDFN



Julian Kanigan,
Secretary/Treasurer
GNWT



Arnold Enge
NSMA



Gord Macdonald
DDMI



Jack Kaniak
KIA



Sean Richardson
TG

Vacant - Government of Canada



ENVIRONMENTAL SETTING OF DIAVIK MINE

Lac de Gras is a large lake, 60 kilometres in length, with an average width of 16 kilometres and 740 kilometres of shoreline. The lake is located roughly in the centre of the Slave Geological Province, north of the tree line, and in Canada's Southern Arctic ecozone. The area is cold and dry. Lac de Gras is the headwaters of the Coppermine River, which flows 520 kilometres north to the Arctic Ocean. Typical of arctic lakes, it is cold with long ice-covered periods and with little food for fish and other creatures. Fish species include lake trout, Cisco, round whitefish, Arctic grayling and burbot. Lac de Gras is also near the centre of the Bathurst caribou herd range. The caribou population has declined considerably from 186,000 in 2003 to 20,000 in 2015 (GNWT). Many other animals include the Lac de Gras area in their home ranges, such as grizzly bears, wolves, wolverines, smaller mammals, migratory birds and waterfowl.

Photo courtesy of Diavik Diamond Mine

DIAVIK NOW *(courtesy of Diavik)*

In 2016, Diavik celebrated many positive accomplishments:

- Produced 100 million carats of rough diamonds, since the mine commenced in 2003;
- Hauled 10 million tonnes of ore (kimberlite) from underground to surface, since underground mining began in 2010; and
- Processed 6.7 million carats of diamonds, during the year.

Another major milestone in 2016 was finishing in-lake rock placement for the new A21 dike. Construction continues in 2017, with mining set to begin in 2018.

Diavik also continued to work with our community partners to operate and plan the closure of the mine responsibly, leaving behind a positive community and environmental legacy. One of the key closure activities was updating and reviewing the Closure and Reclamation Plan, and we consulted with all Participation Agreement communities and other stakeholders to draft Version 4 of the plan.

Another important goal for Diavik is to incorporate both scientific and Traditional Knowledge (TK) into our closure planning process. During the 2016 TK Panel session, the Panel focused on caribou management and monitoring at closure, and generally supported the final closure plan for the North Country Rock Pile. To date, they have made 156 recommendations to Diavik.

INVOLVING AND SUPPORTING COMMUNITIES

EMAB Board members appointed by Aboriginal Parties are a key link between the Board and Affected Communities. They are able to update community members on EMAB activities and bring back any concerns raised by the community. In the past EMAB has set aside a budget to support members to update their communities, but with cuts to EMAB's overall budget and a lack of uptake by Board members, this community consultation budget is now minimal.

EMAB reviewed 19 reports and plans in 2016-17 as well as proposed legislation. All these reviews were forwarded to the Parties to the EA and the land/environment managers for each Party. Technical reviews always include a plain-language summary to make them more accessible. EMAB also makes these reports available on our website.

EMAB staff gave the Kwe Beh Working Group (established by TG) an update on April 26, 2016. The Working Group members had questions about the effect of the mine on caribou and general

concerns about the health of caribou, as well as the need to plan for caribou movement around the mine site after closure. It was noted that TG believes the Zone of Influence (ZOI) of the mine on caribou is much larger than the monitoring programs have concluded.

EMAB's KIA representative and EMAB staff updated the KIA Board and held a community meeting May 4, 2016. The meeting was attended by about 15 people. There were questions and concerns expressed about: the effect of Diavik on the Coppermine River, the need for Diavik to do a thorough clean up at closure and not to dispose of anything by burying it, and about the health of fish. Staff were lucky to be delayed in Kugluktuk due to weather, so were able to attend the KIA community feast the following evening.

EMAB staff participated in a community update in Behchokò on May 11. Ecology North partnered with the Community Government of Behchokò and



Inuit drum dancing in Kugluktuk, May 2016

TG to host a public event about water. The purpose of the event was to provide an opportunity for community members to learn more about aquatic monitoring happening in the NWT. EMAB was invited to present on the aquatic effects monitoring that Diavik carries out in Lac de Gras. There were numerous other engagement activities including a 3-D watershed model and tour of the water treatment plant in Behchokò.

KIA member Jack Kaniak gave KIA Environment staff an update in February 2017 with discussions focusing on closure and the North Country Rock Pile (NCRP), the need for long-term monitoring of closure, the Total Suspended Solids (TSS) amendment process, mercury levels in lake trout, and extent of nutrient enrichment in Lac de Gras.



EMAB Photo

EMAB Closure Workshop

EMAB CLOSURE WORKSHOP

In February EMAB organized a workshop on closure of the Diavik mine that focused on participants from each of the five Aboriginal Parties to the EA as well as on Board members. The goals of the workshop were to:

- Help participants learn about current closure plans
- Get feedback on issues and concerns, particularly from community participants

- Plan for next steps on input into closure decision-making

The workshop included presentations from Diavik, technical experts EMAB works with in reviewing closure plans, and the Wek'èezhii Land and Water Board (WLWB). Participants also went on a site tour at Diavik. Participants commented the site tour would have been better in the summer. They were not able to see the mine clearly due to snow cover, and were kept in the tour vehicle due to the cold. However, participants were very pleased to see large numbers of caribou near the site

(estimated at hundreds to a couple of thousand).

The workshop will be very helpful for EMAB, and Affected Communities, in responding to future versions of Diavik's closure plans. The workshop set out an overall Vision for the site and discussed each site component. The participants recommended that:

- Diavik needs to engage more fully with communities on closure
- Wildlife will return to the site so it should be safe for wildlife and neutral for attracting or repelling wildlife
- Site should be revegetated as close to pre-development conditions as possible
- Water quality should be like it was before development
- Long-term monitoring is needed to make sure the Processed Kimberlite Containment (PKC) Facility and waste rock piles do not fail.
- Community members will want to go to the site to observe the recovery; once wildlife returns people will want to go there to hunt.

In 2011 EMAB became more actively involved in bringing TK/IQ holders together as a TK Panel, to address issues such as caribou and closure planning. Then in 2013 Diavik began to take a greater role in facilitating the TK Panel, with EMAB assessing the results of the work and Diavik's response. EMAB also made recommendations to Diavik on ways to more effectively work with the panel.

TRADITIONAL KNOWLEDGE / INUIT QAUJIMAJATUQANGIT

EMAB's strategic plan includes objectives to assess the use of TK/IQ in Diavik's monitoring programs as well as requesting Diavik provide an annual update on use of TK/IQ in monitoring and management at the mine. EMAB has identified Diavik's use of TK/IQ in environmental management and monitoring at the mine site as a monitoring priority. The meaningful involvement of Aboriginal people in environmental monitoring program design, as well as the inclusion of TK/IQ has been an EMAB priority since EMAB's creation. EMAB has tried various ways to encourage Diavik to take action on this EA commitment.

Another EMAB strategic objective is to develop a reporting protocol on TK/IQ with the TK Panel. EMAB plans to meet with some Panel members to review the Panel's work early in 2017-18. EMAB is pleased to see that Diavik has made efforts to include TK/IQ in closure planning through the TK Panel. The Panel's recommendations, and Diavik's responses, are included as part of Diavik's closure planning reports and can be found on the EMAB website: EMAB.CA.

EMAB's Chair and Environmental Specialist attended the final day of a TK Panel meeting at the Diavik mine site on May 16. The Panel met to discuss the NCRP Final Closure Plan. EMAB representatives observed the TK Panel present their recommendations on the NCRP Final Closure Plan to Diavik. Diavik staff gave the Panel an initial answer to each recommendation on whether it was feasible, but planned to give the Panel formal answers with rationale at the next TK Panel meeting tentatively scheduled for fall 2017.



OVERSIGHT AND MONITORING

Photo courtesy of Diavik Diamond Mine

EMAB monitors Diavik and regulators to make sure they are doing a good job protecting the environment around the Diavik mine and are keeping the promises they made in the EA.

Most of EMAB's focus is on Diavik's environmental monitoring programs and reports, and on the way the regulators handle them. When EMAB notes concerns coming from regulators we take that as a signal that we need to know more about the issues. These issues are outlined in the following pages.

Each year we do our own reviews of the Wildlife Monitoring Program report and the Aquatic Effects Monitoring Program report. We also review reports on Air Quality and on Closure and Reclamation. Occasionally we review other reports.

WHO ARE THE REGULATORS AND MANAGERS?

- **Wek'èezhii Land and Water Board (WLWB)** are responsible for the Diavik water licence and the technical review of all documents required under the licence. The WLWB is a regional panel under the Mackenzie Valley Land and Water Board (MVLWB).
- **Canada**
 - › **Department of Fisheries and Oceans (DFO)** reviews some of the reports submitted under the water licence and all the reports submitted under the fisheries authorizations.
 - › **Environment and Climate Change Canada (ECCC)** reviews the reports required by the water licence focusing on water and air quality. ECCC officers inspect compliance with federal environmental regulations and permits, such as Fisheries Authorizations.

- **GNWT**
 - › **Department of Lands** reviews reports required by the water licence and the land leases. Lands has an Inspector assigned to Diavik. This Inspector updates the Board regularly to keep us aware of what is happening at the site. The Inspector is also responsible for ensuring Diavik meets the terms of its water licence and land leases.
 - › **Environment and Natural Resources (ENR)**, has regulatory responsibility for wildlife,

including monitoring under the Wildlife Act. It also proposes better ways to monitor effects of Diavik on wildlife. ENR also has responsibility for environmental protection, including air and water quality, and provides detailed reviews of reports in these areas.

- **Wek'èezhii Renewable Resources Board (WRRB)** is a wildlife co-management authority established by the Tłı̨chǫ Agreement. The WRRB is responsible for managing wildlife and wildlife habitat (forests, plants and protected areas) in the Wek'èezhii area.

REPORTS RECEIVED FOR REVIEW

Table 1

Report Name	Date Received	Regulatory Instrument
ICRP (Annual, 2015) including North Country Rock Pile Final Closure Plan	21 Jan 2016	Water Licence
Consolidated Report: NI Sludge Management Report and NI Hydrocarbon Investigation Report	26 Feb 2016	Water Licence
Site-Specific Risk-Based Closure Criteria Report	17 March 2016	Water Licence
Type 'A' Water Licence (Annual, 2015)	21 March 2016	Water Licence
Management Plans (Annual, various) 2015: Hazardous Materials (Ver 19), Operational Phase Contingency Plan (Ver 20)	30 March 2016	Water Licence
Seepage Report (Annual, 2015)	31 March 2016	Water Licence
Waste Rock Management Plan (Ver 7)	31 March 2016	Water Licence
WMP (Annual, 2015): includes Waste Management Plan, Lichen and Permanent Vegetation Plot Monitoring Programs	31 March 2016	Environmental Agreement
AEMP (Annual, 2014, re-submission)	31 March 2016	Water Licence
Environmental Agreement Annual Report	16 May 2016	Environmental Agreement
EAQMP (Annual, 2014 & 2015 Combined)	9 May 2016	Environmental Agreement
GNWT Proposed Air Regulations	6 June 2016	Environmental Agreement
AEMP Design Plan (Version 4)	14 Jul 2016	Water Licence

Report Name	Date Received	Regulatory Instrument
AEMP (Annual, 2015)	15 Sep 2016	Water Licence
Waste Management Plan Version 1.2	27 Oct 2016	Water Licence
Engagement Plan Version 2.0	5 Jan 2017	Water Licence
Bathurst Caribou Range Plan Interim Discussion Paper	6 Mar 2017	Environmental Agreement
Type 'A' Water Licence (Annual, 2016)	30 March 2017	Water Licence
Processed Kimberlite Trial Extension Request	28 Mar 2017	Water Licence
Seepage Report (Annual, 2016)	31 March 2017	Water Licence
WMP (Annual, 2016): includes Waste Management Plan	31 March 2017	Environmental Agreement
WRSA Final Closure Plan Version 1.1	19 May 2017	Water Licence

TSS AMENDMENT APPLICATION

Diavik applied to amend the TSS limit in its water licence in October 2015 (see 2015-16 Annual Report). The WLWB held a hearing in February 2016. EMAB did not intervene since Diavik had already addressed its concerns. EMAB staff observed the hearing.

On May 11, 2016, the WLWB sent their recommendation for the new TSS limit to the Minister for review. The limit was more stringent than what interveners or Diavik proposed.

Two days after the WLWB made its recommendation, Diavik wrote asking the Minister to defer his decision. Two weeks later the company wrote asking the Minister deny approval of the amendment, with its reasons.

YKDFN and LKDFN both wrote the Minister stating concerns that Diavik's letters tried to affect the decision process outside the WLWB review.

On June 24, 2016 the Minister rejected the WLWB's recommended amendment due to procedural fairness issues; he said the limit recommended by the WLWB had not been introduced as evidence during the review, so Diavik and the interveners did not have the opportunity to comment on it. In a separate letter, he stated that he did not consider any new information in making his decision.





Photo courtesy of Diavik Diamond Mine

The WLWB then re-opened the review process. Diavik submitted a revised amendment application. EMAB reviewed the revised application and had no concerns. The WLWB held a Technical Session on July 26, 2016 that EMAB staff attended. On July 27 Diavik withdrew its amendment application; it felt that by the time a decision could be made, the construction of the A21 dike would be largely complete.

INSPECTOR'S DIRECTION ON TSS EXCEEDANCES

On August 19, 2015 the Inspector wrote to Diavik following a TSS exceedance and warned, under

Section 67(1) of the Waters Act, that he would issue a stop work order if other A21 in-water construction activities led to more exceedances.

On September 4, 2015 Diavik wrote to the GNWT requesting the Inspector's Direction/Warning be withdrawn. Diavik argued the Inspector did not have authority under section 67(1) to issue the direction, and that it was based on incorrect findings.

GNWT responded on September 9, 2015 that the concerns in the Inspector's original letter had been resolved, but that the letter would stay on the public record. GNWT sent another letter on October 14, 2015 stating that all the conditions

of the August 19 direction had been met.

Then on March 2, 2016 Diavik's President wrote to GNWT's Minister of ENR requesting that he review the Inspector's direction from August 2015 based on Diavik's earlier argument that:

- The conditions for issuance of direction under Section 67(1) of the Waters Act were not met
 - › No evidence that the TSS was waste as defined by the Act
 - › No evidence that the TSS exceedance was a threat to the environment (required by Section 67(1)(b))
- The Inspector's direction was not reasonable

On April 22, 2016, the Inspector wrote to Diavik stating that he was rescinding his direction on the basis that all conditions of Section 67(1) of the Waters Act had not been met. He also stated that there would be no need for a Ministerial Review of the August 2015 direction.

EMAB'S QUESTIONS

EMAB investigated three questions surrounding Diavik's application and the review:

1. Was it improper for Diavik to write to the Minister after the WLWB made its recommendation;

2. Could Diavik's arguments about the WLWB recommendation have any implications for future regulatory processes; and
3. Could Diavik's arguments regarding the Inspector's direction of August 19, 2015 affect the enforceability of some of the Effluent Quality Criteria in the water licence, or the Inspector's ability to issue direction in future?

EMAB had GNWT ENR (Waters), GNWT Lands and the WLWB, as well as Diavik, provide their perspective on these questions. GNWT ENR and Diavik addressed all three questions at our March meeting while GNWT Lands and WLWB only spoke to the third question at our May meeting. After considering this information EMAB decided:

1. It was not improper for Diavik to write the Minister. The Minister correctly decided not to consider new evidence provided. The system was transparent and worked as designed.
2. The system was transparent and worked as intended for the WLWB's recommendation on a TSS limit, and the Minister's decision not to approve it.
3. There was an error in the Inspector's letter on the TSS exceedance that resulted in it being withdrawn (no reference to Section 67(1)(b) of the Waters Act). Diavik's arguments with respect to the Inspector's direction have identified problems with the way Section 67(1) is currently written.

EMAB finds the issues with respect to Section 67(1) of the Waters Act to be problematic: the requirement for imminent danger to the environment in addition to breaking the terms of the Water Licence. EMAB plans to make recommendations to GNWT for changes to this section of the Waters Act. The Board believes it would also be helpful if the Act provided more enforcement options.

NORTH INLET HYDROCARBON INVESTIGATION REPORT AND NORTH INLET SLUDGE MANAGEMENT REPORT

The WLWB directed Diavik to submit a "North Inlet Hydrocarbon Investigation Report" and a "North Inlet Sludge Management Report" as a condition of their new water licence (#W2015L2-0001). The reports addressed the effects of hydrocarbon contamination in the North Inlet (NI) on benthic invertebrates and zooplankton (there are no fish in the NI). EMAB had Intrinsik consultants review the reports and submitted nine comments and recommendations. ECCC, ENR and Lands also commented on the report.

EMAB felt the report addressed questions raised at the 2015 water licence renewal hearing to some degree, except for the effects of hydrocarbon contamination on zooplankton. EMAB raised concerns about decreased diversity of zooplankton in NI compared to Lac de Gras, and recommended Diavik address the reasons for this.



EMAB Director Charlie Catholique examining a sample in the Water Treatment Building at Diavik Mine



Photo courtesy of Diavik Diamond Mine



Photo courtesy of Tracy Covey

New hydraulic hoses in the underground

RECOMMENDATION: Additional text should be added to the consolidated report to directly address EMAB's questions and concerns with respect to the toxicity of NI sediment to zooplankton and the reason for reduced species richness of zooplankton in NI compared to Lac de Gras. Statements and conclusions should be supported by adequate data and proper statistical analysis.

EMAB's review found that conditions in the NI are stable for benthic organisms and did not support Diavik's conclusion that conditions might be improving. Our review also noted that in most cases there was not enough sampling, and that a proper statistical analysis had not been done on the data collected.

RECOMMENDATION: Throughout the report, where it is stated that "conditions in NI may be improving" should be changed to "conditions of sediment quality within NI appear relatively stable, and may be improving", as is stated in the summary of the consolidated report.

EMAB agreed with Diavik's conclusion that the main source of hydrocarbons in NI was spills and leaks from underground mining equipment getting into the minewater and being pumped to NI, in particular the Petroleum Hydrocarbon (PHC) F3 fraction.

RECOMMENDATION: Diavik should provide more detail on its improved management practices, track number of spills and volumes, and continue monitoring for hydrocarbons in sludge.

Note: Currently, spill information is summarized in the annual Water Licence Reports and Surveillance Network Program (SNP) Reports; improved management practices are documented in the Operational Phase Contingency Plan. The number of spills decreased from 2013 to 2015, with 228 spills in 2013, 212 in 2014 and 155 in 2015. Volume of spills also decreased and total oil and grease from the underground has also decreased during that period. In 2016 the number of spills increased to 163 and the volume also increased. We encourage Diavik to continue to work to reduce the number and volume of spills in the underground and re-establish the previous decreasing trend.

A complete record of EMAB's recommendations on the report can be found on EMAB's website: EMAB.CA.

SNP AMENDMENT REQUEST

In June 2016 Diavik requested changes to parts of the SNP, including the way they analyzed Total PHC at certain SNP stations. EMAB was concerned that the proposed change would mask the PHC F3, which was identified as the main source of hydrocarbons in the NI.



Photo courtesy of Diavik Diamond Mine

EMAB submitted comments and recommendations on the request, as did ECCC and ENR.

RECOMMENDATION: Diavik should continue to analyze for PHC F3 to help understand the effect on aquatic ecosystem health in the NI, and monitor PHC F3 entering Lac de Gras.

The WLWB made their decision on this request in October 2016. EMAB's recommendation was addressed; Diavik is required to report the complete list of hydrocarbon fractions, including PHC F3, in monthly SNP Reports to address concerns related to contamination in the NI caused by underground oil spills.

AQUATIC EFFECTS MONITORING PROGRAM (AEMP)

Note: in 2016-17 Diavik submitted a revised version of the 2014 AEMP report, the 2015 AEMP report and the 2016 AEMP report. EMAB's comments on each of these is summarized in this section. For an overview of EMAB's assessment of the status of water and fish in Lac de Gras, please review the Report Card at the front of this report.

THE ENVIRONMENTAL ASSESSMENT AND THE WATER LICENCE

The water licence and the Environmental Assessment both contain requirements for the AEMP. Most of the water licence requirements are more detailed than those in the Environmental Assessment. The WLWB cannot make Diavik meet any of the Environmental Assessment commitments unless they are also in the water licence. In the Environmental Assessment Diavik said it would do its best to involve Aboriginal People in designing monitoring programs, and that all its monitoring programs would include activities to:

- consider TK/IQ,
- establish or confirm thresholds or early warning signs,
- trigger adaptive mitigation measures,
- provide ways to involve each of the Aboriginal Peoples in the monitoring programs and
- provide training opportunities for each of the Aboriginal Peoples.

EMAB is working with Diavik to help it meet its commitments as described throughout this annual report

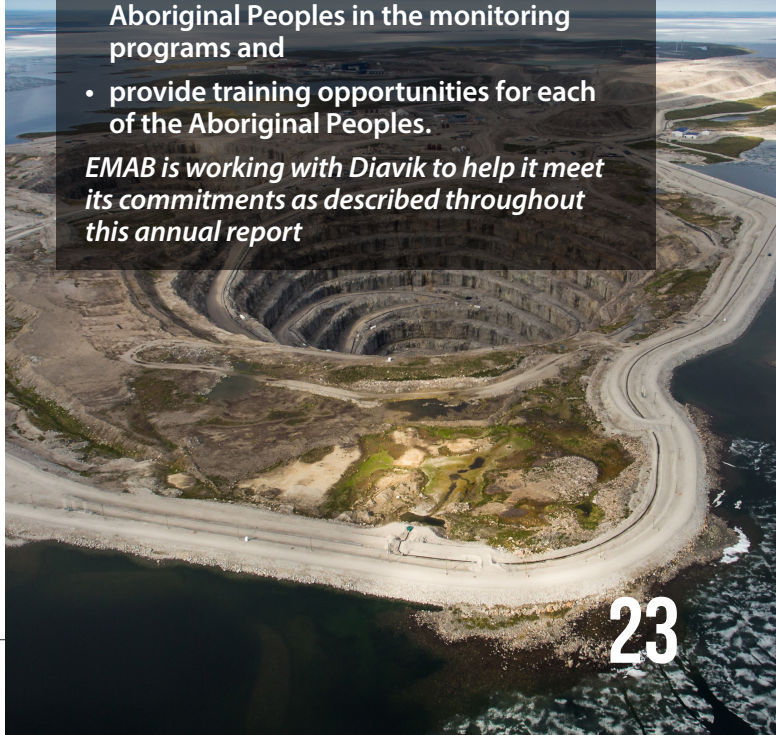


Photo courtesy of Diavik Diamond Mine



Board members examine slimy sculpin from Lac de Gras

2014 AEMP REPORT

Diavik must submit an AEMP Annual Report to the WLWB. The Annual Report gives a summary of results from that year. Diavik re-submitted the 2014 Annual Report to the WLWB on March 31, 2016. EMAB had North South Consultants (NSC) review the report and submitted 26 recommendations to the WLWB. The WLWB and ENR also submitted comments. DFO reviewed the report but did not submit comments.

Some highlights of EMAB's comments and recommendations are:

EXTENT OF EUTROPHICATION

Lac de Gras is ultra-oligotrophic meaning the water is very clear and has low nutrient levels. The Environmental Assessment predicted increased nutrient levels from the Diavik mine would affect up to 20% of Lac de Gras.

Diavik monitors chlorophyll *a* and phosphorus loadings as indicators of eutrophication. Chlorophyll *a* affected 42% of Lac de Gras in 2014. This was the largest extent of effects on Lac de Gras so far and is double what it was in 2013. Although the affected area is large, Diavik

WHAT IS EUTROPHICATION?

Eutrophication happens when a water body has more nutrients in it than normal. More nutrients promote growth of algae and aquatic plants which take oxygen from the water. Lac de Gras gets increased nutrients from Diavik's effluent.

did not take any action because the concentration of chlorophyll *a* is quite low.

Total Phosphorus in Lac de Gras decreased from 14% in 2013 to 1% in 2014.

EMAB will continue to monitor trends in eutrophication in Lac de Gras. Table 2 shows changes in eutrophication indicators from 2013 to 2016.

RECOMMENDATION: Diavik should comment on what may be causing the increase in the extent of effects of chlorophyll *a*, regardless of the operational improvements to phosphorus removal efficiencies at the two water treatment plants.

MERCURY IN LAKE TROUT

Mercury concentrations in Lake Trout found in Lac de Gras have been variable over the life of the mine, and they were near baseline in 2014. Diavik requested to no longer monitor mercury in Lake Trout every three years based on this data. They proposed to only measure mercury in Lake Trout when effects from small-bodied fish studies show that tissue mercury concentrations are mine-related.

EMAB is concerned with Diavik's proposal to make future monitoring of Lake Trout dependent on results of mercury in small-bodied fish. It does not consider other years where mercury in Lake Trout has been

higher. This proposal also does not consider that people may fish for Lake Trout in Lac de Gras in the future.

EMAB addressed this issue further in the AEMP Design Plan, Version 4.0.

RECOMMENDATION: Please revise the recommendation to discontinue monitoring of mercury in Lake Trout pending further consideration and discussion of appropriate guidelines for human and fish health.

A complete record of EMAB’s recommendations on the report can be found on EMAB’s website: EMAB.CA .

EUTROPHICATION INDICATORS FOR LAC DE GRAS AS PERCENT OF LAKE AREA AFFECTED (FROM 2016 AEMP REPORT)

Table 2

Year	Phosphorus above normal range	Nitrogen Above normal range	Chlorophyll a above normal range
2007	5.1%	-	15.5%
2008	19.6%	14.8%	13.5%
2009	9.3%	31.5%	21.0%
2010	4.2%	23.1%	15.5%
2011	1.6%	37.2%	15.6%
2012	0.6%	20.7%	3.0%
2013	14.1%	31.9%	22.6%
2014	0.6%	Greater than 40.1%	Greater than 42.4%
2015	Less than 0.6%	Greater than 42.4%	10.3%
2016	6.5%	Greater than 84.7%	43.7%

2015 AEMP REPORT

Diavik submitted the 2015 AEMP Report to the WLWB on September 15, 2016. EMAB had NSC review the report and submitted 32 recommendations to the WLWB. ENR also submitted comments. DFO reviewed the report but did not submit comments.

Some highlights of EMAB’s comments and recommendations are:

MERCURY IN LAKE TROUT

NSC reviewed Diavik’s data collected for the 2015 lake trout mercury study. Diavik did not include length-adjusted mercury concentrations in the analysis so it was not possible to compare them to previous sampling results. NSC did a rough adjustment of the data and found that 2015 mercury levels in lake trout were like levels in 2008 and 2011. They were also higher than levels in 2005 and 2014. This result seems to contradict the conclusion in the 2014 AEMP report that mercury levels in lake trout are going down, and supports EMAB’s view that lake trout mercury studies should continue and not be based on the sculpin monitoring program (as proposed by Diavik in the 2014 AEMP). We also note two fish appear to have mercury concentrations above the Health Canada guideline.

RECOMMENDATION: Diavik should compile all mercury data collected under the AEMP and TK/ IQ studies so that it can be utilized for evaluating changes over time. As well, Diavik should do a detailed analysis of the 2015 fish mercury monitoring program and include a comparison to previous years of data. The discussion should include consideration of changes in sampling and/ or analytical methods.

EUTROPHICATION INDICATORS

The eutrophication assessment showed that Diavik Mine is having a nutrient enrichment effect on Lac de Gras. The area of Lac de Gras affected by chlorophyll *a*, phosphorus and zooplankton is smaller than in 2014, but Total Nitrogen extended to over 40% of Lac de Gras in 2014 and 2015. Total Nitrogen was above the normal range at the outlet of Lac de Gras, which suggests another input to Lac de Gras as well as Diavik effluent.

RECOMMENDATION: Diavik should discuss reasons for less year-to-year variability in Total Nitrogen compared to other eutrophication indicators. Additionally, comment on the continued large spatial extent of effects of Total Nitrogen in 2015 in comparison to the reduction of extent for other parameters (i.e. total phosphorus, chlorophyll *a*, and zooplankton biomass). Additional input(s) affecting Total Nitrogen concentration in Lac de Gras may be a contributing factor and should be considered in this discussion.

Diavik uses chlorophyll *a* and phytoplankton biomass to see if the mine is having a nutrient enrichment or toxicological effect. Chlorophyll *a* can be used to see how much phytoplankton there is. The 2015 AEMP Report found that chlorophyll *a* was above the normal range close to the mine (which shows nutrient enrichment), but phytoplankton biomass was below the normal range (which shows toxicological effects). Diavik did not provide an explanation for this difference in results.

RECOMMENDATION: Assess the relationship between chlorophyll *a* and phytoplankton biomass and abundance using available data to determine if chlorophyll *a* is a sufficient indicator for assessing eutrophication effects on phytoplankton.

A complete record of EMAB's recommendations on the report can be found on EMAB's website: EMAB.CA.

AEMP DESIGN PLAN VERSION 4.0

Diavik submitted Version 4.0 of its AEMP Design Plan to the WLWB on July 15, 2016. The water licence requires Diavik to submit a Design Plan every three years. Design Plans give reviewers like EMAB a chance to comment on how well the program is working and recommend changes. The WLWB also directed Diavik to work with Ekati Corporation on this plan to address cumulative effects on Lac de Gras.

EMAB had NSC review the report and submitted 14 recommendations to the WLWB. ECCC and ENR also submitted comments. DFO stated it reviewed the plan and had no comments. Diavik responded to all reviewer comments and the WLWB came out with the Reasons for Decision on the report at the beginning of March. This document gives detailed explanations for acceptance or rejection of changes to the program based on reviewer comments and Diavik's responses.

Some highlights of EMAB's comments and recommendations are:

FREQUENCY OF SAMPLING AT FAR-FIELD (FF) AREAS

Diavik's far-field (FF) areas were located with the intention that they would never be affected by the mine. However, in 2005 these areas began to show effects of mine effluent. In 2014 the extent of chlorophyll *a* and Total Nitrogen extended to over 40% of Lac de Gras. Based on this data for chlorophyll *a* and Total Nitrogen extent, EMAB recommended that Diavik consider increasing frequency of sampling at FF areas in Lac de Gras.

RECOMMENDATION: Given the recently observed increases in effects, it may be warranted to expand the frequency of sampling in FF areas to assist with defining the spatial extent of effects on a more frequent basis and to allow for a more accurate estimate of the area affected.

The WLWB's Reasons for Decision asked Diavik to include a discussion about the frequency of sampling at the FF areas as part of their 2014-2016 Aquatic Effects summary report. More recent data from the 2016 AEMP will help determine if there needs to be more sampling in the FF areas.

MERCURY IN LAKE TROUT

Diavik started sampling mercury in Lake Trout in 2008 after the results of Slimy Sculpin studies showed elevated levels of mercury in 2007. Diavik continued to sample mercury concentrations in Lake Trout every three years in 2011 and 2014. The 2014 study showed that mercury concentrations in Lake Trout were near baseline; based on this data, Diavik proposed to sample mercury in Lake Trout only if triggered by the results of the Slimy Sculpin studies.

EMAB disagreed with this proposed change and submitted the following recommendation to the WLWB.

RECOMMENDATION: Mercury in lake trout flesh has been a continuing concern in Affected Communities since the Comprehensive Study Report (CSR). Diavik should continue to sample large-bodied fish for mercury on the same schedule as in the past - every three years to ensure this concern is addressed, and to verify Diavik's predictions in the CSR.

In the Reasons for Decision Document, the WLWB approved Diavik's proposed change; Diavik will now sample mercury concentrations in Lake Trout only if triggered by the results of the Slimy Sculpin studies.

It should also be noted that Diavik will sample Lake Trout tissue for mercury concentrations during the palatability studies which occur at least every three years.

DEFINITION OF CUMULATIVE EFFECTS:

a change in the environment caused by multiple human activities and natural processes that build up over time and space.

CUMULATIVE EFFECTS ON LAC DE GRAS

The WLWB directed Diavik and Ekati to work together on their AEMP Design Plans due to growing concern about the cumulative effects they may have on Lac de Gras. The WLWB wanted the AEMP programs to align, where possible, so that cumulative effects on Lac de Gras could be evaluated more easily.

Diavik discharges effluent to Lac de Gras from the NI Water Treatment Plant through a diffuser 60 metres from East Island. The Ekati mine also discharges treated effluent that is diluted through a series of small lakes that enter Lac de Gras at the western end, in the general area of Diavik's most distant FF sites. These sites have been starting to show mine-related effects, raising the question of whether these are cumulative from the two mines. In addition during the recent environmental assessment and regulatory review of the Ekati-Jay pipe, interveners expressed concern about how this activity would impact Lac de Gras. Jay pipe is in Lac du Sauvage, which flows directly into Lac de Gras.

In their Design Plan, Diavik added a new sampling location where Lac du Sauvage flows into Lac de Gras to monitor water quality. Diavik will analyze increasing trends in water quality variables at stations where effects from both mines have been detected.

RECOMMENDATION: Clarify which parameters will be assessed for analysis and reporting of cumulative effects and what Response Framework triggers would be applied.

Note: the WLWB has stated that AEMPs should be kept consistent to monitor project-specific effects and that monitoring of cumulative effects is outside the scope of either Diavik or Ekati's AEMP.

A complete record of EMAB's recommendations on the report can be found on EMAB's website: EMAB.CA.

2016 AEMP REPORT

Diavik submitted the 2016 AEMP Report to the WLWB on March 31, 2017. EMAB had NSC review the report and submitted 92 recommendations to the WLWB. ECCC and ENR also submitted comments. DFO did not submit comments.

Some highlights of EMAB's comments and recommendations are:

EUTROPHICATION INDICATORS

The eutrophication assessment showed that Diavik Mine is continuing to have a nutrient enrichment effect on Lac de Gras. The area of Lac de Gras affected by chlorophyll *a*, is the largest ever reported by Diavik at 43.7%. The affected area has varied widely over the last few years. The area affected by Total Nitrogen is now effectively all of Lac de Gras. The question of whether there is another nitrogen input to Lac de Gras other than Diavik effluent remains.

RECOMMENDATION: Incorporate data collected at site Lac de Gras-48 during the water quality monitoring program into the eutrophication analyses and reporting and update maps and spatial extent of effects estimates. Consider increasing the frequency of FF sampling for eutrophication metrics to annual and/or provide a rationale for what actions would be taken in the event that the spatial extent of effects on eutrophication metrics extends up to the mid-field sites in years when FF sampling is not conducted.

RECOMMENDATION: Diavik should identify additional information it would need to collect to explain these varying trends in eutrophication indicators in Lac de Gras.

FISH HEALTH

The report states that fish tissue analysis did not include fish livers, which is different from previous years, and would likely decrease the amount of contaminants found in the tissue.

RECOMMENDATION: Diavik should explain why fish livers were not included in the fish tissue analysis. Fish tissue results from 2016 should not be compared to previous years.

DUST MONITORING

Dust levels near the A21 dike have increased due to dike construction and with the ongoing activity in the area additional dust monitoring is needed.

RECOMMENDATION: Diavik should add dust monitoring stations in the south and southwest areas of the mine.

Dustfall monitoring done under the AEMP showed that the main source of phosphorus in Lac de Gras is from dustfall not mine effluent. The amount of dustfall in Lac de Gras may also be underestimated because Diavik only included winter dustfall data.

RECOMMENDATION: Diavik should modify the dustfall monitoring program so that it can give accurate estimates of phosphorus loadings into Lac de Gras during the summer.

A complete record of EMAB's recommendations on the report can be found on EMAB's website: EMAB.CA.

METAL MINING EFFLUENT REGULATIONS AMENDMENTS

The Metal Mining Effluent Regulations (MMER) were established under the *Fisheries Act* in 2002. The *Fisheries Act* prohibits depositing “deleterious substances” in waters where there are fish except if authorized by MMER. The MMER defines deleterious substances for metal mines; it sets out a list of substances, such as arsenic and lead, and allowable concentrations. Generally the MMER have been criticized for having a very limited list of substances and some allowable concentrations that can be toxic to fish.

The MMER also require each mine to have an Environmental Effects Monitoring (EEM) program to assess effects on fish or fish habitat. These include specific types of sampling and testing.

ECCC completed a ten-year review of the MMER in 2015 and is now proposing to amend the MMER in 2018. The amendments will add diamond mines to the list of mines covered by MMER. The amendments will also add some deleterious substances and lower some allowable concentrations.

Having diamond mines under the MMER means that Diavik will be required to meet the limits of the MMER and meet requirements for the associated EEM. Diavik’s water licence limits are lower than the proposed MMER limits so this is not a concern for EMAB. Diavik’s AEMP, which is also part of the water licence, is fairly similar to EEM, but not identical. EMAB’s main priority is that the AEMP not be negatively affected by trying to align it more closely with EEM requirements.

EMAB has been in contact with ECCC officials and will participate in the MMER amendment consultation process.

SPILL DATABASE — 2016-17 (GNWT)

Spill No.	Date	Site Description	Commodity	Quantity	Source
2016104	2016-04-01	Diavik Diamond Mine	Hydraulic Oil	112 L	Other Transportation
2016256	2016-07-10	Diavik Diamond Mine	Hydraulic Oil	120 L	Other Transportation
2016268	2016-07-19	Diavik Diamond Mine	Glycol-60% Glycol/ 40% Water	3000 L	Pipe or Line
2016292	2016-08-11	Diavik Diamond Mine	Gear Oil	1 L	Marine Vessel
2016317	2016-08-28	Diavik Diamond Mine	Glycol (Product name Dowtherm) 60% Glycol/40% Water	7500 L	Pipe or Line
2016339	2016-09-14	Diavik Diamond Mine	Hydraulic Oil	200 L	Other Transportation
2016369	2016-10-06	Diavik Diamond Mine	Hydraulic Oil	100 L	Instrument
2016402	2016-11-12	Diavik Diamond Mine	Hydraulic Oil	100 L	Unknown
2016416	2016-12-04	Diavik Diamond Mine	Hydraulic Oil	265 L	Other Transportation
2017082	2017-03-15	Diavik Diamond Mine	Water	3000 L	Pipe or Line

Total spills on this report is 10 compared to 23 in 2015-16.



Tlicho representatives visit Diavik Mine in August 2016

DIAVIK COMMUNITY ENGAGEMENT PLAN

Diavik submitted Version 2 of its Engagement Plan near the end of 2016. DFO, ECCC and GNWT stated they had no comments. LKDFN reviewed the plan and made detailed comments. EMAB also reviewed the plan. EMAB made six comments on the plan addressing weaknesses in Diavik's community engagement for the NCRP Final Closure Plan and the previous versions of the ICRP, and the need for Diavik to meet all the requirements in the MVLWB Engagement Guidelines.

EMAB recommended that Diavik

- Identify which issues were resolved or unresolved during the community engagement, and the process Diavik uses to try to resolve issues
- Identify frequency of engagement
- Commit to follow MVLWB Engagement Guidelines and Consultation Policy for Closure and Reclamation of Mine Sites
- Request permission from communities to document TK/IQ shared during engagement

The WLWB had not made a decision on Diavik's Engagement Plan Version 2.0 as of March 31, 2017.

INTERIM CLOSURE AND RECLAMATION PLAN (ICRP)

Diamond mining produces large amounts of waste and disturbs the landscape: roads, open pits, waste rock piles, concrete pads, buildings and processed kimberlite containment facilities. Interim closure and reclamation is the process Diavik will follow to reclaim the land as close to its original state as possible.

Diavik works with a TK Panel to review the proposed closure planning and receive input. The Panel's recommendations can be found on the EMAB website: EMAB.CA.

1. 2015 ICRP PROGRESS REPORT

Diavik is required to provide an ICRP Progress Report to the WLWB every year. The purpose of the Progress Report is to keep all parties informed about closure planning at the mine site and make sure Diavik stays on schedule. This report is generally for information, not for approval under the WLWB.

As discussed in EMAB's 2015-16 Annual Report, Diavik submitted their 2015 Progress Report on March 31, 2016 and included three documents for the WLWB's approval:

- NCRP Final Closure Plan
- The A21 Pit Interim Closure and Reclamation Plan
- RECLAIM security deposit estimate

EMAB had Arcadis Canada review the documents listed above with most attention focused on the NCRP Final Closure Plan. EMAB also had Slater Environmental Consulting (SEC) review the effectiveness of Diavik's proposed closure criteria to meet the closure objectives, and apply these findings to the NCRP



Final Closure Plan. Arcadis Canada also reviewed the site-specific risk-based closure criteria proposed in the plan. EMAB made a total of 72 comments on the ICRP Progress Report. ECCC, GNWT-ENR, GNWT-Lands, LKDFN, NSMA, WLWB and YKDFN also made comments.

The key issues raised by EMAB were also described in last year's annual report: cover design, caribou safety, revegetation, community engagement and closure criteria. A complete record of EMAB's recommendations on the report can be found on EMAB's website.

WLWB DECISION

Diavik asked this Plan be approved in a timely manner because they want to start progressively reclaiming the NCRP in 2017. As a result of this urgency and comments from EMAB and others the WLWB gave interim direction to Diavik on October 25, 2016:

- Diavik did not do enough community engagement to support the NCRP Final Closure Plan. Diavik must complete the required engagement on this Plan,

submit a record of engagement, update it to reflect the results of the engagement, and explain how the Plan changed in response to input from communities.

- MMR limits are not appropriate water quality closure criteria as they are not protective of aquatic life.

After the revised report is submitted, reviewers would have a second opportunity to comment on the Plan.

The WLWB also stated that a closure criteria workshop was required to help Diavik address closure criteria.

A revised plan was expected for review by March 31, 2017, but was delayed.

In December, the WLWB accepted Diavik's ICRP for the A21 Pit, and its updated RECLAIM estimate, with some minor changes.

2. DIAVIK REQUEST FOR SUPPORT FOR NCRP FINAL PLAN

In December, Diavik's President wrote to EMAB requesting formal support for the NCRP Final Closure Plan.

EMAB responded that it will review the plan through the WLWB process.

3. CLOSURE CRITERIA

EMAB has concerns with some of Diavik's proposed closure criteria. As described in the 2015-16 Annual Report, EMAB did a technical evaluation of Diavik's closure criteria and found many were not good at measuring whether closure objectives were met.

Following our evaluation of closure criteria EMAB contracted SEC to develop different criteria to address the problems identified, as a basis for future discussions on the NCRP Final Closure Plan, and the next version of the ICRP.

WHAT ARE CLOSURE OBJECTIVES AND CRITERIA?

The MVLWB *“Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories”* describe how to close and reclaim sites in the NWT using Closure Objectives and Closure Criteria. Diavik developed Closure Objectives and Closure Criteria for the NCRP.

Closure objectives are the end goals of closure activities. They must be measurable, achievable, and allow for the development of closure criteria.

Closure criteria are developed for each closure objective. They are used as a ‘checklist’ to make sure closure objectives are met. Closure criteria must be meaningful, measurable, and achievable to ensure mine sites are left in a safe, desirable state for people and wildlife. Companies can choose to develop site-specific criteria or use generic guidelines.

A draft of this document was circulated to Diavik, the WLWB and the rest of the participants in the Closure Criteria Workshop held on December 12, 2016, with the final



version approved at EMAB’s March 2017 meeting.

Our recommendations addressed all criteria with a general focus on the following issues:

- whether to return the environment to pre-development conditions (non-degradation) or protect it from unhealthy levels of contamination (use-protection)
- the need to measure ongoing performance of each part of the mine that is closed; sometimes this will require more than one assessment over a long time period

The report can be viewed on EMAB’s website.

4. WASTE ROCK MANAGEMENT PLAN VER 7

Diavik submitted a revised Waste Rock Management Plan in March 2016. The plan addressed placement of Type III (Potentially Acid Generating) rock in unauthorized areas of the mine site, including construction of the A21 dike and in raising the North Dam of the PKC. EMAB contracted Arcadis Canada to review the report’s implications for closure and submitted five recommendations. ENR and Lands also commented on the Plan. Below are key recommendations from EMAB’s review.



Photo courtesy of Tracy Covey

South A21 Embankment



EMAB Photo

Inspecting the slope of the test pile

RECOMMENDATION: Diavik should ensure that all Type III waste rock in the PKC North Dam is capped with till and Type I rock. Diavik should update the cost to cover this material in the NCRP component of the RECLAIM security estimate.

RECOMMENDATION: Diavik should provide information on the location, size and quantity of waste rock for the South Country Rock Pile.

A complete record of EMAB's recommendations on the report can be found on EMAB's website: EMAB.CA.

Note: In September 2016, the WLWB directed Diavik to revise the plan and re-submit it for review.

5. REVISED WASTE ROCK STORAGE AREA (NORTH COUNTRY ROCK PILE) FINAL CLOSURE PLAN VER 1.1

The WLWB directed Diavik to submit its revised NCRP by March 31, 2017 but it did not do so until early May. Readers should note that the official name for the NCRP is the Waste Rock Storage Area (WRSA), so EMAB will call it that from here on. EMAB reviewed the plan and made 62 comments and recommendations. ECCC, GNWT-ENR, GNWT Lands, and TG also made comments.

The full list of EMAB's recommendations can be found on our website: EMAB.CA. The key areas EMAB identified are:

5.1 RUNOFF AND SEEPAGE WATER QUALITY

Diavik is predicting that seepage and runoff from the WRSA will not meet many standards for protection of fish and other aquatic life where it enters Lac de Gras, and will not meet some standards for human and wildlife health on land as well as in Lac de Gras. Diavik has proposed that there be a one kilometre ring around East Island (where the mine is located), and that the water quality one kilometre from the island should meet the AEMP benchmark levels plus 20% (the AEMP benchmarks are generally considered safe). They are basing this proposal on the definition of "significant" aquatic impact that was used during the environmental assessment of the mine: an effect that is measurable for more than 30 years and exceeds a set threshold by more than 20% and covers an area beyond the "local study area," which was one kilometre from East Island for aquatics.

EMAB has rejected this idea. Closure objectives for Diavik are clear that surface runoff and seepage must be safe for humans and wildlife, and not cause adverse effects on aquatic life in Lac de Gras or the



Snow melt from WRSA

07/11/2016



Type 1 rock that will be used as to cover the WRSA

10/26/2015

Coppermine River. Community members, the TK Panel, and participants in EMAB's recent closure workshop have consistently stated water in Lac de Gras should be returned to the quality it was before development.

RECOMMENDATION: Diavik should propose a solution to seepage from the WRSA that meets the AEMP benchmarks where seepage enters Lac de Gras, and protects humans and wildlife on land.

5.2 SAFETY FOR WILDLIFE

Diavik proposed caribou pathways across the rock pile to allow animals safe passage across it or around it. EMAB is concerned that Diavik proposed to use boulders up to 1.5 metres in the cover and that there are no details on how the surface of the sides and top of the pile will be made smooth and safe for walking, with no openings where caribou could break or damage their legs. This issue has also been raised by the TK Panel, LKDFN, YKDFN, KIA, NSMA and TG during Diavik's community engagement, and by community participants at EMAB's Closure Workshop.

RECOMMENDATION: Diavik should discuss in more detail the requirements, specifications and quality assurance program to assure final waste rock surfaces along caribou pathways are safe and do not contain voids where feet and legs could be injured.

5.3 REVEGETATION

Diavik is not planning to re-vegetate the WRSA. EMAB has consistently stressed the need for consideration of some re-vegetation of the pile, and has noted that re-vegetation might reduce water infiltration into the rock pile. The TK Panel, TG, KIA, LKDFN and YKDFN feel that some level of re-vegetation should be planned for the WRSA. The participants in EMAB's Closure Workshop in February 2017 also recommended that Diavik should re-vegetate the WRSA using local species.

RECOMMENDATION: TK Panel and nearly all community organizations would like to see some revegetation on or around the WRSA. Diavik should revise their plans and include revegetation options using local species as this is an important consideration raised by the TK Panel and most community organizations.



Revegetation plots at Diavik Mine

5.4 EFFECTS OF CLIMATE WARMING ON PERFORMANCE OF THE WRSA

The WRSA cover is going to be 4.5 metres thick. Diavik's climate models show how the WRSA cover will perform 100 years into the future with an average temperature increase of 5.6°C. Based on this climate model, there will be up to 4.1 metres of thaw back during the spring and summer. However, this analysis did not show how the cover will perform under a more severe warming scenario. EMAB is concerned that under a more severe warming scenario the thaw depth could potentially reach the Type III rock beneath the cover.

RECOMMENDATION: Given that the thaw depth on the side of the pile is predicted to be 4.1 metres for the mean climate change scenario, Diavik should undertake additional modelling using less conservative assumptions (i.e. greater rise in temperature) to assess whether the seasonal thaw depth would extend into the Type III rock.

5.5 CLOSURE CRITERIA

In general, the methods and assumptions Diavik used to propose closure criteria for the WRSA are not transparent.

Many of the comments EMAB made on closure criteria in the previous version of the plan have not been addressed, including comments on site-specific risk-based closure criteria that Diavik had agreed to correct. Diavik also does not appear to have addressed many of the alternate criteria EMAB provided through the report from SEC.

5.5.1 PROTECTION OF AQUATIC LIFE

As discussed above, Diavik proposed that water quality parameters one kilometre from the mine meet AEMP benchmark levels plus 20%. This number is not based on science; a 20% increase in one parameter on a certain species could cause a much different effect than a 20% increase in a different parameter on the same species.

RECOMMENDATION: Closure criteria need to be protective of aquatic life. Multiplying an environmental criterion by an arbitrary 20% does not take into account toxicity, dose responses or effects on aquatic organisms. Diavik should not add the proposed additional 20% to the AEMP benchmarks for protection of aquatic life.

Some contaminants are expected to leach out of the WRSA at higher concentrations than Diavik's proposal of the AEMP benchmark amount plus 20% at one kilometre from East Island. In these cases, Diavik proposed to use the maximum predicted leaching concentration as closure criteria. EMAB does not find this approach defensible. See recommendation under section 5.1.

5.5.2 PROTECTION OF HUMAN HEALTH

Diavik did not update its original site-specific risk-based closure criteria reports to address deficiencies and has used some of these in setting human and wildlife criteria. These should be corrected where there are implications for human or wildlife health in the current plan.

Diavik should consider lead as a parameter that needs closure criteria. EMAB feels Diavik should try to decrease any exposure to lead above concentrations that exist in the natural environment. There are also concerns about uranium exceeding safe drinking water guidelines. As well, Diavik did not consider all potential pathways that humans could come in contact with contaminants.

RECOMMENDATION: Diavik should include lead as a contaminant of potential concern that requires closure criteria.

RECOMMENDATION: Consumption of fish or waterfowl was not considered in the protection of human health in the back-calculated closure criteria. This pathway must be considered.

RECOMMENDATION: The closure criteria for uranium in drinking water should be reduced to protect drinking water quality.

5.5.3 USE OF SITE BY WILDLIFE

Monitoring the ZOI on caribou over time could be a useful way to assess whether the effect of the site on caribou is decreasing after closure.

RECOMMENDATION: Diavik should develop a method for monitoring post-closure changes in the ZOI on caribou.

CRITERIA THAT MONITOR PERFORMANCE OVER TIME

SEC has identified several closure components where performance must be monitored over time to assess whether the closure objective has been met. A number of the closure criteria proposed by Diavik only require that a component be constructed as it was designed; this does not ensure that the component will perform as it was designed, over time. For example, it is critical to WRSA closure that the cover remain frozen, so this should be a monitored over decades to be sure the criteria can be met. The TK Panel, YKDFN, NSMA, and KIA also want the pile to be monitored over the long-term to make sure it remains frozen and stable.

RECOMMENDATION: Post-closure monitoring programs for the WRSA, and associated closure criteria, should continue until facilities demonstrate stable performance over an appropriate time period, which could be decades. Critical components will include: integrity of the cover, physical stability, and seepage water quality.

RESPONSE PLAN TO AVOID WATER QUALITY EXCEEDANCES

RECOMMENDATION: Action plans should be included in the closure plan in case accumulation of water quality contaminants trends toward exceeding site-specific water quality criteria for human health.

EMAB has made many recommendations for more effective closure criteria that can be found on our website: EMAB.CA.

5.6 LONG-TERM MAINTENANCE AND MONITORING

This version of the WRSA Final Closure Plan provided Diavik's first attempt at assessing long-term costs for care, maintenance and monitoring. Diavik estimated the cost for long-term care and maintenance for the whole mine-site to be \$560,000 per year once closure is completed. This amount may be reasonable, however EMAB feels it would be helpful if Diavik provided more details to better assess it.

RECOMMENDATION: It would be worthwhile for Diavik to provide additional details (e.g. the type of equipment, storage location, fuel requirements etc.) to better assess the validity of the estimate.

RECOMMENDATION: Diavik should provide an estimate for long-term operation of a water treatment plant in case runoff/seepage quality is not good enough to be released into Lac de Gras.

6. ICRP VER 4.0

Diavik submitted ICRP version 4.0 in late April. EMAB will review this document and provide comments to WLWB by the October 19, 2017 comment deadline.

WILDLIFE MONITORING PROGRAM (WMP)

Diavik's WMP began in 2002 as part of the EA. The WMP studies the Mine's effects on wildlife and vegetation in the study area, and determines if these effects were correctly predicted in the Environmental Assessment. (Note: The study area is 1,200 km² and covers the East and West Islands, smaller islands in the northeast part of Lac de Gras, and parts of the mainland along the southern, eastern and northern shores of Lac de Gras.)

Diavik produces a Wildlife Monitoring Report (WMR) each year as part of the WMP. This report compares results of the program to predictions made at the beginning of the Project. This year Diavik also completed the Comprehensive Analysis Report (CAR). This report is done every three years under the WMP. The 2014-2016 CAR analyzed caribou seasonal movement and wolverine distribution throughout the study area.

2016 WMR AND 2014-2016 CAR

EMAB's wildlife consultant, Management and Solutions in Environmental Science Inc. (MSES) reviewed Diavik's 2016 WMR and 2014-2016 CAR. EMAB reviewed MSES' comments and sent them to Diavik as recommendations. It is EMAB's understanding that ENR plans to review the reports and submit comments later this year.

This section details the results from the 2016 WMR and 2014-2016 CAR and gives EMAB's main recommendations. Go to EMAB's website: EMAB.CA to see the full list of recommendations.

1. VEGETATION

Diavik monitors direct and indirect vegetation loss or change resulting from the mine. It monitors vegetation and lichen to see if dust deposition from the Mine changes the abundance and number of plant species. Diavik did a comprehensive analysis of this program in the 2016 WMR. Diavik found that dust deposition is higher closer to the mine and higher in years with above-ground mining. Diavik has been completely underground since 2010, but this changed in 2016 when construction of the A21 dike began, and will continue until 2023 when mining of the A21 pit is completed.



Photo courtesy of Diavik Diamond Mine



Photo courtesy of Diavik Diamond Mine

RECOMMENDATION: Diavik should include a discussion on how potential project effects on vegetation abundance and composition could be mitigated.

Diavik also measured lichen cover around the Mine and tested metals in lichen from dust deposition. They found there was lower lichen cover near the Mine versus farther away, and nearly all metals were higher in lichen closer to the Mine. Metal levels in lichen close to the mine were lower in 2016 compared to 2013 and 2010. Based on this information Diavik did not feel it was necessary to complete the last part of this analysis which was to assess whether metal concentrations in lichen are safe for caribou. The last time Diavik did this assessment in 2010 they found there was no risk of negative

effects to caribou if they consumed lichen near the mine; however EMAB had some concerns about the way the 2010 risk assessment was carried out.

RECOMMENDATION: Diavik should provide additional information to show that concentrations of metals in lichen are safe for caribou.

Diavik proposed to reduce vegetation and lichen monitoring from once every three years to every five years. EMAB does not agree with this program change and feels that with open pit mining beginning again in 2018 dust deposition and metal concentrations in lichen are likely to increase.

RECOMMENDATION: Diavik should continue the three-year monitoring schedule to

capture changes in vegetation and lichen parameters. With a return to above-ground mining activities scheduled for 2018, dust deposition and metal concentrations in lichen are likely to increase again.

The Mine footprint increased by less than one square kilometre in 2016. The total area of vegetation/habitat loss remains at a lower level than predicted.

2. CARIBOU

During the Bathurst caribou herd's annual migration to and from the calving grounds, they move through the Lac de Gras region and may be influenced by the Diavik and Ekati mines. Caribou from the Beverly/Ahiak herd have also been seen near the mine recently, so may now be affected by the mine.



Photo courtesy of Diavik Diamond Mine

RECOMMENDATION: Diavik should explain how it will include Beverly/Ahiak caribou in its caribou monitoring program.

The Bathurst caribou herd has declined from nearly 450,000 in 1986 to about 19,000 in 2016. The direct cause of the decline has not been determined. Factors that affect herd size include: weather, fire, predation (including hunting), development, and climate change. There have been fewer caribou in the Lac de Gras area recently which makes monitoring caribou at Diavik difficult. It also makes it difficult to compare data between years. The programs discussed below measure the effect Diavik mine has on caribou.

ZONE OF INFLUENCE

EMAB has asked Diavik to evaluate the caribou aggregation at 14 km from the mine for several years. Diavik completed this analysis in the 2014-2016 CAR to see if caribou density changed with distance from mine footprint. They used existing aerial survey information and excluded areas with water from the analysis. Diavik concluded that the new analysis of caribou density shows there is no caribou ZOI, or that the ZOI is smaller than could be detected. EMAB found this result unexpected and would like more information

ZONE OF INFLUENCE

A Zone of Influence is the size of the area surrounding a development that wildlife are affected by. It is likely to change based on size, location, type, and current activities of the development. The Zone of Influence for caribou at Diavik has been accepted to be 14 km. A recent analysis by Diavik's consultant questions this Zone of Influence (see main text).

Photo courtesy of Diavik Diamond Mine



on the analysis to assess the strength of Diavik's new conclusions. Until this information is presented and assessed EMAB will continue to assume that the 14 km ZOI is still valid, and that Diavik should continue monitoring the ZOI and discuss possible adaptive management measures.

RECOMMENDATION: Diavik should present the reasons for the type of analysis they used and information on the power of the data to detect an effect. Future analyses using caribou density should include habitat associations and changes in mine activity, and other potential confounding factors. Non-linear relationships should also be considered.

RECOMMENDATION: Diavik should undertake an evaluation and assessment of possible adaptive management measures to address the larger than expected ZOI.

ZONE OF INFLUENCE WORKING GROUP

Diavik did aerial surveys in the past to identify a ZOI, and to assess changes in the ZOI with Mine activity (e.g. open pit vs. underground). This has been done in cooperation with the Ekati mine. Diavik and Ekati asked ENR if they could discontinue the surveys in 2013 due to low caribou numbers (surveys were also suspended for 2010 and 2011). ENR approved this request and aerial surveys have not been completed since 2012. ENR set up a ZOI Technical Task Group (TTG) in 2014 to decide when aerial surveys should resume, or if other studies would better address caribou ZOI. A draft guidance document was circulated in March 2015 and was expected to be finalized by fall of 2016, but remains outstanding. Diavik has indicated it will consider resuming aerial surveys once the ZOI TTG finalizes its recommendations. EMAB is concerned

there is now a four-year gap in caribou ZOI data collection, and that only one year of data has been collected since 2009. It is EMAB's opinion that there is lack of clarity on how the ZOI prediction is being tested, monitored and managed.

RECOMMENDATION: ENR should finalize the draft Guidance document on monitoring the ZOI as a matter of high priority, to guide ZOI monitoring at Diavik.

RECOMMENDATION: Diavik should continue to monitor and test predictions on the ZOI while they wait for ZOI guidance from ENR. This could include gathering more aerial survey data, use of all caribou collar data available to the present time and additional analysis of existing data, looking at other factors that might affect caribou (e.g. habitat or changing mine activity).

CHANGES TO BEHAVIOUR

Diavik and Ekati do ground-based caribou observations on a cooperative basis to see if caribou behaviour changes with distance from the Mine. In general Diavik focuses on observations further from the mines, since the area close to the mine is mostly water, although they will do scans on East Island if caribou are present. Ekati concentrates on observations close to the mine. In 2016 Diavik observed only two caribou groups that were over 22 km from the Mine. Diavik has said it will analyze the data once more observations are collected closer to the Diavik and Ekati mines (within 5 km of mining activities). There is now a four-year gap in caribou behavioural analysis (2012-2016) due to lack of data collected near the Mine. EMAB emphasizes the importance of collecting and analyzing these data to understand the influence of the Mine on caribou and the mechanisms that lead to avoidance of the Mine area.

RECOMMENDATION: Diavik should analyse caribou behavioural data from Diavik and Ekati Mines from 2012 to 2016. This type of analysis is important for guiding caribou management and mitigation actions at the Diavik mine. Diavik should consider use of non-parametric analytical techniques. Diavik should include a discussion of limitations that might result from pooling data across years.

RECOMMENDATION: Diavik should

- provide details on the methods and data collected by Diavik and Ekati both close to and far from the mines, including sample sizes, group sizes and group composition and distance from mine;
- explain how it determines how much data is needed to do an analysis, and provide a power analysis to support the target sample size; and
- explain why there is such a large range in the number of observations per year and provide details on how it decides when to collect behavioural data at distances greater than 5 km from the mine.

RECOMMENDATION: If insufficient caribou observation data is available far from mine, Diavik should expand the time period for data collection and develop additional means for identifying when caribou are within observation range.

RECOMMENDATION: Diavik should identify whether Ekati and Diavik are using the same methods for behavioural observations. If there are issues of compatibility with caribou behavioural data from the two mines, Diavik should discuss the reasons and possible solutions.

EMAB also notes that at the March 2015 Wildlife Monitoring Workshop ENR committed to develop

monitoring objectives for a potential behaviour monitoring technical task group to run by potential participants, and draft a terms of reference.

RECOMMENDATION: ENR should make it a priority to follow through on its commitment to develop monitoring objectives and a draft terms of reference for a caribou behavioural monitoring technical task group.

DISTRIBUTION AND MIGRATION

Diavik uses data from collared caribou to monitor changes in caribou distribution due to mining activities. Diavik did an analysis on data collected from 1996-2016 to test predictions regarding caribou migration patterns.

Diavik predicted that during the northern (spring) migration caribou would move west of Lac de Gras, and during the southern (fall) migration caribou would move east around Lac de Gras.

Diavik's analysis of all caribou collar data showed caribou are following predictions regarding migration patterns. However, the last several years of collar data show caribou are staying north longer than normal and most are moving west of Lac de Gras during the southern migration. Since 2011, 48 collared caribou went west and two went east during the southern migration. Diavik suggested caribou may be staying north longer to avoid industrial activities. EMAB is concerned this shift may become more pronounced in 2018 with above-ground mining activities starting again.

RECOMMENDATION: Diavik should re-do its analysis of the southern migration of caribou using collar information up to the end of November, to take into account changes in migration timing.



Photo courtesy of Diavik Diamond Mine



Photo courtesy of Diavik Diamond Mine

Diavik should discuss why some caribou are not following the predicted southern migration, particularly in the last six years. Diavik should also discuss potential response actions to the departure from the prediction regarding the southern migration of caribou and changes to the timing of migration.

3. GRIZZLY BEAR

Diavik's monitoring objective for grizzly bear is to provide estimates of their abundance and distribution in the study area over time. Diavik, Ekati, Snap Lake, and Gahcho Kue undertook a grizzly bear hair snagging program in 2012 and 2013 to meet this objective. The next sampling program is planned for 2017 to compare with earlier results; EMAB looks forward to seeing the analysis which will help address Diavik's grizzly bear monitoring objective. The 2012-2013 program results showed the grizzly bear population is stable or increasing.

In 2015 ENR agreed to organize a one-day carnivore monitoring workshop by January 2016 to develop standardized methods for carnivore monitoring, including the frequency of grizzly hair snagging. This

workshop has not yet taken place due to the fact GNWT-ENR is still waiting to analyze data from the Diavik-Ekati wolverine hair snagging study (see below).

RECOMMENDATION: ENR should organize a workshop with Diavik and Ekati and all interested groups to provide direction on standardized methods for carnivore monitoring, including the frequency of grizzly hair snagging surveys.

There is also an increasing number of both grizzly bear observations, and the number of days Diavik has to use deterrent actions on East Island over time.

RECOMMENDATION: Diavik should include a discussion of the possibility that grizzly bears may be becoming habituated and their presence on site may be on the rise.

4. WOLVERINE

Diavik's monitoring objective for wolverine is to provide estimates of wolverine abundance and distribution in the study area over time. Wolverine presence around the Mine is monitored using snow track surveys, hair-snagging surveys, and observations.



Photo courtesy of Diavik Diamond Mine

SNOW TRACK SURVEYS

Diavik did wolverine snow track surveys in 2016 and completed a full analysis on data collected from 2003-2016 to look at indirect Mine-related effects. The results showed that wolverine occurrence in the study area is increasing over time, but Diavik could not determine a definite reason for this.

RECOMMENDATION: Diavik should explore the reasons for higher levels of misdirected food waste in the A21 Area as this may be contributing to wildlife (particularly wolverine) presence and possible habituation near the Mine site.



Photo courtesy of Diavik Diamond Mine

Community member helping with wolverine track surveys

HAIR-SNAGGING SURVEYS

ENR organized wolverine hair-snagging surveys with Diavik and Ekati to determine wolverine abundance and distribution in the study area. The last survey was completed in 2014 and the analysis has still not been completed. EMAB is concerned that Diavik is not meeting this WMP objective because they are waiting for guidance from ENR on how often this program is to be carried out.

RECOMMENDATION: ENR should complete the analysis of the wolverine hair-snagging survey at the earliest possible time. ENR should then organize a workshop with Diavik and Ekati and all interested groups to determine the future of this program.

RECOMMENDATION: Diavik should describe alternative plans for evaluating wolverine abundance in the study area as per their WMP objective if they are not anticipating the analysis of the wolverine hair-snagging program to be complete in 2017.

5. FALCONS

Diavik monitors pit walls and mine infrastructure for nesting raptors. One active peregrine falcon nest was observed on a site building and one peregrine falcon mortality was reported in 2016. The cause of death could not be determined.

6. REGIONAL MONITORING

A number of Diavik's wildlife monitoring programs are done in cooperation with the Ekati mine and ENR, and in some cases, other mines as well. These include ZOI monitoring, caribou behaviour monitoring, caribou distribution monitoring including monetary contributions to ENR caribou collaring, grizzly bear DNA hair snagging and wolverine DNA hair snagging. While the idea of these regional programs is commendable, they require leadership from ENR for development and implementation. We have made recommendations to ENR on:

- The ZOI monitoring draft guidance document has been waiting to be finalized since 2015, and no aerial surveys have taken place since 2012.
- Development of protocols for caribou observations has not progressed.
- Guidelines for grizzly bear hair snagging, including scheduling, have not been developed.
- Data from wolverine hair snagging in 2014 has not been analyzed.

7. DIAVIK RESPONSES TO EMAB RECOMMENDATIONS ON THE 2015 WMR

Diavik must respond to EMAB recommendations within 60 days under the EA. Diavik provided responses to EMAB's recommendations on the 2015 WMR. EMAB was satisfied with 10 out of 13 of Diavik's responses. EMAB would like Diavik to give a better response to the following recommendations:

- Diavik should discuss adaptive management actions regarding changes to caribou migration patterns as this indicates a potential mine-related effect.
- Diavik should propose adaptive management measures to mitigate the 14 km ZOI since this area is larger than predicted.
- Dustfall could be falling out onto vegetation that caribou eat. Diavik should analyse how much caribou forage area has been lost due to dustfall.

BATHURST CARIBOU RANGE PLAN

The Bathurst caribou herd declined from roughly 450,000 in the mid-1980s to a low of about 19,000 today. Due to concern over the low population and development pressures on the herd, the GNWT is developing a Bathurst Caribou Range Plan (BCRP) to manage human and natural disturbance across its habitat. The BCRP brings together scientific and traditional knowledge for habitat management across their range.

The GNWT started engaging stakeholders on the draft BCRP in February 2017. EMAB invited GNWT to present the BCRP Discussion Document at EMAB's March meeting. They presented the BCRP Discussion Document to guide engagement prior to developing the Draft Range Plan.

The Bathurst caribou range includes the Diavik Diamond Mine, and mine activities contribute to cumulative effects on the herd and its habitat. EMAB reviewed the BCRP Discussion Document as it relates to our mandate and submitted comments to the GNWT.

PLANNING BOUNDARY

EMAB noted the Range Plan does not include all areas used by Bathurst caribou in the last several decades. This could lead to problems if Bathurst caribou start to use them again.

RECOMMENDATION: GNWT should explain how the BCRP will address potential changes to areas used by Bathurst caribou.

MAINTAIN SENSITIVE HABITATS

The BCRP is supposed to help identify where new developments in the NWT and NU should be allowed. The BCRP considers areas that have little activity to be good places for new developments. The BCRP does not consider sensitivity level of caribou habitat when allowing new projects into an area. Diavik mine is in an area sensitive to disturbance for caribou as this is the summer range, calving and post calving grounds. EMAB feels that allowing future developments in areas where there is little activity is not the best measure, as this does not consider how sensitive that habitat is for caribou. This also potentially conflicts with a main objective of the BCRP to maintain integrity of sensitive habitats.

RECOMMENDATION: GNWT should reconsider basing desirability of development solely on the level of disturbance already in these areas. This is particularly true in areas most sensitive for Bathurst caribou. Any approach to maintaining disturbance below thresholds must ensure the integrity of sensitive habitats is maintained and consider the amount of habitat already disturbed.

COMMUNITY BASED MONITORING PROGRAMS

EMAB supports the opportunity the BCRP presents for using TK/IQ to study the Bathurst herd. EMAB has commented on the absence of TK/IQ used in monitoring and reporting in Diavik's WMP in the past.

RECOMMENDATION: GNWT should coordinate these community based monitoring efforts with mining developments in the Territory.

ENVIRONMENTAL AIR QUALITY MONITORING PROGRAM (EAQMP)

Diavik has been doing the EAQMP since 2012. This program is not part of Diavik's water licence; it is required by the EA.

EAQMP ANNUAL REPORT

Diavik submitted their first EAQMP Annual Report to EMAB in 2013. Diavik did not submit the EAQMP Report for 2014 during the 2015-16 year (see Annual Report from last year). Diavik submitted the 2014 and 2015 Combined EAQMP in May 2016 and EMAB had Arcadis review it. EMAB notes that many comments on the 2013 EAQMP Annual Report were not sufficiently addressed in the report.

HIGHLIGHTS FROM THE 2014 & 2015 COMBINED EAQMP REVIEW

TOTAL SUSPENDED PARTICULATE MONITORING

Diavik continuously monitors the amount of small airborne particles largely made up of dust and air emissions such as exhaust, that come from mine operations using two Total Suspended Particulate (TSP) monitoring stations. These stations measure the amount of TSP in the air by drawing air in and measuring the mass. TSP monitoring is important because it gives information on air quality.

The two TSP monitoring stations are located east and south of the mine. The winds at Diavik are mostly from the east, south and southeast meaning TSP is blown to the west.

WHAT IS THE DIFFERENCE BETWEEN TSP AND DUSTFALL?

TSP is made of very small airborne particles such as dust, smoke, ash, and pollen, in technical terms, smaller than 100 microns. Higher levels of TSP in the air is a concern for human, wildlife and plant health due to problems it can cause with breathing. Dustfall or dust deposition is all particles that fall out of the air and settle, no matter the size.

RECOMMENDATION: The location of TSP monitoring stations should be reconsidered. The current stations are located east and south of the mine site while the main dustfall areas are south, west, northwest and north.

The TSP monitors did not function properly in 2014 and 2015 making the whole TSP data set questionable. Half of the data at each TSP monitor was missing in 2014 which means trends could not be identified. It was also noted that Diavik did not properly maintain the TSP monitors and their calibration methods are unclear.

RECOMMENDATION: The validity of the entire TSP data set is questionable due to data quality problems. This means any statements or conclusions about air quality near the mine site may also be invalid. QA/QC and calibration procedures need to be reviewed for the continuous TSP monitor and a determination made where improvements are required to ensure the measurements are reliable.

DUSTFALL MONITORING

Diavik also monitors dustfall at the mine site. Dustfall is the amount of TSP that falls onto vegetation, snow and water. The larger, heavier particles settle quickly while the lighter ones, like exhaust fumes, can travel long distances. Diavik monitors dustfall at the mine site using dust gauges and snow cores. Diavik measures the amount of dustfall at different distances from the mine and tests what chemicals are in the dust. During an EMAB board meeting in June 2016 Diavik noted that dustfall monitoring was designed to meet AEMP objectives and not necessarily EAQMP objectives. From an air quality perspective, the sampling frequency Diavik uses to monitor dustfall under the AEMP does not follow air quality monitoring guidelines nor provide enough information to analyse air quality.



Photo courtesy of Diavik Diamond Mine

Dustfall monitoring

RECOMMENDATION: Diavik should sample dustfall monthly, or at a minimum, sample monthly during snow free periods so that dust suppression efforts can be better evaluated.

Diavik did not explain trends in dustfall data, unexpected results such as control areas having higher levels of some contaminants than areas closer to the mine, or evaluate the effectiveness of dustfall suppression efforts.

RECOMMENDATION: Diavik should use current and historical dustfall monitoring results to evaluate the effectiveness of dust suppression efforts.

Go to EMAB's website: EMAB.CA to see the full list of recommendations on the 2014 & 2015 EAQMP Annual Report.

DIAVIK RESPONSES TO EMAB RECOMMENDATIONS ON THE 2014 & 2015 COMBINED EAQMP REPORT

Diavik provided responses to EMAB's recommendations on the 2014 & 2015 EAQMP Report. EMAB reviewed



Photo courtesy of Diavik Diamond Mine

these responses and is looking forward to the 2016 EAQMP Report which will include more information on Diavik's QA/QC measures to give more confidence in the air quality data.

EMAB would like to note that Diavik did not respond to one of our key recommendations. The 2013 EAQMP stated that Diavik would assess the TSP monitoring after a year and make recommendations for any changes. This program is now in its fourth year and the TSP monitoring has not been assessed. EMAB recommended a formal assessment of the TSP monitoring be conducted as soon as possible, considering our reviews, and comments from other reviewers. We note issues related to

- the dispersion modelling that is the basis for the program
- the locations of the samplers, dust gauges and snow core sites
- the use of non-standard methods for analyzing the data

EMAB is still waiting to hear from Diavik when this formal assessment will take place.

GNWT AIR REGULATIONS

BACKGROUND

Air quality is currently not regulated in the NWT. The GNWT committed to setting up Air Regulations in 2015 to address this gap. The Air Regulations will be created under the NWT Environmental Protection Act (EPA) and will be in place in 2017.

EMAB attended two information sessions during the summer of 2016 to learn more about the Air Regulatory Framework and then submitted comments to the GNWT in September 2016. EMAB's main concerns about the Framework are highlighted below.

The Framework was originally not going to use a co-management system to regulate air quality, meaning Aboriginal Nations and other organizations would not be able to participate in decision-making. This was a main concern for EMAB because co-management of resources is a fundamental approach to managing water, land and wildlife at Diavik and in the rest of the NWT; air should be no different.

RECOMMENDATION: Developing and implementing an Air Regulatory Framework should be addressed by amending the Mackenzie Valley Resource Management Act with the Federal Government to include air so that environmental resources in the NWT can be regulated with one, integrated and holistic system.

EMAB's other main concern dealt with our ability to review Diavik's EAQMP under the proposed framework. EMAB reviews Diavik's EAQMP because the EA mandates us to do so. However, the new Air Regulatory Framework would have moved Diavik's EAQMP from under the EA to the NWT EPA where it would be regulated by the GNWT. EMAB was concerned about no longer being able to provide input on Diavik's

EAQMP. This created uncertainty about how EMAB would fulfill its role in monitoring air quality at Diavik.

RECOMMENDATION: GNWT should develop a mechanism for EMAB to review and provide comments on Diavik's air quality monitoring program and annual reports.

EMAB is pleased to report that due to overwhelming feedback from stakeholders, the GNWT will be working with the Land and Water Boards to create a co-management system to regulate and monitor air quality in the NWT.

The GNWT anticipates the draft Bill to amend the EPA to include air will go to the Legislature during the spring session. The second round of engagement on the Draft Air Regulations will start in November 2017. EMAB plans to be involved in this process.

ENVIRONMENTAL AGREEMENT ANNUAL REPORT

As part of the EA Diavik must submit an Environmental Agreement Annual Report (EAAR) to the Parties, the Government of Nunavut and EMAB every year. The EAAR must meet certain conditions in the EA and then be approved by the Minister. Diavik submitted their EAAR to EMAB and the GNWT on June 5, 2016.

EMAB reviewed the EAAR in terms of how adequately terms from the EA were addressed, and submitted a letter to Diavik with our recommendations. GNWT also submitted recommendations. To see a full list of EMAB recommendations go to EMAB's website: EMAB.CA.

EMAB was generally pleased with how well Diavik met each EA condition for the EAAR. The only requirement Diavik did not include was a full summary of public concerns and responses to public concerns. EMAB recommended that Diavik include a list of all

community engagement meetings that were held for the year and describe how any public concerns raised at these meetings were addressed.

EMAB looks forward to the continued improvement of this report and seeing how our recommendations were incorporated into the 2016 EAAR.

REPORT CARD ON DIAVIK AND THE REGULATORS

EMAB's mandate includes oversight of the regulatory process. This section summarizes how Diavik and other Parties have responded to EMAB recommendations. It also summarizes the level of engagement of the various regulators responsible for the Diavik file.

Diavik's responsiveness to EMAB recommendations last year has been good with respect to issues related to its water licence, including closure planning. Diavik has responded promptly and thoroughly to EMAB's recommendations as made through the WLWB review process.

EMAB accepted Diavik's proposal to submit its 2014 and 2015 EAQMP as a single comprehensive report as a way to resolve the problem of not submitting the 2014 report during 2015. Diavik provided the combined report in early May 2016. Diavik has not responded to EMAB's recommendation from 2016 to do a formal assessment of the program.

To EMAB's knowledge ENR did not make comments on the 2014 & 2015 EAQMP Report.

Diavik's responses to EMAB's recommendations on wildlife monitoring have been variable. EMAB will work with Diavik to develop a more structured process for responding to WMP recommendations.

To EMAB's knowledge ENR did not make comments on the 2015 WMP report. In addition there are two wildlife monitoring studies that have been put on hold waiting for direction from ENR.

EMAB notes that regulator response to Diavik requests and reports has been variable. For input related to Diavik's water licence please see the following table:

Report	ECCC	DFO	ENR	Lands	EMAB
NI Report	Commented	No comment	Commented	Commented	Commented
2014 AEMP Re-submission	No comment	No comment	Commented	No comment	Commented
2015 AEMP Report	No comment	No comment	Commented	No comment	Commented
2011-13 Summary Report Re-submission	No comment	No comment	Commented	No comment	Commented
AEMP Design Report	Commented	No comment	Commented	No comment	Commented
NCRP Final Closure Plan	Commented	No comment	Commented	Commented	Commented
SSRBCC report	Commented	No comment	Commented	Commented	Commented
Engagement Plan	No comment	No comment	No comment	Commented	Commented
Waste Rock Management Plan	No comment	No comment	Commented	Commented	Commented
2016 AEMP Report	Commented	No comment	Commented	No comment	Commented

EMAB has noted lack of review of some Diavik reports by ECCC and especially DFO. The Board met with DFO and ECCC to discuss each of their participation in review of documents for the Diavik water licence file. The federal government has designated ECCC as being responsible for sections of the Fisheries Act prohibiting putting deleterious substances into waters used by fish. DFO continues to be responsible for sections of the Fisheries Act prohibiting serious harm to fish, which includes fish habitat. DFO's policy is that since its mandate does not include deleterious substances, it doesn't comment on any report or plan that relates to these, whether or not the activities can result in serious harm to fish or fish habitat. DFO sometimes submits a letter to the WLWB indicating it has reviewed a report and has no comments pertaining to its mandate. ECCC has stated they review reports based on priority and available resources.

EMAB plans to make recommendations on the value of additional review by ECCC and especially DFO in the coming year.

EMAB is pleased to note the continued active engagement of ENR with respect to the Diavik water licence file, as well as the

involvement of Lands. We also note that in virtually all cases WLWB has provided substantial comments on reports and management plans.

As discussed on pages 19-21 EMAB is concerned about the future

implications of Diavik's challenge to the Inspector's directive on exceedance of the TSS limit. EMAB will make recommendations about this in the coming year.

DFO PROVIDED THE FOLLOWING RESPONSE TO EMAB'S COMMENTS (edited to reduce size):

The mandate of the Fisheries Protection Program (DFO-FPP) is to maintain the sustainability and ongoing productivity of commercial, recreational and Aboriginal fisheries. This mandate is achieved through the administration of Section 35 of the *Fisheries Act*. Subsection 35(1) prohibits *serious harm to fish* (death of fish, permanent alteration to, or destruction of fish habitat). DFO-FPP also addresses fish passage, as described by Section 20 of the *Fisheries Act*.

Following a Designation Order on February 28, 2014, Environment and Climate Change Canada (ECCC) became the responsible minister for the administration and enforcement of subsections 36(3) through (6) of the *Fisheries Act*, which prohibits the deposition of deleterious substances in waters frequented by fish. That means DFO-FPP no longer provides regulatory guidance on: the establishment of water quality guidelines for potentially deleterious substances, including suspended sediments in water; the specific techniques or methodologies by which water quality is monitored; toxicological thresholds of exposure for the protection of either fish or aquatic invertebrates; or impacts to fish as a result of exposure to deleterious substances, such as changes in fish health. Consequently, many aspects of Water Licences and associated plans, including Aquatic Effects Monitoring Programs, waste containment facilities or discharge criteria for water quality or contaminants including total suspended solids, are not within DFO-FPP's mandate and therefore comments are not provided. DFO-FPP recommends that ECCC be consulted regarding these items.

COMMUNICATIONS



ANNUAL GENERAL MEETING

Each September, we hold our Annual General Meeting (AGM) in our Yellowknife office boardroom. Parties to the EA are invited to attend and provide input on EMAB's activities and direction. Napoleon Mackenzie was elected as Chair, Charlie Catholique was re-elected Vice Chair and Julian Kanigan was re-elected as Secretary-Treasurer.

PUBLIC LIBRARY

EMAB is responsible for making sure that people have access to materials that relate to the EA. Anyone interested can visit our office and access plans and reports,

expert reviews, correspondence, Board meeting minutes, maps and images. Our office hours are 9 a.m. – 5 p.m. Monday to Friday.

EMAB DIRECTORS

EMAB Directors are one of the main ways EMAB communicates with Affected Communities. Our Directors are responsible for updating communities on what is going on at Diavik and bringing any concerns and questions about the environment at Diavik back to EMAB. Due to funding reductions from Diavik, and lack of uptake, EMAB has cut back the budget that covers Director consultation in communities.

MEETINGS

As noted in the section on Involving and Supporting Communities, EMAB holds public updates in the communities of the Aboriginal Parties. The goal is to keep people informed and allow them to ask questions and voice opinions and concerns.

WEBSITE

EMAB's website is another way for EMAB to reach out to the people. We use our website to post Diavik's WMP Reports and the EAQMP Reports. We do not post the AEMP or ICRP Reports as these are on the WLWB public registry. We also use our website to post EMAB Annual Reports, Diavik's EAARs, and meeting minutes. This year, EMAB hired a company in Yellowknife to redesign our website and make us a new online public library to hold our documents. You can visit us at our website, EMAB.CA.

ANNUAL REPORT

EMAB circulates its annual report to all Parties to the EA, as well as key leaders in the Affected Communities and throughout the NWT.

BROCHURE AND POSTER

We updated our brochure and poster to match our strategic plan and current activities.

EMAB GOVERNANCE AND OPERATIONS

EMAB Photo



EMAB Directors getting a tour of the Water Treatment Plant in September 2016

The Board met 13 times in 2015-16; six face-to-face meetings and seven conference calls. The Annual General Meeting took place on September 8. The Board passed 18 email motions over the year.

BUDGET AND FINANCE

EMAB's budget for 2016-17 was \$634,651; this was accomplished by rolling over \$155,000 from 2015-16 coupled with Diavik's payment of \$477,000. EMAB spent \$592,464 during the year and will roll over \$35,000 for technical reviews that were scheduled to take place this year but are delayed until next year and \$6,000 for a meeting with the TK Panel that was not able to take place in 2016-17. The remaining \$5,673 will be returned to Diavik.

EMAB negotiates its budget with Diavik every two years, for the following two years. The EA says that EMAB will try to keep any increases to the rate of inflation. EMAB recommends a budget to Diavik that we both have to agree on. If there is no agreement Diavik submits its own proposed budget to the Minister and he can choose EMAB's or Diavik's. For the last three budget periods EMAB and Diavik have not agreed on a budget, and each time the Minister has chosen Diavik's budget. This has resulted in EMAB's budget being cut back from \$726,000 in 2011 to \$477,000 in 2016. To follow the EA, EMAB's proposed budget was based on the 2016 budget plus the rate of inflation. The Board had to make substantial cuts to meet this budget. In particular the budget for Board members to undertake community consultation was drastically reduced, and there are no funds for EMAB to host community workshops for the next budget period. To conduct any activities above and beyond those budgeted, EMAB must submit a separate request to Diavik for approval.

DIAVIK SITE VISITS

Board members and staff took a site tour of Diavik on September 7, during the September Board meeting. Board members and staff appreciated the tour and were pleased to see the site and changes that have been taking place.

EMAB also arranged a site tour for community participants, board members and consultants during the EMAB Closure workshop on February 16. Workshop participants found the site tour to be of limited value due to the winter conditions.

Both tours covered the above-ground portion of the site including: WRSA, PKC Facility, A154 and A418 pits, NI, and A21 dike construction. The Board's tour also included the Waste Transfer Area, Water Treatment Plant and the wind farm.

STRATEGIC PLAN

EMAB reviewed and updated its current strategic plan in March. Some changes were made to reflect the new staffing structure with changes in roles and reduced staff resources, and the re-assigning of the TK Panel to Diavik.

OPERATIONS

EMAB staffing remained consistent through the year. For professional development, the Environmental Specialist attended the Environmental Forum of the Saskatchewan Mining Association in October and a workshop on Designing for Northern Mine Closure arranged as part of the NWT Geoscience Forum in November. The Executive Director attended a workshop on Negotiation Skills in March.

EMAB's Operations Manual was reviewed and updated.

WHAT ARE EMAB'S PLANS?

Our priorities for 2017-18 will have a focus on closure plans.

OVERSIGHT AND MONITORING

Monitoring development of the A21 pit now that dike construction is complete

Review TSS amendment process with emphasis on questions about the enforceability of Inspector directives under the Waters Act

REVIEW REPORTS:

- 2017 AEMP Annual Report
- 2014-16 AEMP Summary Report
- 2017 Annual WMP Report
- 2016 EAQMP Report
- WRSA Final Closure Plan Version 1.1
- ICRP Version 4.0
- 2017 Annual ICRP Progress Report
- GNWT Air Regulations

- 2016 EAAR
- MMER Amendments

ABORIGINAL AND COMMUNITY INVOLVEMENT

- Meet with Diavik TK Panel members
- Engage Communities through Board members and community update meetings

COMMUNICATIONS

- Annual Report
- Website
- Public Registry

GOVERNANCE

- Hold regular meetings
- Oversee EMAB operations
- Prepare Five-year Strategic Plan for 2018-2022

AUDITED FINANCIAL STATEMENTS

Independent Auditors' Report

To the Board of Directors of Environmental Monitoring Advisory Board

We have audited the accompanying financial statements of Environmental Monitoring Advisory Board (the "Board") which comprises the statement of financial position as at March 31, 2017 and the statements of operations, changes in net assets and cash flows for the year then ended, and a summary of significant accounting policies and other explanatory information.

Management's Responsibility for the Financial Statements

Management is responsible for the preparation and fair presentation of these financial statements in accordance with Accounting Standards for Not-for-profit Organizations, and such for internal control as management determines is necessary to enable preparation of financial statements that are free from material misstatement, whether due to fraud or error.

Auditors' Responsibility

Our responsibility is to express an opinion on these financial statements based on our audit. We conducted our audit in accordance with Canadian generally accepted auditing standards. Those standards require that we comply with ethical requirements and plan and perform an audit to obtain reasonable assurance whether the financial statements are free of material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditor's judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinion.

Opinion

In our opinion, these financial statements present fairly, in all material respects, the financial position of the Board as at March 31, 2017 and the results of its operations and cash flows for the year then ended in accordance with Accounting Standards for Not-for-profit Organizations.



Yellowknife, Northwest Territories
June 28, 2017 except as to Note 2, which is as of September 20, 2017

Chartered Public Accountants

Environmental Monitoring Advisory Board

Statement of Operations

For the year ended March 31,	Budget (Unaudited)	2017	2016
Revenue			
Diavik Diamond Mines Inc.	\$ 477,590	\$ 487,140	\$ 477,590
Interest income	3,750	2,825	3,714
Transferred from deferred revenue	632,901	632,901	467,663
Transferred to deferred revenue	(479,590)	(528,141)	(632,901)
Contributions repayable	-	(5,673)	-
	634,651	589,052	316,066
Program expenditures			
Administration (Schedule 1)	78,962	66,101	81,066
Management Services (Schedule 2)	171,793	185,876	104,714
Board Expenditures (Schedule 3)	112,926	108,118	83,333
Oversight and Monitoring - Science Program (Schedule 4)	229,000	194,989	43,621
Involving and Supporting community (Schedule 5)	19,270	6,352	-
Communications (Schedule 6)	22,700	26,083	-
Amortization	-	4,945	6,022
	634,651	592,464	318,756
Excess expenditures before other items	-	(3,412)	(2,690)
Other items			
Transfer to Tangible Capital Asset Fund	-	4,945	6,022
Purchase of capital assets	-	(1,533)	(3,332)
	-	3,412	2,690
Excess revenue	-	-	-

Environmental Monitoring Advisory Board

Statement of Changes in Net Assets

For the year ended March 31,

	Operating Fund	Tangible Capital Asset Fund	2017	2016
Balance, beginning of year	\$ -	\$ 16,172	\$ 16,172	\$ 18,862
Surplus (deficit)	-	-	-	-
Amortization	(4,945)	-	(4,945)	(6,022)
Additions	1,533	-	1,533	3,332
Transferred from Operating Fund	3,412	(3,412)	-	-
Balance, end of year	\$ -	\$ 12,760	\$ 12,760	\$ 16,172

Environmental Monitoring Advisory Board

Statement of Financial Position

As at March 31,	2017	2016
Assets		
Current		
Cash	\$ 586,715	\$ 670,907
Prepaid expenses	1,724	2,174
	588,439	673,081
Tangible capital assets (Note 4)	12,760	16,172
	\$ 601,199	\$ 689,253

Liabilities

Current		
Accounts payable and accrued liabilities (Note 4)	\$ 54,625	\$ 40,180
Contributions repayable (Note 5)	5,673	-
Deferred revenues (Note 6)	528,141	632,901
	588,439	673,081

Net Assets

Tangible capital asset fund	12,760	16,172
Operating fund	-	-
	12,760	16,172
	\$ 601,199	\$ 689,253

Approved on behalf of the Board

 Director

 Director

Environmental Monitoring Advisory Board

Statement of Cash Flows

For the year ended March 31,	2017	2016
Cash provided by (used in)		
Operating activities		
Excess expenditures	\$ (3,412)	\$ (2,690)
Item not affecting cash		
Amortization	4,945	6,022
	1,533	3,332
Change in non-cash operating working capital		
Accounts receivable	-	2,875
Prepaid expenses	450	11,198
Accounts payable and accrued liabilities	14,446	(34,991)
Contributions repayable	5,673	(262,410)
Deferred revenue	(104,761)	165,238
	(82,659)	(114,758)
Investing activity		
Purchase of equipment	(1,533)	(3,332)
Change in cash position	(84,192)	(118,090)
Cash position, beginning of year	670,907	788,997
Cash position, end of year	\$ 586,715	\$ 670,907

Environmental Monitoring Advisory Board

Notes to Financial Statements

March 31, 2017

1. Organization and Jurisdiction

The Environmental Monitoring and Advisory Board (the "Board") is a not-for-profit organization established as a requirement of the *Diavik Environmental Agreement*. It aims to provide a meaningful role for Aboriginal People in the review and implementation of environmental monitoring plans with respect to the Diavik Diamond Mine site in the Northwest Territories. The Board will be in place until full and final reclamation of the mine is complete.

The Board is exempt from income tax under section 149(1)(l) of the *Income Tax Act*.

2. Amendment

These financial statements were amended on September 29, 2017 to reflect authorization received from Diavik Diamond Mines Inc. to defer \$6,000 of funding to the 2018 fiscal year instead of requesting repayment. The financial statements were also amended to show deferred revenues and contributions repayable on the statement of operations on a gross rather than net basis.

3. Significant Accounting Policies

The following is a summary of the significant accounting policies used by management in the preparation of these financial statements in accordance with Canadian accounting standards for not-for-profit organizations.

(a) Financial Instruments – Recognition and Measurement

Financial assets originated or acquired or financial liabilities issued or assumed in an arm's length transaction are initially measured at their fair value. In the case of a financial asset or financial liability not subsequently measured at its fair value, the initial fair value is adjusted for financing fees and transaction costs that are directly attributable to its origination, acquisition, issuance or assumption. Such fees and costs in respect of financial assets and liabilities subsequently measured at fair value are expensed.

The Board subsequently measures the following financial assets and financial liabilities at amortized cost:

Financial asset measured at amortized cost includes cash.

Financial liabilities measured at amortized cost include accounts payable and accrued liabilities and contributions repayable.

At the end of each reporting period, management assesses whether there are any indications that financial assets measured at cost or amortized cost may be impaired. If there is an indication of impairment, management determines whether a significant adverse change has occurred in the expected timing or the amount of future cash flows from the asset, in which case the asset's carrying amount is reduced to the highest expected value that is recoverable by either holding the asset, selling the asset or by exercising the right to any collateral. The carrying amount of the asset is reduced directly or through the use of an allowance account and the amount of the reduction is recognized as an impairment loss in operations. Previously recognized impairment losses may be reversed to the extent of any improvement. The amount of the reversal, to a maximum of the related accumulated impairment charges recorded in respect of the particular asset, is recognized in operations.

Environmental Monitoring Advisory Board

Notes to Financial Statements

March 31, 2017

3. Significant Accounting Policies (continued)

(b) Fund Accounting

The Board uses fund accounting to segregate transactions between its Operating Fund and Tangible Capital Asset Fund. The Operating Fund accounts for the Board's operating and administrative activities. The Tangible Capital Asset Fund reports the assets, liabilities, revenues and expenses related to tangible capital assets.

(c) Tangible Capital Assets

Tangible capital assets are recorded at original cost plus any costs of betterment less accumulated amortization and excludes any assets not in current use. Amortization is calculated when the tangible capital assets are ready in use by the declining balance and straight-line method at rates set out in note 3.

(d) Revenue Recognition

The Board follows the deferral method of accounting for contributions. Restricted contributions are recognized as revenue in the year in which the related expenses are incurred. Unrestricted contributions are recognized as revenue when received or receivable if the amount to be received can be reasonably estimated and its collection is reasonably assured. Contributions which are not expensed in the current year are set up as deferred funding to be used in the future year when services are provided and goods acquired or refundable contributions that must be repaid to the contributor. Interest income is recognized on the basis of the time funds are in the account and interest is accrued.

(e) Unexpended Funds

On January 16, 2011 an Arbitration Award findings resulted in a change in accounting policy for the recognition and treatment of unexpended funds. Previously the Board classified the unexpended funds as unrestricted net assets. Beginning in 2011, unexpended funds are classified as net unexpended contributions repayable. The Board may not accumulate unrestricted net assets from unexpended Diavik Diamond Mines Inc. funds over a two year period.

(f) Allocation of Expenses

The Board allocates expenditures according to its activities. Expenditures are allocated to Administration, Management Services, Board, Science Program, Involving and Supporting communities and Communication.

(g) Use of Estimates

The preparation of financial statements in conformity with Canadian accounting standards for not-for-profit organizations requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the updated amounts of revenues and expenses during the period. Actual results could differ from those estimates.

Environmental Monitoring Advisory Board

Notes to Financial Statements

March 31, 2017

4. Tangible Capital Assets

				2017	2016
	Rate	Cost	Accumulated Amortization	Net Book Value	Net Book Value
Furniture and fixtures	30%	\$ 24,209	\$ 19,248	\$ 4,961	\$ 6,891
Office equipment	30%	33,017	29,769	3,248	2,779
Computer equipment	30-100%	60,895	56,344	4,551	6,502
		\$ 118,121	\$ 105,361	\$ 12,760	\$ 16,172

5. Accounts Payable and Accrued Liabilities

	2017	2016
Trade accounts payable	\$ 45,319	\$ 33,628
Payroll remittances payable	7,656	5,496
NWT Payroll Tax	1,650	1,056
	\$ 54,625	\$ 40,180

6. Contributions Repayable

	2017	2016
Diavik Diamond Mines Inc.	\$ 5,673	\$ -

7. Deferred Revenues

	2017	2016
Diavik Diamond Mines Inc.	\$ 528,141	\$ 632,901

Included in deferred revenue is a surplus of \$35,000 carried forward from 2015-2016 fiscal year retained to undertake detailed technical review of the Mine Closure and Reclamation Progress report and \$6,000 for the Traditional Knowledge Panel facilitator. Remaining unexpended surplus of \$5,673 has been transferred to contributions repayable to Diavik Diamond Mines as stated in Note 6.

Environmental Monitoring Advisory Board

Notes to Financial Statements

March 31, 2017

8. Financial Instruments

(a) Credit risk

Credit risk is the risk that a third party to a financial instrument might fail to meet its obligations under the terms of the financial instrument. The Board does have credit risk in cash of \$586,715 (2016 - \$670,907) with a chartered bank in excess of the insurable limit throughout the year. Furthermore, the Board has a concentration risk as full balance of cash is maintained with one large federally regulated financial institution. This risk has decreased from the prior year due to decreased cash balance.

(b) Interest rate risk

Interest rate risk is the risk that the fair value or future cash flows of a financial instrument will fluctuate because of changes in market interest rates. The Board's financial asset that is exposed to interest rate risk consists primarily of cash. The cash flow from variable rate financial instruments fluctuate as market rates of interest change. The risk has not changed from the prior year.

(b) Liquidity risk

Liquidity risk is the risk that the Agency cannot repay its obligations when they become due to its creditors. This risk has not changed from the prior year. The Board does have a liquidity risk in the accounts payable, accrued liabilities and contributions repayable of \$60,299 (2016 - \$40,180).

9. Comparative figures

Certain of the prior year figures have been reclassified to conform with the current year's presentation.

10. Economic Dependence

The Board is dependant upon funding in the form of contributions from Diavik Diamond Mines Inc. Management is of the opinion that if the funding was reduced or altered, operations would be significantly affected.

Environmental Monitoring Advisory Board

Schedule 1 - Administration

For the year ended March 31,	Budget	2017	2016
Expenditures			
Advertising	\$ -	\$ -	\$ 5,844
Annual report	-	-	7,748
Audit fees	9,875	9,000	9,000
Bank charges and interest	500	1,427	855
Bookkeeping fees	3,000	2,168	2,683
Capital equipment	3,350	-	-
Insurance	7,500	8,647	8,371
Janitorial	4,000	3,192	3,150
Library/Publications	1,000	80	-
Office supplies	5,000	1,853	2,281
Postage and freight	500	481	580
Printing and photocopy	2,500	2,455	2,386
Professional fees	997	-	1,070
Rent	31,500	31,500	31,500
Repairs and maintenance	500	-	273
Technical support	500	-	-
Telephone and internet	8,240	5,298	5,325
	\$ 78,962	\$ 66,101	\$ 81,066

Schedule 2 - Management Services

For the year ended March 31,	Budget	2017	2016
Expenditures			
Employee benefits	\$ 18,000	\$ 16,254	\$ 10,023
Employers costs - CPP, EI	8,000	11,258	7,622
Professional development	4,181	3,741	393
Salaries	140,000	152,899	82,364
Travel	1,000	883	3,649
Workers' compensation	612	841	663
	\$ 171,793	\$ 185,876	\$ 104,714

Environmental Monitoring Advisory Board

Schedule 3 - Board Expenditures

For the year ended March 31,	Budget	2017	2016
Expenditures			
Accommodations	\$ 6,000	\$ 6,198	\$ 2,267
AGM	301	349	-
BOD - Training	1,000	-	-
Conferences/ Professional development	5,000	-	-
Executive Committee	2,625	2,250	-
Food and beverage	-	-	197
Honoraria	22,500	27,375	18,575
Meeting Expenses	500	1,096	1,133
General community consultation	-	-	7,500
Teleconference Honoraria	3,000	3,472	-
Per diems	4,000	4,834	2,541
Personnel Committee	-	-	3,913
Preparation	45,000	45,000	40,500
Transportation	18,000	17,544	6,707
Workshop	5,000	-	-

Schedule 4 - Oversight and Monitoring: Science Program

For the year ended March 31,	Budget	2017	2016
Expenditures			
Aquatic Effects Monitoring Program	\$ 45,000	\$ 41,967	\$ 42,089
Air Quality Management Program	6,000	6,677	-
Interim Closure and Reclamation	67,000	57,111	-
Other reviews and reports	16,900	15,558	-
Traditional Knowledge Panel Review	6,000	-	-
Wildlife Monitoring Plan	11,100	11,840	-
Workshops	77,000	61,836	1,532
	\$ 229,000	\$ 194,989	\$ 43,621

Environmental Monitoring Advisory Board

Schedule 5 - Involving and supporting communities

For the year ended March 31,	Budget	2017	2016
Expenditures			
Board member consultation honorarium	\$ 3,000	\$ 375	\$ -
KIA	5,870	5,977	-
Lutsel K'e	4,300	-	-
North Slave Metis Alliance	1,000	-	-
T'licho	2,800	-	-
Yellowknife Dene First Nation	2,300	-	-
	\$ 19,270	\$ 6,352	\$ -

Schedule 6 - Communications

For the year ended March 31,	Budget	2017	2016
Expenditures			
Advertising, public relations and promotions	\$ 6,500	\$ 6,604	\$ -
Annual report	3,700	3,981	-
Posters and brochure development	1,000	1,229	-
Website maintenance	1,500	126	-
Website database re-design	10,000	14,143	-
	\$ 22,700	\$ 26,083	\$ -

EMAB RECOMMENDATIONS

EMAB RECOMMENDATIONS TABLE 2016-2017

Recommendation	To	Response
North Inlet Hydrocarbon Investigation Report and North Inlet Sludge Management Report		
EMAB submitted 9 recommendations to Diavik via the WLWB on the North Inlet Hydrocarbon Investigation Report and North Inlet Sludge Management Report. Highlights can be found on pages 21-22. As required by the WLWB, Diavik responded to each of the recommendations. The complete list of recommendations, as well as detailed technical reviews, can be found on our website: EMAB.CA.		
SNP Amendment Request		
EMAB submitted one recommendation to Diavik via the WLWB on the SNP Amendment Request (see page 22-23). As required by the WLWB, Diavik responded to the recommendation.		
2014 AEMP		
EMAB submitted 26 recommendations to Diavik via the WLWB on the 2014 AEMP Report. Highlights can be found on pages 24-25. As required by the WLWB, Diavik responded to each of the recommendations. The complete list of recommendations, as well as detailed technical reviews, can be found on our website: EMAB.CA.		
2015 AEMP		
EMAB submitted 32 recommendations to Diavik via the WLWB on the 2015 AEMP Report. Highlights can be found on pages 25-26. As required by the WLWB, Diavik responded to each of the recommendations. The complete list of recommendations, as well as detailed technical reviews, can be found on our website: EMAB.CA.		
AEMP Design Plan Version 4.0		
EMAB submitted 14 recommendations to Diavik via the WLWB on the AEMP Design Plan Version 4.0. Highlights can be found on pages 26-28. As required by the WLWB, Diavik responded to each of the recommendations. The complete list of recommendations, as well as detailed technical reviews, can be found on our website: EMAB.CA.		
2016 AEMP		
EMAB submitted 92 recommendations to Diavik via the WLWB on the 2016 AEMP Report. Highlights can be found on page 28. As required by the WLWB, Diavik responded to each of the recommendations. The complete list of recommendations, as well as detailed technical reviews, can be found on our website: EMAB.CA.		
Diavik Community Engagement Plan Version 2.0		
EMAB submitted 6 recommendations to Diavik via the WLWB on the revised Community Engagement Plan. Highlights can be found on page 30. As required by the WLWB, Diavik responded to each of the recommendations. The complete list of recommendations can be found on our website: EMAB.CA.		
Waste Rock Management Plan Version 7		
EMAB submitted 5 recommendations to Diavik via the WLWB on the Waste Rock Management Plan Version 7 through reviews by technical consultants and our own recommendations. Highlights can be found on pages 32-33. As required by the WLWB, Diavik responded to each of the recommendations. The complete list of recommendations, as well as detailed technical reviews, can be found on our website: EMAB.CA.		

Recommendation	To	Response
WRSa Final Closure Plan Version 1.1 EMAB submitted 62 recommendations to Diavik via the WLWB on the revised WRSa Closure Plan Version 1.1 through reviews by technical consultants and our own recommendations. Highlights can be found on pages 33-37. The complete list of recommendations, as well as detailed technical reviews, can be found on our website, emab.ca. Readers should note EMAB's recommendations were made after March 31, 2017 so there was no opportunity for Diavik to respond by March 31, 2017.		
Diavik response to recommendations on the 2014 & 2015 Combined EAQMP Report EMAB submitted 19 recommendations to Diavik on the 2014 & 2015 Combined EAQMP Report. Highlights can be found on pages 45-47. Diavik responded to most of the recommendations. Some of the recommendations and responses have been edited due to length and technical language. The complete list of recommendations, as well as detailed technical reviews, can be found on our website: EMAB.CA.		
EMAB recommends that a formal assessment of the TSP monitoring be conducted as soon as possible, taking into account the comments and recommendations made by EMAB and our consultants on both the 2013 report and 2014-15 consolidated report, as well as any comments from other reviewers.	Diavik	No response - EMAB has followed up with a request for a response as required by the Environmental Agreement (section 4.3)
During discussion at the June 2016 EMAB meeting it was noted that the dustfall monitoring was designed to meet the AEMP objectives, not necessarily EAQMP objectives. It would be useful to assess the objectives of the dustfall monitoring program with respect to Air Quality Monitoring and determine whether any adjustments are required. From an air quality standpoint the sampling frequency does not follow guidelines and does not provide information that may be useful to an air quality analysis.	Diavik	Dustfall concentrations in the AQ report were typically described in annual amounts to facilitate comparison with previously reported monitoring results and the 2012 modelling predictions. The focus of the analysis was the determination of the overall dustfall from the Mine and characterizing the chemical composition of dust, as well as providing an assessment of inter-annual variation and the identification of inter-annual trends.
Calibration records need to be provided for all equipment (i.e., laboratory scale, continuous monitoring equipment, etc.).	Diavik	The QA/QC processes for TSP have been updated in 2016. There were no external calibrations performed in 2015 and no internal calibration records were available to include in the report. Internal TSP sampler operation and data review is continuing in 2016, and maintenance and calibration records are being maintained.
No details were provided as to the reason for missing data. Details on annual averages cannot be made with confidence as 56% and 45% of the data were missing for the stations. Typically, if more than 25% of data is incomplete then trends should not be estimated for these data.	Diavik	Details on the QA/QC issues with the TSP samplers, including missing observations, are detailed in Appendix B of the AQMR. The causes have not been conclusively identified, but improvements to the operational procedures and tracking are expected to better address missing data in the future.
TSP is strongly correlated to dustfall. If dustfall is expected to occur west, north, northwest and south of the Project it is reasonable to expect the maximum TSP values to occur in those directions as well. As such, the locations of the TSP stations may not be located at the most appropriate sites for the 2014-2015 years.	Diavik	The dustfall locations have been chosen based on the results of dispersion modelling.

Recommendation	To	Response
<p>Although the report states that the dustfall was collected on a quarterly basis, there seems to be a trend of higher dustfall during the spring-summer months. To get a better representation of seasonal trends and effectiveness of dust suppression, dustfall collection on a monthly basis would be useful. TSP concentrations are linked to dustfall, however, TSP concentrations do not show the same seasonal trends (magnitude) which suggests the locations of the TSP monitors were not appropriate for the 2014-2015 monitoring years.</p>	Diavik	<p>The dustfall and TSP monitoring locations have been chosen based on the results of dispersion modelling as well as the monitoring frequency.</p>
<p>A QA/QC procedure should be adopted in the dust gauge collection SOP to ensure the field sampling does not contain any significant in-situ variability.</p> <p>The TSS SOP and all laboratory calibration certificates and/or records should be included with the AQMP report to demonstrate that laboratory calibrations and laboratory QA/QC have been completed as appropriate.</p>	Diavik	<p>The TSS SOP will be included in 2016 annual report.</p>
<p>Below are Recommendations from EMAB's 2015-16 Annual Report that Diavik did not get a chance to respond to before it went to print.</p>		
<p>Diavik's responses to recommendations on the 2015 ICRP Progress Report</p> <p>Last year EMAB submitted 72 recommendations to Diavik via the WLWB on the North Country Rock Pile Final Closure Plan, A21 ICRP and the updated RECLAIM estimate (all included in the 2015 ICRP Progress Report) through reviews by technical consultants and our own recommendations. Highlights can be found on pages 25-31 of the 2015-16 Annual Report. Due to the timing of the report Diavik was unable to respond by March 31, 2016; they did respond in 2016-17 as required by the WLWB. The complete list of recommendations and responses, as well as detailed technical reviews, can be found on our website: EMAB.CA.</p>		
<p>Diavik responses to recommendations on the 2015 WMP Report</p> <p>Last year EMAB submitted 20 recommendations to Diavik on the 2015 WMP Report through reviews by technical consultants and our own recommendations. Highlights can be found on pages 33-36 of the 2015-16 Annual Report. Due to the timing of the report Diavik was unable to respond by March 31, 2016; they did respond in 2016-17. Some of the recommendations and responses have been edited due to length and technical language. The complete list of recommendations and responses, as well as detailed technical reviews, can be found on our website: EMAB.CA.</p>		
<p>Please provide a discussion of the potential response actions to the departure from the prediction regarding the southern migration of caribou and changes to the timing of the migration.</p>	Diavik	<p>DDMI is not aware of any reports of Bathurst caribou remaining on calving areas longer than historic data from radio-collars. It is assumed that EMAB is referring to the duration that Bathurst caribou are remaining in the Contwoyto Lake area during the post-calving period and north of the Mine study area (Golder 2014a). Range size in caribou is positively correlated with herd abundance (i.e., more animals need more habitat area) and contraction of seasonal ranges is a natural phenomenon that has been reported in a number of barren-ground caribou herds in decline including Bathurst caribou (DDEC 2014). Although the EER discusses the effects from natural factors on caribou to provide context for cumulative effects, specific predictions of natural effects are not made in the EER (DDMI 1998) and are not relevant to Mine management. Analysis of annual range overlap of collared Bathurst caribou completed as part of the Jay Project (DDEC 2014) shows that while some seasonal ranges have contracted during the Bathurst caribou herd decline, collared cows consistently use similar broad-scale core areas from one year to the next. As this is not a Mine-related effect, mitigation is not required.</p>

Recommendation	To	Response
<p>Some collared caribou unexpectedly moved west around Diavik mine during the southern migration in 2014 and 2015, rather than east. Please provide a discussion of the potential response actions to the departure from the prediction regarding the southern migration of caribou and changes to the timing of the migration.</p>	Diavik	<p>The predictions in the EER are applied at the herd level over multiple years and not the individual level for a specific year. Migration routes of collared Bathurst caribou from 1996 to 2011 have varied among years (DDMI 2011), where some individuals travel east around East Island during the northern migration and west during the southern migration. However the overall pattern across years is consistent with predictions in the EER. As the 2015 WMP indicates, movement patterns of collared caribou in 2014 and 2015 are consistent with the EER prediction and the general pattern across years. The next assessment of this prediction is scheduled to be reported in March 2017. As noted in the above response, Bathurst caribou continue to use the same broad-scale core areas in seasonal ranges over time, which indicates that deflections of individuals or even occasional deflection of all collared caribou has not resulted in fragmentation of the Bathurst herd. New or additional mitigation is not required.</p>
<p>Testing changes in caribou behaviour over time will require an increased sample size of behavioural observations to allow for an analysis of behavioural changes over time. Please justify the pooling of caribou behavioural data across years and any assumptions made in future analyses.</p>	Diavik	<p>4a) For caribou behavioural analysis, there are insufficient data to detect annual variation in a behavioural ZOI, which leaves pooling across years as the only means to evaluate this effect. This explanation is consistent with conclusion made by MSES in comment (4e).</p>
<p>Why is there the same effect before Diavik was built (given that the years 1998/99 show the same ZOI “effect” as the years after the mine was built)?</p>	Diavik	<p>4c) A ZOI (i.e., zone of avoidance) was not detected using the second order equation for all caribou groups and just nursery groups prior to construction of the mine (Table 2.4-5; Appendix III). A zone of avoidance was detected using piece-wise regression for 1999, although qualitatively, the result was weak (i.e., 95% CI of first slope overlapped the second slope [Table 2.4-4; Appendix III]). These results do not suggest a strong ZOI prior to construction of the mine site, which may be due partially to the presence of the Ekati mine prior to construction of the Mine. Analysis of aerial survey data have also detected avoidance of large lakes by caribou (DDMI 2011b), which are present prior to construction of the Mine.</p>
<p>Please give careful consideration to the possibility that grizzly bears may be becoming habituated and their presence on the site may be on the rise. We recommend that DDMI provide clarity on their specific plans (i.e., schedule) for future grizzly bear data collection and analyses that would allow for adequate testing of the GNWT (2013) grizzly bear monitoring objective.</p>	Diavik	<p>As explained in the WMP report, caution needs to be used when interpreting patterns of incidental observations as these could be the same individual reported many times by different mine staff. Bears could be spending more time at site for a number of reasons, which are not necessarily adverse effects to the grizzly bear population. If more grizzly bears are spending more time at the Mine and mortalities are not occurring then this indicates that current mitigation to protect grizzly bears is effective, so new or additional mitigation is not required. The long-term frequency of hair-snagging programs for grizzly bear and wolverine will be discussed and determined collaboratively at a future wildlife monitoring workshop hosted by the GNWT.</p>

Recommendation	To	Response
<p>Please consider how the information gained from various caribou datasets could be used in terms of mitigation and adaptive management for the Diavik mine in particular and for other future projects in the region in general. The Cumulative Impacts Monitoring Program (CIMP) indicated that they had proposed a project for 2015 that would “look at the mechanisms of ZOI and what mitigation methods could be used”; however, no further details on adaptive management were found.</p>	Diavik	<p>As responded to January 16, 2012 on Comprehensive Analysis Report comments, DDMI continues to review the results of annual monitoring programs in an effort to determine any management actions that can be implemented at the Mine to reduce impacts to caribou, other wildlife, and the terrestrial and aquatic environments. For example, adaptive management of mitigation policies and practices has resulted in the successful avoidance and minimization of direct mine-related mortality of caribou and other wildlife from collisions with vehicles and aircraft, open pits, mine rock piles and processed kimberlite containment areas. Results from the analysis of behavioural scanning observations in the 2010 Comprehensive Analysis of Effects from the Diavik Diamond Mine on Wildlife in the Lac de Gras Region (Golder 2011b) showed that caribou groups with calves spent about 10% less time feeding/resting within 5 km of the Ekati-Diavik mines. Analysis of aerial survey data has estimated a zone of influence of 14 km from the Ekati-Diavik mines (Boulanger et al. 2012). Mitigation used by the Mine to limit sensory disturbances includes housing the crusher inside, the vehicle reduction program, watering roads during summer, and the use of ultra-low sulfur diesel (DDMI 2012). The switch from surface to underground mining will also limit sensory disturbance.</p>
<p>Please provide detailed explanation and justification as to why aerial surveys have been postponed “in favour of other studies”. Please provide details on what “other studies” would examine regarding mechanisms that may cause caribou to avoid the mine. Once finalized (expected in fall of 2016), a ZOI Guidance Document may provide direction on when or if aerial surveys should be resumed or if other studies would better address the caribou ZOI issue.</p>	Diavik	<p>A response to this comment was provided on June 25, 2015. As described in Section 1.1 of Golder (2014a), there is much concern by government and communities over the use of aerial surveys to monitor caribou during this low point in their population cycle. At this time there is no willingness to disturb caribou, outside of government population surveys and collaring programs. Currently, the GNWT-ENR is leading a Zone of Influence Technical Task Group to determine the best approach(es) to monitoring effects on the behaviour and distribution of caribou. Scanning observations provide important data on changes in caribou behaviour near mines that can be used as input into energetic models, which DDMI has continued to support and gather data. The GNWT-ENR also increased the number of cows with collars and applied collars to bulls, which will increase the ability to detect and monitor changes in the zone of influence (and caribou movement as they approach the mines). Other studies and financial support from DDMI have included research on Bathurst caribou winter range resource selection (Golder 2016). DDMI has also supported deployment of geo-fenced collars on Bathurst caribou and provided funding to support wildlife monitoring workshops.</p>

Recommendation	To	Response
<p>Please consider an analysis of the indirect (in addition to the currently presented direct) footprint effect on caribou habitat for understanding the true effects on caribou and for determining future mitigation measures. This is particularly relevant given the effects of dust deposition on local plant species composition and elevated metal concentrations in lichen near the mine.</p>	<p>Diavik</p>	<p>Monitoring and analysis of indirect effects were completed by DDMI through caribou aerial surveys to assess changes to the presence and distribution of caribou. The results of the analyses of these aerial survey data have been provided in a number of reports, which provide an estimate of the combined direct and indirect effects to caribou (see Golder 2011b; Boulanger et al. 2012). These surveys were suspended because of community concerns about survey disturbance noted previously. Monitoring and analysis of vegetation and lichen are completed to characterize how indirect effects from the Mine may be related to the changes in caribou distribution observed. Now that mining is restricted to underground, Mine-related effects from dustfall are predicted to be reduced from lower levels of surface activity.</p>
<p>Please consider maintaining a schedule for surveying the mine site, roads, rock piles, and Processed Kimberlite for caribou presence.</p>	<p>Diavik</p>	<p>A response to this comment was provided on June 25, 2015. Long-term monitoring has indicated that roads, mine rock piles and the processed kimberlite areas do not result in the mortality and injury of caribou. DDMI decided to modify the Road/Rock Pile/ PKC Caribou Monitoring Program from a date trigger (i.e., May 31, Sept 30 - 31) to an actual presence trigger (i.e., caribou spotted on East Island or within 5 km of the Site) (DDMI 2014).</p>
<p>When objectives or methods of the WMP are altered, removed or replaced by new studies, including participation in regional studies, the WMP report should describe the changes and rationale for them. The WMP should clearly demonstrate how the changes will meet the WMP objectives.</p>	<p>Diavik</p>	<p>The changes that have occurred in the WMP have been reported and discussed with EMAB. This includes changes resulting from consensus among communities, regulators and mine monitoring agencies at Wildlife Monitoring Workshops hosted by the GNWT. EMAB has participated or been invited to participate since these workshops began in 2009 (A. Patenaude, pers. comm.) including workshops where changes to objectives or methods for monitoring caribou, grizzly bear, wolverine and raptors have occurred. Workshop minutes and reports indicate that EMAB was present at the September 2009, June 2010, March 2013 and March 2015 workshops. Workshop minutes indicate EMAB was absent from the meeting in November 2013. The objectives, methods and history have been provided in reports when these programs have occurred (e.g., 2011 WMP report; 2013 WMP report).</p>
<p>In future WMP Reports, please indicate which wildlife studies included community members in monitoring or data collection.</p>	<p>Diavik</p>	<p>Page 24 of the 2015 WMP report indicates Ernest Lockhart of Łutselk'e participated in the wolverine snow track survey. Communities also participated in caribou behaviour monitoring but were not identified in the 2015 WMP, and will be identified in future reports.</p>

TABLE OF ACRONYMS

Acronym	Definition
AEMP	Aquatic Effects Monitoring Program
AGM	Annual General Meeting
BCRP	Bathurst Caribou Range Plan
CAR	Comprehensive Analysis Report
CSR	Comprehensive Study Report
DDEC	Dominion Diamond Ekati Corporation
DFO	Department of Fisheries and Oceans
EA	Environmental Agreement
EAAR	Environmental Agreement Annual Report
EAQMP	Environmental Air Quality Monitoring Program
ECCC	Environment and Climate Change Canada
EEM	Environmental Effects Monitoring
EMAB	Environmental Monitoring Advisory Board
ENR	Environment and Natural Resources
EPA	Environmental Protection Act
FF	Far-Field
GNWT	Government of the Northwest Territories
ICRP	Interim Closure and Reclamation Plan
KIA	Kitikmeot Inuit Association
LKDFN	Lutsel K'e Dene First Nation
MMER	Metal Mining Effluent Regulations
MSES	Management and Solutions in Environmental Science



Acronym	Definition
MVLWB	Mackenzie Valley Land and Water Board
NCRP	North Country Rock Pile (aka WRSA – see below)
NI	North Inlet
NSC	North South Consulting
NSMA	North Slave Metis Alliance
PHC	Petroleum Hydrocarbons
PKC	Processed Kimberlite Containment Facility
SEC	Slater Environmental Consulting
SNP	Surveillance Network Program
TG	Tłıchǫ Government
TK/IQ	Traditional Knowledge / Inuit Qaujimajatuqangit
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
TTG	Technical Task Group
WLWB	Wek'èezhii Land and Water Board
WMP	Wildlife Monitoring Program
WMR	Wildlife Monitoring Report
WRRB	Wek'èezhii Renewable Resources Board
WRSA	Waste Rock Storage Area (aka NCRP – see above)
YKDFN	Yellowknives Dene First Nation
ZOI	Zone of Influence



Working with *the* People *for the* Environment

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