ENVIRONMENTAL MONITORING ADVISORY BOARD FOR THE DIAVIK MINE

Working with *the* People *for the* Environment

ENVIRONMENTAL MONITORING ADVISORY BOARD
FOR THE DIAVIK PROJECT

ANNUAL REPORT 2018 2019

Photo courtesy of Diavik Diamond Mine

ENVIRONMENTAL MONITORING ADVISORY BOARD FOR THE DIAVIK MINE

TEL 867-766-3682

Box 2577, Room 204 - 5006 Franklin Avenue, Yellowknife, NT X1A 2P9

www.emab.ca • emab1@northwestel.net • emab2@northwestel.net

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Photo courtesy of Diavik Diamond Mine

Before the start of mining operations, Diavik went through an Environmental Assessment (EA). The EA allowed everyone to learn more about the water, vegetation, air, fish, and wildlife in the area. This information was documented in the Comprehensive Study Report (1999). In this report, Diavik also made predictions about environmental changes that would happen because of the mine. The following summary gives a broad picture about how much the environment has changed at Diavik. It also highlights how these changes compare to the predictions made in 1999.

WATER

Water quality in Lac de Gras (LDG) is usually within water licence limits, and within the original predictions. LDG is experiencing mild nutrient enrichment in parts of the lake. Excess phosphorus and nitrogen from human activity at the mine are causing this nutrient enrichment in the lake. Nutrient enrichment is determined based on elevated chlorophyll *a* measurements as well as phosphorus. Nutrient enrichment means more food is available for algae and phytoplankton. This can cause them to grow rapidly. The growth uses oxygen, so can lead to lower oxygen levels in the water, which can negatively affect other species living in the lake. The extent of the area affected has shown large and variable changes over the last few years (10% of the lake in 2015, 43% in 2016, 26% in 2017 and 12% in 2018). The predicted extent of effect was 20% of the lake. Diavik measures nutrient enrichment at the near-field sites yearly but only measures it at the far-field sites every third year. Because of this, we can't be sure about the extent of effects during the years where the far-field is not monitored. In the past, EMAB has recommended Diavik sample the far-field sites for nutrient enrichment every year.

Diavik measures the amount of dust that comes from the mine. A recent study by Diavik shows the main source of phosphorus in LDG is likely from dustfall. Dust from the mine settles on the lake and adds contaminants, such as phosphorus, to the water. It is not clear how much of the phosphorus in dust adds to nutrient enrichment.

FISH AND AQUATIC LIFE

Monitoring results for fish and other aquatic life are generally within predictions. There are many different aquatic organisms living in LDG. Small aquatic organisms are useful indicators of aquatic health. Two types of aquatic organisms that Diavik measures are plankton and benthics. Plankton are microscopic plants and animals that live suspended in the water. Benthic invertebrates are small creatures that live on the lake-bottom (e.g. snails and worms). They are also a food source for fish. Changes in the number and type of benthics can affect fish populations in different ways. Prior to 2013, density of benthics was higher closer to the mine compared to further away. Since then they have returned to their normal range and distribution in the lake.

Plankton are also food for fish. Since 2007, plankton communities near the mine have been different from those far away. These changes seem to show that increased nutrients in LDG from Diavik's activity are affecting plankton near the mines.

Mercury levels in Lake Trout have been variable in LDG since the beginning of the mine. Occasionally, levels in some fish have been above consumption limits set by Health Canada. Mercury has not been detected in Diavik's effluent, so this effect cannot necessarily be linked to Diavik. Mercury levels in fish in many other lakes in the NWT are also increasing. Diavik requested a change to the Aquatic Effects Monitoring Program


EMAB Photo

and will no longer routinely sample trout for mercury unless slimy sculpin (an indicator fish species) show effects. EMAB disagreed with this program change and continues to make monitoring lake trout for mercury a priority issue.

Traditional knowledge (TK) camps take place about every three years. The last TK camp took place in the summer of 2018. Community participants in Diavik's Fish Camp prepared the fish using standard cooking methods: boiling, baking, frying and grilling. They say taste and texture of fish in LDG have not changed. They did express concern about high amounts of cysts and parasites in the fish, but when they checked back, the numbers were similar to previous years. Mercury levels in fish samples collected at TK camps were tested for mercury. This year none of the samples were above the commercial fish limit for mercury set by Health Canada.

WILDLIFE

Diavik monitors caribou, grizzly bear, wolverine, raptors and the vegetation they eat. In general effects on these animals and plants are within the predictions that Diavik made during the environmental assessment. The measured effect of the mine on caribou is greater than

Photo courtesy of Diavik Diamond Mine

what was predicted, and progress in collecting data to identify the reasons has met a number of roadblocks. Diavik has not proposed any adaptive management measures to try to reduce the extent of its effect on caribou.

The Bathurst caribou herd inhabit the area of LDG during their migration. The average population size of Bathurst caribou dropped from 349,000 in 1996 to about 8,200 in 2018. The cause of this decline is not well understood. Some other herds are also declining. Community members have expressed concern that the mines are contributing to this effect.

Movement and migration patterns of the caribou are also changing. The Bathurst caribou are staying on the northern calving grounds longer than they used to. When they migrate south, many are moving in different directions than in the past. In the last couple of years many caribou from the Beverly/Ahiak herds have also been seen at or around the mine during the winter.

The Zone of Influence (ZOI) for caribou is larger than Diavik predicted. EMAB has recommended that Diavik consider what operational changes it can make to reduce the ZOI. Diavik has not proposed any changes so far. Direction for ZOI monitoring needs to come from ENR. ZOI monitoring has been put on hold at Diavik since 2011. With A21 open-pit mining beginning in 2018, EMAB recommended Diavik begin ZOI monitoring again in 2019. At the time of writing this report, there has been no direction from the Government of the Northwest Territories (GNWT) - Department of Environment and Natural Resources (ENR) to resume ZOI monitoring.

There have been problems analyzing caribou behaviour data due to the changes in caribou distribution around the mine. There are less caribou around to study. Diavik and Ekati agreed to coordinate their caribou behaviour data collection methods in an attempt to get more useful data. After these efforts Diavik says there are still not enough data for in-depth analysis. However, Diavik was able to complete a small analysis on caribou feeding behaviour in 2018. EMAB is working to help resolve the issues surrounding caribou behaviour data collection and analysis. GNWT-ENR could play an important role in making sure both mines are collecting compatible data near and far from the mines.

Diavik works in cooperation with GNWT-ENR and other mines to conduct DNA hair snagging surveys on grizzly bear and wolverine. Diavik's studies show that grizzly bear populations are stable or increasing. Wolverine populations showed a slight decreasing trend at Diavik. The weak decline observed at Diavik

Photo courtesy of Diavik Diamond Mine

is not a concern at this time. Wolverine population decrease was more significant at other mines.

AIR

Diavik's air quality monitoring has significant ongoing problems, particularly with respect to total suspended particulates (TSP). Diavik's monitoring is done by measuring the amount of dust that lands on the land and water. They also measure TSP in the air. Dustfall increased in LDG near the A21 dike while construction activity for A21 occurred. This will likely continue with the above-ground mining of A21 that started in 2018. In recent years, it has come into question whether control stations for measuring dustfall have become affected by the mine. EMAB has asked Diavik to consider sources of dust that may be causing this.

Diavik's air quality report showed that TSP emissions were generally within GNWT guidelines. There was only one exceedance in 2017. However, the two monitors were only operational for 69% and 71% of days in 2017. Other exceedances could have occurred at times when the monitors were not operational, but there is no way to know. Diavik has proposed to stop TSP monitoring. EMAB disagrees with this and is working with Diavik and the GNWT to improve TSP monitoring at Diavik.

CLOSURE

Diavik's closure planning needs quite a bit of work to get it on track to be finalized by 2022, the date Diavik has requested it be allowed to submit the final closure plan. The Wek'èezhìi Land and Water Board (WLWB) has decided not to approve Diavik's Final Closure Plan for the north Waste Rock Storage Area and did not approve Version 4 of Diavik's Interim Closure and Reclamation Plan, stating that there were substantial changes required.

The North Country Rock Pile is the first part of the mine that Diavik is closing. It submitted a revised North Country Rock Pile closure plan in 2017. The WLWB did not approve the plan as final. They want Diavik to engage with the communities more about this plan. They did agree that Diavik could go ahead with covering the pile and that outstanding issues could be dealt with through the main closure plan.

EMAB continues to have serious concerns with the revised plan. The WLWB said these issues will be dealt with through the review of the closure plan for the rest of the mine.

Diavik submitted its Interim Closure and Reclamation Plan for the rest of the mine in 2017. In December 2018 the WLWB decided not to approve the plan. The Board noted that reviewers expressed many serious concerns about the plan and they also required many substantial revisions to the plan. They directed Diavik to submit a revised version by June 2019, but have extended this to December 2019 at Diavik's request.


EMAB Photo

The WLWB's concerns were extensive and many of them reflect EMAB's concerns including:

- Re-vegetation – Diavik is proposing to revegetate about 11% of the site using local species. Vegetation covered about 70% of the site before development. WLWB directed Diavik to engage with communities and reviewers on this.
- Contaminated runoff and seepage, especially from the waste rock pile.
- Size of the mixing zone – Diavik is proposing a 25-square-kilometre mixing zone around the East Island; inside this zone water quality would not have to meet aquatic health guidelines.
- Effectiveness of the cover on the North Country Rock Pile is uncertain, particularly when the effects of climate change are considered.
- Wildlife Safety – Diavik should plan to make sure wildlife cannot hurt themselves walking around the mine, and that the vegetation and water are safe for wildlife to eat and drink.
- Processed Kimberlite Containment Facility (PKC) or tailings pond – the proposed plan to close the PKC has a good chance of failing; a lot of work needs to be done here. WLWB directed Diavik to update the seepage and outlet water quality predictions and to expand the PKC reclamation research to address the many uncertainties. Diavik must also prepare a schedule for closing the PKC that includes the research and closure activities.
- Contaminated soil – Diavik wants to bury any soil that doesn't meet guidelines. EMAB wants Diavik to begin treating any contaminated soil as soon as possible.
- WLWB has also directed Diavik to engage on reconnecting the North Inlet (NI) with LDG, on specific closure criteria and on the Site-specific Risk-based Closure Criteria.
- Closure Criteria – many of Diavik's proposed criteria are not adequate. The WLWB expressed concern about the lack of progress here.
- Security Estimate – EMAB is concerned that in light of all the uncertainty the security estimate may not be enough, particularly if there are problems in the future after the ice road has closed.
- Long-term maintenance and monitoring – EMAB expects that part of the mine will need a very long time before we can be sure there will not be problems. Diavik would like to finish closing the site seven years after they stop operating. A plan is needed for monitoring and making repairs over the long-term, including a policy and legislative framework.

ABOUT US

EMAB Photo

Diavik Staff, EMAB Staff, and Board Members by pit A418.

HOW EMAB WAS FORMED

The Environmental Monitoring Advisory Board (EMAB or the Board) exists because of the Environmental Agreement for the Diavik Diamond Mine. The Environmental Agreement 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. EMAB makes sure the environment around Diavik remains protected. The Environmental Agreement states EMAB will work independently and at arm's length from Diavik and the other Parties who signed the agreement.

WHY THE ENVIRONMENTAL AGREEMENT IS IMPORTANT

The Environmental Agreement is a legal contract between the Parties. It says what Diavik and the Parties must do to minimize environmental effects of the mine. The Environmental Agreement 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 Environmental Agreement sets out EMAB's mandate.

WHAT EMAB DOES

EMAB was set up in 2001 and is in its 17th year of operations. EMAB's mandate covers four main areas:

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

WHO WE ARE

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

- Executive Director
- Environmental Specialist

Since December of 2013, the GNWT and the Government of Canada have taken steps to amend the Environmental Agreement as a result of the Devolution process. Their plan is for Canada to remain a Party but with many of Canada's responsibilities transferred to the GNWT. This is an ongoing process. Canada has delegated its authority regarding the Environmental Agreement to the GNWT in the meantime.

WHERE WE ARE LOCATED

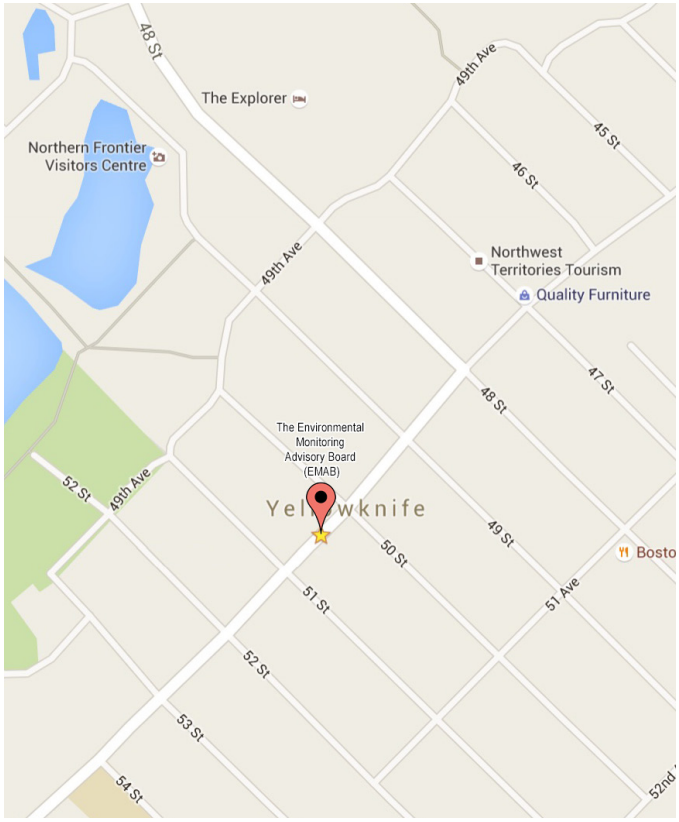
Our office is downtown Yellowknife at 5006 Franklin Ave, suite 204 on the 2nd floor of the 50/50 Mini Mall.

Phone: **867-766-3682**

Email: **emab1@northwestel.net**

Website: **www.emab.ca**

Facebook: **facebook.com/EMAB2015**



CHAIR'S MESSAGE

EMAB is the watchdog for the environment affected by the Diavik mine. This is a job that all Board members take very seriously. We are all watching for changes at the mine, in the water, in the air and in the wildlife. We talk to the members of our communities to tell them what we are seeing and to listen to their observations, questions and concerns about the effects of the mine.

All EMAB members and Parties were saddened when our elder and EMAB Chair, Napoleon Mackenzie, passed away on May 11, 2019. I have stepped in as EMAB Interim Chair following the unexpected passing of Napoleon, who had been the Chair since 2016. On behalf of the Board I would like to recognize Napoleon's long and dedicated service to protecting the environment at Diavik, and to contributing to EMAB's work. We will miss his experience, his support and his leadership. We send our condolences to his family, friends, colleagues and all those whose lives he touched.

Under Napoleon's leadership last year we worked on an Action Plan for the next five years that responds to the needs of the Parties to the Environmental Agreement, the issues EMAB faces and the activities taking place at Diavik.

Diavik plans to stop mining by 2025, then close the mine over a seven-year period. EMAB is directing more of our work towards the closure planning, and will continue for the next few

EMAB Photo

EMAB Photo

years. We make sure to comment on how well Diavik is engaging with communities, and how Traditional Knowledge/Inuit Qaujimajatuqangit is being included in the planning. We hear from communities that they want the minesite to be as much like it was before any development as possible, and we use this approach to guide our recommendations. We have also started discussions with Diavik about monitoring the environment after closure, and how people from communities can be involved in that.

The TK Panel, administered by Diavik, met twice last year, to talk about the processed kimberlite at closure and to taste the fish from Lac de Gras near the mine. EMAB was invited to the last day of the meetings and we are pleased that the Panel has invited us to attend the next meeting from start to finish, so we can get a better idea of how they make their recommendations. We are going through all the recommendations made by the TK Panel to see how Diavik has followed them up.

We expect we will have a lot to do this coming year and we look forward to it. We plan to work with Affected Communities in helping to protect the environment at Diavik, and encourage everyone to get in touch with the Board member from your area if you have ideas or concerns.

Marsi Cho

Charlie Catholique, Vice-Chair
Interim Chair

WHAT HAVE WE DONE THIS YEAR?

EMAB Photo

EMAB Staff and Directors on a tour of the Diavik mine site.

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 2018-19, with more detail on the following pages. Readers can also visit our website: www.emab.ca.

GOVERNANCE: The Board is developing an Action Plan for 2019-24. The plan is in the final draft stage. The emphasis continues on doing more technical reviews of Diavik's plans and reports, and making them accessible. We provide these to the Parties for their information and use in making their own interventions to regulators. The plan also recognizes the changed role of the Traditional Knowledge Panel, and EMAB's role in working with the panel. It highlights the need for tracking collection and use of TK/IQ by Diavik.

COMMUNITY INVOLVEMENT: EMAB held two community update meetings with the Tłı̨chǫ Government Resource Management Working Group and Łutselk'e Dene First Nation.

OPERATIONS: EMAB's budget for 2018-19 was $558,115. There were no staff changes from the previous year.

REVIEWING REPORTS: In 2018-19 EMAB reviewed 13 reports and plans from Diavik; most of them were also reviewed by technical experts. These reports are required by the water licence, fisheries authorizations and the Environmental Agreement. EMAB focuses on reports that are in our priority areas (water, air, wildlife, closure and TK/IQ). EMAB also reviewed discussion

documents on legislative updates for the GNWT's *Waters Act* and proposed *Wildlife Management and Monitoring Plan* regulations.

COMMUNICATIONS: EMAB regularly updated our website. We circulated our annual report in September. We have been working on a way for people to comment on reports or EMAB comments through social media

BOARD MEETINGS: The Board met eight times in 2018-19: six face-to-face meetings and two conference calls. Board members visited the minesite in June.

The Board membership has been the same since 2015-16 providing valuable consistency and experience. The Executive Committee (Chair, Vice Chair, and Secretary Treasurer) stayed the same as the previous year.


EMAB Photo

Touring the waste rock pile.


EMAB Photo

Touring the water treatment plant.


EMAB Photo

EMAB meeting at Diavik.

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 Environmental Agreement

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.

Charlie Catholique, Vice Chair and Interim Chair
LKDFN

Julian Kanigan, Secretary/Treasurer
GNWT

Sean Richardson
TG

Arnold Enge
NSMA

Jack Kaniak
KIA

Gord Macdonald
DDMI

Machel Thomas,
YKDFN

Vacant - *Government of Canada*

Napoleon Mackenzie was appointed by the Yellowknives Dene First Nation in October 2011. He was EMAB's Chair from September 2016 until May 2019 when he passed away after a short illness.

Photo courtesy of Diavik Diamond Mine

ENVIRONMENTAL SETTING OF DIAVIK MINE

Lac de Gras (LDG) is a large lake, 60 kilometres in length, with an average width of 16 kilometres and 740 kilometres of shoreline. This lake is located roughly in the center of the Slave Geological Province, north of the tree line, and in Canada's Southern Arctic ecozone. The area is cold and dry. LDG 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. LDG is also near the center of the Bathurst caribou herd range. Since 2016 substantial numbers of Beverly/Ahiak caribou have been seen in the area in the winter and spring. The Bathurst caribou population has declined considerably from 186,000 in 2003 to 8,200 in 2018 (GNWT). Many other animals include the LDG 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)

2018 at Diavik marked a key milestone with the inauguration of our new A21 pipe, bringing a fourth pipe to production as we started surface mining in the summer months of 2018. Another landmark last year was the record tonnage processed at our processing plant. We are proud to say that the hard work from all teams in delivering A21 and processing ore at a record breaking level was done with safety as a first priority.

In terms of community contribution program, Diavik continued to provide financial and in kind resources to many local organizations, such as the *NWT On the Land Collaborative* offering land-based activities across the territory. We also funded a new scholarship for women in the NWT and Kitikmeot region to pursue postsecondary education in science, technology, engineering and math programs.

During the summer of 2018, we held a Traditional Knowledge (TK) Study of fish health and water quality in Lac de Gras, which is part of our Aquatics Effect Monitoring Program (AEMP). Following on our last Traditional knowledge (TK) studies in 2012 and 2015, participants provided input on the fish health and water quality, while scientists performed their studies. A video named *Our Youth, Our Future: Watching Fish and Water near the Diavik Diamond Mine* was produced and shared online to showcase the work of the Aquatics Effect Monitoring Program (AEMP).

Building on a successful 2018, we will be able to continue to deliver training, employment and business benefits to local communities, meet our commitments to environmental protection, and generate economic prosperity for our investors. As we continue to develop our mine, actively planning the closure of Diavik until 2025 is a priority. Meaningful engagement with stakeholders will ensure responsible closure plans are put into action, leaving behind a positive community and environmental legacy.

Diavik at a glance

- Four ore bodies: A21, A154 South, A154 North, and A418
- Spending (2000 to 2018): C $8.0 billion ($5.7 billion northern, of which $3.0 billion was Indigenous)
- Operations workforce (2018): 1,113 employees (560 northerners)
- 2018 rough diamond production: 7.3 million carats
- Reserves: 11.5 million tonnes at 2.4 carats per tonne (31 December 2018)
- Total rough diamond production: 117.4 million carats (2003 to 2018)

INVOLVING AND SUPPORTING COMMUNITIES

Community meeting in Łutselk'e.

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 report to the Board on 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 13 reports and plans in 2018-19 as well as proposed legislation. All these reviews were forwarded to the Parties to the Environmental Agreement and the land/environment managers for each Party. Technical reviews always include a plain-language summary to make them more useful for general readers. EMAB also makes these reports available on our website.

EMAB met with the Tłı̨chǫ Government Resource Management Working Group on September 25, 2018 to update them on EMAB's activities and current major issues.

EMAB held a Board meeting in Łutselk'e in December 2018 to work on development of a five-year action plan. The Board also held a public meeting and feast. We heard a lot of interest about the mine's closure plans including concerns about contaminated seepage and effects on Lac de Gras (LDG), concerns about wildlife eating contaminated vegetation, the need for a long period of monitoring after the mine closes and the effectiveness of a number of Diavik's proposed plans.

EMAB is exploring additional ways to involve communities in monitoring the Diavik mine in the draft Action Plan for 2019-24, such as providing more summary material and working to ensure youth are more involved. We expect the plan will be finalized in the coming year.

EMAB has been thinking ahead about ways for Aboriginal people and communities to be involved in monitoring the environment at the mine after closure. We have requested that Diavik provide information on qualifications the company will require, and Diavik has said they have an ongoing process where they work with

communities and other stakeholders to develop their plans for post-closure monitoring.

TRADITIONAL KNOWLEDGE/ INUIT QAUJIMAJATUQANGIT (TK/IQ)

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 minesite 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 procedure for TK with the Traditional Knowledge Panel. EMAB is pleased to see that Diavik has made efforts to include TK/IQ in closure planning through the Traditional Knowledge 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: www.emab.ca.

The TK Panel met twice in 2018. In May they met to discuss Processed Kimberlite in relation to closure planning and potential effects on fish and water. In August they met at the Traditional Knowledge Camp to catch fish in the area of the mine, examine them and cook and taste the flesh.

Preparing fish at the TK Camp.

In 2011 EMAB became more actively involved in bringing TK/IQ holders together as a Traditional Knowledge Panel, to address issues such as caribou and closure planning. Then in 2013 Diavik began to take a greater role in facilitating the Traditional Knowledge 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. The Panel had finalized 178 recommendations as of September 2017.

Photo courtesy of Diavik Diamond Mine

EMAB made recommendations on Traditional Knowledge that we presented in the 2017-18 annual report; we also noted the Board had met with two TK Panel members to discuss how the Panel functions. In follow-up EMAB decided to suggest that the Panel do an assessment of how satisfied it was with Diavik's responses, and its follow-up to Panel recommendations. The Board also decided to request to attend a full Panel meeting rather than only the last day as has been done in the past, to develop a better understanding of how the Panel arrives at its recommendations.

EMAB staff attended a Panel meeting in May 2018 where the Panel was informed of EMAB's suggestions. The Panel agreed that EMAB could attend the next full meeting. The Panel also identified a list of priority topics for discussion. They included EMAB's suggestion to review their satisfaction with Diavik's responses on the list.

After consideration the Board determined that EMAB should do its own review of Diavik's responses to the Panel recommendations. Given that the Panel only meets once or twice a year it could be years before they are able to do their own review. EMAB has examined all of the Panel recommendations and Diavik responses and assessed whether or not Diavik accepted the recommendation. There does not seem to be information provided on Diavik's follow-up so EMAB is developing a list of questions to clarify the status of each recommendation that Diavik accepted.

In general Diavik accepted a little over half of the Panel's recommendations, sometimes with modifications. In some cases it is not clear whether Diavik has accepted a recommendation or not. EMAB plans to finalize this review in 2019-20 and will report back on the results.

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 Environmental Agreement.

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 AEMP report. We also review reports on Air Quality and on Closure and Reclamation. We review other reports and documents on a case-by-case basis.

WHO ARE THE REGULATORS AND MANAGERS?

- **Wek'èezhìı Land and Water Board (WLWB)** is responsible for the issuance of Diavik's water licence and land use permits and the technical review of all documents required under the licence and permits. The WLWB is a regional panel under the Mackenzie Valley Land and Water Board.
- **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 as well as section 36 of the Fisheries Act.

- **Government of the Northwest Territories (GNWT)**
  - Department of Lands reviews reports required by the land use permits. 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, land use permits and land leases.
  - Environment and Natural Resources (ENR), has responsibility for environmental protection, including air and water quality, and provides detailed reviews of reports in these areas. It also has regulatory responsibility for wildlife, including monitoring under the *Wildlife Act*. It also proposes better ways to monitor effects of Diavik on wildlife. The Minister of ENR approves Diavik's Type A water licence.
- **Wek'èezhìi 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'èezhìı area.

TECHNICAL DOCUMENTS EMAB RECEIVED FOR REVIEW IN 2018-19

Report Name	Date Received	Regulatory Instrument
Water Management Plan Ver 14.1	March 6 2018	Water Licence
2014-2016 Aquatic Effects Re-evaluation Report	March 14 2018	Water Licence
Aquatic Effects Monitoring Program (AEMP) Design Plan Version 5.0	March 14 2018	Water Licence
Type 'A' Water Licence (Annual, 2017)	March 31 2018	Water Licence
Seepage Report (Annual, 2017)	March 31 2018	Water Licence
Wildlife Monitoring Program (WMP) (Annual, 2017)	April 3 2018	Environmental Agreement
AEMP (Annual, 2017)	April 13 2018	Water Licence
Waste Rock Storage Area (WRSA) Security Holdback Estimate	May 23 2018	Water Licence
EAAR - 2017	May 18 2018	Environmental Agreement
Water Licence (WL) Amendment Application	June 15 2018	Water Licence
Environmental Air Quality Monitoring Program (EAQMP) (Annual, 2017)	July 5 2018	Environmental Agreement
Engagement Plan Ver. 2.1	July 24 2018	Water Licence
WRSA Instrumentation Location 1	August 7 2018	Water Licence
WRSA Instrumentation Location 2	September 6 2018	Water Licence
WRSA Instrumentation Location 3	September 28 2018	Water Licence
WL Amendment Application IR#1	November 6 2018	Water Licence
EAQMP Management Plan	January 24 2019	Environmental Agreement
WL Amendment Application IR#2	February 11 2019	Water Licence
WMP (Annual, 2018)	April 3 2019	Environmental Agreement
AEMP (Annual, 2018)	April 11 2019	Water Licence

ENR LEGISLATION UPDATE

In our 2017-18 annual report EMAB reported on EMAB's participation in legislative updating initiatives by GNWT's Department of ENR. In particular the updates apply to two Acts of interest to EMAB:

- the *Waters Act* as it relates to Diavik's water licence, and
- the *Environmental Protection Act* as it relates to air quality regulations being developed by GNWT and their relation to Diavik's Air Quality Monitoring Program.

The most recent meeting EMAB staff participated in was in May 2018. The updating process is ongoing and EMAB will continue to participate and raise issues the Board has identified.

WATERS ACT

ENR is proposing a number of updates EMAB has an interest in:

- allowing the Minister to send a draft water licence back to the land and water board for clarification or further consideration
- security and long-term liability for mine closure may be addressed through the *Waters Act*
- updating offences section so that the Inspector can give direction if the company breaks the terms of the water licence (EMAB raised this issue in our 2016-17 annual report, as well as last year and we were pleased to see it was being discussed as part of the amendments)
- possible use of *Waters Act* to include air quality permitting by the land and water boards.

Amendments to the *Waters Act* are still under discussion.

AIR QUALITY MONITORING AND REPORTING

At the time of writing this report, there is no updated information on the development of Air Quality Regulations in the NWT. The GNWT is still evaluating their options regarding the development and implementation of Air Quality Regulations, and is still working with the Land and Water Boards to include air quality regulation and monitoring as part of the co-management system. Air quality standards are still planned to be added under the *Environmental Protection Act* as a part of the ENR Legislative Update process.

WATER MANAGEMENT PLAN VERSION 14.1


EMAB Photo

In our comments on Water Management Plan Ver 14.1, EMAB recommended that Diavik provide more detailed information about runoff to the Processed Kimberlite Containment Facility (PKC) and to the North Inlet so that readers could see a water balance for the Waste Rock Storage Area.

THE ENVIRONMENTAL AGREEMENT AND THE WATER LICENCE

The water licence and the Environmental Agreement both contain requirements for the AEMP. Most of the water licence requirements are more detailed than those in the Environmental Agreement. The WLWB cannot make Diavik meet any of the Environmental Agreement commitments unless they are also in the water licence. In the Environmental Agreement, 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.


EMAB Photo

RECOMMENDATION: Diavik should break out the amount of runoff attributed to the WRSA-NCRP in Tables 1-4 and 1-6 of Appendix C, Attachment 1. Diavik should provide an estimated water balance for the WRSA-NCRP.

Go to EMAB's website: www.emab.ca to see the full list of recommendations on version 14.1 of the Water Management Plan.

WLWB DECISION:

In its response to EMAB's recommendation Diavik suggested it report runoff from the WRSA in Tables 1-4 and 1-6 of the updated water balance. Diavik also recommended that the water balance be reported in its Annual Water Licence Report. The WLWB accepted both of these commitments.

EMAB is pleased to note that Diavik reported on the water balance for the north WRSA in the 2018 Annual Water Licence Report.

AQUATIC EFFECTS MONITORING PROGRAM


EMAB Photo


EMAB Photo

Fish in Lac de Gras.


EMAB Photo

Building the A21 Dike.

Diavik's AEMP (aquatic effects monitoring program) monitors dust, water quality, eutrophication indicators, sediment quality, plankton, benthic invertebrates, and fish health. Diavik submits many different reports for the AEMP. These include Re-evaluation reports, Design Plans, and Annual Reports. EMAB submits hundreds of recommendations on Diavik's AEMP reports. Below is a summary of the highlights. Go to our website: www.emab.ca to see the full list of recommendations.

1. KEY WLWB DECISIONS ON THE 2014-2016 AQUATIC EFFECTS RE-EVALUATION REPORT AND AEMP DESIGN PLAN VERSION 5.0.

Every three years Diavik submits a Re-evaluation Report to give a summary of AEMP results over the past three years. Diavik submitted the 2014 to 2016 Aquatic Effects Re-evaluation Report to the WLWB in March 2018. Based on the results of the 2014-16 Re-evaluation Report, Diavik submitted a revised AEMP Design Plan Version 5.0.

EMAB reported on our key comments and recommendations on these two reports in our 2017-18 Annual Report. EMAB received the WLWB's decisions on the report and plan in March 2019. This section is to update readers on the WLWB's decisions on EMAB's highest priority concerns. We have combined the decisions on both documents under the main topics where EMAB had made recommendations.

The WLWB approved Version 1.0 of the Re-Evaluation Report under the condition that Diavik submit a Version 1.1 with revisions. The WLWB did not approve AEMP Design Plan Version 5.0. Version 5.1 is required in September 2019. Diavik will continue following version 4.1 until a new version is approved.

1.1 DUST DEPOSITION

Diavik measures dustfall that comes from the mine. The purpose is to see if there are changes in dustfall. Measuring dustfall also helps estimate the amount of contaminants (e.g. metals) from dust landing on Lac de Gras (LDG). When dust lands on LDG, the contaminants end up in the water, which can cause effects to aquatic life.


EMAB Photo

Learning about Diavik's dust collection gauges.


EMAB Photo

DESIGN PLAN VERSION 5

ADDING MORE DUSTFALL MONITORING SITES

In EMAB's review of Diavik's 2016 AEMP Report, we recommended Diavik add two more dustfall monitoring sites. The WLWB said that this recommendation would be better addressed during the review of the 2014-2016 Re-evaluation report and Design Plan Version 5.0.

Diavik committed to considering the recommendations to add more dustfall monitoring sites. After considering, they decided that they will not add new dustfall monitoring sites. Diavik says that more monitoring stations would not affect overall conclusions about dustfall.

EMAB recommended that Diavik provide rationale as to why more stations could not be added. Diavik responded that the location suggested by EMAB is on LDG. Monitoring stations must be placed on land. The closest on-land sites near the area that EMAB recommended are quite far from the mine (around 1.5 km).

WLWB DECISION:

The WLWB noted that there will be another opportunity for EMAB to comment on this issue during the review of Design Plan 5.1.

2014-2016 RE-EVALUATION

GROUPING OF DATA SETS

In the 2014-2016 Re-evaluation, Diavik's dustfall analysis grouped the data by multi-year time period. It's possible that combining multiple years of data for the analysis could hide short-term effects. This is because effects happening over a short time frame could be masked by the trends observed over a longer time period.

EMAB recommended that Diavik should discuss short term trends. Diavik responded that grouping data by year provides the best analysis of dust deposition over space and time.

WLWB DECISION:

The WLWB asked Diavik for further clarification on their response to EMAB's recommendation. Diavik responded that no short-term

effects have been observed. This response satisfied the WLWB.

CHANGES OVER TIME

Phosphorus and metal content in dustfall increased from the 2010-2013 Re-evaluation to the 2014-2016 Re-evaluation. The increase was even seen at control stations (particularly near A21). Control stations are not supposed to be affected by the mine. This could be a result of mine-related influence over time. The increase in phosphorus at control sites suggests that effects of dust at the mine could be extending further than predicted.

EMAB recommended that Diavik should provide an explanation for this. Diavik responded that they would need to make assumptions about the rate of dustfall that is not related to the mine (also called background deposition) to provide an explanation. Their response did not consider that the increase in phosphorus and metals could be linked to mining.

WLWB DECISION:

The WLWB is requiring that Diavik monitor dust near A21. Diavik should do this as a part of the 2019 AEMP Annual Report. If the outcome shows that inclusion of background deposition rates is needed, the WLWB directed that Diavik include this in the 2017-2019 Re-evaluation Report. Diavik should also use the information for the next Design Plan update.

1.2 CHANGES TO WATER SAMPLING METHODS

DESIGN PLAN VERSION 5

PROPOSED GRADIENT DESIGN AND SAMPLING STATION CHANGES

Diavik proposed to change the sampling design of the AEMP. They proposed to move away from comparing near-field to far-field results. This is because far-field stations are no longer useful as control stations. (It was initially thought that far-field stations would not be affected by mine effluent, but this is no longer the case.) Instead, they want to evaluate the trends along lines from the near-field to the far-field. To do this Diavik proposed:

- reducing the number of far-field monitoring stations from 15 to eight
- adding stations between the mid-field and far-field.

The GNWT-ENR recommended that the Board should not approve this proposal because:

- reducing far-field monitoring stations would reduce the ability to assess long-term changes
- the change would not improve the AEMP program.

WLWB DECISION:

The WLWB agreed that more information supporting the proposed changes is necessary. In Version 5.1 of the Design Plan, Diavik must include a full consideration of how their proposed changes to sampling design will influence the assessment of other effects.

SAMPLING FREQUENCY – METAL AND DIAMOND MINING EFFLUENT REGULATIONS

Diavik also proposed to change water sampling frequency under Design Plan Version 5. This includes a change to sampling frequency at near-field sites and at LDG-48 (west end of LDG where it flows into the Coppermine River). Diavik proposed that at these sites water sampling would take place twice during the open water season. The two sampling events would happen at least one month apart. Diavik proposed to apply this change when the Metal and Diamond Mining Effluent Regulations (MDMER) are applied

to diamond mines. This is inconsistent with the new MDMER regulations, which requires sampling to be completed four times during the open water season. For more information on MDMER go to page 32.

WLWB DECISION:

The WLWB noted that Diavik is required to abide by the new MDMER regulations (i.e. four sampling sessions during open water season) starting in June 2021. Diavik committed to update the Design Plan to reflect MDMER requirements.

The WLWB also decided that additional water sampling required by the MDMER will not replace water quality monitoring included in the AEMP Design Plan.

1.3 EUTROPHICATION

Diavik has three groups of water quality monitoring stations: near-field, mid-field, and far-field. Near-field sites are closest to the mine and far-field sites are furthest from the mine. Diavik studies total phosphorus, total nitrogen and chlorophyll *a*. Studying these nutrients helps determine how much of LDG has been affected by eutrophication.

DESIGN PLAN VERSION 5

ADDING BENTHIC INVERTEBRATES TO THE NUTRIENT ENRICHMENT ANALYSIS

Diavik measures chlorophyll *a* because it is an early indicator of food supply for fish. EMAB suggested that benthic invertebrates (small organisms, like snails and worms, that live in the lake sediment) would be a better indicator. This is because they are the main food source for slimy sculpin.

WHAT IS EUTROPHICATION?

Eutrophication happens when a water body has more nutrients than normal. More nutrients promote growth of algae and aquatic plants which use up oxygen in the water. This can reduce the amount of oxygen available for other organisms (e.g. fish) in the lake. Limited oxygen can negatively impact these organisms because they need oxygen to breathe and survive. LDG receives nutrients from Diavik's effluent which leads to eutrophication.

WLWB DECISION:

The WLWB is requiring that Diavik includes benthic invertebrate density in the nutrient enrichment (eutrophication) analysis for Version 1.1 of the 2014-2016 Re-evaluation. Diavik indicated that they would add this to the analysis.

ADDING PLANKTON TO THE NUTRIENT ENRICHMENT ANALYSIS

EMAB recommended that plankton sampling should be added at the outflow to the Coppermine River. At this location chlorophyll *a* is the only nutrient enrichment variable monitored.

WLWB DECISION:

The WLWB did not require Diavik to add plankton sampling for nutrient enrichment at LDG-48 to Design Plan 5.1. Diavik added more plankton sampling to sites in mid-field and far-field areas. This sampling will start in 2019.

CHANGES TO SAMPLING SCHEDULE

In response to the 2016 AEMP annual report, the WLWB directed Diavik to increase the sampling frequency of plankton at mid-field sites from once every three years to once per year. Diavik agreed to the change and included it in Design Plan Version 5. Diavik will now sample plankton at mid-field (MF) sites every year. EMAB supports this addition.

EMAB had also recommended that far-field sites be sampled every year. This would reduce data gaps that could come up during years where the mid-field is sampled but the far-field is not. For example, if eutrophication effects are found in the mid field during a year without far-field sampling, there would be no way to tell how far the effects are extending. Diavik responded that there is no reason to increase far-field sampling. If the Action Level is triggered, they would sample the far-field in the following year.

WLWB DECISION:

The WLWB noted that this concern was raised by reviewers during the review of the 2017 AEMP. The reasons for Decision on the 2017 AEMP include direction for additional far-field sampling to be a part of the 2019 AEMP report. Diavik has already determined that 2019 is a comprehensive monitoring year. Far-field monitoring was scheduled to be conducted regardless of the WLWB's direction.

2014-2016 RE-EVALUATION

EXTENT OF SAMPLING

The far-field was not sampled for total nitrogen or chlorophyll *a* in 2014 or 2015. Because of this, we cannot know the actual area of LDG affected by these nutrients. The data from 2014 and 2015 show these nutrients were seen at all sampled stations. There is no far-field data to show if these changes extended past the mid-field. Far-field sites were sampled in 2016. Results of this sampling showed that all of LDG was affected by total nitrogen. 44% was affected by chlorophyll *a*.

EMAB recommended that Diavik discuss the implications of the spatial extent of effects caused by the lack of far-field data. Diavik responded that there is no need to discuss this, and no reason to sample the far-field more often.

EMAB also recommended that Diavik update the figures to clearly show which sites were not sampled in 2014 and 2015. Diavik agreed to this.

WLWB DECISION:

The WLWB is requiring Diavik to discuss the implications caused by limited far-field data in Version 1.1 of the Re-evaluation report.

1.4 FISH

2014-2016 RE-EVALUATION

LAKE TROUT TISSUE

The WLWB has allowed Diavik to stop monitoring mercury in lake trout as a part of the AEMP. They were allowed to stop because in 2014 it was determined that mercury levels in lake trout were back near baseline.

EMAB recommended that Diavik should describe what 'baseline' for mercury concentration means. Diavik responded that baseline data refer to measurements taken in 1996.

EMAB also recommended that Diavik should add a summary table for lake trout mercury data. Diavik committed to include this in Version 1.1 of the Re-evaluation.

Examining slimy sculpin from Lac de Gras.

WLWB DECISION:

The WLWB is requiring Diavik to include a summary table on mercury data in Version 1.1 of the Re-evaluation report. Diavik committed to doing this.

The WLWB asked Diavik to provide rationale for 1996 mercury data being used as baseline. Diavik responded that this is the only available data that pre-dates the mine. This response satisfied the WLWB.

1.5 UPDATE ACTION LEVELS AND STUDY FREQUENCY

DESIGN PLAN VERSION 5

BIOLOGICAL ACTION LEVELS

Diavik also proposed to change the Action Level trigger for when lake trout mercury surveys would be done. They proposed an Action Level 3 trigger as compared to the Action Level 2 trigger in AEMP Design Plan 4.1.

Certain conditions must be met to trigger Action Level 3. These conditions do not need to be met to trigger Action Level 2. For example, to trigger Action Level 3 the observed effects need to be observed for two sampling events in a row (i.e. twice in six years). This means that slimy sculpin would have to exceed acceptable mercury levels for six years before a lake trout survey is initiated.

In addition to this, Diavik proposed to change the frequency of slimy sculpin surveys. Currently, surveys take place every three years. Diavik has proposed that if Action Level 3 is not triggered, then the next slimy sculpin survey will take place in six years.

EMAB proposed that this change to the lake trout health survey trigger should be reviewed.

WLWB DECISION:

The WLWB decided not to approve changes proposed for biological action levels. This included action level triggers for mercury in lake trout. The WLWB also did

WHAT IS AN ACTION LEVEL?

Diavik has a "Response Framework" as part of the AEMP. The framework sets Action Levels so that Diavik can detect changes to the environment with enough time to respond before harmful effects occur. Low Action Levels require Diavik to take less action, such as investigating whether there is a trend that might lead to a harmful effect. Higher Action Levels take stronger actions to stop or reverse such a trend. By keeping track of small changes triggered by low Action levels, Diavik can do their best to be ready to mitigate the changes before higher Action Levels are be triggered. All Action Levels are set below the threshold for significant negative effects to the environment, so that Diavik can take action before environmental damage is significant or irreversible.

not approve the proposed change to the frequency of slimy sculpin surveys.

2. 2017 AEMP REPORT

Diavik submitted the 2017 AEMP report to the WLWB on April 13, 2018. The WLWB had not circulated it for review before writing last year's EMAB Annual Report.

EMAB had North South Consultants (NSC) review the report and submitted 24 comments to the WLWB. ECCC and DFO stated they had no comments on the report under their mandate. GNWT-ENR submitted comments.

Below are some highlights of EMAB's review and the WLWB's decision:

EUTROPHICATION INDICATORS

LDG is a nutrient-poor lake. Effects of the mine add nutrients to the lake. The Environmental Assessment predicted that nutrient input from Diavik would affect up to 20% of the lake. It was also predicted that the increased nutrient levels would have an effect on aquatic organisms. Diavik measured chlorophyll *a*, plankton, phosphorus, and total nitrogen for the 2017 AEMP.

Excess phosphorus occurs due to human activity at the mine. It is in the mine's effluent. Diavik has high confidence in their estimates of the amounts of phosphorus in mine effluent.

Seasonal differences of nutrient concentrations are usually observed in the effluent. In 2017 seasonal differences in nitrogen and phosphorus showed different trends than normal. Loads of nitrogen and phosphorus were highest during the open-water season. Typically, they are the highest during the ice-cover season.

Chlorophyll *a* concentrations were highest near the effluent diffusers. Concentration decreased with distance from the diffusers. Zooplankton feed on chlorophyll *a*, so zooplankton showed the same trend as chlorophyll *a* (i.e. more zooplankton were present near the diffusers than far away from them).

Phytoplankton biomass was above the normal range in the near-field and in some mid and far-field areas.

EXTENT OF EUTROPHICATION

Eutrophication effects were identified in the mid-field in 2017. Eutrophication effects were not tested in the far-field in this sampling year. So, we do not know if eutrophication effects extended beyond the mid-field in 2017. The far-field will be tested in 2019 during the next comprehensive sampling year.

Diavik reported that 41.9% of LDG was affected by total nitrogen in 2017. They compared these results to the results from 2016. EMAB does not feel like this was a good comparison. This is because in 2016 the far-field was sampled, but in 2017 it was not.

RECOMMENDATION: Include a qualifying statement indicating that due to the lack of far-field data for 2017 and the implications regarding limitations on defining the spatial extent of effects in those years, comparison to 2016 or other years is associated with uncertainty.

TOTAL PHOSPHORUS

Phosphorus has also been discovered in dust that comes off the mine. This dust lands on LDG and introduces more phosphorus to the lake. There is low confidence in the estimated amounts of phosphorus coming from dust. EMAB continues to comment that Diavik should improve dust monitoring methods. This would help to provide better estimates of phosphorus coming from dust.

RECOMMENDATION: incorporate discussion of all human-caused sources of total phosphorus (TP) to LDG within the main document and Appendix XIII.

WLWB DECISION:

The WLWB approved the 2017 AEMP Annual Report in March 2019. Although they approved the report, the WLWB required Diavik to submit additional information for the 2017 AEMP that answers a number of comments and recommendations from reviewers. Diavik and the WLWB are working together to decide when the updated information is due.

Go to EMAB's website: www.emab.ca to see the full list of recommendations on the 2017 AEMP Report.

3. 2018 AEMP REPORT

Diavik submitted the 2018 AEMP report on March 29, 2019. EMAB had NSC review the report. EMAB submitted 34 recommendations to the WLWB. GNWT-ENR also submitted comments on the report. ECCC and DFO did not submit comments.

Below are some highlights of our review:

TK FISH CAMP: FISH PALATABILITY

The AEMP TK Fish Camp takes place every three summers. Youth and Elders from affected communities attend the camp to taste fish and water from LDG, and to inspect fish for cysts and parasites. Tissue samples are also collected for lab analysis. Camp participants generally described the fish harvested at the camp as healthy. It was reported that participants thought the taste of the fish and water were good.

The TK fish palatability studies also summarize data collected on mercury and other metals in lake trout. Monitoring mercury levels in fish is important for ensuring the health of people who eat fish from LDG.

None of the fish harvested at the 2018 TK Fish Camp had mercury levels that exceed the guidelines set by Health Canada. However, fish collected at the camps are not collected using scientific methods. This makes it difficult to assess the fish tissue data. EMAB had some questions about the way Diavik reported statistics on the lab results. For more information about EMAB's views on Diavik's methods for monitoring mercury refer to AEMP section 4 (pg. 31 of this report).

RECOMMENDATION: Provide summary statistics for lake trout mercury concentrations and associated biological variables. Suggest calculating a mean mercury concentration adjusted for an average fish length (this length should be the same as used in previous studies).

RECOMMENDATION: Provide additional detail of the field and laboratory methods (e.g. date, method, and location of capture for each fish).

DUST DEPOSITION

Mining activity generates dust. This dust is suspended in the air and eventually settles on the ground or surface water. Dust that lands on the water introduces contaminants into LDG. Dust monitoring measures the amount of dustfall and the contaminants that it contains.

Diavik has control stations (i.e. sampling stations far from the mine that are not supposed to be affected by mining) for dust sampling. The control stations are showing higher rates of dustfall than they have in the past. This suggests that dust from the mine may be travelling further that anticipated. Control stations may now be affected by mining activity. If control stations are affected by the mine, they are less useful as controls. This is because they would no longer serve as an accurate reference. EMAB has raised concerns about this.

RECOMMENDATION: provide a discussion of the implications of potential project effects on dust at the control stations with respect to interpretation of the dust monitoring program results overall (i.e. are effects potentially consequential in terms of monitoring for project effects or are effects marginal and not consequential for the program).

EUTROPHICATION INDICATORS

2018 was not a comprehensive monitoring year. This means the far-field was not monitored for eutrophication indicators. The mid-field was affected by eutrophication, but it is unknown if these effects extended to the far-field in 2018.

A 2016 study done by Diavik showed that dustfall is likely one of the main inputs of phosphorus into LDG. Diavik is studying how this phosphorus affects eutrophication.

RECOMMENDATION: incorporate discussion of all human sources of total phosphorus (TP) to LDG within the main document and Appendix XIII.

WLWB DECISION:

As of time of writing the WLWB had not released a decision on the 2018 AEMP Report.

Go to EMAB's website to see the full list of recommendations on the report.

4. MERCURY IN LAKE TROUT AND SLIMY SCULPIN

In 2008 Diavik started sampling mercury in lake trout as a part of the AEMP. They started this to investigate high mercury levels that were found in slimy sculpin in 2007. Diavik studied mercury in lake trout every three


EMAB Photo

years from 2008-2014. In 2014 the studies showed that mercury levels were back near baseline. Based on this, Diavik proposed to stop sampling mercury in lake trout. The WLWB approved this change.

EMAB disagreed with this AEMP program change. We continue to have concerns about mercury levels in lake trout because they are not routinely sampled. Diavik currently documents mercury concentrations in fish caught at TK camps. Although this provides some indication about mercury levels in large-bodied fish, the data are not collected systematically. This makes it difficult to compare results between years.

Under the AEMP, mercury in lake trout is only sampled if an increasing trend of mercury in slimy sculpin is identified. Because the spike in mercury levels in 2007 was abnormal, EMAB is unsure how an increasing trend in mercury in slimy sculpin would be identified. It is uncertain if mercury levels would need to be higher than the levels recorded in 2007 to identify an increasing trend and trigger the need for a lake trout survey.

Diavik did not fully explore the reasons why mercury concentrations in slimy sculpin were unusually high in 2007. They noted that a change in labs is a possible explanation but it is impossible to rule out effects of the mine. EMAB has concern that this 2007 data could have been inaccurate. If the data was faulty, then using it as a baseline for identifying an increasing trend in mercury is not appropriate.

This issue continues to be high priority for EMAB and members of affected communities. Ensuring that fish are safe to eat is essential for subsistence harvesters. In the absence of direction from the WLWB, EMAB is concerned that potentially harmful levels of mercury in lake trout may not be identified by Diavik. Because of our uncertainties, EMAB has proposed doing an independent review of Diavik's lake trout mercury data in cooperation with NSC.

METAL AND DIAMOND MINING EFFLUENT REGULATION AMENDMENTS

The new Metal and Diamond Mining Effluent Regulation (MDMER) amendments came into effect on June 1, 2018. Environment and Climate Change Canada updated the regulations to include diamond mines. A three-year transition phase is allowed. This means that industry, including Diavik, has until June 1, 2021 to conform to the new regulations.

Below is a brief overview of some of the new regulations:

- Mines are required to have an Environmental Effects Monitoring (EEM) program. This is similar to the current AEMP; some changes to the AEMP may be needed.
    - Diavik must have the study design for the EEM program completed by the end of the three-year transition phase.
- The EEM program must have more water quality and biological monitoring requirements.
    - e.g. Diavik will be required to complete open water sampling four times during the open water season (they currently sample twice during the open water season).

Construction of A21 dike.

- The EEM program must assess effects to fish and fish habitat.
- The new MDMER includes regulation and monitoring of more deleterious substances. It also will reduce the maximum concentrations allowed for some substances.

Diavik has proposed to update the AEMP Design Plan prior to the MDMER regulations coming into effect in June 2021. The WLWB agreed to this approach while noting that the EEM program will not replace the current AEMP.

SPILL REPORT FOR DIAVIK DIAMOND MINE 2018-19
(GNWT DATABASE)

Spill No.	Date	Commodity	Quantity	Source
2018120	2018-04-10	Diesel	225 L	Truck
2018155	2018-05-06	Hydraulic oil	400 L	Truck
2018183	2018-05-20	Hydraulic oil	138 L	Drill
2018283	2018-06-18	Glycol	100 L	Drum or barrel
2018253	2018-06-28	Diesel	500 L	Fuel tank
2018404	2018-09-28	Diesel, hydraulic oil	500 L	Truck
2018406	2018-09-29	Hydraulic oil	200 L	Truck
2018433	2018-10-21	Glycol	115 L	Drill
2018445	2018-11-05	Hydraulic oil	1000 L	Drill
2018456	2018-11-17	Hydraulic Oil	280 L	Truck
2018464	2018-11-26	Hydraulic oil	521 L	Truck

Continued on next page

Spill No.	Date	Commodity	Quantity	Source
2018471	2018-11-30	Mine water	50 L	Pipe or line
2018490	2018-12-30	Underground mine water	unknown	Pipe or line
2019003	2019-01-04	Diesel	100 L	Other transportation
2019032	2019-02-03	Hydraulic coolant	760 L	Truck
2019099	2019-03-08	Diesel	400 L	Truck
2019104	2019-03-10	Hydraulic oil	1300 L	Truck
2019115	2019-03-16	Coolant	200 L	Truck
2019128	2019-03-21	Compressor oil	170 L	Instrument
2019130	2019-03-22	Hydraulic oil	150 L	Truck

DIAVIK COMMUNITY ENGAGEMENT PLAN VER. 2.1

Diavik is required to develop an engagement plan for engaging with communities that addresses the WLWB Engagement and Consultation Policy and the MVLWB guidelines. The WLWB did not approve Version 2.0 of the Engagement Plan that Diavik submitted in November 2016 because it did not satisfy the Policy. The WLWB gave direction to Diavik to address 6 issues in Version 2.0.

Diavik submitted Version 2.1 of the plan in late March of 2018. DFO, ECCC and GNWT stated they had no comments or recommendations on the plan. Lutsel K'e Dene First Nation submitted detailed comments on the plan. EMAB also reviewed the plan and made 8 comments addressing weaknesses in the plan. In EMAB's view the plan did not meet the requirements of the MVLWB guidelines for engagement.

EMAB's comments and recommendations on Version 2.1 were similar to those on Version 2.0, including:

- Show how Version 2.1 addressed the MVLWB guidelines and policies and provide a rationale where it did not.
- Identify which issues were resolved or unresolved during each community engagement, and Diavik's dispute resolution process.
- Show planned frequency of engagement.
- Request permission from communities to document TK/IQ shared during the engagement.
- Recognize that the WLWB technical review processes are not the same as engagement, and that Diavik must commit to following the MVLWB engagement guidelines in addition to the WLWB review process.

WLWB DECISION

In November 2018 the WLWB released its decision, which did not approve Version 2.1 of Diavik's Engagement Plan. The Board decided that the revised plan did not satisfy the Board's previous direction on Version 2.0.

Go to EMAB's website: www.emab.ca to see the full list of recommendations on the 2017 AEMP Report.


EMAB Photo

PKC Facility.


EMAB Photo

Pit A418.

WATER LICENCE AMENDMENT AND ENVIRONMENTAL ASSESSMENT:

PK TO MINE WORKINGS PROJECT PROPOSAL

Diavik submitted an application to amend their Water Licence in June 2018. The purpose was to request to deposit processed kimberlite (PK) to the mine pits instead of the processed kimberlite containment facility (PKC). The project is called the PK to mine workings (PKMW) Project. The Mackenzie Valley Impact Review Board (MVEIRB) referred the project proposal to an Environmental Assessment in February 2019. A hearing is scheduled for September 3-6, 2019. EMAB will make an intervention. There is a long list of interveners including GNWT, ECCC and DFO.

The project has been complicated to review due to the large number of rounds of Information Requests (IR's) and the high number of IR's, rather than a single project description that provided sufficient information on potential environmental impacts. This situation can be traced back to an inadequate description of the possible adverse environmental impacts in Diavik's original application (one-half page). The information supporting the project application consists of:

- 106 Party comments on the initial application, with responses from Diavik (Aug'19).
- WLWB IR's (Aug 31'18) following up Party comments on the application and responses – five IR's with 17 sub-IR's.
- 77 Party comments on Diavik responses to WLWB IR's, with responses from Diavik.
    - Additional Information provided by Diavik with its responses to Party comments (provided Jan 8'19).
- WLWB Technical session Jan 16-17 with follow up IR's (15 plus four model scenarios to run).
- MVEIRB Scoping Session March 18 followed by comments on scoping.

- MVEIRB IR's to Diavik (24 plus requirement for Summary Impact Statement) in April '19. Not for comment by Parties.
  - Diavik also provided supplementary information with its responses (16 attachments).
- Party IR's to Diavik (156 plus 10 after deadline) - June 20'19 with responses from Diavik.
- MVEIRB Supplementary IR's on July 26'19 (five including 10 sub-IR's).

EMAB supports the concept of putting PK in the mine pits. But, it must be done in a way that does not cause damage to the environment around Diavik or LDG. EMAB was especially supportive of the concept of putting the slimes (extra-fine PK or EFPK) from the PKC into the pits. Unfortunately, moving the slimes from the PKC was removed from the scope of the project proposal. EMAB disagreed with this.

EMAB has had a number of questions and concerns about the project since it was first proposed. Some of these have been addressed through IR responses from Diavik, or through the WLWB Technical Session in January 2019. As more IR responses are provided some questions are answered while new ones emerge. Our most current issues are best described in the intervention we submitted to MVEIRB on August 1, 2019. North-South Consultants, Slater Environmental Consultants, and Randy Knapp Consulting helped EMAB prepare our intervention. Eleven other organizations have also submitted interventions.

The purpose of the intervention is to bring up questions that Diavik has not provided adequate answers to. Below is a summary of key issues that EMAB highlighted in our intervention:

1. SIGNIFICANCE DEFINITIONS:

- Definitions of significance (i.e. what level of an effect would be enough to cause environmental damage) should be carefully considered.
- Diavik's proposed definitions of significance do not seem guaranteed to be protective of the environment.
- EMAB is most concerned about the proposed significance definitions for water quality and cultural use.
- Diavik's reasoning for their proposed significance definitions is that they are in line with definitions in the Comprehensive Study Report (CSR) from the environmental assessment completed in 1999. EMAB disagrees with this rationale because the CSR is outdated. Conditions were very different in 1999 than they are now. Because of this, updated significance definitions should be considered.
- The proposed definitions could be misused. Diavik used similar definitions to argue for a 25-square-kilometre mixing zone in its ICRP (see pg 44 - 45).

RECOMMENDATION SUMMARY: Diavik should update their proposed definitions for significance of impacts and provide a rationale. They should be sure to show how they have considered effects on Aboriginal users.

2. RELIABILITY OF PREDICTIONS

- Diavik made a number of predictions about what will happen when PK is deposited into the pits. This includes predictions about effects to water quality, fish, wildlife, and cultural use of the area.
- EMAB needs to be confident that Diavik's predictions are accurate. We need to know that the project will not cause significant adverse

environmental impacts (i.e. effects that can't be mitigated or reversed).

- Diavik used water quality models to make predictions about other components such as effects to fish and wildlife.
- Diavik has stated that the models are simplified, and that they will be improved after the assessment.
- The models are not complete because Diavik is still waiting for results from research at the University of Alberta. The research is about the characteristics of PK (for example, how it will settle in the pits). This information will provide Diavik with more accurate inputs for the models and make the models more accurate.
- In EMAB's view it would have been more beneficial to have complete model results before the assessment. Complete models would make EMAB more confident in Diavik's predictions.

RECOMMENDATION SUMMARY: MVEIRB should take into account that the water quality modelling is preliminary. MVEIRB should require completion of more detailed, site-specific modelling to confirm the accuracy of predictions. This refined modelling should be provided for review/approval prior to final approvals and deposition of PK into pits.

a) Diavik should be required to re-run the water quality model once U of A results are available.

b) Diavik should also be required to re-run the model once it can be calibrated using information specific to the pit lake, i.e. before breaching the dike.

c) MVEIRB should engage an independent 3rd party expert to review the water quality model and results.


Photo courtesy of Diavik Diamond Mine

Open pit mining at A21.

3. INCLUSION OF A21 IN THE PK PROJECT PROPOSAL

- Diavik's modelling confirms that the A21 pit is the least suitable for PK disposal.
- The idea of the project is that PK in the pits will remain very deep and not contaminate surface waters. There is a very small chance that the pit lakes could 'turn over' and mix with the rest of LDG, contaminating surface waters.
- A21 is not as deep as the other pits and much wider. This makes A21 more likely to turn over.
- A21 is also predicted to release contaminants into LDG at a faster rate than the other pits.
- A21 is predicted to release all contaminants into LDG after 50 years. This is not predicted to happen for more than 100 years in A418 and A154.
- A418 and A154 will release the contaminants from the PK at a much slower rate and at lower concentrations.

Photo courtesy of Diavik Diamond Mine

A21 open pit and dike.

RECOMMENDATION SUMMARY: The A21 pit should not be considered for PK disposal. If MVEIRB decides to allow A21 for PK disposal, they should include pit-specific limits on the amount of PK allowed for disposal, increase the size of the water cap, and direct Diavik to conduct separate sensitivity analyses.

4. DECISION TO RECONNECT PIT LAKES TO LDG

- Diavik has proposed that if the water quality in pit lakes with PK is not good, they will not reconnect the pit lakes to LDG.
- The decision to reconnect is important. We must be certain that water quality is good before this happens.
- EMAB does not feel Diavik's proposed water sampling schedule for determining whether to open the dikes is adequate. Diavik has proposed to only sample once before breaching. In EMAB's view, water quality in the pit lakes should be monitored for at least a couple years before deciding if it is safe to open the pit lakes.
- Diavik has not provided a description of how they would re-close the dikes if needed.

RECOMMENDATION SUMMARY: Water and sediment quality in the pit lake should be monitored throughout the pit lake and over a sufficient time period to identify trends, to ensure conditions are protective of aquatic ecosystem health before reconnecting with LDG.

MVEIRB should require establishment of Traditional Knowledge criteria to consider in the decision.

5. EFFECTS TO FISH AND FISH HABITAT

- Diavik predicts that the project will not have an effect to fish. This is because they assume that the top 40m of water will be safe. They also assume that fish will not swim below 40m.

- EMAB has some concern with Diavik's assumption that fish will not go below 40m. In EMAB's view they have not provided enough evidence for this assumption.
- EMAB also has concern with Diavik's lack of proposed fish and fish habitat monitoring.
- Diavik has proposed some habitat reconstruction monitoring prior to breaching the dikes. They have not outlined how they will monitor fish and fish habitat after the pit lakes are reconnected to LDG.
- Aboriginal harvesters need to be sure that the fish are safe. Monitoring must confirm this.

RECOMMENDATION SUMMARY: Monitoring should be done to confirm that fish are only using the upper 40 m portion of the water column. Fish tissue should be surveyed and Diavik should study all fish tissue data it has collected and compare it with existing health guidelines.

6. EFFECTS TO WILDLIFE

- EMAB does not feel Diavik has fully investigated the potential for the project to affect wildlife.
- There are possible impacts to wildlife and Diavik needs to provide plans to mitigate them.
- The pit lakes are smaller water bodies than LDG. Because of this, it is expected that they will have open water earlier in the season. This could attract wildlife, particularly waterfowl.
- Water quality benchmarks do not need to meet AEMP standards during the pit lake filling or monitoring stages before breaching. It is possible that surface water will not be safe for wildlife at these times.

RECOMMENDATION SUMMARY: Diavik should develop management plans for monitoring and managing possible effects of the project on wildlife, including waterfowl, during the period before water is added to the pit lakes.

7. MONITORING (PRE AND POST DIKE BREACH)

- It is important to follow a comprehensive monitoring plan to assess the predictions made by Diavik. The plan should extend from the start of the project through to the post-breach period.
- Monitoring should include water quality, stability of the pit lakes (i.e. will they turn over or mix sooner than expected), fish health, fish use of pit lakes, and wildlife health and use of pit lakes.
- EMAB does not believe that Diavik's proposed water quality monitoring plan is adequate.
- Diavik has not included monitoring plans for fish and wildlife.
- The pit lakes should not be reconnected until sufficient monitoring has determined that it is safe.

RECOMMENDATION SUMMARY: Diavik should develop a comprehensive water and sediment quality monitoring program to confirm the model predictions and the suitability of water quality for reconnection with LDG. Pit lake reconnection should only occur once monitoring confirms that water quality is suitable in all parts of the pit, and through all seasons. Monitoring should continue after reconnection to confirm continuation of suitable conditions. The monitoring plan should be adaptive.

8. REVISED CLOSURE OBJECTIVES

- Currently approved closure objectives do not address pit lakes containing PK.
- Closure objective and criteria need to be updated to consider this project.

RECOMMENDATION SUMMARY: MVEIRB should identify an effective closure and reclamation plan as a key mitigation measure for addressing long-term effects of the PKMW Project. Updated closure planning should include updates of closure objectives and criteria to address potential interactions between valued components (VCs) and PK stored in pits, as well as changes in conditions at the PKC Facility.

9. CUMULATIVE EFFECTS ON WATER QUALITY:

- Effects of this project should be considered in combination with other anticipated effects from other mining activities. This includes mining activity from both Diavik and Ekati.
- EMAB has questions about how Diavik assessed cumulative effects. Diavik has not provided enough information to understand the basis for their assessment.

RECOMMENDATION SUMMARY: MVEIRB should seek additional clarification about the methods Diavik used to predict cumulative effects to water quality.

10. PK SLIMES

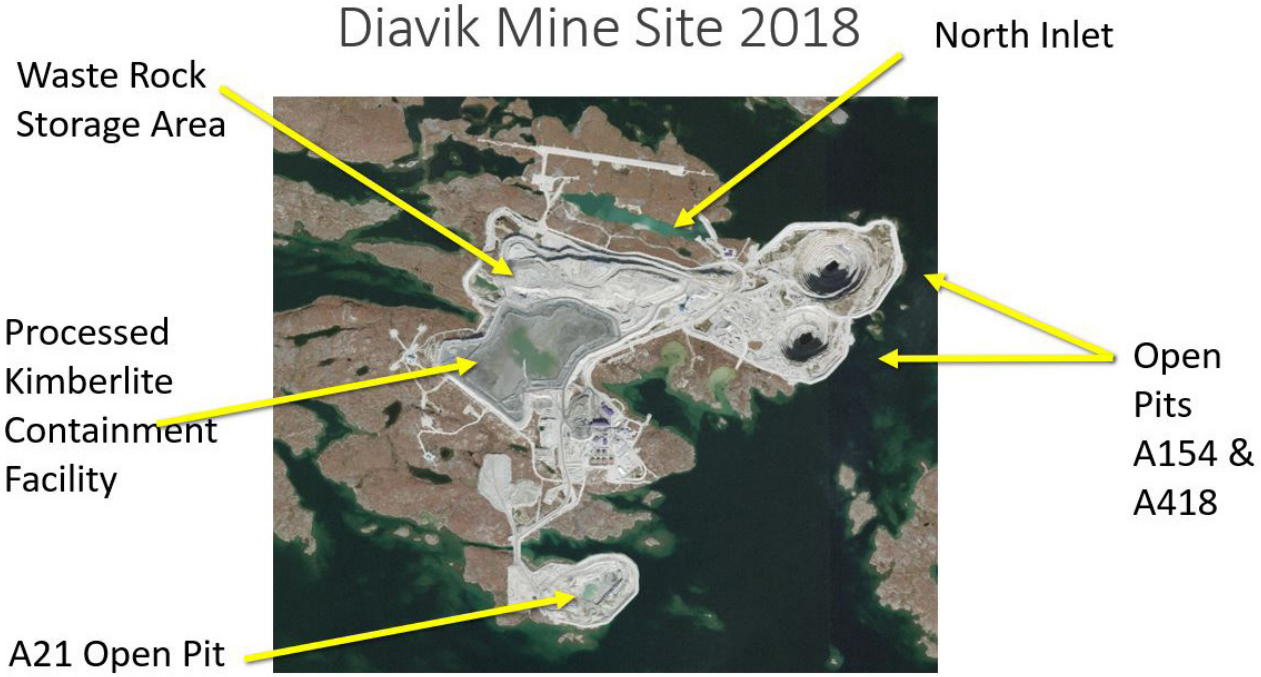
- The proposal to include placing PK slimes into the pits was removed from the scope of this EA.
- EMAB thinks this should be reconsidered by MVEIRB and Diavik.
- The current plan for PK slimes is to keep them in the PKC facility. Keeping them there will need a lot more maintenance (maintaining the dam, spillway, and pond), than putting them in the pits.
- The pits would be a more stable place to store the slimes. Putting them there would also eliminate all the problems that exist because of the current closure plan for the slimes.
- EMAB and our consultants feel like the most significant benefit of this project would be to remove the slimes from the PKC facility.

RECOMMENDATION SUMMARY: Diavik should be required to evaluate feasibility of relocation of the slimes to the pits as a condition of any project approval as soon as possible. If Diavik decides not to move the slimes they should provide reasons why.

INTERIM CLOSURE AND RECLAMATION PLAN

Diamond mining disturbs the landscape and produces large amounts of waste. Diavik's Interim Closure and Reclamation Plan (ICRP) provides detailed information about how Diavik plans to reclaim the land to be as close to its original state as possible.

Diavik works with a Traditional Knowledge Panel to seek TK input on closure plans. The Panel's recommendations can be found on the EMAB website: www.emab.ca.



1. WASTE ROCK STORAGE AREA (NORTH COUNTRY ROCK PILE) CLOSURE PLAN UPDATE

In last year's annual report EMAB reported that the WLWB had agreed to allow Diavik to start covering the Waste Rock Storage Area (WRSA), but did not approve the final closure plan for the WRSA.

EMAB continues to have serious concerns with the current version of the plan. WLWB decided that the many outstanding issues with the WRSA would be addressed through the ICRP review process. Since that time Diavik began to re-slope the WRSA in summer 2018 to a lower angle to provide a more stable surface for the cover, and has begun to build the cover in some areas. They are using till (soil from under the water) and rock from the A21 pit for the cover.

SECURITY HOLDBACK ESTIMATE

The WLWB directed Diavik to submit a security holdback estimate for the WRSA for the Board to consider. Diavik's estimate was supposed to take into account uncertainties about the cover on the WRSA:

- For the cover to freeze as designed the till layer must have a moisture content between 10 and 25%. If the till layer is not working as designed Diavik may need to add to the cover. Part of the holdback would cover the costs of doing this until Diavik shows the till moisture is as designed. This could take in the range of ten years.
- Climate change predictions may not be accurate, which might prevent the cover from working as designed. A holdback would address the additional costs of fixing the cover until Diavik can show the cover is behaving as it was designed. This could take in the range of 20 years.


Photo courtesy of Diavik Diamond Mine

WRSA: original slope.


Photo courtesy of Diavik Diamond Mine

WRSA: re-sloped.

- Long-term monitoring and maintenance of the cover may be required. Some security would be held back to cover these costs.

EMAB reviewed Diavik's estimates and had concerns that the estimates did not take all the likely costs for fixing possible issues with the WRSA into account. EMAB made six recommendations. GNWT and Dominion Diamond Mines also commented on Diavik's estimates. ECCC and DFO did not submit comments. EMAB's main comments were:

- Diavik said it would fix any issues with the moisture content of the cover by adding a metre of rock to the side of the pile. EMAB said this was likely reasonable.
  EMAB recommended Diavik use a model to confirm that the approach would work
- Diavik also said that an additional metre of rock on the side of the pile would address any issues with climate change beyond 100 years.
  EMAB recommended Diavik provide a rationale and evidence to support this claim
- Diavik did not take into account the possibility that the problems would be seen after the mine was closed. Fixing these would require bringing in people and equipment from the south which would add costs. Another important concern is that the problems might happen after the winter road is no longer being built, so they would have to build the winter road themselves. In addition, with climate change it may not be possible to build the winter road at some time in the future. These would both result in very large expenses.
  EMAB recommended Diavik include scenarios where equipment and operators need to be brought to site, supported and removed from site following completion of the work.
- Diavik used a "likelihood table" to estimate the likelihood of problems with the cover freezing as predicted, then proposed that the lower the likelihood the less security should be held back. This is not a standard practice and Diavik did not provide a rationale for using it, or to the likelihood scores Diavik gave to each of the possible problems with the cover.
  EMAB recommended Diavik provide its reasons for its approach and noted that there should be sufficient security held to cover the total costs of fixing the cover.

- Diavik did not estimate long-term monitoring and maintenance costs because they have not requested a reduction in these.
  EMAB recommended WLWB use Attachment 3 of ICRP Ver. 4.0 as a starting point for an estimate of long-term monitoring and maintenance; this amounts to $567,000 per year.

WLWB DECISION:

The WLWB decided not to finalize security holdbacks at that time. They noted that GNWT is developing a policy on long-term liabilities and that the MVLWB is working on security refund issues, and that these might give some guidance to Diavik on security holdbacks.

Go to EMAB's website: www.emab.ca to see the full list of recommendations on the 2017 AEMP Report.

INSTRUMENTATION

The WLWB also directed Diavik to propose locations for instrumentation on the WRSA to provide data on temperature and moisture content in the till layer of the cover. Diavik proposed a method to select locations for instruments and locations for instruments in three different areas of the pile.

EMAB reviewed Diavik's proposals, and contracted Randy Knapp Consulting to provide technical comments. We made 26 recommendations on three instrument location proposals. ECCC and DFO stated they had no comments on the report under their mandate. GNWT also reviewed the proposals.

Diavik proposed to take a number of soil samples in each area and use the data to decide where to locate the instruments, generally aiming for the areas with lowest moisture. EMAB made a number of comments about the way moisture was calculated, the number of samples, the location of samples and the location of the instruments. In particular:

- The moisture contents were very variable even over very short distances. Diavik proposed to place instruments between sample locations. Because of the variability, Diavik would not know the moisture content where they placed the instruments.
  EMAB recommended Diavik place the instruments as close to where they measured as possible.
- Diavik proposed to put instruments on the south and north slopes of the pile. EMAB noted the drying effect of the sun would be greatest on the south and west slopes, and less on the north slope.
  EMAB recommended Diavik instrument the south and west slopes.

WLWB DECISION:

The WLWB decided that Diavik will have to demonstrate that the instrument locations are able to show how well the cover is performing. The WLWB directed Diavik to make sure they are using best practices in choosing the locations. They recommended some improvements Diavik could make in choosing the locations. They noted that return of security will depend on the instruments showing the cover is performing as designed.

Go to EMAB's website: www.emab.ca to see the full list of recommendations on the Security Holdback Estimates and Instrumentation Locations.

2. CLOSURE AND RECLAMATION PLAN VERSION 4.0

Diavik submitted Version 4.0 of its Interim Closure and Reclamation Plan (ICRP) on April 20, 2017. This plan lays out Diavik's proposed closure design for each mine component. EMAB has major concerns with the plan.

EMAB made 161 comments and recommendations on ICRP Ver 4.0. Highlights are in our 2017-18 Annual Report and the full document is on www.emab.ca.

WLWB ENGAGEMENT AND DECISION

The WLWB released its decision on ICRP Version 4.0 in December 2018. It did not approve the plan, and its 81-page Reasons for Decision required Diavik to make substantial revisions by June 2019. Diavik requested an extension to December 2019 and the WLWB granted it while noting that this was longer than normal, and stating its concern that the company will request additional extensions.

The WLWB required Diavik to re-engage with the Parties on a number of topics (see below). Diavik met with EMAB on these topics in March 2019. EMAB will comment on results of the engagement during the Review of ICRP Version 4.1.

Below is a summary of the WLWB decisions on each of EMAB's key concerns:

RE-VEGETATION

Before development, vegetation covered about 70% of the mine footprint. Diavik's current re-vegetation plan only proposes to vegetate 11% of the disturbed area. This is based on a map developed by the Traditional Knowledge Panel.

During the review of ICRP Version 4.0, EMAB commented that the affected communities have said that more re-vegetation should be planned for the entire minesite (EMAB's 2017 Closure Workshop Report).

WLWB DECISION

The WLWB recognizes that Diavik and EMAB have different views on what affected communities want


EMAB Photo

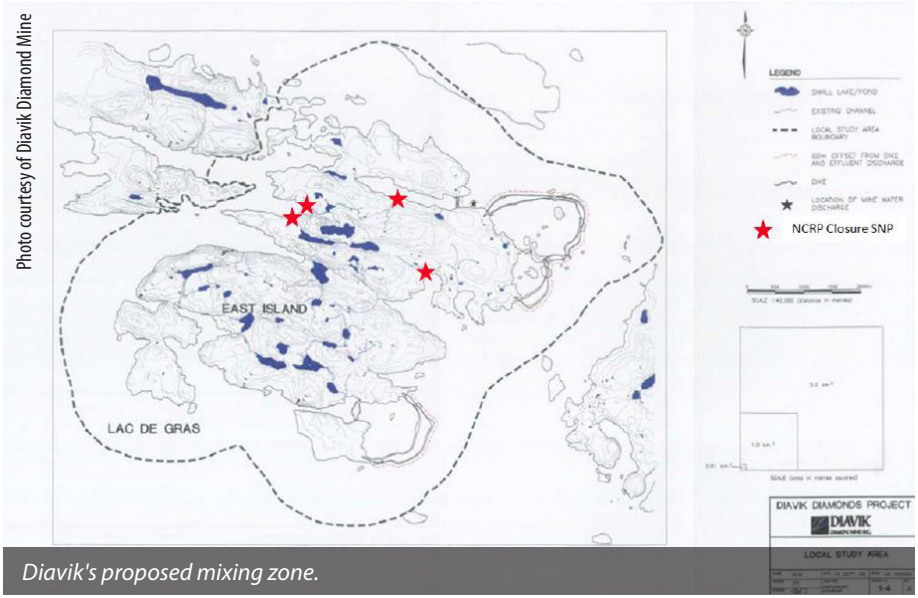
EMAB Directors and Staff inspecting the re-vegetation plots.

in terms of re-vegetation. They have directed Diavik to engage with the communities and other reviewers on re-vegetation of the WRSA. The WLWB is advising Diavik to consider revising this closure objective in light of the engagement results.

RUNOFF AND SEEPAGE WATER QUALITY

A mixing zone is an area of a water body where discharged pollutants (i.e. Diavik's effluent) mix with the cleaner, natural waters. Inside the mixing zone water does not have to meet aquatic, human or wildlife health guidelines. Diavik's closure plan proposes a 25-square-kilometre mixing zone around East Island (all waters within one kilometre of the shore).

The proposed 1km mixing zone is not supported by EMAB. It is also generally not supported by other reviewers or affected communities, or by the MVWLB Guidelines for Effluent Mixing Zones. The GNWT-ENR recommended a 60m mixing zone from the point where the runoff from the north WRSA enters Lac de Gras (LDG).



Diavik's proposed mixing zone.

Much of the mine site, including the waste rock pile, is constructed from type 1 rock, which was thought not to leach contaminants. Testing now shows that type 1 rock has contaminated runoff. Diavik has predicted that seepage and runoff from the WRSA may not meet standards for protection of aquatic life and human and wildlife health. However, Diavik plans to build the cover of the WRSA with rock from A21 which will likely leach less contaminants.

There are also uncertainties about whether the cover will perform as Diavik has predicted, particularly under climate change conditions.

EMAB commented that it's possible that re-vegetating the WRSA could decrease the potential for seepage and runoff. This possibility has not been addressed by Diavik.

Diavik did not make predictions about runoff and seepage from the PKC facility in ICRP V. 4.0.

WLWB DECISIONS

WLWB has directed Diavik to update its predictions about water quality of runoff from the WRSA based on using rock from A21 for the cover instead of Type 1 rock. Diavik must also predict the quality of runoff from the tailings pond (PKC) and from any other areas on the minesite.

The WLWB is requiring Diavik to consult the WLWB/GNWT mixing zone guidelines when preparing ICRP Version 4.1. They are requiring Diavik to provide evidence that they are proposing the smallest practical mixing zone. They have also directed Diavik to present options for addressing any contamination in runoff.

The WLWB is requiring Diavik to include predictions about PKC seepage in ICRP V. 4.1.

WILDLIFE SAFETY

EMAB raised several concerns about wildlife safety in our review:

- Harm from rough surfaces that caribou or other animals could trap their legs in
- Drinking contaminated runoff or seepage
- Eating contaminated vegetation

WLWB DECISION

WLWB has directed Diavik to add a commitment to continue working with elders, communities and the TK Panel to ensure the surface of the WRSA is safe.

The WLWB did not directly address the other two concerns although safety of water for wildlife falls under closure objective SW1. Potential for contamination of vegetation is touched on by a number of closure objectives:

- Objective SW10: refers to safe passage and use by wildlife.

- Objective P1: requires no adverse effects on people, wildlife or vegetation in the PKC and.
- Objective I2: requires onsite disposal areas be safe for people, wildlife and vegetation.

NORTH INLET CLOSURE OBJECTIVES AND CRITERIA

There are concerns about reconnecting the North Inlet (NI) to LDG. Diavik predicts that the water quality in the NI will be safe at closure. However, the sediment in the NI is contaminated with hydrocarbons and it is predicted that it will still be polluted at closure. In ICRP V. 4 Diavik proposed to make a barrier that would allow water into the inlet, but not fish. In ICRP V. 4 Diavik also proposed to remove NI reconnection as a closure objective. Instead they want to include it as a closure option.

EMAB and a number of other reviewers wanted the objective of reconnecting the NI to remain, recognizing that it might not be achievable if the sediments remain contaminated. EMAB also recommended Diavik do research into natural rehabilitation of the sediments over time.

WLWB DECISION

The WLWB is requiring Diavik to continue to investigate and consider all practical options for the closure of the NI. They are also requiring Diavik to engage with reviewers on whether to remove the objective of re-connecting with LDG.

CONTAMINATED SOILS

Diavik currently stores contaminated soil in a lined part of the Waste Transfer Area (WTA). There may be 1000 to 1500 cubic metres of contaminated soil produced during the mine's operations. Diavik plans to treat these soils to make them safe. If the treatment does not remove the contamination, Diavik is proposing


EMAB Photo

Waste Transfer Area contaminated soil area.

to bury the soil at closure rather than remove it from site. EMAB would like Diavik to start treating the contaminated soil as soon as possible.

WLWB DECISION

The WLWB has directed Diavik to engage with reviewers on disposing of contaminated soil by burial.

The WLWB is requiring that Diavik assess the pros and cons of off-site disposal of contaminated soil. Diavik should also compare the results to the pros and cons of on-site disposal. Diavik should use the findings to provide rationale for their preferred option.

CLOSURE CRITERIA AND SITE-SPECIFIC RISK-BASED CRITERIA

None of Diavik's proposed closure criteria have been approved, including Site-Specific Risk-Based Closure Criteria (SSRBCC). Many of the closure criteria are unsatisfactory or insufficient, and do not address the need for long-term assessment of performance. EMAB provided detailed comments and recommendations

on criteria proposed to address the closure objectives.

We also undertook a complete review of Diavik's updated SSRBCC and provided many specific recommendations. These updated reports were not provided until after the WRSA review was complete; the revised reports, and our recommendations, apply to all components of the mine, including the WRSA.

Diavik also has closure criteria related to wildlife. Closure activities have potential to affect wildlife; these should be mitigated.

RECOMMENDATION TO GNWT: GNWT-ENR should coordinate a review amongst their wildlife, forestry, and any other departments, as necessary, for the next public review of Diavik's CRP and comment on the closure objectives and criteria related to wildlife and re-vegetation of wildlife habitat. As noted in the WLWB's reasons for decision, Diavik will be expected to submit their Final CRP in 2020, three years before the expiry date of the Water Licence.

WLWB DECISION

The WLWB has commented several times on the need for Diavik to develop adequate closure criteria and that these should be finalized and approved before closure. In its decision it expressed concern about the lack of progress. It also stated that Diavik must provide evidence that standards or guidelines cannot be met before it proposes SSRBCC, and that the currently proposed SSRBCC are not adequate. WLWB directed Diavik to revise its proposed closure criteria (14 revisions in Reasons for Decision) and SSRBCC (9 revisions).

WLWB directed Diavik to engage with EMAB on the SSRBCC, and to engage with reviewers about two specific closure objectives.


EMAB Photo

PKC Facility.

PROCESSED KIMBERLITE CONTAINMENT FACILITY

The PKC Facility is where Diavik's tailings are dumped. The tailings (called fine processed kimberlite, similar to sand) are over 40 metres deep and are contained in a dammed area. There is a pond located near the center of the PKC that changes size depending on the time of year and depending on the activities occurring at Diavik. Diavik's closure design for the PKC has changed since the last approved ICRP.

Since submitting ICRP Ver. 4, Diavik also applied to amend their Water

Licence so they can dispose of PK in the mine pits. An environmental assessment is currently underway to determine if Diavik will be allowed to do this (see p. 35 Water Licence Amendment and Environmental Assessment: PK to Mine Workings Project Proposal).

In ICRP V. 4, Diavik's proposed closure plan for the PKC involves leaving the pond in the center and using a spillway leading to LDG for any overflow. Under the pond is a thick layer of very fine PK that is like quicksand. It is also called slimes. Anyone walking on it would sink in. Diavik proposed that the fine PK would be covered with a layer of geotextile fabric, which would support a layer of waste rock as the cover. This rock layer would go right up to the edge of the pond and be safe to walk on. The pond would protect wildlife from being caught in the slimes.

EMAB is concerned that a lot of water seeps out of the PKC. During operations, water that seeps out is replaced with more water from the processing plant. After closure there will not be any process plant water going into the PKC and the pond will drain. Without the pond the slimes will be exposed. This would be dangerous for wildlife and people.

WLWB DECISION

The WLWB is requiring that Diavik update PKC facility seepage quality predictions and water quality at the outlet, and to compare the predictions to the proposed closure criteria.

Diavik is also required to expand its Reclamation Research Plan to address uncertainties with PKC closure that it has identified.

Diavik is also required to clarify whether PK slimes would be removed if Diavik receives approval to dispose of PK in the pits.

Diavik is required to include a schedule of PKC closure planning and implementation milestones to ensure closure planning (including research and progressive reclamation) stays on track.

LONG TERM MAINTENANCE AND MONITORING

Diavik plans to be done operations in 2025. After 2025, Diavik has committed to seven years of post-closure monitoring. They hope to leave the site in 'walk-away' condition in 2032. Diavik does state that it will submit Performance Assessment Reports for approval, and that these may be required after 2032 for some components. EMAB's review of the closure plan identified issues that will require monitoring and maintenance for many more than the seven years Diavik has committed to. The GNWT-ENR also commented that monitoring until 2032 may not provide sufficient time to assess post closure performance.

EMAB was also concerned about how any maintenance of the minesite would be done after Diavik completes its closure work and removes its personnel and equipment from the site. While this is an issue for the WLWB, it is also one that the GNWT must set a policy and legislative framework for.

WLWB DECISION

The WLWB disagreed with Diavik's proposal to be done monitoring in 2032. The WLWB is requiring Diavik to estimate the length of time required to show that each closure objective has been completed and the closure criteria have been met. They must provide rationale. This must be reflected in ICRP V. 4.1.

Diavik must also include the costs of long-term maintenance activities in the reclaim estimate in V. 4.1.

Diavik is to provide an estimate of long-term water treatment in V. 4.1.

GNWT POLICY ON SECURITY AND LONG-TERM CLOSURE MONITORING

EMAB has concerns about long-term monitoring and maintenance at Diavik, and who will be responsible and liable for addressing it. GNWT is updating legislation to address long term closure monitoring at mine sites post-closure. The GNWT has been participating in discussions with many groups about long-term liability, security, progressive reclamation, and responsibility for maintenance at closed or abandoned mine sites. This is a complex process that involves engaging with a number of responsible authorities.

In 2017-18 EMAB met with GNWT on this issue and made a recommendation that GNWT develop the policy as a high priority and provide a timeline. We received a positive response that this was a high priority for GNWT. We followed up the recommendation to request a timeline and the Departments of ENR and Lands stated they intended to have a process developed and implemented by the end of this Legislative Assembly (i.e. fall 2019). We discussed the issue at a meeting with the GNWT in December 2018. The GNWT clarified that it intends to begin implementing the process for policy development by fall 2019. We did not receive a timeline for completion of the policy.

WILDLIFE MONITORING PROGRAM

1. 2018 WMP REPORT REVIEW AND DIAVIK'S RESPONSES TO 2017 RECOMMENDATIONS

Diavik's Wildlife Monitoring Program (WMP) began in 2002. It is required by the Environmental Agreement. The WMP has changed over the years to address community concerns, and to include updated wildlife monitoring objectives. The WMP studies the mine's effects on wildlife and vegetation in the study area (1,200km^2 area surrounding LDG). It also determines if the observed effects were correctly predicted in Diavik's initial Environmental Assessment (EA). The three main species that Diavik studies are barren-ground caribou, grizzly bear and wolverine.

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, and to any revised objectives. Diavik submitted their 2018 WMR to EMAB on April 1, 2019. EMAB had MSES (Management and Solutions in Environmental Science Inc.) help with the review. EMAB submitted seven recommendations to Diavik on the 2018 WMP. We also submitted two follow-up recommendations to the GNWT on the 2017 WMP.

Below are the highlights of our review. Go to EMAB's website: www.emab.ca to see the full list of recommendations on the 2017 and 2018 WMP reports.


Photo courtesy of Diavik Diamond Mine

BARREN GROUND CARIBOU

Diavik's caribou studies have focused on the Bathurst herd. The Bathurst herd travels through the LDG area during their annual migration. This means they may be influenced by Diavik. Recently, caribou from the Beverly/Ahiak herd are also seen near Diavik. This indicates that these herds may now also be affected by the mines.

The Bathurst caribou herd has declined from nearly 450,000 in 1986 to 8,200 in 2018. The direct cause of the decline is not known. The population decline means that there are fewer caribou in Diavik's study area. This makes monitoring caribou more difficult than it was in the past. It also makes it difficult to compare data between years. Diavik's WMP has several monitoring programs to measure mine-related effects on caribou.

RECOMMENDATION:
Opportunities for improvement of existing mitigation measures that alleviate noise, dust, light, sounds, smell, and human presence may arise with technological advances and should be implemented to help minimize indirect impacts on caribou habitat.

ZONE OF INFLUENCE

2018 REVIEW

The zone of influence (ZOI) is the area around the mine that causes an effect to wildlife. Analysis of aerial survey data shows a 14 km ZOI around the two mines. This is larger than what was predicted at the beginning of the project. It has been suggested that dust could be contributing to the size of the ZOI. A TK study found that caribou avoid using areas near the mine because dust on plants can change the smell and taste.

Over the years, EMAB has made requests that Diavik discuss why the ZOI is larger than expected. We've also requested Diavik use adaptive management to attempt to mitigate effects that are influencing the ZOI.

In the past, Diavik did aerial surveys to identify its ZOI on caribou. These aerial surveys were also used to assess changes to the ZOI caused by changes in mine activity. This was done in cooperation with the Ekati mine. In 2013 Diavik requested to stop doing aerial surveys to monitor the ZOI due to low caribou numbers. ENR approved this request. Aerial surveys have not been completed since 2012.

In 2018 the ENR held a Slave Geological Province Wildlife Monitoring Workshop. At this workshop there was discussion about using GPS collar data to measure the caribou ZOI. This method could be better than aerial surveys. This is because it would cause less disturbance to caribou and reduce the cost to industry.

In 2014, ENR set up a ZOI Technical Task Group (TTG) to decide when ZOI monitoring should resume, and what type of survey should be conducted. The TTG produced a draft guidance document for ZOI monitoring. This document suggests that ZOI monitoring should resume when a project sees a major shift in activities (e.g. the start of open-pit mining at A21 in 2018).

Last year, EMAB recommended that Diavik should resume ZOI monitoring in 2019 due to the start of above ground mining at A21. As of June 2019, formal ZOI monitoring has not resumed. Diavik is still waiting for direction from the ENR and TTG on this.

RECOMMENDATION: GNWT-ENR should follow through on its commitment to recommend that Diavik resume ZOI monitoring in 2019, in accordance with the ZOI Guidance Document.

This recommendation was made in March 2019. A response is expected within 60 days of the recommendation. At the time of writing this report, a response had not been received.

2017 WMP RECOMMENDATIONS AND RESPONSES ON CARIBOU ZOI:

RECOMMENDATION: EMAB recommends that Diavik resume formal ZOI monitoring in 2019 given that they are starting open-pit mining of A21 in 2018.

Diavik Response: Diavik will determine whether collar, aerial survey data, or an alternative method will be used for ZOI monitoring when required, and discuss with EMAB.

RECOMMENDATION: If Diavik uses the GPS collar data analysis approach to ZOI evaluation (as presented in the 2018 SGP Wildlife Monitoring Workshop), Diavik should consider including other factors in the analysis to reflect changing mine activity over time to answer the question: does mine activity influence the ZOI between years?

Diavik Response: Diavik has included temporal mine activity indices as covariates in analyses of caribou, wolverine, and raptors since 2011. To date, none of these analyses have demonstrated any statistically significant relationship between mine activity and indirect effects.

RECOMMENDATION: Diavik should discuss their plans regarding adaptive management actions relating to the larger than predicted caribou ZOI.

Diavik Response: The mechanism of caribou ZOIs is unknown at this time and therefore cannot be adaptively managed. As was presented at the 2018 SGP Wildlife Monitoring Workshop, annual estimates of ZOI range from 0 km to 11 km for collar data, which indicates ZOI monitoring is unlikely to be adequate for assessing mitigation effectiveness.

RECOMMENDATION: Diavik should consider the use of TK to help uncover causes for unanticipated impacts to caribou and to develop adaptive management measures.

Diavik Response: Diavik considers Traditional Knowledge as an additional stream for identification of effects, and monitoring and mitigation design through regular engagement activities with the Diavik Traditional Knowledge Panel and site visits from community members.

BEHAVIOUR

2018 REVIEW

Diavik and Ekati work together to conduct ground-based caribou behavioural surveys. These surveys detect if caribou behaviour inside the ZOI is different than outside.

From 2012 until 2018, data collected between Diavik and Ekati was mostly incompatible. This is because Diavik and Ekati were using different methods to collect behavioural data. The incompatibility made comparing results difficult. In addition, the much smaller size of the Bathurst herd meant it was harder to collect data.

During a conference call in June 2018, Diavik and Ekati confirmed that they are now using the same data collection methods. They also confirmed that Diavik would survey caribou at far-from-mine locations (i.e. beyond the 14km ZOI). Ekati would focus on caribou near the mines.

In 2018, Diavik collected behavioural data on 56 caribou groups between 0 and 2.2 km from the mine. They also collected data on four groups at 80 km from the mine. Over the years, EMAB has recommended that Diavik should focus on collecting caribou behaviour data far away from the mines to make sure there is enough data.

RECOMMENDATION: Diavik should continue to focus on conducting far-from-mine behavioural group scans to ensure data are balanced between Ekati's near-mine and far-field scans, and to be in line with the original intent of this WMP component.

RECOMMENDATION: Diavik should explain why only four far-from-mine samples were collected in the 2018 season.

Last year, we recommended that behaviour data from Ekati and Diavik should be analyzed to test how behaviour changes with distance from the mine. Diavik responded by providing an analysis on feeding behaviour. They used data from 1998-2017 to complete this analysis. The results showed that there was no difference in feeding behaviour in near-mine versus far-from-mine caribou.

RECOMMENDATION: We recommend that Diavik provide summaries for other caribou activities, particularly those with a high energetic cost.

2017 WMP RECOMMENDATION AND RESPONSE ON CARIBOU BEHAVIOUR:

RECOMMENDATION: Analyze a Diavik-Ekati combined dataset for the next reporting period, using all available data to date, to test how caribou behaviour changes as a function of distance from the mine. This is particularly relevant due to the recent change to above-ground mining at Diavik.

Diavik Response: Since the last analysis of behaviour data in 2011, observations since this time have been from caribou groups that were at least 20 km from the Ekati and Diavik mines. From 1998 through 2010, the highest numbers of observations occurred annually within 5 km of the mines. Observations at 15 km to 25 km (i.e., intermediate distances) have been sporadic over time. Note that in 2014, 2015 and 2017 caribou were not detected within the RSA during the post-calving period and in 2015 and 2017 were recorded during winter. Caribou were monitored during winter because they were visible from the Diavik mine.

DISTRIBUTION AND MIGRATION

2018 REVIEW

Diavik uses data from collared caribou to track changes in caribou distribution and migration. Diavik did an

analysis on data collected between 1996-2018. The analysis tests original predictions made about caribou migration patterns. Initial predictions from the EA state that caribou should:

- deflect West of East Island during northern (spring) migration.
- deflect East of East Island during southern (fall) migration.

In 2018 Diavik found that caribou follow the prediction for northern migration. They did not follow the prediction for southern migration. Long-term data show that caribou have not followed the predicted path for southern migration for a long time.

Diavik has recommended to stop deflection monitoring. According to Diavik, this is because it has become well established that caribou do not follow the predictions. They also claim that changes to migration patterns do not negatively affect caribou (e.g. causing the population to become fragmented). Diavik remains unable to explain why migration patterns have shifted.

RECOMMENDATION: If Diavik is proposing to remove the deflection test, please provide ideas on how Diavik can continue to monitor changes in herd distribution specifically in relation to the Diavik mine using collar data.

RECOMMENDATION: We recommend that Diavik explore opportunities and options to mitigate dust deposition, which may be influencing caribou migration patterns according to TK.

2017 WMP RECOMMENDATION AND RESPONSE ON CARIBOU DISTRIBUTION AND MIGRATION:

RECOMMENDATION: Diavik should consider the use of TK to help uncover causes for unanticipated changes to the caribou southern migration and to develop adaptive management measures. TK may also provide insight into why some caribou may have traveled past LDG, then turned around and traveled back to the opposite side of LDG.

Diavik Response: TK has identified the importance of LDG narrows to caribou movements. The collar data support that caribou continue to use the LDG narrows. This was demonstrated in Figure 6 of the 2016 WMP where the movement path of a collared caribou crossed the narrows twice. This was also shown in the southern migration maps of collared caribou in annual WMPs and the Golder (2012) movement analysis.

RECOMMENDATION: Diavik should discuss potential response actions to the change in the southern migration of caribou compared to the prediction, and the shift to later migration.

Diavik Response: In the context of caribou deflection patterns, study results show that whether caribou move west or east around Lac de Gras does not result in herd fragmentation (i.e., an ecological effect), which was part of the basis for measuring Lac de Gras deflections.

GRIZZLY BEAR

DNA MONITORING

2018 REVIEW

Diavik monitors grizzly bear to track their abundance and distribution over time. ENR has worked with Diavik, Ekati, Snap Lake, and Gahcho Kue mines to develop a regional hair snagging program to gather DNA data on grizzly bear. Results from 2012, 2013, and 2017 hair snagging analyses show that grizzly populations are stable or increasing. EMAB supports Diavik's continued involvement in the grizzly bear hair snagging program. Direction from the ENR about the long-term frequency of this program has not been provided.

RECOMMENDATION: GNWT-ENR should continue to provide direction on grizzly bear hair snagging surveys to ensure objectives and predictions are being tested. ENR should confirm the schedule for future hair snagging surveys.

This recommendation was made in March 2019. A response is expected within 60 days of the recommendation. At the time of writing this report, a response had not been received.

OBSERVATIONS

2018 REVIEW

Over time there have been more grizzly bear sightings on East Island. Diavik says the same bear is responsible for most of the observations as its home range includes the Mine. Diavik has said that the number of grizzly bear observations do not seem to be related to the number of people at the mine.

Diavik's impact on grizzly bear is likely minimal because mortality rates do not exceed predictions made in the CSR.

2017 WMP RECOMMENDATION AND RESPONSE ON GRIZZLY BEAR OBSERVATIONS:

RECOMMENDATION: Diavik should look into the possibility that there is something attracting grizzly bears to the site and whether some mitigation could be applied to remove any attractants.

Diavik Response: All incidents are reported and investigated by the Environment Department. The same bear has repeatedly been interacting with the mine site. As reported, this bear was relocated 80 km away by ENR and returned to site within 10 days. This bear has been interacting with the mine site since it was a cub and may be adapted to the mine or recognize the mine site as safe habitat.

WOLVERINE

Diavik monitors wolverine to estimate their abundance and distribution over time. Wolverine presence around Diavik is monitored using snow track surveys, hair-snagging surveys, and incidental observations.

SNOW TRACK SURVEYS

2018 REVIEW

Diavik completed wolverine snow track surveys in 2018. The survey was completed with a Lutsel K'e community member. Detailed analysis of the track data was not completed in the 2018 WMR. The most recent detailed snow track analysis used data collected from 2003-2016. Results showed that wolverine occurrence near Diavik is increasing over time. Reports also show that wolverine track density decreased when caribou herd size increased. Track density also decreased when there was an increase in waste rock hauling. Diavik has not determined a reason for these effects.

Photo courtesy of Diavik Diamond Mine

HAIR SNAGGING SURVEYS

2018 REVIEW

ENR organized wolverine hair snagging surveys with Diavik and Ekati. The surveys determine wolverine abundance and distribution near Diavik and Ekati. Daring lake is used as a control (not affected by mines) site for comparison purposes. The last hair-snagging survey was completed in 2014. The results showed that wolverine density at Diavik, Ekati and Daring Lake declined between 2005-2014. The weakest decline occurred at Diavik. The long-term schedule for wolverine hair snagging surveys has not been determined. Diavik is waiting on direction from ENR.

RECOMMENDATION: GNWT-ENR should continue to provide direction on hair snagging surveys to ensure objectives and predictions are being tested. ENR should confirm the schedule for future hair snagging surveys.

This recommendation was made in March 2019. A response is expected within 60 days of the recommendation. At the time of writing this report, a response had not been received.

2017 WMP RECOMMENDATION AND RESPONSE ON HAIR SNAGGING SURVEYS:

RECOMMENDATION: Diavik should continue to engage with other mines and GNWT-ENR to determine the long-term frequency and duration of the wolverine hair-snagging program.

Diavik Response: Diavik is waiting on direction from the GNWT. Diavik has said they will not continue this monitoring if other mines are not participating.

RECOMMENDATION: Diavik should use recently available information from the wolverine DNA hair snagging program results (2018) to support conclusions in the 2019 WMR regarding the changes to wolverine populations.

Diavik Response: Results indicate that population growth rate is approximately stable through time and similar across study areas, except for Daring Lake, which showed a slight decline. Apparent survival was similar across study areas. These data support the conclusion that mine-related wolverine mortalities are unlikely influencing population parameters.

RAPTORS

2018 REVIEW

Diavik monitors pit walls and mine infrastructure for nesting raptors. One peregrine falcon nest was observed this year. It was located at the Site Services building. Three nestlings were present in the nest.

WASTE MANAGEMENT

2018 REVIEW

Food waste at Diavik must be properly disposed of in order to minimize food attractants to wildlife. In 2018


Photo courtesy of Tracy Covey

Fox in the waste transfer area.

there was a lower number of misdirected food items than in 2017. The waste transfer area (WTA) saw more misdirected food items than any other waste collection area. Fox and wolverine observations were also the highest at the WTA. The number of wildlife observed in waste collection areas was lower in 2018 than in 2017.

2017 WMP RECOMMENDATION AND RESPONSE ON WASTE MANAGEMENT:

RECOMMENDATION: Diavik should explore the reasons for the higher levels of misdirected food waste in the WTA in 2017 as this may be contributing to wildlife presence and possible habituation near the minesite.

Diavik Response: At the conclusion of weekly (or twice weekly in winter) inspections, misdirected waste is reported and sorted correctly by the Waste Management staff. The primary reason waste is misdirected is because occasionally Mine workers forget how waste items are to be sorted. Diavik also notifies area managers to remind and follow-up with workers. As well, environment staff complete waste management training.

VEGETATION AND LICHEN SURVEYS

2018 REVIEW

As of 2018 the Diavik project footprint is 11.62 km^2. This is below the prediction of 12.67 km^2. The footprint of the South Country Rock Pile (SCRP) was the only area of the mine to increase in size in 2018. The SCRP is the only area expected to increase in size for the rest of Diavik's operations.

Diavik monitors changes to vegetation and lichen resulting from the mine. They monitor to see if dust deposition changes the abundance of plants and the number of plant-species. Diavik did a comprehensive analysis of this program in the 2016 WMR. They found that dust deposition is higher closer to the mine. Dust deposition is also higher in years with above-ground mining (above ground mining at A21 began in 2018 and is expected to continue until 2023).

2017 WMP RECOMMENDATION AND RESPONSE ON VEGETATION SURVEYS:

RECOMMENDATION: Diavik should not increase the dust trigger for vegetation monitoring and use a trigger in line with the original prediction. Diavik should also continue with the three-year monitoring schedule for vegetation and lichen.

Diavik Response: Diavik agreed to this request and chose a threshold that was in line with reference station values.

EMAB Photo

WILDLIFE ACT - WILDLIFE MANAGEMENT AND MONITORING PLAN REGULATIONS

GNWT ENR has been developing draft regulations for Wildlife Management and Monitoring Plans (WMMP) under the new Wildlife Act. These regulations apply to Diavik's Wildlife Monitoring Program (WMP) and its wildlife management plans. They will come into effect on July 1, 2019. EMAB expects these regulations will be a positive development, giving ENR more authority to give direction on wildlife monitoring to developers such as Diavik.

EMAB commented that it was generally in support of the draft regulations with the following comments:

- Diavik's WMP is based on the predictions and proposed mitigations for wildlife that were made during the environmental assessment (CSR) back in 1999. It is important to link any WMMP to the outcomes of the environmental assessment.
- The regulations should provide for wildlife monitoring coordination among different proponents, such as the coordination of caribou zone of influence monitoring between Diavik and Ekati.
- EMAB and the other Parties to the Environmental Agreement have an opportunity to comment on Diavik's WMP program and annual reports. The WMMP regulations should also provide this opportunity to interested parties and the public.
- It would be valuable for the regulations to provide for WMMP's and results to be reviewed through the co-management authorities set up under the Mackenzie Valley Resource Management Act and land claims agreements.
- EMAB looks forward to reviewing the new regulations. It is our understanding that ENR will work with Land and Water Boards to develop a coordinated public review process for WMMPs.


EMAB Photo

TSP monitoring station.

ENVIRONMENTAL AIR QUALITY MONITORING PROGRAM

In 2012 Diavik started the Environmental Air Quality Monitoring Program (EAQMP). Diavik submits annual reports on the EAQMP. This program is required by the Environmental Agreement but is not required by law.

When it was developed, the EAQMP included a requirement that it be re-assessed after the first year. Diavik submitted the re-assessment in January 2019 and EMAB is reviewing the proposal.

ENVIRONMENTAL AIR QUALITY MONITORING AND MANAGEMENT PLAN VERSION 2

The EAQMP reports have shown some serious weaknesses in the current design of the Total Suspended Particulate (TSP) monitoring section. EMAB has identified these problems in previous annual reports as well as our review of the 2017 EAQMP report below. EMAB has been recommending that Diavik re-assess the program for a number of years. We have also undertaken our own review of the program using our technical consultants.

Diavik submitted Version 2 of the Environmental Air Quality Monitoring and Management Plan in January 2019. This is a re-design of the monitoring program, so it is not clear why Diavik has added "management" to the title. In the original monitoring program description Diavik stated that "After a period of one year, the TSP monitoring will be re-assessed to determine the suitability of the monitoring methods, locations, interpretation and reporting and recommendations will made regarding any changes." Now Diavik has said it plans to remove the TSP monitoring from the program.

EMAB strongly disagrees with Diavik's statement that TSP monitoring should be removed from the program. When Diavik first suggested this, EMAB recommended that:

Diavik continue to collect TSP data as set out in the currently approved EAQMP until a revised EAQMP has been finalized, reviewed and agreed to by EMAB, GNWT and other Parties to the Environmental Agreement.

Diavik did not respond to this recommendation before proposing to stop monitoring TSP.

In November 2018, before submission of V. 2 of the plan EMAB made three recommendations on the EAQMP re-evaluation:

1. **The TSP monitor locations should be re-evaluated using historical meteorology and dustfall results, as the TSP monitor results do not appear to be correlated with the 2016, 2015 and 2014 meteorology or dustfall monitoring results presented.**

2. **Diavik should update the 2012 dispersion modelling assessment to reflect current operations. This assessment should then be used to evaluate the appropriateness of TSP monitor locations and assess the observed dustfall patterns.**
3. **Dustfall sampling frequency should be reviewed and completed on a monthly basis per ASTM International methods**.

Diavik did not respond to these recommendations or address them during its re-assessment. It will continue to collect dustfall samples approximately every three months instead of monthly.

EMAB asked Arcadis Canada to undertake a review of the EAQMP and proposed EAQMMP Ver.2. Key findings were:

- Diavik has not met the CSR requirements to monitor ambient air levels of particulates (TSP monitoring).
- Diavik has not met the environmental agreement requirement to monitor air quality, or verified the accuracy of the air quality predictions. It has not established air quality thresholds or triggers for adaptive management.
- Diavik's air quality model is inadequate:
  - › does not include open pit mining of A21
  - › appears to be based on outdated weather data so location of sampling stations seems to be upwind of dust sources (should be downwind)
  - › underpredicts dust levels
  - › appears to be calibrated to wrong size of dust particles
- Problems with the TSP monitoring include:
  - › Large amounts of missing data, or unreliable data
  - › Poor calibration and maintenance of equipment
  - › No spare monitor in case of equipment breakdown
  - › No real-time alarms to alert staff of equipment issues
  - › Insufficient staff with insufficient training
  - › No validation of data by an external organization
  - › Data not collected in real time, so not used for adaptive management
- Other northern mines, including Ekati and Gahcho Kue, have successful air quality monitoring programs that yield useful results. Ekati had similar problems as Diavik's for several years, then revised the program and now it yields good results.

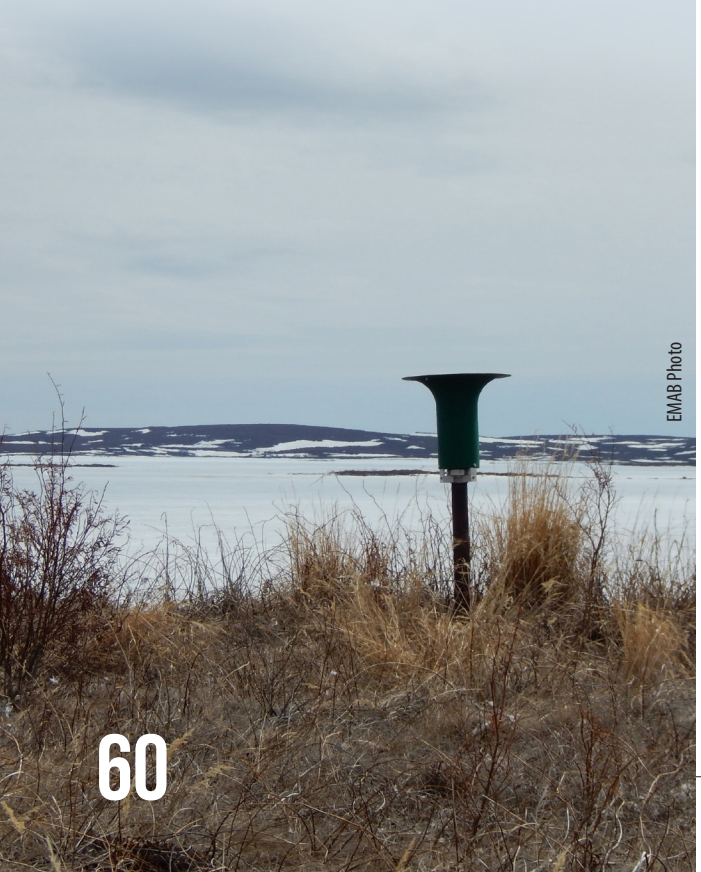
EMAB plans to discuss the results of the Arcadis review with Diavik and GNWT with the aim of developing a successful ongoing TSP monitoring component of the EAQMP. EMAB's view is that Diavik should update its air quality model to address the existing issues and to include A21 open pit mining; Diavik should then re-assess the location of the TSP monitors. Diavik should also address the problems with the existing TSP monitoring program and collect ongoing data on TSP.

2017 EAQMP ANNUAL REPORT

Diavik submitted their 2017 EAQMP Annual Report to EMAB in July 2018. EMAB had Arcadis help with the review of the EAQMP Annual Report and submitted 10 recommendations to Diavik in November 2018. Diavik responded to EMAB's review in January 2019, however many of our recommendations were not addressed.

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, they are any airborne particles 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 refers to all particles that fall out of the air and settle. Larger particles usually fall out of the air closer to their source than the smaller ones.



EMAB Photo

EMAB is working with Diavik to address the unanswered recommendations. GNWT did not provide comments or recommendations on the report.

Below are some highlights from our review. Go to EMAB's website: emab.ca to see the full review of the 2017 EAQMP Report. EMAB's full list of recommendations on the 2017 EAQMP can be found on page 84 of this report.

CONTINUOUS TOTAL SUSPENDED PARTICULATE MONITORING PROGRAM

Diavik monitors the amount of suspended airborne particles using two Total Suspended Particulate (TSP) monitoring stations. The TSP collected is made up of dust and air emissions. This comes from sources such as exhaust from mine operations, and dust particles produced by blasting rock.

Diavik's monitoring showed one exceedance of the GNWT air quality guidelines for TSP in 2017. This exceedance took place during a period with heavy smoke from nearby forest fires so may not be related to Diavik's operations.

RECOMMENDATION: Available meteorological data should be used to document the cause/rationale for events of high TSP concentrations measured by monitors.

Diavik's Response: Diavik did not respond to this recommendation.

EMAB considers TSP monitoring to be very important. There are number of concerns regarding TSP data collection at Diavik. EMAB's main concern is the lack of reliable data. Another issue is that the TSP monitors have a lot of downtime due to technical difficulties. The monitor located at the Communications Building was out-of-order for 29% of 2017. The monitor located at the A154 dike was out-of-order for 31% of 2017. There could be periods of TSP exceedances at times when the monitors were not working, but there is no way to know. EMAB does not feel that the program is providing reliable information as currently designed.

EMAB Photo

Dustfall gauge.

Photo courtesy of Diavik Diamond Mine

Snow core sampling.

DUSTFALL MONITORING

Diavik also monitors dustfall at the mine. Dustfall is the amount of TSP that falls out of the air and settles on the ground. The larger particles settle quickly near the mine. The smaller ones can travel long distances in the wind and settle to the ground far from the mine site. Diavik monitors dustfall at the mine using dust gauges and snow cores. They measure the amount of dustfall at different distances from the mine. They also test what chemicals are in the dust.

Diavik's dustfall sampling frequency does not follow air quality monitoring guidelines. It also does not provide enough information to analyze air quality. There is no regulation stating that Diavik must conform to the guidelines.

RECOMMENDATION: Consider returning to monthly dustfall sampling or, at a minimum, perform monthly sampling during the snow-free periods to evaluate effectiveness of dust suppression efforts.

Diavik's Response: Diavik did not provide a clear response to this recommendation.

RECOMMENDATIONS: Use current and historical dustfall monitoring results to evaluate the effectiveness of dust suppression efforts.

Diavik's Response: Diavik did not respond to this recommendation.

DUSTFALL GAUGES

Dustfall recorded in gauges showed that dustfall rates were higher near the mine than further away. The dustfall rates in 2017 were lower than all other years except for 2013. This is likely because for most of 2017 there was no ongoing surface mining. Mining at the surface started in December 2017.

SNOW CORE SAMPLING

Diavik analyzes water from snow cores collected from snow survey stations around the mine. In 2017, one of the 19 samples analyzed exceeded the guidelines. That sample exceeded guidelines for aluminum, chromium, nickel, and zinc.


Photo courtesy of Diavik Diamond Mine

ENVIRONMENTAL AGREEMENT ANNUAL REPORT

As part of the Environmental Agreement, Diavik must submit an Annual Report to the Parties, the Government of Nunavut and EMAB every year. The Environmental Agreement Annual Report (EAAR) must meet conditions stated in the Environmental Agreement. It also must be approved by the Minister. The main purpose of the EAAR is to summarize the mine's activities and results of the environmental monitoring programs from the past year.

Diavik submitted the draft 2017 EAAR to EMAB and the GNWT on May 21, 2018. EMAB reviewed the report to see how it met the requirements of the Environmental Agreement. EMAB submitted 10 recommendations on the 2017 EAAR to Diavik. The GNWT also submitted recommendations.

Diavik sent back a revised EAAR on June 30 2018. At that time, it was also submitted to the Minister and circulated for public review. Diavik addressed most of the recommendations made by EMAB, however some recommendations were not addressed. On September 25, 2018 the ministered determined that the 2017 EAAR was satisfactory.

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.

WATER LICENCE

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.

Regulator responses to Diavik's requests and reports has been variable (see table on pg. 64).

Since 2015 EMAB has been expressing concern about the involvement of two key federal government departments in the review of monitoring reports and management plans related to Diavik's Water Licence. EMAB's view is that both the Department of Fisheries and Oceans (DFO), and Environment and Climate Change Canada (ECCC) have an important role to play in providing oversight on Diavik's impact on the air and water at the Diavik mine area. EMAB has recommended ECCC, and DFO in particular, be more active in making comments and recommendations.

EMAB continues to be disappointed by DFO's lack of substantive comment on reports that bear on the health of fish and fish habitat. This year EMAB made a recommendation to DFO that it should participate in reviews of Diavik's aquatic reports and management plans.

RECOMMENDATION: EMAB recommends that DFO review and comment on any potential concerns or impacts on fish health or fish habitat associated with all monitoring plans and reports and management plans submitted by Diavik, regardless of whether the concern or impact might result from the introduction of a deleterious substance.

DFO responded that it has a valuable perspective and expertise on fish and fish habitat. It participates in reviews for the Diavik Diamond Mine that relate to its mandate. DFO's mandate does not include the effects of deleterious substances on fish and fish habitat.

DFO did not comment on any of the reports listed below, except for the PKMW intervention.

EMAB notes that DFO has initiated a process to amend the *Fisheries Act* and it is our hope that this renewed interest will also result in greater DFO engagement in reviewing reports from Diavik under their Water Licence.

EMAB also made a recommendation to ECCC.

RECOMMENDATION: EMAB recommends that Environment and Climate Change Canada provide sufficient resources to allow it to review all monitoring plans and reports and management plans submitted by Diavik with respect to potential effects on water quality or fish health in relation to the introduction of deleterious substances into Lac de Gras, or air quality including greenhouse gas emissions.

ECCC responded that it provides reviews of the Diavik Diamond Mine that fall within its mandate based on available resources and potential risk to the environment.

ECCC did not comment on any of the reports listed except for the PKMW intervention.

In 2018 the Inspector visited the Diavik mine site nine times and made three presentations to EMAB throughout the year on the results of the inspections. The Inspector commented on one report during the last year.

ENR-Waters commented on all the reports we looked at except Diavik's Engagement Plan and we commend their continued thorough and substantive reviews of the Diavik Water Licence plans and reports.

Similarly the WLWB consistently provides detailed reviews of all documents submitted by Diavik for review.

Reviewer	ECCC	DFO	GNWT - ENR	EMAB
2017 AEMP Report	No comment	No comment	Commented	Commented
WRSA Security Holdback	No comment	No comment	Commented	Commented
Water Licence Amendment / PKMW Assessment	Intervened	Intervened	Intervened	Intervened
WRSA Instrumentation Locations	No comment	No comment	Commented	Commented
Engagement Plan Ver. 2.1	No comment	No comment	No comment	Commented
2018 AEMP Report	No comment	No comment	Commented	Commented

WILDLIFE MONITORING

Diavik's responses to EMAB's recommendations on wildlife monitoring have been variable. Twice Diavik did not respond to EMAB's recommendations related to the WMP within the 60-day period required by the Environmental Agreement. EMAB will continue to work with Diavik to develop a more structured process for responding to WMP recommendations.

As of the time of writing, ENR-Wildlife has not responded to EMAB's recommendations on the WMP, which were sent on March 20, 2019; this is long past the 60-day response period agreed to in the Environmental Agreement. Other observations regarding ENR wildlife engagement on the Diavik WMP are:

- To EMAB's knowledge ENR-Wildlife did not make comments on Diavik's 2017 WMP report.
- ENR-Wildlife organized a Slave Geological Province Regional Wildlife Monitoring Workshop in April 2018 which was helpful in understanding the regional monitoring programs that Diavik is involved in: caribou ZOI, caribou behavior, grizzly DNA and wolverine DNA.
- ENR-Wildlife has not given follow-up direction to Diavik on the workshop discussions regarding re-starting ZOI monitoring, or schedules for DNA hair snagging for grizzly bear and wolverine.
- ENR - Wildlife have not taken action on issues regarding the collection of caribou behaviour data near and far from the Diavik-Ekati caribou ZOI.
- EMAB also looks forward to ENR-Wildlife's input on closure criteria for wildlife in Diavik's ICRP as they relate to how the post-closure landscape will accommodate wildlife in the area, and monitoring effects to wildlife, post-closure.

AIR QUALITY MONITORING

Diavik submitted the 2017 EAQMP report and EMAB's review is discussed earlier in this report. Diavik did not respond to EMAB's recommendations. Diavik submitted an assessment of the EAQMP, as recommended by EMAB; EMAB comments on the EAQMP are also presented earlier in this report. Diavik did not respond to two sets of recommendations from EMAB on the EAQMP. EMAB is disappointed in Diavik's proposal to discontinue TSP monitoring; our reviews indicate that the program could work if it were re-designed and provided with better resources.

ENR - Air Quality did not make comments on the 2017 EAQMP report. EMAB looks forward to ENR - Air Quality's comments and recommendations on Diavik's future air quality monitoring reports.

INSPECTOR'S AUTHORITY TO GIVE DIRECTION

EMAB is pleased with GNWT ENR's inclusion of section 67(1) of the *Waters Act* in its initiative to update its legislation. We believe the proposed change will resolve our concern about possible limitations on the Inspector's authority to give direction to Diavik in the current wording of the Act.

COMMUNICATIONS


EMAB Photo

ANNUAL GENERAL MEETING (AGM)

Each September, we hold our AGM in our Yellowknife office boardroom. Parties to the Environmental Agreement are invited to attend and provide input on EMAB's activities and direction. At the 2018 AGM Napoleon Mackenzie was re-elected as Chair, Charlie Catholique was re-elected Vice Chair and Julian Kanigan was re-elected as Secretary-Treasurer.

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.

COMMUNITY MEETINGS

As discussed 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.

PUBLIC LIBRARY

EMAB is responsible for making sure that people have access to materials that relate to the Environmental Agreement. Anyone interested can visit our office and access plans and reports, expert reviews, correspondence, Board meeting minutes, maps and images. Our office hours are 8:30 a.m. – 4:30 p.m. Monday to Friday.

Much of this information is also available on our website.

WEBSITE

EMAB's website is another way for EMAB to reach out to the people. We use our website to post our comments and recommendations on Diavik's ICRP, AEMP, WMP and EAQMP reports, as well as posting the WMP and EAQMP reports. We also post EMAB Annual Reports, Diavik's EAARs, meeting minutes and correspondence. You can visit us at our website, www.emab.ca and our Facebook page, facebook.com/EMAB2015.

ANNUAL REPORT

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

BROCHURE AND POSTER

EMAB has a brochure and poster summarizing our work. These are available on request.

EMAB GOVERNANCE AND OPERATIONS


EMAB Photo

EMAB Board Members at the June 2019 meeting.

The Board met eight times in 2018-19; six face-to-face meetings and two conference calls. The Annual General Meeting took place on September 11. The Board passed 25 email motions over the year.

BUDGET AND FINANCE

EMAB's budget for 2018-19 was $556,115; this included requesting agreement from Diavik to roll over $56,235 from 2017-18 coupled with Diavik's payment of $496,880. EMAB spent $493,969 during the year. With Diavik's agreement we will roll over $39,575 for activities in 2019-20 and will return $41,228 to Diavik.

EMAB negotiates its budget with Diavik every two years, for the following two years. At the end of the two-year period any surplus must be returned to Diavik, except as agreed between Diavik and EMAB. The Environmental Agreement 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 they can choose EMAB's or Diavik's. This year EMAB and Diavik agreed on the two-year budget for 2019-2021 as we did for 2017-2019, but for the previous three budget periods EMAB and Diavik did not agree, and each time the Minister chose Diavik's budget. This has resulted in EMAB's budget being cut back from $726,000 in 2011 to $496,880 in 2018. To conduct any activities above and beyond those budgeted EMAB must submit a separate request to Diavik for approval.

DIAVIK SITE VISIT

Board members and staff took a site tour of Diavik on June 4, during the June Board meeting. Board members and staff found the tour quite useful and noted a number of changes since the previous visit, including additional re-sloping work on the WRSA, pump-out and stripping of the A21 pit and development of the South WRSA near A21.

The tour covered the above-ground portion of the site including: North and South WRSA, PKC Facility, A154, A418 and A21 pits, and NI. The Board's tour also included the WTA and Water Treatment Plant.

ACTION PLAN

EMAB initiated a process to develop an Action Plan for 2019-2024. This included reviewing the previous Strategic Plan, surveying the Parties regarding their views on key issues, and a workshop with the Board to identify strengths and weakness and set priorities going forward. The plan is expected to be finalized early in 2019-2020.

ENVIRONMENTAL AGREEMENT

EMAB has been informed that GNWT has prepared proposed amendments to the Environmental Agreement in consultation with Canada, and is waiting for them to be circulated to the Parties and EMAB for review.

OPERATIONS

EMAB staffing has been consistent since 2016.

EMAB's Operations Manual was reviewed and updated.

WHAT ARE EMAB'S PLANS?

Our priorities for 2019-2020 will have a focus on closure plan revisions along with the environmental assessment of the PKMW project and subsequent water licence proceeding. Other planned activities include:

OVERSIGHT AND MONITORING

Continue monitoring development of the A21 pit as mining proceeds. This work includes the resumption of above-ground blasting for the first time in several years.

Continue participation in ENR initiative to revise environmental legislation including the *Waters Act* and *Environmental Protection Act*.

Photo courtesy of Diavik Diamond Mine


Photo courtesy of Diavik Diamond Mine

Continue to monitor and participate in development of GNWT policy on security and long-term liability and monitoring for closed minesites.

Review Reports:

- 2019 AEMP Annual Report
- 2019 Annual WMP Report
- 2018 EAQMP Report
- EAQMP Assessment and Re-design
- Proposed ICRP Version 4.1
- Updated SSRBCC Report
- GNWT Air Regulations
- 2018 EAAR

ABORIGINAL AND COMMUNITY INVOLVEMENT

- Attend Diavik Traditional Knowledge Panel meetings
- Engage Communities through Board members and community update meetings
- Implement TK Recommendations including assessment of Diavik response and follow-up

COMMUNICATIONS

- Annual Report
- Website
- Public Registry
- Facebook Page

GOVERNANCE

- Hold regular meetings
- Oversee EMAB operations
- Finalize Action Plan for 2019-2024

AUDITED FINANCIAL STATEMENTS

To the Board of Directors of
Environmental Monitoring Advisory Board

Opinion

We have audited the accompanying financial statements of Environmental Monitoring Advisory Board, which comprise the statement of financial position as at March 31, 2019, and the statement of operations, changes in net assets and statement of cash flows for the year then ended, and notes to the financial statements, including a summary of significant accounting policies.

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the organization as at March 31, 2019, and its results of operations and its cash flows for the year then ended in accordance with Canadian accounting standards for not-for-profit organizations.

Other Matter

The financial statements of the Board for the year ended March 31, 2018 were audited by another auditor who expressed an unmodified opinion on those financial statements on August 14, 2018.

Responsibilities of Management and Those Charged with Governance for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with Canadian accounting standards for not-for-profit organizations, and for such internal control as management determines is necessary to enable the preparation of financial statements that are free from material misstatement, whether due to fraud or error.

In preparing the financial statements, management is responsible for assessing the organization's ability to continue as a going concern, disclosing, as applicable, matters related to going concern and using the going concern basis of accounting unless management either intends to liquidate the Board or to cease operations, or has no realistic alternative but to do so.

Those charged with governance are responsible for overseeing the organization's financial reporting process.

Auditor's Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditor's report that includes our opinion. Reasonable assurance is a high level of assurance, but is not a guarantee that an audit conducted in accordance with Canadian generally accepted auditing standards will always detect a material misstatement when it exists. Misstatements can arise from fraud or error and are considered material if, individually or in the aggregate, they could reasonably be expected to influence the economic decisions of users taken on the basis of these financial statements.

As part of an audit in accordance with Canadian generally accepted auditing standards, we exercise professional judgment and maintain professional skepticism throughout the audit. We also:

- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, design and perform audit procedures responsive to those risks, and obtain audit evidence that is sufficient and appropriate to provide a basis for our opinion. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control.

- Obtain an understanding of internal control relevant to the audit 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 Board's internal control.

- Evaluate the appropriateness of accounting policies used and the reasonableness of accounting estimates and related disclosures made by management.

- Conclude on the appropriateness of management's use of the going concern basis of accounting and, based on the audit evidence obtained, whether a material uncertainty exists related to events or conditions that may cast significant doubt on the Board's ability to continue as a going concern. If we conclude that a material uncertainty exists, we are required to draw attention in our auditor's report to the related disclosures in the financial statements or, if such disclosures are inadequate, to modify our opinion. Our conclusions are based on the audit evidence obtained up to the date of our auditor's report. However, future events or conditions may cause the Board to cease to continue as a going concern.

- Evaluate the overall presentation, structure and content of the financial statements, including the disclosures, and whether the financial statements represent the underlying transactions and events in a manner that achieves fair presentation.

We communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit and significant audit findings, including any significant deficiencies in internal control that we identify during our audit.

EPR Yellowknife Accounting Prof. Corp.

EPR Yellowknife Accounting Professional Corporation
Chartered Professional Accountants
Yellowknife, NT
July 24, 2019

ENVIRONMENTAL MONITORING ADVISORY BOARD
Statement of Operations
For the year ended March 31, 2019

	2019 Budget	2019 Actual	2018 Actual
Revenues			
Diavik Diamond Mines Inc.	$ 496,880	$ 496,880	$ 487,140
Interest income	5,000	5,918	2,951
Transfer from deferred revenue	56,235	69,254	41,000
Transfer to deferred revenue	-	(39,575)	(69,254)
Contributions repayable	-	(41,228)	-
	558,115	491,249	461,837
Expenditures			
Administration, Schedule 1	69,410	66,397	65,288
Management Services, Schedule 2	183,200	189,026	178,775
Governance, Schedule 3	111,025	100,186	89,598
Oversight and monitoring, Schedule 4	157,961	121,430	113,112
Involving and supporting communities, Schedule 5	21,900	2,623	8,686
Communications, Schedule 6	9,519	11,587	6,377
Amortization	-	2,720	3,693
	553,015	493,969	465,529
Surplus (deficit) for the year	$ 5,100	$ (2,720)	$ (3,692)

ENVIRONMENTAL MONITORING ADVISORY BOARD
Statement of Changes in Net Assets
For the year ended March 31, 2019

	Operating Fund	Tangible Capital Asset Fund	Total 2019	Total 2018
Balance, opening	$ -	$ 9,068	$ 9,068	$ 12,760
Deficit	(2,720)	-	(2,720)	(3,692)
Amortization	2,720	(2,720)	-	-
Balance, closing	$ -	$ 6,348	$ 6,348	$ 9,068

ENVIRONMENTAL MONITORING ADVISORY BOARD
Statement of Financial Position
As at March 31, 2019

	2019	2018
ASSETS		
Current		
Cash	$ 15,280	$ 99,994
Restricted cash (Note 4)	620,167	496,880
Accounts receivable	274	-
Prepaid expenses	1,579	1,087
	637,300	597,961
Tangible Capital Assets (Note 5)	6,347	9,068
	$ 643,647	$ 607,029
LIABILITIES		
Current		
Accounts payable and accrued liabilities (Note 6)	$ 49,676	$ 31,827
Deferred revenue (Note 7)	546,395	566,134
Contributions repayable (Note 8)	41,228	-
	637,299	597,961
NET ASSETS (Note 1)		
Net Assets	6,348	9,068
	$ 643,647	$ 607,029

APPROVED ON BEHALF OF THE BOARD

Member

Jack Kavanagh Member

ENVIRONMENTAL MONITORING ADVISORY BOARD
Statement of Cash Flows
For the year ended March 31, 2019

	2019	2018
Operating activities		
Surplus (deficit)	$ (2,720)	$ (3,692)
Adjustment for		
Amortization	2,720	3,692
	-	-
Change in non-cash working capital items		
Increase in accounts receivable	(274)	-
(Increase) decrease in prepaid expenses	(492)	638
Increase (decrease) in accounts payable and accrued liabilities	17,850	(22,799)
(Decrease) increase in deferred revenue	(19,739)	43,993
Increase (decrease) in contributions repayable	41,228	(11,673)
Increase in cash	38,573	10,159
Cash, opening	596,874	586,715
Cash, closing	$ 635,447	$ 596,874
Cash consists of:		
Cash	$ 15,280	$ 99,994
Restricted cash	620,167	496,880
	$ 635,447	$ 596,874

1. ORGANIZATION AND JURISDICTION

Environmental Monitoring 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. SIGNIFICANT ACCOUNTING POLICIES

The Board applies the Canadian accounting standards for not-for-profit organizations.

(a) *Financial instruments*

The Board initially measures its financial assets and liabilities at fair value. The Board subsequently measures its financial assets and financial liabilities at amortized cost, except for securities quoted in an active market, which are subsequently measured at fair value.

Financial assets measured at amortized cost include cash and restricted cash. Financial liabilities measured at amortized cost include accounts payable and accrued liabilities.

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.

(b) *Fund accounting restricted*

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 at rates set out in note 4.

(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 or deferred revenue. The Board may not accumulate unrestricted net assets from unexpended Diavik Diamond Mines Inc.

(f) *Allocated 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) *Cash and cash equivalents*

Cash and cash equivalents consist primarily of cash in chequing account and restricted cash.

(h) *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 at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. By their nature, these estimates are subject to measurement uncertainty. The effect of changes in such estimates on the financial statements in future periods could be significant. Accounts specifically affected by estimates in these financial statements are .

3. FUTURE ACCOUNTING CHANGES

In March 2018, the Accounting standards Board (AcSB) issued the following new standards in part III (Accounting Standards for Not-for-Profit Organizations) of the CPA Canada Hand Book.

Section 4433 Tangible Capital Assets Held by Not-for-Profit Organizations and Section 4434 Intangibles Assets Held by Not-for-Profit Organizations states that the cost of contributed tangible capital assets is deemed to be fair value at the date of contribution plus all cost directly attributable to it acquisition, including installing at the location and the condition necessary for its intended use. Previously, there was no guidance on how to determine the cost of a contributed tangible asset. The new section is not expected to impact the Board.

Section 4441, Collections held by Not-for-Profit Organizations states that collections (which includes work of arts, historical treasures or similar assets) are recorded on the statement of financial position at either cost or nominal value on the statement of financial position. All collections are accounted for using the same method. The new section is not expected to impact the Board.

Section 4433, 4434 and 4441 (the new standards) replace Section 4431, 4432 and 4440 respectively. The new standards are effective for annual periods beginning on or after January 1, 2019. Earlier Application is permitted.

4. RESTRICTED CASH

Restricted cash represents cash received from Diavik Diamond Mines Inc. that is intended for a specific purpose or represents the amount to repay.

	2019	2018
Cash received in advance for the 2019/2020 fiscal year	$ 620,167	$ -
Cash received in advance for the 2018/2019 fiscal year	-	496,880
	$ 620,167	$ 496,880

5. TANGIBLE CAPITAL ASSETS

			2019	2018
	Cost	Accumulated amortization	Net	Net
Office equipment	$ 33,017	$ 31,426	$ 1,591	$ 2,274
Furniture and fixtures	24,209	21,683	2,526	3,608
Computer equipment	60,895	58,665	2,230	3,186
	$ 118,121	$ 111,774	$ 6,347	$ 9,068

6. ACCOUNTS PAYABLE AND ACCRUED LIABILITIES

	2019	2018
Trade accounts payable	$ 40,364	$ 23,303
Accrued payroll	7,881	7,438
Government remittance	1,431	1,086
	$ 49,676	$ 31,827

7. DEFERRED REVENUE

	2019	2018
Diavik Diamond Mines Inc. - funding for next year	$ 546,395	$ 496,880
Diavik Diamond Mines Inc. - 2017-2018 surplus	-	69,254
	$ 546,395	$ 566,134

8. CONTRIBUTIONS REPAYABLE

	2019	2018
Diavik Diamond Mines Inc.	$ 41,228	$ -

9. ECONOMIC DEPENDENCE

The Board is dependent 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.

10. FINANCIAL INSTRUMENTS

Interest rate risk

Interest rate is the risk that the fair value of future cash flows of a financial instrument will fluctuate because of changes in market interest rates. The Board's financial assets that are exposed to interest rate risk consists of cash and restricted 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.

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 $635,447 (2018 - 596,874) with a chartered bank in excess of the insurable limit throughout the year. Furthermore, the Board has a concentration risk as the full balance of cash is maintained with a single federally regulated financial institution. This risk has not changed from the prior year.

Liquidity risk

Liquidity risk is the risk that the Board cannot repay its obligations when they become due. The Board does have a liquidity risk in the accounts payable and accrued liabilities. the Board reduces its exposure to liquidity risk by ensuring a budget process is in place and through monitoring of expenses. This risk has not changed from the prior year.

ENVIRONMENTAL MONITORING ADVISORY BOARD
Schedules of Expenditures
For the year ended March 31, 2019

SCHEDULE OF ADMINISTRATION

Schedule 1

	2019	2019 Actual	2018 Actual
Audit fees	$ 11,025	$ 11,146	$ 10,394
Bank charges and interest	700	635	660
Bookkeeping fees	2,800	4,745	2,399
Capital equipment	1,000	-	-
Insurance	6,500	3,519	6,721
Janitorial	2,700	2,835	2,730
Library/Publications	200	-	-
Office supplies	2,500	2,267	2,083
Postage and freight	700	775	233
Printing and photocopy	2,500	2,038	2,004
Professional fees	1,000	-	-
Rent	31,500	31,500	31,500
Repairs and maintenance	285	53	47
Technical Support	500	-	-
Telephone and internet	5,500	6,884	6,517
	$ 69,410	$ 66,397	$ 65,288

SCHEDULE OF MANAGEMENT SERVICES

Schedule 2

	2019	2019 Actual	2018 Actual
Employee benefits	$ 17,000	$ 22,666	$ 17,339
Employer's costs - CPP, EI, WSCC	11,200	12,246	11,331
Salaries	155,000	153,579	150,029
Travel	-	535	76
	$ 183,200	$ 189,026	$ 178,775

ENVIRONMENTAL MONITORING ADVISORY BOARD
Schedules of Expenditures
For the year ended March 31, 2019

SCHEDULE OF GOVERNANCE

Schedule 3

	2019	2019 Actual	2018 Actual
Accommodations	$ 5,500	$ 6,571	$ 5,262
Annual general meeting	-	-	73
Board of directors - Training	500	-	-
Executive Committee	4,500	4,500	4,500
Food and beverage	1,000	1,172	688
Honoraria	25,300	23,936	20,813
Meeting expenses	3,750	-	-
Per diems	5,350	4,615	3,707
Preparation	45,000	45,000	45,000
Teleconference honoraria	1,000	-	-
Transportation	10,700	8,323	9,555
Strategic Planning	7,675	6,069	-
Personel committee	750	-	-
	$ 111,025	$ 100,186	$ 89,598

SCHEDULE OF OVERSIGHT AND MONITORING

Schedule 4

	2019	2019 Actual	2018 Actual
Aquatic Effects Monitoring Program	$ 42,235	$ 42,220	$ 17,765
Air Quality Management Program	12,000	16,431	5,896
Interim Closure and Reclamation	39,795	3,081	59,490
Other reviews and reports	49,100	44,867	3,825
Traditional Knowledge Panel Review	-	-	9,331
Wildlife Monitoring Plan	14,831	14,831	16,805
	$ 157,961	$ 121,430	$ 113,112

SCHEDULE OF INVOLVING AND SUPPORTING COMMUNITIES

Schedule 5

	2019	2019 Actual	2018 Actual
Kitikmeot Inuit Association	$ 6,100	$ -	$ -
Lutsel K'e	3,800	2,623	5,271
North Slave Metis Alliance	1,700	-	1,686
T'licho Government	2,900	-	1,167
Yellowknives Dene First Nation	2,300	-	-
Board member consultation honorarium	5,100	-	562
	$ 21,900	$ 2,623	$ 8,686

SCHEDULE OF COMMUNICATIONS

Schedule 6

	2019	2019 Actual	2018 Actual
Advertising, public relations and promotions	$ 1,671	$ 3,739	$ 504
Annual report	7,650	7,650	5,243
Website maintenance	198	198	-
Website database re-design	-	-	630
	$ 9,519	$ 11,587	$ 6,377

EMAB RECOMMENDATIONS

EMAB RECOMMENDATIONS TABLE 2018 - 2019

2017 AEMP
EMAB submitted 24 recommendations to Diavik via the WLWB on the 2017 AEMP Report. Highlights can be found on pages 29-30. Diavik responded to each recommendation as required by the WLWB. The complete list of recommendations, as well as technical reviews, can be found on our website: emab.ca.

2018 AEMP
EMAB submitted 34 recommendations to Diavik via the WLWB on the 2018 AEMP Report. Highlights can be found on pages 30-31. Diavik responded to each recommendation as required by the WLWB. The complete list of recommendations, as well as technical reviews, can be found on our website: emab.ca.

WRSA Closure and Reclamation Plan - Instrumentation
EMAB submitted 26 recommendations to Diavik via the WLWB on Diavik's three instrument location proposals. Highlights can be found on page 43. The complete list of recommendations can be found on our website: emab.ca.

WRSA Closure and Reclamation Plan - Security Holdback Estimate
EMAB submitted six recommendations to Diavik via the WLWB on Diavik's cost estimates on security holdbacks. Highlights can be found on page 41. The complete list of recommendations can be found on our website: emab.ca.

Community Engagement Plan Ver. 2.1.
EMAB submitted eight recommendations to Diavik via the WLWB on Diavik's Community Engagement Plan Ver. 2.1. Highlights can be found on page 34. The complete list of recommendations can be found on our website: emab.ca.

2017 EAAR
EMAB submitted 10 recommendations to Diavik on their 2017 EAAR. Highlights can be found on page 62. The complete list of recommendations can be found on our website: emab.ca.

Water Licence Amendment Application
EMAB made 37 recommendations on Diavik's Water Licence Amendment Application. EMAB also made 31 recommendations on Diavik's responses to WLWB's IR #1 on Diavik's Water Licence Amendment Application. The complete list of recommendations can be found on our website: emab.ca.

MVEIRB Scoping Decision
EMAB made three recommendations to MVEIRB on MVEIRB's Clarification to the Scope of Diavik's PKMW Project. The complete list of recommendations can be found on our website: emab.ca.

2018 WMP Report
EMAB submitted seven recommendations to Diavik on the 2018 WMP Report. Highlights can be found on pages 49-56. The complete list of recommendations is below. Detailed technical reviews can be found on our website, emab.ca. As per section 4.3 of the EA, DDMI is required to respond to recommendations within 60 days. At the time of writing the 2018/19 Annual Report it had not been over 60 days since EMAB's recommendations were sent.

EMAB RECOMMENDATIONS ON THE 2018 WMP

Opportunities for improvement of existing mitigation measures that alleviate noise, dust, light, sounds, smell, and human presence may arise with technological advances and should be implemented to help minimize indirect impacts on caribou habitat.

DDMI has committed to provide a table summarizing sample sizes of caribou behavioural data including categories for mine operator, type of scan, season, distance from mine, and year in the next WMR. Please organize the information on distance from mine into categories of less than and greater than 15km from the mine (please see the example table below for a suggested format).
In response to the 2017 WMP, EMAB recommended that "Diavik should continue to focus on conducting far-from-mine behavioural group scans to ensure data are balanced between Ekati's near-mine scans and far-field scans, and to be in line with the original intent of this WMP component." (EMAB 2019a). Please explain why only four samples were collected far-from-mine in the 2018 season.
We recommend that DDMI provide summaries for other activities, particularly activities with a high energetic cost.
Please provide a discussion regarding the original intent behind the predictions regarding the northern and southern migrations (i.e. please clarify if the original prediction related to the connectedness of the herd, change in the movement (and thus energetics) of the herd, or any other concepts). Please explain why a deflection test was selected to test predictions regarding caribou distribution since predictions were not followed but DDMI can still conclude no effect of the Mine.
We recommend that the question of the influence of mining on caribou distribution remains "on the table" through the annual collection and evaluation of GPS-collar data. Please provide ideas on how DDMI can continue to monitor changes in herd distribution specifically in relation to the Diavik mine using collar data, if DDMI is proposing to remove the deflection test.
We recommend that DDMI explore opportunities and options to mitigate dust deposition, which may be influencing caribou migration patterns according to TK. This could include a coordination of best management practices for all mining operations in the vicinity. Are there any technological advancements for dust suppression or techniques being used by other mine operations in the NWT that could be implemented at the Mine site?

2017 EAQMP Report

EMAB submitted 10 recommendations to Diavik on the 2017 EAQMP Report. Highlights can be found on pages 59-61. EMAB's recommendations and Diavik's responses are listed below. EMAB's technical review of this document can be found on our website, emab.ca. At the time of writing this Annual Report Diavik has responded to our review but did not provide a clear response to EMAB's recommendations.

EMAB Recommendation	Diavik Response
It is recommended that DDMI include (and adhere to) a detailed summary of QA/QC practices in the EAQMP Report for each aspect of the monitoring program, including all laboratory procedures.	No Response
Complete and final calibration records be provided for all equipment (i.e., laboratory scale, continuous monitoring equipment, etc.).	No Clear Response
Final SOPs be provided for all field sampling and laboratory methods.	No Clear Response
The dust gauge collection SOP be updated to include QA/QC requirements similar to the QA/QC procedure used for snow core sampling (i.e., field duplicates and blanks).	No Response
Quality checking procedures need to be added to the TSS SOP (if not already) to ensure that they meet the same standard that an accredited laboratory would meet.	No Clear Response
Consider returning to monthly dustfall sampling or, at a minimum, perform monthly sampling during the snow-free periods, to evaluate effectiveness of dust suppression efforts.	No Clear Response
The current and historical dustfall monitoring results be used to evaluate the effectiveness of dust suppression efforts.	No Response
Available meteorological data and records of on-site activity be used to document the cause/rationale for events of high TSP concentration measured by the monitors.	No Response
A detailed comparison of monitored and modelled TSP/dustfall be included within the AQMR.	No Response
Details of the NPRI and GHG calculations be included, or a reference to an external document containing such details, to allow for validation of methods and quantities reported.	No Clear Response

EAQMP Re-Evaluation

EMAB submitted four recommendations to Diavik on their EAQMP Re-evaluation. Highlights can be found on pages 58-59. EMAB's recommendations and Diavik's responses are listed below. Diavik has not responded to these recommendations. As per section 4.3 of the EA they are required to respond within 60 days. At the time of witing this report, Diavik is past the 60 day deadline. EMAB's technical review of this document can be found on our website: emab.ca.

EMAB RECOMMENDATIONS ON THE EAQMP RE-EVALUATION
Diavik continue to collect TSP data as set out in the currently approved EAQMP until a revised EAQMP has been finalized, reviewed and agreed to by EMAB, GNWT and other Parties to the Environmental Agreement.
The TSP monitor locations should be re-evaluated using historical meteorology and dustfall results, as the TSP monitor results do not appear to be correlated with the 2016, 2015 and 2014 meteorology or dustfall monitoring results presented.
The dustfall sampling frequency be reviewed and completed on a monthly basis per ASTM International methods.
Diavik should update the 2012 dispersion modelling assessment to reflect current operations. This assessment should then be used to evaluate the appropriateness of TSP monitor locations and assess the observed dustfall patterns.

2017 WMP Report

Last year EMAB submitted 21 recommendations to Diavik on the 2017 WMP Report. We also submitted two recommendations to the GNWT on the 2017 WMP Report. Highlights can be found on pages 37-42 of the 2017-18 Annual Report and pages 49-56 of the 2018-19 Annual Report. Diavik's responses to the recommendations are included below. Some of these responses have been edited for clarity. More information can be found in our technical review documents on our website, emab.ca.

EMAB Recommendation	Diavik Response
Please discuss 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. Although some discussion occurred during the 2018 SGP Wildlife Monitoring Workshop, no decisions were made, and more discussion regarding potential adaptive management actions was deferred to an unspecified future date. This discussion should be prioritized.	Adaptive management resulting from caribou analyses would require strong linkage between an activity and the changes detected. Mitigation would also have to measurably reduce the change and the associated effect. For adaptive management actions to be effective, effects must be measurable on the ecological scale, otherwise whether or not the adaptive management action achieved the desire result cannot be determined. At the time of the EER (1998) there was little to no information about how barren-ground caribou would respond to indirect effects from mines. The predictions were merely a best guess of what the extent indirect effects might be. Thus, those predictions came with uncertainty, which was addressed by follow-up monitoring. A larger observed effect than predicted does not necessarily mean that mitigation for sources of sensory disturbance are not effective because there was uncertainty with the prediction. The mechanism that causes this pattern is unclear because all sources of sensory disturbance operate simultaneously (noise, dust, lights, sound, smells, and presence of people) and experimental manipulation to determine which is key is not feasible. More recent environmental assessments for mines (De Beers 2010; Dominion Diamond 2014) have assumed that indirect effects from active mines extend to 15 km. The resulting cumulative indirect effects estimate that 98% of Bathurst seasonal ranges remain undisturbed by human activity. It is predicted that the effectiveness of adaptive management on the remaining 2% would not be measurable with respect to an observed response by caribou.

Please give careful consideration to the interpretation of the 14 km ZOI presented in Boulanger et al. (2012). The 14 km distance, based on presence-absence data, may actually demonstrate an aggregation of caribou that would not exist without the mines. A 2017 analysis of caribou density implied that there may not be ZOI but more rigorous analyses were requested for the density approach to ZOI evaluation. In the 2018 SGP Wildlife Monitoring Workshop, an approach to ZOI analysis was presented which evaluates ZOI on an annual basis using GPS collar data. Diavik should consider using the GPS collar data approach to analyze ZOI for the 2018 season. Given that aboveground mining in the A21 pit will commence in 2018, Diavik should resume ZOI monitoring in 2019. Diavik should confirm the status and form of caribou ZOI monitoring prior to the 2019 WMP monitoring season.	Diavik will determine whether collar, aerial survey data, or an alternative method will be used for ZOI monitoring when required, and discuss with EMAB.
Move forward on collaboration and coordination of efforts, including both data collection and analysis, of the caribou behaviour monitoring program. Based on a June 14th, 2018 conference call, we understand that Ekati will be shifting their data collection to include more group scans in future years. This will allow for a combined analysis of behavioural data from both the Ekati and Diavik mine in the future. If possible, please confirm that this coordination of survey types will happen for the next reporting period.	Diavik and Ekati already use the same methods to collect data on group-level behaviour. As noted by Karin Clark of the Department and Natural Resources and Environment (ENR) (EMAB 2018), the methods used by the mines are similar and are appropriate for meeting their respective monitoring objectives. The behaviour data collected by the mines spans caribou active and rest cycles, which are implicit in the data.
Upon our review of DDMI's Response (14 June 2018) to EMAB's Letter regarding the Establishment of Wildlife Monitoring Program Terms of Reference, we recommend that DDMI provide summaries for activities other than just feeding time, particularly activities with a high energetic cost.	Behaviours observed other than feeding time include time spent bedded, trotting, running, walking and alert. A summary of these behavioural types is provided in annual WMP reports and in Golder (2011).
Given that the feeding data presented by DDMI (DDMI's Response on 14 June 2018) do not appear to show the same pattern, we recommend DDMI comment on why there might be a difference in the pattern between 2011 and 2018 and discuss whether they implemented a change to mine protocol that may have minimized the impacts on caribou behaviour.	Golder (2018) was requested by EMAB (MSES) to show pooled behaviour data across different spatial strata. These include the same data as analysed in Golder (2011). The behaviour analyses in Golder (2011) did not evaluate the data the same way as Golder (2018). For example, Golder (2011) considered behaviour by nursery and non-nursery group status independently, whereas Golder (2018) did not. Golder (2011) also considered 10 different distance categories whereas Golder (2018) considered two distance categories. It is not surprising that behaviour patterns may be different.
Given that the two mines have agreed to cooperate, please provide the current sample sizes for behavioural data, perhaps in Table format, including information on: mine operator (Ekati vs Diavik), type of scan, season, distance from mine, and year.	Diavik will provide the requested summary table in the next WMP report. The table will include a summary of Ekati data, pending a data sharing agreement. Since Diavik does not collect focal scans, these will not be included in the table. Note that data available have been summarized previously in Golder (2011; 2018) and in Figure 3.
Please analyze a DDMI-Ekati combined dataset for the next reporting period, using all behavioural data available to date, to test how caribou behaviour changes as a function of distance from the Mine. This is particularly relevant given the change to above-ground mining at the Diavik mine.	Since the last analysis of behaviour data in 2011, observations since this time have been from caribou groups that were at least 20 km from the Ekati and Diavik mines (Figure 3). From 1998 through 2010, the highest numbers of observations occurred annually within 5 km of the mines. Observations at 15 km to 25 km (i.e., intermediate distances) have been sporadic over time. Note that in 2014, 2015 and 2017 caribou were not detected within the RSA during the post-calving period and in 2015 and 2017 were recorded during winter. Caribou were monitored during winter because they were visible from the Diavik mine.

Provide a description of how non-parametric statistics have been or could be used in the analysis of behavioural data.	Diavik has responded to this comment previously in December 2017, which was included in the 2017 Wildlife Monitoring Program report in Appendix J. Non-parametric statistics were not used in the most recent comprehensive analysis of the behaviour data (Golder 2011). A number of different analyses could be used including non-parametric statistics; however, the approach used is consistent with methods used in the scientific literature (e.g., Duquette and Klein 1987). Golder (2018) also summarized behaviour data among different distance strata as requested by EMAB in February, 2018. Non-parametric statistics were not used in this analysis.
Clearly state the assumption of no yearly variation in caribou behaviour if the data are insufficient to detect annual variation.	The assumption about duration of effects to caribou behaviour in the EER (1998) was that adverse effects would be continuous (i.e., a precautionary approach). This means that the effect would always be present and detectable. Detecting intermittent annual effects as demonstrated in the Golder (2011) behaviour analysis, implies that duration is periodic and less than assumed in the EER.
In the event that collaboration on/sharing of behaviour data between operators occurs, please be explicit about all assumptions made in future analyses.	Diavik will include assumptions related to future analyses.
DDMI should complete 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, which affects both forage species composition and elevated metal concentrations in lichen near the Mine. DDMI indicated that the ZOI analysis for caribou captures the effect of indirect habitat loss. It appears that indirect habitat loss is implicitly incorporated into the ZOI modelling, but not explicitly measured on the ground. For that reason, no mitigation measure of the indirect habitat loss is discussed, to the best of our knowledge.	Indirect effects to caribou habitat were assessed in Section 6.3.1 of the ERR (1998). A 14 km ZOI buffer (Boulanger et al. 2012) applied around Diavik covers an area of 88,806.7 ha. Within a 14 km buffer area, existing disturbance from Diavik and Ekati mine infrastructure covers 1.9% (1,655.0 ha) (Table 3, Figure 1). Within 14 km deep water is the most abundant land cover type and covers 42.8% (38,037.6 ha) with a nil suitability ranking. Heath tundra is the second most abundant land cover at 24.1% (19,047.6 ha) and was considered highly suitable in the EER (1998). Nil and low value habitats combined comprise 62.0% (55,057.9 ha) of the area within 14 km of Diavik mine (Table 4). Assuming that high and moderate suitable habitats are reduced by one level (low and nil are unchanged) from sensory disturbances regardless of proximity to Diavik mine, then all 29.0% (25,727.3 ha) of high suitability habitat present is reduced to moderate suitability and moderate suitable habitat increases by 220.7% (25,727.3 ha) (Table 4). The area of low and nil suitability increases by 14.6% (63,079.4 ha) and would represent 71.0% (63,079.4 ha) of the total 14 km area. This assessment likely overestimates changes to habitat suitability because the magnitude of sensory disturbance is predicted to diminish with increasing distance from point sources (see Boulanger et al. 2012) and quality habitats like heath tundra are abundant beyond Lad de Gras and near the 14 km boundary (Figure 1). Deep water, which is a nil value habitat, dominates the area within 14 km and also represents a large area adjacent to Diavik Mine (Figure 1). There is existing Ekati mine infrastructure in this area making it problematic to assign all indirect changes to Diavik mine. Also, this area is predominantly marginal quality (i.e., nil and low suitability) in the absence of indirect changes so ecological effects to caribou are likely to be limited, particularly when considering the spatial scale of caribou seasonal ranges and the limited amount of time caribou are present in the area. Vegetation monitoring during post-closure will include reference sites that will determine whether reclaimed areas provide similar ecological function for caribou and other wildlife.

Please provide information on the statistical independence of the data used in the caribou distribution analysis and 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. Please consider the use of TK to help uncover causes for unanticipated changes to the caribou southern migration and to develop adaptive mitigation measures.	Diavik disagrees that the presence of diamond mines is not considered in the analysis of Bathurst caribou collar data and changes in seasonal range attributes. The collar locations from 1998 to 2017 reflect caribou interactions with their environment, which includes the time when Ekati, Diavik, Snap Lake, Gahcho Kué, Lupin and Jericho mines were constructed and operating. In the context of caribou deflection patterns, the results from Virgl et al. (2017) show that whether caribou move west or east around Lac de Gras does not result in herd fragmentation (i.e., an ecological effect), which was part of the basis for measuring Lac de Gras deflections. High range fidelity also means that cumulative interactions with six mines has not resulted in herd fragmentation. During the June 2018 meeting with EMAB, EMAB (MSES) committed to recommending adaptive management strategies to mitigate caribou deflections around Lac de Gras. Diavik looks forward to reviewing these strategies and would also request that EMAB indicate how the reduced ecological effect from their proposed adaptive management strategies will be measured and identify thresholds for assessing strategy effectiveness.
Please address the possibility that grizzly bears may be becoming habituated and their presence on the site may be on the rise. We await the results of 2017 grizzly bear hair snagging data collection that can help with determining whether increases in grizzly bear observations near the Diavik mine are having population-level consequences for grizzly bears.	Diavik has already responded to this comment that grizzly bears, particularly females with cubs, may recognize the Mine site as safe habitat. Deterrent actions are reasonably effective at reducing grizzly bear-worker interactions and limiting grizzly bear mortalities over time. Of note is that Diavik believes the majority of grizzly bear sightings include the same individual that has been observed at the mine site since it was a cub.
Please use recently available information from the DNA hair snagging program (2018) to support conclusions in the 2019 WMP report regarding the alteration of wolverine population parameters.	Efford and Boulanger (2018) results indicate that population growth rate (lambda) is approximately stable through time and similar across study areas, except for Daring Lake, which showed a slight decline. Apparent survival was similar across study areas. These data support the conclusion that mine-related wolverine mortalities are unlikely influencing population parameters.
Please evaluate whether the increase in fox and wolverine observations in the WTA in 2017 persists in future years.	At the conclusion of weekly (or twice weekly in winter) inspections, misdirected waste is reported and sorted correctly by the Waste Management staff. The primary reason waste is misdirected is because occasionally Mine workers forget how waste items are to be sorted. Diavik also notifies area managers to remind and follow-up with workers. As well, Environment staff complete waste management training.
Please explore the reasons for the higher levels of misdirected food waste in the WTA and Landfill areas as this may be contributing to wildlife presence and possible habituation near the Mine site.	At the conclusion of weekly (or twice weekly in winter) inspections, misdirected waste is reported and sorted correctly by the Waste Management staff. The primary reason waste is misdirected is because occasionally Mine workers forget how waste items are to be sorted. Diavik also notifies area managers to remind and follow-up with workers. As well, Environment staff complete waste management training.

Please discuss the results showing an effect of the Mine on vegetation structure in reclamation and revegetation studies and discuss the implications for wildlife recolonization in terms of the likelihood for re-establishment of natural or pre-disturbance vegetation and wildlife communities. The Mine closure plan and proposed reclamation activities should ensure that forage species palatable to caribou be part of the mix of species (at a natural ratio) in the reclaimed landscape.	Vegetation monitoring during post-closure will include reference sites that will determine whether reclaimed areas provide similar ecological function for caribou and other wildlife.
We recommend that the established three-year monitoring schedule for a comprehensive analysis of vegetation and lichen data be continued in order 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.	DDMI and EMAB agreed that the trigger for changing vegetation and lichen monitoring frequency would be changed to reference station values for dust deposition.
Diavik should continue to focus on conducting far-from-mine behavioural group scans to ensure data are balanced between Ekati's near-mine scans and far-field scans, and to be in line with the original intent of this WMP component.	The intent of the WMP was to test if caribou behaviour within the study area changes with distance from the mine, particularly comparisons between groups inside and outside the zone of influence of the mine. However, it became clear after construction that caribou were seldom observed on East Island (likely avoided the island), and because of Lac de Gras, the closest observations were 3-5 km from the mine site. Consequently, it was agreed to combine data from Ekati and Diavik, with DDMI focusing on observations further from the mine. However, the agreement did not state that DDMI would only collect observations far away from the mines. All data are important and useful and DDMI will continue to complete scans on caribou groups encountered regardless of distance from mine whenever practical and safe to do so. The primary trigger for far field monitoring is GPS collar detection of sufficient caribou groups within the study area at a time when helicopter access monitoring is safe and practical. DDMI reiterates that due to changes in the herd size and migration patterns / timing over the past decade, caribou are generally in the study area during the winter when far field observations are not practical or safe (related to cold temperatures) but on-site observations are safe and practical on account of continuous access to shelter (vehicles).
Diavik should include a description of its adaptive management activities and an evaluation of how well they are working as a sub-section for each program component in the 2018 WMP Report and have this as a regular section in future annual WMP Reports.	Adaptive management activities have been provided in the Recommendations Section for each component. To make this clear, these sections were renamed "Adaptive Management and Recommendations" in the 2018 WMP Report and this will be carried forward to future reports. The Introductory section of the WMP Report also provides a summary of programs that have been adaptively managed. DDMI would like to emphasize that adaptive management is not just about increasing and/or adding mitigation and monitoring, it is also about decreasing and/or removing mitigation and monitoring that is no longer effective or necessary. At the Slave Geological Province Wildlife Workshop in April 2018 EMAB suggested that they could provide additional adaptive management measures to DDMI for consideration. To DDMI's knowledge, this information has not been received. DDMI does encourage this exchange of information and believes it could be useful to identify additional potential adaptive management activities that have not already been considered by DDMI.

Diavik should develop a WMP program description in line with the EA requirement that Diavik revise its environmental monitoring programs on an ongoing basis in response to changing circumstances and additional information. This document should include program monitoring objectives; methods of data collection and analysis; coordination with other mines as applicable; use of Traditional Knowledge; and participation in, or contributions to, regional monitoring initiatives.	DDMI believes that the current WMP Report, including a concordance table to specifically link Environmental Agreement (EA) articles in Section 7.1 to the relevant WMP Report sections (as originally provided in DDMI's 14 June 2018 response to EMAB re: Establishment of Wildlife Monitoring Program Terms of Reference) adequately aligns with the EA requirements. Within each section of the WMP Report, there are specific sections that discuss: (1) component objectives, and (2) methods of data collection and analysis (including use of traditional knowledge, descriptions of coordinated efforts between mines, and participation in regional monitoring initiatives). These sections describe how DDMI monitored each component during the current reporting year and the subsequent Adaptive Management and Recommendations sections identify any updates for the following monitoring year. DDMI does not see value in creating a new document that simply reproduces these WMP Report sections, as this would result in an unnecessary duplication of effort for DDMI, reviewers and readers. This report duplication may also delay progress to make adaptive management changes to monitoring programs. DDMI suggests that the current WMP Report format, as currently accepted, is appropriate. DDMI acknowledges that the EA concordance table for the 2018 WMP Report was inadvertently missed. The concordance information provided in the 14 June 2018 letter was still relevant to the 2018 WMP Report. DDMI will ensure this information is provided in future reports.
EMAB Recommendation	**GNWT Response**
GNWT-ENR should follow through on its commitment to recommend that Diavik resume ZOI monitoring in accordance with the ZOI Guidance Document, in 2019	The GNWT has not responded. As per section 4.3 of the EA they are required to respond within 60 days. At the time of writing this Annual Report GNWT is 90 days beyond the 60 day deadline.
GNWT-ENR should continue to provide direction on hair snagging surveys to ensure objectives and predictions are being tested. ENR should confirm the schedule for future hair snagging surveys.	The GNWT has not responded. As per section 4.3 of the EA they are required to respond within 60 days. At the time of writing this Annual Report GNWT is 90 days beyond the 60 day deadline.
ICRP Version 4.0. - Closure Criteria EMAB made one recommendation to GNWT-ENR on Diavik's wildlife closure criteria. Further information is on page 47 of the Report. As per section 4.3 of the EA the GNWT is required to respond within 60 days.	
EMAB Recommendation	**GNWT Response**
Recommendation to GNWT: GNWT-ENR should coordinate a review amongst their wildlife, forestry, and any other departments, as necessary, for the next public review of Diavik's CRP and comment on the closure objectives and criteria related to wildlife and re-vegetation of wildlife habitat. As noted in the WLWB's RFD, Diavik will be expected to submit their Final CRP in 2020, three years before the expiry date of the Water Licence.	The GNWT has not responded. As per section 4.3 of the EA they are required to respond within 60 days. At the time of writing this Annual Report GNWT is 90 days beyond the 60 day deadline.

Recommendations for Federal Water Licence Reviewers

EMAB made recommendations to ECCC and DFO regarding their participation in Water Licence reviews.

EMAB Recommendation	DFO Response
EMAB recommends that DFO review and comment on any potential concerns or impacts on fish health or fish habitat associated with all monitoring plans and reports and management plans submitted by Diavik, regardless of whether the concern or impact might result from the introduction of a deleterious substance.	DFO responded that it has a valuable perspective and expertise on fish and fish habitat. It participates in reviews for the Diavik Diamond Mine that relate to its mandate. DFO's mandate does not include the effects of deleterious substances on fish and fish habitat.
EMAB Recommendation	**ECCC Response**
EMAB recommends that Environment and Climate Change Canada provide sufficient resources to allow it to review all monitoring plans and reports and management plans submitted by Diavik with respect to potential effects on water quality or fish health in relation to the introduction of deleterious substances into Lac de Gras, or air quality including greenhouse gas emissions.	ECCC responded that it provides reviews of the Diavik Diamond Mine that fall within its mandate based on available resources and potential risk to the environment.

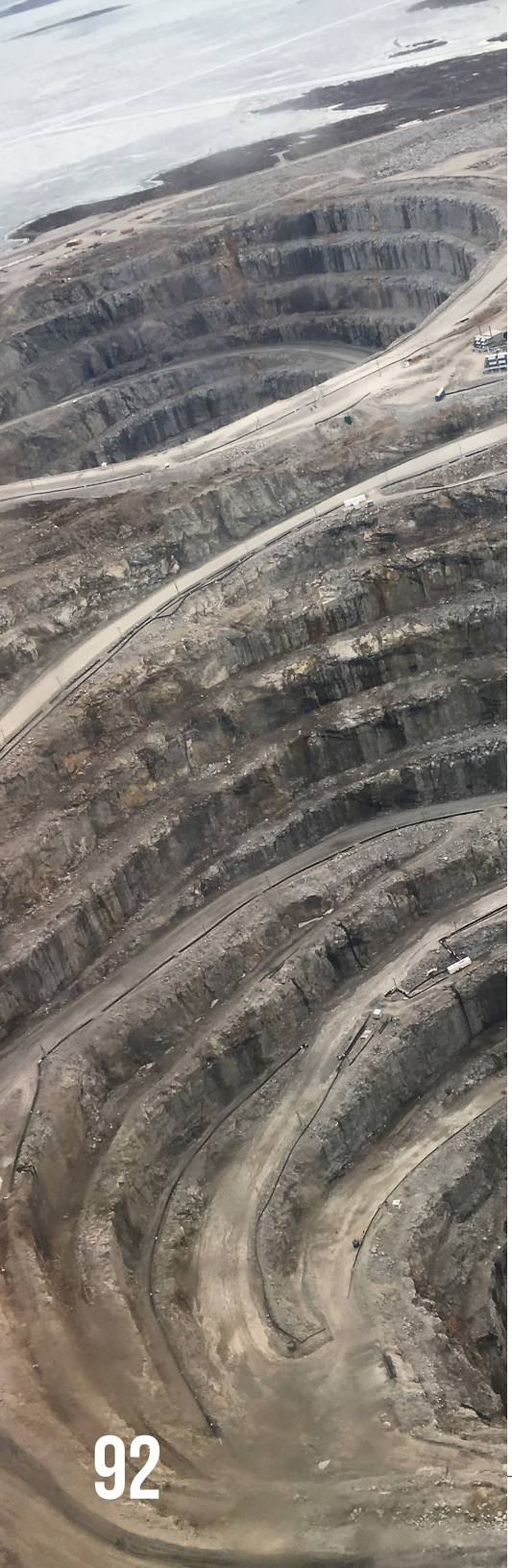


TABLE OF ACRONYMS

Acronym	Definition
AEMP	Aquatic Effects Monitoring Program
AGM	Annual General Meeting
BCRP	Bathurst Caribou Range Plan
CAR	Comprehensive Analysis Report
CCME	Canadian Council of Ministers of the Environment
CSR	Comprehensive Study Report
DDEC	Dominion Diamond Ekati Corporation
DFO	Department of Fisheries and Oceans
EA	Environmental Assessment
EAAR	Environmental Agreement Annual Report
EAQMP	Environmental Air Quality Monitoring Program
ECCC	Environment and Climate Change Canada
ED	Executive Director
EEM	Environmental Effects Monitoring
EFPK	Extra-Fine Processed Kimberlite
EMAB	Environmental Monitoring Advisory Board
ENR	Environment and Natural Resources
EPA	Environmental Protection Act
EQC	Effluent Quality Criteria
FF	Far-Field
GNWT	Government of the Northwest Territories
ICRP	Interim Closure and Reclamation Plan
KIA	Kitikmeot Inuit Association

Acronym	Definition
LDG	Lac de Gras
LKDFN	Lutsel K'e Dene First Nation
MDMER	Metal and Diamond Mining Effluent Regulations
MVLWB	Mackenzie Valley Land and Water Board
NCRP	North Country Rock Pile (aka WRSA – see below)
NI	North Inlet
NSC	North South Consultants
NSMA	North Slave Metis Alliance
PHC	Petroleum Hydrocarbons
PK	Processed Kimberlite
PKC	Processed Kimberlite Containment Facility
PKMW	PK to Mine Workings
SEC	Slater Environmental Consulting
SGP	Slave Geological Province
SNP	Surveillance Network Program
SOI	Substance of Interest
TG	Tłı̨chǫ Government
TK/IQ	Traditional Knowledge / Inuit Qaujimajatuqangit
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
TTG	Technical Task Group
WTA	Waste Transfer Area
WLWB	Wek'èezhìı Land and Water Board
WMP	Wildlife Monitoring Program
WMR	Wildlife Monitoring Report
WRRB	Wek'èezhìı Renewable Resources Board
WRSA	Waste Rock Storage Area (aka NCRP – see above)
YKDFN	Yellowknives Dene First Nation
ZOI	Zone of Influence

HOW TO CONTACT US

ENVIRONMENTAL MONITORING ADVISORY BOARD FOR THE DIAVIK MINE

204 – 5006 Franklin Ave.
Box 2577
Yellowknife, NT X1A 2P9

Executive Director
John McCullum
Emab1@northwestel.net
Phone: 867-766-3682

Environmental Specialist
Janyne Matthiessen
Emab2@northwestel.net
Phone: 867-766-3682

www.emab.ca
www.facebook.com/EMAB2015