

# INDEPENDENT ENVIRONMENTAL MONITORING AGENCY



A PUBLIC WATCHDOG FOR ENVIRONMENTAL MANAGEMENT AT EKATI DIAMOND MINE™



# 2015-16

## Annual Report

Plain Language



# Table of Contents



1

Message from  
the Chair 2016



2

Mining at Ekati



4

How We Do  
Our Work



6

Waste Rock



8

Reclamation  
and Closure



11

Water and Fish



13

Air Quality



15

WildLife



18

Jay Expansion  
Project



20

Lynx and Sable  
Projects



21

Regional  
Monitoring



22

Traditional  
Knowledge



24

How Are the  
Regulators  
Doing?



26

How is DDEC  
Doing?



27

Agency Recommendations for 2015-16

29

Glossary



**INDEPENDENT**  
ENVIRONMENTAL  
MONITORING AGENCY

# Glossary

**Adaptive Management** – Learning from environmental monitoring results and using the results to change and improve operations and monitoring.

**Closure** – Act of ceasing mining, processing and other production activities (final closure of the mining operation).

**Consultation** – (i) The party to be consulted has enough notice on a matter to allow for the party to prepare its view on the matter. (ii) Opportunity to present these views to the decision making body. (iii) Full and fair consideration be given to any party that presents their views to the decision making body.

**Contaminant** – A substance not naturally present in the environment or present in amounts that can negatively affect the environment.

**Cumulative Effects** – Environmental changes or impacts from past, present and future human land use activities (e.g., exploration and mining) combined with natural factors (e.g., fires, climate change).

**Devolution** – A transfer of responsibility from the federal government to a provincial or territorial government.

**Dioxins and furans** – A type of organochlorine that can cause cancer and other health problems. A group of chemicals that mainly come from the burning of waste.

**Effluent** – Wastewater that flows into a receiving body of water.

**Environmental Agreement** – Signed by BHPB and the federal and territorial governments in 1997 to provide environmental monitoring for the Ekati Mine not covered by other licences and permits. The Tłtchq Government, Akaichto Treaty 8 First

Nations (LKDFN and YKDFN), KIA and NSMA were involved in the negotiations.

**Financial Security** – Money that is required for the reclamation of the mine.

**Hydrocarbons** – Elements made of only hydrogen and carbon. Hydrocarbons are found in oil products.

**Kimberlite** – A rare type of rock rich in iron and magnesium that sometimes contains diamonds. Created deep below the earth's surface, kimberlites are usually found in long pipe-shaped forms.

**Nitrate** – A nutrient formed from nitrogen. Nitrate can affect the growth of baby fish.

**Processed Kimberlite** – The crushed rock and water mixture that is left over after kimberlite ore has been processed by the mill to collect diamonds. Also called "tailings".

**Progressive Reclamation** – Reclamation that can be carried out during the construction and operation phases of a mine prior to final closure (e.g., rock waste dumps). See also "Reclamation".

**Reclamation** – The process of returning areas of land and water to healthy ecosystems after being disturbed by mining or other human activities.

**Tailings** – See "Processed Kimberlite".

**Total Suspended Particulates** – Portion of dust released into the air that remains in the air.

**Waste Rock** – Rock that must be removed to access kimberlite pipes, or rock that contains diamonds but that is not worth mining or processing.

**Wastewater** – Water that contains wastes from the mining process (e.g., sewage and chemicals from explosives).



# MESSAGE FROM THE CHAIR 2016



Jaida Ohokannoak at the Narrows.

I am pleased to present the 2015-16 annual report of the Independent Environmental Monitoring Agency. The report tells about the Agency's activities. It has recommendations for Dominion Diamonds Ekati Corporation (DDEC) and the regulators.

Major changes took place at the Agency last year. Bill Ross, our Chairperson, was replaced, and Director Tony Pearse retired. Both had been directors for a long time. They had served since the Agency started in 1997. Kevin O'Reilly, our Executive Director, also left the Agency. After over 10 years of service, he left to become an MLA for the NWT. I would like to thank all of them. They did very valuable work for us. They helped to ensure there is good environmental management at Ekati.

Welcome back to Kim Poole. He is the director named by the Tẖcẖq̱. Welcome also to Jesse Jasper as a new director.

I am pleased to introduce our new Executive Director Marc Casas. And thanks to Tee Lim for his hard work filling in as our Communications and Environmental Specialist.

Our major focus this past year has been the environmental assessment for the Jay Project. We took part in workshops. We reviewed the company's Developer's Assessment Report, highlighting issues and making recommendations. We suggested measures to the Mackenzie Valley Environmental Impact Review Board in our technical report. We also spoke at the public hearing in Yellowknife. We went to community meetings in Behchoḵ, Łutselk'e and Kugluktuk. In January, the Review Board issued its Report of Environmental Assessment to the GNWT Minister of Lands. It included many of our recommendations. We look forward to the Minister's decision on if the project can proceed.

The financial security to close the mine has now been posted. We were disappointed with both the GNWT's process and in the value of the security held. We believe a chance to ensure fairness and clarity was lost when our participation was cut off early by the GNWT.

An issue that still remains unresolved is the proposed change to the Environmental Agreement (Canada ceasing to be a party). We continue to talk to GNWT, DDEC and INAC on the issue. We hope that in the next year, the parties will resolve this.

DDEC is still effective at environmental protection at Ekati Mine. The Agency will continue to work to ensure these good environmental practices are maintained and enhanced.

Jaida Ohokannoak  
March 31, 2016



# Mining at Ekati

Dominion Diamond Ekati Corporation (DDEC) is mining diamonds using large open pits and underground tunnels to remove the kimberlite rock that contains the diamonds.



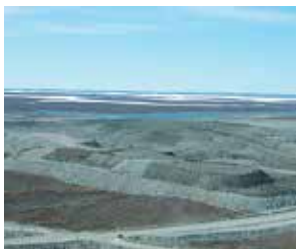
## 1 Long Lake Containment Facility

The Long Lake Containment Facility (tailings pond) holds the crushed wet kimberlite that remains after diamonds are removed. It is a lake divided into five sections (cells A to E) by dykes (rock walls) so the processed kimberlite can settle. Water is eventually released into lakes downstream when it is clean and pollutants are below the amounts set in the water licence.



## 2 Main Camp

This area includes an accommodation building for hundreds of workers, a power plant, a truck shop and a processing plant where the diamonds are removed from the kimberlite.



## 3 Waste Rock Piles

Rock that does not contain diamonds is piled in layers up to 50 metres high.



## 4 Incinerator

The building where garbage is taken to be burned.

SATELLITE IMAGE 2010/BHP BILLITON CANADA INC.







## 5 Beartooth Pit

DDEC has finished mining Beartooth Pit. The company currently stores water from underground mining in the pit. Beginning in 2012, DDEC has also used Beartooth Pit for processed kimberlite.



## 6 Panda and Koala Pits

Open pit mining has finished here. Underground mining is finished at Panda, but is still happening at Koala. DDEC has built an underground tunnel (located between Panda and Koala pits) to provide access to the bottoms of the pits. A conveyor belt system takes the kimberlite rock to the processing plant.



## 7 Panda Diversion Channel and Pigeon Stream Diversion

The Panda Diversion Channel and Pigeon Stream Diversion are man-made streams diverting water that would otherwise flow into the pits. Fish, mostly grayling, use the new channels for travel and spawning. The Pigeon Stream Diversion was opened in 2014.



## 8 Haul Roads

DDEC has built all-weather roads to connect the pits to Main Camp. DDEC carefully applies chemicals to reduce dust on the roads. They apply to try to make sure that chemicals do not seep into the lakes and streams near the roads.



## 9 Fox Pit

This is the biggest pit at Ekati and most diamonds are found in here. Mining was finished in early 2015.



## 10 Misery Pit

DDEC stopped mining at Misery Pit in 2005. The company has begun work to push back the walls and mine deeper in the pit.

# HOW WE DO OUR WORK



Behchok̓

## Highlights:

- Four Board Meetings, annual general meeting, Environmental Workshop, visit to Behchok̓.
- Took part in the Jay Project assessment.
- Site visits to Ekati Mine.
- New directors and staff change

## ACTIVITIES 2015-16

We hold four board meetings each year. One is held in a community. This year, we visited Behchok̓, but we had the board meeting part in Yellowknife.

We held our annual general meeting in December. We talked about and approved changes to the Society By-Laws. We also talked about:

- Our part in the settling of security under the Environmental Agreement.
  - Roads at the mine are barriers to wildlife, especially caribou.
  - Using Traditional Knowledge in monitoring.
- Directors and staff visited the mine two times. They were very interested in the:
- Composter and incinerator
  - Panda Diversion Channel
  - Pigeon Stream Diversion
  - Old Camp reclamation
  - Long Lake Containment Facility revegetation

We took a helicopter ride over the Narrows between Lac du Sauvage and Lac de Gras and the proposed Jay Project site.

This past year, we also had some changes of staff and Directors. For Agency staff, Jessica Simpson returned from Maternity Leave while Tee Lim filled in. Kevin O'Reilly, after 10 years as the Agency's Executive Director, was elected Member of the Legislative Assembly for Frame Lake South. In his place, we welcome Marc Casas as Executive Director. As for the Agency's Directors, Tony Pearse retired, and Bill Ross's term ended in December 2015. Kim Poole was named a director by the Tłıchq Government in August. Jesse Jasper was named by Dominion Diamond Ekati Corporation (DDEC), Government of Northwest Territories (GNWT) and Canada on April 1, 2016.

## Reviews and Input

Most of our efforts were aimed at the Jay Project environmental assessment. It was coordinated and reviewed by the Mackenzie Valley Environmental Impact Review Board. We were involved in all stages of the environmental assessment.



We are pleased that many of our recommendations were used in the Review Boards Report of Environmental Assessment (REA).

We took part in the review of the Aquatic Response Framework. In 2015, we went to the workshop and made comments on version 1.2. It was approved by the Wek'èezhii Land and Water Board (WLWB) in December 2015.

We were part of the review of the Potassium Response Plan. We called for a study on water treatment for potassium.

We gave comments on the DDEC Fish Offsetting Plan. This is about fish lost to the Lynx Project.

Most of our wildlife work was about the Jay Project environmental assessment. We were active in the Wildlife Road Mitigation Plan workshops. They looked at ways to reduce impact of roads on caribou and other wildlife. We also went to a workshop and a teleconference to discuss how to offset impacts to caribou.

We reviewed the 2015 Interim Closure and Reclamation Plan Progress Report. DDEC gave updates and proposed financial security updates. We argued that security should not be returned until all closure rules for reclamation of the mine have been met.

DDEC has improved their waste management. To honor this work, we gave a letter of support for DDEC's nomination for The Mining Society of Canada's – Toward Sustainable Mining-Environmental Excellence Award.

#### Communicate and Work Together

In December 2015, we held a one-day workshop on water quality. People from the Tłıchq Government, Yellowknives Dene First Nation, North Slave Métis Alliance, and the Kitikmeot Inuit Association, took part.

We had a good visit to Behchokò in March 2016. We started with a visit to the Chief Jimmy Bruno School in Edzo. The students were very interested in our work. We then met with the Community Action Research Team and the Tłıchq Government's Land and Environment Department. These meet-and-greets were a very good chance for us to learn more about how the diamond mines have changed communities and families. Close to 30 people came to the Open House in the evening. We heard worries about caribou, dust, and fixing the land when the mines close. We also heard that people feel they are not given all the facts. They would like to be told all of the good and bad about the mine and its operations.

We heard that it would be helpful to see a video about the mine and its operations. This comment fits with our communications project. Over the coming year, we plan to make a video about Ekati Mine. It will be translated into the Aboriginal languages.

Environmental Agreement Implementation Meetings are held twice a year between the three signers of the Environmental Agreement and the Agency. This year the meetings were held in February and June 2015. These meetings improve how we work together. They let each side give an update on its activities. We also report on finances and future plans. Signers can respond to recommendations made in our annual report.

In July, we made a site visit to meet with the Inter-Agency Coordinating Team. This team consists of the Agency and a group of government regulators. ■



The Agency's Environmental Workshop



# WASTE ROCK



Beartooth Pit

## HIGHLIGHTS:

- Permafrost is being established in the Panda/Koala/Beartooth waste rock storage area.
- Additional geotechnical studies commenced on the Fox waste rock storage area.

## SEEPAGE MONITORING

Seepage along the edges of the waste rock piles was sampled during spring, in the fall, and after summer rain. For the most part, leaking from the rock piles is seasonal, rare, and in small amounts.

During the monitoring and sampling program, six new leaks were found. A total of 56 existing and new leaks were sampled. The 2015 sample results follow the existing trend.

## WASTE ROCK STORAGE AREAS

The Waste Rock and Ore Storage Management Plan includes samples and testing of waste rock from active storage areas. The testing of the waste rock samples gave results like earlier tests. This is not a surprise, since there are no

new waste rock types being placed in the piles. Lynx waste rock was excluded from the plan as it is granite.

The Wek'èezhì Land and Water Board (WLWB) approved some changes to the waste rock piles in 2015. The Misery waste rock pile will increase the area of exposed rocks from 3.5 to 6 hectares. It will have a slightly larger footprint. The Course Kimberlite Reject Storage Area (CKRSA) expansion was approved for a 15% increase. It will cover 114 hectares.

## WASTE ROCK STORAGE AREAS RESEARCH

### WRSA Risk Framework

Due to concerns raised in 2012, Dominion Diamond Ekati Corporation (DDEC) proposed



a waste rock storage area seepage risk framework. It would weigh any effects on water quality during operations and after closure.

In support of the waste rock storage area risk framework, DDEC did some studies. One looked at the current conditions of the waste rock piles. It found there are no bad health risks now.

#### Thermal Modeling

Thermal modeling looks at how freezing works. A study was done for Misery and Panda/Koala/Beartooth Waste Rock Storage Area (WRSA) and the CKRSA to find the rate of permafrost growth. The Panda/Koala/Beartooth WRSA is freezing as expected, but other waste rock piles are not.

An early study of the Fox WRSA showed unique factors affecting its freezing. So, five more ground temperature cables were placed

in the Fox WRSA in 2015. Current results show the cover is thicker than the active layer and the edge remains frozen. However, buried and central areas in the rock pile are warmer than other areas. This needs more study.

Right now there are only three working ground temperature cables at the Misery WRSA. They are all at the edge of the pile. Therefore, there is little information about temperatures in the main part of the pile. The Misery WRSA needs a thermal profile, like the work done at Fox WRSA.

The CKRSA has not had any working ground temperature cables since the spring of 2014. Therefore, data is limited. The April 2, 2015, Tetra Tech Inc. report said that the CKRSA is likely unfrozen due to high water content and salt

in the pore water. It said that freezing should occur and there are no concerns now.

DDEC does not plan on placing more temperature cables in the CKRSA.

#### More Studies

Studies have shown that kimberlite can possibly neutralize acid from rock seepage. However, more study is needed.

### AGENCY ASSESSMENT

We commend the WLWB's continuing work in overseeing the environmental practices of DDEC at Ekati Mine. At the request of WLWB, DDEC undertook an ecological risk assessment of Waste Rock Storage Areas and the Coarse Kimberlite Rejects Storage Area. Analysis of the data will help make better choices to minimize the long-term effects Waste Rock Storage Areas will have on the environment.

The start of the thermal modeling program for the Fox rock pile is an important research study. The data from the extra five cables will aid future decisions about long-term environmental stability of the Fox rock pile.

We are concerned by the lack of ground temperature cables and amount of current data for both the Misery WRSA and the CKRSA. The Misery WRSA has limited thermal data and has no centrally located cables. The CKRSA does not appear to be frozen, and DDEC has stated that they will not be installing any new cables. We urge DDEC to start thermal studies like Fox WRSA's for the Misery WRSA and CKRSA. ■



# RECLAMATION AND CLOSURE



Looking at the revegetation in Cell B of Long Lake Containment Facility.

## HIGHLIGHTS:

- Delays in reclamation research are a serious concern.
- A time for submission of the next Interim Closure and Reclamation Plan has not been set.
- A chance for fairness and openness during review of the financial security was lost when our participation was cut off by the GNWT.

## CURRENT CLOSURE PLAN

Dominion Diamond Ekati Corporation (DDEC) must have an approved Interim Closure and Reclamation Plan (ICRP) during active mining. DDEC must also report on and update the plan. The current ICRP was approved in 2011. It expects active mining until at least 2020.

The goal of reclamation is to return the Ekati Mine site to a useful and self-sustaining place. It should be a healthy place and be suited to human activities.

The current plan is to flood the open pits and connecting underground mines. This would make pit lakes that are connected with the local watersheds. Ursula Lake, Upper Exeter Lake and Lac de Gras are named as possible water sources for flooding. This would take about 35 years. Berms will be built around the pits to keep wildlife away during the flooding.

The waste rock piles will stay in place after mining has stopped. They will be covered with granite or glacial till and allowed to grow plants again. The design has ledges and a flat top. This stops snow build-up. It will help plants grow and aid the permafrost.

The Long Lake Containment Facility has processed kimberlite tailings. They will be shaped and capped with rock and plants. It will be tied to the watershed by drainage channels and ponds. Water will be allowed to flow through.

The Panda Dam will still guide the water through the Panda Diversion Channel. It will have a spillway to allow extra water to flow to the pit lakes. The Pigeon Stream Diversion will also be in place to send water from the Upper Pigeon Stream to Fay Lake.

All buildings, tanks, power lines and other structures will be removed. They will be buried in a landfill or shipped off site. Roads, pads and the airstrip will stay. They will be made safe for human and wildlife use after the mine is closed.

## 2015 CHANGES TO THE CLOSURE PLAN

At its June 2015 meeting, the Wek'èezhì Land and Water Board (WLWB) made some big decisions about reclamation planning and activities at Ekati:

- Approve the Lynx development and Misery power line closure and reclamation plans.
- Approve changes to the Long Lake Containment Facility closure landscape plan.
- Direct DDEC to decide on monitoring and period of time needed to show the slope of the Pigeon waste rock pile cover design is stable.
- Support DDEC's use of crushed gravel

# 1 RECOMMENDATION

The Agency recommends that, following the Minister of Lands' decision on the Jay Project environmental assessment, DDEC develop a single, integrated Interim Closure and Reclamation Plan for Ekati Mine that incorporates all major developments that have commenced since ICRP Version 2.4 was approved in August 2011.



Agency Directors, Emery Paquin and Bill Ross with DDEC's Lukas Novy.

on sections of the Pigeon waste rock pile to improve wildlife access. Reject removal of wildlife access ramps from its reclamation plan. The suggestion to change the slopes of other waste rock piles to wildlife access ramps at Ekati was also rejected.

- Approve the change in closure goal for operation and demolition waste landfills. Require DDEC to place a two-metre deep cap on both landfills.
- Review the required financial security estimate.

A time to submit the next ICRP was not named.

## RECLAMATION ACTIVITIES IN 2015

DDEC continues to do progressive reclamation. This means reclamation activities begin as early as possible during operations. They start with areas no longer needed for mining.

### Old Camp

Reclamation of Old Camp goes on. Work for 2016 includes:

- Remove contaminated soil.
- Shape the Old Camp pad.
- Fix up the North Pond of the Phase 1 processed kimberlite area.
- Do minor re-grading to stop erosion and promote drainage.
- Monitor water quality during spring thaw and again in late summer or fall.

### Koala Underground

Reclamation on three levels of the Koala North underground workings was done in 2015. DDEC said that all hazardous materials, debris, and reusable materials were removed. Barricades control access.

### Saving Topsoil

Topsoil material was saved from the Lynx Pit and the crusher pad. The dirt was added to the stockpile. It will be used for future reclamation activities.

## RESEARCH AND PLANNING

Most reclamation is still in the planning stage. More research is needed. Fifteen tasks scheduled for 2015 were delayed. As we have said before, this delay in research worries us.

### Closure and Reclamation Research on Schedule

How much time will it take to fill Fox Pit with water? Results say 15 to 62 years. This could have a major cost impact.

Research into permafrost and water from leaks in the waste rock piles goes on. Three reports have been written.

Planting tests go on in Cell B of the Long Lake Containment Facility. Samples of plants and processed kimberlite 'soil' were collected and tested. A report on the results will be done in 2016.

Plants were studied at many places around the Ekati Mine. In general, ground cover by seeded grasses has been increasing. Some plants like fireweed and willow were also seen.

### Closure and Reclamation Research Delays

As we said before, we are worried that some studies are late, even by many years.

- Name pits requiring barriers and safe shoreline access for pit lakes.
- Find and fix unstable parts of pit walls.
- Develop a pit lake and connector channel design plan.
- Report results of water quality during and after pit flooding.
- Develop a groundwater study.
- Testing on high-water-content processed





Agency Directors walking to Cell B of the Long Lake Containment Facility.

kimberlite. DDEC says this study may not be needed.

- Testing of weathered processed kimberlite and early plant studies have been delayed until 2016 and 2017.
- No work has been started on closure goals for the long-term stability of the mine infrastructure.

FINANCIAL SECURITY

Water Licence

New financial security estimates are given to the WLWB each year in the ICRP. In June 2015, the WLWB approved a security increase of \$2.29 million. The WLWB also told the DDEC to provide more information to help solve outstanding issues. The WLWB asked for work details for all reclamation research plans.

In July, DDEC updated some costs and made a new estimate for reclamation of the Lynx Project. This resulted in a further increase of \$1.09 million to the overall financial security. Financial security currently held by the GNWT for the Ekati Mine is \$259 million.

In their 2015 Closure and Reclamation Progress Report, DDEC proposed some security updates. If approved, these updates would result in a decrease of \$8.86 million to the estimate. Some of the major proposed changes include:

- Return security for stabilizing the Panda Diversion Channel.
- Less effort to recover granite for capping.
- Lower annual post-closure Aquatic Effects Monitoring Program costs.

- More exposed rocks in the Misery waste rock storage area.
- Expand the coarse rejects storage area.

The WLWB has not yet considered DDEC’s proposed changes to the reclamation security. We will report on the outcome in our next Annual Report.

Environmental Agreement

In addition to the financial security required under the water licence, DDEC must keep security with the GNWT Minister of Lands under the Environmental Agreement. This security would be used if DDEC fails to keep its promises under the Environmental Agreement.

A review of the financial security under the Environmental Agreement was finished. We hoped that a good level of security would be set. Sadly, we were told by the GNWT in March 2015 that we would no longer be part of the review. The review went on without our input. In August 2015, we were told that an updated financial security of \$19.99 million had been set. This is a big decrease of \$22.68 million from the old security amount.

AGENCY’S ASSESSMENT

We are pleased that DDEC is working to fix the Old Camp. We hope to see more work done in 2016.

The WLWB’s review of the 2014 ICRP Annual Report was careful as in previous years. We take special note of the decision to amend Water Licence Schedule 2 to reflect the increase in financial security. While DDEC’s overall closure and reclamation has been good, the legacy of other mining projects in the North show that environmental debts should never be bigger than the posted security.

Another good directive from the WLWB

was for DDEC to include work details for all reclamation research plans. We see the delays in research as a very serious problem. DDEC must try harder to do the scheduled planning and research tasks on time.

Under the NWT Mine Closure Guidelines, a new version of an ICRP should be written every three to five years. Since the current ICRP was approved in 2011, more projects have started and changes have been made. We believe these changes show that the ICRP needs to be updated. We also think that the Jay Project, if approved, will impact closure planning.

At DDEC’s request, the amount of financial security held under the Environmental Agreement was reviewed. We took part in good faith and were very disappointed when, in March 2015, the GNWT said we would no longer be involved. In our opinion, this was a lost chance to ensure clarity and fairness. We urge parties to the Agreement to allow the full participation of the Agency and our Aboriginal Society Members during any future reviews done under the Environmental Agreement. ■



Agency Directors visiting Pigeon Stream Diversion.

## HIGHLIGHTS:

- Potassium standard increased from 41 mg/L to a new level of 64 mg/L. Even this new limit is being reached in Leslie Lake.
- Sable Aquatic Effects Monitoring Program Design Plan follows the existing Aquatic Effects Monitoring Program methods for water and sediment quality.
- More water sampling sites in the north arm of Lac de Gras are being tested by DDEC.

Each year Dominion Diamond Ekati Corporation (DDEC) carries out a number of programs and studies to find out if changes in the water downstream of its mine are caused by the mining.

In December 2015, the Wek'èezhìi Land and Water Board (WLWB) approved the Aquatic Response Framework. Its goal is to ensure that water test results are checked as part of an early warning system. That way, changes can be made before impacts become too large or can't be fixed.

There are three watersheds that may be affected by the current mining work. Lakes and streams in these three systems are checked each year under the Aquatic Effects Monitoring Program (AEMP). Any changes in water and fish can be found. A fourth watershed, Sable-Horseshoe, will soon begin yearly tests of lakes downstream of the new Sable development.

This was another dry year. Total rain and snow in the Ekati area was much less than the average.

## 2015-16 ACTIVITIES

Processed kimberlite, treated sewage, and minewater was sent into the Long Lake Containment Facility. Underground minewater and processed kimberlite were pumped to the Beartooth Pit. Just over 1 million cubic metres of treated water was released from the Long Lake Containment Facility in September 2015. It entered Koala watershed through Leslie Lake. It was diluted as it flowed downstream before reaching Lac de Gras. The Long Lake Containment Facility is the main source of water pollution from Ekati Mine.

A second source of dirty water is the discharge from the Misery site. Water from King Pond Settling Facility was pumped to Cujo Lake in July 2015.

Lynx Lake was drained during summer 2015 to get ready for mining. Clean water was pumped to Lac de Gras. Cloudy lower-depth water was sent to the King Pond Settling Facility.

The Panda Diversion Channel project was completed in 2014. DDEC sees the channel as a working stream. However, we believe full restoration is not yet complete. A few rocks are to be designed and possibly installed in summer 2016. The long-term stability of the channel is not yet assured.

## AEMP RESULTS

Each year DDEC reports the results of its AEMP to the WLWB. This is the 18th year of monitoring for the Koala-Lac de Gras system. It is the 15th year for the King-Cujo system.

Aquatic Response Framework is an early warning system. It sets out levels (low, medium and high) for the total amount of each chemical



and oxygen in the water. Each level calls for a set of actions. The 2015 AEMP is the first time that yearly test results have been compared to the Aquatic Response Framework. Low action levels were exceeded for dissolved oxygen, chloride, potassium, and phosphate.

SUMMARY OF  
WATER QUALITY RESULTS

**Dissolved Oxygen:** Under-ice levels in Cujo Lake continue to be poor. DDEC has responded by measuring oxygen more often and removing snow on the lake ice to allow more light to reach into the water. A study to be reported in September 2016 will find the cause of the problem. It will be used to find new solutions. An update to the Aquatic Response Plan for under-ice dissolved oxygen will be sent to the WLWB by the end of 2016.

**Chloride and Total Dissolved Solids (TDS):** Levels are lower than the amount for the last 2 years. They are still high downstream of the Long Lake Containment Facility. The decline is likely due to most of the dirty water being sent to Beartooth Pit.

**Potassium:** Average winter levels are still above the old Site Specific Water Quality Objective (SSWQO) of 41 mg/L in Leslie Lake. Levels are lower in Moose Lake. Some samples in Leslie Lake are near the new, higher SSWQO.

**Total Ammonia:** Levels are high in all lakes downstream of the Long Lake Containment Facility, but the amount is still safe for fish and plants. DDEC says the high ammonia is from blasting. They do not explain why amounts spiked in 2015.

**Iron:** Levels of iron under ice in Cujo Lake and Fay Bay rose above government guidelines for safe water life. Too much iron can hurt the insides and gills of fish.

**Zinc:** Levels in Lac du Sauvage rose above Canadian Environmental Quality Guidelines at one place, but almost undetectable at the other. The reason for this large difference is not clear.

Biota Results

Slimy Sculpin (a minnow that lives on lake bottoms) are sampled every three years. The results show several bad signs in lakes downstream from the Long Lake Containment Facility; Some of the bad signs include:

- The reproductive organs are slightly smaller in sculpin from lakes closest to the tailings pond (the Long Lake Containment Facility);
- 4 metals, like mercury, are slightly higher in sculpin from lakes at the mine than sculpin from lakes not affected by the mine;
- There are a lot more tapeworms in sculpin in Cujo Lake, which is downstream of the Misery Pit.

OTHER STUDIES AND PLANS

Lac de Gras Water Quality Monitoring Stations

A water sampling program was run in the north arm of Lac de Gras downstream of Koala watershed in 2013. This sampling was done again in 2015. Are water quality changes reaching past S2 and S3 AEMP stations? The results are given in the AEMP report, but were not studied. In June 2016 DDEC will say if the extra sampling stations will be kept.

Grizzly Lake

Some AEMP reports say that shifts in the Grizzly Lake water bugs might be caused by warmer lake water. However, results from 2015 suggest that the changes seen in 2013 and 2014 were more likely due to nature, not caused by mining.

Pigeon Stream Diversion Monitoring Program

The 2015 Panda Stream Diversion Monitoring Program report compares current numbers

4 RECOMMENDATION

The Agency recommends that DDEC expand water quality monitoring further into the north arm of Lac de Gras by incorporating sampling sites S4, S5 and S6 as permanent AEMP stations.

to older data. Physical items and biology are being watched. The Pigeon Stream Diversion contains spawning, nursery, and feeding habitat that is used by four types of fish. It also provides a migration path for Arctic Grayling.

Potassium Response Plan

There are no government guidelines for potassium. An Ekati limit of 41 mg/L was chosen. However, amounts in 2 lakes quickly reached this limit. A response plan was sent to the WLWB in March 2015. In January, the WLWB ruled that a new limit of 64 mg/L is okay. A new Aquatic Response Plan for potassium must be sent by June 30, 2016.

Sable AEMP Design Plan

The AEMP design for the Sable Pit area follows the same pattern as the AEMP for the whole Ekati Mine site. DDEC wants to monitor four lakes downstream of the Sable Pit, with an extra sample site in the last receiving lake, Exeter. The Sable design would look for changes in the Horseshoe watershed. However, the southwest corner of the Sable Waste Rock Pile extends into Osprey watershed, which is not part of the monitoring plan.

AGENCY ASSESSMENT

We suggests that DDEC update the water quality model for all items, not just for potassium. Other chemicals could also be

showing higher levels earlier than forecast. We would also like to see DDEC study other kinds of tiny lake bugs around Ekati Mine.

The Sable waste rock pile sticks out into the Osprey watershed. We would like DDEC to explain why Osprey watershed is not part of the AEMP Design Plan for Sable. We are also unsure why the largest lake (HWL4) between Sable and Exeter is not part of Sable AEMP monitoring.

Cujo Lake has had low oxygen in 8 of the last 15 years. DDEC says the fish have likely adapted to lower oxygen and would have no ill effects. However, we believe the lower oxygen may be a possible cause to the tapeworm rates in sculpin.

We believe that the sampling sites in the north arm of Lac de Gras should be kept. Is effluent from Ekati Mine reaching the end of the north arm before entering Lac de Gras? Along with data from Diavik Diamond Mine, these extra sample stations may help to tell which mine added more pollution to Lac de Gras.

Traditional Knowledge in the Sable AEMP is minimal. For example, fish monitoring in the Sable-Horseshoe watershed will aim at small species, not lake trout and whitefish. This results in less Traditional Knowledge being used for the Sable AEMP. In general, DDEC should make efforts to use traditional knowledge in all monitoring of water as well as fish. ■



Agency Directors learning about the In-vessel Brome composter.

## HIGHLIGHTS:

- Composter was put in the Long Lake Incinerator Building.
- The Conceptual Air Quality and Emissions Monitoring and Management Plan has limits in it. These trigger management responses and actions.

### ACTIVITIES 2015-16

The Ekati Air Quality Monitoring Program (AQMP) includes daily weather reports, dust, snow, and lichen samples, as well as air quality. Results are given every three years. The last AQMP was for the 2012-2014 reporting period.

#### Air Emissions

Every year Dominion Diamond Ekati Corporation (DDEC) calculates air pollution from diesel fuel use. Results are reported to two federal government programs. In 2015, greenhouse gas emissions went up by 3.8%.

In October 2015 a composter was placed at the Long Lake Incinerator Building. It handles part of the organic waste from Ekati. Since the composter started, Ekati is only using one

incinerator unit for about 12 hours a day. This lowers use of diesel (by about 30,000 litres per year).

#### Air Quality

The way of sampling air has improved since the last reporting period (2011). Using Partisol samplers to measure dust levels seems to have improved the number of valid samples collected. However, in some cases almost half of the results were not useable.

It is not clear how such data loss compares to other air quality programs in the NWT or elsewhere. We understand from GNWT-Environment and Natural Resources that the typical data loss for their Partisol samplers is about 5%. Why is so much data lost from Ekati? What will DDEC do to fix the problem?



Dust Monitoring Program

Dust monitoring results show that the amount measured at the airport and Long Lake Containment Facility were higher in 2013 and 2014 than in 2012. Most dust results were below the British Columbia limit of 2.9 mg/dm<sup>2</sup>/d. Some results went over the limit. Since dust is increasing, we recommend that DDEC find more ways to reduce dust from the Long Lake Containment Facility.

We also suggest more dust monitor stations be placed farther from the Long Lake Containment Facility, on the east side and at the airport, so they could better measure what is happening.

Keeping Dust Down

We and others have concerns about the effects of extra dust on plants and caribou. The AQMP has a brief summary of what DDEC applied to the roads and airstrip but it did not outline any research to be done on keeping dust down. This is despite DDEC's promise to do so. In our opinion, data from the study would be very useful. In the summer of 2015, DDEC began trying a new dust suppressant EnviroKleen. It seems to do well. DDEC will expand this study in 2016.

At the July 2015 air quality workshop, there was talk on the lack of clear triggers and actions for dust levels. Right now, actions are based on personal opinions by DDEC. For example, DDEC said that visible dust was a health and safety issue for its drivers yet there appears to be no clear measurement of dust that would trigger actions other than complaints from drivers. Levels of dust where an action would be triggered should be developed as part of the Air Quality and Emissions Monitoring and Management Plan (AQEMMP) for Ekati Mine.

Lichen Samples

In 2015 we asked if taking lichen samples within 300 m of the 2011 sampling sites gives a good data comparison over time. DDEC replied that they do not sample at the same place each time so as not to deplete lichen. They say that sampling within 300 m won't change the results.

Snow Chemistry Sampling

DDEC had promised to study and report on the reason for different chemicals in far field snow samples. However, this subject could not be found in the 2014 AQMP report. We expect to see it in the next AQMP report.

Agency Activities

In 2015 we reviewed the 2014 Ekati AQMP report and gave comments. As part of the Jay Project assessment, DDEC agreed to update the AQEMMP. In June they submitted an AQEMMP for the Jay Project to the Mackenzie Valley Environmental Impact Review Board. The AQEMMP had an adaptive management framework with triggers and action levels. DDEC also agreed to talk with interested groups to further develop the AQEMMP. At our suggestion, DDEC held a Jay Project management plan workshop on June 26, 2015. Another meeting was held July 20 to discuss the 2014 AQMP report results and adaptive management ideas.

AGENCY ASSESSMENT

We see that DDEC has done very well in air quality monitoring and management at Ekati. Consultation is also better. DDEC has promised to do equipment checks and regular recalibration. They have also agreed to update the AQEMMP to include more monitoring sites around the Jay Project (if it is approved). It would also have an adaptive management framework with triggers and action levels. We support the adaptive management idea.



White smoke from the Long Lake Incinerator Building.

SPILLS OF HAZARDOUS MATERIALS

Spills of hazardous materials that exceed quantities set out in the Spill Regulations must be reported to the NWT 24-Hour Spill Report Line. Over the past 10 years, 259 spills have been reported at Ekati including 52 spills, or 20%, occurring in 2015. The most common types of materials spilled are diesel fuel, hydraulic oil, transmission fluid, antifreeze, sewage, fine kimberlite tailings and coarse kimberlite rejects.

However we feel it should be expanded. It needs triggers and responses for dust, snow and lichen. We suggest that more monitoring sites to include the Misery pushback, Lynx Pit, Sable Road and Pit and the Jay Project in the program. And finally, we urge DDEC to continue to build a new AQEMMP, working together with interested groups.

We have a long-standing interest in air quality and dust control at Ekati Mine. We have pressed DDEC for years to do research on dust control products and ways to apply it. We are pleased that DDEC began tests in 2015 on a new dust product EnviroKleen. It looks good and they will be expanding this study during 2016.

We continue to suggest that a Traffic Management Plan to reduce dust is needed. It should include vehicle spacing, cameras to record the amount of dust, and numeric limits when dust control must be used. We look forward to a dust best practices report that gives clear guides and rules for using dust control.

Lastly, we are concerned that there are no enforceable air quality standards in the Northwest Territories. There is no regulatory system to manage air quality. We recommend that the GNWT develop enforceable rules for air quality as soon as possible. ■



Agency Director Bill Ross learning about the wildlife cameras.

## HIGHLIGHTS

- 306 caribou seen – the lowest ever recorded.
- Additional efforts being directed at waste management to reduce attraction at landfills and reduce wildlife incidents.
- 62 infrared motion sensor cameras. Most on Misery and (proposed) Sable roads. Results to be added to the 2015 WEMP in June 2016

## ACTIVITIES 2015-16

Dominion Diamond Ekati Corporations (DDEC) Wildlife Effects Monitoring Program (WEMP) tells how mining impacts wildlife and judges the wildlife management work at Ekati. The 2015 WEMP is the 18th annual report. It focuses on wildlife habitat and animals of greatest interest. Those include caribou, grizzly bear, wolves, wolverine, foxes, raptors and breeding birds. How do they keep track? There are incident reports about when animals are seen, ground and air surveys, behaviour surveys, and photographs from wildlife cameras. Surveys of the power line were done along Misery Road.

### Ekati Mine Footprint

In 2015, 106 hectares more habitat was disturbed at Ekati. This was due to mine development and operations. The total

amount of direct habitat loss caused by the project since 1997 is now 3,400 hectares. That includes 87 km of road.

### Waste management

DDEC continues trying to improve waste management.

- Reduce attractions at landfills.
- Reduce wildlife incidents.
- Keep wildlife away from dangers, like the airstrip

Getting employees to follow waste disposal rules is still hard. In 2015 DDEC hired two waste management Team Leaders and a consultant working only on managing and reducing waste.

This year, like 2014, there was a lot of misdirected waste. Also more animals were seen at the dump. DDEC blames this on an increase in contractors and new employees. In response, DDEC did surveys more often, focused more on finding and removing garbage, and continued talks about problem areas.

### Wildlife Incidents and Deaths

A wildlife incident is direct contact between animal and person or building. There were 13 wildlife incidents reported at Ekati. The animals were 4 grizzly bears, 1 wolf 4 times, a fox, 3 wolverines, and a swan. This has not changed much since 2011. The bears were chased off. The wolf at the Main Camp died, probably from distemper.

Vehicles killed 9 small animals during 2015. There were three other non-vehicle animal deaths, including the wolf, a raven and a duck. No caribou died from mine activities in recent years (see Figure 1).

### Misery Power Line Monitoring

In 2015 surveys of the power line were done 291 times during 138 days. Caribou were seen 11 times, grizzly bears 12, wolves 27 and birds



# WASTE MANAGEMENT

The Agency is encouraged that DDEC continues to make waste management a priority. The commissioning of the new in-vessel Brome composter and establishment of three new positions in waste management during 2015 reflect this priority. Other notable milestones include:

- 406 tonnes of hazardous waste, electronics, and recyclables was shipped off site;
- 23 tonnes of wet and dry biodegradable waste was composted rather than being incinerated;
- Incinerator operation was reduced to one unit each day for approximately 12 hours, saving an estimated 30,000 liters of diesel fuel; and
- Approval of DDEC's Waste Management Plan Version 2.0 by the WLWB. As a result of these efforts, the Agency provided a letter in support of DDEC's submission for the Towards Sustainable Mining Environment Excellence Awards for its work on the Waste Management Program.

53 times. There were no bad incidents and road access did not have to be limited. The WEMP did not say if caribou crossed under the power line. Deterrents were used twice when foxes came near people. Monitoring will continue.

### Caribou Monitoring

Caribou monitoring for 2015 included:

- Study of how many and where.
- How often caribou were seen.
- How caribou behaved.
- Long Lake Containment Facility monitoring.
- Wildlife cameras.

Sample sizes for most monitoring were low. This was due to low numbers of Bathurst caribou. Recently they have spent summer and fall farther north of the mine.

Sightings of caribou have been fewer since

2009. In 2015, 306 ground sightings of caribou were made. This is the lowest number since they started counting in 2006. Nearly one-third of sightings were in late winter. Half were seen during spring migration (May). Fewer caribou have been seen during post-calving and summer in recent years. No groups greater than 2 caribou were seen.

How do caribou behave close to the mine? Eight studies were done in 2015 on seven bulls and one young caribou. This sample size was small. Caribou spent about 80% of their time either feeding, bedded, walking or standing. These are like results of studies done in 2010-2013 at Ekati. Caribou in 2015 showed little response to 28 potential stress events at distances up to 500 m.

The Long Lake Containment Facility program

counts wildlife in the Long Lake Containment Facility to see what they are doing. No caribou were seen near the Long Lake Containment Facility in 2015. A total of 674 caribou have been seen in the Long Lake Containment Facility area between 1999 and 2015. To date, no caribou injuries or deaths have been directly caused by the Long Lake Containment Facility.

The Wildlife Camera Monitoring Study started in 2011. It uses motion-triggered cameras to watch for caribou along Misery Road and other access roads. Sixty-two cameras were used in 2015 around Ekati. DDEC was unable to finish the report in time for the 2015 WEMP. An extra report is due in June 2016. It will have 2014 and 2015 results.

### Grizzly Bear Monitoring

For 2015 grizzly bears were monitored at Ekati through sightings and wildlife cameras. The DNA mark-recapture study done jointly by DDEC and Diavik Diamond Mine ended in

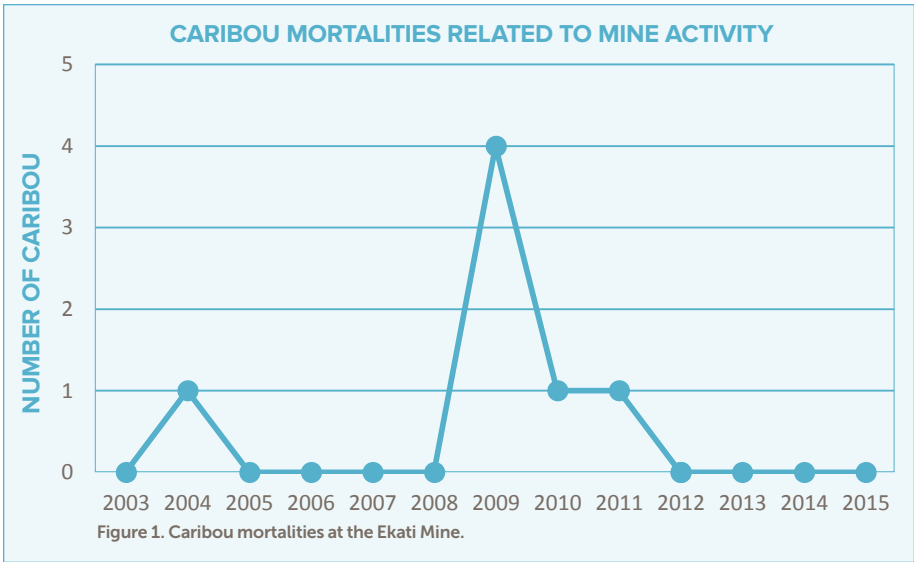
2013. Results were printed in 2014. DDEC talked with Environmental and Natural Resources about a plan to repeat the grizzly bear DNA study in 2017.

In 2015 there were 60 grizzly bear sightings of 75 animals. This is the highest since 2005. Four times they had to be chased off. Fifty-one times there were site-wide notices in response to grizzly bears. Work was stopped to allow grizzly bears to forage or move through an area.

### Other Wildlife

There was no study of known wolf dens in the Ekati area in 2015, although an active wolf den near Misery Road was assumed to have pups. In 2015, 69 sightings of 95 wolves were recorded. The number of sightings of wolves has been higher since 2012.

A DNA-based wolverine count was done in 2005 and 2006 at Ekati, along with studies at Daring Lake, Diavik Diamond Mine, and



Kennady Lake. These studies were repeated in 2010–2011 and in 2014–2015. The Ekati area was checked in April 2015. 180 lure stations were used and nearly 500 hair samples collected and sent in for DNA analysis. The results are not yet available. The number of wolverine sightings in 2015 (26) is about the same as those since 2006. There is still high wolverine activity in the region.

Arctic and red foxes at Ekati Mine are still a worry. Foxes are attracted to human activity and there is a risk of rabies. In 2015 there were 182 sightings of 194 foxes. There was one unconfirmed case of rabies in 2015.

There were 11 sightings of 23 moose in 2015. Moose have been seen more often in recent years.

Raptors nested in several of the pits in 2015. Nesting was actively and successfully stopped at the Misery and Pigeon pits to avoid conflict with mining. Regional falcon surveys were conducted during 2015 with Environmental and Natural Resources and Diavik Diamond Mine. Nest sites were surveyed in mid-June and late July. Sites where falcons were present (35%) was the lowest recorded since 1995. Only two of 10 occupied sites produced chicks. There was no discussion of the cause of this poor nesting success. No gyrfalcon nests were found. This continues the decline since 1995.

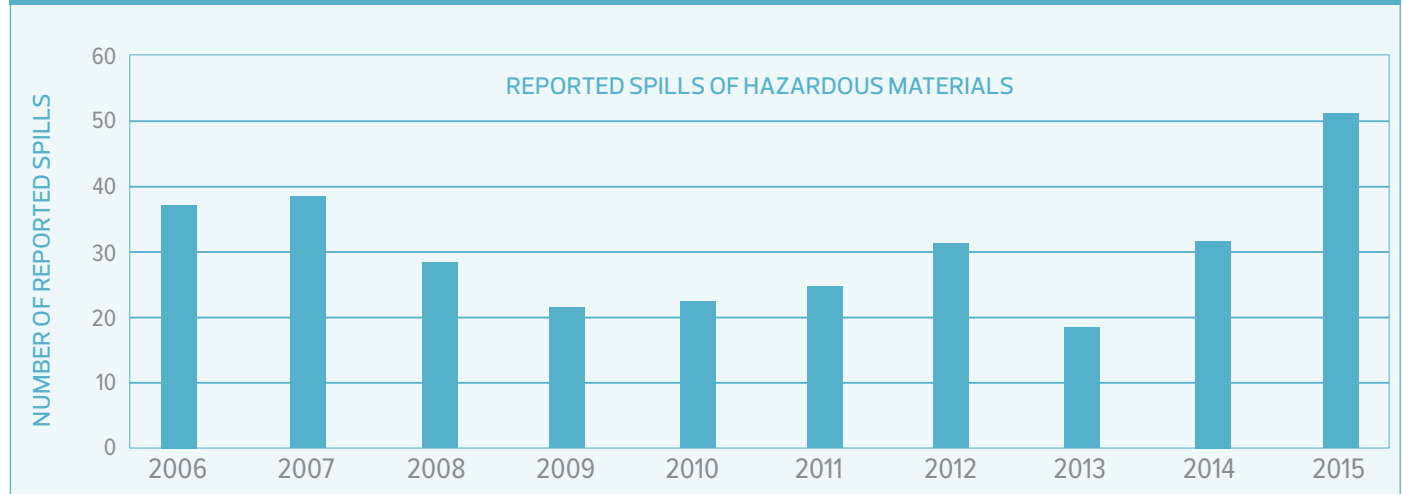
The North American Breeding Bird Survey was done for the 13th year. Types of birds seen (35) and the number of birds seen (505) in 2015 is about the same as in other years.

### AGENCY ASSESSMENT

Results of the 2015 WEMP programs were well presented. It was good to see that DDEC has made waste management a priority.

That caribou seen was the lowest recorded reminds us of the decline of the Bathurst caribou herd. It has dropped to record low

## REPORTED SPILLS OF HAZARDOUS MATERIALS



numbers with no sign of recovery. The very low numbers make it harder to monitor caribou.

We have been concerned about roads acting as barriers to wildlife movement. The 2015 Wildlife Camera Monitoring Program used 62 cameras along Misery Road and the access road to Sable Lake. Other cameras were placed by the Lynx access road and the one to the Jay Project. Unfortunately, the photo report wasn't done in time for inclusion in the 2015 WEMP. DDEC has promised to add this to the WEMP by June 2016. We know the Jay Project review took much effort in 2015, but it is regrettable that the results of this important program could not be included in the 2015 WEMP. We hope that many of the plans made during the Jay Project assessment will be made part of the WEMP. ■



A fox and her kit at Ekati Diamond Mine.



# JAY EXPANSION PROJECT



The Narrows between Lac du Sauvage and Lac de Gras.

## HIGHLIGHTS

- The Review Board found that major impacts from the Jay Project are likely. They set out 22 ways to fix the impacts.
- Many of our recommendations were included in the Review Board's Report of Environmental Assessment.
- If approved, the Jay Project will extend the life of Ekati Mine by more 10 years.
- Effects on caribou and water quality were top concerns of communities.
- More workshops about caribou and roads were held.

The Jay Project will mine and process diamonds from the Jay Pipe. A horseshoe-shaped dike will be built in Lac du Sauvage. Dominion Diamond Ekati Corporation (DDEC) would drain the water in the diked area to expose the kimberlite. They will build a road from the pit to the Misery site. Trucks will transport ore along the road and then on the Misery haul road to Ekati's main site for processing.

Most of the needed milling and power base already exists at the Ekati main site and Misery. A new waste rock storage pile will be built near Lac du Sauvage shoreline. Open-pit minewater and surface runoff water will be pumped to the Misery Pit.

If approved, the Jay Project will extend the life of Ekati Mine by more than ten years.

DDEC submitted the Jay Project Developer's Assessment Report in October 2014. The Mackenzie Valley Environmental Impact Review Board (Review Board) began a review and asked for more information from DDEC.

DDEC held very useful meetings on the Developer's Assessment Report in December 2014. After the meetings, there were more than 500 requests for information sent in to the Review Board. We made 52 of those requests.

In April 2015, we took part in meetings to hear DDEC's answers to our questions. We helped pinpoint the main questions for the environmental assessment. These meetings were about caribou, water, fish, air quality, and social problems.

The Review Board held a public hearing on the Jay Project in September 2015. Twelve formal intervenors, including the Agency, took part in the hearing in Yellowknife and in community meetings.

The Review Board decided that the Jay Project is likely to have major impacts on the environment. They said that there is lots of public concern about these impacts. The Review Board also said that the impacts can be eased.

We focused on four major areas during the environmental assessment review process:

- Caribou
- Water quality and water life
- Air quality
- Waste rock.

### Effects on Caribou

Caribou are a vital part of Aboriginal culture, language, and way of life. DDEC argued that impacts from the Jay Project on Bathurst caribou would be small. DDEC said that caribou-friendly roads, better traffic rules, and better dust codes will reduce impacts on caribou.

We argued that, given the state of the Bathurst herd, any impact at all would be major. We said that the actions proposed by DDEC did not go far enough. Caribou would still turn away from the mine. A dust management best practices paper is still lacking. So is a clear promise to reduce other dust at Ekati. Better truck traffic management would help too.

DDEC held two workshops in 2015 to improve the mine's Conceptual Wildlife Effects Monitoring Plan and Caribou Road Mitigation Plan. They also had a workshop and a teleconference on the Caribou Compensatory Mitigation Plan. DDEC promised to write a Caribou Road Mitigation Plan within one year of the Review Board's Report of Environmental Assessment. This plan will have more ways to help the caribou, details on money support for caribou research, and ideas for better dust control and faster reclamation. DDEC promised to apply these to the Jay Project and to existing Ekati Mine operations.

#### Water Quality and Aquatic Life

The waters and life of Lac du Sauvage are important to Aboriginal culture and to the ecology. This is more true of the "Narrows", a shallow channel connecting Lac du Sauvage and Lac de Gras. During the public hearing, DDEC told how it would manage surface and mine water from the Jay Project by storing it in the Misery Pit. DDEC argued that by making layers of water, the bottom level would have the most pollution. That deeper water should never rise high enough to be sent to Lac du Sauvage.

We and others argued that keeping good water in Lac du Sauvage and Lac de Gras is very important. There must be water good enough for traditional use after the mine is closed. We worry about relying only on water layers to ensure high quality of water. We suggested that other plans are needed in case the layers

of water don't work out. The Review Board agreed. They told DDEC to study other water management plans.

DDEC also promised to keep Lac du Sauvage as a lake with clear water and few aquatic plants.

We argued that high amounts of natural metals could be poison for tiny plants and bugs in Lac du Sauvage. For several years we have been tracking changes in plant groups downstream of the Long Lake Containment Facility. In part due to this work, we recommended that any changes in plant or water bug groups downstream of the Misery Pit be studied every year. Are there changes in plants and bugs? How could fish in Lac du Sauvage be impacted?

#### Air Quality

The Jay Project will be a major new source of road dust. We argued that any dust may cause caribou to avoid using the area. Dust may also impact fish habitat in Lac du Sauvage. We argued that clear response actions are needed when there is too much road dust, even for a short time.

We also said air quality should be controlled and studied on a regional level. The GNWT must develop enforceable air quality rules as soon as possible.

Garbage from the Jay Project will be burned using Ekati's incinerators. Evidence says that incinerators at Ekati have not always been operated correctly. They have been the source of dioxin and furan releases into the air. DDEC has promised to test the incinerators every three years. We argued that inline continuous emissions monitoring is needed to rate incinerators as they work. The use of continuous emissions monitoring is not a clear recommendation of the Review Board. We note, however, the Review Board recommended that, following any failed stack

test, DDEC develop a response that may include continuous emissions monitoring.

#### Waste Rock

Rocks and dirt left from building dikes and waste rock from the Jay Pit will be stored next to the shores of Lac du Sauvage. In the Developers Assessment Report, DDEC said that about a third of this rock could generate acid. Because of the location of this waste, we asked if DDEC would be able to find and manage any leaks from the pile. DDEC promised to monitor the Jay waste rock pile and to watch pile temperatures. The Review Board decided leaks from the rocks are not likely to hurt water quality in Lac du Sauvage.

#### AGENCY ASSESSMENT

During the whole environmental assessment, we gave suggestions to the Review Board of ways to help Bathurst caribou. We are pleased to note that almost all our ideas were included in Review Board's report.

The Review Board agreed with us that the Jay Project is likely to hurt the Bathurst caribou herd. The actions named by the Review Board ensure that ways will be found and used to reduce the risk of serious harm to the caribou and the land.

The Review Board was critical of the GNWT for lack of progress on a Bathurst caribou management plan, lack of dust limits for caribou habitat, and delays in developing good air quality rules.

We are pleased that the Review Board agreed that DDEC should investigate water management options beyond the separation of layers. However, we note that our ideas on water plants, bugs, and fish have been sent to the Wek'èezhì Land and Water Board (WLWB) regulatory process.

We are still concerned about DDEC's ability to monitor and manage the Jay waste rock pile. Experience has shown that metal leaching is occurring in other leaks from rocks. We look forward to working with the WLWB to ensure the Waste Rock and Ore Storage Management Plan has a strong monitoring system. It must also have clear triggers and actions. In this way, rock acids can be kept from entering Lac du Sauvage.

We are pleased with DDEC's promise to hold more talks on the Air Quality and Emissions Monitoring and Management Plan before building the Jay Project. We expect that DDEC would also think about more dust, snow and lichen monitoring places by Lac du Sauvage and along the Jay esker.

The Review Board saw the value of inline continuous emissions monitoring as a tool to monitor the incinerator. In its report, it suggested that DDEC, GNWT and Environment Canada weigh the use of continuous emissions monitoring and report their findings. We are pleased with this suggestion and look forward to the results of the study.

Reports of results are needed to judge how well adaptive management works. We are pleased that the Review Board will require DDEC and regulators to report yearly on what has been done toward items in its final report. ■



# LYNX AND SABLE PROJECTS

## HIGHLIGHTS

- Communities took part in Ceremony of Respect to start the fish-out of Lynx Lake.
- Start of Sable Project announced.

## LYNX PROJECT

The Lynx Pipe is a small deposit under Lynx Lake, near the Misery camp. It will give about 4-5 months of ore to the Ekati processing plant.

The fish-out of Lynx Lake was begun in June after a Ceremony of Respect to honour the land, water and culture. It was led by people of the Yellowknives Dene First Nation. Community Elders took part. After the fish-out, the fish were given to the Impact Benefit Agreement communities. Clean water was then pumped from Lynx Lake to Lac de Gras. The muddier deep water was pumped to the King Pond Settlement Facility. Pre-stripping began to show the kimberlite, ready for mining.

Under their Land Use Permit, Dominion Diamond Ekati Corporation (DDEC) had to send caribou road crossing designs to the Wek'èezhì Land and Water Board (WLWB) for the Lynx access road. The Caribou Crossing Plan was approved provided that DDEC use finer crush to cap the crossings. Or DDEC could show how using 6-inch minus granite crush addresses the concerns of Aboriginal groups.

## SABLE PROJECT

The Sable Project was approved in 2003 after an environmental assessment. The project



Lynx lake

start was announced by DDEC in September 2015. The kimberlite pipe is under Sable Lake, north of the Ekati Main Camp. The project will require a new access road, onsite camp and fuel storage tanks. It also needs a settling pond. This would allow Sable Lake to be emptied before the pre-stripping. Sable has a land use permit, water licence and a *Fisheries Act* permit. It is expected to supply ore to the processing plant for about 10 years.

DDEC sent in a proposed plan in December 2015 to monitor and report on any effects to the water environment near the Sable Pit and

downstream of the Two Rock Sedimentation Pond. The WLWB rejected the proposed plan. They told DDEC to do a new Sable Aquatic Effects Monitoring Plan as a section in the 2016-18 site-wide Aquatic Effects Monitoring Plan Design Plan.

A draft design of the Sable Road was also sent in. It is allowed under the existing Land Use Permit. The planned route has not changed much from the first design of 2001. Minor changes were made to reduce sharp curves and elevation above the tundra. An Elders group will help with the road design using Traditional Knowledge. The design will include caribou crossing places. ■



Labrador Tea flower at Ekati Mine

## HIGHLIGHTS

- Cumulative Impacts Monitoring Program led study on the cumulative effects of the Ekati Mine and Diavik Diamond Mine on Lac de Gras.

## ACTIVITIES 2015-16

Regional monitoring can be a useful tool for seeing how the effects of 2 mines add up. How can they be managed?

The GNWT Department of Environment and Natural Resources hosted a Slave Geological Province Regional Wildlife Monitoring Workshop in March 2015. We took part as did people from all the diamond mines.

### Wildlife

GNWT has made some progress on regional monitoring and cumulative effects assessment. A task group studied monitoring of caribou avoiding land around diamond mines. Agency Director Kim Poole took part in the study. The group released a draft background document in March 2015. It gives useful data for how

to judge cumulative effects and management. Sadly, there was little more progress on this work in 2015-16. Most efforts were aimed at the Jay Project. We hope that work on this important topic will go on during 2016-17.

In February 2016, Environment and Natural Resources called a meeting of diamond mining companies, the Agency, and caribou experts. They wanted to find a standard way to monitor how animals behave at the mines. Talk centred on clear goals and methods being used now. Reports, rules, and data from existing programs are being put together. A first review is planned for 2016-17.

The Bathurst Caribou Range Plan project led by Environment and Natural Resources continued during 2015-16. The working group will recommend how to manage Bathurst caribou habitat at a regional scale. Traditional Knowledge has been part of the project. Three years of funding from Polar Knowledge Canada supports this work.

### Water Quality and Aquatic Effects

The GNWT Cumulative Impact Monitoring Program (CIMP) finished an early study of the existing Aquatic Effects Monitoring Plan at the Ekati and Diavik mines. Are the plans able to detect cumulative impacts on Lac

de Gras? The report is expected to be done before the aquatic effects monitoring program re-evaluations for the Ekati Mine and Diavik Diamond Mine. Both of them are due by June 30, 2016. We look forward to this report. It should allow for the design of a more effective aquatic effects monitoring program at both mines.

In March 2015, the GNWT released the final report of 'Status and Trends of Water Chemistry and Flow in the Coppermine and Lockhart River Basins.' The study looked at water data collected by both GNWT and Environment Canada between 2000 and 2015. It was used to find trends in water quality and flow and to find gaps in monitoring. In general, the data showed some items had important changes. However, the size of these changes was not included in the report.

### Coppermine Watershed Results

Major increases over time have been found for many metals at the Lac de Gras outlet. This also happened at Desteffany Lake and less so at Point Lake. These trends are not seen further downstream at Daring Lake or Rocknest Lake. The trends seen at the Lac de Gras outlet are the same as those for the whole lake. ■





Vegetation at Ekati Mine - Labrador  
Tea, cranberries and birch.

## HIGHLIGHTS

- DDEC engaged community members and Elders on a variety of subjects including fish salvage, caribou, roads, waste rock piles and reclamation.
- The Aquatic Effects Monitoring Program is deficient in use of Traditional Knowledge.

## ACTIVITIES 2015-16

Dominion Diamond Ekati Corporation (DDEC) has Traditional Knowledge (TK) projects that are based in the communities and at Ekati Mine.

### Community TK Projects

*Lutsel K'e Dene First Nations (LKDFN) Projects*

**TK Digital Archives:** We are happy to learn that LKDFN has received money from DDEC to continue their work to record TK. They collect, store, and share community knowledge. This includes place names, trails, and stories from Elders. LKDFN hired two local people to do this work.

**Caribou Monitoring – Traditional Livelihoods Project:** The Bathurst Caribou herd hunting ban means that Aboriginal groups must now travel

## 2 RECOMMENDATION

The Agency recommends that DDEC increase the use of Traditional Knowledge into aquatic monitoring and report on its usage in these activities.

farther to hunt other herds, such as the Beverly herd. Because LKDFN hunts the Beverly herd, DDEC is funding the LKDFN to monitor the health of the caribou. They ensure that hunters are not wasting meat, for example.

*Lands that are Wide and Open, Yellowknife Dene First Nation (YKDFN) Traditional Knowledge Report:* This report focused on the Jay Project. The YKDFN did a review of the recommendations in the 1997 'A Traditional Knowledge Study of Ekati' to find out if they are still valid. Are YKDFN current beliefs still the same for the Jay Project? Are past TK studies for Ekati Mine useful for the Jay Project? Are there gaps in the data?

*Web-Based Atlas for the Naonaiyaotit Traditional Knowledge Project (NTKP):* This project makes user-friendly computer maps of Inuit land use and TK for the Kitikmeot region. The maps have information from the NTKP. They will be used in schools in the Kitikmeot and in cultural programs.

*Inconnu Recovery Program:* This fish study program had YKDFN members help with a recovery project for inconnu (coney) fish in the Yellowknife River Inconnu Recovery Program.

### Ekati-Based Programs

*Site Visits:* This past year the YKDFN chiefs were invited to an update on the Jay Project. They saw the Misery operations and Lac du Sauvage winter

drilling. The YKDFN Lands and Environment Committee, Deninu Kue First Nation, Fort Resolution Métis Council and the LKDFN were also invited for a site tour of the Jay Project.

*Monitoring Programs and Studies:* Over the past several years, DDEC has provided chances for Aboriginal community members to become familiar with the Ekati Diamond Mine environmental monitoring programs and studies and provide any TK they may have.

The Misery Pit Raptor Surveillance Team watched hawks and falcons trying to make nests close to the Misery Pit expansion project. Wildlife monitors also watched as the power poles went up along Misery Road. Community Wildlife Assistants were hired from Kugluktuk and the Tẖchq̱ to help with the Ekati Diamond Mine Caribou Track Survey. An Archaeological Assistant from the YKDFN helped with the Jay Project Archaeological Field Surveys. Members of the YKDFN also helped with a fish shoal survey for the Jay Project in Lac du Sauvage.

For one week in August, five youth from each of the Aboriginal communities took part in reclamation projects. They collected goose grass seeds at the Long Lake Containment Facility, removed weeds from around Ekati Main Camp and they took old waste from the Old Camp Reclamation Project. The students also did wildlife monitoring and water samples. The young people got first-hand experience working safely at the mine.

### Community Caribou Engagement Program:

In August 2015, DDEC held its annual Community Caribou Engagement Program with 22 Aboriginal youth and Elders from the KIA and Hamlet of Kugluktuk, LKDFN, North Slave Métis Alliance, Tłı̨cho Government, and the YKDFN. This year, the focus of the program was on how caribou interact with roads at the mine site. Have the existing methods to make roads more caribou-friendly worked? What new ways are there to reduce the risk to caribou and other wildlife from traffic on the Misery, Sable and Lynx roads and the proposed Jay Project road? The community members saw the new Ekati Caribou Roads Mitigation Plan. They saw the current and future caribou crossing locations, and the proposed Jay Project esker road crossing. They were also flown by helicopter along the Sable Road route.

### Use of TK in Operations:

**Tłı̨cho What'aa Eskers TK Project:** Tłı̨cho Elders were brought to Ekati Mine to see the land and natural eskers around the mine. They were asked for advice on designs for waste rock piles to make them as caribou-friendly as possible. Elders and others studied a historic, culturally-important esker. They studied its design, structure, and rock placement, to find how to use these ideas on the Jay waste rock pile. The Elders said that caribou are attracted to eskers because they are higher than the tundra.

### Lynx Lake Ceremony of Respect and Fish

**Out:** Upon request from YKDFN, DDEC hosted a Ceremony of Respect to honor the land and water at Ekati. The ceremony took place on the shores of Lynx Lake before the fish-out and involved Elders and community members from the YKDFN and several YKDFN members that work at Ekati Mine.

DDEC worked with the Department of Fisheries and Oceans and Aboriginal community members from Gamètì, Kugluktuk, Łutsel'k'e, Dettah, and Yellowknife to find the best way to collect the fish

in Lynx Lake. The species, weight, length, and age of the fish were recorded. Fifty pounds of fish from Lynx Lake were flash-frozen and sent to communities.

### AGENCY ASSESSMENT

We are pleased that the Report of Environmental Assessment for the Jay Project included TK to aid decision-making at the Jay Project and Ekati Mine.

Reclamation Research Plan RP 7.1 studied how to use TK in closure and reclamation planning. We are pleased that DDEC worked with Elders and with youth on projects. DDEC needs to write down how the TK programs worked. We urge DDEC to go further to get TK input in reclamation research.

We believe more TK needs to be used in the Aquatic Effects Monitoring Program. It seems that the only TK use occurs every 5 or 6 years with studies on the health of large-bodied fish. More TK could be used in water and fish work. The Developer's Assessment Report (DAR) for the Jay Project, for example, states:

*YKDFN Elders have observed a lowering of the water levels in the Ekati Mine area and have demonstrated how this changes the location of the campsites in relation to the existing shorelines. It is possible, too, that the lowering water levels have also affected the direction of surface water flow from the area.*

The Developer's Assessment Report also says how water quality is judged using health of shoreline plants. We believe that TK has a role to play in not only fish health, but water monitoring too. We encourage its use. ■

## 3 RECOMMENDATION

The Agency recommends DDEC document the implementation, successes, and lessons learned from Traditional Knowledge studies and how it is incorporated into environmental management at Ekati Mine.



Jay Esker System



# HOW ARE THE REGULATORS DOING?



Agency Directors exploring the Long Lake Containment Facility.

## HIGHLIGHTS

- The Review Board submitted its Report of Environmental Assessment on the Jay Project to the Minister of Lands.
- The Review Board included a requirement for DDEC to do a yearly report on the success of measures.
- Since devolution, INAC has a smaller role in regulatory steps including the Environmental Agreement.

## THE REGULATORS AND OUR MANDATE

The Agency is the public watchdog for environmental management at Ekati. We watch how well Ekati does and the groups that regulate the mine. Here are our comments on the regulators in 2015-16.

## AGENCY'S OVERALL ASSESSMENT

As before, the regulators are still good at making sure that DDEC operates Ekati Mine in an environmentally safe way. Most of the year was aimed at the Jay Project assessment. During 2015-16, we felt some times that regulators did well and other times they could have done better.

### Indigenous and Northern Affairs Canada (INAC)

After moving its land and water management

jobs to the GNWT, INAC has a much smaller role in environmental regulation. They did, however, take part in the annual general meeting and the last Environmental Agreement meeting for the federal government. We urge the Government of Canada to go on taking part in things related to the Environmental Agreement.

### Department of Fisheries and Oceans (DFO)

We are pleased with DFO taking part in the Jay Project environmental assessment. While DFO reviews most regulatory papers sent in, we have seen a narrowed interest. We now look forward to DFO's role in the Jay Project water licence process. This will deal with impact on fish and habitat in Lac du Sauvage and Lac de Gras.

DFO held a national workshop in Yellowknife to tell people about changes to the *Fisheries Act*.

## GOVERNMENT OF THE NORTHWEST TERRITORIES (GNWT)

**Inspectors:** We are pleased that a regular inspection routine has been kept. In 2015-16, 13 inspections were done. The GNWT inspector for Ekati is thorough and effective.

**Environment and Natural Resources (ENR):** ENR did detailed reviews of documents and gave well researched comments. Their knowledge and work on the Jay Project assessment are also noted. However, there has been little progress on a plan for the Bathurst caribou herd. There has been slow progress on a range plan and cumulative effects framework. Both are important and long overdue. ENR's work on wildlife related to development is hopeful. They are leading the development of a Regional Standardized Wildlife Monitoring Protocol.

A review of the financial security held under the Environmental Agreement was finished in 2015. We are not happy with both the GNWT's process and the outcome of the review. We believe a chance to ensure fairness and clarity was lost when our part was ended early by the GNWT.

ENR's overall handling of the Environmental Agreement has been poor. The Environmental Agreement still needs updates. This concern has been raised at many meetings and at our annual general meeting. We hope that progress can be made in the coming year.

## ENVIRONMENT AND CLIMATE CHANGE CANADA (ECCC)

ECCC's part in the regulatory process for Ekati Mine improved in 2015. They gave input into the Potassium Response Plan and the Aquatic Effects Monitoring Program Annual Report, as well as other papers.

Their role in the Jay Project gave valuable technical input on air quality, water quality and animals at risk. We now look forward to ECCC's part in the Jay Project water licence work.

We also still seek details on the development of rules for effluent from mines.

## WEK'EEZHII LAND AND WATER BOARD (WLWB)

We are pleased with the WLWB's management of DDEC's permits and licences in general. Part 1 of the Waste Rock Storage Area Seepage Risk Framework was sent in and accepted by the WLWB. We wait for Part 2: Closure Ecological Risk Assessment in June 2016.

We expect a complete licence process for the Jay Project.

The Tłı̨chǫ Government successfully challenged Canada's intent to get rid of regional co-management boards. Canada appealed the injunction. Now, the appeal has been put on hold. In the meantime, the WLWB still does the job well.

## REVIEW BOARD

The Review Board did a thorough and efficient environmental assessment of the Jay Project. The report had a broad range of issues that included 22 measures. We are pleased to see that many include Traditional Knowledge to aid decision making at Ekati. The requirement for an annual report on implementation is welcome. It should ensure DDEC and regulators are held to account for all measures of the environmental assessment. ■

On March 24, 2016, the Review Board met with parties to the EA to review their findings and took questions on their report. This workshop was helpful and well received by the reviewers including the Aboriginal groups. ■



IACT meeting at Ekati Mine.



# HOW IS DDEC DOING?



Main Camp at Ekati Mine.

## HIGHLIGHTS

- DDEC completed first test of a new dust suppressant.
- Work with communities was good. Some Traditional Knowledge on the environment was gathered, but its use is still unclear.
- DDEC was helpful during the Jay Project environmental assessment.

Dominion Diamond Ekati Corporation (DDEC) continues to run Ekati in an environmentally safe way. We generally have a good working relationship with the staff at DDEC.

DDEC was responsive to concerns raised during the Jay Project environmental assessment. They answered all Information Requests and gave replies without delay. We believe the Jay Project environmental assessment will result in better monitoring and fixing of potential impacts on the ecosystem around Ekati. We look forward to working with DDEC.

It was too bad that during much of the Jay Project environmental assessment, DDEC said that impacts to the Bathurst caribou herd from Jay would be very small and hard to measure. DDEC did not take into account that, given the current state of the Bathurst Caribou herd any impact is significant. This led to much wasted effort by reviewers. That effort could have been better used finding ways to reduce impacts.

In fall 2015, DDEC started a compost program to reduce waste. The program has been very good. Waste is less, and incinerators use less fuel. DDEC is also checking on using the compost as part of closure. We commend DDEC for this work. To recognize their efforts, we wrote a letter of support for DDEC for an environment award.

We have been critical of DDEC's lack of action on dust control. We are pleased that DDEC began tests in 2015 on a new dust suppressant. We look forward to a dust management best practices paper. It should give clear guides and steps for using the product.

Despite improvements, we are still disappointed in DDEC's handling of Traditional Knowledge activities. It is not always clear how the Traditional Knowledge gathered by DDEC is being used in monitoring or mitigation programs. We urge DDEC to improve and clarify the links between Traditional Knowledge gathering and use at Ekati Mine. ■

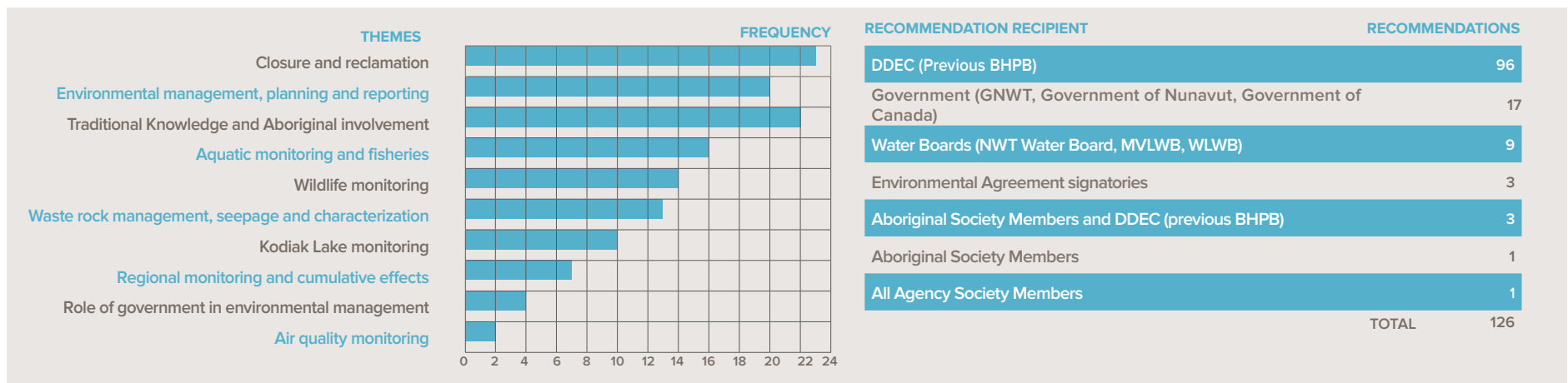
# AGENCY RECOMMENDATIONS 2015–16

## 1 RECOMMENDATION

The Agency recommends that, following the Minister of Lands' decision on the Jay Project environmental assessment, DDEC develop a single, integrated Interim Closure and Reclamation Plan for Ekati Mine that incorporates all major developments that have commenced since ICRP Version 2.4 was approved in August 2011.

**DDEC Response:** DDEC has committed to providing an updated closure and reclamation plan for the Ekati Diamond Mine following the approval of the Water Licence and Land Use Permit Applications for the Jay Project. The updated closure and reclamation plan will include the Jay Project and all developments that have been initiated since the last version of the ICRP.

FIGURE 1: AGENCY RECOMMENDATION THEMES 1997–2016





## 2 RECOMMENDATION

The Agency recommends that DDEC increase the use of Traditional Knowledge into aquatic monitoring and report on its usage in these activities.

**DDEC Response:** DDEC strives to incorporate Traditional Knowledge (TK) into all aspects of environmental monitoring. Historically, the AEMP has primarily benefited from TK through the involvement of community members in large bodied fish sampling

and fish-out programs (e.g., Lynx Lake), especially with respect to assessments of fish health. These efforts will continue in 2016, when community members will be invited to participate in the Sable Lake fish salvage. During the fish salvage, community members will work with DDEC personnel to inform our understanding of fish populations and fish health in Sable and Two Rock lakes.

## 3 RECOMMENDATION

The Agency recommends DDEC document the implementation, successes, and lessons learned from Traditional Knowledge studies and how it is incorporated into environmental management at Ekati Mine.

**DDEC Response:** DDEC has recently submitted an Engagement Plan version 3.0 the WLWB for approval, which outlines how Traditional Knowledge is incorporated into environmental monitoring and management at the Ekati Diamond Mine.

## 4 RECOMMENDATION

The Agency recommends that DDEC expand water quality monitoring further into the north arm of Lac de Gras by incorporating sampling sites S4, S5 and S6 as permanent AEMP stations.

**DDEC Response:** A recommendation to incorporate water quality sampling as far as site S6 in Lac de Gras into the annual Aquatic Effects Monitoring Program (AEMP) has been included in the 2015 AEMP Re-evaluation, which will be submitted to the WLWB on June 30th, 2016.

# INDEPENDENT ENVIRONMENTAL MONITORING AGENCY



A PUBLIC WATCHDOG FOR ENVIRONMENTAL MANAGEMENT AT EKATI DIAMOND MINE™

## 2015-16

### Annual Report

Plain Language



#### DIRECTORS

##### JAIDA OHOKANNOAK

Chairperson  
P.O. Box 2366  
Cambridge Bay NU X0B 0C0  
Phone: (867) 447-2153  
E-mail: Jaida@qiniq.com

##### EMERY PAQUIN

Vice Chairperson  
225 Grace Lake Boulevard  
Yellowknife NT X1A 0C5  
Phone: (867) 873-4314  
E-mail: emerypaquin@outlook.com

##### KIM POOLE

Secretary-Treasurer  
1918 Shannon Point  
Nelson BC V1L 6K1  
Phone: (250) 825-4063  
Fax: (250) 825-4073  
E-mail: kpoole@aurorawildlife.com

##### TIM BYERS

P.O. Box 1049  
Teulon MB R0C 3B0  
Phone/Fax: (204) 886-4642  
E-mail: byerses@escape.ca

##### ARNOLD ENGE

5124 Forrest Drive North  
Yellowknife NT X1A 2N4  
Phone: (867) 873-4812  
E-mail: arnoldenge@gmail.ca

##### DOUG DOAN

5140 Forrest Drive  
Yellowknife NT X1A 2W6  
Phone: (867) 920-4341  
E-mail: dougmdoan@gmail.com

##### JESSE JASPER

2 Vaydik Court  
Yellowknife NT X1A 3H7  
Phone: (867) 873-2469  
E-mail: jjasper@theedge.ca

#### HOW TO REACH US

##### IN PERSON

Suite 203  
5006 Franklin Avenue  
Yellowknife NT

##### BY MAIL

P.O. Box 1192  
Yellowknife NT  
X1A 2N8

##### BY TELEPHONE

(867) 669-9141

##### BY FAX

(867) 669-9145

##### BY E-MAIL

monitor1@yk.com

##### OR VISIT OUR WEBSITE:

[www.monitoringagency.net](http://www.monitoringagency.net)

##### OFFICE HOURS

Monday to Friday  
9:00 a.m.—12:00 p.m.  
1:00 p.m.—5:00 p.m.

#### OFFICE STAFF

##### MARC CASAS

Executive Director

##### JESSICA SIMPSON

Communications and  
Environmental Specialist

