



**Dominion  
Diamond Mines**



2019

# EKATI DIAMOND MINE

ENVIRONMENTAL AGREEMENT AND WATER LICENCE

ANNUAL REPORT SUMMARY 2019



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July 2, 2020

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**Re: Ekati Diamond Mine – Environmental Agreement and Water Licence Annual Report 2019  
Summary**

Dominion Diamond Mines ULC (Dominion) is pleased to submit the *Environmental Agreement and Water Licence Annual Report Summary 2019*. This report was prepared in accordance with the annual reporting requirements of Part B Condition 10 and Schedule 1 Condition 1 of Water Licence W2012L2-0001 and Article 5 of the Environmental Agreement.

Please contact Claudine Lee, Head of Environment at [claudine.lee@ddcorp.ca](mailto:claudine.lee@ddcorp.ca) or (403) 910-1933 ext. 2401 should you have any questions.

Sincerely,

A handwritten signature in black ink that reads 'Claudine Lee'.

**Claudine Lee, M.Sc., P.Geol.**  
Head of Health, Safety, Environment, Communities (HSEC) and Training

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## INTRODUCTION

This report is the plain English summary of the 2019 Environmental Agreement and Water Licence Annual Report for the Ekati Diamond Mine. An Annual Report has been published since 1997. It provides an overview of how the environment at the Ekati Diamond Mine has been managed according to the terms of the Water Licence and the Environmental Agreement.

The summary report is intended for readers who are unfamiliar with technical language. The summary does not present the same level of detail as the Annual Report.

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## THE EKATI DIAMOND MINE STORY

In the early 1980s two geologists, Charles Fipke and Stewart Blusson, began searching for diamonds in the Canadian Arctic. In 1989 they found kimberlite, a rock that often contains diamonds, in an area near Lac de Gras. Their exciting discovery led to a rush of exploration and staking in the area; two years later, they found diamonds.

After environmental studies and permitting were carried out and construction was completed, the Ekati Diamond Mine – Canada's first diamond mine – officially opened on October 14, 1998. This event put Canada on the map as a world-class diamond producer.

Dominion Diamond Mines ULC (Dominion) is the current operator of the Ekati Diamond Mine.



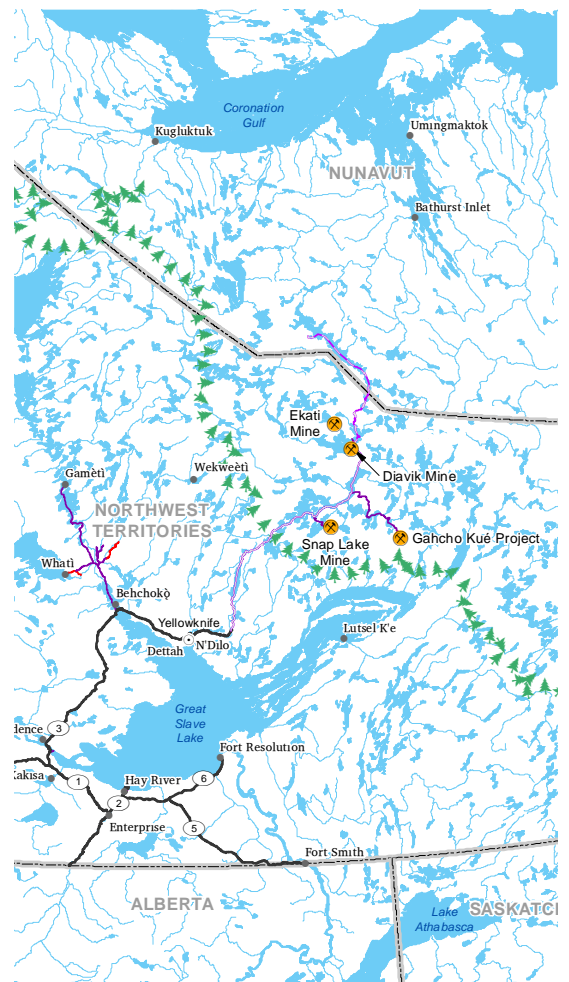


*“E’kati” is the name the Yellowknives Dene and Tłı̄cho peoples gave to the area around Lac de Gras. In English, it means “fat lake,” and is in reference to the layers of white quartz veins in the rock on the lake’s shore that look like marbled caribou fat.*

## THE EKATI DIAMOND MINE LOCATION

The Ekati Diamond Mine is located in the sub-Arctic tundra in Canada’s Northwest Territories. The mine is 100 km above the tree line, 310 km northeast of Yellowknife, and 200 km south of the Arctic Ocean. The surrounding landscape is filled with boulder fields, heath tundra, wetlands, eskers, and over 8,000 lakes with interconnecting streams.

Most of the year, the mine is only accessible by aircraft. It can be reached by ice road for about 2 months of the year. Figure 1 shows the mine’s location.



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# THE EKATI DIAMOND MINE COMPONENTS

The Ekati Diamond Mine is made up of a series of open pits, some of which have underground mines.

The mine site spreads over several **watersheds**, with the Koala Watershed being the largest. Panda, Koala, Koala North, Fox, and Beartooth pits, the Koala and Koala North underground mines, and most of the Ekati Diamond Mine infrastructure are located within the Koala Watershed.

## Within the Koala Watershed, the main mine site includes:

- The process plant, where the diamonds are removed from the kimberlite;
- The Long Lake Containment Facility, which holds fine processed kimberlite from the process plant (the fine processed kimberlite is a slurry of fine particles and water);
- Three waste rock storage areas: Fox, Pigeon, and Panda/Koala/Beartooth;
- An employee camp (the Main Camp);
- An airstrip; and
- Haul truck roads.

The King-Cujo Watershed, about 30 km southeast of the main site, contains Misery Pit, Lynx Pit, Misery and Lynx Waste Rock Storage Areas, King Pond Settling Facility, a crusher pad, Jay Access Road, and a small employee camp. The area is linked to the Main Camp by the Misery Road.

The Carrie Pond Watershed includes a portion of Misery Pit and the Misery Waste Rock Storage Area, and Desperation Sump.

The Pigeon-Fay and Upper Exeter Watershed contains Pigeon Pit and the Pigeon Stream Diversion.

The Horseshoe Watershed contains Sable Pit, Sable West and South Waste Rock Storage Areas, and the Two Rock Sedimentation Pond.

*A watershed is an area defined by a ridge of high land. All rain and snow that falls within the area eventually ends up in the same body of water. Rain may land directly in a stream or lake, or it may fall on land where it will drain or seep into a marsh, stream, river, or lake.*

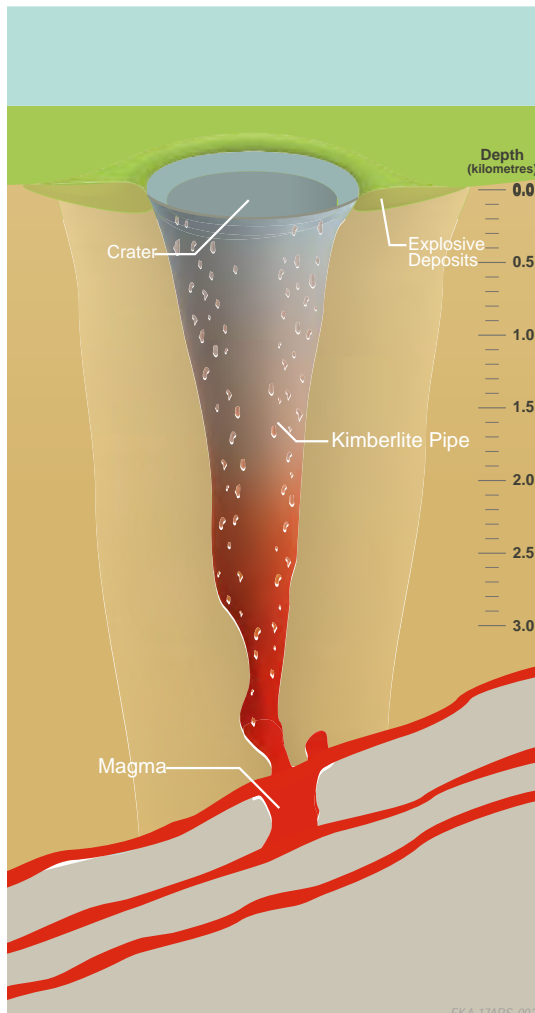


**The Ekati Diamond Mine plan involves bringing pits and underground mines into production over time:**

- Panda, Koala, Koala North, Beartooth, Fox, Lynx, and Misery open pits have all been developed, placed into production, and are now closed.
- Panda, Koala, and Koala North underground mines have all been developed, placed into production, and are now closed.
- Beartooth, Panda, and Koala Pits have all become **containment facilities** for fine processed kimberlite.
- Open pit mining production has been ongoing at Sable and Pigeon Pits and underground mining is ongoing at Misery Underground.

*There are 156 known kimberlite pipes in the Ekati Diamond Mine claim block, with diamond resources currently estimated for 8 pipes. Figure 2 shows the structure of a kimberlite pipe.*

**Figure 2**  
Structure of a kimberlite pipe.



At the Ekati Diamond Mine, miners use two methods to remove the diamond-rich kimberlite ore from the ground: open pit mining and underground mining. In open pit mines, workers remove waste rock and earth to get to the kimberlite pipe using digging equipment and explosives. In underground mines, spiral-shaped tunnels are built to allow mining equipment to drill, blast, dig, and haul the ore from deeper parts of the kimberlite pipes.

The ore is moved to the process plant by haul trucks or dual powered road trains (DPRT). At the process plant, crushing machines reduce the size of the ore. Mechanical scrubbers are then used to remove sand, grit, and other waste material (called fine processed kimberlite). The diamonds are then separated from the remaining ore and sorted using X-ray technology. The rough diamonds are shipped for additional sorting, where they will be polished for jewelry or used in industrial devices for cutting, grinding, and polishing.



**Pigeon Waste Rock Storage Area**



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# SUSTAINABLE DEVELOPMENT AT THE EKATI DIAMOND MINE

Dominion understands the importance of the Arctic tundra environment. The Company is committed to maintaining a safe and healthy environment for people, plants, and animals. This means mining the diamonds found at the Ekati Diamond Mine site in the safest, most environmentally responsible way by meeting the terms of the Environmental Agreement, Water Licence, and other authorizations. Dominion's Sustainable Development Policy is provided on the following page.

Dominion participates in Towards Sustainable Mining (TSM), a Mining Association of Canada program that helps Canadian mines improve sustainability performance. Every year, the Company looks at how well they are performing in Indigenous and Community Relationships, Biodiversity Conservation Management, Crisis Management and Communications Planning, Energy and Greenhouse Gas Emissions Management, Preventing Child and Forced Labour, Safety and Health, and Tailings Management. Dominion provides data that shows it is honoring commitments and continues to review its mining practices to continuously improve the mine's sustainable development performance. Dominion will be reviewing 2019 performance in the second half of 2020.



In early 2019 the Mining Association of Canada presented the TSM Leadership Award to Dominion for demonstrating leadership in environmental management in the Canadian mining industry. Dominion was also selected as a finalist for both the 2019 Environmental Excellence Award (for its Long Lake Containment Facility Pilot Study) and the 2019 Community Engagement Award (for its Corporate Social Responsibility Project in India).

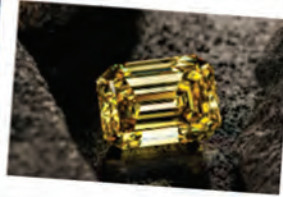
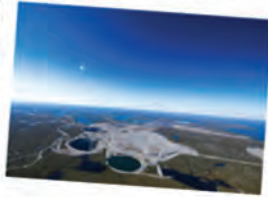
Further information on TSM can be found on [www.mining.ca](http://www.mining.ca).





## Sustainable Development Policy

Dominion Diamond Mines ULC is committed to promoting a sustainable and successful future through a safe and healthy workplace, protecting the environment, developing local communities and delivering a high quality product. By following the principles of accountability, teamwork, respect and stakeholder involvement, we strive to set industry standards for sustainable development. That means meeting stakeholders' needs now and in the future.



### Core Values

Our core values show how we will achieve sustainable development by demonstrating the courage to care; being bold, entrepreneurial, and trusted; and modelling positive behaviours.

#### Zero Harm

**Our goal:** To build a legacy of commitment, trust and respect.

**Our approach:** To actively protect our people, the environment and the local communities.

**Our approach:** To communicate openly and honestly, support local programs, and make real contributions in the communities.

#### Safety

**Our goal:** To work with our people to reduce and eliminate workplace injuries.

**Our approach:** To provide a safe and injury free workplace through committed leadership and working together.

#### Compliance

**Our goal:** To become an industry leader in compliance.

**Our approach:** To comply with all community commitments, standards, regulations and laws by promoting sharing and collaboration with our partners and stakeholders.

#### Health

**Our goal:** To enhance the health and well-being of our people.

**Our approach:** To engage our people to promote personal health and wellness and eliminate occupational illnesses.

#### Creating Value

**Our goal:** To create profit and opportunities for the benefit of our stakeholders.

**Our approach:** To set and achieve business objectives through continuous improvement.

#### Environmental Protection

**Our goal:** To protect the environment.

**Our approach:** To promote a culture of environmental stewardship and respect for the natural environment within our workforce and the communities.

#### Continual Improvement

**Our goal:** To identify and implement opportunities and best practices for continuous improvement to the health, safety and environment culture.

**Our approach:** To set objectives and targets for continuous improvement in areas that include occupational health and safety, prevention of pollution, waste generation, processed kimberlite disposal management, progressive reclamation, biodiversity conservation, energy use and greenhouse gas emissions, and water use.

#### Risk Management

**Our goal:** To identify and effectively manage risk.

**Our approach:** To follow a strong process of assessment, critical control development and monitoring.

#### Community Engagement

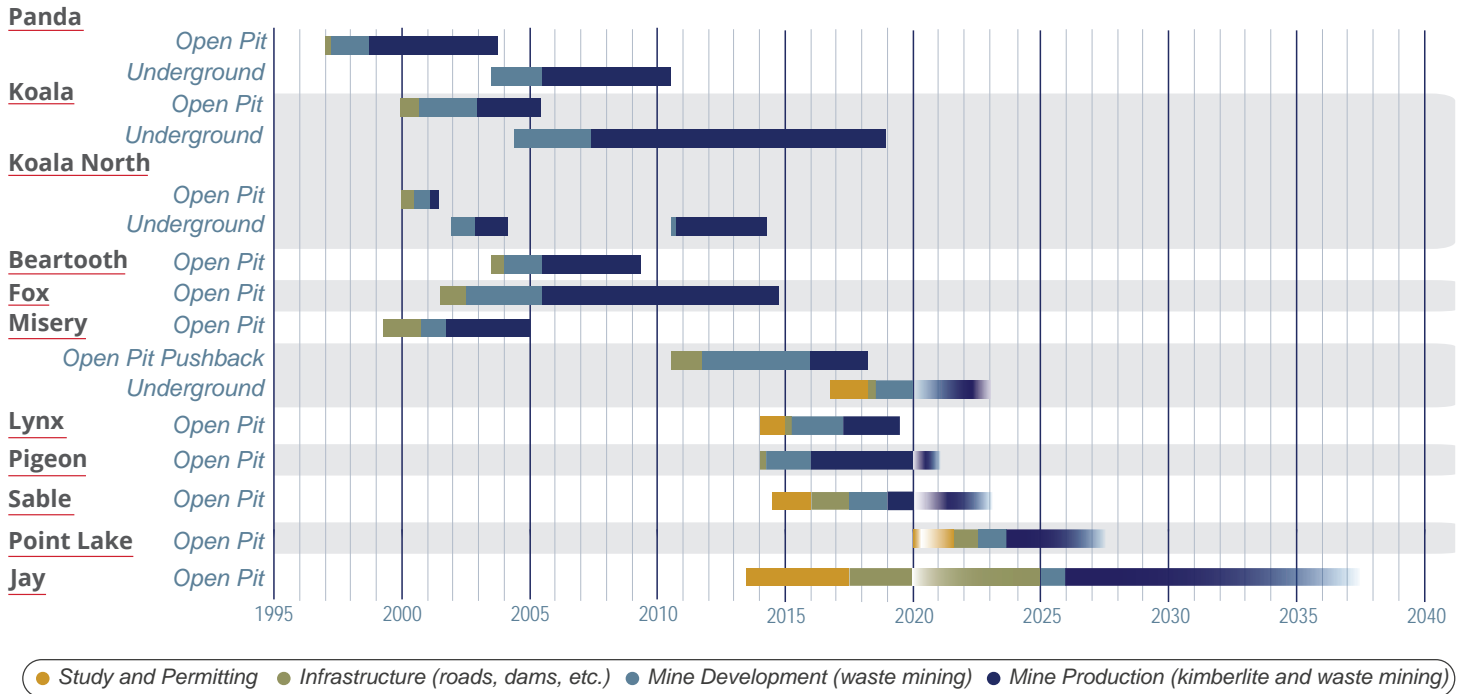
**Our goal:** To build relationships of trust with our stakeholders and build capacity in the communities.



# MINE PLAN

The Mine Plan is Dominion's schedule for the life of each kimberlite pipe at the Ekati Diamond Mine. The Mine Plan changes over time and will continue to change as the business develops and the value of diamonds change. Figure 3 shows the current mine plan for the Ekati Diamond Mine.

**Figure 3**  
Ekati life of mine plan



Note:  
 \*Point Lake is currently in the pre-feasibility stage and is not currently permitted.



## EKATI DIAMOND MINE ACTIVITIES IN 2019

### Misery Underground (MUG) Infrastructure

Dominion continued developing the MUG Project in 2019, milestones included the following:

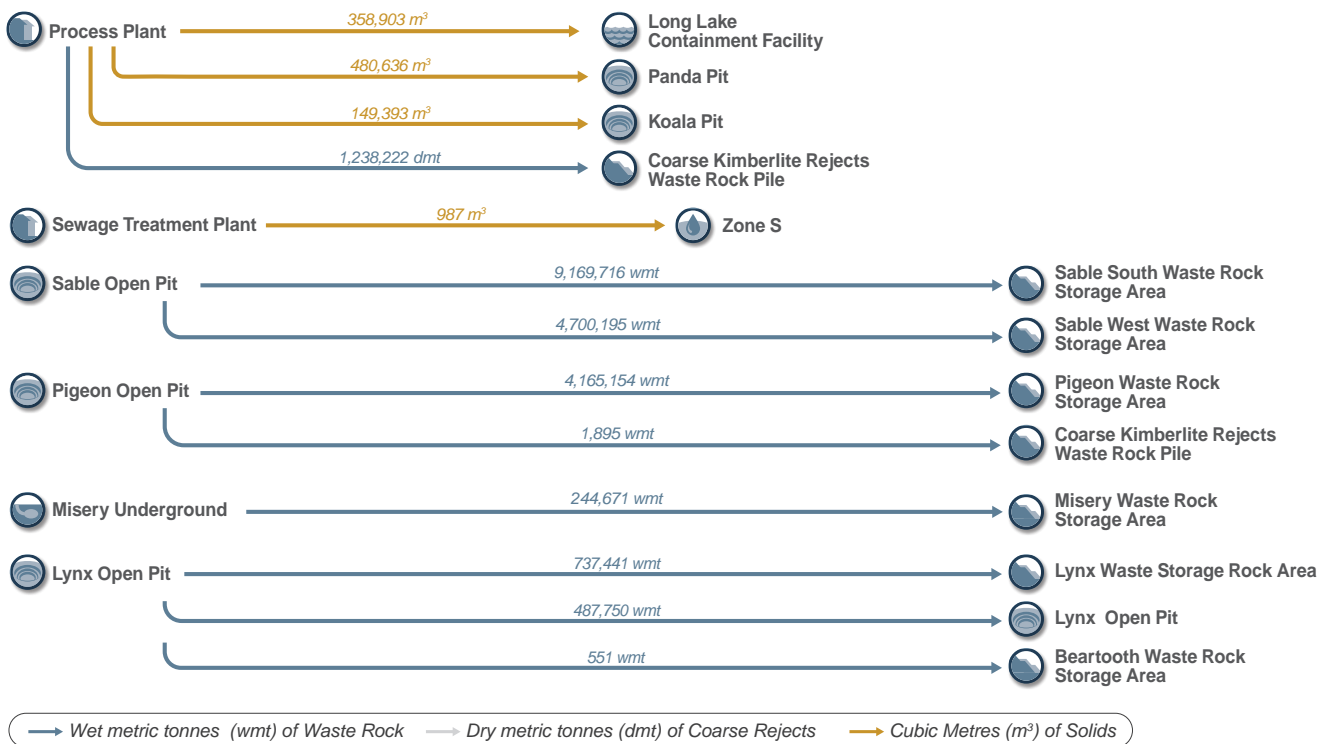
- Successful dewatering of Misery pit prior to kimberlite development underground.
- 4m diameter, 280m deep raise-bored Fresh Air Raise (FAR) completed.
- Power lines delivered to the underground through the main FAR.

- Construction activities started for main underground power distribution centre, underground compressors, main underground de-sliming and dewatering stations.
- The first MUG kimberlite was delivered to the Ekati mine Process Plant.
- Broke through to the upper portal which will be used to enter the mine in the future.

## Waste Rock Storage Areas

In 2019, over 4.1 million tonnes of kimberlite ore went through the process plant. Over 19.5 million tonnes of waste rock were placed into the Misery, Pigeon, Beartooth, Sable West and Sable South Waste Rock Storage Areas, as well as the Coarse Rejects Waste Rock pile.

Figure 4  
Ekati Diamond Mine 2019 Solid Waste Movement



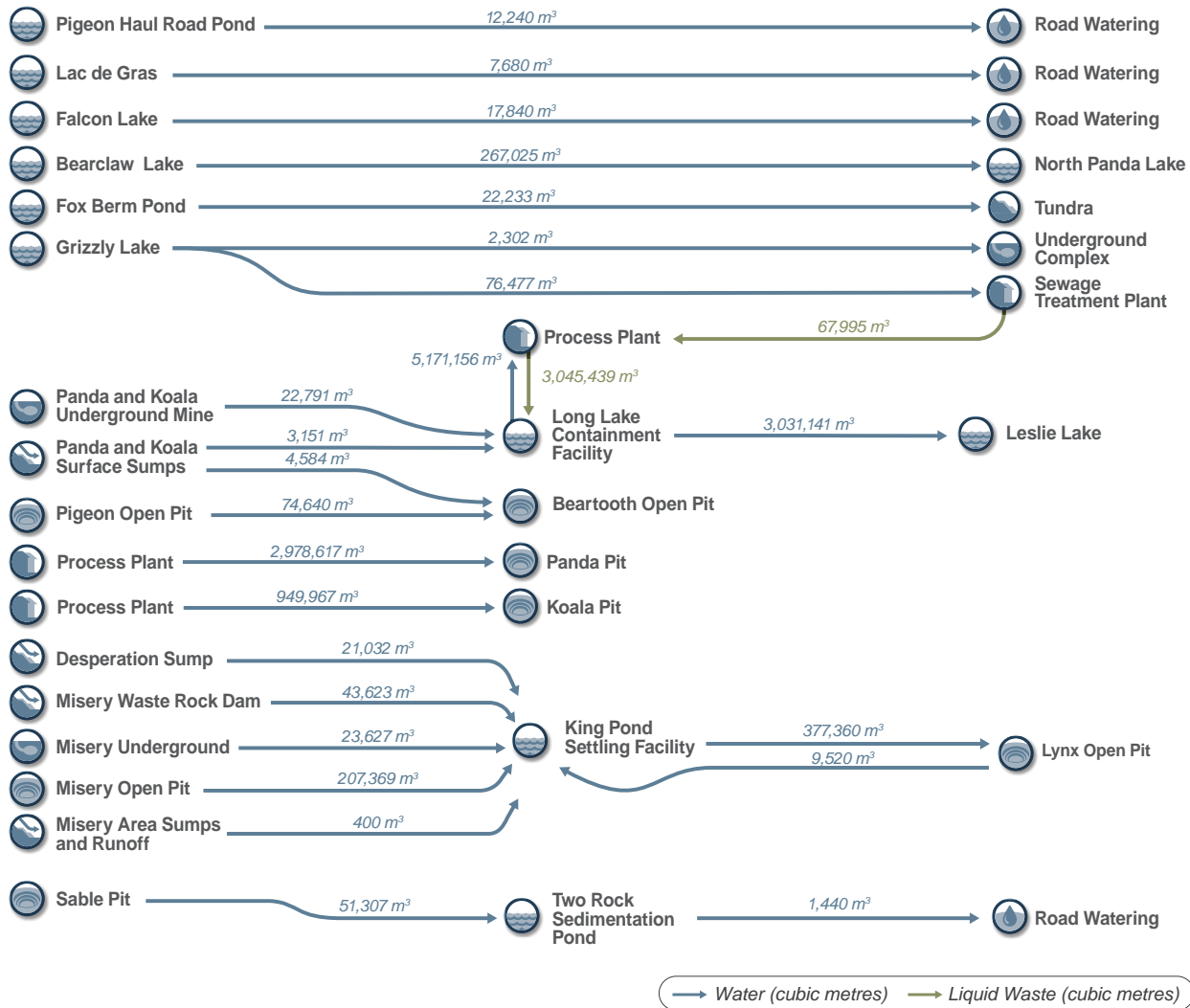
## Water and Liquid Waste Management

Most of the used water and liquid waste generated at the Ekati Diamond Mine is deposited into either the Long Lake Containment Facility (LLCF), Beartooth Pit, Koala Pit, or Panda Pit. This includes fine processed kimberlite and water from the process plant, minewater from Panda and Koala surface sumps and underground mines, Pigeon Pit minewater, and other sump water and runoff from the Main Camp Area. The water in the LLCF was tested to make sure it was below the Effluent Quality Criteria (EQC) in the Water Licence. With approval from the Inspector, Dominion Discharged 3,031,141 m³ from the LLCF to Leslie Lake in 2019.

Minewater from Misery Pit, Misery Underground, Lynx Pit, Misery Waste Rock Dam, and sump water and runoff from the Misery Area, was deposited into the King Pond Settling Facility. Water from King Pond Settling Facility was pumped to Lynx Pit when production from Lynx Pit was completed. No water from this area was Discharged to the Receiving Environment in 2019.

Minewater from Sable Pit and sump water and runoff from the Sable Area was deposited in the Two Rock Sedimentation Pond. A small amount of water from the pond was used to control road dust, but none of the water was Discharged to Horseshoe Lake in 2019.

Figure 5  
Ekati Diamond Mine 2019 Water and Liquid Waste Transfers



Discharge point between Long Lake Containment Facility (right) and Leslie Lake (left)



A Discharge is defined in the Water Licence as "direct or indirect release of any water or waste to the receiving environment."

# Spills and Unauthorized Discharges

A total of 23 spills were reported to the Northwest Territories Spill Line or the new Environment and Natural Resources Online Spill Reporting Tool in 2019. One spill from 2018 and two spills from 2019 remain open with the NWT Spills Line. Details from these three spills can be found below:

**Spill 2019127:** A diesel spill of 111,000 L occurred in the Sable Fuel Farm on March 20, 2019. A faulty High-Level switch in a generator day tank caused fuel to transfer from the bulk tank to the day tank until it overflowed into the containment berm. New timers have been installed to prevent this type of overflow in the future. Dominion pumped most of the spilled diesel back into the bulk tank and used absorbents to collect diesel from inside the berm. Water was pumped out so the pipe connections and tanks in the containment berm could be properly inspected. Clean-up will continue in 2020.

Dominion does daily inspections of the Sable Fuel Tank Farm, as well as every other fuel tank on site. The daily inspection checks for things like leaks, pipe and valve condition, and spill response equipment. The daily inspection includes a walk around the tank farms to make sure no liquids are leaking out of the lined, bermed containment areas. Dominion also

continues to inspect overfill protection, leak detection, and condition of the containment berms on a weekly basis.

**Spill 2019429:** A 117 L diesel spill occurred outside of the Misery Light Duty Shop on October 17, 2019. Fuel was being transferred from a 4,500-L fuel tank to the 1,135-L day tank inside the Shop. The day tank over-filled and the diesel travelled up and out of the vent line onto the ground outside. Dominion cleaned up the spill, however the Inspector was not able to see the clean-up before the area was covered in snow and ice. The spill will be inspected in snow-free conditions in the future.

**Spill 2019456:** A 450 L engine oil spill occurred inside of the Sable Maintenance Shelter onto the rig-matting flooring on November 6, 2019. Most of the oil was cleaned-up, but some of the oil may have leaked between the rig-matting flooring surface and onto the ground beneath the shop. As per the Inspector's direction, Dominion will clean this spill when the Sable Maintenance Shelter is taken down.

Dominion continues to communicate spills data site-wide as part of a monthly Health, Safety and Environment Review. Important spills information is being communicated through two infographics which can be found posted in buildings across the Ekati mine site:

**Dominion Diamond Mines**

## Spill Prevention

- Report leaking equipment to your Team Leader and bring it in for repairs immediately
- Check for leaks during equipment inspections
- Ensure your light vehicle or heavy equipment is equipped with spill response equipment (this is part of the daily inspection checklist)
- Don't rely on overfill protection – **BE PRESENT DURING REFUELING**
- Use drip trays and secondary containment to provide a safeguard against spills:
  - During refueling
  - When storing drums of liquid
  - When heavy equipment is parked for an extended period of time (>2 hours)
- Ensure hazardous liquids and solids are safely stored to prevent contact with equipment, wear and tear from the elements

## Spill Preparedness

- Spill kits, spill pads, and spill response equipment should be readily available in the event of a spill
- Supplies can be found in the warehouse

**FOR MORE INFORMATION**  
The Spill Contingency Plan can be found in the Quick Links section of the Environment Sharepoint Page.

**Dominion Diamond Mines**

**ALWAYS REPORT SPILLS... IT'S THE LAW!**

## Spill Response

EXAMPLES:  
 1 The spill is out of control and the flow cannot be safely stopped.  
 2 The spilled material is an acute hazard to life.  
 3 The material is continuously spilling directly onto roads or a waterway.

Flowchart: OBSERVER (FIRST TO NOTICE) → CONTACT TEAM LEADER → TEAM LEADER → Decision: Does spill pose direct threat to safety or environment? (YES → CALL A DECISION FOR SPILL RESPONSE; NO → Can flow be stopped or contained? (YES → INITIATE SPILL CLEAN-UP; NO → SUBMIT SPILL REPORT TO ENVIRONMENT → ENVIRONMENT DEPARTMENT)

Additional info: Contact Environment on radio channel 9 in the event of a major spill over 100 L (approx. half a drum). The Emergency Response Team (ERT) will respond with additional equipment. Responsible for critical spill events: ENVIRONMENT DEPARTMENT.

## Spill Reporting

**12h** ALL spills must be reported to Environment within 12 hours

Go to the main Environment page on Sharepoint and click on Internal Spill Report under the Quick Links section.

The following information will be needed to complete the form:

- Responsible department contact information
- Date and time of spill
- Substance spilled (hydraulic oil, glycol etc.)
- Quantity released
- Location and/or address (Team Leader should have GPS unit)
- Cause and source of spill (release equipment involved)
- Extent of contaminated areas

Once completed, click the **Forward to Environment** button.

**SPILL DISPOSAL**

Contact Site Services on cell 9 or 2012 to arrange for assistance in clean up.

Contaminated spill kit items (drums, drums, pads) should be bagged and labeled, then transported to the Waste Management facility.

Contact Waste Management personnel on cell 9 or 2006 for assistance with disposing of the spill waste or any other waste on site.

**TAKE PHOTOS!**  
Take before and after photos of the spill clean-up and a GPS point. This verifies clean-up if spill site is snowed in or blasted.

In 2019 the Ekati Diamond Mine Emergency Response Team (ERT) had 55 active members – 37 stationed at the Main Camp and 25 at Misery Camp. The ERT members undergo extensive training and participate in field and desktop exercises to prepare to respond in the event of a major spill.



## EKATI DIAMOND MINE ACTIVITIES PLANNED FOR 2020

Current mining operations are focused on mining ore from Misery Underground as well as Pigeon and Sable open pits. The Ekati Diamond Mine is currently under care and maintenance due to the COVID-19 pandemic and all mining activities have been suspended temporarily. Mine planning for 2020 is currently under internal review.

*Misery Pit*



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## ENVIRONMENTAL PERMITS AND AGREEMENTS

The Ekati Diamond Mine operates under several environmental permits and agreements guided by different regulatory departments:

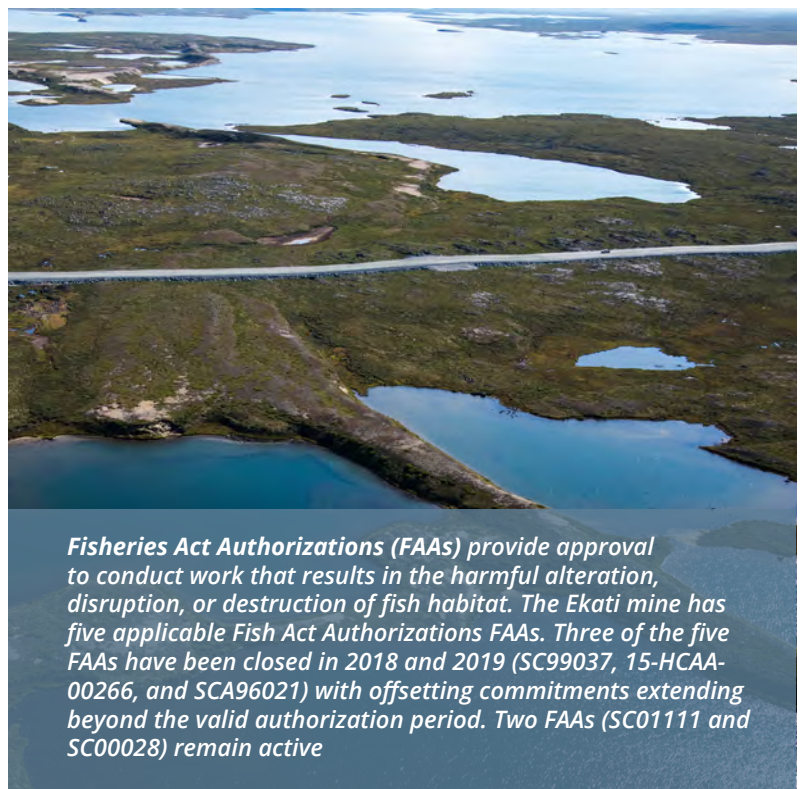
- The Type A Water Licence and 11 Type A Land Use Permits issued by the Wek'èezhii Land and Water Board;
- The Environmental Agreement between the Government of the Northwest Territories, Crown-Indigenous Relations and Northern Affairs Canada and Dominion;
- Two active Fisheries Act Authorizations (FAAs) issued by Fisheries and Oceans Canada (DFO); and
- 282 mining leases and 10 surface leases issued by the Government of the Northwest Territories

To meet the requirements for the Lynx Lake Dewatering and fish salvage FAA (15-HCAA-00266), the following work was completed in 2019:

- Year 1 of monitoring at Pike Creek was planned to be conducted in 2019; however, monitoring programs were deferred due to a community tragedy. As a result, the crew was unable to collect data on the fish migration because freshet (open-water) conditions had not started by the time the program was discontinued. The initial year of monitoring will be completed once field work in the community of Lutsel K'e is possible.

To meet the requirements for the Jay Project set out by Fisheries and Oceans Canada (DFO), the following work was completed in 2019:

- Daily monitoring of the Ac35 fish ladder by the Dominion Environment Department was completed throughout freshet (June 21 to July 28, 2019). A memo was provided to DFO on February 21, 2020 providing a summary on the 2019 Fish Ladder Monitoring Program. The memo included details on stream crossing Ac35 as recommended by DFO in December 2018.



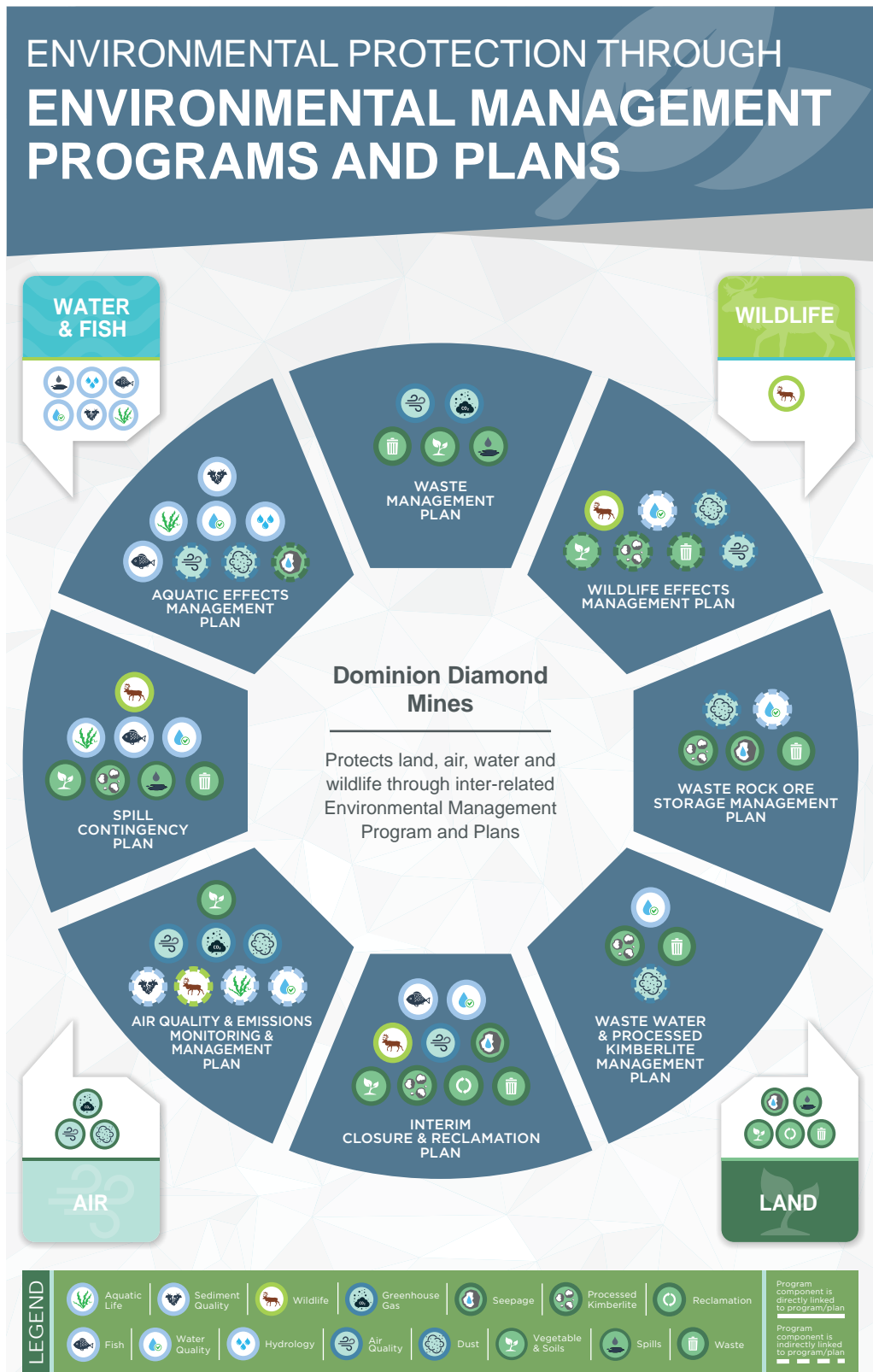
*Fisheries Act Authorizations (FAAs) provide approval to conduct work that results in the harmful alteration, disruption, or destruction of fish habitat. The Ekati mine has five applicable Fish Act Authorizations FAAs. Three of the five FAAs have been closed in 2018 and 2019 (SC99037, 15-HCAA-00266, and SCA96021) with offsetting commitments extending beyond the valid authorization period. Two FAAs (SC01111 and SC00028) remain active*



Ekati Diamond Mine operations must meet the terms of the environmental responsibilities outlined in the agreement, permits, and authorizations. To meet these terms, many environmental monitoring programs are planned and conducted each year.

Figure 6 shows all ongoing environmental plans and programs. The results and components of environmental programs are driven directly and/or indirectly by the plans in place, each with the overarching goal to protect land, air, water, and wildlife.

Figure 6

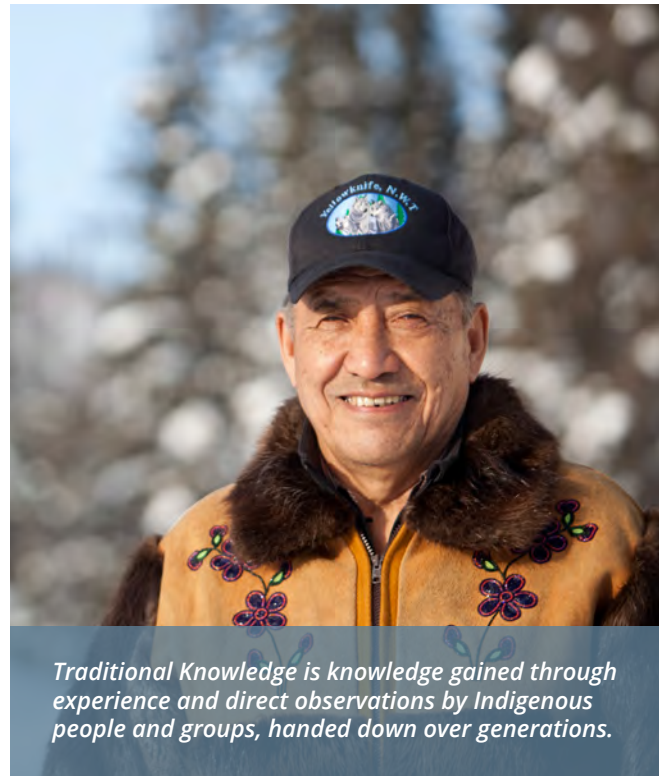


# TRADITIONAL KNOWLEDGE AND COMMUNITY ENGAGEMENT

The Ekati Diamond Mine is built on the traditional lands of Indigenous people, who used the land long before the mine existed and will continue to use it long after the mine is closed. Knowledge shared by traditional land users and community members has become part of environmental management at the mine.

In 2019, Dominion continued to support Traditional Knowledge and community outreach projects, such as on-site monitoring programs, larger regional programs, workshops, meetings, and support of community-led Traditional Knowledge programs. These projects enable Indigenous peoples to preserve their Traditional Knowledge for future generations and assist with wildlife management and the protection of land.

Several projects focus on traditional skills such as sewing, Métis fiddling, storytelling, hunting and fishing, drumming, and hand games. The On-the-Land Collaborative, Kugluktuk Youth & Elder's Language Video Project, and Whatì Youth Hand Games Program help youth reconnect to their culture through land-based education, and engagement with Elders and community members. The Canadian Championship Dog Derby is a world-class event celebrating Traditional Knowledge, athleticism, and endurance, and challenging dog racers to take on the harsh conditions of the Canadian Arctic in a three-day series of races. In June the National Indigenous Peoples Day celebrations bring hundreds of people together in Yellowknife to celebrate the traditional lifestyles of all the cultures across the Northwest Territories.



Throughout 2019, community members continued to participate in environmental programs such as monitoring raptors trying to build nests in the Lynx, Pigeon, and Sable pits. Dominion also supported the LKDFN Caribou Monitoring Program. The Lutsel K'e Wildlife, Lands, and Environment Department have been working closely with Environment and Natural Resources of NWT. Local monitors snowmobiled from Lutsel K'e to Yellowknife and ENR hauled their snowmobiles and equipment up the winter road to do the Bathurst Caribou Monitoring.

*Dominion is committed to incorporating oral and recorded Traditional Knowledge into decision making at the Ekati Diamond Mine. With significant input from communities and the Traditional Knowledge Elder's Group (TKEG), Dominion developed a Traditional Knowledge Management Framework to outline how Dominion will collect, store, manage, and use Traditional Knowledge in a respectful way. This framework was approved by the TKEG in January 2017 and can be amended at any time at the TKEG's discretion. Dominion respects that Indigenous people own and control their Traditional Knowledge, and Dominion will only use it with consent, and only as intended in the context of which it was shared.*



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## AIR QUALITY MONITORING AND CLIMATE

Air quality is tested to see if mining activities at the Ekati Diamond Mine (including blasting, construction, and emissions from diesel generators and vehicles) are affecting air quality. In April 2020 Dominion released the 2019 AQMP Report which discussed meteorological trends and air quality data collected in 2019, as well as greenhouse gas emissions and air pollution.

### Ambient Air Quality

Air quality monitoring stations sample air year-round for tiny airborne particles, dust, and gases such as sulphur dioxide, nitrogen dioxide, nitric oxide, and nitrogen oxides. Continuous ambient monitoring has been performed since the beginning of 2008 and is housed within the Continuous Air Monitoring Building (CAMB). Air testing in 2019 showed that air quality at the Ekati mine met the Government of Northwest Territories standards. The amount of some gases was higher in the winter because of the need for more heating fuel in cold temperatures.

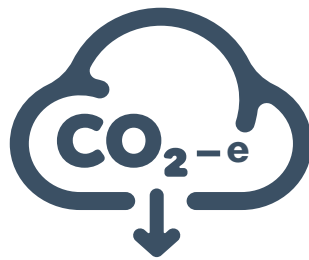
Dust from the operation of light and heavy vehicles can fall on the plants and soil near the road. This dust is measured as dustfall during the summer months (June to September) at the Ekati Diamond Mine. During 2019, dustfall was measured in 31 spots around the mine. As expected, dustfall was higher close to the haul roads and decreased farther away from the roads.

All of the dustfall samples collected 300 m from the haul road were similar to background reference values, with the one exception of the Jay Road station 300 m collection point where the Government of Northwest Territories objective was exceeded. Similar to 2018, total dustfall recorded at all stations in 2019 were generally lowest in June/ July and highest in August/September.

### Greenhouse Gases

Each year Dominion calculates how much greenhouse gas was released to the atmosphere from the Ekati Diamond Mine operations. The emissions can change a lot year to year based on the amount of fuel that was used and the amount of waste burned or composted at the mine. In 2019, greenhouse gas emissions for the Ekati Diamond Mine totaled 165,458 tonnes CO<sub>2</sub> equivalent, which is a decrease of 55,875 tonnes from what was reported to Environment and Climate Change Canada for 2018.





## CARBON DIOXIDE EQUIVALENT

Is a metric measure used to compare the emissions from greenhouse gases on the basis of their global-warming potential (GWP)



Greenhouse Gases

### CO<sub>2</sub> Equivalent

Dominion reports many different greenhouse gas emissions to Environment Canada, not just CO<sub>2</sub>. For example, Dominion also reports methane and nitrous oxide emissions, and those two greenhouse gases have a much stronger global warming potential than CO<sub>2</sub>. CO<sub>2</sub> equivalency is a way to convert the emissions from all of the different greenhouse gases into one unit (CO<sub>2</sub> Equivalent). This makes it easier to track, set reduction goals, and compare emissions from different sources.

The table below shows the Ekati Diamond Mine greenhouse gas emissions for 2019 compared to 2018 and why the emissions changed so much from year to year.

Emission Source	2019 Emissions (tonnes CO <sub>2</sub> e)	2018 Emissions (tonnes CO <sub>2</sub> e)	% Decrease	Reason for Variability
<b>Stationary</b> <ul style="list-style-type: none"> <li>Heating</li> <li>Power</li> <li>Non-motive</li> <li>Waste Oil</li> </ul>	86,785	116,670	25.61 %	Did not have to heat Koala/Panda Underground or some of the outbuildings that have been closed.
<b>Industrial</b> <ul style="list-style-type: none"> <li>Blasting</li> </ul>	1,370	2,046	33.04 %	Less blasting requirements in 2019 vs. 2018 based on mine plan
<b>Transportation</b> <ul style="list-style-type: none"> <li>Motive</li> <li>Helicopter</li> </ul>	77,230	102,507	24.66 %	Transition to larger equipment (CAT 793 and DPRT vs. CAT 777 and Haulmax) as well as decreased mining  More efficient hauling practices (stockpiling ore near pit, hauling to Process Plant with DPRT)
<b>Waste</b> <ul style="list-style-type: none"> <li>Incinerator biomass (does not include diesel consumption)</li> <li>Composter</li> </ul>	41	65	36.92 %	Reduced camp occupancy due to Koala Underground closure, reduced number of site projects, and improved mine planning.
<b>Wastewater</b>	32	45	28.89 %	Reduced camp occupancy due to Koala Underground closure, reduced number of site projects, and improved mine planning.

## Climate

In 2019, there were obvious trends in temperature across the different seasons. Temperatures above 0°C were recorded in early June, marking the start of the open-water season, and daily temperatures dropped below 0°C by early October, marking the end of the open-water season. The total precipitation in 2019 was 40 mm lower than the 1994 to 2019 average of 329 mm. Winds at the Ekati Diamond Mine area were from all directions, with the most common wind speeds ranging from 3.0 to 5.0 m/s.

## Reclamation Research

The reclamation research program helps Dominion understand what types of reclamation will be successful at mine closure. For example, reclamation research in 2019 mainly focused on the completion of pit closure water quality modeling for the Panda/Koala pit lakes, continued field research in Cell B of the Long Lake Containment Facility, and the completion of geochemical and geotechnical investigations at the Misery Waste Rock Storage Area. The field research in Cell B of the Long Lake Containment Facility included:

- Constructing water channels and using soil mounding to help prevent erosion;
- Seeding 2.2 hectares of Cell B with annual grasses;
- Building small islands using topsoil material from Pigeon;
- Monitoring existing species trials and investigating the best planting strategies;
- Use of indigenous mycorrhiza to see if it helps vegetation growth;
- Doing more trials to see if organic matter generated from the Ekati mine composter can help vegetation growth;
- Collecting native plant seeds around Ekati mine for future seeding and trials;

- Establishing vegetation trials using the seeds and seedlings collected from Kugluktuk in 2018; and
- Fertilizing the trial areas in the Cell B boulder field.

## Reclamation Monitoring

Dominion monitored the flow of two seeps in 2019, one downstream of Pigeon WRSA and the other downstream of Panda-Koala WRSA. Increases in flow after heavy rainfall caused **specific conductivity** to drop. This means that the meltwater and rainfall are watering-down the WRSA seepage. When the flow decreases the specific conductivity climbs back up slowly. Dominion will continue to monitor seeps around the Ekati Diamond Mine to learn more in the future.

*Specific conductivity measures the ability of a solution to conduct electricity. Usually, higher specific conductivity means there are more total dissolved solids in the water*

Dominion also worked with a consultant to study groundwater movement around the WRSAs. The study found that most water around WRSAs moves on the surface and only a little bit moves underground. The permafrost and type of ground around the WRSAs make it hard for water to move underground. Most of the seepage from the WRSA can be seen and measured on the surface.

Vegetation monitoring was conducted at the following reclamation sites: Fay Bay, Paul Lake Laydown, Old Camp, and the Misery topsoil storage stockpile. Although there were mixed results for plant growth at the monitored sites, generally plant cover continued to develop at the Ekati Diamond Mine reclamation sites. Monitoring will be repeated at each site in three to five years.

### Old Camp Pad Reclamation

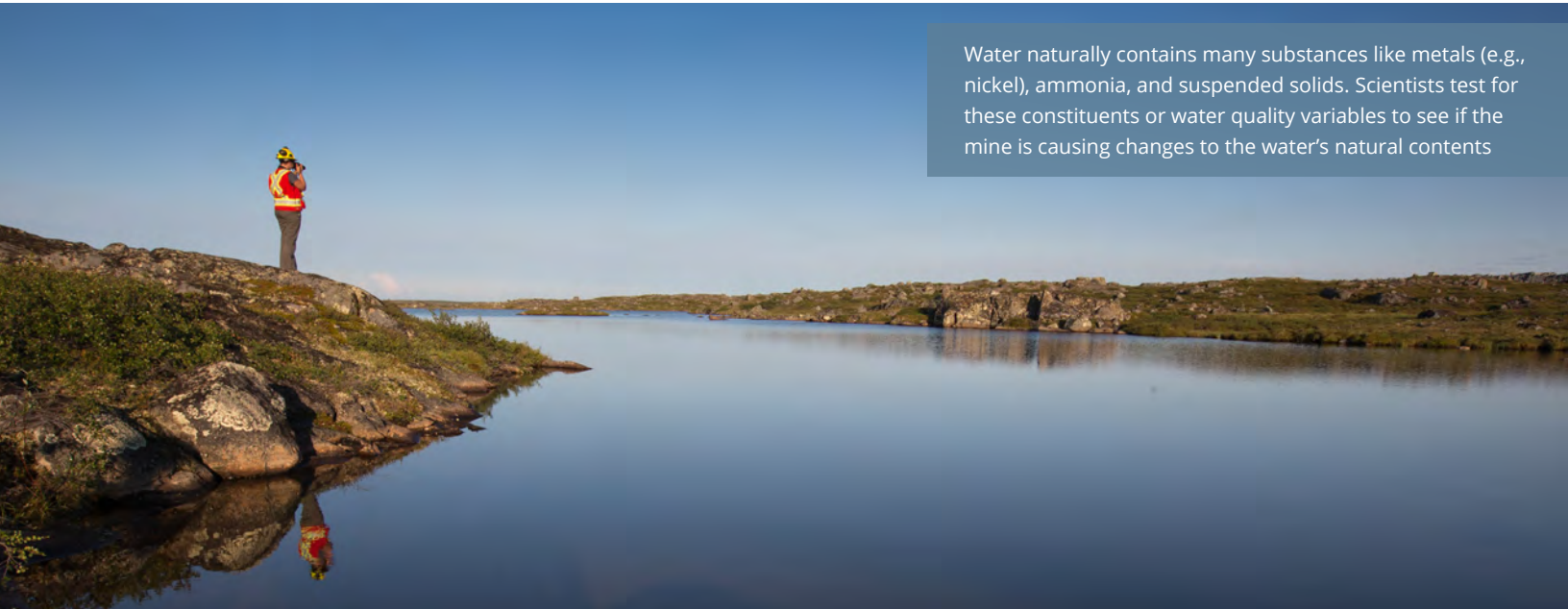


## Land Disturbances

At the Ekati Diamond Mine, construction and operation of facilities like the truck shop, open pit mines, and surface buildings can cause disturbance to the land.

In 2019, 78.9 hectares of additional surface area of habitat were disturbed at the Ekati Diamond Mine due to mine development, including continued development of Lynx, Pigeon, and Sable Pits and associated Waste Rock Storage Areas. A total of 3,897.7 hectares of habitat have been lost by development of the project footprint since 1997, or 2.5% of the total pre-development habitat in the study area.

As mining activities progress, some areas will be reclaimed once mining is finished in that area; other areas will be returned to a natural or productive state once the mine is closed.



Water naturally contains many substances like metals (e.g., nickel), ammonia, and suspended solids. Scientists test for these constituents or water quality variables to see if the mine is causing changes to the water's natural contents

## WATER QUALITY MONITORING

Water quality is important for wildlife and people's well-being. One-third of the Ekati Diamond Mine claim block is covered with water, so monitoring water quality is a key environmental program at the mine. The Ekati Diamond Mine Water Licence regulates water use on the mine site. For example, it sets out the amount of water that Dominion can take from lakes and streams to use in camps or for watering roads to keep down the dust and controls the quality of the processed water Dominion can return into the environment.

According to the current Water Licence, the Ekati Diamond Mine must have two programs to monitor the quality of water released from the Long Lake Containment Facility, Two Rock Sedimentation Pond or King Pond Settling Facility into the downstream lakes. These programs are the Surveillance Network

Program and the Aquatic Effects Monitoring Program. The Water Licence also indicates that seepage water quality from the waste rock storage areas must be monitored as it enters the environment.

### Surveillance Network Program

The Surveillance Network Program monitors the quality of water at sites around the Ekati Diamond Mine. Three of the sites are at Discharge points – places where water from the Ekati Diamond Mine re-enters the natural environment. These three Discharge points monitor water released from the LLCF to Leslie Lake, King Pond Settling Facility to Cujo Lake, and the Two Rock Sedimentation Pond to Horseshoe Lake. The remaining sites monitor the water passing through various mine facilities.

In 2019, water samples were collected from 19 sites identified in the Water Licence. Water quality indicators from the three Discharge points must meet the requirements in the Water Licence. If the water is above the limits, then the water cannot be pumped into lakes or used for road watering. In 2019, all water samples met the requirements of the Water Licence before being pumped or used for road watering.

## Aquatic Effects Monitoring Program

The purpose of the Aquatic Effects Monitoring Program is to determine if water Discharged from mining activities changes water quality affecting the plants and animals that live in water downstream from the Ekati Diamond Mine. The Program works as an early warning system by detecting slight changes in the levels of water quality indicators including nutrients, salts, and metals. Early detection allows the Ekati Diamond Mine team to address water quality changes before they have a negative effect in the Receiving Environment.

The three major watersheds monitored in 2019 for potential effects by mine activities were:

- The Koala Watershed, where the majority of Ekati Diamond Mine operations are located;
- The King-Cujo Watershed, which contains the Misery site; and
- The Pigeon-Fay and Upper Exeter Watershed, which has been monitored since 2014 to determine if construction activities at the Pigeon Pit and Pigeon Stream Diversion had an effect on the aquatic environment.

Not all parts of the lakes are monitored in all watersheds every year. In 2019, Dominion monitored water quality and aquatic biology variables including plankton, and lake and stream benthic invertebrates (called benthos).

### Koala Watershed and Lac de Gras

In 2019, 21 water variables found in the water were evaluated in the Koala Watershed and Lac de Gras. Although several of those components have stabilized or decreased, 18 remain above baseline or reference concentrations. The comparison with reference lakes suggests that the changes are mine-related to the Discharge of water from the Long Lake Containment Facility into the Receiving Environment.

Water quality variables are also compared to limits that have been set to protect aquatic life. These limits are called benchmarks and include nine water quality variables set by the Canadian Council of Ministers of the Environment. In addition, there are six site-specific limits for water quality variables used as benchmarks for water quality in the Ekati Diamond Mine receiving environment. Those are site-specific values because they are considered protective of the specific plants and animals that live in the water around the Ekati mine site. Despite increases in some water quality variables in 2019, concentrations were



Phytoplankton are tiny plants that play an important role in the aquatic ecosystem by producing oxygen and providing food for zooplankton (tiny animals), which are a key food source for fish.

below benchmark values, and therefore would not be expected to have negative effects to aquatic life.

A summary of the aquatic effects in the Koala Watershed and Lac de Gras is shown in Figure 7 (see next page).

A total of 12 plankton and 8 benthos components were also evaluated in 2019 for potential mine-related changes in the Koala Watershed and Lac de Gras.

Scientists observed two mine-related changes in the types of plankton that live in lakes, as well as two potential mine-related changes. Some of these changes may be related to mine operations or due to natural population cycles. Changes in plankton communities have also been linked to some plankton acquiring a competitive advantage over others with the mine-related changes in nutrients (especially carbon, nitrogen, and phosphorus). These changes will continue to be monitored as part of the annual AEMP.

No new mine-related effects or potential mine-related effects were detected for lake or stream benthos.

Both zooplankton and benthos provide important sources of food for many species of fish. Changes in zooplankton or benthos communities could have important consequences for fish, especially if preferred prey items are replaced with non-preferred ones. A mine-related effect was detected in the zooplankton community in three lakes, but it did not seem to affect the diet or biological response of fish.



Figure 7  
Summary of Water Quality and Biological Changes in the Koala Watershed and Lac de Gras

	Grizzly Lake	Lower PDC	Kodiak Lake	Kodiak-Little Stream	LLCF	Leslie Lake	Leslie-Moose Stream	Moose Lake	Moose-Nero Stream	Nema Lake	Nema-Martine Stream	Slipper Lake	Slipper-Lac de Gras Stream	Lac de Gras S2	Lac de Gras S3	Lac de Gras S5	Lac de Gras S6
<b>Physical Limnology</b>																	
Under-ice temperature	●	—	●	—	●	—	●	—	●	—	●	—	●	●	●	●	●
Under-ice dissolved oxygen	⊕	—	⊕	—	⊕	—	⊕	—	⊕	—	⊕	—	⊕	●	●	●	●
Open-water temperature	●	—	●	—	●	—	●	—	●	—	●	—	●	●	●	●	●
Open-water dissolved oxygen	●	—	●	—	●	—	●	—	●	—	●	—	●	●	●	●	●
Open-water Secchi depth	●	—	●	—	●	—	●	—	●	—	●	—	●	●	●	●	●
<b>Water Quality</b>																	
pH	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Total alkalinity	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Water hardness	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Chloride	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Fluoride	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Sulphate	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Total ammonia-N	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Nitrite-N	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Nitrate-N	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Total phosphorus	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Total organic carbon	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Total antimony	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Total arsenic	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Total barium	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Total boron	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Total molybdenum	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Total nickel	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Total potassium	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Total selenium	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Total strontium	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●
Total uranium	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●	●

**Legend:**

- No mine-related change detected.
- Potential mine-related change detected (potential effect).
- Change shows signs of stabilization or decline in recent years.
- Mine-related change detected (mine effect).
- Historical mine-related change that is no longer considered a current effect (historical effect).
- ⊕ Water quality benchmark exceeded by lake mean or CCME dissolved oxygen guideline exceeded at any depth but similar observations at reference lake.
- ⊖ Water quality benchmark exceeded by lake mean or CCME dissolved oxygen guideline exceeded at any depth.
- Not sampled.

Baseline refers to conditions that existed before any mining activity started. Reference refers to lakes and streams that are not affected by mining activities.



Figure 7 (continued)  
 Summary of Water Quality and Biological Changes in the Koala Watershed and Lac de Gras

	Grizzly Lake	Lower PDC	Kodiak Lake	Kodiak-Little Stream	LLCF Leslie Lake	Leslie-Moose Stream	Moose Lake	Moose-Nero Stream	Nema Lake	Nema-Martine Stream	Slipper Lake	Slipper-Lac de Gras Stream	Lac de Gras S2	Lac de Gras S3	Lac de Gras S5	Lac de Gras S6
<b>Phytoplankton</b>																
Chlorophyll a	●	==	⊕	==	⊕	==	⊕	==	⊕	==	⊕	==	⊕	●	==	==
Total density	●	==	⊕	==	⊕	==	⊕	==	⊕	==	⊕	==	●	●	==	==
Edible density	●	==	●	==	●	==	●	==	●	==	●	==	●	●	==	==
Non-edible density	●	==	●	==	●	==	●	==	●	==	●	==	●	●	==	==
Diversity	●	==	●	==	●	==	●	==	●	==	●	==	●	●	==	==
Community composition	●	==	●	==	●	==	●	==	●	==	●	==	●	●	==	==
<b>Zooplankton</b>																
Total biomass	●	==	●	==	●	==	●	==	●	==	●	==	●	●	==	==
Total density	●	==	●	==	●	==	●	==	●	==	●	==	●	●	==	==
Rotifer density	●	==	●	==	●	==	●	==	●	==	●	==	●	●	==	==
Adult crustacean density	●	==	●	==	●	==	●	==	●	==	●	==	●	●	==	==
Diversity	●	==	●	==	●	==	●	==	●	==	●	==	●	●	==	==
Community composition	●	==	●	==	●	==	●	==	●	==	●	==	●	●	==	==
<b>Lake Benthos</b>																
Total density	==	==	●	==	●	==	●	==	●	==	●	==	●	==	==	==
Dipteran diversity	==	==	●	==	●	==	●	==	●	==	●	==	●	==	==	==
Dipteran community composition	==	==	●	==	●	==	●	==	●	==	●	==	●	==	==	==
<b>Stream Benthos</b>																
Total density	==	==	==	●	==	==	==	●	==	●	==	●	==	==	==	==
Dipteran diversity	==	==	==	●	==	==	==	●	==	●	==	●	==	==	==	==
Dipteran community composition	==	==	==	●	==	==	==	●	==	●	==	●	==	==	==	==
EPT taxa diversity	==	==	==	●	==	==	==	●	==	●	==	●	==	==	==	==
EPT taxa community composition	==	==	==	●	==	==	==	●	==	●	==	●	==	==	==	==

**Legend:**

- No mine-related change detected.
- Potential mine-related change detected (potential effect).
- Change shows signs of stabilization or possible shift towards baseline in recent years.
- Mine-related change detected (mine effect).
- Historical mine-related change that is no longer considered a current effect (historical effect).
- ⊕ Mean biomass or density was not within the biology benchmark, however similar observations at reference site.
- ⊖ Mean biomass or density was not within the biology benchmark.
- == Not sampled.

## King-Cujo Watershed and Lac du Sauvage

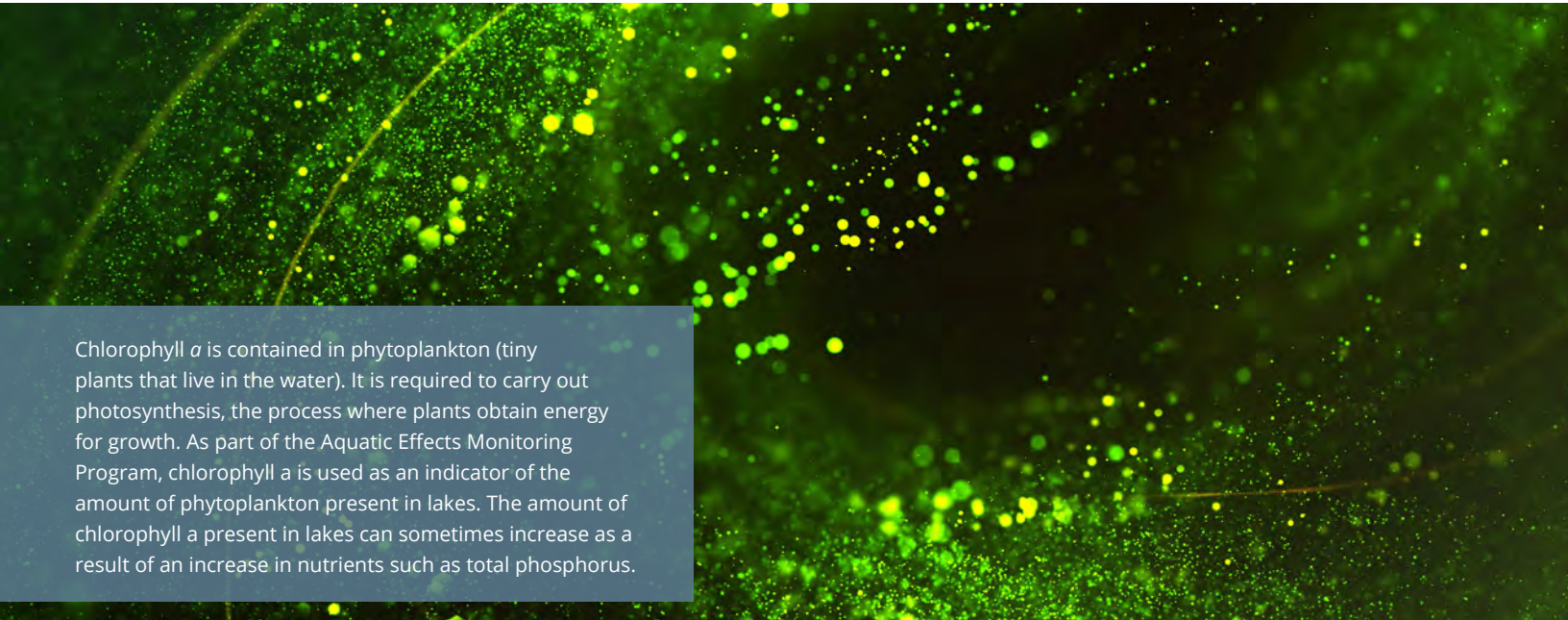
During the 2019 Aquatic Effects Monitoring Program, 21 water quality variables were evaluated for lakes and streams in the King-Cujo Watershed and Lac du Sauvage. The results showed that concentrations of 17 have changed and/or remain above baseline or reference concentrations in monitored sites downstream of the King Pond Settling Facility.

The observed changes generally decrease with distance from the King Pond Settling Facility, which suggests they are mine effects due to the water pumped from this facility into downstream lakes.

With the exception of total phosphorus in Cujo Lake, the water quality variables tested in the King-Cujo Watershed and Lac du Sauvage were below the benchmarks (Canadian guideline numerical limits and the specific numerical limits set for the Ekati Diamond Mine). This suggests that no negative effects to the environment are expected.

Figure 8 summarizes the aquatic effects in the King-Cujo Watershed and Lac du Sauvage. (next page)

A total of 12 plankton and 8 benthos components were evaluated for potential mine-related effects. Four mine-related changes in plankton and benthos variables were observed: an increase in chlorophyll *a*, total phytoplankton, edible phytoplankton, and lake benthos density. Two potential mine-related changes in plankton were also observed.



Chlorophyll *a* is contained in phytoplankton (tiny plants that live in the water). It is required to carry out photosynthesis, the process where plants obtain energy for growth. As part of the Aquatic Effects Monitoring Program, chlorophyll *a* is used as an indicator of the amount of phytoplankton present in lakes. The amount of chlorophyll *a* present in lakes can sometimes increase as a result of an increase in nutrients such as total phosphorus.



*King Pond Settling Facility*

Figure 8  
Summary of Water Quality and Biological Changes in the King -Cujo Watershed and Lac du Sauvage

	Downstream KPSF ↓ Cujo Lake → Cujo Outflow		Christine -Lac du Sauvage Stream	Lac du- Sauvage LdS2	Lac du- Sauvage LdS1
<b>Physical Limnology</b>					
Under-ice temperature	●	══	══	══	●
Under-ice dissolved oxygen	⊕	══	══	══	●
Open-water Secchi depth	●	══	══	●	●
<b>Water Quality</b>					
pH	●	●	●	●	●
Total alkalinity	●	●	●	●	●
Water hardness	●	●	●	●	●
Chloride	●	●	●	●	●
Fluoride	●	●	●	●	●
Sulphate	●	●	●	●	●
Total ammonia-N	●	●	●	●	●
Nitrite-N	●	●	●	●	●
Nitrate-N	●	●	●	●	●
Total phosphorus	●	●	●	●	●
Total organic carbon	●	●	●	●	●
Total antimony	●	●	●	●	●
Total arsenic	●	●	●	●	●
Total barium	●	●	●	●	●
Total boron	●	●	●	●	●
Total molybdenum	●	●	●	●	●
Total nickel	●	●	●	●	●
Total potassium	●	●	●	●	●
Total selenium	●	●	●	●	●
Total strontium	●	●	●	●	●
Total uranium	●	●	●	●	●

**Legend:**

- No mine-related change detected.
- Potential mine-related change detected (potential effect).
- Change shows signs of stabilization or decline in recent years.
- Mine-related change detected (mine effect).
- Historical mine-related change that is no longer considered a current effect (historical effect).
- ⊕ Water quality benchmark or CCME dissolved oxygen guideline exceeded by lake mean but similar observations at reference lake.
- ⊖ Mean biomass or density was not within the biology benchmark.
- ══ Not sampled.

Figure 8 (continued)  
 Summary of Water Quality and Biological Changes in the King -Cujo Watershed and Lac du Sauvage

	KPSF ↓ Cujo Lake	Downstream → Cujo Outflow	Christine-Lac du Sauvage Stream	Lac du Sauvage LdS2	Lac du Sauvage LdS1
<b>Phytoplankton</b>					
Chlorophyll a	⊕	══	══	══	●
Total density	⊕	══	══	══	●
Edible density	●	══	══	══	●
Non-edible density	●	══	══	══	●
Diversity	●	══	══	══	●
Community composition	●	══	══	══	●
<b>Zooplankton</b>					
Total biomass	⊕	══	══	══	●
Total density	●	══	══	══	●
Rotifer density	●	══	══	══	●
Adult crustacean density	●	══	══	══	●
Diversity	●	══	══	══	●
Community composition	●	══	══	══	●
<b>Lake Benthos</b>					
Total density	⊗	══	══	══	●
Dipteran diversity	●	══	══	══	●
Dipteran community composition	●	══	══	══	●
<b>Stream Benthos</b>					
Total density	══	⊗	══	══	══
Dipteran diversity	══	●	══	══	══
Dipteran community composition	══	●	══	══	══
EPT taxa diversity	══	●	══	══	══
EPT taxa community composition	══	●	══	══	══

**Legend:**

- No mine-related change detected.
- Potential mine-related change detected (potential effects).
- Change shows signs of stabilization or possible shift towards baseline in recent years.
- Mine-related change detected (mine effect).
- ⊕ Mean biomass or density was not within the biology benchmark, however similar observations at reference site.
- ⊗ Mean biomass or density was not within the biology benchmark.
- ══ Not sampled.

## Pigeon-Fay and Upper Exeter Watershed

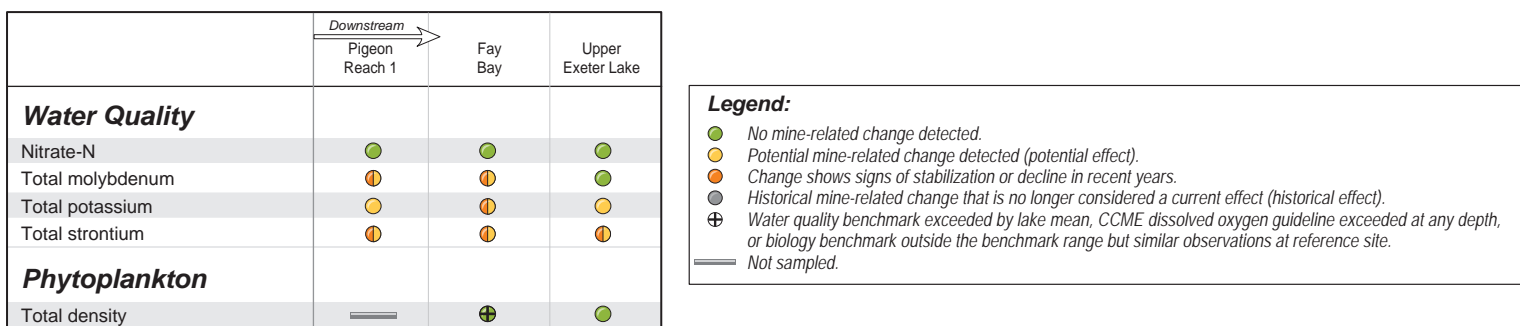
The monitoring of the Pigeon-Fay and Upper Exeter Watershed lake and stream monitoring occurs once every three years, except for potassium, nitrate-N, total molybdenum, total strontium, and phytoplankton density, which need to be evaluated every year. The most recent complete evaluation of effects was completed in December 2019.

Three of four of the water quality variables evaluated in 2019 have changed through time at monitored sites. These changes were considered potential mine-related effects, as the general pattern observed was an increase in 2008 followed by a decrease in concentrations in subsequent years.

Although 2019 concentrations were still higher than during baseline years, the differences were relatively small, and all water quality variables were below the benchmarks. There is no reason to expect negative effects, and results indicated no changes in phytoplankton densities related to mine activities.

A summary of the aquatic effects in the Pigeon-Fay and Upper Exeter Watershed is presented in Figure 9.

Figure 9



Benthic invertebrates are organisms that live in or on the bottom sediments of rivers, streams, and lakes. They have no backbone and range in size from microscopic to several dozen centimetres. The benthic invertebrate community – the population and species present – is strongly affected by its environment, including sediment composition and quality, water quality, and hydrological factors that influence the physical habitat. Because the benthic community is so dependent on its surroundings, it serves as a biological indicator that reflects the overall condition of the aquatic environment.



## Horseshoe and Lower Exeter Lake

During the 2019 Aquatic Effects Monitoring Program, 23 water quality variables were evaluated for lakes and streams in the Horseshoe Watershed and Lower Exeter Lake. The results showed that total potassium is currently above baseline or reference concentrations in Horseshoe Lake as a result of the mine.

With the exception of total phosphorus in Horseshoe Lake, the water quality variables measured in the Horseshoe Watershed and Lower Exeter Lake were below the benchmarks. However, it could not be confirmed if the elevated total phosphorus concentration observed in Horseshoe Lake in 2019 was a trend or was due to natural variability.

A total of 12 plankton and 8 benthos components were evaluated for potential mine-related effects. No mine-related changes in plankton or benthos components were observed. (next page see figure 10)

Figure 10

Summarizes the aquatic effects in the Horseshoe Watershed and Lower Exeter Lake.

	Ulu Lake	Ulu Outflow	TRSP Horseshoe Lake	Horseshoe Outflow	HWL2 Lake	HWL2 Outflow	Ross Lake	Ross Outflow	Logan Lake	Logan Outflow	Lower Exeter Lake
<b>Physical Limnology</b>											
Under-ice temperature	●	==	●	==	●	==	●	==	●	==	●
Under-ice dissolved oxygen	⊕	==	⊕	==	⊕	==	⊕	==	⊕	==	●
Open-water Secchi depth	●	==	●	==	●	==	●	==	●	==	●
<b>Water Quality</b>											
pH	●	●	●	●	●	●	●	●	●	●	⊖
Total alkalinity	●	●	●	●	●	●	●	●	●	●	●
Water hardness	●	●	●	●	●	●	●	●	●	●	●
Chloride	●	●	●	●	●	●	●	●	●	●	●
Fluoride	●	●	●	●	●	●	●	●	●	●	●
Sulphate	●	●	●	●	●	●	●	●	●	●	●
Total suspended solids	●	●	●	●	●	●	●	●	●	●	●
Total ammonia-N	●	●	●	●	●	●	●	●	●	●	●
Nitrite-N	●	●	●	●	●	●	●	●	●	●	●
Nitrate-N	●	●	●	●	●	●	●	●	●	●	●
Total phosphorus	●	●	⊖	●	●	●	●	●	●	●	●
Total organic carbon	●	●	●	●	●	●	●	●	●	●	●
Total antimony	●	●	●	●	●	●	●	●	●	●	●
Total arsenic	●	●	●	●	●	●	●	●	●	●	●
Total barium	●	●	●	●	●	●	●	●	●	●	●
Total boron	●	●	●	●	●	●	●	●	●	●	●
Total molybdenum	●	●	●	●	●	●	●	●	●	●	●
Total nickel	●	●	●	●	●	●	●	●	●	●	●
Total Potassium	●	●	●	●	●	●	●	●	●	●	●
Total selenium	●	●	●	●	●	●	●	●	●	●	●
Total strontium	●	●	●	●	●	●	●	●	●	●	●
Total uranium	●	●	●	●	●	●	●	●	●	●	●
Total zinc	●	●	●	●	●	●	●	●	●	●	●

**Legend:**

- No mine-related change detected.
- Potential mine-related change detected (potential effect).
- Mine-related change detected (mine effect).
- ⊕ Water quality benchmark exceeded by lake mean or CCME dissolved oxygen guideline exceeded at any depth but similar observations at reference lake.
- ⊖ Water quality benchmark exceeded by lake mean or CCME dissolved oxygen guideline exceeded at any depth.
- == Not sampled.

## Aquatic Response Framework

The first version of the Aquatic Response Framework was approved by the Wek'èezhìi Land and Water Board in December 2015. As stated in the Water Licence the "Response Framework is a systematic approach to responding when the results of a monitoring program indicate that an Action Level has been reached". Therefore, Dominion will develop or update Response Plans for water quality, biological (plankton and benthic invertebrates), and fish variables that meet the conditions of an Action Level. The most recent version (Version 3.0) of the framework was submitted on March 9, 2018 and approved on November 19, 2018. Changes to the framework were recommended through the re-evaluation of the ARF (ERM 2019), which is currently being reviewed as part of the 2019 Aquatic Effects Monitoring Program Re-evaluation and awaits approval.

Action Level exceedances were identified for three water quality variables in 2019: chloride (low Action Level in Leslie Lake under-ice), potassium (medium Action Level in Leslie Lake under-ice), and total phosphorus (medium Action Level in Cujo Lake open-water). Low Action Levels were also exceeded in 2019 for phytoplankton biomass in Cujo Lake, and phytoplankton and zooplankton community composition in Leslie and Moose lakes.

Response plans were updated or developed in 2019 in response to the Action Level exceedances. The plans are developed to include why the exceedance was observed, and ongoing or potential management actions that Dominion can undertake to address elevated concentrations or the observed biological changes in the Receiving Environment. The type of management action is applicable to the Action Level exceeded, for example in response to low Action Level exceedances, continued monitoring is proposed. For medium Action Level exceedances (e.g., potassium in Leslie Lake, total phosphorus in Cujo Lake) Dominion has initiated more in-depth studies to understand the source of potassium and phosphorus as a result of mine activities. Water management procedures have also been changed to manage the levels of potassium from entering Leslie and Moose lakes from the Long Lake Containment Facility and phosphorus from the King Pond Settling Facility.

All response plans are reviewed by stakeholders before final approval by the Wek'èezhìi Land and Water Board; thus, versions and approval processes are tracked through the annual effects monitoring program reports.

## Waste Rock Storage Area Seepage Survey

When mining for diamonds within the kimberlite ore, workers must remove other rock (referred to as waste rock) from the ground. After kimberlite ore has been processed to remove diamonds, a mixture of fine and coarse materials, called processed kimberlite, is generated. Waste rock and coarse kimberlite from the process plant are placed in Waste Rock Storage Areas, as set out in the approved Waste Rock and Ore Storage Management Plan. Without carefully designed management plans and monitoring programs, contaminants found in the waste rock and coarse processed kimberlite may enter the receiving environment through **waste rock seepage**.

Over 90% of the waste rock stored at the Ekati Diamond Mine is granite. In 2018, Dominion collected waste rock samples from Misery, Lynx, Sable and Pigeon Waste Rock Storage Areas to determine if there is potential for contaminants in the rock to enter the receiving environment. The 2019 results showed that most of the rock types stored in waste rock piles (including granite) at the Ekati Diamond Mine are not potentially acid generating or have low acid generating potential. A large amount of the waste rock in the Misery and Pigeon WRSAs is metasediment, which is classified as potentially acid generating.

Dominion monitors seepage water quality every year at freshet, during summer rainfall events, and in the fall. In 2019, all existing seeps were checked for flow and 50 samples were collected at freshet, 8 samples were collected after rainfall events, and 17 were collected in the fall. There were 14 new seeps discovered at freshet because there was a large amount of ice melt during that survey. Some of the new stations were established downstream of an existing monitoring station to study how the water changed as it moved downstream. Most of the new stations established during freshet were not flowing in the fall.

### *Misery Waste Rock Storage Area*

Waste rock seepage refers to water that drains over and through the waste rock piles and which may pick up contaminants as it comes into contact with this material.





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# WILDLIFE MONITORING

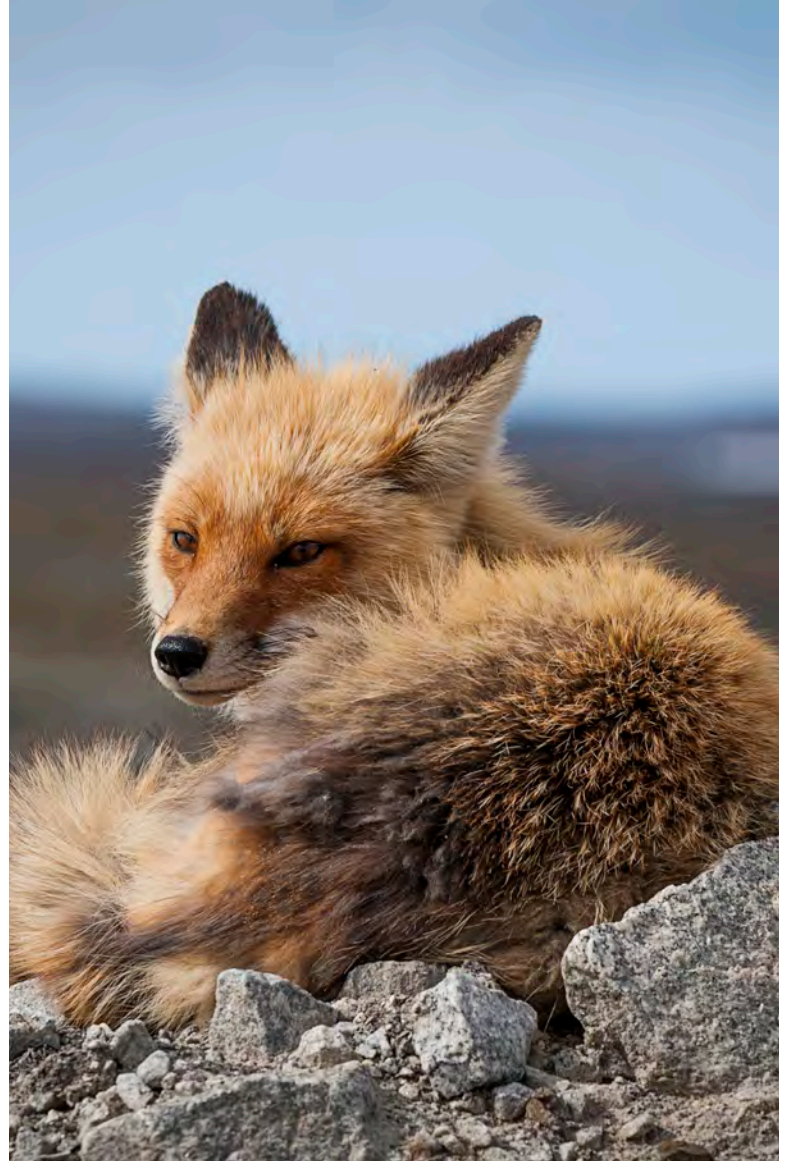
## Wildlife Effects Monitoring Program

There is a variety of wildlife within the Ekati Diamond Mine claim block, including bears, caribou, foxes, wolves, wolverines, and nesting birds. The Wildlife Effects Monitoring Program focuses on animals that are considered particularly important or that have special conservation status; these animal species are referred to as Valued Ecosystem Components (VEC). The program looks at the effects mining activities can have on the health of these animals and helps Dominion's scientists determine how well actions to reduce any effects are working.

### Wildlife and Traffic

To increase wildlife safety, Dominion works hard to minimize potential interactions between mine-related traffic and wildlife by:

- Removing carcasses on or near the roads (to help minimize traffic risks to predator and scavenger species).
- Giving wildlife the right-of-way, temporarily closing roads when necessary, scanning for wildlife on or near the roads, and posting wildlife caution signs.
- Reduced speed limits, and short and long-term road closures following action levels laid out in the Caribou Road Mitigation Plan (CRMP), a plan that requires more caribou monitoring, traffic speed reductions and temporary road closures and as caribou approach the Ekati Diamond Mine and associated roads.
- Strengthening employee education and awareness efforts (i.e., posters, presentations, and site-wide e-mail notifications).
- Using Traditional Knowledge to inform road construction and caribou crossing locations. These mitigation practices are important to minimizing vehicle and aircraft interactions with wildlife. Dominion continues to focus on education and awareness to manage traffic-related mortalities, and there has been continuous improvement in the level and detail of reporting vehicle-related mortalities.



The 2019 reporting year is the third full year that the Caribou Road Mitigation Plan has been implemented. Alert levels beyond the operational level were triggered for the entire year due to caribou occurrences near Sable or Misery roads.

Level 2 (Orange – medium risk) was in place for three periods for a total of 62 days.

Level 3 (Red – high risk) was triggered on three occasions throughout the year, for a total of 303 full days.

In 2019, nine vehicle-related wildlife deaths and two likely vehicle-related deaths were reported at the mine site, involving 7 arctic hares, 1 red fox, 1 Canada goose, and 2 greater white-fronted geese. While caribou were observed at or near mine roads, no vehicle-related caribou deaths were reported. Short term road closures occurred on multiple occasions in February, July, and August due to caribou being near roads. The total amount of time recorded for road closures was 88.5 hrs. Road closures often involved several vehicles, resulting in a loss of at least 300 person-hours while heavy, medium and light vehicles were stopped as a result of caribou being less than 100 m from roads. During road closures and in consultation with ENR, vehicles were used eight times on the Sable Road to gently deter caribou from the roads due to a medical emergency, required shift changes, and an explosives truck needing to take cover in a thunderstorm due to safety concerns. To ensure wildlife safety, visual monitoring, temporary road closures, site-wide notifications, and/or wildlife signs were implemented while caribou and other wildlife were adjacent to or crossing mine roads. Use of Traditional Knowledge to inform construction of accessible road crossing ramps and implementation of the CRMP are key measures in limiting wildlife-vehicle interactions.



#### Caribou Road Mitigation Plan Activity Levels

- Operational Level (Blue – continually)
- Level 1 (Yellow – low risk)
- Level 2 (Orange – medium risk)
- Level 3 (Red – high risk)

## Wildlife Incidents and Mortalities

Wildlife incidents are recorded and reviewed as part of Dominion's management to reduce the potential for wildlife-related safety concerns for employees, and to minimize the potential effects of mine activities on wildlife. Forty-three wildlife incidents involving humans or mine infrastructure were reported at the Ekati Diamond Mine site in 2019. Thirty-five incidents involved the grizzly bear, 3 involved wolves, and 1 incident with an injured caribou. There was no indication that the injury occurred at the Ekati Diamond Mine.

There has been a reduction in wildlife incidents since 2010 related to removal of outdoor food waste bins as sources of attraction, and monitoring and/or relocating field crews before making a decision to actively deter an animal.

Wildlife mortalities not related to vehicle traffic were also recorded. There were ten mortalities in 2019, including seven caribou killed by wolves, two birds (American tree swallow and ptarmigan) that died of unknown causes, and 1 caribou. The injured caribou appeared to be in serious pain for several days, so an ENR Officer used a lethal shot to kill the animal.

## Wildlife Management

Dominion undertakes wildlife management activities when actual or possible interactions may pose a safety risk to animals or humans. These may include site-wide notifications via email, radio, or phone, giving presentations, posting wildlife notice signs, and implementing road closures or work stoppages.

In 2019, Ekati Diamond Mine staff implemented 804 management actions related to specific wildlife including: caribou (385), grizzly bear (252), wolf (103), wolverine (18), fox (12), moose (8), and raptors (4). The 22 remaining management activities were general to all wildlife, or a combination of species, encountered. Dominion continues to explore effective mitigation actions to reduce potential interactions with wildlife. On 15 occasions in 2019 blasting was postponed or cancelled due to the presence of caribou within 1 km of the planned blast.

A wildlife incident is defined as an interaction between animal(s) and human(s) that may compromise the safety of the animal(s) and/or human(s). Incidents also include any action where deterrent measures are deemed necessary.

## Wildlife Attractants and Waste Management

Waste from the mine site must be carefully managed to keep materials that might attract or harm wildlife out of landfills. Proper disposal of waste is an ongoing challenge that Ekati Diamond Mine staff take seriously. Inspections are regularly performed on waste bins and the landfill to ensure that waste is being disposed of correctly. Regular employee education sessions are conducted to stress the dangers posed to wildlife and mine personnel from improperly disposed waste.

Just over 102,000 kg of solid waste and 161,700 L of liquid waste were shipped off site for disposal in 2019. Additionally, an average of 10,566 kg of food waste was composted each month instead of being incinerated as in previous years. Other alternatives to managing waste at the mine site to ensure zero harm to wildlife will continue to be pursued.

## Wildlife Monitoring at the Long Lake Containment Facility

Ingestion of processed kimberlite by wildlife and the potential for injury or entrapment of wildlife in the LLCF is of potential concern. In 2019, there were eight observations of 1,721 caribou on six different days at the LLCF. Before 2019, 694 caribou had been observed at the LLCF since 2000. Evidence from caribou tracks and observed behaviour suggest that processed kimberlite does not affect caribou movement, nor does it appear to attract caribou. Other wildlife were seen in the LLCF, including grizzly bear, wolf, wolverine, arctic hare, red fox, and fox of undetermined species (either arctic or red fox), which means that wildlife species are using the LLCF. Bird species recorded during LLCF surveys included Canada goose, common raven, greater white-fronted goose, gyrfalcon, herring gull, and tundra swan.

### Caribou

There were 269 caribou sightings during the 2019 reporting period, totaling 9,507 animals. These sightings likely include the same caribou or groups of caribou being seen multiple times, rather than indicating that 9,507 different caribou were observed. Most caribou in 2019 were recorded during the two winter periods combined (January 1 to April 14, and November 1 to December 31, 88%) and spring migration (9% of caribou observed). Of the 9,507 caribou observed, sex and age classification was made for 196 individuals; 32% were identified as bulls, 56% as cows, 1% as calves and 11% as yearlings.

Information from satellite collared adult female caribou collected by Environment and Natural Resources (ENR) and Traditional Knowledge indicates that two barren-ground caribou herds, the Bathurst herd, and to a lesser extent the Beverly/Ahiak herd (formerly known as the Ahiak herd), have historically overlapped the area of the Ekati Diamond Mine wildlife study area. This trend continued in 2019, though some of the seasons of overlap have changed. Satellite collar data were used to estimate the extent of the seasonal ranges for the Bathurst caribou herd. For the seasonal ranges (all except spring migration, when caribou are less sedentary), only the 2018/2019 winter ranges for Bathurst caribou overlapped with the Ekati Diamond Mine. Similar to Bathurst caribou, the Beverly/Ahiak caribou herd's winter range also overlapped the mine. This is supported by the 2019 caribou observations; of all the caribou observed at the Ekati Diamond Mine throughout the entire year, most of the caribou were observed during the winter period.



### Grizzly Bear

Mine staff recorded 161 grizzly bear sightings at the Ekati Diamond Mine during 2019, totaling 252 bears on 74 separate days. The earliest sighting in the year was on May 4th, and the last sighting was on October 26th.

The most commonly observed family group included a female with two cubs, which was observed 38 times, a female with one cub (3 times), 1 sighting of an adult female with a bear of unknown sex and age, and one sighting of 2 bears of unknowns sex and age. The other

113 grizzly bear sightings were of solitary animals and presumably adults, most of which were of unknown sex. Sightings of grizzly bears in family groups in 2019 were the highest since documentation started in 2001, suggesting a healthy population near the Ekati Diamond Mine.

There were 244 management activities conducted in response to grizzly bear observations, including site-wide notifications, temporary work stoppages, or relocating work crews to allow grizzly bears to forage or move through an area undisturbed. There were 16 bear awareness training presentations given between May and July 2019 to educate the workforce on bear safety.

## Wolf

There were 117 wolf sightings near the Ekati Diamond Mine in 2019, totaling 212 wolves on 77 separate days. The 117 observations are the highest number recorded since documentation began in 2001. An active den was found next to the airstrip on July 13th after a sighting of 2 adults wolves with 2 wolves of unknown age and sex.

## Fox

Ekati Diamond Mine staff made 113 sightings of 148 foxes over 80 separate days in 2019. Arctic foxes were the most commonly observed fox during the first baseline studies over 20 years ago, red foxes are more common now. Only 2 Arctic foxes were observed in 2019. Red foxes accounted for 84% of fox sightings at the Ekati Diamond Mine site in 2019, consistent with the previous two years. Fox sightings were mostly along Misery Road, Sable Road, and the Ekati Diamond Mine Main Camp.

## Wolverine

Wolverines were observed near the Ekati Diamond Mine 23 times over 18 separate days in 2019. The number of sightings is the same as 2018, but fewer than reported in 2017 (33) and in 2016 (39). Dominion took many actions in response to the wolverine occurrences including waste management to reduce attractants, increased education to the staff, improvements and regular maintenance to the accommodation structures.

## Nesting Raptors on Pit Walls

Many birds (including common ravens, peregrine falcons, rough-legged hawks, gyrfalcons, and golden eagles) have attempted to use pit walls for nesting. Ekati Diamond Mine staff monitor the open pits to identify these nesting birds and have stopped

operations, worked around, or relocated nests in the past to protect the birds.

In 2019, nesting activity occurred at Fox, Koala, Koala North, Panda, and Misery pits. One or more successful nests were raised in each pit. Several pairs of raptors attempted to establish nests in the active Misery, Lynx, Pigeon and Sable pits, but were successfully deterred. A peregrine falcon nest was established on June 12th at the active Pigeon Pit. After discussing with the GNWT, Dominion staff attempted to relocate the nest and eggs; however, the nest was abandoned by adults.

## Migratory Birds

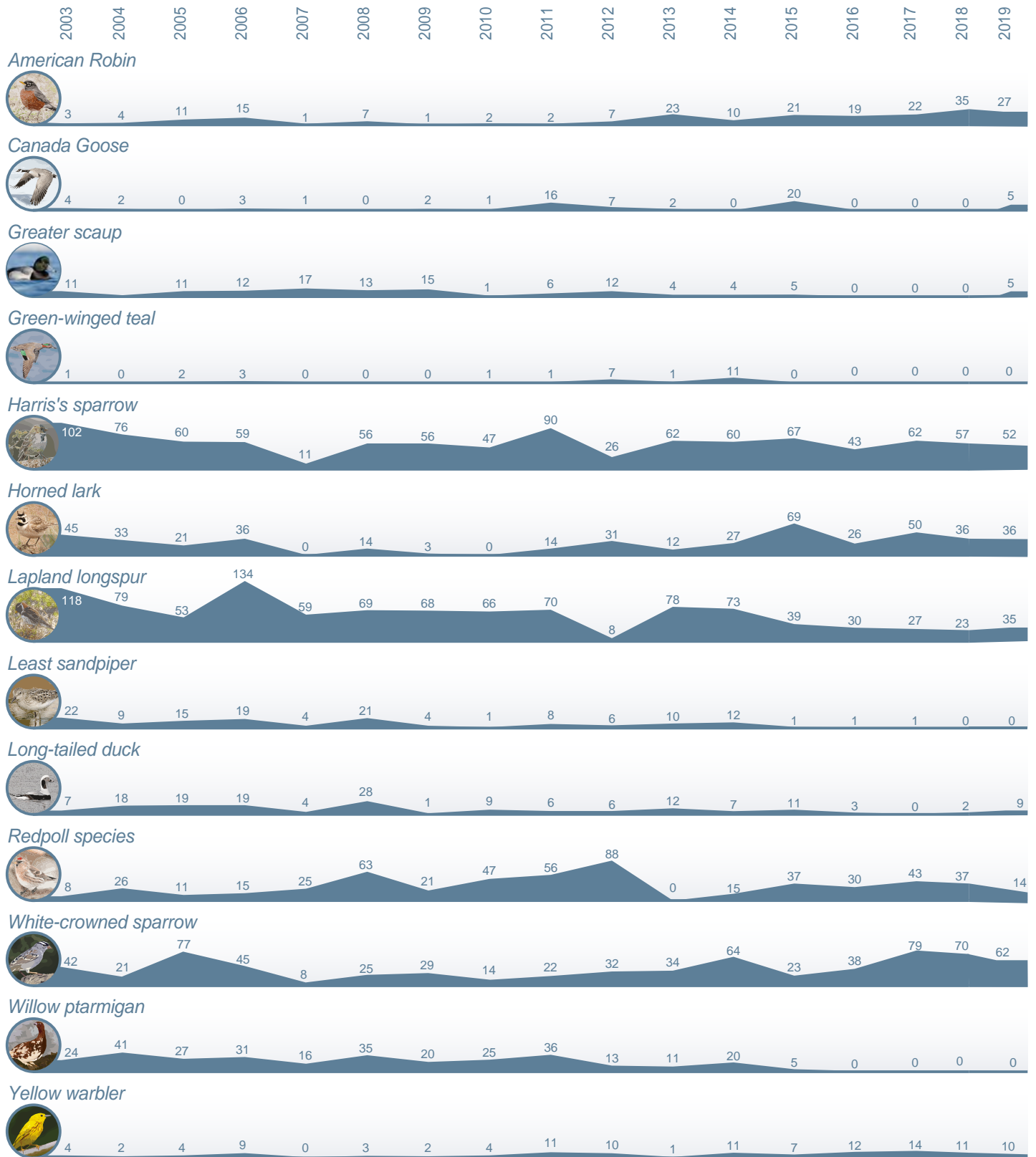
The North American Breeding Bird Survey (NABBS) was done for the 17th year at the Ekati Diamond Mine in 2019. The NABBS is a way of surveying birds that is conducted at over 400 locations across Canada. The data, which are compiled by the Canadian Wildlife Service, helps identify bird distribution and abundance across North America. During the survey, 409 individuals of 26 species were recorded. Five species of conservation concern were observed during the 2019 breeding bird survey: red-necked phalarope, long-tailed duck, Harris's sparrow, yellow-billed loon and northern pintail. Figure 10 shows trends for some of the more common birds observed at the mine site over the past 17 years.

During the 2019 reporting period, there were 38 additional bird sightings. The sightings were of 126 individual birds from 17 species or species groups.

See figure 10 on the next page for number of birds spotted during the Ekati Diamond Mine bird survey



Figure 10  
 Number of Birds Spotted during the Ekati Diamond Mine Bird Survey 2003 to 2019



## Other Wildlife

During 2019, there were 23 sightings of moose (in groups of 1-4 animals) over 18 separate days. It has become more common to see moose near Ekati mine, with a total of 68 moose individuals recorded from 2013 to 2019. There was 1 observation by a drill and blast crew of a group of 10 animals in the distance, possibly muskox, observed on November 27, 2019 at km 10 of Sable Road.



*Tibbitt to Contwoyto Winter Road*

## CONCLUSION

The Ekati Diamond Mine continued to operate successfully in 2019, meeting the terms of its Water Licence and the Environmental Agreement. Ongoing monitoring programs and other improvements mentioned in this summary will be critical to provide lots of time to address changes that might lead to serious effects to the environment.

In 2020, Dominion will continue to monitor air, water, and wildlife in and around the Ekati Diamond Mine, to find ways to minimize the mine's effect on the environment and continue with progressive reclamation.



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