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13 July 2016

Subject: 2015 Environmental Agreement Annual Report for the Diavik Diamond Mine

Attached please find for review the Diavik Diamond Mines (2012) Inc. (DDMI) Environmental Agreement Annual Report (EAAR) for 2015. This document is intended to meet the commitments outlined in Section 12.1(c) of the Environmental Agreement.

On 29 September 2015, DDMI received a letter from the Government of the Northwest Territories (GNWT) indicating that the content of the 2014 EAAR was satisfactory, and requested that the 2015 report be issued at higher resolution. In order to keep the file size of the report small enough to be distributed by e-mail, the attached report remains at a lower resolution. However, a high resolution version will soon be uploaded to the Environmental Monitoring Advisory Board website (http://www.emab.ca/Library.aspx), and a copy can be provided directly to any Party, upon request.

Please note that the translations of the Executive Summary had not been completed at the time of distribution. These will be distributed to each of the Parties to the Environmental Agreement upon receipt.

Please contact the undersigned should you have any questions or wish to discuss the report.

Yours sincerely,

Gord Macdonald
Principal Advisor, Sustainable Development

Attach.

cc: Monica Wendt, GNWT

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2015 Environmental Agreement Annual Report

Diavik Diamond Mines (2012) Inc.

Document #: ENVI-566-0616 R0

Published: 13 July 2016

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Executive Summary

The Diavik diamond mine is located on the East Island of Lac de Gras, in Canada's Northwest Territories, approximately 300 kilometers northeast of the capital city, Yellowknife. Diavik signed an Environmental Agreement ("the Agreement" or EA) with 5 Aboriginal organizations and the federal and territorial governments in 2000. The Agreement says what Diavik is to do to protect the environment while operating the mine. There was also an Environmental Monitoring Advisory Board (EMAB) formed as part of the Agreement; the Board is a public watchdog of the regulatory process and the implementation of the EA. The Diavik diamond mine was in its thirteenth (13th) year of operations during 2015, and all mining was done underground.

This report summarizes the results of Diavik's environmental monitoring and management programs during 2015. Copies of the reports listed can be found in the EMAB registry (in their office, or on-line library at http://www.emab.ca/Library.aspx) or Wek'èezhìi Land and Water Board public registry (http://www.mvlwb.ca/Boards/WLWB/SitePages/search.aspx?app=W2007L2-0003 (prior to October 2015) or http://www.mvlwb.ca/Boards/WLWB/SitePages/search.aspx?app=W2015L2-0001).

Summary of 2015 Environmental Activities

Re-vegetation

In 2004, Diavik started doing research on ways to help plants grow back after the mine closes. This research continued in 2015, and is currently planned through to 2016 with the goals of determining: how best to grow plants from seed, how effective different planting methods are on plant growth and which conditions improve plant growth over time. The research will look at how effective it is to use different planting techniques in patches around the mine site at closure, as this is something that has worked well for other large sites. This work will also include more monitoring of the research plots from 2004, to see how well they are doing over time.

Wildlife

Caribou monitoring continued to focus on behavioural observations (watching caribou to study their reaction to mining or other activities) when caribou were present in the study area. Movement patterns predicted in the Environmental Assessment have shown to be correct, travelling to the west of Diavik and Lac de Gras in spring and to the east in fall. There were no caribou deaths or herding events at the mine in 2015.

Wolverine, grizzly bears and falcons continue to be present in the mine area. Incidental observations are recorded to track the number of times a species is seen on site, including if they are using any of the mine buildings for denning or nesting. There were no deaths or injuries to any of these species on site during 2015. Regional monitoring programs are also conducted, such as a wolverine track survey and a peregrine falcon nest survey in the spring.

Vegetation, Dust and Air Quality

Snow samples are taken every spring and they are melted to test for the amount of dust on the snow and the type and amount of chemicals in that dust. Dust particles are also captured in collectors and checked to see if there are patterns in the amount and location of dust from the mine. During 2015, the amount and quality of the dust was within expected levels.

A total of 67.5 million litres of diesel were used to operate the mine site and the amount of greenhouse gasses generated from fuel use equalled 192,843 tonnes of carbon dioxide (CO_2e).

Water

Diavik continued to do the Aquatic Effects Monitoring Program (AEMP) and on site Surveillance Network Program (SNP) monitoring in 2015. The AEMP studies different parts of the lake in different years in order to identify possible effects to Lac de Gras from mining activities. The types of samples taken in 2015 included water chemistry (quality), sediment (lake bottom) chemistry, plankton (tiny plants and animals in the water - amount and type) and benthic invertebrates (small bugs that live on the lake bottom - amount and type). The AEMP Traditional Knowledge Study of fish and water health was also completed in 2015.

Changes to the lake are mostly cause d by an increase in nutrients from the groundwater and blasting. Diavik tries to reduce the amount of nutrients that reach Lac de Gras by using blasting controls, careful selection of blasting materials as well as water management and treatment.

Community Engagement/Traditional Knowledge

Diavik values opportunities to share updates on environmental monitoring and closure planning progress with community members. Diavik works with each PA organization to try and determine a suitable method and time to carry out such events. Community meetings, open houses and school visits are some of the methods used to achieve this over the years. The following table summarizes planned and completed engagements relating to the environment that Diavik conducted in partnership with the Participation Agreement (PA) organizations during 2015.

Diavik also tries to bring community members to the mine site so that they can see the mine and observe the surrounding environment with their own eyes. While it is impossible to bring everyone to site, the hope is that those who have been involved share their experience with others back home in the community.

Diavik has a Traditional Knowledge (TK) Panel with a primary focus of considering and incorporating Traditional Knowledge into mine closure planning. The TK Panel's focus in 2015 was water monitoring and management, as well as fish habitat designs for the mine site after closure.

The AEMP TK Study for fish health and water quality was carried out in August 2015. Overall, participants in the 2015 AEMP Traditional Knowledge (TK) Study commented that the present status of the fish and water in Lac de Gras beside the Diavik mine is good and better than they expected given how close it is to industrial activity. Participants acknowledged that it is also important to pair TK with science so that all aspects of the environment can be understood to its full potential.

Table A: Planned and Completed Community Engagements Relating to Environment During 2015

Organization	Methods	Dates	Topics
KIA Steering Committee	Meeting Meeting	2015-02-09 2015-11-09	A21 approval and construction, Water License renewal process, Environmental Performance, Closure Planning & TK Panel overview
KIA Implementation	Conference Call Conference Call	2015-05-21 2015-06-08	TK Panel overview
Kugluktuk - Hamlet	Meeting	2015-08-31	Environmental monitoring participation & Closure TK Panel administrative support
Kitikmeot Corporation	Conference Call Meeting Meeting Meeting	2015-03-20 2015-05-24 2015-10-02 2015-11-17	A21 approval and construction
LKDFN Chief & Council	Site Visit Community Update Meeting Meeting	2015-04-28 2015-06-11 2015-10-26 2015-11-10	A21 approval and construction, Water License renewal process, Environmental Performance
LKDFN Community	Open House Career Fair Community Update	2015-03-26 2015-05-22 2015-06-11	A21 approval and construction, Water License renewal process, Environmental Performance
LKDFN L&W Committee	Meeting Site Visit	2015-03-26 2015-04-20	Water License renewal process, Environmental Performance, Closure Planning & TK Panel overview
NSMA Environment	Meeting	2015-03-27	A21 approval and construction, Water License renewal process, Environmental Performance, Closure Planning & TK Panel overview
TG Kwe Beh Working Group	Meeting	2015-09-29	A21 approval and construction, Water License renewal process, Environmental Performance, Closure Planning & TK Panel overview

Organization	Methods	Dates	Topics
TG Implementation & Committee	Meeting Meeting Conference Call Meeting Meeting Meeting Meeting Meeting Meeting Meeting	2015-02-18 2015-04-07 2015-04-21 2015-05-23 2015-06-12 2015-06-23 2015-07-22 2015-09-23 2015-10-02 2015-10-19	A21 approval and construction, Water License renewal process, Environmental Performance, Closure Planning & TK Panel overview, Tłı̨chǫ Cosmology Session
TG – Chiefs & Chief Executive Committee	Meeting	2015-07-30	A21 approval and construction, Water License renewal process, Environmental Performance, Closure Planning & TK Panel overview
TG Communities	Imbe Workshop	2015-08-20	Modern Challenges week
YKDFN - Implementation	Meeting Meeting Meeting Meeting Meeting Meeting Meeting	2014-12-08 2015-04-07 2015-05-15 2015-06-09 2015-07-22 2015-11-26 2015-12-11	Environmental Performance, TK Panel overview, Environmental monitoring participation & Closure TK Panel administrative support
YKDFN Chiefs	Meeting Site Visit / WR Tour Meeting Meeting Conference Call Meeting Meeting	2015-02-06 2015-03-23 2015-03-25 2015-04-24 2015-06-19 2015-09-11 2015-09-22	A21 approval and construction, Water License renewal process, Environmental Performance, Closure Planning & TK Panel overview

New Technologies & Energy Efficiency

There are four wind turbines that operate at the Diavik mine, and staff continued to increase the efficiency of these turbines throughout the year. The wind turbines provided 11% of the mine's power needs and offset 5.2 million litres (6.5%) of diesel fuel use in 2015, which was an increase from the previous year. The turbines have flashing lights to help deter wildlife and bird mortality from the rotating blades.

Diavik also looked at ways to possibly change how the Process Plant operates. The Plant removes diamonds from kimberlite rock, and the rock ends up as either a wet slime (like Jello) or in small pieces similar to sand. The Plant makes more slimes than sand, but slimes will be harder to deal with at closure. Diavik is looking at new technology that could be installed in the Plant to make more sand and less slime.

Compliance and EMAB

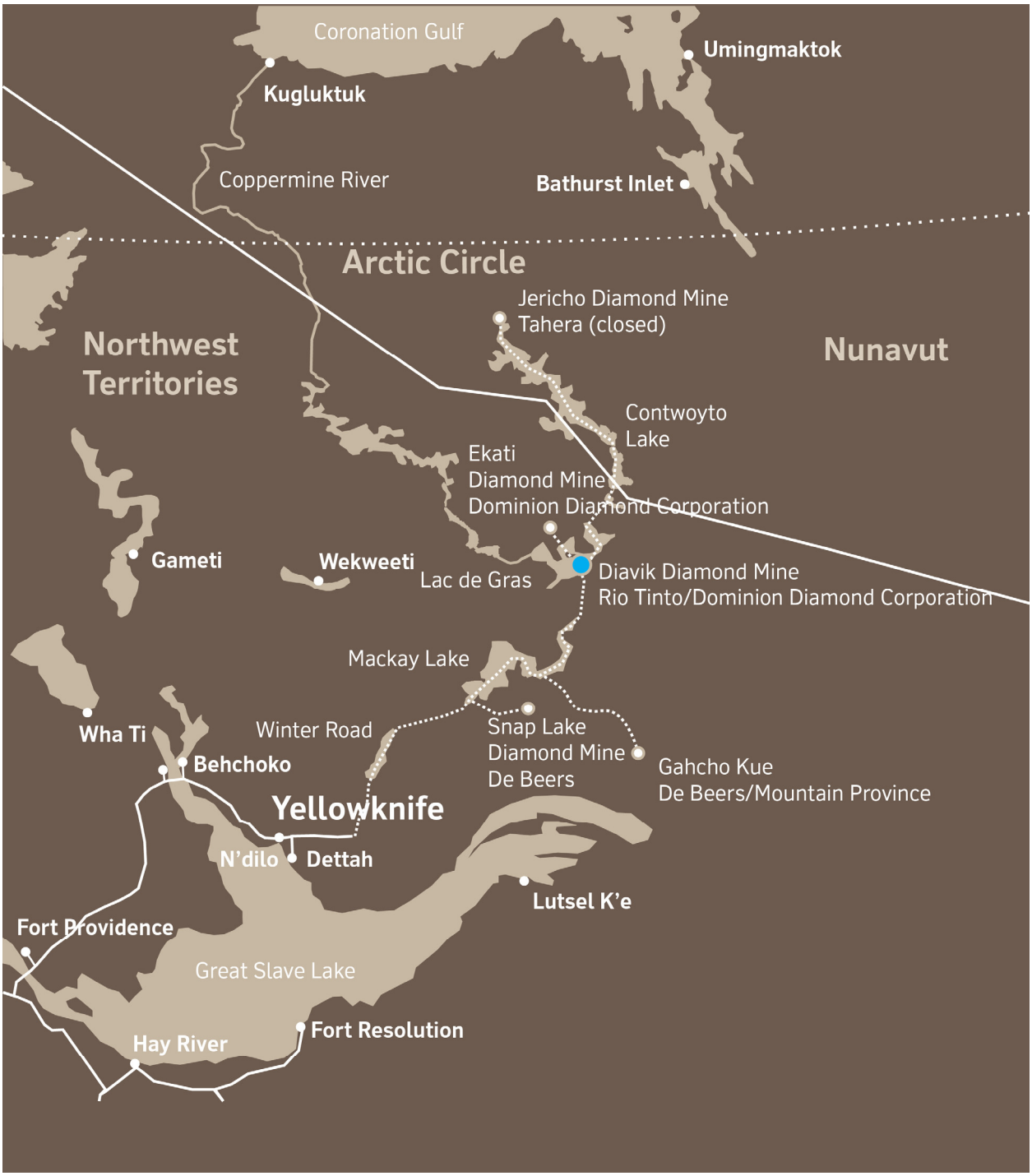
Diavik has a dedicated Inspector that works for the government and visits the mine site to make sure that Diavik continues to meet the terms of the water license and land leases. During 2015, the Inspector visited the mine site 14 times and few environmental risks or concerns were noted by the Inspector. On 8 August 2015, sediment levels in Lac de Gras water exceeded Diavik's water license criteria while the A21 dike was under construction. Weather conditions at the time included continuous high winds. Wave action on the turbidity curtain (a barrier that separates the construction site from the rest of Lac de Gras) caused air to accumulate under the curtain and this raised the curtain off the lake bottom, allowing sediment (disturbed from the bottom of the lake by construction activities) to spread into the lake water. The exceedance was found quickly and corrective action was taken to add extra anchor weights to the curtain to help it stay in place. Within hours the sediment levels in the water had returned to below the water license limit. This has been the only exceedance that has occurred during construction for all three dikes.

There were no direct communications or letters expressing concerns from the public about the mine or its operations during 2015. Diavik renewed their Water License in 2015 and the public review process for the renewal included an opportunity for reviewers to share any concerns with mine operations or impacts (http://www.mvlwb.ca/Boards/WLWB/SitePages/search.aspx?app=W2015L2-0001). The 2014 Environmental Agreement Annual Report (EAAR) was deemed to be satisfactory by the Deputy Minister of the GNWT, Environment and Natural Resources on 29 September 2015. The letter included a requirement for Diavik to respond to reviewer comments. Diavik's response was submitted on 25 November 2015, and any relevant requests for changes to the 2015 EAAR have been addressed in this report.

The Environmental Monitoring Advisory Board (EMAB) and Diavik exchanged letters relating to topics such as the budget and reviews of various environmental monitoring programs.

Thank you/Marsi Cho/Masi Cho/Quana to the Kitikmeot Inuit Association, Tłı̨chǫ Government, Yellowknives Dene First Nation, Lutsel K'e Dene First Nation and the North Slave Metis Alliance for the efforts of their staff, businesses and individual members who worked with Diavik staff in 2015. The continued support of Diavik's PA partners helps to make sure that environmental impacts are minimized and our resources are used wisely.

Diavik Diamond Mine Location Map



List of Acronyms (abbreviations found in this report)

AEMP	Aquatic Effects Monitoring Program
ARD	Acid Rock Drainage
AANDC	Aboriginal Affairs and Northern Development Canada
BOD	Biological Oxygen Demand
CCME	Canadian Council of Ministers of the Environment
DDMI	Diavik Diamond Mines Inc.
EA	Environmental Agreement or Environmental Assessment
EAAR	Environmental Agreement Annual Report
EMAB	Environmental Monitoring Advisory Board
EMS	Environmental Management System
ENR	Environment and Natural Resources
GNWT	Government of the Northwest Territories
ICRP	Interim Closure and Reclamation Plan
LDG	Lac de Gras
MVLWB	Mackenzie Valley Land and Water Board
NIWTP	North Inlet Water Treatment Plant
NTU	Nephelometric Turbidity Units (measurement of water turbidity)
PA	Participation Agreement
PK/PKC	Processed Kimberlite/ Processed Kimberlite Containment
PVP	Permanent Vegetation Plot
QA/QC	Quality Assurance/Quality Control
SNP	Surveillance Network Program
SOP	Standard Operating Procedure
TEK/TK/IQ	Traditional Ecological Knowledge/Traditional Knowledge/Inuit Qaujimajatuqangit
TP	Total Phosphorous
TSP	Total Suspended Particulates
TSS	Total Suspended Solids
WLWB	Wek'èezhìi Land and Water Board
WMMP	Wildlife Monitoring and Management Plan
WTA	Waste Transfer Area
ZOI	Zone of Influence

Definitions

Abundance – a count or measurement of the amount of any one thing

Action Level - a level of environmental change which, if measured in an aquatic effects monitoring program, results in a management action well before effects that could be harmful to the lake can happen

Adaptive Management - a systematic way of learning from monitoring results or management actions with the intent to improve operating or management practices

Benthic Invertebrates – small bugs without a backbone that live in the sediments on the bottom of a lake or river; can include flies, worms, clams, etc.

Density – total amount of a given substance within a defined area

Deposition Rate – the speed at which something settles on to a surface, e.g. how slow/fast a piece of dirt falls through water to settle on the bottom of a lake

Distribution – how any one thing may be spread out over an area

Effluent – cleaned/treated water from the sewage or water treatment plant that is discharged from the plant after cleaning

Enrichment – addition of an ingredient that improves quality; if too much is added, it may then start to reduce quality

Environmental Assessment – process to review potential environmental impacts for a project that is being considered for development and decide if the project can be developed

Eutrophication – water bodies like a lake receive a lot of nutrients and then start to grow a lot of plants within the water

Habitat Compensation – replacement of natural habitat lost during construction of the mine; done using man-made features to improve areas of natural habitat

High-level Effects – change noticed between different areas that may start to be higher than an agreed-upon standard

Interim Closure & Reclamation Plan – a document that outlines ways to close a mine, including what needs to be done with water, land and wildlife. 'Interim' means that it is less detailed than a final plan, as there are still questions to answer before the final design or plan can be done.

Low-level Effect – early-warning level where little change is detected

$mg/dm^2/y$ – milligrams per decimeter squared per year, the amount of dust deposited in a given area each year

Mitigation Measures – things that are done to control or prevent a risk or hazard from happening

Moderate Effect – some change noticed between different areas that may start to be higher than an agreed-upon standard

Monitoring – a way to check on performance and compare it against an expected result, e.g. is anything changing

Parameters – chemical and physical signs that can be used to determine water or soil quality

Plume – an area in air, water or soil that is affected from a nearby source, e.g. a plume of smoke around an erupting volcano

Prediction – an educated guess of what will happen in the future, can be based on existing knowledge or experience where possible

Progressive Reclamation – starting to repair certain areas of land damage by mining activity while the rest of the mine is still operating; focus is on areas where mining activities are complete

Research – a structured way to test questions on unknown features of the environment, e.g. reasons why a change may be happening

Risk Assessment – a way to identify possible harmful effects by looking at how harmful the effect could be and how often it could occur. After risks have been identified, management actions are defined.

Sediment Chemistry – the mineral content of dirt particles that sit on the bottom of the lake

Seepage – a release of water or other liquid material that flows through or out of a containment area

Total Suspended Particulates - small particles in the air that measure 100 micrometers in size (which is slightly larger in size than the diameter of a human hair at 75 micrometers)

Trophic Status – a measure of lake productivity based on how many plants are in the lake

Water Quality – an overall characterization of the chemical (nutrients or metals), physical (temperature) and biological (algae) features of water in a lake or river

Weight-of-Evidence (WOE) – an estimate of the strength (weight) of proof (evidence) that is provided by jointly considering the results from each type of sample (i.e. water quality, nutrients, sediment, small animals and plants living in the lake waters, bugs living on the bottom of the lake, fish health and fish tissue chemistry), throughout a season or across multiple years, to determine the overall effect of mine operations on Lac de Gras.

1. Introduction

Diavik and the Environmental Agreement

The Diavik diamond mine is located on the East Island of Lac de Gras, in Canada's Northwest Territories, approximately 300 kilometers northeast of the capital city, Yellowknife. The lake is roughly 60 kilometers long and drains into the Coppermine River, which flows north to the Arctic Ocean. Diavik Diamond Mines Inc. (DDMI) undertook an Environmental Assessment that started in 1998 through the Canadian Environmental Assessment Agency. The mine has been operating since 2003, and protecting the environment around the mine continues to be important.

Diavik signed an Environmental Agreement ("the Agreement" or EA) with 5 Aboriginal organizations and the federal and territorial governments in 2000. The Agreement says what Diavik is to do to protect the environment while operating and closing the mine.

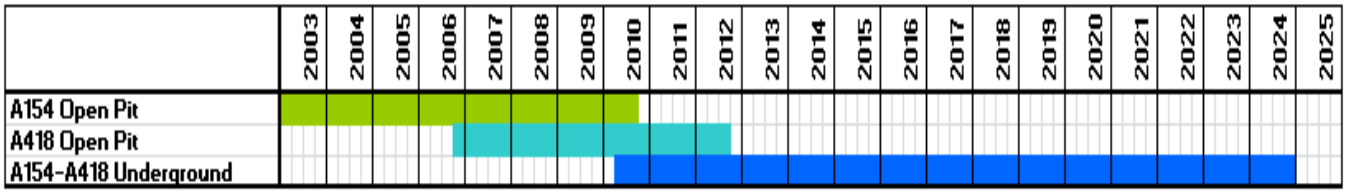
There was also an Environmental Monitoring Advisory Board (EMAB) formed as part of the Agreement; the Board is a public watchdog of the regulatory process and the implementation of the EA.

This report summarizes the results of Diavik's environmental monitoring and management programs during 2015. Complete copies of the numerous reports that Diavik submits each year can be found in the EMAB library (at their office, or on-line at http://www.emab.ca/Library.aspx), or Wek'èezhìi Land and Water Board public registry (http://www.mvlwb.ca/Boards/WLWB/SitePages/search.aspx?app=W2007L2-0003; or http://www.mvlwb.ca/Boards/WLWB/SitePages/search.aspx?app=W2015L2-0001).

Operational Plans

The Diavik diamond mine was in its thirteenth year of operations during 2015, and operated as an all-underground mine. Construction of a third dike to support mining of the A21 kimberlite pipe began in 2015, and will continue in 2016. The figure below shows a timeline of Diavik's mine plan, which shows mining activities planned for the next several years and closure planned in 2024.

Diavik's Planned Schedule of Operations



Feasibility of the A21 kimberlite continues to be assessed
Mining schedule subject to change due to market conditions, further mineral resource evaluation, ongoing mine plan updates, etc.

Figure 1 **Diavik Diamond Mine Labelled Site Satellite Photo**

2. Environmental Agreement Annual Reporting Commitments

Section 12.1 of the EA outlines the content to be reported annually to the Parties, the Government of Nunavut, and the Advisory Board on June 30th (submission date revised from March 31st in 2003), as outlined in Table 1.

Table 1: Summary of EA Commitments in Relation to the 2015 EAAR

EA Commitment	Plain Language Interpretation (from EMAB)
Comprehensive summary of all supporting information, data and results from the Environmental Monitoring Programs and all studies and research	A full summary of all supporting information, data and results from the Environmental Monitoring Programs, plus all studies and research related to these
Rolling summary and analysis of environmental effects data over the life of the Project; compare results to predictions in environmental assessment & CSR, and illustrate any trends	A summary that adds in data of each year and an analysis of environmental effects data over the life of the Project - to show patterns over the years
Comprehensive summary of all compliance reports required by the Regulatory Instruments	A full summary of all reports on how Diavik has followed all rules and regulations in the Regulatory Instruments
Comprehensive summary of operational activities during the preceding year	A full summary of mining activities during the year up to the annual report
Actions taken or planned to address effects or compliance problems	The ways Diavik is fixing any environmental effects or problems following rules and regulations
Operational activities for the next year	A summary of mining activities for the next year
Lists and abstracts of all Environmental Plans and Programs	Lists and summaries of all Environmental Plans and Programs
Verification of accuracy of environmental assessments	A check that environmental assessments are correct
Determination of effectiveness of mitigation measures	A report on how well steps to lessen effects are working
Comprehensive summary of all adaptive management measures taken	A full summary of all adaptive management steps taken
Comprehensive summary of public concerns and responses to public concerns	A full summary of public concerns and responses to public concerns
Comprehensive summary of the new technologies investigated	A full summary of the new technologies Diavik has looked into

EA Commitment	Plain Language Interpretation (from EMAB)
Minister's comments, including any Minister's Report, on the previous Annual Report	The Minister's comments on the Annual Report from the year before, including any Minister's Report
Plain language executive summary and translations into Dogrib/Tłı̨chǫ, Chipewyan, and Inuinnaqtun using appropriate media	Plain English executive summary translated into Dogrib/Tłı̨chǫ, Chipewyan, and Inuinnaqtun

3. Environmental Programs and Plans - 2015

This section outlines the various environmental plans and programs that Diavik follows. For each plan/program, a brief outline is provided that explains why the program is being done and/or how it is completed. Many of these plans and programs are the same from one year to the next. As stated in Diavik's Water License, plans that have not changed do not require updates; those that have been updated and submitted for regulatory approval during 2015 are identified in Table 2. Additionally, Appendix I contains a list of mitigation measures and adaptive management actions that have been implemented during mine operations.

Management & Operations Plans

Management and operations plans are site-specific documents that identify potential environmental issues and outline actions to minimize possible impacts that could result from mining activities. They are reviewed by DDMI each year and updated as required (i.e. if something changes). Table 2 lists the management and operations plans required under DDMI's water license, summarizes the purpose of the plans and identifies which plans were updated for 2015.

Table 2: Management & Operations Plans for the Diavik Mine

Plan & Version Number	Purpose	Updated in 2015 (Y/N)	Updates/ Comments
Ammonia Management Plan, v5	To assist in achieving the lowest practical amount of ammonia from explosives that would enter the mine water and waste water streams. The plan details how ammonia management performance is evaluated, and includes details of ammonia management techniques.	No (2013)	N/A
Waste Rock Management Plan v7	Rock types that surround the kimberlite may have minerals in them that can cause water to become acidic when it runs over the rock. The plan describes how DDMI identifies, separates, and stores the rock to reduce acid runoff.	Yes	- Alignment with new regulatory references - Updated construction material criteria - Organizational changes - Administrative changes

Plan & Version Number	Purpose	Updated in 2015 (Y/N)	Updates/ Comments
Interim Closure & Reclamation Plan v3.2	Outline closure goals (overall vision for what Diavik would like to achieve), objectives (steps the organization needs to take to achieve the goals – specific and measureable) and criteria (a standard against which success is measured), and includes engineering designs and research programs for closure of all the major components of the mine. Because it is a plan that evolves over time, it does not yet include final closure designs or details on specific after-closure monitoring programs.	No (2011)	- Annual progress reports are submitted to the WLWB; 2015 Progress Report was submitted on 21 January 2016
Hazardous Materials Management Plan, v19	Describe procedures for the safe and efficient transport, storage, handling and use of chemicals for mining. Prevention, detection, containment, response, and mitigation are the key elements in the management of hazardous materials. The plan also describes how hazardous materials will be removed from site during closure.	Yes	- Current status of mining operations - Electronic MSDS provider information - Type of emulsion mixture used on site
Operational Phase Contingency Plan, v20	Describe response procedures for any accidental release (spill) of hazardous or toxic substances, as well as procedures for water management. The OPCP outlines the responsibilities of key personnel and gives guidelines for minimizing impacts to the environment, including contingencies for the underground mine.	Yes	- External contact details
Water Management Plan, v14	Describe how water around the site is moved, treated, monitored and controlled. Also includes a 'water balance', which gives Diavik an idea of the amount and location of water on site at any given time, so that plans can be made for handling and treating water.	Yes	- 2015 data - Alignment with new regulatory references - Water balance - PKC dam raise plans
Waste Management Plans (includes Incinerator v1, Hydrocarbon Impacted Materials, Solid Waste & Landfill v1, Dust)	Identify the types of waste generated on site and outline methods for the minimization, collection, storage, transportation and disposal of wastes in a safe, efficient and environmentally compliant manner. Characterizes and segregates waste streams according to their on- and off-site disposal requirements.	Yes	- Alignment with new regulatory references - Asset disposal procedure - Landfill criteria - Waste stream sampling procedures - Dust management processes

Plan & Version Number	Purpose	Updated in 2015 (Y/N)	Updates/ Comments
A21 Construction Environmental Management Plan, v5	Identify the types of waste generated	Yes	- Remove option to leave turbidity barrier in over winter & new 2016 alignment - Hydraulic dredge information added - Improved description of TSS/Turbidity response plan & monitoring - Alignment with new regulatory references
Processed Kimberlite Containment (PKC) Facility Operations Plan, v2.1	Outline how to handle the water and solids within the PKC facility. Includes information on PKC design, dam construction, monitoring and characterization programs for water, ice & solids stored within the PKC. The plan also explains contingency and mitigation measures for the facility.	No (2012)	N/A
North Inlet Water Treatment Plant (NIWTP) Operation Manual, v1	Provide background information about the plant (area layout, design parameters, etc.), operational requirements of the plant (as it relates to water management both on site and within the plant) and plant maintenance requirements.	No (2012)	N/A
Sewage Treatment Plant (STP) Facility Operations Plan, v3	A guide for operators of the plant that outlines the design and layout, operating guidelines and requirements, performance monitoring techniques and requirements, contingency planning, preventative maintenance and closure of the plant.	No (2011)	N/A

Monitoring Programs

Monitoring programs are designed to track changes to the environment as a project develops, and are usually linked to predictions from an Environmental Assessment. Monitoring programs required for Diavik are summarized within the water license (W2015L2-0001), Fisheries Authorization or EA. A summary of the monitoring programs conducted during 2015 is outlined in Table 3.

Table 3: Monitoring Programs for the Diavik Mine

Monitoring Program	Purpose	Completed (Y/N)	Comments
Wildlife			
Caribou Behaviour Observations	If/how caribou behaviour changes in relation to distance from mine	Y	
Aerial Caribou Surveys	Zone of Influence of mining activities in the LDG region	N	Suspended
Caribou Road Surveys	Effectiveness of mitigation measures	Y	Initiated based on collar data or reported sightings
Wolverine Track Survey	Wolverine presence in the area of the mine	Y	
Wolverine DNA	Wolverine numbers in the LDG area	N	Regional program with GNWT & other mines; not completed annually
Grizzly Bear DNA	Bear numbers in the LDG area	N	Regional program with other mines; not completed annually
Raptor Survey	Regional estimate of number of nests with birds in them and how many chicks are alive	Y	Completed every 5 years with GNWT & other mines
Building Inspections	Survey mine buildings and pit walls to identify bird nests and/or wildlife use	Y	
Waste Inspections	Monitor waste disposal that may attract animals	Y	
Wildlife Presence	Track wildlife observations and numbers on the mine site	Y	
Wildlife Mortality & Injury	Track any wildlife deaths or injuries associated with mine operations	Y	
Water			
Mine Site Water Quality	Test water against Water License limits at a set frequency (Surveillance Network Program)	Y	

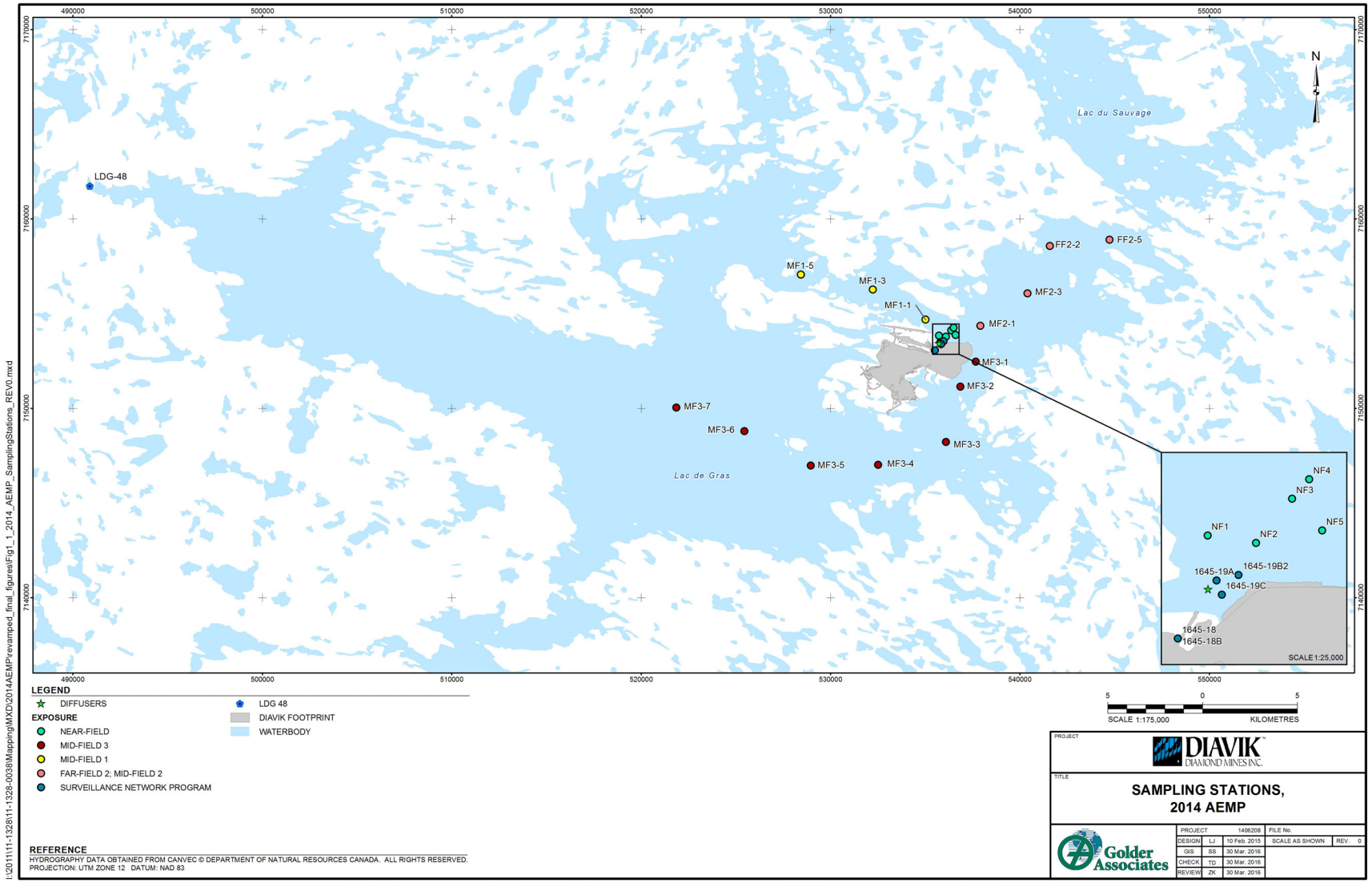
Monitoring Program	Purpose	Completed (Y/N)	Comments
Lake-wide Water Quality	Changes to water quality in LDG over time (part of Aquatic Effects Monitoring Program, AEMP)	Y	
Nutrients, Plants & Bugs in Water	Changes to nutrients, plants and bugs that live in the water column, over time (part of AEMP)	Y	
Lake Sediments	Changes to sediment quality in LDG over time (part of AEMP)	Y	Near diffuser
Lake Bottom Bugs	Changes to number and type of bugs that live on the lake bottom, over time (part of AEMP)	N	Completed every 3 years; next scheduled for 2016
Fish Health	Fish health tests through palatability and/or tissue chemistry	Y	AEMP TK Study for fish palatability
Water Quantity	Measure levels and sources of water used, added or moved on site	Y	
Air Quality, Dust & Vegetation			
Dust Deposition	Amount and chemistry of dust collected in dust gauges and on snow, close to and far from the mine	Y	
Total Suspended Particulates	Continuous monitoring of the amount of small dust particles that are emitted from mine operations	Y	
Meteorological	Weather trends and influence on water balance and dust deposition	Y	
Wildlife Habitat Loss	Track habitat lost due to mine development; total loss and preferred habitats for individual species	Y	
Vegetation Plots	Changes to type and amount of plants over time, near and far from the mine	N	Completed every 3 years; next scheduled for 2016
Lichen Study	Metal levels in lichen and soil, near and far from the mine; included health assessment for caribou consumption	N	Completed every 3 years; next scheduled for 2016

Aquatic Effects (Lake Water Quality & Fish Health)

The AEMP is designed to measure short and long-term changes in Lac de Gras. Sampling efforts focus on sampling stations in Lac de Gras that are located closer to the mine (where effects would first be expected to be measured). There are also sampling stations far away from the mine (where effects would take much longer to measure). Comparing information from both places allows changes in the lake caused by the mine to be measured over time (temporal) and can be measured near the mine site and further away (spatial).

There are 37 sample locations (Figure 2) where many different types of samples are taken. The types of samples that were collected in 2015 included: water quality (e.g. ammonia, metals), the amount and quality of dust deposited, sediments near the area where treated water is discharged back in to Lac de Gras, nutrient indicators (e.g. chlorophyll *a*), phytoplankton (tiny plants), zooplankton (tiny animals), as well as fish health, palatability and mercury levels.

Figure 2 2015 AEMP Sample Locations



Air Quality (Dust & Emissions)

The program goal is to understand dust deposition rates (how much dust falls onto the tundra and lake) caused by project activities, and the program provides data to support the Wildlife Effects and Aquatic Effects monitoring programs.

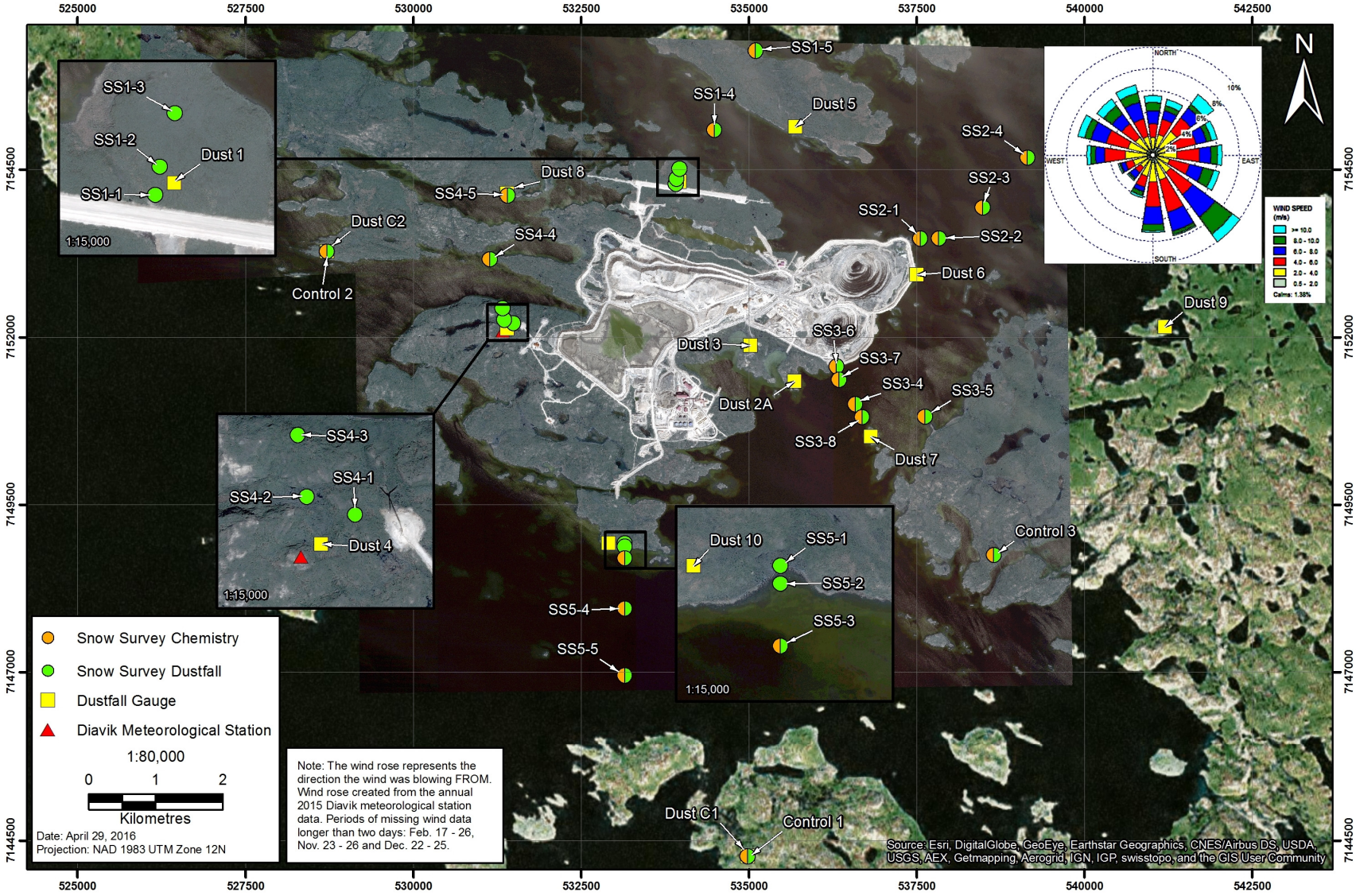
The sampling stations for the Dust Deposition Monitoring Program (Figure 3) were established through a transect approach (series of sample locations that extend outwards on ice and land from the mine site). Three new sample sites were added to the snow survey in 2014 (SS3-6, SS3-7, SS3-8) and Diavik now monitors:

- 12 permanent dust gauges - fixed-location sampling devices that collect dust for analysis all year long; and,
- 27 seasonal snow survey stations - GPS locations where Diavik collects snow samples to measure the amount of dust deposited over the winter (27 samples) and the water quality of the snow where dust was deposited on the lake (16 samples).

They are sampled each year and results have been compared with the British Columbia (BC) dustfall objective for the mining, smelting, and related industries. This objective is used by some mines in the Northwest Territories (NWT) for comparison purposes only, as there are no standards or objectives for the NWT.

The goal of the Air Quality Monitoring Program is to assist in identifying trends in dust deposition beyond the disturbed area of the mine. Two (2) continuous ambient air sampling stations monitor TSP concentrations (TSP – small particles in the air that measure 100 micrometers in size, which is slightly larger in size than the diameter of a human hair at 75 micrometers) continuously, and hourly concentrations are recorded.

Figure 3 2015 Air Quality Sample Locations – Dust and Snow Surveys



Surveillance Network Program (Water Quality at the Mine Site)

Diavik monitors water quality around the mine site in accordance with the Surveillance Network Program (SNP), which is a component of Diavik's water license. The SNP outlines where Diavik collects water samples, how often samples are collected, and what parameters (metals, nutrients and other water quality characteristics) are measured. The SNP also outlines sampling requirements for discharges to Lac de Gras during dewatering activities (e.g. dike construction).

Diavik monitors dams and dikes around the mine site for seepage. The dikes and dams are designed to hold back water; however, some seepage through these structures is expected. The purpose of the survey is to check areas of potential seepage so that Diavik can take appropriate measures to address seepage issues. The monitoring includes regular inspections of the dam and dike structures and collection of water samples. Typically, seepage occurs from May through to the beginning of October. The PKC holds enough water that it does not completely freeze in the winter, and therefore seepage can occur all year round.

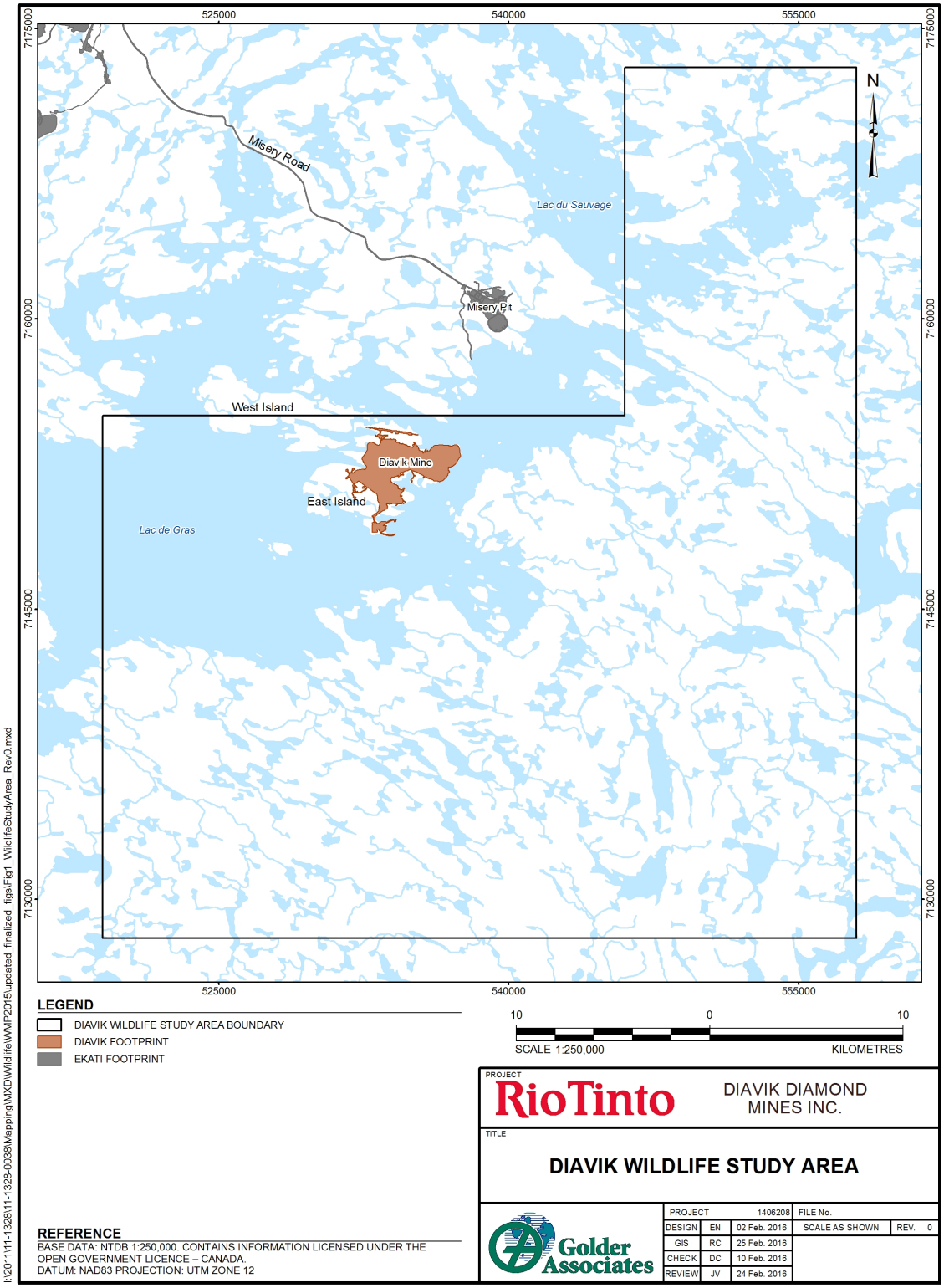
Diavik has a drainage control system to collect seepage before it enters Lac de Gras. It includes a number of collection wells and ponds (Figure 4), which surround major structures such as the PKC, and are monitored. There are some times where runoff from other areas of the mine may not go into a pond and will enter Lac de Gras, but it is usually a small amount of water for a short period of time.

Figure 4 **2015 Mine Water Quality (SNP) Sample Locations, including A21**

Wildlife & Plant Monitoring

Diavik developed a wildlife monitoring program to check if the actions taken to reduce impacts to wildlife are working. The program is called the Wildlife Monitoring and Management Plan (WMMP) and is a method for observing, mitigating and improving procedures for wildlife and habitat management at the mine site. The WMMP is therefore closely linked with Diavik policies, guidelines and management plans. As outlined in Table 3, the program includes monitoring for vegetation/wildlife habitat, caribou, grizzly bear, wolverine, raptors and waste management.

Figure 5 Regional Wildlife Study Area for the Diavik Mine



4. Results: Summary of Rolling Effects & Monitoring Program Changes

This section gives a summary of monitoring results and changes that have occurred to each program over time. Many of the changes have been made in response to data collected, observed deficiencies in study designs or based on feedback from various stakeholders. The Environmental Assessment included predicted indicators that would either stay the same over time or would change over time to pre-calculated predicted levels. The predictions for each indicator have been included in this section, followed by a summary of the information collected to verify those predictions over the years. Graphs and figures or tables are given where practical to show the trends over time. Where indicator trends are not similar to those predicted, DDMI has included a brief discussion of possible reasons. Further details can be found in the full reports that Diavik produces for each topic.

Water and Fish

At Diavik, water quality and fish health are monitored through the AEMP. The discussions below regarding fish and water come from the results of the AEMP.

What effect will the mine development have on water quality?

EA Predictions:

- Water will remain at a high quality for use as drinking water and by aquatic life (i.e. meet CCME thresholds);
- Localized zones of reduced quality during dike construction;
- Nutrient enrichment is likely from the mine water discharge (and may change the trophic status of up to 20% of Lac de Gras);
- Post-closure runoff expected to influence quality of two inland lakes.

2014 Observations:

As noted in the 2014 EAAR, the Annual AEMP report submission was delayed due to a request for further information from the WLWB. An updated version of the 3-year (2011-2013) Summary Report of the AEMP was submitted to the WLWB in April 2016, and the 2014 AEMP Annual Report was submitted on 31 March 2016. The development of the Reference Conditions Report for Lac de Gras is the main reason for these delays. It is a report that calculates and explains the background (natural) water quality and allows regulators to better determine the level of any effect on the lake. As such, the updated 3-year Summary Report and the 2014 Annual report are summarized in this section. The 2015 Annual AEMP Report as well as Version 4 of the AEMP Design document are both due on 30 June 2016, so a summary of these will be included in the 2016 EAAR.

Water quality tests showed that there were 19 elements that had amounts over two times higher close to the mine when compared to samples taken further away in Lac de Gras. Eight of these were also above what is considered the normal range for their concentrations in Lac de Gras.

Diavik is taking the appropriate actions outlined for such a response, as detailed in the approved Action Level Framework for water chemistry.

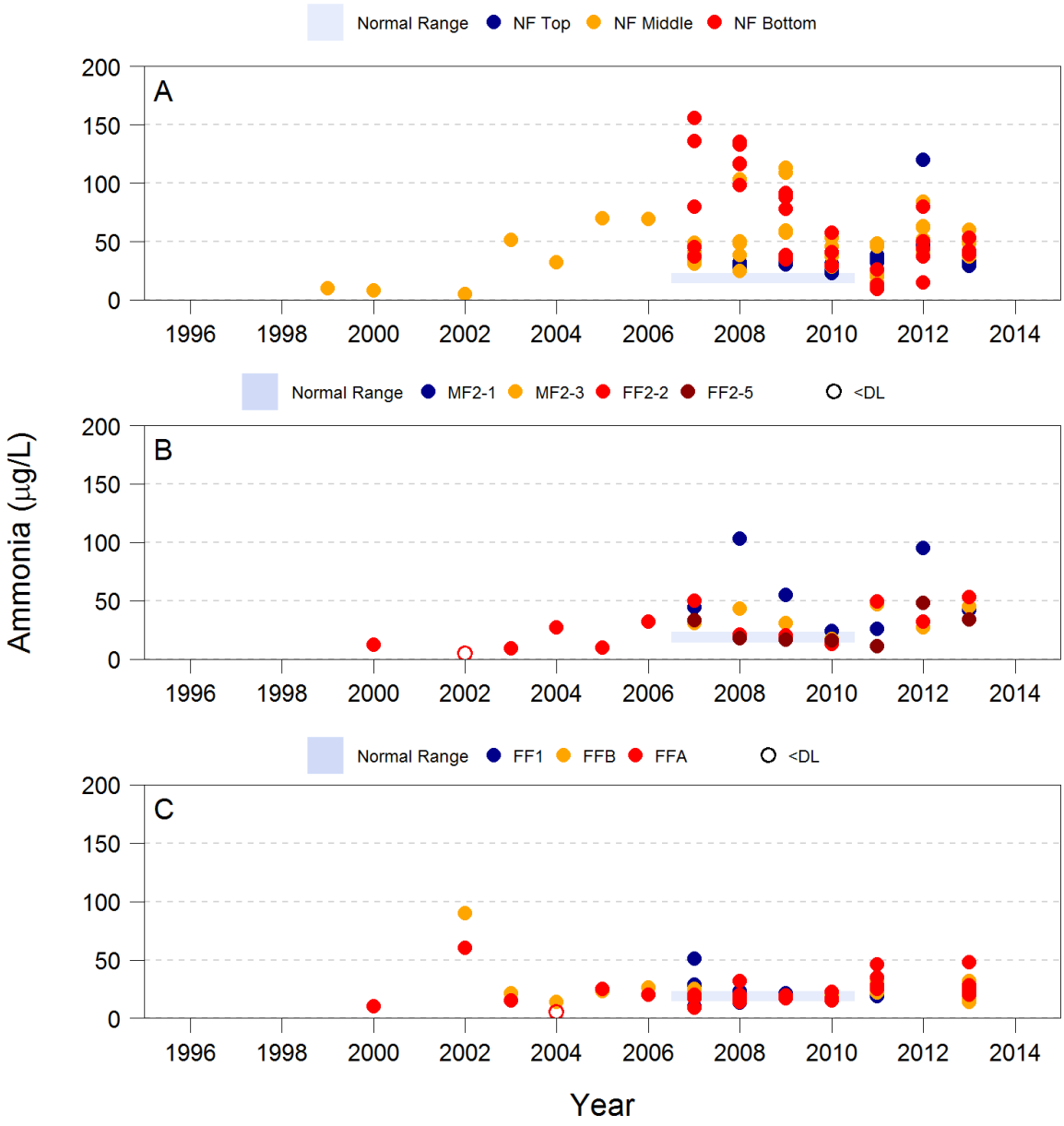
Nutrient addition to the lake, as measured by nitrogen, phosphorous and parts of algae concentrations, continued to show mild enrichment (an increase in nutrients) close to the mine compared to other areas farther from the mine. The small plants and animals that live in the water column (plankton) have increased in light of the increased nutrients, and tests do not show signs of harm (toxicological impairment) to the number or types of organisms that are present.

3-year Summary Report Observations:

Below is a summary of the updated findings for each of the monitoring activities included in the Aquatic Effects Monitoring Program, and it focuses on results from 2011 to 2013.

- The treated water that is discharged back into Lac de Gras has shown changes in quality over the years. For example, salts such as calcium and chloride have decreased since 2010. Some metals have increased over time (molybdenum, strontium), however most have decreased (aluminum, barium, copper, manganese) or stayed the same (chromium, uranium, antimony, silicon). The tested mine effluent has continued to meet water license criteria. Additionally, most of the effluent tested over the years has been non-toxic, with over 500 toxicity tests conducted since 2002.
- A total of 25 different chemicals had levels that were greater near the mine versus further away. Of these, 14 had higher levels than what is considered normal for Lac de Gras, but this does not necessarily mean that it is harmful. None of the chemicals tested were higher than what are called benchmark values, which measures when a chemical may be harmful to aquatic life. With the exception of chromium in 2004 and 2006, water quality has remained below the guidelines for protection of aquatic life throughout the life of the mine.

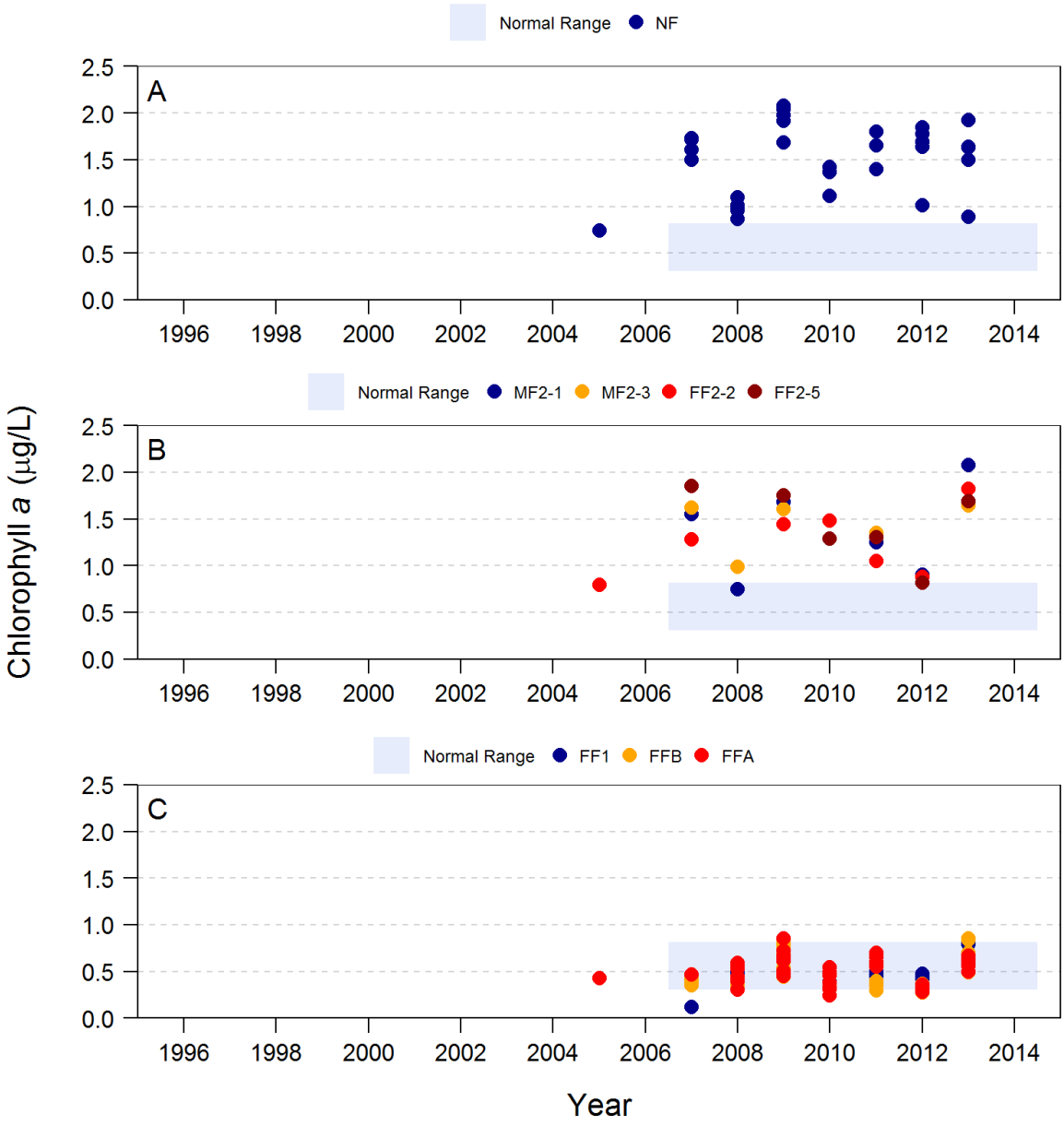
Figure 6 **Ammonia-Nitrogen Concentration (A – close to the mine, B – middle of lake, C – far from mine)**



- Increased productivity (eutrophication) was a predicted effect for Lac de Gras because groundwater and treated mine water would introduce more nutrients into the lake. This is why monitoring nutrients (phosphorous and nitrogen) and algae growth (determined by measuring chlorophyll *a*, the green pigment in algae) is important to measure over time. Concentrations of nitrogen and have been higher than the normal range in over 20% of the lake since 2008 and chlorophyll *a* had the same results in 2009 and 2013. Phosphorus was predicted not to go over 5 micrograms per litre in more than 20% of Lac

de Gras; this level has only been exceeded twice during ice cover in 2008 and 2013, and never during open water.

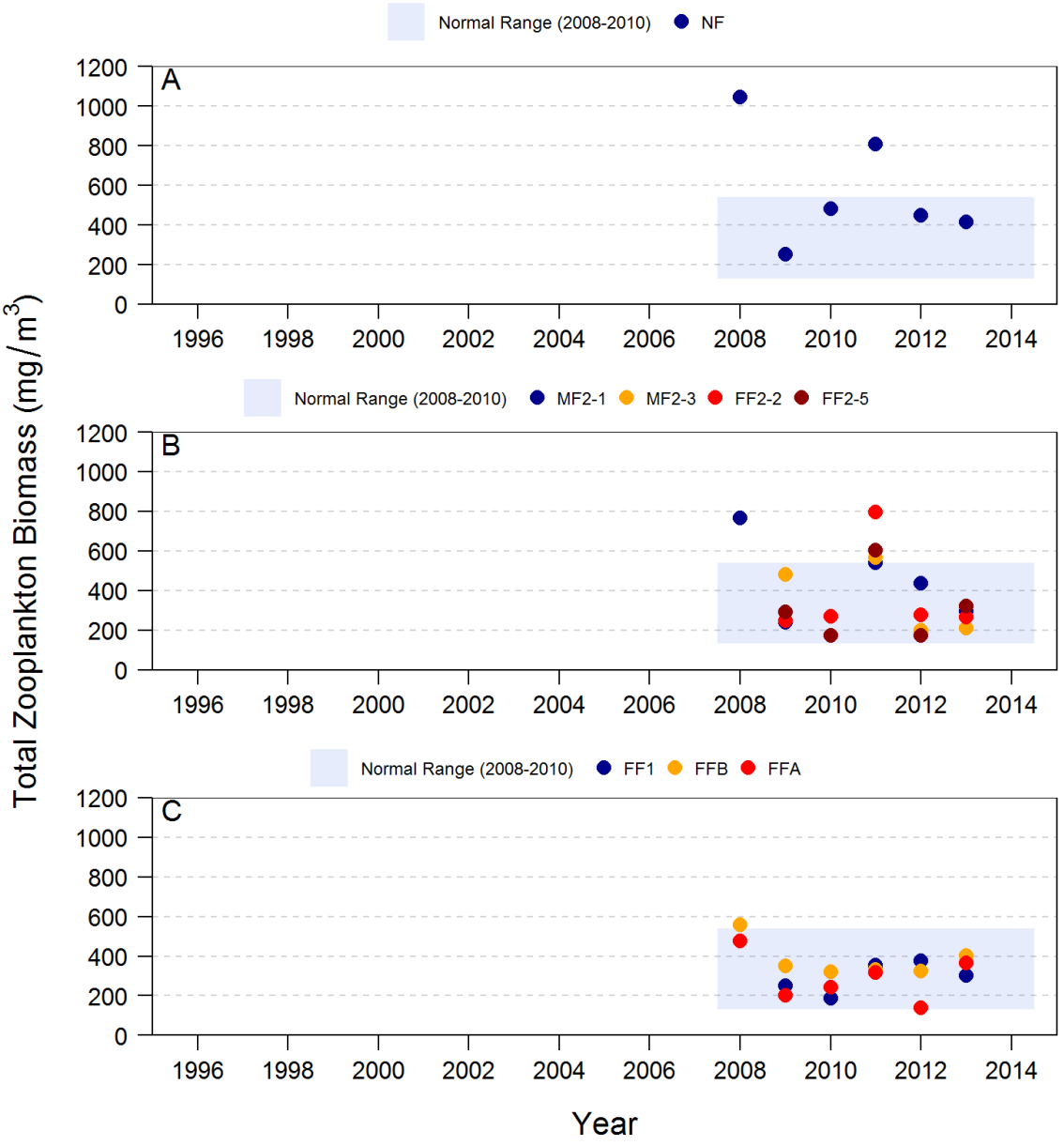
Figure 7 **Amount of Chlorophyll *a* in Open Water (A – close to the mine, B – middle of lake, C – far from mine)**



- Plankton (small plants and animals that live in the water column) are monitored because they are part of the food chain and changes in their population may be seen before any impacts are noted in fish. Since 2007, the amount of plankton has consistently been higher closer to the mine versus farther from the mine. Monitoring has shown that the mine is not having a harmful/toxicological effect on plankton. Changes to the type of plankton are being seen throughout Lac de Gras, suggesting that a natural change is also

occurring. The number of small animals in the water (zooplankton) peaked in 2011 and has decreased since then, but has still been greater than the normal range for Lac de Gras since 2007. The amount of phytoplankton (biomass of small plants) was greater than the normal range in more than 20% of the lake in 2009 and 2011.

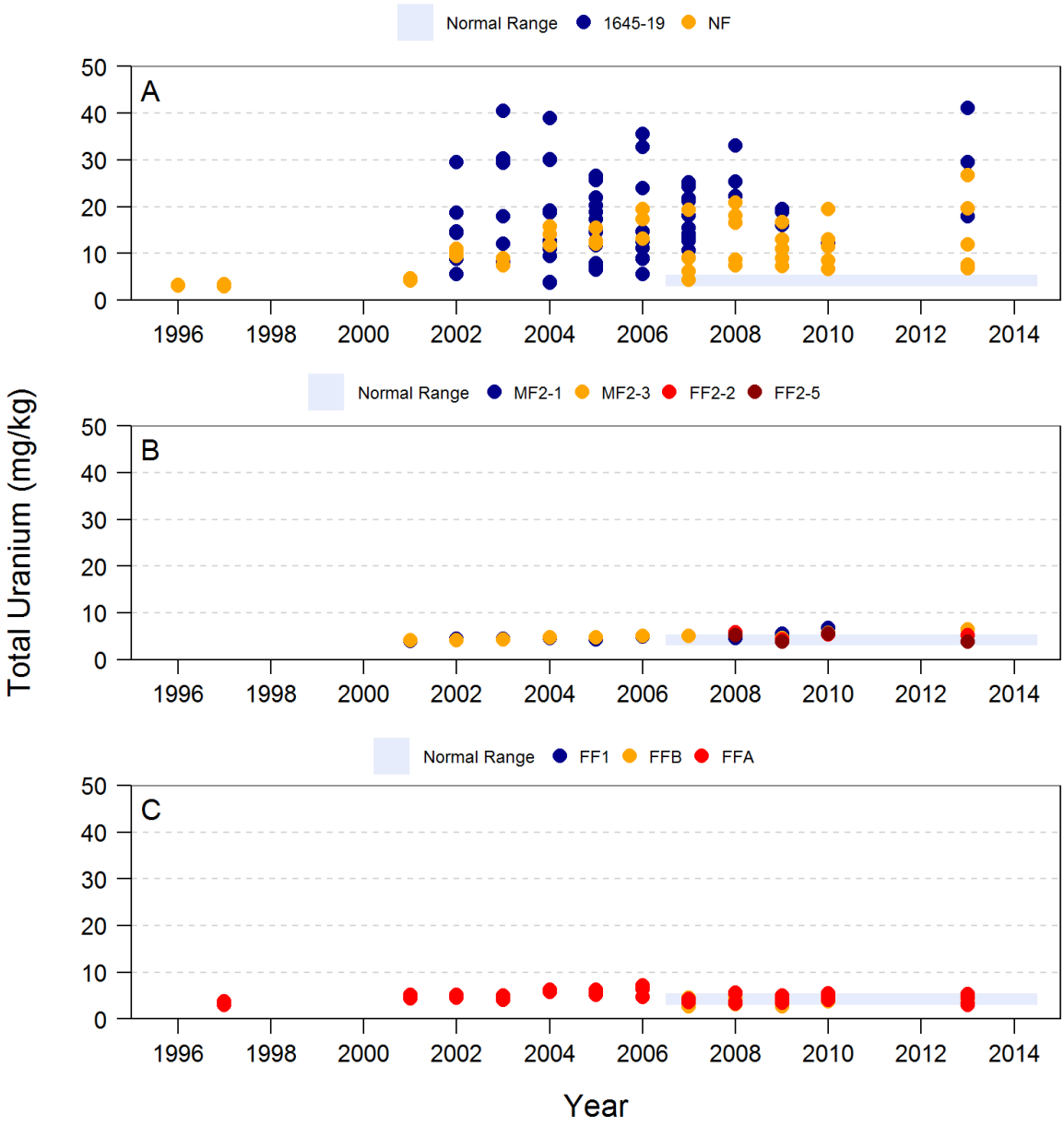
Figure 8 Amount of Zooplankton (A – close to the mine, B – middle of lake, C – far from mine)



- Sediment samples showed that 15 metals were deposited onto the lake bottom near the mine in greater amounts than are present in areas of the lake farther from the mine. To date, the amount of metals present has stayed below the guideline that protects animals living in the lake bottom sediments. Concentrations of bismuth, lead and uranium

increased near the mine from around 2002 to 2008, and it is thought that the construction of the dikes may have contributed to this increase. The amount of these metals in sediments has remained the same since 2008 and have not exceeded Soil Quality Guidelines.

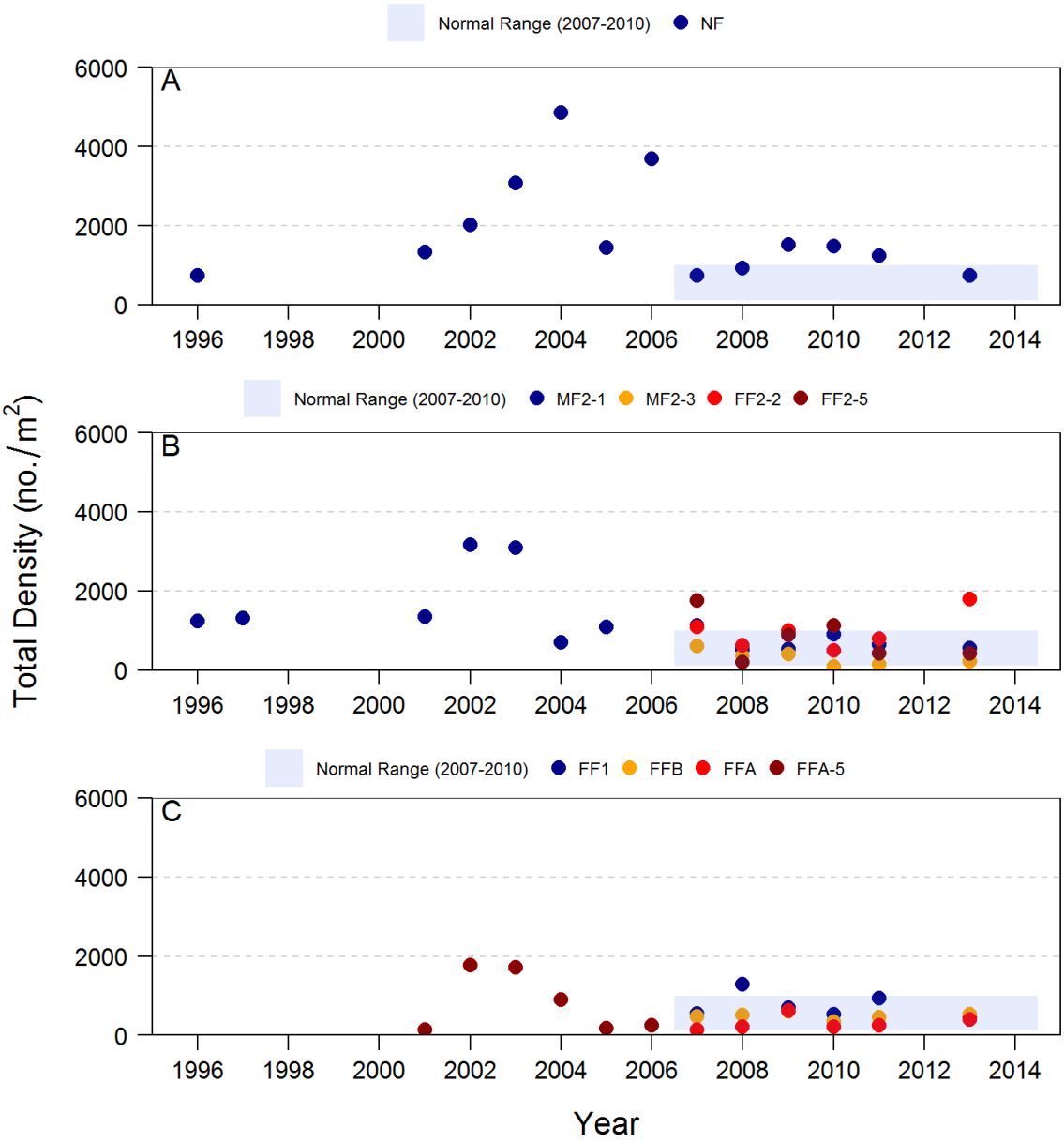
Figure 9 **Amount of Uranium in Sediments (A – close to the mine, B – middle of lake, C – far from mine)**



- Benthic invertebrates (bugs such as snails, clams worms and insects that live in the sediment on the bottom of the lake) are studied because they are food for fish. Since 2008, the number of bugs close to the mine has been higher than areas farther from the

mine, but they are within the normal range for the lake. The types of these bugs have changed over the years, but similar to the findings with plankton, a change over time has also been seen in the reference areas and suggests that natural changes occur over time.

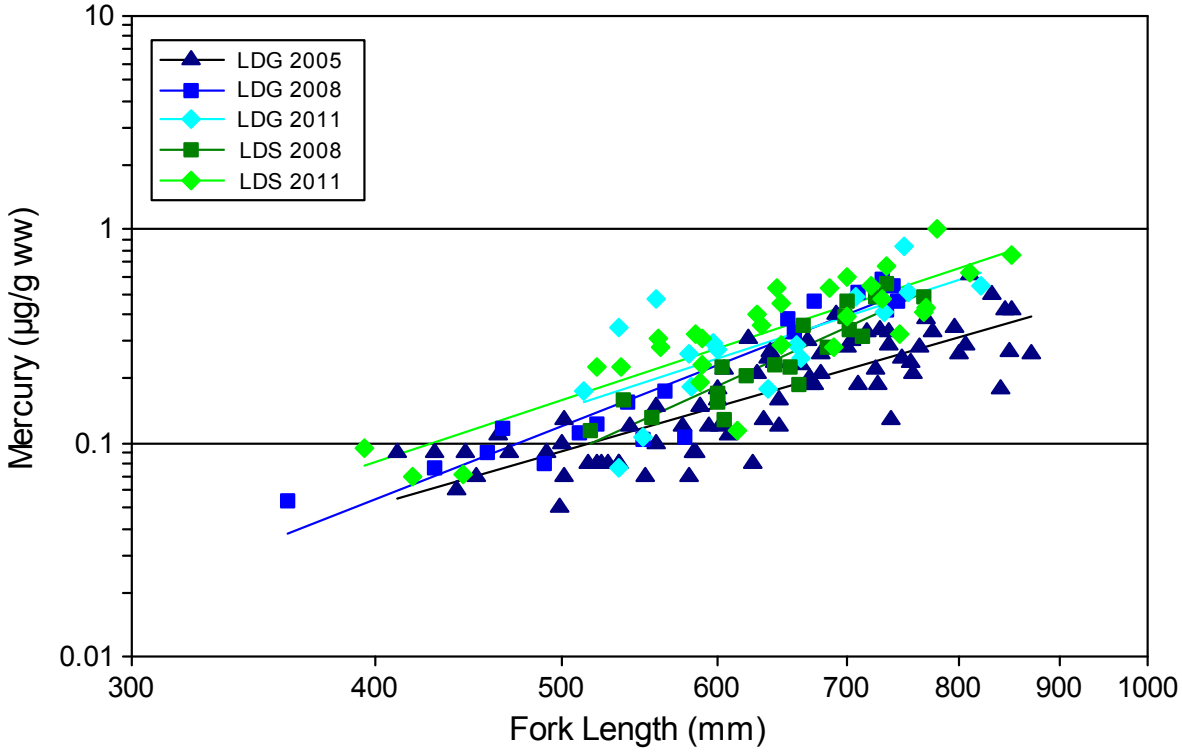
Figure 10 **Number of Benthic Invertebrates (A – close to the mine, B – middle of lake, C – far from mine)**



- Small (slimy sculpin) and large (lake trout) fish are sampled from Lac de Gras. Small fish are good to sample because they tend to live in one area. Large fish are good to sample because they are the top of the food chain and of value to community members. Results from small fish samples have consistently showed increased levels of lead, strontium and uranium even though water quality levels for these chemicals are not of concern.

Outside of this, there have been no consistent trends in differences between small fish close to the mine when compared to those further from the mine. Lake trout flesh samples have shown an increase in mercury concentrations, but this has also been observed in fish from Lac du Sauvage, and other areas in the north. Traditional Knowledge studies have shown that the taste and texture of the fish in Lac de Gras has not changed over the years the mine has been operating.

Figure 11 **Linear Regressions of Mercury Concentrations over Fork Length for Lake Trout Collected from Lac de Gras and Lac du Sauvage, 2005 to 2011**

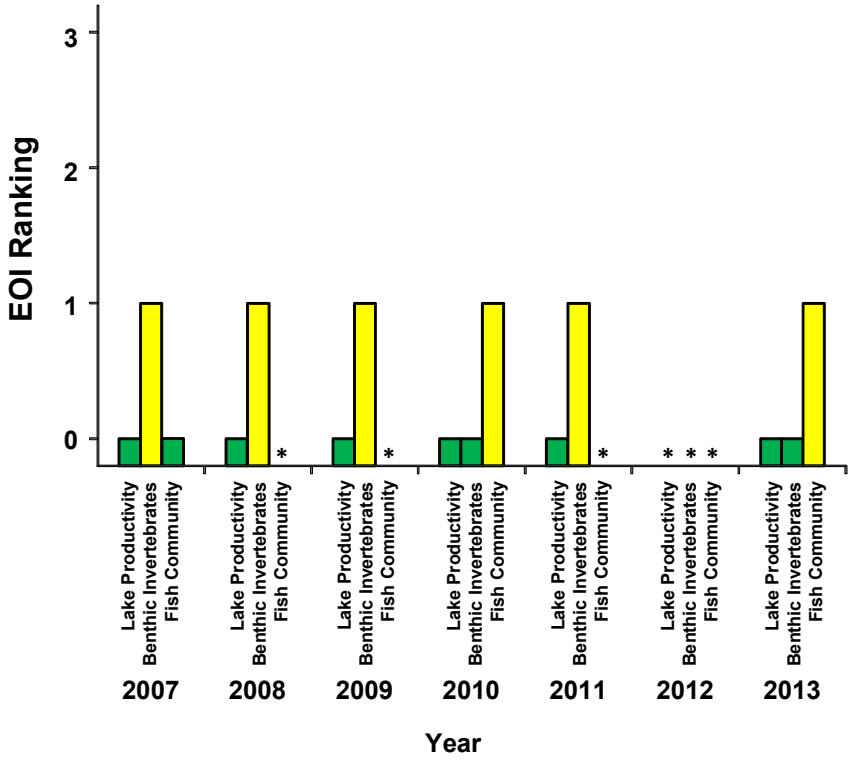


Notes: µg/g = micrograms per gram; mm = millimetre; LDG = Lac de Gras; LDS = Lac du Sauvage. Axes are on a logarithmic scale.

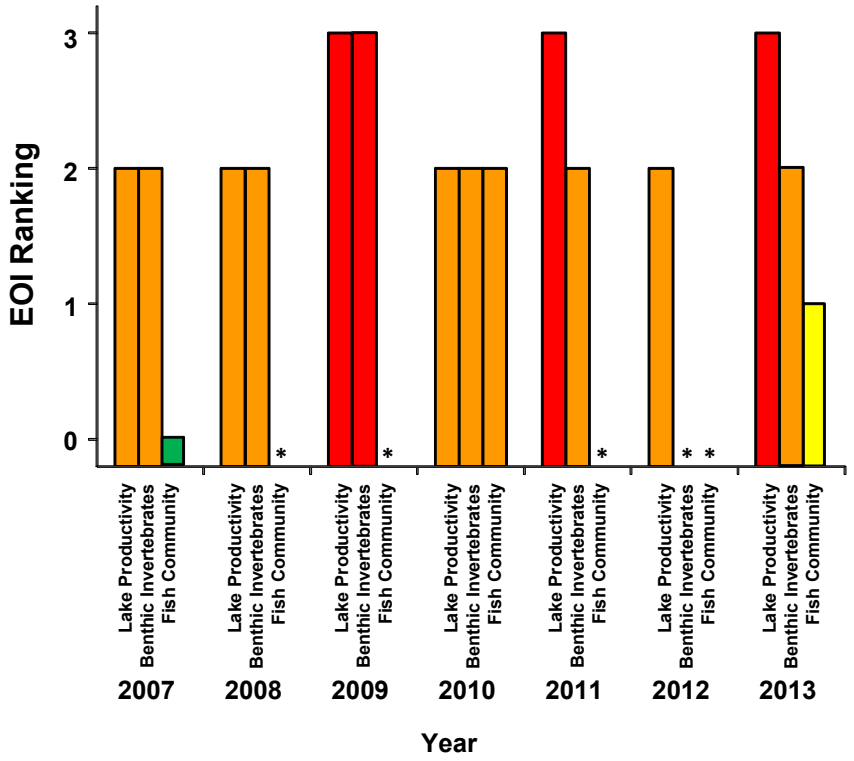
- A weight-of-evidence (refer to Definitions section) uses all of the above information in a qualitative process where professional scientists assess the strength of all the results in determining possible nutrient enrichment or harmful/toxicological impacts from the mine. There was strong evidence for nutrient enrichment and weak evidence for toxicological damage from 2011 to 2013. The effect of nutrient enrichment in Lac de Gras extends over approximately 20% of the lake, as was predicted in the 1998 Environmental Assessment.

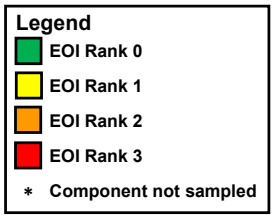
Figure 12 Overall Ranking of Effects

Toxicological Impairment



Nutrient Enrichment





EOI = evidence of impact

2013 Observations:

Revisions to the Aquatic Effects Monitoring Program design resulted in a more in-depth program being conducted on a 3-year cycle for the AEMP, and 2013 was a year where the majority of sampling requirements for the program were conducted. Overall, the program determined that nutrients (nitrogen and phosphorus) released into Lac de Gras from the treated mine water discharge continue to increase in Lac de Gras, near the East Island.

- Mine effluent had an effect on 15 water quality variables and the amount of chemical in each sample was highest close to the mine and lowered with increasing distance from the mine.
- Results relating to eutrophication indicators (chemicals and small plants that show early signs of increasing nutrients) suggest that the mine is causing an increase in nutrients in Lac de Gras as there were greater concentrations of some nutrients and small plants closer to the mine versus further from the mine.

  For example, algae (chlorophyll *a*) concentrations were higher than the normal range for Lac de Gras, and the higher amount of algae was found in over 20% of the lake. The approved AEMP (v3.3) has established an Effects Benchmark for chlorophyll *a* at a concentration of 4.5 µg/L; current results are below this value (Figure 11).

- The 2013 monitoring results for plankton communities (tiny plants and animals) in Lac de Gras suggest that there is a mine-related increase in nutrients because there was a difference in the amount and type of them in the exposure area (close to the mine) when compared to the reference areas (further from the mine). There was however no evidence of toxicological damage, so no Action Level has been reached.

- Effects of the mine discharge on bottom sediments (mud at the bottom of the lake) in the exposure area of Lac De Gras were evident for 13 metals, as areas near the mine had higher average amounts than those further from the mine. Of these 13 metals, three had average amounts that were higher than what would normally be found in the lake. When comparing these results to sediment quality guidelines, it is unlikely that the amounts found in Lac de Gras sediments would be harmful to fish and plants.
- Differences in the total amount of benthic invertebrates (small bugs that live on the lake bottom) were noted between the exposure area (close to the mine) and reference areas (further from the mine). This suggests an increase in nutrients, rather than a harmful effect, so no Action Level was reached. Benthic invertebrates are measured by density, which means counting the number of animals in a given area.

- The Weight of Evidence assessment is meant to rank impacts to Lac de Gras using the data collected by the AEMP, as summarized in the bullet points above and in the Fish section below. Impacts from different parts of the program (e.g. Fish Health) are rated as being: negligible/none (score of 0), low (1), moderate (2) or strong (3). They are also categorized as either 'toxicological' (harmful response) or 'nutrient enrichment' (increased nutrients).

Table 4: Weight-of-Evidence Results, 2013 AEMP

Ecosystem Component	EOI Rating
Toxicological Impairment	
Lake Productivity	**0**
Benthic Invertebrates	**0**
Fish Population Health (see below)	**1**
Nutrient Enrichment	
Lake Productivity	**3**
Benthic Invertebrates	**3**
Fish Population Health (see below)	**1**

- During 2013, a batch of preservative that is provided by an external lab and added to water samples prior to shipping was found to be contaminated. After investigation, a total of seven metals (cadmium, chromium, cobalt, iron, manganese, molybdenum, and nickel) were found to be in higher concentrations than normal when the contaminated preservative was used, starting in July 2013. Further tests were then done to determine which sample results were incorrect because of this contamination. These seven metals from a total of 114 specific samples (21 samples from 1645-18, 24 samples from 1645-19 and 69 samples from the open water AEMP) were removed from the 2013 AEMP and SNP datasets, and these values were also not used in any analyses.

2012 Observations:

The Aquatic Effects Monitoring Program was successfully revised before the 2012 monitoring season so only certain aspects of water quality and fish monitoring were conducted. Overall, the program determined that nutrients (nitrogen and phosphorus) released into Lac de Gras from the treated mine water discharge are causing some enrichment in Lac de Gras, near the east island. A Traditional Knowledge study on fish and water health was also conducted as part of the AEMP during the summer of 2012.

Specific results of note from the 2012 Aquatic Effects Monitoring Program include:

- The analysis of effluent and water chemistry data collected during the 2012 AEMP field program and from relevant sites from the Water License SNP program stations indicated similar trends as observed in 2011, including an increase in arsenic and iron concentrations.
- Results to date of the plankton monitoring program, which examines changes in the amount, number and types of tiny animals (zooplankton) and algae (phytoplankton) that live in the water of Lac de Gras (LDG), indicate a pattern consistent with weak nutrient enrichment from mine effluent.
- Results of the eutrophication indicators component of the AEMP were similar. Based on the measured higher amounts of phytoplankton (chlorophyll *a*) and total phosphorus (TP) in the near field area relative to the reference areas, the observed enrichment effect has been given a "moderate" effect level designation. Zooplankton biomass resulted in a "low" effect level designation. More specifically, the area of the lake that has been affected was 24% of LDG for Chlorophyll *a* and less than 1% for TP in 2012.
- Toxicity testing on the treated mine water that is discharged back to Lac de Gras was done four times in 2012, as part of the SNP program in the Water License. No concerns or issues were noted with any of these tests.
- The results from the 2012 TK camp provided feedback on the context and process for sharing Traditional Knowledge as well as on the health of the fish and water in Lac de Gras. Camp participants noted the importance of TK's context, which is situated in, and interconnected with spirituality (e.g., human-animal transformations), codes of conduct (e.g., respect for and obedience of one another), and connection to the land, animals, and ancestors. Customs and practices (e.g., drumming, feeding the fire and water) and stories about the journey-based creation of unique landscape features (e.g., mountains, islands, and waterbodies) underscore this context of TK. So, the importance of the setting in which knowledge is shared and of being respectful to others becomes important to ensure proper transfer of knowledge.
- TK camp participants noted the environmental indicators that they use to assess water quality, such as condition of the shoreline and clarity of the water. Additionally, a tea test was used to assess water quality and participants noted that tea made from water of a poor quality results in film or scum on the surface of the cup. None of the water samples from Lac de Gras had this scum or film and all the samples tasted acceptable to participants.

2011 Observations:

Overall, the 2011 program determined that nutrients (nitrogen and phosphorus) released into Lac de Gras from the treated mine water discharge are causing mild enrichment in the bay east of East Island.

Specific results of note from the 2011 Aquatic Effects Monitoring Program include:

- The analysis of effluent and water chemistry data collected during the AEMP field program and from relevant sites from the Water License SNP stations continued to show a low level effect on water chemistry in the lake resulting from the mine.
- Analysis of the number and types of small organisms that live on the bottom of the lake (benthic invertebrates) indicated a range of effect terms, from no effect to a high level effect, depending on what was analyzed. Low level or early-warning effects were detected for some species between the reference areas and exposure areas. Effects on total density (amount) and other benthic species density were classified as moderate level. A high level effect was found for the amount of one species. Benthic invertebrate monitoring results show effects of mild nutrient enrichment.
- Results to date of a special study to examine changes in amount, number and types of tiny animals (zooplankton) and algae (phytoplankton) that live in the water of Lac de Gras show a pattern consistent with nutrient enrichment from the mine. Based on the measured higher amounts of algae (chlorophyll *a*) and total phosphorus near the mine versus farther from the mine, this effect remains at a "moderate" level effect designation. Higher zooplankton biomass near the effluent continued to result in a "high" level effects designation.
- Moderate nutrient enrichment from the mine water discharge has been shown for 15.5% of Lac de Gras, based on the amount of algae and phosphorous measured in the lake. This is below the predicted level of 20%.
- Results of the Lake Trout study suggest that there has been a slight increase in mercury in Lake Trout muscle tissue since 2005. This increase is seen in both Lac de Gras and Lac du Sauvage. The increase in mercury from before the mine was built resulted in a low level effect classification.
- A technical analysis confirmed the nutrient enrichment effect and concluded that there continues to be strong evidence for a mild increase in lake productivity, and associated enrichment of the benthic invertebrate community, as a result of nutrient increases in Lac de Gras. There is some evidence suggesting low-level impairment to the small organisms on the bottom of the lake due to contaminant exposure but these findings have a high uncertainty because the link to contaminant exposure is not strong. The slight increases in mercury levels in fish tissue since 1996 have occurred in both Lac de Gras and Lac du Sauvage (upstream from the mine), and it is not likely that the increase is linked to mine operations. Diavik continues to monitor mercury levels in big and small fish in the lake, as well as monitoring for other possible sources of mercury. This helps to try and find out what may cause any increases that do happen and catch any possible issues.

2010 Observations:

Overall, the program determined that nutrients (nitrogen and phosphorus) released into Lac de Gras from the treated mine water discharge are causing mild enrichment in the bay east of East Island.

Specific results of note from the 2010 Aquatic Effects Monitoring Program include:

- The analysis of effluent and water chemistry data collected during the AEMP field program and from relevant sites from the Water Licence SNP stations showed a low level effect on water chemistry in the lake resulting from the mine.
- Results of the sediment analysis did not identify conditions that are likely to affect fish, bug or plant life in the lake through enrichment or harm. Bismuth and uranium were, however, assigned "high level effects" designations as both areas near the mine and at least one halfway down the lake had average concentrations greater than the areas farther from the mine. Measured levels of bismuth and uranium are unlikely to pose a risk to fish, bugs or plant life.
- Analysis of the number and types of small organisms that live on the bottom of the lake (benthic invertebrates) indicated a range of effect terms, from no effect to a moderate level effect, depending on what was analyzed. Low level or early-warning effects were detected based on statistical differences between the reference areas and exposure areas. Effects on total density and other benthic species density were classified as moderate level. Early-warning/low level effects were detected for the amount, distance and density of one species. Benthic invertebrate monitoring results are indicative of nutrient enrichment.
- A study was completed in 2010 to determine the approximate area the treated effluent (a "plume") covers in Lac de Gras. The plume extent was similar between summer open-water and winter ice-cover conditions, but concentrations near the discharge point were higher during winter ice-cover conditions.
- One possible explanation for the 2007 finding of elevated mercury in small fish (Slimy Sculpins) was increased mercury being released from sediments because of nutrient enrichment from the treated mine effluent. A sediment core study was done to look in to this and it showed that this explanation was not likely, based on the results.
- Results to date of a special study to examine changes in amount, number and types of tiny animals (zooplankton) and algae (phytoplankton) that live in the water of Lac de Gras indicate a pattern consistent with nutrient enrichment from treated mine effluent. Based on the measured higher amounts of algae (chlorophyll *a*) and total phosphorus near the mine versus farther from the mine, this effect has been given a "moderate" level effect designation. Higher zooplankton biomass near the effluent resulted in a "high" level effects designation.
- Results for the small fish study indicate a pattern consistent with an increased availability of food and nutrients in the sampling areas near the mine compared to the areas farther from

the mine. Despite the moderate-level effects seen in the fish tissue chemistry for bismuth, strontium, titanium and uranium, there was no evidence that tissue metals concentrations were negatively affecting fish health.

- Mercury levels in small fish (Slimy Sculpin) at sampling sites near the mine were lower than reported in the 2007 AEMP. There was no significant difference between samples taken near the mine and those taken farther away from the mine in 2010, most importantly in relation to tissue concentrations of mercury. The reason for the differences between the 2007 AEMP results for mercury and the 2010 results is unknown; however, a different analytical laboratory using slightly different methods was used in 2010.
- A technical analysis confirmed the nutrient enrichment effect and concluded that there is strong evidence for a mild increase in lake productivity, and associated enrichment of the benthic invertebrate community and fish community, as a result of nutrient increases in Lac de Gras. There is little evidence of harm to lake productivity as a result of any contaminant exposure. Although there is some evidence suggesting potential low-level contaminant issues with benthic invertebrate and fish communities, these observations have a relatively high amount of uncertainty.

2009 Observations:

Similar to 2008, the 2009 Aquatic Effects Monitoring Program showed nutrient enrichment (increased levels of phosphorous and nitrogen in the water available for algal growth, where increasing algal growth is a sign of eutrophication, or increased lake productivity) in areas of the lake. Nutrient enrichment is the main change in Lac de Gras that leads to most of the other changes we see relating to the different animals that live in the water.

Specific observations that were noticed in the 2009 data include:

- The analysis of effluent (treated water discharged back in to the lake) and water chemistry (quality) data collected during the 2009 AEMP field program and from relevant stations from the Water License Surveillance Network Program stations indicated an early warning/low level effect on water chemistry within Lac de Gras resulting from the Mine. This means that there is a difference between samples taken near the mine and those taken farther away from the mine, but is within the expected range. Some values may be slowly increasing over time, though, so it is important to monitor for any changes that may occur from one year to the next.
- Results of the sediment analysis did not identify conditions that are likely to affect aquatic life through enrichment or impairment. Most of the metals and nutrients measured in the sediment had an early warning/low level effect on sediment chemistry. However, bismuth was assigned a "high level effect" designation; this means that samples near the mine and at least one sample part way across the lake had average concentrations that were higher than those of the reference area at the other end of the lake.

- Analysis of the number and types of benthic invertebrates (small organisms that live on the bottom of the lake) indicated a range of effect designations, from no effect to a high level effect, depending on what was analyzed. Low level/early warning effects were detected based on significant differences between the reference areas further from the mine and the exposure areas near the mine in eight of twelve benthic invertebrate community variables compared (variables include things like the number of species found, whether one species was found more than another, number of organisms in a given area, number of midges, etc.). Total invertebrate densities, as well as two species densities (Pisidiidae and Heterotrissocladius sp.) were higher closer to the mine than the range measured in areas farther from the mine. Densities of Pisidiidae near the mine and part way across the lake were greater than the range measured in areas at the other end of the lake; for that reason, it was assigned a high level effect. These results relate back to the nutrient enrichment happening in the lake.
- Findings to date on a special study to examine changes in amount, number and types of zooplankton (tiny animals) and phytoplankton (algae) that live in the water of Lac de Gras show a pattern linked to nutrient enrichment from mine effluent. Because there are higher amounts of phytoplankton (chlorophyll a/algae) and total phosphorus in areas near the mine compared with areas farther from the mine, this effect has been given a "moderate" level effect designation. Higher zooplankton biomass (the amount of small animals in an area) near the effluent resulted in an early warning/low level effect designation; this means that there is a difference between the areas closer to and further from the mine, but that it is within the expected range.
- A weight-of-evidence (WOE) analysis compares all the information collected (water quality, sediment quality, benthic invertebrates, etc.) to try and answer two questions:
    - Could damage to aquatic animals happen due to chemical contaminants (primarily metals) released to Lac de Gras?
    - Could enrichment occur in the lake because of the release of nutrients (phosphorus and nitrogen) from treated mine effluent?

  The weight-of-evidence analysis confirmed nutrient enrichment and concluded that there is strong evidence for a mild increase in lake productivity due to nutrient enrichment. There was not a lot of evidence of damage to aquatic animals as a result of contaminant exposure. The observation of potential low-level harm of the benthic invertebrate community has a fairly high amount of uncertainty.

2008 Observations:

Overall, the 2008 Aquatic Effects Monitoring Program determined that nutrients (nitrogen and phosphorus) released into Lac de Gras from the treated mine water discharge are causing mild nutrient enrichment in the bay east of East Island. Nutrients are essential to the growth of plants and animals in land and in the water. Adding nutrients to natural waters can result in increased

production of plants or algae. Too many nutrients can cause environmental problems generally known as nutrient enrichment or eutrophication. These problems include increased oxygen consumption in the water by algae (fish need this oxygen too) and a reduction in the amount of light getting to plants at the bottom of the water body.

Special Effects Studies for mercury detection limits (measuring mercury at very low levels), chromium VI (a compound Diavik investigated because it could be a concern at lower levels compared to other forms of chromium) and trout fish tissue metals levels (based on previous AEMP studies that showed possible elevated level of metals in fish) were also completed.

Other results of note from the 2008 Aquatic Effects Monitoring Program include:

- The analysis of effluent and water chemistry data collected during the 2008 AEMP field program and from locations around the mine site (from Surveillance Network Program) indicated a low level effect on water chemistry within Lac de Gras resulting from the mine.
- Results of the sediment analysis did not identify conditions that are likely to affect aquatic life through enrichment or impairment. Bismuth and uranium (metals) were however assigned "high level effects" designation as both near-field and at least one mid field area had mean (average) concentrations greater than the reference area (sites far away from the mine) range.
- Analysis of the number and types of small organisms that live on the bottom of the lake (benthic invertebrates) indicated a range of effect designations, from no effect to a high level effect, depending on the variable analyzed. Low level or early warning effects were detected based on differences between the reference areas (far away from the mine) and exposure areas (near the mine) in eight of eleven benthic invertebrate community variables compared. Density (number of individuals in a specified area) of the midge Procladius in the near-field area were greater than the range measured in the reference areas and was assigned a moderate level effect. Density of Sphaeriidae in the near-field and mid field areas greater than the range measured in the reference areas and was assigned a high level effect. Both results are indicative of nutrient enrichment.
- The fish liver tissue analyses from 1996, 2005, and 2008 has not indicated that there has been an increase in the concentration of metals, including mercury, in lake trout over that period and therefore a no effect classification has been assigned for lake trout usability.
- Findings to date on a special study to examine changes in amount, number and types of tiny animals (zooplankton) and algae (phytoplankton) that live in the water of Lac de Gras indicate a pattern consistent with nutrient enrichment from mine effluent. Based on the measured higher amounts of phytoplankton (chlorophyll a) and total phosphorus in the near field areas compared with the reference areas this effect has been given a

"moderate" level effect designation. Higher zooplankton biomass near the effluent resulted in a "high" level effects designation.

- Mercury and chromium VI levels in the treated mine water discharge, both subject of special studies in 2008, were determined to be at concentrations below the best analytical detection limits available.
- The AEMP confirmed that there is a nutrient enrichment effect and concluded that there is strong evidence for a mild increase in lake productivity due to nutrient enrichment. There is negligible evidence of impairment to lake productivity as a result of any contaminant exposure. The observation of potential low-level impairment of the benthic invertebrate community has a relatively high degree of uncertainty.

Special studies on dust sampling frequency, mercury detection limits, and chromium VI are now complete.

2007 Observations:

- Effluent and water chemistry data collected indicated a low-level effect on water chemistry within Lac de Gras from the mine.
- Lakebed sediment chemistry data indicated a potential low-level effect for lead, and a potential high level effect for bismuth and uranium on sediment chemistry within Lac de Gras from mine activities, although benthic results suggest that sediment exposure concentrations are unlikely to pose risk to aquatic life.
- Benthic invertebrate analyses indicate a low-level nutrient enrichment effect on benthic invertebrates within Lac de Gras.
- The fish study indicated a pattern consistent with an increased availability of food and nutrients in near-field and far-field exposure areas compared to far-field reference areas. Elevated barium, strontium, mercury and uranium in slimy sculpin was assigned a moderate-level effect.
- Dike monitoring results revealed potential dike-related minor changes to water quality and concentrations of lead and uranium in sediment. Overall, analyses suggest benthic communities near the dikes are more likely responding to habitat variation than to changes in water quality or sediment chemistry.
- Eutrophication indicators showed a moderate-level nutrient enrichment effect within Lac de Gras, with the mine being a significant contributor to this effect.
- As with the previous year's results, despite the proximity of SNP Station 1645-19 to the effluent diffuser (60m), open-water and ice-cover water quality results remain within Canadian Council of Ministers for the Environment (CCME) Guidelines for the Protection of Aquatic Life.

- Ice-cover concentrations at SNP Station 1645-19 still tend to be higher and more variable than open-water concentrations. This is likely a result of increased wind driven lake circulation in the open-water, resulting in better initial dilution or mixing.

2005/2006 Observations:

Due to pending changes to the AEMP, data reports were completed for the 2005 and 2006 programs, however, a report of the analysis and interpretation was not submitted.

2004 Observations:

- As with the previous year's results, despite the very close (60m) proximity of SNP Station 1645-19 to the effluent diffuser, open-water and ice-cover water quality results remain within Canadian Council of Ministers for the Environment (CCME) Guidelines for the Protection of Aquatic Life.
- Ice-cover concentrations at SNP Station 1645-19 still tend to be higher and more variable than open-water concentrations. This is likely a result of increased wind driven lake circulation in the open-water, resulting in better initial dilution or mixing.
- As with the previous year, the results for several of the parameters indicated a possible change when the actual reason for the positive results was a low baseline statistic. There are also locations (LDG50) or parameters (nitrite at LDG46) where baseline data are not available and so the data analysis is not possible. Finally there are parameters where baseline detection limits have dominated the baseline statistic and could result in changes not being detected.

2003 Observations:

- Despite the very close (60m) proximity of SNP Station 1645-19 to the effluent diffuser, open-water and ice-cover results remain within CCME Guidelines for the protection of aquatic life.
- Ice-cover concentrations at SNP Station 1645-19 tend to be higher and more variable than open-water concentrations. This is likely a result of increased wind driven lake circulation in the open-water resulting in better initial dilution or mixing.
- The results for several of the parameters indicated a possible change when the actual reason for the positive results was a low baseline statistic. There are also locations (LDG50) or parameters (nitrite at LDG46) where baseline data are not available and so the data analysis is not possible. It is therefore recommended that in the future the data analysis method be modified so that the baseline references are from the combined mid-field and far field sites instead of each individual monitoring site. This change would reduce the number of false positives results.

2002 Observations:

- Water quality at all Lac de Gras monitoring locations, including sites immediately adjacent to effluent diffuser remained high.

- Increases from location specific baseline levels were measured for turbidity and suspended solids at 3 mid-field monitoring stations, however all remained within typical baseline values for the area.
- Predicted nutrient enrichment effects were not realized although phytoplankton biomass was determined to have increased over baseline at one far-field location but not at any mid-field locations.
- No trends or specific concerns were noted for zooplankton, benthic invertebrates and sediment quality, based on two sampling results.
- Snow chemistry results were all below discharge limits.

Previous Years Observations:

- Localized increases in turbidity, suspended solids and aluminum were measured due to dike construction.
- Water and sediment quality, zooplankton, phytoplankton and benthic invertebrate results were generally consistent with baseline, however some results, particularly benthic invertebrate numbers, showed larger year-to-year variability.

What effect will the mine development have on fish?

EA Prediction:

- On a regional scale the only effect on the fish population of Lac de Gras would be due to angling;
- The effect of increases in metal concentrations in fish flesh would be negligible (i.e. metal concentrations in fish flesh would not exceed consumption guidelines (500 ug/kg for mercury);
- Mercury concentrations will not increase above the existing average background concentration of 181.5 µg/kg; and,
- Local effects due to blasting, suspended and settled sediment from dike construction, increase in metal concentrations around dikes and post-closure runoff.

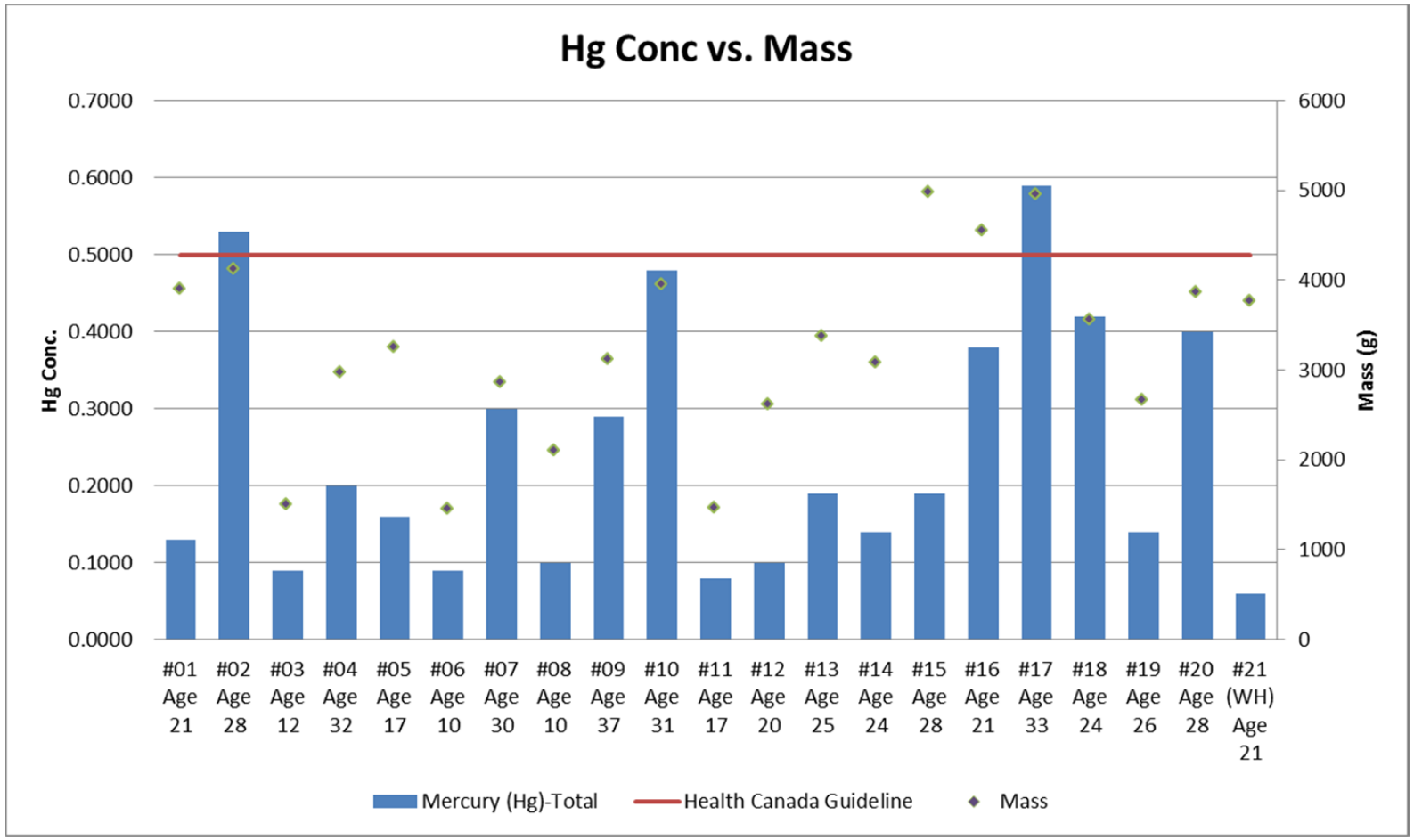
Observations:

- *AEMP TK Study of Fish Health*
  Overall, participants in the 2015 AEMP Traditional Knowledge (TK) Study commented that the present status of the fish and water in Lac de Gras beside the Diavik mine is good and better than they expected given how close it is to industrial activity. People appreciated experiencing the current state of the environment personally and evaluating both water and fish "with their own eyes". Participants acknowledged that it is also important to pair TK with science so that all aspects of the environment can be understood to its full potential.

A total of 31 fish were caught and 20 were Lake Trout while 9 were Whitefish (lake and round). Eight (8) fish were selected for inspection using TK and science. Of all the fish caught, only one fish was considered 'sickly' by participants due to its heart being smaller than usual and the presence of cysts on its liver. Participants chose to include this fish as part of the fish tasting. Four fish were officially tasted for the palatability study and all scored a 1 or 2 rating (i.e. this fish tastes excellent(1)/good (2) and tastes better (1)/similar (2) to fish we usually eat).

Scientific samples to test for mercury in fish tissue were taken for 21 fish. Results were compared against the Health Canada consumption guideline of 0.500 mg/kg of mercury in the edible portion of fish tissue (http://www.hc-sc.gc.ca/fn-an/securit/chem-chim/contaminants-guidelines-directives-eng.php). Two fish slightly exceeded this value; both were large (over 4 kg), old (33 and 28 years) fish and mercury is known to increase in the body over time (Figure 13).

Figure 13 2015 Mercury (Hg) Levels for Fish Tissue Based on Age and Weight



Participants from the 2012 Traditional Knowledge fish camp, conducted as part of the AEMP, noted that the status of the fish in Lac de Gras near the Diavik mine is good. Thirty-nine fish were caught and, of these, two fish were identified as being of poorer condition, noting that these fish were skinny and, in the case of one, had a larger head. Another fish was also observed as having some intestinal worms and was of poorer condition. Participants noted that this tends to occur in all fish populations and that the fish are not eaten. Those that were tasted as part of the palatability study resulted in scores of 1 (excellent for eating, looks better than fish usually caught) or 2 (good for eating, looks similar to fish usually caught) from all participants.

Based on the results of the 2008 trout survey, it was determined that mercury levels were safe for consumption so a fish palatability study was done in 2009. Four fish were cooked for tasting using the same methods as previous studies, and 10 fish tissue and organ samples were taken for metals testing, including mercury. Each of the four fish that were cooked for the palatability study also had metals samples submitted for testing. Results for the metals levels in the fish tested during the 2009 fish palatability study showed mercury levels below Health Canada's guideline for consumption and that fish were okay for eating.

From 2003 until present, the fish from Lac de Gras (LDG) have tasted good according to participants in the community-based monitoring camps that are held in some summers. Scientific testing for metals levels in fish tissue and organs that were caught during these camps were also as expected - the results have showed no concerns.

- *M-lakes and West Island Fish Habitat Restoration*
  These programs were started in 2009 in order to make up for the fish habitat lost to dike/pit construction. This is a requirement from the Department of Fisheries and Oceans. Streams in these areas were improved to encourage fish use and movement between smaller inland lakes and Lac de Gras. Construction was finished in 2012 and monitoring of these areas continued through 2013. Some retrofits were completed after the first year of monitoring, as one type of flow structure created was ineffective in sustaining a suitable depth and was not being used by fish. After these were re-sloped and some additional boulders were added, flows and depths became suitable to support fish use and fish were detected in these streams.

- *Slimy Sculpin*
  These small fish were sampled in 2013. Differences in the body size (length and weight) of the fish, as well as the condition factor (how 'fat' the fish is, or length in relation to weight), relative liver size, and relative gonad size were observed in fish caught near the mine compared to those in areas further from the mine. This demonstrates a potential toxicological response (a reaction to exposure). These observations are not consistent

with the results of previous fish surveys in Lac de Gras or with the other findings of the AEMP that all indicated a nutrient enrichment response. Overall, the fish data indicate that an Action Level 1 (confirm the effect) has been reached, which means this study will be repeated in 2016.

The small-bodied (slimy sculpin) fish survey was also done in 2010. Results showed that there was some change to size and condition of the fish that would be consistent with nutrient enrichment (more availability of food and nutrients); this was found closer to the mine. There were some metals in the fish tissue that could have a moderate effect on fish, but there did not appear to be any impacts to fish health. Mercury levels in the fish tissue were lower than previously reported in 2007 and were within the expected range. A different lab was used to analyze the tissue samples, but the reason for the differences between the 2007 and 2010 studies is not known.

An increased amount of mercury was detected in tissue from small fish (slimy sculpin) taken from the lake in 2007.

- *Lake Trout and Mercury*

  A large-bodied fish tissue sample program was done on Lake Trout between 29 July and 10 August 2014 in Lac de Gras and Lac du Sauvage (LDS). Samples were taken using a non-lethal technique, and fish were also aged and weight and length of each were recorded. Except for one fish from LDS, all sample results, were below the Health Canada guideline of 0.50 mg/kg. Based on the amount of mercury in fish in 2014, Lake Trout in LDG and LDS would not be expected to have health concerns or pose a risk to human health.

  A large-bodied (lake trout) fish survey was done in 2011 to test mercury levels in fish. The results from this study showed that mercury levels are increasing slightly in both Lac de Gras and Lac du Sauvage. The average mercury concentration in lake trout from Lac de Gras was similar to that found during 2008. This number is a length-adjusted number because mercury concentrations increase with size and age. The lake trout in Lac du Sauvage were found to have average mercury concentrations higher than those found during 2008; this lake is upstream from Diavik. A low-level effect was given for fish mercury levels, though it doesn't appear to be linked to the mine.

  A special study was conducted in 2009 as a joint research program with Fisheries and Oceans Canada (DFO) to assist in understanding if mercury in the slimy sculpin tissue (identified in 2007) is related to the treated mine water discharge. Results from this study did not support the idea that higher levels of mercury may be because of increased mercury being released from sediments due to nutrient enrichment from the treated mine effluent.

  In 2008, Diavik conducted a study to further evaluate the elevated mercury in fish tissue, this time studying large-bodied fish (lake trout). The fish liver tissue analyses indicated that there is no concern relating to the concentration of metals, including mercury, in

lake trout, but that some very large/old fish did show higher levels of mercury than smaller fish, as can be expected. A mercury study was also completed on treated mine water discharge and determined that concentrations are below the best analytical detection limits available.

- Global concern over mercury levels has increased due to human activity and industrial processes. Increased levels have been noted in the past in small fish in Lac de Gras (Diavik 2007), as well as in other lakes located throughout the Northwest Territories (http://www.hss.gov.nt.ca/health/environment-and-your-health/mercury-levels-fish).

- *Other*

  A study was also done to see if big fish like Lake Trout move between Lac de Gras and Lac du Sauvage, as it was unclear if LDS could be used as a reference lake for the mercury monitoring program. To do this, 126 Lake Trout (120 from LDG and 20 from LDS) were tagged with a transponder to track their movement between 2014 and 2015. Over the course of one year, 29 fish (23%) travelled between the two lakes by using the Narrows. The majority of the fish that moved between lakes were originally tagged near the Narrows, but nine of the fish travelled greater distances of up to 20 km away. Of the 29 fish that moved between lakes, 4 were detected only once, and the remaining 25 were detected multiple times. One fish was tagged moving between the two lakes 128 times.

  Since 2000, no fish have been taken by recreational fishing from Lac de Gras by Diavik.

  Fish habitat utilization studies showed that lake trout continue to use both natural and man-made shoals near the A154 dike.

  A Blasting Effects Study was done starting in 2003 and showed no effects on fish eggs.

Other observations made in past years include:

- Sediment deposition rates measured during the construction of the dikes were below levels predicted in the Environmental Assessment.
- In 2002, 2526 fish were salvaged from inside the A154 dike pool and released in Lac de Gras. 526 fish were salvaged from the North Inlet and released to Lac de Gras.
- In 2006, 725 fish were salvaged from inside the A418 dike pool and released in Lac de Gras.

Runoff and Seepage:

There are known locations where seepage and runoff occur at the Diavik mine site. There have historically been 22 seepage stations that included: 7 survey stations, 5 groundwater monitoring stations and 10 collection ponds. In 2013, 4 groundwater and all 7 survey stations were discontinued. Working with the WLWB, Diavik's program was changed in the fall of 2013 to include:

- 1 surface runoff station;
- 1 groundwater station;

- 4 seepage collection wells (within the PKC dams), and;
- 10 collection ponds.

Seepage is monitored and managed by DDMI staff and the Inspector is kept informed of seepage issues, as well as the short and long term plans for monitoring and repairs. No seepage has been seen downstream of seepage collection areas since 2013, as the upstream water collection systems successfully captured and diverted any runoff. Five (5) seepage samples were taken during 2012.

What effect will the mine development have on water quantity?

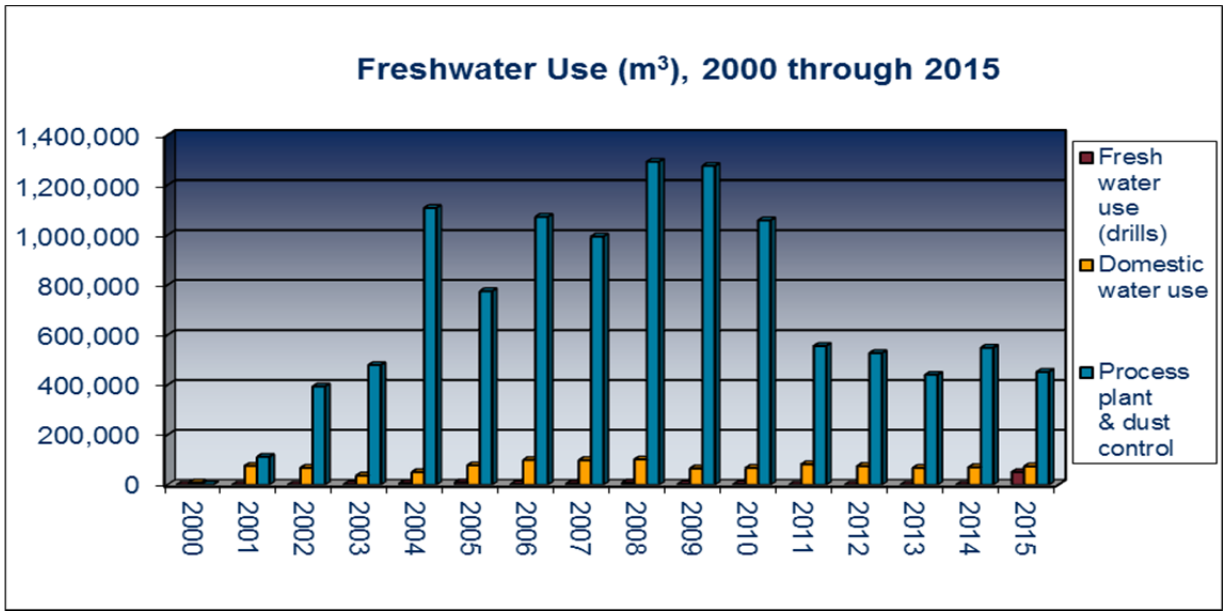
EA Prediction:

- Water supply to the mine is not limited and use of the resource will not cause changes in water levels and discharges from Lac de Gras beyond the range of natural variability.

Observations:

The figure below shows the purpose and amounts of fresh water used from 2000 to 2015. Diavik recycles water from the PKC and North Inlet as much as possible in order to reduce the amount of fresh water needed; in 2015, this amounted to 2.6 million m^3 of recycled water. The Water License allows Diavik to use a total of 1.28 million m^3 of Lac de Gras water per year; Diavik only used 576,532 m^3 in 2015. Use of water from Lac de Gras by Diavik is not causing changes in water levels beyond natural variability. Further information can be obtained from the Water Management Plan.

Figure 14 Freshwater Use Volumes from 2000-2015



Climate and Air Quality

Will the mine development affect air quality around Lac de Gras?

EA Predictions:

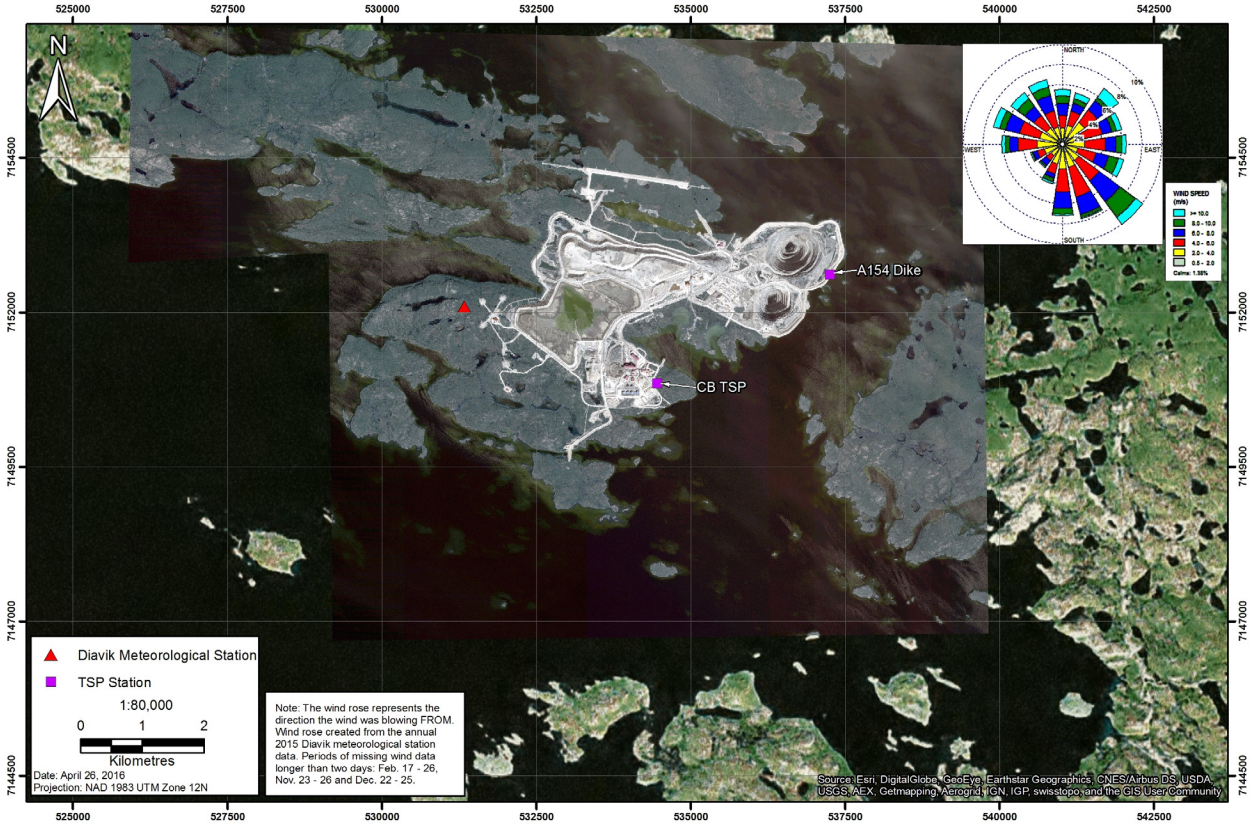
- Ambient air quality objectives will not be exceeded; and
- The mine will be a very minor contributor of greenhouse gases.

Observations:

As predicted, dust deposition decreases as one moves away from the mine. The rate of dust being deposited is affected by activities at the mine (for example, higher dust deposition is typically measured at the airport compared to the west part of East Island where there is very little activity) as well as by wind direction (because wind carries the dust). These trends have been measured each year since dust monitoring began in 2001. Dust suppressants have been investigated for use on the airstrip, but the small runway size and nearness to the lake have prevented the safe use of such chemicals. Suppressants are used on the helipad, taxiway, parking lot and apron areas.

- *Total Suspended Particulates (TSP)*
  During 2012, a revised air quality modeling and monitoring approach was used to update the prediction of deposition rates from the EA. An Air Quality Monitoring Program was finalized and implemented as part of this process and included two TSP monitoring stations; one located by the Communications building and the other on the A154 dike.

Figure 15 TSP Monitoring Station Locations



The report for the 2014 monitoring year was not completed in time to include results in the 2014 EAAR. As such, the results from both 2014 and 2015 are included in this section. During both years, TSP readings did not exceed the GNWT Department of Environment and Natural Resources (ENR) standard of 60 micrograms per cubic meter ($\mu g/m^3$), and there was only one daily exceedance of the 24-hour standard of 120 $\mu g/m^3$ at the Communications building. These results agree with Diavik's prediction that there would be up to two (2) 24-hour exceedances per year.

Figure 16a 2015 Annual 24-hr TSP Amounts – Communication Building

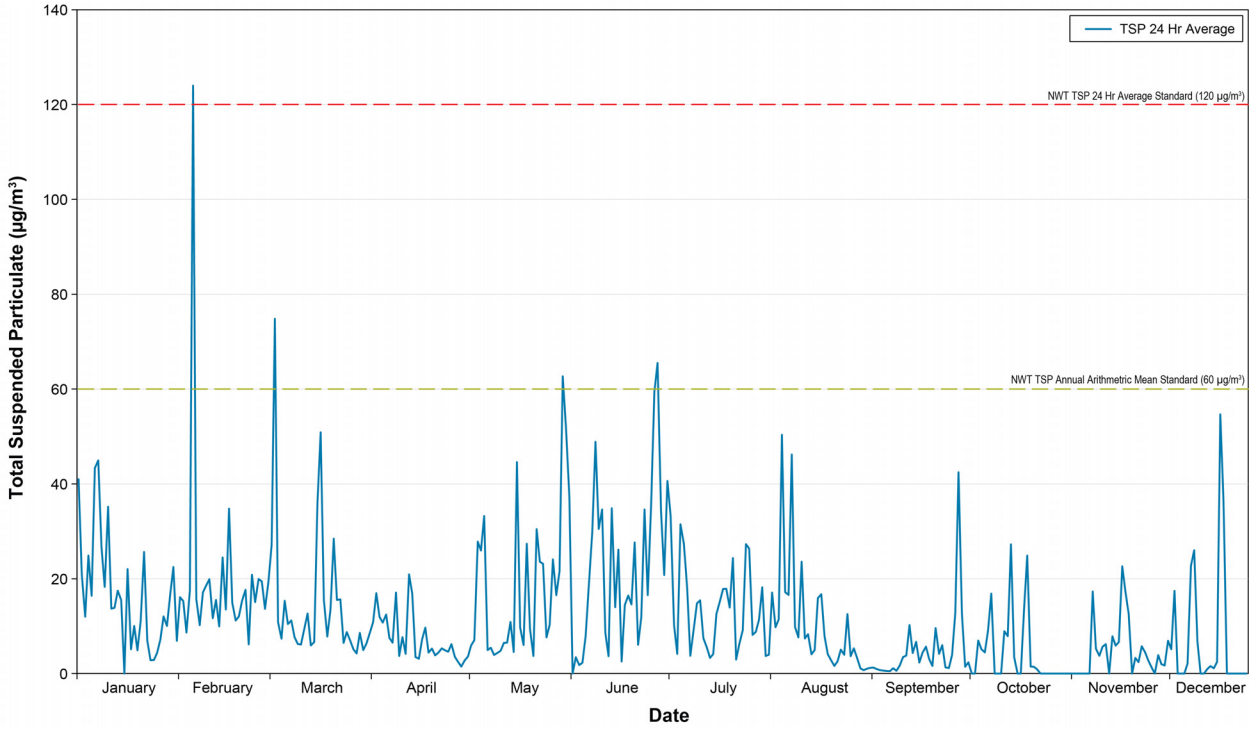
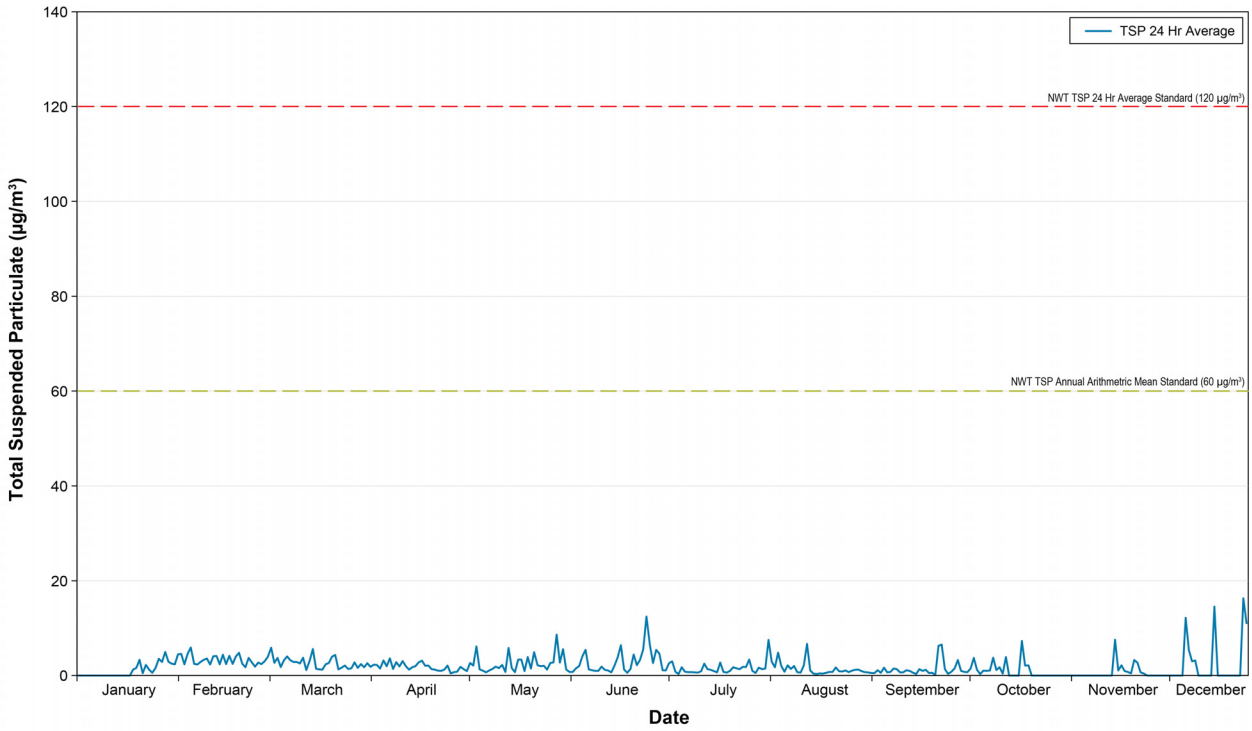


Figure 16b 2015 Annual 24-hr TSP Amounts – A154 Dike



Even with the monitoring stations being located on the mine site, all TSP values measured during 2013 were below the GNWT Ambient Air Quality Guideline, save for one day in December 2013 that was thought to be due to snow clogging the sensor, and the results agreed with DDMI's updated dispersion model predictions completed in 2012.

- *Dust Gauges*

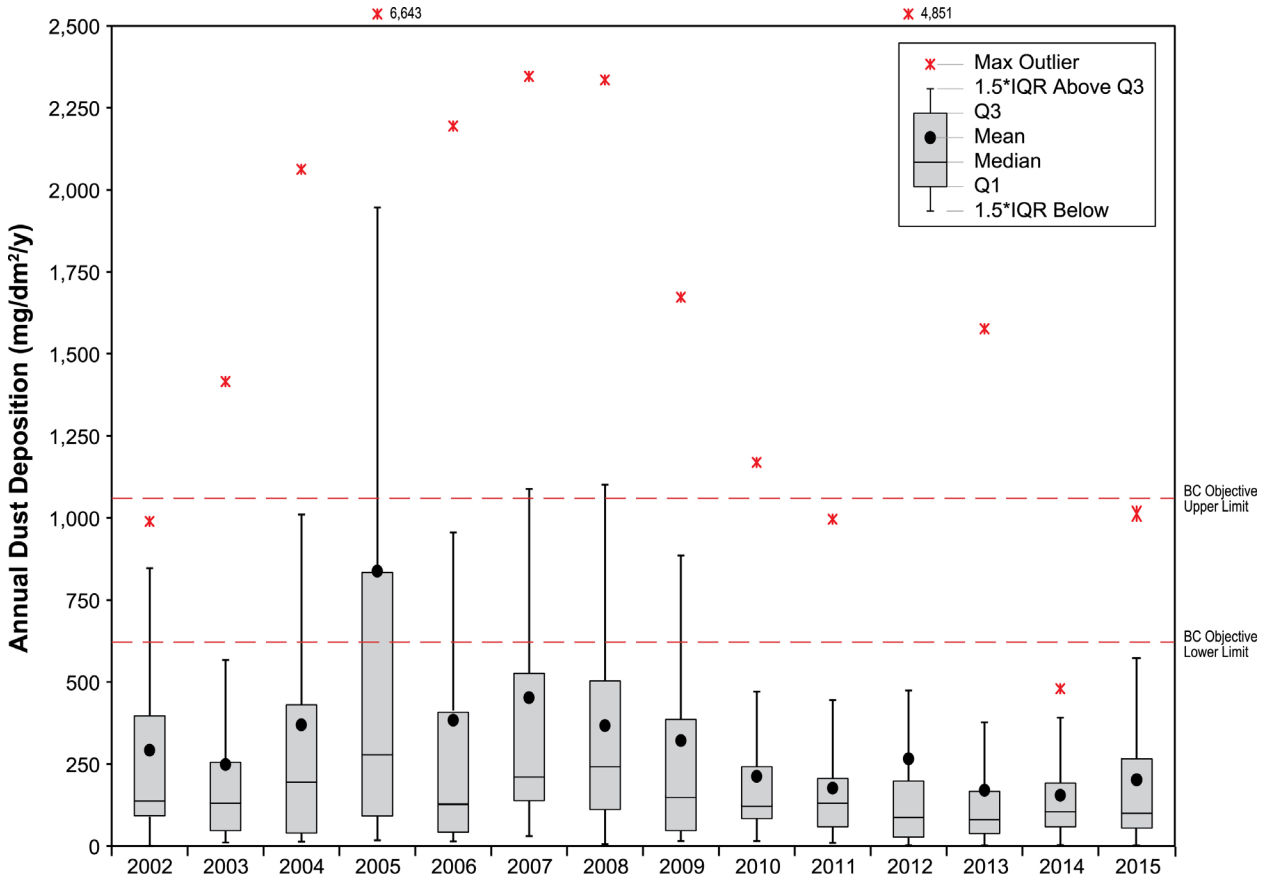
  Dust fall levels continued to show a decreasing trend in 2014 and 2015, based on distance from the mine. The lowest dust fall level was recorded at one of the control sites located 5.5 km away from the mine. The British Columbia (BC) dustfall objectives for the mining industry were used as a comparison against Diavik's dustfall levels, as there are no criteria for the NWT. Values recorded for each of the 12 dust gauges and 27 snow survey stations were below the BC objective range of 621 to 1,059 mg/dm^2/y.

  In 2013, dust fall levels were lower than in previous years, with the exception of the area close to the airstrip (common with gravel runways) and an area downwind of the prevailing winds. Dustfall values for most stations remained below the BC dustfall objectives for the mining industry. The two stations that exceeded the BC objective were located beside the airstrip.

  In 2012 there was a decrease in dust levels at 7 of the 12 dust gauges as construction slowed down and Diavik transitioned from an aboveground to underground mine. Dust levels were still higher than predicted, most notably 250 meters (750 feet) from the airstrip. Dust levels were also higher near the PKC area, due to construction activities.

  Overall, dust deposition rates have been more than what was predicted by models in the Environmental Effects Report, because that model did not account for additional construction and operational activities relating to underground mine development. However, all except one of the average dust deposition levels remained below the BC Objectives for mining (Figure 17).

Figure 17 Annual dust deposition rates compared to BC Objective for Mining - 2002 to 2015



Notes: BC Objective Source: BC MOE (2016)
Annual deposition is calculated using the methodology described in Section 2.
See Table 2-1 for actual 2015 sample exposure times.

- *Snow Water Chemistry*

  Analyses (measurements in the amount of chemicals in the water from melted snow) indicate that the concentrations of regulated parameters (the chemicals in the Water License that Diavik must keep below set levels) measured in 2014 were below the maximum allowable concentration outlined in the Water License. In 2015, results were below water license levels for all snow cores except SS3-6 where elevated levels of aluminum, chromium, nickel and zinc were found (Table 5).

Table 5: Summary of 2015 Snow Water Chemistry Analysis

Distance from Mine	Aluminum	Ammonia	Arsenic	Cadmium	Chromium	Copper	Lead	Nickel	Nitrite	Phosphorus	Zinc
Water License Limit	3.0 mg/L	12.0 mg/L	0.1 mg/L	0.003 mg/L	0.04 mg/L	0.04 mg/L	0.02 mg/L	0.1 mg/L	2.0 mg/L	n/a	0.02 mg/L
0-100 m	4.26	0.190	0.0008	0.00008	0.053	0.0085	0.0076	0.127	0.00554	0.293	0.029
101-250 m	0.599	0.078	0.0003	0.002	0.0081	0.0019	0.0008	0.0139	0.0036	0.028	0.0073
	0.5885	0.0775	0.0001	0.00001	0.0067	0.0014	0.0008	0.018	0.0047	0.00657	0.0056
251-1000 m	0.135	0.045	0.0001	0.00001	0.001	0.0003	0.0003	0.0023	0.0024	0.0156	0.0023
	0.377	0.094	0.0002	0.00001	0.0046	0.0009	0.0005	0.0098	0.004	0.0266	0.0036
	0.633	0.090	0.0002	0.00002	0.0061	0.002	0.0011	0.0157	0.0077	0.121	0.0078
	3.000	0.150	0.0005	0.00005	0.0367	0.0065	0.0055	0.0854	0.0082	0.093	0.0216
1001-2500 m	0.0962	0.035	0.00008	0.00001	0.0007	0.0002	0.0002	0.0017	0.0037	0.0104	0.0022
	0.0525	0.030	0.00005	0.00001	0.0007	0.0007	0.0001	0.0013	0.0027	0.0111	0.0017
	0.418	0.068	0.0004	0.00001	0.0044	0.0013	0.0007	0.0051	0.002	0.0131	0.0036
	0.551	0.120	0.0002	0.00001	0.0052	0.0013	0.001	0.0138	0.0063	0.0491	0.0057
	1.740	0.068	0.0004	0.00007	0.0215	0.0031	0.0019	0.0456	0.0024	0.0642	0.0125
	0.826	0.073	0.0002	0.00002	0.0119	0.0017	0.001	0.021	0.002	0.0234	0.0101
	0.124	0.030	0.00008	0.00001	0.0023	0.0005	0.0002	0.0074	0.002	0.0193	0.0036
	0.455	0.019	0.0001	0.00001	0.0064	0.0008	0.0006	0.0129	0.002	0.009	0.0042
>2500 m (Control)	0.151	0.028	0.00006	0.00001	0.0018	0.0004	0.0003	0.0021	0.0022	0.0046	0.0024
	0.226	0.040	0.00007	0.00008	0.0044	0.0008	0.0006	0.0072	0.0002	0.0116	0.0056
	2.230	0.054	0.00035	0.00003	0.0324	0.0034	0.0023	0.0634	0.0025	0.0193	0.0148

- *Greenhouse Gas Emissions*

  Total greenhouse gas emissions for Diavik in 2015 were 192,843 tonnes of CO_2e, an increase from last year due to A21 dike construction. *"CO2 e"* is an abbreviation of 'carbon dioxide (CO_2) equivalent'. CO_2 is a greenhouse gas, but there are many more greenhouse gases. To make it easier to understand greenhouse gases, a standardized method is to report all of the greenhouse gases from a site together as if they were equal to a set volume of CO_2; this is the *CO2e* referred to above. The wind turbines were able to offset carbon dioxide emissions by 14,404 tonnes in 2015.

Vegetation and Terrain

How much vegetation/land cover will be directly affected by the mine development?

EA Predictions:

- Approximately 12.67 km^2 of vegetation/land cover will be lost at full development; and
- Slow recovery of vegetation following mine closure.

Observations:

- There was a very slight increase in direct vegetation/habitat loss in 2015 due to mine development. Total habitat loss to date from mining activities is 10.55 km^2. This is within the predicted amount of 12.67 km^2. The table below shows a running total of the habitat loss to date.

Table 6: Cumulative Habitat Loss Each Year

Predicted Vegetation Habitat Loss (km^2)	Up to 2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
12.67	3.12	5.88	6.32	7.30	8.15	8.86	9.40	9.66	9.78	9.65	9.71	10.1	10.12	10.15	10.55

How will the vegetation communities outside the mine footprint be changed as a result of mine development?

EA Prediction:

- Localized changes in plant community composition adjacent to mine footprint due to dust deposition and changes in drainage conditions.

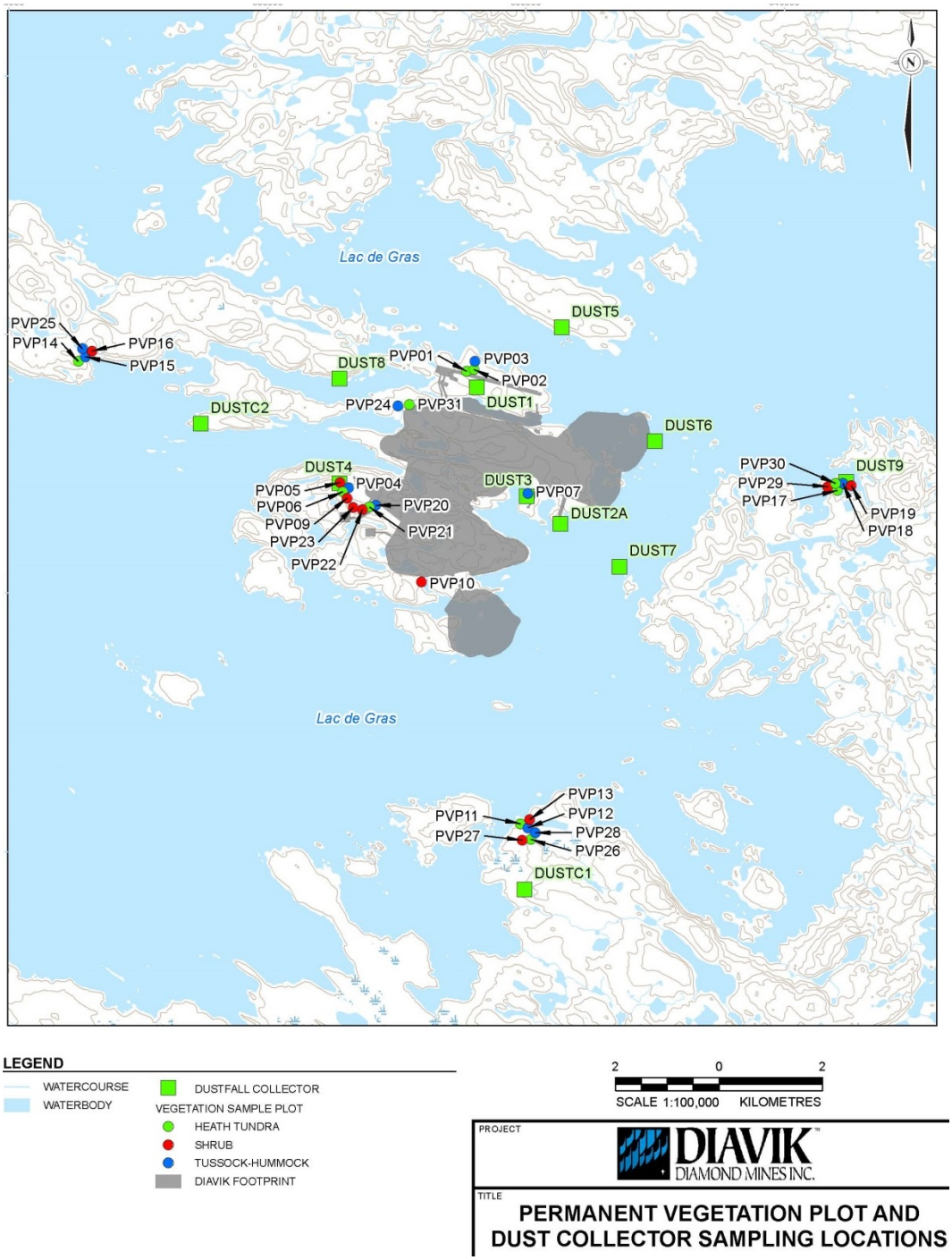
Observations:

- *Vegetation Plots*

  Permanent vegetation plots (PVPs) were established close to and far from the mine site in 2001 to monitor if there are differences in vegetation and ground cover near the mine and farther away from the mine. The program is conducted every 3 years and in 2004, the program expanded to include 15 mine plots and 15 reference plots (far from the mine). In each of these areas, 5 sample plots for each of 3 vegetation types (heath tundra, tussock-hummock and shrub) were set up so as to reduce within site variability of plant communities (which was high) and increase the likelihood of capturing true change in plant abundance between mine and reference areas over time. Figure 18 shows the PVP locations.

  The most recent survey of the PVP's was done in 2013 and results showed that dust on vegetation may be changing the amount (abundance) and types (composition) of some plant species in vegetation types near the mine. Lichen cover on heath tundra and shrub mine plots continues to decrease over time, while the average numbers of vascular plants (e.g. grasses, small plants) in these same areas are increasing. This has also been observed in other studies looking at the effects of road dust on different types of plants.

Figure 18 2013 Permanent Vegetation Plots



Observations of PVPs done in 2010 showed that there were more grasses and flowering plants closer to the mine versus further from the mine, and there was also lower soil lichen cover and higher litter cover values closer to versus further from the mine. During the previous sampling year, there was no ecologically significant difference in vegetation

and ground cover between mine and reference plots for each of the plant communities assessed.

- *Lichen*

  A lichen study was conducted in 2013 (every three years) to determine the amount of metals in lichen from dust deposition closer to and further away from the mine. Sample areas for lichen near the mine were in the same areas as the dust collectors, while the sample sites further away from the mine were chosen by TK holders at a distance approximately 40 km (24 miles) away, as noted on Figure 19.

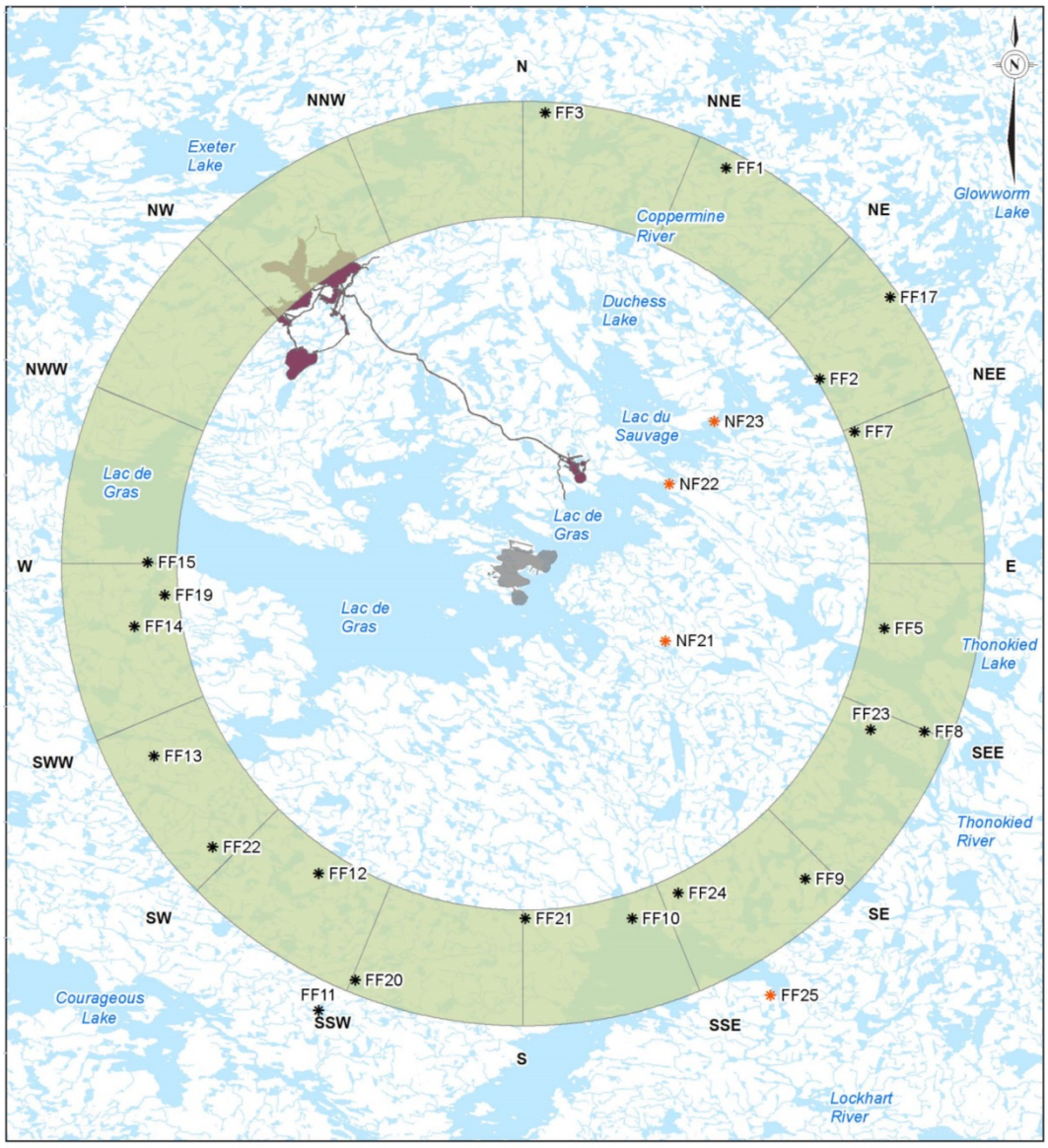
  The 2013 sampling program had a scientific component focusing on metal levels in lichen and soil, as well as a TK component focused on assessing the type of landscapes caribou prefer for forage, use and migration, and to assess lichen conditions at various sample sites to see how dust from the mine potentially affect caribou use of the area. During the program, Elders noticed dust on lichen in near-mine areas, but did not see dust on lichen in areas further from the mine. The analysis of metal concentrations in lichen confirmed the Elder's observations, as the amount of most metals in lichen samples near the mine were significantly higher than those further from the mine. The Elders suggested that caribou would avoid near-mine sites because of poor food quality. It should be noted that the amount of metals found in lichen during the 2013 sampling program was lower than those found in 2010; this means that a follow-up risk assessment is not necessary as the level of exposure to metals remains at a safe level for caribou. Similar to the PVP program, lichen is sampled every 3 years, with 2016 being the next year this program is scheduled.

  The 2010 lichen study also looked at the metals data to find out how much dust caribou are exposed to (could eat) by eating the lichen with dust on it. With the exception of 4 metals, concentrations of all other parameters were higher close to the mine, as was expected. Aluminum levels were slightly high but the assumptions made for the risk assessment were very conservative (meaning that it was assumed that caribou feed in the area of the mine 100% of the time). Based on the risk assessment performed, the level of exposure to metals was within safe levels for caribou.

- *Re-vegetation*

  Research conducted to date has indicated that soils can be constructed from many different materials salvaged from mine operations (e.g. gravel, till from the bottom of the lake, treated sewage sludge) and used effectively for re-vegetation. Seed loss (erosion) is an issue and use of erosion control techniques, such as erosion control blankets (straw mats) and the addition of some protective mounds, bumps and rocks on the ground, are showing some success for increasing plant growth. Lastly, the regrowth process at reclamation sites is faster than for natural recovery but it still takes a long time, with soil and plant development taking 2 to 3 years.

Figure 19 2013 Lichen Monitoring Sites



LEGEND

- WATERCOURSE
- WATERBODY
- HISTORIC LICHEN SAMPLING LOCATION
- NEW 2013 LICHEN SAMPLING LOCATION
- EKATI FOOTPRINT
- DIAVIK FOOTPRINT
- 30-40 Km ORDINAL BUFFER

10 0 10

SCALE 1:500,000 KILOMETRES

PROJECT

DIAVIK DIAMOND MINES INC.

TITLE

FAR-FIELD AREA LICHEN AND SOIL SAMPLING LOCATIONS AND NEW SAMPLING LOCATIONS, 2013

Wildlife

Will the distribution or abundance of caribou be affected by the mine development?

EA Predictions:

- At full development, direct summer habitat loss from the project is predicted to be 2.97 habitat units (HUs). (A habitat unit is the product of surface area and suitability of the habitat in that area to supply food for caribou and cover for predators);
- The zone of influence (ZOI) from project-related activities would be within 3 to 7 km;
- During the northern (spring) migration, caribou would be deflected west of East Island and during the southern migration (fall), caribou would move around the east side of Lac de Gras; and
- Project-related mortality is expected to be low.

Observations:

- *Habitat*

  There was a minor loss of direct summer habitat in 2015 due to mine footprint expansion during A21 construction. The amount of HUs lost in 2015 was of 0.129, bringing the total loss to date to 2.729 HUs (see table below). This is less than the amount that was predicted.

Table 7: Caribou Habitat Loss by Year

Predicted Caribou Habitat Loss (HUs)	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013-2014	2015	Loss to Date
2.97	0.39	0.59	0.28	0.15	0.32	0.23	0.15	0.18	0.13	0.04	0.00	0.02	0.13	0.00	0.13	**2.7**

Caribou summer habitat loss was greatest in 2001, when the majority of haul roads and laydown areas for mine infrastructure were constructed. The loss of habitat in 2008 was associated with expansion of mine infrastructure to support underground mine development, and that for 2012 related to development of the wind turbine pads.

- *Zone of Influence*

  An external, independent review of the Diavik and EKATI survey data was done by Boulanger et al. and the results indicated that the estimated Zone of Influence (ZOI - the size of area where caribou avoid the mine) on the probability of caribou occurrence around the mines was approximately 14 km. This ZOI prediction is largely supported by stakeholders. While it is double the size of the original prediction, it does not appear to be directly related to the level of activity at the mine site. It is not known what kind of influence large lakes like Lac de Gras have on the distribution of caribou, but it is likely a contributing factor to the ZOI.

Due to low caribou numbers and community concern, aerial surveys have been suspended since 2009 (with the exception of 8 July to 13 October 2012), and re-analysis of the data is not expected to result in different information about the animals or their habitat use. It is recommended that aerial surveys continue to be suspended in favour of other studies that support the GNWT Barrenground Caribou Management Strategy and Bathurst Caribou Range Plan. The GNWT (Environment and Natural Resources) has been holding stakeholder workshops to discuss the future of caribou monitoring in the NWT and Diavik plans to contribute financial support to increase the number of GeoFence collars on the herd beginning in 2016.

The caribou movement analysis showed that caribou move more slowly when they are in good quality habitat. It found that more than half of the caribou paths were at least 100 km (61 mi) away from the mine and 24 km (15 mi) from the nearest lake. The relationship between difficult terrain and the distance caribou travel supported TK observations that caribou use flatter terrain and prefer to travel along shorelines. Despite there being a low number of movement paths near lakes in this study, caribou would move more slowly and stay in an area longer when they were near a lake. The analysis also showed that caribou move more quickly as they approach and spend time near the Diavik-Ekati mine complex. Lastly, long term scientific monitoring and TK have shown that caribou were usually present around the mine area in July and August. From 2009 to 2013, caribou remained closer to Contwoyto Lake and approached the areas of the mine during the fall rut period.

- *Behavioural Observations*

  The goal of the program is to generate enough observations to test possible impacts to caribou based on how they behave closer to and further from the mines. In past years, Diavik has had community Elders and youth participate in this work and contribute their input and knowledge to the program results. Few caribou were observed in the study area in 2015, so the number of behavioural observations/scans conducted was a total of 38 in 2015, 9 times in 2014, 90 times in 2013, 86 in 2012, 104 in 2011, 83 in 2010 and 89 in 2009. Diavik works with EKATI mine to collect and share data that covers distances from less than 2 km to greater than 30 km from mine infrastructure.

  During the early years of this monitoring, Diavik had limited opportunities to study caribou behaviour on the ground through scanning observations; in 2003, 2004, 2005, 2006, 2007 and 2008, ground observations of caribou behaviour were successfully completed for 12, 14, 5, 8, 24 and 7 caribou groups, respectively.

- *Migration Patterns*

  Data from satellite-collared animals record cows in the Bathurst herd west of the mine site during the northern migration in 2015 (Figure 20a). Collar maps for the 2015 southern migration suggest that cows remained further north longer than usual (into November) and then the majority travelled east of Diavik during the southern migration as well

(Figure 20b). Two (2) collared cows were recorded moving west of Lac de Gras, as originally predicted. Past analysis showed that from 2002 to 2014, with the exception of 2006, caribou movement patterns agreed with the EER prediction that the majority of collared caribou would travel beside or through the southeast corner of the study area during the southern migration. A TK study conducted through the Tłı̨chǫ Training Institute in 2013 developed a map (Figure 21) based on Elder observations that shows how caribou migrations have changed due to an increase in mining activity in the Slave Geologic Province. TK observations aligned with the EER prediction as well, showing that caribou continue to move east of Lac de Gras during the northern migration and west of the lake during the southern migration, but noting that they ultimately return to the same general areas for calving and overwintering.

Figure 20a 2015 Northern Migration of Caribou

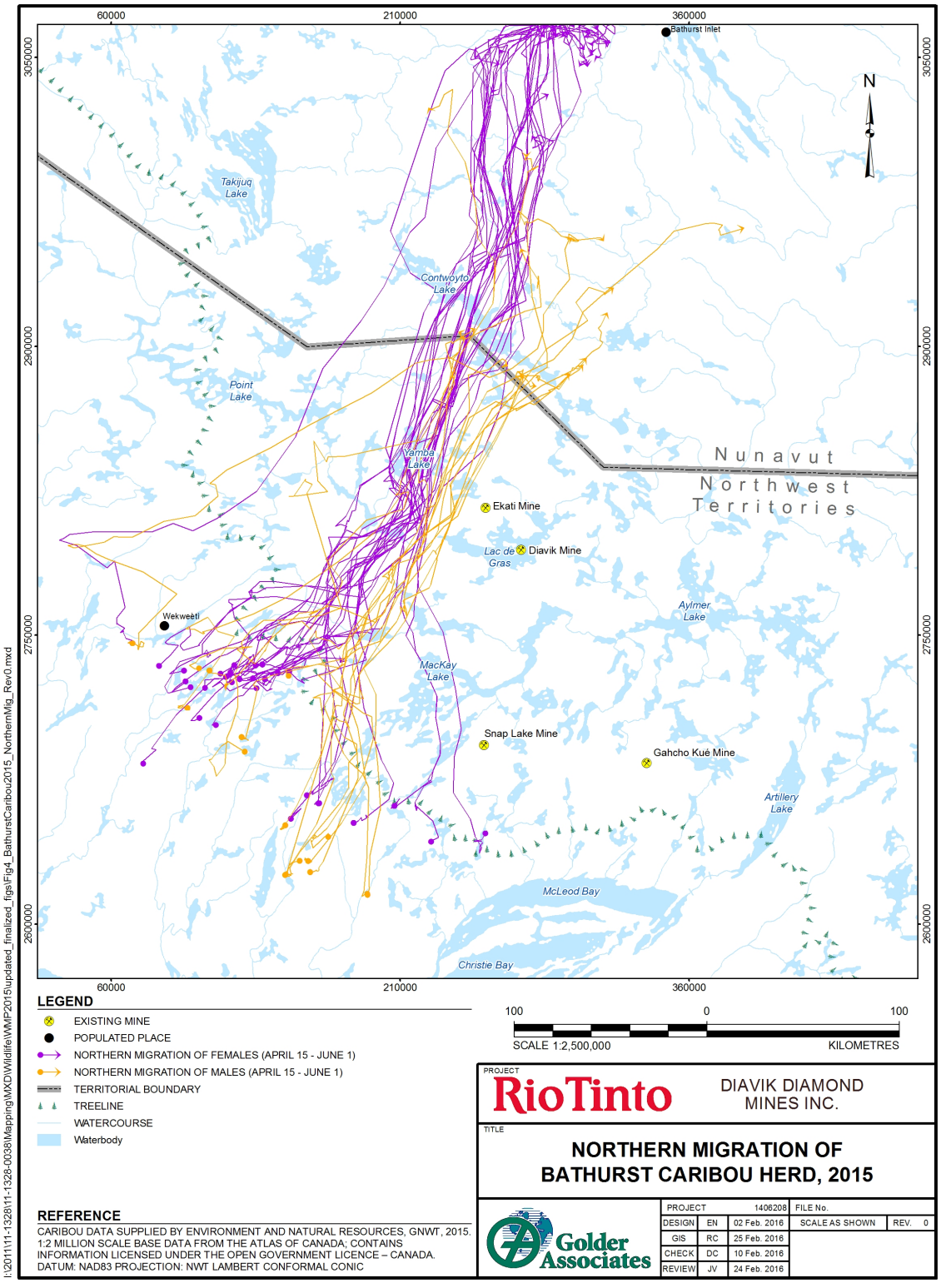


Figure 20b 2015 Southern Migration of Caribou

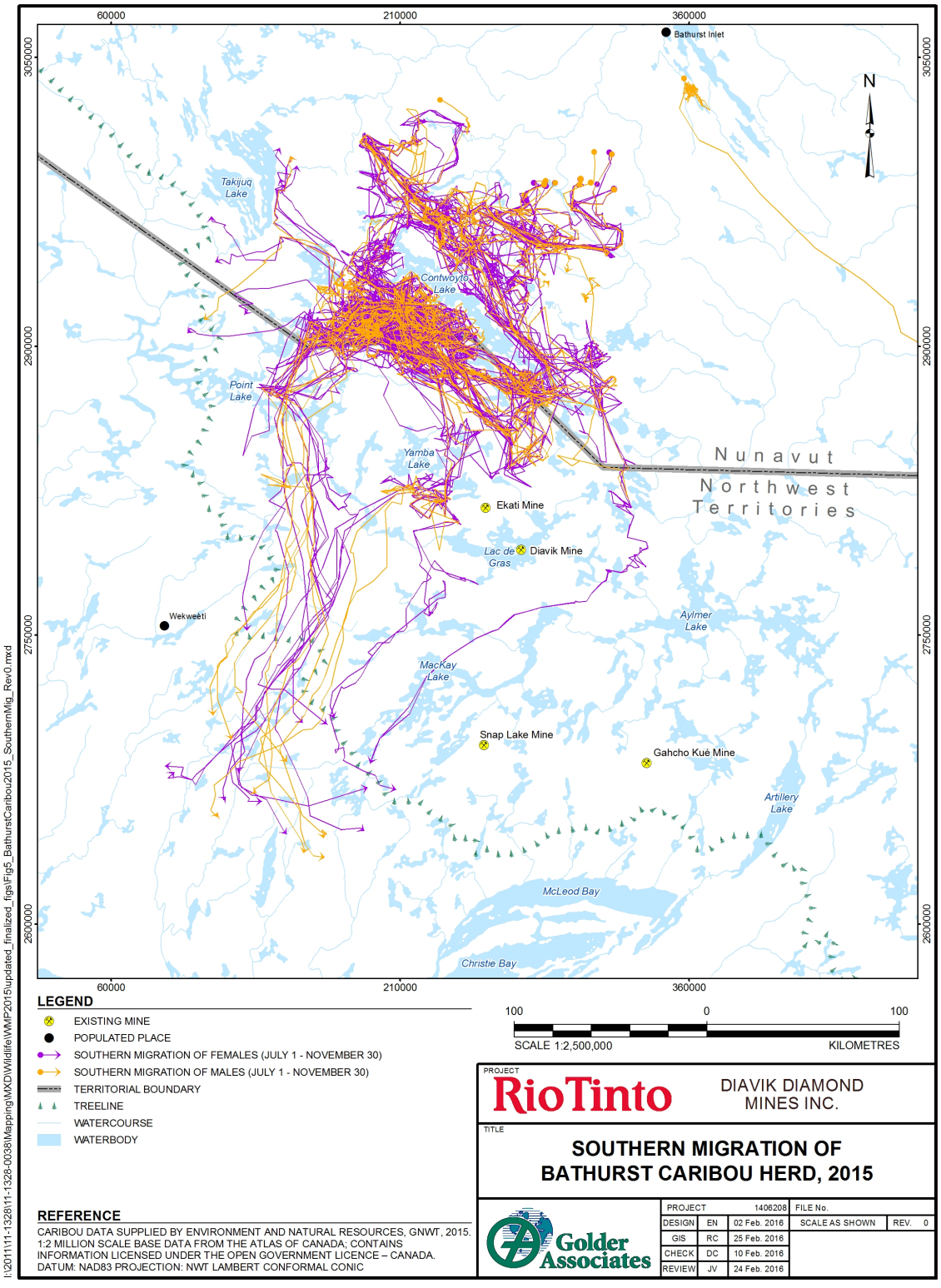
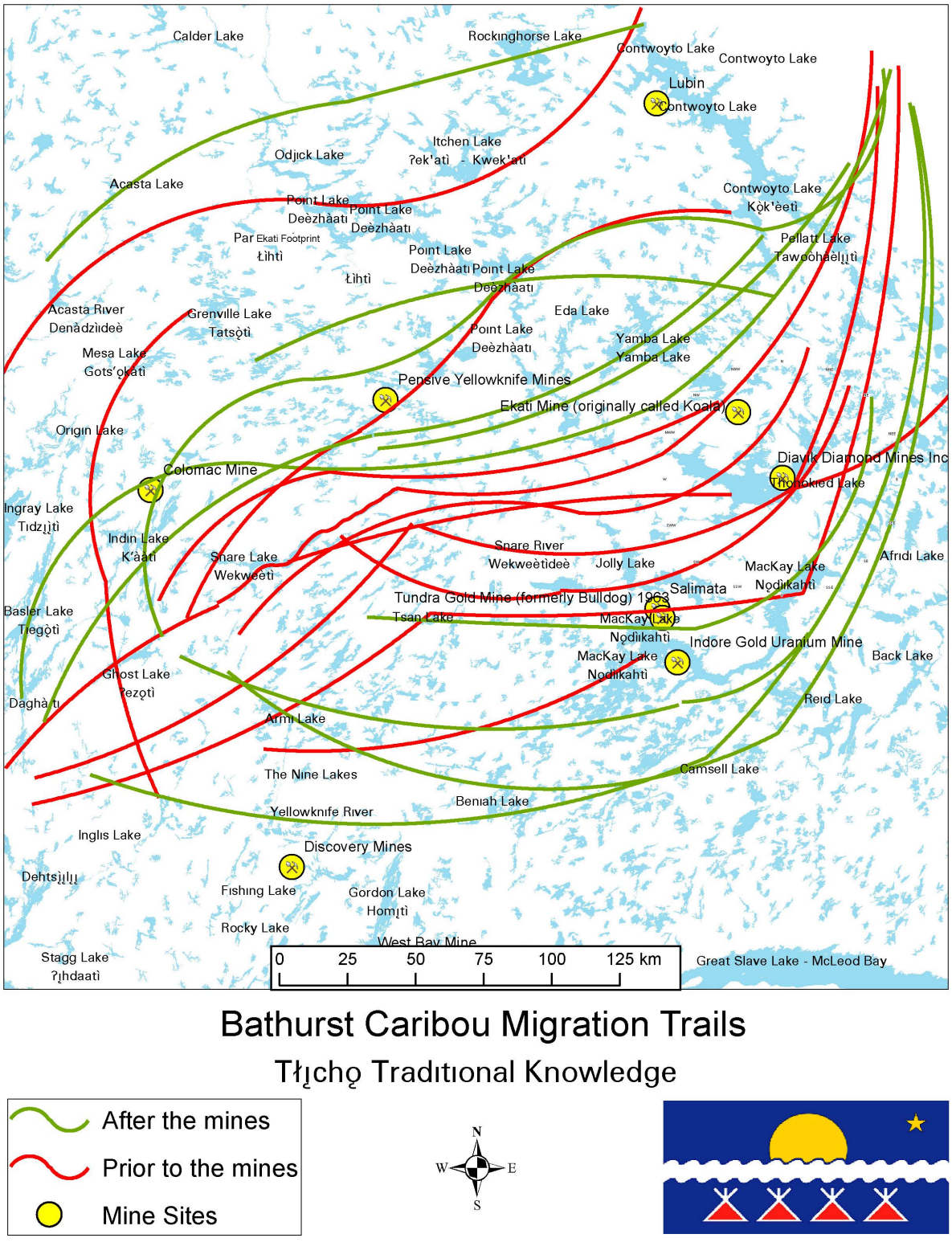


Figure 21 **Caribou Migration Trails Prior to and After the Mines (Tłı̨chǫ Training Institute)**



- *Herding & Mortality*

  No herding events took place in 2015. One caribou herding event took place in 2014, and no events occurred in 2012 or 2013. In 2011, caribou were herded away from mine infrastructure three times. There were also two herding events in 2009 – one for 27 animals near the airstrip with an incoming flight and one for a single caribou walking on the Type I rock pile. Very few herding events have been required since the mine began operating.

  There were no caribou mortalities or injuries caused by mining activities in 2015. There has been only one caribou mortality caused by mining activities (2004) since baseline data began being collected in 1995.

Will the distribution or abundance of grizzly bears be affected by the mine development?

EA Predictions:

- Approximately 8.7 km^2 of grizzly bear habitat will be lost and there will be some avoidance of the area, but the abundance and distribution of grizzly bears in the regional area will not be affected measurably;
- The maximum zone of influence from mining activities is predicted to be 10 km; and,
- Bear mortalities due to mine related activities are expected to average 0.12 to 0.24 bears per year over the mine life.

Observations:

- *Habitat*

  The table below shows the grizzly bear habitat that has been lost to date (in square kilometers), which falls within what was predicted.

Table 8: Grizzly Bear Habitat Loss by Year

Predicted Grizzly Habitat Loss (km^2)	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**Loss to Date**
8.67	1.25	1.62	0.94	0.42	0.93	0.69	0.43	0.50	0.26	0.12	0.00	0.06	0.39	0.03	0.04	**0.35**	**7.96**

- *Mortality*

  The calculated mine mortality rate for grizzlies over the past sixteen years (since 2000) is 0.06, which is below the range predicted. One mortality occurred at the mine in 2004.

- *ZOI and Abundance/Distribution*

  Grizzly bear habitat surveys were conducted from 2001 to 2008, but they were not successful at determining a ZOI for bears within the study area. Diavik submitted a request to remove the Zone of Influence monitoring requirement and this was supported by GNWT-ENR and EMAB.

  A new study design was developed to study grizzly bears in the Diavik and EKATI mine areas in 2012, as well as for De Beers Canada Inc. properties. TK/IQ was used to identify the preferred habitat of grizzly bear and then determine the location in which to set the 113 posts to collect hair samples. Community assistants were also involved with post construction and deployment. The study was conducted in the summers of 2012 and 2013, for the Diavik and EKATI mines, and De Beers completed it in 2013 and 2014. The number of posts with grizzly bear hair varied throughout the 6 sampling sessions each year. In 2012, it ranged from 20% to 44% of posts, while in 2013 it was between 46% to 57%. Methods and timing of future monitoring for this program are yet to be determined.

  There were a total of 77 grizzly bear visits during 2015. This number is not considered to be the number of bears in the Diavik area, as it is likely that these sightings include multiple observations of the same bear due to repeat visits to East Island. The number of grizzly bear sightings in any given year does not appear to be influenced by the number of people on site (Table 9).

Table 9: Average Camp Population and Number of Incidental Grizzly Bear Observations, 2002-2015

Year	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Average # people in camp	1100	470	397	646	716	747	979	562	579	630	629	537	484	524
# Grizzly Bear Seen on island	5	19	24	43	21	41	5	22	44	56	97	67	69	77

Will the distribution or abundance of wolverine be affected by the mine development?

EA Predictions:

- The mine is not predicted to cause a measurable shift in the presence of wolverines in the study area; and
- Mining related mortalities, if they occur, are not expected to alter wolverine population parameters in the Lac de Gras area.

Observations:

- Wolverines were observed on East Island 118 times during 2015. These observations are not recorded systematically and contain repeat sightings of the same animal. A large portion of these sightings were of the same individual that was relocated on 23 March 2015. See Table 10 for historic visitations, relocations and mortalities.

Table 10: Wolverine Observations, Relocations and Mortalities, Baseline to 2015

	Baseline[(a)]	2000-2004	2001	2002-2007	2008	2009-2011	2012	2013	2014	2015
Days with Visits	27/year Total = 82	25	36	149	46	53	11	3	6	118
Relocations	1	0	2	0	0	0	0	0	0	1
Mortalities	1	0	1	0	1	0	2	0	0	0

(a) Includes wolverine occurrences recorded at three different camps (i.e. Diavik, Kennecott, and/or Echo Bay Road camps) annual numbers are not available for baseline investigations.

The number of occurrences of wolverine on East Island in 2008 was higher compared to other years (46); however it is important to realize that many of the sightings were of a male animal that was denning under South Camp and another wolverine that had a snow den on the west side of East Island.

- Snow track surveys began in 2003, and have been conducted with the assistance of community members, as available. In 2008, Diavik revised the wolverine track survey in favour of an increased number of transects of standard length compared to the surveys completed in previous years. They are 4 km straight lines that are randomly distributed throughout the study area, but some bias is placed on tundra areas identified as preferred habitat for wolverine based on TK.

  A total of 38 tracks were found over two transect surveys from 24 March to 17 April 2015, with an average track density of 0.13 (per kilometer) for all transects. Over the years the number of tracks identified has remained relatively consistent.

Table 11: Wolverine Track Index, 2003-2015

Year	Survey Period	Number of Tracks	Distance Surveyed (km)	Track Index (Tracks/km)
2003	April 10 – 12	13	148	0.09
2004	April 16 – 24	22	148	0.15
2004	December 2 - 8	10	148	0.07
2005	March 30 – 31	7	148	0.05
2005	December 7 – 12	18	148	0.12
2006	March 30 – 1	5	148	0.03
2008	April 30 – May 2	15	160	0.09
2009	April 2 – 4	11	156	0.07
2010	No community assistant available			
2011	March 30 – April 3	23	156	0.15
2012	March 28 – April 3	22	160	0.14
2013	April 2 – 6	26	156	0.17
2014	March 23 – 26	25	160	0.13
2015	March 24 – April 17	38	160	0.13

Diavik participates in a joint wolverine DNA research program with the GNWT and EKATI mine in certain years. This program was conducted at Diavik in 2005, 2006, 2010, 2011 and 2014. A total of 66 individuals (34 males, 32 females) were identified in the Diavik area in 5 years of the program. Seven of the wolverine identified in 2014 had been previously detected in the Diavik area. Interestingly, two individuals identified in the Diavik area this year were also seen in the Snap Lake study area. A similar declining trend in the number of wolverine in the Diavik study area has been seen with both the wolverine track survey and the DNA hair-snagging study, and is likely influenced by the number of caribou in the Bathurst herd.

Will the distribution or abundance of raptors be affected by the mine development?

EA Predictions:

- Disturbance from the mine and the associated zone of influence is not predicted to result in measurable impacts to the distribution of raptors in the study area; and
- The mine is not predicted to cause a measurable change in raptor presence in the study area.

Observations:

- Diavik, Ekati and the GNWT conducted falcon productivity and occupancy surveys annually in the Daring Lake, Diavik and Ekati study areas from 2000-2010. The falcon monitoring results from Daring Lake have been used as control data for productivity from an undisturbed area. Previously identified potential nesting sites were visited by helicopter in May each year to determine if nesting sites were occupied, and again in July to count any young in the nest.

  Nest occupancy remained relatively high in the Lac de Gras region throughout those 10 years (raptors were preferentially using the area within 14 km of the mine), supporting the prediction that mine activity levels would have a negligible impact on the presence and distribution of raptors in the study area. Annual changes in nest success were also not related to the level of activity at the mine site.

  As a result of these findings, discussions during the wildlife monitoring program review process from 2009-2011 supported a change in falcon monitoring methods to align with the Canadian Peregrine Falcon Survey (which in turn is aligned with the North American Peregrine Falcon Survey). This survey is conducted across Canada (and North American) every five years. The survey was conducted in 2015.

- Chick production in past years has ranged from zero to seven in the DDMI study area. Observations made over the years were consistently similar to those of the control site at Daring Lake, where productivity and occupancy rates have changed little since baseline.

Table 12: Falcon Nest Occupancy and Production at Diavik and Daring Lake, 2000 to 2010

Year	Survey Area	Total Sites	Occupied	Productive	Total Young
2000	Diavik	6	2	2	5
	Daring	-	-	-	-
2001	Diavik	6	2	0	0
	Daring	13	3	1	3
2002	Diavik	6	4	1	3
	Daring	18	10	9	15
2003	Diavik	6	1	0	0
	Daring	10	5	3	4
2004*	Diavik	6	5	4	7
	Daring	12	6	1	2
2005*	Diavik	6	3	1	2
	Daring	10	5	1	1
2006*	Diavik	6	3	0	0
	Daring	10	4	1	3
2007*	Diavik	6	3**	2	7
	Daring	10	1	2	8
2008*	Diavik	6	5***	2	3
	Daring	12	6	3	4
2009*	Diavik	6	4	2	5
	Daring	12	5	3	6
2010*	Diavik	8	6	3	7
	Daring	12	5	3	7

Daring Lake data originates from the Daring Lake research station (S. Matthews, personal communication, ENR).
*Diavik data includes spring (occupancy only) and summer (productivity only) monitoring data. Previous occupancy values based on productivity survey only.
**Occupancy data for May provided by BHPB and GNWT – site DVK 11 not checked
***Does not include additional site (DVK 19-1) found occupied during the June survey

- Since May 2005, peregrine falcons have been seen nesting on Diavik buildings and pit walls. A total of 25 pit wall/mine building inspections were carried out in 2015, with 2 active nests found (1 with peregrine falcons, 1 common raven). Two rough-legged hawk and 1 peregrine falcon nest were found in 2014, 4 peregrine falcon nests were seen in 2013 and one in 2012, but no raptors were found nesting at the mine site in 2010 or 2011.

Table 13: Nests Observed on Mine Infrastructure and Open Pits in 2015

Area	Species	Date	Active Nest	Observations
Site Services Building	Peregrine Falcon	3 June	Yes	Nest observed on June 3, three fledglings observed on July 15 and fledged on August 14.
Boiler House	Common Raven	6 June	Yes	Pair of ravens using old nest. Four young observed in nest on June 12. No longer monitored after July 18.
A418 Lookout #2	Peregrine Falcon	29 May	No	Observed perched on processing plant. Not observed again.

Area	Species	Date	Active Nest	Observations
A418 Lookout #1	Peregrine Falcon	31 May	No	Observed perched on processing plant; not observed again
Process Plant	Peregrine falcon	24 June	No	Pair observed on 24 June; not observed again.

- There were no falcon deaths at the mine in 2014 or 2015. Two falcon mortalities occurred at the Diavik Mine site in 2013. On 20 July 2013, a peregrine falcon carcass with 3 wounds was found by the A154 dike; it is suspected to have hit a power line. On 17 November 2013, a juvenile carcass that had been heavily scavenged was found below the ore storage area in the A154 pit. There was no nearby infrastructure that would indicate that the mortality resulted from the Mine. No falcons died because of mine operations from 2009 to 2011, but one peregrine falcon was found dead in 2012.

Will the distribution or abundance of waterfowl be affected by the mine development?

EA Predictions:

- At full development, 3.94 km^2 of aquatic habitat will be lost; and
- The mine is not predicted to cause a measurable change in waterfowl presence in the study area.
- Early open water or early vegetation growth might attract waterfowl during spring migration.

Observations:

- By the end of 2007, a total of 2.56 km^2 of shallow and deep water habitat had been lost due to mine development, and there had been no additional shallow or deep water areas developed since that time. With the start of development of the A21 dike in spring 2015, a total of 0.23 km^2 of additional water habitat was lost; 0.06 km^2 of shallow water and 0.17 km^2 of deep water. The total area of water habitat loss still remains below predictions (3.94 km2) at 2.72 km^2.
- East Island shallow bays (natural bays in Lac de Gras) and mine-altered water bodies (ponds that have been changed or created for the mine site) were surveyed annually, on a daily basis, over a 5-week period during the peak spring migration (late May to late June) for waterfowl presence from 2003 to 2013. The results of surveys indicated that mine-altered water bodies are used by water birds, including ducks, geese, gulls, loons and shorebirds, during spring. However, the range of dates when water birds are first detected do not support the predictions that waterfowl or shorebirds are using mine-altered water bodies earlier than the East and West bays. As there is no similar control site that can be used for the shallow bays (they are a unique feature of the region),

detailed statistical analysis on waterfowl presence is not conducted. Over the years, almost 20 different species of shorebirds have been observed, in addition to 5 species of dabbling ducks, 14 types of diving ducks and 4 kinds of geese. Each year, the shallow bays have the highest abundance of birds, followed by the north inlet. Overall, data collected suggest that construction and operation of the mine has had little effect on the presence of birds in the area.

Diavik consulted with Environment Canada, EMAB and other stakeholders about removing the requirement to monitor bird species abundance and diversity at East and West bays, given the results to date. This monitoring program was discontinued in 2014.

- Diavik has been operating 4 wind turbines since September 2012. During consultations with Environment Canada (EC) prior to installation, it was noted that no post-construction follow up monitoring for bird fatalities is required. However, Diavik voluntarily implemented a post-construction monitoring program in 2013 to assess the potential direct impacts the wind farm may have on birds. Surveys for bird carcasses below the turbines were undertaken to estimate bird strikes. Monitoring was completed by Diavik personnel twice per week, within a 50 meter radius of each turbine using the Baerwald Spiral method. In 2013, a total of 23 inspections were completed at the wind farm during post-construction mortality monitoring between 11 June and 23 August and no bird carcasses were observed. Instead of continuing with the more formal Baerwald surveys, Diavik now includes monitoring for bird mortalities at the wind turbines as part of the overall site compliance monitoring program.

- No birds have been killed at the mine site from 2011 to 2015. Four other project-related bird mortalities have occurred, one each in 2010, 2009, 2005 and 2002.

5. Traditional Knowledge Panel: Water Quality and Reefs

A fish habitat design review was originally scheduled for later discussions with the TK Panel. However, the Aquatic Effects Monitoring Program (AEMP) Traditional Knowledge (TK) Study was conducted in 2015 so the opportunity to review the results of this study and focus on post-closure water quality monitoring and fish habitat design resulted in a decision to conduct this session earlier. The TK Panel met in Yellowknife from 2 to 4 December 2015.

Panel members and facilitators have incorporated a cross-cultural approach to learning that has demonstrated an increased understanding of the technical challenges associated with closure and has resulted in more practical recommendations from the Panel. A growing table of recommendations relating to closure that have been provided through TK/IQ Panel reports has been developed, with a summary of the primary recommendations for water quality monitoring and fish habitat design outlined below.

The goals for Session 8, Reefs (fish habitat) and Water Monitoring, were to:

- provide an opportunity for TK Panel members to determine priorities and methods for water management and monitoring after closure;
- review the results of the 2015 AEMP TK Study and determine future plans for this study;
- consider fisheries habitat at closure, specifically the proposed reefs within the dikes; and,
- learn how Panel recommendations provided to Diavik in the past are currently being considered.

There were six key themes that emerged from this TK Panel session. These are listed below, including a brief summary of the main recommendations associated with each item.

i. Monitor Water Quality and Quantity

The TK Panel considered areas that they would want sampled, and identified the reasons why. There was also discussion on how or whether to integrate TK and western science monitoring techniques, as well as identifying landscape features that may naturally help to clean or heal water. Panel members noted that community members are comfortable tasting Lac de Gras water (as part of the AEMP TK Study), but that they were not comfortable tasting water on East Island. A visual inspection of water bodies, combined with scientific sampling, was the preferred method for monitoring East Island water quality at closure. Indicators of good water quality from a TK perspective were identified, such as the presence of bugs in lakes and animals drinking the water. Fish taste is also considered an indicator of water quality, as fish can taste different if the water changes.

The key areas of concern relating to water quality at closure were runoff from the PKC and North Country Rock Pile as well as the water quality in the pits. Panel members wanted to be sure that any contaminants were removed from the pits and underground prior to flooding, and that the dikes would not be breached until the water was proven over many years to be of good quality. The Panel felt that water quality monitoring should be done regularly, with a particular focus on heavy metals and freshet. Panel members noted that moss can filter water, so use of this and other types of vegetation should be considered as a natural way to help clean water in channels and around shorelines.

ii. AEMP TK Study Support

The TK Panel supports ongoing implementation of the AEMP TK Study into the future, even considering options for funding and organizing this program after 2030. The Panel would like to continue to use the camp site that Diavik has on the south side of Lac de Gras to carry out this work, until at least 2018. The Panel also reviewed the location and frequency of the scientific sample locations for the AEMP and are in support of these. There are some minor changes that the Panel recommended for the AEMP TK Study, namely: water quality taste test of plain, cold lake water (not tea) plus a visual inspection of boiled lake water; setting fish nets on both sides

of East Island; including 2 youth and 2 Elders; and, considering sampling water and fish in the area of the Narrows (between Lac de Gras and Lac du Sauvage) due to development upstream.

iii. Fish Habitat Considerations

The most important question for the Panel to address was the type of habitat that should be built inside the dike areas. Spawning habitat was initially of interest, but Panel members determined that there was enough spawning habitat in Lac de Gras so they shifted their focus to rearing and resting habitat for small fish. Gravel with a mix of sand or till in shallow areas was considered as the best substrate for the new lake bottom. The reefs in this area should be of variable size and shape while being far enough under the water to allow for current and for ice to freeze solid.

TK Panel members felt that the shoreline in the A154 pit could be largely left as-is and that the ramps in the pits should be left as well, so that caribou and other wildlife have a safe access point into and out of the water. In relation to the A418 pit, there was concern that an approximately 1 kilometer section of pit wall would become a cliff over the water/ice that could be dangerous for animals. The Panel recommended that this section be broken up with some sloped areas that would allow for safe passage.

iv. Engage Young People from the Communities

Discussions on post-closure monitoring helped the Panel identify that community capacity is not at a level where Aboriginal communities could undertake current monitoring responsibilities carried out by the mines or their consultants. The importance of supporting youth to start training in environmental monitoring was identified as critical. Elder Panel members identified that it is the young people of today that can learn to conduct this type of monitoring and carry through with it to post-closure, benefitting from being a part of the decisions and activities with which the Panel is involved at present. It was important to the Panel members that these young people be knowledgeable in science and equally equipped with personal experience and knowledge (i.e. the foundations of TK). A number of existing training programs were identified to help young people learn the skills required for this type of work.

v. Diavik and TK Panel Demonstrate a Collaborative Model

Collaboration between different groups, disciplines, and generations strengthens the nature and quality of the work that is carried out by TK Panel members. While the membership of the TK Panel has shifted slightly to become more gender balanced, many members have been participating since the TK Panel began in 2011. Such commitment levels are indicators of the success of the TK Panel and enable the members to move through a series of related topics with each session, building on their knowledge from one year to the next.

The purpose of the Panel is to provide TK expertise that simply may not have been applied in the same setting before, but nonetheless, is integral to developing a comprehensive closure plan with relevant and effective design considerations. It is the commitment of TK Panel members

and Diavik staff alike to respect one another's perspectives and see value in learning from each way of knowing that is at the core of this successful collaborative model.

vi. Climate Change and the Mine

This particular TK Panel Session took place the week after the *COP 21: UN Climate Change Conference* such that environmental issues, in general, and climate change impacts, in particular, were on people's minds. More specifically, Panel members were concerned about lower water levels that some areas of the North are experiencing, and how filling the pits would impact water levels in Lac de Gras. They were also interested in learning about the calculations used to predict the impacts of climate change for the North Country Rock Pile, because the integrity of the pile relies on maintaining a frozen core. At a higher level, Panel members connected the products of mining to lifestyle choices and identified that the mine should be working on small things in relation to energy efficiency, as they all count towards a big improvement one day.

6. Operational Activities

The information below provides a summary of the operational activities that occurred during 2015. More detailed information can be found in the Type 'A' Water License annual report. Most of these activities will be repeated or continue to advance in 2016. Additionally, the PVP and lichen study is scheduled to be done in 2016.

- Required SNP stations were sampled during each month. Where samples were unable to be obtained (e.g. safety concerns, weather, equipment issues), samples were re-scheduled or postponed. The amount of each chemical regulated under the Water License remained well below license limits during 2015.
- The Tibbitt to Contwoyto Winter Road operations were successful and Diavik trucked 2,795 loads to the mine site, and backhauled stored hazardous wastes for off-site recycling or disposal. The road was open from 1 February to 31 March 2015.
- Quarterly toxicity samples from stations 1645-18 and 1645-18B were collected in March, June, September and December.
- The AEMP was conducted in April and August.
- Annual snow core surveys were completed in April.
- Wolverine track surveys (two) were done in March and April.
- Construction of the A21 dike began on 14 July.
- Total Suspended Solids (from disturbed lake bottom sediment) value of 32 mg/L exceeds Water License criteria (25 mg/L above background conditions) due to sustained high winds lifting part of the turbidity curtain that separates the construction area from Lac de Gras on 8 August.

- A total of 25,878 m3 of sediment was removed from the bottom of Lac de Gras between July and September for construction of the A21 dike.
- Diavik's re-vegetation research with the University of Alberta continued through the summer of 2015.
- Inspections for raptor nest sites on mine infrastructure & pit walls ran from May to September.
- PKC construction activities include completion of a spillway channel across the dam crest and extension of 22 thermistors, 12 peizometers and 4 observation wells.
- The PKC dam raise (Phase 6) was completed in 2015, with a final elevation of 465 m on the north and east sections.
- Caribou activity budgets/behavioural observations were done from September to October.
- Diavik's water license was renewed in October for an 8 year term with the Wek'èezhìi Land and Water Board. The new license reconfirms water quality limits and added some engineering (design) conditions that are new to NWT requirements. The new license (W2015L2-0001) will be in effect until 2023.
- The TK Panel met to discuss water quality monitoring and fish habitat design for closure.
- The average camp population for the year was 544.
- The open pit bottom elevations are 9035 (A154) and 9110 (A418); the surface of the water on Lac de Gras is 9415.26 m asl.
- A total of 7,344 m was developed underground, including 4,115 m of waste rock and 3,309 m of ore development.
- In addition to regular mine water collection pond dewatering activities, the following operational and construction projects were carried out in 2015:

  Surface Projects

  - PKC Phase VI Dam Raise 9460 m to 9465 m asl (East and North sections) completed
  - Installation of 3 additional dorms at South Camp
  - A21 project construction activities: roads, laydown areas, dredging, dike construction, dewatering infrastructure and electrical infrastructure

  Underground Projects (numbers below are associated with levels (masl) in the mine)

  - Completed the second de-water casing between the D8975 Pump Station and the D8925 Pump Station with the raisebore drill.

- Completed the construction of the D8925 Pump Station and installed the piping from the D8925 Gallery & S8925 Gallery.
- Piping for the N8925 Gallery.
- Complete the N8950 MCC Room.
- Built a vent bulkhead at S9000 and installed the associated fan, includes a vent regulator as well as a Zacon door.
- Constructed the D8925 Level Sump.
- Raisebore drilled the A9045-A8995 Vent Raise.
- Constructed the Truck Load Out, Bumper Blocks and Grizzlies for Ore Pass 6.
- Constructed the S9000 Bumper Block for the Ore Pass 5 Transfer Raise.
- Constructed the A9045, A9020, S8950 and N9000 Vent Regulators.
- Constructed the A8985 Vent Bulkhead on A Ramp.
- Constructed a catwalk at the A9065 Sump.
- Constructed a Zacon door at A9065.
- Constructed a load levelling bar at A8970.
- Constructed the D8935 Vent Bulkhead on D Ramp.
- Constructed additional SLR bulkheads on A9145, A9125 & A9105 after a contact wall failure in A418.
- Constructed a vent bulkhead in S9025 LE 975 for SLR abandonment.
- Constructed a catwalk and equipped the D8900 Sump.
- Constructed a ventilation bulkhead and installed a fan for the A Ramp Escapeway system.
- Constructed a fence barricade on surface at RAR 11.
- Constructed a vent bulkhead/regulator in the D9120 RAD.
- Raisebore drilled the S9025-S8925 Vent Raise.
- Completed the installation of the S9025 Booster Fans and Vent Bulkhead.
- Fabricated two wall washing tanks for use with ITs.
- Started the A8985-A8920 Escapeway with the raisebore drill.
- Built numerous concrete pads and roofs in MLC bays.

References for Further Information

Water Quality

- Monthly Surveillance Network Program (SNP) Reports
- 2015 Reports: Type A Water License, Seepage Survey Report
- AEMP Study Design, Version 3.5 (2014)
- Three Year AEMP Results Summary for 2011 to 2013, v3.2
- AEMP Reference Conditions Report, Version 1.1
- 2014 AEMP Annual Report

All reports: http://www.mvlwb.ca/Boards/WLWB/SitePages/search.aspx?app=W2015L2-0001&doctype=7.+Monitoring+Programs or http://www.mvlwb.ca/Boards/WLWB/SitePages/search.aspx?app=W2007L2-0003&doctype=7.+Monitoring+Programs

Wildlife

- 2015 Wildlife Monitoring Report (EMAB Public Registry)
- 2012 Wildlife Monitoring & Management Plan (EMAB Public Registry)
- 2014 Comprehensive Analysis (EMAB Public Registry)
  EMAB online registry: http://www.emab.ca/Library.aspx

Re-vegetation/Traditional Knowledge

- ICRP 2015 Annual Update, including the TK Panel Session #8 Final Report: Reefs and Water Quality (http://www.mvlwb.ca/Boards/WLWB/SitePages/search.aspx?app=W2015L2-0001&doctype=8.+Closure+and+Reclamation)
- Feeling the Spirit Together: Monitoring our Land, Water, Fish and Air (EMAB Public Registry)
- We Fish Today, for Fish Tomorrow (video, https://vimeo.com/150298226)
- TK Study for the Diavik Soil and Lichen Sampling Program, Tlicho Research and Training Institute (2013, http://www.research.tlicho.ca/research/partnerships-other-govt/traditional-knowledge-study-diavik-soil-and-lichen-sampling-study)

Air Quality

- Air Quality Monitoring Program (EMAB Public Registry)
- 2014-2015 Air Quality Monitoring Report (EMAB Public Registry)
- National Pollutant Release Inventory
  (http://www.ec.gc.ca/inrpnpri/default.asp?lang=En&n=B85A1846-1)

Socio-economics /Sustainable Development

- 2015 Sustainable Development Report
  (http://www.riotinto.com/documents/2015_Diavik_Sustainable_Development_report.pdf)

Management & Operating Plans (as per Table 2)

http://www.mvlwb.ca/Boards/WLWB/SitePages/search.aspx?app=W2015L20001&doctype=6.+Management+Plans

Appendix I

Summary of Adaptive Management & Mitigation Measures

Table I-A - Adaptive Management & Mitigation

Aspect	Compliance	Adaptive Management Response	Mitigative Measures	Effectiveness of Measures
Waste	- Minimize waste management issues. - Maintained dump site for inert waste materials. - Waste rock is managed to reduce the chance of acid runoff	- All domestic and office wastes are incinerated at the waste transfer area. - Use of clear plastic bags in all areas for domestic and office space waste. - New WTA facility incorporated access road around the facility to allow equipment access and snow removal during winter to reduce opportunities for animals to climb over the fence; fencing angled and extended further in to ground to prevent access to burrowing animals; extensions placed on gate & gate automated in an effort to prevent animal access; improved sump facilities for contaminated soil containment area. - New incinerator housed in a building to further prevent animal attraction & rewards. - New, more efficient incinerator that burns more cleanly & completely. - Inert solid waste facility (landfill) access restricted. - Liner repairs conducted in areas where seepage from the dam was found. - More instrumentation was added in some areas to monitor dam and rock pile temperatures and movement. - Seepage monitoring stations changed in response to observations over the years. - Re-vegetation research is testing the use of waste rock as a substrate for plant growth.	- All employees and contractors are provided orientation on proper waste management. Color-coded collection bins and posters for non-food waste around site. - DDMI Environment Staff conduct regular toolbox meeting discussions regarding waste management. - Regular waste inspections are conducted by Environment Staff at the Waste Transfer Area and Landfill. A site-wide compliance inspection is completed weekly. - Site Services implemented clear plastic bags in all domestic and office areas to allow staff to verify contents prior to disposal. - Surface Operations staff collecting waste bins inspect bins prior to pick-up and notify Environment department to arrange for sorting. - Gate installed at inert solid waste facility to limit access to dump area. - Waste rock is classified according to sulphur level and is tested and sorted prior to disposal. - The waste rock pile is designed to encapsulate the rock with the highest sulphur content, and the PKC contains the waste kimerlite rock; each of these areas are surrounded by collection ponds to capture any seepage or runoff. - Granite (lowest sulphur content) is the rock permitted for use as a construction material at the mine site. - Instruments were installed to monitor performance of structures such as the PKC dam and the rock pile. - Extensive lab and field (test piles) experiments are done to test how the rock pile will perform. - Sewage sludge holding cell relocated to prevent human health concerns. - Installation of a waste oil heater for the batch plant. - New approach to waste management plans includes Solid Waste & Landfill, Hydrocarbon Contaminated Materials, Incinerator Management and Dust plans.	- During Inspector's visits in 2015, no concerns were raised regarding food waste, or the landfill. - Bear visits on East Island remained similar to past & bears sightings were not associated with waste management areas. - Improper disposal of waste is identified during DDMI waste inspections (including food waste) despite training and awareness sessions with site staff, but it is minimal when compared to the volume of waste disposed. - Sulphur testing has been an effective means of rock segregation. - Installation of seepage collection wells has proven effective. - Seepage and runoff events have occurred in the past, but there were no such events in 2015. - Monitoring efforts and data were helpful in designing seepage program changes. - Significant efforts undertake to identify, inventory, remove, re-use or dispose of site infrastructure as a means of progressive reclamation.

Aspect	Compliance	Adaptive Management Response	Mitigative Measures	Effectiveness of Measures
Water	- Effluent is treated before being discharged to Lac de Gras, or is recycled. - Ammonia levels within water license limits. - Prevent seepage water entering Lac de Gras - Seepage water quality to be within license limits. - Decrease freshwater use. - Have fish and water quality that are safe for use.	- Review loading and blasting procedures and materials for opportunities to reduce ammonia levels in pit and underground water. - Re-use North Inlet water as supply water to facilities at the mine site. - Treatment plant expanded and some components re-designed to accommodate additional water flow from underground. - Evaluated the use of treated effluent for dust suppression. - Conducted a study with the University of Alberta to evaluate the biological removal of ammonia and other nitrogen compounds in the North Inlet. - Special Effects Studies (SES) are completed when unexpected effects are measured during the AEMP. - Established Action Levels to respond to findings of various parameters of the AEMP. - Evaluate seepage prevention or interception methods upstream or downstream of areas of concern. - Investigate, assess and repair site infrastructure where seepage issues arise, and where possible. - Improve turbidity curtain anchors in response to elevated TSS levels due to deep water trench and site-specific exposure issues.	- The North inlet provides retention time for mine water before treatment, allowing for ammonia reduction by natual attenuation; mine water discharge located far away from treatment plant intake. - Influent and effluent in the NIWTP is monitored consistenly via instream sensors (immediate feedback) and the SNP for parameters that are indicators of water treatment effectiveness. - Daily sampling of pit, underground & effluent water to produce trends & track compliance. - Plant able to automatically stop discharging treated water that meets or exceeds DDMI's *internal* limits (which are set below the water license limits). - Sulphuric acid is available for secondary treatment of water with high ammonia levels. - Ammonia Management Plan followed to minimize ammonia loss; includes use of blast hole liners to reduce ammonia dissolution in water and limiting holding times for loaded blast hole patterns to 4 days for wet holes and 2 days for sump blasts. - Batch and paste plants utilize treated effluent as a water source instead of fresh water. - Sumps and pumps installed underground to collect and transport water to the North Inlet. - Ability to re-use water from the North Inlet and PKC, prior to treatment, to reduce freshwater intake volumes. - Frequent visual inspections of areas downstream of dams, dikes & ponds. - Seepage intercepted with the use of sumps installed downstream of seepage areas. - Repairs to damaged infrastructure to prevent future seepage. - Source water (North Inlet, Collection Ponds, PKC) chemistry around site are monitored as part of the SNP. - On-going SES to determine mercury concentration/availability in fish and sediments within Lac de Gras. - Separation of water collection systems underground to capture clean groundwater and divert it to the North Inlet prior to it coming in contact with mine infrastructure/water. - Use of absorbent berms or skimmers to remove oil from water in underground sumps. - Sediment collection sumps installed underground to separate dirt from the mine	- Ammonia levels in 2015 were well below the license limit of 12 mg/L. - Ammonia levels in mine water and effluent have remained low over time. - Parameters regulated in the Water License in NIWTP effluent remain well below discharge criteria. - No seepage events occurred in 2015. - Over 500 toxicity tests have been done on treated effluent since 2002 and most have been non-toxic. - Traditional Knowledge study of fish and water health completed in 2015; fish and water quality were found to be good.

Aspect	Compliance	Adaptive Management Response	Mitigative Measures	Effectiveness of Measures
Wildlife	- Minimize wildlife-related compliance issues.	- Wildlife monitoring programs are adjusted based on results of previous years of studies. - Review of wildlife monitoring programs has been done with all 3 mines, Monitoring agencies, government and communities. - Study area expanded for caribou based on potentially larger mine zone of influence than predicted. - Participation in a regional wolverine DNA study with BHP-Billiton and GNWT to gain further insite on the wolverine population in the Lac de Gras region and around the mine. - Monitoring methods for grizzly bear changed to consider a more regional objective, while being safer for field crews. - Pit wall & infrastructure surveys for raptors that may nest in the pit or on other structures was added to the raptor monitoring program. - Raptor surveys changed to align with the North American Peregrine Falcon Survey. - Nests relocated or work activity ceased in response to wildlife presence. - Bird mortality monitoring conducted after installation of wind turbines. - Building installed to contain new incinerator and prevent wildlife attraction. - New Waste Transfer Area designed to minimize opportunities for scavengers to enter the area and access attractants/rewards. - Inclusion of community members in wildlife monitoring programs to allow consideration of both TK and science when evaluating impacts.	- Orientation and environmental awareness training related to wildlife on site is provided to all employees. - Employees notify Environment department of any wildlife sightings; these are then recorded. - Caribou advisory board & site-wide radio notifications for caribou presence on island. - Waste inspections conducted regularly. - Waste management system in place. - Caribou are herded away from high-risk areas, such as the airstrip, as requried. - Bears are deterred from the mine site, as required. - Problem wildlife is relocated or destroyed, in consultation with the GNWT. - Wildlife reporting system is in place site-wide, for wildlife observations. - Wildlife have the 'right-of-way' on site. - No hunting or fishing is permitted by employees. - Buildings are skirted and higher-risk areas are fenced or bermed in an effort to deter animal access. - Surveys have been completed to look for caribou on roads, the rockpile and PKC when caribou are getting close to the mine. - Wind turbines equipped with flashing beacons designed to reduce wildlife impacts. - Mine-altered pond water levels are kept low to discourage use by waterfowl. - Re-vegetation research has been on-going for 10 years and will help to determine habitat available for wildlife after closure. - TK Panel focuses on wildlife concerns when considering closure planning options and operational monitoring programs. - Ground-based caribou surveys initiated when caribou seen on site or collar maps show them approaching.	- Mine-related wildlife incidents and mortalities have remained low over the years. - No herding events or wildlife injuries or mortalities happened in 2015.

Aspect	Compliance	Adaptive Management Response	Mitigative Measures	Effectiveness of Measures
Dust	- Isolated higher deposition levels due to construction activities (dust deposition is expected to decrease as construction activities at Diavik decrease and the mine switches from open pit to underground operations).	- Evaluate dust control measures used to minimize dust released from construction and operations. - Evaluate the use of treated mine effluent for dust supression, which would reduce fresh water use from Lac de Gras. - Evaluate dust suppressants that can be used in key areas to reduce dust levels. - Assess vegetation and dust sample locations to provide better coverage of the area for improved data collection. - Recalculate dust emission predictions to consider underground mining methods and construction activities. - Use of BC Objectives for Dustfall at mining operations as a comparison for DDMI levels. - Additional snow core sample stations added to program.	- Dust suppression on roads and mine areas using water during non-freezing periods. - New crusher comissioned in 2009 is contained inside a building and has an advanced dust control and collection system. - Dust suppressant used on the apron, taxiway, airport parking lot and helipad (approved by both the Lands Inspector and Transport Canada). - Addition of vegetation monitoring stations to improve ability to detect potential changes to plant cover or composition. - Modified lichen monitoring program to obtain more samples from further distances & link metal levels to caribou exposure. - Use of blast mats to control dust in smaller-scale blasts. - Transition to a completely underground mine has reduced dust levels from previous years.	- Control of dust from crusher, small blast areas and roads. - Dust suppressant continued to be used on the airport's taxiway, apron, parking lot and helipad in 2015. - The transition from open pit to underground mining reduced dust levels from blasting. - Dust levels are below the BC Objectives for mining operations. - TSP levels in 2014-2015 were below the GNWT Ambient Air Quality Guideline within the vicinity of the mine site.
Air Quality	- Measure consumption of applicable sources of GHGs - primarily diesel combustion. - Meet Internal GHG Reduction Targets. - Report GHG Emissions to regulatory agencies and within Rio Tinto.	- Evaluate new technologies and equipment that may allow for pollution controls/reduced emissions. - Wind power generation research. - Determine energy draws, optimal use and options to reduce power requirements for buildings on site. - Various fuel consumption reduction initiatives, e.g. no idling. - Review of air quality monitoring program and equipment requirements. - Added monitoring of TSP in 2013. - Conducted energy audits on site buildings in 2014. - Determine optimal operating temperatures for the underground mine. - Evaluate energy efficient equipment options. - Evaluate and optimize transportation schedules and volumes to/from site.	- Use of low sulphur diesel. - Archaeological assessment for areas where wind turbines could be installed. - Installation of Delta V fuel consumption monitoring system for all key power consuming buildings on site. - Boiler optimization program. - Installation of 4 wind turbines, integrated into the power distribution system, to reduce fuel consumption. - New waste incinerator (with pollution prevention device). - "Waste" heat from powerhouse generators used to heat facilties connected to powerhouse (camps, maintenance shops, etc.). - Underground air quality monitoring conducted. - Improving efficiencies of plant operations to reduce power draw. - 2 TSP monitors installed at the mine site. - Installation of waste oil heaters on site. - Adjust (lower) underground mine operating temperature by 1°C. - Install energy efficient motors on underground haul truck fleet. - Optimize the glycol heat recovery system in Powerhouse 2 to reduce boiler use.	- DDMI reports GHG emissions annually to appropriate regulators and internally to Rio Tinto. - The wind turbines offset GHG emissions by 14,404 tonnes in 2015. Wind power provided 11% of the mine's power needs in 2015.

Aspect	Compliance	Adaptive Management Response	Mitigative Measures	Effectiveness of Measures
Hazardous Materials	- No significant spills or non-compliance issues. - Disposal practices that minimize possible environmental impacts	- All reported spills are investigated and taproots are conducted on external spills. - Electronic system for MSDS tracking for chemicals on site. - New products being brought to site are reviewed by Health, Safety and Environment personnel. - Equipment identified as having issues relating to frequency/volume of spills can be taken out of service for repairs/overhaul, as required. - Vehicle inspection and storage procedures improved in an effort to reduce spills. - Scheduled preventative maintenance for heavy equipment. - Addition of underground spill response procedures to the Operational Phase Contigency Plan (OPCP). - Evaluate best practices for spill prevention and hazardous material storage underground.	- Orientation and specific training for employees and contractors is provided for storing and handling hazardous materials. - Regular waste inspections are conducted by Environment Staff at the Waste Transfer Area and Landfill. - A site-wide compliance inspection is also completed weekly. - Hazardous materials are backhauled each year on the winter road; materials are either recycled or disposed of in a safe manner. Prior to backhaul, hazardous materials are stored and inventoried at the Waste Transfer Area (contained, lined area). - A Lube Storage Building was built beside the truck shop to fully contain maintenance products. - Containment facilities exist for underground product storage and dispensing, as well as above-ground tankfarms - Pipelines that feed the powerhouse from the south tank farm are encased in cement. - All employees and contractors take WHMIS training. - NIWTP expansion provided improved containment for sulphuric acid and other water treatment chemicals stored on-site. - Alternative biodegradable products are encouraged, as are bulk orders. - Spill containment & clean up kits are located throughout the mine site (on surface & underground). - The on-site Emergency Response Team has spill response equipment & capabilities, and practices such drills annually. - Installation of a waste oil burner at a plant on site to reduce on-site storage, shipment and off-site disposal risks with backhauling product. - Use of absorbent berms or skimmers to remove oil from water in underground sumps. - Hydraulic hoses on underground equipment are wrapped in a plastic sheath to prevent leaks or blow outs caused by abraded or cut hoses.	- Spills are reported, recorded and quickly and effectively cleaned up. Follow up actions resulting from external spills are documented and reported to the Inspector. - No significant hazardous materials compliance issues were identified in 2015. - Spill volumes and frequency from problem equipment remained low during 2015.