Dominion Diamond Corporation

Jay Project Developer's Assessment Report – Regulatory Meeting

Terrestrial

Overview

General overview of presentation

- Introduction
  - Terms of Reference (TOR) requirements
  - Locations in the Developer's Assessment Report (DAR) for the Terrestrial disciplines

- Assessment approach for the Terrestrial disciplines
  - Valued Components, Assessment Endpoints, Measurement Indicators
  - Assessment Cases

- SON: Air Quality – Existing Environment and Assessment
- SON: Vegetation - Existing Environment and Assessment
- SON: Wildlife and Wildlife Habitat - Existing Environment and Assessment
- KLOI: Barren-Ground Caribou - Existing Environment and Assessment
- Follow-up and Monitoring for Terrestrial Environment

Introduction

Developer's Assessment Report (DAR) Objectives

To meet the Terms of Reference:

- Define Valued Components (VCs) and their spatial and temporal assessment boundaries
- Incorporate Traditional Knowledge
- Describe existing conditions from baseline studies, monitoring, and research
- Complete comprehensive analysis of all Project components and activities affecting VCs
- Analyze incremental and cumulative effects (including future developments)
- Application of Follow-up Monitoring

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Introduction

Terms of Reference Requirements

- To meet the requirements of the TOR:
  - SON: Vegetation – this section assessed the incremental and cumulative effects of the Project and other developments on vegetation, soils and eskers
  - SON: Wildlife and Wildlife Habitat – this section assessed the incremental and cumulative effects from the Project and other developments on wildlife other than caribou, and their habitat; the TOR identified carnivores (wolverine, grizzly bears, and wolves), birds (upland birds, waterbirds, raptors, and shorebirds), and species at risk to be used in the assessment
  - KLOI: Barren-Ground Caribou – this section included a detailed and comprehensive assessment of all potential impacts from the Project and other developments on barren-ground caribou populations

Introduction

Developer's Assessment Report – Main Sections and Appendices

Section/ Appendix Number	Section Title
Section 11	Subject of Note: Vegetation
Appendix 11A	Soils
Appendix 11B	Plant Species Observed During the 2013 and 2014 Vegetation Surveys
Section 12	Key Line of Inquiry: Barren-Ground Caribou
Appendix 12A	Barren-Ground Caribou Seasonal Range Quality Maps
Appendix 12B	Bathurst Caribou Herd Seasonal Area and Configuration of Habitat Types
Section 13	Subject of Note: Wildlife and Wildlife Habitat
Appendix 13A	Absolute Values for Landscape Metrics in the Effects Study Areas for Wildlife
Appendix 13B	Noise
Appendix 13C	Resource Selection Function Maps and Habitat Suitability Index Maps
Appendix 13D	Noise Assessment Results and Wildlife Zones of Influence

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Introduction

Developer's Assessment Report – Annexes relevant to the Terrestrial Environment

Section/ Appendix Number	Section Title
Annex IV	Permafrost Baseline Report
Annex V	Soils Baseline Report
Annex VI	Vegetation Baseline Report
Annex VII	Wildlife Baseline Report for the Jay Project
Annex XVII	Traditional Land Use and Traditional Knowledge Baseline Report

Assessment Approach

Terrestrial Valued Components, Assessment Endpoints and Measurement Indicators

- The TOR identified vegetation as valued components (VCs) that were included in the assessment of effects on the terrestrial environment

Valued Component	Assessment Endpoint	Measurement Indicator
Plant populations and communities	• self-sustaining and ecologically effective plant populations and communities	• quantity, arrangement and connectivity (fragmentation) of plant communities • plant community health and diversity • abundance and distribution of habitat for listed and traditional use plants • presence of invasive species
Listed plant species and listed plant habitat potential		
Traditional use plants and traditional use plant habitat potential		

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Assessment Approach

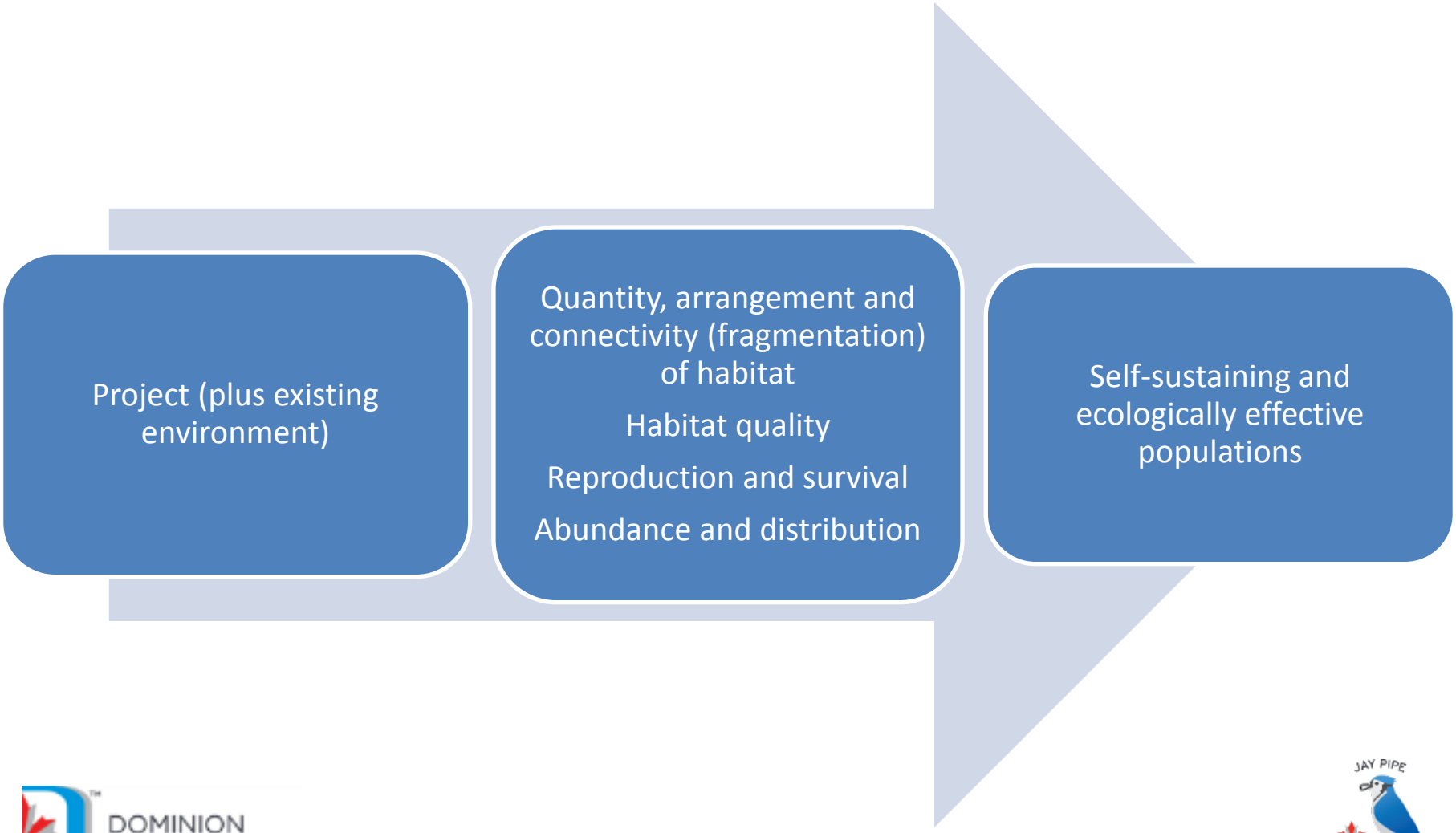
Terrestrial Valued Components, Assessment Endpoints and Measurement Indicators

- The TOR identified Barren-ground caribou and wildlife VCs that were included in the assessment of effects on the terrestrial environment

Valued Component	Assessment Endpoint	Measurement Indicator
Barren-ground Caribou Upland Birds Waterbirds Raptors Wolverine Grizzly Bear Gray Wolf	• self-sustaining and ecologically effective populations	• habitat quantity • habitat arrangement and connectivity (fragmentation) • habitat quality (occupancy, movement and behaviour) • survival and reproduction • abundance and distribution of valued components

Assessment Approach

Conceptual Approach to the Assessment



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Assessment Approach

Assessment Cases

Base Case		Application Case	Reasonably Foreseeable Development Case
Reference Condition	2014 Baseline Condition		
No or little human development	Conditions from all previous, existing, and planned approved developments before the Project	Base Case plus the Project	Application Case plus reasonably foreseeable developments.

Assessment Approach

Assessment Cases: 2014 Baseline Condition

Assessment Approach

Assessment Cases: Application Case

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Assessment Approach

Assessment Cases: Reasonably Foreseeable Development Case

Assessment Approach

Previous, Existing, and Reasonably Foreseeable Developments

- Point features were buffered with a circular footprint
- Linear features were buffered with a corridor
- Winter roads were buffered - only the portages crossing terrestrial areas were used during non-winter months

Disturbance Type	Feature Type	Footprint Extent (m)
Mine	Polygon	Actual
Mineral Exploration	Point	500
Tourism (e.g., lodges)	Point	200
Transmission Line	Line	200
All-Season Road	Line	200
Winter Road	Line	200

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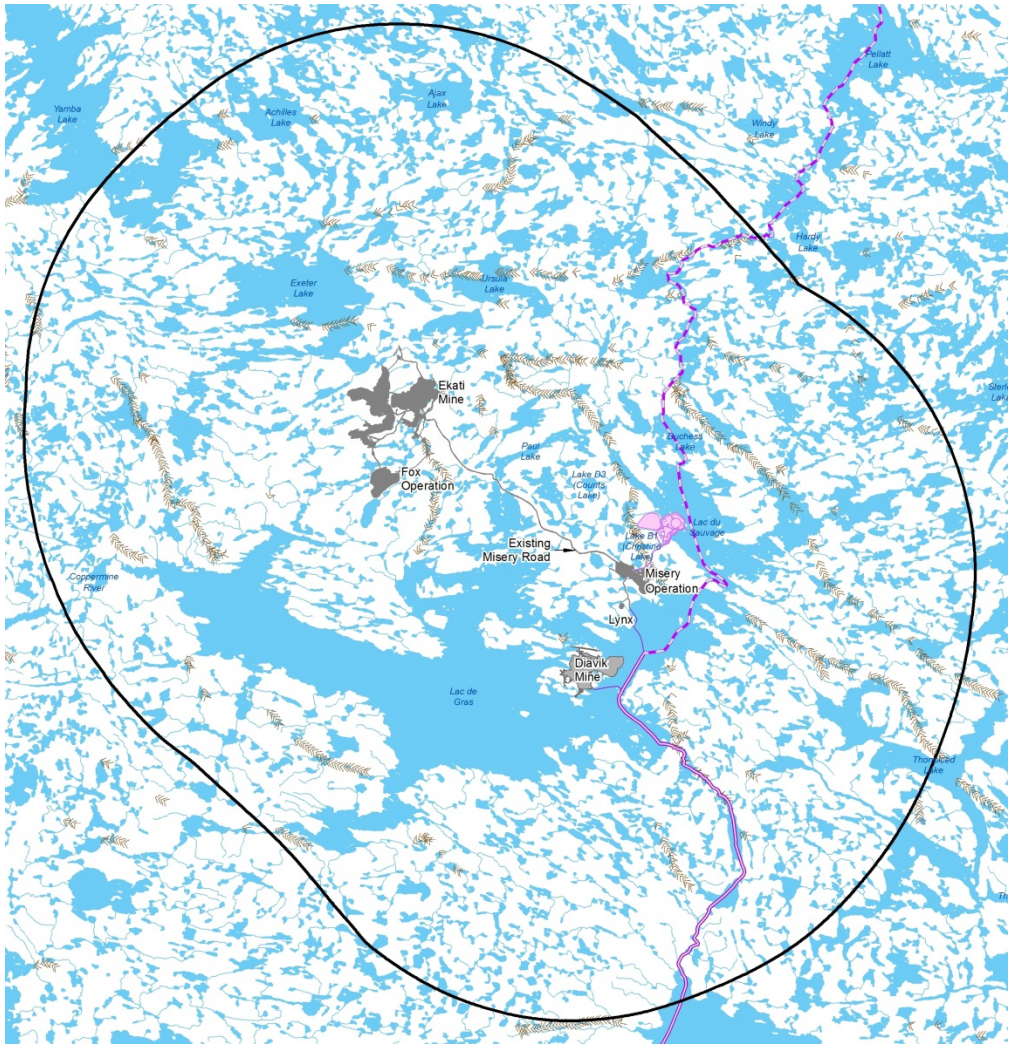
Subject of Note: Vegetation

Subject of Note: Vegetation - Baseline and Effects Study Area

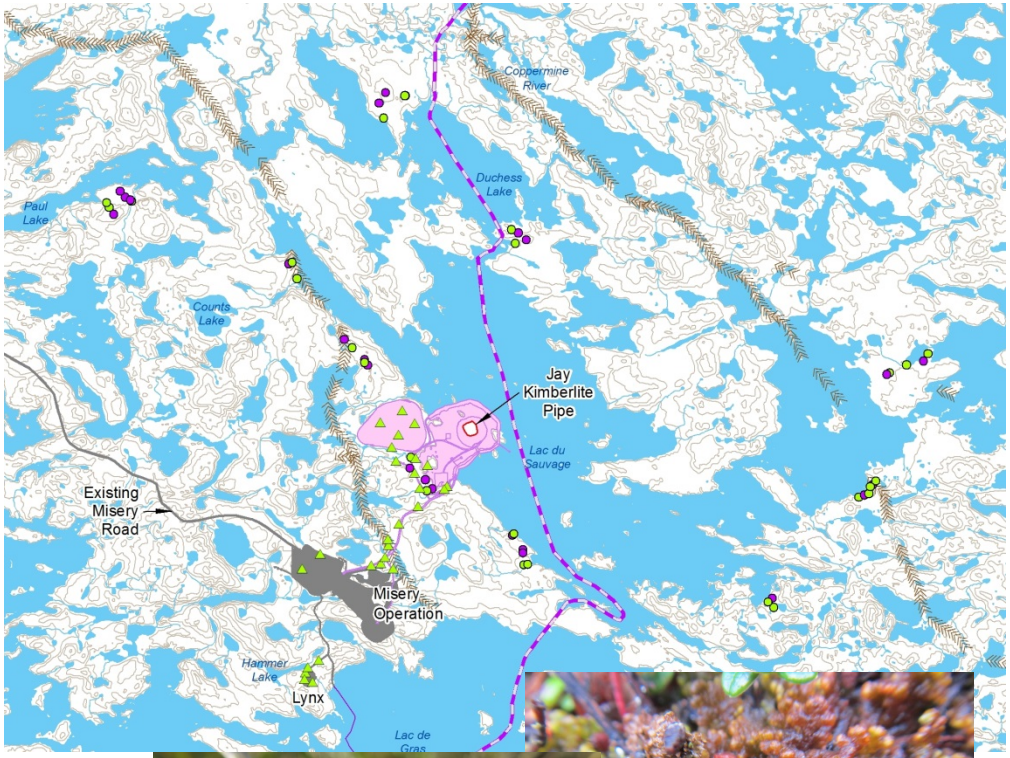
- The effects study area is approximately 5,933 km^2 (593,274 ha), and includes both unaffected (i.e., reference) areas, as well as areas influenced by the Project and existing and future developments

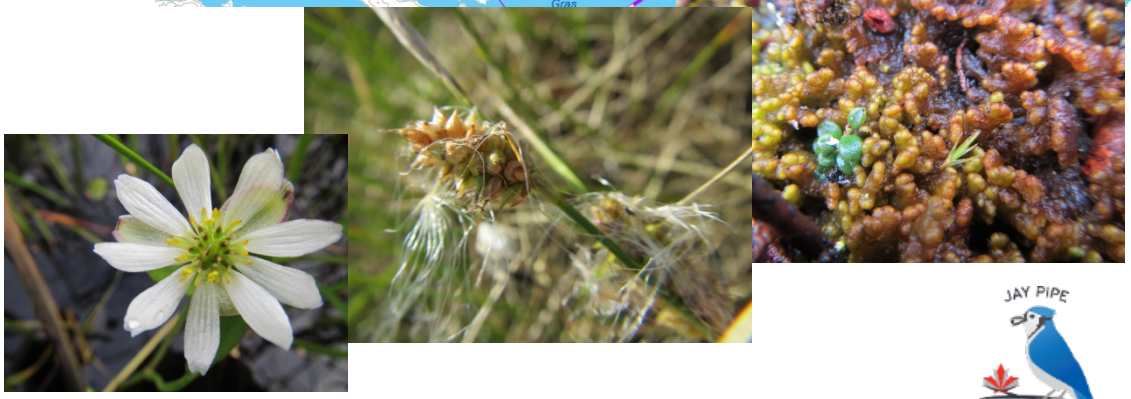
- The same spatial boundary was used for the baseline study area



Subject of Note: Vegetation - Existing Environment Methods

- Baseline vegetation surveys were carried out from July 24 to 31, 2013 and July 4 to 8, 2014
- An ecological landscape classification was used to provide information about the abundance and distribution of vegetation types (ELC map units) in the ESA
- The ELC map units were also ranked according to their ability to support listed and traditional use plant species

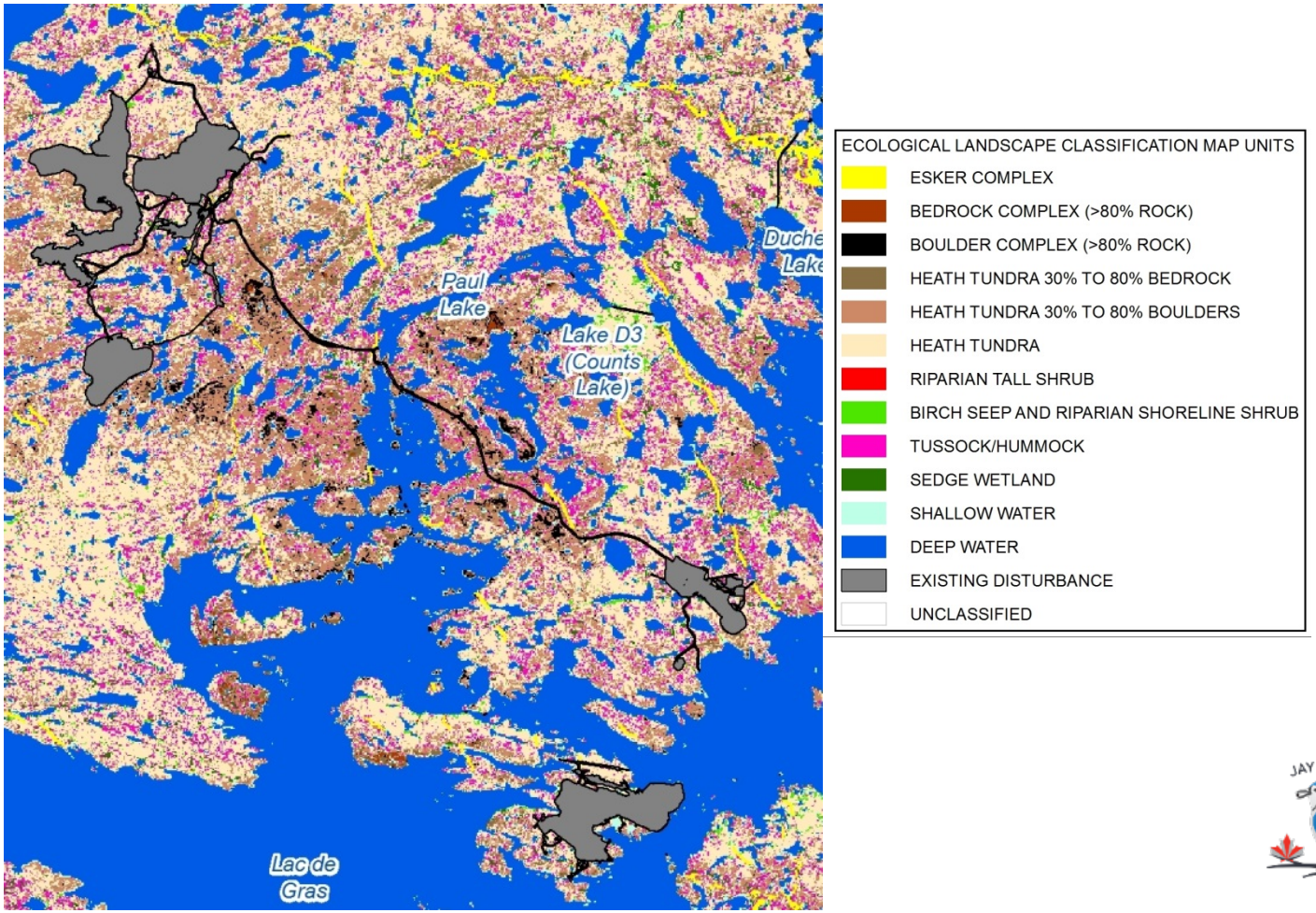




Subject of Note: Vegetation - Existing Environment Results

Vegetation Mapping

- A total of 14 ELC map units are mapped within the ESA, including six upland, four wetland, two non-vegetated, one existing disturbance, and one unclassified map unit



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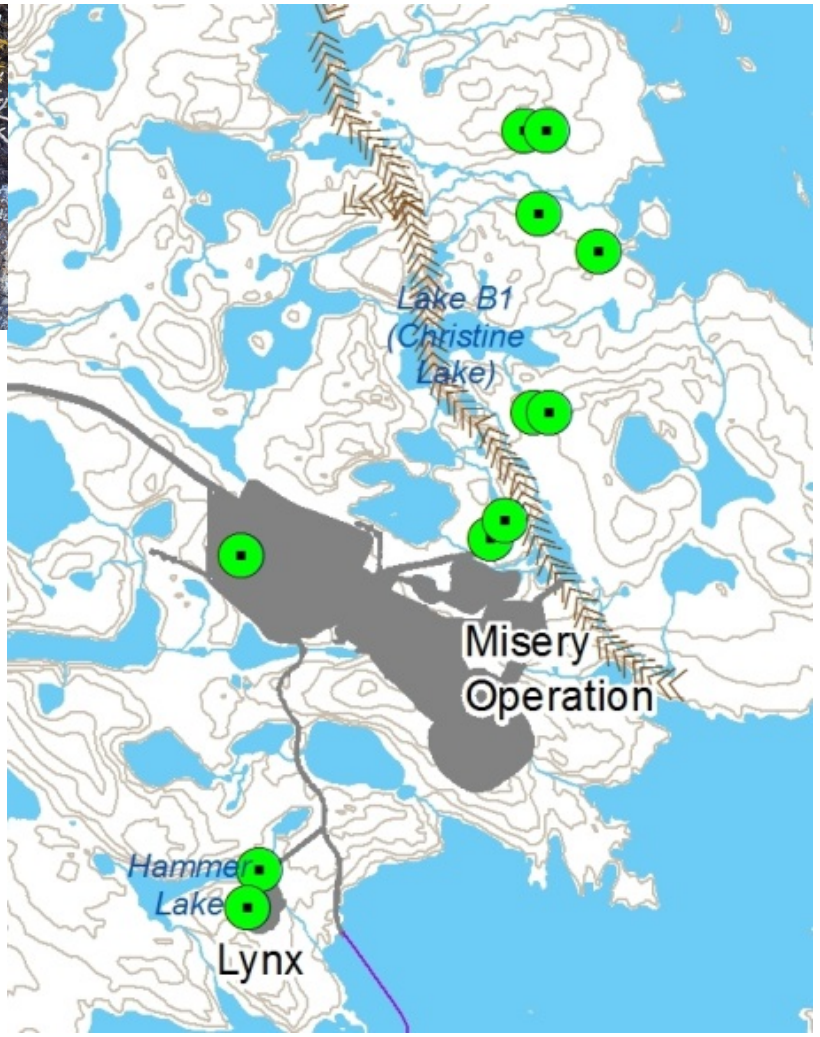
Subject of Note: Vegetation Existing Environment Results

Listed Plant Species and Listed Plant Habitat Potential

- Two territorial listed vascular plant species and five non-vascular plant species were confirmed as occurring within the ESA during the 2014 field program



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Subject of Note: Vegetation - Existing Environment Results

Traditional Use Plant Habitat Potential

- A list of traditional use plants applicable to the vegetation ESA was compiled from the Traditional Land Use and Traditional Knowledge Baseline Report
- This list was used to determine the potential of ELC units to support these species

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Subject of Note: Vegetation - Summary of Traditional Knowledge

Traditional uses for plant species include food, tools, medicine, and construction or other purposes

- Wood within the traditional lands were some of the most important plant resources for many Aboriginal peoples
- Most commonly harvested berries include blueberries, cranberries (lingonberries), cloudberries, and crowberries (blackberries)
- Cottongrass seed heads provided wicks for oil lamps
- Heather and blackberry bushes used to smoke and cure meat
- Lichen was used as spice, and as porridge for young babies
- Lichen is the primary food source for caribou
- Labrador tea, club lichen, juniper berries, crowberries, spiny wood fern, and cranberry have all important for medicinal purposes
- Eskers in the traditional lands are important landscape features

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Subject of Note: Vegetation – Pathway Screening

Pathways identified through:

- Local and Traditional Knowledge obtained from community scoping sessions
- Previous engagement with communities
- Scientific knowledge and experience with other NWT mines
- Potential effects identified in the TOR

13 pathways were considered and 12 pathways were classified as either no linkage or secondary

Key mitigation included:

- Use of existing infrastructure will keep Project footprint small
- Siting and construction of the Project will be planned to avoid environmentally sensitive areas
- A response plan is in place to control non-native invasive plant species
- Research and monitoring will be continued as part of the Jay Project

One primary pathway identified:

- direct loss and fragmentation of vegetation from the Project footprint

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Subject of Note: Vegetation – Assessment Methods

Residual Effects on Vegetation

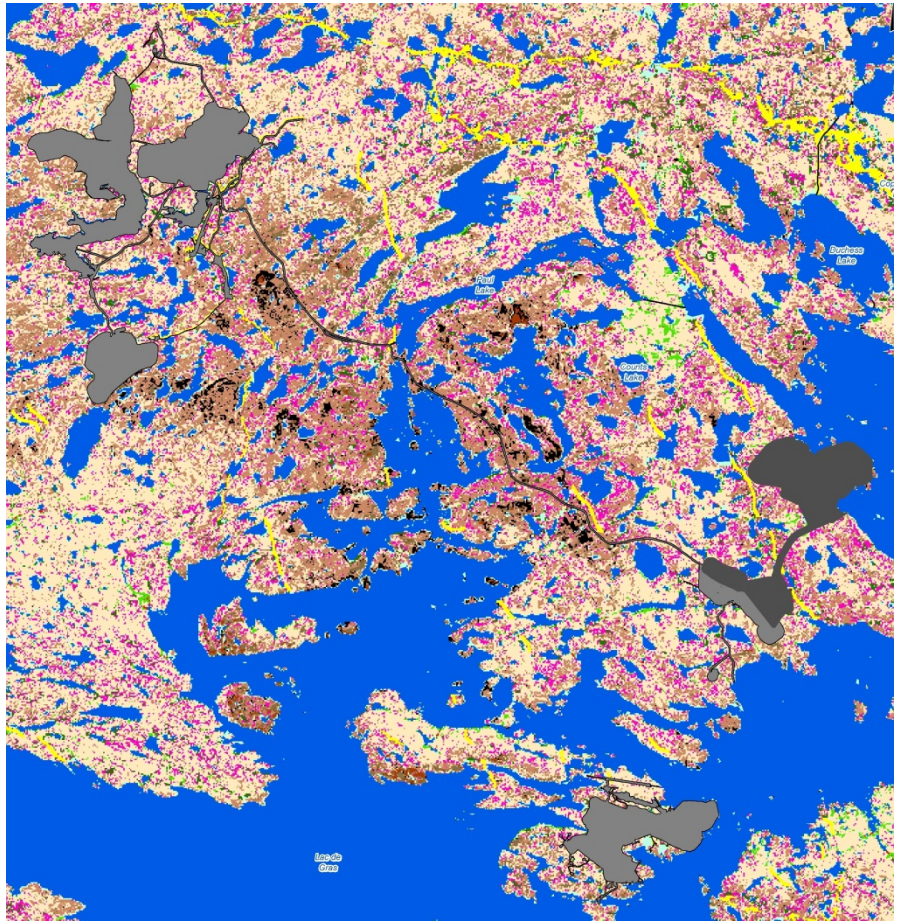
- Vegetation distribution is described using the mapped ELC units and changes from loss and fragmentation of plant populations and communities are expressed by changes to ELC map units
  - The area of ELC units and the direct loss of units caused by the Project footprint and previous, existing , and future developments were quantified in a GIS platform to predict changes
  - Landscape metrics such as number of patches, mean patch areas, and mean distance to nearest neighbour (MDNN) were calculated using the program FRAGSTATS

- The residual effects on vegetation are assessed using predicted changes to ELC map units (i.e., loss), habitat fragmentation, listed plant species habitat potential, and traditional use plant habitat potential

Subject of Note: Vegetation - Assessment Results

Changes in Abundance and Distribution of Plant Communities

- The maximum area of ELC map units to be disturbed by the application of the Project is 1,132 ha
- The cumulative reduction in vegetation through application of the Project and previous and existing developments is predicted to be 6,048 ha
- The cumulative reduction in vegetation through application of the Project and previous, existing, and RFD developments is predicted to be 7,126 ha or approximately 1.2% of the mapped ELC units in the ESA



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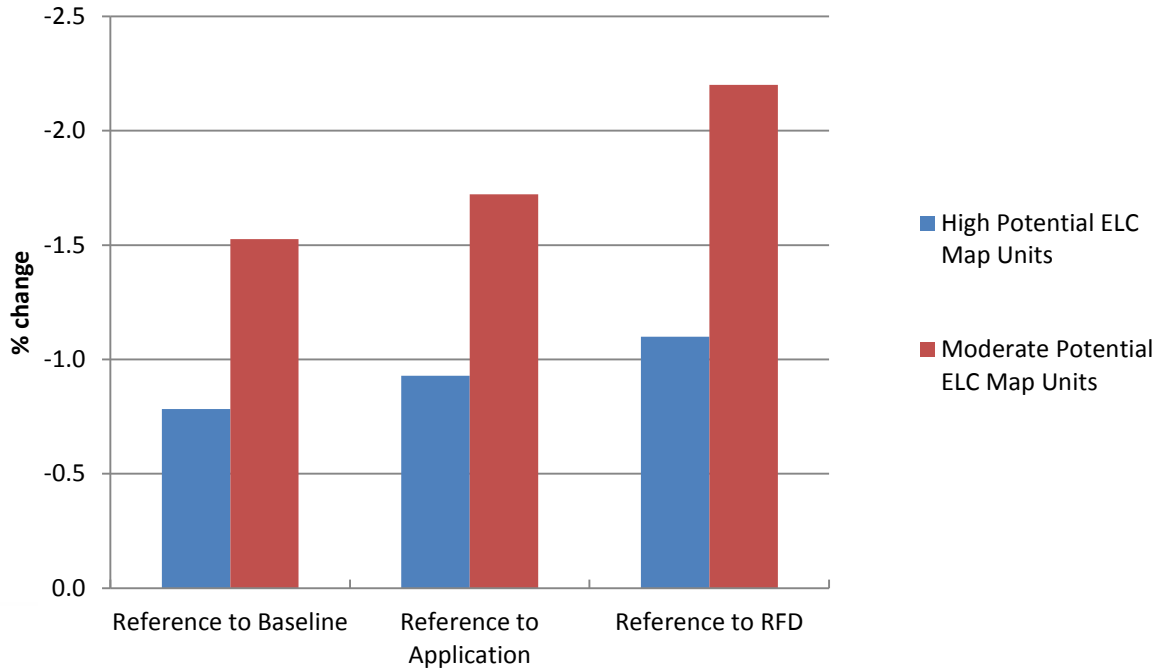
Subject of Note: Vegetation - Assessment Results

Changes to Listed Plants and Listed Plant Habitat

- The Project has potential to remove patches of territorially listed species; the following mitigation will be used to reduce effects on known locations containing listed plant species:
  - Disturbance of vegetation will be limited to the minimum extent necessary for construction and operation of the Project
  - Locations of listed plant species will be avoided to the extent feasible



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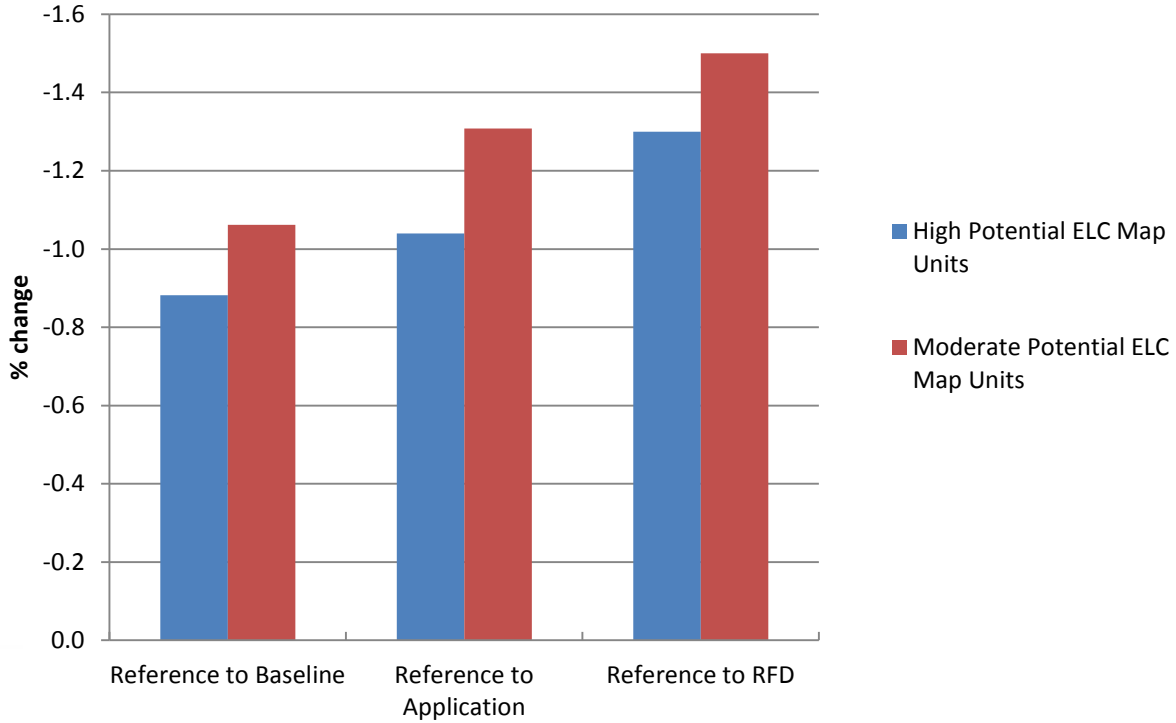
Subject of Note: Vegetation - Assessment Results

Changes to Traditional Use Plant Habitat

- ELC map units predicted to contain the most traditional use species are Heath Tundra 30% to 80% Bedrock, Heath Tundra 30% to 80% Boulders, Heath Tundra, and Birch Seep and Riparian Shoreline Shrub

- The Project-specific change to high and moderate potential units is <1%



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Subject of Note: Vegetation - Summary

- Cumulative changes to vegetation types from the Jay Project and other previous, existing and future developments are predicted to be 4.8% or less
- Changes to vegetation from the Project are small (<1%)
- No significant adverse effects are predicted for the ability of plant populations and communities, including listed and traditional use species, to remain self-sustaining and ecologically effective as a result of the Project or in combination with previous, existing, and future developments
- The scale of residual effects from the Project interactions, independently or combined, should not be large enough to cause irreversible changes at the population and community level and decrease the resilience of vegetation VCs

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Subject of Note: Wildlife and Wildlife Habitat

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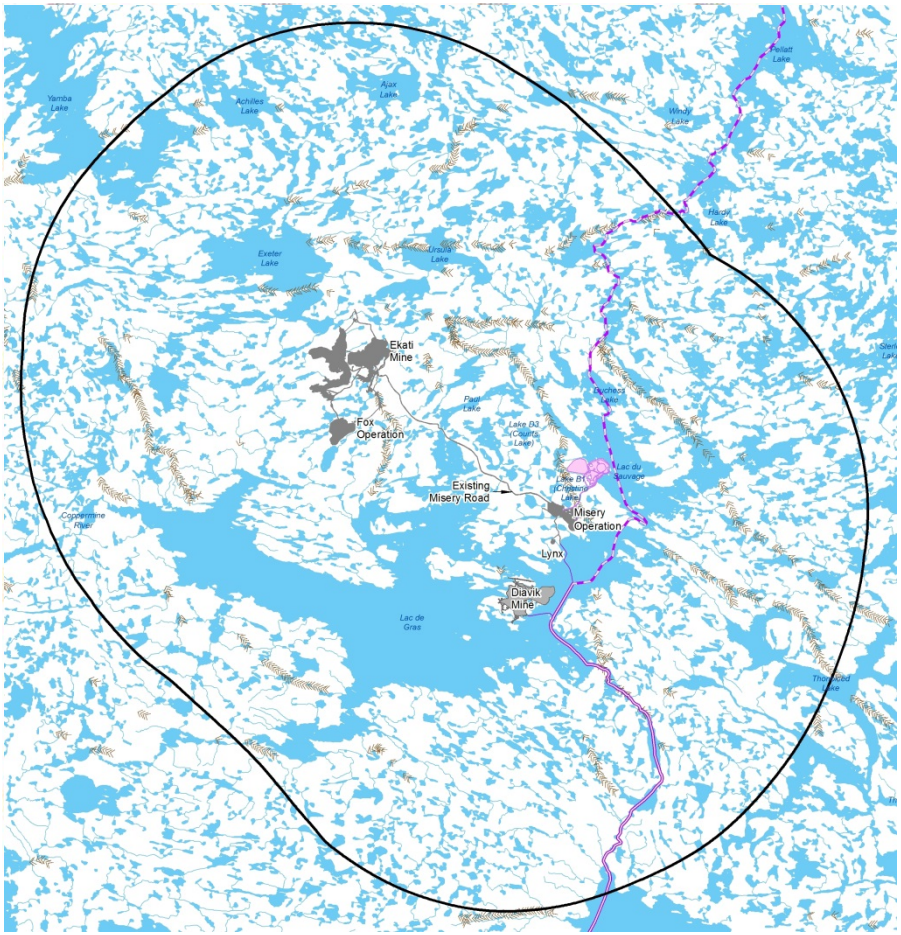
Subject of Note: Wildlife and Wildlife Habitat

Baseline and Effects Study Area – Upland Birds, Waterbirds, Raptors, and Gray Wolf

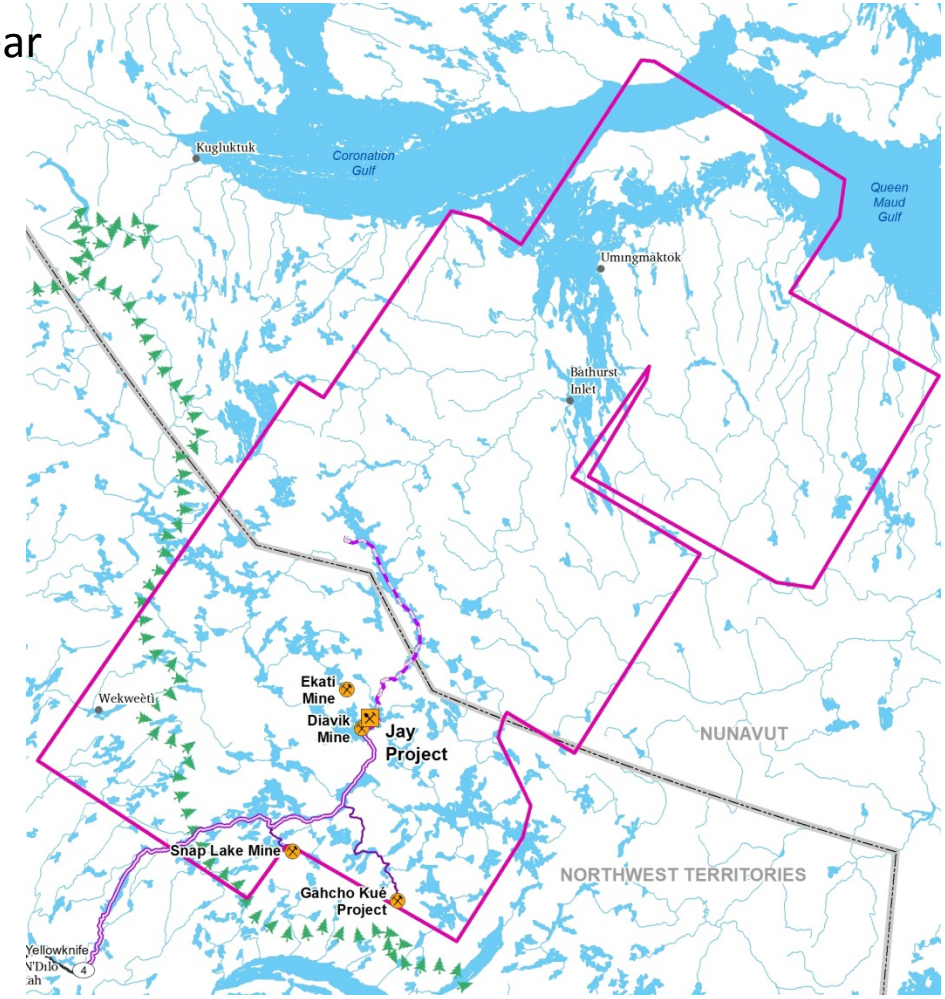
- The effects study area is approximately 5,933 km^2 (593,274 ha), and includes both unaffected (i.e., reference) areas, as well as areas influenced by the Project, and existing and future developments
- The same spatial boundary was used for the baseline study area and vegetation ESA



Subject of Note: Wildlife and Wildlife Habitat

Effects Study Area – Wolverine and Grizzly Bear

- The wolverine and grizzly bear ESA is approximately 200,000 km^2
- Area with landscape classification
- Demographic and habitat selection information
- Overlaps the core annual range of Bathurst caribou



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Subject of Note: Wildlife and Wildlife Habitat – Overview of Existing Environment

Wildlife and Wildlife Habitat

- Purpose: to describe the existing composition, population status and distribution of VCs at baseline
- Review of existing regional monitoring and research (1995 to 2014)
  - Existing monitoring used to measure effectiveness of mitigation
- Traditional Knowledge reported for the region
- Surveys of upland birds, carnivore dens and waterbird completed near Jay Project in 2013 and 2014
- An ecological landscape classification was used to provide information about the abundance and distribution of vegetation types (ELC map units [wildlife habitat]) in the ESA

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Subject of Note: Wildlife and Wildlife Habitat - Summary of Traditional Knowledge

Publicly available Traditional Knowledge and traditional land use information for seven groups of Aboriginal peoples whose traditional lands overlap the Ekati Mine claim block were reviewed

- Moose, muskoxen, and caribou were important for food and hides
- Wolves and ravens aided hunters in locating animals
- Barren-land furbearers were an important source of food and income
- Esker is preferable denning habitat for wolves and grizzly bears
- Animals on the barren-grounds are dependent on one another

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Subject of Note: Wildlife and Wildlife Habitat – Pathway Screening

Pathways identified through:

- Local and Traditional Knowledge obtained from community scoping sessions
- Previous engagement with communities
- Scientific knowledge and experience with other NWT mines
- Potential effects identified in the TOR

21 pathways were considered and residual effects for 18 pathways were classified as either no linkage or secondary

Key mitigation included:

- Use of existing infrastructure will keep Project footprint small and limit new sensory disturbance
- Wildlife right-of-way on and low speeds on roads
- Waste Management System

Three primary pathways were identified:

- Direct loss and fragmentation of habitat
- Sensory disturbance (lights, smells, noise, dust, viewscape)
- Increased traffic on the Misery Road and Jay Road and the above-ground power line along these roads may create barriers to movement

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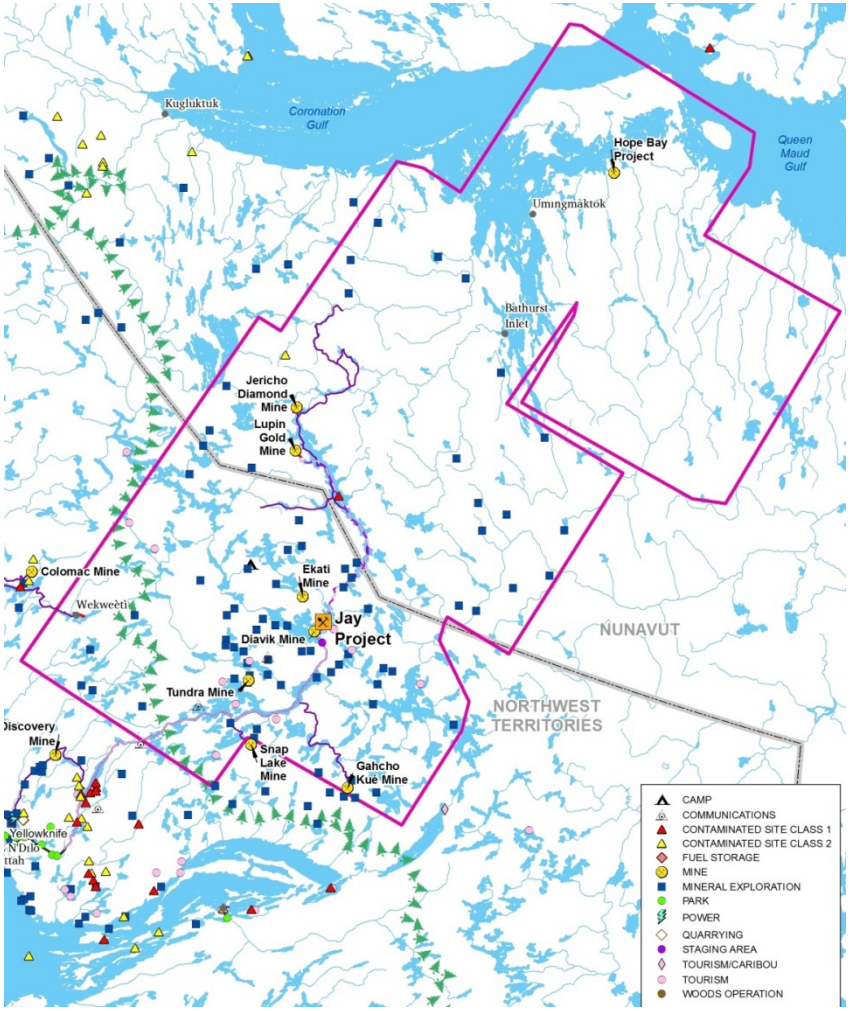
Subject of Note: Wildlife and Wildlife Habitat – Assessment Methods

Cumulative Effects Development Database

- Used to assess direct and indirect effects
- All previous, existing and reasonably foreseeable developments
- Data sources: INAC, MVLWB, NRCAN, GNWT
  - Land-use permits
- 16 types of developments
  - Explorations camps are most abundant
  - Footprint sizes
    - Varied
    - Overestimated



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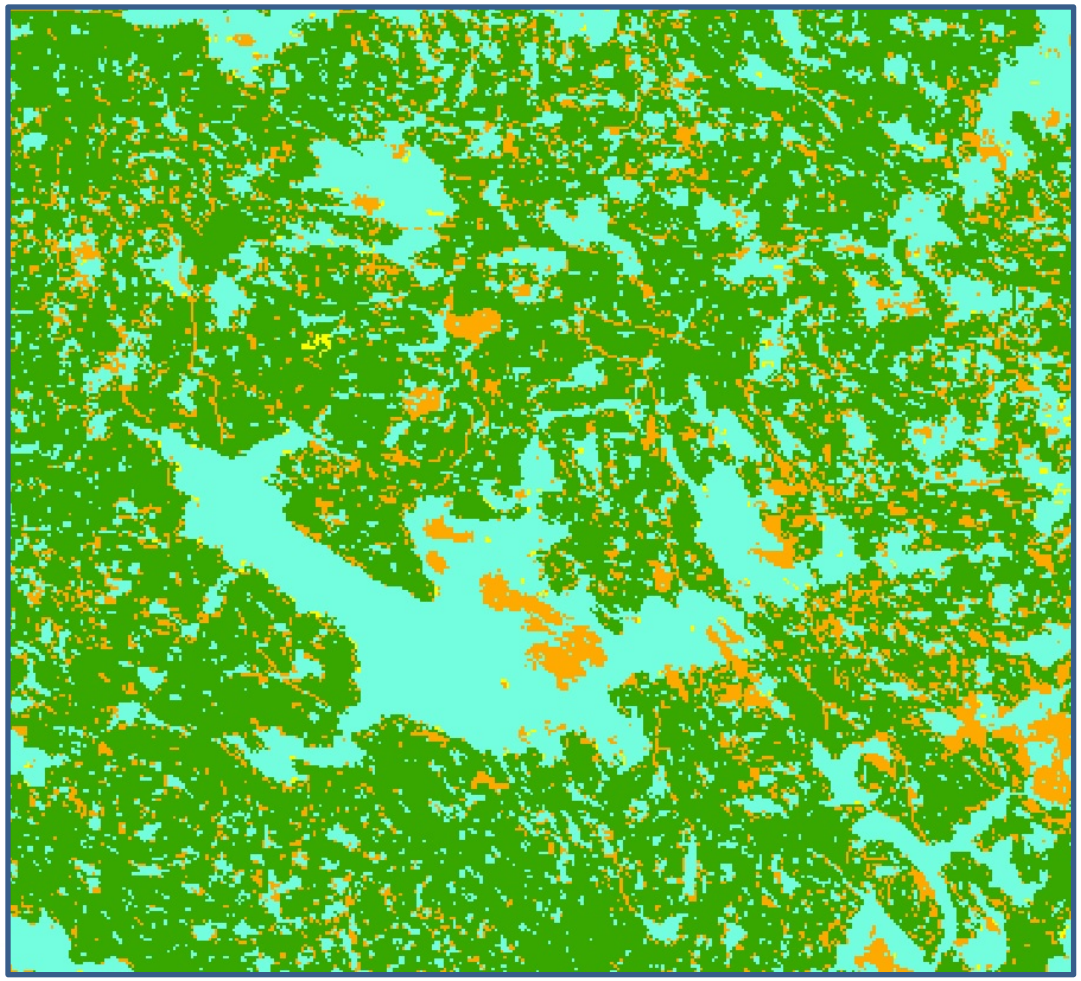
Subject of Note: Wildlife and Wildlife Habitat – Assessment Methods

Habitat Change

- Key measurement indicator for Terrestrial Valued Components
- Habitat described using raster maps in GIS
  - Large geographic areas comprised of small cells (e.g., 25 m x 25 m for birds, 200 m x 200 m for grizzly bear and wolverine)
- Habitat described as a class (or type) on raster maps in GIS
  - Where raster cells are either esker, forest, heath tundra
- Also described as habitat suitability (or quality) using a model
  - Where raster 'cells' ranked 0 to 1
  - Habitat Suitability Indices (HSIs)
  - Resource Selection Functions (RSFs)
- Direct changes to habitat calculated from development footprint
- Indirect changes calculated from a zone of influence (ZOI)

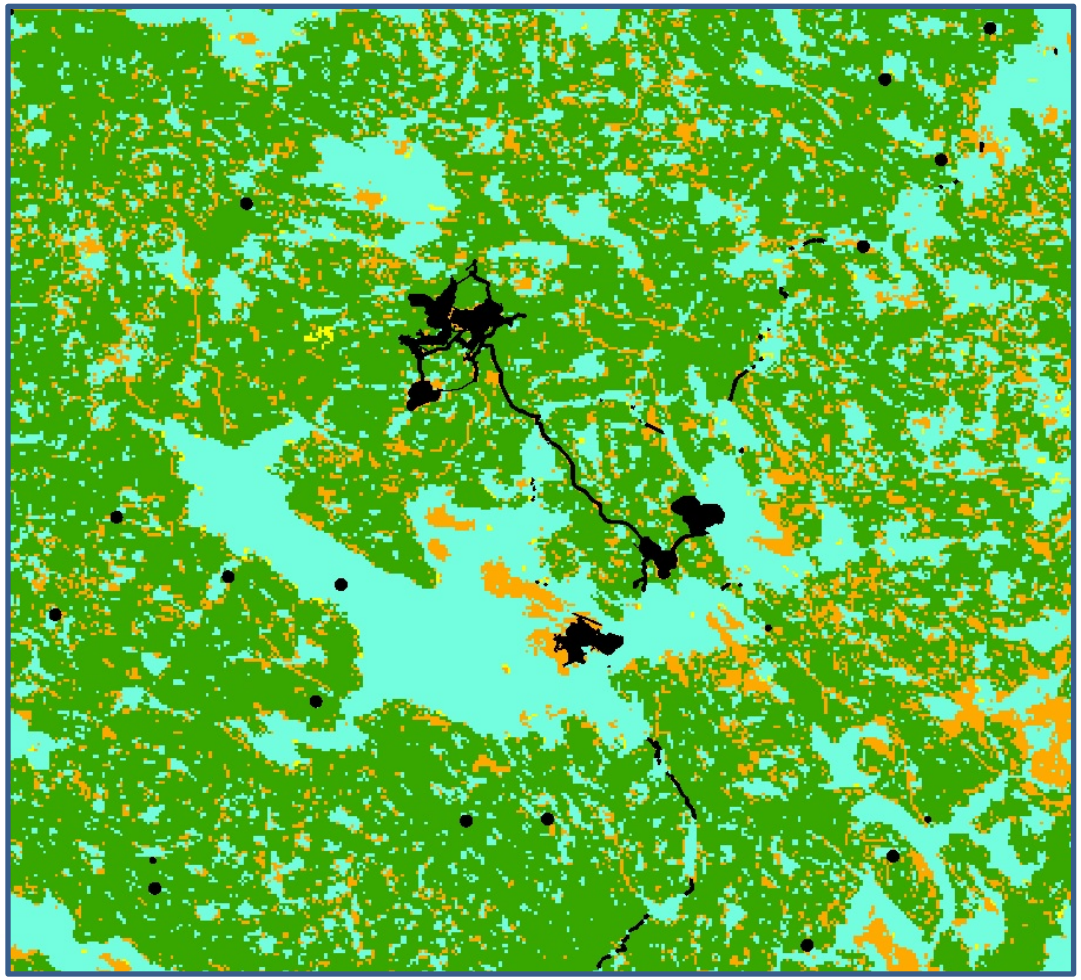
Subject of Note: Wildlife and Wildlife Habitat – Assessment Methods

Example: Reference landscape



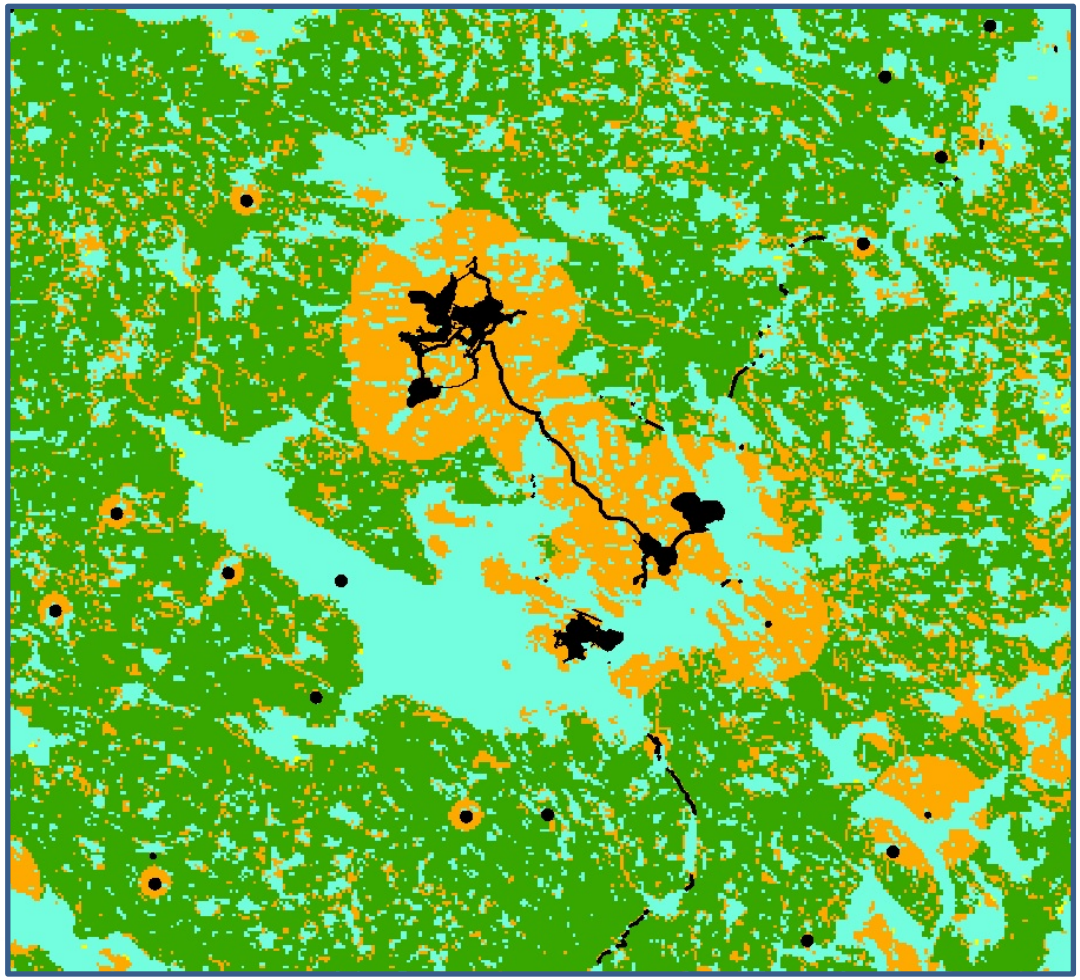
Subject of Note: Wildlife and Wildlife Habitat – Assessment Methods

Example: Direct changes to habitat



Subject of Note: Wildlife and Wildlife Habitat – Assessment Methods

Example: 5 km Zone of Influence



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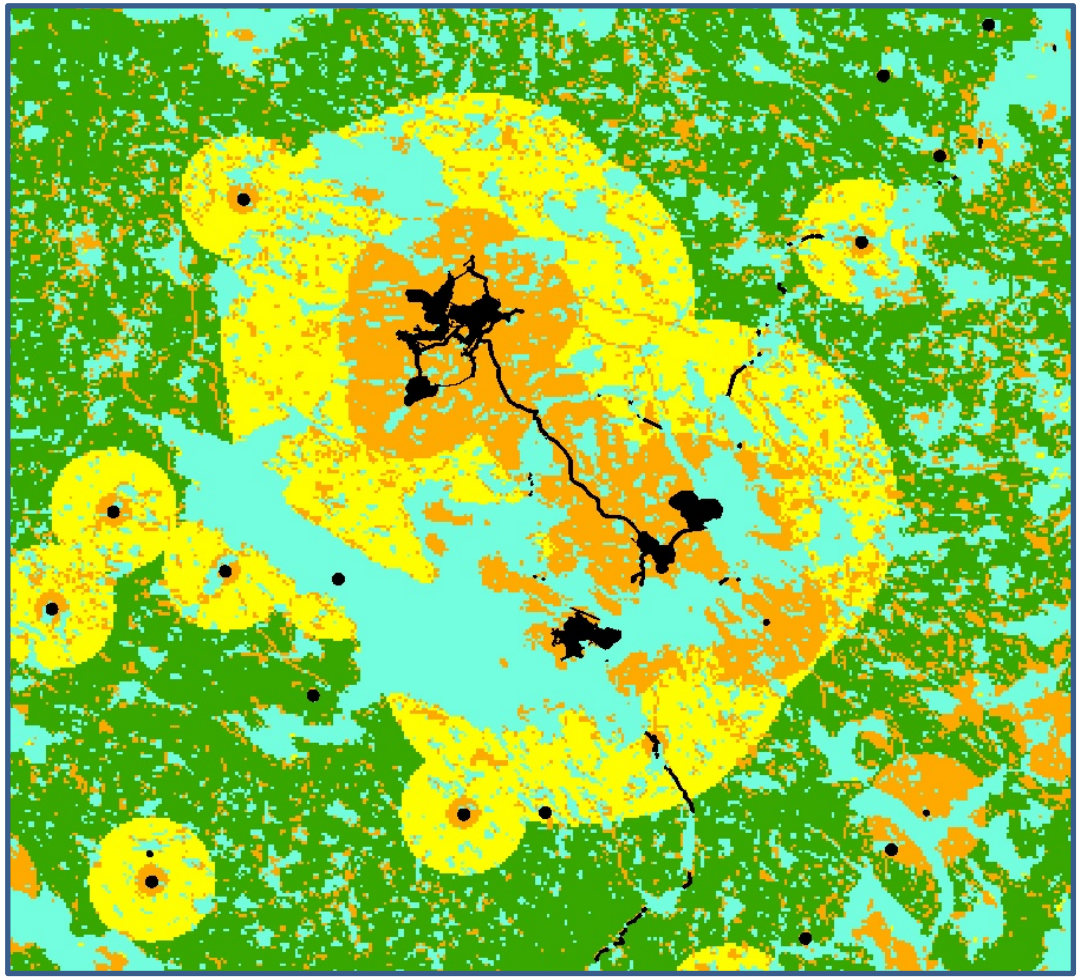
Subject of Note: Wildlife and Wildlife Habitat – Assessment Methods

Example: 15 km Zone of Influence



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Subject of Note: Wildlife and Wildlife Habitat – Assessment Results

Wildlife – Upland Birds and Gray Wolf

- 15 pathways considered and residual effects assessed as either no linkage or secondary
- Key mitigation included:
  - Use of existing infrastructure will keep Project footprint small and limit new sensory disturbances
  - Wildlife right-of-way and speed limits on roads

- Gray Wolf – cumulative loss of esker is 4.8% (265 ha) from reference condition
- Upland birds – cumulative direct and indirect change of breeding territories is 4.1% reduction from reference condition

Incremental and cumulative changes from the Project and other developments are predicted to have negligible effects on self-sustaining and ecologically effective gray wolf and upland breeding bird populations.

Subject of Note: Wildlife and Wildlife Habitat – Assessment Results

Wildlife – Waterbird Habitat Quality, Movement ,and Behaviour

Approach

- Direct and indirect change used HSI models of staging and breeding habitat
- Applied a 1 km ZOI around all developments which reduced all habitats to low (except for poor habitats)

Results

At Reference, study area is:

- 48.6% high and good staging
- 30.3% high and good breeding
- ***Project-specific change = -0.7% or less***

Staging Habitat Suitability	Reference to Application Case	Reference to RFD Case
High	-4.2%	-4.6%
Good	-4.5%	-5.2%
Low	39.0%	44.7%
Poor	1.1%	1.1%

Breeding Habitat Suitability	Reference to Application Case	Reference to RFD Case
High	-4.9%	-5.6%
Good	-4.5%	-5.2%
Low	26.8%	31.3%
Poor	0.5%	0.6%

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Subject of Note: Wildlife and Wildlife Habitat – Assessment Results

Wildlife – Raptor Habitat Quantity and Fragmentation

Approach

- Direct habitat loss was assessed using veg ELC units (results are same as for vegetation and waterbirds) within actual and assumed development footprints
- Direct loss of quality nest habitat using HSI model (Wightman and Fuller 2005, 2006; Coulton et al. 2013)

Results

- At Reference, the study area is 95.7%
- Low and poor nest habitat

- ***Project-specific change < -0.1%***

Nest Habitat Suitability	Reference to Application Case	Reference to RFD Case
High	-0.6%	-0.9%
Good	-1.1%	-1.5%
Low	-1.2%	-1.4%
Poor	0.8%	0.9%

Subject of Note: Wildlife and Wildlife Habitat – Assessment Results

Wildlife – Raptor Habitat Quality, Movement, and Behaviour

Approach

- Direct and indirect change used HSI model nest habitat
- Applied an 800 m ZOI around all developments (Richardson and Miller 1997), which reduced all habitats by one level (except for poor habitats)

Nest Habitat Suitability	Reference to Application Case	Reference to RFD Case
High	-3.5%	-4.7%
Good	-4.0%	-5.0%
Low	-4.8%	-5.9%
Poor	3.2%	3.9%

- ***Project-specific change = -0.1%***

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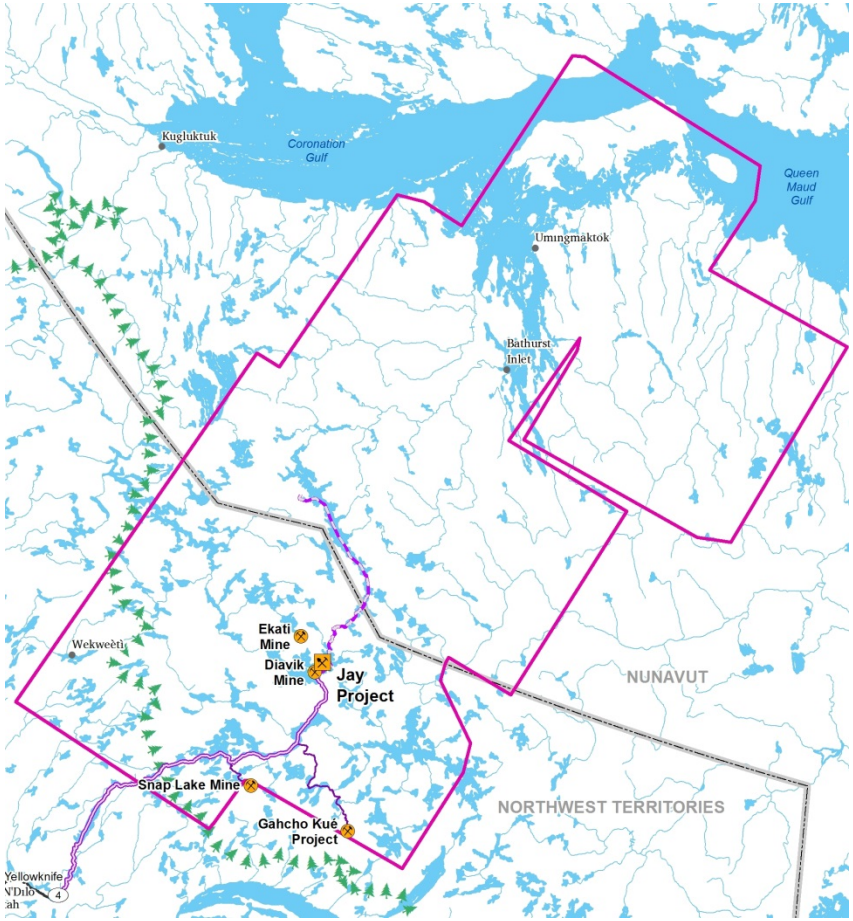
Subject of Note: Wildlife and Wildlife Habitat – Assessment Methods

Wildlife – Wolverine and Grizzly Bear Habitat Quality, Movement, and Behaviour

Approach

- Direct and indirect change used RSF model for seasonal habitat preferences (Johnson et al. 2005)
- Applied ZOIs up to 15 km (mines and communities) around developments
- Quality reduced by 100% within footprints and from 95% to 25% depending on proximity to development footprint (mines and communities)



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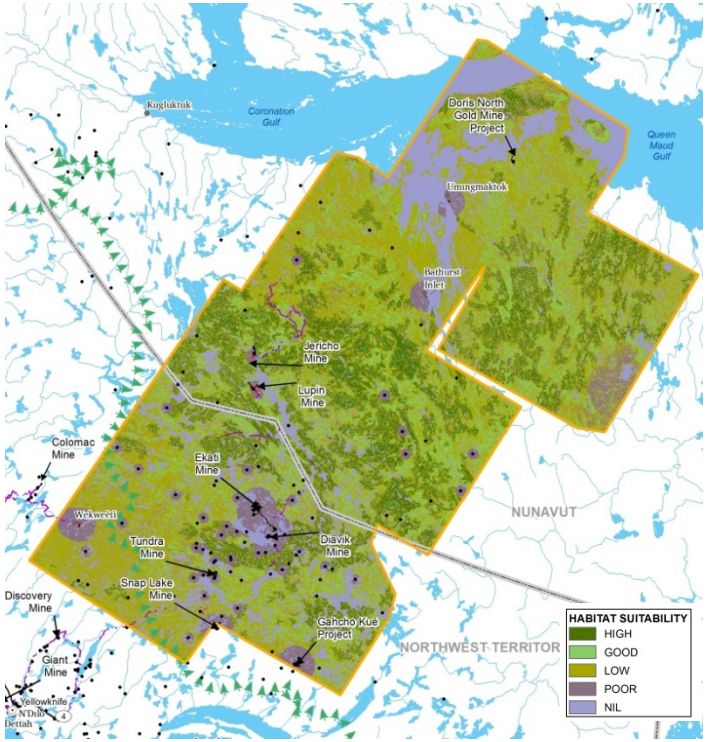
Subject of Note: Wildlife and Wildlife Habitat – Assessment Results

Wildlife – Wolverine Habitat Quality, Movement, and Behaviour Results

- Largest changes occur in winter season (winter roads)
- ***Project-specific change = -0.1%***



Spring to Autumn Habitat Quality	Reference to Application Case	Reference to RFD Case
High	-3.1%	-8.4%
Good	-4.0%	-10.6%
Low	-3.6%	-8.0%
Poor	98.6%	237.1%

Winter Habitat Quality	Reference to Application Case	Reference to RFD Case
High	-7.7%	-11.5%
Good	-7.6%	-13.7%
Low	-6.7%	-11.1%
Poor	58.1%	95.5%

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Subject of Note: Wildlife and Wildlife Habitat – Assessment Results

Wildlife – Grizzly Bear Habitat Quality, Movement and Behaviour

Results: ***Project-specific change = -0.1% or less***

Spring Habitat Quality	Reference to Application Case	Reference to RFD Case
High	-1.8%	-3.5%
Good	-3.4%	-8.5%
Low	-3.6%	-9.4%
Poor	1.8%	4.4%

Late Summer Habitat Quality	Reference to Application Case	Reference to RFD Case
High	-2.8%	-7.2%
Good	-4.0%	-9.6%
Low	-3.7%	-8.7%
Poor	83.1%	200.5%

Early Summer Habitat Quality	Reference to Application Case	Reference to RFD Case
High	-2.2%	-5.9%
Good	-4.4%	-10.2%
Low	-3.6%	-9.1%
Poor	4.7%	11.7%

Autumn Habitat Quality	Reference to Application Case	Reference to RFD Case
High	-3.2%	-7.1%
Good	-4.5%	-10.4%
Low	-3.6%	-8.6%
Poor	39.3%	91.5%

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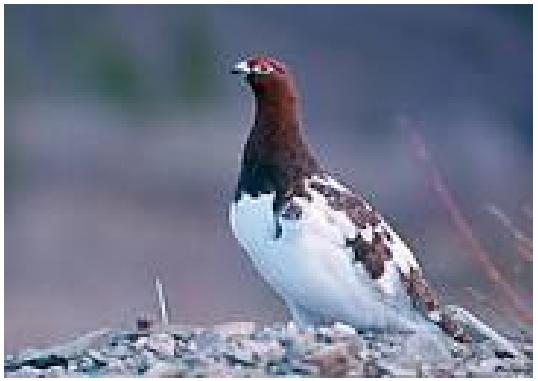
Subject of Note: Wildlife and Wildlife Habitat - Summary

- Wildlife and Wildlife Habitat VCs were wolf, upland birds waterbirds, raptors, wolverine, grizzly bear, and wildlife species at risk
- DAR used multiple approaches and best practices to provide confident and ecologically relevant impact predictions
- Wildlife habitat remains intact so:
  - No fragmentation of populations
  - No strong mechanism causing a long-term or irreversible change in reproduction or survival rates



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Key Line of Inquiry: Barren-Ground Caribou

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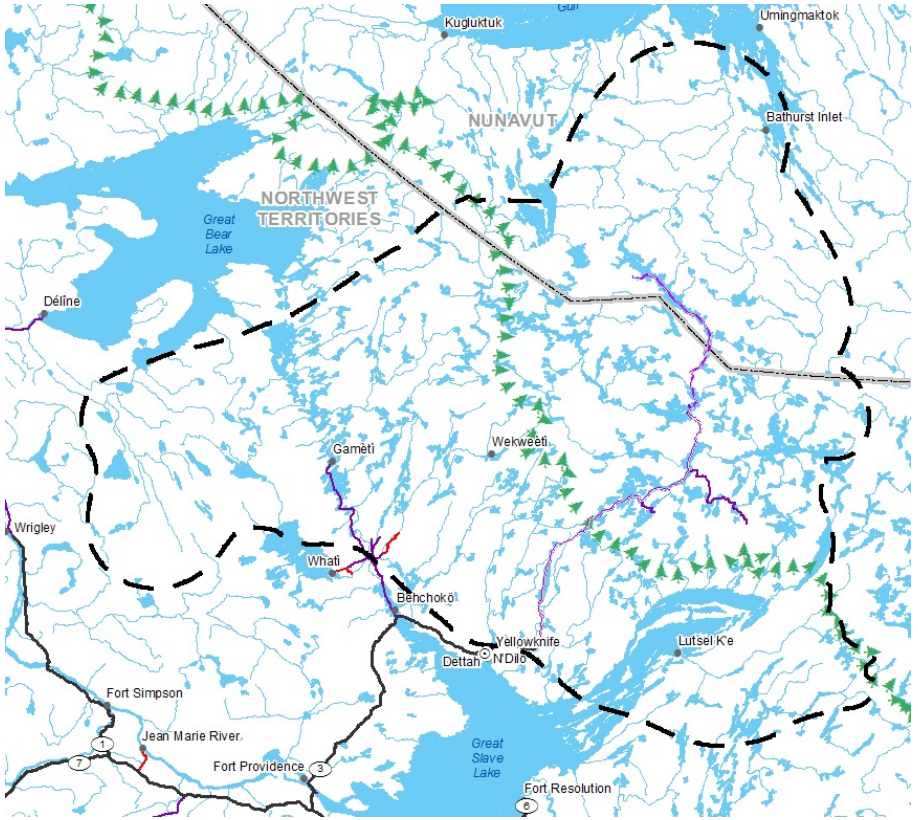
Key Line of Inquiry: Barren-Ground Caribou – Effects Study Area

Effects Study Area – Barren-Ground Caribou

- The ESA for caribou includes the 4 seasonal ranges (spring, post-calving, autumn, and winter) of the Bathurst caribou herd
- Ranges delineated from radio-collar and GPS collar data collected from April 1996 to October 2013
- Total area is 305,780 km^2



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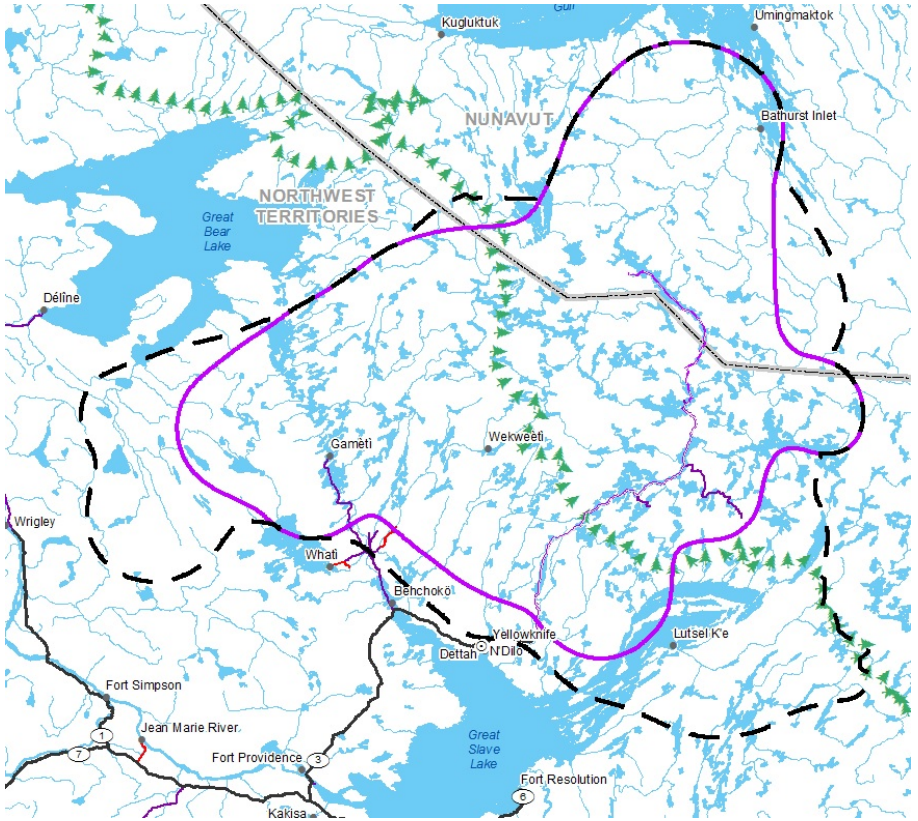
Key Line of Inquiry: Barren-Ground Caribou – Effects Study Area

Effects Study Area – Barren-Ground Caribou

- Spring Range includes calving period and calving grounds



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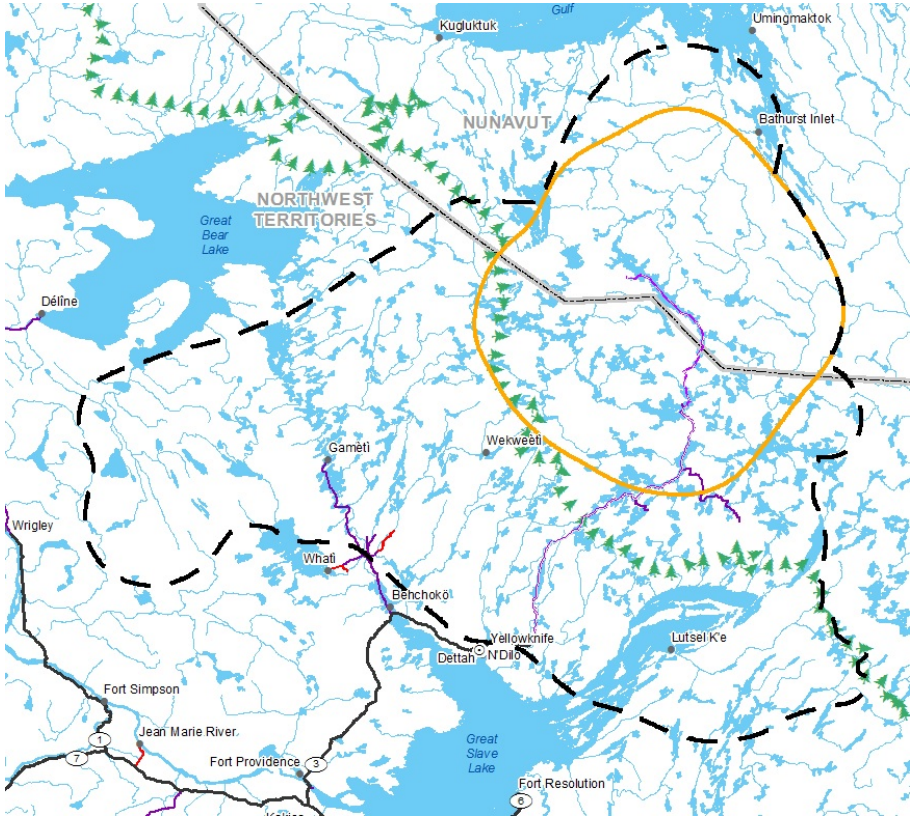
Key Line of Inquiry: Barren-Ground Caribou – Effects Study Area

Effects Study Area – Barren-Ground Caribou

- Post-calving Range



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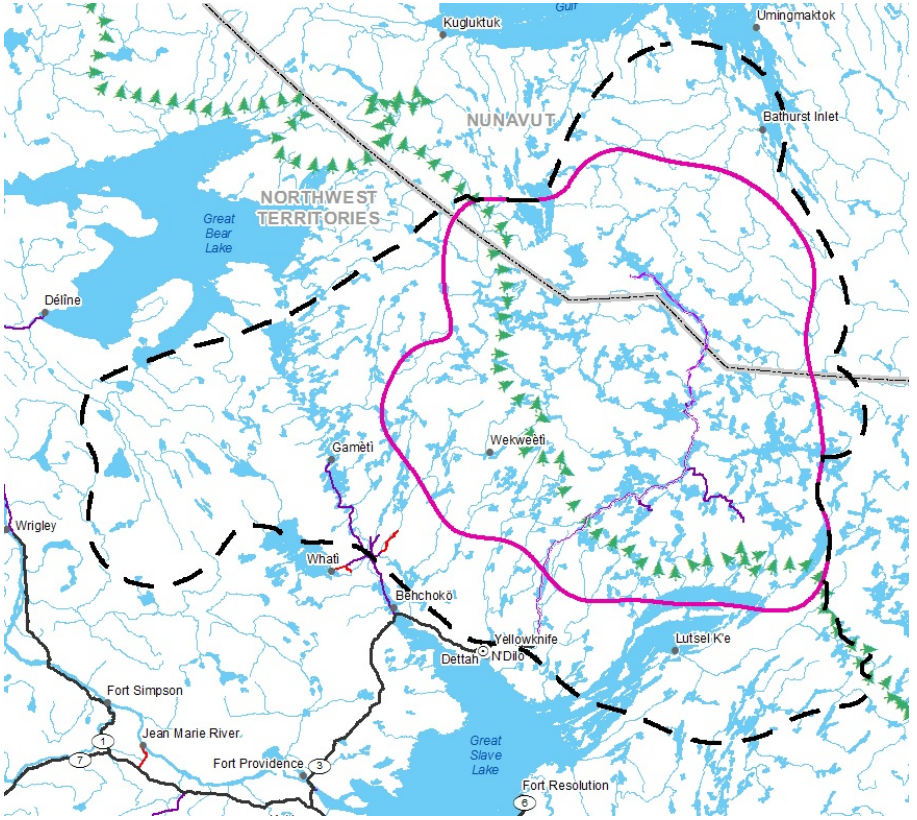
Key Line of Inquiry: Barren-Ground Caribou – Effects Study Area

Effects Study Area – Barren-Ground Caribou

- Autumn Range



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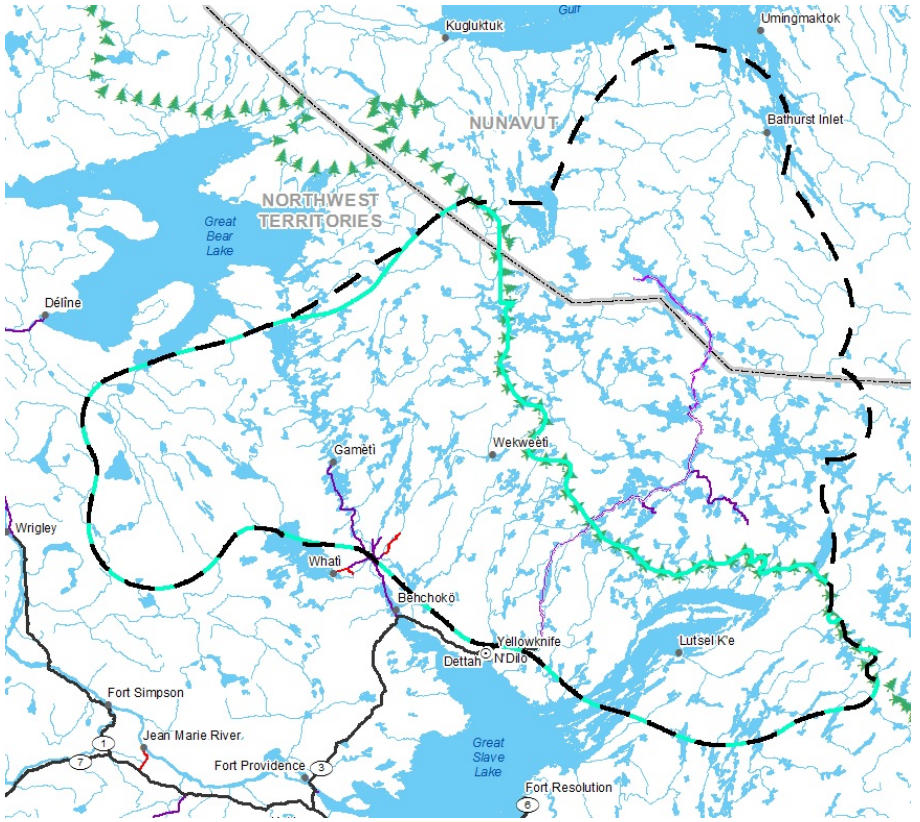
Key Line of Inquiry: Barren-Ground Caribou – Effects Study Area

Effects Study Area – Barren-Ground Caribou

- Winter Range restricted to below treeline
- Winter RSF developed from EOSD data



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Key Line of Inquiry: Barren-Ground Caribou– Overview of Existing Environment

Barren-Ground Caribou – Existing Environment

- Purpose: to describe the existing composition, population status and distribution of barren-ground caribou at baseline
- Review of existing regional monitoring and research (1995 to 2014)
- Traditional Knowledge reported for the region
- Surveys of caribou trails completed near Jay Project in 2013 and 2014
- An ecological landscape classification was used to provide information about the abundance and distribution of vegetation types (ELC map units [wildlife habitat]) in the ESA

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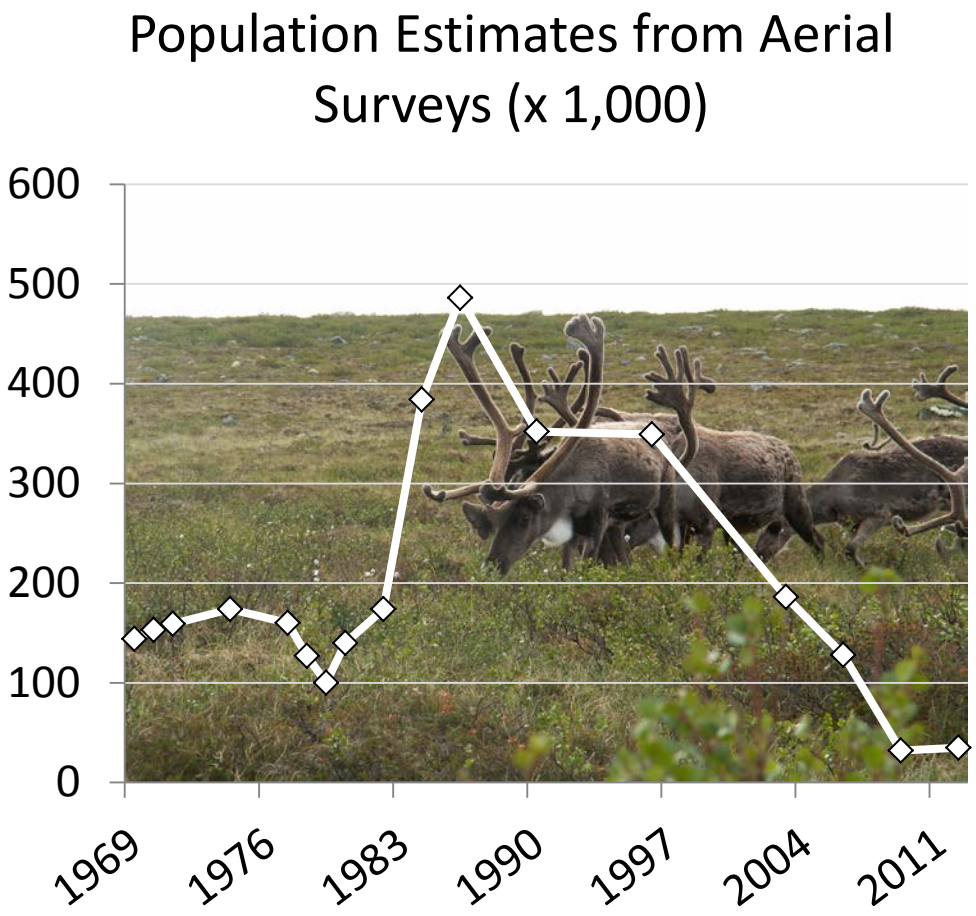
Key Line of Inquiry: Barren-Ground Caribou – Overview of Existing Environment

- Bathurst herd population cycles
- TK indicates:
  - Lows in 1920s, 1950s to 1970s
  - Highs in 1940s and 1990s
- Bathurst herd is presently at a low point in its cycle



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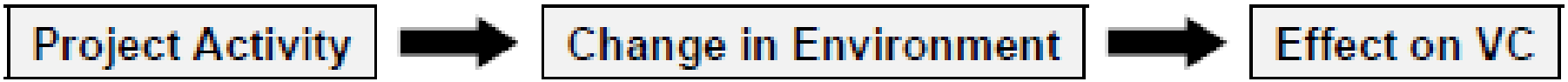
Key Line of Inquiry: Barren-Ground Caribou– Summary of Traditional Knowledge

Publicly available Traditional Knowledge and traditional land use information for seven groups of Aboriginal peoples whose traditional lands overlap the Ekati Mine claim block were reviewed

- Mutual respect between caribou and Aboriginal people
- Caribou are important for food, shelter, tools, clothing and medicine to Aboriginal people
- Managed by selective harvest or deflected by stone markers and flags
- Understand migration movements and important areas
  - Lac du Sauvage esker
  - Lac de Gras-Lac du Sauvage Narrows
  - Islands of Lac de Gras
- Preferences for esker and lichen habitats and avoid burns and deep snow
- Freezing rains limit access to food for and affect populations
- Change climate has resulted in later southern migration

Key Line of Inquiry: Barren-Ground Caribou – Assessment Methods



- 17 potential pathways were assessed to examine the linkages between Jay Project components and the effects on barren-ground caribou, and 14 were classified as either no linkage or secondary pathways

- 3 primary pathways were identified:
  - Direct loss and fragmentation of habitat from the Project footprint causes changes in caribou abundance and distribution

  - Sensory disturbance (lights, smells, noise, dust, viewscape) and barriers to movement causes changes to caribou distribution and behaviour, and changes to energetics and reproduction

  - Increased traffic on the Misery Road and Jay Road and the above-ground power line along these roads may create barriers to caribou movement, change migration routes, and reduce population connectivity

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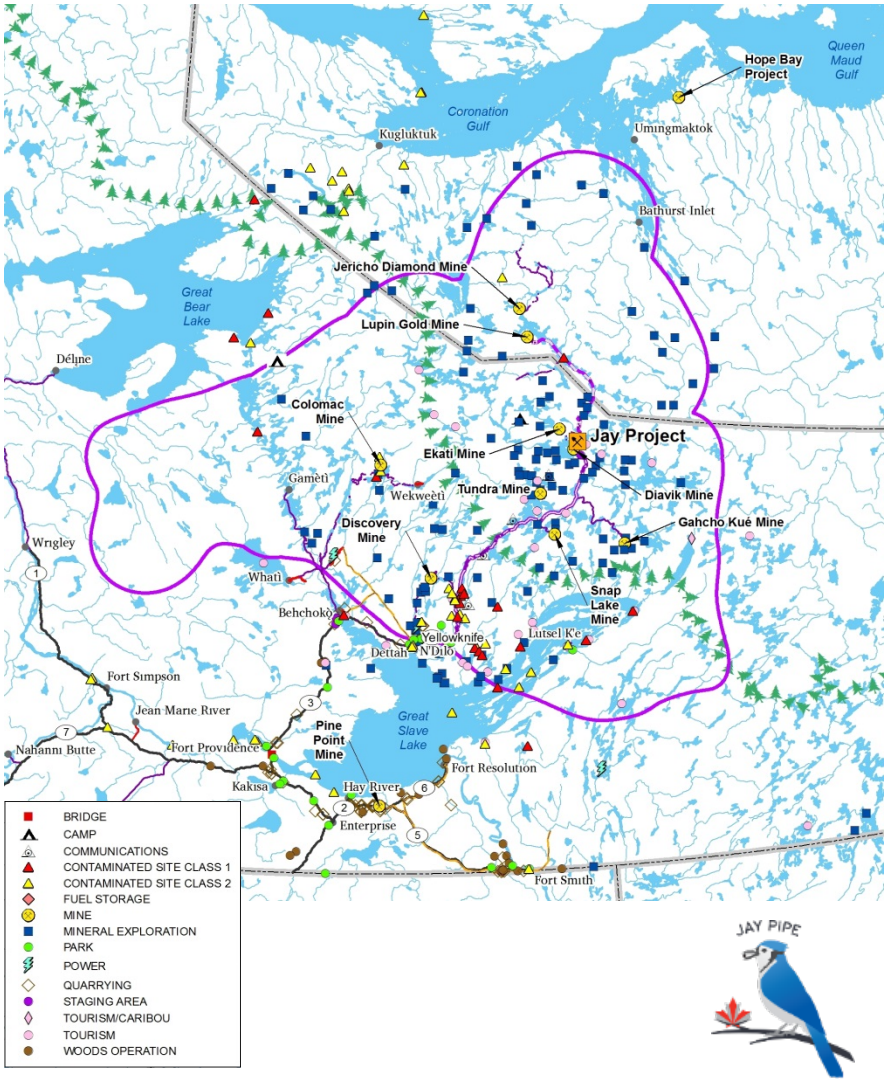
Key Line of Inquiry: Barren-Ground Caribou – Assessment Methods

Barren-Ground Caribou – Habitat Quantity, Arrangement, and Connectivity

- Caribou habitat classification based on Resource Selection Function categories derived from Canada Landcover and EOSD
- Mapped and assessed independently for each season
- Development Database used to identify developments associated with each assessment case
- Actual development footprints applied for previous, existing, and future developments
- Jay Project infrastructure buffered by 250 m, access roads and adjacent pipeline and power line buffered to yield a 250 m right-of-way



Key Line of Inquiry: Barren-Ground Caribou – Assessment - Methods

Barren-Ground Caribou – Habitat Quantity, Arrangement, and Connectivity

- Changes from loss and fragmentation of habitat patches were calculated:
  - The area of habitat units and the direct loss of units caused by the Project footprint and previous and existing developments were quantified in a GIS platform to predict changes
  - Landscape metrics such as number of patches and mean distance to nearest neighbour were calculated using the program FRAGSTATS

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Key Line of Inquiry: Barren-Ground Caribou – Assessment - Methods

Barren-ground Caribou – Habitat Quality

Approach

- Address the indirect effects of human development activities through the application of Zones of Influence and Disturbance Coefficients around development footprints
- Within each seasonal range, raster cells were categorized as High, Good, Low, or Poor habitat based on RSF values
- Applied ZOIs up to 15 km (mines and communities) around developments
- The Disturbance Coefficients reduced habitat quality by 100% within footprints and from 95% to 25% in ZOIs depending on proximity to development footprint
- Assessed separately for each season for each Assessment Case
- Changes to quantities of habitat in each category were determined by comparing the results for the different Assessment Cases

Key Line of Inquiry: Barren-Ground Caribou – Assessment - Methods

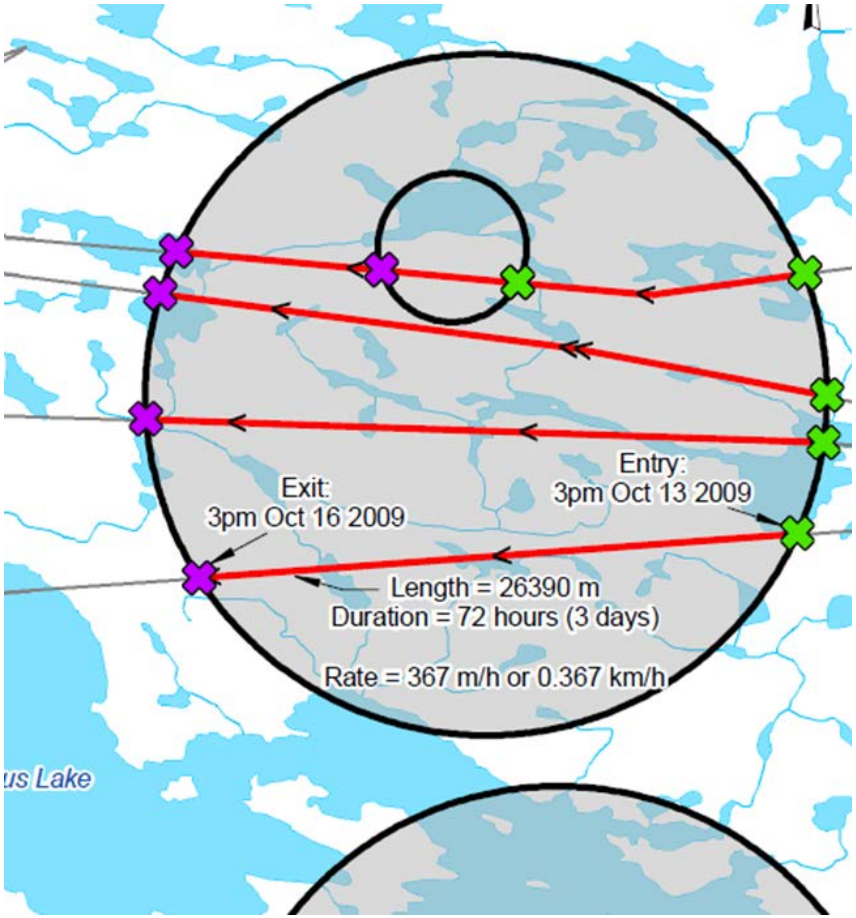
Zone of Influence Residency and Encounters

Approach:

- Identified caribou paths
  - Used GNWT caribou data
  - 138-day exposure period
- Identified encounters with ZOIs

Calculated energy loss (Bradshaw et al. 1998; Weladji et al. 2003)

- About 0.08 kg cost / disturbance
  - Assumed deflection cost from Jay, Misery, and Sable roads
- About 0.19 kg cost / days of potential insect harassment



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Key Line of Inquiry: Barren-Ground Caribou – Assessment Results

Barren-ground Caribou – Habitat Quantity, Arrangement, and Connectivity

- Dominant and Most Affected Habitats

Spring Habitat	Reference Condition (km^2)	Reference to Application Case	Reference to RFD Case
Heath Tundra / Heath Rock	83,185	-0.3%	-0.4%
Forest	45,142	-0.3%	-0.4%
Water	43,716	-0.3%	-0.3%
Rock Association	619	-5.4%	-5.5%
Post-Calving Habitat	**Reference Condition (km^2)**	**Reference to Application Case**	**Reference to RFD Case**
Heath Tundra / Heath Rock	60,310	-0.3%	-0.6%
Water	17,303	-0.3%	-0.5%
Lichen Veneer	5,300	-0.1%	-0.5%
Rock Association	209	-14.9%	-15.3%

- ***Project-specific change is -0.06%***

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Key Line of Inquiry: Barren-Ground Caribou – Assessment - Results

Barren-ground Caribou – Habitat Quantity, Arrangement, and Connectivity

- Dominant and Most Affected Habitats

Autumn Habitat	Reference Condition (km^2)	Reference to Application Case	Reference to RFD Case
Heath Tundra / Heath Rock	74,024	-0.3%	-0.5%
Water	32,041	-0.3%	-0.4%
Forest	18,469	-0.4%	-0.4%
Rock Association	213	-15.5%	-15.5%
Winter Habitat	**Reference Condition (km^2)**	**Reference to Application Case**	**Reference to RFD Case**
Coniferous Forest	43,434	-0.2%	-0.3%
Burn	37,765	-0.3%	-0.3%
Water	34,618	-0.6%	-0.5%
Exposed Land/Rock	10,292	-0.6%	-0.7%

- ***Project-specific change is -0.06%***

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Key Line of Inquiry: Barren-Ground Caribou – Assessment - Results

Barren-ground Caribou – Habitat Quality

- Cumulative Changes in Habitat Quality relative to Reference Conditions

Spring	Application Case	RFD Case
High	-5.1%	-11.1%
Good	74.9%	164.9%
Low	-3.7%	-5.8%
Poor	5.2%	8.9%

Autumn	Application Case	RFD Case
High	-6.2%	-12.4%
Good	0.0%	0.0%
Low	19.5%	39.9%
Poor	5.7%	11.1%

Post-Calving	Application Case	RFD Case
High	-5.5%	-13.7%
Good	0.0%	0.0%
Low	NA	NA
Poor	5.5%	11.0%

Winter	Application Case	RFD Case
High	-4.9%	-6.0%
Good	-5.8%	-5.8%
Low	1.7%	2.3%
Poor	8.8%	9.3%

- ***Project-specific change is -0.2%***

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Key Line of Inquiry: Barren-Ground Caribou – Assessment Results

Barren-ground Caribou – Mitigation Measures for Misery and Jay Roads

- Stockpiling of Ore

- Staged monitoring of Bathurst caribou herd to track migratory movements
  - Satellite radio-collars
  - Reconnaissance surveys near the road
  - Road surveys

- Plan and design hauling of ore

- Adaptive management of traffic to permit opportunities for caribou to move across the roads

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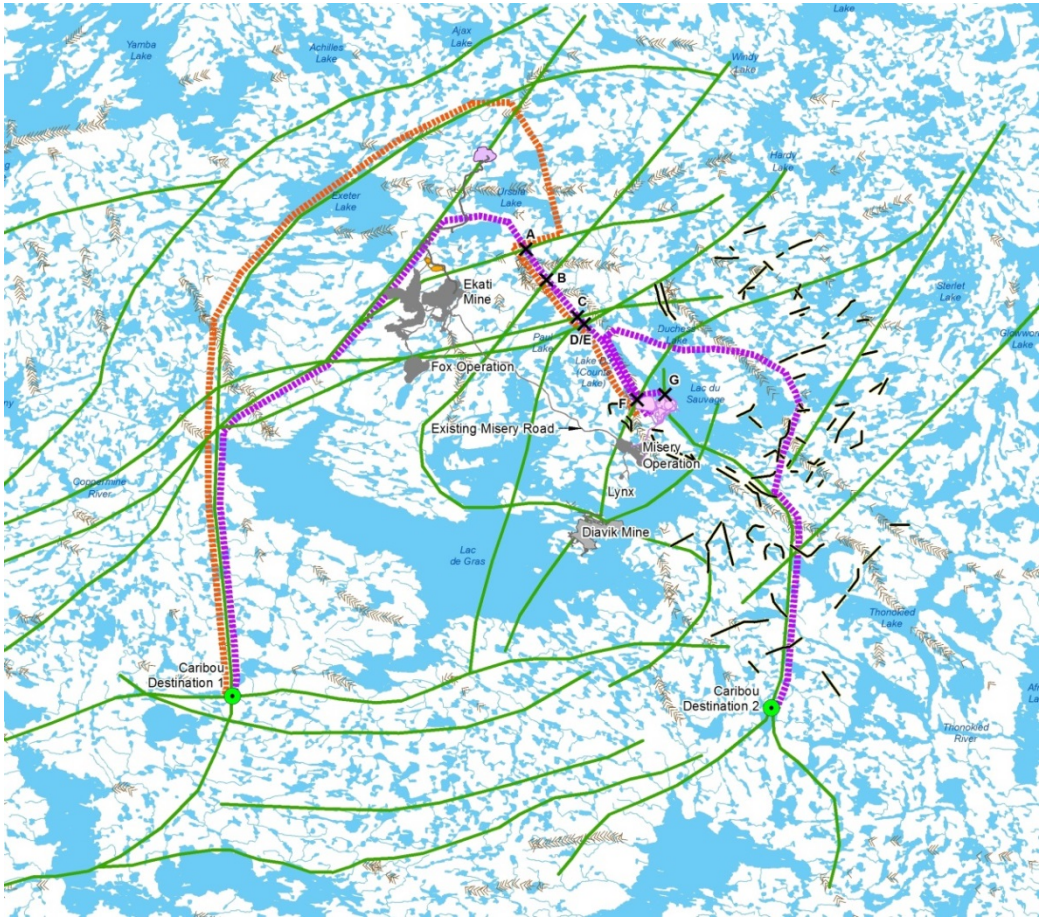
Key Line of Inquiry: Barren-Ground Caribou – Assessment Results

Barren-ground Caribou – Encounters and Energy Balance

- Maximum number of encounters with ZOI based on 1996 to 2013 collared caribou data = 19 per year
- Incorporated caribou migration routes from TK (green routes)
- Animals encountering contiguous ZOI assumed to go around and follow migration routes
- Body mass loss from encounters and deflection = 0.08 kg
- Body mass loss from insect harassment = 0.19 kg



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Key Line of Inquiry: Barren-Ground Caribou – Summary

The caribou ESA was based on the seasonal ranges of, and effects to, the Bathurst caribou herd as the Bathurst herd has a greater likelihood of being affected by the Project relative to the Ahiak and Beverly herds

- DAR used multiple approaches and best practices to provide confident and ecologically relevant impact predictions

- Caribou habitat remains intact so:
  - No fragmentation of populations
  - Traffic manipulation mitigation for Misery, Jay, and Sable roads
  - No strong mechanism causing a long-term or irreversible change in reproduction or survival rates

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Follow-up and Monitoring for the Terrestrial Environment

Existing Ekati Mine Wildlife Effects Monitoring Program (WEMP) will be applied to Project, including:

- Extent of direct disturbance to vegetation communities
- Mine-related wildlife mortalities and interactions with site (including roads)
- Pit-wall nesting by raptors
- Mitigation and waste management effectiveness
- Contribution to regional monitoring of cumulative effects

The current WEMP monitors caribou, grizzly bear, wolverine, gray wolf, fox, raptors, waterbirds, and upland birds

Thank You