Visualizing Mineral Exploration Impacts on a Threatened Species in Ontario

Meg Southee and Justina Ray
SCGIS Conference 2016
Today’s Presentation

• Boreal caribou status
• Mineral exploration in Ontario
• Tracking mining claims to assess cumulative impacts in caribou ranges: issues with data access
• The solution – A Story Map based on Python scripts to access information from disparate sources
Boreal Caribou

Ecotype of caribou
(*Rangifer tarandus*)

Require large expanses of mature boreal forest to thrive

Many populations in Canada are in decline

Threats include:
- habitat destruction,
- human disturbance,
- hunting, predation,
- climate change

*Rangifer tarandus*

Caribou are listed as a Threatened species in Ontario and Canada

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“Over 40 per cent of the caribou range in Ontario has been lost since the late 1800s”
- Ministry of Natural Resources and Forests
This map highlights the most recent survey records of caribou in 100 km² hexagons.

Occuancy, as it is represented here, does not portray the abundance of caribou across the landscape, nor does it show the quality or quantity of caribou habitat. Additionally, the absence of an observation does not mean caribou are not or were not present.

Caribou Occupancy by Decade
- 2010 - present
- 2000 - 2009
- 1990 - 1999
- Pre 1980's
- Unknown

Geographic Features
- Community
- Caribou Ecotype Boundary
- International Boundary
- Waterbody

Disclaimer:
This map is illustrative only. This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Natural Resources shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.

Sources:
Thematic Data: OMNR
Base Data: LIO (Land Information Ontario)
Projection: Lambert Conformal Conic
Datum: North American Datum 1983
© Queen's Printer for Ontario, 2013
Published in May 2013
Map Reference: COCBU0007

ontario.ca/speciesatrisk
Mineral Exploration Activities

Permits are required to conduct mineral exploration activities. Permits are issued by the Ministry of Northern Development and Mines (MNDM). Companies must notify the public about the activities they wish to undertake on their mining claims.

Activities can include:
- Line Cutting
- Surface Stripping
- Pitting and Trenching
- Drilling
Environmental Bill of Rights (EBR)

Part of the Ontario Legislation since 1993
Environmental responsibilities for 14 government ministries, including: Ministry of Northern Development and Mines

Gives citizens the ability to participate in environmental decision-making by submitting comments
Proposals for mineral exploration permits are posted on the Environmental Registry (ER) for 30 days
Impacts of Mineral Exploration

No practical way to monitor the cumulative impacts of these effects in Ontario

Companies have no obligation to return the area to a pristine state if they don’t find any mineral deposits

Caribou in the boreal forest

Impacts of mineral exploration
Story Map Development

Data Access Problem

- Data from MNDM
  - Claim location only
  - No information about ownership

- From Environmental Registry
  - List of claim numbers only
  - Must search for claims one-by-one in MNDM

- Information on mining claims and exploration permits doesn’t exist in one place
  - No one is tracking the impacts

Geospatial Solution

- Python scripts to extract ownership information and track changes over time
  - Gathering data since 2013

- Geodatabase to track proposals and decisions on exploration permits
  - Gathering data since 2015

- Consolidate and share information with public
  - Work in progress
  - Plan to launch this summer
Story Map to Share Data

Current and Historical Caribou Range
Talk about range contraction and impacts to caribou.

Types of Caribou
- Boreal Forest Caribou
- Boreal Mountain Caribou
- Migratory Tundra Caribou

Click on the shaded areas in the map to learn more about the species at risk status of these different types of caribou.

Range Impacts in Ontario
There are six operating mines and one quarry in the Ontario caribou ranges:
1. Victor Diamond Mine (satellite image view)
2. Musselwhite Gold Mine (satellite image view)
3. Detour Lake Gold Mine (satellite image view)
4. Red Lake Gold Mine (satellite image view)
5. Campbell Complex Gold Mine (satellite image view)
6. Pheonix Gold Deposit (satellite view)

The population of Ontario is more dense in the western part of the province.
Boreal Caribou Range

Types of Caribou

Caribou in Canada are separated into 12 designatable units (DUs) for management and assessment. The DUs were created by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2011. Click here to see the full report.

Boreal caribou (green - DU6) are listed as Threatened in Canada and Ontario.

The Central Mountain and Southern Mountain caribou (orange - DU8 and DU9) are listed as Endangered.

Dawson's caribou (red - DU12) on Haida Gwaii are Extinct.

Click on the coloured areas in the map to learn more about the species at risk status and COSEWIC status of the different types of caribou in Canada.

Range Impacts in Ontario

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Species Profile

Caribou Boreal population

Scientific Name: Rangifer tarandus
Other/Previous Names: Woodland Caribou (Boreal population)
Taxonomy Group: Mammals
Range: Yukon, Northwest Territories, British Columbia, Alberta, Saskatchewan, Manitoba, Ontario, Quebec, Newfoundland and Labrador
Last COSEWIC Assessment: November 2014
Last COSEWIC Designation: Threatened
SARA Status: Schedule 1, Threatened

Quick Links: Taxonomy | Photo | Description | Distribution and Population | Habitat | Biology | Threats | Protection | Recovery Initiatives | Recovery Team | National Recovery Program | Documents

Image of Caribou
Range Impacts in Ontario

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4. Red Lake Gold Mine (satellite image view)
5. Campbell Complex Gold Mine (satellite image view)
6. Phoenix Gold Deposit (satellite view)

The population of Ontario is more dense in the southern third of the province following the major roads and railway infrastructure.
Current Mining Claims

Mining Claims in the Caribou Ranges

Click on the claims to see the information about the mining claim owners and access the hyperlinks to the claims information on the Ministry of Northern Development and Mines (MNDM) website.

Mining Claims and Exploration Permits

Talk about permit types and link to the photos

Talk about the EBR

You can also view the mining claims with exploration permits by claim owner

Click this link to access the full functionality of the web map in ArcGIS Online.

Last Data Updates:
Mining claim data: June 3, 2015
Exploration permit data: May 19, 2018
### Active Mining Claim Abstract

**Claim Number:** P 4218198  
**Status:** ACTIVE

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<th>PORCUPINE</th>
<th>Due Date: 2016-Dec-10</th>
<th>Recorded: 2007-Dec-10</th>
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<td>Staked: 2007-Nov-28 15:55</td>
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<td>Total Work:</td>
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<td>Claim Bank:</td>
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### Claim Holders

**Recorded Holder(s) Percentage**

- RESSOURCES KWG INC./KWG RESOURCES INC. (15.00 %)
- NORONT MUKETEI MINERALS LTD. (85.00 %)

<table>
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<tr>
<th>Client Number</th>
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<tr>
<td>224701</td>
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### Transaction Listing

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<td>2007-Dec-10</td>
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<td>PEPLINSKI, MICHAEL WALTER (180975) RECORDS 50.00 % IN THE NAME OF SPIDER RESOURCES INC. (295855)</td>
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</table>
Exploration Permit Status

Mining Claims and Exploration Permits

Talk about permit types and link to the photos

Talk about the EBR

You can also view the mining claims with exploration permits by claim owner

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Last Data Updates:
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Mining Claims and Exploration Permits - Advanced functionality

Search by Claim Number
Toggle Layers On/Off
Change the transparency of the layers
Change the basemap
Collapse the legend
Print your map

Changes to Mining Claims since 2013
Application for Exploration Permit

This is not the latest version of the notice. Click here to view the latest version.

**Instrument Proposal Notice:**

**Proponent:** Noront Resources Limited  
Kenora District  
110 Yonge Street  
Suite 400  
Toronto Ontario  
Canada M5C 1T4

**Instrument Type:** Application to issue an exploration permit under section 78.3 of the Mining Act. - Mining Act s.78(3)

**EBR Registry Number:** 012-0868  
**Ministry Reference Number:** PR-13-10464  
**Ministry:** Ministry of Northern Development and Mines  
**Date Proposal loaded to the Registry:** January 17, 2014

**Keyword(s):** Mining  
**The comment period for this proposal is now over.**

**Description of Instrument:**

Noront Resources Inc. has submitted an application for which MNDM has deemed a permit is required under the Mining Act.

The following activities of the plan are proposed to be in this permit are as follows:

- Geophysics requiring a generator
- Line Cutting less than 1.5 m wide
- Fitting and Trenching of Bedrock at up to 20 sites, each with a 200 m radius to be more than 1 m3 and less than 3 m3
- Mechanized stripping, less than 100m2 in a 200m radius

**Public Consultation:**

This proposal was posted for a 30 day public review and comment period starting January 17, 2014. Comments were to be received by February 16, 2014.

All comments received during the comment period are being considered as part of the decision-making process by the Ministry.

Please Note: All comments and submissions received have become part of the public record.

**Contact:**

Andrew Kane  
MINERAL EXPLORATION AND DEVELOPMENT CONSULTANT  
Ministry of Northern Development and Mines  
Mines and Minerals Division  
Ontario Geological Survey  
Resident Geologist Office: Thunder Bay  
435 James Street South  
Suite 6002  
Thunder Bay Ontario  
PTE 657  
Phone: (807) 475-1518

**Location(s) Related to this Instrument:**

Noront Resources Eagle’s Nest Project, claim numbers  
1221423  
3005622  
3005667  
3005668  
3005669  
3005670  
3006707  
3006708  
3006709  
3006820
Exploration Permits by Owner

Mining Claims and Exploration Permits

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Change Over Time

Shows the growth in mining claims since the year 2000.

The data loads better if you use the forward arrow to step through the data.

Changes to Mining Claims since 2013

The map panel on the left shows the mining claims by decade in November 2013.

The map panel on the right shows the mining claims by decade in June 2018.

Mining claims by decade after 2000

- 2000-2009
- 2010-2016

Ontario Caribou Ranges
Change Over Time

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The map panel on the right shows the mining claims by decade in June 2016.

A mineral disposition is a more advanced type of ownership than a mining claim. It means that the owners have a license of occupation to extract minerals for 10 or 21+ years. Having a disposition is the precursor to the development of a mine. You can see an example of an active disposition in the Ring of Fire.
Our research is generously supported by THE W. GARFIELD WESTON FOUNDATION. We Stand for Wildlife™

Contact:
Meg Southee
msouthee@wcs.org

Thank you