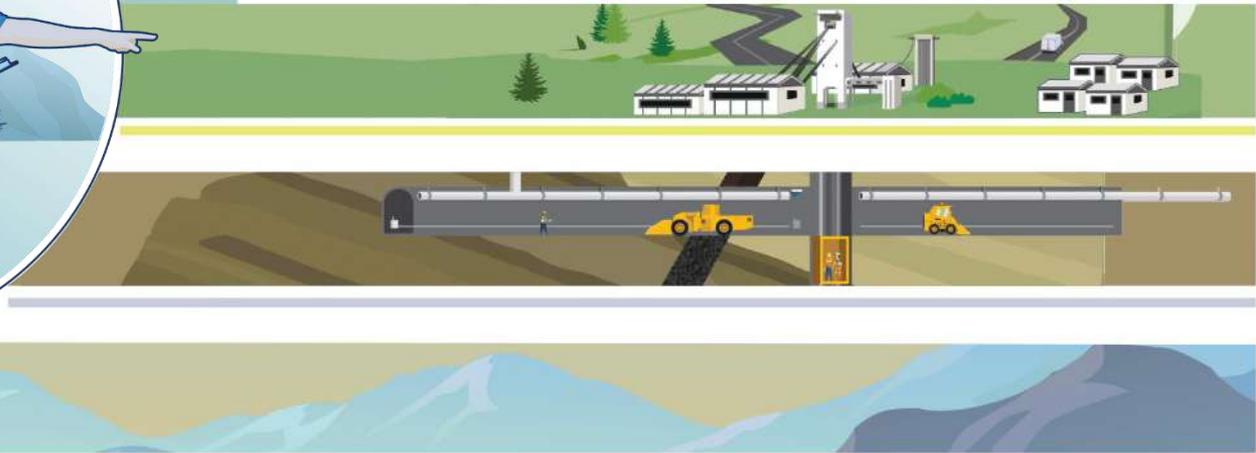


Mining = Opportunity for Indigenous Communities in Manitoba

Dave Lefebure, Ph.D., P. Geo.



March 2021 slide deck

Why Explore for Minerals?

Society is increasingly dependent on minerals!

- Metals
 - copper for electrical wires, zinc to galvanize steel, gold for jewelry/electronics
- Coal
 - Critical for making steel
- Minerals
 - Gypsum for wallboard, phosphate for fertilizers
- Rocks
 - Gravel for highways and building foundations, limestone to make cement, granite for building



Presentation Outline

1. Opportunities for Indigenous mining jobs, businesses and agreements in Manitoba

question and answer session

2. Lifecycle of mining related to Manitoba and potential economic opportunities for indigenous communities
3. End with a few key points relevant to economic development officers related to mining

question and answer session

Why Talk About Mining?

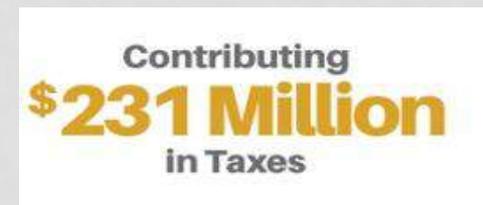
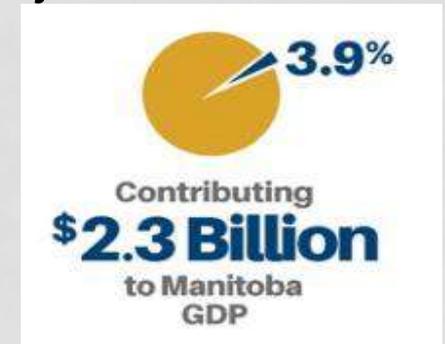
Four reasons:

1. Jobs and contracts
 - mining is #2 employer of Indigenous people in Canada
 - goods and services contracted out by mining companies
2. Numerous agreements with Indigenous communities
 - potential for significant benefits
 - a relatively recent development (largely since 2000)
3. Mines and exploration are spread widely across Manitoba
 - remote, rural and suburban locations
4. Mining sector not well known
 - many people have never visited a mine or learned about them

Don't miss economic development opportunities!

1a. Indigenous Employment in Mines

- Across Canada Indigenous peoples working in mining accounted for 12% of the industry's labour force*
 - compares with an all-industry average of 4% Indigenous workers
 - 14% of workforce in the 777 and Lalor mines in 2019
- For every mining job, there are at least two jobs in the mining supply and service sector
 - ~17,000 Manitoba jobs related to mining (2018)
- Many attractive jobs that build work skills
- Jobs exist in many regions of Manitoba



* Statistics Canada, 2016 Census of Population
MGS PDAC Presentation 2020

Wide Variety of Jobs



Wide Variety of Mine Jobs



Mine Workings
Surveyor`s helper
Miner
Driller
Heavy Equipment Operator
Shift Foreman
Etc.

Mill/Shop
Trades helper/
apprentice
Warehouse assistant
janitor
Technicians
Certified trades
Etc.

Offices
Students
Secretarial
Admin
Engineers
Geologists
Technicians
Accountant
Etc.

Camp
Janitorial
Kitchen
Cook
Admin
Repairs
Safety
Security
Etc.

Roads,
Etc.
Snow removal
Road work
Trucking
Gravel pit
Supplies
Diesel fuel
Explosives
Etc.

Over 160 different mining jobs

Mining Occupations



Surface Mining Equipment Operator

Are you into heavy equipment? Do you have stamina and great hand-eye co-ordination? Can you stay alert while repeating tasks? Then you may want to dig into a career as a surface mining equipment operator.

Outlook below avg	Avg. Wage \$30.77	Min. Education Varies
-----------------------------	-----------------------------	---------------------------------



Environmental Auditor

Are you persistent? Are you passionate about protecting our environment? Do you like research and gathering data? Then you may want to assess a career as an environmental auditor.

Outlook below avg	Avg. Wage \$44.02	Min. Education 2 years post-secondary
-----------------------------	-----------------------------	---



Blaster

Provincially Regulated

Do you have a safety-first attitude? Do you like excitement and have an interest in explosives? Then you may want to find out if a career as a blaster sparks your interest.

Outlook n/a	Avg. Wage \$63.62	Min. Education Varies
-----------------------	-----------------------------	---------------------------------



Chief Administrative Officer

Provincially Regulated

Do you like the idea of contributing to public service, leading a multi-faceted organization, and guiding the long-term growth of a community? Would you enjoy devising strategies to address local community issues and leading a team to deliver essential public services to residents and businesses? Then a career as a chief administrative officer may be a fit for you.

Outlook n/a	Avg. Wage \$75.71	Min. Education 2 years post-secondary
-----------------------	-----------------------------	---

1b. Goods and Services Contracts

- Mines require a wide variety of goods
 - Food, lumber, gravel, vehicles and parts, signs, pickets, ...
- Mines often contract out specific services
 - Security, environmental monitoring, snow removal, food services, accounting, road maintenance, transportation, ...
- Companies of various sizes bid on these contracts
 - Mines generally prefer to contract competent local companies and recognize the value of using Indigenous companies

Norway House Cree Nation

- Chief Anderson of Norway House First Nation said “As a business partnership with Rockcliff Metals, our experience has worked well with Norway House Cree Nation (“NHCN”) providing the camp, camp support and multiple services over the past year. The continued creation of economic opportunities increases the support that NHCN has for mining projects. We look forward to reviewing the PEA and discussing next steps.”



Norway House Cree Nation Playgreen Development Corporation

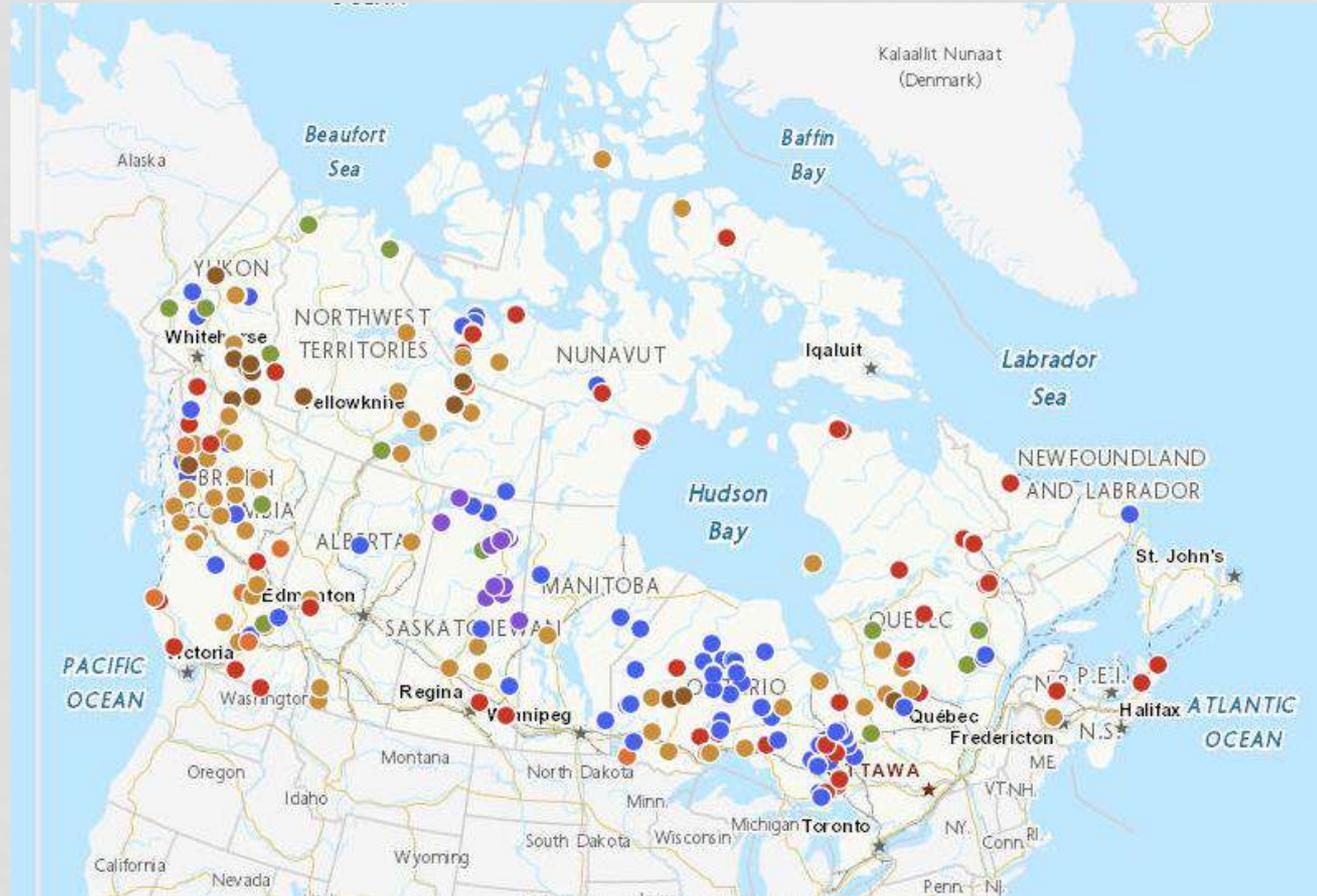
- Playgreen Development Corporation is an operation whose main focus is on Construction & Maintenance. Our operations include the following:
 - The supply of assorted rock materials
 - The supply of redi-mix concrete
 - The supply of Diesel Fuel
 - Vehicle Maintenance and Repair
 - Vehicle Safety Inspection Station
 - Provide Equipment Rentals with an operator
- However, our main focus is to bid on contract jobs which involve Construction and Maintenance mainly to create temporary employment for our people. Since becoming a legal corporation and recently receiving our COR certificate, we are now able to bid on contract jobs outside the Norway House Cree Nation which exceed \$100,000.00.



2. Indigenous Community Active Mining Agreements

Active Agreements

- Impact and Benefits Agreement
- Socio- Economic Agreement
- Exploration Agreement
- Participation Agreement
- Cooperation Agreement
- Memorandum of Understanding
- Letter of Intent
- Surface Lease Agreement
- Other Agreement Type



Agreement Between Red Sucker Lake First Nation and Yamana Gold

Yamana buys \$50 million worth of work and 3 million ounces of gold for \$17.5 million

POSTED ON APRIL 24, 2015 BY TOMMY HUMPHREYS
CATEGORY STORIES,



- Advanced exploration project
 - Many mineral exploration projects often don't last more than three or four years with one operator, but can be intermittently active for decades
- Agreements take time

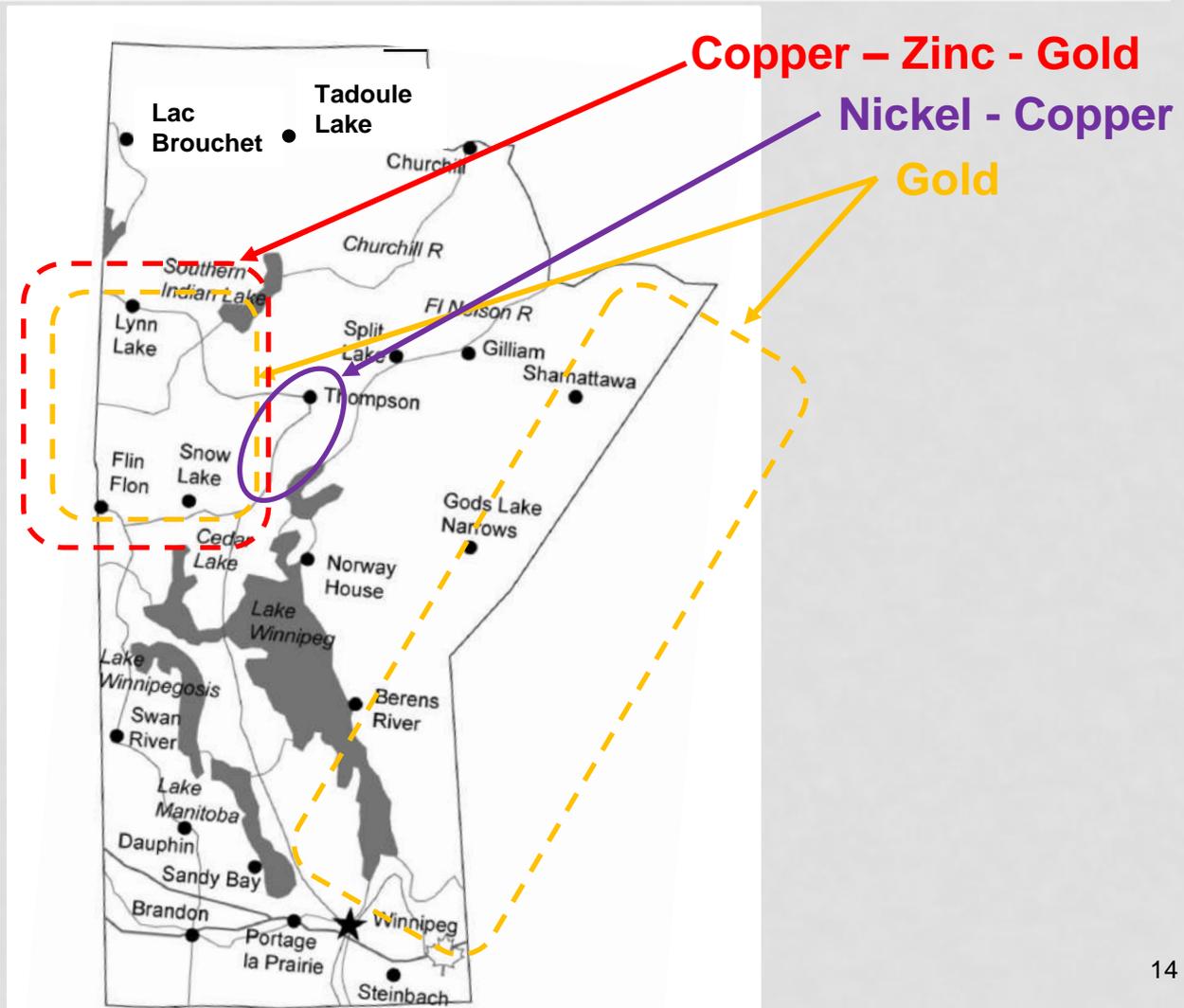
Active Agreements

Monument Bay Gold-Tungste...	
Project name	Monument Bay Gold-Tungsten Project
Mining company	Yamana Gold Inc.
Mining company website	http://www.yamana.com/
Signatories	Red Sucker Lake First Nation
Agreement type	Exploration Agreement
Project status	Exploration
Year agreement signed	2018
Province / Territory	Manitoba
Commodities	Gold

Manitoba Metal Mines

Main Areas

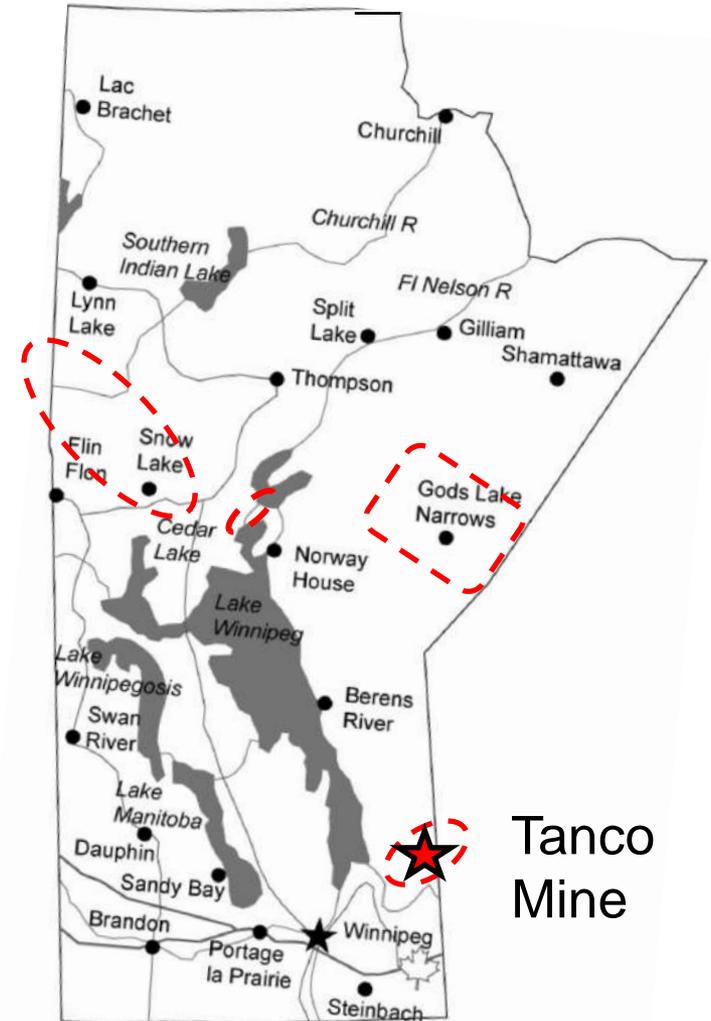
- General areas with known mineral potential demonstrated by mines – past and present
- Exploration could (will) extend these areas



Manitoba

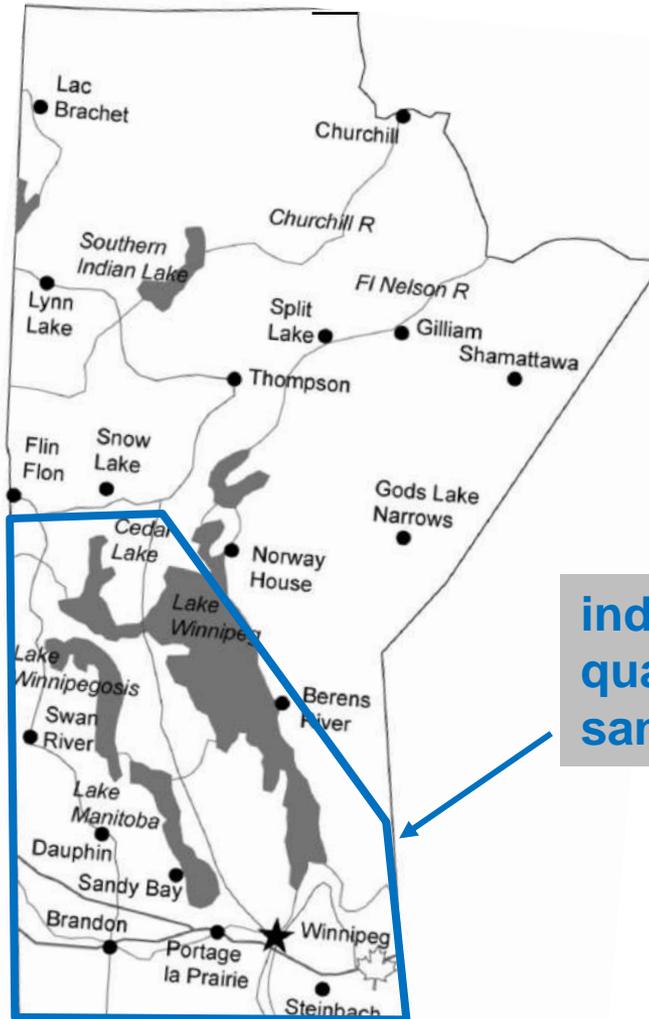
Exciting Rare Metal Potential

- Rare metals
 - cesium (Cs), lithium (Li), tantalum (Ta), rare earth elements (REE)
- Tanco the only mine so far
 - Opened in 1969
- These critical metals and minerals are becoming increasingly important to society
- Exploration will likely extend these areas and may find more mines



Manitoba Quarries and Aggregate Pits

- Largely in the southern part of the province
- Variety of industrial minerals
- Constant demand for aggregate (sand and gravel)



industrial mineral
quarries and most
sand and gravel pits

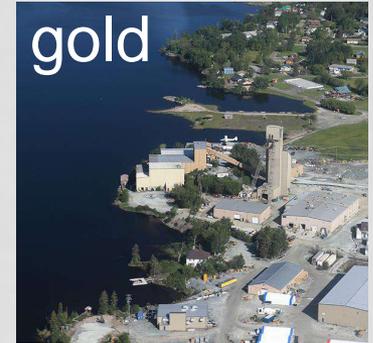
Mine Products

nickel-copper-cobalt



copper-zinc

gold



industrial minerals



rare metals



sand and gravel

4. Mining Not Well Known

- Why?
 - Not generally taught in schools.
 - Many mines are in remote and rural areas.
 - Access to these industrial sites is restricted for safety.
 - Mining is typically the safest heavy industry in Canada.
 - Mining products are often processed to a metal or mineral product before they reach the consumer.
 - Mining sector focuses on the job at hand.

Do you know the following highlights about the mining sector in Manitoba?

Manitoba Mining

- 4 metal mines
- Numerous industrial mineral quarries
- Numerous sand and gravel pits

- Annual value*
 - Mining production = \$1.5 billion (2018)
 - Mineral exploration/deposit appraisal = \$67.4 million
 - Mine/petroleum complex development = \$612.2 million

* PDAC Infographic

Manitoba Mining Commodities 2021

Metals

nickel, copper, zinc,
gold, silver, cesium

Minerals & Rocks

limestone, gypsum,
sandstone, silica
sand, building stone

Construction Materials

gravel, sand,
rip rap,
crushed rock

Q & A Session

Mining Opportunities Can Come with Concerns

Manitoba

Thompson bracing for job losses after northern Manitoba mine owner admits to bleeding \$300K a day



Vale says efforts to find 'simpler and more nimble operating model' will mean smaller workforce



Ian Froese · CBC News · Posted: Jun 17, 2020 7:56 PM CT | Last Updated: June 17, 2020

Manitoba

Hollow Water Chief defends silica sand project near Manitoba reserve

Glen Dawkins

Dec 12, 2018 · December 12, 2018 · 2 minute read · [Join the conversation](#)

Canada: Remediation of Abandoned Mine Sites in Manitoba will take 24 Years

October 15, 2017/in Feature, Remediation, Sustainable Development
/by John Nicholson

Abandoned mine sites at Lynn Lake and near Leaf Rapids, Manitoba will need to have their wastewater treatment plants operating for the next 24 years to clean up the contamination.

Ask questions and learn about mining if you get involved.

Government Role in Exploration and Mining

Provincial and Territorial governments:

- Administer mineral claims & regulate exploration activities
- Generate geological maps and reports to support exploration
- Permit mine developments and mines
- Enforce safety regulations and assist with mine training
- Require reclamation plans and reclamation bonds for mines

Federal government :

- Administer mineral rights on reservations
- Can participate in environmental assessments of mine proposals
- Help administer underground exploration, mining, processing and shipping of uranium

Manitoba Geological Survey (MGS) Government Geoscience

- Conducts investigations of bedrock, subsurface materials, sand, gravel and organic deposits
- Provides advice and information to government and clients
 - Geological maps and reports, mineral deposit reports and databases, mineral resource assessments, targeted geoscience research, exploration models, and data inventories
- Promotes mineral exploration opportunities and contributes to wise land-use management

Manitoba Geological Survey

360-1395 Ellice Avenue
Winnipeg, Manitoba
Canada R3G 3P2

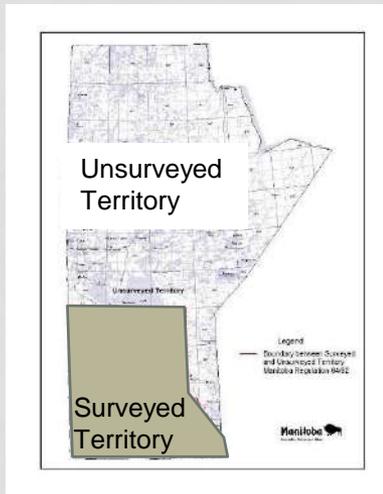
Phone: 204-945-1119,
toll free 1-800-223-5215



a. Manitoba Access to Land for Mineral Exploration and Mining

A mining claim is registered with the provincial government to obtain ownership for metallic and industrial minerals

- Use township lots for claim boundaries in surveyed areas
- Stake a mining claim on the ground in unsurveyed territory



No Land Access for Mineral Exploration and Mining

Protected Areas: Free from logging, mining or the development

of oil, petroleum, natural gas or hydro-electric power

Designated Areas: national and provincial parks, wildlife management areas, ecological reserves and others

The Integrated Mining and Quarrying System (iMaQs; <https://www.manitoba.ca/iem/mines/imaqs/index.html>) is the main digital portal for mineral dispositions data in Manitoba.

b. Manitoba Access to Land for Mineral Exploration and Mining

First Nations Lands

Treaty Land Entitlement Lands (TLE): Not generally available for mineral exploration for new claims. See regulations regarding pre-existing claims.

Northern Flood Hold Areas: Mineral exploration is generally not permitted within these hold areas. Approval for mineral exploration must be granted by the appropriate First Nation Band.

Community Interest Zones (CIZ): Explorationists may stake, develop mineral claims and obtain mineral leases within lands identified as CIZ Zones. Exploration permits must be reviewed and approved by affected First Nations.

Resource Management Areas: Resource co-management areas and boards are currently being established to provide advice on resource use and allocation issues within the resource management area. Although notification of mineral exploration is not a legal obligation it is recommended.

Refer to Manitoba government for a more complete and the complete legal description of mineral tenure and access to land restrictions for the province.

Manitoba

Mining Acts and Regulations

M162 - Act

- M162 - [The Mines and Minerals Act](#)

M162 - Regulations

- MR 63/92 - [Drilling Regulation, 1992](#)
- MR 64/92 - [Mineral Disposition and Mineral Lease Regulation, 1992](#)
- MR 65/92 - [Quarry Minerals Regulation 1992](#)
- MR 67/99 - [Mine Closure Regulation](#)
- [General Closure Plan Guidelines](#)
- [Mine Closure Guidelines, Financial Assurance](#)
- MR 165/92 - [Prospectors Assistance Program Regulation](#)
- MR 202/2011 - [Prospectors Assistance Program Regulation, amendment](#)
- [Amendment - Regulation 3/2001](#)

Other Related Acts and Regulations

- M190 - [The Mining and Metallurgy Compensation Act](#)
- M165 - [The Mining Claim Tax Act](#)
- M195 - [The Mining Tax Act](#)
- P80 - [The Planning Act](#)
-

P80 - Regulations

- MR 81/2011 - [Provincial Planning Regulation](#)
- W210 - [Workplace Safety and Health Act](#)
-

W210 - Regulations

- MR 212/2011 - [Operation of Mines Regulation](#)

For more information on Manitoba government regulations see links listed at the end of this presentation.

Numerous Companies - Varying Levels of Activity

Active Mining Companies

- Vale (Thompson)
- Hudbay (Flin Flon, Snow Lake)
- Sinomine (Tanco, Lac du Bonnet)

Advanced Projects

- Alamos Gold Inc. (Lynn Lake)
- Hudbay (1901)
- Rockcliff Metals (Talbot, Tower)
- Yamana Gold Inc. (Red Sucker)

Over 70 Exploration Companies incl.:

- Hudbay Minerals Inc.
- Sinomine Rare Metals Res.
- Minnova Corp.
- Callinex Mines Inc.
- 1911 Gold Corp.
- Altius Resources Inc.
- Adia Resources Inc.
- Victory Nickel Inc.
- Wolfden Resources Corp.
- Rockcliff Metals Corp.
- CaNickel Mining Ltd.
- Quantum Minerals Corp.
- Satori Resources Inc.
- Alto Ventures Ltd.
- Corazon Mining Ltd.
- Grid Metals Corp.
- Exiro Minerals Corp.
- CanAlaska Uranium Ltd.
- Kinross Gold Corp.
- Copper Reef Mining Corp.
- Yamana Gold Inc.
- Far Resources Inc.
- BWR Exploration Inc.
- Pure Nickel Inc.
- Exiro Minerals Corp.
- Golden Pocket Resources Ltd.
- Infinity Lithium
- Snow Lake Resources
- New Age Metals Inc.
- Canadian Premium Sand Inc.
- HD Minerals

Life Cycle of Mining

Prospecting & Early Exploration



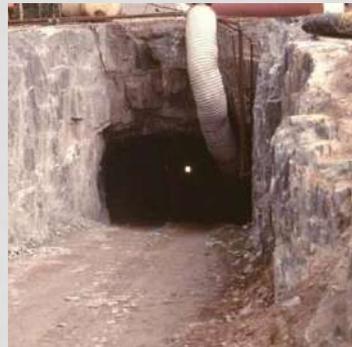
Mine Closure & Reclamation



Indigenous Business Opportunities



Mineral Exploration



Mine Development



Mining

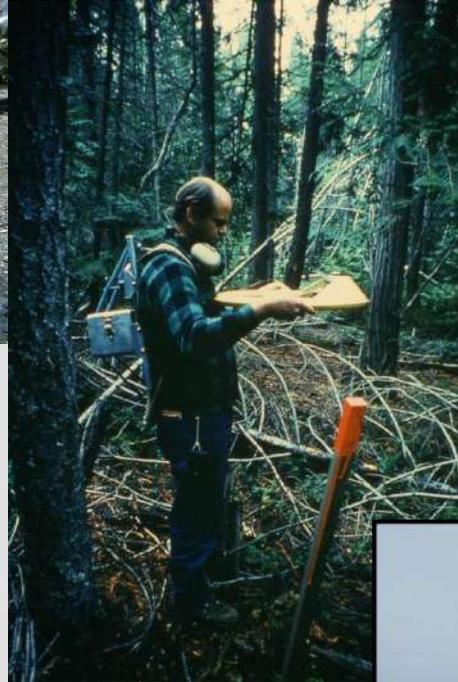
Mineral Exploration Path



Prospecting



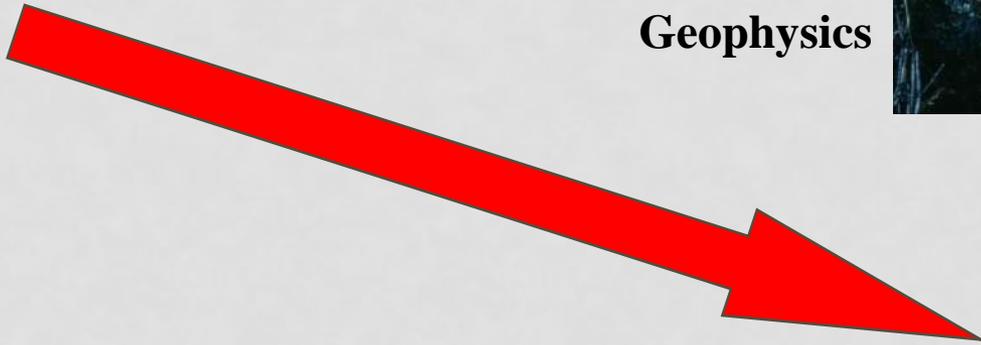
Geochemistry



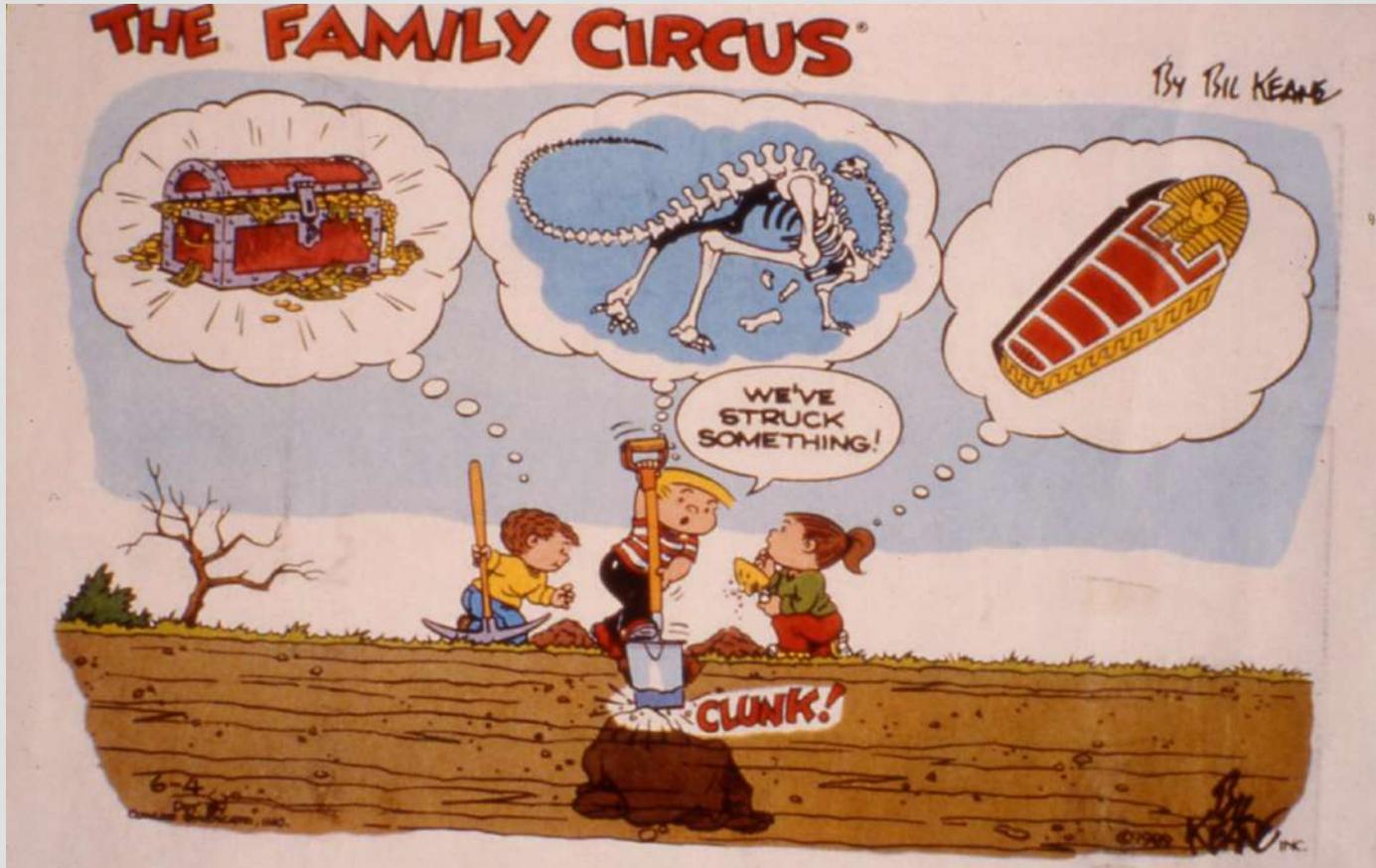
Geophysics



Drilling



Mineral Exploration: Searching for a Hidden Resource

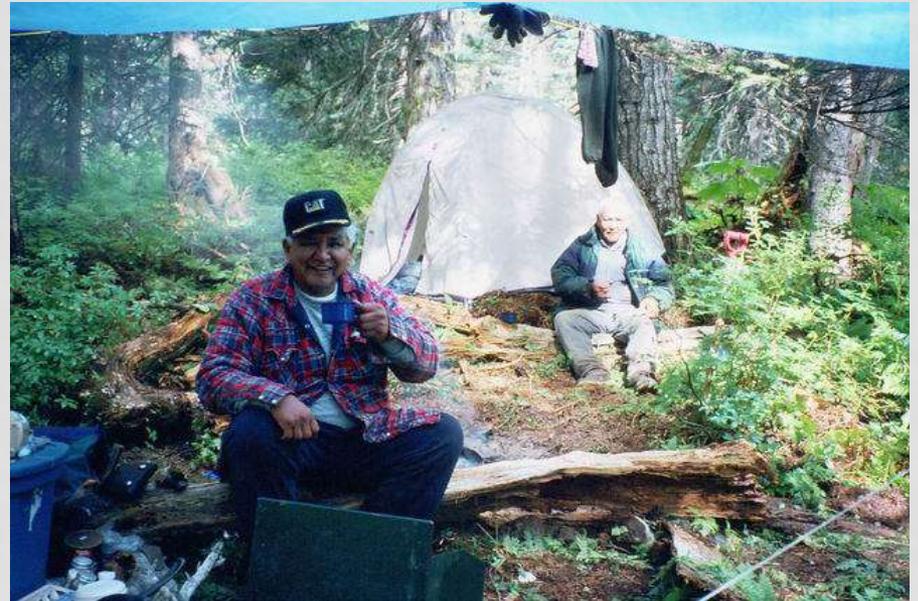




Early
Exploration

Prospectors

- Have discovered many metal and industrial mineral showings
- Hike through the bush, walk new logging roads, follow creek beds, etc.
- Use a rock hammer, GPS locator, gold pan
- Hope to find a property to sell to a company



from Bill Ferreira



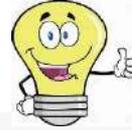
Early
Exploration

Small Companies ("junior companies")

- Several to tens of full time employees
- Often a single office (Toronto, Vancouver)
- Shares trade for cents to dollars
- Most do not own a mine
- Many exist for less than five to ten years



How Does Exploration Start? An Idea!



- Same process as moose hunting



- near an existing mine
- similar types of rocks (geology) to an area with mines
- prospecting finds in new areas

**If you know where to find a big moose,
you aren't telling other hunters!**



Early
Exploration

Collecting Samples Soil, Till, Silt or Rock



from Tom Lewis

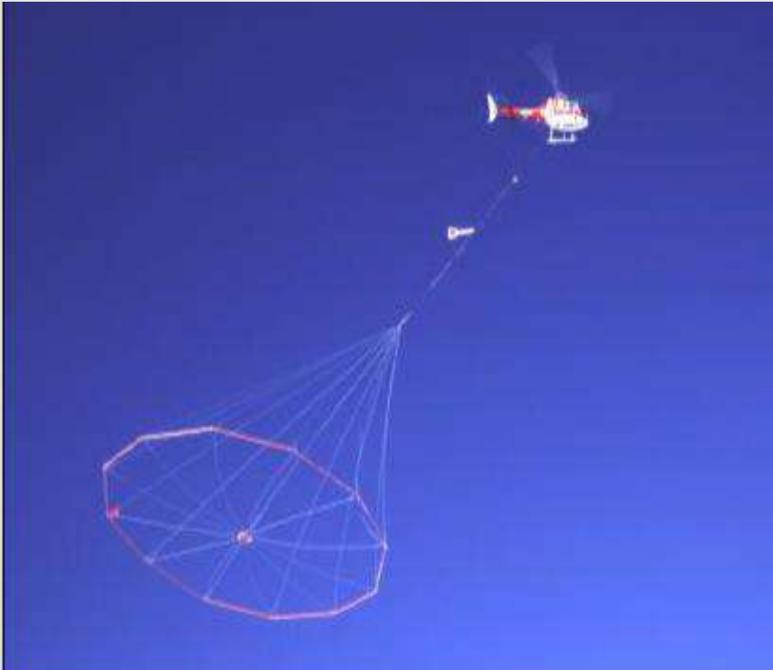




Early
Exploration

Geophysical Surveys

Airborne First



Hinz, USGS for Ministry of Northern
Development, Mines and Forestry, 2011
presentation

Ground Later





Early
Exploration

Early Exploration Jobs

- Prospector
- Line Cutters
- Samplers (soil, etc.)
- Geophysical Crew
- Geologist
- Drillers
- Kitchen Helper
- Cook
- Camp Expediter
- Jack of All Trades
- Camp Set-Up





Advanced
Exploration

Drilling – Key to Many Discoveries



Source: newgenenergy.ca



Advanced
Exploration

Geologist Logging (Describing) Drill Core





Advanced
Exploration

Winter Drill Camp

2019 Winter Drilling Program





Advanced
Exploration

Team Drilling



- A partnership started in 2008 between a team of drilling professionals and Athabaska Basin Development
- Training and using Indigenous drillers and staff



18/03/2021



ATHABASCA BASIN NEWS

By Sponsored Content

Team Drilling Runs Diamond Training Course



Advanced
Exploration

Indigenous Entrepreneurs: An Example



Louis Mercredi was working for an exploration company completing a geophysical survey



The exploration company was planning to drill and needed boxes for drill core



Louis built core boxes and sold them to the company



Early
Exploration

Environmental Studies

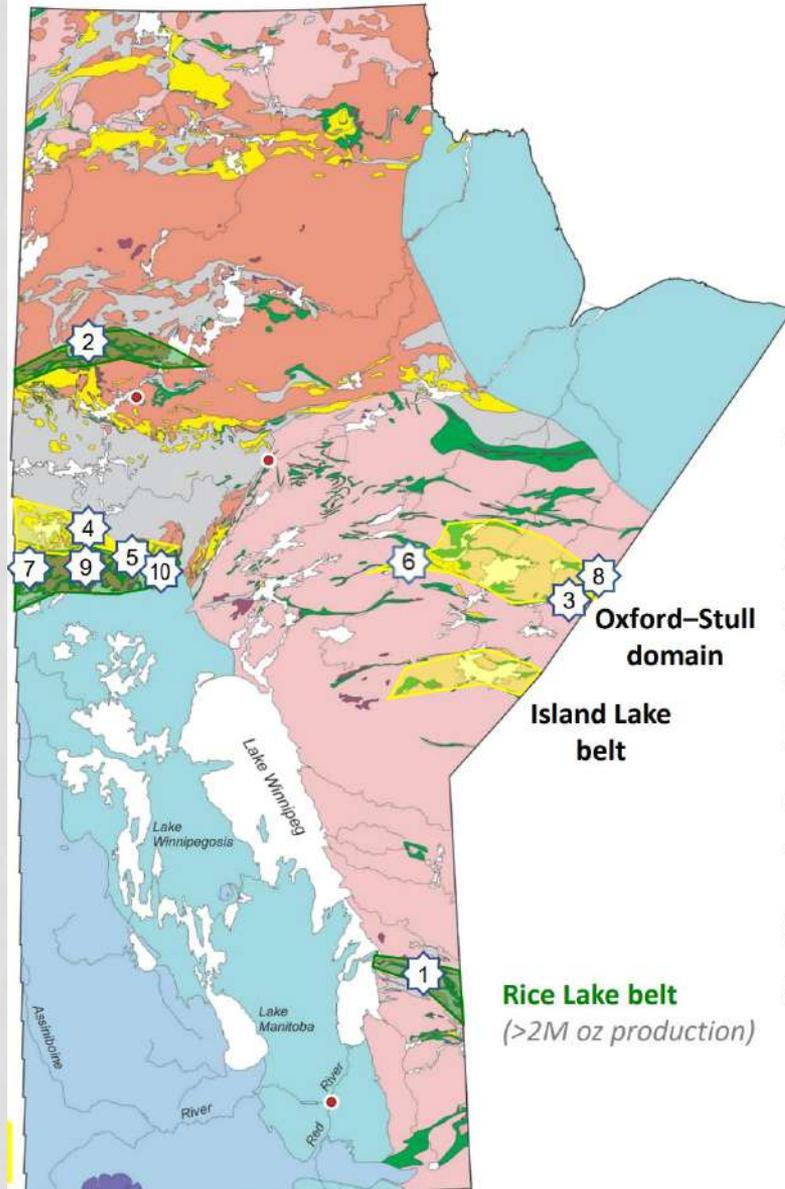
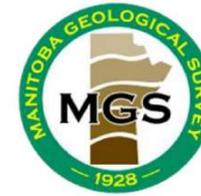


Advanced
Exploration

- Environmental sampling and monitoring start on the property
- Major focus on studying surface water, fish and wildlife for baseline data



Gold



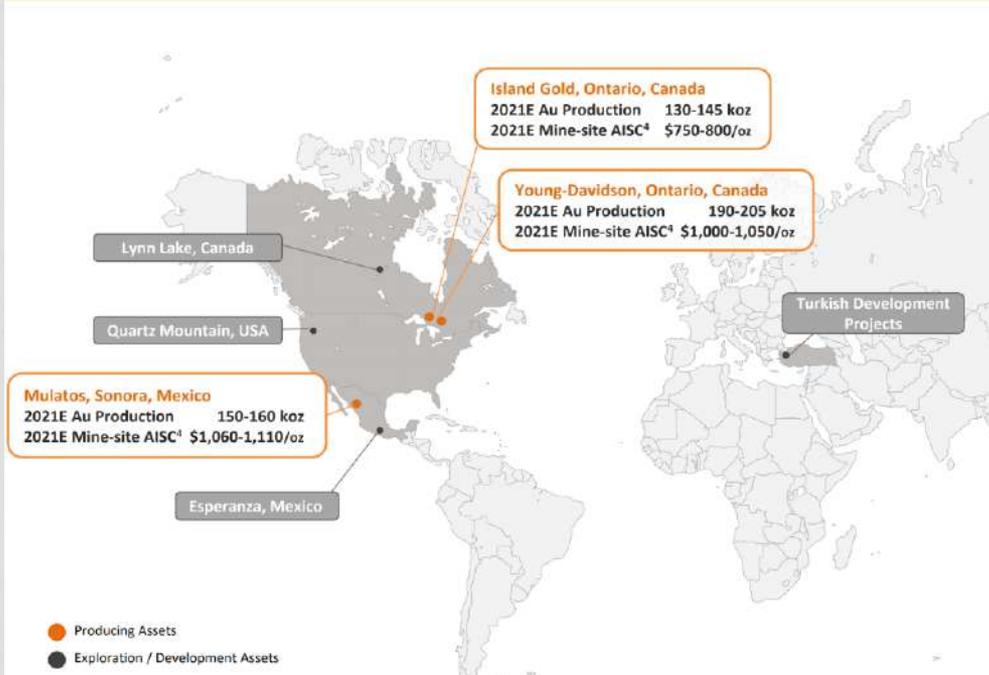
Active companies:

1. 1911 Gold Corp.
 2. Alamos Gold Inc.
 3. Yamana Gold Inc.
 4. Minnova Corp.
 5. Hudbay Minerals Inc.
 6. Alto Ventures Ltd.
 7. Satori Resources Inc.
 8. BWR Exploration Inc.
 9. Copper Reef Mining Corp.
 10. Kinross Gold Corp.
- + Rockcliff Metals Corp.

Lynn Lake Gold deposits



Diversified asset base; low political risk profile



- High grade, open pit with significant exploration potential
- Existing infrastructure in place
- Low cost hydroelectric power
- Feasibility study results announced Dec 2017¹
 - Average production: 143 koz (Years 1-10)
 - LOM Mine-site AISC²: \$745
 - After-tax NPV^{5%}: \$123m; IRR: 13%



First Nation, Gold Mining Company and Gov't Training Partnership

The provincial government's Manitoba Mineral Development Fund (MMDF) is providing \$30,000 to match a contribution split equally between Marcel Colomb First Nation (MCFN) and Alamos Gold to provide local Indigenous youth with traditional knowledge and skills training at a cost of \$60,000.



from
Thompson Citizen,
Dec. 15, 2020



Advanced
Exploration

Oxford Gold Project



- Located in central Manitoba, approximately 150 km southeast of Thompson.
- Access to the property can be gained by float or ski equipped aircraft or by winter road.
- A planned \$1.3 million drill program in early 2018 was deferred due to delays
 - in obtaining a drill permit from the Manitoba government
 - a request from the Bunibonibee Cree Nation to complete a comprehensive exploration agreement.
- Big Ridge signed a long-term exploration agreement with the Bunibonibee Cree Nation (BCN) in October 2020

Yamana buys \$50 million worth of work and 3 million ounces of gold for \$17.5 million

POSTED ON APRIL 24, 2015 BY TOMMY HUMPHREYS

CATEGORY [STORIES](#),



The Monument Bay Project, Mega Precious Metals Inc.'s, most advanced project, is located 570 km northeast of Winnipeg and 340 km east southeast of Thompson, Manitoba. The nearest communities are Red Sucker Lake First Nation, 52km to the southwest, and God's Lake Narrows First Nation, 100 km to the west. Hydro power lines currently run as far as Red Sucker Lake First Nation.

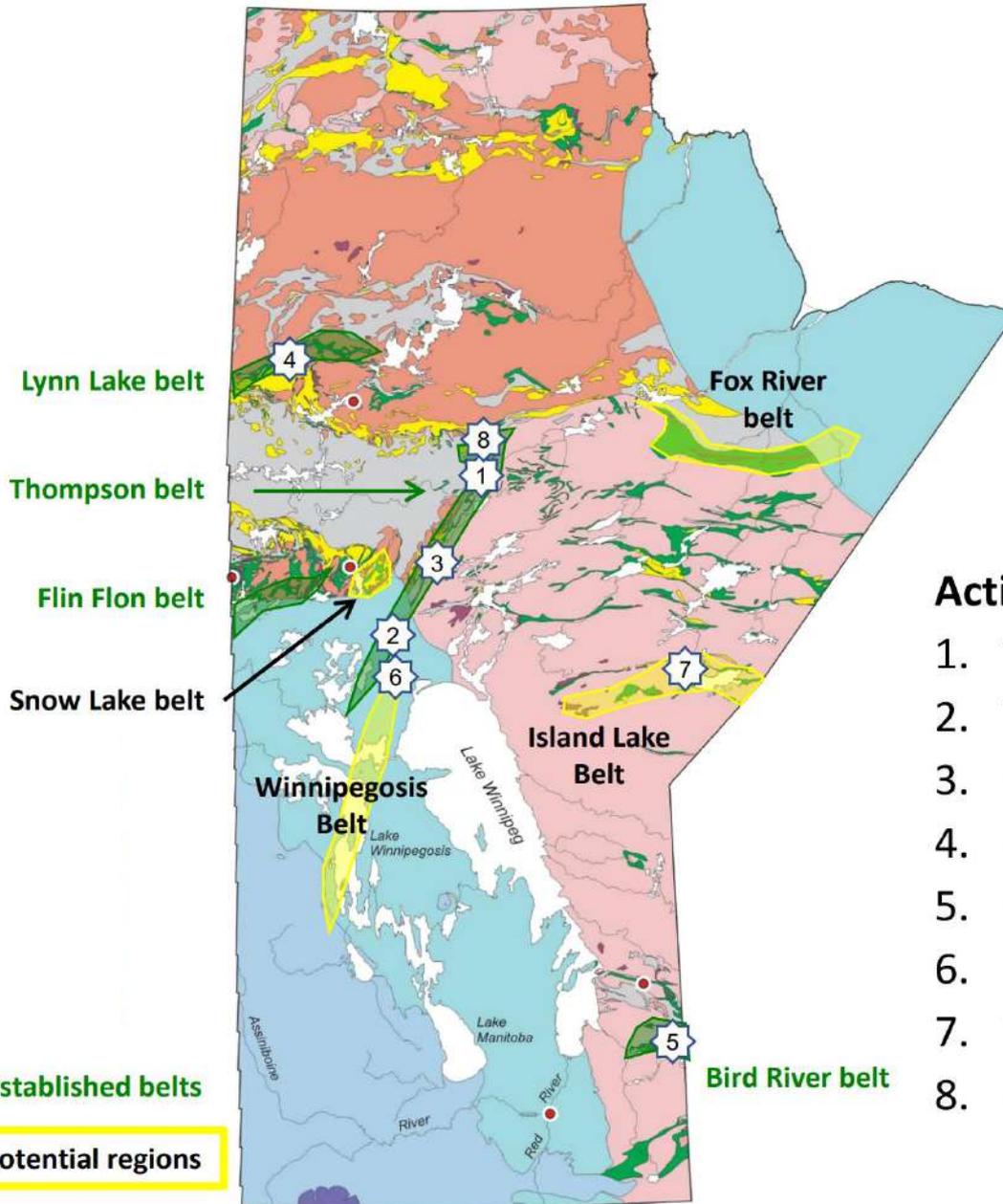
Mega Precious Metals photo

Manitoba Welcomes Mineral Exploration Agreement Between Red Sucker Lake First Nation, Yamana Gold Inc.

by pmnationtalk on [September 14, 2018](#)

Projet name	Monument Bay Gold-Tungsten Project
Mining company	Yamana Gold Inc.
Mining company website	http://www.yamana.com/
Signatories	Red Sucker Lake First Nation
Agreement type	Exploration Agreement
Projet status	Exploration
Year agreement signed	2018
Province / Territory	Manitoba
Commodities	Gold
Former mining company	N/A
Agreement status	Active

Nickel



Active Nickel Companies:

1. Vale Canada
2. Victory Nickel Inc.
3. CaNickel Mining Ltd.
4. Corazon Mining Ltd.
5. Grid Metals Corp.
6. Pure Nickel Inc.
7. Wolfden Resources Corp.
8. CanAlaska Uranium Ltd.



Advanced
Exploration

Rice Island near Snow Lake

- Rice Island property is 5 kilometres from Hudbay's Snow Lake concentrator and associated mining infrastructure
- Nickel-copper mineralization found by Inco Ltd. between 1949 to 1967 in the Main Zone
- Recent drilling completed by Wolfden was successful in discovering a new, underlying mineralized zone
- Work to continue!
- **Note: Negative drill results can lead to termination of exploration on a property**





Advanced
Exploration

Manitoba Mineral Development Fund Exploration Grant

Mineral development fund providing \$230K for diamond drilling near Snow Lake (Thompson Citizen – February 18, 2021)

- Wolfden announced that it is getting \$230,000 to support diamond drilling at its Rice Island property
- Wolfden says the nickel-copper-cobalt deposit has not been explored using modern high-resolution techniques.
- The Manitoba Mineral Development Fund (MMDF)
 - a \$20 million initial contribution by provincial government
 - up to 6% of annual revenues under the Mining Tax Act
- Successor program to Mining Community Reserve Fund
 - Provided assistance to mining communities affected by shutdowns and supported mineral exploration in Manitoba



WOLFDEN

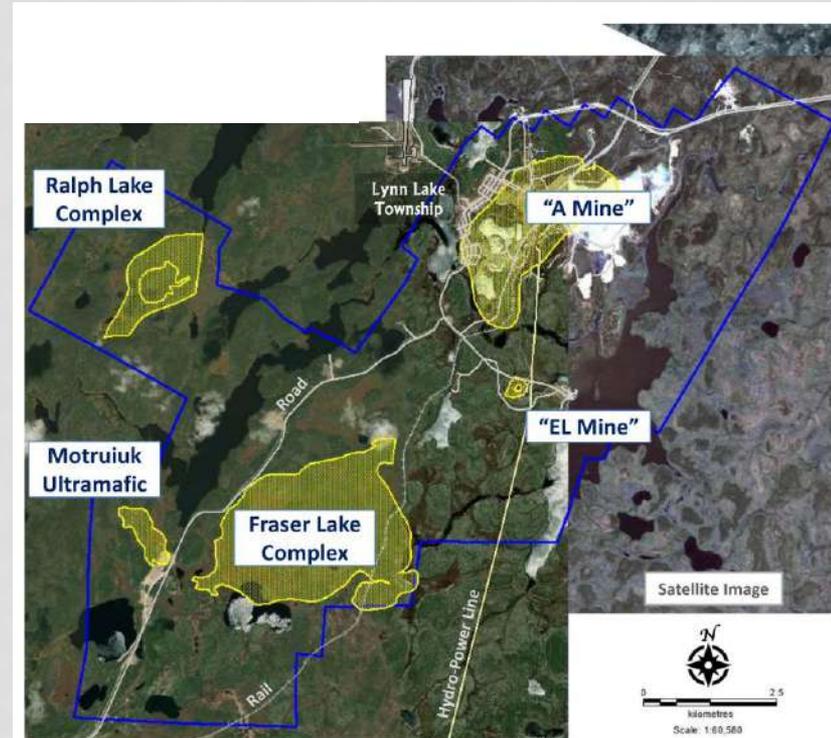


Advanced
Exploration

Lynn Lake Project

CORAZON
MINING LIMITED

- Corazon Mining Limited is an Australia-based company
- The nickel-copper-cobalt deposits at Lynn Lake were mined continuously for 24 years
- Corazon has discovered several new areas of mineralization
- A new phase of drilling commenced in 2021
 - An initial program of approximately 1,600 metres will test three of six priority targets, with subsequent drilling depending on results



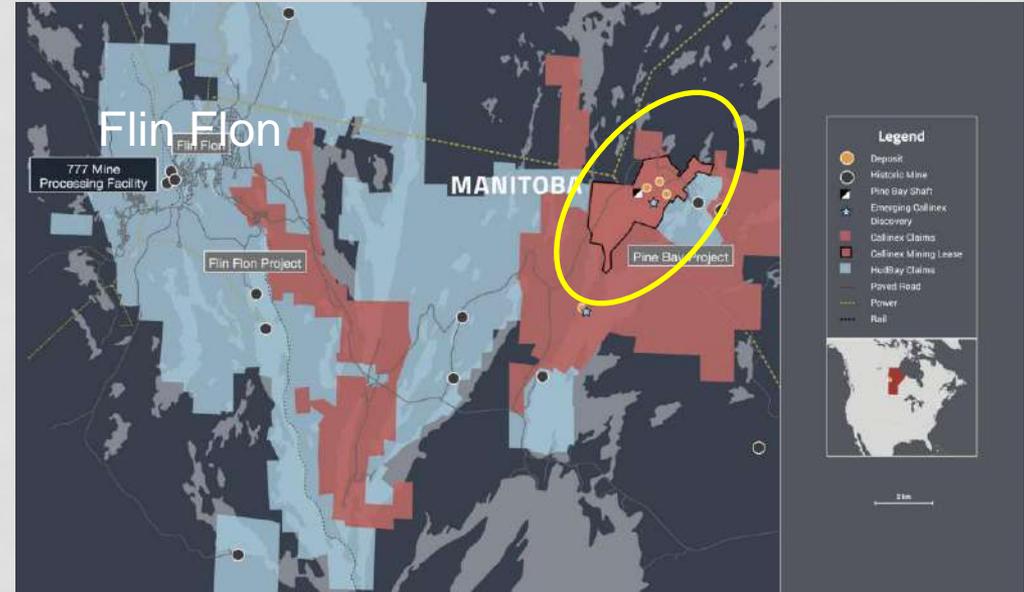


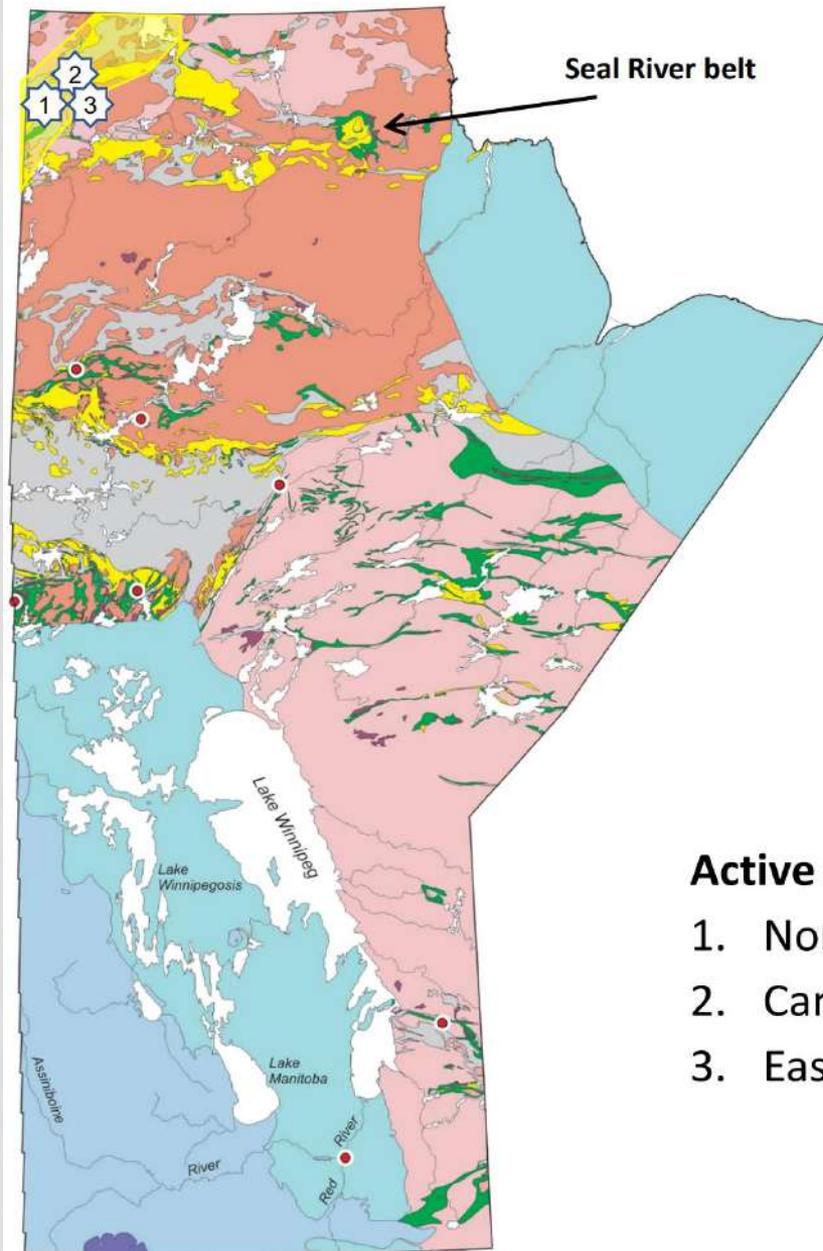
Advanced
Exploration

FLIN FLON MINING DISTRICT



- **February 16, 2021** – Callinex announced that it has commenced its 2021 drilling campaign at its Pine Bay Project located 16 km away from Flin Flon
 - Two drill holes for 1,500 meters; 30,000 meters planned for 2021
- Callinex has a large land position in the Flin Flon Mining District led by its Pine Bay and Big Island Projects





Uranium



Active companies:

1. Northern Uranium Corp.
2. CanAlaska Uranium Ltd.
3. East Resources Inc.



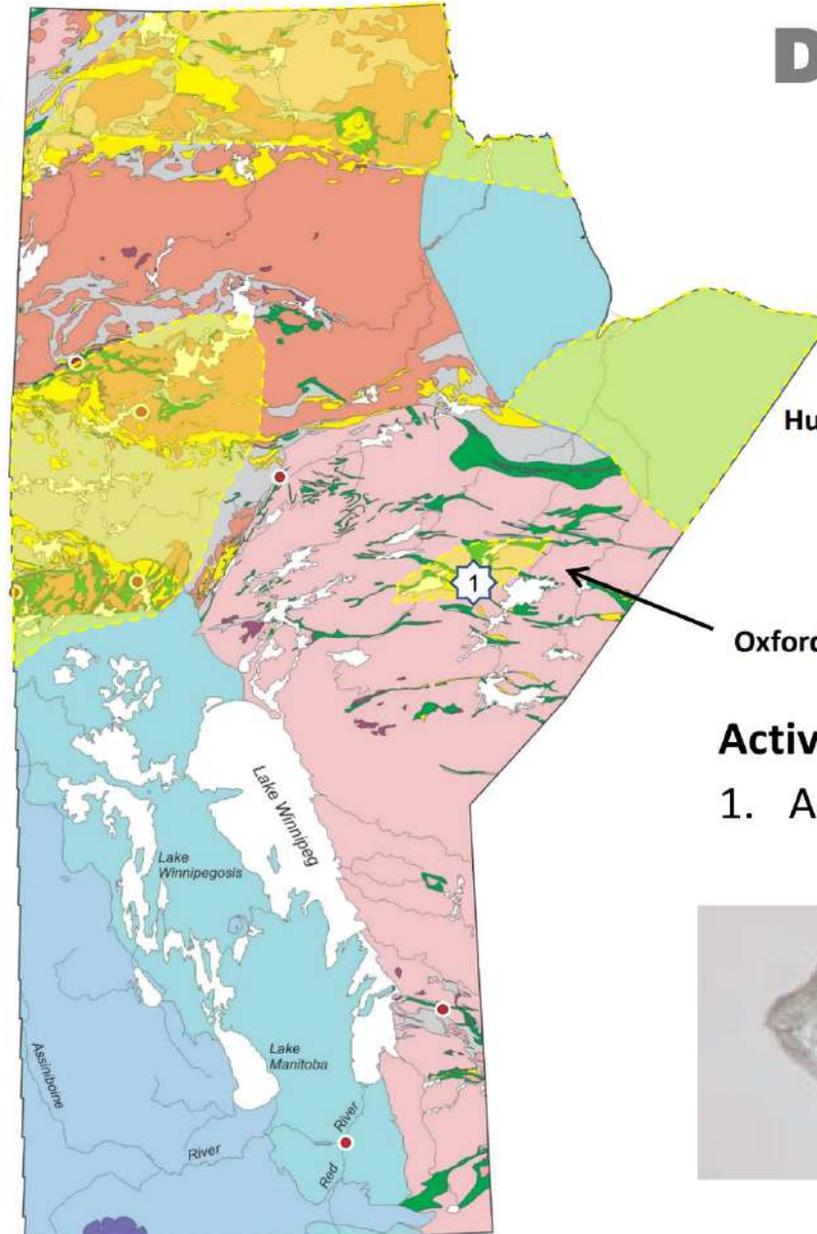
Advanced
Exploration

Northeast Manitoba Near Saskatchewan Border

- The project has been inactive since 2015
- Need a partner to do more work



Diamonds



Hudson Bay Lowland

Oxford Lake-Knee Lake belt

Active company:

1. Adia Resources Inc.



High-potential regions

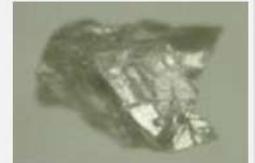
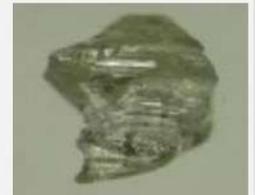


Advanced
Exploration

Lynx Project



- First discovery of diamonds in bedrock within Manitoba
 - on surface and in drill holes
- A total of 29 macrodiamonds



Lynx Project



Exploration agreement with Bunibonibee Cree Nation

Altius now Adia

"We are pleased that Altius was willing to work with us to craft an agreement that is respectful of our rights. Because of their respect and understanding, we can feel comfortable supporting their project. I encourage...other mining and mineral exploration companies to look to this agreement as an example of best practice going forward."



Chief Timothy Muskego
Bunibonibee Cree Nation

Industrial Mineral Localities

High-calcium limestone

- Used to make cement
- Steeprock and Mafeking

Brick & stoneware clay

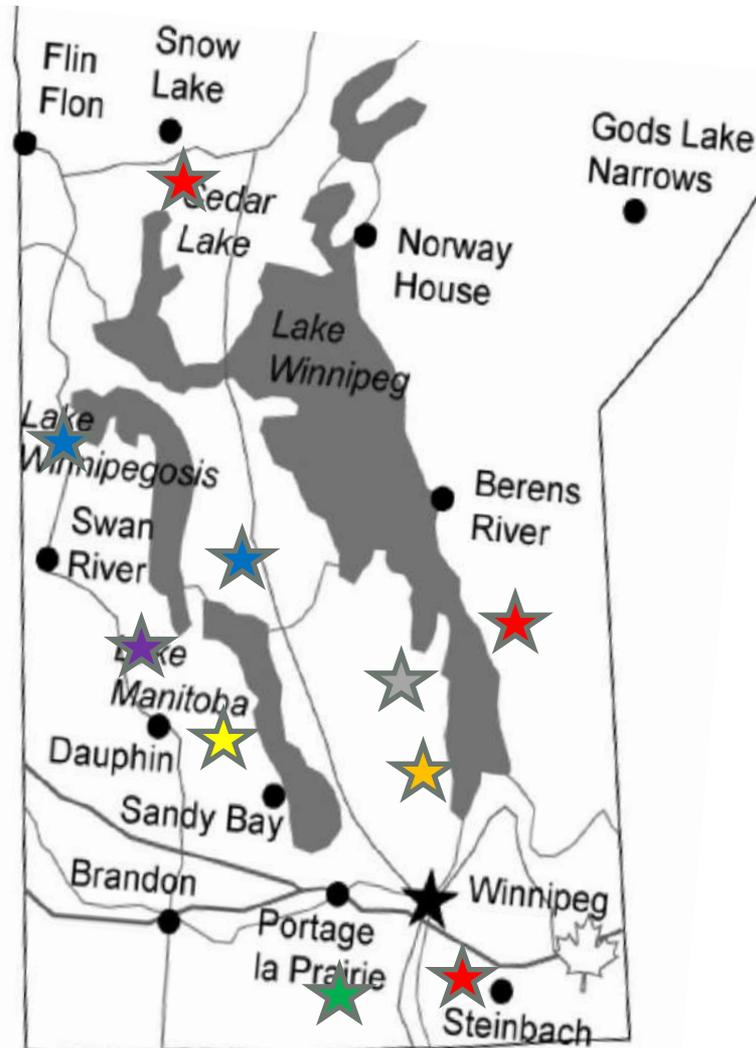
- Used for brick and pottery
- Ste. Rose du Lac

Gypsum

- Used to make wall board
- Harcus

Bentonite

- Used as purifier or adsorbent
- Miami



Silca Sand

- Used for oil and gas drilling
- Near Seymourville and Minago River

Kaolin

- Used: by paper and paint industry and for ceramics

High-purity Dolomite

- Used to produce magnesium metal
- Inwood



Early
Exploration

Silica Sand



Advanced
Exploration

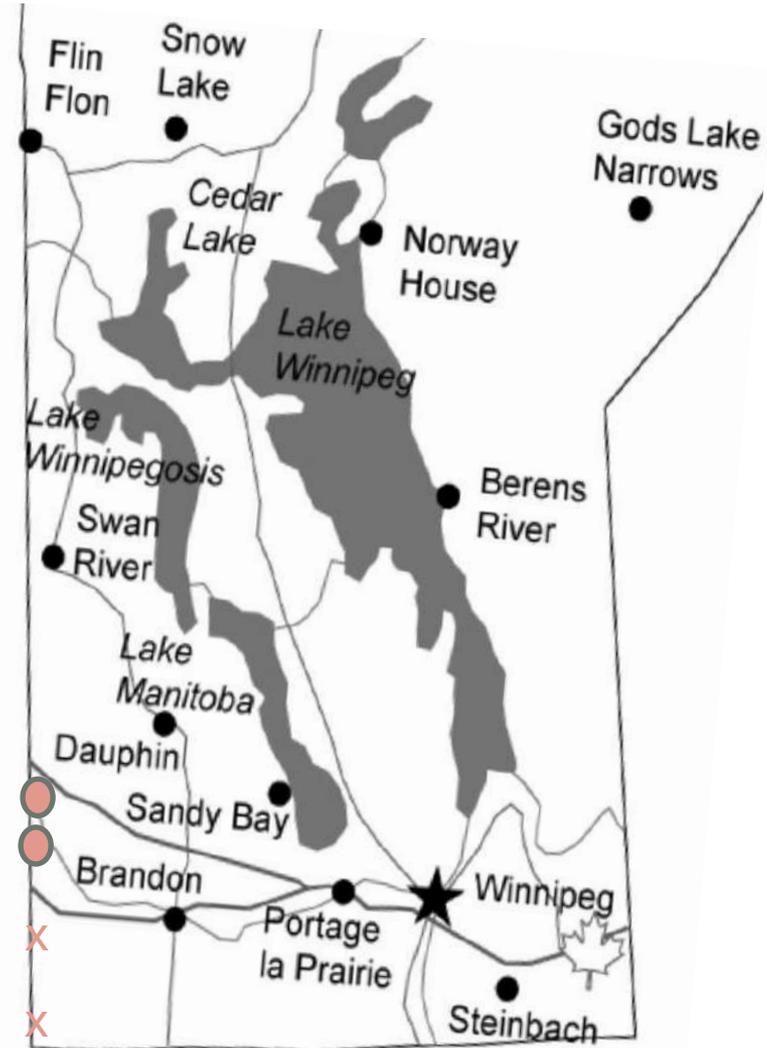
- In places in Manitoba, sands of the Winnipeg Formation have very high purity, with silica values exceeding 99.5%
 - very well sorted, well-rounded grains often possessing frosted surfaces
- Historically, silica sand has been used to make glass
 - high purity silica sand has many value-added applications
- High purity silica sand needed for glass for solar panels
- More recently, silica sand a very high quality, unconsolidated product utilized in tight oil and gas plays
 - When a relatively impermeable petroleum-bearing rock is artificially fractured the fractures are 'propped open' by the silica grains



Unconsolidated silica sand, drillcore RP95-17.

Potash and Salt Potential

- Russell and McAuley potash deposits (○) and occurrences (x) occur in southwest Manitoba
- Salt beds in the same area
- These are the eastern extension of the prolific potash and salt deposits mined in Saskatchewan





Early
Exploration

Exploration Project Characteristics



Advanced
Exploration

Early

- Generally 5 to 50 people in the field
- Junior companies and sometimes larger companies
- \$50,000 to millions of dollars spent annually
- Often summer field programs and sometimes winter drilling
- Opportunity to provide exploration services and derive community benefits
- Generally limited environmental impacts

Advanced

- Generally tens to hundreds of people in the field
- Junior companies and larger companies
- Up to hundreds of millions dollars spent over years
- Field programs for multiple years and often year round
- Significant opportunities to provide exploration services and sign benefit agreements
- Usually have more significant environmental impacts

Require government permits



Early
Exploration

Native Exploration Services



Advanced
Exploration

- **Native Exploration Services (1984 to present)**
 - line cutting, staking, mineral exploration, geological and geophysical surveys and use of explosives
 - training in the field of basic mineral exploration methodologies (prospecting and sampling)
 - Major employer for Oujé-Bougoumou Cree Nation



Skookum Jim Award
PDAC 2015

Sam Bosun, President

- Working with mining and exploration companies in the Chibougamau region for nearly 50 years
- Director of mining and exploration companies



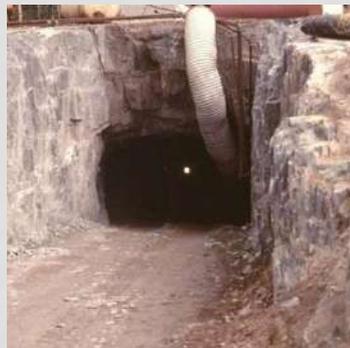
Mining Cycle

Mineral Industry Sequence

Prospecting / Early Exploration



Mineral Exploration



Mine Development



Mine
Development

Mine Development Path



**Environmental
Assessments**



Bulk Sampling

- Government permits
- Economic feasibility studies
- Raise funds



Mine
Development

Evaluation of Potential Value

Factors that determine if a resource is economical include:

- Type of mineral
- Market price of the minerals and metals
- Location, accessibility, size and value of the resource
- Access to infrastructure: roads, airstrips
- Distance from markets and supply points
- Regulatory regime: taxes, royalty taxes
- Environmentally safe and socially responsible mining
- Availability of a qualified work force



Mine
Development

Near Wabowden, central Manitoba

- Rockcliff has a 7-year lease of the Bucko Mill and tailing storage facilities from CANickel Mining Limited
 - Mill currently under care and maintenance
- The nickel mill would be re-developed into a copper processing mill by Rockcliff Metals
- In 2020, Rockcliff planned to complete metallurgical studies to establish required design change and the cost
- Continuing exploration on couple of properties in early 2021





Mine
Development

Wanipigow Silica Sand Project – Stage 1

- Near the communities of Seymourville, Hollow Water First Nations and Manigotagan on the east side of Lake Winnipeg
 - Partnership agreements with Hollow Water First Nations and the community of Seymourville
- Being developed by Canadian Premium Sand (CPS)
 - Sand for originally considered for use in oil and gas fracking
- An estimated initial mine life of 25 years
 - An investment of ~C\$330m to build; expected to create 150 jobs
- Manitoba gov't approved Environmental license in 2019
- Project construction activities were expected to begin in 2020



Manitoba

Hollow Water Chief defends silica sand project near Manitoba reserve

Glen Dawkins

Dec 12, 2018 • December 12, 2018 • 2 minute read • [Join the conversation](#)



Mine
Development

Wanipigow Silica Sand Project – Stage 2

- Canadian Premium Sand shifted in 2021 to focus on developing the Wanipigow silica sand deposit to produce glass for use in solar panels or ultra-clear, energy efficient architectural glass for use in buildings
 - Formed a subsidiary company
- Wanipigow sand deposits contain low amounts of iron
 - Suitable for these high-tech glass products
- Economic analysis to be done by the company to demonstrate the economic and technical viability of the project

Wanipigow
Glass 



Metal Mine Marathon

Mineral Industry Sequence

Prospecting / Early Exploration

1,000 properties
staked



hundreds of mineral
exploration properties



Mineral Exploration

Several mine
development
projects



Mine Development

Results in one or
more
metal mines



Mining



Mine
Development

Senior Companies



Advanced
Exploration

- In existence for decades or more, although name may have changed
- Hundreds to tens of thousands of full time employees
- Multiple offices
- Producing mines and sometimes smelters, refineries, or power plants
- Stocks trade for tens of dollars or more



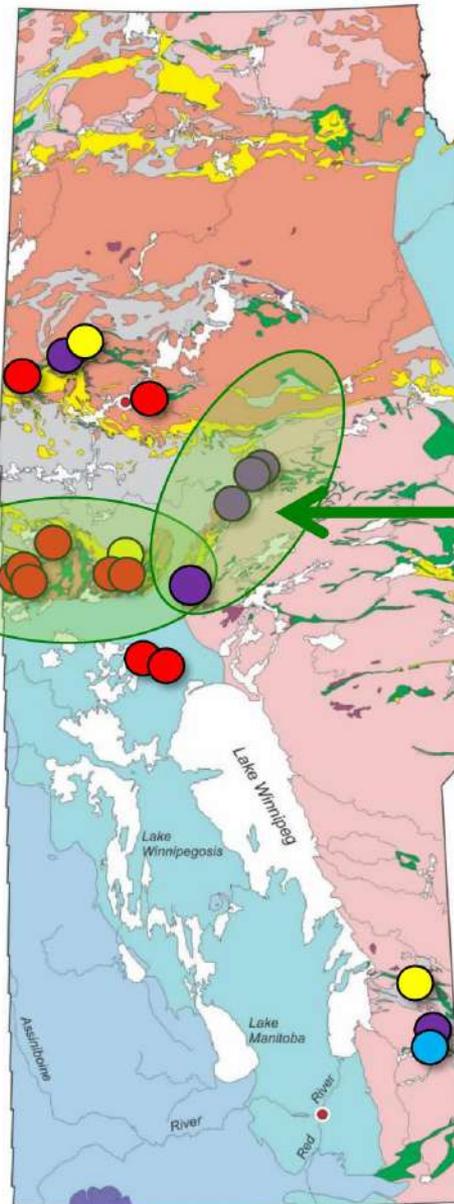
World-Class Mineral Belts

Flin Flon–Snow Lake

Most productive greenstone belt of its age in the world.

Thompson nickel Belt

Third most productive nickel belt globally.



-  Nickel
-  Copper-Zinc-Silver-Gold
-  Gold-Silver
-  Cesium-Tantalum-Lithium



Mine
Production

777 Mine, Flin Flon

- Underground copper/zinc/gold/ silver mine
- Expected closure date of the mine and Flin Flon mill and zinc plant in 2022.
- Plan to transition part of the Flin Flon workforce to Snow Lake over the next several years.



HUDBAY



Mine
Production

Lalor Mine, Snow Lake

- 100% ownership
- Long-life, underground zinc/gold/ silver/copper mine
- Stall and Flin Flon concentrators process Lalor base metal ore
- New Britannia mill to be refurbished to process Lalor gold-rich ore



HUDBAY





Mine
Production

HudBay Mines Important Stats

- 2019 annual report



Palm Marsden (right), Hudbays Aboriginal Liaison Officer, with company employee Annette Last at the opening ceremony of the Reed mine in 2014. Marsden is part of Hudbays efforts to engage First Nations and increase the number of Aboriginal people in the company's workforce. - HUDBAY PHOTO



\$45.4 million
Payments to suppliers

\$1,126,857
Payments to indigenous businesses





Mine
Production

First Nation Mining Training by Hudbay and Government

- A dozen members of Pimicikamak Cree Nation (PCN) at Cross Lake are being trained for mining sector jobs at Hudbay's Snow Lake operation
- A partnership between the company, the provincial government, PCN, University College of the North (UCN) and the Northern Manitoba Sector council





Mine
Production

Thompson Mine



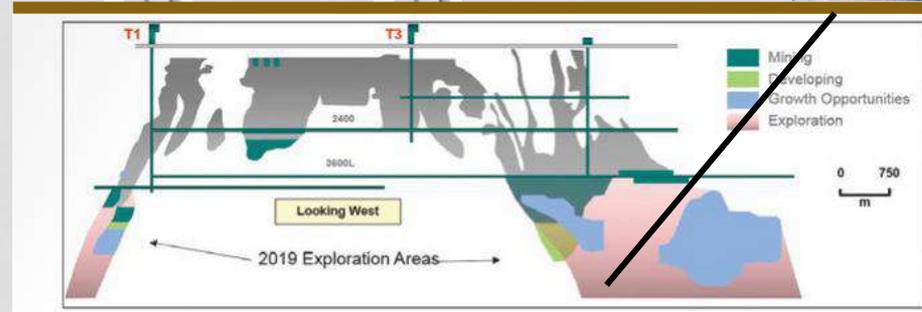
Looking north towards T3 Mine and 378 headframe.



Mine
Production

Thompson Mine Life Extension

- Opened in 1958
- Vale spending \$23 million over the next six months to collect more information on which to base a final decision on extending the mine life of the Thompson Mine (Thompson Press, Feb. 10, 2021)
- 5 surface drilling rigs to determine the precise extent of the footwall deep and hanging wall ore body
- Life of mine depends on finding more ore to mine





Mine
Production

Thompson Nickel Smelter

- Producing nickel from 1959 until 2018; now ship mill concentrate to Sudbury by rail





Mine
Production

Local Hiring and Procurement



HUBBAY



- We recognize that employment and business opportunities are high priorities for community and government stakeholders.
- We prioritize local employment, and we work to build capacity among local workers and suppliers to generate economic benefits and create stronger relationships.
- Under our Local Procurement and Employment (LP&E) Standard, each site identifies opportunities for hiring and sourcing goods and services from the local communities.

Formal accountability

In 2018, our operations in Manitoba added the Business and Reconciliation calls to action to our Community Liaison Committee (CLC) Terms of Reference. The CLC connects Vale, Thompson and neighbouring communities by holding quarterly stakeholders' meetings on sustainable mining matters: environmental monitoring, economic development, careers and training and more.

Fostering northern economic development

We collaborated with the Thompson Urban Aboriginal Strategy to sponsor the Northern Urban Reserves Municipalities and Economic Development Forum organized by Manitoba Keewatinowi Okimakanak and Look North.

Supporting the growth of Indigenous business

Vale is committed to increasing Indigenous procurement opportunities. Currently, we are exploring such opportunities with Nisichawayasihk Cree Nation (NCN).



Mine
Development?

Midnorth Development Corporation

- Midnorth Development Corporation of the Cross Lake Band has been involved in Construction projects for many years
- Received contracts to complete in the community. Midnorth. The
- Employed as many as 90 people on a seasonal basis to carry out construction work
- The long record of projects undertaken and completed, demonstrates Midnorth can undertake major projects





Mine
Production

True North Gold Mine Bisset





Mine
Production

True North Gold Mine Tailings Project

- Opened in 2006
- With the underground mine operations temporarily suspended, the Company is successfully re-processing historic tailings
- Using 1,200 ton er day mill
- (27,500 oz in mineral resource)
- producing 4,500 to 5,500 ounces of gold per annum
- 2019 – sales of \$11.2M and cash flow of \$1.6m
- Exploring regionally





Mine
Production

Tanco Rare Metals Mine

- Located at Bernic Lake; opened in 1969
- A world-class pegmatite deposit
- Consists of several distinct mineralogical zones that have been mined for Li, Ta, Cs, Rb and Be ores
- Currently produces pollucite for the manufacture of cesium formate, a fluid used primarily in oil and gas wells
- Has mined tantalite to produce tantalum, a greyish silver, heavy and very hard metal which is used extensively in electronics





Mine
Production

Limestone Quarry and Plant

- Graymont's Faulkner lime plant and quarry is located near Moosehorn, Manitoba, within two miles of the shore of Lake Manitoba.
- The plant consists of a preheater-equipped rotary kiln that can produce both high-calcium quicklime and dolomitic lime.
- Seven silos provide storage for pebbled, pulverized and crushed quicklime or dolomitic lime.
- In addition to quicklime production, the plant produces calcium carbonate.



2007 Open House
for the community



Mine
Production

Gypsum

- Production of gypsum in Manitoba commenced in 1901 and has continued until the present day.
 - Total of eighteen quarries operated 12 different companies
- Currently only one producing quarry in the Marcus area, on the west side of Lake Manitoba.
 - In this area, the bedrock is covered by a variably thick bed of sediments
 - Only economic quarrying if sediment bed is thinner
- In Manitoba, gypsum is used primarily for the production of wallboard.
 - Also as an additive to cement, soil conditioner and fertilizer for agriculture and a number of other uses



Gypsum quarry



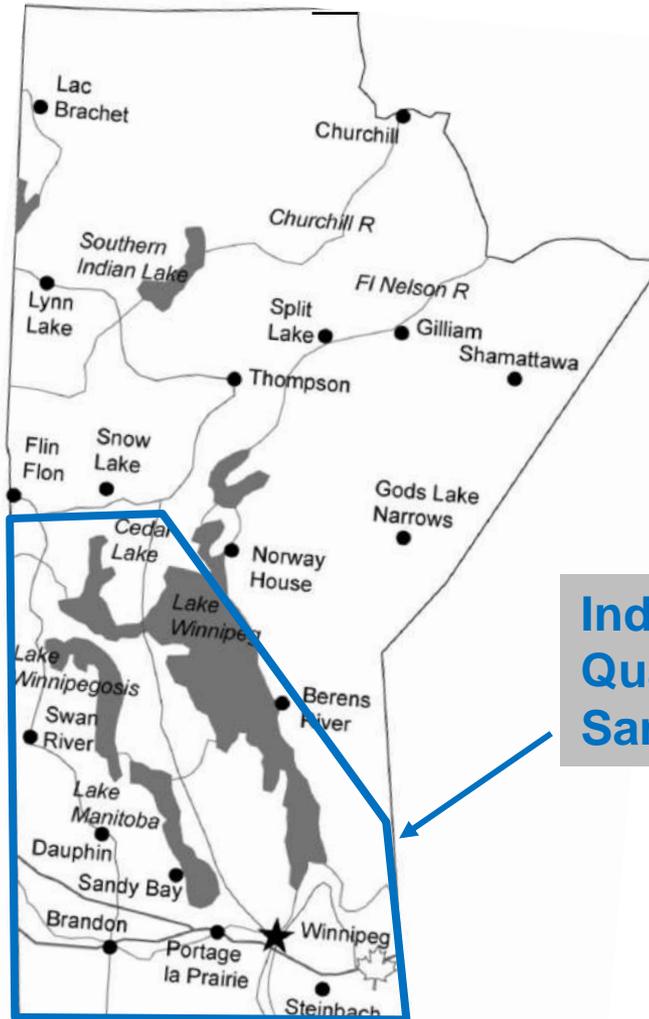
Wallboard



Mine
Production

Manitoba Quarries and Aggregate Pits

- Largely in the southern part of the province
- Variety of industrial minerals
- Constant demand for aggregate (sand and gravel)



**Industrial Mineral
Quarries and Most
Sand and Gravel Pits**



Mine
Production

Aggregate Sector - Sand and Gravel Pits



Mine
Development

- Aggregate describes sand, rocks, gravel and crushed stone and related products that are mined
- Aggregate, and concrete containing aggregate, are used to build roads, schools, houses to hospitals, bridges and water treatment plants



See Alberta mining
webinar for more
information on aggregate
pits and quarries

Life Cycle of Mining

Prospecting & Early Exploration



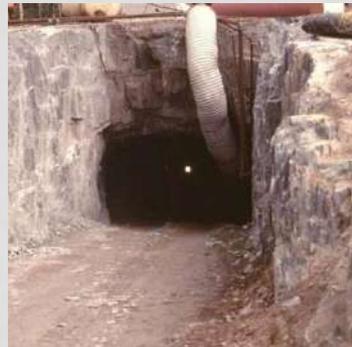
Mine Closure & Reclamation



Indigenous Business Opportunities



Mineral Exploration



Mine Development



Mining



Mine Closure
Reclamation

Mine Site Rehabilitation



near Lynn Lake

- Manitoba introduced mine closure regulations in 1999
 - Environmental liabilities incurred during mining operations be financially secured to cover future remediation costs
 - Mine closure plans and financial security must be filed and approved prior to a permit being granted for a new mine
- Orphaned/Abandoned Mine Site Rehabilitation Program started in 2000
 - to address public safety and environmental health
 - 149 former mine sites were identified as orphaned or abandoned
 - 5 high-priority sites:
Lynn Lake, Sherridon, Gods Lake, Snow Lake, Baker Patton
 - 31 high-hazard sites and 113 low- to moderate-risk sites
- First Nations have participated in mine rehabilitation projects
 - awarded sole source contracts or formed joint-ventures



Mine Closure
Reclamation

Reclamation 2000 High Priority Sites

Lynn Lake: Farley Tailings Management Area remediation work was completed in 2014 to be followed by a 5 year monitoring program.

Sherridon: Tailings relocation and neutralization work commenced in September 2009. The contract value of \$34.5 million included commissioning of a water treatment plant, relocation of hydro lines, haul roads built and construction of coffer dams.

Snow Lake: A detailed site investigation was completed in 2008 in order to implement the closure plan. The final capping of the tailings was completed and re-vegetation of drainage paths was to be completed in 2015.

Gods Lake: Completion of the work on the Elk Island airstrip was planned for the spring of 2015. The demolition of old buildings and removal of scrap steel connected with Kanachuan power station was planned for 2015/16.

Ruttan Mine site: In 2007, site visits identified the necessity of addressing the effluent discharge at the site, dam stability and nuisance dust in the area. A water treatment plant was commissioned in 2014 and capping of the tailings management area continued in 2015/16.

Reed Mine Reclamation

Hudbay Minerals officially celebrated the closure of Reed Mine on July 25, 2018. By October 25, 2018 the tunnels were filled in and the land prepared for planting in spring of 2019.



Reed Mine - July 2018



Reed Mine - October 2018

Reclaimed Soab North and Soab South Mines

- Vale completed work between 2001 and 2007



Soab North Mine - 2017



Soab South Mine - 2017

Mining Association of Manitoba Inc. 2018 annual report

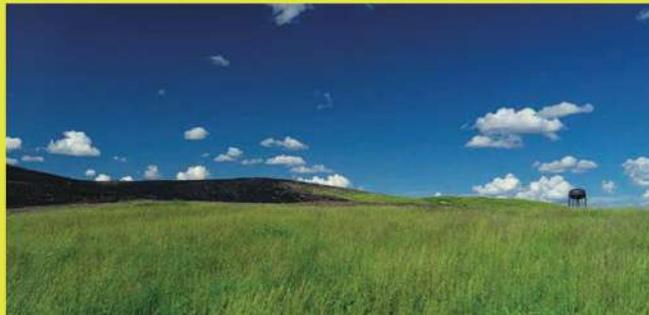


Mine Closure
Reclamation

Vale (Thompson)

Opportunities arise as we retire certain assets

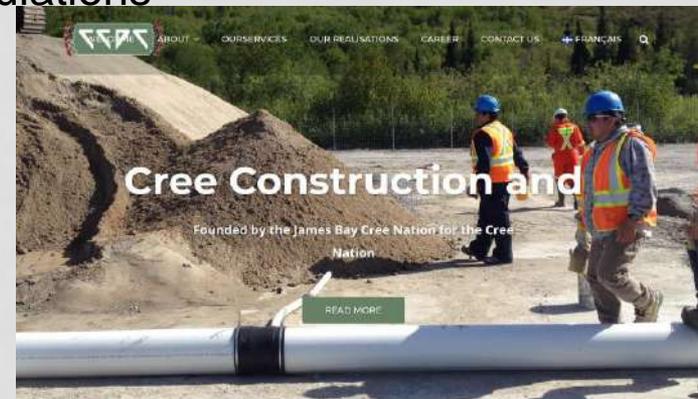
Decommissioning of the Smelter, its slag pile and the Refinery are part of an overall Asset Retirement Obligation (ARO).



The photos left show the gradual remediation of the slag pile. The photo on the top is early work of capping and seeding. The bottom photo shows the results of that work.

Cree Construction and Development Company, Ltd.

- Founded in 1976, owned entirely by The James Bay Cree of Northern Quebec
- Has delivered major projects in remote and semi-remote areas either directly, through its subsidiaries or in partnership within the Cree territories, across Canada and internationally
- Since 2003, CCDC has completed over 250 projects
- Mostly in Quebec, Ontario, and Manitoba,
- For more than \$850 000 000
 - Experience in management of major and diversified equipment fleet
 - Knowledge of industry standards and regulations
 - 100 % Aboriginal owned
 - ISO 9001 certified
 - Important technical skills
 - Strong administration and management
 - Adapted training and coaching programs



Learn Your **ABC's** of Mining for Economic Development

Three important ones are:

FR = financial risk key factor for mining projects

I = increasing Indigenous involvement in mining

N = new mines can support new infrastructure

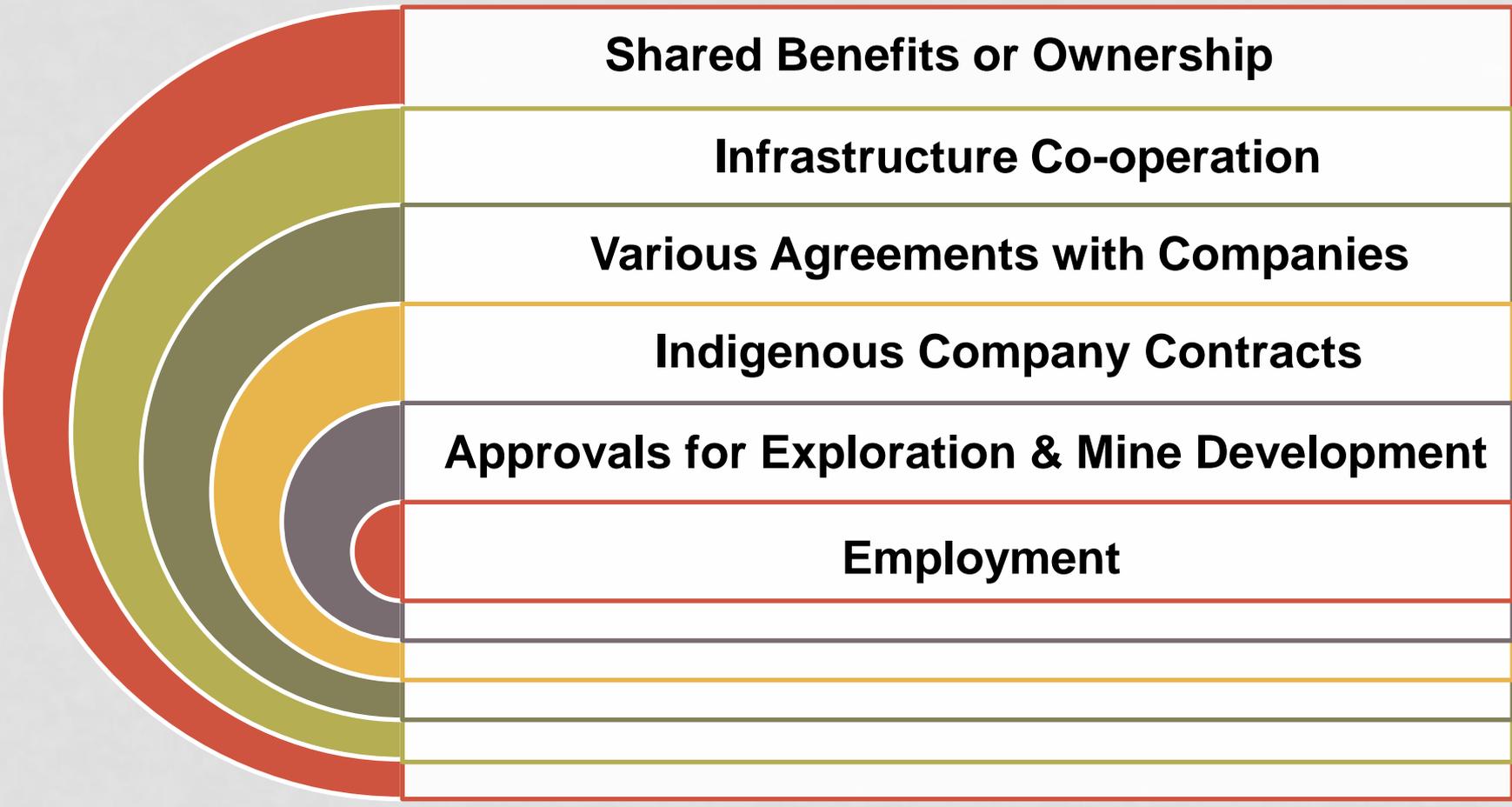
FR. Financial Risk

Key Factor for Mining Projects

- Mineral exploration and mine development require investors to support projects
- Investors can move their investments if:
 - the commodity prices tumble
 - new mines start producing and the demand for that commodity drops
 - mine processing is more costly than anticipated
 - government changes to the business or regulatory environment make the project no longer economic at that time
 - local community opposition is impacting project completion
 - etc.



I. Increasing Indigenous Involvement in Mining



Shared Benefits or Ownership

Infrastructure Co-operation

Various Agreements with Companies

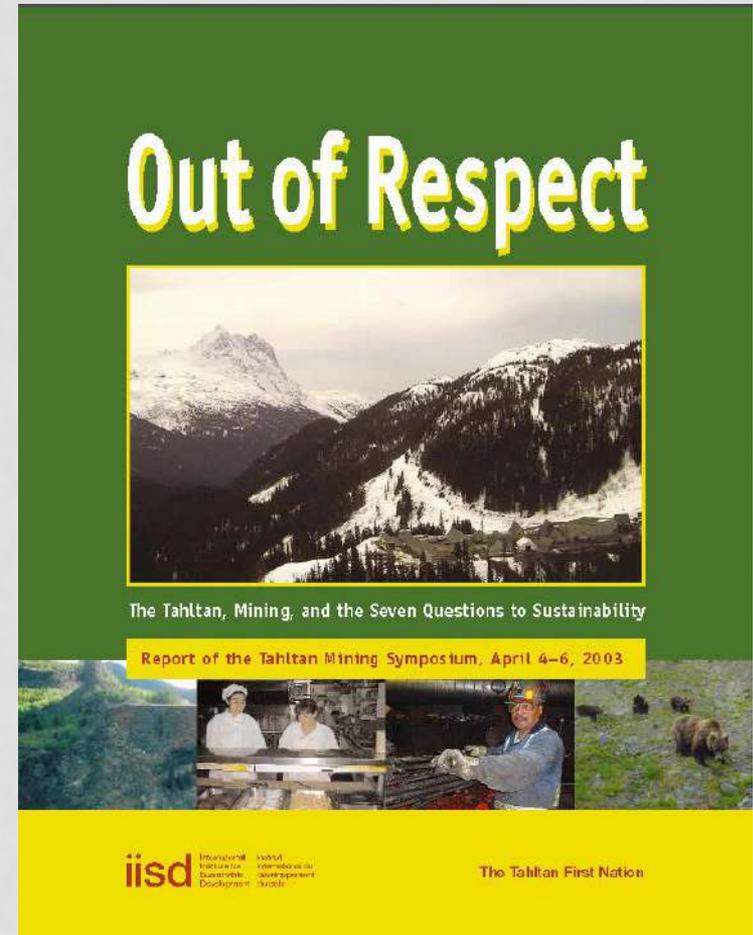
Indigenous Company Contracts

Approvals for Exploration & Mine Development

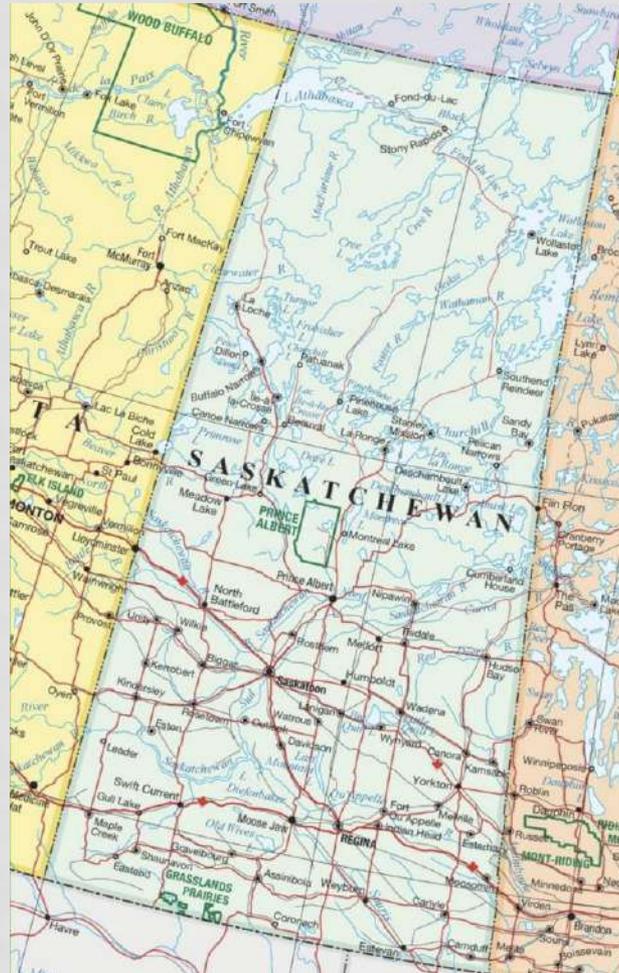
Employment

Out of Respect –Two Way Street

There were no written laws in our history. The rules we lived by were taught to us from childhood and were based on respect. We were expected to respect ourselves, to show respect for others, to show respect for all things in our world, and to show respect for our environment. In this way we believed that our world would be in harmony and we would live a long and healthy life. - Tahltan belief



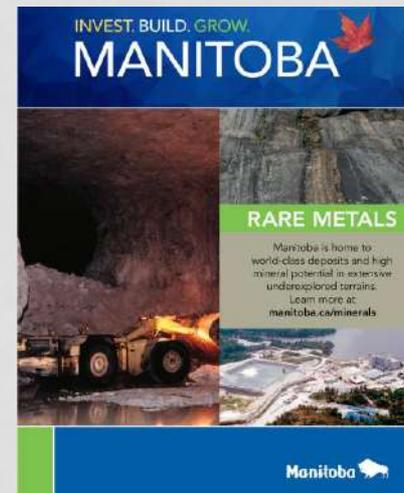
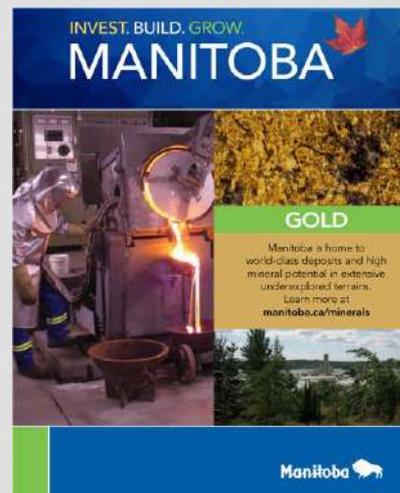
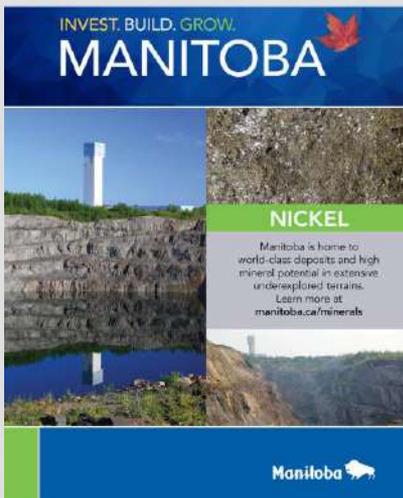
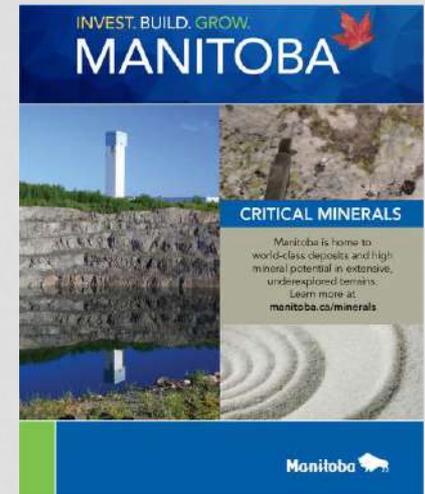
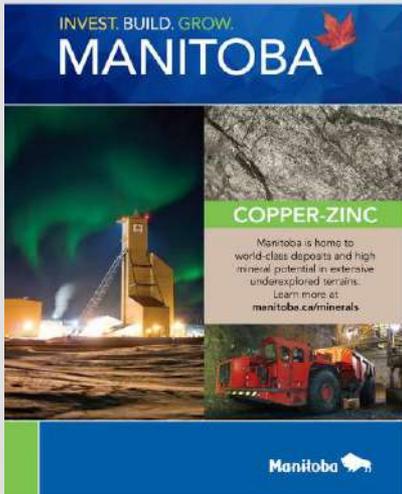
N. New Mines Support New Regional Infrastructure



- Mines have provided the incentive and government income for provinces to build northern roads and powerlines
- New mines could contribute in Manitoba

Mineral Commodity Brochures

Manitoba is home to large areas of high mineral potential which remain under-explored when compared with similar regions elsewhere in Canada.



Selected Mining Information Sources

Manitoba

Mineral Commodities in Manitoba – <https://www.manitoba.ca/iem/geo/commodity/index.html>

Manitoba First Nations Mineral Development Protocol - <https://www.gov.mb.ca/iem/mines/fnmdp.html>

Manitoba Geoscience - [Manitoba Mining, Exploration and Geoscience 2021–2022 \(gov.mb.ca\)](#)

Integrated Mining and Quarrying System (iMaQs): <https://www.manitoba.ca/iem/mines/imaqs/index.html>

Mineral Commodities in Manitoba - [Resource Development | Agriculture and Resource Development | Province of Manitoba \(gov.mb.ca\)](#)

[CEDF – Communities Economic Development Fund – Look North](#)

Manitoba Mineral Development Fund (includes opportunities for Indigenous partnerships) - <https://mbchamber.mb.ca/home/initiatives-resources/mmdf/>

Manitoba Prospectors and Developers Association: <https://mpda.ca>

Mining Association of Manitoba - <https://www.mines.ca/>

National

<https://www.nrcan.gc.ca/our-natural-resources/indigenous-natural-resources/indigenous-participation-mining/indigenous-participation-mining-information-products/7817>

Interactive map of Indigenous mining agreements

Guide to exploration and mining for Aboriginal communities

Mining essentials: training for Aboriginal Peoples

Partnership agreements

Other useful links

The Atlas of Canada - Minerals and Mining - <https://atlas.gc.ca/mins/en/index.html>

Minerals and Metals Facts - <https://www.nrcan.gc.ca/our-natural-resources/minerals-mining/minerals-metals-facts/20507>

Minerals and Mining Publications - <https://www.nrcan.gc.ca/maps-tools-and-publications/publications/minerals-mining-publications/18733>

Mining Association of Canada - <https://mining.ca/>

Prospectors and Developers Association - <https://www.pdac.ca>

Mining Industry Human Resources Council - <https://mihrc.ca/>