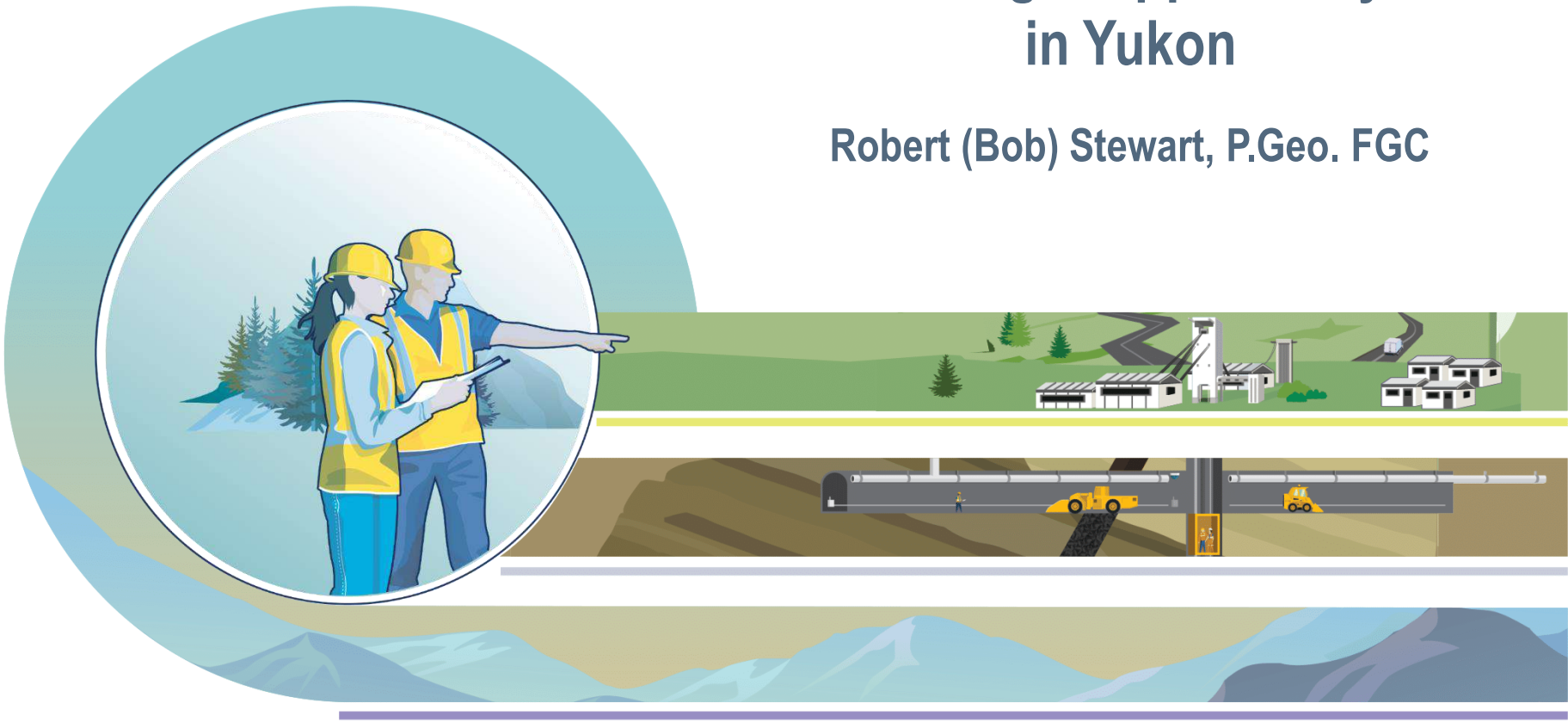
Mining = Opportunity in Yukon

Robert (Bob) Stewart, P.Geo. FGC



March 28, 2024

YUKON HAS MANY UNKNOWN AND UNDEVELOPED MINERAL RESOURCES NEEDED FOR GLOBAL SOCIETY'S MINERAL SUPPLY.

Let's see why !

ACKNOWLEDGEMENTS

Yukon is the ancestral homeland of many peoples and communities that have had adaptive relationships with the Land and society .

There are many excellent sources of information from Indigenous, federal government, territorial government, industry advocates, corporations and subject matter experts that have been drawn upon to provide this perspective tuned for **Economic Development Officers**.

There are many doors of **opportunity** already open between Indigenous communities and **their** mining sector.
We are all in this time together within a global environment.

The Land and its peoples can provide opportunity for prosperity.

Thanks to CANDO and Natural Resources Canada for their support.

The presented content is my sole responsibility.

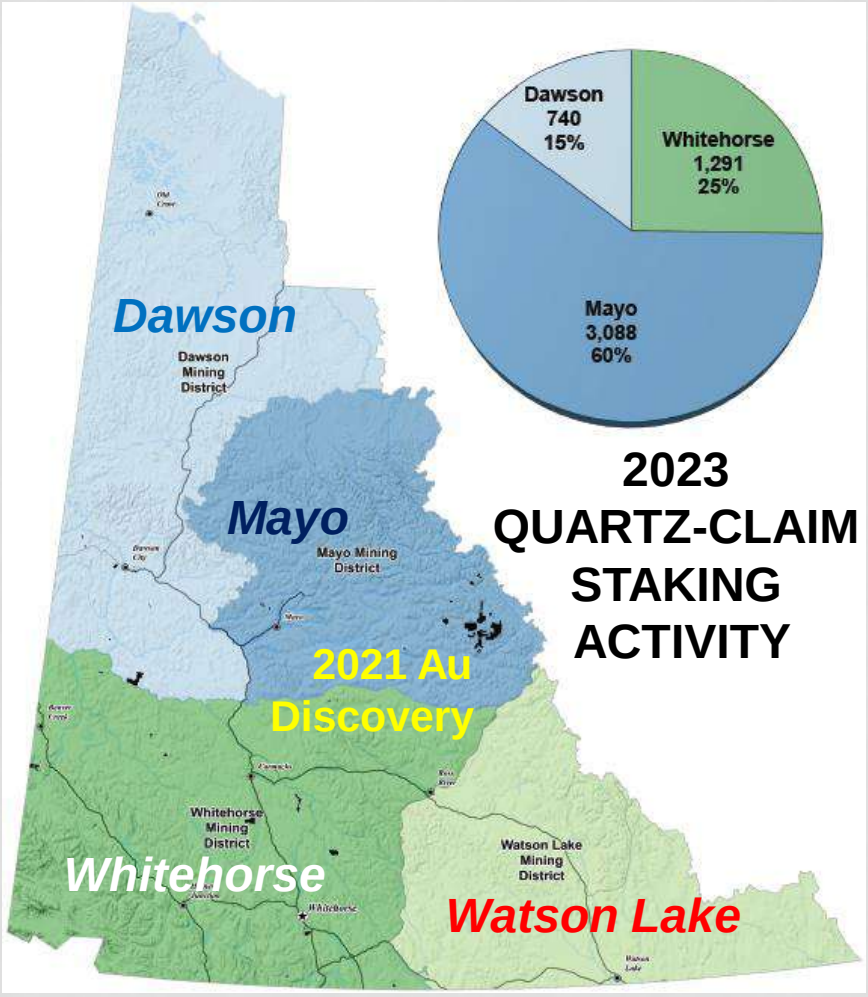
Yukon Geography

482,443 sq. km, ***4 mining districts***

3 types of subsurface "claims / tenure": Indigenous, placer, quartz.

45,148 residents (Q4 2023 Statscan)
80% of population lives in 9 centres
25% have Indigenous identity
14 Indigenous governments
11/14 have modern-day agreements
8 First Nations languages

Indigenous communities have significant control of regional land use including the exploration and development of natural resources.



after figure in *Yukon Exploration and Geology Overview 2023*

Presentation Outline

Our Goal Today:

Gain awareness of Yukon's Mineral Industry and its Opportunities

a 2-part presentation separated by an interactive opportunity

- Use "raise-hand" function at any time for **next** interaction

1: Economic overview of Yukon's mineral industry

- 4 interactive opportunities

2: Mining activity life cycle related to Yukon and EDO's

- Final interactive opportunity

References Cited and Appendices

References and links will be available on the CANDO website (edo.ca) with the recording of this webinar.

- Appendix A: References Indexed By Slide Number
- Appendix B: Additional Resource Material

My Role Today

PART 1: Economic Overview

- Recognizing the basis for Indigenous Opportunities
- Community control throughout the mining cycle

PART 2: Yukon Mining Today – The Full Cycle

- Explain today's mining stages in everyday language
- Opportunity insights into the mining sector

Part 1: Economic Overview
Why Talk About Mineral Development?

Four sub-sections:

a) Indigenous Participation and Opportunity

- Brief historical review of Yukon' mineral developments
- Today's regulatory framework overview
- Continued devolution offers more community participation

b) Economic and Environmental Benefits

- Mining is significant to the health of the environment and economy

c) Today's Mineral Developments Across Yukon

- Can provide the raw materials needed today and for the future.
- Major exploration and development projects in progress
- Why is Mining an opportunity in Yukon ?

ECONOMIC OVERVIEW
PART 1a:
Indigenous Participation and Opportunity

- Review of Yukon's mineral history and early Indigenous mining
- Today's regulatory framework overview
- Continued devolution offers more community participation

Yukon's Mineral Deposits Were Formed By A Few Types of Ancient Natural Events

The Earth and its Moon formed about **4,500,000,000** years ago - this resulted in Earth becoming enriched with metals and the moon setting up tidal forces that have been vital to Earth's continuous evolutionary development.

Metals fell by gravity in this early molten world to be concentrated into a metallic core and the base of Earth's silicate mantle. After more than a billion years the mantle had partly crystallized so processes could bring the metals nearer to the crust.

1590 Ma	Wernecke Breccias	IOCG	Cu-Au-U-REE
430 Ma	Silurian Pipes	Kimberlite	Diamonds
360-358 Ma	Black Smokers	VMS	Cu-Zn-Pb-Ag-Au
231-225 Ma	Kluane "Feeders"	Serpentinites	PGE-Ni-Cu
217-195 Ma	Carmacks	Porphyry-Vein	Cu-Ag-Au-Pb-Zn
183-140 Ma	Dawson-Faro-Mayo	Veins	Au-Ag-Pb-Zn-Cu
110-101 Ma	Whitehorse	Skarn	Cu-Au-Ag-Mo
97-91 Ma	Keno,"Tombstone"	Veins	Ag-Pb-Zn-Cd-Au
5-3 Ma	"Pliocene" Au	Placers	Au
Now 0 Ma	Mt. Churchill…	Ash, Geothermal	Green Energy

Yukon's Mineral Deposits Were Modified Another Ancient Event

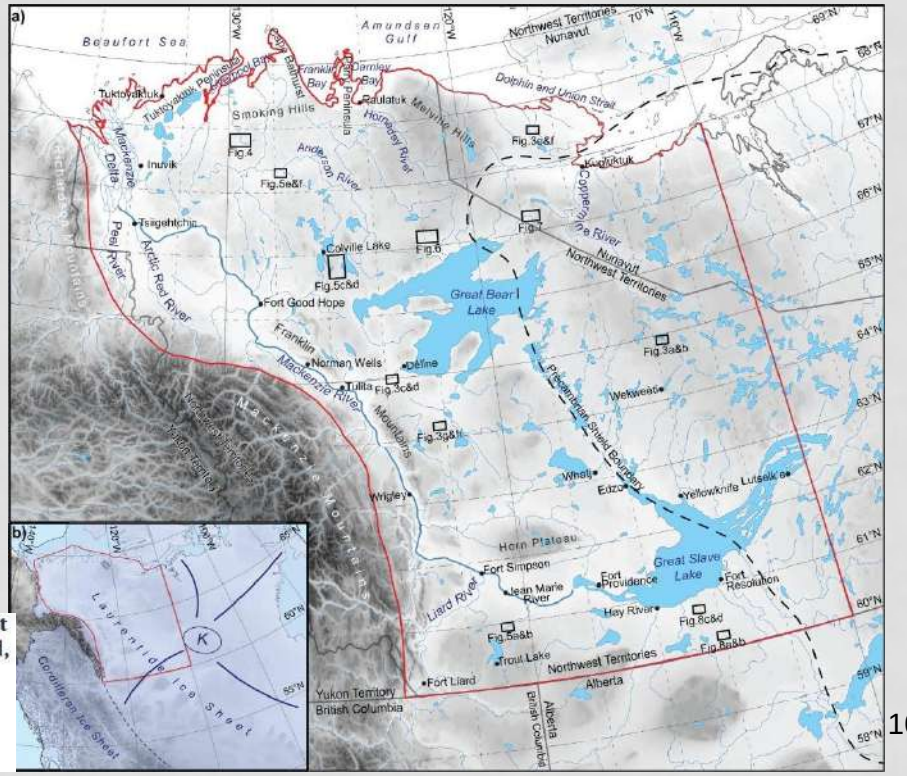
Laurentide Glaciation

2.6 Ma to 21,200 years ago: icecap build-ups and retreats

95,000 to 21,200 years ago: ores were scoured into "trains"

21,200 years ago: Glacial Maximum, start of last retreat.

Icecaps did not cover all the northern latitudes even at 21,200 YBP.



Glacial geomorphology of the northwest Laurentide Ice Sheet on the northern Interior Plains and western Canadian Shield, Canada

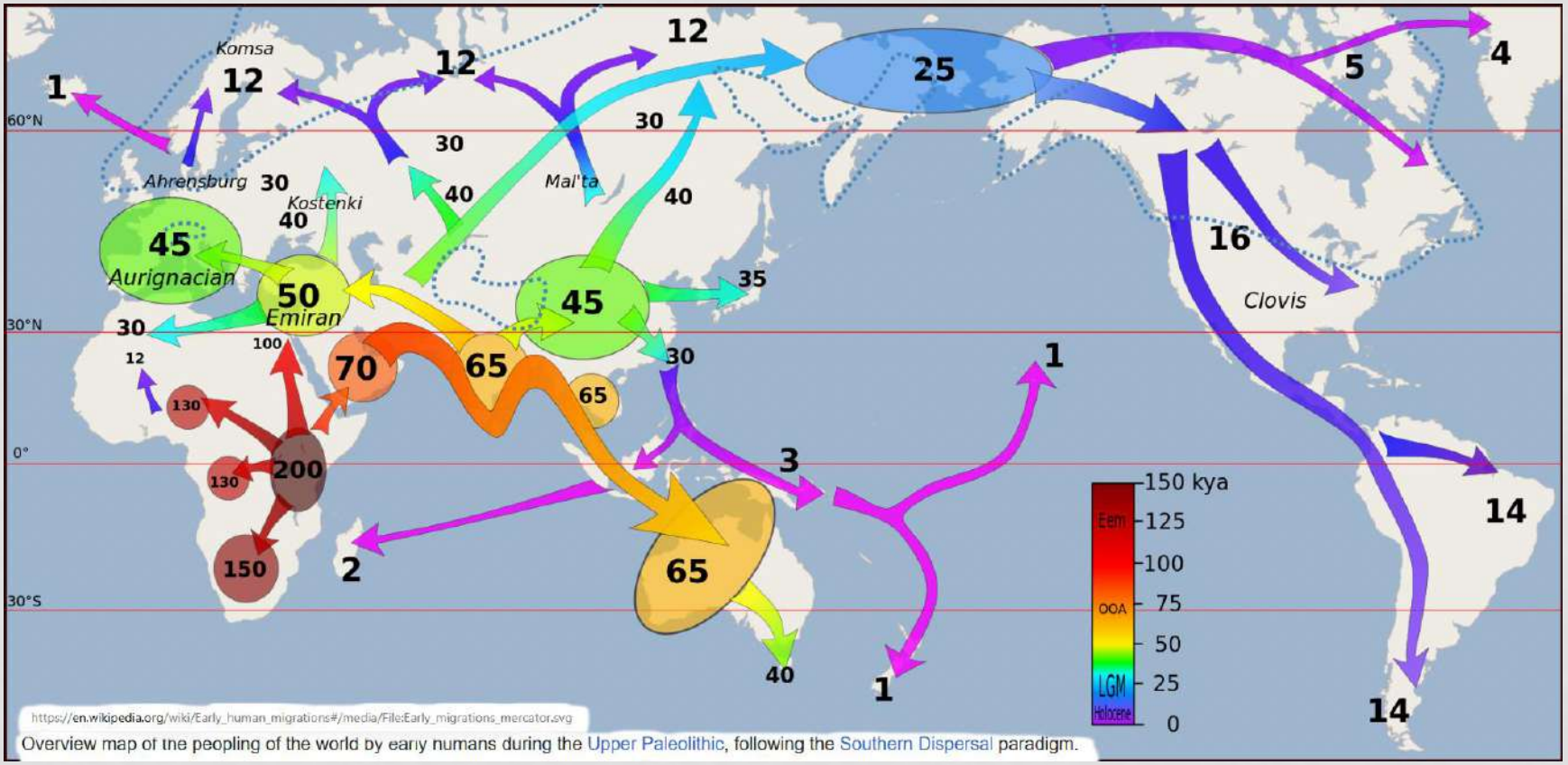
Helen E. Dulfer, Benjamin J. Stoker, Martin Margold & Chris R. Stokes

PUBLISHED ONLINE: 01 March 2023

https://doi.org/10.1080/17445647.2023.2181714

https://www.tandfonline.com/doi/full/10.1080/17445647.2023.2181714

A Human Migration Model



Humans seized the opportunity to cross the Bering Sea, stay in ice-free Beringia (Alaska-Yukon) then spread through the Americas

Geology, Trade, Migration

24,000 Years Before Present (YBP)

Bluefish Caves (near Old Crow) – use of stone tools

- Trading in mineral resources: red ochre, copper, fire-stone, obsidian, chert

Mount Churchill Eruptions and Ash Blankets Forced Migrations

6330,**1890**,1380,**1171**, 374 YBP

image credit: Jake Pogrebinsky / bladesmithforum.com

Some changes linked to Mount Churchill ash falls

- Tlingit to Hän copper and obsidian trade
- Hunting from using atlatl to “bow and arrows”
- Athabaskan oral record of migration to the SW USA (Navajo, Apache)

Russian trader diseases passed along by Alaskan indigenous agents, 1784-1867.

Hudson Bay Company traders first arrived in Yukon in 1840’s

HBC traders encountered Indigenous peoples with well developed trading skills

California Gold Rush (1848-1855) drew **300,000** prospectors

Nova Scotia Gold Mining (1858-1890’s); over 100 hardrock gold mines developed

Indigenous Leadership

First prospectors / miners arrived in 1870's to the Yukon,

1886: Fortymile River placer Au begins

Skookum Jim and his family sparks the Klondike Gold Rush (1897-1899) with an August 1896 discovery of Bonanza gold.

Soon 100,000 prospectors flooded in…

Chief Isaac's Legacy

Chief Isaac's remarkable and long leadership of the Tr'ondëk Hwëch'in not only helped in the community's adaption to the Klondike turmoil but it laid foundations for Modern Treaties and Indigenous businesses.

PLACER MINING TODAY

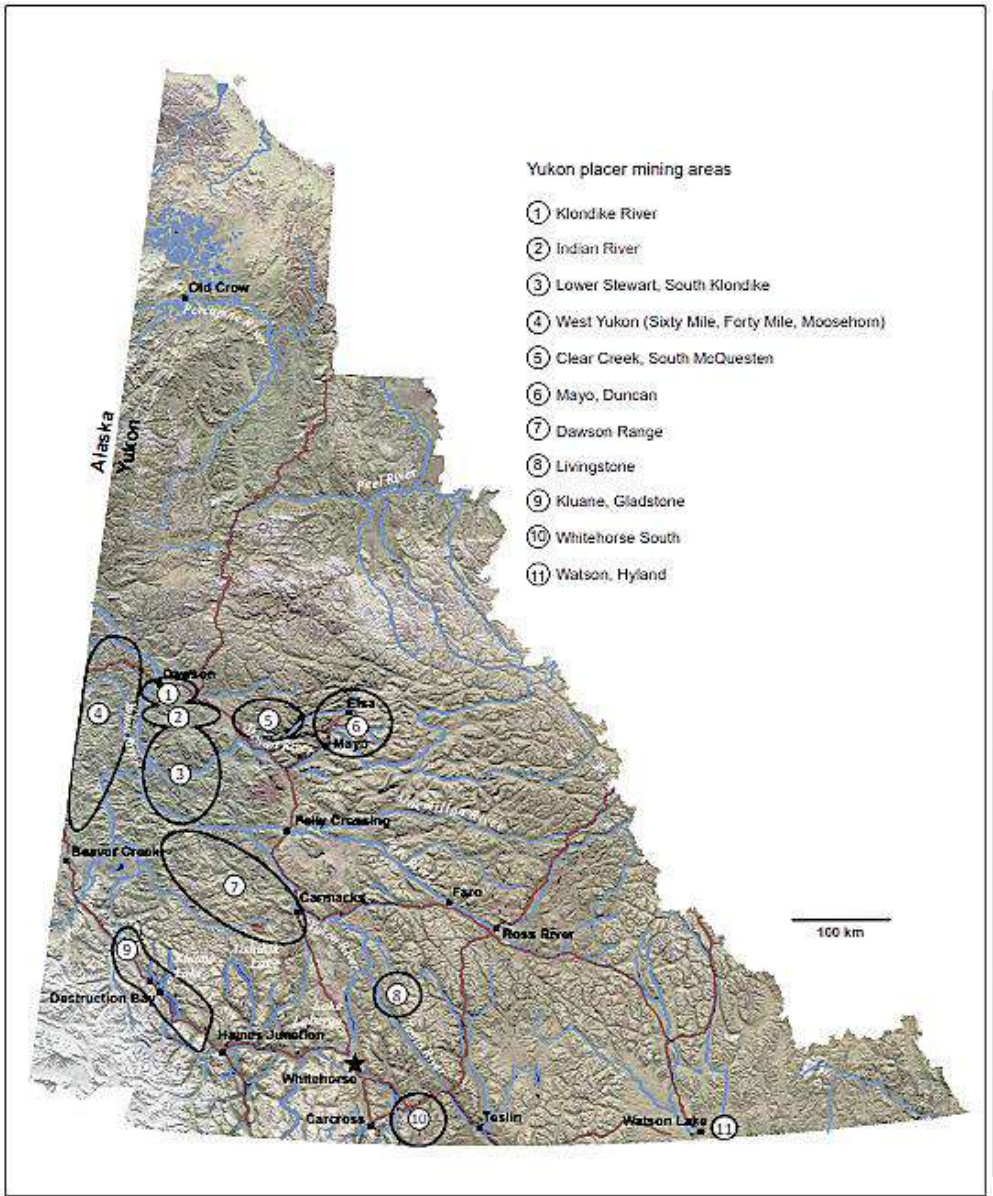
GOLD PLACER MINING IS A SIGNIFICANT COMPONENT OF YUKON'S ECONOMY

2023

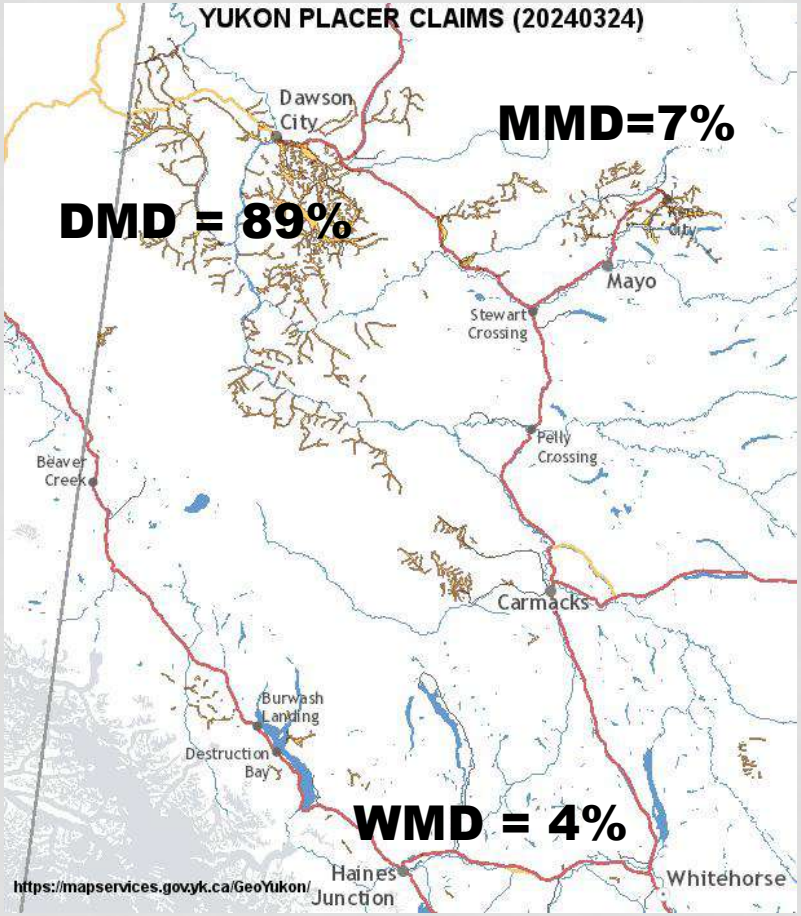
146 Operations in **11** areas
68577 Crude Ounces Gold

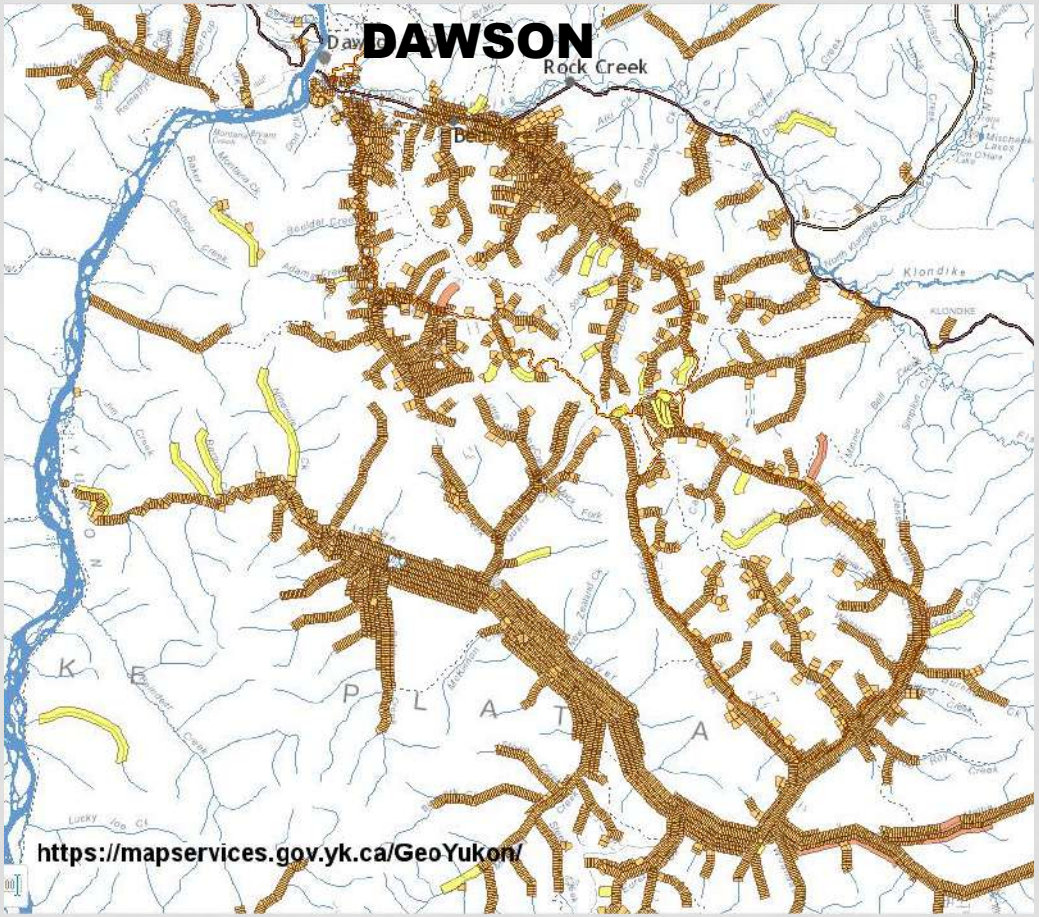
CDN $143.7 million revenue
@ CDN $2620/crude ounce Au

Data/map from *Yukon Exploration and Geology Overview 2023*



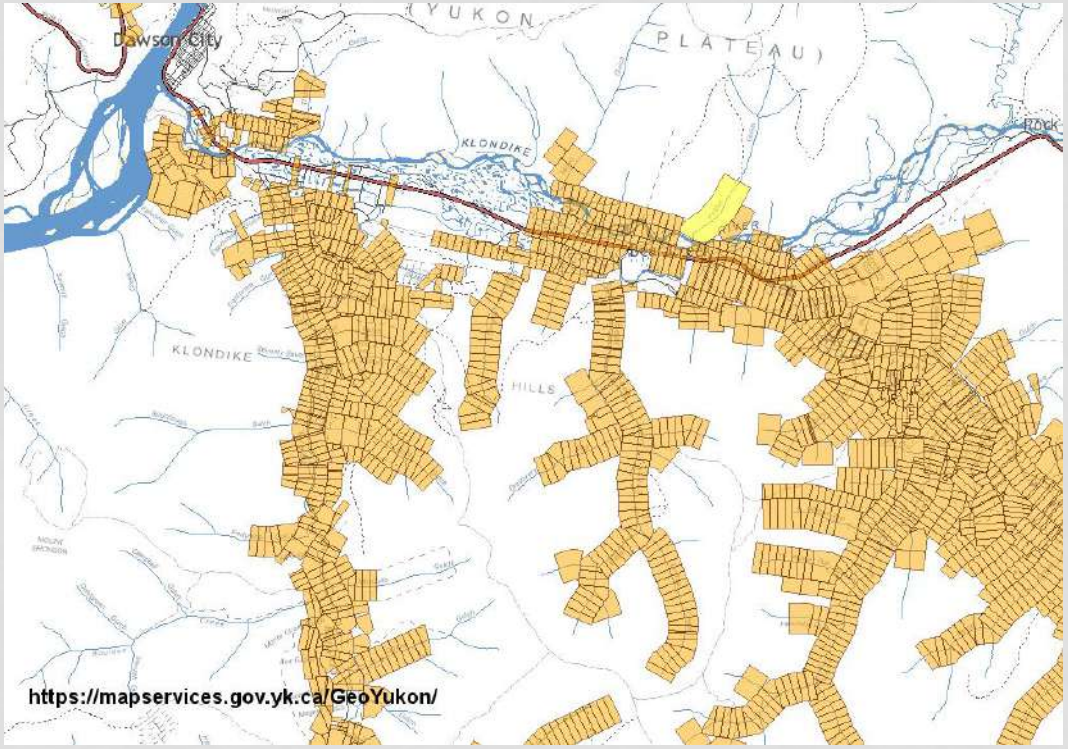
YUKON PLACER MINING

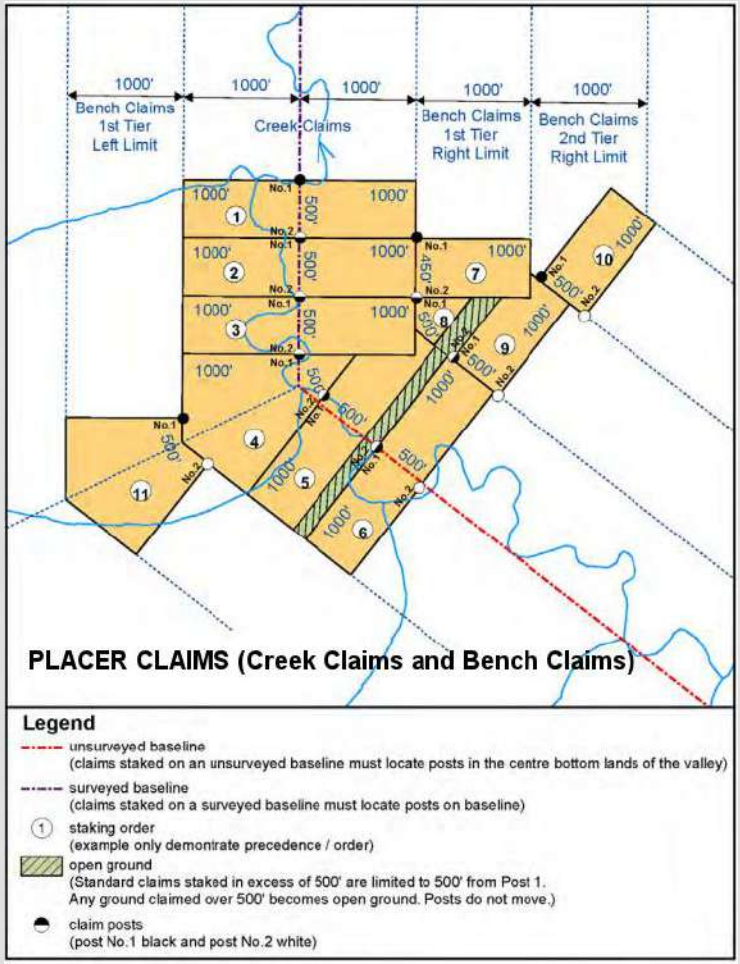




YUKON PLACER MINING

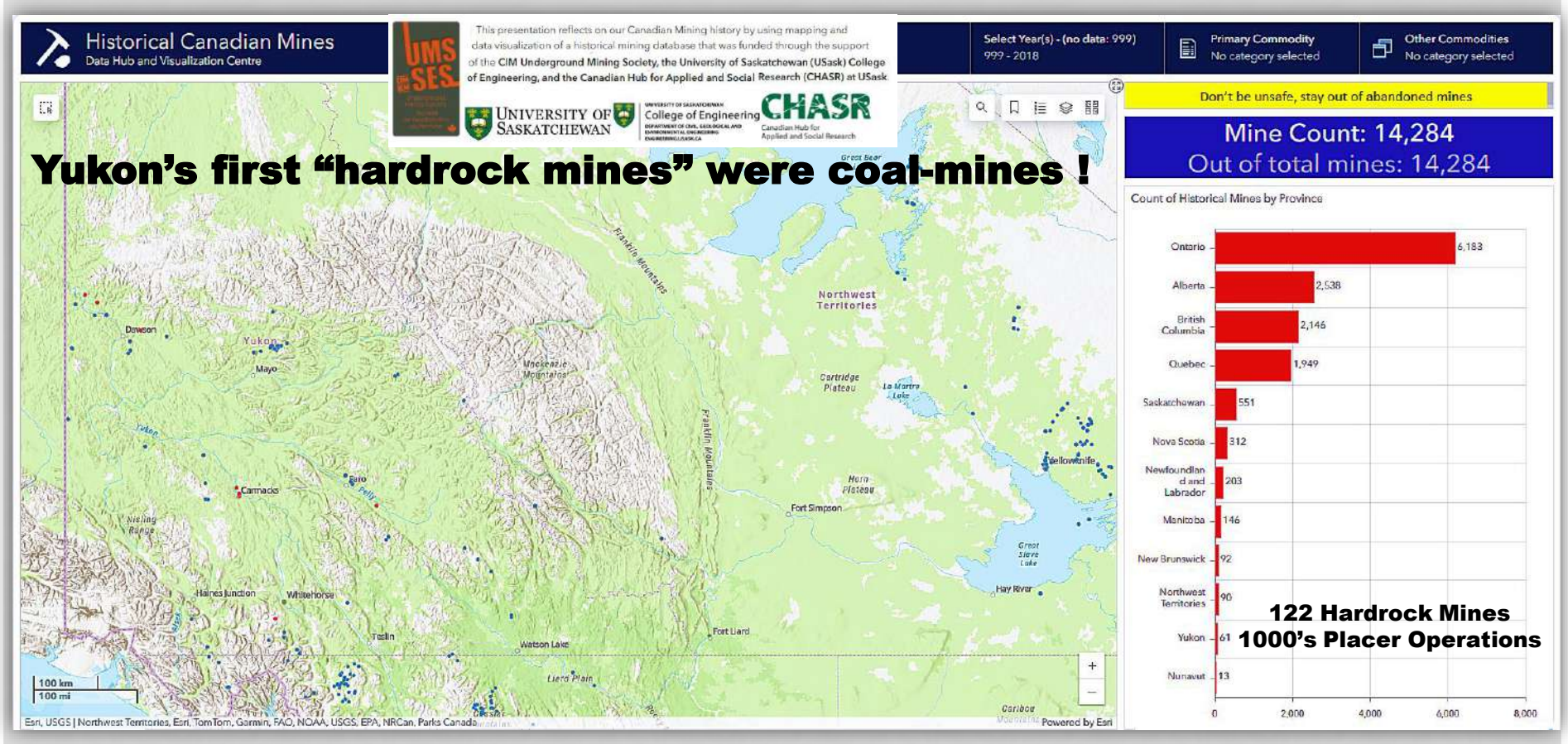
A full placer claim is 500’ by 1000’ and provides limited rights to placer gold **above** bedrock.





Placer mining offers a different scale of opportunities than “Quartz”/ Hardrock mining

Historical Yukon Hardrock Mines 1895 to present



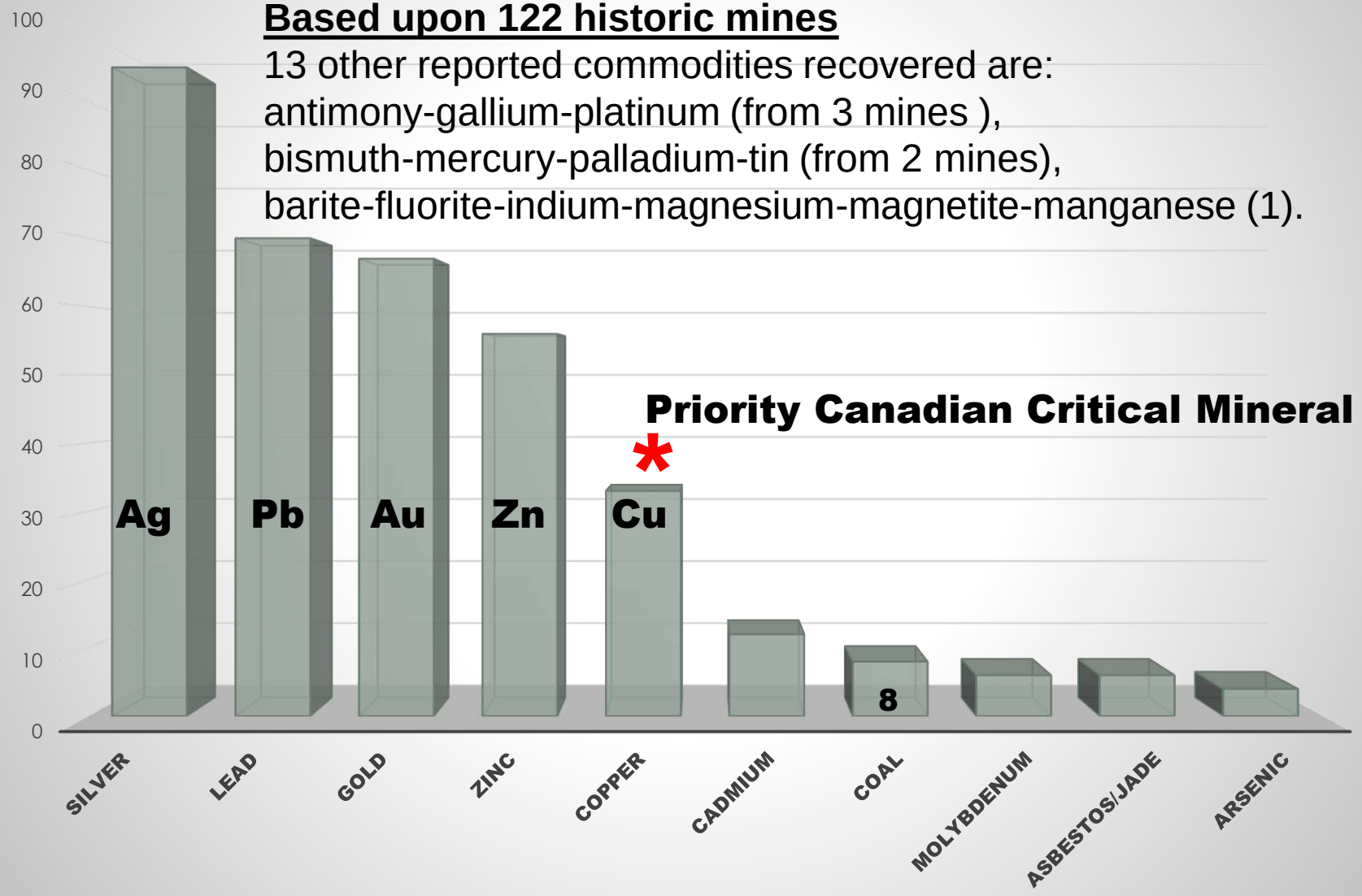
All historic mines are in the southern half of Yukon

https://www.arcgis.com/apps/dashboards/780a4bc0aa524cc38e10a4699bc3511e

YUKON'S TOP 10 HISTORICALLY MINED COMMODITIES BY NUMBER OF MINE SOURCES

Based upon 122 historic mines

13 other reported commodities recovered are:
antimony-gallium-platinum (from 3 mines),
bismuth-mercury-palladium-tin (from 2 mines),
barite-fluorite-indium-magnesium-magnetite-manganese (1).



Yukon's "Old Mines" By Locality

RANKED BY **"MINE-YEARS** PRODUCTION

Keno Hill - Mayo area (**183** mine-years)
45 metal mines for 183 years
Carmacks area (**117** mine-years)… expect major impacts
10 metal mines for 46 years, 3 coal mines for 71 years
Dawson – Klondike area (**102** mine-years)
16 metal mines for 76 years, 3 coal mines for 26 years
Anvil District (Faro) area, **54** mine-years)
13 metal mines for 49 years, 1 coal mine for 5 years
Whitehorse area (**42** mine-years)
19 metal mines for 31 years, 1 coal mine for 6 years, 1 quarry for 5 years
Watson Lake area (**20** mine-years)
7 metal mines for 15 years, 1 stone mine for 5 years
Yukon - NWT Border area (**12** mine-years)
2 metal mines for 12 years **Total of 530 mine-years: 4 mines per year**

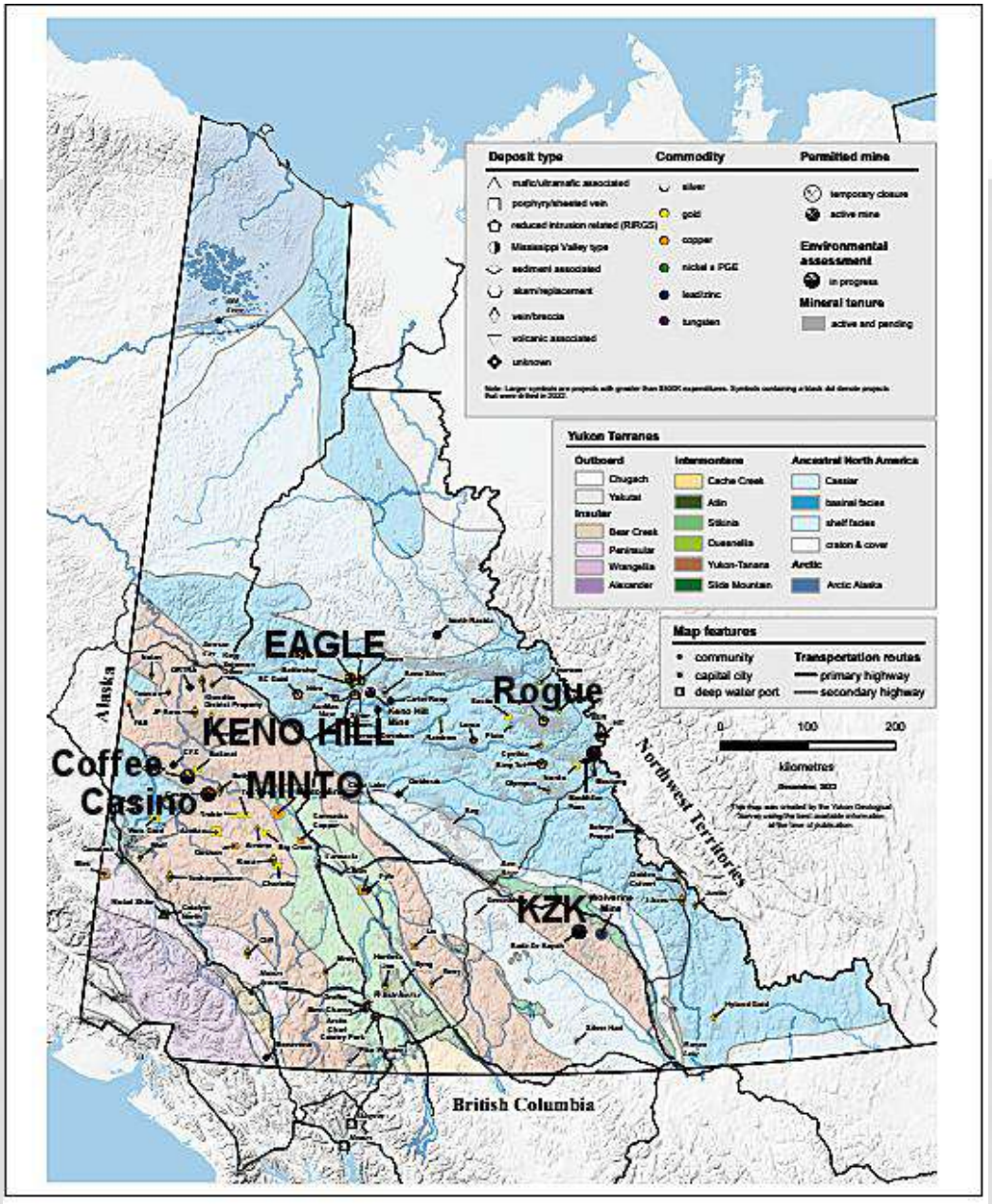
Yukon 2023: "Averaged" 2 Hardrock Mines

- **Eagle Mine** by Victoria Gold Corp.
- **Keno Hill Silver Project** by Hecla Mining Company / restarted midyear
- **Minto Cu-Au-Ag Mine:** Minto Metals Corporation / receivership… Sumitomo Canada (March 2024)
- **2022 and 2023 Revenues from Hardrock mining were about $540 million per year… (3.75 times Placer rev.)**

RECENT AND PENDING HARDROCK MINES

YUKON'S CURRENTLY MOST SIGNIFICANT HARDROCK MINING PROJECTS

after figure in *Yukon Exploration and Geology Overview 2023*



2024+ : Pending Mines

MINE PERMITTING - New Annual Revenues of CAD$3,172 million (a 6 fold forecast !)

Coffee Project: by Newmont Corporation
(10yr LOM @ CDN$555M per year)

Casino Project: by Western Copper and Gold Corporation
(30yr LOM @ CDN$1612M per year; C$4.4M per day)

Kudz Ze Kayah (KZK) Project: by BMC Minerals Limited
(10yr LOM @ CDN$1004M per year

A MAJOR DISCOVERY is on its way to mine permitting
Rogue Project: by Snowline Gold Corporation.
2023 drilling confirms 2021 Valley Discovery in 3 dimensions

EACH PROJECT WILL REQUIRE MORE THAN A BILLION DOLLARS INVESTMENT

First Break

- Questions…?

What are two key factors for maintaining mining investments of billions of dollars in Yukon?

They are:

- large, under-developed world class mineral deposits

- a regime with a maturing regulatory framework that respects a balance between sustainability and prosperity.

Let's dig deeper into Yukon's mining regulatory framework

Today's Regulatory Framework For Mining Projects

1. **Financing**
2. **Social License**
3. **Title**
4. **Permitting**
5. **Contracting**
6. **Sustainable Fieldwork**
7. **Reporting**
8. **… repeat annually**

1. FINANCING

A Proponent's mineral investment capital is "liquid" annually.

- Investment capital is controlled by shareholders and financial regulators
- Proponents are responsible for professionally managed projects
- Projects are often challenged by seasonality, timelines and deadlines

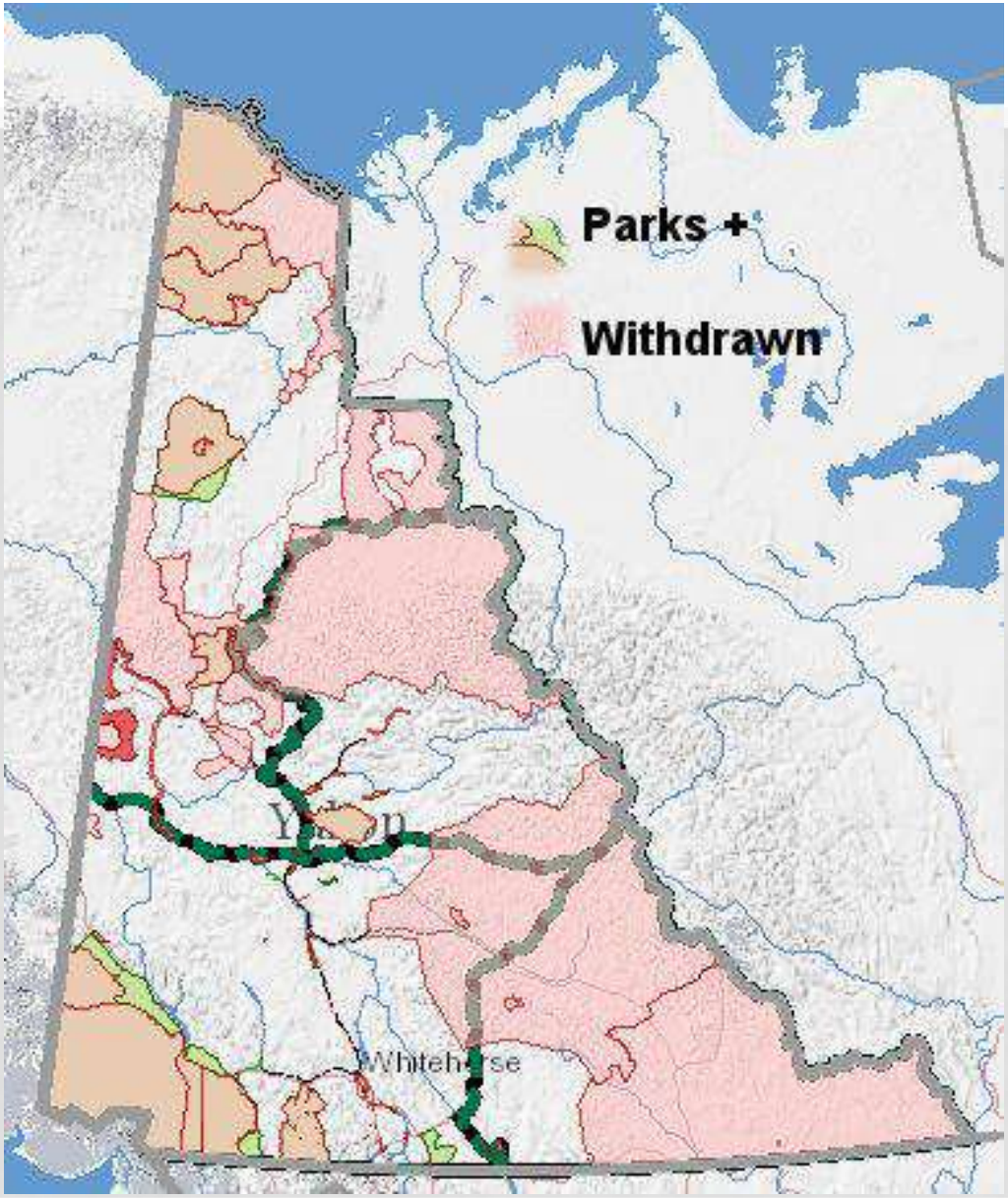
Low "political risk" is earned by fair regulatory decisions.

Yukon has a foundation for mineral investment

- Land use plans (11/14)– preliminary to advanced-stage plans
- Clear mineral opportunity – Yukon Geological Survey
- Mineral title laws under review - *Quartz Mining Act* and *Placer Mining Act*
- Clear community engagement expectations – land use plans / **permitting**
- Clear regulator expectations – set out in Acts and Regulations, **permitting**
- Clear environmental review - set out in Acts and Regulations, **permitting**

THE GLASS IS HALF-FULL

Large areas of concern are easily found on the GeoYukon website where multiple layers can be integrated for informed decision-making right from the earliest stage of a project.



GeoYukon (gov.yk.ca)

2. SOCIAL LICENSE

In the past 40 years, there have been a wide variety of **forward-looking agreements** made for mineral exploration and development projects **between communities and mining industry proponents** and many more agreements are still in progress.

Project proponents prefer working with community businesses near their project whenever possible.

Community businesses make themselves more attractive to proponents when the businesses can demonstrate significant Indigenous ownership and participation. **(Is this an opportunity for EDO's ?).**

Indigenous community businesses can maximize the benefits of set-aside contracts for procurement of goods and services that may be included in a variety of Indigenous Mining Agreements (IMA's).

PROJECT STATUS
17 Exploration
4 Reclamation
3 On Hold
1 Producing

Indigenous Mining Agreements Database is current to 2020: Canada-wide = 434 IMA's

Yukon: 20 Total Projects with 25 Agreements, 15 Signatories, 17 Proponents

Agreement Signatories: Council of Kaska Chiefs (7), Nacho Nyak Dun FN (3), Little Salmon/Carmacks FN (3), Ross River Fn (2), Tr'ondëk Hwëch'in (2), Aishihik FN, Carcross/Tagish FN, Kaska Minerals Corporation, Kluane FN, Nahanni Butte FN, Sachigo Lake FN, Selkirk FN, (all 1) Tulita Land Corporation, Fort Norman Metis Land Corporation, Fort Simpson Land Corporation (all 0.33)

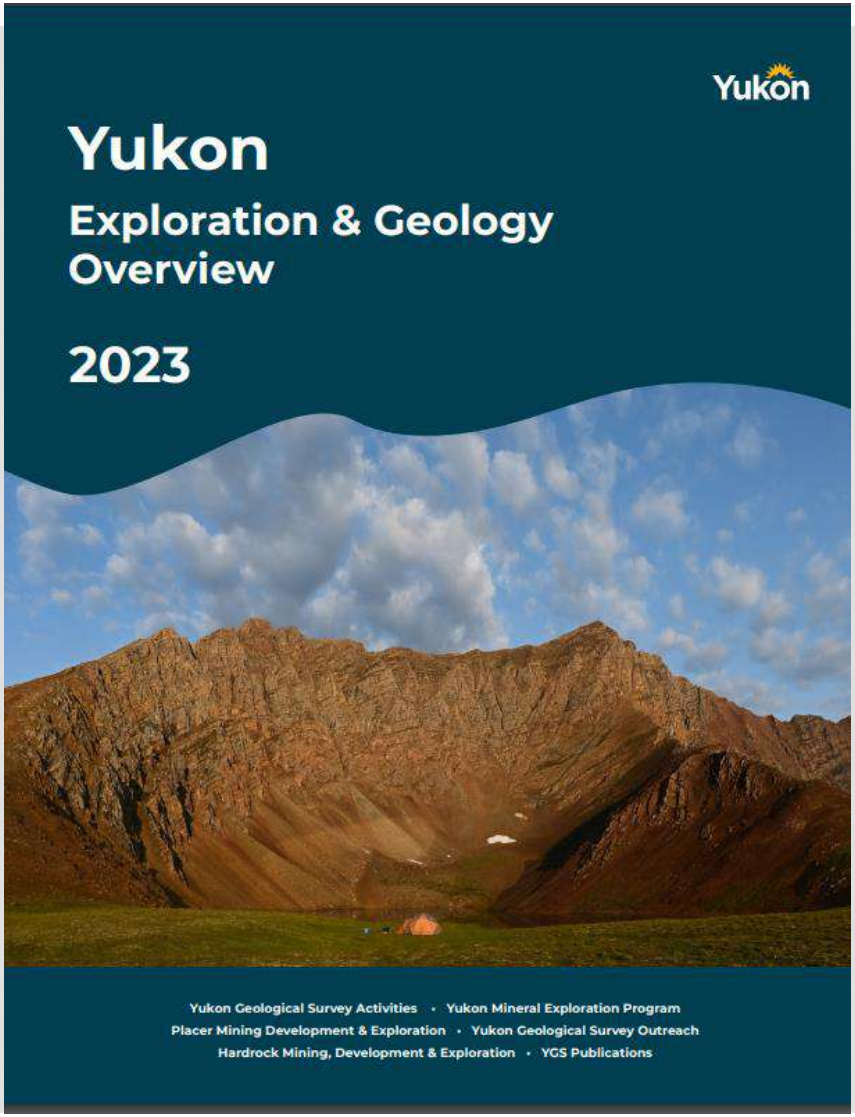
Projects With Potential Indigenous Mining Agreements

Detailed descriptions in these annual publications cover current place and hardrock exploration and mining activity.

Maps and an appendix list all the active hardrock projects and their proponents.

Much of the material included in this presentation was sourced from this publication available at:

YEG2023 - Yukon Exploration and Geology 2023 - Publication Details - Yukon Geological Survey (gov.yk.ca)



3. TITLE
Surface and Subsurface

- The *Placer Mining Act* and the *Quartz Mining Act* lay out the means to earn the right to evaluate surficial and bedrock materials for their mineral content.

- Both *Mining Acts* have **many unique elements** compared to the rest of Canada, some dating back more than a century and the *Acts* are currently headed for a major review.

- Field staking using a 2-post system rather than a 4-post enclosure system applies to both types of claims and can often lead to disputes.

- Indigenous communities hold large areas with surface-only or surface and subsurface rights.

Current Mineral Titles

November 2023 (2022)

162,564 Quartz Claims (164,924)

Full Quartz Claims are up to 1500' by 1500 feet

Using a 9 hectare average Quartz Claim area

14,631 square kilometres or **3% of Yukon**

Mineral Exploration & Deposit Appraisals

2023 Expenditures = CA$147 million

2022 Expenditures = CA$124 million

2023 Projects

$80.5 million Gold Exploration (55%)

$37.7 million Lead-Zinc Exploration (25%)

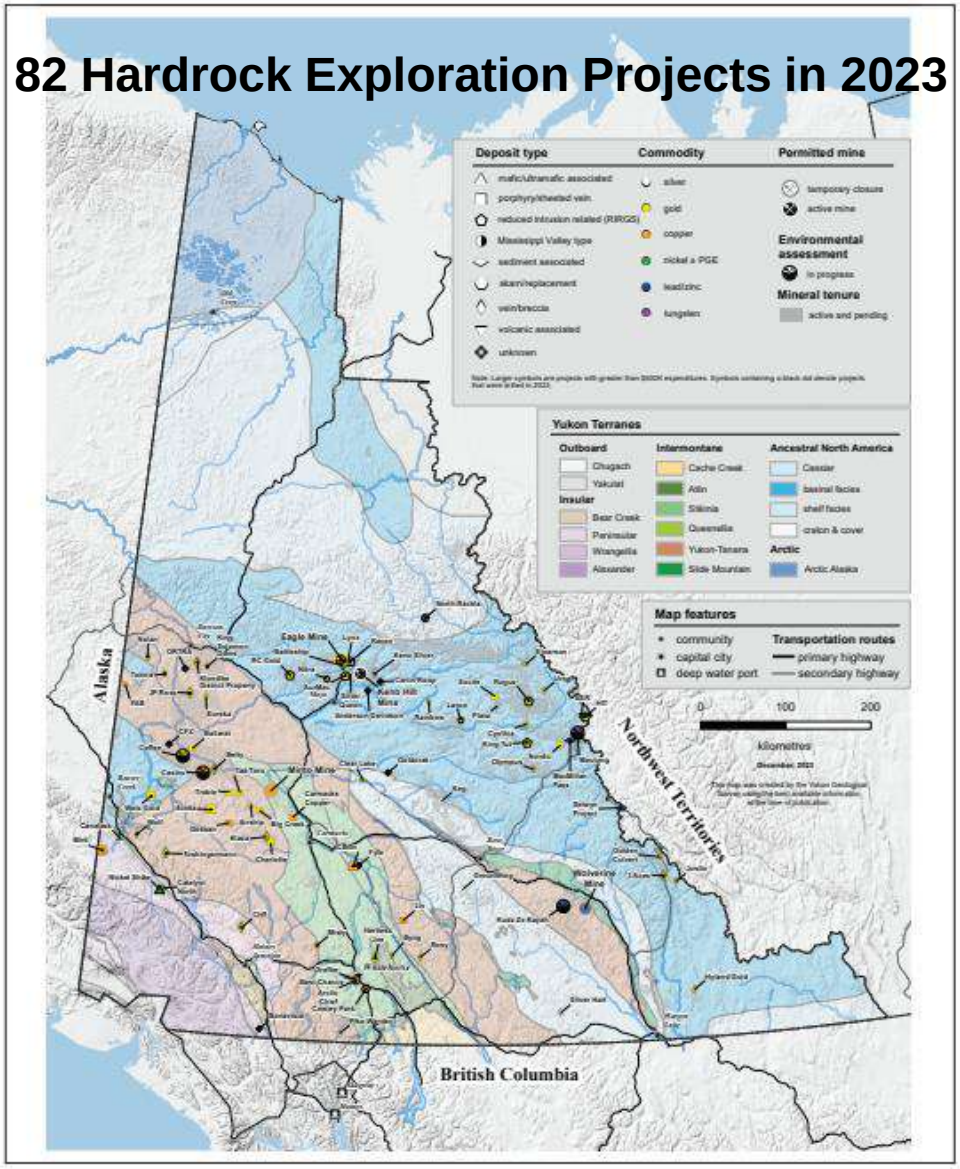
$13.4 million Silver Exploration (9%)

$13.2 million Copper Exploration (9%)

$1.0 million Tungsten Exploration (1%)

$0.9 million Ni-PGE Exploration (1%)

82 HARDROCK EXPLORATION PROJECTS



4. PERMITTING

Numerous land use, environmental laws, regulations, plans must be understood including receiving land-owner (surface-rights) approval before field work on placer or quartz claims can begin.

Additional permission to remove mineral material is required.

Placer and Quartz Mining Acts require annual fees and work expenditures or previous work credits per claim.

Project Leaders are typically professional geoscientists and engineers.

Yukon and Nunavut Association of Professional Engineers and Geoscientists (NAPEG): register and regulate the professional engineers, geoscientists and permit holder companies so they can be held responsible for their professional work in Yukon.

5. CONTRACTING

Project professionals want capable local contractors and persons willing to learn on the job.

Building skills and experience will enable success.

First Nation Development Corporations and several Chamber of Mines websites outline job opportunity types for onsite work.

36 common roles for exploration projects and
173 common roles for minesite projects

Are there EDO initiatives possible here?

6. SUSTAINABLE FIELDWORK

Logistical support services are very well-suited for Yukon-made regulations.
These services are needed by regulators, suppliers and industry.

Rotational work and supplying roadside and remote camps involves 12 hour shifts.

Water, waste management and other activity permits/agreements are required.

Seasonal operations are normal for early project stages. Permitting needs to begin at least 6 months in advance, probably longer as exploration activity increases.

Advanced exploration with resource definition drilling and environmental studies are often the first year-round activity which will require annual re-permitting.

Mining Development and Commercial Operations are typically year-round with increased activity during spring and summer. Permitting will be on-going.

Reclamation and ongoing monitoring is seasonal over many years and requires permits.

7. REPORTING

Project professionals must provide timely reports to:

- Corporate officers, share-holders and stake-holders
- Stake-holders include Communities
- Licence and Permit regulators
- Environmental regulators
- Mineral title regulators
- Securities regulators

8. REPEAT

For a variety of reasons, mineral resource exploration and development budgets are <u>vulnerable</u> annually.

- The entire “financing to reporting” sequence repeats annually.
- Only some licences and permits are easily renewable.
- Multi-year project agreements tied to mineral title can help ensure project commitments are met.
- Performance bonds for final reclamation should be required.

COMMUNITY PARTICIPATION AND OPPORTUNITY

Territorial and Indigenous control of resources requires **informed choices** by the communities, territorial government departments and other regulators.

The Community's participation is essential:

- **in elected governments**
- **in the public service**
- **on regulator boards**
- **in Indigenous-owned companies**
- **within projects**.

Regional Economic Development Plans / Land Use Plans are essential today.

Other capacity-building initiatives include government programs:

$1.5 million over 3 years through the Canadian Northern Economic Development Agency
$2 million over 3 years with Indigenous Natural Resource Partnership Program

These robust regulatory and capacity-building systems **should** create prosperity.

NWT *MRA* Community Engagement (1/3)

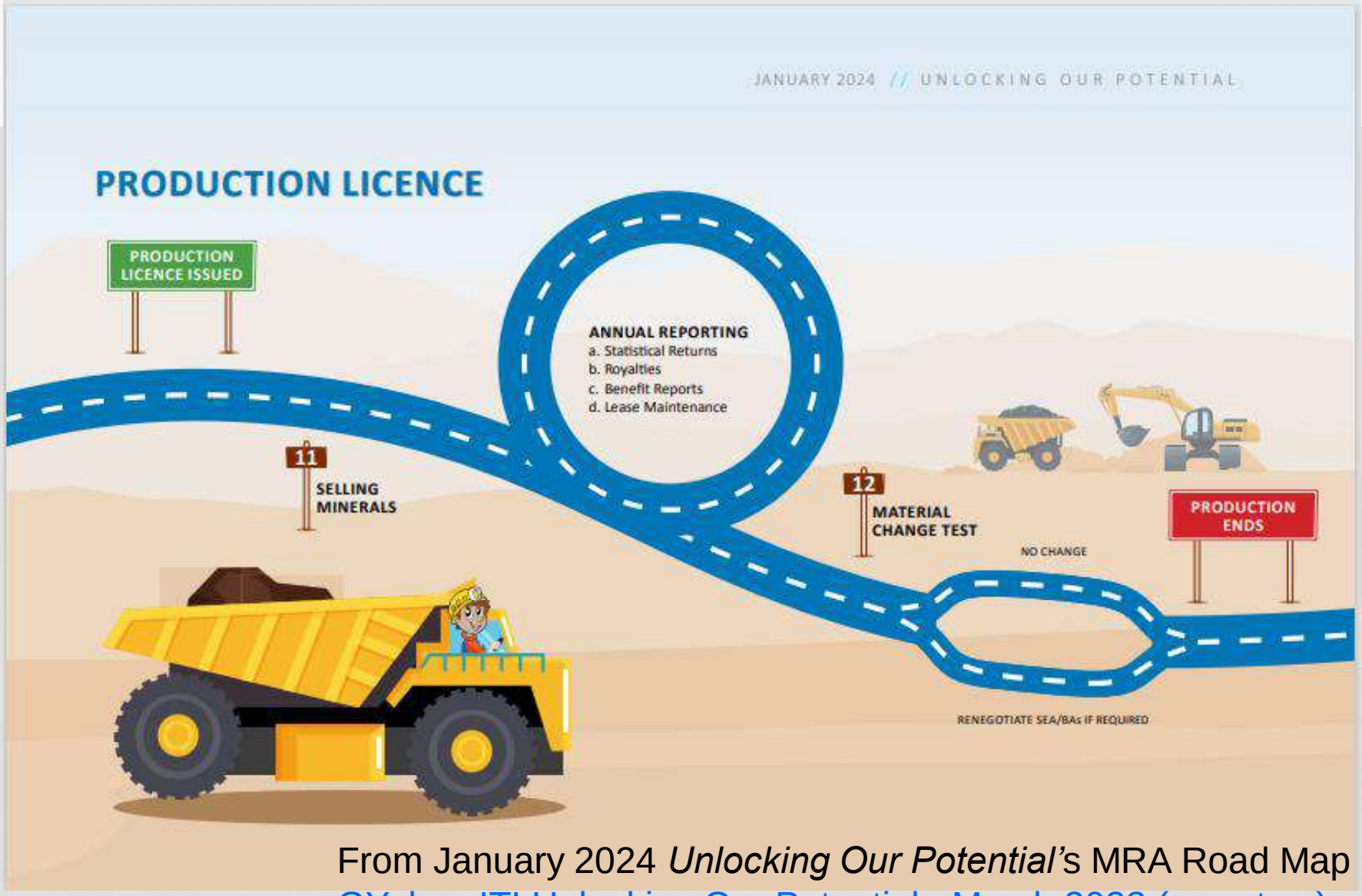
From January 2024 *Unlocking Our Potential*'s MRA Road Map

[GNWT ITI Unlocking Our Potential - March 2023 (gov.nt.ca)]

NWT *MRA* Community Engagement (2/3)

From January 2024 *Unlocking Our Potential*'s MRA Road Map
GNWT ITI Unlocking Our Potential - March 2023 (gov.nt.ca)

NWT *MRA* Community Engagement (3/3)



From January 2024 *Unlocking Our Potential*'s MRA Road Map
[GYukon ITI Unlocking Our Potential - March 2023 (gov.nt.ca)]

Part 1a Summary

Natural resources (wildlife, rocks, metals) have been **used** for millennia in Yukon

Natural resources have been widely **traded** for millennia in Yukon

Indigenous **authority** is now much greater with modern treaties and agreements

Indigenous **responsibility** for the Land is and still is being established

Regulations and regulators have **changed** how the mineral industry operates

Globally significant mineral **opportunities** continue to be identified

The Yukon regulatory system will be continually **refined** for prosperity
A regulatory road map is essential for a safe journey to **prosperity**

Travel along the road of opportunity is a shared journey

Second Break

Questions ?

PART 1b:
Economic and Environmental Benefits For Canada

- “Canadian mining” employs 665,000 people; 403,000 directly (2022 figures)
- 106,000 in “mining” (near mine) versus 297,000 in “mineral processing” (away from mine; smelters/refineries, corporate)
- Inter-provincial/territorial work for professionals and others is common in mining.
- Mineral exploration and development projects naturally have high staff turnover because of seasonality and specialized skillsets for each project stage.
- 16,500 Indigenous people are employed in mining country-wide which is the most employed in any non-governmental sector.
- minerals represent 22% of merchandise exports; $127 billion
- 155 million tonnes of minerals move on trains annually (53% of tonnage)

Mineral Economics "By-The-Numbers"

- In 2021; the Canadian mining sector accounted for $125 billion or 5% of Canada's Gross Domestic Product.

- 2022: Canadian **mineral** production value was $61.4 billion

Mining is part of the **Primary "Resource" Sector** in the Canadian Economy

- Primary "Resource" Sector = 13% ($247 billion)
- Secondary "Manufacturing Sector = 17% ($319 billion)
- Tertiary "Services" Sector = 70% ($1318 billion)

Sources: Statscan, NRCAN, MAC

Canadian Primary "Resource" Sector Components (% Value in Sector; 13% of Canadian GDP)

The 2022 Canadian Primary "Resource" Sector

48%: Fossil fuel industries ($114 billion)

18%: Electrical, gas, water utilities ($42 billion)

17%: Agriculture ($41 billion)

15%: Mining ($35 billion)

1.6% Forestry ($3.6 billion)

0.5% Wildlife ($0.5 billion)

GRAPHIC COMPARISON OF THE 2022 ENTIRE CANADIAN ECONOMY BASED ON GDP CONTRIBUTIONS

						% Economy
TERTIARY "SERVICES" SECTORS	SERVICES					70%
SECONDARY "MANUFACTURING" SECTORS	MANUFACTURING					17%
PRIMARY "RESOURCE" SECTORS		MINING	AGRICULTURE	UTILITIES	FOSSIL FUELS	13%
WILDLIFE						
FORESTRY						
Percentage of Primary Resource Sector	1 2	15%	17%	18%	48%	100%

Economic and Environmental Benefits for Yukon

The 2022 Canadian Primary "Resource" Sector

48%: Fossil fuel industries ($114B)

18%: Electrical, gas, water utilities ($42B)

17%: Agriculture ($41B)

15%: Mining ($35 B)

1.6% Forestry ($3.6 B)

0.5% Wildlife ($0.5B)

The 2022 Yukon Primary "Resource" Sector

0%: Fossil fuel industries **($0)**

14%: Electrical, gas, water, sewage, utilities ($58.7M)

1.7%: Agriculture ($7M)

84%: Mining ($343M)

0.2% Forestry ($1M)

0.1% Wildlife ($0.3M)

Today's mining industry **is** safer, better-paid and better-regulated than 30 years ago.

Today's mining industry has an evolving and highly regulated professional sub-culture whose primary duty is protection of the public and the environment.

YUKON ECONOMY

YUKON

Real GDP at Basic Prices[1] by Industry, chained (2017) dollars

	Industry Sector	2019r	2020r	2021r	2022r	
		---- millions of dollars ----				
	All industries	**2,825.4**	**2,875.0**	**3,117.9**	**3,297.6**	
PRIMARY	**Goods-producing industries**	**524.6**	**630.1**	**755.1**	**842.6**	
	Agriculture, forestry, fishing and hunting	8.2	8.3	7.8	8.5	**13%**
	Mining, quarrying, and oil and gas extraction	151.3	269.4	352.8	351.1	
	Utilities	47.6	57.2	59.5	58.7	
SECONDARY	Construction	300.1	255.3	278.0	372.5	**12%**
	Manufacturing	17.1	19.0	22.1	22.0	
TERTIARY	**Service-producing industries**	**2,301.3**	**2,238.8**	**2,347.0**	**2,432.6**	**75%**

Source: fin-gross-domestic-product-industry-2022.pdf (yukon.ca)

YUKON'S PRIMARY INDUSTRY

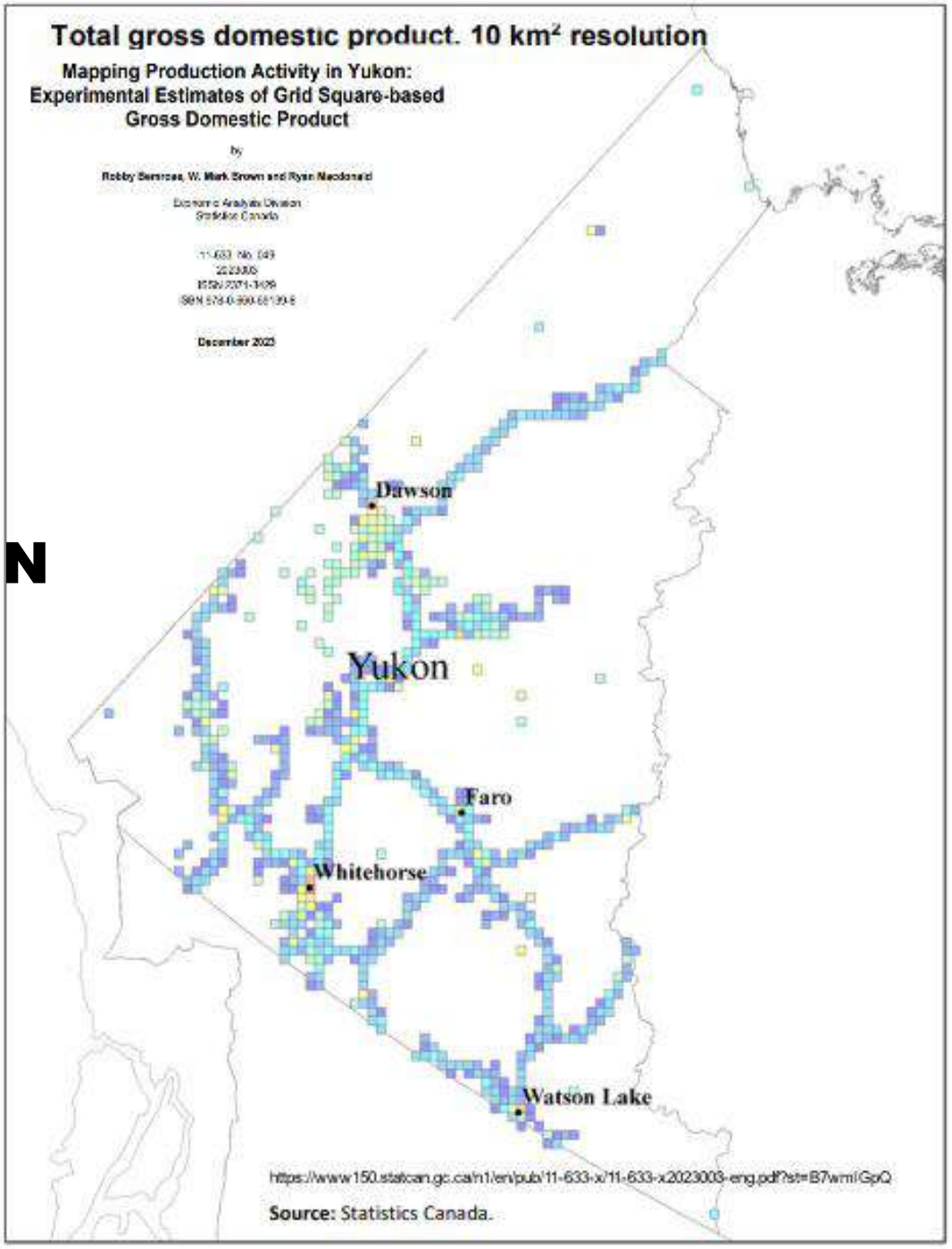
Real GDP by Industry, Yukon, 2013 to 2022
(millions of chained 2017 dollars[1])

INDUSTRY[2]	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
AGRICULTURE, FORESTRY, FISHING AND HUNTING	**5.9**	**5.3**	**6.0**	**6.5**	**5.9**	**6.2**	**8.2**	**8.3**	**7.8**	**8.5**
Crop and animal production	3.5	3.0	3.6	3.8	3.5	3.7	3.7	4.1	3.7	4.2
Forestry and logging	1.0	1.1	1.1	1.1	0.8	0.9	1.1	0.7	0.7	0.6
Fishing, hunting and trapping	0.1	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Support activities for agriculture and forestry	1.3	0.8	1.0	1.4	1.5	1.4	3.1	3.0	3.0	3.2
MINING, QUARRYING, AND OIL AND GAS EXTRACTION	**314.0**	**299.2**	**188.6**	**280.2**	**236.3**	**194.7**	**151.3**	**269.4**	**352.8**	**351.1**
Oil and gas extraction	0.7	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Mining and quarrying (except oil and gas)	247.7	234.6	135.8	222.8	168.3	123.8	95.1	219.6	283.1	281.4
Support activities for mining, and oil and gas extraction	64.5	64.4	54.4	56.7	68.1	70.9	56.1	42.7	61.3	61.3
UTILITIES	**36.4**	**35.9**	**38.6**	**41.1**	**45.3**	**47.5**	**47.6**	**57.2**	**59.5**	**58.7**
Electric power generation, transmission and distribution	32.9	32.4	35.1	37.5	41.8	43.3	43.8	53.2	55.2	54.4
Natural gas distribution, water, sewage and other systems	3.7	3.6	3.6	3.7	3.5	4.2	3.9	3.9	4.3	4.3

Source: fin-gross-domestic-product-industry-2022.pdf (yukon.ca)

The 6-fold additional mineral revenue from just 3 near-term projects can soon provide long-term prosperity for Yukoners.

YUKONS GRIDDED 2022 GDP DISTRIBUTION

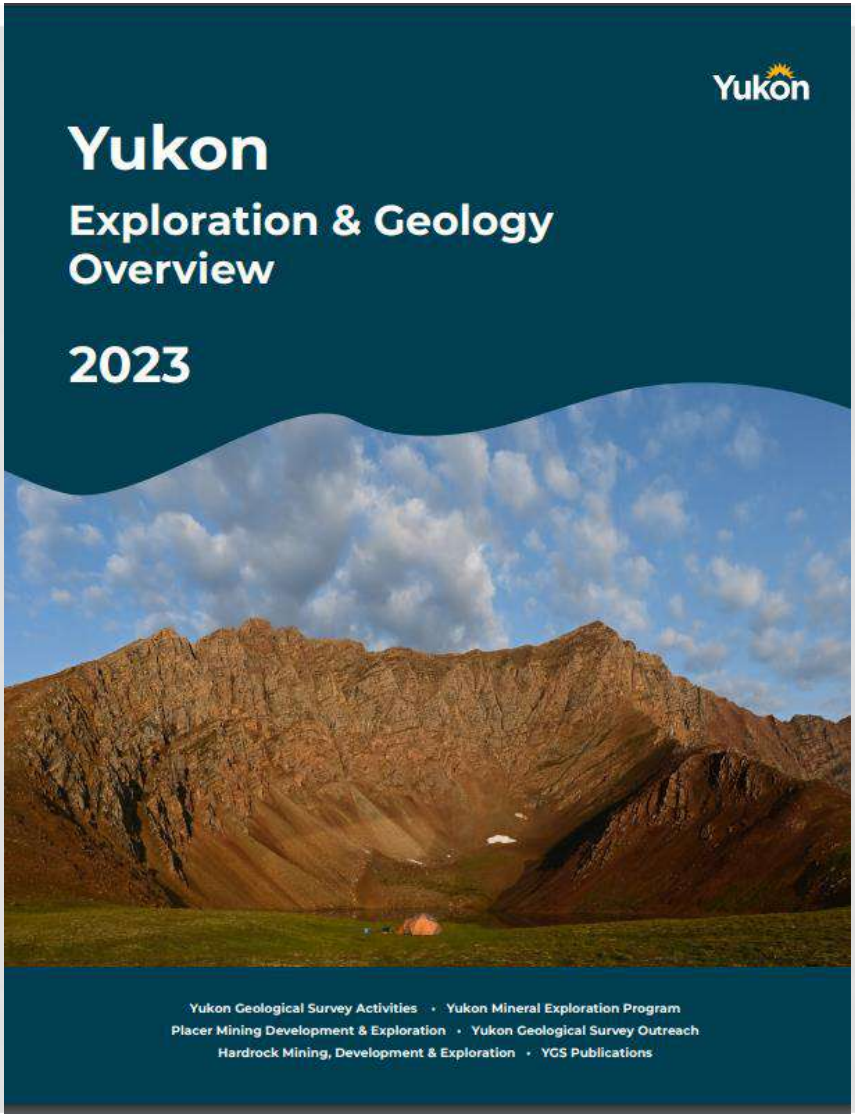


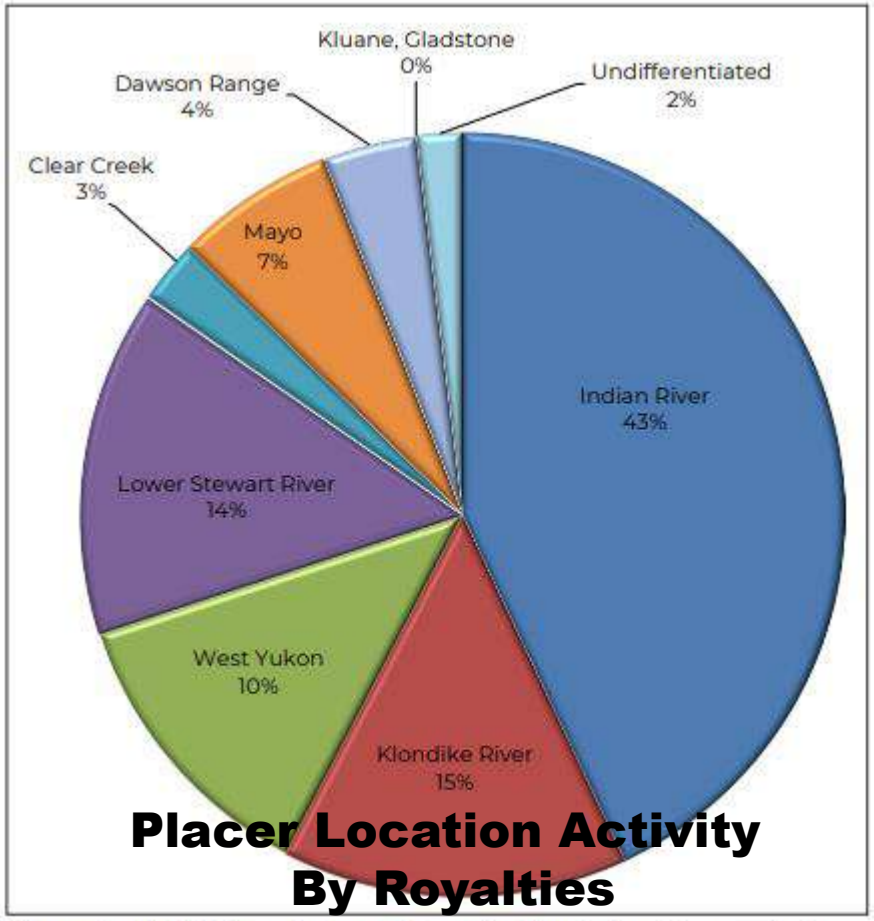
Where to Find Information About Recent Mining Activities In Yukon ?

The ***first*** source for annually updated information is the:

Yukon Geological Survey's "Exploration & Geology Overview 2023" **(YEG2023)**

and its informative descriptions, charts and maps

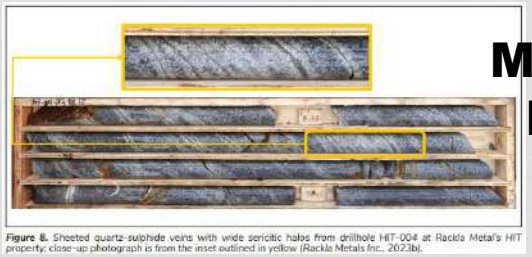




Placer Location Activity By Royalties

Figure 3. Distribution of placer gold production derived from each placer area, according to the reported royalties as of November 10, 2023.

Figure 4. Lovett Hill Corporation's mining cut at their Lovett Hill property.



Mineralized Drill Core

Figure 8. Sheeted quartz-sulphide veins with wide sericitic halos from drillhole HIT-004 at Rackla Metal's HIT property; close-up photograph is from the inset outlined in yellow (Rackla Metals Inc., 2023b).

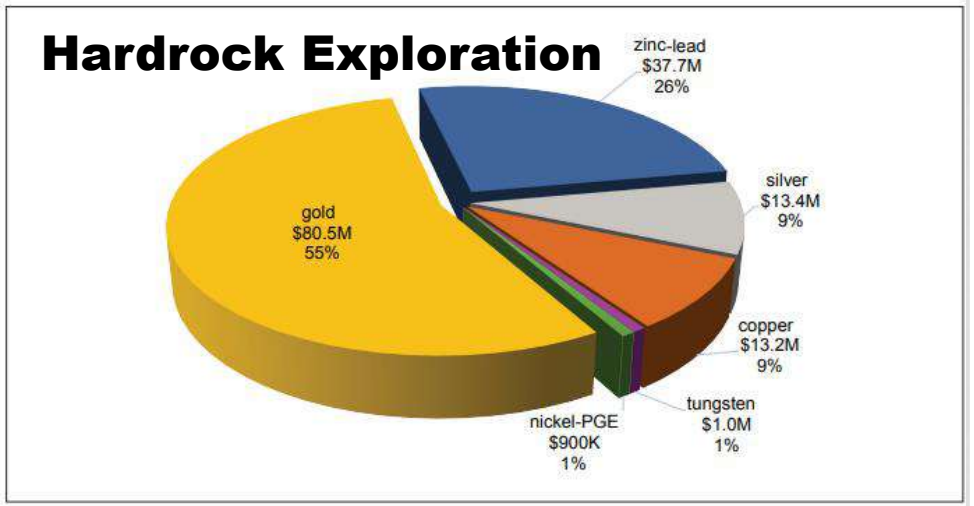


Figure 4. Breakdown of 2023 exploration expenditures in the Yukon by commodity.

Up-to-date Mining Activity Descriptions, Pictures, Maps And Charts

Where to Find Information About Current Mining News In Yukon ?

Community discussions benefit from input from responsible professionals.

- Yukon Geological Survey, offices in Whitehorse, Watson Lake, Mayo, and Dawson
- Companies, Indigenous Development Corporations, Chamber of Mines, Regulators and Politicians want to consult the public on current events in their mining sector. They do this by:
  - Websites, Social Media, news releases, newsletters
  - Community meetings about projects
  - Call / email through their contact portals
  - Participate in community consultations
- any news media available: always use discretion.
- Major Mining Conferences:
  - Yukon Geoscience Forum, November 17-20, 2024, Whitehorse
  - Association for Mineral Exploration (AME) Roundup, January 2025 (Vancouver)
  - PDAC March 2025 (Toronto)

Developing News To Follow

Yukon and its immediate neighbours have long term resources ready to be developed at projects like:

Casino

Coffee

Kudz Ze Kaya (maybe Wolverine too ?)

Minto (emerging from receivership)

Rogue / Valley Discovery

Selwyn Basin/Howards Pass (“on hold”)

Other projects discussed in **YEG2023**

<u>“Headframe Exploration Wisdom”</u>

Exploration in historically mined areas will yield new mines

Yukon-NWT border region exploration will yield new mines

Exploration near new headframes will yield new mines

Economic and Environmental Benefits in Yukon

Mining is 84% of Yukon's Natural Resource Industries Production

(Statscan Table: 36-10-0400-01, Release date: 2023-11-08)

Previous mine-sites are getting better exploration and development investment meaning progressive reclamation can be integrated into programs at no cost to the taxpayer.

Modern technology and drills can better assess mineral potential at surface and at depths never explored by previous explorationists

Multiple Mine Development and Infrastructure Projects
Are Undergoing Financing and Permit Reviews

Part 1b Summary

Mining is an essential part of the Canadian economy.

Mining's contribution to Yukon's economy can grow significantly (600%).

Sustainable capacity systems are being refined by Yukoners that include communities, regulators, prospectors, mining professionals…

Local awareness and consultation is now freely available.

Devolution has authorized communities to work with the mineral industry to create prosperity for their own and Yukon's economy

The Bottom Line for Part 1b ….

All projects are endangered without continued support from Yukoners.

Third Break

Questions ?

ECONOMIC OVERVIEW
Part 1c: Sub-surface

Yukon has 14 Indigenous nations whose traditional territories overlap with neighbours.

Eleven land-use agreements provided clarity to Indigenous-owned surface rights and sub-surface rights.

Land-use (above, adjacent or below surface) requires meaningful Indigenous and community consultation.

Mineral ownership remains with Yukoners

Exclusive rights to recover minerals needs to be continually earned and established.

Self-Governing First Nations, Yukon

This map depicts the traditional territories of the 11 self-governing First Nations in Yukon. (courtesy Mapping the Way)

ECONOMIC OVERVIEW

Part 1c: Today's Mineral Developments Across Yukon

$ 495 million estimated value from Yukon hardrock mines production in 2023 (YGS)
$ 143.7 million reported value from Yukon placer mines production in 2023 (YGS)

2023 Production and Revenue Estimates ($526.2 million) From Yearend Reports

Victoria Gold Corporation's Eagle Gold Mine = 166730 oz Au; C$ 416.9 million
Minto Metals Corporation Minto Mine = Cu-Au-Ag time-prorated estimates C$ 61.9 million
Hecla Mining Company's Keno Hill mine-sites = 1.5M oz Ag,Zn,Pb C$ 47.4 million

---

$ 147 million invested in mineral exploration and deposit appraisal in 2023 (YGS)
$ **95 million invested** in mine development (YGS)

.

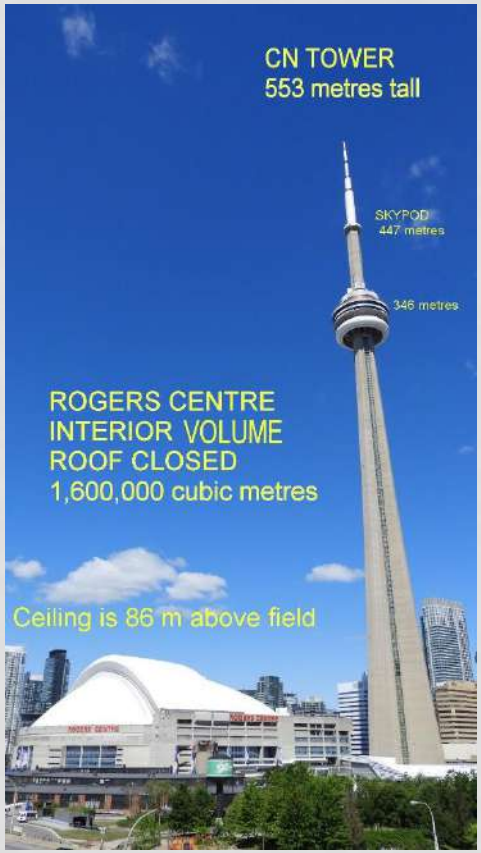
2023 HARDROCK EXPLORATION (YGS)

82 projects by 47 operators

Gold (55%) **Zinc-Lead** (25%) **Silver** (9%) **Copper** (9%) **Tungsten** (1%) **Nickel-PGE** (1%)

November 1, 2023: 162,564 hard rock claims in good standing under about 3% of Yukon
Overall numbers of placer claims and the area impacted were not found. (YGS)

Some Comparisons for Unfamiliar Units Commonly Used In Discussing Mineral Economics



Today's precious metal mines have very large tonnages with very low grades that can only be reliably determined by systematic sampling and accurate assaying.

"High grade" precious metal results are **6 grams per tonne** which can also be stated as 6 parts per million (ppm) or 0.2 troy ounces per tonne.

……

A hockey puck on a NHL rink = 3 parts per million

Six Canadian dimes on a hockey rink is = 1 ppm

Eagle Mine ore averages 0.65 ppm Au (4 dimes on hockey rink)

Yukon's Mining Industry Major Components

2023 "Investments"

3% area of Yukon in claims

2022 Exploration: $ 124 m
2023 Exploration: $ 147 m
Placer and Hardrock
$351.1 M (2022 GDP)

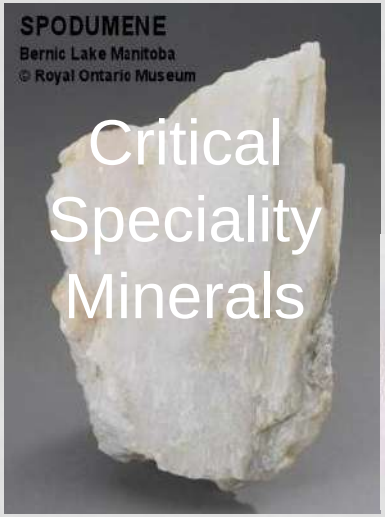
Mine Revenues
2023 = $ 670 million

2023 Revenue
CDN$ 143.7 million
21% Mine Revenues
Nil % exploration

68577 Crude Ounces
48cm by 48cm by 48 cm
0.11 cubic metres

Volumes of paydirt and overburden are indeterminate

Estimate 1 Rogers centre



2023 Revenue
nil

1% Exploration
Nil % Revenue

Pending Mine
Mactung (on hold)

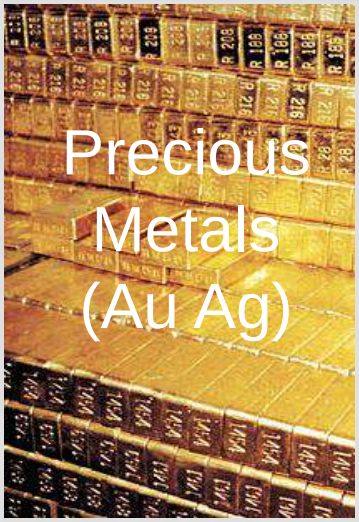
no development

2023 Revenue
CDN $ 60 million
9% mine revenues

35% Exploration
5% Ore Volume
Estimate 5 Rogers Centres
total from 3 Au-BM mines

9.4m * 9.4m * 9.4m
825 cubic metres
Cu-Pb-Zn recovered

A 2 story house



2023 Revenue
C$ 526.2 million
70% mine revenues

64% Exploration
95% Ore Volume
9 million tonnes ore
11 million tonnes waste

1.7m * 1.7m *1.7m
4.9 cubic metres silver-gold recovered

An SUV

Mineral Commodity Value Per Kilogram (Ontario 2022; CDN$/kg)

COMMODITY	PRODUCT VALUE CDN$ / kg	SUB-SECTOR	SHIPPED VALUE ($ CDN MILLION)	% Shipped Ontario Mineral Value (2022p)	OVERALL SUB-SECTOR VALUE
Platinum Group Elements (Pd & Pt)	$ 96,585.80	Precious Metals **$ 66,809 per kg**	$ 1,644	12%	**52%**
Gold	$ 57,672.93		**$ 5,358**	40%	
Cobalt	$ 77.71	Base Metals **$ 20.59 per kg**	$ 96	1%	**29%**
Nickel	$ 26.42		$ 1,883	14%	
Copper	$ 12.04		**$ 1,926**	14%	
Wollastonite	$ 0.41	Industrial Minerals **$ 0.12 per kg**	$ 8	0.1%	**7%**
Clay products	$ 0.29		$ 119	1%	
Nepheline syenite	$ 0.20		$ 140	1%	
Lime	$ 0.19		$ 161	1%	
Salt	$ 0.04		**$ 568**	4%	
Stone	$ 0.010	Aggregate **$ 0.01 per kg**	**$ 809**	6%	**12%**
Sand and gravel	$ 0.009		$ 779	6%	
Clay	$ 0.005		$ 0.4	0.003%	
			$ 13,493		**100%**

Derived From: Projected 2022 NRCAN Shipment Values For Ontario

1 kg ~

----- 3X

2X

----- 4X

2X

2023 YUKON VOLUMES MINED

The volume of the "Rogers Centre" with the roof closed is 1,600,000 cubic metres.

Annual (2023) mined volumes from the 3 Yukon hard-rock mines and the 146 placer mines are estimated to be equivalent to:

Placer mine paydirt/AGGREGATE = 1 filled "Roger's Centre"

Waste / AGGREGATE: mine by-product = 3 filled "Roger's Centres"

Base Metals / Precious Metals Ore treated = 2 filled "Roger's Centres"

Small Volumes of Metal **WON** from 6 filled "Rogers Centres"

Base metals equivalent to a 2 storey house; Precious Metals equals a SUV

Why is Mining an OPPORTUNITY in Yukon?

In Canada, **minerals are shared by the public** under clear agreements.

Modern treaties with Indigenous-owned land and clear provisions for sharing in resource development on traditional lands is an under-developed opportunity.

Regulatory systems are for the well-being of Northerners and the environment.

Mining is already significant component for Yukon's GDP.

Its impact could soon increase 6-fold from 3 hard rock projects.

Low population density and frontier-stage mineral opportunities allow projects to create **planned legacy infrastructure** at no cost to the public which can then **generate more opportunities for future generations**

Part 1c Recap

The mineral industry has access to 3% of Yukon but from a small fraction of these lands it is a major contributor to Yukon's GDP.

YUKON'S ECONOMY NOW			After 6-Fold Impact From 3 New Mines
Tertiary - Services	(75%)	$ 2,432.7 M	
Secondary -	(12%)	$ 394.5 M	
Primary - Resources	(13%)	$ 418.3 M	$ 2,525 M

3 well-qualified Mining companies have planned and prepared for years to develop these 3 new mines.

Skilled professionals are needed to consult, permit, prospect, explore, discover, drill, prove resources, build infrastructure, develop-operate-reclaim mines and mills to recover minute amounts of payables from very large volumes of rock.

Fourth Break

Modern hardrock mining is very different from Yukon's early mining days.

Yukon has skilled Yukoners now and can attract more to accommodate the pending rapid economic growth

Questions ?

PART TWO:
MINING TODAY – THE FULL CYCLE

1. Pre-Exploration = **3 KEY TURNING POINTS**
2. Early Exploration (Surveys, drill targets, drilling)
3. Discovery (drilling results) = **KEY TURNING POINT**
4. Advanced Exploration (Evaluation, Validation, Planning)
5. Feasibility = **KEY TURNING POINT**
6. Mining Lease, Mine and Mill Construction
7. **PRODUCTION: project's only revenue-generating phase**
8. Closure = **KEY TURNING POINT**
9. Reclamation
10. Repurposed Land Usage = **KEY TURNING POINT**

Pre-Exploration / Project Generation: Stage 1/10

Experience, public geoscience information and other information are diligently integrated to generate a potential mineral opportunity concept which can be considered intangible **Intellectual Property**.

Confidentiality is still the only protection for intangible Intellectual Property.

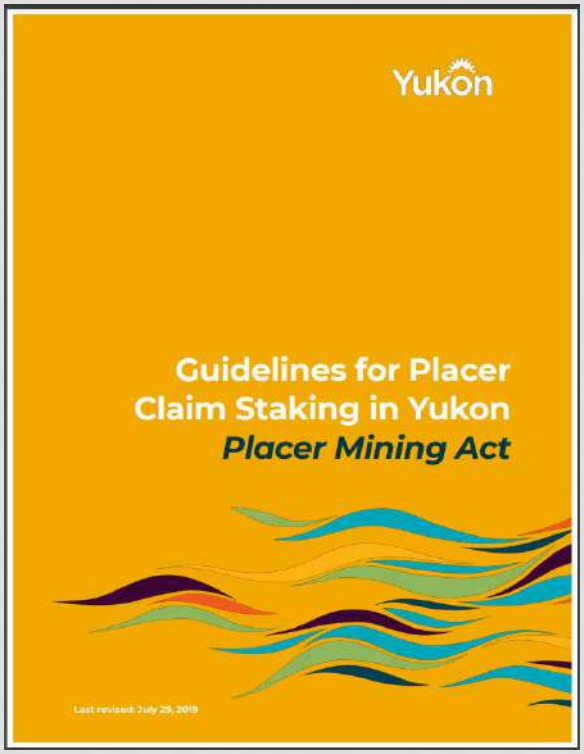
Meaningful Indigenous consultation by new project proponents can be difficult due to their unprotected Intellectual Property at this early stage.

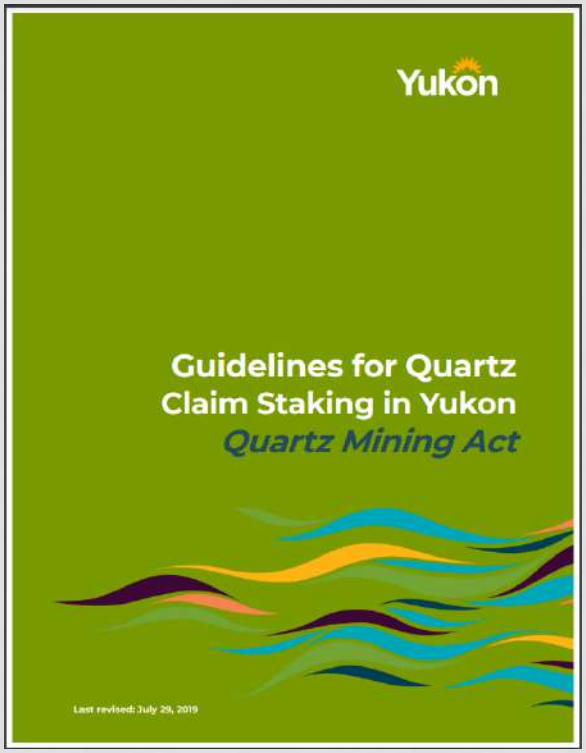
Consultation and land use permission are required prior to staking

Early meaningful consultation is a project's first key turning point.

Pre-Exploration / Project Generation: Stage 1/10

Yukon Mining Recorder Offices currently administer physically staked placer claims and mineral claims





Mineral tenure acquisition is a project's second key turning point.

Pre-Exploration / Project Generation: Stage 1/10

Mineral tenure (claims), the Intellectual Property, a reasonable exploration action plan and a clear understanding of project risk mitigation are needed for project financing, optioning or sale.

Prospectors and junior companies may self-finance their own prospecting activity to try to advance the project.

Initial financing is a project's third key turning point.

Security regulators may require a NI43-101 technical report.

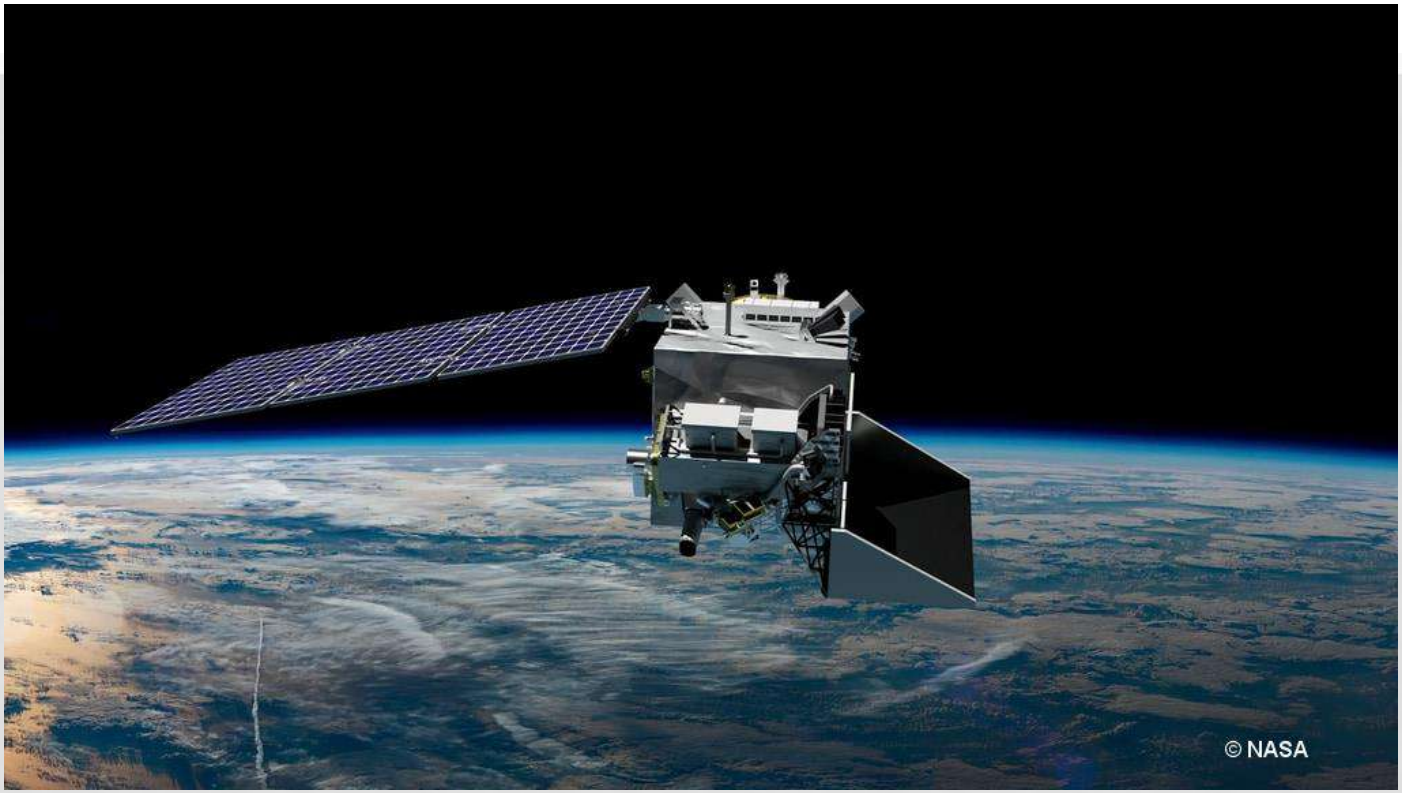
Early Exploration: Stage 2/10

- Early exploration programs require an exploration action plan used to obtain field work permits when necessary from land and water use boards, communities and other regulators prior to undertaking field work.

- The goal of early exploration programs is to get an indication of a mineral deposit discovery through integrated surveys that define reasonable targets for testing with an exploration drill hole.

- Environmental impacts are expected to be minimal and short term with project management using qualified professionals.

Passive Remote Sensing



NASA launched **PACE** on **February 8, 2024** into a **polar** orbit with full VIS-NIR hyperspectral capability at 1 kilometre spatial resolution. Airborne hyperspectral systems can “map” with less than 5 metre resolution **under ideal conditions**
Historical data archives provide material for progressive environmental monitoring.
Companies are using satellite data to identify potential-lithium staking-targets in NWT.

Airborne Geophysical Surveys

- Geophysical Survey – the collection of data from above or below the earth's surface using a sensing instrument to measure a characteristic like magnetism

Passive: hyperspectral, magnetic and gravity surveys

Active: LIDAR and EM surveys

Early Exploration

Collect Rock and Sediment Samples to Identify Drill Target Areas

Rock saws can channel-sample mineralized outcrop and soil-covered terrain can be sampled to detect eroded mineralization.

Ground geophysical surveys are recommended targeting definition methods in all terrains.

SCIENCE-BASED TARGETS ARE PRIORITIZED FOR TESTING WITH DRILLING

Geologists describe the cored rock noting features and selecting samples for analysis.

Geophysical surveys down the drill hole can allow geophysicists to refine targets.

Discovery: Stage 3/10

A **maiden drill hole discovery** is one that encounters a region's typical ore grade mineralization over mineable true widths.

Drilling continues in the advanced exploration stage to **build** a mineral deposit resource around the maiden drill hole discovery.

Around the world, after more than a century of discoveries and mine developments, over the past 50 years, the rate of **discoveries that resulted in mines have steadily declined** due to several factors.

Yukon is one of the last places globally where exploration potential is truly still at the "very early days" or "frontier" stage.

A mineral deposit resource that merits consideration for development is a project's fourth key turning point.

Advanced Exploration: Stage 4/10

Drilling programs and advanced geophysical, geochemical and metallurgical studies are **focused on resource definition, evaluation and validation**.

Environmental baseline studies continue.

Yukon drill programs **progress quickly** to the advanced exploration stage because of the high quality targets.

Feasibility: Stage 5/10

All technical resource and mine planning data is integrated with financial data to obtain a estimated return on investment for the project.

Development decisions are a project's fifth key turning point.

This marks the **end to exploration stages 2 to 5** and the **start of development stages 6 to 9**.

Claims are converted to leases and advanced consultation agreements with Indigenous communities are made.

Mine Development

Mine Lease, Construction, Infrastructure: Stage 6/10

More Extensive Environmental Assessments

Bulk Sampling

Feasibility
Funding
Permitting

Justify Mine

Prepare for Mining

Production: Stage 7/10

The production stage is the main revenue-generating stage related to mineral resource development.

Yukon presently has 2 **active producing mine-sites.**

Producing mining operations **may not be** profitable due to adverse events and economic conditions.

Closure: Stage 8/10

The closure decision is a project's sixth key turning point.

Exploration, development and mining projects may pause and go on "care and maintenance" to weather adverse conditions.

(eg: Sumitomo Canada's Minto Project)

Mine closure plans are developed and approved back in Stage 6.

Companies, communities and government can refine the closure plan and other agreements to accommodate change including cooperating to avoid closure.

Reclamation: Stage 9/10

Environmental impact minimization and reclamation applies to all mining stages from early exploration to mine closure for any activities that disturb the land.

Reclamation plans are included as part of permit applications.

Inspections, on-going reclamation, and compliance reporting are now common day-to-day procedures.

Sometimes the mine operator goes out of business before reclamation is complete. (eg: Wolverine)

Repurposed Land Usage: Stage 10/10

Community consultations before modern mine construction are used to plan how the land will be repurposed after mining.

Repurposed land use decisions by the Public are a project's seventh key turning point.

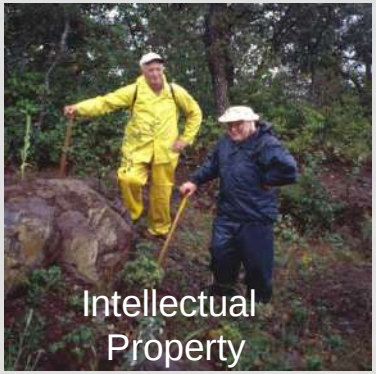
Historical mining sites can remain a public concern because they did not have closure, reclamation and repurposing plans.

Minesite monitoring has never been easier.

Life Cycle of Mining

Indigenous Business is Central to Mining

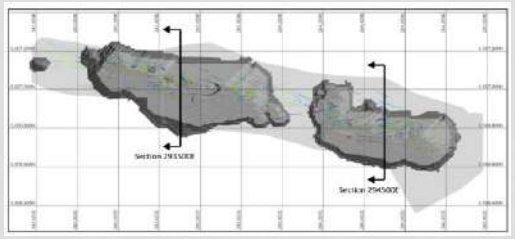
“Early Exploration”
(Pre-Exploration, Research, Prospecting)



“Exploration”

D I S C O V E R Y

Indigenous Business Opportunities



Development

F E A S I B I L I T Y

Reclamation

Wide Variety Of Mineral Exploration and Development 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

Assistants

Administration

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 exploration and mining jobs

Check out the Careers Tab at miningnorthworks.com

Canadian Economic Opportunity

Generational Economic Opportunity

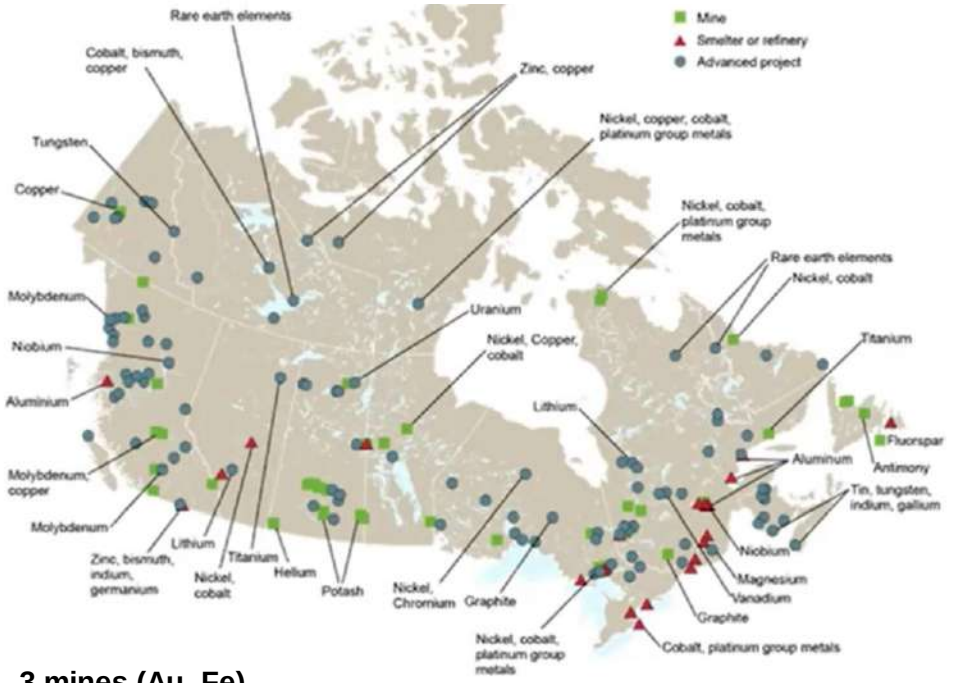
Leveraging Canada's advantages:

- ✓ World-class mineral resource wealth
- ✓ Longstanding mining expertise
- ✓ Extensive technology and manufacturing capabilities
- ✓ Abundant clean energy resources
- ✓ Strong environmental, social and governance (ESG) credentials

Domestic critical minerals can fuel Canadian manufacturing, **employment opportunities**, reduce import dependency, and build economic security.

Focus on 6 priority minerals to develop full Canadian value chains – **from mines to manufacturing** – including recycling waste and end-of-life products

Critical mineral deposits and processing facilities



- **3 mines (Au, Fe)**
- **3 advanced projects (Au, diamonds)**
- **Exploration projects also include critical minerals**

Natural Resources Canada | Ressources naturelles Canada

Canada

Watch Out For Next Opportunity!
Indigenous Natural Resource Partnerships

Canadian government $80m program launched Nov 2022.

Projects funded under the renewed and expanded Indigenous Natural Resource Partnership Program:

Organization name	Description	Years	Sector	Location	NRCan Funding Amount
Łíídlıı̨ Kų́ę́ First Nation	This project aims to increase Łíídlıı̨ Kų́ę́ First Nation (LKFN)'s capacity to train and hire members and develop band-owned businesses and partnerships to capitalize on the opportunities from the Prairie Creek Mine. LKFN will use the internal capacity developed through this project to take full advantage of future development in the territory.	2023/24-2026/27	Critical minerals	Northwest Territories	$1,974,675

Indigenous Natural Resource Partnerships (canada.ca)

Yukon Geological Survey's Outreach Program: 2023 highlights

Leyla Weston and Amanda O'Connor*
Yukon Geological Survey

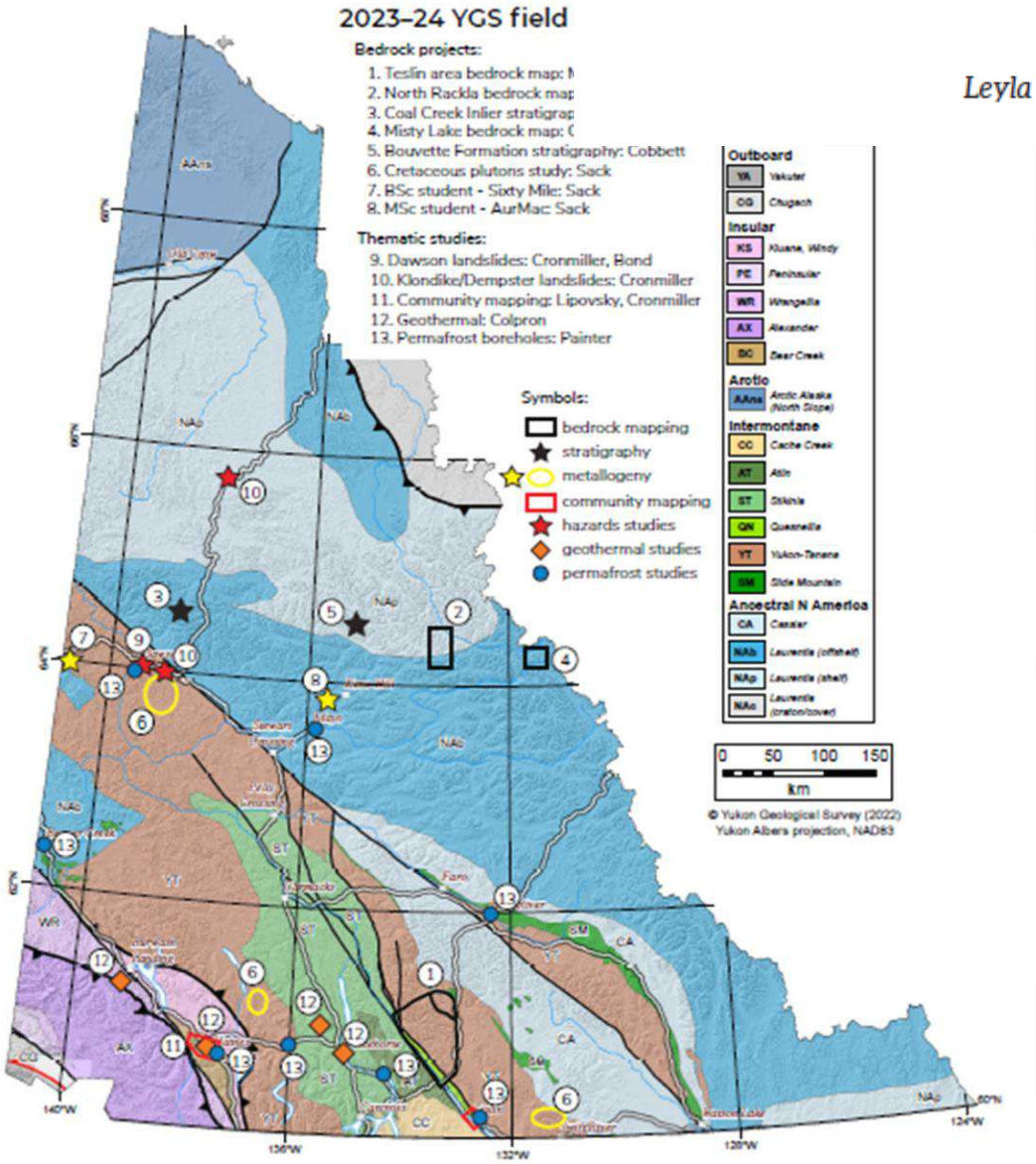


Figure 2. Locations of 2023 YGS field activities. Terrane map from Yukon bedrock geology map (Colpron, 2022).

The Yukon Geological Survey (YGS) has geoscience research projects across the territory.

The YGS has 20 geoscientists also involved in outreach which can include interpretive nature hikes, earth science education in schools, public and community meetings, workshops, open houses and special events.

They are especially interested in providing objective geoscience information about active mineral developments to Indigenous communities and individuals.

Part 2: Summary Opportunities

EDO's can **recognize opportunity through awareness** of:

Yukon' mineral industry
Community capacity and resources
Community consultations in progress
Community consent and agreements
Mineral projects in and adjacent their community
Aggregate potential and un-staked mineral potential
Local project's key turning points and anticipating needs

Know that industry professionals are willing to fully engage with Indigenous partners, businesses and individuals in exploring and developing mineral opportunities.

FINAL BREAK FOR QUESTIONS OR COMMENTS

Thank you.

Appendix A:
REFERENCES INDEXED BY SLIDE NUMBER

Included separately on the Cando Website

Home - Cando (edo.ca)

Watch or download other mining webinars from the Cando website for examples of Indigenous companies or partnerships related to mining.

Appendix B: Resource Material

Included separately on the Cando Website

Home - Cando (edo.ca)

Watch or download other mining webinars from the Cando website for examples of Indigenous companies or partnerships related to mining.