



2021 Northwest Territories Mineral Exploration Overview

Territoires du Nord-Ouest 2021 Aperçu des activités d'exploration minérale



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**NORTHWEST TERRITORIES
GEOLOGICAL SURVEY**

Government of
Northwest Territories

Cover image:

Bags of rare earth oxide concentrate from Vital Metals Limited Nechalacho Mine ready for shipping.

Photo credit, Hendrik Falck.



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English

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French

KĪspin ki nitawihtĭn ē nĭhĭyawihk ōma ācimōwin, tipwāsinān.

Cree

Tĭchq̄ yatı k'èè. Dı wegodi newq̄ dè, gots'ō gonede.

Tĭchq̄

ʔerihł'ıs Dēne Sų́nė yatı t'a huts'elkēr xa beyáyatı theʔa ʔat'e, nuwe ts'ēn yółtı.

Chipewyan

Edı gondı dehgáh got'ıje zhatıé k'éé edat'éh enahddhę nıde naxets'é edahlı.

South Slavey

K'áhshó got'ıne xədə k'é hederı ʔedıhtı'é yerııwę nıde dúle.

North Slavey

Jii gwandak izhii ginjik vat'atr'ıjähch'uu zhit yınohthan ji', diits'at ginohkhii.

Gwich'in

Uvanittuaq ilitchurisukupku Inuvialuktun, ququaqłuta.

Inuvialuktun

Ć'đĀ ĤĤ'ēbΔĊ ĀřLJ&ĤĊ Δđ'ĤĤĊĊ'ē'ŶLĤĤ'ē, ĐēĊĤ'đĊ Đ'ēĊĤ'ē'ē'ēĤĤĊĊ.

Inuktitut

Hapkua titiqqat pijumagupkit Inuinnaqtun, uvaptinnut hivajarlutit.

Inuinnaqtun

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Executive summary

Despite the ongoing COVID-19 pandemic, mining and exploration continued in Northwest Territories. Natural Resources Canada projected exploration spending in Northwest Territories in 2021 would rise to \$41.5 million, a 47% increase from 2020 but still 30% lower than in 2019. The newly-constructed Tłjchq All-Season Road opened in November 2021, providing year-round access from Highway 3 to the community of Whatí and improved access to several exploration projects in the area (Figure 1). Mining operations continued at the Ekati, Diavik, and Gacho Kué diamond mines. Vital Metals Limited commenced a demonstration production at Nechalacho, the first rare earths producer in Canada and the second in North America.

Exploration Drilling by Arctic Star Exploration Corp. on the Diagas diamond property led to the discovery of five new diamondiferous kimberlites. They also carried out an airborne electromagnetic and magnetic survey. Mountain Province Diamonds Inc. announced a ground geophysics survey and surficial sampling at the Kennady North diamond project. North Arrow Minerals Inc. drilled six holes at the Loki diamond project but did not intersect the source of a prominent kimberlite indicator mineral train on the property.

Gold Terra Resource Corp. filed an updated NI 43-101 Technical Report on the Yellowknife City Gold project, with a 64% increase in the inferred mineral resource, and drilled 13,303 metres in 31 holes. Nighthawk Gold Corp. completed 72,325 metres of drilling in 272 holes on the Indin Lake Gold property. Rover Metals Corp. completed 31 holes and an induced polarization survey at the Cabin Lake gold project, and announced the completion of a drilling program at the Up Town gold project with their joint venture partner Arctic Fox Minerals Corp. Golden Pursuit Resources Ltd. completed geological mapping and sampling at the South Gordon Lake gold project. Sixty North Gold Mining Ltd. completed rehabilitation of 125 metres of ramp in the previously-producing Mon gold mine and prospecting near Narrow Lake.

At the past-producing Pine Point zinc-lead mine, Osisko Metals Inc. completed a 79-hole infill and hydrogeological drilling program, carried out re-logging and re-assaying of historical drill core, and advanced a hydrogeological study. NorZinc Ltd. drilled 736 metres in two holes at the Prairie Creek Mine zinc-lead-silver project, and released a preliminary economic assessment that included a 15% increase in total measured and indicated resource tonnage. Vital Metals Limited drilled 29 holes in the Tardiff deposit on the Nechalacho rare earths property. Fortune Minerals Limited drilled 13 holes at the NICO Cobalt-Gold-Bismuth-Copper project and announced an option agreement to purchase a site for a refinery in Alberta and a memorandum of agreement with a third party for waste disposal. Mineral exploration in the Northwest Territories is summarised in Table 1.

A total of 68 new claims (57,994.66 hectares) were staked in 2021 (Figure 2). New claims were staked near Sito Lake, Lac du Sauvage, Squalus Lake, Selwyn Mountains, Munn Lake, Yellowknife (Highway 3), Itchen Lake, Rawalpindi Lake, and Kennady Lake. No claims were cancelled and 244 claims (151,828.15 hectares) lapsed. There are 20 active prospecting permits with a total area of 302,368.77 hectares.

In the 2021-2022 fiscal year, the Department of Industry, Tourism and Investment (ITI) awarded \$1 million in Mining Incentive Program (MIP) funding to 14 successful applicants (7 corporate and 7 prospectors), primarily for early-stage mineral exploration projects. In August 2021, the Canadian Northern Economic Development Agency (CanNor) confirmed an additional \$500,000 in funding to support a second call for MIP applications, bringing the total program budget to \$1.5 million. The one-time additional MIP funding was awarded to five advanced-stage projects. Each project received \$100,000 to support work taking place between Sept 2021 and March 2022. From 2014 to 2018, the MIP directly leveraged \$11.8 million in company and prospector exploration spending. Historically, spending by companies and prospectors has been three to four times the MIP funds dispersed.

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Sommaire

Malgré l'actuelle pandémie de COVID-19, les activités d'exploration minérale et d'exploitation minière se sont poursuivies aux Territoires du Nord-Ouest. Ressources naturelles Canada avait prévu que les dépenses pour l'exploration minérale aux Territoires du Nord-Ouest en 2021 s'élèveraient à 41,5 millions de dollars, ce qui représente une augmentation de 47% par rapport à 2020, mais une baisse de 30% par rapport à 2019. La route toutes saisons des Tłı̨ch̄q nouvellement construite a ouvert en novembre 2021, offrant un accès à l'année à la collectivité de Whatı́ à partir de la route 3, et un meilleur accès à plusieurs projets d'exploration minérale dans la région (figure 1). Les activités se sont poursuivies aux mines de diamants Ekati, Diavik et Gacho Kué. Vital Metals Limited a commencé une production de démonstration à Nechalacho, devenant ainsi la première productrice de terres rares au Canada et la deuxième en Amérique du Nord.

Le forage entrepris par Arctic Star Exploration Corp. sur la propriété Diagas a mené à la découverte de cinq nouvelles cheminées de kimberlite diamantifère. Un levé électromagnétique et magnétique aériens ont également été effectués. Mountain Province Diamonds Inc. a annoncé un levé géophysique à partir du sol et un échantillonnage de surface au site du projet de diamants Kennady North. North Arrow Minerals Inc. a foré six trous au site du projet de diamants Loki, mais n'a pas intersecté la source d'un important train de dispersion de minéraux indicateurs de kimberlite présent sur le site.

Gold Terra Resource Corp. a déposé un rapport technique NI 43-101 révisé sur son projet Yellowknife City Gold, notant une augmentation de 64 % des ressources minérales présumées, et a foré 13 303 mètres dans 31 trous. Nighthawk Gold Corp. a terminé 72 325 mètres de forage dans 272 trous sur le site aurifère du lac Indin. Rover Metals Corp. a foré 31 trous et effectué un levé de polarisation induite sur le site du projet Cabin Lake gold, en plus d'annoncer la réalisation d'un programme de forage sur le site du projet d'or Up Town avec son partenaire de coentreprise Arctic Fox Minerals Corp. Golden Pursuit Resources Ltd. a réalisé la cartographie géologique et un échantillonnage au site du projet South Gordon Lake. Sixty North Gold Mining Ltd. a achevé la remise en état de 125 mètres de galerie inclinée à l'ancienne mine d'or Mon gold et a effectué de la prospection près du lac Narrow.

À l'ancienne mine de zinc et de plomb Pine Point, Osisko Metals Inc. a réalisé un programme de remplissage de 79 trous et de forage hydrogéologique, a refait la diagraphie et l'analyse de carottes de forage historiques et a fait avancer une étude hydrogéologique. NorZinc Ltd. a foré 736 mètres dans deux trous sur le site du projet de zinc, de plomb et d'argent de la mine Prairie Creek Mine et a publié une évaluation économique préliminaire qui incluait une augmentation de 15 % du tonnage total des ressources mesurées et indiquées. Vital Metals Limited a foré 29 trous dans le gisement Tardiff, sur le site de terres rares de Nechalacho. Fortune Minerals Limited a foré 13 trous sur le site du projet NICO de production de cobalt, d'or, de bismuth et de cuivre et a annoncé une convention d'option pour l'achat d'un site pour une raffinerie en Alberta ainsi qu'un protocole d'entente avec un tiers pour l'élimination des déchets. Un résumé des activités d'exploration minérale aux Territoires du Nord-Ouest est présenté dans le tableau 1.

En tout, 68 nouvelles concessions minières ont été jalonnées en 2021, ce qui représente 57 994,66 hectares (figure 2). De nouvelles concessions minières ont été jalonnées près du lac Sito, du lac du Sauvage, du lac Squalus, des monts Selwyn, du lac Munn, de Yellowknife (route 3), du lac Itchen, du lac Rawalpindi et du lac Kennady. Aucune concession minière n'a été annulée; 244 (151 828,15 hectares) ont expiré. Il y a 20 permis de prospection actifs, pour une surface totale de 302 368,77 hectares.

Au cours de l'exercice financier de 2021-2022, le ministère de l'Industrie, du Tourisme et de l'Investissement (MITI) a accordé, dans le cadre de son Programme d'Encouragement aux Activités Minières (PEAM), un million de dollars à 14 candidats retenus (sept sociétés et sept prospecteurs), principalement pour des projets d'exploration minéral à leurs débuts. En août 2021, l'Agence canadienne de développement économique du Nord (CanNor) a confirmé l'octroi de 500 000 \$ supplémentaires pour financer un deuxième appel de candidatures au PEAM, portant le budget total du Programme à 1,5 million de dollars. Le financement supplémentaire unique du PEAM a été accordé à cinq projets avancés. Chaque projet a reçu 100 000 \$ afin de soutenir le travail effectué entre septembre 2021 et mars 2022. De 2014 à 2018, le PEAM a permis de financer directement 11,8 millions de dollars en dépenses d'exploration des entreprises et des prospecteurs. Dans le passé, les dépenses engagées par les entreprises et les prospecteurs ont équivalu à trois à quatre fois le montant des fonds du PEAM distribués.

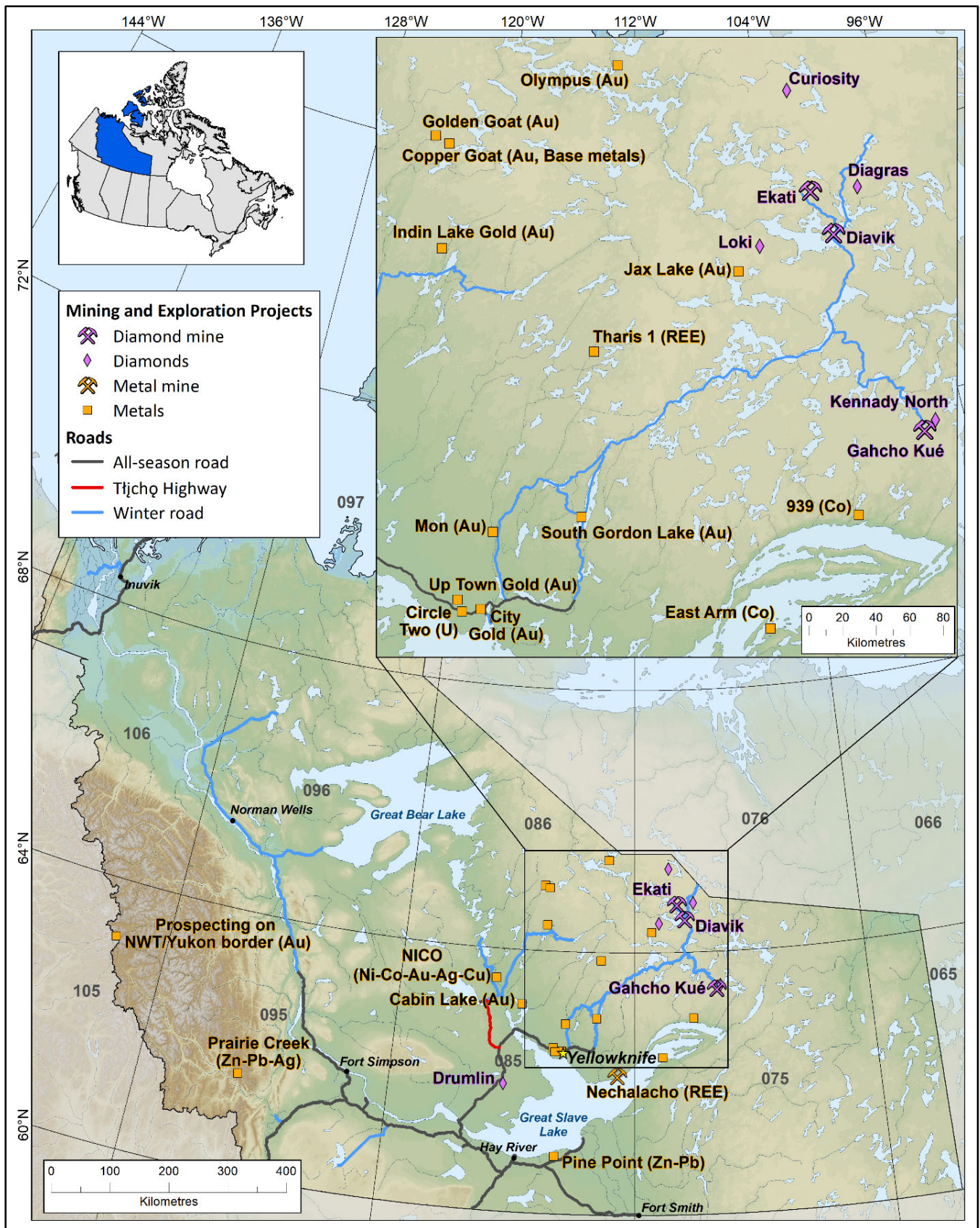


Figure 1. The location of 2021 mining and exploration projects. The Tłı̄chǫ all-season highway (red) was completed in 2021.

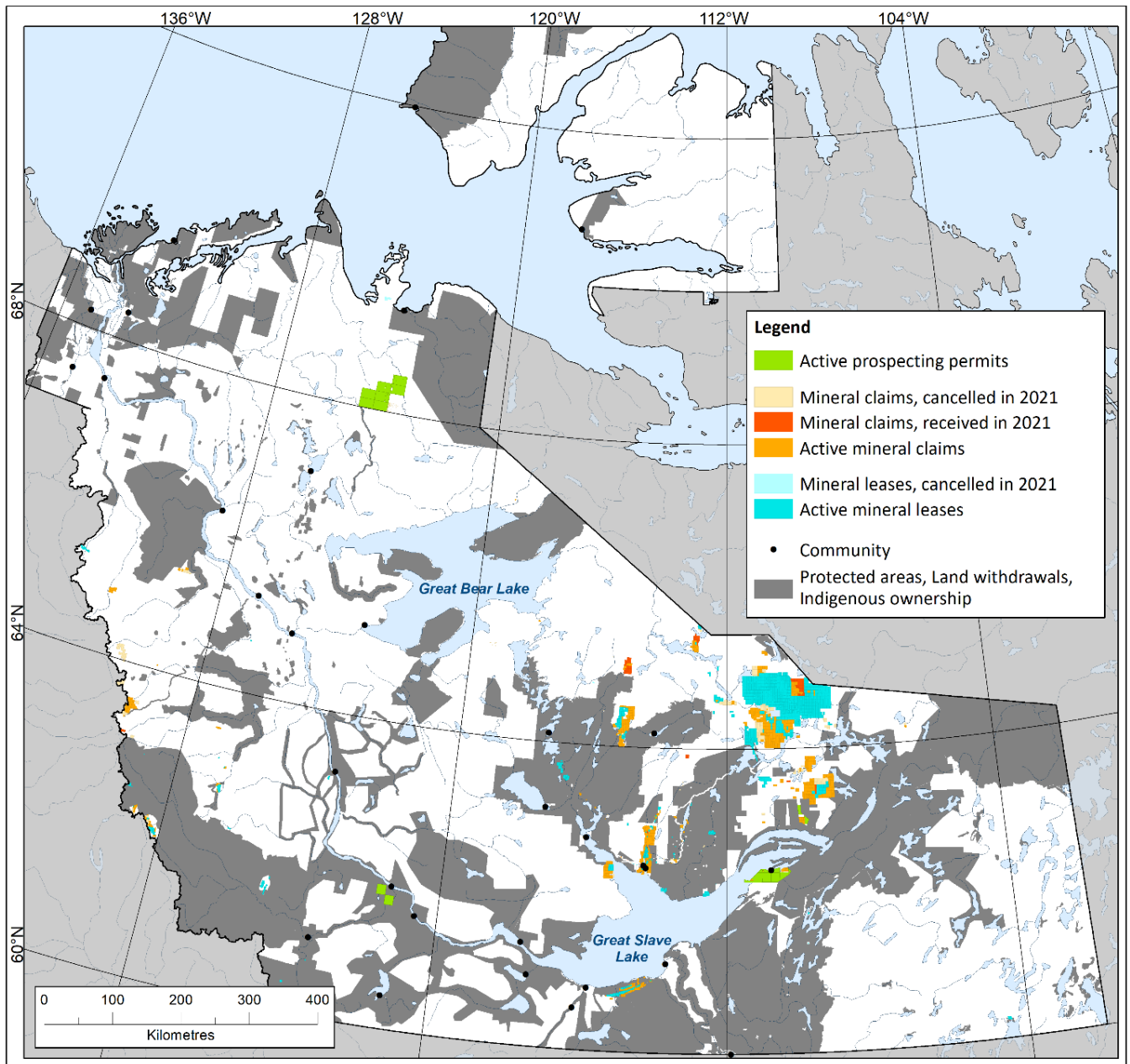


Figure 2. Mineral tenure in Northwest Territories as of December 31, 2021.

Table 1. Summary of Northwest Territories diamond and mineral exploration activity in 2021.

Operator / Partners	Property	Commodity	Drilling	Geophysics	Sampling and other work	Studies and permitting
Arctic Canadian Diamond Mine Ltd	Ekati Diamond Mine	Diamond			Target generation, geophysics reprocessing	
Rio Tinto	Diavik Diamond Mine	Diamond			Mine lease exploration activities	
Arctic Star Exploration Corp. / Margaret Lake Diamonds Inc.	Diagras	Diamond	Drilled let to discovery of 5 diamondiferous kimberlites	Airborne electro-magnetic and magnetic survey		
Mountain Province Diamonds Inc.	Kennady North Project	Diamond		Aurora Rapid Reactance Tomography ground survey	Till sampling & remote mapping	
North Arrow Minerals Inc.	Loki	Diamond	6 holes	Ground gravity survey	Overburden sampling	
Gold Terra Resource Corp. / Newmont Corporation	Yellowknife City Gold Project	Gold	13,303 metres (31 holes)			Updated mineral resource estimate (Northbelt Property)
Nighthawk Gold Corp.	Indin Lake Gold Property	Gold	72,325 metres (272 holes)			Updated mineral resource estimate
Rover Metals Corp.	Cabin Lake Gold Project	Gold	31 holes	Induced polarization survey		Land use permit amendment allowing winter road access
Rover Metals Corp., Arctic Fox Minerals Corp., and Silver Range Resources Inc.	Up Town Gold Project	Gold	Drill program completed, details forthcoming.			
Golden Pursuit Resources Ltd.	South Gordon Lake Project	Gold			Geological mapping and sampling, LiDAR survey	
Sixty North Gold Mining Ltd.	Mon Property	Gold			Rehabilitation of 125 metres of ramp; prospecting at Narrow Lake	Received renewed land use permits and water licence to build and operate mine
Golden Planet Mining Corp.	Olympus	Gold		Ground magnetic and VLF-em and airborne VLF-em surveys	Prospecting, sampling, and mapping	

Table 1. Summary of Northwest Territories diamond and mineral exploration activity in 2021 (continued).

Operator / Partners	Property	Commodity	Drilling	Geophysics	Sampling and other work	Studies and permitting
Osisko Metals Inc.	Pine Point Project	Zinc-Lead	79 holes (infill and hydrogeological)		Re-logging/re-assaying historical drill core	Hydrogeological study
NorZinc Ltd.	Prairie Creek Mine	Zinc-Lead-Silver	736 metres (2 holes)			Preliminary economic analysis with updated mineral resource estimate
Vital Metals Limited	Nechalacho Project	Rare Earth Elements	29 holes			Amended and new offtake agreements; metallurgical test on Tardiff Zone 1; construction of extraction plant underway
Fortune Minerals Limited	NICO Project	Cobalt-Gold-Bismuth-Copper	13 holes			Option agreement to purchase site for refinery; memorandum of understanding with third party for waste disposal

Mining

Gahcho Kué Diamond Mine

The Gahcho Kué Joint Venture mineral leases cover 5,216 hectares and contains the Gahcho Kué Diamond Mine. The Gahcho Kué Joint Venture is a partnership between Mountain Province Diamonds Inc. (49%) and De Beers Canada Inc. (51%). De Beers Canada Inc. operates the mine and associated exploration activities. The Gahcho Kué Joint Venture hosts several kimberlites that are currently being mined, developed, and explored for future development. Note that Mountain Province Diamonds Inc. funds are in \$CAD unless otherwise stated.

On January 13, 2022, full-year production results for 2021 were released for the Gahcho Kué mine. A total of 6.23 million carats were produced against guidance of 6.30 to 6.50 million carats, at a cost of \$61 per carat against guidance of \$58 to \$63 per carat. Actual cost per tonne treated was \$123, against guidance of \$125 to \$135 per tonne treated.

Fourth quarter and 2021 fiscal year production figures are presented in Tables 2 and 3. Highlights of the 2021 fiscal year include 35,447,014 total tonnes mined, 3,561,417 ore tonnes mined, 3,082,572 ore tonnes treated,

and 6,229,042 carats recovered with an average grade of 2.02 carats per tonne. These figures represent an additional 8% ore tonnes mined over guidance, which was the result of modelled waste tonnes representing as ore. Overall, the 2021 production figures are very close to guidance, with lower costs and increased revenue associated with higher demand and rising diamond prices.

Table 2. Fourth quarter (Q4) production figures for the Gahcho Kué Diamond Mine.

	2021 Q4	2020 Q4	Year over year variance
Total tonnes mined (ore and waste)	10,812,723	9,796,823	10%
Ore tonnes mined	1,019,671	840,261	21%
Ore tonnes treated	813,308	736,138	10%
Carats recovered	1,511,253	1,521,617	-1%
Carats recovered (49% share)	740,514	745,592	-1%
Recovered grade (carats per tonne)	1.86	2.07	-10%

Table 3. Fiscal year (FY) production figures for the Gahcho Kué Diamond Mine.

	FY 2021	FY 2020	Year over year variance
Total tonnes mined (ore and waste)	35,447,014	35,870,474	-1%
Ore tonnes mined	3,561,417	3,286,843	8%
Ore tonnes treated	3,082,572	3,245,941	-5%
Carats recovered	6,229,042	6,518,261	-4%
Carats recovered (49% share)	3,052,231	3,193,948	-4%
Recovered grade (carats per tonne)	2.02	2.01	1%

On January 25, 2022, Mountain Province Diamonds Inc. provided an update on their 2022 mining guidance, which projects 35 to 40 million total tonnes material mined, 3.75 to 4.30 million ore tonnes mined, and 6.3 to 6.7 million carats recovered. Anticipated production costs are between \$121 and \$127 per tonne treated and \$64 and \$68 per carat recovered.

Mountain Province Diamonds Inc. also announced the first diamond sale of 2022 saw 181,851 carats sold at \$31.5 million at an average price of \$173 per carat (US\$137). For comparison, total sales in the 2021 fiscal year were 3,158,418 carats for \$298.4 million (US\$236.9 million) at an average price of \$94 per carat (US\$75) and total sales in the 2020 fiscal year were 3,329,289 carats for \$227.0 million (US\$171.3 million) at an average of \$68 per carat (US\$51).

Diavik Diamond Mine

At the beginning of 2021, Diavik Diamond Mine was owned by both Rio Tinto Group (60%) and Dominion Diamond Mines (a part of the Washington Companies; 40%). On November 18, 2021, Rio Tinto Group announced it had become the sole owner.

In 2021, 2,540,075 tonnes of ore were processed yielding a total of 5,842,682.04 carats. Overall, the total carats recovered at the Diavik Diamond Mine in 2021 were 3% higher than in 2020. See Table 4 for additional production details. The Rio Tinto Group also noted plant performance issues and lower ore grade in the fourth quarter, as well as continued mine-lease exploration activities.

Table 4. Productions statistics for the Diavik Diamond Mine.

	Q4	Q1	Q2	Q3	Q4	Full Year	Full Year
Diavik Diamond Mine Production	2020	2021	2021	2021	2021	2020	2021
Ore processed ('000 tonnes)	643	632	669	643	596	2518	2540
Diamonds recovered ('000 carats)	1517	1678	1418	1390	1356	6218	5843

Q1—first quarter; Q2—second quarter; Q3—third quarter; Q4—fourth quarter

Ekati Diamond Mine

The Ekati Diamond Mine consists of the Core Zone, where mining operations are currently underway, and the adjacent Buffer Zone. Both the Core and Buffer Zones are the focus of new development and have significant exploration potential. In early February 2021, Dominion Diamond Mines ULC completed the sale of the Ekati Diamond Mine and associated assets to Arctic Canadian Diamond Mine Ltd., which is owned and managed by Polen Capital; Brigade Capital Management, LP; and Western Asset Management Company, LLC. As of September 30, 2021, Arctic Canadian Diamond Mine Ltd. has 100% ownership of both the Core and Buffer Zones, which includes 229 mining leases totalling about 210,950 hectares.

Current operations at the Ekati Diamond Mine include the Pigeon and Sable open pits and Misery underground mine. Full operations at the Ekati Diamond Mine resumed in late February 2021. The Pigeon open pit will be fully depleted in April 2022. The Misery Underground mine (sublevel retreat) is now operating at the full production rate of approximately 3,000 tonnes per day.

A prefeasibility study was completed for the Point Lake open pit project and the permit application was lodged in May 2021. On August 24, 2021, the Wek'eezhii Land & Water Board issued its recommendation that the project can proceed under the preliminary screening process. On October 18, 2021, the Mackenzie Valley Review Board published their decision not to order an environment assessment. An early works permit was issued on October 20, 2021, and construction of the access road to Point Lake was completed in early 2022. Dewatering pipeline and related equipment are being transported on the winter road and the dewatering of Point Lake will take place in summer 2022, pending receipt of the amended water license.

Exploration in 2021 focused on target generation with desktop studies including machine learning applied to property-wide datasets and re-processing of geophysical datasets. A diamond drilling program is planned for summer 2022 with the aim of discovering additional kimberlites on the property leases.

A future strategic initiative is to develop an underwater remote mining system to extend the mine life of the Ekati Diamond Mine. Arctic Canadian Diamond Mine Ltd. has partnered with IHC Mining to jointly develop an underwater system, which will be tested at the Lynx pit in summer 2024.

Nechalacho Rare Earths Mine

Despite the ongoing COVID-19 pandemic and associated restrictions, Vital Metals Limited successfully completed its maiden mining campaign (Stage 1) at its 100%-owned Nechalacho rare earth deposits. Mining was focused on the North T Zone with an estimated 101,000 tonnes of mineral resources at 9.01% light rare earth oxides (LREO) comprising a measured resource of 68,000 tonnes at 9.60% LREO and an indicated resource of 33,000 tonnes at 7.80% LREO. Mining services were subcontracted to Det'on Cho Nahanni Construction Ltd., a local company owned by the Yellowknives Dene First Nation. Mining equipment was mobilized to the site in March 2021, using a private ice road from Yellowknife on Great Slave Lake. Mining operations started with site preparation in April 2021, and the first

ore blast and crushing in June 2021. Mining and crushing continued through October 2021 when Stage 1 mining ended and mining equipment was demobilized *via* barge.

During the six-month mining campaign, 408,000 tonnes (68%) of the planned 599,000 tonnes (Figure 3) of material were mined, yielding about 58,000 tonnes of ore. A majority of the mined ore (47,500 tonnes or 82%) had been classified as waste in the resource. This included material from within five metres of the surface, which was below the cut-off grade but was found to be amenable to processing upon commissioning of the ore sorter. Another unexpected source of ore was the material from a zone of high-grade mineralisation, called the Dragon’s Tail, discovered in the northern edge of North T pit wall, outside the existing mineral resource. Mining of the Dragon’s Tail produced high-grade ore that was crushed and bagged for shipping without further upgrading through the sorter. The discovery of the Dragon’s Tail mineralisation and the ability of the ore sorter to process lower-grade material enabled Vital to redesign and expand the North T pit beyond the existing mine plan.

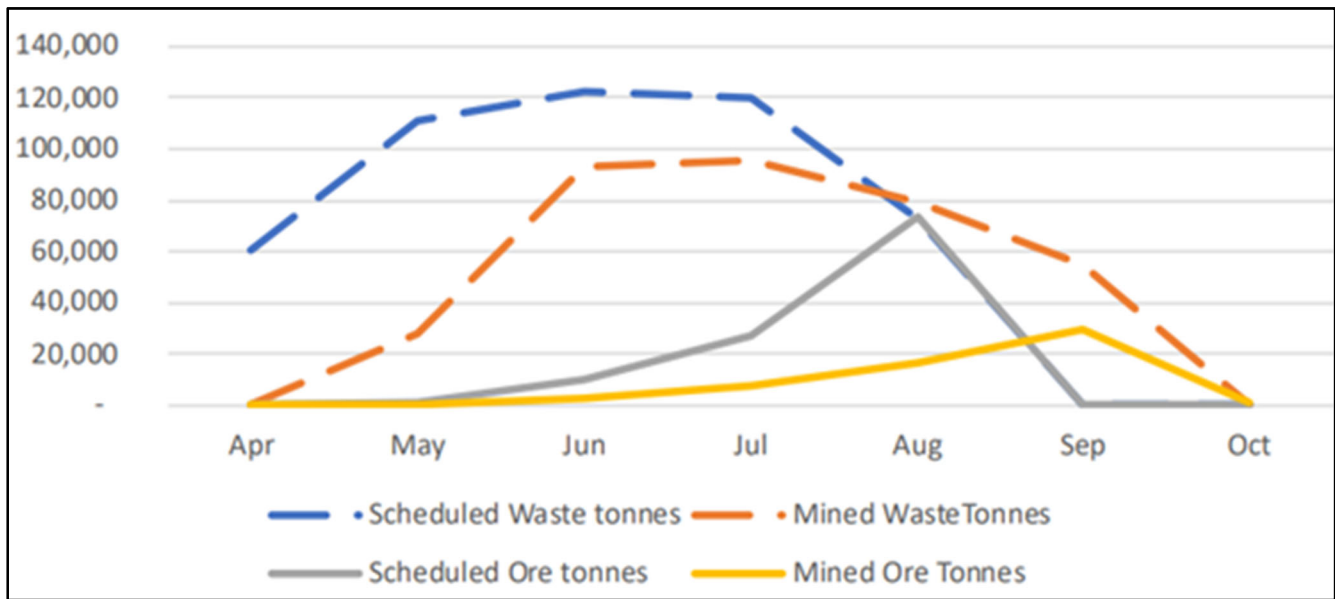


Figure 3. Scheduled vs mined ore and waste tonnages at the Nechalacho Rare Earths Mine in 2021.

The custom-built X-ray transmission (XRT) sensor-based ore sorter was commissioned in July 2021. The sorter uses differences in the atomic densities of the ore and gangue to sort the particles. The innovative ore sorter was partially funded by the Canadian Northern Economic Development Agency (CanNor) through an interest-free repayable loan up to 50% of the cost of procurement and material-handling equipment. The sorter outperformed expectations based on on-site visual estimations of the relative proportions of the brick-red bastnaesite ore and white quartz gangue in the concentrate and waste streams.

Over 1,000 bags of beneficiated product, each weighing approximately 1,000 kilograms, were produced during Stage 1 mining in 2021 (see cover photo). Fines from high-grade zones were bagged directly for shipping without further upgrading due to the higher than expected total rare earth oxide (TREO) grades. The first consignment of bags was shipped to Vital Metals Limited rare earth extraction plant, which is under construction in Saskatoon, Saskatchewan. The amount of concentrate shipped is sufficient to commission and operate the extraction plant before further deliveries in summer 2022. About 11,000 cubic metres of crushed material, comprising 1,630 cubic metres high-grade, 4,240 cubic metres low-grade, and 4,770 cubic metres fines, are currently stockpiled on the mine site and will be processed during the summers of 2022 and 2023.

Stage 2 mining at the Nechalacho Rare Earths Mine is anticipated to begin in 2024. It will involve the development of the Tardiff Zone (Upper Zone) with an estimated 95 million tonnes of mineral resources, comprising 3 million tonnes at 1.4% TREO measured, 14.7 million tonnes at 1.5% TREO indicated, and 77 million tonnes at 1.4% inferred resources.

Vital Metals Limited is also conducting scoping studies for the development of a heavy rare earth-rich xenotime mineralisation subzone identified in the 2019 mineral resource for the North T Zone.

Offtake Agreements: Vital Metals Limited rare earth carbonate feedstock qualities have been approved by REEtec AS, a Norway-based rare earth separation company, following testing on a 12-kilogram sample from the Nechalacho Rare Earths Mine.

In October 2021, Vital Metals Limited and REEtec AS amended the definitive offtake agreement they signed in February 2021. The amendment includes a 50% increase in the amount of rare earth carbonate feedstock that Vital Metals Limited will supply. The feedstock will contain a minimum of 750 tonnes of neodymium-praseodymium in 2,000 tonnes of TREO, with a maximum of 25% cerium per year. This will represent 75% of Vital Metals Limited expanded operation at the Saskatoon, Saskatchewan, extraction plant. The amendment extends the agreement to 2028 and provides an option for expansion up to 2,500 tonnes of neodymium-praseodymium per annum contained within approximately 6,800 tonnes TREO with not more than 25% cerium during an additional ten-year supply agreement.

Vital Metals Limited also signed a non-binding memorandum of understanding with Ucore Rare Metals for the supply of rare earth carbonate feedstock containing a minimum of 500 tonnes rare earth oxides (REO; excluding cerium) per year to Ucore Rare Metals Alaska 2023 project commencing in the first half of 2024. Ucore Rare Metals is a rare earth processing technology developer planning to develop a Strategic Metals Complex (SMC) heavy rare earth element (HREE) and light rare earth separation plant in Southeast Alaska. Under the agreement, Vital Metals Limited agreed to commence a product-acceptance protocol with Ucore Rare Metals by supplying a 1 to 2-kilogram sample of rare earth carbonate feedstock produced from the Nechalacho Rare Earths Mine in the fourth quarter of 2021 and an additional 1 tonne from the second half of 2022.

Extraction plant: In May 2021, Vital Metals Limited signed a lease for its rare earth extraction plant site in Saskatoon, Saskatchewan. The plant site is adjacent to the rare earth separation plant proposed by the Saskatchewan Research Council. The lease includes a custom-built facility to house the extraction plant. The initial lease term is ten years commencing after construction is complete, with a renewal option of two additional five-year terms. Vital Metals Limited signed an agreement with the Saskatchewan Research Council to provide technical support during the construction and operation of the plant, and to ensure ongoing collaboration and to maximise potential synergies between the companies.

Construction of the plant is currently underway, with production anticipated by June 2022. All key components including major plant equipment and engineering are procured. Some plant equipment is oversized to allow Vital Metals Limited the opportunity to double the production capacity during Stage 2 operations with only minimal additional capital expenditure.

The throughput capacity of the plant will be 1,000 tonnes TREO (470 tonnes neodymium-praseodymium equivalent; excluding cerium) per year at start up, and increase to 2,000 tonnes TREO (940 tonnes neodymium-praseodymium equivalent; excluding cerium) in Stage 2.

Exploration

Diamonds

Kennady North Project

The Kennady North Project, wholly owned by Mountain Province Diamonds Inc., covers 107,373 hectares in close proximity to the Gahcho Kué Mine and contains five known kimberlites, three of which have resource estimates. The Kelvin kimberlite has an indicated resource of 13.62 million carats in 8.50 million tonnes, at a grade of 1.60 carats per tonne and a value of US\$63 per carat. Faraday 2 is estimated to contain an inferred resource of 5.45 million carats in 2.07 million tonnes, at a grade of 2.63 carats per tonne and a value of US\$140 per carat. The Faraday 1-3 kimberlite have a combined inferred resource of 1.90 million carats in 1.87 million tonnes, at a grade of 1.04 carats per tonne and a value of US\$75 per carat. All resource estimations were based on a one-millimetre diamond size bottom cut-off.

On November 23, 2021, Mountain Province Diamonds Inc. announced that in addition to the 41 claims staked in early 2020, 3 additional claims have been staked making the Kennady North land package one contiguous area surrounding the Gahcho Kué Mine. These new claims are to the east (up ice) of unsourced kimberlite indicator mineral anomalies in till.

In winter of early 2021, a 650-line kilometre Aurora Rapid Reactance Tomography (ARRT) ground geophysical survey was completed in the area of the Faraday kimberlites. Two new anomalies were identified and are similar to those associated with known kimberlites in the area. The AART is a capacitive-coupled resistivity system developed by Aurora Geosciences Ltd.; provides greater depth and resolution compared to OhmMapper technology.

On September 13, 2021, Mountain Province Diamonds Inc. announced that Palmer environmental consultancy completed an analysis of glacial materials and indicator mineral trains on the property. This work was based on a combination of remote mapping and fieldwork, which involved the collection of 625 till samples. Several areas were identified for follow-up work.

Proposed exploration work for 2022 includes additional AART surveys in the vicinity of Bob camp and other areas of interest, and up to 2,000 metres of exploration drilling on the anomalies identified by geophysical surveys in 2021.

Diagras Diamond Project

The Diagras Diamond Project is located in the Lac de Gras area, which also contains the Ekati and Diavik diamond mines. Previous exploration of this property led to the discovery of 21 kimberlites. The Diagras project is owned by Margaret Lake Diamonds Inc. (20%) and Arctic Star Exploration Corp. (80%), and is operated by Arctic Star Exploration Corp. On June 22, 2021, Arctic Star Exploration Corp. announced that 27 new claims covering 25,750 hectares were added to the Diagras Diamond Project, bringing the totals for the project to 58 claims covering 48,346 hectares.

On May 21, 2021, Arctic Star Exploration Corp. announced the discovery of five kimberlites during their spring exploration program. The new kimberlites are named Birch, Sequoia, Alder, and Cedar, and an additional unnamed kimberlite dyke was identified 125 metres east of the Birch kimberlite. Caustic fusion results showed that all five kimberlites are diamondiferous, with the Sequoia samples returning the highest diamond counts at 99.8 stones per 100 kilograms with 18 stones being in the 0.43 mm or coarser sieve sizes (Table 5). Analysis of samples from the Sequoia kimberlite revealed the presence of numerous diamond inclusion minerals such as

G10 and G11 garnets and CP5 clinopyroxene (which also occur as inclusions in large diamonds mined in Lac de Gras), as well as chromite-rich harzburgite containing diamond-inclusion chromite and orthopyroxene.

Table 5. Caustic fusion results from drilling at the Diagrass Diamond Project.

Kimberlite	Number of diamonds by sieve size (millimetres)								Sample weight (kilograms)	Total stones	Stones per 100 kilograms
	0.11	0.15	0.21	0.3	0.43	0.6	0.85	1.18			
Birch	10	7	7	3	1	1	0	0	141.5	29	20
Sequoia	282	117	39	23	10	6	1	1	505.3	499	99.8
Alder	3	6	1	2	1	0	1	0	223.72	14	6
Cedar	1	0	0	0	0	0	0	0	90.6	1	1

On November 18, 2021, Arctic Star Exploration Corp. announced the preliminary results from Phase 1 of an airborne electromagnetic and magnetic geophysical survey covering the area around the diamondiferous Sequoia and Birch kimberlites. This work generated several drill targets with geophysical signatures similar to those from other known kimberlites on the property. Plans are being developed for Phase 2 of the airborne survey, which will cover the rest of the Diagrass Diamond Project property and follow up drilling on the new targets. In addition, Arctic Star Exploration Corp. plans to drill the Sequoia kimberlite at 100-metre spacing to investigate variations in diamond grade and kimberlite lithologies.

Loki Diamonds Project

The Loki Diamonds Project is 100% owned by North Arrow Minerals Inc. and covers 13,898 hectares approximately 40 kilometres west of Diavik and 35 kilometres southwest of the Ekati Diamond Mine. Five kimberlites have been discovered to date, all of which are confirmed as diamondiferous. The project area also contains several unsourced kimberlite indicator mineral (KIM) trains.

On March 9, 2021, North Arrow Minerals Inc. announced a ground geophysical survey identified a 400 metre by 100 metre gravity low at the head of an unsourced regional indicator mineral train known as the South Coppermine Train. This gravity anomaly and several others were tested by a six-hole summer drilling campaign. No kimberlite was intersected in these holes; the gravity anomalies are instead explained by ice lenses locally greater than 5 metres thick that occur within glacial overburden more than 25 metres thick. The South Coppermine Train remains unexplained.

Samples of glacial overburden and ice units encountered during drilling were processed for KIM analysis. Near-surface samples returned zero to seven KIMs, which is in line with previous surface sampling results from the area. Samples taken from depths between 5 metres and 25 metres returned higher KIM counts, with some samples returning more than 100 KIMs, including pyrope and eclogitic garnet, ilmenite, chrome-diopside, chromite, and olivine. Further interpretation of results from areas with thick glacial overburden is underway and expected to be completed by the end of March 2022. Follow-up field work will be carried out during the 2022 field season.

Gold

Yellowknife City Gold Project

Gold Terra Resource Corp. drilled 13,303 metres in 31 holes on the Yellowknife City Gold Project in 2021. The majority of drilling (12,683 metres in 26 holes) targeted the Campbell shear at approximately 400 metres below surface over a strike length of 3 kilometres south of the historic Con Mine. All holes intersected the Campbell shear

and gold mineralisation, and mineralisation remains open at depth and along strike. Highlighted assay results are shown in Table 6; results for four drill holes were still pending at the time of writing. An additional success of the season was the effective use of alteration (sericite with quartz veins, pyrite, and arsenopyrite needles; anomalous arsenic and antimony) to vector towards gold mineralisation. For example, hole GTCM21-010 successfully intersected new gold mineralised lenses based on alteration observed in holes GTCM21-006 and GTCM21-007.

Table 6. Highlighted composite assay results from 2021 drilling on the Campbell shear of the Yellowknife City Gold Project.

Hole name	Drill width (metres)	Gold (grams per ton)
GTCM21-003	4.35	10.85
<i>including</i>	1.55	25.40
GTCM21-004	1.50	5.69
GTCM21-005	12.35	5.77
<i>including</i>	4.65	14.09
GTCM21-007	11.05	1.14
<i>including</i>	3.30	2.99
GTCM21-014	17.86	5.22
<i>including</i>	4.57	11.20
GTCM21-016	8.35	5.07
<i>including</i>	3.08	11.87
GTCM21-019	4.70	2.46
<i>including</i>	1.90	5.13
GTCM21-020	4.70	2.38
<i>including</i>	0.55	12.95
GTCM21-021	11.00	1.24
GTCM21-022*	5.44	19.74
	11.23	4.16
<i>including</i>	3.7	10.12

*Hole contains two highlighted intercepts, the second of which includes a zone of significantly higher gold grade.

The remaining five holes were drilled at the Crestaurum deposit and Ranney Hill prospect north of Yellowknife. The two holes drilled at Crestaurum targeted a north-northwest-trending vein set in the footwall of the Crestaurum main shear. Both holes intersected various styles of veining; hole GTCR21-114 intersected six discrete veins that returned assay results ranging from 0.118 grams per tonne gold to 0.394 grams per tonne gold over intervals 0.74 metres to 1.50 metres. A third hole targeted the Crestaurum main shear and a hanging-wall structure. Highlights include 1.56 grams per tonne gold over 3.00 metres (including 3.24 grams per tonne gold over 1.00 metre) in the main shear and 1.46 grams per tonne gold over 1.00 metre in the hanging-wall structure. The two holes drilled at Ranney Hill both intersected the targeted shear zone. Highlights include 8.65 grams per tonne gold over 0.70 metres and 0.65 grams per tonne gold over 4.00 metres (including 1.99 grams per tonne gold over 1.00 metre). The relatively high grade of these intersections is taken to support the hypothesis that the Ranney Hill shear is the southern extension of Crestaurum shear zone. The 2.5 kilometres of strike between the two areas remains untested.

On April 1, 2021, Gold Terra Resource Corp. announced they had filed a NI 43-101-compliant technical report containing an updated mineral resource estimate for the Northbelt Property, which includes the Sam Otto, Crestaurum, Barney, and Mispickel gold deposits. The 2021 mineral resource estimate updates the estimate

completed in 2019 with results from 2020 drilling at the Sam Otto and Crestaurum deposits. The result is a 64% increase of the inferred mineral resource for a total of 1,207,000 ounces gold (Table 7).

Table 7. 2021 inferred mineral resource estimate for the Northbelt Property. Gold grades are reported in grams per tonne (g/t).

Deposit	Mining method	Cut-off (g/t)	Tonnes	Grade (gold g/t)	Contained gold (ounces)
Sam Otto/ Dave's Pond	In-pit	0.4	20,403,000	1.10	721,000
	Underground	1.4	948,000	1.75	53,000
Mispickel	In-pit	0.4	893,000	2.20	64,000
Crestaurum	In-pit	0.4	461,000	6.17	91,000
	Underground	2.5	954,000	6.16	189,000
Barney	Underground	2.0	646,000	4.30	89,000
	In-pit		21,757,000	1.25	876,000
Sub-total	Underground		2,548,000	4.04	331,000
Total inferred mineral resources			24,305,000	1.54	1,207,000

On November 22, 2021, Gold Terra Resource Corp. announced they had entered into a definitive option agreement with Newmont Canada FN Holdings ULC and Miramar Northern Mining Ltd. (both wholly-owned subsidiaries of Newmont Corporation) to purchase Miramar Northern Mining Ltd., which includes 100% of all the assets, mineral leases, Crown mineral claims, and surface rights comprising the Con Mine and adjacent areas. This agreement supersedes the initial exploration agreement of September 4, 2020. As part of the new exploration agreement, Gold Terra Resource Corp. will incur \$8.0 million in exploration expenditures (\$3.0 million of which have already been spent under the original agreement) and complete a pre-feasibility study of a mineral resource and a minimum of 1.5 million ounces in all categories.

Gold Terra Resource Corp. intends to drill approximately 40,000 metres in 2022 with a focus on testing the deeper extension (*i.e.*, 1,000 metres below surface) of the Campbell shear and defining the Yellorex Zone on a 50-metre spacing.

Indin Lake Gold Property

In 2021, Nighthawk Gold Corp. drilled 72,325 metres in 272 drill holes at the Indin Lake Gold Property, located approximately 200 kilometres north of Yellowknife. The drilling began in late March 2021 and was completed by the first part of October 2021, with as many as five active drills on the property. Approximately one third of 2021 drilling metreage was aimed at increasing the in-pit resources of known deposits including Colomac, Goldcrest, Grizzly Bear, and 24/27. The assay highlights are listed in Table 8.

Colomac: A total of 43 holes were drilled. The main objective of Phase 1 drilling was to expand the extent of mineralisation along strike to the north and south. Results from the north were particularly promising with wide mineralisation within 150 metres of surface showing better than expected continuity, albeit at slightly lower grades. Phase 2 drilling tested a gap between two series of Phase 1 holes that identified new mineralisation. Results show mineralised widths remain strong in many holes.

Goldcrest: In Phase 1, four holes were drilled to test the south extension of Goldcrest but failed to return significant mineralisation apart from a single assay of 14.20 grams per tonne gold over 0.50 metres. No further work was carried out in this area in Phase 2.

Grizzly Bear: A total of 32 holes were drilled. Phase 1 drilling targeted the mineralised zone along strike to the north and south, and results were in line with expectations. Phase 2 drilling focused on extending new mineralisation identified in Phase 1 to north of the existing in-pit resources. The results demonstrate the deposit remains open to the north and offers potential for additional near-surface mineralisation.

24/27: A total of 22 holes were drilled. Phase 1 drilling doubled the strike length of the near surface mineralisation to 250 metres and returned better-than-expected assay results. Phase 2 drilling tested the northern and southern extension of the mineralisation identified in Phase I, also with significant mineralisation intersected. The results are expected to increase the total in-pit resources at 24/27.

The remaining two thirds of 2021 drilling metreage tested greenfield targets with near-surface potential. Assay results for most greenfield targets were outstanding at the time of writing; highlights of the 51 holes drilled at Cass, 12 holes drilled at Albatross, and 12 of the 26 holes drilled at Kim are listed in Table 8. Additional greenfield targets included Nice Lake (17 holes), Laurie Lake (13 holes), JPK (8 holes), Echo-Indin (11 holes), Andy Lake (9 holes), and Fishhook (24 holes).

Table 8. Highlighted composite assay results from 2021 drilling on the Indin Lake Gold Property.

Hole name	Deposit	Phase	Drill width (metres)	Gold (grams per tonnes)
C21-08	Colomac	1	33.50	1.10
C21-13	Colomac	1	25.45	1.02
C21-16	Colomac	1	17.00	1.05
C21-22	Colomac	1	20.50	1.35
C21-11*	Colomac	1	6.00	4.70
	Colomac	1	4.25	6.78**
C21-28	Colomac	2	14.00	1.07
C21-30	Colomac	2	36.50	0.70
GB21-07	Grizzly Bear	1	10.25	2.77
GB21-13	Grizzly Bear	1	6.15	4.64
GB21-19	Grizzly Bear	2	12.00	1.64
GB21-21	Grizzly Bear	2	28.75	1.01
TFS21-10	24/27	1	14.00	2.16
TFS21-11	24/27	1	27.50	1.84
TFS21-16	24/27	1	17.00	2.69
TFS21-22	24	2	25.50	2.07
TFS21-19	24	2	9.60	4.56
CM21-12	Cass		51.00	6.92
CM21-06	Cass		15.25	1.78
CM21-44	Cass		33.15	3.76
KM21-05	Kim		23.00	0.91
KM21-04	Kim		7.50	1.52
A21-02	Albatross		14.0	1.37

*Hole contains two highlighted intercepts.

**51.13 grams per tonne gold uncut (including 427.00 grams per tonne gold over 0.50 metres)

Nighthawk Gold Corp. reported an updated mineral resource estimate for the Indin Lake Gold Property (Table 9) on March 1, 2021. The new mineral resource estimate builds on the estimate completed in 2020 by including results from 2020 drilling and adjusted economic parameters. The result is a 35% increase in total indicated resources and a 60% increase in total inferred resources. Indicated pit-constrained resources increased 71%. Nighthawk Gold Corp. plans to deliver an updated mineral resource estimate in early 2022 that will incorporate 2021 drilling.

Table 9. The 2021 mineral resource estimate for the Indin Lake Gold Property. Indicated and inferred resources for open pit and underground (UG) bulk. Gold grades are reported in grams per tonne (g/t).

Deposit	Mining method	Cut-off (g/t gold)	Indicated resource			Inferred resource		
			Tonnage (tonnes*1000)	Gold (g/t)	Gold (ounces)	Tonnage (tonnes*1000)	Gold (g/t)	Gold (ounces)
Colomac	Open pit	0.6	15,147	1.64	797,400	219	1.47	10,300
	UG bulk	1.1	19,884	1.97	1,262,000	9,485	1.97	601,800
Goldcrest	Open pit	0.6	2,003	1.5	96,800	76	1.59	3,900
	UG bulk	1.1	717	1.84	42,500	255	1.57	12,900
Grizzly	Open pit	0.6	776	1.57	39,200	23	1.24	900
Bear	UG bulk	1.1	208	1.68	11,200	59	1.51	2,900
24/27	Open pit	0.6	-	-	-	424	1.83	25,000
	UG bulk	1.1	-	-	-	184	1.80	10,600
Sub-total			38,736	1.81	2,249,100	10,724	1.94	668,300
Damoti	UG selective	2.00	-	-	-	736	4.97	117,800
Total			38,736	1.81	2,249,100	11,460	2.13	786,100

At the time of writing, assay results were outstanding for 12 of 29 holes drilled at Colomac and 3 of 15 holes drilled at the regional target Treasure Island. Nighthawk Gold Corp. attributed the delay to the COVID-19 pandemic slowing assay processing times. The results from Colomac indicated a potential for resource growth at depth. For example, hole C20-18B from Zone 1.5 returned 1.67 grams per tonne gold over 61 metres (1.72 grams per tonne gold uncut) and hole C20-07C from Zone 3.5 returned 3.00 grams per tonne gold over 32.7 metres. Drilling at Treasure Island was completed at the Main Zone and the Seadog showing. A highlight was hole T20-09 from the Main Zone, which returned 207.18 grams per tonne gold over 5.5 metres, including a single assay of 2,260 grams per tonne gold over 0.5 metres. The Laurie Lake and JPK greenfield targets of 2021 are also located on Treasure Island.

Cabin Lake Gold Project

Rover Metals Corp. reported drilling 31 holes across multiple near-surface targets in the Bugow Iron Formation at the Cabin Lake Gold Project in 2021. At the time of writing, results had been reported from 9 holes in the Beaver Zone and 13 holes in the Andrew Zone, with results for Andrew Middle still pending. The results confirm and expand historical drilling grades in both locations. Selected highlights are listed in Table 10. The Beaver Zone now extends approximately 90 metres in near-surface length and the Andrew Zone extends 800 metres. Both zones are open at depth and along strike.

On November 4, 2021, Rover Metals Corp. announced plans to construct ice drill pads to drill at the Arrow Zone. Drilling will follow up on 2020 drilling results, including 32 metres averaging 13.6 grams per tonnes. In early 2021, Rover Metals Corp. announced it had received an amendment to its exploration land use permit. The amendment allows for winter road access to the Cabin Lake Gold Project off of Highway 3 until the year 2023 and is extendable for two additional years.

Table 10. Highlighted composite assay results from 2021 drilling at the Cabin Lake Gold Project.

Hole name	Area	Drill width (metres)	Gold (grams per tonne)
CL-21-10	Beaver Zone	6.4	4.63
CL-21-15	Beaver Zone	5.8	2.13
CL-21-39	Beaver Zone	4.6	2.21
CL-21-40	Beaver Zone	4.5	0.84
CL-21-19*	Andrew South	3.1	2.57
	Andrew South	1.0	2.06
CL-21-21*	Andrew South	2.9	5.09
	Andrew South	4.7	3.38
CL21-24	Andrew South	3.9	2.91
CL-21-20	Andrew South	0.4	6.11
CL-21-25	Andrew South	2.3	2.61
CL-21-27	Andrew North	4.3	4.14
CL-21-28	Andrew North	3.2	1.19
CL-21-29	Andrew North	3.0	3.2

*Holes contain two highlighted intercepts.

Rover Metals Corp. also completed a two-part induced polarization (IP) survey in 2021. First, a proof-of-concept survey tested the IP response over a zone of proven high-grade gold in the Bugow Iron Formation. The results indicated a positive correlation between IP chargeability and sulphide content, which is associated with high-grade gold. Following this success, a larger survey was completed over the Beaver Zone, Andrew Zone, and the Camp Target. The results include a chargeability anomaly over the Beaver Zone that extends on-trend 200 metres southeast of the southernmost 2021 hole.

Up Town Gold Project

Rover Metals Corp. assigned the right to earn 75% ownership in the Up Town Gold Project to Arctic Fox Minerals Corp. (formerly Melius Capital Corp). Rover Metals Corp. will retain 25% interest in the project and Silver Range Resources Inc., the titleholder and optionee of the property, has provided its consent to the assignment.

On November 22, 2021, Rover Metals Corp. announced a drill program had been completed at the Up Town Gold Project, but no results had been reported at the time of writing this report. Rover Metals Corp. drilled multiple holes at the Fox South Zone, where successful results would extend the existing zone by 125 metres to the south. Results were still pending at the time of writing this report. Additional drilling was carried out at the No. 22 vein and at two new targets, R45 and Baker West.

South Gordon Lake Project

In August 2021, Golden Pursuit Resources Ltd. entered into purchase agreements with Mike Vaydik and David Nickerson to acquire 100% legal and beneficial interest in the AP3 mineral claim and May mineral lease, respectively. In October 2021, Golden Pursuit Resources Ltd. announced they had completed a three-week geological mapping and sampling program, and that LiDAR data collected in July 2021 was being incorporated in a data compilation for the property. In November 2021, Golden Pursuit Resources Ltd. announced they were in the process of submitting a land use permit to the Mackenzie Valley Land and Water Board to cover line cutting, ground and airborne geophysics, camp construction, geological and geochemical sampling, geological mapping, and diamond drilling. Golden Pursuit Resources Ltd. intends to commence diamond drilling in late winter to early spring of 2022.

Mon Property

In January 2021, Sixty North Gold Mining Ltd. received a renewed water licence and land use permits to build and operate the Mon Gold Mine. Sixty North Gold Mining Ltd. mobilized more than 500 tonnes of supplies, mining and support equipment to the Mon Gold Mine *via* the 45-kilometre winter road constructed from Highway 4. The first phase of reopening the Mon Gold Mine was completed by October 2021 and involved rehabilitation of 125 metres of ramp, which exposed three sections of the high-grade A-Zone vein. Sixty North Gold Mining Ltd. also carried out prospecting at a trend of gold showings at Narrow Lake on the Hangstone claims, which are contiguous to the Mon claims and are part of an option agreement with GoldMining Inc.

Plans for 2022 include further expanding the underground development as well as acquiring additional fuel storage to support an extended season and mill equipment components to enable mill expansion to 100 tonnes per day. In support of these plans, Sixty North Gold Mining Ltd. announced on February 16, 2022, construction of the winter road had been completed and mobilization of supplies would commence in March 2022.

Olympus Project

Golden Planet Mining staked an additional 7,500 hectares, bringing the area of their Olympus Project claims to over 20,200 hectares. The Olympus Project is situated between Point and Itchen lakes, centred approximately 330 kilometres north of Yellowknife. Work in 2021 included prospecting and mapping accompanied by the collection of 229 rock, 126 till, and 110 soil samples; the acquisition of 107 line-kilometres ground magnetic and Very Low Frequency electromagnetic data (VLF-em); and the acquisition of 1360 line-kilometres of airborne VLF-em. The work is targeting gold in silicate and oxide facies banded iron formation and shear zone-hosted gold. The work is following up on numerous historic high-grade drill intercepts and surface showings in metavolcanic rocks and silicate- and oxide-facies iron formation-bearing metasediments of the Contwoyto and Itchen formations. Highlights of 2021 assays include a best result of 33.8 grams per tonne gold grab sample from an arsenopyrite-bearing silicate-facies iron formation, and multiple samples grading greater than one gram per tonne gold from a variety of host rocks. Similar to other nearby iron-formation hosted gold deposits, gold mineralisation appears to be strongly structurally controlled in fold hinges and shears. Till sampling revealed numerous geochemical arsenic anomalies; gold grain and heavy mineral results for the tills are pending. The geophysical surveys have proved valuable in outlining iron formation and other conductive structures, and interpreting these in the context of the structural geology of the area. Geochemistry and geophysical data are being integrated with structural geology and geophysics to develop drill targets for summer 2022.

Base metal exploration

Pine Point Project

Osisko Metals Inc. completed 16 holes in the R190, P499, O556, and X25 deposits in the West Zone, 16 holes in the Z60 deposit in the North Trend, and 36 holes in the L65 deposit in the Central Zone. These holes were designed as infill to support the conversion of current inferred mineral resources to the indicated category, with many holes serving a dual purpose of hydrogeological characterisation. Infill holes generally confirmed historical data and met or exceeded expectations concerning the current resource block model. Selected highlights of assay results are listed in Table 11. Two additional hydrogeological holes (not intended as infill) were drilled in 2021. One hole was off-trend and did not intersect mineralisation, whereas the other hole (HG-21-PP-008) was an exploration hole that confirmed mineralisation in an isolated historical Cominco hole in area N81 on the western edge of the Central Zone. This mineralisation remains untested for 150 metres to 250 metres in all directions. Profile tracer testing was performed on 25 of 31 hydrogeological holes, and all holes were monitored for water outflow.

Infill drilling continued in late 2021 and assay results for 9 holes in the N39 deposit in the East Mill Zone were reported at the time of writing this report. The results are consistent with expectations based on the resource model and have successfully delineated the high-grade zone within the deposit. Highlights include intervals of tabular-style mineralisation listed in Table 11. Osisko Metals Inc. intends to continue infill drilling throughout 2022.

Table 11. Highlighted composite assay results from 2021 drilling at the Pine Point Project.

Hole name	Area	Deposit	Drill width (metres)	Zinc (%)	Lead (%)	Zinc + Lead (%)
R190-21-PP-001	West	R190	27.50	31.15	11.57	42.72
R190-21-PP-002	West	R190	25.8	24.39	14.74	39.13
R190-21-PP-003*	West	R190	7.00	6.33	1.50	7.83
	West	R190	8.80	9.38	1.70	11.08
P499-21-PP-001	West	P499	79.00	6.26	3.61	9.87
O556-21-PP-001	West	O556	46.50	4.36	4.86	9.22
X25-21-PP-001	West	X25	21.0	9.40	3.76	13.16
X25-21-PP-002	West	X25	32.0	20.28	12.02	32.30
Z60-21-PP-001	North	Z60	4.5	17.95	2.25	20.20
Z60-21-PP-006	North	Z60	10.70	10.5	0.25	10.75
L65-21-PP-009	Central	L65	6.00	7.11	1.73	8.84
L65-21-PP-033B	Central	L65	6.00	20.06	0.72	20.78
HG-21-PP-008	N81	NA	6.00	3.72	0.79	4.51
N39-21-PP-002	East Mill	N39	4.80	18.79	0.82	19.61
N39-21-PP-007	East Mill	N39	2.00	16.89	4.56	21.45
N39-21-PP-010*	East Mill	N39	2.00	10.27	1.55	11.82
	East Mill	N39	2.00	15.97	4.62	20.59

NA – not applicable.

*Hole contains two highlighted intercepts.

Preliminary results from the hydrogeological program indicate underground water flow is primarily controlled by subvertical faults and fracture zones rather than formational aquifer flow, as was assumed in the hydrogeological analysis carried out in the 2020 preliminary economic assessment. The initial analysis of the new data indicates significant reduction in water inflow rates into proposed mine workings. Combined with better mine sequencing, Osisko Metals Inc. expects the reduced inflow rates to yield substantial cost savings due to lower dewatering cost estimates. Osisko Metals Inc. expects to complete a 3D hydrogeological model in early 2022.

On July 14, 2021, Osisko Metals Inc. announced re-logging and re-assaying of historical Cominco drill core had been ongoing since June. On July 27, 2021, they announced the launch of a Scope 1 level estimation of greenhouse gas emissions of the operational concept included in the 2020 preliminary economic assessment, which incorporated several measures that are expected to keep emissions relatively low. These measures include pre-concentration of ore *via* sorting and drawing on local hydroelectric power and rail access for transportation to smelters. Osisko Metals Inc. will conduct a concurrent trade-off study to evaluate the potential for alternative on-site renewable energy generation and the incorporation of novel energy storage solutions.

On January 13, 2022, Osisko Metals Inc. announced an update of the 2020 preliminary economic assessment was underway and following completion, Osisko Metals Inc. will initiate work on the feasibility study with a target completion date of late 2023. Osisko Metals Inc. is also working to advance the developer's assessment report, which they expect to submit in early 2023.

Prairie Creek Mine

NorZinc Ltd. completed 736 metres of surface diamond drilling in 2021 as part of a program targeting the inferred resource of the Main Quartz Vein mineral zone. Hole PC-20-226 intersected 1.00 metre at 391 grams per tonne (12.6 ounces per tonne) silver, 21.3% zinc, 10.1% lead, and 1.6% copper, for a combined grade of 49.2% zinc equivalent. Although 533 metres were drilled in a second hole, the target depth was not reached before the conclusion of drilling and no samples were assayed.

Results from a preliminary economic assessment for a 2,400 tonnes per day mine plan with a mine life of 20.3 years predicts an after-tax net present value of \$299 million at a discount rate of 8%, an after-tax internal rate of return of 17.7%, and an after-tax payback period of 4.8 years (Table 12). The preliminary economic assessment incorporated an updated mineral resource estimate of 9.8 million tonnes of total measured and indicated resources at 22.7% zinc equivalent, which is a 15% increase in total measured and indicated tonnage compared with the 2015 mineral resource estimate. The 2,400 tonnes per day mining and milling rate is higher than the 1,600 tonnes per day on which the 2017 feasibility study was based. To reflect the increase in processing, NorZinc Ltd. applied for amendments to their water licence and land use permit; the Mackenzie Valley Land and Water Board has confirmed that the project will not be referred to environmental assessment. Furthermore, NorZinc Ltd. signed an amended agreement with smelting company Boliden Commercial AB that extends the existing memorandum of understanding through June of 2023 and increases the quantity of zinc sulphide concentrates to be delivered.

Table 12. Results from the preliminary economic assessment for the Prairie Creek Mine.

Prairie Creek Mine zinc-lead-silver project preliminary economic assessment	Reported values
After-Tax Internal Rate of Return ("IRR")	17.7%
After-Tax Net Present Value ("NPV") (Discount Rate 8%)	US\$299 million
After-Tax Payback Period	4.8 years
Pre-Production CAPEX	\$368 million
Sustaining Capex and Closure Costs	\$332 million
Average Annual Payable Silver	2,551 thousand ounces
Average Annual LOM Production Zinc	122 million pounds
Average Annual LOM Production Lead	101 million pounds
Life of Mine ("LOM")	20.3 years
Total Mineral Resources Mined	17.2 million tonnes
Average zinc equivalent Diluted (12%) Grade of Mineral Resources Mined	17.10%
Gross Revenue After Royalty (LOM)	US\$6,274 million
After-tax Free Cash Flow (LOM)	US\$1,121 million
Average Annual EBITDA	US\$123 million
C1 Costs over LOM (By-Product; zinc)	US\$0.19 per pound
C3 Costs over LOM (By-Product; zinc)	US\$0.60 per pound
C1 Costs over LOM (Co-Product; zinc equivalent)	US\$0.73 per pound
C3 Costs over LOM (Co-Product; zinc equivalent)	US\$0.92 per pound
Zinc Price - Flat (LOM)	US\$1.20 per pound
Lead Price - Flat (LOM)	US\$1.05 per pound
Silver Price - Flat (LOM)	US\$24.00 per ounce
FX Rate (CAD:USD)	1.25

NorZinc Ltd. signed a road benefit agreement with the Lídłı́ Kúé First Nation of Fort Simpson, along with a letter of agreement linking the road benefit agreement with the impact benefit agreement signed in 2011. These agreements are related to the construction and operation of the all-season Pioneer Winter Road that will connect the Prairie Creek Mine to the Liard Highway. Construction of the road was expected to begin in the winter of 2022 but on December 20, 2021, NorZinc Ltd. announced construction would be delayed by up to one year due to unexpected regulatory requirements. This will postpone the concentrate production by approximately one year from the estimated start date at the end of 2024.

Other commodities

Nechalacho Project

During 2021, Vital Metals Limited carried out exploration drilling in the Tardiff Zones to plan for its Stage 2 mining. The Tardiff deposit has about 95 million tonnes of mineral resources, making it larger than the North T Zone mined in 2021. Drilling targeted three high-grade REO zones (Tardiff Zones 1, 2, and 3) identified in wide-spaced historical drilling by Avalon Advanced Materials Inc. and its predecessors. The focus of historical drilling was the deeper, HREE-rich Basal Zone, which occurs below the Vital Metals Limited-owned Upper Zone. The holes were drilled as fans from a few drill pads, which resulted in poor definition of the Upper Zone mineralisation. Vital Metals Limited drilled a total of 29 holes including 19 holes in Zone 1, 5 holes in Zones 2, and 5 holes in Zone 3. The holes were drilled vertically to a maximum depth of 72 metres. Drilling in Zone 1 and Zone 3 was on a 25 metre by 25 metre grid to delineate and upgrade the higher-grade mineralisation to the measured and indicated categories and allow for appropriate mine planning. Drilling in Zone 2 was exploratory in nature, designed to better constrain high-grade REO mineralisation outside the 2019 mineral resource estimate.

The 29 holes intersected thick, high-grade mineralisation near the surface, and mineralisation remains open in all directions. Highlights of the assay results are summarised in Table 13. This demonstrates the potential for broad high-grade mineralisation of the Upper Zone. Zone 2 mineralisation shows potential to add more resources to the current mineral resource estimate. In addition to rare earth element mineralisation, the Tardiff Zone also contain significant grades of zircon and niobium that may provide future revenue opportunities.

Following the positive results from 2021 drilling, Vital Metals Limited is planning additional delineation drilling in the three Tardiff Zones to further constrain the high-grade mineralisation and determine the relationship between zones, including whether the Tardiff Zones are continuous. The program will also test the depth extent as some of the holes ended in mineralisation.

Vital Metals Limited completed a scouting metallurgical test on a 770-kilogram bulk sample collected from Tardiff Zone 1. Parameters tested included grindability; ore sorting using an XRT-based sensor; heavy liquid, gravity, and magnetic separation; acid leaching; and flotation. The results were promising and suggest the ore can be processed using a similar flowsheet designed for the North T Zone. However, due to the finer-grained nature of the bastnaesite from the Tardiff Zones, further optimisation is required to achieve a concentrate with >35% TREO and 75% recovery. This will include additional beneficiation steps such as gravity separation and flotation.

Table 13. Highlighted composite assay results from 2021 drilling at the Nechalacho Project.

Zone	Hole name	From (metres)	To (metres)	Interval (metres)	TREO grade (%)
Tardiff Zone 1	L21-551	35.75	50.3	14.55	2.48
	L21-555	36	49	13	3.12
	L21-559	15.3	41.1	25.8	2.56
	L21-563	11.4	72.3	60.9	1.92
	L21-564	16	56	40	2.54
	L21-565	11.5	43.3	31.8	4.35
	<i>Including</i>	11.5	22	10.5	9.16
	L21-566	15.5	56	40.5	2.35
	L21-550	35	52.6	7.1	1.97
Tardiff Zone 2	L21-567	3	25.6	22.6	1.54
	L21-567	37	50	13	1.53
	L21-568	3.8	9	5.2	2.36
	L21-568	16.6	19.4	2.8	3.92
	L21-569	8	11.5	3.5	1.88
	L21-569	24.9	50	25.1	3.03
	L21-570	12	31	19	2.05
Tardiff Zone 3	L21-572	22.75	33	10.25	1.83
	L21-572	37	50	13	2.31
	L21-573	14.5	51.2	36.7	1.96
	L21-573	57.6	62	4.4	2.2
	L21-574	11	62	51	2.13
	L21-575	3.8	29.8	26	1.87
	L21-576	5.3	17	11.7	1.71

NICO Project

In 2021, Fortune Minerals Limited completed an exploratory drill program comprising 13 holes on its 100% owned NICO Cobalt-Gold-Bismuth-Copper project. The drilling was designed to test four targets identified by reconciling the modelled deposit geometry with three-dimensional modelling of IP and ground magnetic survey conducted in 2020. Six holes were drilled to test the east strike extension of the NICO deposit where coincident magnetic, chargeability, and resistivity anomalies have been identified. Four holes were drilled to test the potential extensions of the Peanut Lake Zone mineralisation along strike with a high chargeability anomaly. Two holes tested the strike extension of the Ralph Zone in an area with coincident strong magnetic and chargeability high anomalies. Finally, one hole was drilled in the Roadcut Zone to test the source of altered and sulphide mineralised boulders discovered during a road construction on the lease. Assay results for the drill program were pending at the time of writing.

On November 5, 2021, Fortune Minerals Limited hailed the completion and opening of the Tłı̄ch̄q All-Season Highway that links the community of Whatı̄ to Highway 3. The road is a key enabler for Fortune Minerals Limited NICO Project. The new all-season road will be used in conjunction with a spur road that Fortune Minerals Limited plans to build to allow trucking of metal concentrates to the railway at Enterprise or Hay River for delivery to the planned refinery in southern Canada.

Beside the NICO project, Fortune Minerals Limited also owns the satellite Sue-Dianne Copper-Silver-Gold Deposit located 25 kilometres north of the NICO Project mine site and is a potential future source of incremental mill feed to extend the life of the NICO mill and concentrator.

In January 2022, Fortune Minerals Limited entered into an option agreement with JFSL Field Services ULC, a wholly-owned subsidiary of a large international engineering company, to purchase a steel fabrication plant located in Lamont County, northeast of Edmonton in Alberta's industrial heartland. Fortune Minerals Limited intends to use the brownfield site to construct a hydrometallurgical refinery to process concentrate from the NICO project.

In September 2021, Fortune Minerals Limited announced it had received indicative terms from a large waste disposal and environmental services company to dispose of the process residue from the planned refinery for the NICO project. The waste disposal company provided its quote after reviewing the chemistry and environmental characteristics of the process residue previously produced in Fortune Minerals Limited pilot plant.

Mining Incentive Program (MIP)

The Mining Incentive Program (MIP) was launched in 2014 to help increase levels of mineral exploration in the Northwest Territories. The program is administered by the Northwest Territories Geological Survey and provides funding to prospectors and exploration companies to conduct mineral exploration in the Northwest Territories. Between 2014 and 2018, the MIP has provided nearly \$3 million in government support to Northwest Territories mineral exploration projects. This \$3 million investment resulted in additional project spending of nearly \$12 million from MIP recipients.

In 2020-2021, the Government of Northwest Territories invested \$1.1 million in grassroots mineral exploration through the MIP. This funding was dispersed to 19 exploration projects comprising 12 prospectors and 7 companies. The 2019-2020 and 2020-2021 fiscal years saw several MIP-funded projects negatively affected by COVID-19. By way of support, MIP reporting requirements for the affected projects were extended to 2021-2022. Final figures for total MIP funding awarded and leveraged exploration spending for 2019-2021 will not be known until all projects have completed their reporting. Preliminary reporting suggests that despite the negative influence of the pandemic, MIP results for 2019-2021 are positive and in-line with those of recent years.

In 2021-2022, the Government of Northwest Territories awarded \$1 million through the MIP to 14 successful applicants (7 corporate and 7 prospectors), primarily for early-stage mineral exploration projects (Tables 14 and 15). In August 2021, the Canadian Northern Economic Development Agency (CanNor) confirmed an additional \$500,000 in funding to support a second call for MIP applications, bringing the total program budget for the year to \$1.5 million. This one-time CanNor MIP funding was awarded to five advanced-stage exploration projects. Each project received \$100,000 to support work taking place between September 2021 and March 2022 (Table 16).

Table 14. Government of Northwest Territories Mining Incentive Program – 2021-2022 recipients (Prospectors).

Recipient and project	Commodity	Funding awarded
Blake Mowbray – Copper Goat/ Golden Goat	Gold/Base metals	\$18,484
Danny Yakeleya – Summer 2021 Prospecting on the Northwest Territories/Yukon Border	Gold	\$18,750
Dave Nickerson – Circle Two Project	Uranium	\$18,000
Dave Smith – Drumlin	Barite/Gold/Diamonds	\$18,750
Jared Suchan – Curiosity	Diamonds	\$20,000
Lane Dewar – Jax Lake Gold Project	Gold	\$18,750
Ryan Bachynski – Tharis 1	REE	\$21,250
	Total	\$133,984

Table 15. Government of Northwest Territories Mining Incentive Program – 2021-2022 recipients (Corporate).

Recipient and Project	Commodity	Funding awarded
Arctic Star Exploration Corp. – Diagrass	Diamonds	\$180,000
NorZinc Ltd. – Prairie Creek	Zinc-Lead-Silver	\$96,000
Fortune Minerals Ltd. – NICO	Cobalt, Gold, Base metals	\$144,000
Golden Planet Mining Corp. – Olympus	Gold	\$120,000
Gold Terra Resource Corp – Mispickel	Gold	\$39,388
Kennady Diamonds Inc. – Kennady North	Diamonds	\$168,000
Rover Metals Corp. – Cabin Lake Properties	Gold	\$120,000
	Total	\$867,388

Table 16. Government of Northwest Territories Mining Incentive Program – 2021-2022 CanNor supported funding recipients.

Recipient and Project	Commodity	Funding awarded
Cheetah Resources Corp. – Nechalacho	REE	\$100,000
Fortune Minerals Ltd. – NICO	Cobalt, Gold, Base metals	\$100,000
Gold Terra Resource Corp. – Campbell Shear South	Gold	\$100,000
Kennady Diamonds Inc. – Kennady North	Diamonds	\$100,000
Rover Metals Corp. – Cabin Lake - Arrow Zone	Gold	\$100,000
	Total	\$500,000

Please note that the amounts given reflect the current allocation at the time of writing and that final funding amounts are dependent on the approval of final reports and expenses.

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