

# An Overview of Mining and Exploration Activities Northwest Territories November 2002



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## Introduction

The Northwest Territories constitutes 13.48% of Canada's total landmass and its geological record spans billions of years. As such, the territory is richly mineralized, hosting a wide variety of commodity types. For many years precious and base metal mines formed the mainstay of the territories' mining industry. However, the industry is now centred on the emerging diamond mines, which are set to dominate the territories' economy for many years to come.

On April 1, 1999, the territory of Nunavut came into existence, along with the new Northwest Territories. The move removed the Lupin Gold Mine, as well as, the Polaris and Nanisivik base-metal mines from the Northwest Territories but saw Ekati Diamond Mine<sup>TM</sup>, Canada's first diamond mine, reach full production in the NWT.

## Mineral Production Summary

The total value of metal and diamond shipments from the Northwest Territories increased to \$901.13 million in 2001 from \$685.16 million in 2000. The rise can be ascribed to an increase in diamond production (3.7 versus 2.5 million carats respectively), partially offset by a decrease in diamond prices. The value of gold shipments remained relatively static at around \$55 million. A small amount of silver was also produced.

Diamond shipments accounted for 94% of the total value of mineral production in the Northwest Territories in 2001, with gold making up most of the remainder. The territory accounted for 100% of Canadian diamond production and around 3% of gold production during the same period. The CanTung tungsten mine was re-opened in 2002.

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## PRODUCING MINES

### GIANT AND CON GOLD MINES

Con Mine began operating in 1938 and has produced 5.5 million ounces of gold to date. Giant Mine was brought into production in 1948 and has produced over 7 million ounces of gold. Both are mature mines nearing the ends of their mine lives.

Operations at Miramar Con Mine Ltd. were suspended owing to a labour dispute from May 1998 to April 1999. Mining resumed in July 1999 under a five-year plan. In December 1999, Miramar Giant Mine Ltd. was formed as a subsidiary of Miramar Mining Corporation (Miramar) to acquire the assets of the Giant Mine from the Department of Indian Affairs and Northern Development (DIAND). Miramar calculated that the acquisition would allow the company to boost production at the combined operations to around 130,000 ounces per year, while reducing cash operating costs to under US\$260 per ounce.

In December 1999, the Con autoclave was successfully recommissioned to process refractory ore concentrates. By mid-February 2000, the autoclave was consistently processing 500 tons per day of refractory ore from both Con and Giant mines. Production statistics for Con Mine are tabulated below.

Year	Production (ounces gold)	Operating Costs (\$US/oz)	Comments
1997	94,410	351	
1998	23,477 <sup>1</sup>	343	Operations suspended owing to a labour dispute from May 1998 to April 1999.
1999	38,678 <sup>2</sup>	272	
2000	121,874 <sup>3</sup>	264	
2001	129,607	256	
2002 1 <sup>st</sup> Quarter	31,749	240	
2002 2 <sup>nd</sup> Quarter	25,791	197	
2002 3 <sup>rd</sup> Quarter <sup>e</sup>	37,000		The price of gold as at October 28, 2002, was \$US315 per ounce.

<sup>1</sup> For the period from January 1 to May 13, 1998

<sup>2</sup> For the period from July 1 to December 31, 1999

<sup>3</sup> Output from Giant included from year 2000 onwards

<sup>e</sup> Estimated

Miramar has been able to reduce cash operating costs at Con, through increases in production together with cost reduction measures. Approximately 82,000 tons of ore were mined during the second quarter of 2002, with production from Giant accounting for 20% of the total. Giant's contribution represents a substantial proportion of the total and the mine has therefore played an integral role in lowering operating costs at Con. Reserve estimates for the Con and Giant Mines as at December 31, 2001, are tabulated below:

Operation	Tonnes	Grade (grams per tonne)	Kilograms Gold	Ounces Gold
Con Mine	860,000	11.79	10,195	324,000
Giant Mine	94,000	11.95	1,152	36,000
<b>Total</b>	<b>954,000</b>	<b>11.89</b>	<b>11,347</b>	<b>360,000</b>

The reserve estimates are based on a \$US280 per ounce gold price.

Miramar has accelerated the treatment of arsenic wastes at Con. Just over 8,300 tonnes of waste material were treated during 2001, leaving 10,900 tonnes to be treated. Miramar expects all of the Con arsenic wastes to have been processed by mid-2003.

**EKATI DIAMOND MINE™** (BHP Billiton 80%, C. Fipke 10%, S. Blusson 10%)

The Ekati Diamond Mine™ was opened on October 14, 1998 in the sub-Arctic barren lands of the Northwest Territories, 300km northeast of the city of Yellowknife. A total of 136 kimberlite pipes have been identified on the property, and 20 of these have been bulk sampled. Of the 20 pipes, eight are in the current mine plan. In excess of 70 million tonnes of ore, and approximately 508 million tonnes of waste rock, are scheduled to be mined over the life of the project. Ore grades are in the order of one carat per tonne (one carat equals 0.2 grams). Seven of the eight pipes in the mine plan will initially be mined via open pit. The Panda and Koala pipes will subsequently be exploited via underground methods because of the higher value of their ore. The Koala North pipe will be exploited by underground methods only.

The ore is currently being processed at a rate of 9,000 tonnes per day, but it is planned to increase to 18,000 tonnes from 2007 onwards. The mine life is currently predicted at 17 years.

The Ekati Diamond Mine™ produces around 4 million carats of predominantly gem and industrial quality diamonds a year, about four per cent of current global production by weight, and six per cent by value.

Production statistics for Ekati are tabulated below.

<b>Year</b>	<b>Diamond Production (000 carats)</b>
<b>1998</b>	278
<b>1999</b>	2,496
<b>2000</b>	2,533
<b>2001</b>	3,691
<b>2002 (estimated)</b>	4,086

Ekati ore reserve estimates as of June 31, 2001 are tabulated below

Pipe	Proven (mt)	Probable (mt)	Total (mt)	Grade ct/t	Avg Value US\$/ct
Panda	3.7	1.9	5.6	0.90	150*
Panda (ug)	1.5	1.1	2.5	0.80	150*
Koala	6.4	2.3	8.8	0.76	122
Koala (ug)	1.2	2.1	3.3	1.50	122
Misery	5.1	0.9	6.0	3.50	26
Fox	8.1	8.3	16.4	0.30	125
Sable	12.0	3.0	15.0	0.80	65
Koala North	0.1		0.1	0.40	200
Koala North (ug)		1.3	1.3	0.40	200
Total			59.0	1.00	79

\*assumption

Ekati resources (all mineral resources) for additional pipes as of June 31, 2001 are tabulated below

Pipe	Total (mt)	Grade (ct/t)
Beartooth*	1.4	1.1
Pigeon*	4.4	0.5
Jay	17	2.1
Lynx	1.4	0.8

\* in mine plan

#### **DIAVIK DIMOND MINES INC** (Diavik 60%, Aber 40%)

Permitting and licensing approvals were obtained from the federal government in late 1999 for the Diavik Diamond Project (Diavik). Construction of the mine, at a cost of \$1.3 billion, is currently near completion. During the 2001 winter road season, 4,089 truckloads of fuel, construction materials and equipment were hauled to the project site.

Diavik is scheduled to commence production in the first quarter of 2003. Reserves are estimated at 25.6 million tonnes grading at 4.15 carats per tonne making the deposit one of the richest in the world. A 20-year mine life is envisaged with diamond production averaging 5.4 million carats per year. Diamond prices are expected to be \$US63.74 per carat.

Diluted proven and probable reserves for Diavik are listed below (2000 feasibility study)

Pipe	Total (mt)	Grade (ct/t)	Value US\$/ct	Value US\$/t
A154S	11.7	5.21	79	412
A154N	1.3	3.48	33	115
A418	8.7	3.40	56	190
A21	4.0	2.95	28	83
Total	25.7	4.16	65	271

### CANTUNG TUNGSTEN MINE

North American Tungsten (NAT) owns both the CanTung Mine and the MacTung deposit, located in the Deh Cho and Sahtu regions, respectively. Both are situated on the NWT/Yukon border and contain approximately 15% of the western world's known tungsten resources. The CanTung Mine operated from 1962 to 1986; it was subsequently closed due to low commodity prices and placed on care-and-maintenance. The MacTung deposit is undeveloped at this time but contains substantial reserves of tungsten.

CanTung resumed operations, crushing the first tungsten ore in January 2002, and beginning commercial production in March/April 2002. Production statistics for the mine are tabulated below.

Year	Production (MTU) <sup>1</sup>	Production Costs (\$Cdn/MTU)	Comments
2002 1 <sup>st</sup> Quarter	34,700		
2002 2 <sup>nd</sup> Quarter	90,698	75.47	Revenues were \$81.31/MTU

<sup>1</sup> One MTU (metric tonne unit)= 10kg of tungsten concentrate

## 2002 EXPLORATION SUMMARY

Exploration expenditures in the NWT are expected to total \$37.7 million in 2002, a significant drop from the \$86.6 million spent in 2001. Furthermore, a large proportion of this exploration money is being spent on deposit appraisal rather than grassroots exploration - \$16.4 million versus \$21.3 million respectively. (Deposit appraisal includes engineering studies, environmental studies and additional drilling to firm up on grade and tonnage estimates of known mineral deposits, while grassroots exploration involves the discovery of new mineral deposits.)

Exploration expenditures for Canada as a whole are expected to total \$501.1 million in 2002. Expenditures in the NWT therefore account for around 7.5% of the total.

Some more advanced mineral exploration and development projects in the NWT are detailed in the table below.

Project	Commodity	Owner	Tonnage (million tonne)	Grade
<b>Diavik (mine under construction)</b>	Diamonds	Diavik 60%, Aber 40%	25.60	4.15 carats per tonne
<b>Snap Lake</b>	Diamonds	De Beers 100%	24.40	1.51 carats per tonne
<b>Kennady Lake (Gacho Kué)</b>	Diamonds	Mountain Province 44.1%, Camphor 4.9%, De Beers 51%	29.06	1.51 carats per tonne
<b>Damoti Lake</b>	Gold	Standard Mining Corp. 100%	0.41	12.91 grams per tonne gold
<b>Discovery Mine/Nicholas Lake</b>	Gold	Tyhee Development Corp. 100%	1.04	13.99 grams per tonne gold (indicated resources only)
<b>NICO</b>	Cobalt, gold, bismuth, copper	Fortune Minerals 80%, Private Company 20%	35.40	0.11% cobalt, 0.6 grams per tonne gold, 0.13% bismuth
<b>Prairie Creek</b>	Zinc, lead, silver	Canadian Zinc 100%	11.8	12.5% zinc, 10.1% lead, 161 grams per tonne silver
<b>Howard's Pass</b>	Zinc, lead	Placer Dome 51%, Cygnus Minerals 49%	113.4	5.4% zinc, 2.1% lead
<b>Lake Zone, Thor Lake</b>	Tantalum	Highwood Resources/ Navigator	65	0.03% Ta <sub>2</sub> O, 0.4% Nb <sub>2</sub> O <sub>5</sub>
<b>"M" Zone, Hart property</b>	Zinc, lead, silver gold	Solid Resources 49%, Tri-Star Syndicate 51%	1.2	5.10% zinc, 2.2% lead, 337 grams per tonne silver, 0.6 grams per tonne gold

Work was carried out on approximately 45 exploration projects in the NWT in 2002. Of this total, 33 projects were focussed on diamonds and 12 on various metals (i.e., precious metals, base and steel industry metals, industrial metals).

## DIAMONDS

Diamond exploration highlights and developments for 2002 are as follows and are shown on Figure 1:

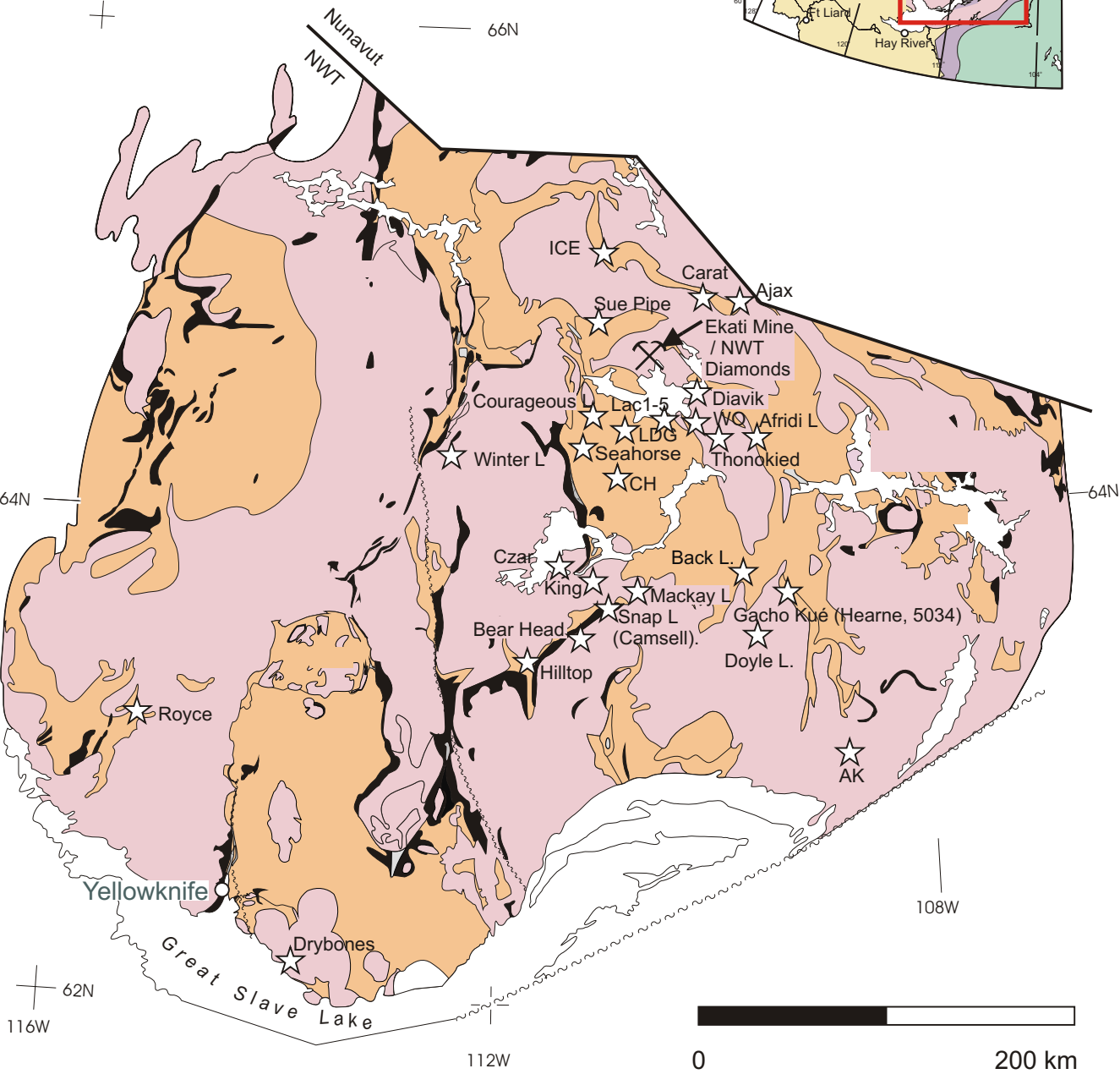
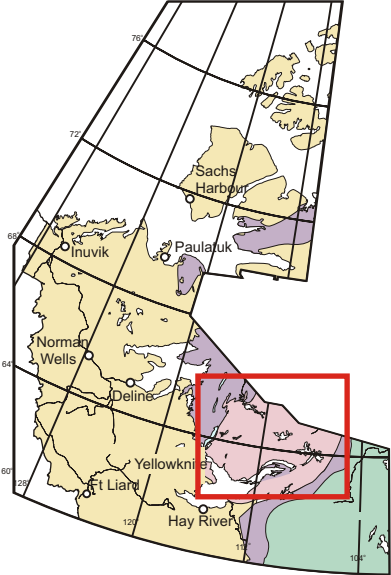
- **Almaden Minerals Ltd.** conducted a three-hole drill program on their **MacKay Lake** property. No kimberlite was intersected. Each target was a resistivity low, and two are explained by the presence of graphite conductors, the third anomaly remains unexplained. The MacKay Lake property is a joint venture of **ATW Resources** (75%), **Aberex Minerals Ltd.** (15%), and **SouthernEra Resources** (10%). ATW Resources in turn is owned by **Almaden Minerals Ltd.** (40%), **Troymin Resources Ltd.** (20%) and **Williams Creek Explorations Ltd.** (40%).
- **Cantech Resources Ltd** acquired 100% of the **Outram Lakes** property from **Mayan Minerals**. The Outram Lakes property consists of 13 mineral claims covering approximately 30,000 acres.
- **Cantech Resources Ltd** acquired a 100% interest in the **Baylee Mineral** claims from a private company. The property is 18,077 acres in size and is comprised of two claim blocks. One is 32 kilometres southwest of Snap Lake and the other is 40 kilometres east of the Snap Lake property.
- **DHK Diamonds Inc**, a private company, reported that Archon Minerals Ltd had intersected crater facies kimberlite on the **WO claim block (Dentonia Resources Ltd., Horseshoe Gold Mining Inc, Kettle River Resources)**, with Archon as operator of the program. A total of four targets were tested, with three negative and one positive result. The new kimberlite is located approximately 2.1 kilometres south-west of DO-27 and DO-18 and 200 metres north of DO29N. The kimberlite target was generated through a combination of Falcon and topographic interpretations.
- **Diamondex Resources Ltd.** conducted a 2,000 line kilometer airborne Mag/EM survey over the **Czar property**. In addition, ground magnetics, resistivity, and gravity surveys were conducted over 5 high priority targets. A total of 288 till samples were taken. The Czar property is 100% owned by Diamondex and covers 77,000 acres in a contiguous claim block.
- **Diamondex Resources Ltd** conducted detailed ground surveys (magnetics, resistivity, and gravity) over 10 high priority targets on the **Bear Head** property (75M/06). Of the 10 targets three have been selected for a fall drill program. A total of 305 till samples were taken on the property. The Bear Head property is 10% owned by Diamondex and covers 353,000 acres.
- **Diamondex Resources Ltd.** has a winter 2003 drill program planned for the **Hilltop property** (75M/02-06). Targets are focused along an unresolved kimberlite indicator train. The Hilltop property is 100% owned by Diamondex and covers 215,000 acres in contiguous claim blocks.
- **Diamondex Resources Ltd.** continued to evaluate a 2-D seismic survey undertaken in 2001 and conducted an additional 3.6 line-kilometre survey in spring 2002 on their wholly owned **King Property** (75M/10). Interpretation of the new seismic data is anticipated to show lateral and vertical variations within the package of kimberlite dykes beneath the property. Data from the 2001 2-D seismic survey clearly defined the Snap Lake dyke at depth, the 2002 survey was conducted at right angles to the original 7.6 line-kilometre survey line. Twenty anomalies were selected for detailed ground geophysical surveys. Subsequent



**Fig.1: Northwest Territories  
Diamond Exploration  
Southern Slave Province**

**Slave Archean Geology**

- Plutonic rocks
- Metasediments, migmatite and plutonic rocks
- Metavolcanics
- Active Diamond Projects



drilling tested 7 targets with 8 holes, totalling 1,410 metres. No kimberlite was intersected. A sampling campaign was designed to collect some 200 follow-up samples on the property.

- **Diamondex Resources Ltd.** released caustic fusion results for the CT-55 kimberlite on the **Carat property** (76D/15, 16; 76E/01, 02). A total of 242 kilograms of kimberlite were processed and 2 micro diamonds were recovered. Diamondex and its joint venture partner, **Tyler Resources** are re-evaluating all exploration data for the property.
- **Diamondex Resources Ltd.** staked the 56,000acre **Ajax property** in 2002. The 23 claim block adjoins the eastern boundary of the Carat claim block. Plans include a 200 till sample campaign.
- **Diavik Diamond Mines Inc.** conducted exploration on the **Diavik claim block**. Exploration consisted of ground based geophysical surveys, detailed and regional geochemical surveys and diamond drilling. Mini-bulk samples were taken from two kimberlite pipes, results from the sampling are pending. Three new kimberlites were discovered bringing the total number of pipes on the property to 63.
- **Geodex Minerals Ltd.** optioned several claim blocks in the Lac de Gras area from Trevor Teed. Plans for the 5 contiguous **Lac1-5 claims**, located west of the Diavik mine, include a till sampling program during the fall of 2002.
- **GGL Diamond Corporation** announced the discovery of three hypabyssal spinel phlogopite serpentine kimberlite bodies on the 100% owned **Seahorse property** (76D/06, 11). The property consists of 62,000 acres and is located approximately 40 kilometres south southwest of the Ekati Diamond Mine™. The three bodies occur along a south-west trend and are strong magnetic high anomalies. Drillhole CH02-08SE was the first body intersected, CH02-09SE kimberlitic body was drilled approximately 670 metres south southeast of the first body intersected, hole CH02-10SE was drilled approximately 350 metres southeast of CH02-09SE. All holes intersected kimberlite intruding a metasedimentary package. A total of 339.4 kilograms of kimberlite were submitted to Saskatchewan Research Council for caustic fusion. No micro or macro diamonds were recovered.
- **GGL Diamond Corporation** continued follow up heavy mineral sampling on the **Seahorse** (161 samples), **Starfish** (261 samples), **Mackay** (49 samples), and **Winter Lake North** (128 samples). New sampling was carried out on the **Winter Lake South** (89 samples) and **G claims** (152 samples). A total of 874 till samples and 971 soil samples were collected on properties listed above and elsewhere in the Slave Craton of the NWT.
- **GGL Diamond Corporation** reported on the results of a 136 glacial sediment sample survey conducted in 2001 over the **Doyle Lake LA 1-25** mineral claim (75N/02-07). Two samples in the Squiggly Lake dispersion train contain counts of 10 and 3 garnets, from a follow up program of 32 samples. In addition, a follow-up program of 16 samples was undertaken to further elucidate the nature of one sample – a 4 garnet anomaly on the eastern portion of the claim. **DeBeers Canada Exploration Ltd.** has earned a 60% interest in the property and is operator for the LA1-25 claims. To the north the Doyle LA 1-25 property adjoins the Mountain Province Mining Inc. property AK.
- **GMD Resources** announced work done on the **Royce Group** of claims (85O/2, 3, 5-7, 10-14). **BHP Billiton** drilled four holes on exploration targets generated by BHP Billiton's Falcon gravity system, no kimberlite was intersected. Two of the holes tested lake-based coincident gravity low/EM conductors. The anomalies were selected from a 3,500 line-kilometre Falcon gradiometer airborne survey at a line spacing of 100 metres. Results from 106 till samples

collected in 2001 were successful in 'cutting off' 4 indicator trains, a fifth train remains open. Indicator mineral chemistry indicates each train has a distinct chemistry.

- **Kalahari Resources Ltd.** reported that a 1,453 line-kilometre airborne magnetic and EM survey was flown on the **Back Lake project** (75M/08, 75N/05). The intent of the survey was to locate the sources of the North Margaret Lake and South One kimberlite indicator trains. A total of 160 till samples were taken in August to further evaluate the trains.
- **Mountain Province Mining Inc.** announced that DeBeers Canada Exploration Inc. had completed a 10 hole program into sill-73 at MZ lake on the **AK claims** (75N/06, 11). The program was designed to better define the sill's thickness and size in conjunction with further microdiamond analysis. The thickness of kimberlite recovered ranges from 7cm to 2.19 metres and the sill appears to have a strike length of at least one kilometre. DeBeers also drilled an additional seven holes (HQ) into the Tuzo pipe to better define the internal geology and diamond grade in underexplored portions of the pipe. Two of the holes were drilled to depths of 300 metres, the remaining holes were drilled to 130 metres. The deeper holes were parallel to two 1999 bulk sample holes, this should allow for calibration of microdiamond to bulk sample grades.
- **Mountain Province Mining Inc.** announced that **DeBeers Canada Exploration Inc** had received results from the bulk sampling of the **Hearne** and **5034** kimberlite bodies (75N/06, 11). From the Hearne pipe a total of 1,174 carats were recovered from 665.5 tonnes of kimberlite. The three largest diamonds recovered weigh 8.7, 6.4, and 4.9 carats. The number of diamonds greater than 0.50 carats (207) is proportionately (to total carats recovered) greater than that of the 1999 and 2000 bulk samples. The Hearne kimberlite consists of two bodies. The main portion of the pipe is the North lobe, an elongated pipe over 250 metres in length trending north-south. The south lobe trends E-W and is approximately 100 metres long. The 2002 bulk sampling focussed on the North lobe.

**Hearne 2002 Bulk Sample Results**

Drill Hole	Tonnes (in situ)	Carats	Grade Ct/t
2002-101	122.2	283.4	2.32
2002-99	149.6	267.2	1.79
2002-103	100.7	228.8	2.27
2002-105	104.7	222.1	2.12
2002-91	188.3	172.5	0.92

**Hearne 2002 Bulk Sample Results**

Bulk Sample Year	Carats	#diamonds >2 carats	#diamonds >1 carat*	#diamonds btwn 0.5 and 1 carat
2002	1174	13	50	157
2001	751	6	27	74
1999	846	9	40	90

\*includes those diamonds > 2.0 carat

For the 5034 kimberlite a total of 1,215 carats were recovered from 836 tonnes of kimberlite, the three largest diamonds recovered weigh 7.0, 6.6, and 5.9 carats. Seventy diamonds greater than 1.0 carat were recovered. Bulk sampling targeted the western and central lobes of the 5034 body. The 5034 kimberlite is comprised of an east, center, west, and north lobe. The first three lobes listed above are approximately the same size.

#### 5034: 1999 and 2002 Bulk Sample Results

Drill Hole	Tonnes	Carats	Grade ct/t
WestLobe 2002-08	191.7	419.5	2.19
WestLobe 2002-89	143.4	243.6	1.70
WestLobe 2002-102	101.9	179.9	1.77
WestLobe 1999-03	49.9	92.6	1.86
Center Lobe 2002-81	138.5	138.2	1.00
Center Lobe 2002-86	139.7	109.9	0.79
Center Lobe 2002-90	121.0	123.8	1.02
Center Lobe 1999-06	42.2	38.5	0.91
Center Lobe 1999-05	45.7	60.02	1.32

#### 5034 Bulk Sampling results

Bulk Sample Year	Carats	#diamonds >2 carats	#diamonds >1 carat*	#diamonds btwn 0.5 and 1 carat
2002	1215	21	70	161
2001	914	10	34	104
1999	1005	10	42	113

\*includes those diamonds > 2.0 carat

The greater number of carats, especially the larger weights, will allow for better confidence in grade and revenue modelling for the Hearne and 5034 pipes. The diamonds will be sent to the Diamond Trading Company for valuation.

- **New Shoshoni Ventures Ltd.** has signed an agreement with David Smith to further explore and sample the **Drybones Bay** kimberlite (85I/04). The company has acquired the results of a high resolution EM survey over the Drybones Bay area from **Snowfield Development Corporation**. The eastern portion of the pipe was flown with 100 metre spaced north-south lines and 50 metre spaced lines over the western portion of the pipe, where there is a suspected satellite kimberlite to the main Drybones pipe. Drilling in February 2003 hit kimberlite.
- **Patrician Diamonds Inc.** staked claims in **Blackwater Lake** area (96E/01), 160 kilometres southeast of Norman Wells. The property is comprised of 33 mineral claims in two blocks, covering 26,800 ha. A till sample campaign was designed to confirm earlier kimberlitic indicator results (sampling by DeBeers in the late 1980's) and to obtain high quality chemistry on the indicators from each of three dispersion trains observed in archival material. Preliminary results from 33 of 56 till samples have been reported. Only the coarse fraction has been

picked and to date visual counts have been as high as 217 indicators in one sample. These preliminary results appear to substantiate the mineral zoning previously observed in three discrete trains. Further picking and electron microprobe work is planned.

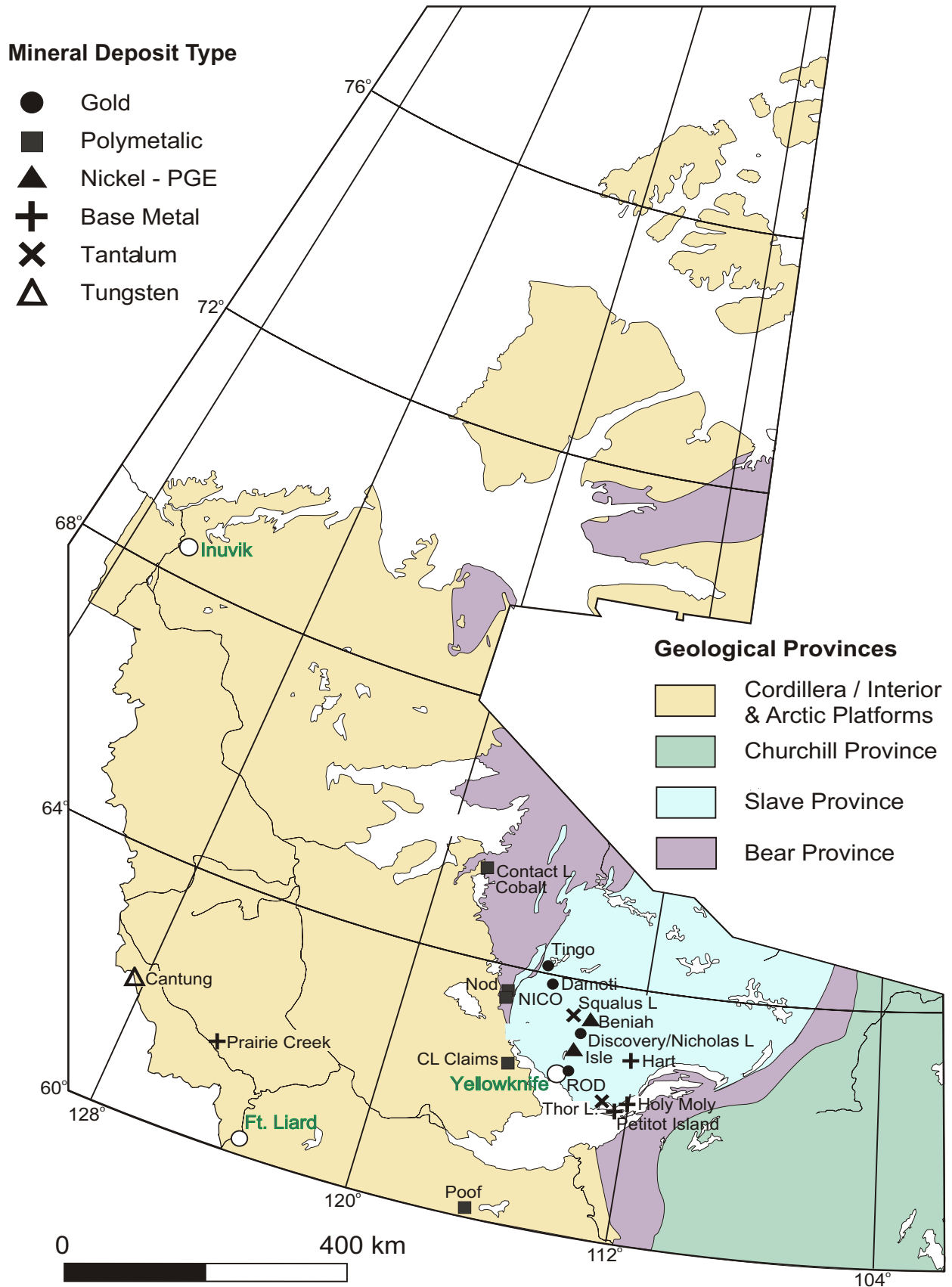
- **Premier Diamond Corporation** is continuing with a reverse takeover of the privately held **Slave Lake Diamond Corporation**. Slave Lake Diamond Corp. owns 90% of the **Courageous Lake property** (76D/05, 06) comprised of 163 mineral claims in 4 blocks (379,628 acres) approximately 45 kilometres south of the Ekati mine site and 50 kilometres north of the Snap Lake deposit. The remaining 10% of the property, is held by **Klad Enterprises Ltd.** which can earn a 40% interest by meeting certain spending requirements. Klad had planned a program consisting of a 7,400 line-kilometre airborne geophysical survey and collection of 300 till samples.
- **Shear Minerals, Mantle Minerals, Dasher Energy Corp, and International Samuel Expl. Ltd** announced that a kimberlite had been intersected on the **Afridi Lake Property** (76C/03, 06). Drill hole AL02-02 was designed to test an EM anomaly immediately west of the DA-2 kimberlite. Kimberlite was encountered in the hole from 256 to 460 feet, with the hole angled at -50 degrees. Three subsequent holes failed to intersect kimberlite, one hole tested a gravity low and intersected metasediments, the other two holes tested well-defined magnetic lows.
- **SouthernEra Resources Ltd** conducted a 6 drill hole program to test the Sue kimberlite. Total core sampled from six holes was 716 kilograms, a total of 22 stones had 2 axes > 0.5mm. The Sue pipe is estimated to have a surface expression of 150 metres by 100 metres. A 194.92 kg sample of the Sputnik pipe returned one stone from + 0.425 mm square mesh.
- **Tahera Corporation** released results from the Ranch Lake kimberlite. **BHP-Billiton**, as operator of the **ICE claims/Ranch Lake** (76E/03, 04, 06; 86H/01, 02, 07, 08) joint venture, drilled 4 vertical NQ holes into the central untested area of the Ranch Lake pipe. A total of 854.6 kilograms of kimberlite (dry weight) were processed at Lakefield Research and 266 stones (0.1 mm square mesh cut-off) were recovered, 46 were greater than 0.425 mm square mesh sieve size. The largest stones recovered were 1.31mm x 1.20mm x 0.95 mm (0.015 carats), 1.60mm x 0.86mm x 0.75mm (0.009 carats), 1.71mm x 1.31mm x 1.37mm (0.024 carats), and 2.00mm x 1.82mm x 1.10mm (0.043 carats). Those units that contain the largest stones correspond to an olivine-rich tuffisitic kimberlite unit.
- **Wheaton River Minerals Ltd.** announced that they would spend a total of \$300,000 on a drill program in order to acquire an interest in the **Crystal Property** from **Navigator Exploration Corp.** The program was designed to test approximately five high priority geophysical targets

## Gold

Gold exploration highlights and developments for 2002 are shown on Figure 2 and are as follows:

- **Canadian Zinc** has recently signed a Letter of Intent to enter into an Option Agreement with **Standard Mining**, a wholly owned subsidiary of **Doublestar Resources** to acquire 50% of the **Damoti Lake** gold project. Damoti Lake is located 200 km north of Yellowknife, 14 km south of the past producing Colomac gold mine. The Option Agreement contemplates Canadian Zinc expending \$2.4 million on the property over four years to earn its 50% position and also making annual lease payments in cash and stock.
- **Tyhee Development Corp.** is exploring their **Nicholas Lake** and **Discovery Mine** properties, located 90km north of Yellowknife. The two properties are known to contain 690,000 ounces of gold. Tyhee has budgeted \$800,000 on a 21 drill hole program for 2002. Drill results received

**Fig. 2: Northwest Territories Metals Exploration**



to-date confirm that the gold mineralization continues for at least 300 m north of the previously established resource. Intercepts so far include 11.8 g/t gold over 1.5 m, 7.2 g/t gold over 1.5 m, 21.8 g/t gold over 1.5 m and 6.6 g/t gold over 1.6 m.

- **Navigator Exploration Corp.** and **North Continental Energy Ltd.** completed detailed magnetics and electromagnetic airborne surveys over the 495 ha **Tingo** property, located 240 km north-northwest of Yellowknife on Arseno Lake. As well, prospecting and 1:10 000 scale geological mapping was carried out on this potentially gold rich area.

### **Iron Oxide Copper Gold Deposits (IOCG)**

IOCG deposit exploration highlights and developments for are shown on Figure 2 and are as follows:

- **Phelps Dodge Corp.** of Canada Ltd. drilled five holes totalling 1150 m on the **Mazenod Lake: NOD** (85N/10 & 11) showing, in search of copper, cobalt and gold.
- **Tyhee Development Corp.**, completed sampling and a due diligence survey on their IOCG (Iron oxide copper-gold orebodies) **Contact Lake** and **Cobalt** properties. Contact Lake is being prospected for copper, cobalt and gold while the Cobalt property targets were copper, silver and gold. Two new zones have been identified within a 14 km long by 4 km wide alteration zone. The 6118 Zone, a 1,200m by 3,400m aeromagnetic anomaly, had grab samples taken from across a 70 metre zone with copper staining within a magnetite-matrixed andesite breccia. The 4020 Zone is comprised of narrow fractures and disseminations within massive to brecciated basalts and lies 3500 metres northwest of the 6118 Zone, grab samples were taken across an area measuring 70 by 40 metres. Additional grab samples were taken within the favourable 14 km long by 4 km wide trend.
- **Fortune Minerals**, owner of the **NICO** cobalt-gold-bismuth project, carried out metallurgical test work to improve metal recoveries. Recoveries are now estimated at 83% for cobalt, 42% for bismuth, and 50 to 70% for gold. Positive results were returned from a resource estimation and scoping level economic assessment of the property based on an underground mining development scenario with supplemental mill feed from smaller pits.
- **Fronteer Development Group Inc.** completed a four week reconnaissance exploration program on their **Conjuror**, **Achook**, **McPhoo** and **Flex** properties confirming the potential for IOCG style mineralization in the Bear Province. All four properties have a number of prominent copper and gold occurrences related with them. The Achook Property has copper and gold occurrences associated with classic IOCG style hematite-cemented breccias and associated alteration, the McPhoo is characterized by zones of wholesale magnetite replacement with associated copper and gold enrichment, while the Flex has copper and gold bearing quartz veins and the Conjuror has encouraging copper-gold values along underexplored structural corridors.

### **Volcanogenic Massive Sulphides (VMS)**

Shown on Figure 2:

- **Solid Resources** drilled three holes in the **Hart Property** west of the Sunrise deposit. Known deposits on the property include the Pb-Zn-Ag-Au C Zone, and the Au-rich M Zone. The first hole tested the northern extension of the M zone, the second hole tested the C zone, while the final hole tested an area north of the M zone. Results are not available.

## REE

Shown on Figure 2:

- **Navigator Exploration** and **Highwood Resources** carried out further metallurgical test work on the tantalum-niobium-yttrium-zirconium and rare earth element bearing Lake Zone, situated at **Thor Lake**, 100 km southeast of Yellowknife. The Lake Zone has a resource of 65 million tonnes, grading 0.03% tantalum pentoxide and 0.4% niobium pentoxide. Navigator may acquire a 51% interest in the property from Highwood by making cash payments and exploration expenditures totalling \$1.5 million over four years.

## Prospectors

General prospecting exploration highlights and developments for 2002 are shown on Figure 2 and are as follows:

- **Lane Dewar** has been working on the **Beniah Lake** (85P/08) property. Beniah Lake is being prospected for nickel, platinum group elements, and diamonds. As well, Lane Dewar continued prospecting for tantalum and Rare Earth Elements (REE) at **Squalus Lake** (85P/14).
- **Dave Nickerson** prospected for bismuth, silver and copper on the **Poof** property (85C/02). Samples of humus and black spruce were taken for analysis. As well, Dave Nickerson has been prospecting and sampling the **Lake 1052**, Beaulieu River (85I/10,15,16) property for prospective base metal and gold occurrences.
- **Pat Hungle** continued work on the poly-metallic **Holy Moly** Group of claims on Opener Island in the East Arm of Great Slave Lake (NTS 75L/4, 75E/13 east, 75E/13 west). The Holy Moly 8 claim was staked. Re-logging of eight holes drilled by Scurry Rainbow in 1981 was done and three of the holes were re-sampled. In total, twenty-eight samples were taken for 32 element ICP plus Au, Pt and Pd analyses.
- **Walt Humphries** carried out prospecting work for gold in the Gordon Lake area (NTS 85P/3 and 85I/14). Prospecting and sampling was done on the **Isle #1, Isle #2, Laren #1 and Joliff #5** claims. Seventy-one grab samples were taken and analyzed for gold and 32 elements (ICP analysis).
- **Wayne Kendrick** worked on the **Petitot Island claims** (NTS 85H/10). The **LCW #25 to #30** (inclusive) claims were staked. Prospecting and sampling was carried out with 139 grab samples taken for 32 element ICP analysis.



## **2002 Government Programs (C.S. Lord Northern Geoscience Centre)**

In June 2002, the federal Department of Indian Affairs and Northern Development and the Government of the Northwest Territories' Department of Resources, Wildlife and Economic Development merged staff from the NWT Geology Division (federal) with the Minerals, Oil and Gas Division into the new C.S. Lord Northern Geoscience Centre building. The Centre, located in Yellowknife, delivers a geoscience program in co-operation with industry, aboriginal groups and other government agencies that supports responsible northern resource development. Our expertise includes petroleum geoscience, mineral deposit studies, kimberlite research, GIS, remote sensing, and multi-disciplinary field-based studies. Our archives and technical library contain geology maps and reports on the NWT, and reports of representation work filed by the mineral industry.

### **SUMMARY OF 2002 C.S. LORD NORTHERN GEOSCIENCE GOVERNMENT ACTIVITIES**

#### **C.S. Lord Activities**

The NORMIN database of mineral showings and exploration/geology references for NT and NU has been moved. It is now located at [www.nwtgeoscience.ca/normin](http://www.nwtgeoscience.ca/normin). This dynamic database with thousands of references is continuously updated. NORMIN will be the NT/NU node of the Canadian Geoscience Knowledge Network (CGKN) data catalogue, allowing search and discovery of distributed Canadian geoscience publications and datasets.

An initiative, precipitated by a reduction in warehouse space, was undertaken this year to inventory and move NWT drill core previously held in DIAND's core library. Core was checked, retagged, catalogued, placed on palettes, wrapped and re-located to the Giant Mine site. Core with no corresponding data (logs, collar location, etc.) was discarded. A comprehensive list of NWT core (~511 diamond drill holes) held by the C.S. Lord Northern Geoscience Centre is now available for the clients to view upon request. To aid in the use of the drill core by clients, a digital database in ArcView format will be released in January, 2003. The Arcview project will link collar locations to the scanned logs or sections and/or grid location maps, and will also hotlink the collar locations to pertinent NORMIN showings and references (in Adobe Acrobat format).

Conversion of assessment reports from paper to digital format (\*.pdf and \*.tif files) continues to be a priority for the Centre. As time/resources allow, files are being scanned systematically by report number, and on demand in response to client requests. Work is underway to develop an ftp site to allow clients to download assessment reports.

A C.S. Lord Northern Geoscience Centre website [www.nwtgeoscience.ca](http://www.nwtgeoscience.ca) is currently under development and should be active early in the new year. This site will allow access to resources and publicly available digital data housed at the centre.

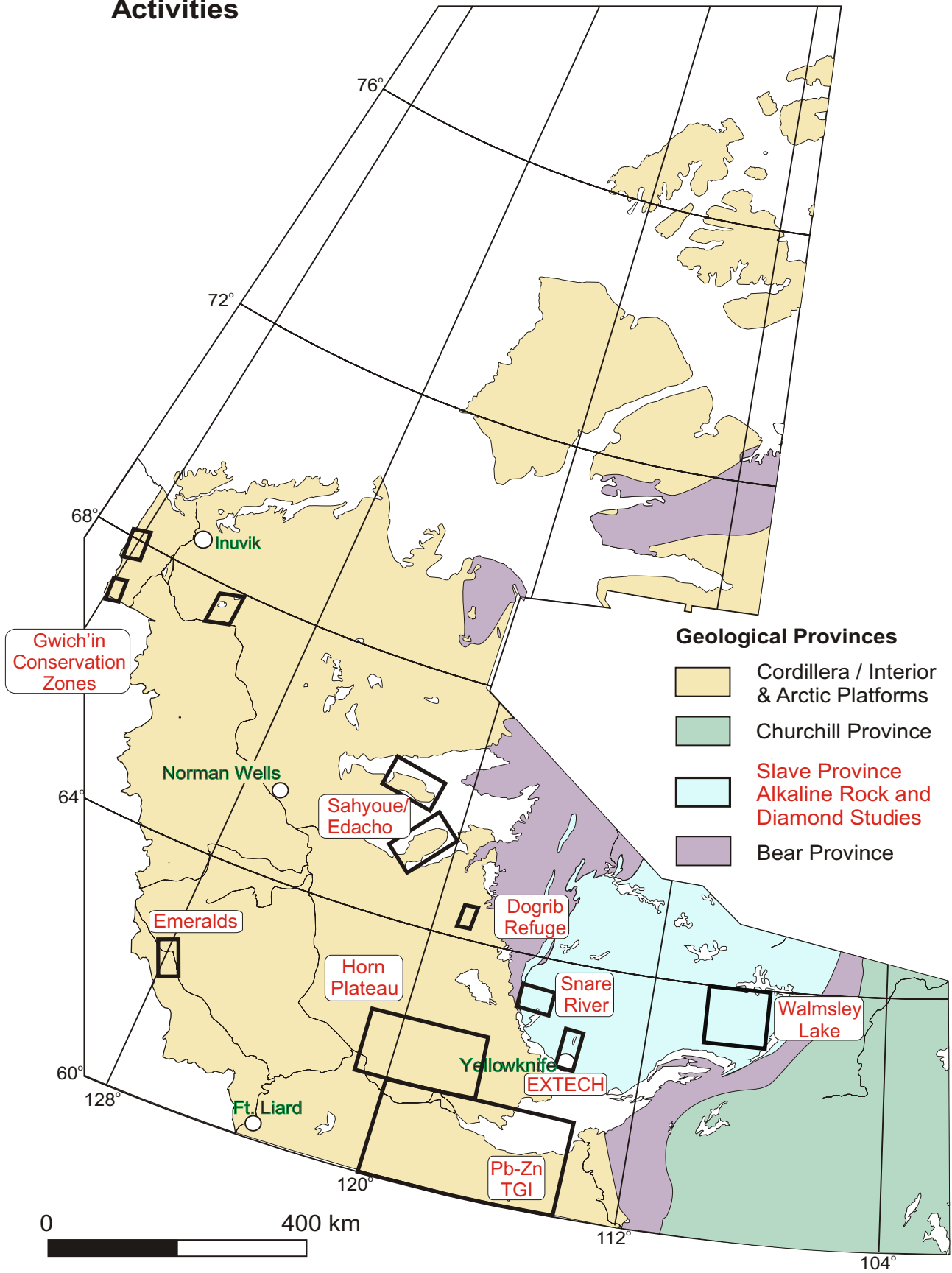
#### **Geoscience Initiatives**

The CS Lord Northern Geoscience Centre delivers a diverse geoscience program. A number of projects are under way this year, several of them in collaboration with the Geological Survey of Canada and/or Canadian Universities. Products from these projects will be released in the coming months. Project locations are shown in Figure 3.

#### ***The MVT-TGI Project***

The study of carbonate-hosted Pb-Zn deposits in the Western Canadian Sedimentary Basin is in its second and final year. The project is a collaborative effort between the C.S. Lord Centre, GSC-Calgary, and the Alberta Geological Survey, and is aimed at describing and delineating the origin,

**Fig. 3: Northwest Territories  
Government Geoscience  
Activities**



distribution and potential for MVT-type deposits in southern NWT and northern Alberta. The NWT component of the project is being led by Allan Turner and is a contribution to GSC's Targeted Geoscience Initiative. During the 2002 field season, a fracture analysis study was undertaken on the NWT side of the border, the results of which are being released in the GSC's Current Research (January 2003), and core samples were collected for geochemical studies. Products to be released by spring include a map delineating the distribution of Presqu'île dolomite in the Great Slave Plain (Janicki); a Database of Drillholes from the Great Slave Reef (Turner); a paper examining the differences in the reflectance spectra between mineralized and unmineralized core for distinct facies (Turner et al.); and two submissions to a final MVT project publication by GSC: an interpretation of basement structures based on reflection seismic data (MacLean), and a summary paper of the NWT component of the MVT project (Turner)

### ***The Walmsley Lake Project***

The Walmsley Lake project is in its third and final year of regional (1:125K) bedrock mapping in the southeastern Slave Province (parts of NTS 75N/ 1,2,3,4,5,6, 7,11,12). The mapping completes the field-work component of the three year, multidisciplinary Walmsley Lake Targeted Geoscience Initiative project conducted in partnership with the GSC. The project is being coordinated by Scott Cairns. Highlights from 2002 field work will be published in GSC's Current Research (January 2003). Pocket PCs and ESRI's ArcPad software were successfully used to collect field data. A final digital atlas for the Walmsley project, containing a bedrock geology compilation and numerous data sets (P-T data, wholerock and isotope geochemical data, etc.), is in progress and will be released in 2003.

### ***The Snare River Mapping Project***

Val Jackson completed bedrock mapping in the Snare River area (parts of NTS 85O and 85N; southwestern Slave Province). This is the fifth year and final year of mapping. The aim of the project is to upgrade our knowledge of a part of the Slave province that was last mapped in the mid 1900's, and integrate the bedrock geology with complementary geochemical, geochronological, and metamorphic studies. Preliminary 1:50K maps showing the results of 2002 mapping will be released early in 2003, and work is underway on a digital atlas which will contain a final bedrock compilation and various data sets (e.g. geochemical data, assay results, age data, etc.). Three B.Sc. theses and one Ph.D. thesis are being supported by this project.

### ***Resource Assessments***

James Lariviere and Len Gal carried out Non-renewable Resource Appraisals (NRA's) in a number of areas. A Phase I NRA was completed for the Sahyoue/Edacho proposed park on Great Bear Lake, and initial field work for a Phase II appraisal was undertaken during the summer. Activities included outcrop examinations, geochemical stream sediment sampling and heavy mineral sampling. Sahyoue/Edacho has been identified as a candidate park under the NWT Protected Areas Strategy (PAS). A second candidate park being supported by PAS is the Edehzie (Horn Plateau). Initial data compilation for the area was followed up with helicopter reconnaissance in September. A preliminary workplan and budget have been generated, and the Phase 1 report is anticipated this spring. An Economic Information Request (EIR) report was completed for the Pehdze Ki Deh (Blackwater Lake) proposed protected area early in the summer and community meetings have been attended in Tulita. It is expected that this area will advance through the PAS process over the next year.

Preliminary reconnaissance geologic investigations commenced on three proposed Conservation Zones in the Gwich'in area, as part of a Phase I NRA for the Gwich'in Land Use Plan (GLUP). The Phase I report is due to be completed this winter, and a preliminary work plan and budget have been submitted to the Land Use Planning Board for further work.

### ***Yellowknife EXTECH III***

The multidisciplinary Yellowknife EXTECH III project is jointly managed by the C.S. Lord Centre, Geological Survey of Canada (GSC), and industry partners, and is coordinated by Hendrik Falck (C.S. Lord). EXTECH III consists of several integrated studies aimed at developing improved gold exploration models for the Yellowknife Basin. As this is the final year for the project, effort is being directed at publishing results. In June, 2002, a Geological Association of Canada (GAC) field trip was organized to showcase some of the project's highlights, and a CD containing new data (GSC Open File 4339), was released. A final volume containing a series of integrated papers will be published by the Mineral Deposits Division of GAC in 2003. C.S. Lord participants in the EXTECH project include Hendrik Falck, John Armstrong, Karen Gochnauer, Doug Irwin and Kelly Pierce.

### ***NWT Emeralds***

A one-year study of the Lened emerald showing was initiated this year by Hendrik Falck. The showing, originally discovered by R. Berdahl while prospecting a nearby tungsten skarn, is NWT's first emerald showing. Co-investigators include Dr. Lee Groat from the University of British Columbia and Dr. Dan Marshall of Simon Fraser University. Exploration guidelines for this showing type will be released this spring through the Centre, and a manuscript will be submitted for publication to Canadian Mineralogist.

### ***Cordilleran Geochemistry Compilation***

A project is planned for January 2003, to compile Regional Geochemical Data for NTS 105I (Northern Cordillera). The data will be compiled from assessment files and company sources. The product will be a georeferenced database that is suitable for inclusion in a GIS framework. Preliminary results should be available by June 2003.

### ***Oil and Gas Activities***

The Oil and Gas Poster Series, summarizing the NWT's petroleum resources, table of formations and selected cross sections, was updated by Adrienne Jones and will be re-released this fall. Ed Janicki is updating the NWT Hydrocarbon Pool Studies, focusing on the Great Slave Plain area. Janicki has reviewed core and samples of the Presqu'île dolomite and the pre-Devonian Basal Clastics of the Great Slave Plain. Products anticipated by spring 2003 include a paper on the Hydrodynamics of the Great Slave Plain, and a final summary of the Basal Clastics study. Both Jones and Janicki have given presentations on NWT petroleum geology at various venues over the last year.

### ***Databases To Support Diamondiferous Kimberlite Exploration***

A number of studies in support of kimberlite exploration are currently underway. Early in 2002, John Armstrong, along with Nunavut colleagues, released a compilation of kimberlite-related data on CD ROM for the northern Slave Province. Efforts are underway to update the previously released Kimberlite ANomaly Drillhole Database (KANDD) and the Kimberlite Indicator and Diamond Database (KIDD) compilations. Work has started on a Slave Gaton Lineament study that will utilise aeromagnetic data from the SMAC series of CD-ROMS, product release should occur in the summer of 2003. Continued support is being provided to a MSc. Thesis on the geochemistry of mafic dykes in the Walmsley Lake map sheet (UWO). Armstrong will co-lead the Northern Alberta – Slave field trip as part of the 8th International Kimberlite Conference to be held in June 2003. In addition three abstracts were submitted to the 8IKC technical committee for review.

### ***Seismic Studies***

Bernie MacLean has been completing a study which proposes new subdivisions of Sequence A of the Proterozoic Dismal Lakes and Hornby Bay formations using reflection seismic data.

## **New C.S. Lord Northern Geoscience Centre Publications**

NWT Open File 2002-01 (paper or \*.tif file \$10.00)

Ootes, L. Geology of the Crestaurum Mine Area, Yellowknife, Greenstone Belt, NWT. (Part of 85J/09); NWT Open File 2002-01. DIAND, NWT Geology Division, Yellowknife, NT. 1 map, scale 1:2500.

NWT Open File 2002-02 (paper or \*.tif file \$10.00 per map; \$50 for the set)

Jackson, VA. Preliminary Geology of the Snare River Area, Southwestern Slave Province; Parts of 85O and 85N. (Assay tables to accompany maps); NWT Open File 2002-02. DIAND, NWT Geology Division, Yellowknife, NT. 4 maps plus legend, scale 1:50 000.

NWT Open File 2002-03 (paper or \*.pdf file \$10.00)

Lariviere, JM. Dogrib Refuge Non-renewable Resource Assessment Riviere Grandin Area, NWT, 86D. NWT Open File 2002-03. DIAND, NWT Geology Division, Yellowknife, NT. Report plus appendices.

NWT Open File 2002-04 (paper or \*.pdf file \$10.00)

Gal, LP & Lariviere JM. Sahyoue-Edacho Candidate Protected Areas Non-Renewable Resource Assessment (Phase I), Great Bear Lake Area, NWT, Canada, NTS 96A, G, H, I, J. NWT Open File 2002-04. CS Lord Northern Geoscience Centre, Yellowknife, NT. Report plus appendices.

NWT Open File 2002-05 (Paper or tiff files only)

Jones AL. NWT Oil and Gas Poster Series. Petroleum Resources, poster 1 of 3 (Jones AL); Table of Formations, poster 2 of 3 (Jones AL); Schematic Cross Sections, poster 3 of 3 (Jones AL, Janicki EP). NWT Open File 2002-05. CS Lord Northern Geoscience Centre, Yellowknife, NT.

NWT Open File 2002-06 (Paper or pdf files only)

Brophy J, Pell J. Preliminary geology of the Labrish Lake Area, NTS 85N/9. NWT Open File 2002-06. CS Lord Northern Geoscience Centre, Yellowknife, NT. 1 map, scale 1:50 000.

NWT Open Report 2002-001 (digital only)

Turner WA, Pierce KL, Cairns KA. Great Slave Reef (GSR) Project Drillhole Database. A compilation of the drillhole locations, drill logs, and associated geochemical data for the Great Slave Reef Joint Venture Project; Interior Platform, Northwest Territories, Canada, NTS 85B/11-14. NWT Open Report 2002-001. CS Lord Northern Geoscience Centre, Yellowknife, NT.

## **Websites related to Northwest Territories Geology**

CS Lord Northern Geoscience Centre	<a href="http://www.nwtgeoscience.ca/">http://www.nwtgeoscience.ca/</a>
NORMIN Northern Minerals Database	<a href="http://www.nwtgeoscience.ca/normin">http://www.nwtgeoscience.ca/normin</a>
Beaufort-Mackenzie Mineral Development Area	<a href="http://www.bmmda.nt.ca/">http://www.bmmda.nt.ca/</a>
Fort Liard Resources Directory	<a href="http://www.liardresources.nt.ca/">http://www.liardresources.nt.ca/</a>
GNWT RWED Minerals Oil and Gas Division	<a href="http://www.gov.nt.ca/RWED/mog/">http://www.gov.nt.ca/RWED/mog/</a>
INAC NWT Region; SIDViewer (mineral claims)	nwt.inac.gc.ca
INAC Oil and Gas Directorate	<a href="http://www.ainc_inac.gc.ca/oil/index_e.html">http://www.ainc_inac.gc.ca/oil/index_e.html</a>
NWT and Nunavut Chamber of Mines	<a href="http://www.miningnorth.com/">http://www.miningnorth.com/</a>
Canadian Geoscience Knowledge Network (CGKN)	cgkn.net/2002/index_e.html
GSC Geological Survey Canada	<a href="http://www.nrcan.gc.ca/gsc/index_e.html">http://www.nrcan.gc.ca/gsc/index_e.html</a>
NWT Centre for Remote Sensing	<a href="http://www.gov.nt.ca/RWED/rs/index.htm">http://www.gov.nt.ca/RWED/rs/index.htm</a>

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