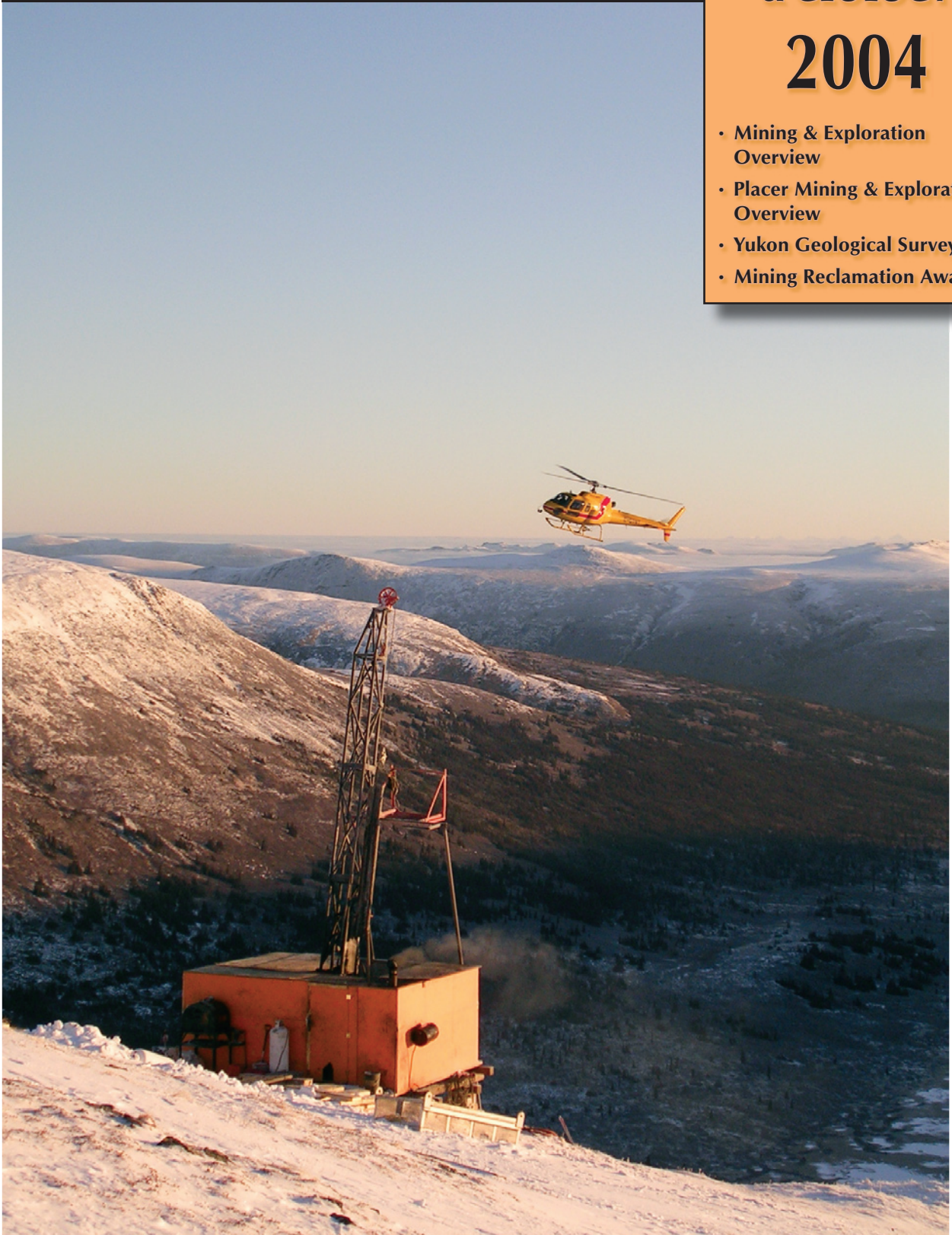


Energy, Mines and Resources • *Yukon Geological Survey*

YUKON EXPLORATION & GEOLOGY

2004

- Mining & Exploration Overview
- Placer Mining & Exploration Overview
- Yukon Geological Survey
- Mining Reclamation Awards



YUKON
EXPLORATION
& GEOLOGY
2004

Edited by
D.S. Emond, L.L. Lewis and G.D. Bradshaw
Yukon Geological Survey
Energy, Mines and Resources
Yukon government

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PHOTOGRAPHS

Front cover: Winter drilling on the Thunderstruck volcanic massive sulphide (VMS) (zinc-copper-lead-silver-gold) discovery, of Yukon Zinc Corporation in the Finlayson Lake VMS District, Yukon. Photo by Phu Van Bui, Yukon Zinc Corporation

Back cover: The Yukon Prospectors Association recipients of the 2004 Prospector of the Year award, was the team of Tom Morgan (left) and Vern Matkovich (right).



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MINERAL INDUSTRY

Yukon Mining, Development and Exploration Overview 2004

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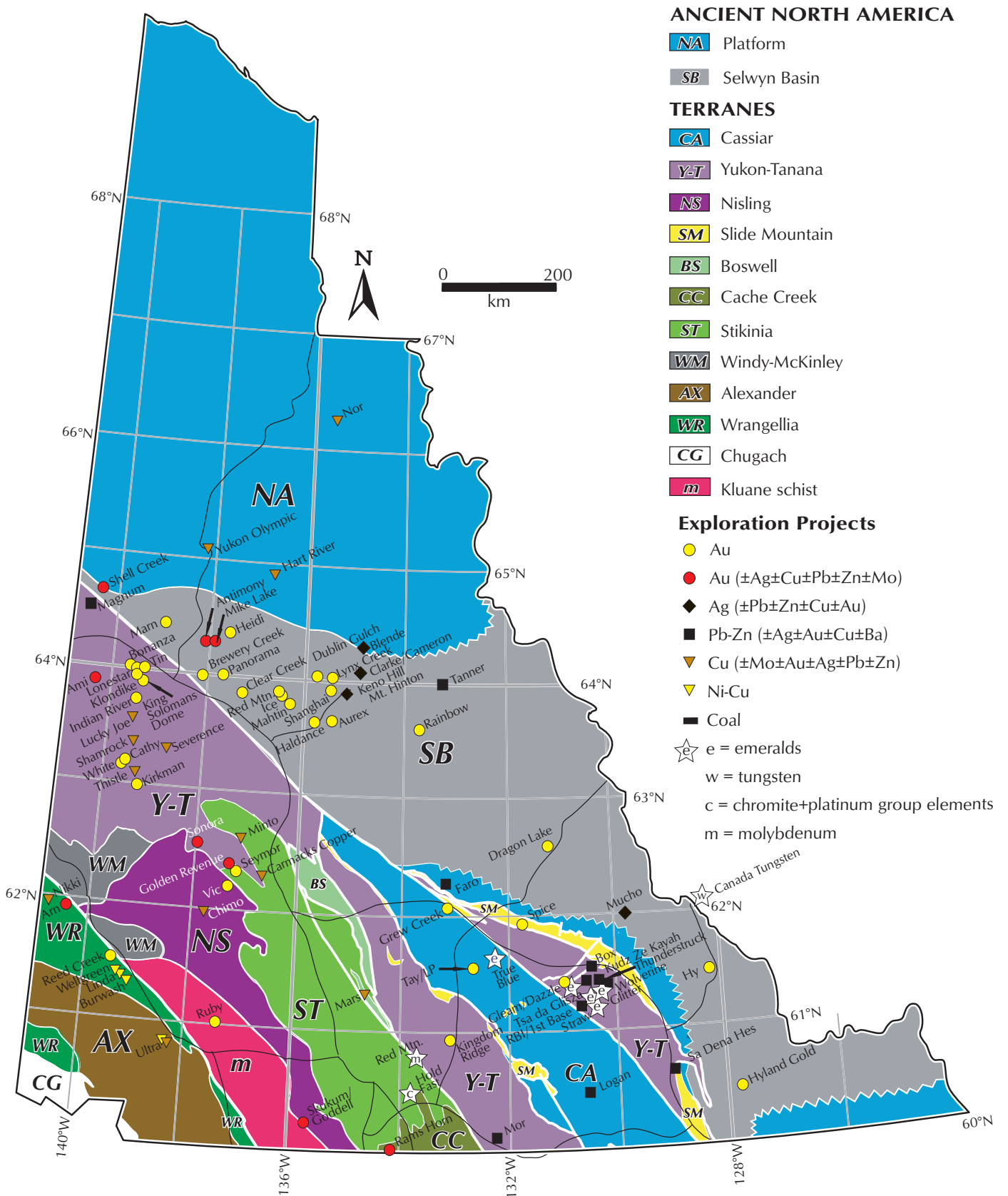


Figure 2. Location of Yukon exploration projects in 2004.

Yukon Mining, Development and Exploration Overview 2004

Mike Burke¹

Yukon Geological Survey

Burke, M., 2005. Yukon Mining, Development and Exploration Overview 2004. In: Yukon Exploration and Geology 2004, D.S. Emond, L.L. Lewis and G.D. Bradshaw (eds.), Yukon Geological Survey, p. 2-33.

ABSTRACT

Mineral exploration in Yukon increased dramatically in 2004 with estimated total expenditures of \$22 million, compared to \$13 million spent in 2003. Most was spent on gold exploration, with less spent on base metals and gemstones. The exploration industry in Yukon continues to be dominated by junior mining companies although several major mining companies are also involved in exploration projects. The number of new mineral claims staked also rose substantially in 2004, as did the claims in good standing. Current or anticipated mining development projects in Yukon include: the Wolverine (Zn-Cu-Pb-Ag-Au) project, the Carmacks Copper (Cu-Au) project and the Minto (Cu-Au-Ag) and Keno Hill (Ag-Pb) projects.

RÉSUMÉ

En 2004, l'exploration minière au Yukon a énormément augmenté : les dépenses estimées ont atteint 22 millions de dollars cette année, par rapport à 13 millions de dollars en 2003. Environ 60 % des dépenses ont été consacrées à la prospection d'or, 25 % à la prospection de métaux communs (surtout le Zn, le Cu et le Pb), et 15 % à la recherche de pierres précieuses. L'exploration minière au Yukon continue d'être dominée par de petites sociétés, qui sont responsables de 90 % des dépenses totales de prospection. Toutefois, plusieurs grandes sociétés minières, notamment Kennecott, Newmont, Northgate et Teck-Cominco participent aussi à des projets d'exploration. Le nombre de nouveaux claims miniers jalonnés a aussi considérablement augmenté en 2004, atteignant 9061 claims à la fin d'octobre, soit presque 3 000 de plus qu'en 2003. Le nombre total de claims en règle est passé à 49 772. Les projets miniers actuels ou prévus au Yukon comprennent le projet Wolverine (Zn-Cu-Pb-Ag-Au), pour lequel le processus d'émission de permis est en cours, le projet Carmacks Copper (Cu-Au), qui devrait faire l'objet d'une demande de permis, et les projets Minto (Cu-Au-Ag) et Keno Hill (Ag-Pb), qui sont à vendre.

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INTRODUCTION

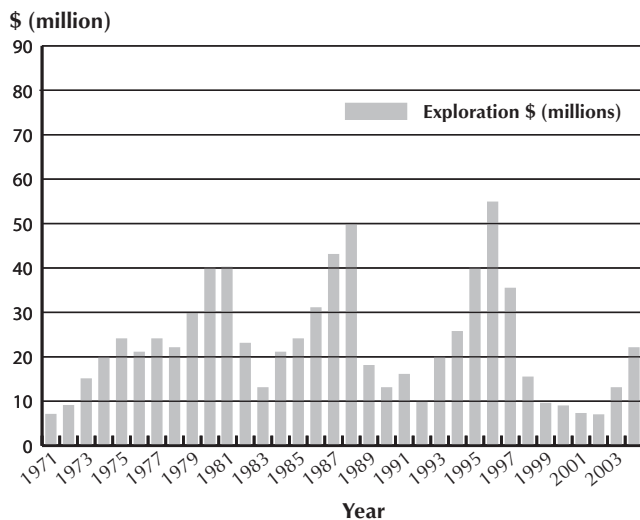
Mineral exploration in Yukon increased dramatically in 2004 with estimated total expenditures of \$22 million (Fig. 1), compared to \$13 million spent in 2003. Approximately 60% of expenditures were spent on gold exploration, 25% on base metal (mainly zinc, copper and lead) exploration and 15% on the search for gemstones. The locations for most 2004 Yukon exploration projects are shown in Figure 2 (page 2). The exploration industry in Yukon continues to be dominated by junior mining companies, who accounted for 90% of total exploration expenditures. Several major mining companies, however, including Kennecott, Newmont, Northgate and Teck-Cominco are also involved in exploration projects. The number of new mineral claims staked also rose substantially in 2004 (Fig. 3); the 9061 claims staked in 2004 is nearly a three-fold increase over the 3571 claims staked in 2003. The total number of claims in good standing increased to 49 442 (Fig. 4). Current or anticipated mining development projects in Yukon include: the Wolverine zinc-copper-lead-silver-gold project, for which mine permitting is underway; the Carmacks Copper copper-gold project, for which an application for a mining permit is expected; and the Minto copper-gold-silver and Keno Hill silver-lead projects, which are for sale.

On April 1, 2003, responsibility for managing the Territory’s public lands, water, mineral resources, forests and environment was devolved from the federal to the Yukon government. This transfer of authority has had a positive impact on the mineral industry. The Yukon government offers a 25% direct tax credit on mineral exploration expenditures, which is in place until March 31, 2007. The Yukon Mining Incentive Program is another Yukon government initiative, which provides a portion of the risk capital required to explore for mineral deposits. In 2004, the Yukon Mining Incentive Program offered over \$1 million to individuals and companies active in Yukon.

Gold exploration continued to be led by the search for intrusion-related gold deposits, mainly related to mid-Cretaceous plutons in the Tombstone Gold Belt portion of the Tintina Gold Province. Although this belt of gold occurrences as a whole is perceived to be at an advanced stage of exploration, the reality is quite the opposite. There are advanced projects within the belt, but only six properties have received over 5000 m of drilling. Some of the more advanced projects include the

Brewery Creek mine and the Red Mountain project, where exploration has been ongoing since the early 1990s. StrataGold Corporation recently acquired the Dublin Gulch deposit and the Clear Creek property, two advanced properties within the belt that have numerous high-quality exploration targets and potential for resource expansion; however, each property has remained dormant since 1996 and 2000, respectively. The belt also has many properties such as the Mahtin and Heidi properties that have excellent drill targets yet have never had a single drill hole. New targets that have just received their first drilling are highlighted by the program at Antimony Mountain, where porphyry-style mineralization with very little alteration in a Cretaceous Tombstone intrusion was tested.

Figure 1. Exploration expenditures 1971 to 2004 (estimated).



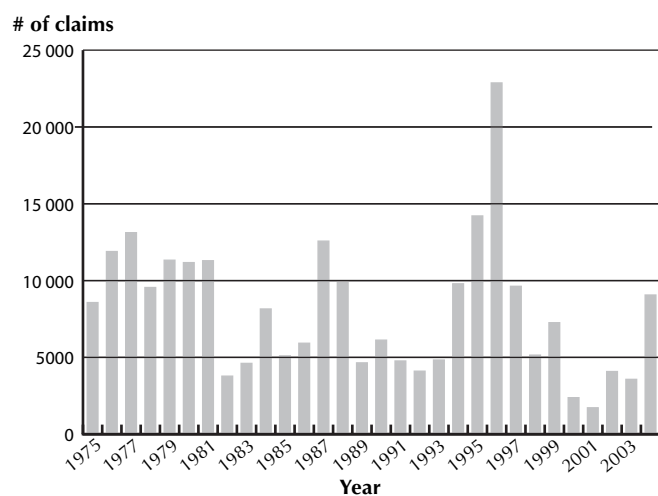


Figure 3. Claims staked 1975 to 2004.

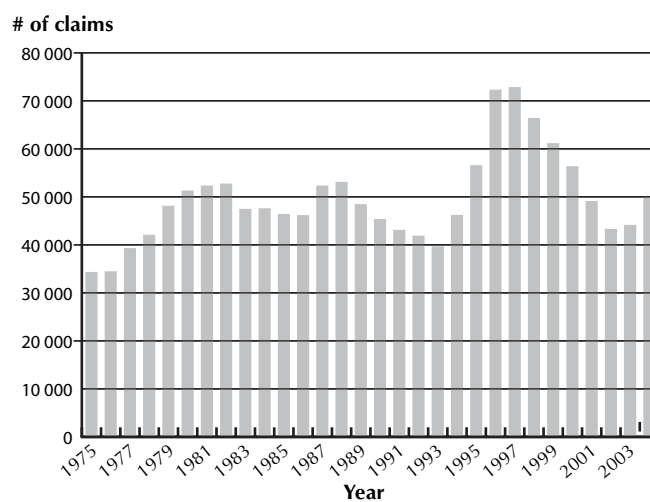


Figure 4. Claims in good standing 1975 to 2004.

Companies and prospectors have expanded the search for gold in Yukon, looking for various deposit types, such as gold-rich porphyry targets in the Stewart River area south of Dawson and in the Dawson Range Mineral Belt; orogenic gold veins in the White River and surrounding areas and in the Klondike; and epithermal gold-silver mineralization at the Grew Creek deposit near Ross River.

Base-metal exploration also mounted a significant comeback in 2004. The Finlayson Lake Volcanogenic Massive Sulphide District was the focus of renewed exploration after a lull of several years. The largest program in the district was conducted by Expatriate Resources on their Wolverine deposit. Early in the year, Expatriate purchased joint venture partner Atna Resources' interest in the Wolverine joint venture to own 100% of the project; the company is advancing the project to a bankable feasibility and production decision in 2004-2005. Teck-Cominco renewed their exploration efforts in the Finlayson Lake District by optioning a block of land known as R-15 from the Kaska Mineral Development Corporation (KMDC). The KMDC was able to obtain a 5-year lease on the land, with the permission of the Ross River Dena Council (RRDC), from the Yukon government. The block was interim-protected since 1983 as part of the RRDC land claim; thus, this agreement could not have been completed before devolution. Iron-oxide-copper-gold deposits were also a favoured target for base metal exploration this year, with several programs examining occurrences within Proterozoic inliers in north-central Yukon.

Exploration for coloured gemstones, mainly emeralds, continued at significant levels in 2004. True North Gems completed a large program of bulk sampling, core drilling and prospecting on the Tsa da Glisza project (formerly called Regal Ridge) in the Finlayson Lake District. Several companies were also active in the area, continuing the search for additional emerald deposits (Appendix 1).

PRECIOUS METALS

PORPHYRY/SHEETED-VEIN ASSOCIATED

Figure 5. Geologists and students examining drill core at Brewery Creek as part of a field trip during the first Dawson Rocks conference.



NovaGold Resources conducted a four-hole (769-m) diamond drilling program, which was stopped due to encroaching forest fires on the **Brewery Creek** mine property (Yukon MINFILE 2004, 116B 160, Deklerk and Traynor, 2004). Drilling followed a program of geophysics consisting of an induced polarization survey over a 2-km square grid. Brewery Creek produced approximately 280,000 ounces (8 700 000 g) of gold from a heap leach operation that operated from 1998 to

2002. Previous exploration focused on the search for additional oxide resources. NovaGold is exploring Brewery Creek based on similarities with their 25-million-ounce (780-million-g) Donlin Creek deposit in Alaska. NovaGold tested several targets, which included a higher grade and deeper structural sulphide zone. It successfully intersected a massive stibnite-arsenopyrite-pyrite mineralized vein within sheared argillite, however, results of the drilling have not been released (Fig. 5).

ASC Industries optioned the **Red Mountain** property (Yukon MINFILE 2004, 115P 006, Deklerk and Traynor, 2004) from Regent Ventures and merged it with their wholly owned and adjoining Ice claims. Drilling on the Ice claims was directed at the Jethro structure which was discovered in 2003, with an intersection of 102 m grading 0.88 g/t Au in DD03-12. Drilling in 2004 was again directed at the

Table 1. Drill highlights from the Jethro structure of the Red Mountain property.

Drill hole	Depth		Width (m)	Au (g/t)
	From (m)	To (m)		
DDH04-13	33.0	48.0	15.0	1.10
DDH04-14	3.8	120.0	116.2	1.07
DDH04-16	2.0	112.8	110.8	0.485
including	12.60	16.2	3.60	5.57
DDH04-17	11.00	12.0	1.00	2.00
	19.00	21.0	2.00	1.10
	34.00	35.0	1.00	9.24
	52.00	53.0	1.00	10.20
DDH04-18	17.00	191.00	174.00	0.95
including	17.00	142.00	125.00	1.14
or	45.00	113.00	68.00	1.49
or	74.00	113.00	39.00	1.97
DDH04-19	67	113	46	0.86
	98	118	20	1.01
	128	167	39	0.90

1.2 km strike-length of the structure (Fig. 6). Six of the holes that were drilled intersected significant gold mineralization within Cretaceous quartz monzonite of the Tombstone Plutonic Suite and hornfelsed siltstone of the Neoproterozoic to Lower Cambrian Hyland Group. The zone remains open along strike to the northeast and southwest and at depth. Highlights from drilling on the Jethro structure are presented in Table 1. Drilling also tested the Treadwell structure with four holes following up on the discovery hole of 2003. Results have been released from one hole (Table 2) with additional results pending.

Table 2. Drill highlights from the Treadwell structure of the Red Mountain property.

Drill hole	Depth		Width (m)	Au (g/t)
	From (m)	To (m)		
DDH04-41	34.60	35.60	1.00	1.15
	62.00	68.00	6.00	1.05
	154.50	157.50	3.00	1.85
	164.50	165.50	1.00	1.24
	172.60	173.60	1.00	1.24



Figure 6. Drill operating on the Jethro structure at the Red Mountain property.



Figure 7. Julianne Madsen examines evidence of historical gold exploration, an old flume located on a ridgecrest within the Jethro structure, Red Mountain.

StrataGold Corporation conducted induced-polarization surveys followed by diamond drilling on their **Lynx Creek** property (Yukon MINFILE 2004, 106D 020, Deklerk and Traynor, 2004). The property has not been explored since 1997 when previous operators drilled a shear-hosted quartz-sulphide mineral vein zone within a small Cretaceous Tombstone Plutonic Suite plug over a 500-m strike length that assayed up to 7.37 g/t Au over 3.4 m. Drilling in 2004 mainly tested geochemical anomalies proximal to the intrusive body and intersected gold-bearing sheeted and cross-cutting quartz and quartz/calcite veins. Higher grades were generally associated with arsenopyrite, pyrite, stibnite and sphalerite in veinlets within metasedimentary rocks of the Neoproterozoic to Lower Cambrian Hyland Group proximal to the granodiorite intrusion (Fig. 8). Five of the fourteen drill holes (2070 m) intersected significant mineralization:

- LX04-20: 17.1 m averaging 1.50 g/t Au;
- LX04-18: 7.6 m averaging 1.09 g/t Au;
- LX04-11: 27.5 m averaging 0.62 g/t Au;
- LX04-08: 8.1 m averaging 0.48 g/t Au;
- LX04-13: 4.5 m averaging 0.89 g/t Au.

Lynx Creek is located ~6 km east of the **Dublin Gulch** deposit (Yukon MINFILE 2004, 106D 025, Deklerk and Traynor, 2004). Dublin Gulch is a plutonic-related gold deposit hosted by sheeted quartz veins in Cretaceous granodiorite of the Tombstone Plutonic Suite. StrataGold Corporation entered into a binding agreement in October to purchase the Dublin Gulch deposit and the **Clear Creek** property (Yukon MINFILE 2004, 115P 011,012,013, Deklerk and Traynor, 2004) from Sterlite

Figure 8. Quartz-carbonate mineral vein with pyrite-arsenopyrite from drilling at the Lynx Creek property.



Gold Ltd. The occurrence at Clear Creek consists of a number of plutonic-associated gold occurrences related to several Cretaceous granodiorite intrusions of the Tombstone Plutonic Suite. Snowden Mining Industry Consultants has reviewed and confirmed the resource estimates for the Eagle zone located on StrataGold's Dublin Gulch property. Snowden confirms that, at a cut-off grade of 0.5 g/t Au, the Eagle zone contains 55.2 million tonnes of indicated resources at a grade of 0.934 g/t Au (1,658,000 ounces, 51 570 000 g) and 17.3 million tonnes of inferred resources grading 0.734 g/t Au (412,000 ounces, 12 800 000 g). Subsequent to the purchase, StrataGold conducted airborne magnetic and electromagnetic surveys of Dublin Gulch and their surrounding claims. In conjunction with this acquisition, on December 1, 2004, StrataGold closed an \$18.4-million special warrant and flow-through share private-placement financing. Additionally, Newmont Mining Corporation invested \$3.25-million in a subscription receipt private-placement financing which closed on November 16, 2004. Newmont also participated in the December 1, 2004, special warrant financing as to 1 million special warrants. StrataGold now holds over 740 km² of mineral claims in the Mayo Mining District, which include the Dublin Gulch, Clear Creek, Lynx Creek and **Aurex** properties.

Strategic Metals staked claims to cover a portion of the Antimony Mountain pluton which it subsequently optioned to War Eagle Mining. Previous exploration at the **Antimony Mountain** property (Yukon MINFILE 2004, 116B 094, Deklerk and Traynor, 2004) targeted high-grade gold-bearing quartz-sulphide mineral veins proximal to the main intrusive body. In 2004, the companies focused on porphyry-style mineralization within the syenite to monzonite intrusive rock of the Cretaceous Tombstone Plutonic Suite. An area of anomalous copper, gold and silver in stream sediments, soils and rocks was tested with four diamond drill holes (832 m; Fig. 9). The drilling intersected arsenopyrite and chalcopyrite occurring on hairline fractures, in 0.2- to 2-cm-wide quartz veinlets, or in narrow alteration envelopes surrounding the mineralized fractures and veinlets. The drilling returned values in the range of 200-300 ppb Au over 20 to 40 m in three of the four holes.

Figure 9. (left) Mike Phillips of Archer, Cathro and Associates with Craig Hart and Lara Lewis from the Yukon Geological Survey, viewing core at Antimony Mountain.



Yale Resources and Atac Resources completed a 13-hole core drilling program (Fig. 10) on their **Golden Revenue** property (Yukon MINFILE 2004, 115I 107, Deklerk and Traynor, 2004) located within the Dawson Range Mineral Belt. This belt includes several Late Cretaceous copper-gold and gold porphyry deposits and targets (including the Casino deposit of Lumina Copper, 964 million tonnes grading 0.22% Cu, 0.24 g/t Au and 0.02% Mo) in central Yukon. Drilling was directed at a 1000-m by 400-m area within the Nucleus zone which had returned gold intersections from previous drilling. Disseminated sulphide minerals and quartz-sulphide mineral veins and stockwork are hosted within quartz-feldspar dykes

and adjacent metavolcanic and metasedimentary schists. Holes drilled late in the program intersected more copper-rich mineralized rock indicating drilling was approaching the porphyry centre, which was previously thought to be a deeper system. Table 3 contains highlights from the 2004 drilling.

Firestone Ventures optioned the **Sonora Gulch** property (Yukon MINFILE 2004, 115J 008, Deklerk and Traynor, 2004) which is also located within the Dawson Range Mineral Belt. The company explored the property with a small program of geochemistry, prospecting and geological mapping. At Sonora Gulch, high-grade gold-tetradymite veins are hosted within structural zones, and copper and gold occur in quartz-chalcopyrite stockwork and disseminated pyrite-chalcopyrite within a quartz-feldspar porphyritic intrusion. The company focused their attention on the newly discovered K-467 zone, where quartz-pyrite-chalcopyrite stockwork within intrusive rocks returned values up to 0.232 g/t Au, 8.4 g/t Ag and 0.168% Cu from a 1.4-m chip sample (Fig. 11). Composite grab samples of quartz-arsenopyrite veins returned values up to 0.95 g/t Au and 10.6 g/t Ag. Silt sampling and reconnaissance-scale geochemical sampling returned values suggesting the new zone may be quite extensive.

Other companies active in the belt included Atac Resources, who trenched on the **Seymour** property (Yukon MINFILE 2004, 115I 051, Deklerk and Traynor, 2004).



Figure 10. Drilling at the Golden Revenue property in early October.



Figure 11. Dennis Ouellette examining outcrop in the K-467 zone at Sonora Gulch.

Table 3. Highlights from 2004 drilling on Golden Revenue property.

Drill hole	Depth		Width (m)	Au (g/t)
	From (m)	To (m)		
DN04-01	8.84	115.5	106.66	0.57
DN04-02	8.38	65.53	57.15	0.71
DN04-03	16.0	126.0	110.0	0.76
DN04-04	14.63	37.0	22.37	0.66
DN04-06	95.40	110.30	14.90	0.92
including	99.84	110.30	10.19	1.13
DN04-07	32.63	53.07	20.44	0.62
including	43.28	53.07	9.79	0.88
including	43.28	50.60	7.32	1.07
DN04-08	6.25	117.06	110.81	1.35
including	6.25	84.6	78.35	1.69

Drill hole	Depth		Width (m)	Au (g/t)
	From (m)	To (m)		
DN04-09	109.27	127.73	18.46	0.64
including	109.27	115.76	6.49	1.04
and	138.94	148.74	9.80	0.51
and	170.84	172.98	2.14	3.70
DN04-12	141.55	157.35	15.80	0.572
including	147.22	151.79	4.57	1.112
and	227.09	238.66	11.57	0.619
DN04-13	105.36	112.7	7.34	6.78
and	123.15	127.94	4.79	1.87
DN04-14	17.37	23.65	6.28	1.18
and	37.80	41.15	3.35	1.150
and	147.10	151.53	4.43	0.613

SKARN/REPLACEMENT ASSOCIATED



Figure 12. Dig here! Callum Ryan exposing skarn rock in a blast trench at the Mahtin property.

International Gold Ventures optioned the **Mahtin** property (Yukon MINFILE 2004, 115P 007, Deklerk and Traynor, 2004) and performed a program of geological mapping, geochemistry, geophysics (magnetics) and trenching (Fig. 12). The Mahtin property covers the Cretaceous Sprague Creek stock, which intrudes Upper Cambrian-Ordovician limestone of the Rabbitkettle Formation. The property is host to several styles of intrusive-related gold occurrences, including sheeted quartz-arsenopyrite veins within the intrusion, and skarn and calc-silicate rock within the Rabbitkettle Formation.

Logan Resources completed a program of geophysics (magnetics, induced polarization (IP) and electromagnetics) on the **Heidi** property (Yukon MINFILE 2004, 116A 037, Deklerk and Traynor, 2004). The magnetometer survey covered an area of 3.2 km²,

whereas the IP covered a smaller 0.5-km² grid. Four short lines of horizontal-loop electromagnetics were also completed. The surveys outlined geophysical anomalies (magnetic and chargeability) that coincide with areas of anomalous geochemistry (up to 1100 ppb Au and 12 000 ppm As) defined by Homestake, who held the property in the mid-1990s. Sphide minerals on the property replaced limestone and calcareous grit of the NeoProterozoic to Lower Cambrian Hyland Group. The area is likely distal to an unexposed intrusion as indicated by regional geophysics, the presence of porphyry dykes and hornfelsing of the sedimentary rocks. No drilling has ever been done on the property.

Figure 13. Diamond drilling on the Hyland Gold property.



Northgate Exploration and StrataGold Corporation conducted a program of geophysics (IP) and diamond drilling (Fig. 13) of eight holes (1800 m) on the **Hyland** property (Yukon MINFILE 2004, 095D 011, Deklerk and Traynor, 2004) in

southeastern Yukon. A historical oxide resource of 3.2 million tonnes grading 1.1 g/t Au exists on the property. The claims are underlain by the Neoproterozoic to Lower Cambrian Hyland Group phyllite and quartzite, which in the main area of exploration are interpreted to form an east-verging overturned anticline. A large magnetic-low feature is located just to the north of the Main zone. There is intense silica and sulphide mineral replacement of the phyllite and quartzite in the core of the anticline. Three drill holes tested an area along strike from the Main zone, where drilling in 2003 intersected significant gold-silver mineralization which assayed up to 1.38 g/t Au and 3.54 g/t Ag over 53.2 m, and 2.02 g/t Au and 64.87 g/t Ag over

6.5 m. Drilling in 2004 returned significant results, but grades were generally lower than in the core of the Main zone. An additional two holes tested quartz-sulphide veins in the hanging wall of the Main zone and also intersected gold mineralized rock (Table 4).

Three regional targets up to 2.7 km from the Main zone were each drilled with a single drill hole based on geophysics, geochemistry and structural interpretations. No significant results were reported from these holes.

In the Mayo area, John Peter Ross staked the **Haldane** property (Yukon MINFILE 2004, 105M 056, Deklerk and Traynor, 2004) on Mt. Haldane, based on a similar geologic setting to the McQuesten and Aurex properties located 10 km to the east. The properties are located along the Robert Service Thrust fault in hangwall rocks of the Neoproterozoic to Lower Cambrian Hyland Group. Klondike Gold Corporation optioned the property from Ross and performed a small program of geochemistry on the claims.

Yankee Hat Exploration conducted a program of geochemistry and geological mapping on the **Shanghai Creek** property (Yukon MINFILE 2004, 105M 028, Deklerk and Traynor, 2004) near Mayo. Shanghai Creek is located on the north limb of the McQuesten anticline. The claims cover a portion of the Robert Service Thrust, are underlain by the Neoproterozoic to Lower Cambrian Hyland Group rocks, and are intruded by a small plug. This is the same geologic setting as the McQuesten and Aurex properties located 10 km to the south. The program outlined several areas anomalous in gold, arsenic and antimony (Fig. 14). The claims were staked based on data from geochemical and heavy-mineral sampling done by the Geological Survey of Canada as part of Operation Keno in the 1960s (Boyle and Gleeson, 1971).

Eagle Plains Resources conducted a geophysical program consisting of IP and horizontal-loop electromagnetics on their **Dragon Lake** property (Yukon MINFILE 2004, 105J 007, Deklerk and Traynor, 2004) located approximately 85 km northeast of Ross River. Previous work by the company,

Table 4. Significant drill intersections from the Hyland property.

Drill hole	Depth		Width (m)	Au (g/t)
	From (m)	To (m)		
Main Zone				
Hy04-13	111.48	113.48	2.00	0.79
including	147.83	153.39	5.56	0.47
including	186.46	218.22	31.76	0.63
	194.00	198.06	4.06	0.99
	201.71	204.42	2.71	1.24
HY04-14	65.25	79.80	14.55	0.54
including	74.58	78.03	3.45	0.97
including	85.64	88.68	3.04	0.70
	166.66	168.17	1.51	0.87
	210.47	237.45	26.98	0.61
	210.47	216.69	6.22	0.93
HY04-15	68.32	77.42	9.10	0.45
including	69.76	71.48	1.72	0.89
including	166.30	173.30	7.00	0.48
including	167.60	169.16	1.56	0.92
	226.50	245.31	18.81	0.75
	241.78	245.31	3.53	1.06
Hanging wall veins				
HY04-16	99.81	101.51	1.70	0.62
	109.62	112.31	2.69	0.56
	115.14	116.05	0.91	0.60
HY04-17	92.02	94.84	2.82	0.56



Figure 14. Demobilizing from the Shanghai Creek property near Mayo.



Figure 15. Helicopter-portable drill on the Arn property.

Table 5. Significant drill intersections from the Arn property.

Drill hole	Interval (m)	Au (g/t)	Ag (g/t)	Copper (%)
Arn-05	5.28	2.17	9.4	1.27
	5.19	3.17	18.9	2.50
Arn-06	1.39	0.53	5.1	0.92
Arn-09	0.99	15.55	2.1	0.48
Arn-10	2.32	18.10	0.5	nil
	3.05	3.05	26.9	3.18
Arn 11	1.85	1.57	nil	0.03
	1.34	1.98	17.1	3.95
Arn-12	1.38	1.38	20.4	3.24
	8.59	8.59	10.4	1.30
Arn-14	0.6	1.72	3.1	0.63
Arn-16 including	6.34	8.60	2.7	0.50
	0.75	66.30	12.2	0.92
Arn-20	1.83	0.9	0.10	3.63

was conducted late in the season. Results from the drilling had not been released by year's end.

Klondike Gold optioned the **Arn** property (Yukon MINFILE 2004, 115F 048, Deklerk and Traynor, 2004), a copper-gold skarn occurrence, from Atac Resources. The Arn property is located only 6 km from the Alaska Highway in southwestern Yukon. Skarn is developed in Upper Jurassic to Lower Cretaceous volcanic and sedimentary rocks that have been intruded by a swarm of late Early Cretaceous porphyritic to non-porphyritic andesite, diorite and latite dykes. Drilling (Fig. 15) targeted a zone where drilling in 2003 intersected skarn that assayed 11.92 g/t Au over 12.67 m, including 64.40 g/t Au over 1.98 m. This year's drilling intersected numerous skarn units, but abundant post-mineralization dykes disrupted many of the zones. Despite that, many significant pyrrhotite-magnetite-pyrite-chalcopyrite-rich zones were drilled (Table 5). Numerous other skarn zones have been discovered on the property by prospecting and trenching, and remain to be further tested.

VEIN/BRECCIA ASSOCIATED

Ross River Minerals digitally compiled all previous drilling on their **Tay-LP** property (Yukon MINFILE 2004, 105F 121, Deklerk and Traynor, 2004) and computer modeling of the data suggested a westerly dip to mineralized structures intersected in earlier drill programs. The earlier holes were oriented mostly parallel to the structurally hosted quartz-sulphide mineral veins, which are not exposed in the bottom of the till-covered valley. The drilling was reoriented and the first target was a 1.6-km-long magnetic-electromagnetic anomaly intersected in hole TLP02-7 drilled in 2002, which assayed 8.99 g/t Au over 3.56 m. The drilling successfully intersected mineralized rock in all holes drilled at various spacings along the geophysical anomaly over a 1.3 km strike length. Quartz occurs in veins with pyrrhotite-pyrite (Fig. 16) and minor chalcopyrite and tourmaline, hosted within a Lower Cambrian

including diamond drilling in 1999 (3.7 g/t Au over 1.2 m), outlined extensive metalliferous calc-silicate rock within calcareous sedimentary rocks of the Neoproterozoic to Lower Cambrian Hyland Group, which were intruded by a small mid-Cretaceous stock.

Cash Minerals Ltd. conducted a five-hole (671 m) diamond drill program on their wholly owned **Mucho** property (Yukon MINFILE 2004, 105I 004, Deklerk and Traynor, 2004) in southeastern Yukon. The property hosts numerous intrusion-related mineralization styles, including skarn, veins and shears associated with the Cretaceous Nar pluton. Cash Minerals targeted silver-zinc-copper-lead-gold mineralized rock with the drilling that

calcareous biotite schist and interbedded limestone. Gold-bearing sulphide replacement zones occur over significant thicknesses adjacent to the veins. Table 6 summarizes drilling highlights from this year's program.

There is a new exploration revival in the Klondike, with several companies focusing on gold mineralization in this large, and still active, placer gold district. Klondike Star optioned a number of properties from Klondike Gold Corporation and constructed a pilot mill (Fig. 17) on the **Lone Star** property (Yukon MINFILE 2004, 115O 072, Deklerk and Traynor, 2004). This was in preparation for a bulk sampling program which will test rock from this occurrence and other properties in the region. In addition to the mill construction, Klondike Gold conducted geological mapping, prospecting, geochemical surveys and mechanized trenching on their extensive claim groups in the area. Prospecting resulted in the discovery of an old shaft approximately 1300 m along strike from the historic Lone Star adit. Grab samples of quartz vein material from the newly discovered shaft assayed up to 13.68 g/t Au. Soil sampling along the trend of the Lone Star vein returned anomalous gold values for an additional 900 m beyond the new discovery. This zone will be a high priority target for bulk sampling in 2005.

Klondike Source Limited, an Australian-based exploration company, conducted an exploration program on their **Klondike** property (Yukon MINFILE 2004, 115O 079, etc., Deklerk and Traynor, 2004), which included diamond drilling (Fig. 18) of six holes (1437 m). Klondike Source has been working on their holdings which consist of 490 wholly owned claims and an additional 443 claims optioned from PacRim Resources. The company has performed geochemical surveys, structural interpretation from landsat and airphotos, and geological mapping on the claims. The drilling was designed to test the theory that the source of the abundant placer gold in the Klondike District was from flat-lying zones similar to the Pogo deposit in Alaska. Drilling was concentrated in the area above Victoria Gulch and Bear Creek. Drill hole 04-01 intersected 0.018 g/t Au and 1070 g/t Ag over 2.88 m and hole 04-06 intersected 1.2 m of 0.951 g/t Au associated with a narrow arsenopyrite vein.

J.A.E. Resources conducted a geological sampling and prospecting program on their claims, which cover the east and north flanks of **King Solomon Dome** (Yukon MINFILE 2004, 115O 068, Deklerk and Traynor, 2004) in the heart of the Klondike District. The program was following up on significant results generated by

Table 6. Significant drill intersections from the Tay-LP property.

Drill hole	Interval (m)	Au (g/t)
TLP04-01	19.6	1.33
including	3.4	5.13
TLP04-02	10.5	3.96
including	6.1	6.5
TLP02-03	5.5	0.7
TLP04-04	11.0	3.0
including	1.08	12.5
TLP04-05	3.2	1.85
and	10.52	2.0
TLP04-07	8.02	0.91
TLP04-08	1.08	1.68



Figure 16. Jeff Bond of the Yukon Geological Survey with a cored section of quartz-pyrrhotite-pyrite vein from the Tay-LP property.



Figure 17. Pilot-scale mill on the Lone Star property in the Klondike.



Figure 18. Drill set-up on Klondike Source's Klondike property. The headwaters of Victoria Gulch are in the background.

Barramundi Gold who optioned the property during 1996-97. Work by Barramundi generated 72 chip and grab samples grading from 0.1 to 32.0 g/t Au. In 2004, values up to 3.72 g/t Au were obtained from pyritic chlorite-muscovite schist adjacent to gold-quartz veins. Chip sampling across a zone of narrow mesothermal quartz veins (>15 cm) hosted in pyritized dark green schist (quartz porphyry?) returned values of 0.633 g/t Au over 4.13 m and 1.162 g/t Au over 3.1 m. Elsewhere on the property, limonitic and pyritized schist adjacent to quartz-pyrite-galena veins returned up to 40.7 g/t Au over 0.7 m, with the vein assaying 3.4 g/t Au over 2.2 m.

Hinterland Metals Inc. explored the **Helen** gold vein (Yukon MINFILE 2004, 105G 030, Deklerk and Traynor, 2004), with prospecting, geochemical sampling and a horizontal-loop electromagnetic (HLEM) survey. The Helen vein was discovered in 2003 while conducting gemstone exploration adjacent to a Cretaceous intrusion in the Finlayson Lake District. The vein contains quartz, arsenopyrite and pyrite. The HLEM survey outlined a weak conductor over 300 m long that encompasses the newly discovered vein showing. Prospecting along the conductor discovered poorly exposed mineralized rock that assayed 3.41 g/t Au and 2.9 g/t Au approximately 50 m from the original showing. Rusty quartz float in talus that assayed 59.6 g/t Au was found a further 80 m from the newly discovered mineralization.

Freegold Ventures Limited optioned the Eocene **Grew Creek** low sulphidation epithermal gold-silver deposit (Yukon MINFILE 2004, 105K 009, Deklerk and Traynor, 2004) from Whitehorse prospector Al Carlos. Drill-indicated reserves (non-compliant with the National Instrument 43-101) of 773 020 tonnes grading 8.92 g/t Au and 33.6 g/t Ag exist in the Main zone. The property is midway between Ross River and Faro and is located 1 km from the Robert Campbell Highway on the main Yukon power grid. The deposit is hosted in Eocene volcanic rocks within a graben formed by the Tintina fault system. A new interpretation of the dominant vein direction in the deposit is being tested by Freegold. Initial results support their hypothesis that the veins have a northerly strike and that previous drilling was conducted subparallel to the veins (Fig. 19). The new interpretation indicates additional potential for expanding the Main zone 200 m to the south and to depth. Quartz-adularia veins and stockwork are hosted within pyroclastic felsic tuffs. Based on the immediate success of the drilling, Freegold expanded their exploration budget (12 holes, 2077 m) and mobilized a second drill to the property. Drilling continued through December. Several other zones exist on the property that remain to be drill tested. Results available by year end are highlighted in Table 8.



Figure 19. Narrow quartz-adularia vein from drilling at Grew Creek.

Tagish Lake Gold conducted a two-hole (900 m) drill program on the **Goddell** shear zone (Yukon MINFILE 2004, 105D 025, Deklerk and Traynor, 2004). The drilling was used to train diamond drill helpers and was funded by the Yukon government's Department of Energy, Mines and Resources, and administered by the Yukon Mining Training Trust Fund. The drilling was directed along strike from the zone which

Table 8. Drill intersections from the Grew Creek property.

Drill hole	Width (m)	Au (g/t)	Au (g/t)
GC-04-225	118.0	1.81	2.6
including	90.5	2.25	3.2
including	17.5	6.79	8.8
including	2.0	14.38	8.5
and	2.3	17.77	30.2
GC-04-226	128.0	0.38	0.70
including	90.0	0.46	0.65
including	57.5	0.53	0.65
including	7.5	1.56	0.80
GC-04-227	6.25	22.12	44.7
and	1.55	60.50	149.0



Figure 20. Participants in a Mining Analyst Tour sponsored by the Yukon government, viewing Goddell core.

contains indicated mineral resources of 320 000 tonnes grading 11.2 g/t Au and inferred mineral resources of 280 000 tonnes grading 9.21 g/t Au. Last year, Tagish Lake Gold drilled two holes 225 m along strike from the resource, with the best hole intersecting 26.9 m grading 2.5 g/t Au, including 9.0 m grading 5.9 g/t Au. This year's drilling was a further 200 m stepout along strike from last year's intersections. Drill hole GG04-03 intersected intensely sheared Cretaceous quartz monzonite cut by dark mylonitic shear fabrics that contain fine pyrite and arsenopyrite. The quartz monzonite is also cut by rhyolite and andesite dykes. Intervals in this zone assayed 0.99 g/t Au over 0.35 m and 1.03 g/t Au over 1.21 m. The drilling indicates the zone is still present but is less mineralized in this area. The second hole, drilled 40 m along strike from the first, intersected a 49-m-wide barren rhyolite dyke within the shear zone. A 1.5-m section of sheared quartz monzonite and mylonite graded 1.03 g/t Au (Fig. 20).

The **Shell Creek** property (Yukon MINFILE 2004, 116C 029, Deklerk and Traynor, 2004) was explored by Logan Resources with silt sampling, geochemistry, geological mapping and excavator trenching in 2004. The property covers a Precambrian or Cambrian Algoma-type banded iron formation (BIF) consisting of a magnetite-chert unit that has been subjected to several phases of folding. In 2002, prospector Shawn Ryan discovered a visible gold- and copper-mineralized quartz-carbonate zone hosted by chloritic schists and phyllites in the hanging wall of the iron formation. Mapping in 2004 suggests the quartz-carbonate veins formed in the noses of folds, similar to saddle reef-type veins (Fig. 21). Mapping and prospecting concentrated on the northern portion of the BIF, where four, or possibly five, gold-copper-mineralized quartz saddle reef structures were identified over a 6-km

Figure 21. Massive quartz saddle reef vein on the Shell Creek property.





Figure 22. *Cheyenne Ryan learning to trench at the White property.*

Figure 23. *Shawn Ryan stands on a massive gold-bearing quartz vein exposed by trenching on the White property.*



strike length. Quartz reefs along the northern belt of BIF form shallow southwest-plunging, upright, openly folded, anticlinal structures that are from 50 to 75 m wide across the region of the fold closure. Individual reefs consist of a number of stacked quartz veins that range from less than half a metre to several metres in thickness, separated by intervals of variably chloritized, host sedimentary rock. Quartz reefs are thickest at the hinge zone and progressively thin out and dissipate as the veins roll into the steeper fold limbs. In addition to the

gold in quartz veins, clastic metasedimentary rocks proximal to zones with late-stage vein development are typically pervasively chloritized and contain elevated copper. This copper occurs as disseminated chalcocite developed along schistosity surfaces. Grab samples of chalcocite-bearing, chloritized sedimentary rocks returned assays up to 1.8% copper. One trench was excavated on the property and uncovered veins and extensive quartz-carbonate mineral float where predicted by mapping. The morphology of the veins was not well exposed by the trench. Assay results of sampling from this year's program are not yet available. Results from last year's exploration on the property returned up to 9.08 g/t Au in quartz-carbonate.

Madalena Ventures optioned the **White** property (Yukon MINFILE 2004, 115O 012, Deklerk and Traynor, 2004) which is located on the Yukon River across from the mouth of the White River. In 2003, prospector Shawn Ryan discovered quartz float on the property that contained traces of galena, tetrahedrite and chalcopyrite and assayed 50 g/t Au. A return visit to the site resulted in the discovery of an old hand trench approximately 25 m from the location of the float. The company performed a program of geological mapping, line-cutting, geochemistry, geophysics

(magnetics) and trenching (Fig. 22) in 2004. Trenching at the location of the original hand trench exposed two parallel quartz veins with trace galena, chalcopyrite and visible gold. The veins vary from 1 to 5 m in width and are each exposed over a 12-m length. The veins dip steeply, and are hosted in Devonian to Mississippian quartz-sericite schist with a shallow foliation, which is in turn intruded by a large mid(?) to late Paleozoic gabbroic body (Fig. 23).

Cordilleran Minerals Limited, a private Whitehorse-based exploration company, staked the **Kingdom Ridge** property (Yukon MINFILE 2004, 105C 022, 027, Deklerk and Traynor,

2004) south of Quiet Lake in 2003. Gold-bearing quartz veins are hosted in Devonian to Mississippian rocks of the Yukon-Tanana Terrane which are intruded by the mid-Cretaceous Quiet Lake Batholith. In the area of quartz veining, host rocks are described as orange-weathering carbonates intercalated with a light green to dark green amphibolite(?). Grab samples of quartz vein material assayed up to 15.2 g/t Au, 4.3 g/t Ag and 912 ppm As. In 2004, the company completed a 700 line-km airborne magnetic, electromagnetic and radiometric survey over the property, as well as stream sediment sampling.

Aurchem Exploration, a private company, explored the **Vic** claims (Yukon MINFILE 2004, 115I 068, Deklerk and Traynor, 2004) which are approximately 10 km to the north of the former producing Mt. Nansen gold-silver mine. The company conducted diamond drilling of the “28 zone,” a quartz vein that varies from 1 to 3 m over an approximately 200-m strike length. The quartz vein contains no sulphide minerals and cuts a Jurassic porphyritic syenite. The company reported drilling intersected values up to 40.02 g/t Au over 1.34 m.

SEDIMENT ASSOCIATED

Boulder Mining conducted an extensive program of roto-sonic drilling, bulk sampling and trenching on two large bench deposits of White Channel gravels on the **Indian River** project, south of the Klondike Goldfields on claims optioned from the Western Prospector Group. This is one of the first large-scale, methodical exploration programs conducted by a publicly traded company on this type of placer deposit in Yukon. Results from the program have been very encouraging and indicate that a large economic placer deposit may be contained in the benches. Results of the program are outlined in the Placer Mining Overview section of this publication (LeBarge, this report). Boulder Mining also staked over 1000 quartz claims covering exposures of the Cretaceous **McKinnon Creek** conglomerate (Yukon MINFILE 2004, 115O 054, Deklerk and Traynor, 2004; Fig 24). These conglomerates were first explored in the early 1900s and have seen sporadic exploration since the 1960s. Past work has identified gold in the matrix of the conglomerate suggesting paleoplacer potential. Additional potential for epithermal



Figure 24. Cretaceous gold-bearing McKinnon Creek conglomerate from the Indian River area.

mineralization, related to the coeval Cretaceous Carmacks flows, sills and dykes, is indicated by anomalous silver, arsenic, barium, mercury, lead and antimony (c.f., Lowey, 1983). Boulder has confirmed the gold-bearing potential of the conglomerates in several areas, and through their drilling and trenching program has identified areas of higher placer-gold potential that are underlain by conglomerates.

BASE METALS

Base metal exploration made a healthy comeback in 2004. Volcanogenic massive sulphide (VMS) deposits in the Devonian to Mississippian Yukon-Tanana Terrane with high zinc and precious metal values were the main target of companies. The Finlayson Lake VMS District experienced renewed exploration after a lull of several years. Exploration in other areas of Yukon-Tanana Terrane was successful, with the discovery of zinc-copper-lead-gold-silver-bearing massive sulphide in drill core on the Mor property near Teslin in southern Yukon. Strong copper prices resulted in an increase in exploration for porphyry and iron-oxide-copper-gold deposits throughout many areas of Yukon. Very little attention was given to the potential of sedimentary-exhalative (SEDEX) zinc-lead deposits in the Selwyn Basin, with the exception of a small program conducted by Expatriate Resources on their HP/Nod claims near Howard's Pass. With strengthening of the zinc price, it is anticipated that exploration for SEDEX deposits in Yukon will be renewed after a hiatus of nearly twenty years.

VOLCANIC ASSOCIATED

The largest program in the Finlayson Lake VMS District was conducted by Expatriate Resources on their **Wolverine** deposit (Yukon MINFILE 2004, 105G 072, Deklerk and Traynor, 2004). Early in the year, Expatriate purchased Atna Resources' interest in the Wolverine joint venture to own 100% of the project. Expatriate has submitted its project description report to the Yukon Ministry of Energy, Mines and Resources for the development of the Wolverine deposit as a 1250-tonne-per-day underground mine. The report is in support of an application to the Yukon Water Board for a Class A water licence for development of a mine. The application was made in conjunction with a quartz-mining licence application that has also been filed with the Yukon government.

The Wolverine deposit resource in all categories is 6 237 000 tonnes grading 12.66% Zn, 1.55% Pb, 1.33% Cu, 371 g/t Ag and 1.76 g/t Au. Currently, the probable diluted mining reserve, determined by Hatch Associates in a November, 2000 prefeasibility study, is 3 470 000 tonnes grading 336.6 g/t Ag, 1.59 g/t Au, 12.43% Zn, 1.44% Pb and 1.37% Cu (using a 4-m minimum thickness of the sulphide deposit) and will provide an eight-year mine life. Expatriate conducted heavy media separation studies in 2004 that were very successful in separating lighter hanging-wall and footwall argillite from massive sulphide. Initial testwork recovered 98% of base metals and 95% of precious metals. Further heavy media studies and test-mining in 2005 will determine the ability to mine and process thinner parts of the ore-body and increase the projected mine-life.

Recent geological mapping by Murphy et al. (2001), shows that the Wolverine deposit is hosted within a Lower Mississippian package of felsic metavolcanic and metasedimentary rocks of lower greenschist metamorphic rank, referred to as the Wolverine Succession. In 2004, Expatriate drilled the Wolverine deposit (9 holes – 1758 m) to provide metallurgical samples and to infill (Fig. 25) the area proposed for test mining as part of their feasibility study. The drilling confirmed the high-grade nature and continuity of mineralized rock within the deposit as highlighted by hole WV04-124, which intersected 5.3 m of massive sulphide grading 4.29 g/t Au, 669.8 g/t Ag, 0.65% Cu, 1.73% Pb and 8.25% Zn and included a spectacular 2.6 m of 7.37 g/t Au, 1136.8 g/t Ag, 0.67% Cu, 3.01% Pb and 11.48% Zn. Expatriate continued with their drilling program into the fall and winter on the **Fisher** zone (Yukon MINFILE 2004, 105G 040, Deklerk and Traynor, 2004) of the Wolverine property. Previous wide-spaced drilling on the Fisher zone intersected base- and precious-metal-bearing sulphide mineralized rock in all drill holes. The most significant hole to date was WV95-06, which intersected 2.4 m of semi-massive sulphide rock that graded 0.14 g/t Au, 66.3 g/t Ag, 0.12% Cu, 1.41% Pb and 2.84% Zn. Drilling of the Fisher zone continued in December and results were not available at year end.

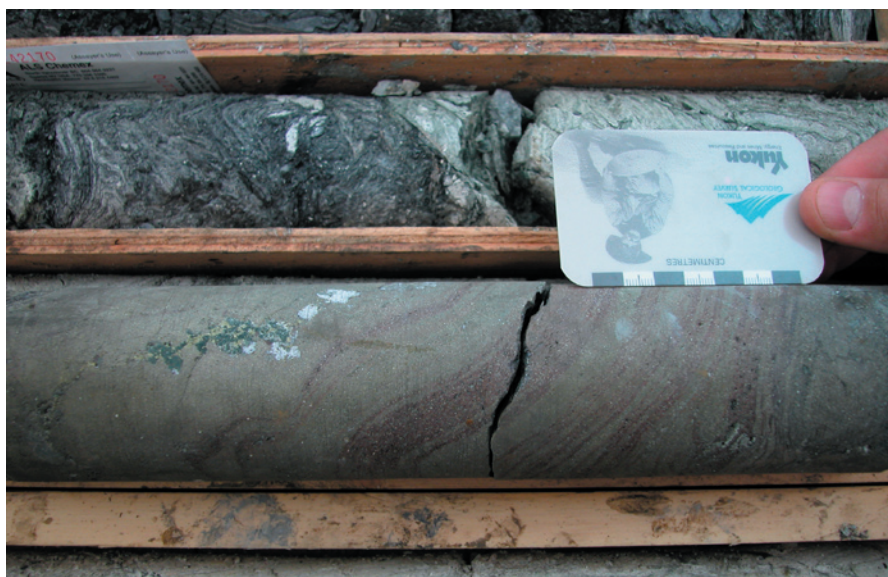


Figure 25. High-grade Zn-Ag-Cu-Pb-Au core from infill drilling on the Wolverine deposit.

At Wolverine Lake, the company expanded their camp facilities with the addition of a mine dry, kitchen enlargement, recreation hall and additional sleeping facilities (Fig. 26). They also lengthened the airstrip and began site preparation of the mine portal (Fig 27). Expatriate closed a \$13 626 840 brokered private placement in the fall of 2004, \$11 million of which is earmarked for the exploration, feasibility study and test mining of the Wolverine deposit. Expatriate immediately initiated their program in late 2004, and after a Christmas break will renew work in January, 2005.



Figure 26. Expanded kitchen facility at the Wolverine camp.



Figure 27. Portal site on the Wolverine property.

Late in 2004, Expatriate completed a company reorganization; Expatriate will change its name to Yukon Zinc Corp. which will retain the Wolverine deposit and Finlayson assets. A new exploration company, Pacifica Resources Ltd., will be formed and will hold Expatriate's non-Finlayson assets.

Expatriate conducted regional mapping, sampling and prospecting on some of their 640 km² claim holdings in the Finlayson district. This work resulted in the discovery of outcropping mineralized rock dubbed the Thunderstruck showing (Fig. 28). The Thunderstruck is located on the southern portion of the **Goal-Net** property (Yukon MINFILE 2004, 105G 121, Deklerk and Traynor, 2004), which has had previous exploration programs that included diamond drilling, but only reconnaissance-scale work in the area of the discovery. The discovery outcrop contains pyrrhotite, sphalerite, galena and chalcopyrite, and assayed 13.4% Zn, 5.07% Pb, 0.3% Cu, 40.7 g/t Ag and 0.04 g/t Au over 0.3 m. The Thunderstruck showing is hosted in the lower portion of the Devonian to Mississippian Kudz Ze Kayah felsic metavolcanic unit (unit DK; Murphy and Piercey, 2001). This is at the same stratigraphic level interpreted to host Teck-Cominco's **GP4F** deposit (Yukon MINFILE 2004, 105G 143, Deklerk and Traynor, 2004) located approximately 15 km to the north. Expatriate conducted a winter drilling program of three widely spaced holes on Thunderstruck, with results from that program pending.

Teck-Cominco conducted an exploration program on a 44 km² parcel of land known as **R-15** optioned from the Kaska Mineral Development Corporation (KMDC), as mentioned in the introduction. Teck-Cominco conducted a University of Toronto electromagnetic (UTEM) geophysical survey on the property in the spring of 2004. The survey outlined geophysical targets in the lower portion of the Devonian to Mississippian **Kudz Ze Kayah** felsic metavolcanic unit (unit DK; Murphy et al., 2001) that hosts their adjoining Kudz Ze Kayah (Yukon MINFILE 2004, 105G 117, Deklerk and Traynor, 2004) and GP4F deposits (11.3 Mt @ 5.9% Zn, 1.5% Pb, 0.9% Cu, 133 g/t Ag, 1.3 g/t Au and 1.5 Mt @ 6.4% Zn, 3.1% Pb, 0.1% Cu, 90 g/t Ag, 2.0 g/t Au, respectively). Teck-Cominco drilled eight holes (1727 m; Fig. 29) and intersected mineralized rock in several of the holes, however, detailed results have not been released.



Figure 28. Jason Dunning and Phu van Bui of Expatriate Resources at the Thunderstruck discovery outcrop.



Figure 29. Drill on the R-15 land claim block optioned by Teck-Cominco from the Kaska Mineral Development Corporation.



Figure 30. Chuck Downie (Bootleg Exploration) and Maurice Colpron (Yukon Geological Survey) examine massive sulphide in the discovery hole at the Mor property.

In southern Yukon, Kobex Resources optioned the **Mor** property (Yukon MINFILE 2004, 105C 061, Deklerk and Traynor, 2004) from Almaden Resources. Exploration interest in the region has recently risen as most of the rocks are similar in age (Devonian-Mississippian) and lithology to those hosting VMS occurrences in the Finlayson Lake District. The Mor property is located within the Big Salmon Complex, a sequence of Late Devonian to late Mississippian deformed and metamorphosed rocks considered to be part of the Yukon-Tanana Terrane. Kobex, following up on previous exploration work, conducted an IP geophysical survey in the area of the Discovery showing. The survey generated an 800-m-long IP chargeability anomaly. The company subsequently conducted a two-hole (185 m) drilling program (Table 9). The two holes, spaced 100 m apart, intersected VMS mineralized rock in a package of mixed felsic and mafic volcanic rocks. The drill holes intersected significant but low-grade mineralization massive pyrite with sphalerite, chalcopyrite and galena (Fig. 30).

Table 9. Drill intersections from the Mor property.

Drill hole	From m	To m	Interval m	Cu %	Zn %	Ag g/t	Au g/t	Pb %
MO04-01	18.0	22.9	4.9	0.69	1.31	39.70	0.82	0.15
including	19.3	21.7	2.4	0.83	1.43	40.71	0.83	0.14
	19.3	19.9	0.6	1.06	1.27	25.28	0.63	0.06
	41.9	42.6	0.9	0.69	0.18	11.80	0.50	0.05
MO04-02	23.30	27.05	3.75	0.17	0.76	12.95	0.17	0.11
including	24.50	24.85	0.35	0.44	2.17	26.20	0.41	0.27
including	66.12	68.00	1.88	0.97	0.21	19.78	0.35	0.05
	67.30	68.00	0.70	1.23	0.37	37.65	0.50	0.12

WERNECKE BRECCIA

The other main target of base metal explorationists was the iron-oxide-copper-gold (IOCG) targets hosted in Proterozoic Wernecke Breccias. At least 65 bodies of Wernecke Breccia are known throughout Yukon, and all contain iron-oxide copper (\pm gold, uranium, cobalt) mineralized rock. Janina Resources conducted magnetic and gravity surveys and outlined significant anomalies on the **Yukon Olympic** property (Yukon MINFILE 2004, 116G 082, Deklerk and Traynor, 2004), optioned from Copper Ridge Exploration. The early 2004 winter exploration program included detailed gravity, magnetic and IP surveys on 31 km of line grid at the eastern end of the previously defined, 12-km-long gravity and magnetic trend. The survey successfully defined a strong, roughly circular magnetic anomaly with a partially fringing gravity anomaly locally in excess of 2 mGal. The southeastern portion of the gravity anomaly correlates with known copper-bearing hematite (iron oxide) breccia in Spectacular Creek. The source of the combined magnetic and gravity feature is mostly hidden under younger cover rocks.

Copper Ridge conducted geological mapping, prospecting, soil, rock and silt geochemical sampling, and a helicopter-supported gravity survey on the **Hart River** property (NTS 116A/15), a new IOCG breccia discovery made in 2002. The 2004 program focused on six showings of iron oxide breccias and gabbro stocks with associated copper and locally gold. The mineralized gabbro and breccias are developed within the 6- by 10-km area of a large magnetic anomaly and on the margins of three newly defined gravity anomalies. A partially defined, 5-mGal gravity anomaly coincides with a new copper-bearing hematite breccia occurrence (Fig. 31), known as the Ironman. At the Ironman showing, one day of prospecting discovered a body of hematite breccia occurring over at least a 200- by 50-m area. Grab samples of the breccia contained up to 5373 ppm copper. The Ironman showing, which occurs near an unconformity separating underlying Proterozoic sedimentary rocks from overlying Paleozoic carbonate rocks, was discovered on the last day of the 2004 field program. A porous iron- and manganese-oxide

Figure 31. Hematite breccia from the Ironman showing on the Hart River IOCG property.



cemented breccia, that occurs over at least a 200- by 100-m area, contains up to 1151 ppm Cu. At the Smokey showing, copper is hosted in a strongly silicified and pyrite-rich fine-grained sandstone, and is spatially related to a prominent northwest-trending structure. Chip sampling in 2004 in this area returned copper values up to 0.74% over 1.5 m and 0.70% over 3 m. The Copper Slope showing is associated with the same structure that hosts the Smokey showing. Anomalous copper is hosted in a sericite-, tourmaline- and albite-altered dolomitic siltstone. Copper values in scarce outcrop are highly anomalous and a 30-cm piece of angular float returned a value of 6.7% Cu. The Copper Slope showing occurs on the eastern side of

a newly defined gravity anomaly. A large area of hematite breccia occurs on the western side of this anomaly. At the Copper Top showing, copper, and local gold were discovered over a 100- by 300-m area in dolomitic siltstones within the contact halo of a gabbro stock. Grab samples returned values up to 2.0% Cu and 509 ppb Au from outcrop (Fig. 32). At the AA Petite showing, massive chalcopyrite and magnetite with anomalous gold and uranium occur in a dolomitic siltstone adjacent to a gabbro stock. Outcrop samples returned values up to 2.1% Cu over 1.1 m, while float grab samples returned values of up to 15.0% Cu and 148 ppb Au.

International KRL Resources staked the **NOR** breccia occurrence (Yukon MINFILE 2004, 106L 061, Deklerk and Traynor, 2004) late in the season. The claims are underlain by an 800- by 1800-m heterolithic, diatreme breccia body (Fig. 33) intruded into a fault-bounded outlier of Middle Proterozoic limy siltstone and argillite. This Proterozoic rock is exposed through Cambrian limestone, which unconformably overlies it. Previous sampling of brannerite-bearing boulders assayed as high as 4% U_3O_8 . The copper and gold potential of the breccia body was reconfirmed by sampling that was conducted in 2004.

PORPHYRY/SHEETED-VEIN ASSOCIATED

Copper Ridge Exploration continued to be active in the Stewart River area south of Dawson (Fig. 34), exploring for occurrences similar to that discovered on their **Lucky Joe** property (Yukon MINFILE 2004, 115O 051, Deklerk and Traynor, 2004), which is currently optioned to Kennecott Exploration. Kennecott has outlined a large area of alteration and mineralized rock on the Lucky Joe that they have interpreted as a metamorphosed porphyry copper-gold deposit. Copper Ridge conducted a program of geochemical sampling, mapping and prospecting on the **Shamrock** and **Thistle** properties (Yukon MINFILE 2004, 115O 007,008,009, Deklerk and Traynor, 2004), which lie immediately to the south of the Lucky Joe property. The claim groups are on



Figure 32. Massive chalcopyrite from the Copper Top showing from the Hart River IOCG property.

Figure 33. Hematite breccia from the Nor property, North Yukon.



Figure 34. Fires consumed much of the area south of Dawson. Outcrop exposure should be enhanced in 2005.



trend, and have similar linear magnetic anomalies to those that define the Lucky Joe property. On the Thistle property, the company outlined a 7.5-km-long soil anomaly defined by copper values in the range of 120 to 400 ppm, with anomalous gold (up to 650 ppb) and molybdenum (up to 20 ppm). Zinc and lead values are also locally anomalous adjacent to the copper zone. This is a similar geological, geophysical and geochemical setting to Lucky Joe. The anomalous copper and gold values follow the edge of a linear magnetic anomaly within a sequence of Paleozoic metamorphic rocks. Reconnaissance-scale geochemistry was performed on the Shamrock property, which identified two areas with copper anomalies (from 200 to 850 ppm) in a similar geological and geophysical setting as the Lucky Joe.

Approximately 65 km northeast of Whitehorse, Saturn Ventures explored the **Mars** property (Yukon MINFILE 2004, 105E 002, Deklerk and Traynor, 2004) with a 7-hole (827-m) diamond drilling program. The Mars property covers the Jurassic alkalic Teslin Crossing pluton. Several drill targets have been identified within a 1.5- by 3-km area of alteration with an associated copper-gold-silver-molybdenum showing. The drilling failed to intersect significant mineralized rock, and Saturn relinquished its option on the claims.

Copper Ridge Exploration explored the **Chimo** property (Yukon MINFILE 2004, 115I 070, Deklerk and Traynor, 2004) in the Dawson Range Mineral Belt with a program of geochemistry, geological mapping and IP geophysics. The IP survey succeeded in defining a moderate to strong, 300- to 400-m-wide chargeability anomaly that trends eastward for at least 1200 m. The chargeability anomaly borders a copper-molybdenum anomaly to the south, and is coincident with the central part of a linear gold-in-soil anomaly. Outcrop on the property is rare, but mapping showed the copper-molybdenum anomaly to be underlain by mid-Cretaceous andesitic volcanic rocks and quartz-diorite intrusive rocks. The company is refining drill targets based on the data acquired in the 2004 and 2003 exploration programs.

GEMSTONES

Coloured gemstone exploration in Yukon continued to be led by True North Gems, mainly in the Finlayson Lake District focusing on similar geologic settings to the **Tsa da Glisza** project (Yukon MINFILE 2004, 105G 147, Deklerk and Traynor, 2004; Neufeld, this volume). At Tsa da Glisza, emeralds occur where quartz-tourmaline veins cut mafic-rich layers in a shallowly dipping mica-chlorite schist of the Upper Devonian Fire Lake mafic metavolcanic unit (unit DF, Murphy and et al., 2001). The quartz-tourmaline veins are genetically linked to a body of mid-Cretaceous granite exposed approximately 1 km to the east. Other companies that continued to look for emeralds in the district stood to benefit from recent 1:50 000-scale mapping conducted by the Yukon Geological Survey.

True North Gems' main focus was on the Tsa da Glisza project (formerly Regal Ridge). The company renamed the project in recognition of the renewal of the memorandum of understanding signed in 2003 with the Ross River Dena Council. The program included geological mapping and sampling, prospecting, trenching, bulk sampling, diamond drilling and upgrading of the processing plant (Fig. 35). The company also conducted testwork comparing mechanized faceting versus hand-cutting of gem and near-gem rough material, and dense media separation for mechanized recovery of emeralds as opposed to manual collection at the wash plant. Hand cutting of gemstones resulted in an average 5 to 15% yield with nominal yields on select splits as high as 20% for cabochons and 30% for beads as opposed to the 5% yield for the mechanized cutting. Dense media separation produced positive results, and the company will continue to test this recovery process, which would result in improved security and potentially higher gemstone recoveries.

Mini-bulk sampling in 2003 and 2004 from the Mattscar, Far West and Southwest veins of the Summit zone, including material from underground exploration in 2003,



Figure 35. Upgraded processing plant at the Tsa da Glisza emerald project.

resulted in the recovery of 38.8 kg of gem, near-gem and non-gem material from 2533 tonnes of material processed; 1 g is equal to 5 carats. Details of the mini-bulk sampling result are available at the company website¹. Table 10 outlines the yields.

The 2004 exploration program included 46 core holes (3084 m) on the Summit zone, which encompasses most of the main showings on Regal Ridge. The drilling intersected numerous zones of multistage quartz-tourmaline-scheelite veins accompanied by tourmaline and rusty mica-rich alteration of the Fyre Lake chlorite schist. All these features are indicative of the known emerald mineralization, but in this case occur up to 100 m below the known surface showings. Emerald was intersected in eight diamond drill holes.

Table 10. Bulk sampling results from the Tsa da Glisza property.

	Emerald weight (grams)	Emerald grade (grams/tonne)
Gem	1502.53	0.59
Near-gem	14 334.24	5.66
Non-gem	23 026.33	9.09
Total emerald	38 863.10	15.34

Approximately 1 km southwest of the Summit zone, geologist Heather Neufeld, while mapping and prospecting soil geochemical anomalies on Howdy Ridge as part of the company’s regional exploration work at Tsa da Glisza, discovered a significant new zone of emerald-bearing quartz and tourmaline veins. The newly

discovered Shadow zone (Fig 36) crystals are described as coarse gem and near-gem quality emeralds, 2 mm to 3.5 cm long with excellent colour. The largest stone recovered was 10 cm in length. Access to the new discovery was constructed and an 8-hole (418-m) diamond drilling program was conducted. Drilling intersected the favourable Fyre Lake schist and quartz-tourmaline scheelite veins, the latter correlating with subvertical and shallow-dipping emerald-bearing veins exposed in the initial trenching program. Property-scale geological mapping has expanded the outcrop distribution of the Fyre Lake sequence, which hosts emeralds on Howdy Ridge (Shadow zone) and on the adjacent ridge exposed above the contact with the Cretaceous granite.

True North Gems also conducted regional exploration on other properties in the Finlayson area for emeralds. At the **True Blue** property (Yukon MINFILE 2004, 105F 081, Deklerk and Traynor, 2004; Turner, this volume), the company collected a mini-bulk sample of aquamarine hosted in a Mississippian syenite stock that

intruded Lower Paleozoic carbonate rocks. Diamond-impregnated chain saws (Fig. 37) were used to collect the samples. Results of the mini-bulk sample were not available by year-end.

Firestone Ventures conducted a program of hand-trenching on the **Straw** property (NTS 105G/8) located 5 km southeast of on the Tsa da Glisza property. A total of 165 hand pits were excavated (Fig. 38) to a depth of 1.0 to 1.5 m in areas highlighted by coincident beryllium and chromium soil geochemical anomalies in conjunction with



Figure 36. Greg Davison with the discovery boulder from the Shadow zone on Howdy Ridge at the Tsa da Glisza emerald project.

¹www.truenorthgems.com



Figure 37. Diamond-impregnated chain saws were used for sampling at the True Blue property.

favourable geology, alteration and structure as defined by work conducted in 2003. Although no emeralds were found, a copper-cobalt geochemical anomaly was outlined. The property is located close to the Kona copper-gold-cobalt deposit on the adjoining Fyre Lake property (Sebert et al., 2004).

Entourage Mining Ltd. conducted a program of prospecting and helicopter-supported mechanized trenching on several zones identified in regional geochemical sampling conducted in 2003. The zones are distributed throughout the Finlayson Lake area on claims optioned for their gemstone potential from Expatriate Resources. Results from the program had not been released at year's end.

Arcturus Resources conducted a short program of geological mapping and geochemical sampling on their **Fife** property (Yukon MINFILE 2004, 105G 142, Deklerk and Traynor, 2004), which is located south and west of, and contiguous with, True North Gems' Tsa da Glisza property. The potential of the northern portion of the property has improved due to the newly discovered Shadow zone on True North Gems' Tsa da Glisza property.

Hinterland Metals conducted limited work on their **Gleam** and **Dazzle** properties (Yukon MINFILE 2004, 105G 030,031,120 Deklerk and Traynor, 2004) in the Finlayson Lake area. The



Figure 38. Hand-pitting at the Straw property.

Figure 39. Slinging a net load of chrysoprase from the Dazzle property.



properties were optioned from True North Gems in 2003, and were originally staked based on the similar geologic setting to the Tsa da Glisza property. No significant results were reported. The company collected a bulk sample of chrysoprase (Fig. 39), a gem quality, cryptocrystalline variety of chalcedony used to make beads, cabachons and carved figures. The company discovered the chrysoprase in 2003, and was successful in manufacturing some jewelery from their 2003 samples.

ACKNOWLEDGEMENTS

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APPENDIX 1: 2004 EXPLORATION PROJECTS

PROPERTY	COMPANY/OWNER	MINING DISTRICT	MINFILE # or (1:50 000 NTS)	WORK TYPE	COMMODITY
Ami	Grid Capital Corp.	Dawson	115N 39,40	reclamation	Cu-Mo, Ag-Pb-Au
Antimony	Strategic Metals Ltd./ War Eagle Mining Company Inc.	Dawson	116B 094	G,GC,DD	Au-Cu
Arn	Klondike Gold Corp./ Atac Resources Ltd.	Whitehorse	115F 048	G,GC,T,DD	Au-Cu
Aurex	StrataGold Corp.	Mayo	105M 060	G,GC	Au
Brewery Creek	NovaGold Resources	Dawson	116B 160	G,GP,DD	Au
Blende	Eagle Plains Resources/Shoshone Silver Mining Company	Mayo	106D 064	G,GC,P	Ag-Pb-Zn
Bonanza	International Gold Ventures	Dawson	115O 161	G,GC,P,GP	Au
Box	Expatriate Resources	Watson Lake	(105G/10)	G	Cu-Pb-Zn-Ag-Au
Burwash	Golden Chalice Resources/Strategic Metals Inc.	Whitehorse	115G 100	G,GC,T	Ni-Cu-PGE
Cathy	International Gold Ventures	Dawson	115O 010	G,GC,P	Au
Chimo	Copper Ridge Exploration	Whitehorse	115I 070	G,GP,GC,P	Cu-Au
Clark/Cameron	Klondike Gold Corp.	Mayo	106D 011,012	P,GC	Ag-Pb-Zn
Clear Creek	StrataGold Corp.	Dawson	115P 012,013	AGP	Au
Dazzle/Gleam	Hinterland Metals/ True North Gems	Watson Lake	105G 30,31,120	G,GC,P,GP	gemstones, Au
Dragon Lake	Eagle Plains Resources	Whitehorse	105J 007	G,GP	Au
Dublin Gulch	StrataGold Corp.	Mayo	106D 025	AGP	Au
Fife	Arcturus Ventures	Watson Lake	105G 102	G,GC,P	gemstones
Finlayson emerald	Entourage Mining/ Expatriate Resources	Watson Lake	105G various	G,GC,P,T	gemstones
Fisher	Expatriate Resources	Watson Lake	105G/08	G,DD	Zn-Pb-Cu-Au-Ag
Grew Creek	Freegold Resources	Whitehorse	105K 009	DD	Au-Ag
Goddell Gully	Tagish Lake Gold	Whitehorse	105D 025	DD	Au-Ag
Golden Revenue	Yale Resources Ltd/ Atac Resources	Whitehorse	115I 107	G,GC,DD	Au-Cu
Haldane	Klondike Gold Corp.	Mayo	105M 056	G,GC	Au
Hart River IOCG	Copper Ridge Exploration	Mayo	(116A/15)	G,GC,P,GP	Cu-Au
Heidi	Logan Resources	Dawson	116A 037	G,GC,GP,P	Au

Abbreviations

BS – bulk sample
D – development
DD – diamond drilling

ES – environmental studies
F – feasibility
G – geology
GC – geochemistry

GP – geophysics
IOCG – iron-oxide copper gold
M – mining
PD – percussion drilling

PF – prefeasibility
R – reconnaissance
T – trenching
U/GD – underground development

APPENDIX 1 (continued): 2004 EXPLORATION PROJECTS

PROPERTY	COMPANY/OWNER	MINING DISTRICT	MINFILE # or (1:50 000 NTS)	WORK TYPE	COMMODITY
Helen	Hinterland Metals Inc.	Watson Lake	105G 030	G,GP	Au
Hold Fast	Gordon McLeod	Whitehorse	105C 012	G,GC	Cr-PGE
Hy/Fer	Dentonia	Watson Lake	105H 102	G,GC	Au
Hyland Gold	Northgate Exploration Ltd./StrataGold Corp.	Watson Lake	95D 011	G,GC,GP,DD	Au
Indian River	Boulder Mining Corp./Western Prospector Group	Dawson	115O 054	G,GC,P	Au
Kirkman	International Gold Ventures	Dawson	115O 016	G,GC,P	Au
Klondike	Klondike Source	Dawson	115O 079	G,GC,DD	Au
Kudz Ze Kayah (R-15A)	Teck-Cominco/Kaska Development Corp.	Watson Lake	105G	GP,DD	Zn-Pb-Cu-Au-Ag
Lonestar etc.	Klondike Star Mineral Corp./Klondike Gold Corp.	Dawson	115O 072	G,GC,T	Au
Lynx Creek	StrataGold Resources	Mayo	106D 020	DD,GP	Au
Mt. Hinton	Yukon Gold Corp.	Mayo	105M 052	T	Au
Mahtin	International Gold Venture	Mayo	115P 007	G,GC,GP,P,T	Au
Mars	Saturn Ventures Inc.	Whitehorse	105E 002	G,GC,DD	Cu-Au
Maverick	Al Carlos	Whitehorse	105K 009	DD	Au-Ag
Minto	Minto Resources	Whitehorse	115I 021,022	D	Cu-Ag-Au
Mike Lake	Dynamite Resources	Dawson	116A 012	G,GC,P	Au-Cu
Morley	Kobex Resources Ltd./Almaden Minerals Ltd.	Whitehorse	105C 061	GP,DD	Cu-Zn-Pb-Au-Ag
Mucho	Cash Resources	Watson Lake	105I 004	DD	Pb-Zn-Cu-Ag
Nikki	Atac Resources	Whitehorse	115K 082	G,GC,P	Cu-Au
Nor	KRL Resources	Dawson	106L 061	GC,P	Cu-Au
Panorama	Atac Resources	Dawson	116A 031	G,GC,P	Au
Rainbow	Klondike Gold	Mayo	(105N/12)	G,GC,P	Au
Rams Horn	Oredorado Resources	Whitehorse	105D 002,003	G,GC	Au-Ag
Red Mountain	ASC Industries/Regent Ventures	Mayo	115P 006	G,GC,GP,DD	Au
Red Mountain Mo	Tintina Mines	Whitehorse	105C 009	G	Mo
Reed Creek	Cercom Electric	Whitehorse	115G 102	DD	Au
Severence	Eagle Plains Resources	Dawson	115J 003	G,GC,GP	Au

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PD – percussion drilling

PF – prefeasibility
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T – trenching
U/GD – underground development

APPENDIX 1 (continued): 2004 EXPLORATION PROJECTS

PROPERTY	COMPANY/OWNER	MINING DISTRICT	MINFILE # or (1:50 000 NTS)	WORK TYPE	COMMODITY
Shamrock	Copper Ridge Exploration	Dawson	(115O/6)	GC	Cu-Au
Shanghai Creek	Yankee Hat Resources	Mayo	105M 028	G,GC,P	Au
Shell Creek	Logan Resources	Dawson	116C 029	G,GC,P,T	Au-Cu
Sonora Gulch	Firestone Ventures Inc.	Whitehorse	115J 008	G,GC,P	Au-Cu
Spice	Klondike Gold Corp.	Whitehorse	105G 150	G,GC	Au-Ag
Straw	Firestone Ventures Inc./True North Gems	Watson Lake	(105G/2)	G,GC,P	gemstones
Tanner	Manson Creek Resources	Mayo	106C 091	G,GC	Zn-Pb-Ag
Tay/LP	Ross River Minerals	Whitehorse	105F 121	G,GC,DD	Au
Tin	Madelena Ventures	Dawson	116B 157	G,GC,GP	Au
Thistle	Copper Ridge Exploration	Dawson	(115O/6)	G,GC	Cu-Au
Thunderstruck	Expatriate Resources	Watson Lake	(105G/8)	G,GC,DD	Zn-Pb-Cu-Ag-Au
True Blue	True North Gems	Whitehorse	105F 081	G,P,T	gemstones
Tsa da Glisza	True North Gems	Watson Lake	105G 147	G,GC,T,DD,BS	emeralds
Ultra	Klondike Gold	Whitehorse	115B 008	G,GC,AGP	Ni-Cu-PGE; Zn-Cu-Au-Ag
Wellgreen	Northern Platinum Ltd.	Whitehorse	115G 024	G	Ni-Cu-PGE
White	Madalena Ventures	Whitehorse	115O 011,012	G,GC,P	Au, Cu
Wolverine	Expatriate Resources	Watson Lake	105G 073	G,DD,PF	Zn-Pb-Cu-Au-Ag
Vic	Aurchem Exploration	Whitehorse	115I 068	G,DD	Au-Ag
Yukon Olympic	Janina Resources Limited/Copper Ridge Exploration	Dawson	116G 082	G,GP	Cu-Au
Yukon regional	Rimfire Minerals Corp./Newmont Exploration		various		

Abbreviations

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DD – diamond drilling

ES – environmental studies

F – feasibility

G – geology

GC – geochemistry

GP – geophysics

IOCG – iron-oxide copper gold

M – mining

PD – percussion drilling

PF – prefeasibility

R – reconnaissance

T – trenching

U/GD – underground development

APPENDIX 2: 2004 DRILLING STATISTICS

PROPERTY	COMPANY	DIAMOND DRILL		RC/ PERCUSSION/ *ROTONIC	
		metres	# holes	metres	# holes
Antimony Mountain	Strategic/War Eagle	832	4		
Arn	Klondike Gold/Atac	900	18		
Brewery Creek	NovaGold Resources	769	4		
Goddell Gully	Tagish Lake Gold	900	2		
Golden Revenue	Yale Resources/ATAC	1832	14		
Grew Creek	FreeGold Resources	2077	12		
Hyland Gold	Northgate/StrataGold	1800	8		
Indian River	Boulder Mining/Western Prospector			*552	61
Klondike	Klondike Source	1537	6		
Kudz Ze Kayah (R-15A)	Teck Cominco/Kaska Development Corporation	1727	8		
Lynx Creek	StrataGold	2070	14		
Mars	Saturn Ventures	827	7		
Maverick	Al Carlos	220	5		
Mor	Kobex Resources	185.3	2		
Mucho	Cash Resources	671	5		
Red Mountain	ASC/Regent Ventures	1922	12		
Kelli (Reed Creek)	Cercom Electric/Reed Creek Placers	330	5		
Tay-Lp	Ross River Minerals	1002	9		
Thunderstruck (3 holes) Goal Net (1 hole)	Expatriate Resources	1034	4		
Tsa da Glisza	True North Gems	3504	54		
Vic	Aurchem	2535	26		
Wolverine	Expatriate Resources	1758.4	9		
Wolverine (Fisher zone)	Expatriate Resources	1150	2		
TOTAL		29 582.7		552	

YUKON PLACER MINING AND EXPLORATION OVERVIEW 2004

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LeBarge, W., 2005. Yukon Placer Mining and Exploration Overview 2004. *In: Yukon Exploration and Geology 2004*, D.S. Emond, L.L. Lewis, G.D. Bradshaw (eds.), Yukon Geological Survey, p. 35-40.

Even prior to the arrival of European explorers to the Yukon, placer mining had been conducted by First Nations people, who recovered native copper nuggets from the White River area in southwestern Yukon. Explorers from the Hudson Bay Company first reported fine gold on the banks of the Pelly River around 1850. In 1874, coarse gold was discovered on a tributary of the Liard River, and in 1885 significant quantities of gold were found on river bars of the Stewart. Gold was discovered in the Fortymile area on both sides of the border the following year, and by 1893, active mining was taking place on Miller and Glacier creeks in the Sixtymile district.

On August 17, 1896, the discovery of nugget gold on Rabbit Creek (renamed Bonanza) set off the Klondike gold rush. By 1900, over a million ounces (30 million grams) was being mined in a season, at that time completely by hand. Later years saw the arrival of large-scale mining with dredges and heavy equipment.

Today, over 100 years later, placer mining is still an important sector in the Yukon's economy. Over 16.5 million crude ounces (513 tonnes) of placer gold have been produced to date in the Yukon – at today's prices that would be worth more than \$7 billion.

PLACER MINING

Approximately 500 people were directly employed at 163 placer mines in 2004 – and at least several hundred more were employed in businesses and industries that serve the placer mining industry. Most of the placer operations are small and family-run, with an average of three or four employees.

The majority of active placer mining operations were in the Dawson Mining District (116), followed by the Whitehorse Mining District (25), and the Mayo Mining District (21) (Fig. 1). One operation was reported as active in the Watson Lake Mining District.

The total Yukon placer gold production in 2004 was 101,108 crude ounces (3.1448 million g), compared to 50,888 crude ounces (1.5828 million g) in 2003 (Fig. 2). The value of this 2004 gold production was \$42.9 million, more than double the \$42.9 million mined in 2004. It should be noted that over 20,000 ounces (600 000 g) was reported as royalties in March; this probably reflects 2003 production and may have inflated the apparent production for 2004 for some areas.

Over 90% of the Yukon's placer gold was produced in the Dawson Mining District, which includes the unglaciated drainages of Klondike River, Indian River, West Yukon (Fortymile and Sixtymile rivers, and the Moosehorn Range) and lower Stewart River. The remaining gold came from the glaciated Mayo and Whitehorse mining districts, which include the placer areas of Clear Creek, Mayo, the Dawson Range, Kluane, Livingstone and Whitehorse South.

Reported placer gold production from Indian River drainages in 2004 increased compared to the previous year, from 16,126 crude ounces (501 580 g) to 36,279 crude ounces (1 128 400 g). Most of this increase came from operations in Dominion Creek.

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In Klondike area drainages, production rose to 20,031 crude ounces (623 030 g), at least partly because of an increase in gold coming from operations on Last Chance Creek.

A large increase was seen in West Yukon placer gold production, mainly due to increased output from operations on Sixtymile River. Royalty totals for the 2004 season were more than triple the previous year, at 20,454 crude ounces (636 190 g).

Reported production from operations in the Lower Stewart drainages nearly quadrupled in 2004, to a total of 15,617 crude ounces (485 740 g). Most of the increase came from operations on Thistle and Black Hills creeks.

As usual, little gold was reported from Clear Creek drainages although several operations were active in 2004. The total reported gold from royalties increased slightly to 341 crude ounces (10 600 g).

In the Dawson Range, reported placer gold production dropped slightly to 1619 crude ounces (50 370 g).

In the Mayo area, gold production increased somewhat in 2004 to 2539 crude ounces (78 970 g). Significant increases were seen in Owl and Duncan creeks.

In the Kluane area, reported placer gold production rose slightly to 1670 crude ounces (51 940 g).

The Livingstone area remained inactive; however 17.2 crude ounces (535 g) of gold were reported in royalties.

Conversely, although some mining activity took place in the Whitehorse South area (which includes Moose Brook and Wolverine creek), no gold was reported in royalties.

PLACER EXPLORATION

Although it is essentially unreported, exploration on placer mining properties has been a part of the process for many miners since they began to mine. Traditional methods of sampling and exploration include auger, reverse circulation and churn drilling, and geophysics including seismic surveys, ground-penetrating radar and magnetometer surveys. Trenching and bulk sampling also continue to be well used methods of testing placer ground.

An upsurge of placer exploration in 2004 was due, to a large extent, to activity by a single joint venture. Boulder Mining Corporation, a Vancouver-based company, began exploration of a prospect in the Indian River area south of Dawson City, along with Western Prospector Group. The property was discovered by long-time prospector and miner Pete Risby, and consists of a large-volume bench deposit which lies above the modern valley of Indian River. Generalized stratigraphy consists of a Tertiary, 'White Channel' gold-bearing gravel on a bedrock terrace, which is in part overlain by glaciofluvial and glaciolacustrine sediments deposited during the earliest pre-Reid glaciation. A total of 795 placer claims in 3 zones (Upstream, Downstream and Ruby benches) were staked on a 21-km stretch of Indian River, and cover an estimated 8300 hectares.

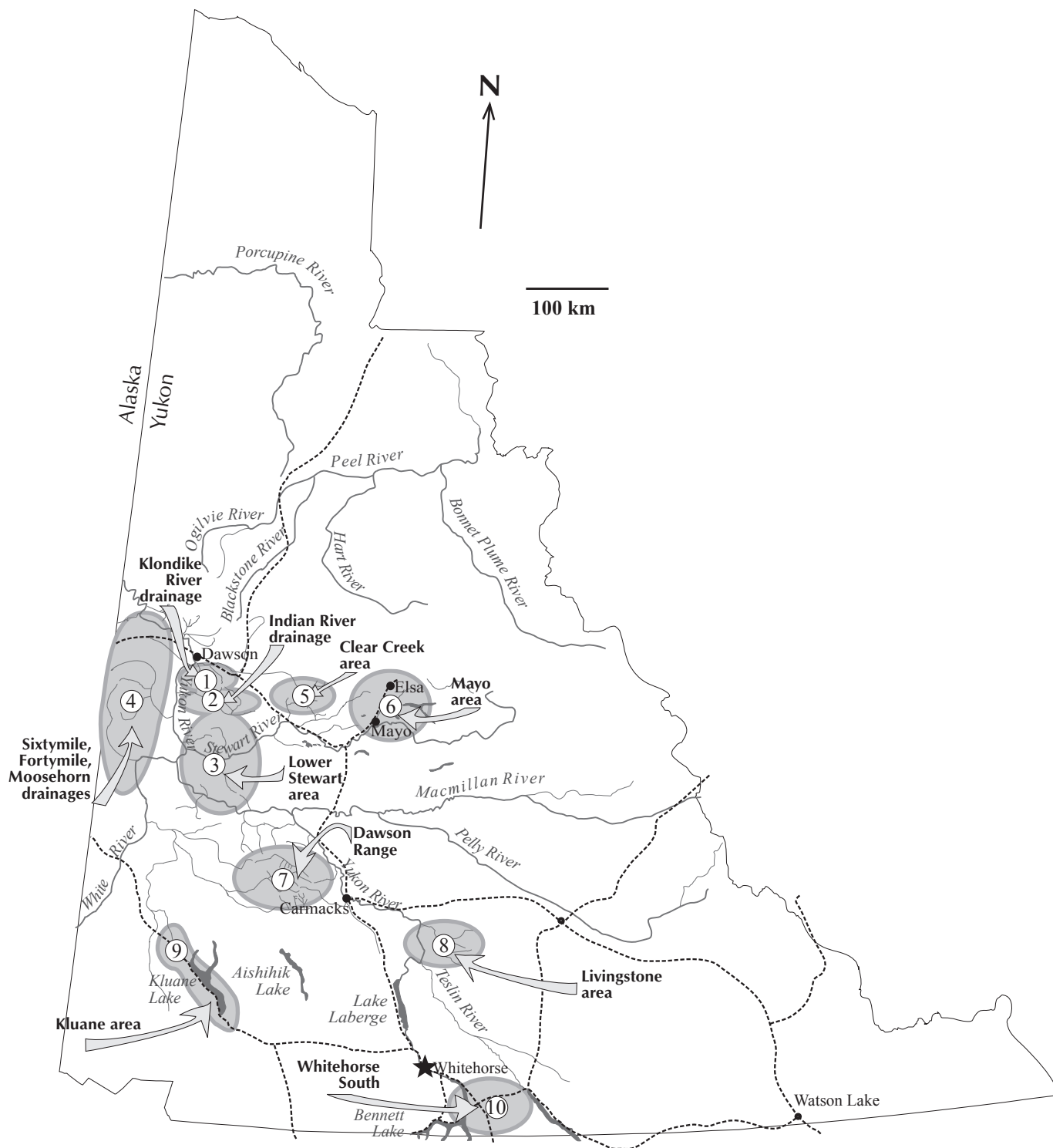


Figure 1. Yukon placer mining areas.

Exploration on this property consisted of an extensive program of auger drilling, rotonsonic drilling, ground-penetrating radar, bulk sampling and geological mapping. The total cost of this program was well over the initial projected expenditures of \$500 000 and represents the largest placer exploration program undertaken in recent history by a public company in Yukon. Agreements are to spend a further \$750 000 prior to December 31, 2005; \$1.25-million prior to December 31, 2006; and \$2.5-million prior to December 31, 2007.

Auger drilling on the Downstream bench early in the program resulted in a weighted average gold grade in five holes of 2.3 grams per tonne (g/t) gold over 6.1 m. On the Upstream bench, the weighted average gold grade of 10 holes along a 3500-m length and 750-m width was 0.58 g/t gold over 21.5 m.

Rotosonic drilling results included intersections of 3.16 g/t over 0.9 m, 1.08 g/t over 1.7 m, and 0.319 g/t over 2 m. Cut-off grades for the deposit are estimated to be 0.1 g/t.

Bulk sampling by excavator in test pits increased the gold grades compared to drilling, as well as recovering coarser gold, with several nuggets in the +1 gram range. Some typical gold grades in test pits were 0.411 g/t over 0.8 m, 0.586 g/t over 0.93 m, and 0.220 g/t over 1.12 m. Individual bulk sample weights were in the range of 12.3 to 34 tonnes.

In the fall, Boulder Mining Corp. staked hundreds of quartz claims over local sedimentary rocks, targeting a quartz-pebble conglomerate, which in sampling has proven to have disseminated grains of fine gold throughout. The possibility exists that this may be a paleoplacer deposit which was a source for both the bench deposits and the local placer gold in Indian River.

Similar geologic and geomorphic settings to that of Indian River exist in other unglaciated drainages in the Yukon, specifically in Fortymile and Sixtymile areas. Although limited placer exploration has taken place on alluvial terraces in these areas, they remain poorly understood. It is possible that significant quantities of gold lie in these bench deposits, which have yet to be methodically evaluated.

Figure 2. Yukon gold production figures and average US gold price, 1971-2004.

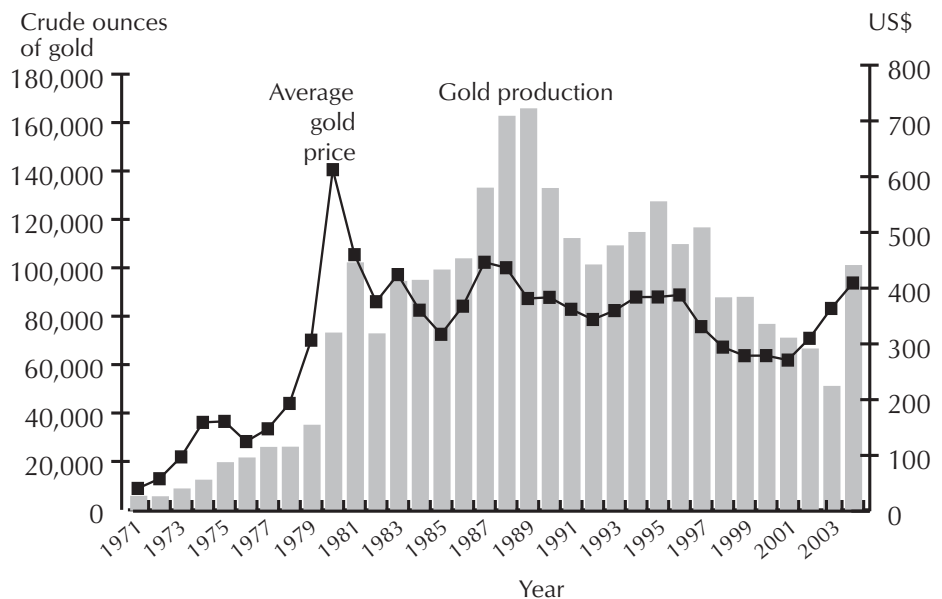




Figure 3. Boulder Mining Corporation's roto-sonic drill in operation in the Indian River area in 2004. The drill was successful in recovering intact stratigraphic samples of gravel in core which was processed for heavy minerals and gold after detailed descriptions and documentation.

The long-term health of the Yukon's placer mining industry requires that new placer gold reserves be discovered as traditional mining areas become depleted. With the application of new placer exploration and research techniques and new ideas, additional placer gold reserves may be found in non-traditional, more complex geological settings.

The staff at the Yukon Geological Survey and the Client Services and Inspection Division (Department of Energy, Mines and Resources, Yukon government) can provide information and advice regarding placer mining in the Yukon. Publications on placer mining in the Yukon are available through the Yukon Geological Survey office at Room 102, Elijah Smith Building, 300 Main St. Whitehorse, Yukon. Many recent publications and maps can be downloaded for free from our website at www.geology.gov.yk.ca.

APERÇU

Même avant l'arrivée des explorateurs européens au Yukon, des autochtones exploitaient des placers, notamment dans la région de la rivière White, dans le sud-ouest du Yukon, où ils récoltaient des pépites de cuivre natif. Vers 1850, des explorateurs de la Compagnie de la Baie d'Hudson ont été les premiers à signaler la présence d'or fin sur les berges de la rivière Pelly. En 1874, on a découvert de l'or grossier dans un tributaire de la rivière Liard, et en 1885 on a trouvé d'importantes quantités d'or dans des bancs de la rivière Stewart. L'année suivante, on a découvert de l'or dans la région de Fortymile, de part et d'autre de la frontière, et en 1893 on exploitait des placers dans les ruisseaux Miller et Glacier, dans le district de Sixtymile.

Le 17 août 1896, la découverte d'or en pépites dans le ruisseau Rabbit (que l'on a renommé Bonanza) a lancé la ruée vers l'or du Klondike. En 1900, on récoltait manuellement plus d'un million d'onces par saison. Plus tard, on s'est mis à exploiter les placers à grande échelle au moyen de dragues et d'équipement lourd.

Aujourd'hui, plus de 100 ans plus tard, l'exploitation de placers est encore un secteur important de l'économie du Yukon. Jusqu'à maintenant, plus de 16,5 millions d'onces (513 tonnes) d'or placérien brut ont été produites au Yukon, ce qui vaudrait plus de sept milliards de dollars au prix actuel de l'or.

En 2004, 163 exploitations de placers employaient environ 500 personnes, et plusieurs centaines d'autres personnes travaillaient dans des commerces et des industries fournissant des services à l'industrie des placers. Les exploitations de placers sont pour la plupart de petites entreprises familiales et emploient en moyenne trois ou quatre employés.

La plupart des exploitations de placers se trouvaient dans les districts miniers de Dawson (116), de Whitehorse (25) et de Mayo (21) (Fig. 1). Il y avait une exploitation active dans le district minier de Watson Lake.

À la fin de novembre 2004, 98 185 onces (3 053 900 g) d'or placérien brut avait été produit depuis le début de l'année au Yukon, en hausse par rapport à la production de 2003 qui s'est chiffrée à 50 888 onces (1 582 800 g) (Fig. 2). La valeur de cette production d'or en 2004 a atteint 41,8 millions de dollars, soit plus du double des 20,7 millions que valait la production de 2003. Il faut mentionner que plus de 20 000 onces (600 000 g) ont été déclarées comme des redevances en mars : cela correspond sans doute à de l'or produit en 2003 et pourrait avoir exagéré la production apparente de 2004 dans certaines régions.

Plus de 90 % de l'or placérien du Yukon a été produit dans le district minier de Dawson, qui comprend les régions non glaciaires de la rivière Klondike, de la rivière Indian, de l'ouest du Yukon (rivières Fortymile et Sixtymile et la chaîne Moosehorn) et le cours inférieur de la rivière Stewart. Le reste de l'or a été produit dans les districts miniers glaciés de Mayo et de Whitehorse, qui comprennent les zones de placers de Clear Creek, de Mayo, de la chaîne Dawson, de Kluane, de Livingstone et de Whitehorse Sud.

Il est évident que les réserves d'or placérien dans les parties non glaciaires traditionnellement exploitées du Yukon ont commencé à baisser, tandis que la production d'or dans les parties glaciaires du Yukon augmente. L'application de nouvelles techniques d'exploration et de recherche de placers pourrait permettre de trouver d'autres réserves d'or dans des cadres géologiques non traditionnels plus complexes, ce qui est essentiel pour assurer la santé à long terme de l'industrie des placers du Yukon. En 2004, la compagnie Boulder Mining de Vancouver, en collaboration avec le Groupe Western Prospector, a entamé un programme d'exploration pour les placers dans la région de la rivière Indian, au sud de Dawson (Fig. 2).

GOVERNMENT

Yukon Geological Survey

Grant Abbott and staff
Yukon Geological Survey

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Yukon Geological Survey

Grant Abbott¹ and staff
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Abbott, J.G. and staff, 2005. Yukon Geological Survey. *In: Yukon Exploration and Geology 2004*, D.S. Emond, L.L. Lewis and G.D. Bradshaw (eds.), Yukon Geological Survey, p. 43-56.

OVERVIEW

The Yukon Geological Survey (YGS; Fig. 1) is in its second year as part of the Minerals Development Branch of the Department of Energy Mines and Resources. YGS is comanaged by Grant Abbott and Rod Hill and includes 24 staff (Fig. 2). The Geological Survey of Canada (GSC) also maintains an office with YGS.

Welcome to new staff members Steve Israel as project geologist and Olwyn Bruce as geological and spatial database administrator. Thanks and farewell to previous spatial database administrator Amy Stuart, to surficial geologist Crystal Huscroft and to Director Jesse Duke. Welcome back to Julie Hunt who has successfully completed a PhD thesis at James Cook University in Australia and congratulations to Craig Hart who has also completed his PhD thesis at the University of Western Australia.



Figure 1. Yukon Geological Survey staff, left to right: Amy Stuart, Craig Hart, Rod Hill, Robert Deklerk, Lee Pigage, Jeff Bond, Grant Lowey, Diane Emond, Karen Pelletier, Bill LeBarge, Monique Raitchey, Geoff Bradshaw, Steve Traynor, Maurice Colpron, Crystal Huscroft, Mike Burke, Lara Lewis, Steve Israel, Olwyn Bruce, Charlie Roots and Grant Abbott. Absent: Julie Hunt, Panya Lipovsky, Don Murphy and Ali Wagner.

Funding for YGS remains close to the same level it has been over the past few years. This year, in addition to our core budget, we obtained additional short-term funding from Department of Indian Affairs and Northern Development (DIAND) through the Northern Geoscience and Knowledge and Innovation Funds, and from NRCan through the Targeted Geoscience Initiative (TGI).

This year, YGS embarked on the third in a series of five-year planning exercises that have guided government geoscience in the Yukon over the last ten years. The documents from previous exercises (“Yukon Geoscience – A Blueprint for the Future” in 1995 and “Yukon Geoscience: Looking to the Next Millennium” in 1999) have been used to design and implement mapping and

research programs that meet the needs of the mineral industry and other clients such as land use planners. The effectiveness and utility of these documents is demonstrated by the large proportion of high-priority projects that have been completed during this time and by the continued support and satisfaction reported by client groups for the work of YGS. The new document is still under development and will be released shortly.

A Technical Liaison Committee to YGS reviews our program twice a year. We are grateful to Chair Gerry Carlson and members Al Doherty, Moira Smith, Jean Pautler, Forest Pearson, Bernie Kreft, Jim Mortensen and Jim Christie for their valuable support and constructive advice. We welcome Greg Lynch to the committee to

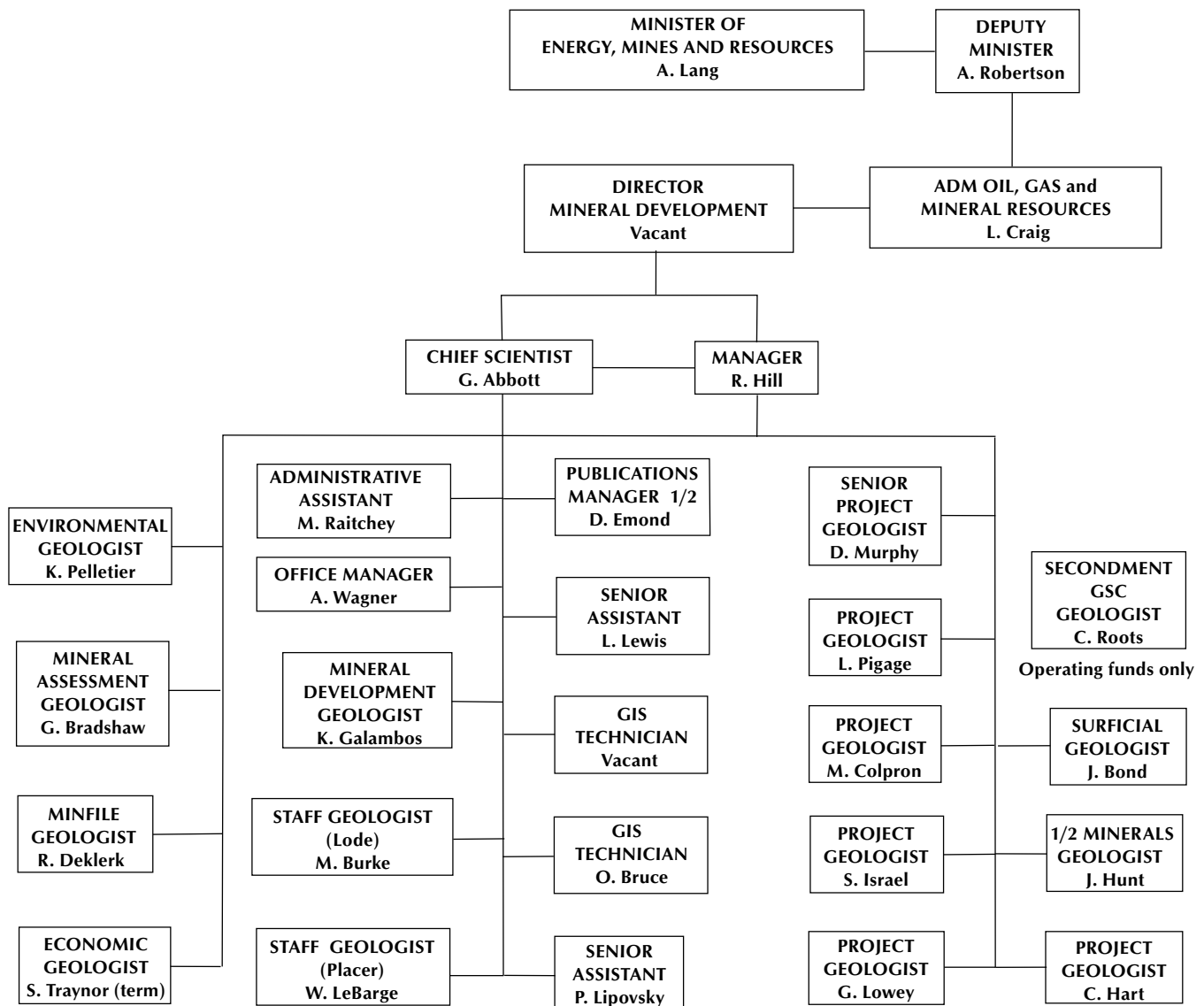


Figure 2. Yukon Geological Survey organization chart.

represent oil and gas interests. Greg has a long association with the Yukon and currently works as a project geologist with Shell Canada.

YGS has the responsibility “to build, maintain, and communicate the geoscience and technical information base required to enable stewardship and sustainable development of the Territory’s energy, mineral, and land resources.” Support for the mineral industry remains the primary focus of YGS, but this year we also took on the responsibility for geoscience studies to define petroleum potential. Effort is also going into environmental studies that have relevance to the extractive industries and land use issues. In recent years, interest and demand for geoscience information has increased substantially from regulators, First Nations, the general public and schools. In addition, the interests of resource industries are best served by informed decision-making and informed public opinion. As a result, the largest change is not in what we do, but in the increased diversity of our clients.

PROJECTS

The Yukon Geological Survey completed a successful, but challenging, field season that saw widespread and prolonged forest fires interfere with several projects. This year included a greater diversity of work that reflected our new mandate to support hydrocarbon development and to meet increased demands for baseline data to address environmental and development issues, while continuing to support our primary client, the mineral industry. Projects included 1:50 000-scale bedrock mapping, mineral deposit studies, surficial studies and mapping, regional stream sediment geochemistry, topical geology studies and a regional seismic study. In addition, several office-based projects were undertaken to advance the Yukon Geoscience database.

BEDROCK MAPPING

Three bedrock mapping projects were initiated this year. Near Livingstone Creek, Maurice Colpron continued his work on the Yukon-Tanana Terrane in an area where the source of historical placer deposits has not been defined. In southeastern Selwyn Basin near Toobally Lakes, Lee Pigage continued to map in areas that will help to define the potential for hydrocarbons and for sedimentary-exhalative deposits like those at Faro, Howard’s Pass and Macmillan Pass. In the Kluane Ranges, Steve Israel began a new project to better define the setting of magmatic nickel-copper-PGE deposits associated with Triassic

volcanic and related intrusive rocks of the Nicolai Greenstone.

MINERAL DEPOSIT STUDIES

This year Craig Hart and Lara Lewis focused on beryl and emerald potential in the Yukon while continuing their work on the metallogeny of intrusion-related gold and tungsten. Julie Hunt continued her work on the Wernecke Breccias by focusing on summary reports and posters of their geology and mineral potential, with emphasis on uranium. Jim Mortensen at the University of British Columbia, in partnership with Bill LeBarge, is being supported to undertake a microprobe study to define the trace element characteristics of placer gold in order to identify distinct populations and potential lode sources.

SURFICIAL GEOLOGY STUDIES

Surficial geology studies included ongoing work by Bill LeBarge and Mark Nowosad to characterize the grain size distribution in Yukon placer deposits, to estimate potential impact of sediment discharge from different types of gravel, and to study other sources of contamination in placer districts. Jeff Bond has several projects underway. His studies of the last glacial ice flow in the Pelly Mountains of southern Yukon show that the “Cassiar lobe” of the Cordilleran ice sheet flowed into and up the mountain valleys. These results have significant implications for mineral exploration projects that utilize soil and float geochemistry. He is also completing a surficial geology map of the greater Whitehorse Area. Panya Lipovsky is undertaking surficial geological mapping in southeast Yukon as part of a biophysical mapping project being led by the Department of Environment in support of land use planning initiatives. Panya and Crystal Huscroft have initiated monitoring studies of several land failures related to permafrost melting in central Yukon. These landslides are long-lived and may have a significant impact on water quality in salmon-bearing streams.

GEOCHEMISTRY/MINERAL ASSESSMENTS

Our mineral assessment geologist Geoff Bradshaw has been mainly involved in the north Yukon land use planning initiative. In preparation for a mineral assessment of the area, the first phase of a regional stream geochemical survey was completed in partnership with the Geological Survey of Canada. Field visits to most mineral occurrences were also undertaken. Geoff has also been involved in other Yukon land use planning processes

and has given presentations to First Nations Groups on the mineral potential of their traditional territories.

WHITEHORSE TROUGH PROJECT

The major initiative for YGS this year has been the Whitehorse Trough project which is largely aimed at better defining the hydrocarbon potential of this frontier basin. Late last winter, a seismic line was shot across the north end of the basin by the Geological Survey of

Canada in partnership with YGS. The bulk of the funding was provided by NRCan through their Targeted Geoscience initiative. Other components of the project include stratigraphic and sedimentological studies by Grant Lowey of YGS and Dr. Darrel Long from Laurentian University; igneous chemistry by Dr. Steve Piercey of Laurentian University; and structural studies by Amy Tizzard under the direction of Dr. Steven Johnston at the University of Victoria.

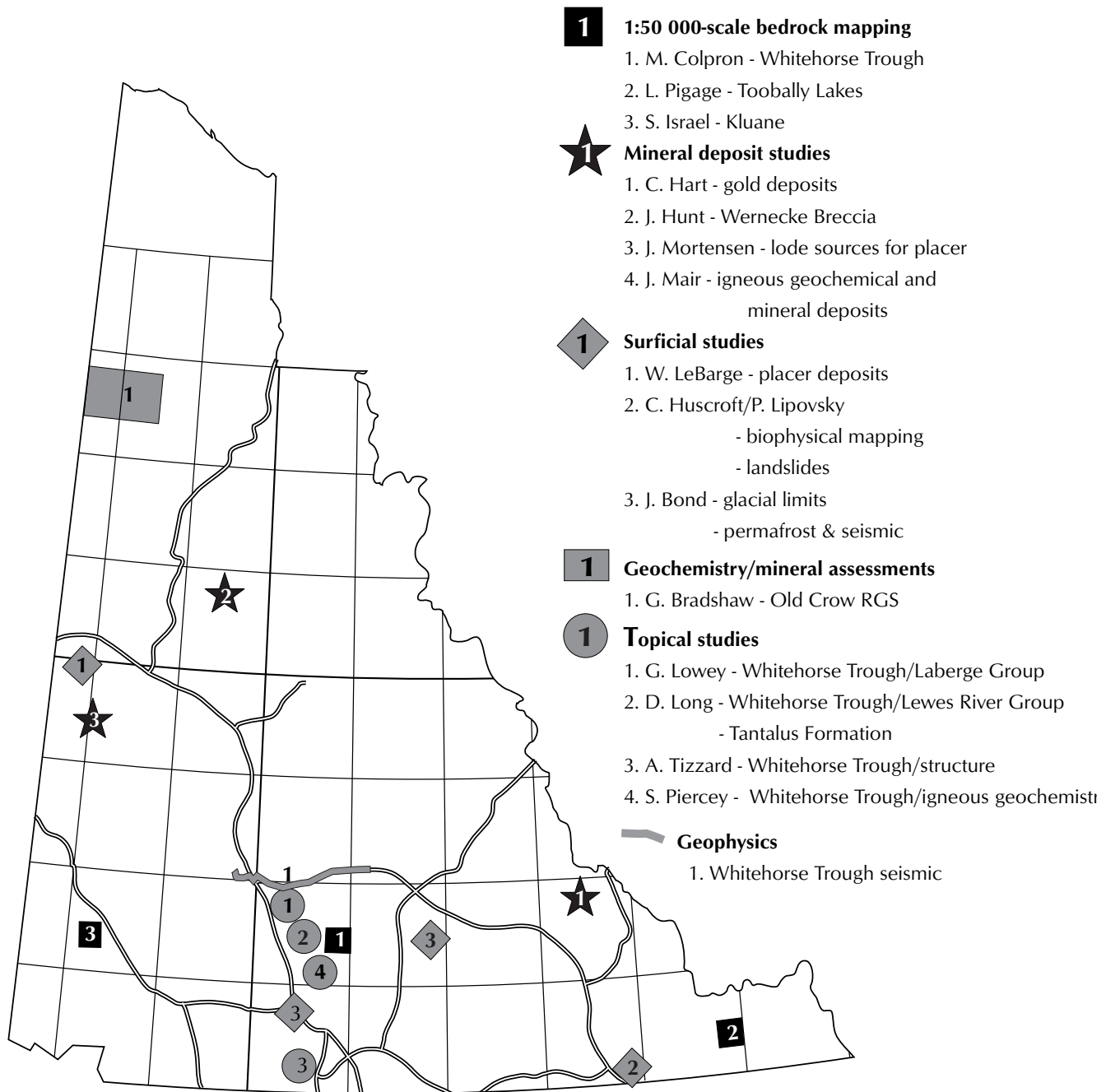


Figure 3. Field projects carried out or sponsored by the Yukon Geological Survey in 2004.

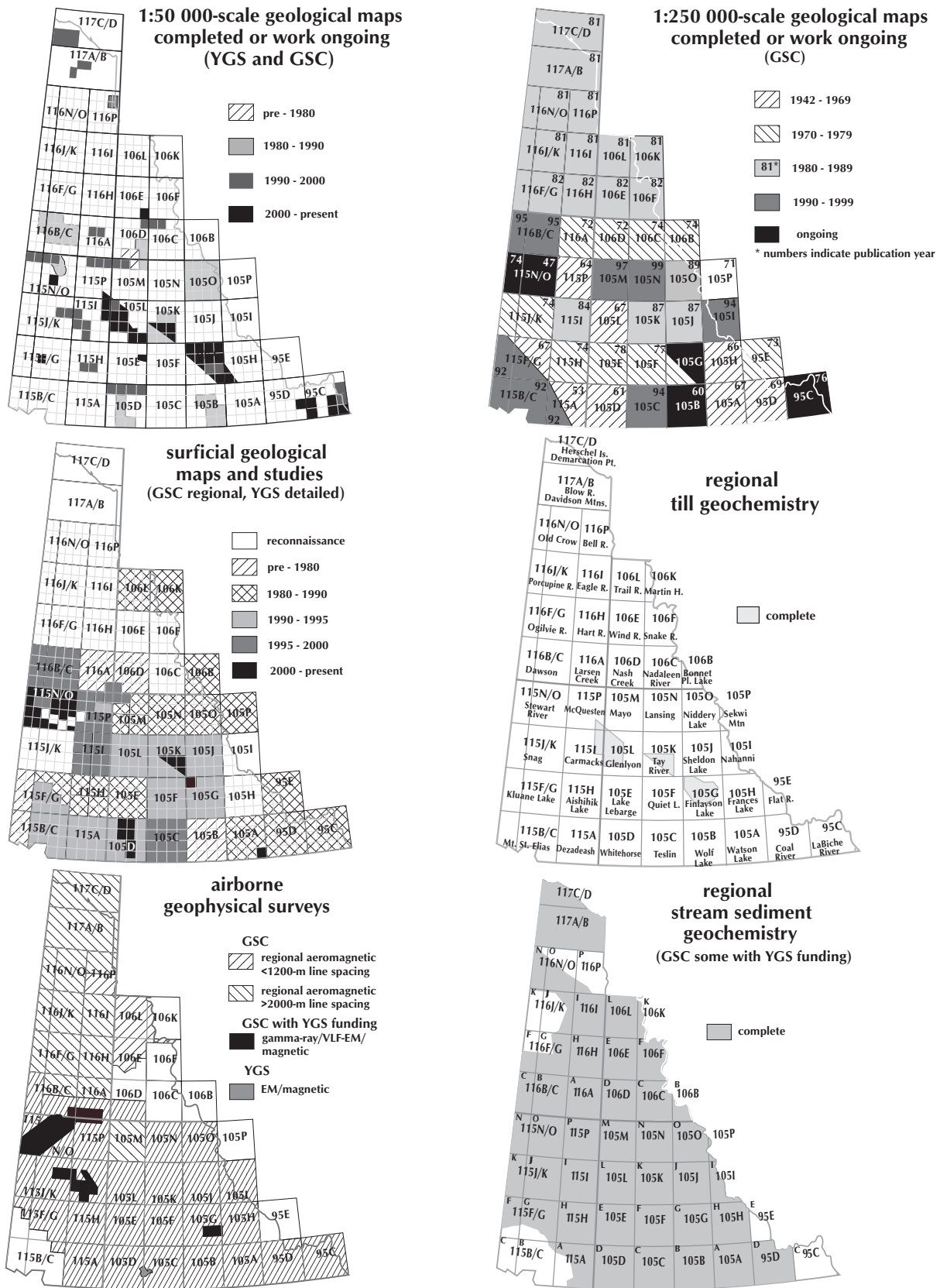


Figure 4. Summary of available geological maps, and regional geochemical and geophysical surveys in the Yukon.

MINING ENVIRONMENT RESEARCH GROUP (MERG)

Karen Pelletier continued to administer the Mining and Environmental Research Group (MERG), YTC. Five projects were approved for funding in 2003/4. Baseline Selenium Studies by Laberge Environmental Services examined the fate and cycling of selenium in the natural environment at Earn Lake. The study is regarded as an initial step towards developing selenium water quality guidelines applicable to northern conditions, specifically for the Yukon. Final Repairs to Noname Bioengineering Structures by Laberge Environmental Services in the Carmacks area involved the completion of repairs using geo-textile to partially failed willow fences that were constructed to correct permafrost melt and extensive erosion on a north-facing slope. A Bio-Engineering Demonstration Project on the Klondike River at Germaine Creek was undertaken by M. Miles and Associates Ltd. and Polster Environmental Services. The aim of the project is to demonstrate how bioengineering can be used to stabilize various erosional environments at a site that is accessible and visible to the public. The project involved a large outreach component that included on-the-job training for interested participants and an information sign at the site. T. Hutchinson and Alison Clark from Trent University were funded for a second and final year of a MSc thesis project. The objective of the project, entitled "Creating a self-sustaining plant community in derelict mine sites in the YT using native colonizing vegetation by" is to create a long-term revegetation management solution for abandoned mine sites in the Yukon using local native plant species. Funding provided to the Metal Leaching and Acid Rock Drainage Prediction Methods project by Bill Price of NRCan will be put towards the completion of guidelines and recommended methods for the prediction of metal leaching. These methods and guidelines will be nationally applicable and will serve as a 'tool-kit' of current best-testing procedures, including northern considerations.

Karen continues to review Mining Land Use and Water License applications, and monitor reclaimed sites to document the effectiveness of mitigation practices. She represents the YGS on several committees that sponsor environmental research involving geology. Karen has also been involved in developing a best practices guide for reclamation of placer mines.

YUKON MINING INCENTIVES PROGRAM (YMIP)

The Yukon Mining Incentives Program is administered by Ken Galambos. This year, funding was offered to 66 of 78 applications for a total of \$1 046 500. Nine of the successful applications were in the Grassroots-Prospecting, three in the Grassroots-Grubstake, 21 in the Focused Regional and 33 in the Target Evaluation modules. These applicants included 73% Yukon-based individuals or companies.

With the surge in the price of gold, there was a corresponding surge in precious metals exploration. In all, 70% of successful applicants were exploring for the yellow metal, including 20% who were exploring for alluvial gold; 27% proposed exploration programs for base metals (primarily copper); two applicants explored for gemstones or other commodities.

LIAISON TO INDUSTRY, FIRST NATIONS AND THE PUBLIC

YGS recognizes the importance of effectively communicating information on the geology and mineral and energy resources of the Yukon to a broad audience that includes: industry, resource managers, First Nations and the general public. We are continuing to focus more attention on developing strategies and products that meet these needs.

Mike Burke and Bill LeBarge, our main links to the exploration industry, continued to monitor Yukon hard-rock and placer mining and mineral exploration activity, visit active properties, review reports for assessment credit, and maintain the assessment report library.

Karen Pelletier, Charlie Roots and other YGS staff continue to make presentations in the schools and conduct field trips in the communities. New products developed this year to increase public awareness of the geology and mineral resources of the Yukon include: an interpretive guide to the Whitehorse Copper Belt by Danièle Héon; a geological map and interpretive display of Tombstone Park by Charlie Roots; and a geological map of southwest Yukon with emphasis on the Kluane Ranges and Kluane Park in partnership with the Geological Survey of Canada.

INFORMATION MANAGEMENT AND DISTRIBUTION

With the increasing volume of information generated by YGS and others, and rapidly evolving digital technology, the Survey has placed more effort and resources into making geological information more accessible. A large part of our effort has gone into developing and maintaining key databases and making all of our information internet-accessible. Ongoing activities include support for the H.S. Bostock Core Library and the Energy, Mines and Resources (EMR) library (Elijah Smith Building).

DATABASES

With new reporting requirements to securities regulators, widely recognized mineral deposit models are becoming increasingly important. In cooperation with the British Columbia Geological Survey, Anna Fonseca and Geoff Bradshaw have adapted the British Columbia Geological Survey Mineral Deposit Models for the Yukon. These models are now incorporated into Yukon MINFILE and will be published in early 2005.

Yukon MINFILE, the Yukon's mineral occurrence database, is maintained by Robert Deklerk and Steve Traynor. An update was released in November, 2004. The database now contains 2606 records, of which more than 500 have been revised, and is complete to the end of 2003. All mineral occurrences are now assigned to a deposit model. Reserve tables have been completely revised and updated to match, as closely as possible, the Canadian Institute of Mining Standards for Reporting Mineral Resources and Reserves.

The Yukon Placer Database, compiled under the direction of Bill LeBarge, was updated in the spring of 2004. The database is in Microsoft Access 2000 format and is a comprehensive record of the geology and history of Yukon placer mining. The database contains descriptions of 440 streams and rivers, and 1356 associated placer occurrences of which about 200 were updated for this version. It also includes location maps in Portable Document Format (PDF).

The Yukon GEOPROCESS File, under the direction of Diane Emond, is an inventory of information on geological processes and terrain hazards. It includes 1:250 000-scale maps showing permafrost, landslides, recent volcanic rocks, structural geology and seismic events, and also includes references and summaries of bedrock and surficial geology. The GEOPROCESS File is intended as a

planning aid for development activities and is available for most areas south of 66° latitude. The maps are now standardized in colour, and available on a single compact disk. Maps with text are in AutoCAD 2000 and PDF formats.

The Yukon Digital Geology compilation was updated in 2003 by Steve Gordey and Andrew Makepeace of the Geological Survey of Canada with funding from YGS. It includes syntheses of bedrock geology and glacial limits, compilations of geochronology, paleontology and mineral occurrences, and a compendium of aeromagnetic images, as well as an oil and gas well database. All are now available on CD-ROM. Bedrock geology and glacial limit paper maps are also available at 1:1 000 000 scale.

The Yukon Regional Geochemical Database 2003, compiled by Danièle Héon, contains all of the available digital data for regional stream sediment surveys that have been gathered in the Yukon under the Geological Survey of Canada's National Geochemical Reconnaissance Program. It is available on CD-ROM in Microsoft Excel 2000 format and in ESRI ArcView Shapefile format. The database has been enhanced this year through a contract with Georeference Online. Multielement anomaly clusters were generated using Minematch software and matched with mineral deposit models. This exercise was essentially the same as one undertaken on the British Columbia stream geochemical database through the Rocks to Riches Program. Results are now available online through the YGS Map Gallery.

The YukonAge Database, compiled by Katrin Breitsprecher and Jim Mortensen at the University of British Columbia with funding from YGS, was updated in 2004. It can be viewed on the on-line YGS Map Gallery in a version modified by Mike Villeneuve and Linda Richard of the Geological Survey of Canada. The database now contains 1556 age determinations derived from 1166 rock samples from the Yukon Territory. It is available in both Microsoft Access 2000 format and as a flat file in Microsoft Excel 2000 format so that the data may be viewed without Microsoft Access.

The Yukon Geoscience Publications Database, 2003, compiled by Lara Lewis and Diane Emond, is current to 2003 and contains more than 5000 references to papers on Yukon geology and mineral deposits, including YGS publications. A completely up-to-date searchable version is now available on our website.

This year, YGS was fortunate to receive funding through the DIAND Northern Geoscience Program to continue

digitizing assessment reports. By April 2005, the entire collection of more than 5000 open reports will be in PDF format and accessible over the internet. In addition, we have acquired exploration records from the various companies that owned properties in the Faro District. This acquisition includes both records of the Faro District as well as outside projects; the records should be available for viewing by late winter of 2005.

H.S. BOSTOCK CORE LIBRARY

Mike Burke and Ken Galambos maintain the H.S. Bostock Core Library. The facility contains about 128 000 m of diamond drill core from about 200 Yukon mineral occurrences. Confidentiality of material is determined on the same basis as mineral assessment reports. Confidential core can be viewed with a letter of release from the owner. Rock saws and other rock preparation equipment are available to the public.

EMR LIBRARY

The EMR library in the Elijah Smith Building is an invaluable resource that is available to the public, but often overlooked. It is Yukon's largest scientific library and includes collections that, prior to devolution, belonged to Indian and Northern Affairs Canada and the Department of Energy, Mines and Resources, Yukon Government. The library houses Yukon assessment reports, maps (including geological, topographical and aeromagnetic), and aerial photographs. It contains most geological journals and a good selection of references on general geology, Yukon geology and economic geology. This year, the library* has updated its online search capabilities, making search and retrieval of assessment reports and other documents easier and more efficient. The library will also be the point of contact for access to Faro exploration records. In addition to geological information, the library also has books, reports and journals for the following subjects: oil and gas, forestry, agriculture and energy.

INFORMATION DISTRIBUTION

YGS distributes information in three formats: 1) paper maps and reports are sold and distributed through our Geoscience Information and Sales Office; 2) many recent publications and databases are available in digital format

on CD-ROM also from the same outlet; and, 3) most of our publications are available as free downloads on our website (www.geology.gov.yk.ca). A catalogue of assessment reports is also available online*.

We are pleased to make spatial data available through our interactive map server – the Map Gallery; it can be accessed through the YGS website. We are continuing to improve the Map Gallery. This year a shaded relief map has been added and vector data can now be clipped and downloaded. Users are encouraged to provide feedback and suggest improvements (see website address below).

Hard copies of YGS publications are available at the following address.

Geoscience Information and Sales
c/o Whitehorse Mining Recorder
102-300 Main Street (Elijah Smith Building)
P.O. Box 2703 (K102)
Whitehorse Yukon Y1A 2C6
Ph. (867) 667-5200
Fax. (867) 667-5150
E-mail: geosales@gov.yk.ca

To access publications and to learn more about the Yukon Geological Survey, visit our website at <http://www.geology.gov.yk.ca>, or contact us directly.

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Phone (867) 667-5384
E-mail: rod.hill@gov.yk.ca

To access the EMR library website:
www.emr.gov.yk.ca/library
Phone: (867) 667-3111
E-mail: emrlibrary@gov.yk.ca

*www.emr.gov.yk.ca/library

2004 PUBLICATIONS AND MAPS

YGS BULLETINS

Lowey, G.W., 2004. Placer Geology of the Stewart River (115N&O) and Dawson (116B&C) map areas, west-central Yukon, Canada. Yukon Geological Survey, Bulletin 14, report and two maps 1:250 000 scale, CD-ROM.

Pigage, L.C., 2004. Bedrock geology compilation of the Anvil District (parts of NTS 105K/2, 3, 5, 6 and 7), central Yukon. Yukon Geological Survey, Bulletin 15 (includes two 1:100 000- and fifteen 1:25 000-scale maps); also available on CD-ROM.

YGS OPEN FILES

(also see under Joint YGS/GSC Open Files)

Héon, D. (compiler), 2004. The Whitehorse Copper Belt, Yukon – An annotated geology map. Yukon Geological Survey, Open File 2004-15, 2 sheets, 1:50 000 scale.

Huscroft, C.A., Lipovsky, P.S. and Bond, J.D., 2004. A regional characterization of landslides along the Alaska Highway Corridor, Yukon. Yukon Geological Survey, Open File 2004-18, report and CD-ROM, 65 p.

Israel, S. (comp), 2004. Geology of southwest Yukon. Yukon Geological Survey, Open File 2004-16, 1:250 000 scale.

Israel, S., 2004. Preliminary bedrock geology of the Quill Creek area (parts of NTS 115G/5, 6 and 12), southwest Yukon. Yukon Geological Survey, Open File 2004-20, 1:50 000 scale.

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La Commission géologique du Yukon

Grant Abbott et Maurice Colpron
Le Service de géologie du Yukon

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APERÇU

La commission géologique du Yukon (CGY; Figure 1, p. 43) en est à sa deuxième année au sein de la Division de la mise en valeur des ressources minérales du ministère de l'Énergie, des Mines et de Ressources. La CGY est gérée conjointement par Grant Abbott et Rod Hill et comprend vingt-quatre employés (Figure 2, p. 44). La commission géologique du Canada (CGC) maintient aussi un bureau à la CGY.

Nous accueillons cette année Steve Israel à titre de géologue de projet et Olwyn Bruce comme gérante des données géologiques spatiales. Nous disons au revoir à Amy Stuart, gérante des données spatiales, Crystal Huscroft, géologue du Quaternaire, et à notre directeur, Jesse Duke. De plus, Craig Hart et Julie Hunt ont présenté leur thèse de doctorat, respectivement à l'Université d'Australie-occidentale (University of Western Australia) et à l'Université James Cook en Australie.

Le financement de la CGY demeure essentiellement au même niveau depuis quelques années. Cette année, en plus de notre financement de base, nous avons obtenus un financement additionnel à court terme du ministère des Affaires indiennes et du Nord canadien par l'entremise des Fonds pour le savoir et l'innovation, et du ministère canadien des Ressources naturelles dans le cadre de l'initiative géoscientifique ciblée.

Cette année, la CGY s'est embarquée dans le troisième d'une série d'exercices de planification quinquennal qui ont guidé les travaux géoscientifiques gouvernementaux au Yukon au cours de la dernière décennie. Les documents résultants des exercices précédants (« Yukon Geoscience – A Blueprint for the Future » en 1995, et « Yukon Geoscience : Looking to the Next Millenium » en 1999) furent à la base de la conception et de l'exécution de projets de cartographies et de recherches qui répondent aux besoins de nos clients dans l'industrie minérale et d'autres groupes tels que ceux préoccupés de la gestion des terres. L'usage et l'efficacité de ces documents est clairement indiquée par le nombre de projets de « haute priorités » complétés depuis leurs publication et par la satisfaction et le support continu de nos clients envers les travaux de la CGY.

Un Comité de liaison technique à la CGY examine nos programmes deux fois par année. Nous remercions le président, Gerry Carlson et les membres du comité Al Doherty, Moira Smith, Jean Pautler, Forest Pearson, Bernie Kreft, Jim Mortensen et Jim Christie pour leur précieux appui et les conseils constructifs qu'ils nous fournissent. Nous accueillons au comité Greg Lynch qui représentera les intérêts du secteur pétrolier. Greg a une longue association avec le Yukon et travaille présentement pour Shell Canada à titre de géologue de projet.

La CGY a la responsabilité « d'accumuler, de gérer et de communiquer la base d'information géoscientifique et technique nécessaire pour la gérance et le développement durable des ressources en énergie, en minéraux et en terres du territoire ». Le soutien à l'industrie minérale reste l'objectif premier de la CGY, mais cette année on a aussi assumée la responsabilité des études géoscientifiques ayant pour but l'évaluation du potentiel pétrolier du territoire. Des ressources sont

aussi consacrées aux études environnementales pertinentes aux industries d'extraction et à l'utilisation des terres. Au cours des dernières années, la demande d'information géoscientifique de la part des organismes de réglementation, des Premières nations, du grand public et des écoles a considérablement augmenté. De plus, les intérêts de l'industrie des ressources sont mieux servis par une prise de décision éclairée et un public bien informé. Le changement le plus important pour la CGY n'est donc pas dans la nature de nos activités, mais plutôt dans la diversité croissante de notre clientèle.

TRAVAUX SUR LE TERRAIN

La CGY a connu cette année une campagne de travaux sur le terrain mouvementée en raison des conditions extrêmes d'incendies forestiers, mais néanmoins couronnée de succès. Nos travaux furent plus diversifiés en réponse à notre nouveau mandat de soutien à la mise en valeur des hydrocarbures et à la demande accrue pour les données de base à l'appui de la réglementation dans le domaine de l'environnement et de la gestion des terres, tout en continuant nos projets en support de l'industrie minière. Des projets ont été menés en cartographie géologique du substratum rocheux et en géochimie régionale des cours d'eau, en plus des études de gisements minéraux, d'études géologiques détaillées, d'études et de travaux de cartographie de formations superficielles, d'un levé sismique régional et de l'amélioration de plusieurs bases de données.

CARTOGRAPHIE DU SUBSTRATUM ROCHEUX

Trois projets de cartographie du substratum rocheux ont été complétés dans les régions ci-après : ruisseau Livingstone par Maurice Colpron; lacs Toobally par Lee Pigage; et ruisseau Quill par Steve Israel. Ces régions avaient été choisies pour leur potentiel minéral.

ÉTUDES DE GISEMENTS MINÉRAUX

Craig Hart et Lara Lewis ont poursuivi leurs travaux sur l'or associé aux roches intrusives, le tungstène et les pierres précieuses. Julie Hunt poursuit ses travaux sur la géologie et le potentiel minérale des brèches de Wernecke. Jim Mortensen de l'université de Colombie-Britannique a étudié en collaboration avec Bill LeBarge (CGY) les caractéristiques des éléments traces des gîtes d'or placériens afin d'identifier des populations distinctes et d'éventuelles sources d'or filonien.

ÉTUDES DE FORMATIONS SUPERFICIELLES

Parmi les études des formations superficielles, mentionnons les travaux de Bill LeBarge et Mark Nowosad visant à caractériser la granulométrie des gîtes placériens au Yukon à des fins environnementales. Jeff Bond a étudié l'écoulement glaciaire de «haute vallée» pour le «lobe de Cassiar» au Yukon méridional et ses incidences pour l'exploration; il a complété une carte géologique des formations superficielles de la région de Whitehorse et plusieurs études de gîtes placériens. Panya Lipovsky a effectué des travaux de cartographie géologique de formations superficielles pour un projet de cartographie biophysique (ministère de l'Environnement du Yukon) dans le sud-est du Yukon et a travaillé avec Crystal Huscroft à la surveillance des effondrements de terrain liés à la fonte du pergélisol dans le centre du Yukon et à l'étude de leur incidence sur la qualité des cours d'eau à saumons.

ÉVALUATIONS GÉOCHIMIQUES/MINIÈRES

Notre géologue évaluateur des ressources minérales, Geoff Bradshaw, a principalement travaillé dans le cadre de l'initiative de planification de l'utilisation des terres du nord du Yukon. Afin de préparer une évaluation minérale de la région, il a effectué un levé géochimique régional des cours d'eau en partenariat avec la CGC en plus d'examiner plusieurs indices de minéralisation. Geoff a en outre tenu à l'intention de groupes des Premières nations des présentations sur le potentiel minéral de leurs territoires traditionnels.

PROJET DU BASSIN DE WHITEHORSE

Le Projet du bassin de Whitehorse fut l'initiative majeure de la CGY cette année; il vise à mieux définir le potentiel en hydrocarbures de ce bassin sous-exploré. Vers la fin l'hiver dernier, un relevé sismiques à l'extrémité nord du bassin fut exécutés par la CGC en partenariat avec la CGY. Des études stratigraphiques et sédimentologiques par Grant Lowey (CGY) et Darrel Long de l'Université Laurentienne, une étude de la chimie des roches ignées par Steve Piercey de l'Université Laurentienne et des études structurales par Amy Tizzard sous la direction de Steven Johnston de l'Université de Victoria constituent d'autres volets de ce projet.

AUTRES INITIATIVES

Cette année la CGY a reçu un appui financier par l'entremise du fonds de développement économique du ministère des affaires indiennes et du Nord canadien pour la poursuite de la numérisation des rapports d'évaluation – toute la collection comptant plus de 5000 rapports sera convertie au format PDF et accessible par Internet avant la fin de l'année. Nous avons en outre acquis les dossier d'exploration des projets menés au fil des ans dans le district de Faro et à l'extérieur par les diverses sociétés qui en ont été propriétaires (disponibles vers le fin de l'hiver, 2005). Notre base de données géochimiques sur les cours d'eau a été analysée par la société Georeference Online afin d'y repérer des groupements d'anomalies multi-éléments (MineMatch). Les résultats sont maintenant disponibles en ligne.

DIFFUSION DE L'INFORMATION

La Commission géologique du Yukon (CGY) produit maintenant une gamme complète de publications numériques. Toutes nouvelles cartes et rapports géologiques sont disponibles sur demande en format numérique, et toutes publications récentes sont aussi disponibles (sous format PDF) sans frais sur notre site internet (<http://www.geology.gov.yk.ca>). De plus, une gammes de rapports d'évaluation de propriété minières est maintenant disponible par l'entremise de notre site internet. Nous sommes aussi fier de notre service de carte interactive ('Map Gallery'). Ce service est disponible par l'entremise de notre site internet et permet la visualisation de la géologie régionale, des sites MINFILE, des levés régionaux de géochimie des sédiments de ruisseaux, de la topographie, des routes et des communautés du Yukon, et des sélections des terres des nations autochtones. Les données vectorielles peuvent maintenant être sélectionnées et téléchargées. Certaines des améliorations à venir incluent l'addition de données géophysiques, géochronologiques et paléontologiques. De plus, la couverture des concessions minières sera bientôt disponible.

Les publications de la Commission géologique du Yukon sont diffusées par le Bureau d'information et des ventes en géoscience. Elles sont disponible à l'adresse suivante :

Bureau d'information et des ventes en géosciences
a/s Conservateur des registres miniers
le ministère de l'Énergie, des Mines et des Ressources
le gouvernement du Yukon
300 rue Main-bur. 102
C.P. 2703 (K102)
Whitehorse (Yukon) Y1A 2C6
Téléphone : (867) 667-5200
Télécopieur : (867) 667-5150
Courriel : geosales@gov.yk.ca

Pour en savoir plus long sur le Commission géologique du Yukon, visitez notre page d'accueil à www.geology.gov.yk.ca ou communiquez directement avec :

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Robert E. Leckie Award for Outstanding Reclamation Practices

Judy St. Amand¹

Mining Lands, Energy Mines and Resources

St. Amand, J., 2005. Robert E. Leckie Awards for Outstanding Reclamation Practices. *In: Yukon Exploration and Geology 2004*, D.S. Emond, L.L. Lewis and G.D. Bradshaw (eds.), Yukon Geological Survey, p. 61-63.

The 2004 Robert E. Leckie Award for outstanding reclamation practices for quartz exploration and mining were presented to **NovaGold Resources Inc.** NovaGold is an international company with interests in Yukon, British Columbia and Alaska. Reclamation work at their McQuesten property in the Mayo mining district has been very commendable.

The company began their reclamation in November 2003. They performed most of the required reclamation, leaving a few outstanding issues that could not be addressed in winter. At that time, they surpassed government expectations in some areas.

In September 2004, they returned to complete the decommissioning of the property. They re-assessed the results of the previous work and felt that more could be done. At that time they put in water control bars and regroomed the whole area. Contouring, brush disposal and drag-bag of vegetative mat was undertaken again. Where there was a scarcity of vegetative mat, the company scarified the ground to enable entrapment of water and airborne seed. They also decommissioned the access roads (Fig. 1).

Redistribution of the organic material over access roads contributes largely to the revegetation success of a disturbed site by providing capture areas for moisture, shade for seedlings, and habitat for small animals. The practice also prevents access by small terrain vehicles and snow machines. It is anticipated that the area will be more pristine than when work began.

This company shows a dedication to reclamation that is exemplary. They are good corporate citizens and are very worthy of this award.



Figure 1. Reclaimed access road to the McQuesten property.

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Figure 2. Martin Knutson (left) and John Alton (right) of Henry Gulch Placer.

The 2004 Robert E. Leckie Award for outstanding reclamation practices in placer mining was presented to Henry Gulch Placers' **Martin Knutson** and **John Alton** (Fig. 2). They have been mining together for 22 years throughout the Klondike area and have consistently maintained high standards of reclamation.

They moved to Last Chance Creek in July, 2000. This site had been severely disturbed since 1896. White channel gravels had sloughed down to the creek and formed a fan up to 18 m deep in areas. These gravels are a poor host for revegetation. Previous mining on the right limit hillside resulted in a slump into Last Chance Creek. Old drains, still in place, posed a safety hazard. The creek was completely destabilized by the onslaught of all these effects, which then contributed to sedimentation of Hunker Creek.

Massive amounts of White Channel gravels were moved to the left limit to form low-relief rolling hills, and covered with overburden to ensure swift natural revegetation. Old mine pits were reclaimed and stabilized. A pond was built



Figure 3. Aerial photo of Henry Gulch property shows reclamation work recently completed on the site.

to catch material from ongoing degradation of old workings above the site, to further protect the creek. The drains have been removed and that area restored. The creek has been stabilized (Fig. 3). A new, safer road system is in place. All areas have been sloped and contoured, and materials conducive to revegetation have been spread. This represents an immense effort to restore old mine works that could not have successfully recovered without the dedication of these two partners. Staff and colleagues can only strive to emulate such a shining example of these community leaders.

Honourable mention was given to **Newmont Exploration of Canada Ltd.** In the fall of 2001 this company completed extensive reclamation of trenches on the Aurex property in the Mayo mining district.

Trenches were backfilled and contoured, and a drag-back technique was used to replace the vegetative mat (Fig. 4). This gave the area a consistent and rough finish of soil, scattered brush and trees, which had been removed at the time of excavation. Redistribution of the organic material over recontoured trenches contributes largely to the revegetation success of a disturbed site.

Newmont Exploration of Canada Ltd. is commended for excellent reclamation in an area of ongoing exploration.



Figure 4. Road reclaimed on the Aurex property using dragback technique, which prohibits access by snowmachines, ATVs and other off-road vehicles.

