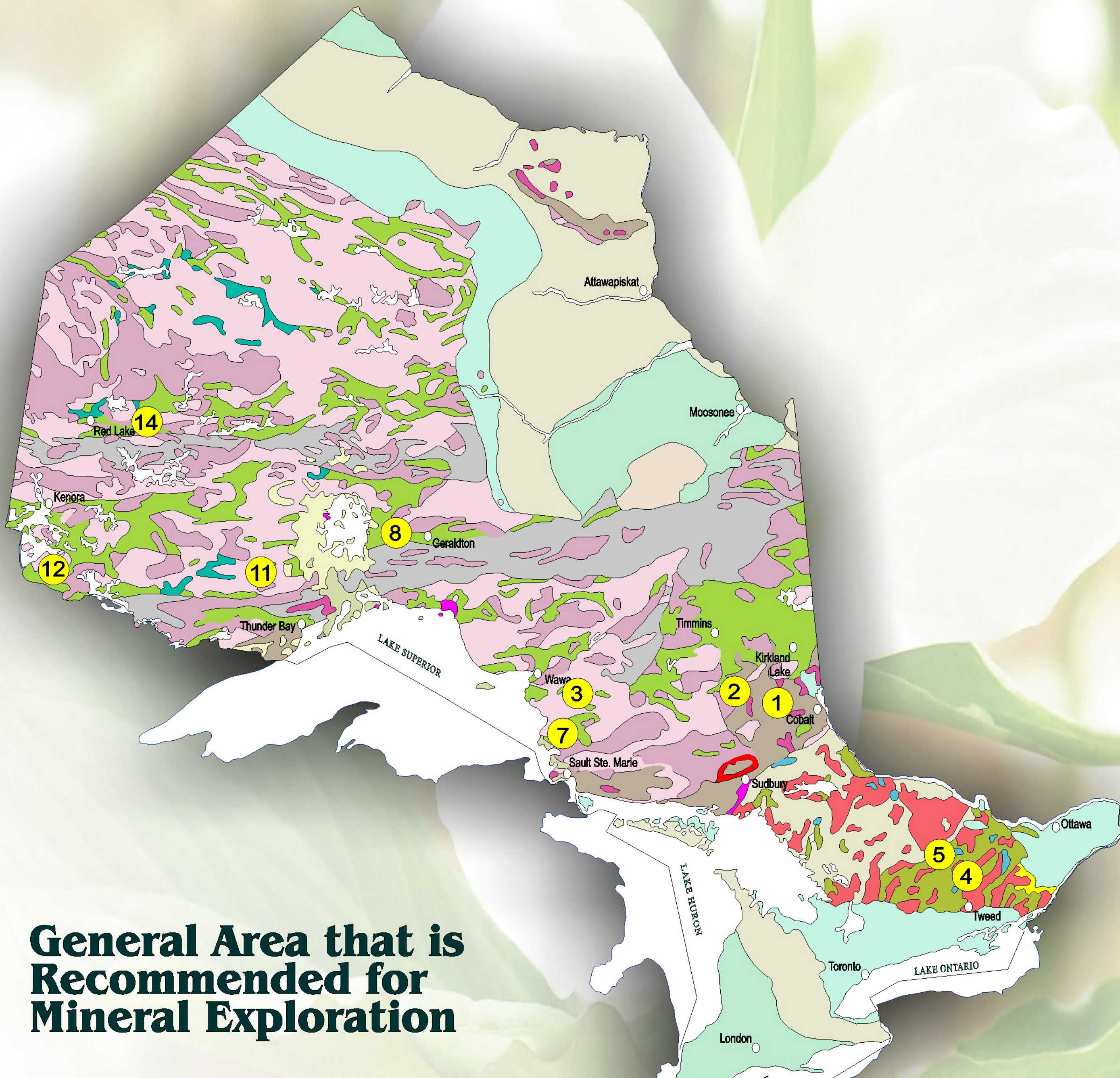
Recommendations for Exploration

2008-2009



General Area that is Recommended for Mineral Exploration

ONTARIO
CANADA

Photo courtesy of Karen Labonte

The Ontario Resident Geologist's Program

The role of the Ontario Geological Survey's Resident Geologist Program is to monitor, stimulate and facilitate mineral exploration and support the sustainable development and stewardship of Ontario's mineral resources. The program is provincial in scope, forms the primary client service component of the Ontario Geological Survey and operates with a staff complement of 40 through a network of 9 field offices strategically located across the province. Six Regional Resident Geologists, supported by 8 District Geologists, 7 District Support Geologists and 3 GIS/Data Specialists provide a variety of services to mineral industry clients as well as functions internal to government that support the mineral resource sector. The Program's Land Use Policy and Planning Co-ordinator and 2 Regional Land Use Geologists provide input into land use planning issues in support of the mineral exploration industry. A First Nations Minerals Information officer, based in Thunder Bay, provides education, information, advice and expertise regarding geology, mineral exploration and mining to First Nation Communities throughout Ontario generally, and northern Ontario particularly.

Program services and functions are grouped into the following 7 key areas:

- **Provide expert geological consultation and advisory services to promote and stimulate mineral exploration and support the development and stewardship of Ontario's mineral resources in an environmentally responsible manner**
- **Generate and transfer new geoscientific data and ideas**
- **Maintain and provide public access to geoscience databases/other resource materials**
- **Monitor and report on mineral exploration and development activity**
- **Provide input into land use planning issues and initiatives to support the stewardship of Ontario's mineral resources**
- **Foster relationships amongst government, the mineral sector and Aboriginal communities**
- **Participate in marketing forums to promote Ontario's mineral endowment and attract mineral resource investment to the province**

The Resident Geologist Program also provides support to MNDM's Mining Lands Section front-counter client services.

The Senior Manager for the Resident Geologist Program is John Mason, who is resident in Thunder Bay.

John Mason
A/Senior Manager
Resident Geologist Program
Mines and Minerals Division

Ontario

Ministry of Northern Development and Mines
Ontario Geological Survey
Resident Geologist Program
Suite B002, 435 James Street South
Thunder Bay, ON, P7E 6S7
Tel. 807 475-1107 Fax: 807 475-1112
E-mail: john.mason1@ontario.ca

For additional information on the Resident Geologist Program and the Ontario Geological Survey please log on to:
http://www.mndm.gov.on.ca/mines/ogs/resgeol/default_e.asp

HIGHLIGHTS

- **potential for IOCG deposits in the Huronian Supergroup has been largely overlooked**
- **MDI records indicate >25 Cu-Au occurrences in the Elk Lake to Matachewan area, associated with intersecting crustal scale faults**

Contact:
Gary Grabowski
Dave Guindon
gary.grabowski@ontario.ca
dave.guindon@ontario.ca
(705) 568-4518

Iron-Oxide-Copper-Gold Potential in the Huronian Supergroup

The search for iron-oxide-copper-gold (IOCG) deposits is developing in the Kirkland Lake Resident Geologist District. The reward for success can be huge: the largest known deposit is the Olympic Dam in Australia with a size of 2.3 billion t grading 1.3% Cu and 0.5 g/t Au, along with significant amounts of Ag, U, and rare earth elements (REE's). IOCG deposits have only been recognized as a distinct ore deposit type since the early 1990's (about 15 years) and significant research on the character of these deposits is beginning to emerge (Porter 2000).

IOCG deposits are characterized by high iron-oxide content, exhibited in such minerals as magnetite or hematite, and low sulphur content. Element associations include copper, gold, cobalt, uranium, REE's, barium and fluorine. The deposits occur in a variety of geological settings and range in age from late Archean to Cretaceous. Deposits are localized along high- to low-angle faults which are generally splays off major, crustal-scale faults. They display a variety of morphologies from stratabound sheets to stockwork breccia zones. Virtually all deposits are formed by replacement of host rocks.

Limited exploration is taking place west and south of Matachewan. A number of chalcopyrite bearing veins have been mapped in the area, as well as a number of auriferous quartz veins with minor associated chalcopyrite. A search of the Mineral Deposit Inventory (MDI) database indicates that the Sauve Occurrence is one of at least twenty-five copper-gold occurrences in the Elk Lake to Matachewan area.

The above areas are situated in structures conjugate to the Montreal River Fault, a major northwest-trending crustal-scale fault related to the Lake Timiskaming Structural Zone. Mining camps are situated along this fault where it intersects major east-west trending structures (e.g. Kidd Creek mine at the north end of the fault, Timmins Mining Camp at the intersection with Destor-Porcupine Fault, Matachewan Mining Camp at the intersection with Larder Lake Cadillac Fault and Cobalt Mining Camp at the intersection of the Montreal River fault and the Temiskaming fault).

The Huronian Supergroup rocks in the area are thick. Two diamond drill holes near the Huronian-Archean contact west of Matachewan penetrated over 1000 feet of Cobalt Group sedimentary rocks before entering Archean basement. The Huronian Supergroup was intensively explored at the turn of the twentieth century for Cobalt-type silver deposits but it has largely been ignored since. For the most part, airborne magnetic surveys available are widely spaced flight line surveys flown in the 1960's. Proximal iron-oxide mineralization and barite veining suggest a potential for locating IOCG-type mineralization deposits in the area.

Porter, T.M. (Ed.) 2000. Hydrothermal Iron Oxide Copper-Gold & Related Deposits: A Global Perspective Australian Mineral Foundation, Adelaide, 349p.

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HIGHLIGHTS

- **world-class gold deposits occur along the 450km of PDFZ and LLCB**
- **portions of the LLCB are covered by the Huronian Supergroup west of Matachewan**
- **Operation Treasure Hunt airborne magnetic surveys reveal that the LLCB likely trends northwest from Matachewan**
- **more than 12 Au occurrences are known from this interpreted 30km-long trend**

Contact:
Gary Grabowski
Dave Guindon
gary.grabowski@ontario.ca
dave.guindon@ontario.ca
(705) 568-4517 Ph.
(705) 568-4515 Fax

Larder Lake - Cadillac Break West of Matachewan

The relationship between major structures and gold deposits in the Abitibi greenstone belt has been well documented and studied over the last century. The two most prolific and well known “breaks” (also referred to as fault zones or deformation zones) are the Porcupine-Destor (PDFZ) and Larder Lake-Cadillac LLCB). Trending in a general east-west direction for more than 450 km through the south-central portion of the Abitibi greenstone belt, these two “breaks” have accounted for more than 65% of the historical production of gold in Canada or more than 140 million ounces (>4,000 tonnes) worth about C$75 billion (based on C$530/oz). Major mining camps include Timmins, Kirkland Lake, Larder Lake, and Matachewan in Ontario as well as Val d’Or, Malartic and Rouyn-Noranda in Quebec.

An interesting feature is the parabolic nature of portions of these “breaks”, which can be illustrated by digital magnetic data available in Geosoft® format and viewed with the freeware viewer OASIS montaj.™ The PDFZ (Figure 1) exhibits this parabolic character from Beatty to Garrison townships for a distance of about 30 km and a south “displacement” of about 8 km. The LLCB (Figure 2) follows a similar shaped path from Lebel to McGarry Townships for a distance of about 30 km and a south “displacement” of about 6 km. Coincidence?

The LLCB has been confidently traced as far west as Matachewan (Young Davidson and Matachewan Consolidated mines) where it becomes covered by Proterozoic Huronian Supergroup sedimentary rocks. Traditionally, from Matachewan, the break is considered to follow a southwest trace toward Midlothian Township, or farther south toward Shining Tree. The magnetic pattern shown in Figure 3 suggests that there is a similar parabolic trace of the LLCB, which would bring the break in a northwest direction toward Hincks Township. The distance is about 30 km long by about 8 km deep, almost an identical image of the above two examples. There are more than twelve gold showings along this trend, the most important being the Ashley Mine in Bannockburn Township. Some of these showings are associated with altered ultramafic rocks (green carbonate), a common feature of the PDFZ and LLCB. The Operation Treasure Hunt magnetic survey was not available when mapping was done and the striking similarity with the other portions of the breaks may support the hypothesis that the LLCB trends northwest from Matachewan.

Many gold occurrences are also associated with splay faults or structures that emanate in various directions from these breaks. The Pipestone, Munro, Arrow, Ghostmount and McKenna faults are some of the more important PDFZ splays, while the Kirkland Lake, Upper Canada and Benson Creek faults are associated with the LLCB. Similar splay structures are also seen in the magnetic pattern west of Matachewan. Mapping by L.S. Jensen interprets one of these trends west of Matachewan to be the Galer Lake branch of the LLCB.

Exploration efforts, using deposit models based on those found within the PDFZ and LLCB, should be carried out within this relatively unexplored area.

Larder Lake - Cadillac Break West of Matachewan

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Jensen, L.S. 1996. Precambrian Geology of Bannockburn Township; Ontario Geological Survey, Preliminary Map P.3355, scale 1:20,000.

Jensen, L.S. 1996. Precambrian Geology of Powell Township; Ontario Geological Survey, Preliminary Map P.3356, scale 1:20,000.

Jensen, L.S. 2002. Precambrian Geology of McNeil, Robertson, Hincks and Cleaver Townships; Ontario Geological Survey, Open File Report 5931, 77p.

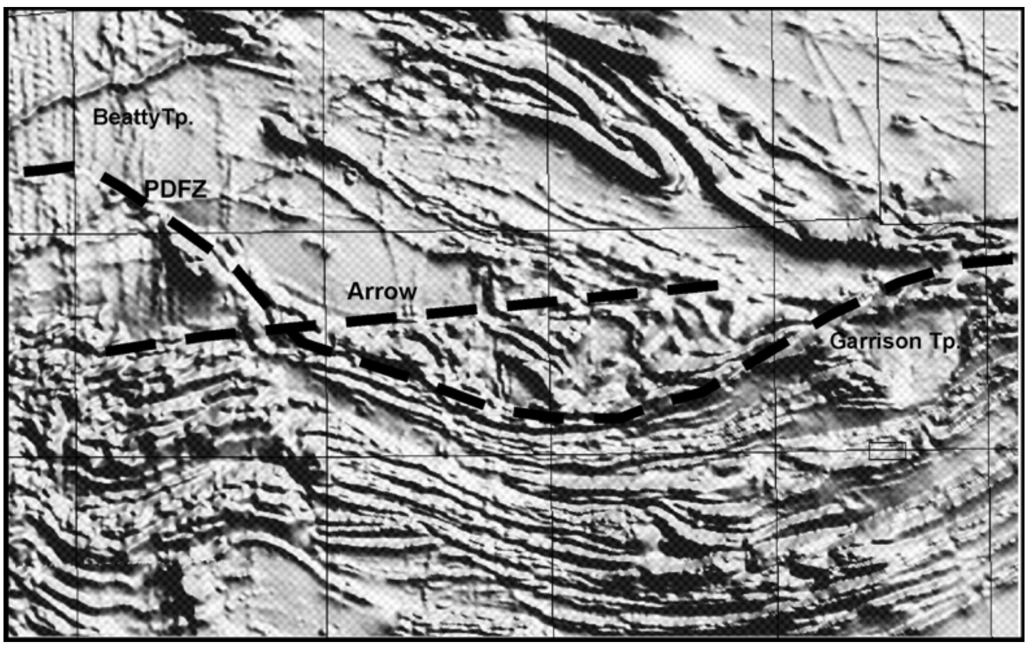

Figure 1: Porcupine-Destor Fault Zone (PDFZ) from Beatty to Garrison townships

Larder Lake - Cadillac Break West of Matachewan

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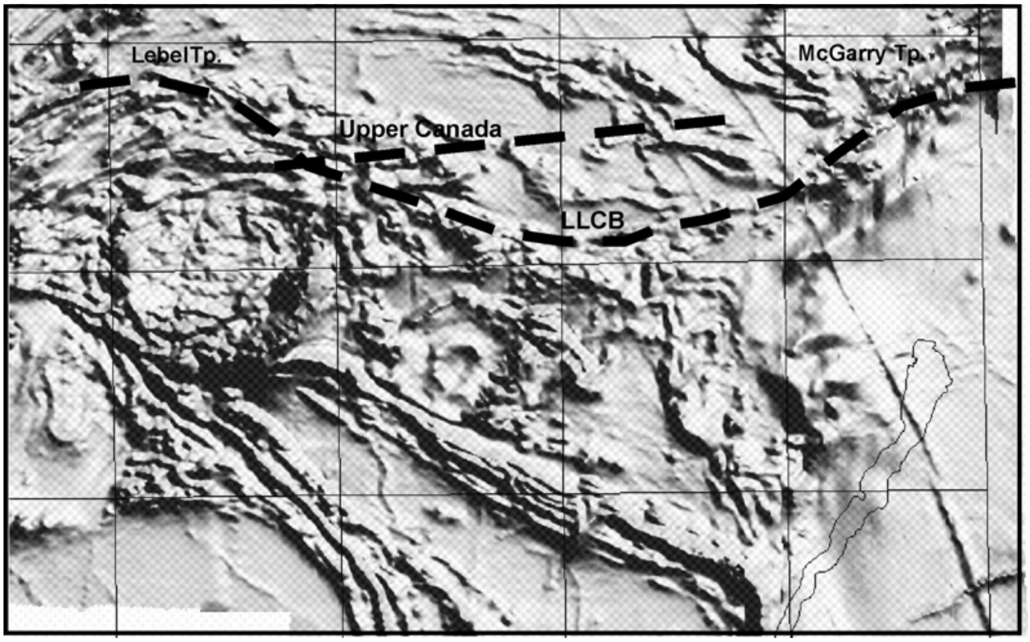

Figure 2: Larder Lake – Cadillac Break (LLCB) from Lebel to McGarry townships

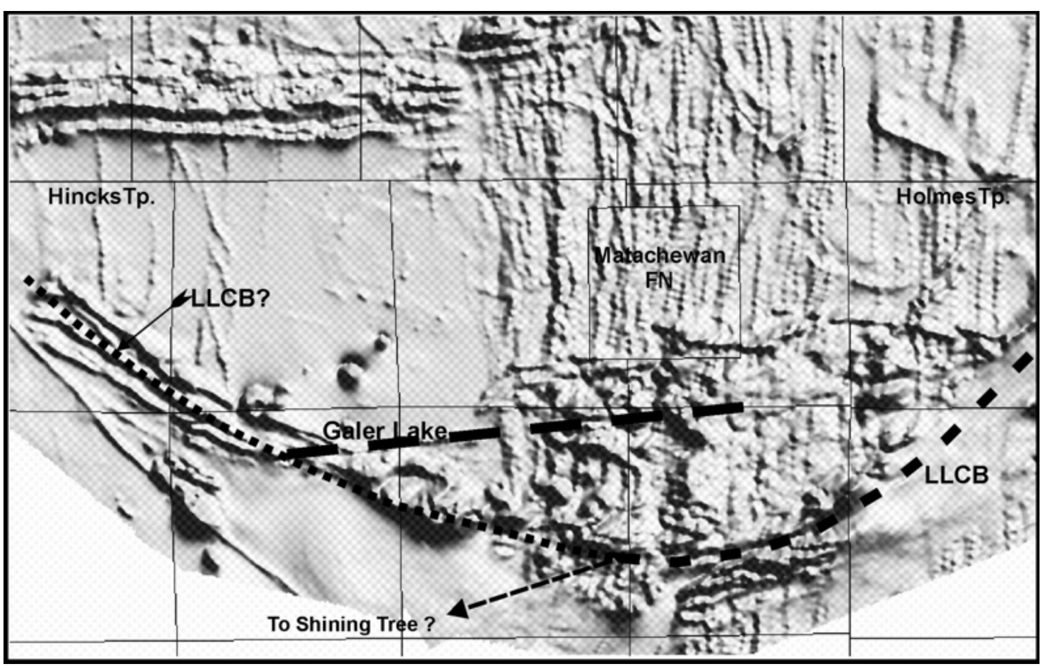

Figure 3: Larder Lake – Cadillac Break (LLCB) from Hincks to Holmes townships

HIGHLIGHTS

- **world-class Au deposits are known to be associated with Timiskaming sediments**
- **a relatively unexplored area west of the Kapuskasing structural zone is underlain by Timiskaming sediments**
- **the Borden Lake area hosts known Au occurrences in highly metamorphosed terrane**

Contact:

Brian Atkinson

(705) 235-1619 Ph.

(705) 235-1620 Fax

brian.atkinson@ontario.ca

Timiskaming hosted gold mineralization in the Borden Lake area

A common feature of large scale Archean lode gold deposits is their spatial association with Timiskaming clastic sediments. This holds true for a number of major gold deposits in the Timmins, Kirkland Lake, Hemlo and Red Lake gold camps.

An often overlooked area of Timiskaming aged metasediments are those that outcrop on the west margin of the Kapuskasing Structural Zone (KSZ) (Percival 2008; Thurston, Siragusa and Sage 1977). Fifteen kilometers east of Chapleau, Moser (1989) has identified paragneissic rocks including metaconglomerate in a broad west-trending band that underlies the north part of Borden Lake in Cochrane and Borden townships. Clast-supported cobble conglomerates and associated metawackes, and meta-arkose exhibit pronounced deformation and metamorphism, possibly associated with deep burial, upper amphibolite to granulite facies metamorphic conditions and subsequent exhumation related to Proterozoic uplift of the KSZ. The Borden Lake conglomerate forms the uppermost 30 m thick part of the 3 km wide Borden Lake greenstone belt (Percival 2008). U-Pb geochronology of clasts of the conglomerate indicated an age range between 2690±2 and 2667±2 Ma (Krogh 1993).

Recent prospecting activity in the area has revealed the presence of significant iron sulphides with reported anomalous gold mineralization. Hydromuscovite is a ubiquitous mineral component of much of the paragneiss in the area, attesting to high fluid-rock interactions. Consequently, the area is considered highly prospective for Timiskaming hosted gold mineralization. The fact the rocks are highly metamorphosed should be borne in mind when exploring the area. Carbonate alteration assemblages that typically accompany greenschist grade Archean lode gold deposits will be replaced by calc-silicate metamorphic assemblages. Instead of ankerite, quartz, sericite, chlorite and pyrite, one should anticipate the presence of quartz, epidote, diopside, amphibole, feldspar and pyrrhotite in skarn deposits and amphibolitized to granulitized metamorphic rocks. Due to the high strain state of the rocks around Borden Lake, economic mineralization will likely be narrow, high grade, possibly arsenical and parallel to the pronounced stretching lineation that developed during ductile extensional strain related to uplift of the Kapuskasing structural zone.

Krogh, T.E., 1993. High precision U-Pb ages for granulite metamorphism and deformation in the Archean Kapuskasing structural zone, Ontario: Implications for the structure and development of the lower crust. Earth and Planetary Science Letters, 119: 1-18.

Moser, D.E., 1989. Geology of the Wawa Gneiss Terrane adjacent to the Kapuskasing Structural Zone near Chapleau, Ontario. Geological Survey of Canada, Open File Map 2056. Scale 1:50 000.

Percival, J., 2008. Field Guide to the Kapuskasing Uplift, Chapleau-Foleyet transect: A window on the deep crust, in Geological Society of America Field Forum "Late Archean Crust: Magmatism and tectonics of the Abitibi Subprovince, Canadian Shield" 19-25 July, 2008

Thurston. P.C., Siragusa, G.N. and Sage, R.P., 1977. Geology of the Chapleau area, Districts of Algoma, Sudbury and Cochrane. Ontario Division of Mines, Geological Report 157, 293p.

HIGHLIGHTS

- **two extensive shear zones in the Grimsthorpe domain host a number of Au occurrences associated with highly altered volcanic rocks**
- **Au-arsenopyrite-iron carbonate-chlorite±biotite mineralization resembles Archean lode gold deposits**
- **historical exploration efforts did not always focus on areas of highest potential**

Contact:
Pam Sangster
(613) 478-5238 Ph.
(613) 478-2873 Fax
pam.sangster@ontario.ca

Gold Potential in the Grimsthorpe Domain, Southeastern Ontario

Gold mineralization is associated with two major, northerly to northeasterly-trending shear zones within a sequence of mafic metavolcanics, metasediments, and felsites within the Grimsthorpe Domain of the Central Metasedimentary Belt of the Grenville Province. The two zones, separated by about 30 km, lie on opposite sides of an area dominated by intrusive rocks of the Elzevir tonalite and gabbroic to dioritic rocks of the Lingham Lake complex. Each hosts numerous gold and gold-arsenopyrite occurrences within both altered mafic metavolcanics and altered, conformable felsite bodies within or proximal to the shear zones.

The western zone, in Tudor Township, lies along the intersection of the northeasterly – trending Gilmour Shear Zone and the northerly-trending Moira River Shear Zone (Easton 2008). Within mafic metavolcanics, pervasive iron carbonate, chlorite, and local biotite alteration are accompanied by the development of quartz veins and pods. Within the felsites, carbonate alteration is minimal, but schistose, chloritic, silicified, and protomylonitic zones host disseminated arsenopyrite and quartz vein-arsenopyrite mineralization. Carbonatized rock with disseminated pyrite has yielded assays of 1.6g/t Au; sugary quartz veins with pyrite and arsenopyrite contain up to 5.6g/t Au; and mylonitized felsite with disseminated arsenopyrite can assay up to 8.4g/t Au (Dillman 1997). Gold mineralization appears to be indicated by, but not directly related to, arsenopyrite content.

The eastern zone, in Kaladar and Anglesea townships, is associated with the northerly-trending Mooroton Shear Zone, an area up to 1 km wide of sheared and carbonatized mafic metavolcanics, metasediments, and felsites – possibly felsic metatuffs (Easton 2001) – which probably represents the eastern boundary of the Grimsthorpe Domain (Easton 2006). Gold-arsenopyrite mineralization has been documented in several occurrences (Moore and Morton 1986), but despite the presence of numerous trenches exhibiting abundant quartz veins and arsenopyrite mineralization, there are very few records of exploration work in the assessment files. Gold values have been reported from quartz veins and sulphide-bearing interflow metasediments.

Alteration, mineralization and host lithologies in the Mooroton zone appear to be similar to those in the Gilmour/Moira River zone. Both resemble lode gold-bearing systems of Archean greenstone belts, and both have undergone relatively little exploration work which has not necessarily focussed on the areas of highest potential.

Dillman, R.J. 1997. Geology and rock sampling results on the Tudor property, Tudor Township, Ontario, OPAP File OP97-170; Tweed Resident Geologist's office, assessment file Tudor #86, 24p.

Easton, R.M. 2001. Geology of the Mazinaw Lake area (31C/14); Ontario Geological Survey, Preliminary Map P.3439, scale 1:50,000.

Easton, R.M. 2006. Precambrian geology of the Cloyne-Plevna-Ompah area, northern Mazinaw domain, Grenville Province; Ontario Geological Survey, Open File Report 5454, 165p.

____________ 2008. Precambrian geology of western Grimsthorpe domain, Grenville Province; Ontario Geological Survey, Preliminary Map P.3600, scale 1:50,000; with inset map, scale 1:20,000.

HIGHLIGHTS

- **demand for REE outpacing supply due in part to increased uses in hybrid, electric and hydrogen vehicles**
- **MDI database indicates at least 84 known REE occurrences in SE Ontario**
- **some of these occurrences were mined for their apatite, feldspar, molybdenum, mica, beryllium and uranium content**
- **the REE content of these deposits was largely overlooked**

Contact:
Pam Sangster
(613) 478-5238 Ph.
(613) 478-2873 Fax
pam.sangster@ontario.ca

Rare Earth Elements in the Bancroft Terrane, Southeastern Ontario

Demand for rare earth elements has grown substantially in recent years, primarily due to increased use of permanent magnets and rechargeable batteries (table 1). Long range projections of market demand predict that 2 million tonnes of rare earth oxides will be required by 2025 to meet the requirements of hybrid, electric and hydrogen vehicles. Forecast demand for 2010 is about 150,000 tonnes (Benecki 2007).

Table 1. Rare Earth Oxide Demand by Application (Tonnes). Source: Benecki 2007

Application	2005	2010	% AAG
Rare Earth Magnets	17,150	31,100	12.6%
NiMH Batteries	7,200	27,300	30.5
Catalysts	21,230	25,960	3.8
Polishing Compounds	15,150	23,500	9.2
Glass Additives	13,590	13,990	0.6
Phosphors	4,007	7,512	13.0
All Other	16,935	24,950	8.0
Total	95,262	154,312	10.1

Rare earth magnets are the world's strongest permanent magnets. Neodymium magnets are key components in electric motors and regenerative braking systems used in hybrid, electric and hydrogen vehicles, as well as in miniaturization of high-technology applications such as hard disc drives, DVDs, cell phones and iPods. Nickel metal hydride (NiMH) rechargeable batteries, used in hybrid and electric vehicles, contain cerium and lanthanum. A typical hybrid vehicle may contain 20 kg of REEs.

A search of the Ontario Geological Survey's Mineral Deposits Inventory database, using "rare earth elements" and "southeastern Ontario" as search criteria, gave 84 records. Uranium, molybdenum, and REE- bearing pegmatites, skarns, and fluorite-apatite-calcite veins (some of which are carbonatite "vein-dikes") are most abundant in the Bancroft and northern Elzevir terranes (Easton 1992). To date, these deposits have been sub-economic with respect to REE content, but have been mined in the past for apatite, feldspar, molybdenum, mica, beryllium, and uranium. The rare earth potential of the pegmatites and carbonatite dikes has been largely overlooked in the past, and warrants renewed exploration.

Benecki, W. 2007. Rare earths are becoming rare; article *in* Magnetics Business and Technology magazine, Nov. 2007.

Easton, R.M. 1992. The Grenville Province and the Proterozoic history of central and southern Ontario; *in* Geology of Ontario, Ontario Geological Survey, Special Volume 4, Part 2, p.714-904.

Great Western Minerals Group Ltd. 2008. About rare earth elements: frequently asked questions; www.gwmg.ca/rare-earths/faq

HIGHLIGHTS

- **global shortage of metallurgical grade silica bodes well for further production increases in Ontario**
- **MDI indicates over 200 silica occurrences that may have potential as sources of high purity silica**

Contact:
Pam Sangster
(613) 478-5238 Ph.
(613) 478-2873 Fax
pam.sangster@ontario.ca

High Purity Silica

Southeastern Ontario has long history of silica production. Over 150 years ago, Mallorytown, the first glassworks in Canada used high purity silica from Cambrian sandstone as a local source of raw material. Since that time southeastern Ontario vein quartz, sandstone, quartzite and pegmatite deposits have been exploited for a wide variety of silica applications. Currently, southeastern Ontario Potsdam Formation sandstone deposits are quarried for dimension stone and aggregate. Rose quartz is extracted from pegmatite bodies in Renfrew County for use as decorative stone, landscaping stone, specimens and gemstones.

Unimin Canada Ltd. is the largest producer of silica in Ontario with a capacity of about 500 000 t/y. Lump quartzite from Badgeley Island (150 000 t/y capacity) is shipped by boat to Canadian destinations for the manufacture of ferrosilicon. The finer material, produced by grinding, is shipped to Unimin's plant at Midland (400 000 t/y capacity), where it is further processed to a glass-grade silica sand and to silica flour for ceramic and other uses.

The following summary of silica specifications for high-purity applications is complied from Harburn and Kuzvart (1996). It is important to note that with higher purity applications the presence of certain impurities even in parts per billion concentrations can be critical.

Application	**Specification % SiO2**
Iron casting	85%
Steel casting	95%
Flux	90% *
Any glass grade	98.5%
Silicon metal	98%
Silicon carbide	99.7%
Refractories	95-99%
PV Silica	99.9999 % (6n)

**absolute minimum, usually 95%*

There is currently a global shortage of metallurgical grade silicon.

Changing technology and environmental concerns have seen an increased demand for metallurgical grade silicon to be converted to photovoltaic silicon for use in solar energy technology.

In recent years, the development of high-tech composite stone comprised of a high percentage of silica has created a new demand for high purity quartz.

In 2007, two international companies announced the opening of multi-million dollar composite stone plants in southern Ontario.

High Purity Silica

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Hanwha L & C Canada Inc. has announced plans to locate a manufacturing facility in London, Ontario to produce HanStone Fine Quartz Surfaces. Their announcement represents an initial capital investment of $70 million. The first phase of Hanwha L & C Canada Inc.'s facility will manufacture HanStone Fine Quartz surfaces used for kitchen countertops, vanities and other surfaces for residential and commercial applications.

In August 2007, Cambria, the only producer of natural quartz surfaces in the United States, opened a state-of-the-art operation in Bolton, Ontario. Cambria is a natural quartz surfacing product used for residential and commercial applications including countertops, shower and tub surrounds, vanities and flooring. Cambria is comprised of natural quartz from an unnamed Canadian source.

The Mineral Deposit Inventory (MDI) database documents over 200 occurrences of silica in southeastern Ontario including sandstone, quartzite and pegmatite hosted deposits. Further examination of these as potential sources of high purity silica is recommended.

HIGHLIGHTS

- **bimodal island arc domain hosts numerous historic geophysical anomalies**
- **OGS lake sediment surveys revealed base metal anomalies coincident with geophysical anomalies and known base metal occurrences**

VMS Potential in the Dismal Lake Assemblage of the Batchewana Greenstone Belt

The Archean metavolcanic-metasedimentary units of the Dismal Lake assemblage form the eastern domain of the Batchewana Greenstone Belt (Figure 1). The Dismal Lake assemblage is made up of an early cycle of mafic metavolcanics followed by a second cycle of calc-alkalic volcanism (Grunsky 1991). The second cycle of volcanism is largely distributed within Lunkie Township and is composed of felsic to intermediate metavolcanics. The composition varies from calc-alkaline andesite to rhyolite. The associated bimodal volcanism along with extensive sedimentary accumulations suggests an island arc sequence (Grunsky 1991). The volcanic assemblage in Lunkie Township is gradational into migmatites of the Ramsey Gneiss Domain to the northwest and intruded in the south by the Algoma Plutonic Domain, which includes massive tonalite and granodiorite intrusions.

During the early 1980's airborne and ground electromagnetic and magnetic surveys detected numerous geophysical anomalies throughout the area. These anomalies have been under-explored in the past partly due to limited outcrop exposure. Some of the strongest base metal lake sediment geochemical anomalies detected in a survey completed over the Batchewana greenstone belt in 1995 by the Ontario Geological Survey (Hamilton, Fortescue and Hardy 1995) were underlain by portions of the Dismal Lake assemblage located north of Lunkie Township. The lake sediment geochemical survey revealed significant anomalies in Zn, Cd and Cu which is consistent with metal associations typical of Archean, volcanic-associated, massive sulphide deposits (VMS).

The submarine volcanic stratigraphy associated with many occurrences of copper and zinc mineralization makes the area prospective for VMS mineralization. Known exhalative horizons and to a lesser extent banded sulphide iron formations are an indication of subseafloor hydrothermal activity. The exhalites are commonly composed of finely bedded, sulphide-rich tuffaceous material along with interbedded siltstone, and graphite (Figure 1). The large accumulations of felsic to intermediate calc-alkaline volcanic rocks may suggest proximity to a felsic volcanic vent. This may favour a model of hydrothermal solutions, coming to surface and forming syngenetic sedimentary deposits close to this large felsic volcanic vent during periods of quiescence (Jensen 1986, p.75) (see Figure 1).

Grunsky, C.E., 1980. Geology of the Cowie Lake Area, District of Algoma; Ontario Geological Survey, Report 192, 41p.

Grunsky C.E., 1991. Geology of the Batchewana Area, District of Algoma; Ontario Geological Survey, OFR 5791.

Hamilton, M.S., Fortescue, C.A.J., Hardy, S.A., 1995. A Zinc-Cadmium-Copper Anomaly: Preliminary Results of the Cow River Geochemical Mapping Project, Batchewana Greenstone Belt, OFR 5917, 31p.

Jensen S.L., 1986. Mineralization and Volcanic Stratigraphy in the Western Part of the Abitibi Subprovince; Ontario Geological Survey, Miscellaneous Paper 129, 75p.

Contact:

Anthony Pace,
anthony.pace@ontario.ca
(705) 945-6931 Ph.
(705) 945-6935 Fax

VMS Potential in the Dismal Lake Assemblage of the Batchewana Greenstone Belt …cont'd

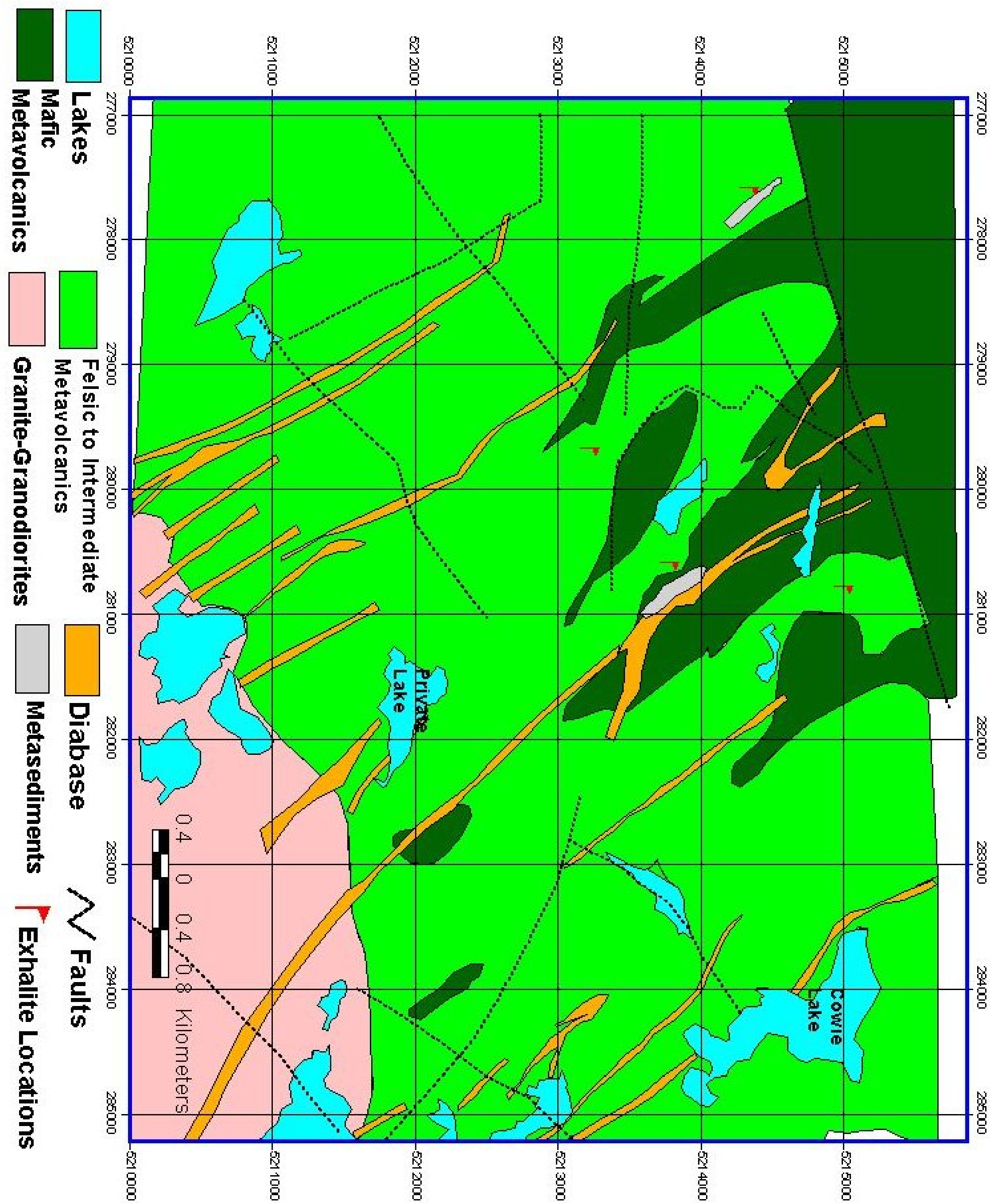

Figure 1: Map Illustrating the Archean metavolcanic-metasedimentary units of the Dismal Assemblage in the eastern domain of the Batchawana Greenstone Belt (after Grunsky 1977.)(modified by A.Pace).

HIGHLIGHTS

- **notable examples of felsic intrusive hosted Au deposits exist in Ontario, Quebec and Australia**
- **recent discovery of a Au-bearing zone in the Elmhirst granodiorite has prompted renewed interest in other plutons of similar age**
- **NW trending fracture systems and associated alteration provide previously unrecognised gold targets**
- **detailed magnetometer surveys aid the delineation of the fracture systems**

Contact:

Mark Smyk

Gerry White

mark.smyk@ontario.ca

gerry.white@ontario.ca

(807)475-1334 Ph.

(807 475-1112 Fax

Gold in Felsic Intrusions in the Onaman-Tashota Belt

Although felsic intrusions (i.e. tonalite, trondhjemite, granodiorite, granite, quartz diorite, etc.) in and around greenstone belts have never garnered as much gold exploration as the belts themselves, the recent discovery of the Golden Mile zone by Kodiak Exploration Limited within the Elmhirst granodiorite pluton on their Hercules property, north of Jellicoe, should prompt a re-evaluation of felsic intrusions as potential hosts to gold mineralization. As shown by Colvine et al. (1988), for example, large felsic intrusions, while accounting for over one-quarter of the Abitibi greenstone belt lithologies, are not represented at all (i.e. in statistically significant amounts) as hosts to gold mineralization at either a mine- or deposit-scale. Most Archean lode gold deposits are hosted by supracrustal rocks and minor, post-volcanic intrusions within the supracrustal assemblages. However, notable exceptions do exist, including deposits in the Bourlamaque Batholith, Quebec (e.g. Ferdeber deposit; Vu 1990); the Wawa area (e.g. Renabie, Callan and Spooner 1998; Eagle River); and in Western Australia (e.g. Woodcutters-Lady Bountiful; Mason 2004). Gold is typically hosted by quartz-carbonate veins which are localized by brittle-ductile shear zones that crosscut the intrusion and have a protracted history of movement and dilation. Veins and/or permeable shear zones are usually enveloped by altered wall rocks. Alteration assemblages may consist of mica (e.g. sericite, muscovite, biotite), chlorite, sulphides (e.g. pyrite), oxides (e.g. hematite) and epidote and are dictated by fluid and wall rock chemistry, temperature and metamorphic conditions.

The Elmhirst Lake, Coyle Lake and Kaby Lake stocks range in composition from tonalite to quartz diorite and granodiorite (Mackasey and Wallace 1978; Stott et al. 2002). U-Pb dates from the Elmhirst Lake and Kaby Lake stocks are 2736.1 + 1.5 Ma and 2734 $\pm$ 1 Ma, respectively (Stott et al. 2002). Although they intrude metavolcanic rocks of the Elmhirst-Rickaby assemblage (ca. 2740 Ma), they are just slightly younger and may, in part, be synvolcanic with this assemblage. They have experienced regional metamorphism as well. Mineral occurrences in Elmhirst and Rickaby townships have been documented by Mackasey and Wallace (1978) and Parker (1996).

The significance of this new discovery is realized in the fact that very little exploration had been undertaken until recently within the Elmhirst Lake and nearby plutons. Much of the past exploration has been limited to the contact zone between the granodiorite and the intermediate to felsic metavolcanic rocks. The discovery of other northwest-trending fracture systems within these three plutons provides new, previously unrecognized gold targets. Exploration companies have had some success in delineating these fracture systems by employing very detailed and sensitive magnetometer surveys. These fractures may host mafic dykes as well, enhancing the utility of magnetic surveys.

The recognition of these gold-mineralized, northwest-trending fracture systems and associated hematite, sericite, sulphide and silica alteration within these felsic intrusions should prompt investigation of other intrusive bodies of similar age and composition within the Onaman-Tashota and other belts. Lafrance et al. (2004) demonstrated that in the Beardmore-Geraldton belt, adjacent to the Onaman-Tashota belt, gold deposits and gold-bearing ore shoots are parallel to the intersection between D_3 shear zones and map-scale folds.

Gold in Felsic Intrusions in the Onaman-Tashota Belt …cont'd

The northwest-trending shear zones that cut these three felsic intrusions may be correlative with the D_3, dextral shear zones on the southern side of the Paint Lake Deformation Zone (G. Stott, OGS, personal communication, 2008). They should be considered prime gold targets.

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Gold in Felsic Intrusions in the Onaman-Tashota Belt …cont'd

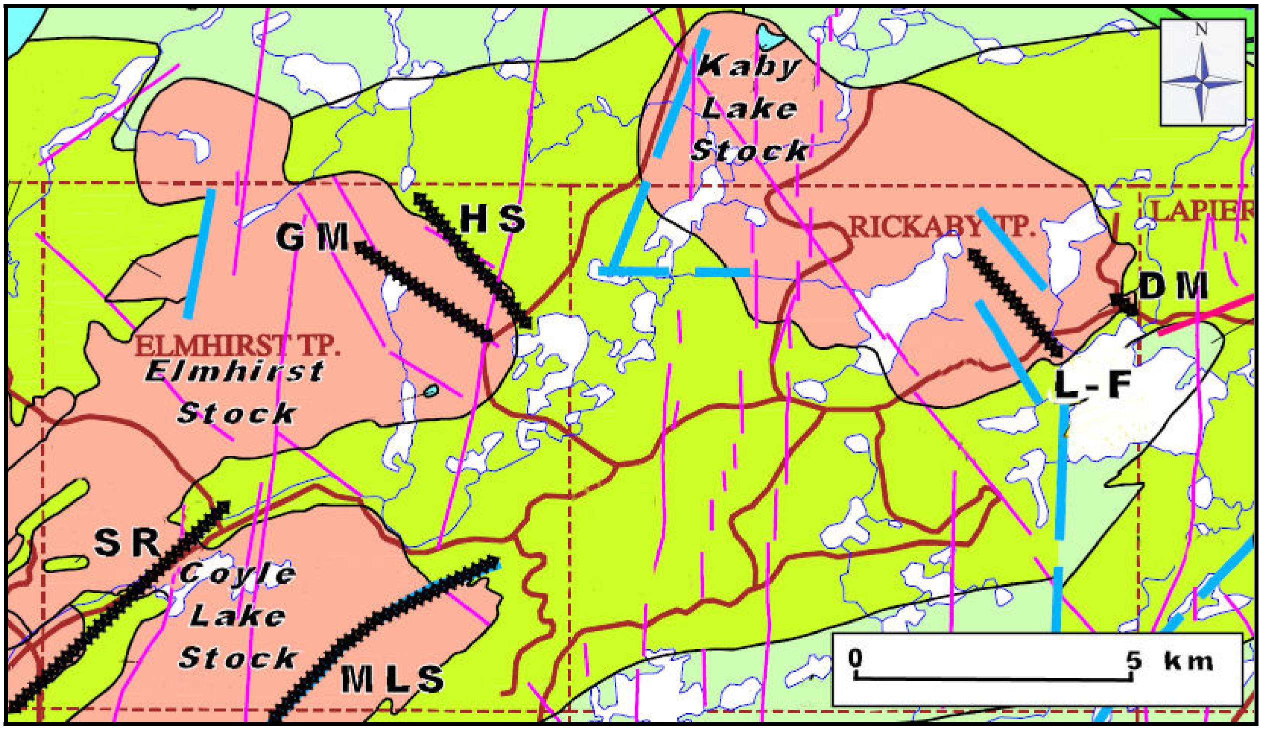

Figure 1.Geology and gold occurrences in Elmhirst and Rickaby townships. Gold-bearing structures (black hachured lines) in granodiorite (dark grey) stocks: DM – Dikdik (Orphan) Mine; GM – Golden Mile; HS – Hercules Shear; L-F – Larson-Foisey; MLS – Mud Lake Shear; SR – Sturgeon River. Solid, straight line segments are faults and other structures which host diabase dykes. Country rocks are metavolcanic rocks of the Onaman-Tashota greenstone belt. Geology after Stott et al. (2002).

HIGHLIGHTS

- **folded, banded iron formation occurs in proximity to a regional shear zone, in a volcanic belt SW of the Musselwhite gold mine**
- **anomalous gold values were obtained in historic drilling of the iron formation**

Contact:
Mark Smyk
Gerry White
mark.smyk@ontario.ca
gerry.white@ontario.ca
(807)475-1334 Ph.
(807 475-1112 Fax

Gold in the Upper Windigo Greenstone Belt

The Upper Windigo greenstone belt is a poorly understood belt of mostly overburden-covered supracrustal rocks, located approximately 140 km northwest of Pickle Lake. Nevertheless, this mafic metavolcanic rock-dominated belt (Thurston et al. 1991) is known to contain quartz vein- and iron formation-hosted lode gold mineralization.

Most outcrop exposure is found in the vicinity of Upper Windigo Lake in the western half of the belt, while the eastern half is covered by thick glaciofluvial deposits of the Agutua Moraine (Cortis et al. 1988). The only known surface exposure of economic-grade gold mineralization is found in a 1.9 m wide quartz vein (MDI53B05NE00002) hosted by sheared, sericitized, quartz-eye leucogranite on the southern shore of Upper Windigo Lake (North and Fogal 1987). The vein is located in a shear zone that also marks the contact between the granite and a gabbroic intrusion. This shear zone is likely to be associated with the regional-scale, northwest-trending, Windigo Lake-Horseshoe Lake shear zone (Osmani and Stott 1988), which also extends southeast to the Horseshoe Lake greenstone belt.

In the early 1980's Dome Exploration carried out a gold exploration program in the overburden-covered eastern portion of the belt, advancing a limited number of diamond drill holes (logs are found in AFRI File Nos. 53B06NW0004, 5 and 6) to test geophysically inferred targets (Racic 1983) in folded, oxide-facies banded iron formation. Several of these diamond drill holes encountered anomalous gold values (i.e., assays of greater than 500 ppb Au), most commonly at the noses or hinges of geophysically inferred folds. These mostly iron formation-hosted zones of gold mineralization are also in close proximity to the Upper Windigo-Horseshoe Lake shear zone, which is inferred to mark the southwestern margin of the greenstone belt in this area.

The nearby Musselwhite Mine is a folded banded iron formation-hosted deposit that is also in close proximity to a major northwest-striking regional structure (the North Caribou-Totogan Lakes shear zone; Osmani and Stott 1988). Therefore, the road-accessible Upper Windigo greenstone belt is considered to be a favourable target for further gold exploration.

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Gold in the Upper Windigo Greenstone Belt

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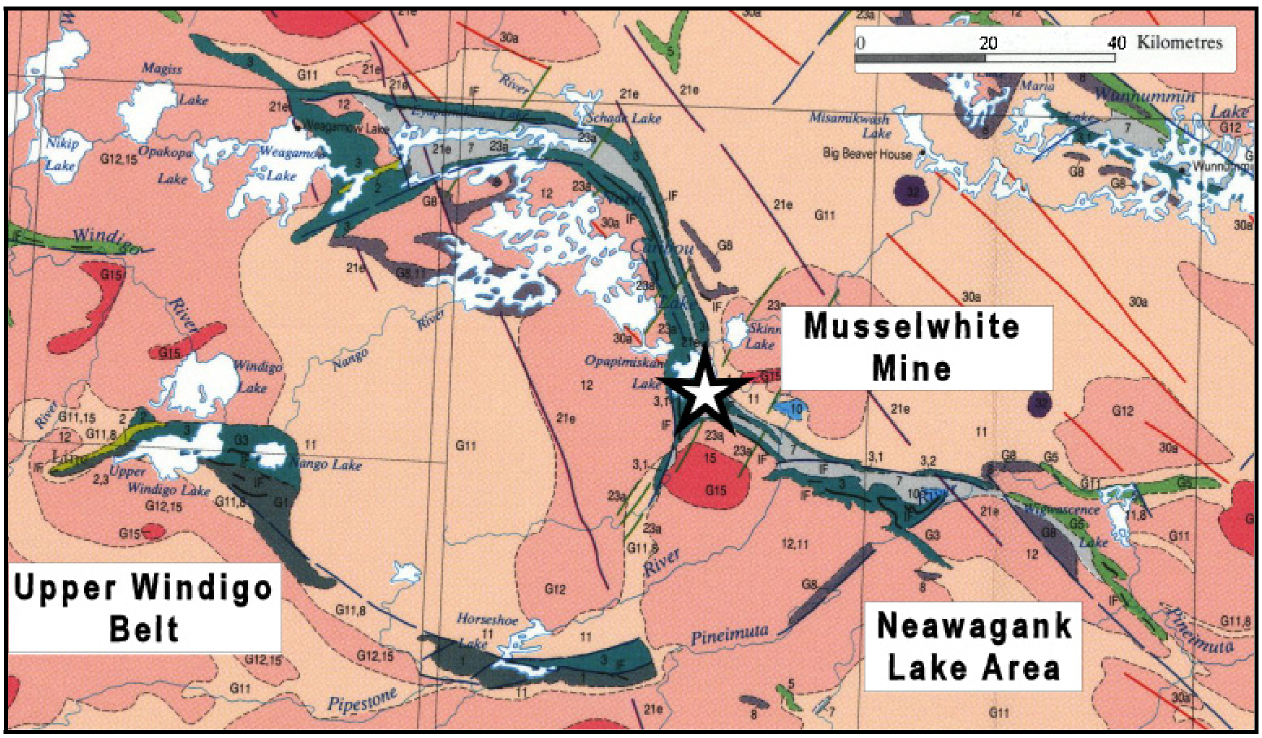

Figure 1. Musselwhite Mine-Upper Windigo Belt-Neawagank Lake Area

HIGHLIGHTS

- **structures, lithologic units and known gold mineralization are similar to those in the vicinity of Pickle Lake**
- **folded iron formation and major shear zones in proximity to known gold occurrences enhance the prospectivity of the belt**

Contact:

Mark Smyk

Gerry White

mark.smyk@ontario.ca

gerry.white@ontario.ca

(807)475-1334 Ph.

(807 475-1112 Fax

Gold in the Neawagank Area, North Caribou Lake Greenstone Belt

Since the initial discovery of gold in the Neawagank Lake area, southeast of Musselwhite Mine, in 1941 (Sage and Breaks 1982), this area has seen sporadic exploration that has resulted in the discovery of a number of quartz vein- and iron formation-hosted lode gold occurrences. The greenstone belts in this area are dominated by mafic metavolcanic rocks of the Forester-Neawagank sequence (Breaks et al. 1986). This metavolcanic rock-dominated sequence also contains two major northeast-trending bands of geophysically inferred banded iron formation. A large gabbroic intrusion has also been mapped in the area immediately north of Wesley Lake.

Geological mapping carried out in this area by Breaks et al. (1987) indicated that this is an area of considerable structural complexity. Notable structures include a major northeast-striking shear zone centered on Neawagank Lake (Breaks et al. 1986) that marks the southeastern margin of the greenstone belt, an east- to northeast-striking zone of shearing within the gabbro north of Wesley Lake (Piroshco et al. 1989), and a major anticlinal fold, whose axis trends east-northeasterly in the area between Wesley and Neawagank lakes, changing to northwesterly west of Wesley Lake (Breaks et al. 1987).

Known occurrences of gold mineralization in the Neawagank Lake area include the Tex showing, which was discovered northeast of Wesley Lake by Van Horne Exploration and Tex U.S. Oil and Gas in the early 1980s (Talbot 1996; MDI53A05NW0006). This showing is associated with intersecting east- and northeast-striking shear zones in gabbro. A second notable occurrence is the Subgrid A occurrence that was intersected by Van Horne Gold Exploration and Santa Maria Resources during a late 1980s diamond drilling program (Timoshenko and Corkery 1989). This occurrence is hosted by folded and brecciated banded iron formation horizons southwest of Wesley Lake, in the area where the dominant structural trend of the greenstone belt changes from northwest to northeast.

The structures, lithologic units and mineralization described above are very similar to those that have been noted nearby in the vicinity of Pickle Lake (Puumala 2007), where a number of past-producing gold mines (Pickle Crow, Dona Lake, and Central Patricia Nos. 1 and 2) are located. These structural and geological similarities suggest that the Neawagank Lake area has the potential for a significant gold discovery. It is recommended that exploration in this area focus on:

- structures that cross-cut banded iron formation, either in fold hinge zones or where they cross-cut banded iron formation horizons at an oblique angle (cf. Pickle Crow Mine); and
- locations where structures cross-cut competent lithologic units and contacts between rocks with significant competency contrasts.

Gold in the Neawagank Area, North Caribou Lake Greenstone Belt …cont'd

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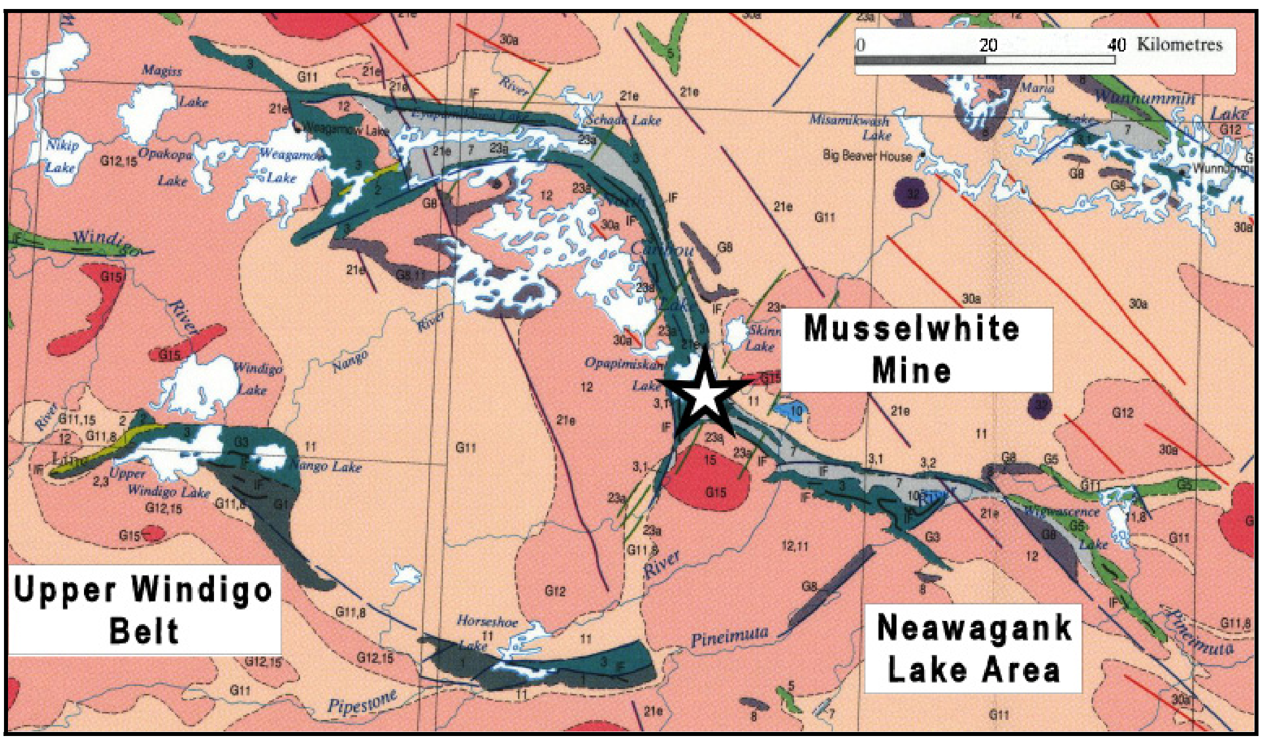

Figure 1. Musselwhite Mine -Neawagank Lake Area-Upper Windigo Belt

HIGHLIGHTS

- **large tonnage-low grade Au deposit or high-grade Au-bearing quartz veins are known to be associated with NE trending structures**
- **a cluster of lake bottom sediment Au anomalies are interpreted to occur over a NE trending shear structure between the Sandy and Bedivere lakes Au occurrences**

Atikokan (Marmion Lake – Bedivere Lake Area)

In the Atikokan area, gold is associated with large northeast trending shear structures and quartz-carbonate stockwork. Examples of these would be the Hammond Reef and Sawbill occurrences. Gold has been found disseminated in a **large tonnage-low grade deposit** or concentrated in **high-grade quartz veins**, such as the Fern Elizabeth Mine. Several properties with gold occurrences along strike of the Hammond Reef and along parallel and sub-parallel northeast trending structures, staked by local prospectors are available for option. Geological mapping by D. Stone (2005) in the Atikokan area has delineated many of these large structures. An area east of the Hammond Reef (Figure 1) along a northeast trending structure in the Bedivere Lake area merits attention. A cluster of lake bottom sediment gold anomalies (INAA) reported by the OGS, occur along a northeast trending fault/shear zone (R.D. Dyer, 1999). Dyer advises a note of caution regarding the initial results of these Au anomalies, as they were not duplicated by subsequent lake sediment sampling surveys by the OGS and by the Geological Survey of Canada. However, the geological setting is favourable and there are two gold occurrences located southwest and northeast of the cluster of gold anomalies, in close proximity to the northeast trending shear structure;

- Sandy Lake Au-Cu-Ag Occurrence occurs on the north side of West Bay on Sandy Lake; assay values returned trace to 0.02 oz/t & 3.83 % Cu within a quartz-carbonate zone with associated pyrite, chalcopyrite, sericite and chlorite schists (B.R. Schnieders & R.J. Dutka, 1985).

- A gold occurrence, located on the southwest corner of Bedivere Lake was reported in an assessment report by Fern Elizabeth Gold Exp. Ltd., 1989. Gold assays from Trench #1 returned 0.02 oz/t, 0.10 oz/t, tr, 0.01 oz/t and 0.01 oz oz/t. Four other trenches in the vicinity returned trace and up to 0.06 oz/t.

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Contact:

John Scott

Dorothy Campbell

dorothy.campbell@ontario.ca

john.scott@ontario.ca

(807)475-1334

Atikokan (Marmion Lake – Bedivere Lake Area)

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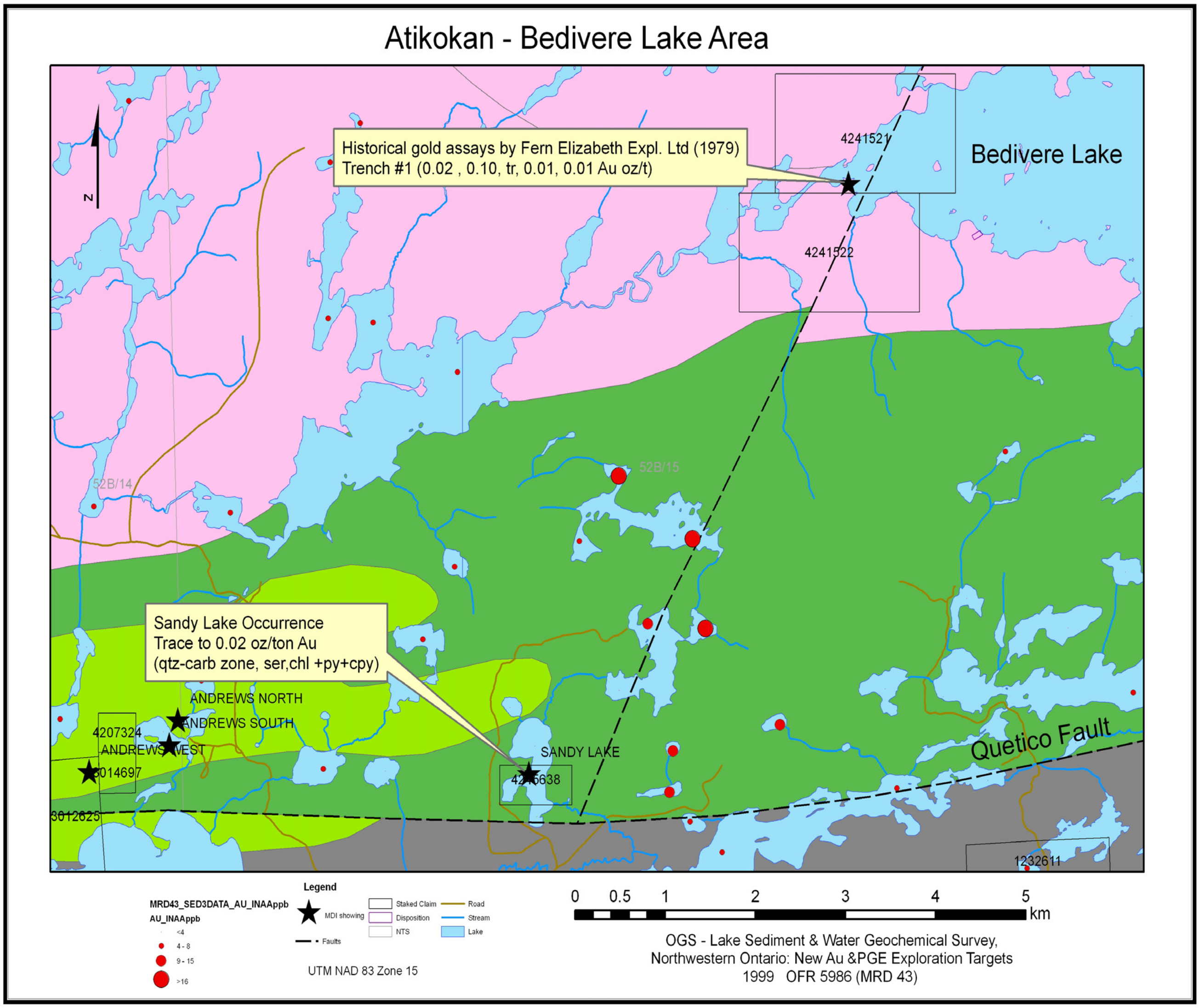

Figure 1. Bedivere Lake Area

HIGHLIGHTS

- **diamond occurrences from ultramafic and lamprophyric rock have been described from Wawa and most recently from Ft. Frances**
- **the current recommendation catalogues all the known occurrences of lamprophyre in the Kenora District**

Contact:

Craig Ravnaas

(807) 468-2819 Ph.

(807) 468-2930 Fax

craig.ravnaas@ontario.ca

Lamprophyres in the Kenora District

Thurston and Newsome (2002) present a predictive model for diamond-bearing rocks in Ontario. They conclude that specific structures, including Archean terrane boundaries, are spatially, and possibly genetically associated with kimberlites and alkaline magmatism. The Archean structures in the Kenora District identified, by the model include the Miniss River fault and the Archean fault coincident with the eastern portion of the western Wabigoon Subprovince boundary. The location of this boundary is approximately parallel with the eastern border of the Kenora District.

Thurston and Newsome (2002) state “All Archean terrane boundaries display evidence of Neoarchean sanukitoid suite monzodiorite to syenite bodies”. In the Kenora District, these include the Sturgeon Narrows, Squaw Lake and Bell Lake alkalic rock complexes. Based upon this model, an elevated potential for new kimberlite discoveries exists in a 60 km buffer zone adjacent to these structures and lithologies.

Stott et al. (2002) observes that “the Wawa area has been the focus of exploration activity for diamonds in Archean mica- and actinolite-rich heterolithic breccias and associated lamprophyre dikes”. Based upon field examination, Stott et al. (2002) suggest “heterolithic breccias and lamprophyric phases associated with late orogenic alkalic, and possibly sanukitoid intrusions, should be investigated for their diamond potential”. Stott et al. (2002) also mention “the ultramafic phases of such late intrusions, which have attracted some attention for their platinum group element potential have not been suggested as possible carriers of diamond from the mantle. Exploration should be conducted on ultramafic intrusions, breccias and lamprophyre dikes in the vicinity of Archean alkalic plutons”.

MetalCORP Limited announced six diamonds were recovered from a 100 kg sample of an ultramafic fragmental rock (“GUP”) using the caustic fusion procedure. The GUP underlies part of the North Rock property which is located approximately 25 km east of Fort Frances. Kennecott Canada Exploration Inc. subsequently optioned the GUP property and is planning an exploration program (MetalCORP Limited, press release, June 17, 2008).

A compilation of all lamprophyre dikes illustrated on final and preliminary OGS maps was completed for the Kenora District. Table 1 presents a summary of all lamprophyre dikes identified during this review and Figure 1 illustrates the locations of the dikes. There has been limited examination of these dikes and intrusions in the Kenora District, implying a significantly large area of terrane remains to be examined for potentially diamond-bearing rocks.

Lamprophyres in the Kenora District

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Table 1. Known lamprophyre dikes in the Kenora District.

No	Matrix of Dike	Type of Xenolith(s)	Host Rock	Reference Report	Reference Map
1	Unspecified	None reported	Metamorphosed coarse-grained sedimentary rocks (conglomerate) Metamorphosed granitoid rocks (tonalite)	GR 227	2525
2	Biotite	None reported	Metasedimentary rocks (biotite-quartz-feldspar schist)	GR 115	2279
3	Unspecified	None reported	Mafic intrusive rocks (hornblende gabbro)	GR 115	2278
4	Unspecified	None reported	Ultramafic to mafic metavolcanic rocks (ultramafic metavolcanics and fine-grained massive flows)	OFR 5804	P.3144
5	Unspecified	None reported	Mafic metavolcanic rocks (medium-grained massive amygdaloidal flows)	OFR 5710	P.3121
6	Rounded granitic to mafic inclusions	None reported	Mafic metavolcanic rocks (pillowed flows)	GR 280	2549
7	Mica-pyroxene lamprophyre	Biotite replaced hornblende crystals	Mafic metavolcanic rocks (mafic flows)	GR 201	2430 44e
8	Medium-grained biotite-feldspar-quartz-pyroxene-mica lamprophyre	Potassic feldspar crystal	Felsic intrusive rocks (gneiss, migmatite)	GR 201	2430
9	Biotite lamprophyre	None reported	Clastic metasedimentary rocks (fine-grained arkosic wacke)	GR 222	2463
10	Biotite-rich lamprophyre	Amphibole phenocrysts	Felsic intrusive rocks (potassium-feldspar-megacrystic monzonite	GR 282	2567
11	Biotite-rich lamprophyre	None reported	Mafic intrusive rocks (quartz gabbro)	GR 282	2566
12	Biotite and amphibole with interstitial plagioclase	Biotite	Ultramafic intrusive rocks (peridotite)	GR 223 GR 202	2438 2476
13	Unspecified	None reported	Mafic metavolcanic rocks		47k
14	Unspecified	None reported	Mafic intrusive rocks	OFR 5659	P.2569
15	Unspecified	None reported	Felsic metavolcanic rocks		1950-2
16	1 to 3% biotite in a tremolite-plagioclase matrix	Granite and metasediment	Clastic metasedimentary rocks (greywackes)	GR 272	2534
17A	1 to 3% biotite in a tremolite-plagioclase matrix	Hornblende, metasediment and granite	Clastic metasedimentary rocks (greywackes)	GR 268	2528
17B	1 to 3% biotite in a tremolite-plagioclase matrix	Lapilli tuff	Felsic metavolcanic rocks (lapilli tuff)	GR 268	2528

Lamprophyres in Kenora District

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No	Matrix of Dike	Type of Xenolith(s)	Host Rock	Reference Report	Map
18	50% chlorite, carbonate, plagioclase and quartz	Granite	Mafic metavolcanic rocks (porphyritic basalt) Clastic metasedimentary rocks (volcanic boulders and pebble conglomerate)	GR 101	2242
19	Biotite, sodic plagioclase, carbonate, apatite	None reported	Felsic intrusive rocks (trondhjemite and quartz diorite)	GR 101	2243
20	Unspecified	None reported	Alkaline intrusive rocks of the Bell Lake alkalic complex (biotite pyroxenite)	GR 24	2044W
21	Hornblende, biotite phenocrysts set in a fine-grained matrix of feldspar and quartz	None reported	Felsic intrusive rocks (migmatite and granitic gneiss)	GR 24 GR 114	2044W 2269
22	Unspecified	None reported	Mafic intrusive rocks (pyroxenite)	GR 24 GR 144	2044W
23	Unspecified	None reported	Mafic intrusive rocks (pyroxenite)	GR 24	2044W
24	Unspecified	None reported	Alkaline intrusive rocks of the Sturgeon Narrows alkalic complex (biotite-pyroxene syenite)	GR 154	2335
25	40 to 70% plagioclase and 25 to 60% biotite with 5% carbonate	Syenite	Alkaline intrusive rocks of the Sturgeon Narrows alkalic complex (nepheline-biotite-pyroxene syenite) Mafic metavolcanic rocks (flows)	Study 49 GR 154	Chart A 2335
26	Biotite lamprophyre	Metagabbro and quartz-feldspar porphyry	Mafic metavolcanic rocks peripheral to the Squaw Lake alkalic complex (flows)	Study 49	Chart A

GR-geological report, OFR-open file report, P-preliminary map

Stott, G.M., Ayer, J.A., Wilson, A.C. and Grabowski, G.P.B. 2002. Are the Neoarchean diamond-bearing breccias in the Wawa area related to late-orogenic alkalic and "sanukitoid" intrusions?; *in* Summary of Field Work and Other Activities 2002, Ontario Geological Survey, Open File Report 6100, p.9-1 to 9-10.

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Lamprophyres in the Kenora District

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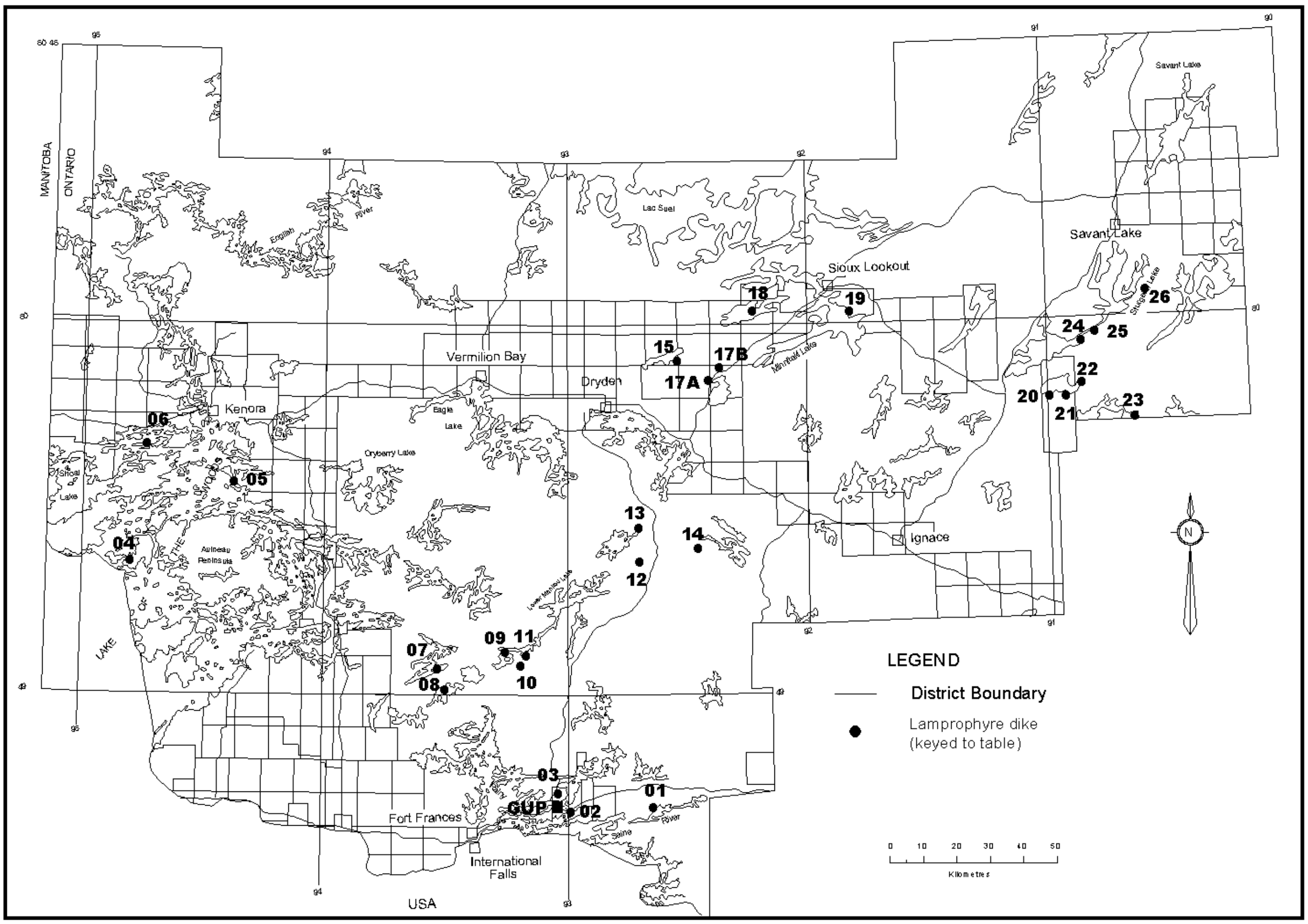

Figure 1. Location map of lamprophyre dikes mentioned in Table 1.

HIGHLIGHTS

- **a compilation of 9 OGS lake sediment surveys has been used to outline areas of anomalous element associations**
- **numerous areas of lode gold, Cu-Ni, Cu-Zn, Mo and U indicator element anomalies reveal the highly prospective nature of the Kenora District**

Contact:

Craig Ravnaas

(807) 468-2819 Ph.

(807) 468-2930 Fax

craig.ravnaas@ontario.ca

Highly Anomalous Lake Sediment Sample Sites in the Kenora District

In a study initiated and carried out by the Kenora District Resident Geologist Program ("RGP") staff, results from the 9 Ontario Geological Survey ("OGS") lake sediment sampling reports were extracted and compiled using Geographic Information System ("GIS") technology. The areas of the Kenora District covered by these surveys are illustrated in Figure 1. The purpose of the Kenora RGP study was to recommend areas for exploration in the Kenora District based on the highly anomalous values of certain indicator and pathfinder elements in the lake sediment samples. For most elements, concentrations exceeding the 98th percentile are classified as highly anomalous (Felix 2006). These lake sediment sampling programs covered parts of the English River, Winnipeg River and Western Wabigoon subprovinces (OGS 2003).

The methodology used to compile this study can be reviewed in the 2007 Annual Report of Activities (Lichtblau et al. 2008). A GIS comparison of the pathfinder and indicator elements in the 98th percentile identified multi-element and multi-site clusters. These clusters are related to deposit model types identified in Table 1. Figures 2 to 6 illustrate the approximate extent of areas in the Kenora District that are underlain by these clusters. The highly anomalous ore association elements, which are unique for each area, are also presented in the figures.

The areas indicated in these figures were subjectively outlined; the reader is encouraged to undertake their own examination of the data. These areas could identify parts of the Kenora District that historically have not received exploration work but, based on the OGS lake sediment sample results, should be examined. The Open File Report for each OGS lake sediment survey also includes recommendations for exploration based on geochemical interpretation of the data.

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Highly Anomalous Lake Sediment Sample Sites in the Kenora District …cont'd

Table 1. Ore associations, indicator and pathfinder elements for selected metallic deposit models (*modified after* Parker 1992).

Ore Association	Indicator Elements	Pathfinder Elements
Lode gold	Au, Ag	As, Cu, Sb, W
Orthomagmatic	Cu, Ni	Co, Cr
Volcanogenic massive sulphide	Cu, Zn	Ag, Pb
Molybdenum	Mo	
Uranium	U	

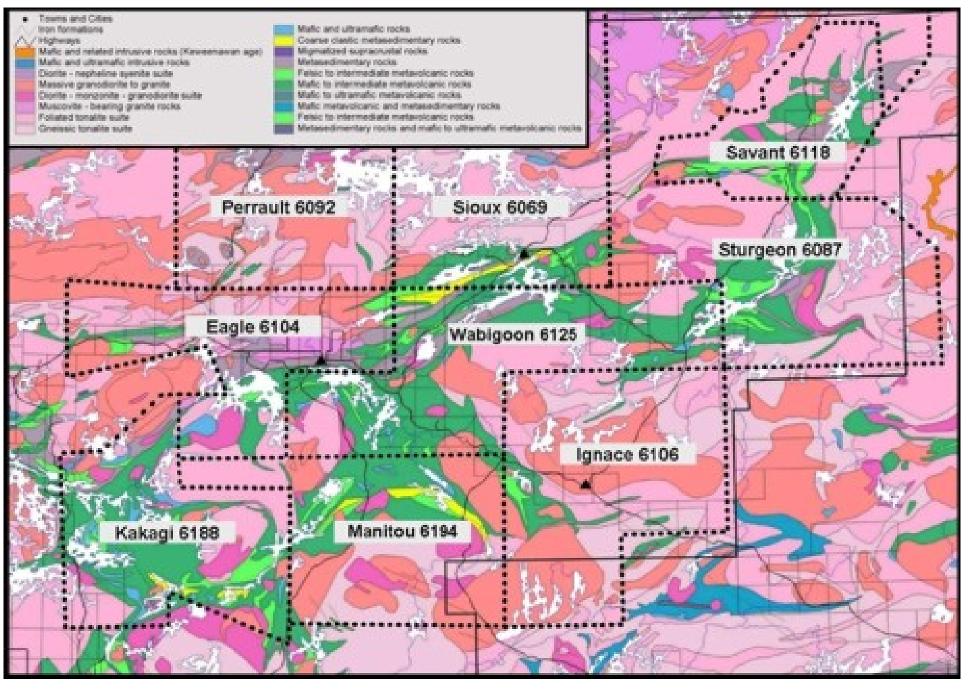

Figure 1. Areas covered by OGS lake sediment sampling programs, 2000-2006, Kenora District.

Highly Anomalous Lake Sediment Sample Sites in the Kenora District …cont'd

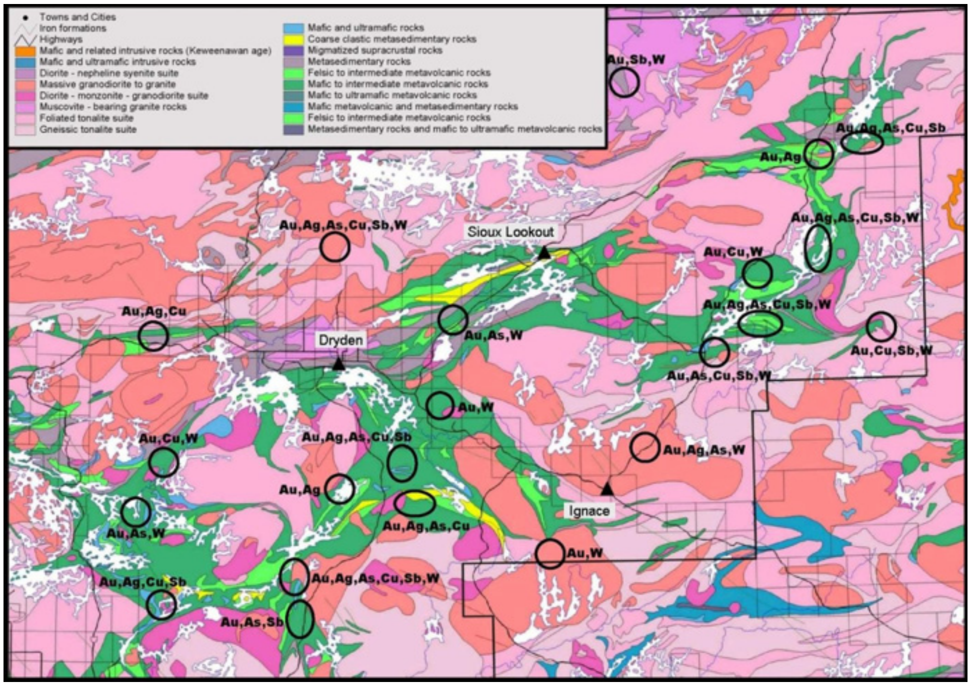

Figure 2. Lode gold prospective target areas based on the location of highly anomalous ore-associated elements.

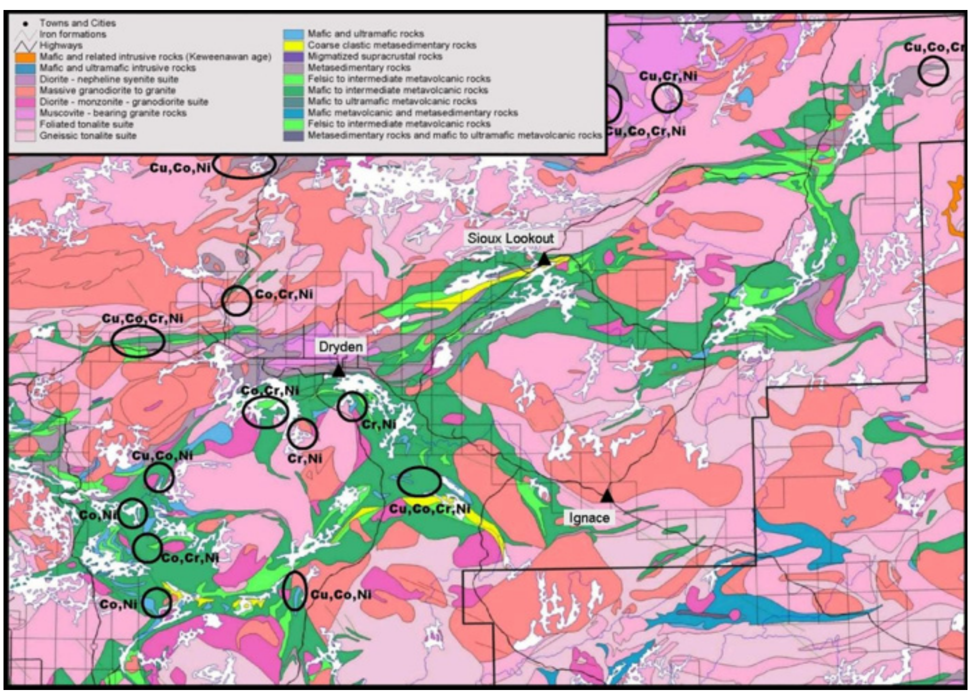

Figure 3. Orthomagmatic base metals prospective target areas based on the location of highly anomalous ore-associated elements.

Highly Anomalous Lake Sediment Sample Sites in the Kenora District …cont'd

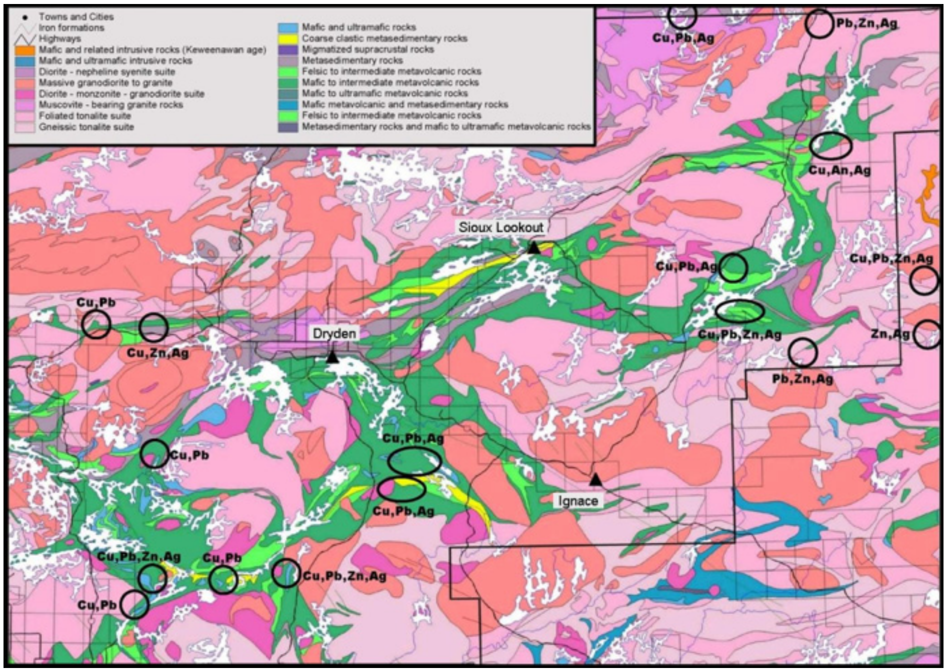

Figure 4. Volcanogenic massive sulphide prospective target areas based on the location of highly anomalous ore-associated elements.

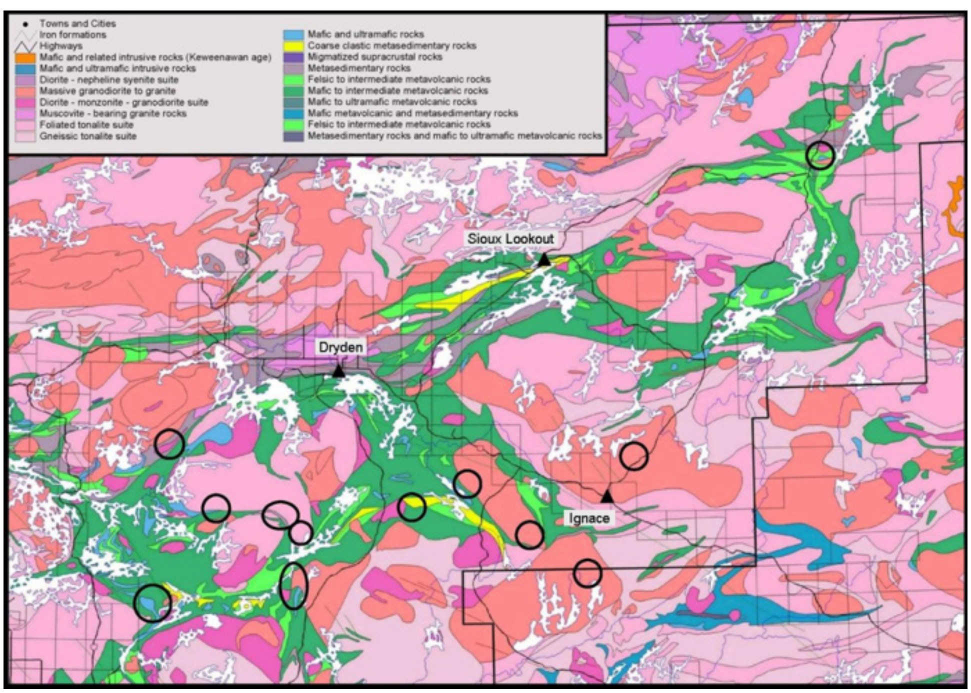

Figure 5. Molybdenum prospective target areas based on the location of highly anomalous ore-associated elements.

Highly Anomalous Lake Sediment Sample Sites in the Kenora District …cont'd

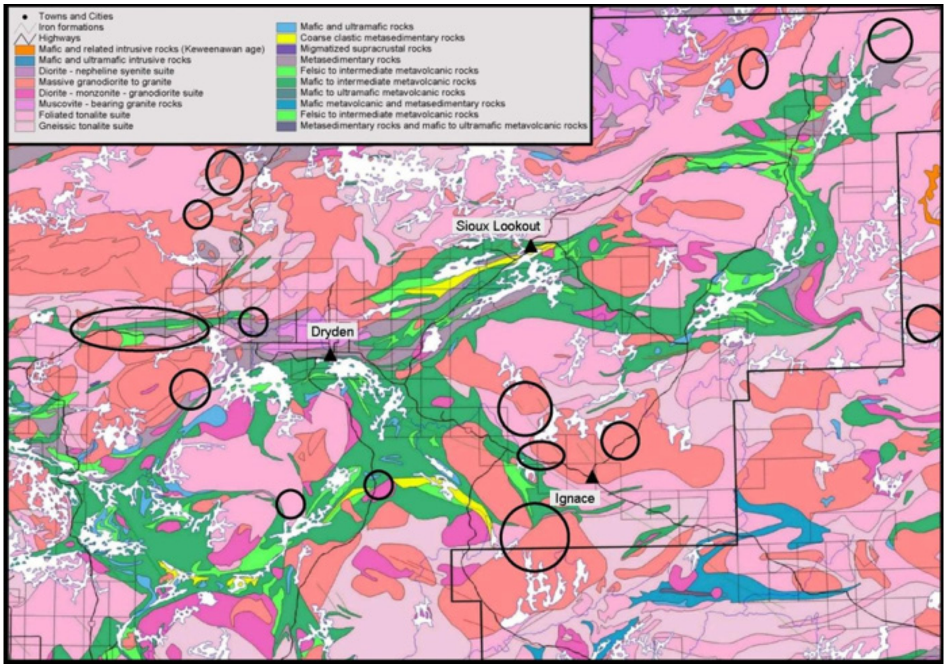

Figure 6. Uranium prospective target areas based on the location of highly anomalous ore-associated elements.

HIGHLIGHTS

- **known gold occurrences proximal to the English River-Uchi subprovince boundary have some similarities to Roberto-style mineralization**
- **the presence of a past-producing base metal mine and current Advanced Exploration stage base metal activity argues for the excellent prospectivity of Confederation assemblage FII and FIII rhyolites**
- **base metal showings where historic emphasis was on gold exploration should be the first occurrences to be examined**

Contact:
Andreas Lichtblau
Carmen Storey
andreas.lichtblau@ontario.ca
carmen.storey@ontario.ca
(807)727-3272 Ph.
(807)727-3553 Fax

Precious and Base Metal Potential of the Red Lake–Birch-Uchi Belts

GOLD

Gold occurrences have been documented along portions of the **Lake St. Joseph-Sydney Lake Fault** that are within a few kilometres of the Papaonga Lake quartz-diorite stock, 100 km east of Red Lake. The fault represents the subprovince boundary between the Uchi metavolcanic terrane to the north, and the English River metasedimentary gneisses to the south. At least six gold showings are known between Curie and Papaonga lakes; they are hosted by sheared, silicified, sericitized ± tourmalinized tuffs and sedimentary rocks, which are cut by quartz-tourmaline-arsenopyrite veins. At the PL-1a zone of the Papaonga Lake occurrence (MDI#52K16NW00005), sulphide-bearing, graphitic wacke hosts a 1.7 km long zone of contorted, quartz-tourmaline veining. Channel samples as high as 0.33 ounce gold per ton over 0.5 m were reported from the North Showing of the Curie Lake occurrence (MDI#52K16NE00003) during the last exploration work performed in mid-1980’s.

Gold mineralization in the Curie and Papaonga lakes area has certain similarities with **Roberto-style** gold mineralization, being actively explored at Goldcorp Canada Ltd.’s Eleonore property in Québec. They include: 1) the regional association of gold mineralization with a quartz diorite stock, adjacent to a subprovince boundary; 2) the polydeformed nature of host sedimentary rocks and tuffs; and 3) the association of gold with tourmaline-arsenopyrite-sulphide veins and disseminated sulphides.

BASE METALS

Volcanogenic massive sulphide (VMS) deposits and prospects, and associated, proximal chlorite and aluminosilicate alteration, have been documented in the Red Lake and Birch–Uchi greenstone belts, hosted in Confederation Assemblage rocks (Parker 1999). **FII-type and FIII-type rhyolites** (cf. Lesher et al. 1986) have also been documented (Parker 1999) in a 100 km band of greenstone, extending east from Red Lake, to the past-producing South Bay Mine (1.6 million tons grading 11.06% Zn, 1.8% Cu and 2.12 ounces Ag per ton; MDI#52N02SE00012).

Tribute Minerals Inc. holds a large number of claims in the greenstone belt southwest of the South Bay Mine. The company continues to build upon its exploration success in tracking sulphide-mineralized horizons with deep-penetrating Titan-24 magnetotelluric–induced polarization geophysical surveys. The company is in the first stages of permitting for a ramp to extract a bulk sample and perform underground delineation drilling on its **Arrow Zone** (indicated resource of 2.1 million tonnes at 5.92% Zn, 0.75% Cu, 0.58 g/t Au, 21.1 g/t Ag, with indium and gallium credits). Further exploration in this prospective VMS belt is highly encouraged. At year-end 2008, a significant portion of the ground was still open.

A number of rhyolite-hosted Zn occurrences have been documented within a 3 km radius of the intersection of Highways #105 and 125, in northeastern Heyson Tp. Very little work has been done in this area of FIII rhyolite volcanism.

Precious and Base Metal Potential of the Red Lake–Birch-Uchi Belts

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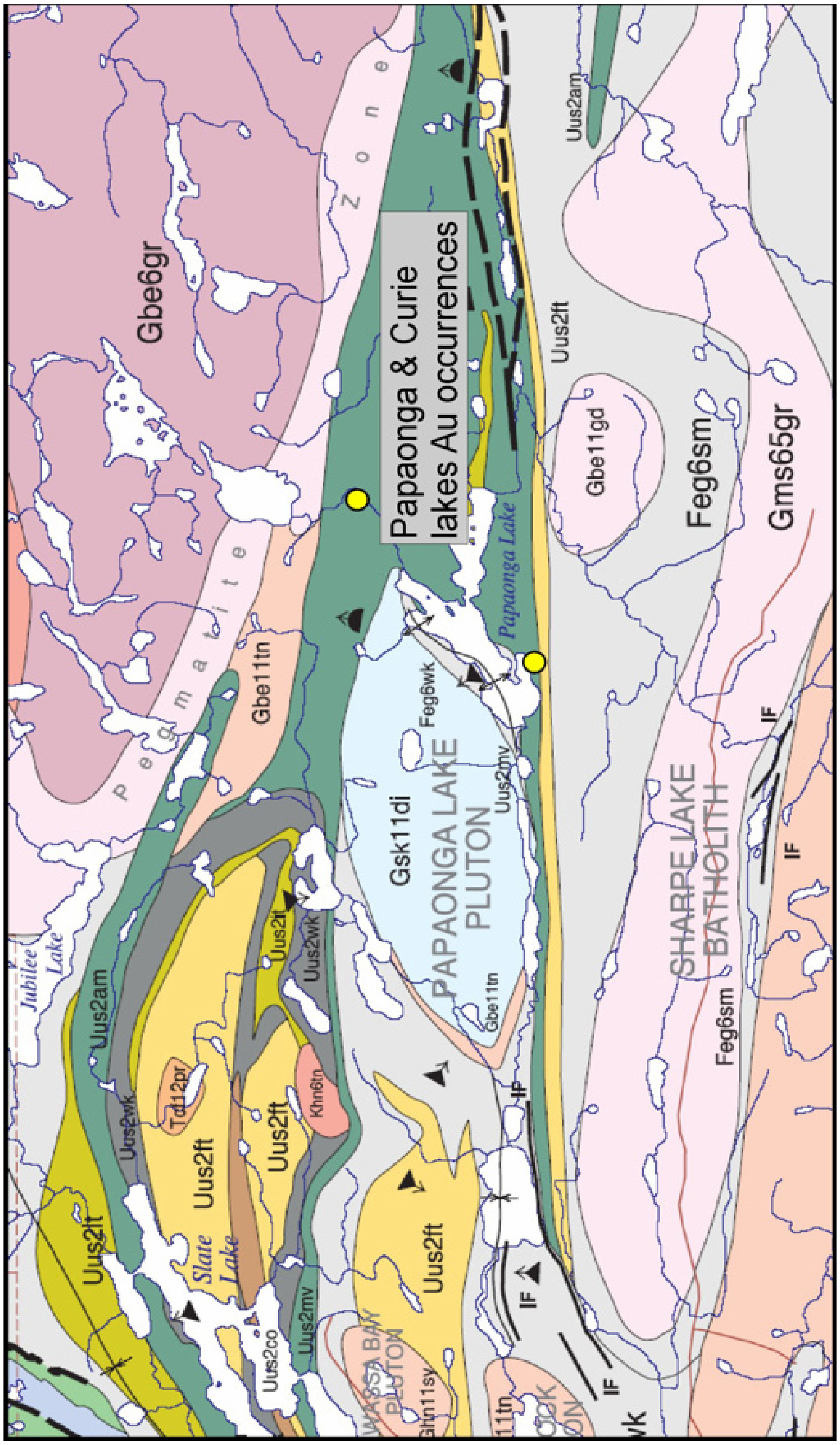

Figure 1. Generalized location of Au occurrences in the Papaonga and Curie Lakes Area. Scale of map approximately 1:170 000.

From Sanborn-Barrie, M., Rogers, N., Skulski, T., Parker, J., MvNicoll, V., and Devaney, J. 2004. Geology and Tectonostratigraphic Assemblages, East Uchi Subprovince, Red Lake and Birch-Uchi belts, Ontario; Geological Survey of Canada, Open File 4256; Ontario Geological Survey, Preliminary Map P.3460.