

**ASSESSMENT REPORT, 2011 STREAM SEDIMENT SAMPLING  
PROGRAM  
NLC PROPERTY**

MAYO MINING DIVISION, YUKON, CANADA  
NTSMAP SHEETS: 105N/08  
UTM-NAD83-Zone 8N-Property Centered-640213E, 7019454N

**Claims and Owners:**

<b>Claim Name</b>	<b>Claim No.</b>	<b>Grant Number</b>	<b>Registered Owner</b>
NLC	1-108	YD86101-208	Golden Predator Canada Corp.

**Total of 108 Claims**

**PERIOD OF WORK: July 23, 2012.**

**OPERATOR:**

**GOLDEN PREDATOR CANADA CORP.**  
1 Lindeman Road  
Whitehorse, Yukon  
Y1A 5Z7

November 14, 2012.

Prepared by:

**Golden Predator Canada Corp.**  
Shane Carlos, B.Sc.

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## 1.0 INTRODUCTION

The NLC quartz claims form a contiguous block covering an area of 2,255.6 hectares, located in the Selwyn Basin in East-Central Yukon. Golden Predator Canada Corp. (Golden Predator) has a 100% undivided interest in the property and is targeting intrusion-related gold systems, and possible skarn and /or Carlin-style gold systems.

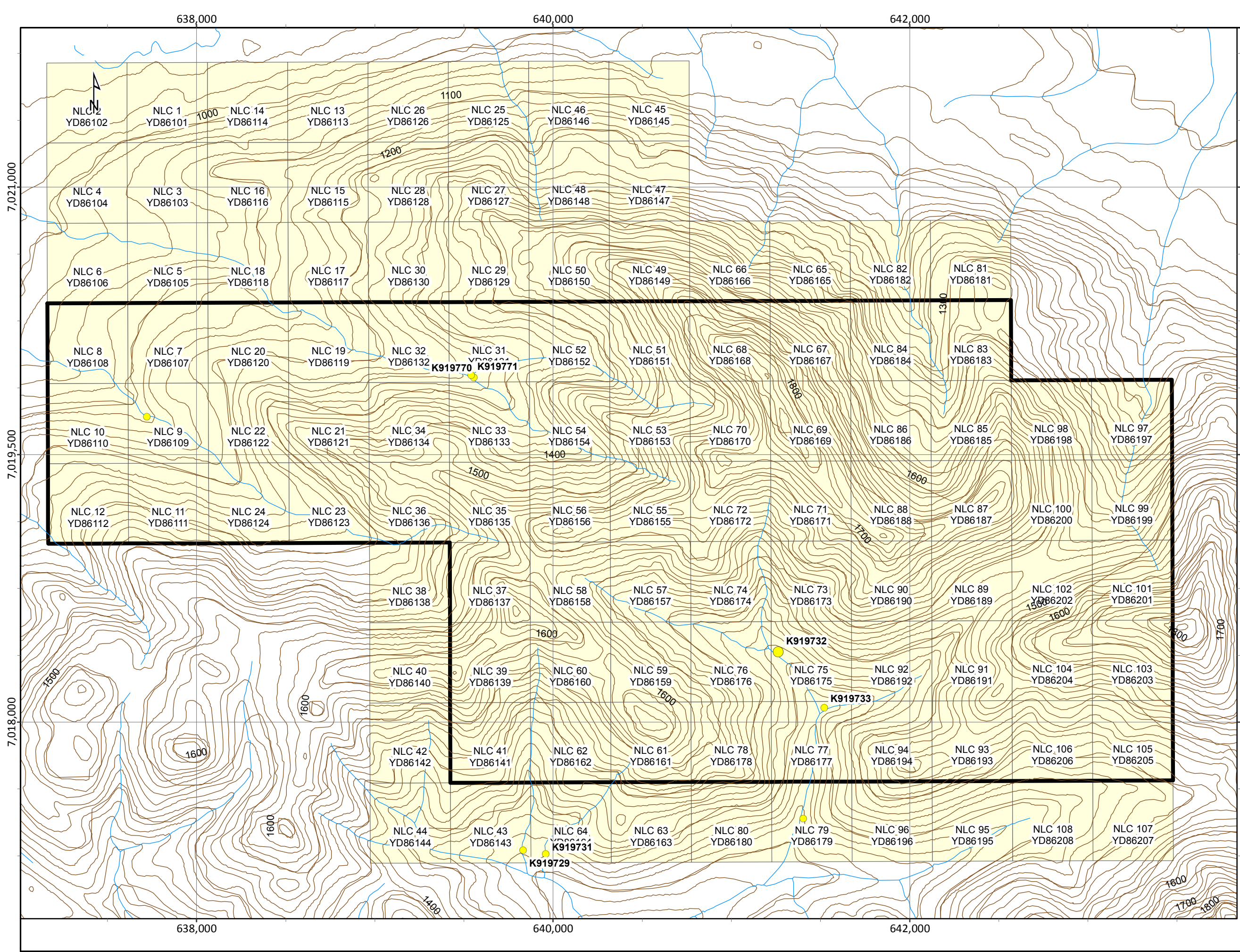
This report describes work completed in the 2011 field season on July 23rd which included stream sediment sampling. The program was designed to follow up on regional government stream geochemical anomalies as a first pass exploration tool to assess the prospective claims.

## 2.0 PROPERTY LOCATION AND DESCRIPTION



Figure 2-1. NLC Property Location, Yukon Territory

The claim group lies in East-Central Yukon, 130 kilometers North-Northeast, of the town of Faro, Yukon, (Figure 2-1). The property consists of 108 quartz claims covering an area of 2,255.6 hectares (Figure 2-2) and is located in the Mayo Mining District. The property can be reached by approximately 70 minutes of helicopter flight from the town of Ross River and the property is about 100 kilometers from the nearest point on the North Canol Road.



**Legend**

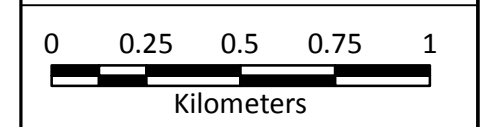
**Au\_2011\_Silts**

**Au\_ppb**

- 0.05 - 16
- 16.01 - 40
- 40.01 - 101
- 101.01 - 410
- ▲ SEL\_Z8\_Rock\_2011207
- Claim Outline (work applied)



**NLC PROPERTY**  
 Claim Map and  
 Sample Locations



Scale:	1:20,000	Map ID:	--
Draw Date:	2012/04/02	Rev. Date:	--
Version:	1	Figure:	2--2
Author:	S. Carlos	Office:	Whitehorse
Location:	130 km NNE of Faro, Yukon Territory		
Projection:	NAD 1983 UTM Zone 8N		
Filename:	NLC_20120417_11x17_ClaimMap		

Table 2-1, below summarizes claim data and lists updated expiry dates dependent upon the acceptance of this report.

**Table 2-1. NLC claim information**

Claim Name	Claim No.	Grant Number	Registered Owner	Requested New Expiry Date
NLC	1-6	YD86101-06	Golden Predator Canada Corp.	2012/07/14
NLC	7-12	YD86107-12	Golden Predator Canada Corp.	<b>2013/10/14</b>
NLC	13-18	YD86113-18	Golden Predator Canada Corp.	2012/07/14
NLC	19-24	YD86119-24	Golden Predator Canada Corp.	<b>2013/10/14</b>
NLC	25-30	YD86125-30	Golden Predator Canada Corp.	2012/07/14
NLC	31-37	YD86131-37	Golden Predator Canada Corp.	<b>2013/10/14</b>
NLC	38	YD86138	Golden Predator Canada Corp.	2012/07/14
NLC	39	YD86139	Golden Predator Canada Corp.	<b>2013/10/14</b>
NLC	40	YD86140	Golden Predator Canada Corp.	2012/07/14
NLC	41	YD86141	Golden Predator Canada Corp.	<b>2013/10/14</b>
NLC	42-50	YD86142-50	Golden Predator Canada Corp.	2012/07/14
NLC	51-62	YD86151-62	Golden Predator Canada Corp.	<b>2013/10/14</b>
NLC	63-66	YD86163-66	Golden Predator Canada Corp.	2012/07/14
NLC	67-78	YD86167-78	Golden Predator Canada Corp.	<b>2013/10/14</b>
NLC	79-82	YD86179-82	Golden Predator Canada Corp.	2012/07/14
NLC	83-106	YD86183-206	Golden Predator Canada Corp.	<b>2013/10/14</b>
NLC	107-108	YD86206-08	Golden Predator Canada Corp.	2012/07/14

### 3.0 INFRASTRUCTURE

The centre of the property is located at 641380E, 7018900N (NAD83, zone 8). The nearest main road is the North Canol located ~100 km to the East with access to the nearest town of Ross River, 174 km Southwest. The road is maintained by the Yukon government in the summer months. There also appears to be a bush road that could possibly be used for getting closer access to the property from the Canol at the ~174 km point from Ross River. The Plata airstrip is also a good base located at 646661E, 7045398N (NAD83Zone8N), being about 25 km North of the center of the NLC property.

## **4.0 EXPLORATION HISTORY**

### **Exploration History of the NLC Property**

The following exploration history of the NLC property has been compiled from the Yukon Energy and Mines and Resources Library and Yukon Geological Survey MINFILE database.

The only historic work in the area that could be determined is from the Yukon government's regional stream sediment sampling program with high of 25 ppb Au from a stream draining the East-North corner of the claims.

## **5.0 GEOLOGY**

### **5.1 Regional Geology**

The property is located in the Selwyn Basin, which is bound on the south by the Tintina Fault (and the Intermontane Superterrane) and bound on the north by the Dawson Thrust Fault and the North American Shelf (Figure 5-1). The Teslin Suture is the zone of deformation between the accreted terrane and the ancient shelf.

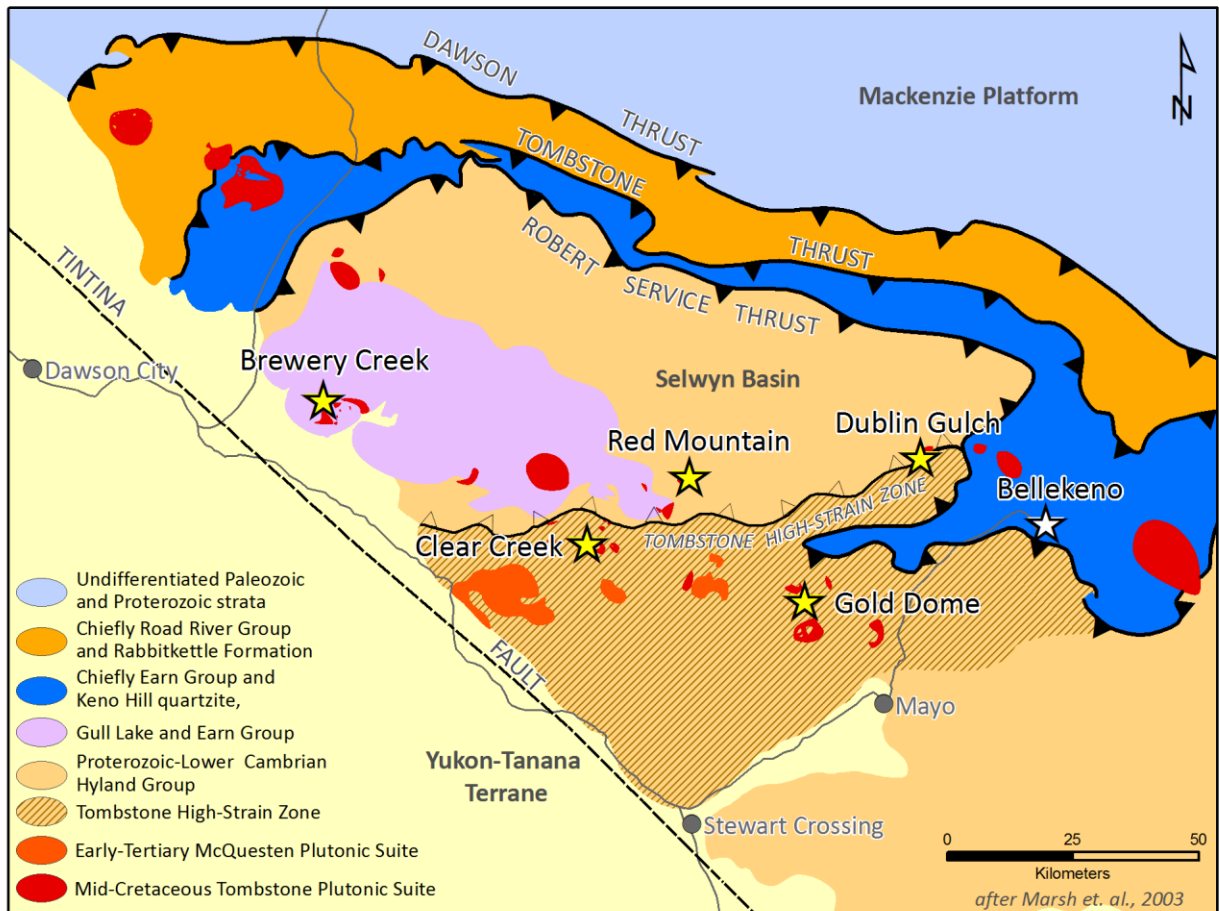
The Selwyn Basin stratigraphy consists of late Proterozoic to Palaeozoic marginal basinal and platformal clastic and pelitic sediments from ancient North America. Various aged volcanic piles are stratabound within the sediments. The basin was subjected to rifting during the Proterozoic and again in the late Devonian. During periods of rifting, contemporaneous magmatic rocks were emplaced as volcanics and as thick sill sequences.

By late Jurassic, the rocks of the Intermontane Belt of the Cordillera collided with the passive margin of the North America Shelf, causing compressive tectonics (Murphy, 1997). This resulted in crustal shortening, tight folding, and failure along hinges. Three regionally stacked thrust panels were formed: the Robert Service, Tombstone and Dawson thrust sheets (from oldest to youngest; Murphy, 1997).

The Selwyn Basin is intruded by northwest-trending post-accretionary plutonic mid-Cretaceous suites including the Tungsten, Mayo and Tombstone. The Tungsten suite (97-94 Ma) consists of granitoids with associated sheelite skarn deposits including Mactung and Cantung. The granitoid Mayo Suite occurs northwest of the Tungsten suite and is associated with the intrusion-related gold systems of Dublin Gulch and Clear Creek. Tombstone plutonic suite (92-90 Ma) lies further to the west and closely to the Tintina Fault (Lang et al., 2000). The Tombstone rocks are more alkalic with monzonites and syenites and are associated with U-Th-REE mineralization and intrusion-related gold deposits (Israel et al., 2011).

Mineralization associated with the mid-Cretaceous plutonic suite intrusions includes veins, skarns, stockworks and breccias within, proximal or distal to the intrusions. The most predominant form of mineralization however, is sheeted quartz veins in the intrusions.

More often than not, more than one style of mineralization will exist proximal to these intrusions (Abbott et al., 1986).

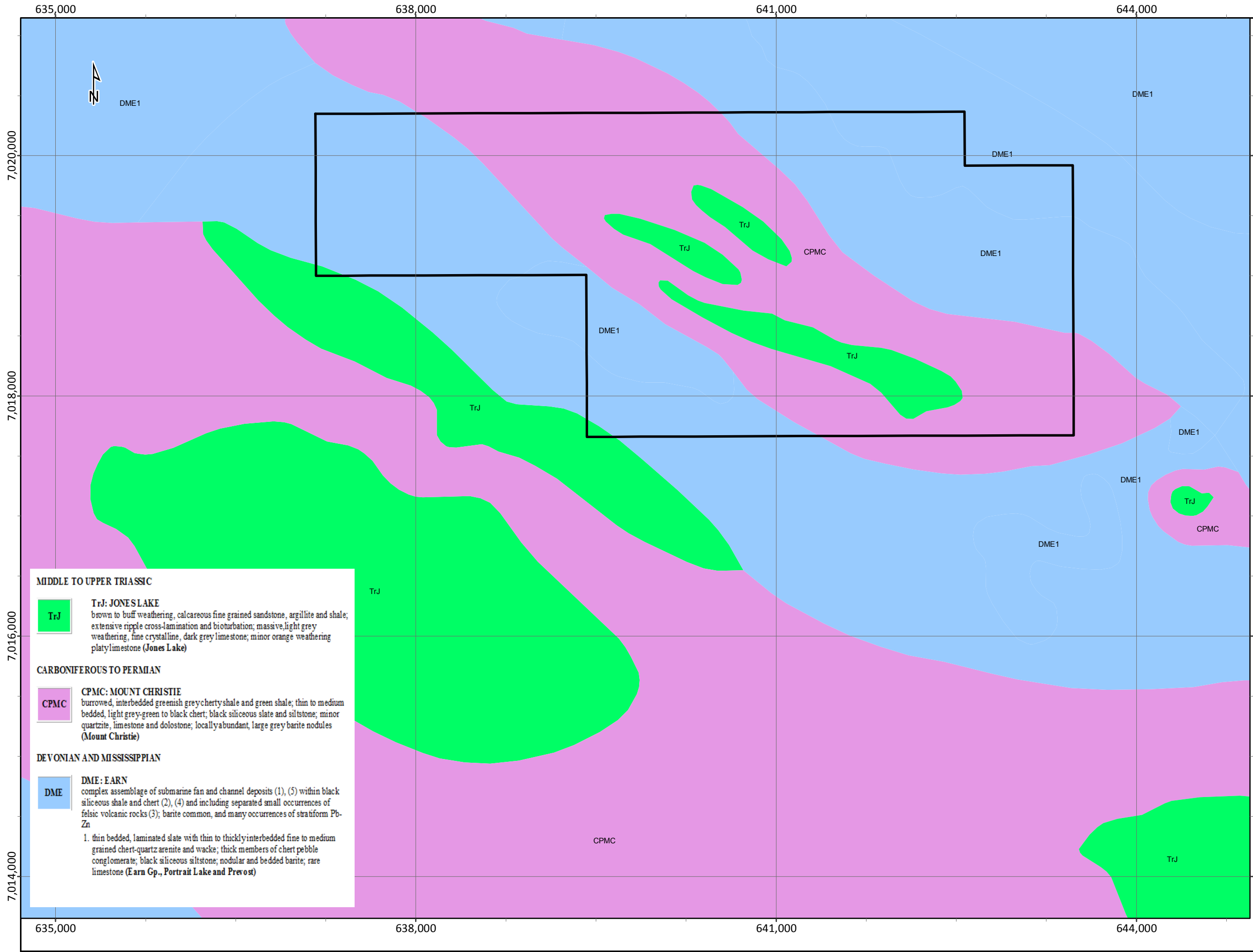


**Figure 5-1. Regional Geology of the Selwyn Basin**

More recently discovered styles of mineralization include Carlin-style gold mineralization in Bouvette Formation shallow water limestone, dolomite, and calcareous siltstone of Cambrian to Devonian age, (sourced from ATAC Resources webpage). This occurrence is found 55km north of the town of Mayo.

## 5.2 Property Geology

The property covers three formations of geological time, including: Triassic aged Jones Lake, Carboniferous to Permian Mount Christie and Devonian to Mississippian Earn Group. Jones Lake includes calcareous sandstone, argillite, shale with extensive ripple cross-laminations and bioturbation, and minor orange weathering platy limestone (Roots et al, 1995). Jones Lake is underlain by Mount Christie which includes: greenish-grey-cherty shale, green shale, black chert, black siliceous slate, and minor quartzite, limestone and

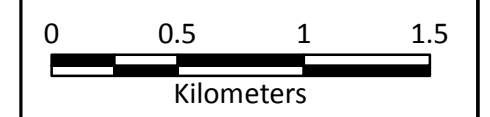


**Legend**

- GPD Property Outline
- Minfile Occurrence



**NLC PROPERTY**  
Local Geology and  
Minfile Occurrence



Scale:	1:30,000	Map ID:	--
Draw Date:	2012/04/02	Rev. Date:	--
Version:	1	Figure:	5--2
Author:	S. Carlos	Office:	Whitehorse
Location:	130 km NNE of Faro, Yukon Territory		
Projection:	NAD 1983 UTM Zone 8N		
Filename:	NLC_20120417_11x17_Geology		

dolostone. Surrounding the previous formations and underlying them (see Fig. 5-2) are the Earn Group sediments, which include laminated slate with interbeds of chert-quartz arenite and wacke, thick beds of chert pebble conglomerate, black siliceous siltstone, nodular to bedded barite and rare limestone (Roots et al, 1995).

### **5.3 Mineralization**

The Tintina Gold Belt is a metallogenic region extending from the Yukon into Alaska which hosts several intrusion-related gold deposits including Dublin Gulch, Brewery Creek and Fort Knox. Gold deposits that are spatially and temporally associated with the mid-Cretaceous plutonic suite intrusions, and in the Yukon, form the Tombstone Gold Belt (Goldfarb et al., 2000).

The Selwyn Basin is also host to world class sedimentary exhalative districts such as the Anvil District, Macmillan Pass and Howards Pass, (Heon, 2003).

No known mineralization on the NLC claims could be found documented.

## **6.0 EXPLORATION**

### **6.1 Exploration Program**

The 2011 sampling program was based out of the Rogue Camp, located at the Plata Air strip on July 23, 2011. Golden Predator collected 9 silt samples from active stream- beds. All the work was helicopter assisted using a NOTAR supplied by Fireweed Helicopters of Whitehorse, YT, with daily flight times averaging about 4.6 hours/day for the program.

### **6.2 Sampling Methodology and Protocols**

#### **Stream Geochemical Program**

Stream sediment samples were collected at intervals of approximately 750 m along first, second and third order streams, and immediately upstream of confluences. Samples were also collected in the vicinity of historical RGS stream anomalies, to test repeatability.

Each sample was collected from several points along the active stream bed to produce a representative composite sample. The uppermost sediment was discarded to avoid spurious high content of Fe and Mn oxide coating. The active silt and fine to medium sand that has been recently transported by the stream was the target sediment. This type of sediment was generally located: 1) in the lee of large boulders or logs; 2) in low energy pools at the tail-end of bars; and 3) infilling voids below the surface of cobble-gravel bars.

Samples were sieved in the field to a fraction of less than one-eighth inch (<1/8" or 3.36 mm) and placed in labelled, double layered plastic sample bags. Each sample site was flagged and photographed. The sample weights varied between 4-12 kg. Large sample sizes were required to obtain sufficient fine material for the selected assay techniques.

If the drainage contained seasonal stream sediment deposition, but was currently dry, a sediment sample was collected by dry sieving the material. Occasionally the south-facing slopes had underground drainage that sporadically comes to surface, in which case sample spacing sometimes varied.

Sample data was recorded on data cards and included the following: geographic location, sample color, angularity of the clasts, sediment composition (percentage of gravel, sand, silt, clay and organics), slope direction, slope angle, stream flow, vegetation type and comments.

Samples were transported by air from Jeff Creek camp to Whitehorse by Alkan Air. Samples were delivered by in-house personnel or insured professional expeditors to ALS Chemex's ISO 9001 certified preparation facility in Whitehorse. Samples were dried and screened to 180 microns (80 mesh).

The pulps were analyzed at ALS Chemex's ISO 9001 certified laboratory in North Vancouver using the ultra-trace ME-MS41 package. A 0.5 g sample is digested by aqua regia techniques and 51 elements are analyzed through a combination of ICP-AES and ICP-MS.

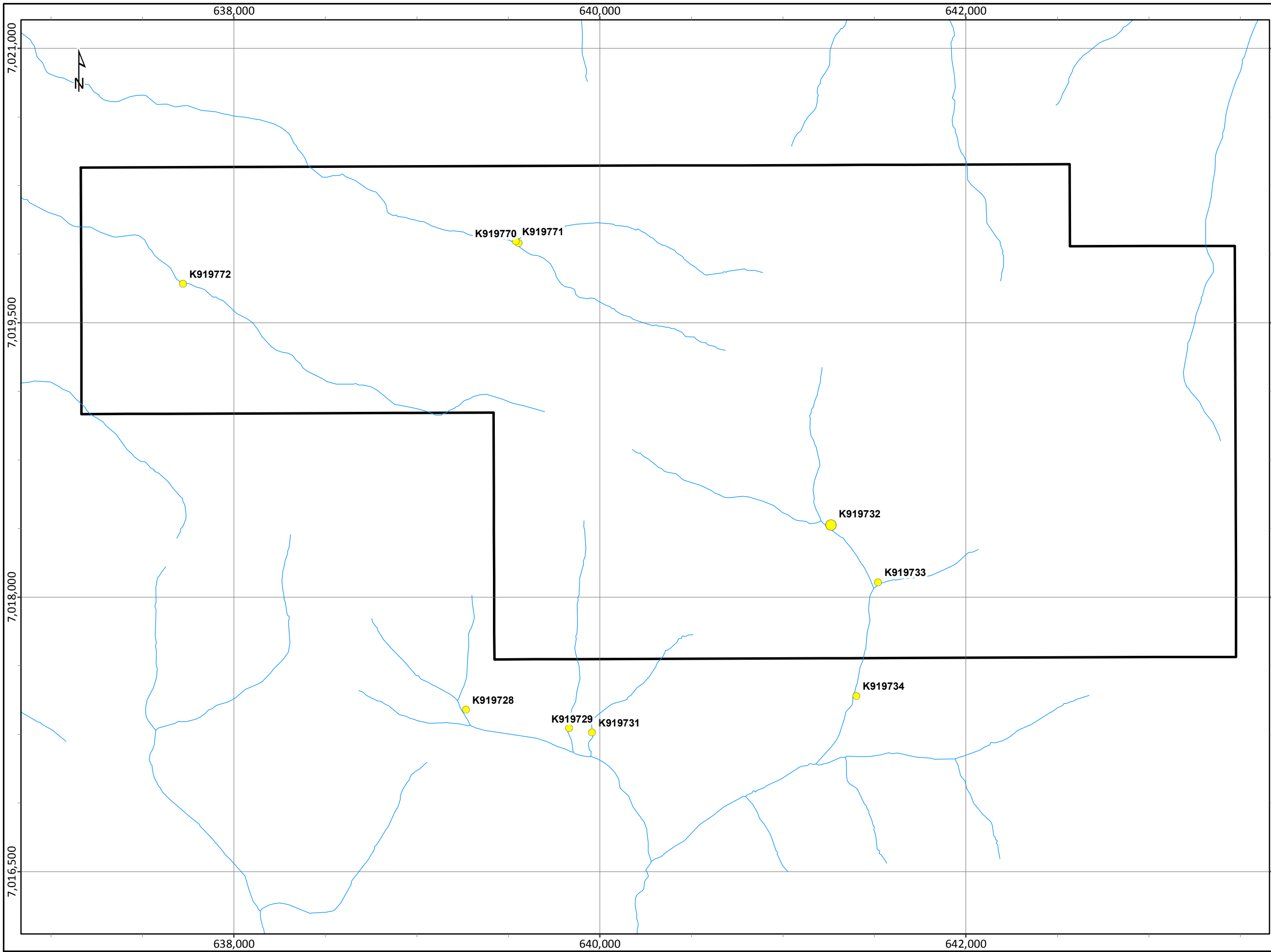
The Au-ST44 method was used to analyze gold using a 50 g sample of <80 micron material. This method provides the lowest possible detection limit for gold of 0.0001 – 0.1 ppm, using aqua regia digestion with analysis by ICP-MS. The larger sample size for the gold analysis is used in an effort to reduce potential nugget effects. Samples exceeding the upper limit of Au detection (0.1 ppm) were re-analyzed using Au-OG44, an ore grade assay technique. A 50 g sample of 180 microns sediment is digested in an aqua regia solution and finished with ICP-MS methods to provide an Au detection range between 0.01 – 100 ppm.

ALS completes quality assurance/ quality control (QA/QC) data verification of their assays through internally inserted duplicates, standards and blanks. In addition, Golden Predator's QA/QC program included the insertion of field duplicates, blanks and standard reference material obtained from CDN Resource Laboratories of Langley, BC. Assay certificates are compiled in Appendix 3 and the detailed methodology and detection limits are in Appendix 4. See Figure 6-1 for sample locations and gold geochemical plots from stream sediment samples collected by Golden Predator in 2011.

## 6.3 Results

### Stream Sediments

Nine stream sediment samples were collected over multiple drainages on the property as shown in Figure 6-1. An anomalous gold value of 38.6 ppb was detected which may be related to a nearby 25 ppb gold in silt from the Yukon Government's regional stream program.

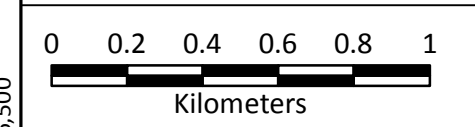


### Legend

- ◊ GPD Property Outline
- Au\_2011\_Silts**
- Au\_ppb**
- 0.05 - 16
- 16.01 - 40
- 40.01 - 101
- 101.01 - 410
- ▲ SEL\_Z8\_Rock\_20111207



**NLC PROPERTY**  
 Sample Location Map  
 and Gold in Silt Plots



Scale:	1:20,000	Map ID:	--
Draw Date:	2012/04/02	Rev. Date:	--
Version:	1	Figure:	6--1
Author:	S. Carlos	Office:	Whitehorse
Location:	130 km NNE of Faro, Yukon Territory		
Projection:	NAD 1983 UTM Zone 8N		
Filename:	NLC_20120417_11x17LandscapeSampleLoc		

## 7.0 CONCLUSIONS AND RECOMMENDATIONS

Traverses up-stream of the 38.6 ppb gold anomaly should be undertaken and along surrounding ridges. Geological mapping, as well as rock sampling could be undertaken, as well as topographic contour soil sampling targeting the valley hosting the gold anomaly.

## 8.0 2011 EXPENDITURES

Expenditures for the 2011 exploration program were \$8,543.10 as summarized in Table 8-1.

**Table 8-1. 2011 Expenditures**

<b>Phase 1 - July 23, 2011</b>				
<b>Expenditure</b>	<b>Units</b>	<b>Unit Cost</b>	<b>Per</b>	<b>Cost</b>
<b>Wages</b>				
Golden Predator Canada Corp.	0.35	\$ 3,750.00	day \$	1,312.50
Management and report writing	1	\$ 500.00	day \$	500.00
<b>Transportation</b>				
Helicopter July 23 (35% of 6.7 hr = 2.4)	2.4	\$ 1,100.00	hour \$	2,640.00
Fuel July 23 (35% of 6.7 hr = 2.4)	2.4	\$ 300.00	hour \$	720.00
<b>Consumables</b>				
Camp, food, fixed wing etc.	0.35	\$ 8,216.00	day \$	2,875.60
<b>Samples</b>				
Stream Sediment Samples	9	\$ 55.00	sample \$	495.00
<b>Total</b>				<b>\$ 8,543.10</b>
<b>Total Number of Samples</b>	<b>9</b>			
<b>Cost Per Sample</b>		<b>\$ 949.23</b>		

## 9.0 STATEMENT OF AUTHORSHIP

This Report titled, “Assessment Report, 2011 Stream Sediment Sampling Program, NLC Property, Mayo Mining Division, Yukon, Canada,” and dated November 14, 2012 was prepared and signed by the following author:

Shane A. Carlos  
 Dated: November 14, 2012  
 Whitehorse, Yukon Territory



## 10.0 REFERENCES

- Abbott, J.G., Gordey, S.P., & Tempelman-Kluit, D.J., 1986. Setting of stratiform, sediment hosted lead-zinc deposits in the Yukon and Northeastern British Columbia; Mineral Deposits of Northern Cordillera, ed. J.A. Morin, The Canadian Institute of Mining and Metallurgy, Special Volume 37, p. 1-18.
- Carlson, G., 1993. Geological and Geochemical Evaluation of the Spot 1 to 34 Claims, Yukon Assessment Report #093069.  
[http://virtua.gov.yk.ca:8080/search/query?term\\_1=093069](http://virtua.gov.yk.ca:8080/search/query?term_1=093069)
- Coates, M.E., 1969. HESS PROJECT. Yukon Assessment Report #019033.  
<http://servlet.gov.yk.ca/ygsmin/index.do>  
<http://servlet.gov.yk.ca/ygsmin/occurrence.do?occurrenceID=105N+012>
- Goldfarb, R., Hart, C., Miller, M., Miller, L., Farmer, G.L., and Groves, D., 2000. The Tintina Gold Belt: A Global Perspective. *In: The Tintina Gold Belt: Concepts, Exploration and Discoveries*, British Columbia and Yukon Chamber of Mines, Special Volume 2. 5-34.
- Gordey, S.P. and A.J. Makepeace (compilers), 2001. Bedrock Geology, Yukon Territory; Geological Survey of Canada. Open File 3754 and Exploration, Exploration and Geological Services Division, Yukon and Northern Affairs Canada, Open File 2001-1, scale 1: 1,000,000.
- Heon, Daniele, 2003. <http://www.geology.gov.yk.ca/metallogeny/selwyn/intro.html>
- Israel, S., Colpron, M. and T. Fraser, 2011. Overview of Yukon Geology.  
[www.geology.gov.yk.ca/pdf/Bedrock\\_Full\\_Overview.pdf](http://www.geology.gov.yk.ca/pdf/Bedrock_Full_Overview.pdf)
- MINFILE: 105O 023. [http://ygsftp.gov.yk.ca/publications/minfile/text\\_files/105O&P/105O023.pdf](http://ygsftp.gov.yk.ca/publications/minfile/text_files/105O&P/105O023.pdf)
- Murphy, D., 1997. Geology of the McQuesten River Region, Northern McQuesten and Mayo Map Area, Yukon Territory (115P/14, 15, 16; 105M/13, 14). Bulletin 6, Exploration and Geological Services Division, Yukon Region, Indian and Northern Affairs Canada.
- Roots, C.F., Abbott, J.G., Cecile, M.P. and Gordey, S.P., 1995. Bedrock geology of Lansing Range map area (105N) east half, Hess Mountains, Yukon. Exploration and Geological Services Division, Yukon, Indian and Northern Affairs Canada, Open File 1995-7(G). Map, scale: 1:125,000.
- Schulze, 1998. Geological and Geochemical Assessemnt Report on the Bach Property.  
Assessment Report #093970

**APPENDIX 1**  
**CERTIFICATE OF AUTHOR**

Shane Allen Carlos  
1 Lindeman Road  
Whitehorse, Yukon Territory  
Canada Y1A 5Z7  
E-mail: [scarlos@goldenpredator.com](mailto:scarlos@goldenpredator.com)

### **Certificate of Author**

I, Shane Allen Carlos of, Whitehorse, Yukon Territory, certify that:

1. I graduated from the University of British Columbia with a Bachelor of Science in Earth and Ocean Sciences, in 2009.
2. I have worked in the mineral exploration business for the last 15 years on diamond drill rigs, as a line cutter, soil sampler, claim staker and core logger, with the last 2 years as a geologist for Golden Predator Canada Corp.

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Shane Allen Carlos

Whitehorse, Yukon Territory

Dated this 14th day of November, 2012

**APPENDIX 2**  
**SUMMARY**  
**STREAM SEDIMENT/ROCK SAMPLE**  
**DESCRIPTIONS**

NLC Sample Descriptions

Stream Sediment Samples

Sample	Au ppb	Claim	2011 Date	GRID	Easting	Northing	Elevation (m)	Angularity	Color	% Gravel	% Sand	% Silt	% Clay	% Organics	Slope Direction	Slope Angle	Stream Flow	Comments
K919770	4.5	NLC	2011_07_23	UTM83-8	639555.3	7019935	1273	SR	BRD	6	3	1			W	2	4	calcite coating rocks, rusty particles in fines
K919771	2.3	NLC	2011_07_23	UTM83-8	639540.2	7019945	1265	SR	GYD	5	5				W	2	4	
K919772	7.2	NLC	2011_07_23	UTM83-8	637721.2	7019713	1103	SR	BR	6	4				NW	2	4	conglomerate subcrop wouth of sample with qtz veining
K919728	1.6	NLC	2011_07_23	UTM83-8	639267.6	7017385	1292	SR	BRD	8	1	1			SE	2	4	metaseds- shale, slate, weakly phyllitic
K919729	2	NLC	2011_07_23	UTM83-8	639831.8	7017282	1224	SR	BRD	7	3				SE	4	5	metaseds
K919731	4.4	NLC	2011_07_23	UTM83-8	639958.1	7017260	1222	SR	BRD	6	3	1			SE	4	5	metaseds
K919732	38.6	NLC	2011_07_23	UTM83-8	641262.7	7018394	1304	SR	BRD	8	2				SE	4	5	metaseds
K919733	2.9	NLC	2011_07_23	UTM83-8	641521.3	7018081	1259	SR	BRD	9	1				SE	4	5	metaseds. Hard to get sample
K919734	3.7	NLC	2011_07_23	UTM83-8	641401.9	7017459	1210	SR	BRD	1	9				SW	3	5	lots of fines. Metaseds, lots of shale. Willows

<p><b>ANGULARITY</b></p> <p>WR well rounded</p> <p>R rounded</p> <p>SR subrounded</p> <p>SA subangular</p> <p>A angular</p>	<p><b>SLOPE ANGLE</b></p> <p>1 flat (&lt;5°)</p> <p>2 gentle (&lt;5° -15°)</p> <p>3 moderate (&lt;15° -25°)</p> <p>4 steep (&gt;25°)</p>	<p><b>STREAM FLOW</b></p> <p>1 dry</p> <p>2 stagnant</p> <p>3 slow</p> <p>4 moderate</p> <p>5 fast</p>	<p><b>SEDIMENT COMP</b></p> <p>must add to 10 or 100%</p> <p>&gt;2mm gravel</p> <p>&gt;0.16mm sand</p>
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**APPENDIX 3**  
**ASSAY CERTIFICATES**

See Data Folder for Secured Assay Certificates

**APPENDIX 4**  
**ANALYTICAL METHODS AND**  
**DETECTION LIMITS**



## Sample Preparation Package

### PREP- 41

#### Standard Preparation: Dry sample and dry- sieve to -180 micron

Sample preparation is the most critical step in the entire laboratory operation. The purpose of preparation is to produce a homogeneous analytical sub-sample that is fully representative of the material submitted to the laboratory.

An entire sample is dried and then dry-sieved using a 180 micron (Tyler 80 mesh) screen. The plus fraction is retained unless disposal is requested. This method is appropriate for soil or sediment samples up to 1 kg in weight.

Method Code	Description
LOG-22	Sample is logged in tracking system and a bar code label is attached.
DRY-22	Low temperature drying of excessively wet samples where the oven temperature is not to exceed 60°C. This method is suitable for more soil and sediment samples that are analyzed for volatile elements.
SCR-41	Sample is dry-sieved to - 180 micron and both the plus and minus fractions are retained.

Revision 02.01  
Feb 22, 2010

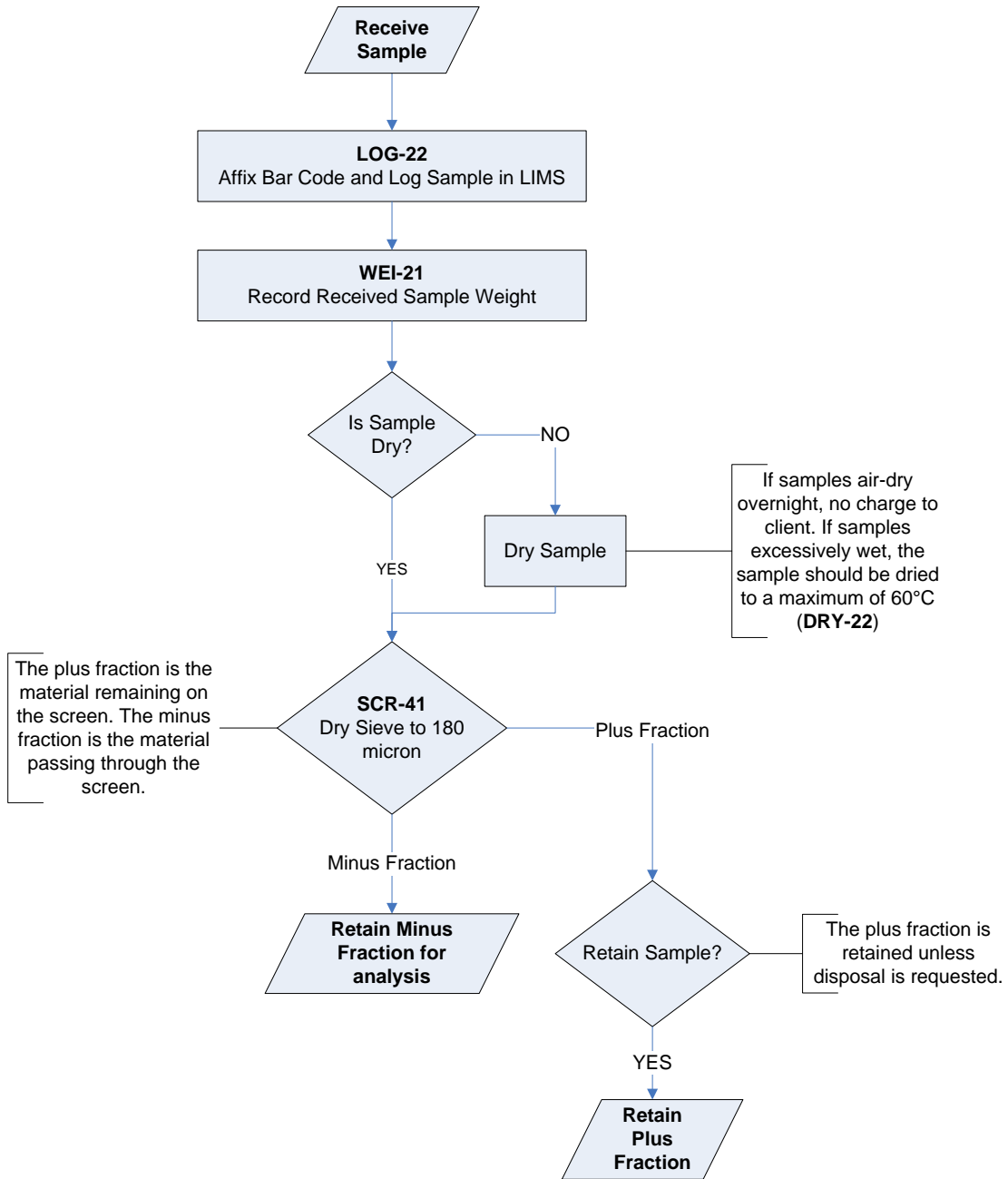
RIGHT SOLUTIONS RIGHT PARTNER

[www.alsglobal.com](http://www.alsglobal.com)



# Sample Preparation Package

## Sample Preparation Flowchart Package -PREP- 41



Revision 02.01  
Feb 22, 2010

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## Geochemical Procedure

### ME- MS41

### Ultra- Trace Level Methods Using ICP- MS and ICP- AES

#### Sample Decomposition:

Aqua Regia Digestion (GEO-AR01)

#### Analytical Method:

Inductively Coupled Plasma-Atomic Emission Spectroscopy (ICP-AES) Inductively Coupled Plasma - Mass Spectrometry (ICP-MS)

A prepared sample (0.50 g) is digested with aqua regia in a graphite heating block. After cooling, the resulting solution is diluted to with deionized water, mixed and analyzed by inductively coupled plasma-atomic emission spectrometry. Following this analysis, the results are reviewed for high concentrations of bismuth, mercury, molybdenum, silver and tungsten and diluted accordingly. Samples are then analysed by ICP-MS for the remaining suite of elements. The analytical results are corrected for inter-element spectral interferences.

Element	Symbol	Units	Lower Limit	Upper Limit
Silver	Ag	ppm	0.01	100
Aluminum	Al	%	0.01	25
Arsenic	As	ppm	0.1	10 000
Gold	Au	ppm	0.2	25
Boron	B	ppm	10	10 000
Barium	Ba	ppm	10	10 000
Beryllium	Be	ppm	0.05	1 000
Bismuth	Bi	ppm	0.01	10 000
Calcium	Ca	%	0.01	25
Cadmium	Cd	ppm	0.01	1 000
Cerium	Ce	ppm	0.02	500
Cobalt	Co	ppm	0.1	10 000
Chromium	Cr	ppm	1	10 000

Revision 04.00  
Sep 20, 2006

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## Geochemical Procedure

Element	Symbol	Units	Lower Limit	Upper Limit
Cesium	Cs	ppm	0.05	500
Copper	Cu	ppm	0.2	10 000
Iron	Fe	%	0.01	50
Gallium	Ga	ppm	0.05	10 000
Germanium	Ge	ppm	0.05	500
Hafnium	Hf	ppm	0.02	500
Mercury	Hg	ppm	0.01	10 000
Indium	In	ppm	0.005	500
Potassium	K	%	0.01	10
Lanthanum	La	ppm	0.2	10 000
Lithium	Li	ppm	0.1	10 000
Magnesium	Mg	%	0.01	25
Manganese	Mn	ppm	5	50 000
Molybdenum	Mo	ppm	0.05	10 000
Sodium	Na	%	0.01	10
Niobium	Nb	ppm	0.05	500
Nickel	Ni	ppm	0.2	10 000
Phosphorus	P	ppm	10	10 000
Lead	Pb	ppm	0.2	10 000
Rubidium	Rb	ppm	0.1	10 000
Rhenium	Re	ppm	0.001	50
Sulphur	S	%	0.01	10
Antimony	Sb	ppm	0.05	10 000
Scandium	Sc	ppm	0.1	10 000
Selenium	Se	ppm	0.2	1 000
Tin	Sn	ppm	0.2	500
Strontium	Sr	ppm	0.2	10 000

Revision 04.00  
Sep 20, 2006

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## Geochemical Procedure

Element	Symbol	Units	Lower Limit	Upper Limit
Tantalum	Ta	ppm	0.01	500
Tellurium	Te	ppm	0.01	500
Thorium	Th	ppm	0.2	10000
Titanium	Ti	%	0.005	10
Thallium	Tl	ppm	0.02	10 000
Uranium	U	ppm	0.05	10 000
Vanadium	V	ppm	1	10 000
Tungsten	W	ppm	0.05	10 000
Yttrium	Y	ppm	0.05	500
Zinc	Zn	ppm	2	10 000
Zirconium	Zr	ppm	0.5	500

**NOTE:** In the majority of geological matrices, data reported from an aqua regia leach should be considered as representing only the leachable portion of the particular analyte.



## Geochemical Procedure

### Au- OG43, Au- OG44

### Determination of Gold by Aqua Regia Digestion / Solvent Extraction - Flame AAS or ICPMS finish

#### Sample Decomposition:

Aqua regia gold digestion (GEO-AuAR01/02)

#### Analytical Method:

Inductively coupled mass spectrometry (ICPMS) or Atomic absorption spectrometry (AAS)

A finely pulverised sample (25 – 50 g) is digested in a mixture of 3 parts hydrochloric acid and 1 part nitric acid (aqua regia). This acid mixture generates nascent chlorine and nitrosyl chloride, which will dissolve free gold and gold compounds such as calaverite (AuTe<sub>2</sub>).

The dissolved gold is complexed and extracted into Aliquat 336/DIBK and determined by Flame AAS. Alternatively gold is determined by ICPMS directly from the digestion liquor. This method allows for the simple and economical addition of extra elements by running the digestion liquor through the ICPAES or ICPMS.

**Note:** Samples high in sulphide or carbon content may lead to low gold recoveries unless they are roasted prior to digestion.

Method	Element	Sample Mass	Units	Lower Limit	Upper Limit
Au-OG43	Gold	25 g	ppm	0.01	100
Au-OG44	Gold	50 g	ppm	0.01	100

Revision 01.01  
Jun 2, 2005

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## Geochemical Procedure

### Au- TL43, Au- TL44 Determination of Trace Level Gold by Solvent Extraction – Graphite furnace AAS or ICPMS finish

#### Sample Decomposition:

Aqua regia gold digestion (GEO-AuAR01/02)

#### Analytical Method:

Inductively coupled mass spectrometry (ICPMS) or Atomic absorption spectrometry (AAS)

A finely pulverised sample (25 – 50 g) is digested in a mixture of 3 parts hydrochloric acid and 1 part nitric acid (aqua regia). This acid mixture generates nascent chlorine and nitrosyl chloride, which will dissolve free gold and gold compounds such as calaverite, AuTe<sub>2</sub>.

The dissolved gold is complexed and extracted either with diisobutyl ketone (DIBK) or Kerosene/DBS and determined by graphite furnace AAS. Alternatively gold is determined by ICPMS directly from the digestion liquor. This method allows for the simple and economical addition of extra elements by running the digestion liquor through the ICPAES or ICPMS.

**Note:** Samples high in sulphide or carbon content may lead to low gold recoveries unless they are roasted prior to digestion.

Method	Element	Sample Mass	Units	Lower Limit	Upper Limit	Default Overlimit Method
Au-TL43m	Gold	25 g	ppm	0.005	2	Au-OG43
Au-TL44m	Gold	50 g	ppm	0.005	2	Au-OG44

Revision 01.00  
Jun 13, 2007

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## Sample Preparation Package

### PREP- 31

### Standard Sample Preparation: Dry, Crush, Split and Pulverize

Sample preparation is the most critical step in the entire laboratory operation. The purpose of preparation is to produce a homogeneous analytical sub-sample that is fully representative of the material submitted to the laboratory.

The sample is logged in the tracking system, weighed, dried and finely crushed to better than 70 % passing a 2 mm (Tyler 9 mesh, US Std. No.10) screen. A split of up to 250 g is taken and pulverized to better than 85 % passing a 75 micron (Tyler 200 mesh, US Std. No. 200) screen. This method is appropriate for rock chip or drill samples.

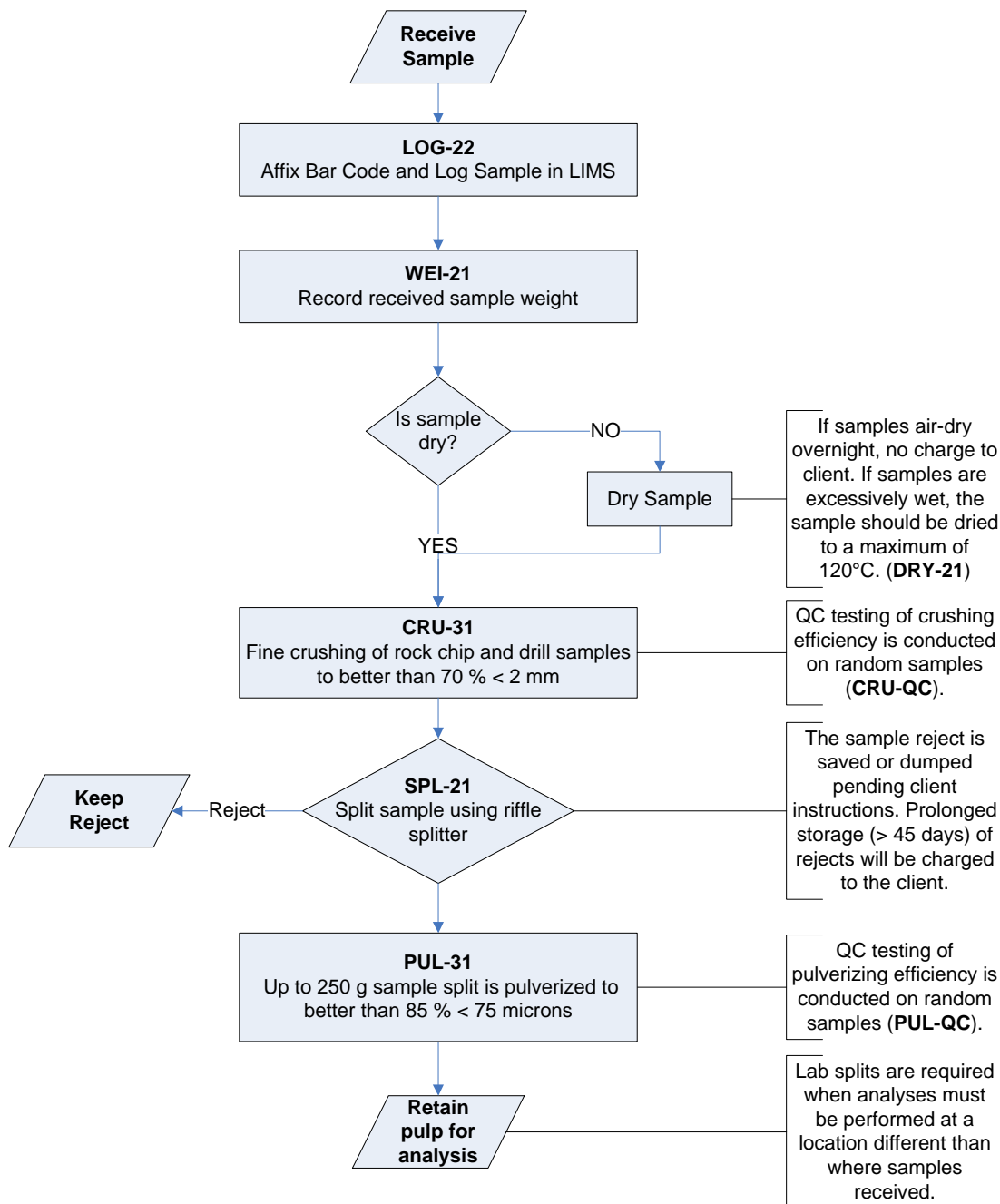
Method Code	Description
LOG-22	Sample is logged in tracking system and a bar code label is attached.
DRY-21	Drying of excessively wet samples in drying ovens. This is the default drying procedure for most rock chip and drill samples.
CRU-31	Fine crushing of rock chip and drill samples to better than 70 % of the sample passing 2 mm.
SPL-21	Split sample using riffle splitter.
PUL-31	A sample split of up to 250 g is pulverized to better than 85 % of the sample passing 75 microns.

Revision 02.03  
Feb 22, 2010



## Sample Preparation Package

### Flow Chart - Sample Preparation Package - PREP- 31 Standard Sample Preparation: Dry, Crush, Split and Pulverize



Revision 02.03  
Feb 22, 2010

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## Geochemical Procedure

### ME- ICP41

### Trace Level Methods Using Conventional ICP- AES Analysis

#### Sample Decomposition:

Nitric Aqua Regia Digestion (GEO-AR01)

#### Analytical Method:

Inductively Coupled Plasma - Atomic Emission Spectroscopy (ICP - AES)

A prepared sample is digested with aqua regia in a graphite heating block. After cooling, the resulting solution is diluted to 12.5 mL with deionized water, mixed and analyzed by inductively coupled plasma-atomic emission spectrometry. The analytical results are corrected for inter-element spectral interferences.

**NOTE:** In the majority of geological matrices, data reported from an aqua regia leach should be considered as representing only the leachable portion of the particular analyte.

Element	Symbol	Units	Lower Limit	Upper Limit	Default Overlimit Method
Silver	Ag	ppm	0.2	100	Ag-OG46
Aluminum	Al	%	0.01	25	
Arsenic	As	ppm	2	10000	
Boron	B	ppm	10	10000	
Barium	Ba	ppm	10	10000	
Beryllium	Be	ppm	0.5	1000	
Bismuth	Bi	ppm	2	10000	
Calcium	Ca	%	0.01	25	
Cadmium	Cd	ppm	0.5	1000	
Cobalt	Co	ppm	1	10000	
Chromium	Cr	ppm	1	10000	

Revision 06.02  
Apr 20, 2009

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## Geochemical Procedure

Element	Symbol	Units	Lower Limit	Upper Limit	Default Overlimit Method
Copper	Cu	ppm	1	10000	Cu-OG46
Iron	Fe	%	0.01	50	
Gallium	Ga	ppm	10	10000	
Mercury	Hg	ppm	1	10000	
Potassium	K	%	0.01	10	
Lanthanum	La	ppm	10	10000	
Magnesium	Mg	%	0.01	25	
Manganese	Mn	ppm	5	50000	
Molybdenum	Mo	ppm	1	10000	
Sodium	Na	%	0.01	10	
Nickel	Ni	ppm	1	10000	
Phosphorus	P	ppm	10	10000	
Lead	Pb	ppm	2	10000	Pb-OG46
Sulfur	S	%	0.01	10	
Antimony	Sb	ppm	2	10000	
Scandium	Sc	ppm	1	10000	
Strontium	Sr	ppm	1	10000	
Thorium	Th	ppm	20	10000	
Titanium	Ti	%	0.01	10	
Thallium	Tl	ppm	10	10000	
Uranium	U	ppm	10	10000	
Vanadium	V	ppm	1	10000	
Tungsten	W	ppm	10	10000	
Zinc	Zn	ppm	2	10000	Zn-OG46

Revision 06.02  
Apr 20, 2009

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## Geochemical Procedure

Elements listed  
below are available upon request

Element	Symbol	Units	Lower Limit	Upper Limit	Default Overlimit Method
Cerium	Ce	ppm	10	10000	
Hafnium	Hf	ppm	10	10000	
Indium	In	ppm	10	10000	
Lithium	Li	ppm	10	10000	
Niobium	Nb	ppm	10	10000	
Rubidium	Rb	ppm	10	10000	
Selenium	Se	ppm	10	10000	
Silicon	Si	ppm	10	10000	
Tin	Sn	ppm	10	10000	
Tantalum	Ta	ppm	10	10000	
Tellurium	Te	ppm	10	10000	
Yttrium	Y	ppm	10	10000	
Zirconium	Zr	ppm	5	10000	

Revision 06.02  
Apr 20, 2009

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## Fire Assay Procedure

### Au- AA23 & Au- AA24 Fire Assay Fusion, AAS Finish

#### Sample Decomposition:

Fire Assay Fusion (FA-FUS01 & FA-FUS02)

#### Analytical Method:

Atomic Absorption Spectroscopy (AAS)

A prepared sample is fused with a mixture of lead oxide, sodium carbonate, borax, silica and other reagents as required, inquarted with 6 mg of gold-free silver and then cupelled to yield a precious metal bead.

The bead is digested in 0.5 mL dilute nitric acid in the microwave oven, 0.5 mL concentrated hydrochloric acid is then added and the bead is further digested in the microwave at a lower power setting. The digested solution is cooled, diluted to a total volume of 4 mL with de-mineralized water, and analyzed by atomic absorption spectroscopy against matrix-matched standards.

Method Code	Element	Symbol	Units	Sample Weight (g)	Lower Limit	Upper Limit	Default Overlimit Method
Au-AA23	Gold	Au	ppm	30	0.005	10.0	Au- GRA21
Au-AA24	Gold	Au	ppm	50	0.005	10.0	Au- GRA22

Revision 04.00  
Aug 17, 2005

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## Fire Assay Procedure

### Ag-GRA21, Ag-GRA22, Au-GRA21 and Au-GRA22 Precious Metals Gravimetric Analysis Methods

#### Sample Decomposition:

Fire Assay Fusion (FA-FUSAG1, FA-FUSAG2, FA-FUSGV1 and FA-FUSGV2)

#### Analytical Method:

Gravimetric

A prepared sample is fused with a mixture of lead oxide, sodium carbonate, borax, silica and other reagents in order to produce a lead button. The lead button containing the precious metals is cupelled to remove the lead. The remaining gold and silver bead is parted in dilute nitric acid, annealed and weighed as gold. Silver, if requested, is then determined by the difference in weights.

Method Code	Element	Symbol	Units	Sample Weight (g)	Detection Limit	Upper Limit
Ag-GRA21	Silver	Ag	ppm	30	5	10,000
Ag-GRA22	Silver	Ag	ppm	50	5	10,000
Au-GRA21	Gold	Au	ppm	30	0.05	1000
Au-GRA22	Gold	Au	ppm	50	0.05	1000

Revision 03.01  
Aug 17, 2005

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