

**Ministry of Energy & Mines**  
Energy & Minerals Division  
Geological Survey Branch

**ASSESSMENT REPORT  
TITLE PAGE AND SUMMARY**

TITLE OF REPORT [type of survey(s)]	TOTAL COST
Assessmnt Rpt on the Airborne Magnetic and Spectrometric Survey, Mammoth Property, BC	\$26,205.05

AUTHOR(S) Agnes Koffyberg, P.Geo. SIGNATURE(S) \_\_\_\_\_

NOTICE OF WORK PERMIT NUMBER(S)/DATE(S) N/A YEAR OF WORK 2009

STATEMENT OF WORK - CASH PAYMENT EVENT NUMBER(S)/DATE(S) 4397468 (2009/Nov/09)

PROPERTY NAME Mammoth Property

CLAIM NAME(S) (on which work was done) Big Showing (390111), Mammoth (390112), Scout (405424), Ruby Silver (519121)

COMMODITIES SOUGHT Silver, Lead, Zinc

MINERAL INVENTORY MINFILE NUMBER(S), IF KNOWN 082KNW077, 082KNW078

MINING DIVISION Revelstoke NTS BCGS 082K.082 & 083

LATITUDE 50 ° 52 ' 14 " LONGITUDE 117 ° 34 ' 27 " (at centre of work)

OWNER(S)

1) Silver Phoenix Resources Inc. 2) \_\_\_\_\_

MAILING ADDRESS

Box 134

Canoe, BC V0E 1K0

OPERATOR(S) [who paid for the work]

1) Silver Phoenix Resources Inc. 2) \_\_\_\_\_

MAILING ADDRESS

Box 134

Canoe, BC V0E 1K0

PROPERTY GEOLOGY KEYWORDS (lithology, age, stratigraphy, structure, alteration, mineralization, size and attitude):

Kootenay Arc, early Paleozoic, Lardeau Group, Index Formation, isoclinal folding, phyllite, siliceous marble, galena, sphalerite, tetrahedrite

REFERENCES TO PREVIOUS ASSESSMENT WORK AND ASSESSMENT REPORT NUMBERS 7996, 15372, 17978, 19288, 27941, 28871, 29602

TYPE OF WORK IN THIS REPORT	EXTENT OF WORK (IN METRIC UNITS)	ON WHICH CLAIMS	PROJECT COSTS APPORTIONED (incl. support)
<b>GEOLOGICAL (scale, area)</b>			
Ground, mapping _____			
Photo interpretation _____			
<b>GEOPHYSICAL (line-kilometres)</b>			
Ground			
Magnetic _____			
Electromagnetic _____			
Induced Polarization _____			
Radiometric _____			
Seismic _____			
Other _____			
Airborne _____	348 line-km	390111, 390112, 405424, 529121	26,205.05
<b>GEOCHEMICAL</b> (number of samples analysed for ...)			
Soil _____			
Silt _____			
Rock _____			
Other _____			
<b>DRILLING</b> (total metres; number of holes, size)			
Core _____			
Non-core _____			
<b>RELATED TECHNICAL</b>			
Sampling/assaying _____			
Petrographic _____			
Mineralographic _____			
Metallurgic _____			
<b>PROSPECTING (scale, area) _____</b>			
<b>PREPARATORY/PHYSICAL</b>			
Line/grid (kilometres) _____			
Topographic/Photogrammetric (scale, area) _____			
Legal surveys (scale, area) _____			
Road, local access (kilometres)/trail _____			
Trench (metres) _____			
Underground dev. (metres) _____			
Other _____			
<b>TOTAL COST</b>			<b>26,205.05</b>

ASSESSMENT REPORT  
on the  
Airborne Magnetic and Spectrometric Survey

BC Geological Survey  
Assessment Report  
31315

MAMMOTH PROPERTY  
REVELSTOKE MINING DIVISION, BC  
BCGS 82K.082, 083

Exploration on claims: 529121, 390112, 390111, 405424

Work filed on: 529121, 390112, 390111, 405424

NTS:	082K/13
LATITUDE:	50° 52 ' 14" N
LONGITUDE:	117° 34' 27" W
OWNER:	Silver Phoenix Resources Inc.
OPERATOR:	Silver Phoenix Resources Inc.
CONSULTANT:	Discovery Consultants
AUTHOR:	A. Koffyberg, PGeo
DATE:	June 28, 2010

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### Plan Maps within the Geophysical Survey Report

Total Magnetic Field.....	in pocket
Preliminary Total Count.....	in pocket
Preliminary Potassium.....	in pocket
Preliminary Uranium.....	in pocket
Preliminary Thorium.....	in pocket

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## 1.0 SUMMARY

An airborne magnetic and spectrometric geophysical survey was flown over the Mammoth Property ("Property"). The airborne survey work was contracted to Precision GeoSurveys Inc. of Vancouver, BC. Silver Phoenix Resources ("Silver Phoenix"), which owns the Property, funded the survey. In total, 108 line-km were flown over the Property. The work was performed from June 5 to June 10, 2009.

The Property is situated within the Badshot Range of the Selkirk Mountains, and is located approximately 50 km southeast of Revelstoke. Access to the general area of the Property and all of the showings are best accessed via helicopter from Revelstoke.

Geologically, the Property lies within the Kootenay Arc, which in this area consists of early Paleozoic rocks of the Hamill, Lardeau Groups and the Badshot Formation. The Kootenay Arc hosts many past producing mines (Reeves-McDonald, HB, Jersey) and many lead-zinc-silver occurrences and is of regional metallogenic significance.

Within the Property are rocks belonging to the Index formation, which is the lowest and most extensive unit in the Lardeau Group. It consists of a thick sequence of grey, green and black phyllite, limestone and thick calcareous phyllite, tuff, tuffaceous greywacke, pillow basalt and rare quartzite and gritty sandstone.

The airborne survey results have been plotted by Precision GeoSurveys. The survey covers the majority of the Property and includes the Big Showing, Mammoth and Scout showings. Lines were flown at an average elevation of 90 m vertically above the terrain surface, due to the steep and rugged topography of the area that was surveyed.

The overall magnetic trend is oriented in a northwest-southeast direction. This reflects the general trend of the sedimentary rock units in this area. Total magnetic relief throughout the Property is low, with a maximum difference between high and low values of 34 nanoTeslas (nT). This low relief appears to reflect slight differences among various sedimentary rock units. No significant airborne magnetic or radiometric anomalies are present on the Property.

## 2.0 INTRODUCTION

This assessment report ("Report") was prepared at the request of William Murray, president of Silver Phoenix. The Report describes the results of an airborne magnetic and spectrometric geophysical survey over the Property. The work took place from June 5 to June 10, 2009.

## 3.0 LOCATION AND ACCESS

The Property is centred at latitude 50° 52' 14" N and longitude 117° 34' 27" W, which is physiographically located within the Badshot Range of the Selkirk Mountains in south-central British Columbia (Figure 1).

The Property is located 20 km northeast of the community of Beaton, on Upper Arrow Lake, and 50 km southeast of the town of Revelstoke.

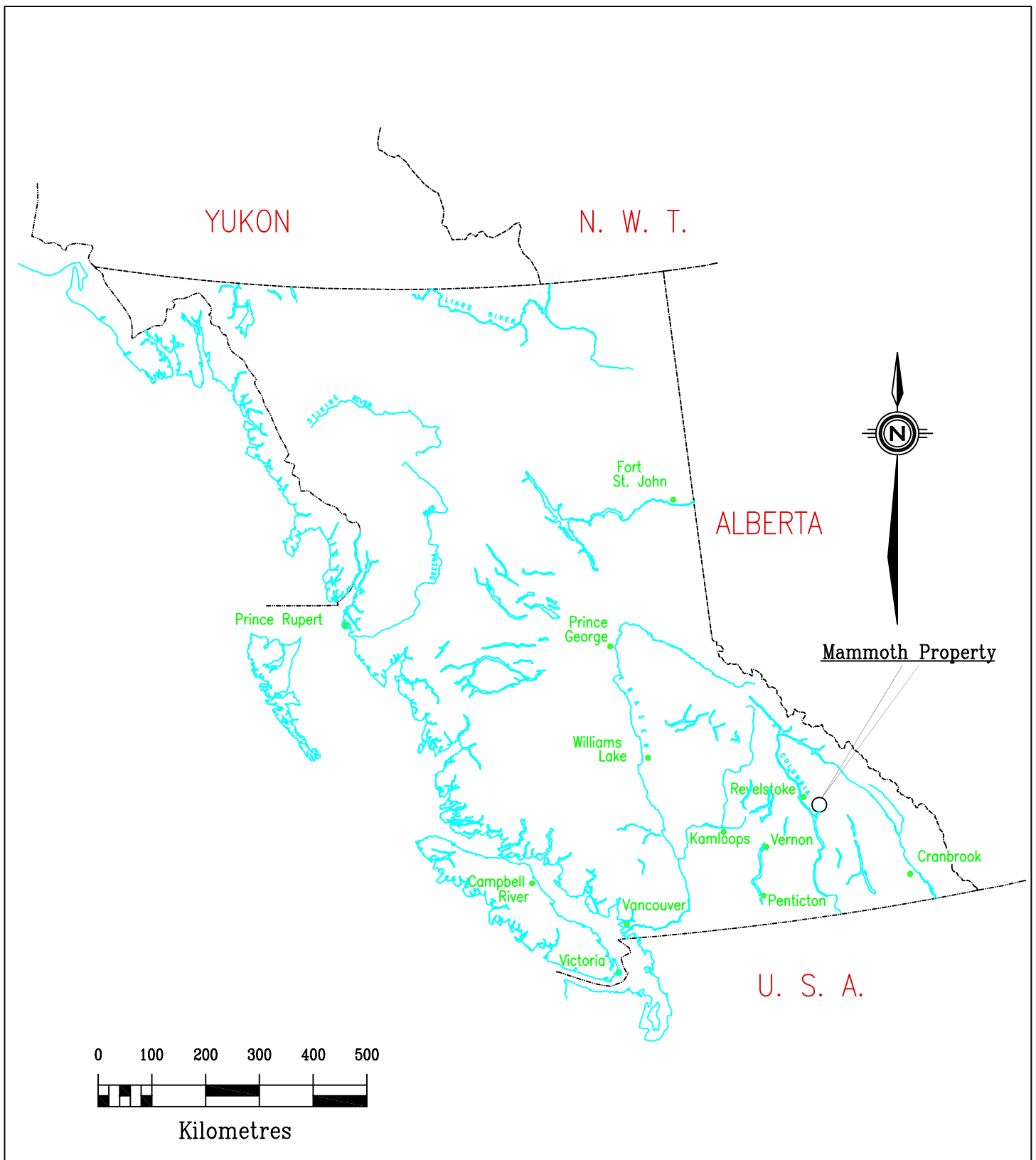
Access to the Property can be gained from Revelstoke south via Highway 23, then across the lake on the Galena Bay Ferry, then by 28 km on an all weather gravel road (Bradley Creek Rd). The Mammoth Showing and the Big Showing are located on the ridge of Goldsmith Mountain, south of the logging road, and are best accessed using a helicopter from Revelstoke. Alternatively, a steep trail leads up the side of the mountain for about 1,070 m, and then drops about 150 m to the Big Showing.


## 4.0 TOPOGRAPHY

The Property straddles the northern ridge of Goldsmith Mountain, which is southeast of the confluence of the Incommappleux River and Boyd Creek. Elevations within the Property range from 600 metres in the lower areas to 2,179 metres at the uppermost part of the ridge. Topography within the Property is steep to extremely rugged, consisting of mountain ridges, cirques and sheer rock walls. Drainage on the property is via numerous creeks including the Ruby Silver Creek and the Kid Creek. These creeks all eventually flow into the Incommappleux River, which drains southwest into Upper Arrow Lake.

Lower parts of the Property are covered by a moderate to thick mantle of glacial till. Much of the evergreen forests in the lower areas have been clear cut and replanted. The higher elevations extend beyond the tree-line and consist of 100 m cliffs and ridges.

Rock exposure is good; however, the rugged and steep terrain requires extreme caution and alpine mountain climbing experience.



 Discovery Consultants		Silver Phoenix Resources Inc.	
Mammoth Property		Property Location	
Date: June 17, 2010	Project: 809	Scale: 1:10,000,000	N.T.S.: B.C. Mining Div: Revelstoke Figure: 1



## 5.0 PROPERTY DESCRIPTION

The Property consists of four Mineral Title Online claims, which are recorded in the name of Silver Phoenix Resources. Figure 2 shows the location of the Property. Table 1 lists the details of the claim tenure.

Table 1: Tenure Description

Tenure Name	Tenure Number	Area (ha)	Registered Owner	Good to Date**
Big Showing	390111*	500.00	Silver Phoenix Resources Inc.	2013/mar/05
Mammoth	390112*	300.00	Silver Phoenix Resources Inc.	2013/mar/05
Scout	405424*	200.00	Silver Phoenix Resources Inc.	2013/mar/05
Ruby Silver	529121*	285.52	Silver Phoenix Resources Inc.	2013/mar/05
	Total:	1285.52		

\* Claim on which work was done

\*\* Good to date is dependent on the acceptance of this report

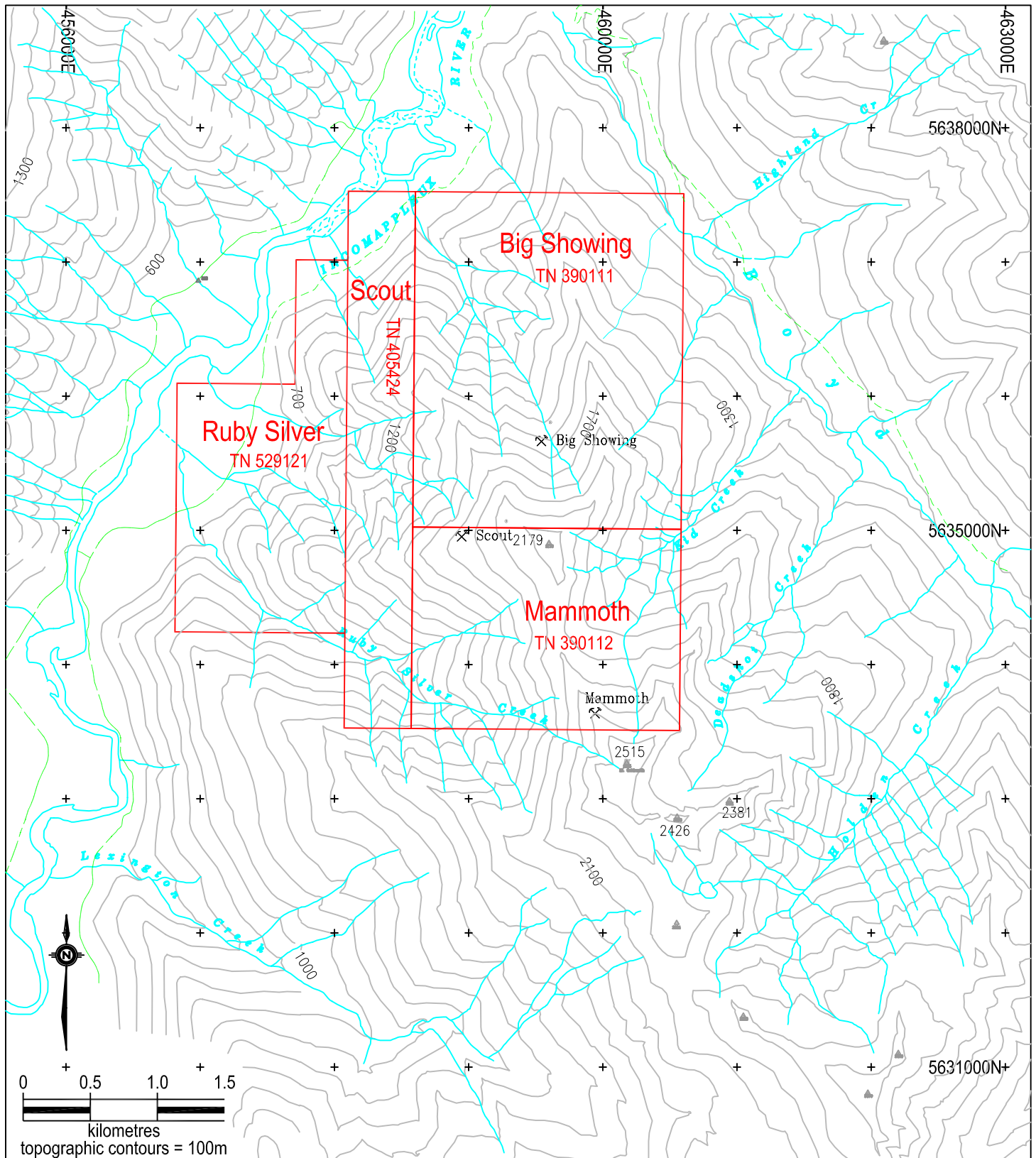
## 6.0 EXPLORATION HISTORY

Initial work in the area occurred with the discovery in 1903 of high grade silver-lead mineralization at the Mammoth Showing. From 1905 to 1907, it produced 765 tonnes of hand-sorted ore that yielded 249 grams of gold, 484 kilograms of silver, 23 tonnes of lead and 1.95 tonnes of zinc (Minfile). The Consolidated Mining and Smelting Company optioned the property in 1913. By the 1920s, an adit had been driven at the Mammoth at an elevation of 2,340 m. It was 180 m long towards the southeast with numerous crosscuts along the ridge.

Similarly, the Big Showing was discovered in 1906, and 64 m of adit and crosscuts were completed in 1914 over a strike length of 90 m.

The Scout Showing was also discovered and worked on in the early 1900s. Work prior to 1941 consisted of an upper 56 metre adit and a lower 2 to 3 m adit.

The three showings were consolidated into one property and staked in 1973 by the Leask Syndicate, and again in 1979. Exploration in 1979 consisted of detailed prospecting and mapping (at that time, the Big Showing was named the Ruby Silver Showing). Work in the 1980s by various companies consisted of geochemical soil and rock sampling, and geological mapping. New Campbell Island Mines Limited optioned the Property from Summer 90 Resources Ltd in 1984, and from 1984-86 carried out geological mapping, geochemical surveys and property evaluations.



DISCOVERY Consultants		Silver Phoenix Resources Inc.	
Mammoth Property		Claim Locations	
Date: June 17, 2010	Project: 809	Scale: 1:40000	N.T.S.: 082K.083,082
		Mining Div: Revelstoke B.C.	Figure: 2

Estimates by H.A. Simmons (International Limited) and W.J. Olsson and Associates in 1986, presumably on the Big Showing, yielded "indicated reserves" estimated at 217,620 tonnes grading 754 g/t silver, and "inferred reserves" of 398,883 tonnes grading 480 g/t silver. These "reserves" are non NI 43-101 compliant and should not be relied upon.

W. Murray obtained the claims for Silver Phoenix Resources in 2002. Geological mapping and rock sampling was conducted on the Mammoth and the Scout Showing in 2005 (Turner, 2007). In 2007, a geological survey program was carried out on the Big Showing by R.I. Thompson, who prospected and collected rock samples in and around the Big Showing. A new showing, termed the Gossan Showing was discovered, with a grab sample returning 6.4 g/t silver and >1% lead (Thompson, 2008, Koffyberg, 2008).

## 7.0 GEOLOGY

### 7.1 Regional Geology

The Property is located in the Kootenay Arc of the Omineca Belt, a concave arcuate, north-south-trending fold belt of Paleozoic to Mesozoic sedimentary, volcanic and metamorphic rocks and traceable for about 400 km from Revelstoke, south along Kootenay Lake to Washington State. The Kootenay Arc is host to several past producing mines (Jersey, HB, Reeves-MacDonald), and many base-metal and precious-metal occurrences. To the west of the Kootenay Arc are the Shuswap and Monashee metamorphic complexes. The Windermere-Purcell anticlinorium lies to the east.

The Kootenay Arc succession in the region of the Property comprises three main terranes: the early Paleozoic pericratonic Kootenay terrane consisting of the Hamill and Lardeau Groups, and the Badshot Formation; the accreted late Paleozoic and early Mesozoic Slide Mountain terrane, comprising the Milford and Kaslo Groups; and the Mesozoic Quesnel terrane, comprising the Kaslo and Rosslund volcanic rocks and the Slokan argillites.

The stratigraphic succession is cut by several batholiths and stocks of Jurassic, Cretaceous and Tertiary ages. The Kuskanax and Nelson batholiths are the largest intrusions and are predominately of granite and granodiorite composition. The Battle Range pluton of Cretaceous age is of local importance.

The Lardeau Group consists of six conformable units named the Index, Triune, Ajax, Sharon Creek, Jowett and Broadview Formations. The Index Formation is the lowest and most extensive unit in the Lardeau Group. It consists of a thick sequence of grey, green and black

phyllite, limestone and thick calcareous phyllite, tuff, tuffaceous greywacke, pillow basalt and rare quartzite and gritty sandstone.

The Index Formation is overlain by the Triune, Ajax and Sharon Creek Formations, which comprise an assemblage of black siliceous argillite, grey quartzite and black siliceous argillite respectively. These rocks are overlain by volcanic breccias and pillow lavas of the Jowett Formation. The rocks are intercalated with the overlying greywackes, slates and phyllites of the Broadview Formation.

The Lardeau Group underwent folding and deformation in Devonian to Mid-Mississippian time.

Structurally, the Lardeau shear zone at Boyd Creek marks the boundary between the Lardeau Group and the older Badshot Formation and Hamill Group to the east. This likely coincides with the deformation of the Lardeau Group. Further deformation occurred through late Jurassic, producing large isoclinal folds within the rocks of the Index Formation.

The second prominent structural feature is the Columbia River Fault zone to the west of the Property. It is a 250-km long linear detachment zone trending north-south along the Columbia River. It separates the ductilely-deformed gneisses of the Monashee-Shuswap complex to the west from the Lardeau, Milford and Hamill Groups and related intrusions on the east. The fault dips gently to the east and truncates the major folds and metamorphic zones that had developed in the mid-Jurassic.

Figure 3 shows the regional geology of the Property.

## 7.2 Property Geology

The Property is situated within the Index Formation of the Lower Paleozoic Lardeau Group. The rocks consist of green to tan, thinly layered phyllite with numerous quartz veins deformed within isoclinal folds. The phyllite is interbedded with calcite and siliceous marble units and phyllitic marble units. In addition to the phyllite are various units consisting of siliceous marble, marble and iron-rich marble. Within the Property are three main showings: The Big, Mammoth and Scout showings.

The Big Showing consists of two zones of galena, sphalerite and pyrrhotite mineralization, a lower 3 m wide zone (1,400 - 1,430 m elevation) and an upper 9 m zone (1,460 – 1,490 m elevation) which lies within the hinge zone of a parasitic anticlinal fold (Leask, 1980). The

showing consists of veins, mineral aggregates and disseminations within a siliceous, iron-rich marble horizon (Thompson, 2007).

The Mammoth Showing lies 2.2 km south of the Big Showing at a higher elevation of 2,240 - 2,600 m. Several zones of galena, sphalerite, tetrahedrite and argentite occur within fractures of the carbonate unit within 33 m of the Scout fault.

The Scott Showing, at an elevation of approx 1,840 m and 1 km southwest from the Big Showing, consists of galena, sphalerite and pyrite within silicified carbonates. Structurally it occurs within a hinge zone of an isoclinal fold (Leask, 1980).

The geology of the property was mapped by J. Leask (1980) and is shown on Figure 4.

## 8.0 WORK PROGRAM

The helicopter-borne gamma-ray spectrometric and magnetic survey was carried out by Precision GeoSurveys Inc. of Vancouver, BC. The work was performed from June 5 to June 10, 2009. The report, which includes five geophysical maps in plan view, is given in the Appendix.

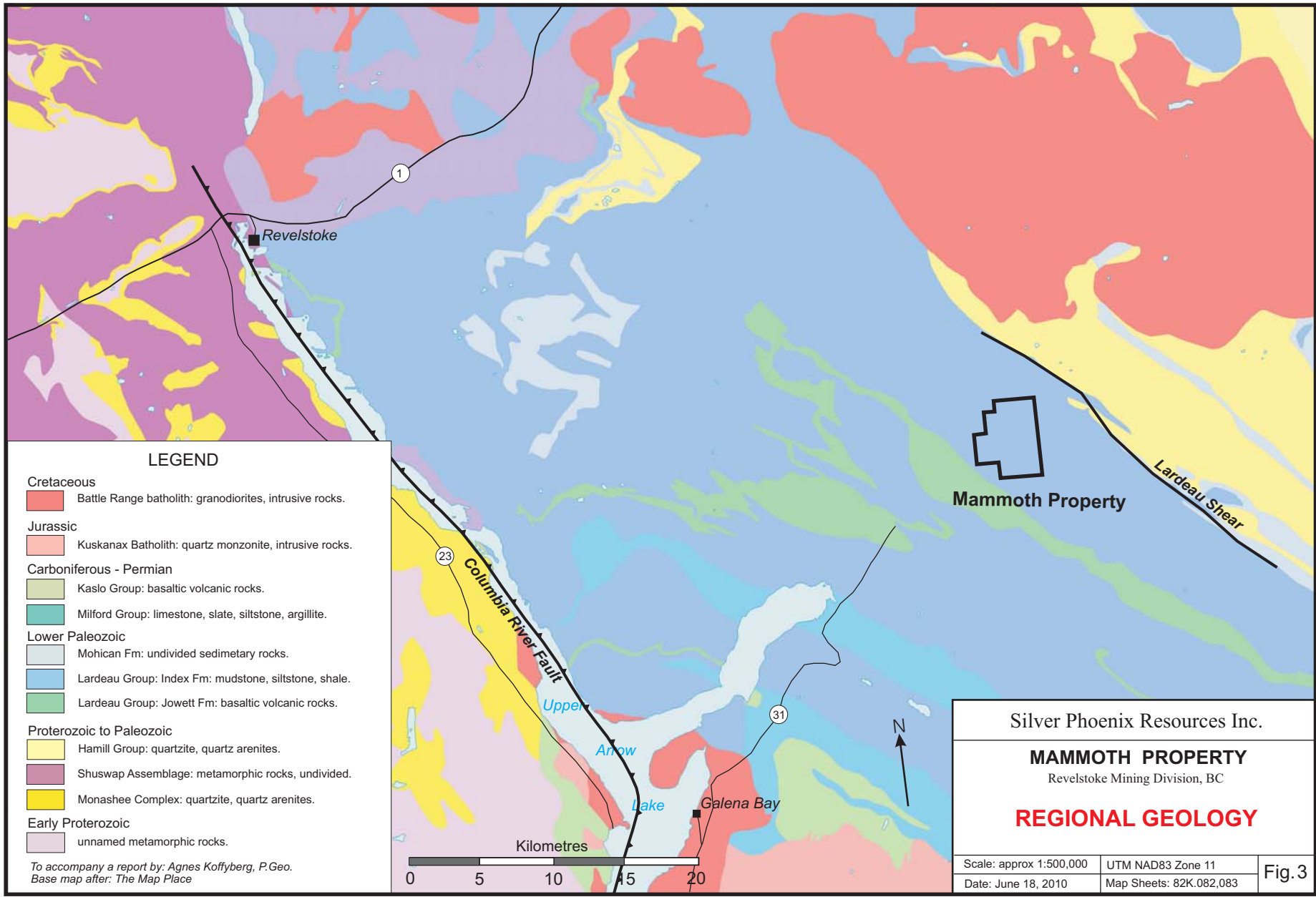
Figure 5 shows the extent of the airborne survey in relation to the Property. The survey coverage includes the Big Showing, Mammoth and Scout showings. Flight lines, oriented at a 90°/270° heading, were flown at 100-metre spacing. The tie lines, oriented at 0°/360°, were flown at one km spacing. In total, 108 line-km were flown on the Property.

The helicopter used in the survey was a Bell 206 BIII Jet Ranger. Lines were flown at an average elevation of 90 m vertically above the terrain surface, due to the steep and rugged topography of the area that was surveyed.

Precision GeoSurveys Inc. used a magnetometer, a spectrometer and a data acquisition system. Details of the instrumentation are given in their report. Data compilation including editing and filtering, quality control and final data processing, was performed by Precision GeoSurveys Inc. The plan maps with GPS corrected UTM coordinates are given within their report at a scale of 1:10,000, and include the various types of spectrometric data as well as the magnetic data.

Figure 6 shows the locations of the showings in relation to the magnetic survey.

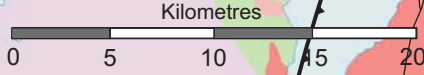
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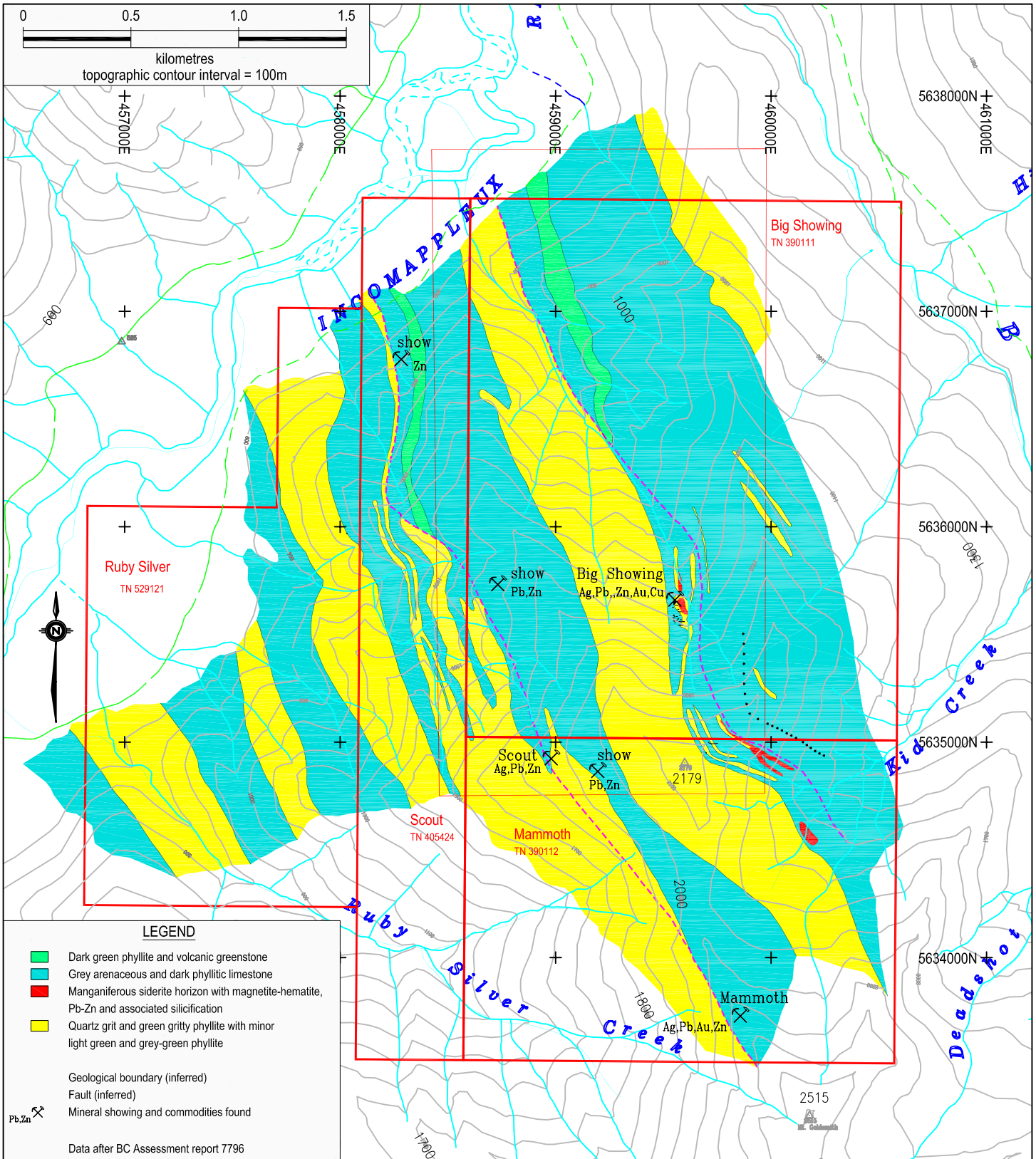
**LEGEND**

- Cretaceous**
- Battle Range batholith: granodiorites, intrusive rocks.
- Jurassic**
- Kuskanax Batholith: quartz monzonite, intrusive rocks.
- Carboniferous - Permian**
- Kaslo Group: basaltic volcanic rocks.
- Milford Group: limestone, slate, siltstone, argillite.
- Lower Paleozoic**
- Mohican Fm: undivided sedimentary rocks.
- Lardeau Group: Index Fm: mudstone, siltstone, shale.
- Lardeau Group: Jowett Fm: basaltic volcanic rocks.
- Proterozoic to Paleozoic**
- Hamill Group: quartzite, quartz arenites.
- Shuswap Assemblage: metamorphic rocks, undivided.
- Monashee Complex: quartzite, quartz arenites.
- Early Proterozoic**
- unnamed metamorphic rocks.

To accompany a report by: Agnes Koffyberg, P.Geo.  
Base map after: The Map Place



Silver Phoenix Resources Inc.		
<b>MAMMOTH PROPERTY</b>		
Revelstoke Mining Division, BC		
<b>REGIONAL GEOLOGY</b>		
Scale: approx 1:500,000	UTM NAD83 Zone 11	<b>Fig. 3</b>
Date: June 18, 2010	Map Sheets: 82K.082,083	



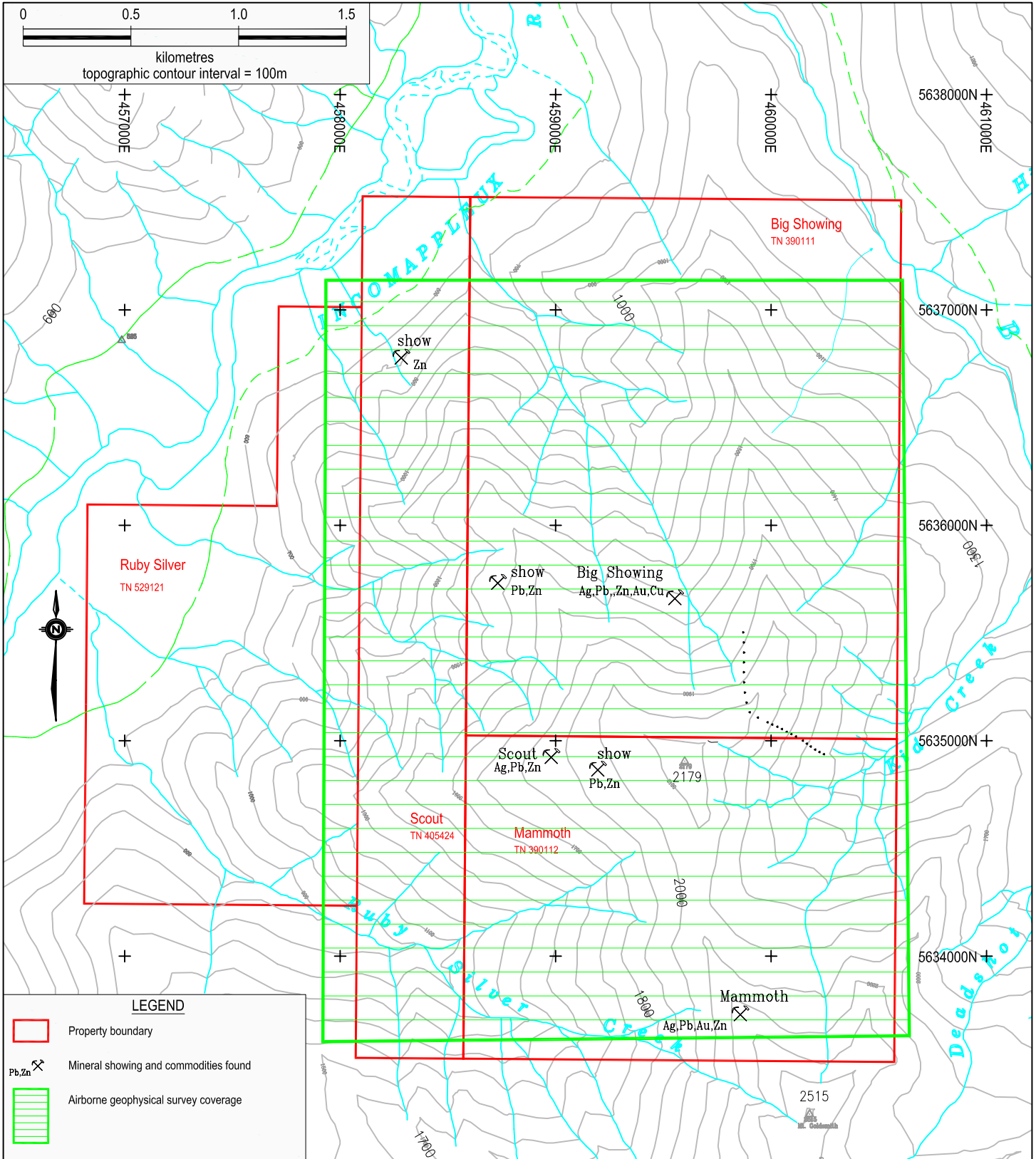
**DISCOVERY** Consultants

Silver Phoenix Resources Inc.

Mammoth Property

Property Geology

Date: June 17, 2010	Project: 809	Scale: 1:25000	N.T.S.: 082K.082,083	Mining Div: Revelstoke B.C.	Figure: 4
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**LEGEND**

- Property boundary
- Mineral showing and commodities found
- Airborne geophysical survey coverage

**DISCOVERY** Consultants

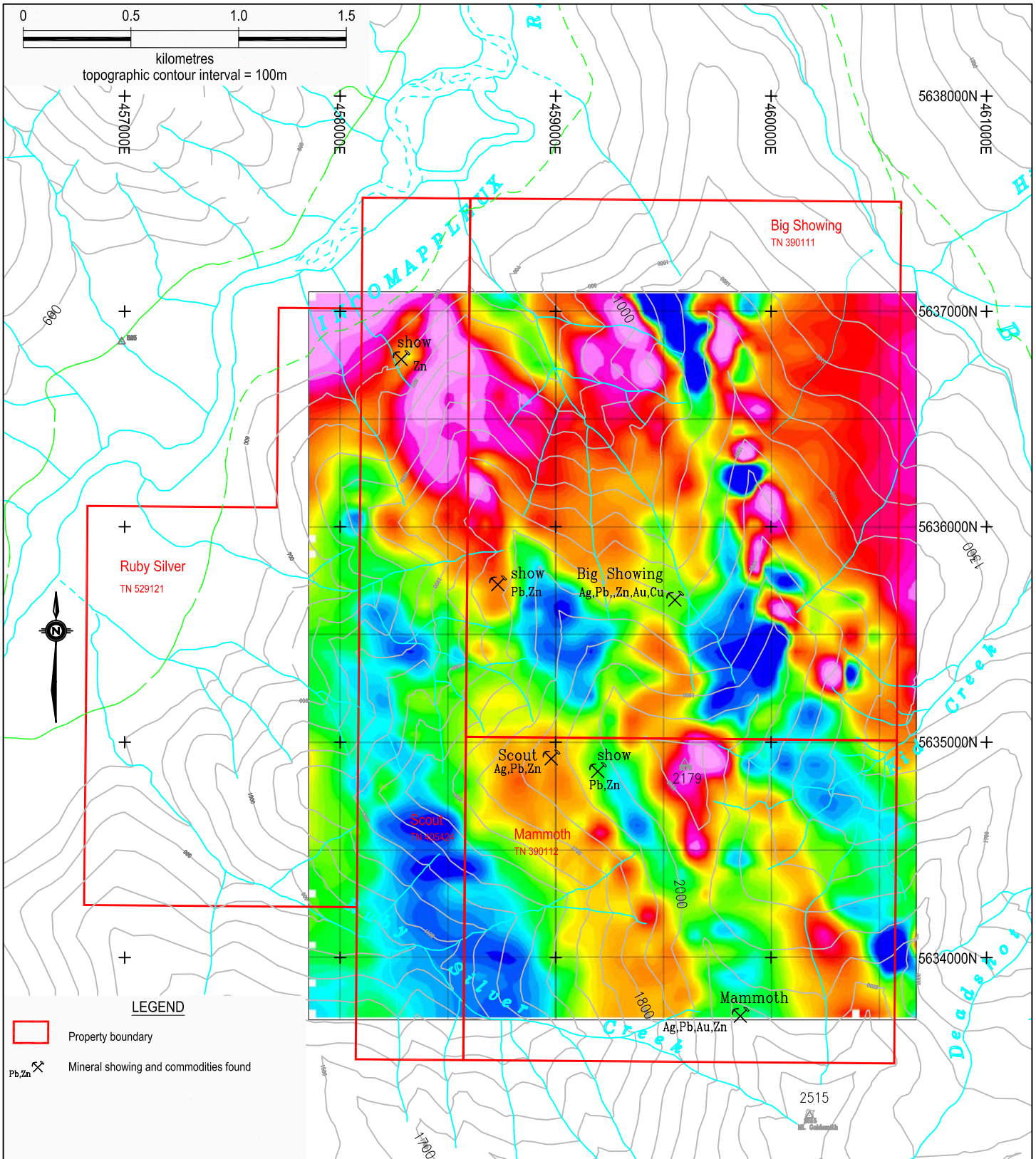
Silver Phoenix Resources Inc.

Mammoth Property

**Airborne Survey Location**

Date: June 17, 2010	Project: 809	Scale: 1:25000	N.T.S.: 082K.082,083	Mining Div: Revelstoke B.C.	Figure: 5
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**DISCOVERY** Consultants

Silver Phoenix Resources Inc.

Mammoth Property

Airborne Magnetic  
Survey Compilation

Date: June 17, 2010 Project: 809 Scale: 1:25000 N.T.S.: 082K.082,083 Mining Div: Revelstoke B.C. Figure: 6

## 9.0 DISCUSSION AND CONCLUSIONS

Precision GeoSurveys Inc. has presented the magnetic data as total field magnetics only. The data has not been interpreted by a geophysicist. However, several general observations can be made:

- The overall magnetic trend is oriented in a northwest-southeast direction. This reflects the general trend of the sedimentary rock units in this area (Figure 4).
- Total magnetic relief throughout the Property is low, with a maximum difference between high and low values of 34 nanoTeslas (nT). This low relief appears to reflect slight differences among various sedimentary rock units.
- None of the areas of mineral showings (including some containing magnetite) were identified by the magnetometer survey (Figure 6). The types of mineral occurrences on the Property do not usually have a magnetic signature unless accompanied by significant pyrrhotite and/or magnetite.

In general, airborne radiometric surveys measure the physical properties of the top 30 cm of the earth's surface (Miles et al., 2007). The gamma-ray spectrometry provides bedrock information on the radioactive elements (potassium, thorium and uranium) present in rocks and soils. If granitic intrusions or felsic volcanic units are present they may be identified in the radiometric survey as potassium anomalies.

The radiometric data for the Property is presented as preliminary by Precision GeoSurveys Inc. The report mentions that the accuracy of the radiometric data may have been hampered by the extensive ice and snow cover on the higher elevations of the Property. No interpretation of the radiometric survey has been done.

Respectfully submitted,

***Original Signed by Author***

---

A. Koffyberg, PGeo  
Discovery Consultants  
Vernon, BC  
June 28, 2010

## 10.0 REFERENCES

- British Columbia Ministry of Mines; Annual Reports: 1896-536; 1900-810; 1903-133; 1904-G121; 1905-J156; 1906-H139, H249, H253; 1907-L214; 1914-K270; 1916-K523
- British Columbia Department of Energy, Mines and Petroleum Resources; Assessment Reports: #7996, #15372, #17978, #19288, #27941, #28871, #29602
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- Miles, W.F., Shives, R.B.K., Carson, J., Buckle, J., Dumont, R. and Coyle, M. (2007): Airborne Gamma-ray Spectrometric and Magnetic Surveys over the Bonaparte Lake Area (NTS 092P), South-Central British Columbia. BC Geological Fieldwork 2006, Paper 2007-1, p 375-376
- Thompson, R.I. (2007): Geological Reconnaissance of the Big Showing Property, Incommappleux River Area, Southern British Columbia, internal report for Discovery Consultants; in Assessment Report 29602
- Turner, J. (2007): Technical Report on the Mammoth, Scout and Big Showing Property, Revelstoke Mining Division, for Silver Phoenix Resources Ltd, dated February 9, 2007

## 11.0 STATEMENT OF COSTS

### 1. Professional Services

W.R. Gilmour, PGeo			
Report Editing			
1.00 hrs @	\$100 per hr	\$100.00	
A. Koffyberg, PGeo			
Report Writing			
14 hrs @	\$90 per hr	1,260.00	
		-----	\$1,360.00

### 2. Personnel

Office			
Drafting		165.00	
Secretarial		265.00	
		-----	430.00

### 3. Expenses

Office		100.00	
Precision GeoSurveys Inc.			
- Field Program	\$19,897.00		
- Interpretation Report	1,000.00		
		-----	20,897.00
		-----	20,997.00

### 5. Corporate Management Fee @15%

	<i>Exploration Expenditures:</i>	\$22,787.00
		3,418.05
		-----
	<i>Total Exploration Expenditures:</i>	<u>\$26,205.05</u>

## 12.0 STATEMENT OF QUALIFICATIONS

I, Agnes Koffyberg, PGeo, of Discovery Consultants, 201-2928 29<sup>th</sup> Street, Vernon, BC,

DO HEREBY CERTIFY that:

1. I am a geologist in mineral exploration and am employed by Discovery Consultants, Vernon, BC.
2. I graduated with a B.Sc. degree in combined Geological Sciences/Chemistry from Brock University in 1987. In addition, I have obtained a M.Sc. in Geology from the University of Alberta in 1994.
3. I am a member of the Association of Professional Engineers and Geoscientists of BC, registration number 31384.
4. I have worked as a geologist for a total of 13 years since graduation from university.
5. This report is based upon knowledge of the Property gained from a review of existing industry and government reports.

Dated this twenty-eighth day of June, 2010 in Vernon, BC

Signature of

***Original Singed by Author***

Agnes Koffyberg, PGeo

Discovery Consultants

# APPENDIX I

Airborne Geophysical Survey Report, Mammoth Property,  
Precision GeoSurveys Inc., for Silver Phoenix Resources  
dated September 7, 2009



## **Airborne Geophysical Survey Report Mammoth Property**

Prepared for: Silver Phoenix Resources  
September 7, 2009



Precision GeoSurveys Inc.  
520-355 Burrard Street, Vancouver, Canada V6C 2G8  
[www.precisiongeosurveys.com](http://www.precisiongeosurveys.com)

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## 1.0 Introduction:

This report outlines the survey operations and data processing actions taken during the airborne geophysical survey flown in the Mammoth property, located 45 km south-east of Revelstoke, BC. The airborne geophysical survey was flown by Precision GeoSurveys Inc. for Silver Phoenix Resources. The geophysical survey, carried out on June 10, 2009, saw the acquisition of gamma ray spectrometer data and magnetic data.



Figure 1: Survey blocks outlined in red and survey lines in black

The Big Showing/Mammoth block, located on the headwaters of the Incomappleux River (Figure 1) is located approximately 45 km south-east of Revelstoke, BC (Figure 2). The survey area itself is approximately 8 km by 4.7 km. A total of 348 line kilometers of radiometric and magnetic data were flown for this survey, this total includes tie lines and survey lines. The survey lines were flown at 100 meter spacings at a  $90^{\circ}/270^{\circ}$  heading; the tie lines were flown at 1 km spacings at a heading of  $0^{\circ}/360^{\circ}$ .



Figure 2: River Jordan survey area location relative to Revelstoke, BC. Survey area outlined

## 2.0 Geophysical Data:

Geophysical data are collected in a variety of ways and are used to aid in the exploration and determination of geology, oil and gas deposits, contaminated land sites and UXO detection.

For the purposes of this survey, airborne gamma ray spectrometer and magnetic data were collected to serve in the exploration of the Mammoth property which is host to silver, lead, zinc bearing rocks (Turner, Thompson, 2008).

### 2.1 Magnetic Data:

Magnetic surveying is probably the most common airborne survey type to be conducted for both mineral and hydrocarbon exploration. The type of survey specifications, instrumentation, and interpretation procedures, depend on the objectives of the survey. Typically magnetic surveys are performed for:

1. Geological Mapping to aid in mapping lithology, structure and alteration in both hard rock environments and for mapping basement lithology, structure and alteration in sedimentary basins or for regional tectonic studies.
2. Depth to Basement mapping for exploration in sedimentary basins or mineralization associated with the basement surface.

## 2.2 Radiometric Data:

Radiometric surveys detect and map natural radioactive emanations, called gamma rays, from rocks and soils. All detectable gamma radiation from earth materials come from the natural decay products of three primary elements, uranium, thorium, and potassium. The purpose of radiometric surveys is to determine either the absolute or relative amounts of U, Th., and K in surface rocks and soils.

## 3.0 Survey Operations:

Precision GeoSurveys flew the Mammoth property using a Bell 206 BIII Jet Ranger (Figure 3). The survey lines were flown at a nominal line spacing of one hundred (100) meters and the tie lines were flown at 1 km spacing for both the spectrometer and magnetometer as they were acquired simultaneously. The average survey elevation was 90 meters vertically above ground; this is due to the very steep mountains that were being surveyed. While the laser altimeter sensor was 90 meters vertically above ground, the helicopter was flying quite close to the mountain side, but within the bounds of safety. The experience of the pilots helped to ensure that the data quality objectives were met and that the safety of the flight crew was never compromised given the extreme topography.



Figure 3: Bell 206 Jet Ranger equipped with mag stinger for magnetic data acquisition.

The base of operations for this survey was the town of Revelstoke, BC. The Precision crew varied in size throughout the survey and consisted of a total of five members:

Harmen Keyser – Pilot  
Spring Harrison – Pilot  
Paula Vera – Co-pilot/operator  
Pat Dwan – AME  
Chris Brown – On-site geophysicist

The first day of surveying was June 5, 2009 and the final day was June 10, 2009.

#### 4.0 Equipment:

For this survey a magnetometer, spectrometer and a data acquisition system were required to carry out the survey and collect quality, high resolution data.

#### 4.1 AGIS:

The Airborne Geophysical Information System, AGIS, (Figure 4), is the main computer used in data recording, data synchronizing, displaying real-time data for the operator to QC, pilot navigation and pilot display information.



Figure 4: AGIS installed in the Bell 206.

The AGIS was manufactured by Pico Envirotec; therefore the system uses standardized Pico software and external sources are connected to the system via RS-232 serial communication cables. The AGIS data format is easily converted into Geosoft or ASCII file formats by a supplied conversion program called PicoView. Additional Pico software allows for post survey quality control procedures.

## 4.2 Spectrometer:

The IRIS, or Integrated Radiometric Information System is a fully integrated, gamma radiation detection system containing two downward facing 4.2 litre NaI detecting crystals for a total volume of 8.4 liters (figure 5). Real time data acquisition, navigation and communication tasks are integrated into a single unit that is installed in the rear of the aircraft as indicated below. Information such as total count, counts of various elements (K, U, Th etc.), temperature, barometric pressure, atmospheric humidity and survey altitude can all be monitored on the AGIS screen for immediate QC. All the radiometric data are recorded at 1 Hz.



Figure 5: IRIS strapped into the cargo box of the helicopter.

## 4.3 Magnetometer:

The magnetometer used by Precision GeoSurveys is a Scintrex cesium vapor CS-3 magnetometer. The system was housed in a front mounted “stinger” (Figure 6). The CS-3 is a high sensitivity/low noise magnetometer with automatic hemisphere switching and a wide voltage range. The static noise rating for the unit is +/- 0.01 nT. On the AGIS screen the operator can view the raw magnetic response, the magnetic fourth difference and the survey altitude for immediate QC of the magnetic data. The magnetic data are recorded at 10 Hz. A magnetic compensator is also used to remove noise created by the movement of the helicopter as it pitches, rolls and yaws within the Earth’s geomagnetic field.



Figure 6: View of the mag stinger.

## 5.0 Data Processing:

After all the data are collected after a survey flight several procedures are undertaken to ensure that the data meet a high standard of quality. All data were processed using Pico Envirotec software and Geosoft Oasis Montaj geophysical processing software.

### 5.1 Magnetic Processing:

A magnetic base station is set up before every flight to ensure that diurnal activity is recorded during the survey flights. Precision GeoSurveys uses a Geometrics 858 base station and sampled at 0.1Hz. Base station profiles were reviewed at regular intervals to insure that no data were collected during periods with high diurnal activity (greater than 5 nT per minute). The base station was installed at a magnetically noise-free area, away from metallic items such as steel objects, vehicles, or power lines. The magnetic variations recorded from the stationary base station are removed from the magnetic data recorded in flight to ensure that the anomalies seen are real and not due to solar activity.

Some filtering of the magnetic data is also required. A Non Linear filter was used for spike removal. The 1D Non-Linear Filter is ideal for removing very short wavelength, but high amplitude features from data. It is often thought of as a noise spike-rejection filter, but it can also be effective for removing short wavelength geological features, such as signals from surficial features. The 1D Non-Linear Filter is used to locate and remove data that are recognized as noise. The algorithm is 'non-linear' because it looks at each data point and decides if that datum is noise or a valid signal. If the point is noise, it is simply removed and replaced by an estimate based on surrounding data points. Parts of the data that are not considered noise are not modified. The combination of a Non-Linear filter for noise removal and a low pass trend enhancement filter resulted in level data as indicated in the results section of this report. The low pass filters simply smoothes out the magnetic profile to remove isolated noise.

A lag correction was applied to the total magnetic field data to compensate for the lag in the recording system as the magnetometer sensor flies 6.45 m ahead of the GPS antenna. Following a lag correction of 1.7 seconds, a low-pass filter equivalent to 1 second was then applied to the lag corrected data.

### 5.2 Radiometric Processing:

Radiometric data were not post processed. The radiometric data provided are in cps (counts per second). The radiometric data were provided at no cost and may be adversely affected by extensive ice and snow cover on the property while the survey was undertaken.

### 5.3 Final Data Format

X – Easting in NAD83, UTM zone 11N  
Y – Northing in NAD83, UTM zone 11N  
Utctime – UTCtime  
Basemag – diurnal data  
Mag – total magnetic field  
TC\_cps – Total count  
K\_cps – Potassium  
U\_cps – Uranium  
Th\_cps – Thorium

This file format will be provided in two (2) formats, the first will be a .GDB file for use in Geosoft Oasis Montaj, the second format will be a .XYZ file, this is text file.

Appendix A  
Maps



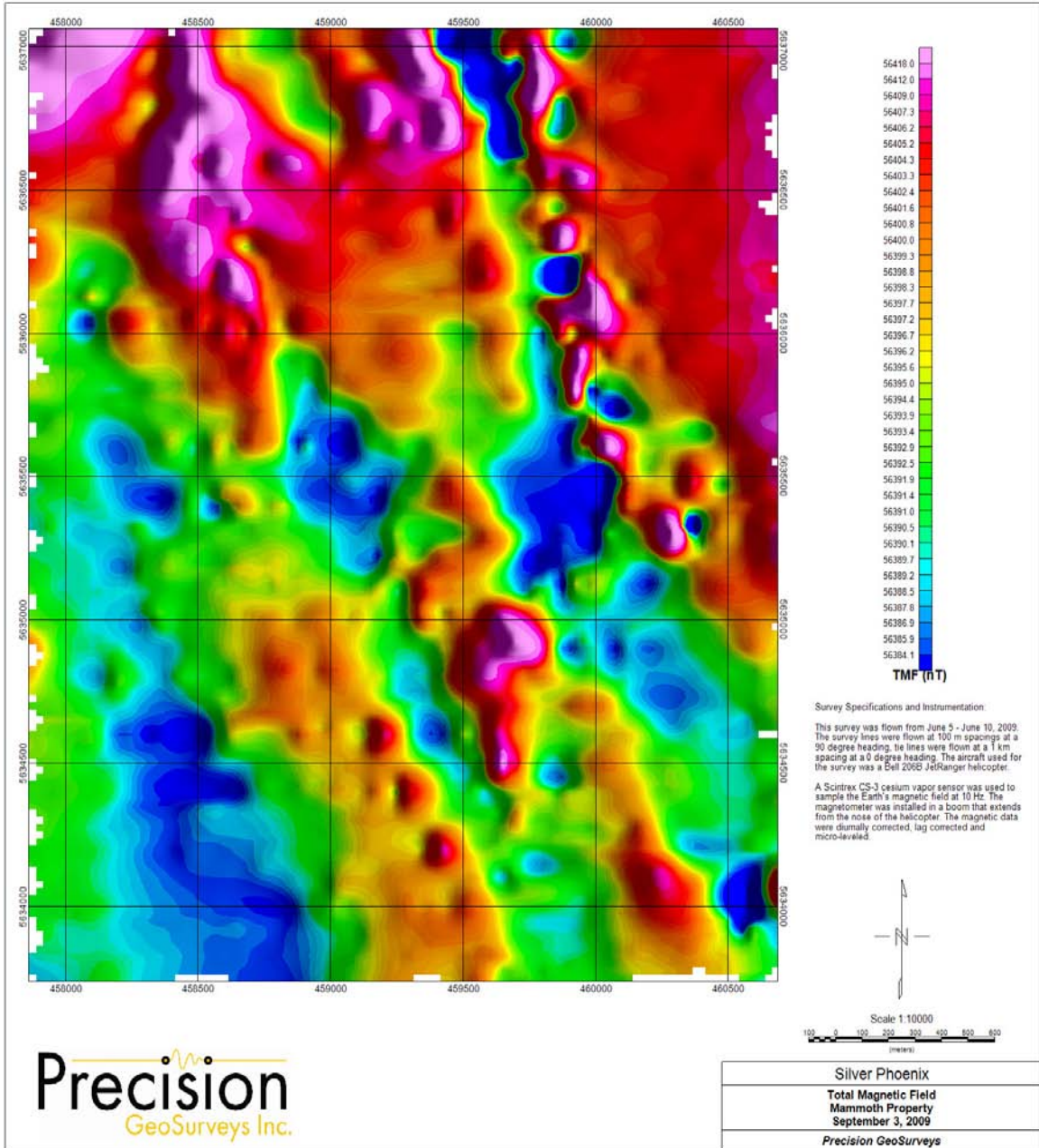


Figure 1: Mammoth total magnetic field map.

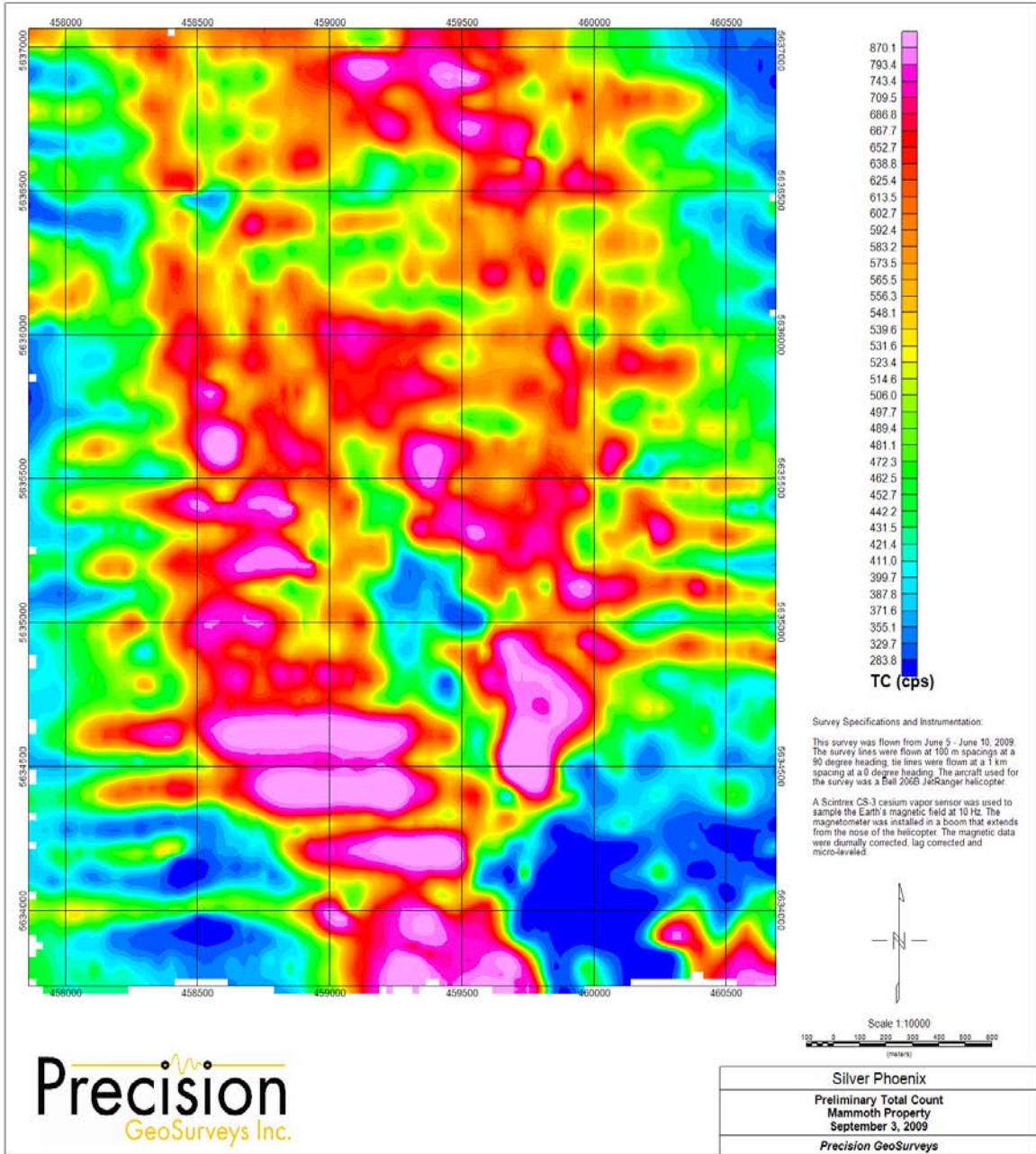


Figure 2: Mammoth total count.

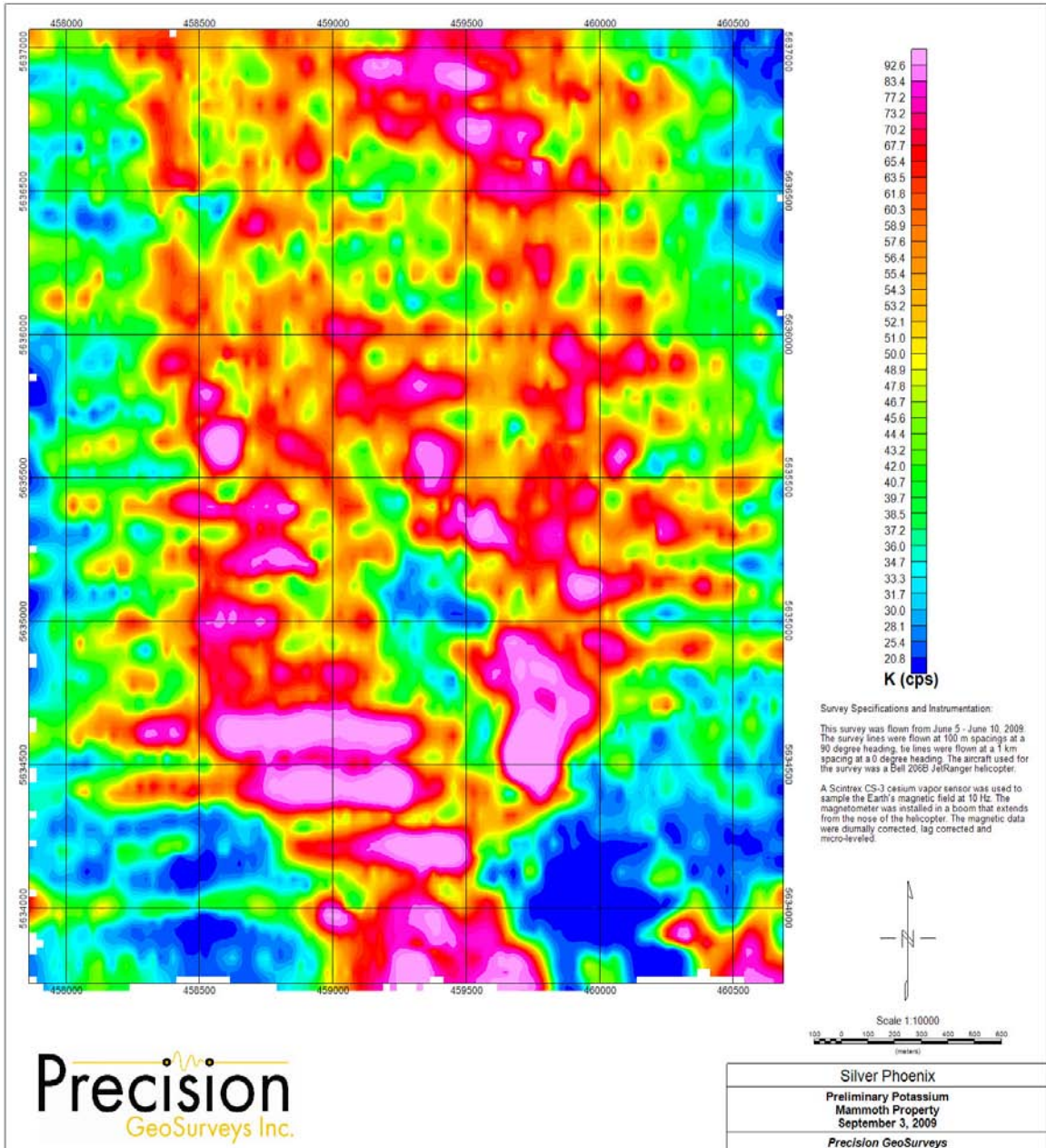


Figure 3: Mammoth potassium

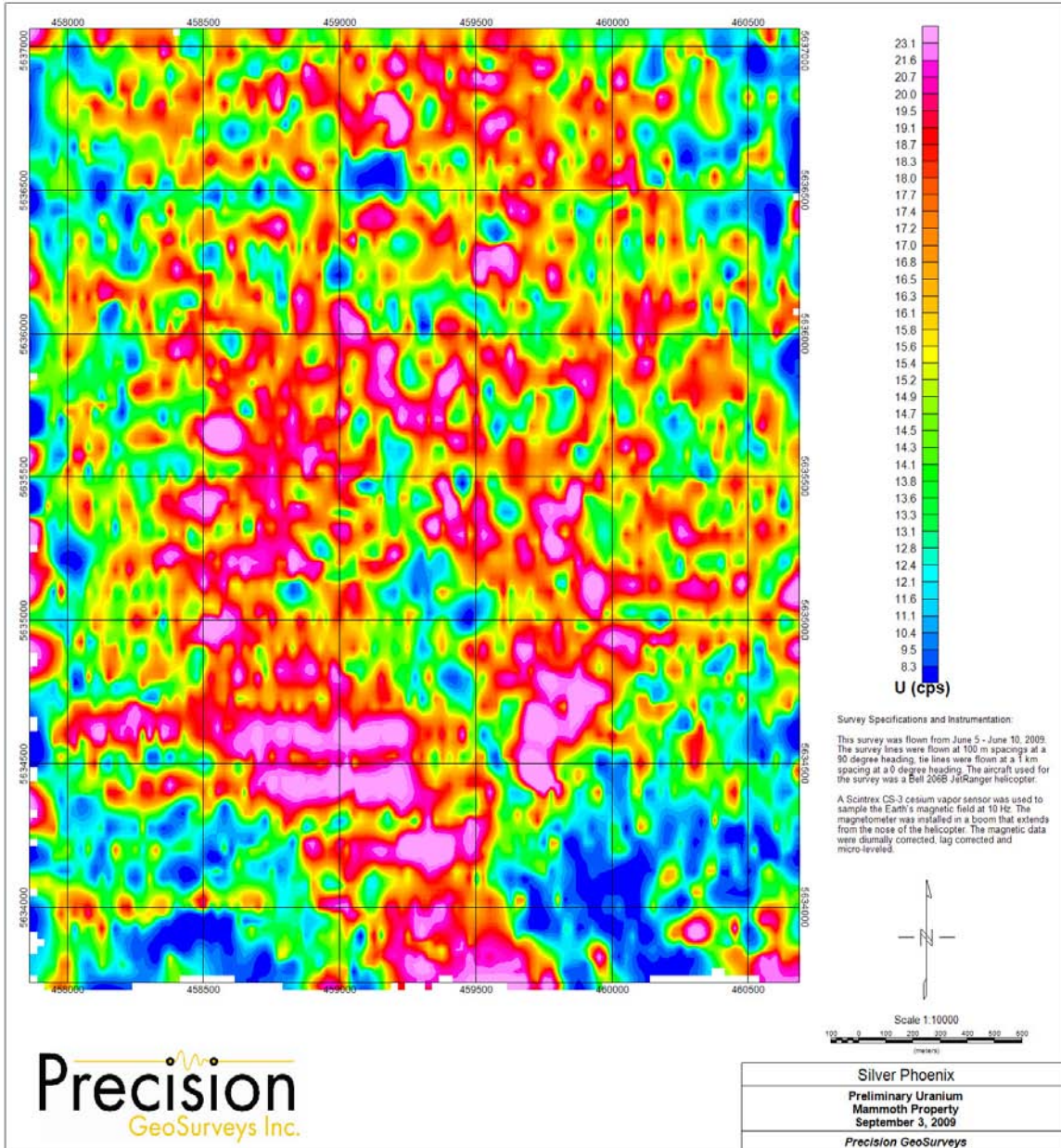
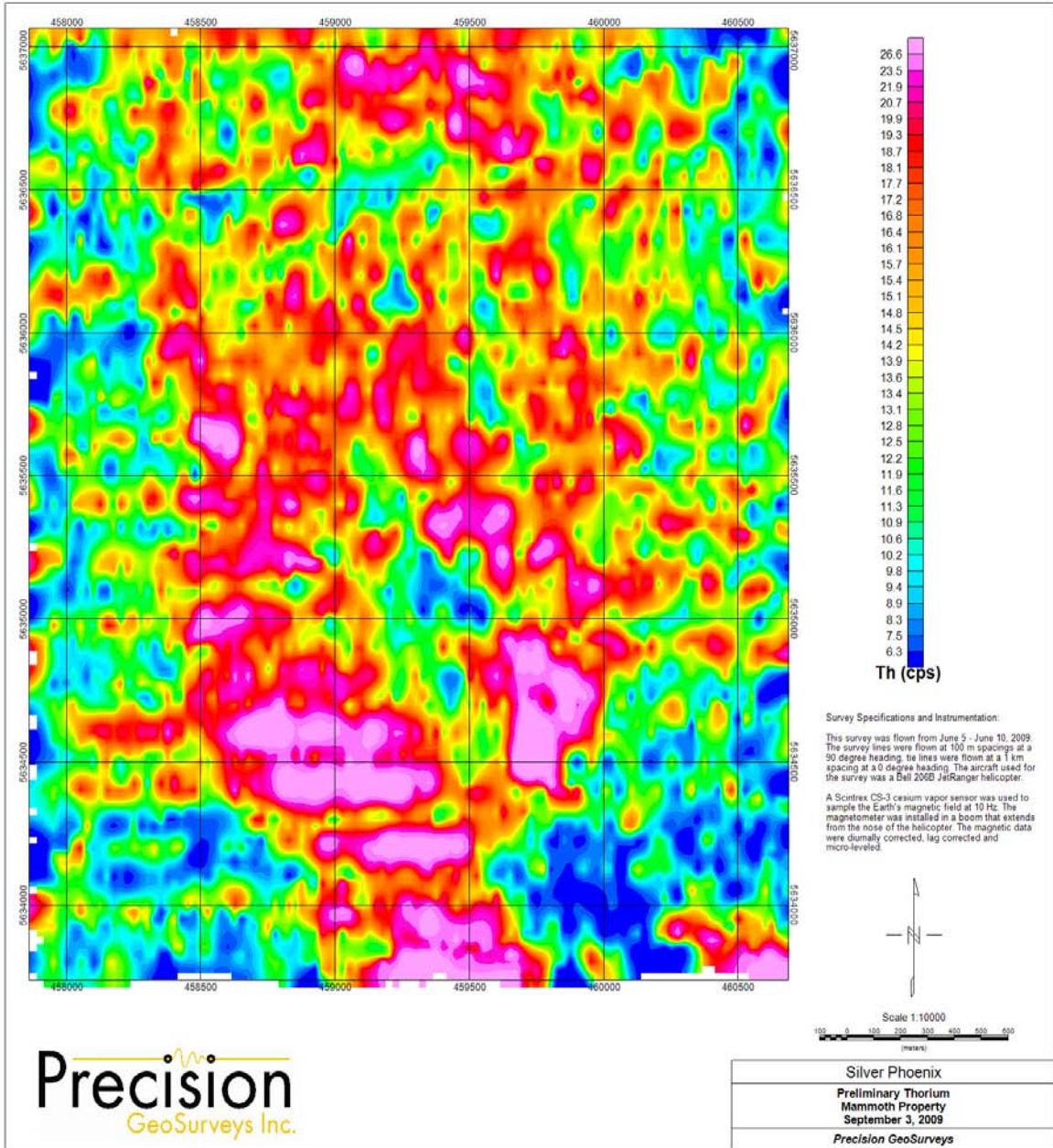
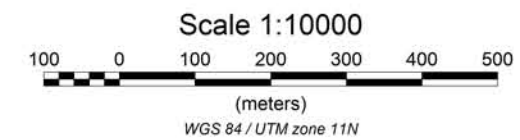
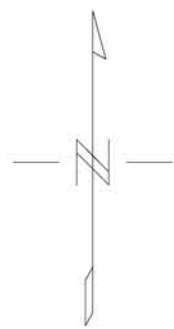
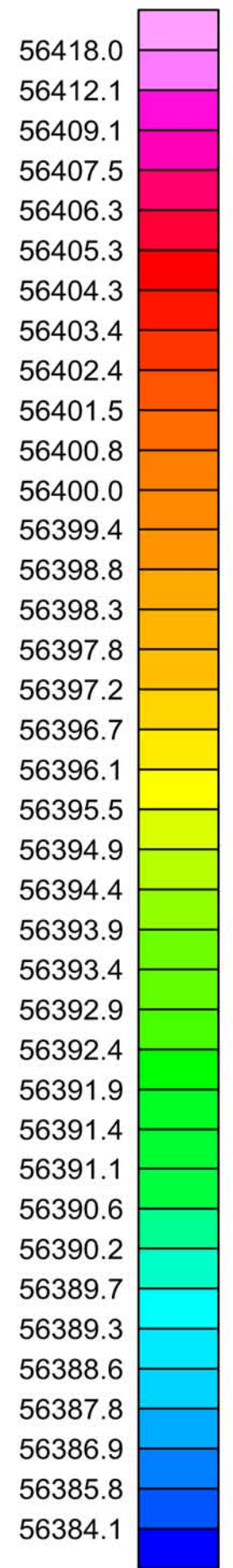
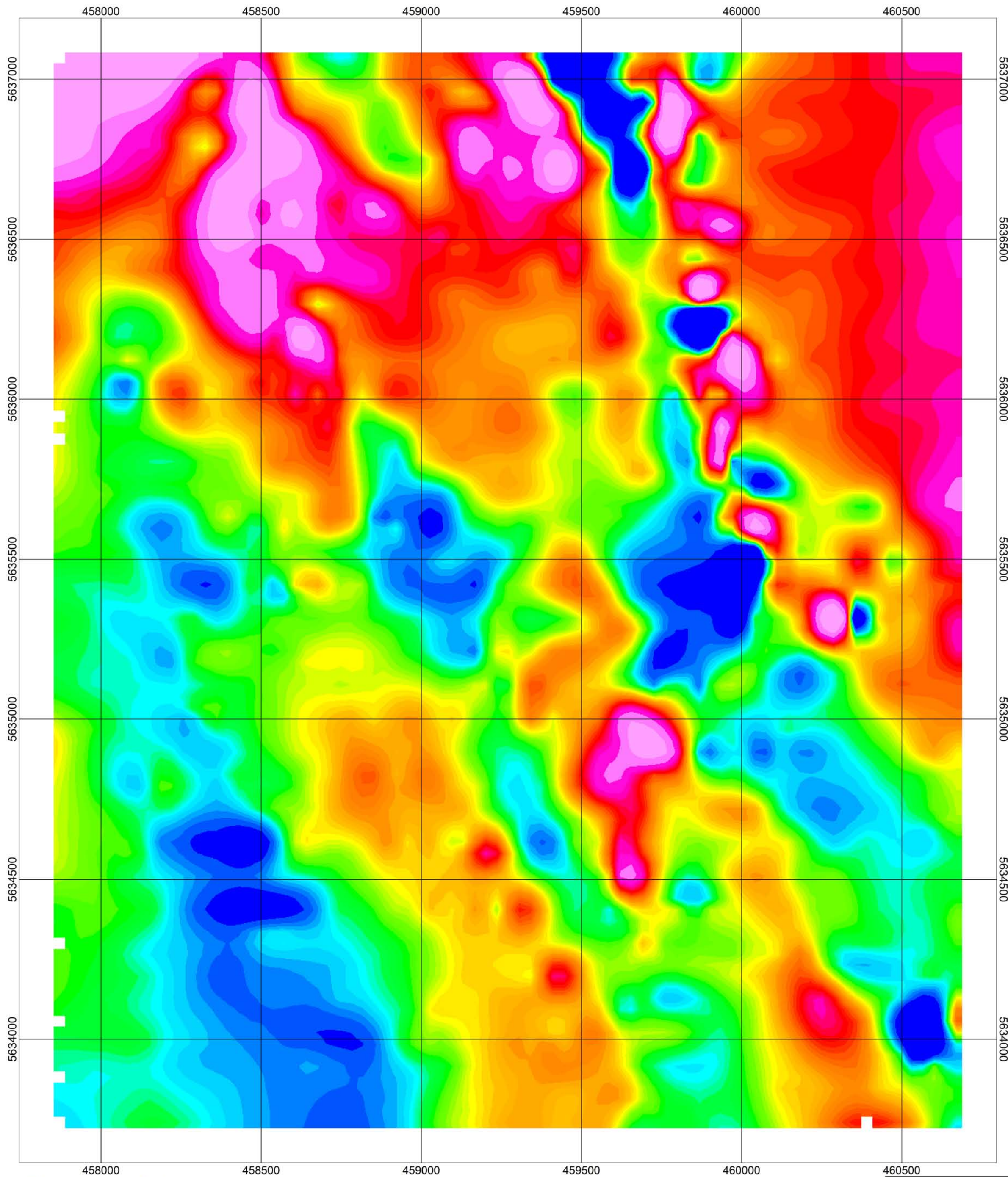


Figure 4: Mammoth uranium



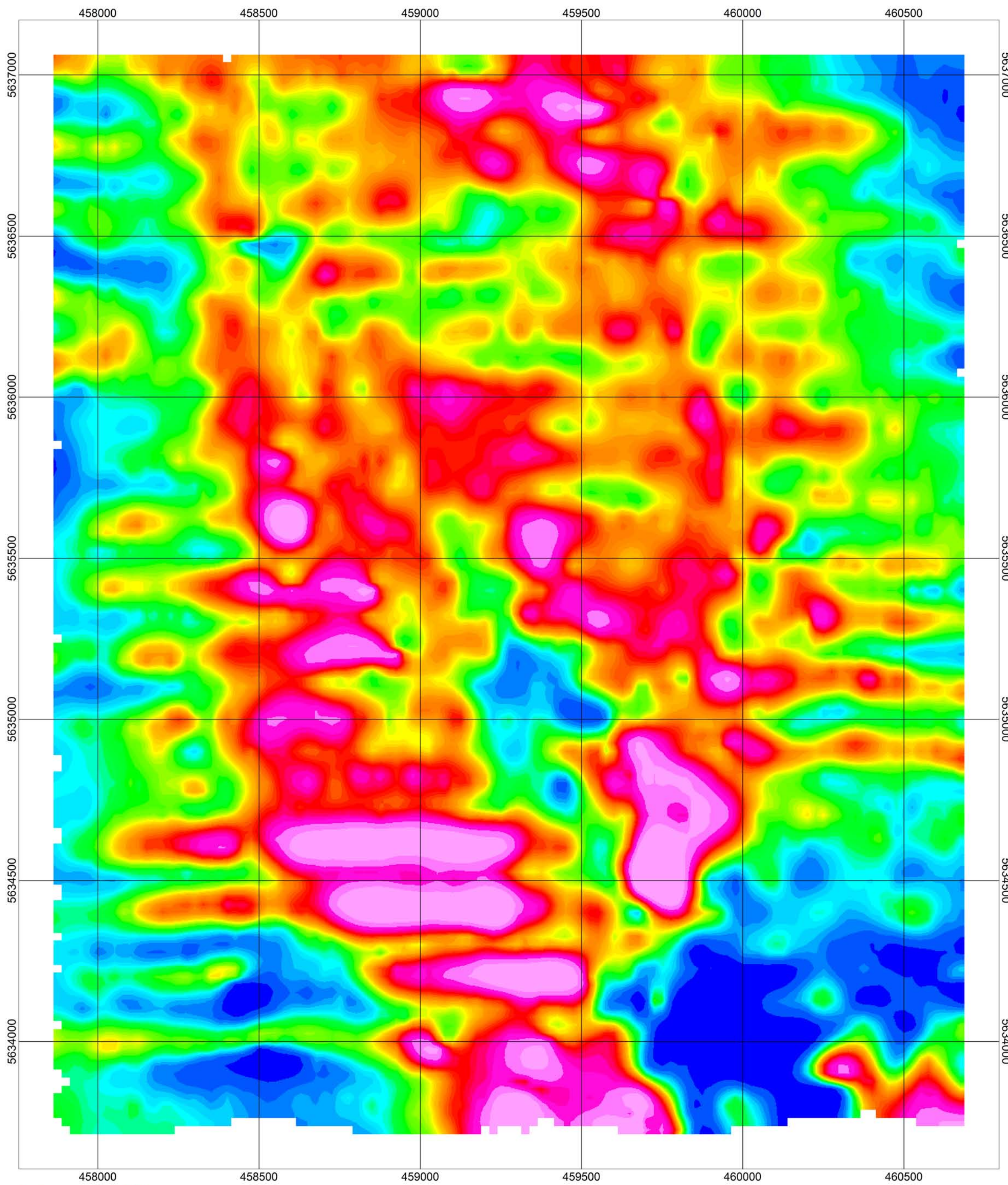
**Precision**  
 GeoSurveys Inc.

Figure 5: Mammoth thorium

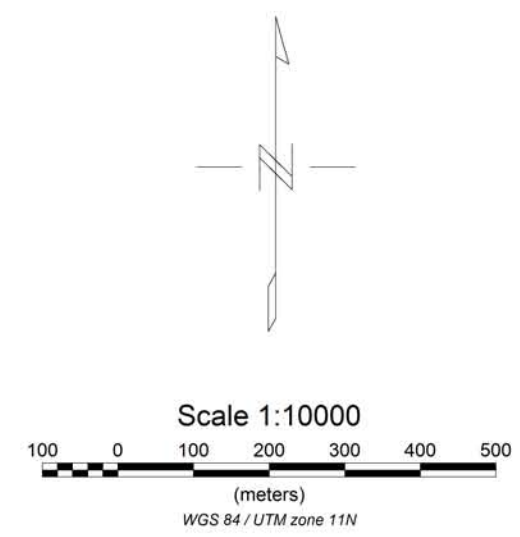


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Silver Phoenix  
 Total Magnetic Field  
 Mammoth Property  
 September 3, 2009  
 Precision GeoSurveys Inc.

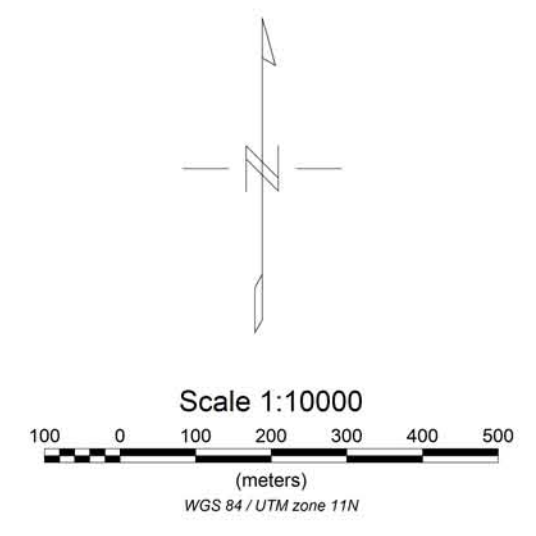
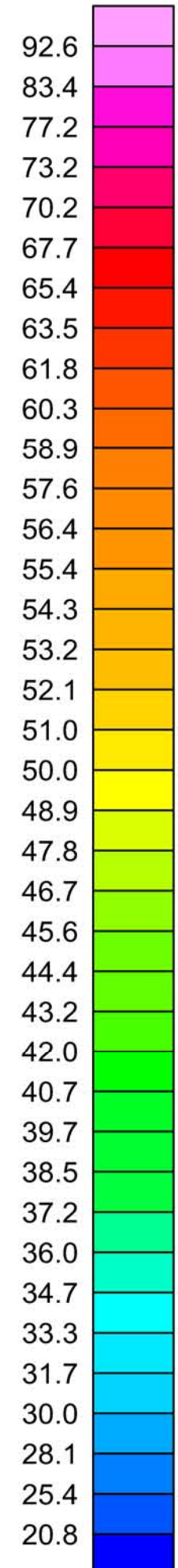
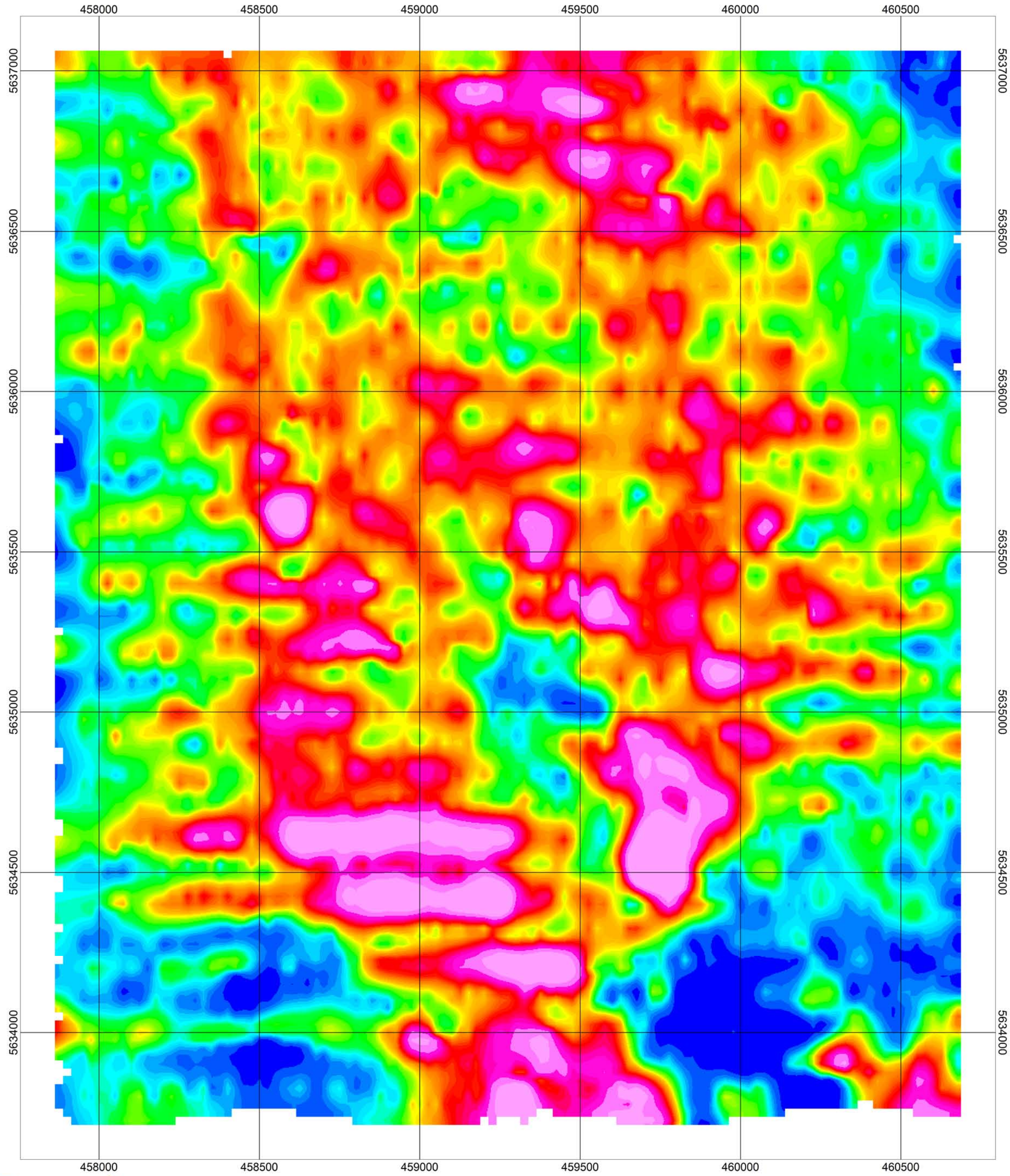


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- 793.4
- 743.4
- 709.5
- 686.8
- 667.7
- 652.7
- 638.8
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- 613.5
- 602.7
- 592.4
- 583.2
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- 565.5
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- 548.1
- 539.7
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- 514.6
- 506.1
- 497.7
- 489.4
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- 472.3
- 462.5
- 452.7
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- 431.5
- 421.4
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- 283.9



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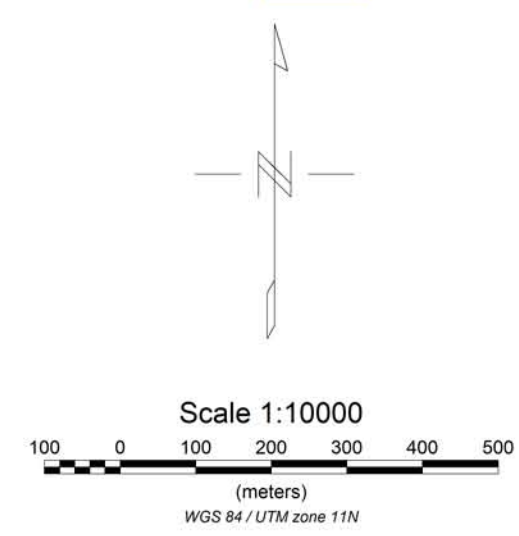
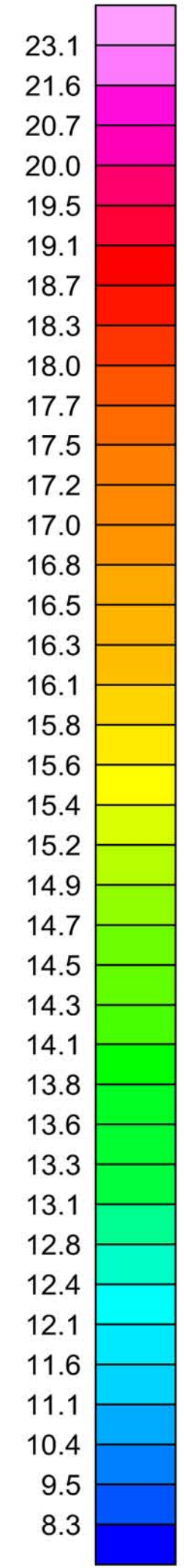
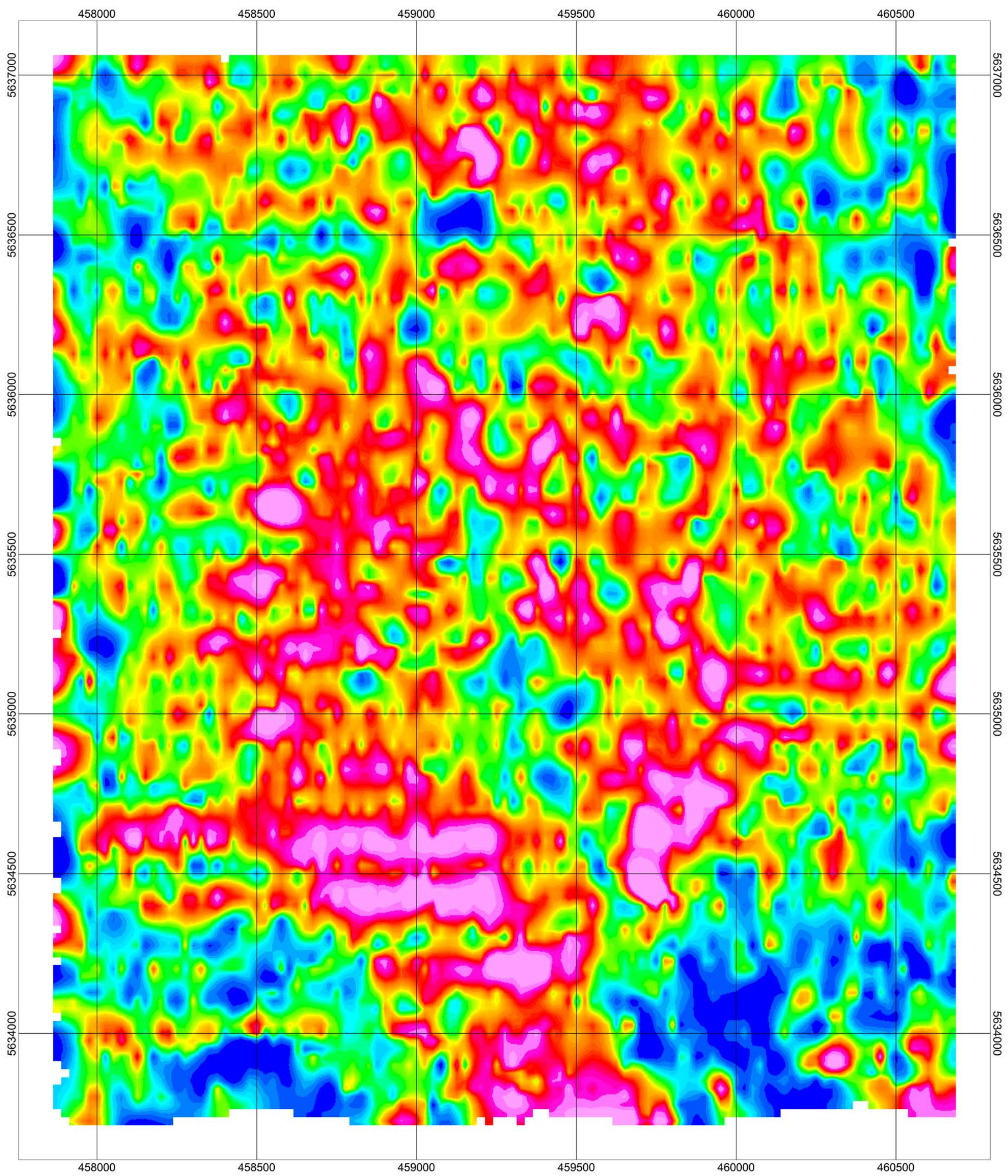
Silver Phoenix
Preliminary Total Count Mammoth Property September 3, 2009
<b>Precision GeoSurveys Inc.</b>



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GeoSurveys Inc.

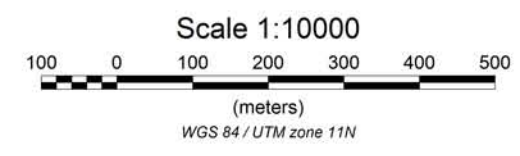
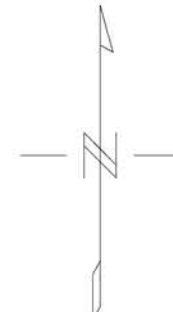
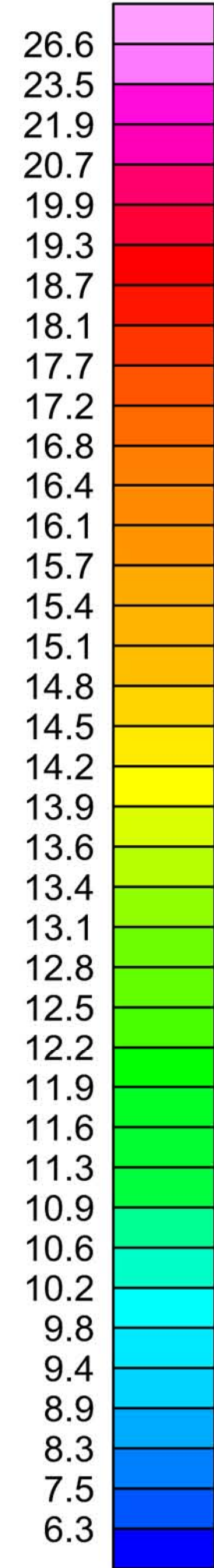
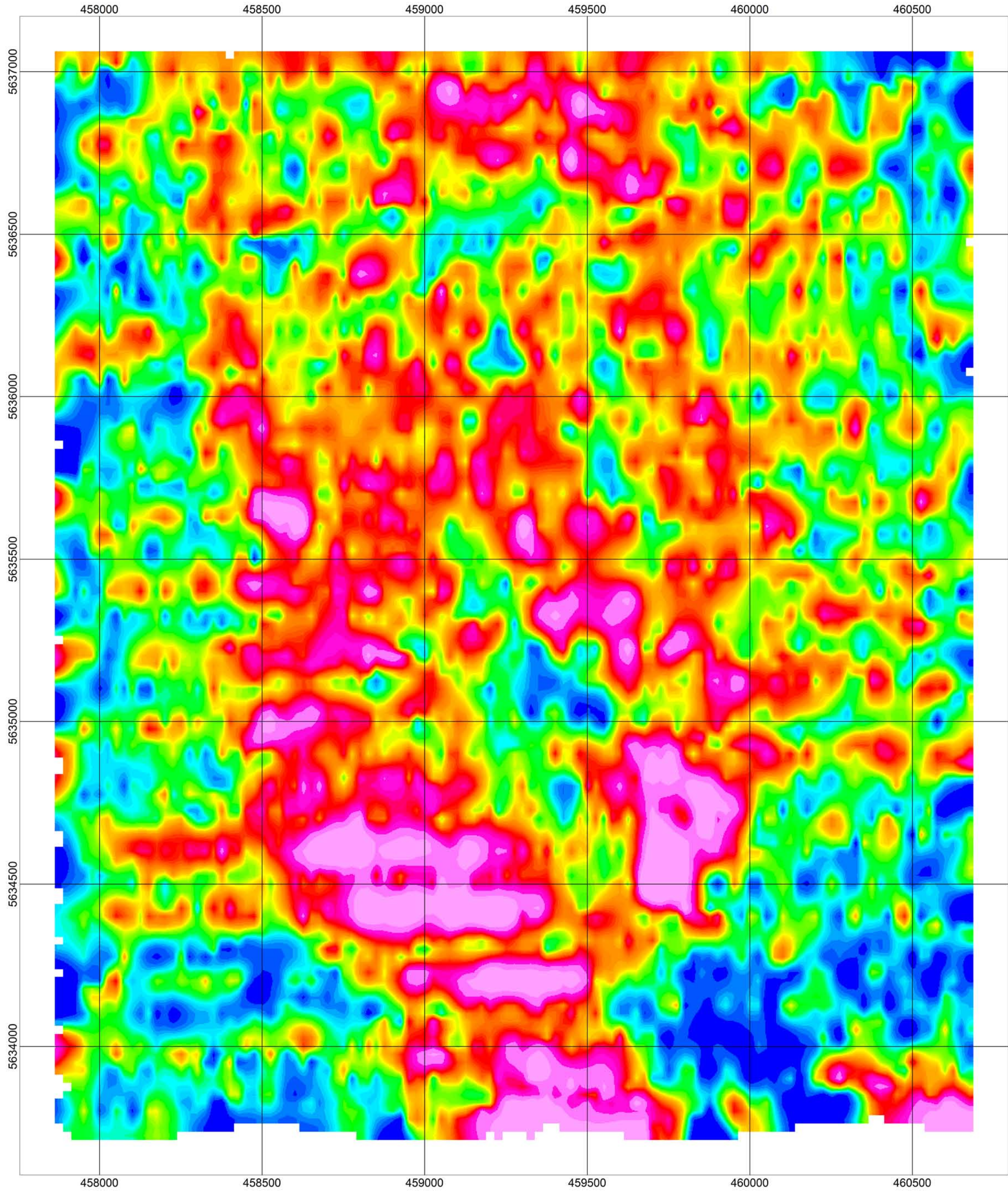
Silver Phoenix
Preliminary Potassium Mammoth Property September 3, 2009
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 Preliminary Uranium  
 Mammoth Property  
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 Preliminary Thorium  
 Mammoth Property  
 September 3, 2009  
 Precision GeoSurveys Inc.