

BIOGEOCHEMICAL  
ASSESSMENT REPORT

on the

COPPER KEG CLAIM GROUP  
ASHCROFT AREA  
KAMLOOPS MINING DIVISION

by

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CLAIMS:

Copper Keg 7-11 and Copper Kettle 1 (6 units)

LOCATION:

The Copper Keg Claim Group is situated on the south side of the Thompson River Valley, 9 km northeast of Ashcroft, B.C.

Lat. 50° 45'; Long. 121° 10';

N.T.S: 92-I-11 & 14E

OWNER:

M. S. Morrison

OPERATOR:

M. S. Morrison

DATE STARTED:

November 13, 2000

DATE COMPLETED:

November 13, 2000

GEOLOGICAL SURVEY BRANCH  
ASSESSMENT REPORT

Kelowna, B.C.

February 8, 2001

26,489

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## **SUMMARY**

The Copper Keg Claim Group, covers  $1\frac{1}{2}$  square kilometres of ground on a bench on the southern side of the Thompson River Valley, 9 kilometres northeast of Ashcroft, B.C. The property was staked by the writer in May 1995 & 96 as a copper prospect.

The property is presently owned 90% by the writer, M. Morrison of Kelowna, B.C. and 10% by Doublestar Resources of West Vancouver, B.C.

The Claim Group is located at the northern edge of the Early Jurassic Guichon Creek Batholith and it is dissected by a northwest-striking regional fault, the Barnes Creek Fault, which crosses the northern portion of the batholith. The fault separates andesitic rocks of the Upper Triassic Nicola Group on the southwest from a quartz diorite intrusive on the northeast. The intrusive is believed to be a hybrid phase of the Guichon Creek Batholith.

A large gossan, comprised of pyritic, limonitic and clay-altered decomposed rock, overlies the quartz diorite-andesite contact zone. The bright-coloured altered zone is well exposed in a steep-sided ravine 1 km north of the property, but the southern extent of the zone is unknown. Deep Pleistocene drift and thin flows of the Kamloops Group volcanics cover much of the property.

It is thought that the intense alteration and pyritization at the gossan postdates the intrusion of the Guichon Creek Batholith. It is suggested that the hydrothermal solutions that brought about the alteration and mineralization may have emanated from a later cooling intrusive of possible Early Tertiary Age which is associated with the Barnes Creek Fault.

It is believed that the spectacular gossan 1 km north of the property could mark just the edge (i.e. halo) of a very large hydrothermal system that could have deposited concentrations of copper, molybdenum, or precious metals at any point along the Barnes Creek Fault. It is believed that there is potential for finding both primary and supergene ore along the Barnes Creek Fault.

**SUMMARY** (continued)

An east-west valley which runs obliquely towards the Barnes Creek Fault from the east was the focus of a 1997 geological mapping program on the Copper Keg 9-11 and Copper Kettle 1 Mineral claims. The valley may represent another zone of faulting with associated clay-alteration and pyritization at the southern contact of the quartz diorite plug in a situation similar to that occurring at the Barnes Creek Fault on the southwest edge of the intrusive.

A strong east-west VLF-EM conductor identified during a 1996 survey aligns with a portion of the east-west valley and lends support to the fault hypothesis.

An experimental biogeochemical survey (using sagebrush as a sample medium) was conducted over the east-west valley and VLF-EM conductor centred on the Copper Kettle 1 mineral claim in 1998. Elevated potassium and molybdenum values were obtained in the area and they strengthen the hypothesis that an altered and mineralized fault zone occurs below the overburden at the southern contact of the quartz diorite intrusive.

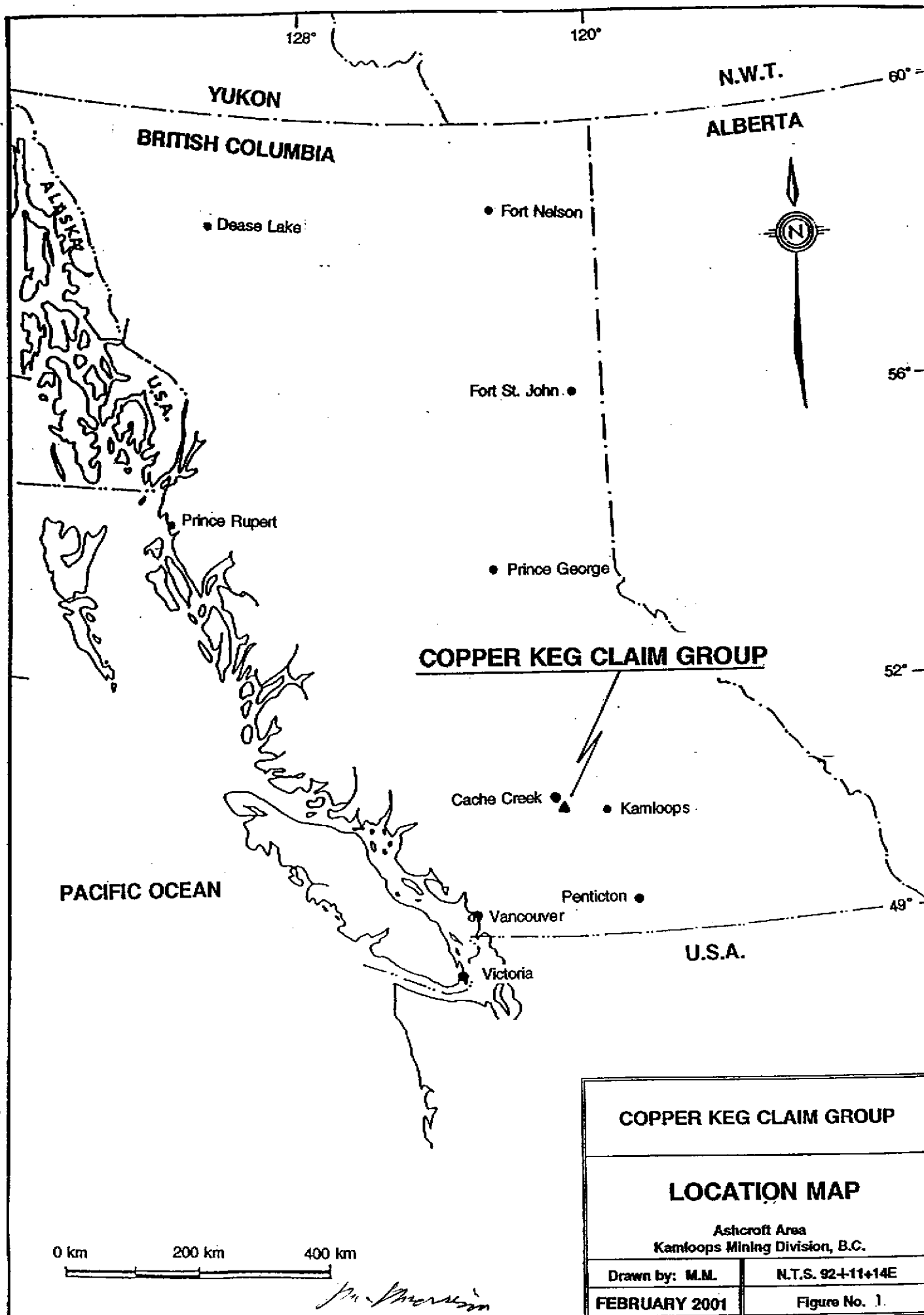
A second biogeochemical survey was conducted over portions of the Copper Keg 5-8 mineral claims in the vicinity of the Barnes Creek Fault in 1999. Elevated potassium and molybdenum concentrations were once again found in the sagebrush samples collected from over this fault zone. High concentrations of silver were also found in Douglas fir and Ponderosa pine sampled in the 1999 survey area.

This year, two intermediate grid lines were established between two of the 1999 grid lines on the Copper Keg 8 mineral claim and 25 additional samples were collected. The results of the new survey reinforced the validity of the 1999 survey results.

Based on the modest success of the two biogeochemical surveys, a shallow-hole Percussion Drill Program is recommended to test for copper and molybdenum mineralization in bedrock below the drift-covered Barnes Creek Fault on the Copper Keg 7 & 8 mineral claims and below the East-West Fault (inferred) on the Copper Kettle 1 mineral claim.

**SUMMARY** (continued)

If significant mineralization is discovered during the initial drilling program, then an expanded program of deeper drill holes is recommended on the southwestern side of the Copper Keg 9 mineral claim where the two faults are believed to intersect.



## **INTRODUCTION**

This report, written for government assessment work credits, discusses the results of a biogeochemical survey carried out over portions of the Copper Keg 8 mineral claim by the writer on November 13, 2000.

The Copper Keg Claim Group, which was originally comprised of 18 contiguous 2-post mineral claims, was staked by the writer in May, 1995 and 1996, to cover a spectacular gossan located on the southern side of the Thompson River, 9 km northeast of Ashcroft, B.C. The writer has, for several years, thought that the pyritic gossan could represent the outer limits of a large mineralized system associated with the Barnes Creek Fault and that this system could host sizeable deposits of copper, molybdenum or precious metals. On November 15, 2000, the Copper Keg Claim Group was reduced to a core of 6, 2-post mineral claims.

The gossan, located immediately south of the Canadian Pacific Railway tracks, is coincident with a zone of highly fractured, altered and pyritized rock that is well exposed in a steep-sided ravine. The ravine marks the northwestern end of the Barnes Creek Fault - a late fault that cuts diagonally across the northeast corner of the Guichon Creek Batholith (McMillan, 1976). The fault separates a quartz diorite hybrid phase of the Early Jurassic Guichon Creek Batholith on the northeast from the Upper Triassic Nicola Group rocks that lie to the southwest on the Copper Keg property.

The Barnes Creek Fault is very well exposed in the ravine 1 km north of the Copper Keg Claim Group, but is hidden beneath a thin cover of Pleistocene drift and Tertiary basalt on the property. Over a period of years, the writer has conducted several surveys (geological, magnetometer and VLF-EM) in an attempt to trace the fault from the ravine to the southern half of the original property (Morrison, 1984, 91, 92 & 96).

A secondary fault may cross the centre of the property from east to west at the southern edge of the quartz diorite plug, and it is thought that fracturing, alteration and pyritization may all occur along the southern border of the intrusive plug in a manner similar to that seen at the



**INTRODUCTION** (continued)

southwestern contact. This second fault (inferred) may intercept the Barnes Creek Fault in the vicinity of the Copper Keg 9 mineral claim.

In 1998, an experimental biogeochemical survey was conducted over the centre of the east-west valley (i.e. the east-west inferred fault) in an attempt to determine if any economic elements are present in the area. The deadwood twigs of sagebrush were selected as the sample medium and it was found that the sagebrush growing over the region of the inferred fault contained elevated levels of potassium and molybdenum.

Encouraged by the modest success of the 1998 survey, a similar survey was conducted over the drift-covered Copper Keg 5-8 mineral claims in the vicinity of the Barnes Creek Fault in 1999. This survey also yielded elevated levels of potassium and molybdenum from samples selected from deadwood branches of sagebrush.

This year's survey was conducted on two intermediate lines lying between lines surveyed on the Copper Keg 8 mineral claim in 1999. The purpose of this year's survey was to try to confirm the validity of the 1999 survey by duplicating the results on the new grid lines. All of the procedures of the 1999 survey were repeated for this year's survey.

A total of 25 samples were collected for this year's survey and the 30 element ICP analyses of these samples are listed on the Certificate of Analysis in Appendix C. Four of the 30 elements, molybdenum, potassium, silver and iron, have been selected for plotting and contouring on Figures 4-7 accompanying this report. The 1999 values are also plotted on the figures for comparative purposes.

Geological maps (Figures 8 & 9) covering this year's survey area have been added to this report for reference. These maps were submitted with a 1992 Assessment Report which is now on file with the government. Much of the geological description outlined in this report has also been reproduced from the 1992 report.

## **LOCATION and ACCESS**

The Copper Keg Claim group is situated south of the Thompson River, 9 km northeast of Ashcroft, B.C. (Lat. 50° 45'; Long. 121° 10'; N.T.S. Maps 92-I-11 & 14E). The property is reached from Ashcroft via the Highland Valley Highway (#97C) and the Barnes Lake Road (which is also known as logging road #44). A powerline road branches north from logging road #44 at 10.4 km, and this road gives access to the central portion of the property as illustrated on Figure 2.

The dirt road requires a four-wheel-drive vehicle during the wet Spring and Autumn seasons.

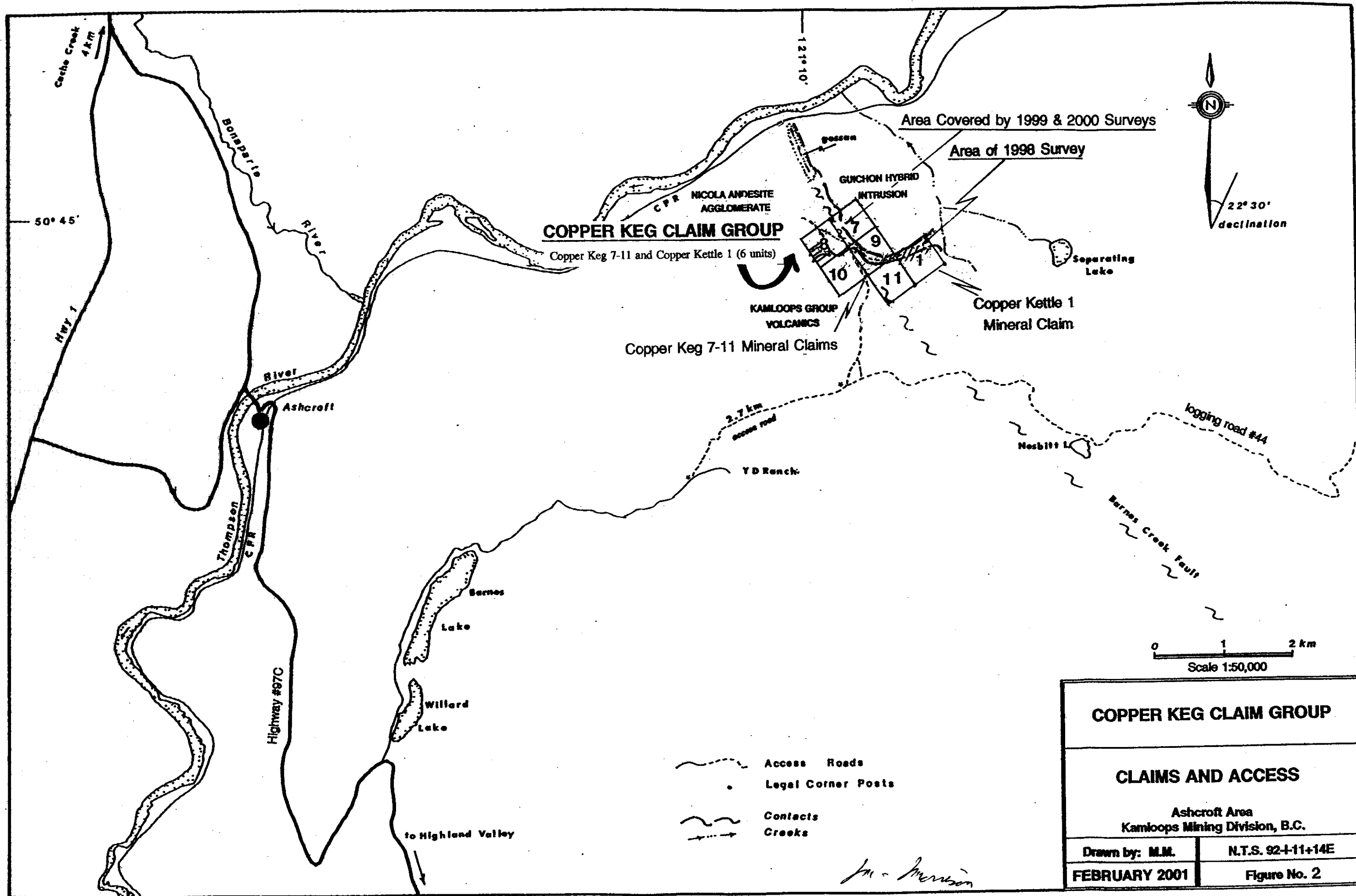
## **PHYSICAL FEATURES AND CLIMATE**

The Copper Keg Claim Group covers a bench at the 760 metre elevation, 2 km south of the Thompson River. Much of the bench is covered with sagebrush, but there is also a light, patchy forest of Ponderosa pine, Douglas fir and Juniper on local ridges and northern slopes.

The Thompson River Valley at Ashcroft has a desert climate with less than 25 cm of precipitation annually and summer temperatures often greater than 30°C. The Copper Keg property, which is at a higher elevation than Ashcroft, receives more precipitation and enjoys slightly cooler temperatures.

The bench area is used as rangeland, and a creek lying just to the east of the property provides drinking water for the livestock.

The winter snowpack seldom exceeds 30 cm on the property and the snow lasts only from November until early March.



## **CLAIM STATUS**

The mineral claims, making up the Copper Keg Group are 90% owned by the writer, M. Morrison of Kelowna, B.C. Doublestar Resources Ltd., a Vancouver based company, owns a 10% interest in the Claim Group.

On April 17, 2000, the mineral claims comprising the Copper Keg Claim Group were granted a Common Anniversary Date of November 15.

Specifics related to the 6, 2-post mineral claims located within the Kamloops Mining Division are given below:

<b><u>CLAIM NAME</u></b>	<b><u>UNITS</u></b>	<b><u>DATE OF RECORD</u></b>	<b><u>TENURE NUMBER</u></b>	<b><u>EXPIRY* DATE</u></b>
Copper Keg 7	1	May 14, 1995	336351	Nov. 15, 2001
Copper Keg 8	1	May 14, 1995	336352	Nov. 15, 2001
Copper Keg 9	1	May 14, 1995	336353	Nov. 15, 2001
Copper Keg 10	1	May 14, 1995	336354	Nov. 15, 2001
Copper Keg 11	1	May 14, 1995	336355	Nov. 15, 2001
Copper Kettle 1	1	May 15, 1996	345861	Nov. 15, 2001

\* Note: The new Expiry Dates are based on the acceptance of this report for Assessment Work Credits.

## **HISTORY**

The large gossan located immediately south of the Canadian Pacific Railway Tracks, 1 km north of the Copper Keg Claim Group, was one of British Columbia's early prospects. It was known as the Burr property and it was first described in the Minister of Mines Annual Report for 1898, p. 1107 as follows:

"The Burr group of eight claims is situated about 5.5 miles east of Ashcroft on the C.P. Railway, which runs through the property. It has a large body of ore, carrying gold and silver, but principally copper, and lies between diorite and granite. The country rock is diorite.

About 80 feet of tunnelling has been run in on the claims which are most favourably situated for working, as the ore can be dumped into the cars without extra handling."

It wasn't until the late 1960's that the prospect was recorded again in the Minister of Mines Annual Reports (1969, p. 263; 1970, p. 348; and 1971, p. 362). It was called the Pyrite property. Soil geochemical and Induced Polarization surveys were conducted on the Pyrite property and this work was followed-up with the drilling of three diamond drill holes in 1970.

The exact locations of the three drill holes are unknown to the writer, but drill core lying on the ground at two sites, well to the west of the gossan zone, suggests that at least two of the drill holes were drilled to test targets other than the gossan zone.

The Burr 1 mineral claim was staked by the writer in 1982 to cover the main gossan zone. The gossan and surrounding region were prospected late in 1982 (Morrison, 1983). In 1984, the Burr 2 mineral claim of 20 units was added to the south side of the Burr 1 mineral claim and a ground VLF-EM survey was conducted over ground lying to the southeast of the gossan zone (Morrison, 1984).

**HISTORY** (continued)

The Burr property was allowed to lapse, but in May, 1990, the writer staked the Key 1-18, 2-post mineral claims to cover the gossan and territory lying to the southeast.

During April 1991, a ground magnetometer survey was conducted over portions of the Key 3-10 mineral claims (Morrison, 1991) and in 1992 a geological mapping program was carried out on the Key 5-8 mineral claims (Morrison, 1992).

The property was restaked for a second party as the Copper Key 1-18 mineral claims in 1994 and then restaked again by the writer in 1995 and 1996 as the Copper Keg 1-14 and Copper Kettle 1-4 mineral claims that made up the original Copper Keg Claim Group.

In 1996, a VLF-EM ground survey was conducted over portions of the Copper Keg 9 & 11 mineral claims, and in 1997 geological mapping at a scale of 1: 2500 was conducted on portions of the Copper Keg 9-11 and Copper Kettle 1 mineral claims (Morrison, 1996-97).

An experimental biogeochemical survey, using sagebrush as a sample medium, was conducted over portions of the Copper Keg 9 & 11 and Copper Kettle 1 mineral claims in 1998 and a second survey was conducted over portions of the Copper Keg 5-8 mineral claims in 1999 (Morrison, 1998 & 99).

**REGIONAL GEOLOGY**

The regional geology of the Highland Valley Copper-Molybdenum District which extends from Ashcroft on the northwest to the old Craigmont Mine (near Merritt) on the southeast is illustrated on Figure 3 accompanying this report. The map which is centred over the Guichon Creek Batholith has been reproduced from a map appearing in C.I.M. Special Volume 15 titled "Porphyry Deposits of the Canadian Cordillera". The map by W.J. McMillan accompanies a paper in Volume 15 entitled "Geology and Genesis of the Highland Valley Ore Deposits and the Guichon Creek Batholith".

**REGIONAL GEOLOGY** (continued)

The outline of the Copper Keg property, situated northeast of Ashcroft, has been added to the regional map to illustrate the location of the property with respect to: the Barnes Creek Fault; the hybrid phase of the Guichon Creek Batholith; and the world class copper-molybdenum mines (Valley Copper, Lornex and Bethlehem) that lie 30 to 35 km to the southeast.

Several excellent geological papers have been written about the Guichon Creek Batholith and the large mines located near the centre of the batholith and the reader is referred to the paper cited above for further details.

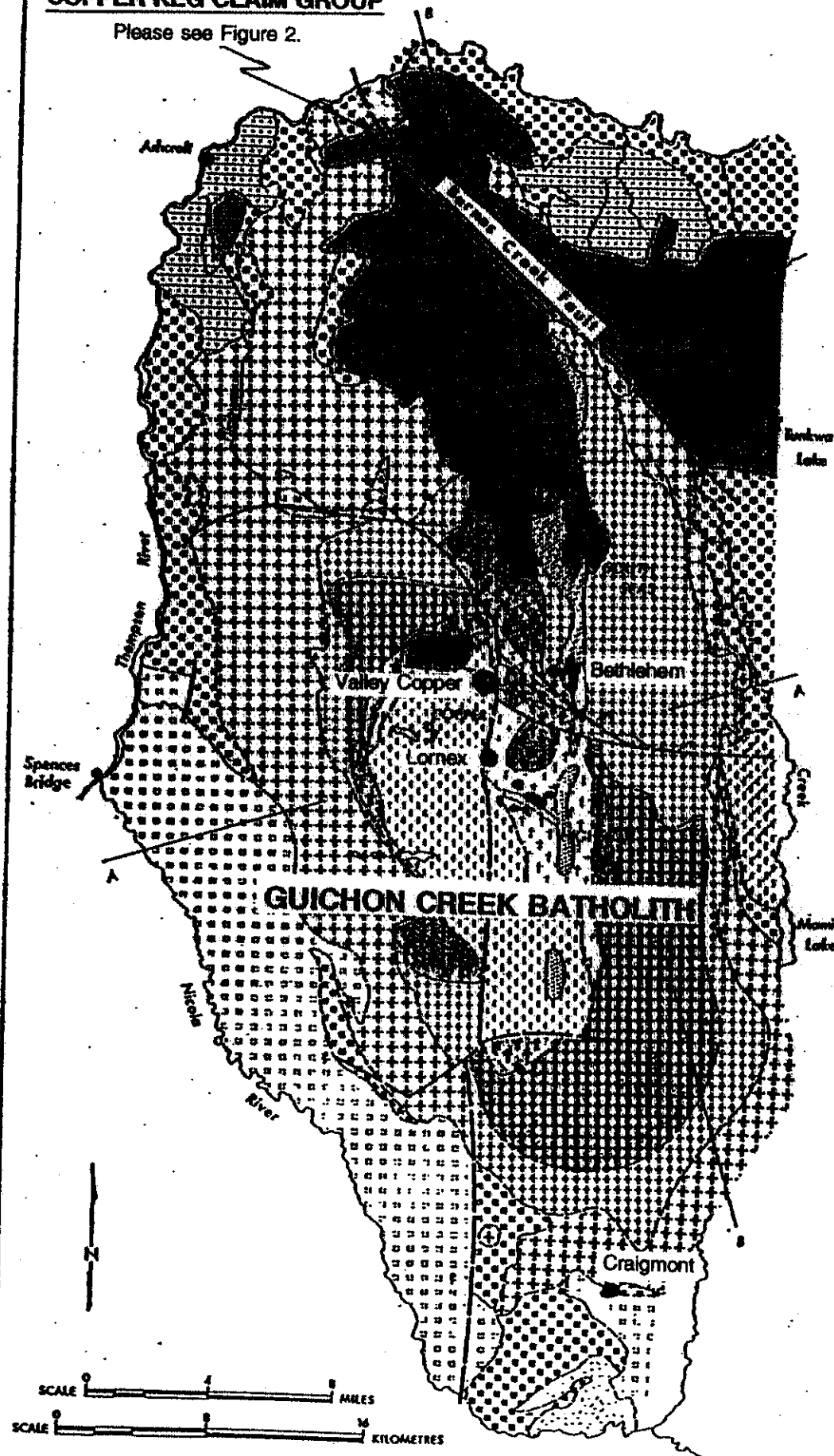
In the vicinity of the Copper Keg Claim Group, Figure 3 shows that the Barnes Creek Fault dissects the property, separating a hybrid phase of the Guichon Creek Batholith on the northeast side of the property from Upper Triassic Nicola Group rocks on the southwest. Movement on the fault is believed to be left-lateral.

Tertiary volcanics unconformably overlie pre-Tertiary rocks on the southern half of the Copper Keg property.

A mantle of Pleistocene drift covers three-fourths of the property.

# COPPER KEG CLAIM GROUP

Please see Figure 2.



Geology of the Guichon Creek batholith.

## TERTIARY

VOLCANIC AND SEDIMENTARY ROCKS

CRETACEOUS (?)

VOLCANIC AND SEDIMENTARY ROCKS

JURASSIC

SEDIMENTARY ROCKS

INTRUSIVE ROCKS OF THE BATHOLITH

POST-BETHSADA DYKES

BETHSADA PHASE

POST-SKEENA DYKES AND PLUGS

SKEENA VARIETY

POST-BETHLEHEM DYKES AND PLUGS

BETHLEHEM PHASE \*

HIGHLAND VALLEY PHASE

CHATAWAY VARIETY

GUICHON VARIETY

HYBRID PHASE

INTRUSIVE ROCKS OF UNCERTAIN AFFILIATION

GUMP LAKE PHASE

COYLE "GRANITE"

UPPER TRIASSIC

VOLCANIC AND SEDIMENTARY ROCKS

## SYMBOLS

BRECCIA BODIES .....

ORE DEPOSITS, IMPORTANT PROSPECTS .....

AREAS WITH SWARMS OF PORPHYRY DYKES .....

FAULTS, MAPPED, INFERRED .....

SECTION LINES FOR GRAVITY PROFILES .....

\* DESIGNATION OF GRANITIC UNITS AS PHASES OR VARIETIES  
FOLLOWS THE USAGE OF NORTHCOE, 1969.

from CIM Special Volume No. 15

# COPPER KEG CLAIM GROUP

## REGIONAL GEOLOGY

## GUICHON CREEK BATHOLITH

Ashcroft Area  
Kamloops Mining Division, B.C.

FEBRUARY 2001

N.T.S. 92-11-14E

Figure No. 3



## **PROPERTY GEOLOGY**

### **Summary from 1992 Geological Report**

The geology of the Copper Keg property is relatively simple. A wide fracture zone (Barnes Creek Fault) is coincident with the contact of a quartz diorite plug that is intrusive into an andesite agglomerate. The quartz diorite lying to the northeast of the fracture zone is a medium grained hybrid phase of the Guichon Creek Batholith, while the andesite lying to the southwest is part of the Upper Triassic Nicola Group.

The fracture zone is pyritized, hydrothermally altered and bleached over a width of up to 200 metres. The fracturing, pyritization and clay alteration are particularly well exposed in the steep sided ravine 1 km north of the Copper Keg Claim Group, but less well exposed to the southeast where a creek has just begun to cut through the deep drift to bedrock. Further south, on the Copper Keg 9 mineral claim, the southeast projection of the Barnes Creek Fault is entirely concealed by Tertiary Kamloops Group volcanics up to 35 metres thick.

Geological mapping in 1992 confirmed that the alteration and pyritization of the quartz diorite and andesite agglomerate postdates the Guichon Creek Intrusion. Both the quartz diorite and andesite have been altered by late hydrothermal solutions that have percolated through the Barnes Creek Fault Zone. It is thought that the hydrothermal solutions have emanated from a late-cooling magma that lies at some shallow depth below surface. Although the mineralization exposed in the ravine is pyrite, it is thought that copper, molybdenum, or precious metals may have been deposited by these same hydrothermal solutions at some point along the Barnes Creek Fault.

An east-west valley that is coincident with the southern edge of the quartz diorite intrusive may represent another fault that could be mineralized with pyrite and/or copper and molybdenum. This fault (inferred) runs into the Barnes Creek Fault at an oblique angle from the east on the Copper Keg 9 mineral claim.

**PROPERTY GEOLOGY** (continued)**Summary of 1997 Mapping Program**

The three major geological units that are described in the foregoing summary (i.e. Upper Triassic Nicola Group andesite, Early Jurassic Guichon Creek Intrusive, and Tertiary Kamloops Group Volcanics) underlie portions of the Copper Keg 9-11 and Copper Kettle 1 mineral claims mapped in 1997. The specifics related to these major lithological units will be described in the paragraphs that follow.

**Upper Triassic Nicola Group Andesite Agglomerate (Unit 1)**

A black andesite agglomerate of the Upper Triassic Nicola Group (Unit 1) underlies much of the Copper Keg 5, 6 and 8 mineral claims that were mapped in 1992. The agglomerate has been intruded by the Guichon Hybrid plug on the Copper Keg 5 mineral claim in the vicinity of the Barnes Creek Fault.

The 1992 mapping found that the andesite agglomerate is highly indurated and often massive to blocky in outcrop. Some banding suggests that the agglomerate may strike at 150 degrees and dip vertically.

The agglomerate is made up of amorphous and porphyritic andesite lapilli and bombs of 1 to 15 cm, set in a matrix of tuff (20%). The andesite clasts (or bombs?) contain either white feldspar or black augite phenocrysts. The agglomerate is sometimes hornfelsic, or it can contain up to 5% epidote. Near the Barnes Creek Fault the rock has been well fractured and argillically altered or highly bleached to a white clay by hydrothermal solutions.

**PROPERTY GEOLOGY** (continued)**Early Jurassic Guichon Creek Intrusive (Unit 2)**

The intrusive plug (Unit 2 on Figures 9 & 10) is a quartz diorite hybrid phase of the Early Jurassic Guichon Creek Batholith.

The quartz diorite intrudes the Upper Triassic Nicola Group andesite agglomerate on the property. In 1992, it was found that a contact zone of mafic-rich quartz diorite grades into hornfelsic andesite over a distance of 20 metres near the centre of the Copper Keg 5 mineral claim. At this location a wide fracture zone (Barnes Creek Fault) is coincident with the intrusive contact. The fracture zone extends only 10 to 20 metres into the intrusive, but up to 175 metres southwest into the andesitic rocks. Northeast of the fracture zone the intrusive is blocky to massive and it forms precipitous bluffs up to 60 metres high on the Copper Keg 5 mineral claim.

The quartz diorite a short distance away from the contact zone is a fresh, white to grey, medium grained, equigranular rock comprised of 65% plagioclase, 15% quartz, 10% hornblende, 5% biotite and minor orthoclase and augite. The mafic minerals vary from 10 to 25% locally and are noted to increase towards the perimeter of the intrusive. The rock is weakly chloritized near fractures.

**Tertiary Kamloops Group Volcanics (Unit 3)**

Tertiary Kamloops Group basalts unconformably overlie pre-Tertiary rocks on the southern portion of the original Copper Keg Claim Group. The flat-lying basalts which are thought to be up to 35 metres thick form a plateau surface southeast of the Copper Keg 7 & 8 mineral claims.

The basalts are generally black to grey, fine grained, and comprised of black feldspars and mafic minerals. Olivine equals less than 2% of the visible minerals, while vesicles equal up to 5% of the rock.

**PROPERTY GEOLOGY** (continued)**Tertiary Kamloops Group Volcanics (Unit 3)** (continued)

The basalt weathers blocky to platy and some flows are less than 1 metre thick. Interflow horizons are occasionally rubbly and hematitic.

**Pleistocene Sediments**

Overburden comprised of Pleistocene drift, 1-3 metres deep, is common on much of the property. The drift deepens to a possible 15 metres on the northeast side of the Copper Keg 8 mineral claim where there are low moraines and glacial benches. The drift also fills the eastern side of the east-west valley on the Copper Kettle 1 mineral claim to depths estimated to be 5 to 10 metres.

Several low morainal ridges indicate that the last ice cover moved towards the southeast.

**Faulting****Barnes Creek Fault**

The Barnes Creek Fault occurs as a wide shattered zone of rock that coincides with the Guichon Hybrid Intrusive - Nicola Group Andesite Agglomerate contact which is exposed on the Copper Keg 1-6 mineral claims. It was found, during the 1992 mapping program, that the well fractured rock extends for 20 metres into the intrusive and for up to 175 metres into the agglomerate on the Copper Keg 5 mineral claim. The zone is well exposed by the deep erosion of a ravine on the Copper Keg 1 & 3 mineral claims where the spectacular gossan occurs. The gossan extends 900 metres north-south and 200 metres east-west on this portion of the property. The gossan is

**PROPERTY GEOLOGY** (continued)**Faulting** (continued)**Barnes Creek Fault** (continued)

comprised of intensely clay-altered and pyritized andesite and quartz diorite that has been flooded with hydrothermal solutions that have invaded the well fractured rock.

The shattered zone is made up of a complex series of fractures - none of which clearly define the strike of the Barnes Creek Fault that is thought to strike 150 degrees and dip nearly vertical. Evidence of the Barnes Creek Fault is lost under Pleistocene deposits on the Copper Keg 7 & 8 mineral claims, and under the thin cover of Kamloops Group basalt on all mineral claims to the southeast (i.e. Copper Keg 9-13).

**The East-West Inferred Fault**

The east-west valley crossing the Copper Keg 9 and Copper Kettle 1 mineral claims is thought to be coincident with a fault which defines the southern contact of the quartz diorite intrusive with Nicola Group andesites. It is thought that the intensity of fracturing, clay-alteration and pyritization on this fault could match that of the Barnes Creek Fault.

**Alteration and Mineralization**

The spectacular gossan on the original Copper Keg 1-6 mineral claims represents an area of intense hydrothermal alteration that is associated with highly fractured rock related to the Barnes Creek Fault. The rock is entirely altered to white clay minerals over areas measuring up to tens of metres in diameter. The altered rock contains 2% pyrite (or limonite after

**PROPERTY GEOLOGY** (continued)**Alteration and Mineralization** (continued)

pyrite) generally and up to 5% pyrite locally. The pyrite is usually disseminated throughout the rock, but occasionally forms blebs and masses up to 2 cm in size which fill fractures. Chalcopyrite is sometimes present in small amounts.

The degree of alteration is directly proportional to the degree of fracturing, and it decreases sharply in either direction away from the fault. Both the Nicola Group andesite and the Guichon quartz diorite are altered, but the fracturing (and therefore, the alteration) extends much further into the andesite towards the southwest than towards the quartz diorite to the northeast. The quartz diorite forms massive cliffs just a few tens of metres northeast of the Barnes Creek Fault.

The hydrothermal alteration and pyritization clearly postdates the Guichon Intrusive event as the pyrite fills late fractures in both the quartz diorite and andesite agglomerate.

Weak clay alteration and pyritization of the Tertiary basalt was observed at a few scattered locations across the property. Some of the alteration zones are cut by chalcedony veinlets and some vesicles are filled with chalcedony. Although the alteration of the basalt is nowhere intense, the alteration does point out that relatively recent hydrothermal solutions have invaded regions of the property.

## **BIOGEOCHEMICAL SURVEY - 2000**

### **Grid**

The Location Line of the Copper Keg 8 mineral claim, which runs at a bearing of 145 degrees, was called Baseline 5+00E for the survey. Flagged grid lines 16+50S and 17+50S were then measured perpendicular to the Baseline 100 metres apart. The two lines extend from the Baseline for 300 metres to the southwest. The new grid lines are separated from the 1999 survey lines by 50 metres. Stations were marked for sample sites at each 25 metre interval along the grid lines. Both the 1999 and 2000 grid lines are illustrated on Figures 4-7. In all, 600 metres of new grid line were established using a Silva Ranger compass and a Topolite belt chain.

Twenty-five biogeochemical samples were collected from the new grid stations.

### **Sampling**

Deadwood branches of sagewood proved to be an effective sample medium for the 1998 & 99 surveys on the property, so similar material was used for this year's survey. Sagebrush was available on all of L16+50S and on the southwestern half of L17+50S, but deadwood twigs of pine or fir trees were the only material available for sampling at some site on the northeastern half of L17+50S. The material used as a sample medium is illustrated for each station on Figures 4-7. In all cases, a single species was used for the sample and deadwood branches and twigs were collected. At station 17+50S, 3+75E there was no deadwood sagebrush available and a livewood sample was obtained.

The procedure at each site consisted of breaking dead branches from several bushes (or trees) located near the survey station. Twigs of 1 to 1½ cm diameter were then cut from these branches into 10 cm lengths and placed in "kitchen-catcher" garbage bags marked with the station grid number. Approximately 160 grams of sample were collected at each site.

**BIOGEOCHEMICAL SURVEY - 2000** (continued)**Sampling** (continued)

The deadwood branches and twigs were used in place of "livewood" or bark at most sample sites, because the writer has had success using the deadwood samples on several other properties in Southern British Columbia.

The 25 samples collected from the Copper Keg property were shipped to Acme Analytical Laboratories in Vancouver for standard ICP analyses of 30 elements. The laboratory procedures are listed in Appendix C along with the results.

**Results****The Effects of the Sample Medium**

The vegetation within the survey area changes from open sagebrush regions to forest cover over short distances and it was impossible to conduct the 1999 and 2000 surveys with a single species of material. The mix of species definitely resulted in inconsistencies across the survey area. The data on Figures 4-7 clearly shows that different varieties of vegetation absorb and retain elements at different rates and, in some cases, these differences are great.

The survey data shows that Douglas fir and Ponderosa pine both have a great affinity for silver (e.g. there is 13.0 parts per million silver in sample 15+00S, 4+75E), whereas sagebrush draws up very little silver from the soil (0.3 parts per million, or less, in most samples). On the other hand, the sagebrush samples yield very high potassium values (greater than 14%) while the Douglas fir and Ponderosa pine samples generally contain only 2 to 4% potassium. Sagebrush also has a slight affinity for molybdenum compared to the tree samples.



**BIOGEOCHEMICAL SURVEY - 2000** (continued)**Results** (continued)**The Effects of the Sample Medium** (continued)

In addition to the very high silver values, the Douglas fir and Ponderosa pine samples generally contain elevated values of copper, lead, zinc, arsenic and calcium. The sagebrush samples contain unusually low values of nickel, cobalt, manganese, chrome, aluminum and calcium. The Juniper samples contain low concentrations of many of the elements with the exception of calcium, which is often high.

When the laboratory data (see Appendix C) is reviewed only four elements yield values that are considered to represent bedrock concentrations of minerals. These four elements, molybdenum, potassium, silver and iron, have been selected for plotting and contouring on Figures 4-7.

There is not enough data to treat statistically, so in all cases the value chosen for contouring each element was picked after a visual inspection of the data in 1999. The same values were used for contouring this year's survey data.

The concentrations of elevated molybdenum (Figure 4) and potassium (Figure 5) are clearly related to the sagebrush samples collected on lines 16+00, 16+50, 17+00 and 17+50S. The concentration of elevated silver (Figure 6) and iron (Figure 7) are notably associated with the Douglas fir and Ponderosa pine samples collected on lines 14S, 15S, 18S and 19S.

**Molybdenum (Figure 4)**

A zone of elevated molybdenum (greater than 18 ppm) occurs over an area of 150 square metres between lines 16+00S & 17+00S and 2+75E & 4+50E on the Copper Keg 8

**BIOGEOCHEMICAL SURVEY - 2000** (continued)**Results** (continued)**Molybdenum (Figure 4)** continued

mineral claim. A second zone occurs at the southwestern ends of lines 16+50S and 17+50S.

The sample medium in both areas was predominantly sagebrush.

**Potassium (Figure 5)**

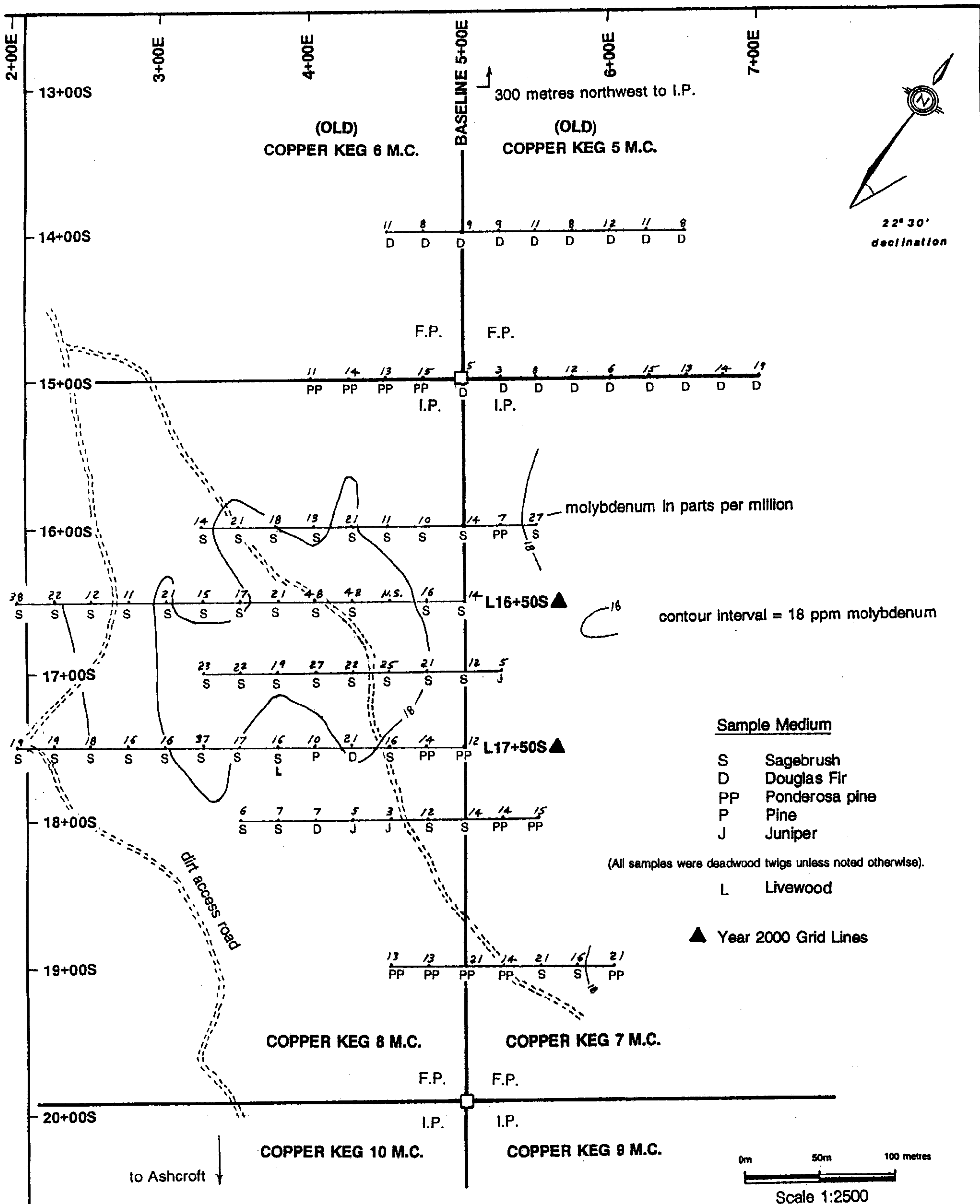
Potassium contoured at the 14.00 % value covers the main area of elevated molybdenum values just described and extends another 50 metres to the southwest to 2+50E.

**Silver (Figure 6)**

The 2.0 ppm value has been used for outlining three areas with elevated silver on Figure 6. The three areas are all associated with either Douglas fir or Ponderosa pine samples and no significant silver occurs within the central portion of the survey area where the sample medium was sagebrush. As noted earlier, sagebrush has little, or no, affinity for silver.

**Iron (Figure 7)**

The value of 1.50% iron was used to outline areas with elevated iron on Figure 7. Three of the outlines closely match the three elevated silver zones on Figure 6. A fourth area with elevated iron values occurs from L14S to L15S at 5+75E, and a fifth area occurs at the southwestern end of L16+50S where four sagebrush samples were collected.



Please see Figures 8 & 9 for geology.

Please see Figure 2 for entire Copper Keg Claim Group.

Claim posts tied in to grid with a compass and belt chain

## COPPER KEG CLAIM GROUP

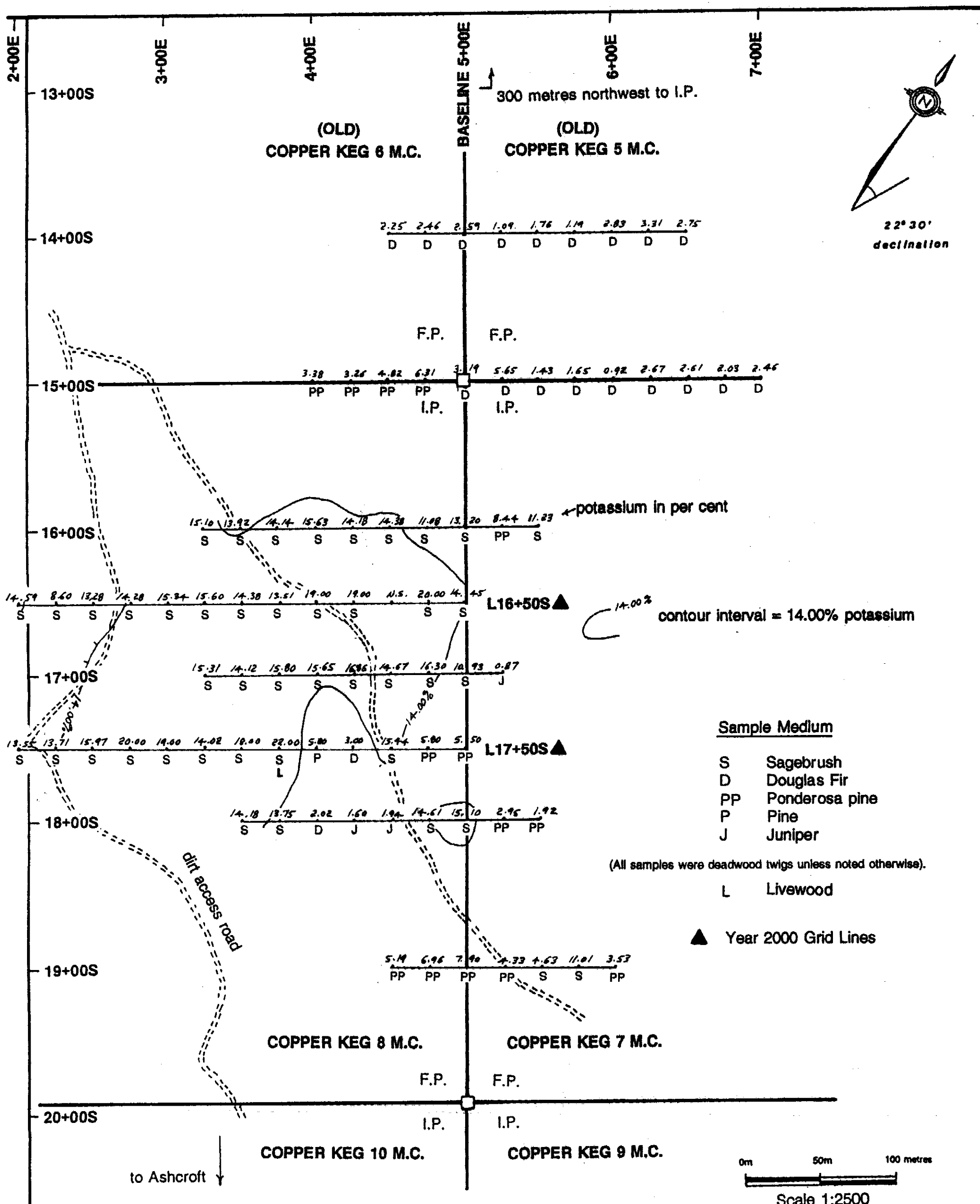
**BIOGEOCHEMICAL SURVEY  
MOLYBDENUM  
COPPER KEG 5-8 M.C.s  
Ashcroft Area  
Kamloops Mining Division, B.C.**

Drawn by: M.M.

N.T.S. 92-I-11+14E

FEBRUARY 2001

FIGURE 4

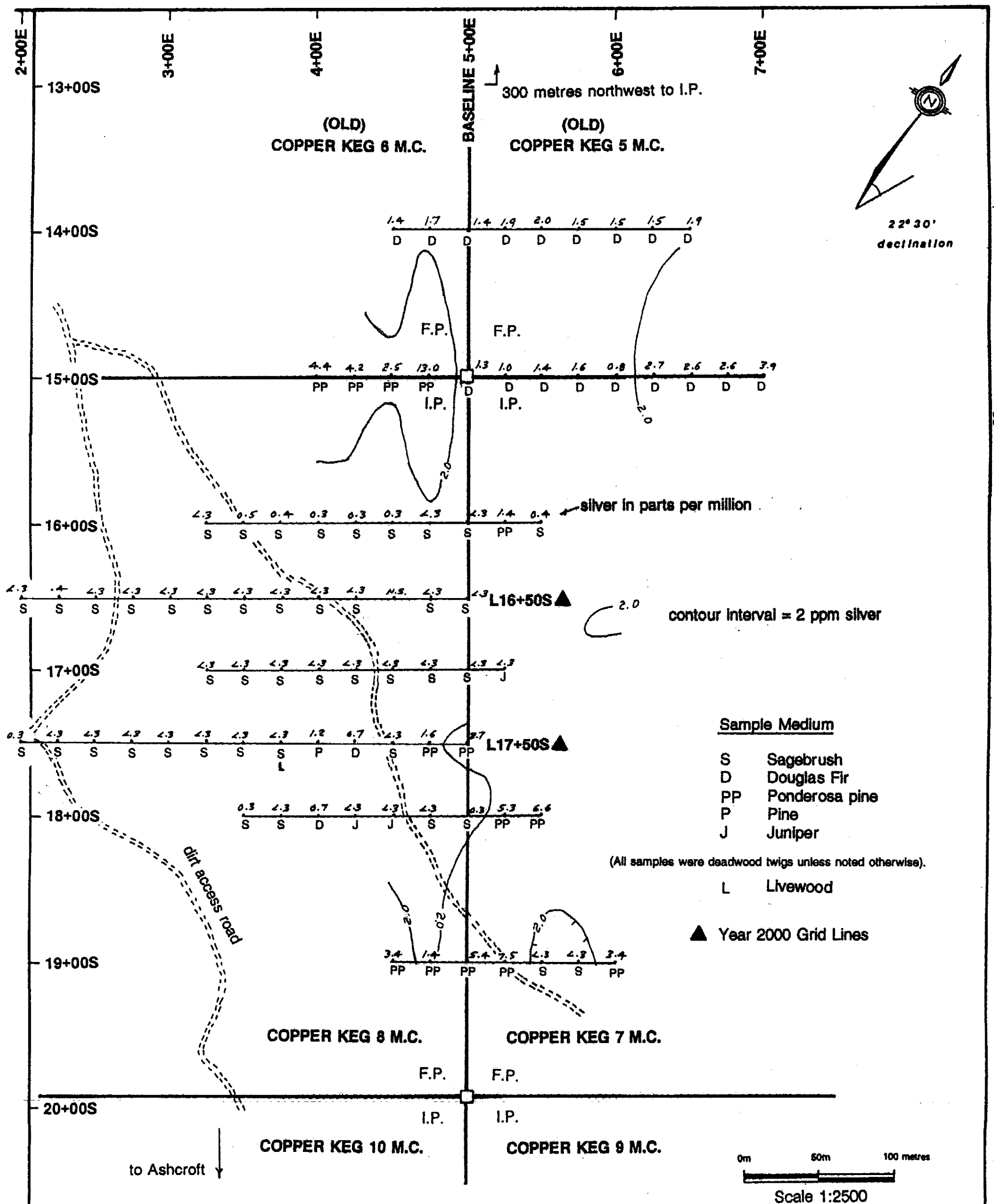


Please see Figures 8 & 9 for geology.  
 Please see Figure 2 for entire Copper Keg Claim Group.

Claim posts tied in to grid with a compass and belt chain

*J. Morrison*

COPPER KEG CLAIM GROUP	
BIOGEOCHEMICAL SURVEY POTASSIUM COPPER KEG 5-8 M.C.s Ashcroft Area Kamloops Mining Division, B.C.	
Drawn by: M.M.	N.T.S. 92-I-11+14E
FEBRUARY 2001	FIGURE 5

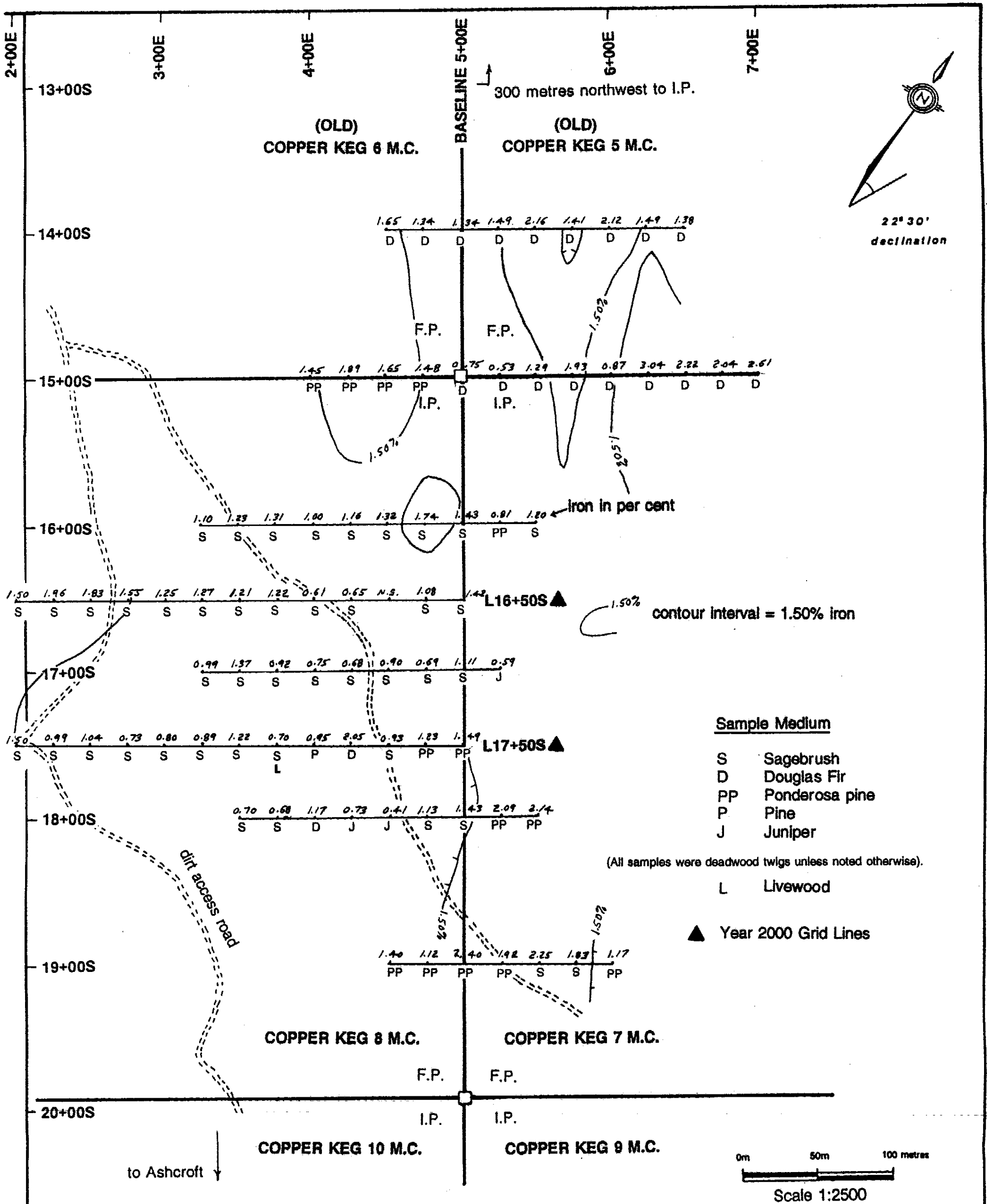


Please see Figures 8 & 9 for geology.

**Please see Figure 2 for entire Copper Keg Claim Group.**

### Claim posts tied in to grid with a compass and belt chain

<b>COPPER KEG CLAIM GROUP</b>	
<b>BIOGEOCHEMICAL SURVEY SILVER COPPER KEG 5-8 M.C.s Ashcroft Area Kamloops Mining Division, B.C.</b>	
<b>Drawn by: M.M.</b>	<b>N.T.S. 92-11+14E</b>
<b>FEBRUARY 2001</b>	<b>FIGURE 6</b>



Please see Figures 8 & 9 for geology.

Please see Figure 2 for entire Copper Keg Claim Group.

Claim posts tied in to grid with a compass and belt chain

## COPPER KEG CLAIM GROUP

### BIOGEOCHEMICAL SURVEY IRON

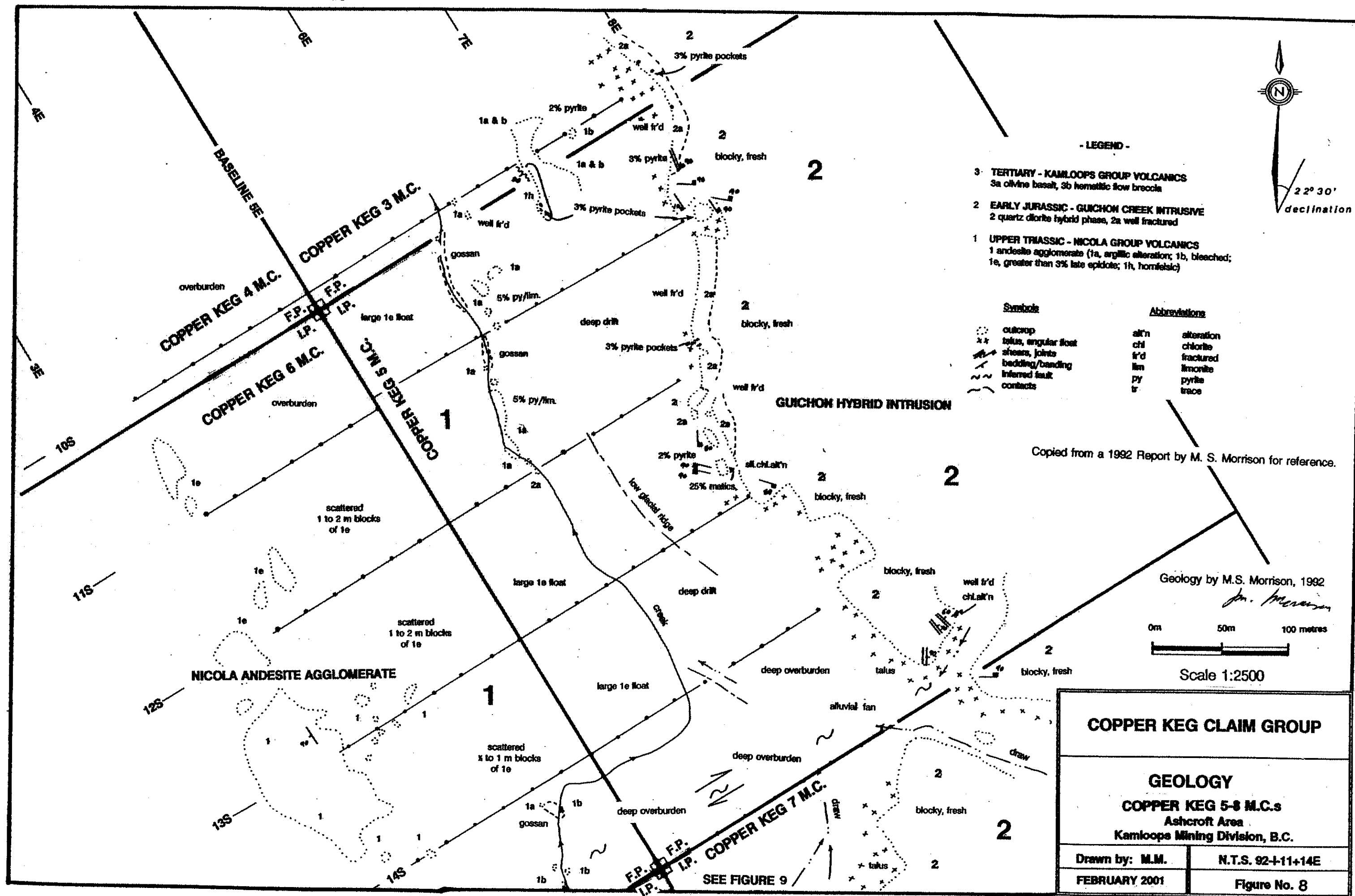
COPPER KEG 5-8 M.C.s  
Ashcroft Area  
Kamloops Mining Division, B.C.

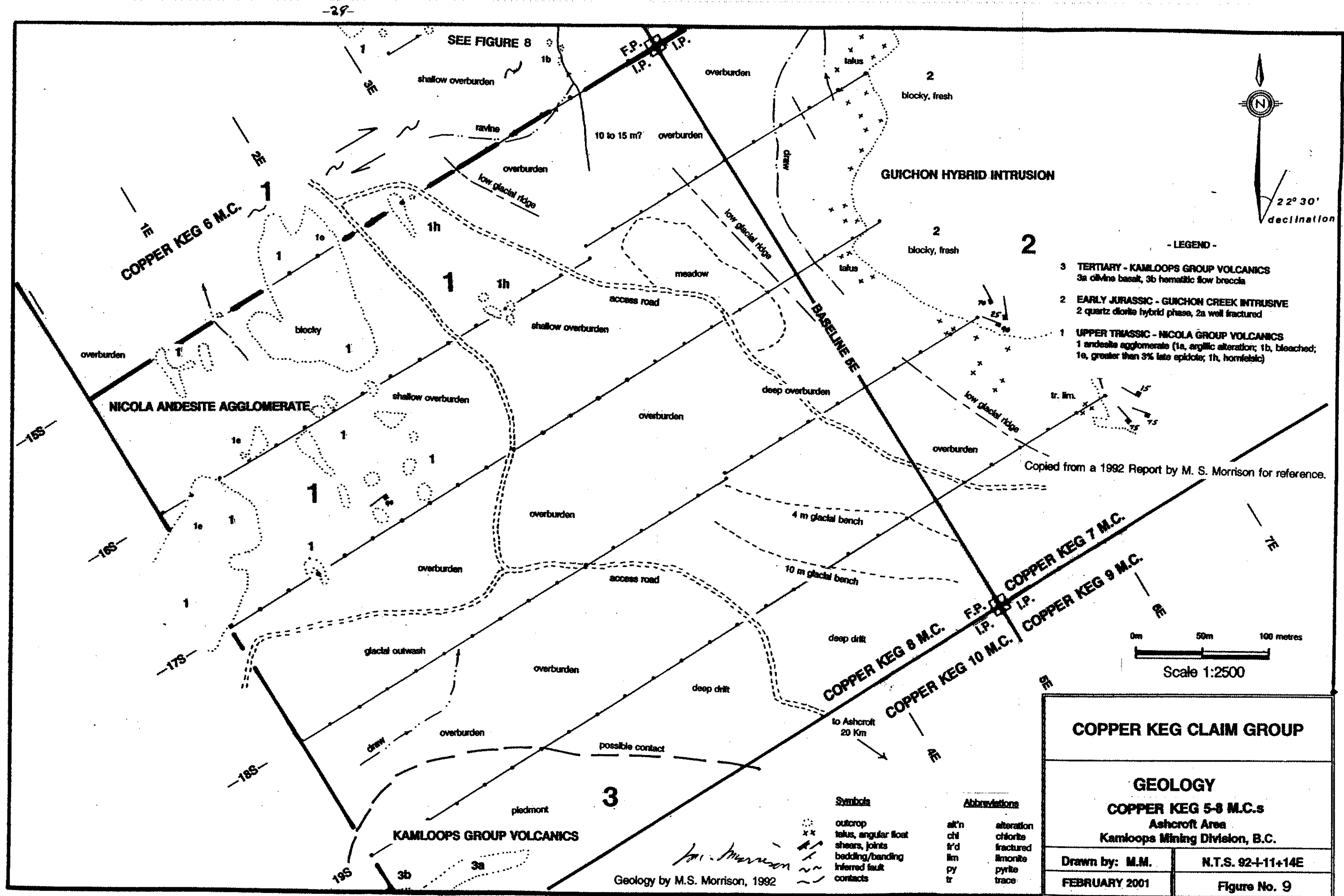
Drawn by: M.M.

N.T.S. 92-11+14E

FEBRUARY 2001

FIGURE 7







## **DISCUSSION**

The use of four types of vegetation for sample material in the survey area complicated the interpretation of the results, but in spite of this, four of the 30 elements analyzed clearly occur in elevated amounts.

The four elements, molybdenum, potassium, silver and iron, are all consistent with those that might be expected to be found in soil overlying the southern extension of the Barnes Creek Fault gossan zone. The elevated molybdenum and potassium values in sagebrush samples on lines 16+00S, 16+50S, 17+00S & 17+50S equate with those found in sagebrush samples during the 1998 survey over the East-West Fault (inferred) on the Copper Kettle 1 mineral claim. The elevated iron values in the 1999 & 2000 samples are thought to represent iron originating from the pyritic gossan zone associated with the Barnes Creek Fault.

The silver values are particularly high in the 1999 & 2000 survey area (e.g. 6.6, 7.5 and 13.0 ppm) and these match some of the values (8.6 ppm) obtained from Ponderosa pine in the 1998 survey area. It would seem that, in addition to molybdenum and potassium, silver is also associated with the pyritic, clay-altered fault zones that are believed to underlie both survey areas.

Unfortunately, the data indicates that sagebrush has no affinity for silver, and the sagebrush samples collected during all of the surveys do not reflect the concentration of silver in bedrock.

When all four of the elements with elevated values are considered (i.e. molybdenum, potassium, silver and iron) it would seem that hydrothermal solutions bearing economic elements have entered the fractured rocks of the two fault systems covered by the two surveys.

**DISCUSSION** (continued)

It is recommended that a low-cost, short-hole Percussion Drilling Program be conducted over portions of the East-West Fault (inferred) on the Copper Kettle 1 mineral claim and the Barnes Creek Fault on the Copper Kettle 7 & 8 mineral claims to test the bedrock for economic elements (i.e. copper, molybdenum, gold and silver). Both target areas are easily accessible and the drift-cover is not expected to be excessive.

If the low-cost drilling program is successful, then a second program of deeper drilling is recommended to test bedrock underlying the southwestern side of the Copper Keg 9 mineral claim where the two faults are believed to intersect. This region is considered to be the prime exploration target on the property, but the drift and basalt cover in this area is believed to be 25 to 35 metres thick.

## **CONCLUSIONS and RECOMMENDATIONS**

This year's biogeochemical survey, conducted over a small portion of the Copper Keg 8 mineral claim, confirmed results obtained during a 1999 survey over the same area. Elevated values for molybdenum and potassium occur on two intermediate grid lines located 50 metres from the original grid lines. The molybdenum and potassium occur along with elevated silver and iron values (1999 survey) over a drift-covered segment of the Barnes Creek Fault which underlies the Copper Keg 7 & 8 mineral claims.

It is thought that the elevated concentrations of the four elements in the biogeochemical samples may represent concentrations of these elements in bedrock, which on the Copper Keg 7 & 8 mineral claims is believed to lie below 3 to 6 metres of drift. It is thought that the bedrock could be intensely clay-altered and pyritic like rock exposed at the spectacular gossan which lies one kilometre to the northwest.

The elevated molybdenum and potassium values obtained from the sagebrush samples in the 1999 and 2000 survey area are similar to those recorded in 1998 from samples collected over the East-West Fault (inferred). The 1999 and 2000 surveys also discovered highly anomalous silver values in samples of Douglas fir and Ponderosa pine. This raises the possibility that the hydrothermal solutions invading the Barnes Creek Fault are also silver bearing.

The 1999 and 2000 survey results also demonstrate that different types of vegetation absorb a wide range of elements in different concentrations. Sagebrush, for instance, has a high affinity for potassium, but no affinity for silver, whereas both Douglas fir and Ponderosa pine have a high affinity for silver (see Figures 4-7).

The data from three surveys (1998-2000) suggests that hydrothermal solutions containing at least some economic elements have invaded both the East-West and Barnes Creek Faults which are believed to underlie the two drift-covered survey regions.

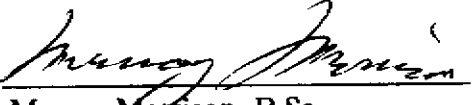
**CONCLUSIONS and RECOMMENDATIONS** (continued)

It is recommended that a low-cost, shallow-hole Percussion Drilling Program be conducted over the two Fault Zones to test the bedrock for indications of economic mineralization.

If the initial drilling program is successful, then a deeper drilling program is recommended to test the prime zone on the southwestern side of the Copper Keg 9 mineral claim where the two faults are believed to intersect.

The drift is believed to be shallow in the two target areas selected for the initial drilling program and both areas are easily accessible. The target area on the Copper Keg 9 mineral claim is slightly less accessible, and it is possible that 25 to 35 metres of drift and basalt overlie the mineralized (?) pre-Tertiary rocks.

February 8, 2001  
Kelowna, B.C.

  
Murray Morrison, B.Sc.

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              Dept. of Mines and Petroleum Resources, Bulletin No. 56

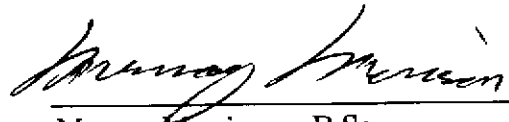
\*   Assessment Reports filed with the Ministry of Energy and Mines of British Columbia.

**APPENDIX A****STATEMENT OF QUALIFICATIONS**

I, Murray Morrison, of the City of Kelowna, in the Province of British Columbia, do hereby state that:

1. I graduated from the University of British Columbia in 1969 with a B.Sc. Degree in Geology.
2. I have been working in all phases of mining exploration in Canada for the past thirty-one years.
3. During the past thirty-one years, I have intermittently held responsible positions as a geologist with various mineral exploration companies in Canada.
4. I have conducted several geological, geochemical, and geophysical surveys on mineral properties in Southern British Columbia during the past thirty-one years.
5. I conducted the Biogeochemical Survey outlined in this report.
6. I own a 90% interest in the Copper Keg 7-11 and Copper Kettle 1 mineral claims.

February 8, 2001  
Kelowna, B.C.

  
Murray Morrison - B.Sc.

**APPENDIX B****STATEMENT OF EXPENDITURES - ON THE COPPER KEG CLAIM GROUP**

Statement of Expenditures in connection with a Biogeochemical Survey carried out on the Copper Keg Claim Group, located 9 km northeast of Ashcroft, B.C. (N.T.S. Maps 92-I-11 & 14E) for the year 2000.

**BIOGEOCHEMICAL SURVEY (600 metres)**

M. Morrison, geologist	1 day @ \$300.00/day	\$ 300.
Truck, 4 x 4 (including gasoline and insurance)	1 day @ \$75.00/day	75.
Meals and Lodging	1 day @ \$70.00/day	70.
Flagging, belt chain thread, and sample bags		<u>10.</u>
	Sub-total	\$ 455.

**ASSAYING COSTS**

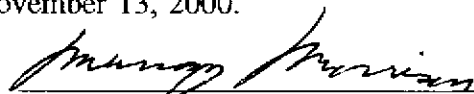
25 biogeochemical samples analyzed for 30 elements by ICP	25 @ \$10.70 each	\$ 268.
Bus express samples to lab		<u>8.</u>
	Sub-total	\$ 276.

**REPORT PREPARATION COSTS**

M. Morrison, geologist	1 day @ \$300.00/day	\$ 300.
Drafting		68.
Typing		84.
Copying Reports		<u>20.</u>
	Sub-total	\$ 472.
	<b><u>Grand Total</u></b>	<b><u>\$1,203.</u></b>

I hereby certify that the preceding statement is a true statement of monies expended in connection with the Biogeochemical Survey carried out November 13, 2000.

February 8, 2001  
Kelowna, B.C.

  
Murray Morrison, - Geologist





## **APPENDIX C**

### **Certificate of Analysis**

## GEOCHEMICAL ANALYSIS CERTIFICATE

Morrison, M.S. PROJECT Copper Keg File # A100213

684 Balsam Road, Kelowna BC V1W 1B9 Submitted by: M.S. Morrison

SAMP#	E#	Type	Mo ppm	Cu ppm	Pb ppm	Zn ppm	Ag ppm	Ni ppm	Co ppm	Mn ppm	Fe %	As ppm	U ppm	Au ppm	Th ppm	Sr ppm	Cd ppm	Sb ppm	Bi ppm	V ppm	Ca %	P %	La ppm	Cr ppm	Mg %	Ba ppm	Ti %	B ppm	Al %	Na %	K %	W ppm	Ash gm	Sample gm
L16+50S	2+00E	S	38	414	51	607	<.3	28	9	1311	1.50	200	<8	<2	<2	1248	13.7	<3	<3	18	9.37	1.020	5	21	3.06	344	.04	308	.80	.06	14.59	<2	3.12	165
L16+50S	2+25E	S	22	443	69	625	.4	35	12	1457	1.96	124	<8	<2	2	1025	13.7	<3	3	28	10.45	.829	7	27	2.71	342	.06	277	.97	.05	8.60	<2	2.83	162
L16+50S	2+50E	S	12	428	61	688	<.3	32	10	1414	1.83	65	<8	<2	<2	1001	19.1	<3	<3	25	9.45	.856	6	25	3.09	374	.05	261	.98	.07	13.28	<2	3.76	192
L16+50S	2+75E	S	11	388	54	533	<.3	27	9	1079	1.55	93	<8	<2	<2	830	14.6	<3	<3	19	9.05	.893	6	21	2.78	296	.04	277	.82	.05	14.28	2	2.74	129
L16+50S	3+00E	S	21	387	42	593	<.3	26	8	1334	1.25	93	<8	<2	<2	1144	16.5	<3	<3	14	10.73	1.032	4	23	3.45	285	.04	332	.66	.06	15.34	3	2.68	156
L16+50S	3+25E	S	15	446	55	638	<.3	27	7	1187	1.27	97	<8	<2	<2	1055	14.4	<3	<3	14	10.87	1.053	4	19	3.34	311	.04	331	.67	.07	15.60	3	3.09	197
L16+50S	3+50E	S	17	487	38	815	<.3	29	8	1682	1.21	106	<8	<2	<2	913	16.1	<3	<3	13	12.65	1.337	4	19	3.05	296	.03	329	.66	.07	14.38	<2	2.86	170
L16+50S	3+75E	S	21	412	31	646	<.3	24	7	1404	1.22	77	<8	<2	<2	1011	15.7	<3	<3	13	11.94	1.148	4	22	3.03	293	.03	330	.67	.08	13.51	<2	2.66	159
L16+50S	4+00E	S	48	321	11	671	<.3	19	4	1169	.61	51	<8	<2	<2	1279	6.5	<3	<3	2	12.56	1.809	2	12	4.02	88	.02	419	.33	.35	19.00	<2	2.81	164
L16+50S	4+25E	S	42	255	12	546	<.3	20	4	1356	.65	362	<8	<2	<2	1137	5.2	<3	3	1	11.70	1.829	2	12	3.86	88	.02	409	.39	.11	19.00	<2	3.14	139
L16+50S	4+75E	S	16	366	37	651	<.3	26	6	1270	1.08	152	<8	<2	<2	1246	10.7	<3	<3	12	9.42	1.180	4	19	3.25	247	.03	427	.60	.08	20.00	<2	3.00	132
L16+50S	5+00E	S	14	374	32	626	<.3	27	8	1371	1.42	371	<8	<2	<2	913	10.2	3	<3	19	10.10	1.068	5	22	2.73	246	.04	308	.84	.10	14.45	2	2.72	128
L17+50S	2+00E	S	19	378	47	728	.3	29	9	1211	1.50	199	<8	<2	<2	1246	15.9	3	<3	19	10.15	.953	6	27	3.37	330	.04	389	.86	.11	13.55	<2	2.51	126
L17+50S	2+25E	S	19	379	27	658	<.3	19	6	1229	.99	60	<8	<2	<2	1633	16.9	<3	<3	10	12.12	1.235	3	18	3.65	279	.03	424	.51	.11	13.71	<2	2.32	156
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L17+50S	2+75E	S	16	308	13	515	<.3	18	4	1147	.73	22	<8	<2	<2	1088	17.4	<3	<3	4	10.36	1.120	3	14	3.46	217	.02	355	.38	.06	20.00	<2	3.33	177
L17+50S	3+00E	S	16	330	12	520	<.3	24	5	1058	.80	33	<8	<2	<2	1244	10.7	<3	<3	4	10.48	1.157	2	16	3.85	145	.02	363	.42	.20	19.00	<2	2.72	123
L17+50S	3+25E	S	37	381	16	565	.3	19	5	1283	.89	47	<8	<2	<2	1820	6.3	<3	<3	7	12.48	1.334	2	14	3.60	119	.03	430	.47	.66	14.02	<2	2.87	178
L17+50S	3+50E	S	17	272	14	479	<.3	40	7	882	1.22	53	<8	<2	<2	1440	6.2	<3	<3	10	9.30	1.420	3	17	3.80	85	.04	322	.74	.43	18.00	<2	4.35	195
RE L17+50S	3+50E		17	272	16	481	<.3	40	7	884	1.22	55	<8	<2	<2	1436	6.3	<3	<3	10	9.28	1.399	4	16	3.78	85	.04	323	.75	.42	18.00	<2	-	-
L17+50S	3+75E	S	16	317	16	499	<.3	25	4	812	.70	111	<8	<2	<2	1297	5.2	<3	<3	2	9.24	1.570	2	12	3.45	70	.02	309	.40	.14	22.00	<2	3.41	165
L17+50S	4+00E	P	10	379	71	2047	1.2	33	10	2949	.95	197	<8	<2	<2	884	14.6	3	<3	9	21.47	.983	3	17	3.28	151	.02	478	.59	.11	5.80	<2	2.46	194
L17+50S	4+25E	D	21	556	130	1294	.7	40	12	3730	2.05	303	<8	<2	2	1903	3.7	4	<3	32	17.01	1.337	7	35	2.02	242	.05	246	1.18	.24	3.00	<2	3.10	196
L17+50S	4+50E	S	16	309	14	493	<.3	17	5	1146	.93	158	<8	<2	<2	1468	4.1	<3	<3	7	10.88	1.392	3	15	4.27	153	.03	380	.55	.37	15.44	<2	3.62	198
L17+50S	4+75E	PP	14	472	86	2267	1.6	35	12	3270	1.23	553	<8	<2	<2	1102	11.8	<3	<3	15	20.57	1.161	5	21	3.40	178	.03	609	.74	.16	5.80	<2	2.45	202
L17+50S	5+00E	PP	12	539	94	1992	2.7	35	13	3165	1.49	543	<8	<2	<2	1025	12.4	3	<3	20	18.93	1.188	4	23	3.40	209	.03	479	.92	.13	5.50	<2	2.37	200
STANDARD	C3		26	65	40	165	5.9	37	12	781	3.47	56	20	<2	19	29	23.5	15	25	82	.59	.090	19	170	.64	153	.09	23	1.85	.04	.17	20	-	-
STANDARD	G-2		1	4	<3	40	<.3	8	4	506	1.99	<2	<8	<2	4	69	<.2	<3	<3	40	.63	.091	7	75	.60	220	.13	6	.93	.08	.44	3	-	-

GROUP 1D - 0.50 GM SAMPLE LEACHED WITH 3 ML 2-2-2 HCL-HNO3-H2O AT 95 DEG. C FOR ONE HOUR, DILUTED TO 10 ML, ANALYSED BY ICP-ES.  
UPPER LIMITS - AG, AU, HG, W = 100 PPM; MO, CO, CD, SB, BI, TH, U & B = 2,000 PPM; CU, PB, ZN, NI, MN, AS, V, LA, CR = 10,000 PPM.  
- SAMPLE TYPE: Vegetation VABO Samples beginning 'RE' are Reruns and 'RRE' are Reject Reruns.

DATE RECEIVED: JAN 23 2001 DATE REPORT MAILED: Feb 5/2001 SIGNED BY: J. Wang D. TOYE, C. LEONG, J. WANG; CERTIFIED B.C. ASSAYERS

Sample Medium

S Sagebrush  
D Douglas Fir  
PP Ponderosa pine  
P Pine

M. Morrison

All results are considered the confidential property of the client. Acme assumes the liabilities for actual cost of the analysis only.

Data FA