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**Geological Mapping
and Mineralization
on the northern half of the
Desmont Claim
Monmouth Township, Ontario**

Cell claims; 167120, 281885, 118830, 180531 and 215872.

By

Bradley S Wilson
Kingston, Ontario

For

Municipality of Highlands East
P.O. Box 295
2249 Loop Road
Wilberforce, Ontario,
K0L 3C0

March 31, 2020

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Introduction

For decades, recreational mineral collectors from around the world have been coming to south eastern Ontario to pursue their fascinating hobby by searching out mineral samples from the many available collecting sites for which the region is famous. For this reason, many consider the region, often referred to in general as the Bancroft area, the “Mineral Capital of Canada”.

A wide variety of minerals are known from hundreds of different occurrences throughout the region. Sadly, over the years, many of these localities have been closed to mineral collectors due in part to park and cottage development and a host of other land access issues. It has been suggested that fewer mineral collectors are coming to the region now than in the past. If this is true it may be, in part, because there are fewer collecting sites available to the collector. The Municipality of Highlands East has acquired a number of mineral claims to explore the possibility of developing these claims as new recreational mineral collecting destinations, thereby providing incentive for mineral collectors to return and stay in the region. Because the Municipality of Highlands East had recently provided to the public, information about the Schickler Occurrence and opened the site, recreational minerals collectors have started returning to the region as tourists. The Schickler Occurrence has now become a mineral destination.

One of the claims held by the Municipality of Highlands East, known as the Desmont claim, is the subject of this report. The original Desmont legacy claim has now been replaced by a contiguous group of 8 encumbered cell claims, which are located 1.5 km west of the town of Wilberforce. The Desmont claim is famous among mineral collectors as a locality for fine crystals of the very rare mineral stillwellite-(Ce). It is also home to other rare minerals such as; hydroxylbastnäsite-(Ce) and perrierite-(Ce). In addition, superb mineral specimens of apatite, diopside, zircon, uraninite, amphibole, feldspar and titanite from localities in the Wilberforce area are well known among mineral collectors. Many well known mineral collecting sites are located on privately owned land within several kilometres of the Desmont claim.

It seems reasonable to postulate that additional mineral collecting sites might be found on the Desmont legacy claim. The goal of this study was to systematically explore for and identify sites on the Desmont claim that would be attractive to the recreational mineral collector. This was done by mapping geology and prospecting over the northern part the original legacy claim. The author spent 2 person days on the claim in May 2019 gathering data for this report.

Claim Information and History

The original Desmont legacy claim was staked on June 6, 2013 and its original claim number was SO 1500642. The Desmont claim originally covered one concession lot in Monmouth Township (Lot 31, Concession 17). This lot is crown land and according to the online municipality registry the surrounding lots are privately owned. According to MLAS, ownership of the surrounding lots is a mix of crown land and private land.

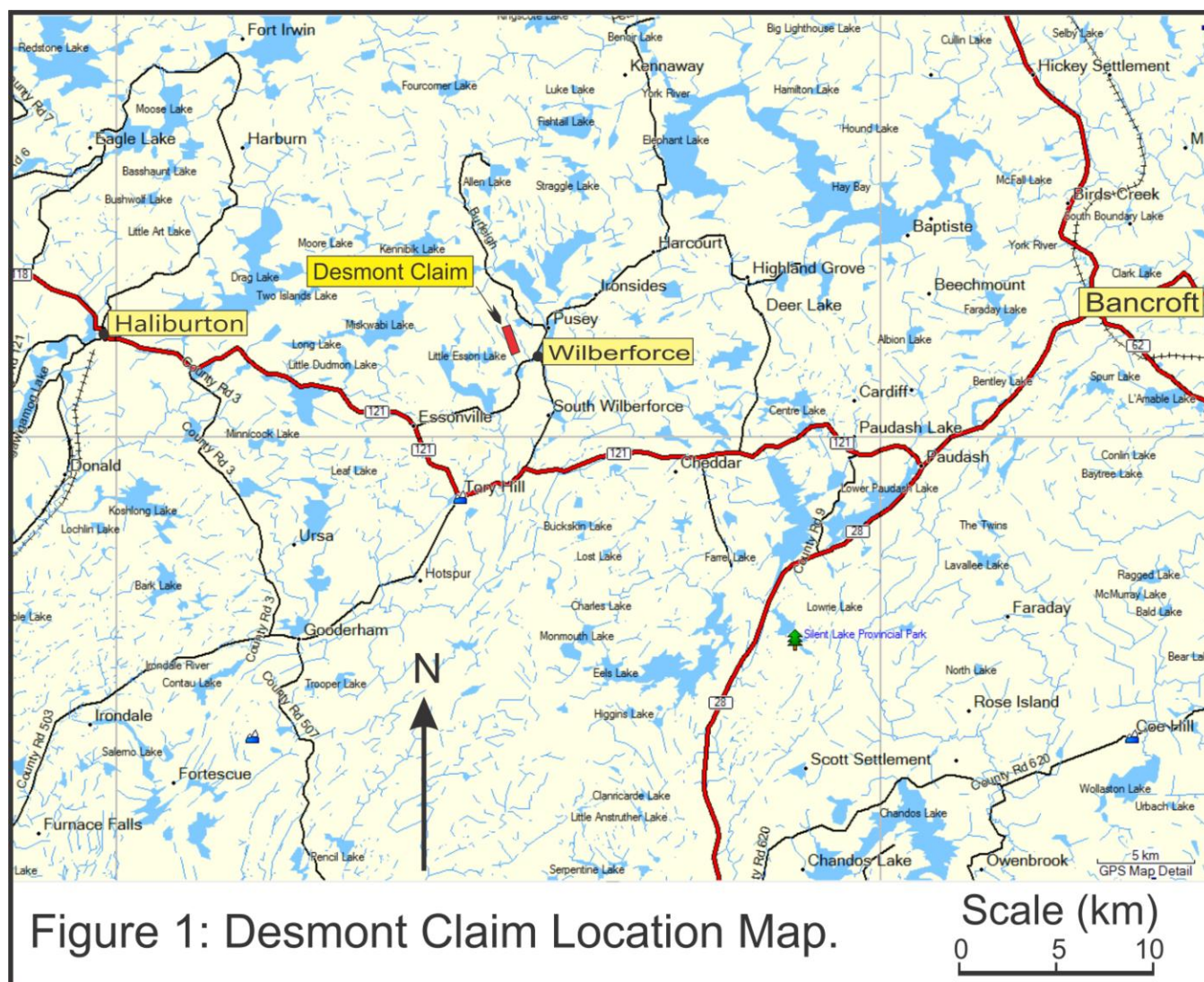
The original Desmond Claim (SO 1500642) was converted to 8 encumbered cell claims in April, 2018, when the Ministry of Development and Mines introduced its new online claim and mining lands management system, MLAS. The 8 cell claims that cover the “legacy” Desmond claim are;

167120, 281885, 118830, 180531, 215872, 341527, 281886 and 161070.

All of these claims are owned by the Corporation of the Municipality of Highlands East and are the subject of this report.

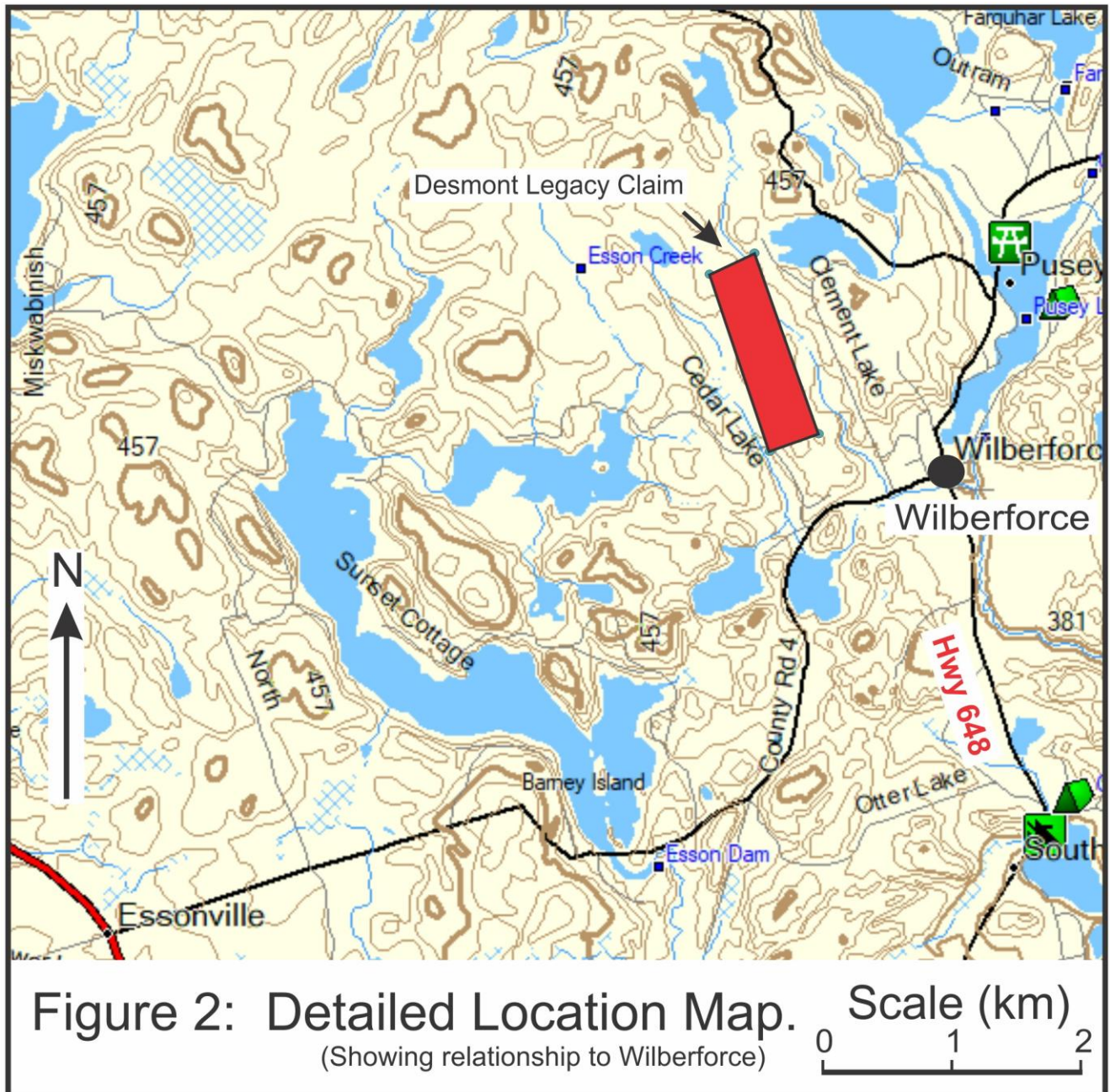
Location and Access

The original Desmond legacy claim (SO 1500642) which has been converted to 8 cell claims cover all of the crown land on Lot 31, Concession 17 in the township of Monmouth. These claims are located approximately 21 kilometres east from Haliburton and 30 km west from Bancroft, the two largest towns in the region (Figure 1).



The Desmond group of cell claims are approximately 1.5 kilometres west of Wilberforce, the easiest community from which to access the claims (Figure 2). The claims are located on NTS map 31E/01. The claims are easily accessed from Wilberforce. Starting at the centre of town at the junction of Hwy 648 and County Road 4 (AKA Essonville Line) travel 1.2 km west on County Road 4. Turn right (north) on Cedar Lake Road (gravel road). Travel 0.7 km north on Cedar Lake Road until a pull off on the right is reached. This is the southwest corner of

Lot 31, Concession 17 and the Desmond claim. From here it is possible to drive in a high clearance vehicle another 400 m to a clearing located in the centre of the southern half of the claim. Several trails branch out from this clearing. Some go east to old workings and another trail heads northward to trenches on the northern part of the claim group. The northern trail ends near the northwest corner of the claims.



Regional Geology

The Desmond group of claims is underlain by high-grade metamorphic rocks of the Grenville Province of the Canadian Shield. On a regional level Grenville Province rocks have been extensively studied and prospected for various ores over the last century. Authors, too numerous to mention, have studied and described these rocks. Rocks here are 1.0 to 1.3 billion years old. The region is underlain by marbles and metasedimentary rocks which have been intruded by granites, gabbros, nepheline syenites and pegmatites.

Previous Work

The mineral property on Lot 31, Concession 17 in Monmouth Township is referred to as the “Desmont claim” in this report but various authors have given this property other names in the past. It was called “Homer Yellowknife Mines, Limited” by Satterly and Hewitt (1955), “Desmont Mining Corporation, Limited” by Satterly (1957), and “Highland Mercury Occurrence” by Gordon *et al* (1981).

A township wide geological report was published in 1968 by Armstrong and Gittins that included detailed geologic maps covering both Monmouth and neighbouring Glamorgan Townships. Their study concentrated on the geology and economic mineral deposits of Monmouth and Glamorgan Townships and not specifically on occurrences of crystals and minerals suitable for the recreational mineral collector. Armstrong and Gittins (1968) did, however, mention an apatite occurrence and several occurrences of mica and zircon in Monmouth Township which might be of interest to mineral collectors. They also describe in detail, nepheline and radioactive mineral occurrences, including those of the Desmont claim. Several authors, including Armstrong and Gittins (1968), describe the radioactive mineral occurrence on the Desmont claim from the point of view uranium potential (Satterly and Hewitt, 1955; Hewitt, 1967; Gordon *et al*, 1981; Satterly, 1957). At least two authors describe some of the minerals known to occur on the Desmont claim that would of interest to mineral collectors (Sabina, 1986 & 1982, McDougall, 2014).

According to Satterly (1943) mineral exploration began in the immediate area in 1917 when molybdenum in the form of molybdenite was found in the concession lot (Lot 32, Con 17) immediately to the southeast of the Desmont claim (Lot 31, Con 17). Two shafts were dug and almost 85 tons of molybdenum ore shipped. Additional exploration for molybdenum in the lot to the east of the Desmont claim occurred in 1921 and was renewed in the early 1940’s (Satterly, 1943).

Between 1954 and 1955 the Desmont Mining Corporation Limited, formerly known as Homer Yellowknife Mines Limited, explored for uranium bearing mineralization on several lots in Monmouth Twp, including Lot 31, Con 17 (Desmont claim). On the Desmont claim their work included trenching and stripping with a bulldozer, the development of a small adit and 2810 feet of diamond drilling (Satterly, 1957). The trenches exposed bands of radioactive diopside rock and diopside-calcite rock containing erratic and sparse disseminations of uranothorite. Molybdenite was also identified at this time.

Further work was done in 1965 and 1966 in the search for molybdenum by New Far North Exploration for the Molybdenum Corporation of Canada and consisted of geochemical and magnetometer surveys and 2,713 feet of diamond drilling (Wilson, 1979).

Pitting, trenching, sampling and geological surveys were conducted on the Desmont claim by Highland Mercury Mines, Limited in 1976 and 1977 (Gordon *et al*, 1981).

In 1979, a radiometric survey was undertaken for Lacana Mining Corporation (Wilson, 1979).

Over the past many decades the Desmont claim has attracted the attention of recreational mineral collectors because of some of the rare and attractive minerals that occur there. Fouts (1998 & 1999) describes some of the limited exploration activities in 1998 and 1999 that were undertaken for minerals of interest to mineral collectors.

Guides to mineral collecting sites in southern Ontario have been published by various authors. One of the many guides covering the general area is by Sabina (1986). Sabina (1986) describes mineral collecting sites throughout the Bancroft region, including those in the Wilberforce area and the Desmont claim. Sabina (1986) reports the occurrence of the following 31 minerals on the Desmont claim; diopside, actinolite, albite, pyrite, pyrrhotite, calcite, molybdenite, uranothorite, thorianite, apatite, titanite, garnet, serpentine, quartz, K-feldspar,

chondrodite, scapolite, marcasite, gypsum, allanite, graphite, stillwellite-(Ce), hydroxylbastnäsite-(Ce), perrierite-(Ce), monazite, magnetite, goethite, tourmaline, sulphur, sphalerite, and ancylite. Some of these minerals occur as relatively large euhedral crystals or are rare enough to attract mineral collectors. Sabina (1982) describes in greater detail the occurrence of 3 extremely rare minerals found at the Desmond claim which are very attractive to recreational mineral collectors. These minerals are stillwellite-(Ce), hydroxylbastnäsite-(Ce) and perrierite-(Ce). Overall the mineral of greatest interest to mineral collectors are the euhedral crystals of stillwellite-(Ce) which are rarely found at the Desmond claim. McDougall (2014) gives a more recent account of the occurrence of stillwellite-(Ce) and other minerals at the Desmond claim.

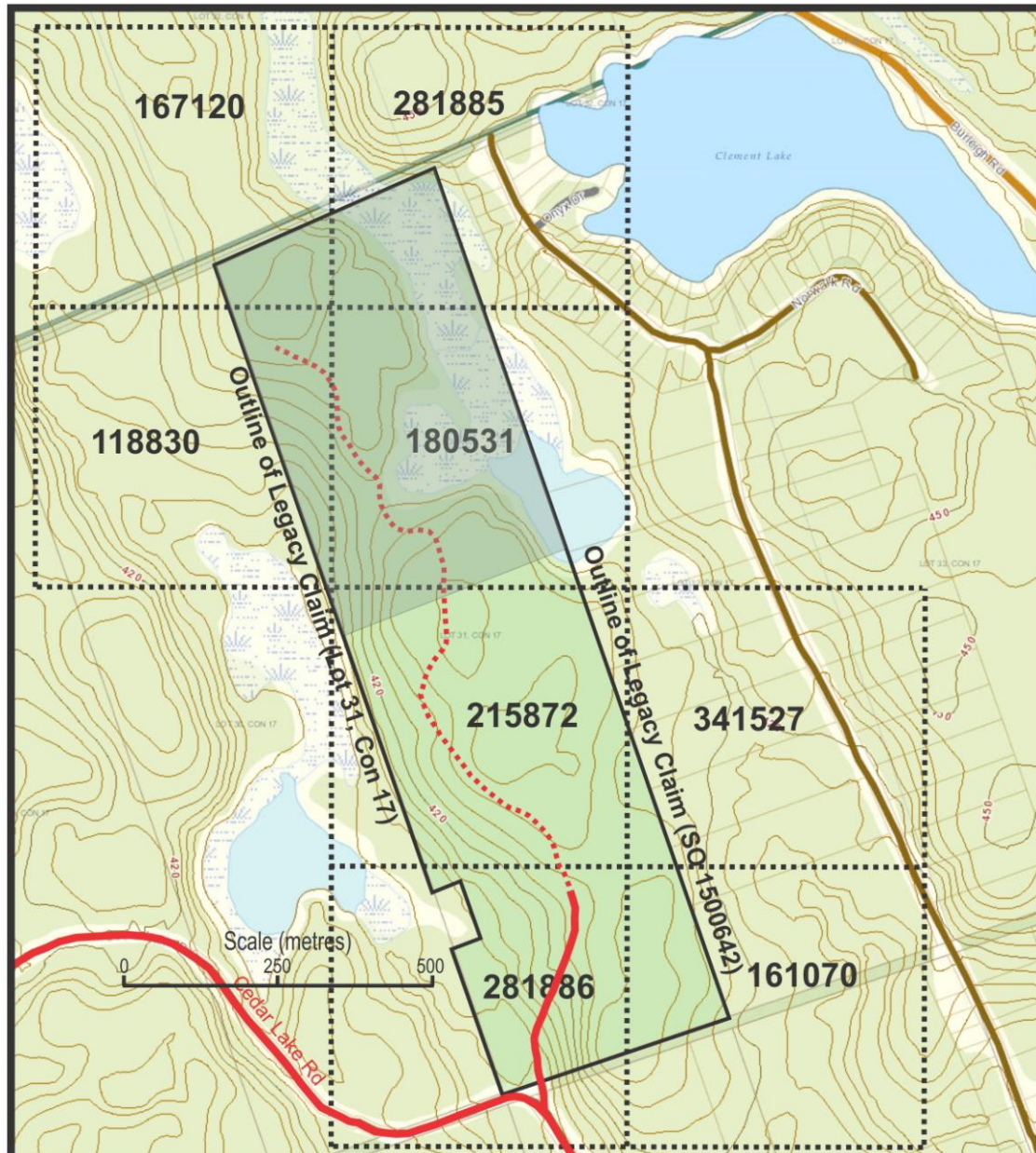





Figure 3; Map showing position of cell claims relative to Legacy Claim and the area which was examined in detail and described in this Report.

-  Area upon which work was performed.
-  Gravel road
-  ATV trail

Fieldwork and Terminology

The author spent 2 days mapping and gathering data on the Desmont claims on the following dates; May 21 and 22, 2019. An additional 2 days were spent by the author preparing the geology map and writing this report.

The author mapped local geology by noting outcrop locations with a hand held GPS device and examining rock types and structures. This was done concurrently with general prospecting for mineral and crystal occurrences of interest to recreational mineral collectors. The area examined during this study is shown in Figure 3. This area was chosen with the expectation that it could be covered in reasonable detail in 2 days. Results are shown on the geology map of Figure 4.

Assumptions have been made and a number of terms used by the author in preparing this report. Some of these require clarification. The minerals found on the Desmont claims and those named in this report were identified using standard field identification practices (observations of lustre, hardness, cleavage, crystal form, etc). No analytical work was performed to verify these identifications. Amphiboles belong to a complex group of minerals whose individual mineral species are difficult, if not impossible, to identify without detailed analytical work. Instead of going through the expense and time of having each sample analysed, the author has used the general terms "hornblende" for a black amphibole. Rocks were examined and identified visually.

Property Geology

The Desmont claim is underlain by high-grade metamorphic rocks of the Grenville Province of the Canadian Shield. Rocks of the Grenville Province are well known and have been described by many authors. These rocks host virtually all the known mineral and crystal occurrences that attract mineral collectors, both professional and recreational, to the Bancroft area.

The area prospected and mapped for this report covers most of the northern half of Lot 31, Concession 17 in Monmouth Township (Figure 3). The cell claims mapped are 167120 (SE corner), 281885 (SW corner), 118830 (eastern edge), 180531 (a little more than the western half) and 215872 (NW corner) (Figure 4). Much of the eastern edge of the area mapped is swamp with no outcrop. Most of the rest of the map area is covered by hardwood forest with sparse outcrop. Although overburden appears shallow in most areas, outcrop quality was generally poor. Most outcrops were small in area, low in relief and covered in moss and/or lichen. On Figure 4 outcrops appear larger on the map than they are in reality.

A township wide geological report was published in 1968 by Armstrong and Gittins that included geology maps covering both Monmouth and neighbouring Glamorgan Townships. Armstrong and Gittins' geology map shows the Desmont claim being underlain mostly by marble and to the north, granite and paragneiss.

Mapping revealed that geology on the claim scale is more complex than that indicated on a township wide scale. A number of rock units were identified during this project, but there are only two broad categories of rock on the area mapped for this report; marble and gneiss. The gneisses comprise two basic types; foliated biotite-feldspar gneiss and poorly foliated granitic gneiss.

The granitic gneiss is pink in colour, has weak to no discernable foliation and is composed primarily of pink potassium feldspar and quartz with minor amounts of biotite and possibly hornblende.

The foliated biotite-feldspar gneiss has well defined compositional layering and foliation and is composed primarily of variable amounts of biotite, potassium feldspar, quartz and probably plagioclase. Typical grain size is 1-2 mm. In places this unit is noticeably rusty, probably due to weathering of small amounts of contained pyrite or pyrrhotite. This unit can contain what appear to be bands of granitic gneiss. One outcrop on the northern edge of the Desmont claim is composed of banded quartz-rich gneiss and quartzite. Since only one exposure like this was identified, the outcrop was included in the foliated biotite-feldspar gneiss unit.

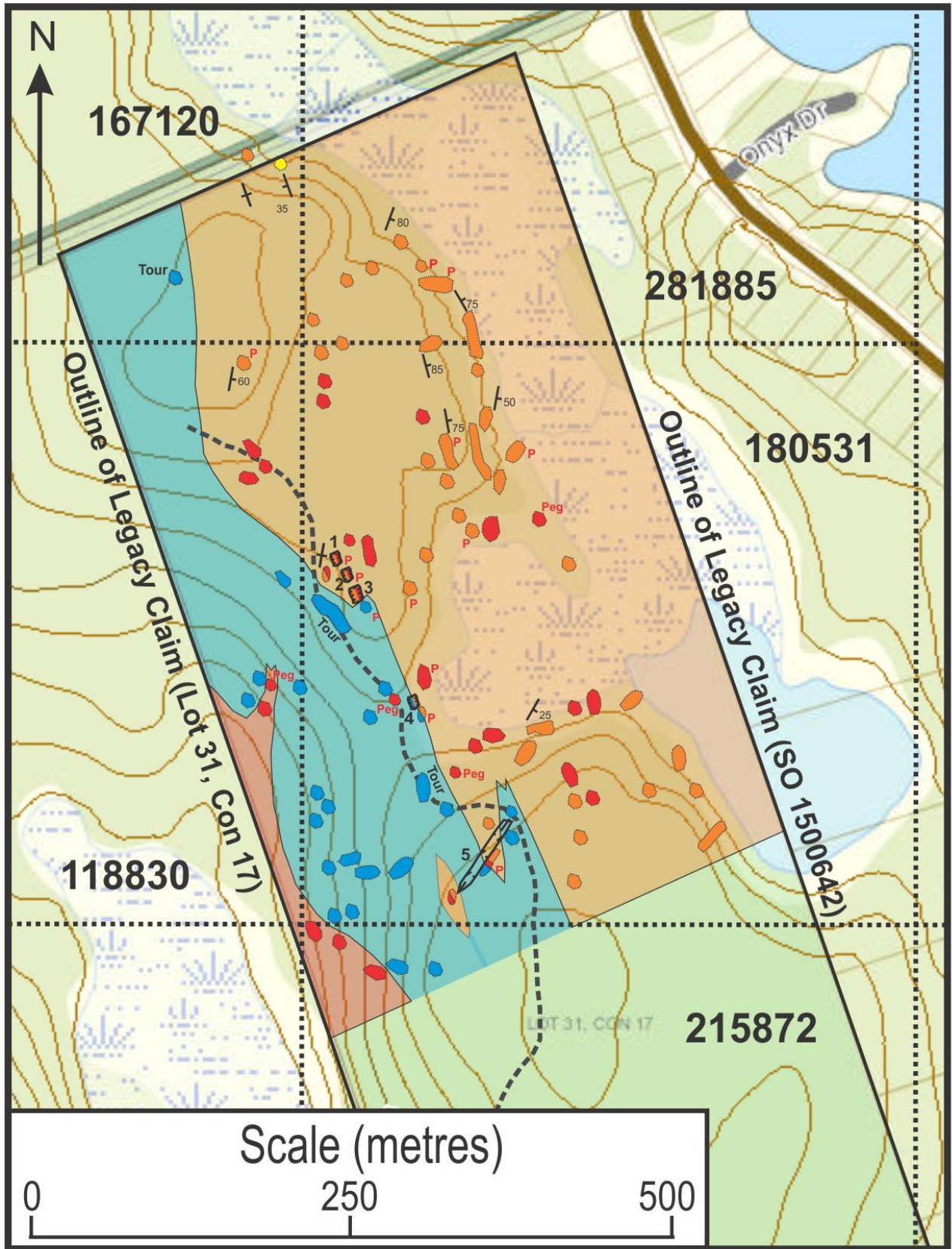


Figure 4; Geology and Mineralization on cell claims 167120, 281885, 118830, 215872 and 215872, Monmouth Twp.

Legend for Figure 4; Geology and Mineralization on cell claims 167120, 281885, 118830, 180531 and 215872 (Lot 31, Con 17) Monmouth Township, Ontario.



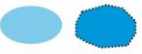






	Poorly foliated granitic gneiss (underlain, outcrop).	 ₁₅	Attitude of foliation (strike and dip)
	Marble, calc-silicate gneiss (underlain, outcrop).	P	Pegmatite dyke in the outcrop
	Foliated biotite-feldspar gneiss (outcrop).	Peg	Outcrop composed of pegmatite
	Mixed foliated biotite-feldspar gneiss and poorly foliated granitic gneiss (underlain).	Tour	Brown tourmaline
	Quartzite (outcrop)		Old trench
			Cell claim boundary
			ATV trail

Figure 5; Legend for map on Figure 4.

Where possible, an attempt was made to differentiate the two gneisses in the field. As can be seen in Figure 4 these two units can occur next to each other in apparent random fashion. Based on the author's mapping, one could draw a more complex map with convoluted contacts that separated the two gneisses. The granitic gneiss could, in places, be interpreted as igneous granite, but in some outcrops it appears to be simply poorly foliated bands within the overall banded, foliated biotite-feldspar gneiss. Hence, on the eastern side of the map, the two gneisses are mapped as one unit. On the south western part of the map the relatively few granitic gneiss outcrops have been mapped as a single granitic gneiss unit. This was done for two reasons. First, Armstrong and Gittins (1968) mapped a larger area of granite west of here. The outcrops mapped by the author could be an extension of that granite. Second, foliated biotite-feldspar gneiss was not found in this area.

The unit mapped as marble ranges from marble to calc-silicate gneiss. The marble is commonly composed of course grained calcite with minor amounts of quartz, diopside, mica (probably phlogopite), scapolite and brown tourmaline (probably uvite or dravite). The calc-silicate gneiss on surface is a crumbly, granular mix of mostly calcite, pale green diopside and phlogopite. It is the calc-silicate bands within the marble that have been recognized as host for uranothorite mineralization on the unmapped southern parts of the Desmond claim.

Outcrops marked with the letter "P" contain granite pegmatite veins which cross-cut foliation. Grain size typically varies from 1-2 cm but can be much larger. Black tourmaline was found in one of these pegmatites.

Outcrops in red (granitic gneiss) and marked "Peg" are composed of course-grained granite pegmatite.

Mineralization

The author did not have a scintillometer or spectrometer in the field during mapping, hence was unable to prospect for radioactivity or confirm the presence radioactive minerals. He did find 5 trenches, which indicate previous exploration activity, likely for radioactive minerals.

Five trenches, probably created during past exploration activities, were identified in the map area and are numbered 1 through 5 (Figure 4). The northern 3 water-filled trenches, numbers 1-3, are likely the northern most trenches shown on Figure 13 (page 87) of Satterly's 1957 report on Radioactive Mineral Occurrences in the Bancroft area. Here, Satterly (1957) records high background levels of radioactivity and identifies several potentially radioactive minerals including uranothorite.

Trench #4 (Figure 4) is clearly disturbed ground but may be related to road/trail construction instead of a deliberately constructed exploration trench. Exposed are boulders of biotite-feldspar gneiss, calc-silicate gneiss and granite pegmatite. Several euhedral crystals of potassium feldspar to 8 cm across were found in the calc-silicate gneiss. Additional crystals could possibly be found at this site with more time and effort.

Trench #5 (Figure 4) is the longest trench identified in this map area. It is 1 to 2.5 m deep with a comparable width and is 62 m long. At the southwest end is an outcrop of mixed biotite-feldspar gneiss and granitic gneiss and at the northeast end is marble and diopside-rich calc-silicate gneiss. In the middle is marble, calc-silicate gneiss and granite pegmatite. This trench doesn't show up on Satterly's 1957 map and may have been constructed at a later date. Without a scintillometer or spectrometer, the author was unable to confirm the presence of radioactive minerals in this trench.

At three places within the marble unit the author identified small (up to 1 cm) brown tourmaline crystals and grains some of which were, in part, gemmy or partially transparent. These three sites are marked "Tour" in Figure 4. Although only identified at three sites, brown tourmaline is likely widely disseminated in the marble throughout the Desmond claim. Brown tourmaline is likely the mineral species uvite or dravite and has been found at several other sites in the region where it is hosted in Grenville marble.

When collecting information for the recreational mineral collector in a future report, consider including the brown tourmaline that's widely disseminated in the marble as a mineral of potential interest for the recreational mineral collector.

Of potential interest to mineral collectors are the euhedral feldspar crystals found in trench #4 and several small but gemmy, brown tourmaline crystals.

Summary and Recommendations

The northern half of the Desmond claim was geologically mapped and prospected.

Several sites with mineral collecting potential were identified (trench #4 and disseminated brown tourmaline).

The amount of follow up work recommended for this area of the Desmond claim is going to depend on budget and the degree of commitment to develop this claim for mineral collectors. Based on the limited success of this survey the author recommends the following;

1/ Investigate further the mineral collector potential of trenches 4 and 5.

Use the RS-230 Spectrometer or similar instrument to carefully search for radioactive minerals and minerals associated with radioactive minerals, such as stillwellite-(Ce), hydroxylbastnäsite-(Ce) and perrierite-(Ce). Sift the soil and loose debris carefully during this search. In addition, search for euhedral crystals as feldspar, diopside, molybdenite, tourmaline and tremolite in both these trenches.

2/ Continue exploring the remainder of the Desmond claim with geological mapping and prospecting.

Finish the present geologic survey so it covers the remainder of the claim. If budget allows consider the use of the RS-230 Spectrometer or similar instrument in conjunction with mapping and prospecting for identifying areas of increased radioactivity and radioactive minerals.

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Appendix 1; Statement of Qualifications of the Author

I, Bradley S. Wilson of P.O. Box 352, Kingston, Ontario, K7L 4W2, do hereby state that I:

- 1/ graduated from Queen's University in 1982 with an Honours B.Sc. degree in Geology.
- 2/ graduated from Carleton University in 1987 with a M.Sc. degree in Geology.
- 3/ received a degree in gemmology in 1991 from the Canadian Gemmological Association (F.C.Gm.A).
- 4/ worked as an independent consultant on over 20 coloured gemstone projects since 1991.
- 5/ worked for mineral exploration companies since 1978 on many projects either as a consultant or as a seasonal employee.
- 6/ conducted gemstone exploration on my own behalf, nearly continuously, since 1982.
- 7/ have no interest, direct or indirect, in the Desmont claim.
- 8/ performed the work described in this report.

Bradley S. Wilson

March 31, 2020