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

Cell claims; 180531, 215872, 341527, 281886 & 161070.

By

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For

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March 30, 2021

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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. This strategy appears to be working.

The Municipality of Highlands East recently opened two such sites to the public and recreational minerals collectors have started returning to the region as tourists. Both the Desmont claim and the Schickler Occurrence were opened up and have now become tourist destinations for the recreational mineral collector.

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 The original Desmont legacy claim has now been replaced by a contiguous group of 8 encumbered cell claims, which are located 1.5 km west of the town of Wilberforce (Figure 2). 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 southern part the original legacy claim (Figure 3). The author spent 2 1/2 person days on the claim in October, 2020 gathering data for this report.

Claim Information and History

The original Desmond 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. This discrepancy has not been resolved.

The original Desmont 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" Desmont 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 Desmont 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).

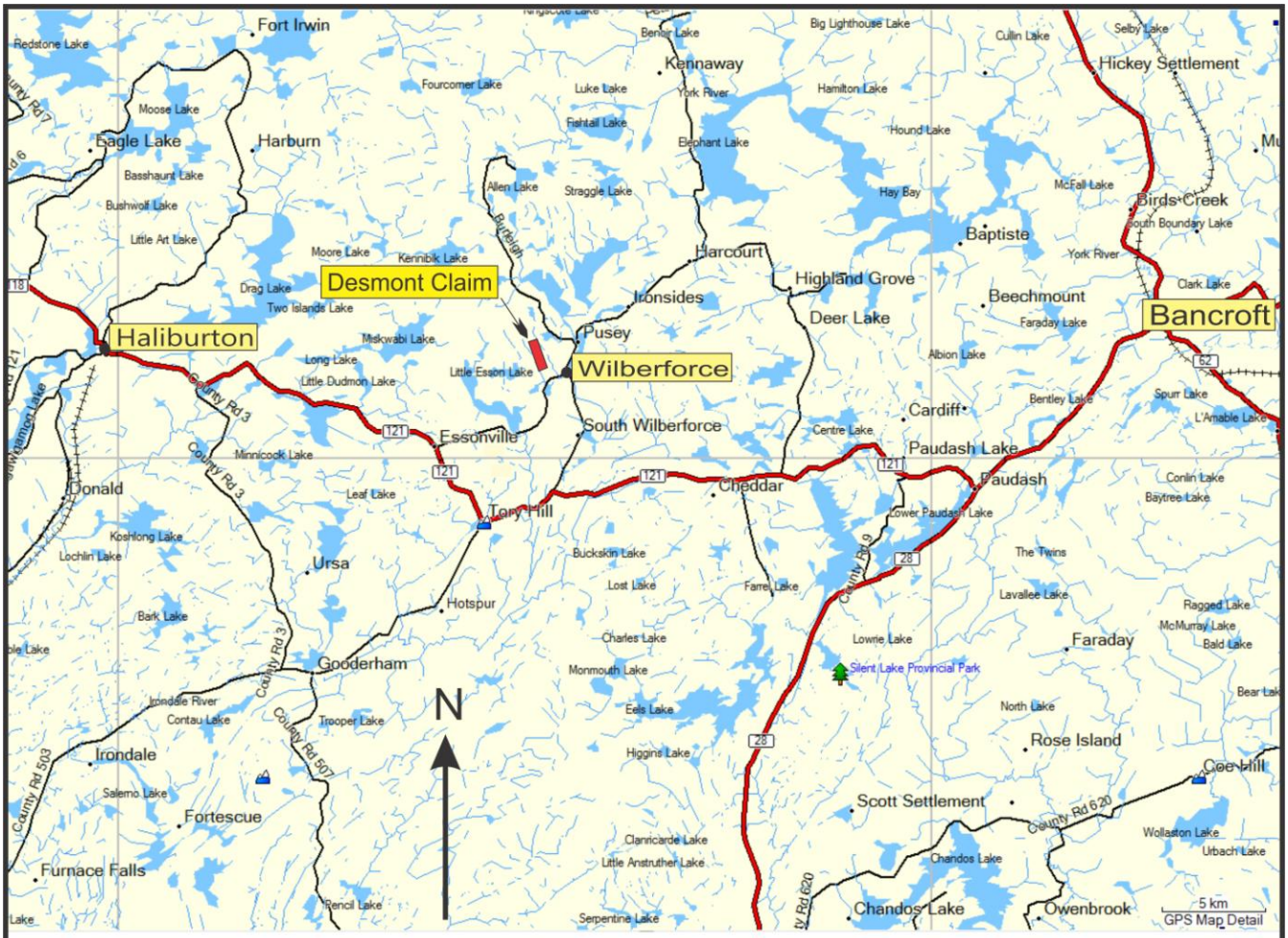
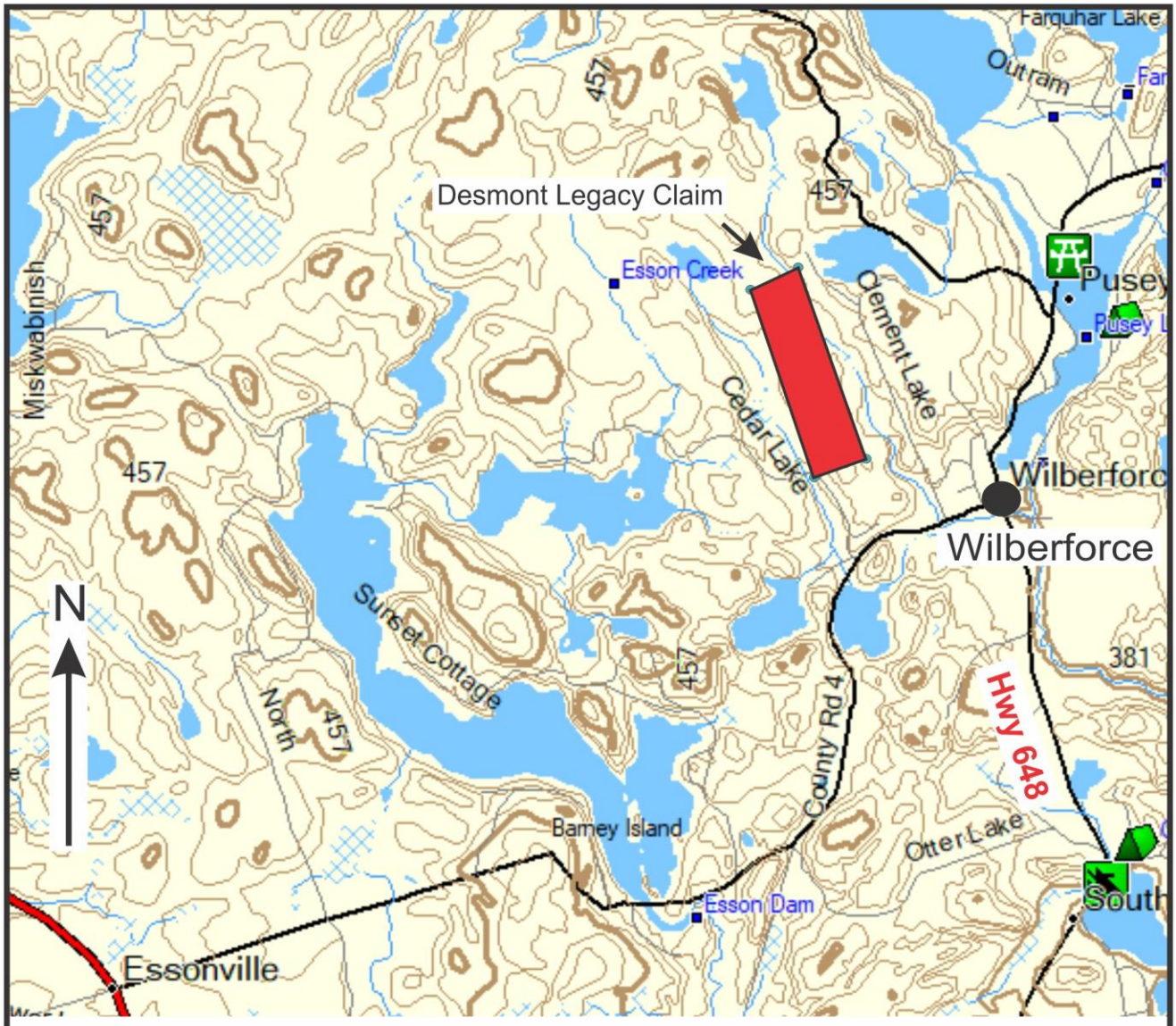


Figure 1: Desmont Claim Location Map.

The Desmont 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 Desmont 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 Desmont 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 of 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 Desmont 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 Desmont claim. McDougall (2014) gives a more recent account of the occurrence of stillwellite-(Ce) and other minerals at the Desmont claim.

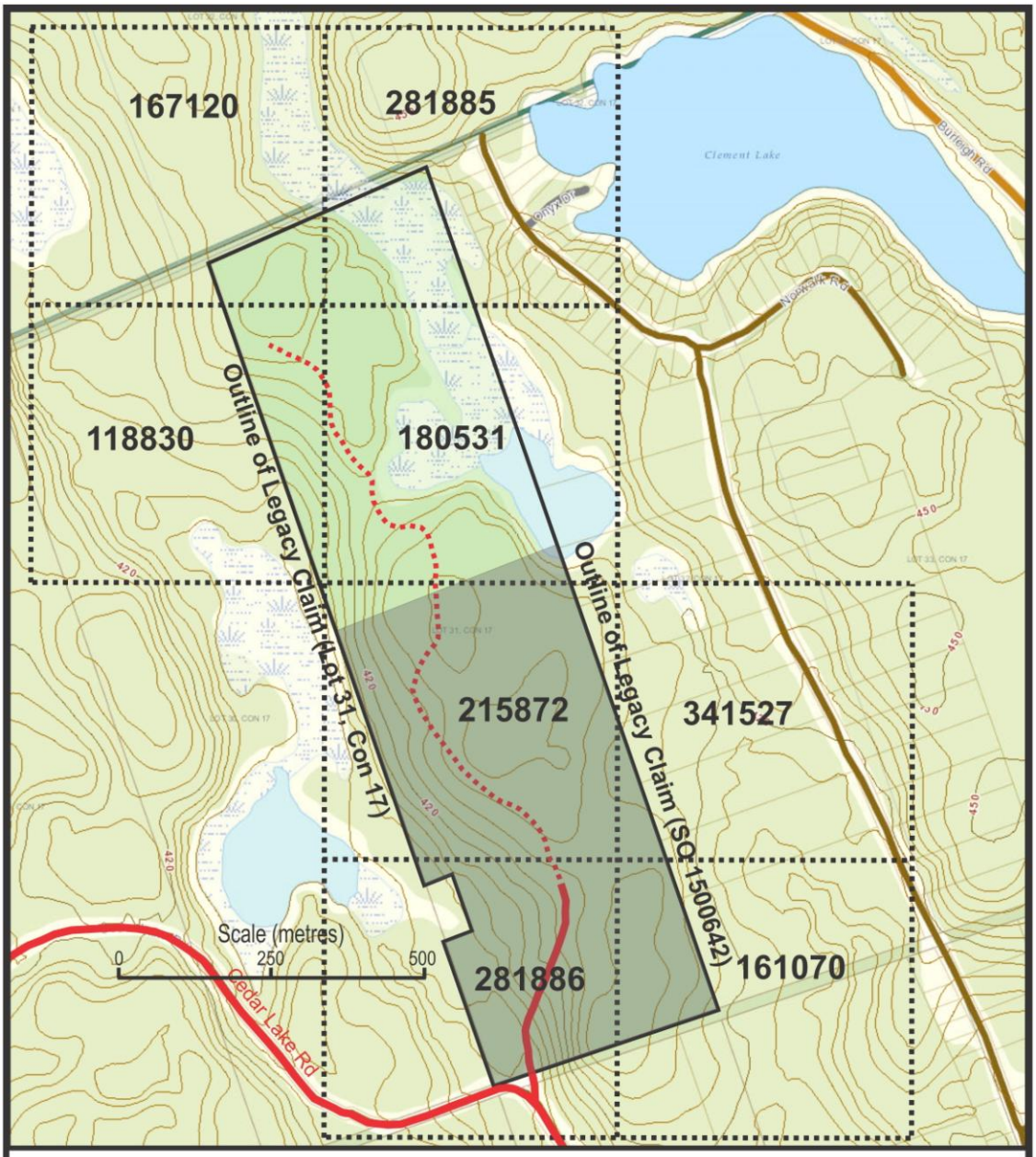


Figure 3; Map showing position of cell claims relative to Legacy Claim and the area which was examined in detail and described in this Report.

Fieldwork and Terminology

The author spent 2 1/2 days mapping and gathering data on the Desmont claims on the following dates; October 9, 10 & 11, 2020. An additional 2 1/2 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 the southern portion of Lot 31, Concession 17, Monmouth Twp. and is shown in Figure 3. Results are shown on the geology map of Figure 4. The area to the north was previously mapped and prospected in 2019.

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 to the Bancroft area.

The area prospected and mapped for this report covers most of the southern half of Lot 31, Concession 17 in Monmouth Township (Figure 3). The cell claims mapped are 180531 (tiny area on southern edge), 215872, 341527 (extreme southwest corner), 281886 (northeast third) and 161070 (northwest corner) (Figures 3 & 4). Generally the area east of the road is covered by open hardwood forest, while west of the road forest cover is primarily coniferous. Although overburden appears shallow in most areas, outcrop quality is generally poor. Accept for a few small areas in the south-eastern portion of the claim most outcrops were small in area, low in relief and covered in moss and/or lichen.

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. Six rock types were identified during this project. These were grouped into four mappable units. The six rock types are 1/ granitic gneiss (and granite), 2/ granite pegmatite, 3/ foliated gneiss, 4/ marble, 5/ diopside-bearing calc-silicate gneiss and 6/ diopside-calcite rock. The first three rock types were grouped together to comprise the first mappable unit. The other three rock types were mapped as separate units.

Unit 1/ Foliated biotite-feldspar gneiss, Granitic gneiss and Pegmatite

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. In places the granitic gneiss can be course-grained in texture and would be called pegmatite. Some outcrops contain a heterogeneous mixture of grain-sizes. When most or all of an outcrop is course-grained it was marked with “P” on the map in Figure 4 to indicate pegmatite.

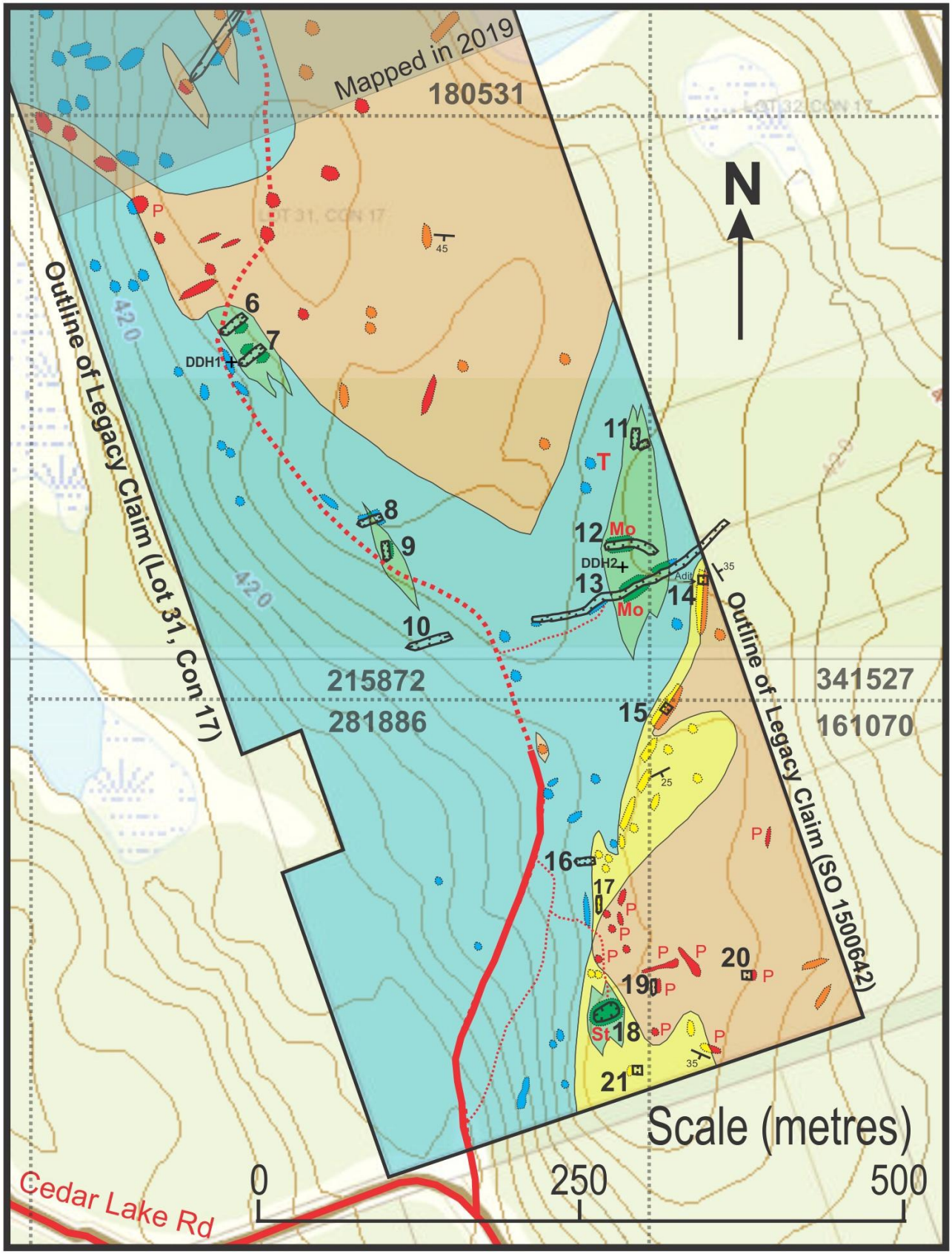


Figure 4; Geology and Mineralization on cell claims 167120, 281885, 118830, 215872 and 215872, Monmouth Twp.

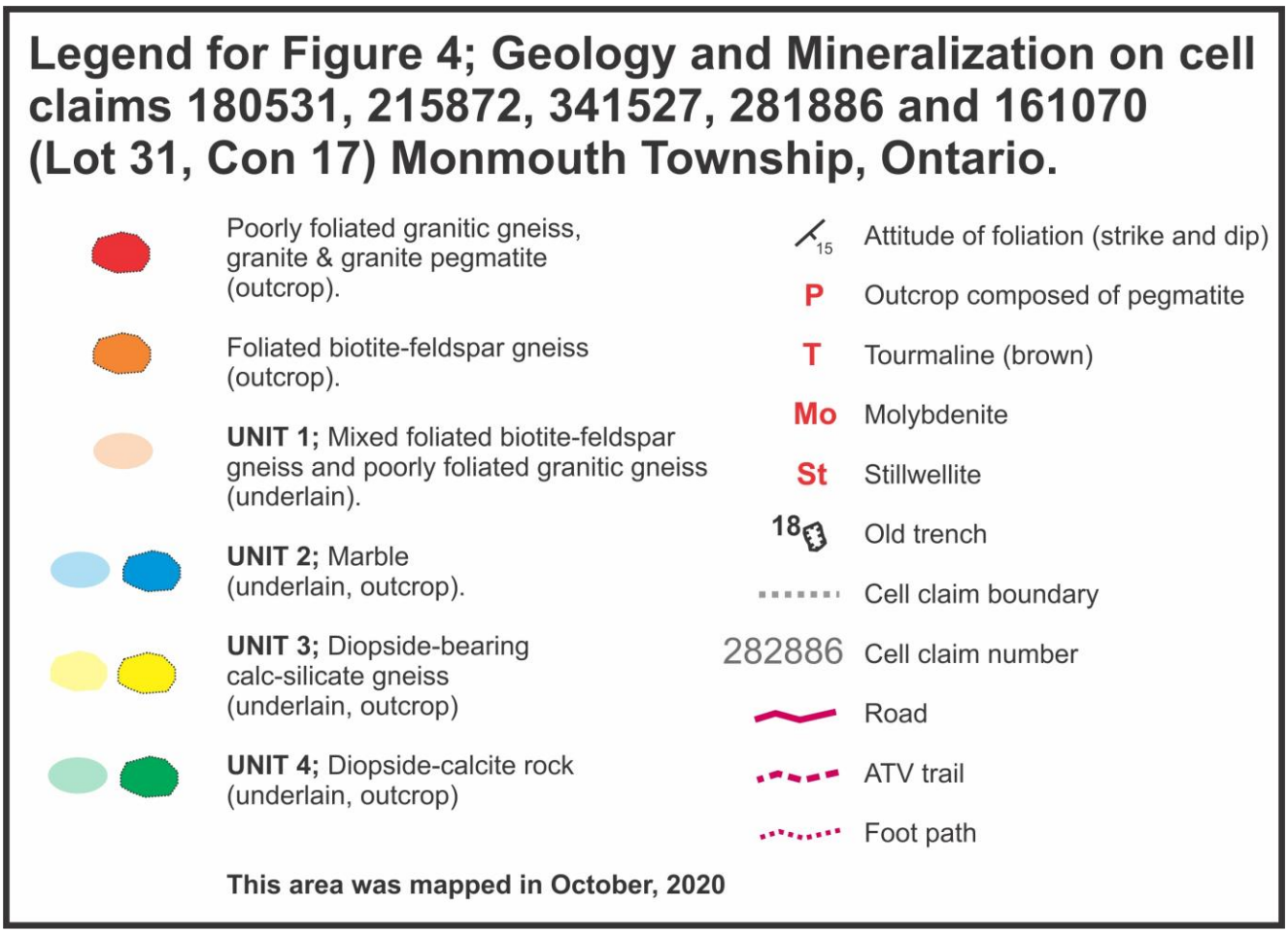


Figure 5; Legend for map on Figure 4.

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 along with minor amounts of hornblende. 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 layers of poorly foliated to massive granitic gneiss.

Where possible, an attempt was made in the field to differentiate pegmatite and these two gneisses. As can be seen in Figure 4 these units can occur next to each other in an 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. This indicates that the two gneisses are, at least, partially overlapping and without more data should be grouped together. Hence, the two gneisses, including granite pegmatite, are mapped as one unit.

An area of granitic gneiss and pegmatite outcroppings marked with "P" in the southern portion of the claim between Trenches 17, 19 & 20 may be a larger area of intrusive pegmatite or possibly a gently dipping dyke.

Unit 2/ Marble

Marble is composed of course grained calcite with minor amounts of quartz, diopside, mica (probably phlogopite), scapolite, graphite and brown tourmaline (probably uvite or dravite). Outcrops are commonly crumbly in texture, where the calcite grains have fallen apart, probably due to weathering.

Unit 3/ Diopside-bearing calc-silicate gneiss

The diopside-bearing calc-silicate gneiss crops out on the south-eastern part of the property. It forms a convoluted band of rock separating marble from granitic and foliated biotite-feldspar gneiss (Unit 1). One possible reason for its convoluted contact with Unit 1 is because Unit 3 may have a gradational contact with Unit 1. Lack of outcrop, difficulty in recognizing diopside, a possible gradational contact and the abundance of pegmatite between Trenches 17 and 20, have all contributed to making this contact poorly defined.

The upper part of Unit 3 is similar in appearance to and in contact with the foliated biotite-feldspar gneiss (Unit 1). Unit 3 has a grain size of 1-3 mm, noticeable foliation and compositional banding which is similar to that observed in the foliated biotite-feldspar gneiss. The primary difference between the two is a greater degree of rusty weathering and the presence of diopside in Unit 3.

The lower part of Unit 3, where it is closest to marble, is a heterogeneous mix of fine- and course-grained diopside rock and diopside-potassium feldspar-quartz rock with stringers of potassium feldspar, quartz, diopside and patches of pegmatite-like mixtures of white potassium feldspar, quartz and diopside. Immediately north of Trench 18, Unit 3 includes outcrops composed of a course-grained mixture of potassium feldspar, amphibole (tremolite?), diopside, calcite, and black tourmaline.

Unit 4/ Diopside-calcite rock

This unit is only exposed in trenches 6, 7, 8, 9, 12, 13 and 18 and appears to be the mineralized rock that was the target of previous exploration programs. Satterly (1957) indicates that the diopside-calcite rock is the host for the radioactive occurrences of the area. Satterly (1957) describes one type of radioactive occurrence on the Desmont claim area as being

> "*in the bands of pale-green diopside rock or diopside-calcite rock in the marble. These bands contain erratic and sparse disseminations of uranothorite*".

As the name of this unit implies, diopside and calcite are its main constituents. It can range from fine- to course-grained and often contains minor amounts of other minerals such as apatite, potassium feldspar and in two of the trenches, molybdenite.

The diopside-calcite rock in Trenches 6, 7, 8, 9, 12 and 13 appears to be associated with or are part of the marble unit as suggested by Satterly (1957). Its association with the marble unit at Trench 18 is unclear.

Diamond drill holes

In the past several exploration companies conducted diamond drilling as part of their exploration activities. The author found the metal collars of two old diamond drill holes. They are marked in Figure 4 as DDH1 and DDH2. Should anyone want to know precisely where these holes are the following are the GPS UTM coordinates;

DDH1, 17 T 717223 4991554
DDH2, 17 T 717534 4991405

Pre-existing Trenches

During mapping, 16 old or pre-existing trenches were identified. These were likely excavated during previous phases of mineral exploration activity. Several trenches may have originally reached bedrock but today appear as excavations in unconsolidated soil. In other trenches bedrock is still exposed. The following is a description of each trench. Numbering begins at Trench 6, which continues from the author's previous 2019 report which describes 5 trenches located to the north.

Trench 6 is 17 m long and has several loose boulders and minor bedrock exposed along its mostly soil walls. The rock exposed is a fine-grained diopside-calcite rock.

Trench 7 is approximately 25 m long. Along some of the walls are outcroppings of crumbly diopside, calcite and calc-silicate rich rock with quartz stringers and calcite-hornblende stringers.

Trench 8 is approximately 11 m long and up to 4 m deep with several bedrock exposures along the north side. Bedrock is mostly marble with a near vertical band, 0.3 - 0.5 m wide, of course-grained calcite and fine-grained diopside.

Trench 9 is approximately 8 m long and up to 5 m deep with a small marble exposure at the eastern edge. Another outcrop along the north wall exposed diopside, calc-silicate and calcite rich rock. Many boulders, presumably from bedrock in the trench, consist of hornblende-mica rock and fine-grained diopside and course-grained calcite rock.

Trench 10 is 30 m long and 1.5 to 2 m deep, in soil and without bedrock exposures. There were no associated boulders found.

Trench 11 is "V" shaped with two uneven limbs, 11 m and 8 m long. No bedrock was exposed in this trench, however, there were several boulders of diopside-calcite rock observed in the trench.

Trench 12 is 39 m long. The eastern half is in soil while the western half is lined with outcrop. Bedrock exposures consist of a chaotic mix of diopside, calc-silicates and orange calcite with appreciable amounts of molybdenite disseminated throughout.

Trench 13 is approximately 170 m long and is oriented nearly east-west. The eastern third of the trench extends beyond the eastern boundary of the legacy claim and is walled with earth. The middle third has abundant outcrop consisting of a heterogeneous mixture of diopside, orange calcite, quartz, potassium feldspar, pyroxene and hornblende with abundant flakes of molybdenite. The walls of the western third of this trench are mostly earth with several marble outcrops.

Trench 14 is an excavation on the edge of a small escarpment and is more of a short adit than a trench. It is 2 m wide, 2 m high and extends inward, like an adit, for 4 m. The outcrop above the "adit" consists of rusty, foliated biotite-feldspar-quartz gneiss while the walls of the "adit" are rock composed of mostly fine-grained diopside with stringers of potassium feldspar and quartz.

Trench 15 is cut into the steep side of the same escarpment as Trench 14 ("adit"). It is 7 m long, 2-3 m wide and up to 3 m deep. Rock exposures here on this escarpment are similar to that of trench 14. The upper part is rusty foliated gneiss and the lower part is diopside rich, rusty calc-silicate gneiss with pods of white potassium feldspar, calcite and titanite.

Trench 16 is 7 m long, 4 m across and 1-2 m deep. The walls expose only earth. Bolders nearby are composed of fine-grained pink granite.

Trench 17 is 6 m long and <1 m deep and is surrounded in rock debris composed of fine- and course-grained diopside, potassium feldspar and quartz (calc-silicate gneiss).

Trench 18 is 15 x 8 m in area and 1-1.5 m deep. This is the trench of greatest interest to mineral collectors. This is the only known source of the very rare mineral "stillwellite" on the property. Here outcrop consists primarily of a diopside-calcite rock.

Trench 19 is 5 m long, 2 m wide and 0.5 m deep. Abundant nearby rock debris and out crop along one side is composed of quartz, potassium feldspar granite and pegmatite with minor amounts of biotite and black tourmaline.

Trench 20 is 2 x 1.5 m in area and 0.5 m deep. Outcrop around the edges is similar to that at trench 19 and composed of quartz, potassium feldspar granite/pegmatite with a grain-size of 3-10 mm.

Trench 21 is a small pit with abundant rock debris composed of diopside, potassium feldspar, calcite and calc-silicates.

Mineralization

The Desmont claim was originally explored for molybdenum and radioactive elements, primarily uranium. Some of this exploration resulted in the creation of the 16 trenches identified during this study. For at least 4 decades the Desmont claim has attracted the attention of recreational mineral collectors because of some of the rare and attractive minerals that occur there. During this study the author identified and/or confirmed several potential mineral occurrences of interest to mineral collectors.

Any of the trenches where Unit 4 (diopside-calcite rock) is exposed has the potential to contain uranium minerals and other minerals of interest to the recreational mineral collector. These are Trenches 6, 7, 8, 9, 12, 13 and 18. Sabina (1986) lists 31 minerals that can be found on the Desmont claim, many of which are of interest to the recreational mineral collector and many could potentially be found in these trenches.

Molybdenite flakes and crystals can easily be found in Trenches 12 and 13 wherever Unit 4, the diopside-calcite rock, crops out.

Trench 18 is the only site known to the author where the rare mineral stillwellite can be found, although Sabina (1982) states that it occurs in the “East and Main showings”. Of all the minerals that occur here, stillwellite is probably the mineral of greatest interest to mineral collectors. Sabina’s “main” showing is likely Trench 18 and the “east” showing is most likely Trench 13. If stillwellite occurs in Trench 13 it may not occur with same high quality or abundance as at Trench 18.

The author did not spend a significant amount of time in the trenches trying to identify which minerals could be found in each trench. That should be the focus of a future study.

In addition to the mineralization exposed in the trenches there is potential to find euhedral tourmaline anywhere in the marble. Euhedral brown tourmaline was identified from three sites in 2019 within the marble on the northern half of the claim. Similar euhedral brown tourmaline in marble was found during this study at the outcrop nearest Trench 11. The author believes that upon further investigation additional occurrences of brown tourmaline can be found in the marble. 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.

Summary and Recommendations

For this report/study the southern half of the Desmont claim was geologically mapped and prospected. This study and author’s previous study in 2019 of the northern half of the Desmont claim provide a framework for future studies to help determine sites of greatest interest to the recreational mineral collector.

Sixteen old exploration trenches were indentified, seven of which have potential to host minerals of interest to mineral collectors. Two trenches contain molybdenite and one, possibly two trenches, contain(s) fine examples of the rare mineral stillwellite.

Based on the results of this investigation the author recommends the following;

1/ Investigate further the mineral collector potential of Trenches 6, 7, 8, 9, 12, 13 and 18.
Determine which minerals from each trench would be of greatest interest to the recreational mineral collector. Use a scintillometer 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, tremolite etc. in all these trenches. The goal could be the creation of a map showing the most productive of these trenches and showing were good examples of each mineral are found.

This search could be expanded to include the northern trenches as well.

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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 30, 2021