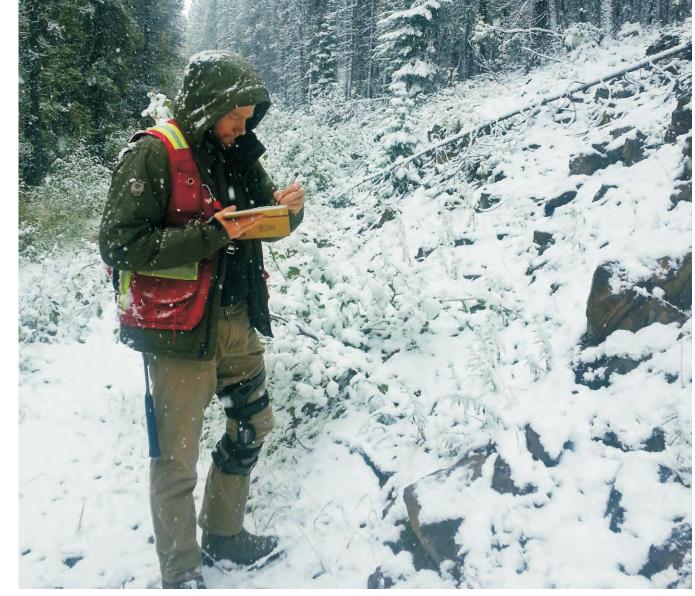


THE STRUCTURAL CONTROLS ON THE KIMBERLEY GOLD TREND M. Seabrook and T. Höy

Geoscience BC, Stimulation Exploration in the East Kootenay (SEEK) Program



Geological mapping in September (M. Seabrook)

America to the Kootenay Valley (Photo 1). By 1882 the town of Fort established a presence to maintain peace and to prevent the smuggling trail was begun and by 1965 it was completed. This 720km long trail

source has been ongoing for a century with only minor successes. The efforts towards base metals when the giant Sullivan SEDEX deposit was discovered in 1892. To date, an estimate of more than 10million oz of gold has been recovered from the gold bearing streams in the East Kootenay area and the locations of more than 50 gold showings suggested characteristics that bear similarity to large deposit models Hosted Vein (SHV) deposits. The term "Kimberley Gold Trend" was coined by Thompson in 2009 and subsequent work by the authors built on concepts described in Thompson's report (Thompson, 2010).



Photo 1: Placer miners on the Wild Horse Creek 1882

Program Objectives

The Kimberley gold trend lies within a structural corridor bounded to the northwest and southeast by Proterozoic structures that were reactivated in the Mesozoic, namely the St. Mary's and Movie faults (Figure 1). Between these, formations of the host Belt-Purcell Supergroup are fractured, folded, altered and mineralized in complex patterns that are not well understood. The purpose of this investigation

- the age of gold mineralization relative to intrusive events and structures;
- the relationship between gold mineralization and specific fault structures:
- the potential for certain pre-mineralizing structures to produce either structural traps or conduits for gold mineralization; and
- categorize the alteration style and mineralogy of structural elements, so they can be readily identified in areas of sparse

The project included approximately 40 days of geological mapping, concentrated mainly in three project areas within the Kimberley gold trend. (Included in the planned field-mapping days were several days spent touring known gold occurrences outside the mapping areas to compare their characteristics with those of showings in the mapping areas). This work will be augmented by compilation of industry work, including several map programs done by the authors for industry clients between 2011 and 2013. The data from the field program will be analyzed to produce digital geology maps that include compilation of geochemistry, geophysics, geology and drill-location data. The digital database will be used to update BC MINFILE occurrences and create additional files, if required. All of the data will be available in widely used digital formats for reliable integration with other datasets.

Regional Geology

The Kimberley Gold Trend lies within the Purcell anticlinorium. a generally north plunging structure that is cored by Middle Proterozoic sedimentary and minor volcanic rocks of the Purcell Supergroup and flanked by unconformably overlying Late Proterozoic clastic and carbonate rocks of the Windermere Supergroup (Figure 1 These are generally overlain by either Cambrian or Devonian rocks, part of the North American "miogeoclinal" sequence.

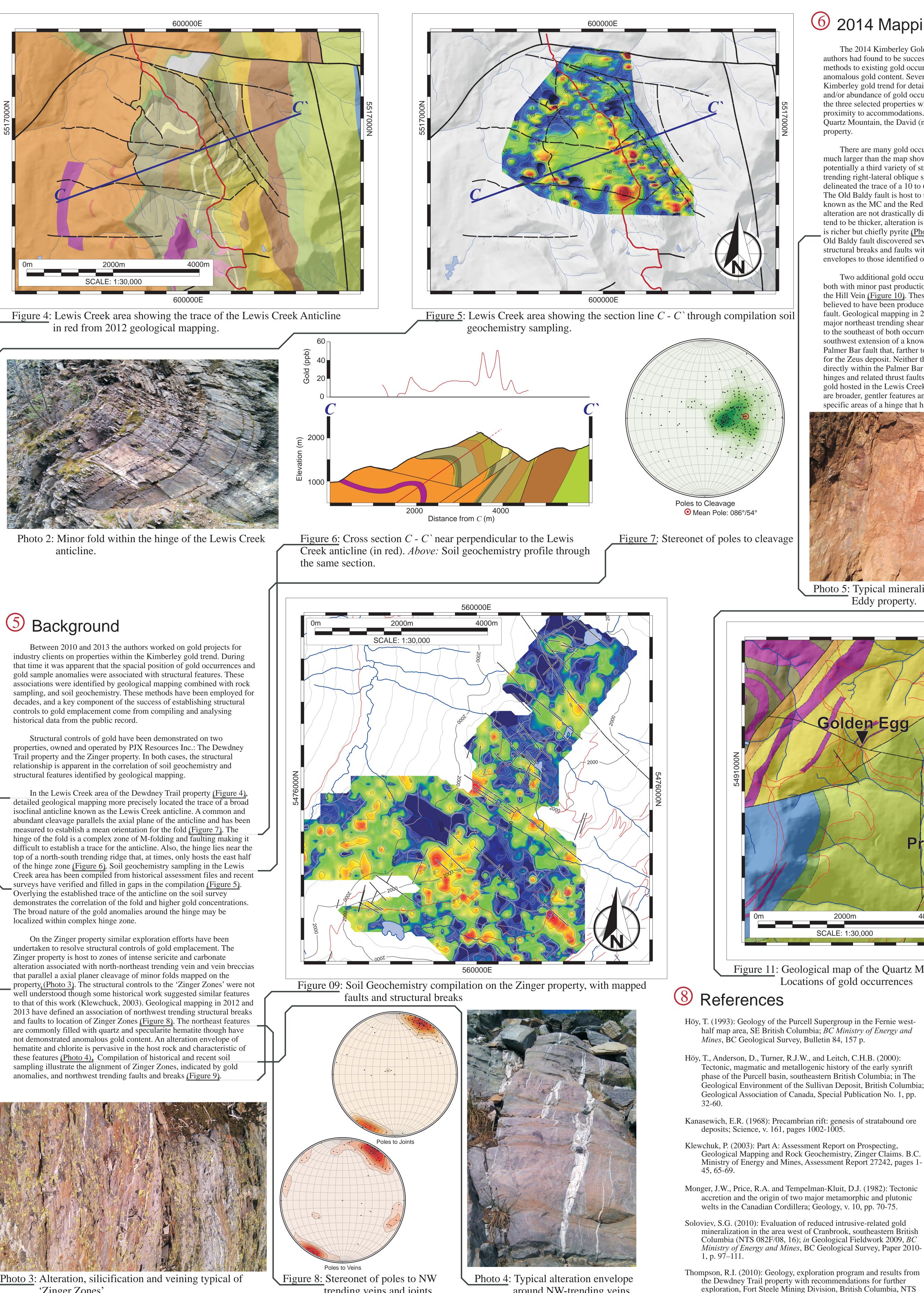
The Purcell Supergroup, and correlative Belt Supergroup in the United States, comprises a syn-rift succession, the Aldridge Formation, and an overlying, generally shallow-water post-rift or rift fill sequence that includes the Creston and Kitchener Formations and younger Purcell rocks (Höy, 1993).

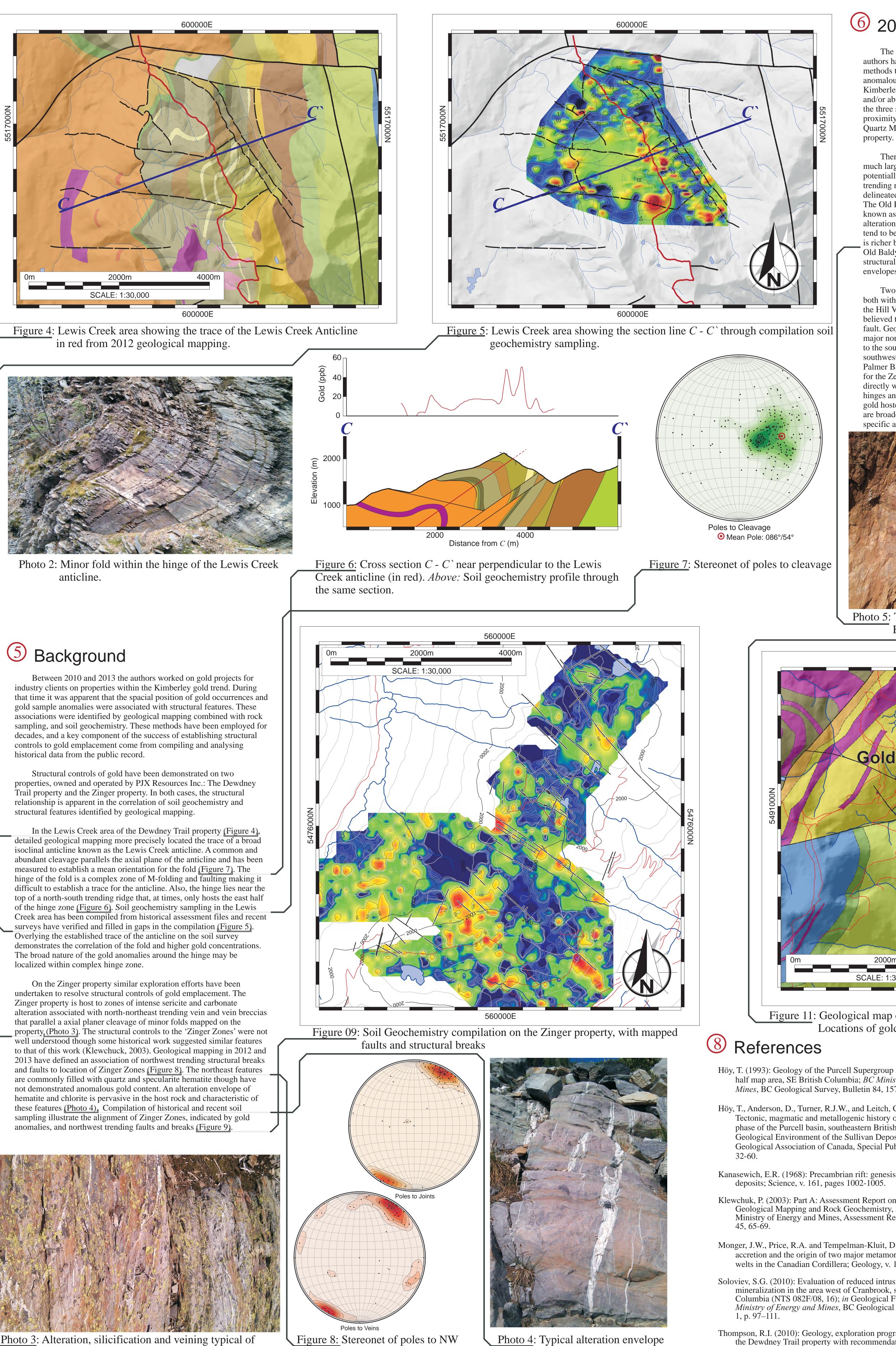
The exposed part of the Aldridge Formation comprises more than 3000 metres of mainly turbidite deposits and numerous, laterally extensive gabbroic sills referred to as the Moyie intrusions. The gabbroic sills are laterally extensive, typically up to several hundred metres thick and can be traced over hundreds of square kilometres. Locally, particularly in areas of growth faulting, they cut across stratigraphy as dykes. Some of the Moyie sills have contact features that suggest intrusion into wet and partially consolidated sediments (Höy, 1993).

The Purcell Supergroup succession is allochthonous, part of the Foreland Thrust and Fold Belt, the most eastern physiographic belt in the Canadian Cordillera (Monger et al., 1982). Structures within the Purcell anticlinorium include east verging thrust faults, northeast trending, right lateral reverse faults, and open to tight folds (Höy, 1993). A complex array of normal faults that trend dominantly northward parallel to the Rocky Mountain trench cut the earlier thrust faults and associated folding.

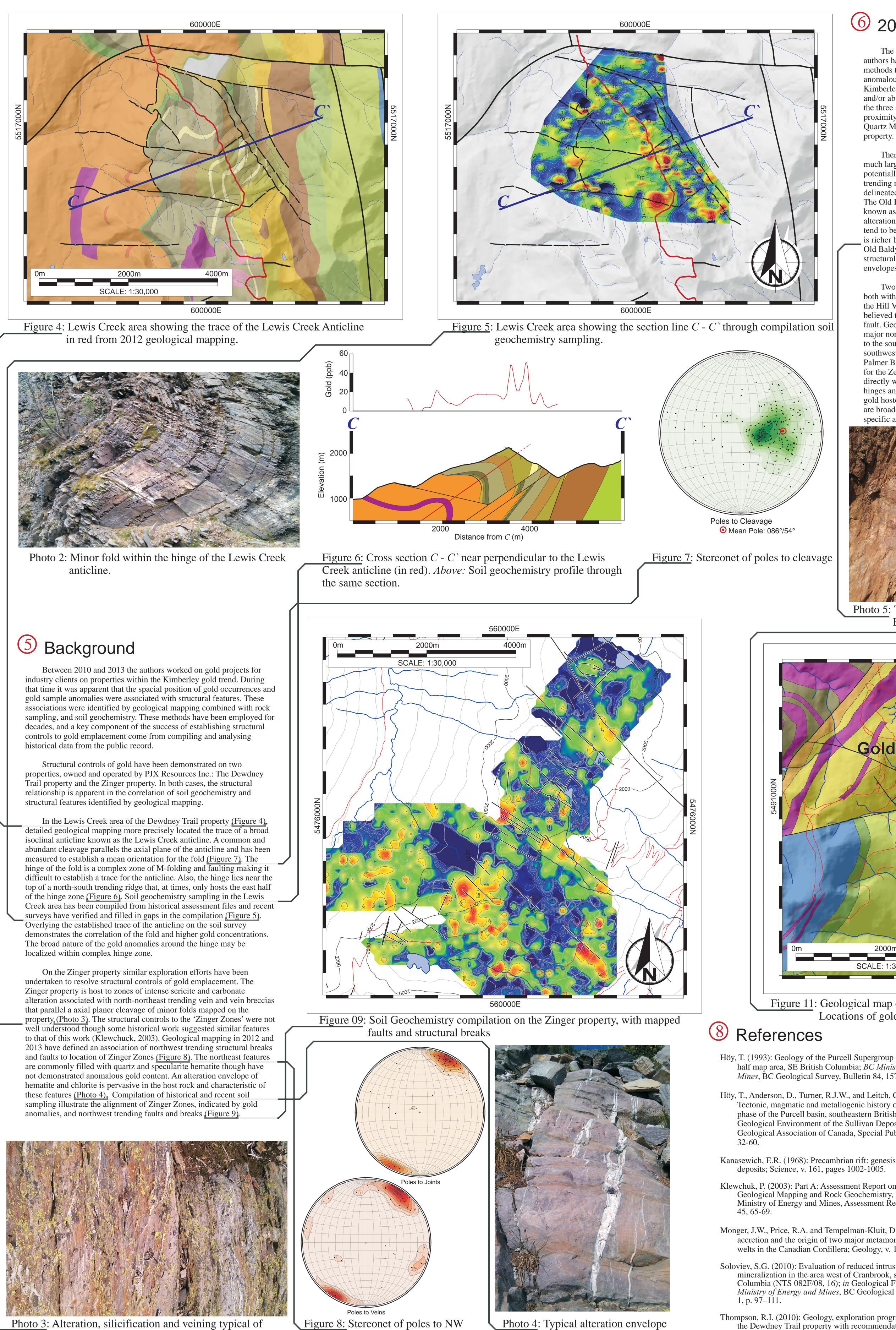
The northeast-trending structures, including the St. Mary and Moyie faults, are within or parallel to a broad structural zone that cuts the Purcell anticlinorium, crosses the Rocky Mountain trench and extends northeastward across the Foreland thrust belt (Kanasewich, 1968). This zone is marked by a conspicuous change in the structural grain, from northerly north of the zone to northwesterly south of the zone, and by pronounced and fundamental changes in the thickness and facies of sedimentary rocks that range in age from Middle Proterozoic to early Paleozoic (Höy, 1993; Höy et al., 2000).

The zone, referred to as the Kanasewich rift, in the central part of the Purcell Mountains, including the area of the Kimberley gold trend, is also characterized by a variety of mineral deposits and occurrences of varying ages and tenor. These include the Sullivan and Kootenay King sedex deposits, the St. Eugene and Vine lead-zinc-silver veins, and the placer gold deposits of the Wildhorse, Moyie and Sawmill Creek drainages. Farther west along this trend, lead-zinc replacement deposits occur in Cambrian carbonates in the southern Kootenay Arc, and gold-copper vein deposits characterize the Rossland camp in Quesnel terrane.









'Zinger Zones'

Figure 1.2: Locations of projects discussed on this poster

trending veins and joints.

around NW-trending veins.

— Follow the lines to see the figure or photo

6 2014 Mapping Program Part 1

The 2014 Kimberley Gold Trend project focussed on methods the authors had found to be successful in previous years, and applied the methods to existing gold occurrences and sample locations with anomalous gold content. Several properties were selected in the Kimberley gold trend for detailed mapping programs due to their siz and/or abundance of gold occurrences and geological setting. However, the three selected properties where mainly chosen due to access and proximity to accommodations. The detailed mapping properties are the Quartz Mountain, the David (not included on this poster), and the Eddy

There are many gold occurrences on the Eddy property which is much larger than the map shown in Figure 10. The Eddy properties has potentially a third variety of structural control for gold, namely northeast trending right-lateral oblique shears. Historical geological mapping delineated the trace of a 10 to 60m shear zone called the Old Baldy fault. The Old Baldy fault is host to two gold occurrences on the property known as the MC and the Red Zone (Figure 10). The mineralization and alteration are not drastically different from Zinger Zones, though veining tend to be thicker, alteration is more intense, and sulphide mineralization is richer but chiefly pyrite (Photo 5). Mapping conducted distal to the Old Baldy fault discovered several instances of northwest trending structural breaks and faults with identical alteration assemblages and envelopes to those identified on the Zinger property (Photo 6).

Two additional gold occurrences are recorded in the public record, both with minor past production, known as the Prospectors Dream and the Hill Vein (Figure 10). These two occurrences were previously believed to have been produced as a distal feature from the Old Baldy fault. Geological mapping in 2014 identified the presence of a second major northeast trending shear cutting through Aldridge formation units to the southeast of both occurrences. It is believed that this fault is the southwest extension of a known gold mineralizing shear called the Palmer Bar fault that, farther to the northeast, is a controlling structure for the Zeus deposit. Neither the Hill Vein nor the Prospectors Dream lie directly within the Palmer Bar fault but are instead, hosted within fold hinges and related thrust faults. While this bears resemblance with the gold hosted in the Lewis Creek Anticline, the folds on the Eddy property are broader, gentler features and gold distribution may be localized to specific areas of a hinge that has incurred greater structural deformation.



Photo 5: Typical mineralization in the Red Zone area of the $\sqrt{}$ Photo 6: NW trending fault on the Eddy with Eddy propert

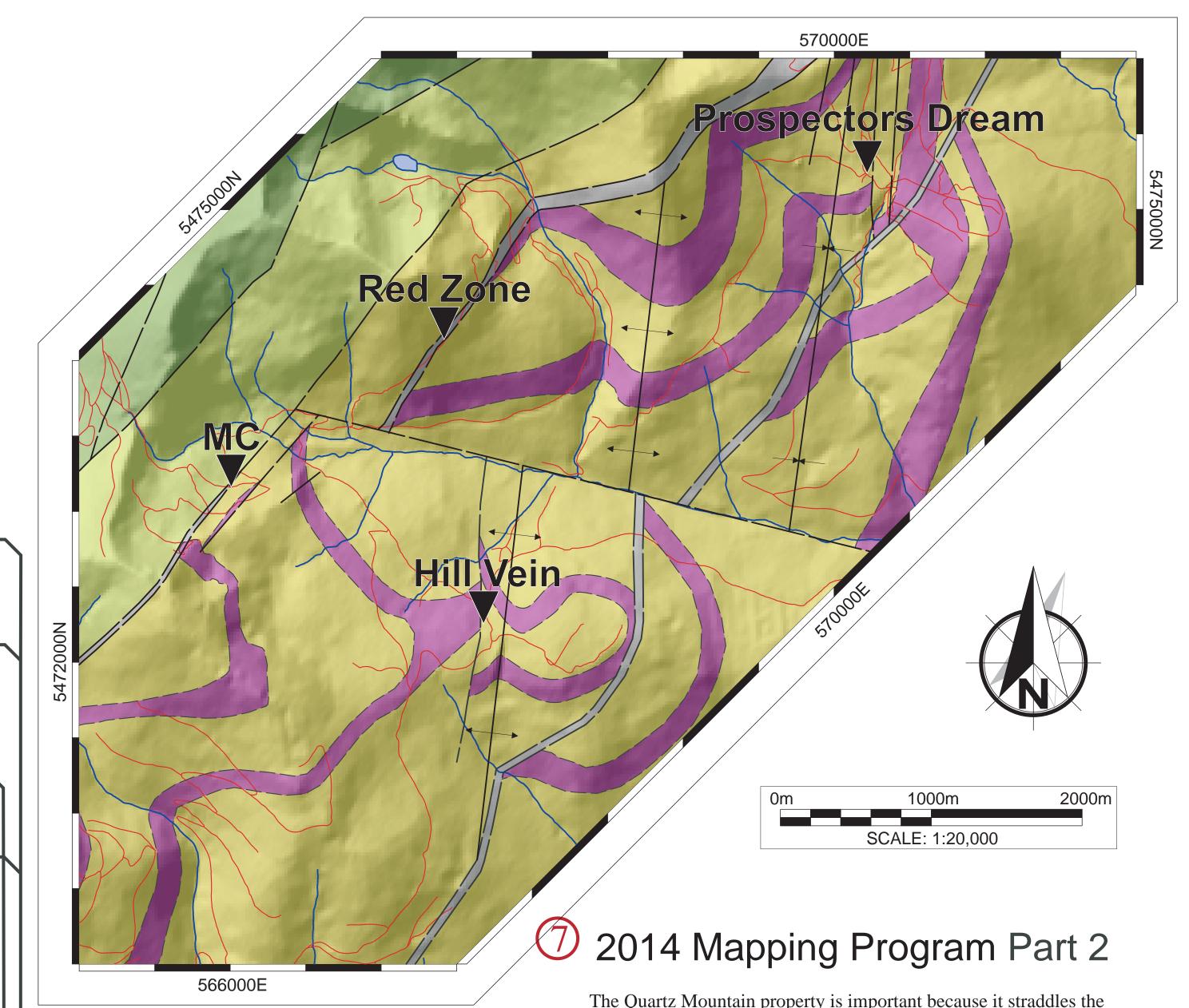
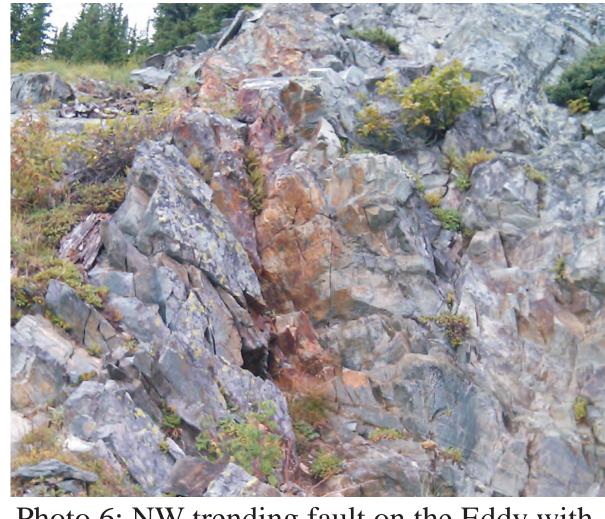
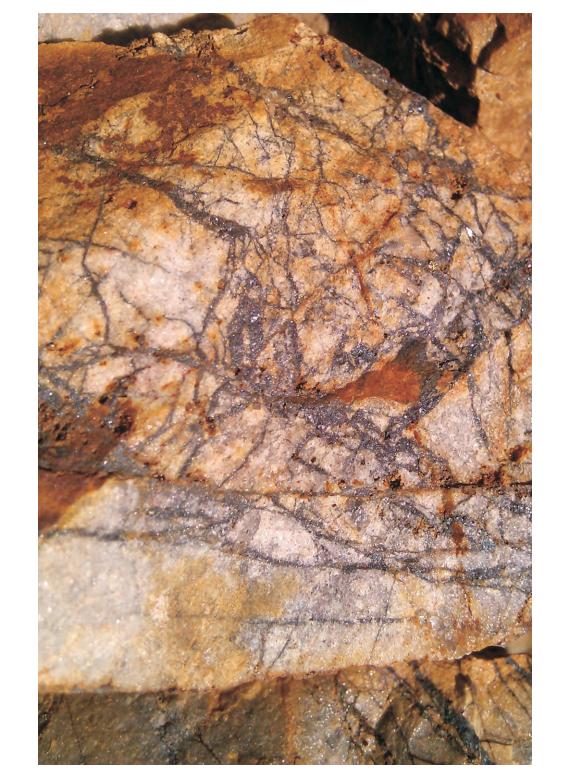


Figure 10: Geological map of the Eddy property showing locations of known gold occurrences and past producers



typical alteration envelope.



<u>Photo 7</u>: Iron-oxide, quartz, albite breccia

north boundary of the Kimberley gold trend along the St. Mary's Fault (Figure 11). Gold mineralization on the property is in two main occurrences known as the Golden Egg and Prices Pit. Both are limited past producers and have different characteristics that are not easily comparable. Prices Pit is a thick quartz carbonate vein with coarse gold that lies along a east-northeast trending fault where it intersects the northeast Perry Creek thrust fault. Outcrop is sparse in the area around Prices Pit and there was no indication of the character of the eastnortheast trending fault.

Of more interest to the authors is the Golden Egg occurrence which lies within the broad St. Mary's shear zone, and near the intersection of the St. Mary's Fault and a west-northwest trending structural feature known as the Quartz Mt. Fault. mapping on the Quartz Mountain property in 2014 indicated that the Quartz Mountain Fault cuts the St. Mary's Fault with left-lateral displacement and extends east towards the Perry Cr. fault. The Quartz Mt. fault was easily identified by it's plagioclase alteration envelope grading to distal chlorite and the presence of an iron-oxide breccia within in the centre of the structure (Photo 7) With the exception of plagioclase, the mineralogy of the Quartz Mt. fault is identical to northwest trending breaks and faults found on the Zinger and Eddy properties. As on other properties, the Quartz Mt. fault is not host to mineralization rather, the Golden Egg deposit lies proximal to the

Many additional properties were visited for short periods of time in the 2014 program in an attempt to estimate the potential for success if work was conducted on the property. In most cases, the geological aspects of the property were encouraging, but a combination of degrading road conditions and distance from accommodations meant that other options were preferable. Of the properties visited, several are now believed to be key components for further understanding the gold mineralization of the Kimberley gold trend.

In particular, the Gar property is one of only a few locations in the Kimberley gold trend where gold mineralization is hosted directly within _granitic rocks (Figure 12). While visiting the Gar property in 2014, it was observed that widespread, high density sericite filled fracture hosted an elevated to anomalous gold concentration (Photo 8). Limited industry work has been conducted on the property even though rock sampling revealed many locations of greater than 1g/tonne gold within the granitic units. It has been proposed that the gold and heat, necessary for the gold bearing hydrothermal fluid, have been sourced from deep cretaceous intrusions (Soloviev, 2010). While small intrusions are scattered throughout the Kimberley gold trend, only on the Gar, neighbouring Leader property, can sizable granitic plugs be found at surface.

The presence of iron-oxide breccias on the Quartz Mountain property, and isolated locations on the Eddy property are indications that iron-oxide breccias may also be associated with gold. One of the most encouraging properties currently being explored in the Kimberley gold trend is the Iron Range located north of Creston. Our understanding of gold mineralization in the East Kootenays would be greatly improved should these properties be studied in greater detail. It is hoped that this project could be expanded in future years to include these and other gold properties in the Kimberley gold trend and as a result, stimulate industry development in the region.

Figure 11: Geological map of the Quartz Mountain property showing

82G/12; NI43-101 technical report prepared for PJX Resources Inc.

and filed with SEDAR May 27, 2011, 208 p.



Photo 8: High density, fine sericite fractures hosting anomalous gold.

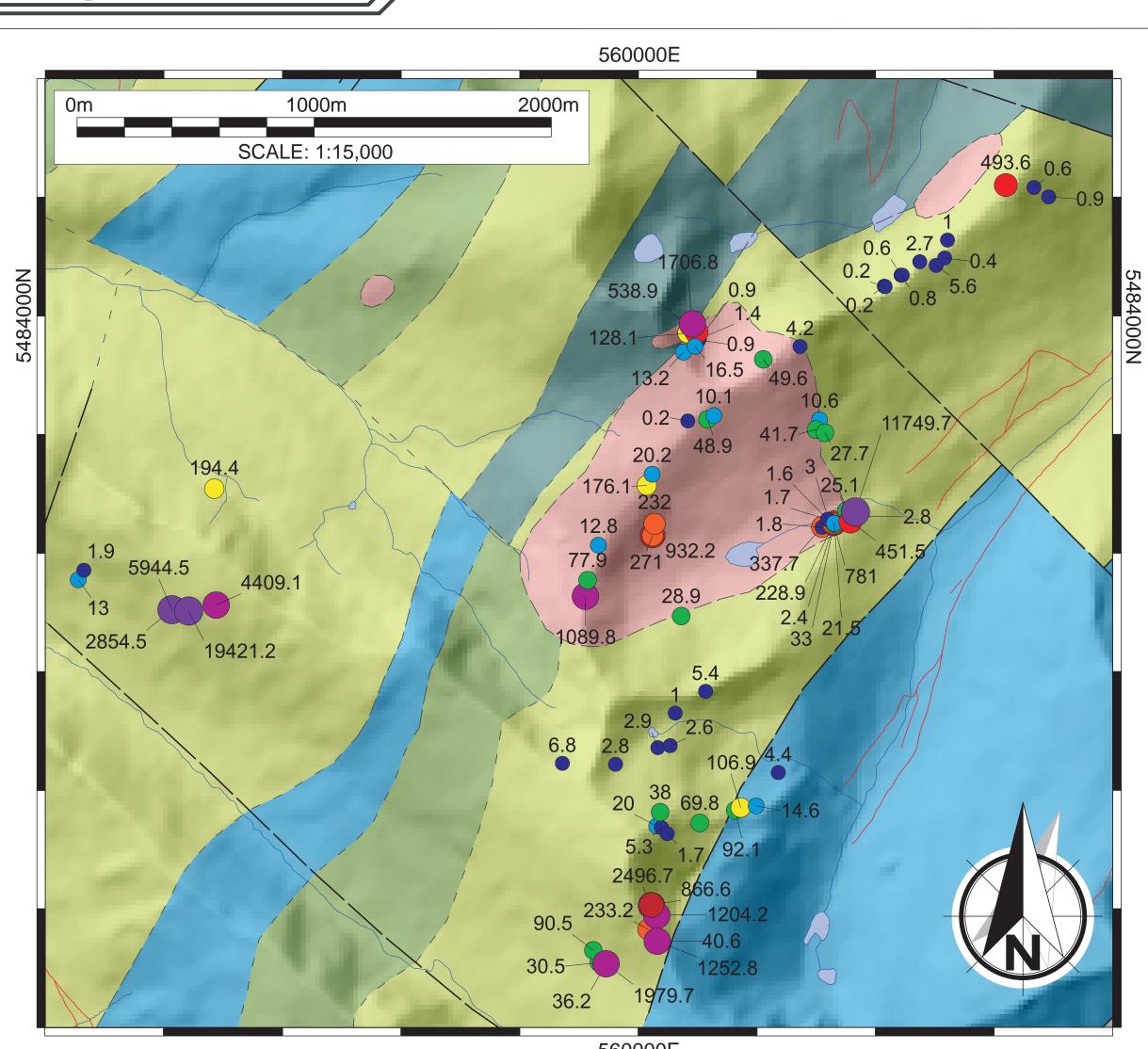


Figure 12: Geology map of the Gar property with rock geochemisty samples for gold in ppb