Newfoundland Labrador

Natural Resources

Mines

STRUCTURALLY CONTROLLED GOLD SYSTEM, ANTLER GOLD INC.'S WILDING LAKE PROPERTY, CENTRAL NEWFOUNDLAND

I.W. Honsberger, W. Bleeker, H.A.I. Sandeman, D.T.W. Evans and S.L. Kamo

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St. John's, Newfoundland
October, 2019

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ABSTRACT

Crustal-scale fault zones in central Newfoundland are emerging as significant gold-mineralized structures. In particular, the northeast-trending Rogerson Lake Conglomerate structural corridor, in the eastern Dunnage Zone (Exploits Subzone), contains highly prospective orogenic-style vein-hosted gold deposits. Such mineralized vein systems, exposed near Valentine Lake (Marathon Gold Corp.) and Wilding Lake (Antler Gold Inc.), are products of progressive Paleozoic deformation and fluid-pressure cycling along crustal-scale faults that cut the Silurian Rogerson Lake Conglomerate and underlying Neoproterozoic basement rocks of Ganderia. Well exposed, gold-bearing quartz vein systems of the Alder Zone and Elm Zone on Antler Gold Inc.'s Wilding Lake property, reveal a kinematic history that involved a main phase of reverse sinistral shearing and subsequent transient phases of horizontal extension, oblique compression, and, at least, local components of late dextral strike-slip. High-grade gold mineralization is associated with siderite–ankerite–sericite alteration of the host rocks, quartz vein formation, and supergene alteration of chalcopyrite. Gold-bearing veins sets are composed of quartz, pyrite, chalcopyrite, tourmaline, bismuth-tellurides, and secondary goethite and malachite. A prospective mineralized belt of Silurian feldspar porphyry and felsic volcanic rocks adjacent to the Rogerson Lake Conglomerate structural corridor is exposed in the Red Ochre Complex and Third Spot showing, respectively, on the Wilding Lake property. A prospective future gold exploration target in the Wilding Lake area is a rheologically favourable Neoproterozoic granodiorite–gabbro–tonalite body that nonconformably underlies the Rogerson Lake Conglomerate and may provide a setting similar to that at Valentine Lake.

INTRODUCTION

The Island of Newfoundland occupies the northeastern-most portion of the northern Appalachian orogen, and is subdivided into tectonostratigraphic zones based on geological and geochemical contrasts in pre-Silurian rocks (Figure 1; Williams, 1978). The Humber Zone underlies western Newfoundland and consists of basement, and cover rocks of the early Paleozoic Laurentian margin. The Dunnage Zone spans central Newfoundland and consists of accreted peri-Laurentian (Notre Dame Subzone) and peri-Gondwanan (Exploits Subzone) arc terranes, juxtaposed along a major east-verging fault zone, the Red Indian Line (Williams *et al.*, 1988). The Notre Dame Subzone, dominated by magmatic arc rocks, intrudes the paleogeographic, low-latitude microcontinent of Dashwoods (Waldron and van Staal, 2001). The Exploits Subzone comprises Cambrian to Ordovician continental and oceanic arc–back-arc complexes derived from Ganderia at higher latitudes on the opposite side of the Iapetus Ocean from Dashwoods and Laurentia (Williams *et al.*, 1988; van Staal *et al.*, 1998; Zagorevski *et al.*, 2007). The Gander and Avalon zones represent peri-Gondwanan continental fragments, accreted, respectively, to composite Laurentia during the Silurian to Early Devonian Salinic, and Devonian Acadian orogenies (Dunning *et al.*, 1990; van Staal and Barr, 2012; van Staal *et al.*, 2014).

Structurally controlled mesothermal gold deposits in Newfoundland are associated with crustal-scale fault zones within, and along, the Dunnage Zone. The major fault zones include, from west to east, the Baie Verte–Brompton Line (Williams and St. Julien, 1982), Cape Ray Fault Zone (Dubé *et al.*, 1996; van Staal *et al.,* 1996), Red Indian Line, and Victoria Lake Shear Zone (Valverde-Vaquero *et al.*, 2006). The largest known gold deposit in Newfoundland occurs at Valentine Lake (Marathon Gold Corp., press release, October 30, 2018) in the footwall of the Victoria Lake Shear Zone, which forms the base of the Devonian Meelpaeg nappe and essentially separates the Dunnage Zone from the Gander Zone in central Newfoundland (Valverde-Vaquero *et al.*, 2006). The Cape Ray Fault Zone separates the Notre Dame Subzone from the Exploits Subzone in southwestern Newfoundland, hence, correlates with the Red Indian Line farther to the northeast. Key marker lithologies and exploration targets along the Cape Ray Fault

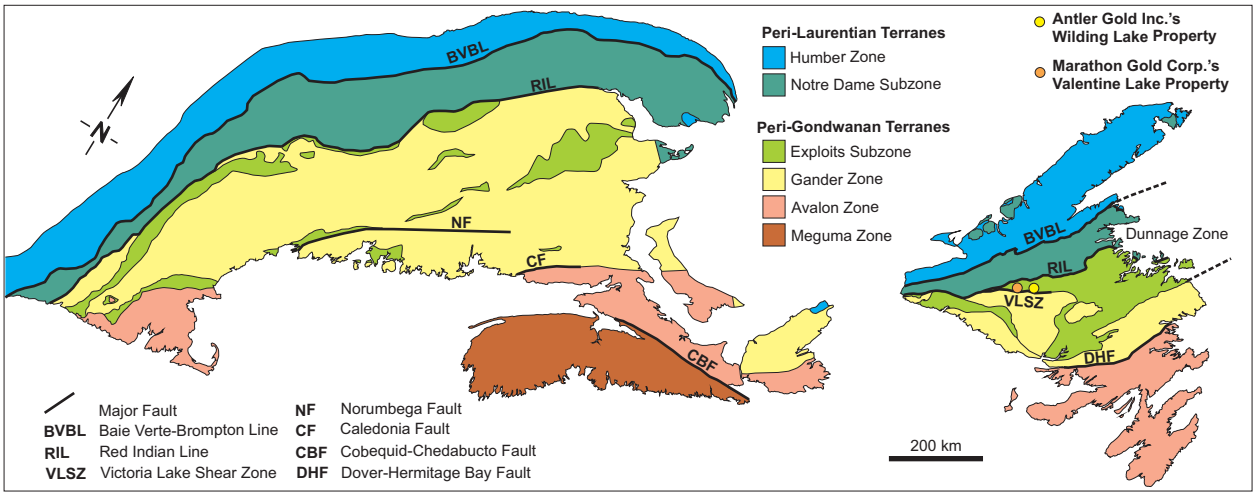

Figure 1. *Generalized geological map of the northern Appalachians showing the distribution of tectonostratigraphic zones in pre-Silurian rocks and the locations of Marathon Gold Corp.'s and Antler Gold Inc.'s properties. Map adapted from Hibbard* et al. *(2006).*

Zone and Victoria Lake Shear Zone are panels of Silurian synorogenic polymict conglomerate and associated volcanic rocks unconformably overlying the faulted and imbricated basement terranes (Dubé *et al.*, 1996; van Staal *et al.*, 1996). Structurally controlled gold mineralization on Antler Gold Inc.'s Wilding Lake property is concentrated within shear vein systems that cut Silurian polymict conglomerate (Rogerson Lake Conglomerate), and felsic volcanic and volcaniclastic rocks, within the Exploits Subzone.

This contribution presents an overview and detailed field data from Antler Gold Inc.'s Wilding Lake property, including two exploration trenches within the Rogerson Lake Conglomerate, the Alder and Elm zones, mapped, in detail, during the summer of 2018, as part of Natural Resources Canada's Targeted Geoscience Initiative. The outcome of this field work is summarized in this open-file report as two poster sheets (Appendix). The first (Appendix, Poster Sheet 1 of 2) presents a geological and structural overview of the Wilding Lake property and includes a detailed discussion of the smaller Alder Zone trench, whereas the second poster sheet (Appendix, Poster Sheet 2 of 2) summarizes the geological and structural features of the more extensive Elm Zone trench.

WILDING LAKE PROPERTY

EXPLORATION HISTORY

In 2015, prospecting along new logging roads in the Wilding Lake area led to the discovery of visible gold in large quartz boulders. In 2016, additional quartz–tourmaline boulders having visible gold were identified by follow-up prospecting and soil sampling by Altius Resources. In September 2016, Antler Gold Inc. optioned the Wilding Lake property from Altius Resources. Between September and November 2016, Antler Gold Inc. exposed five new gold showings hosted in the Rogerson Lake Conglomerate; the Alder, Taz, Elm, Cedar, and Dogberry zones, and three additional showings near the contact with or within felsic volcanic rocks (Birch, Third Spot, and Bridge; Antler Gold Inc., press release, August 30, 2017). In 2017, Antler Gold Inc. discovered the Red Ochre Complex within feldspar porphyry in contact with the Rogerson Lake Conglomerate. The first phase of channel sampling and drilling was completed by Antler Gold Inc. in 2017, including three drillholes in the Alder Zone and 13 drillholes in the Elm Zone (Antler Gold Inc., press release, December 13, 2017). Gold values of up to 19.2 g/t over 0.9 m and 49.92 g/t over 0.98 m were reported for the Alder and Elm zones, respectively (Antler Gold Inc., press release, January 24, 2017).

REGIONAL SETTING

Antler Gold Inc.'s Wilding Lake property spans the gold-mineralized Rogerson Lake Conglomerate structural corridor, which trends northeast from Cape Ray to Marathon Gold Corp.'s Valentine Lake gold property to Wilding Lake (Figures 1 and 2). The prospective structural corridor is characterized by a truncated footwall syncline of the Rogerson Lake Conglomerate and associated felsic volcanic and volcaniclastic rocks that nonconformably overlie a granodiorite–gabbro–tonalite body (Figure 2). High-precision U–Pb zircon dating of granodiorite from a drillcore reveals that this underlying granitoid is 565.0 ± 2.3 Ma Ganderian basement (Honsberger *et al.*, 2019), which correlates with the Neoproterozoic Cripplebacк Intrusive

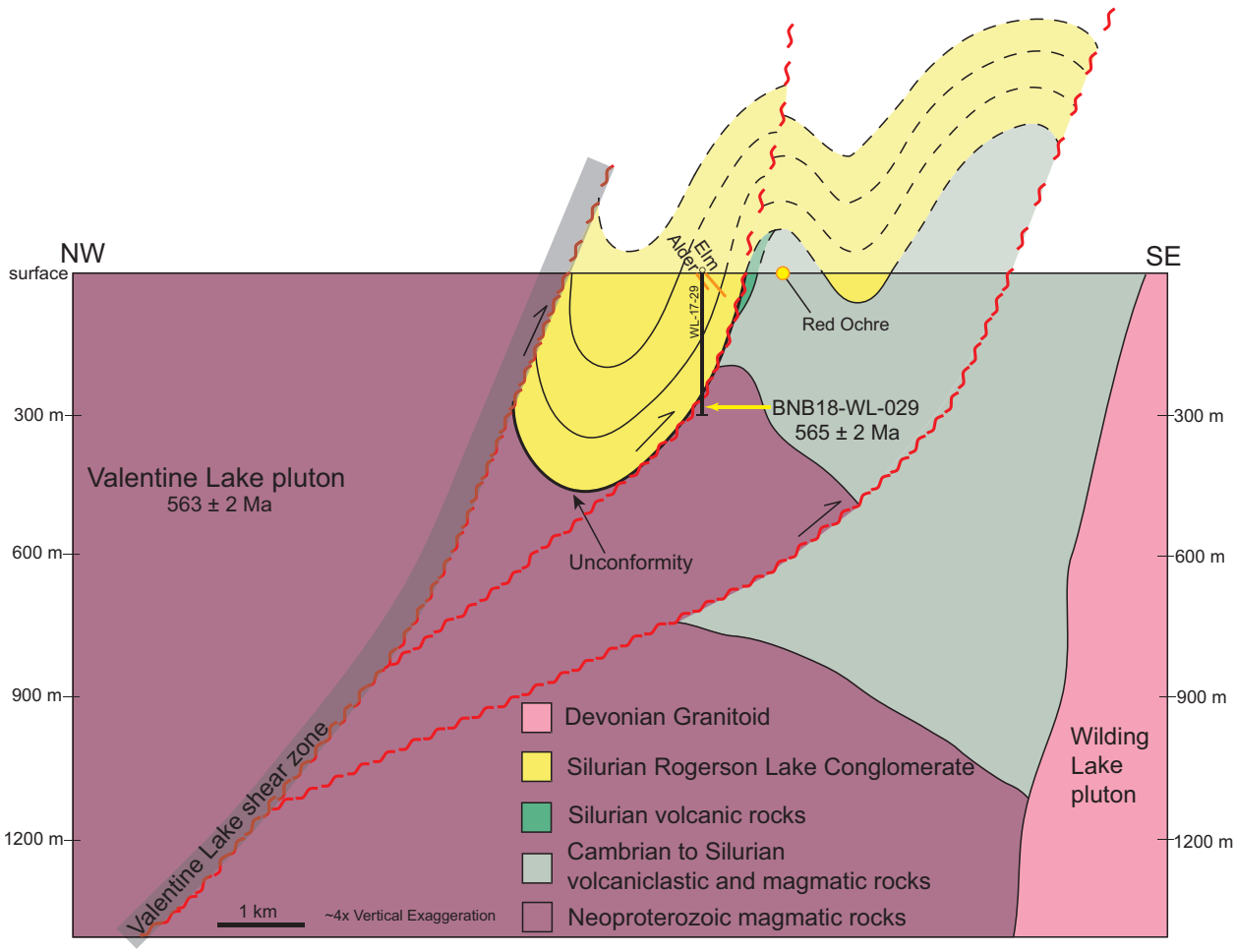

Figure 2. *Interpreted composite cross-section representing ~40 km strike length along the Rogerson Lake Conglomerate structural corridor between Valentine Lake and Wilding Lake. The cross-section stitches (thick grey line) structural hanging wall rocks of the Valentine Lake pluton above footwall rocks at Wilding Lake, which consist of the Rogerson Lake Conglomerate and volcanic and volcaniclastic rocks nonconformably overlying Ganderian basement. Antler Gold's Inc.'s Alder and Elm zones (trenches are orange lines) preserve shear vein-hosted gold mineralization in the Rogerson Lake Conglomerate, whereas the Red Ochre Zone preserves quartz veins and disseminated mineralization in feldspar porphyry. Geochronology sample (BNB18-WL-029) from the granodiorite–gabbro–tonalite body (565 ± 2 Ma) was collected between 296–290 m depth along Antler Gold Inc.'s vertical drill hole WL-17-29 (Honsberger* et al.*, 2019). Age of Valentine Lake pluton from Evans* et al. *(1990). Figure adapted from Honsberger* et al. *(2019).*

Suite at Valentine Lake (Valentine Lake pluton, 563.0 ± 2 Ma) and elsewhere in central Newfoundland (Evans *et al.*, 1990; Rogers *et al.*, 2006). To the east of Antler Gold Inc.'s property, the Wilding Lake pluton stitches the Victoria Lake Shear Zone, whereas gold-bearing Neoproterozoic rocks of the Crippleback Intrusive Suite occur to the west of the property. Accordingly, the regional crustal-scale fault system that controls gold mineralization between Valentine Lake and Wilding Lake is interpreted to cut Neoproterozoic Ganderian basement of the Exploits Subzone (Figure 2).

ACKNOWLEDGMENTS

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STRUCTURALLY CONTROLLED GOLD SYSTEM, ANTLER GOLD INC.'S WILDING LAKE PROPERTY, CENTRAL NEWFOUNDLAND

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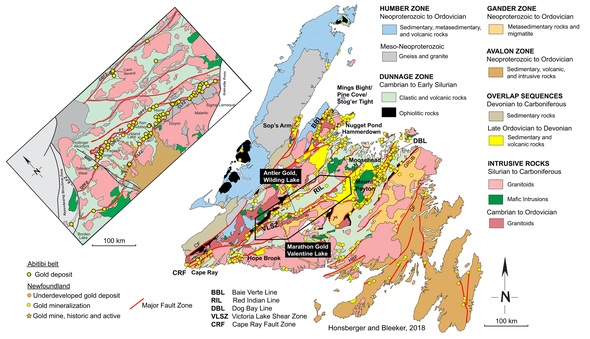
Introduction

Targeted gold exploration along the Rogerson Lake Conglomerate structural corridor within the Paleozoic Dunnage Zone of central Newfoundland (Williams, 1978) is revealing a pattern of gold-mineralized, structurally controlled quartz vein systems along northeast-trending fault zones between Cape Ray and Mount Peyton. With respect to geology and spatial scale, gold-bearing fault zones throughout central Newfoundland bear strong similarity to world-class, structurally controlled, orogenic-style Archean gold systems of the Abitibi greenstone belt (*e.g.*, Poulsen *et al*., 2000; Dubé and Gosselin, 2007; Bleeker, 2015; Honsberger and Bleeker, 2018). As in the Abitibi, the central Newfoundland gold district is controlled by crustal-scale faults that cut middle and lower crustal sedimentary-magmatic arc terranes and preserve upper-crustal panels of synorogenic sedimentary (*e.g.*, Rogerson Lake Conglomerate) and volcanic rocks. Mineralized high-grade quartz vein systems, such as those at Wilding Lake and Valentine Lake, are evidence of the resource potential of central Newfoundland, and provide local geometric and kinematic constraints on the structural evolution of the regional fault systems controlling gold transport, deposition, and preservation. Detailed lithological and structural trench mapping of two structurally controlled, gold-bearing quartz vein systems (Alder Zone and Elm Zone) on Antler Gold Inc.'s Wilding Lake property indicates that the major vein systems are oblique sinistral reverse shear zones comprised of a main vein (V_{1b}) and an accompanying set of shallowly dipping extension veins (V_{1a}) that cut siderite–ankerite–sericite altered Rogerson Lake Conglomerate. At least three additional generations of gold mineralized extensional quartz veins (V_2, V_3, V_4) containing chalcopyrite, pyrite, tourmaline, and goethite (after pyrite and chalcopyrite), cut the main vein systems of the Alder and Elm zones. The structural evolution of the vein systems at Wilding Lake is described by a progressive history evolving from early sinistral transpression to transient phases of horizontal extension, followed by subsequent localized phases of oblique compression and dextral strike–slip.

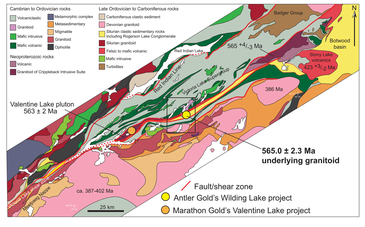
Central Newfoundland Gold District



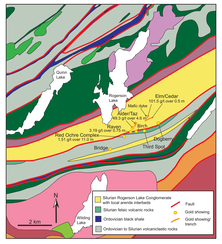
Comparison of the geology and gold-bearing fault systems for the Archean Abitibi greenstone belt (left) and Paleozoic Dunnage Zone, central Newfoundland Appalachians (right), at the same scale. Major fault zones shown in red. Rogerson Lake Conglomerate dominates the Silurian sedimentary sequence (yellow) in central Newfoundland in the vicinity of Valentine Lake and Wilding Lake

Wilding Lake Property

Antler Gold Inc.'s Wilding Lake property in central Newfoundland encompasses the synformal Rogerson Lake Conglomerate structural corridor between Wilding Lake and Rogerson Lake. The gold-bearing corridor is characterized by Neoproterozoic basement granitoids of the Crippleback Intrusive Suite. These granitoids underlie Silurian synorogenic polymict conglomerate intercalated with sandstone and bimodal volcanic and shallow-level intrusive rocks that correlate with the Botwood basin to the northeast. Cambrian to Ordovician mafic volcanic and volcaniclastic rocks of the Victoria Lake Supergroup occur farther to the northwest. Structurally controlled gold mineralization in Rogerson Lake Conglomerate is well exposed in the Alder Zone and Elm Zone. The Wilding Lake property also shows mineralized quartz veins in felsic volcanic rocks (Third Spot Showing), disseminated mineralization in feldspar porphyry (Red Ochre Complex), and mineralization along the sheared contacts of Rogerson Lake Conglomerate with felsic volcanic rocks and an underlying Neoproterozoic gabbro–tonalite–granodiorite body that is marked by a regional magnetic anomaly. Mineralized extensional quartz veins are composed of chalcopyrite, pyrite, tourmaline, Bi-tellurides, malachite, and goethite after pyrite.

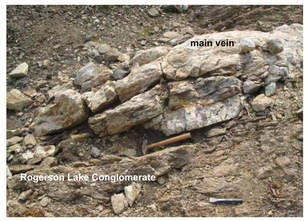


Generalized geological map of the Rogerson Lake Conglomerate structural corridor, central Newfoundland. Map adapted from Valverde-Vaquero et al. *(2005). Ages from Dunning* et al. *(1990); Evans* et al. *(1990); McNicoll* et al. *(2008); Honsberger* et al. *(2019)*

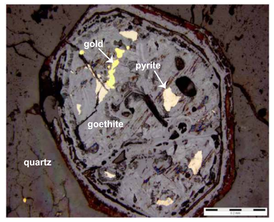


Geological map, Wilding Lake area. Map adapted from Valverde-Vaquero et al. *(2005) and Antler Gold Inc., press release, December 13, 2017*

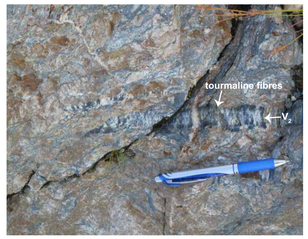
Mineralized Showings



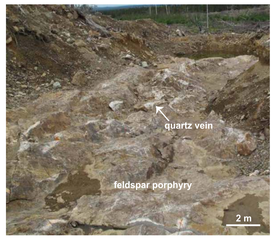
Laminated main vein (V_{1b}), Elm Zone



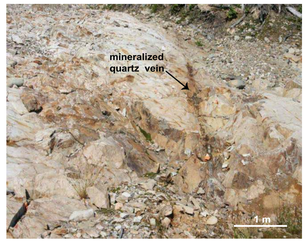
Gold in goethite-altered pyrite, Elm Zone



Tourmaline-bearing quartz vein (V_2), Alder Zone



Feldspar porphyry, Red Ochre Complex

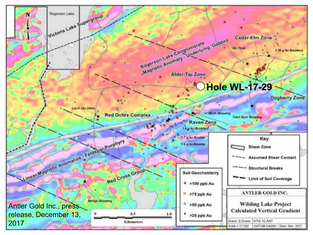


Felsic volcanic rocks, Third Spot Showing

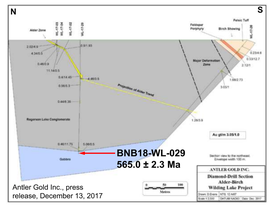
Altered conglomerate, Birch Showing

Prospective Basement Rocks

Basement rocks underlying Antler Gold Inc.'s Wilding Lake gold property consist of 565.0 ± 2.3 Ma deformed and altered gabbro-tonalite-granodiorite (Honsberger *et al.,* 2019) of the Ganderian Crippleback Intrusive Suite, which includes the gold-mineralized Valentine Lake pluton to the southwest. The along strike structural position, combined with the brittle nature of these granitoids, make the gab bro-tonalite-granodiorite body a prospective future drilling target for exploration.

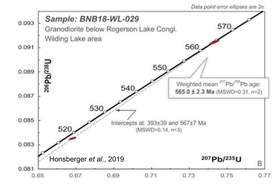


Magnetic anomaly map and gold soil geochemistry anomalies



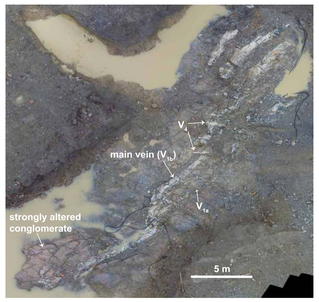
Cross-section between Alder Zone and Birch Showing. Age from Honsberger et al. *(2019)*

Vertical drillcore WL-17-29; numbers are metres



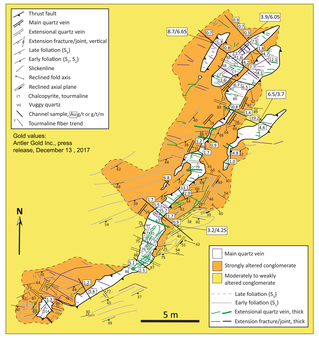
U-Pb Concordia diagram

Alder Zone

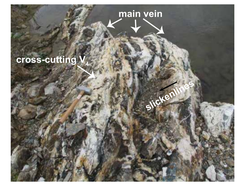


Unmanned aerial vehicle image, Alder Zone

The Alder Zone trench exposes a 5 by 35 m quartz vein system that cuts the Rogerson Lake Conglomerate, which is strongly altered along the main vein and weakly altered farther away. Foliation varies from nearly east–west striking (S_1) away from the main vein to northeast–southwest striking (S_2) along the vein. S_1 is folded into east–southeast plunging, nearly reclined, folds. Four generations of quartz vein sets are observed. The oldest extensional veins (V_{1a}) dip moderately to the southeast and are slightly older than the main vein (V_{1b}), which consists of a network of fault-fill veins that dip moderately to the southeast. Combined with shallowly south–southeast plunging slickenlines, V_{1a} and V_{1b} are consistent with oblique sinistral reverse shear. A tourmaline-bearing vein set, dipping steeply to the northeast (V_2), cuts the main vein, consistent with transient subhorizontal extension. V_2 veins are cut by chalcopyrite-bearing veins that dip steeply to the northwest (V_3), compatible with oblique compression. Steeply south-southwest dipping veins (V_4) consistent with dextral strike-slip cut V_2 and V_3. Joints of variable attitudes cut all vein sets.



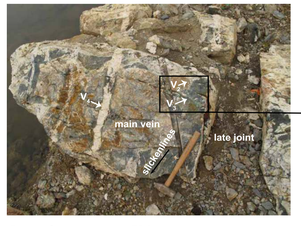
Geological map, Alder Zone



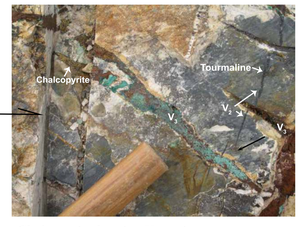
Main vein, looking southwest

Alder vein system, looking east

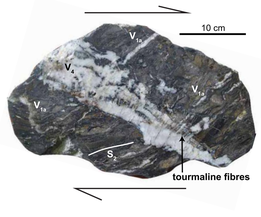
Early extensional vein (V_{1a})



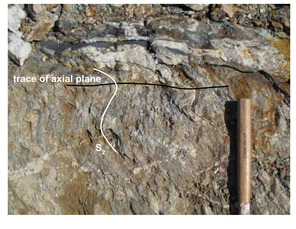
Dextral quartz vein (V_4) cutting chalcopyrite-bearing V_3, main vein



Chalcopyrite-bearing V_3 cutting tourmaline veinlets (V_2)



Dextral vein (V_4) cutting folded V_{1a}



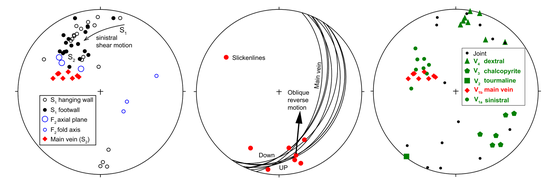
Reclined folds in conglomerate

Structural Synthesis

Antler Gold Inc.'s Wilding Lake gold property occupies a portion of the gold-bearing Rogerson Lake Conglomerate structural corridor between Rogerson Lake and Wilding Lake in central Newfoundland. The property exposes structurally controlled mineralization in Rogerson Lake Conglomerate and felsic volcanic rocks. High-grade gold mineralization of the Alder and Elm zones is controlled by regional northeast-trending oblique sinistral reverse shear zones. Three generations of chalcopyrite and/or tourmaline-bearing quartz veins (V_2, V_3, and V_4) overprint the main sinistral fault-fill (V_{1b}) and extensional (V_{1a}) vein systems, and reflect a structural evolution from early sinistral transpression to transient horizontal extension, renewed oblique compression, and subsequent local dextral strike–slip. The unexplored Neoproterozoic gabbro–tonalite–granodiorite body underlying the Rogerson Lake Conglomerate is prospective for gold mineralization, as are along-strike extensions within the Silurian Rogerson Lake Conglomerate gold corridor.

Time	Deformation phase	Fabric element and tectonic structure		Mechanism of formation
↓	D_1	S_1	E-W striking early foliation in Rogerson Lake Conglomerate	Folding of Rogerson Lake Conglomerate and Ganderian basement
	D_2	S_2	NE-SW striking progressive foliation	Reverse sinistral shearing
		V_{1a}	Initial shallowly-dipping extension veins	
		V_{1b}	Main shear vein	
	D_3	V_2	NW-SE striking vertical veins	Transient horizontal extension
	D_4	V_3	NE-SW striking extension veins and fractures/joints cutting main vein	Oblique compression
	D_5	V_4	E-W striking vertical extension veins	Local dextral strike-slip
	D_6	S_3	Shallowly-dipping cleavage	Late reclined folding

Summary table of deformation events, tectonic structures, and formation mechanisms through time



Lower-hemisphere equal-area projections of structural elements of the Alder Zone, Wilding Lake property. Poles to planar features plotted, except for great circles in the centre diagram

Acknowledgements

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ELM ZONE, ANTLER GOLD INC.'S WILDING LAKE PROPERTY, CENTRAL NEWFOUNDLAND

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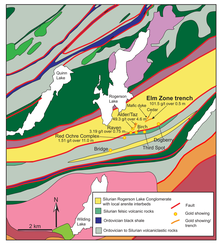
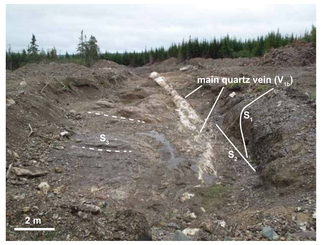
GSNL Open File 012A/1811

Overview

The Elm Zone trench consists of a ~230-m long, structurally controlled quartz vein shear system that cuts an early axial-planar cleavage in the Rogerson Lake Conglomerate. At a distance away from the main vein, early foliation strikes in an easterly direction and dips steeply to the south (S_1), but rotates to northeast-striking (S_2) along, and subparallel, to the main vein. The main laminated fault-fill quartz vein (V_{1b}) is up to 2.5-m-wide, dips moderately to the southeast, and contains slickenlines that plunge moderately to the south-southwest. Stacked, extensional veins (V_{1a}) emanate from the main vein and dip moderately to shallowly to the south, or east-northeast if rotated, consistent with oblique sinistral reverse shear. The main vein system is cut by a chalcopyrite-rich vein set (V_2) that dips steeply to the north, and also by a moderately to steeply northwest-dipping set of tourmaline-rich veins (V_3). Conjugate sets of extension fractures/joints that contain vuggy quartz cut V_1 and V_2. The northwest-dipping joint set is subparallel to both V_3 and a siderite/ankerite–sericite-altered mafic dyke adjacent to Elm. A late set of steeply south-dipping extension veins consistent with dextral strike–slip (V_4) cuts the older vein and fracture sets. Minerals associated with gold include chalcopyrite, pyrite, tourmaline, bismuth-tellurides, rutile, geothite after pyrite and chalcopyrite, and malachite. The system is locally folded into late open to tight reclined folds that plunge shallowly to the southeast.



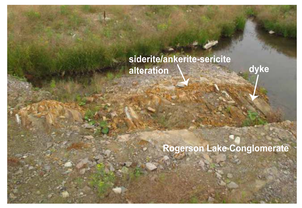
Geological map, Wilding Lake area. Map adapted from Valverde-Vaquero et al. *(2005) and Antler Gold Inc., press release, December 13, 2017*



Main shear vein V_{1b} and foliation in Rogerson Lake Conglomerate, Elm Zone trench, looking northeast

Rogerson Lake Conglomerate

Weakly altered conglomerate



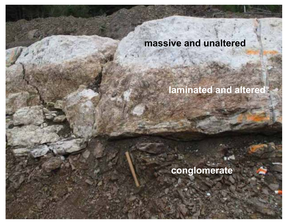
Mafic dyke cutting Rogerson Lake Conglomerate adjacent to Elm Zone

Strongly altered conglomerate

Main quartz vein
Strongly altered conglomerate
Moderately to weakly altered conglomerate
Late foliation (S_3)
Early foliation (S_1, S_2)
Extensional quartz vein
Extension fracture/joint
Thrust fault
Main quartz vein
Extensional quartz vein
Extension fracture, vertical
Bedding
Late foliation (S_3)
Early foliation (S_1, S_2)
Slickenline
Intersection lineation
Early fold axis
Early fold axial plane, vertical
Reclined fold axis
Reclined fold axial plane
Channel sample, Au g/t/m
Chalcopyrite
Laminations, main vein
Tourmaline
Vuggy quartz

Vein Sets

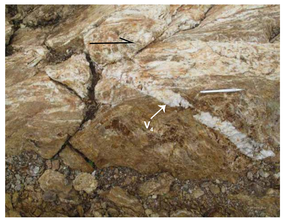
Rotated V_{1a} quartz veins



Laminated main vein V_{1b}

Mineralized chalcopyrite-rich V_2

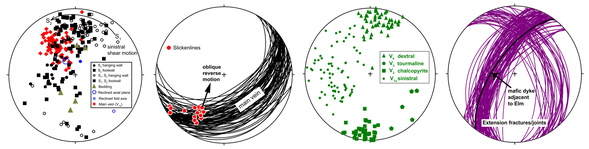
Tourmaline-bearing V_2 and V_3 and joints



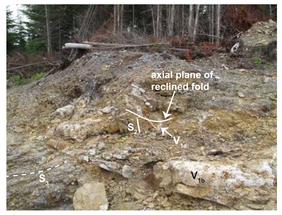
Extensional dextral vein V_4

Goethite after pyrite in rutile-bearing V_4

Structural Data



Lower-hemisphere equal-area projections, Elm Zone. Poles to planar features plotted except in the second and fourth diagrams, from left to right, where great circles are plotted



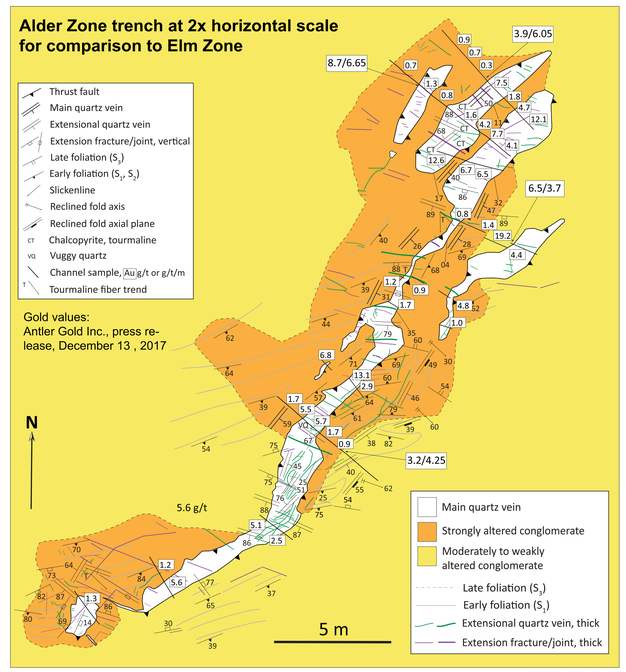
Shallowly dipping extension veins (V_{1a}) folded into reclined folds in the hangingwall of the main vein system. Late clevage (S_3) is well developed in the footwall

Mineralized extension fractures/joints (V_3) cutting main vein

Mineralized V_3 cutting main vein

Trench Maps

Cross-section interpretation parallel to oblique sinistral reverse slip vector (slickenlines) and V_3



Synorogenic Evolution

The main gold-bearing quartz vein system (V_1) of the Elm Zone is structurally controlled by an oblique sinistral reverse shear zone displaying hangingwall motion towards the north-northeast. V_{1a} and V_{1b} represent an extensional vein (V_{1a}) and dilational fault-fill vein (V_{1b}) shear system, characteristic of lode gold systems, formed via progessive fluid pressure cycling along faults under prehnite–pumpellyite to green–schist facies conditions (*e.g.*Sibson*et al.*, 1988). Overprint of V_1 by steep, chalcopyrite-bearing veins (V_2) suggests rotation of the principal stress axes during progressive shearing and the onset of north–south-oriented subhorizontal extension Subsequent overprint by tourmaline-rich V_3 and extension fractures/joints is consistent with renewed oblique compression oriented north–south. The system then devolved into dextral strike–slip to form V_4. V_{1-4} are all prospective for gold mineralization, arguing for multiple gold-forming episodes. The polymetallic nature (Cu–Au–Ag+W+Mo+Bi+Sb) along with the presence of bismuth-tellurides in veins throughout the Elm Zone suggests that synorogenic magmatism within the Rogerson Lake Conglomerate structural corridor may have contributed fluid to the system. Future exploration might consider targeting the unexposed southwestern continuation of the main Elm shear vein towards the deformation zone between the conglomerate and mineralized felsic volcanic rocks. Ultimately, latest Silurian to Early Devonian crustal-scale faults, which accommodated accretion of Ganderia and Avalonia to composite Laurentia, may have exerted fundamental controls on the formation and preservation of gold mineralization in the Elm Zone trench.

Acknowledgements

This work is a contribution to NRCan's Targeted Geoscience Initiative Program. Support for this study was provided through the TGI Gold Project's "Activity G-2.1: Deep faults, synorogenic clastic sequences, alkaline magmatism and gold deposits: testing and refining the Timmins-Kirkland Lake model in areas with high gold potential." Thanks to John Hinchey, Neil Rogers, and Cees van Staal for help and guidance at various times, and to Lakeview Inn for comfortable lodging. This report has benefitted from reviews by Anne Westhues and Greg Sparkes.

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