The Role of Wittenburg Mountain as the Possible Source of Auriferous Paleoplacer Material in the Gays River Gold District, Coldstream (NTS 11E/03)

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Introduction

Coldstream, Colchester County, often referred to as the 'Gays River Gold District', is an intriguing site. A lot of work has been devoted to the site in recent years in an attempt to study the relationships between gold and basal units of the Carboniferous Horton Group where they overlie the Cambro-Ordovician Meguma Supergroup metasediments. Such study is permitted by a well exposed contact in a stream cut at Coldstream (Mills, 1992).

There has been a long-standing belief that the basal units of the Horton Group at Coldstream, laid down as braided stream sediments in a tectonically unstable environment, form a 'Witwatersrand type' placer deposit. Recent historical study of the site (Densmore, 1965; McCullough, 1987), however, as well as field observation by the author, has suggested that while the contact at the Meguma-Horton interface is the locale for gold-bearing sediments, the auriferous sediments are not typical lithified Horton Group quartz-pebble conglomerates, but are restricted to gouge material hosted in cracks and fractures in the Meguma Supergroup basement at the contact itself.

Recognition that bedrock cracks in the Meguma Supergroup host gold has shed new light on the Coldstream site, not just as a past producer of gold but also as a deposit that has potential for further mining. It has been postulated in the past by workers studying the Horton Group at Coldstream that the Carboniferous rock is actually an upper (as opposed to a basal) unit of the Horton Group (R. J. Ryan, personal communication, 2007). Adits driven in the Coldstream area in the 1940s reveal a development pattern following fracture systems in the Meguma Supergroup bedrock (Anonymous, 1948).

The site last produced gold in the mid-1960s when a large sluice mill was set up on the property of Tim Scott, a local landowner and prospector (Fig. 1) (Densmore, 1965). At this time, it was believed that Horton Group rocks were the gold source, and an area was stripped with a bulldozer, steam shovel and dragline (G. Mills, personal communication, 2007) to recover ore that could be put through the sluice set up at the Coldstream site. Additional infrastructure development also took place (McCullough, 1987). Using such heavy equipment to remove the ore resulted in removal of Meguma bedrock as well and gold was produced from the mill, which supported the idea that the Horton Group was the source of gold at Coldstream. This interpretation has influenced modern workers who have tried to assess the site (Cullen, 2004; Mills, 1998).

Recently, prospector Chris Findlay, the current mineral rights holder of the claims at Coldstream, spoke with a former worker of the 1960s exploration and mining group (C. Findlay, personal communication, 2007). This conversation has helped shed light on the extent of possible aurifereous sediments at Coldstream, as well as consideration of nearby Wittenburg Mountain (Fig. 2) as a potential gold source. This historical information led to investigation of another historical site approximately 1 km to the northeast of the 1960s mine site, close to a large esker (Fig. 1; Findlay, 2003).

Methods

Samples were collected from five sites (Figs. 1 and 2): (1) the historically worked site close to the esker north of the former Coldstream mine, (2) the east end of the esker in a currently operating aggregate development (Fig. 3), (3) the west end of the same esker in another aggregate development (West pit on Fig. 1), (4) approximately 20 m downstream from the south adit development on Coldstream, and (5) from well washed material in a

Mills, R. F. 2008: *in* Mineral Resources Branch, Report of Activities 2007; Nova Scotia Department of Natural Resources, Report ME 2008-1, p. 69-74.

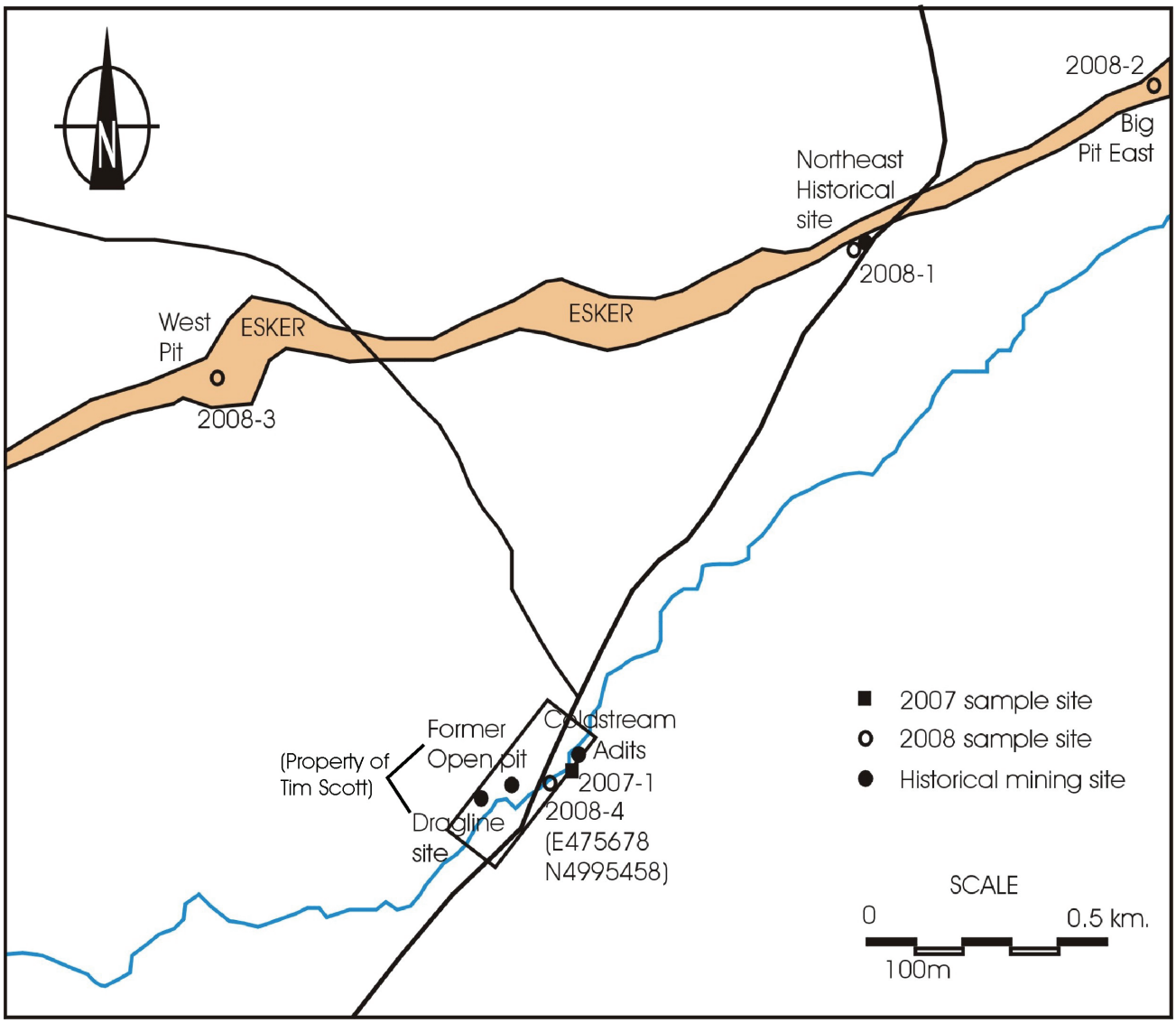

Figure 1. Map of the Coldstream area showing sample locations and former mining sites.

small stream on Wittenburg Mountain. These samples were collected in early 2008 and were compared to a sample taken in 2007 of 0.5 l of material collected from a Meguma Supergroup bedrock crack at the Meguma-Horton contact at the south adit site on Coldstream Brook. It is hoped that this will help determine the origin of material in the bedrock cracks and their mode of transport to that final deposition locale.

Samples were taken with a hand auger (Fig. 4) and sieved on site into coarse and fine fractions before pebbles were counted and the observations recorded.

The samples were sieved with two sieves, sized 1 cm and 0.25 cm. The 1 cm oversize was discarded and 50 pebbles were counted for each sample for the -1 cm +0.25 cm and -0.25 cm size fraction. These results were multiplied by two in order to give percentages for the rock types encountered (Fig. 5).

The sample collected in 2007 was sieved at 0.25 cm then concentrated with a gold pan prior to investigation with a binocular microscope.

Results

Results are provided in Table 1. Pebble types encountered in the samples consisted mostly of Meguma Supergroup (psammite and pelite) and

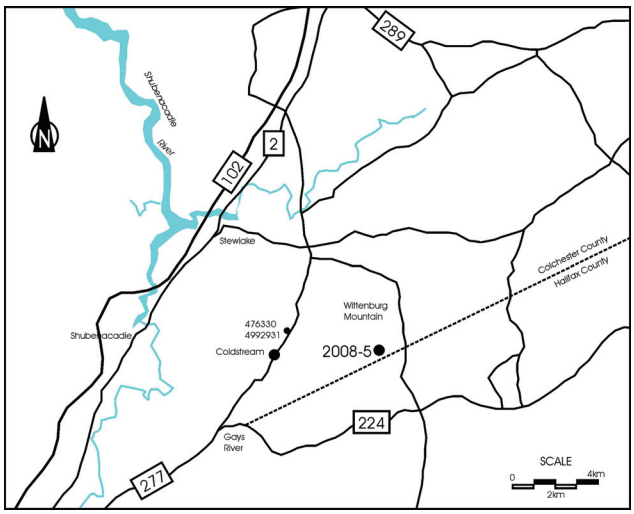

Figure 2. Map of the Stewiake area showing sample locations at Coldstream and Wittenburg Mountain.

Horton Group (quartz-pebble conglomerate) components, and quartz pebbles. In addition, lesser amounts of granitoid clasts and Triassic siltstone clasts (Fig. 6) are believed to have come from greater distances. Garnets were encountered in the finest fraction of material inspected in one sample (Fig. 7).

The sample from 2007 contained many small nuggets of coarse (approximately +60 mesh) native gold (Fig. 8). Most nuggets were found to be well rounded and mature, a grain morphology commonly encountered in the past (Mills, 2007). The sample also had a large percentage of deep rose to dark reddish garnets (20%). Approximately 20% of the garnets were euhedral, the other 80% of the garnets were well rounded. This sample also had the highest

Figure 3. Photograph exhibiting a cross section through much of the esker at Coldstream.

Figure 4. Auger used for sampling at Coldstream and Wittenburg Mountain.

Figure 5. Pan and fine (90.25 cm) screen used to separate fractions at Coldstream.

Table 1. Results for pebble counts of five samples, from the coarse and fine fractions.

-1 cm +0.25 cm (Coarse) Fraction											
Sample	Northing	Easting	Ele*	Qtz*	Grn*	Psam*	Pel*	Hor*	Slsn*	Garn*	Comment
2008-1	4992903	476284	130	6%	8%	12%	54%	10%	18%	0%	North site
2008-2	4993327	476940	121	10%	12%	24%	40%	14%	10%	0%	Big Pit East
2008-3	4992629	474987	85	8%	10%	24%	34%	10%	14%	0%	West pit
2008-4	4991823	475678	74	6	8%	12%	50%	18%	6%	0%	Coldstream
2008-5	4995458	479643	218	4%	12%	12%	34%	10%	18%	0%	Wittenburg Mtn.
-0.25 cm (Fine) Fraction											
Sample	Northing	Easting	Ele*	Qtz*	Grn*	Psam*	Pel*	Hor*	Slsn*	Garn*	Comment
2008-1	4992903	476284	130	14%	8%	10%	48%	8%	12%	0%	North site
2008-2	4993327	476940	121	12%	8%	28%	38%	0%	14%	0%	Big Pit East
2008-3	4992629	474987	85	20%	0%	36%	24%	8%	12%	0%	West pit
2008-4	4991823	475678	74	8%	2%	18%	42%	20%	10%	0%	Coldstream
2008-5	4995458	479643	218	18%	16%	14%	22%	0%	30%	0%	Wittenburg Mtn.
2007-1	4991828	475678	77	38%	0%	12%	32%	6%	0%	20%	Meguma Crack

*Abbreviations: ele = elevation in feet; qtz = quartz pebbles; grn = granite; psam = psammite; pel = pelite; hor = Horton Group quartz-pebble conglomerate; slsn = siltstone; garn = garnet

percentage of quartz (38%). The quartz was almost exclusively well rounded and mature.

A high degree of maturity could also be seen in the quartz pebbles in the 2008 samples, which also displayed higher percentages of this component in the finer fraction.

The proportion of Meguma Supergroup components (psammite and pelite) varied little between size fractions in each sample. There was a noticeable difference in proportions, however, between Meguma-derived components in the Coldstream and esker areas compared to that of Wittenburg Mountain. Percentages from Wittenburg Mountain were, on average, 10% lower than percentages for the other samples.

The Wittenburg sample displayed the highest percentage of Triassic red siltstone (30%) of any sample in the dataset.

Figure 6. The great majority of clast types at Coldstream consisted of (from bottom to top) (Meguma) quartz vein material, (Horton Group) quartz-pebble conglomerate, Goldenville Group sandstone, granites (and granitoids) and siltstones.

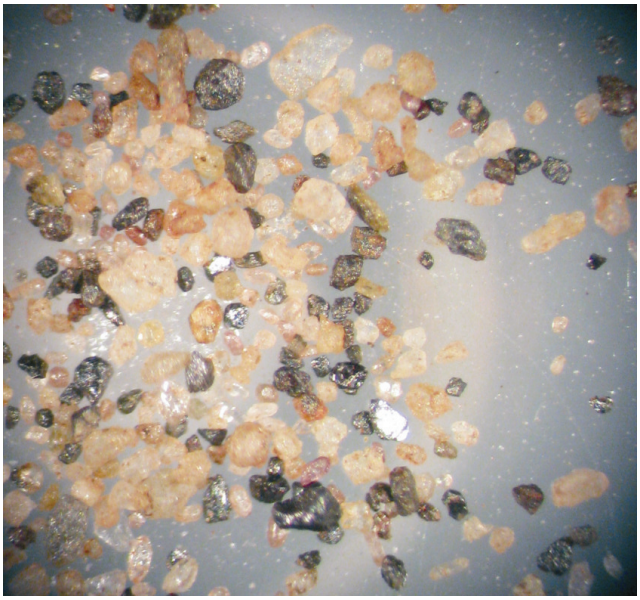

Figure 7. Photo of fine clasts taken from a typical sample from the Coldstream area. Note the high percentage of garnets (pale reddish-brown to wine coloured clasts) in the sample.

Discussion and Recommendations for Prospecting

The high percentage of quartz and garnet in the Meguma Supergroup bedrock fracture, as well as the gold present, is believed to be the result of fluvial reworking of sediments deposited there. This material is, for the most part, of a finer size fraction than the other samples. Quartz percentages in the finer fraction of the 2008 samples were also higher.

The noticeable difference in percentages between Meguma-derived components in the Coldstream and esker areas and that of Wittenburg Mountain is interesting since Wittenburg Mountain is often cited as the source of gold at Coldstream (Harris, 1995; Mills, 2007). It is not clear if this percentage difference is due, at least in part, to the Meguma Supergroup bedrock fracture sample being of a finer fraction than the Wittenburg sample.

The high percentage of red Triassic siltstone in the Wittenburg sample is common for glacial tills in that area, which display a large percentage of this far travelled material in the till matrix.

Whether or not Wittenburg Mountain is the source region for the gold deposited at Coldstream remains unclear. This study suggests, however, that the high percentages of garnets and mature quartz pebbles, as well as gold, in the fine fractions of auriferous material in the Meguma Supergroup basement fractures are the best indicators of source rock for this material. Since such cracks and fractures are the only known location for this material, localities where the contact is close to surface are good prospecting targets, as it is possible that gold would have been emplaced in Meguma Supergroup bedrock cracks on the shores of an advancing sea (Jutras *et al.,* 2006) by a series of braided streams. Bedrock to the southeast and northwest of Coldstream is, therefore, the best target but thick overburden in these areas, such as that in the vicinity of the esker, presents a considerable barrier to development.

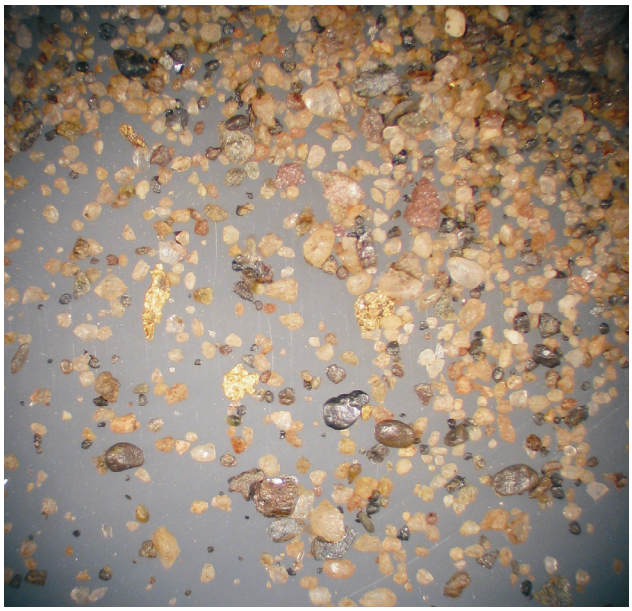

Figure 8. Photo of fine groundmass of clasts taken from sample 2007-1. Note the gold grains present in the sample.

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