

The Hillsvale Vein System, Hants County

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Introduction

A number of previously undocumented, bedding-parallel quartz veins were discovered in the Hillsvale area (Figs. 1, 2) during regional bedrock mapping in the summer of 2004. At least 30 veins are exposed along a recently established logging road developed on the west side of the paved road between Lakelands and Hillsvale (Hillsvale Road, Fig. 3), NTS map area 11D/13 and 11E/04. The character of these veins is similar with respect to vein type, setting, density and mineralogy to veins that constitute the many Meguma Group gold districts, and therefore present a potential exploration target. Although the veins are locally well exposed as a result of road construction, there is no evidence that these veins had been previously sampled or otherwise evaluated. A few 'leads' are indicated along strike to the southwest of these veins (Fig. 3) and to the northeast on Meander River (Fig. 2) on the geological map of the area by Fletcher and Faribault (1909). In addition to the road exposures, a few quartz veins and some quartz float were also found in the area south of where the veins are exposed on the road (Fig. 3).

Setting

The Hillsvale vein array occurs on the steep to slightly overturned north limb of the Rawdon Gold Mines Anticline (Figs. 2, 3). The Rawdon Gold Mines Anticline represents the north end of the Mount Uniacke anticlinorium, which is bound in the south by the steep-dipping south limb of the Mount Uniacke Anticline. The Mount Uniacke anticlinorium defines a kilometre-scale box fold with open folds between the steep limbs (Fig. 2). The vein array at Hillsvale is hosted by the Goldenville Formation, consisting primarily of metasandstone with minor metasiltstone and slate.

Veins

Thirty bedding-parallel quartz veins are exposed along two intervals of the new logging road (veined

intervals, Fig. 3). There is incomplete exposure in both intervals, as well as between them, and it is likely that additional veins occur. All veins occur in metasiltstone or slate intervals, commonly at the contact with metasandstone beds. The spacing of bedding-parallel veins is highly anomalous with respect to regional vein concentrations, and comparable only to vein concentrations within Meguma gold districts.

Veins range from 1 cm to 30 cm in thickness, and most consist primarily of massive quartz (Fig. 4). Locally, some of the veins have a coarsely laminated texture and some are boudinaged. Sulphide minerals are not abundant, but arsenopyrite was noted in a few veins as well as in the adjacent wall rock.

Veins 1 through 21 were sampled, inspected and analyzed for gold, arsenic, copper, lead and zinc at the Minerals Engineering Centre, Dalhousie University (Table 1). Samples represent "grab samples" collected from surface exposures of limited extent and are intended as a first evaluation of the veins. Results of the geochemical analysis (Table 1) indicate gold levels ranging from less than detection (<0.003 ppm) up to 0.03 ppm. Several samples returned elevated arsenic levels, ranging up to 8670 ppm, consistent with observed arsenopyrite in some veins and wall rock. Base metal (Cu, Pb, Zn) levels are generally low, although elevated in some samples. The gold concentrations, although generally low, are similar to levels found in the non-economic parts of vein systems in Meguma lode gold deposits (P. K. Smith, personal communication), and therefore do not preclude the possibility of elevated, economic levels elsewhere within the vein system. The elevated arsenic and locally elevated base metal concentrations are consistent with auriferous veins of Meguma gold districts, where gold and base metal levels are typically erratic, but locally elevated.

Till Sampling

Six till samples were collected over an area

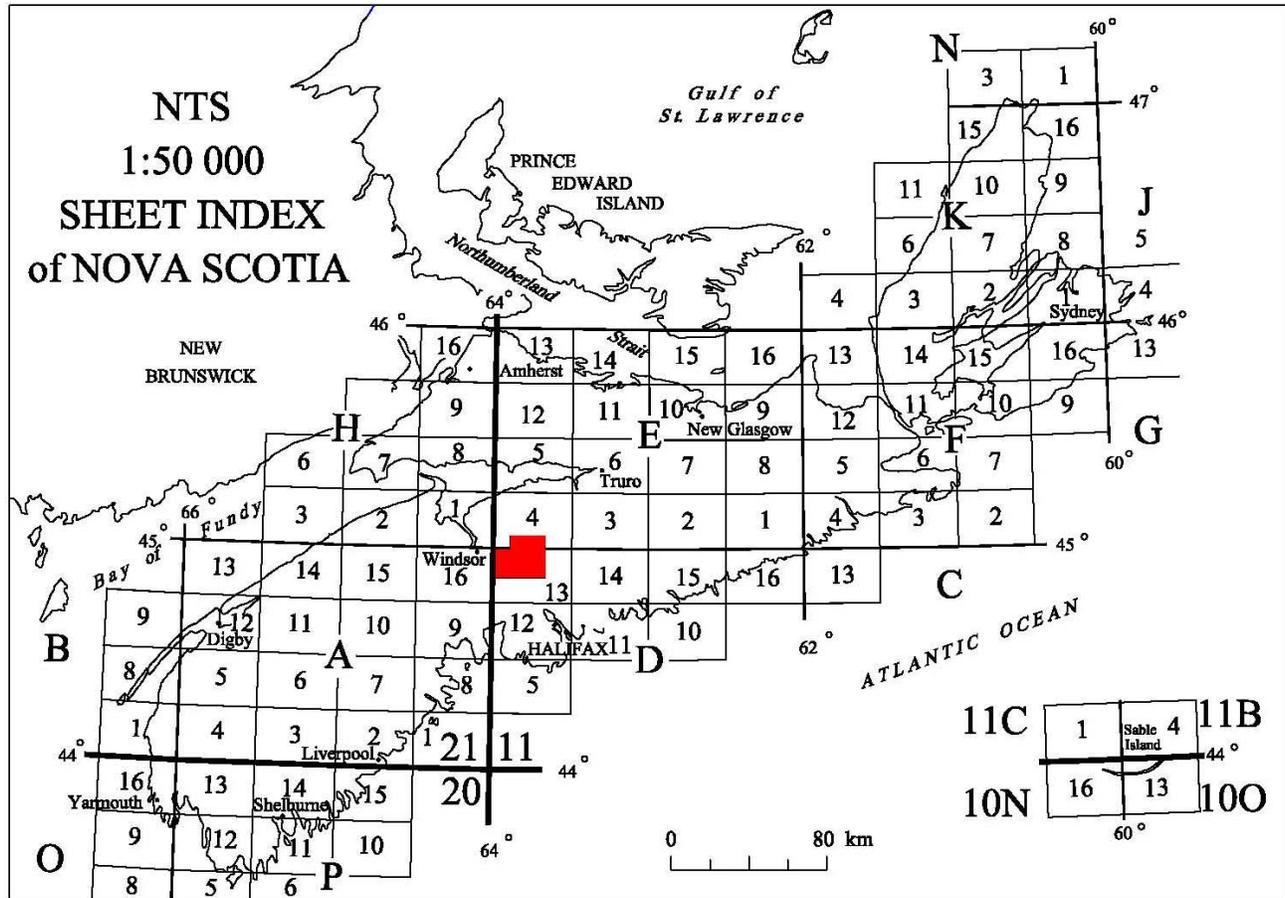


Figure 1. NTS Index map of Nova Scotia showing the location of Figure 2 covering parts of NTS sheets 11D/13 and 11E/04.

extending north and south of the exposed veins in an attempt to assess the potential gold content of the veins (Fig. 3). Till in the area is thin to non-existent and its origin is uncertain. Locally, exposed striations indicate an episode of northward ice flow. Mineral concentrations from the till samples produced by a ‘Super-Panner’ at the Minerals Engineering Centre, Dalhousie University, did not yield any gold grains. The till samples, however, contained very little quartz vein material and the till may not have been derived from local bedrock.

Discussion

The Hillsvale vein array represents an anomalous concentration of bedding-concordant veins in the Meguma Group, and resembles vein arrays constituting the many Meguma gold districts. Discovery of this vein array, therefore, indicates

the potential for discovery of new Meguma lode gold deposits. Although no visible gold was observed and gold concentrations are only slightly anomalous at best, we note that only limited exposure of the veins is presented. The low gold levels are not inconsistent with many parts of vein arrays in Meguma gold districts, where significant gold distribution is typically restricted to certain zones (ore shoots). Elevated levels of As, Cu, Pb and Zn are consistent with vein arrays of Meguma gold districts and we suggest that further evaluation is required to establish the gold potential of the Hillsvale vein array.

The Hillsvale vein array is located on the steep limb of the Rawdon Mines Anticline, which defines the north limb of the Mount Uniacke Anticlinorium. It is notable that other gold districts within the Mount Uniacke Anticlinorium occur in similar structural positions: (1) the Rawdon Gold Mines occurs on the north limb of the Rawdon

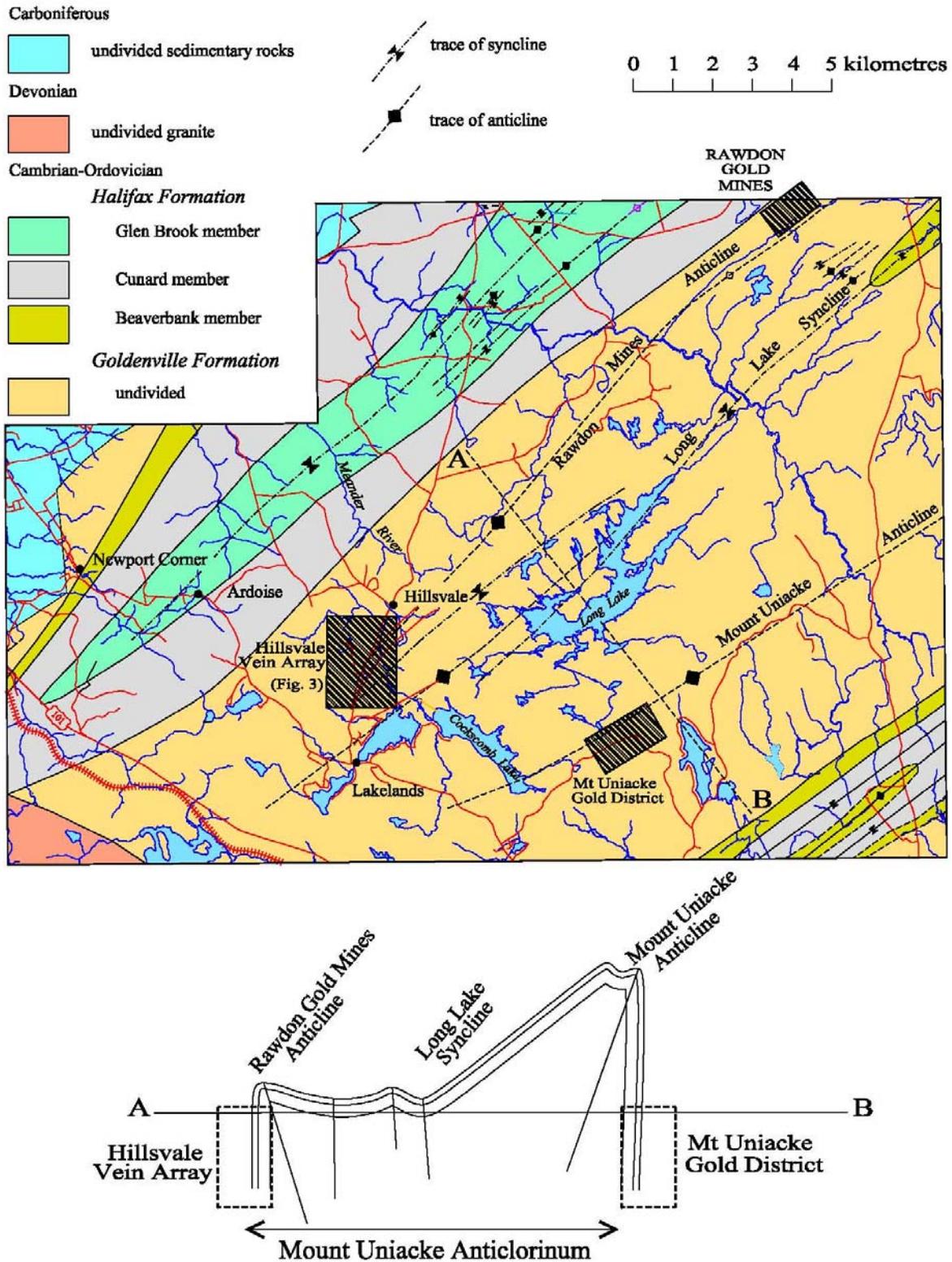


Figure 2. Geological map of the Mount Uniacke-Hillsvale area showing the location of the Hillvale vein array and the Mount Uniacke and Rawdon Gold Mines gold districts. Cross section A-B shows the character of the Mount Uniacke Anticlinorium and the locations of the Mount Uniacke gold district and the Hillvale vein array on the steep limbs of the anticlinorium.

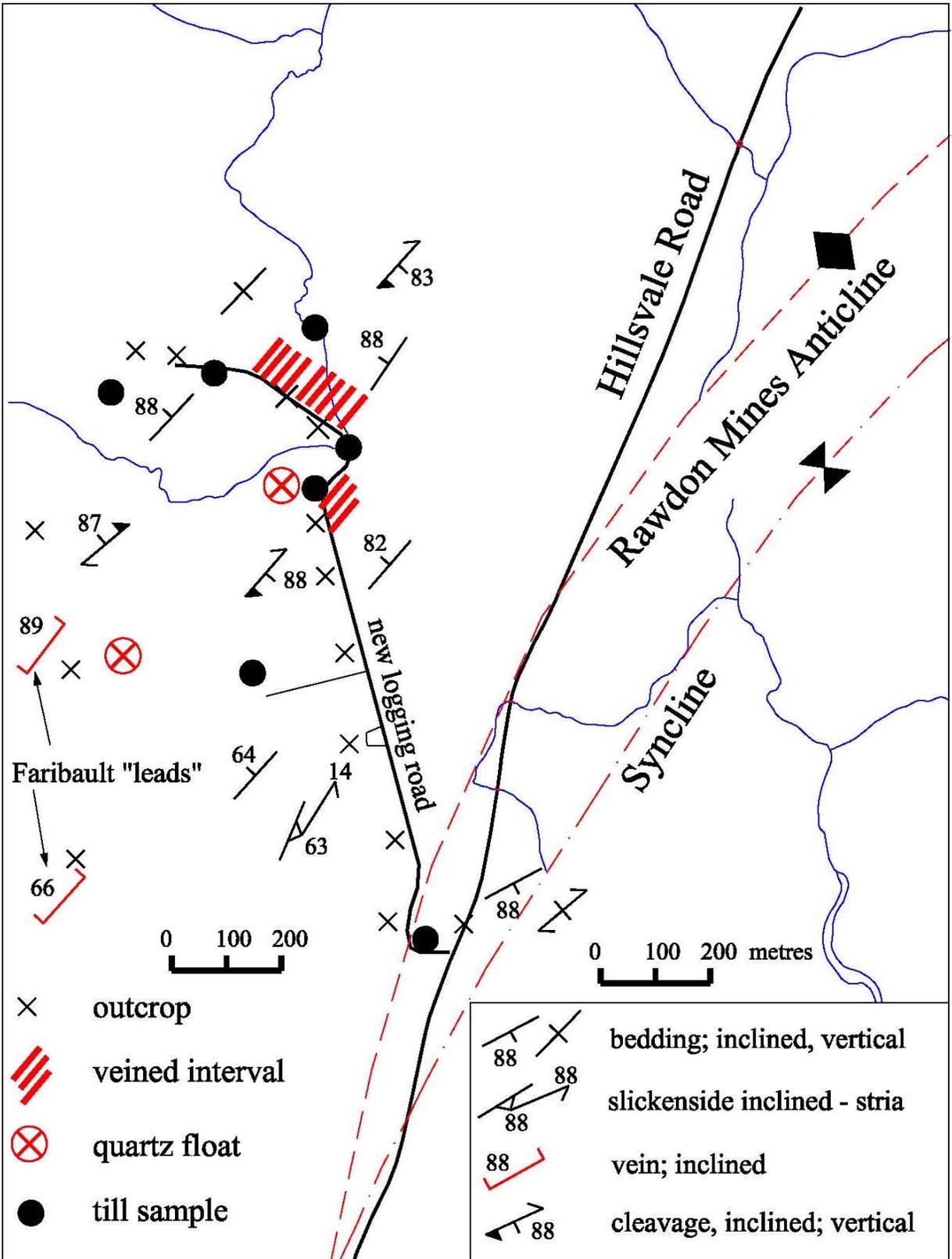


Figure 3. Detailed map showing the location of the Hillsvale vein array (veined interval) exposed on a logging road on the west side of the Hillsvale Road. Area of this map indicated on Figure 2.



Figure 4. Photographs of a bedding-parallel quartz vein in the Hillsvale vein array exposed along logging road off the Hillsvale Road (veined interval, Fig. 3).

Table 1. Table of assay results for selected elements for 21 quartz veins from the Hillsvale vein system. All concentrations given in ppm.

| Sample | Au | As | Cu | Pb | Zn |
|---------------|-----------|-----------|-----------|-----------|-----------|
| Vein-1 | 0.005 | 375 | 7.0 | 45.0 | 53.0 |
| Vein-3 | 0.003 | 344 | 3.1 | 22.0 | 4.8 |
| Vein 4 | 0.003 | 442 | 5.9 | 11.9 | 5.6 |
| Vein 5 | <0.003 | 254 | 4.4 | 17.0 | 4.7 |
| Vein-6 | 0.016 | 8670 | 3.2 | 60.0 | 2.9 |
| Vein-7 | 0.013 | 4770 | 3.3 | 2.4 | 1.6 |
| Vein-8 | <0.003 | 58 | 4.9 | 5.5 | 1.4 |
| Vein-9 | 0.013 | 130 | 6.9 | 10.8 | 8.0 |
| Vein-10 | <0.003 | 33 | 11.0 | 27.0 | 8.9 |
| Vein-11 | <0.003 | 461 | 5.1 | 1.8 | 2.7 |
| Vein-12 | <0.003 | 87 | 4.5 | 2.6 | 2.5 |
| Vein-13 | <0.003 | 204 | 4.3 | 1.3 | 2.3 |
| Vein-14 | <0.003 | 7650 | 2.8 | 30.0 | 2.6 |
| Vein-15 | <0.003 | 154 | 4.0 | 3.3 | 3.4 |
| Vein-16 | 0.003 | 34 | 40.0 | 41.0 | 32.0 |
| Vein-17 | <0.003 | 1630 | 5.5 | 10.5 | 4.7 |
| Vein-18 | <0.003 | 4 | 7.2 | 5.4 | 2.4 |
| Vein-19 | <0.003 | 3460 | 7.0 | 298.0 | 14.7 |
| Vein-20 | 0.003 | 226 | 4.0 | 0.4 | 3.2 |
| Vein-21 | 0.030 | 273 | 8.2 | 1.9 | 5.6 |

Gold Mines anticline, along strike of the Hillsvale vein array (Fig. 2); (2) the Mount Uniacke Gold District occurs on the south limb of the Mount Uniacke Anticline (Fig. 2), and (3) the Renfrew Gold District occurs on the south limb of the Renfrew Anticline, which defines the south limb of the Mount Uniacke anticlinorium in that area. The distribution of Meguma gold districts on the steep limbs of anticlinoria is not restricted to the Mount Uniacke anticlinorium. For example, the Waverley and Montague districts occur on the north and south limbs of the Waverley anticlinorium (Horne *et al.*, 1998). The distribution of vein arrays on steep limbs is consistent with a model of vein development in response to high flexural-shear strain experienced at high limb dips, where veins form in structures related to bedding-parallel shear (Faribault, 1899; 1913; Horne and Culshaw, 2001; Horne and Jodrey, 2002; Horne *et al.*, 2004). Such a model provides a target for exploration for undiscovered vein arrays, notably along the north limb of the Rawdon Mines Anticline between the Hillsvale vein array and the Rawdon Gold Mines (Fig. 2).

References

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