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Mount Pleasant Sn-W-Mo-Zn-In and Clarence Stream Au-Sb Deposits

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GAC-MAC 2014: FIELD GUIDE SUMMARY

Devonian Intrusion-Related Mineralization in Southwestern New Brunswick: Mount Pleasant Sn–W–Mo–Zn–In and Clarence Stream Au–Sb Deposits

GAC–MAC Fredericton 2014, pre-meeting field trip

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Figure 1. Three metre wide auriferous quartz vein exposed in a trench at the Main Zone of the Clarence Stream deposit.

FIELD TRIP OBJECTIVES

This two-day field trip will focus mainly on the regional geological setting and mineralizing characteristics of two Devonian intrusion-related deposits in the New Brunswick segment of the Northern Appalachians: the Clarence Stream Au–Sb and Mount Pleasant Sn–W–Mo–Zn–In deposits. These two deposits are located near a major tectono-stratigraphic boundary between the Gander and Avalon zones that is now stitched by multiple intrusive phases of the Late Silurian to Late Devonian Saint George Batholith.

The Clarence Stream deposit is a structurally controlled, intrusion-related gold deposit situated near the terrane-bounding Sawyer Brook Fault Zone that separates the Ordovician St. Croix Terrane from Silurian metavolcanic and metasedimentary rocks. These volcano-sedimentary rocks have been intruded by several generations of gabbroic and felsic dykes in a structural corridor that parallels the northern margin of the Early Devonian Magaguadavic Granite. Two major zones of mineralization are recognized at this deposit: (1) auriferous quartz veins that occupy a northeast-trending brittle-ductile shear zone (Fig. 1) cutting deformed gabbroic, granitic, and sedimentary rocks (Main Zone - proximal deposits), and (2) gold-bearing, antimony-enriched stockwork mineralization developed within metasedimentary rocks (Anomaly A – distal deposits). Together, these zones represent indicated resources of 182 000 oz Au and 7.3 million lbs Sb and an inferred resource of 250 000 oz Au, with further potential for resource expansion. Visiting road side outcrops, expansive trench exposures (Fig. 2), and examining drill core will: 1) provide a regional stratigraphic and structural context for the gold mineralization, 2) establish the contrasting styles and types of mineralization at the two major mineralized

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Figure 2. Large trench exposure showing metagabbroic rocks (left) in contact with rusty altered metasedimentary rocks (right) and cut by auriferous quartz veins, Clarence Stream deposit.

Figure 3. Aerial view of the Mount Pleasant Sn–W–Mo–Zn–In Mine, southwestern New Brunswick.

Figure 4. Greenish-coloured banded porphyry dyke (associated with Granite II) intruding silicified breccia at the Fire Tower Zone of the Mount Pleasant deposit.

zones, 3) further characterize the nature of the deposit at depth, and 4) demonstrate evidence to support the source of the gold and the controlling factors on the mineralization.

The second day of the trip will focus on the world renowned, former producing Mount Pleasant polymetallic mine (Fig. 3) that contains the world's largest undeveloped resource of indium. This deposit is hosted by volcanic and subvolcanic rocks of the Late Devonian Mount Pleasant Caldera Complex and is located along the northern margin of the Saint George Batholith. The Mount Pleasant Granitic Suite comprises three phases of subvolcanic rocks (Granite I, II, and III), which generated mineralized hydrothermal breccias that cut the overlying volcanic stratigraphy. Tungsten-molybdenum-bismuth mineralization associated with Granite I predominates at the Fire Tower Zone, whereas Sn–Cu–Zn–In mineralization (associated with the emplacement of Granite II) comprises the North Zone. The day will begin with a visit to several glaciated exposures atop Mount Pleasant where participants will see spectacular volcanic textures and examine the various types of mineralization while enjoying breathtaking views of the local landscape. The remainder of the day will include a core display and visits to road side outcrops to examine the various components of the Mount Pleasant Caldera (Fig. 4).

ADDITIONAL INFORMATION

This trip will depart from the Currie Center at UNB on the morning of May 17 and end late May 18. It is geared toward geoscientists and students interested in intrusion-related mineralizing systems. Travel to the field area will be provided by bus. Most stops are easily accessible and will involve short walks over level to moderately uneven ground with a few minor wet areas; however, one stop will involve a moderate 4 km walk (round trip). Because of the uneven terrain and unpredictable weather, sturdy footwear and rain gear are recommended. An overnight stay in St. Andrews-by-the-sea will afford participants the chance to sample the local maritime culture and cuisine while taking in the spectacular coastal scenery of southern New Brunswick.