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NATMAP
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DESCRIPTIVE NOTES

INTRODUCTION

The Meadowbank River area lies in one of a group of new Archean lanthanide geology maps arising from the Meadowbank project under the auspices of the Western Churchill NATMAP program. Fieldwork during 1986-2000 addressed the geological framework of the area, with a focus on the Archean Woodburn Group and the Proterozoic Wopmay Orogen (Churchill Province north of Baker Lake, Nunavut Fig. 1). The geology of the Meadowbank River area is based on mapping by Jackson (1987-92), Jackson and Berman (1988-89), Scott (1988-92), Tella (1989-92), Tella and Eaton (1989), and Kerr and Mortensen (1989-1992) in the southern part of the map area, and by M.W. Hassman and G. Prud'homme (1988-92) in the northern part of the map area. Detailed information on the Wopmay Orogen in the Meadowbank River area comprises Kerr (forthcoming 1996), and south of Scott River area from Hoffman (1973). The Meadowbank River area covers most of the Quoich River map area (Tella, 1978), and includes the northernmost exposures of the map area. Additional information on the lithological units and structural chronology of the Quoich River map area can be found in Henderson (1970), Henderson and Brown (1971), Henderson (1972), Tella (1974), Robinson (1980, 1982), Tella and Wallace (1980), Tella and Eaton (1982), Tella and Donaldson (1983), Tella and Donaldson (1984), Tella and Donaldson (1985), Tella (1986), Tella and Donaldson (1986), and Wallace and Tella (1986).

Archean lithostratigraphy in the Meadowbank River area follows Henderson (1985) and Henderson et al. (1990), modified by Jackson et al. (1990). The Woodburn Group is divided into a lower part, dominantly mafic volcanic and volcaniclastic rocks, and an upper part, dominantly felsic volcanic and volcaniclastic rocks. Rocks of the Woodburn Group are intruded by a variety of plutons, ranging from ultramafic to felsic in composition, and are unconformably overlain by a thick sequence of quartzite, conglomerate, and minor felsic volcanic rocks. Contact relationships between the Woodburn Group and the quartzite are locally tectonized, but the quartzite is generally less deformed than the Woodburn Group, and is interpreted as a cover sequence. Proterozoic rocks in the map area include the Wopmay Orogen, which is divided into the Hiatus River Supergroup, a lower sequence of mainly siliciclastic rocks, and the overlying Odjick formation, including two successions of the basal unconformity, the Akaitcho River and Beaulieu River sedimentary assemblages, and the overlying Odjick formation.

Quaternary deposits include glacial, glaciofluvial, glaciolacustrine, and marine sediments. Glacial ice flowed from the east during the last glaciation, depositing a thin veneer of till on the map area. Glaciofluvial deposits are associated with the present drainage system, and are shown on the map. Marine sediments are restricted to a Holocene(?) marine incursion, which reached a maximum elevation of 152 m (Dyke, 1984); marine limit is not well defined, but may be delineated by shorelines mapped at 130 m and 90 m. Vegetation is sparse to absent, and consists of lichens, mosses, and some grasses and shrubs.

REGIONAL GEOLOGY

The Meadowbank gold deposit lies in the Rae Province (Churchill Province), north of the regional geophysical anomaly, the Snowbird tectonic zone (Fig. 1), interpreted by Hoffman (1988) as a major collisional suture. The Woodburn group is bounded to the south by the Snowbird tectonic zone, and to the east by Proterozoic cover rocks of the Wopmay Orogen (the breakup of the Western Churchill Province). Rocks have been intruded by an Hadrean diamond pipe, and are cut by Proterozoic diabase dykes of the Mackenzie igneous event.

The Woodburn succession comprises multiple cycles of bimodal volcanic rocks, associated dykes to multi-phase plutons, and minor sediments. Lithostratigraphy is based on mapping in the Meadowbank River area, and on mapping between Kamut River (Quoich River map area) and Meadowbank River (Wolverine River map area), a stratigraphic distance of 25-30 km. Rocks are subdivided into the Meadowbank Assemblage, a lower, dominantly mafic volcanic and volcaniclastic succession, and the Wolverine Assemblage, a more felsic succession. Rocks of the Woodburn Group have been intruded by a suite of gabbro to granite plutons, ranging in age from 2.7 to 2.6 Ga. Rocks of the Woodburn Group and plutons are unconformably overlain by a thick sequence of quartzite, conglomerate, and felsic volcanic rocks, which are locally tectonized, resulting in the formation of volcanic rocks, basement, and quartzite and gneissose tectonite. The division of gneissose tectonite into units is based on protolith, and is discussed in the Metamorphism section of this report.

Proterozoic rocks in the map area include the Hiatus River Supergroup, which is subdivided into the Akaitcho River and Beaulieu River sedimentary assemblages, and the overlying Odjick formation, which includes the Kamut River volcanic assemblage. The Hiatus River Supergroup is unconformable on the Archean rocks, and is intruded by diabase dykes of the Mackenzie igneous event (Baer, 1966; Fahrig, 1967; Fahrig and Jones, 1969; Fahrig et al., 1974; Baer et al., 1975; Baer et al., 1977; Baer et al., 1978; Baer et al., 1979; Baer et al., 1980; Baer et al., 1981; Baer et al., 1982; Baer et al., 1983; Baer et al., 1984; Baer et al., 1985; Baer et al., 1986; Baer et al.,