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Bedrock geology of Lansing Range map area (NTS 105 N), central Yukon (1:250 000 scale)

## Open File 1616

Natural Resources Canada Geological Survey of Canada Pacific Region

Yukon Geological Survey Energy, Mines and Resources Government of Yukon Geoscience Map 2003-1

Recommended citation: Roots, C.F., 2003. Bedrock geology of Lansing Range map area (NTS 105N), central Yukon (1:250 000 scale). Yukon Geological Survey, Energy Mines and Resources , Government of Yukon, Geoscience Map 2003-1; and Geological Survey of Canada, Open File 1616. Digital cartography and drafting by Charlie Roots and Jason Adams, Yukon Geological Survey.

**Wineral potential** Lansing Range map area contains 30 known mineral occurrences (Deklerk, 2002). Many where discovered during the Hess joint venture (1967-1969); one became the Plata -Inca property, which produced 2800 tonnes of high-grade silver-lead ore (Abbott, 1986). At least eight quartz veins with galena and freibergite(?) were located in the area within cherty and carbonaceous siltstone of the Earn Group. Several stratiform pyritic-baritic horizons are located in similar strata along strike to the west. Following release of the reconnaissance silt geochemical survey by the GSC (Friske et al., 1990), six additional occurrences were staked within the Earn Group. In 1997-1999 another six claim groups were examined for low-grade gold associated with mid-Cretaceous granitic intrusions. In the northwestern quadrant of Lansing map area two stratigraphic units have undetermined potential for base metal sulphide mineralization. Abundant iron sulfide nodules, concretions and laminae are located in Earn Group strata along the Stewart River near the confluence of the Beaver River. Secondly, abundant pyrite was found in grey-green phyllite south of the confluence of the Beaver River (Roots, 1997). This unit is possibly the Upper Devonian or Lower Carboniferous meta-tuff which hosts the Marg massive sulfide deposit (Holbek et al. 2001) 23 km west of the northwest corner of Lansing map area.

A prominent elliptical aeromagnetic and gravity anomaly (15 x 35 km) is centered over lower Pleasant Creek, and extends into eastern Mayo map area. The horseshoe of aeromagnetic peaks surrounds an aeromagnetic low 12 km wide which coincides with a prominent gravity high. A similar (but much smaller) geophysical response is shown by the Lansing Range (plutonic core exposed) and by Kalzas Twins, a peak in southwestern Mayo map area where zonation of vein minerals suggests an igneous body at shallow depth (Roots 1997). The Pleasant Creek anomaly is therefore interpreted to reflect a buried intrusion surrounded by a magnetite-rich alteration aureole. Exposures of bedrock in the area, however, consist of Yusezyu Formation without indication of thermal metamorphism or concentration of quartz veins. Perhaps an unrecognized, low-angle thrust sheet has beheaded a large intrusion in this area. This explanation requires plutonic intrusion before thrusting, for which there is no evidence in the map area.

**Igneous rocks and geophysical interpretation** The Midde Cambrian to Ordovician Log Cabin volcanics (Cecile, 2000), exposed in the northeast and southwest parts of the map area, are ensional remnants of eruptive centres near the Rogue River and Plateau Mountain. Both are typical of sub-alkalic submarine effusions suggesting widespread volcanism and dispersion of its effusive products. Intermediate- to felsic-crystal tuff beds were observed on the conical peak at the northwest eff the map area. Triassic meta-diorite sills (Galena Suite), within a relatively thin Keno Hill Quarzite the meta-utif of broad Missispipian age near the Marg massive subplied deposit immediately northwest of the mouth of the Nataleen River, are the eastern extremity of a belt of intrusions in similar strata in southeastern Nash Creek map area (Abbott, 1990), north-central Mayo map area (Roots, 1997) and the Tombstone Ringe north of Dawson (Mortensen and Thompson, 1990). The 250 km extent of this belt of martie sills suggests a zone of crustal weakness and magma upwelling prior to the Jurassic contractional deformation event. Incompetant Jurassic shale and the relatively stiff diorite and quarzite unit beneath likely defined the planes of the Tombstone Thrust Fault. The Cretaceous Tombstone Suite (92-94 Ma; Mortensen and Murphy, in prep.) are undeformed granitic plugs and stocks that constitute two northwest-trending belts across Lansing Range map area. The northern trend includes Lansing pluton, satellite stocks, and quarzi-physic rhyolite dykes which extend eastward out of the map area at 63°397N. Each pluton has a prominently oxidized halo of sedimentary rocks resulting in rugged mountain skylines and a positive acomagnetic expression. Disseminated epithemal gold and base meta-laweing Lake, in contrast to the norther trend includes Mount Osgoode, seven plugs south of Fairweather Lake, and a large, party uncoded bubbith in the Rusen Yusith in these aureoles in the industion in the Rair Rairweather Lake. In contrast to the norther trend

The Robert Service thrust sheet was deformed and translated by the younger, underlying nbstone Thrust (The trace of the Robert Service Thrust at the northern edge of this domain nasked by subsequent overturning and offset on steep faults between the Stewart River and rweather Lake) . In the thrust sheet strata older than areas to the north has been uplified. strong strain fabric in Yusezyu strata east of the Russell Range is characteristic of the nbstone Strain Zone as defined by Murphy (1997). In addition to northeast contraction, Tombstone Thrust Fault had a component of northwesterly displacement (about 90 km; bott; 1990). In the Lansing Range map area displacement on the Tombstone Thrust Fault probably linked to dextral motion on the Hess and Macmillan faults. Tight-to-overturned ta in the Wilson and southern Surveys ranges with fold axes oblique to the Macmillan It may be a transpressional effect (flower structure) related to lateral fault motion.

Most strata dip moderately southwest and contain a strong parallel tectonic fabric. Three omains in the map area are separated by two northwest-trending faults; these domains hibit different stratigraphic successions and distinct structural characteristics. 1) Northeast of the Hess Fault a complete Paleozoic succession forms a thrust sheet. The bricated Narchilla maroon argillite footwall in the northeast corner of the map area is part the Einarson décollement (Cecile, 2000). 2) In a northwest-to-southeast swath across the centre of the map area are Upper Paleozoic d Mesozoic strata. Hyland Group rocks are exposed in the eastern Surveys Range (near the stern margin of the map area) where the Road River Group has been removed beneath a id-Paleozoic unconformity. South of a fault that passes beneath the Plata airstrip, the estern Surveys Range exhibits an impressive succession of folded Road River strata. 3) South of the mid-Jurassic Robert Service Thrust Fault (Roots, 1997), the hanging wall onsists of Yusezyu grit and sandstone with erosional outliers of Paleozoic strata. In the treme southwest of the map area the presence of Road River allows recognition of the inor Moose Lake thrust fault which extends westward into Mayo map area. In the utheastern part of the map area Middle Devonian, Carboniferous-Permian and Triassic rata are preserved, and Ordovician through Early Devonian strata are missing beneath an nconformity. Structure

Sedimentary rocks of the Hyland (primarily Yusezyu Formation and Arrowhead Lake Member of the Narchilla Formation) and Road River (Gull Lake, Duo Lake/Elmer Creek, and Steel formations) groups represent the clastic fill and deep water chemical precipitate of the Late Proterozoic and Lower Paleozoic Selwyn Basin. Some areas of the basin were uplifted in mid-Devonian time (indicated by a locally prominent unconformity); in other places the distinctive black siltstone and conglomerate of the Earn Group conformably overlies a complete Selwyn Basin succession and is up to 1000 m thick. Clastic shelf conditions returned in the Late Paleozoic and many units reflect distinctive depositional facies. The areal distribution of Triassic and Lower Jurassic formations is incompletely known because it depends upon relatively few microfossil collections; these indistinctive strata are probably more widespread than shown. Summary descriptions of rocks in Lansing Range map area are included in fieldwork reports by: Roots and Brent (1994 a,b) for northeast quadrant; Roots et al. (1995 a,b) for eastern half; Roots (1997) for the northwest quadrant, and Roots (1998) for southwest quadrant. Formal description of all named rock units can be found in Gordey and Anderson (1993) and Cecile (2000).

Manly schistose clastic strata of the northern Selwyn Basin underlie Lansing map area. These strata form rounded mountains, although jagged ridgelines occur in the thermal metamorphic aureoles surrounding six Cretaceous granitic plutons. Major faults occupy some broad northwest-trending valleys: two of these extend eastward as the Hess and Macmillan faults (Abbott and Turner, 1990) in the Macmillan Pass area; another appears to continue westward as the Robert Service Thrust Fault. Argentiferous galena veins were intermittently mined from the east edge of the map area from 1976 to 1985, whereas the stratiform base metal and disseminated gold potential of these rocks have been investigated during the 1990s

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form or anticline se of axial plane; upright, overt form or syncline se of axial plane; upright, overt t with normal or transcurrent d ined, approximate, inferred) orm or antic e of axial pla fault d, app \*24

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ill occurrence, mineral occ its, 1998; Deklerk, 2002 )

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MINERAL OCCURRENCES 105N Yukon MINFILE (Deklerk, 2002)

HUGO
ARMSTRONG (Pb-W)
PLATA (Ag, Pb, Au vein)
PLATA (Ag, Pb, Au vein)
GOLF (Cu skarn)
GOLF (Cu vein)
ETZEL (Cu vein)
ETZEL (Cu vein)
DEAN (Pb vein)
DEAN (Pb vein)
DEAN (Pb vein)
BLOOM (Cu, Mo, Pb vein)
PLEASANT (Cu, W skarn)
SKIDD (Zn)
Note: numbers on the map are show 016 ANDREA (Ba formation) 017 FLATASA 018 AIRSTRIP 019 DOG 020 JAGOWERITE (Ba vein) 021 EMILY 022 FIDO 023 KEG 024 BERDAHL 025 ROG 026 PLEASURE 026 PLEASURE 027 OR 028 CDN 029 ABBOTT (Ba formation) 030 ROOTS (Ba formation) 030 ROOTS (Ba formation)

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