Geologic Map of the Macon Quadrangle, Camas and Blaine Counties, Idaho

John D. Kauffman and Kurt L. Othberg

2008

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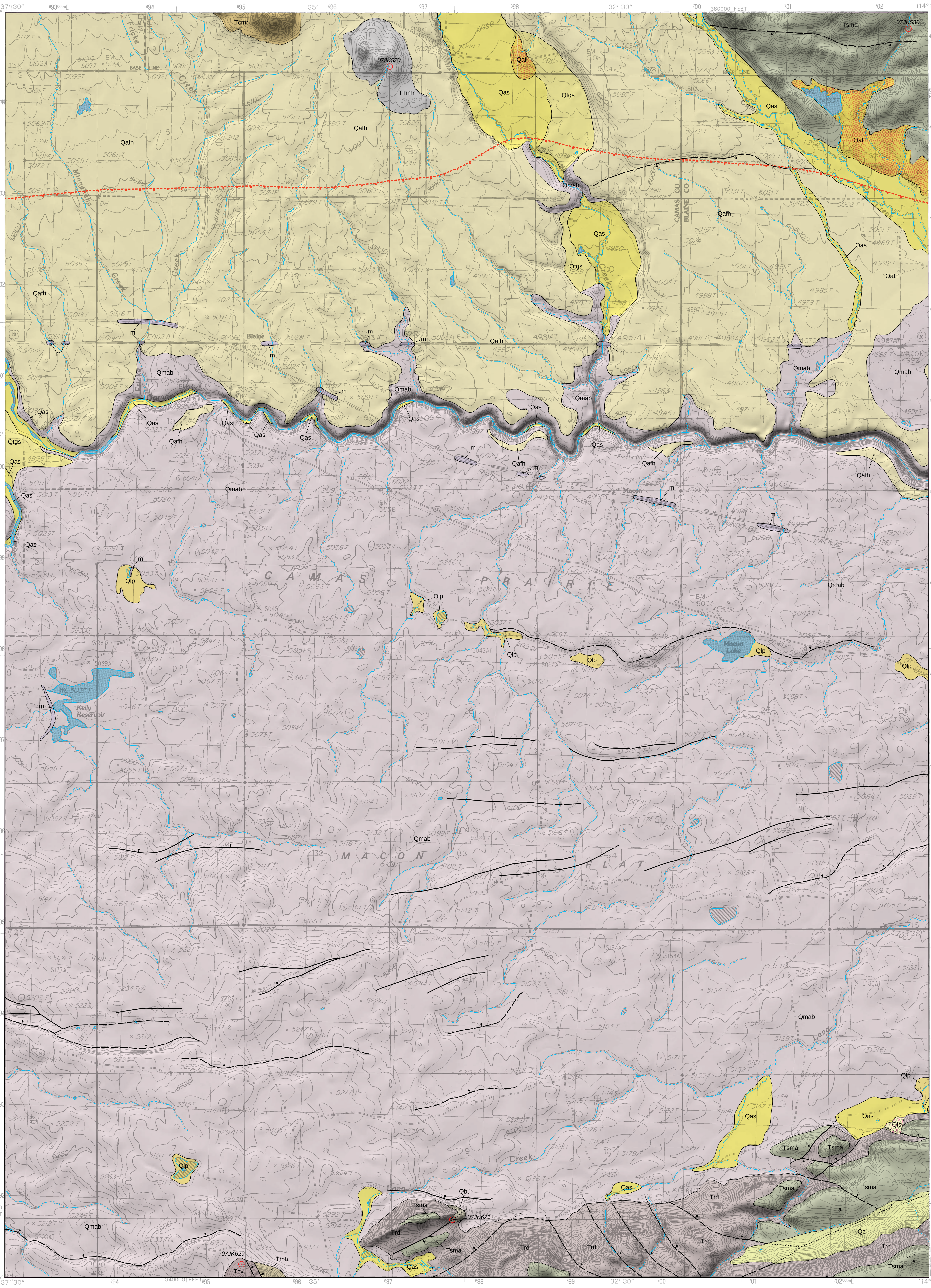


Base map scanned from USGS film positive, 1986.

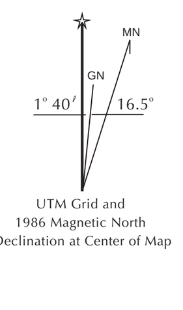
Shaded elevation from 10 m DEM, vertically exagerated 2x.

Topography by photogrammetric methods from aerial photographs taken 1980. Field checked 1981. Map edited 1986.

Transverse Mercator projection. 1927 North American Datum.

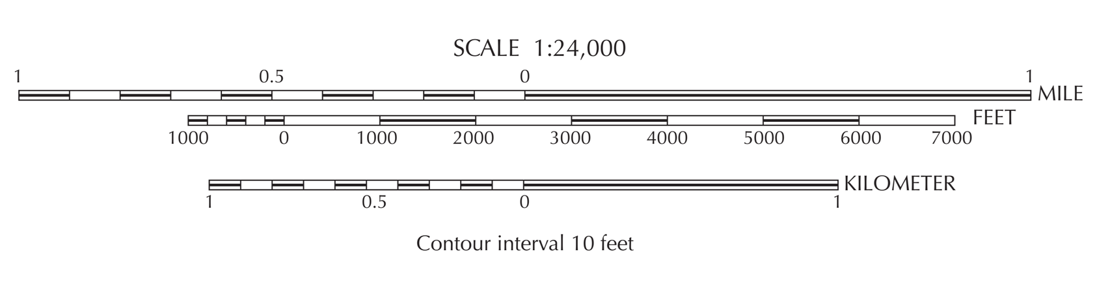
10,000-food grid ticks based on Idaho coordinate system, central zone.

1000-meter Universal Transverse Mercator grid ticks, zone 11.



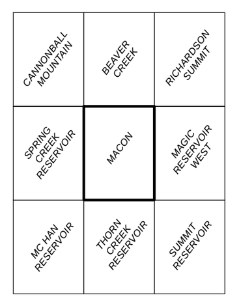
UTM Grid and 1986 Magnetic North Declination at Center of Map

SCALE 1:24,000



Contour interval 10 feet

QUADRANGLE LOCATION



ADJOINING QUADRANGLES

Field work conducted 2007.

This geologic map was funded in part by the U.S. Geological Survey National Cooperative Geologic Mapping Program, USGS Award No. 07HQAG0070.

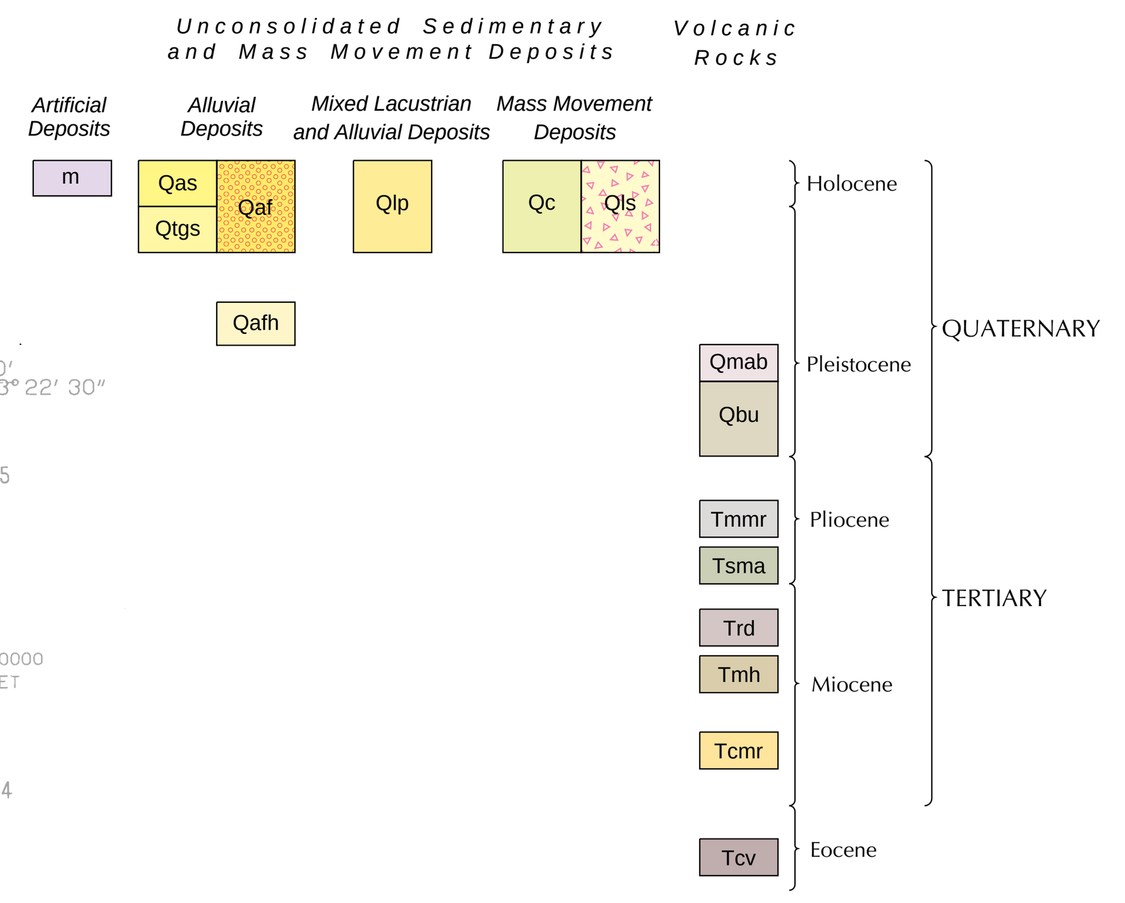
Digital cartography by Theresa A. Taylor at the Idaho Geological Survey's Digital Mapping Lab.

Note on printing: The map is reproduced at a high resolution of 600 dots per inch. The inks are resistant to run and fading but will deteriorate with long-term exposure to light.

Map version 8-27-2008.

PDF (Acrobat Reader) map may be viewed online at www.idahogeology.org.

CORRELATION OF MAP UNITS



INTRODUCTION

The geologic map of the Macon quadrangle depicts rock units exposed at the surface or underlying a thin cover of sediment. Thicker stream, lake, and mass movement deposits are also depicted where they form significant mappable units. The map is the result of field work conducted in 2007 by the authors. Mapping by previous workers, noted below, was field checked and incorporated where appropriate. Soils information is from Case (1981) and Johnson (1991, 2002). Major oxide and trace element analyses of samples in the quadrangle were done at Washington State University's GeoAnalytical Laboratory in Pullman, Washington; analytical results are listed in Table 1.

Previous work in the area includes that of Malde and others (1963), Schmidt (1961), Smith (1966), and Worl and others (1991). Malde and others conducted regional reconnaissance mapping and established a regional stratigraphy. Schmidt mapped the Bellevue area to the east and provided a more detailed stratigraphy and description of units, although his main focus was on Quaternary units and stream diversions by basalt flows that occur east of the Macon quadrangle. Smith mapped part of the eastern Mount Bennett Hills, which includes the southwest part of the Macon quadrangle. Worl and others mapped and compiled the geology of the Hailey 1° x 2° quadrangle, which includes the Macon quadrangle.

The Pleistocene basalt of Macon is the predominant map unit and erupted from vents in the south part of the quadrangle near the head of Lava Creek. North of Camas Creek, Pleistocene sand and gravel form a large alluvial-fan complex that extends south to the Camas Creek canyon and buries the northern extent of the basalt. Camas Prairie is probably fault-bounded along its northern and southern boundaries, although these faults are obscured by the Pleistocene fan complex on the north and by the basalt of Macon on the south. The northern bounding fault is probably located along the range front near the northern edge of the map. The southern bounding fault is located approximately where basalt of Macon abuts the Tertiary felsic rocks of the Mount Bennett Hills.

DESCRIPTION OF MAP UNITS

ARTIFICIAL DEPOSITS

m **Made ground (Holocene)**—Artificial fills composed of excavated, transported, and emplaced construction materials typically derived locally. Primarily highway, railroad, and reservoir dam fills.

UNCONSOLIDATED SEDIMENTARY AND MASS MOVEMENT DEPOSITS

Alluvial Deposits

Qas **Alluvium of side streams (Holocene)**—Moderate- to well-sorted gray to tan sandy pebble and cobble gravel. Gravel clasts primarily subrounded to rounded Cretaceous granitic rocks, Paleozoic sedimentary and metamorphic rocks, Tertiary felsites, and Pleistocene basalt. Thickness 10 feet and greater. Includes alluvium less than 10 feet thick in small, intermittent drainageways.

Qaf **Alluvial-fan deposits (Pleistocene and Holocene)**—Poorly sorted silty, clayey sand with common subangular pebbles and cobbles. Thickness highly variable, ranging 5-25 feet.

Qtgs **Terrace gravel of side streams, undivided (Pleistocene)**—Crudely bedded and moderately sorted pebble to boulder gravel with a sand matrix. Forms terraces 20-40 feet above present streams.

Qafh **Alluvial-fan gravel, high position (Pleistocene)**—Moderately sorted and stratified pale brown sandy pebble and cobble gravel in large coalesced fan aprons formed primarily by ancestral Willow Creek. Buries most of basalt of Macon north of Camas Creek canyon where the gravel is 75-100 feet thick. Southward, grain size diminishes to pebbly sand near US Highway 20. Deposit thins to several feet thick between the highway and Camas Creek canyon where the underlying basalt of Macon is exposed. Gravel clasts primarily subrounded to rounded Cretaceous granitic rocks, Paleozoic sedimentary and metamorphic rocks, and Pliocene felsites. Near the surface, deposits are weathered reddish brown and soil has a clay-rich B horizon and indurated layers and nodules of silica. West of "Blaine," limited exposures show the gravel overlying thin-bedded silt and clay, suggesting lake deposits were buried by the alluvial-fan deposits near the upstream end of Camas Creek canyon.

Mixed Lacustrine and Alluvial Deposits

Qlp **Playa deposits (Pleistocene and Holocene)**—Thin-bedded to massive clay and silt. Include layers with common pebble- and cobble-sized basalt fragments. Forms flat to gently sloping fills in shallow closed depressions. Sediments largely derived from erosion of loess from surrounding basalt surfaces and washed into areas of internal drainage or nearly flat surfaces.

Mass Movement Deposits

Qls **Landslide deposits (Pleistocene and Holocene)**—Poorly sorted and poorly stratified angular cobbles and boulders mixed with silt and clay. Deposited by slumps, slides, and debris flows.

Qc **Colluvium (Pleistocene and Holocene)**—Primarily unsorted and unstratified silty to clayey sand and gravelly sand with few to common boulders. Forms foot slopes of large, steep escarpments stabilized by vegetation. Deposited by sheet wash, creep, and rock fall; largely relic judging by well-developed clayey B horizons and duripan soils.

VOLCANIC ROCKS

Qmab **Basalt of Macon (Pleistocene)**—Fine- to medium-grained basalt with scattered plagioclase phenocrysts 2-3 mm long and uncommon olivine <1 mm in diameter. Diktytaxitic and vesicular. Most vesicle walls coated with calcium carbonate. Remanent magnetic polarity normal, as measured in the field and the laboratory. Unit covers most of the quadrangle and forms Macon Flat. Source appears to be vent(s) in southwest part of the quadrangle. Scarps in this basalt are likely extensional fractures related to late-stage development of the Camas Prairie. An $^{40}Ar/^{39}Ar$ date on this basalt at Moonstone Landing resulted in a weighted mean plateau age of 1.45 ± 0.16 and an inverse isochron age of 1.25 ± 0.36 (New Mexico Geochronological Research Laboratory, Richard Esser, written commun., 2005). Pressure ridges are common and stream drainage is poorly developed. Soils are thin to absent except between pressure ridges where 2 feet of silt and clay overlie a silica-rich hardpan (duripan). Variations in soil characteristics and vegetation form a patterned ground visible on aerial photographs, including east-west elongate bands of thin dune sand.

Qbu **Basalt, undivided (Pleistocene?)**—Fine-grained basalt with common plagioclase laths 1-4 mm long, plagioclase and olivine clots 5-7 mm, and rare plagioclase and olivine intergrowths as large as 1 cm. Olivine altered to purplish iddingsite(?), which gives the rock a faint purplish hue. Remanent magnetic polarity reverse, as determined in the field. Source undetermined. Occurs only near south edge of the quadrangle, south of Lava Creek, where it overlies *Trd* unit. Age uncertain and may be as old as Pliocene. Major oxide and trace element analysis of one sample (07JK621) listed in Table 1.

Tmmr **Rhyolite of Moonstone Mountain (Pliocene)**—Small knob of rhyolite west of Willow Creek near north edge of quadrangle has chemical composition (sample 07JK520) similar to the rhyolite of Moonstone Mountain, a rhyolite dome just east of the quadrangle. Phenocrysts consist of coarse sanidine as large as 8 mm, quartz, plagioclase, and assessory hornblende in a fine-grained pinkish gray glassy groundmass. Honjo and others (1986) report a K-Ar age of 3.89 ± 0.04 Ma for the rhyolite at this location.

Tsma **Andesite of Square Mountain (Pliocene)**—Dark gray, fine-grained andesitic lava with phenocrysts of plagioclase 2-8 mm and xenocrysts of plagioclase and rounded quartz. Locally contains foliated granitic xenoliths. Platy jointing common where the unit is thicker. Remanent magnetic polarity inconclusive, but probably reverse; both normal and reverse readings were obtained in the field. Soils are thin to absent. Occurs in the northeast corner of the quadrangle and caps an erosional surface on Trd unit at the south edge. Equivalent to Square Mountain basalt of Schmidt (1961) and Square Mountain ferrolatite of Honjo (1986). Stratigraphic position relative to rhyolite of Moonstone Mountain uncertain. Overlies that unit in the Moonstone Mountain area, but the rhyolite dome may have intruded beneath and through the andesite, or there may have been several episodes of dome building, both before and after emplacement of *Tsma*.

Trd **Rhyolite and dacite of eastern Mount Bennett Hills (Miocene)**—Phenocryst-, xenocryst-, and locally xenolith-rich rhyolite to dacite lavas(?). Groundmass is light tan-gray in platy, interior part of flow to dark gray to black and vitrophyric at the top and possibly in zones within the interior and at the base. Small pyroxene grains are scarce to common. Many of the xenocrysts are rounded and embayed. Vesicular zones may be flow tops. Remanent magnetic polarity at several locations was normal, as measured in the field. Forms ridges with common outcrops and aprons composed of colluvium, sheet-wash deposits, and few outcrops; where thick, forms cliffs as high as 300 feet. Forms a rugged topography with common ridges and knobs on which soils are thin to absent. Foot slopes and narrow valleys have a thin cover of colluvium and sheet wash composed of coarse sand and fine gravel. Covers a large area south and east of the Macon quadrangle. Included in the Moonstone rhyolite by Schmidt (1961) and Leeman (1982). Equivalent to rhyolite of Magic Reservoir (Tmr unit) of Honjo (1986) and quartz latite of Magic Reservoir (Tmq unit) of Worl and others (1991). Using the total alkali-silica classification of Le Maitre (1984), Honjo's samples plot in the dacite and rhyolite fields and several samples we analyzed from nearby quadrangles also plot near the rhyolite-dacite boundary. Honjo (1986) reports a K-Ar age of 4.2 Ma for the Tmr unit. Struhsacker and others (1982) report a K-Ar age of 5.8 Ma for their "older rhyolite" unit, which we believe is the same unit as *Trd*. A sample we submitted for dating resulted in a low confidence $^{40}Ar/^{39}Ar$ age of about 4.22 Ma (Pacific Centre for Isotopic and Geochemical Research, Thomas Ullrick, written commun., 2007). Stratigraphic relations with units in the Magic Reservoir West quadrangle support the 5.8 Ma age.

Tmh **Basalt of McHan (Miocene)**—Medium gray, fine- to medium-grained nearly aphyric to plagioclase-phyric basalt. May be several flows. Plagioclase phenocrysts in the more phyric flows (or parts of a flow) range from 2-7 mm in length. Poorly exposed on north face of ridge along south edge of quadrangle, but extends south and west into adjacent quadrangles. Occurs in fault contact with tuff of Gwin Springs (*Tgs*) described below. Thickness not determined, but estimated at less than 200 feet. Equivalent to McHan basalt of Smith (1966) and basalt of McHan of Oakley (2006). Honjo and others (1986) report a K-Ar age of 9.44 ± 0.11 Ma for this unit.

Tcmr **Rhyolite tuff of Cannonball Mountain (Miocene?)**—Lewis (1990) identified this unit as an alkali rhyolite (comendite) tuff and described it as light gray, porphyritic, and in places vesicular. He reported phenocrysts of sanidine and quartz in a thoroughly devitrified groundmass of feldspar and quartz intergrowths with opaque minerals and amphibole. He also reported a sanidine K-Ar age of 10.2 ± 0.3 Ma.

Tcv **Challis Volcanics, undivided (Eocene)**—Light gray, tan, or pale purplish dacite porphyry. Phenocrysts are mostly plagioclase; a few small hornblende laths noted, commonly with altered rims. Poorly exposed on the same ridge as the McHan basalt at the south edge of the quadrangle.

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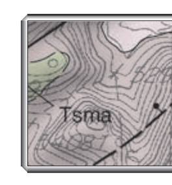
SYMBOLS

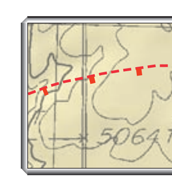


Contact: approximately located; dashed where inferred.

Fault: dashed where approximately located; dotted where concealed; bar and ball on downdropped side. Includes extensional faults and fractures in basalt of Macon, some with little or no displacement.

Estimated strike and dip of volcanic flows.

Sample location and number.



Inferred northern edge of basalt of Macon beneath fan gravels and alluvium, based on water well drill logs.

ACKNOWLEDGMENTS

We thank the landowners who allowed us access to their land.

Table 1. Major oxide and trace element chemistry of samples collected in the Macon quadrangle.

Sample number	Latitude	Longitude	Unit name	Map unit	Major elements in weight percent										Trace elements in parts per million																	
					SiO_2	TiO_2	Al_2O_3	FeO*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	Ni	Cr	Sc	V	Ba	Rb	Sr	Zr	Y	Nb	Ga	Cu	Zn	Pb	La	Ce	Th	Nd
07JK520	43.36969	-114.57293	rhyolite of Moonstone Mtn	Tmmr	75.18	0.212	13.40	2.20	0.034	0.10	0.38	2.81	5.67	0.022	0	2	3	5	397	299	44	267	58	52.3	23	4	68	41	111	202	48	65
07JK530	43.37343	-114.50264	andesite of Square Mountain	Tsma	60.56	1.902	14.79	8.89	0.113	1.72	4.88	3.53	3.18	0.442	9	10	17	143	1496	63	275	524	53	38.3	21	12	115	14	72	135	7	62
07JK621	43.25573	-114.56444	basalt, undivided	Qbu	47.89	1.294	17.92	10.91	0.207	8.19	10.77	2.53	0.15	0.135	115	60	31	230	413	1	269	64	23	3.1	16	67	87	1	7	13	1	12
07JK629	43.25131	-114.59295	Challis Volcanics	Tgs	64.38	0.786	15.93	4.74	0.043	2.07	3.74	3.51	4.45	0.338	16	53	11	92	3160	130	560	253	25	21.1	19	25	63	21	76	127	18	49

* Major elements are normalized on a volatile-free basis, with total Fe expressed as FeO.
All analyses performed at Washington State University GeoAnalytical Laboratory, Pullman, Washington.

Published and sold by the Idaho Geological Survey
University of Idaho, Moscow, Idaho 83844-3014