Geologic Map of the Corral Quadrangle, Camas County, Idaho

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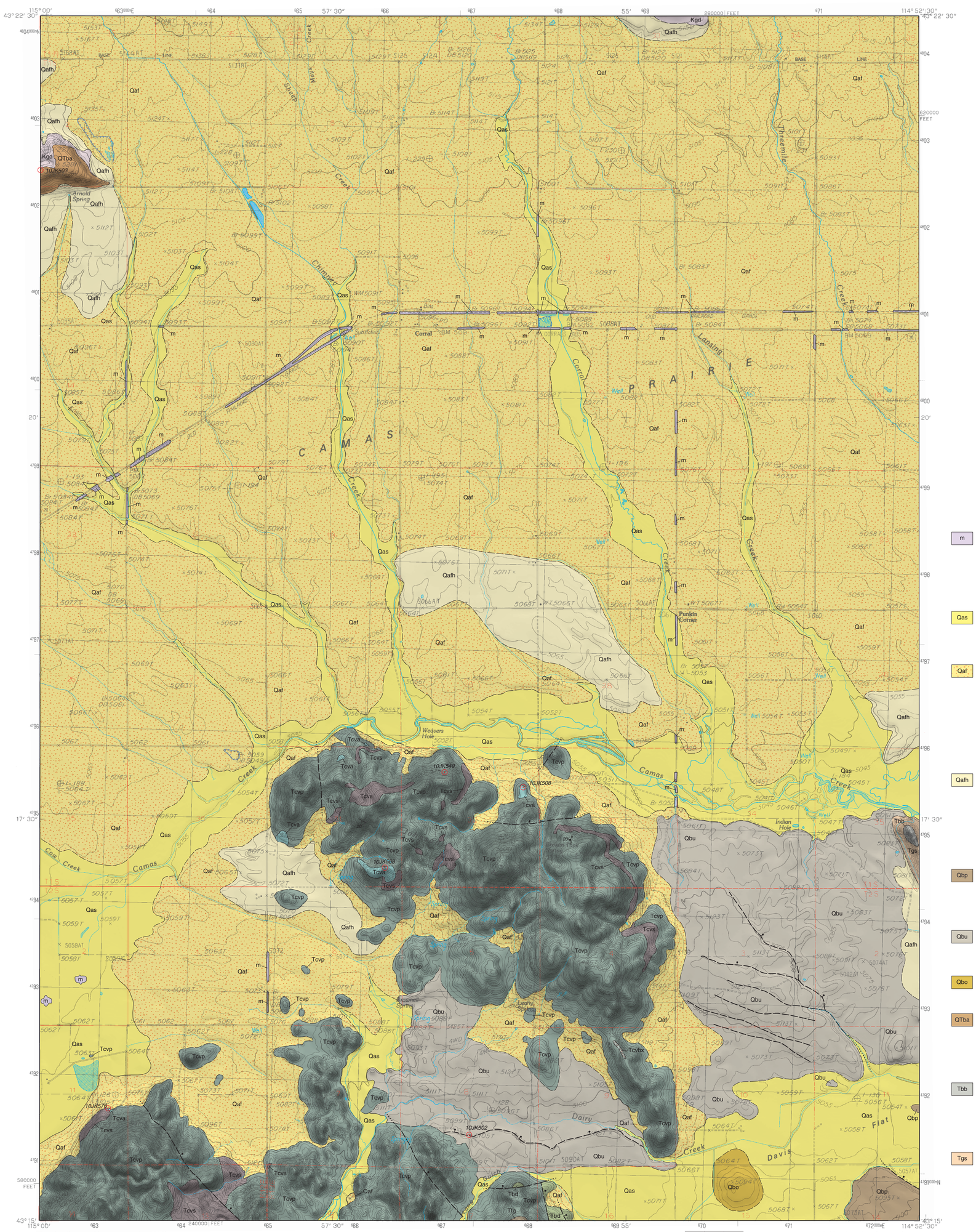
2011



Base digitally scanned from 24,000-scale USGS film separates, 1986.

Shaded elevation from 10 m DEM.

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

Projection: Idaho coordinate system, central zone (Transverse Mercator). 1927 North American Datum.

10,000-foot 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
Supplemental contour interval 5 feet.

QUADRANGLE LOCATION

ADJOINING QUADRANGLES

Field work conducted 2008 and 2010.

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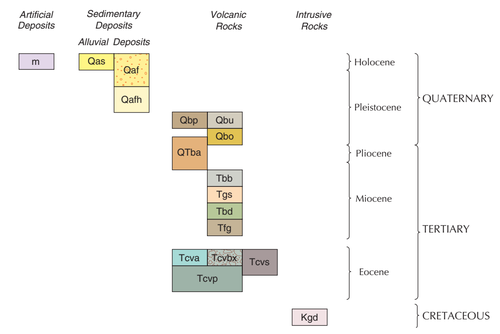
Digital cartography by Jane S. Freed at the Idaho Geological Survey's Digital Mapping Lab.

Review status: Authors only.

Map version 7-22-2011.

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

CORRELATION OF MAP UNITS



INTRODUCTION

The geologic map of the Corral quadrangle identifies rock units exposed at the surface or underlying thin surficial cover of soil and colluvium. The map is the result of field work conducted in 2009 and 2010 by the authors. Mapping by previous workers, noted below, was field checked and incorporated where appropriate. Soils information is from Case (1981). 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), Smith (1966), Worl and others (1991), Oakley (2006), and Othberg and Kauffman (2010). Malde and others conducted regional reconnaissance mapping and established a regional stratigraphy. Smith mapped part of the eastern Mount Bennett Hills, which includes part the quadrangle. Worl and others mapped and compiled the geology of the Hailey 1°x 2°quadrangle, which also includes the quadrangle. To the south, Oakley mapped the Davis Mountain quadrangle; some of his map units extend into this quadrangle. Othberg and Kauffman mapped the adjacent Fairfield quadrangle to the east.

The area is near the center of the Camas Prairie, an extensional graben that is probably related to formation of the Snake River Plain (Kirkham, 1931; Cluer and Cluer, 1986). Cretaceous granodiorite and aplitic rocks crop out along the north edge of the map and a thin Quaternary or Tertiary basalt caps the granitic rocks in the northwest corner. Most of the hills in the south half of the quadrangle are composed of Eocene Challis Volcanic Group andesitic and dacitic to rhyolitic rocks and associated sedimentary units. The Eocene rocks are locally capped with Miocene basalt and rhyolite tuff. Quaternary basalt flows erupted from local vents, such as the The Pothole just south of the quadrangle, and flowed onto the Camas Prairie. Quaternary alluvial-fan deposits derived from the highlands cover the northern part of the quadrangle; stream alluvial deposits occur in Camas Creek and local stream valleys.

DESCRIPTION OF MAP UNITS

ARTIFICIAL DEPOSITS

m — **Made ground (Holocene)**—Artificial fills composed of excavated, transported, and emplaced construction materials typically derived locally. Includes fills for highways, old railroad grades, and artificial ponds.

SEDIMENTARY AND MASS MOVEMENT DEPOSITS

Alluvial Deposits

Qas — **Alluvium of side streams (Holocene)**—Moderate- to well-sorted and stratified clay, silt, and fine to coarse sand in flood plains of Camas Creek and its north tributaries. Includes poorly drained areas with surface clay as much as 1 m (3 ft) thick. Alluvium of Davis Flat includes pebbles of basalt, rhyolite, and tuff. The unit is 3-6 m (10-20 ft) thick and overlies Pleistocene sediments or bedrock.

Qaf — **Alluvial-fan deposits (Holocene and Pleistocene)**—Moderately sorted and stratified pebbly coarse sand grading southward and westward into sand, silt, and clay. Forms large coalesced alluvial fan that emanates from the foothills and mountains to the north and northwest. Yellowish brown weathering and slightly clayey soil B horizons suggest an age of earliest Holocene to latest Pleistocene. North of Camas Creek the unit overlies older sediments (Pleistocene to Pliocene lake deposits?) in which beds of clay are more predominant (water well logs show alternating beds of sand and clay to a depth of at least 150 m (500 ft). South of Camas Creek, alluvial-fan deposits are poorly sorted, include pebbles of rhyolite, and overlie older Pleistocene sediments or bedrock. Small alluvial fans include areas of older alluvial-fan deposits (*Qafh*). The unit ranges from 3 to 30 m (10 to 100 ft) in thickness.

Qafh — **Alluvial-fan deposits, high position (Pleistocene)**—Moderately sorted and stratified coarse sand and pebbly coarse sand in remnants of formerly more extensive alluvial fan graded to ancestral Camas Creek. Near the surface, reddish-brown weathering and clay-rich soil B horizons indicate an age of at least late Pleistocene. North of Camas Creek the unit is 24-30 m (80-100 ft) thick and overlies older Pleistocene to Pliocene sediments. South of Camas Creek the unit is 3-6 m (10-20 ft) thick and overlies basalt.

VOLCANIC AND ASSOCIATED SEDIMENTARY ROCKS

Qbp — **Basalt of Pothole (Pleistocene)**—Dark gray, fine-grained, vesicular, diktytaxitic olivine-bearing basalt erupted from The Pothole, a circular vent just southeast of the quadrangle. The vent and associated flows are cut by a west-northwest-trending scarp; maximum offset is about 25 m (70 ft), down to the north. Part of the scarp crosses the southeast corner of the map. Remanent magnetic polarity normal (Oakley, 2006). Some basalt mapped as *Qbu* may also be from this source. Equivalent to basalt of Pothole of Oakley (2006).

Qbu — **Basalt flows, undivided (Pleistocene)**—Dark gray, vesicular, diktytaxitic olivine-bearing basalt flows; some flows plagioclase phyric. Source(s) not determined, but some basalt may be related to the same eruptive event as basalt of Pothole. Remanent magnetic polarity of flows examined is normal, as determined in the field.

Qbo — **Basalt of older vent (Pleistocene)**—Mapped unit is a small, subdued circular vent near the south edge of the quadrangle. Consists of basalt rubble in thin soils but no outcrop was noted and the unit was not sampled. Appears to be older than *Qbp* and *Qbu* basalts.

QTba — **Basaltic andesite (Pleistocene to Miocene)**—Dense, gray, fine-grained basaltic andesite with common 2-3 mm plagioclase phenocrysts and scarce olivine grains ~ 1 mm; also a few glomerocrysts of plagioclase and olivine about 5 mm in diameter. Remanent magnetic polarity not determined. Caps granitic rock in the northwest corner of the quadrangle, but otherwise age is poorly constrained. Higher SiO_2 than most Quaternary basalt units in the area but does not have high Sr content that is characteristic of Challis volcanics-age andesitic rocks (Table 1).

Tbb — **Basalt of Big Bluff (Miocene)**—Medium to dark gray basalt with scattered 1-2 mm plagioclase laths, abundant olivine 1 mm, and scattered plagioclase + olivine clots as large as 5 mm. Caps Gwin Spring tuff on the north end of Big Bluff and on the south flank of the bluff (on the adjacent Fairfield quadrangle; Othberg and Kauffman, 2010). Composition is similar to that reported for basalt of Davis Mountain (Oakley, 2006), although texture is dissimilar and stratigraphic age is younger – Davis Mountain basalt is older than Gwin Spring tuff whereas Big Bluff basalt is younger than the tuff.

Tgs — **Tuff of Gwin Spring (Miocene)**—Light purplish or pinkish gray to tan or brown crystal-poor rhyolite tuff. Platy partings common. Folded flow layering locally common. Equivalent to Gwin Spring Formation of Smith (1966) and tuff of Gwin Springs of Oakley (2006). The tuff forms most of Big Bluff at the southwest edge of the map and Windmill Bluff on the adjacent Fairfield quadrangle. Chemical composition of samples from a rock quarry on Big Bluff and from Windmill Bluff (Othberg and Kauffman, 2010) closely matches composition reported by Oakley (2006) for the tuff. Appearance nearly identical to Fir Grove tuff but separable by chemical composition. Soils are generally thin to absent.

Tbd — **Basalt of Davis Mountain (Miocene)**—Medium to dark gray plagioclase-phyric and plagioclase-olivine-glomerophyric basalt. Plagioclase phenocrysts 2-8 mm in length; plagioclase-olivine glomerocrysts are as large as 1 cm. Remanent magnetic polarity not determined; Oakley (2006, p. 138) reports polarity as normal, but several of his field measurements gave reverse polarity readings. Caps Challis volcanics at south edge of quadrangle. Farther south, the basalt caps tuff of Fir Grove (Oakley, 2006).

Tfg — **Tuff of Fir Grove (Miocene)**—Tan to brown crystal-poor rhyolite tuff. Lithophysal cavities present at one or more horizons, otherwise commonly platy weathering. The tuff lies unconformably on Challis volcanics (*Tcvp*) in a small area along the south edge of the quadrangle; it extends southward into the Davis Mountain quadrangle (Oakley, 2006). Equivalent to Fir Grove tuff of Smith (1966) and tuff of Fir Grove of Oakley (2006), who reports reverse magnetic polarity, although our field measurements of polarity were inconclusive. An $^{40}Ar/^{39}Ar$ date on the Fir Grove tuff from the Davis Mountain quadrangle resulted in an age of 11.17 ± 0.08 Ma (Oakley, 2006).

Challis Volcanic Group

Tcva — **Challis Volcanic Group, andesitic rocks (Eocene)**—Dark gray andesitic rocks with pale greenish to brownish mottling. Some of the mottling appears to be weathered phenocrysts. Weathered surfaces are light tan to reddish brown. Restricted to a few isolated areas and appears to cap the porphyritic dacitic to rhyolitic rocks (*Tcvp*), although contact relationships are obscure. Characterized by high Sr and Cr (Table 1).

Tcvp — **Challis Volcanic Group, porphyritic dacite and rhyolite (Eocene)**—Light to dark gray, tan, pale maroon, or pale purple porphyritic hornblende ± biotite dacite to rhyolite. Vitrophyric in places. Phenocrysts are mostly plagioclase, small hornblende laths that are commonly altered or have altered rims, and biotite. Massive to flow layered. Attitude difficult to determine, but crude layering appears to dip south. Exposed in the hills in the south part of the quadrangle. Textures vary from coarsely porphyritic, almost granitic in appearance, to slightly porphyritic.

Tcvbx — **Challis Volcanic Group, breccia (Eocene)**—Small area of breccia capping the ridge in the N½, sec. 9, T. 2 S., R. 13 E. Clasts range from several millimeters to decimeters in size and consist of angular fragments of the above units (*Tcvp* and *Tcva*) and some undetermined lithics in a finer grained matrix. Thickness on the ridge is less than 10 m (30 ft).

Tcvs — **Challis Volcanic Group, sedimentary rocks (Eocene)**—Sediments consist of indurated arkosic sand, siltstone, mudstone, and locally fine ashy deposits. Most are light colored. Appears to overlie the dacitic rocks at the southwest corner of the quadrangle; on the northeast flank of Johnson Hill, appears to be interbedded with the volcanic units, suggesting several episodes of deposition, although some repetition of sediments may be caused by unrecognized faulting.

INTRUSIVE ROCKS

Kgd — **Biotite-hornblende granodiorite (Cretaceous)**—Medium- to coarse-grained biotite-hornblende granodiorite and associated aplite and pegmatite crop out along the north edge of the quadrangle. The unit is poorly exposed and is inferred from mapping to the north (Worl and others, 1991) and from exposures in the old county landfill just west of the quadrangle boundary. A thin Quaternary or Tertiary basaltic andesite (*QTba*) caps the unit in the northwest corner of the map.

SYMBOLS

Contact: dashed where approximately located.

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

Estimated strike and dip of volcanic unit.

Strike and dip of volcanic flow foliation.

Gravel pit or rock quarry that exposes a map unit.

10JK502 Sample location and number.

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ACKNOWLEDGMENTS

We appreciate the cooperation of the private landowners who allowed access to their land.

Table 1. Major oxide and trace element chemistry of samples collected in the Corral 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	U
10JK502	43.2589	-114.93901	basalt, undivided	Qbu	46.51	3.444	14.32	15.06	0.229	6.61	9.73	2.54	0.66	0.901	69	150	31	317	665	9	346	357	50	34.8	21	34	168	6	42	91	1	51	1
10JK503	43.359	-114.99999	basaltic andesite	QTba	54.95	2.326	14.26	10.91	0.163	4.84	7.06	2.81	2.13	0.544	51	125	22	226	617	74	270	335	52	34.6	22	25	124	16	56	110	10	55	3
10JK508	43.29497	-114.9313	Challis volcanics, andesite	Tcva	58.36	0.935	15.45	7.53	0.139	5.26	7.02	3.24	1.85	0.222	118	311	20	140	1081	119	516	170	21	12.4	19	54	69	15	36	64	10	25	3
10JK549	43.29653	-114.94249	Challis volcanics, rhyolite	Tcvp	72.04	0.333	14.52	2.10	0.043	0.69	1.92	3.39	4.86	0.110	7	15	4	25	1392	158	305	188	13	16.0	18	5	45	30	54	86	26	29	6
10JK568	43.28662	-114.95097	Challis volcanics, andesite	Tcva	58.32	1.085	15.89	7.12	0.140	4.56	7.13	3.33	2.11	0.326	145	292	21	147	1132	78	535	215	23	16.4	19	41	82	12	44	83	8	34	0
10JK576	43.26164	-114.99031	Challis volcanics, andesite	Tcva	62.30	0.878	15.08	5.33	0.096	4.63	5.46	3.42	2.50	0.308	93	261	15	111	1192	111	514	203	20	18.1	19	32	72	16	43	88	12	36	2

* 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.

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