

Tuff, undivided (Eocene)—Mixed unit of tuffs interbedded with, and directly below, the mafic lava flow unit (*Tlm*). Equivalent to rhyolitic tuff beds (Tct) of Staatz (1972), who noted characteristic recessive weathering and a wide range of crystal, lithic, and vitric fragment (pumice) proportions. Tuffs lower in the sequence commonly contain conspicuous biotite phenocrysts. Most or all are probably rhyolitic. A quartzite-bearing tuff interbedded with mafic lava flows north of Trail Creek yielded a U-Pb zircon age of 47.0 ± 0.2 Ma (LP-06; Table 3). Thickness as much as 60 m (200 ft).

Upper conglomerate (Eocene)—Poorly sorted, poorly indurated conglomerate north of Agency Creek and southeast of Lemhi Pass. Contains well-rounded pebbles, cobbles, and boulders as large as 1.5 m in diameter. Most are quartzite, but includes distinctive cobbles and boulders of coarse-grained Mesoproterozoic biotite granite exposed 40 km (25 mi) to the northwest (Burmester and others, 2016a). Rare garnet amphibolite cobbles also noted north of Agency Creek. Boulders also form lag deposits west of the actual unit exposures. Equivalent to granite clast conglomerate (Tcg2) of Blankenau (1999), but mapped higher in the stratigraphic section in the area north of Agency Creek. Blankenau (1999), Janecke and others (2000), and Chetel and others (2011) postulated that an Eocene paleoriver flowed through the Salmon basin and transported the granite clasts across the Beaverhead Range at Lemhi Pass. As thick as 150 m (500 ft), but absent in the southeast part of the map.

Tgs. Older quartz-sanidine welded tuff (Eocene)—Tan-orange to light-pink welded tuff present north of Agency Creek and southeast of Lemhi Pass. Contains sparse, euhedral to subhedral crystals of sanidine and quartz. Termed vitric tuff of Lemhi Pass by Staatz (1972, 1979), who estimated a thickness of 115-200 m (380-650 ft). Our estimate of maximum thickness is 60-90 m (200-300 ft). Equivalent to Tqs1 of Blankenau (1999). M'Gonigle and Dalrymple (1996) reported an 40 Ar/ 39 Ar weighted mean age of 47.95 ± 0.12 Ma for this unit near Lemhi Pass

Middle conglomerate (Eocene)—Poorly sorted, matrix-supported conglomerate. Poorly consolidated and not exposed in outcrop north of Agency Creek where clasts consist of quartzite pebbles, cobbles, and boulders as large as 1 m in diameter. Silicified and finer grained in thin exposure immediately south of Lemhi Pass where subangular to subrounded clasts are quartzite and siltite; small feldspar clasts, originally volcanic-derived phenocrysts(?), are present in the matrix at this locality. Included in conglomerate of Flume Creek by Staatz (1972), but considered a separate, less extensive unit here. Blankenau (1999) and Janecke and others (2000) included this unit in their granite-clast conglomerate unit (Tcg2) but we only noted the granite clasts in our upper conglomerate (Tcg₃) and, rarely, in the uppermost conglomerate (Tcg₄). Thickness north of Agency Creek is about 120 m (400 ft) but

south of Lemhi Pass only about 10 m (30 ft). Quartzite-bearing ash-flow tuff (Eocene)—White, white-gray, pinkish red, or pink-gray tuff. Contains sparse to abundant angular dark-gray to black quartzite lithic fragments, less abundant quartz and plagioclase, and minor sanidine. Poorly to moderately welded. Equivalent to Tcq unit of VanDenburg (1997) and Tgt unit of Blankenau (1999). The latter obtained an ${}^{40}\text{Ar}/{}^{39}\text{Ar}$ age on single sanidine crystals of 49.51 \pm 0.14 Ma on a sample collected along Withington Creek about 30 km (18 mi) to the west-northwest in the Sal Mountain quadrangle. An 40Ar/39Ar weighted mean age of 48.64 ± 0.12 Ma from a sample collected near Lemhi Pass was reported by M'Gonigle and Dalrymple (1996). Estimated to be as thick as 520 m (1,700 ft) in the area south of Lemhi Pass (Staatz, 1972), but thins to

Basal conglomerate (Eocene)—Clast-supported conglomerate present locally in northern part of map. Well-rounded pebble to cobble clasts are mostly quartzite, typically 10 to 20 cm in diameter, although Staatz (1972) also reported that some of the small pebbles are white tuff and that the matrix is tuffaceous. Equivalent to Tcg1 of VanDenburg (1997). Staatz (1972) reported a maximum thickness of 5 m (15 ft).

INTRUSIVE ROCKS

Small intrusive bodies are present throughout the quadrangle. Many are thought to be Cambrian based on extreme mafic composition, degree of alteration, and a U-Pb age determination from the adjoining quadrangle to the west (Gillerman and others, 2010, 2013). Some dikes to the north are Eocene (Lonn and others, 2009) so less-altered intrusions on this map are possibly Eocene.

Dikes, undivided (Eocene?)—Mostly diorite dikes. Equigranular to porphyritic dikes and small plugs that contain more plagioclase and quartz and fewer mafic minerals than the *€mi* intrusions. A gray-weathering intrusion (LP-09; 58.52 wt. percent SiO₂ Table 1) cut by a fault north of Everson Creek contains feldspar laths in an equigranular groundmass dominated by feldspar and minor altered mafic grains (biotite and pyroxene?) that are completely replaced by alteration minerals including chlorite and epidote.

Dacite intrusive rocks (Eocene)—Pink- to dark brown-weathering, porphyritic dacite dikes and small plugs containing phenocrysts of quartz and plagioclase with minor biotite and altered hornblende. An intrusion west of Lemhi Pass (LP-01; 63.96 wt. percent SiO₂; Table 1) yielded a U-Pb zircon

Syenite (Cambrian)—Fine-grained syenite plug 1.9 km (1.2 mi) south-southwest of Lemhi Pass. Consists largely of 1-2 mm subhedral alkali feldspar (oligoclase with albite rims), with interstitial specular hematite and quartz. Alkali concentrations (K₂O+Na₂O) are 9.79 to 11.50 wt. percent (Gillerman, 2008). SHRIMP zircon 207 Pb/ 206 Pb age of 529.1 \pm 4.5 Ma determined from sample collected from prospect pit in the syenite (Gillerman, 2008; Gillerman and others, 2008, 2010).

Mafic intrusive rocks (Cambrian)—Fine-grained, equigranular to porphyritic diorite, lamprophyre, and related mafic intrusive rocks, mostly in dikes. Plagioclase and clinopyroxene are the major constituents and are present locally as small phenocrysts. Opaque oxides, minor interstitial quartz, and apatite also present. Some rocks may have once contained olivine or orthopyroxene, but alteration minerals now completely replace the original mineral. Alteration minerals (chlorite, sericite, and epidote) are common. Chemical analysis shows that most samples are low in SiO₂ (44.94 to 46.68 wt. percent), but that more silica-rich samples such as 15RL086 (58.43 percent) also are present (Table 2; Gillerman, 2008). One small body 1.2 km (0.8 mi) west of the map and north of Cow Creek was mapped as diorite by Anderson (1961a) and Staatz (1979). It was reinterpreted as pyroxene

Mafic igneous rocks (Cambrian or Mesoproterozoic?)—Aphanitic and vesicular mafic igneous rock mapped in two localities along the Continental Divide toward the south edge of the map. Vesicles contain amygdules of calcite. Chilled margins and lack of lateral continuity consistent with intrusion or a small flow. Although visually similar to *€mi* unit, vesicles have not been found in $\in mi$.

MESOPROTEROZOIC STRATA

the Lemhi Pass quadrangle. In surrounding areas, these rocks were assigned to the Swauger and Lemhi quartzites by Anderson (1961a), Gunsight Formation and unassigned quartzite and siltite units by Staatz (1979), and Gunsight and Apple Creek formations of Ruppel's (1975) Lemhi Group by Lund and others (2003). They are very fine- to fine-grained quartzite and rare medium-grained quartzite, plus siltite and argillite, but vary in details of bedding character and sedimentary structures. To the north, we applied formal names to units (Burmester and others, 2016a) following revised stratigraphic nomenclature (Burmester and others, 2013; Burmester and others, 2016b) that uses the coarsest unit, the Swauger Formation, to distinguish otherwise similar rocks that occur above and below it. Rocks north of the Lemhi Pass fault were assigned to the Gunsight Formation based on apparent continuity to the north and our understanding in 2015 of the regional framework that placed these below the Swauger Formation. This continuity is now in question because diamictite, similar to that found in the Lemhi Range (Tysdal, 2000) above the Swauger (revised stratigraphic position, Burmester and others, 2013, 2016), is in strata west of what we had assigned to the stratigraphically much lower Yellow Lake Formation north of North Fork, 65 km (40 mi) north-northwest of Lemhi Pass. (Burmester and others, 2017). Unpublished mapping in the Goat Mountain and Lemhi quadrangles south and southwest of this map found Swauger Formation, although not in direct contact with units on this map. Spherical, medium quartz grains are rare in Lemhi Group units below the Swauger but common in, if not characteristic of, the Swauger and Lawson Creek formations, reported in the Lake Mountain member of the Apple Creek Formation in the Salmon River Mountains (Gunsight Formation of Tysdal, 2003) and discovered in the diamictite member in the Lemhi Range. Units above the Swauger are the most likely correlatives of the strata in this quadrangle that have spherical, medium-grained quartz, but which ones is unclear. Because of this uncertainty we use local informal names for some units but specuJahnke Lake member, Apple Creek Formation (Mesoproterozoic)—Feldspathic quartzite, minor siltite, and argillite. Poorly exposed and only in the northeast corner of the map. Description based mostly on that of Yqpi on the Kitty Creek map (Lewis and others, 2009) to the north. Fine- to medium-grained, moderately well-sorted feldspathic quartzite. Typically flat-laminated m to dm beds with little siltite or argillite. Plagioclase content (12-28 percent) is greater than or sub-equal to potassium feldspar (5-16 percent) in nine quartzite samples. Four others contained 19 to 35 percent plagioclase but lacked potassium feldspar. One sample from immediately east of the northeast part of the map contained about 15 percent plagioclase and no potassium feldspar, and one from the map itself contained about 20 percent plagioclase and 5 percent potassium feldspar. Top and bottom of unit not exposed, but thickness at least 900 m (3000 ft). Correlated with an upper part of the Jahnke Lake member, Apple Creek Formation, on the Goldstone Pass map (Lonn and others, 2009; Burmester and others, 2016a) to the northwest.

> Siltite of Yearian Creek (Mesoproterozoic)—Thinly bedded siltite and argillite, and white-weathering, gray and green quartzite. Characterized by undulating, graded, uncracked couplets and rare couples of medium-green siltite and light-green to gray argillite. Mud cracked bedding surfaces less common than angular light-colored mud chips. Mud chips commonly in bases of beds along with well-rounded, fine to spherical medium quartz grains in dark green channels a few cm wide and as thick as 1 cm. Similar grains comprise quartzite beds a few cm to a few dm thick. Green to white, very fine- to fine-grained feldspathic quartzite in beds 1 to 3 dm thick is less common than in the Agency Creek quadrangle to the west (Burmester and others, 2018). Six quartzite samples in the Agency Creek quadrangle and one east of Bear Creek had plagioclase exclusively or in excess of potassium feldspar, and most had greater than 90 percent quartz. Lithologic correlation with the Lawson Creek Formation favored because of spherical medium quartz grains, mud cracks, and chips. However, nowhere else have we seen such a thick section of siltite and argillite couplets in the Lawson Creek. An alternative is the coarse siltite member of the Apple Creek Formation, which is a thick unit in the Salmon River Mountains but lacks large spherical grains. Thickness uncertain for lack of mapped lower and upper contacts, and deformation. Upper contact appears gradational into quartzite of Grizzly Hill in the Goat Mountain quadrangle to the south (unpublished mapping). There the contact

is placed above the highest interval that contains recognizable siltite and

argillite couplets and lag deposits of well-rounded quartz grains. **Sunsight Formation?** (Mesoproterozoic)—Feldspathic quartzite, less siltite, and minor argillite. Quartzite beds are as thick as one meter but more commonly dm scale and are flat laminated or trough cross bedded, with rare hummocky cross lamination. Some of the thicker beds have bedding defined by dark mm-scale, parallel laminations. Common are climbing ripple or ripple drift cross lamination, large loads, convolute bedding, and soft-sediment deformation. Less common are cm-thick dark green to light internal lamination of quartzite with little macroscopic grain size change. Quartzite beds are repeated in cosets or interbedded with siltite that is commonly thinner than a meter. Contacts with siltite more commonly sharp than graded. Graded couples of light quartzite, dark siltite, and darker, gray to green argillite occur locally. Quartzite comprises approximately one third of these intervals, which gives the rock a candy-striped appearance. Platy parting with muscovite surfaces present but rare. Finer grained material, locally phyllite, is most common along the divide in the middle of the map. Five quartzite samples ranged from 32 to 80 percent quartz with the rest plagioclase. Potassium feldspar is similarly lacking in about half of the samples from Kitty Creek quadrangle to the north (Lewis and others, 2009), and constitutes less than a third of the feldspar in the other half. Correlated with the Gunsight Formation to the north (Burmester and others, 2016a). However, ages of two detrital zircons from near the Copper Queen mine and a single detrital grain from near the Lucky Horseshoe mine range from 1371 to 1375 Ma (Gillerman, 2008), consistent with the unit being above the Swauger Formation. That would make it a new member of the Apple Creek Formation because it is very different from the Jahnke Lake member exposed to the north (Ygf; Lonn and others, 2009). Thickness uncertain because of deformation and lack of upper

STRUCTURE

and lower contacts, but in the Kitty Creek quadrangle (Lewis and others,

2009) a minimum of 2,400 m (8,000 ft) was estimated.

Several faults traverse the quadrangle and many have been mapped and others (2001) show and discuss distribution and sequence of extensional faults and folds over a wider area. It is likely that more faults exist within the Mesoproterozoic units, but are unrecognized due to the lack of reliable lithologic markers. Regional extensional faults bound some Tertiary units, some of which are preserved in hanging walls (Janecke and others, 1998). VanDenburg and others (1998) interpreted fault geometry, fold orientation, and angular unconformities to document multiple episodes of extensional faulting and folding in the region. Named faults within the quadrangle are

WEST STRAND OF THE BLOODY DICK CREEK FAULT This fault is the southward continuation of the western part of the Beaverhead Divide fault system and possibly the Freeman thrust and North Fork fault that merged with it (Burmester and others, 2016a). The west strand of the Bloody Dick Creek fault in the northeast corner of the map was interpreted in the Kitty Creek quadrangle (Lewis and others, 2009) as a shallow thrust with the Jahnke Lake member of the Apple Creek Formation in the footwall. Accumulation of Challis volcanics on the hanging wall and

brecciation of quartzite of the footwall suggest post-Challis normal displacement and brittle faulting at shallow level. In contrast, VanDenburg (1997) and VanDenburg and others (1998) considered it to be a pre-Challis listric extensional fault that may have reactivated a southwest-dipping thrust fault. On the Salmon 1:75,000-scale compilation (Burmester and others, 2016a) the fault is shown in cross section as continuous with the "Freeman thrust?" that is exposed in the Pattee Creek window. If this fault is shallower than we presently depict, it is plausible that it also is exposed at the Lucky Horseshoe mine near the west edge of the map. Shallow mylonite, cataclasite, and possible drag folds there along with 100 Ma ages on monazite and thorite (Gillerman, 2008) are consistent with thrust faulting in the Cretaceous. This fault is shown in sections A-A' and B-B' as the west strand Bloody Dick Creek fault, and, along with younger faults,

probably separates *Yg*? and *Ysyc* on this map.

LEMHI PASS FAULT

The Lemhi Pass fault can be traced across the northern part of the map through Lemhi Pass. VanDenburg (1997), VanDenburg and others (1998) and Blankenau (1999) interpreted the structure as a 22° to 24° south-dipping detachment fault, which was slightly steeper before latest tilting. However, its linear trace over topography is consistent with a steeper dip. It forms the northeast boundary of Tertiary rocks within the quadrangle but to the east is overlapped by Late Eocene strata (VanDenburg and others, 1998). Most simply, its heave is the thickness of the Challis that accumulated in the half-graben it formed, estimated as 1 km (VanDenburg and others, 1998).

DAN PATCH FAULT

This fault is shown on maps by Staatz (1972, 1979) and VanDenburg (1997) with down-on-the-southwest displacement that preserves Eocene strata in its hanging wall. Bedding attitudes suggest that both the hanging wall and footwall are tilted northeast, perhaps as part of a set of bookshelf fault blocks above the Lemhi Pass or lower detachment. If so, some of the northeast dip of the bedrock would be due to this block faulting.

COW CREEK FAULT The Cow Creek fault is seen only in cross sections B-B' and C-C'; it is interpreted as an east-directed fault. See Burmester and others (2018) for more detailed explanation.

MINERALIZATION

The Lemhi Pass quadrangle includes the eastern part of the Lemhi Pass REE-Th district. Details of many of the mines and prospects can be found in Anderson (1958, 1961b), Sharp and Cavender (1962), and Staatz (1972, 1979). Locations of veins and prospects are taken largely from Staatz (1972). Proterozoic metasedimentary rocks and altered mafic rocks locally host quartz-chalcopyrite-bornite veins. REE-Th mineralization is present as quartz veins, and biotite-rich replacements of country rock with abundant specular hematite, thorite, and monazite. Magnetite and magnetite-rich breccias are common. The syenite plug south of Lemhi Pass is cut by specular hematite veins, and locally magnetite-rich veins. It is possible that

this Cambrian intrusive event introduced the magnetite and REEs. Whole-rock geochemical analysis of the syenite indicates enrichment in Y (54-89 ppm), Nb (192-218 ppm), Nd (90-119 ppm), La (131-180 ppm), and Ce (234-325 ppm) relative to other intrusive rocks in the region (data from Gillerman, 2008). Mineralization ages are complex, but some are clearly Paleozoic (Gillerman, 2008; Gillerman and others, 2008, 2010, and 2013) as summarized below. Dating of Nd-enriched monazite and thorite from the Lucky Horseshoe mine by electron microprobe analysis returned Carboniferous ages (300-350 Ma) for mineralization, much younger than the syenite-lamprophyre suite and not matching known intrusive events. Zircons from the Lucky Horseshoe ultramafic to mafic sill yielded ages from Neoproterozoic to Late Carboniferous. Neoproterozoic and Carboniferous cores appear to have younger Carboniferous overgrowths, but four zircon

grains yielded concordant results with dates between 317.9 and 315.1 Ma.

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ACKNOWLEDGMENTS

Proterozoic Rocks of Western Montana and Adjacent Areas: Montana

Bureau of Mines and Geology Special Publication 94, p. 85-124.

We would like to thank Bar Double T Ranch and Ed Mooney for granting us access to their lands. This access helped improve the quality of this report.

								Major	oxides	in weigh	nt perce	ent								Trace	elemer	ts in par	ts per m	nillion													
Sample number		Longitude	Unit name	Map unit	Lithology	SiO ₂ Ti	O ₂ Al ₂ O	FeO* /	MnO I	MgO Ca	aO Na	₂ O K ₂ O	P_2O_5	Sum I	LOI	Ni [†] Cr [†]	V† G	a† Cu† Zr	n† La	Се	Pr	Nd Sm	Eu (Gd T	b Dy	Но	Er Tm	Yb L	u Ba	Th	Nb	Y H	lf Ta	U F	b Rb	Cs S	Sr Sc Z
LP-01	44.9747	-113.4527	Dacite intrusive rocks	Td	dacite plug	63.96 0.6	44 15.55	3.95	0.060	2.63 4.0	06 4.1	10 2.57	0.154	97.67 1	1.70	58 136	68 2	2 16 84	52.20	93.21	10.08 3	5.01 5.74	1.46	3.91 0.	53 2.73	0.50 1	.26 0.18	1.11 0.	16 1443	15.69	14.62 1	2.90 5.8	37 0.95	2.94 19	1.73 136.9	5.12 5	70 9.0 2
LP-02	44.9692	-113.4212	Mafic lava flows	Tlm	trachyandesite	59.75 0.9	39 14.41	7.37	0.110	2.80 5.0	64 3.0	08 3.67	0.364	98.14 1	1.01	19 21	167 1	9 51 78	3 41.24	80.95	9.99 3	9.18 7.88	3 2.03	6.67 1.	00 5.86	1.16 3	.00 0.44	2.67 0.4	42 1062	8.65	14.79 2	9.49 6.0	9 0.92	2.16 12	12 128.5	8.63 59	91 18.8 2
LP-04	44.9672	-113.4265	Mafic lava flows	Tlm	basaltic trachyandesite	54.82 1.0	90 14.85	8.72	0.165	5.36 7.0	63 2.6	56 2.90	0.393	98.59	0.72	28 154	207 1	9 30 86	36.17	73.63	9.23	6.50 7.52	2.00	6.32 0.	97 5.58	1.13 2	.87 0.43	2.58 0.4	40 967	8.86	15.96 2	.8.01 5.1	7 0.94	1.86 9.	.95 96.1	2.12 60	06 26.3 2
LP-08	44.9289	-113.3874	Mafic lava flows	Tlm	basaltic andesite	52.63 0.7	69 11.20	8.38	0.141 1	12.23 6.3	77 2.0	3.04	0.356	97.54 1	1.32	357 797	162 1	6 82 80	34.44	70.02	8.71 3	4.95 7.43	1.80	6.01 0.	88 5.07	1.01 2	.64 0.39	2.33 0.3	36 963	9.18	10.53 2	5.66 4.9	0.60	1.79 10	.60 132.5	4.32 48	188 23.1 1
LP-09	44.8941	-113.3779	Dikes, undivided	Tdu	quartz monzonite plug	58.52 1.1	51 16.22	7.00	0.159	1.76 3.4	44 4.2	28 4.64	0.394	97.55 1	1.42	13 18	52 2	1 15 92	74.64	138.66	15.56 5	7.86 10.72	4.41	8.88 1.	38 7.88	1.54 3	.98 0.57	3.42 0.5	54 2460	15.13	72.98 3	9.23 6.5	3.92	2.79 17	.08 122.8	0.90 52	20 11.4 2

Latitudes and longitudes are in the 1927 North American Datum (NAD27). All analyses performed at Washington State University GeoAnalytical Laboratory, Pullman, Washington, by X-ray fluorescence (XRF) and inductively coupled plasma mass spectrometry (ICP-MS). Trace elements denoted by [†] were analyzed by XRF; all other trace elements were measured by ICP-MS.

Sample				Мар					M	ajor oxi	des in	weight	percer	nt									Ггасе	elem	ents	in pai	rts pei	r milli	ion			
	Latitude	Longitude	Unit name	unit	Lithology	SiO ₂	TiO ₂	Al_2O_3	Fe ₂ O ₃ *	MnO	MgO	CaO	Na ₂ O	K ₂ O	P_2O_5	Total	LOI	Ni	Cr	Sc V	Ва	Rb	Sr	Zr	Υ	Nb	Ga	Cu	Zn P	b La	. Ce	T
15RL085	44.9018	-113.3962	Mafic intrusive rocks	€di	mafic dike	46.68	1.51	11.38	12.42	0.19	12.22	12.51	1.53	1.2	0.21	99.85	3.25	222	298	32 29	8 1050	32.9	345	81	22.1	37.3	13.6	127	139 1	9 18	50	2
15RL086	44.9021	-113.3974	Mafic intrusive rocks	€di	intermediate dike	58.43	1.25	15.95	8.96	0.18	2.38	3.4	4.19	4.48	0.51	99.73	1.96	22	45	11 80	2485	105	438	270	39.4	81	21	31	100 2	0 54	142	1
15RL088	44.8952	-113.4756	Mafic intrusive rocks	€Ymi	mafic intrusive or flow	44.94	2.78	14.54	14.05	0.2	8.01	10.33	2.7	1.43	0.57	99.55	3.13	113	263	20 23	8 893	23	1209	200	33.2	93.9	17.3	47	169 1	0 24	63	1
16RB130a	44.8955	-113.4784	Mafic igneous rock	€Ymi	mafic intrusive or flow	44.92	2.81	14.34	14.09	0.24	7.96	9.54	2.78	2.17	0.57	99.42	2.43	107	272	21 23	9 1300	34.5	865	213	28.5	95.3	15.6	57	120	3 26	70	7
16RL167	44.9003	-113.4707	Mafic intrusive rocks	€di	mafic dike	46.84	4.34	14.26	16.27	0.24	5.25	6.31	3.58	1.71	0.87	99.67	2.43	59	83	20 27	1 557	33.7	498	345	39.7	53.4	21.8	62	159	3 19	28	1

LOI = loss on ignition. Latitudes and longitudes are in the 1927 North American Datum (NAD27). All analyses performed by X-ray fluorescence methods at Franklin and Marshall College X-Ray Laboratory, Lancaster, Pennsylvania.

	Table 3.	LA-ICPMS	S U-Pb zir	con ages.	
mple mber	Unit	Latitude	Longitude	Age (Ma)	20
07	Tcr	44.9498	-113.3880	47.0	0.3
06	Tt	44.9472	-113.4243	47.0	0.2
01	Td	44.9747	-113.4527	49.4	0.5

All samples analyzed by LA-ICPMS at the University of California, Santa Barbara. Datum used for sample coordinates is North American Datum 1927 (NAD27