OPEN-FILE REPORT O-92-17
PRELIMINARY GEOLOGIC MAP OF THE RUFINO BUTTE QUADRANGLE
MALHEUR COUNTY, OREGON
1992
BY HOWARD C. BROOKS

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

RUFINO BUTTE QUADRANGLE
OREGON—MALHEUR CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

Mapped, edited, and published by the Geological Survey

Control by USGS and NOS/NOAA

Topography by photogrammetric methods from aerial photographs taken 1971. Field checked 1972

Projection and 10,000-foot grid ticks: Oregon coordinate system, south zone (Lambert conformal conic)
1000-metre Universal Transverse Mercator grid ticks, zone 11, shown in blue. 1927 North American datum

Fine red dashed lines indicate selected fence lines

UTM GRID AND 1972 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET

OREGON DEPARTMENT OF GEOLOGY
AND MINERAL INDUSTRIES

Field work conducted 1991

Funded jointly by the Oregon Department of Geology and Mineral Industries, the Oregon State Lottery, and the U. S. Geological Survey COGEOMAP Program.

ROAD CLASSIFICATION

Primary highway, hard surface
Light-duty road, hard or improved surface
Secondary highway, hard surface
Unimproved road
Interstate Route
U. S. Route
State Route

QUADRANGLE LOCATION

RUFINO BUTTE, OREG.
N4330—W11737.5/7.5

1972

AMS 2471 II SW—SERIES V892

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Map Scale: 1:24,000

Funding Statement: Funded jointly by the Oregon Department of Geology and Mineral Industries, the Oregon State Lottery, and the U. S. Geological Survey COGEOMAP Program as part of a cooperative effort to map the west half of the 1^{0} by 2^{0} Boise sheet, eastern, Oregon.

GEOLOGY AND MINERAL RESOURCES MAP OF THE RUFINO BUTTE QUADRANGLE, MALHEUR COUNTY, OREGON

By Howard C. Brooks, Oregon Department of Geology and Mineral Industries. Field work conducted in 1991. Funded jointly by the Oregon Department of Geology and Mineral Industries, the Oregon State Lottery and the U. S. Geological Survey COGEOMAP program as part of a cooperative effort to map the west half of the Boise 1 by 2 quadrangle.

EXPLANATION*

Qal — Alluvium (Holocene and Pleistocene)

Qls — Landslide deposits (Holocene and Pleistocene) -- Unconsolidated mix of bedrock, soil, and colluvium formed as a result of bedrock failure.

Qtfc — Colluvium and alluvial fan deposits (Holocene, Pleistocene, and Pliocene)

Qtg — Terrace gravels (Pleistocene and Pliocene ?) --

Tsb — Shumway Ranch Basalt (upper Miocene) -- Mostly dark gray to black, commonly diktytaxitic, olivine basalt flows which form an extensive tableland in the northern part of the quadrangle and southern part of the adjacent Avery Creek quadrangle. Thin tuffaceous sedimentary deposits separate flows locally. Varies from 1 to 6 or more flows 10 to 40 ft thick.

Tdss — Fluvial and lacustrine sedimentary rocks (middle and upper Miocene) -- Chiefly light colored, interbedded tuffaceous sedimentary rocks and water-laid tuff, arkosic sandstone, and conglomerate. Includes thin discontinuous beds of pumice lapilli tuff breccia and diatomaceous tuff. Conglomerate in the upper part of the unit characteristically contains well rounded rhyolite and obsidian pebbles and cobbles in a poorly to moderately consolidated sand and silt matrix. Continuous with unit Tdss in the Avery Creek quadrangle, units Ts1, Ts2, and Ts3 of Evans (unpublished mapping, 1991b) and the Butte Creek Volcanic Sandstone of Kittleman and Others (1967)

Dry Creek igneous complex (Middle Miocene) Divided here into 5 felsic units and 1 basalt unit. Stratigraphic relations of the felsic units to the basalt unit is shown in the Time Rock Chart. Interrelationship of the pre-basalt felsic units is not clear. Tdr1, Tdr2, and Tdr3 are rhyolite flows and\or

lava-like welded tuff formed from very hot pyroclastic flows; most of the rocks are aphyric. Typical colors are pale yellow, pale brown, gray, and red. Felsic units were mapped as Littlefield Rhyolite by Kittleman and others (1967) but appear chemically and petrographically distinct from Littlefield exposures in the Avery Creek and Alder Creek quadrangles and exposures to the north (See recent maps by Ferns, Evans, Brooks) Locally the rocks are vesicular and in places the vesicles are flattened parallel to flow direction.

Stratigraphic relationship of the Dry Creek igneous complex to the Littlefield Rhyolite is not clear. The Littlefield clearly underlies the Drip Springs Formation in the Avery Creek sheet and farther north. A small exposure of the Dry Creek complex in Sec. 10, T. 22 S., R. 41 E. (Avery Creek Quad.) appears to be unconformable beneath Drip Springs deposits.

Tdr3 — Rhyolite or welded tuff. Indistinguishable(?) petrographically or chemically from Tdr1.

Tdb — Mostly gray, aphyric, locally vesiculated, generally fine grained basalt and basaltic andesite. Includes small patches of red cinders and tuff. Hand specimens of flow rocks commonly exhibit disseminated dark red iron oxide. Mapped by Kittleman and others (1967) as "unnamed igneous complex". Continuous with rocks mapped by Evans (Alder Creek sheet) as Malheur Basalt.

Tdp — Chiefly pale yellowish brown or gray, low density rocks composed of a welded aggregate of 80-90 perc ent fibrous pumice lapilli up to 2-in diameter and 10-20 percent less vesicular colorless to black glass, vitrophyre, rhyolite or welded tuff fragments, and discrete feldspar crystals. Unit includes light gray, poorly lithified tuff and tuffaceous sediments, and small bodies of obsidian. Underlies unit Tdb in sec. 10, T. 23 S., R. 41 E. Unconformably overlies unit Tdr1 or may be a local facies of Tdr1 related to marginal explosive vesiculation of rhyolitic domes.

Tdrd — Plagioclase and pyroxene phyric rhyodacite (See sample F Table 1. Equivalent to Tdrd in Avery Creek sheet.

Tdr2 — Rhyolite or welded tuff. Gray, greenish gray, reddish brown, platy to massive, mostly aphyric (locally plagioclase and sanidine(?) phyric) Flow banding and lamination common and commonly

contorted. Platy rocks locally exhibit mullion-like structure. Unit includes small zones of interlayered (layers commonly 1 to 3 inches thick) perlite, black glass, and densely welded tuff (see accompanying photo); lenses of black glass that appears more opaque than obsidian (See sample U, Table 1); and small patches of gray pumiceous tuff.

Tdrl — Rhyolite or welded tuff. Mostly aphyric, locally plagioclase phyric. Flow banding common. Some flows contain large vesicles up to 1.5 in. across.

*Chemical analyses of samples from several units are shown in the accomanying tables.

TABLE 1. WHOLE ROCK ANALYSES, RUFINO BUTTE QUADRANGLE, MALHEUR COUNTY, OREGON

Map	Laboratory	Field	1\4	1\4	Sec.	T.(S.)	R.(E.)	UTM		Elev.	Lithology	Map	Oxides (wt., percent)									
no.	no.	no.						Coordinates		ft.		unit	SiO2	Al2O3	TiO2	Fe2O3	MnO	CaO	MgO	K2O	Na2O	F
A	AZB-304	B-91-122	NW	SW	30	22	41	4830280N	439640E	4,680	Basalt	Tsb	50.4	15.8	1.940	12.3	0.18	7.95	4.62	1.45	3.43	
B	AZB-325	B-91-302		SW	25	22	41	4830050N	448200E	4,160	Dacite	Tdrd	67.0	15.2	0.781	3.66	0.06	1.90	0.39	3.86	5.21	
C	AZB-302	B-91-121	NE	NW	31	21	41	4829770N	440335E	4,750	Basalt	Tsb	50.7	15.8	1.960	11.8	0.17	7.91	4.50	1.61	3.40	
D	AZB-331	B-91-304		NE	34	22	41	4829650N	446530E	4,290	Basalt	Tdb	52.7	15.9	1.520	10.6	0.17	8.93	4.36	1.17	3.41	
E	AZB-301	B-91-143	NW	NE	34	22	41	4829410N	445260E	4,340	Rhyolite	Tdr1	73.8	13.1	0.285	1.35	0.03	0.46	0.21	4.31	5.30	
F	AZB-324	B-91-307		NW	36	22	41	4829395N	447605E	4,300	Dacite	Tdrd	65.4	15.4	0.884	4.42	0.07	2.15	0.62	3.69	5.29	
G	AZB-313	B-91-131	NW	NE	4	22	41	4827785N	443740E	4,430	Rhyolite	Tdr1	72.0	13.3	0.253	1.78	0.11	0.42	0.21	4.68	5.11	
H	AZB-312	B-91-132	NE	NW	5	22	41	4827770N	441590E	4,600	Rhyolite	Tdr1	70.6	13.7	0.424	3.02	0.08	0.72	0.27	3.99	5.30	
I	AZB-303	B-91-110	NW	SE	3	23	41	4827185N	445335E	4,360	Rhyolite	Tdr1	70.9	13.9	0.441	3.22	0.12	0.98	0.35	4.05	5.33	
J	AZB-335	B-91-159		NW	6	23	42	4827090N	449500E	4,350	Basalt	Tdb	53.1	15.8	1.460	10.30	0.17	7.62	3.55	1.50	3.70	
K	AZB-339	B-91-207		SW	1	23	41	4826395N	448065E	4,460	Rhyolite	Tdr3	74.0	12.4	0.245	1.55	0.05	0.49	0.18	4.78	3.94	
L	AZB-336	B-91-317		SW	10	23	41	4825410N	444635E	4,610	Pumice	Tdp	69.4	13.2	0.258	2.20	0.10	1.11	0.59	4.48	3.62	
M	AZB-341	B-91-217		SW	20	23	41	4821820N	441180E	4,610	Rhyolite	Tdr1	71.5	13.3	0.238	1.85	0.10	1.65	0.40	4.31	4.83	
N	AZB-323	B-91-265		NE	31	23	41	4819890N	440255E	4,300	Basalt	Tdb	52.4	15.3	1.600	10.60	0.18	7.72	3.89	1.56	3.59	
O	AZB-322	B-91-266		NE	31	23	41	4819820N	440270E	4,260	Rhyolite	Tdr3	72.4	13.8	0.276	2.23	0.08	0.44	0.20	4.52	5.17	
P	AZB-333	B-91-289		SE	36	23	41	4818925N	448710E	4,090	Rhyolite	Tdr3	74.9	13.0	0.213	1.24	0.05	0.42	0.16	4.81	4.15	
Q	AZB-334	B-91-288		SE	36	23	41	4818925N	448800E	4,180	Basalt	Tsb	48.2	15.7	2.170	13.00	0.20	9.36	5.97	0.93	2.83	
R	AZB-338	B-91-270		NW	3	24	41	4818955N	444485E	3,900	Rhyolite	Tdr3	73.8	12.8	0.232	1.39	0.02	0.39	0.08	4.96	4.16	
S	AZB-340	B-91-239		NW	5	24	41	4818545N	440985E	4,000	Rhyolite	Tdr2	74.6	12.8	0.219	1.39	0.03	0.44	0.17	4.88	4.16	
T	AZB-328	B-91-276		SW	6	24	41	4817335N	439610E	4,040	Rhyolite	Tdr2	71.7	14.3	0.375	2.11	0.05	1.32	0.43	4.69	4.26	
U	AZB-329	B-91-246		SW	6	24	41	4817305N	439380E	4,040	Obsidian	Tdr2	70.5	14.5	0.397	2.10	0.06	1.28	0.46	4.85	4.48	
V	AZB-330	B-91-260		SW	5	24	41	4816775N	441430E	4,040	Basalt	Tdb	59.8	15.2	1.050	5.88	0.10	4.70	2.89	3.24	3.70	
W	AZB-337	B-91-252		SW	4	24	41	4816775N	442530E	4,260	Rhyolite	Tdr3	74.7	13.2	0.219	1.43	0.05	0.48	0.18	4.98	4.28	

ent)					Trace Elements (ppm)												
2O	Na2O	P2O5	LOI	Total	Cr	Rb	Sr	Y	Zr	Nb	Ba	Co	Cu	Li	Mn	Ni	Zn
.45	3.43	0.71	1.08	100.2	81	36	616	39	213	26	1740	32	52.8	9.9	1326	54	130
.86	5.21	0.26	1.54	100.1	12	80	275	33	437	29	1480	5	8.9	14.5	376	7	96.8
.61	3.40	0.72	0.85	99.7	73	18	610	37	197	14	1030	28	49.1	10.0	862	46	127
.17	3.41	0.49	0.77	100.3	520	36	518	20	153	52	697	31	66.7	7.6	1122	40	102
.31	5.30	0.05	0.77	99.9	<10	116	38	72	500	52	1560	<5	1.7	7.5	147	<5	106
.69	5.29	0.25	1.23	99.7	<10	77	289	45	426	42	1380	6	7.1	15.9	480	10	79.0
.68	5.11	0.05	0.93	99.1	<10	129	11	90	465	39	1250	<5	0.7	10.1	388	<5	66.4
.99	5.30	0.07	1.08	99.6	<10	98	141	91	457	37	1990	<5	0.3	13.9	298	<5	113
.05	5.33	0.08	0.7	100.4	<10	100	137	76	459	50	1800	<5	1.9	14.4	343	<5	97.4
.50	3.70	0.52	1.54	99.4	45	39	472	36	171	25	720	28	63.9	14.0	1253	25	97.7
.78	3.94	0.06	1.23	99.1	<10	116	55	53	282	30	1090	<5	5.4	15.2	294	<5	30.2
.48	3.62	0.04	5.70	100.9	<10	99	36	92	506	40	1170	<5	7.7	30.2	630	6	102
.31	4.83	0.09	1.93	100.5	<10	110	78	78	447	32	1800	<5	14.7	12.9	619	6	80.5
.56	3.59	0.65	1.16	98.9	56	47	481	28	171	23	940	28	85.1	9.8	1030	34	110
.52	5.17	0.07	1.00	100.5	118	105	51	69	458	34	1400	<5	6.4	17.4	226	<5	47.0
.81	4.15	0.04	0.62	99.8	19	125	36	46	238	48	792	<5	4.5	16.7	274	<5	26.3
.93	2.83	0.62	1.08	100.3	238	51	453	17	111	26	869	47	59.1	11.2	1412	124	98.6
.96	4.16	0.04	0.7	98.7	13	129	16	54	282	25	650	<5	3.4	14.8	108	<5	32.0
.88	4.16	0.05	0.85	99.7	<10	126	27	34	289	37	763	<5	7.0	16.6	191	5	32.8
.69	4.26	0.12	0.93	100.5	47	131	153	13	319	31	1390	<5	8.3	20.4	306	10	33.4
.85	4.48	0.08	0.31	99.2	11	133	147	30	327	41	1180	6	8.9	34.7	251	5	36.3
.24	3.70	0.30	2.54	99.6	65	77	304	41	234	<10	838	20	30.5	56.0	644	39	69.5
.98	4.28	0.05	0.62	100.4	21	147	53	32	248	38	927	<5	6.7	23.6	288	<5	30.2

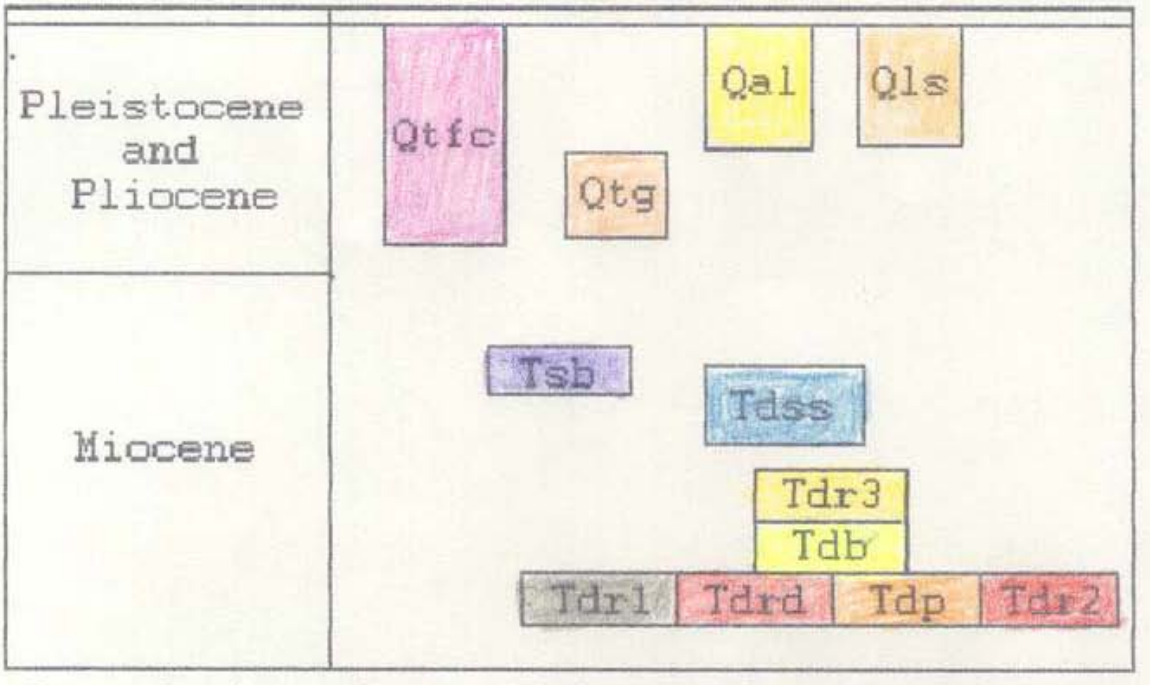
MAP SYMBOLS

Contact -- approximately located

Fault contact -- dashed where approximately located, dotted where concealed. Ball and bar on down throw side

Strike and dip of beds

Location of whole rock sample analyzed in Table 1



Correlation chart, Rufino Butte Quadrangle