OPEN-FILE REPORT O-92-02
PRELIMINARY GEOLOGIC MAP OF THE BOGUS BENCH QUADRANGLE
MALHEUR COUNTY, OREGON
1992
BY MARK FERNS

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

BOGUS BENCH QUADRANGLE
OREGON—MALHEUR CO.
7.5 MINUTE SERIES (TOPOGRAPHIC)

(RINEHART CANYON) 2470 II NW

(THE HOLE IN THE GROUND)

(JORDAN CRATERS NORTH) 2570 III NW

(OWYHEE BUTTE) 2469 I NW

(LAMBERT ROCKS) 2470 II SW

(JORDAN CRATERS SOUTH) 2570 III SW

(AROCK) 2469 I NE

(THREEMILE HILL) 2569 IV NW

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 10 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

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.

QUADRANGLE LOCATION

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

BOGUS BENCH, OREG.
N4300—W11730/7.5

1972

AMS 2470 II SE—SERIES V892

OPEN-FILE REPORT O-92-02
PRELIMINARY GEOLOGIC MAP OF THE BOGUS BENCH QUADRANGLE MALHEUR COUNTY, OREGON

By M. L. Ferns
Oregon Department of Geology & Mineral Industries

1992

Field work conducted in 1991
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^{O} by 2^{O} Boise sheet, eastern Oregon.

Bogus Bench

The Bogus Bench quadrangle is almost entirely covered by Late Miocene to Holocene basalt flows. The small steptoes of peralkaline, porphyritic rhyolite (Ttip) exposed in the northwest corner of the quadrangle are petrographically and chemically similar to Evan's Tuff of Iron Point and comprise the oldest unit exposed in the quadrangle. Much of the northern half of the quadrangle is covered by diktytaxitic and glomeroporphyritic, high alumina and transitional, olivine basalt flows that erupted from small shield volcanoes on and north of Bogus Bench (units Tbdb and Tbab). Hart (1982) give K/Ar dates of 4.1 - 4.5 Ma for presumably equivalent flows to the north.

Younger alkali-olivine basalt flows cover much of the southern half of the quadrangle. The oldest of these flows are the basalts of Three Mile Hill (Tbtm), from which Hart (1982) reports a radiometric age of about 1.9 Ma. The Owyhee River Canyon apparently did not exist at the time at which the Tbtm flows were erupted. Younger alkali-olivine basalt flows (Qbbr, Qbcb, Qbwc, Qbrb) erupted from vents south and east of Bogus Rim and flowed westward down tributary canyons to the ancestral Owyhee River.

BOGUS BENCH

Qc — Colluvial deposits (Quaternary) Slope covering deposits of angular blocks of basalt from rim forming basalts of units QTbbr, Tbab and Tdb.

Qa — Lacustrine and eolian deposits (Quaternary). Unconsolidated lacustrine and eolian deposits of silt and fine sand accumulated in shallow pans peripheral to young basalt flows.

Qbrb — Basalt of Rocky Butte (Quaternary) Dark gray diktytaxitic olivine basalt flows, with well preserved primary volcanic structures such as tumuli, pahoehoe surfaces, and collapse structures. In thin section, consists of olivine phenocrysts 3 mm in diameter and elongate plagioclase phenocrysts set in a subophitic groundmass of clinopyroxene, opaques, and glass. Includes alkali-olivine basalt characterized by high abundances of TiO2 (Analyses, Table 1) with a maximum age of 0.03 - 0.09 Ma (Hart, 1982).

Qbwc — Basalt of the West Crater (Holocene?) Dark gray, plagioclase- and augite-phyric basalt flows with well preserved primary volcanic structures such as tumuli, pahoehoe surfaces, and collapse structures. Includes constructional eruptive center of scoriaceous basalt cinders at West Crater. Texturally hyalophitic with intragranular olivine crystals and phenocrysts of augite and plagioclase. Chemically an alkalic basalt (analyses , Table 1).

Qbcb — Basalt of Clarks Butte (Pleistocene) Grayish-black olivine basal flows forming lava field about Clarks Butte. Well preserved tumuli, pahoehoe surfaces, and collapse structures are mantled by eolian and lacustrine silts. In thin section, consists of phenocrysts of olivine and plagioclase with glomerocrysts of plagioclase and olivine set in an intergranular groundmass of plagioclase, opaques, and clinopyroxene. Chemically an alkali olivine basalt radiometrically dated at 0.25 Ma (Hart, 1982).

Qf — Alluvial fan deposits (Holocene and Pleistocene) Unconsolidated accumulation of basalt boulders mantling the north and west flanks of Bogus Bench.

Qbbr — Basalt of Bogus Rim (Holocene? or Pleistocene) Grayish black to black olivine basalt flow. Age based on geomorphic relationships. Flows fills part of the canyon of the ancestral Owyhee River. Equivalent to unit QTb of Plumley (1986) and unit Qb of Walker (1977).

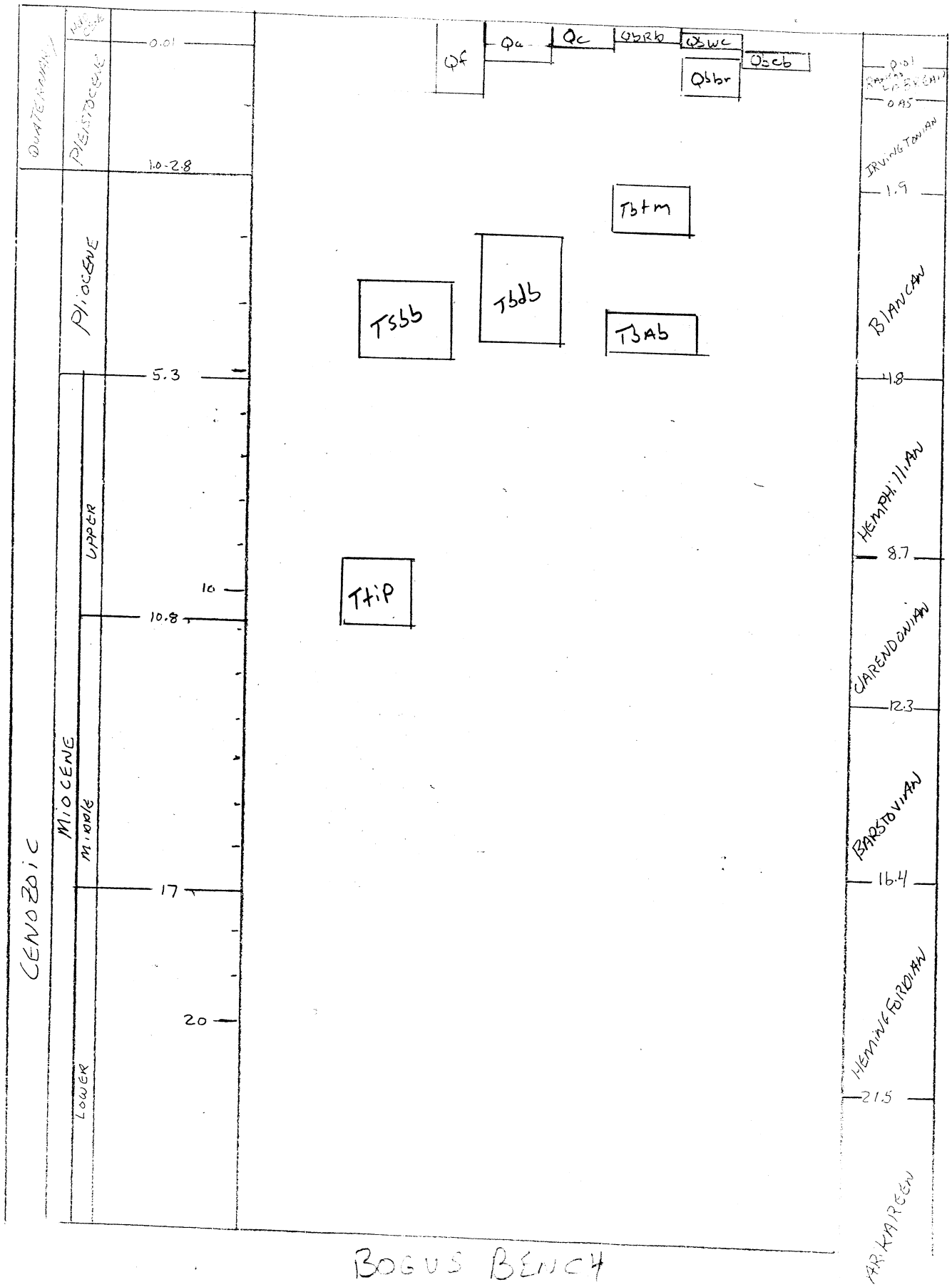
Tbtm Basalts of Three Mile Hill (Pliocene) Vesicular black diktytaxitic olivine basalt flows. Includes holocrystalline flows with 2mm diameter plagioclase and olivine phenocrysts in groundmass of plagioclase, intergranular olivine, and subophitic titanaugite. According to Hart (1982) these are 1.9 Ma alkali olivine basalts.

Tbdb Basalts of Deer Butte (Pliocene) Grayish- and bluish-black diktytaxitic olivine basalt flows. Finely vesicular with subophitic to ophitic clinopyroxene (titanaugite), plagioclase, and intergranular olivine. Characterized by variable amounts of TiO2 and generally low K2O, thus corresponding to the high alumina olivine and transitional basalt types of Hart (1981). Pliocene date based on K/Ar determinations of 4.1 and 4.5 Ma by Hart (1982). Equivalent to part of unit QTb of Walker (1977).

Tsbb Sediments of Bogus Bench (Pliocene?) Pale yellowish-white to white tuffaceous siltstones and diatomite. Poorly exposed.

Tbab Basalt of Bogus Bench (Pliocene) Vesicular black to bluish-black olivine basalt flows. Includes basalts with olivine, augite, and plagioclase glomerocrysts. Chemically a high alumina olivine basalt (analyses, Table 1).

Ttip Rhyolite porphyry (Miocene). Pale pinkish-gray, sanidine-phyric, lithoidal rhyolite porphyry. Spherulitic with about 10% quartz and sanidine phenocrysts. Chemically a high silica rhyolite (Analyses, Table 1) roughly similar in composition to the rhyolite at Iron Point (Ferns, 1992).


Qf
Qa
Qc
QbRb
QbWc
Qbbr
Qbcb
QUATERNARY
PLEISTOCENE
0.01
1.0-2.8
PLIOCENE
5.3
MIOCENE
UPPER
MIDDLE
LOWER
10
10.8
17
20
CENOZOIC
Tbtm
Tbdb
Tbsb
TbAb
TbP
0.01
0.95
IRVINGTONIAN
1.9
BLANCAN
1.8
HEMPHILLIAN
8.7
CLARENDONIAN
12.3
BARSTOVIAN
16.4
HEMINGFORDIAN
21.5
ARIKAREEN

BOGUS BENCH

LAB #	1/4	1/4	Sec.	T.(S.)	R.(E.)	Lithology	Map Unit	SIO2	AL203	TIO2	FE203	MNO	CAO	MGO	K20	NA20	P205	Cr	Co	Ni	Cu	Zn	Rb	Sr	Y	Zr	Nb	Ba	Li
								%	%	%	%	%	%	%	%	%	%	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm	ppm
AZB-125	NW	NW	2	29	42	Olivine basalt	Tbab	48.3	16.0	0.96	10.9	0.19	11.6	7.89	0.23	2.13	0.14	254	46	122	111.	83.3	14	183	16	52	<10	426	9.3
AZB-126	SW	NW	29	28	42	Rhyolite	Ttip	76.1	11.7	0.11	1.3	0.03	0.62	0.09	4.58	3.61	0.51	12	<5	<5	8.4	71.5	231	34	275	258	125	87	36.3
AZB-127	NW	SW	16	29	42	Olivine basalt	Tbab	45.6	15.0	1.75	11.9	0.18	11.4	7.90	0.60	2.41	0.32	212	45	122	39.2	98.9	<10	287	21	106	18	269	9.3
AZB-128	SW	SW	7	29	42	Pyroxene basalt	Qbwc	48.2	16.4	1.86	11.6	0.19	9.95	6.52	1.06	2.74	0.41	304	42	86	50.5	96.0	38	432	25	145	40	651	14.9
AZB-129	SE	SW	25	29	42	Olivine basalt	Tbtm	47.3	16.1	0.99	11.2	0.18	11.2	8.66	0.27	2.41	0.15	413	47	90	80.2	107.	29	185	<10	57	18	150	9.2
AZB-130	SE	NE	23	29	42	Olivine basalt	Qbrb	47.3	15.7	2.03	12.1	0.18	9.34	7.39	0.91	2.80	0.41	162	48	115	54.4	102.	38	460	24	149	36	457	9.7
AZB-131	NE	NE	1	29	42	Olivine basalt	Tbdb	46.7	14.8	1.80	12.9	0.21	11.1	6.81	0.43	2.32	0.35	336	50	160	57.1	83.6	<10	242	26	129	29	409	7.2
AZB-132	SE	SE	36	28	42	Olivine basalt	Tbdb	46.5	15.2	2.06	13.8	0.20	10.3	7.69	0.39	2.27	0.44	389	50	122	57.8	115.	30	258	34	150	47	379	9.2

REFERENCES OF-O-92-2

Ferns, M.L. and Evans, J.G., 1993, Preliminary geologic map of the Rinehart Canyon quadrangle, Malheur County, Oregon: Oregon Department of Geology and Mineral Industries Open-File Map O-93-5, scale 1:24,000.

Hart, W.K. and Merzman, S.A., 1983, Late Cenozoic volcanic stratigraphy of the Jordan Valley area, southeastern Oregon: Oregon Department of Geology and Mineral Industries, Oregon Geology, Vol. 45, no. 2, p. 15-19.

Plumley, P.S., 1986, Volcanic stratigraphy and geochemistry of the Hole in the Ground area, Owyhee Plateau, southeastern Oregon: Moscow, Idaho, University of Idaho M.S. thesis, 161 p.

Walker, G.W., 1977, Geologic map of Oregon east of 121st meridian: U.S. Geological Survey Miscellaneous Investigations Map I-902, scale 1:500,000

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**