UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

OPEN-FILE REPORT O-93-5
PRELIMINARY GEOLOGIC MAP OF THE RINEHART CANYON QUADRANGLE
MALHEUR COUNTY, OREGON
1993
BY MARK L. FERNS/JAMES G. EVANS, USGS

RINEHART CANYON 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

(WRANGLE BUTTE) 2470 III SE

UTM GRID AND 1972 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

0°28′ 8 MILS — 18½° 329 MILS

SCALE 1:24 000

1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 KILOMETRE

CONTOUR INTERVAL 20 FEET

OREGON DEPARTMENT OF GEOLOGY
AND MINERAL INDUSTRIES

Field work conducted 1986/1992

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

OREGON
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) 2470 II SE

RINEHART CANYON, OREG.
N4307.5—W11737.5/7.5
1972
AMS 2470 II NW—SERIES V892

OPEN-FILE REPORT O-93-5
PRELIMINARY GEOLOGIC MAP OF THE RINEHART CANYON QUADRANGLE MALHEUR COUNTY, OREGON

By Mark L. Ferns, Oregon Department of Geology and Mineral Industries and James G. Evans, U. S. Geological Survey

1993

Field work conducted in 1986/1992
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.

GEOLOGIC SUMMARY

The study area is underlain by flat-lying or gently dipping volcanic, sedimentary and pyroclastic rocks of late Miocene to Holocene age. These deposits fill the central part of the Ore-Ida Graben (Ferns and others, 1993). Oldest rocks exposed include the rhyolite and ashflow tuff at Iron Point (Trip), basaltic andesite flows (Tbwc) and sedimentary and pyroclastic rocks (Tsbc). At Iron Point, the Trip rhyolite is 360 m thick and consists of at least two cooling units separated by nonwelded tuff and lithic ash-flow tuff. In the western part of the quadrangle, the Trip rhyolite is overlain by 12 Ma olivine basalt and plagioclase-phyic ferroandesites (Tbmv).

Poorly to moderately lithified sedimentary and pyroclastic rocks (Tsbc) interfinger with the Trip rhyolite to the south. Maximum uninterrupted Tsbc thickness south of the quadrangle boundary at Chalk Basin is 150 m (Evans, 1990). Tsbc sediments include bentonitic clays and oolitic limestones, suggestive of a lacustrine environment. Shrinkage cracks in clay-rich siltstone suggest that part of the basin were subject to periodic desiccation.

Upper Miocene and lower Pliocene basalt flows (Tbwb) overlie and interfinger with Tsbc sediments near Hoot Owl Spring. The flows are olivine basalts which erupted from vents west of the quadrangle boundary. Still younger Pliocene and lower Pleistocene basalt flows (QTb) erupted from small shield volcanoes east and west of the quadrangle, forming a broad, flat plateau at about 4 Ma. The Owyhee River began to cut down through the plateau at about 1.5 Ma. Young intracanyon basalt flows (Qb and Qbbr) partially filled the Owyhee paleocanyon. These young basalts include alkali-olivine and high-alumina olivine basalts (Hart and Mertzman, 1983). Large landslides (Qls) have formed where the Owyhee River has cut through and exposed weakly lithified tuffaceous sediments below the basalt flows.

Qal — Unconsolidated deposits of sand and gravel deposited along the Owyhee River.

Qls — Landslide deposits

Qf — Alluvial fan deposits (Quaternary) Mainly unconsolidated and poorly sorted accumulations of coarse gravel deposited along the flanks of Cedar Mountain.

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 and MacLeod (1992).

Qs — Fluviatile sands (Pleistocene or Pliocene) Unconsolidated deposits of sand, gravel, and silt, presumably deposited during downcutting of the Owyhee Canyon.

Qb — Basalt of Sand Basin (Pleistocene or Pliocene) Reddish-weathering, dark grayish black, plagioclase-phyric olivine basalt flow. Intercanyon flow emplaced early during downcutting of the Owyhee canyon. Hyalopilitic with 2mm plagioclase phenocrysts, 1mm olivine phenocrysts in a groundmass of plagioclase, intergranular clinopyroxene, glass, and opaques. Contains high abundances of TiO_2 and K_2O (Sample AZB-117, Table 1) which are characteristic of alkali olivine basalts using the terminology of Hart (1982).

Qss — Lacustrine sediments (Quaternary) Mainly unconsolidated eolian and lacustrine deposits of light colored, fine-grained sand and silt. Interpreted as shore-line facies marginal to a large pluvial Pleistocene lake to the west (Ferns and Williams, 1993).

QTb — Olivine basalt (Pliocene?) Gray and grayish-black diktytaxitic olivine basalt flows with well preserved flow tops. Locally heavily mantled by windblown silt. Includes holocrystalline basalts with less than 2% olivine phenocrysts as large as 3mm in diameter in a groundmass of interlocking plagioclase lathes and subophitic clinopyroxene Includes high alumina basalts. 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 and MacLeod (1991).

Tps — Unconsolidated fluvial and lacustrine deposits (Pliocene?) Unconsolidated accumulations of sand, silt, and gravel separating QTb from underlying Tbwb flows. Upper part of section contains caliche deposits.

Tbwb — Olivine basalt flows of Wrangle Butte (Pliocene and upper Miocene?) Bluish and grayish-black, olivine basalt flows and interbedded palagonitic breccias. Includes hyalophitic pillow basalts with 2 mm diameter olivine and plagioclase phenocrysts with ophitic and subophitic clinopyroxene. Chemically, includes quartz tholeiites (Ferns, 1993c). Equivalent to part of unit Tb of Evans (1991) and QTb of Walker and MacLeod (1991).

Tcmb — Basaltic andesite (Pliocene or Late Miocene) A single flow of aphyric, bluish black platy basaltic andesite. Presumably correlative with basaltic andesite flows off of Cedar Mountain.

Tstcb — Tuffaceous siltstones, sandstones, and ashflow tuff (Late Miocene) Mainly pale yellowish-white to white, tuffaceous siltstones. Includes a 4' thick densely-welded, lithic, quartz-latite tuff in Rinehart Canyon (Analyses 4, Table 1). Also includes sandstone, conglomerate, bentonitic clay, chert, limestone, and cherty limestone. Unit includes a thin vitric welded tuff in the Sacramento Butte quadrangle to the southwest which is correlated by Ferns (1992b) with the 9.2 Ma Devine Canyon Ash-Flow Tuff of Greene and others (1973).

Tbvc — (Late Miocene) Bluish-black to bluish-gray, platy tholeiitic andesite, basaltic andesite, and basalt flows. Includes distinctive glomeroporphyritic flows with plagioclase phenocrysts as large as 2 cm in diameter, plagioclase and orthopyroxene glomerocrysts, and rare quartz xenocrysts. At least three flows with an aggregate thickness of 200 feet exposed in the Mustang Butte quadrangle, where analyses show high abundances of K2O and a large degree of iron enrichment (Ferns, 1992a). Xenocryst-bearing flows are petrographically and chemically similar to the Square Mountain ferro-latite (Bonnichsen and others, 1988).

Trip Rhyolite at Iron Point (late Miocene?) Sequence of rhyolite flows and ashflow tuffs exposed at Iron Point. Includes at least two thick rhyolite flows. Lower flow is a reddish-gray, porphyritic rhyolite with a perlitic vitrophyre carapace. Both flows are dark-gray to reddish-gray and contain sanidine, quartz, and plagioclase phenocrysts. Lower flow contains dark brown pleochroic phenocrysts of aenigmatite. Basal vitrophyre of uppermost flow is peralkaline in chemistry (Analysis AZB-116, Table 1) while the lower flow is meta-aluminous (Analyses AZB-119, Table 1). Aggregate thickness of flows and tuffs is over 1000 feet at Iron Point where Evans (1991) identified a 720 foot thick basal ash flow overlain by a 360 foot thick upper unit.

Tbwc Basalt of Whiskey Canyon (Miocene) Grayish-black and locally reddish-brown, plagioclase-phyric hyalocrystalline olivine basalt flows. Correlative with the Deer Butte Basalts of Plumley (1986) and laterally continuous with the basalts of Hammond Hill (Cummings, 1991).

Table 1 Major and Trace Element Analyses for unaltered rocks, Rinehart Canyon Quadrangle 0-93-5

LAB #	1/4	1/4	S.	T.S.	R.E	Elev.	Lithology	Map Unit	SiO2 %	Al2O3 %	TiO2 %	Fe2O3 %	FeO %	MnO %	CaO %	MgO %	K2O %	Na2O %	P2O5 %	LOI %	Cr ppm	Co ppm	Ni ppm	Cu ppm	Zn ppm	Rb ppm	Sr ppm	Y ppm	Zr ppm	Nb ppm	Ba ppm	Li ppm
AZB-116	NW	SE	3	28	41	4000	Rhyolite	Trip	76.5	11.5	0.11	1.45	0.08	0.03	0.21	0.22	4.83	4.04	0.04	0.54	<10	<5	<5	5.8	121.	264	<10	173	264	117	131	37.9
AZB-117	NE	SE	27	27	41	3980	Olivine basalt	Qb	48.5	13.4	2.84	15	9.92	0.19	8.29	5.66	1.15	2.63	0.56	0.93	85	41	72	52.8	141.	33	218	35	204	46	558	12.4
AZB-119	SW	SE	16	27	41	4100	Rhyolite	Trip	73.5	12.5	0.31	2.06	0.21	0.03	1.34	0.44	5.22	3.59	0.09	1.08	<10	<5	<5	14.2	36.	166	82	62	230	85	734	10.3
AZB-123	NW	NE	24	27	41	3830	Ashflow tuff	Tstcb	64.2	13.7	0.46	5.74	2.87	0.17	2.14	0.61	5.9	3.75	0.09	3.08	<10	7	5	13.3	123.	85	27	62	1150	61	1120	14.3

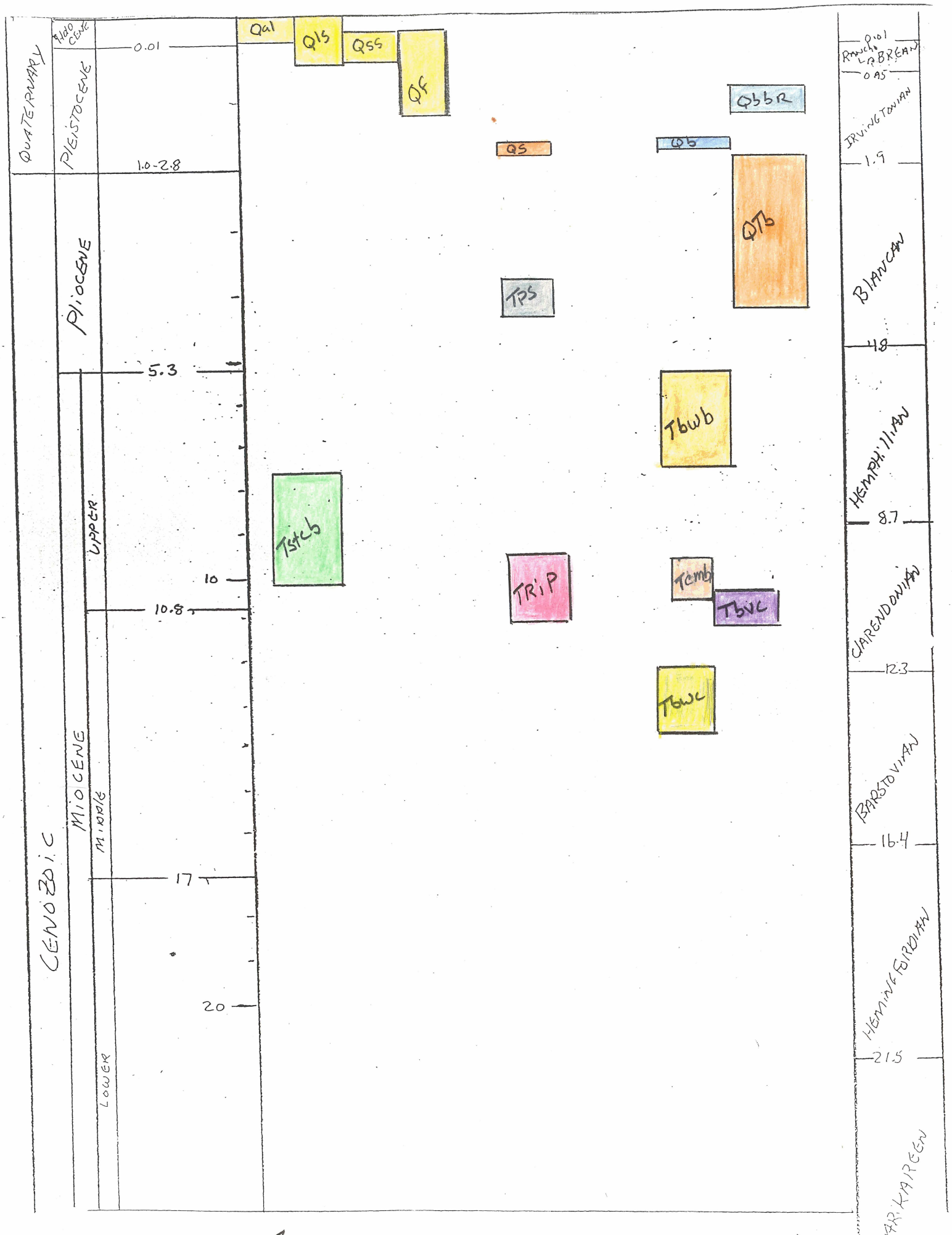
MAP SYMBOLS

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



TIME ROCK CHART RINEHART CANYON

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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