Nevada Bureau of Mines and Geology

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OPEN-FILE REPORT 03-4 PRELIMINARY GEOLOGIC MAP OF THE OXLEY PEAK AREA, ELKO COUNTY, NEVADA

PRELIMINARY GEOLOGIC MAP OF THE OXLEY PEAK AREA, ELKO COUNTY, NEVADA

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DESCRIPTION OF MAP UNITS

Qal **Alluvium (Holocene)** Gravel, sand, and silt deposits. Includes unsorted and unindurated deposits along watercourses and dry stream beds and sheetwash and alluvial deposits that form a thin veneer of cover between some stream beds.

Qaf **Alluvial fan deposits (Quaternary)** Gravel, sand, and silt deposits. Includes unsorted and unindurated sheetwash deposits between stream beds.

Qls **Landslide deposits (Quaternary)** Landslide and slump features developed in Paleozoic and Tertiary units.

QTg **Gravel (Pleistocene and Pliocene?)** Coarse sand, gravel, and boulders of Paleozoic carbonate rocks, sandstone, chert, and shale. Locally the gravel contains abundant clasts of green to buff, crystal-rich tuff and porphyritic volcanic rocks similar to Tertiary units that crop out on the south and east sides of the range. Forms ridge- and terrace-capping deposits as much as 5 to 7 m thick.

QTih **Gravel of Indian Hollow (Pleistocene and Pliocene?)** Sand and gravel composed of Paleozoic and Tertiary detritus. Includes sparse lenses of horizontal to subhorizontal, tan, reworked vitric tuffs 1 to 3 m thick. Unit is poorly exposed due to its weakly indurated nature and generally is overrun by colluvium from overlying terrace-capping gravels.

Ttm **Sedimentary and volcanic rocks of Threemile Spring (Miocene)** Undifferentiated sedimentary and volcanic sequence that includes intercalated, laterally discontinuous fluvial, lacustrine, and tuffaceous units. The lowest unit, present at the south end of the range and in the westernmost railroad cuts, includes yellowish brown to tan fluvial and lacustrine, weakly indurated to locally highly siliceous siltstone, sandstone, and conglomerate. The middle unit includes medium- to fine-grained, pale red to yellowish-brown sandstone and siltstone of fluvial and lacustrine origin; locally contains abundant wood fragments, fish fossils, and ripple marks. The middle unit is best exposed in quarries in the SE corner of section 16, T38N, R62E and in the low hills between the radio facility and the hot springs in the SE corner of section 29 and in the NE corner of section 32, T38N, R62E. Thick-bedded, massive conglomerates with interbedded siltstone and sandstone occur at the transition between the lower and middle units; the conglomerates are typically silicified, commonly have a greenish matrix, and the clasts include Tertiary volcanic fragments and rounded to subangular Paleozoic quartzite, chert, and shale. The upper unit mainly comprises soft-weathering, white, gray, and greenish airfall vitric tuffs, including fluvially reworked tuffs and local conglomerate interbeds. The upper unit is best exposed in the easternmost railroad cuts. The thickness of the Threemile Spring unit is greater than 1,000 m. Four fission-track ages on zircon (11.9±0.9, 8.9±0.7, 11.9±1.0, and 11.1±0.9 Ma) have been determined on samples from the middle unit by R.A. Zimmermann.

Tv **Volcanic rocks (Miocene?)** Light-colored, reddish-weathering, fine-grained porphyritic rhyolitic(?) rock with medium-grained phenocrysts of quartz and feldspar. Age uncertain.

Trp **Porphyritic rhyolite flow (middle Miocene)** Reddish black, porphyritic devitrified flow rocks with local black basal vitrophyre. Phenocrysts, as much as 5 mm in size, include resorbed quartz, sanidine, and plagioclase; plagioclase occurs as glomerocrysts with or without sanidine. Spherulitic groundmass contains microlites of phenocryst mineralogy plus trace amounts of zircon, subhedral 0.3-0.5 mm embayed opaque minerals, and lithic fragments. Zircon fission-track age of 15±1.2 Ma by R.A. Zimmermann.

Ts **Lake sediments (Eocene?)** Gray to white, tuffaceous, thin-bedded, fine-grained lacustrine siltstone and shale. Unit is soft weathering and poorly exposed. Fragments of silicified wood, as much as 0.3 m across, occur locally. Unit ranges from several feet to more than 100 m in thickness; appears to be concordant with underlying volcanic unit, though the mutual contact is an irregular erosional surface.

Trau **Upper rhyolitic welded ash-flow tuff (middle to upper Eocene)** Densely welded, silicified, gray ash-flow tuff with eutaxitic pumice. Contains 10-15% phenocrysts, including sanidine (0.5-2.0 mm), resorbed quartz (0.5-1.0 mm), and partially oxidized biotite (0.5 mm). Groundmass is devitrified and granophyric with trace amounts of zircon and opaque minerals. Lithic fragments are sparse, as much as 6-7 mm in size. An $^{40}Ar/^{39}Ar$ age of 39.4±0.3 Ma was determined from biotite (L.W. Snee, written commun., 1989). Patterned area is channel-filling silicified cream-colored conglomerate cut into Trau. Contains angular to subrounded clasts ranging up to 1 m derived from ash-flow tuffs (Trau and possibly other units) as well as possible chert clasts derived from upper Paleozoic units in the range.

Tiv **Intermediate volcanic rocks (middle to upper Eocene)** Unit includes andesitic to dacitic flows and agglomerates. Rocks are dark-green to reddish-gray, fine grained, some with medium-grained phenocrysts. Individual units are laterally discontinuous and irregular in thickness, as much as 10 m. Phenocrysts include plagioclase, hornblende, and possibly clinopyroxene. Groundmass in most rocks is pilotaxitic with plagioclase microlites and is spotted with euhedral opaque minerals. All of the rocks observed in thin section show signs of alteration, which is interpreted to be deuteric. Plagioclase is weakly to strongly altered to white mica and epidote(?) and mafic minerals are altered to biotite(?) and unidentified fine-grained, in part opaque, minerals. Phenocrysts are typically weakly to strongly iron stained. Some rocks have quartz veinlets. The upper contact on the east side of the range is an irregular erosion surface, where the unit ranges from about 3 m to more than 100 m in thickness. The unit occurs at the south end and on the east side of the range. At the south end of the range, the unit occurs between the upper (Trau) and lower (Tral) rhyolite ash-flow units and is clearly Eocene in age. On the east side of the range the unit occurs between the lower rhyolite unit and the lake sediments (Ts), which are undated, but are older than ~15 Ma. Based on lithologic similarity the eastern occurrence of intermediate composition rocks are considered correlative with those to the south.

Tral **Lower rhyolitic welded ash-flow tuff (middle to upper Eocene)** Moderately welded, tan to white, crystal-poor ash-flow tuffs; individual tuff beds are laterally discontinuous and as much as 10-15 m in thickness. Typical rock sample contains 10% phenocrysts (sanidine, resorbed quartz, biotite) that are 0.5-1.5 mm in diameter in a shard-rich axiolitic groundmass with lithic fragments and a trace of zircon. The lower tuff beds are commonly altered to bright green. An oolitic limestone about 1 m thick (dashed red marker) and an overlying thin biotite-bearing, altered rhyodacitic flow are at the base of the unit on the east side of the range (SE¼ sec. 1 and NE¼ sec. 12, T38N, R62E). Tral ranges from about 3 m to more than 200 m in thickness. An $^{40}Ar/^{39}Ar$ age of 39.8±0.1 Ma was determined on biotite from a tuff near the base of the unit at the south end of the range and ages of 39.7±0.1 and 40.8±0.2 were determined on biotite from two tuffs near the base of the unit on the east side of the range (L.W. Snee, written commun., 1989).

EASTERN FACIES UNITS

Trd **Dinwoody(?) Formation (Triassic)** Shale and limestone. Interbedded greenish, gray, and "chocolate brown" thin-bedded to fissile shale with subordinate brownish, thin-bedded to platy, fine-grained, limestone to shaley limestone; locally contains thin lenses of limestone-pebble conglomerate a with clasts of Permian limestone, chert, and dolomite and productid fragments. Thickness unknown, but probably greater than 175 m; upper contact is faulted. Lithologically this unit is essentially identical to Triassic rocks in the northern Adobe Range, approximately 56 km to the west (Ketner and Ross, 1983) and resembles the Dinwoody Formation of southeastern Idaho and northeastern Utah, except for the presence of the limestone-pebble conglomerates.

Pm **Murdock Mountain Formation (Permian)** Limestone, chert, and siltstone. Gray, medium- to thick-bedded, medium- to coarse-grained bioclastic limestone to dolomitic limestone; brachiopod valves and spines are common. Thin interbeds of yellowish-brown, argillaceous and calcareous siltstone. Contains dark gray, reddish-brown, and yellowish-brown chert, commonly with sponge spicules, that occurs as irregular nodules or as thin-bedded units up to several feet thick. Thickness unknown, but probably greater than 175 m.

Mm **Sandstone of Melandco (Lower Mississippian)** Sandstone, conglomerate, and shale. Brown to reddish-brown, medium- to thick-bedded, medium- to coarse-grained to gritty chert-quartz sandstone. The sandstone beds are typically massive, with no visible internal layering; locally where they are thinner bedded, graded bedding is present. Medium-bedded chert-pebble conglomerate occurs locally in the upper part of the unit. Black fissile shale occurs locally. The unit has a minimum thickness of approximately 1,750 m. The basal contact is gradational with the Lower Mississippian Tripon Pass Limestone and the upper contact is a low-angle fault. A Devonian to Lower Mississippian assemblage of conodonts (Bruce Wardlaw, oral commun., 1988) occurs about 300 m above the base in a thin limestone bed. Early Mississippian conodonts have been collected from a black shale interval in the upper part of the unit in sec. 24, T39N, R62E, south of Bishop Creek (K.B. Ketner, oral commun., 1988). This is the same unit that Smith and others (1983) refer to as their unit Mss in their structural Plate I in the Summer Camp Quadrangle. A similar and probably correlative unit occurs in the Adobe Range (Ketner and Ross, 1983, 1990) in the same stratigraphic and structural position and is referred to as their unit Ms.

Mtp **Tripon Pass Limestone (Lower Mississippian)** Gray, medium- to thin-bedded, fine- to medium-grained limestone with graded bedding. Locally becomes sandy, the grains being quartz and chert. Contains interbeds of fissile to platy brown calcareous shale. Contact with underlying Guilmette Formation is normal in the Bishop Creek area, but is a bedding fault at Cedar Peak. Basal part of unit is poorly exposed as a grassy slope littered with small chips of fissile shale and platy limestone. Upper contact with sandstone of Melandco is gradational and is placed where limestone/sandstone ratio is approximately 1:1. The Tripon Pass Limestone is Early Mississippian in age (Oversby, 1972).

Dg **Guilmette Formation (Upper Devonian)** Gray, medium- to thick-bedded, medium-grained limestone. Contains medium- to thin-bedded dolomite as interbeds in lower 35 to 70 m. Basal part of unit consists of thin-bedded, argillaceous, *Atrypa*-bearing limestone that forms a smooth slope. Formation is approximately 325 m thick.

Dsi **Simonson Dolomite (Middle Devonian)** Gray, medium- to thick-bedded, fine- to medium-grained, laminated dolomite with minor interbeds of limestone. Base is not exposed. Thickness probably exceeds 500 m.

WESTERN FACIES UNITS

Ma **Argillite, shale, and chert (Mississippian)** Black siliceous argillite with chert-quartz arenite beds. Black shale and siltstone with scarce bedded black chert and bedded barite. Fine-grained sandy beds. Upper and lower contacts are low-angle faults. Thickness probably exceeds 100 m.

Dsh **Shale, limestone, and chert (Devonian)** Dominant lithology is black to dark brownish gray, fissile to thin-bedded, locally weakly phyllitic shale. Contains interbedded medium gray, thin- to medium-bedded, medium-grained, in part bioclastic limestone; locally beds contain well-rounded, frosted, medium-grained quartz. Black, thin-bedded chert is present locally as thin interbeds. Thickness of unit exceeds 250 m. Upper and lower contacts are low-angle faults. Contains four early Late Devonian conodont assemblages (written commun., Bruce Wardlaw, 1988). Equivalent to unit Dt of Smith and others (1983) in the Summer Camp Quadrangle, where it ranges from Early to Late Devonian in age.

Dsl **Shale, limestone, and chert (Upper Devonian)** Contains irregular though more or less equal amounts of fissile black shale, yellowish thin-bedded to platy, argillaceous, siliceous, fine-grained limestone, and black, thin-bedded, platy chert. Contains sparse bedded barite. Thickness is unknown, but probably exceeds 135 to 175 m. The lower and upper contacts are low-angle faults. Two conodont assemblages are middle Middle Devonian and Devonian to Early Mississippian in age (written commun., Bruce Wardlaw, 1988). Equivalent to unit DSOw of Smith and others (1983), which they determined to range in age from Ordovician to Devonian.

Dw **Shale, limestone, and chert, undivided (Devonian)** Contains lithologies found in both units Dsh and Dsl.

Sw **Siltstone, chert, and argillite (Silurian)** Graptolite-bearing, yellow-weathering, greenish-gray micaceous siltstone, chert, and argillite underlain by black, white, red, and green chert.

Ow **Shale and chert (Middle to Upper Ordovician)** Black bedded chert containing sparse graptolites, underlain conformably by thick, graptolite-rich black shale.

DSOw **Shale, siltstone, chert, and limestone, undivided (Devonian, Silurian, and Ordovician)** Undifferentiated western facies rocks, including units Dsi, Sw, and Ow. Thickness probably exceeds 150 m.

REFERENCES

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Smith, J.F., Jr., Ketner, K.B., Hernandez, G.X., Harris, A.G., and Smith, M.C., 1983, Preliminary geologic map of the southern Snake Mountains, Elko County, Nevada: U.S. Geological Survey Open-File Report 83-303.

Scale 1:24,000

0 0.5 1 kilometer

0 0.5 1 mile

0 1000 2000 3000 4000 5000 feet

CONTOUR INTERVAL 40 FEET (Oxley Peak and Summer Camp)
CONTOUR INTERVAL 20 FEET (Melandco and Wells Peak)

Base map: U.S. Geological Survey 1:24,000 quadrangles:
Melandco, 1968; Oxley Peak, 1968; Summer Camp, 1968, Wells Peak, 1968.
Projection: Nevada Coordinate System, east zone (Transverse Mercator)
1927 North American datum.

This map should be considered preliminary.

Field work performed from 1988–1990.

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Contact Dashed where inferred; dotted where concealed

Marker beds Shown by dot-dash lines within units

Fault Showing dip (arrow); dashed where inferred; dotted where concealed

Normal fault Bar and ball on downthrown side; dashed where inferred; dotted where concealed

Thrust fault Solid sawteeth on upper plate; dashed where inferred, dotted where concealed

Subordinate thrust fault Hollow sawteeth on upper plate

Strike-slip fault Arrows show relative or apparent movement; double headed arrows indicate movement unknown

Strike and dip of beds

35 Inclined — Vertical

Strike and dip of inclined flow layering

35 Inclined

Fossil location

◇ 359

Pillow basalt location

● 358

Summer Camp Quadrangle | Melandco Quadrangle | area of geologic mapping | Wells Peak Quadrangle | Oxley Peak Quadrangle

CORRELATION OF MAP UNITS

	Qal	Holocene	CENOZOIC
	Qaf	Holocene and Pleistocene	
	Qls		
	QTg	Pleistocene and Pliocene(?)	
Radiometric ages in millions of years	QTih		
11.1, 11.9 11.9, 8.9	Ttm	Miocene	
	Tv	Miocene(?)	
15	Trp	Miocene	
	Ts	Eocene(?)	
39.49	Trau		
	Tiv	Eocene	
39.85 39.76 40.8	Tral		

EASTERN FACIES

WESTERN FACIES

	Trd	TRIASSIC	MESOZOIC
	Pm	PERMIAN	
Ma	Mm	MISSISSIPPIAN	PALEOZOIC
Dsh Dw Dsl	Mtp		
DSOw	Dg	DEVONIAN	
Sw	Dsi		
Ow		SILURIAN	
		ORDOVICIAN	