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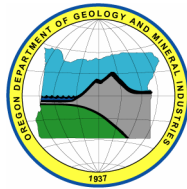
State of Oregon  
Department of Geology and Mineral Industries  
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**OPEN-FILE REPORT  
O-06-18**

**PRELIMINARY GEOLOGIC MAP OF THE GOLD HILL AND  
ROGUE RIVER 7.5' QUADRANGLES,  
JACKSON AND JOSEPHINE COUNTIES, OREGON**

By

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**2006**

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## 1.0 INTRODUCTION

The geologic map of the Rogue River and Gold Hill quadrangles depicts geology along approximately twenty miles of the Rogue River Valley, tributary valleys, and adjacent uplands. Forest lands north and south of the river are managed by the U.S. Bureau of Land Management and private timberland owners. Tributary valleys shelter small ranches and low-density rural residential development. U.S. Interstate Highway 5 and U.S. Highway 99 follow the east-west course of the Rogue River, passing through the Cities of Rogue River and Gold Hill.

The geology of this area is generally mountainous with bedrock of deformed Jurassic and older igneous and metamorphic rocks. Valleys are locally filled with Quaternary river deposits and terrace remnants that rest unconformably on bedrock. West of the City of Rogue River the bedrock metamorphic sequence is interpreted as a dismembered block of oceanic, arc, or ocean-island crust. East of Rogue River the rocks are interpreted as Jurassic or older meta-sedimentary and metavolcanic sequences. The metamorphic sequences are intruded by the Wimer and Gold Hill Plutons, two Late Jurassic hornblende-biotite granodiorite bodies that underlie the wider valleys.

Earlier mapping depicts the geology of the area using two distinctly different styles. Mapping by Smith and others (1982) emphasized straight contacts offset by faults while Wells (1949) typically used curves to draw contacts between observations where possible. To produce this map the latter methodology was generally used, although contacts along small bodies of serpentinite have been uniformly mapped as faults. Faults have been mapped where observed in the field or where geology and terrain suggest a fault must be present.

Studying the geology of the Klamath Mountains, Irwin (1966) broke out four fault-bounded stratigraphically similar belts of rock (now known as tectonostratigraphic terranes) and assigned all of the rocks in this area to his western Triassic and Paleozoic belt. Later workers divided this belt into smaller terranes, assigning these rocks to the Applegate Terrane (Howell and others, 198?). Most recently, these rocks have been interpreted as northern equivalents of the Rattlesnake Creek and Hayfork terranes of Northern California (Donato and others, 1996, Irwin 2003, Murray, 2002, 2003).

## 2.0 EXPLANATION OF MAP UNITS

### 2.1 QUATERNARY

**Mined Mine Tailings (Recent)**—Dredge spoils in areas disturbed by extensive placer mining

**Qls Landslides (Holocene)**

**Qal Alluvium (Holocene and upper Pleistocene)**—Unconsolidated sand, gravel, and silt, mud, and clay deposited in the Klamath Graben along the Wood River

**Qaf Alluvial Fan Deposits (Holocene and upper Pleistocene)**

**Qt Terrace Deposits (Upper Pleistocene and Holocene)**—Often blanketed by younger colluvium and small alluvial fans along valley edges. Often overlain by a thin veneer of younger alluvium along streams.

**Qtu Upper Terrace Deposits (Pleistocene)**—Often blanketed by younger colluvium and small alluvial fans along valley edges

Unconformity

### 2.2 NEOGENE

**Ttr Andesite of Table Rocks (middle Miocene)**—Blocks of trachyandesite rubble exposed along Highway 234 west of Sams Valley. Solid bedrock not recognized. These boulders and cobbles may represent an erosional lag deposit similar to rubble and blocks recognized east of Upper Table Rock (Wiley and Smith, 1993).

Unconformity

### 2.3 PALEOGENE

**Tpc Payne Cliffs Formation (upper Eocene)**—Non-marine sandstone, siltstone, pebbly sandstone, and pebble conglomerate. Westerly dips as steep as 30° were measured near the contact with underlying older rocks. Brown concretions to 1 m in diameter. No fossils were recovered in the map area.

Unconformity

### 2.4 JURASSIC TO TRIASSIC

#### 2.4.1 Broken Formation: metamorphosed sedimentary, volcanoclastic, and volcanic rocks

This sequence of rocks is exposed in a NNE-trending band that includes the towns of Rogue River and Gold Hill. Rocks are deformed and sheared with many small faults along bedding planes. However, transitional facies were recognized at several contacts. These include sandstone (quartzite) and phyllite with enclosed blocks and boulders of marble at marble/sandstone and marble/phyllite contacts. In places, graded beds interpreted as turbidites have volcanic sands in the larger grain sizes (Bouma a and b intervals) and quartzite in the finer grain sizes (Bouma b and c(?) intervals) indicating that volcanic and quartz/chert sources contributed sediment to the basin simultaneously. Where recognized, sandstone-shale sequences are generally similar to those recognized on the middle to upper parts of submarine fans. These include thick sections of massive to parallel laminated sandstone in amalgamated beds (Mutti-Ricci Lucchi facies B) and interbedded 0.5 to 3 m thick sandstone and phyllite beds with sandstone:phyllite ratios greater than 1 (Mutti-Ricci Lucchi facies C). In places (or at times?) provenance changes from volcanic and volcanoclastic sands to quartz (chert?) sands. This suggests that juxtaposed lithologies reflect, at least in part, original relations. These rocks are interpreted as lapping across several blocks in the underlying melange. Alternative interpretations include that of a large block in a

regional block-on-block melange and that of an exotic terrane that overlies such a melange (Hayfork terrane).

**JTrs Sedimentary rocks (Middle Jurassic to Lower Triassic)** –Predominantly siliciclastic sedimentary rocks. Probably with unmapped areas of volcanic and volcanoclastic rock and schist. Includes the following lithologies not mapped separately:

**Marble** – massive to banded, generally coarse, crystalline. At least some contacts are depositional as at the Gold Hill quarry where large blocks and boulders of marble form clasts in the overlying quartzite and phyllite beds to the east.

**Phyllite, slate, and argillite** – Fine grained, dark gray to black clastic strata with lesser amounts of sandstone and siltstone.

**Lithic sandstone and pebbly sandstone** – sandstone and pebbly sandstone with grains and clasts flattened to aspect ratios generally greater than 3:1 in sections perpendicular to bedding/foliation.

**Quartzite** – Interbedded quartz sandstone and siltstone with lesser amounts of phyllite/slate/argillite. Also includes laminated and banded quartzite interpreted as metachert.

**Volcanic sandstone** – Interbedded sandstone, siltstone, and shale (phyllite/slate/argillite). Volcanic sandstone is distinguished from volcanoclastic rocks of unit JTrvs by the predominance of rounded grains, by grain support, or by disequilibrium provenance. Sandstone beds with disequilibrium provenance have grain suites inconsistent with derivation from magmas in chemical/mineralogical equilibrium. For example, a single sandstone bed containing both high aspect ratio igneous hornblende (wet magma) and equant hornblende pseudomorphs after augite (dry magma).

**Conglomerate** – Composed primarily of cobbles and small boulders with volcanic provenance. Rounded clasts and the presence of a few granitic boulders confirm that this unit is a conglomerate rather than a volcanic breccia or pillow breccia. Generally not well exposed. Breaks, weathers, and polishes across clasts. In weathered exposures clast boundaries are obscure; there the unit is indicated by cobble to boulder sized, elongate, rounded zones with varying amygdule and phenocryst content.

**JTrvs Volcanoclastic rocks (Middle Jurassic to Lower Triassic)**– interpreted as primary eruptive products deposited by sediment-gravity flows. Typically contains abundant euhedral to subhedral crystals of augite and plagioclase that form angular to sub-angular sand grains and very fine pebbles. Equant magmatic augite is often partly or completely replaced by pseudomorphs of metamorphic hornblende. Interpreted as volcanoclastic rather than sedimentary where provenance is generally consistent with an equilibrium magma, where crystals are euhedral to subhedral, and where crystal size and sorting appears to reflect magmatic history rather than erosion and transport. May include unmapped areas of volcanic and sedimentary rocks and schist. Includes the following lithologies:

**Augite-plagioclase sandstone** – metamorphosed volcanic sandstone with euhedral to subhedral crystals (particularly mafic crystals), small percentage of lithic fragments, may be matrix supported, provenance generally consistent with sands derived from an augite and plagioclase pyritic magma.

**Augite-plagioclase sandy mudstone**

**JTrv Volcanic rocks (Middle Jurassic to Lower Triassic)** – Flows and vesicular flows of intermediate to mafic composition.

#### **2.4.2 Metamorphosed volcanic and intrusive rocks of the Sexton Mountain ophiolite of Smith and others (1982)**

These rocks crop out in the Rogue River quadrangle, generally west of Evans and Savage Creeks. Rocks assigned to

the Sexton Mountain ophiolite (Smith and others, 1982) are typically metamorphosed to greenschist, epidote-amphibolite, or amphibolite facies. Amphibolite facies is recognized in coarsely crystalline rocks interpreted to represent deeper crustal levels. Greenschist metamorphism affected fine-grained igneous rocks interpreted as lava flows. These observations are consistent with the sequence sea floor metamorphism occurring near a spreading center. Other lithologies commonly associated with ophiolite suites, including ultramafic rocks and shale, are present north and west of the mapped area. However, pillow basalt was not recognized.

**JTrb Basalt(?), basaltic andesite(?) and andesite(?) (Middle Jurassic to Lower Triassic)** – chemistry and textures suggest original compositions ranged from andesite to basalt, locally porphyritic. Seem to have originated as flows or shallow(?) dike and/or sill complexes. May contain lesser amounts of other metamorphosed volcanic and sedimentary lithologies. Metamorphism is epidote-amphibolite to greenschist facies. Crops out on Fielder Mountain and south along the ridge west of Savage Creek.

**JTrd Diorite with lesser amounts of gabbro, diabase, basaltic andesite, and basalt (Middle Jurassic to Lower Triassic)**– amphibolite, typically medium grained, often with mixtures or bands of different crystal sizes, interpreted as complex intrusions, dikes, and/or sills that have experienced epidote-amphibolite facies metamorphism. In the northwestern part of the Rogue River quadrangle, along the divide between Jones and Fielder Creeks, coarse-grained amphibolite of hornblende- and epidote-amphibolite facies is interpreted as metamorphosed gabbroic to dioritic intrusions.

#### 2.4.3 Melange and/or Shear Zones

Along Savage Creek and northeastward to the southern end of the Wimer Pluton, blocks of meta-sedimentary rock are separated by serpentinite/steatite/talc septa, presumably localized along faults. Similar features cut basalt, diabase, and gabbro in the ophiolite to the west.

**sp Serpentinite (Middle Jurassic to Lower Triassic?)** – serpentinite, steatite, and talc that occur in lenses and bands defining fault zones or as larger blocks.

**JTrm Schist (Jurassic to Paleozoic)**– Schist of various compositions all having well developed metamorphic segregation banding. Sedimentary and volcanic protolith textures recognized. Occurs near Pyroxenite of Gold Hill, Gold Hill Pluton, Wimer Pluton, and Grayback Pluton. Locally, banding may have developed by extreme deformation of relict phenocrysts, bedding, sand grains, and/or pebbles. Locally divided into:

**quartz, +/-biotite schist**--interpreted as metamorphosed quartz-rich sedimentary rocks

**plagioclase, biotite(?), +/- talc schist**-- interpreted as metamorphosed dacite or as plagioclase rich sedimentary rock with serpentinite lenses that may have been entrained along faults

**amphibolite schist**-- interpreted as metamorphosed andesite, basaltic andesite, and basalt.

#### 2.4.4 Intrusive Rocks

**JTrp Pyroxenite of Gold Hill (Middle Jurassic to Lower Triassic)** – clinopyroxinite and gabbro that crop out at Gold Hill (the hill). Although adjacent to the younger Gold Hill pluton (unit Jgd), these rocks are similar to ultramafic rocks described from Wagner Gap to the south.

**Jgd Granodiorite and related intrusions (Late Jurassic)** – felsic igneous intrusive bodies of all sizes. Typically hornblende-biotite granodiorite but also including trondjemite, quartz diorite, and hornblende diorite. Includes the western half of the Gold Hill pluton, the southern part of the Wimer pluton and northern outliers of the Grayback pluton.



## 3.0 GEOLOGIC HISTORY

### 3.1 GEOLOGIC SETTING

The geologic map of the Rogue River and Gold Hill quadrangles depicts geology along approximately twenty miles of the Rogue River Valley, tributary valleys, and adjacent uplands. Forest lands north and south of the river are managed by the U.S. Bureau of Land Management and private timberland owners. Tributary valleys shelter small ranches and low-density rural residential development. U.S. Interstate Highway 5 and U.S. Highway 99 follow the east-west course of the Rogue River, passing through the Cities of Rogue River and Gold Hill.

The geology of this area is generally mountainous with bedrock of deformed Jurassic and older igneous and metamorphic rocks. Valleys are locally filled with Quaternary river deposits and terrace remnants that rest unconformably on bedrock. West of the City of Rogue River the bedrock metamorphic sequence is interpreted as a dismembered block of oceanic, arc, or ocean-island crust. East of Rogue River the rocks are interpreted as Jurassic or older meta-sedimentary and metavolcanic sequences. The metamorphic sequences are intruded by the Wimer and Gold Hill Plutons, two Late Jurassic hornblende-biotite granodiorite bodies that underlie the wider valleys.

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The geologic history of the Rogue River – Gold Hill area is obscured by several episodes of faulting, metamorphism,

and intrusion. Tertiary rocks underlie about two square miles in the northeastern corner of the area. Late Jurassic and Early Cretaceous felsic plutons occur along Evans Creek and east of Gold Hill. Older, poorly dated metamorphic rocks underlie the remainder of the map area. The older rocks have tentatively been divided into four north-northwest trending sequences. The westernmost of these is a suite of mafic to ultramafic rocks interpreted to be a partially dismembered block of oceanic, arc, or ocean island crust. Lithologies present in this sequence include serpentinite, gabbro/diorite, diabase dikes, basaltic dikes, and basalt (Units JTrd, and JTrb). Argillite and fissile metamorphic rocks that could be interpreted as metasedimentary rock appear to be interlayered mafic lava flows and perhaps dike/sill sequences in the eastern exposures of unit JTrb. The second sequence consists of blocks of meta-sedimentary rock including phyllite, sandstone, and pebbly sandstone that are separated by serpentinite septa along, and south of, the southern edge of the quadrangle (The westernmost exposures of unit JTrs). The third includes fine-grained, fissile chloritic and talc schist and amphibolite thought to represent metamorphosed dacitic waterlaid tuff and interbedded tuffaceous sediment and perhaps dolomite (Unit JTrm). The fourth, easternmost sequence includes interlayered volcanic and volcanoclastic rocks (Units JTrv and JTrvs) and siliciclastic rocks and marble (Unit JTrs). Rare, poorly preserved radiolaria, conodonts, and mega-fossils (Irwin and Galanis, 1976; Irwin and others, 1978) give Jurassic or older ages for the easternmost sequence.

### 3.2 STRUCTURAL GEOLOGY

Along the Rogue River the thickness of alluvial and terrace deposits varies widely. Locally, alluvium is as much as 60 meters (200 feet) thick. Elsewhere, the river flows directly over bedrocks. Several mechanisms can cause such variation including: bedrock offset, channel migration, or scour.

Upstream of the study area the 7 Ma andesite of Table Rocks forms valley wall terrace remnants and mesas as it follows the Rogue River channel into the Cascade Range. This lava flow is largely undeformed, and for most of its length it unconformably overlies tilted strata of the Payne Cliffs Formation and volcanic and volcanoclastic strata in the western Cascade Range. This suggests that the main channel of the Rogue River has occupied more or less the same position since the middle Miocene. At the extreme western end of the flow, however, flow-top elevations are offset by up-to-the-west faulting about two kilometers



east of the Gold Hill quadrangle (between Lower Table Rock and Castle Rock). This faulting similarly offsets the contact between the Payne Cliffs Formation on the east and older metamorphic rocks to the west (Wiley and Smith, 1993). Immediately downstream, the Rogue River leaves the alluviated valley and flows directly on bedrock. The ponding of alluvium suggests that at least part of the offset is Quaternary. Exposures of Table Rock andesite rubble at low elevations in the northeastern corner of the Gold Hill quadrangle are attributed to erosion of softer, underlying rocks and preservation of flow remnants as an erosional lag deposit. Similar deposits have been used to map the course of the flow across the valley north of White City (Wiley and Smith, 1993). Erosion rates of about one hundred feet per million years are based on the age of the flow and its height above the valley floor. This is considered to be a reasonable rate for downcutting of the Rogue River through the study area.

West-dipping beds in the Eocene Payne Cliffs Fm. form part of the west limb of a north-northwest trending anticline that has been mapped to the east (Wiley and Hladky, 1990). Farther north, this fold affects older metamorphic rocks beneath the unconformity (Wiley, 1994). Throughout the area rocks as young as 14 Ma appear to be affected by this folding episode (Mortimer and Coleman, 1984), yet, over most of its length, the 7 Ma Table Rocks lava flow appears to be undeformed. So folding occurred at the end of the middle Miocene or early in the late Miocene.

An episode of north-south to northwest-southeast oriented extension is indicated by a suite of hornblende diorite dikes that cut the older metamorphic sequences. These acicular-hornblende-bearing dikes were not observed to cut the Wimer or Gold Hill plutons, but Page and others (1977) show dikes with similar trends that are compositionally similar to the Wimer pluton.

Although folded, graded beds and other orientation indicators in the meta-sedimentary sequences usually dip eastward, suggesting westward vergence and perhaps overall eastward younging.

Cobbles, boulders, and fragments of marble in quartzite and argillite immediately above the eastern contact with massive marble in the Gold Hill quarry suggest bedding tops are to the east. It also demonstrates that limestone, quartz sandstone, siltstone, and mudstone were interlayered when they formed. The marble is not an exotic block relative to the rest of the sequence and, while rocks may be extremely deformed, it is not a true melange at the scale of the marble pods. If it is in fact melange, the blocks must be much larger, probably as large as the coherent

sequences mapped here. Serpentinite is relatively rare east of Savage Creek and the Wimer pluton, so interpretation of these rocks as serpentinite matrix melange seems unlikely.

In the southwestern part of the Rogue River quadrangle sedimentary blocks are separated by serpentinite septa in a fashion similar to that interpreted as incipient melange formation by Wright and Wyld (1994). They observed similar anastomosing serpentinite-filled fractures in rocks near the contact between melange and the overlying cover sequence in the Rattlesnake Creek terrane. Similar serpentinite septa are present, albeit more widely spaced, in the oceanic crustal sequence. South of the study area, at approximately the same structural horizon, a well developed block-on-block melange has been mapped by Murray (2003) along the western side of the Grayback Pluton.

The igneous oceanic sequence that crops out west of the City of Rogue River shows a west-to-east arrangement of lithologies, with generally coarse crystalline diorite and gabbro grading easterly into diabase and fine-grained mafic dikes and then to fine-grained mafic dikes and flows. This suggests a crustal sequence with an overall eastward dip. Where present in these rocks, foliation and/or schistosity generally dip eastward. Parts of the sequence may be structurally repeated. Although the contact between the oceanic sequence and volcanic and sedimentary rocks to the east is faulted, the overall basement-cover relationship similarly suggests regional eastward dips and somewhat younger ages for the volcanic and sedimentary sequences than for the crustal sequence.

## 4.0 ACKNOWLEDGMENTS

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