

SUMMARY OF THE GEOLOGY OF THE DAIRY QUADRANGLE, KLAMATH COUNTY, OREGON

For more detailed information, please see the accompanying text and references.

INTRODUCTION

The Dairy quadrangle is located in southern Oregon's Klamath County about 10 miles east of the city of Klamath Falls (Figure 1). Oregon State Highways 140 and 70 provide access to the quadrangle. Several small communities are located within the quadrangle, Dairy being the largest near the northeast corner.

Prominent landforms in the quadrangle are northwest-trending basins and ranges. Cutting diagonally across the quadrangle is the Poe Valley. This basin is flanked to the southwest by the ridge at Olene Hot Springs and Horton Rim to the northeast. To the east of Horton Rim is the Yonna Valley. The Lost River enters the quadrangle from

the west. The river flows through the Olene gap in the ridge at Olene Hot Springs and meanders along the Poe Valley before exiting on the east side of the quadrangle (Figure 1).

The Dairy quadrangle is one of several quadrangles being mapped to delineate the geology in the Klamath Basin. A variety of geologic-information products are derived from mapping the quadrangle. Examples are a report that describes the geologic setting and history and a geologic map. This information provides the public and agencies with scientific support to assist with local and regional planning and environmental conservation and protection decisions.

GEOLOGIC HISTORY

Deciphering the geologic history of quadrangle is an interesting geological detective story. Rocks in the quadrangle reveal a complicated sequence of events starting with dep-

osition of sedimentary rocks onto an irregular, subdued surface of older volcanic rocks. The sedimentary rocks, primarily diatomaceous and tuffaceous mudstones, are believed to be six million years old (Miocene). They accumulated to a thickness of a few hundred meters.

Eruption of basaltic andesite in the quadrangle began a period of Pliocene volcanism from 4.5 to 3.8 Ma. The beginning of the Pliocene volcanism is marked with surge deposits. Surge deposits are indicative of an explosive water-lava interactions near the lava-sediment interface. Then elongate lavas flows poured out of volcanic vents and covered the sedimentary rocks.

Horton Rim is actually a remnant of one of these volcanoes. As can be seen in Figure 1, it stands as a curvilinear feature trending northwest in its western segment and

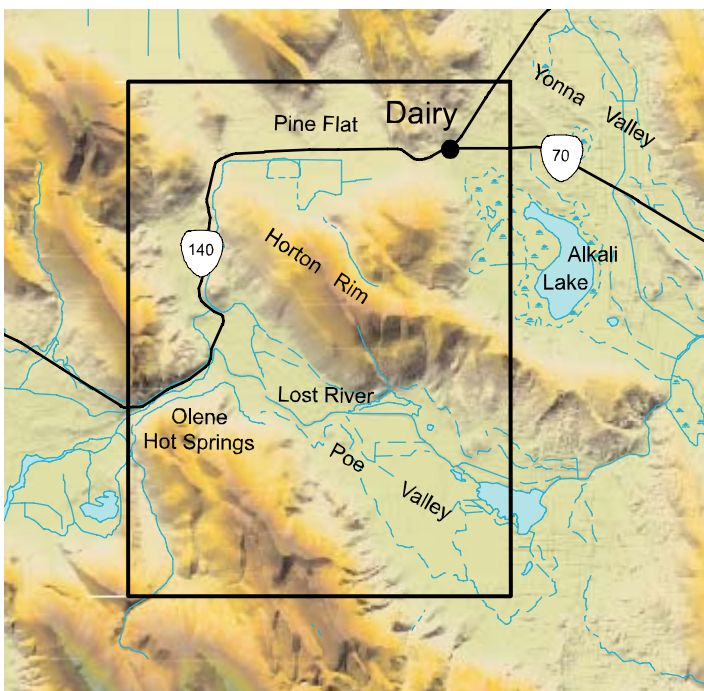


Figure 1. Shaded-relief image of the Dairy quadrangle and its vicinity. Rectangle marks the location of the quadrangle.

east-west in its eastern segment.

The sedimentary and volcanic rocks of the quadrangle are offset by normal faults. Trends of the more extensive faults are northwesterly, and along which displacements are several hundred feet. These faults also bound the sides of the valleys and structurally control the ridges.

Mapping indicates that the volcanics were built upon the thin sedimentary veneer, concurrent with faulting. The large volumes of primarily basaltic andesite lava flows closely followed the predominant northwesterly trend of

the faults. Dikes, the source conduits for erupting lava flows, also trend mostly northwest.

Sedimentation and faulting have continued intermittently to the present. Evidence for recent sedimentation is found at alluvial fans near range fronts and at enclosed basins such as Alkali Lake (Figure 1). Although most of the upland streams are cutting their beds, the Lost River shows little evidence of having eroded its bed during Holocene time.

GEOLOGIC HAZARDS

Seismic Hazard

The quadrangle lies within the seismically active Basin and Range Province. Major faults in the Klamath Falls region have historically generated Richter-magnitude 6.0

and have the potential to produce magnitude 7.3 earthquakes. Some Quaternary-age alluvial fan deposits in the Dairy quadrangle may have developed in response to Quaternary-age fault movement.

GEOLOGIC RESOURCES

Water

Drill-hole logs for the wells within the quadrangle provided important geologic and geohydrologic information. Analysis of the logs improved the interpretation of the quadrangle's structure and stratigraphy. The original drill-hole logs are available for viewing at the Oregon Water Resources Department's website: <http://www.wrd.state.or.us>. The Oregon Water Resources Department is currently monitoring water levels in many of these wells to gain important information on the dynamics of the groundwater regime.

Geothermal

The Dairy quadrangle lies about 10 km west of extensive, geothermal resources near Klamath Falls. In the Klamath Falls area, circulation of the geothermal waters is related

to major fault and fracture zones of the Basin and Range type. Presumably water circulating in deep fractures and faults is the source that feeds the Olene Hot Springs at Olene gap. Currently, the hot springs are not being utilized but findings of a recent geothermal survey indicate reservoir temperatures of 60° C (140° F).

Aggregate and Industrial Minerals

Five quarries in the quadrangle have produced crushed rock. Abundant resources are still available, particularly on ridges where soil development is minimal. Cinder resources are present in the quadrangle, but to a limited extent. Most deposits of cinder have not been exploited. Diatomaceous sediments or clays are possible resources for some industrial minerals uses (cat litter, absorbents, pond sealers) but agricultural uses have been already established on the deposits.