GEOLOGIC MAP OF THE OWINZA QUADRANGLE, LINCOLN COUNTY, IDAHO

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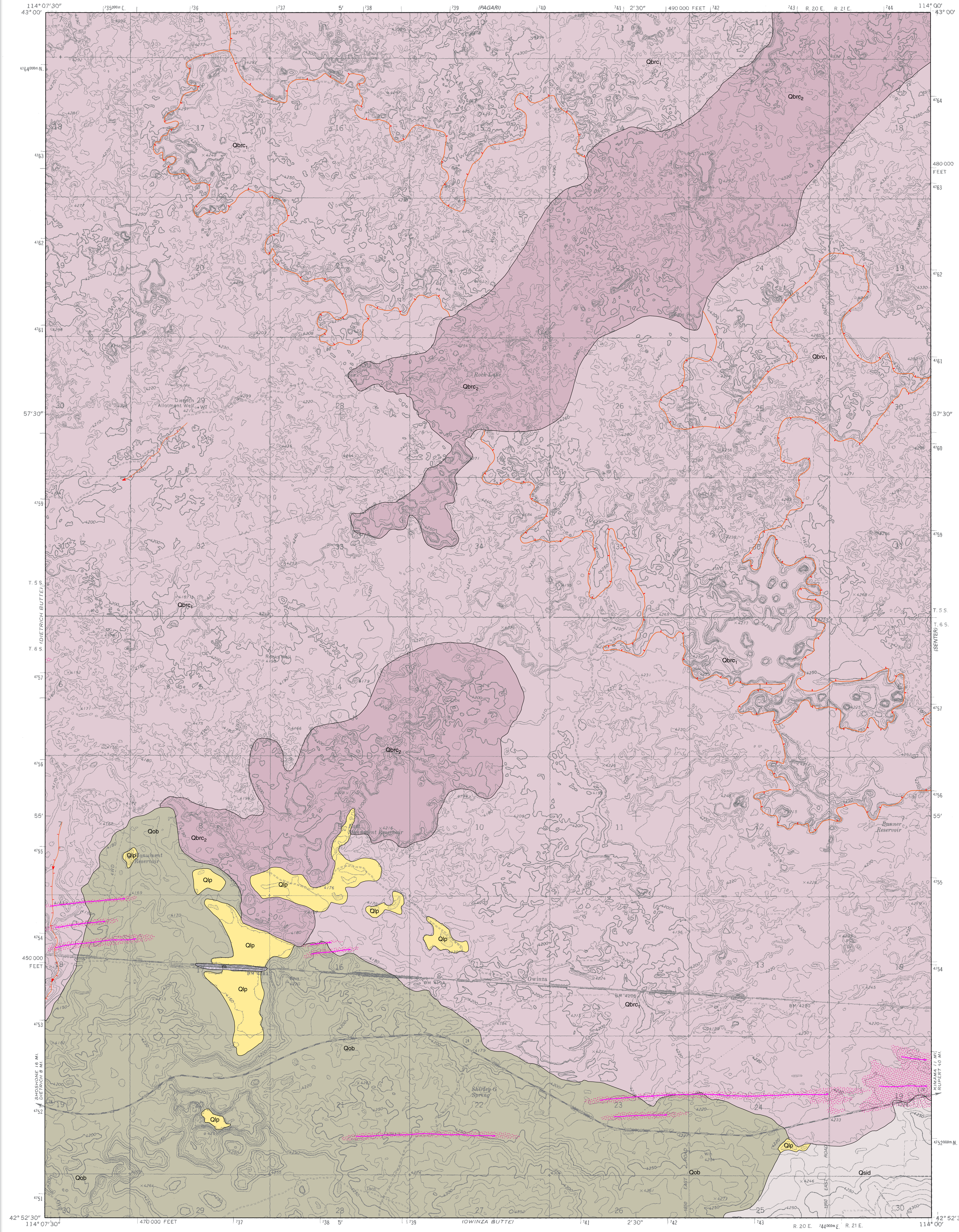
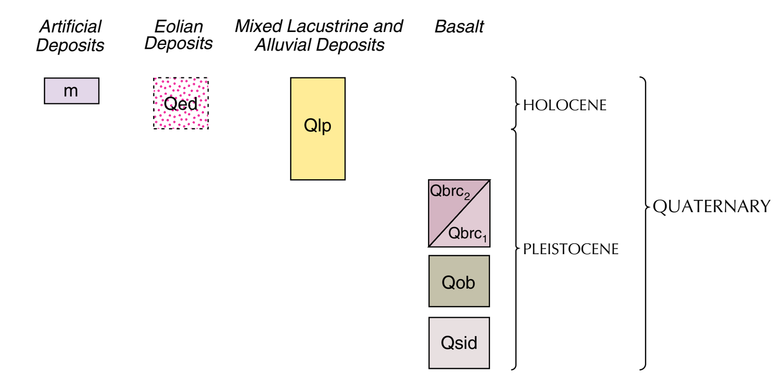


CORRELATION OF MAP UNITS



INTRODUCTION

The geologic map of the Owinza quadrangle identifies both the bedrock and surficial geologic units. It shows the geographic distribution of rock types at the surface and in the shallow subsurface. The Owinza quadrangle lies near the center of the Snake River Plain, a large arcuate, lava-filled depression crossing southern Idaho. Pleistocene basalt flows from shield volcanoes, such as Black Ridge Crater just a few miles northeast of the quadrangle, form the land surface. The older basalt flows are mantled with alluvium and wind-blown sand and silt which form the soils that are cultivated. The rugged lava land that forms most of the land surface in the quadrangle is from Black Ridge Crater. The geologic units in the area control soil development, groundwater movement and recharge, and geotechnical factors important in construction design and waste management. Land uses in the area include grazing, irrigated agriculture, and dairy farms with confined animal feeding operations. The Snake River Plain aquifer underlies the area and discharges to the southwest of the Owinza quadrangle as springs in the Snake River Canyon.

Modern geologic mapping of the Owinza quadrangle was started through the U.S. Geological Survey EDMAP program, which supported work by Cooke (1999) and Shervais and Cooke (2004). With support from the U.S. Geological Survey's STATEMAP program, additional field investigations by the Idaho Geological Survey of both bedrock and surficial geology completed the mapping. Earlier geologic mapping was by Malde and others (1963). Exposures of the geology were examined in the field and selectively sampled. Cooke (1999) provides results and interpretation of basalt-sample chemical analysis. Aerial photographs were studied to aid in identifying boundaries between map units through photogeologic mapping of landforms. Soil series information is from Johnson (2002). The information depicted at this scale furnishes a useful overview of the area's geology but is not a substitute for site-specific evaluations.

DESCRIPTION OF MAP UNITS

ARTIFICIAL DEPOSITS

m **Made ground (Holocene)**—Artificial fills composed of excavated, transported, and emplaced construction materials typically derived locally. Primarily areas modified for railroad beds.

MIXED LACUSTRINE AND ALLUVIAL DEPOSITS

Qlp **Playa deposits (Holocene and Pleistocene)**—Fine sand, silt, and clay sorted into thin beds and laminae. Sediments largely derived from erosion of loess from surrounding basalt surfaces and washed into areas of internal drainage or nearly flat slopes. Form flat to gently sloping fills in shallow depressions primarily between basalt flows. Deposited during periodic floods, especially during periods of heavy rains and times of rapid snow melt. These conditions were probably more prevalent during the Pleistocene, therefore the deposits are mostly relict.

EOLIAN DEPOSITS

Qed **Dune sand (Holocene)**—Stratified fine sand of stabilized wind dunes. Shown only where identified on aerial photographs (1972 NASA false-color infrared; 1992 NAPP black and white).

BASALT UNITS

The surface geology of the Snake River Plain north of the Snake River is primarily Pleistocene basalt flows of the Snake River Group. On the Owinza quadrangle, the basalt flows originated from three shield volcanoes beyond the borders of the quadrangle. Each volcano probably extruded numerous lava flows or flow lobes, although individual flows cannot easily be mapped, especially on the older surfaces now subdued by surficial deposits. Nearly all of the basalt is vesicular to extremely vesicular and most of the units are also diktytaxitic to some degree (i.e., containing voids with protruding crystals). Even units with a fine-grained groundmass have a coarse, grainy texture. Older basalt surfaces tend to be less rugged and more subdued than younger surfaces, primarily the result of greater accumulation of loess over a longer period of time. Over time, drainage patterns change from essentially no drainage on young, very rugged topography, to radial drainage on older buttes. Likewise, young basalt surfaces support little or no agriculture because of the lack of soil, while the older surfaces with thin to thick soil support a wide variety irrigated crops and grazing pastures.

$Qbrc_1$ **Basalt of Black Ridge Crater, unit 1 (Pleistocene)—**Fine-grained, dark gray basalt with scattered small olivine phenocrysts ranging up to about 1 mm in diameter. Remanent magnetic polarity not determined. The vent is located approximately 3 miles northeast of the quadrangle. Equivalent to basalt of Black Ridge Crater of Cooke (1999).

$Qbrc_2$ **Basalt of Black Ridge Crater, unit 2 (Pleistocene)—**Fine- to medium grained, plagioclase-physic basalt with plagioclase phenocrysts ranging from less than 1 mm to 2.5 mm. Olivine phenocrysts 1 mm or less are uncommon to common. Remanent magnetic polarity not determined. Occurs at higher stratigraphic levels and closer proximity to the vent than $Qbrc_1$ flows and represents younger, late-stage eruptions (Cooke, 1999).

Qob **Basalt of Owinza Butte (Pleistocene)**—Medium-grained, black plagioclase- and olivine-phyric basalt. Plagioclase phenocrysts are lath shaped and range from 0.8-4.0 mm in length. Olivine phenocrysts are 0.3-1.3 mm in diameter. Erupted from Owinza Butte, located less than 1 mile south of the quadrangle. Much of the basalt surface is covered with soil and thin eolian deposits, but some pressure ridges and collapsed lava tubes are still visible.

Qsid **Basalt of Sid Butte (Pleistocene?)**—Basalt flows originating from Sid Butte, located 3miles southeast of the quadrangle. Not examined in detail. Cinder pit near the summit contains gabbroic xenoliths (Matthews, 2000). Remanent magnetic polarity is reverse as determined in the laboratory (Duane Champion, written communication, 2004) and in the field during this project.

SYMBOLS

Contact: Line showing the approximate boundary between one map unit and another. The location accuracy of an approximate contact is 80 feet or more on the ground.

Lava flow front: Edge of younger lava flow that erupted onto an older flow from the same source. Includes individual cooling fronts formed during the same eruption.

Lava tube or channel: Relict course of lava that flowed within a relatively narrow tube. Forms a channel where the roof of the tube collapsed.

Trend of dune field: Arrow points in the downwind direction.

REFERENCES

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Shervais, J.W., and M.F. Cooke, 2004, Geologic map of the Owinza 7.5' quadrangle, Lincoln County, Idaho: EDMAP deliverable, scale 1:24,000.

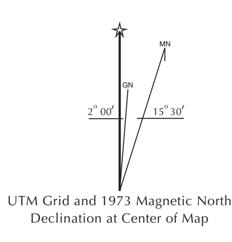
Base map from USGS digital raster graphic base, 1985.

Topography by photogrammetric methods from aerial photographs taken 1969. Updated from aerial photographs taken 1987. Field checked 1987. Map edited 1992.

Transverse Mercator. 1927 North American Datum.

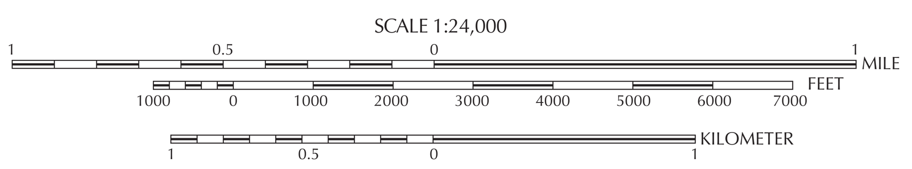
10,000-foot grid ticks based on Idaho coordinate system, west zone.

1000-meter Universal Transverse Mercator grid ticks, zone 11.



UTM Grid and 1973 Magnetic North Declination at Center of Map

SCALE 1:24,000



QUADRANGLE LOCATION

Field work conducted 2004.

This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program.

Digital cartography by Jane S. Freed at the Idaho Geological Survey's Digital Mapping Lab.

Map version 8-30-2006.

Note on printing: The map is reproduced at a high resolution of 600 dots per inch. The inks are resistant to run and fading but will deteriorate with long-term exposure to light.

PDF map (Acrobat Reader) may be viewed at www.idahogeology.org.

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