Geologic Map of the Wendell Quadrangle, Gooding County, Idaho

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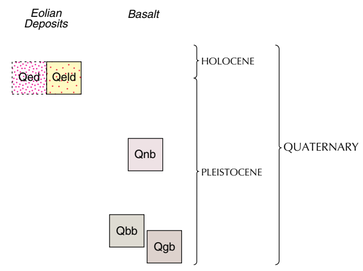
2004

CORRELATION OF MAP UNITS



INTRODUCTION

The geologic map of the Wendell 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 Wendell 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 to the east and north of Wendell form a nearly horizontal land surface mantled with wind-blown sand and silt which form the soils that are cultivated. 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 irrigated agriculture, rural and urban residential development, industrial and commercial enterprises, and dairy farms with confined animal feeding operations. The Snake River Plain aquifer underlies the area and discharges to the west and south of the Wendell quadrangle as springs in the Snake River Canyon.

Previous geologic studies include work by Gillerman and Schiappa (1994) who did an investigation of western Jerome County to assess groundwater vulnerability to contamination. Earlier geologic mapping by Malde and others (1963) was reviewed, and field checking of their map was combined with new field investigations in 2002 of both bedrock and surficial geology. Exposures of the geology were examined and selectively sampled. Aerial photographs were studied to aid in identifying boundaries between map units through photogeologic mapping of landforms. In most areas map-unit boundaries (contacts) are approximate. Contacts are inferred where lack of exposures and poorly defined landforms prevent greater mapping precision. 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

EOLIAN DEPOSITS

Qed **Dune sand (Holocene)**—Stratified fine sand of stabilized and active wind dunes. Deposits are thin. Shown only where identified on aerial photographs (1972 NASA false-color infrared; 1993 NAPP black and white).

Qeld **Loess and dune sand undifferentiated (Holocene and Pleistocene)**—Wind-blown silt and sand. Typical textures are fine sand, silty fine sand, and fine sandy silt. Generally 6-10 feet thick and buries original undulating basalt surface. Rock outcrops are rare.

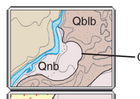
BASALT

Qnb **Basalt of Notch Butte (Pleistocene)**—Fine-grained, dark gray basalt, with common to abundant olivine as individual grains and clots up to 1-2 mm, and abundant small plagioclase crystals 0.5-1 mm that give the basalt a sparkly character in sunlight; a few scattered clusters of plagioclase and olivine 2-3 mm, and scattered plagioclase phenocrysts 1-2 mm. Moderately to very vesicular and diktytaxitic. Remanent magnetic polarity is normal, as determined in the field and through laboratory analysis. Erupted from the Notch Butte shield volcano located 3 miles south of Shoshone. Equivalent to Wendell Grade Basalt of Malde and others (1963). Many lava-flow features, like pressure ridges, are exposed and 30-75 percent of the surface is outcrop except where thicker sand and silt (*Qeld*) obscure the rough character of the original basalt surface. Stream drainage is not developed to poorly developed. Discontinuous loess (silt and fine sand) is thin and primarily accumulated in swales and depressions. Loess ranges 1-10 feet thick; commonly 1-3 feet thick. Soil caliche (duripans) are generally limited to thin soil horizons and coatings on the basalt surface at the base of the soil, but may be thicker in some low areas. Small, discontinuous areas are cultivatable, but most of area generally unfit for cultivation.

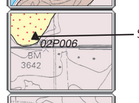
Qbb **Basalt of Bacon Butte (Pleistocene)**—Medium to dark gray basalt; texture variable from fine grained with common to abundant olivine grains and clots 0.5 to 2 mm, to fine-grained groundmass but coarse-textured due to abundant plagioclase and olivine phenocrysts. Plagioclase laths 1-3 mm in length; olivine grains and clots 0.5 to 1.5 mm in diameter; and scattered to common plagioclase-olivine glomerocrysts 3 to 7 mm. Probably several flows, with the finer grained olivine-rich variety likely the youngest. Remanent magnetic polarity is normal, as determined in the field and through laboratory analysis. Erupted from a shield volcano with third-order elevation mark 4050 (Shoshone SW 7.5-minute quadrangle) located about 15 miles east of Wendell. Covington and Weaver (1991) used the name "Bacon Butte" for flows to the west near the Snake River, and referred to the source as butte 4000 (from Twin Falls 1:125,000-scale topographic map). The butte crater is currently the location of the Jerome shooting range. The name "Bacon Butte" is retained for this report. Equivalent to *Qtt* (Thousand Springs Basalt) of Malde and others (1963) but includes some areas they mapped as *Qss* (Sand Springs Basalt). Surface drainage is moderately developed. Older flows poorly exposed with isolated pressure ridges rising above a nearly complete mantle of loess and dune sand (*Qeld*); possible younger flow characterized by exposed pressure ridges with relatively thin silt and sand cover. Thickness of mantle ranges from 3-25 feet on older flows; commonly 3-12 feet thick. Soil caliche (duripan) is typically well developed within the soil profile (Youngs and others, 1929; Johnson, 2002) and at the soil-basalt contact, but the thickness of the caliche is highly variable. Most of the surface can be cultivated, except on exposed pressure ridges.

Qgb **Basalt of Gooding Butte (Pleistocene)**—Fine-grained basalt with scattered to abundant plagioclase phenocrysts up to 1 cm in length, and plagioclase-olivine intergrowths up to 1 cm in diameter; olivine olive-greenish-brown in color; olivine grains mostly clustered; diktytaxitic and vesicular; vesicles small and circular to large and irregular. Common carbonate filling and coating in voids. Remanent magnetic polarity is normal, as determined in the field with a fluxgate magnetometer. Source is Gooding Butte, approximately two miles southwest of Gooding. Equivalent to *Qtm* (Thousand Springs Basalt, Malad Member) of Malde and others (1963). Surface topography is subdued; outcrops uncommon. Lack of a crater in the butte suggests basalt of Gooding Butte is slightly older than basalt of Flat Top Butte. Away from the butte, a mantle of loess nearly completely covers original basalt surface. Stream drainage is moderately developed. Loess ranges 3-25 feet thick. Soil caliche (duripan) is commonly well developed within the soil profile (Youngs and others, 1929; Johnson, 2002) and at the soil-basalt contact, but the thickness of caliche is highly variable. Most of the land is cultivatable.

SYMBOLS

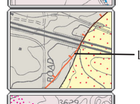


Contact: Line showing the approximate boundary between one map unit and another. The location accuracy of an approximate contact is more than 80 feet on the ground.

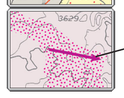


Sample site for paleomagnetic and chemical analysis.

Canal:Trace of major irrigation canal zone that includes area of excavation and side-casted fill. Zone of disturbance ranges 50-300 feet wide.



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.



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

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Base map scanned from USGS film-positive base, 1992.

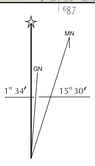
Topography by photogrammetric methods from aerial photographs taken 1969. Information shown has been updated from aerial photographs taken 1987 and field checked. Map edited 1992.

1927 North American Datum.

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

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

National geodetic vertical datum of 1929.



UTM Grid and 1980 Magnetic North Declination at Center of Map

SCALE 1:24,000

1 0.5 0 1 MILE

1000 0 1000 2000 3000 4000 5000 6000 7000 FEET

1 0.5 0 1 KILOMETER

Contour interval 10 feet

QUADRANGLE LOCATION

Field work conducted 2002.

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Digital cartography by B. Benjamin E. Studer and Jane S. Freed at the Idaho Geological Survey's Digital Mapping Lab.

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