Geologic Map of the Shoshone Quadrangle, Lincoln County, Idaho

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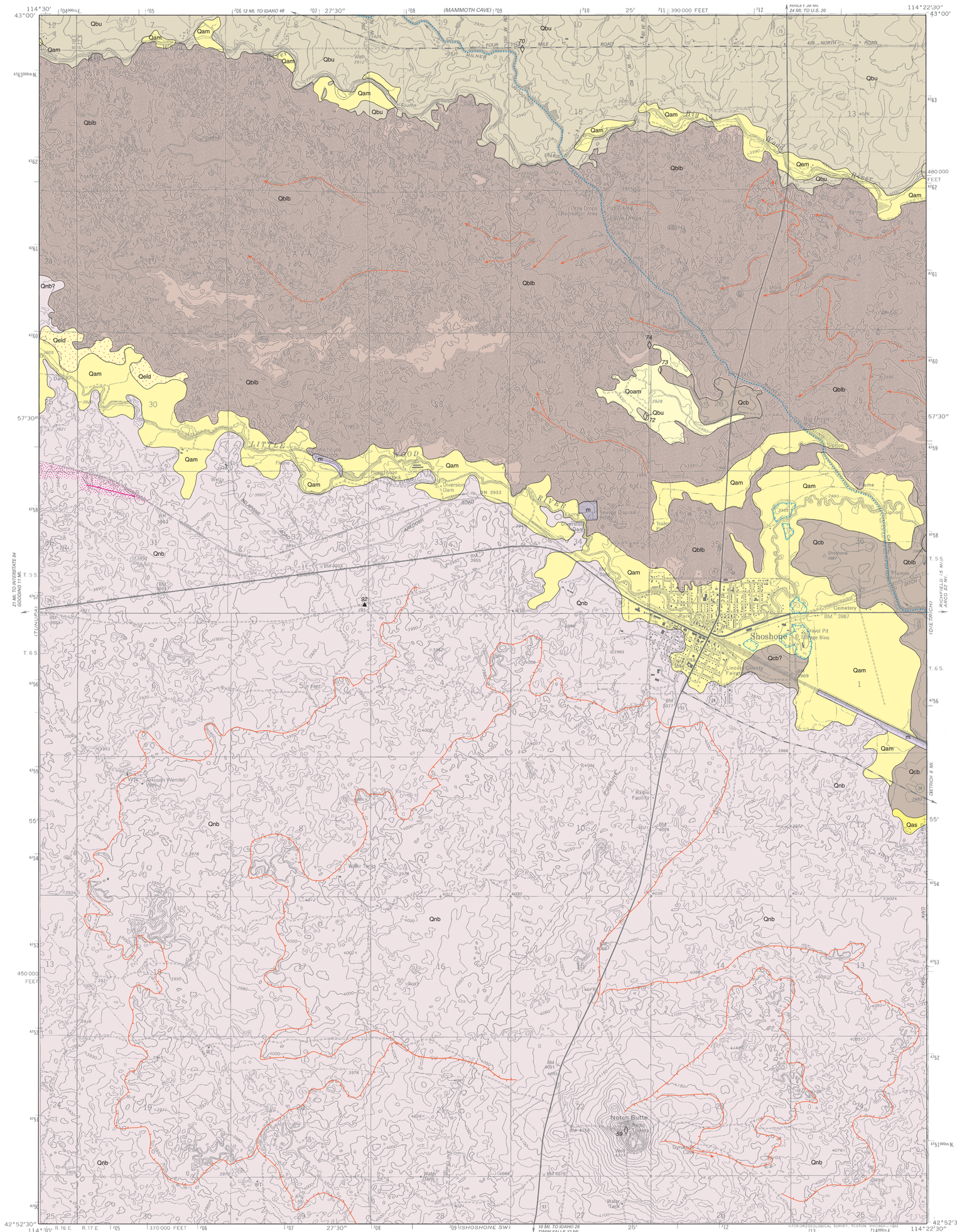


Base map scanned from USGS film positive, 1992.

Topography by photogrammetric methods from aerial photographs taken 1969. Updated from aerial photographs taken 1987 and field checked. Map edited 1992. Conflicts may exist between some updated features and previously mapped contours.

Polyconic projection. 1927 North American Datum.

10,000-food grid ticks based on Idaho coordinate system, central zone.

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

UTM Grid and 1971 Magnetic North Declination at Center of Map

SCALE 1:24,000

Contour interval 10 feet.

QUADRANGLE LOCATION

Field work conducted 2003.

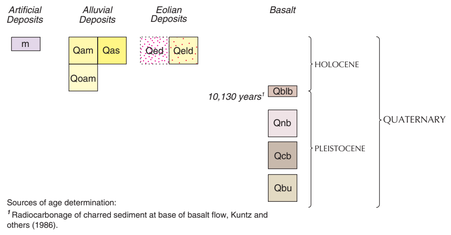
This geologic map was funded in part by the USGS National Cooperative Geologic Mapping Program.

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

Map version 11-29-2005.

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

CORRELATION OF MAP UNITS



Sources of age determination:
[1] Radiocarbonage of charred sediment at base of basalt flow, Kuntz and others (1986).

INTRODUCTION

The geologic map of the Shoshone 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 Shoshone 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 Notch Butte just south of Shoshone, 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 youngest basalt flow from Black Butte Crater to the north forms the rugged lava land that cuts east-west across the quadrangle. 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 southwest of the Shoshone quadrangle as springs in the Snake River Canyon.

Earlier geologic mapping by Malde and others (1963) was reviewed, and field checking of their map was combined with new field investigations in 2003-2004 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. 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 settling ponds and railroad beds.

ALLUVIAL DEPOSITS

Qam — **Alluvium of mainstreams (Holocene)**—Channel and flood-plain deposits of the Big Wood and Little Wood rivers. Channel deposits primarily stratified sand and pebble gravel; coarser gravel present in thicker deposits. Flood-plain deposits primarily stratified sand along the Big Wood River and silt in the Little Wood River floodplain. Basalt outcrop is common in channels during low water. Thickness 1-20 feet.

Qoam — **Older alluvium of mainstreams (Holocene)**—Coarse sand and pebble to cobble gravel deposited by the ancestral Wood River. Deposits are exposed in a window through *Qblb* one mile north of Shoshone where the basalt of Black Butte Crater (*Qblb*) flowed around an older surface. The channel sand and gravel of Wood River source overlies stream-smoothed and -scoured older basalt (*Qbu*).

Qas — **Alluvium of side-streams (Holocene)**—Channel, flood-plain, and sheet-wash deposits in the drainage system south of Crater Butte in the Dietrich 7.5′ quadrangle. Slope gradients are low and the deposits primarily are silt and clay. During extreme high flows, water from Little Wood River may have crossed the low divide near SR 24 one mile east of the quadrangle boundary.

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; 1993 NAPP black and white).

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

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 Shoshone quadrangle, the basalt flows originated from several shield volcanoes within and 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 development support a wide variety irrigated crops and grazing pastures.

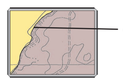
Qblb — **Basalt of Black Butte Crater (Holocene)**—Fine-grained, dark gray, glassy basalt with common to abundant olivine as individual grains and clots up to 1-2 mm, and abundant small plagioclase crystals 0.5-1 mm that give the basalt a sparkly character in sunlight; diktytaxitic and vesicular; vesicles circular to irregular and tubular. Minor carbonate lining some voids. Remanent magnetic polarity is normal, as determined in the field with a fluxgate magnetometer. Source is Black Butte Crater to northeast near Magic Reservoir. Possibly several flow units or lobes. Youthful surface characterized by very irregular topography of pressure ridges and flow and collapse features (see Symbols). Little to no loess or other surficial deposits; vegetation restricted to sagebrush and scattered grass. Equivalent to *Ql* (Lava flows) of Malde and others (1963), and to Shoshone flow of Cooke (1999) and of Kuntz and others (1986) who reported a radiocarbon age of 10,130 ±350 years B.P. from charred sediment at base of the lava flow.

Qnb — **Basalt of Notch Butte (Pleistocene)**—Fine-grained, dark gray basalt. Several flows or flow units with varying characteristics. Some units have common to abundant olivine as grains and clots 1-2 mm and abundant small plagioclase crystals 0.5-1 mm that give the basalt a sparkly character in sunlight; others have a few scattered clusters of plagioclase and olivine 2-3 mm, and scattered plagioclase phenocrysts 1-2 mm; and still others contain glomerocrysts of plagioclase and olivine intergrowths 3-7 mm. Moderately to very vesicular and diktytaxitic. Similar in hand specimen to basalt of Black Butte Crater but not as glassy. Carbonate lining and filling in voids slightly more common than in basalt of Black Butte Crater. Remanent magnetic polarity is normal, as determined in the field and through laboratory analysis. Source is Notch Butte located about 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 near the Little Wood River. Stream drainage is not developed to poorly developed. Surface topography is, however, not as youthful in appearance as basalt of Black Butte Crater, which has virtually no soil. Discontinuous loess (silt and fine sand) is thin and primarily accumulated in swales and depressions. Soil caliche (duripan) is 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. Vegetation characterized by sagebrush and grasses, or rarely farmed on flatter, soil-covered areas.

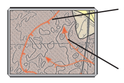
Qcb — **Basalt of Crater Butte (Pleistocene)**—Fine- to medium-grained, medium to dark gray, abundantly plagioclase-phyric basalt with common to abundant olivine, some as inclusions or intergrowths in plagioclase. Plagioclase laths typically 2-5 mm in length and randomly oriented, forming a coarse open texture of voids and intersecting crystals. Remanent magnetic polarity is normal, as determined in the field. Source is Crater Butte about seven miles east of Shoshone. Occurs along east edge of map east of Shoshone and may be exposed in a window through *Qblb* one mile north of Shoshone. Loess covers most of the surface. Loess thickness ranges 3-10 feet and soil caliche (duripan) is commonly well developed with the soil profile and at the soil-basalt contact (Johnson, 2002), but the thickness of caliche is highly variable. Most of the land is cultivatable.

Qbu — **Basalt flows, undivided (Pleistocene)**—Fine- to medium-grained, medium to dark gray basalt with common plagioclase phenocrysts 1-3 mm; olivine mostly as individual grains in groundmass or small scattered clusters; scattered plagioclase-olivine intergrowths 2-4 mm; diktytaxitic and vesicular. Some carbonate coating and filling in voids. One location gave a reverse polarity magnetometer reading in the field, but other sites checked in the field indicated normal polarity. Laboratory analysis of core-sample site 70 indicates normal polarity (drilled along Four Mile Road 2 miles west of Highway 75). Undetermined source or sources to north probably from the Mount Bennett Hills area, but may include flows from Kinzie Butte, about 12 miles northeast of Shoshone. Equivalent to *Qbb* (Bruneau Formation, basaltic lava flows) of Malde and others (1963). Surface topography is subdued; outcrops uncommon. A mantle of loess nearly completely covers original basalt surface. Stream drainage is moderately developed. Loess ranges 3-10 feet thick. Soil caliche (duripan) is commonly well developed within the soil profile (Johnson, 2002) and at the soil-basalt contact, but the thickness of caliche is highly variable. Most of the land is cultivatable.

SYMBOLS



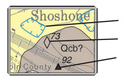
Contact: Line showing the approximate boundary between one map unit and another. The location accuracy of an approximate contact is more than 80 feet on the ground.



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.

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



Gravel pit that exposes a map unit.

Sample site for paleomagnetic analysis.*

Sample site for chemical and paleomagnetic analyses.*

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

*Data available at Idaho Geological Survey, igs@uidaho.edu.

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