GEOLOGIC MAP OF THE KINZIE BUTTE QUADRANGLE, LINCOLN COUNTY, IDAHO

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2007

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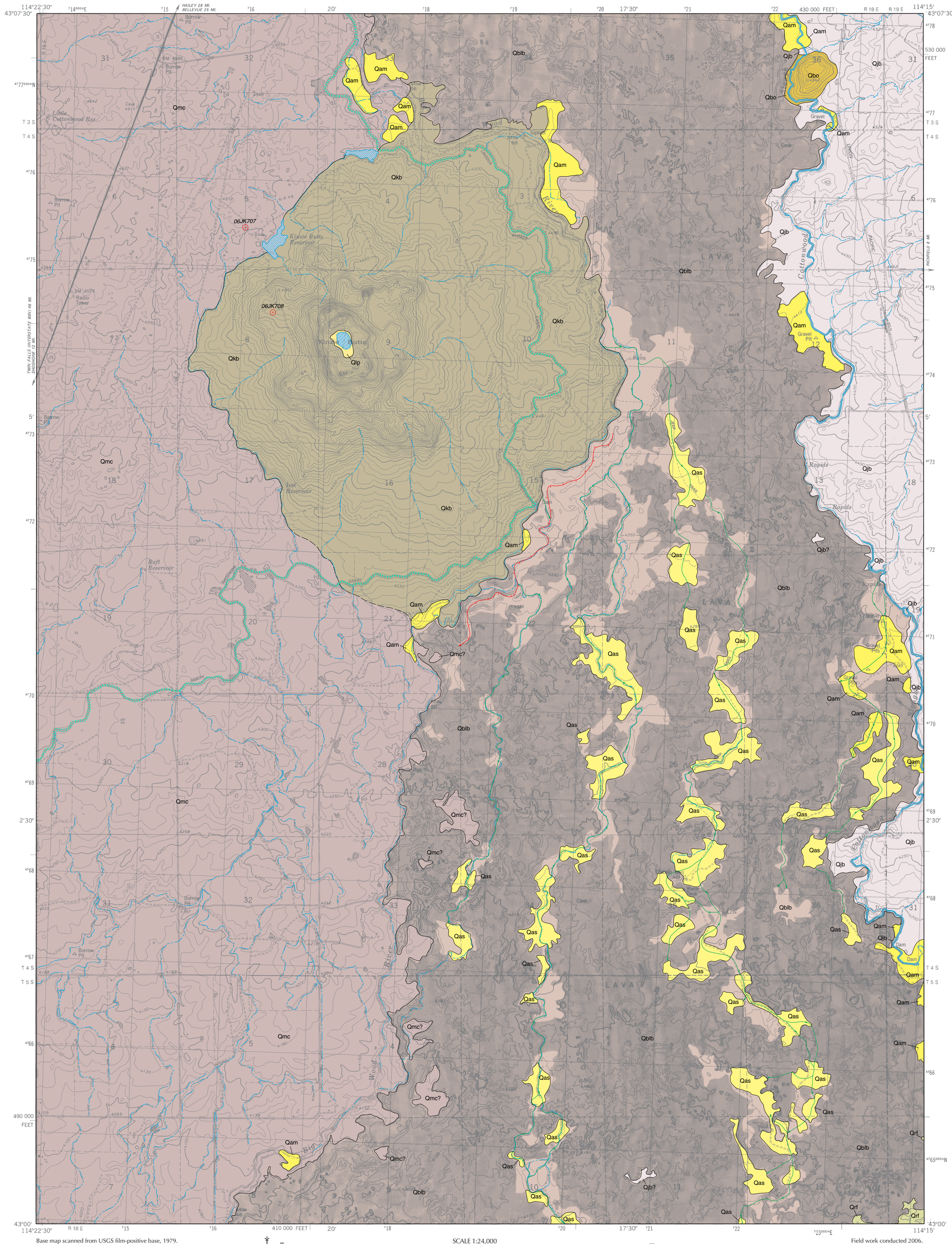

Base map scanned from USGS film-positive base, 1979.

Topography by photogrammetric methods from aerial photographs taken 1971. Field checked 1973. Map edited 1979.

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.

National geodetic vertical dat um of 1929.

UTM Grid and 1979 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

IDAHO

QUADRANGLE LOCATION

Field work conducted 2006.

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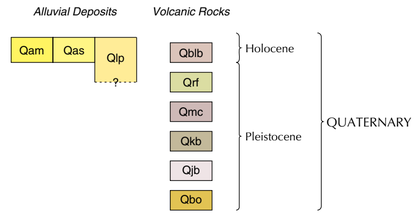
Digital cartography by Jesse S. Bird and Jane S. Freed at the Idaho Geological Survey's Digital Mapping Lab.

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.

Map version 6-6-2007.

CORRELATION OF MAP UNITS



INTRODUCTION

The geologic map of the Kinzie Butte quadrangle depicts rock units exposed at the surface or underlying thin surficial cover of soil and colluvium. Thicker surficial deposits of alluvium are also depicted where they mask or modify the underlying rock units or form significant units. The map is the result of field work conducted in 2006 by the authors. Previous mapping in the quadrangle is restricted to reconnaissance by Malde and others (1963). Mapping on adjacent quadrangles to the south includes Kauffman and others (2005) and Cooke and others (2006) in the Shoshone and Dietrich quadrangles, respectively. Soils information from Johnson (2002).

The Kinzie Butte quadrangle is underlain by Quaternary basalt flows and alluvial deposits of the Big Wood River. The basalt flows were erupted from local shield volcanoes that range in age from early Pleistocene(?) to Holocene. The oldest basalt, unit *Qbo*, is restricted to an isolated hill in the northeast part of the quadrangle. The age of this unit is unknown, but is probably early Pleistocene. Flows from Johnson Butte, a large shield volcano to the east, occur along the east edge of the quadrangle (*Qjb* unit). Flows from Kinzie Butte (*Qkb*), the prominent shield volcano in the northern part of the quadrangle, are covered on the west by flows erupted from an unnamed vent to the northwest (*Qmc* unit) and on the east by the young Black Butte Crater flow (*Qblb*). The latter forms the striking flow that traverses the quadrangle from north to south and is characterized by pressure ridges, collapse features, pahoehoe surfaces, and patches of aa basalt. Black Butte Crater flows filled the ancestral Big Wood River channel and diverted the river to its present course. Stream deposits of the Big Wood River (*Qam*) flank the Black Butte Crater flow. Alluvial deposits in several relict channels (included in *Qas*) on the Black Butte Crater flow resulted from periodic flooding of the river.

DESCRIPTION OF MAP UNITS

ALLUVIAL DEPOSITS

Qam **Alluvial deposits of the Big Wood River (Holocene)**–Channel and flood-plain deposits of the Big Wood River. Stratified coarse sand and pebble to cobble gravel in channel deposits; sandy pebble gravel to silty sand in flood-plain deposits. Basalt outcrop is common in channels during low water. Thickness 1-10 feet.

Qas **Alluvial deposits of side streams and relict channels (Holocene)**–Primarily channel and flood-plain deposits of sand and pebbly sand.

Qlp **Deposits of lakes and playas (Holocene and Pleistocene)**–Stratified clay, silt, and fine sand. Sediments largely derived from erosion of loess from surrounding basalt surfaces and washed into areas of internal drainage or nearly flat slopes. Deposited during periods of heavy rains and times of rapid snow melt.

VOLCANIC ROCKS

Qblb **Basalt of Black Butte Crater (Pleistocene)**–Fine-grained, dark gray, glassy basalt with common to abundant olivine as individual grains and clots as large as 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 in some voids. Remanent magnetic polarity is normal, as determined in the field and in the laboratory. Source is Black Butte Crater shield volcano. Probably consists of several flow units or lobes. Youthful surface characterized by very irregular topography of pressure ridges and collapse features (see Symbols). Rough aa surfaces common near the vent; pahoehoe surfaces elsewhere. These flows host the tourist attraction of Shoshone Ice Caves. Surficial deposits are mostly restricted to relict stream channels where transported sand and pebbly sand accumulated as thin deposits (see *Symbols*); 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.

Qrf **Basalt of Richfield (Pleistocene)**–The basalt of Richfield occupies several small areas in the southeast corner of the quadrangle. The following description of the unit is modified from Cooke and others (2006). Fine-grained, aphyric to olivine-phyric basalt. Glomerocrysts of plagioclase and olivine are present in some samples. Remanent magnetic polarity not determined. Possibly erupted from small, unnamed shield volcano located about 1 mile south of Richfield. Flow surface retains youthful features such as pressure ridges, flow fronts, collapsed lava tubes, lava channels, and thin soil restricted to isolated low areas.

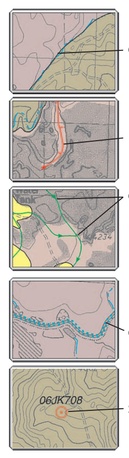
Qmc **Basalt of Mammoth Cave (Pleistocene)**–Flows examined are coarse grained with abundant plagioclase laths 5-7 mm long and common to abundant olivine grains and clots. Source is unnamed butte with survey elevation "4975" located about 5 miles northwest of Kinzie Butte in the southeast corner of the Summit Reservoir 7.5-minute quadrangle. Remanent magnetic polarity not determined. Flows of this basalt host the tourist attraction of Mammoth Cave. In the north part of the quadrangle, flow surface has common pressure ridges and stream drainage is not develop to poorly developed. To the south, loess covers most of the surface and much of the land is farmed. Between pressure ridges loess is 2-6 feet thick and includes a well-developed soil caliche (duripan). Variations in soil characteristics and vegetation form a patterned ground between pressure ridges which is visible on aerial photographs. Included in Qlo unit (older lava flows) by Malde and others (1963).

Qkb **Basalt of Kinzie Butte (Pleistocene)**–Fine- to medium-grained basalt with scattered olivine clots 2-4 mm and clusters of intergrown plagioclase and olivine crystals as large as 1.5 cm. Source is Kinzie Butte. Remanent magnetic polarity as determined in the field inconclusive but probably normal. Buried on the east by the basalt of Black Butte Crater and on the west by basalt of Mammoth Cave. Almost no pressure ridges remain and stream drainage is well developed. Basalt outcrops are common only in the upper areas of the butte where loess and soil is 1-2 feet thick. Loess has accumulated to more than 5 feet thick on lower slopes of the butte where variations in soil characteristics and vegetation form a patterned ground visible on aerial photographs. Included in Qbb (basalt flows of the Bruneau Formation) by Malde and others (1963).

Qjb **Basalt of Johnson Butte (Pleistocene)**–Basalt flows from Johnson Butte, a large shield volcano located about 3 miles to the east in the northern part of the Richfield 7.5-minute quadrangle. Flows examined are fine to medium grained with abundant plagioclase and olivine phenocrysts, commonly as clusters and intergrowths. Of six samples at two locations checked in the field for remanent magnetic polarity, five gave strong normal readings; the sixth gave strong reverse. Pressure ridges are still visible in many areas. Stream drainage is moderately well developed. Between pressure ridges loess is 2-6 feet thick and soil caliche (duripan) is commonly well developed. Outside of farmed areas, variations in soil characteristics and vegetation form a patterned ground visible on aerial photographs. Included in Qbb (basalt flows of the Bruneau Formation) by Malde and others (1963).

Qbo **Older basalt, undivided (Pleistocene)**–Restricted to a small butte near the northeast corner of the quadrangle. Bordered on the east by basalt of Johnson Butte and on the west by basalt of Black Butte Crater. Mapped from air photographs and topographic expression; not examined in the field. Included in Qbb (basalt flows of the Bruneau Formation) by Malde and others (1963). Although mapped as Quaternary, the age of this unit is uncertain and it may be as old as Pliocene.

SYMBOLS



Contact: Line showing the approximate boundary between one map unit and another.

Lava tube or channel: Relict course of lava that flowed within a relatively narrow tube; arrow points in the direction of flow. Forms a channel where the roof of the tube collapsed.

Course of relict stream flow: Location of former channel and overland flow across the surface of basalt of Black Butte Crater. Arrows points in direction of flow. Occurred during flood discharges of the Big Wood River that allowed water to leave the main river channel along the edge of the basalt. Flood waters transported sand and pebbly sand that accumulated as thin deposits which are light colored in contrast with the dark basalt. Thickest deposits are mapped as *Qas*.

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

Sample location and number.

Table 1. Major oxide and trace element chemistry of basalt samples collected in the Kinzie Butte quadrangle.

Sample number	Latitude	Longitude	Unit name	Map unit	Major elements in weight percent										Trace elements in parts per million															
					SiO_2	TiO_2	Al_2O_3	FeO*	MnO	MgO	CaO	Na_2O	K_2O	P_2O_5	Ni	Cr	Sc	V	Ba	Rb	Sr	Zr	Y	Nb	Ga	Cu	Zn	Pb	La	Ce	Th	Nd
06JK707	43.10292	-114.34559	basalt of Mammoth Cave	Qmc	47.22	3.168	16.74	12.62	0.194	5.08	10.75	2.74	0.57	0.921	66	120	27	284	496	6	381	326	45	28.1	24	36	138	7	36	83	0	48
06JK708	43.09415	-114.3417	basalt of Kinzie Butte	Qkb	46.55	2.958	15.12	13.60	0.212	7.51	10.51	2.48	0.46	0.606	118	203	32	315	541	6	302	226	36	18.5	22	29	134	5	23	56	2	35

* Major elements are normalized on a volatile-free basis, with total Fe expressed as FeO.
All analyses performed at Washington State University GeoAnalytical Laboratory, Pullman, Washington.

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