GEOLOGIC MAP OF THE EDEN QUADRANGLE, JEROME AND TWIN FALLS COUNTIES, IDAHO

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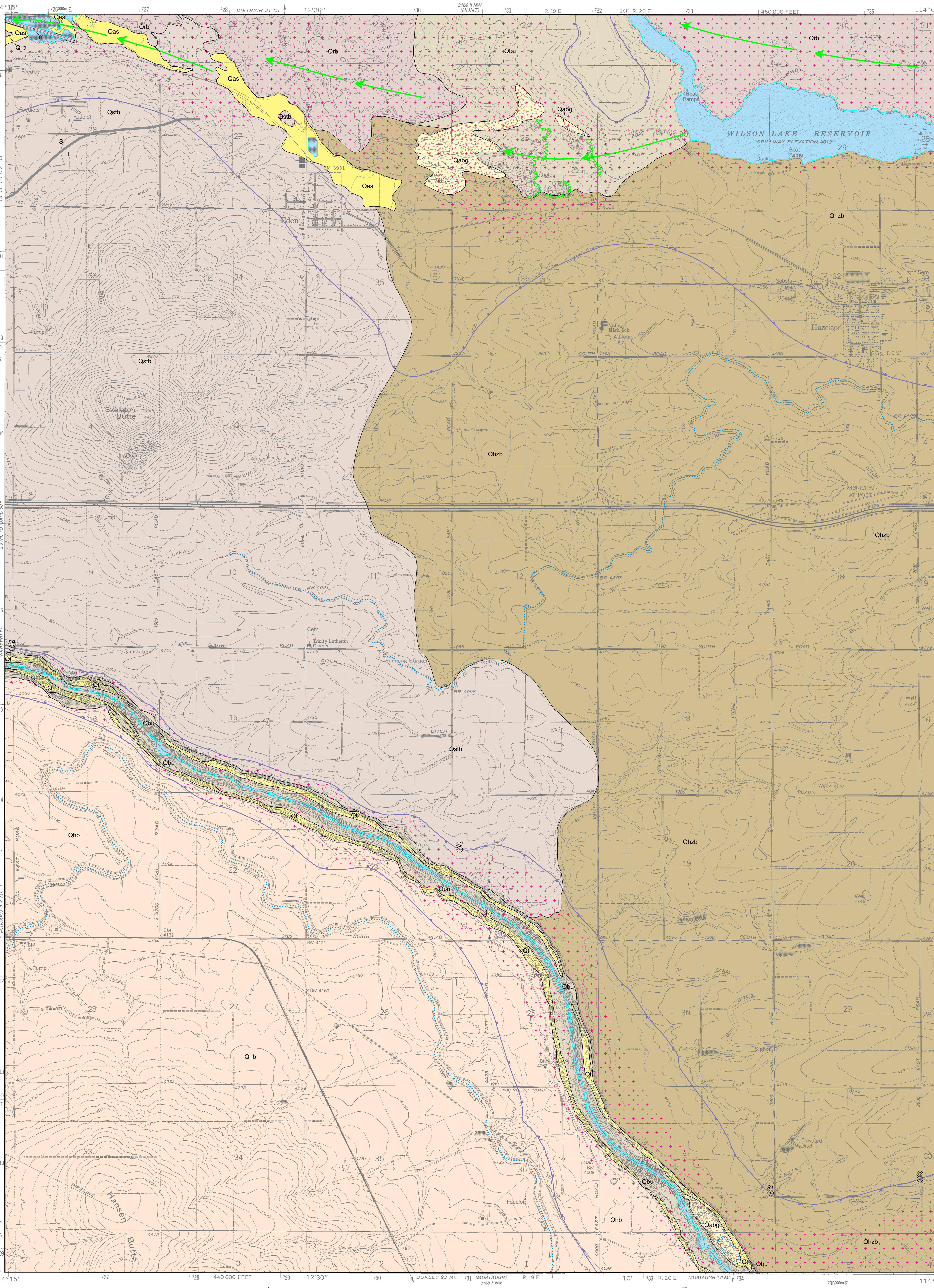

Base map scanned from USGS film-positive base, 1992.

Topography by photogrammetric methods from aerial photographs taken 1962. 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, central zone.

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

National geodetic vertical datum of 1929.

MN
GN
1° 54'
15° 30'

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

Map version 2-5-2004

CORRELATION OF MAP UNITS

Artificial Deposits	Alluvial Deposits	Mass Movement Deposits	Basalt		
m	Qas	Qt		HOLOCENE	QUATERNARY
Bonneville Flood 14,500 years	Qabg, Qabs		Qrb, Qstb, Qhzb, Qhb, Qbu	PLEISTOCENE	QUATERNARY

INTRODUCTION

The geologic map of the Eden quadrangle identifies both the bedrock and surficial geologic units found at the surface and in the shallow subsurface. The information is directed at a broad range of specialists concerned with land development and its consequences as population increases place greater demands on the region's natural resources. Knowledge of the geology in the area is important to understanding soil development, slope stability, groundwater movement and recharge, and geotechnical factors important in construction design and waste management. The information depicted at this scale furnishes a useful overview of the area's geology but is not a substitute for site-specific evaluations.

The Eden quadrangle is located near the center of the Snake River Plain, a large arcuate, lava-filled depression crossing southern Idaho. The incised Snake River Canyon cuts across the southwest part of the quadrangle and is centered between the gentle slopes of three shield volcanoes, Skeleton Butte, Hansen Butte, and Hazelton Butte (vent in adjoining Milner quadrangle). The land's morphology is primarily formed by basalt flows of the shield volcanoes (Malde and Powers, 1962; Malde and others, 1963; Covington, 1976; Williams and others, 1990; and Covington and others, 1990). See Covington and Weaver (1990) for details on the geology of the north wall of the Snake River canyon. Most of the basalt surface is mantled by loess in which the cultivated soils formed (Baldwin, 1925; Poulson and Thompson, 1927; Lewis and Fosberg, 1982; Scott, 1982; Ames, 1998). Approximately 14,500 years ago the Bonneville Flood filled and overtopped the Snake River Canyon. Upstream near Burley, flood waters were partially diverted northward and flowed through the Eden channel now partly filled by Wilson Reservoir and Goose Lake (O'Connor, 1993). The potholes and rugged basin and butte topography near Eden were carved by flood waters rushing through the Eden channel.

DESCRIPTION OF MAP UNITS

ARTIFICIAL DEPOSITS

m **Made ground (Holocene)**—Artificial fills composed of excavated, transported, and emplaced construction materials typically derived locally.

ALLUVIAL DEPOSITS

Qas **Alluvium of sidestreams (Holocene)**—Stratified silt and sand in underfit stream drainages located in upland north of Snake River Canyon.

Bonneville Flood

Qabg **Sand and gravel in giant flood bars (Pleistocene)**—Boulders, cobbles, and pebbles of basalt in a matrix of basaltic sand. Forms streamlined gravel deposits downstream of cataracts and potholes in the "East of Eden channel" (O'Connor, 1993).

Qabs **Scabland of flood pathways (Pleistocene)**—Flood-scoured basalt surface. Loess stripped, basin and butte topography is common. Unit adapted from Scott (1982) and O'Connor (1993). Character of scoured surface ranges from areas of original basalt morphology stripped of pre-flood loess and soils, to areas where the original basalt surface has been plucked, gouged, and molded. Includes patchy sheets and bars of thin sand and gravel that are not mapped at this scale. Some areas include pavements or strings of boulders transported by flood traction forces or that are lags from erosion by lower-energy regime during late stages of the flood.

MASS MOVEMENT DEPOSITS

Qt **Talus of Snake River canyon walls (Holocene)**—Angular pebble-, cobble-, and boulder-sized fragments of basalt that have broken off nearly vertical rock walls and accumulated below. Deposits are characterized by a steeply sloping surface that is at or near the angle of repose. Prominent deposits are shown. Thin, discontinuous talus is included in basalt unit.

BASALT

Qrb **Basalt of Rocky Butte (Pleistocene)**—Unweathered, medium gray plagioclase-olivine basalt. Remanent magnetic polarity is normal, as determined in the field and through laboratory analysis. Erupted from a shield volcano located 22 miles northeast of the city of Twin Falls in the Eden NE topographic quadrangle, which shows a permanent horizontal-control mark labeled "Rocky" at 4526 feet on the south rim of the vent (Sec. 14, T. 8 S., R. 20 E.). Equivalent to Sand Springs Basalt of Malde and Powers (1962), Malde and others (1963), Covington (1976), and Covington and Weaver (1990). Covington and Weaver (1990) called source volcano "Butte 4526." In the Eden quadrangle, entire unit was scoured by Bonneville Flood (*Qabs*) and is 90 percent outcrop.

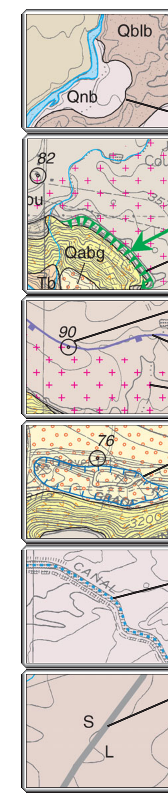
Qstb **Basalt of Skeleton Butte (Pleistocene)**—Gray, olivine-rich pahoehoe basalt from vent at Skeleton Butte (Covington and others, 1990) located 2 miles southwest of Eden. Possible subsidiary vent(s) located southeast of Skeleton Butte (Sec. 14, T. 10 S., R. 19 E.). Mapped as basalt member 3 (*Qi3*) by Covington and others (1990). Surface drainage is moderately well developed, vent lacks a crater, and basalt is almost entirely mantled with loess. The topographic slopes, however, reflect the original morphology of the shield volcano. Loess thickness ranges from 3 to greater than 50 feet (Lewis and Fosberg, 1982; Ames, 1998). Loess is thinnest on the steeper slopes of the vent and within the extent of the Bonneville Flood (see *Symbols*). Thickest loess may include a younger deposit with weak soil development and an underlying older loess with a thick caliche (duripan) horizon (Poulson and Thompson, 1927; Ames, 1998).

Qhzb **Basalt of Hazelton Butte (Pleistocene)**—Gray to dark-gray, vesicular, pahoehoe basalt erupted from Hazelton Butte vent located 3.5 miles southeast of Hazelton (in the adjoining Milner quadrangle). Petrography described by Williams and others (1990). Normal magnetic polarity reported by Williams and others (1990). Mapped as basalt member 4 (*Qi4*) by Covington and others (1990). Surface drainage is moderately well developed and the basalt is entirely mantled with loess. The topographic slopes, however, reflect the original morphology of the shield volcano. Loess thickness ranges from 5 to greater than 50 feet (Lewis and Fosberg, 1982; Ames, 1998). Loess is thinnest on the steeper slopes of the vent and within the extent of the Bonneville Flood (see *Symbols*). Thickest loess may include a younger deposit with weak soil development and an underlying older loess with a thick caliche (duripan) horizon (Poulson and Thompson, 1927; Ames, 1998).

Qhb **Basalt of Hansen Butte (Pleistocene)**—Gray, dense, pahoehoe basalt erupted from Hansen Butte vents 7 miles south of Eden. Petrography described by Williams and others (1990). Normal magnetic polarity reported by Williams and others (1990). Surface drainage is moderately well developed, vent lacks a crater, and basalt is entirely mantled with loess. The topographic slopes, however, reflect the original morphology of the shield volcano. Loess thickness ranges from 5 to greater than 50 feet (Lewis and Fosberg, 1982; Ames, 1998). Loess is thinnest on the steeper slopes of the vent and within the extent of the Bonneville Flood (see *Symbols*). Thickest loess often includes a younger deposit with weak soil development and an underlying older loess with a thick caliche (duripan) horizon (Baldwin, 1925; Ames, 1998).

Qbu **Older basalt flows, undivided (Quaternary and Tertiary)**—Various basalt flows that include, but not limited to, map units *Qi6*, *Qi7*, *Qi12*, *Qi13*, and *Qi14* of Covington and Weaver (1990). Unit similar to *Qbu* of Williams and others (1990). Primarily exposed in the Snake River canyon, but includes older shield volcano located 2 miles northeast of Eden.

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.

Bonneville Flood flow direction.

Relict cataracts of Bonneville Flood.

Location of reported evidence for maximum stage of Bonneville Flood (O'Connor, 1993).

Approximate extent of Bonneville Flood at maximum stage.

Flood-scoured basalt surface (see *Qabs* description)

Gravel pit that exposes a map unit.

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

Indistinct, gradational transition zone between sandy eolian surface deposits and silty eolian surface deposits. The transition zone is close to the pre-agriculture morphological change from dunes to blanket deposits of dust. Based on 2002 field evidence and soil surveys (Poulson and Thompson, 1927; Ames, 1998). The transition zone was primarily based on a general distribution of loose, fine-sand soils and more compact loam to silt-loam soils. The sand to silt transition was chosen where generally the amount of silt begins to exceed 50% and sand tends to be less than 50%. In soils with little clay, typical of eolian deposits, the transition occurs between sandy loam and silt loam. In the Unified Soil Classification System used by engineers, the transition is between course-grained soils (<50% passes a #200 sieve) and fine-grained soils (>50% passes a #200 sieve).

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