Geologic Map of the Eagle Quadrangle, Ada County, Idaho

Kurt L. Othberg
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Technical Report 90-5
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Kurt L. Othberg[1] and Loudon R. Stanford[1]

INTRODUCTION

This map is one of several geologic maps for the region covered by the Boise 1° x 2° quadrangle. Until now, no geologic maps at this scale had been produced for the area. County Report 3, *Geology and Mineral Resources of Ada and Canyon Counties* (Savage, 1958), contains a countywide geologic map that includes the area of the Eagle 7 1/2-minute quadrangle. Although the 1958 report still provides useful information, this new, larger scale map gives a further interpretation of the geology and furnishes the detail needed for understanding the region's land, water, and mineral resources.

Key quadrangles near Boise were chosen for this major geologic mapping program undertaken to unravel the stratigraphy, chronology, and geologic history of the fastest growing region in the state. With financial assistance of the U.S. Geological Survey's COGEOMAP Program, the Idaho Geological Survey has conducted since 1986 detailed mapping of nine 7 1/2-minute quadrangles. The *Geologic Map of the Eagle Quadrangle, Ada County, Idaho* is among the first published maps from that project. The long-term goal of the program is to compile and publish two regional geologic maps at 1:100,000 scale. These smaller scale maps will represent both detailed and reconnaisance mapping of sixty-four 7 1/2-minute quadrangles. The more-detailed geologic maps, such as this one, will be released in the Technical Report series.

This report consists of two parts, a geologic map and an expanded description of map units in accompanying text. The geologic map can be read alone. The map's legend briefly describes the rock units in addition to providing a correlation diagram and an explanation of symbols. The accompanying text contains further information about physical properties, age-

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dating, associated features, and other details about the units.

DESCRIPTION OF MAP UNITS

Qa Alluvium of active streams

LITHOLOGY AND TEXTURE. Mostly sandy pebble and cobble gravel of the Boise River. Granitic rocks and porphyritic felsites dominate the lithologies of the gravel clasts; 5-10 percent of the clasts consist of gray unweathered basalt. Unit includes sandy alluvium of Dry Creek and Spring Valley Creek.

SOURCE. Mostly channel alluvium of the Boise River; includes minor sidestream deposits. Most transported clasts came from the Idaho batholith and associated felsic rocks of the central Idaho mountains. Basalt clasts came from Pleistocene basalt flows in the Boise River drainage basin.

THICKNESS. Well logs suggest a gravel thickness of 7-11 meters (24-35 feet) overlying much older, finer grained sediments.

SURFACE SOILS. Soils developed in these young deposits exhibit little or no A or B horizons, for example, Notus Series and unvegetated riverwash (Collett, 1980). In vegetated areas gravel or sand typically lies within 1/3 meter (1 foot) of the surface.

AGE. Late Holocene. Virtually no gravels have been deposited by the Boise River since construction of the dams in the twentieth century.

Qas Sandy alluvium of Dry Creek Valley and fans and valley bottoms of the Boise foothills

LITHOLOGY AND TEXTURE. Medium to coarse sand interbedded with silty fine sand and silt. The mineralogy of the sand includes quartz, feldspar, and mica grains in amounts similar to the granitic rocks and grus from which the sand originated. Much of the sediment is reworked from Tertiary sedimentary rocks in the Boise foothills.

SOURCE. Mostly alluvium deposited in Dry Creek Valley, Spring Valley, and Woods Gulch. Unit includes alluvium and alluvial fan deposits of the many gulches in the Boise foothills.

THICKNESS. Highly variable: ranges from 8 to 30 meters (26-100 feet) in Dry Creek Valley and is as much as 9 meters (30 feet) thick in alluvial fans along Hill Road.

SURFACE SOILS. Soils in these deposits have weakly to moderately developed clayey and calcic B horizons. Typical soils include the Goose Creek, Brent, Drax, and Cashmere series (Collett, 1980).

AGE. Includes Holocene alluvium, but most of the sand probably was deposited during greater runoff conditions in the Pleistocene (Pierce and Scott, 1982). The surface of Dry Creek Valley grades into the Boise terrace, suggesting the same age for the two landforms.

Qbg Gravel of the Boise terrace

LITHOLOGY AND TEXTURE. Sandy pebble and cobble gravel. Granitic rocks and porphyritic felsites dominate the lithologies of the gravel clasts; 5-10 percent of the clasts consist of gray unweathered basalt.

SOURCE. Mostly channel alluvium of the former Boise River deposited on the river-cut surface of the first terrace above the modern Boise River. In the Eagle quadrangle the Boise terrace is 2-5 meters (5-15 feet) above the present floodplain. Most transported clasts came from the Idaho batholith and associated felsic rocks of the central Idaho mountains. Basalt clasts came from Pleistocene basalt flows in the Boise River drainage basin.

THICKNESS. The gravel deposit ranges from 11 to 15 meters (35-50 feet) in thickness. It overlies weakly consolidated Tertiary-age sands, silts, and claystones incised by the former Boise River during valley deepening.

SURFACE SOILS. Soils developed in the Boise terrace have weakly to moderately developed clayey and calcic B horizons. Typical soils include the Bram and Bissell series (Collett, 1980). Gravel may be found at about 1 meter (3 feet).

AGE. Late Pleistocene. The Boise terrace is the lowest well-defined alluvial surface above the present floodplain of the Boise River. This geomorphic position and the soil characteristics found in the surface of the terrace's gravel-fill both suggest correlation with the time of the most recent glaciation in the mountains, i.e., late Pinedale Glaciation. This appears corroborated west of Caldwell where this terrace was blanketed by slackwater sediments from the Bonneville Flood about 14,000-15,000 years ago (Scott and others, 1982).

Qds Sand of Dry Creek terrace

LITHOLOGY AND TEXTURE. Medium to coarse sand interbedded with silty fine sand and silt. The mineralogy of the sand includes quartz, feldspar and mica grains in amounts similar to the granitic rocks and grus from which the sand originated. Some of the sediment is reworked from Tertiary sedimentary rocks in the Boise foothills.

SOURCE. Remnant of alluvium deposited in Dry Creek Valley.

SURFACE SOILS. Soils in the Dry Creek terrace have clayey and calcic B horizons and locally have weak duripan (caliche) characteristics at about 1 meter in depth. Typical soils include the Power and Purdam series (Collett, 1980).

STRATIGRAPHY AND AGE. Late Pleistocene. The Dry Creek terrace remnant occupies a geomorphic position between Dry Creek Valley (Boise terrace level) and the Whitney terrace.

Qfs Sand of incised alluvial fans

LITHOLOGY AND TEXTURE. Medium to coarse sand interbedded with silty fine sand and silt. The mineralogy of the sand includes quartz, feldspar, and mica grains in amounts similar to the granitic rocks and grus from which the sand originated. Much of the sediment is reworked from Tertiary sedimentary rocks in the Boise foothills.

SOURCE. Large alluvial fans formed by Dry Creek and the former drainage out of Woods Gulch.

THICKNESS. Highly variable: ranges in thickness from less than 1 meter on the southern edge of the alluvial fans to more than 15 meters (50 feet) near the foothills.

SURFACE SOILS. Soils in these deposits vary from those with weakly developed clayey and calcic B horizons to soils with clayey B horizons and weak duripan (caliche) characteristics at about 1 meter in depth. Typical soils include Brent, Landbush, Power, and Purdam series (Collett, 1980).

STRATIGRAPHY AND AGE. These alluvial fans overlie the Whitney terrace and are probably late Pleistocene in age.

Qwg Gravel of Whitney terrace

LITHOLOGY AND TEXTURE. Sandy pebble and cobble gravel. Granitic rocks and porphyritic felsites dominate the lithologies of the gravel clasts. The surface of the gravel is mostly buried by 1-2 meters of loess.

SOURCE. Mostly channel alluvium of the former Boise River deposited on the river-cut surface of the second terrace above the modern floodplain. In the Eagle quadrangle this terrace is 18 meters (60 feet) above the present floodplain. Most transported clasts came from the Idaho batholith and associated felsic rocks of the central Idaho mountains.

THICKNESS. The gravel fill underlying the terrace averages 13 meters (42 feet) thick. It overlies weakly consolidated Tertiary-age sands, silts, and claystones incised by the former Boise River during valley deepening.

SURFACE SOILS. Soils in the Whitney terrace primarily formed in loess. The soils have clayey and calcic B horizons and locally have weak duripan (caliche) characteristics, at about 1 meter in depth, that may extend into the gravel. Typical soils include the Power and Purdam series (Collett, 1980).

AGE. Late to middle Pleistocene. By tracing the Whitney terrace upstream into the Boise River canyon, its geomorphic position can be shown to be higher than that of the basalt of Mores Creek mapped in the Lucky Peak quadrangle (Othberg and Burnham, 1990). Whitney terrace is, therefore, older than the basalt of Mores Creek, i.e., greater than 0.107 Ma.

Tps Sand of the Pierce Gulch Formation

LITHOLOGY AND TEXTURE. Medium- to coarse-grained arkosic sand. Sand is compact but uncemented. Structures include crossbeds and foreset bed sequences. Upper (30 feet) of unit is commonly a pebble to cobble gravel with subrounded clasts of local granite and basalt.

SOURCE. Spencer H. Wood and Willis L. Burnham (personal communication) interpret these sands to be fluvial and deltaic and deposited by range-front streams prograding into the northeastern margin of a regressing lake shore.

SURFACE SOILS. Soils in the foothills primarily formed in colluvium from underlying sands and claystones. The soils appear no older than Holocene or late Pleistocene and have clayey and calcic B horizons. Typical soils include the Haw, Lankbush, and Payette series. The Quincy series, a soil formed in wind-blown sand, may be found locally (Collett, 1980).

FORMAL NAME. Spencer H. Wood and Willis L. Burnham (personal communication) named the Pierce Gulch Formation during recent mapping in the adjacent Boise South and Boise North quadrangles. The type section is located in the Eagle quadrangle in a sand quarry along Pierce Park Road (NW1/4, sec. 18, T. 4 N., R. 2 E.). Previously, these sediments were called the "upper Idaho Group" by Wood and Burnham (1983) and were included in the Idaho formation by Savage (1958).

STRATIGRAPHY AND AGE. May be correlative with the upper Glenns Ferry Formation and some portion of the Tenmile Gravel. Possibly formed at the same time as other coarse sediments prograded across the western Snake River Plain in late Pliocene to early Pleistocene time (Othberg, 1988).

Ttc Silty claystone facies of the Terteling Springs Formation

LITHOLOGY AND TEXTURE. Mostly silty claystone with interbeds of arkosic sandstone.

SOURCE. The Terteling Springs Formation is a facies assemblage of sediments and sedimentary rocks of mostly lacustrine and lake-shore depositional environments. The silty claystone facies represents the westward-lying lacustrine environment. East of the Eagle quadrangle, the silty claystone interfingers with fluvial and deltaic sand and oolitic sandstone (Gallegos and others, 1987).

SURFACE SOILS. Soils in the foothills primarily formed in colluvium from underlying sands and claystones. The soils appear no older than Holocene or late Pleistocene and have clayey and calcic B horizons. Typical soils include the Haw, Lankbush, and Payette series. The Quincy series, a soil formed in wind-blown sand, may be found locally (Collett, 1980).

FORMAL NAME. Spencer H. Wood and Willis L. Burnham (personal communication) named the Terteling Springs Formation during recent mapping in the adjacent Boise South and Boise North quadrangles. Previously, these sediments and sedimentary rocks were called "sediments of the lower Idaho Group" (Wood and Burnham, 1983) and were included in the Idaho formation by Savage (1958).

STRATIGRAPHY AND AGE. May be correlative with the Pliocene Glenns Ferry Formation.

Ts Sand and mudstone of stream and lake sediments

LITHOLOGY AND TEXTURE. Medium- to coarse-grained arkosic sand, sandstone, and claystone. Includes interbeds of fine gravel, locally cemented, and sandy siltstone. Structures range from large foreset beds of sand to thin-bedded claystone.

SOURCE. This undifferentiated unit reflects a variety of fluvial and lacustrine depositional environments along the northeastern margin of the former western Snake River Plain. As mapped, it may include portions of the Pierce Gulch and Terteling Springs Formations as well as the Payette Formation.

SURFACE SOILS. Soils in the foothills primarily formed in colluvium from underlying sands and claystones. The soils appear no older than Holocene or late Pleistocene and have clayey and calcic B horizons. Typical soils include the Haw, Lankbush, and Payette series. The Quincy series, a soil formed in wind-blown sand may be found locally (Collett, 1980).

Tbv Basalt volcanic assemblage

LITHOLOGY AND TEXTURE. This unit is widespread in the Boise foothills southeast of the Eagle quadrangle. It contains several associated lithologies originating from nearby basalt volcanism: (1) thin subaerial lava flows, (2) thin subaqueous and other water-affected subaerial lava flows, and (3) tuff and volcaniclastic sediments.

LOCATION AND SOURCE. Mapped in the northeastern corner of the Eagle quadrangle only. Some of the lava flows form a sloping mesa in the north half of the Boise North quadrangle. These lavas and associated volcaniclastic lithologies can be traced northwest just into the Eagle quadrangle.

STRATIGRAPHY. Based on the dip of the volcanic flows and beds, they appear to be older than the Terteling Springs Formation. To the north, basalt lava flows interfinger with sedimentary beds of the Miocene Payette Formation (Savage, 1958; Sam Matthews, personal communication). However, positive correlation of any of the basalt lava flows in the Boise foothills with those to the north is not possible at this time.

REFERENCES

Collett, R. A., 1980, Soil survey of Ada County area, Idaho: U.S. Department of Agriculture, Soil Conservation Service, 327 pages and 72 map sheets, scale 1:20,000.

Othberg, K. L., 1988, Changeover from basin-filling to incision in the western Snake River Plain: Geological Society of America Abstracts with Programs, v. 20, no. 6, p. 461.

Othberg, K. L., and W. L. Burnham, in 1990, Geologic map of the Lucky Peak quadrangle, Ada County, Idaho: Idaho Geological Survey Technical Report 90-4, scale 1:24,000.

Pierce, K. L., and W. E. Scott, 1982, Pleistocene episodes of alluvial-gravel deposition, southeastern Idaho, *in* Bill Bonnichsen and R. M. Breckenridge, editors, Cenozoic Geology of Idaho: Idaho Bureau of Mines and Geology Bulletin 26, p. 685-702.

Savage, C. N., 1958, Geology and mineral resources of Ada and Canyon Counties: Idaho Bureau of Mines and Geology County Report 3, 94 p.

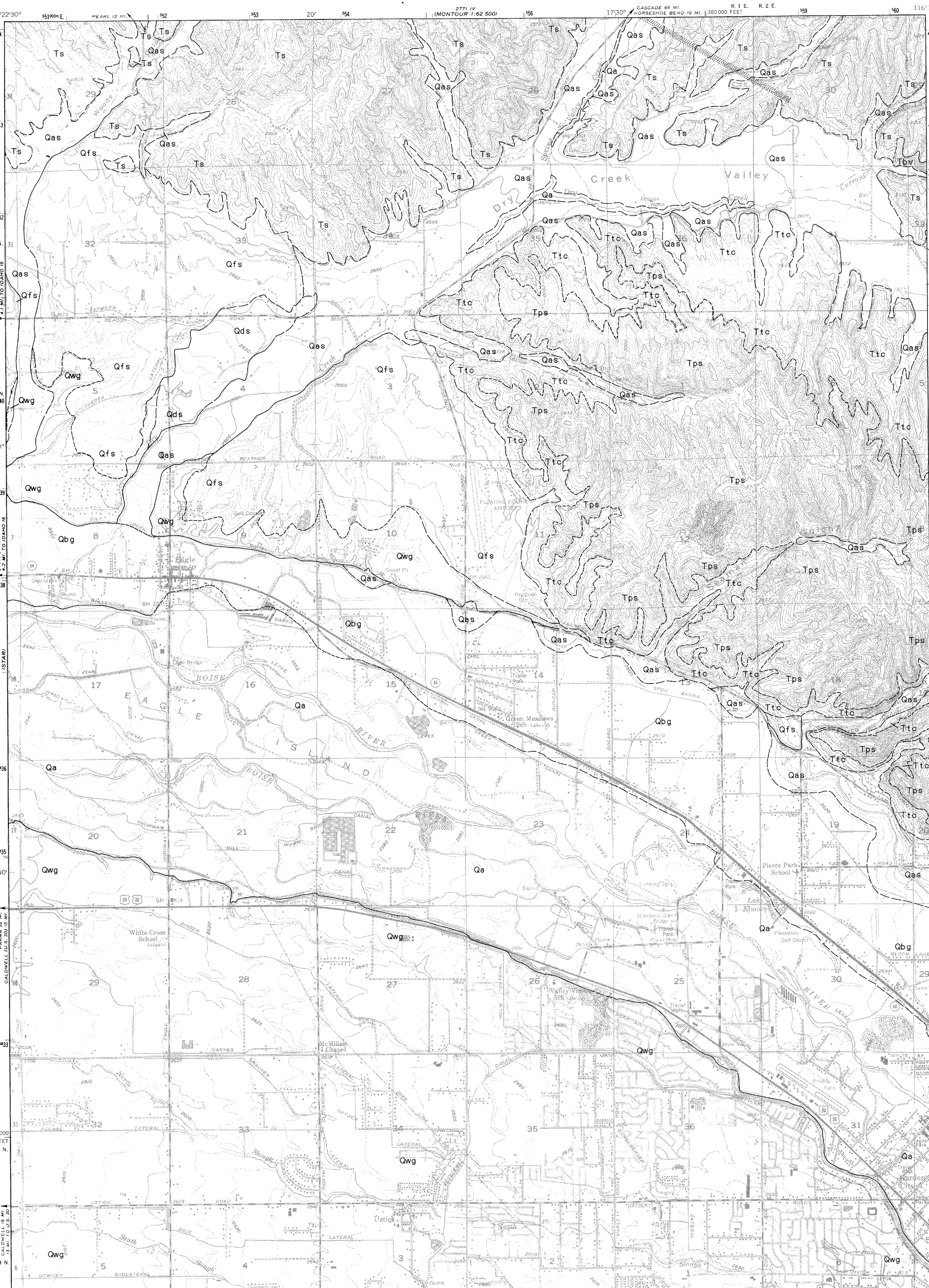
Wood, S. H., and W. L. Burnham, 1983, Boise, Idaho geothermal system: Transactions of the Geothermal Resources Council, v. 7, p. 215-223.

GEOLOGIC MAP OF THE EAGLE QUADRANGLE, ADA COUNTY, IDAHO

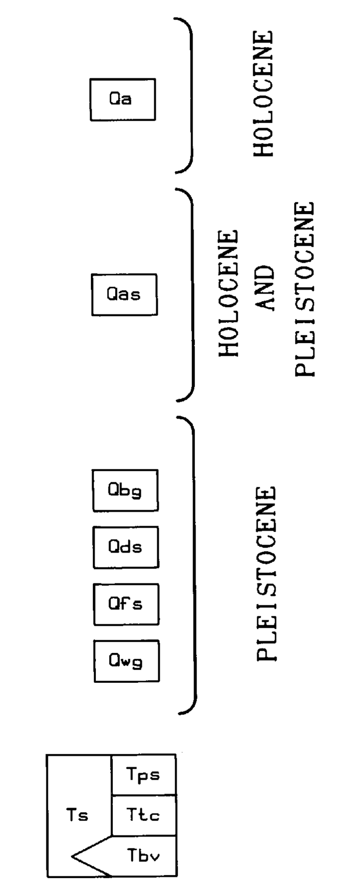
BY

KURT L. OTHBERG AND LOUDON R. STANFORD

1990



CORRELATION OF MAP UNITS



EXPLANATION

Refer to accompanying text

Qa	Alluvium of active streams
Qas	Sandy alluvium of Dry Creek Valley and fans and valley bottoms of the Boise foothills
Qbg	Gravel of Boise Terrace
Qds	Sand of Dry Creek terrace
Qfs	Sand of incised alluvial fans
Qwg	Gravel of the Whitney Terrace
Ts	Sand and mudstone of stream and lake sediments
Tps	Sand of the Pierce Gulch Formation
Ttc	Silty claystone facies of the Terteling Springs Formation
Tbv	Basalt volcanic assemblage

CONTACT

Definite

Approximate

Inferred

FAULTS

Trend: linear topographic feature that suggests fault control

SCALE 1:24 000

CONTOUR INTERVAL 20 FEET
DOTTED LINES REPRESENT 5-FOOT CONTOURS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

Topography from aerial photographs by multiplex methods and by plane-table surveys 1953. Aerial photographs taken 1951

Polyconic projection. 1927 North American datum
10,000-foot grid based on Idaho coordinate system, west zone

To place on the predicted North American Datum 1983 move the projection lines 15 meters north and 77 meters east as shown by dashed corner ticks

UTM GRID AND 1971 MAGNETIC NORTH DECLINATION AT CENTER OF SHEET

QUADRANGLE LOCATION

Field work conducted in 1985-1988.

Funded in part by the U.S. Geological Survey's COGEOMAP program.

Computer-aided cartography by Loudon R. Stanford.

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