

DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

RECONNAISSANCE GEOLOGIC MAP OF WEST-CENTRAL
SNAKE RIVER PLAIN, IDAHO

By

Harold E. Malde, Howard A. Powers, and Charles H. Marshall

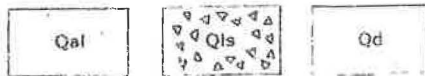
MISCELLANEOUS GEOLOGIC INVESTIGATIONS
MAP I-373



PUBLISHED BY THE U. S. GEOLOGICAL SURVEY
WASHINGTON, D. C.
1963



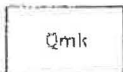
EXPLANATION



Surficial material

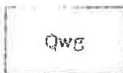
Unconsolidated detritus conforming to present topography. Talus commonly present below rocky cliffs not shown.

Qal, stream alluvium.
Qls, landslide debris.
Qd, dune sand



McKinney Basalt

Lava flow of porphyritic plagioclase-olivine basalt from McKinney Butte 8 miles northwest of Gooding. Terminus less than 20 feet above Snake River near King Hill where the thickness is about 20 feet.



Wendell Grade Basalt

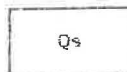
Lava flow of olivine basalt from Natch Butte 4 miles south of Shoshone. Overlaps landslide and talus debris younger than Melon Gravel near Hagerman where the flow thickness does not exceed 20 feet.



Melon Gravel

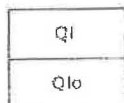
Boulders, cobbles, and pebbles of basalt in matrix of basaltic sand arranged in giant crossbeds. Derived from nearby outcrops of basalt of various ages. Boulders commonly 3 feet in diameter, some as large as 10 feet. Downstream from Twin Falls, the gravel is confined to floor of present canyon, but farther east the gravel also occupies uplands. Within the canyon, the gravel forms constructional bars and terraces that rise as high as 300 feet above the Snake River, generally downstream from canyon constrictions. Terraces commonly separated from canyon walls by marginal troughs 50 to 150 feet deep. Terrace surfaces characteristically veneered with pavement of boulders ("melon patches").

EROSION OF CANYON-FILLING LAVA FLOWS



Bancroft Springs Basalt

Lava flow of porphyritic plagioclase-olivine basalt, probably from a concealed source near McKinney Butte 8 miles northwest of Gooding. Includes part of McKinney Basalt of Stearns (1936) and Bliss Basalt of former usage. Surface under-



Lava flows

Basalt conforming to present topography and largely unmodified by surficial deposits or by weathering. Some flows locally identified as older, Qlo, than adjacent flows.

Pleistocene

Lower Pleistocene

Upper Pleistocene

Idaho Group

Qbb, basaltic lava flows that erupted from several vent areas at various times so as to form a series of lava plateaus and canyon-filling volcanic domes. Lavas locally stained brown and yellow but not generally softened by decomposition. Canyon fill includes some fragmental material altered locally to palagonite. Flows not generally divided on the map, but some are identified as older, Qbbo, or as younger, Qbby, than contiguous flows.

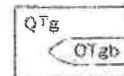
CANYON CUTTING



Tuana Gravel

Pebble and cobble gravel interbedded with layers of massive brown to gray sand and silt. Composed dominantly of siliceous volcanic debris along Tuana Gulch and Salmon Falls Creek, but includes much cobble to bouldery quartzitic debris south of Branson. Covers erosion surface south of Snake River and 500 to 800 feet higher. Capped by massive caliche layer several feet thick. Top eroded; about 200 feet thick at Indian Butte, 10 miles southwest of Hagerman.

PLANATION OF BASIN DEPOSITS: MINOR FAULTING



Glens Ferry Formation

Basin fill of poorly consolidated detrital material and minor lava flows of basalt. Includes most of the Hagerman Lake Beds of former usage. Sequence of bedding interrupted by numerous minor unconformities as a consequence of contemporaneous basin subsidence. About 2,000 feet of beds exposed.

QTg, lake and stream deposits characterized by abrupt lateral changes in facies. Facies include: (1) silt in massive layers marked with faint banding; (2) sand in evenly layered thick beds cemented locally to flaggy sandstone; (3) thinly bedded dark clay, olive silt, and carbonaceous shale; (4) ripple-marked sand and silt; (5) granitic sand and fine pebble gravel; and (6) quartzitic cobble gravel. With these facies are several thin beds of siliceous volcanic ash and thicker beds of basaltic fragmental material.

QTgb, lava flows of olivine basalt, mostly subaerial, that form sheetlike bodies within the detrital deposits. Generally altered to basaltic saprolite with residual spheroids of undecomposed rock. Includes some basaltic ash, commonly altered to palagonite and usually at the bases of flows. Several source areas identifiable within the basin of detrital accumulation, but other possible source areas in uplands cannot be reliably distinguished from vents of Banbury Basalt.

MINOR DEFORMATION AND EROSION



Chalk Hills Formation

Basin fill of consolidated, locally indurated,

QUATERNARY

Lava flow of porphyritic plagioclase-olivine basalt, probably from a concealed source near McKinney Butte 8 miles northwest of Gooding. Includes part of McKinney Basalt of Stearns (1936) and Bliss Basalt of former usage. Surface moderately rough but partly mantled with collian material. Fills a canyon as deep as 500 feet discontinuously exposed from mouth of Malad River to Pasadena Valley. Most of the canyon fill is pillow lava.

UNCONFORMABLE ON THOUSAND SPRINGS BASALT; RELATIONS TO SAND SPRINGS BASALT UNKNOWN



Sand Springs Basalt

Lava flow of olivine basalt from vent 23 miles northeast of Twin Falls. Undulating surface largely mantled by collian sand and silt. Surface east of U.S. Highway 29 locally denuded and scoured along abandoned stream channels. Fills a canyon as deep as 350 feet exposed at Blue Lake Alcove 4 miles north of Twin Falls and near Thousand Springs.

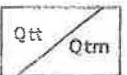
CANYON CUT TO PRESENT DEPTH



Crowsnest Gravel
Lithology variable. Upstream from Hagerman composed mostly of siliceous volcanic pebbles, but farther downstream has abundant quartzite and porphyry cobbles. Occupies terraces that range from 50 feet above Snake River near Bruneau to more than 250 feet above the river near Hagerman. Ranges from 25 to 75 feet in thickness.



Unnamed gravel
Pebble and cobble gravel along Bruneau and Big Wood Rivers. Deposits mostly about 25 feet thick, on terraces 50 feet above present streams.



Thousand Springs Basalt

Lava flows of porphyritic plagioclase-olivine basalt and some olivine basalt from several vents east of Hagerman. Includes Malad Basalt and Thousand Springs Basalt, as well as parts of Sand Springs Basalt as mapped by Stearns and others (1938). Smoothly mantled with alluvial and collian deposits of gravel, sand, and silt as thick as 50 feet.

Qtt, lava flows that form canyon fill as thick as 75 feet near Thousand Springs, and undivided lava flows farther east.

Qsr

Basalt of Snake River Group, undivided

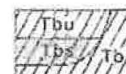


Chalk Hills Formation

Basin fill of consolidated, locally indurated, elastic deposits and minor lava flows of basalt. Exposed thickness about 300 feet. Tc, lake and stream deposits and less abundant siliceous volcanic ash in variegated sequences of white, pink, brown, and gray beds 2-10 feet thick. Individual beds well sorted, ranging from crossbedded sand to massive silt, clay, and diatomite. Ash beds generally only a few inches thick. Adjacent beds of contrasting texture and color generally form well-layered banded sequences of wide lateral extent, but the deposits are locally drab and monotonous, consisting of massive, brownish-gray luffaceous silt. Volcanic ash comparatively fresh but cemented locally by opal.

Tcb, lava flow of olivine basalt. Overlies baked detrital material. About 25 feet thick.

BLOCK FAULTING AND EROSION



Banbury Basalt

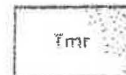
Lava flows of olivine basalt interbedded locally with minor amounts of stream and lake deposits. Basalt commonly altered to greenish-brown basaltic saprolite with residual spheroids of undecomposed rock. Thickness exceeds 1,000 feet northeast of King Hill and 800 feet in canyon of Bruneau River.

Tbu, basalt of upper part; olivine basalt and some porphyritic plagioclase-olivine basalt generally in columnar flows as thick as 50 feet. Includes several thin sedimentary layers that are usually baked by overlying lava flows. Lava along upper Clover Creek is possibly of Glenns Ferry age.

Tbs, sedimentary deposits of middle part; largely brownish sand and pebble gravel in lenticular channel deposits, but includes light-colored silt, clay, and diatomite in lake deposits.

Tb, undivided basalt; lava flows mostly vesicular and less than 15 feet thick. Voids commonly filled with zeolites and calcite in basin area near canyon of Snake River. Locally includes stream deposits of massive brownish sand and fine gravel, as well as basaltic pyroclastic material in vent deposits. On upland surface south of Snake River very likely includes some flows and vents of Glenns Ferry age.

SUBSIDENCE OF SNAKE RIVER PLAIN



Rhyolite of Magic Reservoir

Rhyolite tuff, densely welded and rich in large phenocrysts of quartz and sanidine held in a pale purplish-gray aphanitic groundmass. Conspicuously broken by widely spaced columnar joints that control weathering into spires and domes. Weathered surfaces commonly stained reddish brown. Vent areas, indicated by dots, characterized by vertical and outward-dipping flow banding and by massive outcrops. At head of Magic Reservoir includes crystal-poor, lapilli-rich thin ash flows with black glassy lower parts and pumiceous upper parts that weather yellow. At least 500 feet thick southwest of Magic Reservoir.

Snake River Group

Upper Fluv

QUATERNARY

Pliocene
Middle Pliocene

TERTIARY

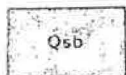
or Pliocene

by erosion with successive sand-
olian deposits of gravel, sand, and
silt as thick as 50 feet.

Qtt, lava flows that form canyon fill
as thick as 75 feet near Thousand
Springs, and undivided lava flows
farther east.

Qem, Malad Member; lava flows of
porphyritic plagioclase-olivine
basalt, capped locally with olivine
basalt, from Gooding Butte. Fills
a canyon 200 feet deep near mouth
of Malad Canyon.

UNCONFORMABLE ON MADSON
BASALT. RELATIONS TO SUG-
AR BOWL GRAVEL UNKNOWN



Sugar Bowl Gravel

Pebble gravel rich in quartzite and
porphyry that forms terrace de-
posit 35 feet thick and 400 feet
above Snake River between Pasa-
dena Valley and Indian Cove.

TERRACE CUTTING



Madson Basalt

Lava flow of olivine basalt probably
from a vent east of Gooding. Fills
a canyon 100 feet deep discon-
tinuously exposed from mouth of
Malad River to Swiss Valley.

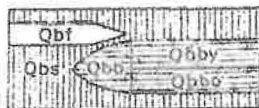
PARTIAL ENTRENCHMENT OF SNAKE RIVER



Black Mesa Gravel

Gravel and sand as thick as 25 feet on Black
Mesa and related remnants of a widely
preserved pediment surface south of the
Snake River and 550 feet higher. Gravel
largely reworked from gravel beds of older
formations. Capped by caliche layer about
5 feet thick.

BROAD VALLEY EROSION



Bruneau Formation

Canyon fill of undeformed, unconsolidated
debtal material and interbedded basaltic
lava flows associated with marginal de-
posits of gravel and basalt. Canyon fill
sequences interrupted by several local
disconformities caused by dissection of lava
dams. Thickness of fill about 300 feet near
Bruneau.

Qbs, detrital material dominated by massive
lake beds of white-weathering fine silt, clay,
and diatomite in layers 50 feet or more
thick, with minor amounts of alluvial silt
and sand. Includes conspicuous beds of
iron-stained pebble and cobble gravel re-
worked as beach deposits from contiguous
older gravels. Lake deposits rise to altitude
of 3,200 feet and are overlain locally by
mixed alluvial and colluvial deposits of
sand, clay, and gravel that rise nearly 300
feet higher.

Qbf, fan gravel, cobbly to pebbly. Deposits
north of Snake River merge with debtal
material and lava flows in the canyon fill.
Fan debris north of Mountain Home con-
sists largely of coarse sand derived from
decayed granite. Deposits north of Camas
Prairie merge with lava flows on valley
floor. Deposits west of Gramara are of
uncertain age but are physiographically
similar.

Lower Pliocene

by erosion. The Magic Reservoir includes crystal-poor,
spill-rich thin ash flows with black glassy
lower parts and pumiceous upper parts
that weather yellow. At least 500 feet
thick southwest of Magic Reservoir.



Idavada Volcanics

Silicic latite; chiefly thick layers of doleritified
welded tuff, but includes some bedded
siltic tuff and lava flows. Rhyolitic
rocks occur in minor amounts, mainly as
siltic tuff. Predominantly porphyritic
with phenocrysts of andesine, clinopyroxene,
hypersthene, and magnetite, but with no
quartz, sanidine, hornblende, or biotite. In-
cludes granitic pebbles and cobble gravel at
the base along north side of Mount Bennett
Hills. Thickness exceeds 3,000 feet at
Bennett Mountain and 1,400 feet along
upper Rock Creek southeast of Twin Falls.

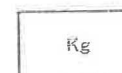
PROLONGED EROSION AND WEATHERING



Challis Volcanics

Tuffs and flows of variable lithology, ranging
from rhyolite to andesite. Rhyolite com-
monly has phenocrysts of quartz, sanidine,
and biotite. Andesite has phenocrysts of
plagioclase and hornblende. Coarse-
textured rocks weather to craggy outcrops.
Fine tuffaceous rocks weather to smooth
yellow slopes. Forms layered sequences,
highly tilted and broken, along north side
of Mount Bennett Hills and northeast of
Magic Reservoir.

MAJOR UNCONFORMITY



Granitic rocks of Idaho batholith

Includes small areas of Challis Volcanics
west of Camas Prairie, and gneissic rocks
along South Fork of Boise River.

CRETACEOUS

Contact

Dashed where approximately located; short
dashed where inferred

Normal fault

Dashed where approximately located; dotted
where concealed. Bar and ball on down-
thrown side.

Strike and dip of beds

Barb indicates direction of dip estimated from
a distance or from aerial photographs.
Shown mainly in Idavada Volcanics where
dips are generally less than 10°.

Source of basaltic lava flow

REFERENCES CITED

- Stearns, H. T., 1936, Origin of the large
springs and their alcoves along the Snake
River in southern Idaho: Jour. Geology,
v. 44, no. 4, p. 429-450.
Stearns, H. T., Crandall, Lynn, and Steward,
W. G., 1938, Geology and ground-water
resources of the Snake River Plain in south-
eastern Idaho: U.S. Geol. Survey Water-
Supply Paper 774, 268 p.

Middle Pleistocene

Idaho Group

