

Qpo Old piedmont alluvium (middle Pleistocene)--Light-brown to reddish-brown silts, sands, and gravels, poorly to moderately sorted. Soil contains a well-developed, thick argillic B horizon and stage III Cca horizon. Surface highly dissected, commonly surrounded by younger surficial units. Thickness commonly 2-4 m Undivided piedmont alluvium (upper to middle Pleistocene) -- Consists largely of middle (Opm) and older (Opo) piedmont alluvium, mapped as an undivided unit because of poor exposures COLLUVIAL DEPOSITS (HOLOCENE AND PLEISTOCENE) --

CORRELATION OF MAP UNITS.

DESCRIPTION OF MAP UNITS

STREAM DEPOSITS (HOLOCENE AND PLEISTOCENE) --

Alluvial deposits of floodplains and

well-rounded and well-sorted sands and

Undivided stream and sheetwash alluvium

brown to light-gray silts, sands and

gravels. Consists of locally derived

of these arroyos. Thickness unknown;

Undivided flood-plain alluvium (Holocene) --

probably less than 4 m

corner of the mapped area

strath terraces

gravels that fill channels and form thin

(Holocene and upper Pleistocene) -- Light-

terraces. Commonly consist of moderately to

sheetwash alluvium on side slopes and stream

small alluvial fans which form at the mouths

Light-brown to light-gray, medium to coarse

sand and pebbly to bouldery gravel grading

downstream into massive silts to fine sands

environment. Forms broad flood plains which

fill deeply excavated channels along parts

tributaries. Thickness at least 5 m near

Young terrace alluvium (upper Pleistocene) --

. .gtavel. Forms broad, slightly elevated and

stream valleys. Soil contains thin, weak

1966). Forms terrace 3-5 m above Indian

Creek north of Manderfield in the southeast

glacial outwash and associated alluvium of

Pinedale, which ended about 12,000 to 15,000

years ago. Major source of high quality

Middle terrace alluvium (upper Pleistocene) ---

sand and gravel. Thickness commonly 2-4 m

Light-gray to light-reddish-brown sand and

Fortuna Canyon in the central part of the

mapped area and 10-13 m above Indian Creek

the mapped area. Soil contains moderately

developed argillic B horizon and stage II

and III Cca horizons (Gile and others,

associated alluvium of the Bull Lake

2-4 m

Glaciation, which may have ended about

Old terrace alluvium (middle Pleistocene) --

Light-brown to reddish-brown sand and

near Manderfield in the southeast corner of

1966). Considered to be glacial outwash and

140,000 years ago. Minor source of moderate

quality sand and gravel. Thickness commonly

gravel. Forms terrace surface 60-65 m above

Fortuna Canyon in the central part of the

mapped area; to the south the same terrace

is considerably lower, about 25 m above

stage III Cca horizon. Considered to be

description of middle terrace alluvium--

source of high quality sand and gravel.

mantle of alluvium on bajada slopes and

thicker accumulations of locally derived

alluvial fan deposits near the mountain

angular, and more variable in lithologic

composition than terrace and flood plain

alluvium. Especially widespread along the

eastern flank of the Mineral Mountains, 3-

5 km west of this quadrangle, and along the

of Manderfield. Units commonly overlap

Young piedmont alluvium (upper Pleistocene)--

silts, sands, and gravels, poorly to

Light-brown to very slightly reddish brown

moderately sorted. Grades into or overlies

weak argillic B-horizon and stage I to II

undissected surfaces. Thickness commmonly

Middle piedmont alluvium (upper Pleistocene) --

sands, and gravels, poorly to moderately

sorted. Grades into or overlies middle

Light-brown to light-reddish-brown silts,

terrace alluvium (Qtm) along Indian Creek,

south of the mapped area. Soil contains

stage II to III Cca horizon. Surface is

moderately dissected. Thickness commonly

moderately developed argillic B horizon and

Cca horizon. Forms smooth, relatively

young terrace alluvium (Qty). Soil contains

western margin of the Tushar Mountains, east

front. Generally more poorly sorted,

PIEDMONT SLOPE DEPOSITS (PLEISTOCENE) -- Thin

glaciation preceding the Bull Lake, perhaps

Qtm). Thick deposits below soil are a major

glacial outwash and associated alluvium

tentatively correlated with the major

200,000 to 250,000 years ago (See

Thickness commonly 2-10 m

associated stream alluvium

2-4 m

2-4 m

Indian Creek west of Manderfield. Soil

contains a well developed, but locally

eroded, thick argillic B horizon and

gravel. Forms terrace surface 40-45 m above

the most recent major glaciation, the

corner of the mapped area. Considered to be

coalesced former flood plains of major

horizon (stage I of Gile and others,

Manderfield, 1 1/2 km south of the southeast

Light-brown to very slightly reddish brown,

medium to coarse sand and pebbly to bouldery

argillic B horizon and weakly calcareous Cca

with abundant organic matter and calcium

carbonate deposited in a cienaga

alluvium in small arroyos. Also includes

Middle

Pliocene

Miocene

TERTIARY

Poorly sorted, gravitationally emplaced ,deposits of talus, rockfall, slope creep, and landslide debris. Deposits are generally thin, accumulate in small areas, and lithologically resemble the units from which they were derived Colluvium (Holocene and upper Pleistocene) --Light-gray to reddish-brown silty sands to sandy gravels. Forms thin mantle of poorly sorted debris on steep slopes of poorly consolidated basin-fill deposits. Commonly unstable and subject to further movement if disturbed. Thickness 0-2 m

Landslide deposits (Holocene to middle Pleistocene) -- Includes large cuspate rotational slump'blocks (toreva blocks) of unbroken to highly fractured basalt adjacent Tsp to the basalt of Black Mountain (Obm) BASALT OF RED KNOLL (MIDDLE PLEISTOCENE)

Ork Lava flows--Dark-gray to black porphyritic basaltic andesite having a blocky, scoriaceous surface underlain by dense to vesicular rock. Phenocrysts of labradorite and pyroxene (30-40 percent) are set in a glassy to very finely granular matrix Qrkc Cinder Cone--Red to dark-gray basaltic cinders and ash forming a constructional pyroclastic cone. Vent for lava flows of basalt of Red Knoll (Qrk) BASALT OF CRATER KNOLL (MIDDLE PLEISTOCENE)

Ock Lava flow--Dark-gray to black porphyritic basaltic andesite having a blocky, scoriaceous surface underlain by dense to vesicular rock. Phenocrysts are largely labradorite and pyroxene (40-45 percent); matrix is glassy to finely granular, with microlites of plagioclase, pyroxene, olivine(?), and opaque minerals

Qckc Cinder Cone--Reddish to dark-gray basaltic cinders and ash forming a constructional pyroclastic cone. Vent for lava flows of basalt of Crater Knoll (Qck)

Qglc GRAVELS OF LAST CHANCE BENCH (MIDDLE PLEISTOCENE) -- Light-brown to reddish-brown pebbly sand to sandy gravel. Forms broad widespread gravel bench resting on a pediment cut across basin-fill deposits. Soil profile contains very well developed, reddish-brown argillic B horizon and (or) well developed stage III to weak IV stage K horizon (See Gile and others, 1965, for K horizon definition). Basal erosion surface (pediment) on which unit was deposited was cut after drainage from Beaver basin was integrated with that of Escalante Desert, located about 25 km to the west of Beaver. Deposition of this unit preceded accumulation of tuff of Ranch Canyon (Qrct) about 0.55 m.y. ago. These gravels are extensively deformed by middle to late Pleistocene faulting. Thickness 2-5 m; possibly thicker near the mountains and in buried alluvial channels. Unit shown by

stipple pattern Orct TUFF OF RANCH CANYON (MIDDLE PLEISTOCENE) --Light-brown, poorly consolidated rhyolitic tuff erupted from volcanoes in the Mineral Mountains (Lipman and others, 1978), 5 km west of west edge of the mapped area. Primary and fluvially reworked air-fall and ash-flow materials fill deeply excavated channels along Cunningham Wash; elsewhere the unit consists of thin lenses of fluvially deposited silty to sandy pumiceous tuff. Deposition occurred after an outlet from the Beaver basin had been established at Minersville Canyon, located about 20 km west of Beaver, but before the gravels of Last Chance Bench (Qglc) had been deposited. A recent K-Ar age determination on the tuff of Ranch Canyon by G. A. Izett and J. D. Obradovich gave an age of 0.55+0.01 m.y. (G. A. Izett, written

commun., 1980) Obm BASALT OF BLACK MOUNTAIN (LOWER PLEISTOCENE) --Dark-gray, scoriaceous to massive basaltic lava flow erupted from a source which is probably buried by basalt flows of Crater Knoll (Qck). Flows filled old stream valley of Cunningham Wash prior to establishment of through-flowing drainage out of the Beaver basin. Natural remnant magnetic direction is weakly reversed with strong normal overprint. K-Ar age is 1.1+0.3 m.y. (Best and others, in press). Thickness 1-6 m;

locally more in deep channels

BASIN-FILL DEPOSITS (LOWER? PLEISTOCENE TO

UPPER? MIOCENE) -- Includes six informal units of poorly to moderately consolidated fluvial and lacustrine deposits which comprise two formational rank sedimentary packages, the upper and lower basin-fill deposits. Deposition occurred concurrently with basin development from 9 m.y. ago (or earlier) until drainage from Beaver basin was integrated with the Escalante Desert, 25 km to the west, sometime between 1.1 and 0.5 m.y. ago. The upper basin-fill deposits, younger than the Sevier River Formation (Pliocene and Miocene), are most widely exposed in the basin. The lower basin-fill deposits are largely correlative with younger parts of the Sevier River Formation. As mapped the undivided basinfill deposits (QTs), are poorly exposed, generally coarser grained facies of the upper basin fill (QTsp or QTsf) but may include older units of the lower basin fill in uplifted blocks along the eastern margin

Upper basin-fill deposits (Lower? Pleistocene to upper Pliocene) -- Consists of a poorly indurated, gradational sequence of lacustrine, piedmont, and fanglomeratic basin-fill sediments deposited in a closed basin with a shallow but perennial lake QTsl Lacustrine deposits--Light- to medium-green

of the basin

silty clays and silts interbedded with well bedded, light-gray to light-brown fine sands grading laterally into pebbly sands. Within the Beaver basin this unit contains four water-laid tephra, the second lowest being of 2.0 m.y. old Huckleberry Ridge ash bed (formerly the Pearlette type B ash; Izett and Wilcox, in press). This tephra is present in lacustrine deposits from Minersville Reservoir, 10 km southwest of Beaver, north to Cunningham Hill. Top of unit eroded. Minimum thickness is 200-250 m

QTsp Piedmont facies--Mountainward coarsening sequence of interbedded subrounded fluvial channel and deltaic(?) sands and subangular to subrounded pebble to cobble gravels derived from adjacent mountain slopes. Commonly light brown to light reddish brown (oxidized) and have zones of abundant and along the Hogsback east of Maple

manganese cementation. This facies is best exposed between I-15 east to Utah Highway 91 Flats. Minimum exposed thickness 100 m, base covered . Fanglomerate facies -- Uniformly coarsegrained light-reddish-brown sandy subangular , pebble to cobble gravels exposed along the east margin of the basin. Unit is generally

finer grained than the overlying gravels of Last Chance Bench (Oglc). Base covered. minimum exposed thickness 100 m. May be considerably thicker along the eastern margin of the basin, east of the mapped area Lower basin-fill deposits (Pliocene to upper? Miocene) -- Consists of moderately oxidized and indurated basin-fill deposits; the upper and lower members are fine grained and separated by a coarse grained. conglomeratic member. These deposits reflect sedimentation during more arid and saline

(gypsiferous and calcareous) conditions than

the upper basin-fill deposits Upper piedmont member (Pliocene) -- Lightreddish-brown and light-brown moderately oxidized sands, sandy conglomerates and white calcareous marls. Moderately oxidized and indurated throughout; contains calcium carbonate cemented sandstone lenses and discrete calcium carbonate nodules. Consists mainly of piedmont facies but may grade southward in the subsurface into a playa facies. Thickness about 100-150 m in the southern part of the mapped area Conglomerate of Maple Flats (lower? Pliocene) -- Light-brown to light-reddishbrown pebbly sands to boulder conglomerates. Boulders of Tertiary granitic (Tigr) and Paleozoic rocks (Pzc, Pzq) derived from the Mineral Mountains,

about 5 km to the west, are as large as 2 m in diameter and mantle the eroded top of the deposit. Unit mainly exposed in uplifted horst, which forms the north trending highland area of Maple Flats, in central and southern part of map area. Unit represents deposition in response to a phase of major uplift and structural development of the basin. Minimum thickness 250 m; may be 500 m thick in subsurface to south of mapped area Lower piedmont member (lower? Pliocene to upper? Miocene) -- Light-brown, brown, and reddish-brown (oxidized) slightly

gypsiferous silty clays to pebbly sands. Unit poorly exposed below conglomerate of Maple Flats (Tsmf) in north part of map area. Near the abutment of Minersville Reservoir, 20 km southwest of Beaver, equivalent(?) rocks consist of channelfilling conglomerates with abundant rhyolitic pumice (probably correlative with the 9-m.y.-old rhyolites exposed in this quadrangle) indicating that parts of this basal unit may be as old or older than 9 m.y. Thickness unknown; base covered, 75 m exposed

RHYOLITE AND RHYOLITE TUFF OF GILLIES HILL (UPPER MIOCENE)

Rhyolite--Thick, local lava flows and volcanic domes of light-gray to white flow-layered rhyolite. Texture ranges from nearly aphanitic to porphyritic; contains abundant phenocrysts of sanidine, plagioclase, quartz, biotite, and hornblende. Quartz phenocrysts are commonly partly resorbed. Matrix is finely granular and ranges from dense to highly vesicular. K-Ar age is about 9 m.y. (S. H. Evans, University of Utah, written commun., 1980) Rhyolite tuff--Soft, white zeolitically

altered ash-flow tuff interlayered with rhyolite (Trg); fills a local valley within and forms an apron on the northwest flank of Gillies Hill where accumulation of rhyolite flows and volcanic domes are quite prominent FELSITE (UPPER? MIOCENE) -- Microgranular to fine-

grained porphyritic, pink to light-gray rock consisting mostly of a finely granular to micrographic or spherulitic aggregate of orthoclase and quartz with minor plagioclase. Small phenocrysts of quartz and feldspar are present locally. Altered phases contain sparse disseminated pyrite. Field evidence from adjacent areas shows that felsite forms dikes that cut the syenite (monzonite, Tis) and granite (Tigr). Possibly related to the rhyolite of Gillies Hill (Trg)

Tigr GRANITE (MIOCENE?) -- Coarse-grained porphyritic to hypidiomorphic granular aggregate of orthoclase, plagioclase, quartz, and biotite; contains prominent accessory sphene. Quartz constitutes about 25 percent of the rock. Field evidence indicates that the granite cuts the syenite (monzonite, Tis). Granite may be the same age as the Mount Belknap Volcanics in the Tushar

Mountains, 10 km to the east Tis SYENITE (MONZONITE) (MIOCENE?) -- Medium- to coarse-grained leucocratic, porphyritic to bypidiomorphic granular rock consisting of predominant orthoclase and plagioclase, and lesser amounts of hornblende, clinopyroxene, and rare biotite. Sphene and Fe-Ti oxide grains are common accessory minerals. Feldspars range from predominantly orthoclase to subequal amounts of orthoclase and plagioclase. Very sparse, highly resorbed grains of quartz are present locally. Cuts the gabbro porphyry (Tig) with which it is closely associated. May be related to 22- to 27-m.y.-old monzonite intrusions near Sulphurdale, 10-12 km northeast of the mapped area

Tig GABBRO PORPHYRY (MIOCENE?) -- Strongly porphyritic dark-gray rock consisting of prominent phenocrysts of labradorite and clinopyroxene in a felted matrix of plagioclase microlites and Fe-Ti oxide granules. Cuts propylitically altered intermediate composition volcanics (Tb) and may be related to 22- to 27-m.y.-old monzonite intrusions near Sulphurdale, 10-12 km

northeast of the mapped area The BULLION CANYON VOLCANICS (MIOCENE AND OLIGOCENE) -- A heterogeneous assemblage of light- to dark-gray and brown, porphyritic rhyodacite and quartz latite lava flows, flow Dreccia and mudflow breceias, characterized by abundant phenocrysts of plagioclase, biotite, and clinopyroxene. Thickness in hundreds of meters

PALEOZOIC--Pzc Carbonate sedimentary rocks and derivative skarn deposits

Pzq Quartzites interbedded with carbonate rock

(Pzc)

NORTHWEST-QUARTER, BEAVER QUAD., UTAH --- CONTACT -- Approximately located, queried where

gradational

FAULT-Dashed where approximately located; dotted where concealed. Bar and ball on downthrown side. Inclination and direction of dip shown where known ----- LINEATION -- Possible fault-controlled lineations which appear as faint vegetional, tonal or strong topographic alignments on aerial

photographs LANDSLIDE SCARP--Topographic scarps produced by gravitational rotation and slumping of basalt blocks (Qbm) resting on fine grained basinfill deposits. Especially well developed

southeast of Cunningham Hill STRIKE AND DIP OF SEDIMENTARY UNITS \_40 STRIKE AND DIP OF LAVA FLOWS OR SEDIMENTARY BEDDING IN TUFFS

References

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