DEPARTMENT OF THE INTERIOR

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Preliminary Geologic Map of the Hatch 7.5 Minute Quadrangle, Garfield County, Southwestern Utah

by

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This map is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature.

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DESCRIPTION OF MAP UNITS

Qf **ARTIFICIAL FILL (LATEST HOLOCENE)**--Man-made material in earthen dams and along drainage ditches. Alluvium deposited behind dams is generally mapped as part of the underlying alluvium (Qal) and sidestream alluvium (Qa)

Qal **CHANNEL AND FLOOD-PLAIN DEPOSITS (HOLOCENE)**--Unconsolidated silt, sand, and gravel deposited by in-channel and over-bank processes along Sevier River and Mammoth Creek. Less than 6 m thick

Qa **SIDESTREAM ALLUVIUM (HOLOCENE)**--Unconsolidated silt, sand, and gravel within ephemeral and perennial channels of streams that are tributary to Sevier River and Mammoth Creek, as well as on bordering flood plains and in alluvial fans. Thickness rarely exceeds a few meters

Qac **SLOPEWASH GRAVEL (HOLOCENE AND LATE PLEISTOCENE)**--Unconsolidated silt, sand, and gravel colluvium originating from pediment-capping sediments and deposited topographically below piedmont-slope deposits as slopewash. Mapped in the northwest section of the Hatch quadrangle where the slopewash gravel is thick enough to preclude mapping underlying strata. Thickness locally several meters or more in valley bottoms

Qat **TERRACE DEPOSITS (EARLY HOLOCENE AND LATE PLEISTOCENE)**--Unconsolidated silt, sand, and gravel of abandoned flood plains along Sevier River and Mammoth Creek. Locally includes minor slopewash. Thickness rarely exceeds 8 m

Qap1 **PIEDMONT-SLOPE DEPOSITS (EARLY HOLOCENE)**--Unconsolidated silt, sand, and gravel capping broad sloping plains and erosional remnants. Results from deposition on fans, incipient pediments, and flood plains. Locally includes colluvium and alluvium of minor drainages. Two levels of piedmont-slope deposits (Qap1 and Qap2) developed as a result of two or more periods of stream incision followed by lateral fluvial planation. Mode of deposition and lithology similar to that of sidestream alluvium (Qa), but mapped to emphasize the degree of dissection in the Hatch quadrangle. Exposed thickness as much as 4 m, but total thickness may exceed this in Sevier River valley

Qap2 **OLDER PIEDMONT-SLOPE DEPOSITS (PLEISTOCENE)--** Unconsolidated silt, sand, and gravel capping broad sloping plains and erosional remnants. Deposits like those of piedmont-slope deposits (Qap1) except occur as higher levels, as much as 43 m above present drainages. Exposed thickness as much as 4 m, but total thickness may exceed this in Sevier River valley

Qb **BASALT LAVA FLOW (EARLY HOLOCENE AND PLEISTOCENE)--**Dark-reddish-brown and black, vesicular to scoriaceous, olivine basalt rich in olivine and plagioclase phenocrysts; anorthite content is 70 percent. Appears to be relatively unoxidized and unvegetated in outcrop. The lack of vegetation has been used by some authors as a relative indicator of a youthful, possibly Holocene, age (Gregory, 1949; Rowley, 1968; Anderson and Rowley, 1975). Originated from a crater 13 km to the west of the quadrangle (Gregory, 1951) and followed the paleo-course of Mammoth Creek. The lateral migration of Mammoth Creek has left the outcrop perched above creek level and has exposed underlying strata. Best and others (1980) obtained a K-Ar date of 0.52 ± 0.05 Ma from a sample west of the Hatch quadrangle that is believed to be correlative with the map unit. Maximum thickness is approximately 12 m

Tvu **UPPER VALLEY-FILL DEPOSITS (PLIOCENE AND UPPER MIOCENE)--**Moderately to poorly consolidated, texturally immature to submature, tuffaceous, tan, pink, and salt-and-pepper siltstone, pebbly sandstone, and pebble conglomerate. Deposits west of the Sevier River are dominated by volcanic clasts derived from the Marysvale volcanic region and(or) the Markagunt Plateau, and deposits east of the Sevier River are dominated by sedimentary clasts derived from the Claron Formation and Cretaceous strata on the Paunsaugunt Plateau. Deposition was in response to the damming of the Sevier River by a structural uplift downstream in Circleville Canyon (Anderson, 1987). May be correlative in whole or in part with the Sevier River Formation (Callaghan, 1939). Upper part may be as young as earliest Pleistocene. Thickness as much as 100 m but may have exceeded several hundred meters at time of deposition

Tb **OLDER BASALT LAVA FLOW (UPPERMOST MIOCENE)--** Dark-reddish-brown and steel-gray, vesicular to scoriaceous, olivine basalt rich in olivine and plagioclase phenocrysts. Olivine commonly altered to iddingsite. Anorthite content from 68 percent to 75.5 percent (labradorite to bytownite). May be correlative with a basalt 5 km north of Hatch quadrangle that has been dated as 5.3 +/- 0.5 Ma by Anderson and Christenson (1989). Variable thickness, as much as 30 m

Tvl **LOWER VALLEY-FILL DEPOSITS (MIOCENE)**--Lithologically similar to upper valley-fill deposits (Tvu) but also includes sparse air-fall tuff and sparse limestone. Exposed thickness in the study area as much as 140 m, but the base of the unit is not exposed and its total thickness may be in excess of several hundred meters in Sevier River valley. May be correlative in whole or in part with the Sevier River Formation (Callaghan, 1939)

Tib **BALDHILLS TUFF MEMBER OF ISOM FORMATION (OLIGOCENE)**--Two cooling units of resistant, densely welded crystal-poor vitric ash-flow tuff. The lower cooling unit is light- to medium-bluish-gray, extremely platy, with 2 to 15 cm thick partings that radically change their attitudes over a distance of a few meters. The upper cooling unit is dark-brown to reddish-purple, more massive, with platy partings as much as 1 m thick, and it weathers into a granule- to pebble-size "popcorn"-textured gravel. Thickness is as least 30 m; base of the unit is not exposed. Potassium-argon age is about 26 to 27 Ma (Fleck and others, 1975; Best and others, 1989)

Tl **TUFFACEOUS SEDIMENTARY STRATA OF LIMEROCK CANYON (OLIGOCENE)**--Predominantly texturally immature to submature, pale- to dark-green and white to bluish-white, tuffaceous volcanic wacke, with lesser calcareous to silicified mudstone, tuffaceous volcanic arenite, tuffaceous siltstone, air-fall tuff, and tuffaceous conglomerate, and minor shale and tuffaceous limestone. In Rock Canyon and Spring Hollow, the strata include pale-olive-green, dark-yellowish-orange, black, light- to dark-reddish-brown, light- to moderate-red, white and dark-blue chalcedony pods 1 m or more in thickness. Extensively bioturbated. Sandstone is commonly bimodal, containing a large amount of granules and pebbles. Thickness as much as 76 m

Tcw **WHITE MEMBER OF CLARON FORMATION (OLIGOCENE)**--Massive, white to tan and gray, argillaceous limestone, calcareous shale, siltstone, sandstone, and conglomerate of lacustrine and fluvial origin, generally with pale-green secondary coloration. Vuggy with void spaces commonly filled with calcite crystals. Nodules, green and black siliceous veinlets, dendritic pyrolusite, brecciation, stylolitization, and caliche-related alteration common. Maximum exposed thickness is approximately 55 m. Wagner (1984) reported the white member of the Claron Formation to be greater than 300 m thick west of the Hatch quadrangle in the Haycock Mountain quadrangle

Tcr **RED MEMBER OF CLARON FORMATION (OLIGOCENE AND EOCENE)**--Basal quartzite conglomerate capped by massive cliffs of dense to fine-grained argillaceous limestone and calcareous mudrocks in red, reddish-pink, orange, yellow, and pale-gray. Grades upward to less resistant, tan and red calcareous sandstone, calcareous mudrocks, and lesser conglomerate. Description modified from Wagner (1984) and Thomas (1985), who reported thicknesses of greater than 270 m and as much as 400 m. Basal parts may contain rocks as old as Late Cretaceous. Shown only in cross-section.

Ku **CRETACEOUS ROCKS UNDIVIDED**--Well-sorted, fine- to medium-grained, texturally mature, massive to cross-bedded tan sandstone. Exposed thickness is 152 m

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MAP SYMBOLS

Contact--Dashed where approximately located or of unknown depth and configuration in cross-sections.

Fault--Dotted where concealed; ball and bar on downthrown side.

Probable fault--Approximately located; seen as subdued, linear scarp on aerial photographs; ball and bar on downthrown side.

Lineament--Seen as alignment of drainage or vegetation on aerial photographs; probable joint or fault of small displacement.

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Strike and dip of inclined beds.

Slump block--Scarp at head of a coherent block of slumped bedrock; hachures on downthrown side.

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CORRELATION OF MAP UNITS