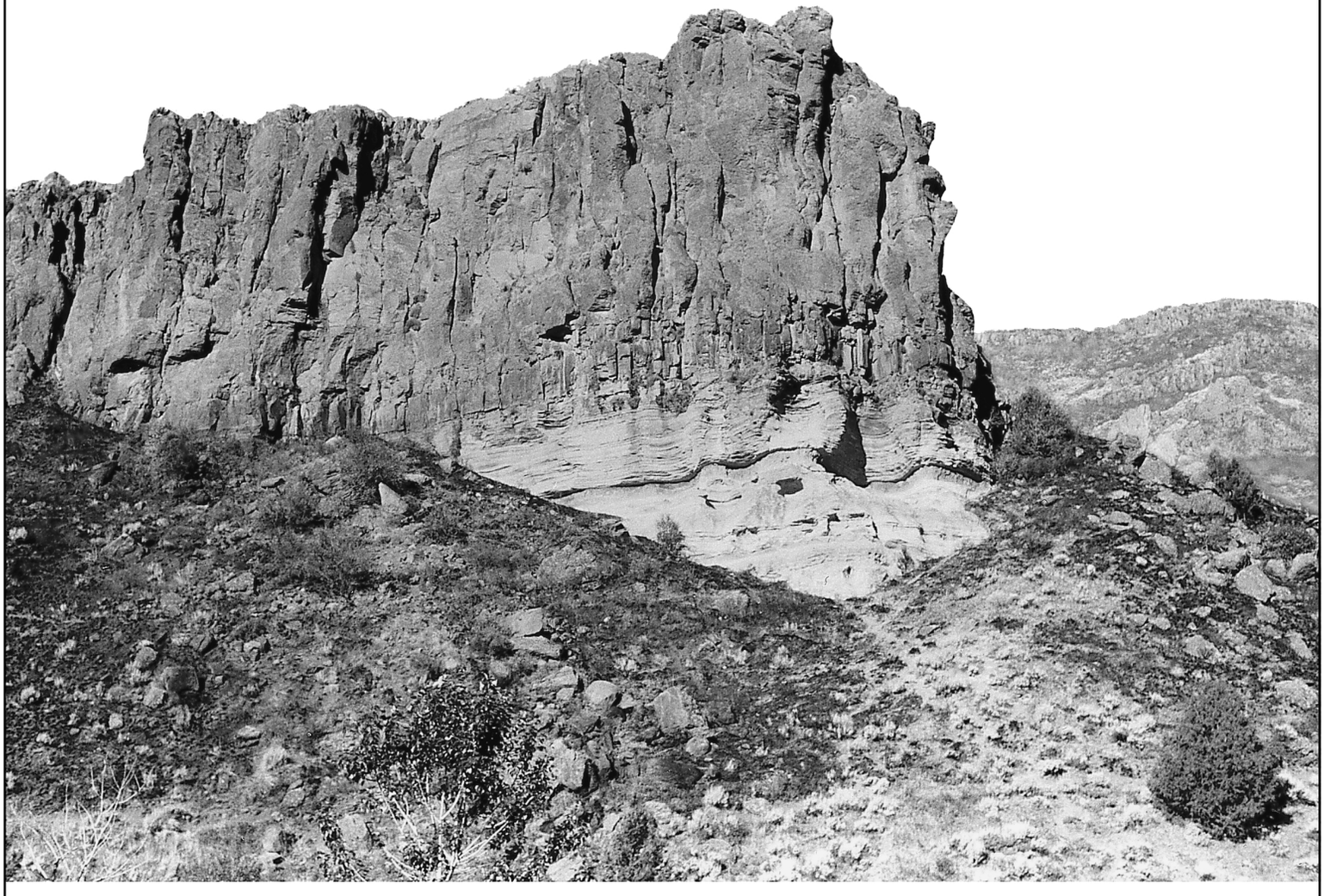
USGS
science for a changing world

Geologic Map of the Stricker 3 Quadrangle, Twin Falls and Cassia Counties, Idaho

By Paul L. Williams, James W. Mytton, and William A. Morgan

Geologic Investigations Series I–2633



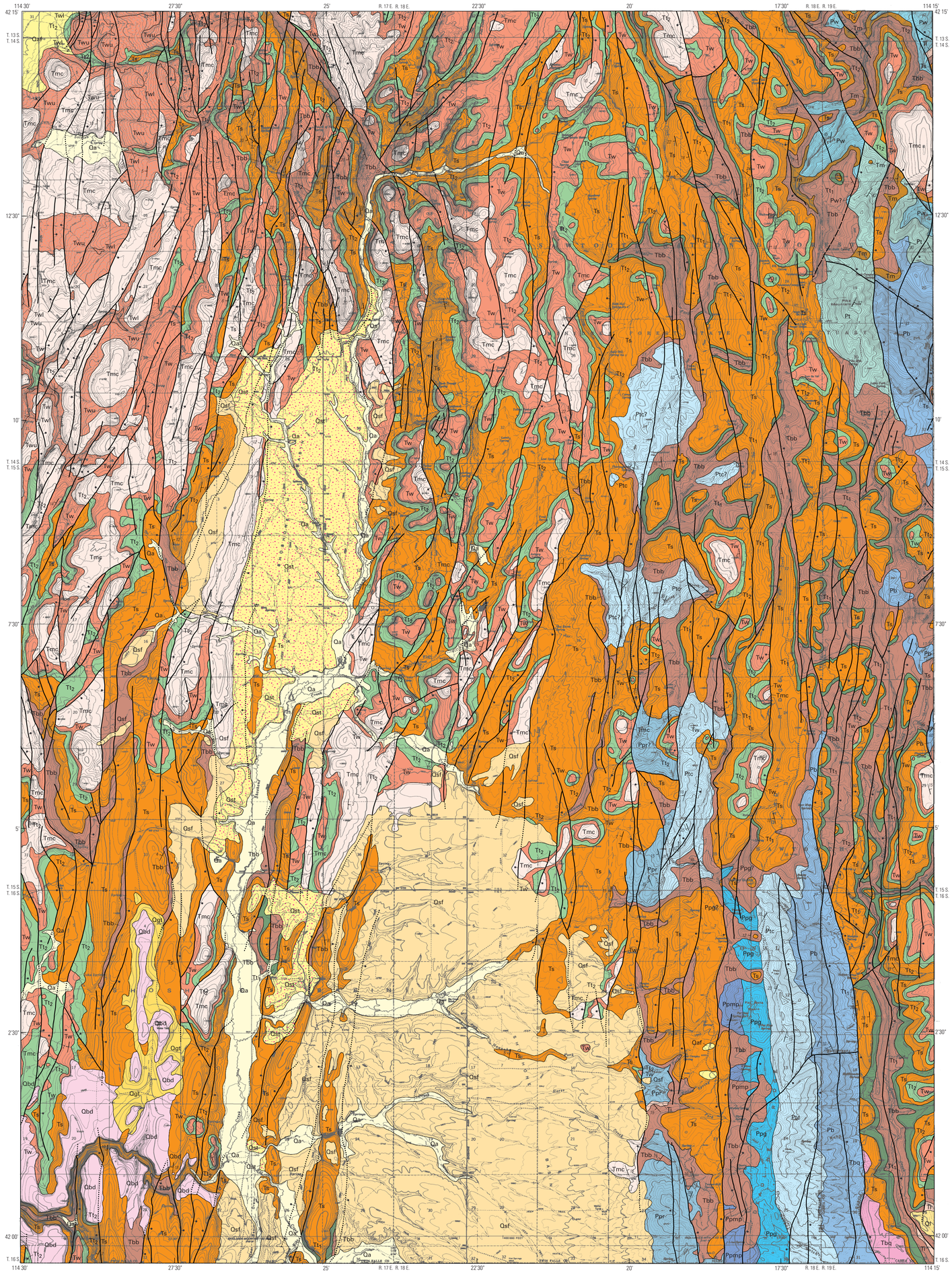
Tuff of Wooden Shoe Butte, lower member. Thin dark line marks the contact with underlying unnamed bedded tuff unit 2. Location is in Rock Creek canyon at Steer Basin campground. *(Photograph by P.L. Williams, 1980)*

1999

U.S. Department of the Interior
U.S. Geological Survey

U.S. DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

GEOLOGIC INVESTIGATIONS SERIES
I–2633



Base from U.S. Geological Survey
Hopper Gulch, Pike Mountain, Big Creek Ranch, and Timber Butte, 1:24,000, 1974
Transverse Mercator projection
Idaho coordinate system, central zone

APPROXIMATE MEAN DECLINATION, 1990

SCALE 1:48,000

1 0 1 2 3 4 MILES

1 0 1 2 3 4 5 KILOMETERS

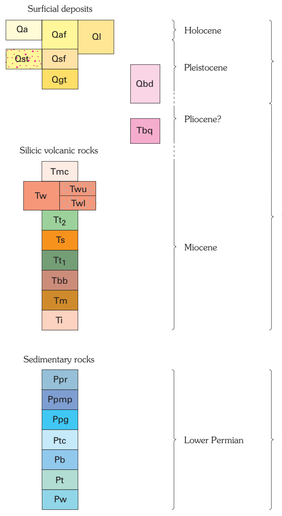
CONTOUR INTERVALS 20 AND 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

IDAHO
MAP LOCATION

Geology mapped by P.L. Williams in 1993–95 and J.W. Mytton and W.A. Morgan in 1980-82, assisted by J.N. Weaver in 1980
Map digitized by TechniGraphic Systems, Inc.
Digital cartography and layout by Gayle M. Dumonceaux
Editing and some digital file preparation by F.C. Brunstein

Manuscript approved for publication,
February 23, 1998

CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

Qa — **Alluvium (Holocene)—**Gravel, sand, and silt mostly along flood plain and channel of Shoshone Creek and its major tributaries. About 1-5 m (3-15 ft) thick

Qaf — **Alluvial fan deposits (Holocene and Pleistocene)—**Poorly sorted gravel, sand, and silt on slopes flanking the Cassia Mountains in the northwestern part of the quadrangle and small deposits in scattered localities elsewhere. Thickness 5-20 m (15-65 ft) or more

Ql — **Landslide deposit (Holocene and Pleistocene)—**Large blocks, boulders, sand, and silt forming poorly sorted deposit mantling bedrock in the southeastern part of the quadrangle. Thickness as much as 40 m (130 ft)

Alluvium of Shoshone Basin (Middle(?) Pleistocene)—Alluvial fill in Shoshone Basin resulting from damming by basalt flows (Qbd) that partially filled the canyon of Shoshone Creek in the southwestern part of the quadrangle

Qst — **Terrace gravels of Shoshone Creek and major tributaries—**Subrounded to rounded cobbles and pebbles in a matrix of sand and silt forming a low terrace 6-30 m (20-100 ft) above the flood plain in northern and western Shoshone Basin. Coarser clasts are slightly to moderately weathered. Deposit is locally quarried for road metal and fill. Thickness 5-25 m (15-80 ft)

Qsf — **Alluvial-fan deposits—**Subangular to subrounded cobbles and pebbles, mixed with sand and silt, forming alluvial fans flooring southern Shoshone Basin and flanking northern Shoshone Basin. Coarser clasts are dominantly of Tertiary volcanic rocks in northern Shoshone Basin, of mixed volcanic and Paleozoic provenance in the northern part of southern Shoshone Basin, and mostly of Paleozoic rocks in the southern part of southern Shoshone Basin. Thickness ranges from 5 m to more than 40 m in southern Shoshone Basin (15 to more than 130 ft)

Qgt — **Gravel and Tuff (Middle(?) Pleistocene)—**Poorly exposed gravel, sand, silt, and bedded basaltic tuff interbedded with the basalt of Delaplain in the southwestern part of the quadrangle. Interpreted to be gravel of a former south-flowing tributary of Shoshone Creek; inundation of the flood plain by basalt led to abandonment of the tributary valley. About 20 m (65 ft) thick

BASALT FLOWS

Qbd — ***Basalt of Delaplain (Pliocene(?) to Middle(?) Pleistocene)—**Lava flows erupted from one or more centers in or near the southwestern part of the quadrangle. Gray, aphanitic to porphyritic basalt. Small (2-5 mm) olivine phenocrysts partly altered to iddingsite comprise 2-20 percent of the rock; matrix consists of 30-40 percent calcic plagioclase laths, 40-50 percent clinopyroxene, and 3-15 percent opaque minerals. Texture is glassy to ophitic. Flows partly filled the canyon of Shoshone Creek to an altitude of about 1,800 m (5,900 ft) and caused aggradation of the creek and its major tributaries in Shoshone Basin. Thickness 0-100 m (0-330 ft)

Tbq — ***Basalt of Quartz Gulch (Miocene or Pliocene)—**Basalt overlying the tuff of Steer Basin west of Goose Creek in the southeastern part of the quadrangle. Consists of one or more lava flows of gray porphyritic basalt that weathers reddish-brown. Rock contains 25 percent calcic plagioclase phenocrysts 5-7 mm long, 15 percent yellow unaltered olivine phenocrysts as large as 5 mm, and 15 percent opaque minerals in a matrix consisting of subequal amounts of plagioclase and olivine crystals <0.1 mm in diameter. Flows are discontinuous on ash-flow tuff (Ts) and are tilted 10-20° westward. Probably equivalent in age to the basalt of Little Cedar Canyon in the Stricker 1 quadrangle (Williams and others, 1990), which was dated at 7.26 ± 0.06 Ma (G.B. Dalrymple, 1979 and written commun., 1979). About 30 m (100 ft) thick

SILICIC VOLCANIC ROCKS
(Stratigraphic names are informal)

Ash-flow tuffs and related rocks (Miocene)—A series of densely welded, vitric and vitric-crystal, rhyolite ash-flow tuff sheets derived from eruptive centers north and northwest of the Cassia Mountains (Pierce and Morgan, 1992). In this quadrangle, the series contains eight cooling units of welded tuff subdivided into six map units. In most places, ash-flow tuff units are separated by layers of bedded tuff, two of which are map units. Ash-flow tuff units are well zoned. Generally from top to bottom, zones are: thin gray to black vitrophyre; a vapor-phase zone of gray to light-brown vesicular, ledge-forming platy tuff, commonly containing conspicuous flowage folds; brown, reddish-brown, red, and purple, massive to platy, densely welded devitrified tuff forming columnar-jointed cliffs and ledges; gray to black vitrophyre; and commonly poorly exposed light-gray bedded surge deposits. The ash-flow tuff units generally thin southward; in places in the eastern part of the quadrangle they are thin to absent on topographic highs in the pre-volcanic terrain of eroded Paleozoic rocks. Magnetic polarity of all silicic volcanic units in the quadrangle is normal. Maximum thickness of the series, including bedded tuff, is about 300 m (1,000 ft)

Tmc — **Tuff of McMullen Creek—**Densely welded, light- to dark-brown, purple, and pale-yellow tuff comprising three informal members, each probably a cooling unit. Member 3: densely welded brown to light-purplish-gray tuff having pronounced platy parting that is commonly intensely contorted by flowage folds alternating with thin (1 m) layers of strongly lithophysal rock, and having a gray perlitic basal vitrophyre; 10-30 m (30-100 feet) thick. Member 2: Pale-purplish-gray flow-banded to lithophysal rock with a greenish-gray vitrophyre containing red devitrified lenticles at the base; 10-25 m (30-80 feet) thick. Member 1: Light-yellow slope-forming nonwelded pisolitic tuff. Plagioclase phenocrysts comprise 1-5 percent of the rock although higher percentages are present in places; 0-20 m (0-65 feet) thick. K-Ar ages obtained from Member 3 are 8.6 ± 0.3 Ma and 8.6 ± 0.2 Ma (Armstrong and others, 1975, using International Union of Geological Societies decay constants [Dalrymple, 1979]). Total thickness of tuff of McMullen Creek is about 15-60 m (50-200 ft)

Tw — **Tuff of Wooden Shoe Butte, undivided—**Consists of two members, each a simple cooling unit. Upper and lower members mapped separately only in northwest part of quadrangle. Phenocrysts in both members comprise 10-20 percent of rock and are mostly plagioclase plus minor quartz and pyroxene. Total thickness 10-60 m (30-200 ft)

Twu — **Upper member—**Mostly gray, glassy ash-flow tuff containing black glass blobs 0.5-2 cm in diameter. In northwest part of quadrangle, middle part of member is a brown ledge-forming devitrified zone and is densely welded. Thickness 0-30 m (0-100 ft)

Twl — **Lower member—**In the northern part of the quadrangle, consists (from top to bottom) of a gray, poorly welded vitrophyre; a slope-forming light-brown and gray vapor-phase zone; a dark-brown and red cliff-forming devitrified zone; and a basal vitrophyre. Unit thins to a black vitrophyre in the southern part of the quadrangle. K-Ar age is 10.0 ± 0.1 Ma (Armstrong and others, 1980), although this age is questioned as too old by Perkins and others (1995). Thickness 10-30 m (30-100 ft)

Tt_2 — **Unnamed bedded tuff unit 2—**White to gray and grayish-yellow thin- to thick-bedded air-fall tuff and thin-bedded, silty to sandy water-laid tuff; locally contains light-brown soil zones near top. Thickness 15-40 m (50-130 ft)

Ts — **Tuff of Steer Basin—**A simple cooling unit of densely welded tuff that commonly crops out as two cliffs or a lower cliff and steep upper slope. Upper vapor-phase zone is light-brown and gray crystal-poor tuff that commonly forms large flowage folds and weathers to reddish blocks that ring when struck with a hammer and form conspicuous talus aprons below outcrops. Medial devitrified zone is cliff-forming, reddish-brown tuff containing 5-20 percent conspicuous white plagioclase phenocrysts. Basal vitrophyre contains obsidian that was used by prehistoric Indians to make projectile points and scrapers. K-Ar age is 12.0 ± 0.4 Ma according to G.B. Dalrymple (written commun., 1979), and about 10 Ma [40Ar/39Ar] according to Perkins and others (in press). Thickness 30-60 m (100-200 ft)

Tt_1 — **Unnamed bedded tuff unit 1—**White to gray, locally light-green, thin- to thick-bedded air-fall tuff and silty to sandy thin-bedded water-laid tuff. Mapped separately in the northeast quarter of the quadrangle and locally elsewhere; in other places included in the tuff of Big Bluff. Thickness 0-60 m (0-200 ft)

Tbb — **Tuff of Big Bluff—**Compound cooling unit of moderately to densely welded tuff. At the top is usually a ledge about 1 m thick of lithophysal tuff locally capped by a thin gray vitrophyre. In the middle is a blocky, slope-forming vapor-phase zone of pale-purplish-gray tuff on a devitrified zone consisting of pink to red tuff containing small, flat, gray lenticles of vapor-phase minerals 1-4 cm long. This zone crops out as dark, craggy columnar cliffs containing large, weathered-out subspherical cavities. Black basal vitrophyre is as much as 15 m (50 ft) thick. Phenocrysts form 5-25 percent of the rock and are mostly alkali feldspar and quartz and minor plagioclase. K-Ar age is 16.2 ± 0.5 Ma (G.B. Dalrymple, written commun., 1979; Perkins and others (1995) suggest a much younger age of 10.83 ± 0.03 Ma ($^{40}Ar/^{39}Ar$). Thickness 45-120 m (150-400 ft)

Tm — **Tuff of Magpie Basin—**Moderately to densely welded tuff. Mostly chocolate-brown, cliff-forming devitrified tuff above a basal crumbly gray vitrophyre. Top of unit is gray vapor-phase tuff, overlain by a layer of gray hydrated glass. Phenocrysts, mostly plagioclase, form 5-15 percent of the unit. Present only in the northeast part of the quadrangle. Thickness about 25 m (80 ft)

Ti — **Tuff of Ibex Peak—**White to gray, rarely orange, thin-bedded to massive air-fall tuff and tuffaceous sandstone and siltstone; locally cross-bedded. Contains minor thin beds of conglomerate. Present only along east margin of quadrangle. Thickness 0-50 m (0-160 ft)

PALEOZOIC SEDIMENTARY ROCKS
(see Mytton and others, 1983)

Phosphoria Formation (Lower Permian)

Ppr — **Rex Chert Member—**Medium-dark-gray chert forming bands 10-15 cm thick; weathers olive to brown; locally shows lamination and cross-stratification and contains chalcedony-filled fractures. Some beds are spicular, and others have sparse fossil debris. Medium- to thick-bedded in upper part, thick-bedded to massive in middle part, and thin- to medium-bedded in lower part. Forms prominent cliffs. Thickness about 180 m (600 ft)

Ppmp — **Meade Peak Phosphatic Shale Member—**Dark-brown thin-bedded siltstone containing minute white-weathering phosphatic oolites or pellets; dark-gray, partly silicified phosphorite containing abundant fossil debris; interbeds of shale, chert, silty limestone, and fine-grained sandstone present locally. Upper part of unit characterized by brown and yellowish orthoquartzite; brown chert; white to yellow, red and purple mottled, platy silicified sandstone and siltstone; and, locally, olive- to brownish-gray partly silicified limestone (wackestone) to dolomitic limestone. Liesegang rings common on surfaces of slabs of orthoquartzite, sandstone and siltstone. Forms steep to gentle slopes. Thickness about 90 m (300 ft.)

Ppg — **Grandeur Tongue of Park City Formation (Lower Permian)—**White, fine- to medium-grained, finely laminated, thin- to medium-bedded silicified and dolomitic sandstone; grades vertically and laterally into orthoquartzite. Locally contains interbeds of siltstone and chert and grades vertically and laterally into sandy and silty laminated dolomite. Sandstone displays small- to medium-scale cross-stratification; some laminae are completely silicified and have a banded appearance. Uppermost part mainly dark chert. In lower part, white to light-gray very fine grained dolomite (dolomitic packstone and wackestone) containing abundant fossil debris (principally brachiopod fragments and crinoid ossicles) alternates with sandstone. Chert and less silty dolomite increase upward in section. Unit forms steep to gentle slopes. Thickness about 150-180 m (500-600 ft)

Ptc — **Trapper Creek Formation (Lower Permian)—**Medium- to dark-brownish-gray, very fine grained, medium- to thick-bedded, fossiliferous limestone (packstone to wackestone) alternates with brown to yellowish, very fine grained, thin- to medium-bedded, calcareous, silty sandstone and siltstone that grade laterally into orthoquartzite. Limestone is generally silty to sandy and is characterized by algal-like elliptical to concentric rings and lenticular bands of very fine grained sandstone that resemble chert where silicified; calcareous zones between sandstone bands resemble concretionary nodules. Sandstone and sandy limestone exhibit small-scale cross-stratification. Limestone beds contain light- to dark-gray nodular to lenticular chert, brachiopod fragments, mollusks, and bryozoans; scaphopods and bellerphontid gastropods are present in some beds; crinoid ossicles, notably pentacrinoids, are abundant in lower part. Unit forms prominent ledges and cliffs. Thickness about 270 m (890 ft)

Pb — **Badger Gulch Formation (Lower Permian)—**Brownish-gray to black, very fine grained, thin-bedded lime mudstone containing quartz silt and silt-sized skeletal fragments replaced by, or recrystallized to, calcite. Commonly exhibits blocky texture; darker areas are more calcareous and lighter areas are more siliceous. Interbeds of silty and sandy lime mudstone are sparse in upper part of unit but are more common in lower part. Soft-sediment deformation is common. Beds have sharp even contacts, and are characterized by evenly spaced laminae about 1 mm thick. Fracture cleavage developed at high angles to laminae; beds break into angular plates that shatter easily. Locally, beds are contorted, and fold axes generally plunge in a southerly direction. Unit forms castellated cliffs that have jagged spires. Contacts are gradational with overlying and underlying units. Thickness approximately 315 m (1,030 ft)

Pt — **Third Fork Formation (Lower Permian)—**Gray to yellow and pink calcareous sandy siltstone and rare black limy mudstone. Siltstone weathers gray, yellow, pink, and orange and is characterized by mottling resulting from extensive bioturbation. Trace fossils include various forms of *Scalarituba* sp., *Zoophycos* spp., and *Chondrites* sp. Lime mudstone weathers gray or grayish yellow. Unit forms steep to gentle slopes at its type section west of Third Fork of Rock Creek in the northeast part of the quadrangle. Contacts are gradational with overlying and underlying units. Thickness 330 m (1,080 ft)

Pw — **Wahlstrom Hollow Formation (Lower Permian)—**Light- to dark-gray or brown to red, fine-grained, medium- to thick-bedded, fossiliferous, silty limestone (wackestone to packstone) and calcareous siltstone; weathers dark gray, yellowish orange, or, less commonly, various shades of pink. Contacts between beds are generally sharp and planar. Submarine channels and zones of recumbently folded, laterally discontinuous beds, interpreted as subaqueous soft-sediment slumps, are locally present. Sedimentary structures such as graded lamination, microripples, cross lamination, convolute lamination, scoured surfaces, and load structures are common. Grayish-orange- to grayish-brown-weathering subspherical to elliptical siliceous nodules, which are aligned parallel to bedding and stand out prominently in relief, are abundant within certain intervals. Grayish-orange-weathering siliceous laminae parallel to bedding are common. Fossiliferous limestone is dominant in lower part of unit; lime mudstone is present only in basal part. The upper part of formation forms steep slopes and broken ledges; lower part at its type section, located just north of the northeast corner of the quadrangle, forms irregular, scraggly cliffs. Thickness approximately 500 m (1,640 ft)

Contact—Dashed where approximately located

Fault—Dashed where approximately located; dotted where concealed; bar and ball on downthrown side

Strike and dip of beds in sedimentary rocks or compaction foliation of volcanic rocks where parallel to base of unit

REFERENCES

Armstrong, R. L., Leeman, W. P., and Malde, H. E., 1975, K-Ar dating, Quaternary and Neogene volcanic rocks of the Snake River Plain, Idaho: American Journal of Science, v. 275, p. 225-251.

Armstrong, R. L., Harakal, J. E., and Neill, W. M., 1980, K-Ar dating of Snake River Plain (Idaho) volcanic rocks—new results: Isochron/West, no. 27, p. 5-10.

Dalrymple, G. B., 1979, Critical tables for conversion of K-Ar ages from old to new constants: Geology, v. 7, p. 558-560.

Mytton, J. W., Morgan, W. A., and Wardlaw, B. R., 1983, Stratigraphic relations of Permian units, Cassia Mountains, Idaho, *in* Miller, D. M., Todd, V. R., and Howard, K. A., eds., Tectonic and stratigraphic studies in the Eastern Great Basin: Geological Society of America Memoir 157, p. 281-303.

Mytton, J.W., Williams, P.L., and Morgan, W.A., 1990, Geologic map of the Stricker 4 quadrangle, Cassia County, Idaho: U.S. Geological Survey Miscellaneous Investigations Series Map I-2052, scale 1:48,000.

Perkins, M.E., Nash, W.P., Brown, Francis H., and Fleck, R.J., 1995, Fallout tuffs of Trapper Creek, Idaho—a record of Miocene explosive volcanism in the Snake River Plain volcanic province: Geological Society of America Bulletin v. 107, p. 1484-1506.

Pierce, K.L., and Morgan, L.A., 1992, The track of the Yellowstone hot spot: volcanism, faulting, and uplift, *in* Link, P.K., Kuntz, M.A., and Platt, L.B., eds., Regional geology of eastern Idaho and western Wyoming: Geological Society of America Memoir 179, p. 1-53.

Williams, P.L., Covington, H.R., and Mytton, J.W., 1991, Geologic map of the Stricker 2 quadrangle, Twin Falls and Cassia Counties, Idaho: U.S. Geological Survey Miscellaneous Investigations Series Map I-2146, scale 1:48,000.

Williams, P. L., Mytton, J. W., and Covington, H. R., 1990, Geologic map of the Stricker 1 quadrangle, Cassia, Jerome, and Twin Falls Counties, Idaho: U. S. Geological Survey Miscellaneous Investigations Series Map I-2078, scale 1:48,000.

* Provisional name

GEOLOGIC MAP OF THE STRICKER 3 QUADRANGLE, IDAHO AND NEVADA

By
Paul L. Williams, James W. Mytton, and William A. Morgan

1999

USGS science for a changing world

Any use of trade names in this publication is for descriptive purposes only and does not imply endorsement by the U.S. Geological Survey.

For sale by U.S. Geological Survey, Map Distribution
Box 25286, Federal Center, Denver, CO 80225
1-888-ASK-USGS

This map was produced on request, directly from digital files, on an electronic plotter. It is also available as a PDF file at http://greenwood.cr.usgs.gov

150
U.S. Department of the Interior
1849-1999