U.S. DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

Geologic map of the Weaver Canyon, Nevada and Utah, quadrangle and parts of the Ibapah Peak, Utah, and Tippett Canyon, Nevada, quadrangles—scale 1:24,000

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INTRODUCTION

The map area includes part of the southern Deep Creek Range, Utah and Nevada, within or near the boundary of the Goshute Indian Reservation (fig. 1). This geologic map was completed as part of a mineral resource assessment contracted by the Goshute Indian Tribe and funded by the Bureau of Indian Affairs.

PREVIOUS WORK

Geologic maps of the Deep Creek Range are shown in figure 2. Parts of the Reservation were included in reconnaissance maps by Bick (1966) and Nelson (1966); Hose and Blake (1976) incorporated the maps by Bick and Nelson into the White Pine County geologic map.

GEOLOGIC SETTING

The Deep Creek Range, in the eastern Great Basin, is a predominantly north-trending range that at its southern end swings to the west. The range is separated into four geologic domains that are, from north to south, (1) the Gold Hill mining district, which is underlain by deformed Paleozoic rocks intruded by Jurassic and Tertiary plutons and overlain by Tertiary volcanic rocks (Nolan, 1935, Robinson, 1990), (2) a homoclinal sequence of Proterozoic and Paleozoic rocks, (3) the 39-Ma Ibapah pluton (Rodgers, 1989), and (4) the southern Deep Creek Range, which consists of folded and (or) faulted Proterozoic and Paleozoic rocks overlain by Tertiary volcanic rocks. The map area is in the southern Deep Creek Range and extends to the southwestern boundary of the Ibapah pluton (fig. 3).

The southern Deep Creek Range is underlain by Proterozoic metasedimentary rocks, Cambrian to Permian miogeoclinal clastic and carbonate rocks, and Eocene to Oligocene volcanic rocks that, in general, are distributed so that progressively younger rocks are exposed to the west. Paleozoic rocks dominate the map area; Proterozoic rocks crop out only at the eastern edge and Eocene to Oligocene rocks at the western edge of the map area. Rare Eocene sedimentary rocks are exposed in the central part of the map area where they are in depositional contact with (1) Pennsylvanian and Mississippian rocks and (2) Devonian rocks. Eocene to Oligocene volcanic rocks overlie Permian rocks. Tertiary to Quaternary unconsolidated sediments range from recent alluvium deposited in stream beds to alluvial fans that are composed of debris derived from an adjacent uplifted area and incised by present-day streams.

The southern Deep Creek Range is within the part of the eastern Great Basin that was compressed during Jurassic and Late Cretaceous to early Tertiary orogenies and extended during the Tertiary. Rodgers (1987) dated metamorphism of the Proterozoic rocks at 73 Ma or older and showed a large, overturned and west-vergent anticline (the Water Canyon anticline) as cut by the 75-Ma Tungstonia Granite. The map area is north of the axial trace of the Water Canyon anticline and on the upright limb.

Major structures that deform rocks in the map area are, from oldest to youngest, (1) low-angle attenuation faults that place younger over older rocks and thin units, (2) broad, north- to northeast-trending folds, and (3) high-angle, down-to-the-west, north-striking faults.

Attenuation faults, identified by thinning or elimination of units, breccia zones, and discordance between bedding and contacts, are most commonly developed at (1) the contact separating Upper Mississippian, Pennsylvanian, and Lower Permian Ely Limestone and Mississippian Chainman Shale, (2) the contact between Upper Devonian and Lower Mississippian Pilot Shale and Middle and Upper Devonian Guilmette, and (3) the top of the Middle and Upper Ordovician Eureka Quartzite. Attenuation faults are associated with small-scale folds and local repetition of beds and are overlain by, and therefore predate, the Eocene White Sage Formation and Eocene to Oligocene volcanic rocks. Because of the associated small-scale features and their age, we suggest that attenuation faults formed during Mesozoic to early Tertiary contractional deformation. A series of broad, north- to northeast-trending folds is present, and best expressed in the Guilmette Formation. These folds deform attenuation faults, are unconformably overlain by Eocene to Oligocene volcanic rocks, and are cut by high-angle faults; the relationship between the folds and the Eocene White Sage Formation is enigmatic in that White Sage is conformable on Pennsylvanian Ely Limestone in the central part of the map area and unconformable on Devonian Guilmette Formation in the eastern part of the area. North- to northeast-trending high-angle faults are related to differential uplift of the range; Gans and others (1991) date uplift as starting in Oligocene and reaching a maximum about 20 Ma. The most prominent of these faults is the western range-bounding fault, dipping westward at about 60 degrees, and dying out at the southern end of the map area. A series of down-to-the-west high-angle faults is about parallel to the western range-bounding fault, but, at the exposed level, the faults are steeper. High-angle faults cut the attenuation faults, broad folds, Eocene White Sage Formation, and the Eocene-Oligocene volcanic rocks.

REFERENCES CITED

Ahlborn, R.C., 1977, Mesozoic-Cenozoic structural development of the Kern Mountains, eastern Nevada and western Utah: Brigham Young University Geology Studies, v. 24, no. part 2, p. 117-131.

Bick, K.F., 1966, Geology of the Deep Creek Mountains, Tooele and Juab Counties, Utah: Utah Geological and Mineralogical Survey Bulletin 77, 120 p.

Gans, P.B., Miller, E.L., Houseman, G., and Lister, G.S., 1991, Assessing the amount, rate, and timing of tilting in normal fault blocks: a case study of tilted granites in the Kern-Deep Creek Mountains, Utah: Geological Society of America Abstracts with Programs, v. 23, no. 2, p. 28.

Hintze, L.F., 1988, Geologic history of Utah: Brigham Young University Geology Studies Special Publication 7, 202 p.

Hose, R.K., and Blake, M.C., Jr., 1976, Geologic map of White Pine County, Nevada, *in* Geology and Mineral Resources of White Pine County, Nevada: Nevada Bureau of Mines and Geology Bulletin 85, plate 1, scale 1:250,000.

Miller, E.L., Gans, P.B., Wright, J.E., and Sutter, J.F., 1988, Metamorphic history of the east-central Basin and Range Province; tectonic setting and relationship to magmatism, *in* Ernst, W.G., ed., Metamorphism and crustal evolution of the western United States: Englewood Cliffs, N.J., Prentice-Hall, Inc., p. 649-682.

Nelson, R.B., 1966, Structural development of the northernmost Snake Range, Kern Mountains, and Deep Creek Range, Nevada and Utah: American Association of Petroleum Geologists Bulletin, v. 50, no. 5, p. 921-951.

Nolan, T.B., 1935, The Gold Hill mining district, Utah: U.S. Geological Survey Professional Paper 177, 172 p.

Robinson, J.P., 1990, A comprehensive study of the structural geology and regional tectonics of the Gold Hill area, Northern Deep Creek Mountains, western Utah: Ithaca, N.Y., Cornell University, Ph.D. dissertation, 287 p.

Rodgers, D.W., 1987, Thermal and structural evolution of the southern Deep Creek Range, west central Utah and east central Nevada: Palo Alto, Calif., Stanford University, Ph.D. dissertation, 149 p.

______1989, Geologic map of the Deep Creek Mountains Wilderness Study Areas, Tooele and Juab Counties, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-2099, scale 1:50,000.

Wallace, A.R., 1986, Mid-Tertiary shearing in the two-mica Ibapah stock, western Utah: U.S. Geological Survey Open-File Report 86-0151, 12 p.

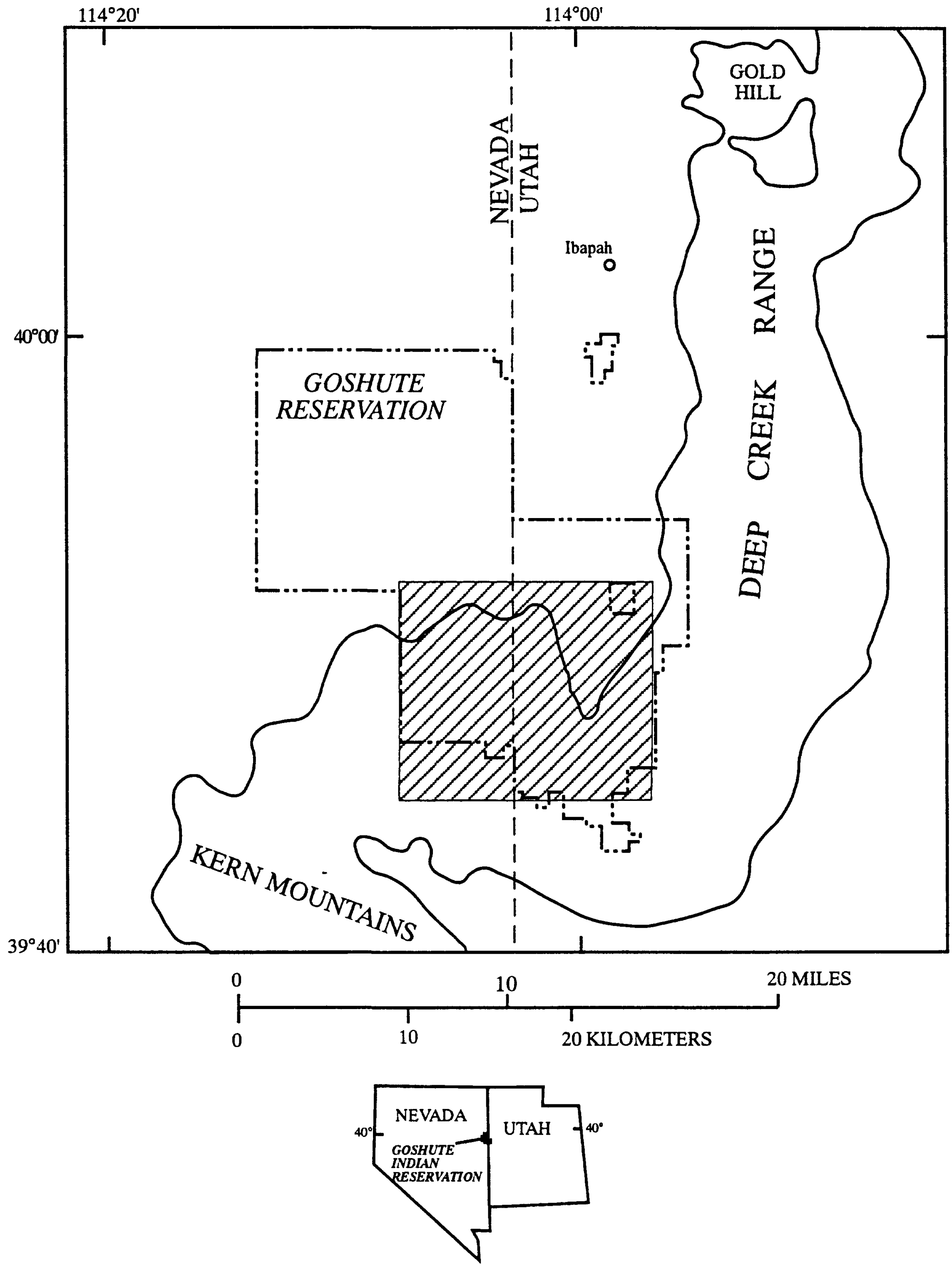
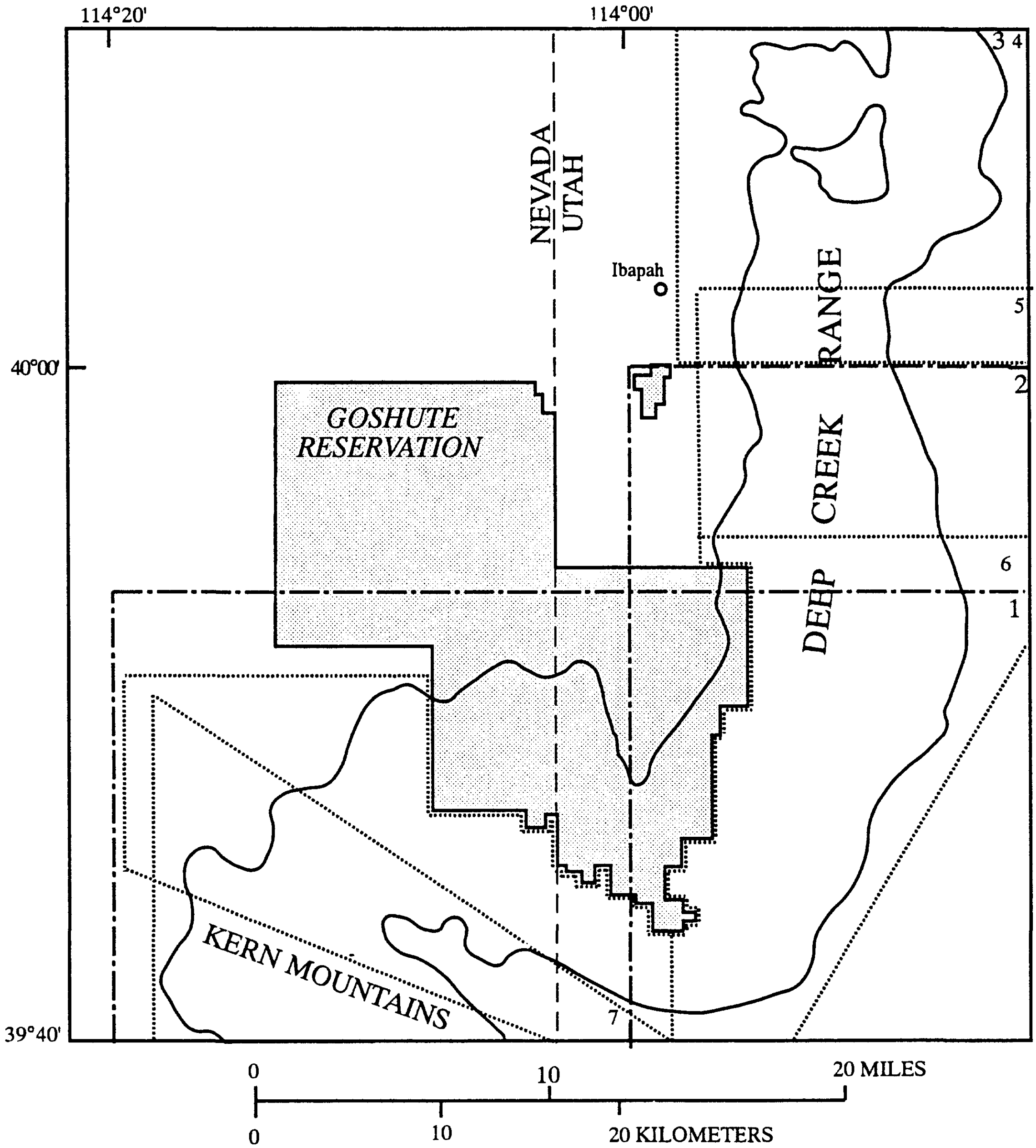


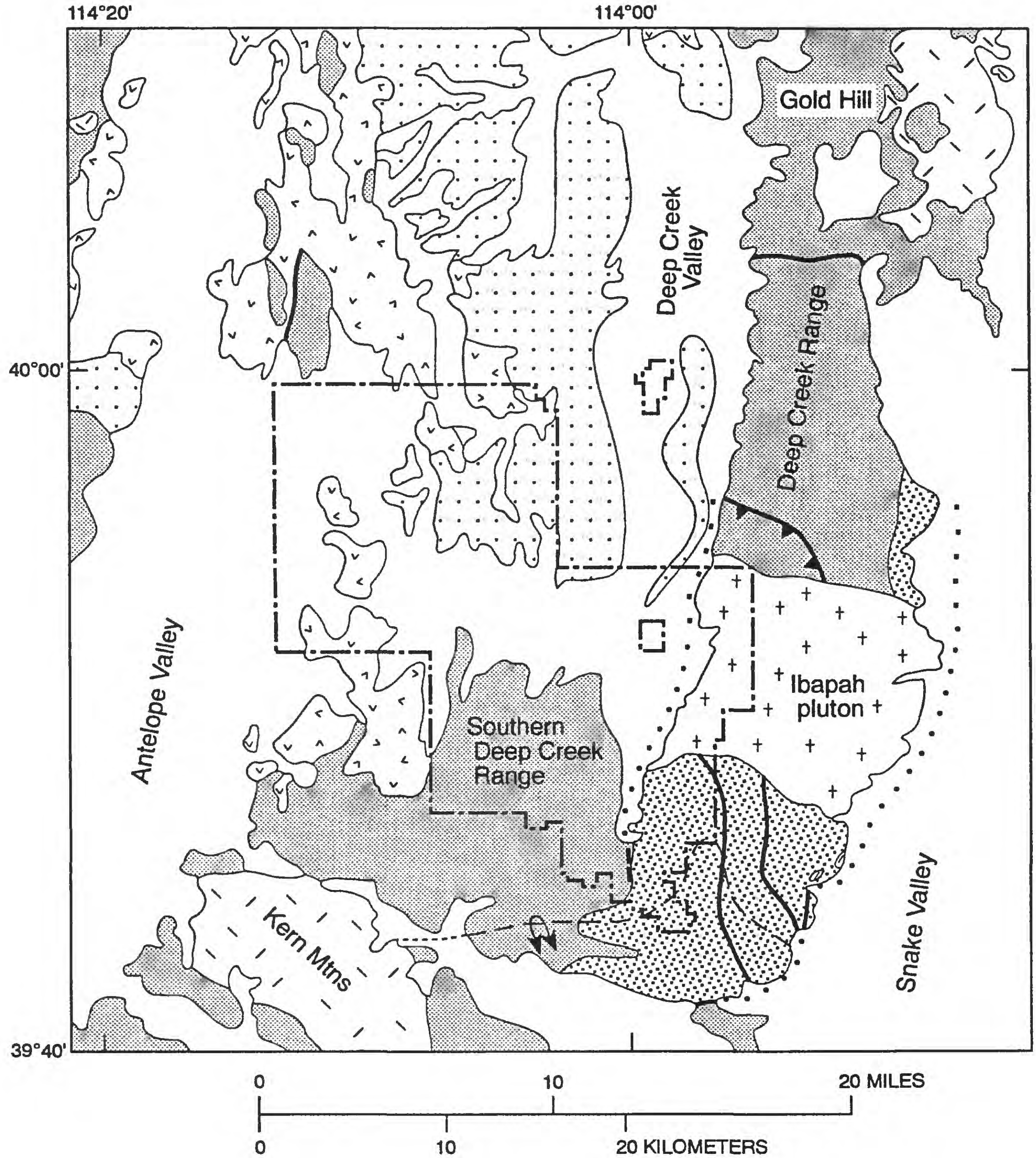
Figure 1.—Location of the Goshute Reservation and the map area. Map area (pattern) is a composite of the Weaver Canyon, Nevada and Utah, and parts of the Ibapah Peak, Utah, and Tippett Canyon, Nevada, 1:24,000 quadrangles.



Includes parts of the Reservation
1 Nelson, R.B. (1966)
2 Bick, K.F. (1966)
3 Hose, R.K., and Blake, M.C., Jr. (1976)

General Deep Creek Range
4 Nolan, T.B. (1935)
5 Rodgers, D.W. (1987)
6 Rodgers, D.W. (1989)
7 Ahlborn, R.C. (1977)

Figure 2.—Geologic maps that include parts of the Deep Creek Range.



EXPLANATION

- Quaternary alluvium
- Miocene and younger sandstone, conglomerate, and reworked tuff
- Eocene volcanic rocks
- Eocene Ibapah pluton
- Tertiary to Jurassic pluton
- Paleozoic carbonate and clastic rocks
- Proterozoic metasedimentary rocks

- Contact
- Fault, dashed where approximate, dotted where concealed
- Thrust fault, sawteeth on upper plate
- Reservation boundary
- Overturned Water Canyon anticline, approximately located, dotted where covered

Figure 3.—Generalized geologic map of the Deep Creek Range and Kern Mountains.