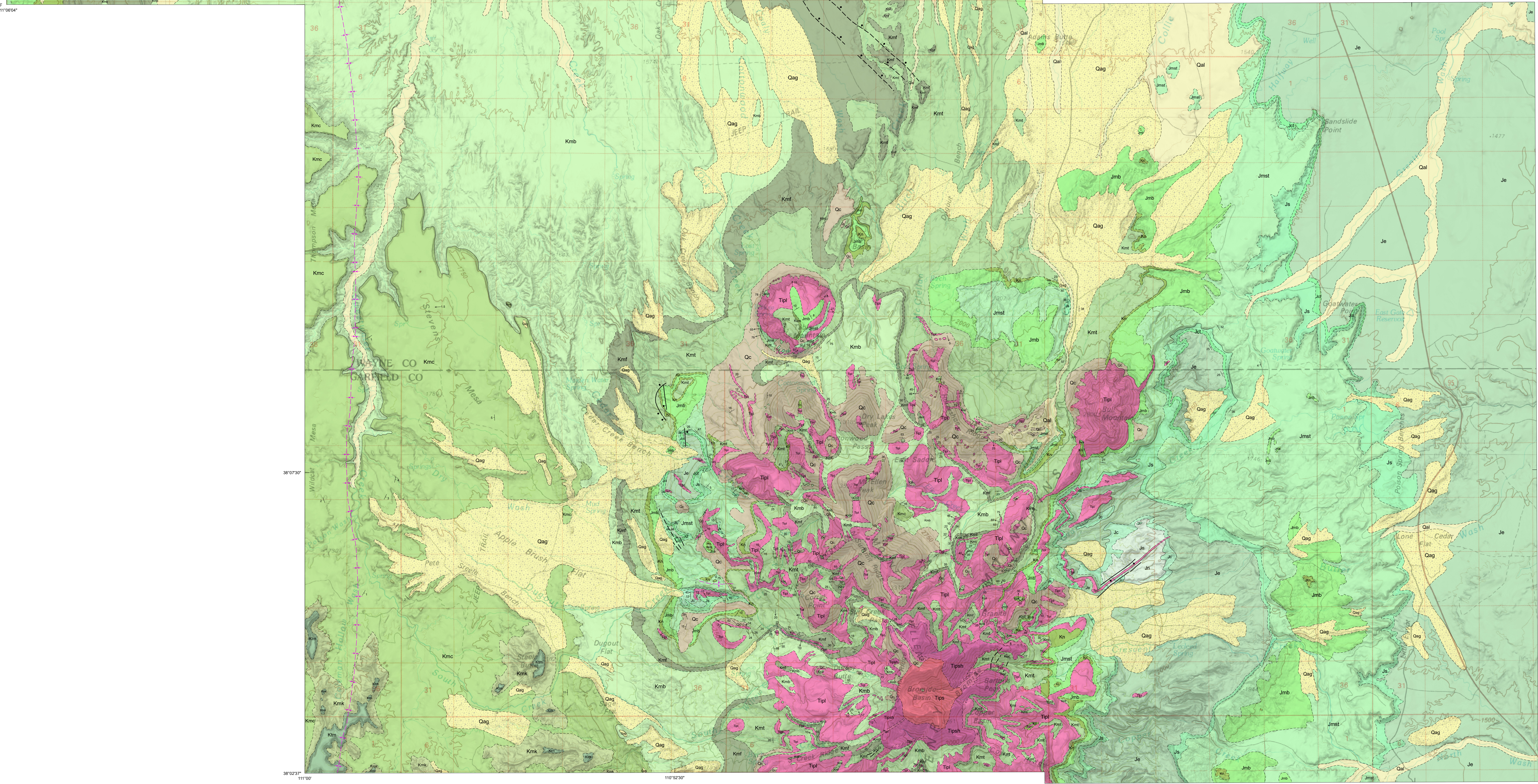
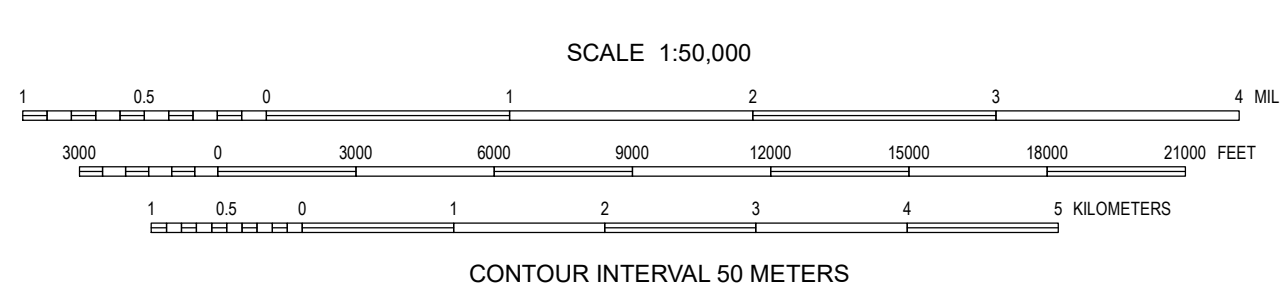


Utah Geological Survey Open-File Report 710DR  
Geologic Map of the Mt. Ellen-Blue Hills Wilderness Study Area  
and Bull Mountain Study Area, Garfield and Wayne Counties, Utah  
(GIS Reproduction of USGS MF-1756-B (1985))  
by  
C.G. Patterson, C.S. Bromfield, R.F. Dubiel, J.E. Faulds, M.J. Larson, P.G. Milde,  
and Fred Peterson  
2019

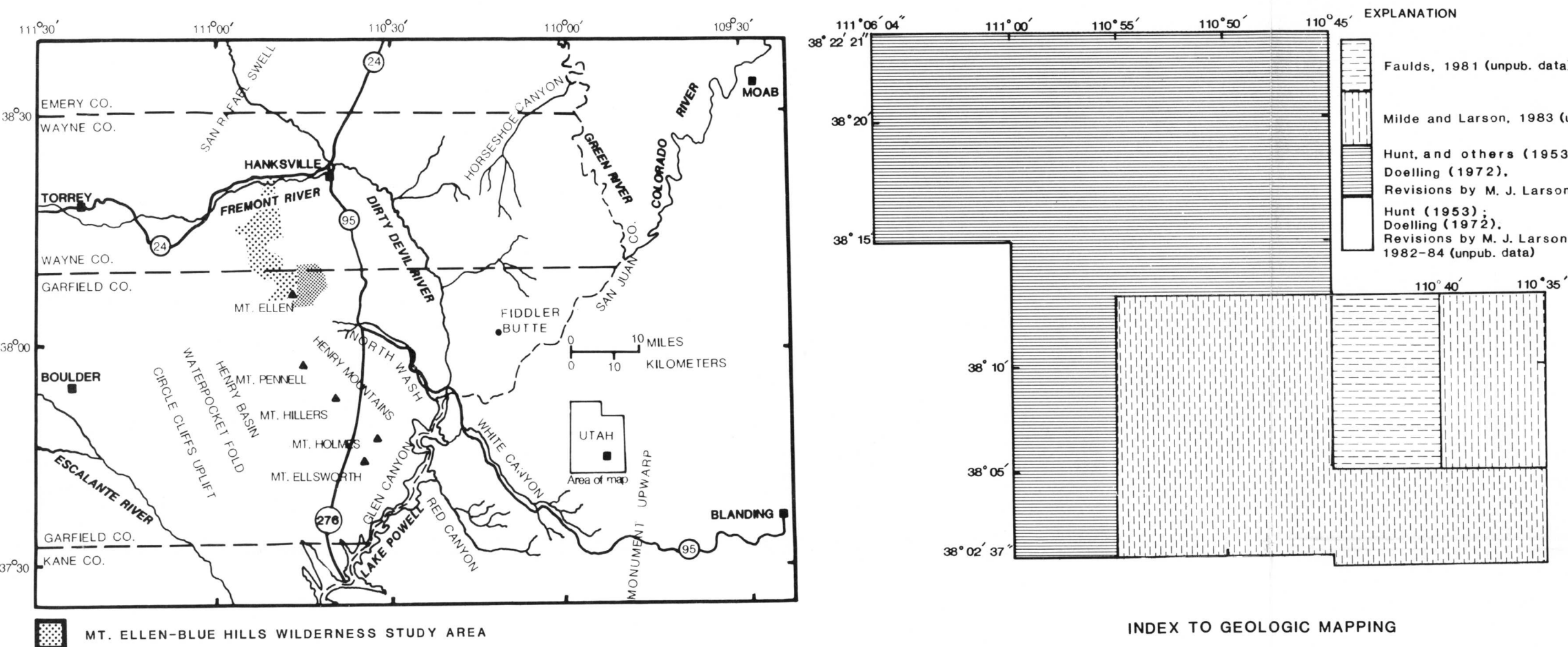
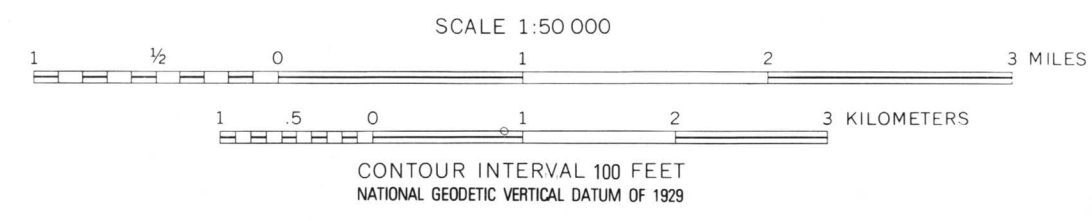
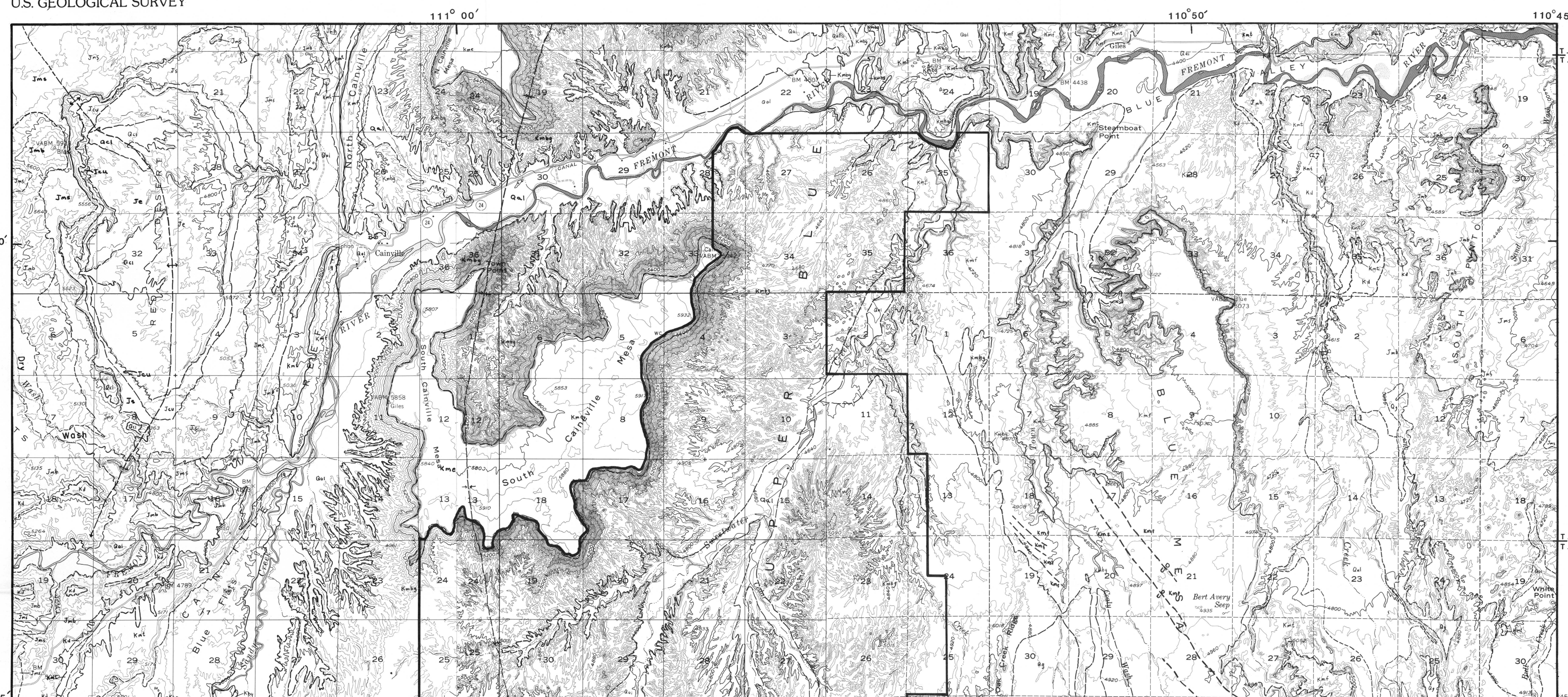




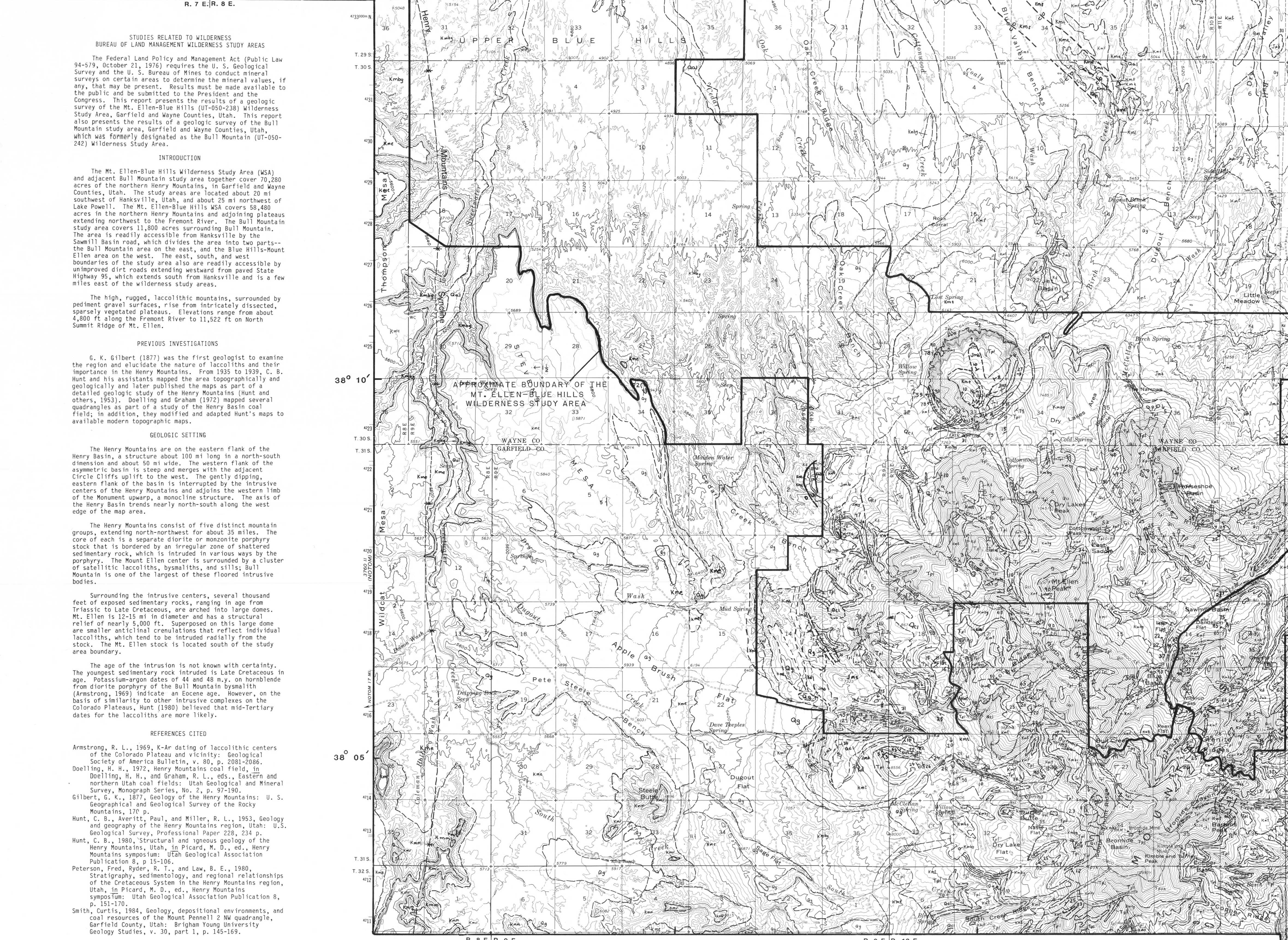
# GEOLOGIC MAP OF THE MT. ELLEN-BLUE HILLS WILDERNESS STUDY AREA AND BULL MOUNTAIN STUDY AREA, GARFIELD AND WAYNE COUNTIES, UTAH

By  
C.G. Patterson, C.S. Bromfield, R.F. Dubiel, J.E. Faulds, M.J. Larson, P.G. Milde, and Fred Peterson

1985



INDEX MAP SHOWING LOCATIONS OF THE MT. ELLEN-BLUE HILLS WILDERNESS STUDY AREA AND THE BULL MOUNTAIN STUDY AREA



**STUDIES RELATED TO WILDERNESS**  
BUREAU OF LAND MANAGEMENT WILDERNESS STUDY AREAS  
The Federal Land Policy and Management Act (Public Law 94-179, October 21, 1976) requires the U. S. Geological Survey and the U. S. Bureau of Mines to conduct mineral surveys on certain areas to determine the mineral values, if any, that may be present. Results must be made available to the public and be submitted to the President and the Congress. This report presents the results of a geologic survey of the Mt. Ellen-Blue Hills (07-050-238) Wilderness Study Area, Garfield and Wayne Counties, Utah. This report also presents the results of a geologic survey of the Bull Mountain study area, Garfield and Wayne Counties, Utah, which was formerly designated as the Bull Mountain (07-050-242) Wilderness Study Area.

**INTRODUCTION**  
The Mt. Ellen-Blue Hills Wilderness Study Area (WSA) and adjacent Bull Mountain study area together cover 70,280 acres of the northern Henry Mountains, in Garfield and Wayne Counties, Utah. The study areas are located about 20 mi southwest of Hanksville, Utah, and about 25 mi northwest of Lake Powell. The Mt. Ellen-Blue Hills WSA covers 58,480 acres in the northern Henry Mountains and adjoining plateaus extending northeast to the Fremont River. The Bull Mountain study area covers 11,800 acres surrounding Bull Mountain. The area is readily accessible from Hanksville by the Small Basin road, which divides the area into two parts: the Bull Mountain area on the east, and the Blue Hills-Mount Ellen area on the west. The east, south, and west boundaries of the study area also are readily accessible by unpaved dirt roads extending westward from paved State Highway 89, which extends south from Hanksville and is a few miles east of the wilderness study areas.

The high, rugged, laccolitic mountains, surrounded by pediment gravel surfaces, rise from intricately dissected sparsely vegetated plateaus. Elevations range from about 4,000 ft at the Mount Ellen River to 11,522 ft on North Summit Ridge of Mt. Ellen.

**PREVIOUS INVESTIGATIONS**  
S. K. Gilbert (1877) was the first geologist to examine the region and elucidate the nature of laccoliths and their importance in the Henry Mountains. From 1935 to 1939, C. B. Hunt and his assistants mapped the area topographically and geologically and later published the maps as part of a detailed geologic study of the Henry Mountains (Hunt and others, 1953). Doelling and Graham (1972) mapped several quadrangles as part of a study of the Henry Basin coal field; in addition, they modified and adapted Hunt's maps to available modern topographic maps.

**GEOLOGIC SETTING**  
The Henry Mountains are on the western flank of the Henry Basin, a structure about 100 mi long in a north-south direction and about 50 mi wide. The western flank of the asymmetric basin is steep and merges with the adjacent Circle Cliffs uplift to the west. The gently dipping, eastern flank of the basin is interrupted by the intrusive centers of the Henry Mountains and adjoins the western limb of the Monument uplift. The intrusive centers of the Henry Basin trends nearly north-south along the west edge of the map area.

The Henry Mountains consist of five distinct mountain groups, extending north-south for about 35 miles. The core of each is a separate diorite or monzonite porphyry stock that is bordered by an irregular zone of shattered sedimentary rock, which is intruded in various ways by the porphyry. The Mount Ellen center is surrounded by a cluster of satellite laccoliths, bismuthites, and sills; Bull Mountain is one of the largest of these floored intrusive bodies.

Surrounding the intrusive centers, several thousand feet of exposed sedimentary rocks, ranging in age from Triassic to Late Cretaceous, are arched into large domes. Mt. Ellen is 12-15 mi in diameter and has a structural relief of nearly 5,000 ft. Superposed on this large dome are smaller anticlinal culminations that reflect individual laccoliths, which tend to be intruded radially from the stock. The Mt. Ellen stock is located south of the study area boundary.

The age of the intrusion is not known with certainty. The youngest sedimentary rock intruded is Late Cretaceous in age. Potassium-argon dates of 44 and 48 m.y. on hornblende from diorite porphyry of the Bull Mountain bismuthite (Armstrong, 1983) indicate an Eocene age. However, on the basis of similarity to other intrusive complexes on the Colorado Plateau, Hunt (1980) believes that mid-Tertiary dates for the laccoliths are more likely.

**REFERENCES CITED**  
Armstrong, R. L., 1983, K-Ar dating of laccolithic centers of the Colorado Plateau and vicinity. Geological Society of America Bulletin, v. 80, p. 2083-2096.  
Doelling, H. W., 1972, Henry Mountains coal field. In Doelling, H. W., and Graham, R. L., eds., Eastern and northern Utah coal fields. Utah Geological and Mineral Survey, Monograph Series, No. 2, p. 97-190.  
Gilbert, S. K., 1877, Geology of the Henry Mountains. U. S. Geological and Geographical Survey of the Rocky Mountains, 37c p.  
Hunt, C. B., Averitt, Paul, and Miller, R. L., 1953, Geology and geography of the Henry Mountains region, Utah. U. S. Geological Survey, Professional Paper 228, 214 p.  
Hunt, C. B., 1980, Structural and igneous geology of the Henry Mountains, Utah. In Picard, M. D., ed., Henry Mountains symposium. Utah Geological Association Publication 8, p. 15-165.  
Peterson, Fred, Ryder, R. J., and Law, B. E., 1980, Stratigraphy, sedimentology, and regional relationships of the Cretaceous system in the Henry Mountains region, Utah. In Picard, M. D., ed., Henry Mountains symposium. Utah Geological Association Publication 8, p. 151-170.  
Smith, Curtis, 1984, Geology, depositional environments, and coal resources of the Mount Pennell 2 NW quadrangle, Garfield County, Utah. Brigham Young University Geology Studies, v. 30, part 1, p. 145-169.

R. 8 E. R. 8 E.  
Base on U.S. Geological Survey, 1:50,000 Bull Mountain and Fruita, 1954; Hanksville, 1963; Mt. Ellen, 1962.

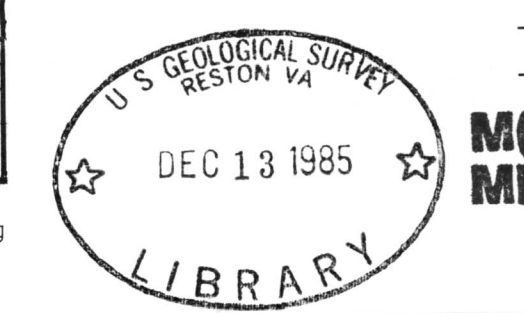
R. 9 E. R. 10 E.

R. 10 E. R. 11 E.

R. 11 E. R. 12 E.

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Geologic credits-see index to geologic mapping



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