

INTRODUCTION

The Mahogany Point quadrangle, in Emery County in central Utah, was mapped in 1978-79 as part of the U.S. Geological Survey's program to evaluate lands in the public domain for potential coal leasing. Mapping was done using U.S. Forest Service color aerial photographs at a scale of 1:15,840 on U.S. Geological Survey topographic maps at a scale of 1:24,000. The quadrangle was mapped previously by Spieker (1931) at a scale of 1:62,500.

GEOGRAPHY

The quadrangle is named for Mahogany Point, the northern end of North Horn Mountain, which lies south of Straight Canyon about 10 km northwest of Orangeville, Utah. This area is part of the Wasatch Plateau and altitudes are from 1,850 m in the southeastern part of the quadrangle to 3,080 m in the northern part. Most of the area is drained by the southward-flowing Cottonwood Creek; the southwestern part of the area is drained by the eastward-flowing stream in Straight Canyon. Trail Mountain and East Mountain are bordered by stepped-cliffs; these cliffs reach 500 m in height above the dissected valleys in the southeastern part of the quadrangle.

Resistant sandstones and limestones form cliffs throughout the area, with less resistant shales forming gentler slopes that, in places, are covered by hummocky landslide deposits. Small areas of badlands have been formed in the shales of the landslide deposits. Small areas of badlands have been formed in the shales of the Mancos Shale. Extensive pediments slope into the valleys from the plateau cliffs.

Access to much of the area is by foot or four-wheel-drive vehicle; the only secondary highway is Utah Route 29. There are no permanent habitations; active (1981) coal mines exist on Trail and East Mountains.

Annual precipitation varies from less than 40 cm to at least 60 cm and increases with altitude. The vegetation zones found in this area are the Upper Sonoran, Transition, Canadian, and Hudsonian (U.S. Forest Service, 1978).

STRATIGRAPHY

Sedimentary rocks total about 1,100 m in thickness and range in age from Late Cretaceous to Tertiary. Lithology and thickness of the units are shown in the stratigraphic sequence of exposed rocks.

The part of the marine Mancos Shale that occurs in this area has been divided into five units: the upper part of the Blue Gate Shale Member, the upper, middle, and lower parts of the Emery Sandstone Member, and the lower part of the Blue Gate Shale Member. Only the upper three units are exposed in this quadrangle. This terminology is a modification of the work of Peterson and Ryder (1975), who reworked parts of the Mancos Shale in southeastern Utah. The threefold breakdown of the Emery Sandstone Member follows that of Spieker (1931), who first mapped the Mancos Shale in this area.

Blackhawk Formation is a deltaic facies and contains the major coal deposits of the area. The Blackhawk is predominantly sandstone with lesser amounts of shale, siltstone, and coal. The sandstone is thicker and more extensive in the upper part of the formation than in the lower part. The economically valuable coal beds occur in the lower part.

Price River Formation contains a distinct marker bed approximately 20 m thick about 30 m below the top of the formation. This marker bed, informally named the great white sandstone, is lithologically similar to the Castlegate Sandstone in that it is very pale orange to pinkish gray, medium to coarse grained, massive, and locally conglomeratic. The great white sandstone forms a prominent cliff in this and adjacent quadrangles.

North Horn Formation is a flood-plain lacustrine facies, well known for its vertebrate fossils. Fossils of reptilia and mammals, in particular, have been described from North Horn Mountain by researchers from the Smithsonian Institution (Garin, 1941; Gilmore, 1946) and from various universities (for example, Jensen, 1966).

STRUCTURE

The rocks generally dip very gently southward or southwestward in this area although broad gently dipping structures may exist locally. The area lies between two zones of faulting: the large Jose Valley fault zone 1-2 km to the west and the numerous faults located 2-4 km to the east in the Red Point quadrangle. Two faults cut across the northern part of East Mountain. The Pleasant Valley fault zone (Spieker, 1931) is typical of the north-trending graben systems in the plateau. The informally named East Mountain fault strikes northeastward.

ECONOMIC GEOLOGY

Coal.—The coal beds in the area that meet current classification standards (Bass and others, 1970) are those in the Hiawatha and Blind Canyon zones in the lower part of the Blackhawk Formation. These coal beds are generally lenticular. The lowest coal bed of the Hiawatha zone is usually the thickest and the most laterally extensive, although it may be cut locally by paleochannels. The Blind Canyon bed tends to be less consistent in thickness than those in the Hiawatha zone.

Coal analyses from this quadrangle (Doelling, 1972) show average values for high-volatile B bituminous coal to be 12,905 Btu/lb; moisture 4.7 percent; volatile matter, 41.6 percent; fixed carbon 46.4 percent; ash, 6.5 percent, and sulfur 0.57 percent.

Doelling (1972) reported reserves of 509,222,020 tons for this quadrangle—an estimate based on limited data.

Coal sections in part of the area are published by permission of the Utah Power and Light Co.

Limestone.—Limestone of potential economic value is found in the lacustrine Flagstaff Limestone. At least some of this limestone meets the purity requirements for potential use in the sulfur dioxide scrubber systems of coal-burning powerplants and as mine rock dust in coal mines. Analyses of samples have shown this limestone to be generally very pure, with an average soluble carbonate percentage of 94.4 (Stamm, 1979).

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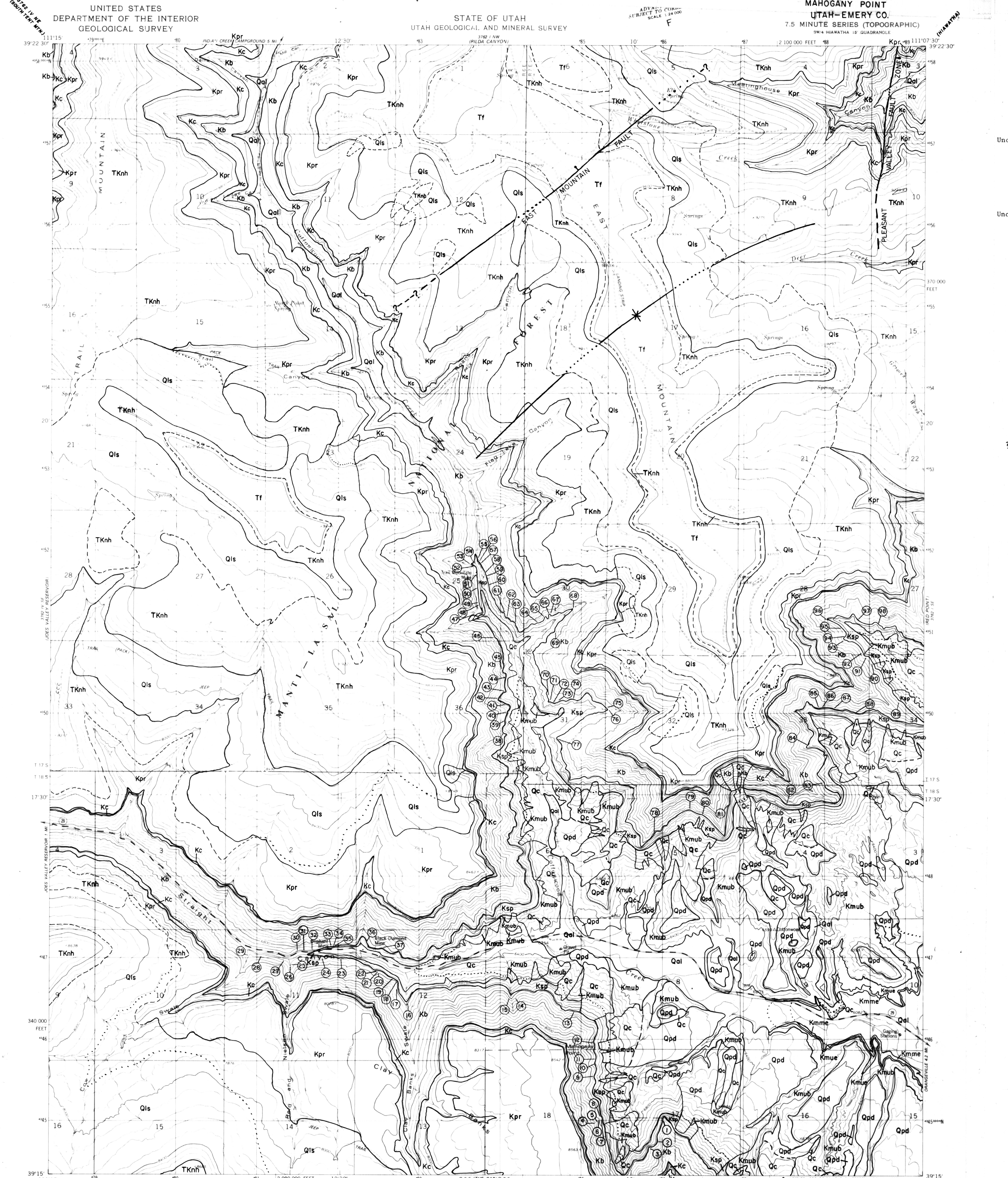
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CORRELATION OF MAP UNITS

Qal	Holocene and Pleistocene	QUATERNARY
Qpd		
Qls		
Qc	Eocene	TERTIARY
Tf		
TKn		
Kpr	Paleocene	TERTIARY
Kc		
Kb		
Ksp	Upper Cretaceous	CRETACEOUS
Kmub		
Kmme		

LIST OF MAP UNITS

Qal	Alluvium	Kc	Castlegate Sandstone
Qpd	Pediment deposits	Kb	Blackhawk Formation
Qls	Landslide deposits	Ksp	Star Point Sandstone
Qc	Colluvium		MANCOS SHALE
Tf	Flagstaff Limestone	Kmub	Upper part of Blue Gate Shale Member
TKn	North Horn Formation	Kmme	Upper part of Emery Sandstone Member
Kpr	Price River Formation		Middle part of Emery Sandstone Member

CONTACT—Dashed where approximately located; dotted where concealed

FAULT—Dashed where approximately located; dotted where concealed; queried where conjectured. Bar and ball on downthrown side

SYNCLINE—Dotted where concealed

COAL SECTION—Circled number refers to measured coal section. Line points to top of coal section

STRATIGRAPHIC SEQUENCE OF EXPOSED ROCKS

NOT TO SCALE

SYSTEM	SERIES	FORMATION	DESCRIPTION
QUATERNARY	Holocene and Pleistocene	Unconformity	ALLUVIUM (Qal)—Mostly moderately sorted and stratified subangular to subangular clay, silt, sand, and gravel; includes some colluvium and alluvial fan deposits, particularly in broad valleys
		Surficial deposits	PEDIMENT DEPOSITS (Qpd)—Poorly sorted and stratified deposits composed of subangular to subrounded pebbles to boulder-sized clasts of reworked local sediments with interstitial clay, silt, and sand; locally partially cemented by calcium carbonate
		Landslide deposits	LANDSLIDE DEPOSITS (Qls)—Poorly sorted deposits derived from older surficial deposits and bedrock blocks derived mainly from Flagstaff Limestone and North Horn Formation
TERTIARY	Eocene	Unconformity	OLLUVIUM (Qc)—Poorly sorted and stratified subangular to angular clay, silt, sand, and gravel
		Flagstaff Limestone	FLAGSTAFF LIMESTONE (Tf)—Limestone, dark-bluish to yellowish-gray; contains subordinate light-bluish to yellowish-gray fine- to medium-grained medium even-bedded sandstone interbeds, shale interbeds, and very light to yellowish-gray volcanic ash interbeds; cliff-forming. Moderate- to dark-reddish-brown fine- to medium-grained thin to medium even-bedded sandstones occur in some localities in the upper part exposed in quadrangle. Fresh-water gastropods occur locally. Base conformable with North Horn Formation in map area. Only lower 50 m present in quadrangle. Formation 150-300 m thick elsewhere on Wasatch Plateau
		North Horn Formation	NORTH HORN FORMATION (TKn)—Shale, gray, grayish-purple, moderate-red, or variegated; contains interbeds of light-brown fine- to coarse-grained medium even-bedded and massive lenticular sandstone, and thin- to medium-bedded gray limestone and lenticular conglomerate; slope-forming. Contains vertebrate fossils, particularly reptilian and mammalian. Base conformable and gradational with Price River Formation. About 245 m thick
		Price River Formation	PRICE RIVER FORMATION (Kpr)—Sandstone, grayish- to dark-yellowish-orange fine- to coarse-grained medium-crossbedded to massive; massive beds usually white to pinkish-gray; subordinate pinkish-gray to dark-yellowish-orange pebble to cobble conglomerate; clasts predominantly light-gray quartzite, light-gray quartzitic sandstone, and grayish-black chert; medium-dark to olive-gray shale. Great white sandstone unit (about 30 m below top) mostly very pale orange to pinkish-gray medium- to coarse-grained massive; locally conglomeratic; stepped-topography-forming. Base conformable and gradational with Castlegate Sandstone. 50-145 m thick
		Castlegate Sandstone	CASTLEGATE SANDSTONE (Kc)—Sandstone, very pale orange to pinkish-gray medium- to coarse-grained massive; locally conglomeratic; local medium-dark-gray siltstone lenses; cliff-forming. Base locally unconformable with Blackhawk Formation; probably low-relief erosional surface. 50-75 m thick
CRETACEOUS	Upper Cretaceous	Unconformity (local)	BLACKHAWK FORMATION (Kb)—Sandstone, grayish-orange to light-brown fine- to medium-grained medium- to large-crossbedded; moderate-yellowish-brown to medium-dark-gray shale; light-gray to medium-dark-gray siltstone; coal; stepped-topography-forming. Base conformable with Star Point Sandstone; paleochannels into upper Star Point Sandstone locally present. 220-290 m thick
		Blackhawk Formation	STAR POINT SANDSTONE (Ksp)—Sandstone, light-gray very fine grained to fine-grained massive to planar laminated; white to very light gray "cap" locally present; light-gray siltstone; light-gray shale; cliff-forming. 100-120 m thick
		Star Point Sandstone	MANCOS SHALE—Shale, dark- to light-gray, silty; gray siltstone; and yellow, brown, and gray, very fine grained sandstone. Only upper 375 m present in quadrangle. Total thickness about 1,265 m at Quitcupah Creek 45 km to the south (Spieker, 1931)
Mancos Shale	Mancos Shale	Upper part of Blue Gate Shale Member (Kmub)—Shale, gray, silty; gray siltstone; and gray very fine grained sandstone. About 300 m thick	
		Upper part of Emery Sandstone Member (Kme)—Sandstone, gray to yellow, very fine grained, thin-bedded; gray silty shale; and gray siltstone. About 25 m thick	
Mancos Shale	Mancos Shale	Middle part of Emery Sandstone Member (Kmm)—Shale, gray, silty; gray siltstone; and gray very fine grained sandstone. About 50 m thick	
		Middle part of Emery Sandstone Member (Kmm)—Shale, gray, silty; gray siltstone; and gray very fine grained sandstone. About 50 m thick	

GEOLOGIC MAP AND COAL SECTIONS OF THE MAHOGANY POINT QUADRANGLE, EMERY COUNTY, UTAH

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