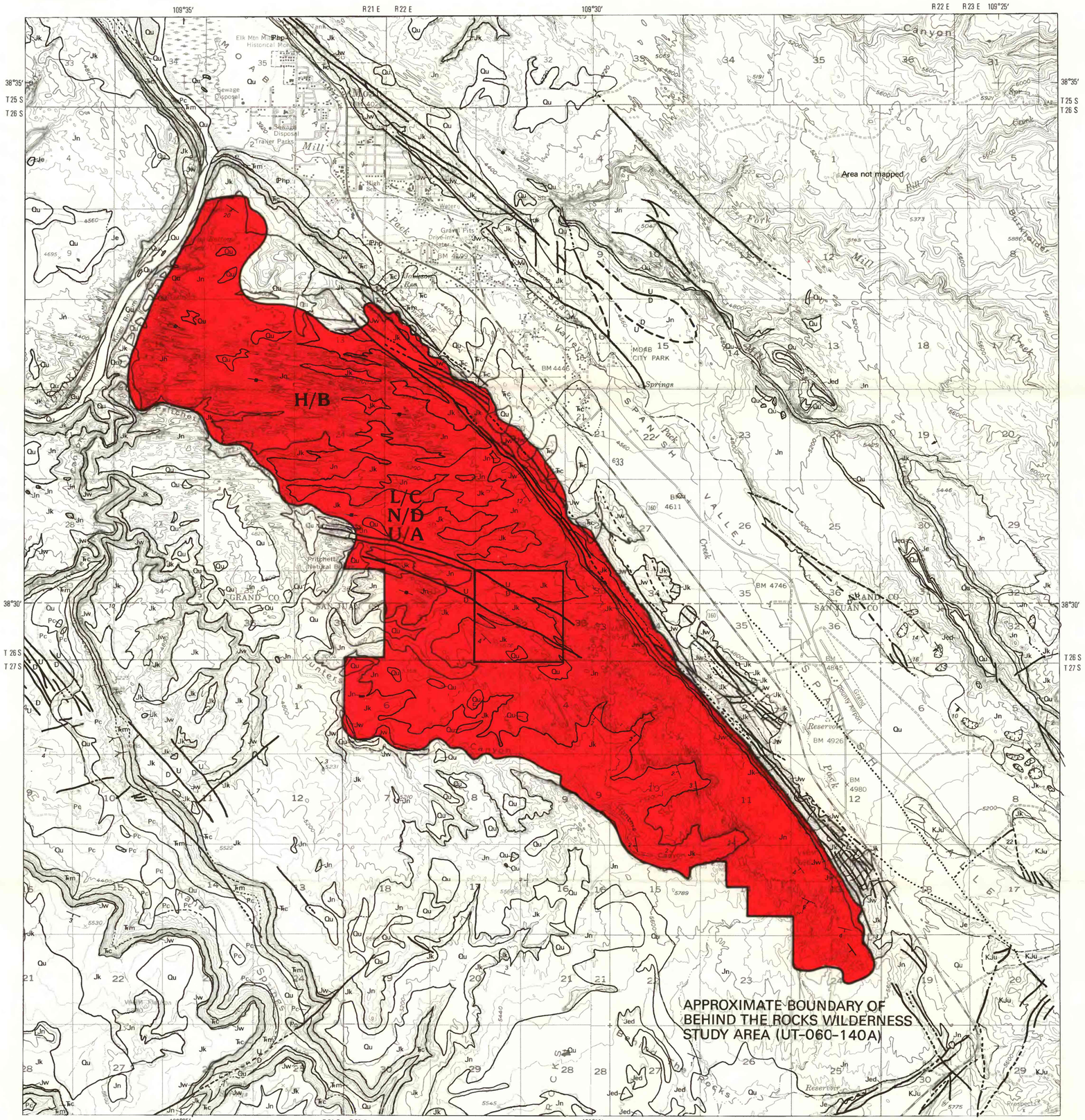
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

BULLETIN 1754–B
PLATE 1



Base from U.S. Geological Survey 1:62,500
Castle Valley, Hatch Point,
LaSal Junction, and Moab, 1954

Geology from Huntoon and others (1982), Baker (1933), and Weir and others (1961)

SCALE 1:50 000

1 ½ 0 1 2 3 MILES

1 .5 0 1 2 3 KILOMETERS

QUADRANGLE LOCATION

MAP SHOWING MINERAL RESOURCE POTENTIAL AND GEOLOGY OF THE BEHIND THE ROCKS WILDERNESS STUDY AREA, GRAND AND SAN JUAN COUNTIES, UTAH

EXPLANATION OF MINERAL RESOURCE POTENTIAL

[Entire wilderness study area has inferred subeconomic resources of potash and halite in the subsurface]

H/B — **Geologic terrane having high resource potential for oil and gas with certainty level B**—Applies to entire study area

L/C — **Geologic terrane having low resource potential for uranium, copper, vanadium, gold, silver, other metals, and geothermal energy, with certainty level C**—Applies to entire study area

N/D — **Geologic terrane having no mineral resource potential for additional potash and halite, or coal, with certainty level D**—Applies to entire study area

U/A — **Geologic terrane having unknown mineral resource potential for rare-earth mineral braitschite, with certainty level A**—Applies to entire study area

CORRELATION OF MAP UNITS

Qu	Holocene and Pleistocene	QUATERNARY
Unconformity		
KJu	Upper Cretaceous and Upper Jurassic	CRETACEOUS AND JURASSIC
Unconformity		
Je, Jed	Upper Jurassic	JURASSIC
Unconformity		
Jn, Jk, Jw	Lower Jurassic	JURASSIC
Unconformity		
Trc	Upper Triassic	TRIASSIC
Unconformity		
Trm	Lower Triassic	TRIASSIC
Unconformity		
Pc	Lower Permian	PERMIAN
Unconformity		
IPhp	Middle Pennsylvanian	PENNSYLVANIAN

LEVEL OF RESOURCE POTENTIAL →

	A	B	C	D
U/A	H/B HIGH POTENTIAL	H/C HIGH POTENTIAL	H/D HIGH POTENTIAL	
UNKNOWN POTENTIAL	M/B MODERATE POTENTIAL	M/C MODERATE POTENTIAL	M/D MODERATE POTENTIAL	
	L/B LOW POTENTIAL	L/C LOW POTENTIAL	L/D LOW POTENTIAL	
			N/D NO POTENTIAL	

LEVEL OF CERTAINTY →

Diagram showing relationships between levels of mineral resource potential and levels of certainty. Shading shows levels that apply to this study area

LEVELS OF RESOURCE POTENTIAL

- **H** High mineral resource potential
- **M** Moderate mineral resource potential
- **L** Low mineral resource potential
- **U** Unknown mineral resource potential
- **N** No known mineral resource potential

LEVELS OF CERTAINTY

- **A** Available data not adequate
- **B** Data indicate geologic environment and suggest level of resource potential
- **C** Data indicate geologic environment, give good indication of level of resource potential, but do not establish activity of resource-forming processes
- **D** Data clearly define geologic environment and level of resource potential and indicate activity of resource-forming processes in all or part of the area

DESCRIPTION OF MAP UNITS

Qu — **Surficial deposits (Holocene and Pleistocene)**—Unconsolidated deposits of sand and gravel along stream courses, windblown sand as dunes and sheets, and rubbly talus below cliffs, often intermixed; thickness 0–25 ft

KJu — **Mancos Shale, Dakota Sandstone and Burro Canyon Formation (Upper Cretaceous) and Morrison and Summerville Formations (Upper Jurassic), undivided**—In descending order, gray marine shale of the Mancos Shale; gray to yellow sandstone and conglomerate of the Burro Canyon Formation and the Dakota Sandstone; variegated bentonitic mudstone, sandstone, and conglomerate of the Morrison Formation; and red shale and siltstone of the Summerville Formation. Total thickness may exceed 1,000 ft

Je — **Entrada Sandstone (Upper Jurassic)**—Distinctive salmon-orange-pink to white fine-grained sandstone. Not exposed in study area. Thickness about 70 ft

Jed — **Dewey Bridge Member (Upper Jurassic)**—Red siltstone and shale at base of Entrada Sandstone. Not exposed in study area. Thickness about 70 ft

Jn — **Navajo Sandstone (Lower Jurassic)**—Buff to light-gray, calcareous, fine- to medium-grained quartz sandstone. Prominent large-scale, tabular crossbeds indicate eolian origin with source to northwest. Thin, laterally continuous limestone ledges form caprocks within unit and may represent interdune ponds. Typically weathers to rounded domes atop the Wingate and Kayenta cliff. Where heavily jointed within study area, forms large fins. Thickness about 300 ft

Jk — **Kayenta Formation (Lower Jurassic)**—Brownish-red to buff sandstone, with minor mudstone and conglomerate. Cut-and-fill trough crossbeds and lenticular bedding indicate fluvial origin with source to east. Some eolian beds may be present in middle part. Weathers to ledgy cliff, acts as protective caprock for underlying Wingate Sandstone. Thickness about 250 ft

Jw — **Wingate Formation (Lower Jurassic)**—Mainly orange fine-grained quartzose, calcareous sandstone, and some light-yellow to dark-red, large-scale tabular crossbeds, which indicate eolian origin with source to northwest. Forms prominent cliff throughout canyonlands area of Utah. Cliff erodes by collapse of large prismatic joint blocks. Commonly stained black by desert varnish. Thickness about 300 ft

Trc — **Chinle Formation (Upper Triassic)**—Variegated gray, green, and red, slightly bentonitic mudstone, with thin limestone and siltstone layers, and ledges of gray to buff lenticular, calcareous, medium- to coarse-grained trough-crossbedded sandstone and conglomerate. Fluvio-lacustrine origin, derived from source areas to east and south (Stewart and others, 1972). Basal contact is a surface scoured into underlying Moenkopi or into Cutler where Moenkopi is not present because of nondeposition over rising salt anticlines. Sandstone in places contains accumulations of carbonized wood, known as carbonaceous trash, which may be uraniferous. Forms ledgy slope below Wingate cliff. Base not exposed in study area. Thickness 275–500 ft

Trm — **Moenkopi Formation (Lower Triassic)**—Red to brown shale, siltstone, and minor sandstone. Even bedding, ripple marks, and mud cracks indicate tidal-flat deposition. Forms ledgy slope. Not exposed in study area. Thickness about 300 ft

Pc — **Cutler Formation (Lower Permian)**—Red to purple arkosic conglomerate, sandstone, siltstone, and shale. Bedding is somewhat irregular to lenticular and shows cut-and-fill trough crossbedding, indicating fluvial transport. Deposited in large alluvial fan spreading away from granitic source area in ancestral Uncompahgre Highland (Campbell, 1975). Not exposed in study area. Thickness about 1,300 ft

IPhp — **Paradox Member of Hermosa Formation (Middle Pennsylvanian)**—Interbedded salt, dolomite, black shale, and siltstone. Exposed in diapiric upwellings along edge of Spanish Valley near Colorado River. Exposures consist of silty, gypsiferous mounds and crusts, with fragments of slightly micaceous siltstone suspended in the gypsum. Original thickness difficult to estimate due to salt flowage. May be as thick as 10,000 ft in Spanish Valley but thinned to 0–3,000 ft under the study area (Hite and Lohman, 1973; Clem and Brown, 1984)

Contact—Dashed where approximately located

U/D **Normal fault**—Dashed where approximately located; dotted where concealed. U, upthrown side; D, downthrown side

Strike and dip of beds

6 — Inclined

Strike of vertical joint

Adit

Collapse feature