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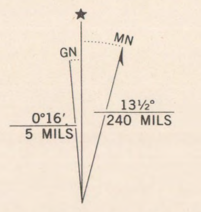


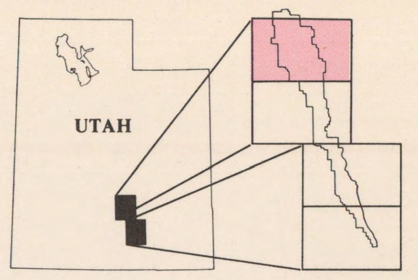
UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF MAP DIAGRAM IS APPROXIMATE

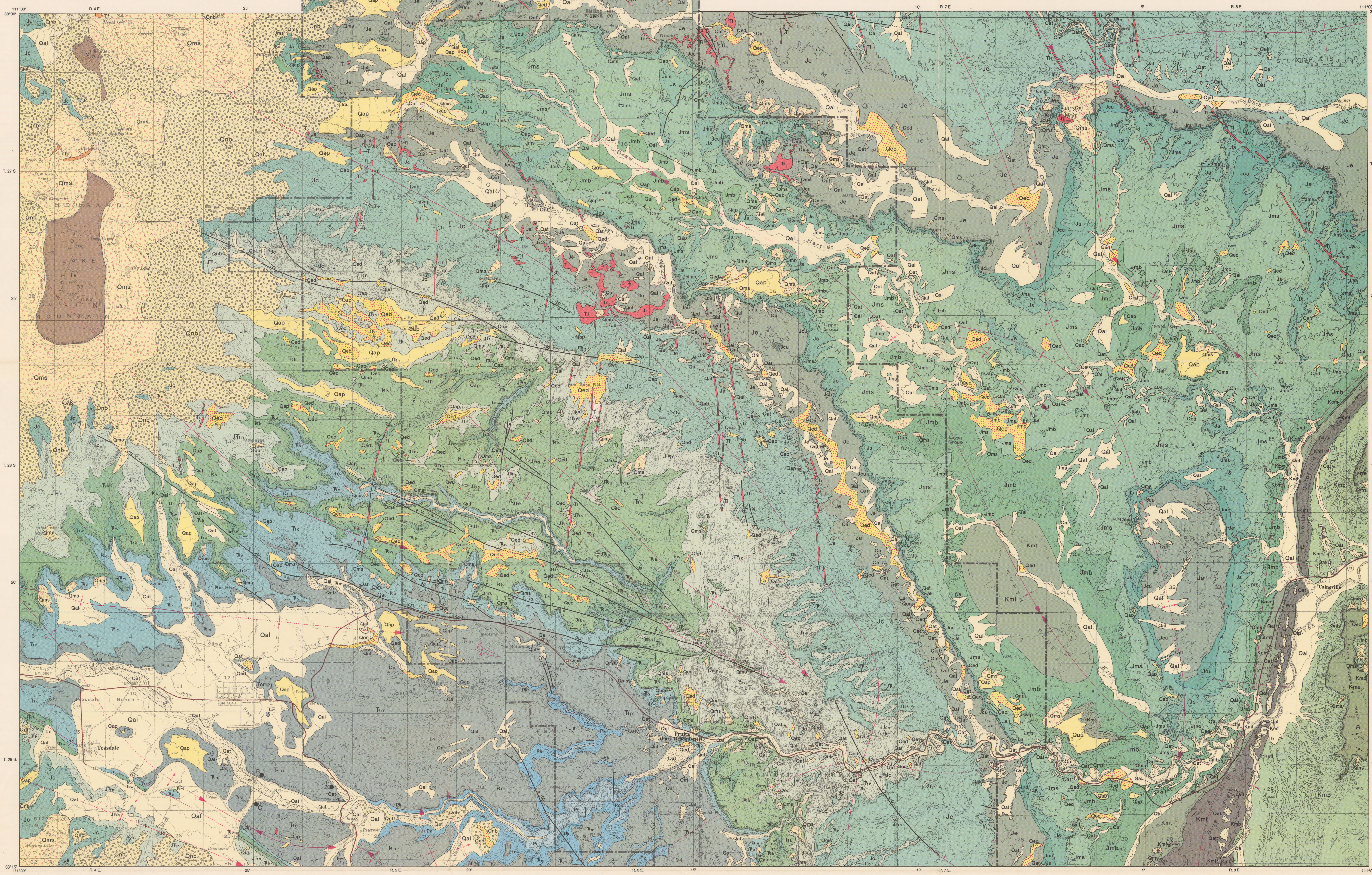
GEOLOGIC MAP OF CAPITOL REEF NATIONAL PARK AND VICINITY, UTAH

by
George H. Billingsley, Peter W. Huntoon, and William J. Breed

1987

Plate 1
Utah Geological and Mineral Survey Map 87





Base from U.S. Geological Survey, Torrey 1952 and Fruita 1954 quadrangles

SCALE 1:62500

CONTOUR INTERVAL 80 FEET

Mapped and compiled by authors between 1978 and 1980
Kent D. Brown, Cartographer

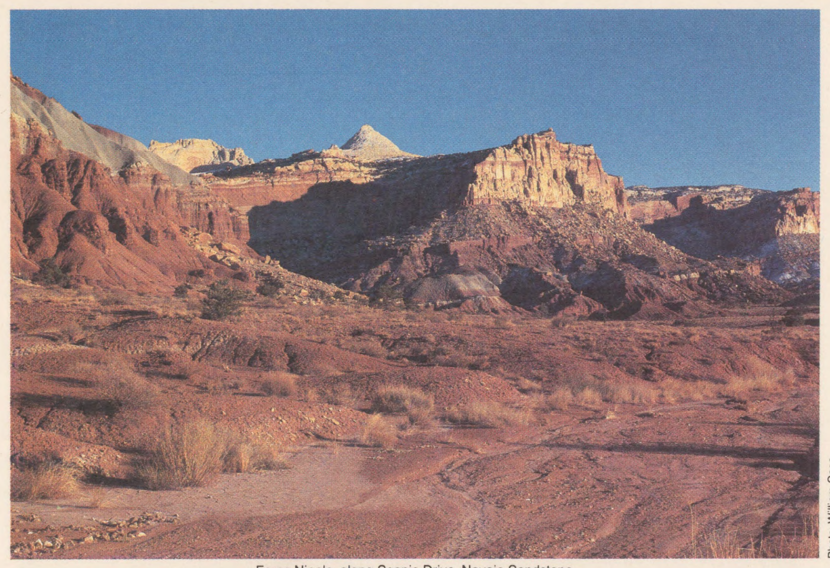


Photo: William Case

Ferns Nipple, along Scenic Drive. Navajo Sandstone

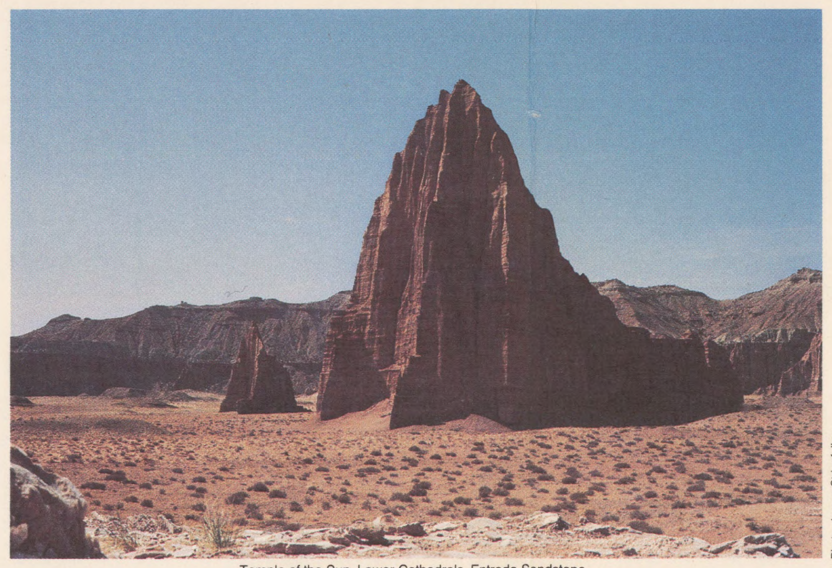


Photo: James Stringfellow

Temple of the Sun, Lower Cathedrals. Entrada Sandstone

Photo: Alex Keith

Looking southwest across Waterpocket Fold from Brimhall Arch trailhead on Big Thomson Mesa. Note massive Red Slide in left center

Photo: James Stringfellow

Lower Cathedrals, looking west to Thousand Lake Mountain. Entrada Sandstone

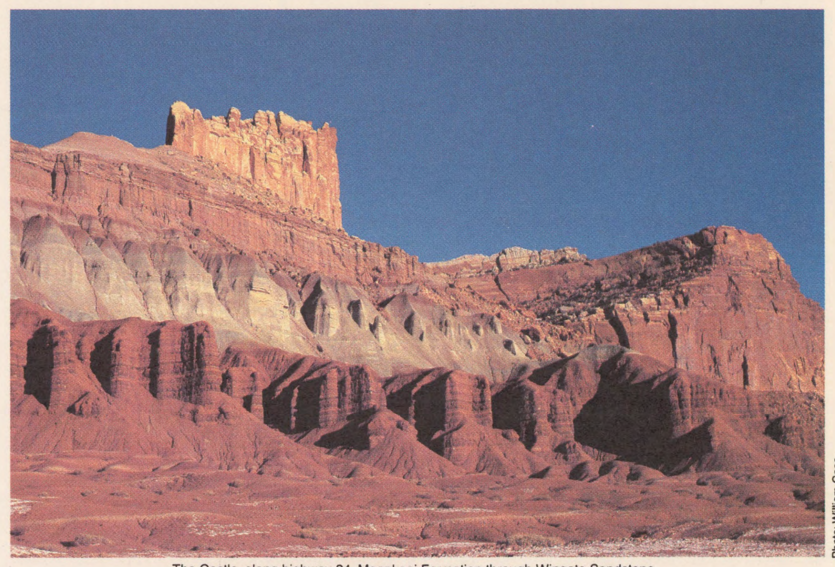


Photo: William Case

The Castle, along highway 24. Moenkopi Formation through Wingate Sandstone.

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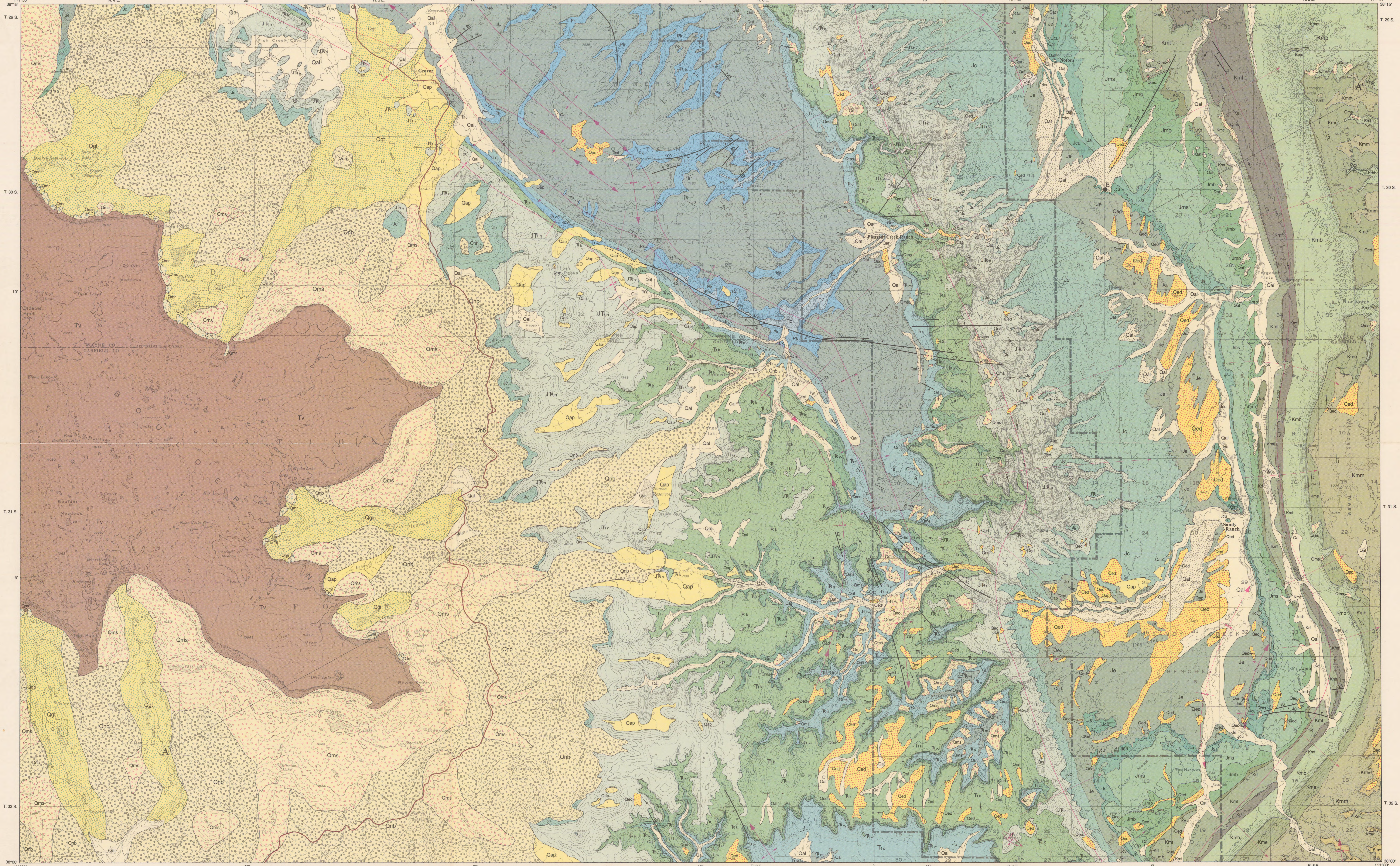

Base from U.S. Geological Survey, Grover and Notom quadrangles 1952

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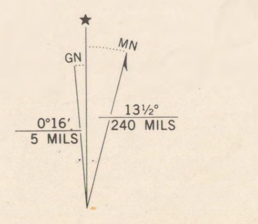
Kent D. Brown, Cartographer



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SCALE 1:62500

CONTOUR INTERVAL 80 FEET

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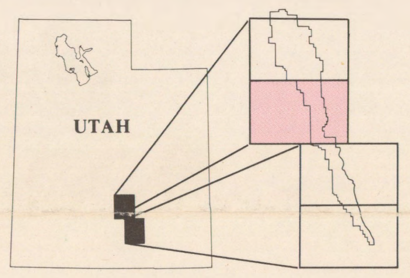

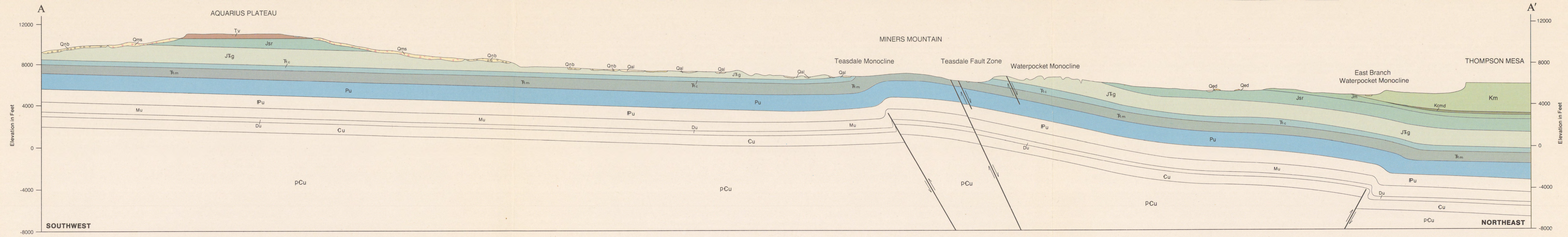

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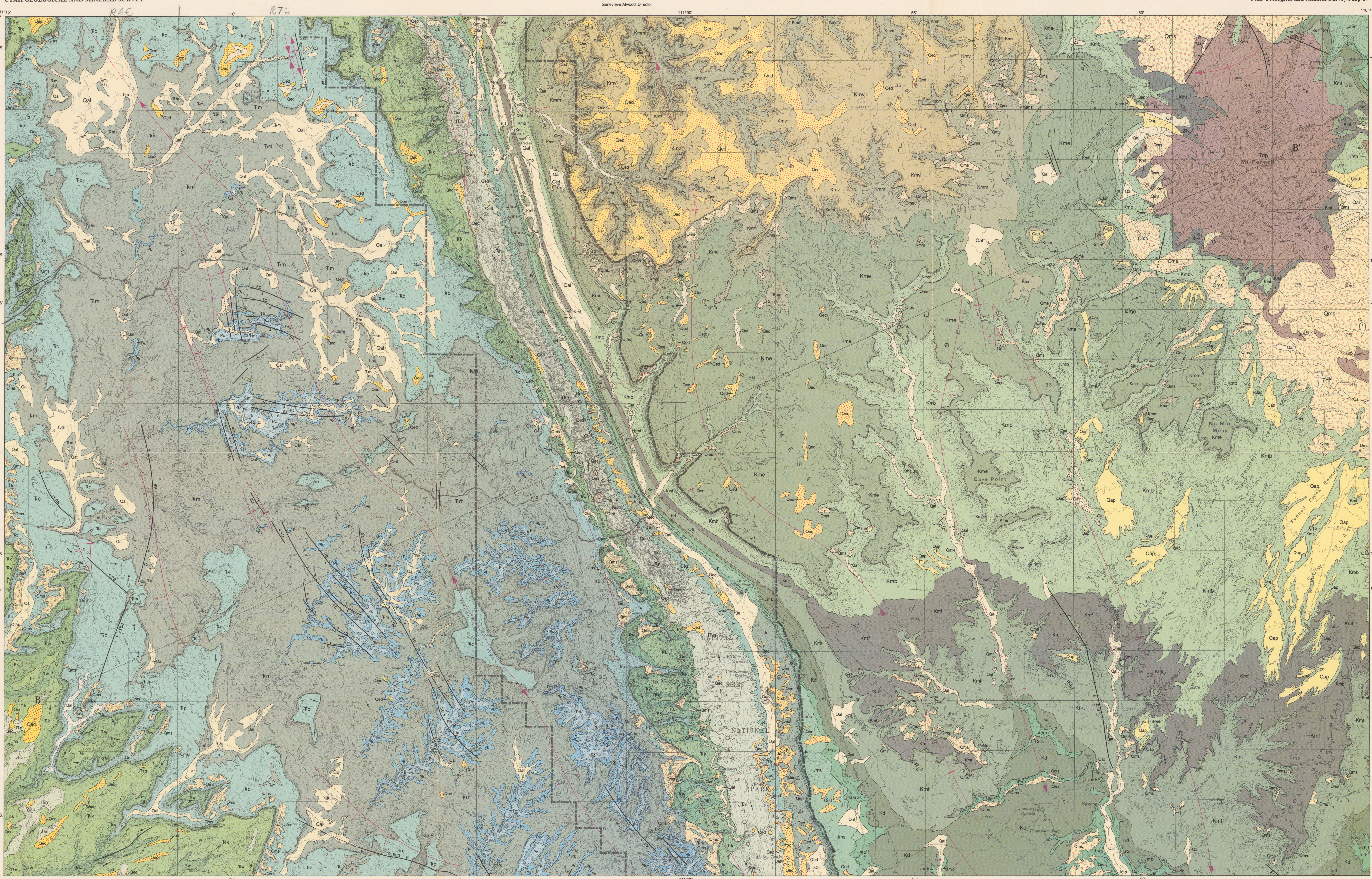
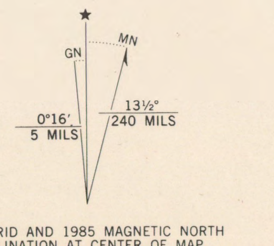


Base from U.S. Geological Survey, Wagon Box Mesa and Mt. Pennel quadrangles 1953



UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF MAP
DIAGRAM IS APPROXIMATE

SCALE 1:62 500

CONTOUR INTERVAL 80 FEET

Mapped and compiled by authors between 1978 and 1980
Kent D. Brown, Cartographer

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by
George H. Billingsley, Peter W. Huntoon, and William J. Breed

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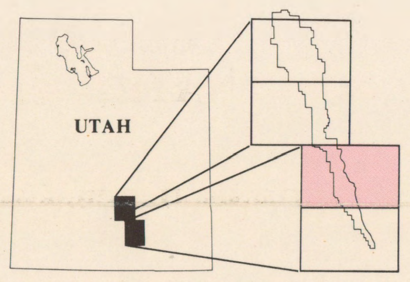

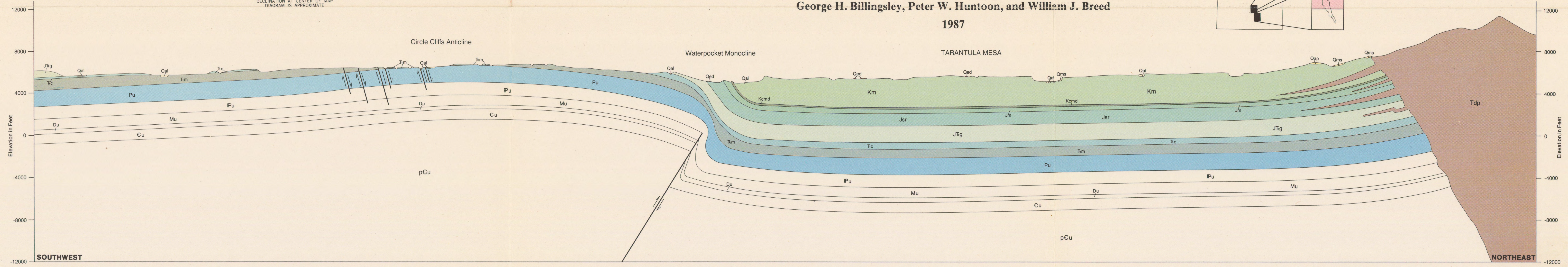

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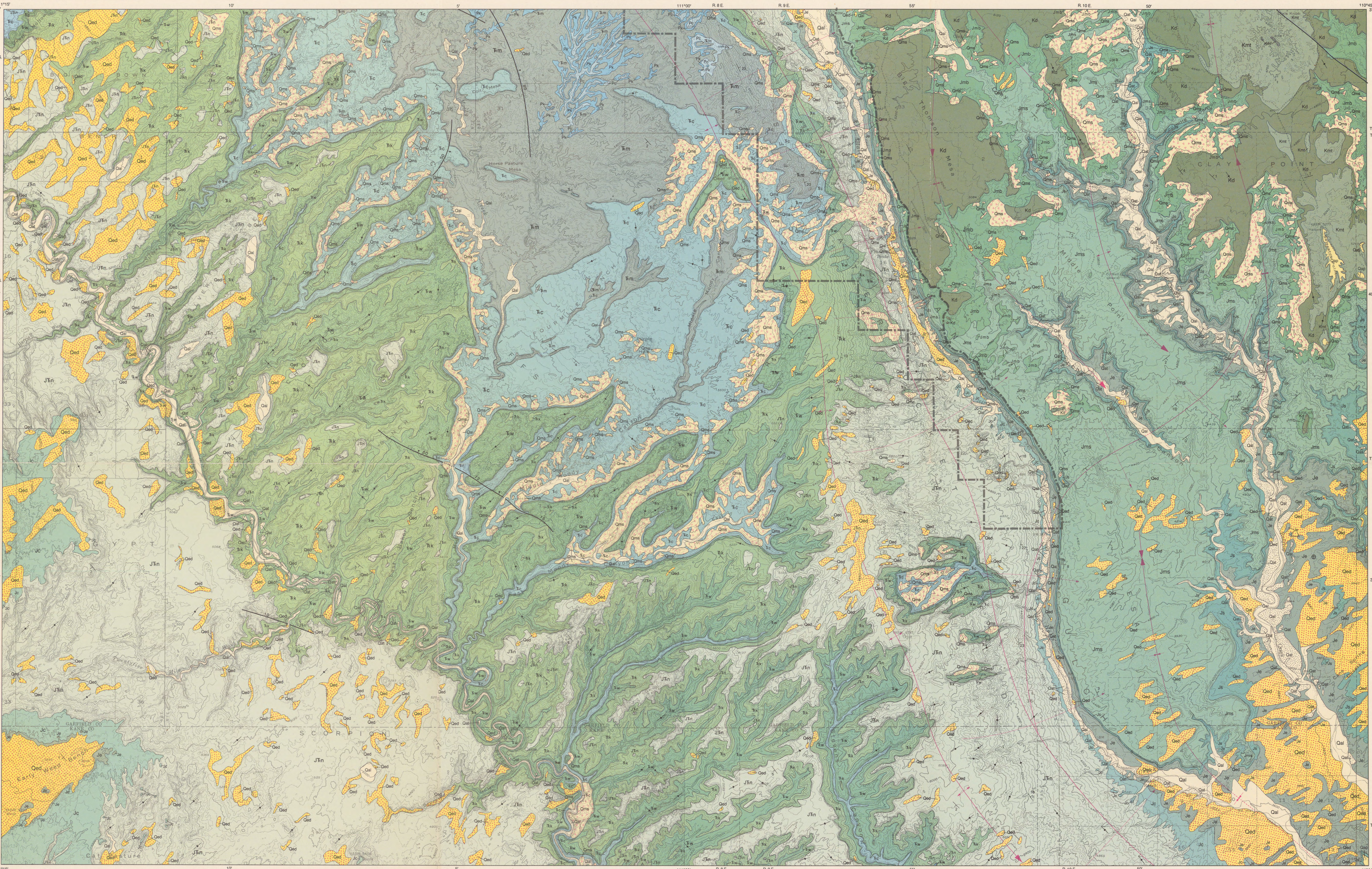
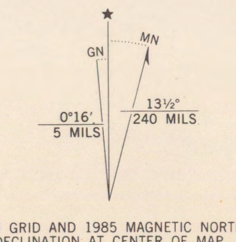


Base from U.S. Geological Survey, Moody Creek and Hall Mesa quadrangles 1953



UTM GRID AND 1985 MAGNETIC NORTH DECLINATION AT CENTER OF MAP DIAGRAM IS APPROXIMATE

SCALE 1:62500

1 ½ 0 1 2 3 4 MILES

3000 0 3000 6000 9000 12000 15000 18000 21000 FEET

1 .5 0 1 2 3 4 5 KILOMETERS

CONTOUR INTERVALS 40 AND 80 FEET

Mapped and compiled by authors between 1978 and 1980
Kent D. Brown, Cartographer

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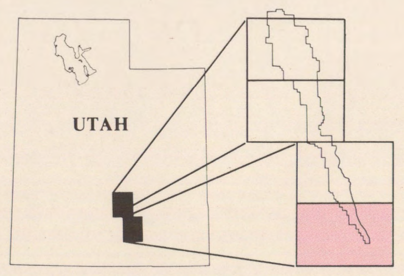
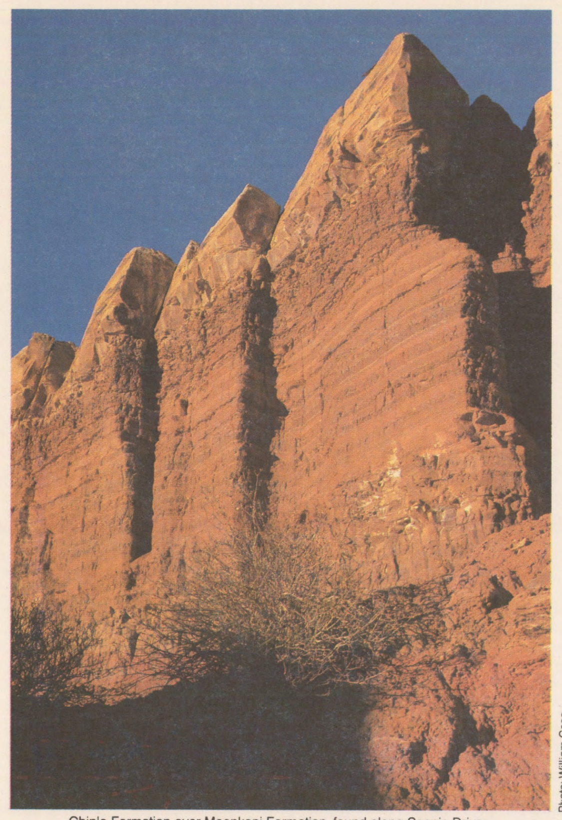
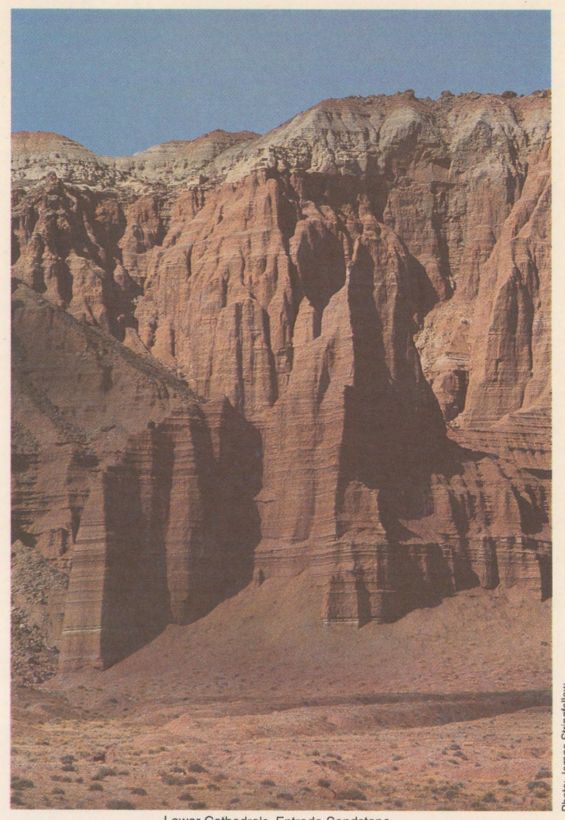
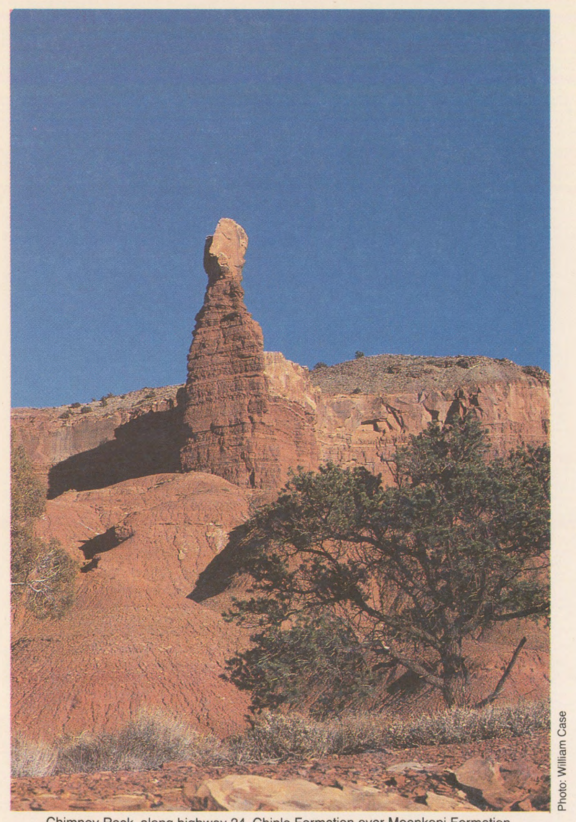




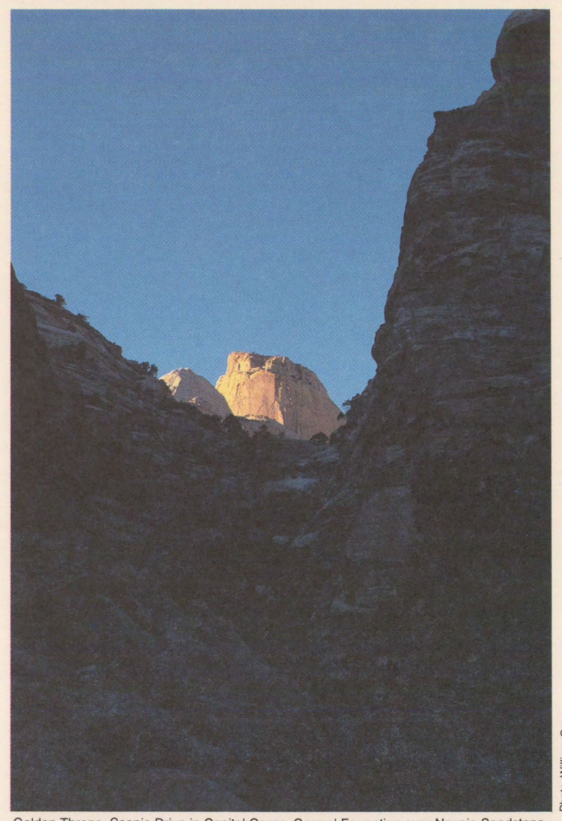
Chinle Formation over Moenkopi Formation, found along Scenic Drive.



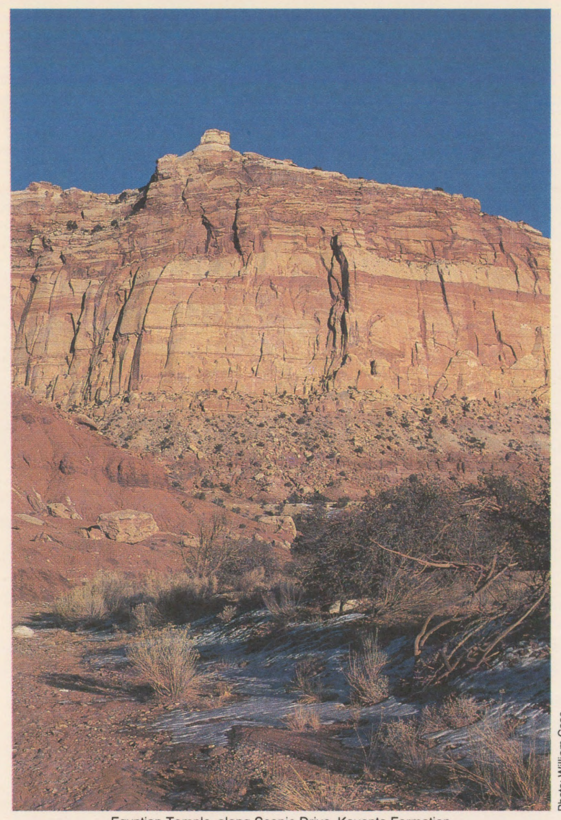
Lower Cathedrals, Entrada Sandstone



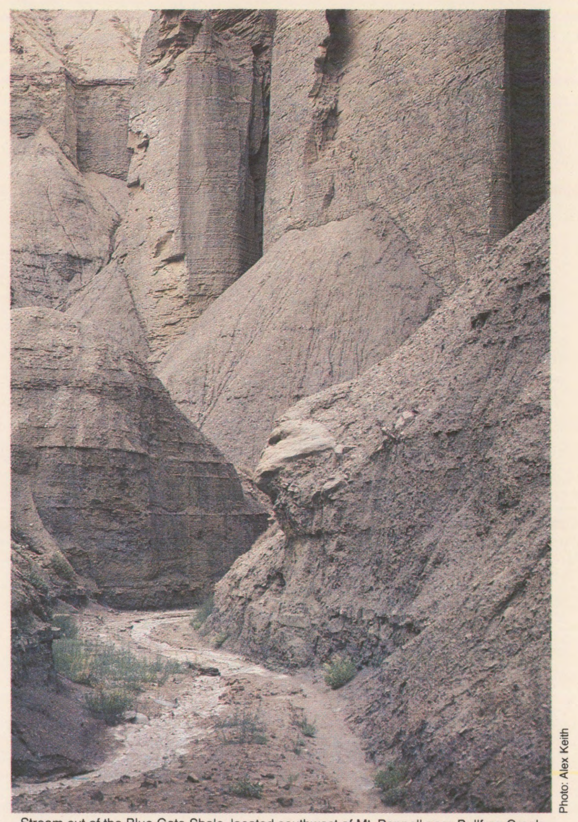
Chimney Rock, along highway 24. Chinle Formation over Moenkopi Formation



Golden Throne, Scenic Drive in Capitol Gorge. Carmel Formation over Navajo Sandstone



Egyptian Temple, along Scenic Drive. Kayenta Formation



Stream cut of the Blue Gate Shale, located southwest of Mt. Pennell near Bullfrog Creek

GEOLOGIC MAP OF CAPITOL REEF NATIONAL PARK AND VICINITY, EMERY, GARFIELD, MILLARD AND WAYNE COUNTIES, UTAH

by

George H. Billingsley[1], Peter W. Huntoon[2], and William J. Breed[1]

[1]Geology Department, Museum of Northern Arizona

[2]Professor, Department of Geology and Geophysics, University of Wyoming

1987

The following are gratefully acknowledged for assistance in the preparation of this map:

Fred Peterson, U.S. Geological Survey, Denver, Colorado;
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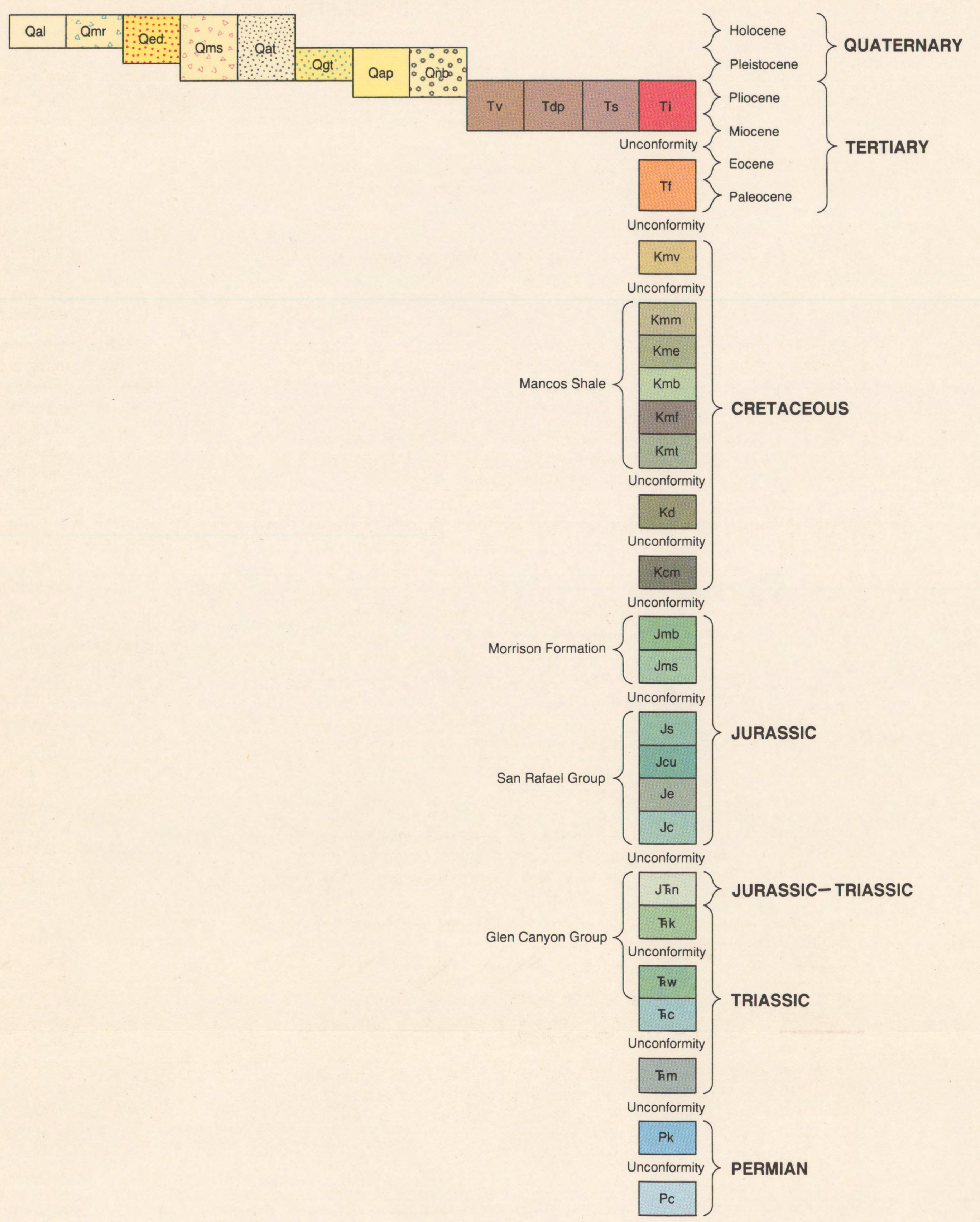
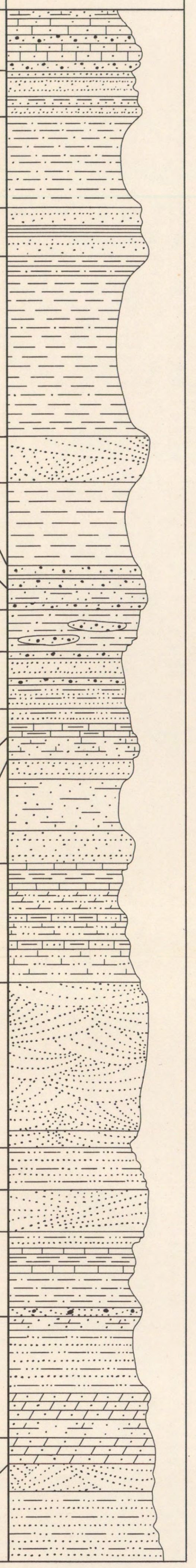
CORRELATION OF MAP UNITS



SYSTEM		FORMATION	SYMBOL	THICKNESS (feet)	LITHOLOGY
TERTIARY		FLAGSTAFF LIMESTONE	Tf	500+	
CRETACEOUS		MESAVERDE FORMATION	Kmv	300-400	
	MANCOS SHALE	Masuk Member	Kmm	650-750	
	MANCOS SHALE	Emery Sandstone Member	Kme	300-400	
	MANCOS SHALE	Blue Gate Shale Member	Kmb	1200-1500	
	MANCOS SHALE	Ferron Sandstone Member	Kmf	205-385	
	MANCOS SHALE	Tununk Shale Member	Kmt	540-720	
		DAKOTA SANDSTONE	Kd	0-150	
		CEDAR MOUNTAIN FORMATION	Kcm	0-166	
JURASSIC	MORRISION FORMATION	Brushy Basin Member	Jmb	200-350	
	MORRISION FORMATION	Salt Wash Member	Jms	100-500	
		SUMMERVILLE FORMATION	Js	50-200	
		CURTIS FORMATION	Jcu	0-175	
		ENTRADA SANDSTONE	Je	400-900	
		CARMEL FORMATION	Jc	200-1000	
JURASSIC / TRIASSIC		NAVAJO SANDSTONE	JŦn	950-1400	
TRIASSIC		KAYENTA FORMATION	Ŧk	350	
		WINGATE SANDSTONE	Ŧw	350	
		CHINLE FORMATION	Ŧc	500-700	
		MOENKOPI FORMATION	Ŧm	800-1000	
PERMIAN		KAIBAB LIMESTONE	Pk	0-200	
		CUTLER GROUP UNDIVIDED	Pc	800+	



SYMBOLS

CONTACT

Dashed where approximate; dotted where covered

R ↑ 100

FAULT **INTRUDED FAULT**

Dashed where approximate; dotted where covered;
Bar and ball on downthrown side; R, reverse fault;
100, estimated displacement in feet.

TRACE OF AXIAL SURFACE OF FOLD

Arrows show direction of plunge; dotted where covered

Anticline Syncline

Monocline

Trace located approximately midway between the anticlinal and synclinal hinges of the fold. Arrows show the actual direction of dip. Length of arrows indicates the distance between the anticlinal and synclinal hinges where they are exposed on the land surface. Dashed where approximate; dotted where covered.

STRIKE AND DIP

10

inclined prominent vertical joints

● B Collapse structure with visible breccia
● C Collapse structure, probable breccia at depth

Paved Highway National Park Boundary

EXPLANATION OF SYMBOLS ON CROSS SECTIONS

Symbol	Definition	Corresponding Map Symbols
Quaternary/Tertiary	as listed in description of map units	same
Kmv	Mesa Verde Formation	same
Km	Mancos Shale, undivided	Kmt, Kmf, Kmb, Kme, Kmm
Kcmd	Cedar Mountain Formation and Dakota Sandstone, undivided	Kcm, Kd
Jm	Morrison Formation, undivided	Jms, Jmb
Jsr	San Rafael Group, undivided	Jc, Je, Jcu, Js
JŦg	Glen Canyon Group, undivided	JŦn, Ŧk, Ŧw
Ŧc	Chinle Formation	same
Pu	undivided Permian rocks	Pk, Pc
IPu	undivided Pennsylvanian rocks	not exposed
Mu	undivided Mississippian rocks	not exposed
Du	undivided Devonian rocks	not exposed
Єu	undivided Cambrian rocks	not exposed
pЄu	undivided Precambrian rocks	not exposed

DESCRIPTION OF MAP UNITS

Qal Alluvial deposits—*Includes stream and flood plain deposits bordered by low terraces of boulders, gravel and alluvial fan deposits that consist of boulders, gravel, sand, silt and clay.*

Qmr Rock glacier deposits—*Unconsolidated boulder deposits near the tops of Boulder Mountain and Mt. Pennell.*

Qed Eolian deposits—*Wind blown sand, fine to medium grained. Forms small dunes and sandsheet deposits.*

Qms Colluvial deposits—*Includes rockslides, slumps and talus slopes consisting of a mixture of boulders, gravel, sand and silt.*

Qat Terrace gravel deposits—*Higher stream deposits of boulders, gravel, sand and silt. Includes unconsolidated glacial outwash and pediment gravels.*

Qgt Glacial till—*A mixture of unsorted angular boulders, gravel and sand. Includes some glacial outwash deposits.*

Qap Pediment deposits—*Gently sloping surfaces covered with boulders, cobbles, sand and gravel several hundred feet above adjacent streams and valleys, also on some flat-topped hills and benches. On Mt. Pennell, thinner and less bouldery on lower benches.*

Qnb Boulder deposits—*Unconsolidated deposits of a diverse mixture of soil and boulders that generally mantle the upper slopes of Thousand Lake and Boulder mountains. Includes undifferentiated glacial, landslide and alluvial deposits.*

Tv Extrusive volcanics—*Chiefly lava flows with interbedded tuffaceous sedimentary rocks overlain by unmapped glacial deposits on Boulder and Thousand Lake mountains.*

Tdp Diorite porphyry—*Intrusions of diorite porphyry; includes some monzonite porphyry on Mt. Pennell.*

Ts Shattered sedimentary and igneous rocks—*Sedimentary and igneous rocks irregularly intruded by igneous materials. Many dikes and sills.*

Ti Intrusive volcanics—*Intrusive rocks; dikes, sills and a few plug-like dikes with intrusive breccias. Thicknesses of dikes are not drawn to scale but do reflect lateral variations.*

Tf Flagstaff Limestone—*White fossiliferous limestone, tuffaceous sediment and conglomerate in the northwest; forms ledges and slopes. Thickness is more than 500 feet (150 meters); top and bottom contacts concealed.*

Kmv Mesaverde Formation—*Light brown, thick-bedded sandstone and thin interbedded dark gray shale; intertongues with Masuk Member of the Mancos Shale; forms a cliff. Thickness ranges between 300 and 400 feet (90-120 meters). Top is eroded.*

Kmm Masuk Member of the Mancos Shale—*Yellowish-gray mudstone and minor bluish-gray to black mudstone with interbedded light gray sandstone; forms slopes and ledges; thickness ranges from 650 to 750 feet (200-230 meters) due to uncertainty of the lower contact with the Emery Sandstone Member.*

Kme Emery Sandstone Member of the Mancos Shale—*Light gray to yellow, medium-bedded sandstone containing interbedded carbonaceous shale and coal beds in the upper part; lower beds intertongue with the Blue Gate Shale Member; forms a cliff. Thickness about 300-400 feet (90-120 meters).*

Kmb Blue Gate Shale Member of the Mancos Shale—*Laminated blue-gray and black shale with a few interbedded light yellow sandstone and limestone lenses; forms a slope. Thickness ranges from 1,200 feet (365 meters) in the south to 1,500 feet (455 meters) in the north.*

Kmf Ferron Sandstone Member of the Mancos Shale—*Fine-grained laminated brown sandstone and white cross-bedded sandstone containing interbedded carbonaceous gray shale and impure coal in the upper part; intertongues with the Tununk Shale Member; forms a cliff and some ledges. Thickness ranges from 205 feet (60 meters) to 385 feet (120 meters).*

Kmt Tununk Shale Member of the Mancos Shale—*Bluish gray and black shale; locally fossiliferous; forms a slope. Thickness ranges from 540 feet (165 meters) to 720 feet (220 meters).*

Kd Dakota Sandstone—*Yellowish-brown to gray sandstone and conglomerate with interbedded carbonaceous shale and thin coal beds; locally fossiliferous; forms ledges and slopes. Thickness ranges from 0 to 150 feet (0-45 meters).*

Kcm Cedar Mountain Formation—*Variegated mudstone and sandstone and conglomerate at the base (the Buckhorn Conglomerate Member). Thickness ranges from 0 to 166 feet (0-50 meters) in the north.*

Jmb Brushy Basin Shale Member of the Morrison Formation—*Variegated mudstone including some white, gray and brown sandstone and conglomerate containing abundant red and green chert pebbles; forms a slope. Thickness averages 200 feet (60 meters) in the south and 200-350 feet (60-105 meters) in the north.*

Jms Salt Wash Sandstone Member of the Morrison Formation—*Thick-bedded, light gray sandstone and conglomeratic sandstone interbedded with greenish to reddish mudstone; forms ledges and cliffs. Thickness varies from 100-200 feet (30-60 meters) in the north to 500 feet (150 meters) in the south.*

Js Summerville Formation—*Thin beds of reddish-brown siltstone and mudstone; forms a slope when weathered; about 50 to 250 feet thick (15 and 75 meters). Map unit includes interbedded red and gray mudstone, pink and white gypsum, gray limestone and gray sandstone in the Tidwell unit of the Morrison Formation (Peterson, 1980). Thickness is about 30 to 100 feet (10-30 meters) and thins southward.*

Jcu Curtis Formation—*Thin- to thick-bedded, white, fine-grained calcareous sandstone and minor sandy limestone; forms a cliff. Formation is discontinuous to the south and increases to approximately 175 feet (55 meters) in the north. Grades upward into the Summerville Formation.*

Je Entrada Sandstone—*To the south, a slope- to cliff-forming, thin- to thick-bedded reddish brown sandstone and siltstone in the upper and lower part separated by a middle silty slope unit. In the north, generally a red-brown, slope-forming siltstone. Thickness ranges from 400 feet (120 meters) to 900 feet (275 meters).*

Jc Carmel Formation—*Very fine-grained, thin-bedded, orange-red sandstone and siltstone; calcareous mudstone common in the lower half and pink gypsiferous siltstone and gray limestone beds in the upper part; forms ledges and slopes. Thickness ranges from 200 feet (60 meters) in the south to 1,000 feet (305 meters) in the north.*

JŦn Navajo Sandstone—*White, yellow, and light reddish-brown, large-scale crossbedded, fine-grained sandstone; forms cliffs and hummocky knobs. Thickness ranges from 950 feet (290 meters) in the north to 1,400 feet (425) meters) in the south. Includes Page Sandstone of Middle Jurassic age at top. The Page Sandstone consists of light reddish-brown,fine-grained, large-scale crossbedded sandstone and is about 30 to 60 feet thick (10-20 meters).*

Ŧk Kayenta Formation—*Irregularly bedded, grayish-purple to reddish-brown, thin-bedded, fine-grained sandstone and siltstone; forms ledges and cliffs. Thickness averages 350 feet (105 meters).*

Ŧw Wingate Sandstone—*Reddish-Brown, thin- to thick-bedded, fine-grained sandstone; massive and crossbedded; forms sheer cliffs. Thickness averages 350 feet (105 meters) and thins slightly from east to west.*

Ŧc Chinle Formation—*The Chinle Formation includes the following units in ascending order: a ledge-forming, medium- to coarse-grained crossbedded sandstone and conglomerate (Shinarump Member); a slope-forming greenish-gray bentonitic mudstone, sandstone and minor conglomerate (Petrified Forest Member); a slope- and ledge-forming, thin-bedded, green limestone unit interbedded with red, brown and greenish-gray sandstone (Owl Rock Member); and a ledge-forming fine- to medium-grained red sandstone and siltstone unit (Church Rock Member). Thickness ranges from 500 feet (150 meters) in the east to 700 feet (215 meters) in the west. Distinction between the Monitor Butte and Petrified Forest Members is questionable.*

Ŧm Moenkopi Formation—*The Moenkopi Formation includes the following units in ascending order: a slope-forming white to light gray dolomitic sandstone in the south and a red mudstone and sandstone with gypsum veinlets and stringers in the north (basal unit); a cliff-forming thin- to medium-bedded, brownish-orange and yellow conglomeratic and sandy dolomite (Sinbad Limestone Member); a ledge-forming, grayish-red to brownish-red interbedded sandstone and siltstone with crossbedding and ripple marks (lower ledge-forming unit); a slope-forming reddish brown siltstone and some brown, fine-grained sandstone beds (slope-forming unit); and a ledge-forming, dark reddish-brown, thin-bedded mudstone, sandstone and dolomitic sandstone with veinlets and stringers of gypsum and selenite (upper ledge-forming unit). Thickness ranges from 800 feet (245 meters) to 1,000 feet (305 meters).*

Pk Kaibab Limestone—*Thin-bedded, fine-grained, white, calcareous siltstone and porous oolitic dolomite containing chert layers in the upper part; forms a cliff. Formation becomes discontinuous to the south and averages 200 feet thick (60 meters) in the north.*

Pc Cutler Group Undivided—*Includes the White Rim Sandstone and Cedar Mesa Sandstone. Light yellow to white, very fine-grained crossbedded sandstone which is thick-bedded and dolomitic in upper part; lower units may be in part of the Cedar Mesa Sandstone Member; forms a cliff. Thickness is over 800 feet (245 meters); base is not exposed.*

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