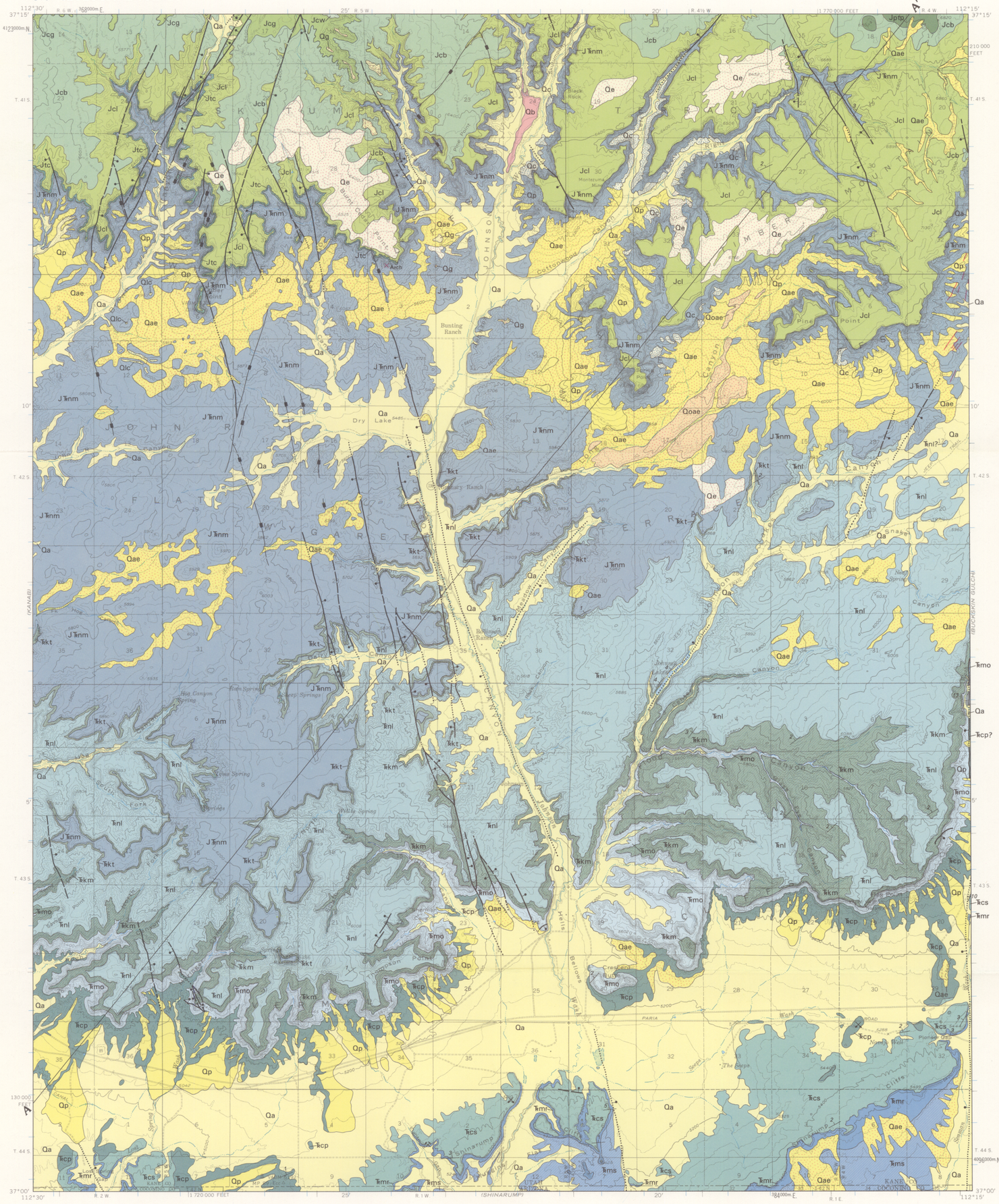
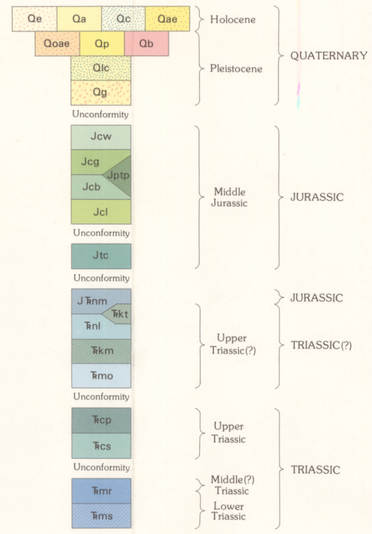
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

GEOLOGIC QUADRANGLE MAP
JOHNSON QUADRANGLE, UTAH-ARIZONA
GQ-1602



CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

Qe EOLIAN SAND (HOLOCENE)—Light-gray, yellowish-gray, and reddish-orange, fine- to medium-grained, windblown sand composed mostly of quartz in currently active sand dunes. Navajo Sandstone is major source of unit

Qa ALLUVIUM (HOLOCENE)—Unconsolidated clay, sand, gravel, and silt as channel, flood-plain, lacustrine, and, locally, alluvial-fan deposits

Qc COLLUVIUM (HOLOCENE)—Locally derived rock-fall and rock-slide debris mixed with slopewash and eolian material

Qae ALLUVIUM AND EOLIAN SAND, UNDIVIDED (HOLOCENE)

Qoae OLDER ALLUVIUM AND EOLIAN SAND (PLEISTOCENE)—Older interbedded alluvial gravel to clay and eolian sand and silt generally 15-30 ft (5-10 m) above adjacent alluvial deposits. Deposits are not currently active

Qp PEDIMENT ALLUVIUM (PLEISTOCENE)—Unconsolidated clay, silt, sand, and gravel forming mantle over eroded sloping bedrock. Includes poorly sorted alluvial-fan debris, slope wash, and minor talus. Generally slightly higher than adjacent alluvial surfaces. Deposits merge at their lower end with alluvium

Qb OLIVINE BASALT LAVA FLOWS (PLEISTOCENE)—Dense to vesicular, dark-gray olivine basalt in lava flows confined to paleo-stream channels. Locally consists of two flows, each 10-50 ft (3-15 m) thick. Luedke and Smith (1978) suggest basalt is between 0.01 and 5.0 m.y. old. Map unit is in north-central part of quadrangle, in Johnson Canyon. Total thickness as much as 60 ft (18 m)

Qlc LIMESTONE COLLUVIUM (PLEISTOCENE)—Partly consolidated, unsorted, unstratified deposit of cobbles and boulders as much as 1 ft (0.3 m) in diameter. Consists of subangular clasts of limestone, derived from limestone member of Carmel Formation, in sandstone matrix, derived principally from Navajo Sandstone; partly cemented with calcium carbonate. Occurs as resistant hills on main body of Navajo Sandstone, south of cliffs capped with limestone member of Carmel Formation. Unit believed to be remnant of colluvial deposit. Thickness as much as 30 ft (10 m)

Qg GRAVEL (PLEISTOCENE)—Poorly consolidated, tan to pale-reddish-brown, calcareous, unsorted, poorly stratified sand, cobbles, and boulders. Larger clasts consist of pink, white, and black quartzite; tan sandstone; gray limestone; sparse dark-brown ironstone concretions; and rare basalt. Deposits occur at two levels, one at about 200 ft (60 m) and the other from about 200-600 ft (60-190 m) above present adjacent stream channels. Deposits are probably ancient pediment gravels. Thickness locally more than 200 ft (60 m)

CARMEL FORMATION (MIDDLE JURASSIC)

Jcw Winsor Member—Fine-grained to very fine grained, friable red and pink sandstone. Unit weathers to smooth slopes. Incomplete thickness about 30 ft (10 m) in one exposure along north edge of map area. North of quadrangle, unit is 200 ft (60 m) to more than 400 ft (122 m) thick (Goode, 1973a, 1973b)

Jcg Gypsiferous member—Upper half is gray and green gypsiferous limestone, sandstone, and shale. Lower half is white to very light gray, massive, ledge-forming gypsum. Thin fossiliferous limestone bed marks top of member. Thickness 200 ft (60 m)

Jcb Banded member—Alternating bands of light-gray to very light gray and reddish-brown, very friable, very thin bedded to thin-bedded sandstone and siltstone. Weathers to gentle slopes. Contact with overlying gypsiferous member is placed at base of thick gypsum bed but is generally approximately located because of poor exposure. Thickness about 125 ft (38 m)

Jcl Limestone member—Consists of an upper, main part 105-170 ft (32-51 m) thick consisting of thin-bedded, gray and tan, silty limestone and a lower part 16 ft (5 m) thick consisting of thin-bedded mudstone and sandstone. In most of quadrangle, upper limestone part is composed of two massive, cliff-forming oolitic units separated by unit of thin-bedded shaley limestone and calcareous mudstone that forms slopes. Lower part consists of light-gray to brownish-gray mudstone and very fine grained sandstone. Contact with overlying banded member is placed at top of highest thick limestone, but exposure of contact is generally poor. Total thickness of member is about 120-180 ft (37-56 m)

Jptp THOUSAND POCKETS TONGUE OF PAGE SANDSTONE (MIDDLE JURASSIC)—Yellow to white, massive, faintly crossbedded, fine-grained sandstone. About 25 ft (8 m) of unit is exposed in an incomplete section in northeast corner of quadrangle; not present farther west

Jtc TEMPLE CAP SANDSTONE (MIDDLE JURASSIC)—White Throne Member, at top, is very light gray to tan, fine-grained, crossbedded sandstone that generally weathers bluish gray; Sinawava Member, at base, consists of interbedded sandstone, silty sandstone, and mudstone. Maximum thickness 65 ft (20 m). Temple Cap thins from west to east to a feather edge near Johnson Canyon and is too thin to show at map scale east of Burnt Cedar Point

NAVAJO SANDSTONE

J Tnm Main body (Jurassic and Triassic?)—White, light-gray, yellowish-gray, and reddish-orange, thickly crossbedded, medium- to fine-grained, well-sorted eolian quartzose sandstone. Lower half of unit is generally reddish brown. Colors are not confined to lithostratigraphic boundaries. Locally contains thin lenses of reddish-brown to reddish-purple, silty sandstone and mudstone. Forms massive cliffs. Within unit are sandstone dikes, steeply dipping intraformational bodies that are highly fractured and recemented with silica. Dikes are as much as 33 ft (10 m) wide and resistant to erosion; they form northeast-trending ridges that in places protrude through Quaternary deposits. Dikes are near northeast border of quadrangle. Thickness of unit is 1,350-1,600 ft (410-490 m)

Tnl Lamb Point Tongue (Upper Triassic?)—Grayish-white to grayish-orange, fine-grained to very fine grained, crossbedded sandstone of eolian origin. Top 10-15 ft (3-5 m) locally shows penecontemporaneously deformed beds that are beveled by overlying Tenney Canyon Member of Kayenta Formation. Lower contact is gradational. Unit interfingers with main body of Kayenta Formation. Thickness 365-490 ft (111-150 m)

KAYENTA FORMATION (UPPER TRIASSIC?)

Tkt Tenney Canyon Tongue—Pale-reddish-brown siltstone, mudstone, and very fine grained, very thin bedded to laminated sandstone, all of fluvial origin. Unit splits into three discontinuous mudstone and siltstone beds east of Johnson Canyon and is not present in easternmost part of quadrangle. Maximum thickness of unit is 115 ft (35 m); thins eastward

Tkm Main body—Medium-reddish-brown to pale-red calcareous siltstone and mudstone. In western part of quadrangle contains light-gray siltstone marker bed 40-50 ft (12-15 m) thick that occurs 75-85 ft (23-26 m) above base of formation. Total thickness of unit is 240-300 ft (74-93 m)

Tmo MOENAVE FORMATION (UPPER TRIASSIC?)—Consists of two members having a total thickness of 310-390 ft (96-120 m). Thickens eastward.

Springdale Sandstone Member, at top of Moenave, is a pale-reddish-brown sandstone that forms prominent cliffs. Beds in this member are 1-10 ft (0.3-3 m) thick and consist of sweeping, low-angle fluvial crossbeds characteristically containing scattered pebble-size chips of reddish-brown mudstone (Wilson and Stewart, 1967). Crossbedded strata commonly are overlain and underlain by beds of finely laminated, reddish-brown mudstone and pellet conglomerate that are 1-2 in. (2.5-5 cm) thick. Upper half of member is locally stained pale greenish yellow. Thickness 175-215 ft (53-65 m); thickens eastward.

Underlying Dinosaur Canyon Member consists of pale- to medium-reddish-orange, thick-bedded to laminated calcareous sandstone and siltstone. Contact with underlying Chinle Formation is placed at top of highest prominent reddish-purple shale bed. Thickness of Dinosaur Canyon Member 135-175 ft (41-54 m). Thickens eastward

CHINLE FORMATION (UPPER TRIASSIC)

Tcp Petrified Forest Member—Variegated light-gray, grayish-red, and purple claystone, clayey siltstone, clayey sandstone, and sandstone. Montmorillonitic throughout; weathers to frothy surface. Small fragments of petrified wood are locally common. Contact with underlying Shinarump Member is transitional. Complete section is not exposed in quadrangle, but thickness is calculated to be 700-800 ft (213-244 m)

Tcs Shinarump Member—Cliff-forming unit of yellowish-brown conglomerate and conglomeratic sandstone. Conglomerate composed of rounded to subrounded quartz, quartzite, and chert pebbles in light-gray sandstone matrix. Conglomerate is underlain by as much as 5 ft (1.5 m) of light-gray, fine- to coarse-grained, wavy-bedded sandstone. Overlies and fills channels in Moenkopi Formation. White to light-gray petrified wood fragments as much as 3 ft (1 m) long are common. Thickness 25-50 ft (7.5-15 m)

MOENKOPI FORMATION

Tmr Upper red member (Middle? and Lower Triassic)—Reddish-brown, laminated to thin-bedded, locally gypsiferous, calcareous mudstone, siltstone, and fine-grained sandstone; sandstone beds are resistant and form ledges. Thickness 120-160 ft (37-49 m)

Tms Shnabkaib Member (Lower Triassic)—Yellowish-gray, very fine grained gypsiferous mudstone and siltstone, and fine-grained sandstone. Laminated to wavy bedding is characteristic. Locally calcareous. About 120 ft (37 m) exposed in quadrangle

CONTACT—Dotted where concealed; all contacts of Quaternary units are approximately located

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

PROMINENT FRACTURE—Probable joint or possible fault. Most are very steeply dipping. Dashed where approximately located; dotted where concealed

STRIKE AND DIP OF INCLINED BEDS

GRAVEL OR BORROW PIT

MINE FOR URANIUM, INACTIVE

NATURAL ARCH—Located south of Burnt Cedar Point

SANDSTONE DIKE—Present in main body of Navajo Sandstone

REFERENCES CITED

Goode, H. D., 1973a, Preliminary geologic map of the Bald Knoll quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-520, scale 1:24,000.

_____1973b, Preliminary geologic map of the Skutumpah Creek quadrangle, Utah: U.S. Geological Survey Miscellaneous Field Studies Map MF-521, scale 1:24,000.

Luedke, R. G., and Smith, R. L., 1978, Map showing distribution, composition, and age of late Cenozoic volcanic centers in Colorado, Utah, and southwestern Wyoming: U.S. Geological Survey Miscellaneous Investigations Series Map I-1091-B, scale 1:1,000,000.

Wilson, R. F., and Stewart, J. H., 1967, Correlation of Upper Triassic and Triassic(?) formations between southwestern Utah and southern Nevada: U.S. Geological Survey Bulletin 1244-D, 20 p.

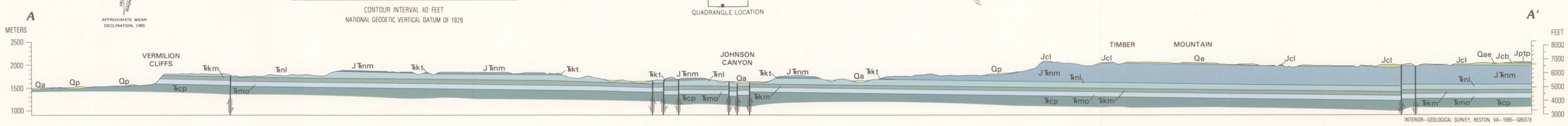
Base from U.S. Geological Survey, 1954
10,000-foot grid based on Utah coordinate system, south zone
1000-meter Universal Transverse Mercator grid ticks, zone 12, shown in blue
Roads as of 1981

14° APPROXIMATE MEAN DECLINATION, 1985 (TRUE NORTH, MAGNETIC NORTH)

SCALE 1:62 500
1 ½ 0 1 2 3 4 MILES
1 .5 0 1 2 3 4 KILOMETERS
CONTOUR INTERVAL 40 FEET
NATIONAL GEODETIC VERTICAL DATUM OF 1929

UTAH — QUADRANGLE LOCATION

Geology mapped 1978-83



GEOLOGIC MAP OF THE JOHNSON QUADRANGLE, KANE COUNTY, UTAH, AND COCONINO COUNTY, ARIZONA

By

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1985

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