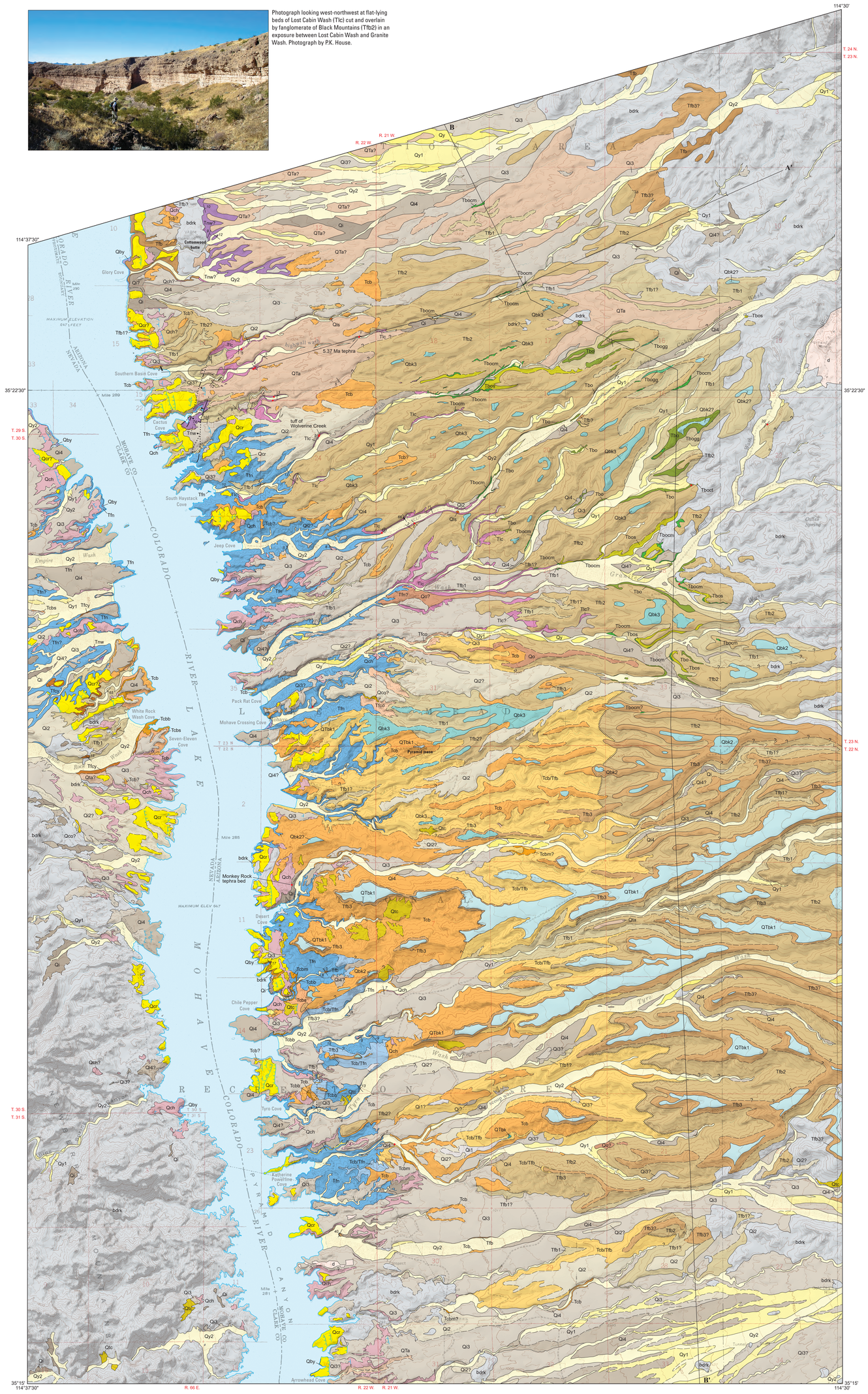
U.S. Department of the Interior
U.S. Geological Survey

Prepared in cooperation with
Nevada Bureau of Mines and Geology; Arizona Geological Survey; University of Nevada, Las Vegas, Department of Geoscience; University of Oklahoma School of Geosciences; and National Park Service

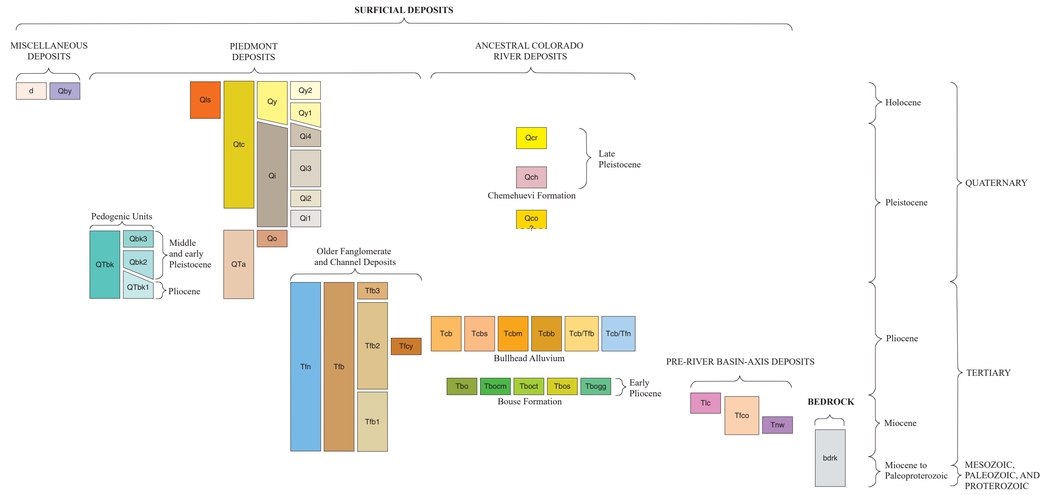
Scientific Investigations Map 3448
Pamphlet accompanies map

Photograph looking west-northwest at flat-lying beds of Lost Cabin Wash (Tlc) cut and overlain by fanglomerate of Black Mountains (Tfb2) in an exposure between Lost Cabin Wash and Granite Wash. Photograph by P.K. House.



CORRELATION OF MAP UNITS

[See Description of Map Units for specific unit ages]



LIST OF MAP UNITS

[See Description of Map Units in pamphlet for complete unit descriptions. Some unit exposures on the printed or plotted map are too small to distinguish the color for unit identification. These units are labeled where possible, and unlabeled units are attributed in the database]

SURFICIAL DEPOSITS

MISCELLANEOUS DEPOSITS

- d — **Disturbed ground (latest Holocene)**
- Qby — **Beach sediments of Lake Mohave (latest Holocene)**

PIEDMONT DEPOSITS

- Qls — **Landslide deposits (Holocene)**
- Qtc — **Talus and colluvium (Holocene and Pleistocene)**
- Qy — **Young piedmont alluvium, undivided (Holocene to latest Pleistocene)**
- Qy2 — **Unit 2 (late to middle Holocene)**
- Qy1 — **Unit 1 (early Holocene to late Pleistocene)**
- Qi — **Intermediate piedmont alluvium, undivided (late to middle Pleistocene)**
- Qi4 — **Unit 4 (late Pleistocene)**
- Qi3 — **Unit 3 (late Pleistocene)**
- Qi2 — **Unit 2 (late to middle? Pleistocene)**
- Qi1 — **Unit 1 (middle Pleistocene)**
- Qo — **Older piedmont alluvium (middle to early? Pleistocene)**
- QTa — **Oldest piedmont alluvium (early Pleistocene to late Pliocene?)**

Pedogenic units

- QTbk — **Soil carbonate, undivided (Pleistocene and Pliocene)**
- Qbk3 — **Unit 3 (middle? Pleistocene)**
- Qbk2 — **Unit 2 (middle to early? Pleistocene)**
- QTbk1 — **Unit 1 (early Pleistocene to Pliocene)**

Older Fanglomerate and Channel Deposits

- Tfn — **Fanglomerate of Newberry Mountains (Pliocene and Miocene)**
- Tfb — **Fanglomerate of Black Mountains, undivided (Pliocene and Miocene)**
- Tfb3 — **Unit 3 (Pliocene)**
- Tfb2 — **Unit 2 (Pliocene)**
- Tfb1 — **Unit 1 (Pliocene and Miocene)**
- Tlcy — **Young paleochannel-fill conglomerate (early Pliocene)**

ANCESTRAL COLORADO RIVER DEPOSITS

- Qcr — **Riverside alluvium (late Pleistocene)**
- Qch — **Chemehuevi Formation (late Pleistocene)**
- Qco — **Older Colorado River deposits (Pleistocene)**
- Tcb — **Bullhead Alluvium, undivided (Pliocene)**
- Tcbm — **Mud (Pliocene)**
- Tcbs — **Sand (Pliocene)**
- Tcbb — **Boulder and cobble conglomerate (Pliocene)**
- Tcb/Tfn — **Interbedded with fanglomerate of Newberry Mountains (Pliocene)**
- Tcb/Tfb — **Interbedded with fanglomerate of Black Mountains (Pliocene)**
- Tbo — **Bouse Formation, undivided (early Pliocene)**
- Tbos — **Mud and sand (early Pliocene)**
- Tboom — **Marl (early Pliocene)**
- Tboct — **Tufa or travertine (early Pliocene)**
- Tbogg — **Nearshore gravel (early Pliocene)**

PRE-RIVER BASIN AXIS DEPOSITS

- Tlc — **Beds of Lost Cabin Wash (lower Pliocene to upper Miocene)**
- Tlco — **Older paleochannel-fill conglomerate (upper and middle? Miocene)**
- Trnw — **Beds of Nellis Wash (upper and middle? Miocene)**

BEDROCK

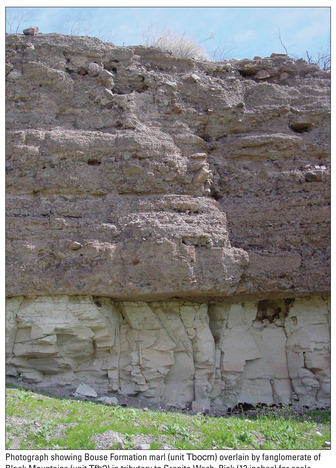
- bdrk — **Bedrock, undivided (Miocene to Paleoproterozoic)**

EXPLANATION OF MAP SYMBOLS

- **Contact**—Dashed where approximately located; queried where identity or existence uncertain. Internal contacts delineate certain from uncertain (queried) parts of a unit
- **Gradational contact**
- **Fault**—Dashed where approximately located; dotted where concealed. Ball and bar on downthrown block. Showing dip value and dip direction, where known
- **Fluvial terrace scarp**—Queried where identity or existence uncertain
- A — A' **Location of cross section**
- **Horizontal bedding**
- 23 **Inclined bedding**—Showing strike and dip
- 62 **Small, minor inclined joint**—Showing strike and dip
- **Tephra sample locality**—Labeled when mentioned in the text

Photograph showing detail of intricately cross bedded sand and relatively fine gravel of Bullhead Alluvium (unit Tcb) in south-facing exposure in steep bluff above Tyro Wash, the type area. Section shown is about 5 m thick. Photograph by P.K. House.

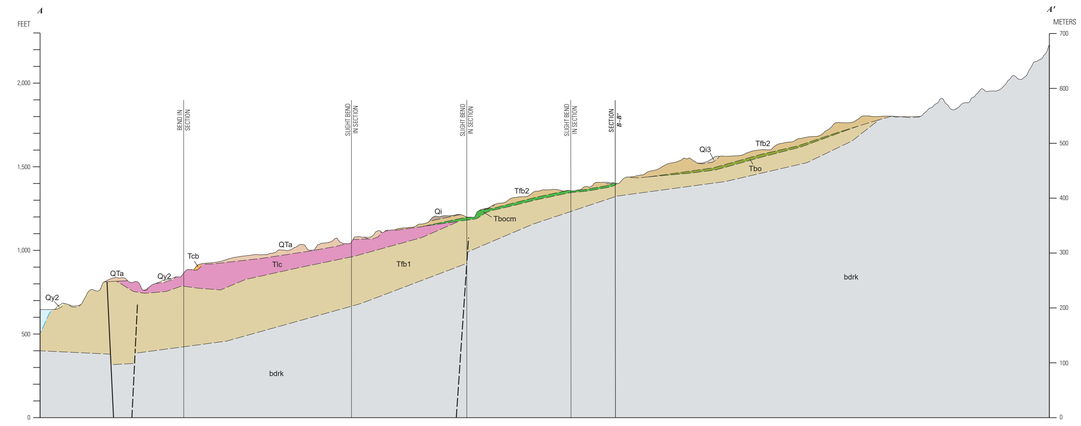
Photograph showing view to north-northwest from soil carbonate, unit 1 (QTbk1), surface across Lake Mohave and towards Eldorado Mountains, Nevada. Bullhead Alluvium (light gray; unit Tcb) overlies fanglomerate of Newberry Mountains (reddish brown; unit Tfn) in foreground. Chemehuevi Formation (unit Qch) forms light pink hills near middle left of photo. This stack of Chemehuevi Formation overlies Bullhead Alluvium and contains tephra of Monkey Rock near its base. Photograph by P.K. House.

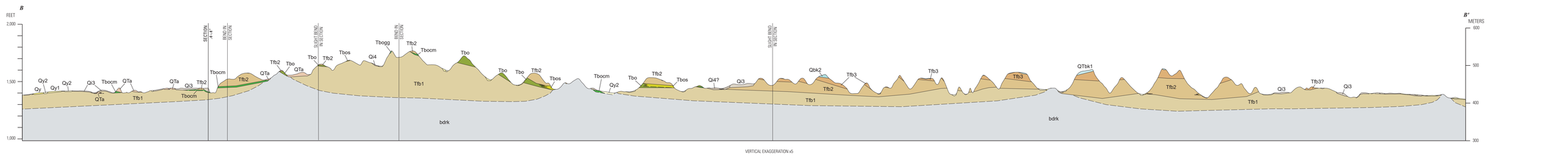


Photograph showing Bouse Formation marl (unit Tboom) overlain by fanglomerate of Black Mountains (unit Tfb2) in tributary to Granite Wash. Pick (12 inches) for scale. Photograph by P.K. House.

Photograph showing massive petrified log found in Bullhead Alluvium (unit Tcb). Pencil (5.5 inches) for scale. Photograph by P.K. House.

Photograph showing an approximately 1 m erosional window in a tiny island of strongly consolidated Bullhead Alluvium (unit Tcb) that protrudes a few meters above the surface of Lake Mohave. Deposit is mostly rounded small and medium cobbles. Photograph by P.K. House.





Base from U.S. Geological Survey Spirit Mountain SE and Spirit Mountain NE quadrangles (DRGs) and 10-meter digital elevation data (DEMs)
Transverse Mercator projection
North American Datum of 1983; UTM Zone 11N

APPROXIMATE MEAN DECLINATION, 2020

SCALE 1:24,000
1 MILE
1000 0 1000 2000 3000 4000 5000 6000 7000 FEET
1 KILOMETER
CONTOUR INTERVAL 40 FEET

MAP LOCATION

Surficial geology mapped by P.K. House, P.A. Pearthree, and A.L. Brock-Hon between 2002 and 2012 and by P.K. House, R.S. Crow, P.A. Pearthree, J. Schwing, J.O. Thacker, and B.F. Gootee between 2014 and 2018. Field support provided by T. Felger, B. Buck, D. Malmon, S. Beard, and R. Reeves

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Edited by J.L. Zigler; digital cartographic production by J.F. Mangano

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Surficial Geologic Map of the Spirit Mountain SE and part of the Spirit Mountain NE 7.5′ Quadrangles, Nevada and Arizona

By
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2020

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