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

Prepared In Cooperation With The
National Park Service, U.S. Forest Service, Bureau of Land Management, and Navajo Nation

Scientific Investigations Map 3268
Sheet 3 of 3
Pamphlet accompanies map

CORRELATION OF MAP UNITS

SURFICIAL DEPOSITS

Qaf | Qs | Qf | Qes | Qd | Qdl | Qdp | Qdb | Qdm | Qdlu | Qg1 | Qa1 | Qg2 | Qa2 | Qps | Qae | Qg3 | Qa3 | Qv | Qtr | Ql | Qg4 | Qa4 | Qg5-18 | Tgs

Holocene — QUATERNARY
Pleistocene — QUATERNARY
Pliocene — TERTIARY
Miocene — TERTIARY

SEDIMENTARY ROCKS

Km, Kd — Upper Cretaceous — CRETACEOUS
Unconformity
Jms — Upper Jurassic — JURASSIC
Unconformity
San Rafael Group: Jr, Je — Middle Jurassic — JURASSIC
Unconformity
Jcu, Jc, Jcj, Jp — Middle Jurassic — JURASSIC
Unconformity
Glen Canyon Group: Jn, Jk, Jks — Lower Jurassic — JURASSIC
Unconformity
Jm — Lower Jurassic — JURASSIC
Unconformity
Tico, Tcp, Tcs — Upper Triassic — TRIASSIC
Unconformity
Trmu, Trms — Middle(?) and Lower Triassic — TRIASSIC
Trmlm — Lower Triassic — TRIASSIC
Unconformity
Pkh, Pkf — Cisuralian — PERMIAN
Unconformity
Pt — Cisuralian — PERMIAN
Unconformity
Pc — Cisuralian — PERMIAN
Unconformity
Ph — Cisuralian — PERMIAN
Unconformity
Supai Group: Pe — Cisuralian — PERMIAN
Unconformity
Supai Group: PPms — Upper, Middle and Lower Pennsylvanian and Upper Mississippian — PENNSYLVANIAN
Unconformity
Ms — Upper Mississippian — MISSISSIPPIAN
Mr — Upper and Lower Mississippian — MISSISSIPPIAN

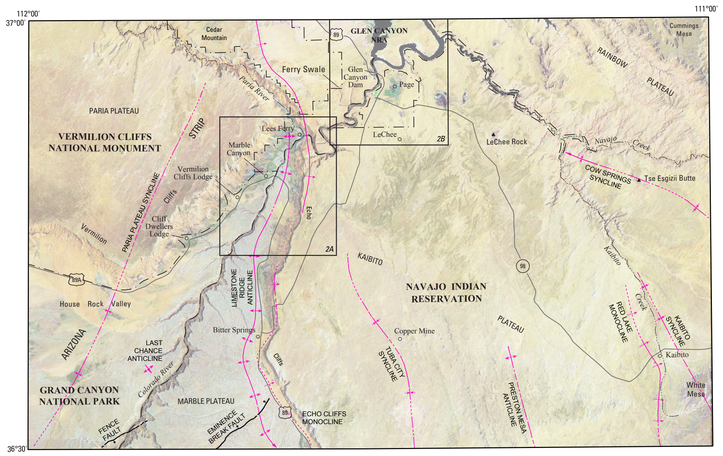

Figure 1. Map of the Glen Canyon Dam 30′ x 60′ quadrangle showing cultural and physiographic features as well as major geologic structures. Boxes define area of maps in figure 2.

LIST OF MAP UNITS

[Some map units are too small to distinguish unit identification by color. These units are labeled where possible; all units are attributed in the geodatabase]

SURFICIAL DEPOSITS

- **Qaf** — Artificial fill and quarries (Holocene)
- **Qs** — Stream-channel deposits (Holocene)
- **Qf** — Floodplain deposits (Holocene)
- **Qes** — Sand sheet deposits (Holocene)
- **Qd** — Dune sand and sand sheet deposits, undivided (Holocene)
- **Qdl** — Linear dune deposits (Holocene)
- **Qdp** — Parabolic dune deposits (Holocene)
- **Qdb** — Barchan dune deposits (Holocene)
- **Qdm** — Mixed dune deposits (Holocene)
- **Qdlu** — Linear dune and sand sheet deposits, undivided (Holocene)
- **Qg1** — Young terrace-gravel deposits (Holocene)
- **Qa1** — Young alluvial fan deposits (Holocene)
- **Qg2** — Intermediate terrace-gravel deposits (Holocene)
- **Qa2** — Intermediate alluvial fan deposits (Holocene)
- **Qps** — Ponded sediments (Holocene)
- **Qae** — Mixed alluvium and eolian deposits (Holocene)
- **Qg3** — Old terrace-gravel deposits (Holocene)
- **Qa3** — Old alluvial fan deposits (Holocene)
- **Qv** — Valley-fill deposits (Holocene and Pleistocene(?))
- **Qtr** — Talus and rock-fall deposits (Holocene and Pleistocene(?))
- **Ql** — Landslide deposits (Holocene and Pleistocene)
- **Qg4** — Older terrace-gravel deposits (Pleistocene)
- **Qa4** — Older alluvial fan deposits (Pleistocene and Pliocene(?))
- **Qg5-18** — Oldest terrace-gravel deposits, undivided (Pleistocene and Pliocene(?))
- **Tgs** — Gravel and sedimentary deposits (Pliocene(?) or Miocene(?))

SEDIMENTARY ROCKS

- **Km** — Mancos Shale (Upper Cretaceous)
- **Kd** — Dakota Sandstone (Upper Cretaceous)
- **Jms** — Morrison Formation (Upper Jurassic)
  - Salt Wash Member
- **Jr** — San Rafael Group (Middle Jurassic)
  - Romana Sandstone
- **Je** — Entrada Sandstone
- **Jc** — Carmel Formation, undivided
- **Jcu** — Paria River Member and Winsor Member, undivided
- **Jcj** — Judd Hollow Tongue and Page Sandstone Tongues, undivided
- **Jp** — Page Sandstone
- **Jn** — Glen Canyon Group (Lower Jurassic)
  - Navajo Sandstone
- **Jk** — Kayenta Formation, undivided
- **Jks** — Springdale Sandstone Member
- **Jm** — Moenave Formation and Wingate Sandstone, undivided
- **Tico** — Chinle Formation (Upper Triassic)
  - Owl Rock Member
- **Tcp** — Petrified Forest Member
- **Tcs** — Shinarump Member
- **Trmu** — Moenkopi Formation (Middle(?) and Lower Triassic)
  - Upper red member (Middle(?) and Lower Triassic)
- **Trms** — Shnabkaib Member (Lower Triassic)
- **Trmlm** — Lower red member, Virgin Limestone Member, and middle red member, undivided (Lower Triassic)
- **Pkh** — Kaibab Formation (Cisuralian)
  - Harrisburg Member
- **Pkf** — Fossil Mountain Member
- **Pt** — Toroweap Formation, undivided (Cisuralian)
- **Pc** — Coconino Sandstone (Cisuralian)
- **Ph** — Hermit Formation (Cisuralian)
- **Pe** — Supai Group (Cisuralian, Pennsylvanian, and Upper Mississippian)
  - Esplanade Sandstone (Cisuralian)
- **PPms** — Wescogame (Upper Pennsylvanian), Manakacha (Middle Pennsylvanian) and Watahomigi (Lower Pennsylvanian and Upper Mississippian) Formations, undivided
- **Ms** — Surprise Canyon Formation (Upper Mississippian)
- **Mr** — Redwall Limestone, undivided (Upper and Lower Mississippian)

EXPLANATION OF MAP SYMBOLS

- **Contact**—Contacts between all alluvial and eolian units are approximate and arbitrary
- **Fault**—Dashed where inferred; dotted where concealed; bar and ball on down-thrown side. Showing fault offset in feet
- **Folds**—Showing trace of axial surface and direction of plunge; dotted where location is concealed
  - **Anticline**
  - **Plunging anticline**
  - **Syncline**
  - **Plunging syncline**
  - **Monocline**
- **Strike and dip of beds**
  - **Inclined**—Showing dip measured in the field
  - **Implied**—Interpreted from aerial photographs; dip not determined
- **Strike of vertical and subvertical joints**—Interpreted from aerial photographs; symbol placed where joints are most visible on aerial photographs
- **Collapse structure**—Black dot shows circular collapse structure characterized by strata dipping inward toward a central point. Magenta dot shows circular collapse structure characterized by strata dipping inward toward a central point and brecciated rock
- **Sinkhole**
- **Mine or prospect**
- **Fracture**—Open fracture (0.5 to 3.5 m wide) without offset
- **Offset fracture**—Open fracture (0.5 to 3.5 m wide) with offset (generally less than 1.5 m

Table 1. Age and elevation of floodplain and terrace-gravel deposits along the Colorado River from Glen Canyon Dam to Badger Rapids, a 25 mile (40 km) section of the river. Refer to locations of separate older terrace-gravel deposits in figure 2.

Map unit	*Age*	*Elevation above Colorado River*
	Floodplain deposits	
Qf	Holocene	0–45 ft (0–14 m)
	Young and intermediate terrace-gravel deposits	
Qg1	Holocene	7–17 ft (2–5 m)
Qg2	Holocene	27–47 ft (8–14 m)
Qg3	Holocene	47–77 ft (14–23 m)
Qg4	Holocene and Pleistocene(?)	87–127 ft (27–39 m)
	Older terrace-gravel deposits	
Qg5	Holocene and Pleistocene(?)	107–127 ft (33–39 m)
Qg6	Holocene(?) and Pleistocene	147–207 ft (45–63 m)
Qg7	Pleistocene	275–300 ft (84–91 m)
Qg8	Pleistocene	290–390 ft (88–119 m)
Qg9	Pleistocene	495–555 ft (151–169 m)
Qg9a	Pleistocene	620–635 ft (189–194 m)
Qg10	Pleistocene	600–620 ft (183–189 m)
Qg11	Pleistocene	620–630 ft (189–192 m)
Qg12	Pleistocene	760–800 ft (232–244 m)
Qg13	Pleistocene	800–860 ft (244–262 m)
Qg14	Pleistocene	900–920 ft (274–280 m)
Qg15	Pleistocene	960–980 ft (293–299 m)
Qg16	Pleistocene and Pliocene(?)	990–1,000 ft (302–305 m)
Qg17	Pleistocene and Pliocene(?)	1,060–1,085 ft (323–331 m)
Qg18	Pleistocene and Pliocene(?)	1,140–1,190 ft (347–363 m)

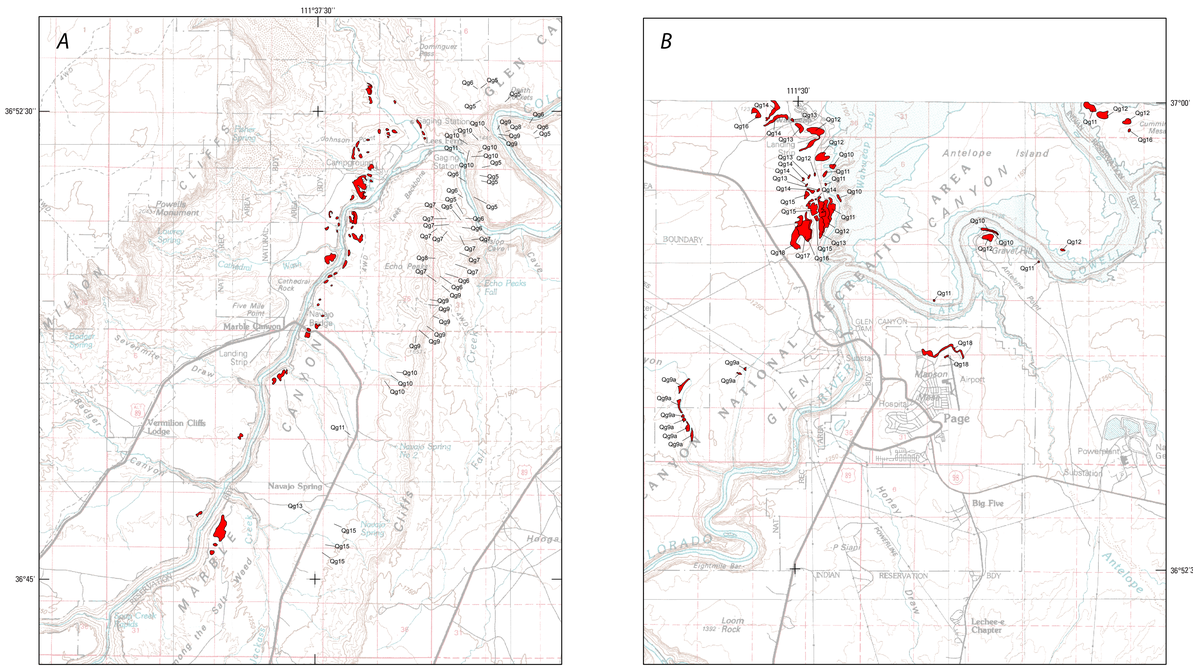

Figure 2. Maps showing detail of terrace gravels (units Qg5-Qg18) along the Colorado River. *A*. Gravels from Lees Ferry south to River Mile 9 below Badger Rapid. Colorado River elevation at Lee's Ferry is 3,133 ft (955 m). *B*. Gravels from northeast of Lees Ferry north to lower Lake Powell. Colorado River elevation at base of Glen Canyon Dam is 3,146 ft (959 m). River gradient between Glen Canyon Dam and River Mile 9 is 3.5 ft/mi. See table 1 for additional unit information. See figure 1 for map locations.

Geologic Map of the Glen Canyon 30′ x 60′ Quadrangle, Coconino County, Northern Arizona

By
George H. Billingsley and Susan S. Priest

2013

For sale by U.S. Geological Survey, Information Services, Box 25286, Federal Center, Denver, CO 80225, 1–888–ASK–USGS

Digital files available at http://pubs.usgs.gov/sim/3268/

Suggested Citation: Billingsley, G.H. and Priest, S.S., 2014, Geologic map of the Glen Canyon Dam 30′ x 60′ quadrangle, Coconino County, northern Arizona: U.S. Geological Survey Scientific Investigations Map 3268, pamphlet 43 p., 3 sheets, scale 1:50,000 (http://pubs.usgs.gov/sim/3268/).