



U.S. Geological Survey
Geologic Investigations Series I-2663
Online version 1.0

Map Showing Quaternary Geology and Geomorphology of the Lees Ferry Area, Glen Canyon, Arizona

Present (1996) and Past (1921) Views of the Lees Ferry Area

The landscape of the Lees Ferry and Lonely Dell Ranch area has changed noticeably in the past 75 years (figs. 1 and 2). These rematched photos capture two unrelated types of change. The landscape reflects changes in local land use along the Colorado River and a decrease in the width of the channels of the Colorado and Paria Rivers.

Present land use is now almost entirely recreational, involving fishing, launching point for whitewater rafting in the Grand Canyon, and hiking. The area was developed for recreation beginning in 1963. This development resulted in the disturbed areas, roads, parking areas, boat launching ramps, and National Park Service (NPS) facilities shown on the geologic map and figure 1A. Traditional uses were agriculture, livestock raising, hydraulic mining, and transportation. Interestingly, this early activity was less visible in the landscape than development for recreation, as shown by figure 1 (A and B).

The landscape of the Lonely Dell Ranch area has changed the least from human activity (fig. 2). Hiking is the principal recreational use of this area, leaving little mark on the landscape, as suggested by figure 2A. The once productive agricultural fields near the ranch are now abandoned (fig. 2B). The orchards are maintained by the NPS, but the surrounding fields are not irrigated or planted. Future NPS plans include small native grass plots for restoration projects (K. Crumbo, oral commun.).

The channel of the Colorado River is substantially narrower than in 1921 (fig. 1). The width of the channel immediately downstream of the right-bank cableway is about 50 m less than in 1921. Most of this decrease is from aggradation of the pre-dam terrace (pt) on a sand bar visible in the 1921 photograph (fig. 1B). Aerial photographs show that the former sandbar had become vegetated by at least 1937. The relatively low flows after the 1921 flood of 6,250 m³/s (220,000 ft³/s) resulted in deposition of sand on a floodplain in the former channel adjacent to the terrace rise of the intermediate terrace (it). The pre-dam terrace (pt) has evidently been little affected by regulated

streamflow since closure of Glen Canyon Dam in 1963. Steep banks have been cut into the terrace; otherwise it has not been eroded any more than the width of the post-dam zone (pdz), which varies from 0–20 m at this locality. Vegetation on all the terraces has also changed substantially. In 1923, sandbar willow was the dominant shrub and saltcedar was probably absent (Turner and Karpiscak, 1980), whereas today saltcedar is the dominant shrub and less than two dozen willow remain only as stumps in the mapped area.

The channel of the Paria River is also substantially narrower than in 1921 (fig. 2). This decrease in channel width began during the early 1940s (Hereford, 1986). Aggradation along with narrowing of the former channel (fig. 2A) built up the modern terrace of the Paria River (pmt). In addition, the junction of the Paria with the Colorado River shifted southwest 1.5 km (0.9 mi) in 1912 according to Reilly (1999). A photograph taken in 1873 (Turner and Karpiscak, 1980, fig. 32A) shows the mouth of the river southwest of the long-term parking lot, on what is now the pre-dam terrace. This junction was abandoned after 1912 and before 1917 and was subsequently covered by deposition of the pre-dam terrace (pt) and modern terrace of the Paria River.

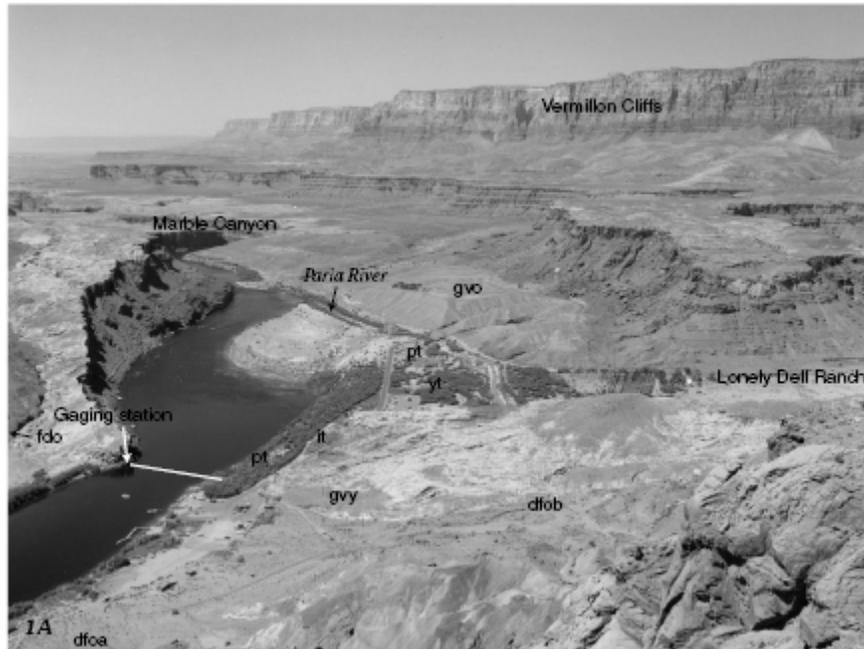


Figure 1. (A) Colorado River and Lees Ferry area from Spencer Trail; view to the southwest, photograph taken May 8, 1996 by Richard Hereford. (B) Approximately same scene as 1A, photograph taken 1921. Several of the mapped units are shown with labels; line across river is cableway. From Emery Kolb Collection (accession no. 568-4600), Special Collections Library, Northern Arizona University, Flagstaff.

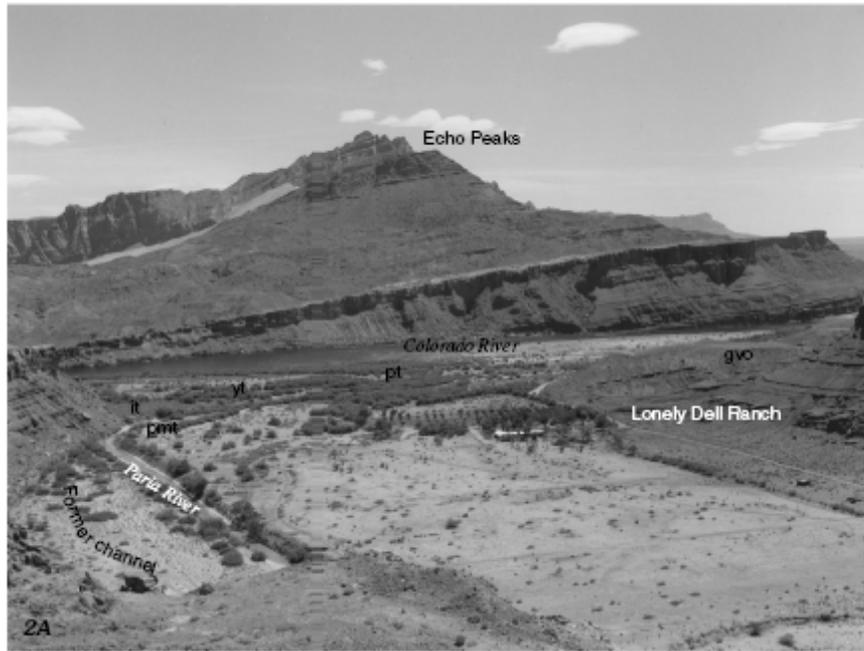
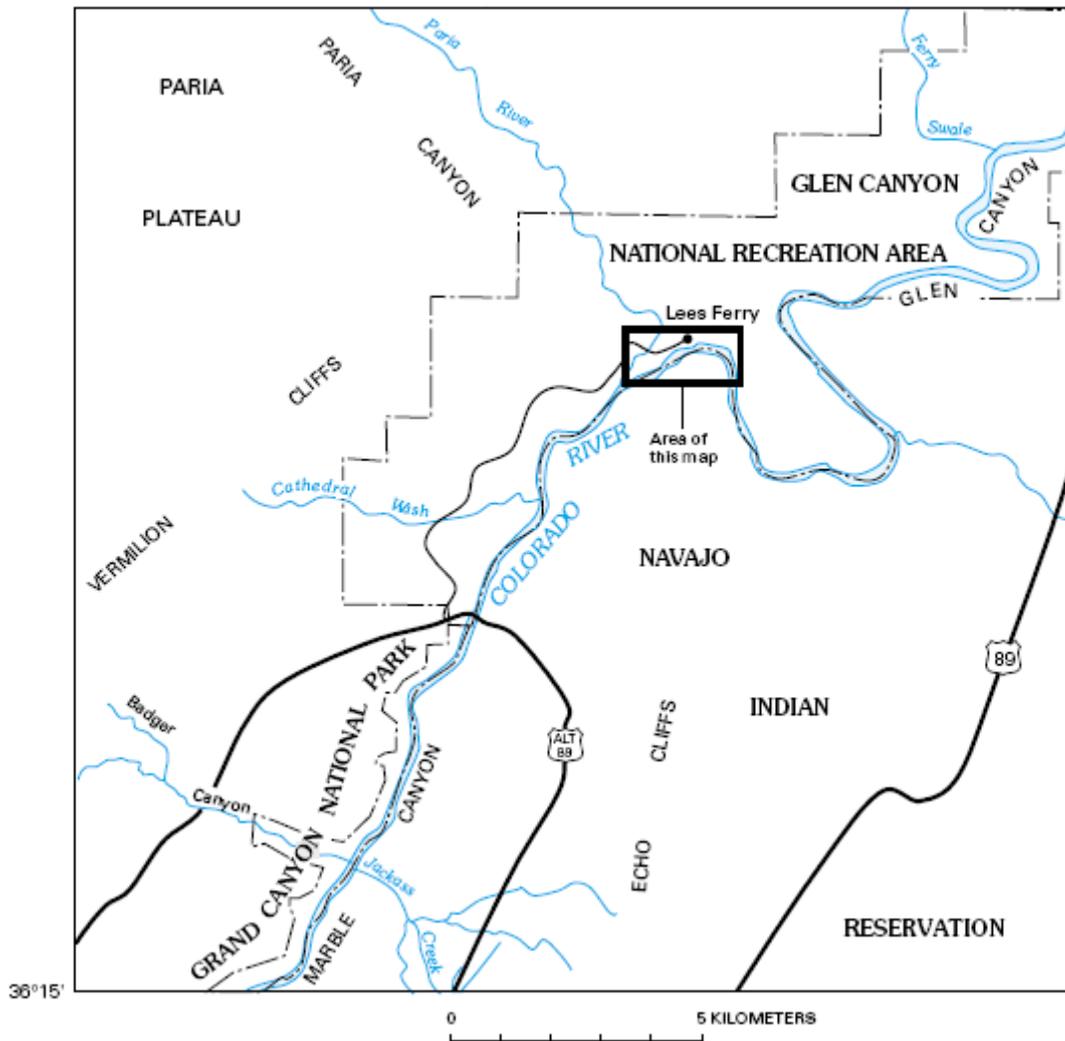


Figure 2. (A) Lonely Dell Ranch and Lees Ferry area; view to southeast, photograph taken May 7, 1996 by Richard Hereford. (B) Approximately same scene as 2A, photograph taken 1921. Several of the mapped units are shown where they occur at the north boundary of map area. From Emery Kolb Collection (accession no. 568-1383), Special Collections Library, Northern Arizona University, Flagstaff.



LOCATION OF MAP AREA, WESTERN GRAND CANYON, ARIZONA

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