

Transient Aggradation and  
Incision of the Colorado River in  
Grand Canyon during the  
Holocene and late Pleistocene

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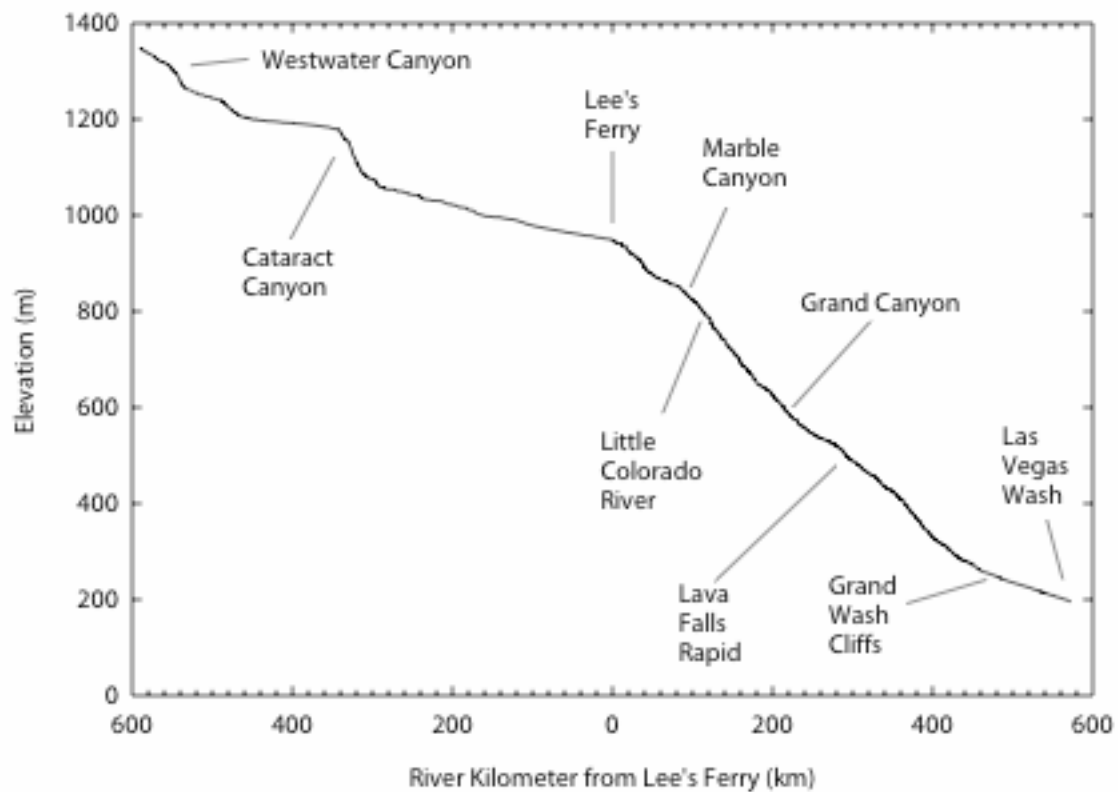


Figure 1. Longitudinal profile of the Colorado River from the Utah-Colorado border to near present-day Hoover Dam (from U.S. Geological Survey longitudinal profile data, various dates).

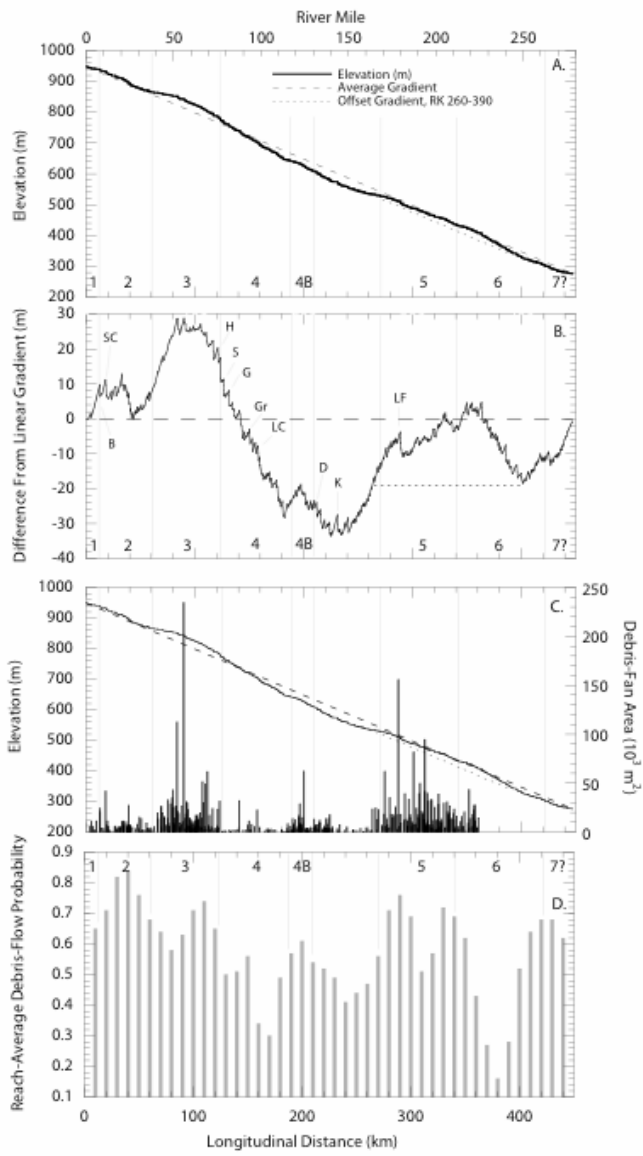


Table 1. Geomorphic reaches of the Colorado River in Grand Canyon as defined by *Melis* [1997] and modified in this study.

Geomorphic Reach	Beginning River Mile	Ending River Mile	Average Channel Width (m)	Average Density of Debris Fans (number/RM)	Geology at River Level <sup>3</sup>
1	0	8	108	1.1	KL, CS, HS
2	8	38	83	1.8	SG, RL, ML
3	38	77	133	2.6	ML, BAS, TS, GCSG
4	77	170	69	1.2	ML, BAS, TS, VS, ZG
5	170	213	126	2.2	ML, BAS, TS
6	213	262 <sup>1</sup>	103 <sup>2</sup>	1.9 <sup>2</sup>	VS, ZG
7?	262	277	n.d.	n.d.	ML, BAS, TS

<sup>1</sup>According to *Melis* [1997], geomorphic reach (GR) 6 ends at RM 225, the down stream limit of his field research. In this study, we have extended GR 6 to RM 262, where Paleozoic rocks again crop out at river level and the Lower Granite Gorge ends. We also arbitrarily define GR 7? to extend from this point to Grand Wash Cliffs.)

<sup>2</sup>Data end at mile 225.5.

<sup>3</sup>KL, Kaibab Limestone; CS, Coconino Sandstone; HS, Hermit Shale, SG, Supai Group; RL, Redwall Limestone; ML, Muav Limestone; BAS, Bright Angel Shale; TS, Tapeats Sandstone; GCSG, Grand Canyon Super Group; VS, Vishnu Schist; ZG, Zoroaster Granite



Alluvial (?) Islands in the Colorado River, Grand Canyon  
(not counting obvious boulders)  
(from Stevens, 1983)

Top of Eastern Canyon Convexity, River Mile ~50-70

R.M.

31.8 Vasey's Paradise

53.2 downstream of Nankoweap Creek

*61.5 mouth of Little Colorado River*

62.8

66.6 Espejo Creek

69.1 Basalt Creek

69.2 Basalt Creek

71.5 Hilltop Ruin

73.4 downstream of Unkar Creek

Fossil Canyon Convexity, River Mile 112-130

R.M.

112.1 Waltenberg Canyon (2)

117.3

122.2

Top of Western Canyon Convexity, River Mile ~195-225

R.M.

190± (3)

191.6

192.0

193.5 (2)

207.4

209.0 Granite Park, very large island

220.1

*(mouth of Whitmore Wash, RM 188)*

# Grand Canyon Summary

- River-profile convexities exist at all scales along the Colorado River in Grand Canyon.
- At short wavelength and long, these convexities arise from tributary debris fill.
- Locations of both major rapids and alluvial islands reflect the locations of ECC, FCC, and WCC.
- Nankoweap Island is an important site.
- This debris fill has raised the river level and river bed(?) by as much as ~25 m.
- Much of this debris fill is of Holocene age.
- An unknown amount at depth is of late(?) - Pleistocene age.

# Virtual repeat Photography

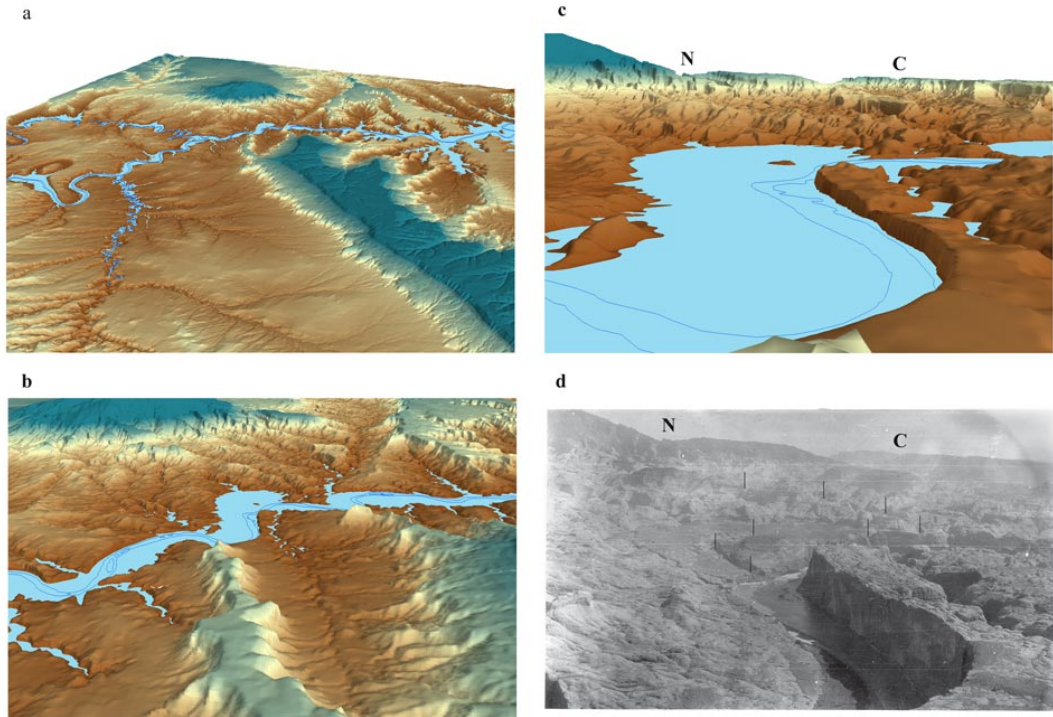
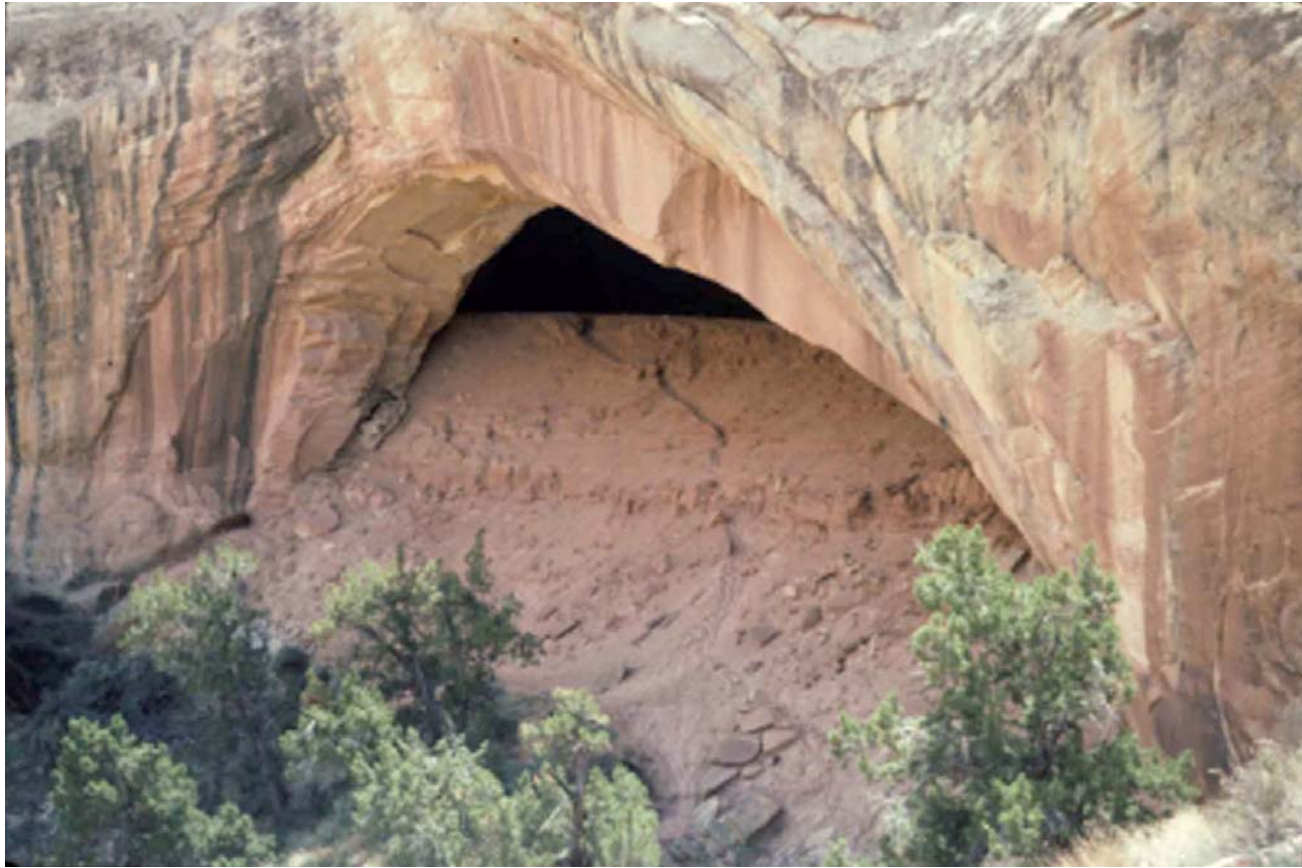


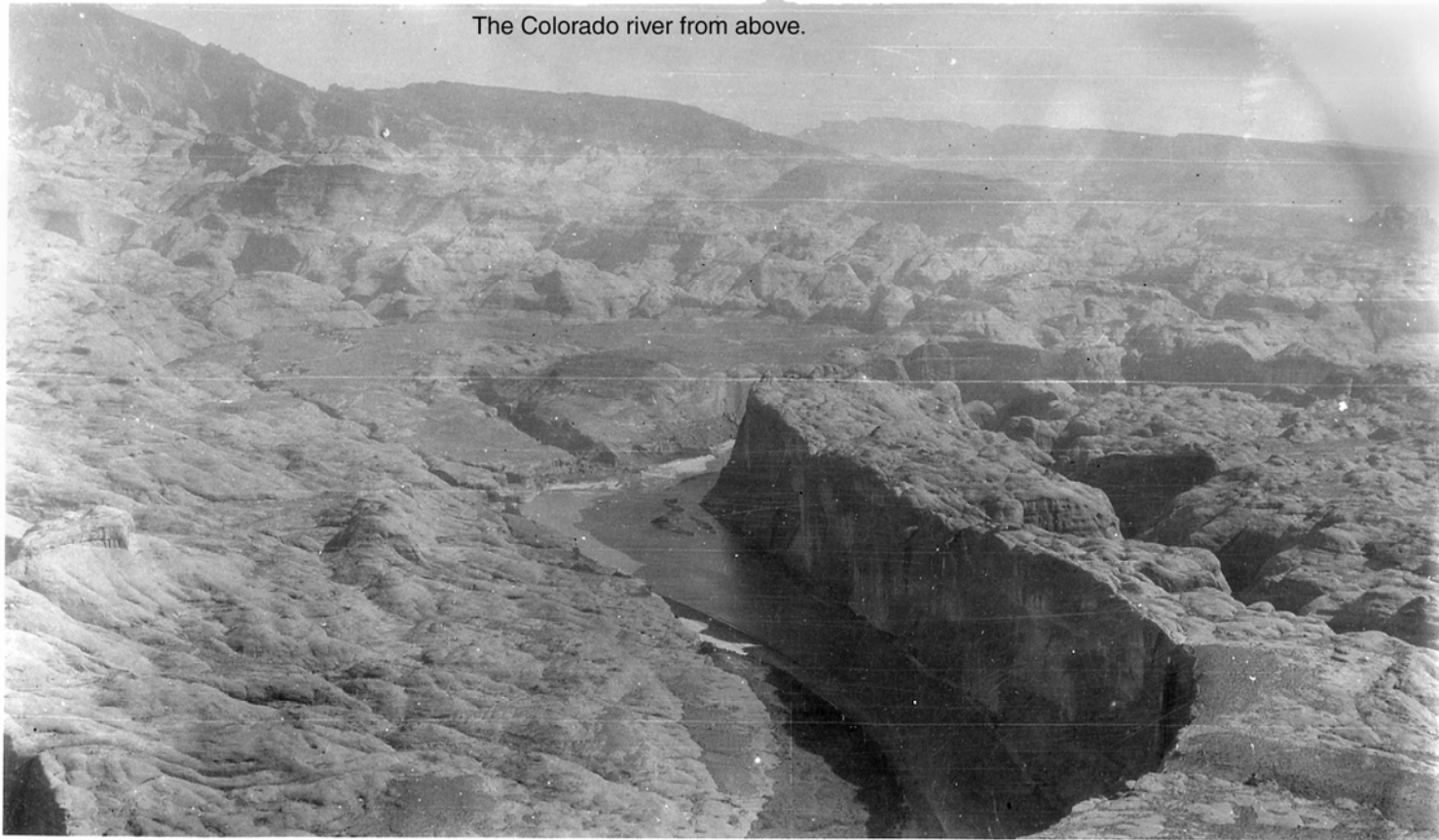
Figure 2.



# Oak Cave



# “The Colorado River from above”



## Glen Canyon Summary, Briefly

- Glen Canyon, like Grand Canyon, also shows evidence of Holocene deposition and very recent incision, at the mouths of Oak Creek and the San Juan River.
- Other photographs of James J. Hanks taken in Glen Canyon during the summers of 1927 and 1928 may provide additional evidence of Holocene deposition and very recent incision (*e.g.*, at the mouth of Bridge Creek).