ABSTRACT

TITLE:	The Effects of Lake Powell on Sediment Aggradation in the Lower Reaches of the San Juan
AUTHOR(S):	Gianniny, Dr. Gary L.; Dott, Dr. Cynthia E.; Hartle, Logan
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ABSTRACT: This study focuses on the Lower San Juan River in Southeastern Utah between Government Rapid at river mile (RM) 63.9, to Clay Hills at RM 83.5 (river miles after Whitis and Martin, 2009). Here we document the on-lapping layers of sediment that have been aggrading upstream from Lake Powell since the drop of the reservoir and the effects on stream morphology. The decrease in stream gradient in this reach has apparently induced a self-reinforcing feedback that slows current and increases sediment storage in the river channel. Repeat photography that contrasts pre-dam photographs from Miser (1921) and other sources was conducted at 11 locations. In the most upstream reach studied, from Government Rapid to the mouth of Slickhorn Canyon (RM 63.9 to 66.5) repeat photography at four locations (RM 63.9,64.4,64.41,and 66.5) indicates no vertical change from aggradation has occurred. The rapid which existed at the mouth of Slickhorn canyon is now gone, but repeat photographs show that there has not been aggradation outside the previous channel. Directly downstream of Slickhorn Canyon, there is a noticeable change in stream bank material and vegetation, along with an addition of sandbars located within the river channel. Along with these changes, the elevation of the water surface and sandbars at low flows (550-800cfs) are significantly higher than surveyed channel elevations from Miser (1921). Two miles below Slickhorn at Grand Gulch (RM70.5) the channel is now 24 ft. above 1921 and 1955 levels. Below Grand Gulch the thickness of post dam sediment increases to a maximum thickness of 80 ft. by RM 82, with location (RM) and thickness in feet as follows: RM70.5 +26.5', RM71.9+38.4', RM76+57.5', RM76.5+56.1',RM76.9+55.1,RM78.5+60', and RM82+80'. These new data combined with previous surveys (Miser, 1921 and the 1986 Lake Powell Sediment Survey) delineate the thickness of the sediment wedge. The resultant lower stream gradients are correlated with a shift in stream bank vegetation types from willow-dominated (Salix exiqua) to seep-willow and reedgrass-dominated (Baccharis salicina and Phragmites australis). This documented case of sediment aggradation has implications for the hydrology, stream morphology, aquatic and riparian ecology of river systems that are upstream of reservoirs.