

Sandbar and Campsite Monitoring in Grand Canyon National Park

Sandbar Monitoring



We measure the sandbars with total station survey equipment, take pictures, and sometimes dig pits to collect stratigraphic information from the sand deposits. A total station is an optical instrument that acquires one data point at a time by firing a laser beam to reflect off of a glass prism mounted on top of an adjustable height survey rod. If you encounter us on your trip, you will see instrument operators at tripod-mounted survey benchmarks (typically across the river from a study site) and several crews running around on the sandbars. The goal of each total station survey is to make a digital topographic map of the sandbar above the elevation reached by flows of $8,000 \text{ ft}^3/\text{s}$, measure the campsite area of

the site, and locate the positions of sampling locations.

Importance of Sandbar Monitoring

Because Glen Canyon Dam traps all of the upstream sediment supply, the amount of sand supplied to Grand Canyon National Park has been reduced by about 94%. The Paria River, a tributary to the Colorado River downstream from the dam, is now the single most important supplier of sand to the Colorado River within the Park. This large reduction in sand supply has resulted in substantial decrease in the number and size of sandbars. Sandbars are important because they serve as campsites for river runner and hikers, provide important aquatic and riparian habitats, and are the source of sand that may help protect archeological sites.



Between 1963 and 1965, the period immediately following completion of Glen Canyon Dam, USGS stream gaging and sediment transport measurements indicate that operation of the dam resulted in the erosion of about 16 million metric tons of sand from the bed and sandbars of the Colorado River between Lees Ferry and Phantom Ranch. For perspective, this amount of eroded sand is equivalent to the volume of a 100-story building covering the area of six football fields. Operation of the dam since 1965 has resulted in continued, but slower erosion of sand from the Colorado River.

Recent research suggests that changing dam operations to a pattern of sustained lower dam releases and short-duration artificial floods (after new sand is supplied from the Paria River and other downstream tributaries) may help rebuild and maintain the sandbars that have eroded during the almost 50 years of operations of Glen Canyon Dam.

The information collected by this project will be used to determine whether dam operations, including short-duration artificial floods, result in the increase, loss, or conservation of sand bars and campsite area in Grand Canyon National Park. This effort is funded by hydropower revenues provided by the Bureau of Reclamation as part of the Glen Canyon Dam Adaptive Management program. More information can be found on the GCMRC web site sediment and geomorphology page:

http://www.gcmrc.gov/research_areas/sediment_geomorphology/sediment_geomorphology_default.aspx

Our Science and Your Visit



Where are you camping? Like most boaters, chances are that you will be camping on a sandbar. The goal of the U.S. Geological Survey/Northern Arizona University project is to monitor trends in sandbar size and campsite area. In order to do this, scientists survey the sandbar size (volume and area) and campsite area at 45 sandbars located throughout Grand Canyon. This October, crews will be conducting surveys at established monitoring sites, most of which are also campsites. Sometimes, the scientists must camp at the monitoring sites in order to complete their work. If the trip is occupying a camp you need to use, please stop and we can figure out the local camping logistics. You are also welcome to co-camp with the science trip. Anywhere along the river that you encounter this or any other USGS trip, we encourage you to stop by and ask questions about the work that they are doing and

about the USGS sediment and sandbar monitoring program in Grand Canyon National Park.

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