Adopt A Beach:
Long Term Monitoring of Camping Beaches in Grand Canyon

Summary of Results for Years 1996 – 2002

The Adopt-a-Beach (AAB) program has completed its seventh year as a study that monitors annual camping beaches in Grand Canyon. This program, sponsored by Grand Canyon River Guides, Inc., is implemented by a 100% volunteer force of river guides, scientists, and NPS personnel. Results are submitted to various agencies such as the Cultural Resources Program of the Grand Canyon Monitoring and Research Center (GCMRC). Results are also presented to the Adaptive Management Program so that private and commercial recreational interests are represented as stakeholders in Colorado River management as reported to the Secretary of the Interior.

Adopt-a-Beach is a program of repeat photography that documents the changing conditions of a selected set of Grand Canyon camping beaches from April through October of each year. The selected beaches lie within five critical reaches of the river corridor. A critical reach is defined as an extended area in which camping beaches are sparse, small, and/or in high demand. The program assesses visible areal change to beaches resulting from changing regulated-flow regimes, rainfall, wind, and human impacts. Volunteers for this program are unique in that they run the Colorado River many times in one season, and they are able to provide sets of repeat photographs for each study beach. To date, guides have produced over 1,000 repeat photographs and associated field sheets having recorded the sequential condition of beaches throughout the commercial boating season, year after year. Research results include: 1) total cumulative change to beaches after a summer season and the processes that affect change, 2) change to beaches after a winter season, 3) longevity of the 1996 beach/habitat building flow (BHBF) deposits, 4) change in campsite quality throughout the summer season, and 5) areal change to beaches following any experimental flow.

The most recent high flow experiment of 30,000 cfs, was conducted during fall of 2000. To date, this deposit is either very narrow and thin, or no longer exists on campsite beaches. The primary cause of erosion, reported by guides for river season 2002, was the moderately high fluctuating flows of 10,000-18,000 cfs throughout July and August.

The most significant event recorded by guides was the small beach-building event caused by the Little Colorado River (LCR) flood in early September 2002. Morphological changes resulted in new low-elevation benches (around the 20,000 cfs zone) and sand bars that covered pre-existing gravel-and-boulder bars. The combined mainstem with LCR flood peaked at about 22,000 cfs. The resulting beachfront deposits suggest that a coordinated mainstem spike with an LCR flood can be very effective in building beaches or low-elevation bars.

The longevity of the BHBF deposit since 1996 shows varying results. As of fall 1999, 59% of camps had returned to their pre-BHBF condition (O'Brien and others 2000). Results of the 2000 HMF flows showed that 78% of beaches were again larger than their pre-BHBF condition, within the 20,000 to 30,000 cfs zone. Then by September 2001, 45% of the adopted beaches had returned to conditions similar to that before the BHBF. Campsite areas within the 30,000 and 45,000 cfs zone have continued to decrease overall throughout the years. At least 30% of beaches have apparently developed quasi-stable deposits within this zone, as they show no to very little change.

The Low Steady Summer Flows (LSSF) of year 2000 provided more diverse camping, both upstream and downstream of campsites within the study set, and within the campsite itself, according to guide response for 31 beaches. The combination of the HMF followed by the LSSF proved beneficial to 78% of all studied beaches.

These results contrast with those of the 1999 river season, during which a high percentage of beaches lost area due to flash floods, and a small percentage were affected by fluctuating flows. Before 1999, beaches had been eroding at a decreasing rate, mostly from fluctuating flows, as reported by guides and supported by visual cutbank retreat in photographs (O'Brien and others 2000). Typically, rapid adjustment of newly aggraded beaches to fluctuating flows following a high release leads to initial high rates of erosion. These rates then fall off over time (Hazel and others 2001). According to many guide remarks, campsite beaches were "primed and ready" for the HMF and LSSF regime of 2000. Then by September 2001, guides reported that camping had become harder on about 50% of the beaches. This loss of campsite quality directly relates to beach erosion. Other reported influences include tamarisk encroachment.

These results suggest that any newly deposited sand will be quickly eroded if subsequent high fluctuating flows are released from Glen Canyon Dam. This was evidenced by 3 events: 1) High steady flows (of about 27,000 cfs) following the 1996 BHBF eroded much of the new deposit at all beach sites through the summer of 1996 and 1997; 2) High fluctuating flows following the fall HMF of 1997 stripped away the new deposit entirely by spring 1998; and 3) Medium fluctuating flows following the fall HMF of 2000 eroded most of the new deposit by spring 2001. To date, at least 30% of beaches still show evidence of high-elevation sand (above 30,000 cfs line) deposited by the 1996 BHBF. However, the amount of sand appears to be diminishing from year to year. Annual implementation of HMFs in spring and in fall would help preserve this deposit by maintaining the beachfront. A regimen of Beach Habitat Building Flows followed by low fluctuating flows is needed periodically to rebuild campsite areas above the 30,000 cfs line. However, future BHBFs need to have enough sediment in the system so as to preserve Marble Canyon beaches and lessen impacts on lower beach areas (below the 20,000 cfs line) systemwide.

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