Long Term Monitoring of Camping Beaches In Grand Canyon

Summary of Results for 2008 with Comparisons to Pre 1996 Beach Habitat Building Flow and Post 2004 High Experimental Flow Beaches

Annual Report of Repeat Photography
By Grand Canyon River Guides, Inc.[1]
(Adopt-A-Beach Program)

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

Executive Summary of Results for Year 2008

Introduction and Methods

The Adopt-A-Beach (AAB) program has now completed its thirteenth year as a study that monitors camping beaches along the Colorado River in Grand Canyon. This program, sponsored by Grand Canyon River Guides, Inc., is implemented by a 100% volunteer group 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.

Methods implement repeat photography and observational comments that document a selected set of camping beaches in Grand Canyon. Data collection is usually conducted from April through October of the year, though data has been gathered in January and through December in some years. The selected beaches are categorized as belonging within one of four different critical reaches within the river corridor (Marble Canyon, the Upper Granite Gorge, the Muav Gorge and the Lower Granite Gorge). 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 photographs and first-hand, objective comments pertaining to changes to beaches, as influenced by regulated flow regimes, rainfall, wind, vegetation and human impacts. Volunteers for this program are unique in that many run the Colorado River more than once in one season, and are able to provide sets of repeat photographs and on-the-spot comments for each study beach. To date, river runners have produced more than 2300 repeat photographs and associated field sheets recording the sequential condition of beaches. Research results include reporting positive and negative or that no changes were found in beaches; longevity of the Beach Habitat/Building Flows (BHBF) and High Experimental Flow (HEF) deposits; and primary and secondary processes that cause change in camping beach area and quality.

Results and General Conclusions

Results of this study show that beaches, when compared to the Pre-1996 BHBF beaches, responded favorably to the 2008 BHBF. As of the end of 2008, 8 of 24 (33%) of the beaches reviewed were classified as being degraded compared to the same beaches examined from 1996. While 5 of 24 (21%) are reported as unchanged, 11 of 24 (46%) are currently considered more desirable in camp utility. The 46% reported as being in a condition preferable to the 1996 beaches is an increase over the past four years of analysis. Most importantly, this is the first time in at least the last four years that the BETTER rating has exceeded the WORSE classification (Thompson and Pollock, 2006, Lauck, 2007 and 2008).

The factor sited as being the primary contributor of long-term erosion is fluctuating flows that contain low sediment concentrations. This is especially evident for a period immediately following a BHBF or HEF event. This is followed by a decreased magnitude of change that reflects two geomorphic processes:1) the increased stability of beach fronts as they attain an angle of repose, and 2) decreased amounts of sediment that can be eroded from beaches (Thompson, 2004, Lauck, 2008). The angle of repose is achieved as the beach recedes to a point static with the erosive force of the water. This recession is directly related to the amount of river

flow and the geography of the surrounding canyon near an individual beach. While this remains true, beach front scour during the 2008 BHBF can be attributed as an important acerbating factor for perhaps three of the beaches considered as degraded since 1996.

Independent of low sediment concentration flows is the loss of camp area at a beach through the action of rain created gullies or flashfloods. Severe impact by rainfall funneled onto a beach by tributaries or the surrounding rock walls is recorded in at least 2 instances during 2008, and has been the second most often cited cause of erosion in the three previous years of study (Thompson and Pollock, 2006, Lauck, 2007). Unlike the decrease in magnitude of erosion from fluctuating flows, flash events are less predictable in their frequency and vary considerably in their effects. Any single event can prove devastating to a beach, as happened at Olo, RM 146.1L in 2008 and previously, and the erosion effects appear to be accumulative, as was experienced at Matkat Hotel, RM 148.9L in 2006, 2007 and 2008.

Vegetation encroachment is often a less dramatic and a less frequent factor in beach change, though reduced camp area and camp desirability due to vegetation, particularly arrowweed and camelthorn, are commented on by adopters. However, camp area lost to vegetation spread through 2008 was readily evident, particularly on beach deposition specifically related to the BHBF.

Changes in beaches due to eolian action is another of the lesser emphasized contributors to beach adjustment. Though not cited as a cause for change in beach classification during this study, sand removal and repositioning on beaches by wind was discernable. Dune buildup was noted with concern by volunteers on two beaches. Human impacts, specifically urine and trash found, were also more pronounced as secondary factors in comments from volunteers this year.

For the year 2008 specifically, the March BHBF resulted in beach improvement on 28 of 41 (68%) beaches examined, 5 (12%) showed no significant change, and 8 (20%) were reported as degraded compared to late 2007. Of the 44 beaches included in the AAB archive, 34 were analyzed throughout the year 2008, with 2 (6%) improving, 17 (50%) were found to be relatively unchanged, and 15 (44%) degraded between the first and final photos of the year.

The data accumulated for 2008 emphasize the need for continued BHBF events whenever the sediment load available in the system allows, followed by low fluctuating flows. The flows that exceed power plant capacity are vital in replacing beach areas above the normal dam release flow line where sand has been removed by flash floods and wind, for restoring beach fronts eroded by river and wave action and to help mitigate the effects of vegetation encroachment and human impacts.

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