Long Term Monitoring of Camping Beaches In Grand Canyon

Summary of Results for the Year 2009 with Comparisons to Pre 2008 High Flow Experiment

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

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Adopt – A – Beach:

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Summary of Results for Year 2009

Introduction and Methods

The Adopt-A-Beach (AAB) program has now completed its fourteenth year as a long-term photo-matching 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, private river runners, scientists and NPS personnel. Results are submitted to various agencies such as the Socio-Cultural Program of the Grand Canyon Monitoring and Research Center (GCMRC) and Grand Canyon National Park. Results are also presented to the stakeholders of the Glen Canyon Dam Adaptive Management Program in order to effectively integrate observational data on the evolving recreational resource into management recommendations forwarded to the Secretary of the Interior.

The methods implemented are repeat photography and real time observational comments that document a selected set of camping beaches in Grand Canyon. Data collection is typically conducted from April through October of the year, though data has been gathered as early as January and as late as December in some years. The beaches monitored were not selected randomly, but rather 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 observations pertaining to changes of beaches, as influenced by regulated flow regimes, rainfall, wind, vegetation and human impacts. Research results include beach criteria categorizations of positive, negative or no change; an analysis of the longevity of the Beach Habitat/Building Flows (BHBF) and High Flow Experiment (HFE) deposits; and an examination of the primary and secondary processes that cause change in camping beach area and quality.

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 beach in the dataset. To date, river runners have produced more than 2500 repeat photographs and associated field sheets recording the sequential condition of beaches. These images categorized by beach and year (1996 – 2009) are now part of the extensive *Adopt-A-Beach Photo Gallery*, accessible to researchers and the general public through a link on the AAB page of Grand Canyon River Guides' website: http://www.gcrg.org/advocacy_aab.php.

Additionally, Cooperative Agreement #08WRAG0048, Mod #002 from the United States Geological Survey, integrates the Adopt-a-Beach program data and repeat photographs into the comprehensive GIS Campsite Atlas that is currently being developed by Grand Canyon Monitoring and Research Center in cooperation with Grand Canyon National Park. The integration of events, images and data from other sources such as Adopt-a-Beach contributes to the greater understanding of the recreational resource as a whole while maximizing efficiency through information sharing.

We extend our appreciation to our funders for their support: the above referenced cooperative agreement with Grand Canyon Monitoring & Research Center as well as support from the Grand Canyon Conservation Fund, a non-profit grant-making program established and managed by the Grand Canyon river outfitters.

Results and General Conclusions

For the year 2009, 36 beaches had an adequate span of photos to assess the beginning to ending of the season. Twenty-three of the beaches (64 %) reviewed were classified as being relatively unchanged through the year. While 2 of the beaches (6 %) are reported as having improved, 11, or 31 %, are considered as having degraded in camping desirability by late 2009.

The factor sited as being the primary contributor of degradation is erosion created by fluctuating flows that contain low sediment concentrations. This was particularly evident following the early July jump in dam release and subsequent increase in the mean of the daily fluctuation. Increased vegetation and aeolian effects were noted as secondary factors, and were minor in comparison. 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. Most wind action involved sand buildup in the back and upslope of the camping areas.

One of the predominant factors in beach degradation for the past few years has been the creation of gullies or significant sand removal in the camp area due to rainfall (Thompson and Pollock, 2006, Lauck, 2008). This was not observed, nor reported in the comments this year.

Of the 2 beaches that appeared improved, one was due to a softening of the slope at the parking area, possibly from human induced 'creep' of the sand when moving up and down to the boats. The second was classified as BETTER because of an increase in sand covering rocks in the parking area, as reported on one of the comment sheets.

Some wind reworking of sand and vegetation growth were noted on almost all of the remaining beaches, but not in an amount considered to warrant a classification other than SAME.

Early comparison of the beaches in 2009 to late season photos acquired in 2008 was possible for 27 of the study sites. Over-winter changes were found at 6 of the beaches, with 2 having improved and 4 classified as WORSE.

The 2 BETTER beaches (7 %) had a marked softening in the front slope of the beach, while the 4 WORSE camps (15 %) exhibited increases in cutbank formation. One of these camps also had an increase in rock exposure in camp. As this was found above the maximum flow line, it is assumed to be the result of wind scour. Twenty-one beaches (78 %) displayed little or no change.

To help ascertain the long term effects of the March 2008 HFE, a comparison of the photos acquired in late season 2009 with the same beaches as photographed in late season 2007 was also conducted. A total of 38 sites qualified for this comparison, with almost all time spans between photos being 23 or 24 months. The typical photo dates were mid-to-late September of each year.

Of these 38, a total of 9, or (24 %), were considered as less desirable than the same camp in late 2007. Of these, 3 were previously evaluated as having been degraded from the effects of the March 2008 HFE, and vegetation increase and beach erosion from river fluctuations were equal in importance as factors. Thirteen of the beaches (34 %) were classified as being fairly similar to the same camp two years earlier, and 16 (42 %) were rated as having improved when compared to their pre-HFE photos. Most improvements noted were increased camp area and fewer rocks exposed at the boat landing spots.

The data accumulated for 2008 - 2009 emphasize the need for continued BHBF and HFE 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.

For questions or comments please contact Paul Lauck or Lynn Hamilton at Grand Canyon River Guides, Inc., Flagstaff, Arizona (928) 773-1075.