

**Discussion Points for a Sediment-Triggered BHBF Test in WY07,
New Information and Need for Reconsideration and Recommendation to the
Secretary of the Interior**

11/30/07

FINAL

Proposed AMWG motion for Dec. 5-6 meeting:

AMWG recommends that the Secretary of the Interior implement an experimental BHBF in the timeframe from mid-January 2007 to March 2007 in accordance with a science plan that will be developed by GCMRC, approved by the TWG, and funded from the experimental fund.

I. Science issues

- The Sediment PEP III panel recently recommended unanimously for the AMP to actively move forward at the next opportunity to implement a short duration, sediment-triggered experimental BHBF.
- Long-term sustainability of sediment resources in Grand Canyon depends upon utilizing BHBFs to redistribute tributary-derived sediments from the channel to channel margin sand bars.
- The sediment trigger from the Paria River was reached on Oct. 6, 2006, with concurrent activity from the LCR. GCMRC scientists estimate that sediment inputs exceed the trigger by at least 540,000 metric tons.
- Compared to the sand status leading to the November 2004 flood, there is now almost 2 times that amount in upper Marble Canyon, and about 3 times that amount in upper Grand Canyon.
- The magnitude of the recent sediment deposits from the Paria, LCR, and lesser tributaries occurs only once in every 5-10 years -- truly a rare opportunity for experimentation and the maximization of resource benefits.
- The Nov. 04 BHBF test resulted in a net positive sand flux throughout the Colorado River ecosystem (CRE) with consistent sand bar restoration in upper Marble Canyon. We now have an opportunity to determine whether another sand-enriched BHBF will result in cumulative sand bar restoration beyond benefits observed in 2004 condition.
- The next experimental BHBF under enriched sand supply conditions is a key step in addressing the most important science question identified by sediment scientists and managers at the 2005 Knowledge Assessment Workshop: Is there a "flow-only" operation that will restore and maintain sandbar habitats over decadal timescales?
- Sediment Scientists also recommend that we test ROD/MLFF flows as a way of "conditioning" or longitudinally distributing the new sediment inputs more evenly

downstream, in contrast to the previous experiment which required steady flows before the BHBF. The strategy for this element of the experiment is to determine whether such conditioning operations might result in a more uniform sand bar restoration response.

- Sand bars built by the 2004 BHBF test were exposed to experimental fluctuating flows in Jan. – Mar. 2005. Another BHBF test during 2007, followed by MLFF fluctuations would allow scientists to compare the 2005 bar response to sand bar responses under ROD operations.

II. Resource benefits

Å. Native Fish

- Backwater native fish habitat: The strategic question of whether ROD dam operations can provide spawning/rearing habitat for endangered native fishes will be evaluated.
- Food base: The aquatic food base program, which was in development during the 2004 experimental BHBF, is in place to monitor and assess the effects of BHBFs on the aquatic food base throughout the CRE. Observations by fishing guides in the Glen Canyon reach are that BHBFs scour the aquatic food base and deprive the rainbow trout population of nutrition. Other studies have shown that the aquatic vegetation is quickly regenerated following scour by BHBFs. A 2007 BHBF test may provide the opportunity to scientifically assess these observations and hypothesis.
- Disturbance event: Native fish in Grand Canyon evolved in a system where disturbance events were common. BHBFs are the primary disturbance events in the post-dam era.

B. River Recreation

- Monitoring results show that total campsite area decreased by an average of 15% each year between 1998 and 2003. These studies have also shown that the only times when either the number or size of campsites has increased was following the high flow events in 1983, 1996 and 2004, with positive benefits lasting only 2-3 years. In fact, during the post-dam era, ALL of the monitoring conducted from 1973 to 2005 (10 separate studies) show a similar pattern: a significant increase in either the number or area of campsite following a high flow event, with significant decreases in either the number or area of campsites in years without high flow events.
- Restore the eroded conditions of recreational camping beaches, especially in the five critical narrow reaches: Glen Canyon, Upper Marble Canyon, Upper Granite Gorge, Muav Gorge, and Lower Granite Gorge. “Conditioning flows” prior to a proposed BHBF experiment in 2007 may better distribute sediment throughout the entire system, improving on the '04 BHBF test response.
- Reworking of aggraded debris fans. In 1996, the first experimental BHBF was proven to clean out the recent build-up of rocks in debris flows and rapids. This may help restore

the channel to safer, more navigable conditions during lower water dam releases.

- Provide more camping space on beaches for the increased public visitation anticipated under the new Colorado River Management Plan rules.
- Restore the safety and quality of access to the shorelines for boat mooring, loading/unloading of boats, side canyon hiking, camping, lunching, and fishing.

C. Archaeological Sites and Cultural Concerns

- Rebuild sand bars above the fluctuating zone as a sand resource for wind-transport into archaeological sites.
- A BHBF test in the January - March period in 2007 has significant potential for restoration of sediment cover to some archaeological sites, and this effect can be maximized by timing a flood in late winter or early spring, just prior to the April-June period when wind transport is greatest.
- Deposition of sand, silt, and nutrient refreshment in the terrestrial zone to benefit native plants and animals, many of which are Traditional Cultural Properties of the Native American tribes.
- Restore natural landscape features of sand bars endemic to native habitat in the CRE.
- Increasing the campable area of Grand Canyon beaches through a BHBF reduces the likelihood that campers will move up into the fragile, old highwater zone where a majority of archaeological sites are located.

III. Policy issues

- Sediment conservation is a primary goal of the GCDAMP Record of Decision, AMP Strategic Plan, and Strategic Science Plan, and is a top AMWG priority.
- Fine sediment is a foundational element of the Colorado River Ecosystem (CRE), a critical component of the interface between rock and life in the CRE and a common element for protection in the Grand Canyon Protection Act, “natural and cultural resources and visitor use”. Similarly, Beach Habitat Building Flows are integral to the protection of the natural geomorphic features of Grand Canyon as guaranteed by the National Park Service Organic Act of 1916.
- Due consideration must be given to fulfilling legal mandates for the protection and preservation of the humpback chub (Endangered Species Act), and cultural sites (National Historic Preservation Act of 1966 and related laws).
- The BHBF is the only known mechanism to test whether sand can be sustained in the

river ecosystem on a multi-year time scale.

- The BHBF is the only known mechanism by which sand can be deposited above the normal operation of the river. Solely maintaining sediment below the water surface does not fulfill the management goals for the overall ecosystem.
- The GCMRC Chief recommended to AMWG on their early Sept. phone conference to retain the option of doing an experimental BHBF in WY07.
- The sediment-triggered BHBF test is a common element of all Long Term Experimental Plan (LTEP) options. Conducting and studying the effects of another BHBF test prior to the implementation of a Long Term Experimental Plan can further refine our knowledge of frequency, sustainability, and other science questions, thereby ensuring a stronger and more sharply focused LTEP.
- The BHBF is a common element of the Glen Canyon Dam EIS alternatives and written into the ROD as a management action for conserving sediment in the ecosystem.
- NEPA compliance and FONSI have been previously completed for a sediment-triggered BHBF test, facilitating this process.
- The historic proportions of this sediment load are far better utilized for scientific advancement and resource benefit in Grand Canyon, rather than being transported down to Lake Mead and exacerbating its sedimentation.
- Adaptive management needs to be adaptive to changing conditions. The sediment storage conditions have changed and the program needs to adapt.
- High flows from Glen Canyon Dam are essential to maintaining desirable river resources in Grand Canyon.

IV. Budget issues

- There is currently sufficient money in the 2007 Experimental Fund to do the necessary research and monitoring around a 2007 BHBF experiment. Additional long-term monitoring, such as remotely sensed photography, scheduled for 2009, will provide ongoing information for evaluating such sediment tests.
- By determining the most effective BHBF methods now, future Beach Habitat Building Flows should be more cost efficient owing to increased knowledge and confidence in resource outcomes.
- Experimental flows provide a better, faster, and cheaper alternative than using a sediment pipeline to restore declining sand bars within the Colorado River Ecosystem.

References:

- 1) Letter from GCMRC Chief, John Hamill, to AMWG, Sept. 1, 2006.
- 2) Rubin, Topping and Wright, Oct. 19, 2006 memo to GCMRC, October, 2006.
- 3) Limbaugh memo to AMWG on LTEP, November 1, 2006.
- 4) Glen Canyon Dam EIS Record of Decision, 1996.
- 5) Grand Canyon Protection Act of 1992.
- 6) Adaptive Management Strategic Plan
- 7) Policy priorities of AMWG from their August, 2004 meeting.
- 8) Sediment fact sheet for the AMP Public Outreach Program.
- 9) Sediment PEP III panel final report, October 18, 2006.
- 10) Kaplinski and others, 2005; Kaplinski and others, in prep

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