TWG 11/4/97 Attachment 9

TWG DISCUSSION PAPER Barry Gold

POTENTIAL SPRING 1998 ADAPTIVE MANAGEMENT EXPERIMENTAL FLOW

INTRODUCTION

Colorado River basin runoff is anticipated to be at or above normal levels during Water Year 1998 (WY98). Both Lake Powell and Lake Mead are nearly full and a pronounced El Niño/Southern Oscillation pattern is developing that may result in high inflows to Lake Powell in WY98. The goal of adaptively managing the Colorado River is to use the best scientific information to plan and accomplish preservation and enhancement of Colorado River ecosystem resources; and to mitigate the undesirable impacts of Glen Canyon Dam (GCD) releases on those resources. Given the potential that releases from GCD above 25,000 cfs may be required in WY98, the Adaptive Management Work Group (AMWG) has asked the Grand Canyon Monitoring and Research Center (GCMRC) to work with them in initiating early planning efforts aimed at preparing for managing these flows. In response, GCMRC has developed information regarding an Adaptive Management Experimental Flow (AMEF) alternative for GCD releases in WY98.

PURPOSE

The AMEF presented below is intended to provide information for use by the AMWG in discussing and planning for a Spring 1998 AMEF. While in some sense, the impetus for developing the AMEF is to provide the AMWG with a plan for releases from GCD that might mitigate the negative impacts on sediment resources of high steady flows, the initiation of this planning process is intended to result in an AMEF that has the potential to benefit physical, biological, cultural, socio-economic and recreational resources of Glen Canyon Recreation Area and Grand Canyon National Park. Implementing such an experimental flow will allow the AMWG to test these hypotheses. Included in this document is a description of a likely WY98 hydrological scenario and a proposed iterative planning process and schedule.

BACKGROUND

Legal Framework. A provision for Beach/Habitat Building Flow (BHBF) was included in the preferred alternative of the Glen Canyon Dam Final Environmental Impact Statement (GCDEIS). As discussed in the GCDEIS (p. 40), the BHBF was intended to comprise releases in excess of powerplant capacity in low (8.23 maf) water years. The Record of Decision (ROD) on the GCDEIS signed by the Secretary of the Interior modified these conditions and established a framework for implementing BHBFs in high water years using releases in excess of powerplant capacity for dam safety purposes. Flows above the 25,000 cfs level established in the ROD can exist to avert emergency situations, anticipated spills[1], or to accommodate high forecasted inflows.

[1] A spill is defined as any dam release in excess of power plant capacity (33,200 cfs).

Water Year Scenarios. The Colorado River Basin is anticipated to be at or above normal levels during WY98, as both Lake Powell and Lake Mead are nearly full and a pronounced El Niño/Southern Oscillation pattern may increase streamflow runoff throughout the Colorado River basin. Based on correlations with past historical data for similar El Nino events, GCMRC believes there is an increased likelihood that WY98 will produce at or above normal runoff into an already full Lake Powell. Thus, the possibility exists that flows from GCD may exceed 25,000 cfs in 1998 and may include unplanned spills with flows of 45,000 cfs or higher.

Proposed Planning Process and Schedule. The AMWG may wish to implement the following planning process and schedule:

1. Develop "risk of spill" criteria (September-October 1997);

2. Draft a hydrograph for an adaptive management experimental flow (October - November 1997);

3. Refine the objectives of an AMEF (i.e. mitigate the negative effects of unplanned spills or high steady flows vs. An objective to enhance specific resources), evaluate the "draft hydrograph" for positive and negative resource effects, and revise the timing and shape of the draft hydrograph as appropriate (November - December 1997);

4. Determine compliance (environmental and cultural) requirements and initiate needed compliance activities (November 1997), and design 1998 releases to meet upstream storage needs and downstream obligations;

5. Evaluate forecast, winter snowpack development, and State-of-the-Colorado River Ecosystem Resources (December 1997 - February 1998);

6. Conduct an AMEF, if appropriate (January - April 1998);

Delete ~~7. Design subsequent 1998 releases to meet upstream storage needs and downstream obligations;~~

7 8. Continue to monitor the forecast and inflows to assess potential for an unplanned spill in the Spring/Summer (March - July 1998);

8 9. Assess the State-of-the- Colorado River Ecosystem Resources and WY 1999 (August - December 1998).

PLANNING SCENARIO

Description of Flow. In spring 1996, an experimental Beach/Habitat-building Flow (BHBF) from GCD was initially tested. The BHBF consisted of a controlled constant release from GCD of 45,000 cfs for seven days during late March and early April. This level of flow was achieved

through a combination of releases from the powerplant and bypass jet tubes. Neither of the two spillways at GCD were used during the BHBF.

The experimental flow being proposed will consist of 2-4 days of a constant 45,000 cfs flow. Unlike the 1996 BHBF no flows of 8,000 cfs are proposed to immediately precede or follow this 45,000 cfs experimental flow. In addition, it is proposed that the duration of the flow be determined based on real-time monitoring of sediment deposition and biological and cultural resources, and that the experimental flow be concluded at the point of maximum sediment deposition. The upramping will begin from the highest point in the existing daily powerplant release hydrograph at a proposed rate of 3,000 cfs/hr. The downramping will begin, once maximum sediment deposition has been achieved, at a proposed rate of 1,500 cfs/hr until flows rejoin the existing daily powerplant release hydrograph.

Adaptive Management Objectives. The 1996 BHBF was conducted as an experiment to study planned flooding as a management tool for restoration and preservation of Colorado River ecosystem resources. The primary goals of the 1996 BHBF were to learn about sediment transport under high flows and to mobilize and redeposit channel-stored sand as higher-elevation bars. Additional objectives included preservation of cultural resources, providing more natural flood-disturbance processes to riparian vegetation, rejuvenation of other important channel features such as backwater habitats, and flushing non-native fishes from critical areas in downstream reaches. Of the eight objectives generally listed in the GCDEIS, the BHBF achieved five that were mostly related to sediment transport and deposition.

1. This AMEF will provide scientific benefit by allowing researchers to test conclusions developed from the results of the 1996 BHBF regarding modes and rates of sediment deposition.

2. Based on the "State of the Colorado River ecosystem" report, and subject to the acceptance of the recommendations of the "Risk of Spill" workgroup, this AMEF is also being proposed as a management action that can be designed to benefit natural, cultural, socio-economic, and recreational resources.

3. This AMEF is being proposed, initially as a management action to mitigate against the negative effects of high steady releases or unplanned spills which could occur in WY98.

TIMING AND COMPLIANCE

Potential conflicts with the U.S. Fish and Wildlife Service Biological Opinion and National Park Service and Bureau of Reclamation cultural resource management needs may exist and should be addressed by the TWG and the AMWG. Of specific concerns are habitat and incidental take issues related to the endangered Kanab ambersnail, Humpback chub, and Southwestern willow flycatcher. In addition, the effect on other biological resources such as the Lees Ferry trout fishery, the aquatic food base, and riparian vegetation will need to be considered prior to making final decisions regarding the shape and timing of an AMEF. Compliance required under the

National Environmental Protection Act, the Endangered Species Act, and the Historic Preservation Act will need to be determined and initiated, as appropriate.

ISSUES

1. The Biological Opinion was a one time opinion for the spike flow in 1996 that had an element that required the establishment of a second population of Kanab ambersnail prior to any additional spikes being run. Section 7 consultation will need to occur.

2. It is assumed a flow of 2-4 days in the March-April time frame is within the EIS and the Operating Criteria; therefore further NEPA and cultural resource compliance would not be necessary.

3. The effects on other resources such as the Lees Ferry trout fishery will need to be considered (See Attached Matrix) prior to making final decisions regarding the timing of such a potential BHBF.

4. GCMRC estimates the cost to perform the proper research and monitoring could be as high as $1,000,000. This would be in addition to work planned in the current FY98 budget. Is the money available?

RECOMMENDATIONS

1) Initiate planning process for AMEF.

____ YES ____ NO

2) Initiate compliance activities.

____ YES ____ NO

3) Instruct GCMRC to initiate evaluation of the effects on resources of conducting an AMEF in different months.

____ YES ____ NO

4) Constrain design and evaluation of AMEF to flows less than or equal to 45,000 cfs.

____ YES ____ NO

5) Additional funds to be provided to GCMRC for monitoring and research activities regarding an AMEF.

____ YES ____ NO