

## FINDING OF NO SIGNIFICANT IMPACT

**Final Environmental Assessment for  
Experimental Releases from Glen Canyon Dam, Arizona, 2008 through 2012  
Colorado River Storage Project  
Coconino County, Arizona**

**United States Department of the Interior  
Bureau of Reclamation  
Upper Colorado Region  
Salt Lake City, Utah**

Recommended by:

  
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## **FINDING OF NO SIGNIFICANT IMPACT**

### **PROPOSED EXPERIMENTAL RELEASES FROM GLEN CANYON DAM**

The Department of the Interior, acting through the Bureau of Reclamation (Reclamation), is proposing a series of experimental releases of water from Glen Canyon Dam to help native fish, particularly the endangered humpback chub, and conserve fine sediment in the Colorado River corridor in Grand Canyon National Park.

The purpose of the proposed experimental releases from Glen Canyon Dam is to determine if prescribed releases can benefit resources located downstream of the dam in Glen, Marble, and Grand canyons, Glen Canyon National Recreation Area and Grand Canyon National Park, respectively, in accordance with applicable federal law, including the Grand Canyon Protection Act, while meeting the project purposes of the dam. Specifically, the purpose of the high flow test portion of the proposed action is to rebuild sandbars and beaches and rejuvenate backwaters – which may be important rearing habitat for native fish – during a period of enriched sediment storage conditions and to monitor changes over time. The purpose of the steady flow portion of the experiment is to potentially enhance the continuance of recent positive trends in the population of humpback chub and test the impact of fall steady flows on the endangered humpback chub and other aspects of the aquatic environment, particularly backwater environments.

This proposed action is needed because (1) much of the positive initial results of previous high flow tests have eroded, impacting recreational use and aquatic habitat; (2) previous tests were conducted under depleted and moderately enriched sediment conditions and there is a strong need to assess effects under current enriched sediment conditions; (3) the scientific information from the proposed high flow test will help inform the evaluation of long-term sustainability of the sediment resource; (4) there is a desire to enhance the current positive trends in the humpback chub population; and (5) there is a need to test whether recruitment of humpback chub can increase under fall steady flows. While recent population estimates show an improving humpback chub population, the experiment is designed to help scientists better understand the cause of this improvement and methods by which further improvement could occur.

The proposed action builds on decades of scientific monitoring and research conducted during the preparation of the 1995 Operation of Glen Canyon Dam Environmental Impact Statement and during subsequent efforts of the Glen Canyon Dam Adaptive Management Program (GCDAMP). Specific experiments conducted since formation of the GCDAMP in 1997 include steady flows, high flow tests, mechanical removal of predatory nonnative fish, nonnative fish suppression flows, and humpback chub and Kanab ambersnail translocation efforts. Experimentation was designed to assess relationships between dam operations and resources in and along the Colorado River in Glen Canyon National Recreation Area and Grand

Canyon National Park. Results from these scientific efforts helped inform the development of the proposed action.

## **Proposed Action**

The Proposed Action<sup>1</sup> consists of two major elements:

1. an experimental high flow test of approximately 41,500 cfs for a maximum duration of 60 hours beginning March 4, 2008; and
2. steady flows in September and October of each year, 2008 through 2012.

The March 2008 high flow test hydrograph would include the following elements:

- on March 4, 2008 at 2200 hours the modified low-fluctuating flows described in Reclamation (1995) would increase at a rate of 1,500 cfs/hour until powerplant capacity is reached;
- on March 5 once powerplant capacity is reached, each of the four bypass tubes would be opened, where once every three hours bypass releases would be increased by 1,875 cfs until all bypass tubes are operating at full capacity for a total bypass release of 15,000 cfs;
- an essentially constant flow of 41,500 cfs would be maintained for 60 hours;
- discharge would then be decreased at a down-ramp rate of 1,500 cfs/hour until the normal powerplant releases scheduled for March have been reached.

Conservation of fine sediment is a key objective for both the Department of the Interior and the GCDAMP. Determining the long-term sustainability of the sediment resource is a critical objective of the proposed action. Significant progress has been made in understanding sediment transport processes over the last decade, particularly as a result of high flow tests, but the long-term sustainability question cannot yet be answered. The proposed action is an essential step in that effort. This portion of the proposal is similar to high flow tests conducted in 1996 and 2004, but is unique in proposing a high flow test during enriched sediment conditions, to be followed by modified low fluctuating flow operations during a low annual release year.

Steady flow releases during September and October of 2008 through 2012 would include the following constraints:

- typical monthly dam release volumes would be maintained in all water years except 2008, where reallocation of water would occur due to the high flow test in March;
- dam releases for September and October would be steady<sup>2</sup> with a release rate

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<sup>1</sup> The proposed action described in and approved by this Finding of No Significant Impact is the proposed action submitted to the US Fish and Wildlife Service in Reclamation's December 21, 2007 Biological Assessment.

<sup>2</sup> Regulation release capacity of  $\pm 1,200$  cfs within each hour will be available if needed for hydropower system regulation during the fall steady flow periods. Each hourly average release is expected to be very close to the steady flow target for the day. Also, spinning reserves will be available if needed for emergency response purposes.

determined to yield the appropriate monthly release volumes;

- if possible, dam operations would be managed so September and October releases would be similar (Table 3), but September releases may be structured to provide a transition between August and October monthly volumes.

The proposed action relies on the best and most recent scientific information regarding the status and population trend of the humpback chub. This includes recognition that recent improvement in the humpback chub population began between 1994 and 1999 - before any of the recent suite of specific actions to benefit the species were undertaken - and that significantly greater numbers of young humpback chub have been found in the mainstem Colorado River during 2002 through 2006, including above the Little Colorado River. These improvements were seen during implementation of modified low fluctuating flow as adopted in the 1996 Record of Decision. The positive response of the humpback chub and the risks associated with warming of fish habitats were primary factors in the FWS conclusion that a conservative approach was warranted. The FWS issued a final biological opinion on the proposed action in a February 27, 2008 Biological Opinion<sup>3</sup>.

In addition, the 2008 biological opinion uses an adaptive management approach to the implementation of steady flows and describes triggers which would lead to reinitiation of formal consultation under ESA, in the event that either a significant decline in the Grand Canyon population of humpback chub occurs or a single year population estimate of 3,500 fish or less was calculated. The purpose of reinitiating such consultation would be to evaluate and determine the cause of the decline and propose actions to reverse the decline. Potential actions could include expanding the months when steady flows would be released from the dam as well as other responses to scientific assessment of the causative factors.

During the public review process for this proposed action, a number of entities have advocated additional steady flows or high flows in the future or management actions. This proposed experiment neither mandates nor precludes future experimentation. Rather, this proposed experiment was developed consistent with the principles of adaptive management to require full scientific and public analysis of the effects of the experiment and integration of such results into future decision making.

## **Mitigation Measures**

The following measures have been agreed upon to remove or mitigate potentially negative effects of the proposed action.

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<sup>3</sup> Reclamation's proposed action consists of continued implementation of Modified Low Fluctuating Flows selected in the 1996 record of decision (Interior 1996) with the added elements of identified experimental dam operations for the five-year experimental period (the remainder of water year 2008 through 2012). Accordingly, the FWS issued a biological opinion on the proposed action on February 27, 2008 which "...replaces the 1995 final biological opinion on the operation of Glen Canyon Dam (FWS 1995; Consultation No. 2-21-93-F-167)." The FWS further noted in its final biological opinion (FWS 2008) that "[a]t the end of the five year period of the proposed action, it is expected that Reclamation will reconsult with FWS" under the ESA.

The timing of the high flow test was established to minimize adverse impacts to recreation, tamarisk seedling dispersal, the aquatic foodbase, and the Kanab ambersnail.

Reclamation will, through the AMP, temporarily remove and safe-guard all Kanab ambersnails found in the zone that would be inundated during the high flow test, as well as approximately 15 percent of the Kanab ambersnail habitat that would be flooded by the experimental high flow test. The ambersnails would be released above the inundation zone, and habitat would be held locally above the level of inundation until the high flow test has ended (approximately 60 hours). Habitat will be replaced in a manner that will facilitate regrowth of vegetation. Subsequent monitoring of this conservation measure will be coordinated with the Grand Canyon Monitoring and Research Center (GCMRC).

Reclamation, US Fish and Wildlife Service (FWS), National Park Service (NPS), and Arizona Game and Fish Department (AGFD) will propose creation of an ad hoc group within the GCDAMP to facilitate discussion among angling guides, dependent local businesses, and the public, and consideration of updating the Lees Ferry Management Plan. With respect to the Lees Ferry Management Plan, the NPS and AGFD have primary authority and responsibility for this action, with the FWS and Reclamation participating in an advisory role. If this proposal was accepted by these agencies, workshops could be used to help develop the specific aspects of the management plan.

**Analysis Regarding Whether the Proposed Action Will Have a Significant Effect on the Human Environment**— As defined in 40 CFR § 1508.27, significance is determined by examining the following criteria:

- **Impacts that May Be Both Beneficial and Adverse**
- **Degree of Effect on Public Health or Safety**
- **Unique Characteristics of the Geographic Area of the Proposed Action**
- **Degree of Controversy for Effects of the Proposed Action**
- **Degree to which Effects of the Proposed Action are Highly Uncertain**
- **Degree to which the Proposed Action Sets a Precedent for Future Actions with Significant Effects or Represents a Decision in Principle about a Future Consideration**
- **Whether the Action is Related to other Actions with Individually Insignificant but Cumulatively Significant Impacts**
- **Degree to which the Action may Adversely Affect Historic Properties or Cause Loss or Destruction of Significant Cultural Resources**
- **Degree to which the Action may Adversely Affect Federally Listed Species or their Critical Habitat**
- **Whether the Action Threatens a Violation of Federal, State, or Local Environmental Protection Law**
- **Impairment of Park Resources or Values**

Each element is discussed as follows:

**Impacts that May Be Both Beneficial and Adverse**— As fully discussed in the environmental assessment, the proposed action will not affect NPS operations or employee and visitor health and safety. The proposed action could affect soils and biotic communities, Federally listed species and their critical habitats, recreational angling and boating, trout and other non-native fishes, tribal cultural resources and sacred sites, environmental justice, and hydropower generation. The long-term expected outcome of the proposed action is to benefit native fish, principally the endangered humpback chub, and to conserve fine sediment in the Colorado River and its riparian corridor. Negative effects, where they occur, are based on available information and predicted to be minor and temporary.

**Degree of Effect on Public Health or Safety**— The only potential effects on public health or safety could occur in conjunction with the effects of changes in dam releases on recreational angling and boating on the Colorado River, particularly due to the high flow test. All daily fluctuations, minimum flows, and maximum flows in the proposed action are within the range experienced by recreationists in the past. Furthermore, an incident command center has been established by the NPS. It will be used whenever necessary to further protect public health or safety of these individuals.

**Unique Characteristics of the Geographic Area of the Proposed Action** —The proposed action will occur within the confines of Glen Canyon National Recreation Area and Grand Canyon National Park. Sand beaches are an important feature and habitat within the Grand Canyon National Park and are expected to be benefited by the proposed action. A portion of the floodplain and some wetland plants will be inundated and likely scoured by the high experimental flows. The plant species affected by the high flow recolonize quickly, however, and the effect will only be temporary. No wild and scenic rivers will be affected by the proposed action. No Indian Trust Assets are found in the project area. Some effects on ecologically critical areas will occur during experimental flows, but the effects will be temporary in nature and the long-term effects are expected to be beneficial.

**Degree of Controversy for Effects of the Proposed Action**— Four aspects of the proposed action have generated public controversy. First, several Native American tribes consider the salt mines and the confluence of the LCR and Colorado River sacred, and are concerned about potential adverse impacts from the high flow test. This portion of the proposed action is designed to benefit the natural ecosystem in Grand Canyon and should result in positive benefits. The proposed high flow is well within historic flows, both pre-dam and post-dam. Second, the Hualapai Tribe is concerned with potential adverse economic impacts to their boating industry and structures as a result of the high flow test. The third area of controversy is over impacts to the food base, fishery, and fishing industry in the Lees Ferry reach due to the high flow test. Past tests have affected these resources to some degree, but impacts were generally minor and of short duration. A fourth area of controversy involves the potential temporary release of water at levels in excess of powerplant capacity and the reduction of

hydropower revenues. Reclamation believes that this limited component of the experiment is consistent with applicable provisions of federal law.

**Degree to which Effects of the Proposed Action are Highly Uncertain**—The proposed action is being carried out as part of the Glen Canyon Dam Adaptive Management Program to achieve goals of that program. It is being carried out as an experiment that will be monitored under the auspices of the Grand Canyon Monitoring and Research Center using a science plan developed specifically to assess this action. As an experiment, the proposed action operates on hypotheses constructed from the best available scientific information after years of study by scientific researchers in the Grand Canyon. As with all experiments, this action has some uncertainty in outcomes; however, the level of uncertainty, particularly given the feedback system to resource managers built into accompanying research and monitoring, does not rise to the level of highly uncertain, unique or unknown risks.

**Degree to which the Proposed Action Sets a Precedent for Future Actions with Significant Effects or Represents a Decision in Principle about a Future Consideration**—The GCDAMP operates under the principles of adaptive management in which lessons learned by doing, through scientific experiments, are built into present and future management decisions. The iterative approach taken in this process helps to ensure that changes in management direction are not so large as to have a significant adverse effect on the system and its resources. Neither does any single outcome represent a decision in principle about a future consideration because the outcome of each experiment is added to the knowledge gained in previous experiments in making prospective management decisions.

**Whether the Action is Related to other Actions with Individually Insignificant but Cumulatively Significant Impacts**—No non-Federal projects were identified as planned, in progress, or completed in the project area. No other GCDAMP actions are proposed at present, but may be considered in the future as part of either NPS, FWS, or AGFD management responsibilities or through recommendations to the Secretary of the Interior.

**Degree to which the Action may Adversely Affect Historic Properties or Cause Loss or Destruction of Significant Cultural Resources**—There will be no adverse effects to historic properties as a result of implementing the preferred alternative.

**Degree to which the Action may Adversely Affect Federally Listed Species or their Critical Habitat**— Four Federally listed species, three of which have designated critical habitat, occur in the proposed action area. Two of those species, the Kanab ambersnail and the humpback chub received “may affect, likely to adversely affect” determinations in the biological assessment due to potential take of individuals during the high flow test. Identified adverse effects on listed species or their critical habitat are short-term in nature, and long-term consequences of the proposed action are expected to be beneficial. Conservation measures have been identified for Kanab ambersnail and humpback chub to assist in the conservation of these

species and to reduce potential negative effects of the proposed action. The remaining impacts to listed species or their critical habitat are expected to be negligible to minor.

**Whether the Action Threatens a Violation of Federal, State, or Local Environmental Protection Law**— The proposed action violates no federal, state, or local environmental protection laws.

**Impairment of Park Resources or Values**— The proposed action is designed to enhance, rather than impair the resources and values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established. In fact, both elements of the proposed action were specifically designed to enhance such resources and values: to assist in the conservation of endangered native fish, and conserve fine sediment in the Colorado River corridor in Grand Canyon National Park. There will be no significant adverse effects to park values from the proposed action.

## **Decision**

The proposed action will not have a significant adverse effect on the human environment. The proposed action is designed to improve the conservation of sediment and humpback chub. Negative environmental impacts that could occur are negligible to moderate, and could be short to long term in effect. No significant unmitigated adverse impacts on public health, public safety, threatened or endangered species, historic properties, or other unique characteristics of the region have been identified as a result of analysis of the proposed action. No highly uncertain or controversial impacts, unique or unknown risks, significant cumulative effects, or elements of precedence were identified. Implementation of the proposed action will not violate any federal, state, or local environmental protection law.

Based on the Environmental Assessment, an analysis of all oral and written comments received on the EA, and the foregoing, a finding of no significant impact is justified for the proposed action. Therefore, an environmental impact statement is not necessary to further analyze the environmental effects of the proposed action.