

FINDING OF NO SIGNIFICANT IMPACT

PROPOSED EXPERIMENTAL RELEASES FROM GLEN CANYON DAM AND REMOVAL OF NON-NATIVE FISH

Three Department of the Interior agencies, the Bureau of Reclamation (Reclamation), National Park Service (NPS), and U.S. Geological Survey (USGS), are proposing a series of experimental releases of water from Glen Canyon Dam and mechanical removal of non-native fish to help protect native fish, particularly the endangered humpback chub (collectively "proposed action"). The dam releases are also designed to conserve fine sediment in the Colorado River corridor in Grand Canyon National Park. Reclamation has responsibility for the dam operations aspects of the proposed action, while the NPS and Grand Canyon Monitoring and Research Center (GCMRC: USGS) have responsibility for the mechanical removal.

The purpose of the proposed action is: (1) to contribute to the conservation of endangered native fish, especially the humpback chub, by reducing populations of non-native fish who compete with and prey on native fish in the Colorado River between Glen Canyon Dam and Lake Mead; (2) to conserve fine sediments that form sandbars, beaches, and habitat for young native fish by altering dam operations; and (3) to improve the Lees Ferry sport fishery by reducing the overabundance of trout. These proposals are within the constraints established by applicable federal statutes (commonly known as the "Law of the River") and other applicable legal obligations.

The need for the proposed action arises because: (1) the Grand Canyon population of endangered humpback chub has declined to levels that threaten its viability and future existence, and (2) fine sediment has been exported to such an extent that camping beaches and sandbars, including those that form native fish rearing habitat, continue to be washed downstream and lost. These changes have occurred during operation of Glen Canyon Dam under the 1996 Record of Decision (ROD) by the Secretary of the Interior. They suggest that the predictions of resource responses to dam operations in the 1995 environmental impact statement were, in some respects, incorrect. The proposed action would provide important information that will be used as additional operational and physical modifications are considered regarding future operation of Glen Canyon Dam.

The proposed action was deemed necessary by the Glen Canyon Dam Adaptive Management Program (GCDAMP), which is comprised of 25 member agencies, Native American tribes, and organizations, because endangered species and sandbars in the Grand Canyon have not responded as well as predicted to past management actions regarding the operation of Glen Canyon Dam. The proposed action is the product of years of scientific study and would implement the recommendation of an independent advisory committee, the Adaptive Management Work Group, that has been studying the natural and cultural resources of the Grand Canyon since 1997. It is multi-faceted and complex, and has been designed to protect both the endangered species and the important beach habitat found in the Grand Canyon.

PROPOSED ACTION

The Proposed Action consists of two major elements:

1. A set of hydrological scenarios and experimental dam releases that are triggered by minimum sediment inputs to the Colorado River from tributaries; and
2. Reduction of non-native fish populations, primarily rainbow and brown trout, through mechanical removal and experimental releases from Glen Canyon Dam.

Experimental Flows— Proposed dam operations include five types of releases, in addition to ROD operational flows, that would occur within four hydrological scenarios over a period of at least two water years. The five proposed release types are:

- 8,000 cfs steady flows,
- 6,500-9,000 cfs fluctuating flows,
- 5,000-20,000 cfs fluctuating non-native fish suppression flows¹,
- 31,000-33,000 cfs habitat maintenance flow, and
- 42,000-45,000 cfs high flows. The magnitude of these short-term releases would not exceed 45,000 cfs but they would vary below this level depending on Lake Powell elevation and generator availability.

The order in which the releases would occur depends on the amount of sediment inputs from the Paria River or ungaged tributaries in Glen Canyon and upper Marble Canyon. However, under the proposed action the fluctuating non-native fish suppression flows would occur independent of sediment availability.

The first release scenario is called the *autumn sediment input scenario*. It would occur if three conditions are met. First, if at least 500,000 metric tons of fine sediment enters the Colorado River from the Paria River and ungaged upper Marble Canyon tributaries between July 1 and October 31, then dam releases would change from current ROD operations to a series of alternating 2-week long steady 8,000 cfs releases and 2-week long 6,500-9,000 cfs fluctuating releases. If the minimum sediment input does not occur, dam releases would continue to follow the prescription of the ROD.

Second, if at least 1,000,000 metric tons of fine sediment enter Marble Canyon by October 31, the alternating steady and fluctuating releases would continue. If the minimum sediment input does not occur by that date, dam releases would follow the prescription of the ROD. By

¹ Maximum flow, upramp and downramp rates could be adjusted through the adaptive management and environmental compliance process during the second year of non-native suppression flows if the proposed action is not achieving the objectives of the experiment or is creating unanticipated adverse effects.

December 1, a comparison would be made of the effectiveness of sediment conservation by the 8,000 cfs steady releases and the 6,500-9,000 cfs low fluctuating releases. The action agencies within the Department of the Interior would decide which flow is most effective at sediment conservation and discontinue the less effective release.

Third, if at least 800,000 metric tons of sediment input are retained in the Colorado River between Glen Canyon Dam and the Little Colorado River by January 1 of the ensuing year, then a powerplant and jet tube total release between 42,000-45,000 cfs would occur in the first week of January in an effort to “bank” the conserved sediment at higher elevations within the Grand Canyon. This high flow would last for approximately 60 hours. Upramp rates for this release would be 4,000 cfs/hour for the first two hours, then 1,500 cfs/hour up to powerplant capacity, then opening one bypass tube in two steps over the course of six hours until reaching jet tube capacity. The downramp rate would be 1,500 cfs/hour from maximum releases (42,000-45,000 cfs) to 8,000 cfs and this would take about 22 hours to achieve. A steady release of 8,000 cfs would be continued for a period not to exceed 10 days during which time aerial photography and surveying would occur to document the effect of the high flow test on sediment conservation and other resources.

If the minimum sediment accumulation does not occur by January 1, dam releases would change to fluctuating non-native fish suppression releases between 5,000 cfs and 20,000 cfs with an upramp rate of 5,000 cfs/hour and a downramp rate of 2,500 cfs/hour. The fluctuating non-native fish suppression flows would continue from January through March unless a minimum sediment input of 800,000 metric tons is received.²

If the minimum tributary sediment input of 800,000 metric tons occurs in the months of January-March during fluctuating non-native fish suppression flows, the *winter sediment input scenario* would begin with the release of 42,000-45,000 cfs. This release would have the same features as the high flow test under the autumn sediment input scenario, including the succeeding period of 8,000 cfs steady releases for aerial photography and surveying. It would interrupt the non-native fish suppression flows, but they would be resumed through the end of March following the high flow test and ensuing steady releases.

The third hydrologic scenario is the *no sediment input scenario*. In this scenario, the minimum sediment inputs necessary to trigger the autumn sediment scenario or the winter sediment input scenario do not occur. Under these conditions ROD operations would continue until at least July 1 of that water year, except for the January to March period of fluctuating non-native fish suppression flows. Dam releases after July 1 would depend on tributary sediment inputs. If minimum tributary inputs occur and the first scenario has been completed, the fourth hydrological scenario would be initiated. If they do not occur, ROD operations would continue.

² These fluctuating non-native fish suppression flows were designed to mimic pre-1990 daily fluctuations and ramp rates. Pre-1990 flows limited natural recruitment of rainbow and brown trout. The proposed downramp rate of 2,500 cfs/hour was also selected to test the validity of the beach seepage model used to formulate the ROD downramp constraints.

The fourth hydrological scenario is the *habitat maintenance flow scenario*. This scenario would be implemented only under two conditions: (1) the autumn sediment input scenario must have been completed, and (2) a minimum tributary sediment input of 500,000 metric tons must occur between July 1-December 31.³ This scenario is similar to the winter sediment scenario in that a high flow would immediately follow the tributary input, but in this case the dam release would be limited to powerplant capacity, last two days, and have 4,000 cfs/hr upramp rates and 1,500 cfs/hr downramp rates.

Total flow, including tributary inputs and dam releases, during this scenario will be limited to 45,000 cfs. It is estimated that the Paria River flow necessary to provide the minimum sediment input would be approximately 2,500 cfs, though in rare events Paria River flows could be as high as 12,000 cfs. Thus, the combined powerplant capacity and tributary flow would be in the approximate range of 33,500 cfs (31,000 cfs dam release + 2,500 cfs tributary inflow) to 43,000 cfs (31,000 dam release + 12,000 cfs tributary flow). If the combined flows would exceed 45,000 cfs, then dam releases would be reduced to constrain total flow to 45,000 cfs or less. The close association in timing of the sediment input and the ensuing dam release would be facilitated through installation of additional gages on the Paria River to serve as an early warning system announcing the inflow.

The habitat maintenance flow would be followed by ROD operations with daily fluctuations until January 1 unless another minimum 500,000 metric ton input occurred, in which case the powerplant capacity releases would be repeated, followed again by ROD operations. On January 1, if there was a minimum sediment retention of 800,000 metric tons in the reach of the Colorado River between Glen Canyon Dam and the Little Colorado River, a high flow of 42,000-45,000 cfs would be released from the dam having the same features as that under the autumn sediment input scenario or winter sediment input scenario. If the minimum amount of sediment is not retained above the Little Colorado River, fluctuating non-native fish suppression releases would be initiated following the January 1 evaluation. These releases would continue until April 1 unless additional sediment was received by the Colorado River sufficient to bring the sediment retained up to the 800,000 metric ton minimum. This amount of additional sediment in the system would trigger a two-day 42,000-45,000 cfs high flow having the same features as in the winter sediment input scenario. Following this high flow, the non-native fish suppression flows fluctuating between 5,000-20,000 cfs would continue through March 31. Dam releases would then revert to those prescribed under ROD operations.

Although the proposal is focused on water years 2003 and 2004, it could take an indeterminate number of years to implement the sediment conservation portion of the proposed action due to the necessary sediment input triggering involved. To ensure that development of a program of experimental flows benefits the resources of concern, the Adaptive Management Work Group has directed GCMRC to report back at six-month intervals on relevant resource conditions.

³ If the minimum sediment input trigger does not occur during the first or ensuing years of proposed action operations, the autumn sediment input scenario would continue to receive the highest priority for completion in the following year.

Mechanical Removal of Non-Native Fish—A second key component of the proposed action is assisting native fish through mechanical removal of non-native fish. Non-native fish removal is targeted at reducing adult rainbow and brown trout and other non-native fish in the Colorado River near the confluence of the Little Colorado River. The area around the confluence of the Colorado and Little Colorado rivers has the highest abundance of adult and juvenile humpback chub in the Colorado River mainstem. To help the humpback chub in this reach, an area located approximately five miles upstream (RM 56.4) to four miles downstream (RM 65.8) from the confluence of the Little Colorado and Colorado rivers has been proposed as the “depletion reach.” The proposed depletion effort (i.e., the removal of non-native fish by electrofishing techniques) would be uniformly distributed within this 9.4 mile reach and repeated six times a year in the 2003-2004 water years.

Each year for two years, GCMRC is proposing to conduct three depletion trips from January to March and three depletion trips from July to September.⁴ During each 10-day field trip there would be five passes through the reach using four electrofishing boats that concurrently sample the river on opposing sides. Following each trip, the data would be used to construct abundance estimates for rainbow and brown trout present at the beginning of each trip. Comparisons among trip population estimates and trip catchability coefficients would be analyzed to evaluate if mechanical removal is an effective means to control undesirable fish species. Additionally, electrofishing and hoopnet collections would be used to measure juvenile humpback chub relative abundance and any potential adverse effects on adult humpback chub.

A fish anesthetic will be used to euthanize the non-native fish. The proposed disposal mechanism for non-native fish would be to transport the fish out of the Grand Canyon. In response to concerns expressed by Native American tribes, remains of the non-native fish will be used as fertilizer on gardens tended by tribal members.

MITIGATION MEASURES

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

No mechanical removal of non-native fish by electrofishing will occur within 50 feet of the point (line) of the confluence of the Little Colorado River and Colorado River.

Non-native fish euthanized during mechanical removal activities will be preserved and transported out of Grand Canyon to lands of the Hualapai tribe where they will be used as fertilizer in gardens maintained by the tribe for food.

⁴ The exact timing of these trips could be adjusted through the adaptive management process to minimize adverse effects to humpback chub. The effort would also yield information regarding abundance of young-of-year humpback chub and complement existing monitoring efforts.

Approximately 25% of the vegetation and Kanab ambersnails that could be washed downstream by the experimental high flow under the autumn sediment input scenario will instead be removed from the path of the flood and then replaced after the flood has passed.

A number of young-of-year humpback chub, not to exceed 300, that might otherwise be carried into the Colorado River and suffer a high rate of mortality will be translocated out of the lower Little Colorado River to the perennial reach above the series of travertine falls called Atomizer Falls. This reach does not contain the endangered fish, probably because the falls are too high, but research using caged humpback chub indicates that they can survive there.

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 environmental justice, National Park Service operations or employee and visitor health and safety. The proposed action will 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, wilderness resources, air quality, 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 predicted based on best available scientific information and are expected 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. All daily fluctuations, minimum flows, and maximum flows in the proposed action are within the range experienced by recreationists in the past. Furthermore, an advance warning system has now been developed by the action agencies. 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 and unique 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 and mechanical removal of non-native fish, 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 confluence of the LCR and Colorado River sacred, and they object to killing fish there. This concern has been mitigated by eliminating any electrofishing immediately around the confluence. Second, three Native American tribes expressed a concern over the large number of non-native fish that would be collected and euthanized without any recognized beneficial use. This controversy has been addressed through an agreement to place the remains of the dead fish in gardens tended by Native Americans to serve as a fertilizer substance. The third area of controversy is over the reduction of the Lees Ferry trout population through use of fluctuating flows. Some anglers and angling groups fear that the reduction will result in the degradation or demise of the fishery. Multiple meetings were held with concerned anglers and guides to identify that the proposed action is intended to reduce what is presently an overabundance of trout in the Lees Ferry reach. That overabundance is resulting in large numbers of small fish and a lack of large, trophy fish. There is no intent in the proposed action to harm the Lees Ferry trout fishery by this controlled reduction. Rather, it is hoped that the abundance of large trophy fish will increase. The monitoring and research program conducted by the GCMRC will be used to determine when the reduction has proceeded to a level that will allow for the continuation of a trout population sufficient to meet the management objectives of the GCDAMP and provide a healthy, blue ribbon fishery for the angling public. A fourth area of controversy involves the potential temporary release of water at levels in excess of powerplant

capacity. 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 GCDAMP to achieve goals of that program. It is being carried out as an experiment that will be monitored under the auspices of the GCMRC 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 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. Eight Federal projects, programs, or plans were identified in the environmental assessment. Many of these actions are complementary to the proposed action in achieving NPS and GCDAMP management objectives; only one was identified as having a minor negative effect on achieving management objectives for the GCDAMP.⁵ Adverse impacts of the proposed action would be a relatively minor component of the overall minor cumulative impacts.

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 proposed action. The electrofishing portion of the experiment is considered by some Native American tribes to have an adverse effect on tribal values; however, the effect will be mitigated by not electrofishing at the confluence of the Little Colorado River and Colorado River and by utilizing killed trout for a beneficial purpose.

⁵ The Colorado River Interim Surplus Criteria EIS identified a slight reduction in the frequency of Beach/Habitat Building Flows from Glen Canyon Dam as a result of implementing interim surplus criteria. Any impacts resulting from the adoption of Interim Surplus Criteria were considered when this proposed action was developed.

Degree to which the Action may Adversely Affect Federally Listed Species or their Critical Habitat— Six Federally listed species, three of which have designated critical habitat, occur in the proposed action area. Three of those species, the Kanab ambersnail, humpback chub, and bald eagle received “may affect, likely to adversely affect” determinations in the biological assessment. 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 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.

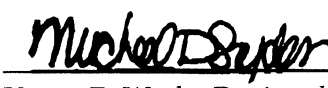
Impairment of Park Resources or Values— The proposed action is designed to enhance, rather than impair the resources and values for which Grand Canyon National Park and Glen Canyon National Recreation Area were established. There will be no significant adverse effects to park values from the proposed action.

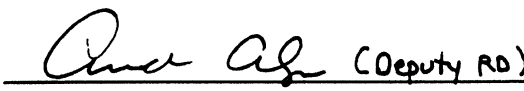
DECISION

The proposed action will not have a significant adverse effect on the human environment. The proposed action is designed to reverse negative trends in sediment retention and humpback chub abundance that were not predicted at the time of the adoption of the Glen Canyon Dam ROD in 1996. 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.

Approved:  12-6-02
for Rick L. Gold, Regional Director Date
Upper Colorado Region, Bureau of Reclamation

Approved:  12/6/02
Karen P. Wade, Regional Director Date
Intermountain Region, National Park Service

Approved:  (Deputy RD) 12/06/02
for John D. Buffington, Regional Director Date
Western Region, U.S. Geological Survey