

# RECLAMATION

*Managing Water in the West*

## **Finding of No Significant Impact for the Environmental Assessment for Non-native Fish Control Downstream from Glen Canyon Dam**



**U.S. Department of the Interior  
Bureau of Reclamation  
Upper Colorado Regional Office  
Salt Lake City, Utah**

**FINDING OF NO SIGNIFICANT IMPACT**

**Environmental Assessment for  
Non-Native Fish Control  
Downstream from Glen Canyon Dam  
Colorado River Storage Project  
Coconino County, Arizona**

**Approved:**

\_\_\_\_\_  
Responsible Official

\_\_\_\_\_  
Date

FONSI Number: \_\_\_\_\_

# FINDING OF NO SIGNIFICANT IMPACT

## Non-native Fish Control Downstream from Glen Canyon Dam

### Introduction

The Bureau of Reclamation (Reclamation), Upper Colorado Region, proposes to conduct scientific research, monitoring and specific actions through 2020 to control non-native fish in the Colorado River downstream from Glen Canyon Dam. The proposed action would be implemented through the Glen Canyon Dam Adaptive Management Program (GCDAMP) in an effort to help conserve native fish, particularly the humpback chub (*Gila cypha*), an endangered species listed under the Endangered Species Act (ESA), and improve its critical habitat by reducing the threat of predation and competition from non-native fish. The proposed action is tiered from two Reclamation EISs, the 1995 EIS on the operation of Glen Canyon Dam and the associated 1996 Record of Decision (ROD), and the 2007 Colorado River Interim Guidelines EIS and the associated 2007 ROD. This effort utilizes the best available science developed through previous adaptive management research and monitoring and has been specifically designed to further advance scientific understanding of the complex interactions between native and non-native fish in the Colorado River mainstem.

The action also addresses the concerns of Indian tribes over the taking of life associated with non-native fish control in the Colorado River. Because this action takes place in the Grand Canyon and the Colorado River, an area with which a number of American Indian tribes have a spiritual, cultural, and historical connection, it was developed through a lengthy process of consultation and analysis to ensure that implementation can take place in a manner that respects tribal perspectives. In a separate Environmental Assessment (EA), Reclamation is addressing the development and implementation of a protocol for high-flow experimental releases from Glen Canyon Dam (HFE Protocol). The proposed action considered in this decision will offset and mitigate potential adverse affects of HFEs. The proposed non-native control action addresses evidence that HFEs, particularly if conducted in the spring, result in increases of non-native rainbow trout (*Oncorhynchus mykiss*) downstream of Glen Canyon Dam, and subsequent predation and competition on humpback chub in occupied habitat. Pursuant to its acceptance of the 2011 Biological Opinion on Glen Canyon Dam Operations, Reclamation will implement non-native fish control consistent with the provisions of this proposed action. In addition, in light of information regarding the effects of HFEs conducted in the spring, Reclamation has concluded that non-native fish control efforts are particularly essential during the term of the HFE Protocol (through 2020).

### Purpose of Proposed Action

In addition to anticipated benefits for endangered humpback chub, the proposed action would also likely increase survival of flannelmouth sucker (*Catostomus latipinnis*), bluehead sucker (*Catostomus discobolus*), and the speckled dace (*Rhinichthys osculus*). The flannelmouth and bluehead suckers are native species that are declining throughout their range and are part of a

Rangewide Conservation Plan for native fishes among six western states. In contrast to downstream of Lees Ferry, the proposed action is predicted to have no adverse effect on the non-native Lees Ferry rainbow trout population (i.e. the population above Lees Ferry). However, if the proposed action were to reduce total numbers of adult rainbow trout in Lees Ferry, it could result in a healthier, more sustainable population of rainbow trout, with a more balanced age-structure and larger trout of better condition.

Following preparation of an EA in 2002, non-native fish control was first tested as a means to help conserve native fish in Grand Canyon from 2003-2006. Non-native fish control later was included as a conservation measure of biological opinions issued by the U.S. Fish and Wildlife Service (USFWS) on operations of Glen Canyon Dam in 2008, 2009, and 2010. Non-native fish control was included as a conservation measure because reducing numbers of non-native fish was thought to offset certain operations of Glen Canyon Dam that may benefit non-native fish. Indian tribes objected to implementing non-native fish control in 2009 because the killing of fish in a sacred area impacted their spiritual values. Accordingly, the Bureau of Reclamation halted mechanical removal of non-native fish and began this National Environmental Policy Act process to evaluate alternatives for non-native fish control. On December 23, 2011 the USFWS issued the Final Biological Opinion on the Operation of Glen Canyon Dam including High Flow Experiments and Non-Native Fish Control, (the 2011 Opinion), which included the non-native fish control actions considered in this decision notice.

The proposed action is to help conserve the endangered humpback chub by reducing numbers of non-native fish, particularly rainbow trout and brown trout (*Salmo trutta*), as well as undertaking new research to better understand non-native and native fish interaction dynamics. The area near the confluence of the Colorado and Little Colorado rivers is occupied by a large portion of the humpback chub population in Grand Canyon, and nearshore areas in this part of Grand Canyon are used as nursery habitat by young humpback chub. The population in Grand Canyon is currently the largest in existence and the status of this population has significantly improved over the past ten to fifteen years. The research and monitoring and removal elements of the proposed action are intended to facilitate and enhance this upward trend in population status.

Reclamation is developing the HFE Protocol for the purpose of evaluating the effects of high flow releases to improve ecological conditions in the canyon, including more natural sediment dispersal throughout the Canyon, and improving conditions for sediment-derived resources such as camping beaches. The HFE Protocol will likely have effects to native and non-native fishes. Implementation of the HFE Protocol provides for the opportunity to conduct multiple high flows through 2020 of 31,500 cfs to 45,000 cfs for 1-96 hours. Proposed time frames are March/April and October/November periods following the primary sediment-input seasons of late summer/early fall and winter. High flows conducted in the March/April period likely would result in improved conditions for rainbow trout based upon observations from the 1996 and 2008 HFEs. Available scientific information indicates that these past spring HFEs resulted in increases in rainbow trout. Based on limited information from these two prior spring HFEs, implementation of the HFE Protocol may increase rainbow trout abundance in the Colorado River in Glen and Marble canyons, including in the area near the Little Colorado River. The proposed action considered in this decision notice would offset and mitigate the potential adverse effects of the HFE Protocol.

## The Proposed Action

The proposed action includes efforts to conduct research, monitoring and specific actions to control non-native fish in the Colorado River downstream from Glen Canyon Dam in an effort to help conserve native fish, particularly endangered humpback chub, by reducing the threat of predation and competition from non-native fish. The effort utilizes the best available science developed through previous adaptive management research and monitoring and has been specifically designed to further advance scientific understanding of the complex interactions between native and non-native fish in the Colorado River mainstem. The proposed action will evaluate the degree to which predation and competition are a threat to the recovery of humpback chub, the sources and movement dynamics of non-native fish in Glen, Marble and Grand Canyons, and the potential of various control options to reduce numbers of non-native fishes.

The proposed action will test reducing emigration of rainbow trout and brown trout from source populations in Glen and Grand Canyon through removal in areas below Lees Ferry, and, if necessary, includes the option of removing non-native fish further downstream at the Little Colorado River to protect humpback chub. Non-native fish, predominantly rainbow trout, would be removed from an 8-mile reach of the Colorado River from the Paria River to Badger Creek (PBR Reach) using boat-mounted electrofishing for up to 10 fish removal trips per year. Non-native fish would also be removed from a 9-mile reach of the Colorado River from Kwagunt Rapid to Lava Chuar Rapid (LCR Reach) near the mouth of the Little Colorado River (LCR) using the same methods in up to 6 removal trips per year, but only if monitoring and modeling data indicate that a trigger has been reached indicating removal is necessary to ensure that the humpback chub is not jeopardized and its critical habitat is not adversely modified; this trigger is defined in the 2011 Opinion and is provided below. To address the Tribal concerns identified above, fish that are removed would be kept alive and stocked into waters as sport fish in areas that have approved stocking plans. If live removal proves to be infeasible, Reclamation anticipates fish removed would be euthanized for later beneficial use identified through continued tribal consultation. The non-native fish control research and removal efforts would be located within Glen Canyon National Recreation Area (GCNRA) and Grand Canyon National Park (GCNP), Coconino County, Arizona, and would take place through 2020.

The EA evaluated the no action and the proposed action relative to the purpose and need for the action. In addition, a range of non-native fish control treatments were evaluated in a Structured Decision Making Project (SDM Project) and the EA process that included flow and non-flow actions to control non-native fish. Although all of these treatments could have desirable effects (in terms of benefits for native fish), based on similar prior actions, there is some uncertainty about the effectiveness of each treatment if applied individually or in combination with others. The SDM Project was used to identify this uncertainty and analyze the performance of potential actions in reducing non-native fish predation on humpback chub and other objectives, such as cultural resources, hydropower, and recreation. Through the SDM process, and through further analysis in the EA, the proposed action was selected because it best meets the purpose and need to reduce non-native fish predation on humpback chub, reduce scientific uncertainty on aspects of non-native fish control, limit costs of implementing non-native fish control, address concerns of tribes about the taking of life, and provide the least impact to other resources. A Science Plan

to evaluate the proposed action, including a strategy for long-term application and monitoring, is included as an Appendix to the EA.

The proposed action will utilize boat-mounted electrofishing to remove non-native fishes at the LCR reach only if data indicates this is necessary to protect humpback chub. Reclamation has committed to working with USFWS to further define the triggering criteria for LCR removal over the life of the proposed action based on continuing research and related analyses. However, action may otherwise be taken, such as moving to immediate removal of non-native fish in either the PBR or LCR reach, in the event of new information. The trigger for this action was defined in the USFWS 2011 Opinion as follows:

*LCR Reach removal will occur if 1) rainbow trout abundance estimates in the portion of the reach from RM 63.0-64.5 exceeds 760 fish, and 2) if the brown trout (*Salmo trutta*) abundance estimate for this reach exceeds 50 fish (evaluated each calendar year in January); and 3) the abundance of adult humpback chub declines below 7,000 adult fish based on the Age-Structured Mark Recapture Model (ASMR, this model estimate will be conducted every 3 years, and each year the latest ASMR results will be evaluated with the other elements of the trigger, i.e. numbers of trout, each calendar year in January).*

*OR*

*The above conditions 1 and 2 for trout abundance are met, and all of the following three conditions are also met:*

- 1. In any 3 of 5 years during the proposed action using data extending retrospectively to 2008, the abundance estimate of humpback chub in the LCR between 150-199 millimeters (mm) [5.9- 7.8 inches] total length within the 95 percent confidence interval drops below 910 fish (evaluated each calendar year in January); and*
- 2. Temperatures in the mainstem Colorado River at the LCR confluence do not exceed 12 degrees Celsius (°C) in two consecutive years (evaluated each calendar year in January); and*
- 3. Annual survival of young humpback chub (40-99 mm total length (TL)) in the mainstem in the LCR Reach drops 25 percent from the preceding year (evaluated each calendar year in January).*

The abundance of trout in the LCR reach would be monitored with the system-wide electrofishing program of the Grand Canyon Monitoring and Research Center (GCMRC). Electrofishing is conducted twice per year at a large number of stations downstream of Lees ferry, providing density and size composition information on age 1+ rainbow and brown trout and on densities and spatial distributions of key warm water species in the mainstem (juvenile humpback chub, suckers, carp, catfish).

Within two years, Reclamation will undertake an assessment of the feasibility of other non-native fish control actions. Additional flow and non-flow actions not analyzed here would continue to be evaluated and may be added through adaptive management, such as flow actions

to suppress recruitment of rainbow trout in Lees Ferry. Implementation of these actions may require additional environmental compliance.

## Mitigation Measures

Past non-native fish control efforts have likely benefitted native fish, particularly humpback chub, but a number of Indian tribes have stated that the lethal control of non-native fish has had adverse effects to their spiritual, cultural, and historical connection with the Grand Canyon and the Colorado River. Adverse effects to recreational use have also been identified in the form of disturbance to recreationalists from activities associated with non-native fish control. The following mitigation measures are prescribed to avoid, reduce, or compensate for potential adverse effects of non-native fish control.

- To address adverse effects to cultural resources as identified by a number of tribes, particularly the Pueblo of Zuni:
  - Prior to each removal effort that occurs, Reclamation will coordinate with Tribes and other parties on the need to conduct removal and on relocation sites for live non-native fish. Fish removed would be kept alive and stocked into other waters as sport fish or would be euthanized for other beneficial uses identified through continued tribal consultation. Stocking into other waters would require an existing stocking plan for the water.
  - Resolution of adverse effects to historic properties (traditional cultural properties) has been completed<sup>1</sup> in accordance with Section 106 of National Historic Preservation Act (NHPA) through a memorandum of agreement with the tribes and other consulting parties.
- To address adverse effects to recreation interests:
  - An interpretive plan would be developed with NPS to develop public information and educational materials for recreational users describing project effects.
  - Crews working in the park units would be required to meet NPS minimum impact requirements, including evaluations and approval, for all work within proposed wilderness areas.

In addition, the following conservation measures have been agreed to as part of ESA section 7 consultation with the USFWS and are described in the December 23, 2011 final biological opinion (these conservation measures are common to both this EA and the HFE Protocol EA):

*Re-Evaluation Points* – Pursuant to 50 CFR § 402.16 (c), reinitiation of formal consultation is required and shall be requested by the Federal agency or by the FWS where discretionary

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<sup>1</sup> As of the date of public review of this Draft FONSI, Reclamation is in the final stages of completion of this referenced MOA.

*Federal involvement or control over the action has been retained or is authorized by law and if new information reveals effects of the action that may affect listed species or critical habitat in a manner or to an extent not previously considered. Reclamation and FWS agree to meet at least once every 3 years to specifically review the need for reinitiation based on humpback chub status and other current and relevant information. Reclamation will undertake a review in 2014 of the first two years of implementation of the proposed action through a workshop with scientists to assess what has been learned, which will also serve as the first re-evaluation point. Reclamation will also produce a written report of each evaluation and either FWS or Reclamation may require reinitiation of formal consultation on the proposed action to reevaluate the effects of the action.*

***Humpback Chub Translocation*** – Reclamation will continue to assist the NPS and the GCDAMP in funding and implementation of translocating humpback chub in the LCR and into tributaries of the Colorado River in Marble and Grand canyons, and in monitoring the results of these translocations. Non-native fish control in these tributaries will be an essential element to translocation, so Reclamation will help fund control of both cold water and warm water non-native fish in tributaries, as well as efforts to translocate humpback chub into these tributaries. Havasu, Shinumo, and Bright Angel creeks will continue to be the focus of translocation efforts, although other tributaries may be considered.

***Humpback Chub Nearshore Ecology Study*** – Through the Natal Origins Study, in coordination with other GCDAMP participants and through the GCDAMP, Reclamation will continue research efforts on nearshore ecology of the LCR reach to better understand the importance of mainstem nearshore habitats in humpback chub recruitment and the effect of non-native fish predation on humpback chub recruitment, and to monitor the trend in annual survival of young humpback chub in the mainstem for use in determining the need for non-native fish control.

***Humpback Chub Refuge*** – Reclamation will continue to assist FWS in maintenance of a humpback chub refuge population at a Federal hatchery (Reclamation has assisted the FWS in creating a humpback chub refuge at Dexter National Fish Hatchery and Technology Center) (DNFHTC) or other appropriate facility by providing funding to assist in annual maintenance (including the collection of additional humpback chub from the Little Colorado River for this purpose). In the unlikely event of a catastrophic loss of the Grand Canyon population of humpback chub, a humpback chub refuge will provide a permanent source of sufficient numbers of genetically representative stock for repatriating the species.

***Humpback Chub Monitoring and Mainstem Aggregation Monitoring*** – Reclamation will, through the GCDAMP, continue to conduct annual monitoring of humpback chub and, every 3 years, conduct the ASMR. Reclamation will also monitor the abundance of humpback chub and species composition at the eight mainstem aggregations of humpback chub in Marble and Grand Canyon annually.

***Bright Angel Creek Brown Trout Control*** – Reclamation will continue to fund efforts of the NPS to remove brown trout from Bright Angel Creek and will work with GCMRC and NPS to expand this effort to be more effective at controlling brown trout in Grand Canyon. This issue has been prioritized based on emerging information on the particular risk that brown trout pose to native fish.

**High Flow Experiment Assessments** – Reclamation will conduct pre- and post-HFE assessments of existing data on humpback chub status and other factors to both determine if a HFE should be conducted and to inform decisions to conduct future HFEs. Consideration will be given to minimize effects to humpback chub in defining the timing, duration, and magnitude of each HFE conducted within the framework established by the HFE protocol.

**Dexter National Fish Hatchery Genetic Study** – Reclamation will fund an investigation of the genetic structure of the humpback chub refuge housed at the DNFHTC that will include: 1) a genotype of the refuge population using microsatellites; 2) an estimate of humpback chub effective population size; and 3) a calculation of pairwise relatedness of all individuals in the DNFHTC Refuge population.

**Kanab Ambersnail** – Reclamation implemented conservation measures for the HFEs conducted in 2004 and 2008 to protect habitat for the Kanab ambersnail at Vasey’s Paradise. However, due to the pending taxonomic evaluation, the FWS and Reclamation have agreed to forgo this conservation measure for future HFEs and to study the effect of the HFE Protocol on the population of Kanab ambersnail at Vasey’s Paradise through continued monitoring. FWS has analyzed the effect of the potential loss of habitat over the life of the proposed action and concluded that the conservation measure is not necessary to maintain a healthy population of Kanab ambersnail at Vasey’s Paradise because the amount of habitat and snails that will be unaffected by the proposed action is sufficient to maintain the population. Reclamation will continue, through the GCDAMP, to monitor the population on a periodic basis to assess the health of the population over the life of the proposed action.

**Conservation of Mainstem Aggregations** – Reclamation will also, as part of its proposed action, work within its authority through the GCDAMP to ensure that a stable or upward trend of humpback chub mainstem aggregations can be achieved. Ongoing and additional efforts will be coordinated to: 1) explore and potentially implement flow and non-flow measures to increase the amount of suitable humpback chub spawning habitat in the mainstem Colorado River (additional environmental compliance may be required); 2) secure numbers of humpback chub in a wider distribution in the mainstem Colorado River by supporting the number of young-of-year (y-o-y) recruiting to aggregations; 3) expand the role of tributaries and their ability to contribute to the growth and expansion of mainstem aggregations; and 4) develop and implement a protocol for “maintenance control” of rainbow trout through appropriate means to ensure low levels of trout in the LCR Reach, for example, by implementing PBR control every year, in coordination with the FWS and other partners.

**Reasonable and Prudent Measures** - The 2011 USFWS biological opinion on the proposed action also provided the following reasonable and prudent measures and terms and conditions which are necessary and appropriate to minimize incidental take of humpback chub:

1. Reclamation has committed to develop, with GCDAMP and stakeholder involvement, additional non-native fish control options during the first two years of the proposed action to reduce recruitment of non-native rainbow trout at, and emigration of those fish from, Lees Ferry. Reclamation will coordinate the development of these actions with the on-going NPS Management Plan for native and non-native fish downriver of Glen Canyon Dam in both the GCNRA and GCNP. Both flow and non-flow

*experiments focused on the Lees Ferry reach may be conducted in order to experiment with actions that would reduce the recruitment of trout in Lees Ferry, lowering emigration of trout. Additional environmental compliance may be necessary for implementation of the following types of experiments that will be considered.*

*A. Within two years, Reclamation should include an assessment of the feasibility to disadvantage reproduction of rainbow trout as described in Treatment #3 and Treatment #4 in Valdez et al. 2010, and repeated here.*

***Treatment 3: Increase Daily Down-Ramp to Strand or Displace Age-0 Trout***

*This treatment would use dam releases during June through August to strand or displace age-0 trout and reduce rainbow trout survival. Increased down-ramp rates could reduce survival of age-0 trout by stranding them in exposed dewatered areas or by displacing them into less favorable habitats where they are subject to increased predation. Increased fluctuations would be most effective if they occurred daily from June through August when young fish occupy habitats that are more affected by fluctuating flows; i.e., shallow, low-angle habitats. This treatment may only need to be done once a week.*

*Several dam release options may be used to achieve this treatment including (1) a wider range in flows (higher maximum, lower minimum; e.g., summer normal 16,000 to 10,000 cfs, could be modified to 16,000 to 5,000 cfs and keep at 5,000 cfs for 3 hrs), (2) lower minimum flow than ROD flows (e.g., 3,000 cfs) for a short period of time (e.g., 1 hr) with a step up to a higher minimum that is within the ROD (e.g., 8,000 cfs); and (3) same range as ROD with faster ramp rates.*

***Treatment 4: High Flow Followed by Low Flow to Strand or Displace Age-0 Trout***

*Under this treatment, flows would be held high and steady (about 20,000 cfs) for a few days during June and July. Recently emerged trout tend to migrate to the lower edge of the varial zone, and steady flows are expected to produce an aggregation of fish in near-shore habitats. This would be followed by a quick down-ramp to a minimum flow (about 8,000 cfs) which would be held for 12-14 hours. This operation would be done every 2-3 weeks in June and July. Because this operation might not need to be done every day during the summer, there should be less impact to other resources compared to Treatment # 3. However, it could be used more frequently.*

*B. Explore flow and non-flow options for controlling trout movement downstream (such as coordination with angling community, NPS, AGFD, Tribes, and other groups, to better manage the Lees Ferry trout fishery through such actions as changing fishing regulations).*

*2. Reclamation shall protect y-o-y and juvenile humpback chub, monitor the incidental take resulting from the proposed action, and report to the FWS the findings of that monitoring.*

*A. Reclamation shall monitor the action area and ensure the long-term protection of the humpback chub as established by the GCDAMP.*

*B. Reclamation shall submit annual monitoring reports to the Arizona Ecological Services Office beginning in 2012 in collaboration with other GCDAMP participants including GCMRC, AGFD, NPS, and other cooperators to complete this monitoring and reporting. These reports shall briefly document for the previous calendar year the effectiveness of the terms and conditions and locations of listed species observed, and, if any are found dead, suspected cause of mortality. The report shall also summarize tasks accomplished under the proposed minimization measures and terms and conditions.*

## **Analysis Regarding Whether the Proposed Action Will Have a Significant Effect on the Human Environment**

As defined in 40 CFR § 1508.27, a determination of whether the proposed action will have a significant effect on the human environment requires considerations of both “context” and “intensity”:

(a) Context. This means that the significance of an action must be analyzed in several contexts such as society as a whole (human, national), the affected region, the affected interests, and the locality. Significance varies with the setting of the proposed action. For instance, in the case of a site-specific action, significance would usually depend upon the effects in the locale rather than in the world as a whole. Both short- and long-term effects are relevant.

(b) Intensity. This refers to the severity of impact. Responsible officials must bear in mind that more than one agency may make decisions about partial aspects of a major action. The following should be considered in evaluating intensity:

1. Impacts that may be both beneficial and adverse (1508.27(b)(1))
2. Degree to which the selected alternative affects public health or safety (1508.27(b)(2))
3. Unique characteristics of the geographic area of the proposed action (1508.27(b)(3))
4. Degree to which the effects of the proposed action on the quality of the human environment are likely to be highly controversial (1508.27(b)(4))
5. Degree to which the effects of the proposed action on the human environment are highly uncertain or involve unique or unknown risks (1508.27(b)(5))
6. 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 (1508.27(b)(6))
7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts (1508.27(b)(7))
8. Degree to which the action may adversely affect sites, districts, buildings, structures, and objects listed in or eligible for listing in the National Register of Historic Places or cause loss or destruction of significant cultural resources (1508.27(b)(8))
9. Degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973 (1508.27(b)(9))
10. Whether the action threatens a violation of federal, state, local, or tribal law, regulation, or policy imposed for the protection of the environment (1508.27(b)(10))

Each element is discussed as follows:

**Context:**

The Proposed Action will be limited in geographic context (40 CFR 1508.27(a)). Project activities will be implemented in a finite area, as discussed in the EA in Section 3.1 (also see EA Figure 1), that is the 294-mile reach of the Colorado River corridor from Glen Canyon Dam downstream to the Lake Mead inflow near Pearce Ferry. The environmental effects as described in the EA in Section 3 are local and will not be noticed beyond the local scale, and this local area should be considered the locality and affected region. Affected interests have been analyzed in the EA in Section 3, and no effects beyond the locality and regional area were identified, and no effects to society as a whole were identified.

**Intensity:**

**(1) Impacts that may be both beneficial and adverse.** — The long-term expected outcome of the proposed action is to benefit native fish, principally the endangered humpback chub and its critical habitat, by removing non-native fish that prey on and compete with native fishes. The proposed action could also affect biotic communities, recreational angling and boating, trout and other non-native fishes, and could potentially affect tribal cultural resources and sacred sites. Although the proposed action could result in the removal of large numbers of non-native fish species, and rainbow trout in particular, the proposed action is not expected to result in significant adverse effects to the Lees Ferry trout fishery (i.e., the population above Lees Ferry). To the contrary, non-native removal is expected to reduce numbers of rainbow trout and could result in improved conditions of the trout fishery in Lees Ferry because there are likely to be fewer, larger fish that are more desirable to anglers. The proposed action is anticipated to maintain the existing Lees Ferry trout fishery, and perhaps benefit the trout fishery and biotic communities in general by periodically reducing an overabundance of rainbow trout. The primary effect of the action will be to reduce numbers of non-native fishes to benefit native fishes, a beneficial effect, and the associated negative impacts to other resources are predicted to be minor and temporary.

There will be no significant adverse effects to park values from the proposed action. There will be short-term effects of disturbance to park visitors from removal activities that involve power boats, gas-powered generators, and lighted work areas at night. Reclamation will work with the National Park Service on an interpretive plan for public information and education to inform visitors of project effects. Crews working in the park units will also use work plans to ensure minimum impact requirements are met, including evaluations and approval, for all work within proposed wilderness areas.

**(2) Degree to which the selected alternative affects public health or safety.**— We do not anticipate that there will be any effects to public health or safety from the proposed action because the actions associated with non-native fish control do not implicate public health and safety issues.

**(3) Unique characteristics of the geographic area of the proposed action.**—The proposed action will occur within the confines of GCNRA and GCNP and is expected to benefit native fish, including native fish listed under the ESA within the GCNP. No wild and scenic rivers will be affected by the proposed action. No Indian Trust Assets are found in the project area.

**(4) Degree to which the effects of the proposed action on the quality of the human environment are likely to be highly controversial.**—Under NEPA, the degree to which the effects of the proposed action on the quality of the human environment are likely to be highly controversial is determined by whether there are substantial questions that are raised by experts as to whether a project may cause significant degradation of some human environmental factor or there is a substantial dispute among the experts about the size, nature, or effect of the action. No effects on the quality of the human environment from the action have been identified that can be considered highly controversial.

We recognize however that some members of the public may object to aspects of the proposed action based on perceptions of its effects to the human environment. There is a perception by the angling community that the proposed action may adversely impact recreational fishing in Glen Canyon upstream of Lees Ferry. Anglers have expressed concern about related actions that could directly affect the trout population but are not part of the proposed action, such as future testing of non-native fish suppression flows and potential changes in angler harvest regulations. These actions are not part of this proposed action, but may be considered by appropriate agencies in the future. As discussed above, the proposed action is expected to maintain and may benefit the trout fishery.

Another concern that was expressed during the NEPA process regarding the proposed action is the potential effect to traditional cultural properties of several American Indian tribes. The Hopi, Hualapai, Navajo, the Kaibab Paiute tribes, and the Zuni Pueblo, all consider the Grand Canyon a Traditional Cultural Property. Reclamation has determined that the taking of life associated with past non-native fish control efforts constitutes an adverse affect to these cultural properties under NHPA, and is of concern to these tribes. Reclamation has committed to several measures to avoid or mitigate this impact: removing non-native fish alive to be stocked into other waters as sport fish; providing for tribal participation during non-native fish removal activities; continuing tribal consultation on all aspects of the proposed action including evaluating possible future flow options for non-native fish control; identifying beneficial uses of non-native fish removed through tribal consultation should euthanasia be necessary; and, if euthanizing non-native fish is necessary, avoiding euthanizing non-native fish from ½ mile above the LCR confluence to ½ mile below the confluence to avoid sacred areas to the Navajo Nation.

**(5) Degree to which the effects of the proposed action on the human environment are highly uncertain or involve unique or unknown risks.**— The effects of the proposed action are not highly uncertain and will not involve unique or unknown risks. Based upon the implementation of previous non-native fish control actions as part of the GCDAMP, there is certainty that non-native fish can be removed from the Colorado River, and that this removal will benefit native fish by reducing the number of non-native fish that prey on and compete with native fish including endangered humpback chub. The uncertainty associated with the proposed action stems from the precise degree to which removal of non-native fish will lead to specific increases in native fish populations including humpback chub. There is also some uncertainty regarding the location of removal, and whether removing fish about 60 miles upstream of the Little Colorado River at the Paria River will adequately reduce numbers of non-native fish downstream. The proposed action is the best way to resolve this uncertainty and does so through

a robust research and monitoring program that will develop additional scientific information to assist in understanding the relationship and interactions between populations of native and non-native fish species in the Colorado River.

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

**(6) 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 proposed action will not set a precedent for future actions or represent a decision in principle about future considerations and determinations. To the contrary, GCDAMP operates under the principles of adaptive management in which lessons are learned by doing, through scientific experiments, and information developed in each phase of experimentation and monitoring is built into future management decisions. The iterative approach taken in this process is a continuation of the adaptive management process established in 1996 and helps to ensure that changes in management direction are based on incremental advances in scientific understanding and 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.

The research element of the proposed action will develop additional scientific information and better inform future GCDAMP adaptive management decisions including the analysis contained in the Long Term Experimental and Management Plan Environmental Impact Statement currently underway. The LTEMP EIS is the first major, comprehensive analysis of the GCDAMP since the initiation in 1996 of the GCDAMP.

**(7) Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.**—The proposed action is related to other actions that will have both beneficial and adverse impacts on endangered native fish. Taken together, this proposed action and the related actions will not have cumulatively significant adverse impacts on native fish, and are anticipated to further improve native fish status and other resources downstream of Glen Canyon Dam.

Implementation of the proposed action will make a contribution to improving conservation (i.e., improving the survival and recovery to the point at which protection under the ESA is no longer necessary) of endangered native fish in the Colorado River below Glen Canyon Dam. This proposed action is related to other actions that are also designed to benefit endangered native fish and do not result in cumulatively significant adverse impacts. As part of the GCDAMP and related activities, there are a number of ongoing efforts to assist in conservation of native fish. These efforts include:

- Translocation of humpback chub within the Little Colorado River and to Shinumo Creek and Havasu Creek: juvenile humpback chub have been translocated within the Little Colorado River and from the Little Colorado River to Shinumo Creek and Havasu Creek.

Plans are in place to make additional translocations. These translocations are a conservation measure in the 2011 Opinion and prior biological opinions.

- Non-native fish removal: Non-native fish are being removed from Bright Angel and Shinumo Creeks to restore and enhance the native fish community in Bright Angel Creek and to reduce predation and competition on endangered humpback chub from non-native fish. Non- native fish (rainbow and brown trout) are being removed from Shinumo Creek in conjunction with translocation to minimize predation upon newly translocated humpback chub and reduce potential competitive interactions. These removal efforts are a conservation measure of the 2011 Opinion and prior biological opinions.

In a related, but separate EA, Reclamation is addressing the development and implementation of a HFE Protocol for high-flow experimental releases from Glen Canyon Dam. The HFE Protocol is designed to further evaluate the ability of high flow releases to conserve sediment downstream of Glen Canyon Dam, and improve resource conditions such as riparian habitat in Grand Canyon National Park. Based on information gained from three previous high flow experimental releases, Reclamation has determined that implementation of the HFE Protocol could result in increased numbers of trout in the Lees Ferry reach, particularly if conducted in the March and April release window. Trout are documented predators on native fish including the endangered humpback chub. Thus if trout emigrate downstream into reaches of the river occupied by native fish additional predation is likely to occur. As such, Reclamation concluded the adoption of the HFE Protocol is anticipated to have both significant beneficial and adverse impacts. In conjunction with previously described conservation measures, the proposed action, non-native fish control, is expected to mitigate the potential adverse impact of implementation of the HFE Protocol such that the impacts will not have a significant cumulative impact. Furthermore, the HFE EA states that Reclamation will defer implementation of spring HFEs in calendar years 2013 and 2014 to reduce the risk of producing an over-abundance of trout.

Both the actions considered in this decision notice and those of the HFE Protocol include important research components, with the expectation that the undertakings would improve resource conditions, and thereby provide important additional information for future decision-making within the GCDAMP. These actions do not constitute “cumulative actions”, “connected actions”, or “similar actions” necessitating review in a single NEPA document as defined by 40 C.F.R. § 1508.25(a)(1), (a)(2), and (a)(3). Reclamation analyzed the cumulative effects from both actions in the affected environment section of each EA, under the topical discussion for each resource. Cumulative actions, connected actions, and similar actions are also discussed in section 1.16 of the Non-native Fish Control EA. There are relatively few actions that cumulatively impact the affected environment because the location of the proposed action is the Colorado River in Glen, Marble, and Grand Canyons, almost entirely in national parks, GCNP and GCNRA, areas protected and managed for their natural resources and scenic beauty and thus not likely to be subject to many project impacts. Thus Reclamation has properly considered the cumulative effects from these two actions and other actions in both NEPA documents. Consistent with these analyses, Reclamation concludes that the actions are not “connected actions” or “similar actions” and do not have “cumulatively significant impacts.”

**(8) Degree to which the action may adversely affect sites, districts, buildings, structures, and objects listed in or eligible for listing in the National Register of Historic Places or cause loss or destruction of significant cultural resources.**—As described above, the action will adversely affect traditional cultural properties of several Indian tribes. The Hopi, Hualapai, Navajo, and Kaibab Paiute tribes, and the Zuni Pueblo, all consider the Grand Canyon a Traditional Cultural Property. Reclamation has determined that the taking of life associated with past non-native fish control efforts constitutes an adverse affect to these cultural properties under NHPA, and is of concern to these tribes. Reclamation has committed to several measures to avoid or mitigate this impact: removing non-native fish alive to be stocked into other waters as sport fish; providing for tribal participation during non-native fish removal activities; continuing tribal consultation on all aspects of the proposed action including evaluating possible future flow options for non-native fish control; identifying beneficial uses of non-native fish removed through tribal consultation should euthanasia be necessary; and, if euthanizing non-native fish is necessary, avoiding euthanizing non-native fish from ½ mile above the LCR confluence to ½ mile below the confluence to avoid areas sacred to the Navajo Nation.

**(9) Degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.**—Four ESA-listed species, three of which have designated critical habitat, occur in the proposed action area. In our January 28, 2011, request to the USFWS for ESA section 7 consultation, we determined that the proposed action may affect two of these species, the humpback chub and razorback sucker (*Xyrauchen texanus*), but not likely to adversely affect such species, because, the action of removing non-native fish species is largely beneficial to these native fish species. We further determined that the proposed action would not affect the other two species, Kanab ambersnail (*Oxyloma haydeni kanabensis*) and southwestern willow flycatcher (*Empidonax traillii extimus*).

**(10) Whether the action threatens a violation of federal, state, local, or tribal law, regulation, or policy imposed for the protection of the environment.**—The proposed action will be conducted in a manner fully consistent with other applicable Federal State and local laws.

### **Findings Required by Other Authorities**

The EA and project file provide information sufficient to evaluate the proposed action in order to insure compliance with NEPA and to meet other appropriate laws and regulations.

#### ***Endangered Species Act***

See item 9 above in the “Analysis Regarding Whether the Proposed Action Will Have a Significant Effect on the Human Environment” section.

#### ***National Historic Preservation Act, Archaeological Resources Protection Act, Native American Graves Protection and Repatriation Act***

See item 8 above in the “Analysis Regarding Whether the Proposed Action Will Have a Significant Effect on the Human Environment” section.

### ***Environmental Justice (Executive Order 12898)***

This Order requires consideration of whether projects would disproportionately impact minority or low-income populations. This decision complies with this Order. Public involvement occurred for this project and did not identify any adversely impacted local minority or low-income populations. This decision is not expected to adversely impact minority or low-income populations, as explained in Section 3.9 of the EA.

### **Decision**

The decision is to implement non-native fish control as set forth in the EA to benefit and conserve native fish, particularly endangered humpback chub, in the Colorado River below Glen Canyon Dam. Non-native fish, especially brown trout and rainbow trout, are known to prey on and compete with the endangered humpback chub, which are most abundant in and around the Little Colorado River and its confluence with the Colorado River. Populations of adult humpback chub (age class four years and older) have been steadily increasing for over a decade. As discussed in the EA for this proposed action, U.S. Geological Survey estimates for humpback chub in Grand Canyon in 2008 show that the number of humpback chub below Glen Canyon Dam is estimated between 6,000 and 10,000 fish, with the mostly likely current estimate at 7,650 chub based on the ASMR. Other monitoring information developed through the GCDAMP also indicates humpback chub status has been improving over the past decade. USFWS monitoring efforts in the Little Colorado River indicate that recruitment of young humpback chub into juvenile and adult life stages has steadily been increasing through 2011, and estimates of adult abundance have also been steadily increasing through 2011. Improved population numbers may in part be attributable to previous non-native fish control and other conservation measures implemented as part of the GCDAMP as discussed above.

In a 2008 Biological Opinion on Reclamation's ongoing and proposed experimental dam operations for Glen Canyon Dam for the period 2008-2012, the USFWS found that 2008-2012 operations may affect a number of native fish, including the humpback chub and other species listed under the Endangered Species Act. As part of the 2008 Biological Opinion, the USFWS included renewed non-native fish control as a conservation measure to address the threat to humpback chub posed by non-native fish, in addition to other conservation measures. Inclusion of this conservation measure was intended to continue, and potentially enhance, the improvement in humpback chub population in the Colorado River below Glen Canyon Dam.

In 2010, directly in response to concerns raised by several American Indian tribes, particularly the Pueblo of Zuni, Reclamation decided to forego planned mechanical removal trips to control non-native fish and to take time to evaluate alternative methods of non-native fish control. Reclamation reinitiated Section 7 consultation with the USFWS on the deferral of the non-native fish removal trips, and initiated this Environmental Assessment process to thoroughly evaluate alternative methods of non-native fish control. Reclamation involved the tribes and other stakeholders in development of the EA, including numerous meetings, conference calls and a structured decision-making process that included two workshops, which is further described in the EA. Reclamation also held formal, government-to-government consultation meetings with each of the concerned tribes.

Mechanical removal of non-native trout at the confluence of the Little Colorado River and the Colorado River is of serious concern to the tribes because of the location, which the tribes consider sacred and which is fundamental in several Tribal creation stories. Evaluation of alternatives required extremely careful evaluation to ensure that Reclamation continues to meet its obligations under the Endangered Species Act, while also being respectful of Tribal concerns.

Following engagement by a range of stakeholders, including several participating tribes, Reclamation structured the final proposed action to incorporate multiple options for non-native fish control, including avoiding areas of particular cultural concern, removing fish alive, and ensuring beneficial use of removed non-native fish if euthanasia is required. It is important to recognize that continued or indefinite deferral of non-native fish removal would not meet the purpose and need for the proposed action and Reclamation's existing obligations under the ESA. The ongoing effort to address these potentially competing concerns illustrates the many complex interests Reclamation must consider in operating Glen Canyon Dam.

The action proposed in this EA is tiered from two Reclamation EISs, the 1995 EIS on the operation of Glen Canyon Dam and the associated 1996 Record of Decision, and the 2007 Colorado River Interim Guidelines EIS and the associated 2007 ROD. The proposed action shall supplement the operations previously approved by those prior RODs and their associated NEPA compliance documents, and decisions which remain in full force and effect. The proposed action is designed to improve the conservation of humpback chub and other native fish, and although there is some uncertainty as to its effects, it is anticipated that it would have beneficial impacts on those populations. It will not have a significant adverse effect on the environment. No significant 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. Mitigation measures have been included to address adverse effects identified by multiple tribes on cultural resources. No highly uncertain or controversial impacts, unique or unknown risks, significant cumulative effects, or elements of precedent were identified. Implementation of the proposed action will not violate any federal, state, or local environmental protection law.

The proposed action is also anticipated to advance scientific understanding of the interaction between native and non-native species, thereby assisting in the conservation of ESA-listed fish species. The proposed action builds on previous adaptive management efforts to: continue research, monitoring, and non-native fish removal and to evaluate the degree to which predation and competition from non-native fish are a threat to the recovery of humpback chub; the assess sources and movement dynamics of non-native fish in Glen, Marble and Grand Canyons; and to evaluate the potential of various control options to reduce numbers of non-native fishes. These efforts are needed to continue the successes of previous conservation measures targeted at benefiting native fish consistent with the 2011 Opinion. The proposed action also will implement these efforts in a way determined to be acceptable to American Indian tribes by mitigating adverse affects to historic properties and tribal and cultural values as determined through extensive government-to-government tribal consultation. As discussed above, and consistent with commitments set forth in accordance with Section 106 of the National Historic Preservation Act (NHPA) through a memorandum of agreement with the tribes and other consulting parties,

Reclamation will undertake continued tribal consultation as part of implementation of the non-native fish control proposed action.

The proposed action considered in this decision is also meant to offset and mitigate potential adverse effects of HFEs conducted under the related HFE Protocol, because there is evidence that HFEs, particularly if conducted in the spring, result in increases of non-native rainbow trout below Glen Canyon Dam. These measures will also include continued monitoring that will assist in defining the connection between HFEs and trout response and will enhance understanding of this interaction to inform adaptive management. The proposed action will address potential increases in non-native rainbow trout that may result from future HFEs by providing for mechanical removal of trout in two areas of the Colorado River, immediately downstream of the Paria River and around the mouth of the Little Colorado River respectively, to protect native populations of fishes including humpback chub, if necessary.

Based upon the Environmental Assessment, an analysis of all oral and written comments received on the Environmental Assessment, 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. Accordingly, with adoption of this set of non-native fish control actions and research, implementation of the Glen Canyon Dam Adaptive Management Program will include these actions and provide the baseline for further actions and decisionmaking within the Program, as well as for future environmental compliance analyses (e.g., in the context of the ongoing Long Term Experimental and Management Plan).