

# 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**

Recommended by:

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# 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 effects 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 (NEPA) 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 was developed and designed to appropriately offset and mitigate the potential adverse effects of the HFE Protocol.

## The Proposed Action

The proposed action includes 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 Non-Native Fish Control 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 in accordance with Section 106 of National Historic Preservation Act (NHPA) through a memorandum of agreement with the tribes and other consulting parties (see Appendix A).
- 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 and quoted here from 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 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, and are quoted here:

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 Non-native Fish Control 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 Section 3 of the Non-Native Fish Control EA 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 Non-native Fish Control 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 affects 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: notifying the tribes of Reclamation's intention to conduct live removal at least 30-days in advance, 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 Protocol FONSI 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 Non-native Fish Control 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 Non-Native Fish Control EA.

### **Decision**

The decision is to implement non-native fish control as set forth in the Non-native Fish Control 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 Non-native Fish Control 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; 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 effects 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.

Additional NEPA compliance is not required for continuation of the Modified Low Fluctuating Flow (MLFF) and the proposed action continues under the 1996 ROD. The action approved in this FONSI is tiered from two Reclamation EISs, the 1995 EIS on the operation of Glen Canyon Dam and the associated 1996 ROD, and the 2007 Colorado River Interim Guidelines EIS and the associated 2007 ROD. Specific comments were received in the public reviews of the Non-Native Fish Control EA that the proposed action required an environmental impact statement (see Appendix B). Those comments were considered and addressed in revisions of the Non-native Fish Control EA. Following further evaluation and extensive consideration of the proposed action and its expected impacts, Reclamation concludes that 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 GCDAMP will include these actions and provide the baseline for further actions and decision making 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).

## **Memorandum of Agreement**

### **Non-Native Fish Control in the Colorado River below Glen Canyon Dam**

WHEREAS the Bureau of Reclamation (Reclamation), U.S. Department of the Interior (DOI), manages the release of water out of Glen Canyon Dam down the Colorado River through the Glen Canyon, Marble Canyon, and Grand Canyon in Arizona (Canyons), in accordance with the Colorado River Storage Project Act of 1956 (CRSPA), the Grand Canyon Protection Act (GCPA), and other authorities collectively known as the “Law of the River;” and

Whereas, Reclamation consulted with the U.S. Fish and Wildlife Service (FWS) under § 7 of the Endangered Species Act of 1973, as amended, on the effect on listed species on the continued operation of Glen Canyon Dam under modified low fluctuating flows with the inclusion of a protocol for high-flow experimental releases and non-native fish control for the ten-year period, 2011-2020; and

Whereas, as a result of those consultations, in December 2011 the FWS issued a biological opinion that described various actions and conservation measures, including non-native fish control in the Colorado River downstream from Glen Canyon Dam, to which Reclamation is committed; and

Whereas, Reclamation now has consulted with various parties under § 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, to assess the effects on historic properties from the undertaking, non-native fish control as described in the FWS’s biological opinion; and

Whereas, the National Park Service (NPS), U.S. Department of the Interior, protects and manages units of the national park system within Grand Canyon National Park (GRCA)

and Glen Canyon National Recreation Area (GLCA), including the lands and waters in the Canyons, and is responsible for identifying, managing, and preserving historic properties within GRCA and GLCA pursuant to §§ 110 and 106 of the National Historic Preservation Act of 1966, as amended (NHPA); and

Whereas, Reclamation and the NPS recognize that Reclamation is the lead federal agency for purposes of compliance with § 106 of the NHPA for the undertaking, non-native fish control, described in this agreement; and

Whereas, Western Area Power Administration, under the Act of Congress approved August 4, 1977 (91 Stat. 565) is responsible for marketing power and energy and transmitting electric power generated at the facilities of the Colorado River Storage Project, including Glen Canyon Dam, to preference customers in various states, and also has responsibility for managing the Upper Colorado River Basin Fund which funds various work related to historic properties protection within the area of potential effects (APE), and is authorized as part of the Colorado River Storage Project Act of 1956 (70 Stat. 105), consistent with sound business principles to ensure repayment of Colorado River Storage Project construction and operation expenses to the United States Treasury (36 CFR 800.2(c)(5)); and

Whereas, the APE for the proposed undertaking is the Colorado River between Lees Ferry and Lava Chuar Rapid in Glen Canyon National Recreation Area and Grand Canyon National Park; and

Whereas, the Hopi Tribe, the Hualapai Tribe, the Kaibab Band of the Paiute Indians, the Navajo Nation, the Paiute Indian Tribe of Utah for Shivwits Band, and the Pueblo of Zuni (collectively “the Tribes”) are federally recognized Indian tribes; and

Whereas, the Tribes have advised Reclamation that they attach religious or cultural significance to historic properties located within the Canyons, including the entire Grand Canyon, and also regard the Canyons including the Colorado River as constituting a



Traditional Cultural Property (TCP) eligible for the National Register of Historic Places (National Register); and

Whereas, Reclamation, in consultation with NPS and the Tribes, has determined that the Colorado River and the Canyons are eligible for the National Register as a TCP, and the Arizona State Historic Preservation Officer (SHPO) and NPS have concurred in so regarding them; and

Whereas, the Pueblo of Zuni (Zuni) in Tribal Council Resolution M70-2010-C086 and other representations, has advised Reclamation that the lethal removal of fish is offensive to Zuni cultural and spiritual values and an act of desecration, and specifically counterproductive to Zuni's efforts, grounded deeply in Zuni traditional and cultural values, to ensure harmony and prosperity of all life; and

Whereas, other Tribes have supported Zuni in its expression of concern; and

Whereas, Reclamation has accordingly determined that lethal removal of non-native fish would constitute an adverse effect on the historic and cultural character and use of the canyons; and

Whereas, Reclamation therefore revised its undertaking to avoid adverse effects to cultural resources by committing to live removal of non-native fish when conducting non-native fish removal is necessary to comply with the ESA; and

Whereas, pursuant to Section 106 of the NHPA and its implementing regulations (36 CFR Part 800), Reclamation has consulted with all parties who have expressed an interest in the protection of historic properties related to the proposed undertaking, specifically NPS, the Tribes, the Advisory Council on Historic Preservation (ACHP), the Arizona SHPO, the Bureau of Indian Affairs, the U.S. Fish and Wildlife Service, Western Area Power Administration, Colorado River Energy Distributors' Association, and the Grand

Canyon Monitoring and Research Center, and invited these parties to sign or concur in this memorandum of agreement (MOA) pursuant to 36 CFR § 800.6(c); and

Whereas, Reclamation has consulted with the public through the National Environmental Policy Act process; and

Whereas, in accordance with 36 C.F.R. § 800.6(a)(1), Reclamation has notified the Advisory Council on Historic Preservation (ACHP) of its adverse effect determination providing the specified documentation, and the ACHP has chosen to be a signatory; and

Whereas, Reclamation has invited the ACHP to participate in consultation, and the ACHP has participated to seek ways to avoid, minimize, or mitigate adverse effects to historic properties resulting from the undertaking and to develop this memorandum of agreement (MOA);

NOW, THEREFORE, the signatories agree that should Reclamation decide to proceed with actions that may lead to non-native fish removal, Reclamation will ensure that the following measures are implemented to resolve the adverse effects of such removal on historic properties.

### *Stipulations*

In consultation and collaboration with all parties to this MOA, Reclamation shall ensure the following stipulations are carried out:

1. Reclamation, to the maximum extent practicable, will remove non-native fish alive, thereby avoiding adverse effects to the Colorado River and the Canyons and address the concerns raised by the Tribes, in accordance with the following:
  - a. Reclamation, in removing non-native fishes in the Colorado River between Lees Ferry (river mile 0) and Lava Chuar Creek (river mile 65),

will conduct up to 10 trips annually in the Paria River to Badger Creek area and up to 6 trips annually near the Little Colorado River confluence between Kwagunt Rapid to Lava Chuar Creek. These removals will only be undertaken if the best available science indicates that these non-native fish are posing a threat to endangered fish species.

- b. Reclamation will notify the Tribes and other consulting parties of its intention to conduct live removal as soon as possible but at a minimum 30 days in advance.
  - c. The Tribes may, if they so choose, participate in non-native fish control efforts if they occur, in order to assure that they are being conducted appropriately with regard to tribal concerns.
  - d. Prior to each live removal effort that occurs, Reclamation will coordinate with Tribes and other consulting parties on the need to conduct removal and relocation sites for live non-native fish.
2. Should live removal prove infeasible, Reclamation will reconsult with the Tribes and other consulting parties to determine acceptable mitigation for adverse effects of the action.
3. In any event, Reclamation shall abide by the terms of the agreement between Reclamation and the Navajo Nation executed on DATE entitled "Agreement Between the Bureau of Reclamation and the Navajo Nation to Avoid Adverse Impacts - Non-Native Fish Control in the Colorado River below Glen Canyon Dam".
4. Resolving Objections:



Non-native Fish Control  
Memorandum of Agreement

- a. Should any party to this MOA object in writing or electronically to Reclamation regarding any action carried out or proposed with respect to non-native fish control or implementation of this MOA, Reclamation will consult with the objecting party to resolve the objection. If after initiating such consultation Reclamation determines that the objection cannot be resolved through consultation, Reclamation will forward all documentation relevant to the objection to the ACHP, including Reclamation's proposed response to the objection.
- b. Within 30 days after receipt of all pertinent documentation, the ACHP will exercise one of the following options:
  - i. Advise Reclamation that the ACHP concurs in Reclamation's proposed response to the objection, whereupon Reclamation will respond to the objection accordingly;
  - ii. Provide Reclamation with recommendations, which Reclamation will take into account in reaching a final decision regarding its response to the objection; or
  - iii. Notify Reclamation that the objection will be referred for comment pursuant to 36 CFR 800.7(a)(4), and proceed to refer the objection and comment. Reclamation will take the resulting comment into account in accordance with 36 CFR 800.7(c)(4) and Section 110(l) of NHPA.
- c. Should the ACHP not exercise one of the above options within 30 days after receipt of all pertinent documentation, Reclamation may assume the ACHP's concurrence in its proposed response to the objection.
- d. Reclamation will take into account any ACHP recommendation or comment provided in accordance with this stipulation with reference only

to the subject of the objection; Reclamation's responsibility to carry out all actions under this MOA that are not the subjects of the objection will remain unchanged.


- e. At any time during implementation of the measures stipulated in this MOA, should an objection pertaining to this MOA or the effect of non-native fish control on historic properties be raised by a member of the public, Reclamation will notify the parties to this MOA and take the objection into account, consulting with the objector and, should the objector so request, with any of the parties to this MOA to resolve the objection.
5. Amendments: This MOA may only be amended by mutual written consent of the signatories. Amendments shall not be effective until approved by all signatories.
  6. Termination: Any signatory may terminate this agreement in accordance with 36 C.F.R. § 800.6(c)(8) and by providing the other signatories with 60 days advance written notice of its intention to do so. If any signatory provides the other signatories with notice of its intention to terminate this agreement, then the signatories agree to meet to discuss the issues that prompted the notice and to try to resolve them through further consultation or by amending this agreement. In order to be considered a "signatory" for purposes of this termination provision, a party must sign this agreement within 60 days after the last date when Reclamation, the NPS, the SHPO, or the ACHP signs the agreement.
    - a. Notwithstanding any of the above, this MOA will expire eleven (11) years after the date of its execution by Reclamation, unless the signatories hereto, in consultation with the other parties and such others as may have become involved in implementation of this MOA, agree in writing to extend its terms.

7. Anti-Deficiency Act: Reclamation's obligations under this MOA are subject to the availability of appropriated funds, and the stipulations of this MOA are subject to the provisions of the Anti-Deficiency Act. Reclamation will make reasonable and good faith efforts to secure the necessary funds to implement this MOA in its entirety. If compliance with the Anti-Deficiency Act alters or impairs Reclamation's ability to implement the stipulations of this agreement, Reclamation will consult in accordance with the amendment and termination procedures found at 5 and 6 above.


Execution and implementation of this MOA evidences that Reclamation has afforded the SHPO and ACHP a reasonable opportunity to comment on the effects of nonnative fish control on historic properties. Execution and compliance with this MOA fulfills Reclamation's Section 106 responsibilities regarding this undertaking.

**SIGNATORIES:**

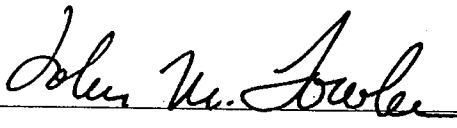
BUREAU OF RECLAMATION

By:  Date: 3/23/2012  
Larry Walkoviak, Director, Upper Colorado Region


NATIONAL PARK SERVICE

By:  Date: 4/12/12  
John Wessels, Director, Intermountain Region

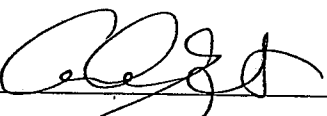
ADVISORY COUNCIL ON HISTORIC PRESERVATION

By:  Date: 5/22/12  
John Fowler, Executive Director

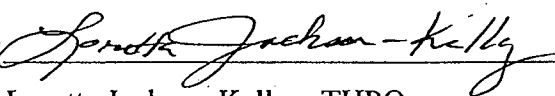
ARIZONA STATE HISTORIC PRESERVATION OFFICE

By:  Date: 5/18/12  
James Garrison, Arizona State Historic Preservation Officer

PUEBLO OF ZUNI


By:  Date: 3-13-12  
Governor Arlen Quetawki, Sr.

HUALAPAI TRIBAL HISTORIC PRESERVATION OFFICE


By:  Date: 3/3/2012  
Loretta Jackson-Kelley, THPO

**SIGNATORIES:**

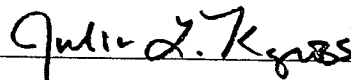
HUALAPAI TRIBE

By:  Date: 3.3.2012  
Louise Benson, Chair

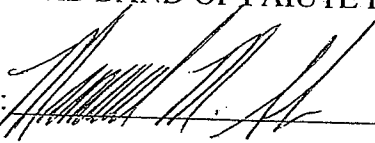
NAVAJO NATION TRIBAL HISTORIC PRESERVATION OFFICE

By:  Date: 3.14.12  
Alan Downer, Tribal Historic Preservation Officer (THPO)

WESTERN AREA POWER ADMINISTRATION

By:  Date: March 16, 2012  
Julia L. Kyriess, Colorado River Storage Project Manager

KAIBAB BAND OF PAIUTE INDIANS

By:  Date: 4.19.2012  
Manual Savala, Chairperson

HOPI TRIBE

By: \_\_\_\_\_ Date: \_\_\_\_\_  
Leigh J. Kuwanwisiwma



**CONCURRING PARTIES:**

COLORADO RIVER ENERGY DISTRIBUTORS ASSOCIATION

By: Leslie James Date: 5/25/12  
Leslie James, Executive Director

BUREAU OF INDIAN AFFAIRS

By: Bryan Bowker Date: 3/20/12  
Bryan Bowker, Regional Director, Western Region

**Agreement**  
**Between the Bureau of Reclamation and the**  
**Navajo Nation to Avoid Adverse Impacts -**  
**Non-Native Fish Control in the Colorado River**  
**below Glen Canyon Dam**

WHEREAS the Bureau of Reclamation (Reclamation), U.S. Department of the Interior (DOI), manages the release of water out of Glen Canyon Dam down the Colorado River through the Glen Canyon, Marble Canyon, and Grand Canyon in Arizona (Canyons), in accordance with the Colorado River Storage Project Act of 1956 (CRSPA), the Grand Canyon Protection Act (GCPA), and other authorities collectively known as the “Law of the River;” and

Whereas, Reclamation consulted with the U.S. Fish and Wildlife Service (FWS) under § 7 of the Endangered Species Act of 1973, as amended, on the effect on listed species of the continued operation of Glen Canyon Dam under modified low fluctuating flows with the inclusion of a protocol for high-flow experimental releases and non-native fish control for the ten-year period, 2011-2020; and

Whereas, as a result of those consultations, in December 2011 the FWS issued a biological opinion that described various actions and conservation measures, including non-native fish control in the Colorado River downstream from Glen Canyon Dam, to which Reclamation is committed; and

Whereas, Reclamation now has consulted with various parties under § 106 of the National Historic Preservation Act of 1966 (NHPA), as amended, to assess the effects on historic properties from the undertaking, non-native fish control as described in the FWS’s biological opinion; and

## Navajo Non-Native Fish Control Agreement

Whereas, the Navajo Nation (Nation) is a federally recognized Indian tribe; and

Whereas, the Nation has advised Reclamation that they attach religious or cultural significance to historic properties located within the Canyons, including the entire Grand Canyon, and also regard the Canyons including the Colorado River as constituting a Traditional Cultural Property (TCP) eligible for the National Register of Historic Places (National Register); and

Whereas, Reclamation has accordingly determined that lethal removal of non-native fish would constitute an adverse effect on the historic and cultural character and use of the canyons; and

WHEREAS Reclamation therefore revised its undertaking to avoid adverse effects to cultural resources by committing to live removal of non-native fish when conducting non-native fish removal is necessary to comply with the ESA; and

Whereas, Reclamation is in the process of completing a memorandum of agreement with various parties including the Navajo Nation under § 106 of the NHPA, as amended, to avoid the effects on historic properties from the removal of non-native fish required by the FWS's biological opinion;

NOW, THEREFORE, the signatories agree that should Reclamation proceed with non-native fish removal, Reclamation shall ensure that the following measures are implemented to resolve the adverse effects of such removal on historic properties.

### *Stipulations*

Reclamation and the Navajo Nation agree, in addition to the provisions contained in the related memorandum of agreement with various parties including the Navajo Nation under § 106 of the NHPA:



## Navajo Non-Native Fish Control Agreement

1. Should live removal prove infeasible, Reclamation shall reconsult with the Navajo Nation to determine acceptable mitigation for adverse effects of the action, and consistent with prior consultation with the Navajo Nation, fish shall not be euthanized within the area extending from ½ mile upstream of the Little Colorado River to ½ mile downstream of the Salt Mine.
2. Resolving Objections: Should the Nation object in writing or electronically to Reclamation regarding any action carried out or proposed with respect to non-native fish control or implementation of this agreement, Reclamation shall consult with the Nation to resolve the objection.
3. Amendments: This Agreement may only be amended by mutual written agreement of Reclamation and the Navajo Nation.
4. Termination: Either Reclamation or the Nation may terminate this agreement by providing 60 days advance written notice of its intention to do so. If either signatory provides the other with notice of its intention to terminate this agreement, then the signatories agree to meet to discuss the issues that prompted the notice and to try to resolve them through further consultation or by amending this agreement.
  - a. Notwithstanding any of the above, this Agreement will expire eleven (11) years after the date of its execution by Reclamation and the Navajo Nation, unless Reclamation and the Navajo Nation, agree in writing to extend its terms.

Navajo Non-Native Fish Control Agreement

**SIGNATORIES:**

**BUREAU OF RECLAMATION**

By:  Date: 3/23/2012  
Larry Walkoviak, Director, Upper Colorado Region

**NAVAJO NATION TRIBAL HISTORIC PRESERVATION OFFICE**

By:  Date: 3.13.12  
Alan Downer, Tribal Historic Preservation Officer

**Appendix B. Summary of Responses to Public Comments on the Draft Non-Native Fish Control Environmental Assessment (EA) for both comment periods January 18-March 26 and July 5-July 26, 2011, and on the Draft Finding of No Significant Impact (FONSI) released to the general public on April 27, 2012.**

**These comments are composites from various reviews received on previous drafts of the Non-Native Fish Control EA and on the draft Non-Native Fish Control FONSI. Reclamation's responses follow.**

*The High Flow Experimental Protocol Environmental Assessment (EA) and Non-native Fish Control EA should be combined into one EIS because of the interactions between dam operations and fish management.*

Reclamation has completed the National Environmental Policy Act process for two actions related to the ongoing implementation of the Glen Canyon Dam Adaptive Management Program (GCDAMP). In addition to the Non-native Fish Control EA that addresses non-native fish control, the High Flow Experimental Protocol (HFE Protocol) EA addresses the development and implementation of a protocol for high-flow experimental releases from Glen Canyon Dam. Both efforts are designed to 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. Although both EAs relate to and are part of the overall GCDAMP, Reclamation has considered the content of both efforts and believes that it is appropriate to maintain separate National Environmental Protection Act (NEPA) processes because each activity under consideration serves a different and independent purpose, has independent utility, and includes very different on the ground activities and actions (rate, duration and timing of water releases as compared with non-native fish research, management and control actions).

Reclamation has considered the most appropriate approach to NEPA compliance for these actions and has concluded that combination of the two EAs into a single NEPA document is not required under the applicable NEPA regulations. Under NEPA's implementing regulations, the question of whether the two actions must be analyzed in a single compliance document turns on whether the two actions are considered "connected actions," "cumulative actions," or "similar actions." Pursuant to 40 C.F.R. § 1508.25(a)(1), connected actions are "closely related and therefore should be discussed in the same impact statement." The regulations go on to provide that: "Actions are connected if they: (i) Automatically trigger other actions which may require environmental impact statements. (ii) Cannot or will not proceed unless other actions are taken previously or simultaneously. (iii) Are interdependent parts of a larger action and depend on the larger action for their justification." 40 C.F.R. § 1508.25(a)(1). Reclamation fully considered these regulations and concluded for the reasons set forth in Section 1.16 in the updated EA Non-Native Fish Control EA, that inclusion in a single EIS is not required. Moreover for the reasons set forth in the analysis of resource impacts in the Section 3 of the Non-native Fish Control EA, Reclamation has also concluded that an EIS is not required for this action.

*A separate Cumulative Effects analysis is needed for the Non-native Fish Control EA.*

Cumulative effects are appropriately addressed in 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, Grand Canyon National Park (GCNP) and Grand Canyon National Recreation Area (GCNRA), areas protected and managed for their natural resources and scenic beauty and thus not likely to be subject to many project impacts. Other actions that could affect resources in the project area stem primarily from

implementation of various National Park Service (NPS) resource management plans, discussed in Section 1.7, Related Actions, Plans, Projects, and Documents. Reclamation has addressed the cumulative effects from such actions in the affected environment section of the EA, under the topical discussion for each resource. Reclamation in this way fully considered the cumulative effects from numerous actions within the project area. Section 3 the Non-native Fish Control EA, Affected Environment and Environmental Consequences, described the potential changes to the environment due to implementation of the alternatives and presented the scientific and analytical basis for comparison of alternatives. Resource analysis included consideration of direct, indirect, and cumulative impacts in accordance with Council on Environmental Quality and Department of the Interior regulations. Each impact topic or issue was analyzed for direct, indirect, or cumulative effects from each of the alternatives, and in consideration of the related actions, projects, plans, and documents (Section 1.7). Impacts were described in terms of context (site specific, local or regional), duration (short- or long-term), timing (direct or indirect), and type (adverse or beneficial). Issues related to natural resources were described first, followed by socioeconomic and cultural resources.

*The Structured Decision Making (SDM) process used in the NNFC EA did not include detailed impact analysis as portrayed in the EA.*

Impact analysis from a wide array of potential alternatives was conducted as part of an SDM process and is reported in the SDM report in Appendix A of the Non-native Fish Control EA. The SDM process analyzed impacts based on how they achieved the following fundamental objectives: 1. Manage resources to protect tribal sacred sites and spiritual values; 2. Manage resources to promote ecological and native species integrity; 3. Preserve and enhance recreational values and uses; 4. Maintain and promote local economies and public services; and 5. Operate within the authority, capabilities, and legal responsibility of the Bureau of Reclamation. Impacts were analyzed using predictive models and expert elicitation. Some of the fundamental objectives, and in particular, number 1 (Manage resources to protect tribal sacred sites and spiritual values), proved difficult to quantify, as is discussed in the SDM report. Reclamation used the SDM process to help define the issues surrounding the decision and to assist in selecting alternatives for further analysis in the EA, and this is accurately described in Section 1.5 Structured Decision Making Report and in Section 1.18 Issues for Analysis.

*The existing science does not support the assertion that rainbow trout predation and competition are limiting humpback chub numbers and that removal of rainbow trout is necessary to conserve humpback chub.*

Several recent scientific publications described in the EA demonstrate that rainbow trout are predators and competitors to humpback chub and that these interactions are an identified threat to both the species and its critical habitat. However, this same body of literature also acknowledges that there is uncertainty as to whether losses of young humpback chub from this threat are limiting recovery of the species. The proposed action in the EA incorporates a strong research and monitoring component to attempt to better understand the relationship between rainbow trout and humpback chub over the life of the proposed action. The proposed action includes a monitoring trigger, based on the status of humpback chub and its habitat, to determine when non-native fish control using mechanical removal would take place in the Little Colorado River confluence area. In this way, the proposed action promotes learning about this issue but is also protective of the humpback chub, providing for removal of non-native fish only if necessary pursuant to ongoing monitoring.

*The Modified Low Fluctuating Flow (MLFF) should be analyzed as a cumulative effect for both the no action and proposed action alternatives.*

The action analyzed in the Non-native Fish Control EA includes the continuation of MLFF, and this action is tiered from two Reclamation EISs and these documents are incorporated by reference: 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 1996 Record of Decision implemented the MLFF to govern releases from Lake Powell at monthly, daily, and hourly increments. The 2007 ROD governs annual water year releases from Lake Powell in coordination with Lake Mead. There is also an ongoing program of experimental releases from Glen Canyon Dam in effect from 2008 through 2012, under an existing EA and FONSI.

MLFF has been evaluated under NEPA as part of these previous actions, beginning with the 1995 Environmental Impact Statement on the operation of Glen Canyon Dam and, most recently, the 2008 EA on experimental releases from the dam. MLFF has further been evaluated for its potential impacts on endangered species by the U.S. Fish and Wildlife Service (USFWS). Their determination for the two most recent proposed actions, which include continued operation of Glen Canyon Dam under MLFF with the inclusion of a protocol for high-flow experimental releases from Glen Canyon Dam and non-native fish control for the period through 2020, is that the actions are not likely to jeopardize the continued existence of the humpback chub, razorback sucker, or Kanab ambersnail and are not likely to destroy or adversely modify designated critical habitat for razorback sucker or humpback chub.

*Reclamation should reconsider other alternatives such as the humpback chub “head start” option, or changing fishing regulations.*

As explained in the EA, these two actions are not within Reclamation’s authority to implement. The humpback chub head-start option proposed adding a supplemental hatchery-based stocking program to maintain the desired population level for the humpback chub in lieu of control methods currently in place. Wild-caught humpback chub would be grown in hatcheries and stocked into the system. This option does not address or meet the purpose and need since of the Non-native Fish Control EA as it does not reduce predation and competition from non-native fish on humpback chub. This action would have to be initiated and implemented under the authority of the USFWS, and would likely take a substantial period of time to implement, potentially delaying needed efforts to address the purpose and need for the action. For these reasons, this option was eliminated from further consideration.

Changing fishing regulations and restrictions to allow a greater take of rainbow trout and brown trout by anglers was also proposed as a way to reduce the trout populations. This action was also not analyzed in the Non-native Fish Control EA because it is not within the authority of Reclamation to implement. Fishing regulations in the state of Arizona are the purview of the Arizona Game and Fish Commission and the Arizona Game and Fish Department (AZGFD), as well as the NPS, which has authorities and responsibilities for fisheries management within GCNP and GCNRA.

*Reclamation has not resolved the adverse effects of the proposed action of removal of non-native fish on cultural properties or completed tribal consultation on the proposed action.*

Reclamation has completed National Historic Preservation Act (NHPA) compliance on the Non-native Fish Control EA through development and finalization of a memorandum of agreement with the Hopi Tribe, the Hualapai Tribe, the Kaibab Band of the Paiute Indians, the Navajo Nation, the Paiute Indian Tribe of Utah for Shivwits Band, and the Pueblo of Zuni. Reclamation has determined that lethal removal of non-native fish would constitute an adverse effect on the historic and cultural character and use of Marble and Grand canyons, and has revised its undertaking to avoid adverse effects to cultural resources

by committing to live removal of non-native fish when conducting non-native fish removal is necessary to comply with the ESA. Fish that are removed alive will be stocked into other waters as sport fish. If non-native fish cannot be removed alive, Reclamation will reconsult with the tribes.

*The conclusion in both the HFE Protocol and Non-native Fish Control FONSI that taking of life associated with non-native fish control results in adverse impacts under NHPA should not be regarded as implying the NHPA, in and of itself, provides an independent basis for protecting endangered fish.*

Reclamation agrees with the comment and concurs that the adverse impact finding under NHPA does not constitute an independent basis for protecting the endangered fish. The adverse impact occurs as an indirect effect on historical properties covered by NHPA.

*Reclamation should only implement non-native fish control using a specific trigger that indicates humpback chub are declining and removal of non-native fish is necessary.*

As described in the 2011 USFWS biological opinion on the proposed action described in the Non-Native Fish Control EA, the proposed action includes a trigger for determining if removal of non-native fish in the region of the Little Colorado River would take place. The trigger incorporates both abundance measures of rainbow and brown trout and humpback chub, as well as habitat conditions, and would help determine the necessity of removal in humpback chub recovery, while also being protective of humpback chub by providing for non-native fish removal if necessary.

*The HFE Protocol could result in increases of rainbow trout and the Non-native Fish Control EA should analyze these potential effects.*

The Non-native Fish Control EA fully acknowledges and analyzes the potential effects of implementation of the HFE Protocol EA. These effects do include the potential for increased numbers of rainbow trout in Lees Ferry and potentially other downstream areas. This effect could result in adverse effects to humpback chub through increased predation and competition from rainbow trout. The Non-native Fish Control EA proposed action provides for a means to directly address this threat through removal of non-native fish species in two locations in the project area, coupled with other research to better understand the relationship between native and non-native fish in the action area. The USFWS 2011 biological opinion also reviewed these proposed actions and concluded that they would not jeopardize the humpback chub nor adversely modify its critical habitat. These effects were also considered in the HFE Protocol EA and FONSI. The HFE Protocol EA commits to a review of resource status prior to any decision on implementing an HFE (see section 2.2.3), which would include a high emphasis on endangered species. The NNFC EA contains commitments for additional mitigation and monitoring measures for non-native fish identified by Reclamation to offset any negative impacts from dam operations, including impacts from implementation of the HFE Protocol EA. These measures have further been identified in the 2011 USFWS biological opinion on the operation of Glen Canyon Dam. In consideration of scientific evidence that spring HFEs and sustained high spring flows can result in increased rainbow trout production, the HFE Protocol FONSI commits to not conduct spring HFEs until after 2014. This restriction in the proposed action does not constrain further research on fall HFEs and on non-native fish control actions that are intended to serve as mitigation for unintended increases in non-native fish, particularly rainbow trout. Reclamation also has committed to consult with USFWS if scientific evidence emerges that the endangered HBC population is being affected by the proposed action. Reclamation also has identified that the agency may take immediate action to initiate non-native fish control actions if new information indicates there is a threat to humpback chub from increasing non-native fish numbers. It is important to consider, however, that HFEs are not the only potential cause of declines in the humpback chub population and that the Non-native Fish Control EA and FONSI proposed action includes research to

better understand the relationships among dam operations, non-native fish, and the endangered humpback chub.

*The analysis of potential economic effects of the proposed action should not rely on the 1995 EIS nonuse economic data.*

An assessment of potential economic effects of implementing the Non-native Fish Control EA proposed action was conducted in the EA. Effects to nonuse values were considered in the Non-native Fish Control EA, and a prior study developed as part of the 1995 EIS on Glen Canyon Dam Operations was referenced. Although the NPS is currently in the process of a new study of nonuse values for the park units along the Colorado River, which will likely update some of the findings of the 1995 study, the 1995 study and data were referenced in the EA because this information is the best available science.

*Reclamation should clearly state that the Interim Guidelines will not be affected by the proposed action.*

As is stated in several places in the Non-Native Fish Control EA, the Interim Guidelines for Lower Basin Shortages and the Coordinated Reservoir Operations adopted in 2007 will not be affected by the implementation of the Non-native Fish Control EA or the High Flow Experimental Protocol.

*Reclamation should explain the relationship of the proposed action to LTEMP*

The Department is embarking on the first major, comprehensive analysis of the Glen Canyon Dam Adaptive Management Program since 1996 with the initiation of the Glen Canyon Dam Adaptive Management Program Long Term Experimental and Management Plan (LTEMP; 76 FR 39435-46, July 6, 2011). As explained in Section 1.17 of the Non-native Fish Control EA, "Relationship between this EA and the Long-Term Experimental and Management Plan", Reclamation has determined that it is essential and appropriate to move forward with the Non-native Fish Control EA because it will provide important information related to non-native fish control for consideration in this separate EIS process.

*The effects of HFEs should be analyzed, and HFEs should not be conducted in the Spring, to protect humpback chub. HFEs should be stopped if HBC decline.*

The effects of HFEs on humpback chub and other native fish species were analyzed both in the Non-native Fish Control EA and the HFE Protocol EA. A biological opinion was also received from the USFWS on the implementation of the MLFF, the actions in the Non-native Fish Control EA, and the HFE Protocol EA through 2020. The biological opinion found that this proposed action was not likely to jeopardize the continued existence of the humpback chub, razorback sucker, or Kanab ambersnail and was not likely to destroy or adversely modify designated critical habitat for razorback sucker or humpback chub. Also, as discussed above, in consideration of the scientific evidence that spring HFEs and sustained high spring flows can result in increased rainbow trout production, the HFE Protocol FONSI commits to not conduct spring HFEs until after 2014.

*Reclamation has not fully investigated the potential to use live removal of non-native fish to address the tribal concerns.*

Under the Non-native Fish Control FONSI, Reclamation will be investigating the use of live removal of non-native fish for use as sport fish for stocking into other waters and has committed to evaluating this as mitigation for the adverse effects of non-native fish control to historic properties via a memorandum of agreement completed under section 106 of the National Historic Preservation Act.

*Lethal removal of non-native fish should be avoided ½ mile up and downstream of the mouth of the LCR because of its cultural significance.*

Reclamation has committed to avoiding this sacred area as mitigation for the adverse effects of non-native fish control to historic properties via a memorandum of agreement under section 106 of the National Historic Preservation Act and a separate related agreement with the Navajo Nation.

*Reclamation should focus the proposed action on researching the effect of trout predation and competition on humpback chub rather than immediately moving to removal of fish.*

Research is a primary aspect of the non-native fish control plan approved in the Non-native Fish Control FONSI. As described in the EA and the FONSI, Reclamation and the US Fish and Wildlife Service (USFWS) have adopted a trigger, based on ongoing monitoring, for determining the appropriate circumstances when non-native fish control would take place at the mouth of the Little Colorado River. This species-based population trigger would both enable the implementation of removal of non-native fish in the event that data indicates humpback chub are declining due to this threat, as well as provide through monitoring and research included in the proposed action, important information on the degree of the threat to humpback chub recovery from predation and competition from non-native fish.

*The trigger for non-native fish control in the LCR Reach is in error – 760 rainbow trout is too high a number.*

Reclamation engaged in formal consultation with the USFWS and provided input into the development of the species-based population trigger for non-native fish control removal actions at the LCR Reach using data provided by the U.S. Geological Survey, Grand Canyon Monitoring and Research Center. This population trigger is included in the final biological opinion issued by the USFWS and accepted by Reclamation. The number for rainbow trout contained in the final biological opinion trigger, 760 rainbow trout, is accurate and is based on the results of prior removal efforts and prior efforts to estimate the size of the population of rainbow trout in this reach of the Colorado River in Marble and Grand canyons. FWS and Reclamation may however implement non-native fish control independently of this trigger, as explained in the 2011 biological opinion, if other information indicates non-native fish control, and specifically mechanical removal in the LCR Reach, is needed to protect and conserve the endangered humpback chub in the opinion of the fisheries biologists of FWS and Reclamation.

*Reclamation's proposed actions in the two EAs are inconsistent in proposing an action that is likely only to aid sediment resources in a relatively small segment of river downstream of Glen Canyon Dam, yet is simultaneously likely to negatively impact humpback chub, a federally endangered species.*

Reclamation has proposed two actions, the HFE Protocol and Non-native Fish Control, in a coordinated manner to result in overall beneficial effects to the Colorado River downstream from Glen Canyon Dam. The HFE Protocol is designed to benefit sediment resources through improved distribution of sediment inputs downstream, primarily in Marble Canyon, but also downstream in Grand Canyon. Spring HFEs may benefit non-native rainbow trout, and Reclamation is proposing to forego HFEs until 2014 in recognition and as additional mitigation of this effect. Reclamation has also proposed the actions in the Non-native Fish Control EA to provide for protection of humpback chub from predation and competition from non-native fish and this includes research to better understand the relationship between non-native fish and humpback chub. Reclamation believes these actions result in beneficial effects to both sediment resources through improved sediment conservation and beneficial effects to humpback chub through an improved ability to protect humpback chub from non-native fish predation and competition as well as an improved understanding of how this threat affects humpback chub recovery.