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U.S. Fish and Wildlife Service
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In Reply Refer To:
AESO/SE
02-21-03-F-0016-R3

November 17, 2004

Memorandum

To: Regional Director, Bureau of Reclamation, Salt Lake City, Utah
Superintendent, Grand Canyon National Park, Grand Canyon, Arizona
Superintendent, Glen Canyon National Recreation Area, Page, Arizona
Chief, Grand Canyon Monitoring and Research Center, USGS, Flagstaff, Arizona

From: Field Supervisor

Subject: Reinitiation of Section 7 Consultation on Proposed Experimental Releases from Glen Canyon Dam and Removal of Non-native Fish

Thank you for your November 5, 2004, request for reinitiation of formal consultation with the U.S. Fish and Wildlife Service pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). You have requested this reinitiation to extend certain elements of the proposed action in time, and to make changes to other elements. The consultation concerns the possible effects resulting from experimental flows from Glen Canyon Dam, and from mechanical removal of rainbow trout (*Oncorhynchus mykiss*), brown trout (*Salmo trutta*), and other non-native fishes from the Colorado River from above and below the confluence of the Little Colorado River and the Colorado River in Grand Canyon, Coconino County, Arizona. The joint leads for this project are the Bureau of Reclamation (Reclamation), Glen Canyon National Recreation Area and Grand Canyon National Park, and the U.S. Geological Survey's Grand Canyon Monitoring and Research Center (GCMRC).

Your cover letter concluded that the proposed action is likely to adversely affect the endangered humpback chub (*Gila cypha*) and its critical habitat, the endangered Kanab ambersnail (*Oxyloma haydeni kanabensis*), and the threatened bald eagle (*Haliaeetus leucocephalus*). You also requested our concurrence that the proposed project may affect, but is not likely to adversely affect, the endangered razorback sucker (*Xyrauchen texanus*) and its critical habitat, the endangered California condor (*Gymnogyps californianus*), and the endangered southwestern willow flycatcher (*Empidonax trailii extimus*). Our concurrences for those species are the same as those provided to you in Appendix A of our December 6, 2002, biological opinion.

This biological opinion was prepared using the November 2004 Supplemental Environmental Assessment (EA), titled: "Proposed Experimental Actions for Water Years 2005-2006 Colorado River, Arizona, in Glen Canyon National Recreation Area and Grand Canyon National Park" the

September 2002 EA, titled: "Proposed Experimental Releases from Glen Canyon Dam and Removal of Non-native Fish;" the March 1995 Final Environmental Impact Statement, titled "Operation of Glen Canyon Dam;" the December 6, 2002, biological opinion; telephone conversations; information provided by Reclamation and GCMRC staff; and other information in our files. A complete administrative record for this consultation is on file in our office.

CONSULTATION HISTORY

- In our December 6, 2002, biological opinion, we found that the proposed action was not likely to jeopardize the continued existence of humpback chub, the Kanab ambersnail, or bald eagle, or adversely modify critical habitat for humpback chub.
- June 12, 2003, we issued a non-jeopardy biological opinion on the reinitiation to change the conservation measure for the translocation of humpback chub above Chute Falls.
- On August 12, 2003, we issued a non-jeopardy biological opinion on the reinitiation to expand the length of the downstream removal reach.
- On August 11, 2004, the Adaptive Management Workgroup passed several motions concerning the continuation of experimental flows in water year 2005; these formed the basis for the proposed action in this document.
- On November 5, 2004, we received your supplemental EA and request for reinitiation of consultation.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action and action area remain the same as described in our original December 6, 2002, biological opinion, and reinitiations of that opinion on June 12 and August 12, 2003 (U.S. Fish and Wildlife Service 2002, 2003a, 2003b), with the exception of the following:

- The proposed action would be extended to include fiscal years 2005 and 2006.
- Non-native fish suppression flows of 5,000-20,000 cfs would be extended to include the first week of April (January 1- April 7).
- The high experimental flow could now take place as early as November 15, 2004, if a trigger of 800,000 metric tons of sediment is present.
- The high experimental flow would be about 41,000 cfs as opposed to 45,000 cfs because of drought-induced reductions in the level of Lake Powell, and ongoing maintenance at Glen Canyon Dam.
- The sediment conservation flows of 6,500-9,000 cfs will now take place from September 1- October 31, regardless of a sediment trigger.

- Mechanical removal will be conducted in January, February, March, July, August, and September 2005 and 2006, in the Little Colorado River (RM 56.2- 65.7) and in the mainstem from the Lava Chuar to Tanner (RM 65.7 - 68.5) reaches.
- Hoop netting to monitor humpback chub will be conducted in the Hopi-Salt Reach (RM 63.7–64.3), Tanner Reach (RM 68.5–68.9), and Unkar Reach (RM 72.2.–72.8), during mechanical removal trips and at other times (see below).
- Translocation of humpback chub above Chute Falls would be conducted in 2005, and potentially in 2006 as necessary.

See Bureau of Reclamation (1995) and U.S. Department of the Interior (2002, 2004) for a complete description of the proposed action, including a description of experimental flows in tabular and graphical form.

The action agencies will continue to remove non-native fishes (primarily salmonids) from removal reaches through the use of a series of depletion trips where non-native fishes are captured using electrofishing methods, euthanized, and removed from Grand Canyon. The original proposal included a total of 12 depletion river trips, three winter trips in January, February, and March, and three summer trips in July, August, and September during 2003 and 2004. Those trips have been completed. The proposed sampling design for all future trips would retain the established control reach (RM 44.0 – 52.3) using electrofishing to measure relative abundance and marking rainbow trout (i.e., Floy-tags, catch and release) for determining downstream emigration rates and system-wide population changes. This sampling effort would consist of one night period using four electrofishing boats. Four depletion pass efforts would be conducted each in the Little Colorado River Inflow (RM 56.2 - 65.7) and in the Lava Chuar-Tanner removal reaches (RM 65.7 - 68.5) using four electrofishing boats over a two- to four-night sampling period. The Tanner to Unkar removal reach (RM 68.5 - 72.7) will not be conducted, as GCMRC has determined that completing three reaches of mechanical removal is logistically difficult in a single trip.

Hoop net sampling would be continued as a method for assessing relative abundance of humpback chub young of the year in the Colorado River main stem to monitor the effects of mechanical removal. Thirty 72-hour hoop net sets would be conducted each trip in the Hopi-Salt Reach (RM 63.7–64.3), Tanner Reach (RM 68.5–68.9), and Unkar Reach (RM 72.2.–72.8). Stomach contents of all non-natives captured in hoop nets will be analyzed.

Operation of Glen Canyon Dam would essentially be the same, following Record of Decision (ROD) flows and several types of experimental flows (U.S. Bureau of Reclamation 1995, 2002, 2004). Several changes from those consulted on in the 2002 biological opinion would occur. Non-native fish suppression flows of 5-20,000 cfs, with 11 hours at 20,000 cfs, would occur Monday – Saturday, followed by 5,000 – 8,000 cfs on Sunday to allow for the additional water released during the week. These flows would be conducted from January 1 – April 7. Sediment conservation flows would occur, regardless of achieving the relevant sediment triggers, in September and October releases in both calendar years 2005 and 2006; these will consist of sequential periods of steady (8,000 cfs) and low fluctuating (approximately 6,500 - 9,000 cfs) flows, with duration and magnitude determined by research requirements. The high

experimental flow likely would be closer to 41,000 cfs than 42,000 - 45,000 cfs because of the drought-induced reduction in the level of Lake Powell and because of maintenance occurring at Glen Canyon Dam, and the timing of the high experimental flow would be moved forward from January to November-December, specifically no earlier than November 15.

Conservation Measures

The following conservation measures replace those described in our December 6, 2002, biological opinion:

1. Translocation of humpback chub will take place in 2005, and in 2006 as necessary, as it did in 2003 and 2004. This measure has proven successful and is therefore being continued (see Environmental Baseline). In 2005, up to 600 individuals between 50 and 100 mm will be removed from the Little Colorado River near the Colorado River confluence and transported 9.3 miles upstream above Chute Falls in the Little Colorado River; actions in 2006 will be determined based upon an analysis of the need to continue translocation as part of a long-term effort to manage the humpback chub above Chute Falls. The goal of this effort is to increase the probability of survival of young humpback chub by removing them from a part of the Little Colorado River where the likelihood of mortality is very high to an area that has proven to be a good nursery for these fish. The Little Colorado River is part of the Navajo Nation, therefore this conservation measure will only proceed with approval and appropriate permits from the Navajo Nation. All take associated with this activity will be covered under FWS 10(a)(1)(A) research permits.
2. To monitor humpback chub in relation to the high experimental flow, hoop netting will be conducted in the Hopi-Salt Reach (RM 63.7-64.3), Tanner Reach (RM 68.5-68.9), and Unkar Reach (RM 72.2-72.8) immediately prior to and immediately after the high experimental flow. Also, the action agencies will map near-shore habitats of fish using appropriate technology before and after the high experimental flow. The action agencies will also monitor the effect of the high flow on food base by monitoring drift of invertebrates and organic matter before, during, and after the flood. The action agencies will produce a report of this effort that assesses the fate of humpback chub from the experiment, the experiment's effects on near-shore rearing habitats for humpback chub, and the overall effect on the humpback chub population in Grand Canyon, within one year following the date of initiation of the high experimental flow.
3. The action agencies will develop and implement a study to examine the fate of juvenile humpback chub under various mainstem flow conditions. The study will compile information from all existing relevant information on flows and humpback chub abundance in the mainstem, including studies on the ecology of near-shore rearing habitats for fish in Grand Canyon, and use this information to develop and implement a study design to evaluate the effect of specific Glen Canyon Dam flow scenarios on humpback chub, including the effects to the ecology of near-shore rearing habitats for fish in Grand Canyon. The study will use hypothesis testing, i.e. specific flows will be contrasted and their effects evaluated (e.g. steady flows vs. fluctuating, low vs. high, etc.). The action agencies will meet with FWS to discuss the study design by January 1, 2005. Annual reports of this study will be delivered to FWS by January 1 each year, and will

include specific recommendations for enhancing survival of early life stages of humpback chub via operational flow regimes from Glen Canyon Dam.

4. For the Kanab ambersnail, the action agencies propose to temporarily remove and safeguard between 25 - 40% (30m² and 48m²), or more if feasible, of the Kanab ambersnail habitat that will be flooded by a high experimental flow, if the sediment trigger occurs during the autumn months or anytime before December 31. The habitat and ambersnails would be held locally above the level of inundation until the high flow has ended, after approximately 60 hours. Habitat and ambersnails will be replaced in a manner that will facilitate regrowth of vegetation. Habitat will be surveyed following the BHBF and be compared to the most recent survey prior to the BHBF. Subsequent monitoring of this conservation measure will be coordinated by GCMRC.

STATUS OF THE SPECIES

The status of the species remains the same as described in our 2002 biological opinion (U.S. Fish and Wildlife Service 2002). This biological opinion does not rely on the regulatory definition of “destruction of adverse modification” of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statute and the August 6, 2004, Ninth Circuit Court of Appeals decision in *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service* (No. 03-35279) to complete the following analysis with respect to critical habitat. The conservation role of the action area is essential for the humpback chub in the lower Colorado River Basin and range-wide.

ENVIRONMENTAL BASELINE

The environmental baseline remains basically the same as described in the 2002 biological opinion (U.S. Fish and Wildlife Service 2002). Research and monitoring has continued, including experimental flows to disadvantage non-native fish, non-native fish removal, and translocation of humpback chub.

The results of non-native fish suppression flows in January-March 2003 and 2004 resulted in a combined total mortality of 25 percent of rainbow trout eggs and alevins in the Lee’s Ferry reach (Korman et al. 2004). Results indicate that fluctuating flows in January caused little mortality, as emergence occurs before the onset of lethal temperatures. Korman et al. (2004) suggested that changing the timing of fluctuations to between February and April or May would substantially increase mortality, and also suggested that performing a stranding flow, a high steady flow for 2 days followed by sudden decrease in flow to 5,000 cfs for one day, in June or July, could also be very effective in mortality of trout (young-of-the-year rainbow trout). Korman et al. (2004) found no evidence of rainbow trout recruitment below Lee’s Ferry.

Mechanical non-native fish removal efforts in the removal reaches in 2003 and in January-March 2004 have been very successful (see Table 1). Results associated with the removal effort for nine trips (Jan – Mar; July – Sept 2003 and Jan – Mar 2004) indicate that removal has a 50 percent efficiency for rainbow trout and that consistent removal can have a persistent effect on this species’ abundance in the removal area (Coggins and Yard 2004). This pattern is not

repeated for brown trout, however. With respect to the increased recruitment of humpback chub, the earliest time at which a recruitment signal can be identified for humpback chub is spring 2006, but more likely in 2007. As such, data collected to date cannot support or refute whether a removal effort is effective in enhancing humpback chub population dynamics (GCMRC, in litt. 2004). However, hoop netting conducted near the mouth of the Little Colorado River in late October 2004 found approximately 270 humpback chub, mostly 50-150 mm TL, a tenfold increase in the catch from late October 2003, which could indicate that mechanical removal is reducing predation on these young humpback chub (R. Van Haverbeke, FWS, pers. comm. 2004).

Mechanical removal, including monitoring in the control reach, has resulted in two humpback chub mortalities (74 mm and 87 mm TL). A total of 422 humpback chub have been captured via electrofishing, most of which were less than 200 mm TL. Hoop netting efforts through March 2004 resulted in capture of 694 humpback chub and several other species (see Table 2). Hoop netting through March 2004 has also resulted in five mortalities of humpback chub (55, 57, 61, and 166 mm TL), and five humpback chub mortalities were found in the stomachs of brown trout in the hoop nets.

Table 1. Electrofishing catch in the Little Colorado River, Lava Chuar to Tanner, and Tanner to Unkar removal reaches by species for 2003 and January-March 2004 (from Coggins and Yard 2004).

Species	2003	2004	Total
Speckled Dace	41	182	223
Humpback Chub	252	170	422
Flannelmouth Sucker	926	536	1,462
Bluehead Sucker	93	138	231
Fathead Minnow	59	114	173
Common Carp	237	61	298
Brown Trout	243	174	417
Rainbow Trout	11,399	3,310	14,709

Table 2. Catch results from hoop net sets conducted during mechanical removal trips in 2003 and January-March 2004 (L. Coggins, GCMRC, pers. comm. 2004).

Species	2003	2004	Total
Speckled Dace	1	7	8
Humpback Chub	534	160	694
Flannelmouth Sucker	19	6	25
Bluehead Sucker	14	0	14
Unknown Sucker	4	0	0
Brown Trout	4	5	9
Rainbow Trout	54	27	81
Common Carp	4	0	4
Fathead Minnow	11	29	40

Red Shiner	3	1	4
Black Bullhead	0	1	1
Yellow Bullhead	0	1	1
Channel Catfish	0	1	1
Plains Killifish	0	2	2

The mainstem Colorado River in Grand Canyon is becoming warmer, already by as much as 1°C, due to the drop in Lake Powell levels. This is likely benefiting all fish species in Grand Canyon including native species such as humpback chub. The Bureau of Reclamation anticipates that the first test of a temperature control device, which will warm Glen Canyon Dam release temperatures by an estimated 2°C, will take place in 2007 for the purposes of improving conditions in the Colorado River mainstem for humpback chub and other native fish (D. Kubly, Bureau of Reclamation, pers. comm. 2004). Given this, there is an increasing need to develop improved mechanical removal techniques for warm water non-native species to protect humpback chub and other native species from non-native predators and competitors as waters warm. This need has been recognized by the action agencies and efforts are underway to study this issue.

Translocation of humpback chub above Chute Falls occurred in the summers of 2003 and 2004, as described in the original biological opinion and in the June 12, 2003, reinitiation. The translocation was quite successful: of 283 humpback chub translocated in August 2003, 42 humpback chub were recaptured during monitoring in November 2003. During the May 2004 monitoring trip, 35 humpback chub were captured above Chute Falls, 18 of which were recaptures from the November monitoring trip. Growth of these translocated fish was significantly greater than that recorded in the Little Colorado River below the falls (P. Sponholtz, US Fish and Wildlife Service, pers. comm. 2004). An additional 299 humpback chub were translocated above Chute Falls in August 2004. A total of 17 humpback chub mortalities occurred in 2003, which was reduced to one mortality by altering translocation methods in 2004.

EFFECTS OF THE ACTION

The effects of the action remain the same as described in the 2002 biological opinion, except for the following:

Humpback chub and its Critical Habitat

Changing the timing of the high experimental flow from January to November – December may result in an increase in take of humpback chub. Valdez and Ryel (1995) reported that adult and juvenile humpback chub found in the mainstream utilize deeper eddies in the fall and winter period (approximately late October through February); therefore, they may be less affected by a short duration high flow of the proposed magnitude. Young-of-year humpback chub emerging from the Little Colorado River may suffer mortality as a result of the high flow event, but monsoonal floods that would transport them into the mainstream largely have ceased by the end of October. However, hoop netting conducted at the mouth of the Little Colorado River in late October 2004 found approximately 270 humpback chub, mostly 50-150 mm TL, a tenfold

increase in catch from late October 2003 (R. Van Haverbeke, FWS, pers. comm. 2004). Although monsoonal flows had occurred in the Little Colorado River in October 2004, they happened early in the month, and the Little Colorado River was at base flow by the time these hoop net surveys were taken. This increased catch may be attributable to the mechanical removal efforts. Nevertheless, mortality of humpback chub attributable to the high experimental flow is likely not discernable from other hypothesized, more consistent mortality factors associated with the mainstream, including cold temperatures (Valdez and Ryel 1995), predation, or loss of habitat. Despite this, the presence of increased numbers of young humpback chub in the mainstem must be taken into account.

The November – December high experimental flow is being conducted, in part, because it is thought that conducting these flows closer in time to inputs from the Paria River will better help to conserve and redistribute sediment. If this turns out to be the case, humpback chub and its critical habitat may benefit. The redistribution of sediment may result in the creation of near-shore features (sandbars, pools, and eddies) that provide habitat for young humpback chub. Therefore, there is potential for beneficial effects to humpback chub and critical habitat as well.

Non-native suppression flows would be extended by one week into April. These fluctuations could follow a November-December high flow that would hypothetically rework sediment in sandbars and pools of eddies (i.e., backwaters), the latter serving as habitat for young fish. These habitats are most often utilized by young fish emerging from tributaries in either late spring or summer. The time period proposed conflicts slightly with the life history traits of humpback chub and other native fish found in the Grand Canyon with respect to spawning. Fluctuations into the first week of April might have an effect on larvae that might be dispersed into the mainstem early as a result of tributary flows. Effects of fluctuations versus other affects that contribute to larval mortality (temperature, predation) would be difficult to discriminate under current mainstem conditions. Hoop netting indicates that young humpback chub are also present in the mainstem in April, albeit at lower numbers than in the fall. The physical effects of the fluctuations on the habitats may include either loss or accumulation of sediment in the pools as sediment is transported downstream.

Limited information exists on the effects of the total research and monitoring effort in Grand Canyon that would allow us to effectively assess the effects of this action along with the other ongoing efforts. Clearly, more research is needed, particularly to examine the effects of varying flow regimes on young humpback chub, a need that has been identified for over a decade (U.S. Fish and Wildlife Service 1995), but has still not been met.

Non-native fish suppression flows have resulted in 25 percent mortality of rainbow trout eggs and alevins in Glen Canyon and, apparently, there is no reproduction of rainbow trout below Glen Canyon (Korman et al 2004). This is expected to continue under the proposed action and result in an overall decrease in numbers of rainbow trout throughout Grand Canyon, and therefore at the mouth of the Little Colorado River. Humpback chub could benefit from this reduction in rainbow trout numbers via reduced competition and predation. However, fluctuating flows in January do little in this regard.

Adverse effects of non-native mechanical removal to humpback chub would continue to occur from capture and handling stress from electrofishing in both the control and removal reaches and via the concurrent hoop net surveys. However, mortality associated with these efforts in 2003 and 2004 has been quite low; only nine humpback chub mortalities have been documented through March 2004 (including three mortalities in the stomachs of brown trout, which may not be attributable to the proposed action). These efforts have also been successful in terms of removing rainbow trout. Continuing this effort may benefit humpback chub through reduced competition and predation from non-native fishes. Critical habitat for humpback chub will also benefit. The primary constituent elements of critical habitat include the biological environment. Competition and predation, otherwise normal components of the biological environment, are out of balance because of the presence of large numbers of non-native fishes (see 59 FR 13378). Mechanical removal and non-native fish suppression flows should have a beneficial effect by restoring, to some degree, the native biological environment, and improving the conservation value of critical habitat.

Kanab ambersnail

Flows above power plant capacity will inundate and scour the occupied habitat of the Kanab ambersnail at Vasey's Paradise. Most if not all snails in the vegetation will be washed down river or covered with sediment. Based on estimates calculated in August 2004, a flow of 45,000 cfs would scour approximately 119.4 m² of habitat. This may occur over two years of high flows, although the actual flow will likely be closer to 41,000 cfs due to low lake levels in Lake Powell and ongoing maintenance at Glen Canyon Dam. The actual number of snails lost will vary by season, with the most individuals and habitat lost during a high flow after spring reproduction in years with low overwinter mortality. The loss of vegetation below the flood line will also mean that snails which migrate or are washed off the talus slope will have a greater likelihood of falling into the river. The action agencies have proposed a conservation measure to improve the recovery rate of lost vegetation (see Conservation Measures). It is not known if this will increase the survival of ambersnails in the transported vegetation.

Bald Eagle

As identified in the original biological opinion, the removal of trout may affect the availability of locally abundant food resources for wintering bald eagles. Wintering bald eagles have been documented foraging on spawning rainbow trout in tributaries of the Colorado River in Grand Canyon, with a concentration at the mouth of Nankoweap Creek (Brown et al. 1989), which is approximately 3 miles upstream of the start of the Little Colorado River Inflow Removal Reach at Kwagunt Rapids. However, when trout are less abundant in Grand Canyon, bald eagles appear to utilize other resources in the area (G. Beatty, FWS, pers. comm. 2003, van Riper et al. 1995). Mechanical removal of trout has been successful in removing salmonids in the Colorado River (Coggins and Yard 2004), and this is expected to continue under the proposed action so there are likely fewer trout available to bald eagles as a result of this project. Bald eagles may continue to feed opportunistically in the project area, although wintering bald eagles are not likely to remain in areas with reduced food resources (van Riper et al. 1995). There are several alternative places for bald eagles to winter in Arizona; although a reduction in numbers of trout

in the action area may change local feeding opportunities, it is not likely to result in significant effects to bald eagles.

Cumulative Effects

Cumulative effects are those effects of future non-Federal (State, local, government, and private) actions that are reasonably certain to occur in the project area. Future Federal actions would be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project. Effects of past Federal and private actions are considered in the Environmental Baseline. The analysis of cumulative effects remains unchanged from the 2002 biological opinion.

Conclusion

After reviewing the current status of the species, the environmental baseline for the action area, the effects of the proposed implementation of the experimental releases from Glen Canyon Dam and removal of non-native fish, and the cumulative effects, it is the FWS's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the humpback chub, Kanab ambersnail, and bald eagle. Critical habitat for the humpback chub will not be destroyed or adversely modified, since the critical habitat would remain functional and continue to serve a conservational role for the species. No critical habitat is currently designated for the Kanab ambersnail or bald eagle, thus none will be affected.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. "Take" is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding or sheltering. "Incidental take" is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described are non-discretionary, and must be undertaken by the action agencies so that they become binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The action agencies have a continuing duty to regulate the activity covered by this incidental take statement. If the action agencies (1) fail to assume and implement the terms and conditions or (2) fail to require field crews to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit

or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the action agencies must report the progress of the action and its impact on the species to the Fish and Wildlife Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

In the original biological opinion, we anticipated the total level of incidental take of humpback chub would be difficult to detect because of the difficulty in finding dead or injured fish. Humpback chub will continue to be captured via hoop netting in the Little Colorado River Inflow Removal Reach, and additional humpback chub will be captured during proposed hoop netting from Lava Canyon to Unkar rapids. The level of electroshocking effort over the remainder of the project will be similar to previous efforts. The incidental take is expected to be in the form of collect, harass, and kill. Most of the take is expected to be in the non-lethal form of collection and harassment. We anticipate 20 humpback chub will be killed as a result of this action over the two-year term of this project.

We anticipate that incidental take of the Kanab ambersnails will be difficult to detect because of the losses that may be masked by seasonal variations. However, the following level of incidental take can be estimated by the surrogate measure of maximum habitat lost, approximately 119.4 m² over the course of the next two years. Incidental take is expected to be in the form of harm and mortality.

We do not anticipate incidental take of bald eagles as a result of the proposed modification.

EFFECT OF TAKE

The effect of take remains the same as described in the 2002 biological opinion.

REASONABLE AND PRUDENT MEASURES

The reasonable and prudent measures remain the same as described in the 2002 biological opinion.

TERMS AND CONDITIONS

The terms and conditions remain the same as described in the 2002 biological opinion.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office, 2450 West Broadway Road #113, Mesa, Arizona, 85202 (telephone: (480) 967-7900) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the

Law Enforcement Office with a copy to this office. Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact specimens of listed animal species shall be submitted to educational or research institutions holding appropriate State and Federal permits. If such institutions are not available, the information noted above shall be obtained and the carcass left in place.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution prior to implementation of the action. Injured animals should be transported to a qualified veterinarian by a qualified biologist. Should any treated listed animal survive, FWS should be contacted regarding the final disposition of the animal.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1. We recommend that the action agencies initiate a study of the causes of decreased flow at Vasey's Paradise.
2. We recommend that the action agencies fund research using sonic cameras to monitor warm water non-native fish species abundance and distribution in Grand Canyon in relation to naturally increasing water temperatures and the temperature control device at Glen Canyon Dam.

In order for the Fish and Wildlife Service to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, we request notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

This concludes this reinitiation of formal consultation on the proposed action. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We appreciate your efforts to identify and minimize effects to listed species from this project. For further information please contact Glen Knowles (x233) or Debra Bills (x239). Please refer to the consultation number, 02-21-03-F-016-R3 in future correspondence concerning this project.

/s/ Steven L. Spangle

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
Project Leader, Fish and Wildlife Service, Pinetop, AZ
Bruce Taubert, Arizona Game and Fish Department, Phoenix, AZ
Norm Henderson, National Park Service, Salt Lake City, UT
Director, Navajo Fish and Wildlife Department, Window Rock, AZ
Robert Begay, Navajo Nation, Window Rock, AZ
Jeff Cole, Navajo Nation, Window Rock, AZ
Director, Bureau of Indian Affairs, Phoenix AZ
San Juan Southern Paiute, Tuba City, AZ
Pueblo of Zuni, Zuni, NM
Havasupai Tribe, Supai, AZ
Hualapai Nation, Peach Springs, AZ
Southern Paiute Consortium, Fredonia, AZ
Hualapai Fish and Wildlife, Peach Springs, AZ
Hopi Nation, Kykotsmovi, AZ
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