

**APPENDIX L**

**Public Response**



# ARIZONA RIPARIAN COUNCIL

for Environmental Studies  
a State University

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Tempe AZ 85287-3211

January 22, 2004

Ms. Nora B. Rasure, Forest Supervisor  
Attn: Ms. Cecelia Overby  
Coconino National Forest  
23223 East Greenlaw Lane  
Flagstaff, Arizona 86004

Dear Ms. Rasure:

The Arizona Riparian Council (ARC) appreciates the opportunity to comment on the "Native Fish Restoration in Fossil Creek" Draft Environmental Assessment (DEA) which was issued jointly by the U.S. Forest Service (USFS) and U.S. Bureau of Reclamation (BR). The ARC has been involved with the restoration of Fossil Creek since 1992 when relicensing for the Childs/Irving Hydroelectric Project was proposed. We are looking forward to December 2004 when full flows to Fossil Creek will be restored.

## General Comments.

The main concern of the ARC is the risk to the native fish community this action potentially poses. In the DEA the USFS and BR are proposing restoration of Fossil Creek's native fish community. All who have worked for the restoration of Fossil Creek flows and those presently involved with its restoration have the same goal in mind – protecting the native fish and the riparian ecosystem of this unique area. However, killing all of the fish (except the natives removed before the renovation) and an the undocumented community of macroinvertebrates is a very drastic measure, an irreversible step. It is one that should be undertaken only as the last resort. During the time the natives are being held in tanks an equipment failure could kill the entire population of native fish to be reintroduced into the stream. This would be disastrous.

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Page 49 states, "In the absence of Federal action to protect the native fish community, the trend of increasing nonnative populations and decreasing native populations would continue, and Fossil Creek would likely become a smallmouth bass, green sunfish, and catfish dominated stream." This perhaps is the model for most southwestern streams; however, Fossil Creek's flow is going from 2-5 cubic feet/second (cfs) to 43 cfs. What is the probability that the native fish community living in newly created natural flow regime would be able to out compete the nonnative species? Serious analysis should be given to this scenario.

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Specific Comments.

The number of individuals of each species of native fish needed to be collected to ensure that a sufficient gene pool needs to be determined. Page 23 states, "...capture as many native fish alive as possible." How many is this? 50 or 100 or 2,000 or 11,000 or 210,000 or 456,000, 6,987,000, etc. It is important to have a science-based approach to determine a minimum viable population. Page 86 states that "There is no definitive number of fish that must be salvaged to ensure that genetic viability is preserved for repatriation following chemical renovation (T.E. Dowling, Arizona State University, personal communication)". Because of the importance of knowing the number of individuals needed to ensure a genetically viable population a second opinion on this matter would be prudent.

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Page 23 describe the collection of native fish to be held for reintroduction to the creek subsequent to renovation. Who specifically will be in charge of the salvage operation? Who will be responsible for each subreach? This description needs to contain a complete plan for the collection of the native fish: When will it take place? How many people are needed? Where are these people coming from? What equipment is needed and in what quantity? Will each stream section be broken down into subreaches for collecting? Where will the collection point be for each subreach? Where will the helicopter land? These and all of the "nuts and bolts" of the salvage operation need to be determined well in advance of project implementation.

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Also, the equipment to be used to hold the native fish needs to be identified. How many and the type of holding tanks and aeration systems needs to be determined, where will you get them, when will you set them up and test them, what will be the water testing protocol, what is the contingency plan(s) in case of equipment failure. Who specifically will be in charge of the holding operation and how many people are needed for this phase of the operation?

The concentration of Antimycin A needed to be used to obtain a 100 percent fish kill needs to be decided. Page 24 discusses the concentration of Antimycin A needed to achieve this level. Yellow bullhead is the most difficult to kill and a 100 percent kill was reported using concentrations between 25 to 200 ppb. The lower reach in which yellow bullheads have been documented will be treated with "20 and above ppb" and the upper three reaches will be treated with 20 ppb. First, it would seem to be the prudent thing to do to assume that at least a few yellow bullheads are in the upper three reaches and dose the stream accordingly. Second, the amount of Antimycin A needed to achieve a 100 percent kill in all reaches (more specific that "20 and above ppb") needs to be determined.

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Although the macroinvertebrate community would be expected to recolonize the renovated segment of Fossil Creek, it is unknown because of the lack of in depth surveys. Do any sensitive species exist in the stream? Prior to renovation, this information should be collected and a determination made.

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In light of the fact that the renovation project is an extremely drastic measure which could result in dire consequences for the stream's native fish community, a thorough analysis of this action should be made. Appendix C lists the stream renovations in the Lower Colorado River Basin and notes whether or not the project achieved its purpose. The projects were reported to achieve their purpose in 19 of 21 cases. However, the definition of "achieve its purpose" is not given. Was the purpose to benefit native fish or was the purpose to benefit native fish by removing 100 percent of nonnative fish? Are the projects which were deemed successful still regarded as successful. In other words were they truly successful and for how long?

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Design criteria for the barriers needs to be listed. For example, was it determined that a 4-foot vertical drop was needed with a 20-foot apron downstream of the barrier with a 2 percent slope needed for an effective barrier? Also, under what flood flows (1 in 10 year, 1 in 100 year, etc.) will the barrier be effective? Does the preferred alternative meet these design criteria?

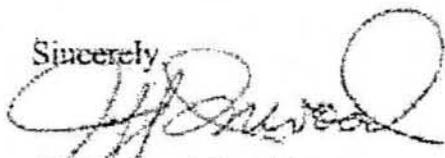
1-8

In summary, the renovation project may be the prudent action to take to save the fish population in Fossil Creek; however, a more thorough analysis is needed to determine if this action is actually needed and what will be its probability for long term success.

Above all, if this project is implemented it must be done so successfully. Time is growing short until December 2004 and all the agencies involved in this operation need to plan--plan--plan.

Failure due to lack of planning is not an option.

Sincerely,



Jeff Inwood, President  
Arizona Riparian Council

## **Response to Letter of Comment from Arizona Riparian Council**

**1-1** As discussed in section 2.3, *Stream Renovation*, Fossil Creek would be divided into four reaches, each reach being considered as a discrete treatment unit. Once a particular reach has been successfully treated, native fishes removed from that reach would be returned before renovation of the next reach is attempted. At no time would the entire native fish population be removed from the stream

**1-2** The new flow regime would not produce a substantial competitive advantage to the native fish community. Other similar streams within the Gila River basin have required human intervention to prevent community dominance by nonnative species and avert partial or complete loss of the native component (also see response 2-8). In the mainstem Verde River, predation and competition from nonnative fishes have greatly reduced the number and distribution of native species, despite flow velocities that are much higher than those in Fossil Creek.

**1-3** As discussed in section 3.2.6, *Stream Renovation*, there is no definitive, scientifically defensible number of fish that can be collected to ensure preservation of a "sufficient gene pool." Sampling techniques discussed on pages 22 to 23 will be employed to capture as many native fishes as technically practicable from each reach. As noted in the EA, the native fish community above the Fossil Springs diversion would continue to be a source of genetic variability to downstream populations (also see response 2-13).

**1-4** Specific personnel assignments, equipment needs, and operational procedures will be identified in an implementation plan prepared after the NEPA process has been completed and an alternative selected. Stream renovation will be supervised by AGFD.

**1-5** Proposed piscicide application rates are discussed on pages 24-25. The final application rates will be determined following completion of field bioassays.

**1-6** As discussed on page 71, sampling conducted by Northern Arizona University found no macroinvertebrate species of special concern within proposed treatment areas.

**1-7** The fourth column of Table C-1 describes the purpose of each stream renovation project. All sought to remove 100 percent of the nonnative fishes. Projects that list multiple years of treatment clearly were not successful in achieving the project purpose in the initial (and in some cases, subsequent) attempt. Most, but not all, projects are considered successful at the present time.

**1-8** Design criteria for the proposed (Wilderness) fish barrier are presented on pages 18 to 22. The minimum vertical drop of the barrier will be 5 feet, as shown in Figure 3 on page 20. Below the barrier, the stream quickly descends an additional 8 to 10 feet in elevation. This configuration will maintain sufficient vertical drop to prevent ingress of nonnative fishes during low-level floods. As noted in the EA, we do not anticipate upstream movements of fishes during peak flooding due to high current velocities and sediment loads.

January 27, 2004

Ms. Nora B. Rasure, Forest Supervisor  
Attention: Ms. Cecelia Overby  
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2323 East Greenlaw Lane  
Flagstaff, AZ. 86004  
*Via Email*

Re: Comments of American Rivers, Arizona Audubon Society, Center for Biological Diversity, Friends of Arizona Rivers, Sierra Club – Grand Canyon Chapter on the Draft Environmental Assessment for Native Fish Restoration in Fossil Creek, Coconino and Tonto National Forests, December 2003

## **I. INTRODUCTION**

The undersigned organizations have a keen interest in the restoration of Fossil Creek dating back to the beginning of the original relicensing process in 1995. Since that time, many of our staff members and consultants have engaged in various stakeholder processes, intervened in the relicensing process, participated in negotiations, and ultimately signed the settlement in support of surrendering the Childs-Irving Project. We continue to strongly support the efforts of Arizona Public Service (APS) to surrender its hydropower license and retire the Childs Irving Project consistent with the settlement agreement, to restore the natural form and function of Fossil Creek, one of the few remaining intact riparian areas in Central Arizona.

The restoration of flows to Fossil Creek offers one of the best opportunities to provide habitat for native desert fishes in Central Arizona. In order to achieve the full benefits of the decommissioning of the Childs-Irving Project and the return of natural flows to the stream, we have been and remain generally supportive of the restoration actions of the Bureau of Reclamation and the US Forest Service in the proposed construction of a stream barrier and treatment of the stream to remove non-natives.

## II. COMMENTS

### A. Barrier

As organizations principally dedicated to river protection and restoration, the Conservation Groups are not in the habit of supporting the placement of structures or barriers in rivers or streams. However, that general opposition is overcome by the need to protect native fish species assemblages from predation by non-natives migrating up Fossil Creek from the Verde River. Therefore, the question for us is not whether, but how and where.

Concerns over barrier construction and placement revolve around several issues: a) short-term impacts of construction activities; b) long-term effectiveness; c) impact on fish and wildlife; and d) impact on Wilderness or Wild and Scenic River status.

#### *a) Short-term impacts of construction activities*

We have no comments on the impacts of barrier construction beyond concerns about the Wilderness area and the need to minimize impact. Due to the rugged terrain, it appears that carrying the materials and equipment in by mule would cause more negative impacts than the proposal to use a helicopter. We also understand that the use of power drill in this case will minimize the amount of time to establish the barriers and therefore limit the impacts to the area. The explanation in the DEA is reasonably thorough.

2-1

#### *b) Long-term effectiveness of the barrier*

This project is only as good as its effectiveness and durability. Our understanding is that this project is being funded by the Central Arizona Project for the purpose of meeting Endangered Species Act requirements for projects elsewhere in the state. While we expect that this project will be successful, in the event that the barrier fails to block non-natives from moving from the Verde up into Fossil Creek, will the Central Arizona Project be held accountable to undertake other native fish restoration projects as a substitute? Would these take place in the Fossil Creek watershed or elsewhere?

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The DEA states on page 12 that the Central Arizona Water Conservation District (CAWCD) will be responsible for the long-term maintenance of the fish barrier. We take this to mean that the CAWCD will ensure that funding is there for proper monitoring and maintenance of the barrier and that if the barrier breaks, then CAWCD would be liable to fix it. We believe that CAWCD should be responsible for paying for construction-related activities, and that while the CAWCD should pay for the maintenance, the USFS should be responsible for overseeing the maintenance activities. Often these fish barriers fail because they are improperly maintained. Considering the remote location of the proposed barrier in the Mazatzal Wilderness, it is essential that the land manager have a long-term commitment to maintaining it in a manner that both affords protection to the native fish and is consistent with the wilderness area. Please address these concerns in the final EA.

2-3

*c) Impact on fish and wildlife*

There appears to be little short- or long-term impact on fish and wildlife from the construction of the barrier other than its intended purpose of preventing movement of non-native fish from moving up Fossil Creek.

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*d) Impact on Wilderness and Wild and Scenic River status.*

Several of us stated in our scoping comments that because the proposed barrier would not have an impact on flows, we do not believe that the barrier will affect either Wilderness or Wild and Scenic Rivers status.

The DEA's characterization on page 86 of the future eligibility for Wild or Scenic River classification of the reach where the barrier is constructed in the Wilderness area seems unnecessarily pessimistic. If the project is completed as it is described in the DEA and contemplated by the proponents, we would expect that the barrier would have little if any effect on eligibility for either classification. We strongly believe that the EA should work from such a presumption. Section 16(a) of the Wild and Scenic Rivers Act of 1968, as amended, in defining "Free Flowing," states as follows:

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The existence, however, of low dams, diversion works, and other minor structures at the time any river is proposed for inclusion in the national wild and scenic rivers system shall not automatically bar its consideration for such inclusion: *Provided*, That this shall not be construed to authorize, intend, or encourage future construction of such structures within components of the national wild and scenic rivers system.

Here we have a hybrid situation, where the river has already been studied and deemed eligible for wild and scenic status, thus perhaps triggering the "proposed for inclusion" language, but the river has not been designated by Congress into the national wild and scenic rivers system. As we read the statute, then, there is no statutory bar to construction of the proposed stream barrier while maintaining eligibility for wild and scenic status, because Fossil Creek is not as yet a "component" of the national system. And one of the "outstandingly remarkable values" ("ORV") assigned for Fossil Creek is "fish." Surely the construction of the stream barrier would both "protect and enhance" the "fish" ORV of Fossil Creek, to quote section 10(a) of the Wild and Scenic Rivers Act. In the circumstances, we believe the Forest Service can proceed with the construction of the stream barrier without necessarily jeopardizing the current potentially "wild" classification of that segment.

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(cont.)

The last row in the table on page 33 should be amended to strike the phrase "Minor effect on free-flow" in the second column and "Slightly greater effect on free-flow" in the third column.

Page 83 of the DEA references Forest Service policy (FSM 2354.76) which identifies a 10-step process used when evaluating proposed water resources projects on a river authorized by Congress under Section 5 of the Act, of which Fossil Creek is one. Please include this memo as an attachment to the final EA.

2-6

In the May 2002 comments for the scoping of this DEA, some groups urged the USFS to undertake a formal determination pursuant to Section 7(a) of the Wild and Scenic Rivers Act as to the impact of the project on the designated Verde River, which is only 4.5 miles

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south of the project area. (DEA, p. 84.) The requirement comes from the second sentence of section 7(a) of the Wild and Scenic Rivers Act, as follows:

Nothing contained in the foregoing sentence, however, shall preclude licensing of, or assistance to, developments below or above a wild, scenic or recreational river area or on any stream tributary thereto which will not invade the area or unreasonably diminish the scenic, recreational and fish and wildlife values present in the area on the date of designation of a river as a component of the national wild and scenic rivers system.

It appears to us that the 10-step process described at pp. 83 – 84 of the DEA was used to determine the project's likely effects on *Fossil Creek*, and did not study the effect of the Fossil Creek stream barrier project on the Wild and Scenic Verde River. The first full paragraph on page 84 of the DEA makes the assertion that the Fossil Creek stream barrier project will not affect the free-flowing character of the Verde Wild and Scenic River or the scenery, recreational or wildlife values thereof, thus paralleling the words of the statute quoted above, but no reference is made to the actual conduct of a detailed study thereof. The Forest Service should give full effect to its statutory obligation and provide an explicit reference to the requirements of the Act and incorporate an appropriate analysis of the impacts of the barrier on the free-flowing character of the Verde River Wild and Scenic River or lack thereof. We do expect that the result of such a consultation would be the finding stated on p. 84, namely, that the project has no adverse effect on the Verde Wild and Scenic River.

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(cont.)

Based upon prior precedence and the intent of the framers of the Wilderness Act it seems clear that fisheries enhancement activities and facilities were contemplated as actions that are accepted within designated areas. (PL 88-577 "A wilderness, in contrast with those areas where man and his own works dominate the landscape, is hereby recognized as an area where the earth and its community of life are untrammelled by man, where man himself is a visitor who does not remain. An area of wilderness is further defined to mean in this Act an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvement or human habitation, which is protected and managed so as to preserve its natural condition.") We are generally not supportive of

installing concrete structures in wilderness, nor using helicopters or drills in the wilderness area, but believe that in this specific case and based upon the project description in the DEA, the barrier and its construction is consistent with the management requirements of the wilderness area and the Wilderness Act. Having undertaken a site visit to the proposed barrier location and having read the plans to make the structure blend to the greatest degree possible, we believe that it will help restore a more natural fish community and promote protection of the native fishes and will leave "... the imprint of man's work substantially unnoticeable."

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(cont.)

**B. Antimycin**

Application of a piscicide in a waterbody is a significant and arguably drastic action albeit necessary in specific occasions. Although we support exploring alternatives to using these kinds of chemicals, such as physical collection of non-natives, the Conservation Groups understand that resource managers sometimes need to resort to such measures and this case may support that option. However, we continue to urge BOR and USFS to minimize unintended impacts, especially on macroinvertebrate populations.

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On page 10 and Table C-1, the DEA cites previous treatments of streams with antimycin that have yielded variable results in terms of native fish recovery. Please document the stream lengths of these projects and describe in general how they are similar to the circumstances found in Fossil Creek. Has a stream the size of Fossil Creek ever been treated? Were the other streams warm water fisheries?

Later, on page 25, the DEA states that additional antimycin applications may be needed following the initial doses. How many times might reapplication be tried? Under what circumstances would BOR and USFS decide that enough is enough? Please explain the potential impacts of repeated applications of antimycin.

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On page 49 of the DEA, crayfish are described as likely remaining a chronic problem, even after the application of antimycin. Can restoration resources be applied to address this problem, at least in the short term? Do crayfish pose a significant threat to

2-10

restoration efforts and if so, should they be addressed as we move forward with the barrier and antimycin treatment? While the antimycin application is underway, could crayfish gain a competitive advantage in the basin while the fish are gone?

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(cont.)

One significant concern of the Conservation Groups is whether stream treatment will have a significant impact on macroinvertebrate populations. Several studies identified by the Conservation Groups seem to indicate that treatments with antimycin-A do not have a large effect on macroinvertebrates, but we wish to see more discussion of this in the final EA.<sup>1</sup> Please also further your discussion on the possible effects on other non-target species due to the depletion of the food base.

2-11

Please provide the following information that was lacking in the DEA:

- Amount of antimycin expected to be used to treat the stream
- Expected biomass of the non-natives estimated to be in the stream
- Management of natives in the holding tanks during the antimycin application?
- Impacts of the neutralizing agent, potassium permanganate, on all affected environments.

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**C. Miscellaneous**

The DEA should reflect a greater expectation that Arizona Game and Fish will be responsible for managing fishermen and their introduction of non-natives into the stream as referenced on page 48. The bait-bucket transfer problem was described several times in the DEA, but little was said about additional actions that AG&FD could take to prevent this problem. Consideration should be given to declaring Fossil Creek off limits to sport fishing except as needed to "catch and remove" the exotics.

2-16

<sup>1</sup> "Short-term effects of antimycin and rotenone on invertebrates in first order, high elevation streams." K.M. Cerrero, R.O. Hall, Jr., and H. Sexauer. Department of Zoology & Physiology, University of Wyoming, Laramie, WY 82070, Wyoming Game & Fish Department, Region 1, Pinedale, WY 82941

"Effects of chemical treatment on benthic macroinvertebrates in Sams Creek, Great Smoky Mountains National Park, North Carolina/Tennessee, USA" C.A. Walker and D.A. Etnier. Department of Ecology and Evolutionary Biology, University of Tennessee, Knoxville, TN 37996

Finally, cautionary signage referenced on page 28 of the DEA should be provided in both Spanish and English.

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(cont.)

**D. Forest Service Appeal Eligibility**

USFS regulations for appeals of decisions based upon an EA (36 CFR 215, June 4, 2003) require interested persons to file substantive comments within the 30-day notice period. Individuals and organizations wishing to appeal must provide the following information:

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1. Name and address;
2. Title of proposed action;
3. Specific substantive comments on the proposed action along with supporting reasons;
4. Signature or other verification of identity;
5. Signature of a representative for each organization wishing to be eligible; and
6. Individual members of organizations must file separately from the organization to be eligible to appeal individually.

The undersigned organizations have met each of these requirements and should be eligible to appeal a Forest Service decision in this matter.




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**Response to Letter of Comment from American Rivers, Arizona Audubon Society,  
Center for Biological Diversity, Friends of Arizona Rivers, and Sierra Club**

**2-1** Your comment is noted.

**2-2** Reintroduction of nonnative fishes is addressed on page 27. Under the 2001 CAP biological opinion, nonnative control and removal actions above the barrier are the responsibility of the FWS working in partnership with the AGFD, Forest Service, and Reclamation. Any failure of the barrier in preventing reintroduction of nonnative fishes will be thoroughly assessed by the agencies to determine appropriate management actions.

**2-3** The CAWCD will afford the same qualitative standard of inspection and maintenance to the barrier as it utilizes on the CAP. Provisions for Wilderness protection will be included in a special use permit issued by the Forest Service to the CAWCD for activities associated with barrier maintenance. All the cooperating agencies are committed to the long-term protection of Fossil Creek as a refugium for native fishes.

**2-4.** Your comments are noted.

**2-5** The WSR Section 7(a) analysis conducted by the Forest Service concluded that modification of the waterway at either of the alternative barrier sites will have a minor effect on free flow. Table 1 accurately reflects that conclusion.

**2-6** This policy statement has been included in the final Environmental Assessment as Appendix K.

**2-7** The WSR Section 7(a) analysis conducted by that Forest Service concluded the project will not adversely affect the free-flowing character of the Verde Wild and Scenic River.

**2-8** Stream lengths of renovation projects listed in Table C-1 range from very short reaches (<0.5 km) at Bylas Springs, AZ, to approximately 15 km on Mogollon Creek. Since Fossil Creek has been divided into four treatment reaches, none longer than 5 km, the length of stream to be treated there is not unusual. Although most streams listed in Table C-1 are cold water streams, some (Arnett Creek, Bylas Springs, O'Donnell Creek, Sabino Canyon, and West Turkey Creek) are warm water streams like Fossil Creek, with similar discharge rates, pool formation, substrate type, etc.

**2-9** As described on page 25, we are planning for a minimum of two, and a maximum of three back-to-back chemical treatments of each of the four reaches of Fossil Creek. Additional applications of antimycin would be needed in the future only if monitoring shows that nonnative fish have been reestablished in the stream. Use of antimycin for stream renovation has a high probably of success when applied correctly (see Appendix C for more information). We recognize that repeated introductions of nonnative fishes by humans would be problematic for the project in the long term.

On pages 52-54 we note that impacts to aquatic biota (other than the target organisms) from chemical treatments are temporary. As long as the reach of Fossil Creek above the Fossil Springs Diversion Dam is not renovated, it will always provide a source for recolonization of macroinvertebrates. We recognize that chemical treatment is a last-choice management alternative, and we intend to minimize the impacts of such actions to the greatest extent possible.

**2-10** At present there are no technologies other than trapping that are effective and approved for control of crayfish. And even by trapping, it is questionable if enough effort can be applied to significantly suppress crayfish populations (Momot 1998). The period of time in which treated segments of Fossil Creek will be fishless following renovations will be short (not more than two weeks), and we do not anticipate that crayfish will gain a competitive advantage during this brief absence. As stated on page 53, we do not believe the continued presence of crayfish in Fossil Creek, while undesirable, will preclude the success of native fish restoration efforts. Removal of nonnative fishes will eliminate the primary limiting factor to survival of native fishes in the system. Although the project is not designed to eradicate crayfish, we will keep apprised of crayfish control methodologies and propose new control efforts against them as appropriate.

Momot, W. T. 1998. An example of how exploitation can increase production and yield in a northern crayfish (*Orconectes virilis*) population. Pages 225-233 in G. S. Jamieson and A. Campbell, editors. Proceedings of the North Pacific Symposium on Invertebrate Stock Assessment and Management. Canadian Special Publication of Fisheries and Aquatic Sciences.

**2-11** We added some additional discussion of references pertinent to this topic on page 53. To our knowledge, there is no direct information available concerning food base effects on non-target species due to depletion of macroinvertebrates following antimycin treatment. However, macroinvertebrate losses due to antimycin treatment would be functionally no different than losses from floods (Bruns and Minckley 1980; Gray 1980, 1981). Native fishes have evolved with and are adapted to withstand such disturbances. We expect rapid recolonization of macroinvertebrate populations following antimycin treatment, and therefore we do not expect significant impacts to non-target organisms.

Bruns, D.A., and W.L. Minckley. 1980. Distribution and abundance of benthic invertebrates in a Sonoran Desert stream. *Journal of Arid Environments* 3:117-131.

**2-12** Although precise dosages of antimycin needed to effect mortality of target fishes will be refined with bioassay and field experiments, if we assume a standard dosage of approximately 20 ppb of antimycin, the total amount of antimycin required to treat all four reaches of Fossil Creek two times will be approximately 60 units, where a unit consists of 960 ml of undiluted antimycin (60 units equals 15 gallons). In the most likely scenario of treating at approximately 20 ppb in the three upper reaches and at approximately 200 ppb in the lowermost reach (to dispatch yellow bullheads), the total amount required for two complete stream treatments will be 137 units, or 131,520 ml (35 gallons). Using a worst-case scenario of three complete stream treatments, with the upper two reaches treated at approximately 20 ppb and the lower two reaches treated at approximately 200 ppb, the total amount of antimycin required will be 777 units, or 745,920 ml (197 gallons). The final application rates will be determined following completion of field

bioassays.

**2-13** There are no data available to provide a definitive estimate. Biomass of nonnative fishes does not appear high in upper reaches of the action area. The uppermost ½-mile reach below the Fossil Springs Diversion Dam is protected by a small natural barrier and appears to be devoid of nonnative fishes. Native fish diversity and numbers are quite high in this uppermost reach, and chemical treatment of the reach will not be necessary if surveys confirm the absence of nonnative fishes.

**2-14** As described on pages 22-23, native fishes transported to tanks at Irving will be held alive during antimycin treatments and released back into the stream reach where they were taken prior to treatment. Specific operational and contingency procedures will be addressed in the implementation plan.

**2-15** Toxicity of potassium permanganate ( $\text{KMnO}_4$ ) to fishes was briefly described in Appendix B on pages 124-125. It is more toxic in alkaline water than soft water (Marking and Bills 1975). There is little information available about its effects on other biota; however, Kemp et al. (1966) reported that  $\text{KMnO}_4$  reacted quickly in natural waters to form a biologically inert residue. Breakdown components of  $\text{KMnO}_4$  (potassium, manganese, and water) are common in nature and have no deleterious environmental effects at concentrations used for neutralization of antimycin (2-4 mg/l; Finlayson et al. 2000). Note that the draft EA erroneously reported  $\text{KMnO}_4$  would be applied at 1 mg/l.

Potassium permanganate will be acquired in a fine granular form and dissolved in water before dispensing to the stream. The dry material is inert, but becomes active when dissolved in water. If the chemical comes in contact with eyes or skin, the area should be flushed with copious amounts of water (Finlayson et al. 2000). Personnel are required to wear protective clothing and breathing apparatus for protection. The implementation plan will include personnel safety and spill contingency procedures.

**2-16** Thank you for your suggestion. The agencies will continue to use every management tool available to them to prevent reintroduction of nonnative fishes.

**2-17** Your comment is noted.



"Craig Sommers"  
<csommers@eroresour  
ces.com>

01/31/2004 08:33 AM

To: <comments-southwestern-coconino@fs.fed.us>

cc: "Rob Clarkson (E-mail)" <rclarkson@ic.usbr.gov>, "Dave Roberts  
(E-mail)" <dcrebert@srpnet.com>, "Rich Siegel (E-mail)"  
<rssiegel@srpnet.com>

Subject: Draft EA, Native Fish Restoration in Fossil Creek -- Comments by  
SRP

Attn: Ms. Cecelia Overby, Coconino National Forest  
Copy also sent by facsimile.

Dear Ms. Overby,

I am submitting these comments on behalf of the Salt River Project (SRP). If you have questions, please contact me or Dave Roberts, Manager, Water Rights and Contracts, Salt River Project (602-236-2343).

First, we regret missing the January 28 deadline for comments. We were unaware of this Draft EA until we coincidentally found it on the internet the other day during a search for native fish information for the Verde River watershed.

Although the Draft EA is quite comprehensive in its analysis of many types of potential impacts, it is silent on the effects of fish barrier construction on water flows and downstream water rights. We believe that the final EA and related documents must disclose the quantity of water to be lost by construction of either fish barrier alternative, including water used during construction, initial fill of the pond created by the fish barrier, and increased evapotranspiration losses over the life of the project. Similarly, the final documents should disclose the status of resolution of water right issues involving SRP and other downstream water users.

3-1

Discussions of water right issues related to construction of a Fossil Creek fish barrier were initiated with Reclamation in 2003. However, those water right issues have not been resolved to date. Of note, the recently released draft EA for an Apache Trout Enhancement Project by the Apache-Sitgreaves Forests recognizes the water rights issues created by construction of fish barriers, and suggests that if the water right issues are not resolved successfully, alternatives would be considered including backfilling the structure or making the barrier permeable.

In summary, the final EA, FONSI, and ROD must address the water losses and water right impacts if a Fossil Creek fish barrier is to be constructed.

Thank you for your consideration of these comments.

Craig Sommers  
President  
ERO Resources Corp.  
1842 Clarkson St.  
Denver, CO 80218  
P: 303-830-1188  
F: 303-830-1199  
csommers@eroresources.com

**Response to Letter of Comment from ERO Resources Corporation (Salt River Project)**

**3-1** Appropriate revisions have been made to the final EA.



"Glen Knowles"  
<xyrauchen@hotmail.com>

To: comments-southwestern-coconino@fs.fed.us  
cc:

Subject: Comment on Draft EA on Native Fish Restoration in Fossil Creek

01/28/2004 09:24 AM

Ms. Nora B. Rasure  
Forest Supervisor  
Attention: Cecilia Overby  
Coconino National Forest  
2323 East Greenlaw Lane  
Flagstaff, Arizona 86004

Re: Comment on Draft Environmental Assessment on Native Fish Restoration in Fossil Creek

Dear Ms. Rasure:

I support renovating Fossil Creek to eliminate nonnative fishes and building a barrier in Fossil Creek at the proposed action site in the Mazatzal Wilderness. The existing native fish community in Fossil Creek consists of headwater chub (*Gila nigra*), roundtail chub (*Gila robusta*), speckled dace (*Rhinichthys osculus*), longfin dace (*Agosia chrysogaster*), Sonora sucker (*Catostomus insignis*), and desert sucker (*Pantosteus clarki*). There are only a handful of streams in Arizona left that still support 5 native species. If our native fishes are to survive we will need to use renovation to create refuges for native fishes and barriers to protect them from the nonnative fishes that are the primary cause of their decline.

4-1

The proposed action wilderness alternative barrier will allow for an additional 2.8 miles of stream habitat that will benefit native fishes. Perhaps more importantly, the non-wilderness alternative will allow greater public access to the stream and facilitate potential illegal bait bucket introductions of nonnative fishes that could jeopardize the entire project. Please move forward with the proposed action wilderness alternative and implement this important project for native fishes.

Sincerely,

Glen W. Knowles  
35223 N. 9th St.  
Phoenix, AZ 85086

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**Response to Letter of Comment from Glen Knowles**

**4-1** Your comments have been noted.

JAN 27 2004

COCONINO.F.

# Arizona State University

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January 23, 2004

Ms. Nora B. Rasure, Forest Supervisor  
Attn: Ms. Cecelia Overby  
Coconino National Forest  
2323 East Greenlaw Lane  
Flagstaff, Arizona 86004

NORA W W  
CE Cdo

Inre: Draft Environmental Assessment (EA) on Native Fish Restoration in Fossil Creek – Opportunity to Comment (Action by January 28, 2004)

Dear Ms. Rasure:

As a conservation biologist with nearly 25 years of research and management experience dealing with native fish issues in the arid Southwest, I am familiar with the fauna of the Gila River basin in general and with that of Fossil Creek in particular. I have worked on the stream and its fishes for many years, and know them well. I have visited the stream and its watershed many times and know the specific sites being considered as part of the subject project. I have carefully read those portions of the EA upon which I feel qualified to comment.

If the Fossil Creek native fish restoration project is successfully implemented as presently scoped it will be a significant and precedent-setting action benefiting our state and regional natural resources. As you know, the project incorporates placing a barrier across the stream to prevent undesirable non-native species from invading (or reinvading) the system, salvage of existing native fishes, reclamation of the stream to remove non-native fishes, and re-establishment of the indigenous fishes. Because of this project there also is potential in the future to establish new populations of critically imperiled species such as loach minnow and spikedace.

The fact of the matter is that native fishes in Arizona are in particularly bad shape. Excluding our two indigenous trouts, there is no native fish species that is in better shape today than it was twenty years ago, and this is startling when considering that many of these species have been federally listed throughout this time. And, additional species are being proposed for protection (roundtail chub, for example). The message is clear that too little is being done to conserve these valuable resources.

Most scientists agree that non-native fishes pose the most serious threat to the continued survival of our native fish populations, and there is much evidence in support of this view. In most instances, it seems unlikely that native fishes will persist where non-natives become established. Management needs for native fishes are clear: eliminate or reduce non-native populations where native fishes are desired, and keep non-natives out of places from which they have been eliminated (or where they do not yet exist). Fossil Creek represents an almost ideal opportunity to do just this, while at the same time preserving all other resource values (I do not consider a barrier in Forest Service wilderness a compromise to resource values in that reach, especially in context of the overall benefit of the project).

5-1

Ms. Nora B. Rasure, page 2

In conclusion, I fully support the Fossil Creek native fish restoration project, and specifically support the proposed action (wilderness alternative). Please contact me at your convenience if you would like additional information or would like to discuss the project further.

Sincerely,

*Paul C. Marsh*

Paul C. Marsh, PhD

**Response to Letter of Comment from Paul Marsh**

5-1 Your comments have been noted.

January 28, 2004

Ms. Nora B. Rasure, Forest Supervisor  
Attention: Ms. Cecelia Overby  
Coconino National Forest  
2323 E. Greenlaw Lane  
Flagstaff, AZ 86004

Submitted via email to: comments-southwestern-coconino@fs.fed.us.

In re: Draft Environmental Assessment, Native Fish Restoration in Fossil Creek

Dear Ms. Rasure:

Thank you for the opportunity to review the draft "Environmental Assessment, Native Fish Restoration in Fossil Creek". I have looked forward to seeing this document for many years and am not disappointed. It is a finely written document that fully and logically explains the project. Please convey my compliments to those who prepared it.

Before my retirement from the Forest Service (Tonto National Forest) as a fisheries biologist in 2002, I was fully involved with the Childs-Irving Hydroelectric Project that had been ongoing for longer than a decade, and more recently the Fossil Creek native fish restoration project. Because of this involvement, I am extremely familiar with Fossil Creek, the hydroelectric and fisheries projects, and have visited the locations of the proposed fish barriers. I am also familiar with fish barrier construction and fisheries renovation projects in both wilderness and non-wilderness areas for coldwater and warmwater fishes, having planned and participated in more than two dozen efforts during my career.

Throughout the Forest Service's negotiations with Arizona Public Service Company, the Federal Energy Regulatory Commission, and the environmental coalition, the primary goal consistently was to restore the natural ecosystem values in the Fossil Creek watershed. The native fishery was an integral part of that goal. If this project is successfully implemented as per the proposed action, it will be a precedent-setting achievement of regional and national importance to native fish conservation and wilderness management. In addition to conserving the native fishes currently found in Fossil Creek, there also will be significant potential for reestablishing several species that were lost from Fossil Creek during the past century.

Fishes in the southwestern United States, particularly the Gila River basin, are in peril of extinction. Despite efforts stimulated by the Endangered Species Act and other federal and state statutes, these native fishes are in worse shape in terms of distribution and abundance than they were 20 years ago. Native fishes have been lost from a significant proportion of their historical range due to a combination of water manipulations, watershed impacts, and introduction and spread of nonnative fishes. It will be only through efforts such as the proposed Fossil Creek native fish restoration project that this deadly decline can be slowed or reversed.

**I encourage your efforts and strongly urge you to recommend the proposed wilderness alternative to the Regional Forester for his approval.**

Of the two action alternatives, the proposed wilderness alternative would provide the greatest extent of protection for native fishes, and the least disturbance to the landscape and natural values. The no action alternative would do nothing to improve the status of native fish in the region, but instead would allow their continued decline and loss from Fossil Creek. Bait-bucket transfers of nonnative fish would likely compromise the non-wilderness alternative soon after

- project completion. Once compromised, management agencies would then be forced to perform additional activities to restore the integrity of the project, which would probably lead to even more disturbances. 6-1 (cont.)
- Following are more specific comments on the EA:
- Page 8, 1<sup>st</sup> para, 3<sup>rd</sup> sentence: During the comment period for designation of critical habitat for razorback sucker in 1994, the Forest Service recommended to the U. S. Fish and Wildlife Service that Fossil Creek be included in critical habitat because of its value to recovery of the species. 6-2
- Page 10, 1<sup>st</sup> paragraph, penultimate sentence: Add Sabino Canyon to the list of streams recently renovated to remove green sunfish. 6-3
- Page 15, Renovation methods: Alternative means of removing nonnative fishes will also harm native fishes. Nets, angling, and electrofishing do not distinguish between native and nonnative fishes, and reliance on these methods to keep the nonnative species in control would likely injure and/or kill many individual native fishes in the long-term. 6-4
- Page 25, 2<sup>nd</sup> paragraph, 5<sup>th</sup> sentence and following: The use of a second application of piscicide to determine if the preceding application was successful was pioneered by the Gila Trout Recovery Team in order to determine actual success of the project. Previously in other renovation projects, the stream would have been treated and then electrofishers or other gear used to determine if fish had survived the treatment. This often resulted in a false conclusion that the treatment had been successful, only to find out later that a few individuals had survived and the project was compromised. Unfortunately, the comprehension that target organisms had survived and required a removal project usually was not realized until native fish had been repatriated into the stream. This resulted in wasted effort, dashed expectations, and sometimes public ridicule. The Gila Trout Recovery Team determined that a follow-up application of piscicide was much more likely to reveal any surviving individuals than electrofishing. The team has successfully used this methodology for 15 years and many renovation projects with no failures. 6-5
- Page 28, 1<sup>st</sup> line: Typo: "zix". 6-6
- Page 33, last row, 3<sup>rd</sup> and 4<sup>th</sup> columns: I don't agree that a barrier that is lower than other natural waterfalls in Fossil Creek will have an effect on free-flow. Both barriers are designed to retain base flow in the natural thalweg of the stream with no artificial widening of the active channel. Nor will they impound any water or have an effect on discharge below the barrier. I recommend they be modified to "no effect on free-flow". 6-7
- Page 34, 1<sup>st</sup> row: Define acronyms "ORV", "VQO". 6-8
- Page 41, 2<sup>nd</sup> paragraph, 4<sup>th</sup> line: Typo: "5-oot". 6-9
- Page 46, 3<sup>rd</sup> paragraph: Would you add some description of the private inholding, i.e., how many acres, how much stream frontage? Also please note that the housing at Irving is on National Forest System land, not private. 6-10
- Page 47, 6<sup>th</sup> line: Typo: remove comma at end of line. 6-11
- Page 49, 3<sup>rd</sup> paragraph: An excellent citation to document crayfish effects on native fish is: Guan, R.Z., and P.R. Wiles. 1997. *Ecological impact of introduced crayfish on benthic fishes in a British lowland river*. Conservation Biology 11:641-647. They used field and laboratory data and experiments to document the fish responses to crayfish and the mechanisms by which crayfish altered the native fish community. 6-12
- Page 53, 3<sup>rd</sup> paragraph, 2<sup>nd</sup> sentence: This is a particularly strong statement and could be toned down. Although there may not be any published evidence to support the statement, there are anecdotal accounts that suggest that crayfish could decimate fish populations to the point of no return, particularly if there are nonnative fish predators also present. I observed crayfish nearly eliminate longfin dace in Cave Creek north of Phoenix in the mid-1990's. Although longfin dace remain extant in that stream, their population vigor, and perhaps genetic variation, could have been compromised during that bottleneck. 6-13
- Page 55, 1<sup>st</sup> paragraph: A local example of nonnative fish being moved over a barrier into a renovated stream occurred in Sabino Canyon Creek on Coronado National Forest. There, the barrier was about 8' high, but was in a location with considerable public access and water-play. 6-14

Green sunfish were moved over the barrier within a few years of the renovation project, which then compromised the previously successful project.

Page 61, razorback sucker, last sentence: Should change this statement to read "Razorback suckers were stocked above Irving dam in 1988, where they grew to lengths >15". None have been collected in Fossil Creek since 1992. However, the aquatic habitat there is complex, the fish are secretive, and surveys have not been intense."

6-15

Page 62, spikedace: Rinné, J.N. 1992. *Physical habitat utilization of fish in a Sonoran desert stream, Arizona, southwestern United States*. Ecology of Freshwater Fish 1:35-41 is probably a better citation for habitat of spikedace, and other native fishes.

6-16

Page 62, last paragraph, 3<sup>rd</sup> line: "several thousand feet" should be changed to "several tens of miles".

6-17

Page 69, Other species of concern, 2<sup>nd</sup> line: Add: "and elsewhere in their range" after comma.

6-18

Page 86, Classification: It needs to be emphasized that fish barriers do not create impoundments. In Fossil Creek, the height of the barrier will be no more or less than natural waterfalls that currently exist, and sediment moving through the system will rapidly deposit and aggrade the channel behind the barrier, thus displacing any potential for impounding water. Additionally, the proposed fish barrier would be a replacement for a natural barrier that was destroyed during flooding a few years ago.

6-19

Construction of fish barriers in wilderness and/or wild and scenic rivers is a relatively common practice on National Forest lands. I have knowledge of rock masonry and gabion structures constructed in Gila, Aldo Leopold, Golden Trout (Figure 1), and San Pedro Parks wilderness areas, none of which caused any controversy or public comment. Most were constructed to blend in well with the surrounding landscape and were typically placed in areas where there was little human use. Their effect on the landscape or free-flowing aspects of the streams was minimal.



Figure 1. Templeton fish barrier on South Fork Kern River in Golden Trout Wilderness, Inyo National Forest, California. The barrier was about 6' high, but water behind the barrier was only a few inches deep and moved at a velocity of >1 foot per second during base flow. The South Fork Kern River was designated a Wild and Scenic River. Before livestock removal, the grassy areas were barren sand flats. Photo: 8/9/2003, J. Stefferud.

Based on my considerable experience with other barrier construction and fish restoration efforts, I am convinced that the Fossil Creek fish restoration project is technically and physically possible with little to no environmental perturbation. The wilderness alternative would place a structure in a part of Fossil Creek that receives almost no human visitation, thus visual impacts

6-20

and potential for bait-bucket transfers of fish would be minimized. The carefully planned and implemented application of antimycin, as per the EA, would have minimal or no impact on non-target organisms, or downstream effects. Fossil Creek is a linear system that will have untreated areas both up- and downstream of the project area from which macroinvertebrates will be able to recolonize the treated reaches. Based on my experience with antimycin treatments, associated macroinvertebrate monitoring, and knowledge of the literature, I do not believe that there will be any long-term detrimental effects on aquatic macroinvertebrates. Detoxification of antimycin with potassium permanganate will limit downstream effects on fishes to a very short distance. When label instructions are followed, there is no potential for harm to humans, terrestrial wildlife, other aquatic animals, or plants.

Although successful application of piscicide to a stream the length of Fossil Creek appears formidable, the situation has certain advantages:

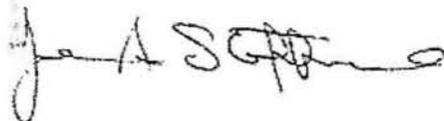
- There is excellent vehicular access along the middle portion of the stream, and moderately good access to the upper portion.
- Fossil Creek has simple drainage complexity with no tributaries, backwaters, or marshy areas that would be difficult to treat.
- Work can occur nearly yearlong.
- The discharge is controlled and does not change incrementally downstream, which makes calculation of dosages more accurate.
- The area to be treated can be divided into distinct and isolated segments that can be treated individually.

I have applied piscicide to streams in wilderness areas that were much longer, and with much greater drainage complexity than Fossil Creek. Although Fossil Creek has its own unique problems (e.g., most of the volume of water is in pools), I do not see anything insurmountable to prevent successful completion of the project, other than running out of time before the treatment can be completed.

I support the wilderness alternative and urge its timely implementation. The Fossil Creek native fish restoration project presents a unique opportunity to contribute significantly to the conservation of native fishes in the Gila River basin. Moreover, it fulfills the goals developed during discussions of the Childs-Irving Hydroelectric Project to restore natural ecological values to the Fossil Creek watershed. The time is swiftly approaching when full flows are returned to the stream, and delay in approving this project may preclude its successful completion.

I appreciate your consideration of these comments. Please contact me at your convenience if you would like additional information or would like to discuss the project further.

Sincerely,



Jerome A. Stefferud

6-20  
(cont.)

## Response to Letter of Comment from Jerome Stefferud

- 6-1 Your comments have been noted.
- 6-2 Your comment has been noted.
- 6-3 Appropriate revisions have been made to the final EA.
- 6-4 Appropriate revisions have been made to the final EA.
- 6-5 Your comment has been noted.
- 6-6 This typographic error has been corrected.
- 6-7 Please see response 2-5.
- 6-8 The acronyms are spelled out in Table 1 of the final EA. They also are defined on pages 81 and 84.
- 6-9 This typographic error has been corrected.
- 6-10 Appropriate revisions have been made to the final EA.
- 6-11 This typographic error has been corrected.
- 6-12 Thank you for pointing out this reference. This article discussed how an introduced species, the crayfish *Pacifastacus leniusculus*, native to parts of western North America, affected the abundance of two benthic fishes in the United Kingdom through shelter competition, habitat alteration, and predation.
- 6-13 See response 2-10.
- 6-14 Your comment is noted.
- 6-15 Appropriate revisions have been made to the final EA.
- 6-16 Thank you for pointing out this reference.
- 6-17 Appropriate revisions have been made to the final EA.
- 6-18 Appropriate revisions have been made to the final EA.
- 6-19 Thank you for your comment. We believe those issues were adequately address on page 41 (*Hydrology*) and page 87 (*Free-flow*).

6-20 Your comments are noted.

SALLY E. STEFFERUD  
315 E. Medlock Drive  
Phoenix, Arizona 85012  
602-274-5544  
stefferud@cox.net

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January 27, 2004

Nora B. Rasure, Forest Supervisor  
Attention Cecelia Overby  
Coconino National Forest  
2323 East Greenlaw Lane  
Flagstaff, Arizona 86004

Dear Ms. Rasure:

Thank you for the opportunity to comment on the draft Environmental Assessment (EA) on Native Fish Restoration in Fossil Creek. I strongly support this very important project for native fish conservation in the Gila River basin. I am a biologist with nearly 30 years experience with fishes of the American southwest. I recently retired from the U.S. Fish and Wildlife Service in Phoenix, where I worked for 13 years on protection and recovery of native fishes. As an independent biologist, I continue to work on native fish conservation in a variety of ways, including field studies and collaborative management efforts. As a Fish and Wildlife Service biologist, I was involved with the Childs/Irving Hydropower and Fossil Creek native fish restoration projects for over 5 years and have a continuing interest in this unique opportunity for significant forward progress in recovery of Gila basin native fishes.

Please convey my compliments to the preparers of this EA. The draft EA is, within the constraints of the form, well organized, readable, well documented, and logically presented. My comments are presented as general comments on the project and then as specific comments on particular items of the document.

#### General Comments

I support the proposed action (wilderness alternative) and urge you to move forward expeditiously to implement the project. To ensure the maximum probability of success, the nonnative removal portion of the action must take place prior to restoration of full flows. The proposed wilderness alternative will provide for the greatest amount and quality of native fish and aquatic ecosystem restoration. I support the use of the downstream wilderness location for the barrier because of its lesser negative impacts and because, as the EA clearly points out, it will have a significantly higher probability of preventing reinvasion of the stream by nonnative fishes. The short-term, minor impacts to wilderness values are far outweighed by the substantially greater beneficial impacts to the ecosystem. Methods proposed for nonnative fish removal are state-of-the-art and have been successfully used in many other projects.

Nonnative fishes are the greatest single obstruction to recovery of native fishes in the Gila River basin. The landmark effort to restore flows to Fossil Creek will be a hollow one without removal

7-1

of nonnative fish. If not removed, the nonnative fish will continue to reduce and possibly extirpate the remaining native fishes. The proposed project to remove nonnatives and repatriate extirpated natives will make Fossil Creek a showcase in native fish restoration. Fossil Creek is a unique opportunity in Arizona to fully restore a medium-sized stream system and is the only significant opportunity in the Verde River drainage for repatriation of the native fishes. Other tributaries are either unsuitable due to lack of sufficient flow, high gradient, etc., or have substantial areas in private ownership and/or are highly modified by existing and increasing human activities. Fossil Creek, with its substantial flow (post-decommissioning), travertine ecosystem, Federal ownership, and lack of significant adverse human activities, is an ideal stream for native fish and aquatic ecosystem restoration. This proposed project is a key component to reversing the rapid decline of the native fishes of the Verde River drainage.

7-1  
(con

Specific Comments

**page 6, paragraph 2.** Although it is discussed later, it would be helpful to mention here that the proposed barrier is a replacement for a natural barrier that was destroyed by catastrophic flooding. The bullet statements in this paragraph could be improved by adding the fact that Fossil Creek is the only Verde River tributary with the potential for major native fish restoration. The final bullet statement should also add that the project will help avoid decline and listing of additional native fish species.

7-2

**page 9, paragraph 4.** Yellow bullhead are also in the Santa Cruz River basin.

7-3

**page 9, Stream renovation.** It may be helpful to add that detoxification of antimycin with potassium permanganate happens immediately upon mixing of the two.

7-4

**page 10, Repatriation of native fishes.** The second sentence should provide for including advice from academic and independent experts on Fossil Creek and native fish.

7-5

**page 15, Renovation methods, paragraph 1.** Repeated disturbance of stream channel and banks and handling of fish during frequent mechanical removal attempts on a long-term basis would have significant negative effects to habitat and fish.

7-6

**page 15, Renovation methods, paragraph 2.** Rotenone also causes higher invertebrate mortality than antimycin.

7-7

**page 28, paragraph 1.** In the first complete sentence on this page, there is a typo in the word "six."

7-8

**page 28, Information and Education.** Delete the word "casual" in sentence three.

7-9

**page 40, last paragraph.** In the third sentence I believe the word "velocity" was omitted between the words "diminish" and "upstream."

7-10

page 49, paragraph 3. Although it is discussed later in the document, it would be helpful to the reader to state here that crayfish control methods are being investigated and an experimental mechanical removal project is underway in Fossil Creek.

7-11

page 52, paragraph 1. Although we have little ability to predict the habitat mix that will result after travertine deposition returns to natural levels, under current conditions lower gradient, finer sediment areas, such as will occur behind the barrier, are rare in Fossil Creek. These types of habitats are desirable for some species, such as longfin dace and spikedace. Thus, the localized effects of the barrier on habitat may benefit some fish species and may beneficially affect the critical habitat of spikedace.

7-12

pages 52 and 53. Regarding effects of the proposed use of antimycin on invertebrates, the statement in the last sentence on page 52 is very important. The fact that the treated area will always have upstream and downstream sources for recolonization is highly significant in mitigating impacts to invertebrates from the project. The discussion of possible impacts to rare invertebrates is excellent. Fossil Creek is a linear system with a high degree of homogeneity except at the source springs. That, along with the high degree of modification of flows and travertine, and the historic interconnection with similar habitats in the Verde River, makes it very unlikely that rare invertebrates exist in localized areas of the system. The staged treatment proposed should provide for the greatest possible avoidance and mitigation of adverse impacts to the aquatic invertebrates of Fossil Creek.

7-13

page 54, paragraph 3. Remove the word "greatly" in the first sentence. Its presence there implies that affects to human uses may be of significance, when in reality they are unlikely to be affected at all, or at the most in very minor ways.

7-14

page 55, paragraph 1. In addition to increasing the probability of the public moving fish across the barrier, the accessibility of the nonwilderness barrier also makes the barrier more susceptible to purposeful or inadvertent damage from the public. People recreating around structures in streams may pile rocks on the apron or top, build ramps, or various other actions that may decrease barrier effectiveness or cause damage to the barriers.

7-15

page 56, paragraph 1. Gila topminnow and desert pupfish may also be affected by the proposed action, if they are repatriated to Fossil Creek. The effect would be beneficial.

7-16

page 61, Razorback sucker. The last sentence in this section says that razorback sucker may no longer occur in Fossil Creek. Although that is possible, the Fish and Wildlife Service asserts, and I agree, there is no basis for a belief that the stocked razorback sucker are extirpated from the system. In fact several razorback sucker were discovered in Stehr Lake just a few years ago.

7-17

pages 61 and 62, Loach minnow. The discussion of where loach minnow still exist is confusing to anyone who has knowledge of that species. It is not clear that you are referring only to populations in Arizona and descriptions for some of the other species are not restricted solely to Arizona. I would recommend that the populations in the San Francisco and Gila Rivers in New Mexico be added to the description. In the second paragraph on page 62, it should be clarified that loach minnow were recorded historically in the Verde River basin.

7-18

page 62, Spikedace. Similar to loach minnow, I recommend that the description of existing populations of spikedace include the Gila River in New Mexico. 7-19

page 62, Colorado pikeminnow. It would be helpful to identify that Colorado pikeminnow is the newer name for the Colorado squawfish. The old common name was used in most earlier Fossil Creek documents, which may lead to confusion. 7-20

page 64, Razorback sucker. It is not a correct statement to say that razorback sucker are not present in Fossil Creek. See my earlier comment for page 61. In addition, this is in contradiction to the statement on page 61 and to the entry on Table 4 on page 75. 7-21

page 65, Spikedace critical habitat. It should be added that the proposed action will beneficially affect spikedace critical habitat. 7-22

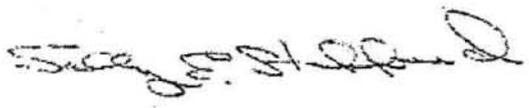
page 65, Non-wilderness alternative. The non-wilderness alternative would also not provide the beneficial effects to critical habitat that would accrue from the wilderness alternative. 7-23

page 75, Table 4. Roundtail chub should be noted to include headwater chub. 7-24

page 86, Classification. It is clear that the barrier would have no negative effect on the suitability of Fossil Creek for inclusion in the wild classification of the wild and scenic rivers system. There will be no impounded body of water behind the barrier. I have been involved with installation of fish barriers in several locations throughout the southwest, including those completed by the Bureau of Reclamation on Aravaipa Creek. None have result in impoundment of a body of water behind the barrier. As the EA notes, in a few years this proposed wilderness barrier will be virtually unnoticeable to anyone other than a close and discriminating observer. 7-25

I appreciate your consideration of these comments and commend you on an excellent EA. If you have question, please do not hesitate to contact me.

Sincerely,



Sally E. Stefferud

## **Response to Letter of Comment from Sally Stefferud**

**7-1** Your comments are noted.

**7-2** We thank you for your recommendation. We believe those issues were adequately addressed in the EA.

**7-3** Appropriate revisions have been made to the final EA.

**7-4** In Appendix B we noted that potassium permanganate reduces the half life of 7 to 11 minutes in the laboratory. Organic material in the stream would further reduce the half life of antimycin.

**7-5** Appropriate changes have been made to the final EA.

**7-6** Appropriate changes have been made to the final EA.

**7-7** Your comment is noted.

**7-8** This typographic error has been corrected.

**7-9** Appropriate changes have been made to the final EA.

**7-10** The sentence refers to the inverse relationship between distance from the barrier vs. volume of sediment deposition.

**7-11** Appropriate changes have made to the final EA.

**7-12** We concur. Thank you for your comment.

**7-13** Your comment is noted.

**7-14** The use of "greatly" in the context of the sentence was meant to infer the effects would be minor.

**7-15** Your comment is noted.

**7-16** Your comment is noted.

**7-17** Appropriate changes have been made to the final EA.

**7-18** Appropriate changes have been made to the final EA.

**7-19** Appropriate changes have been made to the final EA.

**7-20** Appropriate changes have been made to the final EA.

**7-21** Appropriate changes have been made to the final EA.

**7-22** Appropriate changes have been made to the final EA.

**7-23** Appropriate changes have been made to the final EA.

**7-24** Appropriate changes have been made to the final EA.

**7-25** Your comment is noted.

RECEIVED

JAN 28 2004

COCONINO NAT. FOREST

MS NORA B RASURE FOREST SUPERVISOR  
ATTN: CECILIA OVERBY  
COCONINO NAT FOREST  
2323 E GREENLAW LANE  
FLAGSTAFF, AZ 86004

14 JAN 2004

MS OVERBY,

THIS IS A COMMENT IN REFERENCE TO THE FOSSIL CREEK NATIVE FISH RESTORATION PROJECT.

WE BELIEVE THE MIDDLE SITE IS THE FISH BARRIER SITE THAT SHOULD BE CONSTRUCTED. THIS WOULD NOT ONLY ALLOW MORE HABITAT FOR THE NATIVE FISH SPECIES, BUT IT IS OUR UNDERSTANDING IT IS MORE SUITABLE FOR CONSTRUCTION.

WE WOULD ALSO LIKE TO COMMENT IN GENERAL. WE BELIEVE, WITH NATIVE FISH THE MOST IMPERILED SPECIES IN ARIZONA, THAT THIS PROJECT SHOULD RECEIVE ALL THE RESOURCES & EFFORT NECESSARY. AS CITIZENS WE APPRECIATE THE AGENCIES WILLINGNESS TO DO THIS HUGE EFFORT ON BEHALF OF NATIVE FISH SPECIES.

WE APPRECIATE THE OPPORTUNITY TO COMMENT ON THIS SIGNIFICANT PROJECT FOR NATIVE FISH SPECIES OF ARIZONA.

SINCERELY,

*Tom Taylor for*

TOMAS & TOM TAYLOR  
C/O 1640 N LINDSAY ROAD  
MESA, AZ 85213  
480 964 6482

8-1

**Response to Letter of Comment from Tomas and Tom Taylor**

**8-1** Your comments have been noted.

RECEIVED

JAN 29 2004

COCONINO N.F.

Michael T. Perkinson  
P. O. Box 1822  
Tempe, AZ 85280-1822  
(480) 967-7923  
mperk@worldnet.att.net

*Wally W*  
*NORA*  
*CE*

Ms. Nora B. Rasure, Forest Supervisor  
Attn: Ms. Cecelia Overby  
Coconino National Forest  
2323 East Greenlaw Lane  
Flagstaff, Arizona 86004

Re: Draft Environmental Assessment (EA) on Native Fish Restoration in Fossil Creek – Opportunity to Comment  
(Action by January 28, 2004)

Dear Ms. Rasure:

I want to thank you for the opportunity to comment on this proposed action. I also want to thank the Forest Service staff and planners from the Tonto and Coconino National Forests who worked on the development of the above referenced material. After reviewing the Draft Environmental Assessment (DEA), I can wholeheartedly conclude that these documents have been prepared with the maximum protection of the Fossil Creek fauna and flora in mind while adhering to the doctrine of multiple use.

I have been living in Arizona for over 25 years. Throughout those 25 years I have had concern for the welfare of Arizona's wildlife. Although I am not a professional biologist, I hold a degree in conservation biology with a concentration in fisheries management and frequently volunteer to assist Arizona Game and Fish Department (AGFD) and Forest Service (FS) personnel with assorted projects. Therefore I feel qualified to comment on this DEA.

As stated in the DEA, Fossil Creek is home to a variety of species listed under the Endangered Species Act (ESA), and like many of Arizona's watercourses is unique in many ways. If the proposed project is successfully implemented as presented in the DEA, it will be a significant and precedent-setting action benefiting our state and regional natural resources. This project has the potential to maintain and establish new populations of critically imperiled species such as loach minnow and spikedace.

We all know that native fishes in Arizona are doing quite poorly and get little of the badly needed attention they deserve. Without protection they will continue to decline. By reclaiming Fossil Creek and constructing the proposed barrier to non-native species the native fish populations will have an opportunity to survive and the FS will demonstrate its commitment to complying with its mandate. Without the barrier, as most scientists will agree, the native populations will surely decline when the non-natives return.

Therefore, I fully support the Fossil Creek native fish restoration project, and specifically support the proposed action (wilderness alternative). Once again, thank you for the opportunity to comment on the proposed action. If you have any questions, please contact me at your convenience

Sincerely,



Michael T. Perkinson

9-1

2

**Response to Letter of Comment from Michael Perkinson**

**9-1** Your comments have been noted.



United States  
Department of  
Agriculture

Forest  
Service

Rocky Mountain  
Research Station

Southwest Forest Science Complex  
2500 South Pine Knoll Drive  
Flagstaff, Arizona 86001-6381

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JAN 29 2004

COCONINO N.F.

CE cdo  
NORA  
wally

Ref: PXAO-1500, ENV-7.0

To: Ms. Nora B. Rasure, Forest Supervisor  
Att: Ms. Cecelia Overby  
Coconino National Forest  
2323 East Greenlaw Lane  
Flagstaff, Arizona 86004

From: Project RMRS-4302: *Sustainability of Riparian Ecological Systems in Southwestern Forests and Woodlands*. Rocky Mountain Research Station, Flagstaff Laboratory

Daniel Neary, Project Leader  
John Rinne, Research Fisheries Biologist  
Al Medina, Research Riparian Ecologist  
Steven Overby, Soil Scientist

Subject: Comments on "Draft Environmental Assessment on Native Fish Restoration in Fossil Creek"

After review of the "Draft Environmental Assessment on Native Fish Restoration in Fossil Creek" we wish to make our comments a part of the public record. The "Proposed Action (Wilderness Alternative)" is by far the most beneficial alternative for potential restoration of native fish in Fossil Creek. By decreasing accessibility to the fish barrier by placing in the Wilderness Area, you mitigate a major threat to the native fish ecosystem decreasing the probability of "bucket biology" reintroduction of non-native fish, and equally important provide an extra 2.8 miles of habitat (20% increase in total restored habitat). After many days spent in Fossil Creek doing research, we feel that Fossil Creek restoration is a rare opportunity to return not only streamflow, but the entire unique biological community that Fossil Creek and the surrounding basin provide. With ever growing populations in Arizona, the pressure to capture and utilize precious water resources will increase. This opportunity provides the National Forest, Bureau of Reclamation, and Arizona Game and Fish an extraordinary chance to establish a native fish community in the Southwest, which continues to be threatened by loss of habitat. We further believe that the short-term intrusion into the Wilderness area is more than offset by the long-term ecological and esthetic benefits a native fishery adds to the Wilderness Area.

10-1

Daniel Neary, Project Leader  
  
John Rinne, Research Fisheries Biologist  
  
Al Medina, Research Riparian Ecologist  
  
Steven Overby, Soil Scientist



Caring for the Land and Serving People

**Response to Letter of Comment from Rocky Mountain Research Station  
(USDA Forest Service)**

**10-1** Your comments have been noted.

In reply refer to: SHPO-2002-847  
General comments

January 27, 2004

**FAXED**  
1/27/04

Ms. Nora B. Rasure, Forest Supervisor  
Coconino National Forest  
2323 East Greenlaw Lane  
Flagstaff AZ 86004

Re: Draft Environmental Assessment (EA) on Native Fish Restoration in Fossil Creek;  
BR, CNF; SHPO-2002-847 (18467)

Dear Ms. Rasure:

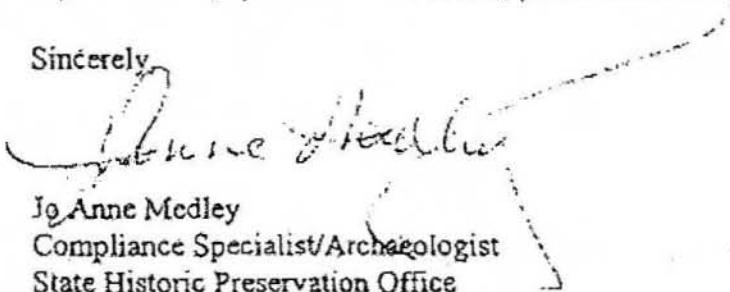
Thank you for the opportunity to comment on the Draft Environmental Assessment (December 2003) prepared in support of the above referenced federal undertaking. Dr. William Collins, SHPO Historian, and I have reviewed the document and have the following comments:

In consultation with the Coconino National Forest (CNF), archaeological sites within the proposed Wilderness alternative have been identified and determined eligible for inclusion in the National Register of Historic Places. If the Wilderness alternative is chosen, we would support the proposed treatment measures (avoidance and monitoring of Register-eligible sites, and additional surveys of trails) as detailed on pages 78-79 and as described during the telephone conversation today between Sharon Blood, CNF archaeologist, and Jo Anne Medley, SHPO archaeologist.

No historic properties have been identified within other alternatives.

If you have any questions or concerns, please feel free to contact me at (602) 542-7142.

Sincerely,



Jo Anne Medley  
Compliance Specialist/Archaeologist  
State Historic Preservation Office



Janet Napolitano  
Governor

State Parks  
Board Members

Chair  
Suzanne Pfister  
Phoenix

Gabriel Beechum  
Casa Grande

John U. Hays  
Yarnell

Elizabeth Stewart  
Tempe

William C. Porter  
Kingman

William Cordasco  
Flagstaff

Mark Winkleman  
State Land  
Commissioner

Kenneth E. Travous  
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800.285.3703 from  
(520 & 928) area codes

General Fax:  
602.542.4180

Director's Office Fax:  
602.542.4188

11-1

**Response to Letter of Comment from Arizona State Historic Preservation Office**

**11-1** Your comment is noted.