RECLAMATION

Managing Water in the West

PROPOSED SEDIMENT FILL AND REAPPLICATION OF ROTENONE IN BONITA CREEK

Revised Supplement to the Environmental Assessment on Native Fish Restoration in Bonita Creek Gila Box Riparian National Conservation Area Graham County, Arizona

U.S. Department of the Interior
Bureau of Reclamation
Phoenix Area Office

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Mission Statements

The mission of the Department of the Interior is to protect and provide access to our Nation's natural and cultural heritage and honor our trust responsibilities to Indian Tribes and our commitments to island communities.

The mission of the Bureau of Reclamation is to manage, develop, and protect water and related resources in an environmentally and economically sound manner in the interest of the American public.

BACKGROUND

The Decision Record and Finding of No Significant Impact (FONSI) for the February 2007 Draft Environmental Assessment on Native Fish Restoration in Bonita Creek (hereafter referred to as the 2007 EA)[1] was signed by Tom Schnell, Bureau of Land Management (BLM) acting Field Manager, Safford Field Office, on July 13, 2007. Carol Erwin, Bureau of Reclamation's Area Manager, Phoenix Area Office, signed a FONSI on July 16, 2007. The decision was to authorize actions to protect the existing native fish assemblage (including endangered Gila chub *Gila intermedia*) and facilitate the repatriation[2] of threatened spikedace (*Meda fulgida*), threatened loach minnow (*Tiaroga cobitis)*, endangered desert pupfish (*Cyprinodon macularius*), and endangered Gila topminnow (*Poeciliopsis occidentalis*) into Bonita Creek. Public involvement for the project included a scoping meeting in Safford, distribution of scoping information to potentially interested parties, and posting information on the Phoenix Area Office Web site. In February 2007, the EA was distributed to more than 160 individuals, organizations, and agencies (Reclamation and BLM 2007). The 2007 EA and FONSIs are available at www.usbr.gov/lc/phoenix.

The 2007 EA and Decision Record/FONSIs considered the effects of fish barrier construction, stream renovation, and repatriation of the federally-listed native fish species into Bonita Creek. Construction of the fish barrier was completed in September 2008. Salvage of native fishes and renovation of the 1.7-mile reach of Bonita Creek between the barrier and a City of Safford water-system dike using a formulation of rotenone, CFT Legumine®, was undertaken in October 2008. Following the renovation, native unlisted and federally-listed fishes including salvaged Gila chub and loach minnow, spikedace, desert pupfish, and Gila topminnow were stocked into the stream. Subsequent to these actions, three nonnative species have reappeared in lower Bonita Creek. Mosquitofish (*Gambusia affinis*) and green sunfish (*Lepomis cyanellus*) were detected in 2009, and fathead minnow (*Pimephales promelas*) was discovered in 2010. All species have repopulated the renovated stream reach. On-going efforts to remove these nonnative fish using mechanical methods (including nets, traps, and electrofishing,) have not been successful. Because of the negative impacts the nonnative species will have on the future status of the native fish assemblage, Reclamation, in cooperation with the BLM, the U.S. Fish and Wildlife Service (FWS), and the Arizona Game and Fish Department (AGFD), propose to retreat the same 1.7-mile reach of Bonita Creek with CFT Legumine® to protect and restore the native ichthyofauna.

The 2007 EA did not consider the possible need for retreatment with a piscicide after Gila topminnow, desert pupfish, loach minnow, and spikedace were stocked into the stream. In addition, suitability of streamside habitat for southwestern willow flycatcher (*Empidonax traillii extimus*) (SWWF) may have changed since 2007. In April 2010, Reclamation issued a supplement to the 2007 EA to analyze the effects of future chemical

[1] Public comment on the draft EA did not identify significant issues or concerns; therefore, the draft EA was considered final and was not reissued as a final document.

[2] *Repatriation* is defined as the intentional release of individuals of a species into an area formerly occupied by that species (Reinert 1991).

renovations of the stream to recently repatriated species, the existing population of Gila chub, and SWWF. Reclamation received two comment letters on the proposed action. Table 1 provides a summary of public comments and Reclamation's responses.

Subsequent to preparation of the April 2010 supplement, the cooperating agencies determined the success of any additional renovation(s) and associated management actions would be enhanced if a ponded area that formed immediately upstream of the constructed fish barrier was filled with sediment prior to re-treatment. Reclamation reinitiated Endangered Species Act (ESA) section 7 consultation with FWS to address the placement of fill material behind the barrier, in addition to reapplication of rotenone. The proposed reapplication of rotenone and placement of fill is addressed in this document, which is tiered to and supplements the 2007 EA.

PURPOSE AND NEED

Stream Renovation. The 2007 EA described the adverse effects of nonnative fish populations on native fish communities. Continued persistence of nonnative fishes will result in significant suppression or loss of recently stocked populations of federally-listed fishes in lower Bonita Creek. Also, the integrity of the City of Safford infiltration gallery dike is not certain, and if that structure fails and nonnative fishes now present below it invade the upper drainage, the native fish assemblage in the entire stream would be at risk. In order to address these concerns and promote long-term sustainability of the native fish community, Reclamation and the cooperating agencies propose the management option of providing additional chemical renovations in the 1.7-mile reach of stream between the dike and fish barrier (Figure 1). Any future renovation(s) in this reach would be conducted to remove threats posed by nonnative fishes that cannot be adequately addressed by employing mechanical removal methods. Bonita Creek is considered a high value stream for protecting its Gila chub population and achieving enhanced status for spikedace, loach minnow, and other species. Sustainability of viable populations of these species in Bonita Creek will contribute toward improvement of their recovery status.

Dewatering and Placement of Fill Material. Elimination of pooled water at the fish barrier is needed to reduce the size and complexity of the treatment area. The presence of a large volume of water in this area adds considerably to both the amount (and cost) of piscicide required for application as well as difficulty of the treatment. It becomes more problematic to apply piscicide effectively to deep waters, and deep waters may also obscure complex habitats that would require special consideration during application of the piscicide. The pooled area also invites public use which increases the probability of intentional or inadvertent human transfer of nonnative fishes over the fish barrier into the upstream reach of stream.

DECISION FRAMEWORK

The Responsible Official for Reclamation (Area Manager of the Phoenix Area Office) must authorize the expenditure of Reclamation funds to implement the proposed action, or decide to take no action. If this Revised Supplement demonstrates that there are no significant effects, the Area Manager will record this determination in a Finding of No Significant Impact (FONSI) and approve funding for the proposed placement of fill and stream renovation. Reclamation's FONSI and decision to implement the proposed action would be available at www.usbr.gov/lc/phoenix

The Responsible Official for the BLM (Field Manager of the Safford Field Office) must decide whether to authorize the proposed action on BLM lands, or to continue with current management. If this Revised Supplement demonstrates that there are no significant effects, the Field Manager will record this determination in a FONSI/Decision Record and authorize the proposed placement of fill and stream renovation. The BLM's FONSI/Decision Record would be available at www.usbr.gov/lc/phoenix

DESCRIPTION OF THE PROPOSED ACTION

Dewatering and Placement of Fill Material. Reclamation originally anticipated that deposition of bedload sediment during high flow events would aggrade the stream channel and displace most if not all of the impounded water on the upstream side of the barrier within 3-5 years. In Bonita Creek, mobilization of sediment begins at a 2-year flow event, or approximately 2,750 cubic feet per second (cfs). Following construction of the fish barrier, however, 97.4 percent of mean daily flows have been within 10 cfs of base flow[3]. Peak flow during this period has not exceeded 350 cfs. As a result, practically no sediment has been deposited along the upstream face of the fish barrier.

Under the proposed action, clean fill material would be imported and placed on a 0.64-acre tract of land where water has been impounded by the fish barrier (Figure 2). The proposed fill area is characterized by two distinct features: (1) an abandoned channel (backwater) that is now cutoff by the fish barrier, and (2) a public road that is used by the City Safford to inspect and maintain a municipal water pipeline. These features are located west of the active thalweg of Bonita Creek.

The pooled area will be partially dewatered prior to the placement of fill material. Initial dewatering would be accomplished by removing a beaver dam that has increased the water surface elevation immediately upstream of the fish barrier and contributed to inundation of the fill area shown in Figure 2. After the beaver dam is breached, the water surface elevation in the stream should decrease to the approximate elevation of the barrier notch. If necessary, pumps may be employed to further reduce the size of the pool. Partial dewatering will sever any surface water connection between the remaining pool and the low-flow channel of Bonita Creek. Eliminating this surface water connection would prevent incidental release of sediment into the stream during the placement of fill.

[3] Mean daily base flow between 10/1/08 and 10/1/10 was 3.8 cfs at the USGS stream gauge.

Approximately 1,800 cubic yards of fill material would be purchased from a source near Safford and imported to the site in dump trucks. Imported material would consist of a mixture of sand and gravel (commonly referred to as aggregate) which is commercially mined from a pit located approximately three miles south of Safford on Highway 191. The pit has been in operation since 1929. It is anticipated that material would be hauled by BLM road maintenance crews.

The fill material would be spread using a backhoe or other heavy equipment provided by the BLM. Overall the fill will slope from channel right towards the active thalweg. However, the catch point of the fill is set so that this slope does not come into contact with the creek and typically ends near the road alignment.

Stream Renovation. Bonita Creek upstream of the fish barrier will be managed for the foreseeable future as a native-only stream, whereby management prescriptions such as mechanical and chemical removals of invading nonnative aquatic organisms, repatriations, and augmentations[4] of native fishes, are all options needed to maintain and protect the native fish assemblage. This Revised Supplement considers the effects of all of these potential management actions to listed fishes.

Details of the fish salvage and holding, chemical application and detoxification, restocking of salvaged fishes, and subsequent monitoring of fishes are essentially identical to those described in the 2007 EA and are not repeated here. The major differences include the re-salvage and repeated holding of all native fishes (except Gila topminnow at this time) prior to subsequent renovation activities, and effects of renovations to repatriated fishes not present in the stream at the time of the initial application of rotenone. Gila topminnow would not be salvaged in order to ensure that they are not accidentally mixed with the similar-appearing nonnative mosquitofish,[5] although they may be moved downstream of the fish barrier. Potential re-applications of piscicides as a management option need to be considered in the event of unsuccessful renovations (i.e., failure to kill all nonnative fishes in the reach), human-aided transfer of nonnatives upstream of the fish barrier subsequent to renovation, movement of fishes past the fish barrier due to its failure or other unforeseen event, or other unlikely but possible incidents that result in an introduction of nonnative aquatic organisms upstream of the barrier. These potential piscicide applications would be limited to the 1.7-mile reach of Bonita Creek shown in Figure 1. Piscicides would not be applied during periods of precipitation and storm runoff to avoid water quality effects outside of the targeted area.

Salvage operations for unlisted fishes, endangered Gila chub, and the listed repatriated fishes would be identical to those described in the 2007 EA. The duration of holding of those salvaged fishes prior and subsequent to the initial re-application of rotenone, however, is anticipated to be longer than the relatively brief period (one to two weeks) of the original renovation. In this case, salvaged fishes may be transported in hatchery

[4] A*ugmentation* is defined as the release of individuals of a species into an area already occupied by that species (Reinert 1991).

[5] Gila topminnow could be salvaged and handled as other natives during potential future unplanned renovations if the offending nonnative(s) to be targeted did not include mosquitofish.

trucks to established fish holding facilities including but not limited to the Arizona-Sonora Desert Museum, University of Arizona, and/or Bubbling Ponds Hatchery. Longer-term holding of fishes prior to restocking would allow for additional interim monitoring (intensive searches for live fishes using standard fishery equipment) to enable better determination of the success of the piscicide application. This delay in repatriation would facilitate repeated rotenone applications, if required, while the stream remains fish free, thereby minimizing future losses of native fishes. Salvaged fishes likely would be held through the summer following the initial re-treatment, and possibly for up to one year or more to facilitate hatchery propagation to bolster the number of fishes available to be stocked.

During holding and possible propagation, fishes would be maintained and fed according to standard hatchery practices. If any species is held through winter of 2011-2012, propagation may be attempted via either volunteer spawning or by injection of the synthetic hormone Ovaprim®. Following spawning, the adults would likely then be placed in Bonita Creek, and the progeny would be allowed to mature until autumn of their first year and then stocked.

It is also possible that native species captured (except Gila topminnow as described above) during salvage activities would be moved to upper Bonita Creek upstream of the City of Safford infiltration gallery. However, only a small number (<200) of Gila chub and the other species that are already present in the upper section would be repatriated to minimize effects on existing populations. The repatriated species (except Gila topminnow as just described) have already been released into this reach anyway, so if they are determined free of parasites and pathogens of concern, they will be moved upstream and released immediately following salvage using a truck or helicopter transport system.

Sonora mud turtle (*Kinosternon sonoriense*) and aquatic invertebrates from several locations throughout the treated section also would be salvaged, held onsite in portable tanks, and restocked immediately following chemical renovation. Pre- and post-renovation monitoring may be conducted for these taxa as well as other aquatic amphibians and reptiles.

To improve effectiveness of the rotenone application(s), beaver dams within the treatment reach would be breached a few days in advance of the renovation(s) to drain pools and reduce areas where submerged debris and plant material could impede circulation of the piscicide. Pools behind beaver dams might also be siphoned to further reduce size and complexity of the treatment area. Mechanical removal of nonnative fishes using standard fishery equipment may also be practiced anywhere in the stream below the San Carlos Apache Reservation boundary, depending on circumstances.

Following the planned re-application of rotenone, salvaged native fishes and those from other sources, as necessary, would be repatriated to the renovated reach of Bonita Creek or potentially anywhere in the stream downstream of the San Carlos Apache Reservation and upstream of the fish barrier.

Augmentations of repatriated species from appropriate sources would occur during the first several years following the initial re-treatment period, but could occur any time during the foreseeable future until it has been determined the species have either established self-sustaining populations or are unlikely to result in successful establishment. Augmentation events may include releases of tens to thousands of individuals, depending on the species and source availability, at any locality or localities upstream of the constructed fish barrier and downstream of the San Carlos Apache Reservation.

The proposed chemical renovation(s) would be closely coordinated with the City of Safford to avoid any adverse effect on operation of the Bonita Creek municipal water system. Measures described in the 2007 EA to minimize public exposure during renovation would be included in the proposed project.

AFFECTED ENVIRONMENT

The affected environment, as described in the 2007 EA, has been biologically modified as the result of eradication of several nonnative fish species, although mosquitofish, fathead minnow, and green sunfish have re-established populations in the lower 1.7-mile reach of Bonita Creek. In addition, the resident fish community (Gila chub, longfin dace, speckled dace, desert sucker, and Sonora sucker) has been supplemented with Gila topminnow, desert pupfish, loach minnow, and spikedace, all of which were stocked into the renovated reach during 2008. Spikedace was also stocked into Bonita Creek upstream of the City of Safford infiltration gallery in 2009 and 2010, and loach minnow, Gila topminnow, and desert pupfish were stocked in 2010. All species have been detected in the 1.7-mile reach during subsequent monitoring. Consequently, this modified fish assemblage forms a new environmental baseline that must be considered in the determination of effects of the proposed action.

Critical habitat for spikedace and loach minnow in Bonita Creek was proposed on October 28, 2010 (75 FR 66482). The reach extends 14.8 miles upstream from the confluence with the Gila River and includes the proposed treatment reach.

There are no known changes to the affected environment with respect to the SWWF. Because it is possible that suitability of habitat for SWWF could have improved since the summer of 2007, habitat conditions in the action area would be re-evaluated prior to implementing the proposed action.

ENVIRONMENTAL CONSEQUENCES

Dewatering and Placement of Fill Material. Efforts to salvage federally listed fishes and other native aquatic biota inhabiting the ponded area would be implemented prior to dewatering. However, there could be some unquantifiable level of mortality to these species during salvage and dewatering.

The proposed fill area is located within the sediment deposition zone and former construction impact area. This area was substantially modified and stripped of vegetation during construction. Following construction, emergent aquatic vegetation has become established within the pooled area.

The effects of the proposed fill on floodplain substrates and vegetation would be similar to effects described in the 2007 EA. Displacement of lentic habitat with fill material on the 0.64-acre site would mimic the deposition of bedload sediment that eventually will cover the fill area. No effect to water quality in Bonita Creek is anticipated.

Stream Renovation. The effects of chemical renovations on water resources, the City of Safford municipal water supply, non-target biota, vegetation, cultural resources, recreation, and public safety and health were addressed in the 2007 EA and are not repeated here.

Because salvage attempts are unlikely to capture all fishes present in affected reaches of Bonita Creek prior to renovations, all native fish species occupying the stream likely would experience some unquantifiable level of mortality as a result of the proposed action. As no Gila topminnows are to be salvaged under the proposed action, all would be killed from the piscicide application unless they are moved below the fish barrier. Sources of mortality to other species also could include salvage efforts and transport and holding activities. These impacts to federally-listed fishes were addressed under formal ESA section 7 consultation with FWS (FWS 2010). Depending on quantities, mortality caused by salvage, transport, and holding also may be covered under AGFD's ESA section 10(a)(1)(A) permit.

This mortality would diminish the supply of fishes to be repatriated back into Bonita Creek following the proposed and potential future unplanned renovations. However, the Gila chub population upstream of the infiltration gallery (and repatriated species if they establish there) would be unaffected by the renovation(s) and can serve as a source to increase the numbers of fish to be repatriated to the renovated reach. Some mortality also can be expected during hatchery propagation and transport and release activities, which also may be covered by AGFD's section 10(a)(1)(A) permit associated with stocking events.

All stocks of the repatriated species are currently under captive propagation at Bubbling Ponds Hatchery, the Lower San Pedro River Preserve ponds, Arizona State University, and elsewhere, and thus additional fishes would be available to bolster the numbers to be restocked or augmented. Wild stocks of loach minnow are also available from Blue River, spikedace from Gila River (New Mexico), Gila topminnow from Bylas Springs, and desert pupfish from El Doctor Marsh (Mexico), depending on the natural variability in the size of those populations and access to those sites. All of these sources of fish were originally planned to be used to augment populations that were repatriated to Bonita Creek under the native fish restoration project.

If the proposed action is successful, all listed fishes restocked into Bonita Creek will accrue considerable conservation benefit by elimination of the known limiting factor of nonnative fishes. Protection of these populations into the future as provided by the fish barrier would enhance the conservation status of all species, and aid in the recovery of those species. The proposed action also would have a beneficial effect on proposed critical habitat for spikedace and loach minnow by increasing the ability of the habitat to achieve conservation for the species.

The 2007 EA considered the effects of temporarily breaching beaver dams by the City of Safford to facilitate access for repair and maintenance of infrastructure associated with the Bonita Creek municipal water system. Breaching the beaver dams prior to renovation of the stream, as proposed in this Revised Supplement, would produce environmental effects that are substantially the same as those described in the 2007 EA. Dewatering the beaver ponds could cause some mortality to Gila chub and repatriated fishes that become trapped in small, isolated pools, as noted in the 2007 EA, but the effect of this mortality on these species is expected to be minor. Mortality of listed fishes resulting from breaching the dams was also addressed under ESA section 7 consultation with FWS, as well as under AGFD's section 10(a)(1)(A) permit. The breached dams likely would be repaired by beavers immediately following the renovation(s).

To facilitate long-term protection of the native fish assemblage and discourage bait-bucket transfer of nonnative fishes, the AGFD will close Bonita Creek downstream of the San Carlos Apache reservation boundary to fishing beginning in 2011.

Anticipated cumulative effects of stream renovation are substantially the same as those described in the 2007 EA. The proposed project is expected to ultimately improve the conservation status of Gila chub, loach minnow, spikedace, desert pupfish, and Gila topminnow.

Southwestern Willow Flycatcher. SWWF surveys were conducted along Bonita Creek from 2004 through 2007. No willow flycatchers were ever documented and the closest nesting flycatcher was a single SWWF located 3 miles south of the project area in 2003. All other records were from the Gila River approximately 20 to 25 miles southwest of the project area. SWWF habitat suitability declined from 2004 to 2007 primarily from increased beaver activity which reduced the vegetation density adjacent to the stream. As a result, habitat suitability for SWWF was considered marginal by 2007. Reclamation concluded that the project as proposed in the 2007 EA would have no effect on the SWWF.

Although it is unlikely that a SWWF would be present along Bonita Creek, based on past survey results, that conclusion cannot be reached without conducting a site visit to determine current habitat conditions. Based on informal ESA section 7 consultation with the FWS on January 27 and 28, 2010, the following protocol would be followed if stream renovation is conducted during the SWWF nesting season:

1) Reclamation will conduct one SWWF survey during the first survey period (15-31 May). During the survey, the habitat suitability for the SWWF will be evaluated. If habitat conditions appear similar to conditions during the last (2007) survey, Reclamation would draft a memorandum to the file indicating that habitat suitability is marginal and, based on the previous survey records, it is unlikely that a SWWF would be present in the project area. Reclamation would conclude that the proposed project would have no effect on the SWWF.

2) If habitat conditions have improved, Reclamation would conduct a second survey after the June 15 migrant cut-off date and prior to renovation activities. If no SWWFs are observed during the second survey, Reclamation would document the findings in a memorandum to the file concluding that the proposed renovation would have no effect on the SWWF.

3) If, on the other hand, a SWWF is observed during the second survey, Reclamation would document the location. This information would be provided to personnel conducting the renovation activities. Renovation personnel would be required to minimize their activities near the SWWF territory. With this mitigation in place, the proposed project "may affect, but would not likely adversely affect" the SWWF, as determined in a Biological Assessment prepared by Reclamation and submitted to the FWS (Reclamation and BLM 2010). In consultation with the FWS, Reclamation would request expedited concurrence with this determination, so that the renovation project could proceed prior to onset of the monsoon season and increased flood risk. Reclamation would conduct a third SWWF survey after renovation was completed in accordance with survey protocol.

CLEAN WATER ACT COMPLIANCE

The proposed placement of fill material qualifies for Clean Water Act (CWA) Section 404 coverage under Nationwide Permit (NWP) number 27. The Arizona Department of Environmental Quality (ADEQ) has issued a waiver of individual certification pursuant to CWA Section 401 for the action. In lieu of individual certification, the ADEQ is requiring adherence to 401 general conditions that are part of NWP number 27.

FUTURE REGULATORY CHANGES

Under the Federal Insecticide, Fungicide and Rodenticide Act (FIFRA), the U.S. Environmental Protection Agency (EPA) is charged to consider the effects of pesticides on the environment by determining whether a pesticide will perform its intended function without unreasonable adverse effects. The EPA, in its March 2007 Reregistration Eligibility Decision for Rotenone, determined the use of rotenone, when used as a piscicide in accordance with product instructions, will not cause unreasonable adverse effects on human health or the environment.

On November 27, 2006, the EPA issued a Final Rule (71 FR 68483) concluding that pesticides when applied to or near waters of the United States in accordance with FIFRA are exempt from the CWA permitting requirements. However, on January 7, 2009, the United States Court of Appeals for the Sixth Circuit (*National Cotton Council vs. U.S. EPA*) vacated the Final Rule, thereby requiring dischargers of piscicides to comply with the National Pollutant Discharge Elimination System (NPDES) permitting process. Following the ruling, the EPA was granted a stay of the mandate until April 9, 2011, during which time EPA will work with NPDES-authorized states, such as Arizona, to develop permits. The ADEQ anticipates having a permit process in place to provide Arizona Pollutant Discharge Elimination System (AZPDES) coverage for piscicide applications by the April 2011 deadline. The AGFD, as the piscicide applicator, would obtain coverage under the AZPDES permit for any chemical renovation(s) that would occur after March 2011.

LIST OF AGENCIES AND PERSONS CONSULTED

This Revised Supplement will be distributed to individuals, organizations, and agencies that commented on and/or received the 2007 EA and commented on the April 2010 supplement. The names and addresses of entities that receive this Revised Supplement will be retained in the administrative record at the Phoenix Area Office of Reclamation. A copy of the Revised Supplement is available at www.usbr.gov/lc/phoenix

LITERATURE CITED

FWS. 2010. Biological opinion for reinitiation of Section 7 consultation for rotenone application and related native fish management actions in Bonita Creek, Arizona.

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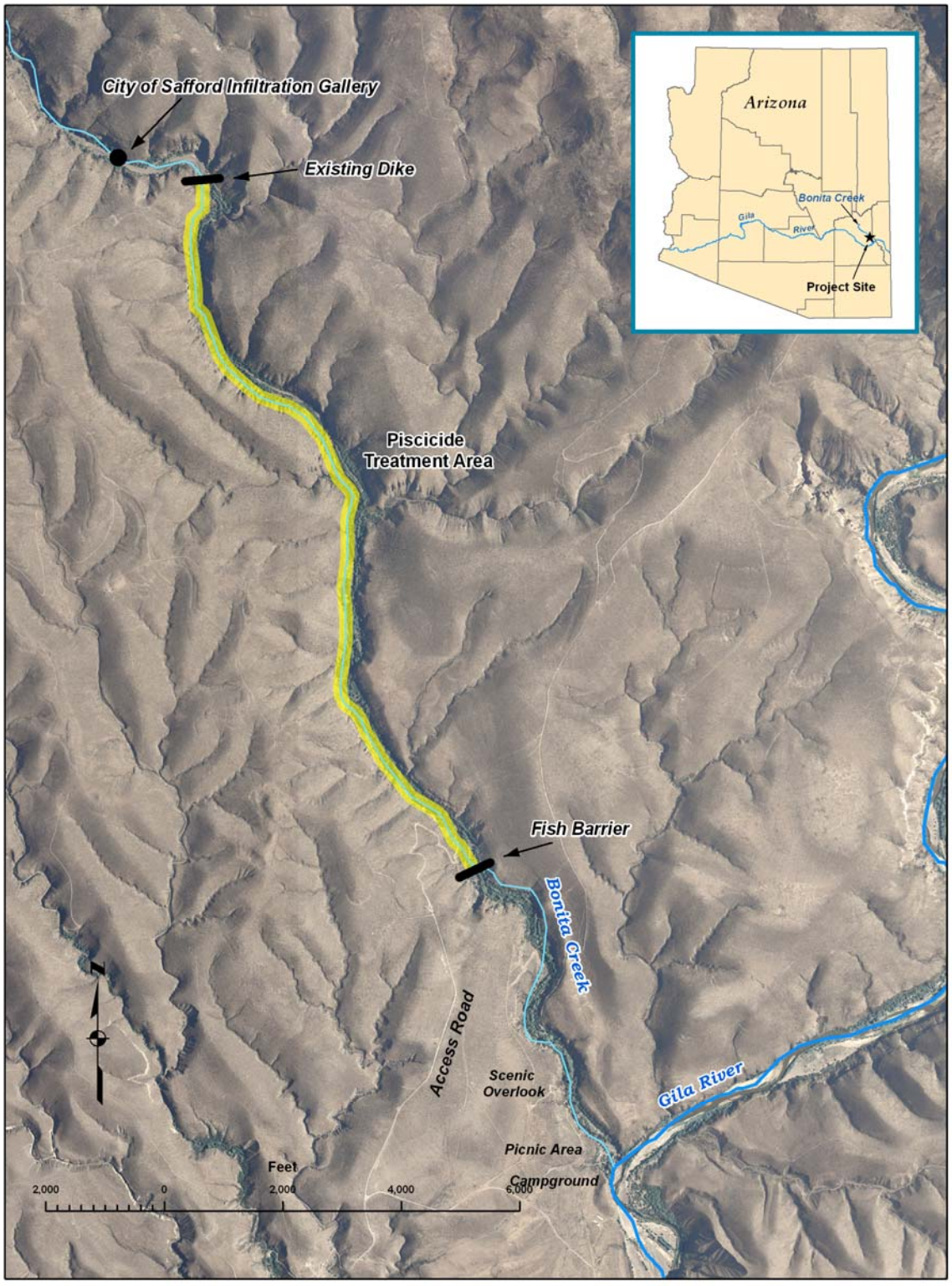

Figure 1. Piscicide treatment area.

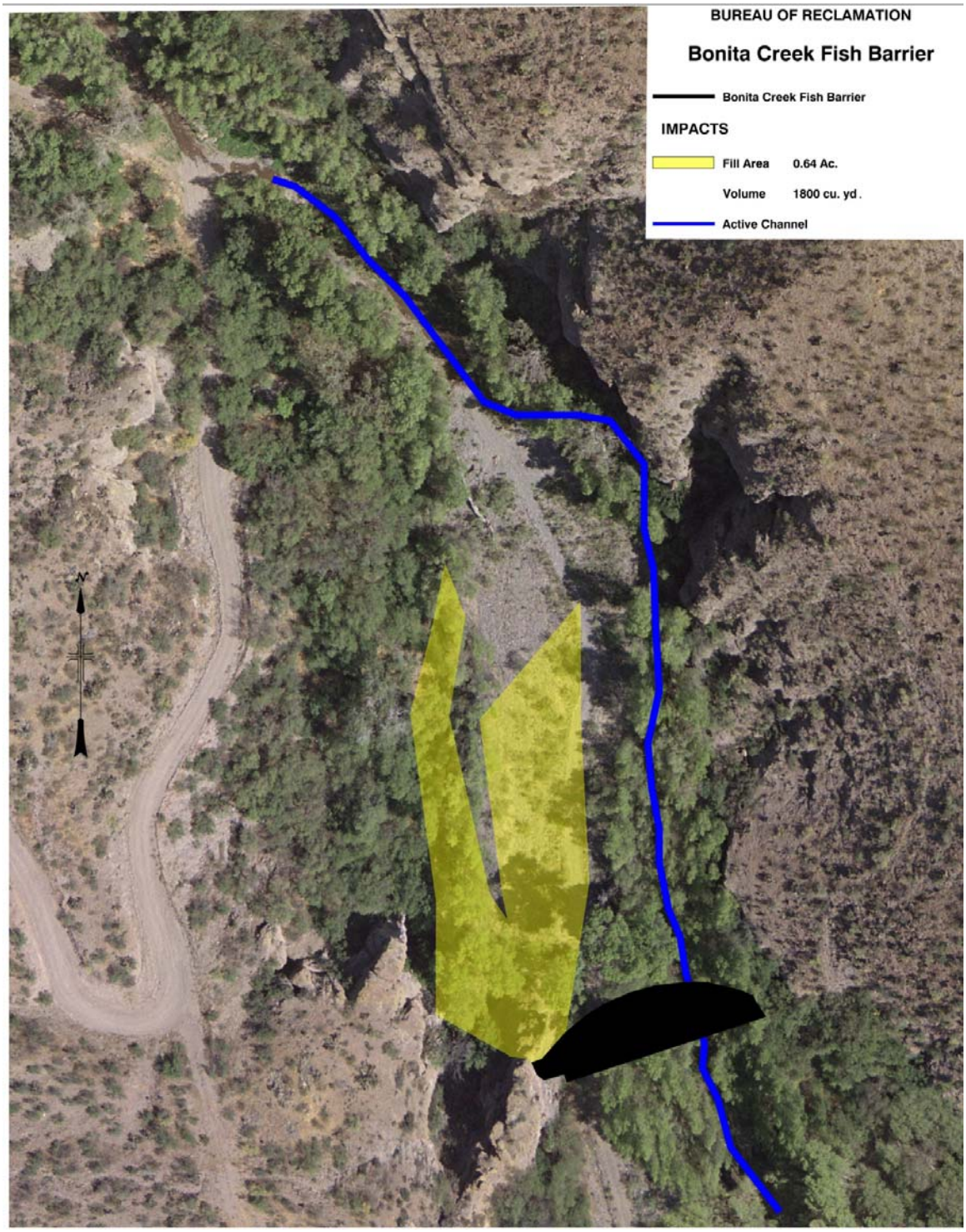

Figure 2. Proposed fill location (pre-construction photograph).

Table 1. Public comments on the proposed action

Summary of Comments	Reclamation's Response
Support efforts to protect native fish but do not support repeated applications of piscicide.	Comment noted.
Will repeated poisonings of this creek actually benefit native wildlife and the ecosystem?	Establishment and expansion of nonnative populations due to inaction or continued application of mechanical control strategies which have not worked inarguably will not benefit native wildlife and the ecosystem. Although repeat renovations erase previous native fish restoration efforts and restart the process, the consequence of ineffective action assuredly is decline and loss of native aquatic species and therefore deterioration of the native ecosystem. It took many decades for the native fish fauna of the basin to deteriorate to its present state, and short-term failures of restoration attempts cannot be cause for their abandonment, especially so early in our efforts at recovery. The opportunity to restore and enhance a native fish community at Bonita Creek is too rare to casually abandon any future attempt due to an initial failure. Impacts of repeated renovations to the native fish community and associated aquatic ecosystem are considered less than allowing establishment of nonnative fishes and loss of the native assemblage and ecosystem.
What is the impact of repeated poisoning on the system?	Native stream biotic communities are well adapted to repeated disturbances from flood events, and have been considered in a state of "perpetual succession." In the big picture, the regrettable repeated renovations of the fish and aquatic invertebrate populations have only temporary impacts to the ecosystem. As discussed in the 2007 EA and elsewhere in this supplement, aquatic macroinvertebrates are resilient to rotenone poisoning due to their life history adaptations and multiple recolonization pathways. Fishes will recolonize the area from unaffected upstream areas and from direct human assistance. There are no known substantive long-term impacts to the ecosystem as a result of these renovations, especially given the site-specific conditions at Bonita Creek where more than 80 percent of the stream is upstream of the treatment area.
How did nonnative fishes become re-established in the stream after completion of the fish barrier and application of rotenone?	It is not unequivocally known how the nonnative fishes repopulated the stream reach upstream of the fish barrier following the 2008 renovation. Fathead minnow likely was transported from the reach upstream of the Safford infiltration gallery dike during a flood, where the species maintains a small population. Reoccupation of the treated reach by green sunfish and mosquitofish could have resulted from inadequate chemical treatment. Mosquitofish is a notoriously difficult species to chemically eliminate from a complex stream system such as Bonita Creek. Aquatic

Summary of Comments	Reclamation's Response
	vegetation, beaver dens, and submerged debris in the treatment area may have impeded circulation and provided pockets of water with sub-lethal concentrations of rotenone. It is also possible that nonnative fish were intentionally or inadvertently released into the stream by humans after the renovation occurred.
How many additional piscicide applications are anticipated? It is questionable if repeated renovations will lead to self-sustaining populations of native fishes.	Only one more treatment is planned; however, the agencies wish to keep the management option of additional treatments open in the event nonnatives become re-established. Eradication of nonnative fishes in the 1.7-mile treatment area provides an important buffer against nonnative invasion of the upper drainage. Fifteen miles of stream above the treatment area support a robust native fish assemblage that must be protected. Bonita Creek is considered a high value stream for conservation and recovery of spikedace and loach minnow, but its contribution toward recovery of these species will be greatly diminished if nonnative fishes are not controlled. Fathead minnow is one of the few nonnative fish species that does not appear to have noticeable detrimental effects to native fishes in stream habitats in the Gila River basin, and its probable reinvasion to the treated reach in the future is not considered particularly problematic and would not trigger another renovation. If the planned chemical re-application fails to eradicate mosquitofish, its presence would likely preclude long-term establishment of Gila topminnow but not other native species. In that situation, mosquitofish would continue to be managed against, but it is unlikely additional chemical renovations would be attempted if it was the only nonnative fish that became re-established. Of the three nonnative species that have reoccupied Bonita Creek following the initial renovation, green sunfish is by far the most offensive to the persistence of a healthy native fish assemblage. The species has been specifically implicated in the decline of chubs in other Gila River basin streams, as well as entire stream native fish communities. Reinvasion of green sunfish to Bonita Creek likely would automatically trigger additional renovation attempts, as its presence would doom the native fishery. Invasions by other offensive nonnative species such as smallmouth bass or catfishes would also likely trigger consideration of re-renovations into the future.

Summary of Comments	Reclamation's Response
Reclamation must consider the likelihood that nonnatives will again repopulate the treatment area and take proactive steps to limit that probability.	As mentioned in this Supplement, the agencies propose to substantially reduce the size and complexity of the treatment area by dewatering beaver ponds and the pool that formed adjacent to the fish barrier. We believe these actions will enhance the probability of a successful outcome. Permanent removal of the pool upstream of the fish barrier will eliminate a potential public attraction and discourage human transfer of nonnative fishes at the barrier. In addition, the AGFD is closing to recreational angling all of Bonita Creek downstream from the San Carlos Apache Reservation boundary starting in 2011. This action should minimize the potential for bait-bucket transfers of nonnative fishes into Bonita Creek. At some uncertain point in the future if native fish restoration attempts are continually thwarted by invasions of nonnative fishes, then indeed a decision could be made to abandon further efforts. The timing and circumstances involved in making such a decision cannot be predicted at this time.
Effects on non-target wildlife populations must also be considered. Will unlisted native species be salvaged?	The effects of stream renovation on non-target species, including food base for sensitive species, was considered in the 2007 EA and are not repeated in this Supplement. The proposed action includes salvaging leopard frog eggs and tadpoles (if present), unlisted native fishes, mud turtles, and macroinvertebrates.
Are there any plans to mitigate losses of macroinvertebrates and amphibians?	Aquatic invertebrates from several locations throughout the treated section would be salvaged, held onsite in portable tanks, and restocked immediately following application of rotenone. As mentioned in the 2007 EA, not all aquatic insects likely will be killed in the treatment area, and significant source populations for recolonization are available in non-treated reaches of stream above the infiltration gallery dike and below the fish barrier. We do not anticipate any significant impacts to amphibians, as their populations are low and their adult life stages should not be affected by the treatment(s). The relatively short (1.7 mi) reach of Bonita Creek under consideration for renovation downstream from a much longer unaffected reach helps minimize impacts of renovations on aquatic macroinvertebrates in that this source of recolonization is present. In addition, adaptations of macroinvertebrates to desert streams, including shortened life histories and multiple recolonization pathways, are conducive to rapid recolonization of Gila River basin streams.

Summary of Comments	Reclamation's Response
	The following articles describe some of these adaptations: 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. Gray, L.J. 1981. Species composition and life histories of aquatic insects in a lowland Sonoran Desert stream. American Midland Naturalist 106:229-242. Gray, L.J., and S.G. Fisher. 1981. Postflood recolonization pathways of macroinvertebrates in a lowland Sonoran Desert stream. American Midland Naturalist 106:249-257.