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In Reply Refer To:
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June 28, 2007

Email Transmission
Memorandum

To: Chief, Environmental Resource Management Division, Bureau of Reclamation,
Glendale, Arizona

To: Manager, Safford Field Office, Bureau of Land Management, Safford, Arizona

From: Field Supervisor

Subject: Biological Opinion for Restoration of Native Fishes in Lower Bonita Creek and
Implementation of a Memorandum of Understanding (MOU) and 10-Year Operation
Plan between the Bureau of Land Management (BLM) and the City of Safford

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request, dated February 2, 2007, was received by us on February 13, 2007. At issue are impacts that may result from the proposed "Restoration of Native Fishes in Lower Bonita Creek and Implementation of a Memorandum of Understanding (MOU) and 10-Year Operating Plan between the Bureau of Land Management and the City of Safford (Safford)" located in Graham County, Arizona. The proposed action may affect endangered Gila chub (*Gila intermedia*), endangered Gila topminnow (*Poeciliopsis occidentalis*), endangered desert pupfish (*Cyprinodon macularius*), threatened loach minnow (*Tiaroga cobitis*), and threatened spinedace (*Meda fulgida*).

As requested, this draft biological opinion includes the proposed action of the Gila Box Riparian National Conservation Area Management Plan (consultation number 02-21-92-F-0070). We have also evaluated its effects on the fish to be repatriated to Bonita Creek as part of this project (Gila topminnow, desert pupfish, spinedace and loach minnow). This includes several related biological opinions, including the Safford/Tucson Field Offices' Livestock Grazing Program, Southeastern Arizona (consultation number 02-21-96-F-0160) the BLM Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management (consultation number 02-21-03-F-0210), and the Safford Resource Management Plan (consultation number 02-21-88-F-0114). A full description of the projects listed above including the biological opinions can be found in the specific project files. All analyses remain the same unless noted in this document. This opinion also confirms the conference opinions for Gila chub as biological opinions for the Gila Box Riparian National Conservation Area Management Plan and the BLM Arizona

Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management consultations; no aspect of those conference opinions is changed except where noted.

In your memorandum, you requested our concurrence that the proposed action was not likely to adversely affect the threatened bald eagle (*Haliaeetus leucocephalus*). We concur with your determination for reasons explained in Appendix A.

This biological opinion is based on information provided in the February 2, 2007, biological assessment (U.S. Bureau of Reclamation 2007a), the February 20, 2007, draft environmental assessment (U.S. Bureau of Reclamation 2007b), and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, fisheries repatriations and their effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at our Phoenix office.

CONSULTATION HISTORY

The consultation histories on the Gila Box Riparian National Conservation Area Management Plan; Safford/Tucson Field Offices' Livestock Grazing Program, Southeastern Arizona; the BLM Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management; the Safford Resource Management Plan; and the Revised Biological Opinion on Transportation and Delivery of Central Arizona Project Water to the Gila River Basin are hereby incorporated by reference (U.S. Fish and Wildlife Service 2001, 2002, 2004a, 2004b, 2006).

2004-2006: Informal consultation with BLM and BR on native fishes conservation strategies in Bonita Creek.

February 13, 2007: We received your request for formal consultation including your biological assessment of the proposed project.

February 20, 2007: We received your draft Environmental Assessment of the proposed project.

June 18, 2007: We received by telephone (with subsequent email transmission) the BLM's request to consider their water delivery action to be interrelated to the City of Safford's water withdrawal.

June 25, 2007: We transmitted our draft biological opinion to you.

June 28, 2007: We received your comments on the draft biological opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

Overview

The proposed action consists primarily of a project to enhance native fish in Bonita Creek, Graham County, Arizona. The project includes construction of a physical barrier to prevent the upstream movement of nonnative fishes, chemical removal of nonnative fish from a 1.7-mile reach of Bonita Creek, and repatriation of a suite of native fishes to Bonita Creek following renovation, including both currently extant native fishes and native fishes that do not currently occur in Bonita Creek (we note that the purposeful capture, transport, and other forms of intentional take associated with salvage of Gila chub, repatriation of listed fish species, and monitoring activities, will be covered under a 10(a)(1)(A) permit and is not covered under this consultation). This project is part of a conservation measure by the Bureau of Reclamation (BR) under the revised Biological Opinion, dated April 17, 2001, on the transportation and delivery of Central Arizona Project water to the Gila River basin (U.S. Fish and Wildlife Service 2001). The project will be funded by the BR and implemented on lands administered by the BLM, and is intended to be beneficial to native fishes and the ecosystem as a whole by preventing the immigration of nonnative fishes that prey on and compete with native fishes, and thereby establishing and protecting an intact native fish assemblage free from nonnative fishes in Bonita Creek.

The proposed action also includes maintaining a healthy native fishery in Bonita Creek consistent with existing uses and the BLM's ongoing management of the area within the Gila Box National Riparian Conservation Area, which includes such activities as livestock grazing, recreation, and maintenance of related facilities and roads. Many of these actions have been consulted upon in the past for listed species in the action area, most recently as part of section 7 consultations on the Gila Box Riparian National Conservation Area Interdisciplinary Activity Plan (U.S. Fish and Wildlife Service 2004a), the Safford District Resource Management Plan (U.S. Fish and Wildlife Service 2006), the Safford/Tucson Field Offices' Livestock Grazing Program, Southeastern Arizona (U.S. Fish and Wildlife Service 2002), and the BLM Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management (U.S. Fish and Wildlife Service 2004b). Because this project will ultimately result in the presence of four listed fish species not previously present in the action area of these consultations, BLM has requested reinitiation on these consultations. We utilize the effects analyses in these past biological opinions on Gila chub to analyze their effects on repatriated populations of Gila topminnow, desert pupfish, loach minnow, and spikedace since the effects of these actions will essentially be the same to these species as they are to Gila chub. No other changes are being considered in the proposed actions of these prior consultations.

The proposed action also includes water withdrawal by the City of Safford (Safford), which is considered an interrelated action with the BLM action of allowing the delivery of water from Bonita Creek to the City. Safford operates and maintains the Bonita Creek Municipal Water System (Bonita water system) within the BLM Gila Box Riparian National Conservation Area (RNCA). The Bonita water system provides drinking water for Safford and the surrounding communities. Currently, Safford and BLM refer to the 1986 Memorandum of Understanding (MOU) for system management guidelines and actions. Safford and BLM have developed a new

MOU, no. AZ-410-0608, and the Bonita Creek Water Production and Delivery System 10-Year Operation and Maintenance Plan (10-year plan) to provide future management (see Appendix in U.S. Bureau of Reclamation 2007a). The MOU allows operation, maintenance, and expansion of the water system to meet full capacity of the Safford water right, to the extent allowed under their right-of-way issued prior to 1976. Currently, Safford is utilizing approximately 60 percent of their water right. The proposed action includes operation, maintenance, and expansion of the Bonita water system within Safford's existing right-of-way under the 10-year operation and maintenance plan. The native fish restoration project cannot occur without Safford's approval, as a substantial portion of lower Bonita Creek flows through Safford lands.

Specific Project Elements

Barrier construction and maintenance - The first step in readying Bonita Creek for native fish repatriations is to construct a fish barrier that will serve three primary functions: (1) prevent upstream incursion of nonnative fishes; (2) prevent re-invasion of exotics that were transported downstream during flooding; and (3) function as a downstream control site for eradications of nonnative fishes in the stream reach between the barrier and the grade control dike 1.7 miles upstream.

The barrier site is located 1.3 miles upstream of Bonita Creek's confluence with the Gila River and was chosen in order to secure the greatest length of stream for native fishes and minimize the fragmentation of populations of the existing native fish community in Bonita Creek; it has the site criteria of a narrow channel with exposed bedrock walls on both sides to solidly anchor and protect the barrier against floods; it is far enough away from easy access points to minimize vandalism; and it is in a location that will minimize visual and on-the-ground disturbance to the environment.

Ground access will be needed to transport construction crews, inspectors, tools, machinery, and equipment. Construction vehicles and equipment will utilize Kearny Camp, West Bonita Rim, and Bonita Creek roads within the RNCA to access the stream corridor. Project staging and lay-down will be confined to three temporary contractor use areas.

The reinforced concrete barrier will be constructed within the 160-foot-wide channel on an alluvial foundation. To ensure stability against boulders and vegetative debris carried by high-magnitude flows, the barrier will be anchored to abutment bedrock with anchor bars and keyed into the channel alluvium. Standard earthmoving equipment and excavation methods will be used to create the foundation trench. The trench will be excavated to the depth required for construction of the keys, which is estimated to be approximately 15 feet. Sand and gravel from the trench excavation will be temporarily stockpiled outside the wetted perimeter of the stream for subsequent use as backfill on the upstream side of the fish barrier.

Concrete will be poured in two phases to allow for stream diversion: the first phase will construct approximately two-thirds of the structure, and the second phase will complete the project. Stream flow will be diverted around active work areas with temporary dikes consisting of alluvium excavated from the diversion channel. Following construction, the material used in the dikes will be spread along the upstream side of the barrier to minimize potential pool development. All formwork and other temporary construction material will be removed when the project is finished. The construction phase is expected to require 4 months.

The proposed fish barrier consists of five primary features: (1) a 4-foot-high concrete drop structure to preclude upstream incursion of fishes, (2) a 160-foot-wide concrete apron spanning the length of the drop structure to prevent scour and plunge pool development, (3) upstream and downstream keys to help anchor the barrier and prevent scour from undermining the structure, (4) riprap armoring across the entire width of the streambed at the base of the apron to prevent scour, and (5) a ramp to accommodate vehicle passage over the structure.

The Bonita Creek barrier will be a reinforced concrete structure similar to those emplaced on Aravaipa Creek. But, the Bonita Creek barrier will be an arched design that will better stabilize the structure against erosive forces without the need for reinforced-concrete piles. The other major difference between the Bonita Creek barrier and the barriers at Aravaipa Creek is that there is no major terrace development at the Bonita Creek site that will dictate that the barrier crest follow those contours to protect against upstream fish movements during high flow events. Instead, a single notch that will accommodate an approximate 1.5-year recurrence interval flood will be added, and the barrier crest wall lateral to this notch will rise in elevation only slightly as it approaches the abutments.

Construction will use methods usually associated with a road-accessed project, including establishment of contractor use areas, temporary road improvements, stream dewatering, excavation, importation of pre-mixed concrete and riprap. Also, future maintenance of the barrier will be required, which could involve the use of similar actions to those described above, although the barrier is expected to require little maintenance.

Construction of the barrier and rip-rap will affect a total of approximately 2.6 acres of riparian vegetation, and will permanently remove approximately 0.2 acres of riparian habitat. The remaining impacts will be temporary and, over time, the area will naturally revegetate. Sediment deposition following construction will inundate 2.2 acres of the active channel. An additional 0.2 acres of vegetation outside of the sedimentation zone will be utilized for access and material staging around the barrier.

Fish Salvage - This action will be covered under the aforementioned 10(a)(1)(A) recovery permit and is not part of this consultation (see Environmental Baseline).

Stream Renovation - An EPA-registered fish toxicant effective in killing most species and life stages of gill-breathing fishes will be used to remove any nonnative fish remaining in the treatment reach. Antimycin A has proven especially effective and safe for stream renovations and application of this chemical for modern fishery management has been practiced successfully for many decades. The option to use a similar toxicant, rotenone, will be retained should stream chemistry dictate antimycin cannot be used, or in the event antimycin cannot be acquired. Sodium or potassium permanganate will be used as a detoxifying agent at the downstream end of the treatment zone.

The piscicide will be applied under the supervision of a certified applicator, in accordance with a treatment plan approved by the Arizona Game and Fish Department (AGFD), FWS, and BLM. If antimycin is used, each reach will be treated with a combination of aqueous antimycin A (Fintrol-Concentrate) and possibly sand-coated antimycin A (Fintrol-15). If the treatment chemical is rotenone, the formulation used will be either Nusyn-Noxfish or CFT Legumine.

Prior to treatment, stream discharge and volume will be calculated using direct measurements. An inert fluorescent dye will be applied at the head of a few test pools to determine residence time and mixing potential in the larger pools. Results of the dye study will assist in determining how best to apply the piscicide to ensure all possible areas of the stream are treated at target concentrations. Appropriate calculations will then be made to determine the amounts of piscicide necessary to treat the stream reach. These calculations will be double-checked by a certified pesticide applicator.

On-site field bioassays may be attempted prior to the actual stream renovation to determine target concentrations needed to eradicate the nonnative species. Once application targets have been defined, specified amounts of piscicide will be applied. Controlled amounts will be released at constant-flow drip stations (Stefferd and Propst 1996) to be located approximately every 300-500 feet along the treated reach if antimycin, or at approximate 0.5 mile distances if rotenone, over a 4-6 hour time period. Roving crews will treat shallow backwaters and poorly-mixed shorelines with backpack sprayers. If Fintrol-15 is applied, other crews will disperse it into deeper areas of the stream. To determine effectiveness of the first treatment, a second piscicide application using procedures identical to the first will be made 1-7 days following the initial treatment. If no fish are observed alive during the second treatment, the renovation will be considered successful and completed. If live fish are observed during the second treatment, a third treatment will be undertaken immediately following the second.

Below the constructed fish barrier, a drip station similar to that described for application of piscicide will be established to meter either aqueous potassium permanganate (KMnO₄) or sodium permanganate (NaMnO₄) into the stream during the course of each piscicide treatment to ensure detoxification. A cage with sentinel fish will be placed in the stream approximately 100 m below the permanganate station to ensure that detoxification is occurring as intended.

Repatriation of Native Fishes

The ultimate goal of the project is to restore a purely native fish fauna to Bonita Creek. This will include returning salvaged native fishes including Gila chub, and repatriation of four other native fish species that were either extirpated from the stream prior to the project or had historic access to the stream: Gila topminnow, desert pupfish, loach minnow, and spikedace. Native fishes salvaged prior to the treatment will be released near their point of capture once the stream has detoxified. Samples of fishes captured in the untreated reach above the grade control dike may also be released at several points above the fish barrier, and natural downstream movements of fishes from above the dike will likewise serve as a source for repatriation to the treated stream reach. Native fish not currently present in the action area (Gila topminnow, desert pupfish, loach minnow, and spikedace) will be repatriated to Bonita Creek within the action area in both upper and lower Bonita Creek. All of these activities associated with repatriation will be conducted under the authority of a 10(a)(1)(A) permit (see Environmental Baseline).

Water Use and Management

MOU and 10-Year Plan - In 1939, Safford completed installation of an infiltration gallery (gallery) and associated transmission pipeline on Bonita Creek to supply municipal water for Safford and the surrounding communities. The gallery system is located approximately 3.5

miles above the mouth of Bonita Creek. The BLM has issued Safford a right-of-way authorization to allow operation and maintenance of the Bonita water system on public land. In addition, Safford may expand the system within the next 10 years to withdraw and transport their full allocated water right of 5,310 acre-feet per year within their existing right-of-way. If expansion of the Bonita water system requires a change in the existing right-of-way to include upper Bonita Creek, additional compliance will be necessary.

Following a flood in 1949, the original 10-inch delivery pipeline was replaced with a 16-inch line. In 1956, the two retention (grade control) dams (dikes), originally installed to lessen the risk of the gallery washing out during flood, were realigned and reinforced. The original gallery consisting of 12-inch and 15-inch perforated galvanized steel pipe arranged in four lateral lines was replaced in 1994 following damage from a large flood. The new system consists of the following elements: (1) a 24-inch well pipeline connected to a cluster of six wells; (2) a 24-inch gallery pipeline connected to 15 perforated laterals; (3) a single grade control dike downstream from the gallery that has raised the bed of the channel upstream approximately 5 feet; (4) a 16-inch pipeline that carries water from the well and gallery pipelines to approximately the mouth of Bonita Creek; and (5) two smaller pipelines that carry the water to Safford, approximately 17.5 miles to the southwest.

The perforated laterals are buried approximately 19 feet below stream grade, which has been artificially raised approximately 5 feet by the retention dike. The passive infiltration gallery is normally sufficient to supply Safford needs, but during high demand/low supply periods the wells are operated to augment flows as needed. Average production of this system is approximately 2,000 gallons per minute (gpm; ~4.5 cubic feet per second (cfs); ~3,227 acre-feet per year; Montgomery and Associates 1996). Primary routine operation and maintenance needs of the system include maintaining roads within and adjacent to the Bonita Creek channel, construction of temporary roads to provide vehicle access to water system facilities on an as-needed basis, use of heavy equipment to breach beaver dams and move brush, trees, and boulders, etc., to allow access to the pipeline and other facilities, pump testing and monitoring of wells, water sampling, and monitoring and replacement of pipeline sections, pipeline concrete support pillars, and cable hangers on an as-needed basis.

Safford may expand the present system to accommodate its full water right allocation of 5,310 acre-feet per year, an increase in capacity of approximately 40 percent within its existing right-of-way. This will be accomplished primarily by replacing the existing 16-inch transmission pipeline with larger-capacity pipe. Temporary transmission pipelines will be laid on the canyon floor while the existing infrastructure is replaced or during emergencies. Generators may be needed to operate the system during times of emergency. Water-resource development includes the following stipulations:

1. Safford shall have the right to increase the size of the permanent water transmission mains to allow transport of Safford's total water right allotment.
2. Safford shall have the right to provide temporary water transmission mains, 16- to 24-inch pipe, joined by butt fusion. Temporary transmission mains will be laid on the canyon floor, anchored to the canyon wall, or secured by pilings. Temporary transmission mains will be in operation while permanent water sources and mains are being developed and during emergencies.

3. Safford shall have the right to provide generators with fuel-storage tanks at each water production site. Generator and fuel-storage sites must meet current law and regulation for operating near surface water.

A generator and a spill containment facility may be temporarily (i.e., three-five months) set up at each water-production site to pump water. Approximately 100-300 gallons of diesel fuel will be contained within the generator on-site. No additional gas and/or oil for the generator will be stored in the canyon bottom, except at the City's maintenance facility.

Beaver Pond Breaching - Safford may breach beaver ponds if necessary to reach maintenance sites. Safford will consult with BLM prior to any beaver ponds being lowered, and a biologist from BLM will be on-site when beaver ponds are breached to minimize injury and/or mortality to native fish by capturing and moving any fish out of the immediate area of the stream where ponds are breached, if necessary.

Beaver Dam Removal (dam free zone) - Safford may remove beaver dams in the designated beaver-dam free zone. A biologist from BLM will be on-site when beaver dams are removed to minimize injury and/or mortality to native fish by capturing and moving any fish out of the immediate area of the stream where ponds are breached, if necessary.

Pipeline Monitoring and Maintenance - Safford will have the right to inspect, repair, replace, and upgrade the entire pipeline from the infiltration gallery to Safford. Upgrades may include increasing the size of the pipeline to allow Safford to meet full capacity of their water right. To access the pipeline for monitoring and maintenance, Safford will have the right to remove all brush, trees and overhanging limbs less than six inches in diameter and approximately 15 feet from the pipe. The cuttings will be scattered to allow for natural decomposition. Prior to cutting, trees and limbs will be inspected for nesting wildlife. If nesting wildlife is present, Safford will consult with BLM biologists.

If Safford exercises their right to remove vegetation along the pipeline from where it originates and from where it leaves Bonita Creek, approximately 3.6 acres of riparian and aquatic habitat could be impacted. However, it is unlikely that Safford will need to remove vegetation from the entire pipeline in any given year. More realistic will be Safford inspecting 100 percent of the pipeline and removing vegetation from 50 percent of the pipeline annually.

Well Monitoring and Maintenance - Consistent with Safford's pre-1976 rights-of-way to construct, operate, and maintain a water collection and distribution system within Bonita Creek, well monitoring and maintenance will be conducted with the following stipulations:

1. Safford shall have the right to pump-test all wells currently in production bi-annually, and to pump-test all non-production wells annually. Well flow data will be recorded including draw down and rate of recovery.
2. Safford shall have the right to sample and analyze water from all Safford wells as necessary to comply with all applicable drinking water laws, Safford's Emergency Operations Plan, and Safford policy.

3. Safford shall have the right to inspect all wells for storm and flood damage and vandalism on an as-needed basis.
4. Safford shall have the right to install protective shields on any well casings on an as-needed basis.

Recreation and Transportation Management

The proposed action for recreation and transportation management is the same as that analyzed in the Gila Box Riparian National Conservation Area Management Plan (U.S. Fish and Wildlife Service 2004a), the Safford District Resource Management Plan (U.S. Fish and Wildlife Service 2006), and subsequent reinitiations, and is incorporated here by reference. The BLM and BR have supplemented the proposed action with the following elements:

Access and Roads - Safford will maintain the following roads: Kearny Camp Road from Sanchez Road to West Bonita Rim Road; West Bonita Rim Road from Kearny Camp Road to Bonita Creek Road; Bonita Creek Road grade down to Bonita Creek; and Bull Gap Road from Kearny Camp Road to the Safford water facility building to BLM Level III standard. This standard entails roads to be open seasonally or year-round for commercial, recreation, or high-volume administrative access. Typically, these roads are natural or aggregate surfaced, but may include low-use bituminous surfaced roads. These roads have defined cross sections with drainage structures (e.g., rolling dips, culverts, or ditches). These roads may be negotiated by passenger cars traveling at prudent speeds.

The Bonita Creek Road and temporary access roads to the pipeline and water system facilities within lower Bonita Creek from the existing water infiltration system downstream to the Bull Gap Road will be maintained to BLM Level II standards. These standards require the road to be opened for limited administrative traffic. Typically, these roads are passable by high-clearance vehicles. Drainage structures are to be maintained as needed. Road grading is conducted as necessary to correct drainage problems. Brush removal is conducted as needed to allow administrative access. Rock slides may be left in place provided they do not adversely affect drainage.

Safford has a right-of-way on the Bonita Creek Road for maintaining the City's drinking water pipeline. Temporary road construction will occur on an as-needed basis to provide vehicle access to water system facilities within lower Bonita Creek. Safford will consult with BLM prior to construction of temporary roads. Temporary roads will be constructed with a roadway just wide enough to allow maintenance vehicles, equipment and crews to access the work site safely. During use of the temporary roads, portable barricades will be installed to prevent unauthorized access. Following completion of the maintenance work, all temporary roads will be closed with a vehicle barrier to prevent unauthorized access.

Roads will be maintained or rebuilt, in case of flood or other natural disaster, in the same location as before the event if possible. Creek crossings will be reconstructed to a 90 degree angle with Bonita Creek whenever possible. Native materials will be used to stabilize the creek crossings. Material pits are designated in the 10-year Operation Plan. Road berms or material stockpiles near creek and wash crossings will be pulled back into the road bed or spread evenly to prevent stream flow alterations.

Heavy equipment will be used to move obstacles such as brush, trees, boulders, tree stumps, and snags. Trees and snags greater than six inches in diameter will remain intact if possible. Creek diversions will be created if necessary, to allow access to the pipeline and other facilities for maintenance and repair. Safford will consult with BLM and their biologist prior to any creek diversion.

Safford will limit their travel in and through Bonita Creek to the bare minimum when accessing maintenance sites to reduce impacts to aquatic and riparian habitat and listed native fish. Equipment used to construct, maintain, or repair roads and other facilities include, but shall not be limited to, bull dozers, loaders, excavators, graders, cranes, welders, dump trucks, water trucks, and heavy trucks with trailers.

Recreation - Dispersed recreation in the form of picnicking, camping, hiking, recreational driving, horseback riding, water play, bird watching, hunting, and photography occur within Bonita Creek to various degrees. These activities have the potential, if they become concentrated, to affect wildlife species and their habitats.

Safford and BLM will work together to provide natural, cultural, recreational, and visual resource conservation, protection and enhancement through education, interpretation, on-site visitor contact, and law enforcement. Weekly campground maintenance for the City Campground on Bonita Creek will continue to be provided by BLM and Safford. Safford may replace the existing pit toilet with a sealed vault toilet within the next 10 years. The BLM and Safford will also work cooperatively with the U.S. Geological Survey to install a stream flow monitoring station below the fish barrier and infiltration gallery. The downstream data can be compared with data from the existing monitoring station located above the gallery.

Riparian Area Management

The proposed action for riparian area management, including livestock grazing, is the same as that analyzed in the Gila Box Riparian National Conservation Area Management Plan (U.S. Fish and Wildlife Service 2004a), the Safford District Resource Management Plan (U.S. Fish and Wildlife Service 2006), and subsequent reinitiations, and is incorporated here by reference. Below is a summary of these actions.

The BLM's goal for the action area is to achieve healthy tree-sapling ratios and densities for cottonwood, willow, and sycamores within seven years following major flood events. Ratios and densities are defined for five segments of Bonita Creek and four segments of the Gila River. Ratios for tree-saplings vary from 1:1 to 1:7. A healthy tree-sapling ratio and densities indicate continued recruitment of seedlings and saplings, which ensures a continual replacement of larger trees, and adequate densities of trees to ensure quality fish and wildlife habitat. These objectives will be met by collaborative management with agencies and individuals and deferment of livestock grazing in the riparian areas. Monitoring will be conducted to track progress and management effectiveness.

Livestock Grazing - Livestock grazing within the action area is defined by grazing decisions made in two prior documents, the 1987 Upper Gila-San Simon Grazing Environmental Statement and the 1987 Eastern Arizona Grazing Environmental Impact Statement. Additional

site-specific guidance for the action area is found in the 1996 BE for livestock grazing in the Safford/Tucson Field Offices, the 1998 Gila Box Management Plan, the Final Safford District Resource Management Plan and subsequent biological opinions on these plans.

Livestock grazing on the eight allotments in the RNCA (Bonita Creek - 4616, Bull Gap - 4617, Turtle Mountain - 4618, Twin C - 4021, County Line - 4022, Smuggler - 4010, Gila - 4014, and Morenci – 4003 allotments) were addressed in our September 26, 1997, biological opinion for the Safford/Tucson Field Offices' programmatic biological opinion and subsequent amendments. The Bonita Creek, Johnny Creek, and Bull Gap allotments border Bonita Creek, and the Bonita Creek allotment includes Bonita Creek and portions of its watershed in the action area. The proposed action for these allotments is the same as that analyzed in the Safford/Tucson Field Offices' Livestock Grazing Program, Southeastern Arizona (U.S. Fish and Wildlife Service 2002) the Gila Box Riparian National Conservation Area Management Plan (U.S. Fish and Wildlife Service 2004a), and the Safford District Resource Management Plan (U.S. Fish and Wildlife Service 2006), and subsequent reinitiations, and is incorporated here by reference.

Fire Management

The proposed action for fire management in the action area is defined in BLM's Arizona Statewide Land Use Plan (LUP) Amendment for Fire, Fuels, and Air Quality Management, and associated biological opinion (U.S. Fish and Wildlife Service 2004b) and is incorporated here by reference. The BLM does not plan to implement wildland fire use or mechanical or chemical treatments in the Bonita Creek watershed. The BLM does anticipate effects to fishes in the Bonita Creek watershed from fire suppression and prescribed fire actions. The BLM proposes various conservation measures to avoid and minimize the effects of wildfire suppression, prescribed fire, and mechanical and chemical vegetation treatments. General conservation measures will be applied to activities that could affect riparian and aquatic ecosystems. Species-specific conservation measures have been developed to address effects on Gila chub, Gila topminnow, desert pupfish, loach minnow, and spikedace (see Appendix B of U.S. Fish and Wildlife Service 2004b).

The BLM projects up to 5,000 acres of prescribed fire treatment within Gila chub habitat over the 10-year duration of the LUP amendment (see Appendix C in U.S. Fish and Wildlife Service 2004b). The exact location of this acreage is not defined and thus could occur in the Bonita Creek watershed. Adverse effects such as increased runoff and sedimentation can accumulate following the first prescribed fire, if fires are repeated frequently and vegetation does not have an opportunity to recover. Conservation measure RA-14 (B) states that fuels management projects will, in consultation with FWS and AGFD staff, determine and implement an "appropriately-sized buffer adjacent to perennial streams in order to minimize soil and ash from entering the stream." Careful design of buffers should reduce these effects. We anticipate that the conservation measures proposed, along with additional site-specific measures developed in lower level planning documents (i.e. implementation plans), will serve to further minimize any adverse affects from prescribed fire and vegetation treatments.

Specific fire projects that may affect listed fish species in Bonita Creek will be developed in implementation plans. Implementation plans are site-specific plans and include fuels management plans, prescribed fire plans, and fire use plans. They will identify the project location, prescriptions, and tools that will be used for specific projects. The BLM does not

currently have a specific prescribed fire plan for the action area. Should a specific project that may affect listed or proposed species or designated or proposed critical habitats be developed for the action area in the future, it will be subject to additional consultation.

Other BLM Land Management Actions

The proposed action includes BLM's ongoing and planned management of the action area which is defined in the Gila Box Riparian National Conservation Area Interdisciplinary Activity Plan, and further defined in the Final Resource Management Plan for BLM lands of the Safford and Tucson field offices in eastern and southeastern Arizona. These planning documents guide management on BLM lands in the action area through 2013 and include overall management guidance, decisions on land allocation, acquisition, and designation, determinations of allowable uses, and specific management guidelines for fish and wildlife, research, and education. The proposed action has been previously defined in the biological opinions on these plans (U.S. Fish and Wildlife Service 2004a, 2006). These elements of the proposed action are unchanged from these prior consultations and are hereby incorporated by reference.

Action Area

The action area for this consultation, as well as the MOU-defined planning area for the operation, maintenance and expansion of the Bonita Creek water system, is upper and lower Bonita Creek. Upper Bonita Creek is defined geographically as Bonita Creek from the existing water infiltration gallery upstream to, but not including, the San Carlos Apache Indian Reservation and RNCA boundary. Lower Bonita Creek is defined as from the infiltration gallery downstream to the Gila River and Bonita Creek confluence, including the gallery site.

The proposed fish barrier is to be constructed in Graham County in the lower reach of Bonita Creek, approximately 1.3 miles upstream from the Gila River confluence, within the Gila Box RNCA. Bonita Creek is a small perennial tributary to the Gila River, draining southeasterly between the Gila and Turtle mountains in a structural trough coextensive with the Safford Valley (Gilbert 1875). Elevations in the watershed range from 3,140 feet at the confluence with the Gila River to 7,004 feet at Turtle Mountain. Topography in the upper part of the drainage is of generally low relief and the stream flows through a broad valley. In lower reaches, canyon conditions prevail, with walls nearly vertical to 180 feet or more and at one point restricting the channel width to less than 45 feet.

The headwaters of Bonita Creek lie outside the action area within the San Carlos Apache Indian Reservation, while the majority of the lower drainage is public land under BLM management. Safford also owns several parcels of land along the stream in the lower reach.

Perennial flow begins at about 4,270 feet elevation (18 miles upstream from the mouth), although intermittency is common downstream. The June low flow mean discharge estimate at the U.S. Geological Survey gage station located 6.4 miles above the mouth is 3.1 cfs over the 24-year period of 1982-2005. Maximum flood flow recorded during this period was 19,500 cfs on January 18, 1993.

Bonita Creek is located within the Gila Box RNCA, which was designated under the Arizona Desert Wilderness Act of 1990 (PL 101-628). Bonita Creek was designated a "Unique Water"

for its exceptional water quality and dependable flow and is on the list of eligible waterways for inclusion under the Wild and Scenic Rivers Act of 1968 (PL 90-542). These actions serve to provide additional protection for the natural resources of Bonita Creek, including Gila chub.

Bonita Creek upstream of the Safford infiltration gallery (located approximately 3.5 miles above the mouth) retains a purely native fish fauna of five species, including the federally-endangered Gila chub. Downstream of the gallery, at least nine nonnative fishes have invaded the stream; this has degraded the native fauna there and threatens to invade upper reaches of the stream. Although a grade control dike associated with the infiltration gallery has apparently functioned well as a fish barrier in the past, it is under-engineered and has washed out twice. The potential for nonnatives to invade the upper stream during another wash-out is high, and thus a barrier dedicated to protect native fish and designed to withstand a 100-year flood event will provide needed assurance that the stream will be protected for native fishes. The addition of a dedicated fish barrier will also reclaim an additional 1.7 miles of stream for native species.

STATUS OF THE SPECIES (rangewide)

Gila chub

We listed the Gila chub as endangered with critical habitat on November 2, 2005 (U.S. Fish and Wildlife Service 2005). Historically, Gila chub have been recorded from rivers, streams, and spring-fed tributaries throughout the Gila River basin in southwestern New Mexico, central and southeastern Arizona, and northern Sonora, Mexico (Miller and Lowe 1967, Rinne and Minckley 1970, Minckley 1973, Rinne 1976, DeMarais 1986, Propst 1999, and Weedman *et al.* 1996). Today the Gila chub has been restricted to small, isolated populations scattered throughout its historical range. Critical habitat includes approximately 160 miles of stream reaches in Arizona and New Mexico, organized into seven river units (U.S. Fish and Wildlife Service 2005).

Decline of Gila chub is due to habitat loss from past and current dewatering of rivers, springs, and cienegas (e.g. from diversions, impoundments, and groundwater pumping), poor land management practices (e.g. excessive livestock grazing) resulting in erosion and arroyo formation, and the concomitant introduction of predacious and competing non-indigenous fish species (Miller 1961, Minckley 1985). Life history information can be found in the status review (Weedman *et al.* 1996), the final rule (U.S. Fish and Wildlife Service 2005), and references cited therein.

The Gila chub is a small-finned, deep-bodied, chunky, darkly colored member of the minnow family Cyprinidae. Adult males average about six inches in total length; females can exceed eight inches. Gila chub commonly inhabit pools in smaller streams, springs, and cienegas, and can survive in small artificial impoundments (Miller 1946, Minckley 1973, Rinne 1975). Highly secretive, preferring quiet, deeper waters, especially pools, or remaining near cover like undercut banks, terrestrial vegetation, boulders, and fallen logs, they feed on large and small aquatic and terrestrial invertebrates and sometimes other small fishes, organic debris, aquatic plants, and diatoms (Rinne and Minckley 1991).

Gila chub occur in New Mexico only in Turkey Creek (Grant County); in Arizona, they occur in Indian, Larry, Little Sycamore, Silver, Spring, Sycamore, and Walker creeks and Lousy Canyon (Yavapai County), Sabino Canyon (Pima County), Sheehy Spring and O'Donnell Creek (Santa

Cruz County), Cienega Creek (Pima and Santa Cruz counties), Redfield and Bass canyons (Graham and Cochise counties), Babocomari River (Santa Cruz and Cochise counties), the San Carlos and Blue rivers (Gila and Graham counties), Harden Cienega and Dix creeks, (Greenlee County), Eagle Creek (Graham and Greenlee counties), and Bonita Creek (Graham County); in Mexico, Gila chub occur in Cienega los Fresnos and Cienega la Cienegita (Varela-Romero *et al.* 1992, Weedman *et al.* 1996).

Most known extant Gila chub populations are small. Only one, Cienega Creek, is considered stable and secure; about two thirds are considered stable but threatened, and a third are unstable and threatened (Weedman *et al.* 1996). Reestablishment of Gila chub has been attempted in three Arizona sites; two are believed to be extant, in Lousy Canyon and Larry Creek, which are tributaries to the Agua Fria River.

Our records indicate that, rangewide, twelve informal or formal conferences or consultations have been completed or are underway for actions affecting Gila chub.

Gila topminnow

The Gila topminnow was listed as endangered in 1967 without critical habitat (U.S. Fish and Wildlife Service 1967). The reasons for decline of this fish include past dewatering of rivers, springs, and marshlands; impoundment; channelization; diversion; regulation of flow; land-management practices that promote erosion and arroyo formation; and the introduction of predacious and competing nonindigenous fishes (Miller 1961, Minckley 1985). Life history information can be found in the 1984 recovery plan (U.S. Fish and Wildlife Service 1984), the draft revised Gila topminnow recovery plan (Weedman 1999), and references cited in the plans.

Gila topminnow was listed as *Poeciliopsis occidentalis*. The species was later revised to include two subspecies, *P. o. occidentalis* and *P. o. sonoriensis* (Minckley 1969, 1973). *P. o. occidentalis* is known as the Gila topminnow, and *P. o. sonoriensis* is known as the Yaqui topminnow. *Poeciliopsis occidentalis*, including both subspecies, are collectively known as the Sonoran topminnow. Both subspecies are protected under the ACT. More recent information presented by Minckley (1999), considers the two subspecies to be separate species, *P. occidentalis* and *P. sonoriensis*. Regardless of their taxonomy, both species or subspecies are protected under the Act.

Gila topminnow are highly vulnerable to adverse effects from nonindigenous aquatic species (Johnson and Hubbs 1989). Predation and competition from nonindigenous fishes have been a major factor in their decline and continue to be a major threat to the remaining populations (Meffe *et al.* 1983, Meffe 1985, Brooks 1986, Marsh and Minckley 1990, Stefferud and Stefferud 1994, Voeltz and Bettaso 2003). The native fish fauna of the Gila River Basin and of the Colorado River Basin overall was naturally depauperate and contained few fish that were predatory on or competitive with Gila topminnow (Carlson and Muth 1989). With the introduction of many predatory and competitive nonindigenous fish, frogs, crayfish, and other species, Gila topminnow could no longer survive in many of their former habitats, or the small pieces of those habitats that had not been lost to human alteration. Both large (Bestgen and Propst 1989) and small (Meffe *et al.* 1983) nonindigenous fish cause problems for Gila topminnow, as can nonindigenous crayfish (Fernandez and Rosen 1996) and bullfrogs.

Historically, the Gila topminnow was abundant in the Gila River drainage and was one of the most common fishes of the Colorado River Basin, particularly in the Santa Cruz system (Hubbs and Miller 1941). This formerly widespread distribution has been reduced to only 14 recent naturally occurring populations. Presently, only 11 of the 14 recent natural Gila topminnow populations are considered extant (Voeltz and Bettaso 2003). Only three (Cienega Creek, Monkey Spring, and Cottonwood Spring) have no nonindigenous fish present and therefore can be considered secure from nonindigenous fish threats. There have been at least 175 wild sites stocked with Gila topminnow, however, topminnow persist at only 19 of these localities. Of the 19, one site is outside topminnow historical range, and three now contain nonindigenous fish (Voeltz and Bettaso 2003). Many of the remaining natural and reestablished populations have a surface area smaller than 1,000 ft².

The Sonoran Topminnow Recovery Plan (USFWS 1984) established criteria for down- and de-listing. Criteria for down-listing were met for a short period. However, due to concerns regarding the status of several populations, down-listing was delayed. Subsequently, the number of reestablished populations dropped below that required for down-listing, where it has remained. A draft revised recovery plan for the Gila topminnow is available (Weedman 1999). The plan's short-term goal is to prevent extirpation of the species from its natural range in the U.S. and to reestablish it into suitable habitat within its historical range.

Desert pupfish

In Arizona, the genus *Cyprinodon* historically consisted of two recognized subspecies, (*C. m. macularius*) and (*C. m. eremus*), and an undescribed species, the Monkey Spring pupfish. The desert pupfish subspecies are now recognized as separate species, the desert pupfish (*Cyprinodon macularius*) and the Quitobaquito pupfish (*C. eremus*) (Echelle *et al.* 2000). Also, Minckley *et al.*, (2002) suggested that the Santa Cruz River drainage was historically occupied by the extinct Santa Cruz (=Monkey Spring) pupfish, recently described as *Cyprinodon arcuatus*. All three species (then considered a single species) were listed as an endangered species with critical habitat on April 30, 1986 (U.S. Fish and Wildlife Service 1986). The historical distribution of desert pupfish in Arizona included the Gila, San Pedro, and Salt rivers, and likely the Hassayampa, Verde, and Agua Fria rivers, although collections are lacking for the latter three. The desert pupfish is also found in the lower Colorado River, Salton Sink Basin, and Laguna Salada Basin (Eigenmann and Eigenmann 1888, Gilbert and Scofield 1898, Thompson 1920, Coleman 1929, Miller 1943, Minckley 1973, 1980, Miller and Fuiman 1987). Historical collections occurred in Baja California and Sonora, Mexico, and in the United States in California and Arizona.

The natural history of the desert pupfish is very similar to that described for the Gila topminnow. They occupied similar habitats, although the pupfish was not nearly as widespread. The desert pupfish also went through cycles of expansion and contraction because of natural climatological variation (U.S. Fish and Wildlife Service 1986, 1993; Weedman and Young 1997). Such a scenario will have led to panmixia among populations over a very large geographic area (U.S. Fish and Wildlife Service 1993).

Twelve natural populations persist; eight of these are in Mexico. About 20 reestablished populations exist in the wild (U.S. Fish and Wildlife Service 1993). One or more threats imperil

most natural and reestablished populations. Since the 19th century, desert pupfish habitat has been steadily destroyed by stream-bank erosion, the construction of water impoundments that dewatered downstream habitat, excessive groundwater pumping, the application of pesticides to nearby agricultural areas, and the introduction of nonindigenous fish species. The nonindigenous bullfrog may also prove problematic in the management of desert pupfish. The bullfrog is an opportunistic omnivore with a diet that includes fish (Frost 1935, Cohen and Howard 1958, Clarkson and deVos 1986). There is also concern that introduced salt cedar next to pupfish habitat may cause a lack of water at critical times (Bolster 1990; R. Bransfield, U.S. Fish and Wildlife Service, pers. comm., 1999). Evapotranspiration by luxuriant growths of this plant may especially impact smaller habitats where water supply is limited. The remaining populations continue to face these threats.

Naturally occurring populations of desert pupfish are now restricted in the United States to California, in two streams tributary to, and a few shoreline pools and irrigation drains of, the Salton Sea. The species is found in Mexico at scattered localities along the Colorado River Delta and in the Laguna Salada basin. No natural populations occur in Arizona. Additional life history information can be found in the recovery plan (U.S. Fish and Wildlife Service 1993) and references cited there.

Loach minnow and Spikedace

Loach minnow and spikedace were listed as threatened species in 1986 (U.S. Fish and Wildlife Service 1986b, c). The loach minnow and spikedace recovery plans were completed in 1991 (U.S. Fish and Wildlife Service 1991a, b). Critical habitat was first designated in 1994, but that designation and a subsequent designation were set aside by court order. Critical habitat was redesignated in 2007, and includes approximately 522 river miles in Arizona and New Mexico, organized into five complexes (U.S. Fish and Wildlife Service 2007).

Our information indicates that, rangewide, more than 250 consultations have been completed or are underway for actions affecting loach minnow and spikedace. One-third of these opinions concerned the effects of grazing. One-third focused on roads, bridges, or agency planning. The remaining third dealt with timber harvest, fire, flooding, recreation, realty, animal stocking, water development, recovery, and water quality issues.

Although loach minnow and spikedace are currently listed as threatened, we have found that a petition to uplist the species to endangered status is warranted. A reclassification proposal is pending; however, work on it is precluded due to work on other higher priority listing actions (U.S. Fish and Wildlife Service 1994).

Loach minnow is a small, slender, elongate fish with markedly upwardly-directed eyes (Minckley 1973).). Historical range of loach minnow included the basins of the Verde, Salt, San Pedro, San Francisco, and Gila rivers (Minckley 1973, Sublette *et al.* 1990). Habitat destruction plus competition and predation by nonnative species have reduced the range of the species by about 85 percent (Miller 1961, Williams *et al.* 1985, Marsh *et al.* 1989). Loach minnow remains in limited portions of the upper Gila, San Francisco, Blue, Black, Tularosa, and White rivers and Aravaipa, Turkey, Deer, Eagle, Campbell Blue, Dry Blue, Pace, Frieborn, Negrito, Whitewater and Coyote creeks in Arizona and New Mexico (Barber and Minckley 1966, Silvey and Thompson 1978, Propst *et al.* 1986, Propst *et al.* 1988, Marsh *et al.* 1990, Bagley *et al.* 1995,

Bagley *et al.* 1997, Bagley and Marsh 1998). Loach minnow is a bottom-dwelling inhabitant of shallow, swift water over gravel, cobble, and rubble substrates (Rinne 1989, Propst and Bestgen 1991). Loach minnow uses the spaces between, and in the lee of, larger substrate for resting and spawning (Propst *et al.* 1988; Rinne 1989). It is rare or absent from habitats where fine sediments fill the interstitial spaces (Propst and Bestgen 1991). Some studies have indicated that the presence of filamentous algae may be an important component of loach minnow habitat (Barber and Minckley 1966). Loach minnow feed exclusively on aquatic insects (Schrieber 1978, Abarca 1987). Loach minnow live between two and three years with reproduction occurring primarily in the second summer of life (Minckley 1973, Sublette *et al.* 1990). Spawning occurs in March through May (Britt 1982, Propst *et al.* 1988); however, under certain circumstances loach minnow also spawn in the autumn (Vives and Minckley 1990). The eggs of loach minnow are attached to the underside of a rock that forms the roof of a small cavity in the substrate on the downstream side. Limited data indicate that the male loach minnow may guard the nest during incubation (Propst *et al.* 1988, Vives and Minckley 1990).

Spikedace is a small silvery fish whose common name alludes to the well-developed spine in the dorsal fin (Minckley 1973). Spikedace historically occurred throughout the mid-elevations of the Gila River drainage, but is currently known only from the middle and upper Gila River, and Aravaipa and Eagle creeks (Barber and Minckley 1966, Minckley 1973, Anderson 1978, Marsh *et al.* 1990, Sublette *et al.* 1990, Jakle 1992, Knowles 1994, Rinne 1999). The species also may occur in the upper Verde River. It has not been documented in the Verde River since 1999 despite annual surveys; additional survey work is needed to determine its current status there. Habitat destruction along with competition and predation from introduced nonnative species are the primary causes of the species' decline (Miller 1961, Williams *et al.* 1985, Douglas *et al.* 1994). Spikedace live in flowing water with slow to moderate velocities over sand, gravel, and cobble substrates (Propst *et al.* 1986, Rinne and Kroeger 1988). Specific habitat for this species consists of shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at the downstream riffle edges (Propst *et al.* 1986). Spikedace spawns from March through May with some yearly and geographical variation (Barber *et al.* 1970, Anderson 1978, Propst *et al.* 1986). Actual spawning has not been observed in the wild, but captive studies indicate eggs are laid over gravel and cobble where they adhere to the substrate. Spikedace lives about two years with reproduction occurring primarily in one-year old fish (Barber *et al.* 1970, Anderson 1978, Propst *et al.* 1986). It feeds primarily on aquatic and terrestrial insects (Schrieber 1978, Barber and Minckley 1983, Marsh *et al.* 1989).

Recent biochemical genetic work on both loach minnow and spikedace indicates that there are substantial differences in genetic makeup between remnant loach minnow populations and between remnant spikedace populations (Tibbets 1993). Remnant populations occupy isolated fragments of the Gila River basin. Based upon her work, Tibbets (1992, 1993) recommended that the genetically distinctive units of loach minnow and spikedace should be managed as separate units to preserve the existing genetic variation.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental

baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation.

Past Consultations in the Action Area.

The action area is predominantly BLM land. Some of the major Section 7 consultations with the BLM, or in which the BLM was a cooperating agency, that have addressed one or more species being addressed in this biological opinion (BO) are listed below. These consultations were for actions that were either completely or partially implemented, or are being implemented, in the action area. All concluded that the action will not jeopardize any listed species, nor will critical habitat be adversely modified.

- Safford District Resource Management Plan (Reinitiated Biological and Conference Opinion on the effects of the Safford District Resource Management Plan [FRMP]; Consultation Numbers 02-21-05-F-0086 and 02-21-88-F-0114). Addresses the effects of proposed activities on lands of the Safford and Tucson Field Offices in eastern and southeastern Arizona on listed species.
- Gila Box RNCA BO (Reinitiation of Consultation/Conference on the Gila Box RNCA Interdisciplinary Activity Plan, June 10, 2004; Consultation Numbers 02-21-92-F-0070 R2, 02-21-96-F-0160 R7). Addresses the effects of proposed activities in the Gila Box RNCA on listed species.
- Safford/Tucson Grazing BO and amendments/reinitiations (Programmatic Biological Opinion for the Safford/Tucson Field Offices' Livestock Grazing Program, Southeastern Arizona, September 26, 1997; Consultation Number 2-21-96-F-160). Addresses permitting and operation of 288 grazing allotments in the Safford and Tucson Field Office's jurisdictions through 2006.
- BLM LUP Amendment BO (Biological and Conference Opinion for the BLM Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management, September 3, 2004; Consultation Number 02-21-03-F-0210). Addresses fuel treatments, prescribed fires, wildland fire use, and wildfire suppression throughout Arizona on BLM lands.
- Dos Pobres-San Juan Project (Biological Opinion for the Dos Pobres/San Juan Project, June 11, 2002; Consultation Number 02-21-99-F-007). Addresses adverse and beneficial impacts to listed species if land is exchanged between the BLM and Phelps-Dodge Corporation. BLM would acquire Phelps Dodge lands along the Gila River and other parcels in Arizona. Phelps Dodge would acquire lands adjacent to its privately owned properties north of Safford, Arizona.
- Bull Gap Road (Conference Opinion for the New Bull Gap Road Section Project, Gila Box Riparian National Conservation Area (RNCA), Graham County, Arizona, December 4, 2003; Consultation Number 02-21-03-F-0472) for impacts to the proposed Gila chub from construction of the new Bull Gap Road, which is located in the Gila Box RNCA near the location of the proposed fish barrier.

A. Status of the Species within the Action Area

Gila chub

Gila chub occurs in Bonita Creek within the action area. There is no critical habitat on Bonita Creek or within the action area. Critical habitat was excluded from the final rule designation because, in part, of the partnership that BR, BLM, and the City of Safford have developed with the FWS, which has led to the proposed action of this consultation (U.S. Fish and Wildlife Service 2005).

Bonita Creek's aquatic system is maintained by a seasonal combination of flash floods and low spring and fall flows. Low flows for perennial reaches vary, but generally exceed five cfs (U.S. Bureau of Land Management 1998). Bonita creek's median annual flow was 5,424 acre-feet for 21 years of data (Arizona Department of Water Resources 2007). Above the Narrows in Bonita Creek, only native fish are found; whereas below the Narrows, nonnative fishes have invaded from the Gila River. The two reaches are separated by an ephemeral reach that likely inhibits invasion of the upper reach by nonnatives. Periodic floods also tend to flush nonnative fishes out of Bonita Creek to a greater degree than the native fishes.

Nonnative species in the lower reach include yellow bullhead, fathead minnow, carp, channel catfish, and mosquitofish (Weedman 1996). Parts of the lower reach experience oxygen deficits in summer, with concentrations below that recommended for fish (Minckley and Sommerfeld 1979). Chubs are rare in the first four miles above the confluence, are typically solitary and have exhibited heavy parasite loads and skin infections. In the upper reach, above the Narrows, Gila chub occur with longfin dace, speckled dace, desert sucker, and Sonora sucker (Weedman 1996). As a result, the upper reach of Bonita Creek is more important habitat for Gila chub, although they can be found throughout the creek in the RNCA.

In the past, cattle commonly grazed the creek bottom and roads crossed the creek more than 30 times in the RNCA. Implementation of the Gila Box Riparian National Conservation Area Interdisciplinary Activity Plan limited these activities, excluding cattle from riparian areas and limiting road use to several crossings. City of Safford Municipal Utilities maintains an infiltration gallery as part of the Bonita water system about four miles above the mouth of Bonita Creek. The gallery consists of perforated pipes 17 feet below the surface of the creek bottom. An average of 3.1 million gallons of water flow into the gallery and through a 24-mile long pipeline to storage tanks in Safford, Solomon, and Thatcher.

Gila Topminnow, Desert Pupfish, Spikedace, and Loach Minnow

These fishes do not currently occur in the action area. Bonita Creek represents the best habitat in the action area for these species, and the proposed action will improve that habitat for these species. The proposed action includes reestablishing these fishes in the action area in both upper and lower Bonita Creek. No critical habitat for any of these species occurs in the action area, thus none will be affected.

B. Factors Affecting Species' Environment within the Action Area

Within the Gila River basin, native fishes have deteriorated significantly over the past century and a half to the point that 11 of the 21 native fishes are now listed under the Act, one is extinct, and two additional species have been petitioned for listing. The remaining species have also declined, and five of them have been recommended for federal listing (Desert Fishes Team 2004). Seven species have been extirpated from the basin, although some have been repatriated with variable success (Clarkson 2004).

Reasons for declines of native fishes were initially due to construction of high dams for water storage, hydroelectric production, and flood control; dewatering of streams due to surface diversions and groundwater pumping for municipal, industrial, and agricultural purposes; and watershed perturbations arising from overgrazing by domestic livestock, overharvesting of timber, mining of commercially valuable ores; and habitat loss due to expansion of human populations (Dobyns 1981). More recently, introductions and establishment of nonnative aquatic organisms in the region have biologically polluted native fish habitats that remain (Miller 1961, Moyle *et al.* 1986, Minckley 1991).

The situation in the Gila River basin is that remaining tributary populations of native fishes (most listed fishes are now absent from mainstem rivers) cannot recolonize other tributaries from where their species has been extirpated because large predatory nonnative fish populations reside in the mainstem habitats connecting them (Minckley 1999). Due to the large nonnative fish predator load in mainstem rivers, these important habitats have become population sinks for native fishes that enter them. Not only do nonnatives block recolonization pathways, but they also prevent exchange of genetic material among diverse tributary native populations that historically facilitated adaptation to changing environments (Dowling *et al.* 1996).

Biological conditions within the Bonita Creek watershed have been affected by a long history of poorly managed cattle grazing that had severely limited riparian development along the stream, which reduced instream habitat diversity (especially pool formation). The rarity of pools severely limited populations of Gila chub, but favored certain other species of native fishes (Minckley and Clarkson 1979). Similarly, the lack of any significant regeneration of riparian vegetation due to cattle grazing affected the diversity and abundance of terrestrial species (especially birds) along Bonita Creek.

Cessation of cattle grazing on BLM lands along Bonita Creek below the San Carlos Apache Indian Reservation in the 1980s resulted in a dramatic rebound of riparian vegetation and change in instream habitats. Regeneration of riparian trees and shrubs quickly improved the structure diversity of the riparian habitat resulting in increased diversity and abundance of terrestrial wildlife species. Improved bank stability resulting from development of riparian vegetation noticeably increased pool development in the lower stream, which allowed Gila chub populations to expand, while certain other native fishes that preferred riffles diminished. Historical and current conditions in upper Bonita Creek on Indian lands are largely unavailable, although presently riparian vegetation and instream conditions immediately above BLM lands do not appear dramatically dissimilar to those within.

Surface water diversion from lower Bonita Creek, as previously described, has been ongoing since 1939. This has resulted in the establishment of a persistent ephemeral zone in the vicinity

of the infiltration gallery, and reduced flows in the stream below. However, emplacement of the sediment retention dike associated with the gallery, and perhaps in concert with development of the ephemeral zone, has also prevented incursions of nonnative fishes into upper Bonita Creek. This has resulted in a nearly unprecedented situation where a major tributary of the Gila Basin with perennial connection to a mainstem river has apparently escaped species losses from its native assemblage.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur. There is currently no critical habitat for any species in the action area, thus none will be affected.

Proposed actions may affect the Gila chub, Gila topminnow, desert pupfish, spinedace, and loach minnow. Effects are expected to be both direct and indirect, and include beneficial, neutral, and adverse effects. Because we expect effects of the proposed action will be the same to all five of these species, we evaluate effects by each plan element in general to all fish species; however, because Gila topminnow, desert pupfish, loach minnow, and spinedace will not occur in the action area during all parts of the proposed action, we evaluate some effects to Gila chub only.

Barrier Construction - The effects of barrier construction and maintenance on Bonita Creek were consulted upon previously for Gila topminnow, desert pupfish, loach minnow, and spinedace in the revised biological opinion on transportation and delivery of Central Arizona Project water to the Gila River Basin in Arizona and New Mexico (consultation number 2-21-90-F-119a). Further, because these species will not occupy the action area until after barrier construction is completed, there will be no effects from this part of the action to these species. Barrier construction will only affect Gila chub. However, while the effects of barrier maintenance were considered in the previous biological opinion for Gila topminnow, desert pupfish, loach minnow, and spinedace, the effects of barrier emplacement (e.g. once the barrier is in place, how it effects movements of the species) were not consulted upon for these four species.

Barrier construction and rip-rap installation will remove approximately 2.6 acres of riparian habitat, 0.2 acres of which is estimated to be permanent. Thus, most impacts will be temporary; over time the area will naturally revegetate. Sediment deposition following construction will inundate 2.2 acres of channel habitat. An additional 0.2 acres of habitat outside of the sedimentation zone will be utilized for access and material staging around the barrier. Vegetation removal, earthmoving, trenching, stream diversion and pouring concrete will all require heavy equipment and will be expected to disturb Gila chub. Juvenile and adult fish may also be killed or injured, but would likely be able to react quickly enough to swim away and avoid injury. Sedimentation would also be expected to increase, which could kill eggs or larval fish. Most of these effects will occur in the immediate vicinity of the barrier, with indirect effects from sedimentation to fish downstream. Gila chub are rare in the downstream reach of

Bonita Creek, and the barrier site occurs near the bottom of this reach, approximately 1.3 miles from the mouth of Bonita Creek at its confluence with the Gila River. The number of Gila chub affected by barrier construction would be small compared to the numbers of Gila chub in lower Bonita Creek.

Overall the proposed fish barrier is expected to have substantial, positive benefits to all native fish by preventing upstream invasions of nonnative fishes and other undesirable aquatic biota, but would affect gene flow among native fish populations to some extent. Native fish below the barrier would not be able to move upstream of the barrier, but some individuals above the barrier are likely to go over the fish barrier during flood flows. However, some native fishes currently found in Bonita Creek occur in very low densities or may be absent altogether in the lower reaches of the stream (BLM and AGFD unpublished data). Thus, the native species are already partially genetically isolated from downstream populations, and no genetic effects to the much larger upstream populations are anticipated. We believe the continued presence of nonnative fishes below the barrier will preclude establishment of native fish populations there. If, at a future time, enhanced genetic interchange is deemed desirable, it can be accomplished by periodically moving individuals from downstream to the segment of stream above the barrier.

At the species level, the fish barrier would prevent movements and integration of genetic materials of native fishes derived from other stream systems to Bonita Creek populations. Genetic communication among diverse populations is desirable to maintain long-term (hundreds of generations) genetic health of a species by allowing influx of novel genes that may better enable a species to adapt to changing environments. However, the condition of stream systems within the Gila River basin over the past century has deteriorated to the point that little, if any, communication among tributary fish populations through connecting mainstem river corridors (such as the Gila River) occurs. Presence of an array of nonnative fish predators near tributary mouths and especially in mainstem rivers like the Gila River, coupled with fragmentation of river drainages via stream diversions, channelization, groundwater pumping, and reservoirs render long-distance movements of fishes among streams within a drainage unlikely (Fagan *et al.*, 2002). The dire status of native fishes today necessitates the need to protect remaining populations more immediate than ensuring that longer-term evolutionary needs are met. If obstacles presented by the presence of nonnatives can be removed in the future, the need for the barrier would be eliminated, and it would be breached.

Downstream drift of larvae of native fishes past the barrier would result in some losses to the upstream population, as they would be unable to move back upstream past the barrier. Drift of native larval fishes in streams and rivers of the Colorado River basin is a common phenomenon, but varies greatly among species (Bestgen *et al.* 1985; Valdez *et al.* 1985; Robinson *et al.* 1998; Remington 2002). For example, of nearly 20,000 larval fishes collected from the drift in the Gila River, New Mexico, in March-May, 1984, only 2 percent were minnows (Family Cyprinidae), and the rest were suckers (Family Catostomidae; Bestgen *et al.* 1985). In the Bestgen *et al.* (1985) study, most (87 percent) minnow drift occurred during daylight, and distances drifted were estimated to be short.

Distances drifted by native fish species in Bonita Creek have not been determined, but two lines of evidence suggest that drift losses over the fish barriers would be negligible under the proposed project. First, drift of larval stages of these species has not been shown to be a significant feature of their life histories, and most drift that occurs is during daylight when drift distances are short

(Bestgen *et al.* 1985). Second, a recently-completed study of native fish drift in Aravaipa Creek, Arizona, determined that drift of longfin dace, desert sucker, and Sonora sucker was relatively short (on the order of tens to hundreds of feet; Remington 2002). Therefore, unless drift transport distances are relatively long (several miles or more), large losses are not expected.

Downstream transport of older life stages of fishes during flood or by other avenues of dispersal would also result in some losses of fishes below the barriers, although native fishes in general are adapted to avoid the worst hydraulic conditions of flood events, and they resist downstream transport (Minckley and Meffe 1987). However, entire year classes of native fishes can be destroyed from floods that occur during larval rearing periods (Robinson *et al.* 1998). Loss of native species from flood transport are expected to be minimal and of little significance to upstream populations for reasons similar to those explained for genetic isolation impacts (above).

Fish Salvage - Some mortality of Gila chub salvaged from Bonita Creek in advance of a renovation is anticipated under the issuance of AGFD's 10(a)(1)(A) permit and is not considered part of the consultation. Although capture techniques, handling methods, prophylactic treatment, and holding facility management protocols have been developed to minimize fish stress and mortality, a low level of mortality is typical in capture and holding operations. In a catastrophic failure of one or more of the holding systems (e.g., tank rupture, water filtration), or outbreak of a disease not adequately treated during prophylaxis, larger-scale mortality is possible but of much lower probability.

Stream Renovation - Treatment with antimycin A or rotenone would affect approximately 1.7 miles of stream between the proposed barrier and the Safford infiltration gallery dike. Mortality of individuals not captured during salvage operations (i.e., those that remain in the stream) is certain as a result of a renovation. Piscicide would not be applied downstream of the barrier or upstream of the infiltration gallery dike.

Repatriation of Native Fishes

Repatriation of native fishes including Gila chub, loach minnow, spinedace, desert pupfish, and Gila topminnow will have beneficial biological consequences and is covered under AGFD's 10(a)(1)(A) recovery permit.

Water Use and Management

MOU and 10-Year Plan - BLM has issued Safford a right-of-way authorization to allow operation and maintenance of the Bonita water system on public land; thus, the water withdrawal and associated actions are considered to be interrelated to the BLM's authorization action. In addition, Safford may expand the system within the next 10 years to withdraw and transport their full allocated water right of 5,310 acre-feet per year. Primary routine operation and maintenance needs of the system include maintaining roads within and adjacent to the Bonita Creek channel, construction of temporary roads to provide vehicle access to water system facilities on an as-needed basis, use of heavy equipment to breach beaver dams and move brush, trees, and boulders to allow access to the pipeline and other facilities, pump-testing and monitoring of wells, water sampling, and monitoring and replacement of pipeline sections, pipeline concrete support pillars, and cable hangers on an as-needed basis.

Safford may expand the present system to accommodate its full water right allocation of 5,310 acre-feet per year, an increase in capacity of approximately 40%. This will be accomplished primarily by replacing the existing 16-inch transmission pipeline with larger-capacity pipe as called for in the MOU. Temporary transmission pipelines will be laid on the canyon floor while the existing infrastructure is replaced or during emergencies. Generators may be needed to operate the system during times of emergency. Effects from the Bonita Creek water production and delivery system expansion will reduce, modify, and/or eliminate terrestrial, aquatic, and riparian habitats. Habitat modification or destruction may result in loss of listed native fish species from lower Bonita Creek.

No precautions currently exist to prevent the generator and spill containment facility from being damaged or washed away during a catastrophic event. Such an event could result in up to 300 gallons of diesel fuel entering the Bonita creek watershed. Effects to fish, macroinvertebrates, and aquatic and riparian habitat would depend on the amount of diesel fuel spilled and the volume of water present for dilution. Such an event would adversely effect water quality and thus habitat for listed fishes, likely resulting in mortality.

Beaver Pond Breaching - Safford may breach beaver ponds if necessary to reach maintenance sites, and may remove beaver dams altogether in the beaver-dam-free zone. Lowering of beaver ponds may kill native fish (*e.g.*, desert pupfish, Gila chub, and Gila topminnow) that inhabit or use pool habitat if waters are drawn down too low or too fast to allow fish to escape, and likewise removal of beaver dams may kill native fish that inhabit or use pool habitat when dams are removed. To prevent this from happening, Safford will consult with BLM prior to any beaver ponds being lowered. A biologist from BLM will be on-site when beaver ponds are breached and/or removed to minimize injury and/or mortality to native fish by capturing and moving any fish out of the immediate area of the stream where ponds are breached, if necessary. Fish eggs and larvae, which are largely undetected by the human eye, may be killed when beaver ponds are breached, drawn-down, or beaver dams are removed. Potential loss of eggs, larvae, and fish could likely be high depending on time of year when beaver ponds are breached.

Pipeline and Well Monitoring and Maintenance - Specific effects on habitats and listed fish species from pipeline maintenance and monitoring are dependent on the amount, timing, and location of vegetation removal, which are unknown at this time. However, the following general effects are anticipated to occur, and the extent of these effects is expected to be minor with respect to duration, frequency, and aerial extent.

Removal of vegetation to access the pipeline will likely affect three structure zones located within Bonita Creek. Located on drier soils, zone one serves as a transition between upland and riparian plant species such as velvet mesquite (*Prosopis velutina*), catclaw acacia (*Acacia greggii*), paloverde (*Parkinsonia* spp.), and burroweed (*Isocoma tenuisecta*). Wetter soils of zone two support Fremont cottonwood, Goodding willow (*Salix gooddingii*) coyote willow (*Salix exigua*), Arizona sycamore (*Platanus wrightii*), Arizona walnut (*Juglans major*), and velvet ash (*Fraxinus velutina*). Zone three is located along water's edge and supports species such as horsetail (*Equisetum* spp.), cattail (*Typha* spp.), seep willow (*Baccharis salicipholia*), and sedges (*Carex* spp.). These three vegetation structure zones, upland/riparian transition, riparian, and aquatic serve as a natural buffer by intercepting pollutants such as nutrients (nitrogen and phosphorous), sediments, and pesticides before they enter aquatic systems.

Habitats devoid of vegetation or altered are not as effective in capturing and retaining pollutants, which can affect water quality.

Vegetative structure zones also serve to stabilize the streambank, increase water storage within streambanks, provide water recharge, and provide a measure of flood control. Removal of any of the vegetative structure zones will affect stream health of Bonita Creek. Erosion and bank undercutting by flooding events results when structure zones that hold streambank soils in place are reduced or eliminated. Structure zones of vegetation also aid water recharge. As water moves across the lands from a precipitation event, healthy riparian areas slow or capture the water allowing it to seep into the ground to recharge the water table. If the water table drops as a result of less recharge the surface water in Bonita Creek will likely decrease. Stream intermittency and drying below the infiltration gallery would likely occur with a decrease in surface water. If pipeline maintenance results in increased intermittency of the stream, habitat for fishes would be reduced, which would alter behavioral patterns, food availability, access to cover, and availability of habitat, thus reducing survival of individual fish and potentially reducing or precluding reproduction.

Removal of vegetation would likely require heavy machinery and, if this occurs in habitat occupied by fish, fish or their eggs (except Gila topminnow, which is a livebearer) in the area during maintenance could be killed when crushed by equipment, stranded during flow diversion, exposed to toxic materials such as petroleum products, or smothered by sediment input. Riparian and aquatic vegetation influences stream morphology, structure, hydrology, and water temperature, which provides habitat for native fish. Removal of vegetation will reduce habitat for native fish by changing stream form and function. Habitat for fishes could be reduced, which would alter behavioral patterns, food availability, access to cover, and availability of habitat, thus reducing survival of individual fish and potentially reducing or precluding reproduction.

Additional effects from pipeline and well monitoring and maintenance include indirect effects to listed fish species and their habitats that would likely result from road repair, road construction, and associated vegetation removal, which are discussed in the Recreation and Transportation Management section below.

Increased Diversion of Bonita Creek Water - Safford proposes additional annual water withdrawals of approximately 2,083 acre-feet per year from the infiltration gallery to accommodate their full water right of 5,310 acre-feet per year. Available information suggests that additional gallery diversions will produce a directly proportional reduction in surface flows.

The infiltration gallery site was selected in the 1930s at a location known locally as “The Meadows,” an area characterized by numerous surface springs, and thus the location presumably was an area of maximum base surface discharge of the stream. Hydrological investigation suggests that areas where groundwater is found below volcanic rocks the channel fill is forced upward into both subsurface flows within the channel fill and to surface flows (Heindl and McCullough 1961). This area thus would be capable of producing the greatest amount of water diversion from the stream and would be a logical choice for emplacement of diversion works.

Prior to installation of the infiltration gallery, water now intercepted by the gallery must have included surface water and near-surface underflow. A U.S. Geological Survey study of the infiltration gallery for the City of Safford concluded that “most of the water obtained at the

infiltration gallery is surface flow and underflow entering the lower Bonita Creek area in and beneath the channel of Bonita Creek” (Heindl and McCullough 1961). The contention that water diversion at the infiltration gallery consists largely of surface flow is also supported by the observation that losses in surface flow between an area of high surface discharge upstream of the gallery and at the infiltration gallery site approximates 4 cfs, about equal to the amount diverted by the gallery and lost by evapotranspiration (Heindl and McCullough 1961). The reach of Bonita Creek in the vicinity of the infiltration gallery now is normally dry, when prior to installation of the gallery it exhibited considerable surface flow. This undoubtedly is due to the diversion of surface flows by the gallery, although the influence of the sediment retention dike may also account for a portion of the loss of surface flow.

The direct influence of the gallery on surface flows is further supported by the observation that discharge immediately below the infiltration gallery area typically was the lowest among the 13 measurement stations (excluding the uppermost station above “The Box”) established along the lower 10.8 miles of stream reported by Heindl and McCullough (1961; see their Figure 4). Finally, the fact that the gallery is normally operated passively (i.e., without forced suction via pumping) dictates that only waters in sediments lying above the gallery can be diverted by it. In fact, Heindl and McCullough (1961:44) state that:

“Near the gallery, a small zone of faulting in the volcanic rocks [below the channel fill] apparently acts as a barrier to the movement of ground water within the volcanic rocks and diverts the water into the channel fill. Most of this water is removed at the infiltration gallery and piped to Safford.” (brackets ours).

Such underflow must have contributed to surface and near subsurface flows.

Although a complex system of connections between groundwater in the underlying volcanic rocks and surface and subsurface channel fill flows in Bonita Creek may exist in both vertical directions, we assume here that the relationship between diversions at the gallery and surface flow in Bonita Creek is directly proportional, i.e., any diversion at the gallery will be reflected in a proportional loss in surface flow. Heindl and McCullough (1961:44) noted “. . . the 1- cfs and 0.7-cfs increases in surface flow in 1956 and 1957 approximate the amount of decrease in the gallery production for these years.”

Surface flows of Bonita Creek at the U.S. Geological Survey gage station located 6.4 miles above the mouth average approximately 3.1 cfs during June, the typical month of lowest recorded flows. Discharge measurements taken in 1955 and 1956 demonstrated that surface flows at this site were approximately 40% greater than flows in the reach below the infiltration gallery (mean discharge below retention dike = 1.9 cfs; estimated from Heindl and McCullough [1961] Figure 4). Therefore, if an additional diversion of 2,083 acre-feet per year (equating to approximately 2.9 cfs) occurs, widespread drying of surface flows in lower Bonita Creek might be expected, at least seasonally, and surface discharge during wetter seasons would be diminished proportionally. Such additional diversion from the gallery would certainly affect surface flows downstream from the diversion gallery, but upstream populations comprising the vast majority of the listed native fish, including listed fish, in Bonita Creek are expected to be little effected by this action.

The most obvious effect of further diminishment or drying of surface waters below the gallery would be an increase in the frequency of stream intermittency between the constructed barrier and the sediment retention dike. Although native fish including the five listed natives may have an opportunity to leave that reach by traversing the constructed barrier, they would encounter even more severe drying conditions downstream until reaching the Gila River. Although the Gila River mainstem at that point is perennial, it has large populations of nonnative piscivorous fishes (e.g., channel catfish *Ictalurus punctatus* and flathead catfish *Pylodictus olivaris*) that would consume most native organisms that enter it. This effect would render the reach between the dike and barrier a mortality sink for any natives that might enter it from upstream during periods when flood flows connect the reaches. An increase in the ephemeral length of stream upstream of the infiltration gallery due to increased gallery diversions would simply shorten the length of perennial stream capable of supporting native fishes and other aquatic and semi-aquatic organisms.

An increase in stream intermittency could also affect the condition of riparian vegetation, potentially resulting in losses of riparian trees and shrubs, which would similarly affect other riparian-obligate biota. This effect will depend on the depth of drying within the sediments, which cannot be predicted at this time.

In summary, increased diversion of Bonita Creek water through the Safford infiltration gallery will likely result in a directly proportional loss of surface water below the gallery dike, increasing the frequency of intermittency in the lower stream. This effect will significantly degrade the suitability of the stream to support self-sustaining populations of native fish including the five listed natives in the reach between the dike and barrier, and may slightly reduce the length of perennial stream habitat above the gallery. Riparian vegetation and its associated terrestrial biota may also be affected by this loss of surface water.

Despite the fact that full implementation of Safford's water right will impact the 1.7 miles of fish habitat in lower Bonita Creek above the fish barrier to a point that may result in loss of most of the fish habitat in lower Bonita Creek, the native fish fauna will ultimately benefit. Approximately 13 miles of stream above the infiltration gallery will remain suitable habitat for all 5 native species.

Recreation and Transportation Management

Access and Roads - Road use, maintenance, and construction of new roads occurs both from City of Safford activities in accessing its infrastructure, and through BLM activities in allowing public access to the area and in managing the area. The impacts and effects of roads, including road use and maintenance, on wildlife can affect individuals, populations, or habitat directly and indirectly. Direct effects include mortality from road construction and mortality from road kill, whereas indirect effects include habitat fragmentation, habitat degradation (physical and chemical), and disturbance from vehicle access.

Road construction, maintenance, repair, and travel through aquatic and riparian habitats has the potential to injure or kill Gila chub, Gila topminnow, desert pupfish, loach minnow, and spikedace located in low-water road crossings that intersect Bonita Creek. Road crossings may become fragmented from the stream creating migration barriers, which restricts or prevents fish passage. The road crossings have the potential to act as a biological sink for fish that are unable

to access habitat outside of the crossing. Loss of native fish within road crossings are expected to be negligible and of little significance to upstream populations.

Roads and road maintenance accelerate soil erosional rates and modify natural drainage networks, which degrade stream habitat for aquatic species. Erosion from roads often results in sedimentation of streams and declines in spawning habitat when too high a proportion of fine sediment is deposited. Fine sediments may clog spawning gravels and reduce the availability of oxygen to eggs and increase embryo mortality. Sedimentation also has negative effects on macroinvertebrates (Waters 1995), the primary food supply of Gila chub and many other native fish species. Excess sedimentation could likely cover algae-encrusted rocks and affect feeding habits of macroinvertebrates and native fish.

Destruction of riparian and aquatic vegetation by road construction results in higher water temperatures, which reduces dissolved oxygen concentrations for fish. Riparian areas are important in providing quality habitat for fish. Increased riparian vegetation has been documented to increase instream cover, increase overhanging cover, buffer streams from incoming sediment and other pollutants, and build a sod of herbaceous plants that support formation of undercut banks, buffer temperature extremes, increase habitat complexity, and increase terrestrial invertebrate prey for fish (Platts 1991).

Motorized vehicles driving through established road crossings have the potential to disrupt normal behavior of and injure or kill fish and macroinvertebrates, increase turbidity, and destroy fish eggs and larvae. In addition, mechanical action of vehicles can cause damage to existing vegetation and prevent the establishment of vegetation, which affects habitat quality and quantity.

Small quantities of motor fluids (fuel, engine oil, brake system fluid, transmission fluid, or antifreeze) may leak from motorized vehicles crossing wetted sections, which may enter Bonita Creek and degrade water quality and negatively impact native fish. As a Unique Water, Bonita Creek's water is monitored to ensure compliance with state standards.

Road construction, maintenance, and repair make roads more traversable, and could likely result in increased visitor traffic through Bonita Creek, although BLM is committed to minimizing road use through the action area. Previous consultations have addressed access and roads in lower Bonita Creek. Please refer to Biological Opinion, Gila Box Riparian National Conservation Area Interdisciplinary Activity Plan, Graham County, Arizona (2-21-92-F-070, 02-21-92-F-0070-R2).

Recreation - Dispersed recreation in the form of picnicking, camping, hiking, recreational driving, horseback riding, water play, bird watching, hunting, and photography occur within Bonita Creek to various degrees. These activities have the potential, if they become concentrated, to affect wildlife species and their habitats, including Gila chub, Gila topminnow, desert pupfish, loach minnow, and spikedace.

Concentrated recreation activity, such as wading, splashing, and hiking up and down the creek and wetted sections can injure fish if contact is made or fish are displaced, and stress fishes sensitive to frequent disturbances. The level of disturbance is not likely to reach proportions leading indirectly to mortality through stress, which predisposes fish to disease and predation. It

is possible that streambanks and spawning areas may be damaged by excessive use from hikers and sightseers, however, hiking is limited due to vegetation density and beaver ponds and dams. Currently, the activity level from these types of activities in the area is so light that trampling damage is largely undetectable (Jeff Wilbanks, BLM, pers. comm., 2007). However, it is likely that the current activity level within and around Bonita Creek will increase due to Safford's forecasted growth. If this occurs, Bonita Creek will likely experience more recreational traffic and, if not monitored, native fish species may decrease and aquatic and riparian habitat may be damaged or destroyed. If the creek is used for cleaning and bathing, soap or other such products could degrade water quality, which may affect native fish and aquatic invertebrates, a primary prey base for most species, reducing habitat quality for fishes.

Recreation is also addressed in the Gila Box Riparian National Conservation Area Interdisciplinary Activity Plan, Graham County, Arizona (U.S. Fish and Wildlife Service 2004a).

Livestock Grazing

No grazing effects are anticipated beyond those analyzed under previous biological opinions involving effects of grazing in the Bonita Creek watershed; the following discussion summarizes these effects. The Bonita Creek, Johnny Creek, and Bull Gap allotments border Bonita Creek, or in the case of the Bonita Creek allotment, includes Bonita Creek and portions of its watershed on the RNCA. As of 1996, all three were in predominantly late seral (good) range condition. Bonita Creek and Johnny Creek were in an upward trend, while Bull Gap was static. These data suggest good watershed condition that is static or improving. We have no information on the condition of the Bonita Creek watershed on the San Carlos Apache Reservation; however, the BLM (1993) reported that waters in Bonita Creek are relatively low in turbidity, suggesting minimal erosion from the watershed. We have no other more recent information suggesting these conditions have changed. Under the Gila Box RNCA Plan, grazing in Bonita Creek would be limited to trailing once or twice per year to move cattle between pastures on the Bonita Creek allotment.

Trailing across the creek would occur twice one year and then once the next. Movement of cattle from west to east across Bonita Creek would occur from Lee Trail to Christiansen's Place in upper Bonita Creek. Movements from east to west would occur from Jones Road to Lee Trail where the road runs through Bonita Creek. The BLM has adopted the conservation recommendations from our fourth reinitiation of the Safford/Tucson Field Offices' programmatic livestock grazing opinion. These measures will minimize effects to streambanks, riparian vegetation, and listed native fishes that occur in the stream. The BLM provided information supporting this conclusion in their February 12, 2001, memorandum to us. In that memorandum, they report that monitoring after trailing revealed no impacts to riparian vegetation or stream banks. Any damage that does occur would be localized and infrequent.

Gila chub, Gila topminnow, desert pupfish, spikedace, and loach minnow are likely to be present during annual or biannual crossings of Bonita Creek by cattle. Most fish will swim away from cattle, avoiding significant impacts. However, fish fry and any eggs that may be present could be trampled. Detecting take of this type would be very difficult as dead or injured fish or eggs would be very small and difficult to see in the turbid waters created by cattle crossing the stream. Relatively few fish would be affected because of the localized and infrequent nature of the impact. Loss of these few fish would represent an insignificant impact to the population. Larger fish, which are critical to the breeding population, would probably escape injury.

Fire Management - The proposed action for fire management in the action area is defined in the Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management, and associated biological opinion (U.S. Fish and Wildlife Service 2004b) and incorporates adaptive fire management into planning processes to provide a consistent approach to incorporate the 2000 National Fire Policy into the land use plans. General effects from implementation of the plan amendment on fishes and specific effects on Gila chub are analyzed in the biological opinion and are essentially the same as what we expect for Gila topminnow, desert pupfish, loach minnow and spikédace in the Bonita Creek watershed and are incorporated here by reference.

The BLM does not plan to implement wildland fire use or mechanical or chemical treatments in the Bonita Creek watershed. The BLM does anticipate effects to fishes in the Bonita Creek watershed from fire suppression and prescribed fire actions. The BLM proposes various conservation measures (see Appendix B of U.S. Fish and Wildlife Service 2004b) to avoid and minimize the effects of wildfire suppression and prescribed fire. General conservation measures will be applied to activities that could affect riparian and aquatic ecosystems. Species-specific conservation measures have been developed to address effects on Gila chub, Gila topminnow, desert pupfish, loach minnow, and spikédace (see Appendix B of U.S. Fish and Wildlife Service 2004b).

The BLM projects up to 5,000 acres of prescribed fire treatment within Gila chub habitat over the 10-year duration of the LUP amendment (Appendix C of U.S. Fish and Wildlife Service 2004b). The exact location of this acreage is not defined and thus could occur in the Bonita Creek watershed. Adverse effects such as increased runoff and sedimentation can accumulate following the first prescribed fire, if fires are repeated frequently and vegetation does not have an opportunity to recover. Conservation measure RA-14 (see Appendix B of U.S. Fish and Wildlife Service 2004b) states that fuels management projects will, in consultation with FWS and AGFD staff, determine and implement an “appropriately-sized buffer adjacent to perennial streams in order to minimize soil and ash from entering the stream.” Careful design of buffers should reduce these effects. We anticipate that the conservation measures proposed, along with additional site-specific measures developed in lower level planning documents (i.e. implementation plans), will serve to further minimize any adverse affects from prescribed fire and vegetation treatments.

Specific fire projects that may affect listed fish species in Bonita Creek will be subject to consultation in the future as implementation plans. Implementation plans are site-specific plans and include fuels management plans, prescribed fire plans, and fire use plans. They will identify the project location, prescriptions, and tools that will be used for specific projects. BLM does not currently have a specific prescribed fire plan for the action area. Should a specific project that may affect listed or proposed species or designated or proposed critical habitats be developed for the action area in the future, it will be subject to additional consultation.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, or local private actions that are reasonably certain to occur in the action area. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation

pursuant to section 7 of the Act. Effects of past Federal and private actions are considered in the Environmental Baseline.

Most lands and activities in the action area are federally authorized and thus would be the subject of section 7 consultation. The effects of these activities are not considered cumulative. However, extensive private lands occur along Bonita Creek. We are not aware of activities that affect the Gila chub, Gila topminnow, loach minnow, and spokedace on these lands other than recreation, livestock grazing, and the City of Safford's infiltration gallery and water system (Bonita Creek). The general effects of these activities are discussed above.

The development of the Dos Pobres/San Juan mine on the uplands above Bonita Creek, over time, may influence Bonita Creek. The mine is planned so that no sediment runoff will flow in the direction of Bonita Creek. However, it is impossible to foresee all eventualities and impacts that could occur in the future over the life of the mine.

Expected continued growth of human populations will exert additional pressures to surface water supplies in Bonita Creek from both the Safford infiltration gallery or other users. Such actions could result in further losses and fragmentation of riparian vegetation and aquatic habitats in Bonita Creek, but such affects are speculative and unquantifiable at this time.

Although fish salvage operations in advance of chemical renovation activities, and the action of repatriating native fish to Bonita Creek, are mentioned in this biological opinion as part of the proposed action, they will be covered under 10(a)(1)(A) permits. As such, they are not part of the proposed action, and are expected to benefit the native fish community.

Other BLM Land Management Actions

The proposed action includes BLM's ongoing and planned management of the action area which is defined in the Gila Box Riparian National Conservation Area Interdisciplinary Activity Plan, and further defined in the Final Resource Management Plan for BLM lands of the Safford and Tucson Field Offices in eastern and southeastern Arizona. These planning documents guide management on the BLM lands in the action area through 2013 and include overall management guidance; decisions on land allocation; acquisition, and designation; determinations of allowable uses; and specific management guidelines for fish and wildlife, research, and education. The proposed action has been previously defined in the biological opinions on these plans (U.S. Fish and Wildlife Service 2004a, 2006). These elements of the proposed action are unchanged from these prior consultations and are hereby incorporated by reference. These planned and continuing actions will have mostly beneficial effects to listed native fishes; adverse effects are anticipated to be minimal. The effects of these actions on Gila chub were previously analyzed in the biological opinions on these actions and are incorporated here by reference. Effects from these actions to Gila topminnow, desert pupfish, loach minnow, and spokedace will be the same as those to Gila chub.

CONCLUSION

After reviewing the current status of each species, the environmental baseline for the action area, the effects of the proposed action and the interrelated and interdependent actions, and the cumulative effects, it is our biological opinion that restoration of native fishes in lower Bonita

Creek and implementation of a MOU and 10-Year Operation Plan between the BLM and the City of Safford is not likely to jeopardize the continued existence of Gila chub, Gila topminnow, desert pupfish, spinedace, and loach minnow. Critical habitat for Gila chub, loach minnow, and spinedace has been designated but does not occur in the action area, thus no destruction or adverse modification of critical habitat is anticipated.

We present these conclusions based on the following:

1. The project will have adverse, but largely inconsequential effects to all five listed fish species, and will primarily benefit these species by protecting all five from adverse effects of invasive nonnative aquatic species that prey on and compete with these fishes, and by potentially creating new populations of Gila topminnow, desert pupfish, spinedace, and loach minnow. Ultimately, these five species will be better off and closer to recovery with the project than without it.
2. The BLM's management of Bonita Creek emphasizes protection of riparian and aquatic resources, which is necessary to maintain a healthy, intact, native fish fauna.
3. With the exception of limited trailing, BLM will continue to exclude livestock grazing from Bonita Creek. Upland range conditions and trends along Bonita Creek and water quality in Bonita Creek do not suggest that the Bonita Creek watershed is significantly deteriorated due to grazing or other activities, so effects from livestock grazing on the five fish species would be minimal.
4. The BLM will continue to minimize road use, and vehicles would be limited to designated routes only; BLM proposes to direct potentially damaging recreational activity out of the riparian zone of Bonita Creek.
5. Conservation measures associated with fire use will be implemented to minimize effects to riparian and aquatic habitat in Bonita Creek, and the risk of catastrophic wildfire within the Bonita Creek watershed will be reduced.

INCIDENTAL TAKE STATEMENT

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

The BLM and BR have a continuing duty to regulate the activity covered by this incidental take statement. If the BLM or BR (1) fail to assume and implement the terms and conditions or (2) fail to require the (applicant) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the BLM and BR must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement. [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

Barrier Construction and Maintenance

Barrier construction will not affect Gila topminnow, desert pupfish, loach minnow, or spinedace because they will not be present in the action area during construction. Barrier maintenance has already been consulted on for these species in the revised biological opinion on transportation and delivery of Central Arizona Project water to the Gila River Basin. Take is anticipated to occur to Gila chub from direct mortality to adult, juvenile, and larval fish and their eggs due to barrier construction and maintenance. Any fish or their eggs in the construction area during construction or maintenance of the fish barrier are anticipated to be killed when crushed by equipment, stranded during flow diversion, exposed to toxic materials such as petroleum products, or smothered by sediment input. All Gila chub that remain in lower Bonita Creek after salvage will be taken as a result of renovation.

During fish barrier construction, take of Gila chub can occur due to destruction or alteration of habitat resulting from modification or destabilization of the substrate, channel, streambanks, and riparian vegetation. Such habitat loss would alter behavioral patterns, food availability, access to cover, and availability of habitat, thus reducing survival of individual fish and potentially reducing or precluding reproduction. The anticipated level of take of Gila chub from barrier construction and maintenance is unquantifiable because of the rarity of the species in this reach, the technical difficulties in determining population numbers and mortalities, difficulties in detecting dead or dying individuals, natural population fluctuations, and confounding natural and human-caused factors, but is anticipated to occur to only a small portion of the population.

Given the small proportion of the population that is anticipated to be impacted, we do not believe that this taking will be detectable and therefore we will consider take to have been exceeded if the following surrogate measures occur: any spill of toxic materials occurs in the channel as a result of barrier construction or maintenance (this does not include concrete being poured for the barrier); barrier construction activities exceed the anticipated 2.6 acres of vegetation disturbance during construction.

Water Use and Management

Water use and management consists of beaver dam pond breaching and removal, pipeline and well monitoring and maintenance, and full implementation of Safford's water right over the 10-year period of the MOU (2017). Take of Gila chub, and other listed fish species that become established following repatriation, can occur from these activities from vegetation removal, use of heavy equipment for earthmoving and removal of beaver dams, to gain access to pipelines and wells for maintenance, as well as from drying of lower Bonita Creek from increased water use.

Take is anticipated to occur from direct mortality to adult, juvenile, and larval fish and their eggs (except for the livebearer, *Gila topminnow*) due to these water-use activities. Any fish or their eggs in the area during vegetation removal in the stream are anticipated to be killed when crushed by equipment, stranded during flow diversion, exposed to toxic materials such as petroleum products, or smothered by sediment input. Drying of the creek by increased diversion of water will also result in direct mortality to adult, juvenile, and larval fish and their eggs from stranding in temporary habitat. During pipeline and well maintenance, take can also occur due to destruction or alteration of habitat resulting from modification or destabilization of the substrate, channel, streambanks, and riparian vegetation, from reductions in water quality, and from drying of the creek. Such habitat loss would alter behavioral patterns, food availability, access to cover, and availability of habitat, thus reducing survival of individual fish and potentially reducing or precluding reproduction.

The anticipated level of take from water use and management is unquantifiable because of the technical difficulties in determining population numbers and mortalities, difficulties in detecting dead or dying individuals, natural population fluctuations, and confounding natural and human-caused factors, but the number of *Gila chub*, and potentially *Gila topminnow*, desert pupfish, loach minnow, and spinedace, anticipated to be taken is expected to be a small in proportion to the overall population of Bonita Creek. Incidental take from water use and management will affect the entire 1.7 miles of Bonita Creek between the infiltration gallery and the fish barrier. This take will assume to be exceeded if aquatic habitats in lower Bonita Creek are dried beyond one spawning season, or if any spill of toxic materials occurs in the channel or on the floodplain as a result of water use activities.

Recreation and Transportation System Management

Incidental take could occur on BLM lands to *Gila chub*, and other listed fish species that become established following repatriation, in the action area during the term of the MOU (through 2017). Fish fry and eggs are anticipated to be killed or injured when vehicles drive the approximately two miles of roads through Bonita Creek. Detecting fish taken in this manner would be difficult. Larger fish are likely to swim away and avoid death or injury. The number of fish or eggs affected would probably depend on the speed of the vehicle, the number of vehicles, if vehicles traveling in a caravan, and water conditions. Very low water would reduce options for *Gila chub* to escape impact. Relatively small numbers of fish are likely to be affected during any one vehicle crossing of the stream. Given the small proportion of the population that is anticipated to be taken, and the BLM's efforts to minimize the effects of recreation and transportation system management on listed fish species, we do not believe that any taking will be detectable and therefore it will not be possible to determine if or when allowable take will have been exceeded.

Livestock Grazing

Incidental take could occur on BLM lands in the action area during the term of the RNCA plan (through 2013; the BLM has already consulted with FWS on *Gila chub* in the RNCA biological opinion for this element). Should they become established following repatriation, *Gila topminnow*, desert pupfish, loach minnow, and spinedace are likely to be present during annual or biannual crossings of Bonita Creek by cattle. Most fish will swim away from cattle, avoiding significant impacts. However, fish fry and any eggs (except in the case of the livebearer, *Gila*

topminnow) that may be present at the cattle crossings could be trampled. However, because the use of these crossings will take place infrequently and in a small portion of the stream in the action area, no take is reasonably certain to occur as a result of these actions.

Fire Management

The BLM has already consulted with FWS on fire management impacts for Gila chub in the action area as part of the biological opinion on the Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management, and (U.S. Fish and Wildlife Service 2004b). The opinion concluded that decisions made during wildfire suppression and application of prescribed fire could result in fire in the watershed of Bonita Creek that could result in death or injury of Gila chub due to post-fire ash flow, sedimentation, and flushing of fish downstream during post-fire high flows where the fish would be subject to predation by nonnative fishes. The BLM's fire management element has an objective of improving and protecting the resources of the RNCA, so we assume that a fish kill due to fire suppression or prescribed fire activities would be a rare event. Should repatriated listed fish species become established, we anticipate such a fish kill involving Gila topminnow, desert pupfish, loach minnow, or spokedace, but not extirpating these species from Bonita Creek, once during the life of the plan. We will consider take to have been exceeded if any of these four established species are subsequently extirpated as a result of a fish kill that can be attributed to wildfire suppression and/or prescribed fire.

EFFECT OF THE TAKE

In this biological opinion, we determine that this level of anticipated take is not likely to result in jeopardy to the Gila chub, Gila topminnow, desert pupfish, loach minnow, or spokedace. The implementation of the proposed action will ensure that, while incidental take may still occur, it is minimized to the extent that habitat quality and quantity will be maintained in the planning area and the species' will be conserved.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the BLM and BR must comply with the terms and conditions of the following reasonable and prudent measures, and report implementation of these terms and conditions to us. These terms and conditions are non-discretionary. The reasonable and prudent measures, with the implementing terms and conditions are designed to minimize or avoid the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided.

We believe that the following reasonable and prudent measure is necessary and appropriate to minimize take of listed fish:

1. Conduct all proposed actions in a manner that will minimize direct mortality of listed fish species.

The following terms and conditions will implement reasonable and prudent measure 1:

- 1.1 To the extent practicable, all activities in the stream channel will be conducted outside the reproductive season of all listed fish species addressed under this consultation. This includes construction and barrier maintenance activities, and water use facilities maintenance, but does not include monitoring. If activities cannot be conducted outside the breeding season of listed fish species for barrier construction and maintenance, BR will coordinate with FWS to minimize effects to listed fish species; if activities associated with water use cannot be conducted outside the breeding season of listed fish species for water use facilities maintenance, BLM will coordinate with City of Safford to minimize effects to listed species.
- 1.2 An appropriate spill response kit for cleaning up accidental releases of petroleum products (or other appropriate substances) will be available at the fish barrier construction site whenever work is ongoing, and at least one person present shall have training in use of that kit.
2. Conduct all proposed actions in a manner that will minimize loss and alteration of habitat (including the aquatic faunal community) of listed fish species.

The following terms and condition will implement reasonable and prudent measure 2:

- 2.1 The methodology for recontouring the channel and floodplain following fish barrier construction will be discussed with BLM and FWS prior to implementation.
3. Monitor the effects of the proposed action on the lower Bonita Creek fish communities and habitat to document levels of incidental take, and report the findings to the FWS. Reclamation shall be responsible for this monitoring for barrier construction and maintenance. The BLM shall be responsible for other activities under the proposed action.

The following terms and conditions will implement reasonable and prudent measure 3:

- 3.1 BR or the BLM shall have available to advise and assist in the application of these terms and conditions a qualified fisheries biologist as funding allows. However, the biologist does not need to be on-site at all times during activities covered under this opinion.
- 3.2 A written report shall be submitted by the BLM to the FWS annually documenting Bonita Creek activities for the year that resulted in documented take. The report will include a discussion of compliance with the above terms and conditions and will be due March 15. Reclamation shall provide information for this report to BLM for activities related to barrier construction and maintenance.

4. Minimize the loss of fish habitat due to fire suppression and prescribed fire use.

The following term and condition will implement reasonable and prudent measure 4:

- 4.1 The BLM shall apply the reasonable and prudent measures and terms and conditions for Gila chub, as well as the reporting requirements, from the BLM LUP Amendment BO to any new listed fish species established in Bonita Creek.

In addition to the reasonable and prudent measures and terms and conditions necessary and appropriate to minimize take that are listed above, the reasonable and prudent measures and terms and conditions necessary and appropriate to minimize take listed in the Safford/Tucson Grazing BO, Gila Box RNCA BO, and BLM LUP Amendment BO also apply for Gila chub in Bonita Creek.

Review requirement: The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The BLM/BR must immediately provide an explanation of the causes of the taking and review with us the need for possible modification of the reasonable and prudent measures.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species, initial notification must be made to the FWS's Law Enforcement Office, 2450 W. Broadway Rd, Suite 113, Mesa, Arizona, 85202, telephone: (480) 967-7900 within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

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

1. The BR and BLM should attempt to work with others on a watershed-level conservation plan for Bonita Creek with the objective of protecting the watershed and preventing introductions of nonnative fishes and other organisms.
2. The BR and BLM should work with us on developing and implementing a recovery plan for Gila chub.
3. The BR and BLM should work with us on implementing recovery plans for Gila topminnow, desert pupfish, loach minnow and spikedace.
5. The BR and BLM should coordinate with the Arizona Game and Fish Department and us to implement an aggressive program to control nonnative aquatic species.

In order for the FWS to be kept informed of actions minimizing or avoiding adverse effects or benefiting listed species or their habitats, the FWS requests notification of the implementation of any conservation recommendations.

REINITIATION NOTICE

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

The FWS appreciates the efforts of the Bureau of Reclamation and the Bureau of Land Management to identify and minimize effects to listed species from this project. We encourage you to coordinate the review of this document with the Arizona Game and Fish Department. In keeping with our trust responsibilities to American Indian Tribes, we encourage you to continue to coordinate with the San Carlos Apache Tribe who may be affected by this project. By copy of this biological opinion, we notify the San Carlos Nation on the status of this project. For further information please contact Glen Knowles (602) 242-0210 or (x233) or Steve Spangle (602) 242-0210 (x244). Please refer to consultation number (22410-2007-F-0233) in future correspondence concerning this project.

/s/ Steven L. Spangle

cc: Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ
 State Director, Bureau of Land Management, Phoenix, AZ (T. Cordery)
 Project Leader, Arizona Fisheries Resource Office, Alchesay, AZ
 Area Manager, Bureau of Indian Affairs, Phoenix, AZ

Tribal Chairman, San Carlos Apache Tribe, San Carlos, AZ
 Director, San Carlos Apache Tribe Recreation & Wildlife, San Carlos, AZ (A. Tryfonas)
 Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
 Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ

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APPENDIX A – CONCURRENCE

Bald Eagle

We concur with your determination that the proposed action may affect, but is not likely to adversely affect, the bald eagle. We base this concurrence on the following:

- 1) There are no records of nesting bald eagles on Bonita Creek, and wintering use of Bonita Creek by bald eagles is low with an average of 1.6 bald eagles per year over a 12-mile reach. Bald eagles have been observed in Bonita Creek in only 3 out of the last 8 years.
- 2) Construction activities, for the fish barrier, will be limited to a 0.25 mile reach of Bonita Creek. Construction of the fish barrier would remove an insignificant percentage of the total habitat on Bonita Creek. Only one tree proposed for removal is suitable for roosting bald eagles. Wintering bald eagles are not tied to a specific territory and therefore could forage throughout the length of Bonita Creek. Construction of the barrier or stream renovation would not preclude future use of the area by bald eagles.
- 3) Nonnative fish species will be euthanized and the carcasses buried onsite. Consequently, bald eagles will have no opportunity to forage on euthanized fish. Fish salvage activities will not affect the bald eagle.
- 4) Renovation of Bonita Creek would result in a short-term (6-7 days) loss of foraging locations for bald eagle during renovation activities. This includes impacts from both the lack of fish for forage and the potential disturbance to the bald eagle by the increased human presence along the creek. The 1.7 mile reach represents only a fraction of the potential habitat available for foraging. The Gila River and Bonita Creek (above the infiltration gallery) would remain available sources of foraging habitat. Bald eagles are highly mobile and the short-term loss of this small section of stream would have a negligible effect on the bald eagle.
- 5) A small portion of the nonnative fish killed during the renovation process will float downstream and be available for forage by bald eagles. Bald eagles are known scavengers and will forage on dead fish. Although the potential effects of consuming fish killed by antimycin are poorly studied, there have never been any reports of negative effects to humans or wildlife from ingestion of antimycin-killed fish (Berger *et al.* 1967, Gilderhus *et al.* 1969). One study (Ritter and Strong 1966) indicates it would be impossible for a bald eagle to consume the amount of antimycin-killed fish required to cause it harm over the course of this project.
- 6) The BLM and Safford will limit all human activity including road development in a manner consistent with current practices if nests or roosts are documented. Potential bald eagle roost tree habitat will not be removed for routine pipeline and well maintenance and monitoring or for access and road maintenance.
- 7) Although approximately 3 miles of riparian habitat may be dewatered when the City of Safford takes its full water right allocation from Bonita Creek, this portion of stream

provides little roosting habitat for bald eagles, and the species will be able to find suitable roosting habitat in nearby upper Bonita Creek or the Gila River.