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In Reply Refer To:  
AESO/SE  
22410-02-F-0101 R001

March 11, 2010

Mr. Chris Knopp  
Forest Supervisor  
Apache-Sitgreaves National  
P.O. Box 640  
Springerville, Arizona 85938-0640

RE: Apache-Trout Enhancement Project

Dear Mr. Knopp:

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 was dated March 17, 2009, and received by us on March 20, 2009. Additional information was received via telephone from Stephanie Coleman on March 30 and June 2, 2009, and email on May 27 and 29, 2009. At issue are impacts that may result from the proposed addition of CFT Legumine™ as a piscicide and sodium permanganate or potassium permanganate as a neutralizing agent for Apache trout enhancement on the Apache-Sitgreaves National Forests (ASNF). Your letter determined that the proposed action “may affect” the Apache trout (*Oncorhynchus apache*) and Chiricahua leopard frog (CLF) (*Lithobates chiricahuensis*). You originally indicated that the proposed project was “likely to adversely affect” Little Colorado spinedace (*Lepidomeda vittata*) and Mexican spotted owl (MSO) (*Strix occidentalis lucida*) but these conclusions were changed.

After review of the proposed action we identified portions of your evaluation that included actions from previous consultations (i.e. barrier construction and maintenance). Through discussions with your staff we determined that barrier construction and maintenance should be eliminated from the proposed action.

After the proposed action was clarified several changes were made to the MSO critical habitat effects determination for this consultation. In your letter, you originally requested our concurrence that the proposed action “is not likely to adversely affect” the critical habitat of the MSO. Your “may affect, not likely to adversely affect” determination for MSO critical habitat was related to effects from barrier construction and maintenance. These actions were evaluated in previous consultations for this project but are not included nor should they be evaluated for this consultation. Therefore, the impacts from the revised proposed action will not affect primary constituent elements of MSO critical habitat. Therefore, MSO critical habitat does not need to be addressed in this consultation.

On November 3, 2009, the ASNF added minimization measures to the proposed action to reduce the potential impacts to MSO. With the addition of minimization measures the ASNF requested our concurrence with the determination “may affect not likely to adversely affect” for MSO. We concur with your determination for MSO and our reasoning is provided in Appendix A.

The discussion in the Biological Assessment (BA) also identified effects from salvage operations under the assumption Little Colorado spinedace occupied the affected portion of the stream. However, spinedace do not occur within the action area of this consultation and will not be affected by the chemical effects of CFT Legumine™ and associated neutralization agents. On June 2, 2009, the ASNFs’ requested the removal of spinedace from this consultation.

You also determined that the proposed action may impact but is not likely to result in a trend towards Federal listing or loss of species’ viability for the Three Forks springsnail (*Pyrgulopsis trivialis*), a candidate for Federal listing. We do not consult on actions that may affect species that are not proposed or listed under the Act. We have, however, provided technical assistance under the conservation recommendations section of this biological opinion..

This biological opinion is based on information provided in the February 22, 2009, BA, telephone conversations, field investigations, 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, CFT Legumine™, or sodium or potassium permanganate and their effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

### **Consultation History**

- September 2000: Informal consultation began regarding the Apache trout enhancement project.
- February 28, 2002: We issued a concurrence letter that the proposed action was not likely to adversely affect the endangered jaguar (*Panthera onca*) and the southwestern willow flycatcher (*Empidonax traillii extimus*).
- April 19, 2002: We issued a final biological opinion for the effects of the proposed project on the Apache trout, Little Colorado spinedace, loach minnow and its critical habitat, bald eagle (*Haliaeetus leucocephalus*), and MSO.
- May 2, 2003: We received your request for reinitiation of consultation to remove the timing restrictions for certain actions in relation to the breeding season of the MSO, and to document the discovery of a new breeding pair of bald eagles within proximity to the project area.
- July 2, 2003: We issued a final biological opinion on the effects of the action to the bald eagle, and the effects of the proposed modification to the MSO.
- December 10, 2003: We received your request for reinitiation of consultation on the proposed renovation of four additional streams, expansion of potential locations for barrier construction on the West and East Fork of the Little Colorado River (LCR), to allow for a barrier back-fill option, and to change the implementation schedule.

- February 23, 2004: We issued a final biological opinion (BO).
- February 26, 2006: You requested reinitiation of formal consultation due to changes regarding which strains of Apache trout will be placed in specific streams.
- March 21, 2006: We issued a final biological opinion
- March 20, 2009: We received your request for reinitiation of consultation on the addition of CFT Legumine™ as a piscicide and sodium permanganate as a piscicide neutralizing agent to the project.
- June 2, 2009: We received a request from the ASNF to remove Little Colorado spinedace from consideration for this consultation.
- November 3, 2009: We received a request from the ASNF to change the “May Affect Likely to Adversely Affect” determination for MSO to “May Affect Not Likely to Adversely Affect”.
- December 17, 2009: We sent you a draft biological opinion for agency review.
- February 16, 2010: We received comments on the draft BO from ASNF.
- February 22, 2010: We sent the revised draft BO to ASNF via email.
- February 22, 2010: We received an email from ASNF accepting the edits to the draft BO.
- February 19, 2010: The ASNF sent the draft BO to Arizona Game and Fish Department for technical review.

## **BIOLOGICAL OPINION**

### **DESCRIPTION OF THE PROPOSED ACTION**

The proposed action includes the continuation of activities identified as stream renovations and reintroduction of Apache trout for streams identified in Table 1. The proposed action originally included the use of antimycin for stream renovations; however, in addition to antimycin, this biological opinion includes the use of CFT Legumine™ as a chemical for stream renovations. For a complete description of the proposed action please refer to the previous biological opinions and the Apache Trout Enhancement Project Environmental Assessment (EA) (USFS 2002).

The project is being modified to include the use of CFT Legumine™ as a piscicide and sodium or potassium permanganate as a piscicide neutralizing agent for Apache trout enhancement in streams identified for antimycin use in the EA (USFS 2002). The active ingredient of CFT Legumine™ is rotenone, which is five percent (%) of the formulation. The timeframe for the proposed action, which includes the use of both antimycin A and CFT Legumine™, is scheduled for the next ten years. Previous attempts to remove non-native fish were performed using antimycin A, however they were unsuccessful due to compromised strength of the formulated

product, Fintrol<sup>®</sup>. Chemical analysis of product samples performed by the US Geological Survey's Upper Midwest Science Center found a large variance in the strength of the active ingredient, with a maximum of 4.6% by volume. Full strength of antimycin A in Fintrol<sup>®</sup> is 23%. Much of the Fintrol<sup>®</sup> purchased for the project is believed to be of poor quality and no new product has been provided by the manufacturer, Aquabiotics Corporation. Due to the unavailability of full-potency Fintrol<sup>®</sup>, streams will be treated solely with CFT Legumine<sup>™</sup> at present; however, if full-strength stock become available, then either CFT Legumine<sup>™</sup> or Fintrol<sup>®</sup> will be used. If Fintrol<sup>®</sup> becomes available, treatments with CFT Legumine<sup>™</sup> and Fintrol<sup>®</sup> will usually be separated by time or distance, though occasions may arise where adjacent streams may be treated simultaneously by different piscicides (e.g., main stream treated with CFT Legumine<sup>™</sup> and tributary with Fintrol<sup>®</sup>).

Treatments will generally occur during summer months, prior to monsoon rains, though some treatments may occur in fall months. Streams to be treated are those described in Table 1 below.

**Table 1. Estimated Use and Frequency of Stream Renovations on Apache Trout Streams.**

STREAMS	STREAM RENOVATION ANTICIPATED/PROPOSED (w/in 10 yrs)
<i>Black River Watershed</i>	
Bear Wallow Creek	Yes
Conklin Creek	None scheduled at this time. Possible within 10 yrs.
Fish Creek (Slaughter Draw, Double Cienega, Hagen, and Corduroy)	Yes
Hayground Creek	None scheduled at this time. Possible within 10 yrs.
Snake Creek	Yes
Stinky Creek	Yes
West Fork Black River (Between Barriers)	Yes
West Fork Black River (Lower)	Yes
<i>Little Colorado River (LCR) Watershed</i>	
East Fork LCR (Lower)	Yes
East Fork LCR (Upper)	Yes
Lee Valley Creek	Yes
South Fork LCR (Lower)	None scheduled at this time. Possible within 10 yrs.
South Fork LCR (Upper)	None scheduled at this time. Possible within 10 yrs.
West Fork LCR (Lower)	Yes
West Fork LCR (Upper)	Yes

The label for CFT Legumine<sup>™</sup> contains detailed instructions for use in streams, including determination of application rates, distance between application sites, and detoxification. Treatment of streams will occur exactly as per label directions, and may be repeated one or more times if fish remain in the streams.

CFT Legumine<sup>™</sup> is a formulation of rotenone, a naturally occurring substance derived from the roots of tropical plants in the Leguminosae family. Rotenone behaves like antimycin A by interfering with mitochondrial electron transport, and is a potent inhibitor of respiration in fish and other gill-bearing animals. Rotenone decomposes in light and water, with a half-life of 0.5 - 7.5 days at 5 to 20 degrees Celsius (°C). Toxicity is lowered with increased pH, water temperature, and organic matter. Dissipation is faster in flowing water due to dilution, dispersion and photolysis.

CFT Legumine™ minimizes potential toxicity to applicators and non-target species, which also results in reduced detectability of the chemical by fish. Trace amounts of naphthalene, substituted benzenes, and hexanol have been identified in this formulation (Fisher 2007), as well as methyl pyrrolidone, diethylene glycol, monoethyl ether, fatty acid esters, and polyethylene glycols. These compounds are generally expected to rapidly biodegrade, hydrolyze, and/or photolyze, and are not considered bioaccumulative.

The Arizona Department of Agriculture issued a letter to Arizona Game and Fish Department (AGFD) in 2008 allowing for sodium permanganate or potassium permanganate to be used as a neutralizing agent with CFT Legumine™. Neutralization of rotenone treatment will occur with application of the oxidizing agent sodium permanganate. Sodium permanganate has similar chemical properties to potassium permanganate, the agent evaluated in the Apache trout EA, but a higher solubility in water, allowing less material to be used for neutralization.

Concentrations of rotenone used to eliminate fish can temporarily reduce populations of some species of aquatic invertebrates, causing changes in macroinvertebrate community composition. Certain species of aquatic invertebrates are more sensitive to rotenone than others, and some take longer to recover than others (Engstrom-Heg *et al.* 1978). Most of the sensitive species are in the insect orders Ephemeroptera (mayflies), Plecoptera (stoneflies), and Trichoptera (caddisflies). Also, a high mortality of Chironomides (insect order Diptera) was observed during rotenone treatments on the San Rafael restoration project (Jim Rorabaugh, FWS, pers. comm. 2009). The ability of aquatic invertebrates to survive a rotenone treatment depends on life history, oxygen requirements and habitat. In most cases, reduction of aquatic invertebrates was temporary with the majority of taxa recovering within 1-2 years (Binns 1967, Trumbo *et al.* 2000, UDWR 2002). Engstrom-Heg *et al.* (1978) reported long-term impacts of rotenone are mitigated because those insects that were most sensitive to rotenone also tended to have the highest rate of recolonization. Short life cycles (Anderson and Wallace 1984), good dispersal ability (Williams and Hynes 1976) and generally high reproductive potential (Anderson and Wallace 1984) give aquatic invertebrates the capability for rapid recovery from disturbance (Jacobi and Deegan 1977, Boulton *et al.* 1992, Matthaei *et al.* 1996).

Rotenone is variably toxic to amphibians, depending on their mode of respiration (i.e. gills, skin, buccopharyngeal, or lungs). Differences in sensitivity occur among taxa and lifestages. Larval, gill-breathing forms of amphibians are more sensitive to rotenone than adults. Adults that are obligately aquatic or have high rates of cutaneous respiration are more sensitive as well.

The action area remains the same as the above-mentioned biological opinions.

The following minimization measures are included as part of the proposed action and are designed to reduce the potential affects to CLFs, tadpoles, and egg masses in the action area. This work will be conducted by qualified surveyors under the authority of 10(a)1(A) of the Act.

1. Prior to implementation of stream renovations the ASNF and AGFD will collect eggs, tadpoles, and frogs found during surveys of suitable habitat. Protocols developed in the CLF Recovery Plan for handling, care, and transport of CLFs will be followed.

2. All held specimens will be returned to the site(s) of collection as soon as possible after the areas return to an acceptable condition.

## **STATUS OF THE SPECIES AND CRITICAL HABITAT**

### **Apache Trout**

The status of the species is largely the same as described in the April 2002 biological opinion. Our information indicates that, as of 2009, 16 formal consultations have been completed or are underway for actions affecting Apache trout rangewide (Appendix B). Adverse effects to Apache trout have occurred due to these projects and many of these consultations have included reasonable and prudent measures to minimize effects to Apache trout. The ASNF, White Mountain Apache Tribe, FWS, AGFD, and other cooperators are currently implementing many projects and recovery actions that provide habitat improvement or protection for Apache trout.

One objective of the 2009 Recovery Plan (U.S. Fish and Wildlife Service 2009) is to establish and/or maintain 30 self-sustaining discrete populations of pure Apache trout within its historical range. Many of the recovery and conservation actions implemented to date have resulted in the expansion of populations and habitat protection/restoration within Apache trout historical range. Monitoring will be necessary to verify and sustain recovery. Currently, 27 pure Apache trout populations exist within historical range (in approximately 118 miles of stream) in Gila, Apache, and Greenlee counties of Arizona, on lands of the Fort Apache Indian Reservation and ASNF. Additional streams have been identified as potential recovery populations within the historical range of Apache trout and they may be used for further conservation of the species if they meet the criteria for recovery populations in the future. It is estimated that the actions necessary to restore Apache trout to a non-threatened status can be achieved by the end of 2011.

### **Chiricahua Leopard Frog**

The status of the species is largely the same as described in the February 2004 biological opinion; however, the following discussion highlights the changes to the status of CLF since 2004.

A recovery plan has been completed (U.S. Fish and Wildlife Service 2007), the goal of which is to improve the status of the species to the point that it no longer needs the protection of the Act. The recovery strategy calls for reducing threats to existing populations; maintaining, restoring, and creating habitat that will be managed in the long term; translocating frogs to establish, reestablish, or augment populations; building support for the recovery effort through outreach and education; monitoring; research needed to provide effective conservation and recovery; and application of research and monitoring through adaptive management. Recovery actions are recommended in each of eight recovery units throughout the range of the species. Management areas are also identified within recovery units where the potential for successful recovery actions is greatest. Critical habitat has not been designated for the CLF.

The species has been extirpated from about 80 percent of its historical localities in Arizona and New Mexico. As of 2008, 80 sites were known to be occupied by CLFs in Arizona, at least 34 of which were breeding sites. In New Mexico, 15 to 23 breeding sites were known in 2008; the frogs occur at additional dispersal sites. Although a large percent of its historical localities are extirpated, based on 2008 data, the species is still extant in most major drainages in Arizona and

New Mexico where it occurred historically, with the exception of the LCR drainage in Arizona and possibly the Yaqui drainage in New Mexico. The last surveys in the LCR watershed conducted in 2001 and 2003 did not identify any CLF.

The Three Forks, Rudd Creek, Sierra Blanca Lake, and Concho Bill Springs are four known or introduced CLF populations within the Black River watershed. The status of each population is as follows: the Three Forks population is likely extirpated; the Rudd Creek population is not extant; the Sierra Blanca Lake is a site where CLF have been introduced in the past, although there is no evidence of them persisting; and the Concho Bill Springs site is extant.

In 2002 a CLF sighting was reported at Deep Cienega Tank and in 2003 a second sighting occurred in Fish Creek, two miles upstream of Deep Cienega Tank. These sightings were unconfirmed and with suitable unsurveyed habitat within the area it is possible CLF may be present in the Black River watershed, portions of which are in the action area. Although they may occur within the Black River Watershed, CLF have not been observed and/or salvaged from any of the streams identified in Table 1 as a result of past barrier construction, maintenance, or treatments (Mike Lopez, AGFD, pers. comm. 2009).

Loss of CLF populations is part of a pattern of global amphibian decline, suggesting other regional or global causes of decline may be important as well (Carey *et al.* 2001). Witte *et al.* (2008) analyzed risk factors associated with disappearances of ranid frogs in Arizona and found that population loss was more common at higher elevations and in areas where other ranid population disappearances occurred. Disappearances were also more likely where introduced crayfish occur, but were less likely in areas close to a source population of frogs.

Recent evidence suggests a chytridiomycete skin fungi, *Batrachochytrium dendrobatidis* (*Bd*), is responsible for global declines of frogs, toads, and salamanders (Speare and Berger 2000, Longcore *et al.* 1999, Berger *et al.* 1998, Hale 2001). In Arizona, *Bd* infections have been reported from several populations of CLFs in Arizona, as well as populations of other several other frogs and toads (Morell 1999, Sredl and Caldwell 2000, Davidson *et al.* 2000, Hale 2001, Bradley *et al.* 2002, U.S. Fish and Wildlife Service 2007). A threats assessment conducted for the species during the development of the recovery plan identified *Bd* as the most important threat to the frog in recovery units 7 and 8 in New Mexico. In recovery unit 6, which includes much of the mountainous region of west-central New Mexico, *Bd* and non-native predators were together identified as the most important threats. Die-offs typically occur during the cooler months from October to February.

The role of the fungi in the population dynamics of the CLF is as yet undefined. Some populations are extirpated once animals become symptomatic, while, other CLF populations can exist with the disease for extended periods (U.S. Fish and Wildlife Service 2007). However, even in the best of cases, it is an additional stressor, resulting in periodic die-offs that increase the likelihood of extirpation and extinction. Because of the interchange of individuals among subpopulations, metapopulations of frogs may be particularly susceptible. When these animals move, or are moved by people, among aquatic sites, *Bd* may be carried with them (Collins *et al.* 2003). Other native or nonnative frogs may serve as disease vectors or reservoirs of infection, as well (Bradley *et al.* 2002). *Bd* could also be spread by tourists or fieldworkers sampling aquatic habitats (Halliday 1998). The fungus can exist in water or mud and thus could be spread by wet or muddy boots, equipment, vehicles, cattle, and other animals moving among aquatic sites, or

during scientific sampling of fish, amphibians, or other aquatic organisms. The FWS and AGFD are employing preventative measures to ensure the disease is not spread by aquatic sampling.

Further information on the status of the species is summarized on our website ([www.fws.gov/southwest/es/arizona/](http://www.fws.gov/southwest/es/arizona/)) under “Document Library” and in the Final Recovery Plan (U.S. Fish and Wildlife Service 2007).

## **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.

The Apache Trout Enhancement Project’s first Biological Opinion was provided to the ASNF April 19, 2002. Additional information on factors affecting the species’ environment can be found in the original opinion. The consultation history above documents several re-initiations of this project since 2002. The following is a brief overview of large scale Federal projects within the action area that have occurred since the original opinion. These projects cover watershed impacts, from grazing, timber harvest, and fire.

On-going Federal projects (along with consultation numbers) within the action area of this consultation include the ATV Jamboree (22410-04-F-0100-R2); Eager South WUI (22410-05-F-0640); 26 Bar Allotment (22410-04-F-0355); and the combined Allotment Management Plans for Voigt (22410-03-F-0298), Greer (22410-03-F-0299), and Sheep Springs (22410-02-F-0501).

The ATV Jamboree project is the ASNFs’ issuance of a Special Use Permit to ride ATVs on ASNFs’ lands. The permit is valid for five years. The action area includes 16 routes totaling approximately 850 miles and the surrounding areas between routes. Apache trout occur in several streams that will be crossed (over bridges and culverts) by ATVs or are within the vicinity of ATV routes that occur along existing dirt roads with a watershed containing Apache trout. Streams with potential impacts from the jamboree and that are within the action area of this consultation are: Centerfire (including Boggy Creek), Hayground, Snake, and Stinky creeks within the Black River Watershed; and West, East, and South Fork Little Colorado Rivers, and Lee Valley Creek within the Little Colorado River Watershed. Adverse affects were not anticipated from the proposed action; however, small amounts of sediment from the jamboree are expected to affect Apache trout and its aquatic habitat.

The Eager South WUI is a 15-year project that includes 21,129 acres of ASNF lands. This WUI is located within the Little Colorado River Watershed. Treatments include thinning and treatment of created and existing fuels on the ground using various methods (e.g., pile and burn, broadcast burning, chipping, removal, and re-occurring maintenance burns or fire use). Areas that cannot be treated mechanically (e.g., steep slopes) will receive low-intensity prescribed burning. These treatments will continue to have impacts within the Apache Trout Enhancement action area including smoke disturbance to MSO PAC #010604, and sediment and ash inflow from prescribed fire and mechanical treatments to Apache trout in the South Fork LCR.

Also included in the environmental baseline are grazing actions previously consulted on in the action area. Allotment Management Plan (AMP) decisions for 26 Bar, Voigt, Greer, and Sheep Springs have included a number of measures to limit impacts to listed species (including MSO and CLF) and their habitats. For a complete list of measures included in the AMP decisions above, refer to our website (<http://www.fws.gov/southwest/es/arizona/>) under “Document Library”.

### **Apache Trout**

Apache trout streams that occur within the action area of this consultation are all identified in Table 2. All streams in Table 2 are identified within the Recovery Plan as Apache trout Recovery Streams within the historical range. Impacts from previous recovery actions necessary to maintain viable Apache trout populations within the streams are identified in Table 2 below. These actions are likely to continue to insure Apache trout remain pure within the identified recovery streams.

Actions within the Table 2 that are implemented by the AGFD are identified by one or more of the following actions: salvage of pure Apache trout; renovation of streams; and reintroduction of pure Apache trout within recovery streams. The reclassification of Apache trout to threatened status in 1975 included a 4(d) rule under the Act, allowing AGFD to regulate take of the species and to establish sportfishing opportunities (Federal Register 1975). Activities associated with the establishment of sportfish opportunities include the actions by the AGFD that will be contemporaneous with the antimycin and CFT Legumine™ treatment including removal, holding, and transport of pure Apache trout. Therefore, since the introduction of Apache trout for sportfishing opportunities, effects of salvage of pure Apache trout currently in the stream systems, renovation of streams, and effects of reintroduction on released Apache trout are subject to the provisions of the AGFD 10(A)(1)(a) permit, and applicable State laws. The actions identified as barrier construction and maintenance in Table 2 are implemented by the ASNF and were evaluated through separate section 7 consultation.

**Table 2. Status of Apache trout in Recovery streams, and treatments and barrier construction dates.**

<b>Streams</b>	<b>Treatment Date/s</b>	<b>Barrier Construction/Maintenance</b>
<b>Bear Wallow Creek</b>	1981, 2003, 2005	Rock masonry 1979, repaired with rock gabions 1984, maintenance with gabions 2003, liner installation 2004, splash pad installation 2005
<b>Centerfire/Boggy/Wildcat Creeks</b>		manmade 1984; natural enhanced with rock gabions 2003, 2004
<b>Conklin Creek</b>	2006, 2007	Gabion 1988; maintenance and metal grate installation 1998, jump plate 2008
<b>Fish Creek</b>	2004, 2005	Gabion on Fish Creek 1986; gabions added to stream banks 1998; rock gabions added to spillway and barrier wings 2003, concrete and plastic liner installation 2004
<b>Hayground Creek</b>	1989, 2004, 2005	Gabion 1985; reconstruction 2004, 2006

	2003, Proposed for future treatment pending barrier modification	
<b>Snake Creek</b>		Gabion 1987; modification and grate installation 1998
<b>Stinky Creek</b>	1995, 2007	Gabion 1991; maintenance 2004
<b>West Fork Black River, lower</b>		
<b>West Fork Black River, upper</b>	1996	Rock and masonry gabions (2) 1996
<b>East Fork LCR, lower</b>		Gabion (2) 2004
<b>East Fork LCR, upper</b>	2004, 2005	Colter reservoir, manmade grate over jump pool at outlet of Colter Dam 1998
<b>Lee Valley</b>	1982, 1988, 2003	Manmade 1979; rebuilt 1987, repaired 2003
<b>South Fork LCR</b>	2007, 2008	concrete 2004
<b>West Fork LCR</b>	2006, partial 2008	Gabion (2) 2004, fixed 2008

Additional, formal consultations completed to date for Apache trout are summarized in Table 3, Appendix B.

### **Chiricahua Leopard Frog**

Occupied CLF populations occur within the Black River Watershed portion of the action area of this consultation. Take of CLF was issued in the Apache trout February 23, 2004, biological opinion; however, the amount of take was not quantified. The reasonable and prudent measures and terms and conditions were implemented prior to actions identified in the biological opinion. To date, CLF have not been identified or salvaged during the actions identified in Table 2 above. Future antimycin and CFT Legumine™ treatments will also be preceded by removal of CLF under the authority of their 10(A)(1)(a) permit.

## **EFFECTS OF THE ACTION**

### **Apache Trout**

This analysis evaluated the effects of antimycin A and CFT Legumine™ to the Apache trout and its food source within the stream systems identified in Table 1. The effects of salvage of pure Apache trout currently in the stream systems, renovation of streams, and effects of reintroduction on released Apache trout are subject to the provisions of the AGFD 10(A)(1)(a) permit, and applicable State laws.

The effects to Apache trout from the reduction in macroinvertebrates resulting from the application of antimycin A and neutralization remain the same as the above-mentioned biological opinions. We previously concluded the impacts from antimycin A and neutralization will likely be small and would not have a lasting impact on the fish community. Since the 2002 BO we have not observed any adverse effects to Apache trout populations from the reduction in macroinvertebrates in the affected stream systems.

The modified portion of the project includes the use of CFT Legumine™ as a piscicide and potassium or sodium permanganate as a piscicide neutralizing agent. CFT Legumine™ is a

highly effective tool for removal of fish. It is absorbed through the gills and disrupts cellular respiration by inhibiting oxidative phosphorylation. In addition to the removal of fish, macroinvertebrates will also be affected by the proposed actions. Disruption of the macroinvertebrate community may cause indirect effects on Apache trout. Aquatic insects comprise the most important component of the Apache trout's diet (Minckley and Milhalick 1981). Both caddisflies and mayflies are very susceptible to CFT Legumine™ so it is very likely that there would be a decrease in the availability of suitable food immediately after treatment. However, it is unlikely live fish will remain in the system after treatment, the aquatic invertebrate community is expected to recover within one to two years (Binns 1967, Trumbo *et al.* 2000, UDWR 2002), and once fish are reintroduced, their abundance will be low; consequently, we anticipate the indirect effects of a temporary decrease in aquatic invertebrates to be insignificant to Apache trout.

### **Chiricahua Leopard Frog**

As mentioned before, rotenone is variably toxic to amphibians and the effects are determined by their mode of respiration, taxa, and lifestages. The range of lethal doses of rotenone-containing piscicides for amphibian larvae (0.0165-0.665 milligrams/liter [mg/L]) overlaps to a large extent with lethal doses for fish (0.5-30. mg/L) (Chandler 1982, Fontenot *et al.* 1994; McCoid and Bettoli 1996). Cumulative mortality of CLF tadpoles during 96 hour exposure of the rotenone formulation was zero for rotenone concentrations up to 0.5 mg/L and the 96 hr LC50<sup>1</sup> was 0.79 mg/L ( $\pm$  0.15 mg/L) rotenone (Little and Calfee 2008).

Generally mortality is absent in trials where adult frogs are exposed to rotenone concentrations used for fish removal (Fontenot *et al.* 1994; McCoid and Bettoli 1996, Grisak *et al.* 2007). Grisak *et al.* (2007) studied the response of Columbia spotted frog (*Rana luteiventris*) to the prefish formulation of rotenone and determined that piscicidal concentrations would not kill adults, as determined by 24- and 96-hr LC50 tests. Based on the application rate of 0.25 to 1 parts per million (ppm) for stream use of CFT Legumine, adult mortality is unlikely to occur. The rotenone concentration that the frogs will be exposed to is lower than the concentrations that have caused mortality in adults. However, sublethal effects of rotenone exposure, combined with increased stress, altered immune function, or other temporary physiological effects are largely unexplored. Therefore, we cannot assume that there would be no effect to them if they were exposed to the chemical.

Tadpoles are more susceptible to rotenone effects, with LC50 values of formulated rotenone products falling within and below the range of CFT Legumine stream application rates of 0.25 to 1.0 mg/L. If CLF are found prior to treatments with a waterway, Reasonable and Prudent Measure one and implementing Terms and Conditions 1.1 through 1.5 of the February 23, 2004, BO (Consultation # 02-21-02-F-0101R2) are still applicable for this consultation. Reasonable and Prudent Measure one states that the ASNf shall take measures to minimize impacts to frogs, tadpoles, and egg masses in the action area by removing and holding as many individuals as can be detected by qualified surveyors until stream conditions have returned to normal. Since the original biological opinion, CLF surveys have been performed prior to stream renovations. To date, detection and salvage of CLF has not occurred for this consultation. Although salvage activities will be carried out prior to application of piscicides, CLF or tadpoles that avoid detection and remains in the stream during treatments could be susceptible to mortality.

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<sup>1</sup> LC<sub>50</sub> – is the concentration lethal to 50% of the test organisms.

As discussed under Apache trout, aquatic invertebrates are also susceptible to mortality during treatments, although the sensitivity and recovery from rotenone treatments are variable depending on the insect order, life history, and other physiological and environmental factors.

Mortality of fish by piscicide application usually results in an increase in the density of macroinvertebrates after initial declines post-application. Thus, there may be short-term impacts to food supplies for adult CLF. However, as discussed above, aquatic insect orders which are most sensitive to piscicides are Ephemeroptera, Plecoptera, and Trichoptera. Because adult CLF adults eat a wide variety of invertebrates, appear to eat aquatic insects in families that would be very tolerant to treatment, and because impacted areas would soon be recolonized it is anticipated that the temporary decline in food production would have an insignificant effect on frog adults. Frog tadpoles are herbivorous and while some small invertebrates may be ingested incidentally, a reduction in aquatic macroinvertebrate density or a change in species composition would have short-term impacts.

The Apache trout source population used to supplement the reintroduction process in the waterways, identified in Table 2, is primarily from wild populations. The locations that hatchery fish are or will be used in the recovery streams include: West Fork LCR, Lee Valley Creek, and West Fork Black River (Mike Lopez, AGFD, pers. comm. 2009). The waterways that are stocked from wild populations also have the potential to be stocked with hatchery raised Apache trout. Therefore, the potential effects from introduced *Bd* should also be considered when aquatic species are transported from waterways or hatcheries.

As stated previously sublethal effects of rotenone combined with additional stressors, *Bd* for example, could increase the risk of mortality to CLFs. In Arizona, bullfrogs from Bubbling Ponds Fish Hatchery tested positive for *Bd* (Jim Rorabaugh, FWS, email comm. 2009). Green and Dodd (2007), found *Bd* at one hatchery, as well as a number of other infectious amphibian diseases in the Southeast U.S. hatcheries. At present, hatcheries used to augment Apache trout waters have not been tested for presence of *Bd*. The AGFD has taken measures to reduce transport of pathogens by filling the transport tanks with well water and sorting the fish on machinery that removes nearly all the water and organisms prior to transport (Mike Lopez, AGFD, email comm. 2009). Although the risk of *Bd* transport is minimized by AGFD, there is no information available to determine if any of the hatcheries are infected with *Bd*; therefore, the effect of introduced *Bd* combined with stressors from salvage and piscicide application could have adverse effects to a CLF population.

## **CUMULATIVE EFFECTS**

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this BO. 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.

The cumulative effects section has not changed since the April 19, 2002, biological opinion. Refer to the April 2002 opinion for detailed information.

## CONCLUSION

After reviewing the current status of the CLF and Apache trout, the environmental baseline for the action area, the effects of the proposed Apache Trout Enhancement project and the cumulative effects, it is the FWS's BO that the Apache Trout Enhancement project, as proposed, is not likely to jeopardize the continued existence of the CLF and Apache trout. The conclusions remain the same as the above-mentioned biological opinions, with one additional consideration.

### **Chiricahua Leopard Frog**

1. No frogs, tadpoles, and/or eggs have been located within the treatment area since this project began in 2002 and the recent status of CLFs suggests this trend will continue.

## 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 further defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns 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.

## AMOUNT OR EXTENT OF TAKE

### **Apache Trout**

As noted above, salvage of pure Apache trout, renovation of streams, and reintroduction of pure Apache trout are covered by the AGFD 10(a)(1)(A) permit and applicable state laws, and our analysis considers only the effects of antimycin A and CFT Legumine™. The previous biological opinions anticipated take of Apache trout; however, we do not anticipate that the revised proposed action will incidentally take any additional Apache trout.

### **Chiricahua Leopard Frog**

The 2004 biological opinion anticipated take of CLF. Since 2004, CLF have not been documented or salvaged from any of the Apache trout waterways; some of the waterways are not likely to be treated within the 10 year timeframe of the proposed action (see Table 1); known populations within the Black River Watershed are in decline or extirpated; and conservation measures identified in the proposed action will be applied. Therefore, additional incidental take of CLFs and tadpoles from electroshocking, antimycin, and CFT Legumine™ treatments is not reasonably certain to occur from the revised proposed actions.

### **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 RECOMENDATIONS**

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.

#### **Chiricahua leopard frog**

1. We recommend that FS survey occupied and previously occupied CLF populations and other suitable habitat within the Black River watershed.
2. We recommend that the FS continue to assist in implementing the CLF Recovery Plan and actively participate in the Chiricahua Leopard Frog Mogollon Rim Steering Committee.
3. We recommend that the ASNF work with AGFD to prevent the potential spread of *Bd* to Apache trout recovery streams.

We also provide the following technical assistance recommendations to ensure protection of this candidate species.

#### **Three Forks springsnail**

1. We recommend that piscicides not be applied within the aquatic environments of Three Forks springs or Boneyard Bog springs where the Three Forks springsnail occurs. Springsnails respire through an internal gill and could experience catastrophic population declines from exposure to piscicides.

### **REINITIATION NOTICE**

This concludes formal consultation on the actions outlined in the 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.

We appreciate your efforts to identify and minimize effects to listed species from this project. For further information, please contact Ryan Gordon (x225) or Mary Richardson (x242). We also encourage the ASNF to continue to coordinate this project with the AGFD. Please refer to the consultation number, 22410-02-F-0101 R001, in future correspondence concerning this project.

Sincerely,

/s/ Debra Bills for

Steven L. Spangle  
Field Supervisor

cc: District Ranger, Alpine Ranger District, Alpine, AZ  
Biologist, Alpine Ranger District, Alpine, AZ (Attn: Linda WhiteTrifaro)  
Honorable Chairman, White Mountain Apache Tribe, Whiteriver, AZ  
Sensitive Species Coordinator, Whit Mountain Apache Tribe, Whiteriver, AZ (Cynthia Dale)  
Bureau of Indian Affairs, Western Regional Office, Phoenix, AZ (Attn: Amy Heuslein)  
Jim Rorabaugh, Fish and Wildlife Service, Tucson, AZ  
Shaula Hedwall, Fish and Wildlife Service, Flagstaff, AZ  
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ  
Project Leader, Arizona Fisheries Resource Office, Pinetop, AZ (Attn: J. Voltz)

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## Appendix A

### Minimization Measures

The following minimization measures are included as part of the proposed action and are designed to reduce the potential affects to MSO during the breeding season when stream renovations occur within or adjacent to MSO Protected Activity Centers (PACs).

1. Prior to implementation of stream renovations, AGFD and ASNF will identify the appropriate location of work crew camps outside of PACs. In addition, pre-planning of entry and exit routes that work towards minimizing the effects of large work crews walking through a single PAC during the breeding season will also occur.
2. Prior to implementation of stream renovations, crews will be provided with maps identifying the crew camping locations and entry and exit routes identified by AGFD and ASNF.
3. In order to reduce the potential disturbance to breeding MSO, a guideline of 12 or less crew members within a PAC should be followed. If more than 12 individuals are needed AGFD will coordinate with FS to identify the number of additional individuals and the appropriate distances between crew members needed to complete the renovation.

We concur with your determination of “may affect, is not likely to adversely affect” for the MSO for the reasons listed below.

1. The minimization measures identified in the proposed action are designed to reduce the potential affects to MSO during the breeding season when stream renovations occur within or adjacent to MSO PACs.
2. The use of an auger and a small portable generator to mix the potassium permanganate as a neutralizing agent will occur during the MSO breeding season (approximately two to three days) at the lower West Fork LCR barrier and lower East Fork LCR barrier. The generator is small and has a noise level rating between 53 and 59 decibels. The locations of these two barriers is within the West Fork LCR and East Fork LCR PACs and both of the barriers are approximately 0.5 mile or greater from the MSO nest sites within each PAC. Because the generator and auger do not pulsate or have high frequency noise emissions and the distance to nest sites is approximately 0.5 mile or greater, we believe the noise emissions are insignificant and will not result in adverse effects to breeding MSO.
3. The proposed action does not include any barrier construction or modifications of any kind.

### Appendix B

**Table 3. Formal and Informal Apache Trout Consultations to Date**

Consultation	Date	Project Name	Anticipated Incidental Take (Amount/Surrogate)
22410-90-F-222	November 7, 1990	Pinaleno Mountains Recreation Projects	2 fish/year
22410-91-F-076	December 4, 1992	West Fork Allotment Management Plan Revision	Surrogate Provided
22410-91-F-054	May 7, 1993	Campbell and Isabelle Timber Sale	Surrogate Provided
22410-90-F-120 22410-92-I-666	July 20, 1993	Burro Creek, Hayground, and Reservation Allotment Management Plan Revisions and the Coldwater Fisheries Enhancement Project on the West Fork of the Black River.	Surrogate Provided
22410-94-F-437	December 22, 1994	Apache Trout Habitat Improvement Project	Surrogate Provided
22410-92-F-550 22410-96-F-187	December 11, 1998	EPA's 1996 Modifications to the Arizona Water Quality Standards	Surrogate Provided
22410-90-F-119a	April 17, 2001	Revised Biological Opinion on Transportation and Delivery of Central Arizona Project Water to the Gila River Basin (Hassayampa, Agua Fria, Salt, Verde, San Pedro, Middle and Upper Gila Rivers and Associated Tributaries) in Arizona and New Mexico and its Potential to Introduce and Spread Nonnative Aquatic Species	Surrogate Provided
22410-02-F-030	April 5, 2002	Mineral Ecosystem Management Area	None Anticipated
22410-02-F-0101	April 19, 2002	Apache Trout Enhancement Project	200, and 25% of released population
22410-03-F-0298 22410-03-F-0299 22410-02-F-0501	July 8, 2003	Allotment Management Plan for the Voigt, Greer, and Sheep Springs Allotments	Surrogate Provided
22410-02-F-0101/R2	February 23, 2004	Apache Trout Enhancement Project - 2nd Reinitiation	20 fish
22410-97-F-0229	April 27, 2004	Sunrise Park-Big Lake Road Hwy 43	15 fish/event
22410-02-F-0504	June 21, 2004	U.S. Environmental Protection Agency's approval of the State of Arizona's proposed revisions to existing Water Quality Standards for Surface Waters as submitted by the Arizona Department of Environmental Quality	Surrogate Provided
02-21-04-F-0355	May 20, 2005	26 Bar Grazing Allotment	Surrogate Provided
02-22-03-F-366	June 10, 2005	The Continued Implementation of the Land and Resource Management Plans for the Eleven National s of the Southwestern Region	Surrogate Provided
22410-05-F-0640	May 12, 2006	Eager South Wildland Urban Interface	Informal – No Take
22410-04-F-0100-R2	August 29, 2006	ATV Jamboree	Informal – No Take
224410-08-F-0149	January 31, 2008	Use of Fire Retardant on Service Lands	None Provided