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In Reply Refer To:  
AESO/SE  
02-21-04-F-0103

August 4, 2005

Ms. Nora Rasure  
Forest Supervisor  
Coconino National Forest  
1824 South Thompson Street  
Flagstaff, Arizona 86001-2529

RE: Historic Mail Trail Project

Dear Ms. Rasure:

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request was dated July 6, 2005, and received by us on July 6, 2005. At issue are impacts that may result from the proposed Historic Mail Trail Project located in Yavapai County, Arizona, on the threatened Chiricahua leopard frog (*Rana chiricahuensis*). Critical habitat has not been designated for this species.

This biological opinion is based on information provided in the original April 16, 2004, Biological Assessment and Evaluation (BAE); the July 20, 2005, amendment; conversations and electronic correspondence with your staff; and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the Chiricahua leopard frog, the effects of recreation, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

## Consultation History

Details of the consultation history are summarized in Table 1.

**Table 1.** Consultation History

<i>Date</i>	<i>Event</i>
November 2001	We received a copy of the March 22, 2001, proposed action for the Mail Trail Project and sent an electronic mail transmission to recreation staff regarding potential effects to the Chiricahua leopard frog from the proposed action.
December 2001	We exchanged additional electronic mails with staff at the Red Rock Ranger District regarding the proposed action.
March 14, 2002	Proposed Mail Trail Project and conservation measures were discussed at the Amphibian Coordination Meeting attended by representatives from the Fish and Wildlife Service, Forest Service, and Arizona Game and Fish Department (AGFD).
May 2002	The Schedule of Proposed Actions for the Coconino National Forest listed the Historic Mail Trail as a Categorical Exclusion. We exchanged electronic mails with Red Rock Ranger District staff regarding consultation and conservation measures.
June 2003	We exchanged more electronic mails with Forest Service Staff regarding the Historic Mail Train and consultation. We also received maps of the proposed trail route.
April 22, 2004	We received your request for formal consultation on implementation of the Mail Trail Project.
June 2004	After discussing the project with your staff on several occasions it was decided to delay issuing the biological opinion until the Environmental Assessment (EA) was completed due to potential changes in the proposed action.
December 1, 2004	The Forest Service issued a new scoping letter for the proposed Mail Trail and their intent to begin the EA process.
July 6, 2005	We were informed by your staff that the Mail Trail EA would be finalized soon, no changes were made, and they would like the biological opinion as soon as possible.
July 20, 2005	We received an electronic mail regarding an amendment to the Mail Trail BAE to update the Cumulative Effects section.

## BIOLOGICAL OPINION

### DESCRIPTION OF THE PROPOSED ACTION

The Mail Trail Project is located in Township 13 North, Range 7 East, Sections 22, 27, 28, and 33, and Township 12 North, Range 7 East, Sections 3, 4, 10, and 11. The historical Mail Trail was a 106-mile route from Camp Verde to Payson, Arizona. This trail was used by mail carriers on horseback in the mid-1880s to 1914 to provide mail delivery between the two towns. The Coconino National Forest, in cooperation with the Camp Verde Calvary, the Camp Verde Historical Society, the town of Payson, the Payson Historical Society, and the Yavapai-Apache nation, proposes to designate and restore approximately six miles of this historic trail for recreational use. This trail will be added to the official Forest Service trail system and will also include the construction of a secondary trailhead adjacent to Highway 260, east of Divide Tank (Township 13 North, Range 7 East, Section 28).

The Mail Trail will be restored from the General Crook Trail south to Fossil Creek (see the map provided in the April 22, 2004, BAE). Trail delineation will be to Trail Class 2 standards with the work limited to building rock cairns approximately every 500 feet and installing reassurance markers and directional signs. No trail tread will be established, but as the need arises, erosion control structures (e.g., grade dips, drainage structures, and retaining walls) may be needed.

Design of the secondary trailhead may incorporate parking for up to 20 vehicles and eight trucks with trailers, parking barriers, and interpretive and directional signage. The Mail Trail will be open to foot and equestrian traffic, but will be closed to mechanized vehicles. Most trail labor will be performed with hand tools. However, the Forest Service may selectively use a small tractor for creating large grade dips and carrying out tasks too large for non-mechanized equipment. Back-hoes, loaders, graders, and dump trucks may be required for the trailhead construction.

#### *Conservation Measures*

The original route and trailhead location were in areas where they may have impacted the Chiricahua leopard frog populations in the area. Following discussion with the Fish and Wildlife Service, the Forest Service adopted the following conservation measures to minimize effects to the Chiricahua leopard frog:

- The secondary trailhead will be constructed approximately one mile east of Divide Tank.
- The Mail Trail will be relocated 0.33 mile from Pine Tank in order to minimize hikers and equestrians visiting Pine Tank.
- The trail will be designated for non-motorized use only.
- The interpretive signing for the trail will be limited to the trailhead and the trail route. No trailhead signs will be located along the highway.

- The interpretive signs will contain general information about the Chiricahua leopard frog. Maps, trailhead, and interpretive signs will not show the locations of any stock tanks, except Powerline Tank. Equestrians will be permitted to water their animals at Powerline Tank since the tank is located along the trail, is at the halfway point, and is not currently suitable habitat for Chiricahua leopard frogs. The trail will be signed north and south of Powerline Tank to inform equestrians of the available water source.
- The Forest Service will work with the Fish and Wildlife Service and the AGFD to design additional interpretive signs clearly stating that the stocking and transfer of fish, crayfish, and bullfrogs is illegal. These signs will be installed at Divide Tank and other selected stock tanks.

## STATUS OF THE SPECIES

### Legal Status

The Chiricahua leopard frog was listed as a threatened species without critical habitat in a Federal Register notice dated June 13, 2002 (USDI 2002). The rule included a special rule to exempt operation and maintenance of livestock tanks on non-Federal lands from the section 9 take prohibitions of the Act. The Chiricahua leopard frog is included on the AGFD's Draft Species of Concern list (Arizona Game and Fish Department 1996). The AGFD's Commission Order 41 prohibits the collection of the frog in Arizona, except where collection is authorized by a special permit.

### Reasons for Decline

A number of factors have been identified as possible causes of global amphibian decline, and although the specific role of each factor in the declining status of the frog is unknown or poorly studied, each factor may contribute in certain populations. Furthermore, many factors are likely working in concert to exacerbate deleterious effects (Keisecker and Blaustein 1995; Vatnick *et al.* 1999; Middleton *et al.* 2001; Keisecker *et al.* 2001; Carey *et al.* 1999, 2001). Known threats to the frog include predation by non-native organisms, especially bullfrogs, fish, and crayfish; disease (chytrids; *Batrachochytrium* sp.); drought; climate change; floods; degradation and destruction of habitat as a result of dams, water diversions, and groundwater pumping; improper livestock management; altered fire regimes due to fire suppression and livestock grazing; disruption of metapopulation dynamics; mining; woodcutting; development and other human activities; increased possibility of extirpation due to low population numbers; and environmental contamination (USDI 2002).

Recent articles in the scientific literature report the extirpation and extinction of amphibians in many parts of the world (Blaustein and Wake 1990; Pechmann *et al.* 1991; Vial and Saylor 1993; Laurence *et al.* 1996; Lips 1998; Berger *et al.* 1998; Houlahan *et al.* 2000; Stuart *et al.* 2004). A total of 1,856 species, or 32.5 percent of all amphibians, are globally threatened (on the IUCN Red List), and 43.2 percent are experiencing some form of population decrease (Stuart *et al.* 2004). In the U.S., the family Ranidae, which includes the Chiricahua leopard frog, is

particularly affected (Corn and Fogleman 1984; Hayes and Jennings 1986; Clarkson and Rorabaugh 1989; Bradford 1991; Sredl 1993; Sredl *et al.* 1997). Currently, the frog is known to be absent from approximately 76 percent and 82 percent of its historical localities in Arizona and New Mexico, respectively (USDI 2002).

### Current Range in Arizona

In Arizona, the frog still occurs in seven of eight major drainages of historical occurrence (Salt, Verde, Gila, San Pedro, Santa Cruz, Yaqui/Bavispe, and Magdalena river drainages), but appears to be extirpated from the Little Colorado River drainage on the northern edge of the species' range. Within the drainages where the species occurs, it was not found recently in some major tributaries and/or in river mainstems. For instance, the species has not been reported since 1995 from the following drainages or river mainstems where it historically occurred: White River, West Clear Creek, Tonto Creek, Verde River mainstem, San Carlos River, upper San Pedro River mainstem, Santa Cruz River mainstem, Aravaipa Creek, Babocomari River mainstem, and Sonoita Creek mainstem. In southeastern Arizona, no recent records (1995 to the present) exist for the following areas: Pinaleno Mountains, Peloncillo Mountains, and Sulphur Springs Valley. Moreover, the species is now absent from all but one of the southeastern Arizona valley bottom cienega complexes. Large valley bottom cienega complexes may have once supported the largest populations in southeastern Arizona, but non-native predators are now so abundant that the cienegas do not presently support the frog in viable numbers (Rosen *et al. in press*).

Northern populations of the frog along the Mogollon Rim and in the mountains of west-central New Mexico are disjunct from those in southeastern Arizona, southwestern New Mexico, and Mexico. Recent genetic and morphometric data support describing the northern populations as a distinct species (Platz and Grudzien 1999).

### Habitat

The frog is an inhabitant of cienegas (wetlands), pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,281 to 8,890 ft (1,000 to 2,710 m) in central and southeastern Arizona; west-central and southwestern New Mexico; and in northern Sonora, the Sierra Madre Occidental of northern and central Chihuahua, and perhaps south to northern Durango in Mexico (Platz and Mecham 1984, Degenhardt *et al.* 1996, Sredl *et al.* 1997). The distribution of the species in Mexico is unclear due to limited survey work and the presence of closely related taxa (especially *Rana montezumae*) in the southern part of the range of the frog. In New Mexico, of sites occupied by the frog from 1994 to 1999, 67 percent were creeks or rivers, 17 percent were springs or spring runs, and 12 percent were stock tanks (Painter 2000). In Arizona, slightly more than half of known historical localities are natural lotic systems, a little less than half are stock tanks, and the remainder are lakes and reservoirs (Sredl *et al.* 1997). Sixty-three percent of known populations in Arizona in 1998 occurred in stock tanks (Sredl and Saylor 1998).

No formal studies of habitat use by Chiricahua leopard frogs have been completed. However, an important general characteristic is the presence of permanent or nearly permanent water that is devoid of non-native predators (e.g., bullfrogs, crayfish, and predatory fish). The role of habitat

heterogeneity within the aquatic and terrestrial environment is unknown, but is likely important. Shallow waters with emergent and perimeter vegetation provide tadpole and adult basking habitats, while deeper water, root masses, and undercut banks provide refuge from predators and potential sites for hibernation (Sredl, AGFD, pers. comm. 2002). Most perennial waters supporting frogs possess fractured rock substrata, emergent or submergent vegetation, deep water, root masses, undercut banks, or some combination of these features that frogs may use as refugia from predators and extreme climatic conditions (Jennings, Western New Mexico University, pers. comm. 2002). Frogs are thought to over-winter at or near breeding sites, although these microsites have not been studied. Other leopard frogs typically over-winter at the bottom of well-oxygenated ponds or lakes and may bury themselves in the mud (Nussbaum *et al.* 1983, Cunjak 1986, Harding 1997).

#### Summary of Population Dynamics

Metapopulation dynamics are an important component of stable, persistent frog populations (Jennings, Western New Mexico University, pers. comm. 2004). A metapopulation is a system of local populations connected by dispersing individuals (or a set of local populations which interact via individuals moving among local populations) (Hanski and Gilpin 1991). A local population is a set of individuals which interact with each other with a high degree of probability (Hanski and Gilpin 1991). Local populations are often disjunct, occupying relatively isolated suitable patches of habitat. Interactions among local populations establish a dynamic which can be characterized by the rates of local population extirpation and recolonization, and that in turn create a phenomenon of local population turnover. Metapopulations persist until all local populations are extirpated (Hanski and Gilpin 1991). Metapopulations provide an important survival mechanism for frogs in that they allow for suitable habitats to be repopulated after extirpation or for new sites close to extant populations to be colonized.

#### Threats Relevant to the Proposed Action

The following are summary descriptions of non-native species, the disruption of metapopulation dynamics, and infectious disease (specifically chytrid disease), which are all potential threats that may impact Chiricahua leopard frogs as a result of the proposed Mail Trail Project. A more detailed threat discussion is found in the final rule listing the species.

Numerous studies indicate that declines and extirpations of the frog is at least in part caused by predation and possibly by competition with non-native organisms, including fish in the family Centrarchidae (*Micropterus* spp., *Lepomis* spp.), bullfrogs (*Rana catesbeiana*), tiger salamanders (*Ambystoma tigrinum*), crayfish (*Oronectes* spp.), and several other fish species (Clarkson and Rorabaugh 1989, Sredl and Howland 1994, Rosen *et al.* 1994, Fernandez and Bagnara 1995, Fernandez and Rosen 1996, Rosen *et al.* 1996, Snyder *et al.* 1996). For example, in the Chiricahua region of southeastern Arizona, Rosen *et al.* (1996) found that almost all perennial waters that lacked introduced vertebrate predators contained leopard frogs. In perennial waters with introduced predators (e.g., fishes and bullfrogs), leopard frogs were generally absent (Sredl and Howland 1994).

Disruption of metapopulation dynamics is also an important factor in the regional loss of populations (Sredl and Howland 1994; Sredl *et al.* 1997). Frog populations are often small, with dynamic habitats (appearing and disappearing), resulting in a relatively low probability of long-term population persistence at any one site. Historically, populations were more numerous and closer together (Sredl and Howland 1994; Sredl *et al.* 1997). If populations disappeared due to drought, disease, or other causes, extirpated sites could be recolonized by immigration from nearby populations. However, as the numbers of populations decline and become more isolated, it is less likely the areas previously occupied will be recolonized. In addition, most of the larger source populations along rivers and streams and in valley bottom cienegas have disappeared.

The role of infectious diseases has recently been recognized as a key factor in amphibian declines in seemingly pristine areas (Daszak *et al.* 1999; Carey *et al.* 1999, 2001). Chytrids, fungal skin disease, has been linked to amphibian decline in many parts of the world (Berger *et al.* 1998; Speare and Berger 2000), including Arizona (Sredl 2000; Sredl and Caldwell 2000) and New Mexico (Painter, NMDGF, pers. comm. 2001). Although the exact cause of death is uncertain, a thickening of the skin on the feet, hind legs, and ventral pelvic region is thought to interfere with water and gas exchange, leading to death of the host (Nichols *et al.* 2001). Die-offs occur during the cooler months from October to February. High temperatures during the summer may slow reproduction of chytrids to a point at which the organism cannot cause disease (Bradley *et al.* 2002). Rollins-Smith *et al.* (2002) also showed that chytrid spores are sensitive to antimicrobial peptides produced in ranid frog skin. The effectiveness of these peptides is temperature dependent and other environmental factors probably affect their production and release (Matutte *et al.* 2000).

The fungus does not have an airborne spore, so it must spread via other means. Amphibians in the international pet trade (Europe and USA), outdoor pond supplies (USA), zoo trade (Europe and USA), laboratory supply houses (USA), and species recently introduced (*Bufo marinus* in Australia and bullfrogs in the USA) have been found infected with chytrids, suggesting human-induced spread of the disease (Daszak 2000, Mazzoni *et al.* 2003). Free-ranging healthy bullfrogs with low-level chytrids infections have been found in southern Arizona (Bradley *et al.* 2002). Tiger salamanders and bullfrogs can carry the disease without exhibiting clinically significant or lethal infections. When these animals move, or are moved by people among aquatic sites, chytrids may be carried with them (Collins *et al.* 2003). Grazing activities may also result in the spread of infectious disease. Chytrids can survive in wet or muddy environments and could conceivably be spread by livestock carrying mud on their hooves and moving among frog habitats. Personnel working at an infected tank or aquatic site and then traveling to another site, thereby transferring mud or water from the first site, could also spread this disease. Chytrids could be carried inadvertently in mud clinging to wheel wells or tires, or on shovels, nets, boots, and other equipment. Other transfers of chytrids could accidentally occur during intentional introductions of fish or other aquatic organisms; road maintenance; stock tank maintenance; and by anglers, hunters, or other recreation users

The earliest record for chytrids in Arizona (1972) roughly corresponds to the first observed mass die-offs of ranid frogs in Arizona. Hale and May (1983) and Hale and Jarchow (1988) believed toxic airborne emissions from copper smelters killed Tarahumara frogs and Chiricahua leopard frogs in Arizona and Sonora, but in both cases symptoms of moribund frogs has been found to

match those of chytrids. It is also known that some frog populations can exist with the disease for extended periods. The frog has coexisted with chytrids in Sycamore Canyon, Arizona, since at least 1972. However, at a minimum, it is an additional stressor, resulting in periodic die-offs that increase the likelihood of extirpation and extinction. It may well prove to be an important contributing factor in observed population declines.

Additional information about the Chiricahua leopard frog can be found in Sredl *et al.* (1997), Jennings (1995), Degenhardt *et al.* (1996), Rosen *et al.* (1996, 1994), Sredl and Howland (1994), Platz and Mecham (1984, 1979), and Painter (2000).

## **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.

### **A. Status of the species within the action area**

The range of the Chiricahua leopard frog in Arizona can be divided into two general areas: (1) the southeastern part of the state, and (2) centered along the Mogollon Rim. Populations occurring within the Red Rock Ranger District of the Coconino National Forest occur within the northern portion of the species range. Threats to the species occur throughout its range, but the populations above the Mogollon Rim in Arizona appear to have relatively poor persistence (J. Rorabaugh, USFWS, pers. comm. 2001).

The only extant populations of Chiricahua leopard frogs on the Coconino National Forest occur near the project area. Two occupied sites are currently known, but are located approximately 1.75 to 2.0 miles from the closest point on the proposed Mail Trail. However, in 2002, there were 10 known occupied sites, located in about six square sections covering approximately 4,000 acres. Three other sites contained frogs in 1993, but surveys have not located frogs since that time. These tanks occur within the Horseshoe Reservoir and Fossil Creek 5<sup>th</sup> code watersheds, within the Verde Basin. Records exist from other locations along the Mogollon Rim, including the East Clear Creek and West Clear Creek drainages, but these sites have been unoccupied since at least the mid-1980s.

As natural habitats have been altered or destroyed, stock tanks constructed for watering livestock and/or wildlife have become important habitats for Chiricahua leopard frogs (Sredl and Saylor 1998). The only extant populations within the Buckskin Hills area are located in stock tanks. In 2002, the Buckskin Hills area was adversely affected by drought in 2002 and several stock tanks occupied by Chiricahua leopard frogs dried. This reduced the overall metapopulation significantly within this area and reduced connectivity between occupied sites. The Forest Service, Fish and Wildlife Service, and AGFD all worked to haul water to Buckskin, Walt's, and Sycamore Tanks, but we were unsuccessful at maintaining water at Walt's and Buckskin Tanks.

Prior to Walt's Tank drying, the agencies were able to collect and hold captivity 17 frogs from Walt's Tank. In April 2003, 13 of the original 17 frogs were repatriated to Walt's Tank. Unfortunately, surveys conducted later that year and the following years have shown that those frogs did not survive. The other four frogs died of chytrid fungus while in captivity. Therefore, it is possible that chytrid fungus is present within the Buckskin Hills area, though limited testing of other frogs and tiger salamanders has not identified the fungus again.

As stated above, we currently have two occupied tanks in the area and surveys in 2005 have located a total of 12 to 13 frogs between the two tanks. In 2001, one of these tanks contained approximately 1,000 adults, juveniles, and tadpoles. The drought, chytrid fungus (for which frogs from a tank in the area previously tested positive), and on-going effects to habitat have taken a very large toll on this population in the last three years.

The proposed Mail Trail occurs within one mile of ten stock tanks. Four of these stock tanks have supported Chiricahua leopard frogs at some point in the past. Table 2 lists the stock tanks that are located within one mile of the proposed trail and trailhead and their survey history.

**Table 2.** Stock tanks located within the Buckskin Hills Conservation Management Area located within one mile of the proposed Mail Trail and/or trailhead. The table also includes a brief survey history for each stock tank. Distances are reported in miles.

<i>Stock Tank Name</i>	<i>Distance from Re-routed Mail Trail (Proposed Action)</i>	<i>Years Tank considered occupied</i>	<i>Years Tank considered unoccupied</i>
Road Tank	0	-----	1993, 1997, 2002
Buckhorn Tank	0.5	-----	1997, 2002
Divide Tank	1.0	1983	1993-1999, 2001-2005
Middle Tank	>1.0	1993-1994 1999, 2000	2001-2005
Antelope Tank	0.25 – 0.33	-----	1990, 1997, 2000-2001
Black/Peak Tank	0.75	1999-2002	1996-1998, 2003-2005
Pine Tank	0.33	2000	1998-1999, 2001-2002
Powerline Tank	0	-----	2002
Slate Tank	0.33	-----	1998, 2001-2002
Mail Trail No. 2	<0.25	-----	1998, 2000-2001

Though none of these tanks within 1.0 mile of the proposed trail are currently occupied, the Fish and Wildlife Service, Forest Service, and AGFD hope to re-introduce frogs to Middle Tank and Black/Peak Tank in the future.

## **B. Factors affecting species' environment within the action area**

Actions within the project area that affect Chiricahua leopard frogs include ongoing livestock grazing and related actions, wild ungulate (elk) grazing, recreation, roads, the introductions of fish and other aquatic organisms, habitat improvement projects, and drought-related rescue operations.

Effects to Chiricahua leopard frogs from livestock grazing can be mixed, but it is generally thought that well-managed grazing can be compatible with the maintenance of leopard frog populations (USDI 2002). However, adverse effects to frog habitat at stock tanks may occur when heavy use in an area causes deterioration of watershed condition which results in erosion, siltation, and/or trampling of aquatic vegetation. Direct loss of eggs and/or tadpoles through trampling can also occur. In October 2004, livestock were removed from the Fossil Creek Grazing Allotment due to poor watershed conditions, exacerbated by drought. Of the 20 sites that the Forest Service collected soil data from in 2004, 17 were considered impaired, two were considered unsatisfactory, and one site was considered satisfactory (Summary of FY04 Soil Condition Assessments, Red Rock Ranger District, 2004). To help with this problem, the Fish and Wildlife Service purchased erosion mats to help minimize the effects of sedimentation on the Sycamore Basin Chiricahua leopard frog site. The Forest Service installed these mats at the tank in the spring of 2005. It is hoped that these seeded mats will trap soil, aid in the establishment of vegetation, and reduce sedimentation into the tanks. The AGFD has also obtained a Heritage Grant to help fund more habitat improvement projects for leopard frogs in the Buckskin Hills.

In addition to impacts from ungulate use and drought, recreation use is increasing rapidly within the area. Campers and off-road vehicles can cause soil compaction, reduce riparian vegetation, and reduce infiltration. Roads may adversely impact riparian habitat directly and indirectly (alteration of stream flow, timing of peak flows, increased sedimentation, etc.), and provide access to people which facilitates the introduction of non-native fish and crayfish. Non-native fish, frogs, and crayfish prey on eggs, tadpoles, and occasionally adult leopard frogs. Crayfish may also affect the habitat by impacting aquatic and riparian vegetation along streams, potentially destroying habitat for the Chiricahua leopard frog. Recreationists and their animals can also spread chytrid fungus. The potential change in the level and season of road use could impact Chiricahua leopard frogs and their habitat by increasing the potential for the spread of non-native organisms, the spread of chytrid infected mud from one tank to another, and result in increased disturbance to frogs/habitat when people drive/walk around the tanks.

During the spring of 2005, the Fish and Wildlife Service and AGFD used the piscicide Rotenone® to remove non-native green sunfish (*Lepomis cyanellus*) and goldfish (*Carassius auratus*) from Divide, Middle, Black/Peak, Antelope, Mack's No. 2, and Soldier Mesa stock tanks. The removal of these non-native species from these tanks will allow for Chiricahua leopard frogs to be re-introduced to some of these tanks and will minimize the movement of fish to other tanks and Fossil Creek.

In 2002, volunteers and AGFD staff captured and removed over 11,000 crayfish from 8 livestock tanks in Mud Tanks Draw, within and just east of the project area. Crayfish were removed from Divide, Contractor, Tanque Aloma, and Mud Tank #2. All of these tanks have supported

“satellite” populations of Chiricahua leopard frogs in the past. AGFD personnel also performed a mark-recapture study to examine the effect of crayfish removal on crayfish populations and movement. It is uncertain if the project will have a long-term deleterious effect on crayfish populations, but in the short-term it reduced the numbers of crayfish at several tanks.

## **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.

The delineation of the Mail Trail and the establishment of the trailhead will have no direct effects to either the Chiricahua leopard frog or its habitat in the Buckskin Hills area. There will be no alteration of any stock tanks or drainages as a result of the trail designation and associated construction. However, the proposed action may result in indirect effects to the Chiricahua leopard frog and its habitat if trail users detour off the trail and travel to area tanks. An increase in recreational use at the area tanks increases the threat of the introduction/relocation of non-native fish, crayfish, and bullfrogs; the spread of chytrid fungus; and, destruction of aquatic habitat.

Non-native crayfish and fish have been introduced by people into several tanks in the Buckskin Hills area. The public sometimes intentionally introduces these species to provide angling opportunities or to maintain a bait supply for fishing in other areas. The Fish and Wildlife Service and AGFD have suspected for quite some time that Divide Tank is being used to grow bait (green sunfish) by an unknown person in Camp Verde, Arizona. The tank has dried several times, killing all of the fish present, and yet it is re-stocked each time it fills. Both crayfish and green sunfish are highly predaceous on Chiricahua leopard frog eggs and tadpoles and it is well-documented that the frog cannot co-exist with these species. The delineation of the Mail Trail may increase recreational use in the area, increasing the potential for people to move non-native species in from other areas or between tanks.

Increasing the number of people and animals in the area may also increase the potential for spreading the chytrid fungus from tank to tank. As hikers, hunters, and equestrians visit various area tanks, mud transferred from one tank to another (on boots, hooves, or other gear) has the potential to move this fungus throughout the area. As described in the Status of the Species and the Environmental Baseline, chytrid fungus can be lethal to Chiricahua leopard frogs. We have conducted insufficient testing on tiger salamanders, canyon tree frogs, and leopard frogs in the area to know where chytrid fungus may be present.

The increased use of the area tanks may also result in disturbance impacts to frogs and their habitat. Equestrians, hunters, and hikers accessing water can modify and destroy aquatic vegetation that is important hiding cover for frogs and attachment surfaces for egg masses. The presence of people and horses can also result in disturbance to adult animals. Frogs tend to avoid predators (and people and animals) by jumping into the water. Though this protects the frog, it also reduces the time they have to spend foraging. If disturbance is frequent enough, it could result in reduced fitness in some individuals. There is also the potential for people and horses to unintentionally step on egg masses when horses are watered and/or allowed to cool-off in the tanks.

Frog populations within the Buckskin Hills area are small, dynamic habitats (appearing and disappearing due to drought and other causes). This has resulted in a relatively low probability of long-term population persistence in this area without extensive management. Therefore, as the numbers of occupied sites has declined and these sites have become more isolated, the possibility that one introduction on a non-native predator or the spread of disease could eliminate the entire population has significantly increased.

Conservation measures adopted by the Forest Service will help to minimize these indirect effects. Educational signage, removing critical tanks from trail maps and designating a water source for horses (Powerline Tank), should help in keeping people on the Mail Trail and creating other routes into occupied frog habitat.

## **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 biological opinion. 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. Future actions within the project area that are reasonably certain to occur are the potential for continued unwanted introductions of non-native organisms (crayfish, fish, and bullfrogs) to the area either through human introduction or, in the case of crayfish, movement across the landscape. However, because of the predominant occurrence of Chiricahua leopard frogs (in this portion of their range) on Federal lands in this area, and because of the role of the respective Federal agencies in administering frog habitat, actions to be implemented in the future by non-Federal entities on non-Federal lands are considered to be of minor impact to the Buckskin Hills area Chiricahua leopard frog population.

## **CONCLUSION**

After reviewing the current status of the Chiricahua leopard frog, the environmental baseline for the action area, the effects of the proposed action and the cumulative effects, it is our biological opinion that implementation of the Historic Mail Trail Project will not likely jeopardize the continued existence of the Chiricahua leopard frog. No critical habitat has been designated for this species; therefore, none will be affected.

We present these conclusions for the following reasons:

1. The proposed action will not directly result in the loss of any individual Chiricahua leopard frogs or leopard frog habitat. In addition, the proposed trail is >1.0 mile from the nearest currently occupied site.
2. The Forest Service has adopted conservation measures that will significantly reduce the potential for indirect effects to Chiricahua leopard frogs from the proposed action through education (interpretive signing), avoidance (moving the trail and designating a “safe” water source for equestrians), and designating the trail for non-motorized use only.

The conclusions of this biological opinion are based on full implementation of the project as described in the Description of the Proposed Action section of this document, including any Conservation Measures that were incorporated into the project design.

### **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.

Using available information as summarized within this document, we have identified conditions of possible effects to Chiricahua leopard frogs associated with implementation of the Historic Mail Trail Project within the Buckskin Hills Conservation Management Area. However, based on the best available information concerning the Chiricahua leopard frog, habitat needs of the species, the project description, and information furnished by the Forest Service, we do not believe that the designation of the Historic Mail Trail and the predicted level of increased recreation use within the Buckskin Hills Conservation Management Area is reasonably certain to effect leopard frogs to the point where incidental take occurs. We believe that the Forest Service has incorporated conservation measures that will minimize adverse effects to Chiricahua leopard frogs within the area.

**Amount or Extent of Take Anticipated**

We do not anticipate that incidental take is reasonably certain to result from the proposed action.

**CONSERVATION RECOMMENDATIONS**

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

1. We recommend that the Forest Service continue to work with the Fish and Wildlife Service and the AGFD to implement habitat restoration actions within the project area to benefit Chiricahua leopard frogs. This should include actions that improve soil and watershed condition at stock tanks within the Buckskin Hills Conservation Management Area.
2. We recommend that the Forest Service work with the Fish and Wildlife Service and the AGFD to re-introduce Chiricahua leopard frogs to stock tanks within the Buckskin Hills Conservation Management Area.
3. We recommend that the Forest Service continue to work with the Fish and Wildlife Service and AGFD to educate the public regarding the spread of non-native organisms and chytrid fungus.
4. We recommend that the Forest Service obtain funding to conduct and implement a new Allotment Management Plan for the Fossil Creek Grazing Allotment.

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

**REINITIATION NOTICE**

This concludes 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.

We appreciate the Forest Service's efforts to identify and minimize effects to listed species from this project. For further information please contact Shaula Hedwall (x103) or Brenda Smith (x101) of our Flagstaff Suboffice at (928) 226-0614. Please refer to the consultation number, 02-21-04-F-0103, in future correspondence concerning this project.

Sincerely,

/s/ Steven L. Spangle  
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)  
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ  
Regional Supervisor, Arizona Game and Fish Department, Flagstaff, AZ  
Jim Rorabaugh, Fish and Wildlife Service, Phoenix, AZ

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