United States Department of the Interior
U.S. Fish and Wildlife Service
Arizona Ecological Services Field Office
2321 West Royal Palm Road, Suite 103
Phoenix, Arizona 85021-4951
Telephone: (602) 242-0210 Fax: (602) 242-2513

In Reply Refer to:
AESO/SE
22410-2007-F-0198

April 6, 2009

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

RE: Hackberry and Pivot Rock Range Allotment Management Plans

Dear Ms. Rasure:

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 July 24, 2008, and received by us on July 25, 2008. We received additional information we requested from you on November 5 and 24, 2008. This consultation concerns the possible effects of the proposed livestock grazing and management activities on the Hackberry and Pivot Rock Range Allotments (HPRAs) located on the Red Rock and Mogollon Rim Ranger Districts in Yavapai and Coconino Counties, Arizona. The Forest Service has determined that the proposed action may affect the threatened Chiricahua leopard frog (*Lithobates {=Rana} chiricahuensis*) (CLF) and the threatened Little Colorado spinedace (*Lepidomeda vittata*) and its critical habitat.

You also requested our concurrence that the proposed project may affect, but is not likely to adversely affect, the threatened bald eagle (*Haliaeetus leucocephalus*), threatened Mexican spotted owl (*Strix occidentalis lucida*) (MSO) and its critical habitat, endangered Southwestern willow flycatcher (*Empidonax traillii extimus*) (SWWF), endangered Yuma clapper rail (*Rallus longirostris yumanensis*), Verde River experimental, nonessential population of Colorado pikeminnow (*Ptychocheilus lucius*), endangered desert pupfish (*Cyprinodon macularius*), endangered Gila topminnow (*Poeciliopsis occidentalis occidentalis*), threatened loach minnow (*Tiaroga cobitis*), threatened spikedace (*Meda fulgida*), and endangered razorback sucker (*Xyrauchen texanus*) and its critical habitat. Additionally, the Forest determined that the proposed project is not likely to jeopardize candidate yellow-billed cuckoo (*Coccyzus americanus*) and candidate headwater chub (*Gila nigra*). We concur with your determinations. The basis for our concurrences is found in Appendix A.

You also determined that the proposed action would result in "no effect" to SWWF critical habitat. "No effect" determinations do not require review from the FWS, and are not addressed further.

This biological opinion is based on information provided in the original July 24, 2007, Biological Assessment and Evaluation (BAE), the November 5 and 24, 2007, amendments to the BAE, the April 11, 2008, Draft Environmental Assessment (EA), meetings, 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 species addressed 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. Summary of Consultation History

Date	Event
August 14, 1996	We prepared a draft jeopardy biological opinion (2-21-92-F-503) on the effects of the use of the Buck Springs, Hackberry-Pivot Rock, and Bar-T-Bar Allotments through 2004 on the Little Colorado spinedace. This opinion was never finalized because the proposed action was changed.
March 8, 1997	The Coconino National Forest met with the FWS and requested that the project under consultation be modified to cover only the 1997 livestock grazing season.
May 6, 1997	We issued a non-jeopardy/non-adverse modification biological opinion for on-going livestock grazing on the Buck Springs Allotment and HPRAs for the 1997 livestock grazing season.
June 2002 to present	Ongoing discussions, meetings, and on-the-ground work have occurred with the FWS, Arizona Game and Fish Department (AGFD), Forest Service, and livestock permittee regarding livestock grazing and listed species management on the HPRAs.
September 30, 2002	We issued a biological opinion analyzing the effects to spikedace and loach minnow critical habitat on eight allotments and one sheep driveway on the Coconino National Forest. This opinion included the HPRAs.
October – November 2004	Fossil Creek Native Fish Restoration Project implemented.
March 2005	Six stock tanks within Fossil Creek Range Allotment and HPRAs treated by FWS to remove non-native fish.
November 14, 2006	The Forest Service initiated National Environmental Policy Act (NEPA) analysis for the HPRAs.
March 7, 2008	The Forest Service requested comments regarding the Fossil Creek Range Allotment (FCRA) EA.
April 7, 2008	We provided our comments on the FCRA EA to the Forest Service. We provided comments requesting that the Forest Service not include trailing of livestock across the FCRA in the HPRAs proposed action.
April 11, 2008	The Forest Service released the HPRAs EA.

Spring – Summer 2008	We had much discussion with Forest Service staff and leadership regarding the proposed management of HPRAs and trailing of livestock across the FCRA.
June 18, 2008	We sent a letter to the Forest Service requesting additional coordination and discussion of livestock management on the FCRA and HPRAs.
July 24, 2008	The Forest Service requested formal consultation for potential adverse affects to the CLF and Little Colorado spinedace resulting from implementation of the HPRAs Allotment Management Plan (AMP).
August 8, 2008	We acknowledged your request for formal consultation with a 30-day letter. In this letter we also requested additional information regarding two candidate species.
August 25, 2008	We received your August 22, 2008, response to our letter.
November 5, 2008	We received the information we requested in our August 8, 2008, letter regarding the candidate yellow-billed cuckoo.
November 24, 2008	We received the information we requested in our August 8, 2008, letter regarding the candidate headwater chub.

DESCRIPTION OF THE PROPOSED ACTION

The Forest Service proposes to issue a grazing permit to authorize livestock grazing on the HPRAs. The HPRAs are two separate allotments geographically separated from each other, but are currently administered under one grazing permit as a yearlong grazing operation. The area within the two allotment boundaries is referred to as the project area in the EA and BAE. The purpose of the project is to authorize livestock grazing in a manner that maintains and/or moves the area toward Forest Plan objectives and desired future conditions. There is a need for change from the current management as the allotment is not meeting or moving toward desired conditions in an acceptable timeframe. Specific desired conditions that are not being met include: soil condition, vegetation condition, and riparian and wildlife habitat conditions at certain earthen stock tanks, springs, and creeks.

The Hackberry Allotment is located on the Red Rock Ranger District approximately 10 miles southeast of Camp Verde and is roughly bounded by Highway 260 on the north and the Verde River on the south (BAE, page 74). This allotment lies within the Fossil Creek and Verde River watersheds. Elevations run from approximately 3,000 feet to 5,900 feet, and vegetation adheres to typical elevation regimes: ponderosa pine stringers are present at the highest elevations, pinyon-juniper woodlands and chaparral dominate mid-elevations, and semi-desert grasslands/desert scrub vegetation types are typical at the lower elevations. The allotment is approximately 24,300 acres in size and is divided into 16 main grazing pastures. The allotment also includes several small livestock management pastures and waterlots that are each less than 100 acres in size.

The Pivot Rock Allotment is located on the Mogollon Rim Ranger District and is roughly bisected by Forest Highway 3 (Lake Mary Road) in the northeast, State Route 87 through the midsection and State Route 260 through the western portions of the allotment (BAE, page 76). The allotment is located within the Fossil Creek and East Clear Creek watersheds. Elevations run

from approximately 6,200 feet to 8,000 feet, and vegetation adheres to typical elevation regimes. The allotment is approximately 54,300 acres in size and is divided into 23 main grazing pastures. The allotment also includes several small livestock management pastures and waterlots that are each less than 100 acres in size.

The action area for this project is defined as all areas affected directly or indirectly by the Federal action. Thus, the action area is larger than the boundaries of the proposed project because impacts may be carried downstream with flows and may also affect upstream areas. Watersheds and subwatersheds are comprised of numerous interconnected upland and riparian areas that function together as an ecological unit. Therefore, for the Hackberry Allotment we are defining the action area as including the portion of Fossil Creek from Cimarron Creek down to the confluence with the Verde River, and the Verde River from Beasley Flat to approximately one mile downstream of the confluence. The action area includes the 100-year floodplain of the Verde River and Fossil Creek. Included within this action area are all tributaries of Fossil Creek originating on the Coconino National Forest within the allotment boundary and the uplands that drain into these tributaries and Fossil Creek. For the Pivot Rock Allotment the action area includes portions of the headwaters of Fossil Creek, West Clear Creek from the confluence with Meadow Canyon upstream to its headwaters (including a small portion of the headwaters of Willow Valley), and a significant portion of East Clear Creek (from the Verde/Little Colorado River divide east to Hi Fuller Canyon and its eventual confluence with C.C. Cragin Reservoir). Please see the maps included with the EA (pages 12 and 14) for details regarding these specific locations. The consultation covers a period of 10 years.

The Red Rock and Mogollon Rim Ranger Districts propose to implement the "No Trailing Alternative" (not described in the HPRAs EA, but only in the BAE) for reauthorizing livestock grazing on the HPRAs. The proposed action is referred to as the "No Trailing Alternative" in the BAE as it does not include the trailing of livestock associated with the HPRAs across the FCRA. The proposed action consists of the following components: Authorization, Improvements, Monitoring, Adaptive Management, and Mitigation. These components are described in more detail below. The proposed action follows current guidance from Forest Service Handbook 2209.13, Chapter 90 (Grazing Permit Administration; Rangeland Management Decision making, February 2004).

Authorization

The Coconino National Forest proposes to continue to authorize livestock grazing on the HPRAs under the following terms:

Hackberry Allotment

Permitted livestock numbers for the Hackberry Allotment would be a maximum of 3,650 Animal Unit Months (AUMs) in the No Trailing alternative. This represents the maximum number of AUMs that can be supported during times of favorable climate once the desired conditions for vegetation and soil have been reached. Current conditions would not support this level of grazing and livestock numbers would be authorized at a lower level until such time as conditions improve. Annual authorized livestock numbers would be based on existing conditions, available water and forage, and predicted forage production for the year. Adjustments to the annual authorized livestock numbers (increase or decrease) may occur during the grazing year, based on

conditions and/or range inspections. The EA provides measures that would meet the desired future conditions, but not specific triggers that would result in adjustments to the annual operating instructions.

The typical season of use would be five months (from December 1 – April 30), but may be extended to six months if necessary to achieve management objectives. At the proposed maximum permitted AUMs (3,650), this equates to 730 Animal Units (AUs) for the 5 month season of use. If the season of use is extended, the proposed maximum permitted AUMs (3,650) would not be exceeded. Livestock grazing would occur through a rotational management system (either deferred or deferred, rest-rotation grazing) which would allow for plant growth and recovery.

Forage utilization (as measured at the end of the growing season) would be employed to maintain or improve rangeland vegetation and long term soil productivity. The EA states that grazing utilization would be managed at 30-40% forage utilization. Within riparian areas (Management Area 12 – Riparian and Open Water), utilization would not exceed 20% on the woody vegetation.

Grazing intensity is defined as the amount of herbage removed through grazing or trampling during the grazing period. Grazing intensity would be managed to allow for the physiological needs of plants. Generally, grazing intensity would be managed for 40-50% in the winter and 30-40% in the spring, with reductions as needed (per Table 7, EA page 9).

The grazing period within each pasture would be based upon weather/climate conditions, current growing conditions and the need to provide for plant re-growth following grazing. The length of the grazing period within each pasture would also consider and manage for the desired grazing intensity and utilization guidelines. The grazing period per pasture would generally not exceed 60 days during the winter use period (December 1 – February 28) and 30 days during the spring use period. (March 1 – June 30).

Generally pastures would be grazed only once during the grazing year. However, if the need arises to provide rest (or deferment) for other pastures, a pasture may be used twice provided there has been sufficient vegetative growth/re-growth and grazing is managed within the intensity and utilization guidelines. Livestock use would be deferred in the Teepee pasture due to unsatisfactory soil conditions and the need to determine the effects of livestock exclusion on soil condition recovery. This pasture would be deferred from livestock grazing for a minimum of 10 years.

To protect and enhance woody riparian vegetation, pastures with riparian areas (Management Area 12, perennial and intermittent streams, springs and seeps) that are grazed during the critical growth period for woody riparian species (March 1 – April 30) one year would not be grazed during the critical growth period the following year. Pastures that have these types of riparian areas include: Basin, Bull Run, Doren, Hackberry, Pambo, Phroney, and Lower, Middle and Upper Towel. When livestock exclosure fences are constructed at spring/seep riparian areas (as identified under "Improvements" below), alternate year livestock deferment during the critical growth period would no longer be necessary.

Pivot Rock Allotment

Permitted livestock numbers for the Pivot Rock Allotment would be a maximum of 4,650 AUMs in the No Trailing alternative. This figure represents the maximum number of AUMs that can be supported during times of favorable climate once the desired conditions for vegetation and soil have been reached. Current conditions would not support this level of grazing and livestock numbers would be authorized at a lower level until such time as conditions improve. Annual authorized livestock numbers would be based on existing conditions, available water and forage, and predicted forage production for the year. Adjustments to the annual authorized livestock numbers (increase or decrease) may occur during the grazing year, based on conditions and/or range inspections.

The typical season of use would be seven months (May 1 – November 30). At the proposed maximum permitted AUMs (4,650), this equates to 664 AUs for the seven month season of use. The season of use may be reduced to six months if necessary to achieve management objectives. If the season of use is reduced, the proposed maximum permitted AUMs (4,650) would not change.

Livestock grazing would occur through a rotational management system (either deferred or deferred, rest-rotation grazing) which would allow for plant growth and recovery. The livestock movement between Pivot Rock and Hackberry Allotments would be completed using vehicles to transport the livestock and livestock would not be trailed across the FCRA as has been done in the past.

Forage utilization (as measured at the end of the growing season) would be employed to maintain or improve rangeland vegetation and long term soil productivity. The EA states that grazing utilization would be managed at 30-40% forage utilization. Within riparian areas (Management Area 12 – Riparian and Open Water), utilization would not exceed 20% on the woody vegetation.

Grazing intensity is defined as the amount of herbage removed through grazing or trampling during the grazing period. Grazing intensity would be managed to allow for the physiological needs of plants. Generally, a moderate grazing intensity (40-50%) would be managed for in the spring and early summer months when sufficient opportunity exists for plant re-growth. During the late summer and fall, grazing intensity would be managed at conservative levels (30-40%) when the potential for plant re-growth is limited.

The grazing period within each pasture would be based upon weather/climate conditions, current growing conditions, and the need to provide for plant re-growth following grazing. The length of the grazing period within each pasture would also consider and manage for the desired grazing intensity and utilization guidelines. The grazing period per pasture would generally not exceed 30 days during the spring use period (March 1 – June 30), and 45 days during the summer/fall use period (June 1 – November 30).

Generally pastures would be grazed only once during the grazing year. However, if the need arises to provide rest (or deferment) for other pastures, a pasture may be used twice provided there has been sufficient vegetative growth/re-growth and grazing is managed within the intensity and utilization guidelines. Livestock grazing would be deferred from the following pastures as part of the proposed action:

- Kehl Pasture: Livestock grazing would be deferred from the Kehl pasture until desired conditions in the headwater meadow/riparian areas are achieved. The primary stressor in these important areas is over-utilization by wild ungulates (principally elk according to the BAE). Until wild ungulate grazing is reduced, the ability for these areas to improve in condition is limited. As a result, it is anticipated that long-term livestock deferment from this pasture would be necessary.

- Miller Pasture: Livestock grazing would be deferred in the Miller pasture until the existing electric fence that separates Miller and Kehl pastures is reconstructed with a standard 4-strand barbwire fence.

- Potato South Pastures: Livestock grazing would be deferred in the Potato South pasture until a livestock/wildlife exclosure is constructed at Cienega Draw.

Improvements

The following structural improvements are included as part of the proposed action:

Hackberry Allotment

1. Livestock exclosure fencing would be constructed at the following spring/seep riparian areas: Grapevine Spring (Bull Run pasture), Towel Creek Perennial Pool (Middle Towel pasture), and Wet Prong Spring (Middle Towel pasture). Exclosure fencing would be designed and constructed to protect the important riparian areas while still providing for livestock watering.

2. Lower authorized number of livestock combined with pasture rotation schedules are expected to reduce livestock grazing in sensitive areas and allow riparian conditions to improve. However, livestock exclosure fencing may be constructed at additional spring/seep riparian areas if desired conditions are not achieved through the control of livestock grazing. Exclosure fencing would be designed and constructed to protect the important riparian areas while still providing for livestock watering. Pastures with springs or seeps include: Basin, Bull Run, Doren, Hackberry Springs, Pambo, Phroney, and Lower, Middle and Upper Towel.

Pivot Rock Allotment

1. Construct approximately 1.7 miles of new 3-strand barbwire fence in the Bald pasture. This fence would create the North and South Bald pastures and would improve grazing management by improving the timing, intensity, frequency and duration of livestock grazing. This fence would be constructed in accordance with wildlife specifications.

2. If necessary to improve vegetation and soil conditions, construct approximately 3.5 miles of new 3-strand barbwire fence in the Tom's Creek pasture. This fence would create the North and South Tom's Creek pastures and would improve grazing

management by improving the timing, intensity, frequency and duration of livestock grazing. This fence would be constructed in accordance with wildlife specifications.

3. The existing 2-wire electric fence that separates Miller and Kehl pastures is no longer functional and would be reconstructed with a standard 4-strand barbwire fence. This fence would be constructed in accordance with wildlife specifications.

4. Construct a new livestock/wildlife exclosure at Cienega Draw in the Potato South pasture to protect important riparian habitat.

5. If necessary to facilitate livestock pasture movement, construct a small (5-10 acre) holding/gathering pasture in the West Bed Bug pasture. This holding/gathering pasture may be constructed either in the northeast corner of the West Bed Bug pasture or near Cart Cabin Tank in the center portion of the West Bed Bug pasture. This fence would be constructed in accordance with wildlife specifications.

Monitoring

Two types of rangeland monitoring would be used, implementation and effectiveness monitoring. Implementation monitoring would be conducted on an annual basis and would include: livestock actual use data, grazing intensity evaluations during the grazing season (within key areas), utilization at the end of the growing season (within key areas), and visual observation of vegetation and ground cover trends.

Effectiveness monitoring to evaluate the success of management in achieving the desired objectives would occur within key areas on permanent transects at an interval of 10 years or less. Effectiveness monitoring may also be conducted if data and observations from implementation monitoring (annual monitoring) indicate a need. Two to three years of initial baseline monitoring would occur. Initial baseline effectiveness monitoring has occurred in 2006 and 2007.

Both qualitative and quantitative monitoring methods would be used in accordance with the Interagency Technical References, and the Region 3 Rangeland Analysis and Management Training Guide, and the Region 3 Allotment Analysis Handbook (USDA – Forest Service 1997). See the BAE, Appendix B, Monitoring and Adaptive Management for further information on the proposed rangeland monitoring.

Adaptive Management

The proposed action includes adaptive management, which provides a menu of management options that may be needed to adjust management decisions and actions to meet desired conditions as determined through monitoring. If monitoring indicates that desired conditions are not being achieved, management would be modified in cooperation with the permittee. Adaptive management allows the Forest Service to adjust the timing, intensity, frequency and duration of grazing; the grazing management system, and livestock numbers. If the Forest Service determines that adjustments are needed, changes would be implemented through the Annual Operating Instructions (AOI). Adaptive management would also allow for the construction of rangeland improvements if they have been identified and are determined, through monitoring, to be necessary for achieving desired conditions.

Conservation Measures

Range Management

- The Forest Service proposes during drought conditions, and in periods of drought recovery, to adjust grazing timing, intensity, frequency, numbers, and the management system as necessary to protect the upland vegetation resource.

Soil, Watershed and Fisheries Resources

- If woody riparian vegetation utilization exceeds 20% for two consecutive grazing periods, riparian sites would be fenced prior to the next graze period. Fencing would better maintain riparian vegetation and maintain age-class distribution of woody riparian vegetation.

- Utilize the Forest Drought policy to manage utilization levels and stocking during and immediately following drought. When implemented, this would minimize the effects of drought thereby reducing soil erosion and maintaining soil productivity and water quality and improving plant production.

Noxious and Invasive Weeds

- A weeds assessment and inventory was completed for this analysis. Weeds species of concern in the allotment would be treated as necessary following guidelines in the "Final Environmental Impact Statement for Integrated Treatment of Noxious or Invasive Weeds" (USDA 2005).

- Identify and treat noxious or invasive weed populations that may occur in areas of proposed structural improvements and mitigate impacts to threatened, endangered and Region 3 Regional Forester's sensitive (TES) plants by reducing the risk of noxious or invasive weed infestations in populations or habitats.

Wildlife, Fisheries, and Rare Plants

- Prior to construction of the proposed structural improvements, survey areas for TES plants and noxious or invasive weeds. Identify populations and mitigate impacts of management actions if needed.
- Avoid TES plants during the construction of structural improvements.
- All open storage tanks and drinkers would be constructed with entry and escape ramps for wildlife.
- In order to minimize the risk for introducing and spreading disease among aquatic systems, approved protocols would be followed when conducting work in earthen livestock tanks. This protocol would be attached to the AOI.
- Biologists would be given at least 60 days notice prior to conducting work in earthen tanks. This notice would allow for surveys, if needed, and/or mitigation to reduce adverse affects to amphibians.
- Fences would be constructed to meet wildlife standards.
- Certain water bodies are deemed important for wildlife use. It is important that a sufficient amount of water be left for wildlife after domestic livestock have been removed from the grazing unit. Within the Hackberry Allotment, the following water bodies would be managed to provide water for wildlife: Big Willow Spring, Keg Spring, Cedar Spring,

Grapevine Spring, Doren's Defeat Spring, Hackberry Springs, Wet Prong Spring, Towel Creek Perennial Pool, Partnership Tank, Phroney Spring and Pipeline Drinker. Within the Pivot Rock Allotment, the following waters would be managed to provide water for wildlife: Fuller Tank, Dry Lake Tank, Various natural springs in the Huffer Pasture and Toms Creek Pasture, Miller Canyon, Lee Johnson Spring.

STATUS OF THE SPECIES

Chiricahua leopard frog

We listed the CLF as a threatened species without critical habitat on June 13, 2002 (USFWS 2002). We 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. A recovery plan was completed in April 2007 (USFWS 2007). This frog is distinguished from other members of the *Lithobates pipiens* complex by a combination of distinctive morphological and genetic characters, and a distinctive call (Platz and Mecham 1979, Davidson 1996, Stebbins 2003). Threats to CLF include predation by nonnative organisms, especially bullfrogs (*Lithobates catesbeiana*), fish (including fish in the family Centrarchidae, such as *Micropterus* spp. and *Lepomis* spp.), and crayfish (*Orconectes virilis* and possibly others); disease; drought; floods; degradation and loss of habitat as a result of water diversions and groundwater pumping, improper livestock management, altered fire regimes due to fire suppression and livestock grazing, mining, development, and other human activities; disruption of metapopulation dynamics; increased chance of extirpation or extinction resulting from small numbers of populations and individuals; and environmental contamination. CLF has disappeared from more than 75 percent of its historical localities (Clarkson and Rorabaugh 1989, Jennings 1995, Rosen *et al.* 1996, Sredl *et al.* 1997, Painter 2000, FWS files). 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).

The CLF is an inhabitant of cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,281 to 8,890 feet in central and southeastern Arizona; west-central and southwestern New Mexico; and in Mexico, northern Sonora, and the Sierra Madre Occidental of Chihuahua (Platz and Mecham 1984, Degenhardt *et al.* 1996, Sredl *et al.* 1997, Sredl and Jennings 2005). In New Mexico, of sites occupied by CLFs from 1994-1999, 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 all known historical localities are natural lotic systems, a little less than half are stock tanks, and the remaining locations are lakes and reservoirs (Sredl *et al.* 1997). Sixty-three percent of populations extant in Arizona from 1993-1996 were found in stock tanks (Sredl and Saylor 1998).

Northern populations of the CLF 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 analyses support describing the northern populations as a distinct species (Benedict and Quinn 1999, Platz and Grudzien 1999, Goldberg *et al.* 2004). Goldberg *et al.* (2004) present evidence that *L. subaquavocalis* (Ramsey Canyon leopard frog) and *L. chiricahuensis* may be conspecific.

The species is still extant in most major drainages in Arizona and adjacent areas of New Mexico where it occurred historically, with the exception of the Little Colorado River drainage in Arizona and possibly the Yaqui drainage in New Mexico (Painter 2000, Sredl *et al.* 1997, FWS files). However, it has not been found recently in many rivers, valleys, and mountain ranges, including the following in Arizona: White River, West Clear Creek, Tonto Creek, Verde River mainstem, San Francisco River, 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 mountain ranges or valleys: Pinaleno Mountains, Peloncillo Mountains, Sulphur Springs Valley, and Huachuca Mountains. Moreover, the species is now absent from all but one of the southeastern Arizona valley-bottom cienega complexes. In many of these regions, CLFs were not found for a decade or more despite repeated surveys. Recent surveys suggest that the species may have recently disappeared from some of the major drainages in New Mexico (R. Jennings, pers. comm. 2004).

Disruption of metapopulation dynamics is likely an important factor in regional loss of populations (Sredl *et al.* 1997, Sredl and Howland 1994). CLF populations are often small and habitats are dynamic, resulting in a relatively low probability of long-term population persistence.

The dispersal abilities of CLFs are key to determining the likelihood that suitable habitats will be colonized from a nearby extant population. Evidence exists to show substantial movements of leopard frogs and passive movement of tadpoles along stream courses. Current guidance supported by scientific literature suggests dispersal of CLF can be up to one mile overland, three miles within intermittent drainages, and five miles within perennial drainages. Dispersal of this species is largely thought to occur during the summer monsoon.

Within the last decade, a chytridiomycete skin fungus (*Batrachochytrium dendrobatidis*) has been recognized as an important contributor to global declines of frogs, toads, and salamanders (Speare and Berger 2000, Longcore *et al.* 1999, Berger *et al.* 1998, Daszak 2000, Hale 2001). The amphibian chytrid 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 bullfrog 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 amphibian chytriodiomycosis infections have been found in southern Arizona (Bradley *et al.* 2002). Other native or nonnative frogs may serve as disease vectors or reservoirs of infection, as well (Bradley *et al.* 2002). If amphibian chytrid fungus was introduced to the Southwest via escaped or released African clawed frogs, then the disease may have spread across the landscape by human introductions or natural movements of secondarily-infected American bullfrogs, tiger salamanders, leopard frogs, or other anurans.

Amphibian chytrid fungus could also be spread by people (and terrestrial animals) moving among various tanks and/or by personnel sampling aquatic habitats (Halliday 1998). The fungus can exist in water or mud and could be spread by wet or muddy boots, vehicles, cattle, and other animals moving among aquatic sites, or during scientific sampling of fish, amphibians, or other aquatic organisms.

Numerous studies indicate that declines and extirpations of CLFs are at least in part caused by predation and possibly competition by nonnative organisms, including fish in the family Centrarchidae, bullfrogs, tiger salamanders (*Ambystoma tigrinum mavortium*), crayfish, and several other species of fish (Fernandez and Rosen 1996 and 1998, Rosen *et al.* 1994 and1996, Snyder *et al.* 1996, Fernandez and Bagnara 1995, Sredl and Howland 1994, Clarkson and Rorabaugh 1989).

The Recovery Plan for CLF (USFWS 2007) delineated eight recovery units (RUs) in key areas that were targeted as valuable in the recovery of this species. The action area for this proposed action lies within RU 5, which lies above and below the western and central portions of the Mogollon Rim of Arizona. On the west, it is bordered by the Verde River southeast of Camp Verde, to the north the boundary is roughly along the interface between the forested mountains and the grasslands and pinyon-juniper woodlands of the Colorado Plateau. On the east RU 5 terminates at the border of RU6, where elevations rise into the White Mountains. The boundary on the south is based roughly on where elevations drop below about 4,000 feet, which corresponds to the presumed lower limit of the frog's distribution in the RU. The vegetation communities of RU5 are primarily ponderosa and mixed conifer forest, and pinyon-juniper at the lower elevations. Land management is primarily by the San Carlos and White Mountain Apache Tribes, and portions of the Tonto, Coconino, and Apache-Sitgreaves National Forests.

Historically, there are records of CLF scattered across the western and southern portions of the RU. The relative lack of localities compared to RUs 6-8 may in part reflect a lack of historical survey data, but is also probably a reflection of the relatively dry nature of much of RU5. Today, the species is confirmed present at only one livestock tank in the Buckskin Hills area of the Coconino National Forest (Fossil Creek drainage) and on the Tonto National Forest in the Cherry and Couch Creek area near Young, and at Ellison Creek.

Additional information about the CLF can be found in Painter (2000), Sredl *et al.* (1997), Jennings (1995), Degenhardt *et al.* (1996), Rosen *et al.* (1994, 1996), Sredl and Howland (1994), Platz and Mecham (1979, 1984), Sredl and Jennings (2005), and USFWS (2007).

Given the range of this species, several Federal actions affect this species every year. A complete list of all consultations affecting this species can be found on our website (http://www.fws.gov/southwest/es/arizona/) by clicking on the "Document Library" tab and then on the "Section 7 Biological Opinions" tab. Survey work and recovery projects also occur periodically, and are summarized in the appropriate land-management agency, FWS, or AGFD documents, as well as in the BAE associated with this project.

Little Colorado spinedace

The Little Colorado spinedace was listed as threatened with critical habitat designated on October 16, 1987 (USFWS, 1987). Threats were identified as habitat alteration and destruction, predation by and competition with non-native aquatic organisms, and recreational fishery management. Forty-four stream miles of critical habitat were designated: 18 miles of East Clear Creek immediately upstream and 13 miles downstream from C.C. Cragin Reservoir (formerly called Blue Ridge Reservoir) in Coconino County; eight miles of Chevelon Creek in Navajo County; and five miles of Nutrioso Creek in Apache County. Constituent elements of critical

habitat consist of clean, permanent flowing water with pools and a fine gravel or silt-mud substrate.

In November 2008, the FWS posted our completed five year status review for the spinedace (USFWS 2008) (located at http://www.fws.gov/southwest/es/arizona/Little.htm). The recommendation in the status review is to up-list the spinedace from threatened to endangered status due to the declining population and significant threats affecting the species and its habitat within the foreseeable future.

The spinedace is a small (about 4-inch) minnow native to the Little Colorado River (LCR) drainage. This fish occurs in disjunct populations throughout much of the LCR drainage in Apache, Coconino, and Navajo counties. Extensive collections summarized by Miller (1963) indicated that the spinedace had been extirpated from much of the historical range from 1939 to 1960. Although few collections were made of the species prior to 1939, the species is believed to have inhabited the northward flowing LCR tributaries of the Mogollon Rim, including the northern slopes of the White Mountains.

Food habits of spinedace include chironomid larvae, dipterians, filamentous green algae, and crustaceans (Runck and Blinn 1993, Blinn and Runck 1990). Spinedace are late-spring to early-summer spawners (Blinn 1993, Blinn and Runck 1990, Miller 1961, Minckley 1973, Minckley and Carufel 1967) although some females have been found to contain mature eggs as late as October (Minckley and Carufel 1967). A complete discussion of the taxonomic, distributional, and life history information of the spinedace has been compiled in the Little Colorado Spinedace Recovery Plan (USFWS 1998).

Mitochondrial DNA work on the spinedace was initiated in the 1990s and indicated the existence of three sub-groups identifiable by geographic area (Tibbets *et al.* 1994): the East Clear Creek drainage, Chevelon Creek, and the upper Little Colorado River including Nutrioso and Rudd creeks. The study concluded that the genetic patterns seen were likely the result of populations isolated and differentiated by both natural and human-caused events. The East Clear Creek and Chevelon Creek sub-groups are more individually distinctive, likely the result of a higher degree of isolation, and possess unique haplotypes. Individuals from the upper Little Colorado sub-group are more similar to each other. Possibly, until recent time, there was one population with considerable gene flow until various dams and diversions increased local isolation. The cause and exact time of the isolation of the three sub-groups are not known, but Tibbets *et al.* (1994) recommend that all of these populations be maintained to conserve genetic variation in this species.

As would be expected for a species adapted to fluctuating physical conditions, the spinedace is found in a variety of habitats (Blinn and Runck 1990, Miller 1963, Miller and Hubbs 1960, Nisselson and Blinn 1989). It is unclear whether occupancy of these habitats reflects the local preferences of the species or its ability to tolerate less-than-optimal conditions. Available information indicates that suitable habitat for the Little Colorado spinedace is characterized by clear, flowing pools with slow to moderate currents, moderate depths, and gravel substrates (Miller 1963, Minckley and Carufel 1967). Cover provided by undercut banks or large rocks is often a feature. Spinedace have also been found in pools and flowing water conditions over a variety of substrates, with or without aquatic vegetation, in turbid and clear water (Denova and Abarca 1992, Nisselson and Blinn 1991). Water temperatures in occupied habitats ranged from

58 to 78 degrees Fahrenheit (Miller 1963). Miller (1963) called the spinedace "trout like" in behavior and habitat requirements, and it is likely that prior to 1900 the spinedace used habitats now dominated by non-native salmonids.

As with most aquatic habitats in the Southwest, the Little Colorado River basin contains a variety of aquatic habitat types and is prone to rather severe seasonal and yearly fluctuations in water quality and quantity. Both mountain streams and lower-gradient streams and rivers have provided habitat for the spinedace. Residual pools and spring areas are important refuges during periods of normal low water or drought. From these refuges, spinedace are able to recolonize other stream reaches during wetter periods. This ability to quickly colonize an area has been noted in the literature (Minckley and Carufel 1967) as well as in observations by others familiar with the species. Populations seem to appear and disappear over short time frames and this has made specific determinations on status and exact location of populations difficult. This tendency has been observed by both researchers and land managers (Miller 1963, Minckley 1965, Minckley 1973) and has led to concerns for the species' survival.

Native fishes associated with spinedace include speckled dace (*Rhinichthys osculus*), bluehead sucker (*Pantosteus discobolus*), Little Colorado sucker (*Catostomus* sp.), roundtail chub (*Gila robusta*), and Apache trout (*Oncorhynchus gilae apache*) (USFWS 1998). The list of non-native fishes is much larger and includes species with varying degrees of incompatibility with the spinedace's long-term survival. The presence of non-natives was one of the primary reasons the species was listed, and may contribute to the disjunct distribution patterns observed and the spinedace's retreat to what may be suboptimal habitats. Non-native fish may compete with, prey upon, harass, and alter habitat utilized by native fish. In the last 100 years, at least ten non-native fish species have been introduced into spinedace habitats. These include rainbow trout (*Oncorhynchus mykiss*), fathead minnow (*Pimephales promelas*), and golden shiner (*Notemigonus crysoleucus*). Surveys in East Clear Creek have documented the presence of these three non-native species and brown trout (*Salmo trutta*) in the watershed (Denova and Abarca 1992). Data from research experiments and field observations indicate that at least the rainbow trout is a predator and potential competitor with the spinedace (Blinn *et al.* 1993).

The spinedace is assumed to still occupy the streams it is known from historically (Chevelon, Silver, Nutrioso, East Clear Creek, and the LCR proper). Populations are generally small and the true population size for any occupied stream is unknown due to the yearly fluctuations and difficulty in locating fish. Spinedace have a tendency to disappear from sampling sites from one year to the next and may not be found for several years. This ephemeral nature makes management of the species difficult since responses of the population to changes within the watershed cannot be measured with certainty. However, all of the known populations have decreased since 1993 and drought conditions continue to put additional strain on all known populations.

The most recent survey and habitat data for each watershed are indicated below:

Chevelon Creek Watershed: Currently, the spinedace occupies a section of Chevelon Creek, several miles upstream of Chevelon Creek's confluence with the LCR on the privately owned Rock Art Ranch. Chevelon Creek through the Ranch supports robust populations of spinedace, where large schools of fish (40-50 individuals) can be seen swimming in pools downstream of "The Steps," something not seen in any other currently occupied area (Lopez *et al.* 1998).

There are non-native species present throughout Chevelon Creek, but green sunfish (*Lepomis cyanellus*) and crayfish, both predators of spinedace, were found to be uncommon in areas where spinedace numbers were highest (Lopez *et al.* 1998). However, AGFD has reported that largemouth bass (*Micropterus salmoides*) appear to be increasing in abundance above the occupied area described above. At this time, the distribution and abundance of largemouth bass in this reach and how that may be impacting spinedace populations in the area is unknown. In addition, Willow Springs Lake, a reservoir located at the head of Chevelon Creek, contains a thriving population of smallmouth bass (*Micropterus dolomieu*). Though the smallmouth bass are currently located many miles upstream of known spinedace locations in Chevelon Creek, their occurrence and potential to move downstream are a threat to spinedace and other native fish in the drainage. The presence of these predatory, non-native fishes may adversely impact the future abundance and persistence of spinedace in Chevelon Creek.

On July 23, 2007, AGFD stocked 95 spinedace into five pools on West Chevelon Creek on the Apache-Sitgreaves National Forest. This tributary to middle Chevelon Creek contains only native fish at this time and is expected to provide habitat for spinedace. In July 2008, surveys located spinedace within the perennial pools where they were originally stocked and downstream of the area in ephemeral reaches. It is unclear how many fish are still present or if they spawned in 2008. Further surveys and stockings of this area are needed in order to ensure that spinedace persist in this Chevelon Creek tributary if it is to contribute to recovery.

Critical habitat within Chevelon Creek contains perennial water, but is in danger of losing surface flow due to ongoing groundwater pumping of the C-aquifer (USFWS 2008) and is inhabited by non-native aquatic species that prey on and compete with spinedace.

East Clear Creek Watershed: Spinedace currently occupy small, perennial pool habitats in West Leonard Canyon, Leonard Canyon (including Dines Tank), Bear Canyon, Dane Canyon, and Yeager Canyon. The populations and available habitat are all relatively small throughout the watershed, but West Leonard and Leonard Canyons continue to be the most dependable locations to find spinedace in the entire watershed. The Bear, Dane, and Yeager Canyon populations are sustained by moving spinedace from West Leonard Canyon and Dines Tank to these areas.

In October 2007, non-native green sunfish (multiple size classes), largemouth bass, and yellow bullhead (*Ameiurus natalis*) were detected near the boat ramp and in the Bear Canyon arm of the C.C. Cragin (Blue Ridge) Reservoir. These nonnative species had not been located here prior to this time and if they were to access the drainages occupied by spinedace, these predatory fishes could completely derail recovery efforts in the watershed. High-flow events during the winter 2007-2008 could have allowed these fish to spread up- and downstream of these locations. However, surveys conducted in 2008 did not locate these non-native fishes upstream of the reservoir. Currently Bear Canyon is the only occupied habitat located upstream of C.C. Cragin Reservoir. However, future efforts will be made to stock spinedace in Miller and Kehl Canyons, which are also located upstream of the reservoir.

It has become more difficult to find spinedace because drought conditions have reduced available habitat, particularly in the reach of critical habitat above C.C. Cragin Reservoir. During several of the last years, particularly in 2002 and 2006, spinedace have been salvaged from drying pools in East Clear and Nutrioso Creeks and either brought into captivity or moved

to more permanent pools. Efforts to establish spinedace in additional habitats within currently occupied drainages have been thwarted over the last several years as spinedace were introduced to areas only to have the habitat dry within months of reintroduction. The lack of permanent waters within the watershed continues to impede recovery efforts. The critical habitat below C.C. Cragin Reservoir is currently kept watered year-round via seepage coming out of the dam. However, the presence of non-natives in this stretch of creek has made it impossible to establish spinedace in this critical habitat section as well.

Little Colorado River (including Nutrioso Creek and Rudd Creek): Spinedace are documented in the LCR from Springerville downstream to St. Johns, Arizona (Dorum and Young 1995). Spinedace occur on both the AGFD Wenima and Becker Wildlife Areas within this reach of the LCR in small to moderate numbers. The most recent survey efforts in July 2005 found 39 spinedace at Wenima and 92 spinedace at Becker Wildlife Area. Surveys conducted in 2008 by the AGFD and Bureau of Land Management (BLM) also located spinedace above Lyman Lake in the LCR.

Spinedace have been located in middle Nutrioso Creek from the Apache-Sitgreaves Forest boundary upstream to Nelson Reservoir and from Nelson Reservoir upstream to Nutrioso, Arizona (Lopez *et al.* 2001a). Spinedace were first located in Rudd Creek in 1994 (Lopez *et al.* 2001b).

In the spring 2005, AGFD personnel surveyed several 328-feet transects in Rudd and Nutrioso Creeks. In Rudd Creek, only a single spinedace and a few speckled dace were captured. A total of seven spinedace were captured upstream of Nelson Reservoir in Nutrioso Creek. No spinedace were found below the reservoir, but many fathead minnow and green sunfish were captured. Surveys conducted in April 2006 in Nutrioso Creek located 128 spinedace upstream of Nelson Reservoir. The largest concentration of spinedace was found on the EC Bar Ranch. No spinedace were located downstream of Nelson Reservoir (in Nutrioso Creek) or in Rudd Creek. However, in June 2006, AGFD located 415 spinedace in a drying pool in Nutrioso Creek; these fish were moved into a more permanent pool on the EC Bar Ranch, and 74 spinedace were moved into Rudd Creek. Surveys conducted in 2008 located spinedace above Nelson Reservoir, and above and below the gauging station on Nutrioso Creek. Spinedace were also located on lower Rudd Creek, below AGFD's property.

The absence of water is a limiting factor for spinedace and designated critical habitat within Nutrioso Creek (below Nelson Reservoir) as well as the presence of non-native fish where water does occur, and excess vegetation in pools when water is available. The Apache-Sitgreaves National Forest indicated in their 2006 biological assessment and evaluation for the Nutrioso Wildland Urban Interface Project that the creek's incised channels and poor riparian condition would not adequately process large-scale or chronic disturbances within its drainage (USFWS 2006a). The presence of non-native species, the current condition of Nutrioso Creek, and the general absence of water clearly has a negative impact to the spinedace and critical habitat.

Silver Creek: As stated above, spinedace were thought to be extirpated from Silver Creek until a small number of fish were discovered in lower Silver Creek in July 1997 (Lopez *et al.* 1999). However, numerous surveys since then have failed to find spinedace, including an extensive survey in 2004 funded by a cooperative agreement with the BLM (McKell and Lopez 2005). It is believed that changes to the habitat since 1997 have likely increased habitat for non-native

fishes and impacted our ability to capture spinedace during surveys. If spinedace are still present in Silver Creek, it may be that they exist at such low numbers that our current sampling techniques are insufficient to detect them in this altered habitat.

In 1997, the habitat in Silver Creek consisted primarily of shallow riffle/run habitat with occasional relatively small pools. Starting in 1999 and continuing to the present, the same areas now consist of almost exclusively deep, wide pool habitat due to extensive beaver dams. In addition, the extensive pool habitat, which extends for miles, has created prime habitat for non-native fish and crayfish. This change in habitat has made sampling the area extremely difficult. At this time, both the FWS and AGFD believe that spinedace may still exist in lower Silver Creek. However, the prognosis for spinedace recovery in Silver Creek is bleak at this time. The habitat is conducive to promoting non-native fish and crayfish and there are fewer and fewer native fish found within Silver Creek.

In addition to the above in-stream populations of spinedace, there are currently two refugial populations of spinedace. We have a refugial population of East Clear Creek spinedace located at the Flagstaff Arboretum and a refugial population of Little Colorado River spinedace at AGFD's Grasslands Property. We currently do not have a refugial population for the Chevelon Creek genetic sub-group, although we expect to have a captive population established at Winslow High School for the Chevelon Creek genetic sub-group in late 2009.

Our information indicates 30 formal consultations have been completed or are underway for actions affecting Little Colorado spinedace rangewide (USFWS files). Adverse effects to Little Colorado spinedace have occurred due to these projects and many of these consultations have required reasonable and prudent measures to minimize effects of incidental take on Little Colorado spinedace. However, as is the case with many aquatic species, it is difficult, if not impossible, to quantify the actual incidental take of spinedace to date. The continued invasion of non-native aquatic species into spinedace habitat and the on-going reductions in surface water (due to both drought and groundwater pumping) are two of the greatest threats to the species and are contributing factors to the spinedace's overall decline.

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.

Chiricahua leopard frog

Leopard frog and other herpetofauna surveys have been conducted on the Coconino National Forest since the early 1990's. Most surveys have been conducted by the AGFD and results have been documented in several reports (Sredl and Howland 1992, Sredl et. al 1993, Sredl et al 1995, Windes et al 1997). Sredl *et al.* (1997) summarized the results of statewide surveys for Arizona native ranid frogs, including the CLF, to describe their current status and distribution. Surveys since 1998 have been conducted by agency biologists from AGFD, FWS, and USFS.

The only extant populations of CLF on the Coconino National Forest occur east of the Hackberry Allotment, in an area known as Buckskin Hills Conservation Management Area. There are no known occupied sites on the HPRAs. Currently occupied sites are all located within the FCRA, which is the allotment that sits in-between the HPRAs. Records exist from other locations along the Mogollon Rim, including East Clear Creek and West Clear Creek drainages, but these sites have been unoccupied since at least the mid-1980's. One historical site, New Tank, is located on the Hackberry Allotment. Since New Tank has been invaded by crayfish and surveys for CLF have been negative, New Tank is currently considered unsuitable habitat. There are other historical CLF locations (e.g., Jones Crossing one mile north of Pivot Rock Allotment) and suitable habitats within, immediately adjacent to, or within five miles of the HPRAs (e.g., waters in Buckhead, Basin, and Doren pastures). In addition, the Miller, Kehl, Potato South, Clear Creek, and Potato North pastures are in the East Clear Creek Management Area, which has been identified as an area with high potential for reestablishing and managing CLF (USFWS 2007).

The BAE listed several pastures on the Hackberry Allotment that were considered to be out of the range of the CLF, and therefore, unsuitable habitat. However, some of these pastures contain potential habitats that are directly connected to or within dispersal distance of currently or likely to be occupied habitat (within the next 10 years) on the FCRA. Therefore, suitable habitats on both the Hackberry and Pivot Rock Allotments, though not currently occupied, could become occupied during the life of the proposed action and consultation. The FWS, AGFD, Phoenix Zoo, and other partners, developed a captive breeding program for Buckskin Hills CLF and plan to return frogs to many of the sites they occupied prior to 2002. In addition, once frogs begin reproducing in occupied sites again, they are likely to disperse to habitats on the HPRAs. Though not part of this proposed action, we also intend to work with the permittee to restore CLF on the allotments through active cooperation.

Little Colorado spinedace

Little Colorado spinedace are endemic to the upper portions of the Little Colorado River (LCR) and to its north-flowing tributaries on the Mogollon Rim and the northern slopes of the White Mountains in eastern Arizona. Therefore, spinedace do not occur on the Hackberry Allotment, which is entirely within the Verde watershed and has no connection to the upper LCR watershed. The Pivot Rock Allotment contains portions of East Clear Creek, Miller Canyon, Kehl Canyon and other smaller drainages. Baker, Potato, Kehl, Miller, and Clear Creek pastures in this allotment contain portions of East Clear Creek itself or significant tributaries. The Clear Creek Pasture borders with the McCarty Pasture of the Buck Springs Allotment to the north. There is likely historical and suitable habitat for spinedace within the allotment boundaries including Middle Kehl Canyon, Miller Canyon, Kinder Spring, Cienega Draw, Coldwater Springs, Potato Lake Draw, and Potato Lake, which are identified in the East Clear Creek Watershed Strategy for the repatriation of spinedace if habitat conditions improve (USDA 1999).. There are no known current populations of spinedace within the allotment.

The status of the spinedace has been declining within the East Clear Creek watershed since its 1987 listing, and the population faces the potential of extirpation. The Little Colorado Spinedace Recovery Plan (USFWS 1998) lists the East Clear Creek population as second in order of those populations in imminent danger of extinction, and states that the loss of any population of spinedace significantly increases the risk of extinction for the species (USFWS 1998).

Therefore, any impacts to this species in this watershed are considered extremely serious and warrant careful monitoring. The East Clear Creek population of spinedace has been recorded primarily from the mainstem of the creek and in portions of Leonard Canyon. As stated previously, this population fluctuates widely and is usually found in small, isolated pockets of habitat. A key factor in the presence of the fish appears to be the quantity of water in the systems. Over the past several years, personnel from the Coconino National Forest, the Forest Service's Rocky Mountain Research Station, the AGFD, and Northern Arizona University have conducted surveys for spinedace. These surveys have indicated that spinedace population levels in the East Clear Creek system have continued to decline.

Livestock are supposed to be excluded from East Clear Creek as a result formal section 7 consultation for the Pivot Rock Allotment (USFWS 1997). However, the Coconino National Forest states in the current BAE that "poor fence maintenance and livestock management has greatly decreased the effectiveness of these exclosures and riparian conditions in East Clear Creek and its associated drainages have continued to degrade" as a result of ongoing livestock grazing. On September 19, 2007, livestock were found by the Forest Service and AGFD to be accessing East Clear Creek, and documentation was provided to our office by AGFD.

Critical habitat is designated upstream from the C.C. Cragin Reservoir to Potato Lake. There are four pastures that may contribute effects to designated critical habitat: Clear Creek, Kehl, Miller, and Potato North. Kehl pasture will be deferred until conditions improve, and Miller pasture is deferred until a new fence is constructed. The BAE states that continued livestock access to East Clear Creek from the Clear Creek and Potato North pastures will result in continued adverse effects to spinedace critical habitat. With riparian function currently classified as non-functional, the Forest Service does not expect reductions in livestock numbers to improve current habitat conditions (BAE, page 59).

Some historical background on riparian conditions is contained in the Hydro Science (1993) report. The report states that the present conditions of streams in the area are likely due to the overgrazing that began in the late 1800's and continued through the 1950's. Even if some stream reaches are considered "functional" today, it does not mean that they are in good condition relative to the pre-overuse baseline. A wide, gravel-cobble wash is a very different system compared to a narrow, meandering stream channel bordered by riparian vegetation.

The streams in the allotment are now ephemeral. While this may be the baseline condition, the amount of time when there are no flows may have increased as bank storage declined due to erosive gullying and downcutting, and runoff has increased as vegetation was reduced. This has had a significant effect on the availability and quantity of fish habitat in the stream reaches under consideration in this consultation.

Spinedace habitats in the East Clear Creek drainage and within the project area have been altered by the construction of dams on the mainstem and tributaries such as C.C. Cragin (formerly Blue Ridge) Reservoir, Knoll Lake, and Bear Lake. Past land management activities have included timber harvest, livestock grazing, road construction and maintenance, recreational development and usage, fire management, and inter-basin water diversions that have altered the habitat. These activities have affected watershed function, runoff patterns, peak flows, seasonal flows, riparian vegetation, wet meadow functions, bank erosion, siltation, and water quality. Wildlife and fisheries management largely associated with providing hunting or fishing opportunities has

altered the faunal component of the habitat. Introduction of non-native trout species, baitfish, and crayfish at Blue Ridge and Knoll Lake Reservoirs have increased competition for available resources and possibly predation on spinedace. In addition, there is concern that elk (*Cervus elaphus*) are much more abundant in the East Clear Creek drainage than they were historically, and that they may have a significant effect on the existing riparian and aquatic habitats.

The soil conditions are not broken out by allotment, but only presented as combined data. Over both allotments, approximately 67% of the soils are classified as satisfactory, 10% as satisfactory-inherently unstable, 6% are considered unsatisfactory, and 17% are considered impaired. Based upon our knowledge of the area, we assume that the mountain meadows make up the unsatisfactory areas due to heavy grazing and recreation pressures that have reduced ground cover, compacted soils, and contributed to the lowering of the water table. Meadow areas are located within the headwater drainages of the Pivot Rock Allotment. Compaction and unsatisfactory soil conditions in the headwater meadows may lead to increased runoff, sedimentation, and reduced baseflows, which have the potential of negatively impacting spinedace habitat much farther downstream.

On the Pivot Rock Allotment, approximately 6.3 miles of streams are classified as functional, 12.1 miles classified as at-risk streams, and 12.5 miles are classified as non-functional streams. Based upon our interpretation of Table 27 (EA, page 70), it would appear that only 1.0 mile of non-functional/at-risk stream (Potato Lake exclosure is listed in both categories) is excluded from livestock grazing.

Studies in the East Clear Creek areas indicate that past intensive grazing by ungulates has resulted in considerable change to the historical condition of aquatic and riparian habitats and thus the habitat available for spinedace (Hydro Science 1993). In some areas, the channels are moving toward, or have achieved, stability although it is not the same as the historic stability. Recovery of the streams and associated floodplains and riparian areas to those historical conditions may be extremely difficult, if not impossible, to attain.

EFFECTS OF THE ACTION

Effects of the action means 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.

Chiricahua leopard frog

There are no currently occupied sites on the HPRAs. However, we expect that within the duration of the proposed action (10 years), CLF will either disperse onto the allotment or be reintroduced into historically occupied sites. The reintroduction of CLF onto the HPRAs would be beneficial in assisting with recovery of this leopard frog and would result in reproducing populations of frogs in at least some suitable habitat on both of these allotments. However, livestock grazing can cause a decline in diversity, abundance, and species composition of riparian herpetofauna communities from direct or indirect threats including: (1) declines in the structural richness of the vegetative community; (2) losses or reductions of the prey base; (3)

increased aridity of habitat; (4) loss of thermal cover and protection from predators; and (5) a rise in water temperatures to levels lethal to larval stages of amphibian and fish development (Szaro *et al.* 1985, Schulz and Leininger 1990, Belsky *et al.* 1999). Livestock grazing may also lead to a loss in soil fertility from erosion and gaseous emissions spurred by a reduction in vegetative ground cover, particularly at lower elevations (Schlesinger *et al.* 1990). Specific attributes of ecosystems, such as composition, function, and structure, have been documented as being altered by improper livestock management through a variety of means including: (1) decreasing the density and biomass of individual species, reducing species richness, and changing biological community organization; (2) interfering with nutrient cycling and ecological succession; and (3) changing vegetation stratification, contributing to soil erosion, and decreasing availability of water to biotic communities (Fleischner 1994).

The CLF Recovery Plan (USFWS 2007) provides a lengthy discussion of potential effects to CLF from livestock grazing activities, with an emphasis on effects to CLF during the warmer periods of the year when the species is assumed to be surface-active and/or reproductive. Livestock are adapted to mesic habitats and select riparian habitats for water, shade, and cooler temperatures. They tend to spend a disproportionate amount of their time in riparian zones and can adversely affect these systems in a number of important ways (see Fleischner 1994, Belsky *et al.* 1999, Jones 2000, and references therein).

Both direct and indirect adverse effects may occur through a variety of means during the non-active (i.e., non-breeding) seasons of the year for CLFs, which include trampling of hibernating frogs or tadpoles; erosion and/or siltation of stream courses; elimination of undercut banks that provide cover for frogs; loss of wetland and riparian vegetation and backwater pools; and spread of disease and non-native predators (Arizona State University 1979, Hendrickson and Minckley 1984, Ohmart 1995, Jancovich *et al.* 1997, Belsky *et al.* 1999, Ross *et al.* 1999, USFWS 2000, Sredl and Jennings 2005). Increased watershed erosion caused by grazing can accelerate sedimentation of deep pools used by frogs (Gunderson 1968). The indirect effects of grazing in the HPRAs on suitable CLF habitat may also include increases in sedimentation generated by grazing levels. Sediment can alter primary productivity and fill interstitial spaces in drainage materials with fine particulates that impede water flow, reduce oxygen levels, and restrict waste removal (Chapman 1988). These effects may occur but are expected to be attenuated through consistent monitoring and adaptive management as proposed by the Coconino National Forest in their livestock management plan for the HPRAs.

Direct mortality of amphibian species, in all life stages, from being trampled by livestock has been documented in the literature (see Bartelt 1998, Ross *et al.* 1999), but most likely occurs to egg masses. Trampling of juvenile or adult CLF by livestock has not been documented; however, it likely occurs. Juvenile and adult frogs can probably often avoid trampling when they are active; however, leopard frogs are known to hibernate on the bottom of ponds (Harding 1997) where they may be subject to trampling during the winter months. We are reasonably certain that increased risks of trampling hibernating frogs, carry-over tadpoles from a previous year that have not yet metamorphosed, or egg masses, may occur at sites that may become occupied by CLF due to dispersal from nearby sites during the life of the project. Frogs are known to inhabit an area within five miles of the Hackberry Allotment, and we expect that over the life of the action, there will be occupied sites across the HPRAs as the reintroduction of CLF occurs. With respect to the effects of the action on frogs in the future, we believe there is a potential for impacts to frogs during tank maintenance activities such as dredging or silt removal;

injury at tanks due to transmission of disease by livestock or ranch hands; and direct or indirect mortality at those tanks in areas grazed by livestock as a result of cattle wading into stock tanks, removing shoreline or aquatic cover at egg deposition sites, and increasing turbidity. However, the Forest Service and permittee have agreed to work with us and AGFD to identify potential suitable habitats to provide for CLF recovery and to manage these areas in a manner to minimize these effects.

In review of the potential effects to suitable CLF habitat and individual frogs in the future discussed above, and in acknowledgement of frog dispersal as well as the reintroduction activities planned for CLF in this area, we are reasonably certain that trampling of egg masses, early-stage tadpoles, or dormant-season metamorphosed frogs will occur at some level over the life of the grazing permit. Additionally, we are reasonably certain that adverse effects to bankside and aquatic vegetation in occupied habitat, causing loss of cover for frogs, will also occur at some level during the duration of this proposed action. We anticipate these direct and indirect effects could occur on any of the identified suitable habitat areas (e.g., stock tanks and springs) within the HPRAs.

Since the proposed action does not allow for the trailing of HPRAs livestock through the FCRA, there will be no direct effects to CLFs and their habitat on the FCRA.

Little Colorado spinedace and Critical Habitat

This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statute and the August 6, 2004, Ninth Circuit Court of Appeals decision in *Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service* (No. 03-35279) to complete the following analysis with respect to critical habitat.

Analysis of the effects of livestock grazing on fish and wildlife species and their habitats requires looking at long-term, incremental changes in watershed functions, riparian and aquatic communities, and stream channel morphology. However, extrapolations of general hydrologic and biological principles and site-specific research data provide a large body of evidence linking degradation of watersheds, stream channels, aquatic and riparian communities, and fish habitat and populations in western North America to past grazing and some current grazing management (Leopold 1924, Leopold 1951, York and Dick-Preddie 1969, Hastings and Turner 1980, Dobyns 1981, Kauffman and Krueger 1984, Skovlin 1984, Kinch 1989, Chaney *et al.* 1990, Platts 1990, Armour *et al.* 1991, Bahre 1991, Meehan 1991, Fleischner 1994).

Spinedace are not currently known to occupy any areas within the Pivot Rock Allotment. However, spinedace populations can fluctuate dramatically from year-to-year and may appear in areas that we have not seen them for several years in response to run-off events, etc. It is possible that spinedace currently exist in very low numbers in perennial pools within the allotment, but our surveys have not detected them. In addition, there are plans for supplemental stocking to occur if habitat conditions improve (USDA 1999). Therefore, we are reasonably certain that Little Colorado spinedace are likely to be present within the allotment boundaries during the 10-year life of the proposed action. Since occupancy is reasonably certain to occur during the life of this project, we will evaluate potential effects to spinedace from the proposed action.

The proposed action would temporarily defer livestock grazing in Kehl, Miller, and Potato South pastures (approximately 80% of the East Clear Creek watershed acreage in the allotment) and reduce grazing intensity, utilization, and AUMs. Effects to the East Clear Creek watershed, spinedace, and designated critical habitat from the proposed livestock grazing and its management on the Pivot Rock Allotment may occur through five mechanisms: (1) watershed alteration; (2) physical destruction and alteration of streambanks, stream channels, water column, and the riparian vegetation community; (3) alteration of the faunal community; (4) effects from non-grazing and structural elements; and (5) direct effects to spinedace from livestock accessing future occupied habitat. These mechanisms may have varying effects on spinedace and critical habitat.

(1) Watershed alteration

Watershed changes due to grazing are difficult to document due to their long-term, incremental nature; the time lag and geographic distance between cause and effect; and the numerous confounding variables. With the information available, it is not possible to differentiate watershed alteration effects caused by current livestock grazing on the Pivot Rock Allotment from those caused by past grazing, wild ungulate impacts, roads, or other watershed effects. Despite this, the relationship between livestock grazing in a watershed and effects to river systems is widely recognized and documented (Leopold 1946, Blackburn 1984, Skovlin 1984, Chaney *et al.* 1990, Platts 1990, Bahre 1991, Meehan 1991, Fleischner 1994, Myers and Swanson 1995). Although watershed effects vary depending upon the number and type of livestock, the length and season of use, and the type of grazing management, the mechanisms remain the same and the effects vary only in extent of area and severity (Blackburn 1984, Johnson 1992). The proposed action will reduce the number of permitted livestock and the number of acres grazed (at least temporarily). This should allow for some riparian recovery to Kehl and Miller Canyons and may result in associated beneficial effects downstream to East Clear Creek and designated critical habitat. However, it is unclear under what conditions livestock will be allowed to return to Kehl Pasture, and livestock will be allowed into Miller and Potato South Pastures as soon as the required fencing is constructed.

Livestock grazing may alter the vegetative composition of the watershed (Martin 1975, Savory 1988, Vallentine 1990, Popolizio *et al.* 1994). It may cause soil compaction and erosion, alter soil chemistry, and cause loss of cryptobiotic soil crusts (Harper and Marble 1988, Marrs *et al.* 1989, Orodho *et al.* 1990, Schlesinger *et al.* 1990, Bahre 1991). Cumulatively, these alterations contribute to increased erosion and sediment input into streams (Johnson 1992, Weltz and Wood 1994). They also contribute to changes in infiltration and runoff patterns, thus increasing the volume of flood flows while decreasing their duration, and decreasing the volume of low flows while increasing their duration (Brown *et al.* 1974, Gifford and Hawkins 1978, Johnson 1992). Groundwater levels may decline and surface flow sources may decrease or cease (Chaney *et al.* 1990, Elmore 1992) which could be contributing to the lack of permanent water in designated critical habitat. Development of livestock waters may alter surface flows by impoundment, spring capture, or runoff capture.

(2) Physical alteration of Streambanks, Stream Channels, Water Column, and Riparian Vegetation Community

Livestock have access to both East Clear Creek from the Kehl and Clear Creek pastures and access to the tributaries of both Miller and Kehl Canyons. As stated earlier, livestock are supposed to be excluded from East Clear Creek per agreements reached during consultation on the allotment (USFWS 1997). However, per the BAE "poor fence maintenance and livestock management has greatly decreased the effectiveness of these exclosures and riparian conditions in East Clear Creek and its associated drainages have continued to degrade." The BAE further states that unless the management of these exclosures improves and livestock are effectively removed from these areas, the adverse effects will continue under the proposed action.

The potential adverse effects of grazing on streambanks include the shearing or sloughing of streambank soils either by hoof or head action; elimination of streambank vegetation; erosion of streambanks following exposure to water, ice, or wind due to a loss of vegetative cover; and an increased streambank angle which increases water width and decreases water depth. Damage can begin to occur almost immediately upon entry of livestock onto the streambanks, and use of the riparian zones may be highest immediately following entry of cattle into a pasture (Platts and Nelson 1985, Goodman *et al.* 1989). Vegetation and streambank recovery from long rest periods may be lost within a short period following grazing reentry (Duff 1979). Bank configuration, soil type, and soil moisture content influence the amount of damage, with moist soil being more vulnerable (Marlow and Pogacnik 1985, Platts 1990). Although not quantifiable, some of these effects can be anticipated to occur in critical habitat under the proposed action. Currently, Forest Service modeling estimates that soil loss has increased from an average of 0.2 tons per hectare per year to 0.5 tons per hectare per year on the Pivot Rock Allotment (EA, page 73). It is unclear from the discussion in the EA how much of this is attributable to livestock grazing and what is attributable to roads and recreation activities as all are described as sources of soil loss.

Following streambank alteration, potential effects to the channel itself can include changes in channel morphology and altered sediment transport processes (Platts 1990). Within the stream itself, there can be changes to pools, riffles, runs, and the distribution of backwater areas, a reduction in cover for fishes, elevated water temperatures, changes in nutrient levels, and increased sedimentation (Platts 1990, Belsky *et al.* 1999).

Effects of livestock grazing in riparian habitat have been summarized by many authors (Szaro and Pase 1983, Warren and Anderson 1987, Platts 1990, Schulz and Leininger 1990, Schulz and Leininger 1991, Stromberg 1993). Some of these changes in the structure, function, and composition of the riparian community may occur within the East Clear Creek watershed. Species diversity and structural diversity may be substantially reduced and non-native species may be introduced through spread in cattle feces. Reduction in riparian vegetation quantity and health, plus shifts from deep-rooted to shallow-rooted vegetation contributes to bank destabilization and collapse and production of fine sediment (Meehan 1991). Loss of riparian shade results in increased fluctuation in water temperatures with higher summer and lower winter temperatures (Karr and Schlosser 1977, Platts and Nelson 1989). Litter is reduced by trampling and churning into the soil thus reducing cover for soil, plants, and wildlife (Schulz and Leininger 1990). The capacity of the riparian vegetation to filter sediment and pollutants to prevent their entry into the river and to build streambanks is reduced (Lowrance *et al.* 1984, Elmore 1992). Channel erosion in the form of downcutting or lateral expansion may result (Heede and Rinne 1990, USBLM 1990). The EA states that proper functioning condition of riparian areas in the Pivot Rock Allotment is not expected to greatly improve due to persistent

elk grazing (pages 41-42 and 74). These effects may decrease the ability of designated critical habitat to provide clean, flowing water even in wet years.

Changes to the water column within the stream can be many and varied. Water-column alterations can be caused by changes in the magnitude and timing of organic and inorganic energy inputs to the stream; increases in fecal contamination; changes in water temperatures due to removal of vegetation; changes in water column morphology, including increases in stream width and decreases in stream depth, as well as reduction of stream shore water depth; changes in timing and magnitude of streamflow events from changes in watershed vegetative cover; and increases in stream temperature (Platts 1990, Fleischner 1994).

The general effects of upland grazing on riparian systems have been discussed above. To generate and maintain riparian habitat, a healthy watershed (uplands, tributaries, ranges, etc.) is a key component (Elmore and Kauffman 1994, Briggs 1996). Elmore and Kauffman (1994) note "simply excluding the riparian area (from grazing) does not address the needs of upland vegetation or the overall condition of the watershed. Unless a landscape-level approach is taken, important ecological linkages between the uplands and aquatic systems cannot be restored and riparian recovery will be limited." Depending on the intensity, continuing to graze in uplands may continue to impact spinedace habitat, and may result in unnatural flooding and lack of water retention within the system, delaying recovery of spinedace habitat and critical habitat. However, ongoing actions such as the East Clear Creek Watershed Health Project (USFWS 2006b), which is designed to: restore vegetative health and diversity; reduce the potential for stand-replacing wildfire; restore soils, meadow systems, and riparian areas; and reduce road impacts to watershed condition and riparian habitat. These actions should contribute to long-term ability of the East Clear Creek Watershed to provide habitat and protect critical habitat for spinedace.

The drainages where livestock can access the watercourses are not known to be currently occupied by spinedace but do contain designated critical habitat; however, potential habitat within the allotment may be occupied in the future following supplemental stocking of spinedace. Though supplemental stocking may increase the number of drainages where spinedace may be affected by the proposed action, the benefits of increasing the number of spinedace within the watershed in conjunction with the fencing and adaptive management included in the proposed action to improve critical habitat should aid in our recovery of the species. Fence maintenance is imperative to improving the watershed and reducing direct impacts to spinedace and potentially leopard frogs, improving habitat for both species, and reducing impacts to spinedace critical habitat.

(3) Alteration of the Faunal Community

Research indicates that livestock use of the riparian corridor may cause changes in species composition and community structure of the aquatic and riparian fauna, in addition to floral changes already addressed. The aquatic invertebrate community may change from its baseline because of altered stream channel characteristics, because of sediment deposition, or because of nutrient enrichment (Rinne 1988, Meehan 1991, Li *et al.* 1994). This change in the food base of many aquatic vertebrates, particularly fish, may contribute to loss of or change in the vertebrate community. In addition, the structure and diversity of the fish community may shift due to changes in availability and suitability of habitat types (Storch 1979, Van Velson 1979).

Livestock grazing can lead to loss of aquatic habitat complexity, thus reducing diversity of habitat types available and altering fish communities (Li *et al.* 1987). However, the proposed action should improve current conditions throughout the watershed, resulting in increases in aquatic habitat complexity rather than losses.

(4) Effects from Grazing-related Structural Elements

The Forest Service has stated in past grazing consultations in this watershed that roads throughout the allotment are not maintained for the permittee's access (USFWS 2003), but are maintained for logging, recreation, and administrative actions. Therefore, the potential effects of these roads on spinedace habitat are not entirely an indirect effect of the proposed action. However, these roads will be used by the permittee and are of concern since they are often contributors of sediment to stream courses and are part of the current landscape. Fences provide both beneficial and negative effects. Fences are used in a positive way to control livestock by dividing pastures and excluding them from sensitive areas. However, fences may also cause some habitat damage where they occur near streams and/or in floodplains, livestock may trail along fences and create a potential source of sediment and assist in the creation of erosion channels that can negatively affect the channel banks.

Stock tanks have been developed on public lands throughout the Southwest for livestock and wildlife use. In many areas, they have both indirect beneficial and detrimental effects on aquatic systems. They benefit aquatic systems by limiting and trapping sediment that otherwise would continue down ephemeral channels into perennial streams. They also may benefit species, such as the CLF, by providing habitat that is currently needed for the species recovery and survival. Stock tanks also capture surface water and precipitation that has the potential to increase the flashiness of a stream during a storm event and allow water to percolate into the soil, providing some recharge of the subsurface aquifer and potentially adding to stream base flows. Stock tanks are detrimental to aquatic systems when the sediment berms that are built to capture overland flows fail and cause acute sediment pulses into aquatic systems. An additional negative impact of stock tanks to aquatic systems is the spread of nonnative organisms including crayfish, nonnative fish, and bullfrogs. These nonnative species can negatively affect native aquatic species that may occur nearby, and the nonnative species can be transported downslope to perennial aquatic systems during high flow events where they can have dramatic negative effects to the native ecosystem. Following the native fish restoration project in Fossil Creek, all stock tanks containing non-natives that drained into the watershed were treated to remove nonnative fishes. This work was repeated at three stock tanks in 2008 (USFWS files). Both treatments included removal of non-natives on the Hackberry Allotment and included the assistance of the permittee. We will continue to work with the Forest Service and the permittee to ensure that stock tanks within the HPRAs are managed to inhibit the movement of and/or to remove nonnative aquatic species that become established.

(5) Direct/Indirect Effects from Livestock Access to Occupied Habitat

The effects of animals wading in stream courses are of particular concern in the intermittent reaches of streams where spinedace could be found isolated in small pools. Between the period of spring runoff and summer monsoons, spinedace are often stranded in pools ranging in size from several thousand square feet to just a few square feet. As these habitats begin to dry, spinedace become more susceptible to disturbances and predation, and livestock drinking from

and trampling the pools can eliminate this habitat. We have not documented livestock trampling fish and/or fish eggs in the pools that spinedace inhabit on the Buck Springs Allotment (adjacent to the Pivot Rock Allotment). However, the very nature of these small pockets of habitat allows us to believe that the potential exists for livestock to harm and/or harass spinedace in pool situations.

Documentation of livestock directly impacting fish or fish eggs is mostly through personal observation, and not very well documented in the literature. However, there are a few citations available that have documented livestock and humans trampling fish and/or fish eggs. Minckley (1973) noted that Sonoran topminnow (*Poeciliopsis occidentalis*) were eliminated from Astin Spring by livestock trampling. A study that examined the effects of anglers on trout egg and fry survival found that wading anglers had detrimental effects on trout redds through trampling (Roberts and White 1992). The authors also speculated that livestock trampling may have similar adverse effects. In California, an entire population of Owens pupfish (*Cyprinodon radiosus*) (a few hundred individuals) was rescued from a drying site where the fish were stranded in cattle hoof prints (Miller and Pister 1971). In addition, documentation from a Bonneville cutthroat trout (*Oncorhynchus clarki utah*) project on the Goshute Reservation (UT/NV west desert, south of Wendover, UT) stated that livestock destroyed an estimated 50% of the spawning redds within an exclosure due to trampling and mucking around in the streambed (J. Stefferud, pers. comm. 2003).

There is also the potential for livestock to drink occupied spinedace habitat dry, under certain conditions. According to Vallentine (1990), the Forest Service (USFS 1969) states that cattle will drink 12 to 15 gallons per day per individual, and the University of Nebraska Extension Service (http://www.ianr.unl.edu/pubs/Beef/g372.htm), estimates that at an average maximum daily temperature of 90 degrees Fahrenheit an individual animal (bull, growing cattle, finishing cattle, nursing calves, heifers) may use from 10 to 23 gallons of water per day. The USGS reports that on average (depending upon weather) a cow drinks 35-40 gallons of water per day (http://ga.water.usgs.gov/edu/wulv.html). For the following example, we will use a range of 10 (low) to 23 gallons (high) of water per day as an estimate of individual cattle water usage. If we assume that, in an isolated pool, subflow is equal to evaporation and transpiration (so that the volume remains constant), then we may assume the following:

SMALL POOL
Pool size is 3 feet X 2 feet X 0.5 feet average depth (approximately 22 gallons)

Gallons per day	Approximate number of cattle that could drink pool dry in 1 day	Approximate number of cattle that could drink pool dry in 2 days	Approximate number of cattle that could drink pool dry in 3 days
10	2	1	0.75
23	1	0.5	0.3

MEDIUM POOL
Pool size is 10 feet X 5 feet X 1 foot average depth (approximately 373 gallons)

Gallons per day	Approximate number of cattle that could drink	Approximate number of cattle that could drink	Approximate number of cattle that could drink

MEDIUM POOL Pool size is 10 feet X 5 feet X 1 foot average depth (approximately 373 gallons)			
	pool dry in 1 day	pool dry in 2 days	pool dry in 3 days
10	37	19	12
23	16	8	5

LARGE POOL Pool size is 20 feet X 10 feet X 2 feet average depth (approximately 2,985 gallons)			
Gallons per day	Approximate number of cattle that could drink pool dry in 1 day	Approximate number of cattle that could drink pool dry in 2 days	Approximate number of cattle that could drink pool dry in 3 days
10	299	159	100
23	130	65	43

This example does not imply that we believe livestock will access and drink every pool in the allotment dry. We realize that cattle will have access to stock tanks for water and that water usage in riparian areas will most likely be limited due to the proposed management plan. However, it should be clear that it is not impossible for a small number of cattle to deplete a small pool very quickly (depending upon temperature, time in riparian pool, etc.) and indirectly kill any spinedace that may occupy the pool. This may be especially true during drought conditions.

As stated above, there are not currently any known populations of spinedace on the Pivot Rock Allotment. However, there are long-standing plans to stock Miller and Kehl Canyons (USDA 1999), and AGFD and FWS plan to implement these plans within the next 10 years, the term of the proposed grazing permit. Livestock will have access to watered sites along East Clear Creek, Kehl, and Miller Canyons; therefore, as fish are stocked in the allotment, the potential for direct effects to spinedace will increase. However, as more spinedace are stocked throughout the allotment, our knowledge of important drought refugia should increase, and we intend to work with the Forest Service and the permittee to appropriately manage these areas. The proposed action would help to reduce direct effects to spinedace and critical habitat through pasture fencing. Our analysis is based on the assumption that the proposed action will be implemented as described.

In summary, with the information available, it is not possible to differentiate watershed alteration effects caused by current livestock grazing on the Pivot Rock Allotment from those caused by past grazing, current elk use, roads, or other human activities. However, the following should be noted:

(1) The overall condition of the upland vegetation and watershed condition is considered by the Forest Service to be generally satisfactory in the uplands and side slopes, though there are "hot spots" that continue to be impacted by ungulate grazing.

(2) Conservation measures included in the proposed action will at least temporarily help offset some adverse effects to the species and critical habitat. However, livestock are known to adversely impact vegetation condition, erosion levels, soil compaction, streambank stability, and stream channel characteristics (see preceding and following discussion) and are likely to continue contributing to these conditions on the allotment in the future. If the adaptive management included in the proposed action is implemented as described, it should minimize these impacts; however, we do expect some adverse effects from continued livestock grazing on the allotment.

(3) Despite improvements in excluding livestock from direct access to portions of critical and suitable habitat, access by livestock into sensitive spinedace habitats (including critical habitat) will continue as indicated in the BAE.

The BAE contains a summary of the types of effects to aquatic and riparian systems that can be attributed to ungulate grazing. The Hydro Science (1993) report addressed the effect that past overuse of the available resources by livestock (and possibly elk) has had on the riparian and aquatic habitats within and affected by the Pivot Rock Allotment. We recognize that the Coconino National Forest and the permittee are working to improve range management and range condition within this allotment through modification of the allotment management plan and through implementation of the *East Clear Creek Watershed Recovery Strategy for the Little Colorado Spinedace and other Riparian Species* (USDA 1999). However, in areas that have been significantly affected and altered by past over-use, even allowing well-managed use to continue may impede recovery in the system. In summary, though we recognize and acknowledge the efforts to minimize impacts throughout the allotment, there may be adverse impacts that directly affect future occupied spinedace habitat, and indirectly affect spinedace and critical 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. Since the land within the action area is almost exclusively managed by the Forest Service, most activities that could potentially affect listed species are Federal activities and subject to additional section 7 consultations.

Future non-federal actions within the project area that may be reasonably certain to occur include the potential development and/or modification of private property in-holdings within the East Clear Creek and Fossil Creek watershed and unregulated recreation. These activities may result in increased overland flow and/or sedimentation into aquatic species habitat (from construction of impermeable surfaces) and the potential for further non-native aquatic species introductions.

CONCLUSION

Chiricahua leopard frog

After reviewing the current status of the CLF, the environmental baseline for the action area, the effects of the proposed livestock grazing and the potential for cumulative effects, it is our biological opinion that implementation of the HPRA AMPs, as proposed, is not likely to jeopardize the continued existence of the CLF. No critical habitat has been designated for this species; therefore, none will be affected. We present this conclusion on the CLF for the following reasons:

- The proposed action would reduce grazing intensity, utilization, and AUMs across the allotment.

- Proposed management of livestock grazing is sufficient to allow reestablishment and maintenance of CLF on the allotments.

Little Colorado spinedace

After reviewing the current status of the Little Colorado spinedace, the environmental baseline for the action area, the effects of the proposed action and the potential for cumulative effects, it is our biological opinion that implementation of the HPRA AMPs, as proposed, is not likely to jeopardize the continued existence of the Little Colorado spinedace, or result in the destruction or adverse modification of critical habitat. We present this conclusion for the following reasons:

- The proposed action would temporarily defer livestock grazing in Kehl, Miller, and Potato South pastures (approximately 80% of the East Clear Creek watershed acreage in the Pivot Rock Allotment). We expect that the deferral of the Kehl pasture, which comprises 43% of the pastures grazed in the East Clear Creek Watershed, will be long-term and will aid in the recovery of the creek and its tributaries. This action should aid in improving the long-term recovery potential for both spinedace and designated critical habitat.

- The proposed action would reduce grazing intensity, utilization, and AUMs across the allotment, which should aid in reducing the amount of ungulate grazing in the watershed (though elk may still continue to impact the area).

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.

The measures described below are non-discretionary, and must be undertaken by the Forest so that they become binding conditions of any grant or permit issued to the appropriate utility, for the exemption in section 7(o)(2) to apply. The Forest has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest (1) fails to assume and implement the terms and conditions or (2) fails to require the (applicant) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Forest or appropriate utility must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement. [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

Chiricahua leopard frog

We anticipate that the proposed action is reasonably certain to result in incidental take of CLF over the life of the project. However, it is difficult to quantify the number of individual frogs taken because: (1) dead or impaired individuals are difficult to find and losses may be masked by seasonal fluctuations in environmental conditions; (2) the status of the species could change over time through immigration, emigration, and loss or creation of habitat; and (3) the species is small-bodied, well camouflaged, and occurs under water of varying clarity. For these reasons, we will attribute take at the sub-population level (hereinafter referred to as occupied sites) as addressed in the Programmatic Biological and Conference Opinion on the Continued Implementation of the Land and Resource Implementation Plans for the Eleven National Forests and National Grasslands of the Southwest Region (USFWS 2005). We anticipate all of the following forms of take over the life of the project:

1. Direct mortality or injury of a proportion of CLF adults, metamorphs, tadpoles, or egg masses at one occupied livestock tank where maintenance activities result in significant disturbance at the tank (e.g., dredging or silt removal, major repair of berms).

2. Direct mortality or injury through trampling of a proportion of CLF adults, metamorphs, tadpoles, or egg masses at one occupied site in a summer pasture from March through October; and trampling of small tadpoles and overwintering frogs at one occupied site in a winter pasture where livestock have access from November through February.

3. Harm or harassment including lost productivity of a proportion of CLF due to loss of bankline and emergent vegetation cover, increased sedimentation of pools, or other forms of habitat at one occupied site where livestock contribute to erosion within or upstream of these sites.

4. Harassment of a proportion of CLFs at one occupied livestock tank due to unintentional benefit to, or facilitation of, nonnative bullfrogs, fish, salamanders, or crayfish that immigrate to newly constructed livestock tanks from nearby populations, existing or introduced.

A proportion, as used above, is a small enough quantity of the population at the tank that exists when the incidental take occurs to allow recovery of the population to pre-disturbance levels over time.

Occupancy of suitable habitat within a CLF metapopulation is dynamic. Discovery of new populations, recolonizations of or reintroductions to extirpated sites, and extirpation of occupied sites are common occurrences with this species; therefore, we expect that over the life of this proposed action, sites where take may occur (sites occupied by CLFs) will change across the allotment. The above anticipated take considers the dynamic nature of frog occupancy; thus, we do not believe reinitiation is needed whenever a new population of CLFs is found, or frogs in a particular livestock tank are periodically absent. However, take is considered to be exceeded if mortality, injury, harm, or harassment, as described in the scenarios above, continues to the degree that recovery of the population at a tank to pre-disturbance levels is precluded.

We also reviewed the prescriptions for take outlined on pages 270 and 271 of the LRMP BO to identify when take has been exceeded. In the LRMP BO and as of June 10, 2005, the Red Rock Ranger District was identified as possessing two extant populations of CLFs. As provided for in the LRMP BO, the authorized level of incidental take of CLF from the proposed action will be exceeded if, after a period of two consecutive years, there is a decrease in the total number of occupied CLF population sites on the Red Rock Ranger District of the Coconino National Forest as a result of the proposed action. In other words and in this example, if after a period of two consecutive years, the species is considered extirpated from the Red Rock Ranger District as a result of livestock management, take will have been exceeded. The amount or extent of take anticipated in this biological opinion may potentially exceed that provided for in the LRMP BO. However, the amount or extent of take anticipated in this biological opinion is predicated upon the reintroduction of CLFs as a result of head-starting activities in progress and anticipated to continue over the next several years. Therefore, over the life of this project, a much larger number of CLF will be extant within the action area and potentially taken through any or all of the means anticipated herein.

Little Colorado spinedace

Incidental take from the proposed livestock grazing is expected to occur both as direct mortality of individual Little Colorado spinedace and as harm resulting from habitat modification and destruction. Though we have not documented livestock trampling fish on this allotment, we believe that take of spinedace is reasonably certain to occur from the grazing activities on the Pivot Rock Allotment in the form of harm and/or harassment due to the potential for trampling of spinedace and/or fish eggs by livestock when livestock access occupied pools. We expect that this take is reasonably certain to occur due to the small, isolated pool habitat that spinedace are reasonably certain to occupy during the life of this project on this allotment. Take is also anticipated to occur when exclosure or riparian fences are breached and livestock are able to access occupied and/or critical habitat, and when livestock loiter in accessible, occupied riparian

reaches within the allotment (e.g. Cienega Draw in the Potato South pasture, Miller Canyon in Miller pasture, and other sites identified for supplemental stocking).

Additionally, though we believe that the proposed action will significantly reduce the potential for the following conditions to occur, we believe that harm and/or harassment is reasonably certain to occur to populations from: 1) reductions in surface flows due to watershed degradation; 2) altered watershed conditions that result in flashier streamflow; and 3) watershed conditions that result in unstable stream channels. The amount of take that occurs each year will depend upon the time any area is grazed, length of time any pasture is used, distribution of livestock across the pasture, effectiveness of utilization monitoring, and effects of previous years' grazing. Use of the watershed by livestock will affect runoff and seasonal water flows to the streams. Because of past actions and the damage to the riparian and aquatic habitats resulting from them, it is difficult to separate out new effects resulting from the continuation of livestock grazing on the watershed.

The anticipated level of take cannot be quantified in numbers of individual spinedace due to the variability in both size and current lack of knowledge regarding the location of future spinedace populations within the drainage. In addition, dead fish are seldom found due to their small size and rapid consumption by scavengers. Therefore, the level of anticipated take will be quantified differently depending on whether incidental take is mortality or harm.

For livestock grazing on the Pivot Rock Allotment, authorized incidental take will be considered to have been exceeded if any one of the following conditions occurs:

a) Livestock access pools and/or the riparian corridors within occupied habitat for more than three days or on more than one occasion. The concern is the potential for dewatering of pool habitat and/or trampling of spinedace within pools (especially when there is no room for displacement of fish to occur). Evidence of this occurring may include, but is not limited to, bank trampling and livestock-fouled water.

b) Livestock access into Kehl, Miller, or Potato South pastures when they are closed to livestock (i.e., during the deferral period) on more than one occasion and when habitat within the watershed of these pastures is occupied.

The FWS will not refer the incidental take of any migratory bird or bald eagle for prosecution under the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. §§ 703-712), or the Bald and Golden Eagle Protection Act of 1940, as amended (16 U.S.C. §§ 668-668d), if such take is in compliance with the terms and conditions (including amount and/or number) specified herein.

EFFECT OF THE TAKE

In this biological opinion, the FWS determined that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

Chiricahua leopard frog

The following reasonable and prudent measures are necessary and terms and conditions are appropriate to minimize the effects of the take of CLF for the HPRAs.

1. The Forest shall take steps necessary to minimize take from the proposed action.

The following terms and conditions are necessary to implement reasonable and prudent measure one:

1.1 The Forest Service shall work with the FWS, AGFD, and the permittee to develop a water monitoring protocol for occupied sites where livestock have access.

1.2 The Forest Service shall provide FWS and AGFD staff at least 60 days notice prior to the permittee conducting work in earthen tanks. This notice will allow for surveys, if needed, and/or mitigation to reduce adverse effects to amphibians.

1.3 The Forest Service shall work with the FWS and AGFD to develop a schedule for aquatic habitat monitoring to be conducted on all perennial streams in the allotment using established regional protocols. This monitoring would establish the condition and trends of the aquatic habitat in response to grazed riparian and upland areas.

1.4 The Forest Service shall modify livestock management in cooperation with the permittee, FWS, and AGFD if monitoring indicates that desired conditions are not being achieved.

2. Personnel education programs and well-defined operational procedures shall be implemented to minimize the contamination of occupied CLF habitat by nonnative species and amphibian chytrid fungus.

The following terms and conditions are necessary to implement reasonable and prudent measure two:

2.1 The Forest Service and the permittee shall not move live fish, crayfish, bullfrogs, leopard frogs, salamanders, or other aquatic organisms among livestock tanks or other aquatic sites.

2.2 The Forest Service and the permittee shall not haul water to any site occupied by CLF from another aquatic site or tank that supports leopard frogs, bullfrogs, crayfish, or fish.

2.3 If nonnative species are detected in stock tanks, the Coconino National Forest shall immediately initiate a multi-stakeholder planning effort to remove the nonnative species from the stock tank as quickly as possible. If a complete drying of a stock tank is deemed as the most effective management tool to address the threat of nonnative species, the Coconino National Forest may time this action so as to not place an unnecessary burden on the permittee.

3. Reporting requirements to our office.

3.1 The Coconino National Forest shall submit an annual summary report to our Flagstaff Suboffice by January 1 each year during project implementation. These reports shall briefly document, for the previous calendar year, the results of any monitoring efforts conducted, a summary of any situations (and their corrective actions) that pertain to the above items, and any other pertinent findings from the previous year. The report shall also make recommendations for modifying or refining these terms and conditions to enhance listed species protection.

3.2 The Coconino National Forest shall notify (written correspondence, e-mail, or phone call) our Flagstaff Suboffice as soon as practicable of the observed occurrence or the discovery of aquatic nonnative species in any stock tank on the HPRAs to provide for collaborative emergency planning and corrective action as required in reasonable and prudent measure 2 and its implementing terms and conditions.

3.3 The Coconino National Forest shall notify (written correspondence, e-mail, or phone call) our Flagstaff Suboffice as soon as practicable of any observation of any pasture boundary or exclusion fence line failure or fence line disrepair that is adjacent to known occupied habitat within the HPRAs and the corrective actions implemented.

Little Colorado spinedace

The following reasonable and prudent measures are necessary and appropriate to minimize take of Little Colorado spinedace on the Pivot Rock Allotment:

1. The Forest Service shall minimize direct mortality to the Little Colorado spinedace in occupied habitat.

The following terms and conditions are necessary to implement reasonable and prudent measure number one:

1.1 The Forest Service shall inspect and maintain all fences one month or less prior to livestock being put in a pasture, and ensure that all fences are maintained while livestock are present. The Forest Service shall notify us of any livestock intrusion into excluded areas.

1.2 The Forest Service shall monitor livestock when they occupy any pastures that may be found to contain occupied habitat.

2. The Forest Service shall minimize indirect injury and mortality through the loss and alteration of Little Colorado spinedace occupied habitat.

The following terms and conditions are necessary to implement reasonable and prudent measure number two:

2.1 The Forest Service shall work with us, AGFD, and the permittee to determine the specific triggers that would allow livestock to use Kehl pasture in the future.

2.2 The Forest Service shall inspect and maintain all fences one month or less prior to livestock being put in a pasture, and ensure that all fences are maintained while livestock are present. The Forest Service shall notify us of any livestock intrusion into excluded areas.

3. The Forest Service shall monitor the fish community and habitat to document levels of incidental take.

The following term and conditions are necessary to implement reasonable and prudent measure number three:

3.1 If livestock gain access to extant Little Colorado spinedace sites (occupied sites) a professional fisheries biologist shall survey the site to look for dead and injured spinedace and note any habitat damage. All findings of dead or injured fish shall be reported as specified in the Disposition of Dead or Injured Listed Species section, below.

3.2 The Coconino National Forest shall submit an annual summary report to our Flagstaff Suboffice by January 1 each year during project implementation. These reports shall briefly document, for the previous calendar year, the results of any monitoring efforts conducted, a summary of any situations (and their corrective actions) that pertain to the above items, and any other pertinent findings from the previous year. The report shall also make recommendations for modifying or refining these terms and conditions to enhance listed species protection. This report/meeting shall summarize for the previous calendar year: 1) implementation and effectiveness of the terms and conditions; 2) documentation of take, if any; 3) allotment monitoring summary and analysis and any proposed changes to the AOI; and 4) any fish and/or habitat monitoring data from the project area. If other monitoring or research is completed concerning Little Colorado spinedace or rangeland conditions, riparian areas, or soil, a copy of the relevant reports shall be included. This report/meeting should be viewed as an opportunity for the Forest Service and FWS to annually communicate regarding the status of the species, environmental conditions, and implementation of the proposed action.

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 in handling dead specimens to preserve the biological material in the best possible state.

If possible, the remains of intact species shall be provided to this office. If the remains of the species are not intact or are not collected, the information noted above shall be obtained and the carcass left in place. Injured animals should be transported to a qualified veterinarian by an authorized biologist. Should the treated species survive, contact our office regarding the final disposition of the animal.

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.

1. We recommend that the Forest Service work with us, AGFD, and the permittee to reintroduce CLF and Little Colorado spinedace to suitable habitats identified through habitat assessment and surveys conducted throughout the HCRAs.

2. We recommend the Forest Service work with us and the AGFD to begin an aggressive program to control non-native aquatic organisms on the Forest, particularly bullfrogs, non-native fish, and crayfish.

3. We recommend that the Forest Service work with us to develop a programmatic environmental assessment and biological opinion to cover tank renovation and maintenance on the Coconino National Forest.

4. We recommend that the Forest Service continue to work with us, AGFD, and the permittee to identify factors that limit the recovery potential of CLF and Little Colorado spinedace on the allotments and work to correct them.

REINITIATION NOTICE

This concludes formal consultation on the action outlined in this biological opinion. As provided in 50 CFR Section 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 that was 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.

Thank you for your continued coordination. In all future correspondence on this project, please refer to the consultation number 22410-2007-F-0198. We also encourage you to coordinate the review of this project with the Arizona Game and Fish Department.

Should you require further assistance or if you have any questions, please contact Shaula Hedwall at (928) 226-0614 (x103) or Brenda Smith (x101) of our Flagstaff Suboffice.

Sincerely,

Brenda L. Smith

for Steven L. Spangle
Field Supervisor

cc electronic copy:
Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Field Supervisor, Arizona Game and Fish Department, Region 2, Flagstaff, AZ
District Ranger, Red Rock Ranger District, Sedona, AZ
District Ranger, Mogollon Rim Ranger District, Happy Jack, AZ
Forest Biologist, Coconino National Forest, Supervisor's Office, Flagstaff, AZ
District Biologist, Red Rock Ranger District, Sedona, AZ
District Biologist, Mogollon Rim Ranger District, Happy Jack, AZ
Jim Rorabaugh, U.S. Fish and Wildlife Service, Tucson, AZ

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APPENDIX A - CONCURRENCES

This appendix contains our concurrences with your "may affect, not likely to adversely affect" determinations for the threatened bald eagle, threatened MSO and its critical habitat, endangered SWWF, endangered Yuma clapper rail, Verde River experimental, nonessential population of Colorado pikeminnow, endangered desert pupfish, endangered Gila topminnow, threatened loach minnow, threatened spikedace, and razorback sucker and its critical habitat. In addition, this appendix, also contains your "not likely to jeopardize determinations" for the candidate yellow-billed cuckoo, and candidate headwater chub.

Bald eagle

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

- There will be no livestock management activities within 0.25 miles of an occupied nest (January – June) or winter roost site (October 15 – April 15).

- Bald eagles from the Coldwater BA forage within the project area. However, the proposed action will result in discountable effects to these, and other eagles', ability to forage along the Verde River and/or Fossil Creek.

Mexican spotted owl and critical habitat

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

- Within the action area, no human disturbance or construction activities associated with livestock grazing will occur in MSO PACs during the breeding season (March 1 through August 30).

- The key habitat components of MSO protected and restricted habitat, and the primary constituent elements of MSO critical habitat will not be adversely affected. Livestock grazing and management activities will provide for levels that provide the woody and herbaceous vegetation necessary for prey species habitat, the residual biomass that will support prescribed natural and ignited fires, and the regeneration of riparian trees.

Southwestern Willow Flycatcher

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

- There is no critical habitat, occupied habitat, or suitable habitat within the action area. Therefore, we believe that effects to SWWF are insignificant and discountable.

- The EA states that livestock may use one to two water access points on the Verde River that have been established to use in (drought) emergencies. According to the Forest Service these access points have not been needed for many years at a time in the past, so

they do not believe that use will occur at these locations often, if at all. Due to the proposed low frequency and limited duration of the use of these sites, we believe that indirect effects to SWWF from the proposed emergency use would be insignificant and discountable.

Yuma clapper rail

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

- The EA states that livestock may use one to two water access points on the Verde River that have been established to use in (drought) emergencies. According to the Forest Service these access points have not been needed for years at a time in the past, so they do not believe that use will occur at these locations often, if at all. Due to the proposed low frequency and limited duration of the use of these sites, we believe that effects to the Verde River and riparian habitat would be insignificant and discountable.

Colorado pikeminnow

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the experimental, non-essential population of Colorado pikeminnow in the Verde River. We base this concurrence on the following:

- Livestock will have extremely limited access to the Verde River where pikeminnow occur, and there are no pikeminnow in any of the tributary streams associated with these allotments. Therefore, it is unlikely that there will be any direct impacts to Colorado pikeminnow from the proposed action.

- There is some potential for increased sedimentation in Fossil Creek and the Verde River from the proposed action. However, the expected increase in sedimentation is expected to be insignificant, due to the relatively small portion of the watershed within the project area, and any effects to aquatic habitat in the Verde River and Fossil Creek should be discountable.

- The EA states that livestock may use one to two water access points on the Verde River that have been established to use in (drought) emergencies. According to the Forest Service these access points have not been needed for years at a time in the past, so they do not believe that use will occur at these locations often, if at all. Due to the proposed low frequency and limited duration of the use of these sites, we believe that indirect effects to Colorado pikeminnow from the proposed emergency use would be insignificant and discountable.

Desert pupfish

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

- Desert pupfish have yet to be stocked into Fossil Creek. However, should they be stocked into Fossil Creek, it is unlikely that the proposed action would result in negative impacts to potential habitat. Livestock would not have access to identified potential habitat and though there is some potential for increased sedimentation in Fossil Creek and the Verde River, the expected increase in sedimentation is expected to be insignificant, due to the relatively small portion of the watershed within the project area.

Gila topminnow

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

- Gila topminnow were stocked into Fossil Creek in 2007 and 2008. Livestock do not have access to Fossil Creek, so there are not likely to be any direct effects from the proposed action to the fish.

- There is some potential for increased sedimentation in Fossil Creek and the Verde River from the proposed action. However, the expected increase in sedimentation is expected to be insignificant, due to the relatively small portion of the watershed within the project area, and any effects to aquatic habitat in the Verde River and Fossil Creek should be discountable.

Loach minnow

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

- Loach minnow were stocked into Fossil Creek in 2007 and 2008. Livestock do not have access to Fossil Creek, so there are not likely to be any direct effects from the proposed action to the fish.

- There is some potential for increased sedimentation in Fossil Creek and the Verde River from the proposed action. However, the expected increase in sedimentation is expected to be insignificant, due to the relatively small portion of the watershed within the project area, and any effects to aquatic habitat in the Verde River and Fossil Creek should be discountable.

Spikedace

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

- Spikedace were stocked into Fossil Creek in 2007 and 2008. Livestock do not have access to Fossil Creek, so there are not likely to be any direct effects from the proposed action to the fish.

- There is some potential for increased sedimentation in Fossil Creek and the Verde River from the proposed action. However, the expected increase in sedimentation is expected

to be insignificant, due to the relatively small portion of the watershed within the project area, and any effects to aquatic habitat in the Verde River and Fossil Creek should be discountable.

Razorback sucker and critical habitat

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the razorback sucker and its critical habitat. We base this concurrence on the following:

- Livestock will have extremely limited access to the Verde River and no access to Fossil Creek where razorback suckers occur. Therefore, it is unlikely that there will be any direct impacts to razorback suckers from the proposed action.

- There is some potential for increased sedimentation in Fossil Creek and the Verde River from the proposed action. However, the expected increase in sedimentation is expected to be insignificant, due to the relatively small portion of the watershed within the project area, and any effects to aquatic habitat in the Verde River and Fossil Creek should be discountable.

- The EA states that livestock may use one to two water access points on the Verde River that have been established to use in (drought) emergencies. According to the Forest Service these access points have not been needed for years at a time in the past, so they do not believe that use will occur at these locations often, if at all. Due to the proposed low frequency and limited duration of the use of these sites, we believe that effects to the Verde River and razorback sucker critical habitat would be insignificant and discountable.

Yellow-billed cuckoo

We concur with your determination that the proposed action is not likely to contribute in a trend toward Federal listing, loss of viability, or jeopardize the continued existence of the yellow-billed cuckoo. We base this concurrence on the following:

- The EA states that livestock may use one to two water access points on the Verde River that have been established to use in (drought) emergencies. According to the Forest Service these access points have not been needed for many years at a time in the past, so they do not believe that use will occur at these locations often, if at all. Due to the proposed low frequency and limited duration of the use of these sites, we believe that indirect effects to yellow-billed cuckoo from the proposed emergency use would be insignificant and discountable.

- Suitable habitat for cuckoos exists on the Verde River, Towel Creek, and Cottonwood/Mesquite Spring. Other riparian areas that support potential habitat include Boulder Canyon, Sally May Wash, Hackberry Canyon, Cimarron Creek, and Dorens Defeat Canyon, Wet Prong, and Sycamore Canyon on the Hackberry Allotment. However, there is limited livestock access to most of these areas and impacts to riparian vegetation from the proposed action should be insignificant and discountable.

Headwater chub

We concur with your determination that the proposed action is not likely to contribute in a trend toward Federal listing, loss of viability, or jeopardize the continued existence of the headwater chub in Fossil Creek and West Clear Creek. We base this concurrence on the following:

- Livestock will not have access to any areas occupied by headwater chub. Therefore, there would be no direct effects to the fish from the proposed action.

- There is some potential for increased sedimentation in Fossil Creek and the Verde River from the proposed action. However, the expected increase in sedimentation is expected to be insignificant, due to the relatively small portion of the watershed within the project area, and any effects to aquatic habitat in the Verde River and Fossil Creek should be discountable.