

## United States Department of the Interior

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July 12, 2001

Mr. John C. Bedell  
Forest Supervisor  
Apache-Sitgreaves National Forest  
P.O. Box 640  
Springerville, Arizona 85938-0640

Dear Mr. Bedell:

This batch conference opinion responds to the Forest Service's February 12, 2001, and April 5, 2001, letters requesting initiation of formal section 7 conferencing under the Endangered Species Act (Act; 16 U.S.C. 1531 et seq.), as amended. The conference concerns possible effects of livestock grazing allotment management plans for the Black River, Nutrioso Summer, Williams Valley, Boneyard, South Escudilla, and Tenney allotments on the proposed threatened Chiricahua leopard frog (*Rana chiricahuensis*). The Forest has determined that the above allotments will not jeopardize the continued existence of Chiricahua leopard frogs. However, the Forest has also requested that conferencing be conducted in accordance with the procedures for formal consultation, as provided in 50 CFR 402.10 (d), and has determined that the above allotments are likely to adversely affect the proposed threatened Chiricahua leopard frog. This conference opinion constitutes a reinitiation of the Fish and Wildlife Service's (Service) February 26, 2001, biological opinion, as two new allotments are proposed, and a new species has been proposed since the original biological opinion was issued.

### Consultation History

On February 6, 1998, the Regional Director of the Service's Southwest Region and the Acting Regional Forester of the Forest Service Southwestern Region signed a consultation agreement that defined the process, products, actions, and schedule for completion of consultation for the ongoing site specific grazing activities on an allotment-by-allotment basis in the Forest Service Southwestern Region. However, the consultation agreement was pertinent only to ongoing grazing activities. Thus, in a letter dated September 18, 1998, the Regional Director of the Service's Southwest Region acknowledged and agreed to the use of guidance criteria for term

grazing permits, which is procedurally similar to the process used for consulting on ongoing grazing activities.

Similar to the consultation agreement for ongoing grazing activities, the Forest and the Service established a Federal "Interagency Grazing Consultation Team," including personnel from both agencies, to assess the effects to listed and proposed species and their critical habitats from term grazing permits on an allotment-by-allotment basis, and develop the supplemental biological assessment. The team worked with each respective Forest staff to review allotment management plans, describe the effects of term-permitted grazing on listed species, and arrive at final determinations of grazing effects on an allotment-by-allotment basis. The objectives of the Interagency Grazing Consultation Team and the process that determines when and how the Service consults on various allotments has been detailed in the Biological Opinion for Southwest Region, U.S. Forest Service Ongoing Livestock Grazing Activities on Allotments (hereafter, Ongoing Grazing Opinion; USFWS 1999).

On August 27, 1999, and June 10, 1999, the Forest presented the Biological Assessments (BA) for the Tenney and South Escudilla allotments to the Region 3 consultation team. Since the grazing team agreed that both allotments were "not likely to adversely affect" listed or proposed species and their critical habitat, section 7 obligations (under the Act) were fulfilled. However, during 2000, the Chiricahua leopard frog was proposed for listing as threatened (65 FR 37343). Thus, the Forest subsequently initiated formal conferencing with the Service for the Tenney and South Escudilla allotments in a letter dated February 9, 2001. The consultation package included allotment-specific biological assessments, maps, and an addendum to each allotment-specific biological assessment.

As with the above two allotments, the Forest initiated consultation (April 21, 2000) for the Black River, Nutrioso Summer, Williams Valley, and Boneyard allotments prior to the date that the Chiricahua leopard frog was proposed for listing as threatened (June 14, 2000). The Service issued a final opinion for the Black River, Nutrioso Summer, Williams Valley, and Boneyard allotments on February 26, 2001 for loach minnow (*Tiaroga cobitis*). This species will not be re-evaluated in this document. All conclusions from the February 2001 biological opinion remain unchanged. For this present conference opinion, the Service made use of the original consultation package (April 21, 2000) in addition to the consultation package dated April 3, 2001, which initiated conferencing on the proposed Chiricahua leopard frog. The April 21, 2000, consultation package included the *USDA Forest Service Southwestern Region Biological Assessment for Issuing Term Grazing Permits*, the "Guidance Criteria for Determining the Effects of Issuing Term Grazing Permits on Threatened, Endangered, or Species Proposed for Listing", and allotment-specific biological assessments. The consultation package dated April 3, 2001, included allotment-specific biological assessments and evaluation addendums and maps. A draft conference opinion was sent to the Forest Service on May 17, 2001. On June 28, 2001, we received a letter from the Forest asking us to finalize the draft document.

## **CONFERENCE OPINION**

## **Description of Proposed Action**

### ***South Escudilla Allotment***

This allotment consists of three pastures; North, South, and Northwest pastures. For years 2003-2009, the North and South pastures are proposed for a deferred grazing system with 64 adult cattle, cow/calf, or combination of adult cattle and yearling cattle in the 450 weight class equating to 225 permitted AUM's. The proposed use for 2001 and 2002 is 329 and 252 cattle, respectively. No new range developments are proposed, and no re-grazing of pastures will be allowed. The Escudilla Wilderness Area, Terry Flat Pasture, and the Escudilla Research Natural Area will be excluded from livestock grazing. Utilization standards were identified in the 1998 production-utilization survey and the utilization standard is proposed at 25% maximum. Permitted season of use is July 1 to October 15 each year. The North Pasture is proposed for a 2 month period of use, and the South Pasture is proposed for 1 ½ months (alternating each year).

The Northwest Pasture is an unfenced special use pasture used in conjunction with leased private land. The Northwest Pasture will receive three weeks of livestock use once each year either during the July 1 to 21 period or the September 23 to October 15 period, depending on precipitation. Stock water for the Northwest Pasture is located on leased private land. Pasture stocking in the Northwest Pasture is 50 adult cattle. Maximum utilization is 25%.

The 1998 production-utilization survey report and map revealing site specific allowable utilization standards will be made part of the term grazing permit. If total utilization in key areas on key forage species (those species being utilized) meets or exceeds the prescribed utilization standard in any key area of a pasture, cattle will be required to be moved to the next scheduled pasture or be removed from National Forest System Lands if no other pastures remain on the current year's annual operating plan.

In Milk, Hulsey, and Paddy creeks, no more than 25% of the sprouts/seedling of a species are allowed to be heavily grazed. If more than 25% of the sprouts/seedlings are heavily grazed at midpoint or sooner during key area utilization surveys, livestock will be required to be moved to the next scheduled pasture or be removed from National Forest System Lands if no other pastures remain on the current year's annual operating plan.

Unlike the current situation where livestock are permitted on the allotment prior to the onset of the summer rains, this alternative would not permit livestock on the allotment during the spring and early summer period when cool season forage plants are growing. This period is generally April through June.

The following provides details on the condition, use, and acreage of the South Escudilla Allotment:

Period of Proposed Action:

- 10 years

Allotment Acres:

- 19,369 total
- 4,196 full capacity range

Proposed Use for North and South pastures:

- 2001 - 329 cow/calf
- 2002 - 252 cow/calf
- 2003 - 2009 - 225 cow/calf

Proposed Use for Northwest Pasture:

- 50 adult cattle

Major Vegetation Types:

- ponderosa pine
- mixed conifer
- meadow and grasslands
- pinyon juniper
- pine-oak
- spruce-fir

Type of Grazing System:

- 2 pasture (deferred rotation); 1 pasture special use

Major Drainages:

- Paddy Creek
- Milk Creek
- Hulsey Creek

Allotment Condition by Key Area:

- 25% meets Forest Plan soil standards; 75% does not meet standards
- 12% meets Forest Plan range standards; 88% does not meet standards

Listed (or Proposed) Species Adversely Affected:

- Chiricahua leopard frog

Ecological Condition and /or Management Action that Contributes to Adverse Effects:

- Riparian areas are in poor condition, and riparian vegetation is not meeting forest plan standards

**Tenney Allotment**

This allotment consists of three pastures; East Long Cienega/Cienega Springs, Road, and West Long Cienega pastures. Portions of Road Pasture are located on private property. For years

2003-2010, the term grazing permit is proposed for 41 AUM's for Forest land within these pastures. The proposed use for 2001 and 2002 is 77 and 64 cattle, respectively. The term private land permit will be 10 AUM's. The term private land permit represents 20% of the estimated capacity identified in the 1998 production-utilization survey. Season of use is July 15 to October 15. No re-grazing of pastures is permitted. A three pasture deferred grazing system involving the above three pastures is proposed. The use periods are one month for each pasture to establish early, mid, and late seasons.

Allowable utilization levels were determined from production-utilization surveys, and range from 10-25% on this allotment. The production-utilization survey map will be included in the term permit, and if utilization standards are exceeded at any time during a scheduled pasture use period on key species in key areas, livestock will be required to be moved early to the next scheduled pasture or be removed from National Forest System Lands if no other pastures remain on the current year's annual operating plan. Best management practices will be used for this allotment, and include 1) diligent herd riding to move cattle to areas where actual use is less than the prescribed utilization standard; 2) salt placement to draw cattle into areas where actual use is less than the prescribed utilization standard; and 3) cattle will be kept in the correct pasture and gates will be kept closed.

The following provides details on the condition, use, and acreage of the Tenney Allotment:

Period of Proposed Action:

- 10 years

Allotment Acres:

- 246 total
- 246 full capacity range

Proposed Use:

- 2001 - 77 cattle
- 2002 - 64 cattle
- 2003-2010 - 51 cattle

Major Vegetation Types:

- ponderosa pine
- meadow and grasslands

Type of Grazing System:

- 3 pasture (deferred rotation)

Major Drainages:

- Jackson Creek
- Dry Blue Creek
- Blue River

Allotment Condition by Key Area:

- 100% meets Forest Plan soil standards; 0% does not meet standards
- 0% meets Forest Plan range standards; 100% does not meet standards

Listed Species Adversely Affected:

- Chiricahua leopard frog

Ecological Condition and /or Management Action that Contributes to Adverse Effects:

- Poor watershed and range conditions will continue to cause erosion and/or siltation to downstream stream courses

### ***Black River Allotment***

This allotment consists of three pastures: Open Draw, Three Forks, and East Pasture. Only East Pasture is scheduled for grazing. For years 2003-2010, the proposed season of use is from July 15 to October 15 with 220 cattle (330 AUM's). The proposed use for 2001 and 2002 is 77 and 64 cattle, respectively. Grazing will occur in a two-year cycle, with each grazing season lasting 6 weeks. Cattle are scheduled to enter the East Pasture on July 15 and exit the pasture on September 1 of the first year, and will enter the pasture on September 1 and exit the pasture on October 15 of the second year. The allotment will receive complete rest during the spring growing season (April to mid-July).

Using best management practices, this allotment is proposed for 20% forage utilization objectives. No re-grazing of pastures will be allowed. Grazing will not be allowed in the Boneyard Creek holding trap and in the creek below the holding trap to the pasture boundary. No regrazing of pastures will be allowed. Annual variations in plant vigor and density, precipitation, soil moisture, wild ungulate forage utilization, and other related resource factors will be evaluated during pre-livestock and range readiness inspections. These resource conditions will be documented and carried forward when determining the actual date for a "mid-point" forage utilization measurement within key areas in each pasture. If the forage utilization standard in key areas is met or exceeded at any time during the pasture use period, livestock will be required to immediately move to the next scheduled pasture or removed from National Forest System Lands. If forage utilization at or near midpoint is below the objective, the timing of further monitoring will be based on the rate of forage utilization. At the end of the grazing season, forage utilization measurements and/or range inspections will be completed to determine current conditions.

Livestock shipping will be conducted from the Open Draw Holding Trap and corral #1537, and trailed to the East Pasture. When cattle exit the East Pasture they will be trailed back to the Open Draw shipping corral and trap. When trailing livestock, cattle will only cross the North Fork of the East Fork of the Black River at the confined road crossing of Forest Road 249. Livestock trailing to and from the Open Draw holding trap and corral is limited to four days. Boneyard corral #1096 and the cabin complex corral #1321 will be removed from National Forest System Lands. A range fence will replace a portion of the corral complex to prevent livestock access into Boneyard holding trap #1318.

The following provides details on the condition, use, and acreage of the Black River Allotment:

Period of Proposed Action:

- 10 years

Allotment Acres:

- 14,371 total
- 7,308 full capacity range; approximately 3,600 in East Pasture

Proposed Use:

- 220 cow/calf, 07/15-10/15

Elevation and Major Vegetation Types:

- 7,600 - 9,200 feet (2,316 - 2,804 m)
- ponderosa pine
- mixed conifer
- meadow and grasslands

Projected Stocking Density:

- reduced to 330 animal months from 2134 animal months by 2002

Type of Grazing System:

- 1 pasture (time rotation)

Major Drainages:

- Boneyard Creek
- Coyote Creek
- Deer Creek
- East Fork Black River
- North Fork of East Fork Black River
- Open Draw
- Three Forks

Allotment Condition by Key Area:

- 25% meets Forest Plan soil standards; 75% does not meet standards
- 50% meets Forest Plan range standards; 50% does not meet standards

Listed Species Adversely Affected:

- Chiricahua leopard frog

Ecological Condition and /or Management Action that Contributes to Adverse Effects:

- Grazing in the East Pasture generates sediment that enters Boneyard Creek, which flows into the North Fork of the East Fork of the Black River.

**Boneyard Allotment**

This allotment is proposed to be a consolidation of Boneyard and Nutrioso Winter allotments. The Forest proposes to permit 97 cattle (292 AUM's) from July 15 to October 15, based on the 1998 Production-Utilization Survey. Using a deferred grazing system, Boneyard, Grassyhollow, and Middle pastures are scheduled for use from July 15 to September 20. Each pasture will receive approximately 3 weeks of grazing (Buck McKinney, USFS, pers. com.). The Nutrioso Winter Pasture is proposed for use from September 21 to October 15 each year.

Using best management practices, this allotment is proposed for 25% forage utilization objectives. No regrazing of pastures will be allowed. Annual variations in plant vigor and density, precipitation, soil moisture, wild ungulate forage utilization, and other related resource factors will be evaluated during pre-livestock and range readiness inspections. These resource conditions will be documented and carried forward when determining the actual date for a "mid-point" forage utilization measurement within key areas in each pasture. If the forage utilization standard in key areas is met or exceeded at any time during the pasture use period, livestock will be required to be immediately moved to the next scheduled pasture or be removed from National Forest System Lands. If forage utilization at or near midpoint is below the objective, the timing of further monitoring will be based on the rate of forage utilization. At the end of the grazing season, forage utilization measurements and/or range inspections will be completed to determine current conditions.

Livestock grazing in the Duck Trap adjacent to Sierra Blanca Lake in the Boneyard Pasture will not be permitted. The permittee will be responsible for maintenance of the Duck Trap enclosure, and other gathering traps will only be used by livestock to facilitate scheduled pasture moves. The permittee will finance 100% of new range development materials and construction. The following may be installed: a new storage tank with trough on Robinson Spring development located in the Nutrioso Winter Pasture, and a pipeline with trough from the Forest Service horse pasture. However, these new range developments are not required for implementation or monitoring.

The following provides details on the condition, use, and acreage of the Boneyard Allotment:

Period of Proposed Action:

- 10 years

Allotment Acres:

- 4,478 total
- 3,465 full capacity range

Proposed Use:

- 97 cattle, 07/15-10/15



Major Vegetation Types:

- ponderosa pine
- mixed conifer
- grasslands

Projected Stocking Density:

- 2001 - 628 AUMs, 2002 - 461 AUMs
- reduced to 292 animal months from 795 animal months by 2003

Type of Grazing System:

- 3 pasture deferred rotation (Nutrioso Winter pasture is season long)

Major Drainages:

- Coyote Creek
- Watts Creek
- Davis Creek

Allotment Condition by Key Area:

- 55% of the area meets Forest Plan soils standards; 45% does not meet standards
- 44% of the allotment meets Forest Plan range standards; 56% does not meet standards

Listed Species Adversely Affected:

- Chiricahua leopard frog

Ecological Condition and /or Management Action that Contributes to Adverse Effects:

- Grazing will occur in the headwater areas of streams in action area.
- Some riparian areas influencing aquatic conditions in Boneyard and Coyote creeks are highly eroded and contribute sediment to streams that may be occupied by the Chiricahua leopard frog.

**Nutrioso Summer Allotment**

The Forest proposes to implement a two pasture, deferred grazing system with a season of use extending from July 15 to October 15 of each year. Four pastures will be consolidated into two pastures for this action: North Springs and Pace Draw Trap will be consolidated, and Boneyard and Sulzberger pastures will be consolidated. One-hundred six adult cattle (318 AUM's) will use the resulting two pastures. Auger Canyon and Miller pastures will both be excluded from livestock grazing, and the Forest fenced Boneyard Bog in 1999 to exclude livestock. Rogers Marsh will be excluded from livestock grazing, with the exception of one small livestock watering point.

Using best management practices, this allotment is proposed for 25% forage utilization objectives. No re-grazing of pastures will be allowed. No re-grazing of pastures will be allowed. Annual variations in plant vigor and density, precipitation, soil moisture, wild ungulate forage utilization, and other related resource factors will be evaluated during pre-livestock and range readiness inspections. These resource conditions will be documented and carried forward when determining the actual date for a "mid-point" forage utilization measurement within key areas in

each pasture. If the forage utilization standard in key areas is met or exceeded at any time during the pasture use period, livestock will be required to immediately move to the next scheduled pasture or removed from National Forest System Lands. If forage utilization at or near midpoint

is below the objective, the timing of further monitoring will be based on the rate of forage utilization. At the end of the grazing season, forage utilization measurements and/or range inspections will be completed to determine current conditions.

The following provides details on the condition, use, and acreage of the Nutrioso Summer Allotment:

Period of Proposed Action:

- 10 years

Allotment Acres:

- 15,000 total
- 13,465 full capacity range

Proposed Use:

- 106 cattle, 07/15-10/15

Major Vegetation Types:

- ponderosa pine
- mixed conifer
- grasslands

Projected Stocking Density:

- 2001 - 1067 AUMs, 2002 - 693 AUMs
- reduce to 318 animal months from 1,441 animal months by 2003

Type of Grazing System:

- 2 pasture deferred rotation

Major Drainages:

- Boneyard Creek
- Colter Creek
- Nutrioso Creek
- Auger Creek

Allotment Condition by Key Area:

- 20% meets Forest Plan soils standards; 80% does not meet standards
- 20% meets Forest Plan range standards; 80% does not meet standards

Listed Species Adversely Affected:

- Chiricahua leopard frog

Ecological Condition and /or Management Action that Contributes to Adverse Effects:

- Grazing will occur in the headwater areas of streams occupied by loach minnow, which was addressed in the previous biological opinion.
- Some riparian areas influencing aquatic conditions in Boneyard and Coyote creeks are highly eroded and contributing sediment downstream to loach minnow habitat.

**Williams Valley Allotment**

The Forest proposes to implement a three pasture deferred rotation to include Noble/Williams, Addition, and Talwiwi pastures. Permitted season of use is scheduled between July 15 and October 15 of each year. Capacity is 455 AUM's based on the 1998 Production-Utilization survey (from BA). The small holding pastures for horses and cattle, which are wet meadows in Alpine Valley, will be excluded from livestock grazing. In total, 151 adult cattle (cow/calf) are proposed for this allotment. Three periods of use are proposed (early, mid, and late season), with 1 month of use for each period. No re-grazing of pastures will be permitted. Each pasture will receive two periods of deferment out of three periods during a three-year cycle. On the fourth year, the rotation cycle repeats. This deferred system will be implemented as follows:

Using best management practices, this allotment is proposed for 25% forage utilization objectives. Annual variations in plant vigor and density, precipitation, soil moisture, wild ungulate forage utilization, and other related resource factors will be evaluated during pre-livestock and range readiness inspections. These resource conditions will be documented and carried forward when determining the actual date for a "mid-point" forage utilization measurement within key areas in each pasture. If the forage utilization standard in key areas is met or exceeded at any time during the pasture use period, livestock will be required to be immediately moved to the next scheduled pasture or be removed from National Forest System Lands. If forage utilization at or near midpoint is below the objective, the timing of further monitoring will be based on the rate of forage utilization. At the end of the grazing season, forage utilization measurements and/or range inspections will be completed to determine current conditions.

**The following provides details on the condition, use, and acreage of the Williams Valley Allotment:****Period of Proposed Action:**

- 10 years

**Allotment Acres:**

- 13,378 total
- 7,231 full capacity range

**Proposed Use:**

- 151 cow/calf, 07/15-10/15

**Elevation and Major Vegetation Types:**

- 8,000 - 9,600 (2,438 - 2,926 m)
- ponderosa pine
- grasslands

Projected Stocking Density:

- reduce to 455 animal months from 1045 animal months by 2004

Type of Grazing System:

- 3 pasture deferred rotation

Major Drainages:

- Coyote Creek
- San Francisco River

Allotment Condition by Key Area:

- 75% meets Forest Plan soils standards; 25% does not meet standards
- 58% meets Forest Plan range standards; 42% does not meet standards

Listed Species Adversely Affected:

- Chiricahua leopard frog

Ecological Condition and /or Management Action that Contributes to Adverse Effects:

- Grazing in the Addition Pasture generates sediment that enters Coyote Creek, which flows into the East Fork of the Black River. Elk use in the Kentucky bluegrass bottoms of Coyote Creek are likely to affect the rate of recovery and ability of the vegetation to filter sediments.

**Status of the Species (range-wide)**

The Chiricahua leopard frog (*Rana chiricahuensis*) was proposed for listing as a threatened species without critical habitat in a Federal Register notice dated June 14, 2000. The rule included a proposed special rule to exempt operation and maintenance of livestock tanks on non-Federal lands from the section 9 take prohibitions of the Act. This species is distinguished from other members of the *Rana pipiens* complex by a combination of characters, including a distinctive pattern on the rear of the thigh consisting of small, raised, cream-colored spots, or tubercles, on a dark background; dorsolateral folds that are interrupted and deflected medially; stocky body proportions; relatively rough skin on the back and sides; and often green coloration on the head and back (Platz and Meham 1979). The species also has a distinctive call consisting of a relatively long snore of one to two seconds in duration (Davidson 1996, Platz and Meham 1979). Snout-vent lengths of adults range from approximately 2.1 to 5.4 inches (54.0 to 139.0 millimeters) (Stebbins 1985, Platz and Meham 1979). The Ramsey Canyon leopard frog (*Rana subaquavocalis*) is similar in appearance to the Chiricahua leopard frog, but it often grows to a larger size and has a distinct call that is typically given under water (Platz 1993).

The Chiricahua leopard frog is an inhabitant of cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 1,000 to 2,710 meters (m) (3,281 to 8,890 feet (ft)) in central and southeastern Arizona; west-central and southwestern New Mexico; and in Mexico, northern

Sonora, and the Sierra Madre Occidental of Chihuahua, northern Durango and northern Sinaloa (Platz and Mecham 1984, Degenhardt *et al.* 1996, Sredl *et al.* 1997). The distribution of the species in Mexico is unclear due to limited survey work and the presence of closely related taxa (especially *Rana montezumae*) in the southern part of the range of the Chiricahua leopard frog. In New Mexico, of sites occupied by Chiricahua leopard frogs 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 known historic localities are natural lotic systems, a little less than half are stock tanks, and the remainder are lakes and reservoirs (Sredl *et al.* 1997). Sixty-three percent of currently extant populations in Arizona occupy stock tanks (Sredl and Saylor 1998).

Populations on the Mogollon Rim are disjunct from those in southeastern Arizona. Based on preliminary analysis of allozymes, the Rim populations may represent a taxon distinct from the southern populations (James Platz, Creighton University, pers. comm. 2000). However, mitochondrial DNA work at the University of Denver does not support this conclusion (N. Benedict, pers. comm. 1999). Additional work is needed to clarify the genetic relationship among Chiricahua leopard frog populations.

Die-offs of Chiricahua leopard frogs were first noted in former habitats of the Tarahumara frog (*Rana tarahumarae*) in Arizona at Sycamore Canyon in the Pajarito Mountains (1974) and Gardner Canyon in the Santa Rita Mountains (1977-78) (Hale and May 1983). From 1983-1987, Clarkson and Rorabaugh (1989) found Chiricahua leopard frogs at only two of 36 Arizona localities that had supported the species in the 1960s and 1970s. Two new populations were reported. During extensive surveys from 1995-2000, primarily by Arizona Game and Fish Department personnel, Chiricahua leopard frogs were observed at 60 localities in Arizona (Sredl *et al.* 1997, Rosen *et al.* 1996, Service files). In New Mexico, the species was found at 41 sites from 1994-1999; eight of 31 of those were verified extant during 1998-1999 (Painter 2000). During May-August 2000, the Chiricahua leopard frog was found extant at only eight of 34 sites where the species occurred in New Mexico during 1994-1999 (C. Painter, pers. comm. 2000). The species has been extirpated from about 75 percent of its historic localities in Arizona and New Mexico. The status of the species in Mexico is unknown.

Based on Painter (2000) and the latest information for Arizona, the species is still extant in all major drainages in Arizona and New Mexico where it occurred historically; however, it has not been found recently in many rivers, valleys, and mountains ranges, including the following in Arizona: White River, East Clear Creek, West Clear Creek, Silver 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, Sonoita Creek, Pinaleno Mountains, Peloncillo Mountains, Sulphur Springs Valley, and Huachuca Mountains. In many of these regions Chiricahua leopard frogs were not found for a decade or more despite repeated surveys. Recent surveys suggest the species may have recently disappeared from some major drainages in New Mexico (C. Painter, pers. comm. 2000).

Native riparian ecosystems, especially in the arid Southwest, are disappearing rapidly. Because riparian zones often follow the gradual elevation changes of a watershed, they are often desirable for road and pipeline construction leading to greater impacts to riparian ecosystems. In the early years of livestock management, emphasis was on the uplands with very little concern for riparian areas. In fact riparian areas were considered “sacrifice areas” in range management schemes. As a result, serious damage to stream channels and aquatic habitat occurred. It was not until the 1970's that serious consideration was given to managing riparian areas. Riparian areas are widely recognized as crucial to the overall ecological health of rangelands in the western U.S.; however, many are in degraded condition, largely as a result of poorly managed livestock grazing (U.S. General Accounting Office 1988). Livestock tend to congregate in riparian areas for extended periods, eat much of the vegetation, and trample streambanks, often eliminating other benefits of riparian habitat (e.g., fish and wildlife habitat, erosion control, floodwater dissipation). Riparian areas, however, have ecological importance far beyond their relatively small acreage because they have a greater quantity and diversity of plant species than adjoining land.

Threats to this species include predation by nonnative organisms, especially bullfrogs, fish, and crayfish; disease; drought; floods; degradation and destruction of habitat; water diversions and groundwater pumping; disruption of metapopulation dynamics; increased chance of extirpation or extinction resulting from small numbers of populations and individuals; and environmental contamination. Numerous studies indicate that declines and extirpations of Chiricahua leopard frogs are at least in part caused by predation and possibly competition by nonnative organisms, including fish in the family Centrarchidae (*Micropterus* spp., *Lepomis* spp.), bullfrogs (*Rana catesbeiana*), tiger salamanders (*Ambystoma tigrinum mavortium*), crayfish (*Oronectes virilis* and possibly others), and several other species of fish (Fernandez and Rosen 1998, Rosen *et al.* 1996, 1994; Snyder *et al.* 1996; Fernandez and Bagnara 1995; Sredl and Howland 1994; Clarkson and Rorabaugh 1989). For instance, in the Chiricahua region of southeastern Arizona, Rosen *et al.* (1996) found that almost all perennial waters investigated that lacked introduced predatory vertebrates supported Chiricahua leopard frogs. All waters except three that supported introduced vertebrate predators lacked Chiricahua leopard frogs. Sredl and Howland (1994) noted that Chiricahua leopard frogs were nearly always absent from sites supporting bullfrogs and nonnative predatory fish. Rosen *et al.* (1996) suggested further study was needed to evaluate the effects of mosquitofish, trout, and catfish on frog presence.

Disruption of metapopulation dynamics is likely an important factor in regional loss of populations (Sredl *et al.* 1997, Sredl and Howland 1994). Chiricahua leopard frog populations are often small and habitats are dynamic, resulting in a relatively low probability of long-term population persistence. Historically, populations were more numerous and closer together. If populations winked out due to drought, disease, or other causes, extirpated sites could be recolonized via immigration from nearby populations. However, as numbers of populations declined, populations became more isolated and were less likely to be recolonized if extirpation occurred. Also, most of the larger source populations along major rivers have disappeared.

Fire frequency and intensity in the mountain ranges of southeastern Arizona and southwestern

New Mexico are much altered from historic conditions. Before 1900, surface fires generally occurred at least once per decade in montane forests with a pine component. Beginning about 1870-1900, these frequent ground fires ceased to occur due to intensive livestock grazing that removed fine fuels, followed by effective fire suppression in the mid to late 20<sup>th</sup> century (Swetnam and Baisan 1996). Absence of ground fires allowed a buildup of woody fuels that precipitated infrequent but intense crown fires (Danzer *et al.* 1997, Swetnam and Baisan 1996). Absence of vegetation and forest litter following intense crown fires exposes soils to surface and rill erosion during storms, often causing high peak flows, sedimentation, and erosion in downstream drainages (DeBano and Neary 1996). Following the 1994 Rattlesnake fire in the Chiricahua Mountains, Arizona, a debris flow filled in Rucker Lake, a historic Chiricahua leopard frog locality. Leopard frogs (either Chiricahua or Ramsey Canyon leopard frogs) apparently disappeared from Miller Canyon in the Huachuca Mountains, Arizona, after a 1977 crown fire in the upper canyon and subsequent erosion and scouring of the canyon during storm events (Tom Beatty, Miller Canyon, pers. comm. 2000). Leopard frogs were historically known from many localities in the Huachuca Mountains; however, natural pool and pond habitat is largely absent now and the only breeding leopard frog populations occur in man-made tanks and ponds. Crown fires followed by scouring floods are a likely cause of this absence of natural leopard frog habitats. Bowers and McLaughlin (1994) list six riparian plant species they believed might have been eliminated from the Huachuca Mountains as a result of floods and debris flow following destructive fires.

Recent evidence suggests a chytridiomycete skin fungi is responsible for observed declines of frogs, toads, and salamanders in portions of Central America (Panama and Costa Rica), South America (Atlantic coast of Brazil, Ecuador, and Uruguay), Australia (eastern and western States), New Zealand (South Island), Europe (Spain and Germany), Africa (South Africa, “western Africa”, and Kenya), Mexico (Sonora), and United States (8 States) (Speare and Berger 2000, Longcore *et al.* 1999, Berger *et al.* 1998, S. Hale pers. comm. 2000). Ninety-four species of amphibians have been diagnosed as infected with the chytrid *Batrachochytrium dendrobatidis*. In Arizona, chytrid infections have been reported from four populations of Chiricahua leopard frogs (M. Sredl, pers. comm. 2000), as well as populations of Rio Grande leopard frog (*Rana berlandieri*), Plains leopard frog (*Rana blairi*), lowland leopard frog (*Rana yavapaiensis*), Tarahumara frog (*Rana tarahumarae*), canyon treefrog (*Hyla arenicolor*), and Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*) (Davidson *et al.* 2000, Sredl and Caldwell 2000, Morell 1999, S. Hale pers. comm. 2000). The disease was recently reported from a metapopulation of Chiricahua leopard frogs from New Mexico; that metapopulation may have been extirpated (C. Painter, pers. comm. 2000). The proximal cause of extinctions of two species, the Australian gastric brooding frogs and the golden toad (*Bufo periglenes*) in Costa Rica, was likely chytridiomycosis. Another species in Australia for which individuals were diagnosed with the disease may be extinct (Daszak 2000).

The role of the fungi in the population dynamics of the Chiricahua leopard frog is as yet undefined; however, it may well prove to be an important contributing factor in observed population decline. Rapid death of recently metamorphosed frogs in stock tank populations of



Chiricahua leopard frogs in New Mexico was attributed to post-metamorphic death syndrome (Declining Amphibian Populations Task Force 1993). Hale and May (1983) and Hale and Jarchow (1988) believed toxic airborne emissions from copper smelters killed Tarahumara frogs and Chiricahua leopard frogs in Arizona and Sonora. However in both cases, symptoms of moribund frogs matched those of chytridiomycosis. Chytrids were recently found in a specimen of Tarahumara frog collected during a die off in 1974 in Arizona. This earliest record for chytridiomycosis corresponds to the first observed mass die-offs of ranid frogs in Arizona.

The origin of the disease is unknown, but epizootiological data from Central America and Australia (high mortality rates, wave-like spread of declines, wide host range) suggest introduction of the disease into naive populations and the disease subsequently becoming enzootic in some areas. Alternatively, the fungus may be a widespread organism that has emerged as a pathogen because of either higher virulence or an increased host susceptibility caused by other factors such as environmental changes (Berger *et al.* 1998), including global climate change (Daszak 2000, Pounds and Crump 1994). If it is a new introduction, its rapid colonization could be attributable to humans. The fungus does not have an airborne spore, so it must spread via other means. Amphibians in the international pet trade (Europe and USA), outdoor pond supplies (USA), zoo trade (Europe and USA), laboratory supply houses (USA), and species recently introduced (*Bufo marinus* in Australia and bullfrog in the USA) have been found infected with chytrids, suggesting human-induced spread of the disease (Daszak 2000). Chytrids could also be spread by tourists or fieldworkers sampling aquatic habitats (Halliday 1998). The fungus can exist in water or mud and thus could be spread by wet or muddy boots, vehicles, cattle, and other animals moving among aquatic sites, or during scientific sampling of fish, amphibians, or other aquatic organisms. The Service and Arizona Game and Fish Department are employing preventative measures to ensure the disease is not spread by aquatic sampling.

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

### **III. ENVIRONMENTAL BASELINE**

#### **South Escudilla Allotment**

Problems associated with unsatisfactory soil conditions and dysfunctional riparian conditions include increases in sedimentation into the streams, compaction and poor water infiltration that alter the natural hydrograph by increasing runoff spikes and decreasing baseflows, and poor ground cover that increases rain impacts. These factors contribute to stream conditions which may decrease the quality and quantity of Chiricahua leopard frog habitat. Ungulate grazing tends to amplify many of the existing watershed problems, and may slow or inhibit watershed improvements. The Forest Service has implemented some range improvements; however, overstocking and high levels of range utilization, in combination with wildlife use, appear to affect watershed conditions and reduce the quality and quantity of Chiricahua leopard frog habitat and potential of perennial flow in Nutrioso Creek and its tributaries.

Nutriosos Creek is a north flowing tributary of the Little Colorado River; their confluence is at the town of Springerville. The headwaters of Nutriosos Creek begins at the Alpine Divide. Paddy, Milk/Hulsey, Auger, Colter, and Riggs creeks join Nutriosos Creek above Nelson Reservoir. Stream flow is basically perennial from Paddy Creek to Nelson Reservoir. From approximately Milk Creek above the town of Nutriosos to Nelson Reservoir, Nutriosos Creek has been classified as "functional at risk" and courses through a broad bottom, which is primarily in private ownership. There are several water diversions associated with the private land, and the stream channel in the lower valley is incised up to approximately 6.5 feet (2 m). The National Forest recently acquired property which included Nutriosos Creek immediately above Nelson Reservoir. Below the impoundment, Rudd Creek joins, and US Highway 180 closely parallels, Nutriosos Creek until Correjo Crossing. There are numerous unvegetated, steep angled road cuts which contribute large amounts of sediment to Nutriosos Creek. After Nutriosos Creek exits the National Forest and enters private land, there are several water diversions and the creek only flows seasonally.

A large elk population resides within the Nutriosos Creek watershed and contributes to grazing pressures, especially on riparian habitats. Elk populations may have an affect on riparian areas and functions. Fire suppression has probably also had an effect on the hydrology of the watershed, resulting in pine forests with more trees and dense canopies.

### **Tenney Allotment**

This allotment drains entirely into Jackson Creek, a tributary to the Dry Blue Creek. Drainage from the allotment is collected in Tenney Pond (small reservoir with an earthen dam) prior to entry into Jackson Creek. Tenney Pond therefore acts as a sediment trap, preventing sediments generated from livestock grazing on the allotment from entering Jackson Creek. No perennial streams exist within the allotment. Upland areas are dominated by ponderosa pine, and some areas contain old-growth pine with relatively open understories. Ground cover is good in upland forested areas, and fair in lowland areas. The allotment is characterized by relatively flat topography.

This allotment displays somewhat open, heavily grazed wet meadows and riparian stringers that were historically dominated by alpine timothy, mannagrass, and tufted hairgrass. Grass diversity has since decreased and is now dominated primarily by blue grass. Current and historic grazing practices include both elk and livestock utilization. Ungulate grazing tends to amplify many of the existing watershed problems, and may slow or inhibit watershed improvements. Overstocking and high levels of range utilization, in combination with wildlife use, appear to affect watershed conditions and reduce the quality and quantity of Chiricahua leopard frog habitat. Some stream channels show small downcuts 1.6 - 2.5 feet (0.5-0.75 m), a manifestation of poor watershed condition.

Baseline conditions in this allotment have been degraded by past overstocking and the resultant overutilization. As is shown in the 1998 Production-Utilization Survey Map in the Forest's

August 27, 1999 Biological Assessment and Evaluation for the Tenney Allotment, at least 11 of 14 areas sampled for utilization levels exceeded the allowable use. At least half of the 14 areas showed double the allowable use, and one area near Tenney Pond showed a utilization level more than triple the allowable use (allowable use was 25%, and the utilization survey showed 80% use).

### **Black River Allotment**

Within an elevation range of 7,600 to 9,200 feet (2,316 - 2,804 m), the vegetation communities are ponderosa pine and mixed conifer forests with large areas of open grassland or meadow. There are three pastures on the allotment: Open Draw, Three Forks, and East Pasture. The East Pasture is of primary concern in this allotment because no other pastures will be grazed under this proposed action. All of the East Pasture is within the lower portion of the Boneyard Creek watershed. Boneyard Creek is perennial through this pasture, with several intermittent tributaries. Livestock currently have direct access to Boneyard Creek, and the defined ephemeral drainages that feed into it in the East Pasture. However, livestock have not grazed Boneyard Creek since 1997 because of personal convenience non-use of the permittee. As a result, Boneyard Creek has received rest for three full years. No "in-stream" tanks exist that might capture sediments from the runoff of the East Pasture. Based on data collected in 1998, 50% of key areas in the allotment are in unsatisfactory condition, and 75% of the key areas are in unsatisfactory soil condition.

This allotment was not in use in 1998, 1999, or 2000, and was thus not consulted on as part of the Ongoing Grazing Opinion (USFWS 1999). Thus, although livestock access to Boneyard Creek was not restricted, Boneyard Creek has had 3 years of recovery time since grazing did not occur in recent years. However, given that soil condition is unsatisfactory (75% does not meet Forest Plan Standards), it is reasonable to conclude that the allotment has been in a very poor state for some time, and that livestock grazing has contributed a measurable amount of sediments into the stream channels. Furthermore, since the soil condition is generally unsatisfactory, the filtration of sediments is not likely, and transportation overland is likely to occur. Once sediments reach a defined drainage channel, their transport directly into Boneyard Creek and the East Fork of the Black River is likely.

### **Boneyard Allotment**

The Boneyard Allotment is a rather small allotment (4,478 acres; 1,812 ha) in the upper watershed of the Black River drainage. Within an elevation range of 8,400 to 9,100 feet (2,560 - 2,774 m), the vegetation communities are ponderosa pine and mixed conifer forests with large areas of open grassland or meadow. There are four pastures on the allotment: Boneyard, Middle, Nutrioso Winter, and Grassy Hollow. These lie within the watershed of Coyote and Boneyard creeks.

Coyote Creek crosses through the lower portion of the allotment within the Grassy Hollow Pasture, about 3 miles (4.8 km) upstream from its confluence with the East Fork of the Black

River, just downstream of the area known as Three Forks of the Black River. Most of Grassy Hollow and Middle pastures are within the Coyote Creek watershed. Coyote Creek can be characterized as permanent/interrupted throughout much of the reach through the allotment (in some years, flow is interrupted by dry stretches, though pools are expected to remain). Access to Coyote Creek and the defined ephemeral drainages that feed from both pastures is unhindered. However, in accordance with the 1999 Ongoing Grazing Opinion, the Forest and grazing permittee protected Coyote Creek from grazing in 1999 and 2000 by not allowing livestock grazing in the Grassy Hollow pasture. The Forest and permittee fully met this objective, as Coyote Creek has now had 2 full seasons of rest. The soil condition for this allotment shows 55% are meeting Forest Plan Standards in key areas. Some opportunity exists for filtration of sediments by vegetation; however, once sediments reach a defined drainage channel, some transport into the East Fork of the Black River is possible.

Boneyard Pasture and part of Middle Pasture are within the Boneyard Creek watershed. About half of Boneyard Pasture appears to drain into Sierra Blanca Lake, an impoundment created by the construction of an earthen dam that empties directly into Boneyard Creek approximately 3 miles (4.8 km) above Three Forks. It is likely that this reservoir functions to trap sediments and nutrients that might be generated through livestock grazing on that portion of Boneyard Pasture, and precludes their entry into Boneyard Creek. The balance of the Boneyard Pasture and a small section of Middle Pasture drain into a portion of Williams Valley that, in turn, drains into Boneyard Creek without first flowing through Sierra Blanca Lake. Runoff in this portion of the allotment travels overland or in an eroded channel from 1 to about 4 miles (1.6 to 6.4 km) prior to reaching perennially flowing water at the Boneyard Springs complex. Sediments flowing into the incised channel on the east end of the Boneyard and Middle pastures of the Boneyard Allotment are likely to travel into Boneyard Creek and then to the North Fork of the East Fork of the Black River. Boneyard Creek appears to be heavily embedded and is characterized by incised channels. The 1999 Ongoing Grazing Opinion documented the poor distribution of livestock which had contributed to ongoing erosion problems. Areas easily accessible to livestock had been overgrazed, and less accessible areas had been ungrazed. Range condition on 56% of the allotment is currently unsatisfactory. Elk contribute to heavy forage utilization on the allotment, and often use areas before livestock enter the allotment. Degraded watershed conditions are primarily due to roads, livestock management, and wild ungulates.

### *Nutriosio Summer Allotment*

The Nutriosio Summer Allotment is in the upper watershed of the Black River drainage. Within an elevation range of 7,600 to 8,200 feet (2,316 - 2,499 m), the vegetation communities are ponderosa pine and mixed conifer forests, with scattered tracts of open grassland or meadow. Four pastures of the Nutriosio Summer Allotment (North Springs, Boneyard, Pace Draw Trap, and Sulzberger) lie partially or entirely within the upper watershed of Boneyard Creek, about 3 to 4 miles (4.8 - 6.4 km) upstream from its confluence with the North Fork of the East Fork of the Black River.

The Nutrioso Summer Allotment within Boneyard and Sulzberger pastures may provide some filtration of sediments when the flow is spread overland across the wide, relatively low-gradient Williams Valley. Sediments flowing into the incised channel on the east end of the Boneyard and Middle pastures of the Boneyard Allotment are likely to travel into Boneyard Creek and then to the North Fork of the East Fork of the Black River. Boneyard Creek appears to be heavily embedded and is characterized by incised channels.

On the Nutrioso Summer Allotment, range condition in 80% of key areas in the allotment do not meet Forest Plan standards. Elk contribute to heavy forage utilization on the allotment. Active erosion is occurring and, based on monitoring, soil condition does not meet Forest Plan Soil Standards on 80% of key areas in the allotment. Much of the runoff from these pastures (especially in the southwest portion of Boneyard Pasture and a portion of the Sulzberger Pasture) eventually flows across the wide, relatively low-gradient grasslands of Williams Valley. Although these grass meadows may provide some opportunity for filtering overland runoff, the runoff eventually must flow through degraded, ephemeral drainage channels that offer little filtering capability. Because of direct access by livestock, erosion from the banks of these channels likely has contributed a measurable amount of sediments downstream. Once these sediments enter the degraded channels, they are transported directly into the North Fork of the East Fork of the Black River, and downstream into the East Fork of the Black River. Degraded watershed conditions are primarily due to roads, livestock management, and wild ungulates.

The Ongoing Grazing Opinion directed the Forest to exclude livestock access to the riparian/stream corridor of Boneyard Creek and main tributary channels in Boneyard and North Springs pastures within this allotment in 1999. While livestock did not have access to the primary Boneyard Creek corridor, livestock did graze the main tributary channels in Boneyard and North Springs pastures. This was not in accordance with the Ongoing Grazing Opinion, but the Forest did remove livestock once utilization levels reached the maximum level of 25% (Buck McKinney, USFS, pers. com.).

The Forest completed a fence project in 1999 that excluded livestock access to the sensitive Boneyard Bog area within the Boneyard Pasture. The fencing will exclude livestock from approximately 20 acres (8.09 ha) within the pasture.

### ***Williams Valley Allotment***

The eastern portion of the allotment, including the Talwiwi and Noble/Williams Valley pastures, essentially forms the upper-most headwaters of the San Francisco River. Luna Lake, a human-made reservoir on the San Francisco River, is located about 5 miles (8 km) downstream of the allotment (about 30 miles [48 km] upstream of the occupied leopard frog habitat near Reserve) and likely functions to collect most of the sediments that may originate from the allotment.

The disjunct western portion of this allotment (Addition Pasture) includes the downstream portion of the Coyote Creek watershed, which drains into occupied leopard frog habitat in the

East Fork of the Black River just downstream of the area known as Three Forks of the Black River. Coyote Creek, as it leaves the Addition Pasture, is about 0.7 miles from the East Fork of the Black River. An unnamed tributary of the East Fork of the Black River drains a portion of the Addition Pasture, joining the East Fork of the Black River downstream of Coyote Creek and above Open Draw.

On the Williams Valley Allotment, range condition in all areas is poor, with low plant vigor. Elk contribute to heavy forage utilization on the allotment. Active erosion is occurring, although the soil condition is satisfactory across 75% of the key areas in the allotment. On the Addition Pasture, sediments in overland runoff may be filtered somewhat by the litter accumulated in forested areas. Tanks located in small drainages on the pasture may capture some sediments and prevent them from entering the East Fork of the Black River. Livestock are not restricted from accessing Coyote Creek or any of the other drainage bottoms within the Addition Pasture. In addition, Coyote Creek on the Addition Pasture is characterized by an incised channel running through a heavily impacted grassland/meadow and likely does not function as an effective sediment filter/buffer. Sediments generated from the cutbanks directly enter the drainage channel. Sediments generated in these areas would have little opportunity to be removed from runoff prior to entering the East Fork of the Black River.

Having established the degraded conditions in this allotment, some improvements have been made in the past couple of years. In accordance with the 1999 Ongoing Grazing Opinion, the Forest and permittee took action to ensure that cattle were excluded from Coyote Creek. Within the grazing permit, the Forest stipulated that livestock were to remain out of Coyote Creek, and if ever found in the drainage, cattle were to be promptly removed. In 1999, livestock were found in the Coyote Creek drainage, and were also removed by the permittee (Buck McKinney, USFS, pers. comm.). In addition to this, the Forest has implemented \$15,000 worth of erosion control structures to reduce sediment transport into the East Fork of the Black River from Coyote Creek. In total, 33 small rock structures were constructed on 5 ephemeral drainages within the Addition Pasture. Four of the drainages flow into an existing earthen stock tank prior to entering Coyote Creek, while the fifth flows uninterrupted into the East Fork of the Black River. Degraded watershed conditions are primarily due to roads, livestock management, and wild ungulates.

### **Status of the Species Within the Action Area**

The range of the Chiricahua leopard frog in Arizona can be divided into two general areas: (1) the southeastern part of the state and (2) centered along the Mogollon Rim. Populations occurring on the Alpine District of the Apache-Sitgreaves National Forests occur within the northern portion of the species' range. Threats to the species occur throughout its range, but the populations above the Mogollon Rim in Arizona appear to have relatively poor persistence (J. Rorabaugh, U.S. Fish and Wildlife Service, pers. comm. 2001).

### ***South Escudilla Allotment***

There are no historical or recent references to this species occurring within the boundary of this allotment. However, within the action area of the allotment, the species was historically (1979) known to occur at Nelson Reservoir, approximately 1 mile (1.6 km) north of the North Pasture, and at Correjo Crossing, further downstream in Nutrioso Creek. There have not been any surveys conducted specifically for this species on this allotment. Therefore, it is not known if this species occurs within the allotment boundaries. The allotment contains potential habitat, including livestock tanks, springs, cienegas, and streams such as Hulsey, Milk, and Paddy creeks that are tributaries to Nutrioso Creek, which in turn drains into Nelson Reservoir.

### **Tenney Allotment**

In the Blue River watershed, Chiricahua leopard frogs were reported during the early 1970's and early 1980's from sites downstream of the allotment along the mainstem of the Blue River and upper tributaries. More recently, this species was collected and photographed by Forest personnel approximately 17 miles (27 km) upstream of the confluence with the San Francisco River along the mainstem of the Blue River. In 1997, Forest personnel observed a die-off of leopard frogs, approximately 6 miles (9.6 km) above the confluence with the San Francisco River, at Juan Miller crossing on the Blue River. Some individuals were collected and sent to Jim Platz, who concluded that, in addition to Lowland leopard frogs, some of the individuals were Chiricahua leopard frogs. During 1997, specimens of Chitrid fungus were also found at Juan Miller crossing on the Blue River (Mike Sredl, Arizona Game and Fish Department, pers. comm. 2001). The Service assumes that the Blue River is occupied by Chiricahua leopard frogs.

### **Black River Allotment**

The Chiricahua leopard frog occurs in the North Fork of the East Fork of the Black River at Three Forks within the Three Forks pasture of this allotment. The status of the Chiricahua leopard frog at Three Forks is as follows, and applies to all allotments affecting frogs in the Three Forks area.

Only rough estimates of frog numbers in the Three Forks area are available. Fernandez and Rosen (1996) conducted cursory surveys from 1986-1996, but the surveys lacked the scientific rigor needed for definitive numbers or trend analysis (e.g., surveys were not conducted at night). However, the authors incidentally noticed that frogs were much more abundant at sites lacking introduced crayfish (*O. virilis*). The crayfish population at Three Forks has steadily grown in the past decade (or more), and crayfish have damaged aquatic vegetation, stream banks, and the invertebrate community of the springs complex. Crayfish have effectively removed substantial amounts of aquatic vegetation such as water cress (*Rorippa nasturtium-aquaticum*) and water buttercup (*Ranunculus aquatilis*) from the springs complex, which eliminates refugia for the Chiricahua leopard frog, and may make the frog more vulnerable to predation.

Since many areas in the Three Forks springs complex are devoid of significant amounts of aquatic vegetation, the invertebrate community that relies on such vegetation is impaired.

Crayfish probably also affect invertebrate numbers directly, as supported by the significantly lower numbers of invertebrates in areas occupied by crayfish in the Three Forks area (Fernandez and Rosen 1996). The damage caused by crayfish extends to stream health at Three Forks in other ways which are obvious even to the layperson. Crayfish have altered the stream channel by creating extensive burrow tunnels, which leads to bank erosion, increases in water turbidity, and siltation.

In the Three Forks Springs complex, there exists a small area where water ponds, creating habitat for the Chiricahua leopard frog to breed. This area may be the last natural breeding area for the frog in the White Mountains. Whether this is the case or not, it is important to preserve this area as a breeding locale to maintain the integrity and genetic diversity of Chiricahua leopard frog populations in the White Mountains. At the time of Fernandez and Rosen's (1996) study, crayfish were not observed in the pond, but in recent years, crayfish have dispersed into the pond (P. Fernandez and T. Meyers, Grand Canyon University and USFS, pers. comm.), potentially rendering egg masses vulnerable to crayfish predation.

#### **Boneyard Allotment**

The Chiricahua leopard frog occurs in the North Fork of the East Fork of the Black River at Three Forks, approximately 4.5 miles (7.2 km) downstream from this allotment on the Black River allotment. In addition, frogs (species unknown, but suspected to be leopard frogs) have been sighted at the Boneyard Springs complex on the Nutrioso Summer allotment and in the marsh area on private lands at Sierra Blanca. Both of these areas are immediately adjacent to the boundary for this allotment.

#### **Nutrioso Summer Allotment**

This species occurs in the North Fork of the East Fork of the Black River at Three Forks, approximately 4.5 miles (7.2 km) downstream from this allotment on the Black River allotment. In addition, frogs (species unknown, but suspected to be leopard frogs) have been sighted at the Boneyard Springs complex on the Nutrioso Summer allotment and in the marsh area on private lands at Sierra Blanca. Additional suitable habitat within the allotment occurs in Roger's Marsh, the North Spring complex, and in various stock tanks across the allotment. Suitable habitat outside of the allotment, but within the action area occurs in Colter Creek and at Roger's Reservoir.

#### **Williams Valley Allotment**

Chiricahua leopard frogs are not known to occur within the boundary of this allotment. However, the species occurs within the North Fork of the East Fork of the Black River (NFEFBR) at Three Forks. Three pastures of this allotment (Addition, Noble Mountain, and William's Valley) partially lie within the upper watershed of Coyote and Boneyard Creeks, about 0.25 and 4 miles (0.4 - 6.4 km), respectively, upstream from the NFEFBR. The disjunct western



portion of this allotment, Addition Pasture, includes the downstream portion of the Coyote Creek watershed, which drains into the NFEFBR, approximately 0.25 miles (0.4 km) downstream from Three Forks. The population of Chiricahua leopard frogs in the NFEFBR are considered within the action area of livestock grazing within these pastures of this allotment.

The eastern portion of the allotment, which includes almost all of the Talwiwi, Noble Mountain, and William's Valley pastures are within the upper headwaters of the San Francisco River. There are historical records (1970's) of this species occurring at Luna Lake, approximately 2.5 miles (4 km) downstream from the allotment. Luna Lake is considered within the action area of livestock grazing on this allotment.

#### IV. EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the species or critical habitat, together with the effects of other activities that are interrelated and interdependent with that action, that will be added to the environmental baseline. Interrelated actions are those that are part of a larger action and depend on the larger action for their justification. Interdependent actions are those that have no independent utility apart from the action under consideration. Indirect effects are those that are caused by the proposed action and are later in time, but are still reasonably certain to occur.

The effects of livestock grazing on ranid frog populations are not well-studied. Munger *et al.* (1994) found that sites with adult Columbia spotted frogs (*Rana luteiventris*) had significantly less grazing pressure than sites without spotted frogs. However, in a subsequent survey he found no differences (Munger *et al.* 1996). Bull and Hayes (2000) evaluated reproduction and recruitment of the Columbia spotted frog in 70 ponds used by cattle and 57 ponds not used by cattle. No significant differences were found in the number of egg masses or recently metamorphosed frogs in grazed and ungrazed sites. Seventeen percent of the sites were livestock tanks. The California red-legged frog (*Rana aurora draytonii*) coexists with managed livestock grazing in many places in California. Ponds created as livestock waters have created habitats for red-legged frogs and livestock may help maintain habitat suitability by reducing coverage by cattails, bulrush, and other emergent vegetation (US Fish and Wildlife Service 2000). On the other hand, exclusion of cattle from the Simas Valley, Contra Costa County, corresponded with reestablishment of native trees and wetland herbs, reestablishment of creek pools, and expansion of red-legged frog populations (Dunne 1995).

Maintenance of viable populations of Chiricahua leopard frogs is thought to be compatible with well-managed livestock grazing. Grazing occurs in most of the habitats occupied by this frog. For instance, a large and healthy population of Chiricahua leopard frogs coexists with cattle and horses on the Tularosa River, New Mexico (Randy Jennings, Western New Mexico University, pers. comm. 1995). Effects of grazing on Chiricahua leopard frog habitat probably include both creation of habitat and loss and degradation of habitats. Construction of tanks for livestock has created important leopard frog habitat, and in some cases has replaced destroyed or altered

natural wetland habitats (Sredl and Saylor 1998). Sixty-three percent of extant Chiricahua leopard frog localities in Arizona are stock tanks, versus only 35 percent of extirpated localities (Sredl and Saylor 1998), suggesting Arizona populations of this species have fared better in stock tanks than in natural habitats. Stock tanks provide small patches of habitat, which are often dynamic and subject to drying and elimination of frog populations. However, Sredl and Saylor (1998) also found that stock tanks are occupied less frequently by nonnative predators (with the exception of bullfrogs) than natural sites.

Adverse effects to the Chiricahua leopard frog and its habitat as a result of grazing may occur under certain circumstances. These effects include facilitating dispersal of nonnative predators; trampling of egg masses, tadpoles, and frogs; deterioration of watersheds; 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 (U.S. Fish and Wildlife Service 2000, Belsky *et al.* 1999, Ohmart 1995, Hendrickson and Minckley 1984, Arizona State University 1979, Jancovich *et al.* 1997). Creation of livestock waters in areas without aquatic habitats may provide the means for nonnative predators, such as bullfrogs and crayfish, to move across arid landscapes that would otherwise serve as a barrier to their movement. Increased erosion in the watershed caused by grazing can accelerate sedimentation of deep pools used by frogs (Gunderson 1968). Sediment can alter primary productivity and fill interstitial spaces in streambed materials with fine particulates that impede water flow, reduce oxygen levels, and restrict waste removal (Chapman 1988). Eggs, tadpoles, and metamorphosing Chiricahua leopard frogs are probably trampled by cattle on the perimeter of stock tanks and in pools along streams (US Fish and Wildlife Service 2000). Juvenile and adult frogs can probably 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. Cattle can remove bankline vegetation cover that provides escape cover for frogs and a source of insect prey. However, dense shoreline or emergent vegetation in the absence of grazing may favor some predators, such as garter snakes (*Thamnophis* sp.), and the frogs may benefit from some open ground for basking and foraging. At a tank in the Chiricahua Mountains, Sredl *et al.* (1997) documented heavy cattle use at a stock tank that resulted in degraded water quality, including elevated hydrogen sulfide concentrations. A die off of Chiricahua leopard frogs at the site was attributed to cattle-associated water quality problems, and the species has been extirpated from the site since the die off.

Chytrid fungus can survive in wet or muddy environments, and could conceivably be spread by cattle carrying mud on their hooves and moving among frog habitats. The disease could also be spread by ranch hands working at an infected tank or aquatic site and then traveling to another site with mud or water from the first site. Chytrids could be carried inadvertently in mud clinging to wheel wells or tires, or on shovels, boots, or other equipment. Chytrids cannot survive complete drying, thus, if equipment is allowed to thoroughly dry, the likelihood of disease transmission is much reduced. Bleach or other disinfectants can also be used to kill chytrids (Longcore 2000). Chytrids, if not already present, could immigrate to the allotments naturally via frogs or other animals. Chytridiomycosis is not known to occur within the Black

River, Nutrioso Summer, Williams Valley, Boneyard, South Escudilla, or Tenney allotments, but it is known to occur within the vicinity of the allotments (M. Sredl, Arizona Game and Fish Department, pers. comm. 2001) at Juan Miller crossing on the Blue River. Thus, if chytrids are not already present, there may be a high probability of immigration to the action area.

Maintenance of roads and tanks needed for the grazing program could provide fishing opportunities and facilitate access by anglers, hunters, or other recreationists, who may inadvertently introduce chytrids or may intentionally introduce nonnative predators for angling or other purposes. Chytrids could be moved among aquatic sites during intentional introductions of fish or other aquatic organisms. Anglers commonly move fish, tiger salamanders, and crayfish among tanks and other aquatic sites to establish a fishery or a source of bait, or in some cases bait is released at an aquatic site during angling. Water, salamanders, or perhaps fish and crayfish could all be carriers of chytrids. In addition to possibly introducing chytrids, such activities would also facilitate introduction of nonnative predators with which the Chiricahua leopard frog cannot coexist.

For all of the allotments in this conference opinion, stock tank maintenance would typically occur when tanks are dry or nearly dry. At that time, dams would be repaired or silt would be dredged out of the tanks. During drought, many leopard frogs probably disperse from drying tanks or are killed by predators as waters recede. However, some frogs persist in cracks in the mud of pond bottoms (M. Sredl, Arizona Game and Fish Department, pers. comm. 1999) or in clumps of emergent vegetation. Halfmoon Tank in the Dragoon Mountains went dry during June 1996 for 30 days or more. On July 21, 1996, 29 frogs of several different size classes were counted after the tank refilled with the summer monsoons (J. Rorabaugh, USFWS, pers. comm.). Frogs probably took refuge in thick mats of cattails around the tank, but may have also stayed in cracks in the drying mud of the pond bottom, in rodent burrows, or other retreats that stayed moist. Frogs present in mud or in emergent vegetation could be killed or injured during silt removal or berm repair. If not killed, they may be flushed from moist retreats and die of exposure or dessication, or be killed by predators. If remaining wetted soils and emergent vegetation are completely disturbed or removed during cleaning out of a tank, a frog population could possibly be eliminated.

### **South Escudilla Allotment**

The proposed action would implement a 2-pasture (plus one private pasture) deferred grazing system with a shortened period of livestock operation as compared to the current permit. Unlike the current situation where livestock are permitted on the allotment prior to the onset of summer rains, this proposal would not permit livestock on the allotment during the spring and early summer period when cool season forage plants are growing. This period is generally April through June.

For the first few years, a stocking rate above the capacity of the allotment is proposed. In addition, baseline conditions of the allotment are poor. Overgrazing by livestock contributes to

reducing the quality and quantity of riparian and wetland habitats through deterioration of watersheds, erosion and/or siltation of stream courses, elimination of undercut banks that provide cover for frogs, and loss of wetland and riparian vegetation and backwater pools. A riparian vegetation assessment was conducted in 1998 during the utilization study on Hulsey, Milk, and Paddy creeks. It was determined that these streams do not meet Forest Plan Standards for riparian vegetation condition. In addition, eggs and tadpoles of Chiricahua leopard frogs may be trampled by domestic livestock along the perimeters of stock tanks and in pools along streams. Cattle can also contribute to degraded water quality at stock tanks, including elevated hydrogen sulfide concentrations, which are toxic to frogs (Sredl et. al 1997).

### **Tenney Allotment**

The proposed action would implement a 3-pasture deferred grazing system with a shortened period of livestock operation as compared to the current permit. Livestock season of use would be from 7/15 to 10/15. Livestock capacity was based on the 1998 utilization survey report and a maximum 25% grazing utilization standard would be implemented. This proposed action would not permit livestock on the allotment during the spring and early summer period when cool season forage plants are growing.

The wet and upland meadows of this allotment contain a system of intermittent drainages which flow into Tenney Pond and the overflow drains into the perennial waters of Jackson Creek, which, in turn drains into the perennial Dry Blue Creek in New Mexico. The Dry Blue Creek is a tributary to the Blue River. Tenney Pond and its backwaters and various stock tanks on the allotment provide suitable habitat for this species. In addition, the intermittent drainages also provide suitable habitat and travel corridors for this species during the wetter periods of the year. The first few years of this allotment propose a stocking rate above the capacity of the allotment. In addition, baseline conditions of the allotment are poor. Overgrazing by livestock contributes to reducing the quality and quantity of riparian and wetland habitats through deterioration of watersheds, erosion and/or siltation of stream courses, elimination of undercut banks that provide cover for frogs, and loss of wetland and riparian vegetation and backwater pools. Furthermore, this allotment contains Tenney Pond and several stock tanks that may contain frogs, tadpoles, or egg masses that could be trampled by livestock along the perimeters of the pond and tanks.

### **Black River Allotment**

The proposed action would implement a 1-pasture grazing system with a shortened period of livestock operation as compared to the current permit. Each year's grazing season is 1.5 months where livestock enter July 15 and exit the allotment on September 1 the first year, and enter September 1 and exit October 15 during the second year.

The first few years of this allotment propose a stocking rate above the capacity of the allotment. In addition, baseline conditions of the allotment are poor. Overgrazing by livestock contributes to reducing the quality and quantity of riparian and wetland habitats through deterioration of

watersheds, erosion and/or siltation of stream courses, elimination of undercut banks that provide cover for frogs, and loss of wetland and riparian vegetation and backwater pools. Direct take (through trampling) of Chiricahua leopard frogs in the Three Forks area is not expected because the Three Forks Pasture is not proposed for grazing, and cattle are not permitted in the Three Forks area.

All of the East Pasture of this allotment is within the lower portion of the Boneyard Creek watershed. Boneyard Creek is perennial throughout this pasture, with several intermittent tributaries. Boneyard Creek may be occupied by this species and/or it may serve as a migration corridor to other suitable habitats upstream, such as Sierra Blanca Lake or the Boneyard Spring complex on the Nutrioso Summer Allotment. This may be evidenced by unidentified frogs (but suspected to be leopard frogs) that have been found at the Boneyard Springs complex and in the marsh area on private lands at Sierra Blanca. Livestock have direct access to Boneyard Creek and the defined ephemeral drainages that feed into the East Pasture. In addition to the mechanical damage (trampling) associated with livestock grazing in riparian areas, livestock trampling along drainages and in the upper watershed may generate sediments and/or nutrients that could enter potentially occupied leopard frog habitat along Boneyard Creek. Sediments and/or nutrients may impact this species in the following ways: (1) sediments and/or nutrients may influence the invertebrate food base in some undefined manner by impacting the physical and vegetative characteristics of the aquatic habitat and (2) sediments may be detrimental to successful reproduction by smothering egg masses and early larval stages.

### ***Boneyard Allotment***

The proposed action would implement a 4-pasture grazing system with a shortened period of livestock operation (7/15-10/15) as compared to the current permit. This action combines the Boneyard and Nutrioso Winter allotments into one Boneyard allotment. Each year, three pastures (Boneyard, Grassyhollow, and Middle) would be utilized from July 15 to September 20 and one pasture, Nutrioso Winter, would be utilized from September 21 to October 15.

Livestock grazing on the Boneyard, Middle, and Grassyhollow pastures may generate sediments and/or nutrients that could enter Boneyard Creek during runoff events. Boneyard Creek may be occupied by the Chiricahua leopard frog and/or it may serve as a migration corridor to other suitable habitats upstream, such as the Boneyard Spring complex on the Nutrioso Summer allotment, or suitable habitats downstream, such as the marsh area on private lands at Sierra Blanca. Approximately half of the Boneyard pasture drains into Sierra Blanca Lake, an impoundment created by the construction of an earthen dam that empties directly into Boneyard Creek. Sediments and/or nutrients would most likely collect in the shallow, marshy area at the southern end of the lake. This area may also be occupied by Chiricahua leopard frogs.

The balance of the Boneyard Pasture and a small portion of the Middle Pasture drain into William's Valley, which drains directly into Boneyard Creek. Runoff in this portion of the allotment travels overland or in a highly eroded channel from 1 to about 4 miles (1.6 to 6.4 km) prior to reaching perennially flowing water at the Boneyard Springs complex.

Most of the Middle Pasture and almost all of the Grassyhollow Pasture are within the Coyote Creek watershed. Coyote Creek flows through the Grassyhollow pasture. The creek is typically perennial in much of its reach through this pasture. Livestock have direct access to Coyote Creek and the defined, ephemeral drainages that feed into it in both pastures. Livestock grazing in these pasture most likely generate sediments and/or nutrients into Coyote Creek as a result of stream bank trampling damage. Coyote Creek may be occupied by this species and it may serve as a migration corridor to other suitable habitats downstream in the North Fork of the East Fork of the Black River.

In addition to the mechanical damage (trampling) associated with livestock grazing in riparian areas, livestock trampling along drainages and in the upper watershed may generate sediments and/or nutrients that could enter potentially occupied leopard frog habitat along Boneyard Creek. Sediments and/or nutrients may impact this species in the following ways: (1) sediments and/or nutrients may influence the invertebrate food base in some undefined manner by impacting the physical and vegetative characteristics of the aquatic habitat and (2) sediments may be detrimental to successful reproduction by smothering egg masses and early larval stages.

#### **Nutriosio Summer Allotment**

The proposed action would implement a 2-pasture deferred grazing system with a season of use from July 15 to October 15 each year with 106 adult cattle. The Auger Canyon and Miller pastures will be excluded from livestock grazing, and Boneyard Bog was fenced in 1999 to exclude grazing.

Livestock grazing in the upland watersheds of the North Springs, Boneyard, and Sulzberger pastures and Pace Draw Trap may generate sediments and/or nutrients that could enter Boneyard Creek during runoff events. Boneyard Creek may be occupied by this species and it may serve as a dispersal corridor to other suitable habitats downstream, such as the Boneyard Springs complex, the marsh area on private land adjacent to Sierra Blanca Lake, and the North Fork of the East Fork of the Black River at Three Forks.

Sediments may impact the Chiricahua leopard frog by influencing the invertebrate food base, by impacting the vegetative characteristics of the aquatic habitat, or by smothering egg masses and early larval stages.

#### **Williams Valley Allotment**

This alternative would implement a 3-pasture deferred grazing system, with a shortened period of livestock operation as compared to the current permit. Livestock season of use would be from 7/15 to 10/15, and the utilization standard is from 10-25%, depending on the area.

For the first few years, a stocking rate above the capacity of the allotment is proposed. In addition, baseline conditions of the allotment are poor. Overgrazing by livestock contributes to

reducing the quality and quantity of riparian and wetland habitats through deterioration of watersheds, erosion and/or siltation of stream courses, elimination of undercut banks that provide cover for frogs, and loss of wetland and riparian vegetation and backwater pools.

Three pastures of this allotment (Addition, Noble Mountain, and William's Valley) partially lie within the upper watershed of Coyote and Boneyard Creeks, upstream from the North Fork of the East Fork of the Black River. The disjunct western portion of this allotment, Addition Pasture, includes the downstream portion of the Coyote Creek watershed, which drains into the North Fork of the East Fork of the Black River, downstream from Three Forks. Livestock have direct access to Coyote Creek and the defined, ephemeral drainages that feed into it in both pastures. Livestock grazing in these pastures most likely generate sediments and/or nutrients into Coyote Creek as a result of stream bank trampling damage. Coyote Creek may be occupied by this species and it may serve as a migration corridor to other suitable habitats downstream in the North Fork of the East Fork of the Black River.

An understanding of the dispersal abilities of Chiricahua leopard frogs is key to determining the likelihood that suitable habitats will be colonized from a nearby extant population of frogs. As a group, leopard frogs are surprisingly good at dispersal. In Michigan, young northern leopard frogs (*Rana pipiens*) commonly move up to 2,625 feet (800 m) from their place of metamorphosis, and 3 young males established residency up to 3.23 miles (5.2 km) from their place of metamorphosis (Dole 1971). Both adults and juveniles wander widely during wet weather (Dole 1971). In the Cypress Hills, southern Alberta, young-of-the-year northern leopard frogs successfully dispersed to downstream ponds 1.3 miles (2.1 km) from the source pond, upstream 0.62 miles (1 km), and overland 0.25 miles (0.4 km). At Cypress Hills, a young-of-the-year northern leopard frog moved 5 miles (8 km) in one year (Seburn et al. 1997). The Rio Grande leopard frog (*Rana berlandieri*) in southwestern Arizona has been observed to disperse at least 1 mile (1.6 km) from any known water source during the summer rainy season (Rorabaugh in press). After the first rains in the Yucatan Peninsula, Rio Grande leopard frogs have been collected several kilometers from water (Campbell 1998). In New Mexico, Jennings (1987) noted collections of Rio Grande leopard frogs from intermittent water sources and suggested these were frogs that had dispersed from permanent water during wet periods.

Dispersal of leopard frogs away from water in the arid Southwest may occur less commonly than in mesic environments in Alberta, Michigan, or the Yucatan Peninsula during the wet season. However, there is evidence of substantial movements even in Arizona. In August, 1996, Rosen and Schwalbe (1998) found up to 25 young adult and subadult Chiricahua leopard frogs at a roadside puddle in the San Bernardino Valley, Arizona. They believed that the only possible origin of these frogs was a stock tank located 3.4 miles (5.5 km) away. Rosen et al. (1996) found small numbers of Chiricahua leopard frogs at two locations in Arizona that supported large populations of nonnative predators. The authors suggested these frogs could not have originated at these locations because successful reproduction would have been precluded by predation. They found that the likely source of these animals were populations 1.25 - 4.35 miles (2-7 km) distant. In the Dragoon Mountains, Arizona, Chiricahua leopard frogs breed at Halfmoon Tank,

but frogs occasionally turn up at Cochise Spring (0.8 miles [1.3 km] down canyon in an ephemeral drainage from Halfmoon Tank) and in Stronghold Canyon (1 mile [1.7 km] down canyon from Halfmoon Tank). There is no breeding habitat for Chiricahua leopard frogs at Cochise Spring or Stronghold Canyon, thus it appears observations of frogs at these sites represent immigrants from Halfmoon Tank. In the Chiricahua Mountains, a population of Chiricahua leopard frogs disappeared from Silver Creek stock tank after the tank dried up; but frogs then began to appear in Cave Creek, which is about 0.62 miles (1.0 km) away, again, suggesting immigration. Movements away from water do not appear to be random. Streams are important dispersal corridors for young northern leopard frogs (Seburn *et al.*, 1997). Displaced northern leopard frogs will home, and apparently use olfactory and auditory cues, and possibly celestial orientation, as guides (Dole, 1968, 1972). Rainfall or humidity may be an important factor in dispersal because odors carry well in moist air, making it easier for frogs to find other wetland sites (Sinsch, 1991).

The eastern portion of the allotment, which includes almost all of the Talwiwi, Noble Mountain, and William's Valley pastures are within the upper headwaters of the San Francisco River. The historical records of Chiricahua leopard frogs at Luna Lake indicate that suitable habitat in the San Francisco River drainage is within the action area, and mechanical damage (trampling) associated with livestock grazing in riparian areas will likely generate sediments that may be detrimental to successful reproduction by smothering egg masses and early larval stages.

### **Summary**

The effects to the Chiricahua leopard frog from the proposed action primarily occur in the riparian areas (in or associated with wetter areas), wetland communities, and stock tanks within the South Escudilla, Tenney, Black River, Boneyard, Nutrioso Summer, and Williams Valley allotments. Grazing effects also result from the trampling of egg masses, tadpoles, and frogs from livestock having direct access to aquatic habitat or stock tanks. Diseases such as chytrids can be moved among aquatic sites by cattle and operations.

### **V. 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 conference 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.

The majority of the lands in the action area and adjacent areas is owned and managed by the Forest Service. Thus, the effects of most activities likely to occur in the project area would not be considered cumulative effects. However, a private inholding occurs within the Road Pasture of the Tenney Allotment. This inholding also contains a stream which drains into Tenney Pond. Activities could occur on this land, such as construction of roads, buildings, or other structures, that might adversely affect the Chiricahua leopard frog. Some activities on private lands in Arizona may require Federal permits, such as 404 Clean Water Act permits from the U.S. Army



Corps of Engineers. Effects of these activities would be covered by the section 7 process and are not considered cumulative. Effects of activities in Arizona that do not have a Federal nexus could be addressed by a section 10(a)(1)(B) incidental take permit, if the Chiricahua leopard frog is subsequently listed, and if the action may result in take of frogs.

Further cumulative effects include the impact of elk and antelope that utilize the allotments prior to, during, and after livestock use. Non-native aquatic species such as brown trout, fathead minnows, and crayfish are all potential predators of the leopard frog (perhaps more as a tadpole) and its eggs. The direct impact of non-native aquatic species requires further investigation. However, the effect of crayfish on the habitat of the Chiricahua leopard frog is clearly negative. These effects have been discussed in the “Status of the Species within the Action Area” section of this document.

## **VI. CONCLUSION**

After reviewing the current status of the Chiricahua leopard frog, the environmental baseline for the action area, and the anticipated effects of proposed livestock grazing activities on the South Escudilla, Tenney, Black River, Boneyard, Nutrioso Summer, and Williams Valley allotments, and the cumulative effects, it is the Service's conference opinion that the proposed action is not likely to jeopardize the continued existence of the Chiricahua leopard frog. No critical habitat has been proposed, thus none would be affected. We make these findings for the following reasons:

1. Although the Chiricahua leopard frog is known to be extant in the Black River allotment, grazing is not proposed in pastures that contain areas known to be occupied by the frog.
2. The Chiricahua leopard frog occurs over a large area of eastern Arizona, western New Mexico and portions of northwestern Mexico. The proposed action affects a very small portion of the species' range.
3. Chiricahua leopard frogs can coexist with well-managed livestock grazing.
4. The Forest Service has conducted a production-utilization study, and has determined livestock capacity conducive to healthy range conditions for the allotments covered in this conference opinion. Once livestock numbers have been reduced to capacity (as is proposed), conditions on all allotments are expected to improve.
- 5.

## **INCIDENTAL TAKE STATEMENT**

Section 9 of the Act and Federal regulation 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 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 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 prohibitions against taking the species found in section 9 of the Act do not apply until the species is listed. However, the Service advises the Forest Service to consider implementing the following reasonable and prudent measures. If this conference opinion is adopted as a biological opinion following a listing or designation, these measures, with their implementing terms and conditions, will be nondiscretionary, and must be undertaken by the Forest Service so that they become binding conditions of any grant or permit issued to the permittee, as appropriate, for the exemption in section 7(o)(2) to apply. The Forest Service has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest Service (1) fails to assume and implement the terms and conditions or (2) fails to require the permittee 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 Service or permittee must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement. [50 CFR §402.14(i)(3)]

## **I. AMOUNT OR EXTENT OF TAKE**

Although the occurrence of Chiricahua leopard frogs in the project area is certain, the abundance of frogs in the Three Forks complex is uncertain. Also, because the status of the species could change over time through immigration, emigration, and loss or creation of habitats, the precise level of take resulting from this action cannot be quantified. However, given the presence of Chiricahua leopard frogs and suitable habitat throughout the action area, Chiricahua leopard frogs are likely to occur during the life of the project (10 years). We estimate that take could occur in the following fashion:

1. Mortality of all frogs at numerous livestock tanks due to maintenance activities.
2. Trampling and destruction of egg masses, small tadpoles, and metamorphs.
3. Mortality of recently metamorphosed frogs at one locality (livestock tanks, streams, or springs) due to unintentional introduction of chytridiomycosis resulting from cattle moving among frog populations or unintentional transport of water or mud among aquatic sites by ranch hands.

4. Mortality and lost productivity due to sedimentation of pools, loss of bankline and emergent cover, and other forms of habitat degradation in sites where Chiricahua leopard frogs may occur.

In cases where the extent of anticipated take cannot be quantified accurately in terms of number of individuals, the Service may anticipate take in terms of loss of a surrogate species, food, cover, or other essential habitat elements, such as water quality or quantity. Thus, incidental take will be exceeded if any of the following conditions occur:

1. Ecological conditions do not improve under the proposed livestock management. Improving conditions can be defined through measurable improvements in watershed condition, soil condition, trend and condition of rangelands, riparian conditions, and stream channel conditions within the natural capabilities of the landscape in all representative reaches on all above named allotments. Ecological conditions on all allotments, including Tenney and South Escudilla, will be assessed at 3, 6, and 9 years as is directed in term and condition 1.1 of the February 26, 2001, biological opinion for the Black River, Boneyard, Nutrioso Summer, and Williams Valley allotments.
2. Forage utilization standard is exceeded on three pasture entries within any five-year period on any one allotment.
3. Any time livestock access any portion of the riparian/stream corridor of Coyote Creek, Boneyard Creek in the Boneyard or Black River allotments.
4. Any time livestock trespass on the Three Forks Pasture.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If the Chiricahua leopard frog is listed and this conference opinion is subsequently accepted by the Service as a biological opinion, the following conditions apply: 1) If incidental take anticipated in the preceding paragraphs is met, the Forest should immediately notify the Service in writing. 2) If, during the course of the action, the level of anticipated incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation. In the interim, the Forest must cease the activity resulting in the take if it is determined that the impact of additional taking will cause an irreversible and adverse impact on the species. 3) The Forest must immediately provide an explanation of the causes of the taking and review with the Service the need for possible modification of the reasonable and prudent measures. 4) This conference opinion does not authorize any form of take not incidental to the Forest's proposed action as described herein.

## **II. EFFECT OF TAKE**

In this conference opinion, the Service finds the anticipated level of take is not likely to jeopardize the continued existence of the Chiricahua leopard frog.

### III. REASONABLE AND PRUDENT MEASURES

If the Chiricahua leopard frog is listed, the Service believes that all reasonable and prudent measures (and associated terms and conditions) contained in the February 26, 2001, biological opinion for the Black River, Boneyard, Nutrioso Summer, and Williams Valley allotments apply to the minimization of take of the Chiricahua leopard frog. All reasonable and prudent measures and associated terms and conditions within the February 26, 2001, biological opinion hereby also apply to both the South Escudilla and Tenney allotments if the Chiricahua leopard frog is listed. In addition to such measures, the following reasonable and prudent measures are necessary and appropriate to minimize take of the Chiricahua leopard frog:

1. The Forest shall continue to monitor the Chiricahua leopard frog and its habitat to document levels of take.
2. Measures shall be implemented to reduce trampling of egg masses, tadpoles, and metamorph frogs.
3. Personnel education programs and well-defined operational procedures shall be implemented.

### IV. TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Forest Service must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

1. The following term and condition implements reasonable and prudent measure number one:
  - 1.1 During the first spring after a final listing of the species, the Forest shall, in coordination with the Service and Arizona Game and Fish Department, identify potential habitat within the South Escudilla, Tenney, Black River, Boneyard, Nutrioso Summer, and Williams Valley allotments and survey<sup>1</sup> those sites for the presence of Chiricahua leopard frogs. If frogs are found, the Forest shall work with the Service to evaluate effects of the action on the frog and its habitat, and shall develop a plan with the Service within 90 days to minimize the effects of the action on the frog. The plan shall be approved by the Service.
2. The following term and condition implements reasonable and prudent measure number two:
  - 2.1 If new leopard frogs occurrences are found within the South Escudilla, Tenney, Black River, Boneyard, Nutrioso Summer, or Williams Valley allotments, the Forest shall inform the Service within 10 calendar days and shall work with the Service to develop plans within 90 days for minimizing take of leopard frogs at those sites. The plan shall be approved by the Service.

3. The following terms and conditions implement reasonable and prudent measure number three:
  - 3.1 Live fish, crayfish, bullfrogs, leopard frogs, salamanders, or other aquatic organisms shall not be moved among livestock tanks or other aquatic sites.
  - 3.2 Where new or existing sites occupied by Chiricahua leopard frogs exist, water shall not be hauled to the site from another aquatic site or tank that supports leopard frogs, bullfrogs, crayfish, or fish.
  - 3.3 Where new or existing sites occupied by Chiricahua leopard frogs exist on the South Escudilla, Tenney, Black River, Boneyard, Nutrioso Summer, or Williams Valley allotments, the permittee shall be required to clean any equipment, boots, etc. used at an aquatic site and treat with a 10 percent bleach solution, or allow such equipment, boots, etc. to dry thoroughly, before using the same equipment, boots, etc. at another aquatic site on the allotment.
  - 3.4 All ranch hands, construction personnel, and others implementing the proposed action shall be given a copy of these terms and conditions, and informed of the need to comply with them.
  - 3.5 At least 20 days prior to maintaining or cleaning out livestock tanks, the permittee shall inform the Forest of planned activities. The Forest shall survey the tank for Chiricahua leopard frogs<sup>1</sup> and if frogs are found, shall work with the Service to develop and implement a plan to minimize take of frogs. Measures to minimize take should include salvage and temporary holding of frogs, limiting disturbance and work areas to the minimum area practicable, leaving stands of emergent vegetation in place, and/or measures to minimize that likelihood of disease transmission. Plans to minimize take shall be approved by the Service.

### **Disposition of Dead or Injured Listed Animals**

Upon finding a dead or injured threatened or endangered animal, initial notification must be made to the Service's Division of Law Enforcement, Federal Building, Room 8, 26 North McDonald, Mesa, Arizona (480/835-8289) 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, and any other pertinent information. Care must be taken in handling

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<sup>1</sup>Surveys shall include a night visit to prospective habitat during which all or at least 1,200 feet (365) of the best habitat along creeks and the entire perimeter of tanks are searched for frogs. Surveys shall be carried out with flashlights/headlamps, and a dip net shall be used to sample for tadpoles and frogs concealed in undercut banks or at the base of emergent vegetation. Surveyors shall also listen for the distinctive call of the Chiricahua leopard frog (Davidson 1996) and watch for egg masses. Surveys shall be carried out from April-September when frogs are most active.

injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact specimens of listed animal species shall be submitted as soon as possible to this office or the nearest AGFD office, educational, or research institutions (e.g., Arizona State University in Tempe) holding appropriate State and Federal permits.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution before implementation of the action. A qualified biologist should transport injured animals to a qualified veterinarian. Should any treated listed animal survive, the Service should be contacted regarding the final disposition of the animal.

### **CONSERVATION RECOMMENDATIONS**

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information. We recommend implementation of 2 through 4, below, whether or not the species is listed.

1. If listed, we recommend the Forest assist the Service in development and implementation of a recovery plan for the species.
2. We recommend the Forest work with the Service and Arizona Game and Fish Department to reintroduce the Chiricahua leopard frog to suitable habitats.
3. We recommend the Forest work with the Service and Arizona Game and Fish Department to begin an aggressive program to control nonnative aquatic organisms on the Forest, particularly bullfrogs, fish, and crayfish.

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

### **REINITIATION NOTICE**

This concludes the conference for the livestock grazing allotment management plans for the Black River, Nutrioso Summer, Williams Valley, Boneyard, South Escudilla, and Tenney allotments. You may ask the Service to confirm the conference opinion as a biological opinion issued through formal consultation if the Chiricahua leopard frog is listed. The request must be in writing. If the Service reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the Service will confirm the conference opinion as the biological opinion on the project and no further section 7 consultation will be necessary.

After listing of the Chiricahua leopard frog as threatened and any subsequent adoption of this conference opinion, the Federal agency shall request reinitiation of formal consultation 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 conference opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this conference opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

The incidental take statement provided in this conference opinion does not become effective until the species is listed and the conference opinion is adopted as the biological opinion issued through formal consultation. At that time, the project will be reviewed to determine whether any take of the Chiricahua leopard frog has occurred. Modifications of the opinion and incidental take statement may be appropriate to reflect that take. No take of the species is authorized between the listing of the Chiricahua leopard frog and the adoption of the conference opinion through formal consultation, or the completion of a subsequent formal consultation.

We appreciate your interest in furthering the conservation of this species. If we can be of further assistance, please contact Darrin Thome (x250) or Debra Bills (x239) at the Arizona Ecological Services Field Office. Please refer to number 2-21-00-F-286 in future correspondence concerning this consultation.

Sincerely,

/s/ David L. Harlow  
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)  
John Kennedy, Arizona Game and Fish Department, Phoenix, AZ

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