AESO/SE
2-21-01-F-071 May 14, 2001

Mr. John McGee, Forest Supervisor
Coronado National Forest
300 West Congress Street
Tucson, Arizona 85701

Subject: Biological and Conference Opinion on the Black Diamond Allotment, Coronado National Forest, Cochise County, Arizona

Dear Mr. McGee:

This document transmits the U.S. Fish and Wildlife Service's (Service) biological and conference opinion based on our review of the proposed livestock grazing and management of the Black Diamond Allotment on the Douglas Ranger District, Cochise County, and its effects on the endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*) and the proposed threatened Chiricahua leopard frog (*Rana chiricahuensis*) in accordance with section 7 of the Endangered Species Act (Act) of 1973 (16 U.S.C. 1531 et seq.), as amended. The allotment is located in the Dragoon Mountains and the Dragoon Ecological Management Area (EMA) of the Douglas Ranger District. Your September 25, 2000, request for formal consultation and conference pursuant to the Act was received September 29, 2000. Your October 26, 2000, letter providing clarification was received on October 27, 2000. By letter of December 12, 2000, we responded informing you that formal consultation had been initiated. Both of your letters also included analyses of the Oak Allotment in the Chiricahua EMA. We addressed your Oak Allotment requests in a separate letter, so that allotment will not be discussed further here.

The following biological opinion is based on the information provided in the following documents: the 1986 Coronado National Forest Plan; the U.S. Forest Service's September 8, 1998, Guidance Criteria for Determining the Effects of Issuing Term Grazing Permits on Threatened, Endangered, or Species Proposed for Listing; the November 1998 Biological Assessment of On-going and Long-term Grazing on the Coronado National Forest; the July 29, 1999, Biological Opinion on On-going and Long-term Grazing for the Coronado National Forest; your September 25, 2000, request for formal consultation and conference pursuant to the Act including the biological assessment and evaluation for the Black Diamond and Oak Allotment Management Plans (AMP); your October 26, 2000, letter providing clarification and additional information regarding your earlier request for formal consultation; telephone conversations with

staff of the Douglas Ranger District Office; and our files. A complete administrative record of this consultation is on file in this office.

CONSULTATION HISTORY

Previous consultations and Relationships to this Biological Opinion

Forest Service Land and Resource Management Plans (Forest Plans) provide guidance and direction for managing National Forests and Grasslands for a 10-15 year period. The plans establish goals, objectives, standards and guidelines for multiple-use and sustained-yield management of renewable resources. Standards and guidelines for the management and conservation of threatened, endangered, and proposed species, including proposed and designated critical habitat, are included in the Forest Plans. Forest Plans provide direction for the protection and enhancement of all threatened, endangered, and proposed species' populations, and habitat proposed or designated critical, site-specific evaluation of all projects and activities, and initiation of consultation with the Service, as appropriate. These plans, as amended, also contain guidance specific to grazing actions and threatened and endangered species. Certain aspects related to ongoing grazing activities have been considered as part of previous consultations on the Plans and their amendments for the eleven National Forests and National Grasslands of the Forest Service's Southwestern Region. Forest Plan consultations did not include an evaluation of site-specific effects to listed species that may result from the continuation of ongoing domestic livestock grazing. However, the Forest Plans, as amended, and the resulting biological opinions issued by the Service, did provide general and species specific guidance to be incorporated into site-specific grazing management decisions.

The Coronado National Forest Plan (USFS 1986) was the subject of a formal section 7 consultation, resulting in a biological opinion dated December 6, 1985 (2-21-83-F-012). Numerous grazing improvement projects (e.g., pipelines, fences), grazing permits, and AMPs on the Coronado National Forest have undergone site-specific formal and informal consultation. Other actions on the Forest that might affect the environmental baseline have also been the subject of formal or informal consultation.

On February 6, 1998, the Regional Director of the Service's Southwest Region and the Acting Regional Forester of the Forest Service's 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's Southwestern Region. The management of ongoing grazing is administered under Forest Plans, and annual operating plans. The primary focus of the Ongoing Grazing Activities on Allotments of the Southwestern Region of the Forest Service was ongoing grazing on 158 allotments identified in civil cases: *Forest Guardians v. United States Forest Service and Daniel Glickman, U.S. Department of Agriculture*, CIV97-2562 PHX-SMM, filed December 12, 1997, and *Southwest Center for Biological Diversity, et.al v. U.S. Forest Service, and Apache-Sitgreaves*,

Coconino, Coronado, Gila, Prescott, and Tonto National Forests, CIV97-666 TUC-JMR, filed October 23, 1997. Ongoing grazing activities on additional allotments would be considered as time and resources were available (without compromising the time-line established in the consultation agreement for consultation on the 158 allotments). These two lawsuits alleged Forest Service noncompliance with the Act through a lack of consultation with the Service on threatened and endangered species in regard to grazing actions.

On February 13, 1998, the Forest Service requested initiation of formal consultation on their on-going and long-term grazing program. The consultation initiation package contained the basic information required to begin formal consultation and included the "Grazing Guidance Criteria for Preliminary effects Determinations for Species Listed as Threatened, Endangered, or Proposed for Listing" dated February 13, 1998. As provided for in the consultation agreement, additional information, including an allotment-by-allotment assessment of the effects to listed species and summary cumulative effects analysis were provided in a supplemental biological assessment dated May 1, 1998.

The Service responded (March 5, 1998) with a concurrence on the use of the guidance criteria with conditions. These conditions included: additional criteria for evaluations of effects to listed fish, lesser long-nosed bat, and Mexican long-nosed bat; maintaining an administrative record for each allotment which supports the "may affect, not likely to adversely affect" determination; and that within six months, the Forest Service and Service would meet to review a sample of the determinations made using these criteria. The Service amended their concurrence letter March 31, 1998, to include a technical clarification. National Forests applying the Guidance Criteria are responsible for documenting how criteria have been met for "no effect" and "may affect, not likely to adversely affect" determinations.

In November 1998, we received a biological assessment for on-going and long term grazing on the Coronado National Forest. The assessment evaluated the effects of continued livestock grazing on federally proposed and listed threatened and endangered species for 56 of the allotments on Coronado National Forest including the Black Diamond Allotment.

On July 29, 1999, we issued our biological opinion for on-going and long-term grazing on the Coronado National Forest. In that opinion, we formally consulted in regards to short-term grazing on the Black Diamond Allotment. We found that the proposed action was not likely to jeopardize the continued existence of the lesser long-nosed bat.

On September 25, 2000, we received your request for reinitiation of formal consultation and conference on the Black Diamond and Oak Allotments. On October 26, 2000, we received your letter providing clarification and additional information concerning the September 25, 2000, request for reinitiation of formal consultation and conference. On December 12, 2000, we sent a letter to the Coronado National Forest in response to the request for formal consultation and conference informing the Coronado National Forest they were in formal consultation as of this date. The Coronado National Forest was informed that the biological opinion was due on March

12, 2001. We verbally requested a 45-day extension of that deadline which you provided, establishing a new due date of April 26, 2001.

BIOLOGICAL OPINION

I DESCRIPTION OF THE PROPOSED ACTION

The Douglas Ranger District of the Coronado National Forest proposes to authorize livestock grazing on the Black Diamond Allotment. The life of the permit would be 10 years. The purpose of the proposed action is to implement Forest Service policy pertaining to forage use, authorize livestock grazing on the Black Diamond Allotment, and provide long-term management direction through an AMP. An AMP is a coordinating document between the Forest Service and the livestock grazing permittee. Currently, an AMP is not in place for the Black Diamond Allotment. These plans are generally developed every ten years. Management practices that are approved will be incorporated into the AMP.

The proposed action is to authorize livestock grazing on the allotment not to exceed 384 Head-Months (HMs) (300 HMs on the National Forest and 84 HMs on the private land). This equates to 25 cow/calf pairs on the National Forest and 7 cow/calf pairs on the private land grazing year round. Actual use dates will vary, as the allotment is part of a larger grazing system that includes state and private land outside the Forest boundary. Allowable use rates would be 45 percent in the summer growing season (July-September) and 50 percent the remainder of the year. These are the use levels which have been permitted in the past, and under this management, satisfactory range conditions have been achieved. The grazing system is a three pasture deferred rotation grazing system which utilizes the upper and lower pastures of the allotment, and private and state land as a third pasture.

In addition to permitting livestock grazing, several range and water feature improvements are proposed as part of the action. There are areas on the allotment with soils in less than satisfactory condition. Erosion control features consisting of rock/wire baskets will be installed in the drainages above Black and Smelter Tanks. The erosion control features will consist of stabilizing arroyo headcuts with rock, placed on the surface and secured by wire mesh. Aquatic habitat on the allotment for the Chiricahua leopard frog is currently limited to stock water ponds. To improve this habitat, the ponds will need to be maintained and fenced. Black Tank and Smelter Tank will be cleaned out, and exclosure fences installed around portions of each tank to protect frog habitat. Tank cleanout will occur either when the tanks are totally dry or deposition will be excavated only from the fry/tail-area of the impoundment. Construction of the exclosure fence will be confined to areas already affected by tank construction and maintenance. There will be no new ground disturbance. The project to enhance Chiricahua leopard frog habitat will be done in conjunction with Arizona Game and Fish Department via an approved Collection Agreement currently in effect. Also, two miles of existing Forest Boundary Fence (FBF) will be reconstructed, as well as an additional quarter-mile of FBF relocated to better reflect the actual

boundary of the Coronado National Forest. In addition, there is a continuing problem with errant cows from gates being left open by forest users. This would be remedied by the installation of a cattleguard.

II. STATUS OF THE SPECIES (Rangewide)

Lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*)

The lesser long-nosed bat was listed (originally, as *Leptonycteris sanborni*; Sanborn's long-nosed bat) as endangered on September 30, 1988 (53 FR 38456). No critical habitat has been designated for this species. The lesser long-nosed bat is a small, leaf-nosed bat. It has a long muzzle and a long tongue, and is capable of hover flight. These features are adaptations to feed on nectar from the flowers of columnar cactus, such as the saguaro and organ pipe cactus and from paniculate agaves, such as Palmer's agave (*Agave palmeri*), and Parry's agave (*A. parryi* Hoffmeister 1986), *A. desertii* (Engelman 1875), and *A. schotti* (Engelman 1875). Palmer's agave exhibits many characteristics of chiropterophily, such as nocturnal pollen dehiscence and nectar production, light colored and erect flowers, strong floral order, and high levels of pollen protein with relatively low levels of nectar sugar concentrations (Slauson 1996). Parry's agave demonstrates many (though not all) of these same morphological features (Gentry 1982).

The lesser long-nosed bat is migratory and found throughout its historic range, from southern Arizona and extreme southwestern New Mexico, through western Mexico, and south to El Salvador. It has been recorded in southern Arizona from the Picacho Mountains (Pinal County) southwest to the Agua Dulce Mountains (Pima County), southeast to the Chiricahua Mountains (Cochise County), and south to the international boundary. Roosts in Arizona are occupied from late April to September (Cockrum and Petryszyn 1991); the bat has only rarely been recorded outside of this time period in Arizona (Fleming 1995, Hoffmeister 1986). In spring, adult females, most of which are pregnant, arrive in Arizona gathering into maternity colonies. These roosts are typically at low elevations near concentrations of flowering columnar cacti. After the young are weaned these colonies disband in July and August; some females and young move to higher elevations, primarily in the southeastern parts of Arizona near concentrations of blooming paniculate agaves. Adult males typically occupy separate roosts forming bachelor colonies. Males are known mostly from the Chiricahua Mountains and recently the Galiuro Mountains (Snow pers. comm. 1999) but also occur with adult females and young of the year at maternity sites (Fleming 1995). Throughout the night between foraging bouts both sexes will rest in temporary night roosts (Hoffmeister 1986).

The primary food source for the lesser long-nosed bat in southeastern Arizona from mid-summer through fall is Palmer's agave, which typically occurs on rocky slopes or hill tops, scattered within the desert grassland and oak woodland communities within the elevation range of 900 m to 1,800 m (3,000-6,000 ft) (Gentry 1982). Parry's agave reaches higher elevations than Palmer's, extending from grasslands into oak woodland, chaparral, pine/oak forests, and mixed conifer with an elevation range of approximately 1,500 m to 2,500 m (4,900-8,200 ft) (Gentry 1982).

Like Palmers' agave, Parry's is typically found on rocky slopes (Gentry 1982). Concentrations of paniculate agaves are generally found on the rocky, shallow soils of hills and ridges. Palmer's and Parry's agaves are also found scattered in areas of deep, heavy soils within grasslands or where there may be thick stands of shrubs, mesquite, oak, and other trees.

The ecology of Palmer's agave appears to be poorly understood, especially as it is affected by livestock use and fire (Slauson, pers. comm., 1997; Wendy Hodgson, Desert Botanical Gardens, Phoenix, pers. comm., 1997). Agaves are perennial succulents. Agave seeds germinate readily with adequate moisture, typically in open areas with limited competition from other plants (Tony Burgess, Biosphere Two Center, Tucson, pers. comm., 1997). Palmer's agave is relatively slow growing, often taking 20 or more years before initiating the single reproductive event in its life (Slauson 1996, 1999). A flowering stalk erupts from the rosette of a mature plant, growing rapidly through the spring and early summer. During the summer 8 to 12 flowering panicles are displayed on the upper third of a stalk, 3 to 5 m (10-16 ft) tall (Gentry 1982). Slauson (1996, 1999) has completed a pollination ecology study of Palmer's agave, finding that many pollinator species contribute to establishing seed set. Lesser long-nosed bats have been recorded visiting individual blooming Palmer's agaves more than 1,000 visits per night (R. Sidner, Tucson, pers. comm., 1997; Petryszyn, pers. comm., 1999), while they may not visit other agaves at all (Slauson, pers. comm., 1997). Bat visits generally last less than one second (Slauson 1999). Apparently there are many factors which influence the year a particular plant may bloom. Precipitation one to several years before blooming is probably of special importance. In the Peloncillo Mountains, about 2 to 5 percent of the agave population flowers each year (Peter Warren, Nature Conservancy, Tucson, pers. comm., 1997). Palmer's agave may occasionally produce off-sets (vegetative reproduction or cloning of "pups" produced from rhizomes) though this is less likely than for many other agave species (Hodgson, pers. comm., 1997). Parry's agave freely produces off-sets (Gentry 1982).

The importance of Parry's agave, as well as desert agave and amole, as a forage resource for *Leptonycteris* bats is unknown. As discussed, Parry's agave generally occurs at higher elevation than Palmer's agave, and occurs in forest openings. Benson and Darrow (1982) note that it typically flowers in June and early July, which is before the lesser long-nosed bat arrives at roosts in southeastern Arizona. However, J. Rorabaugh (USFWS Arizona Ecological Services Field Office, pers. comm., 1998) noted many Parry's agave in flower high in the Huachuca Mountains on the crest trail during late July in 1997. It may be that agaves at high elevation bloom later than at lower sites, and could potentially be blooming and be used as a forage resource when lesser long-nosed bats arrive in July or early August. In addition, Parry's agave may be very important as a forage plant for those bats which arrive in southeastern Arizona during late spring and early summer.

As indicated above, the lesser long-nosed bat consumes nectar and pollen of paniculate agave flowers and the nectar, pollen, and fruit produced by a variety of columnar cacti. These bats often forage in flocks. Nectar of these cacti and agaves is high energy food. Concentrations of some food resources appear to be patchily distributed on the landscape and the nectar of each

plant species utilized is only seasonally available. Cacti flowers and fruit are available during the spring and early summer; blooming agaves are available primarily from July through October. Columnar cacti occur in lower elevation areas of the Sonoran Desert region, and paniculate agaves are found primarily in higher elevation desert scrub areas, semi-desert grasslands and shrublands, and into the oak woodland (Gentry 1982). In the Huachuca Mountains, Parry's agave is generally found at higher elevations than Palmer's agave; the former is common in forest openings to the crest of the Huachuca Mountains.

Lesser long-nosed bats appear to be opportunistic foragers and extremely efficient fliers. Seasonally available food resources may account for the seasonal movement patterns of the bat. The lesser long-nosed bat is known to fly long distances from roost sites to foraging sites. Night flights from maternity colonies to flowering columnar cacti have been documented in Arizona at 2.4 km (15 mi), and in Mexico at 40 km (25 mi) and 61 km (38 mi) (one way)(Virginia Dalton, Tucson, Arizona, pers. comm. 1997; Yar Petryszyn, University of Arizona, Tucson, pers. comm. 1997). Fleming (1995) suggests that a substantial portion of the lesser long-nosed bats at the Pinacate Cave in Sonora fly 40 to 50 km (25 to 31 mi) each night to foraging areas in Organ Pipe Cactus National Monument. Horner *et al.* (1990) found that lesser long-nosed bats commuted 15.5 miles between an island maternity roost and the mainland in Sonora. The authors suggested that bats regularly flew at least 47 miles each night. Lesser long-nosed bats have been recorded visiting individual blooming Palmer's agaves in excess of 1,000 visits per night (Ronnie Sidner, Tucson, Arizona, pers.comm. 1997), while other agaves may not be visited at all (Liz Slauson, Desert Botanical Gardens, Phoenix, Arizona, pers. comm. 1997). Lesser long-nosed bats have been observed feeding at hummingbird feeders many miles from the closest known potential roost site (Yar Petryszyn, pers. comm. 1997).

Loss of roost and foraging habitat, as well as direct taking of individual bats during animal control programs, particularly in Mexico, have contributed to the current endangered status of the species. Suitable day roosts and suitable concentrations of food plants are the two resources that are crucial for the lesser long-nosed bat (Fleming 1995). Caves and mines are used as day roosts. The factors that make roost sites useable have not yet been identified. Whatever the factors are that determine selection of roost locations, the species appears to be sensitive to human disturbance. Instances are known where a single brief visit to an occupied roost is sufficient to cause a high proportion of lesser long-nosed bats to temporarily abandon their day roost and move to another. Perhaps most disturbed bats return to their preferred roost in a few days. However, this sensitivity suggests that the presence of alternate roost sites may be critical when disturbance occurs. Interspecific interactions with other bat species may also influence lesser long-nosed bat roost requirements.

According to Fleming (1995), there are 16 known large roost sites in Arizona and Mexico (Fleming 1995). According to surveys conducted in 1992 and 1993, the number of bats estimated to occupy these sites was greater than 200,000. Twelve major maternity roost sites are known from Arizona and Mexico. According to the same surveys, the maternity roosts are occupied by over 150,000 lesser long-nosed bats and of these, just over 100,000 are found at just

one natural cave at Pinacate National Park, Sonora, Mexico (Cockrum and Petryszyn 1991). Several new large roost sites have been located in Arizona, bringing the total number of large roosts to 21 (Mike Coffeen, USFWS Arizona Ecological Services Field Office, pers. com. 2001). The numbers above indicate that although a relatively large number of these bats are known to exist, the relative number of known large roosts is quite small. Disturbance of these roosts, or removal of the food plants associated with them could lead to the loss of the roosts. Limited numbers of maternity roosts may be the critical factor in the survival of this species.

Potential threats which may contribute to the decline of lesser long-nosed bat populations are excess harvesting of agaves in Mexico, the collection of cacti in the U.S., and the conversion of habitat for agricultural uses, livestock grazing, wood-cutting, and other development. This species of bat is particularly vulnerable to disturbances due to many individuals using only a small number of communal roosts.

Chiricahua leopard frog (*Rana chiricahuensis*)

The Chiricahua leopard frog (*Rana chiricahuensis*) was proposed for listing as a threatened species without critical habitat on June 14, 2000 (65 FR 37343). 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. The frog 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 Mecham 1979). The species also has a distinctive call consisting of a relatively long snore of 1 to 2 seconds in duration (Davidson 1996, Platz and Mecham 1979). Snout-vent lengths of adults range from approximately 54 to 139 millimeters (mm) (2.1 to 5.4 inches (in)) (Stebbins 1985, Platz and Mecham 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; 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 the Chiricahua leopard frog 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. 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 20th 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 of 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 native 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 AGFD 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

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The environmental baseline defines the current status of the species and its habitat in the action area to provide a platform to assess the effects of the action now under consultation**.**

The action area means all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. In streams, the action area is often much larger than the area of the proposed project because impacts may be carried downstream with the flow and radiating channel adjustments, both upstream and downstream, are normal whenever stream channels are altered (Dunne and Leopold 1978). The action area for the proposed project is the Black Diamond Allotment.

The Black Diamond Allotment is located in the southeastern portion of the Dragoon Mountains, which are northwest of the town of Douglas, Arizona, in Cochise County. The Black Diamond Allotment is within the Dragoon Ecological Management Area (EMA) of the Douglas Ranger District, Coronado National Forest (see appendix Figure 1). Elevation ranges from 1,484 m (4,868 ft.) at the northeastern-most corner of the allotment to 2,178 m (7,146 ft.) at the summit of Black Diamond Peak. The allotment covers 642 ha (1,586 acres), 527 ha (1,303 acres) of which

are capable range, and consists of two pastures. It also encompasses 340 ha (138 acres) of private land. Topography of the allotment is dominated by rough steep slopes in the western portion of the allotment and semi-alluvial flats with hills in the eastern lower levels. The allotment is part of the Black Diamond Ranch, and makes up 25 percent of the ranch's operating land, along with deeded land and a state lease. Livestock are rotated between the Forest land, state and private land.

The Black Diamond Allotment is classified as management Areas 4 and 1 in the Coronado National Forest Plan (USFS 1986). Management Area 4 is comprised of lands capable and suitable for fuelwood harvest, livestock grazing, and game habitat management. Management Area 4 includes desert scrub, grassland, chaparral, and woodland vegetation types. The Black Diamond Allotment is in the broadleaf woodland vegetation type, and the capability area type, 6H/M, is characterized by moderately sloping to moderately steep hills and mountains at elevations of about 1,463 to 1,920 m (4,800 to 6,300 ft). Dominant slopes are 25 to 40 percent. The climate is humid subtropical. Mean annual air temperature ranges from about 52° to 58° F. Mean annual precipitation ranges from about 40.6-48.3 cm (16 to 19 inches) which comes as low intensity rains in winter and high intensity localized thunderstorms in summer. The dominant native vegetation is emory and Arizona white oak, alligator juniper, manzanita, and *Juniperus erythrocarpa* (USFS 1986).

Management Area 1 is characterized by steep, rugged lands that may be very visible from major travel routes. These lands have generally been determined as incapable of or unsuitable for sustained wood harvest and livestock grazing. Slopes are generally greater than 40 percent. Management Area 1 includes all vegetation types except major riparian areas. The capability area type 6M is characterized by moderately steep to steep mountains at elevations of about 1,524-1,920 m (5,000 to 6,300 ft). Dominant slopes are 40 to 60 percent. The capability area type 6M is otherwise similar to 6H/M.

The Black Diamond Allotment does not currently have an AMP. Grazing has been managed through the Annual Operating Instructions. Past grazing systems have allowed for a use of 45 percent utilization during the summer growing season (July-September) and 50 percent during the rest of the year. This system has produced satisfactory range conditions, and soil conditions identified as 78 percent satisfactory, 10 percent unsatisfactory, and 12 percent unsuited. The overall trend of the allotment is upward, with 95 percent of the allotment in moderately high range condition with an upward trend and 5 percent in moderately high range condition with a static trend.

Two formal consultations have been done on lesser long-nosed bat in the past in the vicinity of the allotment. A non-jeopardy biological opinion for the Bureau of Land Mangement on the Ronald Searl Allotment 5279 (Safford/Tucson Grazing Program) issued September 26, 1997 (AESO/SE 2-21-96-F160), and a non-jeopardy programmatic conference opinion for the U.S. Forest Service on on-going and long term grazing on the Coronado National Forest (AESO/SE 2-21-98-F-399). Two draft conference opinions on the Chiricahua leopard frog have been completed: a non-jeopardy conference opinion on the 13-Mile Rock AMP, Coconino National

Forest, Yavapai and Coconino counties, Arizona, and a non-jeopardy biological and conference opinion for the Montana AMP (AESO/SE 2-21-01-F-124), Coronado National Forest, Santa Cruz County, Arizona (AESO/SE 2-21-00-F-344), and at least one final conference addressing Gila trout stocking in Raspberry Creek, on the Apache-Sitgreaves Forests in Greenlee County.

Status of the Species (within the action area)
Lesser long-nosed bat

The Coronado National Forest has reported one lesser long-nosed bat roost site in the central portion of the Dragoon Mountains, in a mine shaft. The only data available to the Service is from a single visit in 1994 when approximately 20+ bats were observed (including 13 bats which were captured and released). The Dragoon EMA includes large areas of desert grassland which is prime habitat for the Palmer's Agave. Surveys for lesser long-nosed bats in association with mines have been conducted within the Dragoon EMA, but additional surveys throughout the mountain range are still needed.

Based on known distances lesser long-nosed bats have traveled from roost sites to foraging areas, potential foraging habitat may extend in a 64 km (40 mi) radius from roosts. Because of the presence of known and potential roost sites and the availability of considerable numbers of forage plants, the Black Diamond Allotment is considered occupied as lesser long-nosed bat foraging habitat. There are a number of mine shafts and adits, in addition to natural caves and rock crevices adjacent to the Black Diamond Allotment or within the flight range of these bats that have not been surveyed. There is also a lack of information on the degree to which livestock grazing affects agave flower production, reproduction, or agave seedling establishment. Currently, there is a forest-wide study to determine the effects of livestock grazing on agaves.

Chiricahua leopard frog

The Dragoon Mountains, in which the proposed action would occur, is a key area for the Chiricahua leopard frog. The Service is aware of at least 6 historic and current locality areas for the species in this mountain range complex. These include Sycamore Spring on the southern and western tip of the Dragoon Mountains, Halfmoon Tank and adjacent Stronghold Canyon, Black Diamond Spring and nearby tanks, a tank near Majo Spring, and Goodrich Spring. On the allotment, the frog has been found in Black Diamond Spring, Forest Tank, Smelter Tank, and Black Tank. These four areas have been surveyed infrequently throughout the 1990s, and appear to have winked out at times and returned later in response to drought and non-drought conditions respectively. At any one time, at least one of these four have been occupied by the frog (Gary Helbing, pers. com., 2001).

IV EFFECTS OF THE ACTION
Effects on the Lesser long-nosed bat

The extent of adverse effects to *Leptonycteris* bats (including lesser long-nosed bats) resulting from the potential reduction in forage resources is dependent on the importance of forage plants

in a specific area to reproduction, survival, and growth of the bat. Areas with patches of high densities of paniculate agaves and saguaros may be particularly important to these bats, especially if those high density sites are close to roosts. The distribution of agaves across the Forest has been estimated on a landscape level by evaluating the distribution of plant communities which include bat forage plants. However, the local abundance of these forage plants has not been included in this biological assessment prepared for this consultation. Given the ability of the bat to move freely and widely across the landscape, the large geographic scale of the analysis may be more meaningful to assess potential effects to the lesser long-nosed bat due to impacts to its foraging habitat by livestock.

The Coronado National Forest has committed to not disturbing or modifying any bat roost sites on any allotments, although the Forest does not detail how such effects will be avoided (USFS 1998). Range project construction is also implemented so that no more than one percent of agaves and saguaros within 800 m (0.5 mi) of the project are affected. Undetected roosts could occur near the Black Diamond Allotment. Direct disturbance or modification of these roosts could occur because of range projects constructed on the Black Diamond Allotment, but is unlikely.

Indirect effects from livestock grazing to *Leptonycteris* bats may occur through adverse effects to forage plants, primarily paniculate agaves and saguaros. Impacts to forage plants through implementation of the range management program may occur through direct herbivory and trampling by livestock, alteration of the vegetation community, degradation of soil and watershed conditions, modification of the fire regime, and range projects. The Coronado National Forest has provisions in place to reduce effects to agaves from construction and maintenance activities associated with grazing management. Prescribed fire, herbicide application, and seeding of nonnative plants are not part of the proposed actions. As these types of projects are proposed, they will be addressed under site-specific consultations.

No long-term investigation has quantitatively documented the effect of grazing on agave mortality or flowering stalk herbivory. Individual paniculate agave plants only bloom once in their life of about 20 years. However, agave stalks are rich in carbohydrates, and as they begin to bolt are particularly palatable to domestic livestock and wild herbivores, including deer, javelina, rodents, and rabbits (Howell 1996; M. Hawks, University of Arizona, pers. comm., 1997; Hodgson, pers. comm., 1997). Data from an ongoing study of cattle grazing effects on agaves in southern Arizona indicate that a number of factors in livestock management such as slope, stocking rate, forage availability, and utilization, have no significant effects on inflorivory (grazing of the inflorescence) of agaves. However, inflorivory of agaves was 29 percent greater at sites grazed by livestock during the bolting season than at sites not grazed during the bolting season, a significant difference (Kristen Widmer and Dr. Mitchel P. McClaran, University of Arizona, unpub. data). Cattle have also been known to "walk down" agave flowering stalks (T. Cordery, pers. comm., 1998). Cattle probably trample young agaves, causing some level of mortality among these plants. Agave germination and seedling establishment may be influenced by degraded ecological conditions such as soil compaction, erosion, reduced infiltration, and altered plant species composition. Effects on bat forage plants due to livestock grazing may be

more intense where livestock congregate near water sources and less intense on steep slopes or among rocks where grazing is generally lighter and agaves are at higher densities. Preliminary data indicate that cattle distribution, especially distance to water sources, may influence rates of inflorivory (Kristen Widmer and Dr. Mitchel P. McClaran, University of Arizona, unpub. data).

Livestock grazing removes dried herbaceous fine fuels that normally carry fire. Without fire, ladder fuels and woody material build up in woodlands. The result is that when fires finally do occur, they can be catastrophic and stand-replacing (Danzer *et al.* 1997). How this change in fire frequency and intensity caused in part by livestock grazing affects agave populations is unknown. In the absence of frequent ground fires, agave populations could potentially benefit due to reduced mortality resulting from fire. However, infrequent intense fires could kill greater percentages of agaves when fires occur, if agaves are growing amid brush or other areas of high fuel loads.

Other factors are important in determining the effects of livestock grazing on fire regimes and subsequent effects to agaves and floral resources. Activities that directly or indirectly promote invasions or increased density of nonnative grasses, particularly Lehmann lovegrass, may result in increased fire frequency or intensity, reduced densities of Palmer's agave, and thus reduced floral resources for the lesser long-nosed bat. Lehmann lovegrass is abundant in some portions of the Coronado National Forest, especially the Tumacacori, Huachuca, Santa Rita, and Santa Catalina EMA's and its relative abundance has been positively correlated with livestock grazing intensities (Anable *et al.* 1992, McClaran and Anable 1992). This species increases after fire (Martin 1983, Ruyle *et al.* 1988, Sumrall *et al.* 1991, Howell 1996), but also produces an abundance of fine fuel that promotes hot fires (McPherson 1995). Thus, frequent fire is likely to increase the abundance of Lehmann lovegrass, and increased abundance of this grass can fuel more fires and hotter fires, creating a positive feedback loop (Anable *et al.* 1992). Livestock grazing, especially at high utilization levels, often promotes the increase of nonnative and less-palatable species, which may influence the resulting fire regime. Often the objectives of livestock management are to increase the abundance of grasses while the direct impacts of livestock herbivory are the reduction of grass cover. Grasses are probably one of the strongest competitors with agave seedlings (Burgess, pers. comm., 1997). Increased abundance of grass could result in reduced agave abundance. When overgrazing results in declines of perennial grasses (Martin and Cable 1974, Eckert and Spencer 1987), there may be less competition between grasses and agaves. However, there may also be increased trampling of smaller agaves by livestock, and increases in woody/shrub vegetation resulting in an altered fire regime.

Agave mortality due to fire may affect the abundance and distribution of blooming agaves on the landscape for many years into the future, especially if there is high mortality within certain age and size classes. Although fire may affect the availability of blooming agaves, the nectar production and sugar content of surviving plants is little affected. Working in the Peloncillo Mountains, Slauson (pers. comm. 1998) found that nectar production and sugar content did not differ between unburned agaves and burned agaves that did not have greater than 80 to 90 percent of the leaf area burned. The complexity of variables influencing agave flowering may mask the effects of a fire on agave flowering for several years after a fire. In addition, natural

recruitment of agaves may be very episodic and the effects of fire on the agave seed bank in the soil are unknown. Livestock grazing, especially at high utilization levels, often promotes an increase of nonnative and less-palatable species, which may influence the resulting fire regime.

The factors that are important to foraging *Leptonycteris* bats are the availability of agave flowering stalks, each and every year. In southeastern Arizona, Palmer's and Parry's agaves are the only reliable food source for long-nosed bats in mid to late summer. However, agaves are patchily distributed over the landscape and the presence of flowering agaves naturally fluctuates from year to year. Nectar feeding bats are opportunistic foragers, taking advantage of local floral resources. During the breeding season lesser long-nosed bats may fly great distances in search of food resources, and later in the season they may shift roost sites and foraging areas based on the presence (or absence) of flowering agaves (Petryszyn, pers. comm., 1997). The distance the bats will forage from a roost site appears to be related to the size of the colony and the available floral resources (V. Dalton, pers. comm., 1997; Petryszyn, pers. comm., 1997). Lesser long-nosed bats are generally present in southeastern Arizona after the bats have left their maternity colonies and migrated to southeast Arizona and southwest New Mexico in mid to late summer when agaves are in flower.

Effects to *Leptonycteris* bats foraging habitat occur through direct herbivory and trampling of agaves, alterations of species composition of the community, disruption of ecosystem functions, alteration of ecosystem structure, and the related effects on agaves. Agaves have persisted on the landscape over the course of more than a century of livestock use. It has been observed by Slauson (pers. comm., 1999) that overgrazing is detrimental to agaves. A review of the literature by Holechek *et al.* (1998) shows that grazing in southwestern habitats is sustainable, but at moderate levels of utilization. Utilizations levels must be managed to maintain critical dry matter residue on the ground to protect the soil, and maintain forage plant vigor, wildlife habitat, and a natural fire regime. Utilization levels recommended by Holechek et al. (1998) for semiarid grasslands range from 25 percent to a maximum of 40 percent in the best, most easily managed areas (e.g., flats). A major concern is the frequency of drought conditions in the Southwest. Overgrazing often accompanies drought conditions when stocking levels cannot be quickly reduced to match the limited forage production. Periodic overgrazing can damage range resources (Eckert and Spencer 1987) and have long-term negative effects. The Forest does have a drought management policy, though the decision of how to manage under drought conditions is left to the District Ranger in cooperation with the range specialist and the permittee.

Grazing utilization levels over 40 percent are considered damaging to the ecosystem (Martin 1975, Eckert and Spencer 1987, Holechek *et al.* 1998). Little is known about how these or other specific levels of utilization are directly correlated to effects on agaves. Intuitively, as utilization levels or stocking levels increase, effects to the vegetation community and agaves would also increase. However, an ongoing study on the effects of grazing on agaves in southern Arizona indicates that stocking rate has no significant effect on agave inflorivory, and that significant agave inflorivory is most influenced by grazing during the bolting season (Kristen Widmer and Dr. Mitchel P. McClaran, University of Arizona, unpub. data). The Coronado National Forest

has initiated and is committed to completing a multi-year study on agave ecology and the relationship to livestock management.

Whether forage resources are limiting to any lesser long-nosed bat populations is unknown. However, bats are foraging on the Dragoon EMA, and probably on the Black Diamond Allotment. The effects of livestock grazing is most likely to be important towards the end of the summer. Most lesser long-nosed bats fly south in September or October at a time when blooming agaves are becoming less and less abundant, suggesting a waning food supply may be one of the factors that triggers migration. Yar Petryszyn (pers. Comm. 1999) has observed apparent agonistic behavior of bats at agave flowers late in the season, suggesting possible competition for resources. Slauson (2000) noted that in agave flowers at Fort Huachuca, nectar was abundant at dawn until September when peak bat visitation occurred. At this time, flowers were drained of nectar by dawn. If forage resources are limiting at times or certain places, we would expect that in some years or some areas, numbers of bats may be reduced, or bats may have to fly farther from their roosts to obtain sufficient resources. Bats that fly greater distances are probably more vulnerable to predation or accidental death. Under a scenario of limiting food resources, reduced numbers or flowering by agaves or saguaros due to grazing could conceivably further reduce forage resources and bat numbers. It seems likely that landscape-scale projects, such as a Forest-wide grazing program in areas with saguaros and agaves, could have some effects on bat foraging behavior, if bats are present. The Service considers loss of forage resources a great enough threat to include protection of foraging areas and food plants as a priority 1 task in the lesser long-nosed bat recovery plan (USFWS 1997). The relationship of foraging areas to roost sites, especially large roosts, is important in land management decisions. Availability of large roost sites is considered a major limiting factor to the bats (USFWS 1997). Affecting forage resources in proximity to roosts may affect a substantial portion of the bat population in Arizona, and may affect the desirability of a particular roost site.

In summary, superimposing the potential effects of livestock use as it affects the availability of floral resources, adult plant mortality, and seedling mortality, upon the natural variability in agave phenology, episodic reproductive events, and patchy distribution on the landscape, grazing may affect agaves and nectar feeding bats in a variety of ways. *Leptonycteris* bats are opportunistic foragers and are capable of long distance flights. Temporary and minor shifts in the abundance of flowering agaves as an available resource for these bats are expected to have limited adverse effects. However, as these impacts to lesser long-nosed bat food resources occur across large portions of the landscape, as analyzed through the EMA's on the Coronado National Forest, bat survivorship may be reduced through increased foraging flight distances and related energy expenditures, increased exposure to predators, changes in use patterns of limited large roost sites, and potential disruption of the "nectar corridor." These effects may be most evident in those years where weather patterns, fire, or other causes have also affected agaves. The long-term effect of livestock use contributes to ecosystem based changes. The net result is that there are effects from livestock activities across the landscape to the ecosystem upon which the lesser long-nosed bat depends.

Effects to Chiricahua leopard frog

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 (USFWS 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 (USWS 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 (USFWS 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 Black Diamond Allotment naturally via frogs or other animals. The nearest known outbreaks of chytridiomycosis to the Black Diamond Allotment are at Big Spring near Safford, Arizona, and the San Pedro River in Arizona.

Chytrids could also 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. 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 from other areas, or may intentionally introduce nonnative predators for angling or other purposes.

Livestock grazing may cause long-term changes to the watershed and its functions. The extent of these changes varies with watershed characteristics, grazing history, and cumulative effects from other human uses and natural watershed processes. Damage caused by cattle to riparian and stream habitats in the arid and semiarid West can be separated into two broad catagories: impacts that occur at the local level and those that occur at the landscape and regional levels. Local impacts can be further segregated by their effects on water quality and seasonal quantity, stream

channel morphology, hydrology, riparian-zone soils, instream and streambank vegetation, aquatic biota, and terrestrial wildlife. Local impacts have been investigated in a large number of studies, but landscape level impacts have received less attention. Despite this, the relationship between livestock grazing in a watershed and effects to river systems is widely recognized and documented (Leopold 1946; Blackburn, 1984: Skovlin, 1984; Chaney *et al.* 1990; Platts, 1990; Bahre, 1991; Meehan, 1991; Fleischner, 1994, Myers and Swanson, 1995; Satterlund, 1972; Hadley, 1974; Cooke and Reeves, 1976; Sheridan, 1981; Graf, 1985, 1988).

Cryptobiotic crusts, consisting of lichens, fungi, algae, mosses, and cyanobacteria are important soil stabilizers of desert soils (Belnap 1992). These crusts decrease wind erosion and have a significant effect on soil stability and rates of water infiltration (Belnap and Gardner 1993). Cyanobacterial soil crusts have been shown to increase soil retention through absorbency of the polysaccharide sheath material that surrounds groups of living filaments. These crusts also act to increase the availability of many nutrients in sandy soils (Belnap 1992; Belnap and Gardner 1993).

Disturbance of soils, including cryptobiotic crusts, and removal of vegetation by grazing combine to increase surface runoff and sediment transport, and decrease infiltration of precipitation (Gifford and Hawkins 1978, Busby and Gifford 1981, Blackburn 1984, DeBano and Schmidt 1989, Belnap 1992, Belsky and Blumenthal 1997). Loss of vegetation cover and trampling of soils promote further deterioration of soil structure, which in turn accelerates vegetation loss (Belsky and Blumenthal 1997). These changes tend to increase peak flows in drainages (DeBano and Schmidt 1989), making water courses more “flashy”, which promotes erosion, downcutting, and loss of riparian and xero-riparian vegetation (Belsky *et al.* 1999).

Although watershed effects vary depending upon the number and type of livestock, the length and season of use, and the type of grazing management, the mechanisms remain the same and the effects vary only in the extent of area and severity (Blackburn 1984, Johnson 1992). Most landscapes are composed of mostly upland slopes and it is here that cattle have perhaps collectively their greatest effects. They directly reshape the earth, compact the soil and cause increased runoff, sometimes transforming the runoff regime from variable source area to saturated (Hortonian) overland flow. They further weaken biological resistance and trample and loosen soil, changing its susceptibility to both water and wind erosion.

The direct force of cattle hoofs reshapes the land. The most common manifestation of direct force is the path or trail. Although cows tend to range widely on a daily basis, they use the same paths enough to create trails. Because the trails are less permeable (from compaction and crusting: Rostagno 1989) and because they conduct water, they may erode to larger proportions (Hole 1981) even under “light” grazing (Naeth *et al.* 1990). Compaction is a strong direct effect of force which leads to the direct effect of reduced infiltration and the resulting force of increased overland flow, which in turn leads to increased erosion (Arndt 1966). Another soil characteristic that is affected by cattle grazing is the bulk density. The combination of grazing and trampling will also usually reduce the density of grass cover (e.g. Hofmann and Ries 1991). Among other

effects, severe compaction often reduces the availability of water and air to the roots, sometimes reducing plant vitality (e.g., Reed and Peterson 1961). Grass species change from perennial to annual and from deep-rooted to shallow-rooted (Naeth *et al.* 1990). Removal of phytomass by grazing and lessened phytomass production can reduce fertility and organic matter content of the soil. Soil aggregate stability is decreased and the surface sometimes becomes crusted. Proportion of bare soil appears to correlate well with surface run-off and sediment yield (Lusby 1970, Thurow *et al.* 1986, Warren *et al.* 1986, Takar et al.1990).

One of the biological factors that is often neglected in analyzing the effects from livestock grazing is fauna, in particular soil fauna. Soil fauna (endopedofauna) generally have positive effects on the hydraulic conductivity of soil by (1) increasing porosity and permeability, (2) improving soil structure, and (3) increasing fertility. It appears that soil fauna ranging from earthworms to moles have more difficulty surviving in impacted soil conditions resulting from heavy grazing (Hole 1981; Abbot *et al.* 1979).

The current grazing regime on the Black Diamond Allotment has been in place at least since 1998. Under that management, the allotment has improved in condition. The overall trend of the allotment is upward, and 95 percent of the allotment is in moderately high range condition with an upward trend and 5 percent is moderately high with a static trend. Satisfactory soil condition occurs on 70 percent of the allotment, 10 percent is unsatisfactory, and 20 percent is unsuited. Allowable use of upland species in all pastures is a maximum of 45 percent during the growing season (July - September) and 50 percent maximum utilization during the “dormant” season. Black and Smelter Tanks will also be partially fenced to protect frog habitat from cattle.

Stocking rates that result in 35 to 45 percent utilization are recommended for semiarid grassland ranges in general (Holecheck *et al.* 1998). Long-term experiments at the Santa Rita Experimental Range indicated that an average 40 percent use level should be used when assigning stocking rates (Holecheck *et al.* 1999). However, Holecheck *et al.* (1998) recommend average utilization levels of 25-40 percent in arid regions of the Southwest where precipitation is less than 11.8 inches (29 cm). Annual average precipitation in the Black Diamond Allotment is 16-19 inches. Holecheck *et al.* (1998) found that generally, as average precipitation increases, utilization can increase. Within the range of utilization rates given, several factors determine whether a low, medium, or high value should be selected. Holecheck *et al.* (1998) suggest that on ranges in good condition with relatively flat terrain and good water distribution, the higher utilization limit may be appropriate. If the range is in poor or fair condition, or the allotment has thin soils, rough topography, and poor water distribution, the lower utilization rate may be appropriate. Martin and Cable (1974) found that an average of 40 percent utilization on rangeland at the Santa Rita Experimental Range maintained perennial grasses over a 10-year period. Also on the Santa Rita Experimental Range, Martin (1973) recommended resting pastures during spring-summer and winter two years out of three if forage consumption is limited to 50-60 percent utilization. Martin (1975) also recommended stocking cattle at no more than 90 percent of average proper stocking, but with some reductions during prolonged severe drought.

Range condition on the Black Diamond Allotment is primarily in good condition. Because trend has been improving with this management regime, condition is expected to remain good.

From the discussion above, proposed maximum utilization rates of 45-50 percent should probably be adequate to maintain upland range condition and minimize loss of vegetation cover, erosion, and other watershed degradation that could result in loss or deterioration of Chiricahua leopard frog habitat. Note that Martin and Cable (1975) suggest "average" utilization rates of no more than 40 percent, whereas the proposed action is to allow maximum utilization rates of 45-50 percent. If that maximum is implemented, average utilization will probably be less than 45 percent, and probably in the range recommended by Martin and Cable (1975).

Black and Smelter tanks are currently occupied by Chiricahua leopard frogs. Historically, Chiricahua leopard frogs have occupied Black Diamond Spring and Forest Tank, and conceivably these localities could become occupied again in the future. The Upper and Lower Pastures will theoretically be grazed year around, although actual use will vary, as cows are rotated between the allotment and state and private land. Chiricahua leopard frogs breed and deposit egg masses from February through September. Frogs at elevations below 5,900 feet (such as in the Black Diamond Allotment) typically deposit egg masses from spring through late summer, but most activity is before June (Frost and Platz 1983). Some potential exists for trampling of egg masses, young tadpoles or metamorphosing frogs. Also, juvenile and adult frogs could be trampled while dormant on the bottom of tanks during winter. This problem should be partially remedied by fencing portions of the Black and Smelter tanks. Partially fencing the tanks will also provide for growth of aquatic vegetation, which will provide cover for the frogs as well as forage and cover for insects that frogs prey upon.

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 will probably disperse from drying tanks or be killed by predators as waters recede. However, some frogs can persist in cracks in the mud of pond bottoms (M. Sredl pers. comm. 1999) or in clumps of emergent vegetation. 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.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to the section 7 of the Act.

Much of the land in the action area is owned and managed by the Coronado National Forest. Thus, the effects of most activities likely to occur in the project area would not be considered cumulative effects. However, private inholdings occur within the Black Diamond Allotment, and the allotment is adjacent to state and private land. Activities could occur on these lands, such as construction of roads, buildings, or other structures and grazing, that might adversely affect the lesser long-nosed bat and 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.

SUMMARY

Superimposing the potential effects of livestock use as it affects the availability of floral resources, adult plant mortality, and seedling mortality, upon the natural variability in agave phenology, episodic reproductive events, and patchy distribution on the landscape, grazing may affect agaves and nectar feeding bats in a variety of ways. Lesser long-nosed bats are opportunistic foragers and are capable of long distance flights. Temporary and minor shifts in the abundance of flowering agaves as an available resource for these bats are expected to have limited adverse effects. However, as these impacts to lesser long-nosed bat food resources occur across large portions of the landscape, bat survivorship may be reduced through increased foraging flight distances and related energy expenditures, increased exposure to predators, changes in use patterns of limited large roost sites, and potential disruption of the "nectar corridor." These effects may be most evident in those years where weather patterns, fire, or other causes have also affected agaves. The long-term effect of livestock use contributes to ecosystem based changes. The net result is that there are effects from livestock activities across the landscape to the ecosystem upon which the lesser long-nosed bat depends. Exactly how this alters the distribution and abundance of agaves, and to what degree this may impact lesser long-nosed bat populations is uncertain.

The present threats to the Chiricahua leopard frog from the proposed action are most likely in the riparian (in or associated with wetted areas) and wetland communities within the Black Diamond Allotment. In summary, these threats are from the effects of cattle grazing primarily on the springs and stock tanks within the Black Diamond Allotment, and include the following: 1) trampling of eggs, tadpoles, and frogs; 2) mortality due to stock tank maintenance (cleaning tanks); 3) the spread of chytrid fungus; 4) degraded water quality in tanks; 5) trampling of undercut banks and bank vegetation (cover for frogs).

CONCLUSION

After reviewing the current status of the lesser long-nosed bat and the proposed threatened Chiricahua leopard frog, the environmental baseline for the action area, the anticipated effects of

the proposed grazing program, and cumulative effects, it is the Service's biological opinion that the proposed action is not likely to jeopardize the continued existence of the lesser long-nosed bat, and the Service's conference opinion is that the proposed action is not likely to jeopardize the continued existence of the Chiricahua leopard frog. Critical habitat has not been proposed or designated for these species, therefore none will be affected. Our conclusion that the proposed action is not likely to jeopardize the continued existence of the lesser long-nosed bat or the Chiricahua leopard frog is based on the following:

1. Rangeland and riparian improvements are expected as a result of the proposed action.

2. Currently, there are no known lesser long-nosed bat roosts on the Black Diamond Allotment. Although adverse effects to agaves, a crucial forage resource, are anticipated, the effects are not anticipated to substantially reduce post-breeding populations of the bat.

3. 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.

4. The Chiricahua leopard frog can coexist with well-managed livestock grazing.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act prohibits the take of listed species without special exemption. Taking is defined as harassing, harming, pursuing, hunting, shooting, wounding, killing, trapping, capturing, collecting, or attempting 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 behavior patterns, including breeding, feeding, or sheltering (50 CFR 17.3). Harass is defined as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering. Incidental take is any take of a listed animal species that results from, but is not the purpose of, carrying out an otherwise lawful activity conducted by the Federal agency or the applicant. Under the terms of sections 7(b)(4) and 7(o)(2) of the Act, taking that is incidental to and not intended as part of the agency action is not considered to be prohibited under the Act provided that such taking is in compliance with this incidental take statement.

The measures described below are non-discretionary, and must be undertaken by the Coronado National Forest 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 Coronado National Forest has a continuing duty to regulate the activity covered by this incidental take statement. If the Coronado National Forest (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 Coronado National Forest 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)].

Amount and Extent of Take

Lesser long-nosed bat

Although difficult to quantify, take of lesser long-nosed bat could occur through destruction of bat foraging resources and associated increases in foraging flight distances and related energy expenditures, increased exposure to predators, changes in use patterns of limited large roost sites, and potential disruption of the "nectar corridor."

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 (USFWS 1998). Thus, the following will be used to determine if incidental take has been exceeded:

> Long-term ecological conditions do not remain stable or continue to 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. For the bat, this can be more specifically defined as long-term stability or increases in the numbers of agaves within the natural capabilities of the landscape.

Chiricahua leopard frog

Because Chiricahua leopard frogs occur in several cattle tanks on the Black Diamond Allotment, we estimate that take could occur in the following fashion:

1. Mortality of all frogs at one livestock tank due to maintenance activities.

2. Trampling and destruction of egg masses, small tadpoles, and frogs.

3. Mortality of recently metamorphosed frogs at one locality (livestock tank, stream, or spring) 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 (USFWS 1998). The following will also be used to determine if incidental take has been exceeded:

> Long-term ecological conditions do not remain stable or continue to 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.

EFFECT OF THE INCIDENTAL TAKE

In this biological and conference opinion, the Service finds the anticipated level of take is not likely to result in jeopardy to the lesser long-nosed bat or Chiricahua leopard frog.

REASONABLE AND PRUDENT MEASURES
for the lesser long-nosed bat

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of lesser long-nosed bat:

1. The Coronado National Forest shall minimize disturbance to agaves.

2. The Coronado National Forest shall monitor grazing activities and incidental take of lesser long-nosed bats.

TERMS AND CONDITIONS
for the lesser long-nosed bat

In order to be exempt from the prohibitions of section 9 of the Act, the Forest Service shall comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline 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 Structural range improvement project construction shall be implemented so that no more than one percent of agaves within 800 m (0.5 miles) of the project are killed or injured.

2. The following term and condition implements reasonable and prudent measure number two:

2.1 The forest shall submit an annual report to this office. The report shall, at a minimum, briefly summarize for the previous calender year: 1) The implementation of terms and conditions and conservation recommendations, 2) documentation of take or monitoring for listed species, 3) any excessive use, increased animal months, unauthorized use, or other detrimental variations from the propose action. The report shall also make recommendations for modifying or refining these terms and conditions to enhance protection of the lesser long-nosed bat or reduce needless hardship on the forest and its permittee. We recommend that you package this report with the annual report on the ongoing and long-term grazing biological opinion.

REASONABLE AND PRUDENT MEASURES
for the Chiricahua leopard frog

The prohibitions against taking listed species found in section 9 of the Act do not apply until a species is listed. However, the Service recommends that the Coronado National Forest implement the following reasonable and prudent measures for the Chiricahua leopard frog. 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 non-discretionary.

If the Chiricahua leopard frog is listed, the Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the Chiricahua leopard frog:

1. The Coronado National Forest shall continue to monitor the Chiricahua leopard frog and its habitat to document levels of take.

2. Measures shall be implemented to reduce riparian habitat degradation and trampling of egg masses, tadpoles, and metamorph frogs, and take of Chiricahua leopard frogs during maintenance of stock tanks.

3. Personnel education programs and well-defined operational procedures shall be implemented.

4. The Coronado National Forest shall monitor grazing activities and incidental take resulting from the proposed action and report the findings of that monitoring.

TERMS AND CONDITIONS
for the Chiricahua leopard frog

If the Chiricahua leopard frog is listed, 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 conditions implement reasonable and prudent measure number one:

1.1. The Coronado National Forest shall continue, in coordination with AGFD and the Service, to identify potential habitat within the Black Diamond Allotment and survey those sites for the presence of Chiricahua leopard frogs.

2. The following terms and conditions implements reasonable and prudent measure number two:

2.1 If Chiricahua leopard frogs are found on the Black Diamond Allotment in areas outside of those currently known (Black Diamond Spring, Forest Tank, Black Tank, Smelter Tank) the Coronado National 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.

2.2 At least 20 days prior to maintenance or cleanout of livestock tanks, the permittee shall inform the Coronado National Forest of planned activities. Prior to cleanout or other maintenance of known frog localities (Black Diamond Spring, Forest Tank, Black Tank, Smelter Tank) the area shall be thoroughly surveyed for frogs[1]. Care shall be taken to carefully survey for presence of frogs in aquatic emergent vegetation (e.g. cattails) and in cracks in the mud of bottom sediments. Any frogs observed in these surveys shall be collected and held off-site for later release at the capture site, following cleanout and natural refilling of tanks through storm flow and runoff. Protocols for holding frogs will be coordinated with the Service and AGFD. The Coronado National Forest shall inform the Service of any collected frogs within 10 calender days. At other tanks with suitable habitat for frogs, surveys shall be conducted prior to cleanout or maintenance and measures described herein will be implemented if frogs are found.

2.3 Tank cleanout will limit disturbance and work areas to the minimum area practicable, leaving stands of emergent vegetation in place.

3. The following terms and conditions implement reasonable and prudent measure number three:

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[1]Surveys shall include a night visit to prospective habitat during which all or at least 1,200 feet 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, and not during strong winds.

3.1 Live fish, crayfish, bullfrogs, leopard frogs, salamanders, or other aquatic organisms shall not be introduced into any livestock tanks or other aquatic sites on the Black Diamond Allotment.

3.2 If a site is identified as occupied by Chiricahua leopard frogs or salamanders, water shall not be hauled to the site from another aquatic site or tank that supports leopard frogs, bullfrogs, crayfish, or fish.

3.3 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.

4. The following term and condition implements reasonable and prudent measure number 4:

4.1 The forest shall submit an annual report to this office. The report shall, at a minimum, briefly summarize for the previous calender year: 1) The implementation of terms and conditions and conservation recommendations, 2) documentation of take or monitoring for listed species, 3) any excessive use, increased animal months, unauthorized use, or other detrimental variations from the propose action. The report shall also make recommendations for modifying or refining these terms and conditions to enhance protection of the Chiricahua leopard frog or reduce needless hardship on the forest and its permittee. We recommend that you package this report with the annual report on the ongoing and long-term grazing biological opinion.

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 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 purpose of the Act by carrying out conservation programs for the benefit of endangered and threatened species. The term conservation recommendations has been defined as Service suggestions regarding discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat or regarding the development of information. The recommendations provided here relate only to the proposed action and do not necessarily represent complete fulfillment of the Coronado National Forest's 7(a)(1) responsibility for these species.

1. The Coronado National Forest should implement the Lesser Long-nosed Bat Recovery Plan (USFWS 1997), as appropriate.

2. The Coronado National Forest should conduct comprehensive bat roost surveys in the Dragoon EMA.

3. If listed, the Coronado National Forest should assist the Service in development and implementation of a recovery plan for the Chiricahua leopard frog.

4. The Coronado National Forest should work with the Service and AGFD to translocate the Chiricahua leopard frog to suitable habitats in the Forest thereby enhancing metapopulation dynamics.

5. The Coronado National Forest should conduct or support comprehensive surveys for the Chiricahua leopard frog in all suitable habitats on the Black Diamond Allotment.

6. The Coronado National Forest should work with the Service and AGFD 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 or proposed species, the Service requests notification of implementation of any conservation actions.

REINITIATION - CLOSING STATEMENT

This concludes the biological and conference opinion for grazing activities on the Black Diamond Allotment. 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 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 for the project and no further section 7 consultation will be necessary.

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 take. No take of the Chiricahua leopard frog may occur between the listing of the species and the adoption of the conference opinion through formal consultation, or the completion of a subsequent formal consultation. Although not required, we recommend that the Coronado National Forest implement the reasonable and prudent measures and terms and conditions herein prior to our final listing decision. If the species is subsequently listed, implementation of reasonable and prudent measures and terms and conditions in any conference opinion adopted as a biological opinion, is mandatory.

If incidental take anticipated in the preceding paragraphs is met, the Coronado National Forest should immediately notify the Service in writing. 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 Coronado National 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. The Coronado National 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. This opinion does not authorize any form of take not incidental to the Coronado National Forest's proposed action as described herein.

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

We appreciate your interest in furthering the conservation of these species. If we can be of further assistance, please contact Glen Knowles (602/242-0210, x233), Mima Falk (520/670-4619) or Sherry Barrett (520/670-4617) of my staff. Please refer to number 2-21-01-F-071, April 9, 2001, in future correspondence concerning this consultation.

Sincerely,

David L. Harlow
Field Supervisor

cc: Regional Director, U.S. Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
Assistant Field Supervisor, U.S. Fish and Wildlife Service, Tucson, AZ
District Ranger, Coronado National Forest, Douglas, AZ

Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ

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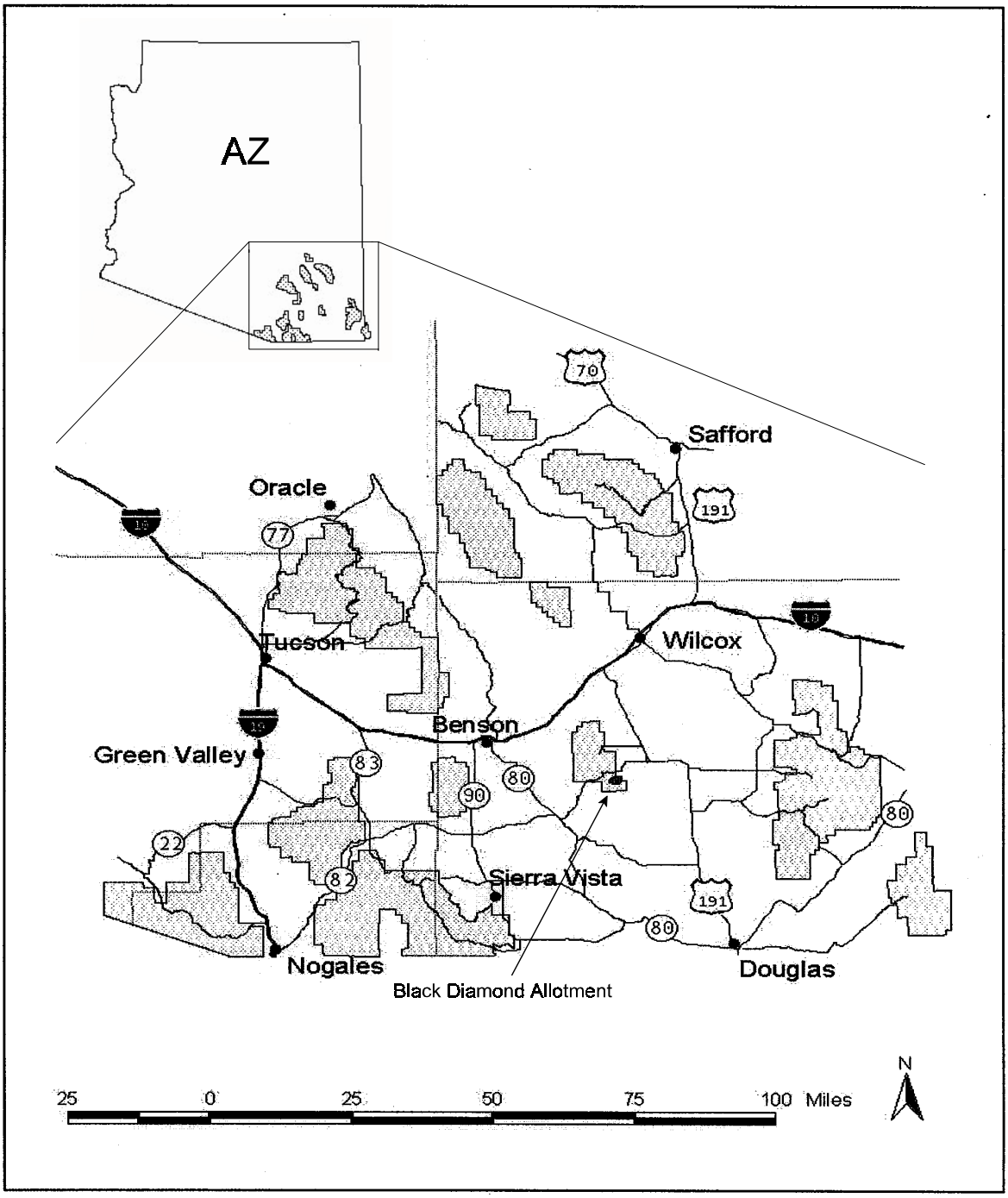
Figure 1. Location of Black Diamond Allotment within Coronado National Forest (light stippled areas are Coronado National Forest; darkened area is Black Diamond Alotment).



Appendix

Figure 2. Detail of Black Diamond Allotment showing pastures and tanks mentioned in the text.