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

In Reply Refer To:
AESO/SE
02-21-99-F-0300-R1

November 17, 2004

Karl P. Siderits
Forest Supervisor
Tonto National Forest
2324 East McDowell Road
Phoenix, Arizona 85006

Dear Mr. Siderits:

Thank you for your July 14, 2003, request for reinitiation of formal section 7 consultation under the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531-1544 et seq.). At issue are impacts that may result from the proposed issuance of a term permit to graze livestock for 10 years on the Little Green Valley Complex, which is near Payson, Gila County, Arizona. The Little Green Valley Complex includes the Star Valley, Payson, Cross V, Green Valley, and Indian Garden allotments. In your request and subsequent changes to that request, you concluded that the proposed action may affect, and is likely to adversely affect, the following species: Mexican spotted owl (*Strix occidentalis lucida*, MSO) and proposed critical habitat, Chiricahua leopard frog (*Rana chiricahuensis*), and Gila trout (*Oncorhynchus gilae gilae*). Critical habitat for the MSO was proposed at the time of the draft biological opinion and has since been finalized, thus we are providing you our biological opinion for MSO critical habitat.

You also concluded that the proposed project, may affect, but is not likely to adversely affect, the Arizona agave (*Agave arizonica*), bald eagle (*Haliaetus leucocephalus*), southwestern willow flycatcher (*Empidonax traillii extimus*), Gila topminnow (*Poeciliopsis occidentalis occidentalis*), razorback sucker (*Xyrauchen texanus*), spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*), and critical habitat for razorback sucker, spikedace, and loach minnow. We concur with those determinations and a full explanation of our concurrences are provided as an appendix to the biological opinion. Please note, that the New Mexico District Court recently vacated the critical habitat designation for spikedace and loach minnow, and that neither species currently occupies the action area; thus, they will not be addressed further in this opinion.

This biological and conference opinion is based on information provided in your biological assessment and evaluation, draft and final environmental assessments, various supporting documents, meetings, telephone conversations, electronic mail messages, field investigations, and other sources of information. A complete administrative record of this consultation is on file at the Phoenix, Arizona Ecological Services Field Office (AESO).

Consultation History

August 26, 1999	We issued a biological opinion on the introduction of Gila trout to Dude Creek on the Cross V allotment that included an analysis of the effects of livestock grazing on Gila trout.
February 28, 2002	We issued a biological opinion on the effects of ongoing grazing on 20 Tonto NF allotments (2-21-99-F-300). The opinion included the Star Valley and Payson/Cross V allotments. For the Star Valley allotment, the opinion concluded that the proposed action was not likely to jeopardize lesser long-nosed bat (*Leptonycteris curosoae yerbabuenae*), Gila topminnow, and southwestern willow flycatcher or result in adverse modification of spikedace and loach minnow critical habitat, and was not likely to adversely affect the Arizona agave. For the Payson/Cross V allotments, the opinion concluded that the proposed action was not likely to jeopardize the lesser long-nosed bat and southwestern willow flycatcher, and not likely to adversely affect the Mexican spotted owl, Gila topminnow, and spikedace and loach minnow critical habitat.
October 31, 2002	We received your initial request for formal conference on the effects of the Little Green Valley Complex to Gila chub (*Gila intermedia*) and your request for our concurrence with your determination that the project may affect, but is not likely to adversely affect, Arizona agave, bald eagle, southwestern willow flycatcher, Mexican spotted owl, Gila trout, Chiricahua leopard frog.
April 14, 2003	You informed us via email that the project would not affect Gila chub as the species does not occur in the action area and withdrew your request for formal consultation.
June 24, 2003	We met to discuss effects of the project and interpretation of the August 15, 2002 Grazing Guidance Criteria.
July 18, 2003	We received your request for formal consultation on bald eagle, southwestern willow flycatcher, Mexican spotted owl, Gila trout, Chiricahua leopard frog, and spikedace and loach minnow critical habitat, and concurrence that the project may affect, but is not likely to adversely affect, Arizona agave, Gila chub, Gila topminnow, and razorback sucker.
August 20, 2003	We responded to your request for formal consultation with a letter initiating consultation.
January 22, 2004	We received your request over the phone to change your

	determinations for bald eagle, southwestern willow flycatcher, and spikedace and loach minnow critical habitat to may affect, not likely to adversely affect, and to change Gila chub to no effect.
March 23, 2004	We transmitted our draft biological opinion to you.
August 10, 2004	We received your comments on the draft biological opinion, and a verbal request to convert the conference opinion to a biological opinion.

BIOLOGICAL OPINION

Description of the Proposed Action

This consultation addresses the effects of livestock grazing on the Little Green Valley Complex under a 10-year term grazing permit beginning in 2004. The complex consists of five separate grazing allotments: Payson, Cross V, Star Valley, Green Valley, and Indian Gardens. The proposed action constitutes a single grazing strategy for the combined allotments and attempts to balance current forage productivity with permitted livestock and wildlife needs in a way that is compatible with other resource values and is consistent with the Tonto National Forest Land Management Plan (USDA Forest Service 1985, 2002).

Collectively, the complex constitutes approximately 164,200 acres and is located near Payson. The complex is bounded to the south by the town of Payson and portions of the Hell's Gate wilderness, to the north by the Mogollon Rim, to the east by portions of the Hell's Gate wilderness, and to the west by a small section of Highway 87 and escarpments coming off the Mogollon Rim (Figure 1).

There are numerous riparian areas in the complex. The two primary perennial stream systems include the East Verde River and Tonto Creek. All other riparian areas are tributaries of these systems. There are multiple creeks that drain the Mogollon Rim that are perennial or interrupted perennial, such as Bray, Ellison, Bonita, Dude, Chase, and Webber creeks. Tonto Creek tributaries on the complex include Houston, Green Valley, Horton, and Dick Williams creeks, and Dry Pocket Wash.

The action area for this consultation is defined as the boundaries of the complex and sections of stream to a point 25 miles downstream of the respective watersheds and subwatersheds. For example, the effects of grazing on the complex to Houston Creek are herein evaluated from where that stream exits the complex in the Dry Pocket pasture and flows into the Gisela allotment, to a point downstream 25 miles at approximately the Tonto Basin allotment. This methodology is consistent with the Forest Service's methods of evaluating effects of grazing to streams and watersheds.

The proposed action reduces the number of acres accessible to livestock from 125,471 to 95,170. Permitted stocking would be 380 head of adult livestock during the calendar year. There would be no provision of yearling carryover. However, until all necessary improvements are in place (see below), permitted stocking would be less than 300 head of adult livestock during the

summer season and 380 head of adult livestock during the winter season. Improvements would include fencing several springs and wet meadows important to wildlife and maintaining water sources. The proposed action permits 4,560 animal months annually, a 41 percent reduction from the prior permit's 7,778 animal months. The proposed action would represent a 31 percent reduction from past actual use, which averaged 6,587 animal months between 1985 and 2000.

Several pastures would be excluded from the proposed rotation due to difficult access for moving livestock, impaired or unsatisfactory soils, and low forage capacity. In addition, the stocking rate has been adjusted and reduced for slope. In rough, rugged terrain, cattle congregate on the more convenient, flat areas such as valley bottoms, riparian zones, and ridgetops. Forage on the steeper slopes (over 60 percent) receive little or no use by cattle and these areas must be deleted from the grazable land area (Holechek 1988).

The Birch, Catholic Peak, Dead Horse, Round Valley, and Ponderosa pastures will not be grazed (see Figure 2). The following pastures have been assigned no capacity toward permitted numbers but will be used on a limited basis (less than 2 weeks) when cattle are pushed through the pasture to the next rotation: Boy Scout, Robert's Mesa - South, Diamond East, Flowing Springs, Girl Scout, Lion Springs, and Beaver Valley.

The following pastures would be scheduled for grazing use during the dormant, or winter, season (October through April): Diamond West, Dry Pocket, Green Valley Hills, Hell's Half Acre, Hole in the Ground, King's Ridge, Lower Neal, Picket Pen, Star Valley, Upper Neal, and Winter Division.

The following pastures would be scheduled for grazing use during the summer season (May through September): Bean Patch, Bonita, Brody, Butcher, Dry Dude, Ellison, Houston Mesa, Moore, Myrtle, Roberts Mesa-North, and East Verde.

Each pasture will be used in conjunction with others such that there are three units of summer and three units of winter pasture. The units will be used in a deferred, rest-rotation grazing scheme (i.e. grazed during the first half of the designated season year 1, the second half of the designated season year 2, and complete rest year 3). Winter units will be grazed no more than 3.5 months each designated year and summer units will be used no more than 2.5 months each designated year. Utilization limits will be as follows:

- Winter Pastures – 45 percent use on total biomass, 50 percent on current 1 year's leaders of browse species
- Summer Pastures – 35 percent use on herbaceous forage, 35 percent on current year's leaders of browse species
- Riparian Areas – limit streambank impact to less than 20 percent of alterable bank
- Limit herbaceous use to less than 30 percent of plant species biomass or 1/3 of plants total foliar height

- Limit tree/shrub use to 50 percent of leaders within the top 1/3 of plant for plants less than 4 ½ feet tall

Additionally, in those years that the Diamond East pasture is used as a travel way, herbaceous use will not exceed 20 percent, as specified in the Management Recommendations for the Northern Goshawk in the Southwestern United States (USDA FS, GTR-217 1992). And, when used, the East Verde pasture will be used no more than one month.

All utilization measurements include use by wild ungulates. Monitoring will be conducted in key areas using the Tonto National Forest riparian monitoring protocol and standard Forest Service range-forage measurements for uplands. Utilization will be monitored in grazed pastures during and after use by livestock and at the end of the growing season. If overall pasture levels are above acceptable utilization levels, livestock will be moved into the next pasture in the rotation. If all pastures are used prior to the originally scheduled off-date, livestock will be removed from the allotment.

No provisions are made under the preferred alternative for drought conditions. Nevertheless, management of livestock during drought periods will follow the current Tonto National Forest Drought Management Policy (Karl Siderits, USDA Forest Service *in litt.*2001). The drought policy requires that a team assess the effects of drought at the individual allotment scale and make recommendations as to management, including a written report. The district ranger then determines if removal of livestock or a reduction in numbers is required and makes the appropriate changes to the permit, if needed. The drought policy is incorporated into the proposed action.

The following improvements are part of the proposed action:

- Moore Pasture – construct a fence (approximately 1.75 miles) to exclude occupied Chiricahua leopard frog habitat in Ellison Creek
- Bonita Pasture – construct 3 earthen road tanks
- Dry Dude Pasture – construct 2 earthen road tanks
- Robert's Mesa North - construct 2 earthen road tanks
- No prescribed burns or other non-structural improvements are planned

The Forest Service proposes to provide the AESO an annual monitoring report that includes riparian and upland utilization and streambank alteration. If either the Forest Service or we determine, based on this annual confirmation, that the terms of the proposed action are not being met, the effects of authorized grazing on the allotment and associated allotment management plan will need reevaluation, and reinitiation of consultation may be required.

Proposed Conservation Measures

Mexican Spotted Owl

Protected habitat outside of designated Protected Activity Centers, restricted habitat, or target-threshold habitat that has not been surveyed in the three years prior to implementation or has fewer than four years of surveys, will be surveyed for owls prior to implementation of the new allotment management plan. Livestock will be excluded from PACs during the MSO breeding season. PACs will continue to be monitored on an annual basis.

Chiricahua Leopard Frog

Occupied habitat in Ellison Creek, and potential habitat at Gilliland and Wildcat springs, will be fenced to exclude livestock

STATUS OF THE SPECIES/CRITICAL HABITAT

Mexican Spotted Owl

The Mexican spotted owl was listed as a threatened species in 1993 (US Fish and Wildlife Service 1993). Critical habitat was designated for the species on June 6, 1995 (US Fish and Wildlife Service 1995a), but was later withdrawn (US Fish and Wildlife Service 1998). The final listing rule identified the primary threats to the species as even-aged timber harvest and the threat of catastrophic wildfire, although grazing, recreation, and other land uses were also mentioned as possible factors influencing the MSO population.

Critical habitat was redesignated on August 31, 2004. The final rule designated approximately 8.6 million acres of critical habitat on Federal lands in Arizona, Colorado, New Mexico, and Utah, including approximately 3.3 million acres of lands in Arizona (US Fish and Wildlife Service 2004). A Recovery Plan for the Mexican Spotted Owl (Recovery Plan) was completed in 1995 (US Fish and Wildlife Service 1995a). This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead we relied upon the statute and the August 6, 2004, Ninth Circuit Court of Appeals decision in Gifford Pinchot Task Force v. U.S. Fish and Wildlife Service (No. 03-35279) to complete the following analysis with respect to critical habitat.

Primary constituent elements of critical habitat necessary to the conservation of the MSO include those physical and biological features that support nesting, roosting, and foraging. Although the vegetative communities and structural attributes used by the owl vary across the range of the subspecies, they consist primarily of mixed conifer forests or canyons. The mixed-conifer, pine-oak communities and canyon habitat appear to be the most frequently used community throughout most portions of the subspecies' range (US Fish and Wildlife Service 2004).

A detailed account of the taxonomy, biology, and reproductive characteristics of the MSO is found in the Final Rule listing the MSO as a threatened species (US Fish and Wildlife Service 1993) and in the Recovery Plan (US Fish and Wildlife Service 1995a), and a detailed discussion of critical habitat can be found in the MSO critical habitat final rule (US Fish and Wildlife Service 2004). The information provided in those documents is included herein by reference.

Although the MSO's entire range covers a broad area of the southwestern United States and Mexico, the MSO does not occur uniformly throughout its range. Instead, it occurs in disjunct localities that correspond to isolated forested mountain systems, canyons, and in some cases, steep, rocky canyon lands. Surveys have revealed that the species has an affinity for older, well-structured forest, and the species is known to inhabit a physically diverse landscape in the southwestern United States and Mexico.

The U.S. range of the MSO has been divided into six recovery units (RU), as discussed in the Recovery Plan. The proposed action is within the Upper Gila Mountains RU. The primary administrator of lands supporting the MSO in the United States is the Forest Service. Most owls have been found within Forest Service Region 3 (including 11 National Forests in Arizona and New Mexico). Forest Service Regions 2 and 4 (including 2 National Forests in Colorado and 3 in Utah) support fewer owls. According to the Recovery Plan, 91 percent of MSO known to exist in the United States between 1990 and 1993 occurred on lands administered by the Forest Service.

A reliable estimate of the numbers of owls throughout its entire range is not currently available (US Fish and Wildlife Service 1995a) and the quality and quantity of information regarding numbers of MSO vary by source. The US Fish and Wildlife Service (1991a) reported a total of 2,160 owls throughout the United States. Fletcher (1990) calculated that 2,074 owls existed in Arizona and New Mexico. However, Ganey *et al.* (2000) estimates approximately 2,950 ± 1,067 (SE) MSOs in the Upper Gila Mountains RU alone. The Forest Service Region 3 most recently reported a total of approximately 980 PACs established on National Forest lands in Arizona and New Mexico (USDA Forest Service, Southwestern Region, December 19, 2002). The Forest Service Region 3 data are the most current compiled information available to us; however, survey efforts in areas other than National Forest System lands have likely resulted in additional sites being located in all Recovery Units.

Currently, high intensity, stand-replacing fires are influencing ponderosa pine and mixed conifer forest types in Arizona and New Mexico. Mexican spotted owl habitat in the southwestern United States has been shaped over thousands of years by fire. Since MSO occupy a variety of habitats, the influence and role of fire has most likely varied throughout the owl's range. In 1994, at least 40,000 acres of nesting and roosting habitat were impacted to some degree by catastrophic fire in the Southwestern Region (Sheppard and Farsnsworth 1995, unpublished Forest Service Report). The Forest Service estimated that, between 1991 and 1996, approximately 50,000 acres of owl habitat has undergone stand replacing wildfires (G. Sheppard, Forest Service, Kaibab National Forest, Arizona, pers. comm.). However, since 1996, fire has become catastrophic on a landscape scale and has resulted in hundreds of thousands of acres of habitat lost to stand-replacing fires. This is thought to be a result of unnatural fuel loadings, past grazing and timber practices, and a century of fire suppression efforts. The 2002 Rodeo-Chediski fire, at 462,384 acres, burned through approximately 55 PACs on the Tonto and Apache-Sitgreaves National Forests and the White Mountain Apache Reservation (all within the Upper Gila RU). Of the 11,986 acres of PAC habitat that burned on National Forest lands, approximately 55 percent burned at moderate to high severity; however, some owls survived the fire. Based on the fire-severity maps for the fire perimeter, tribal and private lands likely burned in a similar fashion. We define moderate severity burn as "high-scorch" trees (burned may still

have some needles) and high severity burn as completely scorching all trees (trees completely dead).

The Upper Gila Mountains RU is a relatively narrow band bounded on the north by the Colorado Plateau RU and to the south by the Basin and Range-West RU. The southern boundary of this RU includes the drainages below the Mogollon Rim in central and eastern Arizona. The eastern boundary extends to the Black, Mimbres, San Mateo, and Magdalena mountain ranges of New Mexico. The northern and western boundaries extend to the San Francisco Peaks and Bill Williams Mountain north and west of Flagstaff, Arizona. This is a topographically complex area consisting of steep foothills and high plateaus dissected by deep forested drainages. This RU can be considered a "transition zone" because it is an interface between two major biotic regions: the Colorado Plateau and Basin and Range Provinces (Wilson 1969). Most habitat within this RU is administered by the Kaibab, Coconino, Apache-Sitgreaves, Tonto, Cibola, and Gila National Forests. The north half of the Fort Apache and northeastern corner of the San Carlos Indian reservations are located in the center of this RU and also support MSOs.

The Upper Gila Mountains RU consists of pinyon/juniper woodland, ponderosa pine/mixed conifer forest, some spruce/fir forest, and deciduous riparian forest in mid- and lower-elevation canyon habitat. Climate is characterized by cold winters, with over half of the precipitation falling during the growing season. Much of the mature stand component on the gentle slopes surrounding the canyons had been partially or completely harvested prior to the species' listing as threatened in 1993; however, MSO nesting habitat remains in steeper areas. MSO are widely distributed and use a variety of habitats within this RU. Owls most commonly nest and roost in mixed-conifer forests dominated by Douglas fir and/or white fir, and canyons with varying degrees of forest cover (Ganey and Balda 1989, US Fish and Wildlife Service 1995a). Owls also nest and roost in ponderosa pine-Gambel oak forest where they are typically found in stands containing well developed understories of Gambel oak (US Fish and Wildlife Service 1995a).

Currently, catastrophic wildfire is probably the greatest threat to MSO within the Upper Gila Mountains RU. As throughout the West, fire intensity and size have been increasing within this geographic area. Table 1 shows several high-intensity fires that have had a large influence on MSO habitat in this RU in the last decade. The information in Table 1 is not a comprehensive analysis of fires in the Upper Gila Mountains RU or the effects to MSO. However, the information does illustrate the influence that stand-replacing fire has on current and future MSO habitat in this RU. This list of fires alone estimates that approximately 11 percent of the PAC habitat within the RU suffered high-to moderate-intensity, stand-replacing fire in the last seven years.

Livestock grazing has several effects to MSO which are well described in the recovery plan (reductions in prey availability, increased risk of catastrophic wildfire, and a reduced ability of forests to develop into owl habitat through ecological succession). Of these, the increased risk of catastrophic wildfire is the greatest threat to MSO. Although most experts point to both livestock grazing and fire suppression as factors in the increase of catastrophic wildfire seen throughout the American west in recent years, the question of which is the greater ill has been a topic of intense debate. However, it has been clearly demonstrated that if grazing significantly reduces herbaceous ground cover, the potential for beneficial low-intensity ground fires does

decrease, and the potential for high-intensity vertical fires does increase (Zimmerman and Neuenschwander 1984), and this effect can cause catastrophic fires on a landscape scale (Belsky and Blumenthal 1997).

Since the owl was listed, we have completed or have in draft form a total of 137 formal consultations for the MSO. These formal consultations have identified incidences of anticipated incidental take of MSO in 327 PACs. The form of this incidental take is almost entirely harm or harassment. These consultations have primarily dealt with actions proposed by the Forest Service, Region 3. However, in addition to actions proposed by the Forest Service, Region 3, we have also reviewed the impacts of actions proposed by the Bureau of Indian Affairs, Department of Defense (including Air Force, Army, and Navy), Department of Energy, National Park Service, and Federal Highway Administration. These proposals have included timber sales, road construction, fire/ecosystem management projects (including prescribed natural and management ignited fires), livestock grazing, recreation activities, utility corridors, military and sightseeing overflights, and other activities. Only one of these projects (release of site-specific owl location information) has resulted in a biological opinion that the proposed action would likely jeopardize the continued existence of the MSO.

In 1996, we issued a biological opinion on Forest Service Region 3's adoption of the Recovery Plan recommendations through an amendment of their Forest Plans. In this non-jeopardy biological opinion, we anticipated that approximately 151 PACs would be affected by activities that would result in incidental take of MSOs, with approximately 91 of those PACs located in the Upper Gila Mountains RU. In addition, we completed a reinitiation of the 1996 Forest Plan Amendments biological opinion which anticipated the additional incidental take of five MSO PACs in Region 3 due to the rate of implementation of the grazing standards and guidelines, for a total of 156 PACs. To date, consultation on individual actions under the amended Forest Plans have resulted in 233 PACs adversely affected, with 126 of those in the Upper Gila Mountains RU.

Chiricahua Leopard Frog

The Chiricahua leopard frog was listed as a threatened species without critical habitat on June 13, 2002 (US Fish and Wildlife Service 2002). Included was a special rule to exempt operation and maintenance of livestock tanks on non-Federal lands from the section 9 take prohibitions of the Act.

The 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 2.1 to 5.4 inches (Stebbins 2003, Platz and Mecham 1979). The Ramsey Canyon leopard frog *(Rana subaquavocali*s) is similar in appearance to the Chiricahua leopard frog, but it may grow to a larger size and has a distinct call that is often 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 3,281 to 8,890 feet in central and southeastern Arizona; west-central and southwestern New Mexico; and northern Sonora, the Sierra Madre Occidental of Chihuahua, and northern Durango, Mexico (Platz and Mecham 1984, Jennings and Scott 1993, Degenhardt *et al.* 1996, Sredl *et al.* 1997, Sredl and Jennings *in press*). Reports of the species from the State of Aguascalientes (Diaz and Diaz 1997) are questionable; however, 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. Of sites occupied by Chiricahua leopard frogs in New Mexico from 1994-1999, 67 percent were creeks or rivers, 17 percent were springs or spring runs, and 12 percent were stock tanks (Painter 2000). In Arizona, slightly more than half of all known historical localities are natural lotic systems, a little less than half are stock tanks, and the remainder are lakes and reservoirs (Sredl *et al.* 1997). Sixty-three percent of populations extant in Arizona from 1993-1996 were found in stock tanks (Sredl and Saylor 1998).

Northern populations of the Chiricahua leopard frog along the Mogollon Rim and in the mountains of west-central New Mexico are disjunct from those in southeastern Arizona, southwestern New Mexico, and Mexico. Recent genetic analyses, including a 50-loci starch gel survey, morphometrics, and analyses of nuclear DNA support describing the northern populations as a distinct species (Platz and Grudzien 1999). Multiple haplotypes within *chiricahuensis* were also identified using mitochondrial DNA analysis (Benedict and Quinn 1999), providing further evidence of genetically distinct population segments.

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 subsequent extensive surveys from 1994-2001, the Chiricahua leopard frog was found at 87 sites in Arizona, including 21 northern localities and 66 southern localities (Sredl *et al.* 1997, Rosen *et al.* 1996, FWS 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 historical 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 most major drainages in Arizona and New Mexico where it occurred historically, with the exception of the Little Colorado River drainage in Arizona and possibly the Yaqui drainage in New Mexico. However, it has not been found recently in many rivers, valleys, and mountains ranges, including the following in Arizona: White River, West Clear Creek, Tonto Creek, Verde River mainstem, San Francisco River, San Carlos River, upper San Pedro River mainstem, Santa Cruz River mainstem, Aravaipa Creek, Babocomari River mainstem, and Sonoita Creek mainstem. In southeastern Arizona, no recent records (1995 to the present) exist for the following mountain

ranges or valleys: Pinaleno Mountains, Peloncillo Mountains, Sulphur Springs Valley, and Huachuca Mountains. Moreover, the species is now absent from all but one of the southeastern Arizona valley bottom cienega complexes. In many of these regions 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).

Threats to this species include predation by nonnative organisms, especially bullfrogs, fish, and crayfish; disease; drought; floods; degradation and loss of habitat as a result of water diversions and groundwater pumping, poor livestock management, a history of fire suppression and grazing that has increased the likelihood of crown fires, mining, development, and environmental contamination; disruption of metapopulation dynamics; and increased chance of extirpation or extinction resulting from small numbers of populations. Loss of Chiricahua leopard frog populations is part of a pattern of global amphibian decline, suggesting other regional or global causes of decline may be important as well (Carey *et al*. 2001). We provide a discussion of the effects of grazing below; for more information on other threats, see the final rule listing the species as endangered (US Fish and Wildlife Service 2002).

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 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 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 that Arizona population of this species have fared better in stock tanks than in natural habitats. Stock tanks provide small patches of habitat that 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 non-native predators (with the exception of bullfrogs) than natural sites.

There are 47 ongoing or completed formal consultations on Chiricahua leopard frog range wide. Most of these consultations involve actions proposed by the Forest Service, Region 3, although we have also consulted on actions affecting the species proposed by the Bureau of Land Management, Bureau of Reclamation, Environmental Protection Agency, and the Federal Highway Administration. Projects consulted on have included livestock grazing, timber sales, road projects, fire use, fire suppression, stream and stock pond renovations, reintroductions of other rare species, development, and issuance of water pollution control permits. A total of 19 consultations on the species have identified incidental take in the form of direct mortality, harm, or harassment. None of these consultations have resulted in a determination that the proposed action would likely jeopardize the continued existence of the Chiricahua leopard frog.

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

Howland (1994), Jennings and Scott (1993), Platz and Mecham (1984, 1979), and Sredl and Jennings (*in press*).

Gila Trout

The Gila trout is endemic to mountain streams in the Gila, San Francisco, Agua Fria, and Verde river drainages in Arizona and New Mexico (Miller 1950, Minckley 1973, Behnke 1992). Although the species was known in the upper Gila River basin since at least 1885, it was not described until 1950, by which time its distribution had been dramatically reduced (Miller 1950). The Gila trout was originally recognized as endangered under the Federal Endangered Species Preservation Act of 1966 (US Fish and Wildlife Service 1967). Federal-designated status of the fish as endangered was continued under the Endangered Species Act of 1973 (US Fish and Wildlife Service 1975). A third revision of the recovery plan was recently completed (US Fish and Wildlife Service 2003b) and provides a detailed account of taxonomy, status and distribution, life history, habitat, threats, and recovery strategy; the following is excerpted from the plan, which is hereby incorporated by reference.

The Gila trout is readily identified by its iridescent gold sides that blend to a darker shade of copper on the opercles. Spots on the body of this trout are small and profuse, generally occurring above the lateral line and extending onto the head, dorsal fin, and caudal fin. Spots are irregularly shaped on the sides and increase in size dorsally. On the dorsal surface of the body, spots may be as large as the pupil of the eye and are rounded. A few scattered spots are sometimes present on the anal fin and the adipose fin is typically large and well-spotted. Dorsal, pelvic, and anal fins have a white to yellowish tip that may extend along the leading edge of the pelvic fins. A faint, salmon-pink band is present on adults, particularly during spawning season when the normally white belly may be streaked with yellow or reddish orange. A yellow cutthroat mark is present on most mature specimens. Parr marks are commonly retained by adults, although they may be faint or absent (Miller 1950, David 1976).

Gila trout require cold, well-oxygenated, high quality water, cobble substrate, deep narrow channels, abundant overhanging banks, and cover. Gila trout begin spawning activity in early April or whenever water temperatures reach 8 degrees C, and continue through June as water warms with summer (Rinne and Minckley 1991, US Fish and Wildlife Service 2003b, Sublette *et al.* 1990). Adults live in pools, with smaller individuals dependent on overhanging vegetation (Rinne and Minckley 1991). The species inhabits clear runs that are typically narrow and shallow, and feeds on aquatic insects including caddisflies, mayflies, chironomids, and beetles (Sublette *et al.* 1990).

In 1975, the known distribution of the species consisted of only five relict populations restricted to headwater stream habitats in the upper Gila River drainage in New Mexico (Main Diamond Creek, South Diamond Creek, McKenna Creek, Spruce Creek and Iron Creek). At the time of listing, no detailed genetic investigations of the few extant populations had been undertaken. Thus, each of the five known occurrences was considered a pure population and essential to recovery. A sixth relict population in Whiskey Creek was discovered in 1992. In 1996 and 1997, it was discovered that the McKenna Creek and Iron Creek populations were hybridized

with rainbow trout. Replication of these two hybrid populations is not a component of recovery of Gila trout.

The Gila trout is one of two native trout species known in Arizona. Prior to 1900, Gila trout were found in Arizona in the Agua Fria River, Verde River, Eagle Creek, Blue River, and San Francisco River, but the species was extirpated from the state around the turn of the century. The species remained extirpated from the state until fish from Main Diamond Creek were translocated into Gap Creek, a tributary of the Verde River, in 1974. This population is believed to be extirpated.

Dude Creek, a tributary of the East Verde River near Payson, was stocked with Gila trout from Spruce Creek in 1999. A high-intensity forest fire in 1989 eliminated an existing nonnative trout fishery and the stream remained fishless until it was stocked with Gila trout. Gila trout currently occupy approximately 2 miles of stream in Dude Creek. A lack of spawning substrate due to continuing siltation from the Dude Fire may be limiting reproduction of Gila trout in Dude Creek (B. Calamusso, Tonto National Forest, 2004). Supplemental stockings may be necessary to ensure long-term success of reestablishment. In November 2000, Raspberry Creek, a tributary to the Blue River, was stocked with 113 age 0 Gila trout, creating a second Arizona population. Some of these fish were removed during the 2004 fire season as a precautionary measure but their return to the stream is currently being planned. These fish are considered the representative native trout for the San Francisco and Blue river drainages (David 1998).

Causes for the decline and current threats to the Gila trout include: changes in habitat suitability due to poor timber management practices, overgrazing, catastrophic forest fire, uncontrolled angling, predation from and competition with brown trout, and introgressive hybridization with rainbow trout. A detailed discussion of these threats may be found in the revised Gila Trout Recovery Plan (US Fish and Wildlife Service 2003b).

Many of the recovery efforts of Gila Trout have been very successful. The FWS is currently evaluating the possibility of downlisting the species. Recovery of Gila trout will require repatriation to habitats in its historical range (including renovation by removing all nonnative fish species), conservation of habitat through protection, restoration and maintenance, additional research on all aspects of the species, and public involvement in recovery.

Since listing, there have been 7 formal consultations completed on the Gila trout. These include: Forest Service and US Fish and Wildlife Services's reintroductions of Gila trout into Dude Creek and Raspberry Creek and the Forest Service's subsequent land managment; the Forest Service's renovation of West Fork of the Gila River for reintroduction of Gila trout; the US Fish and Wildlife Service's proposed closure of the Mescalero National Fish Hatchery; the Forest Service's Sedona Forest Plan Amendment; the Environmental Protection Agency's approval of the Arizona Pollutant Discharge Elimination System; and the Bureau of Reclamation's transportation and delivery of Colorado River water into the Gila River Basin through the Central Arizona Project (CAP). Three of these identified incidental take of the species, though none resulted in a determination that the proposed action would likely jeopardize the continued existence of the Gila trout.

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 Little Green Valley allotment complex is located primarily within the Transition life zone (Lowe 1964). The primary vegetation types are pinyon-juniper/oak woodland, ponderosa pine, mixed-conifer, chaparral, and lovegrass (i.e. the Dude Fire burn area). Terrain varies from mesas and gently rolling slopes to the steep face of the Mogollon Rim, and steep rocky canyons of Hell's Gate Wilderness. Elevations range from about 3,500 feet in Houston Pocket to 7,800 feet on the face of the Mogollon Rim. Precipitation ranges from about 12-18 inches in the Sonoran desert and semi-desert grassland vegetation type in the southern most point of the complex to about 32 inches in the Mixed Conifer vegetation type along the Mogollon Rim to the north.

Forest management areas that are represented in the analysis area include management areas 4C, 4D, and 4F. Management area 4C is the Hell's Gate Wilderness and emphasizes managing for wilderness values and protecting resources. Management area 4D consists of the operable/suitable timber harvest base on the Payson Ranger District. Direction includes managing for a variety of renewable natural resource outputs with emphasis on intensive, sustained yield timber management, timber resource protection, creation of wildlife habitat diversity, increased populations of emphasis harvest species, and recreation opportunity. Management area 4F consists primarily of chaparral vegetation on the Payson District. Direction includes managing for a variety of renewable natural resources with primary emphasis on wildlife habitat improvement, livestock forage production, and dispersed recreation. Watersheds will be managed to improve them to a satisfactory or better condition. Riparian areas will be improved and managed to benefit riparian-dependent resources (USDA Forest Service 1985).

There are many riparian habitats in the analysis area. The two primary perennial systems include the East Verde River and Tonto Creek. All other riparian areas are tributaries of these systems. There are multiple creeks that drain the Mogollon Rim that are perennial or interrupted perennial, such as Bray, Ellison, Bonita, Dude, Chase, and Webber creeks. The headwaters of these creeks are within summer-use pastures.

The Forest Service reported that riparian areas in the winter pastures are being over-utilized on a localized basis. Overuse in the riparian habitats on the allotment is probably a function of both wildlife use (primarily elk) and livestock use and varies with season. A few key examples include riparian habitats in the Dry Dude pasture, Ellison Creek in the Myrtle pasture, Gilliland Spring in the Diamond West pasture, the wet meadows in the Robert's Mesa and Holding/Dry Pocket pasture and Little Green Valley Creek in the Lower Neal pasture. The Forest Service provided condition information for 27 reaches of streams on the allotment (USDA Forest Service 2002a). Riparian condition for 61.52 miles of stream ranged from 31.6 miles (51 percent) in

stable condition, 9.32 miles (15 percent) in unstable condition, and 16.9 miles (28 percent) in impaired condition, with 3.7 (6 percent) miles not assessed (Figure 3).

Under the proposed action, the Forest Service predicts that most of the riparian areas on the complex will improve due to reductions in use of these areas, although they note that several along the Mogollon Rim are experiencing high use by elk, and so may not improve. Three riparian areas that are currently in unstable or impaired condition will still be grazed:

- Upper Dry Dude East in the Dry Dude Pasture – summer use, but new waters will be built in the pasture to alleviate grazing pressure within the creek.

- Lower Dude Creek in East Verde Pasture – summer use, but not to exceed one month.

- Thompson Draw in the Kings Ridge Pasture – This pasture remains a winter-only use pasture, but the management is changed from 6 months every year to 3.5 months of the year and rest every third year.

Gilliland Spring, Wildcat Spring, and the wet meadows in the Roberts Mesa north pasture will also be fenced to exclude livestock.

Current conditions in terms of soil, watershed, and forage on the allotment vary, with some pastures in poor watershed condition (portions of the juniper woodland vegetation types) and others in good condition (ponderosa pine stands). Over 60 percent of the allotment is in satisfactory soil condition (Table 2). The remainder of the allotment is classified in varying degrees of satisfactory/impaired to unsatisfactory soil condition. The Forest Service did not provide any information about range condition and trend. Capacity was determined by measuring pounds per acre of browse and forage in the field and extrapolating to other areas. Capacity was further adjusted based on slope, soil condition, and riparian condition.

The 1990 Dude Fire that burned approximately 23,000 acres of dense timber and interior chaparral has increased the forage availability to both livestock and wildlife. However, this increase in forage is considered transitional range as grazing capacity in this area is expected to continually decrease as trees and shrubs out-compete and reduce the available forage base.

Mexican Spotted Owl

A. Status of the species and critical habitat within the action area

On the Tonto National Forest, the MSO occupies mixed conifer and ponderosa pine-Gambel oak vegetation. The habitat is characterized by high canopy closure, high stem density, multilayered canopies within the stand, numerous snags, and coarse woody debris, with a high conservation value for the species.

The Forest Service states that herbaceous productivity in restricted habitat throughout the analysis area is lacking primarily due to tree densities and crown closure, and is not likely a direct result from past grazing but rather from fire suppression, succession, or a combination of

both. Further, they state that the low herbaceous productivity in restricted habitat throughout the analysis area is not likely a direct result from past grazing but from fire suppression, succession, or a combination of both. Only half of one PAC, the Oak Springs PAC that borders the Diamond West and Diamond East Pasture, will be grazed regularly (in the Diamond West pasture). This PAC is considered marginal MSO habitat. A lone male MSO was captured and banded here establishing the PAC but has not been documented for several years since banding. Monitoring and survey information for all PACs on the allotment is presented in Table 3.

Approximately 22,669 acres of Mexican spotted owl critical habitat occur on the allotment, 5,767 acres of restricted habitat, and 12 PACs occur on or border the allotment (Table 4). Restricted habitat roughly follows a swath through the middle of the complex adjacent to the PACs. Critical habitat occurs along the Mogollon Rim in the northeastern and northwestern sections of the allotment and includes all but 2 of the 12 PACs, and overlaps some restricted habitat. We have no information on the quality of the primary constituent elements in MSO critical habitat on the complex.

B. Factors affecting species' environment and critical habitat within the action area

Actions within the project area that affect MSO include both domestic and wild ungulate grazing, recreation, fuel reduction treatments, and other associated actions. These activities have the potential to reduce the quality of MSO nesting, roosting, and foraging habitat, and may cause disturbance during the breeding season. Livestock grazing has been ongoing throughout the action area for many years and elk populations on the allotment are thought to have a large effect on the availability of grass cover for prey species. Recreation impacts are increasing on the District and on the allotment, especially in meadow and riparian areas. With increasing recreation across the Forest, PACs may be adversely affected by recreationists. Fuels reduction treatments, though critical to reducing the risk of catastrophic wildfire, can have short-term adverse affects to MSO through habitat modification and disturbance.

Chiricahua Leopard Frog

A. Status of the species within the action area

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

A number of streams on the allotment, such as Webber Creek, Bonita Creek, Moore Creek, Green Valley Creek, and Tonto Creek, as well as numerous springs and tanks could provide habitat for the species. Surveys in 2003 were conducted in a number of streams, springs, and tanks, including surveys in the action area within the following US Geological Survey 7.5 minute quads: Diamond Butte, Pine, Diamond Point, Dane Canyon, Kehl Ridge, and Payson South. Waters surveyed in the action area included approximately 30 cattle tanks, Gilliland Spring,

Wildcat Spring, Lower Bonita Creek, Ellison Creek, Hell's Gate Trailhead Spring, Washington Spring, Geronimo Spring, Bear Spring, Poison Spring, East Verde River, Bray Creek, Poison Creek, Upper Webber Creek, Webber Creek, Mail Creek, Chase Creek, and several other unnamed creeks and springs. No Chiricahua leopard frogs were documented in these 2003 surveys, although many areas with suitable habitat were identified, as well as some areas severely impacted by livestock use including Gilliland and Wildcat springs on the complex (unpubl. AGFD survey records). The only confirmed occupied habitat on the complex is in the Moore Pasture in Ellison Creek. To protect occupied Chiricahua leopard frog habitat in Ellison Creek, the Forest Service will construct a fence (approximately 1.75 miles) to exclude livestock during the life of the project. The Forest Service will also fence Gilliland and Wildcat springs to protect potential habitat for the frog.

Historically, Chiricahua leopard frogs were found in the action area in Pyeatte Draw in 1972 (Arizona State University Museum record). Arizona Game and Fish surveys in the early 1990s did not document the species on the allotment and only found one occupied locality on the Tonto NF (Sredl *et al.* 1995). Chiricahua leopard frogs were documented on the allotment along Ellison Creek in the Ellison pasture of the Green Valley allotment in 1998, just north of the Ellison Creek Estate subdivision, and on private property on Kohl's Ranch (unpubl. AGFD survey record, M. Gilbert, Tonto NF, pers. comm. 2001, USDA Forest Service 2003).

Although both the Forest Service and AGFD have recently conducted Chiricahua leopard frog surveys in the action area, a quantified amount of available habitat on the allotment relative to that surveyed has not been provided. The Forest Service did provide a map with point locations of all surveys. We also have survey reports from the Arizona Game and Fish Department that indicate some waters on the allotment and adjacent to it were surveyed in 2003, described above. These surveys did not detect the species, however, we believe that a significant portion of potential habitat on the allotment remains unsurveyed, and that the dispersal capabilities of the species may result in variable population distribution and abundance over the next 10 years.

An understanding of the dispersal abilities of Chiricahua leopard frogs is key to determining the likelihood that suitable habitats will be colonized from a nearby extant population of frogs. As a group, leopard frogs are surprisingly good at dispersal. In Michigan, young northern leopard frogs (*Rana pipiens*) commonly move up to 0.5 mile from their place of metamorphosis, and 3 young males established residency up to 8.4 miles from their place of metamorphosis (Dole 1971). Both adults and juveniles wander widely during wet weather (Dole 1971). In the Cypress Hills, southern Alberta, young-of-the year northern leopard frogs successfully dispersed to downstream ponds 3.4 miles from the source pond, upstream 0.6 mile, and overland 0.6 mile. At Cypress Hills, a young-of-the-year northern leopard frog moved 13 miles in one year (Seburn *et al.* 1997). The Rio Grande leopard frog *(Rana berlandieri*) in southwestern Arizona has been observed to disperse at least one mile from any known water source during the summer rainy season (Rorabaugh, *in press*). After the first rains in the Yucatan Peninsula, Rio Grande leopard frogs have been collected a few miles from water (Campbell 1998). In New Mexico, Jennings (1987) noted collections of Rio Grande leopard frogs from intermittent water sources and suggested these were frogs that had dispersed from permanent water during wet periods.

Dispersal of leopard frogs away from water in the arid Southwest may occur less commonly than in mesic environments in Alberta, Michigan, or the Yucatan Peninsula during the wet season. However, there is evidence of substantial movements even in Arizona. Movement may occur via movement of frogs or passive movement of tadpoles along streamcourses. In 1974, Frost and Bagnara (1977) noted passive or active movement of Chiricahua and Plains (*Rana blairi*) leopard frogs for 5 miles or more along East Turkey Creek in the Chiricahua Mountains. In August, 1996, Rosen and Schwalbe (1998) found up to 25 young adult and subadult Chiricahua leopard frogs at a roadside puddle in the San Bernardino Valley, Arizona. They believed that the only possible origin of these frogs was a stock tank located 3.4 miles away. Rosen *et al.* (1996) found small numbers of Chiricahua leopard frogs at two locations in Arizona that supported large populations of nonnative predators. The authors suggested these frogs could not have originated at these locations because successful reproduction would have been precluded by predation. They found that the likely source of these animals were populations 1.2-4.3 miles distant. In the Dragoon Mountains, Cochise County, Arizona, Chiricahua leopard frogs breed at Halfmoon Tank, but frogs occasionally turn up at Cochise Spring (0.8 mile down canyon in an ephemeral drainage from Halfmoon Tank) and in Stronghold Canyon (1.1 mile down canyon from Halfmoon Tank). There is no breeding habitat for Chiricahua leopard frogs at Cochise Spring or Stronghold Canyon, thus it appears observations of frogs at these sites represent immigrants from Halfmoon Tank. In the Chiricahua Mountains, a population of Chiricahua leopard frogs disappeared from Silver Creek stock tank after the tank dried up; but frogs then began to appear in Cave Creek, which is about 0.6 mile away, again, suggesting immigration. Movements away from water do not appear to be random. Streams are important dispersal corridors for young northern leopard frogs (Seburn *et al.* 1997). Displaced northern leopard frogs will home, and apparently use olfactory and auditory cues, and possibly celestial orientation, as guides (Dole 1968, 1972). Rainfall or humidity may be an important factor in dispersal because odors carry well in moist air, making it easier for frogs to find other wetland sites (Sinsch 1991).

There are numerous waters in the Little Green Valley complex (USDA Forest Service 2002c), including streams, springs, and tanks. Given the amount of potential habitat for the Chiricahua leopard frog across the allotment, the lack of Chiricahua leopard frog surveys, what we know of the dispersal capabilities of the species, and the likelihood that the species is reasonably certain to move in the action area, it reasonable to conclude that Chirichua leopard frog presence on the allotment may now be, and is likely to be during the life of the permit, more widespread across the allotment than current survey data indicates. Reasonable dispersal distance includes the following distances from occupied habitat to sites being evaluated for occupancy: a) within 1 mile overland, b) within 3 miles along an ephemeral or intermittent drainage, or c) within 5 miles along a perennial stream. We believe it is reasonable to expect that Chiricahua leopard frogs will colonize suitable habitats with these the reasonable dispersal distance from the known occupied habitat at Ellison Creek.

B. Factors affecting species' environment within the action area

Actions within the action area that affect Chiricahua leopard frogs include ongoing livestock grazing and related actions, drought, increased elk populations, recreation, roads, and the introductions of non-native fish and other aquatic organisms. Current drought conditions are resulting in the loss of riparian and stock tank habitat for the leopard frog on the Tonto National

Forest and throughout its range. Elk populations on the allotment contribute to ungulate impacts in riparian habitat and may impede the recovery of riparian habitat when livestock are removed. Recreation use is increasing rapidly within the watershed. Campers and off-road vehicles cause soil compaction, reduce riparian vegetation, and reduced infiltration. Non-native fish, frogs, and crayfish prey on eggs, tadpoles, and occasionally adult leopard frogs. Crayfish may also affect the habitat by impacting aquatic and riparian vegetation along streams, potentially destroying habitat for the Chiricahua leopard frog. Roads may adversely impact riparian habitat directly and indirectly (through alteration of streamflow, timing of peak flows, increased sedimentation, etc.) and provide access for people, which facilitates the introduction of non-native fish and crayfish.

Gila Trout

A. Status of the species within the action area

As described in the Status of the Species, Gila trout were extirpated from the state by the turn of the century, largely due to impacts of overgrazing in the late 1800s and hybridization with other salmonids. Gila trout have only recently been reintroduced into Arizona. The only occurrence of the species on the Tonto National Forest is in Dude Creek, which is on the complex in the East Verde Pasture of the Cross V Allotment. In late September 1999, 126 Gila trout were collected from Spruce Creek and translocated to Dude Creek to establish a second replicate population of the Spruce Creek lineage. The Dude Creek population was supplemented in early November 1999 with 17 age 0 Gila trout of Spruce Creek lineage (US Fish and Wildlife Service 2003).

Gila trout persist in Dude Creek and occupy approximately 2 miles of stream. Despite routine monitoring by AGFD, Gila trout recruitment has not been documented since reestablishment, possibly due to a lack of suitable spawning substrate. Suitable substrate composition for development of eggs and embryos is characterized by approximately 7 percent or less fines (particles less than 0.04 in diameter) by weight (Rinne 1980). Moving downstream, substrate in this reach of Dude Creek ranges from loose gravel to fine silt and sand. Severe erosion at the upstream end may be exacerbating this problem (S.Gurtin, AGFD pers. comm. 2004). The erosion is thought to be due to the continued effects of the 1990 Dude Fire (B. Callamusso, Tonto NF, pers. comm. 2004). Additional supplemental stocking may be necessary to ensure long-term success of reestablishment.

B. Factors affecting species' environment within the action area

Actions within the project area that affect Gila trout include ongoing livestock grazing and other related actions, drought, increased elk populations, recreation, roads, fire recovery and other natural conditions, and the introductions of fish and other aquatic organisms. Current drought conditions are resulting in the loss of riparian habitat on the complex. Elk populations on the allotment contribute to ungulate impacts in riparian habitat and may impede the recovery of riparian habitat when livestock are removed. Recreational use is increasing rapidly within the watershed. Campers and off-road vehicles cause soil compaction, reduce riparian vegetation, and reduced infiltration. The introduction of nonnative fish could adversely impact Gila trout through predation, competition, or hybridization with nonnative trout. Roads may adversely impact riparian habitat directly and indirectly (through alteration of streamflow, timing of peak

flows, increased sedimentation, etc.), and provide access to people, which facilitates the introduction of non-native fish and crayfish.

EFFECTS OF THE ACTION

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

The Little Green Valley Complex grazing strategy proposes a number of improvements to the previous allotment management plan designed to help improve conditions on the complex. The proposed action incorporates fewer permitted livestock, a reduction of 41 percent from the previous permit and 31 percent from previous actual use over the last 15 years. Six pastures, about 60,000 acres, will be closed to grazing and an additional 35,000 acres in 5 pastures will only be used as travel-through pastures. The remaining pastures will be used in a deferred rest rotation schedule such that pastures are grazed in alternate halves of a season in successive years and will be rested every third year. The Forest Service anticipates that this will result in improved upland, riparian, and watershed conditions.

In general, the Forest Service will monitor utilization rates during and after use by livestock and at the end of the grazing season. Livestock will be moved if overall pasture levels are above proposed utilization levels. Monitoring data will be provided to the Arizona Ecological Services Office on an annual basis.

Mexican Spotted Owl

The primary effects of the action to MSO will be from livestock grazing in MSO habitat. Although PACs are essentially excluded, parts of at least one PAC will be grazed. Livestock will also have access to critical habitat and restricted habitat. What follows is description of how the proposed action will occur in specific MSO habitats within the action area, followed by a discussion of the effects of livestock grazing effects on MSO and how these will occur in the action area under the proposed action.

The primary goals of the MSO Recovery Plan (U.S. Fish and Wildlife 1995) are: (1) the protection of occupied habitats plus unoccupied areas on steep slopes; (2) management of unoccupied mixed conifer and pine-oak vegetation to provide foraging habitat and future nesting areas; and (3) implementation of ecosystem management principles within the remaining forested areas in the owl's range. The Recovery Plan also focuses on actions to alleviate threats to the owl, particularly catastrophic wildfire and the widespread use of even-aged silviculture. Habitat is classified as "protected" (PACs and steep slopes), "restricted" (mixed-conifer, pine-oak, and riparian habitats), or "unrestricted" (ponderosa pine, spruce-fir, pinyon-juniper, and aspen habitats) in decreasing order of owl-management emphasis. The Recovery Plan advocates

an adaptive management approach (using population and habitat monitoring) to assess the success of management activities. Activities that concentrate livestock within PACs, impact key areas such as meadows, remove cover for prey species, or limit the implementation of prescribed natural fire, may impact MSO population viability.

PACs

Although there are 11 PACs on the complex and one PAC bordering the complex, only about half of one PAC will be grazed seasonally. Livestock grazing has been eliminated from one pasture containing a PAC, the Dick Williams pasture. Ten other PACs on the allotment are in pastures that will receive some level of grazing (Table 4). Eight PACs and approximately half of another are in pastures that will receive grazing only as travel-through pastures. All travel-through pastures containing PACs will only receive use in late April to early May, as cattle are herded through to the next scheduled pasture. Use will be limited to 20 percent utilization or 2 weeks duration. Additionally, PACs in travel-through pastures will not be grazed due to the possibility that nesting female MSOs could be disturbed if roundup times coincide with nesting activity.

Half of one PAC is located in the Diamond West pasture, which will receive winter grazing (45 percent utilization) from October through April. The Forest Service considers this PAC marginal roosting and nesting habitat and information on the lone juvenile male that was trapped and banded here has not been documented for several years since banding, although surveys have not been consistent (USDA Forest Service 2003). Currently the Forest Service believes this PAC to be unoccupied, although survey information is inconclusive (Table 3). However, cattle will be herded out of the PAC during the breeding season. The deferred rest-rotation grazing strategy will reduce the amount of area grazed in any one year on the pastures containing PACs. This will reduce impacts to prey species and remove disturbance from livestock or livestock-related activities every third year.

Restricted Habitat

The Forest Service estimates there are 5,767 acres of restricted habitat on the complex in 11 pastures, and that, although target-threshold habitat (e.g. areas to be managed toward nesting/roosting habitat conditions) has not been quantified, it is a subset of this number. The Forest Service estimates that 552 acres of restricted habitat in the Dick Williams and Dead Horse pastures will not be grazed. Seven pastures are travel-through pastures which will only receive light use in late April to early May. Two pastures, East Verde and Myrtle, contain 418 acres of restricted habitat and would receive summer use at 35 percent utilization two years out of three. Three pastures (Hells Half Acre, Diamond West, and Upper Neal) contain 1,056 acres of restricted habitat that would receive winter use at 45 percent utilization two years out of three.

The Forest Service states that, in general, restricted habitat would receive light utilization rates because of high canopy closures, multistoried conditions, and high basal areas of woody species that limit understory production and because of the association these areas have with steep slopes, cliffs, and the distance from large meadows.

Critical habitat

In general, critical habitat is along the Mogollon Rim in steep areas inaccessible to livestock. There are 22,645 acres of critical habitat on the complex in six pastures. Eliminating the Dick Williams pasture from the rotation will remove the effects of livestock grazing on 3,616 acres. There are 14,543 acres in two travel through pastures (Boy Scout and Girl Scout). There are 4,486 acres of critical habitat in three pastures (East Verde, Dry Dude, Roberts Mesa North) that are summer use and will be grazed at 35 percent utilization two years out of three. Utilization levels of 35 percent in summer pastures should allow for maintenance of the primary constituent elements including adequate cover and food for prey species. Primary constituent elements within the PAC should also improve under the proposed action, as most will be excluded from grazing.

Grazing Effects to MSO from the Proposed Action

The Recovery Plan summarizes the effects of grazing to spotted owls in four broad categories: (1) altered prey availability; (2) altered susceptibility to fire; (3) degradation of riparian plant communities; and (4) impaired ability of plant communities to develop into spotted owl habitat.

To minimize these impacts, the Recovery Plan recommends that grazing by livestock and wildlife be monitored in key areas including riparian areas, meadows, and oak types. The Recovery Plan further recommends implementing and enforcing grazing utilization standards that would attain good to excellent range conditions within the key grazing areas. To do this, the Recovery Plan recommends incorporating allowable use levels based on current range condition, key species, and the type of grazing system. The Recovery Plan further recommends implementing management strategies that will restore good conditions to degraded riparian communities as soon as possible. Strategies to accomplish this may include reductions in grazing levels and increased numbers of exclosures, complete rest, limited winter use, or other methods.

With respect to prey base, Belsky and Blumenthal (1997) note that livestock grazing can reduce the amount of biomass available to be converted into litter and, therefore, increase the proportion of bare ground. The Recovery Plan notes for the Upper Gila Mountain RU that:

> "Overgrazing is suspected to be detrimental in some areas and can affect both habitat structure and the prey base. Effects on the prey base are difficult to quantify, but removal of herbaceous vegetation can reduce both food and cover available to small mammals (Ward and Block 1995). This may be especially true with respect to voles, which are often associated with dense grass cover. Direct effects on habitat are obvious in some places, particularly with respect to browsing on Gambel oak (*Quercus gambelii*). In some areas, oak is regenerating well but unable to grow beyond the sapling stage because of this browsing. We do not attribute these effects solely to livestock. Forage resources are shared by livestock and wild ungulates (US Fish and Wildlife Service 1995a)."

The effect of livestock and wild ungulate grazing on the habitat of spotted owl prey species is a complex issue. Impacts can vary according to grazing species; degree of use, including numbers

of grazers, grazing intensity, grazing frequency, and timing of grazing; habitat type and structure; and plant or prey species composition (US Fish and Wildlife Service 1995a). Livestock can affect small mammals directly by trampling burrows, compacting soil, and competing for food, or indirectly by altering the structure or species composition of the vegetation in a manner that influences habitat selection by small mammals. Vegetation cover is often reduced on grazed relative to ungrazed areas, and vegetation typically appears more dense in ungrazed areas. Hayward *et al*. (1997) found that total abundance of small mammals differed significantly between grazed and ungrazed plots, with the mean abundance of small mammals per census being about 50 percent higher on plots from which livestock were excluded. Bock and Bock (1994) reported that small mammal species that prefer habitats with substantial ground cover were more abundant on an ungrazed site, whereas species that prefer open habitats were more abundant on a grazed site in their study area in southern Arizona.

Based on existing data on the foraging behavior of MSOs, a PAC includes (on average) only 75 percent of a bird's foraging range. Therefore, prey species abundance and habitat suitability on, and adjacent to, a PAC are important in assessing effects to the owl from livestock grazing activities. Currently the ecological condition of the range in the action area with respect to MSO and their prey species is unknown, though some key areas are in poor condition. No data on the occurrence of major meadows (>5 acres) has been provided. These key areas may receive heavy utilization and may influence prey habitat. Effects from the proposed action on MSO prey base are expected to vary, but we do expect that there will be some decline in the prey base of the MSO as a result of the proposed action. This is somewhat mitigated by reduced stocking rates and excluding grazing from most of the PACs on the allotment. Although, many important riparian areas will continue to be grazed, and survey information indicates that a number of riparian areas on the allotment in MSO habitats are in a degraded condition (U.S. Forest Service 2002a). Restricted and critical habitat will also continue to be grazed, so we can expected adverse affects to MSO prey base in these areas as well, although the reduction in stocking and utilization rates should reduce these effects.

With respect to altered susceptibility to fire, Belsky and Blumenthal (1997) note that livestock grazing alters forest dynamics by reducing the biomass and density of understory grasses and sedges, which otherwise outcompete conifer seedlings and prevent dense tree recruitment, and by reducing the abundance of fine fuels, which formerly carried low-intensity fires through forests. Grazing on the allotment will reduce fine fuels in MSO habitat; although most PACs will not be grazed, grazing in restricted habitats and critical habitat will reduce fine fuels. The Forest Service believes that fine fuel production in much of the restricted habitat is already low, however, due to high tree density, thus these effects may be lessened in restricted habitat.

Belsky and Blumenthal (1997) note that grazing can lead to compacted soils, which results in increased runoff and decreased water storage and can also lead to increased erosion and runoff due to reduced plant cover and compacted soils. Both of these factors, which lead to the degeneration of riparian plant communities and impair the ability of plant communities to develop into spotted owl habitat, are expected to continue during the life of the project. Many riparian areas in MSO habitat on the allotment are in a degraded condition (U.S. Forest Service 2002). However, because stocking and utilization rates have been reduced, riparian areas should improve under the proposed action.

Other related activities that could affect MSO or their habitat, including, construction of fences, road closures, or activities that facilitate the concentration of cattle (trailing, gathering, and placement of waters, salt, and nutrient supplements). Construction activities will not occur during the breeding season (March 1 to August 31) and activities that promote the concentration of livestock (e.g., salting or use of supplements) will not occur within PACs.

Summary

The Forest Service has essentially removed grazing from PACs on the allotment. Critical habitat and restricted habitat will still be accessible to livestock, although at light to moderate levels. The proposed grazing strategy utilizes a deferred rest rotation grazing strategy that should reduce adverse effects to the MSO and primary constituent elements. The Forest Service has also addressed and essentially eliminated any effects associated with disturbance to nesting MSO from the proposed action. Quantitative information on the availability of prey species for MSO on the complex and the effect of the grazing strategy on this resource, as well as the effect of the grazing strategy on the fire regime, has not been provided. However, given the extent of grazing on the allotment in restricted and critical habitat, the degraded condition of portions of the allotment, and the 10-year duration of the permit, it is reasonable to conclude that adverse affects will result to the MSO in the form of altered prey availability, degradation of riparian plant communities, impaired ability of plant communities to develop into spotted owl habitat, and to a lesser extent, altered susceptibility to fire.

Chiricahua Leopard Frog

Livestock will have access to numerous waters in the Little Green Valley complex as part of the proposed action (USDA Forest Service 2002c), including streams, springs, and tanks. Given the amount of potential habitat for the Chiricahua leopard frog across the allotment, the lack of Chiricahua leopard frog surveys, what we know of the dispersal capabilities of the species, and the likelihood that the species is reasonably certain to move in the action area, the primary effect of the action on Chiricahua leopard frogs will be from livestock grazing in Chiricahua leopard frog habitat within the reasonable dispersal distance from occupied habitat in Ellison Creek (see Environmental Baseline).

Adverse effects to the Chiricahua leopard frog and its habitat as a result of grazing on the complex is likely to occur under certain circumstances. These effects include facilitating dispersal of non-native 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 (US Fish and Wildlife Service 2002). 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, for example, if they occur on the Diamond West pasture. Drought can also cause frogs to aestivate as the water recedes, thus frogs could aestivate in all seasons. Cattle can remove bankline vegetation 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* spp.), and the frogs may benefit from some open ground for basking and foraging.

Chytrid fungus, which survives in wet or muddy environments, could conceivably be spread by livestock 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 contaminated footwear and equipment from mud or water at 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 allotment naturally via frogs or other animals.

Road use and tank maintenance needed for the grazing program will provide fishing opportunities and facilitate access by anglers, hunters, or other recreationists, who may inadvertently introduce chytrids or may intentionally introduce non-native predators for angling or other purposes.

Stock tank maintenance typically occurs when tanks are dry or nearly dry. At that time, dams could be repaired or silt could be dredged out of the tanks. During drought, many leopard frogs probably disperse from drying tanks or are killed by predators as waters recede. However, some frogs persist in cracks in the mud or pond bottoms (M. Sredl, Arizona Game and Fish Department, pers. comm. 1999) or in clumps of emergent vegetation. Frogs present in the mud or in emergent vegetation will likely 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.

As described, the proposed action would allow livestock to have access to some riparian areas within the allotment. In addition to the mechanical damage (trampling) associated with livestock grazing in riparian areas, livestock trampling along drainages and in the upper watershed may generate sediments and/or nutrients that could enter occupied or potentially occupied leopard frog habitat. Sediments and/or nutrients may influence the invertebrate food base in some undefined manner by impacting the physical and vegetative characteristics of the aquatic habitat. In addition, sediments may be detrimental to successful reproduction by smothering egg masses and early larval stages. Eggs and tadpoles of Chiricahua leopard frogs may be trampled by domestic livestock along the perimeters of stock tanks and in pools along streams. Livestock can also contribute to degraded water quality at stock tanks by elevating hydrogen sulfide concentrations, which are toxic to frogs (Sredl *et al.* 1997).

The only confirmed occupied habitat on the complex is in the Moore Pasture in Ellison Creek. To protect occupied Chiricahua leopard frog habitat in Ellison Creek, the Forest Service will construct a fence (approximately 1.75 miles) to exclude livestock during the life of the project. Indirect effects may still occur from livestock grazing through deterioration of the Ellison Creek watershed, as well as watershed conditions throughout the complex. The Forest Service predicts

that the proposed action will improve conditions in the Ellison Creek watershed, as well as watershed conditions across the complex, to the benefit of Chiricahua leopard frogs.

The Forest Service also will construct seven earthen road tanks as part of the proposed action in the following pastures: Bonita Pasture (3 earthen road tanks); Dry Dude Pasture (2 earthen road tanks); and Robert's Mesa North (2 earthen road tanks). This action could be both beneficial and detrimental to Chiricahua leopard frog. Construction of tanks for livestock has created important habitat and, in some cases, has replaced, destroyed, or altered natural wetland habitats (Sredl and Saylor 1997). In addition, creation or maintenance of livestock waters may provide the means for non-native predators such as crayfish and bullfrogs to move across the landscape that would otherwise serve as a barrier to such species. As part of the proposed action, the Forest Service will work with the Arizona Game and Fish Department and FWS to identify known locations of nonnatives in relation to the new tanks and evaluate the placement of these tanks in relation to the Ellison Creek Chiricahua leopard frog population. Tank placement will be modified if necessary to prevent the spread of nonnative aquatic species.

In summary, the effects to the Chiricahua leopard frog from the proposed action may occur in the riparian areas, wetland communities, and stock tanks within the reasonable dispersal distance from occupied habitat in Ellison Creek (see Environmental Baseline). Grazing effects also could result from the trampling of egg masses, tadpoles, and frogs from livestock having direct access to aquatic habitat or stock tanks. Diseases such as chytrid fungus can be moved among aquatic sites by livestock and operations. Watershed effects of grazing could adversely alter habitat. However, the Forest Service believes that the proposed action will improve the watershed and riparian conditions across the complex and will monitor to ensure the utilization requirements of the proposed action are being met.

Gila trout

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

Effects to the Dude Creek and its watershed from the proposed livestock grazing and its management on the complex may occur through four mechanisms: (1) watershed alteration; (2) physical destruction and alteration of streambanks, stream channels, water column, and the riparian vegetation community; (3) alteration of the faunal community; and (4) direct effects to Gila trout from livestock accessing occupied habitat. These mechanisms may have varying effects on Gila trout.

Watershed Alteration

Livestock grazing may cause long-term changes to the watershed and its functions. The extent of these changes to the watershed varies with watershed characteristics, grazing history, and cumulative effects from other human uses and natural watershed processes. Dude Creek is an approximately 5-mile long tributary of the East Verde River, with headwaters in the steep topography of the Mogollon Rim. Thus, Dude Creek has a relatively small watershed area. Nevertheless, a discussion of livestock effects on the watershed and the concomitant effects to fish is relevant, as livestock have been modifying the Dude Creek watershed for decades and this will continue to occur as part of the proposed action over the 10-year life of the permit. Watershed changes due to grazing are more difficult to document than direct livestock impacts to the riparian and aquatic communities due to their long-term, incremental nature, the time lag and geographic distance between cause and effect, and numerous variables. 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).

Sayre (2001) notes that the emphasis in livestock grazing should be on "managing for the whole," and that "What gets eaten by livestock is a function of numerous processes involving water, soils, decomposers, other plants, and so on." Similarly, Naiman (1992) notes the connectivity of the watershed with riverine and riparian conditions, indicating that water flows down through the watershed, "...integrating influences of natural and human disturbances within the catchment." Although watershed effects vary depending upon the number and type of livestock, the length and season of use, and the type of grazing management, the mechanisms remain the same and the effects vary only in extent of area and severity (Blackburn 1984, Johnson 1992). In the case of this proposed action, grazing will occur in the Dude Creek watershed in the East Verde and Dry Dude pastures during the summer season, so it is likely that effects will be concentrated in riparian areas, as cattle prefer these areas in the warmer seasons (Skovlin 1984). However, livestock use in the East Verde pasture, which contains most of the Dude Creek watershed, will be limited to one month, which should limit effects.

A combination of grazing capacity, utilization, condition, and trend data are needed for sound range management decisions, noting that grazing capacity is dynamic and can show great fluctuations with climatic trend. While all of the allotments are grazed under a deferred rest-rotation system, we conclude that rest alone, as provided by the proposed action, will be insufficient to mitigate the effects of past and potential current overuse, as supported by various authors (Holechek *et al*. 1998, Mueggler 1975, Platts, 1990, Trlica *et al*. 1977). Various other measures such as reduced forage use, reduced livestock numbers, better distribution of cattle, more fencing, and awareness of sensitive areas may be necessary to mitigate the effects of past overuse.

Overutilization is not uncommon even in areas with established utilization criteria, and is not uncommon in the Little Green Valley Complex (USDA Forest Service 2002a, 2002c). Galt *et al*. (2000) note that "Consistently, actual measured use has been 10 - 15 percent higher than the intended use. We attribute this to livestock trampling, wildlife consumption, and weathering." In desert rangelands, researchers recommend that range be stocked for around 30 - 35 percent use of average forage production, with some destocking in drought years (Holechek *et al*. 1998).

While this number was developed for desert ranges, it is consistent with the findings of other researchers who indicate that a harvest coefficient of 35 percent is suitable for arid and semi-arid areas (Galt *et al*. 2000).

Soil condition for the Dude Creek and the East Verde pastures is mostly satisfactory, with a small percentage of impaired and unsatisfactory soils. Riparian condition of Dude Creek was considered unstable in the 2-mile reach above the confluence with Dry Dude Creek and impaired in the 0.5-mile reach below the confluence. Erosion in the upper end of Dude Creek is thought to be contributing to a reduction of habitat values for Gila trout, particularly in regard to spawning substrate (S.Gurtin, AGFD, pers. comm., 2004). The stream substrate is high in fine materials, silt, and sand. Since reintroduction in 1999, Gila trout have failed to recruit in Dude Creek. While the problem is believed to be related to long-term effects of the 1990 Dude Fire (B. Callamusso, Tonto NF, pers. comm., 2004) the effect of grazing in Dude Creek and in the East Verde pasture may also be contributing to erosion. However, the Forest Service believes that the proposed action will improve conditions in Dude Creek through reductions in livestock numbers and through the deferred rest rotation system. The Forest Service believes that the proposed action will improve the situation and will monitor to ensure the utilization requirements of the proposed action are being met.

Physical alteration of Habitat

The potential effects of grazing on streambanks in the East Verde Pasture include the shearing or sloughing of streambank soils by either hoof or head action; elimination of streambank vegetation; erosion of streambanks following exposure to water, ice, or wind due to loss of vegetative cover; and an increased streambank angle which increases water width and decreases stream depth. In some areas, damage may begin to occur almost immediately upon entry of the cattle onto the streambanks and use of riparian zones may be highest immediately following entry of cattle into a pasture, as has been documented elsewhere (Platts and Nelson 1985, Goodman *et al*. 1989). Vegetation and streambank recovery from long rest periods may be lost within a short period following grazing reentry (Duff 1979). Bank configuration, soil type, and soil moisture content influence the amount of damage with moist soil being more vulnerable to damage (Marlow and Pogacnik 1985, Platts 1990).

Cattle presence on streambanks destabilizes them through chiseling, sloughing, compaction, and collapse, and results in wider and shallower stream channels (Platts and Nelson 1985, Platts 1990, Meehan 1991). This may change the way in which flood flows interact with the stream channel and may exacerbate flood damage to banks, channel bottoms, and riparian vegetation. These impacts occur at all levels of cattle presence, but increase as the number of livestock and the length of the grazing season increase (Marlow and Pogacnik 1985).

Cattle grazing in and on riparian vegetation may cause changes in the structure, function, and composition of the riparian community (Szaro and Pase 1983, Warren and Anderson 1987, Platts 1990, Schulz and Leininger 1990, Stromberg 1993). Loss of riparian shade results in increased fluctuation in water temperatures with higher summer and lower winter temperatures (Karr and Schlosser 1977, Platts and Nelson 1985). Litter and duff is pulverized by hoof action that reduces cover for soil, plants, and wildlife (Schulz and Leininger 1990). The capacity of the

riparian vegetation to filter sediment and pollutants to prevent their entry into the river and to build streambanks is reduced (Lowrance *et al*. 1984, Elmore 1992). Channel erosion in the form of downcutting or lateral expansion may result (Heede *et al.* 1990).

Gila trout require cover that typically consists of undercut banks, large woody debris, deep pools, exposed root masses of trees at waters edge, and overhanging vegetation. Grazing in the East Verde pasture may effect these habitat values. However, the Dude Fire resulted in an abundance of downed trees in this system, which provides cover to Gila trout and will continue to limit access by livestock, which should help reduce streambank impacts (S.Gurtin, AGFD, pers. comm., 2004). The short duration that cattle will be allowed into the East Verde Pasture, one month, should also serve to reduce streambank impacts.

Faunal Alteration

Livestock use of the riparian corridor causes changes in species composition and community structure of the aquatic and riparian fauna, in addition to floral changes already addressed. The aquatic invertebrate community may be degraded because of altered stream channel characteristics, sediment deposition, or nutrient enrichment (Meehan 1991, Li *et al*. 1994). Since Gila trout feed on aquatic and terrestrial insects, any changes in composition could effect feeding requirements of Gila trout.

Direct/Indirect Effects from Livestock Access to Occupied Habitat

Documentation of livestock directly impacting fish or fish eggs is mostly anecdotal, and not very well documented in the literature. However, there are a few citations available that have documented livestock and humans trampling fish and/or fish eggs. Minckley (1973) noted that Yaqui topminnow (*Poeciliopsis occidentalis sonoriensis*) were eliminated from Astin Spring by livestock trampling. A study that examined the effects of anglers on trout egg and fry survival found that wading anglers had detrimental effects on trout redds through trampling (Roberts and White 1992). The authors also speculated that livestock trampling may have similar adverse effects. In California, an entire population of Owens pupfish (*Cyprinodon radiosus*) (a few hundred individuals) was rescued from a drying site where they were stranded in cattle hoofprints (Miller and Pister 1971). In addition, documentation from a Bonneville cutthroat trout (*Oncorhynchus clarki utah*) project on the Goshute Reservation (UT/NV west desert, south of Wendover, UT) stated that livestock destroyed an estimated 50 percent of the spawning redds within an exclosure due to trampling and mucking around in the streambed (J. Stefferud, pers. comm. 2003). The proposed action could result in livestock trampling of Gila trout or their eggs in the East Verde pasture where cattle have direct access to the stream. However, the high number of dead and downed pine trees in the creek bottom will limit the ability of cattle to move throughout the stream corridor.

Summary

Gila trout have not recruited in Dude Creek since their reintroduction in 1999. The watershed effects and habitat effects of livestock grazing described above may be contributing to the problem. However, the Forest Service believes that the proposed action will improve the

situation and will monitor to ensure the utilization requirements of the proposed action are being met.

CUMULATIVE EFFECTS

Cumulative effects include those 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 are subject to the consultation requirements established under section 7 and, therefore, are not considered cumulative in the proposed action. Future non-Federal actions within the action area that are reasonably certain to occur include urban growth and development (the allotment surrounds private land in the Payson community that will likely experience further development), recreation, road maintenance, fuels-reduction treatments, elk grazing, and other associated actions. These actions have the potential to reduce the quality of habitat for the MSO, Chiricahua leopard frog, Gila trout, and contribute as cumulative effects to the proposed action. 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, and perhaps fish and crayfish could all be carriers of chytrids. In addition to possibly introducing chytrids, such activities would also facilitate introduction on non-native predators with which the Chiricahua leopard frog cannot coexist.

CONCLUSION

Mexican Spotted Owl and Critical Habitat

After reviewing the current status of the MSO, the environmental baseline for the action area, the effects of the proposed grazing authorization and strategy for the Little Green Valley Complex, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the MSO, and is not likely to destroy or adversely modify its critical habitat. We make these findings for the following reasons:

1. Although the Recovery Plan grazing recommendations will not be strictly followed due to the fact that some areas in the allotment are already below “good to excellent” range conditions, the reduced stocking levels and deferred rest-rotation strategy will allow range improvement over the time period considered in this consultation.

2. Although livestock grazing will be permitted in approximately half of one PAC during the winter season, the PAC will not be grazed during the breeding season, and the Forest Service believes the PAC is no longer occupied.

3. It is expected that the primary constituent elements of critical habitat will be maintained or improved over the next 10 years.

Chiricahua Leopard Frog

After reviewing the current status of the Chiricahua leopard frog, the environmental baseline for the action area, the effects of the proposed grazing authorization and strategy for the Little Green

Valley Complex, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the Chiricahua leopard frog. We make this finding for the following reasons:

1. Livestock grazing will be excluded from occupied habitat in Ellison Creek and from potential habitat in Gilliland and Wildcat springs.

2. The Forest Service will work with AGFD and FWS to ensure that the seven proposed earthen road tanks will not spread nonnative aquatic species.

Gila Trout

After reviewing the current status of the Gila trout, the environmental baseline for the action area, the effects of the proposed grazing authorization and strategy for the Little Green Valley Complex, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the Gila trout. We make this finding for the following reasons:

1. Although livestock grazing in the East Verde pasture may adversely affect Gila trout habitat, the Forest Service will monitor livestock grazing to ensure the utilization requirements of the proposed action are being met and the Dude Creek watershed is improving.

2. The Forest Service will work with FWS and the Arizona Game and Fish Department to identify measures that could be implemented to improve Gila trout habitat in Dude Creek.

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

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. “Take” is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. “Harm” is further defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. “Harass” is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. AIncidental take@ is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

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

AMOUNT OR EXTENT OF TAKE

Mexican Spotted Owl

We do not anticipate the proposed action will incidentally take any MSO based on the current project description and prompt implementation of the conservation measures.

Chiricahua Leopard Frog

Historically, Chiricahua leopard frogs occurred on the Little Green Valley Complex on the Moore Pasture at Pyeatte Draw. Currently they are known to occur on the complex in Ellison Creek. Although a number of waters on the complex were surveyed in 2003, surveys are incomplete and there is an abundance of tanks, springs, and creeks on the complex. Given the presence of Chiricahua leopard frogs within Ellison Creek and the continuity and availability of suitable habitat within the action area, Chiricahua leopard frogs are likely to occur during the life of the project (up to 10 years) in the action area. We believe its is reasonable to conclude that there is a high likelihood that Chircahua leopard frogs may be present in waters, including riparian areas, wetland communities, and stock tanks within the reasonable dispersal distance from occupied habitat in Ellison Creek (see Environmental Baseline).

It is difficult to quantify the number of individual frogs that are reasonably certain to be taken because: (1) dead or impaired individuals are difficult to find and losses may be masked by seasonal fluctuations in environmental conditions; (2) the status of the species should change over time through immigration, emigration, and loss or creation of habitat; and (3) adequate surveys have not been completed to determine the numbers of Chiricahua leopard frogs in areas potentially affected by the proposed action. However, we anticipate the following forms of take over the life of the project:

1. Direct mortality or injury of all frogs at all livestock tanks within the reasonable dispersal distance of Ellison Creek where maintenance activities result in significant disturbance at the tank (e.g., dredging or silt removal, major repair of berms) and frogs are present during the maintenance activity.

2. Direct mortality or injury through trampling, destruction of egg masses, small tadpoles, and metamorphosing frogs, and ingestion of small larvae and eggs to all stock tanks within the

reasonable dispersal distance of Ellison Creek to which cattle have access from March through October; trampling and destruction of small tadpoles and overwintering frogs at all stock tanks where cattle have access from November through February.

3. Harm of frogs at one locality (livestock tank, stream, or spring within the reasonable dispersal distance of Ellison Creek) due to unintentional introduction of chytridiomycosis resulting from cattle moving among frog populations or transport of water or mud from aquatic sites by ranch hands, or other activities associated with the grazing management program.

4. Harm of Chiricahua leopard frogs at one tank within the reasonable dispersal distance of Ellison Creek due to unintentional movement of nonnative bullfrogs, fish, salamanders, or crayfish to a tank occupied by Chiricahua leopard frog.

5. Harassment of Chiricahua leopard frogs at one livestock tank within the reasonable dispersal distance of Ellison Creek where cattle have access to the tank and fouling of the water occurs to such an extent that conditions become toxic to frogs.

Gila Trout

We conclude that take will occur due to stream access within the East Verde pasture of the Little Green Valley Complex. This take will occur in the form of harm, through either injury or death to fish by cattle during stream crossings and grazing within the stream corridor during the summer months. We further anticipate that take will occur due to the indirect effects of grazing and the subsequent adverse effects to the riverine habitat in which Gila trout live. This take will be in the form of harm, in that habitat will be modified or degraded in such a way as to result in death or injury by significantly impairing essential behavioral patterns such as breeding, feeding, and sheltering.

We anticipate incidental take of Gila trout will be difficult to detect for the following reasons: (1) dead or impaired individuals are difficult to find due to their small size as juveniles and the potential for any carcasses to be carried downstream or to be scavenged; and (2) stocking of Gila trout will be an ongoing activity in areas potentially affected by the proposed action which would mask any population decline resulting from the take. Therefore, we define incidental take in terms of habitat conditions and use surrogate measures to identify when take has been exceeded. The authorized level of incidental take of Gila trout from the proposed action will be exceeded if any of the following conditions occur:

1. Cattle access the East Verde pasture outside of the permitted grazing seasons and are not immediately removed, and the result is additional adverse effects not anticipated in this document.

2. Forage utilization objectives are exceeded, AND there is a decrease in ground cover OR channel stability decreases and these decreases are related to cattle grazing.

Utilization rates are an acceptable surrogate measure for determining incidental take because: 1) they are easily measured; 2) they are clearly defined in the proposed action for each allotment; and 3) they relate to habitat conditions, as described in the effects section.

If, during the course of the action, the amount or extent of the incidental take anticipated is exceeded for Chiricahua leopard frog or Gila trout, the Forest Service must reinitiate consultation with the AESO immediately to avoid violation of section 9. Operations must be stopped in the interim period between the reinitiation and completion of the new consultation if it is determined that the impact of the additional taking will cause an irreversible and adverse impact on the species, as required by 50 CFR 402.14(i). An explanation of the causes of the taking must be provided to the FWS.

EFFECT OF THE TAKE

In this biological opinion, we determined that this level of anticipated take is not likely to result in jeopardy to the Mexican spotted owl, Chiricahua leopard frog, or Gila trout, nor is it likely to result in adverse modification of critical habitat. This is due primarily to the fact that Chiricahua leopard frogs occur over a large area of eastern Arizona, western New Mexico, and portions of northwestern Mexico, and the proposed action affects a very small portion of the species' range. For Gila trout, this is because all of the relict populations are self-sustaining in the wild, and all pure populations have been replicated in a sufficient number of drainages to prevent extirpation of any lineage from a natural or human-caused event.

REASONABLE AND PRUDENT MEASURES with TERMS AND CONDITIONS

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

The following reasonable and prudent measures and terms and conditions are necessary and appropriate to minimize the effects of take of Chiricahua leopard frog.

1. The Forest Service shall minimize take associated with maintenance of stock tanks.

    a. All earthen tanks within the reasonable dispersal distance of Ellison Creek will be surveyed for Chiricahua leopard frogs prior to maintenance activities or construction of waterlots. Stock ponds will be maintained, if possible, to avoid impacts to adult frogs, tadpoles, and eggs.

    b. Where Chiricahua leopard frogs are found in stock tanks, the Forest Service shall coordinate with the AESO to develop and implement a site specific plan to either: 1) forego maintenance; 2) salvage and temporarily hold frogs; 3) limit disturbance and work areas to the minimum practicable (i.e., leave stands of emergent vegetation in place, implement measures to minimize the likelihood of disease transmission); 4) fence portions of the occupied pond or tank (portions may be left unfenced to allow some

access by cattle); or 5) otherwise develop a comprehensive plan to provide necessary tank maintenance that addresses protection of Chiricahua leopard frogs. If frogs are salvaged, the Forest Service shall coordinate with appropriate parties (e.g. AGFD) and a qualified institution to be used for the temporary holding of the frogs.

c. CLF Survey data shall be provided to the AESO within 90 days of collection.

2. The Forest Service shall take the following actions to minimize the contamination of occupied Chiricahua leopard frog habitat by non-native species and chytrid fungus.

   a. Live fish, crayfish, bullfrogs, leopard frogs, salamanders, or other aquatic organisms shall not be intentionally moved by the FS, permittees, or their employees among livestock tanks or other aquatic sites.

   b. Where new or existing sites occupied by Chiricahua leopard frogs occur, water shall not be hauled to the site from another aquatic site or tank that supports leopard frogs, bullfrogs, crayfish, or fish.

   c. The permittee and his employees will be instructed to sanitize (with a 10 percent bleach solution) or dry out equipment used in maintenance of stock tanks or after other activities occurring in wetland or riparian areas prior to visiting occupied sites in order to prevent the spread of chytrid fungus.

   d. The Forest Service will coordinate with the AGFD and FWS to identify known locations (based on the most recent surveys) of nonnative aquatic species in relation to the seven tanks to be constructed as part of the proposed action, assess the threats, and review the locations of the new tanks based on the occurrence of nonnative aquatic species and their likely dispersal ranges.

3. The Forest Service shall take the necessary steps to minimize take associated with grazing of occupied habitat not currently excluded from livestock grazing.

   a. The Forest Service shall survey to protocol for quality of habitat and presence of frogs in areas with suitable habitat prior to livestock entry or by 2008.

   b. For remaining areas, before cattle entry, the Forest Service shall perform a visual survey for presence/absence of any frog species and suitability of habitat in drainages with potential habitat. If frogs are present, the Forest Service shall ensure compliance with Term and Condition 3a, completing baseline surveys to determine if the frogs present are Chiricahua leopard frogs.

   c. Where frogs are found, the Forest Service shall coordinate with the AESO to develop a site specific plan to either: 1) ensure that Chiricahua leopard frog habitat will be maintained; or 2) preclude grazing from the site.

d. Water shall not be pumped or diverted from a site occupied by Chiricahua leopard frogs. If the Forest Service elects to pump or divert water, further consultation is needed.

The following reasonable and prudent measures and terms and conditions are necessary and appropriate to minimize the effects of take of Gila trout.

1. Protect riverine and riparian habitat from significant grazing and trailing effects within Dude Creek.

   a. Appropriate management actions shall be taken to ensure that cattle are not congregating within stream corridors. Methods to be used can include, but are not limited to, temporary drift fences, gap fences, and herding.

   b. Check fencing to ensure that trespass cattle are not using these areas. If the fences are found to have been damaged they shall be immediately repaired. If any livestock are found within occupied Gila trout habitat where they are not authorized to graze, they will be immediately removed.

   c. The Forest Service shall closely monitor utilization and physical damage levels to banks and existing vegetation within Dude Creek during periods of cattle use.

2. The Forest Service shall conduct necessary monitoring of the incidental take associated with this proposed action and report the findings to the AESO. The monitoring shall be developed using information collected by the Forest Service and AGFD. Additional sources of information should be used to assess Ecosystem health of the East Verde Pasture.

   a. Records of exclosure and gap fence monitoring and maintenance shall be maintained. A brief summary on exclosure maintenance, repair, livestock intrusion, and other relevant information will be furnished in the annual report.

   b. Soil/watershed or ecological condition, at a minimum, shall be assessed by evaluating plant density, crown and litter cover, stubble height, and other soil stability characteristics. Monitoring shall be sufficient to document changes in watershed and soil health.

   c. In the annual report, briefly summarize for the previous calendar year, 1) implementation and effectiveness of the terms and conditions, 2) documentation of take, if any, and 3) actual livestock use (head, animal months, dates of pasture use, utilization measurements, etc.) with a description of any variations from the proposed action. Any monitoring or research completed pertaining to Gila trout or conditions of rangeland, riparian areas, or soil on the East Verde Pasture shall be included.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures

provided. The Forest Service must immediately provide an explanation of the causes of the taking and review with the AESO the need for possible modification of the reasonable and prudent measures.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office, 2450 W. Broadway Rd, Suite 113, Mesa, Arizona, 85202, telephone: 480/967-7900) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care, and in handling dead specimens to preserve the biological material in the best possible condition.

CONSERVATION RECOMMENDATIONS

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

Mexican Spotted Owl

1. We recommend the Forest Service reduce any possible effects of grazing on the prey base by improving upland range conditions of pastures in, and adjacent to, protected and restricted habitat.

2. We recommend that the Forest Service continue recovery of riparian areas.

3. We recommend that the Forest Service develop and initiate studies to gain a comprehensive understanding of how ungulate grazing affects the habitat of the MSO and its prey species.

4. We recommend that the Forest Service develop utilization standards for local geographic areas and habitat types, particularly in key habitat types such as riparian areas, meadows, and pine/oak and mixed conifer forests that incorporate allowable use levels based on current range conditions, key species, and the type of grazing system and standards which will accomplish moving rangeland conditions to good to excellent condition, or to site potential for the given vegetation type, within key grazing areas, in the most expedient manner possible.

Chiricahua Leopard Frog

1. We recommend that the Forest Service work with FWS and the AGFD to reintroduce the Chiricahua leopard frog to suitable habitats identified through habitat assessment and surveys conducted throughout the complex.

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

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

4. We recommend that the Forest Service coordinate with the FWS in developing a long-term monitoring plan for repeated surveys by 2005. This will allow for completion of needed surveys and assessment of habitat suitability data that will be used in development of the long-term plan.

Gila trout

1. We recommend revising the grazing strategy for the complex to address ungulate grazing (livestock and elk use) in the East Verde pasture to protect Gila trout habitat (e.g. fencing or other improvement measures).

2. We recommend the Forest Service work with us, the AGFD, and the New Mexico Department of Game and Fish to implement the Gila trout Recovery Plan. Specifically, identify streams where nonnative aquatic species can be removed and Gila trout reintroduced, implement habitat improvements in occupied streams, and refine land uses such as livestock grazing where they are causing deterioration of Gila trout habitat.

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

REINITIATION NOTICE

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

The FWS appreciates the Forest Service’s efforts to identify and minimize effects to listed species from this project. For further information please contact Glen Knowles (602) 242-0210 (x233) or Debra Bills (x237). Please refer to the consultation number, 02-21-99-F-0300-R1, in future correspondence concerning this project.

Sincerely,

/s/ Steven L. Spangle
Field Supervisor

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
Assistant Field Supervisor, Fish and Wildlife Service, Flagstaff, AZ
District Ranger, Payson Ranger District, Tonto National Forest, Payson, AZ

Bob Broscheid, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ
Earnhardt Ranches, L.L.C., Tempe, AZ

W:\Glen Knowles\Little Green Valley\Final LGV BO.doc:cgg

Literature Cited

Abarca, F. J., and D. Weedman. 1993. Native Fishes of Tonto Creek. Nongame and Endangered Wildlife Program Technical Report. Arizona Game and Fish Department, Phoenix, Arizona.

Armour, C.L., D.A. Duff, and W. Elmore. 1991. The effects of livestock grazing on riparian and stream ecosystems. Fisheries 16(1):7-11.

Bahre, C.J. 1991. A legacy of change. Historic human impact on vegetation in the Arizona borderlands. University of Arizona Press, Tucson, Arizona.

Barber, W. E., and W. L. Minckley. 1966. Fishes of Aravaipa Creek, Graham and Pinal counties, Arizona. Southwestern Naturalist 11:313-324.

Behnke, R. J. 1992. Native trout of western North America. American Fisheries Society Monograph 6. American Fisheries Society, Bethesda, Maryland.

Belsky, A.J., and D.M. Blumenthal. 1997. Effects of livestock grazing on stand dynamics and soils in upland forests of the interior west. Conservation Biology 11(2):315-327.

Benedict, N., and T.W. Quinn. 1999. Identification of Rio Grande leopard frogs by mitochondrial DNA analysis: a tool for monitoring the spread of a non-native species. Department of Biological Sciences, University of Denver, CO.

Berger L., R. Speare, P. Daszak, D.E. Green, A.A. Cunningham, C.L. Goggins, R. Slocombe, M.A. Ragan, A.D. Hyatt, K.R. McDonald, H.B. Hines, K.R. Lips, G. Marantelli, and H. Parkes. 1998. Chytridiomycosis causes amphibian mortality associated with population declines in the rain forests of Australia and Central America. Proceedings of the National Academy of Science, USA 95:9031-9036.

Bestgen, K.R. 1990. Status review of the razorback sucker Xyrauchen texanus. Colorado State Univ. Larval Fish Laboratory, Contribution 44, Fort Collins, Colorado.

Blackburn, W.H. 1984. Impacts of grazing intensity and specialized grazing systems on watershed characteristics and responses. Pp. 927- 983 *In* Developing strategies for rangeland management. National Research Council/National Academy of Sciences. Westview Press. Boulder, Colorado.

Bock, C.E., and J.H. Bock. 1994. Responses of birds, rodents, and vegetation to livestock exclosure in a semidesert grassland site. Journal of Range Management 37:239-242.

Campbell, J.A. 1998. Amphibians and Reptiles of northern Guatemala, the Yucatan, and Belize. University of Oklahoma Press, Norman, Oklahoma.

Carey, C., N. Cohen, and L. Rollins-Smith. 1999. Amphibian declines: an immunological perspective. Developmental and Comparative Immunology 23:459-472.

Carey C., H.A. Heyer, J. Wilkinson, R.A. Alford, J.W. Arntzen, T. Halliday, L. Hungerford, K.R. Lips, M. Middleton, A.S. Orchard, and A.S. Rand AS. 2001. Amphibian declines and environmental change: use of remote sensing techniques to detect environmental correlates. Conservation Biology 15(4): 903-913.

Chaney, E., W. Elmore, and W.S. Platts. 1990. Livestock grazing on western riparian areas. Produced for the U.S. Environmental Protection Agency by the Northwest Resource Information Center, Eagle, Idaho. 45 pp.

Clarkson, R.W., and J.C. Rorabaugh. 1989. Status of leopard frogs (*Rana pipiens* Complex) in Arizona and southeastern California. Southwestern Naturalist 34(4):531-538.

Croxen, Fred W. 1926. History of Grazing on Tonto National Forest. Presented to Tonto Grazing Conference, Phoenix, AZ, Nov. 4-5, 1926. Unpublished document, Tonto National Forest files.

David, R. E. 1976. Taxonomic analysis of Gila and Gila *x* rainbow trout in southwestern New Mexico. Unpublished M.S. Thesis, New Mexico State University, Las Cruces, New Mexico.

-----. 1998. Native trout of the San Francisco River system, New Mexico and Arizona, a position paper of the Gila Trout Recovery Team. Unpublished report, U.S. Fish and Wildlife Service, Albuquerque, New Mexico.

Davidson, C. 1996. Frog and toad calls of the Rocky Mountains. Library of Natural Sounds, Cornell Laboratory of Ornithology, Ithaca, NY.

Degenhardt, W.G., C.W. Painter, and A.H. Price. 1996. Amphibians and reptiles of New Mexico. University of New Mexico Press, Albuquerque.

Diaz, J.V., and G.E.Q. Diaz. 1997. Anfibios y reptiles de Aguascalientes. Grupo Impressor Mexico, Aguascalientes, Aguascalientes, MX.

Dobyns, H.F. 1981. From fire to flood: historic human destruction of Sonoran Desert riverine oasis. Ballena Press Anthropological Papers No. 20, 222 pp.

Dole, J.W. 1968. Homing in leopard frogs, *Rana pipiens*. Ecology 49:386-399.

Dole, J.W. 1971. Dispersal of recently metamorphosed leopard frogs, *Rana pipiens*. Copeia 1971:221-228.

Duff, D.A. 1979. Riparian habitat recovery on Big Creek, Rich County, Utah. A method for analyzing livestock impacts on stream and riparian habitat in O.B. Cope (ed.) Forum -- Grazing and riparian/stream ecosystems. Trout Unlimited, Denver, Colorado.

Elmore, W. 1992. Riparian responses to grazing practices. Pp. 442 - 457 *In* Watershed management; balancing sustainability and environmental change. R.J. Naiman (ed.), Springer-Verlag, New York, New York.

Fenner, P. 1990. 1989 *Agave arizonica* surveys of Bronco, Six Bar, and Ike's Backbone allotments. USDA Forest Service, Cave Creek Ranger Dist., Tonto National Forest. Phoenix.

Fleischner, T.L. 1994. Ecological costs of livestock grazing in western North America. Conservation Biology 8(3):629-644.

Fletcher, K. 1990. Habitat used, abundance, and distribution of the Mexican spotted owl, *Strix occidentalis lucida*, on National Forest System Lands. U.S. Forest Service, Southwestern Region, Albuquerque, New Mexico. 78 pp.

Frost, J.S., and J.T. Bagnara. 1977. Sympatry between *Rana blairi* and the southern form of leopard frog in southeastern Arizona (Anura: Ranidae). The Southwestern Naturalist 22(4):443-453.

Galt, D., F. Molinar, J. Navarro, J. Joseph, and J. Holechek. 2000. Grazing Capacity and Stocking Rate. Rangelands 22(6):7 - 11.

Ganey, J.L. and R.P. Balda. 1989. Distribution and habitat ecology of Mexican spotted owls in Arizona. Condor 91:355-361.

-----, G.C. White, A.B. Franklin, J.P. Ward, Jr., and D.C. Bowden. 2000. A pilot study on monitoring populations of Mexican spotted owls in Arizona and New Mexico: second interim report. 41 pp.

-----, and C.J. May. 1983. Status report for *Rana tarahumarae* Boulenger. Arizona Natural Heritage Program, Tucson. Report to Office of Endangered Species, US Fish and Wildlife Service, Albuquerque, NM.

Goodman, T., G.B. Donart, H.E. Kiesling, J.L. Holechek, J.P. Neel, D. Manzanares, and K.E. Severson. 1989. Cattle behavior with emphasis on time and activity allocations between upland and riparian habitats. Pages 95 - 102 in R.E. Gresswell, B.A. Barton, and J.L. Kershner (eds.) Practical approaches to riparian resource management, an educational workshop. U.S. Bureau of Land Management, Billings, Montana.

Harding, J.H. 1997. Amphibians and Reptiles of the Great Lakes Region. The University of Michigan Press, Ann Arbor.

Hastings, J.R., and R.M. Turner. 1980. The changing mile. University of Arizona Press, Tucson, Arizona. 327 pp.

Hayward, B., E.J. Heske, and C.W. Painter. 1997. Effects of livestock grazing on small mammals at a desert cienega. Journal of Wildlife Management 61(1):123-129.

Heede, B.H., and J.N. Rinne. 1990. Hydrodynamic and fluvial morphologic processes: implications for fisheries management and research. North American Journal of Fisheries Management 10(3):249-268.

Holechek, J.L. 1988. An approach for setting the stocking rate. Rangelands 10: 10-14.

-----, R.D. Piper, and C.H. Herbel. 1998. Range management principles and practices. Simon & Schuster/A Viacom Company, Las Cruces, New Mexico.

Jennings, R.D. 1987. The status of *Rana berlandieri*, the Rio Grande leopard frog, and *Rana yavapaiensis*, the lowland leopard frog, in New Mexico. Report to New Mexico Department of Game and Fish, Santa Fe, New Mexico.

Jennings, R.D. 1995. Investigations of recently viable leopard frog populations in New Mexico: *Rana chiricahuensis* and *Rana yavapaiensis*. New Mexico Game and Fish Department, Santa Fe.

-----, and N.J. Scott. 1993. Ecologically correlated morphological variation in tadpoles of the leopard frog, *Rana chiricahuensis*. Journal of Herpetology 27(3):285-293.

Johnson, K.L. 1992. Management for water quality on rangelands through best management practices: the Idaho approach. Pp. 415-441 *In* Watershed management; balancing sustainability and environmental change. R.J. Naiman (ed.). Springer-Verlag, New York, New York.

Karr, J.R. and I.J. Schlosser. 1977. Impact of near stream vegetation and stream morphology on water quality and stream biota. U.S. Environmental Protection Agency, Ecological Research Series 600/3-77-097. Athens, Georgia. 90 pp.

Kauffman, J.B., and W.C. Krueger. 1984. Livestock impacts on riparian ecosystems and streamside management implications...a review. Journal of Range Management 37(5):430 -438.

Kinch, G. 1989. Riparian area management: grazing management in riparian areas. U.S. Bureau of Land Management, Denver, Colorado. 44 pp.

Langhorst, D.R., and P.C. Marsh. 1986. Early life history of razorback sucker in Lake Mohave. U.S. Bureau of Reclamation, Boulder City, NV.

Leary, R. F., and F. W. Allendorf. 1998. Genetic issues in the conservation and restoration of the endangered Gila trout. Wild Trout and Salmon Genetics Laboratory Report 98/1. Division of Biological Sciences, University of Montana, Missoula, Montana.

Leopold, A.L. 1921. A plea for recognition of artificial works in forest erosion control policy. Journal of Forestry 19:267-273.

Leopold, A. L. 1924. Grass, brush, timber, and fire in southern Arizona. Journal of Forestry 22:1-10.

-----. 1946. Erosion as a menace to the social and economic future of the Southwest. A paper read to the New Mexico Association for Science, 1922. Journal of Forestry 44:627 -633.

-----. 1951. Vegetation of southwestern watersheds in the nineteenth century. The Geographical Review 41:295-316.

Li, H.W., G.A. Lamberti, R.N. Pearsons, C.K. Tait, J.L. Li, and J.C. Buckhouse. 1994. Cumulative effects of riparian disturbances along high desert trout streams of the John Day Basin, Oregon. Transactions of the American Fisheries Society 123:627-640.

Longcore, J.E. 2000. Information excerpted from Joyce Longcore. Biosafety chapter, workbook for Amphibian Health Examinations and Disease Monitoring Workshop, US Fish and Wildlife Service, National Conservation Training Center, Sherpherdstown, WV, Feb 17-18, 2000.

Lowe, C.H. (ed.) 1964. Arizona's Natural Environment. University of Arizona Press.

Lowrance, R., R. Todd, J. Fail, Jr., O. Hendrickson, Jr., R. Leonard, and L. Asmussen. 1984. Riparian forests as nutrient filters in agricultural watersheds. BioScience 34(6):374-377.

Marlow, C.B., and T.M. Pogacnik. 1985. Time of grazing and cattle-induced damage to streambanks. Pages 279-284 in R.R. Johnson, C.D. Zeibell, D.R. Patton, P.F. Ffolliot, and R.H. Hamre (Technical Coordinators) Riparian ecosystems and their management: reconciling conflicting uses. GTR RM-120, USDA Forest Service, Rocky Mountain Forest and Range Experimental Station, Fort Collins, Colorado. 523 pp.

McCarthey, M.S. 1987. Age estimates for razorback sucker (Pisces: Catostomidae) from Lake Mohave, Arizona, and Nevada. Journal of the Arizona-Nevada Academy of Science 21:87- 97.

Meehan, W.R. 1991. Influences of forest and rangeland management on salmonid fishes and their habitats. American Fisheries Society Special Publication 19, Bethesda, Maryland. 751 pp.

Miller, R. R. 1950. Notes on the cutthroat and rainbow trouts with the description of a new species from the Gila River, New Mexico. Occasional Papers of the Museum of

Zoology, University of Michigan, University of Michigan Press, Ann Arbor, Michigan, 529:1-43.

-----. 1961. Man and the changing fish fauna of the American Southwest. Papers of the Michigan Academy of Science, Arts, and Letters. 46:365-404.

-----, and C.H. Lowe. 1964. Fishes of Arizona. Pages 133-151 in C.H. Lowe, ed., The Vertebrates of Arizona, University of Arizona Press, Tucson.

-----, and E.P. Pister. 1971. Management of the Owens pupfish (*Cyprinodon radiosus*) in Mono County, California. Transactions of the American Fisheries Society 100:502-509.

Minckley, W. L. 1973. Fishes of Arizona. Arizona Game and Fish Department, Phoenix, Arizona.

-----, P.C. Marsh, J.E. Brooks, J.E. Johnson, and B.L. Jensen. 1991. Management toward recovery of the razorback sucker. pp. 303-357 *In*: Battle Against Extinction: Native fish management in the American West. Minckley, W.L. and J.E. Deacon, Eds. University of Arizona Press, Tucson.

Mueggler, W.F. 1975. Rate and pattern of vigor recovery in Idaho fescue and bluebunch wheatgrass. Journal of Range Management 28:198-204.

Myers, T.J., and S. Swanson. 1995. Impact of deferred rotation grazing on stream characteristics in central Nevada: a case study. North American Journal of Fisheries Management 15:428-439.

Naiman, R.J. 1992. Watershed management. Springer-Verlag, New York, New York. 542 pp.

Painter, C.W. 2000. Status of listed and category herpetofauna. Report to US Fish and Wildlife Service, Albuquerque, NM. Completion report for E-31/1-5.

Platts, W.S. 1990. Managing fisheries and wildlife on rangelands grazed by livestock. A guidance and reference document for biologists. Nevada Department of Wildlife.

Platz, J. E. 1993. *Rana subaquavocalis*, a remarkable new species of leopard frog (*Rana pipiens* complex) from southeastern Arizona that calls under water. Journal of Herpetology 27:154162.

Platz, J.E., and J.S. Mecham. 1984. *Rana chiricahuensis*. Catalogue of American amphibians and reptiles. 347.1

-----. and R.L. Nelson. 1985. Stream habitat and fisheries response to livestock grazing and instream improvement structures, Big Creek, Utah. Journal of Soil and Water Conservation 49(4):374-379.

Platz, J.E., and T. Grudzien. 1999. The taxonomic status of leopard frogs from the Mogollon Rim country of central Arizona: evidence for recognition of a new species. Proceedings of Nebraska Academy of Sciences 109:51.

Pounds, J.A., and M.L. Crump. 1994. Amphibian declines and climate disturbance: the case of the golden toad and the harlequin frog. Conservation Biology 8(1)72-85.

Propst, D.L., K R Bestgen, and C. W. Painter. 1986. Distribution, status, biology, and conservation of the spikedace (MedafuIgida) in New Mexico. U.S. Fish and Wildlife Service Endangered Species Report Albuquerque, NM 15:1-93.

Rinne, J.N. 1980. Spawning habitat and behavior of Gila trout, a rare salmonid of the southwestern United States. Transactions of the American Fisheries Society 109:83-91.

Rinne, J.L. and W.L. Minckley. 1991. Native fishes of arid lands: a dwindling resource of the desert southwest. U.S. Department of Agriculture, Forest Service, General Technical Report RM-206. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado. pp. 17-18.

Roberts, B.C., and R.G. White. 1992. Effects of angler wading on survival of trout eggs and preemergent fry. North American Journal of Fisheries Management 12:450-459.

Rosen, P.C., C.R. Schwalbe, D.A. Parizek, P.A. Holm, and C.H. Lowe. 1994. Introduced aquatic vertebrates in the Chiricahua region: effects on declining native ranid frogs. Pages 251-261 *in* L.F. DeBano, G.J. Gottfried, R.H. Hamre, C.B. Edminster, P.F. Ffolliott, and A. Ortega-Rubio (tech. coords.), Biodiversity and management of the Madrean Archipelago. USDA Forest Service, General Technical Report RM-GTR-264.

-----, C.R. Schwalbe, and S.S. Sartorius. 1996. Decline of the Chiricahua leopard frog in Arizona mediated by introduced species. Report to Heritage program, Arizona Game and Fish Department, Phoenix, AZ. IIPAM Project No. I92052.

-----, and C.R. Schwalbe. 1998. Using managed waters for conservation of threatened frogs. Pages 180-202 *in* Proceedings of Symposium on Environmental, Economic, and Legal Issues Related to Rangeland Water Developments. November 13-15, 1997, Tempe, AZ.

Sayre, N.F. 2001. The new ranch handbook: a guide to restoring western rangelands. The Quivira Coalition, Santa Fe, New Mexico. 102 pp.

Schulz, T.T., and W.C. Leininger. 1990. Differences in riparian vegetation structure between grazed areas and exclosures. Journal of Range Management 43(4):295-299.

Seburn, C.N.L., D.C. Seburn, and C.A. Paszkowski. 1997. Northern leopard frog (*Rana pipiens*) dispersal in relation to habitat. Herpetological Conservation 1:64-72.

Sheppard, G. and A. Farnsworth. 1995. Fire effects and the use of prescribed fire in Mexican

Sinsch, U. 1991. Mini-review: the orientation behaviour of amphibians. Herpetological Journal 1:541-544.

Skovlin, J.M. 1984. Impacts of grazing on wetlands and riparian habitat: a review of our knowledge. Pp. 1001-1103 *In* Developing strategies for rangeland management. National Research Council/National Academy of Sciences. Westview Press. Boulder, Colorado.

Stromberg, J.C. 1993. Fremont cottonwood-Goodding willow riparian forests: a review of their ecology, threats, and recovery potential. Journal of the Arizona-Nevada Academy of Science 26(3):97-110.

Sredl, M.J., and J.M. Howland. 1994. Conservation and management of madrean populations of the Chiricahua leopard frog, *Rana chiricahuensis*. Arizona Game and Fish Department, Nongame Branch, Phoenix, AZ.

-----, M.J. Goode, and J.M. Howland. 1995. Tonto National Forest riparian amphibians and reptiles survey: Locality information and survey results for 1992 and 1993 field seasons. Arizona Game and Fish Department Nongame and Endangered Wildlife Program Technical Report 62.

-----, J.M. Howland, J.E. Wallace, and L.S. Saylor. 1997. Status and distribution of Arizona's native ranid frogs. Pages 45-101 *in* M.J. Sredl (ed). Ranid frog conservation and management. Arizona Game and Fish Department, Nongame and Endangered Wildlife Program, Technical Report 121.

-----, and L.S. Saylor. 1998. Conservation and management zones and the role of earthen cattle tanks in conserving Arizona leopard frogs on large landscapes. Pages 211-225 *in* Proceedings of Symposium on Environmental, Economic, and Legal Issues Related to Rangeland Water Developments. November 13-15, 1997, Tempe, AZ.

-----, and R.D. Jennings. In press. *Rana chiricahuensis*: Platz and Mecham, 1979, Chiricahua leopard frogs. *In* M.J. Lanoo (ed), Status and Conservation of U.S. Amphibians. University of California Press, Berkeley.

Stebbins, R.C. 2003. A Field Guide to Western Reptiles and Amphibians, Third Edition. Houghton Mifflin Company, Boston, MA.

Sublette, J. E., M. D. Hatch, and M. Sublette. 1990. The fishes of New Mexico. University of New Mexico Press, Albuquerque, New Mexico.

Szaro, R.C., and C.P. Pase. 1983. Short-term changes in a cottonwood-ash-willow association on a grazed and ungrazed portion of Little Ash Creek in central Arizona. Journal of Range Management 36(3):382-384.

Touchan, R., T. W. Swetnam, and H. Grissino-Mayer. 1995. Effects of livestock grazing on presettlement fire regimes in New Mexico. Pages 268-272 *in*: J. K. Brown, R. W. Mutch, C. W. Spoon, and R. H. Wakimoto (Technical coordinators). Symposium on fire in wilderness and park management. Missoula, Montana, 30 Marcjh to 1 April, 1993. U.S. Forest Service General Technical Report INT-320.

Trlica, M.J., M. Buwai, and J.W. Menke. 1977. Effects of rest following defoliations on the recovery of several range species. Journal of Range Management 30:21-26.

Tyus, H.M., and C.A. Karp. 1990. Spawning and movements of razorback sucker, Xyrauchen texanus, in the Green River basin of Colorado and Utah. The Southwestern Naturalist 34 (4):427-433.

USDA Forest Service. 1985. Tonto National Forest Plan. Southwestern Region, Albuquerque.

-----. 2001. Biological Assessment and Evaluation, Urban Interface Fuel Treatment, February 28, 2001. Southwestern Region, Albuquerque. 271 pp.

-----. 2002a. Biological Assessment and Evaluation, Little Green Valley Complex. Tonto National Forest, Globe, AZ. 52 pp.

-----. 2002b. Guidance criteria for determining the effects of on-going grazing and issuing term grazing permits on selected threatened and endangered species proposed for listing and proposed and designated critical habitat. USDA Forest Service, Southwest Region, Albuquerque, NM.

-----. 2002c. Environmental Assessment: Grazing strategy and associated improvements for the Little Green Valley Grazing Complex. Tonto National Forest, Payson Ranger District, Payson, AZ.

US Fish and Wildlife Service. 1967. Native fish and wildlife, endangered species. Federal Register 32(48):4001.

-----. 1975. Endangered and threatened wildlife and plants. Federal Register 40:44415-44429.

-----. 1984. *Agave arizonica*; determination as an endangered species. Federal Register 49(98):21055-21058.

-----. 1986a. 365-day finding on petition to delist *Agave arizonica* due to taxonomic error, memorandum. Federal Register 51.

-----. 1986b. Endangered and threatened wildlife and plants; determination of threatened status for the loach minnow. Federal Register 51(208):39468-39478.

-----. 1986c. Endangered and threatened wildlife and plants; final rule to determine *Meda fulgida* to be a threatened species without critical habitat. Federal Register 51(126):23769-23781.

-----. 1987. Proposed delisting of *Agave arizonica* denied in support for more studies by the Desert Botanical Garden to determine appropriate taxonomic rank. Federal Register 52(13):2239-2242.

-----. 1991a. Mexican spotted owl status review. Endangered species report 20. Albuquerque, New Mexico.

-----. 1991b. Endangered and threatened wildlife and plants; the razorback sucker determined to be an endangered species. Federal Register 56:54957-54967.

-----. 1993. Endangered and Threatened Wildlife and Plants; final rule to list the Mexican spotted owl as threatened. Federal Register. 58:14248-14271.

-----. 1994a. Endangered and threatened wildlife and plants; determination of critical habitat for the Colorado river endangered fishes: Razorback sucker, Colorado squawfish, humpback chub, and bonytail chub. Federal Register 59:13374-13400.

-----. 1994b. Endangered and threatened wildlife and plants; designation of critical habitat for the threatened loach minnow (Tiaroga cobitis). Federal Register 59(45):10898-10906.

-----. 1994c. Endangered and threatened wildlife and plants; designation of critical habitat for the threatened spikedace (Meda fulgida). Federal Register 59(45):10906-10915.

-----. 1995a. Recovery Plan for the Mexican Spotted Owl. Albuquerque, New Mexico.

-----. 1995b. Endangered and threatened species; bald eagle reclassification; final rule. Federal Register 50(17):35999-36010.

-----. 1995c. Final rule determining endangered status for the southwestern willow flycatcher. Federal Register 60:10694-10715.

-----. 1997a. Final determination of critical habitat for the southwestern willow flycatcher. Federal Register 62(140):39129-39146.

-----. 1997b. Correction; final determination of critical habitat for the southwestern willow flycatcher. Federal Register 62 (161):44228.

-----. 1998. Endangered and threatened wildlife and plants; revocation of critical habitat for the Mexican spotted owl, loach minnow, and spikedace. Federal Register 63(57):14378-14379.

-----. 1999. Endangered and threatened wildlife and plants; proposed rule to remove the bald eagle in the lower 48 states from the list of endangered and threatened wildlife. Federal Register 64(128):36454-36464.

-----. 2000a. Endangered and threatened wildlife and plants; proposed designation of critical habitat for the Mexican spotted owl. Federal Register 65(141):45336-45353.

-----. 2000b. Endangered and threatened wildlife and plants; final designation of critical habitat for the spikedace and the loach minnow. Federal Register 65(80):24328-24372.

-----. 2001. Endangered and threatened wildlife and plants; final designation of critical habitat for the Mexican spotted owl. Federal Register 66(22):8530-8553.

-----. 2002. Endangered and threatened wildlife and plants; listing of the Chiricahua leopard frog (*Rana chiricahuensis*); final rule. Federal Register 67(114):40790-40811.

-----. 2003a. Endangered and threatened wildlife and plants; final designation of critical habitat for the Mexican spotted owl. Federal Register 6(222):65020-65023.

-----. 2003b. Gila trout recovery plan (third revision). Albuquerque, New Mexico. i-vii + 78 pp.

-----. 2004. Final designation of critical habitat for the Mexican spotted owl. Federal Register 69(168):53182-53298.

Ward, J.P. Jr., and W.M. Block. 1995. Mexican spotted owl prey ecology *In* Mexican Spotted Owl Recovery Plan. U.S. Department of the Interior, Fish and Wildlife Service, Albuquerque, New Mexico.

Warren, P.L. and L.S. Anderson. 1987. Vegetation recovery following livestock removal near Quitobaquito Spring, Organ Pipe Cactus National Monument. Technical Report No. 20. National Park Service, Cooperative National Park Resources Studies Unit, Tucson, Arizona. 50 pp.

Weedman, D.A. 2000. Gila topminnow, *Poeciliopsis occidentalis occidentalis*, revised recovery plan. Draft, June 2000. U.S. Fish and Wildlife Service, Phoenix.

Wilson, E.D. 1969. A resume of the geology of Arizona. University of Arizona Press, Tucson. 140 pp.

York, J.C. and W.A. Dick-Peddie. 1969. Vegetation changes in southern New Mexico during the past hundred years. Pp. 157-166 *In* Arid lands in perspective. W.G. McGinnies and B.J.Goldman (eds.). University of Arizona Press, Tucson, Arizona.

Zimmerman, G.T. and L.F. Neuenschwander. 1984. Livestock grazing influences on community structure, fire intensity, and fire frequency within the Douglas-fir/ninebark habitat type. Journal of Range Management 37(2):104-110

Tables, Maps, Figures, Appendices

Figure 1. Map of the Little Green Valley Complex and surrounding area (USDA Forest Service 2002a).

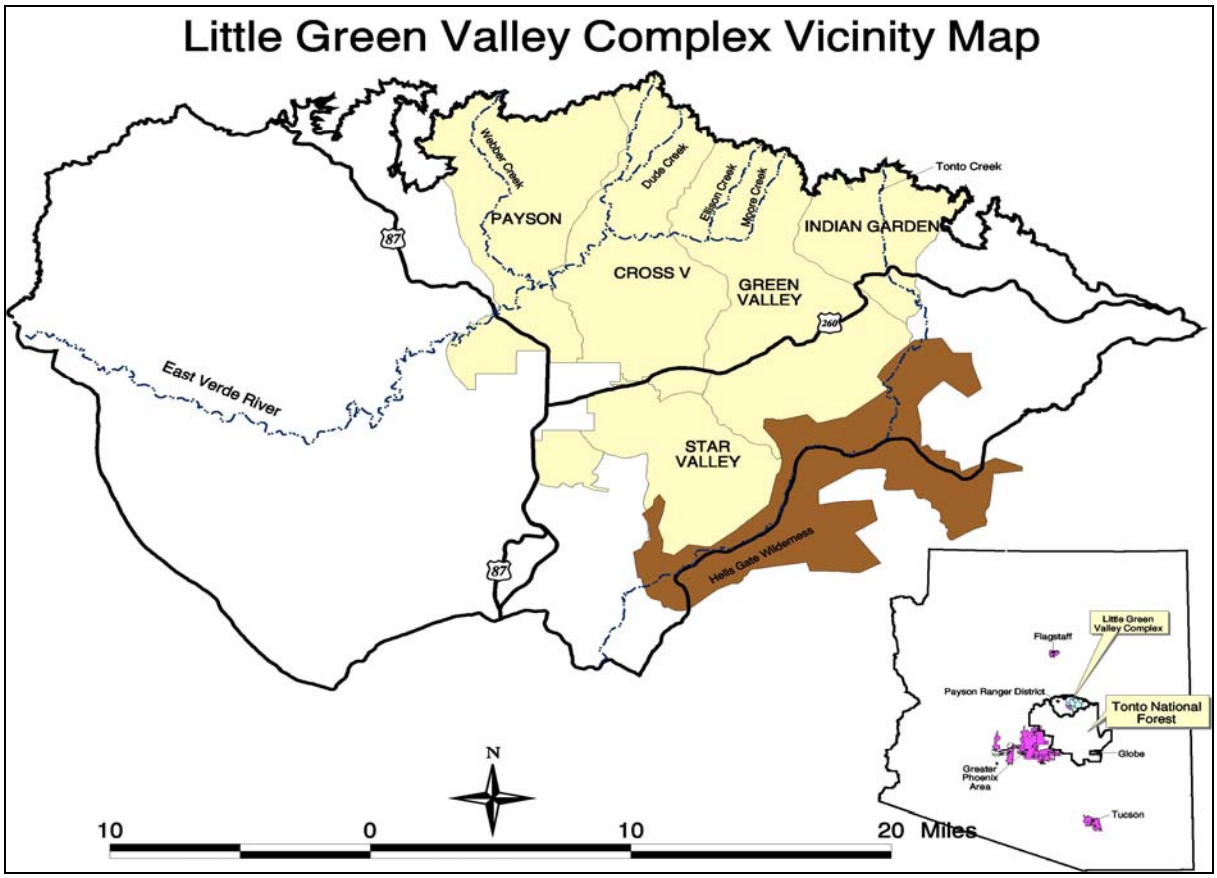

Figure 2. Allotment and pasture map, including season of use, for the Little Green Valley Complex (USDA Forest Service 2002a).

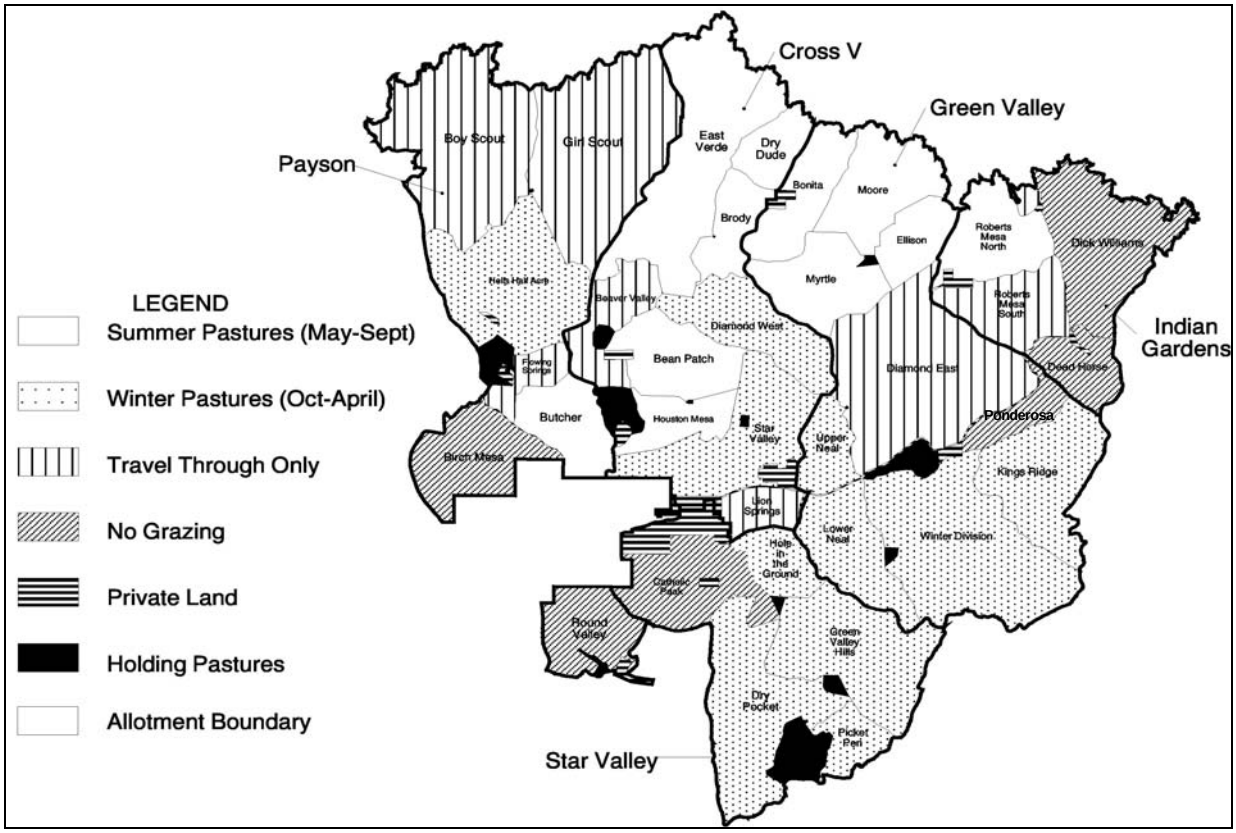

Figure 3. Little Green Valley Complex major accessible stream condition in miles (USDA Forest Service 2002a).

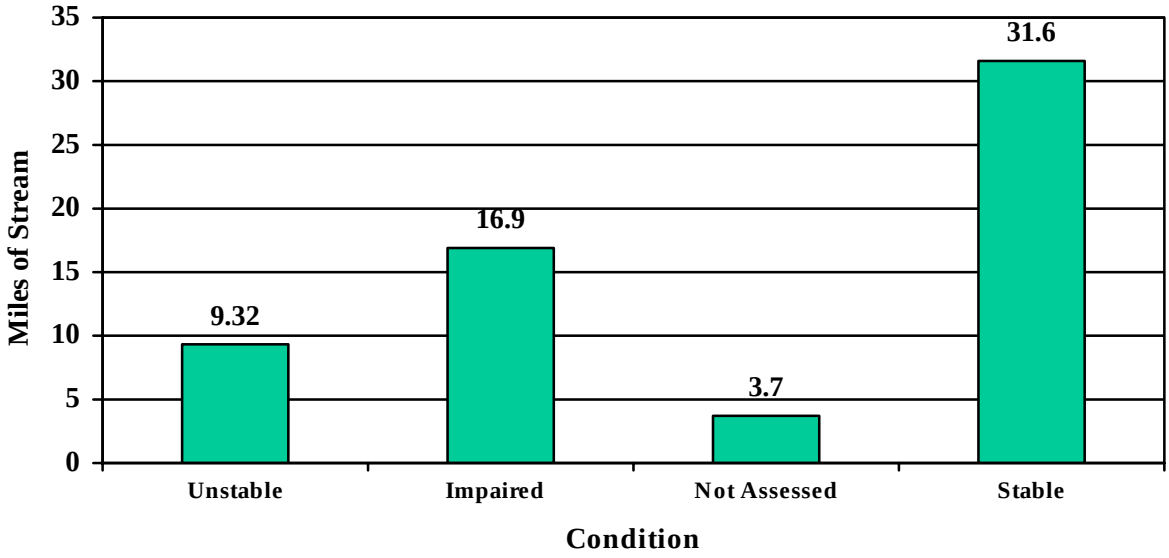

Table 1. Some recent influential fires within the Upper Gila Mountains Recovery Unit, approximate acres burned, number of PACs affected, and PAC acres burned.

Fire Name	Year	Total Acres Burned	# PACs Burned	# PAC Acres Burned
Rhett Prescribed Natural Fire	1995	20,938	7	3,698
Pot	1996	5,834	4	1,225
Hochderffer	1996	16,580	1	190
BS Canyon	1998	7,000	13	4,046
Pumpkin	2000	13,158	4	1,486
Rodeo-Chediski	2002	462,384	55	~33,000
TOTAL		525,894	84	~43,645

Table 2. Soil Condition Ratings, Little Green Valley Complex (USDA Forest Service 2002a).

Category	Acres	Relative Percent
Satisfactory	99,246	61%
Impaired and Satisfactory	23,363	14%
Impaired	21,458	13%
Impaired and Unsatisfactory	17,061	10%
Unsatisfactory	2,288	2%

Table 3. Results of MSO monitoring on and adjacent to the Little Green Valley Complex (USDA Forest Service unpubl. data).

YEAR																	
PAC Name	Pasture	PAC Number	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
Promontory W	Dick Williams	120402	NI	O-3Y	O-NU	O-2Y	O-NU	O-NU	NI	NI	NI	IM-NR	O-2Y	NI	NI	O-NU	NI
Shadow Rim	Girl Scout	120408	P	O-NN	O-NU	O-NN	O-NN	O-NN	NI	IM-NR	NI	NI	NI	NI	O-NU	NR	M
Horton Creek	Dick Williams	120411	NI	M	O-1Y	O-2Y	O-1Y	P	NI	NI	NI	IM-NR	NI	NI	NI	M	NI
E. Chase Creek	Girl Scout	120412	NI	NI	F	O-1Y	NI	IM-NR	IM-NR	P	NI	NI	NI	NI	O-NU	M	O-1Y
E. Bray Creek	Girl Scout	120414	NI	NI	O-NU	M	NI	IM-NR	IM-NR	IM-NR	NI	NI	NI	NI	NR	NR	O-NN
West Webber	Boy Scout	120415	NI	NI	NI	NI	NI	O-1Y	O-1Y	O-2Y	IM-NR	M	F	IM-NR	NR	NR	NI
Camp Geronimo	Boy Scout	120419	NI	NI	NI	NI	NI	O-2Y	M	F	IM-NR	P	IM-NR	IM-NR	IM-NR	NR	A
Poison Spring	Boy Scout	120420	NI	NI	NI	NI	NI	O-NU	O-NU	IM-NR	NI	O-NU	P	NI	NR	NR	O-2Y
Lee Johnson Spr.	Boy Scout	120421	NI	NI	NI	NI	NI	NI	O-NU	IM-NR	NI	NI	NI	NI	NI	NR	NI
Roberts	Diamond East	120422	NI	NI	NI	NI	NI	NI	NI	M	IM-NR	IM-NR	NI	NI	NI	NI	NR
Oak Springs	Diamond East/West	120423	NI	NI	NI	NI	NI	NI	NI	NI	M	M	NI	NI	NI	NI	NR
Turkey Spring	Boy Scout	120424	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	NI	O-NU	NI	NR

Abbreviations in the above table: O = Pair Occupancy inferred or confirmed; M = Male inferred or confirmed; F = Female inferred or confirmed; P = Presence of a single owl inferred or confirmed; sex unknown; Y = Number of young fledged; YD = Number of young found dead; NI = No Information; NU = Nesting status undetermined; NY = Nesting status undetermined; no young produced; NN = Non-nesting/Non-reproduction confirmed; NA = Nest Abandoned, NF = Nest Failed; A= Absence or Unoccupied, IM-NR = Informally monitored - no response or location.

Table 4. Mexican Spotted Owl PACs and Restricted/Protected habitat and critical habitat by pasture, Little Green Valley Complex (USDA Forest Service 2002a).

Pasture	Pasture Designation	Utilization Rate	Total Acres Restricted/Protected MSO Habitat	Total Acres in Pasture	Proposed Critical Habitat Acres	PAC Numbers	PAC(s) Present?
Boy Scout	Travel Way	20%	2,071	9,571	7,363	120415, 120419, 120420, 120421, 120424	Yes
Hells Half Acre	Winter Use	45%	284	7,298	0		No
Girl Scout	Travel Way	20%	570	10,079	7,125	120408, 120412, 120414	Yes
East Verde	Summer Use	35%	183	9,517	3,787		No
Dry Dude	Summer Use	35%	0	1,825	670		No
Diamond West	Winter Use	45%	768	4,218	0	120423	Yes
Diamond East	Travel Way	20%	1,092	10,843	0	120422	Yes
Myrtle	Summer Use	35%	235	3,885	0		No
Upper Neal	Winter Use	45%	4	1,940	0		No
Roberts Mesa South	Travel Way	20%	8	3,435	0		No
Roberts Mesa North	Summer Use	35%	0	3,644	21		No
Dead Horse	Closed	0	267	2,154	0		No
Dick Williams	Closed	0	285	6,633	3,703	120411, 120402	Yes
Totals			5,767	69,573	22,669		

Appendix A: Concurrences

This appendix contains our concurrence with your "may affect, not likely to adversely affect"determinations for the Arizona agave (Agave arizonica), bald eagle (Haliaetus leucocephalus), southwestern willow flycatcher (Empidonax traillii extimus), Gila topminnow (Poeciliopsis occidentalis occidentalis), razorback sucker (Xyrauchen texanus), and critical habitat for razorback sucker.

For the purposes of these concurrences, the Forest Service has proposed monitoring the Litlle Green Valley Complex and providing the Arizona Ecological Services Office (AESO) an annual monitoring report that includes utilization in grazed pastures during and after use by livestock and at the end of the growing season. The Forest Service may submit this report to the AESO as part of a forestwide grazing report. If either the Forest Service or we determine, based on this annual confirmation, that the guidance criteria upon which these determinations and concurrence are based are not being met, for any species, the effects of authorized grazing on the complex and associated allotment management plan will need reevaluation, and additional consultation may be required.

Arizona Agave

Arizona agave was listed as endangered on May 18, 1984 (US Fish and Wildlife Service 1984). Critical habitat has not been designated. Questions regarding A. arizonica's taxonomic status generated a petition from the Forest Service for delisting dated May 7, 1985. Review of all available data by us concluded the petitioned action was not warranted (US Fish and Wildlife Service 1986a, 1987).

Agave arizonica is a perennial succulent that reproduces once in its life. Vegetative offsets (clones) are its primary reproductive means. Individuals occur as isolated plants or as a cluster of plants in proximity to Agave chrysantha and Agave toumeyana variety bella in central Arizona (Gila, Maricopa, and Yavapai counties) south of the Mogollon Rim. Plants have been found at elevations ranging from 3,000-6,000 feet where the ranges of A. chrysantha and A. toumeyana var. bella (currently considered by experts to be the putative parent plants) overlap. Fewer than 100 plants have been documented in the wild. Some plant locations are known to exist on private lands, but most known locations are in the New River Mountains of the Forest, with additional populations southeast of Payson and near Parker Creek on the Tonto Basin Ranger District (Fenner 1990). Primary threats to this species (and its putative parent plants) include grazing of seed stalks and plant trampling by livestock, soil compaction by recreational vehicles, loss and alteration of habitat by mining, housing, and road construction; natural factors (disease, climate), and wildfire.

The only confirmed clone is located in the Dry Pocket pasture of the Star Valley allotment and is fenced from livestock grazing. According to the 1995 BAE for the Star Valley allotment, some "pups" may be sprouting outside of the protective fencing and may need additional protection. Although potential habitat exists in adjacent pastures, the absence of cattle during the majority of the bolting (flowering) period (April–September) reduces the possibility that plant inflorescences would be grazed or trampled (i.e. pastures with potential

Arizona agave habitat are designated winter use pastures). Soil conditions are generally satisfactory for the other pastures that contain Arizona agave habitat. Most areas that constitute unsatisfactory soil conditions are on gentler slopes and do not comprise habitat for Arizona agave. Reductions in the number of days these pastures are being grazed should help soil conditions improve.

The Forest Service determined that the proposed action was not likely to adversely affect the Arizona agave using the April 15, 2002 guidance criteria for term grazing permits (USDA Forest Service 2002b). To make this determination, all of the following criteria must be met:

1. Herbivory to individual plants from livestock grazing is not likely to occur.

2. Trampling of individual plants by livestock is not likely to occur.

3. Suitability and sustainability of the habitat to support the plant will not be altered.

4. Potential habitat will not be prevented from becoming suitable habitat for the plant by changes in plant community composition or deterioration of subwatershed/soil stability.

5. Plants and/or their habitats will not be physically disturbed and potential habitat will not be prevented from becoming suitable habitat by adverse effects from livestock management activities.

The only confirmed clone is located in the Dry Pocket pasture of the Star Valley allotment and is fenced from livestock grazing. Thus, herbivory and trampling of individual plants is not expected to occur. The adjacent Green Valley Hills pasture, which exhibits potential habitat, will be a designated winter use (April-October) pasture instead of summer use, thus eliminating the chance undetected bolting Arizona agave will be grazed. Also, Round Valley and Catholic pastures that exhibit suitable and potential habitat will be closed to grazing due to impaired soils, riparian concerns or lack of forage production. Collectively these efforts will alleviate impacts to occupied, suitable and potential habitat.

We concur with the Forest's determination that the proposed action may affect, but is not likely to adversely affect, the Arizona agave. We base this determination on the following:

1. Arizona agave in the Dry Pocket pasture are fenced from livestock.

2. Pastures with the potential to support Arizona agave will not be grazed during the majority of the bolting period.

3. The Forest Service will insure annually that criteria 3, 4, and 5 of the grazing guidance criteria for Arizona agave will continue to be met, and will provide us with an annual monitoring report.

Bald Eagle

The bald eagle south of the 40th parallel was listed as endangered under the Endangered Species Act of 1966 on March 11, 1967 (US Fish and Wildlife Service 1967). It was reclassified to threatened status on July 12, 1995 (US Fish and Wildlife Service 1995b), and proposed for delisting on July 6, 1999 (US Fish and Wildlife Service 1999). No critical habitat has been designated for this species.

The bald eagle occurs in association with aquatic ecosystems, frequenting estuaries, lakes, reservoirs, major rivers systems, and some seacoast habitats. Generally, suitable habitat for bald eagles includes those areas that provide an adequate food base of fish, waterfowl, and/or carrion, with large trees for perches and nest sites. Potential habitat for nesting, roosting and foraging exists primarily along Tonto Creek, which serves as the allotment's eastern boundary. This area is inaccessible to cattle due to the steep canyons and escarpments along the watershed. The East Verde River provides foraging habitat for eagles nesting on the Verde River.

Four bald eagle breeding areas occur in the action area that will be affected indirectly by the proposed action: the 76 breeding area on Tonto Creek has been active since 1980 and has fledged young in 16 breeding seasons; the Sheep breeding area has been active since 1982 and successfully fledged young in 1996, 1999, and 2002; the Tonto breeding area has been active since 1992 and has successfully fledged young in all but two breeding seasons, 1992 and 2000; the East Verde breeding area on the Verde River has fledged young in at least 18 seasons since 1973 (Arizona Game and Fish Department data). Both of these breeding areas have been relatively successful by Arizona standards. However, the three Tonto Creek nests are in cottonwoods (Populus fremontii) that are dying (G. Beatty, FWS, pers. comm., 2002). Although these nests could continue to be occupied in the dead snags for some years to come, new nest trees will be critical to the success of these eagles in the future. The Tonto Creek watershed is currently in poor condition, which has resulted in a lowering of the water table and intermittent conditions in Tonto Creek. Riparian vegetation has suffered as a result, as evidenced by the dying cottonwood nest tree that the 76 eagles depend upon. Regeneration of mature cottonwood trees will require improved conditions in the watershed. Although the East Verde eagles are in a cliff nest, deterioration of the East Verde watershed could adversely affect that fishery, reducing the suitability of foraging habitat.

The Forest Service determined that the proposed action was not likely to adversely affect the bald eagle using the April 15, 2002 guidance criteria for term grazing permits (USDA Forest Service 2002b). To make this determination, all of the following criteria must be met:

1. Livestock grazing that occurs in riparian areas will not reduce long-term roost and nest tree regeneration.

2. Livestock management activities (beyond presence of livestock) that occur within 0.25 mile of a bald eagle nest or roost site will not occur during the season of bald eagle occupation.

3. Subwatershed condition, in the presence of livestock grazing, will be maintained or improved and indicators of watershed health and TEP species (species listed as threatened or endangered, or are proposed for listing under the Act) habitat demonstrate that any effects will be insignificant or discountable.

Access by cattle to Tonto Creek from the Hell's Gate Wilderness northern boundary in the Kings Ridge pasture, to the Dry Pocket pasture is limited by steep topography and is inaccessible to livestock. The headwaters of Tonto Creek that include Dead Horse and Dick Williams Pastures are closed to livestock grazing to protect wildlife and fisheries habitat. The East Fork of the Verde River originates on the Complex along the Mogollon Rim and flows southwesterly for approximately 25-30 miles. The Forest Service believes that closing the Birch Mesa Pasture and changing use of Flowing Springs and Beaver Valley Pastures from grazing pastures to travel ways will improve watershed condition of the East Verde River.

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

1. Livestock grazing in riparian areas is not expected to reduce long-term roost and nest tree regeneration.

2. No livestock management activities will occur within 0.25 mi of a bald eagle nest or roost site.

3. The proposed action is expected to maintain or improve watershed condition both on the allotment and downstream in the Tonto Creek and East Verde watersheds. The Forest Service will monitor riparian areas and watershed condition on the allotment to ensure that criterion 3 of the grazing guidance criteria for bald eagle continues to be met (i.e., that the subwatershed will be maintained or continues to improve in the presence of livestock grazing) and will provide us with an annual summary monitoring report.

Southwestern Willow Flycatcher

The southwestern willow flycatcher was listed as endangered, without critical habitat on February 27, 1995 (US Fish and Wildlife Service 1995c). Critical habitat was later designated on July 22, 1997 (US Fish and Wildlife Service 1997a). A correction notice was published in the Federal Register on August 20, 1997, to clarify the lateral extent of the designation (US Fish and Wildlife Service 1997b). On May 11, 2001, the 10th circuit court of appeals set aside designated critical habitat in those states under the 10th circuit's jurisdiction. We decided to set aside critical habitat designated for the southwestern willow flycatcher in all states (California, Arizona, and New Mexico) until we can reassess the economic analysis. Redesignation of critical habitat is currently underway and a proposed rule is expected in September 2004.

Southwestern willow flycatchers are neotropical migrants that winter in central and south America and breed in the North American southwest in the spring and summer. Breeding takes place in Arizona from April through August. The closest territories to the allotment are at the Tonto Creek inflow to Roosevelt Lake, approximately 30 miles downstream of the allotment, which, as reported by Smith et al. (2003), were part of the second largest concentration or breeding location of willow flycatchers in Arizona in 2002 (at the Salt River and Tonto Creek inflows to Roosevelt Lake; 272 flycatchers, 146 territories).

Using the April 15, 2002 guidance criteria for term grazing permits (USDA Forest Service 2002b), the Forest Service determined that the proposed action was not likely to adversely affect the flycatcher. To make this determination, all of the following criteria must be met:

1. Livestock use will not occur within 5 miles of occupied habitat during the breeding season, or will not occur within 2 miles if cowbird trapping and monitoring or an approved cowbird research program is in place.

2. Livestock grazing in unoccupied suitable habitat will not reduce the suitability, nor reduce the likelihood of suitable habitat to expand to the site's potential.

3. No livestock will occur in potential habitat.

4. Subwatershed condition, in the presence of livestock grazing, will be maintained or improved and indicators of watershed health and TEP species habitat demonstrate that any effects will be insignificant or discountable.

Within the complex, occupied, suitable and potential habitat occurs along major drainages throughout the Forest Service below 3,500 feet elevation. Occupied habitat occurs at three locations: 1) Roosevelt Lake at the Salt River inflow; 2) Roosevelt Lake at the Tonto Creek inflow; and 3) Ister Flat (Horseshoe Lake at the Verde River Inflow). A single flycatcher was documented on one occasion at the Indian Gardens Administrative site in the Dead Horse pasture. Potential unoccupied habitat exists along Tonto Creek up to approximately Hells Gate. Houston Creek, a perennial tributary to Tonto Creek in the Dry Pocket pasture, may also have potential habitat. No nesting pairs have been documented in the action area.

The Forest Service anticipates that the winter grazing strategy as outlined for the pastures bordering Tonto Creek should help facilitate improvements in riparian conditions. Closure of the Dick Williams and Dead Horse pastures, and conversion of Roberts Mesa South from a summer use pasture to a travel way, should help improve riparian conditions on Tonto Creek north of Hells Gate. Soil conditions in the pastures bordering Tonto Creek are considered 80 percent satisfactory for all slope classes. The remaining impaired and unsatisfactory soils are anticipated to improve under the new winter grazing designation and enforcement of standards and guidelines. The Forest Service will monitor these pastures and report annually to ensure that these conditions within the allotment relative to the proposed action are improving.

We concur with the Forest's determination that the proposed action may affect, but is not likely to adversely affect, the flycatcher. We base this determination on the following:

1. The nearest occupied flycatcher habitat is approximately 60 miles downstream of the allotment at the Tonto Creek inflow of Lake Roosevelt and at the Ister Flat on the Verde River.

2. The proposed action is expected to maintain or improve watershed condition both on the allotment and downstream in the Tonto Creek and East Verde watersheds. The Forest Service will monitor riparian areas and watershed condition on the allotment to ensure that criterion 4 of the grazing guidance criteria for flycatcher continues to be met (i.e. that the subwatershed will be maintained or continues to improve in the presence of livestock grazing) and will provide us with an annual summary monitoring report.

Gila Topminnow

Gila topminnow was listed as endangered in 1967 without critical habitat (US Fish and Wildlife Service 1967). Once common and abundant, the species occupied low elevation areas of the lower Colorado and Gila River Basin. Preferred habitat consisted of backwaters and margins of large rivers to isolated springs and cienegas. Food habits are generalized and include bottom debris, vegetation, amphipod crustaceans, insect larvae, and mosquitoes. Gila topminnow are livebearers and fertilization and development of eggs is internal with young born alive. Breeding occurs year round and varies with water temperatures, photoperiod, food availability, and predation.

The introduction of western mosquito fish in the mid-20th century, combined with habitat destruction and fragmentation by dams and diversions, resulted in a precipitous decline in the range and abundance of the Gila topminnow (Miller 1961, Miller and Lowe 1964). Topminnow appears to be relatively tolerant to riparian and aquatic conditions degraded by livestock so long as water depth, temperature, and cover are sufficient to support them year round. However, most populations are so small that modest impacts may jeopardize the existence of already depressed populations.

Gila topminnow occur in Tonto Creek at its confluence with Kayler Spring and in the Kayler Spring drainage (Weedman 2000), approximately 20 miles downstream of the allotment.

Razorback Sucker

The razorback sucker was once abundant in the Colorado River and its major tributaries throughout the basin, occupying 3,500 miles of river in the United States and Mexico (US Fish and Wildlife Service 1991b). The razorback sucker was listed as an endangered species, due to declining or extirpated populations throughout the range of the species (US Fish and Wildlife Service 1991b). Loss of habitat and competition and predation form nonnative species is the primary causes of its decline. Critical habitat was designated in 1994 (US Fish and Wildlife Service 1994a).

The razorback sucker grows to over two feet in length and has a distinctive, abrupt, sharp-edged dorsal ridge behind the head (Minckley 1973). Adult razorback suckers inhabit a wide variety of riverine habitats including main stem and backwater areas such as slow runs, deep eddies, pools, and sloughs (Bestgen 1990). It also inhabits reservoirs. Larval and juvenile razorback sucker habitat includes shallow, slow moving areas, backwaters, and littoral zones (Langhorst and Marsh 1986, Bestgen 1990). Razorback suckers spawn from January to May and initiation of spawning appears to be tied to water temperature (Langhorst and Marsh 1986, Tyus and Karp 1990). Spawning occurs in shallow water over large gravel, cobble, or coarse sand with little or no fine sediment, on wave-washed lakeshores, or on riverine riffles (Minckley et al. 1991). Razorback suckers live up to about 50 years (McCarthey 1987). It feeds on plankton, algae, and detritus in reservoirs, with riverine populations also consuming a large amount of benthic invertebrates (Bestgen 1990).

Critical habitat for the razorback sucker in the Verde River occurs from the Prescott National Forest Service boundary to Horseshoe Dam. Critical habitat occurs in the action area approximately 23 miles downstream of the allotment at the confluence of the East Verde and Verde rivers. See US Fish and Wildlife Service (1994a) for a description of the primary constituent elements.

Stocking of razorback suckers into the Verde River continues at the rate of approximately 2,000 fish per year at Beasley Flats and Childs. Although individuals are routinely captured as far downstream as Horseshoe Lake, no indication of spawning or recruitment has yet been documented in the Verde. The Verde population appears dependent upon continued stocking to maintain the species in the system. Based on the limited success of the Verde River stocking program, physical habitat characteristics of the Verde River are suitable for at least sub-adult and adult razorback suckers.

Determinations for Listed Fish Species

The Forest Service determined that the proposed action was not likely to adversely affect the Gila topminnow, loach minnow, and spikedace using the April 15, 2002 guidance criteria for term grazing permits (USDA Forest Service 2002b). A single set of criteria apply to all listed fish species in USDA Forest Service Region 3. To make this determination for subject fishes, all of the following criteria must be met:

1. TEP species or their habitats are present within the allotment or the subwatershed that drains the allotment.

2. Direct effects will be avoided by yearlong exclusion of livestock from TEP species habitats.

3. The subwatershed condition, in the presence of livestock grazing, will be maintained or improved and indicators of watershed health and TEP species habitats demonstrate that effects will be insignificant or discountable.

We concur with the Forest's determination that the proposed action may affect, but is not likely to adversely affect, the Gila topminnow, razorback sucker and razorback sucker critical habitat. We base this determination on the following:

1. Direct effects will be avoided because cattle do not have access to Gila topminnow or razorback occupied habitat, including razorback sucker critical habitat.

2. The proposed action is expected to maintain or improve watershed condition both on the allotment and downstream in the Tonto Creek and Verde River watersheds. The Forest Service will monitor riparian areas and watershed condition on the allotment to ensure that criterion 3 of the grazing guidance criteria for TEP fish species continues to be met (i.e. that the subwatershed will be maintained or continues to improve in the presence of livestock grazing) and will provide us with an annual monitoring report.