

02-21-02-F-162

**BIOLOGICAL AND CONFERENCE OPINION SUMMARY**  
Effects of the proposed Las Cienegas National Conservation Area  
Resource Management Plan in Pima and Santa Cruz Counties, Arizona

**Date of opinion:** October 4, 2002

**Project:** Effects of the proposed Las Cienegas National Conservation Area  
Resource Management Plan in Pima and Santa Cruz Counties, Arizona

**Location:** Pima and Santa Cruz Counties, Arizona

**Listed species affected:** endangered southwestern willow flycatcher (*Empidonax traillii extimus*), endangered Gila topminnow (*Poeciliopsis o. occidentalis*), endangered Huachuca water umbel (*Lilaeopsis schaffneriana* var. *recurva*), endangered desert pupfish (*Cyprinodon m. macularius*), endangered Canelo Hills ladies'-tresses (*Spiranthes delitescens*), endangered northern aplomado falcon (*Falco femoralis septentrionalis*), endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuena*), endangered cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*), threatened Chiricahua leopard frog (*Rana chiricahuensis*), and the proposed endangered Gila chub (*Gila intermedia*) with proposed critical habitat.

**Biological and conference opinion:** No Jeopardy and no destruction or adverse modification of proposed critical habitat.

**Incidental take statement:**

**Anticipated take:** *Exceeding this level may require reinitiation of formal consultation.*  
The Service anticipates incidental take may occur for the Gila topminnow, Chiricahua leopard frog, southwestern willow flycatcher, and lesser long-nosed bat. The Service also anticipates that take may occur for the desert pupfish and aplomado falcon, should they be reestablished as proposed under this plan. Take is anticipated for the Gila chub, should it become listed.

**Conservation recommendations:** *Implementation of conservation recommendations is discretionary.*

Multiple conservation recommendations to further the conservation and recovery of the species and implement the appropriate recovery plans for each species.

**United States Department of the Interior**  
**U.S. Fish and Wildlife Service**  
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**Phoenix, Arizona 85021-4951**  
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In Reply Refer To:

AESO/SE

02-21-02-F-162

October 4, 2002

02-21-90-F-196

02-21-90-I-150

02-21-91-I-170

02-21-93-F-430

02-21-95-F-177

02-21-95-I-304

02-21-98-F-430

02-21-96-F-160

Memorandum

To: Field Manager, Bureau of Land Management, Tucson, Arizona

From: Field Supervisor

Subject: Las Cienegas NCA Resource Management Plan Biological Opinion

Thank you for your memorandum requesting formal consultation with the U.S. Fish and Wildlife Service (Service) following section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request for formal consultation was dated April 19, 2002, and received by us on April 22, 2002. At issue are impacts that may result from the proposed Las Cienegas National Conservation Area Resource Management Plan (RMP)[File No. 6840(068)] in Pima and Santa Cruz counties, Arizona. You requested formal consultation on the endangered southwestern willow flycatcher (*Empidonax traillii extimus*), endangered Gila topminnow (*Poeciliopsis o. occidentalis*), endangered Huachuca water umbel (*Lilaeopsis schaffneriana* var. *recurva*), endangered desert pupfish (*Cyprinodon m. macularius*), endangered Canelo Hills ladies'-tresses (*Spiranthes delitescens*), and the endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuena*). You also requested a conference on the Chiricahua leopard frog (*Rana chiricahuensis*) and the Gila chub (*Gila intermedia*). Only the Gila chub has proposed critical habitat within the planning area, and no other species has designated critical habitat in the area.

In your memorandum, you requested our concurrence that the proposed action was not likely to adversely affect the endangered Aplomado falcon (*Falco femoralis*) and the endangered jaguar (*Panthera onca*). You determined the proposed action would not affect the endangered cactus ferruginous pygmy-owl (*Glaucidium brasilianum cactorum*). Discussions between our staffs determined that the pygmy-owl and aplomado falcon should undergo formal consultation. Your letter of July 10, 2002, requested formal consultation for these two species. We concur with the determination for the jaguar, and our rationale is given in Appendix A.

This biological opinion and conference opinion is based on information provided in the April 2002 biological assessment, the August 2001 draft resource management plan and environmental impact statement, numerous telephone conversations, field investigations, and other sources of information. References cited in this biological and conference opinion are not a complete bibliography of all references available on the species of concern, the proposed activities and its effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

Because there have been several section 7 consultations completed on actions in the area and the RMP includes all actions proposed to be taken over the next 20 years, the previous consultations are incorporated here by reference. In addition, all reasonable and prudent measures and terms and conditions still outstanding are incorporated here by reference.

The Service appreciates the Bureau's efforts to identify and minimize effects to listed species on the Las Cienegas National Conservation Area. For further information please contact Doug Duncan (520) 670-4860 or Sherry Barrett (520) 670-4617. Please refer to the consultation number, 2-21-02-F-162, in future correspondence concerning this project.

/s/ Steven L. Spangle

Enclosure

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)

Director, Arizona Game and Fish Department, Phoenix, AZ  
Regional Supervisor, Arizona Game and Fish Department, Tucson, AZ  
John Kennedy, Arizona Game and Fish Department, Phoenix, AZ

# **BIOLOGICAL AND CONFERENCE OPINION**

## **Las Cienegas National Conservation Area Resource Management Plan**

Arizona Ecological Services Field Office  
U.S. Fish and Wildlife Service

AESO/SE 2-21-02-F-162

October 4, 2002

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## CONSULTATION HISTORY

Several consultations have occurred in the action area, mainly on what used to be the Empire-Cienega Resource Conservation Area. These formal and informal consultations are listed below.

*Cienega Creek Diversion Dam Maintenance and Repair (2-21-90-F-196)*. The biological opinion concluded "no jeopardy" for the Gila topminnow. Conservation measures applied to the biological opinion for this species included stipulations to conduct all repair and maintenance in a manner that will minimize water and fish displacement and stream channel and substrate disturbance, salvage Gila topminnow if displaced into diversion canal, and maintain records of any action that may result in take.

*Cienega Creek Pasture Fencing (Consultation 2-21-90-I-150)*. The Service concurred that the project was not likely to adversely affect Gila topminnow.

*Cienega Creek Earth Day Project (2-21-91-I-170)*. The Service concurred that the project was not likely to adversely affect Gila topminnow.

*Cienega Creek Headcut Repair and Riparian Pasture Fencing*. Consultation for the riparian pasture fencing was withdrawn (February 1994) and integrated into a larger Cienega Creek Interim Grazing Plan. The headcut repair was consulted on separately.

*Cienega Creek Headcut Repair (2-21-93-F-430)*. The intent of this project was to stabilize a headcut on Cienega Creek that was threatening 2.5 miles of occupied topminnow habitat. The biological opinion concluded "no jeopardy" for the Gila topminnow. Conservation measures applied to the biological opinion for this species included stipulations to conduct actions in a manner that will minimize take, and maintain records of any action that may result in take of Gila topminnow. The BO was amended in 1995 to reflect changes to the proposed action. The project was partially implemented.

*Cienega Creek Interim Grazing Plan (Consultation 2-21-95-F-177)*. This formal consultation was to cover the Empire-Cienega grazing plan up to five years, or until the RMP was completed. The biological opinion concluded "no jeopardy" for the Gila topminnow, southwestern willow flycatcher, and lesser long-nosed bat (January 1996). Conservation measures applied to the biological opinion for this species included stipulations to conduct actions in a manner that will minimize take, and to monitor and maintain accurate records of population, habitat, incidental take and introduced exotic fish species. The Service concurred that the action was not likely to adversely affect the American peregrine falcon, bald eagle, and the proposed endangered cactus ferruginous pygmy-owl with proposed critical habitat.

The Interim Grazing Plan BO was incorporated by reference into the Safford/Tucson grazing BO (see below). The Safford/Tucson BO covered prescribed fire, mechanical or chemical vegetation management, and range improvement projects beyond that proposed in the interim grazing

program. The Huachuca water umbel was also covered in the new BO. The interim grazing plan BO has been amended twice to extend the period of the proposed action. The most recent extension (March 2002) will be in effect until February 25, 2003, or until formal consultation for the final Las Cienegas Resource Management Plan is completed, whichever comes first.

*Cienega Creek Stream Gauge Station (Consultation 2-21-95-I-304)*. The Service concurred that the project was not likely to adversely affect Gila topminnow.

*Cienega Creek Stream Restoration Project (2-21-98-F-430)*. This project involved the restoration of the natural flow regime and channel geometry to a historically changed section of Cienega Creek. The biological opinion concluded "no jeopardy" for the Gila topminnow and southwestern willow flycatcher in June 1998. The Service concurred that the action was not likely to adversely affect the Huachuca water umbel and with no effect determinations on the jaguar, bald eagle, and lesser long-nosed bat. Conservation measures applied to the biological opinion included stipulations to minimize take, monitor and maintain accurate records of population and habitat conditions. This project is mostly complete and monitoring continues.

*Safford/ Tucson Field Offices' Livestock Grazing Program, Southeastern Arizona (Consultation 2-21-96-F-160)*. This BO covered all livestock grazing for the two Field Offices that had not undergone consultation. The Cienega Creek interim grazing plan BO was incorporated by reference. The Empirita and Rose Tree allotments were covered by this BO. The biological opinion concluded "no jeopardy" for all species. Conservation measures applied to the biological opinion for this species included stipulations to ensure the integrity of inclosures, ensure grazing pressures and watershed effects on habitat will not increase, manage to reduce adverse effects, monitor incidental take and report results.

This BO has been amended numerous times. Please refer to the fifth reinitiation and amendment, dated December 11, 2001, for a history of the amendments.

## **BIOLOGICAL AND CONFERENCE OPINION**

### **DESCRIPTION OF THE PROPOSED ACTION**

The analysis of the effects of the proposed action are predicated on the assumption that the proposed action will be implemented as specified in the RMP. Any changes to the agency action that causes an effect to the listed species or critical habitat not considered in this opinion are cause for reinitiation of consultation (50 CFR §402.16).

Alternative 2 in the draft RMP is the proposed action and is the only action included in this consultation. The RMP applies to lands under BLM's jurisdiction and any lands that may be acquired during the 20-year life of the plan. The proposed action is divided into two parts. Part A describes the desired resource conditions, land use allocations, special designations, and land tenure decisions which are part of each land use plan alternative. Part B describes the resource

management actions which would be implemented under each alternative and includes watershed and riparian management actions, wildlife management actions, cultural resources management actions, livestock grazing management actions, and recreation management actions. The main purposes for this division are (1) to identify plan level actions like desired resource condition and (2) the specific activities proposed to meet the desired conditions.

Most of the public lands in the Empire-Cienega Resource Conservation Area (nearly 42,000 acres) were designated as the Las Cienegas National Conservation Area in 1999. The remainder were included within the Sonoita Valley Acquisition Planning District (Map 1-1, Appendix 1 of Las Cienegas RMP). The planning area BLM considered in the Sonoita Valley Planning Partnership process is also part of the action area. There are differences between the Acquisition Planning District and the planning area. Therefore, the action area being considered here includes the Acquisition Planning District and the planning area (Figure 1).

The Las Cienegas RMP is based on the goals and objectives developed by the Sonoita Valley Planning Partnership. These goals and objectives are based on the vision statement and desired resource objectives also developed by the Planning Partnership. Because the goals and objectives flowed from the desired resource conditions, the desired resource conditions are included here. The Service considers the desired resource conditions to be a part of the proposed action. In addition, there are specific, quantifiable goals given in the desired resource conditions and goals and objectives that BLM management must attain during the 20-year life of the plan.

#### **Desired Future Conditions**

The Sonoita Valley Planning Partnership developed a vision, goals, and resource objectives for the Sonoita Valley area (roughly the Upper Cienega Creek basin and small portions of the Upper Babocomari and Sonoita Creek basins) to be incorporated into planning efforts for the valley. As a participant in the planning partnership, BLM's Tucson Field Office has incorporated the vision, goals, and objectives as the foundation for the Las Cienegas Resource Management Plan.

#### **Planning Area Vision and Goals**

The Sonoita Valley Planning Partnership will work together to perpetuate naturally functioning ecosystems while preserving the rural, grassland character of the Sonoita Valley for future generations. Goals for the Sonoita Valley (Upper Cienega Creek Watershed) include:

1. Maintain and improve watershed health;
2. Maintain and improve native wildlife habitats and populations;
3. Maintain and restore native plant diversity and abundance;
4. Protect water quality;
5. Protect water quantity;
6. Assure sustainability and a complementary relationship of mineral resources to the protection of water quality and quantity;

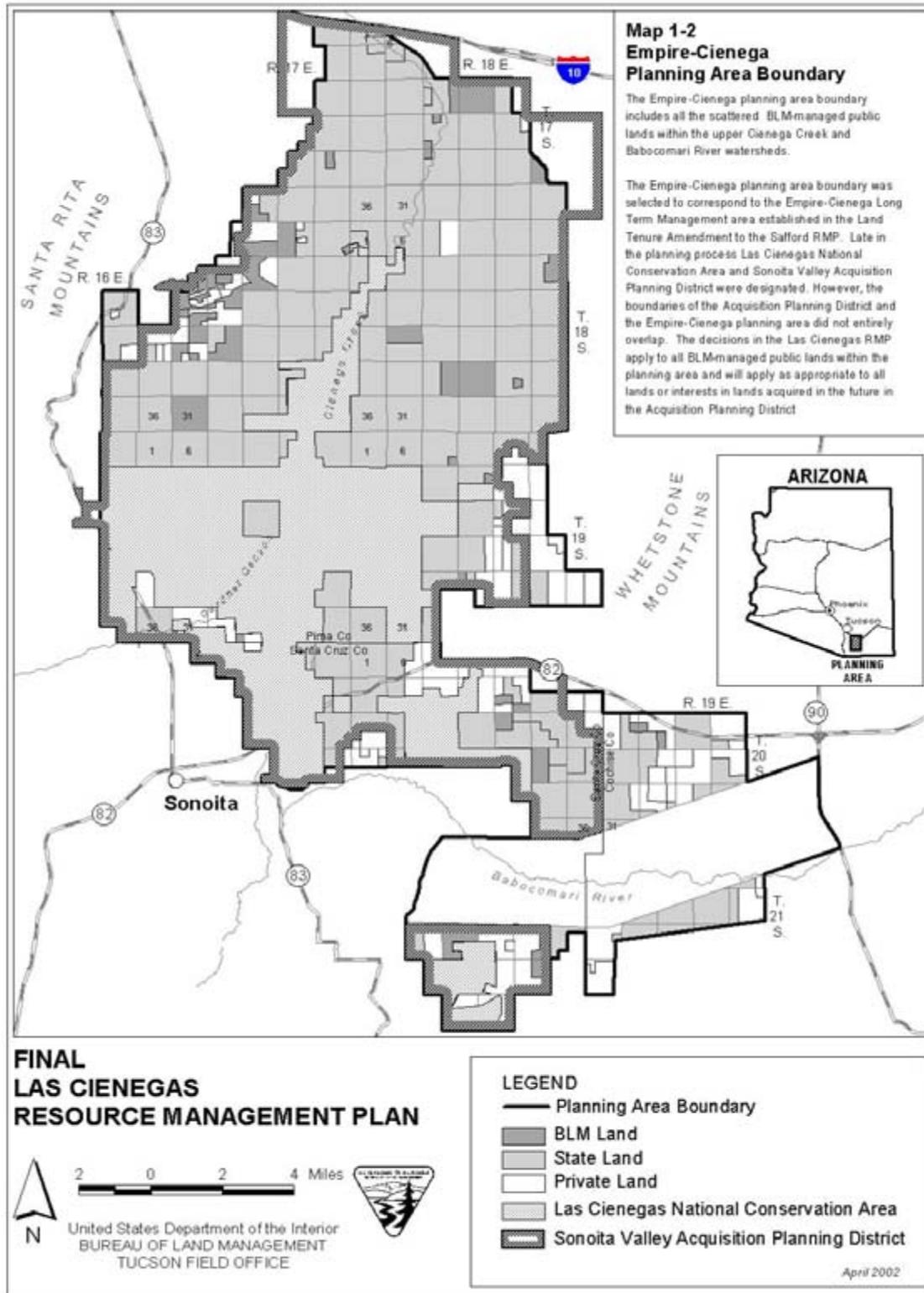


Figure 1. Map1-2, Empire-Cienega planning area boundary, Arizona.

7. Maintain the region's scenic beauty and open spaces;
  - a. Protect the Empire-Cienega Resource Conservation Area and the integrity of public lands in the Sonoita Valley;
  - b. Maintain the character of the Empire-Cienega Resource Conservation Area by limiting the building of any new roads or structures; maintaining the existing road system in its primitive character and condition; using existing road conditions to help control speed while providing sufficient recreational opportunities;
  - c. Alter or upgrade existing roads where needed to protect natural resources on public lands in the Sonoita Valley;
  - d. Encourage interaction and cooperation with other agencies and land owners, including acquiring land to protect and enhance the region's scenic beauty;
8. Sustain compatible traditional, current, and future use of the land;
  - a. Ensure a range of outdoor recreation opportunities that will protect natural resources on all public lands in the Sonoita Valley;
  - b. Develop and implement an education program to disseminate user guidelines that encourage responsible use of the public lands in the Sonoita Valley;
  - c. Establish a Sonoita Valley trail system to promote dispersed recreation and minimize user conflicts;
  - d. Plan, develop, and provide long-term stewardship of the Arizona Trail with community involvement. Priority should be given to developing alternative routes through the Empire-Cienega Planning Area from Oak Tree Canyon to Interstate Highway 10. Establish a primitive, non-motorized route for a diversity of users and provide outstanding opportunities for trail-based recreation;
9. Promote stewardship of the resources to accommodate current and future opportunities and demands;
  - a. Encourage working partnerships between BLM and other agencies, users, groups, and interests;
  - b. Develop maps, signs, and educational literature to promote user stewardship on public lands within the Sonoita Valley;
10. Manage the cultural resources in the planning area in a manner that provides for their preservation and protection and also avails selected properties for scientific, public, and sociocultural uses.

## **Resource Objectives for the Sonoita Valley**

### Desired Upland Vegetation Condition

The upland vegetation of the Sonoita Valley is a dynamic mixed shrub savanna, where the dominance of desirable native perennial grasses is featured. Native trees, shrubs, and succulents are also a part of the natural community. The relative abundance of each species results from the

interaction of soils, climate, disturbance regimes, and competition among plant species. A map showing existing vegetation follows (Figure 2).

#### Watershed and Upland Vegetation Objective

The watershed and upland vegetation objective covers the National Resources Conservation Service (NRCS) ecological sites within the Sonoita Valley (Figure 3). The two sites are Major Land Resource Area D-41-3 Southern Arizona Semidesert Grassland, 12-16 inch precipitation zone; and D-41-1 Mexican Oak-Pine Woodland and Oak Savannah, 16-20 inch precipitation zone (See Appendix 3).

1. Desired Plant Communities--Maintain or achieve properly functioning upland condition and a high similarity index (> 50%, by weight ) to the historic climax plant community present on the site on 80% or more of the ecological sites in the Sonoita Valley by the year 2015.
2. Desired Ground Cover--Maintain or achieve the following ground cover on 80% or more of the ecological sites in the Sonoita Valley by the year 2015: Within Major Land Resource Areas 41-1 and 41-3, maintain or achieve ground cover in woodland communities in excess of 60% (<40% exposed soil surface), in grassland communities in excess of 70%, and in shrubland communities in excess of 40%.

Rangeland Health: The goals, objectives, and actions presented in this plan are intended to meet or exceed the standards required in the BLM's Standards and Guidelines for Rangeland Health in Arizona. BLM developed these standards and guidelines in consultation with Arizona's Resource Advisory Council and others.

Attempting to achieve the historic climax plant community on ecological sites will direct management actions toward maintaining or restoring the physical function and biological health of the rangeland ecosystem. Sustaining the ecological health and function of rangelands allows the maintenance, enhancement, or creation of future social and economic options. Actions selected must be realistic and physically and economically achievable.

#### Upland Wildlife Habitat Sub-Objectives

Upland Wildlife Habitat Sub-Objective A: On loamy bottom ecological sites, provide habitat for breeding grasshopper sparrows and wintering Baird's sparrows in the Sonoita basin by maintaining the following:

- An average of 6-8" grass height;
- Ground cover of live grasses and grass litter >75%;
- Less than 10% shrub canopy on two-thirds of the loamy bottom (swales) range sites that are sampled each year.

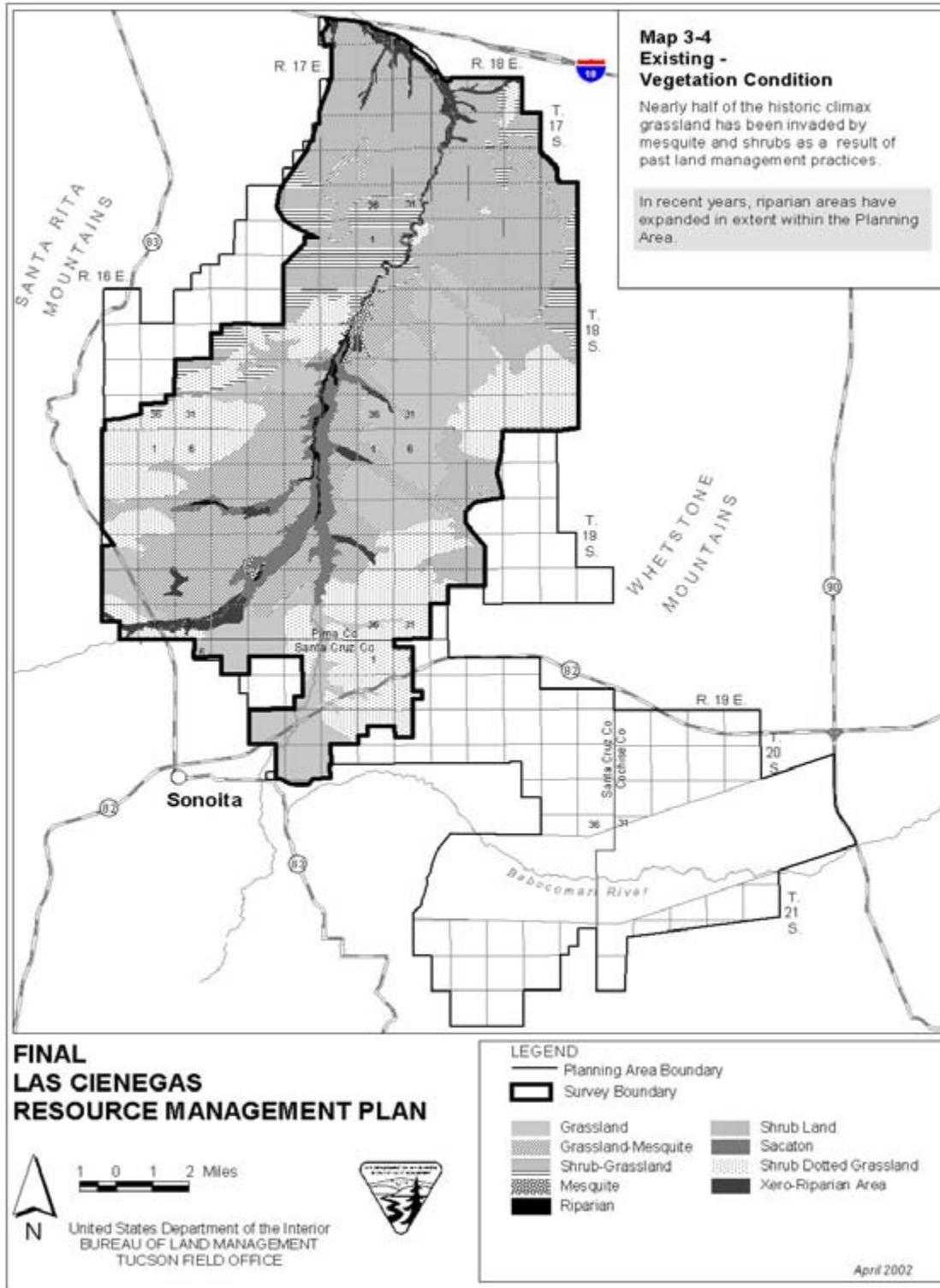


Figure 2. Map3-4, existing vegetation condition, Las Cienegas National Conservation Area, Arizona.

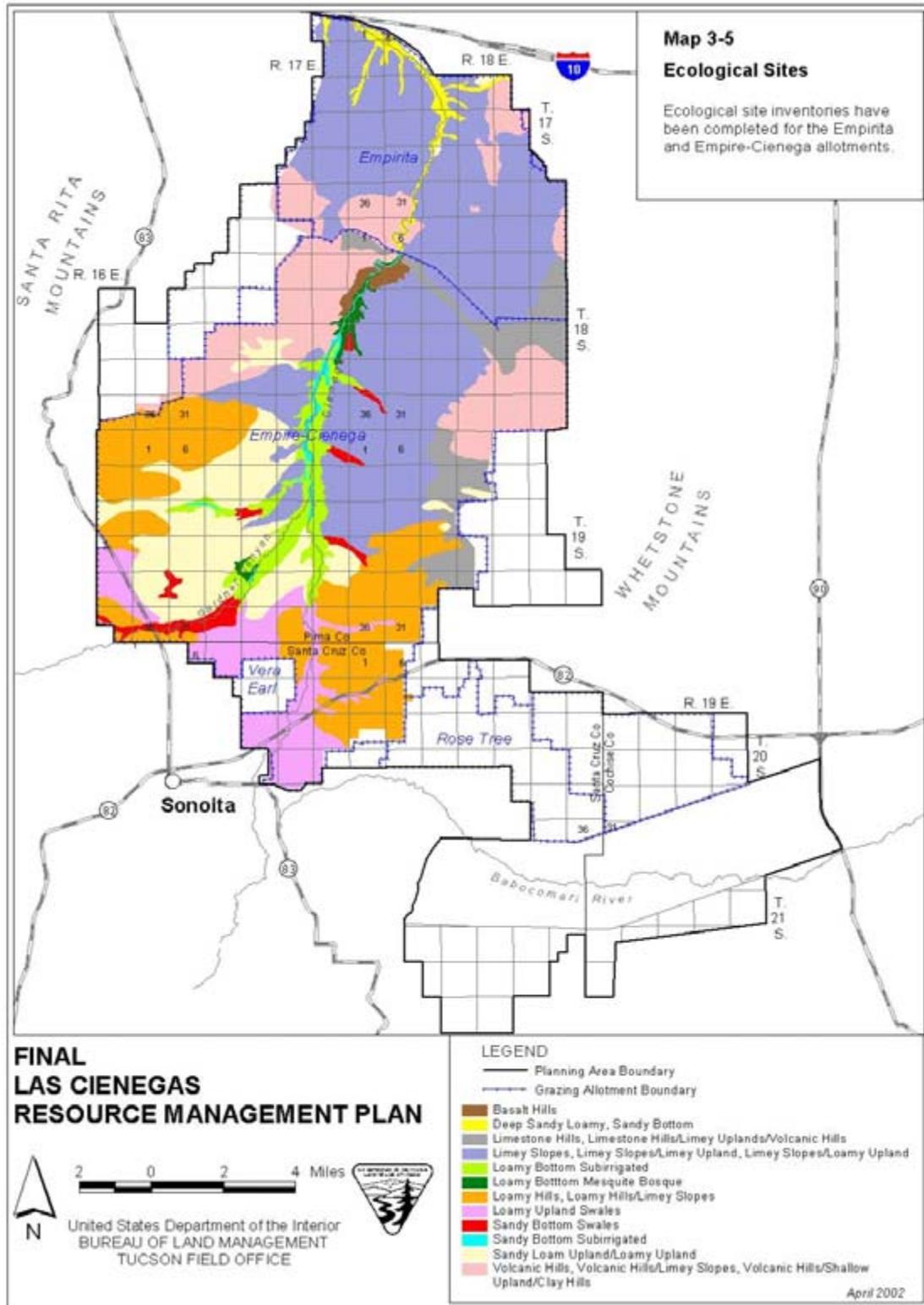


Figure 3. Map 3-5, ecological sites on the Las Cienegas National Conservation Area, Arizona.

Upland Wildlife Habitat Sub-Objective B: On open grasslands and in draws in the semidesert grassland and oak savannah vegetation communities (e.g., loamy bottom swales, loamy hills, and limy slopes ecological sites) provide the following habitat components for pronghorn (*Antilocapra americana*) fawning at key monitoring sites:

1. Maintain vegetation cover 10 to 18 inches (25.4-45.7 cm) high during the fawning season from the beginning of April through June each year in key fawning areas;
2. Maintain the presence of five or more species of grasses and shrubs in the vegetation communities;
3. Limit trees to no more than 5 percent of the total cover;
4. Maintain scattered trees greater than 12 feet (3.7 meters) tall;
5. Ensure usable water within one mile of key fawning areas.

Riparian Vegetation Objective

Maintain or achieve properly functioning condition (PFC) and the potential natural vegetation community (as described below) for 80 percent of the riparian areas in the Sonoita Valley. On BLM lands within the Empire-Cienega Planning Area, the objective is to achieve and maintain proper functioning condition on 100 percent of the riparian areas by 2035 and achieve and maintain potential natural vegetation community (as described below) on 95 percent of the riparian areas by 2010.

Riparian Potential Natural Community Descriptions

Cienegas (valley bottom streams)--Along upper Cienega Creek, achieve and maintain a vegetation community in cienegas with the following conditions:

- Ground cover and protective roots > 90 percent on upper and lower banks;
- Marsh habitat >50 percent of the total aquatic habitat in key cienega riparian segments;
- Vegetation community on lower banks dominated by rushes, sedges, deer grass, and willows (i.e., *Juncus* spp., *Scirpus* spp., *Eleocharis* spp., *Carex* spp., *Muhlenbergia rigens*, *Salix* spp.);
- Upper banks and floodplain dominated by sacaton, yerba mansa, cottonwood, willow, and mesquite (*Sporobolus* spp., *Anemopsis* spp., *Populus* spp., *Prosopis* spp.).

Cienegas (valley bottom ponds)--In the historic floodplain of Cienega Creek, achieve and maintain a vegetation community in valley bottom ponds with the following conditions:

- Ground cover > 90 percent on banks;
- Emergent vegetation covering 75 percent or more of the perimeter of the aquatic habitat;

Vegetation community on banks dominated by rushes, sedges, deer grass, and willows; Adjacent vegetation dominated by sacaton, paspalum grass (*Paspalum* spp.), and yerba mansa.

Dominated means that < 20 percent in aggregate of the plant community consists of other species.

Deciduous Woody Riparian (riparian areas with perennial surface water)--Along lower Cienega Creek (below Mattie Canyon), achieve and maintain the following:

- A tree community dominated by Goodding willow (*S. goodingii*) on lower banks or in aquatic habitat;
- Trees on upper banks to include yew willow (*S. taxifolia*), Fremont cottonwood (*P. fremontii*), velvet ash (*Fraxinus velutina*), and Arizona black walnut (*Juglans major*);
- A good mix of all age classes of riparian trees;
- Lower banks to be dominated by rushes, sedges, seedling riparian trees, and deer grass with bank cover exceeding 90 percent;
- Upper banks to be dominated by deer grass, sacaton grass, and riparian trees of sapling and adult age classes.

Deciduous woody riparian (riparian areas with free subsurface water)--Maintain a tree community composed of any of the following tree species according to the existing site's potential: Goodding willow, yew willow, Arizona black walnut, Fremont cottonwood, sycamore, seep willow, alder, box elder, and velvet ash. In addition, lower banks will be dominated by rushes, sedges, seedling riparian trees, and deer grass. If tamarisk (*Tamarix* spp.) is present, it is only a minor component of the riparian tree community.

#### Aquatic Habitat Objective

Provide diverse and high quality aquatic habitats to maintain and enhance the viability of the existing native fish community and other aquatic species within Cienega Creek. This will be gauged by meeting or exceeding values for aquatic habitat parameters shown in Table 1 within key segments by 2010 or within three years after a major flood.

#### Fish and Wildlife Management Objective

Restore and maintain the native diversity, natural distribution, and abundance of fish and wildlife species in the Sonoita Valley, with sufficient resources and in a manner that perpetuates naturally functioning ecosystem processes by the following:

- Allow for a mosaic of habitats;
- Minimize habitat fragmentation;
- Allow for waters appropriate to ecosystem capacity;
- Minimize restrictions to movement;
- Reestablish, extend the range, or supplement populations;

Table 1. Pool Habitat and Cover Requirements for Selected Segments in Cienega Creek, Arizona.

Segment Name	Minimum Pool Features			Minimum Instream Cover (ft <sup>2</sup> /mile)	Minimum Overhanging Cover (ft <sup>2</sup> /mile)	Minimum Monthly Flow (cfs)
	Total Number per mile	Number >2' Deep	Areal Extent (%)			
Source → Springwater Canyon	70	40	35	10,000	4,000	0.2 (June)
Springwater Canyon → Coldwater Spring	100	40	50	4,000	4,000	Unknown
Coldwater Spring → Confluence Mattie Canyon	N/A	N/A	80	4,000	4,000	Unknown
Confluence Mattie → Canyon Pump Canyon	100	40	50	4,000	4,000	0.7 (June)
Pump Canyon → Narrows	100	40	50	4,000	4,000	Unknown

Implement recovery plans;  
Support research efforts.

#### Cultural Resources Management Objective

Manage the planning area's cultural resources to realize or protect their scientific information potential, their educational, recreational and traditional values, their usefulness as subjects for experimental studies, and their qualities requiring conservation.

#### Cultural Resources Sub-Objective

Cultural Resource Sub-Objective A: Empire Ranch Headquarters Preserve and adaptively reuse the Empire Ranch Headquarters for public benefit without diminishing the historically significant buildings and setting by doing the following:

- Evaluate and nominate structures and buildings for eligibility to the National Register of Historic Places;
- Stabilize and maintain historic structures using the Secretary of the Interior's Standards and Guidelines for Rehabilitating Historic Buildings on the National Register;
- Design and implement adaptive uses of the headquarters for an array of compatible educational, research, interpretive and administrative programs;
- Continue the traditional use of the headquarters to support management of the surrounding lands;
- Maintain the headquarters development and usage at levels compatible with maintaining desired resource conditions for the surrounding lands.

Recreation Objective

Ensure a range of outdoor recreation opportunities to help meet existing and expected needs while protecting natural resources on all public lands in the Empire-Cienega Planning Area by doing the following:

Establish recreation opportunity zones and management standards that will enhance the spectrum of activities and settings;

Develop and implement a visitor education program to encourage responsible use of public lands in the Empire-Cienega Planning Area;

Establish an Empire-Cienega trail system as part of the Sonoita Valley trail system to allow motorized and non-motorized dispersed recreation;

Maintain and secure legal access to the Empire-Cienega portion of the Sonoita Valley trail system.

**Resource Management Plan (RMP ) Land Use Plan -Proposed Actions**

Under Alternative 2 (Preferred Alternative), BLM proposes the following to meet desired resource conditions:

**Watershed and Upland, Riparian, and Aquatic Management:** Manage public lands to achieve and maintain the goals and desired resource objectives for upland and riparian vegetation, and aquatic habitats.

**Fish and Wildlife Management:** Manage public lands to achieve and maintain the goals and desired resource objectives for fish and wildlife. Use an ecosystem approach to manage the four rare habitats (grassland, riparian/aquatic, mesquite bosque, and oak woodland) that support the following priority species:

Gila topminnow (endangered)	Botteri's sparrow (key sacaton species)
Gila chub (proposed)	jaguar (endangered)
longfin dace	lesser long-nosed bat (endangered)
lowland leopard frog	pronghorn (desirable big game and watchable wildlife species)
Chiricahua leopard frog (threatened)	mule deer (desirable big game species)
Mexican garter snake	white-tailed deer (desirable big game species)
southwestern willow flycatcher (endangered)	javelina (desirable big game species)
yellow billed cuckoo (candidate)	Huachuca water umbel (endangered)
gray hawk (key raptor species)	
Baird's sparrow (key grassland sparrow)	

**Visual Resource Management:** Designate 49,000 acres of public land as visual resource management (VRM) Class II.

**Cultural Resource Management:** Manage public lands to achieve and maintain the goals and desired resource objective for cultural resources. Manage the historically significant buildings of the Empire Ranch headquarters for public use. Manage selected cultural properties outside the ranch headquarters area for scientific, conservation, and public use. Work with Native Americans to select harvesting areas for noncommercial collection of indigenous plants.

**Recreation Management:** Manage public lands to achieve and maintain the goals and desired resource objective for recreation opportunities. Manage public lands to maintain the three recreation opportunity settings (roaded natural, natural, and back country).

**Land Use Allocations:** Under Alternative 2, BLM proposes the following land use allocations:

Fish and Wildlife Management: Manage suitable public land habitats for the recovery or reestablishment of native populations in collaboration with federal and state agencies, user groups, and other interested parties. Provide for the reestablishment of Gila topminnow into suitable habitats following the existing BLM, AGFD, and USFWS Memorandum of Understanding. In addition, provide for the translocation, reestablishment, or augmentation of the following native endangered, threatened, candidate and priority species within suitable habitats in accordance with appropriate regulations, policies and agreements:

Gila chub	black-tailed prairie dog ( <i>Cynomys ludovicianus</i> )
desert pupfish	beaver ( <i>Castor canadensis</i> )
southwestern willow flycatcher	pronghorn
aplomado falcon	Gould's turkey ( <i>Meleagris gallopavo mexicana</i> )
Chiricahua leopard frog	
lowland leopard frog ( <i>Rana yavapaiensis</i> )	

Wildland Fire Management: BLM will suppress natural or human-caused wildland fires by first addressing safety concerns to firefighters and the public, and then addressing resource concerns. Because of the planning area's small size and the proximity to an increasing number of homes in the wildland-urban interface, BLM will manage unplanned ignitions for the benefit of resources only once public safety and property protection can be assured and in conformance with the RMP. Due to intermixed land ownership patterns, BLM will pursue development of and utilization of a multi-agency fire management strategy in the planning area which will consider both ecological and administrative issues.

Mineral Development: Close the planning area's 48,542 acres of acquired public lands to locatable and leasable mineral exploration and extraction. Public lands acquired within the planning area would be closed to locatable and leasable mineral exploration and extraction. In addition, BLM would take the following actions:

Petition to withdraw 458 acres of public domain lands in the Empire Mountains;

Petition to withdraw 5,726.86 acres of federal mineral estate with private surface and 1,440.18 acres of federal mineral estate with state surface from locatable and leasable mineral exploration and extraction;  
Not authorize mineral material sales on public lands in the planning area.

Utility Corridors: Designate two major utility corridors across public lands in the planning area:

A 60-foot-wide corridor for buried utility lines running next to the existing El Paso Gas line right-of-way;

A 500-foot-wide corridor for overhead utility lines in the northeast part of the planning area. This corridor already has two overhead utility lines. No new lines can be placed west and south of Mattie Canyon. Any proposed new lines would need to be placed within this corridor and east of the existing lines;

All major utilities crossing public lands would be routed through the designated corridors, and BLM would advise utilities to consider east-west routes along corridors proposed by the 1992 Western Regional Corridor Study-Arizona Map.

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Land Use Permits: BLM would continue to consider other land use authorizations on a case-by-case basis with stipulations attached to any permits or leases to ensure consistency with the plan's goals and objectives.

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Off-Highway Vehicle Management: Limit motor vehicles (which includes bicycles) to designated roads and trails according to the designated transportation system. BLM proposes the following route designations on public lands to implement the Off-Highway Vehicle designation of Limited to Designated Roads:

91.9 miles (147.9 km) would be open for motorized travel by the public;  
0.4 miles (0.64 km) of new road would be constructed to the Empire Ranch headquarters;  
0.7 miles (1.13 km) would be open for motorized travel by the public seasonally;  
28.7 miles (46.19 km) would be designated for administrative use only;  
6.6 miles (10.62 km) would be converted to non-motorized trail for travel by bicycles, horseback, or foot;  
13.7 miles (22.1 km) would be closed and rehabilitated (Figures 4 and 5).

In addition to the above miles of roads and trails, the designated transportation system will also include 11.6 miles (18.7 km) of non-motorized Arizona Trail, the *Heritage Discovery Trail*, and the North Canyon non-motorized trail. For acquired lands, road designations on intermixed non-BLM would be implemented for consistent management.

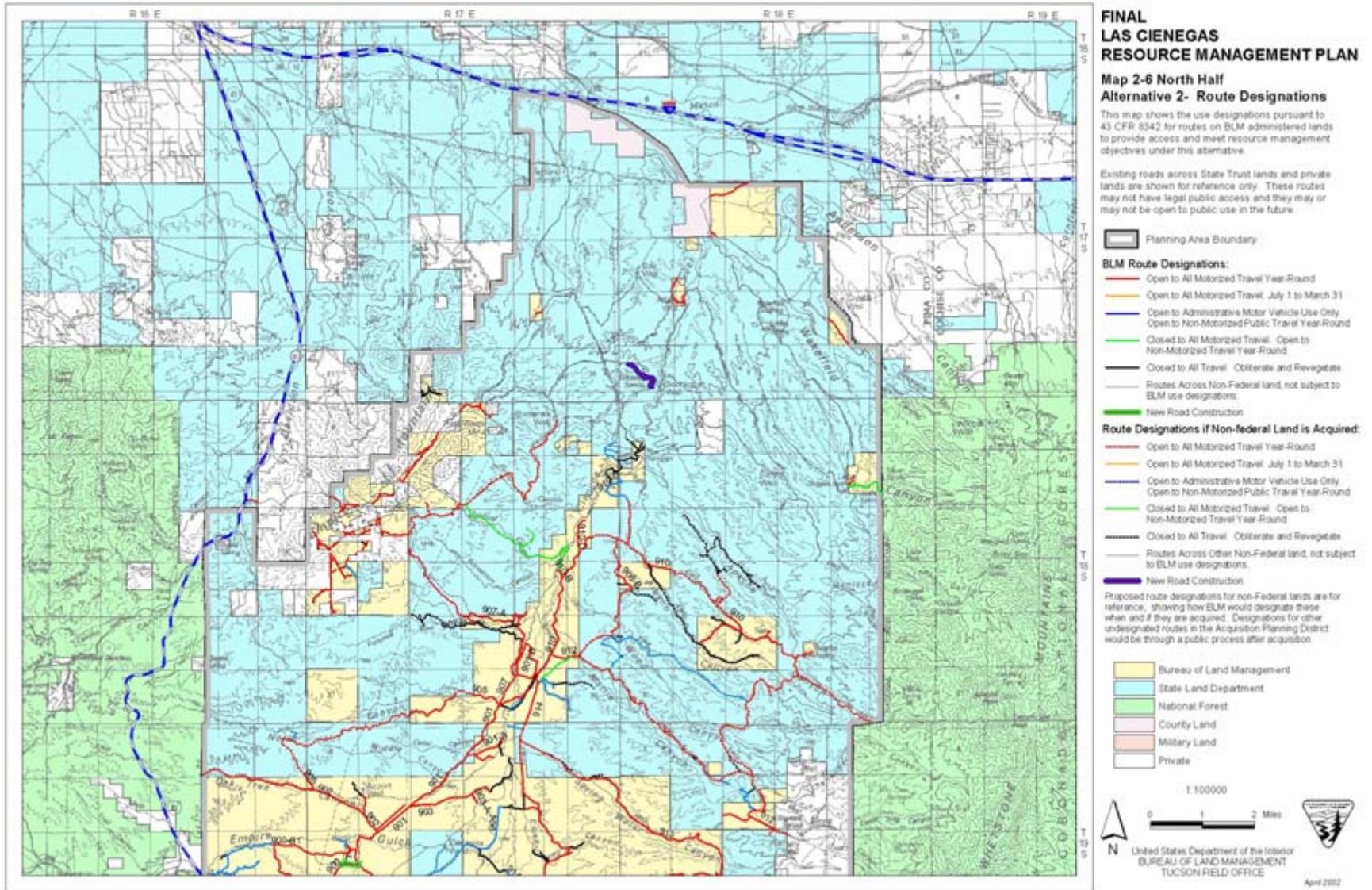


Figure 4. Proposed route designations on the northern half of Las Cienegas National Conservation Area, Arizona.

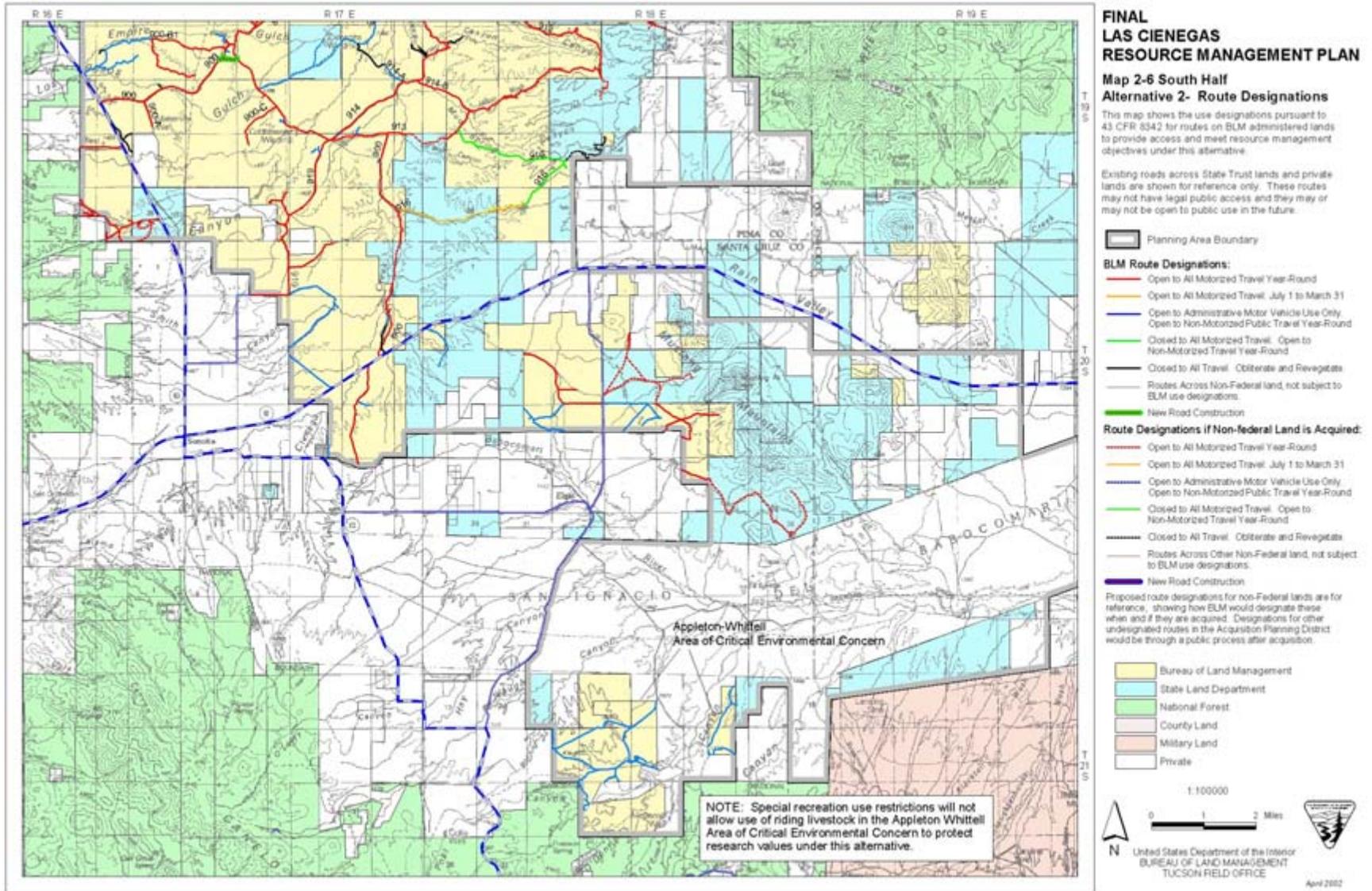


Figure 5. Proposed route designations on the southern half of Las Cienegas National Conservation Area, Arizona.

Legal public access has not been secured to many of the 91.9 miles (147.9 km) of public land roads. In the future, other landowners could close access. In addition, BLM might close roads or portions of roads seasonally, temporarily, or in emergencies where hazards or conditions warrant. To address resource or management concerns BLM might also build new road segments to replace existing roads. BLM will pursue legal public access on four road segments crossing Arizona State Trust Lands.

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Arizona Trail: BLM will designate a corridor for the Arizona Trail across 11.6 miles of public lands. The Arizona Trail within this corridor would require 9.3 miles of new trail across public lands. About 1.7 miles of trail would be shared use on existing roads, and 0.6 miles would be converted from an abandoned road. Except for the segment that is shared use, the Arizona Trail will be non-motorized and available for hiking, horse-back or mountain bike use.

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Recreation Management: BLM will establish three recreation zones on public lands within the planning area, and manage them to conform to the three recreation opportunity settings.

Zone 1 (Roaded Natural) offers developed, concentrated activities for a wide range of visitor types. It has easy access and visitor, interpretive, and educational facilities. It generally allows day use with no public camping. Motorized traffic is directed to use designated parking, pullouts, and the loop drive. Recreation Zone 1 would consist of a half-mile-wide corridor along the entrance road (from Highway 83 to ranch headquarters). This zone would include the ranch headquarters and Empire Gulch Spring and would include 1,109 acres of public land.

Zone 2 (Natural) offers moderate access with infrequently maintained roads; concentrated visitor use in designated areas, including camping, parking, pullouts and group sites, and limited visitor facilities and interpretation. Recreation Zone 2 would consist of 3,504 acres of public land, including half-mile-wide corridors along Oak Tree Canyon and South Roads and a short segment across public lands along Gardner Canyon.

Zone 3 (Back Country/Semi-Primitive) offers a low concentration of visitors and a predominately natural environment, variable access that is likely to be difficult, low to no visitor facilities, limited signs, and dispersed low-impact recreational opportunities. Recreation Zone 3 would be the remaining 44,387 acres of public lands in the planning area.

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Livestock Grazing Management: BLM proposes to allocate 10,524 AUMs of forage for livestock grazing on approximately 42,155 acres of public land and continue to authorize grazing on the Empire-Cienega, Empirita, Rose Tree, and Vera Earl allotments. BLM would also allocate 360 AUMs of forage for livestock grazing on 2,480 acres of public lands in the Empire Mountains. The Empire Mountains allotment would not be activated until the prerequisites described in the livestock management

actions section are completed. If the allotment is not activated within five years of the Record of Decision on the plan, then the BLM would reassess the situation and consider reallocating the forage to watershed and other uses.

BLM would authorize grazing use in riparian pastures and enclosures only to meet resource objectives. Part B has detailed narratives of livestock grazing management, including grazing strategies, livestock numbers, and proposed range improvements for each allotment.

**Special Designations:** Under Alternative 2, BLM proposes the following special designations:

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Areas of Critical Environmental Concern: Designate the Empire-Cienega Area of Critical Environmental Concern (ACEC) on 45,859 acres of public lands within the planning area. This ACEC would include all of the planning area's public lands except for the 3,141 acres of public lands now within the Appleton-Whittell ACEC (Research Ranch), which would remain as a separate ACEC and be renamed the Appleton-Whittell Research ACEC.

Any State Trust and private lands acquired within the planning area boundaries north of the Babocomari Land Grant would be incorporated into the Empire-Cienega ACEC and managed according to the prescriptions of this plan. Any State Trust and private lands acquired within the Sonoita Valley Acquisition Planning District boundary south of the Babocomari Land Grant would be incorporated into the Appleton-Whittell Research ACEC and managed for research values according to the prescriptions of this plan.

Alternative 2 would be the proposed management plan for the Empire-Cienega ACEC, including both land use plan and management actions. See Appendix 2 of the Las Cienegas RMP/FEIS for full descriptions of the ACECs, including management prescriptions. Appendix 2 also describes management for the Appleton-Whittell Research ACEC.

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Wild and Scenic Rivers: Manage the Cienega Creek Wild and Scenic Rivers Study Area to protect those resources pending congressional action on designation.

**Land Tenure:** Public lands in Las Cienegas NCA to be retained and additional public lands or easements that may be acquired within the Sonoita Valley Acquisition Planning District will be managed following the prescriptions in the Las Cienegas RMP/EIS Acquisition Strategy (Appendix 2). Public lands which become contiguous with the NCA after acquisition of intermixed lands become part of the NCA. Lands acquired within the Sonoita Valley Acquisition Planning District become part of the NCA.

Any acquisitions of lands or easements inside the planning area (Empire-Cienega Long Term Management Area) but outside the Sonoita Valley Acquisition Planning District would be completed according to objectives and management prescriptions in the Safford RMP Land Tenure Plan Amendment.

**Monitoring:** BLM proposes to implement a threat-based ecological monitoring program (See RMP Appendix 2) to expand ongoing monitoring efforts. The ecological monitoring program will be fully developed as a separate document but will be an integral part of BLM's Final Las Cienegas Resource Management Plan. The monitoring program would help ensure that the NCA's resources are protected over both the short- and long-term under a flexible, multi-use management plan. Development of partnerships would be an important factor in implementing the monitoring program.

### **Management Actions**

**Watershed and Upland, Riparian, and Aquatic Area Management Actions:** The following actions are proposed to support the upland vegetation, riparian vegetation, and aquatic objectives:

1. Implement an integrated vegetation treatment program.

The resource goals and objectives in this plan require maintaining desired plant communities where they are occurring and attaining desired vegetation states where conditions are not satisfactory. BLM will apply integrated vegetation treatment to meet vegetation objectives by directing desired changes in vegetation communities selected by the plan's monitoring and evaluation protocol.

The proposed treatment program would allow the use of prescribed burning and chemical applications (mainly herbicides), as well as provide for the use of manual, mechanical, and biological treatments. The integrated vegetation management approach consists of selecting and integrating treatment methods for predicted ecological, sociological, and economic effects. BLM will select vegetation treatment methods for a particular project in response to site-specific analyses, which will consider several important parameters, including the following:

- Characteristics of the target plant species;
- Associated non-target plant species;
- Uses of the target area;
- Physical characteristics of the area to be treated;

- Climatic conditions at the time of treatment;
- Proximity to sensitive areas;
- Need for pretreatment of areas or later re-vegetation;
- Determining environmental effects;
- Feasible alternatives.

In non-wildland urban interface areas, BLM will implement the integrated vegetation treatment strategy in coordination with surrounding land owners. The strategy will include the cooperative planning and implementation of prescribed fire on lands within and adjacent to the planning area when it is practical from ecological and administrative standpoints. This collaboration may result in an enlarged potential prescribed fire treatment area in the eastern portion of the planning area, beyond the 20,000 acres initially proposed. Appendix 2 of the Las Cienegas RMP/FEIS describes the vegetation treatment methods in more detail.

The following are the general vegetation treatment prescriptions for each allotment:

- **Empire-Cienega** - Treat up to 11,582 acres of Sandy Loam Upland and Loamy Upland ecological sites where desired ecological condition has not been achieved. Methods would include a combination of prescribed fire; combined mesquite cutting, applying herbicide to cut stumps, burning slash and shrubby vegetation; and deferring grazing. Vegetation treatments may be prescribed for additional acreage in the future in response to vegetation monitoring.
- **Empirita** - Treat up to 8,324 acres of Limy Slopes and Limy Upland ecological sites. Methods would include prescribed burning and deferred grazing. Vegetation treatments may be prescribed for additional acreage in the future in response to vegetation monitoring.
- **Rose Tree** - Conduct an ecological site inventory to determine the vegetation condition compared to the site potential and the upland vegetation objective. Evaluate the need for any vegetation treatments and develop proposed projects as suitable.
- **Vera Earl** - Conduct ecological site inventory to determine the vegetation condition compared to the site potential and the upland vegetation objective. Evaluate the need for any vegetation treatments and develop proposed projects as suitable.
- **Empire Mountains** - Conduct an ecological site inventory to determine the vegetation condition compared to the site potential and the upland vegetation objective. Evaluate the need for any vegetation treatments and develop proposed projects as suitable.

1. Designate the public lands within the Empire-Cienega Planning Area as a weed management area. BLM will not introduce or authorize the introduction of nonindigenous species, unless doing so is essential to control noxious weeds or other undesirable species. BLM will continue to consider potential noxious weed impacts in environmental assessments before authorizing projects. BLM will continue to consider authorization of control activities for nonindigenous species or noxious weeds on a case by case basis.
2. Remove or control nonindigenous vegetation where monitoring finds that they threaten or may threaten native species and where control is feasible and will not degrade ecosystem function.
3. Implement a Vegetative Products Management program with the following guidelines:
  - a. Collection of flowers, leaves, and fruit (including nuts, berries, and seeds) from plants on BLM managed public lands would be allowed for personal use following state native plant laws. The quantity of material collected would be limited to a maximum of 20 pounds (depending on the type of material) per person per year. If monitoring determines that levels of use are an issue, a free use permit system would be initiated and permits would be issued up to the amount of vegetative material available under sustained yield.
  - b. Collection of dead and down and detached wood for on site campfire use would be allowed.
  - c. Reasonable amounts of wood may also be used for administrative purposes.
  - d. Collection of entire live plants or cholla skeletons, yucca or agave stalks, and ocotillo are not permitted except in salvage or treatment areas as described in e.
  - e. Harvest of entire live plants or skeletons of plants (including yucca or agave stalks, cholla skeletons, dead or dormant ocotillo stems) for personal or commercial use would be limited to permitted salvage operations where vegetation will be destroyed by surface disturbance or to vegetation treatment areas where removal of specific vegetation will help achieve the objectives of the treatment. Salvage operations are anticipated to be only in small project areas whereas vegetation treatments may cover larger areas.

- f. Negotiated sales of vegetative products (excluding entire live plants, yucca or agave stalks, cholla skeletons, and dead or dormant ocotillo stems) for commercial use would be considered subject to compliance with the National Environmental Policy Act and only if in compliance with the NCA legislation and objectives of this plan. Criteria used to determine suitability of any proposed sales would include the following:
    - lack of significant impacts to soils, cultural resources, threatened and endangered species, riparian areas, and other sensitive resources;
    - consistent with management objectives of the NCA plan;
    - ability to harvest product on a sustained yield basis;
    - conformance with visual resource management policy;
    - accessibility from designated roads and trails;
    - will promote invasive species;
    - level of public demand and relative availability of product in region;
    - ability to mitigate any surface disturbance.
  - g. Collection of live vegetation or vegetative products will be allowed for legitimate scientific uses when covered by an approved research permit and subject to compliance with the National Environmental Policy Act.
4. Work with other entities in the watershed to maintain or improve watershed processes and characteristics that affect infiltration, runoff, and sediment transport. Current sub-watersheds of concern include Gardner Canyon, Springwater Canyon, Mattie Canyon, Fresno Canyon, and Apache Canyon.
  5. Implement the watershed activity plan for Wood Canyon to stabilize erosion and restore the natural function of the drainage. The activity plan sets the following management prescriptions:
    - a. Monitor the rate at which the gully system in lower Wood Canyon is advancing and the mechanism involved.
    - b. Once the cause of erosion has been determined, develop methods for stabilization.
    - c. Implement erosion prevention in lower Wood Canyon and other areas with this type of erosion.

6. Continue ecological restoration of agricultural fields including, where feasible, routing drainages across the diversion canal, restoration of wetland at south end, and restoration of sacaton/mesquite plant community.
7. Repair eroding streambanks or terraces at abandoned stream crossings or other disturbed sites along Cienega Creek and its tributaries where erosion from these banks or terraces is harming riparian or aquatic habitats or function.
8. Inventory lentic (ponded) wetlands including Cinco ponds and complete lentic proper functioning condition evaluation (see RMP Appendix 2). Any wetlands determined to be “non-functional” will be managed to meet the definition of proper functioning condition and advanced seral state of the plant community (see riparian/wetland objective). Methods used to achieve functional condition may include periodic burning, livestock exclusion or changes in season or duration of use.
9. Limit motorized vehicles to designated roads and crossings on public lands.
10. Limit crossings of Cienega Creek for permitted group activities to dry crossings or designated road or trail crossings. Designated road and trail crossings are shown on the designated road system map (Map 2-6; Table 2) for Alternative 2.
11. Prohibit recreational gold panning, dredging, or sluicing within Cienega Creek or its tributaries within the proposed ACECs.
12. In riparian areas prohibit camping within 100 feet (30.5 meters) of each side of the stream channel (whether flowing or dry).

Table 2. Proposed road crossings at Cienega Creek and Empire Gulch, Arizona.

Road Number	Route Designation Current Management (Alternative 1)	Route Designation Proposed Management (Alternative 2)	Notes
EC-901 at Empire Gulch	Open to All Motorized Travel.	Open to all Motorized Travel.	Perennial water through culvert under concrete crossing. Flows over structure only during peak flood flows.
910D (Narrows)	Open to All Motorized Travel.	Closed to All Travel. Obliterate and Revegetate (as necessary)	Several crossings of perennial creek but very marshy in stream. Proposed to be closed as part of restoration project.

Road Number	Route Designation Current Management (Alternative 1)	Route Designation Proposed Management (Alternative 2)	Notes
910-B- (Fresno Gap)	Open to All Motorized Travel (up to creek).	Closed to All Motorized Travel. Open (across creek) for Non -Motorized Travel*.	Road crossing through Cienega Creek at Sanford Canyon has been closed for restoration and spur to Falls has been closed due to hazards.
EC-901 at Cienega Creek	Open to All Motorized Travel.	Open to All Motorized Travel.	Concrete Crossing. Water flows at crossing about ½ year
EC-901-B at Cienega Creek (Ag. Fields)	Closed to All Motorized Travel. Open For Non - Motorized Travel.	Closed to All Motorized Travel. Open For Non - Motorized Travel.	Crossing closed by restoration project, an alternative non-motorized crossing will be developed upstream
EC 901A at Cienega Creek (Oak Tree Canyon) -Bahti's Bog	Closed to All Motorized Travel for restoration.	Closed to All Travel. Obliterate and Revegetate ( if necessary)	Perennial water in creek. Route across creek has already overgrown and revegetated
EC-903 at Cienega Creek (Springwater Canyon)	Closed to All Motorized Travel for restoration.	Closed to All Travel. Obliterate and Revegetate ( if necessary).	Perennial water. Route through sacaton and across creek is overgrown with vegetation.
EC-904 at Cienega Creek (Gardner Canyon)	Closed to All Motorized Travel for restoration.	Closed to All Travel. Obliterate and Revegetate (if necessary).	Perennial water. Route across creek is overgrown with vegetation.
EC-914A at Cienega Creek (Headwaters)	Open to All Motorized Travel.	Closed to All Travel. Obliterate and Revegetate (if necessary).	Dry Sand Crossing with flows only during storm events. Road approaches severely eroded
EC-914 at Cienega Creek (above Headwaters)	Open to All Motorized Travel.	Open to All Motorized Travel.	Dry Sand Crossing with flows only during storm events.
EC-913 at Cienega Creek (Oil Well)	Open to All Motorized Travel.	Open to All Motorized Travel.	Dry Sand Crossing with flows only during storm events.

Road Number	Route Designation Current Management (Alternative 1)	Route Designation Proposed Management (Alternative 2)	Notes
EC-900 at Cienega Creek (South Rd)	Open to All Motorized Travel.	Open to All Motorized Travel.	Dry Sand Crossing with flows only during storm events.
* Non-motorized travel is hiking, equestrian, and mountain bike use.			

13. In riparian areas prohibit camping within 100 feet of each side of the stream channel (whether flowing or dry).
14. Minimize developments in the 100-year floodplain. Limit developments to those needed to reduce impacts on riparian and aquatic areas.
15. Ensure that activities in riparian areas do not cause streambank stability to drop below 90%.
16. Implement design changes on roads where change is found to be needed to halt excessive erosion or reduce other resource impacts.
17. Monitor at least four 0.25 mile (0.4 km) reaches of Cienega Creek every three years to determine habitat trends.
18. Monitor riparian condition every five years at key riparian monitoring sites for segments currently in proper functioning condition. Segments which are not in proper functioning condition will be monitored every 2 to 5 years depending on the type of management change being implemented.
19. Upland vegetation will be monitored at permanent vegetation transects on the Empire-Cienega and Empirita allotments. A proportion of these transects will be monitored annually. In addition, habitat components for pronghorn fawns and grassland sparrows will be monitored annually at transects in key areas.
20. Stream discharge measurements will be obtained from a continuous recording stream gage on Cienega Creek.

**Fish and Wildlife Management Actions:** Under Alternative 2 BLM would carry out the following actions in managing fish and wildlife in support of the fish and wildlife objective:

1. Cooperate with state and federal agencies, universities, conservation groups, and other organizations on proposals, including fish and wildlife research, fish and wildlife habitat improvement projects, inventory and monitoring of species and habitats, and mitigation of impacts from other activities.
2. Implement the following measures to protect lesser long-nosed bat roosts and foraging habitat:
  - a. Ensure that road or trail building and maintenance activities do not increase or facilitate public access to known day roosts of lesser long-nosed bats;
  - b. Conduct pre-construction surveys for paniculate agaves to avoid or minimize their injury and mortality during any construction;
  - c. Design vegetation treatments, including prescribed fire, to minimize harm to paniculate agaves and to ensure that no more than 20 percent of agaves that are burned during prescribed fire are killed by the fire.
3. Develop a mitigation plan in coordination with the Fish and Wildlife Service for any vegetation treatment, including prescribed fire, within 0.5 mile (0.8 km) of a bat roost or in areas that support paniculate agaves.
4. Ensure that not more than 1 percent of the paniculate agaves within 0.5 mile (0.8 km) of the project area are impacted. If more than 1 percent are impacted, plant enough agaves so that the total number of agaves lost is less than 1 percent.
5. In August 2001, BLM established five photo plots to monitor yearly fluctuations in agave abundance. These plots will be sampled annually. In addition, a plot-based methodology to assess influences of herbivory on agave is being tested by the University of Arizona Range Department and will be evaluated for use on the planning area.
6. Implement the following measures to protect jaguar and jaguar habitat:
  - a. Maintain dense, low vegetation in the Cienega Creek riparian corridor;
  - b. Do not subject jaguar to any predator control activities;
  - c. Investigate all reports of jaguars in coordination with the Service and AGFD;
7. Implement the following measures to protect southwestern willow flycatcher and flycatcher habitat:
  - a. Manage suitable willow flycatcher habitat so its suitable characteristics are not eliminated or degraded. Normal vegetation succession will be allowed to occur even if suitable habitat becomes unsuitable;

- b. Manage potential willow flycatcher habitat to allow natural regeneration into suitable habitat as rapidly as possible. This may be limited where livestock use the creek or other actions are planned;
- c. Control cowbirds within 5 miles (8.0 km) of occupied habitat using suitable control methods if cowbird concentrations indicate a strong likelihood that parasitism to flycatcher nests is occurring or if parasitism of a nest is documented.

Annual willow flycatcher surveys will be conducted in suitable habitat for a minimum of three years to determine if additional pairs are colonizing the area and whether successful nesting is occurring. If breeding pairs are found to be regularly using the area, then monitoring will continue.

Other actions to protect southwestern willow flycatcher and flycatcher habitat from impacts of livestock grazing can be found in the livestock grazing management action sections of Alternative 2.

1. Implement the Gila topminnow recovery plan to increase security for the Cienega Creek Gila topminnow population by the following:

Protect surface water quality and quantity;

Protect the creek from contamination by nonindigenous fish and frogs and their parasites;

Achieve and maintain habitat integrity and function.

Accomplish this action through the following:

- a. Monitor at least five aquatic habitats on Cienega Creek annually using one-pass sampling with seines to determine relative abundance and population trends of Gila topminnow and to screen for nonindigenous fishes and bullfrogs;
- b. Secure adequate instream flow rights for Cienega Creek to maintain the existing aquatic and riparian habitat in the creek for fish and wildlife;
- c. In partnership with the AGFD, control or remove nonindigenous fishes and amphibians from stock tanks or streams in portions of the basin that drain into Cienega Creek;
- d. Develop information and erect signs on the need to protect Cienega Creek from nonindigenous fish and other nonindigenous aquatic species;
- e. Minimize road access and creek crossings to decrease the opportunity for releases of game fish and bait animals. Proposed actions for minimizing road access and crossings are shown on the designated road system map for Alternative 2;

- f. Work with the Pima County and Santa Cruz County Health Departments to ensure that mosquitofish are not used as a biological control;
- g. Evaluate and stock three or more sites within the basin with Gila topminnow in cooperation with the AGFD and the Service. Sites considered include Nogales and Little Nogales Springs, upper Empire Gulch (first release complete), and Cinco Ponds.

Other actions to protect Gila topminnow and topminnow habitat from impacts of livestock grazing can be found in the livestock grazing management action section of Alternative 2.

1. Reestablish, extend the distribution within historic ranges of, or supplement populations of the following wildlife species in the Sonoita Valley where determined to have suitable habitat and be consistent with other management activities:

Aplomado falcon	desert pupfish	lowland leopard frog
Gould's turkey	beaver	Chiricahua leopard frog
Gila topminnow	Gila chub	black-tailed prairie dog
	pronghorn antelope	

Other species may be considered as new information or management needs become known.

Accomplish this action through the following steps:

- a. Determine the population status and resources available (e.g., habitat quality, water availability) to wildlife species proposed for reestablishment or supplementation;
  - b. When habitat conditions have been determined to be suitable for the survival of these species, coordinate the action by established procedures with the proper agencies, stake holders, and land owners.
2. Coordinate with the AGFD to remove or control nonindigenous species where monitoring finds that they threaten native species and continue as necessary the bullfrog control program.
  3. BLM is contracting in 2002 with the University of Arizona to assist in inventory of Cienege Creek for aquatic herpetofauna and development of a long-term monitoring program.
  4. Manage for a mosaic of priority habitats (riparian/wetland, grassland, mesquite bosques, oak woodland, ) by applying vegetation treatments (including prescribed fire) as outlined in the integrated vegetation treatment program; reestablishing wildlife species where determined feasible through steps outlined above in #2; and periodically resting areas from grazing.
  5. Take the following actions to meet upland vegetation sub-objective B for pronghorn:

- a. Use prescribed fire, or mechanical or chemical vegetation treatments as well as periodic rest from grazing to meet the habitat objective for pronghorn;
- b. Provide usable water sources within 1 mile (1.6 km) of each other in pronghorn fawning areas and do not exceed 4 miles between usable water sources in pronghorn habitat. Evaluate and monitor suitability of waters and distance to permanent and functioning waters;
- c. Modify or remove fences that restrict pronghorn movement. Fences proposed for modification are shown on Map 2-24 in the RMP. Additional fences may be proposed for modification or removal in the future in response to monitoring data;
- d. Maintain fences that protect pronghorn from hazards (e.g., highway fences) and erect other restrictive fencing where needed;
- e. Investigate pronghorn use of highway underpasses and explore other partnership opportunities to help pronghorn cross highways;
- f. Recommend to the community through Sonoita Crossroads or another avenue that developments be encouraged to cluster homes to provide open movement areas that could double as community viewing locations for pronghorn;
- g. Recommend to the community through Sonoita Crossroads or other avenue that pronghorn-friendly fencing be installed in developments to ease pronghorn movement;
- h. Minimize human disturbances where possible by allowing only low-use primitive camping and low-use livestock holding and handling areas in pronghorn habitat;
- i. Minimize road densities in pronghorn habitat by implementing the designated road network. Low-use dirt roads are preferable to high-use roads;
- j. Develop partnership educational materials on pronghorn;
- k. Do not authorize dog trials in pronghorn habitat on public lands during the fawning season (April-June);
- l. Require that dogs be leashed during the fawning season in key fawning areas on public lands;
- m. Habitat components for pronghorn fawns and grassland sparrows will be monitored annually along transects in key areas. A pronghorn habitat study initiated by the AGFD in the spring of 2002 should help refine future monitoring and management needs and appropriate methodologies.

Other actions for pronghorn relating to managing livestock grazing are in the livestock grazing management actions section of Alternative 2.

1. To meet upland wildlife habitat sub-objective A for grassland sparrow habitat, implement proposed vegetation treatments, including prescribed fire and other upland restoration actions, to reduce shrub canopy and enhance grass species diversity and cover.
2. Improve wildlife populations by reducing habitat fragmentation, establishing adequate movement and dispersal areas, and ensuring adequate water. Accomplish this with the following:
  - a. Modify or remove fences where feasible. Fences proposed for modification are shown on Map 2-24 in the RMP. Additional fences may be modified or removed in response to monitoring data;
  - b. Remove or modify roads and rights-of-way as described in the road closures and restrictions section;
  - c. Unauthorized roads will be physically closed;
  - d. Reduce human disturbance on public land in critical areas or during critical times of the year;
  - e. Purchase conservation easements or land from willing sellers;
  - f. Maintain existing water sources and provide supplemental water sources as needed through water source inventory and evaluation.
3. A Monitoring Avian Productivity and Survivorship (MAPS) Bird Banding Station is scheduled to be established in 2002. MAPS is a nationwide network of bird-banding stations, operated during spring and summer. The operation of a MAPS banding station entails 6 to 10 days every year between May and August. The purpose of a MAPS station is to provide long-term data on the productivity, survivorship, and population sizes of land bird species through constant-effort mist-netting and banding during the breeding season. The major objective of the MAPS program is to contribute to an integrated avian population monitoring system for North American land bird species by providing annual regional indices and estimates for four population and demographic parameters: adult population size, post-fledging productivity, adult survivorship, and recruitment into the adult population.
4. Wetland ponds in the floodplain of Cienega Creek will be monitored annually for presence of native frogs and bullfrogs.

**Cultural Resource Management Actions:** The master plan for the Empire Ranch headquarters provides for adaptive reuse of headquarters buildings and expanded interpretative, research, and education programs at the headquarters. A restoration program is proposed for selected buildings. Outside of the headquarters area, several sites are allocated to scientific use.

Under Alternative 2, BLM proposes the following actions to support the cultural resources objective:

Empire Ranch Headquarters

1. Allocate the historically significant buildings at the Empire Ranch headquarters to public use;
2. The Cultural Resource Project Plan will provide for developing and implementing adaptive uses of the headquarters area and buildings for an array of compatible educational, research, interpretive, and administrative programs. The headquarters would be developed for public uses as a quality museum experience with a heritage discovery trail and expanded educational programs as described below;
  - a. The Empire Ranch House would be stabilized, restored, and interpreted;
  - b. The *Heritage Discovery Trail* would be developed and interpreted for visitors, school groups, and recreationists. The accessible, hardened trail would connect Empire Ranch headquarters buildings, landscapes, structures, and features;
  - c. *Education on the Empire* would be adopted as an educational program.
3. Evaluate and submit materials nominating the complex of historic buildings at the Empire Ranch headquarters to the National Register of Historic Places by 2003.
4. Continue to stabilize and preserve historic buildings at the Empire Ranch headquarters which are eligible for or listed on the National Register of Historic Places, and complete a restoration program for selected buildings.
5. Stabilize and maintain all eligible or listed historic structures.
6. Manage and maintain buildings and structures within the complex that are not eligible for listing on the National Register of Historic Places, including recreational facilities, storage buildings, sheds, shops, and occupied structures following BLM standards.
7. Continue partnership with the Empire Ranch Foundation and other interested groups.
8. Provide opportunities for the public to volunteer for projects to preserve, conserve, and study the planning area's cultural resources.

9. Manage the ranch headquarters to include support of ranching operations, administration of BLM programs, and resource protection in the planning area, and public uses emphasizing education, research, interpretation, and visitation.
10. Produce a variety of interpretive materials about Empire Ranch history.

#### Cultural Properties outside the Headquarters Area

1. Use the Mattie Canyon site complex, the Sanford Homestead site, and the Pump Canyon site for scientific use.
2. If determined feasible, sites could be developed for interpretation and public visitation. BLM would implement this action only if funds and staff are available to adequately develop an interpretive program that would not harm the resources.
3. Conduct Class III cultural resource surveys along 91.9 miles (147.9 km) of roads and trails by 2004.
4. Conduct Class III cultural resource surveys of about 40,000 acres by 2005.
5. Conduct an ethnoecological study and report of the planning area by 2003.
6. Work with Native Americans, to select harvesting areas and allow noncommercial collection of bear grass, cottonwood, acorns, and medicinal and ceremonial herbs by 2003.
7. Develop the headquarters as a Zone 1 recreational area, but with specific plans for headquarters access: trail loops, interpretive facilities, information signs, visitor facilities, and designated day, overnight, and weekly uses.

**Access and Transportation Management Actions:** The following actions are proposed to support the recreational opportunities objective:

1. BLM will pursue acquisition of perpetual rights-of-ways across State Trust Land parcels on the south entrance road (EC 900), Cienega Ranch Road (EC 901), Cieneguita Road (EC 904), and Oak Tree Canyon Road (EC 902) to ensure continued public access.
2. BLM may seek additional legal access if warranted by acquisition of State Trust or private land.
3. BLM will designate the Oak Tree Canyon entrance a limited access point for off-highway vehicles (OHVs) from the Forest Service trail head parking area in Oak Tree Canyon. If issues result from (1) public use of other access points, including resource damage on public lands, (2) user conflicts, or (3) conflicts with surrounding land owners, BLM will take steps to resolve these issues, including education, restrictions, and, as a last resort, closures.

4. On a case-by-case basis, BLM will evaluate future trail designation proposals, including the Great Western Trail, for conformity with planning area resource objectives and for conflicts with management prescriptions. New trail designations will be considered only for routes on the designated transportation system. Proposals for new trail construction would be considered only if the new construction is to replace a segment of trail or road that will be reclaimed.
5. BLM will complete a transportation system project plan for the planning area. The plan will include road numbering, signing, closures and restrictions, and a road maintenance schedule.
6. All non-motorized trails will be open to hiking, equestrian, and mountain bike use with the exception of routes on the Appleton-Whittell Research ACEC, where horseback use of roads and trails is not allowed to protect research values.

**Recreation Management Actions:** The following actions are proposed to support the recreational opportunities objective:

1. Special Land Use Permit. The mixed land ownership pattern within the planning area, and particularly the intermixed BLM and State Trust Lands create recreation management challenges. To improve recreation management and provide for more seamless recreation opportunities, BLM will work with the Arizona State Land Department to pursue acquisition of a special land use permit for State Trust Lands within the planning area to provide public recreation opportunities on these lands. Currently, recreationists using State Trust Lands for purposes other than hunting must obtain a permit and pay a fee to the Arizona State Land Department.
2. Special Recreation Use Permit System. BLM will analyze the feasibility of implementing a permit system for individual recreational use on public lands. The purpose of the permit system will be to ensure the conservation of resources. The permit system will be developed using a public collaborative process with both fee and non-fee systems examined as options. If a special land use permit with the Arizona State Land Department is obtained, then an integrated permit system will be pursued to ensure that the public would need only one permit for the area.
3. Special Recreation Permits. Many types of Special Recreation Permits may be applied for on Las Cienegas NCA for commercial, competitive, and organized group events. These applications would continue to be considered on a case-by-case basis and issuance of permits is discretionary. Many applications for incompatible uses may be sought in areas that may not be suitable for the use and may conflict with the maintenance of certain desired resource conditions and recreation settings. Table 2-19B in the Proposed Las Cienegas RMP is designed to provide guidance and flexibility in considering the types, number, groups sizes, and frequencies of Special Recreation Permits in each Recreation Zone.

4. Management of Dispersed Recreation. A variety of dispersed recreation activities occur on public lands in the planning area and most would continue under the proposed action. Table 2-19C in the Proposed Las Cienegas RMP lists a variety of dispersed recreation activities which are generally suitable within each recreation zone. Other recreation activities which are generally suitable for public lands in the planning area are included in BLM's Recreation Management Information System (Appendix 2 of RMP). The following is a summary of proposed visitor use restrictions for public lands in the planning area. These prescriptions are found in various sections of the plan for resource or visitor management and protection.
- Motorized vehicles are limited to designated routes in all alternatives. Bicycles and other mechanized vehicles are limited to designated routes. Driving "off road, which means driving a vehicle off a designated road is not permitted. Motorized use on primary access roads 900, 901, 902 require all vehicles to be currently licensed, insured, and registered.
  - In Zones 1 and 2, designated pullouts are to be used for parking. In Zone 3, visitors may park along roads but may not drive a vehicle off a road more than 25 feet (7.6 meters) to park.
  - Speed limits on roads are 25 mph (40 kph) unless otherwise posted.
  - The carrying capacity of roads or planned desired condition of roads will dictate type of use. Most back roads will be maintained, at a minimum, where high clearance vehicles to 4-wheel drive vehicles will be necessary, therefore, precluding low clearance vehicle use such as motor homes and sedans. Camping is not allowed in recreation Zone 1, is restricted to designated camping areas in Zone 2, but is allowed in Zone 3. However, camping is not allowed within 100 feet (30.5 meters) of streams in all recreation zones.
  - Recreational mining is not allowed.
  - Restrictions are placed on the amounts and types of plant materials which may be collected.
  - Restrictions are placed on the amounts, types, and methods by which rocks can be collected.
  - Dogs must be leashed in pronghorn fawning areas from April to June.
  - Cienega Creek has been closed to fishing by Arizona Game and Fish Commission order.
  - Recreation activities which damage resources, endanger public health and safety, or litter are prohibited. Conducting simulated combat activities using paint ball guns and smoke bombs is inconsistent with the Leave No Trace land use practices encouraged by BLM and other land management agencies. Leaving empty cartridges, bullets, permanent stains, and other by-products in an area is considered littering or damaging resources and is subject to fines.

5. Interpretive Program. BLM will develop an interpretive program by 2004. This program integrates all resource objectives with prescriptions such as placing signs and other information and education products directed to affect visitor behavior. This program will follow the National BLM Interpretive Strategy (BLM 1999) and do the following:
  - a. Be thematic and use accepted professional interpretive principles;
  - b. Be evaluated to measure effectiveness;
  - c. Ensure that each resource message will be displayed effectively and match objectives for other resource management programs;
  - d. Collaborate with other groups to provide information to diverse audiences;
  - e. Determine the level and suitability of resource protection messages;
  - f. Locate and compile basic information on safety and orientation and integrate this information with all resource management objectives and programs.
6. Maintenance Program. A facility and inventory maintenance management program will be developed and modified. The overall maintenance program will integrate the maintenance needs and prescriptions for all resource programs. An inventory and maintenance management program integrating Las Cienegas prescribed conditions for recreation zones, roads, and their maintenance needs will be developed by 2004. This plan also determines the degree of scheduled and corrective maintenance for water sources, restoration project components, barricades, parking areas, fences, trails, and administrative sites. Table 2-20 of the RMP summarizes maintenance prescriptions for roads and recreation sites. Appendix 2 of the RMP includes detailed descriptions of each maintenance level.

### **Mineral Resources Management Actions**

1. Administrative Use of Mineral Materials. BLM will use mineral materials such as clay, sand, gravel, and boulders for projects within the planning area. Surface disturbance from removal of the mineral material would be limited to one-half acre or less for each project. Mineral materials will be used for road repair and maintenance, watershed improvement, and cultural restoration. Mineral material extraction will avoid sensitive areas and minimize impacts. BLM will analyze impacts from administrative use of mineral materials on a case-by-case basis.
2. Removal of mineral materials for personal or commercial use will not be permitted.
3. Rockhounding. Rock collectors will follow BLM Arizona guidelines for collecting reasonable amounts of mineral specimens, rocks, and semiprecious gemstones. These

guidelines allow collecting specimens for noncommercial personal use, up to 25 pounds and one piece per day not to exceed 250 pounds per year. Mechanical means may not be used to remove rocks or mineral specimens. Collection of petrified wood or fossils (invertebrate or vertebrate) will not be permitted except where intended for legitimate scientific uses as described in #4.

4. Scientific Collection. Collection of paleontological resources and rocks will be allowed for legitimate scientific uses when covered by an approved research permit. Mechanical means may be used to remove rocks or mineral specimens for scientific collection subject to National Environmental Policy Act compliance.

**Livestock Grazing Management Actions:** The proposed action seeks to maximize livestock management responsiveness to changes in annual vegetation production. Stocking rates would be set annually in response to changes in total forage production, amount of forage available, and monitoring resource health. In the analysis on the impacts of livestock grazing, the use of horses or mules for management is considered part of the action.

The Tucson Field Office uses the drought policy of the Safford Field Office:

At the first sign of drought, as determined by the Bureau, normally below normal rainfall for more than two years, permittees are notified about the consequences of drought on forage production, range condition, and utilization limits and are encouraged to reduce livestock numbers voluntarily. This is handled by the range conservationist assigned to the allotment.

The Upper Gila-San Simon Grazing Environmental Impact Statement (EIS) decision document states utilization limits clearly. Maximum use of key species by livestock and other uses will average 40 percent and will not exceed 60 percent of the current year's growth. The upper limit set in this RMP is 35 percent utilization. Use should not be allowed to exceed 60 percent in a key area just because areas further away from water or in rougher country have less use. If utilization exceeds 60 percent on a key area of the allotment, then policy, established in the EIS, calls for the removal of livestock from the area (pasture or allotment) until plant growth and vigor has recovered.

If the drought continues, letters will be sent to operators of allotments where excessive utilization is becoming a problem. They will be encouraged to reduce livestock numbers and informed of possible adverse actions by the Bureau if utilization exceeds 60 percent.

If a reduction is needed, calculations should be made using utilization and actual use studies for the previous grazing year. If intensive utilization results show that the use made, in AUMs, exceeded the allowable use calculated for the allotment, a reduction in livestock use will be made by at least the number of AUMs calculated.

The degree of reduction needed can be achieved several ways. First, the permittee will be notified of the results of Bureau studies and alternatives will be discussed. If the problem is distribution rather than total numbers, cattle can be moved to a different pasture or to other areas of the allotment where utilization is less. If the problem is total numbers, the allottee will be encouraged to sign an agreement taking the required non-use for a period of two years, minimum. The agreement will be signed by the permittee and Bureau Field Office Manager and will state that the non-use taken will not affect permitted use. It will also specify reasons why two years are necessary and outline conditions that will result in activation of the allotment (i.e. "normal" or above average rainfall, new waters needed to service unused portions of the range).

If no agreement can be reached, a decision will be issued and if necessary, the decision will be placed in full force and effect, which means the reduction in livestock numbers becomes effective immediately. If necessary, the Field Office Manager is authorized (43 CFR 4110.3-3(b)) to close allotments or portions of allotments to livestock grazing, if vegetation on public lands requires immediate protection because of drought conditions. Here again, a grazing decision would be issued and placed in full force and effect.

In spite of all this, the flexible grazing system and the biological planning process proposed in the RMP for all allotments, should never allow for the situation to require the procedures outlined above.

As an example of how the proposed action would be implemented, Tables 2-21, 2-22, and 2-23 of the RMP compare three different rates of possible annual production (favorable, normal, and unfavorable years) to the corresponding stocking rate that would be implemented as a result of that year's forage production on each of the allotments. The goal of flexible stocking rates is to respond quickly to annual production fluctuations by altering the stocking rate and livestock rotation. Actual stocking rates may be higher or lower than those shown in this example depending on evaluation of resource conditions and monitoring data through the biological planning process. Livestock exclosures would be established to help monitor vegetation responses (Tables 2-15 through 2-18 of the RMP).

Table 2-24 of the RMP shows the total vegetation production in favorable, normal, and unfavorable years (based on rainfall) on all lands within each allotment. Also shown is the average amount of forage that livestock could consume on these lands with variable stocking rates. The useable forage is assumed to be 50 percent of the total vegetation produced multiplied by the 35 percent utilization rate on lands allocated for livestock grazing. The percentage of allocated forage consumed remains fairly constant under this management strategy. Note that 50 percent is subtracted from the total production prior to applying the use limit to provide for rangeland health by leaving this cover for watershed values.

#### Highlights of Proposed Livestock Grazing Management Strategies

1. Four livestock operators would continue to lease public lands in the planning area on four individual grazing allotments (Empire-Cienega, Empirita, Rose Tree, Vera Earl). In addition, BLM would establish a livestock grazing allotment in the Empire Mountains.
2. On each allotment a variable stocking rate with a flexible livestock rotation-selective rest-rotation strategy would be implemented. The variable stocking rate would be determined annually by an assessment of range conditions, including forage availability and biological monitoring through the biological planning process.
3. On each allotment, forage utilization limits would be lowered from current limits, following recommendations by Holechek et al. (1999). The utilization limit will be 35 percent of current year's growth on key perennial grass species and insure that the physiological requirements for plant growth, rest, and reproduction are met for the following key perennial grass species:

plains lovegrass (ERIN)  
 sideoats grama (BOCU)  
 cane beardgrass (BOBA3)  
 vine mesquite (PAOB)  
 Blue grama (BOGR)  
 black grama (BOER4)  
 hairy grama (BOHI2)  
 sprucetop grama (BOCH)

plains bristlegrass (SEMA)  
 woolly bunchgrass (ELBA)  
 green sprangletop (LEDU)  
 Arizona cottontop (DICA8)  
 crinkleawn (TRMO)  
 bush muhly (MUPO2)  
 prairie junegrass (KOCR)

The maximum number of cattle authorized would need to be within the utilization limit of 35 percent in favorable, normal, or unfavorable years. Utilization will be based on the weight used of the current years production on the primary forage species identified in key study areas (at a minimum the permanent study sites already established). The Bureau will attempt to identify the utilization patterns across the entire unit or area being used. Use would be measured about the time cattle are moved from the unit, or when the current use level is felt to be near the limit. The guidelines for identifying the key monitoring areas would be based on the size and location of the unit being used (usually only a portion of a single pasture is used based on which primary waters are being used, and the topography and season of use the unit is being grazed). There may be several units of useability within a pasture. Generally these units average 250 to 500 acres and are used by the main herd for several weeks. Use normally is measured one-third to one-half mile from the primary water. The Grazed-Class photo guide method (Schmutz 1978) will be used, and a photograph taken to document the conditions measured. When the desired use levels are reached, cattle will be moved to the next unit.

4. The biological planning process would be expanded and formalized on the Empire-Cienega allotment, and similar biological planning processes would begin for the other allotments. The biological planning processes will have the following structure:

*Biological Planning Process Structure*

The key to the variable stocking rate and flexible pasture rotation management approach is (1) to have a variety of options for any planned grazing rotations and (2) to be able to quickly change from the plan when range conditions or livestock needs differ from expected.

The Biological Planning Team helps the BLM review the monitoring data and provides input into proposed actions. The BLM Field Manager will make any necessary administrative decisions relating to the grazing program after review of existing data and after consultation and coordination with the Biological Planning Team and other interested agencies and public. The BLM will explore having the Tucson Field Manager request that the Biological Planning Team be established as a separate Rangeland Resource Team (RRT) operating under the auspices of the Arizona Resource Advisory Council (RAC) as provided for in 43 CFR 4100.

The Biological Planning Team would establish subcommittees as needed to address specific issues. Standing subcommittees would include a technical monitoring subcommittee to oversee the selection, collection, and analysis of monitoring data for input into the Biological Planning process and a recreation subcommittee to work on recreation issues.

*Participants*

The Biological Planning Team will consist of a balance between resource managers, resource users, and those concerned with proper resource management. Participants may include representatives of the following:

1. Land owners (BLM, Arizona State Land Department, U.S. Forest Service, Audubon Society, private owners, and the Natural Resources Conservation Service);
2. Permitted uses (grazing lessees, recreation groups);
3. Research efforts (USDA Agricultural Research Service, University of Arizona, Arizona State University);
4. Wildlife management needs and concerns (AGFD, Service);
5. Environmental interests and public concerns.

*Actions*

The team will meet at least twice a year (in March or April before the spring growing season and in September following the monsoon rains) to do the following:

- a. Determine the current health and trend of the resource;
- b. Evaluate monitoring data;

- c. Evaluate proposed grazing and recreation actions following RMP objectives and current resource conditions or concerns;
- d. Recommend decisions to BLM management on the following:

Annually authorize livestock grazing (conditions incorporated in grazing bill on numbers, pasture and water use, and rotation);

Change recreation authorizations or site uses.

6. The interim grazing plan for the Empire-Cienega allotment (BLM 1995) and the Coordinated Grazing Management Plan for the Empirita allotment would be modified to incorporate the goals, objectives, and actions in this plan. BLM would develop grazing management plans for the Rose Tree, Vera Earl, and Empire Mountains allotments;
7. BLM would develop exclosures on allotments and monitor these excluded lands to determine the effects of grazing and rest on habitats and would authorize livestock grazing in these riparian pastures and exclosures only at designated livestock crossing lanes and watering areas or only to meet a resource objective.

#### Empire-Cienega Allotment (#6090)- Proposed Management

##### Summary of RMP-Level Proposal

Under Alternative 2, BLM would allocate up to 8,448 AUMs of livestock forage on about 34,365 acres of public land within the Empire-Cienega allotment (# 6090) and would continue to sublease livestock grazing on the 37,462 acres of State Trust Lands leased to BLM. The actual number of AUMs of forage used annually would vary due to the flexible stocking in association with the Biological Planning Process. About 2,319 acres (6%) of the BLM lands would be excluded from livestock grazing as vegetation study areas. The exact number of acres may vary depending on the number, size, and location of exclosures.

##### Management Actions

BLM proposes to manage the Empire-Cienega Planning Area almost the same as it does now: A variable stocking rate with flexible livestock rotation-selective rest-rotation strategy. The main difference is that no livestock numbers would be established through a long-term lease agreement. Numbers would be established annually in response to rangeland health and the assessment and evaluation of the monitoring data, through the Biological Planning process. In addition, the proposed management would exclude more acreage from livestock grazing and would emphasize monitoring both grazed and excluded lands.

##### Summary of Empire-Cienega Grazing Management

1. Formally establish the Biological Planning Team to determine the annual authorized use (which has averaged 1,037 cattle year-long [range of 662-1436]). Licensed use would be based on the number of cattle year-long on the entire allotment at 48 percent BLM public land use;
2. Modify the biological planning process as described above. Expand the process to include wildlife, grazing, and recreation issues. Modify the current interim grazing management plan to incorporate these changes;
3. Modify the current interim grazing management plan to incorporate flexible stocking rates determined annually by an assessment of range conditions and biological monitoring through the biological planning process. Range projects proposed are shown in Tables 2-14B and 2-14C and Figure 6;
4. Modify the current interim grazing management plan to reduce utilization to 35 percent;
5. Modify the current interim grazing plan to establish study exclosures on the 2,319 acres of public lands not allocated to livestock grazing. Monitor these non-grazed lands to determine the effects of grazing and rest on habitats;
6. Continue to implement the following measures to protect populations of Gila topminnow and topminnow habitat from grazing impacts:
  - a. Limit livestock use in riparian areas of Cienega Creek, Mattie Canyon, and Empire Gulch with perennial water to the six crossing lanes and two watering areas listed in Table 2-25 of the RMP. Livestock use may be allowed when the biological planning process determines a need to use livestock grazing as a management tool to meet a riparian or aquatic-related resource objective;
  - b. Rotate use of crossing lanes and move cattle through them within 21 days. Not all lanes are used each year;
  - c. Phase out A&B water gaps. In the interim, the A&B watering areas (0.95 mile) would be used for up to 60 days a year from December 1 to May 1. The Narrows watering area (0.5 miles) is used at various times from December 1 to April 1;
  - d. Inspect and maintain riparian exclosure fences at least once annually just before use of lands next to exclosures;
  - e. Locate all new repressos (earthen stock ponds) to minimize the likelihood of floods or humans moving nonindigenous fish and bullfrogs into topminnow habitat;

- f. Use repressos only when required to water cattle and allow repressos to dry when no longer needed to water cattle. Drain repressos if they do not dry annually. The BLM would be responsible for any required draining of repressos not related to the livestock operation;

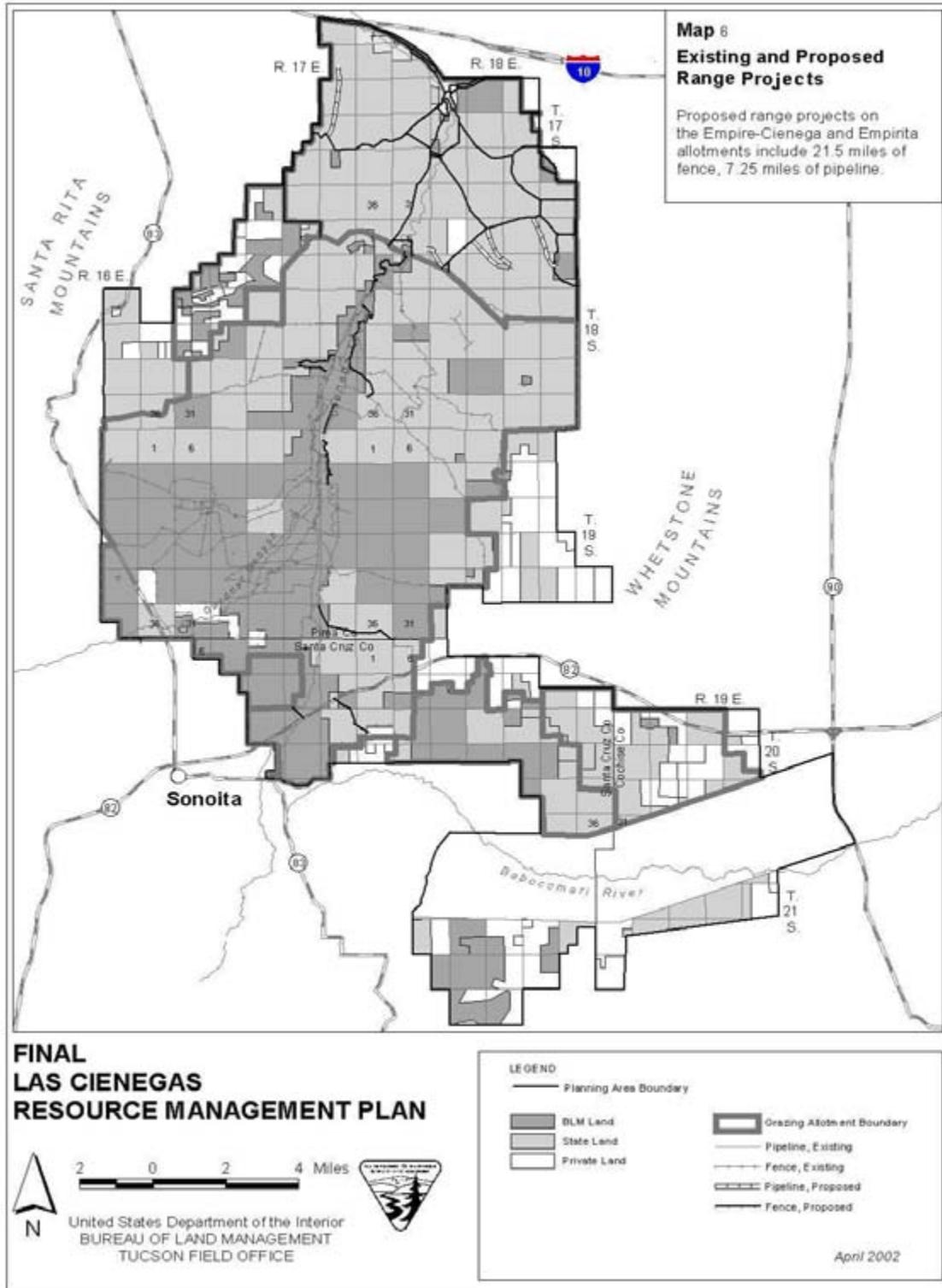


Figure 6. Existing and proposed range projects, Las Cienegas National Conservation Area, Arizona.



Summary of Empirita Grazing Management

1. Change the grazing strategy to a variable stocking rate with a flexible livestock rotation-selective rest-rotation strategy;
2. Formally establish the Biological Planning Team to determine the annual authorized use (that has averaged 80-337 cattle year-long on the entire allotment at 3% public land use);
3. Implement the biological planning process on the Empirita allotment. Allocate livestock forage yearly in response to the health and productivity of the resource, as determined by the Biological Planning Team's evaluation of the monitoring data. This stocking rate would be determined annually by assessing range conditions and biological monitoring through the biological planning process. Flexible rotation is based on current resource conditions and objectives and uses the biological planning process to provide input into seasonal decision making;
4. Modify the grazing management plan to incorporate flexible stocking rates, the biological planning process, and the building of fencing and water developments to develop riparian pastures at the Narrows and around Nogales Spring. The current grazing plan proposes to build and maintain seven range projects to include:
  - \* 1 mile fence
  - \* 7.25 miles pipeline (1 new and 6.25 rebuilt)
  - \* 1 new well with storage
  - \* new storage/trough at old well
  - \* 2 corrals (Map 6)
5. Modify the grazing management plan to reduce utilization to 35% of current year's growth on key perennial grass species;
6. Establish study exclosures on the 520 acres of public lands not allocated to livestock grazing. Monitor these excluded lands to determine the effects of grazing and rest on habitats;
7. Implement the following measures to protect Gila topminnow and topminnow habitat from grazing impacts:
  - a. Limit livestock use in riparian areas of Cienega Creek and Nogales Springs with perennial water to the Narrows crossing lane and watering area (T. 18S, R. 18E, Sect. 3) and areas where BLM, through the biological planning process, determines a need to use livestock grazing as a management tool to meet a riparian or aquatic-related resource objective;
  - b. Rotate use of crossing lanes and move cattle through them within 21 days;

- c. Phase out water gaps in areas where adjacent upland waters are developed;
  - d. Inspect and maintain riparian exclosure fences at least once annually just before use of lands next to the exclosures;
  - e. Locate all new repressos (earthen stock ponds) to minimize the likelihood of floods or humans moving nonindigenous fish and bullfrogs into topminnow habitat;
  - f. Use repressos only when required to water cattle, and allow repressos to dry when no longer needed to water cattle. Drain repressos if they do not dry annually. The BLM would be responsible for any required draining of repressos not related to the livestock operation;
  - g. Monitor the fish community and habitat including crossing lanes, grazed riparian zones, and repressos to document the level of incidental take and to check for introduction of nonindigenous fish and bullfrogs;
  - h. Develop mitigation plans in coordination with the Fish and Wildlife Service for range improvements and vegetation treatments that may harm the topminnow or its habitat.
8. Continue to implement the following measures to protect the southwestern willow flycatcher and its habitat from grazing impacts:
- a. Exclude livestock grazing from occupied or unsurveyed, suitable habitat during the southwestern willow flycatcher breeding season (April 1-September 1) except for crossing lanes;
  - b. Do not authorize livestock management activities, including development of range improvements, in the riparian zone of unsurveyed, suitable or occupied willow flycatcher habitat during the willow flycatcher breeding season;
  - c. Locate any new livestock management facilities likely to attract and support cowbirds more than five miles from occupied, suitable, or potential flycatcher habitat unless such facilities are crucial to protecting riparian habitat, and cowbird trapping is implemented to counteract the effect of the facility.

#### Rose Tree Allotment (#6043) - Proposed Management

##### Summary of RMP-Level Proposal

BLM will allocate 1104 AUMS of livestock grazing forage on 3,550 acres of the 3,950 acres of public lands within the Rose Tree allotment (#6043), and exclude 400 acres (7%) from livestock grazing to study the effects of grazing. The allotment also includes 3,719 acres of State Trust lands and 1,200 acres of private lands, which the livestock operator would continue to use for

grazing. The actual number of AUMs of forage used annually would vary due to the flexible stocking in association with the Biological Planning Process described in the summary of Empire-Cienega Grazing Management below. The exact number of excluded acres may vary depending on the number, size, and location of study exclosures which will be developed to help evaluate the effectiveness of grazing management.

#### Summary of Rose Tree Grazing Management

1. Change the grazing strategy to a variable stocking rate with a flexible livestock rotation-selective rest-rotation strategy;
2. Formally establish a Biological Planning Team to determine the annual authorized use (that has been 27 animal units on a year-long basis on the BLM portion of the allotment only- 100% BLM). Licensed use would be based on the number of cattle year-long on the entire allotment at 5% BLM public land use.
3. If the operator chose, licensed use could also be based on the number of cattle year-long on the entire allotment at 10% BLM public land use. The current stocking rate is 27 CYL on the BLM portion of the allotment (100% public land use). On the entire allotment, the authorized use is about 282 CYL at 10% public land use = 338 AUMs. The other lands include USFS and about 6,000 acres of private lands owned by the estate of Bettie A. Beck.
4. Implement the biological planning process on the Vera Earl allotment as described above. Allocate livestock forage yearly in response to the health and productivity of the resource, as determined by the Biological Planning Team's evaluation of the monitoring data. The team would determine this stocking rate by assessing range conditions and biological monitoring through the biological planning process. The flexible rotation is based on current resource conditions and objectives and uses the biological planning process to provide input into seasonal decision making.
4. Conduct an ecological site inventory to evaluate current vegetation conditions and compare to the upland vegetation objective;
5. Develop a grazing management plan that incorporates flexible stocking rates, the biological planning process, and any other range improvements needed to meet resource objectives;
6. Reduce the utilization limit to 35% of current year's growth on key perennial grass species;
7. Adjust livestock grazing rotation and utilization and develop more fencing as needed to achieve watershed cover required in the upland vegetation objective;
8. Adjust livestock grazing rotation and utilization and develop more fencing as needed to leave enough cover after the summer livestock rotation to meet cover needs for Pronghorn fawning as described in the pronghorn habitat objective and to ensure adequate cover for grassland sparrows as defined in the grassland sparrow subobjective;

9. Establish study exclosures on the 400 acres of public lands not allocated to livestock grazing. Monitor these non-grazed lands to determine the effects of grazing and rest on habitats.

#### Vera Earl Allotment (#6129) - Proposed Management

##### Summary of RMP-Level Proposal

Under Alternative 2 BLM would allocate 324 AUMs of livestock grazing forage on 1,240 acres of the 1,440 acres of public lands on the Vera Earl allotment (#6129) and exclude 200 acres (14%) from livestock grazing. The actual number of AUMs of forage used annually would vary due to the flexible stocking in association with the Biological Planning Process described in the summary of Empire-Cienega Grazing Management below. The exact number of excluded acres may vary depending on the number, size, and location of study exclosures which will be developed to help evaluate the effectiveness of grazing management.

##### Summary of Vera-Earl Grazing Management

1. Change the grazing strategy to a variable stocking rate with a flexible livestock rotation-selective rest-rotation strategy;
2. Implement the biological planning process on the Vera-Earl allotment. Allocate livestock forage yearly in response to the health and productivity of the resource, as determined by the Biological Planning Team's evaluation of the monitoring data. This stocking rate (that has been 27 animal units yearly on the BLM portion of the allotment only-100% BLM). Licensed use would be based on the number of cattle year-long on the entire allotment at 5% BLM public land use;
3. If the operator chose, licensed use could also be based on the number of cattle year-long on the entire allotment at 10% BLM public land use. The current stocking rate is 27 CYL on the BLM portion of the allotment (100% public land use). On the entire allotment the authorized use is about 282 CYL at 10% public land use = 338 AUMs. The other lands include USFS and about 6,000 acres of private lands owned by the estate of Bettie A. Beck;
4. Implement the biological planning process on the Vera Earl allotment as described above. Allocate livestock forage yearly in response to the health and productivity of the resource, as determined by the Biological Planning Team's evaluation of the monitoring data. The team would determine this stocking rate by assessing range conditions and biological monitoring through the biological planning process. The flexible rotation is based on current resource conditions and objectives and uses the biological planning process to provide input into seasonal decision making;
5. Conduct an ecological site inventory to evaluate current vegetation conditions and compare to the upland vegetation objective;

6. Develop a grazing management plan that incorporates flexible stocking rates, the biological planning process, and any other range improvements needed to meet resource objectives;
7. Reduce the utilization limit to 35% of current year's growth on key perennial grass species;
8. Adjust livestock grazing rotation and utilization and develop more fencing as needed to achieve watershed cover required by the upland vegetation objective;
9. Adjust livestock grazing rotation and utilization and develop more fencing as needed to leave enough cover after the summer livestock rotation to meet cover needs for Pronghorn fawning as described in the pronghorn habitat objective and to ensure adequate cover for grassland sparrows as defined in the grassland sparrow subobjective;
10. Establish study exclosures on the 200 acres of public lands not allocated to livestock grazing. Monitor these excluded lands to determine the effects of grazing and rest on habitats.

#### Empire Mountains Allotment - Proposed Management

##### Summary of RMP-Level Proposal

Under Alternative 2 BLM would allocate 360 AUMs of livestock grazing forage on 2,000 acres of the 2,480 acres of public lands in the Empire Mountains and include 480 acres in livestock exclosures. A new grazing allotment would be created. The grazing allotment could also include about 4,000 acres of private lands leased by the grazing operator for grazing.

The actual number of AUMs of forage used annually would vary due to the flexible stocking in association with the Biological Planning Process described in the summary of Empire-Cienega Grazing Management below. The exact number of excluded acres may vary depending on the number, size, and location of study exclosures which will be developed to help evaluate the effectiveness of grazing management. The allotment would not be activated until the prerequisites described in the management actions below are completed. If the allotment is not activated within five years of the date of the Record of Decision on this plan, then the BLM would reassess the situation and consider reallocating the forage to watershed and other uses.

##### Empire Mountains Grazing Management

Before authorization of any active livestock use on the new Empire Mountains allotment, the grazing lessee would be required to submit a proposed Allotment Management Plan developed with full cooperation of the private land owners within the allotment boundary. The plan must include necessary water and pasture development to provide adequate yearly rest for rangeland health. The plan must also include executed leases for grazing use of private lands and easements for fences, waters, and livestock ingress and egress. An economic analysis would be required showing sources and time frames for funding of the necessary infrastructure. An environmental analysis and biological assessment on the plan would also be required including completion of an ecological site inventory. The completed plan would be reviewed by the biological planning team (or Rangeland Resource Team), other interested public, and approved by the Bureau. The following steps must be completed before the allotment can be activated:

1. Conduct an ecological site inventory to evaluate current vegetation conditions to compare to the upland vegetation objective and to help establish an initial stocking rate;
2. Develop a community-based grazing management plan that incorporates flexible stocking rates and rotation, the biological planning process, and any range improvements needed to meet resource objectives and manage livestock;
3. Secure necessary executed leases for grazing use of private lands and easements for fences, waters, and livestock ingress and egress;
4. Complete necessary economic, environmental analysis and biological assessment;
5. Build any needed range projects including water and pasture development and complete the plan with community approval before stocking any livestock on allotment;
6. Establish a Biological Planning Team and a formal process through this team to determine annual authorized use;
7. Establish a utilization limit of 35% of current year's growth on key perennial grass species as described in the Alternative 2 summary above;
8. Establish study exclosures on the 400 acres of public land not allocated to livestock grazing. Monitor these excluded lands to determine the effects of grazing and rest on habitats.

## **Recreation Management**

### Non-Motorized Trails

BLM proposes to designate a non-motorized loop trail in North and Oak Tree Canyons. The trail begins and ends at the Air Strip day use area. The proposed trail route crosses about three miles of public land and also crosses several miles of State Trust and Forest Service lands. The route for the return segment of the trail (~ 1.5 miles) will be coordinated with the route for the Oak Tree Canyon portion of the Arizona Trail so as to not duplicate trails in this area. For the trail to be implemented, a right-of-way must be obtained from the Arizona State Land Department and approval for the trail location and development on Forest Service lands would also need to be obtained.

### Management within Recreation Zones

Table 2-26 summarizes the management prescriptions for each recreation zone (Map 2-7). In addition to these prescriptions, BLM proposes a step-down approach to managing visitor use impacts.

The first step is to increase visitor awareness. This approach may be enough to reverse downward trends in resource conditions. If education is unsuccessful, BLM might apply more heavy-handed approaches to reverse downward trends. Such approaches might include restrictions and regulations. BLM could also use partnerships to help with monitoring and rehabilitation.

#### Management of Designated Recreation Sites

BLM proposes to establish three designated group sites (Maternity Well, Air Strip, and Agricultural Fields), four designated camp areas (Oak Tree, Cieneguita, Oil Well, and Road Canyon), and not more than 11 pullouts (Map 2-28).

The capacity for the group sites are as follows:

*Maternity Well:* 150 people or 30 vehicles with horse trailers or recreational vehicles;

*Air Strip:* 500 people (combination of day use and group use areas). The vehicle capacity in the day use/trailhead area is 30 vehicles;

*Agricultural Fields:* 500 people.

BLM proposes to move the parking area at the Maternity Well group site, south of the existing corral to reduce visual impacts from the entrance road. BLM would also delineate a parking area with barriers of natural materials and, if needed, may harden the parking area with gravel or similar materials. If necessary, BLM might install a gate on this road to control access to the site. In addition, the water source might be moved so that camping in this area does not affect livestock or wildlife access to water. The Maternity Well group site would be open from October to April.

The Air Strip site would consist of a group site and trailhead. About 75% of the site would be open for group use on a reservation basis but would not be open to individual use. About 33% of this group site would consist of an overflow area for larger group events. BLM would reclaim and re-vegetate the site as needed to minimize bare ground, reduce visual impacts, and create more desirable camping opportunities.

The remaining 25% of the site would be a day use area and trailhead and parking area for the Arizona Trail. Trail users could park overnight in this area, and other visitors could use the area in the day. BLM would delineate the day use and trailhead parking area with barriers made of natural materials. The parking area could be hardened with gravel or similar material if necessary. The Air Strip group site would be open year-round with periodic closures to allow the area to recover from impacts determined by monitoring.

The northeast corner of the Agricultural Fields would be designated as a group site and would have no development except for water at the Field Well. This site is specified for group events lasting no longer than one week. The Agricultural Fields would be open seasonally and could be closed, and numbers of users or length of events restricted due to environmental restoration.

### Designated Road Crossings

The proposed route designations (Map 2-6) allow five motorized routes open to public travel that cross Cienega Creek and Empire Gulch (Table 2-19A).

### Designated Creek Crossings

In addition to the motorized crossings, groups under a special recreation permit may only cross Cienega Creek at designated crossings. For mechanized vehicles (bikes), the options would be the designated road crossings (above), the Arizona Trail crossing at the Ag fields, and other non-motorized trails crossing Cienega Creek (above the Falls and Gardner crossing area). For special recreation permit equestrian use, crossings could be made at designated road crossings, the Arizona Trail crossing, other non-motorized crossings, or livestock lanes (since horseback use is not restricted to roads). Hiking groups under a special recreation permit would use the same crossings as equestrian groups. The use of any specific crossing may be restricted by the BLM if conditions warrant such a restriction and would be a condition of any permit.

### Designated Group Sites

Group sites are open for group use only, by reservation, and under a special recreation permit (groups are defined as more than 29 people). Group sites will not be open to use by individuals if not reserved by a group. BLM will determine the capacity of a group site and length of a single event at such a site, depending on the type of activity and resource concerns. Special stipulations will be attached to group activities at these sites through the special recreation permit process. BLM may seasonally or temporarily close group sites in response to resource conditions or other concerns. Any improvements or developments at the sites must conform to the overall management prescription for the zone in which the site occurs. Permit holders may bring in portable improvements but must remove these at the close of the event. BLM will monitor impacts from group sites to determine if it needs to adjust the site management.

### Designated Camp Areas

The designated camping areas would all have similar management prescriptions. These areas would be open for individual but not group use. The capacity of each camping area is expected to be less than 30 people. The number of vehicles allowed at each site within the camping area would vary, depending on the site. Some sites would be limited to one vehicle. Other sites would be suitable for up to five vehicles. BLM would restrict activity to camping and limit proposed development in each camping area to posting site numbers, erecting barriers of natural materials, if needed, and placing signs, which would be kept to a minimum. BLM proposes no other development and may seasonally close any of these sites in response to resource conditions. The Road Canyon site would be closed during pronghorn fawning season (April-June).

The Oak Tree designated camping area has a few special stipulations. Proposed development would consist of creating designated camping sites and parking spots that would prevent parking under oak trees. To deter campers from building fires under the oaks, BLM would establish fire rings away from the trees and erect vehicle barriers. BLM would also post educational signs to inform visitors about oak tree ecology and how parked cars and campfires harm the oaks.

### Pullouts

Pullouts will consist of widened areas along roadways. They will be marked, if necessary, with signing and barriers of natural materials. The pullouts will be designed for vehicles to turn around in or for three to five vehicles to park in. Camping will not be permitted at pullouts.

### Monitoring

In Fall 2001, BLM contracted with the University of Arizona to inventory for and establish a visitor use and impacts monitoring program for Las Cienegas NCA. This work will be carried out in phases the next three years (described below), and will be integrated with the implementation of the RMP.

*Phase I – Assessing Visitor Impact Conditions.* This assessment will consist of mapping all existing visitor impact areas (campsite locations, drainage areas, existing gates, fences, trailheads, etc.). In addition, all visitor impact areas will be inventoried using a modified version of the Cole Campsite inventory methodology. This methodology evaluates each of the impact areas, examining vegetation cover, firewood availability, vegetation density, composition, total area impacted, barren core area, litter and duff, social trails, and mutilations. The data collected for each of the locations will be used to derive an impact condition ranking as well as to determine viable, quantitatively evaluated ecological indicators that can be used to establish a long term monitoring program.

*Phase II – Visitor Use/Social Inventory & Monitoring.* This inventory and monitoring phase will be done to capture baseline information on both spatial and temporal patterns of dispersed visitation. In addition, monitoring will be established to capture current patterns of recreational vehicular use in the NCA. The inventory process will involve undertaking a stratified sample of known trail head and entrance locations. Both overnight and day use activities will be assessed. At all major trail heads and entrances a self-administered, automated card/diary system will be established to capture the spatial and temporal patterns of use in those areas. Trail counters will be used to quantify volume of use, anticipating that not all those visiting the area will take the time to use the diary. Day use cards will also be used at these locations to capture similar information from those only intending on spending the day in the conservation area.

*Phase III – Using Simulation to test alternative Management plans and Derive Capacity Measures.* This phase of the project will construct a simulation system using data collected during the first two phases to simulate and evaluate management alternatives considered in the conservation area's management plan. The simulation system will allow managers to identify issues such as points of overcrowding, bottlenecks in circulation, parking capacity at trail heads, conflicts between different user groups and associated environmental impacts, distribution of use with proposed road closures, and impacts of proposed commercial or new visitor activities before committing resources to expensive construction projects. More importantly, the simulation system will give managers the capability to explore visitor capacities and their associated impacts. This phase will assist in determining how much and where increased use will be expected, and aid in establishing a monitoring plan for both visitor use and associated impacts.

**ENVIRONMENTAL BASELINE - OVERVIEW**

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 that are contemporaneous with the consultation process. The environmental baseline defines the 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. This section discusses the baseline of the NCA.

Southeastern Arizona has been influenced by Europeans and their descendants for centuries and by Native Americans for much longer (Bahre 1991). The effects of this use, though not always obvious, has been pervasive and widespread. These changes can be seen on the Las Cienegas NCA. Cattle grazing has occurred in southern Arizona since the 1600's (Allen 1989). In the 1880's, there were 6,000 cattle and 23,000 sheep grazed on the Empire and Cienega Ranches (Wagoner 1960).

**Description of the Area**

In 1988, BLM acquired 45,000 acres (20,400 ha) within the Empire, Cienega, and Rosetree ranches in northeast Santa Cruz County and southeast Pima County, Arizona. Later exchanges brought in 4,000 more acres (1800 ha). These lands, which became the Empire-Cienega Resource Conservation Area (RCA), have extremely high social, cultural, and resource values. These values include healthy watersheds, extensive native grasslands, intact riparian systems, endangered and special status species habitats, prehistoric and historic cultural resources, and varied dispersed recreation opportunities.

Since acquisition of the Empire-Cienega RCA, several special designations have been made or proposed for the area because of its significant resources:

- The historic Empire ranch headquarters has been proposed for listing on the National Register of Historic Places (the Empire Ranch House is already listed);
- Two segments of Cienega Creek have been proposed to Congress for designation as scenic river segments in the Wild and Scenic Rivers System;
- The American Bird Conservancy has designated the RCA as a globally important bird area;
- The Appleton-Whittell Area of Critical Environmental Concern (ACEC), designated in the Phoenix Resource Management Plan, has been enlarged and set aside for research.

Most of the public lands in the RCA (nearly 42,000 acres) have been designated as the Las Cienegas National Conservation Area. The remainder have been included within the Sonoita Valley Acquisition Planning District (Map 1-1).

A thorough discussion of the setting, planning area, physical resources and processes, and the biological resources and processes can be found in the Draft Las Cienegas Resource Management Plan and Environmental Impact Statement, which is incorporated here by reference (BLM 2001).

## **EFFECTS OF THE ACTION - OVERVIEW**

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 that are contemporaneous with the consultation process. The environmental baseline defines the 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. This section discusses the baseline of the Forest and the general area containing the 20 allotments.

The RMP expects to meet the desired resource conditions it identified (refer to proposed action section of this BO). However, the RMP also allows other activities which could have deleterious effects on listed species and their habitats. If the desired future conditions are met and the goal of the Sonoita Valley Planning Partnership is met, impacts to listed species and habitat will tend to small and transient. The actual key to minimizing effects to listed species will be the full and timely implementation of the RMP., and especially mitigating actions when management actions are preventing a resource objective from being met. The management actions proposed under the RMP fall into the following categories: vegetation and watershed, fish and wildlife, cultural resources, access and transportation, recreation, mineral resources, livestock grazing, and recreation. There will always be project specific impacts that cannot be fully minimized or mitigated. In addition, there is still the potential for impacts to occur during the 20-year life of the plan. The following sections discuss the general effects of actions proposed under the previous categories on listed species and their habitats.

### **Vegetation and Watershed Management Actions**

As long as the resource objectives for desired plant community, desired ground cover, wildlife habitat sub-objectives, and the riparian vegetation and aquatic habitat objectives are met, effects to listed species and their habitat will be minimized. To meet the desired resource conditions and objectives, the BLM proposes to implement an integrated vegetation treatment program which would use prescribed fire, wood cutting, and herbicides.

Upland vegetation management and site restoration would enhance riparian development and channel stability by reducing the prevalence of shrubs and nonindigenous species. Such management should also increase watershed cover by promoting increased perennial grasses. These treatments will improve watershed conditions, reduce sedimentation, and reduce the frequency of peak flood flows. Effects could also include increased ground water recharge which feeds springs.

**Prescribed Fire**

Reestablishment of fire is an option for restoring natural fire regimes that, in the long term, will enhance ecosystem stability and resilience. However, the benefits of reestablishing fire must be weighed against the chance of prescribed fire escaping or burning out of prescription, and possibly impacting the grasslands that prescribed fire may protect (Zwolinski 1996). Prescribed fire is meant to have fewer detrimental effects than wildfire. The BLM proposes to use small burn unit size and sequencing of burn plots over individual subbasins to minimize effects from prescribed burns. In addition, there are published prescriptions on when prescribed burns may be done that BLM is required to follow.

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**Water Effects**

Water quality variables such as pH, turbidity, and dissolved oxygen are altered by wildfire impacts and the severity of effects depends on the severity of the fire. After the catastrophic 1990 Dude fire, subsequent flooding was found to dramatically affect water quality, macroinvertebrates, and fish populations (Rinne and Medina 1992). The most important post-wildfire effects involve sediment movement, and the most important toxicity concern is increased pulses of nitrates. Nutrients contributed from fires are phosphoric in nature (from ash) and nitrogen and ammonia (from smoke). Ammonia is toxic to fish. The absorption of smoke and nitrogen into the water depends on how long the smoke lingers near the water. In addition, incomplete combustion of materials creates charcoal. Charcoal in water leads to de-oxygenation. Minshall et al. (1989) found small temperature changes in shallow ponds and small streams located in severe wildfire areas within coniferous systems (including the Yellowstone fires). They concluded the impact of fire on streams varies proportionally with the intensity and extent of fire behavior including spread within a given watershed and the vegetation and fuel type being consumed.

While less severe than wildfire, prescribed fire can lead to results of increased sediment yield in streams and creeks, increased flood intensity, and water chemistry changes. Loss of vegetation to prescribed fire (or other causes) and other impacts (erosion, slumping) is generally expected to lead to increased water runoff and increased sediment yield, especially during the first two years before vegetation recovers or ground litter accumulates on soils (Minshall et al. 1989, Pase and Granfelt 1977). Pase and Granfelt (1977) noted early establishment of grass cover and conservative management practices improved soil stability. Increased water runoff and increased sediment yield lead to changes in water chemistry (Spencer and Hauer 1991, Tiedmann et al. 1979) that can have negative impacts to native fishes. Dan Robinett (NRCS, pers. comm., 1996) has recommended resting burned sites above 4,000 feet in elevation (1,212m) from grazing for two years to aid in vegetation recovery.

Fire fighting foams are toxic to rainbow trout (*Oncorhynchus mykiss*) (Giakowski and Hamilton 1994). However, the concentrations ( $\leq 1\%$ ) that are used in firefighting are nontoxic. The only practical way for foam to be transported would be for precipitation of a great enough quantity to occur shortly after the burn or for intentional delivery of the foam to a water source.

There is information in the literature concerning the effects of fire on water. However, most of it considers the effects of wildfires on streams in coniferous forests. There is virtually nothing in the literature on the direct effects of prescribed burns on the water quality or fish of lentic waters (Spencer and Hauer 1991).

Since the information regarding the effects of fire on water is scanty, we contacted individuals that might have knowledge of the effects in question. Steve Bouffard (USFWS Idaho, pers. comm., February 1995), has studied burning bulrush in a marsh complex for his Master's Thesis. Prescribed burning conducted on small plots within the marsh led to increases in phosphorous and nitrogen when compared to control plots. But the nutrient levels returned to normal levels within 36 hours of the burn. Bouffard attributed the increased nitrogen and phosphorous to deposition of ash. He measured an increase in dissolved oxygen, which he attributed to a reduction of the overstory and a subsequent increase in periphyton.

Al Medina (USFS Rocky Mountain Forest & Range Experiment Station, pers. comm., February 1995), has investigated the effects of a wildfire and a prescribed burn on aquatic habitats in Arizona. After a wildfire, immediate sampling of fish and macroinvertebrates indicated no marked change in their populations (Rinne and Medina 1992). Subsequent flooding dramatically affected water quality, macroinvertebrates, and fish populations. Fish stocked after the floods grew more rapidly than normal. The most important post fire effects involve sediments, and the most important toxicity consideration is nitrites.

The BLM will implement prescribed fire to minimize and mitigate direct and indirect impacts (e.g., harm, mortality, changes in water quality, changes in streamside vegetation cover, etc.), that are expected to be short-term. This will aid in creating and maintaining vegetation communities in a mosaic across the landscape. This vegetation pattern is more resistant and resilient to wildfire impacts. The influx of sediments from burned areas is not expected to reach levels that alter aquatic habitat composition and characteristics except when close to the tributary carrying the sediment.

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#### Uplands

The main impact of prescribed burning to an ecosystem is to the vegetative communities. The possible impacts include loss of vegetation, effects on soil and nutrients, and changes in plant species composition. The negative impacts of prescribed fires are usually lesser and the positive impacts greater when compared to wildfires (Pase and Granfelt 1977). Prescribed fire is most productive for wildlife when fine-scale mosaics are created (Bock and Bock 1990). Bock and Bock believe that scattered trees and shrubs enhance an area's wildlife values.

Prescribed fires can also lead to increased sediment yield, increased flood intensity, and water chemistry changes. Loss of vegetation to fires and other impacts is expected to lead to increased water runoff and increased sediment yield (Pase and Granfelt 1977, Minshall et al. 1989). Sediment yields after prescribed and wild fires drop rapidly over time and are near preburn yields

in 3 to 5 years (Pase and Lindenmuth 1971). Pase and Granfelt (1977) state that early establishment of grass cover and conservative management assures soil stability and low sediment yields on even moderate slopes. Both increased water runoff and increased sediment yield can lead to changes in water chemistry. In addition, burning can directly effect temperature and nutrient balances in water (Tiedemann et al. 1979, Spencer and Hauer 1991, Dr. Wayne Minshall, Idaho State University, pers. comm., February 1995). Regardless, incised streams like Cienega Creek, need some sediment to aggrade the channel, and increased sediment on a short-term basis may enhance habitat in the long-term.

Shrubs such as burroweed, catclaw, and creosote suffer high mortality from fires (Thornber 1907, Bock and Bock 1990). Many semidesert grasses recover 1 to 3 years after a fire, and may even be stimulated by fire (Wright 1980, Bock and Bock 1987, Bock and Bock 1992). Only smaller mesquite tend to be killed by fire (Pase and Granfelt 1977, Wright 1980). The native grasses may be fire adapted (Wright 1980, Bock and Bock 1992). Spring and fall burning of sacaton may have long-term negative effects (Cox and Morton 1986). However, Bock and Bock (1990) found that sacaton stands which are undisturbed after a fire seem to recover in 2 to 3 years.

Certainly historic woodcutting has impacted southeastern Arizona. Whole streams and mountain ranges were cleared of trees (Bahre 1991). What the BLM proposes is vastly different however. BLM only proposes to cut mesquite in the vegetation treatment areas. Minimization measures such as no off-road driving and avoidance of agaves will minimize impacts to listed species. Herbicides are proposed to be used in combination with mesquite cutting, to ensure mesquite are killed. Following standard procedure for herbicide application will result in no adverse effects to listed species.

#### Species Reestablishment

The difficulties of predicting the behavior of a social and mobile species like beaver make it difficult to precisely determine the effects of beaver. Reestablishing beaver would affect channel geometry and riparian expression resulting in enhanced aquatic habitat diversity through increased velocity and depth diversity, especially in dammed back waters.

In the middle Gila River, at Bill Williams National Wildlife Refuge, and in Cajon Bonito (Sonora), beaver were not observed to negatively impact cottonwood and willow trees (USFWS 1998). Behind each of the herbaceous dams (sedge and cattails were the primary building materials) thousands of willow and cottonwood seedlings were becoming established. In addition, it appeared in these areas that beaver were primarily eating herbaceous vegetation and there was little sign of felled trees of any size.

#### **Fish and Wildlife Management Actions**

Actions proposed to enhance native fish and wildlife should be beneficial to listed species over the life of the RMP. Certain specific actions may have short-term, negative effects on listed species. As part of BLM's proposed monitoring program, they will monitor indicators of ecosystem processes. Incidental to this monitoring program will be the monitoring of listed

species. Therefore, the effects of monitoring listed species will be considered here, and not under an ESA section 10 permit.

Instream flow rights would be pursued to maintain the existing aquatic and riparian habitat that support this species. Instream flow rights would certainly be beneficial to riparian and aquatic species; however, instream flow rights really only exist if you are willing to protect them legally (Jeff Simms, BLM, pers. comm., 2002).

Other actions proposed by the BLM under Fish and Wildlife Management Actions include species reestablishment, translocation, and augmentation, and nonindigenous species control. The RMP would allow the reestablishment, translocation, and augmentation of 10 fish and wildlife species. There will certainly be direct effects to listed species when they are released. Indirect effects may occur when a species is released, which may interact with other species, or cause habitat changes, such as the beaver. Impacts will be reasonably certain to occur if a species not present now were to be released, and thus will be analyzed here.

The BLM proposes to control nonindigenous species, and other problem species, that already occur in the management area, or that may occur during the life of the RMP. The species could be plants or animals. For example, nonnative bullfrogs and exotic Lehmann's lovegrass already occur. Certain native species, such as cowbirds and noxious weeds, may also present a management problem. Control of plant species in the upland will have little effect on riparian and aquatic species, as long as enough cover remains in the treated area. Effects to species will be minimized by minimizing loss of agave and yucca. Control or removal of nonindigenous plants in aquatic areas may have impacts to listed species. Control efforts there will require access to habitat occupied by listed species, which may lead to direct and indirect effects.

Control of nonindigenous animals in aquatic areas is far more problematic than control of vegetation or control in uplands areas. Control of nonindigenous animals requires direct actions in areas that will often be occupied simultaneously by listed species. Also, control requires human activity, structures, chemicals, or any combination of the three. Activity may include netting or shooting of nonindigenous species and capturing and removing resident native species. Structures could potentially include frog-proof fences, traps, and certain barriers. The removal of nonindigenous fish almost always requires the use of piscicides designed and approved for such use.

Control actions may require several phases: potential removal and holding of listed species, removal of nonindigenous or problem species, and the repatriation of listed species. All three phases are likely to cause direct and indirect effects to listed species. These actions will be necessary if a nonindigenous or other problem species negatively affects listed species. Even though there are short-term, injurious effects to listed species, maintaining an intact ecosystem, free from harmful nonindigenous or noxious species, more than offsets the short-term effects. All control of wildlife will be coordinated with the AGFD.

### **Cultural Resources Management Actions**

Most actions taken for cultural resource management will have no effect on listed species or their habitat. The RMP allows selected sites to be developed for interpretation and public visitation. BLM would implement this action only if funds and staff are available to adequately develop an interpretive program that would not harm the resources. There could be effects from site development and use to listed species if cultural sites are developed. The restoration of historical buildings and developing other cultural sites may increase NCA visitation. The education that will be associated with developing these sites should contribute to increased public support for native wildlife. Education programs will also increase awareness about the impacts of human use and how it can be reduced, and the management issues facing listed species and the ecosystems upon which they depend.

### **Access and Transportation Management Actions**

The BLM proposes using and maintaining a road and trail system in the area. Use and maintenance of roads and trails has the potential to create long-term, chronic effects, mainly from excess sedimentation. Roads, due to their greater width and uses, obviously have the potential to have greater impacts than trails. Sedimentation impacts were discussed in the fire section above.

Maintaining a road and trail system allows visitor access to the area. Visitor access is a concern because visitors are the likely way that nonindigenous species will be released in the area. This is especially true of aquatic species. Aquatic species are less mobile than terrestrial species, and are more likely to have serious negative effects since most of the listed species are associated with aquatic and riparian habitat. The listed aquatic species are also known to be very sensitive to certain nonindigenous species. For example, leopard frogs and garter snakes (*Thamnophis* spp.), can be extirpated by bullfrogs. The draft Santa Cruz Central Arizona Project BO (USFWS 1999a) and background document (USFWS 1998b) and the final Gila Central Arizona Project BO (a 2001) and background document (USFWS 2001b) give good reviews of the dispersal mechanisms of mostly aquatic nonindigenous species, the possible nonindigenous species, and their potential effects on listed species.

Introduction and spread of nonnative species are among the most serious and rapidly growing environmental problems today (Elton 1958, MacDonald et al. 1986, Coblenz 1990, Rosenfeld and Mann 1992, McKnight 1993, Simberloff et al. 1997, Claudi and Leach 2000). Species of concern are not just vertebrate nonindigenous species. The Gila topminnow and Chiricahua leopard frog would be the most affected by aquatic nonindigenous species released in the project area, as they could potentially be extirpated.

The "bait-bucket" transfer of nonindigenous species is expected to increase as the human population of southern Arizona increases and as nonindigenous species become more available to the public through increased aquaculture, increased aquarium trade, and increased distribution through mechanisms such as the Central Arizona Project.

Restricting vehicle access to Cienega Creek would decrease erosion caused by illegal off-highway vehicle traffic along the creek and legal crossing of the creek. Designation,

identification, and maintenance of roads could result in increased visitor use at riparian areas where access remains.

BLM proposes to keep 91.9 miles of road open for motorized travel by the public; 0.4 miles of new road to bypass the Empire Ranch headquarters; 0.7 mile open for motorized travel by the public seasonally; 28.7 miles would be for administrative use only; 6.6 miles would be converted to non-motorized trail; and 13.7 miles of road would be closed and rehabilitated. In addition to the above miles of roads and trails, the designated transportation system will also include the 11.6 miles of non-motorized Arizona Trail. The Arizona Trail will require 9.3 miles of new trail across public lands. Trails also allow the public access to sensitive resources and creates potential avenues for release, either intentionally or unintentionally, of nonindigenous species.

The road pullouts create not only a convenient stopping place for legal activities, but also for illegal ones like the intentional release of nonindigenous species. Pullouts make use of the area more convenient for visitors.

### **Recreation Management Actions**

Recreation was once considered a non-consumptive use in regard to its effects on wildlife and ecosystems, but that is no longer true (Knight and Cole 1995). Recreationists use roads and trails, picnic and camp grounds, group-use sites, road pullouts, and educational and interpretive facilities. There are certainly direct impacts to an area associated with the construction, maintenance, and use of these sites. Other impacts include trampling of vegetation and soil, litter, dogs, fires, direct impacts to listed species, human refuse, vandalism, and disturbance of wildlife. While many of these are illegal, they are reasonably certain to occur during the proposed action, and BLM does have some enforcement authority and an enforcement presence in the area.

Increased public use of the area also increases the chance that nonindigenous species will be released, either intentionally or unintentionally. The area is becoming increasingly popular as a recreation area, and will only continue to do so with the recognition it receives and its designation as a NCA. The 20-year life span of the RMP and the proposed action virtually insures that activities associated with recreational use of the area will introduce at least one nonindigenous species. However, several factors are involved in the establishment of a nonindigenous species:

enough individuals need to be brought in (all at once or multiple introductions) to establish a reproductive population;

the species needs to be a biological problem. For example, a small population of nonindigenous species X may become established and reproduce in a small area, but if it doesn't negatively affect ecosystem functioning or displace or compete with native species, it is less of a biological and management concern;

altered ecosystems and degraded habitats are a well-recognized factor in establishment of nonindigenous species (Courtenay and Stauffer 1984, Arthington et al. 1990, Soule 1990, Aquatic Nuisance Species Task Force 1994).

The permit system, interpretive program, and maintenance proposed by BLM, will help to reduce the impacts associated with recreation on natural resources and listed species.

### **Mineral Resources Management Actions**

Since the only allowed uses of mineral materials will be for administrative use, rockhounding, and scientific collection, impacts from mineral resource activities should be minimal and localized. Most of the area will be closed to locatable and leasable mineral exploration and extraction as will any acquired lands. There are 458 acres open in the Empire Mountains, but BLM proposes to withdraw them from mineral entry. Any proposals in the Empire Mountains would likely need additional section 7 consultation.

### **Livestock Grazing Management Actions**

The effects of livestock management on the landscape are related to numerous factors (Holechek et al. 1998). Environmental parameters such as precipitation, temperature regimes, vegetation types, and growing season provide the basics upon which a grazing program is developed (Schmutz 1977). Abiotic factors include soils, climate, geography, and topography. Stocking rates, season of use, utilization levels, class of livestock, and rotation patterns comprise livestock management choices.

Reviews of grazing literature for southwestern habitats support the need to limit levels of utilization (Martin 1973, 1975; Holechek et al. 1998; Holechek et al. 1999). Martin and Cable (1974), working on the Santa Rita Experimental Range in southern Arizona, found that perennial grass vigor declined when average utilization for a ten-year period exceeded 40 percent. Jerry Holechek and his colleagues have published several important papers, and a revision of Holechek et al.'s grazing textbook was published in 1998 (Holechek et al.). Among the important findings in these papers and the revised textbook are that Chihuahuan desert scrub and semi-desert grasslands can sustain about 40 percent use of annual herbage production. Use in drought years may approach 55 to 60 percent, while use in wet years may be 20 to 25 percent. However, routine stocking rates should be conservative, resulting in an average of 30 to 35 percent use with some destocking in drought years (Holechek et al. 1999). Holechek et al. (1998) found that the following average utilization rates are appropriate for maintaining range condition: 25 to 35 percent (desert scrub), and 30 to 40 percent (semi-desert grassland, pinyon-juniper woodland, mountain shrubland, oak woodland, and coniferous forest). Within these ranges, several factors determine whether a low, medium, or high value should be selected. Holechek et al. (1998) suggest that, on ranges in good condition with relatively flat terrain and good water distribution, the higher utilization limit may be appropriate. If the range is in poor or fair condition, or the allotment has thin soils, rough topography, and poor water distribution, the lower utilization rate may be appropriate. Galt et al. (2000) hold the opinion that a 25 percent harvest coefficient is a sound idea for most western rangelands. Because of better ecological

condition and forage production, cattle productivity is substantially higher in conservatively stocked pastures than in more intensely grazed scenarios. Holecheck et al. (2000) found that short-duration grazing, if stocking rates are conservative or moderate, can facilitate improved management of livestock, and it gives ranchers more control over how specific parts of the ranch are grazed as compared to continuous grazing. However, short-duration, high-intensity grazing, as promoted by Allan Savory (1988) and others, has generally failed in the Southwest.

### **SCOPE OF THE CONSULTATION**

This consultation covers the effects of the proposed Las Cienegas National Conservation Area Resource Management Plan. The RMP and consultation cover the 20 years that the RMP will be in place. As many proposed actions as possible are covered to the activity plan level, thereby lessening the need for future section 7 consultation. Many other actions were covered programmatically where possible, and as long as future actions occur within the guidelines additional section 7 consultation may not be needed. The Bureau of Land Management has an obligation under section 7(a)(2) of the Act and 50 CFR 402.14(a) to review all of its actions to decide if they may affect a listed species or critical habitat. If the BLM determines an action may affect a listed species or designated critical habitat, they must consult with the Service if the effects of the action have not undergone consultation or been considered here.

Because there have been several section 7 consultations completed on actions in the area, and the RMP includes all actions proposed to be taken over the next 20 years, the previous consultations are incorporated here by reference. In addition, all reasonable and prudent measures and terms and conditions still outstanding are incorporated here by reference. Any reporting requirements in the earlier consultations are superseded by this biological opinion. Only one report for all activities covered under section 7 will be required for the BLM Tucson Field Office.

### **CUMULATIVE EFFECTS**

Since the cumulative effects of the action are held in common by all species discussed below, the cumulative effects of the proposed action will be discussed here. Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation following section 7 of the Act.

Growth in the Sonoita and Elgin area has not been as rapid as the growth in nearby communities, but the area is still expected to grow over the next 20 years. Water for domestic and agricultural use is limited in the basin, and these uses rely on groundwater supplied by the Cienega Creek aquifer (Bota 1996). Area growth will place increasing demands on the aquifer. Both Sonoita and Elgin overlie the Cienega Creek aquifer. The upper end of the basin, however, appears to grade into the Babocomari drainage to the east. The groundwater supply for the Sonoita-Elgin area is estimated to be 1.2 million acre-feet (Naeser and St. John 1996). Recharge is almost entirely from mountain front sources and accounts for roughly 6 to 7 percent of annual precipitation.

Naeser and St. John (1996) estimated the safe yield for the Sonoita area and the Upper Cienega Creek basin (excluding the Babocomari portion of the basin in which Elgin is located) to be

3,980 acre-feet per year. Since 2,663 acre-feet are already being used each year, only 1,317 acre-feet per year of use remain within safe yield. Therefore, the safe yield population density may be calculated at 2,767 people if each person consumes 151 gallons a day.

Current zoning in the Sonoita area of one residence for every 4.13 acres would result in a population of about 8,200 if area is fully built out at current zoning. The resulting water consumption would be 8,092 acre-feet/year, well above the safe yield (Naeser and St. John 1996).

The upper Cienega Creek watershed has been estimated to provide 10% (6,200 acre-feet) of the recharge to the Tucson Active Management Area (AMA). In addition, the maintenance of this undeveloped watershed in good condition protects Tucson from floods that might surpass the city's flood control channel design. If the basin were fully developed, flood peaks could increase by an estimated 25-50% (Knight 1996).

Continued inhabitation and new development in the area will continue and increase impacts in the NCA associated with human visitation. In addition, many people that use the area come from the Tucson metropolitan area, and Tucson also continues to grow. Recreation is certain to increase with increasing population in the areas nearby. As more people live and recreate in the area, opportunities will increase for nonindigenous aquatic species to enter the basin. Illegal releases of nonindigenous organisms will continue and increase (Aquatic Nuisance Species Task Force 1994, Rosen et al. 1995) as will demand for stocking of nonindigenous sport fish by the AGFD. Use of nonindigenous organisms as pets will probably also increase, as will the illegal release of those organisms (Moore et al. 1976, Shelton and Smitherman 1984, Welcomme 1988).

### **APLOMADO FALCON (*Falco femoralis septentrionalis*)**

#### **Status of the Species**

The northern aplomado falcon was listed as endangered in 1986 (USFWS 1986a). The threats to the northern aplomado falcon are habitat degradation due to brush encroachment fostered by overgrazing and fire suppression; overcollecting; and reproductive failure caused by organochlorine pesticide use, namely DDT.

Adults are characterized by rufous (rust) underparts, a gray back, a long banded tail, and a distinctive black and white facial pattern. Juveniles differ from adults in three respects: (1) the color of the upper breast and face is deep cinnamon; (2) dark, broad streaks obscure most of the breast; and (3) fleshy parts are bluish, not yellow. Aplomado falcons are smaller than peregrine falcons and larger than kestrels. Other birds compose the bulk of their food, with insects, small snakes, lizards, and rodents also being taken. Pairs of aplomado falcons are often seen hunting cooperatively, especially when hunting birds. Eggs are laid between March and June with both parents incubating eggs. The fledgling period is 4 to 5 weeks, with fledglings remaining in their natal areas for at least a month.

Typical habitat is open grasslands with scattered trees, relatively low ground cover, an abundance of small to medium-sized birds, and a supply of suitable nesting platforms, particularly yuccas and mesquite. Typical habitat ranges in elevation from 3,500 to 9,000 ft (1,189 to 2,743 m). Woody vegetation, fence posts, and telephone poles serve as perches.

The historic range in the U.S. was limited to southeastern Arizona (Cochise and Santa Cruz Counties, Arizona), southern New Mexico, and southern Texas. The aplomado was also found throughout most of Mexico south to Tierra del Fuego. The current distribution is very limited, with no confirmed sightings in the U.S. between 1952 and 1997. In 1887, five nests were located in Arizona; these are the only known nests ever found in the state. A small population has been confirmed in northern Chihuahua and Tamaulipas Mexico, and several confirmed sightings have been made in the U.S. in New Mexico since 1995. An active recovery program has been taking place in Texas, with more than 600 falcons being released. There were at least 33 nests in the wild in 2001 (Peregrine Fund 2002).

### **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.

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

According to the Aplomado Falcon Recovery Plan (USFWS 1990b), habitat alteration was the primary reason the aplomado falcon was extirpated from Arizona. High levels of livestock grazing in the 1880's, with loss of riparian and grassland habitats, changed the falcon's preferred habitats of open grasslands (foraging) with scattered yuccas and mesquites (nesting) into desertscrub with greater densities of mesquite, catclaw, and other woody species. Water diversion, channelization, groundwater pumping, urban and agricultural demands, and the resulting hydrological change in both upland and riparian ecosystems further threatens and degrades the species' potential habitat. Introduced nonindigenous grass planted on a landscape basis over the last 30 years has increased monotypic ground cover characteristics. Not well studied, this monotypic regime may have altered the aplomado falcon's prey species diversity, abundance, and distribution.

Corman (1992) surveyed the planning area for potential reestablishment sites for the northern aplomado falcon. Three transects were surveyed and rated suitable for potential reestablishment. One transect was along Cienega Creek, and two were in Fortynine Wash. The planning area was considered to be the best of several potential reestablishment sites in Arizona. Also, the grasslands at the south end of the Empire and on the Rose Tree, Vera Earl, and Research Ranch might have potential habitat for this species (BLM 2002).

### **Effects of the Action**

The northern aplomado falcon is one of the species that will be considered for reestablishment into the planning area. If reestablishment occurs, some of the effects of the proposed action on the lesser long-nosed bat will be similar to those for the northern aplomado falcon. Therefore, the discussion of effects will not be repeated and is incorporated here by reference.

The vegetation treatment program should expand potential aplomado falcon habitat by restoring grasslands with a heavy mesquite invasion to more open grasslands favored by this species. Scattered mesquite and yuccas would likely remain in these areas providing sufficient nesting and roosting sites. Prescribed fire could result in short-term localized reduction of potential habitat for this species. Vegetation clearing which may occur if there is construction of new utility lines and access roads could reduce small areas of habitat for this species. Loss of these small areas is not expected to have a long-term negative impact on future aplomado falcon reestablishment or activities.

The road and trail closures and restrictions proposed in this action will reduce potential disturbance to potential aplomado falcon habitat and increase the likelihood of successful reestablishment. No direct effects are anticipated from these proposed actions since the species is not present. If the species were reestablished, recreational activities would have the potential to directly impact aplomado falcon activities and habitat, including nesting.

Some recreational activities could result in indirect localized impacts to potential aplomado falcon habitat. Impacts might occur from increased human visitation impacts to vegetation, the introduction of nonindigenous species, and wildfire. As long as the upland vegetation is managed so that the desired resource conditions are met, these impacts should not preclude use of the area by the aplomado falcon.

Direct effects from livestock grazing are not anticipated as the species does not occur. After reestablishment, livestock grazing could disturb aplomado falcon nests. The proposed livestock grazing program should not degrade suitable habitat and should at least maintain potential habitat. The main concern with livestock grazing is its relationship with the invasion and increase of Lehmann's lovegrass. The causal factors for invasion of Lehmann's into southeastern Arizona grasslands are not well known and subject to conjecture. Whether or not grazing is a proximal or secondary cause is unknown. Other confounding factors in assessing the potential impacts of livestock are other uses in the area and the different variables associated with livestock grazing (eg. stocking rate, utilization, rotation, etc.).

### **Conclusion**

After reviewing the current status of northern aplomado falcon, the environmental baseline for the action area, the effects of the proposed Las Cienegas NCA RMP and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the endangered northern aplomado falcon. No critical habitat has been designated, thus, none would be affected. We base these conclusions on the following:

1. northern aplomado falcons do not presently occur in Arizona;
2. The proposed action affects a small portion of the species' historic range;
3. All proposed actions that may affect the northern aplomado falcon have conservation actions included which should minimize effects to the species;
4. If aplomado falcon are reestablished in the action area, the proposed action should be mostly beneficial to the conservation and recovery of the species;
5. The BLM proposes actions identified in the recovery plan that will help conserve and recover the species; and
6. The ecological condition of the area should be maintained and improved during the 20-year life of the RMP.

#### **Incidental Take Statement**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significant impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service 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, and sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited taking under the Act if such taking meets the terms and conditions of this Incidental Take Statement.

The Service anticipates that the proposed will result in incidental take of northern aplomado falcons if the falcon is reestablished, as proposed in this plan. Incidental take of the northern aplomado falcon will be difficult to detect for the following reasons: dead animals are difficult to find and cause of death may be difficult to determine. However, take of northern aplomado falcon may occur from livestock grazing and human visitation affects to floral resources. We anticipate that the following take could occur as a result of the proposed action:

1. Not more than 2 northern aplomado falcons during the life of the RMP due to harm resulting from impacts of human visitation and grazing activities on upland vegetation.
2. Not more than 1 nest of northern aplomado falcons during the life of the RMP due to harm resulting from disturbance by grazing activities.

**Effect of Take**

In this biological opinion, the Service finds the anticipated level of take is not likely to jeopardize the continued existence of the endangered aplomado falcon.

**Reasonable and Prudent Measures and Terms and Conditions**

The following reasonable and prudent measures are necessary and appropriate to minimize take of the aplomado falcon. To be exempt from the prohibitions of section 9 of the Act, the BLM must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting and monitoring requirements. These terms and conditions are non-discretionary. These reasonable and prudent measures and terms and conditions are only in effect following reestablishment of aplomado falcons into the project area.

1. The BLM shall continue to monitor the northern aplomado falcon (if they are reestablished) and its habitat to document levels of take and determine effectiveness of conservation measures:
  - 1.1. The BLM shall continue to monitor northern aplomado falcon populations (if they are reestablished) and habitat;
  - 1.2. An annual report will be done which summarizes the implementation of the proposed action and any incidental take that occurred. We are especially interested in an analysis of the effectiveness of the conservation measures and terms and conditions.

**Conservation Recommendations**

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

1. We recommend that the BLM investigate and monitor the invasion of Lehmann lovegrass in the planning area and assist other agencies in developing methods for controlling this nonindigenous grass (USFWS 1990b).
2. We recommend that the BLM implement the northern aplomado falcon recovery plan, as appropriate.
3. If aplomado falcons are reestablished and they nest in the area, consider temporary closures to human access around nest sites during the breeding season.

4. If aplomado falcons are reestablished and they nest in the area, consider temporary closures to livestock grazing around nest sites during the breeding season, or use different pastures.

For the Service to be kept informed of actions reducing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

### **CACTUS FERRUGINOUS PYGMY-OWL (*Glaucidium brasilianum cactorum*)**

#### **Status of the Species**

A detailed description of the life history and ecology of the cactus ferruginous pygmy-owl (pygmy-owl) may be found in the Birds of North America (Proudfoot and Johnson 2000), Ecology and Conservation of the cactus ferruginous pygmy-owl in Arizona (Cartron and Finch 2000), and other information available at the Arizona Ecological Services Field Office. Information specific to the pygmy-owl in Arizona is limited. Research in Texas has provided useful insights into the ecology of the subspecies, and in some instances represents the best available information; however, habitat and environmental conditions are somewhat different in Arizona and conclusions based on Texas information are tentative.

#### **Species description**

The Service listed the Arizona population of the cactus ferruginous pygmy-owl as a distinct population segment (DPS) on March 10, 1997 (USFWS 1997b). The past and present destruction, modification, or curtailment of habitat is the primary reason for the decrease in population levels of the pygmy-owl. On July 12, 1999, we designated approximately 731,712 acres of critical habitat supporting riverine, riparian, and upland vegetation in seven critical habitat units, located in Pima, Cochise, Pinal, and Maricopa counties in Arizona (USFWS 1999c). However, on September 21, 2001, the U.S. District Court for the District of Arizona vacated this final rule designating critical habitat for the pygmy-owl, and remanded its designation back to the Service for further consideration.

#### **Life history**

Pygmy-owls are small birds, averaging 6.75 inches in length. Pygmy-owls are reddish-brown overall, with a cream-colored belly streaked with reddish-brown. The cactus ferruginous pygmy-owl is crepuscular/diurnal, with a peak activity period for foraging and other activities at dawn and dusk. During the breeding season, they can often be heard calling throughout the day, but most activity is reported between one hour before sunrise to two hours after sunrise, and late afternoon/early evening from two hours before sunset to one hour after sunset (Collins and Corman 1995).

A variety of vegetation communities are used by pygmy-owls, such as: riparian woodlands, mesquite bosques, Sonoran desertscrub, and semidesert grassland communities, as well as

nonnative vegetation within these communities. While plant species composition differs among these communities, there are certain unifying characteristics such as the presence of vegetation in a fairly dense thicket or woodland, the presence of trees or saguaros large enough to support cavity nesting, and elevations below 4,000 feet (1,212 m). Historically, pygmy-owls were associated with riparian woodlands in central and southern Arizona. Plants present in these riparian communities include cottonwood, willow, and hackberry (*Celtis* spp.). Cottonwood trees are suitable for cavity nesting, while the density of mid- and lower-story vegetation provides necessary protection from predators and an abundance of prey items for the pygmy-owl. Mesquite bosque communities are dominated by mesquite trees, and are described as mesquite forests due to the density and size of the trees.

Over the past several decades, pygmy-owls have been primarily found in the Arizona Upland Subdivision of the Sonoran Desert, particularly Sonoran desertscrub (Brown 1994). This community in southern Arizona consists of paloverde, ironwood, mesquite, acacia, bursage (*Ambrosia* spp.), and columnar cacti (Phillips et al. 1964, Monson and Phillips 1981, Johnson and Haight 1985, Johnsgard 1988). However, over the past several years, pygmy-owls have also been found in riparian and xeroriparian habitats and semidesert grasslands as classified by Brown (1994). Desertscrub communities are characterized by an abundance of saguaros or large trees, and a diversity of plant species and vegetation strata. Xeroriparian habitats contain a rich diversity of plants that support a wide array of prey species and provide cover. Semidesert grasslands have experienced the invasion of velvet mesquites (*Prosopis velutina*) in uplands and linear woodlands of various tree species along bottoms and washes.

Pygmy-owls are considered non-migratory throughout their range by most authors, and have been reported during the winter months in several locations, including Organ Pipe Cactus National Monument (OPCNM) (R. Johnson, unpubl. data; T. Tibbitts, Organ Pipe Cactus National Monument, unpubl. data). In Texas, juveniles remained within about 165 feet (50 m) of adults until dispersal. Dispersal distances (straight line) of 20 juveniles monitored from their natal sites to nest sites the following year averaged 5 miles ([8.0 km][0.75-19 miles {1.21-30.6}][G. Proudfoot, unpubl. data]). Telemetry studies of dispersing juveniles in Arizona during 1999 and 2000 ranged from 1.4 to 12.9 miles ([2.3-20.8 km][straight line distance][n=6, mean 6.2 miles {10.0 km}) in 1999, and 1.6 to 11.7 miles ([2.6-18.8 km][n=6, mean 5.8 miles {9.3 km}]) in 2000 (S. Richardson and M. Ingraldi, AGFD, unpubl. data). Pygmy-owl telemetry studies have documented movement of owls between southern Pinal County and northwestern Tucson (S. Richardson and M. Ingraldi, AGFD, unpubl. data). Typically, juveniles dispersed from natal areas in July, but did not appear to defend a territory until September. They may move up to one mile in a night; however, they typically fly short distances from tree to tree instead of long single flights (S. Richardson, Arizona Game and Fish Department unpubl. data). Subsequent surveys during the spring have found that locations of male cactus ferruginous pygmy-owls are in the same general location as last observed the preceding fall.

Apparently, unpaired females may also remain in the same territory for some period of time. In the spring of 2001, an unpaired female (the male died in 2000) remained in the same territory as was occupied in previous years well into the spring, exhibiting territorial behavior (calling) for

approximately two months until ultimately switching territories, pairing with an unpaired male and successfully nesting (S. Richardson, AGFD, unpubl. data). Researchers suspect that if this unpaired female could have attracted an unpaired male during that time, she would have likely remained in her original territory.

In Texas, Proudfoot (1996) noted that, while pygmy-owls used between 3 and 57 acres (1.4-25.9 ha) during the incubation period, they defend areas up to 279 acres (127 ha) in the winter. Therefore, a 280 acre (127 ha) home range is considered necessary for pygmy-owls. Proudfoot and Johnson (2000) indicate males defend areas with radii from 1,100 to 2,000 feet (333-606 m). Initial results from ongoing studies in Texas indicate that the home range of pygmy-owls may also expand substantially during dry years (G. Proudfoot, unpubl. data).

### **Species status and distribution range-wide**

The cactus ferruginous pygmy-owl is one of four subspecies of ferruginous pygmy-owl. Pygmy-owls are known to occur from lowland central Arizona south through western Mexico to the States of Colima and Michoacan, and from southern Texas south through the Mexican States of Tamaulipas and Nuevo Leon. Recent genetic studies suggest that ferruginous pygmy-owl populations in southern Arizona and southern Texas are distinct subspecies, and that there is no genetic isolation between populations in the United States and those immediately south of the border in northwestern or northeastern Mexico (Proudfoot and Slack 2001).

The range of the Arizona DPS of the cactus ferruginous pygmy-owl extends from the International Border with Mexico north to central Arizona. The northernmost historic record for the pygmy-owl is from New River, Arizona, about 35 miles north of Phoenix (Fisher 1893). According to early surveys referenced in the literature, the pygmy-owl, before the mid-1900s, was "not uncommon," "of common occurrence," and a "fairly numerous" resident of lowland central and southern Arizona in cottonwood forests, mesquite-cottonwood woodlands, and mesquite bosques along the Gila, Salt, Verde, San Pedro, and Santa Cruz rivers and various tributaries (Breninger 1898, Gilman 1909, Swarth 1914). Additionally, pygmy-owls were detected at Dudleyville on the San Pedro River as recently as 1985 and 1986 (AGFD, unpubl. data; Hunter 1988).

While the majority of Arizona pygmy-owl detections in the last seven years have been from the northwestern Tucson area, pygmy-owls have also been detected in southern Pinal County, at OPCNM, Cabeza Prieta National Wildlife Refuge (CPNWR), Buenos Aires National Wildlife Refuge (BANWR), and on the Coronado National Forest.

### **Range-wide trend**

One of the most urgent threats to cactus ferruginous pygmy-owls in Arizona is thought to be the loss and fragmentation of habitat (USFWS 1997b, Abbate et al. 1999). The complete removal of vegetation and natural features required for many large-scale and high-density developments directly and indirectly impacts pygmy-owl survival and recovery (Abbate et al. 1999).

Habitat loss, degradation, and fragmentation are widely accepted causes contributing to raptor population declines worldwide (Snyder and Snyder 1975, Newton 1979, LeFranc and Millsap

1984). Casualties caused by pest control, pollution, collisions with cars, radio towers, glass windows, power lines, and cat predation are often underestimated, although likely increasing in occurrence due to human population growth (Banks 1979, Klem 1979, Churcher and Lawton 1987).

Nesting in small natural patches may have additional risks. For example, Haug (1985) found burrowing owl home range size increases with the percentage of vegetation disturbance. In fragmented landscapes, burrowing owls may forage greater distances and spend more time away from the nest, making them more vulnerable to predators, and therefore, less efficient at reproduction (Warnock and James 1997). As fragmentation increases, competition for fewer productive pygmy-owl territories may occur (Abbate et al. 1999). Unlike larger birds that can fly long distances over unsuitable or dangerous areas to establish new territories, pygmy-owls, because of their small size and their short style of flight, are exposed to greater risks from predation and other threats (Abbate et al. 1999).

Site fidelity in birds is one of many factors that may create time lags in response to fragmentation and other disturbances. Individuals may remain in sites where they bred successfully in the past, long after the habitat has been altered (Wiens 1985). Because of lack of data, it is unclear whether site fidelity for pygmy-owls, in increasingly fragmented landscapes, is a factor. For example, researchers have been closely monitoring an established pygmy-owl site (documented each year since 1996) in which the male died in 1999, apparently from a collision with a fence (S. Richardson, unpubl. data.). This site has not been known to be active since 1999. It has one of the highest amounts of development (33%) within its estimated home range of any other known nest site (S. Richardson, unpubl. data.).

Other factors contributing to the decline of cactus ferruginous pygmy-owl habitat include the destruction of riparian bottomland forests and bosques. It is estimated that 85 to 90 percent of low-elevation riparian habitats in the southwestern U.S. have been modified or lost; these alterations and losses are attributed to woodcutting, nonindigenous plant invasions, urban and agricultural encroachment, water diversion and impoundment, channelization, groundwater pumping, livestock overgrazing, and hydrologic changes resulting from various land-use practices (e.g., Phillips et al. 1964, Carothers 1977, Kusler 1985, Jahrsdoerfer and Leslie 1988, U.S. General Accounting Office 1988, Szaro 1989, Dahl 1990, State of Arizona 1990, Bahre 1991). Cutting of trees for domestic and industrial fuel wood was so extensive throughout southern Arizona that, by the late 19th century, riparian forests within tens of miles of towns and mines had been decimated (Bahre 1991).

Regardless of past distribution in riparian areas, it is clear that the pygmy-owl has declined throughout Arizona to the degree that it is now extremely limited in distribution in the state (Johnson et al. 1979, Monson and Phillips 1981, Davis and Russell 1984, Millsap and Johnson 1988, Monson 1998). A very low number of pygmy-owls in riparian areas in recent years may reflect the loss of habitat connectivity rather than the lack of suitability (Cartron et al. 2000).

In recent decades, the pygmy-owl's riparian habitat has continued to be modified and destroyed by agricultural development, woodcutting, urban expansion, and general watershed degradation (Phillips et al. 1964, Brown et al. 1977, State of Arizona 1990, Stromberg et al. 1992, Stromberg 1993a and 1993b). Sonoran Desertscrub has been affected to varying degrees by urban and agricultural development, woodcutting, and livestock grazing (Bahre 1991). Pumping of groundwater and the diversion and channelization of natural watercourses are also likely to have reduced pygmy-owl habitat.

Little is known about the rate or causes of mortality in pygmy-owls; however, they are susceptible to predation from a wide variety of species. In Texas, eggs and nestlings were depredated by racoons (*Procyon lotor*) and bullsnakes (*Pituophis melanoleucus*). Both adult and juvenile cactus ferruginous pygmy-owl are likely killed by great horned owls (*Bubo virginianus*), Harris' hawks (*Parabuteo unicinctus*), Cooper's hawks, and eastern screech-owls (*Otus asio*) (Proudfoot and Johnson 2000, G. Proudfoot, unpubl. data). Pygmy-owls are particularly vulnerable to predation and other threats during and shortly after fledging (Abbate et al. 1999). Therefore, cover near nest sites may be important for young to fledge successfully (Wilcox et al. 1999, Wilcox et al. 2000). Although nest depredation has not been recorded in Arizona, only a relatively small sample of nests have been monitored (n = 37 from 1995-2001).

Another factor that may affect pygmy-owls is interspecific competition and predation. In Texas, depredation of two adult female pygmy-owls nesting close to screech-owls was recorded. In 2001, an unpaired female pygmy-owl was found dead in a tree cavity, apparently killed by a screech-owl (S. Richardson, unpubl. data). Conversely, pygmy-owls and screech-owls have also been recorded successfully nesting within 7 feet (2 m) of each other in the same tree without interspecific conflict (G. Proudfoot, unpubl. data).

Direct and indirect human-caused mortalities (e.g., collisions with cars, glass windows, fences, power lines, domestic cats [*Felis domesticus*], etc.), while likely uncommon, are often underestimated, and probably increase as human interactions with owls increase (Banks 1979, Klem 1979, Churcher and Lawton 1987). This may be particularly important in the Tucson area where many cactus ferruginous pygmy-owls are located. Pygmy-owls flying into windows and fences, resulting in serious injuries or death to the birds, have been documented twice. A pygmy-owl collided with a closed window of a parked vehicle; it eventually flew off, but had a dilated pupil in one eye indicating serious neurological injury as the result of this encounter (Abbate et al. 1999). In another incident, an adult owl was found dead on a fence wire; apparently it flew into a fence and died (S. Richardson, unpubl. data). Two female juvenile owls, located 2.5 miles (4.0 km) apart, were found dead from apparent wounds sustained from a cat. Free roaming cats can also affect the number of lizards, birds, and other prey species available to pygmy-owls.

Researchers in Arizona have found that pygmy-owls require habitat linkages, within and between territories for movement and dispersal of young. Continuous cover or patches of trees and large shrubs spaced at close, regular intervals, to provide concealment and protection from predators and mobbing, as well as shade and cooler temperatures is necessary (S. Richardson, unpubl. data, Abbate et al. 1999). Pygmy-owls, particularly juveniles because of their inexperience, are susceptible to predation, weather extremes, human-related injury and mortality factors (e.g., cars,

buildings, fences, domestic cats, etc.) and other mortality factors. A high degree of cover throughout the landscape increases the likelihood of survivorship to the next breeding season. Limiting these mortality factors is critical, especially for small, depressed populations, such as pygmy-owls in Arizona.

Fires can affect cactus ferruginous pygmy-owls by altering their habitat (Abbate et al. 1999). A recent fire altered habitat near an active pygmy-owl nest site (Flesch 1999) and although four mature saguaros in the area survived (at least in the short-term), post-fire mortality of saguaros has been recorded (Steenbergh and Lowe 1977 and 1983, McLaughlin and Bowers 1982). Flesch (1999) also noted that approximately 20 to 30 percent of the mesquite woodland within 164 ft (50 m) of the nest was fire- or top-killed, and ground cover was also eliminated until the summer monsoons. Careful use of prescribed fires in areas potentially suitable for pygmy-owls is necessary so that habitat is not lost or degraded (Flesch 1999).

### **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.

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

Much of the planning area is over 4000 feet in elevation and upper Sonoran desertscrub vegetation communities dominated by saguaro and palo verde are not present. There are areas on the Empirita allotment and small areas on the Empire-Cienega allotment with riparian woodland, mesquite bosque, or xeroriparian habitats below 4000 feet which may provide limited habitat for the species. Habitat may be present along Cienega Creek and Wakefield Canyon. No habitat assessments or specific surveys for cactus ferruginous pygmy-owl have been done within the planning area. Therefore, it is uncertain whether or not pygmy-owls occur in the area.

Pygmy owls were not detected during the 1988 to 1993 volunteer bird-banding project at the "agricultural fields" area of Cienega Creek which is at about 4200 feet elevation. BLM conducted point counts for breeding birds along Cienega Creek in 1993 and 1994 along three transects. All of these transects were above 4000 feet elevation and no pygmy owls were detected. Surveys for yellow-billed cuckoo and southwestern willow flycatcher in 2000 along Cienega Creek, including the narrows, did not detect any pygmy-owls. There are records of pygmy-owls and vocalization detections to the north of the NCA.

### **Effects of the Action**

Some of the effects of the proposed action on the cactus ferruginous pygmy-owl, will be similar to those discussed for the southwestern willow flycatcher. Therefore, the discussion of effects will not be repeated and is incorporated here by reference. The discussion on the effects of the

proposed action to the pygmy-owl will focus on effects that do not pertain to the flycatcher and the effects of some site specific actions. Effects of the proposed action will be limited to potential habitat (Map 3-4) below 4,000 ft (1,212 m) on the Empirita and Empire-Cienega allotments, in the northern end of the planning area.

Implementing a vegetation treatment program would result in conditions that help Cienega Creek meet and maintain the riparian objective. Upland vegetation management and site restoration would enhance riparian development and channel stability by reducing the prevalence of shrubs and nonindigenous species. Such management would also increase watershed cover by promoting increased perennial grasses. Managing upland vegetation so that it reaches a higher seral stage should help it attain characteristics that may be suitable for pygmy-owls. These actions should positively affect the pygmy-owl. Any negative effects of the action should be mitigated with the conservation actions BLM proposes as part of each action. However, before the effects of any specific proposed action on pygmy-owl can be determined, pygmy-owl surveys must be done according to protocol in areas of potential habitat (AGFD and USFWS 2000).

Fire can affect cactus ferruginous pygmy-owl habitat by removing ground cover and destroying potential cavity bearing saguaro cacti and trees. Human disturbance from fire management activities can also impact bird behavior and interfere with brood rearing. Fire locally can impact prey density through direct mortality of reptiles, small mammals, and song birds. Indirect impacts on vegetative cover could also affect prey species densities and distributions.

Controlled burning and herbicide use should affect pygmy-owl similarly as they would the southwestern willow flycatcher. Prescribed fires have the potential to escape. However, as evidenced by the wildfire in March 2002, even in drought conditions, fire may not have a large impact on certain riparian vegetation. The wildfire burned right up to the riparian vegetation, burned some of the trees on the outer edge, then jumped over the riparian vegetation to the other side of Cienega Creek. The riparian vegetation and the aquatic habitat sustained minimal damage from the fire.

Control of nonindigenous species, may impact the pygmy-owl. The purpose of nonindigenous species control is to benefit native species, but there will be transient negative effects. Control actions near territorial birds could disturb them.

The BLM proposes to continue monitoring pygmy-owl and their habitats. BLM plans to do annual surveys in suitable habitat for a minimum of three years to determine if pairs are colonizing the area and whether successful nesting is occurring. If breeding pairs are found to be regularly using the area, then monitoring will be continued.

Cultural resource management and recreational activities would attract more visitors to the area and potentially to riparian and wetland areas contributing to impacts previously described in recreation management. Visitors and large groups can attract cowbirds with their trash, and can negatively impact riparian vegetation that flycatchers rely on for foraging and nesting.

Designation, identification, and maintenance of roads could result in increased visitor use of riparian areas. Potential adverse effects of vehicle access bringing visitors to riparian areas are disruption to pygmy-owl activities.

The impact of livestock grazing has been discussed in the overview section and the Chiricahua leopard frog and Gila topminnow sections. Those discussions are incorporated here by reference.

The loss of riparian habitat to a variety of uses, including livestock overgrazing, is considered one of the causes contributing to the decline of the pygmy-owl. Ohmart and Anderson (1986) note that structural complexity and mean canopy height of riparian forests are generally reduced where riparian systems are under heavy water management, livestock grazing, pollution, or recreational activities. Arizona Department of Environmental Quality (1993) notes that changes to plant community structure and age class structure occur by direct consumption of plants and by disturbances to soils. Because the most palatable plants are eaten first, remaining plants have a competitive advantage and become more widespread. Furthermore, disturbance of soils may prevent establishment of seedlings, and can affect the roots of riparian plants with shallow root systems. Damage to riparian areas from grazing without proper control of intensity, season, and duration can be long-lasting and potentially irreversible.

Grazing can impact cactus ferruginous pygmy-owl prey. Jones (1981) found that grazing reduced lizard abundance and variety in a number of habitats in western Arizona. Pianka (1966) discussed the importance of vegetation structure, and found communities with increased plant structures supported more lizard species than those with less structure. Overall, complex vegetation communities with a high degree of species diversity and structural heterogeneity provide habitat for many prey species including birds, insects, and mammals. Riparian communities, particularly where willows are found, support one of the richest and most diverse insect fauna among plant communities which are also important to fish, amphibians, reptiles, birds, and small mammals (Southwood 1961). In addition, birds have been shown to respond to alterations in vegetation structure and species richness within riparian habitats (Bull and Slovin 1982, Szaro and Jakle 1985). Higher densities and diversity of birds have been found in ungrazed riparian habitats compared with adjacent grazed areas (Crouch 1981, Mosconi and Hutto 1981, Taylor 1986).

Grazing pressure on vegetation has also been shown to alter growth form, plant vigor, and plant species composition, resulting in increases or decreases in populations of bird species (Glinski 1977, Townsend and Smith 1977, Ryder 1980). Excessive livestock grazing can also affect types and abundance of food items for birds (Ryder 1980) and effects on small mammals may be similar (Krueper 1995). Raptors which use small mammals as prey may not choose to frequent submarginal riparian habitats for feeding due to lack of preferred prey items. Additionally, insect biomass may be decreased in riparian habitats which are heavily grazed due to the lack of understory vegetation (Krueper 1995). This can be particularly important to the pygmy-owl since reptiles, birds, and small mammals are important prey species.

Livestock will spend 5 to 30 times longer in riparian habitats than adjacent uplands, and typically congregate in floodplains in hotter, dryer summer months imposing heavy use during the heart of

the growing season, and in many instances throughout the growing season (Skovlin 1984). In many areas of the West, the concentration of livestock in riparian habitats is exacerbated due to steep canyons, narrow riparian corridors, and limited accessibility (Dahlem 1979). These conditions are typical in areas that are likely to contain suitable pygmy-owl habitat.

Steenbergh and Lowe (1977) examined saguaro density and recruitment at nearby Saguaro National Park which, until recently, was grazed by livestock. In addition, Burgess (1964) examined saguaro populations on the Forest. They found that in Sonoran Desert scrub habitats, direct destruction of young saguaros has resulted from trampling by cattle seeking shade and forage beneath the crowns of desert trees, particularly palo verde and mesquite. They also found that livestock grazing has had the greatest impact in non-rocky habitats where germination, establishment, and survival of young saguaros are most directly dependent upon the physical protection of other vegetation. Grazing in rocky habitats has had far less impact upon young saguaro recruitment. They summarized that grazing has reduced the density of saguaro populations by decreasing the number of sites suitable for germination and establishment of young plants by increasing exposure to natural mortality-causing factors. Therefore, since most recent nest cavities used by pygmy-owls have been in saguaros in non-rocky habitat, activities which affect saguaro recruitment could be significant.

In Sonoran Desert scrub, pygmy-owls are typically found in very well-developed thickets of desert vegetation and, within xeroriparian habitats, they appear to select relatively dense drainages lined with trees and shrubs. Although grazing in semidesert grassland and Chihuahuan Desert scrub can cause a decrease in grasses and an increase in shrubby species (Holechek et al. 1994, Bahre 1995), this effect has not been documented in Sonoran Desert scrub. Grazing can result in reduced shrub cover (Webb and Stielstra 1979) and reduced desirable shrubs (Orodho et al. 1990) in Mojave Desert scrub and Great Basin Desert scrub, respectively. Reduction in shrub, tree, and columnar cactus cover and regeneration would degrade pygmy-owl habitat.

Changes to the structure and composition of xeroriparian and Sonoran Desert scrub communities and riparian habitats can result in a decreased prey base for the cactus ferruginous pygmy-owl, increased susceptibility of the pygmy-owl to its aerial predators, reduction in suitable nesting structures, and habitat fragmentation. We are particularly concerned with year-long grazing in riparian and Sonoran Desert scrub habitat. We believe that this type of grazing can, in the long-term, decrease potential nesting habitat for the pygmy-owl by suppressing regeneration of trees in riparian areas and by inhibiting recruitment of saguaros.

Livestock gathering activities which concentrate cattle or human activities such as at corrals, loading and unloading facilities, etc., may impact pygmy-owls if they are nesting near these areas during January 1 to June 30. Such activities may disturb nesting owls, causing them to not nest in a particular area, or abandon active nests, particularly during the period the female is incubating eggs. We are concerned that adverse impacts from such activities may occur to nesting pygmy-owls if they take place within 0.25 mile (0.15 km) of unsurveyed habitat or a future known owl site.

Any new utility lines that are placed in the utility corridor through the Narrows, have the potential to impact pygmy-owl. The impact will be variable, and will depend on the particular project.

The overall effect of the proposed actions on the cactus ferruginous pygmy-owl should be mostly beneficial because conservation actions are part of all specific actions that could impact pygmy-owl, natural processes will be encouraged, and the ecological condition of the area should be maintained and improved during the 20-year life of the RMP. There will be site specific negative impacts from livestock grazing and road crossings, and general effects from recreation, but these impacts should not reduce populations or preclude use of the area by the pygmy-owl. In addition, actions are proposed by BLM that should assist with the conservation and recovery of the species.

### **Conclusion**

After reviewing the current status of cactus ferruginous pygmy-owl, the environmental baseline for the action area, the effects of the proposed Las Cienegas NCA RMP and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the proposed endangered cactus ferruginous pygmy-owl. No critical habitat is currently designated, thus, none would be affected. We base these conclusions on the following:

1. Pygmy-owls are rare in the action area;
2. The proposed action affects a small portion of the species' range;
3. All proposed actions that may affect the cactus ferruginous pygmy-owl have conservation actions included which should minimize effects to the species; and
4. The ecological condition of the area should be maintained and improved during the 20-year life of the RMP.

### **Incidental Take Statement**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significant impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service 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, and sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited taking under the Act if such taking meets the terms and conditions of this Incidental Take Statement.

#### **Amount or Extent of Take Anticipated**

We do not anticipate the proposed action will incidentally take any cactus ferruginous pygmy-owls.

#### **Conservation Recommendations**

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

We recommend that the BLM work with the Service and Arizona Game and Fish Department and other appropriate parties to implement the cactus ferruginous pygmy-owl recovery plan;

We recommend that the BLM survey areas of potential or suitable habitat, using the habitat evaluation protocol; and

We recommend that the BLM survey for pygmy-owls using the large area search protocol.

#### **CANELO HILLS LADIES-TRESSES (*Spiranthes delitescens*)**

##### **Status of the Species**

The Canelo Hills ladies-tresses is a member of the orchid family. Each slender, erect plant has 5 to 10 linear-lanceolate grass-like leaves. Leaves grow on the stem and are approximately 7.1 in (18 cm) long and 0.6 in (1.5 cm) wide. The flower stalk is about 20 in (50 cm) tall containing about 40 white flowers positioned in a spiral at the top of the stalk. Flowering occurs in late July to early August, when temperatures range from 60° F (16° C) at night to 100° F (38° C) during the day. During that time, precipitation averages 15 to 20 inches (38-79 cm).

Populations of this species are known to exist in only four cienegas in southern Arizona. One population is found in Cochise County and three in Santa Cruz County. One population is found at the Arizona Nature Conservancy's Canelo Hills Cienega. Two other populations are found on private land, one in the San Rafael Valley, and one on private property near or in Turkey Creek. The fourth population is on U.S. Forest Service land in the Canelo Hills.

Estimating Canelo Hills ladies'-tresses population size and stability is difficult because non-flowering plants are very hard to find in the dense herbaceous vegetation, and yearly counts underestimate the population because dormant plants are not counted. McClaran and Sundt (1992) monitored marked individuals in a Canelo Hills ladies'-tresses population during two,

three-year periods. They concluded that the subpopulations at both monitored sites were stable between 1987 and 1989, although Newman (1991) later reported that one monitored site was reduced to one non-flowering plant in 1991.

All populations of Canelo Hills ladies'-tresses occur in cienega habitats where scouring floods are very unlikely (Newman 1991). Soils supporting the populations are finely grained, highly organic, and seasonally or perennially saturated. It is found intermixed with tall grasses and sedges at about 5,000 feet in elevation. Springs are the primary water source, but a creek near one locality contributes near-surface groundwater (McClaran and Sundt 1992).

The dominant vegetation associated with *Spiranthes* includes grasses, sedges (*Carex* spp.), rushes (*Juncus* spp.), spike rush (*Eleocharis* spp.), cattails (*Typha* spp.), and horsetails (*Equisetum* spp.) (Cross 1991, Warren et al. 1991). Associated grass species include bluegrass (*Poa pratensis*), Johnson grass (*Sorghum halepense*), and muhlys (*Muhlenbergia aspeifolia* and *utilis*) (Fishbein and Gori 1994). The surrounding vegetation is semidesert grassland or oak savannah.

As with most terrestrial orchids, successful seedling establishment probably depends on the successful formation of endomycorrhizae (a symbiotic association between plant root tissue and fungi) (McClaran and Sundt 1992). The time needed for subterranean structures to produce aboveground growth is unknown. Plants may remain in a dormant, subterranean state or remain vegetative (non-flowering) for more than one consecutive year. Plants that flower one year can become dormant, vegetative, or reproductive the next year (McClaran and Sundt 1992, Newman 1991). The saprophytic/autotrophic state of orchid plants may be determined by climatic fluctuations and edaphic factors, such as pH, temperature and soil moisture (Sheviak 1990).

Threats to the Canelo Hills ladies'-tresses include groundwater pumping, water diversions, sand and gravel mining, recreation impacts, illegal collection, and invasion of cienega habitats by nonnative plant species, such as Johnson grass and Bermuda grass (*Cynodon dactylon*) (USFWS 1997a). The orchid was federally listed as an Endangered species in 1997 (USFWS 1997a). The nonnative Johnson grass is invading one *Spiranthes* site (Dave Gori, Arizona Nature Conservancy, in litt. 1993). This tall grass forms a dense monoculture, displacing less competitive native plants. If Johnson grass continues to spread, the Canelo Hills ladies'-tresses population at this site may be lost (Dave Gori, in litt. 1993). The effect of livestock grazing on the Canelo Hills ladies'-tresses is unclear. A *Spiranthes* population growing at a site grazed for more than 100 years was found to be larger and more vigorous than a population growing at a site ungrazed since 1969 (McClaran and Sundt 1992, Newman 1991); however, this may no longer be the case as the management at the grazed site has changed dramatically in recent years. The Canelo Hills ladies'-tresses, like many species in the genus, shows an affinity for habitats with sparse herbaceous cover (McClaran and Sundt 1992); which moderate livestock grazing can promote. The species would likely be adversely affected by heavy livestock grazing; however, maintenance of viable populations is probably compatible with well-managed grazing. Mowing of pastures, particularly when the species is flowering, can be very detrimental, may prevent seed set, and could result in mortality of plants. Limited numbers of populations and individuals threatens this taxon with demographic and environmental extinction as a result of stochastic

events that are often exacerbated by habitat disturbance. For instance, the restriction of the species to a relatively small area in southeastern Arizona increases the chance that a single environmental catastrophe, such as a severe tropical storm or drought could eliminate populations or cause extinction.

### **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.

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

Refer to riparian conditions described under the Gila Topminnow section. This species has not been found in Cienega Creek but does occupy habitat in nearby drainages. No comprehensive surveys have been conducted for it along Cienega Creek or tributaries. It is unlikely this species will establish a population within the planning area, though there is potential habitat.

### **Factors affecting species environment within the action area**

Conservation of the species is considered and managed for at the two sites on Nature Conservancy property and the Coronado National Forest. The two populations on private lands have very little protection from the Endangered Species Act or State law.

### **Effects of the Action**

Because the Canelo Hills ladies-tresses does not occur in the project area and is unlikely to, there should be no effects from the proposed action to any plants or their habitat. However, if the orchid were to be found or reestablished in the action area, there could be both beneficial and negative effects to the species.

Actions which create moderate amounts of disturbance to cienegas and potential Canelo Hills ladies-tresses habitat, may benefit the orchid. The information presently available indicates that the Canelo Hills ladies-tresses do better with some disturbance, as opposed to no disturbance. Therefore, activities associated with human visitation, including recreation, cultural resource management, education, and roads, may benefit the Canelo Hills ladies-tresses. Livestock grazing could also have a beneficial effect depending on the site and the type of grazing that occurs there. Almost all current and potential cienega areas are grazed moderately, or not at all.

Negative effects could come from the introduction and spread of nonindigenous species, especially Johnson grass and Bermuda grass. Wildfires, depending on their severity, may also negatively impact cienega habitat. However, historical evidence shows that cienegas burned periodically before humans changed the fire regime in southeastern Arizona. Because of the mesic nature of cienegas, fire, both prescribed and wildfire, have few short-term and long-term impacts on the cienega and its vegetation. Fire can act as the periodic disturbance mechanism that the Canelo Hills ladies-tresses appears to do well with.

### **Conclusion**

After reviewing the current status of Canelo Hills ladies-tresses, the environmental baseline for the action area, the effects of the proposed Las Cienegas NCA RMP and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Canelo Hills ladies-tresses. No critical habitat has been designated, thus, none would be affected. We base these conclusions on the following:

1. Canelo Hills ladies-tresses do not occur in the action area;
2. The proposed action should not affect the species;
3. All proposed actions that could affect the Canelo Hills ladies-tresses if it were to occur have conservation actions included which should minimize effects to the species and may actually benefit the orchid and its habitat; and
4. The ecological condition of the area should be maintained and improved during the 20-year life of the RMP.

### **Incidental Take Statement**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significant impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service 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, and sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited taking under the Act if such taking meets the terms and conditions of this Incidental Take Statement.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law.

### **Conservation Recommendations**

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

We recommend that the BLM provide assistance to the Service in developing a recovery plan for the Canelo Hills ladies-tresses;

We recommend that the BLM fund additional surveys for the Canelo Hills ladies-tresses on BLM lands, and support research on the ecology of the species; and

We recommend that the BLM work with all interested parties in the Cienega Creek watershed to insure that groundwater use does not exceed annual recharge.

For the Service to be kept informed of actions reducing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

### **CHIRICAHUA LEOPARD FROG (*Rana chiricahuensis*)**

#### **Status of the Species**

The Chiricahua leopard frog was listed as a threatened species without critical habitat in a Federal Register notice dated June 13, 2002 (USFWS 2002a). The rule includes 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 in (54-139 mm) (Platz and Mecham 1979, Stebbins 1985).

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 ft in central and southeastern Arizona; west-central and southwestern New Mexico; and in Mexico, northern Sonora, and the Sierra Madre Occidental of Chihuahua, and northern Durango (Platz and Mecham 1984, Degenhardt et al. 1996, Sredl et al. 1997, Sredl and Jennings *in press*). 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. Reports of the species from the State of Aguascalientes (Diaz and Diaz 1997) are questionable. In New Mexico, of sites occupied by Chiricahua leopard frogs from 1994 to 1999, 67 percent were

creeks or rivers, 17 percent were springs or spring runs, and 12 percent were stock tanks (Painter 2000). In Arizona, slightly more than half of all known historic localities are natural lotic systems, a little less than half are stock tanks, and the remainder are lakes and reservoirs (Sredl et al. 1997). Sixty-three percent of 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, supports 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 to 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 to 2001, the Chiricahua leopard frog was found at 87 sites in Arizona, including 21 northern localities and 66 southern localities (Rosen et al. 1996, Sredl et al. 1997, Service files). In New Mexico, the species was found at 41 sites from 1994 to 1999; 31 of those were verified extant during 1998 to 1999 (Painter 2000). However, 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 to 1999 (C. Painter, pers. comm., 2000). The species has been extirpated from about 75 percent of its historic localities in Arizona and New Mexico. The status of the species in Mexico is unknown.

Based on Painter (2000) and the latest information for Arizona, the species is still extant in 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. It has also 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 nonindigenous organisms, especially bullfrogs, fish, and crayfish; disease; drought; floods; degradation and loss of habitat resulting from water diversions and groundwater pumping, poor livestock management, mining, development, fire suppression, and other human activities; disruption of metapopulation dynamics; increased chance of extirpation or extinction resulting from small numbers of populations and individuals; and environmental contamination. 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). Numerous studies indicate that declines and extirpations of Chiricahua leopard frogs are at least in part caused by predation and possibly competition by nonindigenous organisms, including fish in the family Centrarchidae (*Micropterus* spp., *Lepomis* spp.), bullfrogs (*Rana catesbeiana*), tiger salamanders (*Ambystoma tigrinum mavortium*), crayfish (*Orconectes virilis* and possibly others), and several other species of fish (Clarkson and Rorabaugh 1989; Sredl and Howland 1994; Rosen et al. 1994, 1996; Fernandez and Bagnara 1995; Snyder et al. 1996; Fernandez and Rosen 1996, 1998). For instance, in the Chiricahua region of southeastern Arizona, Rosen et al. (1996) found that almost all perennial waters investigated that lacked introduced predatory vertebrates supported Chiricahua leopard frogs. All waters except three that supported introduced vertebrate predators lacked Chiricahua leopard frogs. Sredl and Howland (1994) noted that Chiricahua leopard frogs were nearly always absent from sites supporting bullfrogs and nonindigenous predatory fish. Bullfrogs are very capable dispersers in southeastern Arizona. Studies on the Buenos Aires National Wildlife Refuge have found bullfrogs moving at least 3 miles (5 km) overland and at least 5 miles (8 km) down drainage during the monsoon season (Phil Rosen, Univ. of Ariz. and Cecil Schwalbe, USGS, pers. comm., 2001, 2002). Rosen et al. (1996) suggested further study was needed to evaluate the effects of mosquitofish, trout, and catfish on frog presence.

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

Fire frequency and intensity in Southwestern forests are much altered from historic conditions (Dahms and Geils 1997). Before 1900, surface fires generally occurred at least once per decade in montane forests with a pine component. Beginning about 1870 to 1900, these frequent ground fires ceased to occur due to intensive livestock grazing that removed fine fuels, followed by effective fire suppression in the mid to late 20<sup>th</sup> century (Swetnam and Baisan 1996). Absence of ground fires allowed a buildup of woody fuels that precipitated infrequent but intense crown fires (Swetnam and Baisan 1996, Danzer et al. 1997). Absence of vegetation and forest litter following intense crown fires exposes soils to surface and rill erosion during storms, often causing high peak flows, sedimentation, and erosion in downstream drainages (DeBano and

Neary 1996). Following the 1994 Rattlesnake fire in the Chiricahua Mountains, Arizona, a debris flow filled Rucker Lake, a historic Chiricahua leopard frog locality. Leopard frogs (either Chiricahua or Ramsey Canyon leopard frogs) apparently disappeared from Miller Canyon in the Huachuca Mountains, Arizona, after a 1977 crown fire in the upper canyon and subsequent erosion and scouring of the canyon during storm events (Tom Beatty, Miller Canyon, pers. comm., 2000). Leopard frogs were historically known from many localities in the Huachuca Mountains; however, natural pool and pond habitat is largely absent now and the only breeding leopard frog populations occur in man-made tanks and ponds. Crown fires followed by scouring floods are a likely cause of this absence of natural leopard frog habitats.

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 2640 ft from their place of metamorphosis, and 3 young males established residency up to 3.2 mi from their place of metamorphosis (Dole 1971). Both adults and juveniles wander widely during wet weather (Dole 1971). In the Cypress Hills, southern Alberta, young-of-the-year northern leopard frogs successfully dispersed to downstream ponds 1.3 mi from the source pond, upstream 0.6 mi, and overland 0.25 mi. At Cypress Hills, a young-of-the-year northern leopard frog moved 5.0 mi 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. 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 nonindigenous 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 to 4.3 miles distant. In the Dragoon Mountains, Arizona, Chiricahua leopard frogs breed at Halfmoon Tank, but frogs occasionally turn up at Cochise Spring (0.8 mile down stream in an ephemeral drainage from Halfmoon Tank) and in Stronghold Canyon (1.1 mile down stream 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). Also, once one frog finds a wetland and then begins calling, it probably attracts other frogs.

Recent evidence suggests a chytridiomycete skin fungi is responsible for observed declines of frogs, toads, and salamanders in portions of Central America, South America, Australia New Zealand, Europe, Africa, Mexico, and United States (Berger et al. 1998, Longcore et al. 1999, Speare and Berger 2000, Hale 2001). Ninety-four species of amphibians have been diagnosed as infected with the chytrid, *Batrachochytrium dendrobatidis*. The proximal cause of extinctions of two species of Australian gastric brooding frogs and the golden toad (*Bufo periglenes*) in Costa Rica was likely chytridiomycosis. Another species in Australia for which individuals were diagnosed with the disease may be extinct (Daszak 2000). In Arizona, chytrid infections have been reported from four populations of Chiricahua leopard frogs (M. Sredl, pers. comm. 2000), as well as populations of Rio Grande leopard frog, Plains leopard frog (*Rana blairi*), lowland leopard frog, Tarahumara frog, canyon tree frog (*Hyla arenicolor*), striped chorus frog (*Pseudacris triseriata*), and Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*) (Morell 1999, Davidson et al. 2000, Sredl and Caldwell 2000, Hale 2001, V. Miera, pers. comm. 2002). In New Mexico, chytridiomycosis was identified in a declining population of Chiricahua leopard frogs near Hurley, and patterns of decline at three other populations are consistent with chytridiomycosis (R. Jennings, pers. comm., 2000).

The role of the fungi in the population dynamics of the Chiricahua leopard frog is as yet undefined. It is clear that Chiricahua leopard frog populations can exist with the disease for extended periods. The frog has coexisted with chytridiomycosis in Sycamore Canyon, Arizona since at least 1974. However, at a minimum, it is an additional stressor, resulting in periodic die-offs that increase the likelihood of extirpation and extinction. It may well prove to be an important contributing factor in observed population decline, and because of the interchange of individuals among subpopulations, metapopulations of frogs may be particularly susceptible. Rapid death of all or most frogs in stock tank populations in a metapopulation of Chiricahua leopard frogs in Grant County, New Mexico was attributed to post-metamorphic death syndrome (Declining Amphibian Populations Task Force 1993). Hale and May (1983) and Hale and Jarchow (1988) believed toxic airborne emissions from copper smelters killed Tarahumara frogs and Chiricahua leopard frogs in Arizona and Sonora. However in both cases, symptoms of moribund frogs matched those of chytridiomycosis. The disease has now been documented to have been associated with Tarahumara frog die-offs since 1974 (Hale 2001). The earliest record for chytridiomycosis in Arizona (Tarahumara frog -1974) corresponds to the first observed mass die-offs of ranid frogs in Arizona.

The origin of the disease is unknown, but epizootiological data from Central America and Australia (high mortality rates, wave-like spread of declines, wide host range) suggest

introduction of the disease into naive populations and the disease subsequently becoming enzootic in some areas. Alternatively, the fungus may be a widespread organism that has emerged as a pathogen because of either higher virulence or an increased host susceptibility caused by other factors such as environmental changes (Berger et al. 1998), including changes in climate or microclimate, contaminant loads, increased UV-B radiation, or other factors that cause stress (Pounds and Crump 1994, Daszak 2000, Carey et al. 2001). If it is a new introduction, its rapid colonization could be attributable to humans. The fungus does not have an airborne spore, so it must spread via other means. Amphibians in the international pet trade (Europe and USA), outdoor pond supplies (USA), zoo trade (Europe and USA), laboratory supply houses (USA), and species recently introduced (*Bufo marinus* in Australia and bullfrog in the USA) have been found infected with chytrids, suggesting human-induced spread of the disease (Daszak 2000). Chytrids could be spread by tourists or fieldworkers sampling aquatic habitats (Halliday 1998). The fungus can exist in water or mud and thus could be spread by wet or muddy boots, vehicles, cattle, and other animals moving among aquatic sites, or during scientific sampling of fish, amphibians, or other aquatic organisms. The Service and Arizona Game and Fish Department are employing preventative measures to ensure the disease is not spread by aquatic sampling. Additional information about the Chiricahua leopard frog can be found in Painter (2000), Sredl et al. (1997), Jennings (1995), Degenhardt et al. (1996), Rosen et al. (1994, 1996), Sredl and Howland (1994), Platz and Mecham (1979, 1984), USFWS (2000) and Sredl and Jennings (*in press*).

### **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.

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

Chiricahua leopard frogs have been found in several locations in the planning area, including Cienega Creek, Empire Gulch, Mattie Canyon, and off-channel ponds (BLM files; Rosen, pers. comm., 1996). Chiricahua leopard frogs are currently extant or have been found recently in Post Canyon, O'Donnell Creek, Welch Spring, and Freeman Spring. The Research Ranch is just downstream of these sites. Individuals were captured using spotlighting and dipnets for identification in 1990 and collected routinely along with fish as tadpoles or frogs. Since then, leopard frogs have been found much less often, and appear to be relatively rare, although habitat for this species has increased in Cienega Creek in the last 10 years. From this limited data, and based on the discussion of likely dispersal distances in the Status of the Species, we assume that Chiricahua leopard frogs, already proven to be present in the area, could potentially occur in any suitable habitat in the area during the life of the plan. The lowland leopard frog (*R. yavapaiensis*), is also rare in the area.

Many of the threats to the species identified above are issues in the action area. Nonindigenous organisms, especially bullfrogs; disease; drought; floods; degradation and loss of habitat resulting from poor historic livestock management and other human activities; disruption of metapopulation dynamics; increased chance of extirpation or extinction resulting from small numbers of populations and individuals; and environmental contamination are potential factors in the area. Several of these factors are outside of BLM's control, but may affect the species status in the area.

Bullfrogs are present in Cienega Creek. They are also known to be present in stock ponds and private ponds in the Cienega Creek watershed. These ponds are the likely source of the bullfrogs in Cienega Creek. The nonnative bullfrog is probably the nonindigenous species that is the greatest threat to the Chiricahua leopard frog.

Degradation and loss of Chiricahua leopard frog habitat is not a factor in the area, and the area is generally recovering from historic impacts of livestock grazing. In fact, other than the increasing numbers of bullfrogs found, habitat for leopard frogs appears to be improving (Table 31 in BE and 3-12 in RMP). There is increasing evidence that environmental contaminants, potentially in synergy with disease, have been responsible for worldwide amphibian die-offs (Hale and Jarchow 1988, USFWS 2000, Hayes et al. 2002).

Chytridiomycosis was identified at Cienega Creek in lowland leopard frogs in 1998 (Sredl 2000). Because of its presence in lowland leopard frogs, it is likely present in Chiricahua leopard frogs as well, but has yet to be confirmed (M. Sredl, pers. comm., 2002).

#### **Factors affecting species environment within the action area**

Pima County is in the process of drafting a multi-species conservation plan that includes the Chiricahua leopard frog. Actions to minimize negative impacts to leopard frogs and potential habitat will be identified in the plan, as will actions promoting the conservation and recovery of the species.

#### **Effects of the Action**

Proposed actions in the uplands should have little effect on Chiricahua leopard frogs, as long as actions that minimize and mitigate negative effects to the watershed are part of each action. Loss of ground cover, loss of grasslands, and soil disturbance all affect watershed functioning and can lead to excess sediment and modified flow regimes. Modified flow regimes can cause floods with greater peak flows and reduced low flows, which have detrimental effects to riparian and aquatic systems. Excess sediment also negatively affects stream function.

Vegetation treatments in suitable or potential Chiricahua leopard frog habitat can impact leopard frogs. Loss of individuals could occur during vegetation treatments in occupied habitat. All planned vegetation treatments are in upland areas, and not in suitable or potential habitat. BLM plans to design herbicide use to mitigate most potentially harmful impacts to non-target plants

and animals and further analyze potential impacts in site-specific treatment plans. However, negative impacts could still occur.

Though prescribed fire is not planned for wooded aquatic habitats, it is possible that unwooded cienega habitats that harbor Chiricahua leopard frogs might be burned when nearby prescribed fires escape their boundaries, and individual frogs could be lost. However, the current vegetation treatment prescriptions only apply to sandy loam upland, loamy upland, limy slopes, and limy upland ecological sites, and not the bottom sites where aquatic habitat is (Map 3-5 in RMP). Burning cienega vegetation should have only transient effects to the vegetation and any frogs that might be there, since herbaceous wetland plants recover quickly from fire and frogs can escape some fire by taking refuge in the water. Indirect effects could occur due to post-fire ash or sediment flow into aquatic habitats occupied by Chiricahua leopard frogs. Degradation of watershed condition immediately after fires can result in dramatically increased runoff, sedimentation, and debris flow that can scour aquatic habitats in canyon bottoms or bury them in debris (DeBano and Neary 1996). In degraded watersheds, less precipitation is captured and stored, thus perennial aquatic systems downstream may become ephemeral during dry seasons or drought (Rinne and Neary 1996). Fire could result in degradation of the immediate watershed around a pond, and result in erosion, sedimentation, and ash flow into the pond. Ash and slurry flow into streams can be toxic to fish, and populations of macroinvertebrates can be drastically reduced after a fire (Rinne 1996), at least temporarily (Roby and Azuma 1995). Smoke diffusion into water and ash flow can result in high levels of phosphorus and nitrogen (Spencer and Hauer 1991). At Saguaro National Park, lowland leopard frogs were eliminated when post-fire erosion and sediment flows filled pools occupied by the frogs (Swann and Schwalbe 2002). Frogs and tadpoles also disappeared from a pool that was filled with ash (D. Swann, NPS, pers. comm., 2002), suggesting toxic conditions.

Controlled burns might lower water quality for a short time over limited distances of stream habitat. Precautions like small burn unit size and sequencing of burn plots over individual subbasins make the influx of ash to Cienega Creek unlikely to reach concentrations that kill Chiricahua leopard frogs. The influx of sediments from burned areas is not expected to reach levels that alter aquatic habitat composition and characteristics except when close to the tributary carrying the sediment.

Control of nonindigenous species, and especially of bullfrogs, may negatively impact Chiricahua leopard frogs. Control techniques may include methods where personnel may mistake a leopard frog for a bullfrog, or indiscriminant methods may capture all frogs. This could lead to death, injury, or harassment of Chiricahua leopard frogs. Bullfrogs have recently been detected in the Cinco Ponds. Concentrated bullfrog eradication efforts will be undertaken there. Care must be taken in all activities in aquatic habitats to insure that diseases that may impact Chiricahua leopard frogs, such as chytrid fungus, are not spread unnecessarily.

Cultural resource management would attract more visitors to the area and potentially to riparian wetland areas contributing to impacts described in recreation management. Allowing Native

Americans to collect plants in aquatic areas would have minimal impacts to the Chiricahua leopard frog, as long as procedures for minimizing the potential transfer of disease are followed.

Road crossings at Cienega Creek and Empire Gulch will impact Chiricahua leopard frogs. Impacts could occur directly and indirectly from vehicle traffic and road maintenance. Vehicle speed is a factor in wildlife deaths from vehicles. Chiricahua leopard frog egg masses, very small tadpoles, and metamorphosing frogs are particularly vulnerable to crushing by vehicles, because these life stages are not capable of escaping approaching vehicles and could be killed or injured as vehicles cross or maintenance is done. Contaminants associated with vehicles and road maintenance could also affect the development of leopard frog eggs. The two road crossings are also prime locations for the release of nonindigenous species.

Though the Arizona Trail is not located within riparian areas, it is close enough that hikers will gain access to occupied Chiricahua leopard frog habitat. Increased visitation to riparian areas and improved access to remote areas are expected to cause impacts of the type described for Recreation Management and facilitate the release or spread of nonindigenous species or disease.

Some curious sightseers may harass, pursue, and capture leopard frogs. The implementation of this proposed action will increase visitation in riparian areas which is likely to slightly increase injury or mortality to this species. Even though visitors harassing Chiricahua leopard frogs would likely be contrary to State and federal laws, the BLM, through the RMP, is allowing visitor access to the area, which allows the visitor to engage in many activities, both legal and illegal. This injury and mortality should only negligibly affect the Cienega Creek population of Chiricahua leopard frog as it is expected to be minimal. However, it is likely to occur during the 20-year life of the RMP. Establishing a recreation permit system should help ensure the sustainability of aquatic habitats and populations of this species.

Increased activity in and along the creek are likely to slightly increase localized habitat degradation. But, limits on road access and camping near riparian areas would help restrict recreation disturbance to localized areas. There are three road crossings with aquatic habitat: at Empire Gulch, Cienega Creek near the Agricultural fields, and at the Narrows. The road at the Narrows will be open for administrative motor vehicle use and to non-motorized public travel. The development of a visitor education program will also help to minimize adverse impact by encouraging responsible use of public lands, thus helping maintain habitats that support this species.

Use of the Agricultural Fields group site will place up to 500 visitors near aquatic habitat. This creates the potential for a large number of visitors in or near Cienega Creek, along with the potential impacts associated with that and for release of nonindigenous species.

Proposed mineral development is unlikely to impact Chiricahua leopard frogs, as long as no large-scale activities occur in the Empire Mountains before they are withdrawn from mineral entry.

As specified in the section, Effects of the Action - Overview, livestock grazing can affect uplands and watershed functioning, which in turn, can affect drainage systems and riparian and aquatic habitat. Upland vegetation treatments, which may offset the influence of grazing on shrub invasion, would lessen the impacts of grazing on the watershed's long-term health, thereby improving hydrologic relationships and reducing sediment loads. Reducing utilization to 35 percent will also reduce impacts from livestock grazing to upland vegetation and soils. Therefore, as long as the desired resource conditions are met, livestock grazing in the uplands should have minimal effects on drainage systems and riparian and aquatic habitat.

Maintenance of viable populations of Chiricahua leopard frogs is thought to be compatible with well-managed livestock grazing. Grazing occurs in most of the habitats occupied by this frog. For instance, a large and healthy population of Chiricahua leopard frogs coexists with cattle and horses on the Tularosa River, New Mexico (Randy Jennings, Western New Mexico University, pers. comm., 1995). Throughout their range, Chiricahua leopard frogs are often found in dirt cattle tanks that are heavily used by livestock, especially cattle. However, livestock grazing and management activities can adversely affect this frog and its habitats.

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

Effects of grazing on Chiricahua leopard frog habitat probably include both creation of habitat and loss and degradation of habitats (Sredl and Jennings, *in press*). 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 Chiricahua leopard frog populations extant in Arizona from 1993 to 1996 were located in stock tanks, versus only 35 percent of extirpated localities (Sredl and Saylor 1998). Stock tanks provide small patches of habitat, which are often dynamic and subject to drying and elimination of frog populations. However, Sredl and Saylor (1998) also found that stock tanks are occupied less frequently by non-native predators (with the exception of bullfrogs) than natural sites.

Adverse effects to the Chiricahua leopard frog and its habitat as a result of grazing may occur under certain circumstances. These effects include facilitating dispersal of 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 (U.S. Fish and Wildlife Service 2000, Belsky *et al.* 1999, Ohmart 1995, Hendrickson and Minckley 1984, Arizona State University 1979, Jancovich *et al.* 1997). Creation or maintenance of livestock waters in arid environments may provide the means for nonindigenous predators, such as bullfrogs and crayfish, to move across landscapes that would otherwise serve as a barrier to their movement. Increased erosion in the watershed caused by grazing can accelerate sedimentation of deep pools used by frogs (Gunderson 1968). Sediment can alter primary productivity and fill interstitial spaces in streambed materials with fine particulates that impede water flow, reduce oxygen levels, and restrict waste removal (Chapman 1988). Eggs, tadpoles, and metamorphosing Chiricahua leopard frogs are probably trampled by cattle on the perimeter of stock tanks and in pools along streams (US Fish and Wildlife Service 2000, Bartelt 1998). Juvenile and adult frogs can probably avoid trampling when they are active. However, leopard frogs are known to hibernate on the bottom of ponds (Harding 1997), where they may be subject to trampling during the winter months. Cattle can remove bankline vegetation that provides escape cover for frogs and a source of insect prey. However, dense shoreline or emergent vegetation in the absence of grazing may favor some predators, such as garter snakes (*Thamnophis* sp.), and the frogs may benefit from some open ground for basking and foraging. At a tank in the Chiricahua Mountains, Sredl *et al.* (1997) documented heavy cattle use at a stock tank that resulted in degraded water quality, including elevated hydrogen sulfide concentrations. A die off of Chiricahua leopard frogs at the site was attributed to cattle-associated water quality problems, and the species has been extirpated from the site since the die off.

Stock ponds provide refuges for bullfrogs that could disperse among ponds, lay eggs and establish populations along Cienega Creek. To mitigate this probability stock ponds would be supplied with water on a seasonal basis only and would be allowed to dry annually or pumped dry if necessary. Repposos would dry up naturally in 1 to 3 months after the pumping stops and would be monitored and manually dried if necessary. Temporary waters can still provide temporary refuge to dispersing bullfrogs and leopard frogs. Only a few stock waters catch rain runoff that allows for extended persistence. None of these have perennial surface water. There is risk to the Chiricahua leopard frog community from developing these waters, mainly from the additional areas for bullfrogs that they create. BLM should evaluate proposed stock waters in terms of permanency and distance to extant populations of bullfrogs and leopard frogs to determine likelihood of use for breeding or dispersal.

Chytrid fungus can survive in wet or muddy environments, and could conceivably be spread by cattle carrying mud on their hooves and moving among frog habitats. The disease could also be spread by ranch hands working at an infected tank or aquatic site and then traveling to another site with mud or water from the first site. Chytrids could be carried inadvertently in mud clinging to wheel wells or tires, or on shovels, boots, or other equipment. Chytrids cannot

survive complete drying, thus, if equipment is allowed to thoroughly dry, the likelihood of disease transmission is much reduced. Bleach or other disinfectants can also be used to kill chytrids (Loncore 2000).

Chytrids could also be moved among aquatic sites during intentional introductions of fish or other aquatic organisms. Anglers 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, frogs, salamanders, or perhaps fish and crayfish, could all be carriers of chytrids. In addition to possibly introducing chytrids, such activities would also facilitate introduction of nonindigenous predators with which the Chiricahua leopard frog cannot coexist. Maintenance of roads and tanks needed for the grazing program could provide fishing opportunities and facilitate access by anglers, hunters, or other recreationists, who may inadvertently introduce chytrids from other locales, or may intentionally introduce non-native predators for angling or other purposes. Cienega Creek has been closed to fishing by the AGFD.

Livestock use in riparian areas of Cienega Creek and Nogales Springs is limited to six crossing lanes, the Narrows riparian pasture, and the A&B riparian pastures. A&B water gap will eventually be closed. Cattle presence in riparian and aquatic areas can locally degrade aquatic habitat, resulting in short-term, and possibly long-term negative impacts to suitable habitat in the 34.3 acres open to livestock use. Fencing of Nogales and Little Nogales Springs would reduce the livestock impacts, but not eliminate them, since exclosures are not 100 percent effective at keeping livestock out. Livestock periodically go through, under, or over fences; fences go down from tree fall, fires, and floods; and gates are left open. This is also true for existing exclosures. Therefore, periodic, light impacts are expected within exclosures, which may lead to the same impacts discussed for the areas that are open to grazing.

The six crossing lanes could be used year round, but use of the lanes will be rotated and limited to a maximum of 21 days. Expected short-term impacts are localized trampling of the soil and vegetation thereby causing decreased bank stability and impacts to water quality. This in turn increases the opportunity for localized water erosion from soil disturbance which impacts frog habitat by covering food organisms with silt. Pollutants from the chemical breakdown of manure will have negative impact to water quality. Some plants may also be grazed which may slow or reverse the progression toward the natural plant community in these areas. This is especially true when cattle have access to the creek during the growing season. The use of these lanes by cattle will have negative localized impacts on 8.3 acres of habitat or 2.7 percent of the riparian area available.

Maintenance of fences through occupied habitat can also impact Chiricahua leopard frogs. Fence maintenance can require the use of tools and horses, and human access into occupied habitat. These actions could lead to disturbance or loss of egg masses, and less likely, trampling of adult frogs or metamorphs.

The limits on utility and other ROW authorizations will help minimize disturbance to aquatic habitat. Any new utility lines that use the utility corridor through the Narrows, has the potential to impact Chiricahua leopard frogs. The impact will be variable, and will depend on the particular project, and whether or not Chiricahua leopard frogs are present.

The overall effect of the proposed actions on the Chiricahua leopard frog should be mostly beneficial because conservation actions are part of all specific actions that could impact leopard frogs, natural processes will be encouraged, and the ecological condition of the area should be maintained and improved during the 20-year life of the RMP. There will be site-specific negative impacts from livestock grazing and road crossings, and general effects from recreation, but these impacts should not reduce populations of the Chiricahua leopard frog. However, the potential for visitors to spread disease among sites in the action area and to other Chiricahua leopard frog habitats, is a serious concern. Actions are proposed by BLM that should assist with the conservation and recovery of the species.

### **Conclusion**

After reviewing the current status of Chiricahua leopard frog, the environmental baseline for the action area, the effects of the proposed Las Cienegas NCA RMP and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the threatened Chiricahua leopard frog. No critical habitat has been designated, thus, none would be affected. We base these conclusions on the following:

1. The population of Chiricahua leopard frogs in the area is sparsely distributed;
2. The Chiricahua leopard frog occurs over a large area of eastern Arizona, western New Mexico and portions of northwestern Mexico. The proposed action affects a small portion of the species' range;
3. All proposed actions that may lead to take of Chiricahua leopard frogs have conservation actions included which should minimize effects to the species; and
4. The ecological condition of the area should be maintained and improved during the 20-year life of the RMP.

### **Incidental Take Statement**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significant impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service 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, and sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited taking under the Act if such taking meets the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the BLM so that they become binding conditions of any grant or permit issued to any applicants, as appropriate, for the exemption in section 7(o)(2) to apply. The BLM has a continuing duty to regulate the activity covered by this incidental take statement. If the BLM (1) fails to assume and implement the terms and conditions or (2) fails to require any applicants 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. To monitor the impact of incidental take, the BLM must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)]. We anticipate that the following take could occur as a result of the proposed action:

1. Mortality, injury, pursuit, capture, collection, trapping, or harassment of up to 5 adult or metamorph Chiricahua leopard frogs during each control action for bullfrogs;
2. Mortality and injury of up to 4 adult or metamorph frogs and one egg mass annually from the use and maintenance of road and trail crossings in occupied habitat, including contamination from vehicles;
3. Harassment, pursuit, capture, or collection of up to 3 adult or metamorph frogs and one egg mass annually from general recreation use of the area, and use of the Agricultural Fields group site;
4. Mortality, injury, or harassment of up to 5 adult or metamorph Chiricahua leopard frogs and 5 egg masses annually during livestock management actions associated with exclosures, creek crossing and watering areas, and at Cinco Ponds;
5. Mortality of up to 20 adult or metamorph Chiricahua leopard frogs from the introduction or increase of nonindigenous species, especially bullfrogs, associated with the repressos and recreation and other human access;
6. Mortality, injury, or harassment of up to 1 adult or metamorph Chiricahua leopard frog annually during fence maintenance in occupied habitat;
7. Mortality, injury, or harassment of up to 5 adult or metamorph Chiricahua leopard frog annually during construction of a utility line in the utility corridor that crosses the Narrows; and

8. Mortality of Chiricahua leopard frogs at sites outside of the action area, due to dispersal of chytrid fungus by users.

**Effect of Take**

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

**Reasonable and Prudent Measures and Terms and Conditions**

The following reasonable and prudent measures are necessary and appropriate to minimize take of the Chiricahua leopard frog. To be exempt from the prohibitions of section 9 of the Act, the BLM must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting and monitoring requirements. These terms and conditions are non-discretionary.

1. The BLM shall continue to monitor the Chiricahua leopard frog and its habitat to document levels of take and determine effectiveness of conservation measures:
  - 1.1. The BLM shall continue to monitor Chiricahua leopard frog populations and habitat in accordance with FWS/AGFD/NMGF (2002) survey protocol;
  - 1.2. An annual report will be done which summarizes the implementation of the proposed action and any incidental take that occurred. We are especially interested in an analysis of the effectiveness of the conservation measures and terms and conditions.
2. Measures shall be implemented to reduce the impacts of the proposed wildlife management actions, livestock grazing, recreation, and utility corridors:
  - 2.1. During control operations, insure that operators can identify bullfrogs and leopard frogs;
  - 2.2. If traps or other methods that do not discriminate between frog species are used during bullfrog control, they will be checked at least twice a day, for as long as the traps or other gear is deployed;
  - 2.3. Reduce the speed limit to 10mph at the EC901 crossings at Empire Gulch and Cienega Creek, and at the EC910D crossing at the Narrows and post the speed limit at each crossing;
  - 2.4. To minimize impacts from recreation and as part of the proposed public education program, include information on the presence of listed species in the area, their status and importance, and prohibitions. The educational venue can take any form,

but the first one with this message must be completed within one year of the date of this biological opinion;

- 2.5. To minimize the potential for recreationists spreading disease, use the Maternity Well or Airstrip sites before the Agricultural Fields Group Site. If water is present in Cienega Creek near the Agricultural Fields Group Site when it is used, limit the groups access to Cienega Creek;
- 2.5. Use of creek crossings and watering areas for livestock should minimize impacts to Chiricahua leopard frogs;
  - A. When considering which creek crossings to use for livestock, avoid crossings which are known to be occupied by Chiricahua leopard frogs;
  - B. If a crossing within occupied habitat must be used, use it for 14 days or less, and not the 21 days specified in the RMP;
  - C. Insure that livestock do not linger in crossings with aquatic habitat and are moved through the crossing promptly;
- 2.6. Check the fences of all exclosures that have occupied Chiricahua leopard frog habitat at least once when the adjacent pasture is being used. If there is a problem with the fence, and livestock are in that pasture, repair the fence within one week of the fence problem being discovered. If cattle are not in the adjacent pasture, repair the fence before livestock are returned to the pasture;
- 2.7. All new repressos must be located to minimize the likelihood of floods moving exotic fish and bullfrogs into Chiricahua leopard frog habitat;
  - A. Repressos shall be located outside of the current 100-year floodplain when possible;
  - B. Repressos shall be constructed so runoff from precipitation captured by each represso is minimal;
  - C. The maximum water depth in a represso may not exceed four feet at any spot;
  - D. The repressos shall be used only when required to water cattle and shall be allowed to dry when no longer needed to water cattle;
  - E. If repressos do not dry within six months after use ends, they shall be drained. Before draining, check for Chiricahua leopard frogs. If frogs are present,

maintain the pond and remove any nonindigenous aquatic species that may be present;

- F. Repressos shall be located so access to the public, and potential for unauthorized release of nonindigenous species, is minimized;
- G. Coordinate with the Service on citing of new repressos, consider the location based on an analysis of permanency and likelihood of contributing to spread of disease or nonnatives, or contributing to Chiricahua leopard frog metapopulation dynamics.

2.8. All BLM personnel working in aquatic habitats will use the protocol described in FWS/AGFD/NMGF (2002) to reduce the spread of chytrid fungus;

2.9. To minimize the loss of egg masses from livestock grazing at Cinco Ponds, BLM shall build a partial enclosure fence.

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

- 3.1. All personnel performing maintenance at any creek crossing will be informed of the potential presence of Chiricahua leopard frogs, their status, and the need to perform their duties to avoid impacts to the frog and its habitat;
- 3.2. All personnel performing fence maintenance at any creek crossing will be informed of the potential presence of Chiricahua leopard frogs, their status, and the need to perform their duties to avoid impacts to the frog and its habitat;
- 3.3. All personnel installing utility lines at the Narrows will be informed of the potential presence of Chiricahua leopard frogs, their status, and the need to perform their duties to avoid impacts to the frog and its habitat.

### **Conservation Recommendations**

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

We recommend that the BLM consider providing information and expertise to any recovery team or plan for the Chiricahua leopard frog

We recommend that the BLM work with the Service and Arizona Game and Fish Department to reestablish the Chiricahua leopard frog to suitable habitats.

We recommend that the BLM work with the Service and Arizona Game and Fish Department to begin an aggressive program to ensure that nonindigenous aquatic organisms are not introduced to the action area, and if they are, to support actions to remove them.

We recommend that the BLM build bridges across creek crossings with water. Bridges can reduce long-term habitat degradation, mortality, and disease transmission.

For the Service to be kept informed of actions reducing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

### **DESERT PUPFISH (*Cyprinodon m. macularius*)**

#### **Status of the Species**

In Arizona, the genus *Cyprinodon* historically consisted of two recognized subspecies, (*C. m. macularius*) and (*C. m. eremus*), and an undescribed species, the Monkey Spring pupfish. The desert pupfish subspecies are now recognized as separate species, the desert pupfish (*Cyprinodon macularius*) and the Quitobaquito pupfish (*C. eremus*) (Echelle et al. 2000). The desert pupfish was listed as an endangered species with critical habitat on April 30, 1986 (USFWS 1986c). Historical distribution of desert pupfish in Arizona included the Gila, San Pedro, Salt, and Santa Cruz Rivers, and likely the Hassayampa, Verde, and Agua Fria Rivers, although collections are lacking for the latter three. The desert pupfish is also found in the lower Colorado River, Salton Sink basin, and Laguna Salada basin (Eigenmann and Eigenmann 1888, Gilbert and Scofield 1898, Thompson 1920, Coleman 1929, Miller 1943, Minckley 1973, 1980, Miller and Fuiman 1987). Historic collections occurred in Baja California and Sonora, Mexico, and in the United States in California and Arizona.

The natural history of the desert pupfish is very similar to that described for the Gila topminnow. They occupied similar habitats, although the pupfish was not nearly as widespread. The desert pupfish also went through cycles of expansion and contraction because of natural climatological variation (USFWS 1986c, 1993; Weedman and Young 1997). Such a scenario would have led to panmixia among populations over a very large geographic area (USFWS 1993a).

Twelve natural populations persist; eight of these are in Mexico. About 20 reestablished populations exist in the wild (USFWS 1993). One or more threats imperil most natural and reestablished populations. Since the 19th century, desert pupfish habitat has been steadily destroyed by streambank erosion, the construction of water impoundments that dewatered downstream habitat, excessive groundwater pumping, the application of pesticides to nearby agricultural areas, and the introduction of nonindigenous fish species. The nonindigenous bullfrog may also prove problematic in the management of desert pupfish. The bullfrog is an opportunistic omnivore with a diet that includes fish (Frost 1935, Cohen and Howard 1958, Clarkson and deVos 1986). There is also a concern that introduced salt cedar next to pupfish habitat may cause a lack of water at critical times (Bolster 1990; R. Bransfield, USFWS, pers.

comm., 1999). Evapotranspiration by luxuriant growths of this plant may especially impact smaller habitats where water supply is limited. The remaining populations continue to face these threats.

Naturally occurring populations of desert pupfish are now restricted in the United States to California in two streams tributary to, and a few shoreline pools and irrigation drains of, the Salton Sea. The species is found in Mexico at scattered localities along the Colorado River Delta and in the Laguna Salada basin. No natural populations occur in Arizona. Additional life history information can be found in the recovery plan (USFWS 1993) and other references cited there.

### **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.

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

See riparian conditions described under the Gila Topminnow section. This species has not been found in the Cienega Creek drainage within the planning area but does occupy habitat in other drainages nearby. The entire Santa Cruz River drainage, below about 4,000', is considered historic habitat (USFWS 1993). No comprehensive surveys have been conducted for it along Cienega Creek or its tributaries, though numerous fishery surveys have been done since BLM acquired the Empire-Cienega. There are reestablished populations in Arizona, and the closest one is on the private land of the Appleton-Whittell Research Ranch. However, there is the possibility that this population is derived from both Quitobaquito and desert pupfish. A hybrid population should be avoided for conservation and recovery of the species when unhybridized individuals and populations still exist.

### **Factors affecting species environment within the action area**

Pima County is in the process of drafting a multi-species conservation plan that includes the desert pupfish. Actions to minimize negative impacts to pupfish and potential habitat will be identified in the plan, as will actions such as reestablishment, that promote the conservation and recovery of the species.

### **Effects of the Action**

The desert pupfish is one of the species that will be considered for reestablishment into the planning area. If reestablishment occurs, many of the effects of the proposed action on the Gila topminnow, and other listed aquatic species, will be very similar to those for the desert pupfish. Therefore, the discussion of effects will not be repeated and is incorporated here by reference. The analysis of effects assumes that desert pupfish will be reestablished.

The overall effect of the proposed action on the desert pupfish should be mostly beneficial if the species is reestablished. Negative effects from the proposed action will be minimized because conservation actions are part of all specific actions that could impact desert pupfish, and the ecological condition of the area should be maintained and improved during the 20-year life of the RMP. There will be site specific negative impacts from livestock grazing and road crossings, and general effects from recreation, but these impacts should not reduce populations of the desert pupfish. The main concern is the potential for visitors to release, intentionally or unintentionally, NIS that would present problems for desert pupfish. In addition, actions are proposed by BLM that should assist with the conservation and recovery of the species.

### **Conclusion**

After reviewing the current status of desert pupfish, the environmental baseline for the action area, the effects of the proposed Las Cienegas NCA RMP and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the proposed endangered. Critical habitat has been designated outside of the action area, thus, none would be affected. We base these conclusions on the following:

1. The desert pupfish does occur in the action area, but it is on nearby private land and of questionable genetic lineage;
2. The proposed action affects a small portion of the species' range;
3. If desert pupfish are reestablished in the action area, the proposed action should be mostly beneficial to the conservation and recovery of the species;
4. All proposed actions that could affect the desert pupfish, if it were to occur, have conservation actions included which should minimize effects to the species;
5. The BLM proposes actions identified in the recovery plan that will help conserve and recover the species; and
6. The ecological condition of the area should be maintained and improved during the 20-year life of the RMP.

### **Incidental Take Statement**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significant impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service 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, and sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited taking under the Act if such taking meets the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the BLM so that they become binding conditions of any grant or permit issued to any applicants, as appropriate, for the exemption in section 7(o)(2) to apply. The BLM has a continuing duty to regulate the

activity covered by this incidental take statement. If the BLM (1) fails to assume and implement the terms and conditions or (2) fails to require any applicants 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. To monitor the impact of incidental take, the BLM must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

The Service anticipates that the proposed action will result in incidental take of desert pupfish because reestablishment of the pupfish is part of the proposed action. Incidental take of the desert pupfish is likely to occur if the pupfish is reestablished and will be difficult to detect for the following reasons: dead fish are difficult to find, cause of death may be difficult to determine, and losses may be masked by seasonal fluctuations in numbers or other causes. However, take of desert pupfish may occur from livestock grazing, recreation, and wildlife management actions. We anticipate that the following take could occur as a result of the proposed action:

1. Mortality, injury, pursuit, capture, collection, trapping, or harassment of up to 100 desert pupfish during each control action for nonindigenous aquatic species;
2. Mortality and injury of up to 10 desert pupfish annually from the use and maintenance of road and trail crossings in occupied habitat, including contamination from vehicles;
3. Harassment of up to 10 desert pupfish annually from general recreation use of the area, and use of the Agricultural Fields group site;
4. Mortality, injury, or harassment of up to 25 desert pupfish annually during livestock management actions associated with exclosures, creek crossing and watering areas, and at Cinco Ponds or other reestablishment areas;
5. Mortality of up to 500 desert pupfish from the introduction or increase of nonindigenous species, associated with the repressos and recreation and other human access;
6. Mortality, injury, or harassment of up to 5 desert pupfish annually during fence maintenance in occupied habitat; and
7. Mortality, injury, or harassment of up to 5 desert pupfish annually during construction of a utility line in the utility corridor that crosses the Narrows.

### **Effect of Take**

In this biological opinion, the Service finds the anticipated level of take is not likely to jeopardize the continued existence of the endangered desert pupfish.

**Reasonable and Prudent Measures and Terms and Conditions**

The following reasonable and prudent measures are necessary and appropriate to minimize take of the desert pupfish. To be exempt from the prohibitions of section 9 of the Act, the BLM must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting and monitoring requirements. These terms and conditions are non-discretionary. These reasonable and prudent measures and terms and conditions are only in effect following reestablishment of desert pupfish into the project area.

1. The BLM shall monitor the desert pupfish and its habitat to document levels of take and determine effectiveness of conservation measures if the species is reestablished:
  - 1.1. The BLM shall continue to monitor desert pupfish populations and habitat;
  - 1.2. The BLM shall provide to us copies of any reports regarding implementation of the proposed action. We are especially interested in reports that include an analysis of the effectiveness of the mitigation measures. All take must be reported annually.
2. Measures shall be implemented to reduce the impacts of the proposed wildlife management actions, livestock grazing, recreation, and utility corridors:
  - 2.1. Before nonindigenous aquatic species control activities occur, monitor for the presence of desert pupfish and remove and repatriate desert pupfish as appropriate;
  - 2.2. Reduce the speed limit to 10mph at the EC901 crossings at Empire Gulch and Cienega Creek, and at the EC910D crossing at the Narrows and post the speed limit at each crossing;
  - 2.3. To minimize impacts from recreation and as part of the proposed public education program, include information on the presence of listed species in the area, their status and importance, and prohibitions. The educational venue can take any form, but the first one with this message must be completed within one year of the date of this biological opinion;
  - 2.4. Use of creek crossings and watering areas for livestock should minimize impacts to desert pupfish;
    - A. When considering which creek crossings to use for livestock, avoid crossings which are known to be occupied by desert pupfish;
    - B. If a crossing within occupied habitat must be used, use it for 14 days or less, and not the 21 days specified in the RMP;

- C. Insure that livestock do not linger in crossings with aquatic habitat and are moved through the crossing promptly;
- 2.5. Check the fence of all exclosures that have occupied desert pupfish habitat at least once when the adjacent pasture is being used. If there is a problem with the fence and livestock are in that pasture, repair the fence within one week of the fence problem being discovered. If cattle are not in the adjacent pasture, repair the fence before livestock are returned to the pasture;
- 2.6. All new repressos must be located to minimize the likelihood of floods moving nonindigenous aquatic species into topminnow habitat;
- A. New repressos should be located outside of the current 100-year floodplain when possible;
  - B. Repressos shall be constructed so runoff from precipitation captured by each represso is minimal;
  - C. The maximum water depth in a represso may not exceed four feet at any spot;
  - D. The repressos shall be used only when required to water cattle and shall be allowed to dry when no longer needed to water cattle;
  - E. If repressos do not dry within six months after use ends, they shall be drained;
  - F. Repressos should be located so access to the public, and potential for unauthorized release of nonindigenous species, is minimized;
3. Personnel education programs and well-defined operational procedures shall be implemented:
- 3.1. All personnel performing maintenance at any creek crossing will be informed of the potential presence of desert pupfish, their status, and the need to perform their duties to avoid impacts to the frog and its habitat;
  - 3.2. All personnel performing fence maintenance at any creek crossing will be informed of the potential presence of desert pupfish, their status, and the need to perform their duties to avoid impacts to the topminnow and its habitat;
  - 3.3. All personnel installing utility lines at the Narrows will be informed of the potential presence of desert pupfish, their status, and the need to perform their duties to avoid impacts to the topminnow and its habitat.

### **Conservation Recommendations**

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

We recommend that the BLM work with the Service and Arizona Game and Fish Department to reestablish the desert pupfish to suitable habitats (Recovery Plan Tasks 2 [USFWS 1993]).

We recommend that the BLM work with the Service and Arizona Game and Fish Department to begin an aggressive program to ensure that nonindigenous aquatic organisms are not introduced to the action area, and if they are, to support actions to remove them (Recovery Plan Task 1.3, 2).

We recommend that the BLM work with all interested parties in the Cienega Creek watershed to insure that groundwater use does not exceed annual recharge (Recovery Plan Task 1.3, 2).

### **GILA CHUB (*Gila intermedia*)**

#### **Status of the Species**

The Gila chub (*Gila intermedia*) was proposed as endangered with critical habitat on August 9, 2002 (USFWS 2002b). Historically, Gila chub have been recorded in about 30 rivers, streams, and spring-fed tributaries throughout the Gila River basin in southwestern New Mexico, central and southeastern Arizona, and northern Sonora, Mexico (Miller and Lowe 1967, Rinne and Minckley 1970, Minckley 1973, Rinne 1976, DeMarais 1986, and Propst 1989). Today the Gila chub has been restricted to small, isolated populations scattered throughout its historic range.

The reason for the decline of this fish is due to habitat loss, invasion of nonindigenous fish species; and past and current dewatering of rivers, springs, and cienegas, diversion of water channels, impoundments, regulation of flow, and land management practices. All of these activities have promoted erosion and arroyo formation and the introduction of predacious and competing nonindigenous fish species (Miller 1961, Minckley 1985). Life history information can be found in the status review (Weedman et al. 1996), the proposed rule (USFWS 2002b), and references cited there.

The Gila chub is a member of the minnow family Cyprinidae. The Gila chub is small-finned, deep-bodied, chubby (chunky), and darkly colored (sometimes lighter on belly; diffuse lateral band(s) are rarely present). Adult males average about 150 millimeters (6 in.) in total length; females can exceed 200 mm (8 in). Scales are course, large, thick, and broadly overlapped, and

radiate out from the base. Lateral-line scales usually number greater than 61 and less than 80. There are usually eight (rarely seven or nine) dorsal and anal fin-rays; pelvic fin-rays typically number eight, but sometimes nine. Gila chub commonly inhabit pools in smaller streams, springs, and cienegas, and can survive in small artificial impoundments (Miller 1946, Minckley 1973, Rinne 1975). Gila chub are highly secretive, preferring quiet, deeper waters, especially pools, or remaining near cover like terrestrial vegetation, boulders, and fallen logs (Rinne and Minckley 1991).

Undercut banks created by overhanging terrestrial vegetation with dense roots growing into pool edges provide ideal cover (Nelson 1993). Gila chub can survive in larger stream habitat such as the San Carlos River, and artificial habitats, like the Buckeye Canal (Stout et al. 1970, Rinne 1976). The Gila chub interacts with spring and small stream fishes regularly (Meffe 1985), but are usually restricted to deeper waters (Minckley 1973). Adults often are found in deep pools and eddies below areas with swift current, as in the Gila chub habitats found in Bass Canyon and Hot Springs in the Muleshoe Preserve. Young-of-the-year inhabit shallow water among plants or eddies, while older juveniles use higher velocity stream areas (Minckley 1973, Minckley and Deacon 1991). The biological needs of the Gila chub include but are not limited to, the following: space for individual and population growth, and for normal behavior; food, water, or other nutritional or physiological requirements; cover or shelter sites for breeding, reproduction, or rearing of offspring; and habitats that are protected from disturbance or are representative of the historical geographical and ecological distribution of a species.

In New Mexico, the only drainage where Gila chub occur is Turkey Creek. They were last documented there in the summer of 2001. In Arizona, small remnant populations remain in several tributaries of the upper Verde River, San Pedro River, San Carlos River, Blue River, San Francisco River, Agua Fria River, and the Gila River.

In the Verde River basin, Walker and Spring Creek populations (Yavapai County) are considered as stable-threatened populations, and the status of the Williamson Valley Wash population is unknown. The Santa Cruz River has three tributaries with extant populations of Gila chub: Sabino Canyon (Pima County) and Sheehy Spring (Santa Cruz County) have unstable-threatened populations, and Cienega Creek (Pima and Santa Cruz Counties) has the only known stable-secure population of Gila chub in existence. The San Pedro River basin has three extant, stable-threatened populations in Redfield Canyon (Graham and Pima Counties), O'Donnell Creek (Santa Cruz County), and Bass Canyon (Graham and Cochise Counties). The status of the Gila chub in the Babocomari River (Santa Cruz and Cochise counties), is unknown. The San Carlos River and the Blue River, (Gila and Graham counties), are on the San Carlos Apache Indian Reservation and are tributary to the Gila River. They are believed to have extant populations of Gila chub but information is not available to us on the status of Gila chub in those drainages.

The San Francisco River has two tributaries with extant populations, Harden Cienega Creek and Dix Creek, (Greenlee County). The status of these two populations is unknown, but both are thought to be small. The Agua Fria River has two tributaries with stable-threatened populations,

Silver and Sycamore Creeks (Yavapai County), as well as two unstable-threatened populations in Little Sycamore Creek and Indian Creek (Yavapai County). In addition, there are two other populations in the Agua Fria drainage, Larry Creek and Lousy Canyon (Yavapai County), for which the population status is unknown. Two tributaries of the Gila River in Arizona have extant populations of Gila chub. Eagle Creek (Graham and Greenlee Counties), has an unstable-threatened population and Bonita Creek (Graham County), has a stable-threatened population.

In Mexico, the current known distribution of Gila chub in Mexico has been reduced to two small spring areas, Cienega los Fresnos and Cienega la Cienegita, adjacent to the Arroyo los Fresnos (tributary to the San Pedro River), within 2 km (1 mi) of the Arizona-Mexico border (Varela-Romero et al. 1992). No Gila chub remain in the Mexican portion of the Santa Cruz River (Weedman et al. 1996).

Reestablishment of Gila chub has been attempted in three Arizona sites; two are believed to be extant. Lousy Canyon and Larry Creek, are tributaries to the Agua Fria River and were stocked with 200 Gila chub from Silver Creek in July 1995. Both sites will require monitoring to document success of the stockings. The third site, Gardner Canyon (Cochise County), was stocked from Turkey Creek (Santa Cruz County) with 150 Gila chub in July 1988. In May 1995, no Gila chub or any other fish were captured during surveys.

Baird and Girard (1854:28) published a description of the Gila chub, as *Gila gibbosa*, based on the type specimen collected in 1851 from the Santa Cruz River. For nomenclature reasons, the name was changed by Girard to *Tigoma intermedia* in 1856, working with specimens from the San Pedro River. Despite that and other name changes, the Gila chub has been recognized as a distinct species since the 1850's, with the exception of a short period in the mid-1900's when it was placed as a subspecies of *Gila robusta* (Miller 1946). For the past 30 years, *Gila intermedia* has been recognized as a full monotypic species, separate from the polytypic species *Gila robusta*, both currently accepted as valid (Robbins et al. 1991, Mayden et al. 1992). Problematic populations nonetheless exist, variously assigned to one or the other taxa and leading to continued confusion. Minckley and DeMarais (2000) describe a new subspecies within the Gila River Basin, *Gila nigra*. It is of hybrid origin derived from *Gila robusta* and *Gila intermedia*. Its range is similar to that of *Gila intermedia* and is another headwater type chub, whereas, *Gila robusta* is found in the mainstem of the major rivers within the Gila River Basin.

The constituent elements of proposed critical habitat are generalized descriptions and ranges of selected habitat factors that are critical for the survival and recovery of Gila chub. The appropriate and desirable level of these factors may vary seasonally and is highly influenced by site-specific circumstances. Therefore, assessment of the presence/absence, level, or value of the constituent elements must include consideration of the season of concern and the characteristics of the specific location. The constituent elements are not independent of each other and must be assessed holistically, as a functioning system, rather than individually. In addition, the constituent elements need to be assessed in relation to larger habitat factors, such as watershed, floodplain, and streambank conditions, stream channel morphology, riparian vegetation, hydrologic patterns, and overall aquatic faunal community structure.

Riparian and aquatic communities across the southwest have been degraded or destroyed by human activities (Hastings 1959, Hastings and Turner 1965, Hendrickson and Minckley 1984). Humans have affected southwestern riparian systems over a period of several hundred years.

Eighty-five to ninety percent of the Gila chub's habitat has been degraded or destroyed, and much of it is unrecoverable. Only 29 extant populations of Gila chub remain; all but one is small, isolated, and threatened. The current status of the Gila chub is poor and declining.

### **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 discussion of aquatic habitat condition and inventory, and surveys or assessments in the planning area in the Gila topminnow section are incorporated here by reference.

The Gila chub currently occupies three drainages within the proposed action area. These drainages are Cienega Creek, Empire Gulch, and Mattie Canyon.

Cienega Creek has 19.0 miles of proposed critical habitat. Only 9.0 of the miles occur within the proposed action area. The other 10 miles are downstream. Cienega Creek is considered the only stable-secure population of Gila chub. Recent fish surveys (2001) have shown that adult Gila chub occupy all perennial sections of Cienega Creek. Cienega Creek is classified as a Category 1 habitat by the Arizona Game and Fish Department (Simons 1987). Cienega Creek currently has no nonindigenous fish species.

Mattie Canyon has 2.0 miles of proposed critical habitat. Mattie Canyon consists of riffle-pool type habitat with Gila chub. Empire Gulch has 3.2 miles of proposed critical habitat and the last documented Gila chub was in 2001 (pers.comm., BLM 2002). Empire Gulch currently contains the necessary habitat parameters to continue to support the extant population of Gila chub.

### **Effects of the Action**

Within the proposed action area, there is a total of 14.2 miles of proposed critical habitat. As mentioned above all occur in Cienega Creek and two of its tributaries. Critical habitat is defined in section 3 paragraph (5)(A) of the Act as (i) the specific areas within the geographical area occupied by a species, at the time it is listed in accordance with the Act, on which are found those physical or biological features (I) essential to the conservation of the species and (II) that may require special management consideration or protection and (ii) specific areas outside the geographical area occupied by a species at the time it is listed, upon determination that such areas are essential for the conservation of the species. "Conservation as defined by the Act, means the use of all methods and procedures that are necessary to bring an endangered species or a threatened species to the point at which listing under the Act is no longer necessary.

In proposing critical habitat for the Gila chub, we identified all the currently known occupied sites and determined whether they contained the primary constituent elements for the future conservation of the Gila chub. Cienega Creek and its tributaries, Empire Gulch and Mattie Canyon, contain the necessary primary constituent elements necessary for the conservation of the Gila chub. Proposed land-use practices within the proposed action area may affect the Gila chub and its proposed critical habitat.

Many of the effects of the proposed action on the Gila chub and its proposed critical habitat will be very similar to those for the Gila topminnow. Therefore, the discussion of effects will not be repeated and is incorporated here by reference. The discussion on the effects of the proposed action to the Gila chub will focus on effects that are different from that of the Gila topminnow and the effects of some site-specific actions.

Implementing a vegetation treatment program would result in conditions that help Cienega Creek meet and maintain the aquatic portion of the riparian objective. Upland vegetation management and site restoration would enhance riparian development and channel stability by reducing the amount and duration of surface runoff and transport of sediment into occupied Gila chub critical habitat. Upland vegetation management will also help to reduce the prevalence of invading upland shrubs from becoming established in the riparian areas of occupied Gila chub critical habitat. Such management would also increase watershed cover by promoting increased perennial grasses. These actions should positively affect the Gila chub. Any negative effects of the action should be mitigated with the conservation actions BLM proposes as part of each action.

Controlled burning and herbicide use should affect Gila chub similarly as the Gila topminnow and Chiricahua leopard frog. Prescribed fires have the potential to escape. However, as evidenced by the wildfire in March 2002, even in drought conditions, fire may not have a large impact on certain riparian vegetation. The wildfire burned right up to the riparian vegetation, burned some of the trees on the outer edge, then jumped over the riparian vegetation to the other side of Cienega Creek. The riparian vegetation and the aquatic habitat sustained minimal damage from the fire. However, uncontrolled fires can have adverse effects on Gila chub critical habitat by way of surface runoff laden with ash that is deposited into streams as a result of upland vegetation being burned. A proper riparian vegetation buffer, will help reduce the amount of surface runoff from burned areas entering into occupied Gila chub habitat.

Control of nonindigenous species, and especially fish, will negatively impact Gila chub in the short-term. The purpose of nonindigenous species control is to benefit native species, but there will be transient negative effects. If nonindigenous fish get into occupied Gila chub habitat, be it currently occupied or areas where chub may be reestablished, control actions are likely to be taken, and should be taken by the BLM. All control actions of nonindigenous fauna would include the AGFD, and if listed species are involved, the Service. Control of nonindigenous fish will probably include the capture and collection and eventual repatriation of rare species likely to

be impacted by the action, and the use of lethal control. This will lead to death, injury, or harassment of Gila chub. Depending on the locality, it is unlikely that all Gila chub would be removed from a site, and chub would thus be killed during lethal control actions. Nonindigenous fish control is more likely to succeed in simpler habitats like Cinco Ponds, Road Canyon Well, and Nogales and Little Nogales springs. If certain nonindigenous fish became established in Cienega Creek, it would be impossible to completely remove them with current technology.

The BLM proposes to continue monitoring Gila chub and their habitats. Monitoring requires the capture of fish. Following handling protocols, and minimizing handling time will minimize the potential effects of monitoring on Gila chub.

The impacts of cultural resource management, OHVs, and road crossings would be the same for Gila chub as for the Chiricahua leopard frog and Gila topminnow. However, since Gila chub lay eggs, contaminants associated with road crossings are more likely to affect Gila chub than Gila topminnow. Gila chub may be present at the crossings and could be killed or injured as vehicles cross or maintenance is done. The two road crossings are also prime locations for the release of nonindigenous species. If the OHV use is outside these crossings, additional impacts could occur in the form of trampling and crushing of riparian vegetation with the addition of increased sediment into occupied Gila chub critical habitat.

The Arizona Trail and other recreational activities will have similar impacts on Gila chub as the Gila topminnow. Increased travel and activity in the creek such as wading, bathing, and swimming could slightly increase injury or mortality to Gila chub. This injury and mortality should only negligibly affect the Cienega Creek population of Gila chub, as it is expected to be minimal. However, with the increase in human populations in the nearby communities of Sonoita and Tucson, it is likely that there will be an increase in recreational activity within the proposed Gila chub critical habitat within the 20-year life of the RMP. Establishing a recreation permit system should help ensure the sustainability of aquatic habitats and populations of this species.

Potential mineral development in the Empire Mountains may impact Gila chub, since there is a chub population downstream in the Cienega Creek Preserve. It is not possible to determine the specific impacts of mineral development now, as potential actions may be widely variable in their scope of effects, timing, and duration. However, there are only two small claims in this small area. The majority of public lands in the area are closed to mineral development.

As specified in the section, Effects of the Action - Overview, livestock grazing can affect uplands and watershed functioning, which in turn, can affect drainage systems and riparian and aquatic habitat. Upland vegetation treatments, which may offset the influence of livestock grazing on shrub invasion, would lessen the impacts of grazing on the watershed's long-term health, thereby improving hydrologic relationships and reducing sediment loads. Reducing utilization to 35 percent will also reduce impacts from livestock grazing to upland vegetation and soils.

Therefore, as long as the desired resource conditions are met, livestock grazing in the uplands should have minimal effects on drainage systems and riparian and aquatic habitat.

Maintenance of viable populations of Gila chub is compatible with well-managed livestock grazing. Adverse effects to the Gila chub and its habitat as a result of grazing may occur under certain circumstances. These effects include facilitating dispersal of nonindigenous predators; trampling of fish; deterioration of watersheds; erosion and siltation of stream courses; loss of wetland and riparian vegetation and backwater pools; and spread of disease (Arizona State University 1979, Hendrickson and Minckley 1984, Ohmart 1996, Jancovich et al. 1997, Belsky et al. 1999, U.S. Fish and Wildlife Service 2000). Creation or maintenance of livestock waters in arid environments may provide the means for nonindigenous predators, such as bullfrogs and crayfish, to move across landscapes that would otherwise serve as a barrier to their movement. Sediment can alter primary productivity and fill interstitial spaces in streambed materials with fine particulates that impede water flow, reduce oxygen levels, and restrict waste removal (Chapman 1988).

Livestock use, crossing, and watering at Cienega Creek, Mattie Canyon, or Empire Gulch could trample or ingest small numbers of Gila chub causing injury or mortality. For about six weeks during the summer cattle graze and use Cinco Ponds. Heavy grazing and bank trampling may reduce the quality and quantity of habitat for Gila chub. Chub do not occur in Cinco Ponds, but could be repatriated there. Water quality is diminished by sedimentation and accumulation of urine and fecal waste. Bank damage fills and widens these ponds, slowly leading to less open water and more coverage by aquatic plants, speeding succession to wet meadows. Conversely, light to moderate grazing can reduce the biomass of plant material deposited in the ponds annually by cropping off large volumes of aquatic plants, effectively maintaining open pond habitat suitable for fish and making eradication of nonindigenous species easier.

Livestock use in riparian areas of Cienega Creek and Nogales Springs is limited to six crossing lanes, the Narrows riparian pasture, and the A&B riparian pastures. A&B water gap will eventually be converted to a lane. Cattle presence in riparian and aquatic areas can locally degrade aquatic habitat, resulting in short-term, and possibly long-term negative impacts to suitable habitat in the 34.3 acres open to livestock use. Fencing of Nogales and Little Nogales springs would reduce the livestock impacts, but not eliminate them, since exclosures are not 100 percent effective at keeping livestock out. Livestock periodically go through, under, or over fences; fences go down from tree fall, fires, and floods; and gates are left open. This is also true for existing exclosures. Therefore, periodic, light impacts are expected within exclosures, which may lead to similar impacts discussed for the areas that are open to grazing.

At the Narrows riparian pasture, cattle will have access to the creek for up to 112 days. Negative impacts from the grazing of plants at the Narrows is expected but to a lesser degree because cattle will not have access during the growing season. Cattle could have access to the creek for an extended period of time; therefore, other localized impacts mentioned for the crossings would occur to a greater degree at the Narrows riparian pasture's 11.5 acres and 14.5 acres of the A&B pastures.

Stock ponds can provide refuge for nonindigenous aquatic species that could disperse among ponds and establish populations in Cienega Creek. To mitigate this probability, stock ponds would be supplied with water on a seasonal basis only and would be allowed to dry annually or pumped dry if necessary. Repressos would dry up naturally in 1 to 3 months after the pumping stops and would be monitored and manually dried if necessary. Only a few stock waters catch rain runoff that allows for extended persistence. None of these have perennial surface water. There is risk to the Gila chub from developing these waters.

Maintenance of fences through occupied habitat can also impact Gila chub. Fence maintenance can require the use of tools and horses, and human access into occupied habitat. These actions could lead to disturbance or loss of individual Gila chub.

Any new utility lines that use the utility corridor through the Narrows have the potential to impact Gila chub. The impact will be variable, and will depend on the particular project.

The overall effect of the proposed actions on the Gila chub should be mostly beneficial because conservation actions are part of all specific actions that could impact Gila chub, natural processes will be encouraged, and the ecological condition of the area should be maintained and improved during the 20-year life of the RMP. There will be site specific negative impacts from livestock grazing and road crossings, and general effects from recreation, but these impacts should not reduce populations of the Gila chub. The main concern is the potential for visitors to release, intentionally or unintentionally, nonindigenous species that would present problems for Gila chub. In addition, actions are proposed by BLM that should assist with the conservation and recovery of the species.

### **Cumulative Effects**

Cumulative effects are those adverse effects of future non-Federal (State, local government, and private) actions that are reasonably certain to occur in the project area. Future Federal actions would be subject to the consultation requirements established in section 7 of the Act and, therefore, are not considered cumulative to the proposed project. Effects of past Federal and private actions are considered in the Environmental Baseline.

Cumulative effects to Gila chub include ongoing activities in the watershed such as livestock grazing and associated activities outside of the allotments addressed herein, irrigated agriculture, groundwater pumping, stream diversion, bank stabilization, channelization without a Federal nexus, and recreation. Some of these activities, such as irrigated agriculture are declining and are not expected to contribute substantially to cumulative long-term adverse effects to Gila chub.

Other activities, such as recreation, are increasing. Increasing recreational, residential, or commercial use of the private lands near the riparian areas would likely result in increased cumulative adverse effects to occupied Gila chub habitat through increased water use, increased pollution, and increased alteration of the streambanks through riparian vegetation suppression, bank trampling, and erosion.

In 1991, the American Fisheries Society adopted a position statement regarding cumulative effects of small modifications to fish habitat (Burns 1991). That statement concludes that accumulation of localized or small impacts, often from unrelated human actions, pose a serious threat to fisheries. It also points out that some improvement efforts to fish habitat may not result in cumulative increases in status of the species but instead may simply mitigate cumulative habitat alterations from other activities.

### **Conclusion**

After reviewing the current status of Gila chub, the environmental baseline for the action area, the effects of the proposed Las Cienegas NCA RMP and the cumulative effects, it is the Service's conference opinion that the action, as proposed, is not likely to jeopardize the continued existence of the proposed endangered Gila chub and is not likely to destroy or adversely modify proposed critical habitat. We base these conclusions on the following:

1. The populations of Gila chub in the action area are robust;
2. The proposed action affects a small portion of the species' range;
3. All proposed actions that may lead to take of Gila chub have conservation actions included which should minimize effects to the species;
4. The BLM proposes actions in the proposed management plan that will help conserve and recover the species; and
5. The ecological condition of the area should be maintained and improved during the 20-year life of the RMP.

### **Incidental Take Statement**

Section 9 of the Act and Federal regulation following 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 by FWS 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 by FWS as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

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

#### **Amount or Extent of Take**

The Service anticipates that the proposed action will result in incidental take of Gila chub. Incidental take of the Gila chub will be difficult to detect for the following reasons: dead fish are difficult to find, cause of death may be difficult to determine, and losses may be masked by seasonal fluctuations in numbers or other causes. However, take of Gila chub may occur from livestock grazing, recreation, and wildlife management actions. We anticipate that the following take could occur as a result of the proposed action:

1. Mortality, injury, pursuit, capture, collection, trapping, or harassment of up to 500 Gila chub during each control action for nonindigenous aquatic species;
2. Mortality and injury of up to 10 Gila chub annually from the use and maintenance of road and trail crossings in occupied habitat, including contamination from vehicles;
3. Harassment of up to 10 Gila chub annually from general recreation use of the area, and use of the Agricultural Fields group site;
4. Mortality, injury, or harassment of up to 100 Gila chub annually during livestock management actions associated with exclosures, creek crossing and watering areas, and at Cinco Ponds or other reestablishment areas;
5. Mortality of up to 1,000 Gila chub from the introduction or increase of nonindigenous species, associated with the repressos and recreation and other human access;
6. Mortality, injury, or harassment of up to 10 Gila chub annually during fence maintenance in occupied habitat; and
7. Mortality, injury, or harassment of up to 25 Gila chub annually during construction of a utility line in the utility corridor that crosses the Narrows.

**Effect of Take**

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

**Reasonable and Prudent Measures and Terms and Conditions**

The Service believes the following reasonable and prudent measures are necessary and appropriate to minimize take of the Gila chub. The prohibitions against taking the species found in section 9 of the Act do not apply until the species is listed. However, the Service advises the BLM to consider implementing the following reasonable and prudent measures. If this conference opinion is adopted as a biological opinion following a listing or designation, these measures, with their implementing terms and conditions, will be nondiscretionary.

To be exempt from the prohibitions of section 9 of the Act once the proposed Gila chub is listed, the BLM must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting and monitoring requirements. If this conference opinion is adopted as a biological opinion following a listing or designation, these terms and conditions will be non-discretionary:

1. The BLM shall continue to monitor the Gila chub and its habitat to document levels of take and determine effectiveness of conservation measures:
  - 1.1. The BLM shall continue to monitor Gila chub populations and habitat as proposed;
  - 1.2. An annual report will be done which summarizes the implementation of the proposed action and any incidental take that occurred. We are especially interested in an analysis of the effectiveness of the conservation measures and terms and conditions.
2. Measures shall be implemented to reduce the impacts of the proposed wildlife management actions, livestock grazing, recreation, and utility corridors:
  - 2.1. Before nonindigenous aquatic species control activities occur, monitor for the presence of Gila chub and remove and repatriate Gila chub as appropriate;
  - 2.2. Reduce the speed limit to 10mph at the EC901 crossings at Empire Gulch and Cienega Creek, and post the speed limit at each crossing;
  - 2.3. To minimize impacts from recreation and as part of the proposed public education program, include information on the presence of listed species in the area, their status and importance, and prohibitions. The educational venue can take any form, but the first one with this message must be completed within one year of the date of this biological opinion;

- 2.4. Use of creek crossings and watering areas for livestock should minimize impacts to Gila chub;
  - A. When considering which creek crossings to use for livestock, avoid crossings which are known to be occupied by Gila chub when possible (presently, most crossings are occupied by chub);
  - B. Monitor crossings at least once a year to determine if there are problems with erosion, sedimentation, vegetation condition, or any other resource conditions;
  - C. Insure that livestock do not linger in crossings with aquatic habitat and are moved through the crossing promptly;
- 2.5. Check the fences of all exclosures that have occupied Gila chub habitat at least once when the adjacent pasture is being used. If there is a problem with the fence and livestock are in that pasture, repair the fence within one week of the fence problem being discovered. If cattle are not in the adjacent pasture, repair the fence before livestock are returned to the pasture;
- 2.6. All new repressos must be located to minimize the likelihood of floods moving nonindigenous aquatic species into chub habitat;
  - A. Any new repressos shall be located outside the 100-year floodplain;
  - B. Repressos shall be constructed so runoff from precipitation captured by each represso is minimal;
  - C. The maximum water depth in a represso may not exceed four feet at any spot;
  - D. The repressos shall be used only when required to water cattle and shall be allowed to dry when no longer needed to water cattle;
  - E. If repressos do not dry within six months after use ends, they shall be checked for nonindigenous aquatic species first then drained;
  - F. Repressos should be located so access to the public, and potential for unauthorized release of nonindigenous species, is minimized;
3. Personnel education programs and well-defined operational procedures shall be implemented:

- 3.1. All personnel performing maintenance at any creek crossing will be informed of the potential presence of Gila chub, their status, and the need to perform their duties to avoid impacts to the fish and its habitat;
- 3.2. All personnel installing utility lines at the Narrows will be informed of the potential presence of Gila chub, their status, and the need to perform their duties to avoid impacts to the chub and its habitat.

If the Gila chub is listed as threatened or endangered and any subsequent adoption of the conference opinion, the BLM shall request reinitiation of consultation if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may affect the species in a manner or to an extent not considered in the conference opinion; 3) the BLM is subsequently modified in a manner that causes an effect to the species that was not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by the action.

The incidental take statement provided in the conference opinion does not become effective until the species is listed and the conference opinion is adopted as the biological opinion issued through formal consultation. At that time, the project will be reviewed to determine whether any take of the proposed species has occurred. Modifications of the opinion and incidental take statement may be appropriate to reflect that take. No take of the proposed species may occur between the listing of the species and the adoption of the conference opinion through formal consultation, or the completion of a subsequent formal consultation. Although not required, we recommend that the BLM implement the reasonable and prudent measures and terms and conditions before our final listing decision. If the species is subsequently listed, implementation of reasonable prudent measures and terms and conditions in any conference opinion adopted as a biological opinion, is mandatory.

#### **Conservation Recommendations**

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

We recommend that the BLM continue to work with the Service and Arizona Game and Fish Department to reestablish the Gila chub to suitable habitats.

We recommend the BLM work with the Service and Arizona Game and Fish Department to begin an aggressive program to ensure that nonindigenous aquatic organisms are not introduced to or spread in the action area, and if they are, to support actions to remove them.

We recommend the BLM work with all interested parties in the Cienega Creek watershed to insure that groundwater use does not exceed annual recharge.

We recommend the BLM consider combining grazing allotments when the opportunities arise. Larger allotments tend to have more management flexibility in relation to managing the impacts of livestock grazing, natural resources, and also tend to be more economical.

For the Service to be kept informed of actions reducing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

### **GILA TOPMINNOW (*Poeciliopsis o. occidentalis*)**

#### **Status of the Species**

The Gila topminnow was listed as endangered in 1967 without critical habitat (USFWS 1967). The reasons for decline of this fish include past dewatering of rivers, springs and marshlands, impoundment, channelization, diversion, regulation of flow, land management practices that promote erosion and arroyo formation, and the introduction of predacious and competing nonindigenous fishes (Miller 1961, Minckley 1985). Life history information can be found in the 1984 recovery plan (USFWS 1984), the draft revised Gila topminnow recovery plan (Weedman 1999), and references cited in the plans and here.

Gila topminnow was listed in 1967 as *Poeciliopsis occidentalis*. The species was later revised to include two subspecies, *P. o. occidentalis* and *P. o. sonoriensis* (Minckley 1969, 1973). *P. o. occidentalis* is known as the Gila topminnow, and *P. o. sonoriensis* is known as the Yaqui topminnow. *Poeciliopsis occidentalis*, including both subspecies, are collectively known as the Sonoran topminnow. Both subspecies are protected under the ESA. Recent information presented by Minckley (1999) and others (Minckley 1973, Quattro et al. 1996), considers the two subspecies to be separate species. Regardless of their taxonomy both species or subspecies are protected under the Act.

Gila topminnow are highly vulnerable to adverse effects from nonindigenous aquatic species (Johnson and Hubbs 1989). Predation and competition from nonindigenous fishes have been a major factor in their decline and continue to be a major threat to the remaining populations (Meffe et al. 1983, Meffe 1985, Brooks 1986, Marsh and Minckley 1990, Stefferud and Stefferud 1994, Weedman and Young 1997). The native fish fauna of the Gila basin and of the Colorado basin overall, was naturally depauperate and contained few fish that were predatory on or competitive with Gila topminnow (Carlson and Muth 1989). With the introduction of many predatory and competitive nonindigenous fish, frogs, crayfish, and other species, Gila topminnow could no longer survive in many of their former habitats, or the small pieces of those habitats that had not been lost to human alteration. Both large (Bestgen and Propst 1989) and small (Meffe et al. 1983) nonindigenous fish cause problems for Gila topminnow as can nonindigenous crayfish (Fernandez and Rosen 1996) and bullfrogs.

Historically, the Gila topminnow was abundant in the Gila River drainage and was one of the most common fishes of the Colorado River basin, particularly in the Santa Cruz system (Hubbs and Miller 1941). This was reduced to only 15 naturally occurring populations. Presently, only 12 of the 15 recent natural Gila topminnow populations are considered extant (Table 1) (Weedman and Young 1997). Only three (Cienega Creek, Monkey Spring, Cottonwood Spring) have no nonindigenous fish present and therefore can be considered secure from nonindigenous fish threats. There have been at least 175 wild sites stocked with Gila topminnow, however, topminnow persist at only 20 of these localities. Of the 20, one site is outside topminnow historic range and four now contain nonindigenous fish (Weedman and Young 1997). The Sonoran Topminnow Recovery Plan (USFWS 1984) established criteria for down- and de-listing. Criteria for down-listing were met for a short period. However, due to concerns regarding the status of several populations, down-listing was delayed. Subsequently, the number of reestablished populations dropped below that required for down-listing, where it has remained. A draft revised recovery plan for the Gila topminnow is available (Weedman 1999). The plan's short-term goal is to prevent extirpation of the species from its natural range in the US and reestablish it into suitable habitat within historic range. Downlisting criteria require a minimum of 82 reestablished populations, some of which must persist at least 10 years.

The status of the species is poor and declining. Gila topminnow has gone from being one of the most common fishes of the Gila basin to one that exists at not more than 32 localities (12 natural and 20 stocked). Many of these localities are small and highly threatened, and topminnow have not been found in some recent surveys at these sites.

### **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.

### **Aquatic Habitat Condition and Inventory**

From 1989 to 1990 BLM classified all aquatic habitats along the perennial length of Cienega Creek and inventoried them for characteristics related to fish habitat. BLM inventoried habitat type and 12 parameters of habitat complexity, including depth, vegetation cover in the water, overhanging cover, and undercut banks. In 2000, BLM reassessed aquatic habitats along four segments of Cienega Creek to determine change over the 10-year period (Tables 3, 4, and 5).

In 1989 and 1990, livestock still grazed much of the area along Cienega Creek, but grazing did not uniformly affect the creek. Cattle predominately used downstream segments lightly in the winter, and impacts were limited. Impacts were heavier in warm-season pastures along the southern half of the creek. Many segments lacked overstory vegetation, overhanging vegetation, or undercut banks. Floating vegetation (filamentous algae mats) was a common cover type due to increased nutrient levels and fewer shaded habitats. In many segments, shallower and wider habitats such as glides and riffles predominated over deeper pool habitats.

As illustrated in Table 3, tremendous changes in aquatic habitat occurred between 1990 and 2000. Pool habitat increased, except in the Headwaters reach, to where pools are almost 50 percent of available habitat. Table 4 gives additional information on pool habitat by stream segment. The proportion of habitat that is a run increased slightly. Riffle and glide habitat has decreased along the creek; dramatically in some reaches. The marsh, or cienega habitat, had increased in Cienega Creek from 1990 to 2000.

Table 3. Change in aquatic habitat surface area by segment for Cienega Creek, Arizona, 1990 and 2000.

Segment	Pool (%)		Run (%)		Riffle (%)		Glide (%)		Marsh (%)	
	1990	2000	1990	2000	1990	2000	1990	2000	1990	2000
Headwaters (above Gardner Canyon (59M))	64.1	35.5	4.2	0.5	15.0	0.0	4.6	0.2	12.1	63.8
Below Mattie Canyon (59F)	5.0	66.0	5.9	10.8	39.6	3.1	37.0	17.3	12.5	2.8
Below Pump Canyon (59D)	29.7	51.6	0.0	16.8	28.2	1.3	42.1	29.4	0.0	0.8
Fresno to Apache Canyon (59B)	13.3	50.4	0.0	5.3	51.7	4.3	34.3	38.5	0.7	1.5

Table 4. Pool habitat development by segment for Cienega Creek, Arizona, 1990 and 2000.

Segment	Pools per Mile (All)		Pools (>2' Deep) per Mile		Percent of All Aquatic Habitat	
	1990	2000	1990	2000	1990	2000
Headwaters (above Gardner Canyon) (59M)	61	79	32	43	64	36
Below Mattie Canyon (59F)	12	43	3	40	5	66
Below Pump Canyon (59D)	29	124	4	57	30	52
Fresno to Apache Canyon (59B)	12	112	0	0	13	50

However, all of the increase was in the Headwater segment, which was 64 percent marsh in 2000. LM also measured key aquatic habitat characteristics for Cienega Creek (Table 5). Instream cover changed in all four segments, and was dramatically lower in the Mattie Canyon segment. Overhanging cover increased in all but the Fresno-Apache segment, where overhanging cover was 90 percent less in 2000 than 1990. Undercut banks, nonexistent in 1990, increased in all stream reaches, with significant amounts in all but the Fresno-Apache reach.

### Surveys or Assessments in the Planning Area

BLM has conducted fish inventories of Cienega Creek and its tributaries, Mattie Canyon and Empire Gulch, since 1989 using seining and visual observations. These surveys confirmed the presence of Gila topminnow in Cienega Creek, Empire Gulch, and Mattie Canyon. Gila topminnow are present in Cienega Creek from the Headwaters to the Narrows.

Table 5. Some key aquatic habitat characteristics for Cienega Creek, Arizona, 1990 and 2000.

Segment	Instream Cover Square Feet/Mile		Overhanging Cover Square Feet/Mile		Undercut Banks Running Feet/Mile	
	1990	2000	1990	2000	1990	2000
Headwaters (above Gardner Canyon) (59M)	1,343	13,472	424	4,231	0.0	789
Below Mattie Canyon (59F)	27,388	3,819	741	3,941	0.0	538
Below Pump Canyon (59D)	3,344	5,176	469	7,362	0.0	750
Fresno to Apache Canyon (59B)	2,591	297	51,801	4,794	0.0	18

Upper Cienega Creek above Gardner Canyon is relatively isolated from large sediment loads and large floods. Thermal fluctuations along this reach are moderated by incoming groundwater, which adds a stable temperature to the surface flow. Nonetheless, topminnow populations fluctuated greatly. Topminnow density ranged from 0.5 to 101 per 10 ft<sup>2</sup> during 1989 to 1997 but was generally above 20 fish per 10 ft<sup>2</sup> (Table 6). The reduction of topminnow numbers in the fall of 1993 was most likely a result of intense flooding, estimated to have exceeded a 100-year flood.

In Cienega Creek below Gardner Canyon, sediment input and flood flows increase. Habitats fluctuate more and pools seem transient. Thermal conditions are more variable except at the confluence with Mattie Canyon, where groundwater moderates the fluctuation in water temperatures. Topminnow densities fluctuate greatly with the number of topminnow ranging from 0.82 to 18 per 10 ft<sup>2</sup> (Table 6).

The unusually cold winter of 1989/1990 may have greatly reduced topminnow numbers in lower Cienega Creek. Five sites were compared in the fall of 1989 with those in the late winter of 1990. The Headwaters site showed a 303 percent increase in topminnow numbers from fall to late winter. The other sites showed an 87 to 99 percent decrease in topminnow numbers.

Observations over two winters found that topminnow suffer substantial mortality when temperatures fall below 50°F (10°C). At Headwaters Spring, the warmer groundwater during the harsh winter may have provided a refugium for the Gila topminnow. Topminnow numbers similarly declined in 1993, when extreme flooding for more than a week scoured the lower reaches of Cienega Creek. Flooding reduced the Cienega Creek topminnow population in the upper creek, but the upper creek still had densities 10 times that of the lower creek.

Table 6. Population trend data collected during 1989-1996 for Gila topminnow along the upper and lower portions of Cienega Creek, Arizona.

Upper Cienega Creek (above Gardner Canyon)				Lower Cienega Creek (below Gardner Canyon)			
Year	$\bar{x}$ /10ft <sup>2</sup>	Range	# Sites	Year	$\bar{x}$ /10ft <sup>2</sup>	Range	# Sites
1989	21.2		1	1989	10.90	0.04-29	5
1990 W	58.5	2.80-114.0	2	1990 W	1.10	0.00-6.5	12
1990 F	0.5		1	1990 F	4.10	3.80-4.4	2
1992	101.5		1	1992	18.00	0.80-26.2	3
1993	10.2	6.40-13.9	2	1993	0.82	0.00-3.6	6
1994	31.7	0.78-62.0	2	1994	7.10	1.40-20.2	6
1995	53.2	13.8	2	1995	11.20	0.08-33.0	5
1996	no data			1996	10.90	2.10-18.1	6
1997	15.8	9.5-22.0	2	1997	--	--	--

Trend from catch per unit area, one pass seining, at several sample sites. Only pool and glide habitats sampled. Sampled in fall except for 1990, which was sampled in late winter (W) and fall (F).

Results of fish sampling show that the composition of the fish community in Cienega Creek varies from its upper to lower reaches as well as from year to year. Topminnow make up more than 90 percent of the fish community in some years, but average 78 percent during the eight years of record. Longfin dace composed up to 57 percent of the fish community with an average of 21 percent (Table 7). Fish sampling is difficult in Cienega Creek because of the large volume of vegetation cover, great pool depths, and undercut banks. Seining data reflect only the relative abundance for two fish species because Gila chub are effectively captured only by electrofishing.

Seining did produce a substantial number of juvenile chub (<90mm TL), showing that these fish are reproducing at an acceptable level for recruitment (Table 30).

Mattie Canyon supports typical riffle-pool type habitat with large numbers of longfin dace and Gila chub. Gila topminnow occur in small localized groups and are generally uncommon in this tributary.

Empire Gulch supports a marsh habitat with a few large, deep pools that support mud turtles and Chiricahua leopard frogs. Gila topminnow have also been recorded in Empire Gulch near its confluence with Cienega Creek. Gila topminnow were reestablished into upper Empire Gulch in late October of 2001.

Table 7. Relative abundance of fish collected by seining during 1989-1997 for Cienega Creek, Pima County, Arizona.

Year	# Sites Sampled	Percentage of Fish Community		
		Gila Topminnow	Longfin Dace	Gila Chub - Mainly Juveniles
1989	6	92.0	7.6	0.4
1990W	12	78.5	21.4	0.1
1990F	3	75.5	24.4	0.1
1992	4	86.4	13.5	0.1
1993	8	41.6	57.5	0.9
1994	8	82.5	16.4	0.1
1995	7	91.4	8.1	0.5
1996	7	78.4	21.2	0.4
MEAN% (std.Dev.)		78.4 (16)	21.3 (16)	0.3 (0.3)
Seining data based on multiple passes until site depletion. Only pool and glide habitats were sampled. Sampled in fall except for 1990 when sampled in late winter (W) and fall (F).				

Cinco Canyon has seven natural ponds, five of which are perennial. These shallow ponds do not support fish but do support Sonoran mud turtles, breeding rails and ducks, and leopard frogs. The ponds have been proposed as potential reestablishment sites for Gila topminnow.

In 1988 the AGFD reestablished Gila topminnow into Nogales and Little Nogales Springs near Wakefield Canyon, another tributary to Cienega Creek. These transplants appeared to have failed, but these springs still provide habitat for future reestablishments (Weedman and Young 1995).

**Factors affecting species environment within the action area**

Pima County is in the process of drafting a multi-species conservation plan that includes the Gila topminnow. Actions to minimize negative impacts to topminnow and potential habitat will be identified in the plan, as will actions promoting the conservation and recovery of the species such as reestablishment.

**Effects of the Action**

Many of the effects of the proposed action on the Gila topminnow, and other listed aquatic species, will be very similar to those for the Chiricahua leopard frog. Therefore, the discussion of effects will not be repeated and is incorporated here by reference. The discussion on the effects of the proposed action to the Gila topminnow will focus on differences from the Chiricahua leopard frog and the effects of some site specific actions.

Implementing a vegetation treatment program would result in conditions that help Cienega Creek meet and maintain the aquatic portion of the riparian objective. Upland vegetation management and site restoration would enhance riparian development and channel stability by reducing the prevalence of shrubs and nonindigenous species. Such management would also increase watershed cover by promoting increased perennial grasses. These actions should positively affect the Gila topminnow. Any negative affects of the action should be mitigated with the conservations actions BLM proposes as part of each action.

Controlled burning and herbicide use should affect Gila topminnow in manners similar to that of the Chiricahua leopard frog. Prescribed fires have the potential to escape. However, as evidenced by the wildfire in March 2002, even in drought conditions, fire may not have a large impact on certain riparian vegetation. The wildfire burned right up to the riparian vegetation, burned some of the trees on the outer edge, then jumped over the riparian vegetation to the other side of Cienega Creek. The riparian vegetation and the aquatic habitat sustained minimal damage from the fire.

Control of nonindigenous species, and especially fish, will negatively impact Gila topminnow in the short-term. The purpose of nonindigenous species control is to benefit native species, but there will be transient negative effects. If nonindigenous fish get into occupied Gila topminnow habitat, be it currently occupied or areas where topminnow may be reestablished, control actions are likely to be taken, and should be taken by the BLM. All control actions of nonindigenous fauna would include the AGFD, and if listed species are involved, the Service. Control of nonindigenous fish will probably include the capture and collection and eventual repatriation of rare species likely to be impacted by the action, and the use of lethal control. This will lead to death, injury, or harassment of Gila topminnow. Depending on the locality, it is unlikely that all Gila topminnow would be removed from a site, and topminnow would thus be killed during lethal control actions. Nonindigenous fish control is more likely to succeed in simpler habitats like Cinco Ponds, Road Canyon Well, and Nogales and Little Nogales springs. If certain nonindigenous fish became established in Cienega Creek, it would be impossible to completely remove them with current technology.

The BLM proposes to continue monitoring Gila topminnow and their habitats. Monitoring requires the capture of fish. Following handling protocols, and minimizing handling time will minimize the potential effects of monitoring on Gila topminnow.

The impacts of cultural resource management, OHVs, and road crossings would be the same for Gila topminnow as the Chiricahua leopard frog. However, since Gila topminnow are livebearers and do not lay eggs, contaminants associated with road crossings are less likely to affect Gila topminnow. Gila topminnow may be present at the crossings and could be killed or injured as vehicles cross or maintenance is done. The two road crossings are also prime locations for the release of nonindigenous species.

The Arizona Trail and other recreational activities will have similar impacts on Gila topminnow as the Chiricahua leopard frog. Increased travel and activity in the creek such as wading, bathing, and swimming could slightly increase injury or mortality to Gila topminnow, which occupy the shallow margins of the creek in large numbers. This injury and mortality should only negligibly affect the Cienega Creek population of Gila topminnow as it is expected to be minimal. However, it is likely to occur during the 20-year life of the RMP. Establishing a recreation permit system should help ensure the sustainability of aquatic habitats and populations of this species.

Proposed mineral development in the Empire Mountains may impact Gila topminnow, since there is a topminnow population downstream. It is not possible to determine the specific impacts of mineral development now, as potential actions may be widely variable in their scope of effects, timing, and duration. However, there are only two small claims in this small area.

As specified in the section, Effects of the Action - Overview, livestock grazing can affect uplands and watershed functioning, which in turn, can affect drainage systems and riparian and aquatic habitat. Upland vegetation treatments, which may offset the influence of grazing on shrub invasion, would lessen the impacts of grazing on the watershed's long-term health, thereby improving hydrologic relationships and reducing sediment loads. Reducing utilization to 35 percent will also reduce impacts from livestock grazing to upland vegetation and soils. Therefore, as long as the desired resource conditions are met, livestock grazing in the uplands should have minimal effects on drainage systems and riparian and aquatic habitat.

Maintenance of viable populations of Gila topminnow is compatible with well-managed livestock grazing. Adverse effects to the Gila topminnow and its habitat as a result of grazing may occur under certain circumstances. These effects include facilitating dispersal of nonindigenous predators; trampling of fish; deterioration of watersheds; erosion and siltation of stream courses; loss of wetland and riparian vegetation and backwater pools; and spread of disease (Arizona State University 1979, Hendrickson and Minckley 1984, Ohmart 1995, Jancovich et al. 1997, Belsky et al. 1999, U.S. Fish and Wildlife Service 2000). Creation or maintenance of livestock waters in arid environments may provide the means for nonindigenous predators, such as bullfrogs and crayfish, to move across landscapes that would otherwise serve

as a barrier to their movement. Sediment can alter primary productivity and fill interstitial spaces in streambed materials with fine particulates that impede water flow, reduce oxygen levels, and restrict waste removal (Chapman 1988).

Livestock use, crossing, and watering at Cienega Creek, Mattie Canyon, or Empire Gulch could trample or ingest small numbers of Gila topminnow causing injury or mortality. For about six weeks during the summer cattle graze and use Cinco Ponds. Heavy grazing and bank trampling may reduce the quality and quantity of habitat for Gila topminnow. Water quality is diminished by sedimentation and accumulation of urine and fecal waste. Bank damage fills and widens these ponds, slowly leading to less open water and more coverage by aquatic plants, speeding succession to wet meadows. Conversely, light to moderate grazing can reduce the biomass of plant material deposited in the ponds annually by cropping off large volumes of aquatic plants, effectively maintaining open pond habitat suitable for frogs and making eradication of nonindigenous species easier. Cinco Ponds is a potential Gila topminnow reestablishment site. The presence of livestock at Cinco Ponds could result in the trampling or ingestion of small numbers of Gila topminnow causing injury or mortality.

Livestock use in riparian areas of Cienega Creek and Nogales Springs is limited to six crossing lanes, the Narrows riparian pasture, and the A&B riparian pastures. A&B water gap will eventually be converted to a lane. Cattle presence in riparian and aquatic areas can locally degrade aquatic habitat, resulting in short-term, and possibly long-term negative impacts to suitable habitat in the 34.3 acres open to livestock use. Fencing of Nogales and Little Nogales springs would reduce the livestock impacts, but not eliminate them, since exclosures are not 100 percent effective at keeping livestock out. Livestock periodically go through, under, or over fences; fences go down from tree fall, fires, and floods; and gates are left open. This is also true for existing exclosures. Therefore, periodic, light impacts are expected within exclosures, which may lead to similar impacts discussed for the areas that are open to grazing.

At the Narrows riparian pasture, cattle will have access to the creek for up to 112 days. Negative impacts from the grazing of plants at the Narrows is expected but to a lesser degree because cattle will not have access during the growing season. Cattle could have access to the creek for an extended period of time; therefore, other localized impacts mentioned for the crossings would occur to a greater degree at the Narrows riparian pasture's 11.5 acres and 14.5 acres of the A&B pastures.

Stock ponds can provide refuge for nonindigenous aquatic species that could disperse among ponds and establish populations in Cienega Creek. To mitigate this probability, stock ponds would be supplied with water on a seasonal basis only and would be allowed to dry annually or pumped dry if necessary. Repressos would dry up naturally in 1 to 3 months after the pumping stops and would be monitored and manually dried if necessary. Only a few stock waters catch rain runoff that allows for extended persistence. None of these have perennial surface water. There is risk to the Gila topminnow from developing these waters.

Maintenance of fences through occupied habitat can also impact Gila topminnow. Fence maintenance can require the use of tools and horses, and human access into occupied habitat. These actions could lead to disturbance or loss of individual Gila topminnow.

Any new utility lines that use the utility corridor through the Narrows have the potential to impact Gila topminnow. The impact will be variable, and will depend on the particular project.

The overall effect of the proposed actions on the Gila topminnow should be mostly beneficial because conservation actions are part of all specific actions that could impact topminnow, natural processes will be encouraged, and the ecological condition of the area should be maintained and improved during the 20-year life of the RMP. There will be site-specific negative impacts from livestock grazing and road crossings, and general effects from recreation, but these impacts should not reduce populations of the Gila topminnow. The main concern is the potential for visitors to release, intentionally or unintentionally, nonindigenous species that would present problems for Gila topminnow. In addition, actions are proposed by BLM that should assist with the conservation and recovery of the species.

### **Conclusion**

After reviewing the current status of Gila topminnow, the environmental baseline for the action area, the effects of the proposed Las Cienegas NCA RMP and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the endangered Gila topminnow. No critical habitat has been designated, thus, none would be affected. We base these conclusions on the following:

1. The populations of Gila topminnow are robust;
2. All proposed actions that may lead to take of Gila topminnow have conservation actions included which should minimize effects to the species;
3. The BLM proposes actions identified in the recovery plan that will help conserve and recover the species; and
4. The ecological condition of the area should be maintained and improved during the 20-year life of the RMP.

### **Incidental Take Statement**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significant impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service 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, and sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited taking under the Act if such taking meets the terms and conditions of this Incidental Take Statement.

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

The Service anticipates that the proposed action will result in incidental take of Gila topminnow. Incidental take of the Gila topminnow will be difficult to detect for the following reasons: dead fish are difficult to find, cause of death may be difficult to determine, and losses may be masked by seasonal fluctuations in numbers or other causes. However, take of Gila topminnow may occur from livestock grazing, recreation, and wildlife management actions. We anticipate that the following take could occur as a result of the proposed action:

1. Mortality, injury, pursuit, capture, collection, trapping, or harassment of up to 5,000 Gila topminnow during each control action for nonindigenous aquatic species;
2. Mortality and injury of up to 100 Gila topminnow annually from the use and maintenance of road and trail crossings in occupied habitat, including contamination from vehicles;
3. Harassment of up to 10 Gila topminnow annually from general recreation use of the area, and use of the Agricultural Fields group site;
4. Mortality, injury, or harassment of up to 100 Gila topminnow annually during livestock management actions associated with exclosures, creek crossing and watering areas, and at Cinco Ponds or other reestablishment areas;
5. Mortality of up to 1,000 Gila topminnow from the introduction or increase of nonindigenous species, associated with the repressos and recreation and other human access;
6. Mortality, injury, or harassment of up to 10 Gila topminnow annually during fence maintenance in occupied habitat; and

7. Mortality, injury, or harassment of up to 50 Gila topminnow annually during construction of a utility line in the utility corridor that crosses the Narrows.

**Effect of Take**

In this biological opinion, the Service finds the anticipated level of take is not likely to jeopardize the continued existence of the endangered Gila topminnow.

**Reasonable and Prudent Measures and Terms and Conditions**

The following reasonable and prudent measures are necessary and appropriate to minimize take of the Gila topminnow. To be exempt from the prohibitions of section 9 of the Act, the BLM must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting and monitoring requirements. These terms and conditions are non-discretionary.

1. The BLM shall continue to monitor the Gila topminnow and its habitat to document levels of take and determine effectiveness of conservation measures:
  - 1.1. The BLM shall continue to monitor Gila topminnow populations and habitat as proposed;
  - 1.2. An annual report will be done which summarizes the implementation of the proposed action and any incidental take that occurred. We are especially interested in an analysis of the effectiveness of the conservation measures and terms and conditions.
2. Measures shall be implemented to reduce the impacts of the proposed wildlife management actions, livestock grazing, recreation, and utility corridors:
  - 2.1. Before nonindigenous aquatic species control activities occur, monitor for the presence of Gila topminnow and remove and repatriate Gila topminnow as appropriate;
  - 2.2. Reduce the speed limit to 10mph at the EC901 crossings at Empire Gulch and Cienega Creek, and at the EC910D crossing at the Narrows and post the speed limit at each crossing;
  - 2.3. To minimize impacts from recreation and as part of the proposed public education program, include information on the presence of listed species in the area, their status and importance, and prohibitions. The educational venue can take any form, but the first one with this message must be completed within one year of the date of this biological opinion;

- 2.4. Use of creek crossings and watering areas for livestock should minimize impacts to Gila topminnow;
  - A. When considering which creek crossings to use for livestock, avoid crossings which are known to be occupied by Gila topminnow when possible (presently, most crossings are occupied by topminnow);
  - B. Monitor crossings at least once a year to determine if there are problems with erosion, sedimentation, vegetation condition, or any other resource conditions;
  - C. Insure that livestock do not linger in crossings with aquatic habitat and are moved through the crossing promptly;
- 2.5. Check the fence of all enclosures that have occupied Gila topminnow habitat at least once when the adjacent pasture is being used. If there is a problem with the fence and livestock are in that pasture, repair the fence within one week of the fence problem being discovered. If cattle are not in the adjacent pasture, repair the fence before livestock are returned to the pasture;
- 2.6. All new repressos must be located to minimize the likelihood of floods moving nonindigenous aquatic species into topminnow habitat;
  - A. Repressos should be located outside of the current 100-year floodplain when possible;
  - B. Repressos shall be constructed so runoff from precipitation captured by each represso is minimal;
  - C. The maximum water depth in a represso may not exceed four feet at any spot;
  - D. The repressos shall be used only when required to water cattle and shall be allowed to dry when no longer needed to water cattle;
  - E. If repressos do not dry within six months after use ends, they shall be drained;
  - F. Repressos should be located so access to the public, and potential for unauthorized release of nonindigenous species, is minimized;
3. Personnel education programs and well-defined operational procedures shall be implemented:

- 3.1. All personnel performing maintenance at any creek crossing will be informed of the potential presence of Gila topminnow, their status, and the need to perform their duties to avoid impacts to the fish and its habitat;
- 3.2. All personnel performing fence maintenance at any creek crossing will be informed of the potential presence of Gila topminnow, their status, and the need to perform their duties to avoid impacts to the topminnow and its habitat;
- 3.3. All personnel installing utility lines at the Narrows will be informed of the potential presence of Gila topminnow, their status, and the need to perform their duties to avoid impacts to the topminnow and its habitat.

### **Conservation Recommendations**

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

We recommend that the BLM continue to work with the Service and Arizona Game and Fish Department to reestablish the Gila topminnow to suitable habitats (Recovery Plan Tasks 2.1, 2.2; Weedman 1999) .

We recommend that the BLM work with the Service and Arizona Game and Fish Department to begin an aggressive program to ensure that nonindigenous aquatic organisms are not introduced to the action area, and if they are, to support actions to remove them (Recovery Plan Task 1.4, 2.4, 2.5).

We recommend that the BLM work with all interested parties in the Cienega Creek watershed to insure that groundwater use does not exceed annual recharge (Recovery Plan Task 1.3, 2.3).

We recommend that the BLM consider combining grazing allotments when the opportunities arise. Larger allotments tend to have more management flexibility in relation to managing the impacts of livestock grazing, natural resources, and also tend to be more economical.

For the Service to be kept informed of actions reducing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

### **HUACHUCA WATER UMBEL (*Lilaeopsis schaffneriana* var. *recurva*)**

#### **Status of the Species**

The Huachuca water umbel was listed as an endangered species on January 6, 1997 (USFWS 1997a). Critical habitat was designated on the upper San Pedro River, Garden Canyon on Fort Huachuca, and other areas of the Huachuca Mountains, San Rafael Valley, and Sonoita Creek in

1999 (USFWS 1999d). The umbel is a herbaceous, semiaquatic perennial plant with slender, erect leaves that grow from creeping rhizomes. The leaves are cylindrical, hollow with no pith, and have septa (thin partitions) at regular intervals. The yellow/green or bright green leaves are generally 0.04 to 0.12 inch in diameter and often 1 to 2 inches tall, but can reach up to 8 in. tall under favorable conditions. Three to ten very small flowers are borne on an umbel that is always shorter than the leaves. The fruits are globose, 0.06 to 0.08 in. in diameter, and usually slightly longer than wide (Affolter 1985). The species reproduces sexually through flowering and asexually from rhizomes, the latter probably being the primary reproductive mode. An additional dispersal opportunity occurs as a result of the dislodging of clumps of plants which then may reroot in a different site along aquatic systems.

Huachuca water umbel was first described by Hill (1926) based on the type specimen collected near Tucson in 1881. Hill applied the name *Lilaeopsis recurva* to the specimen, and the name prevailed until Affolter (1985) revised the genus. Affolter applied the name *L. schaffneriana* ssp. *recurva* to plants found west of the continental divide.

Huachuca water umbel has been documented from 27 sites in Santa Cruz, Cochise, and Pima counties, Arizona, and in adjacent Sonora, Mexico, west of the continental divide (Warren et al. 1989, Saucedo 1990, Warren et al. 1991, Warren and Reichenbacher 1991, Haas and Frye 1997, Titus et al. 2002, Service files). The plant has been extirpated from 6 of the 27 sites. The 21 extant sites occur in four major watersheds - San Pedro River, Santa Cruz River, Rio Yaqui, and Rio Sonora. All sites are 3,500 to 6,500 feet in elevation.

Huachuca water umbel has an opportunistic strategy that ensures its survival in healthy riverine systems, cienegas, and springs. In upper watersheds that generally do not experience scouring floods, the umbel occurs in microsites where interspecific plant competition is low. At these sites, the umbel occurs on wetted soils interspersed with other plants at low density, along the periphery of the wetted channel, or in small openings in the understory. The upper Santa Cruz River and associated springs in the San Rafael Valley, where a population of Huachuca water umbel occurs, is an example of a site that meets these conditions. The types of microsites required by the umbel were generally lost from the main stems of the San Pedro and Santa Cruz Rivers when channel entrenchment occurred in the late 1800's to early 1900's. Habitat on the upper San Pedro River is recovering, and Huachuca water umbel has recently been found along many reaches of the main channel.

In stream and river habitats, Huachuca water umbel can occur in backwaters, side channels, and nearby springs. After a flood, it can rapidly expand its population and occupy disturbed habitat until interspecific competition exceeds its tolerance. This response was recorded at Sonoita Creek in August 1988, when a scouring flood removed about 95 percent of the Huachuca water umbel population (Gori et al. 1990). One year later, the umbel had recolonized the stream and was again codominant with watercress, *Rorippa nasturtium-aquaticum* (Warren et al. 1991). The expansion and contraction of Huachuca water umbel populations appear to depend on the presence of "refugia" where the species can escape the effects of scouring floods, a watershed that has an unaltered hydrograph, and a healthy riparian community that stabilizes the channel.

Density of umbel plants and size of populations fluctuate in response to both flood cycles and site characteristics. Some sites, such as Black Draw, have a few sparsely-distributed clones, possibly due to the dense shade of the even-aged overstory of trees, dense nonindigenous herbaceous layers beneath the canopy, and deeply entrenched channel. The Sonoita Creek population occupies 14.5 percent of a 5,385 ft<sup>2</sup> patch of habitat (Gori et al. 1990). Some populations are as small as 11 to 22 ft<sup>2</sup>. The Scotia Canyon population, by contrast, has dense mats of leaves. Scotia Canyon contains one of the larger Huachuca water umbel populations, occupying about 57 percent of the 4,756 foot perennial reach (Gori et al. 1990, Falk and Warren 1994).

Overgrazing, mining, hay harvesting, timber harvest, fire suppression, and other activities in the nineteenth century led to widespread erosion and channel entrenchment in southeastern Arizona streams and cienegas when above-average precipitation and flooding occurred in the late 1800's and early 1900's (Bryan 1925, Martin 1975, Hastings and Turner 1980, Dobyns 1981, Hendrickson and Minckley 1984, Sheridan 1986, Bahre 1991, Webb and Betancourt 1992, Hereford 1993). A major earthquake near Batepito, Sonora, about 40 miles south of the upper San Pedro Valley, resulted in land fissures, changes in groundwater elevation and spring flow, and may have preconditioned the San Pedro River channel for rapid flood-induced entrenchment (Hereford 1993, Geraghty and Miller, Inc. 1995). These events contributed to long-term or permanent degradation and loss of cienega and riparian habitat on the San Pedro River and throughout southern Arizona and northern Mexico. Much habitat of the Huachuca water umbel and other cienega-dependent species was presumably lost then.

Wetland degradation and loss continue today. Human activities such as groundwater overdrafts, surface water diversions, impoundments, channelization, improper livestock grazing, agriculture, mining, sand and gravel operations, road building, nonindigenous species introductions, urbanization, wood cutting, and recreation all contribute to riparian and cienega habitat loss and degradation in southern Arizona. The local and regional effects of these activities are expected to increase with the ever increasing human population.

Dredging extirpated the Huachuca water umbel from House Pond, near the extant population in Black Draw (Warren et al. 1991). The umbel population at Zinn Pond in St. David near the San Pedro River was probably lost when the pond was dredged and deepened. This population was last documented in 1953 (Warren et al. 1991).

Livestock grazing can affect the umbel through trampling and changes in stream hydrology and loss of stream bank stability. However, existence of the umbel appears to be compatible with well-managed livestock grazing (USFWS 1997a). In overgrazed areas, stream headcutting can threaten cienegas where the umbel occurs. Such headcutting occurs at Black Draw just south of the international boundary and at Los Fresnos, in the San Rafael Valley, Sonora. Groundwater pumping has eliminated habitat in the Santa Cruz River north of Tubac, and threatens habitat in the San Pedro River. Portions of the San Pedro River occupied by the umbel could be dewatered unless measures are implemented to halt or mitigate groundwater pumping in the upper San

Pedro basin (ASL 1998). Severe, unmanaged recreational impacts can compact soils, destabilize stream banks, and decrease riparian plant density, including densities of the Huachuca water umbel. Populations in Bear Canyon in the Huachuca Mountains have been impacted by trampling and off-highway vehicles.

A suite of nonindigenous plant species has invaded wetland habitats in southern Arizona (Stromberg and Chew 1997), including those occupied by the Huachuca water umbel (Arizona Department of Water Resources 1994). In some cases their effect on the umbel is unclear. However, in certain microsites, the nonindigenous Bermuda grass, *Cynodon dactylon*, may directly compete with the umbel. Bermuda grass forms a thick sod in which many native plants are unable to establish. Watercress is another nonindigenous plant now abundant along perennial streams in Arizona. It is successful in disturbed areas and can form dense monocultures that can outcompete Huachuca water umbel populations.

Limited numbers of populations and the small size of populations make the Huachuca water umbel vulnerable to extinction as a result of stochastic events that are often exacerbated by habitat disturbance. For instance, the restriction of this taxon to a relatively small area in southeastern Arizona and adjacent Sonora increases the chance that a single environmental catastrophe, such as a severe tropical storm or drought, could eliminate populations or cause extinction. Populations are in most cases isolated, as well, which makes the chance of natural recolonization after extirpation less likely. Small populations are also subject to demographic and genetic stochasticity, which increases the probability of population extirpation (Wilcox and Murphy 1985, Shafer 1990).

### **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.

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

See riparian conditions described under the Gila Topminnow section. The Huachuca water umbel has been found along Empire Gulch near its confluence with Cienega Creek and more recently (March 2002) in three patches along Cienega Creek between Empire Gulch and Oak Tree Canyon (BLM files). Additional potential habitat for the species is also found along Cienega Creek and Mattie Canyon on the Empire-Cienega allotment and in Cienega Creek on the Empirita allotment.

### **Factors affecting species environment within the action area**

Pima County is in the process of drafting a multi-species conservation plan that includes the Huachuca water umbel. Actions to minimize negative impacts to water umbel and potential habitat will be identified in the plan, as will actions promoting the conservation and recovery of the species such as reestablishment.

### **Effects of the Action**

Some of the effects of the proposed action on the Huachuca water umbel will be similar to those discussed previously for the Chiricahua leopard frog and Gila topminnow. Therefore, the discussion of effects will not be repeated and is incorporated here by reference.

Implementing vegetation treatment and site restoration programs, limiting creek crossings and livestock use, restricting camping at Cienega Creek, and design changes on roads would result in conditions that should promote habitat development for Huachuca water umbel. Treatments to reduce shrubs and increase perennial grass cover would further improve watershed conditions, reduce sedimentation, and reduce the frequency of peak flood flows which should reduce harm to Huachuca water umbel populations. Effects also include increased ground water recharge which feeds springs that support the planning area's Huachuca water umbel communities. Degradation of watershed condition immediately after fires can result in dramatically increased runoff and sedimentation, and debris flow can bury aquatic habitats in debris (DeBano and Neary 1996). Precautions such as small burn unit size and sequencing of burn plots over individual sub basins reduce the possibility that prescribed burns will impact Huachuca water umbel.

Control of nonindigenous species, especially plants, may impact the Huachuca water umbel in the short-term. Most planned and foreseeable control actions are on upland plants, with the possible exception of tamarisk. Control of tamarisk is often specific to individual plants. Personnel controlling tamarisk may trample Huachuca water umbel. We consider this to be very unlikely. The BLM proposes to continue monitoring the Huachuca water umbel and its habitat.

Visitors to the area can potentially impact Huachuca water umbel through trampling of riparian and wetland areas. Designation, identification, and maintenance of roads could also result in increased visitor use of Huachuca water umbel habitat as would activities associated with cultural resource management.

The impact of livestock grazing has been discussed in the overview section and the Chiricahua leopard frog and Gila topminnow sections. Those discussions are incorporated here by reference. The water umbel may be affected by livestock grazing in the following ways: 1) trampling by cattle, 2) direct impacts from construction of range projects, 3) changes in stream geomorphology that lead to erosion, sedimentation, and downcutting, and 4) watershed degradation and resulting adverse effects to stream hydrology. The umbel is an opportunistic, early- or mid-successional species that probably benefits from periodic disturbance, such as floods, fire, or perhaps grazing by livestock or wildlife. In areas without disturbance, other aquatic and semi-aquatic species, such as cattail, watercress, and bermuda grass may outcompete or reduce water umbel populations to remnant patches or to seeds or rhizomes (Haas and Frye 1997). Periodic disturbance opens these habitats up and allows recolonization or expansion of water umbel populations. Thus, occasional trampling by livestock, or periodic disturbance of bank and stream channels by livestock may mimic natural forms of disturbance that recreate early successional stages favorable for population expansion. However, continual or frequent disturbance, or severe damage to stream morphology, such as head cuts and downcutting would likely reduce populations or eliminate them from areas.

Additional information exists suggesting reduced levels of grazing can benefit the water umbel. Monitoring of umbel populations at Cottonwood Spring near Patagonia occurred before and after livestock were removed. Within two years following removal of cattle, the area became wetter and the riparian area expanded. The area occupied by the umbel increased, although it was becoming less dense in areas that were growing over with cattails and other wetland plant species (D. Gori and P. Warren, pers. comm., *in* Falk 1998).

In some systems, natural levels of disturbance may be relatively low, allowing establishment and growth of emergent and other wetland plants, such as sedges and cattails, that may crowd out water umbel. At the Van Horn enclosure on a tributary of Bear Canyon on the Lone Mountain allotment, wetland vegetation has become very dense. Water umbel has not been found within the enclosure recently, but occurs just downstream of it where the stream bed is much more open. Negative survey results within the enclosure could depend on the difficulty posed in finding water umbel among the dense vegetation, but this may be a site in which some level of grazing could improve the habitat for water umbel because natural levels of disturbance are low.

Livestock crossing Cienega Creek at designated crossing lanes, watering points, and in enclosures could trample small numbers of Huachuca water umbel causing injury or mortality to individual plants. The overall impact to the population in the planning area is expected to be minimal as livestock crossing does not occur in the currently known locations and crossing lanes, and watering areas represent only about 10% of the total potential habitat. Though umbel plants may be trampled, Huachuca water umbel requires some level of disturbance in its habitat. Therefore, the low levels of livestock grazing in aquatic habitats that are proposed may actually benefit the umbel.

Any new utility lines that use the utility corridor through the Narrows have the potential to impact Huachuca water umbel. The impact will be variable, and will depend on the particular project. Water umbel have not been found that far north on Cienega Creek, but no surveys have been done either. Huachuca water umbel has been found about 7 miles downstream on Pima County's Cienega Creek Preserve. The continuing ecological progression of the creek is likely to create additional water umbel habitat.

Eliminating the potential for mining and mineral leasing on public lands should provide for increased security for populations of Huachuca water umbel. Prohibitions on recreational mining will further protect sensitive riparian habitats of water umbel from vegetation loss and reduction in bank stability associated with this activity.

As mentioned for Gila topminnow, the implementation of this proposed action is likely to increase visitation in riparian areas which may slightly increase disturbance of plants and their habitat. If recreation impacts were concentrated in the only area where the species has been found, the effects on the population could be moderate. However, the establishment of a recreation permit system, a monitoring regime and changes in management as monitoring dictates should help ensure the sustainability of aquatic habitats and populations of this species.

Increased recreational activity in and along the creek is likely to slightly increase habitat degradation, as described for Gila topminnow. But, limits on road access to and camping near riparian areas would help restrict recreation disturbance to localized areas. Recreation is likely to be only slightly harmful to this species.

The overall effect of the proposed actions on the Huachuca water umbel should be mostly beneficial because conservation actions are part of all specific actions that could impact water umbel, natural processes will be encouraged, and the ecological condition of the area should be maintained and improved during the 20-year life of the RMP. There will be site-specific negative and positive impacts from livestock grazing and road crossings, and general effects from recreation, but these impacts should not reduce populations or preclude expansion of Huachuca water umbel populations. In addition, actions are proposed by BLM that should assist with the conservation and recovery of the species.

### **Conclusion**

After reviewing the current status of Huachuca water umbel, the environmental baseline for the action area, the effects of the proposed Las Cienegas NCA RMP and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Huachuca water umbel. No designated critical habitat occurs in the action area, thus, none would be affected. We base these conclusions on the following:

1. Huachuca water umbel is rare in the action area;
2. The proposed action affects a small portion of the species' range;
3. All proposed actions that may affect the Huachuca water umbel have conservation actions included which should minimize effects to the species and may actually benefit the umbel and its habitat; and
4. The ecological condition of the area should be maintained and improved during the 20-year life of the RMP.

### **Incidental Take Statement**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significant impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service 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, and sheltering. Incidental take is defined as

take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited taking under the Act if such taking meets the terms and conditions of this Incidental Take Statement.

Sections 7(b)(4) and 7(o)(2) of the Act generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the Act prohibits the removal and reduction to possession of federally listed endangered plants from areas under Federal jurisdiction, or for any act that would remove, cut, dig up, or damage or destroy any such species on any other area in knowing violation of any regulation of any State or in the course of any violation of a State criminal trespass law.

### **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.

The BLM should provide assistance to the Service in developing a recovery plan for the Huachuca water umbel;

The BLM should fund additional surveys for the water umbel on BLM lands, and support research on the ecology of the species; and

The BLM should work with all interested parties in the Cienega Creek watershed to insure that groundwater use does not exceed annual recharge.

For the Service to be kept informed of actions reducing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

### **LESSER LONG-NOSED BAT (*Leptonycteris curasoae yerbabuena*)**

#### **Status of the Species**

The lesser long-nosed bat (originally, as *Leptonycteris sanborni*; Sanborn's long-nosed bat) was listed as endangered in September, 1988 (USFWS 1988). Critical habitat has not been designated. The lesser long-nosed bat is a small, leaf-nosed bat. It has a long muzzle and a long tongue, and is capable of hover flight. These features are adaptations to feed on nectar from the flowers of columnar cactus, such as the saguaro and organ pipe cactus and from paniculate agaves, such as Palmer's agave, *Agave palmeri*, and Parry's agave, *A. parryi* (Hoffmeister 1986). Palmer's agave exhibits many characteristics of chiropterophily, such as nocturnal pollen

dehiscence and nectar production, light colored and erect flowers, strong floral odor, and high levels of pollen protein with low levels of nectar sugar concentrations (Slauson 1996). Parry's agave demonstrates many (though not all) of these same morphological features (Gentry 1982).

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

The lesser long-nosed bat consumes nectar and pollen of paniculate agave flowers and the nectar, pollen, and fruit produced by a variety of columnar cacti. Nectars of these cacti and agaves are high energy foods. Concentrations of some food resources appear to be patchily distributed on the landscape and the nectar of each plant species utilized is only seasonally available. Cactus flowers and fruit are available during the spring and early summer; blooming agaves are available primarily from July through October. Columnar cacti occur in lower elevation areas of the Sonoran Desert region, and paniculate agaves are found primarily in higher elevation desert scrub areas, desert grasslands and shrublands, and into the oak woodland (Gentry 1982). In the Huachuca Mountains, Parry's agave is generally found at higher elevations than Palmer's agave; the former is common in forest openings to the crest of the Huachuca Mountains.

Lesser long-nosed bats are opportunistic foragers and efficient fliers. Seasonally available food resources may account for the seasonal movement patterns of the bat. Lesser long-nosed bats are known to fly long distances from roost sites to foraging sites. Night flights from maternity colonies to flowering columnar cacti have been documented in Arizona at 15 miles, and in Mexico at 25 miles and 38 miles (one way) (Dalton et al. 1994). Steidl (pers. comm. 2001) found that typical one-way foraging distance for bats in southeastern Arizona is roughly 12.5 miles. Fleming (1995) suggests that a substantial portion of the lesser long-nosed bats at the Pinacate Cave in Sonora fly 25 to 31 miles each night to forage in Organ Pipe Cactus National Monument. Horner et al. (1990) found that lesser long-nosed bats commuted 15.5 miles between an island maternity roost and the mainland in Sonora. The authors suggested that bats regularly flew at least 47 miles each night.

Ober et al. (2000) studied foraging ecology of the lesser long-nosed bat on Fort Huachuca, Arizona, and found the high energy demands of the bat, coupled with the small amount of nectar per flower, forces bats to visit many flowers each night. The daily energy use may be as high as one and one-half to two times higher than previously reported. The amount of food needed to support the southeastern lesser long-nosed bat population may be much higher than previously thought. Maintaining sufficient numbers of food sources is very important to the bat population. Ober et al. (2000) estimated that one *A. palmeri* produces enough nectar to support 1.5 bats throughout the time they are in southeastern Arizona. They found evidence that bats select areas with both high resource abundance and evidence of high resource abundance in previous years, suggesting site fidelity may play a role in the bat's foraging behavior. A reduction in, or a fragmentation of, *A. palmeri* populations could have serious effects on bat behavior, forcing them to fly farther, expend more energy, roost in substandard sites, or compete with each other for food at remaining plants. These negative effects would be somewhat masked in good years, but be more substantial in years of low flower production.

Other potential threats to the lesser long-nosed bat are excess harvesting of agaves in Mexico, the collection of cacti in the United States, and the conversion of lesser long-nosed bat foraging habitat for agricultural uses. Livestock grazing, wood-cutting, and other human development activities may contribute to the decline of long-nosed bat populations. Widmer is studying the effects of livestock grazing on *A. palmeri*. Her preliminary results (2000) were: 1) overall herbivory on agave stalks was 56 percent, 2) one-third of emerging inflorescences were grazed at 70 percent of the sites, and 3) herbivory on agave stalks was 29 percent greater at sites grazed by livestock during the agave bolting season (Widmer and McClaran 2000). Other livestock grazing effects can be soil compaction, trampling of young agave, watershed changes, reduction of grasses (and reduction of fire), and erosion potential. Study of these and other livestock grazing effects would aid in more fully determining effects of livestock grazing to the species.

In her study of the foraging ecology of lesser long-nosed bats, Ober (2000), found that bats flew an average of 18.9 km (11.3 miles) from their day roosts to their core use-areas. The bats spent the majority of the night foraging in their core use-areas before returning to their day roosts in the morning. Core use-area sizes ranged from 3 to 42 ha (7.4 to 103.7 acres). Core use-areas are defined as the smallest area that accounted for 50% of locations collected for each individual (n=60) throughout 1998 and 1999. Home ranges were also calculated; they are defined as the smallest area that accounted for 95% of all locations collected for each bat. Home ranges varied widely, from 174 to 5258 ha (430 to 12992.5 acres).

Loss of roost and foraging habitat, as well as direct taking of individual bats during animal control programs, particularly in Mexico, have contributed to the current endangered status of the species. Suitable day roosts and suitable concentrations of food plants are the two resources that are crucial for the lesser long-nosed bat (Fleming 1995). Caves and mines are used as day roosts. The factors that make roost sites useable have not yet been identified, but lesser long-nosed bat appears to be sensitive to human disturbance. Instances are known where a single brief visit to an occupied roost is sufficient to cause a high proportion of lesser long-nosed bats to temporarily

abandon their day roost and move to another. Perhaps most disturbed bats return to their preferred roost in a few days; however, this sensitivity suggests that the presence of alternate roost sites may be critical when disturbance occurs. Interspecific interactions with other bat species may also influence lesser long-nosed bat roost requirements.

Known major roost sites include 16 large roosts in Arizona and Mexico (Fleming 1995). According to surveys conducted in 1992 and 1993, the number of bats estimated to occupy these sites was greater than 200,000. Twelve major maternity roost sites are known from Arizona and Mexico. According to the same surveys, the maternity roosts are occupied by more than 150,000 lesser long-nosed bats. The numbers above indicate that although a relatively large number of these bats are known to exist, the relative number of known large roosts is small. Disturbance of these roosts and the food plants associated with them could lead to the loss of the roosts. Limited numbers of maternity roosts may be the critical factor in the survival of this species.

### **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 primary food source for the lesser long-nosed bat in southeastern Arizona from mid-summer through fall is Palmer's agave, which typically occurs on rocky slopes or hill tops, scattered within the desert grassland and oak woodland communities within the elevation range of 900 m to 1,800 m (3,000-6,000 ft)(Gentry 1982). Parry's agave reaches higher elevations than Palmer's, extending from grasslands into oak woodland, chaparral, pine/oak forests, and mixed conifer with an elevation range of approximately 1,500 m to 2,500 m (4,900-8,200 ft)(Gentry 1982). Like Palmer's agave, Parry's is typically found on rocky slopes (Gentry 1982). Concentrations of paniculate agaves are generally found on the rocky, shallow soils of hills and ridges. Palmer's and Parry's agaves are also found scattered in areas of deep, heavy soils within grasslands or where there may be thick stands of shrubs, mesquite, oak, and other trees. The planning area just reaches into the elevational range of Parry's agave.

The ecology of Palmer's agave appears to be poorly understood, especially as it is affected by livestock use and fire (Slauson, pers. comm., 1997; Wendy Hodgson, Desert Botanical Gardens, Phoenix, pers. comm., 1997). Agaves are perennial succulents. Agave seeds germinate readily with adequate moisture, typically in open areas with limited competition from other plants (Tony Burgess, Columbia University, Tucson, pers. comm., 1997). A flowering stalk erupts from the rosette of a mature plant, growing rapidly through the spring and early summer. Slauson (1996, 1999) has completed a pollination ecology study of Palmer's agave, finding that many pollinator species contribute to establishing seed set. Lesser long-nosed bats have been recorded visiting individual blooming Palmer's agaves more than 1,000 times per night (R. Sidner, Tucson, pers.

comm., 1997; Petryszyn, pers. comm., 1999), while they may not visit other agaves at all (Slauson, pers. comm., 1997). Apparently there are many factors which influence the year a particular plant may bloom. Precipitation one to several years before blooming is probably of special importance. In the Peloncillo Mountains, about 2 to 5 percent of the agave population flowers each year (Peter Warren, Nature Conservancy, Tucson, pers. comm., 1997).

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

*Leptonycteris* forage on loamy hills and loamy uplands ecological sites (Table 8) interspersed throughout the planning area (Map 3-5). Loamy hills are oak woodlands with grassland and loamy uplands are grasslands with fewer trees and shrubs than loamy hills. On both ecological sites, Palmer agave makes up from 1 to 5 percent of the Historic Climax Community. Loamy hills have 15 to 60 percent slopes and loamy uplands have 1 to 15 percent slopes.

A light-tagging study of lesser long-nosed bats was carried out on the Empire-Cienega RCA in 1998. The objective of the study was to locate migratory roosts used by long-nosed bats foraging on the Empire Cienega. An additional objective was to learn more about foraging territory and distances. In two nights of netting, 29 lesser long-nosed bats were captured and equipped with chemiluminescent light tags. Observers tracked one of the bats to a known migratory roost in the Patagonia area, a distance of about 15 miles from the capture location. Other bats were documented foraging at hummingbird feeders on the Empire-Cienega up to 15 miles from their capture location. A night roost in Empire Gulch was discovered as well as a day roost on private property within the planning area. The night roost along Empire Gulch was in tree foliage and was a temporary roost. Such "resting roosts are not frequently used, but are transitory in nature. The presence of such roosts depends largely on the juxtaposition of established day roosts and local forage sources. Several lesser long-nosed bat migratory roosts occur within 50 miles of the planning area.

#### **Factors affecting species environment within the action area**

Pima County is in the process of drafting a multi-species conservation plan that includes the lesser long-nosed bat. Actions to minimize negative impacts to lesser long-nosed bat and potential habitat will be identified in the plan, as will actions promoting the conservation and recovery of the species such as reestablishment.

#### **Effects of the Action**

Some of the effects of the proposed action on the lesser long-nosed bat will be similar to those discussed previously for other species. Therefore, the discussion of effects will not be repeated and is incorporated here by reference. The discussion on the effects of the proposed action to the lesser long-nosed bat will focus on differences from those sections and the effects of site specific actions. Since *Leptonycteris* night roosts are not known within the planning area, the greatest potential for the proposed action to impact lesser long-nosed bats is by effects to forage plants.

Table 8. Ecological sites within the Empire-Cienega and Empirita Ranch areas, Arizona.

Ecological Site	Similarity Index to Historic Climax (range)	Visual Aspect-Historic Climax Plant Community	Acres	% of Total
Basalt Hills	71	shrub-grass mixed	601	0.6
Deep Sandy Loam/Sandy Bottom		grassland	1,494	1.5
Limestone Hills and Limestone Hills/ Limey Upland/Volcanic Hills	60-67	shrubland mixed with grassland	5,847	5.8
Limy Slopes and Limy Slopes/Limy Upland and Limy Slopes/ <b>Loamy Upland</b>	54-60	shrubland mixed with grassland	37,533	37.3
Loamy Bottom/Subirrigated	66	sacaton	3,744	3.7
Loamy Bottom/Mesquite	N/A	mesquite bosque	581	0.6
<b>Loamy Hills and Loamy Hills/Limy Slopes</b>	59-92	oak woodland with grassland	16,108	16.0
<b>Loamy Upland</b>		<b>grassland (savannah)</b>	<b>115</b>	<b>0.1</b>
<b>Loamy Upland/Swales</b>	42-77	grassland	6,577	6.5
Sandy Bottom/Swales	65	xeroriparian with grassland	1,528	1.5
Sandy Bottom/subirrigated	N/A	deciduous riparian woodland	614	0.6
Sandy Loam Upland/ <b>Loamy Upland</b>	31-54	grassland (savannah)	11,523	11.5
Volcanic Hills and Volcanic Hills/Limy Slopes and Volcanic Hills/Shallow Upland/Clay Hills	66-85	oak woodland intermixed with grasses and shrubs	14,350	14.3
<b>TOTAL</b>			100,616	100

The severity of adverse effects to *Leptonycteris* bats resulting from the potential reduction in forage resources is dependent on the importance of forage plants in a specific area to reproduction, survival, and growth of the bat. Areas with high densities of paniculate agaves and saguaros may be particularly important to these bats, especially if those high density sites are close to roosts. There are a few saguaros on the northern end of the planning area. Much of the action area is within core use-areas.

In August 2001, BLM established five photo plots to monitor yearly fluctuations in agave abundance. These plots will be sampled annually. In addition, a plot-based methodology to assess influences of herbivory on agave is being tested by the University of Arizona Range Department and will be evaluated for use on the planning area.

Implementing a vegetation treatment program should result in upland vegetation conditions that meet the desired future conditions and resource objectives identified in the RMP. These actions should positively affect the lesser long-nosed bat. Any negative effects of the action should be mitigated with the conservation actions BLM proposes as part of each action. Most of the proposed vegetation treatments are not in loamy hills ecological sites. BLM proposes to design vegetation treatments, including prescribed fire, to minimize harm to paniculate agaves and to ensure that no more than 20 percent of agaves burned during prescribed fire are killed by the fire. BLM also proposes to not impact more than one percent of the agaves present within 0.5 mile of a project area. If more than one percent is impacted, they propose to plant enough agaves so the total number of agaves lost is less than one percent. BLM would design herbicide use for removal of invasive or exotic plants in a manner that mitigates most potential harm to non-target plants and animals and will further analyze potential impacts in site-specific treatment plans.

Indirect effects from livestock grazing to *Leptonycteris* bats may occur through adverse effects to forage plants, primarily paniculate agaves and saguaros. Impacts to forage plants through implementation of the range management program may occur through direct herbivory and trampling by livestock, alteration of the vegetation community, degradation of soil and watershed conditions, modification of the fire regime, and range projects. The BLM has provisions in place to reduce effects to agaves from construction and maintenance activities associated with grazing management.

No long-term investigation has quantitatively documented the effect of grazing on agave mortality or flowering stalk herbivory. Individual paniculate agave plants only bloom once in their life of about 20 years. However, agave stalks are rich in carbohydrates, and as they begin to bolt are particularly palatable to domestic livestock and wild herbivores (Howell 1996; M. Hawks, University of Arizona, pers. comm., 1997; Hodgson, pers. comm., 1997). The desirability of these stalks in early spring is likely influenced by availability of quality forage in the area. Under conditions of inadequate precipitation to facilitate a spring green-up, especially when high levels of utilization are reached or following range fires, cattle as well as local wildlife may seek out agave stalks (Tricia Roller, Arizona Ecological Services Field Office, pers. comm.,

1997). Cattle have been known to "walk down" agave flowering stalks (T. Cordery, Arizona Ecological Services Field Office, pers. comm., 1998). Cattle probably trample young agaves, causing some level of mortality among these plants. Agave germination and seedling establishment may be influenced by degraded ecological conditions such as soil compaction, erosion, reduced infiltration, and altered plant species composition. Effects on bat forage plants due to livestock grazing are expected to be more intense where livestock congregate near water sources and less intense on steep slopes or among rocks where grazing is generally lighter and agaves are at higher densities.

Effects of livestock grazing on fire frequency and intensity, and subsequent effects to agaves and floral resources for bats are complex. Before about 1900, widespread surface fires occurred in the Madrean borderlands. These frequent ground fires ceased to occur about the time intensive livestock grazing began (Swetnam and Baisan 1996). Although other factors likely played some role in the elimination of frequent ground fires, most authors agree that livestock grazing was probably the most important, at least before effective fire suppression began in the 1930's (Bahre 1991, 1995, Swetnam and Baisan 1996, Danzer et al. 1997). Livestock grazing removes dried herbaceous fine fuels that normally carry fire. Without fire, ladder fuels and woody material builds up in woodlands. The result is that when fires finally do occur, they can be catastrophic and stand-replacing (Danzer et al. 1997). How this change in fire frequency and intensity, caused in part by livestock grazing, affects agave populations is unknown. In the absence of frequent ground fires, agave populations could potentially benefit due to reduced mortality resulting from fire. However, infrequent intense fires could kill greater percentages of agaves when fires occur, if agaves are growing amid brush or other areas of high fuel loads.

Other factors are important in determining the effects of livestock grazing on fire regimes and subsequent effects to agaves and floral resources. Activities that directly or indirectly promote invasions or increased density of nonindigenous grasses, particularly Lehmann lovegrass, may result in increased fire frequency or intensity, reduced densities of Palmer's agave, and thus reduced floral resources for the lesser long-nosed bat. Lehmann lovegrass has been positively correlated with livestock grazing intensities (Anable et al. 1992, McClaran and Anable 1992). This species increases after fire (Martin 1973, Ruyle et al. 1988, Sumrall et al. 1991, Howell 1996), and also produces an abundance of fine fuel that promotes hot fires (McPherson 1995). Thus, frequent fire is likely to increase the abundance of Lehmann lovegrass, and increased abundance of this grass can fuel more fires and hotter fires, creating a positive feedback loop (Anable et al. 1992). Frequent, hot fires caused by prescribed fires and increasing prevalence of Lehmann lovegrass could reduce densities of Palmer's agave. In an ungrazed setting at Fort Huachuca, Howell (1996) found that Lehmann lovegrass creates area of continuous fuels that burn at a constant temperature versus stands of native grasses that are patchy regarding fuels and fire intensity. Agaves can persist in fire-prone native grasslands in bare areas or refugia that burn lightly or not at all. Such refugia are less common in Lehmann lovegrass stands. Howell (1996) also noted a negative relationship between the proportion of agave seedlings and ramets and the amount of Lehmann lovegrass. She suggested that Lehmann lovegrass appears to suppress agave recruitment independent of the fire effects just described. The mechanism of suppression is

unclear, but Howell (1996) suggests Lehmann lovegrass may compete effectively with agaves for nutrients, moisture, or light. If agave densities are reduced due to elevated fire effects or recruitment suppression caused by Lehmann lovegrass invasion, forage resources of the lesser long-nosed bat will be reduced. Agaves in desert grasslands have evolved with fire, but unnatural, high fire frequency can lead to decline or elimination of agave populations (Howell 1996). Howell (1996) found that a fire frequency of three to six per decade on Fort Huachuca is “clearly too high to allow sexual reproduction to persist in the agave community... too high to permit seedling establishment and too high to allow even the fast-growing clones to achieve reproductive status.

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

Livestock grazing, especially at high utilization levels, often promotes the increase of nonindigenous and less-palatable species, which may influence the resulting fire regime. Often the objectives of livestock management are to increase the abundance of grasses while the direct impacts of livestock herbivory are the reduction of grass cover. Grasses are probably one of the strongest competitors with agave seedlings (Burgess, pers. comm., 1997). Increased abundance of grass could result in reduced agave abundance. When overgrazing results in declines of perennial grasses (Martin and Cable 1974, Eckert and Spencer 1987), there may be less competition between grasses and agaves. However, there may also be increased trampling of smaller agaves by livestock, and increases in woody/shrub vegetation results in an altered fire regime.

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

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

Grazing utilization levels greater than 40 percent are considered damaging to the ecosystem (Martin 1975, Eckert and Spencer 1987, Holechek et al. 1998). BLM proposes livestock grazing be limited to 35% utilization. How these or other specific levels of utilization are directly correlated to effects on agaves is not known. However, as utilization levels or stocking levels increase, effects to the vegetation community and agaves also increase. No information is available on the relationship of grazing management systems and utilization levels to the associated effects on agaves. The effects that livestock are having today on the landscape are manifest in changes in the ecosystem for years and decades to come. The effects of livestock use today on seedling agaves will not be manifest to the bat for 20 or more years, when those plants would be reaching maturity and bolting. The effect of livestock today through herbivory on bolting agaves results in immediate reductions of forage resources available to *Leptonycteris*.

Central to the issue of evaluating adverse effects due to livestock impacts to forage plants of post-breeding *Leptonycteris* bats is the question, are agave floral resources potentially limiting to the bat? Though there were many perspectives on this subject, one answer appears clear, there are very little data. Limited information is available on bat foraging ecology and energetics, as well as the relation of livestock use to agave mortality, and weather parameters to agave bolting. Though many, many paniculate agaves are present across the landscape, it is not understood if all these are equally available and desirable to the bat. Slauson (pers. comm, 1999) believes that agave nectar is not limiting to lesser long-nosed bats. This conclusion is based on her pollination biology study of Palmer's agave (Slauson 1999) in which bat visitation and quantities of available nectar were monitored. Nighttime observations were conducted at several sites for a total of over 15 hours of periodic observations. In addition, floral nectar was always abundant at her sites and not depleted by pollinators. Slauson (1999) discussed possible factors related to the lack of observed bat visitations: 1) during stormy or windy weather, bat foraging distances and activity may decrease; 2) sufficient food resources for the number of bats present may have been available closer to the roost; and 3) other foraging sites may have been preferred. Some of the

observation sites were in areas where *Leptonycteris* bats are widely dispersed. The relationship of foraging areas to roost sites, especially large roosts, is important in land management decisions. Availability of large roost sites is considered a major limiting factor to the bats (USFWS 1997f). Affecting forage resources near roosts may affect a substantial portion of the bat population in Arizona, and may affect the desirability of a particular roost site.

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

#### Livestock Grazing

The majority of the livestock herd is not grazing the pastures with loamy upland ecological sites which support agaves during the time that agaves are flowering. One of the secondary herds, such as the bull herd, may be present in these pastures during the flowering period. Flowering agave stocks might be predisposed to herbivory due to the presence of livestock on ecological sites during agave flowering season. This may result in localized reduction of agave nectar and pollen for the lesser long-nosed bat. These events are expected to be minor as cattle feed on agave stocks opportunistically not selectively, and any livestock use in pastures with flowering agaves would be relatively light. Cattle are grazing in the south end of the planning area July-September. By June, agave flower stalks are tall enough to avoid grazing, therefore herbivory is unlikely in this area. Stipulations on livestock grazing activities to protect lesser long-nosed bat habitat and roosts will benefit the species.

The BLM proposes to continue monitoring lesser long-nosed bat and their habitat. BLM plans to do annual surveys in suitable habitat for a minimum of three years to determine if additional pairs are colonizing the area and whether successful nesting is occurring. If breeding pairs are found to be regularly using the area, then monitoring will be continued.

Cultural resource management and recreational activities would attract more visitors to the area. Visitors should have minimal effects to lesser long-nosed bats since there are no day roosts in the

planning area and visitors generally do not impact agaves. The area where most agaves occur is less accessible because they are on the east side of the planning area and roads are rough. The greatest potential impacts from visitors to the area would be from visitors starting wildfires. The proposed closure of roads will reduce vehicular access in the area and thereby reduce the potential for human cause wildfires. The effects of fires on agaves are discussed above. In addition, developing and implementing an educational program to encourage responsible use of public lands should reduce the potential for human caused fires, as will the proposed vegetation treatments.

Restricting vehicles to designated roads will reduce potential impacts to lesser long-nosed bat foraging resources. Illegal off-road travel could still result in harm to young agaves, but the implementation of a designated road system allows for more easy detection and closure of unauthorized or "wildcat" roads. The road closures and restrictions proposed in this action will reduce potential disturbance to agave stands and soil compaction. The designated road system does not increase access to known lesser long-nosed bat roosts.

The overall effect of the proposed actions on the lesser long-nosed bat should be mostly beneficial because conservation actions are part of all specific actions that could impact lesser long-nosed bat, natural processes will be encouraged, and the ecological condition of the area should be maintained and improved during the 20-year life of the RMP. There will be site-specific negative impacts from livestock grazing and road crossings, and general effects from recreation, but these impacts should not reduce populations or preclude use of the area by the lesser long-nosed bat. In addition, actions are proposed by BLM that should assist with the conservation and recovery of the species.

### **Conclusion**

After reviewing the current status of lesser long-nosed bat, the environmental baseline for the action area, the effects of the proposed Las Cienegas NCA RMP and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the proposed endangered lesser long-nosed bat. No critical habitat has been designated, thus, none would be affected. We base these conclusions on the following:

1. The proposed action affects a small portion of the species' range;
2. All proposed actions that may affect the lesser long-nosed bat have conservation actions included which should minimize effects to the species; and
3. The ecological condition of the area should be maintained and improved during the 20-year life of the RMP.

### **Incidental Take Statement**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat

modification or degradation that results in death or injury to listed species by significant impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service 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, and sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited taking under the Act if such taking meets the terms and conditions of this Incidental Take Statement.

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

#### **Amount or Extent of Take**

We anticipate lesser long-nosed bats could be taken as a result of floral resources within core use-areas.

1. All lesser long-nosed bats, whose core use-areas include pastures or allotments that are grazed during the agave bolting season, by human visitation, or by prescribed burning, though harm.

We anticipate incidental take of lesser long-nosed bats as a result of harm will be difficult to detect for the following reasons: dead animals are difficult to find and cause of death may be difficult to determine. However, take of lesser long-nosed bat may occur from livestock grazing, prescribed burning, and human visitation affects to floral resources. The level of take anticipated in the form of harm could be detected either by finding bats taken as a result of the grazing, burning, or recreation program, or if the following surrogate condition is met:

1. Flowering agave densities within core use-areas decline below the natural variability of the species (0.2-5.4 flowering plants /ha).

#### **Effect of Take**

In this biological opinion, the Service finds the anticipated level of take is not likely to jeopardize the continued existence of the endangered lesser long-nosed bat.

#### **Reasonable and Prudent Measures and Terms and Conditions**

The following reasonable and prudent measures are necessary and appropriate to minimize take of the lesser long-nosed bat. To be exempt from the prohibitions of section 9 of the Act, the

BLM must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting and monitoring requirements. These terms and conditions are non-discretionary.

1. The BLM shall continue to monitor the lesser long-nosed bat and its habitat to document levels of take and determine effectiveness of conservation measures.
  - 1.1. The BLM shall develop with us a monitoring program to determine density of flowering agave stalks within core use-areas.
  - 1.2. The BLM shall implement the monitoring plan.
  - 1.3. An annual report will be done which summarizes the implementation of the proposed action and any incidental take that occurred. We are especially interested in an analysis of the effectiveness of the conservation measures and terms and conditions.
2. Measures shall be implemented to reduce the impacts of the proposed livestock grazing and recreation management actions on agaves.
  - 2.1. For roads designated to be closed within lesser long-nosed bat core use-areas, close them before December 31, 2010;
  - 2.2. Ensure that no more than 20 percent of agaves burned during prescribed fire are killed by the fire within lesser long-nosed bat core use-areas.
  - 2.3. Do not impact more than one percent of the agaves present within 0.5 miles of any new road, trail, fence, recreational, or other infrastructure such as parking pull-outs, repressos, and educational facilities within lesser long-nosed bat core use-areas. If more than one percent is impacted, plant and insure the survival of enough agaves so that the total number of agaves lost is less than one percent.

### **Conservation Recommendations**

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

We recommend that the BLM monitor livestock utilization within all pastures used during the agave bolting season (Recovery plan task 2, USFWS 1997f).

We recommend that the BLM investigate and monitor the invasion of Lehmann lovegrass in the planning area and assist other agencies in developing methods for controlling this nonindigenous grass (Recovery plan task 2, USFWS 1997f).

We recommend that the BLM apply restrictions on the exposure of bolting agaves to livestock use, so that no allotment has more than 50 percent of the area accessible to livestock during the agave bolting period (April 15 through September 15) during any one year (Recovery plan task 1, USFWS 1997f).

We recommend that the BLM continue support and cooperation in the investigations of agave relationships to livestock grazing, and of the effects of prescribed fire on paniculate agaves (Recovery plan task 1, USFWS 1997f).

We recommend that the BLM implement the Lesser Long-nosed Bat Recovery Plan, as appropriate.

For the Service to be kept informed of actions reducing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

### **SOUTHWESTERN WILLOW FLYCATCHER (*Empidonax traillii extimus*)**

#### **Status of the Species**

The southwestern willow flycatcher is a small grayish-green passerine bird (Family Tyrannidae) measuring approximately 5.75 inches (14.6 cm). It has a grayish-green back and wings, a whitish throat, light gray-olive breast, and pale yellowish belly. Two white wingbars are visible (juveniles have buffy wingbars). The eye ring is faint or absent. The upper mandible is dark, and the lower is light yellow grading to black at the tip. The song is a sneezy fitz-bew or a fit-a-bew, the call is a repeated whitt. Other life history information can be found in the recently released recovery plan (USFWS 2002c).

The southwestern willow flycatcher is one of four currently recognized willow flycatcher subspecies (Phillips 1948, Unitt 1987, Browning 1993). It is a neotropical migrant that breeds in the southwestern U.S. and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Stiles and Skutch 1989, Peterson 1990, Howell and Webb 1995). The historic breeding range of the southwestern willow flycatcher included southern California, Arizona, New Mexico, western Texas, southwestern Colorado, southern Utah, extreme southern Nevada, and extreme northwestern Mexico (Unitt 1987).

The southwestern willow flycatcher was listed as endangered, without critical habitat on February 27, 1995 (USFWS 1995). Critical habitat was later designated on July 22, 1997 (USFWS 1997c). A correction notice was published on August 20, 1997 to clarify the lateral extent of the designation (USFWS 1997e). On May 11, 2001, the 10th Circuit Court of Appeals

set aside designated critical habitat in those states under the 10th circuit's jurisdiction. The Service decided to set aside critical habitat designated for the southwestern willow flycatcher in all states (California, Arizona, and New Mexico) until it can reassess the economic analysis.

Declining southwestern willow flycatcher numbers have been attributed to loss, modification, and fragmentation of riparian breeding habitat, loss of wintering habitat, and brood parasitism by the brown-headed cowbird (Sogge et al. 1997, McCarthy et al. 1998). Habitat loss and degradation are caused by a variety of factors, including urban, recreational, and agricultural development, water diversion and groundwater pumping, channelization, dams, and livestock grazing. Fire is an increasing threat to willow flycatcher habitat (Paxton et al. 1996), especially in monotypic salt cedar vegetation (DeLoach 1991) and where water diversions or groundwater pumping desiccates riparian vegetation (Sogge et al. 1997). Willow flycatcher nests are parasitized by brown-headed cowbirds (*Molothrus ater*) which lay their eggs in the host's nest. Feeding sites for cowbirds are enhanced by the presence of livestock and range improvements such as waters and corrals; agriculture; urban areas; golf courses; bird feeders; and trash areas. These feeding areas, when in close proximity to flycatcher breeding habitat, especially when coupled with habitat fragmentation, facilitate cowbird parasitism of flycatcher nests (Hanna 1928, Mayfield 1977a, 1977b, Tibbitts et al. 1994).

Since listing in 1995, at least 54 Federal agency actions have undergone (or are currently under) formal section 7 consultation throughout the bird's range (Table 9). Six actions have resulted in jeopardy decisions. Many activities continue to adversely affect the distribution and extent of occupied and potential breeding habitat throughout its range (development, urbanization, grazing, recreation, native and nonindigenous habitat removal, dam operations, river crossings, ground and surface water extraction, etc.). Stochastic events also continue to adversely affect the distribution and extent of occupied and potential breeding habitat. A catastrophic fire in June of 1996, destroyed approximately one-half mile (1 km) of occupied habitat on the San Pedro River in Pinal County. That fire resulted in the forced dispersal or loss of up to eight pairs of flycatchers (Paxton et al. 1996).

As reported by Paradzick et al. (2001), the largest concentrations of willow flycatchers in Arizona in 1999 were near the confluence of the Gila and San Pedro Rivers (219 flycatchers, 119 territories); at the inflows of Roosevelt Lake (207 flycatchers, 115 territories); Gila River near Safford (30 flycatchers, 15 territories); Topock Marsh on the lower Colorado River (25 flycatchers, 15 territories); Verde River at Camp Verde (9 flycatchers, 5 territories); Alpine/Greer on the San Francisco River/Little Colorado River (7 flycatchers, 5 territories); Alamo Lake on the Bill Williams River (includes lower Santa Maria and Big Sandy River sites)(44 flycatchers, 24 territories); Big Sandy River, Wikieup (23 flycatchers, 16 territories); and lower Grand Canyon on the Colorado River (14 flycatchers, 8 territories).

### **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.

Table 9. Agency actions that have undergone formal section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide.

Action (County)	Year	Federal Agency <sup>1</sup>	Incidental Take Anticipated
Arizona			
Cedar Bench Allotment (Yavapai)	1995	Tonto NF	Indeterminable
Tuzigoot Bridge (Yavapai)	1995*	NPS	None
Windmill Allotment (Yavapai)	1995	Coconino NF	Loss of 1 nest annually for 2 years
Solomon Bridge (Graham)	1995	FHWA	Loss of 2 territories
Tonto Creek Riparian Unit (Gila)	1995	Tonto NF	Indeterminable
Eastern Roosevelt Lake Watershed Allotment (Maricopa)	1995	Tonto NF	Indeterminable
Cienega Creek (Pima)	1996	BLM	1 nest annually by cowbird parasitism
Glen Canyon Spike Flow (Coconino)	1996	USBR	Indeterminable
Verde Valley Ranch (Yavapai)	1996*	Corps	Loss of 2 flycatcher territories
Modified Roosevelt Dam (Gila/Maricopa)	1996*	USBR	Loss of 45 territories; reduced productivity/ survivorship 90 birds
Lower Colorado River Operations (Mohave/Yuma)	1997*	USBR	Indeterminable
Blue River Road (Greenlee)	1997	A/S NF	Indeterminable
Skeleton Ridge (Yavapai)	1997	Tonto NF	Indeterminable
White Canyon Fire Emergency Consultation (Pinal)	1997	BLM	Harassment of 4 pairs
U.S. Hwy 93 Wickenburg (Mohave/Yavapai)	1997	FHWA	Harassment of 6 birds in 3 territories and 1 bird killed/decade
Safford District Grazing Allotments (Greenlee, Graham, Pinal, Cochise & Pima)	1997	BLM	Indeterminable
Lower Gila Resource Plan Amend. (Maricopa, Yavapai, Pima, Pinal, La Paz & Yuma)	1997	BLM	Indeterminable
Storm Water Permit for Verde Valley Ranch (Yavapai)	1997	EPA	Indeterminable
Gila River Transmission Structures (Graham)	1997	AZ Electric Power Coop. Inc.	Indeterminable

Table 9. Agency actions that have undergone formal section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide.

Action (County)	Year	Federal Agency <sup>1</sup>	Incidental Take Anticipated
Arizona Strip Resource Mgmt Plan Amendment (Mohave)	1998	BLM	Harm of 1 nest every 3 years
CAP Water Transfer Cottonwood/Camp Verde (Yavapai/Maricopa)	1998	USBR	Indeterminable
Cienega Creek Stream Restoration Project (Pima)	1998	BLM	Harassment of 1 bird
Kearny Wastewater Treatment (Pinal)	1998	FEMA	Indeterminable
Ft Huachuca Programmatic (Cochise)	1998	US Army	None
SR 260 Cottonwood to Camp Verde (Yavapai)	1998	FHWA	Indeterminable
Wildlife Services (ADC) Nationwide	1998	Wildlife	in consultation
Alamo Lake Reoperation (LaPaz,			
Grazing on 25 allotments on the Tonto	1999	Tonto NF	
Mingus Avenue Extension (Yavapai)	1999	ACOE	Indeterminable
The Homestead at Camp Verde	2000	EPA	in consultation
Duncan HWY 75 Bridge -Gila River	2000	FHWA	Indeterminable
Red Creek Grazing Allotment (Gila)	2000	Tonto NF	Indeterminable
Interim Surplus Criteria/4/4 (Mohave,	2001	USBR	Loss of 372 acres of occupied
Peck Canyon Scour HWY	2001	ACOE	Indeterminable
Wikieup/Big Sandy Caithness power	2001	WAPA/BL	in consultation
Tonto Creek Crossing	2001	Tonto NF	in consultation
Big Sandy/Santa Maria Grazing	2001	BLM	in consultation
California			
Prado Basin (Riverside/San Bernardino)	1994	Corps	None
Orange County Water District (Orange)	1995	Corps	None
Temescal Wash Bridge (Riverside)	1995	Corps	Harm to 2 flycatchers
Camp Pendleton (San Diego)	1995	DOD	Loss of 4 flycatcher territories
Lake Isabella Operations 1996 (Kern)	1996	Corps	Inundation 700 ac critical habitat; reduced productivity 14 pairs
Lake Isabella Long-Term Operations (Kern)	1997	Corps	Indeterminable

Table 9. Agency actions that have undergone formal section 7 consultation and levels of incidental take permitted for the southwestern willow flycatcher rangewide.

Action (County)	Year	Federal Agency <sup>1</sup>	Incidental Take Anticipated
H.G. Fenton Sand Mine and Levee near Pala on the San Luis Rey River (San Diego)	1997	Corps	None
Colorado			
AB Lateral - Hydroelectric/Hydropower Facility, Gunnison River to Uncompahgre River (Montrose)	1996	USBR	None
TransColorado Gas Transmission Line Project, Meeker, Colorado to Bloomfield, New Mexico	1998	BLM	None
Nevada			
Gold Properties Resort (Clark)	1995	BIA	Harm to 1 flycatcher from habitat loss
Las Vegas Wash, Pabco Road Erosion Control Structure	1998	Corps	Harm to 2-3 pairs of flycatchers
New Mexico			
Corrales Unit, Rio Grande (Bernalillo)	1995	Corps	None
Rio Puerco Resource Area	1997	BLM	None
Farmington District RMP	1997*	BLM	None
Mimbres Resource Area Management Plan	1997*	BLM	1 pair of flycatchers
Belen Unit, Rio Grande (Valencia)	1998	Corps	Consultation in progress
BIA = Bureau of Indian Affairs; BLM = Bureau of Land Management; Corps = Army Corps of Engineers; DOD = Dept. of Defense; EPA = Environmental Protection Agency; FEMA = Federal Emergency Management Agency; FHWA = Federal Highway Administration; NF = National Forest; NPS = National Park Service; USBR = U.S. Bureau of Reclamation; USFS = U.S. Forest Service. * Jeopardy opinions.			

### Status of the species within the action area

Inventories for endangered southwestern willow flycatcher habitat were completed in 2000 along Cienega Creek and its tributaries: Mattie Canyon, Empire Gulch and Gardner Canyon (Table 10). About four miles of Cienega Creek were classified as having suitable habitat and about 9.5 miles of Cienega Creek and Empire Gulch were classified as having potential habitat. Much of the potential habitat was relatively even-aged stands of willows which had matured to the point where they lacked sufficient density of under-story vegetation. Some type of disturbance to open up these areas to new growth is probably necessary to return them to suitable habitat which is an earlier successional stage.

Table 10. Southwestern willow flycatcher habitat classification 2000 summaries for Cienega Creek<sup>1</sup> and tributaries<sup>2</sup>, Arizona.

Segment				Classification	Attributes				
Number	Location	Date	Length	S;P;N <sup>4</sup>	H <sup>5</sup>	W <sup>6</sup>	C.D. <sup>7</sup>	U.D. <sup>8</sup>	P.S. <sup>9</sup>
59AA	Bootlegger to Narrows	7/12	1.5mi	P	S	P	P	S	P
59A	Narrows to Apache Can.	7/12	0.3	S	S	S	S	S	S
59B	Apache to Fresno Can.	7/12	0.3	S	S	S	S	S	S
59C	Fresno Can. to Bedrock Falls	7/12	1.6	S	S	S	S	S	S
59E	Pump Can. to Cienega Falls	7/11	0.6	P	S	S	S	P	S
59F	Cienega Falls to Mattie Can.	7/11	0.5	P	S	S	S	P	S
59G	Mattie Can. to Cold Springs	7/11	0.5	P	S	S	S	P	S
59H	Ag. Fields to Cold Springs	7/11	1.0		S	S	S	P	S
59I	Ag. Fields to Canal	7/11	1.7	P	S	S	S	P	S
59J	Canal to Oak Tree Can.	7/11	0.9	S	S	S	S	S	S
59K	Oak Tree Can. to Spring Water <sup>3</sup>	7/11	0.3	P	S	S	S	P	S
59L	Spring Water Can. to Gardner Can.	7/11	1.0	S	S	S	S	S	S
59M	Gardner to Head Waters	7/11	1.3	P	S	S	S	P	S
62A	Empire Gulch Confluence	7/11		P	S	S	P	P	S
62D	Empire Gulch Spring-down stream	7/11		P	S	S	S	P	S

<sup>1</sup> 59AA-59M      <sup>2</sup> 62A, 62D      <sup>3</sup> 1500ft<sup>2</sup>  
<sup>4</sup> S- Suitable; P- Potential; N Not SWIFL Habitat      <sup>5</sup> Height      <sup>6</sup> Width  
<sup>7</sup> Canopy Density      <sup>8</sup> Understory Density      <sup>9</sup> Patch Size

Migrant willow flycatchers were captured in 1988, 1989, 1990, 1992, and 1993 along the “agricultural fields” portion of Cienega Creek during a volunteer bird-banding project which ceased in 1993. No willow flycatchers in breeding status were captured. Willow flycatcher surveys using established protocols were conducted along several reaches of Cienega Creek in 1994, but no birds were detected (Table 11).

Table 11. Southwestern willow flycatcher survey results (1994-2000), Cienega Creek, Arizona.

Stream Reach	Birds Detected? (Y/N)	Year Surveyed
Mattie Canyon to Cold Water Spring (59G)	No	1994
Ag. Fields to Canal (59I)	No (all years)	1994, 1998, 1999, 2000
Canal to Oak Tree Canyon (59J)	No	1994
Oak Tree Canyon to Spring Water Canyon (59K)	No	1994
Gardner to Head Waters (59M)	No	1994

The “agricultural fields” section of Cienega Creek (segment 59I) was resurveyed in 1998 to 2000 in association with a stream restoration project, but again, no birds were detected. Suitable habitat along Cienega Creek was surveyed for willow flycatchers in June 2001 (Table 12). A nest and adult bird feeding a fledgling were detected near the confluence of Cienega Creek and Gardner Canyon.

From 1988 to 1990, Robert A. Scheibe, Jr., a local birder, provided information on bird observations on the Empire-Cienega allotment (his own and those provided to him by other Audubon Society members and birders). Cowbirds were recorded in May to August and December 1988; January, February, April, and May 1989; December, January, February, April, and May 1990). Brown-headed cowbirds were also documented on the Empire-Cienega Allotment by USFWS personnel (USFWS 1995).

Table 12. Willow Flycatcher Survey Results (2001) Cienega Creek.

Stream Reach	Birds Detected? (Y/N)
Confluence with Apache Canyon downstream (d.s.) to Narrows (59A)	N
Confluence with Fresno Canyon d.s. to Apache Canyon (59B)	N
“bedrock falls” d.s. to Fresno Canyon (59C)	N
Oak Tree Canyon d.s. to Canal (59J)	N
Confluence with Gardner Canyon d.s. to confluence with Spring Water Canyon (59 L)	Y

BLM conducted point counts for breeding birds along Cienega Creek in 1993 and 1994 at three transects. Beginning at the north end of the Empire-Cienega allotment, they were:

ERG 1 (Empire Ranch Grazed) ran south to the lower falls with eight survey points. Dates and number of brown-headed cowbirds detected are as follows: 5/25/93 (3), 6/8/93 (4), 6/21/93 (4), 7/1/93 (3), 7/14/93 (1), 7/29/93 (1), 5/10/94 (6), 5/17/94 (3), 6/2/94 (2), 6/22/94 (0), 7/7/94 (3), 7/15/94 (4), 7/22/94 (4).

ERUG (Empire Ranch Ungrazed) ran south from the Mattie confluence to the upper falls with eight points. Dates and number of brown-headed cowbirds detected are as follows: 6/8/93 (8), 6/21/93 (7), 7/1/93 (2), 7/14/93 (2), 5/10/94 (9), 5/17/94 (7), 6/2/94 (5), 6/22/94 (1), 7/1/94 (3), 7/7/94 (2), 7/15/94 (3), 7/22/94 (4).

ERG 2 ran south from above the upper falls with seven points. Dates and number of brown-headed cowbirds detected are as follows: 6/21/93 (3), 7/14/93 (4), 5/10/94 (1), 6/2 (2), 7/7 (2), 7/22 (8).

Cowbirds have been seen with cattle, usually in flocks and in riparian areas in breeding groups of one to a few of each sex. Cowbirds also seem common in riparian areas when not concentrated with cows. They were fairly common during flycatcher surveys around the agricultural fields from 1998 to 2000, especially when livestock were present. Brown-headed cowbird abundance is relatively the same at Las Cienegas NCA and the San Pedro Riparian NCA (BLM 2002).

### **Factors affecting species environment within the action area**

Pima County is in the process of drafting a multi-species conservation plan that includes the southwestern willow flycatcher. Actions to minimize negative impacts to willow flycatcher and potential habitat will be identified in the plan, as will actions promoting the conservation and recovery of the species such as reestablishment.

### **Effects of the Action**

Many of the effects of the proposed action on the southwestern willow flycatcher are similar to those discussed previously for the Chiricahua leopard frog and Gila topminnow. Therefore, the discussion of effects will not be repeated and is incorporated here by reference. The discussion on the effects of the proposed action to the southwestern willow flycatcher will focus on differences from those sections and the effects of some site specific actions.

Implementing a vegetation treatment program would result in conditions that help Cienega Creek meet and maintain the riparian objective. Upland vegetation management and site restoration would enhance riparian development and channel stability by reducing the prevalence of shrubs and nonindigenous species. Such management would also increase watershed cover by

promoting increased perennial grasses. These actions should positively affect the southwestern willow flycatcher. Any negative effects of the action should be mitigated with the conservation actions BLM proposes as part of each action. Acquisition and protection of instream flow rights should help maintain the existing aquatic and riparian habitat that supports this species.

Controlled burning and herbicide use should affect southwestern willow flycatcher in manners similar to that of the Chiricahua leopard frog. Prescribed fires have the potential to escape. However, as evidenced by the wildfire in March 2002, even in drought conditions, fire may not have a large impact on certain riparian vegetation. The wildfire burned right up to the riparian vegetation, burned some of the trees on the outer edge, then jumped over the riparian vegetation to the other side of Cienega Creek. The riparian vegetation and the aquatic habitat sustained minimal damage from the fire.

Control of nonindigenous species, especially cowbirds, may impact the southwestern willow flycatcher in the short-term. The purpose of nonindigenous species control is to benefit native species, but there will be transient negative effects. Control actions near territorial birds could disturb them. BLM proposes to control cowbirds within five miles of occupied habitat using suitable control methods if cowbird concentrations indicate a strong likelihood that parasitism to flycatcher nests is occurring or if parasitism of one nest is documented.

The BLM proposes to continue monitoring southwestern willow flycatcher and their habitats. BLM plans to do annual surveys in suitable habitat for a minimum of three years to determine if additional pairs are colonizing the area and whether successful nesting is occurring. If breeding pairs are found to be regularly using the area, then monitoring will be continued.

Cultural resource management and recreational activities would attract more visitors to the area and potentially to riparian and wetland areas contributing to impacts previously described in recreation management. Visitors and large groups can attract cowbirds with their trash, and can negatively impact riparian vegetation that flycatchers rely on for foraging and nesting. Designation, identification, and maintenance of roads could result in increased visitor use of riparian areas. Most riparian crossings and several access points are closed to motorized access under the proposed action. Potential adverse effects of vehicle access bringing visitors to riparian areas can disrupt willow flycatcher activities and cause the trampling of small amounts of young riparian trees, especially willow, that will create the dense lower and mid-story canopies required by southwestern willow flycatcher.

The impact of livestock grazing has been discussed in the overview section and the Chiricahua leopard frog and Gila topminnow sections. Those discussions are incorporated here by reference.

Maintenance of viable populations of southwestern willow flycatcher is compatible with well-managed livestock grazing. Adverse effects to the southwestern willow flycatcher and its habitat as a result of grazing may occur under certain circumstances. The primary impacts of livestock

grazing on southwestern willow flycatcher are on habitat availability and suitability (USFWS 2002c). These effects include attracting brown-headed cowbirds; deterioration of watersheds; erosion and siltation of stream courses; and loss of wetland and riparian vegetation; (Arizona State University 1979, Hendrickson and Minckley 1984, Ohmart 1995, Jancovich et al. 1997, Belsky et al. 1999, U.S. Fish and Wildlife Service 2000). Maintenance of fences through occupied habitat can disturb nesting southwestern willow flycatchers.

Southwestern willow flycatchers breed from late April through mid-August. Therefore, if flycatchers nest within any of the seven livestock creek crossings, there is a possibility that damages to or loss of nests, eggs or nestlings could occur from large numbers of cattle moving through or watering in the area. Valentine et al. (1988) observed nests of the little willow flycatcher (*Empidonax traillii brewsteri*) destroyed by livestock. Some of the losses occurred in inadequately maintained livestock exclosures. The little willow flycatcher nested in willows that are smaller than the willows found in the action area, and were probably more susceptible to disturbance by livestock. Impacts described above during most of the breeding season and all of the nesting season would be avoided in the Narrows riparian pasture due to the absence of cattle then. Cattle will be absent after May 1<sup>st</sup> at the A&B pastures and after April 1<sup>st</sup> at the Narrows. Once the proposed upland waters are developed in the Lower 49 pasture, a lane will be constructed at the A& B pastures instead of riparian pastures, and the impacts in this area would be the same as for the other crossing lanes.

Cattle attract cowbirds, which can result in nest parasitism and negatively impact the breeding success of the flycatcher. About 50 concentrated use areas for cattle on BLM lands are present year long within five miles of Cienega creek. Waters are generally two miles apart. Brown-headed cowbirds were fairly common on southwestern willow flycatcher surveys around the agricultural fields, especially when cows were present. Cowbirds are common in breeding groups during the summer in the planning areas' riparian habitats. Also, cowbirds will travel great distances to breed in riparian areas. Therefore, cowbirds from neighboring ranches would travel to the planning area to breed. Cowbird nest parasitism is likely to occur and would still be likely if grazing was eliminated from the planning area due to the many neighboring ranches (BLM 2002).

Any new utility lines that use the utility corridor through the Narrows have the potential to impact southwestern willow flycatcher. The impact will be variable, and will depend on the particular project.

The overall effect of the proposed actions on the southwestern willow flycatcher should be mostly beneficial because conservation actions are part of all specific actions that could impact willow flycatcher, natural processes will be encouraged, and the ecological condition of the area should be maintained and improved during the 20-year life of the RMP. There will be site-specific negative impacts from livestock grazing and road crossings, and general effects from

recreation, but these impacts should not reduce populations or preclude use of the area by the southwestern willow flycatcher. In addition, actions are proposed by BLM that should assist with the conservation and recovery of the species.

### **Conclusion**

After reviewing the current status of southwestern willow flycatcher, the environmental baseline for the action area, the effects of the proposed Las Cienegas NCA RMP and the cumulative effects, it is the Service's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the endangered southwestern willow flycatcher. No critical habitat has been designated, thus, none would be affected. We base these conclusions on the following:

1. Southwestern willow flycatchers are rare in the action area;
2. The proposed action affects a small portion of the species' range;
3. All proposed actions that may affect the southwestern willow flycatcher have conservation actions included which should minimize effects to the species; and
4. The ecological condition of the area should be maintained and improved during the 20-year life of the RMP.

### **Incidental Take Statement**

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. Harm is further defined by the Service to include significant habitat modification or degradation that results in death or injury to listed species by significant impairing essential behavioral patterns, including breeding, feeding, or sheltering. Harass is defined by the Service 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, and sheltering. Incidental take is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered prohibited taking under the Act if such taking meets the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the BLM so that they become binding conditions of any grant or permit issued to any applicants, as appropriate, for the exemption in section 7(o)(2) to apply. The BLM has a continuing duty to regulate the

activity covered by this incidental take statement. If the BLM (1) fails to assume and implement the terms and conditions or (2) fails to require any applicants 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. To monitor the impact of incidental take, the BLM must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

The Service anticipates that the proposed will result in incidental take of southwestern willow flycatcher. Incidental take of the southwestern willow flycatcher will be difficult to detect for the following reasons: dead animals are difficult to find and cause of death may be difficult to determine. However, take of southwestern willow flycatcher may occur from livestock grazing and human visitation. We anticipate that the following take could occur as a result of the proposed action:

1. Harassment of not more than 1 southwestern willow flycatchers during the life of the RMP from the use and maintenance of road and trail crossings in occupied habitat;
2. Harassment of not more than 2 southwestern willow flycatchers during the life of the RMP from general recreational use of the area, and use of the Agricultural Fields group site;
3. Harassment of not more than 2 southwestern willow flycatchers during the life of the RMP from livestock management actions associated with exclosures and creek crossing and watering areas;
4. Mortality of not more than 1 southwestern willow flycatchers during the life of the RMP from the introduction or increase of brown-headed cowbirds associated with livestock grazing and human visitation; and
5. Harassment of not more than 1 southwestern willow flycatcher during the life of the RMP from fence maintenance in occupied habitat.

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

### **Effect of Take**

In this biological opinion, the Service finds the anticipated level of take is not likely to jeopardize the continued existence of the endangered southwestern willow flycatcher.

**Reasonable and Prudent Measures and Terms and Conditions**

The following reasonable and prudent measures are necessary and appropriate to minimize take of the southwestern willow flycatcher. To be exempt from the prohibitions of section 9 of the Act, the BLM must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting and monitoring requirements. These terms and conditions are non-discretionary.

1. The BLM shall continue to monitor the southwestern willow flycatcher and its habitat to document levels of take and determine effectiveness of conservation measures;
  - 1.1. The BLM shall continue to monitor southwestern willow flycatcher populations and habitat:
    - a. If flycatchers are detected at any time of year, contact the Service, and determine their breeding status using the following criteria:
      - repeated presence of a non-singing southwestern willow flycatcher, or a southwestern willow flycatcher using vocalizations other than the primary song next to an individual exhibiting territorial behavior;
      - observation of a southwestern willow flycatcher carrying nesting material;
      - observation of southwestern willow flycatchers copulating;
      - verification of a willow flycatcher nest;
      - observation of a southwestern willow flycatcher carrying food items; and/or
      - observation of a juvenile southwestern willow flycatcher.
    - b. If breeding status is confirmed or suspected, continue monitoring efforts by visiting breeding locations at least once during each of the three 10-day periods of June and July or until observation indicates that southwestern willow flycatcher have stopped breeding efforts. Collect breeding and habitat data and determine if nest parasitism by brown-headed cowbirds is occurring as outlined in the survey protocol (Tibbitts et al. 1994) and submit the completed data forms to AGFD Partners in Flight Program.
  - 1.2. An annual report will be done which summarizes the implementation of the proposed action and any incidental take that occurred. We are especially interested in an analysis of the effectiveness of the conservation measures and terms and conditions.

2. Measures shall be implemented to reduce the impacts of the proposed wildlife management actions, livestock grazing, recreation, and utility corridors:
  - 2.1. Reduce the speed limit to 10mph at the EC901 crossings at Empire Gulch and Cienega Creek, and at the EC910D crossing at the Narrows and post the speed limit at each crossing;
  - 2.2. To minimize impacts from recreation and as part of the proposed public education program, include information on the presence of listed species in the area, their status and importance, and prohibitions. The educational venue can take any form, but the first one with this message must be completed within one year of the date of this biological opinion;
  - 2.3. Use of creek crossings and watering areas for livestock should minimize impacts to southwestern willow flycatcher;
    - A. When considering which creek crossings to use for livestock, do not use crossings which are known to be occupied by southwestern willow flycatcher. If southwestern willow flycatcher surveys are not done before crossings are used during the flycatcher breeding and nesting period, then do not use crossings that traverse areas identified as suitable flycatcher habitat (Table 10). Temporary crossings for livestock across Cienega Creek may be used. Locations of temporary crossings will be determined in coordination with the Service and the AGFD;
    - B. Insure that livestock do not linger in crossings with aquatic habitat and are moved through the crossing promptly;
  - 2.4. Do not permit organized groups access to areas with nesting southwestern willow flycatchers during the breeding season;
  - 2.5. Check the fence of all enclosures that have occupied southwestern willow flycatcher habitat at least once when the adjacent pasture is being used. If there is a problem with the fence and livestock are in that pasture, repair the fence within one week of the fence problem being discovered. If cattle are not in the adjacent pasture, repair the fence before livestock are returned to the pasture;
  - 2.6. To minimize the potential for recreationists impacting southwestern willow flycatchers, use the Maternity Well or Airstrip sites if nesting flycatchers are present at the Agricultural Fields Group Site and limit the access of organized groups to the area;

- 2.7. If brown-headed cowbirds are found to be parasitizing the nests of southwestern willow flycatchers, begin monitoring nest parasitism for an additional year, using established protocols. If nest parasitism is greater than 30 percent during the two years, begin a cowbird trapping program following the guidance in the draft southwestern willow flycatcher recovery plan (USFWS 2002c) and other established protocols;
- A. Determine the number and location of traps based on the distribution of willow flycatcher along the drainage, but include a minimum of two traps;
  - B. Check all traps at least once each day; individual traps should be checked at about the same time each day;
  - C. Maintain data on the brown-headed cowbird trapping program, including:
    - date trapping is initiated and stopped;
    - locations of traps marked on a topographic map;
    - variations from established protocol;
    - number and sex of brown-headed cowbirds and non-target species captured;
    - date of each capture;
  - D. Euthanize all captured brown-headed cowbirds in a humane manner; dispose of the dead birds properly;
  - E. Report to the Service each year on the survey and trapping program.
- 2.8. In the pasture with the Narrows, implement one of the three following actions:
- A. Remove all livestock by March 30;  
OR
  - B. Exclude the Narrows from livestock grazing all year;  
OR
  - C. In the riparian corridor that is still open to grazing, grass and herbaceous vegetation will have a stubble height of at least six inches when livestock are

removed from the pasture. The riparian corridor includes the high terrace with mesquite. Livestock must be removed from the pasture not later than May 1.

3. Personnel education programs and well-defined operational procedures shall be implemented.
  - 3.1. All personnel performing maintenance at any creek crossing will be informed of the potential presence of southwestern willow flycatcher, their status, and the need to perform their duties to avoid impacts to the flycatcher and its habitat; and
  - 3.2. All personnel performing fence maintenance at any creek crossing will be informed of the potential presence of southwestern willow flycatcher, their status, and the need to perform their duties to avoid impacts to the willow flycatcher and its habitat.

### **Conservation Recommendations**

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

We recommend that the BLM work with the Service and Arizona Game and Fish Department and other appropriate parties to implement the Southwestern Willow Flycatcher Recovery Plan (USFWS 2002c)(Recovery Plan Tasks 2.1, 2.2);

We recommend that the BLM work with the Service and Arizona Game and Fish Department to begin an aggressive program to ensure that nonindigenous aquatic organisms are not introduced to the action area, and if they are, to support actions to remove them (Recovery Plan Task 1.4, 2.4, 2.5).

We recommend that the BLM work with all interested parties in the Cienega Creek watershed to insure that groundwater use does not exceed annual recharge (Recovery Plan Task 1.3, 2.3).

For the Service to be kept informed of actions reducing or avoiding adverse effects or benefitting listed species or their habitat, the Service requests notification of the implementation of any conservation recommendations.

**REINITIATION STATEMENT**

This concludes the formal consultation and conference on the BLM's proposed Las Cienegas National Conservation Area Resource Management Plan. As provided in 50 CFR 402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: 1) the amount or extent of incidental take is exceeded; 2) new information reveals effects of the agency action that may adversely 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 way that causes an effect to a listed species or critical habitat that was not considered in this opinion; or 4) a new species is listed or critical habitat designated that may be affected by this action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation, if it is determined that the impact of such taking will cause an irreversible and adverse impact to the species. Any questions or comments should be directed to Doug Duncan (520) 670-4860 or Sherry Barrett (520) 670-4617 of the Arizona Ecological Services Field suboffice in Tucson.

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## APPENDIX A: CONCURRENCES

### JAGUAR (*Panthera onca arizonensis*)

#### Environmental Baseline

##### Status of the Species in the Project Area

Brown (1983) presented an analysis suggesting there was a resident breeding population of jaguars in the southwestern United States at least into the 20th century. The Service (USFWS 1990a) recognizes that the jaguar continues to occur in the American Southwest, at least as an occasional wanderer from Mexico. Goldman (1932) believed the jaguar was a regular, but not abundant, resident in southeastern Arizona. Hoffmeister (1986) considered the jaguar an uncommon resident species in Arizona. He concluded that the reports of jaguars between 1885 and 1965 indicated that a small but resident population once occurred in southeastern Arizona. Brown (1983) suggested that the jaguar in Arizona ranged widely throughout a variety of habitats from Sonoran desertscrub upward through subalpine conifer forest. Most of the records were from Madrean evergreen-woodland, shrub-invaded semidesert grassland, and along rivers.

The AGFD (1998) cited two recent reports of jaguars in Arizona. The individuals were considered to be transients from Mexico. One of the reports was from 1987 from an undisclosed location. The other report was from 1988, when tracks were observed for several days prior to the treeing of a jaguar by hounds in the Altar Valley, Pima County. An unconfirmed report of a jaguar at the Coronado National Memorial was made in 1991 (Ed Lopez, Coronado National Memorial, pers. comm., 1992 *in litt.* USFWS 1997d). In 1993, an unconfirmed sighting of a jaguar was reported for BANWR (William Kuvlesky, pers. comm., USFWS, *in litt.*, USFWS 1997d). A jaguar was photographed in the mountains west of Nogales in December, 2003.

No surveys for jaguar have been conducted in the action area. It is highly unlikely that a jaguar would take up residence in the area. Most recent records of Jaguar in Arizona have been in the mountain ranges next to the US-Mexico border. Though the riparian area of Cienega Creek is of high quality, there is not a large quantity of riparian vegetation. It is somewhat more likely that a jaguar could move through the area. The proposed management of the area would allow the area to be used for jaguar movement.

##### Effects of The Action

The basic effects of the proposed action would be through habitat modification, from predator control activities, or the presence of humans. Predator control is not a part of the proposed action, and any predator control undertaken would probably be subject to section 7 consultation under the ESA.

Implementing vegetation treatment and site restoration programs; limiting vehicle and livestock creek crossings; implementing camping and recreation restrictions at Cienega Creek, and design changes on roads would result in conditions that promote habitat development as mentioned for Gila topminnow. These actions should result in improved and maintained habitat for the jaguar.

Limits to recreational access and camping at riparian areas will restrict disturbance to jaguar habitat and activities. But as the planning area becomes more well known recreation will increase in riparian areas due to the desired conditions these areas provide. Increased human presence in riparian areas may disrupt jaguar activities if they are present; this is unlikely to occur during the 20-year life of the RMP.

It is well known that livestock grazing can alter vegetation (Marlow and Pogacnik 1985, Ohmart and Anderson 1986, Stromberg 1993a, Fleischner 1994). Changes in vegetation type or structure could affect cover for jaguars. In addition, changes in vegetation may modify the population dynamics of jaguar prey species such as deer and javelina. Livestock grazing in southeastern Arizona and Nevada has been shown to affect deer cover and movement (Loft et al. 1987, Loft et al. 1991, Ockenfels et al. 1991, Ragotzkie and Bailey 1991). Jaguars (Nowak 1975, Swank and Teer 1989) and their prey (Krausman et al. 1985, Hoffmeister 1986, Ohmart and Anderson 1986, Loft et al. 1987) rely heavily on riparian areas. Therefore, impacts to riparian vegetation may impact jaguars indirectly by reducing cover for them and also for their prey.

The livestock grazing program will be managed to ensure riparian objectives are met and thus suitable riparian corridors are maintained. Stipulations on livestock grazing to protect jaguars such as prohibition on predator control activities will benefit the species.

### **Conclusion**

After reviewing the status of the species, the environmental baseline for the action area, and the effects of the proposed action, the Service concurs with the BLM's determination that the proposed action may affect, but is not likely to adversely affect the jaguar for the following reasons:

no jaguar have been recorded in the area and they are unlikely to occur;

suitable dispersal habitat may be present, but habitat for resident jaguars is minimal at best;

dispersal habitat will be maintained; and

expected levels of recreation are not expected to discourage use of the area for jaguar movement.