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Biological Assessment for the Coronado National Forest Land and Resource Management Plan

Cochise, Graham, Pima, Pinal, and Santa Cruz Counties, Arizona and Hidalgo County, New Mexico

Prepared By: Janet Moser

Biologist, TEAMS Enterprise

Approved By: Joshua D. Taiz

District Biologist, Santa Catalina Ranger District

Coronado National Forest

EXECUTIVE SUMMARY

A Land and Resource Management Plan is being proposed for the Coronado National Forest. This biological assessment considers the potential effects of the proposed Land and Resource Management Plan (LRMP) (Preferred Alternative) on a total of twenty-seven species; this includes twenty-one listed species, four candidate species, and two species that have been extirpated but are either close and/or have habitat within the boundary of CNF.

The proposed action *may affect, likely to adversely affect* twenty listed species that include the Jaguar, Mount Graham red squirrel, Ocelot, Lesser long-nosed bat, Mexican long-nosed bat, Mexican spotted owl, Western yellow-billed cuckoo, Sonoran tiger salamander, Chiricahua leopard frog, Northern Mexican gartersnake, New Mexico ridge-nosed rattlesnake, Gila chub, Yaqui chub, Gila topminnow, Gila trout, Apache trout, Sonora chub, loach minnow, spikedace, Huachuca water umbel and Pima pineapple cactus; and *may affect, not likely to adversely affect* one listed species: Canelo Hill's ladies-tresses. For the extirpated Mexican gray wolf within the proposed 10j area and Northern Aplomado falcon a determination of *not likely to jeopardize* was made..

For the five Candidate species considered in the BA a determination of *may affect, likely to adversely affect* was made. The five Candidate species are the Arizona treefrog (Huachuca/Canelo DPS), Sonoran desert tortoise; roundtail chub, Stephan's heterelmis riffle beetle, and Huachuca springsnail.

Critical Habitat: The proposed action *may affect, likely to adversely affect critical habitat* for the Jaguar, Mount Graham red squirrel, Mexican spotted owl, Chiricahua leopard frog, Gila chub, and Sonora chub, loach minnow, spikedace and Huachuca water umbel. If proposed critical habitat becomes designated for the Western yellow-billed cuckoo, the proposed action *may affect, likely to adversely affect critical habitat*. If proposed critical habitat becomes designated for the Northern Mexican gartersnake, the proposed action *may affect, likely to adversely affect critical habitat*.

Table 1. Federally listed, and candidate species and designated or proposed critical habitats addressed in this BA

Common Name	Scientific Name	Federal Status	Determination
Mammals			
Jaguar	*Panthera onca*	Endangered	May affect, likely to adversely affect
Jaguar critical habitat			May affect, likely to adversely affect
Mount Graham red squirrel	*Tamiasciurus hudsonicus grahamensis*	Endangered	May affect, likely to adversely affect
Mount Graham red squirrel critical habitat			May affect, likely to adversely affect
Ocelot	*Leopardus pardalis*	Endangered	May affect, likely to adversely affect
Lesser long-nosed bat	*Leptonycteris yerbabuenae*	Endangered	May affect, not likely to adversely affect
Mexican long-nosed bat	*Leptonycteris nivalis*	Endangered	May affect, not likely to adversely affect
Mexican gray wolf	*Canis lupus baileyi*	Extirpated	Not likely to jeopardize within proposed 10(j) area.
Birds			
Mexican spotted owl	*Strix occidentalis lucida*	Threatened	May affect, likely to adversely affect
Mexican spotted owl critical habitat			May affect, likely to adversely affect
Western yellow-billed cuckoo	*Coccyzus americanus occidentalis*	Threatened	May affect, likely to adversely affect
Western yellow-billed cuckoo proposed critical habitat			May affect, likely to adversely affect
Northern Aplomado falcon	*Falco femoralis septentrionalis*	Non-essential experimental in AZ and NM	Not likely to jeopardize
Amphibians/Reptiles			
Sonoran tiger salamander	*Ambystoma mavortium stebbinsi*	Endangered	May affect, likely to adversely affect

Arizona treefrog (Huachuca/Canelo DPS)	*Hyla wrightorum*	Candidate	(*If listed*) May affect, likely to adversely affect
Chiricahua leopard frog	*Lithobates chiricahuensis*	Threatened	May affect, likely to adversely affect
Chiricahua leopard frog critical habitat			May affect, likely to adversely affect
Northern Mexican gartersnake	*Thamnophis eques megalops*	Threatened	May affect, likely to adversely affect
Northern Mexican gartersnake proposed critical habitat			May affect, likely to adversely affect
New Mexico ridge-nosed rattlesnake	*Crotalus willardi obscurus*	Threatened	May affect, likely to adversely affect
Sonoran Desert tortoise	*Gopherus morafkai*	Candidate	(*If listed*) May affect, likely to adversely affect
Fish			
Gila chub	*Gila intermedia*	Endangered	May affect, likely to adversely affect
Gila chub critical habitat			May affect, likely to adversely affect
Yaqui chub	*Gila purpurea*	Endangered	May affect, likely to adversely affect
Gila topminnow	*Poeciliopsis occidentalis*	Endangered	May affect, likely to adversely affect
Gila trout	*Oncorhynchus gilae*	Threatened	May affect, likely to adversely affect
Apache trout	*Oncorhynchus apache*	Threatened	May affect, likely to adversely affect
Spikedace	*Meda fulgida*	Endangered	May affect, likely to adversely affect
Spikedace critical habitat			May affect, likely to adversely affect
Loach minnow	*Tiaroga cobitis*	Endangered	May affect, likely to adversely affect
Loach minnow critical habitat			May affect, likely to adversely affect
Sonora chub	*Gila ditaenia*	Threatened	May affect, likely to adversely affect
Sonora chub critical habitat			May affect, likely to adversely affect
Roundtail chub	*Gila robusta*	Candidate	(*If listed*) May affect, likely to adversely affect
Invertebrates			
Stephan's heterelmis riffle beetle	*Heterelmis stephani*	Candidate	(*If listed*) May affect, likely to adversely affect

Huachuca springsnail	*Pyrgulopsis thompsoni*	Candidate	(*If listed*) May affect, likely to adversely affect
Plants			
Canelo Hills ladies'-tresses	*Spiranthes delitescens*	Endangered	May affect, not likely to adversely affect
Huachuca water umbel	*Lilaeopsis schaffneriana* var. *recurva*	Endangered	May affect, likely to adversely affect
Huachuca water umbel critical habitat			May affect, likely to adversely affect
Pima pineapple cactus	*Coryphantha scheeri* var. *robustispina*	Endangered	May affect, likely to adversely affect

List of Acronyms

ADEQ – Arizona Department of Environmental Quality
AZGFD – Arizona Game and Fish Department
BA – Biological assessment
BLM – Bureau of Land Management
BMPs – Best management practices
BO – Biological opinion
BO/CO – Biological opinion/Conference opinion
CH - Critical habitat
ESA – Endangered Species Act
LRMP – Land and resource management plan
MVUM – Motor vehicle use map
NF – National forest
NEPA – National Environmental Policy Act
NFMA – National Forest Management Act
NFS – National Forest System
OHV – Off-highway vehicle
PAC – Protected activity center
PCE – Primary constituent element
PNVT – Potential natural vegetation type
SWWF – Southwestern willow flycatcher
T&Cs – Terms and conditions
USFS – U.S. Forest Service
USFWS – U.S. Fish and Wildlife Service
WSR – Wild and scenic river
WUI – Wildland-Urban Interface and Landscape-scale Fire

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- Lesser long-nosed bat and Mexican long-nosed bat

Birds

- Mexican spotted owl
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- Northern Aplomado falcon

Amphibians/Reptiles

- Sonoran tiger salamander, Arizona treefrog (Huachuca/Canelo DPS), and Chiricahua leopard frog, and Northern Mexican gartersnake
- New Mexico ridge-nosed rattlesnake, and Sonoran Desert tortoise

Fish

- Gila Chub, Yaqui chub, Gila topminnow, Gila trout, Apache trout, Spikedace, Loach minnow, Sonora chub, and Roundtail chub.

Invertebrates

- Stephan's heterelmis riffle beetle and Huachuca springsnail

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- Canelo Hills ladies'-tresses, Huachuca water umbel, and
- Pima pineapple cactus

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INTRODUCTION

The proposed action (preferred alternative) analyzed in this BA is the implementation of the management direction provided in a revised LRMP. The proposed LRMP provides Forest-level direction to meet the Forest Service's mission for program management activities. It is largely strategic in nature, but does address types of activities to be conducted on the Forest. The proposed LRMP does not specifically authorize individual projects or activities. Site-specific actions will be subject to future and separate ESA section 7(a) (2) consultations.

In this BA, the Forest is consulting on the LRMP's program administration (effects of recreation, engineering, range management, fire management, etc.), as well as "plan components" (desired conditions, objectives, guidelines, standards, special areas and monitoring; these are discussed in greater detail below). Most of the actions being consulted on are from program management activities and objectives, while standards, and guidelines, tend to mitigate effects of the actions (hence, they result in reduced effects). Many aspects of program management are similar to when the Forest consulted on the previous LRMP, so that documentation (consultation #) serves as a partial basis for an effects determination, although the proposed LRMP contains a greater emphasis on vegetation and watershed restoration (which may have short-term effects while targeting long-term benefits).

This biological assessment (BA) has been prepared for the initiation of Endangered Species Act (ESA) § 7(a)(2) consultation on the proposed revised land management plan (proposed LRMP) for the Coronado National Forest (CNF) of the U.S. Department of Agriculture, Forest Service, Southwestern Region.

This BA summarizes an analysis of the potential effects to federally listed, proposed, and candidate species and their designated or proposed critical habitats from implementing the direction described in the proposed LRMP. The CNFs LRMP was prepared and revised as required by the National Forest and Rangeland Renewable Resources Planning Act of 1974, and as amended by the National Forest Management Act of 1976. Once finalized, the revised LRMP will replace the 1986 CNFs LRMP and its amendments.

The proposed LRMP is part of the land management planning process and provides forest-level direction to meet the Forest Service's mission during management of activities on the CNFs. LRMPs identify general land use purposes or suitability; future conditions that are desirable; goals and objectives for resource conditions on specific lands; and standards, guidelines, or other mechanisms that establish the management framework for all activities conducted and allowed on Coronado National Forest System lands. LRMPs are developed and amended over time and must comply with the National Environmental Policy Act (NEPA) and the ESA. Site specific management actions (e.g., projects) implement the LRMPs and are also subject to individual NEPA and Endangered Species Act (ESA) requirements.

Because LRMPs do not prescribe the timing or exact location of specific land management activities, there is some uncertainty about the potential environmental consequences of implementing LRMP direction. This uncertainty extends to effects on federally listed species and their designated/proposed critical habitats, as well as species that are candidates for Federal listing. Some of the objectives, however, prescribe an annual treatment rate which can be used to describe the timing and intensity of a particular activity or type of action. This BA evaluates the potential effects of the LRMPs programmatic direction that may result in site specific land management activities. The determination of effects for each species results from evaluating the expected outcome of implementing LRMP direction (i.e., objectives, standard and guidelines, suitability determinations, and management area direction) and assumes that LRMP guidance will be followed when site specific land management activities are carried out in the future.

Amending a LRMP (e.g., deleting/adding/changing standards and guidelines and other plan components) either for site specific projects or programmatically (i.e., a permanent change for all future projects) should and will occur on an as-needed basis to adaptively keep the LRMP up to date. Such amendments would be considered outside of the scope of this consultation and would require their own site specific ESA § 7(a)(2) consultation to address the effects of the proposed actions.

A tiered approach to ESA section 7(a)(2) consultation includes consultation at the LRMP programmatic level that will result in a biological opinion with an incidental take statement and reasonable and prudent measures with terms and conditions, as applicable. Additionally, each site specific project/activity implemented under the revised LRMP that may affect a listed species or critical habitat will undergo a separate ESA section 7(a)(2) consultation, which will be tiered to the programmatic level LRMP biological opinion.

The objectives of this BA are to comply with requirements of § 7(a)(2) of the ESA for the CNFs proposed LRMP. This includes reviewing the land and resource management programs to identify ongoing activities and programmatic direction that may affect federally listed, proposed, and candidate species, as well as designated or proposed critical habitats within the Action Area.

Species List

ESA consultation on the CNFs LRMP addresses all federally listed and candidate species, and their designated or proposed critical habitats, as agreed to between the United States Forest Service (USFS) and United States Fish and Wildlife Service (USFWS) (USFWS website 12/17/2013). The table below identifies the 27 species and 10 proposed/designated critical habitats that are addressed in this biological assessment.

Table 2. Species and Habitat Codes by District

Common Name	D1-Douglas EMA's			D2-Nogales EMA's		D3- Sierra Vista EMA's		D4-Safford EMA's				D5-Santa Catalina EMA	Habitat acres on the CNF
	Peloncillo	Chiricahua	Dragoon	Tumacocari	Santa Rita	Huachuca	Whetstone	Pinaleño	Winchester	Galiuro	Santa Teresa	Santa Catalina	
Mammals													
Jaguar	AF45	AF45	AF45	AF45	AF45	AF45	AF45						
Mt Graham Red Squirrel								F7,8					18,120
Ocelot[1]	AF23456	AF23456	AF23456	AF23456	AF23456	AF23456	AF23456	AF23456	AF23456	AF23456	AF23456	AF23456	
Lesser long-nosed bat	FG1234	FG1234	FG1234	FG1234	FG1234	FG1234	FG1234	FG1234	FG1234	FG1234	FG1234	FG1234	1,526,216
Mexican long-nosed bat	FG23456												1,537,768
Mexican gray wolf[2]	FG23456	FG23456	FG23456	FG23456	FG23456	FG23456	FG23456						
Birds													

Mexican spotted owl	F567	F567	F567	F567	F567	F567	F567	F567	F567	F567	F567	F567	236,718
Western Yellow-billed cuckoo	A124	A124	A124	A124	A124	A124	A124	A124	A124	A124	A124	A124	
Northern Aplomado falcon	F2	F2											
Amphibians													
Sonoran tiger salamander						AD2							92,186
Chiricahua leopard frog	ACD 245	ACD 245	ACD 245	ACD 245	ACD 245	ACD 245				ACD 245			960,047
Arizona tree frog						AE45							140,853
Reptiles													
New Mexico ridge-nosed rattlesnake	Riparian/ Rocky												
Northern Mexican gartersnake					A234	A234							524,762
Sonoran desert tortoise				F12	F12					F12	F12	F12	
Fish													
Gila chub					C12 downstream	C12						C12	110,021
Yaqui chub		C24											201,388
Gila topminnow						C124				C124 downstream			247,383
Gila trout								C124					
Apache trout								C124					
Spikedace													
Loach minnow													
Sonora chub				C24									154,413
Roundtail chub									C10 downstream				150,000
Invertebrates													
Stephan's heterelmis riffle beetle					BC4								67,577
Huachuca springsnail						BD245							232,367
Plants													
Canelo Hills ladies'-tresses						AB24							

Pima pineapple cactus					F12	F12							171, 8
Huachuca water umbel						ABD 1245							250,351

[1] Known locale info withheld/ Potential to occur on all districts
[2] EMAs most likely to occur in.

Known or Likely Occurrences on Forest by Ecosystem Management Area	Associated Habitat[1]
1 = Peloncillo	A = Riparian
2 = Chiricahua	B = Spring
3 = Dragoon	C = Lotic
4 = Tumacacori	D = Lentic
5 = Santa Rita	E = Cliff/rock
6 = Huachuca	F = Terrestrial
7 = Whetstone	G = Cave
8 = Pinaleño	H = Other
9 = Winchester	1 = Desert Communities
10 = Galiuro	2 = Valley Grasslands
11 = Santa Teresa	3 = Interior Chaparral
12 = Santa Catalina	4 = Madrean Encinal/PJ
	5 = Madrean Pine-Oak
	6 = Ponderosa Pine
	7 = Mixed-Conifer Forest
	8 = Subalpine Forest
	9 = Montane Meadow

Consultation History

During the planning process that led up to the Proposed Plan, collaboration and consultation between the Coronado and USFWS took place. This effort was ongoing and occurred through meetings and correspondence.

A chronology of past consultations associated with the proposed action, agreed-upon time extensions, and important meetings associated with this biological and conference opinion is provided below.

From 1985 to 1988, each of the 11 NFs in the Southwestern Region developed and approved LRMPs pursuant to the National Forest Management Act (NFMA). The FWS issued a non-jeopardy/no adverse CH modification opinion on each of the USFS LRMPs for all federally listed species.

On April 15, 1993, the MSO was listed as threatened. On September 6, 1995, the USFS requested initiation of formal consultation on the 11 NF Plans for effects on the MSO.

On May 14, 1996, the FWS issued a BO on the 11 LRMPs, which concluded jeopardy to the MSO and adverse modification for its designated CH tat (U.S. Fish and Wildlife Service 1996a). The FWS's Reasonable and Prudent Alternative to the existing LRMPs advised the USFS to implement the 1995 Recovery Plan for the MSO. This opinion was litigated in US District Court because it did not quantify incidental take for the MSO. On November 25, 1996, the FWS issued another final jeopardy BO that included incidental take for the MSO pursuant to a September 17, 1996 Court Order. Also on November 25, 1996, the FWS issued a BO on the USFS's June 1996 Regional Amendment to the LRMPs for the MSO. The 1996 Regional Amendment directs the implementation of the Recovery Plan for the MSO, as well as guidelines for the northern goshawk and old-growth management. The FWS concluded non-jeopardy for the MSO and no adverse modification of its designated CH (U.S. Fish and Wildlife Service 1996b).

On May 15, 1996, the USFS requested formal consultation on the effects to federally listed species on NFs as a result of the continued implementation of the 11 NF LRMPs.

On December 19, 1997, the FWS issued a BO/CO on the USFS's 1996 Regional Amendment to the LRMPs for all federally listed species other than the MSO (U.S. Fish and Wildlife Service 1997). This BO concluded non-jeopardy for all federally listed or proposed species, and no adverse modification for designated or proposed CHs. This opinion contained conservation measures (CMs) for seven listed species including the southwestern willow flycatcher, cactus ferruginous pygmy-owl, Sonora chub, Little Colorado spinedace, loach minnow, spikedace, and Pima pineapple cactus. The CMs were a product of a collaborative effort by FWS and USFS and became known as the "seven species direction." The CMs implemented by the USFS are discussed in the effects of the action sections for these species.

On December 24, 2002, Forest Guardians (et al.) sent the USFS a 60-day Notice of Intent to sue for failing to reinitiate formal consultation on the 11 NF LRMPs for all federally listed species.

On January 13, 2003, the FWS finalized a BO on the proposed rate of implementation of the grazing S&Gs in the 1996 Regional Amendment and its effect on the MSO. This opinion concluded no jeopardy for the MSO.

In February of 2003, the USFS and FWS began discussions on the relevance of the

1996 and 1997 LRMP and 1996 Regional Amendment consultations. In early April 2003, the agencies agreed that for the USFS would reinitiate consultation with the FWS on the USFS's 11 LRMPs and the 1996 Regional Amendment. On June 2, 2003, the USFS and FWS signed a consultation agreement that outlined timelines, responsibilities, and dispute resolution for the 11 NF LRMP consultation.

In November 2003, the USFS provided the FWS with a draft BA for the consultation.

On April 5, 2004, the USFS requested re-initiation of formal consultation under section 7 of the ESA on the 1996 MSO opinion and the 1997 opinion for all other federally listed species on the 11 NFs. The USFS provided the FWS with the final BA for the Continued Implementation of the LRMPs for the Eleven NFs and National Grasslands (NG) of the Southwestern Region USFS2004).

On May 26, 2004, the FWS responded to the USFS, acknowledging formal consultation had been initiated.

On September 14, 2004, the FWS requested a 90-day extension. The USFS responded on November 10, 2004, and extended the timeline further for a draft to be available for USFS review on January 15, 2005.

On February 2, 2005, the USFS provided the FWS with supplemental information to their April 8, 2004 BA. The supplemental information included the following four documents: (1) CMs for the spikedace, Little Colorado spinedace, Chiricahua leopard frog, and Sacramento prickly poppy; (2) replacement of pages 54-66 of the BA regarding the Rangeland Management Program; (3) clarification of grazing management level definitions; and (4) proposed amendment for noxious or invasive plant management for the Coconino, Kaibab, and Prescott, and Coconino NFs, November 2004 Forest Plan Amendment #20. Post- BA submissions were also provided to the FWS informally throughout the consultation and are part of the administrative record.

On April 22, 2005, the FWS provided the USFS with a draft programmatic BO/CO.

On June 10, 2005 the FWS provided the USFS with a final programmatic LRMP BO/CO.

On April 17, 2009, the USFS requested re-initiation of the 2005 LRMP BO/CO because the threshold set for incidental take for the MSO could soon be approached and/or exceeded and due to issues related to term and condition 3.1 in the 2005 LRMP BO/CO for several species. Again, on May 18, 2010, the USFS requested re-initiation for all species addressed in the 2005 LRMP BO/CO, including the ocelot, a species now considered present in small numbers in Arizona.
On June 22, 2010 FWS acknowledged the USFS request for re-initiation on the MSO and followed up with a clarification letter acknowledging FSs request to reinitiate the consultation for all other species, including the ocelot on August 9, 2010.

On April 9, 2011 the CNF requested re-initiation of consultation on the Forest Service's continued implementation of the Land and Resource management Plans for the 11 Southwestern National Forests and National Grasslands.

On April 30, 2012 the US Fish and Wildlife Service issued a Biological Opinion (Consultation Number 2012-F-0005) titled "The Continued Implementation of the Land and Resource Management Plan for The Coronado National Forest of the Southwestern Region U.S.D.A. Forest Service"

A Consultation Agreement between the FWS and USFS was signed on February 23, 2015, that addressed timeframes, staffing, and a dispute resolution process. As part of the CA, the agencies agreed to organize the BA and BO/CO.

Description of the Action Area

The action area addressed in this BA includes all lands under the jurisdiction of the Coronado NF and all adjacent lands that could be directly or indirectly affected by decisions or actions implemented under the direction of the proposed LRMP.

The Coronado NF occupies approximately 1,783,639 acres of southeastern Arizona and western New Mexico within Cochise, Graham, Pima, Pinal, and Santa Cruz Counties in the State of Arizona and Hidalgo County in the State of New Mexico. The southernmost portion of the Coronado NF shares a contiguous international border with the Republic of Mexico. Adjacent lands include: the Chiricahua National Monument and Saguaro National Park managed by the National Park Service; various wildernesses administered by the Bureau of Land Management; Arizona State Trust lands; Buenos Aires National Wildlife Refuge managed by the U.S. Fish and Wildlife Service; San Carlos Indian Reservation; Fort Huachuca Military reservation; and several communities including Tucson, Safford, Sierra Vista, and Nogales. The Coronado NF is divided into five ranger districts: Douglas (Douglas, Az), Nogales (Nogales, Az), Safford (Safford, Az), Sierra Vista (Sierra Vista, Az), Santa Catalina (Tucson, Az). The forest supervisor's office is located in Tucson, Az.

The lands of the Coronado National Forest consist of 16 widely scattered mountain ranges representative of basin and range topography, and are often characterized as "sky islands." These sky islands form distinct land masses. They offer an unusual range of vegetative types and climates; the tree-covered mountains rise from grassy savannahs and are home to plant and animal communities described as among the most diverse found on Earth. The Sonoran and Chihuahuan Desert vegetation communities also come together in this region, creating an overlap zone where many plant and animals are at the edge of their ranges. The mountains of this region are part of the "Madrean Archipelago," which describes the chain of sky islands that stretch from the southern latitudes of the Sierra Madre Occidental to the northern latitudes of the Rocky Mountains (DeBano et al. 1995).

Because of the north-south axis of the mountain ranges and their great variation in elevation, the Madrean Archipelago spans three major climatic zones (temperate, subtropical, and tropical). Following the recession of glaciers in North America, the climate of southeastern Arizona became warmer and drier, shifting the distribution of vegetation. As a result of warming, plants left from this period are arranged by microclimates on mountain slopes. Heat-tolerant species

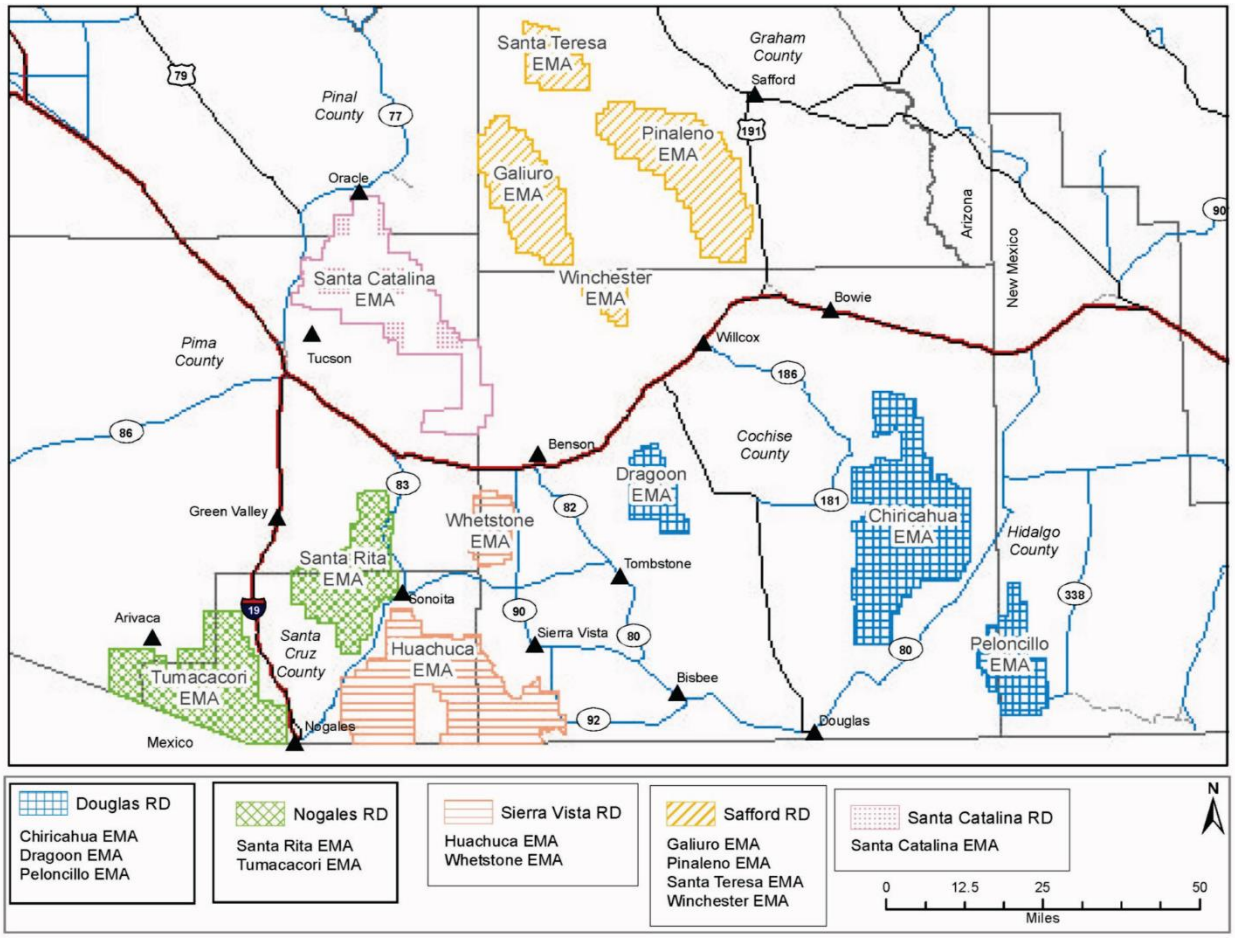
requiring less moisture may be found at the lowest elevations, while species requiring the coolest and moistest conditions are found at mountain summits, along sheltered canyon bottoms, or on north-facing slopes.

Geographic Ecosystem Management Areas (EMA's)

The 12 ecosystem management areas (EMA) that make up the Coronado National Forest range in size from approximately 27,981 acres in the Winchester EMA to 291,493 acres in the Chiricahua EMA (Figure 1). Each EMA supports a unique combination of vegetation, habitats, and wildlife, thus harboring an amazing amount of biological diversity. Distinct species have evolved within the Coronado's sky islands due to barriers to movement. Mountain ranges harbor numerous endemic and rare species such as the Mount Graham red squirrel and Huachuca water umbel.

Each ranger district administers one or more EMAs. The Douglas R.D. administers the Chiricahua, Dragoon, and Peloncillo EMAs. The Nogales R.D. administers the Santa Rita and Tumacacori EMAs. The Safford R.D. administers the Galiuro, Santa Teresa, Winchester, and Pinaleño EMAs. The Sierra Vista R.D. administers the Huachuca and Whetstone EMAs. The Santa Catalina R.D. administers the Santa Catalina EMA (Figure 1). Listed below are the twelve ecosystem management areas and a general description of each one.

Figure1. Location of five ranger districts on the Coronado National Forest and the ecosystem management areas (EMAs) contained within them.



Chiricahua Ecosystem Management Area

General Description - The Chiricahua Ecosystem Management Area includes 291,496 acres of National Forest System land, encompassing nearly all of the Chiricahua Mountains. Steep canyons with densely timbered slopes dissect the range, radiating in all directions from 9,797-foot Chiricahua Peak. Barfoot, Long, and Rustler parks are world renowned for uncommon bird and reptile species, including the largest known population of twin-spotted rattlesnakes. Rock formations are visible from many vantage points throughout the ecosystem management area. At the heart of the Chiricahua Ecosystem Management Area lies the 87,250-acre Chiricahua Wilderness and at the north end lies the 26,266-acre Ku Chish Recommended Wilderness Area.

The Chiricahua Mountains, along with all the lands in the southeastern corner of Arizona, were once part of the Chiricahua Apache Reservation, and the mountains continue to be a special place for descendants of the Chiricahua Apaches. Many of these descendants now live in Oklahoma and New Mexico as part of the Mescalero and Chiricahua-Warm Springs-Fort Sill Apache Tribes, though the San Carlos Apache Tribe in Arizona also counts Chiricahua descendants among its members. Ancestors of members of the White Mountain and San Carlos Apache Tribes frequented the mountain ranges of the Douglas Ranger District, and Apache Scout camps were located in the Chiricahua Mountains in the 19th century. Today, members of the Mescalero Apache Tribe make trips to the Chiricahua Ecosystem Management Area to teach tribal youth about their history and heritage.

Several four-wheel drive roads cross the Chiricahua Ecosystem Management Area at the northern and southern extents. A single two-wheel-drive accessible road crosses the range from east to west over Onion Saddle, but it is usually closed in winter. Numerous developed sites have camping and picnicking facilities, and all are accessible with a two-wheel-drive vehicle. Dispersed areas are also available throughout the Chiricahua Ecosystem Management Area for recreation use. Conversely, the ridges and drainages surrounding Cochise Head (the single largest rock outcrop on the Coronado National Forest) remain rugged and remote with access limited primarily to travel on foot. West of this landmark, within the northern portion of the ecosystem management area, Chiricahua National Monument (managed by the National Park Service) is surrounded by the Coronado on three sides.

Dragoon Ecosystem Management Area

General Description - The rugged Dragoon Ecosystem Management Area contains 54,211 acres of the Dragoon Mountains and adjoining semidesert grasslands and savannahs. Elevations range from 4,600 feet to the 7,519-foot Mount Glenn. The Dragoon Mountains, and specifically Cochise Stronghold (both East and West Stronghold Canyons), have long been recognized as a special place for the descendants of the Chiricahua Apaches (including Mescalero, San Carlos, and Chiricahua-Warm Springs-Fort Sill Apache Tribes). Members of the four southern tribes collect basketry materials at the lower elevations of the Dragoons as their ancestors probably did centuries ago.

The natural fortress of Cochise Stronghold's granite domes and rock formations attracts rock climbers, photographers, wildlife viewers, and hikers from around the country. East Stronghold Canyon offers developed recreation opportunities while West Stronghold Canyon features a more dispersed recreational experience. The rugged terrain does not lend itself to additional road developments. The soils within this ecosystem management area are fragile and easily damaged by vehicles driving off of roads. Access throughout much of the ecosystem management area is via unpaved roads.

Peloncillo Ecosystem Management Area

General Description - The Peloncillo Ecosystem Management Area is one of the most remote portions of the Coronado National Forest. Access is limited to primitive roads, primarily Geronimo Trail (NFS Road 63), and there are no developed recreation sites. Large unroaded areas are valued for their solitude and unconfined recreation opportunities. The relatively narrow range of elevation (from 4,593 to 6,624 feet) supports a surprising diversity of wildlife, most notably reptile and amphibian species.

Although mostly xeric, Cloverdale Cienega is one of the Peloncillo's rare aquatic features. The ecosystem management area's 87,985 acres straddle the Arizona-New Mexico border, with 81 percent in New Mexico. Situated southeast of the Chiricahua Mountains and just north of the U.S.–Mexico border, this southern portion of the Peloncillo range was occupied for millennia by farmers and foragers who had trading and cultural ties with neighboring groups, and was within the heartland of Chiricahua Apache territory. The 15,690-acre Bunk Robinson Wilderness Study Area and 12,840-acre Whitmire Canyon Wilderness Study Area flank Geronimo Trail to the south and north, respectively.

Santa Rita Ecosystem Management Area

General Description - The Santa Rita Ecosystem Management Area takes its name from the mountain range it encompasses, the summit of which is 9,462-foot Mount Wrightson. Its distinctive pyramid-shaped profile rises above the surrounding savannas and deserts, visible from much of southeastern Arizona, and creates a striking backdrop for travelers along Interstate 10

and Highways 82 and 83. In 1985, these two state highways were designated "Patagonia-Sonoita Scenic Road" by the Arizona Department of Transportation. The 148,421-acre Santa Rita Ecosystem Management Area is visible from metropolitan Tucson and second only to the Santa Catalina Mountains in terms of recreational appeal. Madera Canyon, a popular birding area, offers developed recreation opportunities, including rental cabins at the Santa Rita Lodge and a gift shop. The east side of the ecosystem management area offers opportunities for off-highway vehicle (OHV) use and dispersed recreation (such as camping, hunting, and foot trail based pursuits). An unmistakable geologic feature known as Elephant Head, at the ecosystem management area's northwest extent, attracts back-country rock climbers and serves as an attractive goal for cyclists along the Elephant Head Mountain Bike Route. The Arizona Trail traverses the range from south to north. At the core of the Santa Rita Mountains is the 25,407-acre Mount Wrightson Wilderness.

The Santa Rita Ecosystem Management Area has a long history of human use prior to its development as a popular recreation area. Archaeological sites dating back thousands of years testify to hunting, farming, and plant collecting practices; members of the four southern tribes, the San Carlos Apache Tribe and Pascua Yaqui, continue to visit the range to collect important traditional plants. Extensive mining and ranching became prevalent in the late 19th century and continues at various scales today.

Tumacacori Ecosystem Management Area

General Description - The Tumacacori Ecosystem Management Area is the Coronado's most southwesterly administrative land unit, encompassing 203,800 acres. It is bounded by the Santa Cruz River on the east and the Altar Valley on the west. The Tumacacori Ecosystem Management Area shares 29 miles on its southern boundary with the U.S.-Mexico international border. At 6,422 feet, Atascosa Peak forms the summit of the ecosystem management area, presiding over the rugged and rocky Atascosa Mountains and Tumacacori Highlands. Vast rolling landscapes of grasslands and oak woodlands cascade in all directions from these dominating features. Water is a comparatively abundant feature of this ecosystem management area. Aliso Spring, on the northwest slope of the Tumacacori Mountains, provides rare habitat for lowland leopard frogs and other aquatic obligates. Further south, canyons of the Pajarito Mountains open into Mexico, harboring riparian vegetation and a fantastic diversity of birds, mammals, and reptiles. One such drainage, Sycamore Canyon, has long been world-renowned for bird watching opportunities and was recognized in 2003 as an important birding area by the Arizona Chapter of the Audubon Society. The Tumacacori Ecosystem Management Area generally remains wild in character, with developed recreation focused on Peña Blanca and Arivaca Lakes and dispersed recreation abundant within its boundaries. The 7,499-acre Pajarita Wilderness lies in the southern portion of the ecosystem management area.

In addition to outstanding biophysical features, the Tumacacori Ecosystem Management Area is also rich in cultural history. The area was associated first and foremost with the O'odham people. They were the group living in and around the area when Europeans arrived, and though decimated in the 1st century of direct contact, they were still using the area on a regular basis into the 20th century. Other groups (including Apaches and particularly western Apaches) visited often in the 18th and 19th centuries and lived just east of the ecosystem management area at the presidio community of Tubac in the 19th century. The Yaquis, or Yoemem, are best known for their use of the Highlands area in the early 20th century, but their presence dates to the time of initial Jesuit entry into the region. Other groups have more limited historic period connections with the area. Both the Hopi and Zuni consider some of the ancestors of tribal members to have migrated from southern Arizona. The O'odham occupation of the Tumacacori Ecosystem Management Area ended abruptly in 1916 when the main Papago Indian Reservation was created

and those Tohono O'odham living outside the boundaries were forced to leave the area and move to the reservation.

Huachuca Ecosystem Management Area
General Description - An expansive area containing 276,350 acres of land, the Huachuca Ecosystem Management Area includes the massive Huachuca Mountains, the smaller Patagonia Mountains and Canelo Hills, and the vast, rolling grasslands of San Rafael Valley. Fort Huachuca shares the ecosystem management area's northeastern border, and the entire south edge of the ecosystem management area lies on the international boundary with Mexico. The Miller Peak Wilderness encompasses 20,484 acres of the ecosystem management area's upper elevations in the Huachuca Mountains.

Several perennial streams—including Bear Canyon, Scotia Canyon, and Redfield Canyon—provide year-round habitat for aquatic species. These streams generally have at least permanent pools of water, even when continuous flows cease during the driest seasons.

Ancestors of the Chiricahua Apache, western Apache, and O'odham once used the entire ecosystem management area and continue to visit areas near Fort Huachuca for acorn collection. Noted by 17th century Spanish Captain Juan Mateo Manje, the Huachuca range (or Sierra de Huachuca) most likely got its name from a nearby Piman village.

Numerous access roads penetrate the Huachuca Ecosystem Management Area, connecting to a network of unpaved roads within. The route from Montezuma Pass to Sonoita, via Parker Canyon Lake, is a favorite scenic drive navigable by two-wheel-drive vehicles despite having a dirt surface in most sections. Visitors concentrate along Carr Canyon, within campgrounds and picnic areas surrounding Parker Canyon Lake, and at eastside access points near the thriving community of Sierra Vista. Highway 82 closely borders the west side of the ecosystem management area, providing additional access for visitors to the Patagonia Mountains.

Whetstone Ecosystem Management Area
General Description - At 45,023 acres, Whetstone Ecosystem Management Area is the Coronado's second smallest administrative land unit. Its namesake range, the Whetstone Mountains, provides a scenic backdrop for travelers along Interstate 10, with precipitous cliff bands rising dramatically from a sea of desert scrub and semidesert grassland. Apache Peak is the range's focal point, appropriately named for the western Apaches that considered these mountains part of their territory. Historically, the Whetstone Mountains were also within the territory of the Chiricahua Apache, and archaeological sites indicate long use by Hohokam, ancestral O'odham. Today, access is via primitive roads and trails, as this is one of the least developed ecosystem management areas on the Coronado. Trails originating in Karchner Caverns State Park at the northern border of the ecosystem management area are popular. There are no developed recreation sites, but opportunities for dispersed recreation abound.

Galiuro Ecosystem Management Area
General Description - The Galiuro Ecosystem Management Area encompasses 134,517 acres of primarily undeveloped lands, including 714 acres of private inholdings. Two major canyons, Rattlesnake and Redfield, and twin ridges running northeast to southwest form the dominant geologic features of the area. From golden grasslands, 7,651-foot Bassett Peak rises up to form the ecosystem management area's highest point. Access is mainly via gravel and dirt roads, mostly lying on the east side of the mountain, with travel generally restricted to foot and horseback in the interior of the range. There is one developed recreation area in the Galiuro Ecosystem Management Area. Dispersed areas throughout the mountains offer a wealth of opportunities for hunting, back-country hiking, camping, and solitude. The 77,253-acre Galiuro

Wilderness abuts Bureau of Land Management administered Redfield Canyon Wilderness to the south.

The Galiuro Mountains are rich in both cultural and natural history. The ecosystem management area was historically within the territory of the western Apaches. The Hopi Tribe and Zuni Pueblo have ancestral sites in the San Pedro Valley to the west, and likely used the Galiuro Mountains in centuries past. At Power's Cabin deep within the mountain range, a famous old west shoot-out took place in 1918. Wolves roamed the range until the mid-1950s, and black bear and mountain lion are still plentiful today.

Pinaleño Ecosystem Management Area

General Description - The Pinaleño Ecosystem Management Area encompasses a massive mountain range of 198,879 acres and is topped by Mt. Graham at 10,720 feet elevation. This ecosystem management area rises from the surrounding semidesert grasslands up to the Coronado's only representative spruce-fir vegetation community. Residents of the Gila Valley (Safford, Thatcher, and other communities) consider Mount Graham a special place, part of a tradition of retreating to the mountain for relief from summer heat. The entire range (or *Dził Nchaa Si'an*) has been formally recognized as a traditional cultural property important to the western Apache groups, including White Mountain, San Carlos, and Yavapai Apache, and as a place of outstanding significance in western Apache religion, culture, and history. The mountain continues to play a vital role in western Apache lifeways and tribal well-being. *Dził Nchaa Si'an* is home to mountain spirits, serves as a source of natural resources and traditional medicine for ceremonial uses, and is used as a place of prayer and a source of power to western Apache people. The Hopi Tribe, Pueblo of Zuni, and the Four Southern Tribes of Arizona also have sacred sites and shrines within the Pinaleño Mountains. The entire ecosystem management area has been determined eligible for listing on the National Register of Historic Places. Primary access into the mountains is via State Highways 366 (which was designated "Swift Trail Parkway" by Arizona Department of Transportation in 1992) and 266 (over Stockton Pass). Nonmotorized trails penetrate the range for travel by foot and horseback. One of these, Arcadia Trail (328), was named "Arcadia National Recreation Trail" by the Chief of the Forest Service in 1979.

Visitor facilities include developed campgrounds, picnic areas, and a visitor center that is staffed partly by volunteers. There are also many popular locations for dispersed recreation. Large unroaded areas, including the Mount Graham Wilderness Study Area, offer opportunities for back-country hiking and solitude. Additionally, three special management/emphasis zones contribute to the uniqueness of the ecosystem management area: the Goudy Canyon Research Natural Area, Wet Canyon Talussnail Zoological Area, and Mount Graham Astrophysical and Biological Research Area. The University of Arizona's Mount Graham International Observatory has become an important astrophysical research facility and contributes to the rich multiple-use history of the range. The 61,315-acre recommended Mount Graham Wilderness Area circles the high peaks of the ecosystem management area.

Santa Teresa Ecosystem Management Area

General Description - The 49,838-acre Santa Teresa Ecosystem Management Area comprises the Coronado's most northerly administrative land unit, located just beyond and between the Galiuro and Pinaleño Mountains. The ecosystem management area's Santa Teresa range is a network of rugged mountains with bald summits, deep canyons, and sprawling mesas. Extremely rugged Holdout Canyon typifies the Santa Teresa Mountains; abundant caves and alcoves hollow into eroded cliffs with picturesque formations. Vegetation is predominantly thick chaparral with forests of ponderosa pine occupying high ridges. A stand of Douglas-fir grows on the sheltered

north slope of Cottonwood Peak, the highest in the range at 7,481 feet. The 26,617-acre Santa Teresa Wilderness encompasses more than half of the ecosystem management area.

Bordering the ecosystem management area to the north is the San Carlos Apache Reservation, also part of the Santa Teresa range. These mountains also lie within the early territories of the western Apaches and the Four Southern Tribes, and may have been part of the migration routes used by ancestral pueblo groups. As one of the least developed ecosystem management areas within the Coronado National Forest, access into the Santa Teresa Ecosystem Management Area is via gravel and dirt roads or by hiking trails. There are no developed recreation areas, although opportunities for hunting, back-country hiking, camping, and picnicking are abundant.

Winchester Ecosystem Management Area

General Description - Less than half the size of the next largest ecosystem management area, Winchester Ecosystem Management Area contains 19,272 acres. The administrative boundary is considerably larger, yet a significant portion of that acreage is owned by the State of Arizona. The mountains that give this ecosystem management area its name are a small range situated just southeast of the Galiuro Mountains; Reiley Peak forms the apex of the Winchester Mountains, rising to over 7,500 feet in elevation. Part of the Apache territory when Euro-Americans entered the region, this range was evidently visited by Native American groups for thousands of years. Winchester Ecosystem Management Area offers opportunities for primitive recreation and solitude. Access is via primitive roads, with much of the ecosystem management area accessible only by hiking cross country. There are no developed recreation areas in the ecosystem management area, although there are good opportunities for back-country hiking, camping, and solitude.

Santa Catalina Ecosystem Management Area

General Description - The 265,142-acre Santa Catalina Ecosystem Management Area wraps around the northern and eastern sides of the Tucson basin, dominating the viewshed from most parts of the city of Tucson. Elevations range from 2,200 feet at the valley edges to 9,157 feet on Mount Lemmon. The ecosystem management area is comprised of two mountain ranges, the Rincon Mountains and Santa Catalina Mountains. Nearly all of the Coronado's vegetation communities are represented within the Santa Catalina Ecosystem Management Area. Historically, both ranges were within the early territories of the O'odham and Apaches. Large archaeological sites in the foothills and small shrines atop peaks are important to the Zuni and Hopi. There are two designated wilderness areas in the ecosystem management area, the 56,933-acre Pusch Ridge Wilderness in the Santa Catalina Mountains and the 38,590-acre Rincon Wilderness in the Rincon Mountains. The boundary of the Rincon Wilderness is shared with Saguaro National Park.

The north-facing portion of the Santa Catalina Mountains exhibits a number of natural features of interest. Samaniego Ridge and Reef of Rocks dramatically rise to the crest of the range, parallel ridges that harbor Santa Catalina's longest drainage, Cañado del Oro, at nearly 25 miles in length. This canyon and Sabino Canyon are the only known drainages in this range to have historically contained native fishes. Alder Canyon, on the east slope of the Santa Catalina Mountains, is notable for its large deposits of limestone and dolomite, which are uncommon within the range at these concentrations. An interrupted perennial stream flows from multiple springs and seasonal snowmelt, making Alder Canyon particularly lush; it is probably second only to Sabino Canyon in terms of biological diversity. Lowland leopard frogs, canyon tree frogs, coatimundi, and riparian vegetation are abundant.

This ecosystem management area receives more visitors than any other area of the Coronado National Forest. It provides a sanctuary to desert dwellers during the intense heat of summer and

an opportunity to enjoy snow each winter. Mount Lemmon's Ski Valley is the southernmost ski area in the continental U.S., offering rare skiing opportunities and a popular "sky ride" during months without snow. Trails wander the many canyons, ridges, valleys, and forests of the Santa Catalina Ecosystem Management Area, including the Arizona Trail that traverses both mountain ranges. The primary access route into the Santa Catalina Mountains is the Catalina (or General Hitchcock) Highway. The highway was designated a scenic route by Pima County, the "Sky Island Scenic Byway" by the Chief of the Forest Service in 1995, and "Sky Island Parkway" by the Federal Highway Administration (USDOT) in 2001. Visitor facilities are concentrated along the Catalina Highway, in Sabino Canyon, and in Catalina State Park, which is managed by the State of Arizona and administered by the Forest Service. Dispersed recreation is abundant within designated wilderness areas, as well as on the north and east aspects of the Santa Catalina Mountains and throughout the Rincon Mountains.

Vegetation (Potential Natural Vegetation Type (PNVT))

The Coronado NF uses potential natural vegetation types (PNVTs or vegetation types) to describe and map units of similar vegetation, soil, climate, and ecosystem disturbance across the landscape.

Table 3. Major vegetation communities of the Coronado National Forest.

Vegetation Community	Acres of NF (% of forest)	Current Vegetation Departure (%)	Management Concerns	Primary Departure Characteristics
Madrean encinal woodland	765,181 (42.9)	Low to mod (35)	Fire exclusion/ uncharacteristic fire/fuelwood over-harvesting/off road vehicle use/fragmentation/ livestock overgrazing	Overgrazing fragmentation and fire suppression led to woody species encroachment and invasion of nonnative grasses
Grassland communities	440,559 (24.7)	High (81)	Fragmentation/fire exclusion/livestock overgrazing/invasive non-native species/off road vehicle use	Overgrazing, fragmentation and fire suppression led to woody species encroachment and invasion of nonnative grasses
Desert communities	171,229 (9.6)	Mod (59)	Invasive non-native species/Livestock overgrazing/fire/fragmentation	Increased shrub cover and effects of increasing popns of invasive plants
Interior chaparral	155,177 (8.7)	High (78)	Uncharacteristic fire/habitat conversion	Unnaturally open or closed structure
Madrean pine-oak woodland	142,691 (8.0)	Mod (50)	Uncharacteristic fire/fire exclusion	Reduction in frequency of low severity fire
Mixed conifer (wet and dry)	55,293 (3.1)	Dry-Mod to High (69) Wet-Mod (58)	Uncharacteristic fire/insects and pathogens	Deficit of open canopy structure in dry and over represented in mid-development closed and early seral structure
Ponderosa pine-evergreen oak	39,240 (2.2)	High (81)	Uncharacteristic fire/insects and pathogens/fire exclusion	Increased early seral and mid-development structure
Spruce-fir forest	3,567 (0.2)	Low to Mod (34)	Uncharacteristic fire/insects and pathogens	Abundance of late development structure and lack of mid-development
Montane meadows, wetlands, and riparian areas	10,702 (0.6)	Mod (60)	Uncharacteristic fire/livestock overgrazing/off road vehicle use/water diversions	

Total	1,783,639 (100)			

Table 3 summarizes the current conditions for the 9 PNVTs that occur on the Coronado NF. PNVTs were initially evaluated for vegetative departures from reference conditions using methods described in the "Ecological Sustainability Report" (USFS 2009). Subsequently, PNVT spatial distribution was further refined and adjusted based on new information, current science, local knowledge, and field verification. For most of the PNVTs, the vegetation characteristics currently exhibit a moderate or high departure from reference conditions. There are three PNVTs that exhibit a high departure (Grassland Communities, Interior chaparral, and Ponderosa Pine-evergreen oak). Current conditions and ecosystem concerns summarized here are described in greater detail for each PNVT in the proposed LRMP.

Desert communities include both the Sonoran and Chihuahuan Deserts. The grassland vegetation community includes desert, plains, and savanna grasslands. The term "encinal" refers to oak communities. Mixed conifer includes both dry and wet mixed conifer types. Desert communities, grasslands, interior chaparral, Madrean encinal woodlands, and Madrean pine-oak woodlands compose approximately 94 percent of the total area of the Coronado NF. Of this, Madrean encinal woodlands account for approximately 42 percent, and grasslands represent about 26 percent. In contrast, the combined area of montane meadows, wetlands, riparian areas, ponderosa pine-evergreen shrub, mixed conifer forest, and spruce-fir forest compose around 6 percent of the total area of the Coronado NF (Table 3).

Riparian communities range across all elevation gradients, from deserts to subalpine forests, spanning a variety of characteristic vegetation communities. Therefore, riparian communities are composed of various plant species dependent upon the elevation and upland vegetation community type in which they are found. There are three primary riparian associations on the Coronado NF: cottonwood-willow riparian forest (in desert and grasslands), mixed broadleaf deciduous riparian forest (in oak and pine woodlands), and montane willow riparian forest (in mixed conifer forests).

Desert Communities

General Description - Desert communities range in elevation from 2,600 to 3,200 feet, although they may extend beyond this range on steep southern exposures. Annual precipitation averages from 10 to 13 inches. The predominant species are shrubs, desert trees, and succulents, with lesser amounts of grasses and forbs. Common plant species occurring in desert communities include catclaw acacia, triangle bursage, littleleaf paloverde, mesquite, desert ironwood, creosote bush, desert broom, desert willow, brittlebush, desert zinnia, barrel cactus, hedgehog cacti, cholla and prickly pear cacti, saguaro, threeawn grasses, bush muhly, and club moss. Common animal species occurring in the desert communities include desert bighorn sheep, kit fox, black-tailed jackrabbit, round-tailed ground squirrel, cactus wren, Gila woodpecker, Gambel's quail, desert tortoise, zebra-tailed lizard, Gila monster, desert spiny lizard, Sonoran coralsnake, Sonoran Desert toad, red-spotted toad, giant hairy scorpion, desert orangetip, and tarantulas. Gravel and rock cover ranges from 5 to 65% in flood plains, and from 35 to 85% on upland sites. Bedrock outcrops can be as high as 10% in uplands. Active erosion and sedimentation occurs in channels on flood plains.

Based on projections of future climate change for the region, conditions may favor desert communities as they are adapted to the hot, dry conditions that are likely to increase in the area. However, they are susceptible to increases in insect attacks, colonization by invasive species, longer and more severe fire seasons, and altered frequency, severity, timing, and spatial extent of disturbance events (e.g., droughts, fires, flash floods, landslides, and windstorms).

Grasslands

General Description - Grasslands on the Coronado National Forest include semidesert, plains, and savanna grasslands. Elevations range from 3,200 to 4,600 feet in the semidesert grassland communities, although they may extend beyond this range on steep southern exposures. Annual precipitation averages from 12 to 16 inches. Ground cover consists mainly of gravel, cobble, and rock, ranging from 15 to 65 percent on steep and moderate slopes, and 10 to 35% in bottom lands. Bedrock outcrops can be as high as 15% on steep and moderate slopes, with the exception of moderate slopes with limestone parent material where bedrock outcrops range from 0 to 5%. In washes and bottom lands, bedrock outcrops are 2 percent or less. Channel areas are active with both erosion and sedimentation.

Elevations range from 4,000 to 5,500 feet in the plains grassland and savanna communities, although they may extend beyond this range on steep southern exposures. The grassland community spans a wide range of precipitation zones within the Coronado National Forest. The gradient from semidesert to plains to savanna grasslands correlates incrementally to higher precipitation zones. Annual precipitation averages from 16 to 20 inches. Ground cover by gravel, cobble, and rock ranges from 10 to 57%, except in bottom lands with loamy soils. Bedrock outcrops can be as high as 10% in steeper areas.

Common animal species occurring in the grassland communities include pronghorn, American badger, plains harvest mouse, scaled quail, black-throated sparrow, Botteri's sparrow, ornate box turtle, Mexican hog-nosed snake, round-tailed horned lizard, desert grassland whiptail, Sonoran spotted whiptail, Great Plains toad, plains spadefoot, and horse lubber grasshopper. Based on projections of future climate change for the region, habitat suitable for grasslands could increase as warmer, drier conditions will most likely be more common. However, grassland ecosystems are susceptible to decreases in plant productivity from water limitations and increased heat, increases in insect attacks, colonization by invasive species, longer and more severe fire seasons, and altered frequency, severity, timing, and spatial extent of disturbance events (e.g., droughts, flash floods, and landslides). Grasses make use of moisture in the upper soil layers. Intense precipitation events may lead to increased runoff, but decreased effective water infiltration. This could decrease vigor of native plants and lead to increased colonization of nonnative invasive plant species.

Interior Chaparral

General Description - Interior chaparral occurs throughout the Coronado National Forest as a discontinuous band of vegetation. The majority of this vegetation type exists at mid-elevations (3,000 to 6,000 feet). It is bordered and intermixed with Madrean encinal woodland at the upper elevations and semidesert grassland or Sonoran desert at the lower elevations. Shrub live oak and manzanita shrubs are the most common species within interior chaparral; however, a wide range of other shrubs and trees are also found. Common animal species occurring in interior chaparral include American black bear, javelina, cliff chipmunk, white-throated woodrat, scrub jay, rufous-sided towhee, Arizona alligator lizard, and Sonora mountain kingsnake.

Based on projections of future climate change for the region, interior chaparral ecosystems are susceptible to decreases in plant productivity from water limitations and increased heat, increases in insect attacks, colonization by invasive species, longer and more severe fire seasons, and altered frequency, severity, timing, and spatial extent of disturbance events (e.g., droughts, flash floods, landslides, and windstorms).

Madrean Encinal Woodland

General Description - Madrean encinal, or oak, woodland occurs throughout the Coronado National Forest discontinuously distributed in the mountain foothills at elevations ranging from

3,600 to 6,500 feet. These woodlands grade into grasslands at lower elevations and pine-oak woodlands at higher elevations. Emory oak is present throughout the range of Madrean encinal; however, Mexican blue oak and Arizona white oak are the most common oak species. Alligator and single-seed junipers are also common. Madrean encinal woodland plant species (such as manzanita, silktassel, ceanothus, skunkbush sumac, catclaw acacia, mountain mahogany, and rosewood) are common understory shrubs. Warm season perennial bunchgrasses (such as sideoats grama, blue grama, hairy grama, plains lovegrass, deer grass, and longtongue muhly) dominate the understory. Common animal species occurring in Madrean encinal woodland include Coues' white-tailed deer, Mexican fox squirrel, yellow-nosed cotton rat, lesser long-nosed bat, white-nosed coati, acorn woodpecker, Mexican jay, hepatic tanager, Clark's spiny lizard, Gila spotted whiptail, eastern patch-nosed snake, green ratsnake, rock rattlesnake, Arizona eyed click beetle, and great purple hairstreak. Based on projections of future climate change for the region, Madrean encinal woodland ecosystems are susceptible to decreases in plant productivity from water limitations and increased heat, increases in insect attacks, colonization by invasive species, longer and more severe fire seasons, and altered frequency, severity, timing, and spatial extent of disturbance events (e.g., droughts, flash floods, landslides, and windstorms).

Madrean Pine-Oak Woodland

General Description - Madrean pine-oak woodlands are bounded by Madrean encinal woodlands, plains, and savannah grasslands at the lowest elevations. The upper elevations are bounded by ponderosa pine-evergreen shrub and dry mixed-conifer communities. Elevations range from 6,000 feet to over 8,000 feet. Annual precipitation averages from 20 to over 30 inches. Some plant species occurring in woodland communities include sideoats grama, blue grama, hairy grama, plains lovegrass, bullgrass, deergrass, longtongue muhly, mountain muhly, Texas bluestem, crinkleawn, prairie junegrass, piñon ricegrass, bouvardia, silktassel, manzanita, Fendler's buckbrush, Parry's and Palmer's agave, beargrass, sotol, mountain mahogany, pine, fir, oak, piñon, and juniper species. Ground cover consists primarily of organic layers (duff) of pine needles and/or oak leaves and twigs. Gravel, cobble, and rock cover ranges from 20 to 40%. Bedrock outcrop ranges from 5 to 40% of the surface. Disturbances in the Madrean pine-oak woodland community include fire, insects, and diseases. Fires are typically of low and mixed severity causing frequent, larger scale disturbances. Insects are generally small scale disturbance agents, but have the potential to cause large-scale disturbances. Dwarf mistletoes, parasitic plants found on several coniferous species, are chronic disturbance agents. Common animal species occurring in Madrean pine-oak woodland communities include Coues' white-tailed deer, Arizona gray squirrel, common hog-nosed skunk, Gould's wild turkey, painted redstart, acorn woodpecker, red-faced warbler, whiskered screech-owl, mountain skink, striped plateau lizard, ridge-nosed rattlesnake, Sonoran mountain kingsnake, and Huachuca giant skipper. The acorn woodpecker is a management indicator species for this vegetation community. Based on projections of future climate change for the region, Madrean pine-oak woodland ecosystems are susceptible to decreases in plant productivity from water limitations and increased heat, increases in insect attacks, colonization by invasive species, longer and more severe fire seasons, and altered frequency, severity, timing, and spatial extent of disturbance events (e.g., droughts, flash floods, landslides, and windstorms).

Ponderosa Pine-Evergreen Shrub

General Description - The ponderosa pine-evergreen shrub ecosystem generally occurs as a discontinuous band of vegetation at elevations ranging from approximately 5,000 to 10,000 feet. This community is dominated by ponderosa and Arizona pines and is interspersed in the transition between the Madrean pine-oak woodland and mixed-conifer vegetation types. Ponderosa pine-evergreen shrub has two subclasses: one with a more continuous layer of perennial grasses and a relatively minor shrub component, and one with an understory of primarily evergreen shrubs (including manzanita, turbinella oak, sumac species, and mountain

mahogany species). Disturbances in the ponderosa pine-evergreen shrub community include fire, insects, and diseases. Fires are typically of low and mixed severity causing frequent, larger scale disturbances. Insects are generally small scale disturbance agents, but have the potential to cause large-scale disturbances. Dwarf mistletoes, parasitic plants found on several coniferous species, are chronic disturbance agents. Common animal species occurring in this community include North American porcupine, Abert's squirrel (nonnative), striped skunk, white-breasted nuthatch, Gould's wild turkey, Grace's warbler, flammulated owl, Yarrow's spiny lizard, Arizona black rattlesnake, and Chiricahua white butterfly. Under changing climate conditions, ponderosa pine-evergreen shrub ecosystems are susceptible to decreases in plant productivity from water limitations and increased heat, increases in insect attacks, colonization by invasive species, longer and more severe fire seasons, and altered frequency, severity, timing, and spatial extent of disturbance events (e.g., droughts, flash floods, landslides, and windstorms). High-risk occurrences could include uncharacteristically intense wildfire, increased rate of insect or disease attack due to warming temperatures, and increasing challenges to regeneration of ponderosa pine, especially on warmer, drier areas such as south-facing slopes.

Dry Mixed Conifer Forest

General Description - This forest type is transitional with increasing elevation between ponderosa pine-evergreen shrub and wet mixed-conifer forest types and generally occurs at elevations ranging from approximately 5,500 to 9,500 feet. The dry mixed-conifer forest characterizes the majority of the greater mixed-conifer community, representing approximately 88% of the Coronado National Forest's mixed-conifer forest. Dry mixed-conifer forests are dominated by tree species such as ponderosa pine, southwestern white pine, Douglas-fir, and Gambel oak, with a lesser and localized presence of aspen, white fir, corkbark fir, and Engelmann spruce. This forest type typically occurs with understories of grasses, forbs, shrubs, and young trees. Fires occur frequently and are generally not limited by lack of fuel connectivity or high fuel moistures. Insects are generally small scale disturbance agents, but have the potential to cause large-scale disturbances. Dwarf mistletoes, parasitic plants found on several coniferous species, are chronic disturbance agents.

Wet Mixed Conifer Forest

General Description - The wet mixed-conifer forest type generally occurs at elevations ranging from approximately 5,500 to 10,000 feet, representing only 12% of the greater mixed-conifer vegetation community. Tree species composition varies, depending on seral stage, elevation, and moisture availability. This forest type can be composed of early-seral species such as aspen, Douglas-fir, New Mexico locust, southwestern white pine, and Rocky Mountain maple, and late-seral species such as white fir and Engelmann spruce. Ponderosa pine may be present in minor proportions, decreasing with increasing elevation gradients. This forest type transitions with the spruce-fir forest type at its upper elevation range (Pinaleño Mountains only), with ever increasing amounts of Engelmann spruce and corkbark fir in the later seral stages. Disturbances in this type typically occur at two spatial and temporal scales: large scale, infrequent disturbances and small scale, frequent disturbances. Fire in this type is generally limited more by higher fuel moisture than by lack of woody fuels, occurring as larger scale, less frequent disturbances usually during periods of long-term drought. Historically on the Coronado National Forest, insects, diseases, and wind cause small scale, frequent disturbances; however, elsewhere in the West, insects cause large-scale disturbances in this vegetation community. Wet mixed conifer has an understory of a wide variety of shrubs, grasses, forbs, and young trees depending on soil type, aspect, elevation, disturbance, and other factors.

Spruce-Fir Forests

General Description - The spruce-fir forest type occurs only in the Pinaleño Mountains, though spruce and fir species are present at multiple scales elsewhere on the Coronado. The spruce-fir

community occupies the coldest, wettest, and highest elevation sites on the Coronado, occurring at elevations ranging from approximately 8,500 to 10,720 feet. This community can be subdivided into lower elevation and upper elevation spruce-fir, each with differing disturbance regimes and subdominant species composition. At the lower elevations, spruce-fir resembles the wet mixed-conifer community except with a different composition of tree species, due to colder and wetter conditions, and it is a transition zone between wet mixed conifer and the upper elevation spruce-fir community. At these elevations, the spruce-fir community is discontinuous and often occurs as elongated stands in drainages. The majority of the spruce-fir vegetation community occupies upper elevation sites ranging from 10,000 to 10,720 feet.

Spruce-fir is often dominated by Engelmann spruce but contains other species depending on elevation. In lower elevations, the common tree species are aspen, Douglas-fir, white fir, and southwestern white pine. The late-seral forest is dominated by Engelmann spruce. Subdominant species may include corkbark (subalpine) fir. In the upper elevation range of spruce-fir, the dominant tree species are Engelmann spruce and corkbark fir. Patches of aspen are occasionally present but are usually absent. Douglas-fir and southwestern white pine are accidental. Understory plant species commonly include currants, maples, honeysuckle, whortleberry, alpine clover, and sedges. Common animal species occurring in spruce-fir include Mount Graham red squirrel, long-tailed vole, cordilleran flycatcher, warbling vireo, Clark's nutcracker, Steller's jay, Yarrow's spiny lizard, and twin-spotted rattlesnake.

On the Coronado National Forest, the spruce-fir vegetation community is dominated by early-seral stages. A large portion of the community burned in the 1996 Clark Peak Fire or the 2004 Nuttall-Gibson Fire. Severe insect outbreaks affected the remaining spruce-fir. Patches of unburned, late-seral forest exist. In some places, the late-seral forest is growing vigorously and in other areas, it is declining due to fire, dwarf mistletoe, decay, and insect disturbances.

Disturbances in this type typically occur at two spatial and temporal scales: large scale, infrequent disturbances (mostly fire or insects) and small scale, frequent disturbances (fire, insect, dwarf mistletoe, disease, decay, and wind). In the lower elevation spruce-fir, fires occur infrequently and are of mixed severity. In the higher elevation spruce-fir, a decay regime dominates with large, very infrequent, catastrophic fires punctuating the regime. Insects are a common disturbance throughout the spruce-fir community. After disturbance, the spruce-fir community generally recovers slowly, often requiring hundreds of years to reach a late-seral community. Recovery is accelerated when abundant advanced regeneration and seed-bearing trees are present.

Based on projections of future climate change for the region, spruce-fir forest ecosystems are susceptible to decreases in plant productivity (from water limitations and increased heat), increases in insect attacks, colonization by invasive species, longer and more severe fire seasons, and altered frequency, severity, timing, and spatial extent of intense disturbance events (e.g., droughts, flash floods, landslides, windstorms, and ice storms). Spruce-fir on the Coronado National Forest occurs at the highest elevations and, thus, is among the most susceptible to loss under warmer climatic conditions. Extended drought from a delayed monsoonal season or earlier onset of spring conditions could lead to increased tree mortality and increasing intensity and severity of wildfire.

Montane Meadows

General Description - High-elevation, or montane, meadows generally occur only within mixed-conifer and spruce-fir vegetation types. Meadow size ranges from less than 1 acre to 30 acres. Montane meadows may have a defined channel system, generally at the lowest elevations. Common animal species occurring in the montane meadows include the Graham Mountains

pocket gopher, long-tailed vole, wild turkey, Atlantis fritillary butterfly, and Weidemeyer's admiral butterfly.

Based on projections of future climate change for the region, montane meadows are susceptible to decreases in plant productivity from water limitations and increased heat, colonization by invasive species, longer and more severe fire seasons, and altered frequency, severity, timing, and spatial extent of disturbance events (e.g., droughts, flash floods, landslides, windstorms, and ice storms). Montane meadows on the Coronado National Forest occur at the highest elevations and are highly fragmented, making them among the most vulnerable to a changing climate.

Wetlands

General Description - Wetlands are characterized by low waterflow and soils that are frequently or periodically saturated by ground or surface water. Wetland habitats contain a distinctive native plant community typical of saturated soils. Plants may include sedges, rushes, mosses, monkey flowers, lilies, and algae. Common animal species occurring in the wetlands include northern raccoon, Arizona treefrog, Northern Mexican gartersnake, and Huachuca springsnail, among other specialized aquatic invertebrates.

Based on projections of future climate change for the region, wetlands are susceptible to decreased soil moisture from increased evaporation and decreased surface water inputs during drought periods. Increased extreme precipitation events could lead to flash floods that could damage vegetation and be too rapid to be absorbed by underlying soils.

Riparian Areas

General Description - Riparian areas occur throughout all vegetation types. Vegetation supported within riparian areas varies with watershed size, geology, elevation, and aspect. Riparian area health is largely dependent on the storage and movement of sediment and water through the channel system. Natural disturbances (including flooding, scouring, and desiccation) result in changes that promote a diverse community structure necessary for recruitment of riparian species. Common animal species occurring in riparian areas include Arizona gray squirrel, white-nosed coati, gray hawk, elegant trogon, eared quetzal, sulphur-bellied flycatcher, rose-throated becard, canyon spotted whiptail, Mexican gartersnake, Tarahumara frog, and wet canyon talussnail.

Based on future climate projections, riparian areas are susceptible to changes in the frequency, intensity, timing, and spatial extent of extreme weather events (e.g., droughts, flash floods, landslides, and windstorms). These events, coupled with increased ambient air and soil temperatures, can create corresponding shifts in plant evapotranspiration rates, water infiltration, overland flow, erosion, sediment delivery, and loss of organic ground cover.

Climate Change

General Description - The climate of the southwestern United States is often referred to as dry and hot, but variation in topography, seasonal monsoons, and the strong influence of the El Niño Southern Oscillation and other large-scale circulation patterns add complexity to this region. While low deserts of the Southwest experience heat and drying winds in the early summer, forested mountain areas and plateaus may experience cold and drifting snow during winter. Monsoon thunderstorms in July and August are often accompanied by flash flooding, while from fall to spring, the weather can be warm with clear skies. Precipitation patterns are characterized by two peaks each year; winter precipitation is produced primarily from large frontal systems moving over the region, whereas summer precipitation results largely from thunderstorms within the North American monsoon circulation. The Southwest also experiences periods of short- and long-term drought, often linked to anomalies in El Niño.

Data shows that average air temperatures across the globe are rising (IPPC 2007). In summary, by the end of the 21st century, the Southwest, including the Coronado National Forest, is likely to experience:

- temperature increases of 5 to 8 degrees Fahrenheit (or about half a degree Fahrenheit per decade on average);
- an increase in the number of hot days, with summer heat waves lasting 2 weeks or longer;
- warmer winters with reduced snowpack;
- a later monsoonal season;
- a 10% drop in annual precipitation in southern Arizona, and
- an increase in extreme flood events following an overall increase in tropical storms.

The potential ecological implications of climate change trends in the Southwest indicate the following:

- More extreme disturbance events, including wildfires, intense rain, flash floods, and wind events.
- Greater vulnerability to invasive species, including insects, plants, fungi, and vertebrates.
- Long-term shifts in vegetation patterns. Cold-tolerant vegetation moving upslope or disappearing in some areas. Migration of some tree species to the more northern portions of their existing range.
- Potential decreases in overall forest productivity due to reduced precipitation.
- Shifts in the timing of snowmelt (already observed) and increases in summer temperatures affecting the survival of fish species and efforts to reintroduce species into their historic range.
- Effects on phenology and changes in the date of flowering and associated pollination and food chain disruptions.
- Ecosystems and species that may be particularly vulnerable to climate change include:

○ **Sky island forests (spruce-fir, dry and wet mixed conifer, ponderosa pine-evergreen oak, Madrean pine-oak woodland).** These high elevation systems contain plant and animal species that are adapted to cooler climates. They are highly fragmented, so species cannot easily migrate to more suitable areas. They could become more fragmented in the future as suitable climates shift upward in elevation, reducing overall habitat size. These systems also contain many threatened and endangered species, and can be at particular risk for severe wildfires and insect outbreaks.

○ **Aquatic, wetland, and riparian systems.** These systems also contain many threatened and endangered species. They are highly dependent on water and, thus, are highly vulnerable to shifts in precipitation regimes. They may be further threatened by increased human demand for water for use in grazing, agriculture, and municipal drinking water. Many species are also physiologically dependent on narrow temperature ranges as well.

○ **Species expected to be negatively affected by climate change.** A recent wildlife vulnerability assessment found several vertebrate species to be vulnerable to climate change, including the Tarahumara frog, Mount Graham red squirrel, Mexican fox squirrel, elegant trogon, and Chiricahua leopard frog (Coe et al. 2012). Additional species, including plants and invertebrate species may also be vulnerable, especially those with narrow ranges that are not adapted to frequent disturbance.

Potential social and economic effects of climate change trends in the Southwest and the Coronado National Forest indicate the following:

- Potential decrease in forage and water availability for livestock.
- Increased recreation on the Coronado National Forest, where cooler temperatures will attract people to higher elevations as a refuge from increasingly hot summers.
- Greater numbers of diseases that favor warmer climates, heat-induced illnesses, reduced air quality, and increased cases of respiratory illness.
- Greater energy demands for cooling systems that could place greater pressure for permits for alternative energy on National Forest System lands.
- Increased pressures on the region's already limited water supplies.

Based on current climate model projections and research, the climate change factors that appear most likely to affect desired conditions in the revised land management plan on the Coronado National Forest are ecological, weather-related disturbances, and socioeconomic demands:

- Projected increase in frequency of extreme weather events (intense storms).
- Projected increase in wildfire risks.
- Projected increase in outbreaks of insects, diseases beyond endemic levels, and nonnative invasive species.
- Projected increase in demand for deceasing upland water supplies.

Proposed Action

The proposed action (preferred alternative) analyzed in this BA is the implementation of the management direction provided in a revised LRMP. The proposed LRMP provides Forest-level direction to meet the Forest Service's mission for program management activities. It is largely strategic in nature, but does address types of activities to be conducted on the Forest. The proposed LRMP does not specifically authorize individual projects or activities. Site-specific actions will be subject to future and separate ESA section 7(a) (2) consultations.

In this BA, the Forest is consulting on the LRMP's program administration (effects of recreation, engineering, range management, fire management, etc.), as well as "plan components" (desired conditions, objectives, guidelines, standards, management areas and special designations, and suitability; these are discussed in greater detail below). Most of the actions being consulted on are from program management activities and objectives, while standards, guidelines, and special designations tend to mitigate effects of the actions (hence, they result in net proposed actions). Many aspects of program management are similar to when the Forest consulted on the previous LRMP, so serves as a partial basis for an effects determination, although there is a greater emphasis on vegetation and watershed restoration (which may have short-term effects while targeting long-term benefits).

The planning period for the proposed LRMP consists is for 15 years immediately following LRMP approval or until the LRMP is revised, which ever applies. The proposed LRMP includes the following types of direction (i.e., plan components and decisions):

Desired conditions are goals that express an aspiration, often to achieve long-term ecosystem restoration and resiliency. They form the basis for projects, activities, and uses that will occur under the LRMP. Site-specific projects will be designed to maintain or move towards desired conditions over the long term. Desired conditions provided in the proposed LRMP include important ecosystem components including airsheds, watersheds, vegetation, aquatic and terrestrial wildlife, as well as social and cultural resources including recreation, wilderness, scenic beauty, open space, transportation system, and public access and use opportunities for the Forest.

Objectives are the short-term mechanisms to reach desired conditions over the long-term. Objectives are generally the actions proposed to reach certain short-term goals over the planning period. Objectives have two parts: a quantifiable outcome and a time in which to achieve the outcome. There is intent to meet the outcome of objectives during the planning period. Although they are considered realistic short-term goals, there may be unforeseen operational, logistical, environmental, political, or financial considerations that may influence the outcome. To accommodate potential uncertainty, there is a stated or implied range of values for the outcome (e.g., acres treated during the proposed action period).

Standards set sideboards on the achievement of desired conditions and objectives by setting requirements to limit or guide Forest uses or activities that are expected to occur under the LRMP. Standards are activity or project design constraints that must be followed. Thus, standards are often mitigative measures placed on objectives or program activities.

Guidelines set sideboards on the achievement of desired conditions and objectives by setting requirements to limit or guide Forest uses or activities that are expected to occur under the LRMP. Guidelines allow for some variance from the exact wording, as long as the intent of the guideline is met. Thus, guidelines are often mitigative measures placed on objectives or program activities.

Suitability determinations identify areas of land as suitable or unsuitable for the specific uses of timber, livestock grazing, and recreation activities. These relay information about proposed land use activities.

Management area and special designations, or recommendations for special designations, identify areas with differing desired conditions, uses, standards, and/or guidelines than Forest-wide plan direction. Examples include wilderness, botanical areas, and wild and scenic rivers. Management can occur in these areas, so consultation applies to management actions in these areas addressed in the LRMP and this BA.

Monitoring and evaluation are not plan components, per se, but are requirements for LRMP implementation. They are used to determine the degree to which on-the-ground management is maintaining or making progress toward desired conditions, evaluate plan implementation effectiveness, and inform adaptive management. Required monitoring and evaluation is part of the proposed actions being consulted on.

The PNVTs (potential natural vegetation types) are coarse-scale groupings of ecosystem types that share similar geography, vegetation, and historic ecosystem disturbances, such as fire, drought, and grazing by native species. The PNVTs represent the vegetation type and characteristics that would occur when natural disturbance regimes and biological processes prevail.

Like the 1986 plan, the proposed action establishes forestwide management goals (desired conditions); however, they differ from the 12 elements (8 resource and 4 support elements) specified in the 1986 plan. Instead, the draft revised forest plan sets goals for 24 natural resource and social elements: (1) climate, (2) vegetation, Wildland-Urban Interface and Landscape-scale Fire, (3) montane meadows, (4) wetlands, (5) riparian areas, (6) biophysical features, (7) natural water sources, (8) constructed waters, (9) soils, (10) air quality, (11) wildlife, (12) fish and rare plants, (13) invasive species management, (14) forest products, (15) minerals, (16) public access, (17) motorized transportation system, (18) recreation, (19) scenic quality, (20) special use management, (21) heritage resources, (22) tribal relations, (23) range management, and (24) land ownership and boundary management. For each resource element, the draft revised plan describes

general conditions necessary to support sustainable ecosystems, biodiversity, and sustainable social and economic interactions between the Coronado and surrounding communities. It also describes desired outcomes for anticipated tradeoffs or conflicts among resources. In addition to resource and social elements, the draft revised plan defines desired conditions for specific places (i.e., management areas).

Also established in the draft revised plan are objectives, standards, and guidelines for management activities related to many (but not all) specific elements and/or management areas. There are also suggested management approaches for achieving desired conditions. This combination of direction is intended to give a complete picture of desired outcomes and the tools to attain them. It also provides direction for ways to address threats such as invasive species, excessive fuel loading, and climate change, within the authority of the Forest Service.

Certain direction in the 1986 plan is reiterated in the draft revised plan under the proposed action, with the intent to: (1) protect special-status species, including northern goshawks and Mexican spotted owls; (2) protect caves and cultural resources; (3) recognize fire as a beneficial natural disturbance; and (4) provide for a full range of recreational opportunities. While the intent of the 1986 goals is the same in the draft revised plan, its components may not be identical because they are also intended to respond to the needs for change.

Table 4. Land use zones, wilderness areas, and other special management areas allocated by the proposed action.

Management Areas	Acres allocated by the Proposed Action
Land Use Zones	
Roaded Backcountry	647,013
Wild Backcountry	626,167
Developed Recreation	38,655
Motorized Recreation	3,251
Wilderness, Recommended Wilderness, and Wilderness Study Areas	
Wilderness	338,294
Recommended Wilderness (includes Ku Chish and Mount Graham)	87,581
Bunk Robinson Wilderness Study Area	19,052
Whitmire Canyon Wilderness Study Area	12,163
Special Management Areas	
Elgin Research Natural Area (RNA)	315
Appleton-Whittell Research Ranch	2,346
Goudy Canyon RNA	558
Santa Catalina RNA (proposed reduction from 4,040 acres designated in the 1986 plan)	890
Wet Canyon Talus Snail Zoological Area	1,218
Mount Graham Astrophysical and Biological Research Area	2,802
Wild Chile Botanical Area	2,836
South Fork of Cave Creek Zoological-Botanical Area	762
Guadalupe Canyon	3,436
Cave Creek Canyon Birds of Prey Zoological Area	26,241
Goodding RNA	542
Butterfly Peak RNA	1,058
Pole Bridge RNA	460
Finger Rock Canyon RNA	1,103
Canelo RNA	387
Pole Bridge Extension RNA	122
Goodding Extension RNA	1,594

Land Use Zones

Wild Backcountry

The proposed action would designate a Wild Backcountry Land Use Zone of 626,167 acres (35 % of the national forest) to accommodate various nonmotorized uses while concurrently providing for limited motorized access to the area on National Forest System roads designated as maintenance level (ML) 2. The zone comprises inventoried roadless areas, areas adjacent to designated wilderness areas, and other relatively pristine areas. Desired conditions are described, and guidelines are established to maintain desired conditions and visitor experiences.

Suitable uses specified for the Wild Backcountry Land Use Zone are livestock grazing, harvesting of timber for restoration purposes, mountain biking, and collection of forest products and fuelwood. Off-highway vehicle (OHV) recreation, developed recreational facilities, and timber production are not suitable uses.

Roaded Backcountry

A proposed 647,013-acre (37% of the national forest) Roaded Backcountry Land Use Zone would accommodate a range of dispersed uses and motorized access, with an emphasis on quiet recreation. This area would be managed to retain its natural character and to limit the degree and type of development. Desired conditions are described, and guidelines are established to maintain conditions and visitor experiences.

Suitable uses specified for the Roaded Backcountry Land Use Zone include livestock grazing, motorized access, motorized dispersed camping, mountain biking, recreation facilities, harvesting of timber in conjunction with restoration projects, and collection of forest products and fuelwood. This zone is not suitable for OHV trails and timber production.

Developed Recreation

A proposed 38,655-acre (2% of the national forest) Developed Recreation Land Use Zone would serve major public access corridors into the national forest. Roads in this zone would typically be paved (ML 3 to 5; see glossary) and used as popular sightseeing routes. In some cases, main roads are designated as scenic byways. Primarily day use activities occur in these areas, with visitor destinations such as campgrounds, picnic areas, vista points, visitor centers, and lakes. Organization camps and recreational residences are located in the Developed Recreation Land Use Zone. There are many trailheads and hiking trails that provide access to Wild Backcountry Land Use Zones, Roaded Backcountry Land Use Zones, and wilderness areas. Desired conditions are described, and guidelines are established to maintain conditions and visitor experiences.

The Developed Recreation Land Use Zone is designated as suitable for motorized access, dispersed motorized camping, recreation facilities, and harvesting of timber in conjunction with restoration projects, and the collection of forest products and fuelwood. Activities for which it is not suitable include OHV recreation, timber production, harvesting of commercial forest products, and livestock grazing (except for vegetation management, where appropriate).

Motorized Recreation

Approximately 3,251 acres of the Coronado (< 1%) are designated for management as a Motorized Recreation Land Use Zone. This zone includes areas that currently experience heavy use by motorized recreational vehicles. Management direction is focused on providing a wide variety of recreational experiences, including OHV use and vehicular sightseeing, while mitigating effects of motorized use and minimizing conflicts with other users. Desired conditions are described, and guidelines are established to maintain conditions and visitor experiences. Most forest uses, except for timber production, are suitable in this management area.

Special Areas

Existing Wilderness Areas

Eight designated wilderness areas, which add up to 338,294 acres (19% of the national forest), are included in the draft revised plan. Generic desired conditions (goals), objectives, standards, and guidelines are defined for the following resource and social elements of designated wilderness areas: wilderness character, scenic quality, vegetation, wildlife, soil and water, recreation and education, trails and signage, fire, insects and disease, and research. In addition, the draft revised forest plan defines wilderness area specific desired conditions, objective, guidelines, standards, and suggested management approaches. In the draft revised plan, wilderness areas are suitable for livestock grazing, nonmechanical harvesting of traditional forest products, and outfitter and guide services compatible with wilderness character. Selected activities not suitable in wilderness areas include motorized and mechanized use, recreation facilities, timber harvest, fuelwood harvest, and commercial uses that are not wilderness dependent (see chapter 4 of draft revised forest plan).

Recommended Wilderness Areas

The 1986 plan recommends one new wilderness area (Mount Graham). The draft revised plan recommends two areas for congressional designation as wilderness for a total of 87,581 acres: Ku Chish (new) and Mount Graham (formerly a wilderness study area).

In the draft revised plan, 26,266 acres in the Chiricahua Mountains are recommended for designation as a wilderness with the Apache name “Ku Chish” (i.e., Cochise). This recommended wilderness area was ranked high for both capability and availability as potential wilderness, based on the criteria in FSH 1909.12, chapter 70. The area received a medium ranking in the need assessment evaluation following FSH 1909.12, chapter 72.3. Its rugged condition and high quality wilderness character combined with manageability make it the strongest candidate of all new areas evaluated for wilderness recommendation.

In 1984, Congress established three wilderness study areas on the Coronado (Mount Graham, Bunk Robinson, and Whitmire Canyon). The Mount Graham Wilderness Study Area was recommended for wilderness designation in the 1986 forest plan and has been managed as a recommended wilderness area since that time (see the “Recommended Wilderness Areas” section).

The draft revised forest plan repeats a recommendation of the 1986 forest plan (which is the no action alternative) that the Mount Graham Wilderness Study Area be designated by Congress as a wilderness area (61,315 acres). Until congressional designation of this area as a wilderness area occurs, the Mount Graham Recommended Wilderness Area will be managed to meet the desired conditions for wilderness study areas and recommended wilderness areas. The Mount Graham Recommended Wilderness Area was taken through the potential wilderness evaluation process again during development of the proposed action. The area received a high ranking for capability, and although it was ranked medium for availability and low for need, it is being recommended based on its congressional status as a wilderness study area. This area has been consistently managed to preserve wilderness character since being designated a wilderness study area by the Arizona Wilderness Act of 1984.

Both the proposed Ku Chish Recommended Wilderness Area and Mount Graham Recommended Wilderness Area have stimulated a high degree of public interest because of their wilderness characteristics, the refugia they provide for threatened and endangered species, and their outstanding opportunities for recreational use. Each would be managed to maintain wilderness character (i.e., no motorized vehicle use and no use of mechanized equipment) preserving the

area as “untrammeled, natural, and undeveloped, with outstanding opportunities for solitude or a primitive and unconfined type of recreation” (Wilderness Act of 1964).

Wilderness Study Areas

The proposed action carries forward this recommendation for Mount Graham. Bunk Robinson (19,052 acres) and Whitmire Canyon Wilderness Study Areas (12,163 acres) would continue to be managed to preserve wilderness characteristics. The draft revised forest plan describes desired conditions for these areas as well as guidelines to protect wilderness character. Suitable uses of these areas are livestock grazing, nonmechanical harvesting of traditional forest products, and compatible outfitter and guide uses. Activities that are not suitable in wilderness study areas include construction of new roads, mechanized and motorized uses, vehicle trails, recreation facilities, timber harvest, fuelwood harvest, and any commercial uses that would have a long-term impact on wilderness character.

Research Natural Areas

The forest has six research natural areas (RNAs) designated in the 1986 plan that will continue to be managed as such with the draft revised plan. The 1986 plan also recommends extending the boundaries of the Goodding and Pole Bridge RNAs, decreasing the size of the Santa Catalina RNA, and establishing the Canelo RNA. These recommendations are reiterated in the draft revised plan. In addition, the draft revised plan under the proposed action recommends designation of the Finger Rock Canyon RNA on the Santa Catalina Ranger District. Desired conditions, objectives, standards, and guidelines are stated for management of all. Until decisions are made by the Rocky Mountain Research Station director and the regional forester to decrease the size of the Santa Catalina RNA, it will continue to be managed at its current size.

Other Special Areas

Special areas designated and recommended in the 1986 forest plan as MAs 8 and 8A would be managed as such. These include the Wet Canyon Talus Snail Area, Wild Chile Botanical Area, Mount Graham Astrophysical and Biological Area (formally the Mount Graham Red Squirrel Refugium), and proposed Guadalupe Canyon Zoological Area from the 1986 plan. A new special area is recommended by the draft revised plan: the South Fork Cave Creek Canyon Birds of Prey Zoological-Botanical Area in the Chiricahua Ecosystem Management Area (see figure 2). This area encompasses the South Fork Cave Creek Zoological-Botanical Area that was recommended in the 1986 plan. For each of these designated and recommended special areas, the draft revised plan establishes a unique set of plan components to meet management needs.

In addition, the draft revised plan recognizes the Barfoot Park National Natural Landscape, designated by the U.S. Department of the Interior in 2010, as a special area in the Chiricahua Ecosystem Management Area. It also recognizes the Bighorn Sheep Management Area, a special area in the Santa Catalina Ecosystem Management Area established in coordination with the Arizona Game and Fish Department. The latter area differs from other special areas designated by the Forest Service because it establishes rules for public behavior, rather than forest management actions.

Eligible Wild, Scenic, and Recreational Rivers

This management area is newly added in the draft revised forest plan. It was not included in the 1986 plan, because eligibility of forest streams for designation as wild, scenic, or recreational rivers had not yet been determined.

It comprises 16 river segments that meet eligibility criteria for future designation as wild, scenic, or recreational rivers (table 3, page 34). Wild, scenic, and recreational rivers management areas

are depicted in the draft revised plan on the ecosystem management area maps as an overlay across areas in which they occur (see figures 5, 9, 12, 13, and 16 in the draft revised plan). For example, if a wild, scenic, or recreational river is located in a Wild Backcountry Land Use Zone, it is shown on the map as an overlay on the Wild Backcountry Land Use Zone.

Desired conditions are given for each classification (wild, scenic, or recreational) to guide their management. The draft revised forest plan incorporates a standard requiring that conditions and outstanding remarkable values be preserved in those segments that qualify for wild, scenic, or recreational river classification. All other plan direction for specific land use zones or special areas in which these eligible rivers occur applies in addition to direction related to wild, scenic, or recreational eligibility.

Description of the Program Areas

The programs analyzed in this BA are: Wildland-Urban Interface and Landscape-scale Fire, Biophysical Features, Water Resources – Natural, Water Resources – Constructed, Soil, Air, Animals and Rare Plants, Invasive Species, Forest Products, Minerals, Public Access, Motorized Transportation System, Recreation, Scenery, Special Uses, Cultural Resources, Tribal Relations, Range Management, and Land Ownership Adjustments and Boundary Management. Each program area is analyzed under each species to determine if that program will have any effect on the species. If the program area is determined to have no effect it will be dropped out of the discussion for that species.

Desired conditions, standards and guidelines are listed in Appendix A under each of the program areas, if there are any for that program. Objectives are listed under each program area in the body of the document if there are any listed for that area. There are two guidelines that encompass all the programs as well that are worth mentioning here:

- ARP-G-1 - Activities occurring within Federally-listed species habitat should apply habitat management objectives and species protection measures from approved Recovery Plans and signed Conservation Agreements.
- LOA-G-3 - The non-federal lands considered for exchange into federal ownership should meet one or more of the following criteria: (a) lands that provide needed public and administrative access, protect public lands from fire or trespass, or prevent damage to resources; (b) lands that contain vital threatened and endangered species habitat or vital wildlife habitat; (c) lands providing services to the public (e.g., developed and dispersed recreation, open space); (d) wetlands, riparian areas and other water-oriented lands; (e) lands that contain unique, natural or cultural values; (f) lands within designated wilderness; (g) lands that will improve public land management, meet specific administrative needs, or benefit other national forest programs; (h) lands that meet programs prescribed or endorsed by acts or reports of Congress or the Department of Agriculture.

Wildland-Urban Interface and Landscape-scale Fire

Standards and Guidelines for Wildland-Urban Interface and Landscape-scale Fire can be found in Appendix A.

This program area represents all vegetation communities on the CNF within those areas of human populations and developments at imminent risk from wildfire. Use of wildland fire (primarily prescribed burning) is one of the methods for ecosystem restoration.

The Wildland-Urban Interface and Landscape-scale Fire program combines elements of wildland fire prevention, response and management; post-fire area stabilization and rehabilitation; and hazardous fuels planning, implementation, and monitoring.

Wildland fire is defined as any nonstructural fire that occurs in vegetation or natural fuels, and it is further categorized as either wildfire or prescribed fire. Wildfires are fires with unplanned ignitions including lightning or unauthorized and accidental human-caused actions. Prescribed fires are intentionally ignited by the Forest Service under an approved plan to meet specific objectives.

Management actions taken in response to wildfires are not planned, so they are covered under ESA § 7(a)(2) emergency procedures. Therefore, they are not included as part of the proposed action for this consultation. However, the Forest Service expects to work closely with the USFWS on management responses and emergency consultation procedures as wildfires occur during the life of the LRMP.

Prescribed fire and mechanical treatments are actions that are part of the hazardous fuels program designed to protect communities, watersheds, and species at risk; and to restore and maintain resilient ecosystems.

Desired Conditions for Wildland-Urban Interface and Landscape-scale Fire

- As a result of vegetation management, most wildfires in the Wildland-Urban Interface and Landscape-scale Fire are low- to mixed-severity fires that result in limited loss of structures or ecosystem function. Patterns of treatments are effective in modifying fire behavior.
- Wildland-Urban Interface and Landscape-scale Fire residents and visitors are knowledgeable about wildfire protection measures for their homes and property, including defensible space. People using Wildland-Urban Interface and Landscape-scale Fire areas are educated about the potential danger of wildlife, particularly black bears and mountain lions, and measures they can take to prevent encounters.
- Access to Wildland-Urban Interface and Landscape-scale Fire areas allow for increased safety and efficiency of wildfire suppression operations.

These desired conditions (DC) provide for the natural fire regime within PNVTs and public and firefighter safety. This program would reduce the risk of overall uncharacteristic fire impacts.

Objectives for Wildland-Urban Interface and Landscape-Scale Fire

FW-WUI-O-1

The objective of this program is to treat 5,000 to 10,000 acres in the Wildland-Urban Interface and Landscape-scale Fire using wildland fire (planned and unplanned ignitions), prescribed cutting, and mastication every year to reduce fire hazard and risk to communities and the forest. Plan components applying to this program area are listed below:

- PIN-O-1 - Every 10 years, treat the vegetation using wildland fire (planned and unplanned ignitions), prescribed cutting, and mastication on at least 25 percent of the Pinaleño EMA to create resiliency to disturbances. Treatments will be consistent with the objectives for forestwide vegetation communities and resources.
- RIT-O-1 - Every 10 years, treat the vegetation using wildland fire (planned and unplanned ignitions), prescribed cutting, and mastication on at least 20 percent of the Santa Rita EMA to create resiliency to disturbances. Treatments will be consistent with the objectives for forestwide vegetation communities and resources.
- VGC-O-1 - Within 10 years following plan approval, treat at least 72,500 acres of grasslands using wildland fire (planned and unplanned ignitions), thinning, and mastication.
- VIC-O-1 - Treat at least 5,000 acres of interior chaparral over the 10 years following plan approval using wildland fire (planned and unplanned ignitions) and mechanical treatments,

- VME-O-1 - Treat at least 367,000 acres using wildland fire (planned and unplanned ignitions) and mechanical treatments (thinning and mastication) within 10 years following plan approval.
- VMP-O-1 - Treat at least 25,000 acres using wildland fire (planned and unplanned ignitions), and thinning and mastication over the 10 years following plan approval.
- VPP-O-1 - Over the 10 years following plan approval, treat at least 12,500 acres using wildland fire (planned and unplanned ignitions) and mechanical treatments (thinning and mastication).

Biophysical Features (Caves/Mines, Rocky features, Talus slopes)

Standards and Guidelines for Biophysical Features can be found in Appendix A.

Biophysical features include geological features such as caves, cliffs, and talus slopes. Methods used to meet the overall desired conditions of these features include coordinate with partners, State and Federal agencies; educate the public; monitor significant features; foster collaboration with AZG&F, USFWS, Bat Conservation International (BCI) and other stakeholders and researchers to address conservation. Future projects would be designed to protect and improve these features and would employ standards, guidelines, and mitigation measures to protect these resources.

The Coronado National Forest contains many significant caves and karst resources. The National Caves Resources Management and Protection Act (P.L. 110-691) defines a significant cave as a cave located on National Forest System lands that has been evaluated and shown to possess features, characteristics, values, or opportunities in one or more of the following resource areas: biota; cultural; geologic-mineralogic-paleontologic; hydrologic; recreational; or educational-scientific for scientific, educational or recreational purposes; and which has been designated "significant" by the forest supervisor.

Biophysical features occur in all vegetation types and at all elevations throughout the Coronado. These features provide specialized seasonal and year-round habitats for a variety of wildlife species including bats, cliff-nesting birds, talussnails, and several unique montane reptiles and amphibians. Several species of rare plants are adapted for growth on rocky sites and cliff faces. Underground features such as caves often contain unique geological, archaeological, and biological resources. Animal species found in caves and mines range from cave-obligate pseudo-scorpions to many species of bats to opportunistic users like black bear, ringtail, and black-tailed rattlesnake. Species associated with rocky areas and cliffs include desert bighorn sheep, peregrine falcon, Yarrow's spiny lizard, rock rattlesnake, barking frog, and talussnails. Rare plant species found in rocky sites include Bartram's stonecrop, Catalina beardtongue, and many others.

Desired Conditions for Biophysical Features

The following desired conditions (DC) provide for the protection of natural features:

- Cliffs and rock outcrops support nesting, roosting, and feeding habitats of birds of prey, desert bighorn sheep, bats, snails, western barking frogs, and other species. Rock climbing and related recreational activities are compatible with the protection of resident wildlife and plant species, and do not diminish the quantity or quality of specialized vegetation and wildlife habitat. Rockslides and talus slopes are undisturbed, providing habitat for wildlife such as lizards, snakes, and land snails. Talus slopes maintain near-historic levels of moisture

and are free from excessive sedimentation. Rocky habitats occupied by species of conservation concern are maintained.

- Caves provide habitat for species that require specialized conditions for roosting and overwintering, such as bats. Caves maintain moisture and temperature levels consistent with historic conditions. Archaeological, geological, paleontological, and biological features of caves are not disturbed by visitors. Cave formations and relief features continue to develop or erode under natural conditions. Caves known to be important for species of conservation concern are intact or provide habitat for these species. Water flowing into, from, or within the cave system is not altered or diverted in its flow; contains normally fluctuating background levels of sediment, organic matter, and dissolved minerals; and is not polluted. New bat diseases, such as white-nose syndrome (*Geomyces destructans*), are not introduced in caves.
- Significant cave resources' aesthetic, cultural, and scientific values remain intact, and are protected from damage to provide for use by people and wildlife. Some caves provide a range of recreational and educational opportunities without diminishing the cave resource.
- Archaeological, geological, paleontological, and biological features of caves are not disturbed by visitors. Cave formations and relief features continue to develop or erode under natural conditions.

Objectives for Biophysical Features

The objective of this program (BIP-O-1) is to install an average of two wildlife-friendly closures at mines, caves, or adits each year over a 10-year period. This objective would protect these natural features as well as the species that use these them from human disturbance and disease, including but not limited to Lesser long-nosed bat and Mexican long-nosed bat.

Water Resources - Natural Water Sources

Standards and Guidelines for Water Resources – Natural Water Sources can be found in Appendix A.

There are approximately 100 miles of perennial streams and 400 springs and seeps on the Coronado National Forest. All streams, springs, and seeps are small, with a low volume of surface water generally present. Many springs and seeps are developed in a manner that diverts water from the natural source for uses such as livestock and wildlife watering and domestic use. Most species of animals need water to drink. Species that need it for other critical life history components (e.g., food, shelter, and reproduction) include Chiricahua leopard frogs, Arizona treefrog, tiger salamander, Mexican gartersnake, Gila chub, Gila topminnow, Huachuca springsnail, and Stephan's heterelmis riffle beetle.

Based on projections of future climate change for the region, natural water sources are susceptible to increased evaporation from warmer temperatures and altered frequency and severity of both droughts and flash floods. Water resources are also at risk due to competing demands for multiple uses. These conditions place additional stress on native species that depend on surface water for their life histories, especially if these species also rely on a narrow range of water temperatures.

Desired Conditions for Water Resources – Natural Water Sources

- ***Landscape Scale*** Watersheds, streams, wetlands, and riparian areas have characteristics, processes, and features in low departure from reference condition. Water quality, stream channel stability, and aquatic habitats retain their inherent resilience to natural and other disturbances, including climate variability and change. Water resources maintain the capability to respond and adjust to disturbances without long term adverse changes. Vegetation conditions (as described in each section above) contribute to maintaining

downstream water quality, quantity, and aquatic habitat features. Upland soil erosion contributes sediment in amounts that do not impair stream function or water quality.

- ***Mid-Scale*** Instream flows provide for recreational uses and wildlife habitat, including fish. They also provide for channel, flood plain, and riparian maintenance, and recharge of groundwater aquifers. Streamflows provide natural movement among native fish populations. Water quantity and quality meet the needs of beneficial uses and authorized activities such as domestic and municipal water use, irrigation, stockwater, recreation, wildlife (including fish), road construction and maintenance, and fire management activities. Stream channels and flood plains are dynamic and resilient to disturbances.
  The water and sediment balance between streams and their watersheds allows a natural frequency of low and high flows. Occasional flooding does not disrupt normal stream characteristics (e.g., water and sediment transport, woody material) or considerably alter stream dimensions (e.g., bankfull width, depth, slope, and sinuosity). Flood plains are functioning and lessen the impacts from floods on human health and safety by dissipating some flood energy. Water quality meets or exceeds relevant State of Arizona, State of New Mexico, and Environmental Protection Agency standards for designated uses. Water quality meets critical needs of aquatic species. Nonpoint-source loading of streams and lakes from sediment, excessive nutrients, or hazardous chemicals does not reduce water quality beyond the State standards for Arizona and/or New Mexico.
- ***Fine Scale*** Infiltration at outflows allows for soil moisture recharge, supporting the native assemblages of vegetation.

These desired conditions (DC) provides for water quality, adequate instream flows and sediment balance for riparian vegetation, wildlife and fish habitat.

Objectives for Water Resources – Natural Water Sources

- NWS-O-1 - Every 10 years, apply for at least 10 instream flow water rights on streams for recreation and wildlife purposes, prioritizing locations necessary for sustaining native fish populations and species of conservation concern.
- NWS-O-2 - Reconstruct at least 3 developed springs every 10 years to provide aquatic habitat for the recovery of plant and/or animal species.
- NWS-O-3 - Complete 3 stream restoration and/or development projects to benefit aquatic species of conservation concern every 10 years.

Methods used to meet the overall objective of these ecosystems include assessing proper functioning condition (PFC); improving and maintaining water quality through the use of best management practices (BMPs); improving and protecting riparian areas and other groundwater dependent ecosystems; protecting floodplains; and planning and implementing burned area emergency response (BAER) activities. Future projects would be designed to protect and improve PFC condition and would employ best management practices, guidelines, and mitigation measures to protect these resources.

Water Resources - Constructed Waters

Standards and Guidelines for Water Resources – Constructed Waters can be found in Appendix A.

There are approximately 400 developed springs, 300 wells, and 1,100 stock ponds on the Coronado National Forest. These constructed water features provide surface water resources, in many cases perennial sources, which augment natural water resources. Structures include earthen stockponds, reservoirs, such as tanks, wildlife drinkers, and concrete or steel storage tanks or watering troughs fed by a natural spring, groundwater well, or stream diversion. These facilities

can often provide valuable habitat features for native wildlife such as Sonora tiger salamander, but can also harbor invasive aquatic species such as American bullfrogs, crayfish, and green sunfish that prey on or compete with native wildlife. Poorly designed waters can entrap native wildlife or be inaccessible. The Sonoran mud turtle is a management indicator species for constructed waters and can be found in the grasslands, Madrean encinal woodlands, and Madrean pine-oak woodlands vegetation communities. Based on projections of future climate change for the region, constructed water sources are susceptible to increased evaporation from warmer temperatures and altered frequency and severity of both droughts and flash floods. Water resources are also at risk due to competing demands for multiple uses. These conditions place additional stress on native animal species that depend on surface water as a water source. However, a reduction in water availability could lead to a reduction in or slowing of nonnative aquatic species invasions.

Desired Conditions for Water Resources – Constructed Waters

- Artificial structures for holding standing water (such earthen stock ponds, reservoirs, wildlife drinkers, concrete or steel storage tanks or watering troughs, and habitat restoration ponds) are distributed across the landscape in a pattern and density sufficient to sustain wildlife and livestock. Water sources are perennial where possible, providing a high-quality supply of water and aquatic habitat for plants and animals.
- Constructed waters that are used for livestock watering are available for and used by native species. They provide environments that encourage the reproduction of native aquatic organisms and provide important refugia for native wildlife during periods of drought, which are projected to be more frequent under future climate conditions. If aquatic invasive species, such as American bullfrogs, northern crayfish, green sunfish, nonnative tiger salamanders, nonnative mollusks, and nonnative aquatic plants are present, their numbers are low and can be controlled. Waterborne diseases, if present, do not spread among ponds. Water quality is high, and organic pollutants such as nitrates, nitrites, phosphates, and sulfur compounds are at levels that are nontoxic to native species.

These desired conditions (DC) provide aquatic environments and important refugia for native wildlife.

Objective for Water Resources – Constructed Waters

The objective of this program is: COW-O-1 - Install wildlife escape ramps in all above-ground constructed waters within 10 years of plan approval. This objective would benefit species that utilize constructed water sources.

Soil Management

Standards and Guidelines for Soil Management can be found in Appendix A.

This program area covers the mineral and organic matter that occurs on the land surface throughout all vegetation types known as soil. It is characterized by horizons or layers that are distinguishable from the parent material beneath as a result of weathering of that parent material, additions of organic matter, and chemical and physical processes. It is the transition area between air and the parent material beneath, and makes a site capable of supporting vegetation (LRMP 2013).

Based on projections of future climate change for the region, soils are vulnerable to having decreased water available for plant growth, groundwater recharge, and stream recharge due to increases in evaporation and decreases in precipitation. Longer and more severe fire seasons, and altered frequency, severity, timing, and spatial extent of disturbance events (e.g., droughts, flash

floods, landslides, windstorms, and ice storms) could make soils more susceptible to erosion (LRMP 2013).

Desired Conditions for Soil Management

- Ecological and hydrologic functions are not impaired by soil compaction. The soil condition rating is satisfactory across the forest. Vegetation and litter limit the formation of rills, gullies, and pedestals; excessive soil deposition, and topsoil loss. Soils provide for diverse native plant species. Vegetative ground cover is distributed across the soil surface as described for forestwide vegetation community desired conditions and promotes nutrient cycling and water infiltration.

This desired condition (DC) provides for the good soil conditions that promotes nutrient cycling and water infiltration within PNVTs. This program would reduce the risk of overall soil compaction and loss.

Objectives for Soil Management

The objective (SOI-O-1) of this program is to enhance or restore every 10 years, 2,500 to 15,000 acres of uplands with vegetation treatments or soil and watershed restoration treatments to attain necessary ground cover by litter and ground cover by plant basal area. The objective RIA-O-1 would also benefit this program area by treating an additional 2,500 to 10,000 acres of uplands with vegetation treatments or soil and watershed restoration treatments to maintain watershed stability and, thereby, the structure and function of streams, floodplains, and riparian vegetation.

Air Management

Standards and Guidelines for Air Management can be found in Appendix A.

This program area covers air management. Air above the Coronado National Forest is divided into five airsheds, four in Arizona, and one in New Mexico. Airsheds are used to describe air quality-related values and impairment by pollutants, including smoke and emissions from permitted activities. The Clean Air Act as amended assigns Federal land managers the responsibility to protect air quality-related values in class I airsheds, and to protect human health, plant and animal health, and visual quality in all areas. There are two class I airsheds within the Coronado National Forest: the Chiricahua Wilderness and Galiuro Wilderness.

Based on projections of future climate change for the region, airsheds are susceptible to increased levels of pollutants (particulates and aerosols) resulting from longer, more severe fire seasons, increased occurrence of warmer air masses that can suspend higher concentrations of pollutants, and frequent or intense windstorms that can transport pollutants and fugitive dust short and long distances.

Desired Conditions for Air Management

- Air quality above the Coronado National Forest meets Federal and State air quality standards, including standards for visibility and health hazards from pollutants. Air quality-related values, including high quality visual conditions, are maintained within the class I airsheds over the Galiuro and Chiricahua Wilderness areas.

This desired condition (DC) ensures that air quality standards are met. This program would reduce the risk of air quality related issues to plant and animal health.

Objectives for Air Management

No objective is listed for this program.

Animal and Rare Plants

Standards and Guidelines for Animal and Rare Plants can be found in Appendix A.

The Animal and Rare Plants program involves a variety of activities conducted by the USFS and its partners, including inventory and monitoring, habitat assessments, habitat improvements through land treatments and structures, species reintroductions, development of conservation strategies, administrative studies, collaboration with research, and information and education.

The Animal and Rare Plants program is tasked to manage habitats for all existing native and desired nonnative wildlife, fish, and plant species in order to maintain viable populations (FSM 2620.1). Habitat planning and evaluation are integral to meeting the goals for ensuring the continued existence of wildlife, fish, and plants generally throughout their geographic range, and much of this habitat enhancement is accomplished by the involvement of fisheries biologists, wildlife biologists, and botanists in project planning and implementation.

The Coronado National Forest has the highest biological diversity of any national forest in the western United States. This is because it is situated at a convergence zone of ecological regions, and has a wide variety of vegetation communities and steep elevation gradients. Biological diversity is further enhanced by a long growing season, bimodal precipitation, and the evolutionary consequences of isolation in the sky island mountain ranges.

The number of species inhabiting the Coronado National Forest and adjoining lands is not precisely known, and new species are periodically described. Conservative estimates include about 2,100 species of plants, 466 species of birds, 110 species of mammals, 91 species of reptiles, over 240 species of butterflies, and nearly 200 species of mollusks.

Based on projected future climate change, terrestrial wildlife species are susceptible to habitat loss and fragmentation resulting from more frequent or extreme disturbance events, including wildfires, droughts, flash floods, landslides, and windstorms. Wildlife species are also susceptible to alterations in the timing of plant phenology events (greenup, flowering, and fruit ripening), especially those that influence critical life behaviors (migration, breeding, and dispersal).

Based on projected future climate change, aquatic species are susceptible to increased water temperatures, altered seasonal discharge events, increases in drought severity during summer flows, and increased predation pressure. There may be decreases in waterflow and, possibly, a shorter period of sustained flows in the spring due to reduced winter snowpack. Sustained flows and desired temperatures in the spring are needed for successful spawning. There also may be the potential for fragmentation of habitat, with resulting increases in competition and predation in pools due to little or no waterflow in some stream segments.

Desired Conditions for Animal and Rare Plants

- Naturally occurring native ecosystems are present and sustainable across the Coronado National Forest, providing habitat to support a full complement of plants and animals. Habitats are interconnected within the national forest boundary while the interspaces between ecosystem management areas (EMAs) allow for movement of wide-ranging species and promote natural predator-prey relationships.
- Forest boundaries are permeable to animals of all sizes and offer consistent, safe access for ingress and egress of wildlife. In particular, segments of the national forest boundary identified in figure 3 remain critical interfaces that link wildlife habitat on both sides of the boundary.11 Fences, roads, recreational sites, and other manmade features do not impede animal movement or contribute to habitat fragmentation.

- The collection of animals and plants (e.g., butterflies, mushrooms) does not negatively impact species abundance. Native species that are known to have been present during the first decade of the 21st century continue to exist, and none has been extirpated.

- Fire adapted native plants are relatively abundant and fire functions as a critical natural process. Trees in terrestrial and riparian areas provide structural features that accommodate arboreal species such as cavity-nesting birds. Naturally occurring ground structures similarly allow for resting, breeding, and foraging activities by a variety of species. Bats and other cave-dependent wildlife have high-quality habitat in caves and abandoned mine features. Permitted activities—such as livestock grazing, outfitter guiding, and ecotourism guiding—do not compromise healthy populations of native species, nor do they adversely impact habitat components. Hunting, fishing, and other wildlife-based recreation activities are encouraged where wildlife populations are flourishing. Human-wildlife conflicts are rare. Nonnative species occur only where populations are manageable and/or desirable; generally, they are rare across the Coronado.

These desired conditions (DC) ensures that all species and naturally occurring native ecosystems are present and sustainable across the Coronado National Forest, providing habitat to support a full complement of plants and animals. Conservation strategies, research or studies, and public education are additional important components of this program that are often conducted in collaboration with other resource areas and agencies.

Objectives for Animal and Rare Plants

No objectives listed for this program.

Invasive Species Management

Standards and Guidelines for Invasive Species Management can be found in Appendix A.

The Forest Service defines invasive species as "alien species whose introduction does or is likely to cause economic or environmental harm or harm to human health" (Executive Order 13112). Alien refers to species that are nonnative to the ecosystem they have infested. Both terrestrial and aquatic invasive species are a growing threat to native species, ecosystem function, and the quantity of forest goods and services. Invasive plants, such as buffelgrass, threaten native plant communities by competing for resources and increasing the frequency and intensity of fire regimes. Even though complete eradication of invasive species is not always possible, aggressive control of existing populations is important to protect native ecosystem diversity.

Invasive species pose an increasing threat to the integrity of ecosystems by decreasing native plant and animal diversity, increasing soil erosion and sedimentation, and interfering with natural fires regimes. Reducing the threat of aquatic and terrestrial invasive species will allow the Coronado NF to better manage resilient landscapes and species populations that have a greater capacity to survive natural disturbances and uncertain future environmental conditions such as those driven by climate change and increasing human uses. Methods used to meet the overall desired conditions and objectives of the program include assessing and eradicating priority infestations or populations; monitor, prevent and control infestations; coordinating with other Federal, and State agencies; and planning and implementing burned area emergency response (BAER) activities. Future projects would be designed to restore and improve watershed conditions and maintain ecosystem function and would employ best management practices, guidelines, and mitigation measures to protect watershed resources.

Based on projections of future climate change for the region, conditions could favor the spread and establishment of invasive species, which are often more widely adapted to a range of climates and often early colonizers following disturbances.

Desired Conditions for Invasive Species Management

- Infestations of invasive exotic plants do not contribute to the loss of native species or impairment of ecosystem function. Invasive animals are nonexistent or occur in low numbers and do not significantly affect the productivity or sustainability of native wildlife.

Objectives for Invasive Species Management

There are no specific objectives for this program area although the objective (VDC-O-1) covers invasive species.

- VDC-O-1 - Suppress or eradicate buffelgrass on 1,000 to 1,500 acres of Sonoran Desert every year using herbicides and manual methods.

Forest Products

Standards and Guidelines for Forest Products can be found in Appendix A.

Common forest products available from the Coronado National Forest include sawlogs, fuelwood, cactus, and beargrass. Sawlogs and fuelwood are generally available as byproducts of forest restoration or forest fuels reduction projects. Other less common forest products include manzanita, ferns, and mushrooms.

It is unclear how a changing climate may alter the availability of forest products in the future. Some species that are more adapted to drier climates may be more abundant, while others may become less abundant. An increased need for fuels reduction and restoration projects to restore ecosystem resilience may increase the availability of sawlogs and fuelwood during some periods.

Desired Conditions for Forest Products

- A sustainable supply of wood products (e.g., small roundwood, sawlogs, biomass, fuelwood) and other products (e.g., Christmas trees, beargrass, cactus, ferns, and fungi) are provided within the capacity of the land to produce these goods. Results of silvicultural treatments reflect natural disturbance regimes and contribute to ecosystem sustainability. Forest products, particularly those related to wood fiber, are made available as part of fuel treatment projects and restoration activities.

Objectives for Forest Products

No objective listed for this program.

Minerals Management

Standards and Guidelines for Minerals Management can be found in Appendix A.

There are three categories of minerals potentially found on the Coronado. These are referred to as locatable, leasable, and salable minerals; each is subject to different laws and implementing regulations. Locatable minerals are subject to the General Mining Law of May 10, 1872, as amended, and for the most part are outside the scope of the LRMP. The Forest Service role in managing such resources is to provide reasonable protection of surface resources. The Agency does not have the authority to outright deny locatable mineral activities providing they follow applicable laws and regulations. Leasable minerals include oil and gas, coal, and certain other

commodities such as potash, which is a solid leasable mineral. The Forest Service role in managing such resources is to recommend or consent to the Department of the Interior, Bureau of Land Management (BLM) whether leases for these commodities should be issued, and specify any surface resource protections that may be needed. The last category, salable minerals, applies to mineral materials such as sand and gravel for which the Forest Service has total discretion to manage. It is Forest Service policy to support responsible, environmentally sound energy and mineral development and reclamation on the Coronado National Forest.

The potential for locatable minerals within the boundaries of the Coronado National Forest is high because the geology of the area is conducive to their creation, and the fault block mountain ranges expose these mineralized zones in a number of places. Locatable mineral resources occur on all ranger districts on the Coronado National Forest. There are numerous active mining claims throughout the Coronado, but most prominently within the Sierra Vista and Nogales Ranger Districts. Pursuant to Federal mining laws, the Forest Service is required to respond to proposals for conducting exploration and mining operations. The Forest Service must determine whether to approve the preliminary plan of operations submitted, or to require changes or additions deemed necessary to meet the requirement of the regulations for environmental protection. All proposals must comply with Federal and State laws and regulations, and should be managed to reduce adverse environmental impacts to the extent practicable on National Forest System lands.

The potential for leasable minerals such as oil or gas is low. However, there is potential for leasable potash minerals bearing the commodity of potassium on the Coronado. The Forest Service would make a recommendation for a lease to the Bureau of Land Management, which is the lead agency for solid leasable potash minerals. Stipulations to protect surface resources would be made for exploration or mining.

Common variety, or salable, minerals have never been a significant component of minerals operations on the Coronado, and there is only one saleable mineral operation in 2013. The forest has a handful of active rock pits used for aggregate road base and fill.

Methods used to meet the overall desired conditions of the program include incorporating BMPs into future leases as appropriate; considering withdrawal from locatable minerals entry and operations for congressionally designated areas; and coordinating with other Federal, and State agencies. Future projects would be designed to incorporate opportunities for environmentally sound minerals development to protect social, cultural, and ecological values and would employ best management practices, standards, guidelines, and mitigation measures to protect these resources.

The CNF is currently aware of approximately 29 mineral projects. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Eighteen of these projects are active and currently in place, while four projects are expected to occur in the foreseeable future, two are completed and five are withdrawn from consideration at the point. One project is located on the Douglas R.D. within the Dragoon EMA, four on the Santa Catalina R.D. within the Santa Catalina EMA, one on the Safford R.D. within the Galiuro EMA, eleven on the Nogales R.D. within the Santa Rita and Tumacacori EMAs, and twelve on the Sierra Vista R.D. within the Huachuca EMA.

Table 5. Mineral Projects on the Coronado National Forest.

Project Name	Status	EMA	District
Dragoon Quarry	Active	Dragoon	Douglas

Rosemont Copper Mine	Active	Santa Rita	Nogales
Imerys Quarry	Active	Santa Rita	Nogales
Blue Fire Gem Exploration	Active	Tumacacori	Nogales
Blue Fire Gem Quarry	Active	Tumacacori	Nogales
Big Nugget	Active	Santa Rita	Nogales
Greaterville AML	Active	Santa Rita	Nogales
Hermosa Exploration	Active	Huachuca	Sierra Vista
Sunnyside	Active	Huachuca	Sierra Vista
Dice 8	Active	Huachuca	Sierra Vista
CH Drill	Active	Huachuca	Sierra Vista
Patagonia Jewel	Active	Huachuca	Sierra Vista
Moore & Moore	Active	Huachuca	Sierra Vista
Harshaw Borrow Pits	Active	Huachuca	Sierra Vista
Tierny	Active	Huachuca	Sierra Vista
Oracle Ridge Mine	Active	Santa Catalina	Santa Catalina
Korn Kob	Active	Santa Catalina	Santa Catalina
Burney occupancy/trespass	Active	Santa Catalina	Santa Catalina
Imerys Quarry Drilling	Expected	Santa Rita	Nogales
Patagonia Jewel Phase 2	Expected	Huachuca	Sierra Vista
Kennecott Drilling	Expected	Galiuro	Safford
Happy Valley Quarry	Expected	Santa Catalina	Santa Catalina
Oro Grande Placer	Completed	Santa Rita	Nogales
Margarita 1	Completed	Tumacacori	Nogales
Margarita 2 Drilling	Withdrawn	Tumacacori	Nogales
Quartz Dream Placer	Withdrawn	Santa Rita	Nogales
Javelina	Withdrawn	Huachuca	Sierra Vista
White Cloud Providencia	Withdrawn	Huachuca	Sierra Vista
OZ Providencia	Withdrawn	Huachuca	Sierra Vista

Desired Conditions for Minerals Management

- Opportunities for environmentally sound minerals development are available. Important wildlife habitats and areas where appropriated funds have been expended are protected through legally appropriate methods from locatable mineral activities. Adverse surface resource impacts are minimized through the appropriate administration of mineral laws and regulations.
- All mineral exploration and mining activities are operating in environmentally sound ways through protection and mitigation measures, including adequate post-mining reclamation assurances, to minimize environmental impacts to other national forest resources. Abandoned and inactive mines disturbed by past mineral exploration and mine development have been returned to stable conditions and an appropriate, functioning, vegetative state, and do not pose health, safety, or environmental hazards.

Objectives for Minerals Management

No objective listed for this program.

Public Access

Standards and Guidelines for Public Access can be found in Appendix A.

Public access to the Coronado National Forest is provided through a system of arterial, collector, and local roads and trails, which are interconnected with public roads, highways, and trails (local, county, State, and other Federal) within, adjacent to, and adjoining the national forest. Within the Coronado National Forest boundary, there are numerous scattered private inholdings with roads

and trails often crossing these inholdings to access National Forest System lands adjacent to and adjoining them. At the national forest boundary, there are about 300 motorized access points; less than one-third of these provide permanent legal access. Most access points are located at an interface of National Forest System and non-Federal lands (State, county, private, and other ownerships). A number of trailheads located at the national forest boundary provide nonmotorized access to wilderness and National Forest System lands. Many private roads and trails that provide access to National Forest System lands across non-Federal lands (State, county, private, and other ownerships) within and adjacent to the Coronado National Forest have no legal right of public access (written and unwritten title) and may be closed without notice.

Desired Conditions for Public Access

- Permanent legal access to and within the Coronado National Forest for public and administrative users is available and easily accessible on a system of forest arterial, collector, and local roads and trails that are interconnected with public roads, highways, and trails (local, county, State, and other Federal) adjacent to, adjoining, and within the national forest.
- Legal status deficiencies of the existing system of forest roads and trails have been resolved; these roads and trails are available for use by public lands users, unless restricted for administrative purposes.

Objectives for Public Access

The objective of the program is to increase the number of permanent legal access routes to and within the Coronado National Forest by resolving the legal status deficiencies of 40 to 50 existing and proposed National Forest System roads and trails, using a variety of methods every 10 years.

Motorized Transportation System

Standards and Guidelines for Motorized Transportation System can be found in Appendix A.

The motorized transportation system available for public use is displayed on motor vehicle use maps. The motor vehicle use maps include designated roads, trails, and areas for each ecosystem management area. The designations include vehicle class, time of year of use, and any designations for motorized use associated with dispersed camping or game retrieval. Motor vehicle use maps are reviewed and updated as needed on an annual basis. The Coronado National Forest motorized transportation system also includes National Forest System roads that are only available for administrative and permitted use. This system of roads is not displayed on the motor vehicle use map.

The Coronado NF provides management of the transportation system including conducting inventories, surveys, and analyses; formulating plans; and executing reconstruction, maintenance, and obliteration operations.

The miles of road open to motorized use include roads where access may be restricted on a seasonal basis. Any road, regardless of maintenance level, may be closed during extreme weather conditions for public safety or to minimize resource damage. Motor vehicle use off of the designated system of roads, trails and areas is prohibited except as identified on the motor vehicle use map (MVUM) and as authorized by law, permits, and orders in connection with resource management and public safety. Where specifically prohibited the MVUM for all districts identifies a 300 foot buffer on each side of system roads that allows cross country travel for the purposes of camping. Methods used to meet the overall objective of the program include assessing the transportation system to create a more effective road system and to restore natural resources that have been impacted; coordinating with other partners, Federal, and State agencies.

Future projects would be designed to restore and improve watershed conditions and would employ best management practices, guidelines, and mitigation measures to protect watershed resources.

Based on projections of future climate change for the region, roads are susceptible to the altered frequency, severity, timing, and spatial extent of disturbance events (e.g., flash floods and landslides). Increased recreational use to escape summer heat could lead to additional wear and tear and heavy use of roads in some areas.

Desired Conditions for Motorized Transportation System

- The Coronado National Forest has a designated system of routes open for motor vehicle use by the public. The motorized transportation system is environmentally sustainable and meets public needs and desires under a changing climate. It provides access to National Forest System lands for public and administrative use (see "Public Access"). All roads including access roads to wilderness trailheads or wild back-country trails and routes are maintained for safe travel by trail users. Visitors are respectful and stay on designated routes: they do not create new routes or expand existing trails, they avoid sensitive habitats like wetlands and meadows, and they cross streams only at fords where the road or trail intersects the stream and redundancy is minimized. Class of vehicle is appropriate for a given road level, and user conflicts are minimal. Arterial access roads are readily identifiable and have surfaces that are suitable for passenger car use and emergency vehicles. There is adequate signing to assist travelers with finding their destination. The occurrence of gullies, washouts, or slides is minimal. Road edges are intact and safe even in excessive traffic areas. There are adequate turnouts or passing areas and adequate sight distances available.

    - High-clearance roads and motorized trails are available for exploring the forest in off-highway vehicles (OHVs) in a responsible and respectful manner. Users do not cause unacceptable resource damage or create unauthorized routes. Roads are suitable for low traffic volume and low speed. Road surfaces are primarily rough or primitive, but most are available for use by the more experienced traveler with a high ground-clearance vehicle. These roads provide opportunities in appropriate places for safe, responsible motorized recreation and provide varying back-country touring experiences for a variety of vehicle classes. Long distance loop routes provide opportunities for extended day trips with varying levels of challenge. Where appropriate, motorized trails provide a distinct back-country touring experience for motorcycles, all-terrain vehicles, and utility-terrain vehicles and minimize conflicts with other visitors.

    - The existing road system provides adequate access for resource management activities, sufficient legal public access to the Coronado and its amenities such as campgrounds and trailheads, and access for homeland security purposes near the international border. Trailhead parking adequately accommodates vehicles and trucks pulling trailers, where appropriate.

    - There is an ongoing road maintenance program to prevent damage to resources from roads and to support safe travel by the public in a variety of vehicle types. Unneeded roads, as identified through the transportation analysis planning process, are closed and rehabilitated to reduce human disturbance to wildlife and to reduce soil erosion.

Objectives for Motorized Transportation System

The objectives of the program area are:

- MTS-O-1 - Complete maintenance on at least 150 miles of high-clearance (maintenance level 2) roads annually.

- MTS-O-2 - Complete maintenance on at least 200 miles of passenger car (maintenance levels 3, 4, and 5) roads annually throughout the plan period, based on a safety prioritization.
- MTS-O-3 - Decommission, close, and restore 3 to 10 miles of unneeded nonsystem roads annually throughout the plan period, except for roads identified for potential public access routes.
- MTS-O-4 - Install at least one hardened road surface each year at drainage crossings where erosion, sedimentation, or risks to water quality from road-stream crossings are affecting wildlife habitat in order to prevent downstream effects.
- MTS-O-5 - Realign or remove 2 miles of roads in wetlands or meadows within 10 years of plan implementation.

Recreation Management

Standards and Guidelines for Recreation Management can be found in Appendix A.

The Coronado National Forest offers a rich variety of year-round recreational opportunities in myriad settings. There are four lakes and eight wilderness areas on the Coronado National Forest. There are also over 1,100 miles of trail available, including the Arizona National Scenic Trail (ANST). The recreational opportunities that are provided within the CNF range from a very high probability of solitude, self-reliance, challenge, and risk (primitive) to very social experiences where self-reliance, challenge, and risk are relatively low (rural or urban).

The Recreation program provides a wide range of recreation settings, opportunities, and services. Program components include administration and management of resources and visitors at developed recreation sites, dispersed recreation settings, partnerships and tourism, interpretive services, recreation special use permits, congressionally designated areas, visual quality management, trail management, and scenic byways.

Based on projections of future climate change, recreation and transportation sites are susceptible to increased use for relief from increased temperatures in urban areas, and to damage from altered frequency, severity, timing, and spatial extent of disturbance events (e.g., fires, droughts, flash floods, landslides, and windstorms). Winter activities, such as skiing, may be reduced due to a reduction in snowpack under higher temperatures.

Desired Conditions for Recreation Management

- The diverse landscapes of the Coronado National Forest offer a variety of settings for a broad range of recreational opportunities and a place for visitors to escape from busy urban life into quiet, natural, wild places. Landscapes range from primitive settings that provide opportunities for solitude to more developed, rustic settings that provide opportunities for social interaction and greater human comforts. Although development and population in the region continue to grow, recreation settings on the Coronado National Forest are stable, retaining their natural character, and loss of remote, undeveloped settings does not occur. Recreation activities are balanced with the ability of the land to support them and create minimal user conflicts. The Coronado National Forest fulfills a unique and vital role as a place of learning and caring about the environment.
- Growing demand for recreation is accommodated within the capacity of the land to support it, and areas that can accommodate additional use, such as at Peña Blanca Lake, are fully utilized. Recreation on the Coronado National Forest enhances the quality of life for residents and provides tourist destinations, which contribute to local economies. Interpretation and visitor education programs help visitors understand how to reduce their impacts on ecosystems, and visitors actively help support the Coronado National Forest's efforts to

protect natural resources and wilderness values. Low impact recreation principles are promoted and widely practiced by the visiting public.

- Developed recreation facilities such as campgrounds and picnic areas provide a range of visitor needs; most areas have simple facilities like picnic tables and vault toilets, while some offer additional amenities such as paved roads, flush toilets, and RV hookups. Recreation facilities are clean, in good repair, and provide a safe setting for visitors. Most meet accessibility guidelines. Visitor centers are open to the public on busy days and provide places where visitors can find information and learn about natural and cultural resources on the Coronado National Forest. Heritage sites provide unique opportunities for visitors to connect with the past. Interpretive features help people learn about the special places they visit. Facilities and infrastructure are maintained and replaced as needed. Developed sites blend with the natural setting, and uses in these places do not cause damage to ecologically sensitive areas. Potable water is provided in high use areas.
  Special use permits augment the variety of suitable outdoor recreation experiences on the Coronado National Forest. Permitted facilities blend well into the natural landscape. Dispersed recreation activities on the Coronado National Forest include scenic driving, hiking, bird watching, rock climbing, horseback riding, mountain biking, camping, and hunting, among others. Visitors use off-highway vehicles responsibly, staying on designated routes and in identified camping areas. Forestwide dispersed recreation sites are small and clean, and resource damage is minimal. Activities such as paintballing, geocaching, and rock climbing do not detract from the natural character of the forest; do not impact resources such as aesthetics, soils, vegetation, and wildlife; or contribute to user conflicts.
- Opportunities exist in appropriate places for motorized recreation where designated, with varying experiences for a variety of vehicle classes. Forest visitors can enjoy semiprimitive motorized recreation and explore the backcountry in off-highway vehicles along designated routes. Noise from motorized vehicles is infrequent in locations away from areas of higher road density. In other areas, the presence and impact of people and machines is unobtrusive. These areas offer non-motorized recreation opportunities in a variety of settings that provide differing levels of challenge and seclusion, while limited primitive or high-clearance roads allow for motorized access.
- Places such as Redington Pass that receive heavy dispersed recreation use and are within easy driving distance of urban areas provide opportunities for safe, well-managed recreation. Visitors to these areas can enjoy the outdoors in clean, natural settings without conflicts with unsafe or illegal activities, or exposure to excessive noise and disturbance.
- A system of well-marked and well-maintained non-motorized trails provides opportunities for visitors to explore the Coronado's wilderness areas and other unroaded places. Wilderness and other settings where visitors can experience quiet and solitude are well dispersed throughout the forest and easily accessed. Roads to trailheads are open and maintained, and trailheads provide adequate parking and vehicle turnaround space. Damage to resources from trailheads and trails is minimal. Historic trails are preserved and reestablished where appropriate and feasible. Unauthorized user-created ("wildcat") trails are rare.
- Visitors enjoy the beautiful scenery, while understanding that fire and vegetation management projects are necessary for the health of vegetation communities within the forest landscape. Recreation sites and settings along the international border with Mexico are clean and border security infrastructure blends well with the landscape. Visitors understand the risks associated with illegal border activity and are informed about appropriate safety precautions.

Objectives for Recreation Management

The objectives of this program are:

- REC-O-1 - Reduce the backlog of recreation deferred maintenance in developed sites by 20 percent within 5 years of plan approval.

- REC-O-2 - Retrofit or install wildlife-resistant trash cans at all developed recreation areas and wildlife-resistant food storage boxes at all developed campgrounds within 10 years of plan approval.

Scenery Management

Standards and Guidelines for Scenery Management can be found in Appendix A.

The Coronado National Forest sky islands are unique among the lands in southeastern Arizona. The mountains provide a spectacular backdrop for residents living in desert cities, and visitors travel into the Coronado to enjoy the natural beauty of these special places year-round.

The Coronado NF scenic management program is responsible for activities such as desired landscape character. Scenic integrity objectives (SIOs) are defined by degrees or levels of alteration from the desired landscape character and the intent to achieve the highest possible scenic integrity. Some areas of the forest may require restoration in order to move toward the conditions described in the desired landscape character. The effects of future projects would contribute to the scenic integrity of the desired landscape character. Scenic integrity would be addressed on a site specific basis and mitigated individually following scenic integrity objectives (SIOs) and Forest Service policy.

Vegetation treatments contribute to the scenic integrity of the desired landscape character. Long term soil and plant productivity, proper functioning ecosystems, and clean water are considered important components of scenic quality

Based on projections of future climate change, scenic landscapes are susceptible to increased use for relief from increased temperatures in urban areas and to damage from altered frequency, severity, timing, and spatial extent of disturbance events (e.g., fires, droughts, flash floods, landslides, and windstorms).

Desired Conditions for Scenery Management

- Scenic resources on the Coronado National Forest are in excellent condition and are sustainable and resilient to short-term disturbances and climate change. Visitors enjoy vast open spaces and a variety of natural landscapes, including deeply carved desert canyons, riparian corridors with towering sycamores and cottonwoods, rolling native grasslands, oak woodlands, and mountaintop conifer forests. The Coronado's sky islands provide a visual backdrop to cities and roads in the surrounding deserts.
- Structures and facilities required for serving public use of scenic and recreation resources include roads, campgrounds, trails, visitor centers, and observation points. To be functional, these facilities are normally visible in immediate foregrounds, but they harmonize with the natural setting. Widely scattered, minor deviations in the landscape character are occasionally seen, such as distribution and telephone lines and range improvement facilities. In the rare instances where visitors see larger utilitarian structures (such as communications towers, transmission lines, astrophysical facilities, and administrative sites), these elements blend into the landscape well because their design and siting follows the line, form, color, texture, and pattern common in the desired landscape character. Mines and quarries are rarely seen, and mined areas have been reclaimed and naturalized.
- Most landscapes on the Coronado National Forest feature a mosaic of plant species, structures, ages, and densities. Vegetation communities reflect the desired conditions for the associated vegetation type. Mature vegetation and large trees are well distributed on the landscape. Disturbances, including insect and disease outbreaks and wildfire, occur within their natural scale and do not diminish large viewsheds or major portions of any ecosystem

management area. Long term soil and plant productivity, proper functioning ecosystems, and clean water are considered important components of scenic quality. Scenic quality is affected for short periods of time by vegetation management projects that benefit long term ecosystem health. Management activities such as vegetation treatments and prescribed fire appear as part of the natural landscape over time and management created debris, such as slash along concern level 1 and 2 travelways, are located and arranged to minimize their visual disturbance in the immediate foreground (up to 300 feet, unless visibility modeling shows that it is less). Treatment boundaries are naturally shaped and blend with existing vegetation patterns and landscape character and encourage vegetation that screens unsightly elements (such as administrative buildings, communication sites, and mines) from sensitive viewing areas such as campgrounds and trails.

- Along scenic byways and other popular travel routes, visitors find occasional developed recreation sites that provide desired amenities (restrooms, picnic tables, and so forth), but these facilities are in character with the National Forest System setting. Occasionally, visitors see unique historic sites; these areas are positive scenic elements, providing a glimpse of times past. Private cabins appear rustic and blend with the landscape. New facilities are rare, and they blend well into the landscape. Landscapes away from roads provide opportunities for dispersed recreation, solitude, and spending time in pristine wildlands with minimal evidence of human activity.

Objectives for Scenery Management

No objective is listed for this program area.

Special Uses

Standards and Guidelines for Special Uses can be found in Appendix A.

The Coronado National Forest administers over 620 special use authorizations. These uses include such activities as outfitting and guiding, research, various types of utility lines, communications sites, road permits and easements, and recreation residences. Also included are permits for campground, marina, and store facilities; filming; and numerous recreation events. The Coronado National Forest also supports, through the permitting process, military, local law enforcement, and Department of Homeland Security activities.

Desired Conditions for Special Uses

Special use activities on National Forest System lands provide needed services to communities that cannot be reasonably accommodated on non-Federal lands. These activities supplement and complement services that the Coronado National Forest provides. Environmental, social, and visual impacts are minimized; the permit area and duration are the minimum necessary to accommodate the use.

Objectives for Special Uses

There are no objectives for this program area.

Cultural Resources

Standards and Guidelines for Cultural Resources can be found in Appendix A.

Coronado National Forest heritage resources provide the public with opportunities to gain a broader understanding of the 12,000-year history of human habitation in southeastern Arizona. Cultural resources help people connect with the past, not only to enhance their sense of time and place, but also to illuminate aspects of Arizona history that are relevant to modern life and land

use decisions. The unique geographical configuration of the Coronado National Forest, with its relatively small isolated mountain ranges, has strongly influenced the patterns of human use throughout the region. Major occupation sites by Native American peoples are concentrated in the lower elevations of the ranges in adjacent valleys, while the mountainous portions of the ranges are the focus of more limited activities such as resource gathering. The Coronado National Forest also has a rich historic period record of mining, ranching, and Forest Service administration.

Desired Conditions for Cultural Resources

- Cultural resources on the Coronado National Forest, including known Native American sacred sites and traditional cultural properties, are preserved, protected, and/or restored for their cultural and scientific importance. Efforts are made to avoid adverse effects to historic properties, and to develop appropriate mitigation measures in cases where adverse effects cannot be avoided. Landscapes, sites, traditions, and stories contribute to the community's appreciation of the diverse human communities who have lived in the region and how they adapted to the cultural and physical environment. As appropriate, historically significant cultural properties are listed on the National Register of Historic Places (NRHP). The Coronado's priority cultural resource assets are protected and preserved. Archaeological, ethnographic, and historical data guide efforts to manage current ecosystems and, in some cases, restore historic ones.
- Forest facilities that are eligible for the National Register of Historic Places are available for continued use, for Forest Service administration, public recreation and interpretation, and tribal events, as appropriate. Collaborative partnerships and volunteer efforts are developed and maintained to assist the Forest Service in managing its cultural resources. Important archaeological artifacts are protected, either in place in their original contexts or in secure curation facilities. The Coronado's historic documents, including photographs, maps, journals, and program management records, are available for research and interpretation by the Forest Service, other agencies, universities, tribes, and the public.

Objectives for Cultural Resources

The objectives for this program area are:

- HER-O-1 - Complete 200 acres of non-project inventory each year, so that the Coronado's currently unidentified cultural resources can be recorded, evaluated, and protected.
- HER-O-2 - Nominate at least five individual sites or at least two districts to the National Register of Historic Places within 10 years of plan approval.
- HER-O-3 - Conduct stabilization or preservation activities at one or more priority heritage assets21 each year.
- HER-O-4 - Within 5 years of plan approval, complete Native American Graves Protection and Repatriation Act (NAGPRA) repatriations of all items collected prior to 1990.
- HER-O-5 - Host, sponsor, or participate in at least two interpretive events for the public every year.
- HER-O-6 - Provide opportunities for volunteers to participate in heritage resource conservation activities at two to five archaeological sites or historic properties every year.
- HER-O-7 - Within 10 years of plan approval, enter at least two historic sites in the Arizona "Rooms with a View" cabin rental program.
- HER-O-8 - Inspect each priority heritage asset at least once every 5 years.

Tribal Relations

Standards and Guidelines for Tribal Relations can be found in Appendix A.

Federally recognized American Indian tribes are sovereign nations; therefore, the Forest Service strives to establish and maintain government-to-government relationships with each tribe. The Forest Service has Federal trust responsibilities to American Indian tribes. In meeting these responsibilities, Coronado National Forest managers consult with tribes when proposed policies or management actions may affect their interests. The Forest Service recognizes that tribes have cultural ties and knowledge about the lands currently managed by Coronado National Forest staff. Many tribal members regularly visit these lands to gather traditional resources and to visit traditional cultural properties and sacred sites. Therefore, tribes share an interest in protecting important natural and cultural resources.

Tribes with cultural ties to the land now administered by the Coronado National Forest include the Ak-Chin Indian Community, Fort Sill Apache Tribe, Gila River Indian Community, Hopi Tribe, Mescalero Apache Tribe, Pascua Yaqui, Pueblo of Zuni, Salt River Pima-Maricopa Indian Community, San Carlos Apache Tribe, Tohono O'odham Nation, White Mountain Apache Tribe, and Yavapai-Apache Nation. All tribes with traditional connections to lands that are now part of the Coronado National Forest are recognized as having roles in the stewardship of the land. Under a changing climate, some forest products for traditional tribal uses may be vulnerable to more frequent or extreme disturbance events, including wildfires, droughts, flash floods, landslides, and windstorms.

Desired Conditions for Tribal Relations

- Traditional lands on the Coronado provide a setting for education in culture, history, and land stewardship. Interpretive and educational exhibits, events, and other media that focus on the history of the lands now managed by the Coronado National Forest provide the public with a greater understanding and appreciation of native history, culture, and traditions.
- Traditional tribal uses such as the collection of medicinal plants, wild plant foods, basketry materials, and fuelwood take place on the Coronado National Forest. Tribal members have access to sacred sites for traditional ceremonies and rituals, and the integrity of sacred sites is maintained or improved whenever feasible. When available, Forest Service administrative sites can be used by tribal families and organizations through government-to-government agreements.

Objectives for Tribal Relations

No objective is listed for this program area.

Range Management

Standards and Guidelines for Range Management can be found in Appendix A.

The focus of range management on the Coronado National Forest is the production of a diverse array of tangible and intangible products. Tangible products include forage for grazing and browsing livestock and wildlife. Intangible products include natural beauty and quiet places. Livestock grazing is permitted on about 90 percent of the Coronado National Forest. Grazing use is administered through a grazing permit system on designated livestock grazing allotments.

Allotments are managed using an adaptive management strategy whereby results from long and short term monitoring are used to guide managers concerning yearly stocking rates, pasture rotations, and whether other adjustments are needed in order to meet desired conditions for rangelands. Periodic review of allotment management plans also results in decisions to exclude livestock grazing on individual allotments in response to drought, wildfire, and other factors that influence range conditions.

Based on projections of future climate change, conditions may be preferable for grassland habitat. However, suitable forage for grazing or browsing and availability of water for livestock may be reduced during extended drought periods, and increased disturbances could favor nonnative species that are unsuitable for grazing.

Desired Conditions for Range Management

- The Coronado National Forest provides forage for grazing in support of domestic livestock production as a viable, sustainable economic activity. Communities surrounding the Coronado National Forest benefit from the interactions of livestock production activities with other economic sectors, and from the social, cultural, and ecological values tied to conservation ranching.
- Domestic livestock grazing does not move the landscape away from the desired composition and structure of plant communities. Rangeland ecosystems are diverse, resilient, and functioning within a healthy, sustainable landscape in the face of a changing climate. Areas that are grazed have stable soils, functional hydrology, and biotic integrity, while supporting healthy, diverse populations of native wildlife.
- By supporting livestock production on working landscapes with an extensive, low impact land use, the Coronado National Forest contributes to preserving large areas of unfragmented open space. These open spaces sustain biological diversity and ecological processes and help to preserve the rural cultural heritage of southeastern Arizona and southwestern New Mexico.

Objectives for Range Management

No objective is listed for this program area.

Land Ownership Adjustments and Boundary Management

Standards and Guidelines for Land Ownership Adjustments and Boundary Management can be found in Appendix A.

The sky islands nature of the Coronado National Forest combined with the current complex land ownership pattern within and next to the Coronado leads to the need for an intensive and extensive land ownership adjustment and boundary management program. This program includes: land ownership adjustments (donation, purchase, land exchange, and limited sales), withdrawals, right-of-way acquisition, landline location, and boundary modifications. Landline location surveys ensure that boundary lines are accurate. All of these programs ensure that public access, watershed protection, wildlife habitat, recreation, open space, and scenic resources continue to flourish on the Coronado National Forest.

The effects of future development projects such as for utilities and transportation systems would be addressed on a site specific basis and mitigated individually following the Forest Service policy regarding special uses. Mitigations are typically accomplished by consolidation of new developments along existing routes and corridors or by construction techniques that disturb less land and improve reclamation success.

Desired Conditions for Land Ownership Adjustments and Boundary Management

- The land ownership pattern within the boundaries of the Coronado National Forest is characterized by large contiguous blocks of National Forest System land. Complex and fragmented land ownership patterns have been consolidated through collaborative land adjustments with non-Federal landowners or agencies (State, county, private, and other ownerships).
- Lands acquired are valuable for public access, watershed protection, wildlife habitat, recreation, open space, and scenic resources. Administrative complexes costly to maintain

and manage (with a backlog of deferred maintenance) or National Forest System lands encumbered by long-term land occupancy commitments and authorizations that have lost their national forest character and provide minimal benefit to the public have been disposed of through land ownership adjustments.

- Road and trail right-of-way easements have been acquired to maintain the integrity of forest resources and provide public access to National Forest System lands for all existing or proposed road or trail alignments through non-Federal lands (state, county, private, and other ownerships; refer to the "Public Access" section on page 71).
- Property lines between National Forest System and non-Federal lands (state, county, private, and other ownerships) and boundary lines of special areas, such as the National Wilderness Preservation System, are easily identified and recognized by public land users, private landowners, and Forest Service personnel.
- Existing National Forest System unit boundaries have been modified to provide national forest status to lands acquired, or lands to be acquired from non-Federal (state, county, private, and other ownerships) landowners, located outside unit boundaries, to provide logical exterior unit boundaries, and facilitate current and future management and administration of the Coronado National Forest.
- An interconnected network of undeveloped open space within and adjacent to the national forest provides opportunities for legal public access and corridors for wildlife movement and supports healthy ecosystems.

Objectives for Land Ownership Adjustments and Boundary Management

No objectives are listed for this program area.

Species Evaluations

Some species may have similar but somewhat different life functions and habitat needs. Plan components however are generally not definitive enough to differentiate among the finer requirements of these species. Therefore, these species may be grouped and analyzed together. Additionally, there are many plan components that address the needs of the broad range of prey for these species, so some key plan components for prey are also included. Habitat effects are often relative to prey species as well as the species being analyzed.

While plan components are typically the focal points in analyses, there are effects not mitigated by any of those components. There are however beneficial effects from conservation efforts, within recovery plans and conservation agreements, that may be used in lieu of a plan component. Under some program area sections below there are no species-relevant plan components. Forest-wide plan components from other program areas, such as ARP-G-1, can be used to mitigate some of the expected adverse effects.

Potential adverse effects from program areas will be analyzed based on whether or not plan components exist that will mitigate/ameliorate/eliminate those adverse effects.

Mammals

Jaguar_____ (*Panthera onca*)

Endangered Species Act Status: Endangered

Recovery Outline:	2012
District Occurrence:	Douglas, Nogales, and Sierra Vista
Critical Habitat:	Yes
Determination of Effects:	May affect, likely to adversely affect
Determination of Critical habitat:	May affect, likely to adversely affect

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Jaguar.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in four documents: the Final Rule listing the Jaguar as an endangered species (USFWS 1997); in the Recovery Plan (USFWS 2012); the 5-Year Review (USFWS 2006), and the final designation of critical habitat for the Jaguar (USFWS 2014).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the Jaguar in Forest Service Region 3. All of these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

Currently individual jaguars occasionally occur in the southwestern U.S. and are from established populations in Mexico. The most northern recently documented breeding population of jaguars is now known to be centered in (but not restricted to) east-central Sonora, about 130 miles south of the U.S.-Mexico border. The Arizona and New Mexico jaguars reported from 1996 through 2009 almost certainly belong to the northernmost population known in Mexico. Recent U.S. jaguar sightings (post 1963) have been of males, suggesting possible dispersal of individuals originating in northern Mexico. Based on finding jaguars in their study area "frequently, continuously, and year-round", researchers asserted that adult jaguars might be resident (in very low numbers) in the Arizona-New Mexico borderlands shared with Mexico. Recent sightings of jaguar have been in the Peloncillo Mountains of southwestern New Mexico near the Arizona border, in the Baboquivari Mountains west of the CNF, and in the Animas Mountains of southwestern New Mexico. Prior to these sightings, the last confirmed report of a jaguar in Arizona was in 1986 when one was killed in the Dos Cabeza Mountains. On February 18, 2009, the AGFD captured and radio-collared a jaguar southwest of Tucson at approximately 4000 feet elevation, in a transition between desert grassland and oak woodland. Previous camera-trap photographs had confirmed the jaguar's presence in the Arizona borderlands from August 31, 1996, through January 21, 2009.

Threats

In the past, the primary threat to jaguars in the U.S. was from shooting and possibly the reduction in understory vegetation density in riparian areas. In Arizona, the decline of the species was concurrent with the predator control associated with land settlement and development of the livestock industry. To date, shooting still remains a threat to jaguars. At least 64 jaguars have been killed in Arizona since 1900, one as recently as 1986.

Other impacts include clearing of preferred habitat, alteration and destruction of riparian areas, habitat fragmentation or blocking of corridors that jaguars may use to move between Mexico and the U.S., and any trapping or animal control activities that target jaguars or other large predators.

Conservation

In March of 1997, 17 County, State and Federal agencies entered into a Memorandum of Understanding (MOU) which contained a conservation assessment and strategy for the jaguar. The Southwestern Region of the USFS was one of the signatories. In accordance with the 1997 Conservation Assessment/Strategy and MOU, the voluntary, collaborative borderlands jaguar conservation effort is planned and carried out through a Jaguar Conservation Team (JAGCT) convened by AGFD and NMDGF. In 2006-2007, AGFD and NMDGF discussed JAGCT progress and future needs with cooperating agencies and stakeholders with the process culminating in a re-assessment of the status of jaguar conservation in the borderlands, a new MOU between AGFD and NMDGF for jaguar conservation, and a Jaguar Conservation Framework, which (per the MOU) will guide the borderlands jaguar conservation effort from 2007 through 2011. The three documents are known collectively as the Arizona-New Mexico Jaguar Conservation Agreement.

Several sub-committees were formed within the JAGCT to address various jaguar conservation issues. JAGCT activities include: compiling scientific literature and occurrence information; developing protocols for jaguar sighting-verification, handling, capture, and verification of prey killed; creating an education curriculum; monitoring jaguar presence (primarily through the Borderlands Jaguar Detection Project); and developing procedures for the Malpai Borderlands Group (MBG) to use in voluntarily compensating livestock owners for documented losses to depredating jaguars. One depredation has been documented as of February 2009; MBG compensated the livestock owner.

By 2009, JAGCT monitoring efforts confirmed occurrence of four different adult male jaguars (possibly as many as six) since 1996 in the borderlands of southern Arizona and southwestern New Mexico. No females or sub-adult males were documented during that period. The last documented female jaguar occurrence in Arizona was in 1963. No records exist for occurrence of any female jaguars in New Mexico. The monitoring data are not sufficient to determine if jaguars are continuously present in the U.S. The Arizona-New Mexico Jaguar Conservation Agreement focused conservation efforts in a priority geographic area that includes all or parts of Santa Cruz, Pima, Pinal, Graham, Greenlee, and Cochise counties in Arizona and all or parts of Catron, Sierra, Luna, Grant, and Hidalgo counties in New Mexico. The CNF participates in the remote camera census program for jaguar detection along the international border with Mexico. The jaguar is known to occur in the Peloncillo and Tumacacori Mountains with at least one individual repeatedly documented.

Critical habitat was designated for the jaguar in early 2014. Habitat in Arizona and New Mexico is considered to be marginal for the jaguar due to the low availability of food, water, and prey species when compared to occupied areas in Central and South America. However, research has documented jaguar use of Sonoran desert scrub, Sonoran lowland desert, mesquite grasslands, Madrean oak woodlands, pine-oak woodlands, and Madrean evergreen woodlands (USFWS 2014).
A bi-national Jaguar Recovery Team was assembled, and the USFWS worked with the Conservation Breeding Specialist Group of the Species Survival Commission/International Union for the Conservation of Nature to conduct a population viability analysis (PVA) and a population and habitat viability assessment (PHVA) for the jaguar. These analyses assisted in determining factors that limit the viability of the northern jaguar and helped define the demographics and

numbers of jaguars needed for a sustainable population in northern Mexico and the southwestern U.S. (USFWS 2014).

Ocelot_____(*Leopardus pardalis*)

Endangered Species Act Status:	Endangered
Recovery Plan:	2010 (Draft)
District Occurrence:	Potential on all
Critical Habitat:	None
Determination of Effects:	May affect, likely to adversely affect

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Ocelot.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in two documents: the Final Rule listing the Ocelot as an endangered species (USFWS 1982); and in the Draft Recovery Plan (USFWS 2010).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the Ocelot in Forest Service Region 3. All of these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

The ocelot is listed as endangered throughout its range in the western hemisphere where it is distributed from southern Texas and southern Arizona through Central and South America into northern Argentina and Uruguay. There are two subspecies of the ocelot in the U.S.; *L. p. albescens* and *L. p. sonoriensis*. The subspecies *L.p.sonoriensis* occurs in the action area. The ocelot is protected from hunting and live collection in Arizona where it is listed on the AGFD list of *Species of Greatest Conservation Need* in Arizona's CWCS: 2005-2015 (http://www.azgfd.gov/w_c/cwcs_downloads.shtml)."

Southern Arizona represents the northernmost distribution of the species and recent documentation of the ocelot in Arizona is sparse. In recent years the ocelot has been documented in two counties (Cochise and Gila), but the range also includes Pima and Santa Cruz Counties. Researchers have observed that the ocelot may be repeating the northward expansion of the javelina, coati-mundi, and other neo-tropical invaders into the San Pedro River Valley, Arizona. Although there is no evidence of an historic breeding population in the Arizona, it is clear that the subspecies *(L.p. sonoriensis*) occurs in the state at least as dispersing individuals. In February, 2011 an ocelot was observed in the Huachuca Mountains, another in the Whetstone Mountains (date unknown) and in November 2009, an ocelot (*L. p. sonoriensis*) was documented in Arizona (in Cochise County) with the use of camera traps (Sky Island Alliance 2010, unpublished data). Additionally, in April 2010, an ocelot was found dead on a road near Globe, Arizona. Prior to these findings, the last known ocelot in Arizona was from the Huachuca Mountains in 1964. In addition to the recent Arizona sightings, a number of ocelots have been documented just south of the U.S. border in Sonora, Mexico. The original recovery plan (USFWS 1990) did not include

recommendations or contingency plans in the event that the ocelot reoccupied southeastern Arizona.

The draft revised Recovery Plan for the ocelot focuses on two cross-border management units, the Texas/Tamaulipas Management Unit (TTMU) and the Arizona/Sonora Management Unit which includes the CNF. Little is known about ocelot habitat use in Arizona and Sonora; however, researchers found that 27 of the 36 records (75 percent) of ocelots in Sonora were associated with tropical or subtropical habitat, namely subtropical thorn scrub, tropical deciduous forest, and tropical thornscrub. Only males (11.1 percent of the total records) were recorded in temperate oak and pine-oak woodland. The species most often occurs in dense brushy thickets and in riparian bottomland; also preferring rocky areas.

Threats

Habitat conversion, fragmentation, and loss, comprise the primary threats to the ocelot today. In Texas, over 95 percent of the dense thornscrub habitat in the Lower Rio Grande Valley has been converted to agriculture, rangelands, or urban land uses. Small population sizes in Texas and isolation from conspecifics in Mexico endanger the ocelot in Texas with genetic impoverishment and increased susceptibility to stochastic (random) events. Connectivity among ocelot populations or colonization of new habitats is hindered by the proliferation of highways and increased road mortality among dispersing ocelots. Issues associated with developing and patrolling the boundary between the U.S. and Mexico further exacerbate the isolation of Texas ocelots from those in Mexico.

While the draft revised ocelot recovery plan considers the ocelot throughout its range, its major focus is on two cross-border management units, the Texas/Tamaulipas Management Unit and the ASMU. The draft ocelot recovery plan includes scientific information about the species and provides objectives and actions needed for recovery and to ultimately remove it from the list of threatened and endangered species. Recovery actions include: assessment, protection, reconnection, and restoration of sufficient habitat to support viable populations of the ocelot in the borderlands of the U.S. and Mexico; reduction of effects of human population growth and development to ocelot survival and mortality; maintenance or improvement of genetic fitness, demographic conditions, and health of the ocelot; assurance of long-term viability of ocelot conservation through partnerships, the development and application of incentives for landowners, application of existing regulations, and public education and outreach; use of adaptive management, in which recovery is monitored and recovery tasks are revised by the Service in coordination with the Ocelot Recovery Team as new information becomes available; and Support of international efforts to ascertain the status of and conserve the ocelot south of Tamaulipas and Sonora.

In the past, the primary threat to ocelots in the U.S. was from shooting and possibly the reduction in understory vegetation density in riparian areas. In Arizona, the decline of the species was linked to predator control and fur trapping, as well as habitat fragmentation and loss associated with land development. To date, both impacts remain threats to ocelots, though fur trapping and shooting have declined as protections for this species increase. Other impacts include roads, border issues, low genetic diversity, herbicides/pesticides, and climate change. All of these impacts have the potential to adversely affect ocelots and their habitats.

Conservation

Overall, the S&Gs in the CNF LRMP provide for the long-term conservation and recovery of the ocelot by mitigating some of the potential adverse impacts from the various programs areas.

Positive aspects of the CNF LRMP include a focus on restoration ecology, restrictions on vehicle uses, and an excellent road density standard. This is accomplished by a maximum of one mile/mile², a focus on habitat improvement for threatened and endangered species, interagency coordination requirements, a focus on strategic mineral withdrawals by mining closures and reclamation, and habitat enhancements that would benefit ocelot prey.

Mexican gray wolf_____(*Canis lupis baileyi*)

Endangered Species Act Status:	Endangered/Extirpated
Recovery Plan:	1982, update pending
District Occurrence:	Douglas
Critical Habitat:	None
Determination of Effects:	Not likely to jeopardize in 10(j) area

The Mexican gray wolf is a subspecies of gray wolf. It is locally known, and herein referred to, as the Mexican wolf.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS Mexican wolf website at http://www.fws.gov/southwest/es/mexicanwolf.htm (accessed 2014). A detailed account of the taxonomy, biology, and reproductive characteristics of the Mexican wolf is found in the Mexican Wolf Conservation Assessment (USFWS 2010), as well as the Mexican Wolf Recovery Plan (USFWS 1982). Current proposals regarding the Mexican wolf and its management are available at the above cited webpage.

Status, Threats, and Conservation of the Species

Status

Historically, this subspecies was wide-spread then it was exterminated from essentially all of the range through trapping, poisoning, shooting, and reduction of prey resources. Habitat within the historical range has greatly decreased as a result of human encroachment. In the reintroduced population in Arizona-New Mexico, up to several individuals die each year as a result of illegal shooting, and 0-2 are killed each year by collisions with vehicles (USFWS 2013).

According to the Revision to the Regulations for the Non-essesenital Experimental Population Area of the Mexican Wolf (MWEPA) (USFWS 2015). The EMAs located in Douglas R.D., Nogales R.D., Sierra Vista lie within Zone 2 of the MWEPA where both primary and secondary translocations could occur over the course of this plan.

Threats

Human caused mortalities continue to be the primary cause of death for released Mexican gray wolves. In the Blue Range Wolf Recovery Area illegal shooting is the single greatest source of wolf mortality in the reintroduced population. Between 1998 and June 1, 2009, 31 of 68 deaths were due to illegal shooting of wild wolves. In several years, illegal shooting resulted in Blue Range Wolf Recovery Area population declines of close to or exceeding 10 percent. Threats related to the destruction, modification, or curtailment of habitat, disease, and predation are not

currently considered significant threats to the Mexican wolf reintroduced population (USFWS 2010a).

Conservation

Reintroduced population in Arizona-New Mexico has been increasing in recent years (USFWS 2013). Current FWS plans include the potential for the expansion of the recovery area for the experimental population in Arizona, though this proposal is still being subject to a public comment period.

Effects Analysis for the Jaguar, Ocelot, and Mexican Gray Wolf

The jaguar, ocelot, and Mexican wolf have similar but somewhat different life functions and habitat needs. Plan components are generally not definitive enough to differentiate among the finite requirements of these three species. Therefore, these species are analyzed together and effects by plan component below apply to these species unless otherwise noted. Additionally, there are many plan components that address the needs of the broad range of prey, so just some key plan components for prey are included.

Wildland-Urban Interface and Landscape-scale Fire

The Wildland-Urban Interface and Landscape-scale Fire represents all vegetation communities on the CNF within those areas of human populations and developments at imminent risk from wildfire. Treatment of these areas includes thinning, removal of fuels from the landscape, or altering the fuel profile to reduce the potential for loss of property. The treatment of WUI allows the Forest the flexibility to manage landscape-scale wildland fire for resource benefit.

Landscape-scale wildland fire is one of the methods for ecosystem restoration. The goal of this program is to enhance resiliency of all vegetation communities on the CNF by maintaining more sustainable fuel loads, improved habitat diversity, and watershed integrity.

From 2003 to present, the CNF has had a moderate to large prescribed fire program. The Forest has burned about 128,624 acres, which is one of the highest totals in the Region over that time period. Several plan objectives could lead to actions that could affect all of these species: WUI-O-1, VDC-O-1, VIC-O-1, VME-O-1, VPO-O-1, and RIA-O-1. Where the three carnivores are present, direct impacts could include burn-over and smoke effects. Treatments could also lead to indirect impacts, such as short-term reductions in cover, a long-term increase in prey base due to improved plant vigor, and temporary reductions in water quality. The guideline VME-G-1 ensures that areas of breeding, feeding, and shelter habitat be left during restoration projects.

Biophysical Features

Plan components that address the impacts to the habitat are BIP-S-1. BIP-S-1 would ensure that no jaguar, ocelot or Mexican wolf is present in cave or mine feature when closing it. The guidelines BIP-G-2, BIP-G-3, and BIP-G-4 would protect natural cave features utilized by jaguars, ocelots, or Mexican wolves for reproduction and rearing purposes.

Water Resources – Natural

Plan components that address the impacts to the habitat are: NWS-G-2, NWS-G-3, and NWS-G-4. These guidelines protect the habitat around natural water sources thereby providing prey habitat.

Water Resources – Constructed

Plan components that address the impacts to the habitat are: COW-O-1 and COW-G-1. These objectives would benefit wildlife using constructed water sources by providing escape ramps and by providing year-round water and habitat.

Soil Management

This program area has direction to stabilize soil which would help improve prey habitat and potentially prey population numbers for all three species. The plan component that addresses the impacts to the habitat is SOI-O-1, which calls for enhancement or restoration of 2,500 to 15,000 acres of uplands to attain necessary ground cover. By requiring that vegetation treatments enhance or restore soil condition indicators, this objective would help maintain prey species' foraging needs.

Animal and Rare Plants

Guideline ARP-G-1 calls for the implementation of the recovery plans associated with federally-listed species, including the plans for these 3 carnivores. Additional plan components that address the impacts to the habitat are: CHI-S-2A. This standard ensures that any collection of any species would require a special-use permit within these special areas, in addition to federal permit requirements, these permits are reviewed thereby adding some protection to the species. By requiring that native vegetation be planted as needed, the guideline (VLS-G-2) would help maintain prey species habitat needs for forage. Also the guideline (VLS-G-1) ensures that travel corridors would be created to facilitate movement of jaguars, wolves, and ocelots. RIA-O-1, RIA-G-1, and RIA-G-2 aid in protecting the sustainability of riparian areas and minimizing damage to these areas by cattle and vehicular traffic, which will benefit all three species as well.

Forest Products

The sale of forest products are often associated with thinning and fuels reduction projects or silvicultural treatments. Projects such as these can result in impacts to upland and aquatic habitat. The guidelines RIA-G-3, RIA-G-4, NWS-G-1, and NWS-G-3 would favor retention of large riparian woody debris and trees and minimize input of sediment into streams thereby increasing water quality, providing habitat with cover, reducing fuel buildup and regulating stream temperatures. These plan components would help to mitigate effects of the forest products program.

Geographic area objectives recommend treatments that would help to ensure sustainability of habitat for all three species. These objectives are the following: CAT-O-1, CHI-O-1, DRA-O-1, GAL-O-1, HUA-O-1, PEL-O-1, PIN-O-1, RIA-O-1, RIT-O-1, TER-O-1, TUM-O-1, WHE-O-1, and WIN-O-1. Additionally, the standards CAT-S-1b, CHI-S-1a, CHI-S-1b, HUA-S-1b, PIN-S-1b, and TUM-S-2b would ensure that vegetation manipulation would not be permitted within special-designation areas. Not treating within these areas would provide assurance of remaining cover for jaguars, ocelots, Mexican wolves, and their prey species.

Minerals Management

This program area has the potential through land or facility development or activities to impact the jaguar, ocelot, wolf, and their prey, often through disturbance and loss/fragmentation of habitat. Effects to jaguar, ocelot, or wolf from the activities of this program are similar to the effects of roads. Access roads and the accompanying vehicle traffic and use of heavy equipment are often associated with mineral activities. In addition, surface occupancy causes direct habitat loss and the addition of human occupation increases the chances for harassment and lethal

encounters. A plan component that addresses the impacts to the habitat is MIN-S-2; this standard calls for planting native species, which could provide forage and cover for prey species.

The CNF is currently aware of approximately 29 mineral projects. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Eighteen of these projects are active and currently in place, while four projects are expected to occur in the foreseeable future, two are completed and five are withdrawn from consideration at the point. One project is located on the Douglas R.D. within the Dragoon EMA, four on the Santa Catalina R.D. within the Santa Catalina EMA, one on the Safford R.D. within the Galiuro EMA, eleven on the Nogales R.D. within the Santa Rita and Tumacacori EMAs, and twelve on the Sierra Vista R.D. within the Huachuca EMA.

There is a potential for mining operations to be excavated to a depth greater than that of the regional aquifer and water would drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body would continue to remove water from storage in the regional aquifer.

Motorized Transportation System

Impacts of roads on large carnivores include direct mortality from vehicle collisions, avenues for illegal shooting, direct habitat loss and/or fragmentation and harassment. Areas where the ocelot has occurred on the Forest have low road densities and include portions of areas currently being considered for Wilderness status. Currently the CNF has 0.99 mile/mile^2 of USFS roads. This low road density standard is well within densities generally recommended for carnivore conservation. RIA-O-1 encourages the avoidance of road-building within riparian areas, which should provide some benefit to these species and their prey.

Recreation Management

Effects to these species resulting from recreational activities includes: harassment; avoidance of areas heavily-occupied by humans; habituation to human presence; displacement from formerly-occupied areas; habitat modification or loss; and a potential for illegal shooting. In 2010, an estimated 2.4 million people visited the CNF. The standard CHI-S-1c prohibits camping within the Pole Bridge Research Natural Area and its proposed extension, thereby creating less human disturbance in these special areas. Guideline ARP-G-4 would provide for reduction of possible wildlife/ human interactions in developed recreation areas. Finally, DRA-G-1 creates less human disturbance by limiting dispersed camping areas.

Range Management

This program area has the potential to affect the jaguar, ocelot, and wolf in a variety of ways through impacts to prey habitat and availability (e.g., livestock grazing and trampling), disturbance to life cycles (e.g., denning), and practices and management that can lead to depredation of cattle, resulting in the need for removal of the wolf.

The Southwestern Region is using an adaptive management model to respond to dynamics such as drought and the need to adjust domestic livestock grazing based on implementation and effectiveness monitoring of grazing management practices. Monitoring determines if acceptable progress is being made towards attainment of resource management objectives and thus desired conditions. Various adaptive management adjustments may be initiated that were identified,

analyzed, and disclosed in the project-level NEPA decision for individual grazing. Most of the grazing on the CNF occurs on a yearlong basis. The number of animal unit months has steadily decreased on the CNF from 2003 to 2007, with slight increases in 2008 to 2009. Plan components that address the impacts to the habitat are: CAT-S-1a, HUA-S-1a, and TUM-S-2a. These standards ensure that no livestock grazing would occur in these special areas, which will provide cover for prey species. The guidelines RAM-G-3 provides for movement of these species, and RAM-G-4 and RIA-G-2 provide for cover for prey species.

Cumulative Effects

As defined in ESA (50 CFR §402.02), cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the federal action subject to consultation. For this consultation, the Action Area has been defined as the CNF plus adjacent lands that the proposed action may directly or indirectly affect. The time period is defined as the predicted life of this plan which is 10 years. In general, Arizona's population is expected to increase in the next 10 years. Increased urbanization results in loss of habitat or habitat suitability for federally listed species. The intensity of recreational activities is also likely to increase within the Action Area, particularly on Federal lands that are located adjacent to or within a short driving distance of the major metropolitan areas of Phoenix, Tucson, Albuquerque, and Santa Fe, such as the CNF (USFS 2011). Activities may be permitted which may affect individuals of each species. These activities could include private land commercial and residential development, recreation, mining, wildland fire, recreation, and overgrazing. These types of activities have occurred in the past and are likely to occur into the foreseeable future.

Livestock grazing on State, BLM, and private land adjacent to the project area is expected to continue. Most of the adjacent lands use similar livestock management and operations thus we expect naturally occurring water sources and developed water sources to not exclude jaguar, ocelot, or wolf use or impede their movement throughout these lands to maintain connectivity. We do not anticipate the management of adjacent lands to change in the foreseeable future.

Private land development on the CNF boundary is expected to continue to meet demands. Rates of future development are difficult to predict, but given the relatively remote location of the CNF, urban development around the CNF boundary will likely be limited to expanding cities. Tucson, Oracle, Patagonia, Sierra Vista, and Huachuca City are all expanding populations with increasing land development. We also expect minimal development in more remote locations because water is limited. Developments around the CNF will not likely be built in rugged areas but rather on the moderate to flat topography. However, because these species will disperse long-distance, and because wolves and jaguars occupy large home ranges, human development can be expected to further limit jaguar, ocelot, and/or wolf connectivity and/or result in additional human interactions.

Recreational activities such as hiking, hunting, and off-highway vehicle driving are expected to continue on the CNF over the life of the project. Most hiking on the CNF is on developed trails which are few and not highly used. Hunting for deer and javelina does occur on the CNF, typically during the spring and fall, but hunting is regulated by Arizona Game and Fish Department and New Mexico Department of Game and Fish and is restricted to relatively few hunters. Off-highway vehicle use is year-around, but levels of activity are low and confined to a few roads. Most of these activities occur during daylight hours when jaguars, ocelots, and wolves are less active and less likely to be disturbed.

Mining has been occurring on the CNF for over a century. These mines range in size of infrastructure footprint and associated interspace of 5 acres (single mine shaft) to >1,000 acres (open pit mine). Mining operations can also expand infrastructure outside the immediate mine site with the construction of roads, power-lines, pipe-lines, mine tailings, or impermeable fences. These changes can directly affect jaguar, ocelot, wolves, their prey species, and their habitat by removing vegetation cover, reducing water sources, and increasing human presence. Vehicular traffic associated with mining can also lead to direct impacts, including increased mortality rates.

Summary of Effects and Determination- Jaguar

The following rationale supports the conclusion that the proposed action will have effects on the Jaguar because:
1. Overall, implementation of the proposed action is positive for the long-term conservation and recovery of the jaguar;
2. The CNF has low total miles and a low road density standard, which is very positive for carnivores such as the jaguar;
3. The CNF restricts cross country travel;
4. The CNF has the most land of any NF in the Region withdrawn from mineral entry; and,
5. The jaguar only rarely occurs as dispersing individuals and the species is not known to breed on the forest.
6. Mineral extraction operations may occur during the planning period, some are anticipated in the Santa Rita and Patagonia EMAs which may adversely impact the jaguar and its habitat.
Therefore, the implementation of the CNF LRMP **May Affect**, and is **Likely to Adversely Affect** the jaguar.

Summary of Effects and Determination-Ocelot

The following rationale supports the conclusion that the proposed action will have effects on the ocelot because:
1. Overall, implementation of the proposed action is positive for the long-term conservation and recovery of the ocelot;
2. The CNF has low total miles and a low road density standard, which is very positive for carnivores such as the ocelot;
3. The CNF restricts cross country travel;
4. The CNF has the most land of any NF in the Region withdrawn from mineral entry; and,
5. The ocelot only rarely occurs as dispersing individuals and the species is not known to breed on the forest.
6. Mineral extraction operations may occur during the planning period, some are anticipated in the Santa Rita and Patagonia EMAs which may adversely impact the ocelot and its habitat.
Therefore, the implementation of the CNF LRMP **May Affect**, and is **Likely to Adversely Affect** the ocelot.

Summary of Effects and Determination - Mexican gray wolf

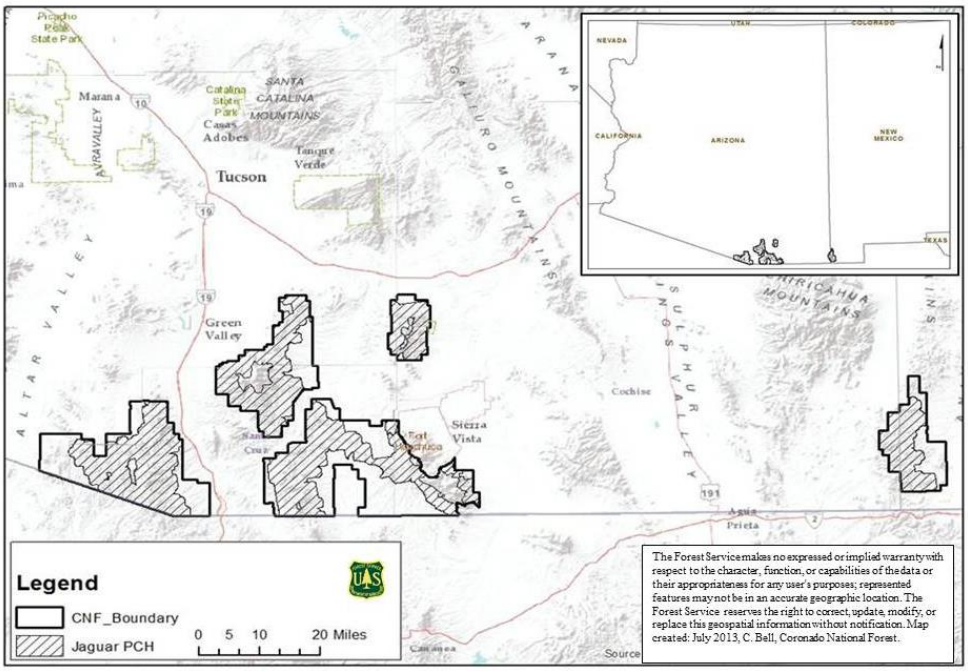
The following rationale supports the conclusion that the proposed action will have insignificant and/or discountable effects on the Mexican gray wolf because:
1. Overall, implementation of the proposed action is positive for the long-term conservation and recovery of the Mexican gray wolf;
2. The CNF has low total miles and a low road density standard, which is very positive for carnivores such as the gray wolf;
3. The CNF restricts cross country travel;
4. The CNF has the most land of any NF in the Region withdrawn from mineral entry; and,

5. The wolf only rarely occurs as dispersing individuals on the CNF, and the species is not known to breed on the forest.
Therefore, the implementation of the CNF LRMP for Mexican gray wolf is **Not likely to jeopardize within proposed 10(j) area**.

Critical Habitat – Jaguar

The US Fish and Wildlife Service (USFWS) designated jaguar critical habitat in 2014. The CNF contains more than 50 percent of the jaguar critical habitat distributed within the Peloncillo, Santa Rita, Tumacacori, Huachuca, and Whetstone Ecological Management Areas (EMAs) (see Figure 1).

Figure 1. Map of Jaguar critical habitat on the CNF.



Jaguars have relatively large home ranges that are highly variable and depend on topography, available prey, and population dynamics (Brown and Lopez Gonzalez 2001). Home ranges need to provide reliable surface water, available prey, and sites for resting that are removed from the impacts of human activity and influence (Jaguar Recovery Team 2012). The jaguar habitat components are large scale and can be described in a landscape or even regional scale. The FWS has identified seven PCEs that are essential to jaguar conservation. Therefore, we are analyzing the potential effects on the seven PCEs within the jaguar critical habitat as identified in the Endangered and Threatened Wildlife and Plants; Designation of Critical Habitat for the Jaguar on the CNF.

Primary Constituent Elements

The FWS has identified 7 primary constituent elements (PCEs) that represent the physical or biological feature and habitat characteristics required to sustain the jaguar's vital life-history

functions. The PCEs of critical habitat are found within areas that occur in expansive open spaces in the southwestern United States which comprise at least 100 square kilometers (38.6 square miles) in size. The primary constituent elements are those which:

1. Provide connectivity to Mexico;

2. Contain adequate levels of native prey species, including deer and javelina, as well as medium-sized prey such as coatis, skunks, raccoons, or jackrabbits;

3. Include surface water sources available within 20 km (12.4 mi) of each other;

4. Contain 1 to 50 percent canopy cover within Madrean evergreen woodland, generally recognized by a mixture of oak, juniper, and pine trees on the landscape, or semidesert grassland vegetation communities, usually characterized by *Pleuraphis mutica* (tobosagrass) or *Bouteloua eriopoda* (black grama) along with other grasses;

5. Are characterized by intermediately, moderately, or highly rugged terrain; and

6. Are characterized by minimal to no human population density, no major roads, or no stable nighttime lighting over any 1-square-km (0.4-square-mi) area.

7. Are below 2,000 m (6,562 feet) in elevation.

Effects Analysis for Jaguar Critical Habitat

1. *Connectivity to Mexico*

Jaguars need to be able to move long distances between and within mountain ranges in the US and Mexico. Currently, the international border fence could prove problematic for free movements of jaguars and other large carnivores in between the Unites States and Mexico.

Livestock fences on the CNF are constructed to minimize wildlife impacts, as described in the LRMP. The CNF manages a large proportion of the rugged topography and Madrean evergreen woodland within the jaguar critical habitat. Most of the adjacent lands use similar livestock management and operations; therefore, we expect continued presence of naturally occurring water sources and livestock developed water sources, which are available for jaguar use. These open lands aid in the maintenance of connectivity for jaguars.

Mining activity, including road use both during the day and at night would cause displacement around the area for the duration of mining activities. Fires can also alter prey species habitat and well as resting and denning habitat. If fires occur in an area when jaguars are moving through, they would likely vacate the area temporarily due to the presence of fire itself, a temporary lack of prey species in the area, and increased human activity (USFS 2013).

2. *Native Prey Species*

Jaguars need adequate levels of native prey such as deer, javelina, and medium-sized prey. Javelina and deer are considered the primary source of food for jaguars. Javelinas are found in many habitats and are opportunistic feeders of flowers, fruits, nuts, berries, bulbs, and most succulent plants. White-tailed deer will eat several species of shrubs, grasses, and forbs. Mule deer feed on grasses and forbs in the spring and summer but are primarily browsers and consume bark, twigs, leaves, and nuts. Mule deer are found in desert shrub, grasslands, pinon-juniper, pine, aspen-fir, and mountain meadows, while white tailed deer habitats include oak-grasslands, chaparral, and pine forests. Other prey species such as coatis, raccoons, and skunks consume a variety of foods like insects, lizards, roots, fruits, nuts and eggs. Jackrabbits are herbivores and rely on grasses, forbs, and some succulents. Overall, the identified prey species are generalists that don't rely on any limiting food source or habitat characteristic for survival and reproduction.

Livestock grazing can modify native prey species' habitat by altering vegetation composition and structure directly by trampling, clipping, or browsing. These changes could alter prey species distribution and/or density by removing herbaceous vegetation that provides food and hiding cover. Livestock could also change plant species composition by continually selecting particular plant species for consumption. Livestock management on the CNF adjusts livestock forage utilization based on site specific resource conditions and management objectives, but in general utilization is managed at a level corresponding to light to moderate intensity (15-45% of current year's growth). This level of utilization will provide adequate food and cover for jaguar prey species (USFS 2013).

Other activities that can alter prey species habitat are fire, recreation, and mining on the CNF. These activities can modify native prey species' cover and forage availability by altering vegetation composition and structure directly by such activities as crushing or total ground disturbance by mining activities. Although these activities would create disturbances both to prey species and their habitat, they are usually temporary in nature and/or small enough in scale that they would not prevent native prey species from inhabiting the project area.

3. *Water Sources*

Closely spaced water sources are important for jaguar survival. Most water sources are water troughs and ponds which contain water during all or most of the year and these water sources do not exclude use by jaguar or prey species. The guideline NWS-G-2 protects or enhances springs and seeps.

4. *Canopy Cover*

Another important component of jaguar habitat is maintaining canopy cover within Madrean evergreen woodland. Wildfire and prescribed fires could change current canopy cover within Madrean evergreen woodland; however, fires are primarily managed to result in low- to moderate-intensity fire, with limited areas of high-intensity fire. As such, canopy cover would likely remain stable to slightly decreasing over the life of the LRMP. In addition, burn areas stimulate the regeneration of the understory and midstory components of most habitats, which could still provide cover for jaguars.

Livestock hoof action and trampling could affect plant species composition and structure. Livestock generally do not consume woody plant species when more desirable and palatable plant species are available (USFS 2013).

5. *Terrain*

Rugged terrain such as canyons, ridges, and rocky hills is an important component in jaguar habitat. Mining activities could alter the topography within the project area, which would cause temporary displacement around the area of activities. Mining has been occurring within or near jaguar critical habitat for over a century. These mines range in size of infrastructure footprint and associated interspace of 5 acres (single mine shaft) to >1,000 acres (open pit mine). Mining operations can also expand infrastructure outside the immediate mine site with the construction of roads, power-lines, pipe-lines, or impermeable fences. These changes can directly affect jaguar CH by removing vegetation cover, modifying prey species, reducing water sources, and increasing human presence (USFS 2013).

Mining development can also indirectly affect jaguar CH by reducing connectivity between mountain ranges and Mexico. Corridors provide the opportunity for jaguars to move from one population to another while providing basic needs for the jaguar, but human development into these corridors can result in the loss of corridor functionally (Rabinowitz and Zeller 2010).

The CNF is currently aware of approximately 23 mineral projects within EMAs where jaguar CH occurs (including Rosemont Copper Mine). These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Fourteen of these projects are active and currently in place, while two projects are expected to occur in the foreseeable future, two are completed and five are withdrawn from consideration at the point. Eleven projects are located on the Nogales R.D. within the Santa Rita and Tumacacori EMAs, and twelve on the Sierra Vista R.D. within the Huachuca EMA. The proposed Rosemont Mine, located at the base of the Santa Rita Mountains, is a large mining operation that is proposed to occupy CNF and adjacent private and state land. The proposed mine is being evaluated through a separate section 7 (USFS 2013).

6. *Human Development*

Jaguars require minimal human interaction. Currently, we don't have enough information to fully understand the response of jaguar movements to human development and definitively determine jaguar tolerance to corridor width (Rabinowitz and Zeller 2010). Rabinwitz and Zeller (2010) suggested 10km width as a possible minimum, but this is largely based on studies of mountain lions (*Puma concolor*) (Beier 1993, Kautz et al. 2006) (USFS 2013).

Recreational activities such as hiking, hunting, and off-highway vehicle driving are expected to continue on the CNF over the life of the project. Most hiking on the CNF is on developed trails which are few and not highly used. Hunting for deer and javelina does occur on the CNF, typically during the spring and fall, but hunting is regulated by Arizona Game and Fish Department and New Mexico Department of Game and Fish and is restricted to relatively few hunters. Authorized off-highway vehicle use is year-around, but levels of activity are low and confined to a few roads, cross country travel is restricted. Most of these activities occur during daylight hours when jaguars are less active and less likely to be disturbed (USFS 2013).

There will be no urban development or additional summer homes as a result of this plan within jaguar critical habitat on CNF lands. There are also no plans to construct any new campgrounds at this time within jaguar critical habitat.

7. *Elevation below 2,000 meters*

Areas above 2,000 m (approx. 6,500 feet) are considered unsuitable jaguar habitat, even though jaguars can use this higher elevation to meet their needs. Most recreational, mining, and range

activities would occur below 2,000 m. These activities could temporarily displace jaguar and their prey although suitable areas should be present nearby.

Summary of Effects and Determination- Jaguar Critical Habitat

The following rationale supports the conclusion that the proposed action will have effects on the jaguar because:
1. There are no habitat connectivity issues with Mexico caused by implementation of the CNF LRMP;
2. Overall, the identified prey species are generalist and don't rely on any limiting food source or habitat characteristic for survival and reproduction.
3. Most water sources are water troughs and ponds which contain water during all or most of the year and be available for jaguar use and its prey;
5. Therefore, no activities that result from implementation of the CNF LRMP are anticipated to result in increased human-jaguar interactions.
6. Mineral extraction operations may occur during the planning period, some are anticipated in the Santa Rita and Patagonia EMAs which may adversely impact critical habitat of the jaguar.
The implementation of the CNF LRMP **May Effect**, and is **Likely to Adversely Affect** critical habitat of the jaguar.

Mount Graham red squirrel_____(*Tamiasciurus hudsonicus grahamensis*)

Endangered Species Act Status:	Endangered
Recovery Plan:	1993
District Occurrence:	Safford
Critical Habitat:	Yes
Determination of Effects:	May affect, likely to adversely affect
Determination of Critical habitat:	May affect, likely to adversely affect

For brevity, the Mount Graham red squirrel is referred to as MGRS throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Mount.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: the Final Rule listing the MGRS as an endangered species (USFWS 1987); in the Recovery Plan (USFWS 1993); and the 5-Year Review (USFWS 2006).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provides information about the MGRS in FS Region 3. All these documents are incorporated by reference into this document.

The MGRS only inhabits the Pinaleño Mountains in Graham County, Arizona. The entire range of the subspecies is within the Safford RD of the Coronado NF. The squirrel inhabits mixed conifer and spruce-fir forests at high elevations (typically above 2,425 m (8,000 feet)). The squirrel may inhabit drainage bottoms where mixed forests occur at lower elevation (USFWS 1993).

Historically, MGRS were common above 8,500 feet in elevation, but is now seldom observed below 9,200 feet. As recently as the 1960s, the species possibly ranged as far east as Turkey Flat and as far west as West Peak, but currently is found only as far west as Clark Peak. It is believed that a local extinction occurred on West Peak, possibly as a result of a fire in the mid-1970s that

caused loss of habitat and isolation of the West Peak sub-population from the rest of the range (USFWS 1993).

Status, Threats, and Conservation of the Species

Status

Between 1986 and 1987, 4,614 acres of the suitable squirrel habitat was surveyed. In 1990 and 1991, an additional 5,412 acres of suitable habitat was surveyed. Thus, between 1986 and 1991, 85 percent of the suitable habitat within the range of the red squirrel was surveyed (USFWS 1993).

Analysis of population estimates indicate that the average number of individuals from 1991-1997 has dropped from about 350 individuals to about 250 individuals in the succeeding 10 years (1998 – 2007). However, no population estimates statistically indicate a trend in the population. However, loss of spruce-fir habitat during this time frame could limit the potential for significant population recovery in the foreseeable future (USFWS 2008).

As of spring 2009, the Technical Subgroup of the MGRS Recovery Team determined that only Fall survey data will be taken. Analysis found that data acquired during spring surveys are inconsistent due to the difficulty of detecting squirrels during this time of year (they're foraging far and wide and not yet caching cones), especially when compared to data collected during Fall surveys (when squirrels are actively caching cones, thereby making it much easier to determine if a midden is occupied) (USFWS 2011).

Midden surveys have been conducted within red squirrel habitat since 1986. In 1986, the potential habitat for the red squirrel was estimated to be 22,436 acres. This estimate included ponderosa pine forests, but surveys in 1986 located no middens in this forest type. In 1988, the amount of potential habitat was revised to exclude ponderosa pine stands, and the amount of red squirrel habitat was estimated to be 11,733 acres (USFWS 1993).

Results of 1991 midden surveys show that over 90 percent (510 out of 549) of middens occur above 9,000 feet in elevation. Most middens occurred in spruce-fir vegetation types (203 out of 549, or 37 percent) or in the mixed conifer/spruce-fir transition (268 out of 549, or 49 percent). Only 78 middens (14 percent) occur in mixed conifer (USFWS 1993).

Based on 1991 survey data, the Region estimated the habitat capability for the red squirrel at 650 individuals. In 200 years, assuming no catastrophic habitat loss, the habitat capability would increase to 900 red squirrels (USFWS 1993). The current population estimate is 270 red squirrels (AGFD 2014).

Threats

Past threats to the red squirrel were direct loss of habitat by human activities, and indirect consequences of this habitat loss or alteration. Actions which directly altered habitat suitability for the red squirrel were logging and associated road construction, road construction for residential and recreation access, and conversion of land to uses other than forest (e.g., recreational and residential development). Actions which directly affected the quantity of red squirrel habitat also affected the quality of the remaining habitat. Fragmentation from timber harvest, road construction, and land use conversion resulted in alteration of forest microhabitats. Also, these activities may have isolated segments of the population making them vulnerable to stochastic events and local extinction (USFWS 1993).

Current threats facing MGRS include predation, loss of habitat due to native and exotic insect infestations, direct mortality and loss of habitat and middens due to large-scale wildfires, loss of habitat due to human factors (e.g., disturbance, conversion to roads, trails, and/or recreation sites, permitted special uses, etc.), loss or reduction of food sources due to drought, and apparent dietary and territory competition with Abert's squirrel, which were introduced in the 1940s by the Arizona Game and Fish Department (AZGFD) (USFWS 2008). Some preventative actions have been taken by the USFS and the AGFD. The USFS has stopped all harvesting of timber, fuelwood, and Christmas trees, and has restricted campfire wood gathering in some areas. Abert's squirrels are now hunted year-round in the pine forest through the spruce-fir zones (AZGFD 2013). Another factor possibly affecting the species' existence is risk of extinction due to genetic and demographic problems associated with small population sizes (USFWS 2008).

Conservation

The Safford RD of the Coronado NF has completed the following activities which meet recovery actions as outlined in the recovery plan:

Physical Protection - The only roads into MGRS habitat are Swift Trail and the new access road that was authorized and built for the Astrophysical Observatory site. Swift Trail is closed and gated from at least November 15 to April 15 annually.

Revegetation - Replanted burned areas within MGRS critical habitat with 125 acres of Engelmann Spruce (2007 & 2009) and 75 acres of Corkbark fir (2008). Planting is scheduled to continue over the next 10 years, with the goal of 500 total acres. Extensive planning was conducted for a major habitat restoration project for MGRS habitat (Pinaleño Ecosystem Restoration Project -- PERP).

Vegetation Monitoring - Insect outbreaks in the Mount Graham area are being monitored by the Rocky Mountain Research Laboratory.

Population Monitoring - MGRS population monitoring has been, and continues to be, conducted cooperatively between the USFS, AZGFD, the USFWS, and the UA. Monitoring and midden surveys have occurred at least semi-annually (spring and fall of each year) every year since 1988 until 2009. As of spring 2009, the Technical Subgroup of the MGRS Recovery Team determined that only fall survey data will be taken. There is now about 20 years of population data on the MGRS.

Road Kill Reduction - The Arizona Department of Transportation (ADOT) put up "Watch for Animals" signs after the Clark Peak fire. In addition, the Swift Trail is posted at a 35 mile per hour, or less, speed limit in the reaches of the squirrel's habitat.

Fire Suppression/Risk Abatement - Several actions have been taken by the Coronado NF to abate fire risk within MGRS habitat. Under the Pinaleño Ecosystem Management project (PEM), a 1,000-acres fuels treatment/understory thinning was completed in some lightly-occupied squirrel areas, with the goal of reducing fire risk and fire intensity. Implementation of the PERP project has begun, restoring habitat and reducing fuel-loading within occupied and designated critical habitat.

Interagency Cooperation - Surveys and research efforts have been conducted cooperatively between the Southwestern Region, USFWS, and the AZGFD as well as the UA. There are two subgroups: Technical and Implementation Team for the Recovery Plan, which includes the Safford RD Wildlife Biologist as a Technical subgroup liaison. In addition, the Forest, in cooperation with the USFWS, AGFD, UA Red Squirrel Monitoring Program, and the Phoenix Zoo, will be participating in a breeding pilot program for the MGRS. Cooperation on experimental removals of Abert's squirrels is ongoing.

Research - Since 2004, a substantial amount of MGRS research was conducted; the majority of which was by Koprowski and other co-authors from the UA (USFWS 2008).

Effects Analysis for the Mount Graham Red Squirrel

Wildland-Urban Interface and Landscape-scale Fire

Within this program area, activities are performed which are evaluated on a site-specific basis for impacts to the red squirrel. Plan components that address the impacts to the habitat are: PIN-S-2. This standard ensures that no new recreational development would occur within MGRS habitat, thereby preserving the habitat. The guideline ARP-G-1; would apply habitat management objectives and species protection measures from Recovery Plans and signed Conservation Agreements. While PIN-G-3a, ensures that red squirrel habitat supersedes the needs of all other species and PIN-G-3c, would protect middens. The guideline PIN-G-1would benefit habitat for rare plant populations for the Pinaleño EMA thereby preserving red squirrel habitat as well.

Animal and Rare Plants

This program area involves a variety of activities that have the potential to reduce impacts to species and improve habitat; as such, it has the potential to reduce impacts to MGRS and its habitat. It is responsible for survey, inventory, and monitoring of species and works with other agencies to sustain viable populations of all species on the CNF. This and other program areas function integrally, such that plan direction related to wildlife, fish, and rare plants occurs throughout the document.

The Species Diversity and Viability Report assessed the MGRS. The analysis found that programmatic direction under the LRMP would provide for viability. The viability report determined that MGRS populations and habitat were both in a positive trend. Plan components that address the impacts to the habitat are PIN-S-2. This standard ensures that no new recreational development would occur within MGRS habitat, thereby preserving the remaining habitat. Guideline ARP-G-1 would require that all activities comply with Recovery Plan habitat protection measures. Guideline PIN-G-3a to would require that the MGRS habitat needs take priority over all other species. Guideline PIN-G-3b, PIN-G-3c, ARP-G-4, and PIN-G-1 would help ensure that recreational activities don't negatively impact MGRS or its habitat.

Invasive Species Management

This program area has the potential to help with removing Abert's squirrel and other nonnatives. The guideline that addresses the impacts to the habitat is PIN-G-3a, which ensures that red squirrel habitat needs supersedes the needs of all other species. Abert's squirrels are considered an invasive species and are now found on Mt. Graham from the pine forest to the spruce-fir zones, so it is likely that resource competition has increased between these species (USFWS 2008). This guideline would help managers determine the direction needed to ensure the viability of the MGRS despite the presence of invasive species.

The guideline ISM-G-1 directly benefits these species by recommending the removal of non-native invasive animals in or near occupied habitat while the guideline RAM-G-6 will help in restoring native plant species. Herbicide and pesticide treatments are expected to continue under this plan as they have under the previous forest plan. The use of herbicide and pesticides can have adverse effects on aquatic species as well as upland species. Any potential future projects implemented under this plan would be assessed on a case by case basis to determine potential effects on individual species and to mitigate them. The use of pesticides may impact forage base for specific individual species.

Forest Products

This program area has the potential to impact MGRS foraging, nesting, and midden habitat by creating a reduction of available resources to MGRS. The objective PIN-O-1 treats vegetation on 25% of the Pinaleño EMA. Treatments will be consistent with the objectives for Forestwide vegetation communities and resources. This objective could be beneficial by addressing threats to MGRS from stand-replacing fires, insect/disease, or climate change and help restore forest and woodland structure and function. However, it could also reduce availability of nesting trees, midden locations, forage for the short term (i.e., several growing seasons) as well as increase disturbance potential. Under this program area, the CNF has stopped all harvesting of timber, fuelwood, and Christmas trees, and has restricted campfire wood gathering in some areas to protect MGRS habitat and protect middens. Guideline VWM-G-3 would require measures to help ensure forest composition that provides primary food sources for MGRS, while PIN-G-3c would avoid disturbance to middens during project implementation. Also VSF-G-1 and VSF-G-2 would help ensure replacement structural stages for future MGRS habitat.

Minerals Management

This program area has the potential to impact MGRS foraging habitat by creating a reduction of available resources to MGRS. Although facility development and mineral exploitation is restricted, new facilities and mineral extraction are not prohibited within the range of the MGRS. However, site-specific management plans would be developed for any new facilities, and these would be required to comply with the recovery plan guidelines to give adequate consideration for the welfare of the squirrel. No mineral explorations are expected to occur over the life of this plan within MGRS habitat.

Motorized Transportation System

This program area can have direct impacts to the species or its habitat, by habitat fragmentation and direct mortality by vehicle. If the activity is limited to simple maintenance, however, direct impacts are negligible to habitat and species. If roads are closed, impacts would be beneficial as there would be reduced fragmentation to habitat and no interaction between vehicles and red squirrels. The standard PIN-S-2 ensures that no new residences or developed recreation areas would be established in MGRS habitat thereby no new roads would be constructed.

Recreation Management

This program area has the potential to impact MGRS by human disturbance. Plan components that address the impacts to the habitat are PIN-S-2; this standard ensures that no new recreational development would occur within MGRS habitat, thereby preserving the remaining habitat. Guideline PIN-G-3b would help ensure that hiking activities don't negatively impact MGRS or its habitat. Recreational use occurs within the range of the red squirrel, but is regulated. It is not known if recreational use within the range of the red squirrel exceeds capacity at certain times, but with the restrictions in place, effects are likely to be minimal.

Range Management

Rangeland Management and associated livestock grazing, has negligible effect on the MGRS since no grazing occurs within the core range of the species.

Cumulative Effects

The USFS recognizes that projects and program activities implemented under the CNF LRMP may occur near or within MGRS habitat. The LRMP does contain S&Gs that can be utilized to

reduce or eliminate impacts to the subspecies. However, activities may be permitted which may affect individuals, such as recreation residences, travel management, fire suppression, PERP, PEM, MGIO, and recreational activities. These types of activities have occurred in the past and are likely to occur into the foreseeable future.

Summary of Effects and Determination

The following rationale supports the conclusion that the proposed action will have effects on the MGRS because:
1. Overall, PIN-G-3a, ensures that red squirrel habitat supersedes the needs of all other species. While the guideline PIN-G-3b ensures that recreational hiking would not negatively impact habitat or individuals, and PIN-G-3c, would protect middens.
2. The CNF is cooperating with AGFD in invasive species removal of nonnatives within MGRS habitat.
3. Removal of forest products has potential to impact foraging, nesting and midden habitat, by creating a reduction in available resources.
4. The minerals program has the potential to impact MGRS foraging habitat by creating a reduction of available resources, although limited in extent, mineral extraction and facilities are not prohibited within MGRS habitat.
5. Habitat fragmentation and direct mortality could occur due to MTS within MGRS habitat.
6. Recreation could impact MGRS through habitat and species disturbance.
Based on the analysis of plan components and Resource Programs, the effects to MGRS are not expected to be insignificant and discountable. Therefore, the implementation of the Coronado NF LRMP **May Affect**, and is **Likely to Adversely Affect** the MGRS.

Effects Analysis for MGRS Critical Habitat

Critical habitat for the MGRS was designated by the USFWS in 1990. All designated critical habitat for the MGRS is within the Pinaleño Mountains on the Safford RD of the Coronado NF. The area designated is composed of three large areas covering about 2,000 acres on Mount Graham, and are named as the Hawk Peak/Mount Graham, Heliograph Peak, and Webb Peak critical habitat blocks (USFWS 1990). These areas incorporate most of the spruce-fir forest in the Pinaleño Mountains. The PCE of critical habitat is dense spruce-fir forests.

Activities which may adversely affect critical habitat are any activities which destroy or substantially reduce forest density. Such activities that could be implemented under the proposed action include timber harvest, transportation, mineral, and recreational development that proceed without adequate consideration of the welfare of the squirrel (USFWS 1990).

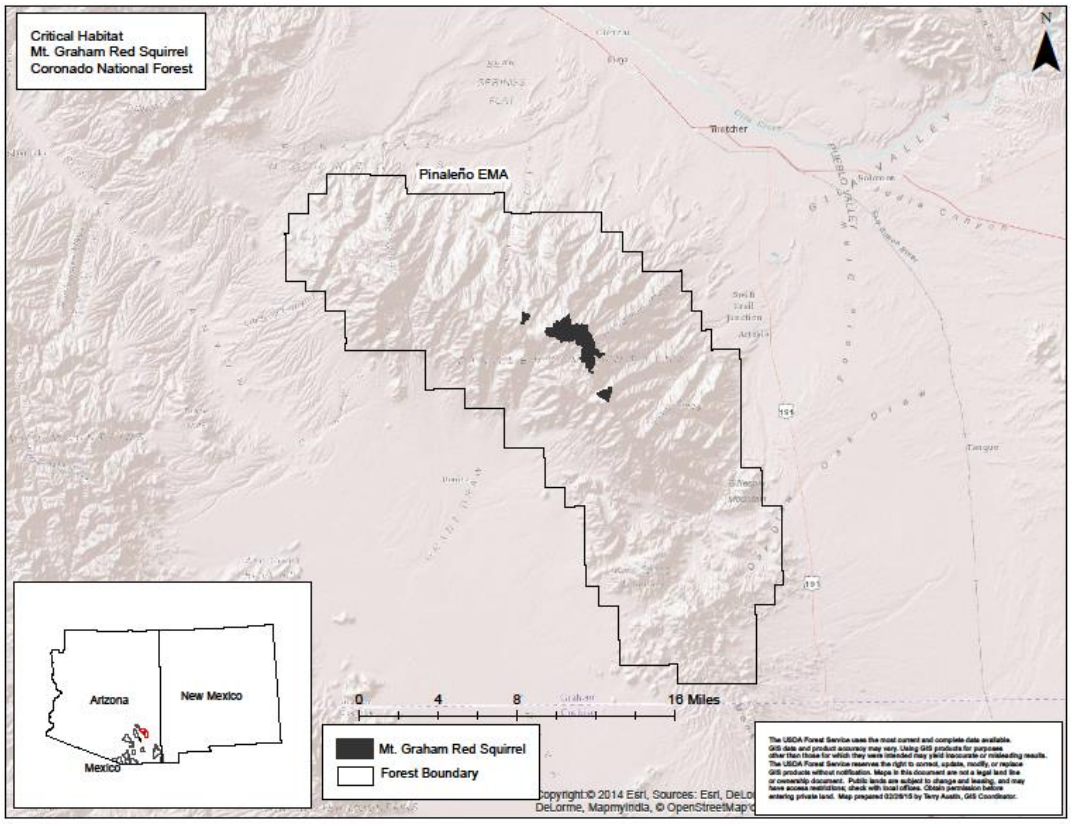


Figure 2. Map of MGRS critical habitat on the CNF.

Wildland-Urban Interface and Landscape-scale Fire

Within this program area, activities are performed which are evaluated on a site-specific basis for impacts to MGRS critical habitat. Plan components that address the impacts to critical habitat are: PIN-S-2. This standard ensures that no new recreational development would occur within MGRS habitat, thereby preserving critical habitat. While PIN-G-3a, ensures that red squirrel habitat supersedes the needs of all other species and PIN-G-3c, would protect middens. The guideline PIN-G-1would benefit habitat for rare plant populations for the Pinaleño EMA thereby preserving red squirrel habitat as well.

Recreation Management

This program area has the potential to impact MGRS critical habitat by human disturbance and use. Plan components that address the impacts to the habitat are PIN-S-2; this standard ensures that no new recreational development would occur within MGRS critical habitat, thereby preserving the remaining habitat. Guideline PIN-G-3b would help ensure that hiking activities don’t negatively impact MGRS or its critical habitat. Recreational use occurs within the range of the red squirrel, but is regulated. It is not known if recreational use within the range of the red squirrel exceeds capacity at certain times, but with the restrictions in place, effects are likely to be minimal.

Minerals Management

This program area has the potential to impact MGRS foraging habitat by creating a reduction of available resources to MGRS. Although facility development and mineral exploitation is restricted, new commercial facilities and mineral extraction are not prohibited within critical habitat. Similarly, although new facilities and infrastructure are discouraged, they are not precluded. Although site-specific management plans would be developed for any new facilities, there could be further loss and degradation of habitat. No mineral explorations are expected to occur over the life of this plan within MGRS critical habitat.

Motorized Transportation System Management

This program area can have direct impacts to MGRS critical habitat, by habitat fragmentation. If the activity is limited to simple maintenance, however direct impacts are negligible to habitat. If roads are closed, impacts would be beneficial as there would be reduced fragmentation to habitat. The standard PIN-S-2 ensures that no new residences or developed recreation areas would be established in MGRS critical habitat thereby no new roads would be constructed.

Rangeland Management

This program has no effect on MGRS critical habitat since no grazing occurs within designated critical habitat.

Forest Products

This program area has the potential to impact MGRS foraging, nesting, and midden critical habitat by creating a reduction of available resources to MGRS. The objective PIN-O-1 treats vegetation on 25% of the Pinaleño EMA. Treatments will be consistent with the objectives for Forestwide vegetation communities and resources. This objective could be beneficial by addressing threats to MGRS critical habitat from stand-replacing fires, insect/disease, or climate change and help restore forest and woodland structure and function. However, it could also reduce availability of nesting trees, midden locations, forage for the short term (i.e., several growing seasons) as well as increase disturbance potential. Under this program area, the CNF has stopped all harvesting of timber, fuelwood, and Christmas trees, and has restricted campfire wood gathering in some areas to protect MGRS critical habitat and protect middens. Guideline VWM-G-3 would require measures to help ensure forest composition that provides primary food sources for MGRS, while PIN-G-3c would avoid disturbance to middens during project implementation. Also VSF-G-1 and VSF-G-2 would help ensure replacement structural stages for future MGRS habitat.

Summary of Effects and Determination – MGRS Critical Habitat

The following rationale supports the conclusion that the proposed action will have effects on the MGRS critical habitat because:

1. Overall, PIN-G-3a, ensures that red squirrel habitat supersedes the needs of all other species. While the guideline PIN-G-3b ensures that recreational hiking would not negatively impact habitat or individuals, and PIN-G-3c, would protect middens.
2. Removal of forest products has potential to impact foraging, nesting and midden critical habitat, by creating a reduction in available resources.
3. The minerals program has the potential to impact MGRS foraging habitat by creating a reduction of available resources, although limited in extent, mineral extraction and facilities are not prohibited within MGRS critical habitat.
4. Critical habitat fragmentation could occur due to MTS within MGRS habitat.
5. Recreation could impact MGRS through critical habitat disturbance.

Based on the analysis of plan components and Resource Program Areas, the effects of implementing the proposed action on MGRS critical habitat are not insignificant and discountable. Therefore, it is determined that the implementation of the Coronado NF LRMP **May Affect**, and is **Likely to Adversely Affect**, MGRS critical habitat.

Lesser long-nosed bat_____(*Leptonycteris yerbabuenae*)

Endangered Species Act Status:	Endangered
Recovery Plan:	1995
District Occurrence:	All
Critical Habitat:	None
Determination of Effects:	May affect, not likely to adversely affect

For brevity, the Lesser long-nosed bat is referred to as LLNB throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Lesser.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: the Final Rule listing the LLNB[1] as an endangered species (USFWS 1988); in the Recovery Plan (USFWS 1995); and the 5-Year Review (USFWS 2007). The 1988 final rule found that listing of critical habitat was not prudent because maps or descriptions of critical habitat could increase LLNB vulnerability to disturbance.

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the Lesser long-nosed bat in Forest Service Region 3. All these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

The LLNB is a seasonal migrant on the Coronado NF. The species occurs in Arizona generally from May to September, but significant numbers of bats are found on the Coronado NF only after leaving low elevation maternity colonies. Occurrence on the Coronado NF coincides with the blooming of paniculate agaves between July and September. Several post-maternity roosts, which house from thousands to only a few individuals, are known from various locations on or near the Forest, but only four are monitored on a priority basis during the simultaneous roost surveys; they are: Patagonia Bat Cave, Lone Star Mine, New Catalina Cave, and Papago Cave. Two roost locations on the Coronado that used to be included in the simultaneous roost surveys were, Kasper and Hilltop Mines. These two sites are no longer surveyed because they are active once again. In 2009 and 2010, New Catalina Cave and Papago Cave were added to the simultaneous

[1] On September 9, 2013, the the USFWS found that substantial information indicates that delisting and reclassifying the LLNB from endangered to proposed may be warranted and they are therefore initiating a review of the status of this species to determine if these actions are warranted. The LLNB was known as the Sanborn's bat at the time of the listing in 1988.

roost surveys. There are also post-maternity roosts close to the Coronado NF where roosting LLNBs most certainly forage on Coronado NF. There are no known maternity colonies on the Coronado NF.

The number of bats at all roost sites can fluctuate substantially each year and among years, which is likely due in part to roost-switching behavior (USFWS 2007). Therefore, it is difficult, and perhaps inappropriate, to determine population trends based on the number of bats detected at select roosts from year to year. However, it does appear that known roosts are still being used, and new roosts and newly discovered roosts continue to be documented on and around the Coronado NF.

The five-year review for this species addresses threats to the species and habitat where the bat is found in southern Arizona and calls for more of a focus on ecosystem health relative to forage needs. Bat disturbance and roost damage by recreationists or activities associated with illegal border activities was identified. Uncharacteristic wildfire was identified as being able to affect bats through short term smoke impacts and possibly longer term changes in roost microclimates (e.g., changes in air flow or hydrological patterns).

LLNB are nomadic allowing them to adapt to varying availability of food sources, especially in years where their early summer food source (columnar cacti) fail to bloom. While LLNB can forage long distances, they prefer to forage as close to the roost site as possible. Therefore, fire, grazing, urban development, and agave harvesting can impact their forage resources by killing the agave plant or affecting the flowering cycle.

Agaves are inventoried on a project basis. Several studies on livestock grazing and *Agave palmeri* are taking place on the Coronado NF: 1) Effects of livestock grazing on demography and flowering of *Agave palmeri* within Coronado NF; 2) The relationship between *Agave palmeri* flower stalk herbivory and livestock grazing management on the Coronado NF. These studies will contribute to the overall understanding of the impacts of livestock and other herbivores on this important food resource for long-nosed bats.

There is little information available on the effects of fire on agaves and bats. Slauson and Dalton (1998, in USFWS 2007a) concluded that the short-term effects of fire on flowering agaves were limited. In fact, they found that burned plants produced significantly more nectar and had higher sugar concentrations than unburned plants. Pollen production and seed set were also unaffected by burning. Bat monitoring did not show a preference for agaves in burned or unburned areas. The short-term effects of fire on flowering agaves appear limited, but this study did not address the long-term impacts on agave survival, reproduction, or distribution. However, it is believed that the overall threats of prescribed fire are likely not as severe as once thought (USFWS 2007a).

Threats

Threats include reduction of habitat (i.e. loss of saguaros and agaves as food sources and loss of cave/adits as roosting sites), grazing, and fire suppression. Some of the most numerous and dense agave clusters are in areas with rocky slopes where there is poor livestock grazing potential. Thus, effects of livestock grazing on agave would likely be limited to the relatively few locations where permanent water is available. In addition, many grazing allotments on the CNF are grazed only during the winter and are rested during the summer growing season when agaves are bolting. On year-round grazing allotments, grazing is managed under strategies that insure periodic rest or deferment during the growing season, thus ensuring that only a percentage of pastures supporting flowering agaves are grazed during any single growing season.

Another possible threat to native agaves is wildfire and/or prescribed burns. A study of agave fire ecology has been initiated on the Coronado NF (Effects of prescribed fire on *Agave palmeri* in the Coronado NF). The USFS is mandated by the USFWS BOs and guidance criteria to kill not more than 20 percent of existing agaves in any prescribed burn. In an attempt to comply with that restriction, the Coronado NF developed monitoring techniques to analyze fire effects on agaves.

Predation of LLNB by owls and snakes occurs but is not significant. Drought and climate change have also been identified as threats to the species. Since 2000, persistent drought has been interspersed with limited periods of higher than normal precipitation on the CNF. Other threats not likely on the CNF include wind energy development and white-nose syndrome. While a possibility, the typical roost temperature for LLNB is higher by 6º C than the optimal temperature for growth of the fungus causing white-nose syndrome. In addition, LLNB do not hibernate, reducing potential exposure.

Long-nosed bats are thought to be negatively affected by reductions in acreage of native agaves over large areas of their wintering grounds in Mexico due to excessive harvesting for local manufacture of mescal and tequila. This threat to the food resource is beyond the control of national forests. However, threats to long-nosed bats from grazing on food plants, the tequila industry, and prescribed fire are likely not as severe as once thought (USFWS 2007).

White Nose Syndrome

Since 2006, WNS has resulted in the mortality of an estimated 1 million hibernating bats in eastern U.S. The fungus (*Geomyces destructans*) that causes the disease (WNS) is primarily transported bat-to-bat, but there is also evidence that humans can transport the fungal spores on their clothing and gear. At present, this disease is only known to affect hibernating species (USFWS 2010). However, because some roosts are shared among hibernators and migrants, there is still some concern that migrants may pick up the fungus. Whether or not this will happen and whether or not it could manifest into WNS in migrants is unknown, but there is currently no evidence to suggest that migrants are being affected. Also, many scientists believe that if the fungus does make its way to the southwest, that it will not manifest as it has in eastern U.S. Rationale for this belief include factors such as shorter hibernation periods, periodic winter foraging sorties instead of deep torpor without winter foraging, and much smaller hibernation colonies. Nonetheless, government land management agencies in the southwest are preparing ahead of the arrival of the fungus. In New Mexico the USFS is beginning to implement targeted closures of caves and mines and mandatory decontamination of caving/mining equipment has been required since October 1, 2010 in an effort to reduce the likelihood of humans transporting the fungus (USFS 2010). Should the fungus and disease spread to Arizona and New Mexico it is possible that land management agencies such as the USFS would move to full cave/mine closures (USFS 2011).

Conservation

The following efforts have been occurring on the CNF since 2004 and were reported in the USFS Wildlife Fish and Rare Plants Management System (USFS 2010), and are consistent with the 2005 BO/CO (USFWS 2005) Conservation Recommendations for the LLNB. It should also be noted that this list does not necessarily capture all of the efforts that benefit the species. For example, certain LRMP S&Gs can significantly contribute to species conservation.

• Data was collected from Papago Cave during the annual simultaneous bat count. LLNB are counted during the emergence using night vision and infrared video equipment. The Coronado NF is also developing a management plan for Papago Cave through installation of a bat-friendly gate and issuing closure orders to restrict disturbance during the peak LLNB season and to deter destruction of the roost site.

• Five agave transects are monitored on an annual basis to determine herbivory on flowering agave.
• Along with Bat Conservation International (BCI) bat biologists, the Coronado NF has conducted internal and external surveys of the caves mentioned above.
• The Cave-of-the-Bells entrance is gated and is open by permit only to cavers during the year when bats are not present. However, many people who are not cavers drive right up to the cave at all times of the year causing vandalism and disturbance to bats. Therefore, a gate was installed on the Forest road to shield the cave entrance from public view thus reducing the number of individuals near the cave entrance.
• The Forest closed the gate at Van Horne cave and posted closure notice at Happy Jack cave; this should provide protection for potential roosting LLNBs.
• CNF biologists have coordinated with other agencies, organizations and interested persons to conduct exit counts at all known roosts in southeastern Arizona on the same night (or as close to as possible), at or near estimated peak occupancy time using consistent methodology.
• Potential roosts are surveyed for long-nosed and other bat species on a project basis. Roost surveys are also coordinated with research personnel, and include southwestern New Mexico and the Peloncillo Mountains.

Mexican long-nosed bat_____(*Leptonycteris nivalis*)

Endangered Species Act Status:	Endangered
Recovery Plan:	1994
District Occurrence:	Douglas
Critical Habitat:	None
Determination of Effects:	May affect, not likely to adversely affect

For brevity, the Mexican long-nosed bat is referred to as MLNB throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in two documents: the Final Rule listing the MLNB as an endangered species (USFWS 1988); and in the Recovery Plan (USFWS 1994).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the Mexican long-nosed bat in Forest Service Region 3. All these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

The MLNB bat is not believed to occur in Arizona, and the only confirmed occurrences of the species on the Coronado NF were from 1963 and 1967 in Hidalgo County, New Mexico (USFWS 2005). It is speculated that the MLNB forages on the Douglas RD of the Coronado NF; however, there are currently no known roosts on the Coronado NF. No new information is available that would indicate that the MLNB roost or breed on NFS lands (USFS 2010).

Threats

Long-nosed bats are thought to be negatively affected by reductions in acreage of native agaves over large areas of their wintering grounds in Mexico due to excessive harvesting for local manufacture of mescal and tequila. This threat to the food resource is beyond the control of

national forests. However, threats to long-nosed bats from grazing on food plants, the tequila industry, and prescribed fire are likely not as severe as once thought (USFWS 2007).

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• Potential roosts are surveyed for long-nosed and other bat species on a project basis. Roost surveys are also coordinated with research personnel, and include southwestern New Mexico and the Peloncillo Mountains.

Effects Analysis for the Lesser Long-nosed Bat and the Mexican Long-nosed Bat

The proposed action would result in plant composition trending toward desired conditions, as would plant density, individual plant basal area, and root density in the surface soil horizon. The proposed action defines desired conditions based on the current science for grassland communities and provides management objectives and guidelines that would provide a framework for implementing site-specific projects to achieve desired conditions. These plan components would result in planned and unplanned ignitions and mechanical treatments on at least 72,000 acres to maintain open, native grasslands with appropriate shrub and overstory cover.

Desired conditions and objectives would improve habitat quality and threats to the bat associated with loss of habitat conditions, while guidelines protect food resources (primarily paniculate agaves). The proposed action would maintain grasslands in a more open state that would restore fire to its characteristic role in these communities. The reduction of shrub encroachment and the promotion of continuous fuels would increase fire spread and improve nutrient cycling, thus improving the health and vigor of individual plants that support bats and provide food sources. Encouraging characteristic disturbance in the grasslands also promotes a functioning system and further maintains the open, native states described by the desired conditions.

The LLNB and MLNB have similar but somewhat different life functions and habitat needs. Plan components are generally not definitive enough to differentiate among the finite requirements of these two species. Therefore, both species are analyzed together and effects by plan component below apply to both species unless otherwise noted.

Wildland-Urban Interface and Landscape-scale Fire

The Wildland-Urban Interface and Landscape-scale Fire represents all vegetation communities on the CNF within those areas of human populations and developments at imminent risk from wildfire. Treatment of these areas incudes thinning, removal of fuels from the landscape, or altering the fuel profile to reduce the potential for loss of property. The treatment of WUI allows the Forest the flexibility to manage landscape-scale wildland fire for resource benefit.

Landscape-scale wildland fire is one of the methods for ecosystem restoration. The goal of this program is to enhance resiliency of all vegetation communities on the CNF by maintaining more sustainable fuel loads, improved habitat diversity, and watershed integrity.

Management of WUI and Landscape-scale wildland fire has the potential to result in short term impacts to LLNB and MLNB. All activities at or near known roost sites will be designed to avoid impacts (ARP-G-5, BIP-S-2), including the possibility of smoke in roosting sites. The primary potential impacts from this treatment may include changes to foraging habitat through loss of agaves. The objectives of these treatments (PIN-O-1, RIT-O-1,VDC-O-1,VIC-O-1,VME-O-1,VPO-O-1,VPP-O-1,WUI-O-1) could impact the foraging habitat of LLNB and MLNB by burning agaves outright or by affecting the phenology for the short term (i.e., the current growing season). However, only a small portion of available habitat would likely be affected at any one time, thus potential effects would be expected to be insignificant. The guidelines NWS-G-3, VDC-G-2 and VDC-G-3, VIC-G-1, VME-G-2, and VPO-G-1 would retain and enhance habitat for paniculate agaves to benefit the foraging needs of these two species. These treatments would reduce the risk of overall long-term loss of LLNB and MLNB foraging habitat.

Biophysical Features

Management of commercial and recreational entry into or upon Biophysical Features could impact possible LLNB or MLNB roosting sites. BIP-G-3 and BIP-G-5 will benefit these bat species by ensuring that cave and abandoned mine management will avoid direct impacts to bats. BIP-0-1, BIP-G-4, and ARP-G-5 are designed to protect LLNB and MLNB and their roosting habitat from human disturbance, microclimate modification, and disease transmission. The standard BIP-S-1 ensures that pre-closure inspections would be performed to determine what species are present and for the safety of the public.

Water Resources – Natural

Commercial and/or recreational development of Water Resources could impact LLNB or MLNB foraging sites. While achieving NWS-O-1 and NWS-O-2, all previously-referenced guidelines pertaining to bat roost protection will be adhered to.

Water Resources – Constructed

This program area would likely not impact LLNB or MLNB because they are not known to readily drink from surface water sources.

Soil Management

Soil management treatments have the potential to impact LLNB and MLNB foraging plants. Soil management is primarily accomplished through vegetation treatments and grazing management. Other forest-wide plan components (e.g., ARP-G-1) would be in effect for all actions within this program area, and thus potential adverse effects and mitigation needs would be identified at the project level.

Animal and Rare Plants

This program area is responsible for survey, inventory, and monitoring of species and works with other agencies to sustain viable populations of all species on the CNF.

The Species Diversity and Viability Report assessed a suite of species including the LLNB and the MLNB. The viability report determined that LLNB and MLNB population trends were unknown and habitats were both in a positive trend. There are objectives and standards in other program areas that already incorporate the habitat needs of both of these bat species. In addition, guidelines VDC-G-3, VIC-G-1, VME-G-2, VPO-G-1, ARP-G-1, ARP-G-5, CHI-G-3, TUM-G-4, HUA-G-4, PIN-G-1, and CAT-G-2 address protection of roosting sites, retention of agaves, and mitigations for vegetation treatments.

Invasive Species Management

The presence of invasive plant species is acknowledged as one of the primary threats to the sustainability of nectivorous bat foraging habitat. VDC-O-1 encourages annual treatment of up to 1,500 acres of Sonoran Desert annually. Treatment of invasive plants may occasionally lead to localized agave and columnar cacti losses. VDC-G-1, VDC-G-2, VDC-G-3, and WIL-S-3 will ensure that foraging habitat for these bats will be retained by ensuring regular re-treatment of invasives as needed and avoiding impacts from fire in non-fire-adapted ecosystems.

This program area has the potential to help with removing invasive nonnative species. The guideline ISM-G-1 would help remove nonnative invasive animals while the guideline RAM-G-6

will help in restoring native plant species. Herbicide and pesticide treatments are expected to continue under this plan as they have under the previous forest plan. The use of herbicide and pesticides can have adverse effects on aquatic species as well as upland species. Any potential future projects implemented under this plan would be assessed on a case by case basis to determine potential effects on individual species and to mitigate them. The use of pesticides may impact forage base for specific individual species.

Minerals Management

Minerals Management could impact LLNB or MLNB by disturbing roosting bats and causing localized losses of agaves due to surface disturbance. Other related standards and guidelines (BIP-O-1, BIP-G-3, BIP-G-4, BIP-G-5, BIP-S-1, and BIP-S-2) guide Forest activities relative to occupied bat caves and mines.

The CNF is currently aware of approximately 29 mineral projects within EMAs where LLNB occur. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Eighteen of these projects are active and currently in place, while four projects are expected to occur in the foreseeable future, two are completed and five are withdrawn from consideration at the point. One project is located on the Douglas R.D. within the Dragoon EMA, four on the Santa Catalina R.D. within the Santa Catalina EMA, one on the Safford R.D. within the Galiuro EMA, eleven on the Nogales R.D. within the Santa Rita and Tumacacori EMAs, and twelve on the Sierra Vista R.D. within the Huachuca EMA.

There is a potential for mining operations to be excavated to a depth greater than that of the regional aquifer and water would drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body would continue to remove water from storage in the regional aquifer.

Motorized Transportation System

This program area could impact some localized agave forage plants where a new road might be built and in places where off-road travel occurs. MTS-S-1 states that the Motor Vehicle Use Map (MVUM) is the sole source of information regarding where motor vehicle use is allowed. Most district MVUMs identify a 300-foot buffer along each side of system roads where driving is allowed for the purposes of camping. The expected use of this 300-foot camping buffer would be low so the potential to impact agave populations would be considered insignificant.

Recreation Management

Recreation Management could impact possible LLNB or MLNB roosting sites through human disturbance. Spelunking is a popular activity on the CNF where hundreds of caves are known to occur within the range of LLNB and MLNB. Human disturbance of roost sites will be mitigated by plan components that protect known roost sites such as BIP-O-1. This objective could help protect LLNB and MLNB and their roosting habitat, if present, from human disturbance. The standard BIP-S-1ensures that pre-closure inspections would be performed to determine what species are present and for the safety of the public. The guideline ARP-G-5 could help protect LLNB and MLNB, if present, from human disturbance and disease.

Range Management

Livestock grazing is listed as a threat, in part because cattle may forage upon bolting agave stalks, but also because of the interaction of cattle within grassland and encinal woodland habitats. The guidelines listed below guide range use by limiting livestock grazing to levels that allow the persistence of native vegetation communities, which would encourage preservation and recruitment of paniculate agave. These guidelines, RAM-G-1, RAM-G-2, RAM-G-4, RAM-G-5, RAM-G-6, and RAM-G-7 would retain and enhance habitat for paniculate agaves to benefit the foraging needs of these two species.

Cumulative Effects

As defined in ESA (50 CFR §402.02), cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the federal action subject to consultation. For this consultation, the Action Area has been defined as the Coronado National Forest plus adjacent lands that the proposed action may directly or indirectly affect. In general, Arizona's population is expected to increase in the next 10 years. Increased urbanization results in loss of habitat or habitat suitability for federally listed species. Additional, the intensity of recreational activities is also likely to increase within the Action Area, particularly on Federal lands that are located adjacent or within a short driving distance of the major metropolitan areas of Phoenix and Tucson such as the Coronado NF (USFS 2011). Activities may be permitted which may affect individuals: private land commercial and residential development, recreation, caving, illegal collecting, mining, wildland fire, and overgrazing. These types of activities have occurred in the past and are likely to occur into the foreseeable future.

Although mineral withdrawals are recommended or considered in several management areas, mineral removal is prohibited in only one management area. Potential LLNB or MLNB roosts could be negatively impacted by the cumulative effect of multiple locatable minerals operations, as well as abandoned mine closures. Cave recreation is regulated; therefore, effects to long-nosed bat cave roosts are likely to be minimal. Recreation impacts to long-nosed bat foraging habitat are expected to be negligible due to the prohibition against OHV use on the Coronado.

Summary of Effects and Determination - Lesser long-nosed bat and Mexican long-nosed bat

Because the Coronado NF has a low road density, and guidance for a minimum transportation system and closure of unneeded roads, effects on long-nosed bat foraging habitat are expected to be minimal. Agave removal is prohibited in most management areas; therefore, effects on long-nosed bat foraging habitat are expected to be minimal. Livestock grazing does occur within potential habitat; however, effects are likely to be minimal due to 2002 Grazing Criteria guidelines.

Although mineral withdrawals are recommended or considered in several management areas, mineral removal is prohibited in only one management area. Potential roosts could be negatively impacted by the cumulative effect of multiple locatable minerals operations, as well as abandoned mine closures. Cave recreation is regulated; therefore, effects to long-nosed bat cave roosts are likely to be minimal. Recreation impacts to long-nosed bat foraging habitat are expected to be negligible due to the prohibition against OHV use on the Coronado.

Plan direction is to maintain or restore desired conditions within PNVTs where the LLNB and MLNB is likely found. Standards would require the protection of resources and wildlife, by addressing the pre-closure inspections and installation of bat gates. Guidelines would require the

protection of caves and mines from disturbance and possible introduction of disease, as well as the protection of agaves (VMP-G-5). Other guidelines would protect the soil resource and associated plants and require that not all areas within landscape scale treatment projects (i.e. grazing and fire) be impacted at once, spatially or temporally.

However, management and activities such as burning and livestock grazing would still have the potential to impact forage plants, and recreation activities would still have the potential to impact roosting habitat for the LLNB. The occurrences of such impacts would be limited and scattered across the 171,229 acres of desert, 440,559 acres of grassland, 155,177 acres of interior chaparral, and 765,181 acres of Madrean encinal woodland. Because these impacts would never reach the scale where take occurs, the effects of these activities are determined to be insignificant. Therefore, it is determined that implementation of the CNF LRMP **May Affect, but is Not Likely to Adversely Affect**, the lesser long-nosed bat and the Mexican long-nosed bat.

Birds

Mexican spotted owl_____(*Strix occidentalis lucida*)

Endangered Species Act Status:	Threatened
Recovery Plan:	2012
District Occurrence:	All
Critical Habitat:	Yes
Determination of Effects:	May affect, likely to adversely affect
Determination of Critical habitat:	May affect, likely to adversely affect

For brevity, the Mexican spotted owl is referred to as MSO throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/MSO.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: the Final Rule listing the MSO as a threatened species (USFWS 1993); in the Recovery Plan (USFWS 2012); and the 5-Year Review (USFWS 2013).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provides information about the MSO in FS Region 3. All these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

The CNF lies completely within the Basin and Range–West Recovery Unit for the MSO. Biologists have formally delineated 108 PACs within the boundaries of the CNF. Surveys within the last four years have identified additional areas that may be appropriate for PAC delineation. The CNF is working with the MSO lead to delineate possibly up to 21 new PACs, but they have not been delineated at the time of the writing of this document.. CNF PACs have been monitored sporadically since 1989. It is not possible to infer any trends related to the population of owls on the CNF.

Threats

Stand-replacing fires, improper livestock grazing (use levels and seasons), land development of facilities or structures and roads (including road maintenance) and recreation activities (often associated with motor vehicles such as ATVs) have contributed noise and disturbance to MSO and have been a threat to MSO and their habitat on the CNF. Other threats to MSO like West Nile virus, predation, wildland fire, or potential for Barred owls are outside of forest management.

Conservation

The Forest Service estimates 241,659 acres of protected habitat are present on the CNF outside of PACs and 78,524 acres of restricted habitat. Surveys in protected and restricted habitat may reveal the presence of additional PACs.

The CNF surveys for owls prior to the implementation of projects. If breeding owls are detected, PACs are established according to Recovery Plan recommendations.

The primary mechanism for species habitat recovery is from fuel reduction projects and fire management plans.

Species Effects for the Mexican spotted owl

Wildland-Urban Interface and Landscape-scale Fire

The Wildland-Urban Interface and Landscape-scale Fire represents all vegetation communities on the CNF within those areas of human populations and developments at imminent risk from wildfire. Treatment of these areas includes thinning, removal of fuels from the landscape, or altering the fuel profile to reduce the potential for loss of property. The treatment of WUI allows the CNF the flexibility to manage landscape-scale wildland fire for resource benefit.

Landscape-scale wildland fire is one of the methods for ecosystem restoration. The goal of this program is to enhance resiliency of all vegetation communities on the CNF by maintaining more sustainable fuel loads, improved habitat diversity, and watershed integrity. This program would reduce the risk of overall uncharacteristic fire impacts, and potentially to MSO foraging habitat.

Two objectives of this program area, VDM-O-1and VWM-O-1 include the treatment of 13,800 acres of dry mixed conifer and 2,400 acres of wet mixed conifer respectively every ten years. Treatment of these vegetation types will benefit MSO in the long-term, but will also have short-term effects to foraging habitat of MSO. Short term impacts would include change in stand structure which may impact nesting and foraging habitat; noise from thinning operations which would cause disturbance to any individuals in the area at the time of operations. Any site-specific treatments of MSO habitat will be designed to meet the goal ARP-G-1 which requires that all activities within federally listed species habitat should apply objectives and measures from species recovery plans. The use of wildland fire provides for desired PNVT conditions including maintaining species needed by wildlife. After a landscape scale fire, it also provides for reestablishment of native plants needed by wildlife and their prey. The guidelines VDM-G-1, VDM-G-2, VDM-G-3, VDM-G-4, VDM-G-5, VWM-G-1, VWM-G-2, VWM-G-3, VWM-G-4, VWM-G-5, and VWM-G-6 would retain and enhance habitat for prey species to benefit the foraging needs of MSO. Additionally, MOM-G-3 would retain standing dead snags greater than 12 inches diameter breast height (dbh) that would benefit MSO habitat. ARP-G-1 will be the overarching guidance for activities associated with this program area as it directs the forest to apply management objective in existing recovery plans to all activities occurring within federally

listed species habitat. The MSO recovery plan describes many standards for management of MSO and their habitat.

Water Resources – Natural

This program area has the potential to benefit MSO by improving habitat conditions. Restoration and development of water resources will make surface water more available for MSO and the prey they depend upon. The objectives that apply that would benefit MSO and their habitat in this program area are NWS-O-1 which encourages the CNF to apply for water rights and NWS-O-2 which would encourage reconstruction of springs to provide for the recovery of wildlife species. Specific goals such as NWS- G-1, 2, 3, and 4 will benefit MSO by improving habitat for the prey they depend on. Activities planned under these plan components will also be guided by ARP-G-1 to be consistent with the MSO Recovery Plan and have the potential to provide long-term benefit by improving riparian habitat and habitat for prey species.

Water Resources – Constructed

This program area has the potential to positively impact MSO by improving habitat conditions for prey species. The objective expressed in COW-O-1 is intended to reduce drowning mortality of small mammals and other wildlife associated with constructed waters such as livestock and wildlife troughs. The guideline COW-G-1 will help design future water sources and retrofit existing constructed water sources to meet this objective. Guideline COW-G-2 would enhance prey habitat for this species by providing artificial water sources year round and the guideline COW-G-3 allows for the creation or maintenance of wetland habitat features to provide prey habitat.

Animal and Rare Plants

The Species Diversity and Viability Report assessed the MSO. The viability report determined that MSO population trend was unknown and that the habitat was in a positive trend. The guideline ARP-G-1 would apply habitat management objective and protection measures from the MSO Recovery Plan.

Forest Products

This program area may have localized short term adverse effects but provide long term benefits through reduced likelihood of habitat loss from large wildland fires. Short term impacts would include change in stand structure which may impact nesting and foraging habitat; noise from thinning operations which would cause disturbance to any individuals in the area at the time of operations. All activities would be designed to comply with the MSO Recovery plan as a result of ARP-G-1. The objectives VWM-O-1 and VDM-O1 would treat at least 2,400 acres of wet mixed conifer and 13,800 acres of Dry Mixed Conifer respectively using wildland fire (planned and unplanned ignitions) and thinning over the 10 years following plan approval. This would benefit MSO and prey habitat by providing an open stand with various structural stages. The guidelines VDM-G-1 and VSF-G-1 would also ensure that these vegetation treatments continue to provide a continuous representation of old growth characteristics. MOM-G-1 and 2 are intended to protect and enhance meadow habitat important to MSO prey species. FOP-G-1 will ensure that making progress toward desired conditions is the goal of timber harvest.

The Forest Plan includes an objective to treat 2,500-10,000 acres every ten years to maintain watershed stability thereby maintaining the function and structure of riparian habitat (RIA-O-1). This objective is to be met by applying guidelines RIA-G-2, 3, and 4 which will limit livestock effects to riparian areas, retain large woody debris in stream channels, and favor the growth of

large diameter riparian trees. Treatments needed to accomplish these guidelines would, of course be designed as directed in ARP-G-1 to be consistent with the MSO Recovery Plan and have the potential to provide long-term benefit to the species by improving riparian habitat and habitat for prey species.

Minerals Management

The CNF is currently aware of approximately 29 mineral projects within EMAs where MSO occur. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Eighteen of these projects are active and currently in place, while four projects are expected to occur in the foreseeable future, two are completed and five are withdrawn from consideration at the point. One project is located on the Douglas R.D. within the Dragoon EMA, four on the Santa Catalina R.D. within the Santa Catalina EMA, one on the Safford R.D. within the Galiuro EMA, eleven on the Nogales R.D. within the Santa Rita and Tumacacori EMAs, and twelve on the Sierra Vista R.D. within the Huachuca EMA.
There is a potential for mining operations to be excavated to a depth greater than that of the regional aquifer and water would drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body would continue to remove water from storage in the regional aquifer.

Motorized Transportation System

This program area could impact possible MSO nesting and roosting sites through motorized entry. There are currently 99.88 miles of system roads within Protected Activity Centers on the CNF. Roads (including road maintenance) and related recreation activities (often associated with motor vehicles such as ATVs) have contributed noise and disturbance to MSO. Effects are variable depending on time of day/night, intensity, frequency, and distance to MSO. Persistent noises are likely more disruptive than infrequent disturbances, and intensity of disturbance is proportional to noise level. The motorized transportation system on the CNF is planned and managed under direction of the Travel Management Rule (36 CFR 212) and a separate NEPA process.

MTS-S-1 directs that motor vehicle use is allowed only where designated and depicted on the Motor Vehicle Use Maps (MVUM). ARP-G-1 guides the forest to apply measures defined in recovery plans for all activities that occur within federally listed species habitat.

Recreation Management

This program area could impact possible MSO nesting and roosting sites through recreational entry. Recreation activities such as OHV use, rock climbing, geo-caching, or camping have contributed noise and disturbance in MSO habitat. Effects are variable depending on time of day/night, intensity, frequency, and distance to MSO. Some developed recreation sites are within MSO habitat and some are adjacent to PACs; however, these sites have been in place for decades. Persistent noises are likely more disruptive than infrequent disturbances, and intensity of disturbance is proportional to noise level. Rock climbing is an increasingly popular activity on the CNF and at times may occur within or adjacent to PAC's. Forest Plan guideline REC-G-6 directs the forest to manage the activity to balance the needs of the climbing public with the needs of plant and animal species. However, the overarching guideline in the Forest Plan ARP-G-1 requires that activities are implemented consistent with recovery plans. The MSO recovery plan

guides land management agencies to minimize disturbance from recreational activities such ATV use and rock climbing in PAC's during the breeding season.

Cumulative Effects

As defined in ESA (50 CFR §402.02), cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the federal action subject to consultation. For this consultation, the Action Area has been defined as the Coronado National Forest plus adjacent lands that the proposed action may directly or indirectly affect. In general, Arizona's human population is expected to increase in the next 10 years. Increased urbanization results increased intensity of recreational activities within the Action Area, particularly on Federal lands that are located adjacent or within a short driving distance of the major metropolitan areas of Phoenix and Tucson such as the Coronado NF (USFS 2011). Activities may occur on private lands which may affect dispersing individual MSO: private land commercial and residential development, recreation, mining, wildland fire, and overgrazing. These types of activities have occurred in the past and are likely to occur into the foreseeable future. Implementation of the Forest Plan will not encourage these types of activities on adjacent private lands and therefore will not contribute incremental effects to MSO off Forest.

Summary of Effects and Determination

Based on the information provided above, the implementation of the CNF LRMP **May Affect, and is Likely to Adversely Affect**, the Mexican spotted owl.

Primary Constituents Elements of critical habitat - MSO

On 31 August 2004, the FWS designated approximately 3.5 million ha (8.6 million ac) of Critical Habitat for the Mexican spotted owl on Federal lands in Arizona, Colorado, New Mexico, and Utah (69 FR 53181). Within the critical habitat boundaries, critical habitat includes only Protected and Restricted habitats as defined in the original Recovery Plan (USFWS 1995). Protected areas include all known owl sites (PACs), all areas in mixed-conifer and pine-oak types with greater than 40 percent slopes where timber harvest has not occurred in the past 20 years and administratively reserved lands, such as Wilderness Areas or Research Natural Areas. Restricted habitat includes mixed-conifer forest, pine-oak forest, and riparian areas adjacent to or outside of protected areas. The primary constituent elements essential to the conservation of the owl include those physical and biological features that support nesting, roosting, and foraging.
The Primary Constituent Elements (PCE's) identified in the 1995 Recovery Plan are as follows:

1. Primary Constituent Elements Related to Forest Structure:
    - A range of tree species, including mixed-conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30-45% of which are large trees with a trunk diameter of ≥0.3 m (12 in) when measured at 1.4 m (4.5 ft) from the ground;

    - A shaded canopy created by the tree branches and foliage covering ≥40% of the ground; and,

    - Large, dead trees (i.e., snags) with a trunk diameter of at least 0.3 m (12 in) when measured at 1.4 m (4.5 ft) from the ground.

2. Primary Constituent Elements Related to Maintenance of Adequate Prey Species:

- High volumes of fallen trees and other woody debris; A wide range of tree and plant species, including hardwoods; and,

- Adequate levels of residual plant cover to maintain fruits, seeds, and allow plant regeneration.

3. Primary Constituent Elements Related to Canyon Habitat (one or more of the following):
- Presence of water (often providing cooler air temperature and often higher humidity than the surrounding areas);
- Clumps or stringers of mixed-conifer, pine-oak, pinyon-juniper, and/or riparian vegetation;
- Canyon walls containing crevices, ledges, or caves; and,
- High percentage of ground litter and woody debris.

Part or all of eleven critical habitat units occur within the boundaries of the CNF: BR-W-7, BR-W-8, BR-W-9, BR-W-10, BR-W-11, BR-W-12, BR-W13, BR-W-14, BR-W-15, BR-W-16, and BR-W-18. The critical habitat units encompass approximately 209,138 acres of protected habitat and approximately 62,622 acres of restricted habitat. Within the critical habitat boundaries, only areas that fit the definition of restricted or protected habitat in the Recovery Plan for the MSO are critical habitat. The areas (acres) listed above represent estimated critical habitat within the critical habitat units and not the total area for the critical habitat unit itself.

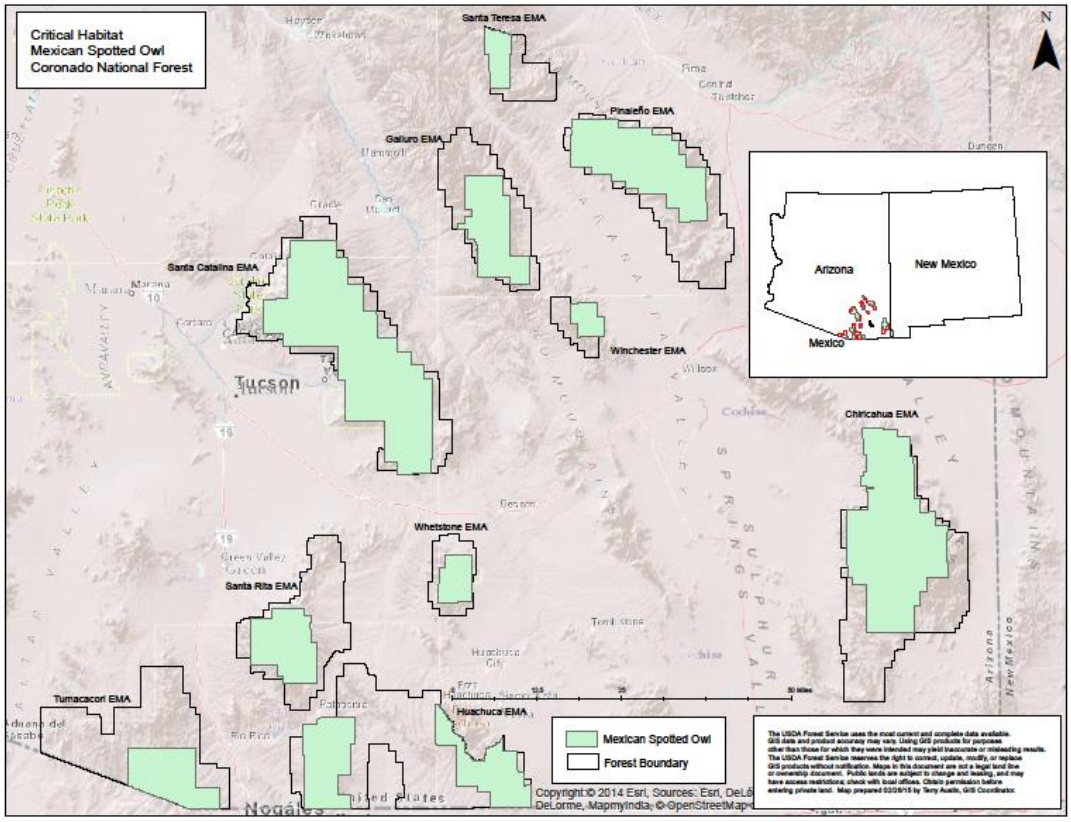

Figure 3. Map of MSO critical habitat on the CNF.

Critical habitat effects for the Mexican spotted owl

Wildland-Urban Interface and Landscape-scale Fire

The Wildland-Urban Interface and Landscape-scale Fire represents all vegetation communities on the CNF within those areas of human populations and developments at imminent risk from wildfire. Treatment of these areas includes thinning, removal of fuels from the landscape, or altering the fuel profile to reduce the potential for loss of property. The treatment of WUI allows the CNF the flexibility to manage landscape-scale wildland fire for resource benefit.

Landscape-scale wildland fire is one of the methods for ecosystem restoration. The goal of this program is to enhance resiliency of all vegetation communities on the CNF by maintaining more sustainable fuel loads, improved habitat diversity, and watershed integrity. This program would reduce the risk of overall uncharacteristic fire impacts, and potentially to MSO foraging habitat.

Two objectives of this program area, VDM-O-1and VWM-O-1 include the treatment of 13,800 acres of dry mixed conifer and 2,400 acres of wet mixed conifer respectively every ten years. These objectives have the potential to affect PCE's for MSO CH. Treatment of these vegetation types will benefit MSO in the long-term, but will also have short-term effects to foraging habitat. Any site-specific treatments of MSO habitat will be designed to meet the goal ARP-G-1 which requires that all activities within federally listed species habitat should apply objectives and measures from species recovery plans. The use of wildland fire provides for desired PNVT conditions including maintaining species needed by wildlife. After a landscape scale fire, it also provides for reestablishment of native plants needed by wildlife and their prey.

The guidelines VPP-G-1, 2, and 5, VDM-G-1, VDM-G-2, VDM-G-3, VDM-G-4, VDM-G-5, VWM-G-1, VWM-G-2, VWM-G-3, VWM-G-4, VWM-G-5, and VWM-G-6 also have the potential to affect PCE's in the short-term, but will have long-term benefits to habitat for this species. Additionally, MOM-G-3 would retain standing dead snags greater than 12 inches dbh that would directly manage for PCE 2 described above. ARP-G-1 will be the overarching guidance for activities associated with this program area as it directs the forest to apply management objective in existing recovery plans to all activities occurring within federally listed species habitat.

Water Resources – Natural

This program area could benefit critical habitat by ensuring that CNF has water rights to surface water associated with MDO CH. The objectives that apply specifically to PCE 3 are WS-O-1 to apply for 10 in-stream flow water rights in a 10 year period. And NWS-O-2 for the reconstruct of at least 3 developed springs every 10 years to provide aquatic habitat for the recovery of plant and/or animal species. These objectives would provide maintenance of PCE's 2 and 3 on the CNF.

Water Resources – Constructed

This program area has the potential to positively impact MSO CH by improving habitat conditions for the prey species (PCE 3). The objective expressed in COW-O-1 is intended to reduce drowning mortality of small mammals and other wildlife associated with constructed waters such as livestock and wildlife troughs. The guideline COW-G-1 will help design future water sources and retrofit existing constructed water sources to meet this objective. Guideline COW-G-2 would enhance prey habitat for this species by providing artificial water sources year round and the guideline COW-G-3 allows for the creation or maintenance of wetland habitat features to provide prey habitat.

Forest Products

This program area has the potential to impact PCE's of MSO critical habitat by altering forest structure or reducing quality of prey habitat. All activities would be designed to comply with the MSO Recovery plan as a result of ARP-G-1. The objectives VWM-O-1 and VDM-O1 would treat at least 2,400 acres of wet mixed conifer and 13,800 acres of Dry Mixed Conifer respectively using wildland fire (planned and unplanned ignitions) and thinning within 10 years following plan approval would benefit MSO and prey habitat by providing an open stand with various structural stages. The guidelines VDM-G-1 and VSF-G-1 would also ensure that these vegetation treatments continue to provide a continuous representation of old growth characteristics. MOM-G-1 and 2 are intended to protect and enhance meadow habitat important to MSO prey species. FOP-G-1 will ensure that making progress toward desired conditions is the goal of timber harvest.

The Forest Plan includes an objective to treat 2,500-10,000 acres every ten years to maintain stability thereby maintaining the function and structure of riparian habitat (RIA-O-1). This objective is to be met by applying guidelines RIA-G-2, 3, and 4 which will limit livestock effects to riparian areas, retain large woody debris in stream channels, and favor the growth of large diameter riparian trees. The guidelines VDM-G-1 and VSF-G-1 would also ensure that these vegetation treatments continue to provide a continuous representation of old growth characteristics. They directly address PCE's 1 and 2 and will thereby have the potential to provide long-term benefit the species by improving riparian habitat and habitat for prey species. Treatments needed to accomplish these guidelines would, of course be designed as directed in ARP-G-1 to be consistent with management of MSO CH.

Minerals Management

The CNF is currently aware of approximately 27 mineral projects within EMAs where MSO CH occurs. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Seventeen of these projects are active and currently in place, while three projects are expected to occur in the foreseeable future, two are completed and five are withdrawn from consideration at the point. Four projects are located on the Santa Catalina R.D. within the Santa Catalina EMA, eleven on the Nogales R.D. within the Santa Rita and Tumacacori EMAs, and twelve on the Sierra Vista R.D. within the Huachuca EMA.

There is a potential for mining operations to be excavated to a depth greater than that of the regional aquifer and water would drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body would continue to remove water from storage in the regional aquifer.

Motorized Transportation System

This program area could impact PCE's of MSO CH through road construction and maintenance activities. Road construction and maintenance have the potential to affect PCE 2 through direct disturbance of vegetation that prey species rely upon. The motorized transportation system on the CNF is planned under direction of the Travel Management Rule (36 CFR 212) and a separate NEPA process. Moreover, ARP-G-1 guides the forest to apply measures defined in recovery plans for all activities that occur within federally listed species habitat.

One objective related to the Motorized Transportation System MTS-O-1 will lead the CNF to maintain 150 miles of high clearance roads annually. Road maintenance can have the effect of

reducing downstream sedimentation of aquatic and riparian habitat thereby providing a means to assist in maintaining PCE 3. The goals MTS-G-2 and 3 discourage new road construction in meadows and riparian areas. MTS-S-1 directs that motor vehicle use is allowed only where designated and depicted on the Motor Vehicle Use Maps (MVUM).

Recreation Management

This program area could impact MSO critical habitat through construction or maintenance of recreation facilities. Recreation facility construction and maintenance is encouraged by objective REC-O-1 that seeks to reduce the backlog of deferred maintenance on the forest by 20% within five years of plan approval. Facility redesign and maintenance has the potential to affect PCE 1 by affecting vegetation structure and PCE 2 by locally reducing the availability of fallen trees and downed woody debris in the vicinity of picnic and campgrounds. All such activities would be compliant with ARP-G-1 which ensures that all projects in federally listed species habitat will apply guidelines of the appropriate recovery plan.

Summary of Effects and Determination of critical habitat - MSO

Based on the information provided above, the implementation of the CNF LRMP **May Affect, and is Likely to Adversely Affect**, critical habitat of the Mexican spotted owl.

Western yellow-billed cuckoo_____(*Coccyzus americanus occidentalis*)

Endangered Species Act Status:	Threatened
Recovery Plan:	None
District Occurrence	All
Critical Habitat:	Yes (Proposed)
Determination of Effects:	May affect, likely to adversely affect
Determination of Proposed Critical habitat:	No destruction or adverse modification; May affect, not likely to adversely affect

For brevity, the Western yellow-billed cuckoo is referred to as WYBC throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Yellow.htm (accessed 2014).

Status, Threats, and Conservation of the Species

Status

Results from an Arizona state-wide survey in 1999, which covered 426 km (265 mi) of river and creek bottoms, indicated that cuckoo numbers have markedly declined since. Although these surveys did not include any portions of the CNF, they show that overall, cuckoo populations in Arizona have declined.

Results from the Arizona Breeding Bird Atlas (Corman and Wise-Gervais 2005) showed that the highest concentrations of WYBC were in central and southeast Arizona. In particular, of the 22 confirmed breeding areas observed by atlasers, 11 of them (50%) occurred in Santa Cruz (5), Cochise (4), and southeast Pima Counties (2). Not surprisingly, they appeared to be clustered around major drainages like Sonoita Creek, Cienega Creek, the Santa Cruz River, and the San Pedro River.

Occurrence data specific to the Coronado National Forest is sparse. Arizona's Heritage Data Management System (HDMS) has nine records of yellow-billed cuckoo in three EMAs: Huachuca, Santa Rita, and Tumacacori (AZGFD 2012). The website ebird (http://ebird.org/content/ebird/) does show several observations of WYBC in almost every EMA, but these are not the results of formal surveys by professional biologists. A formal survey by WestLand Resources, Inc. (WestLand 2012 and 2013) detected several occurrences of WYBC among some major drainages in the Patagonia Mountains, and suggested possible breeding population was present. Although these surveys were conducted in drainages, the habitat is not considered a typical riparian gallery. Many of WestLand's detections were in areas dominated by oak (*Quercus* spp.) and juniper (*Juniperus* spp.) trees, with only a few, scattered sycamore (*Plantus wrightii*) trees present (WestLand 2012 and 2013). These results, along with ebird's anecdotal accounts, suggest that WYBC are utilizing parts of the Coronado that would not be classified as typical riparian woodlands (Corman and Wise-Gervais 2005).

Threats

As mentioned in the supporting documents from the FWS, the primary cause of decline in WYBC numbers has been attributed to the loss and degradation of riparian woodland habitat and the invertebrate communities that they support. Noss et al. (1995) reported 85%-98% declines in the distribution of riparian ecosystems in the United States due to destruction, conversion, or significant degradation in structure, function, or composition, since settlement by Europeans. Overall, a 90% loss of presettlement riparian ecosystems has occurred in Arizona (Arizona State Parks 1988, Bogan et al. 1998). Losses have been the most severe along the Gila and lower Colorado rivers, where human development and drought has been the most acute.

Conservation

The most substantial conservation efforts specific to WYBC in Arizona has occurred on the lower Colorado River. The WYBC is covered under the lower Colorado River (LCR), Multi-species Conservation Program (MSCP) (LCR MSCP 2004). The LCR MSCP conserves and manages the populations and habitat of all covered species. The LCR MSCP goals for the WYBC include maintaining existing important WYBC habitat areas and creating 4,050 acres of cottonwood-willow habitat. They also have an extensive monitoring program to check these restoration efforts for their effectiveness, and conducting long-term WYBC ecosystem monitoring along the entire lower Colorado River (LCR MSCP 2004).

Effects Analysis for the Yellow billed-cuckoo

Water Resources – Natural

The objectives: RIA-O-1; WET-O-1; MTS-O-5; NWS-O-1, 2, and 3; NWS-G-4 and 2; RIA-G-3, and 4; and COW-G-3 would restore and maintain riparian habitat which would benefit WYBC and their prey. WET-S-1 would ensure that existing wetland acreage would not be reduced due to management actions which would also be beneficial to this species. TUM-G-1 would enhance

and maintain riparian habitat which would benefit populations of WYBC in the Tumacacori Mountains.

For land ownership adjustments and boundary adjustments, LOA-G-3b and 3d would prioritize the acquisition of habitat important to WYBC and bring them under the management of the Forest.

Animal and Rare Plants

If WYBC become listed, ARP-G-1 would benefit this species by specifying what research and management actions are necessary to support recovery and allow the Forest to update their management objectives and species protection measures accordingly.

Minerals Management

This program area has the potential through land or facility development or activities to impact the WYBC and their prey, often through disturbance and potential loss/fragmentation of habitat. Effects to WYBC from the activities of this program are similar to the effects of roads. Access roads and the accompanying vehicle traffic are a necessary component of mineral activities. In most cases mineral removal also requires the use of heavy equipment on the site. In addition, surface occupancy causes direct habitat loss and the addition of human occupation increases the chances for harassment and possible mortality. The guideline MIN-G-1 would protect native species utilized by for reproduction and rearing purposes. There is a potential for mining operations to be excavated to a depth greater than that of the regional aquifer and water would drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body would continue to remove water from storage in the regional aquifer.

The CNF is currently aware of approximately 29 mineral projects within EMAs where WYBC occur. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Eighteen of these projects are active and currently in place, while four projects are expected to occur in the foreseeable future, two are completed and five are withdrawn from consideration at the point. One project is located on the Douglas R.D. within the Dragoon EMA, four on the Santa Catalina R.D. within the Santa Catalina EMA, one on the Safford R.D. within the Galiuro EMA, eleven on the Nogales R.D. within the Santa Rita and Tumacacori EMAs, and twelve on the Sierra Vista R.D. within the Huachuca EMA. Two active mineral explorations (Hermosa and Sunnyside) are currently in consultation with the USFWS concerning effects to WYBC.

Forest Products

Fuelwood and other forest products projects have occurred in habitat used by WYBC on the CNF and are expected to continue. These kinds of projects can have adverse effects on WYBC habitat. FOP-G-1 would ensure that timber harvesting activities would be consistent with making progress towards the desired conditions of the Forest Plan. The sale of forest products are often associated with thinning and fuels reduction projects or silvicultural treatments. Projects such as these can result in impacts to upland and aquatic habitat. The guidelines RIA-G-3, RIA-G-4, NWS-G-1, and NWS-G-3 would favor retention of large riparian woody debris and trees and minimize input of sediment into streams thereby increasing water quality, providing habitat with cover, reducing fuel buildup and regulating stream temperatures. These plan components would help to mitigate effects of the forest products program.

Motorized Transportation System

Designated roads, trails, and motorized recreation areas could impact WYBC and their habitat by removing riparian vegetation, the degradation of watershed function and integrity, and by disturbing individuals during maintenance activities. The effects on riparian habitat will be lessened by MTS-O-3, MTS-G-3, and RIA-G-1. Non-system roads in riparian habitat that will be decommissioned would benefit WYBC by allowing the recovery of vegetation and by reducing the potential of disturbance. Any construction that would occur would avoid riparian areas, if possible, and minimize effects to natural water flow and native vegetation. ARP-G-1 would ensure that any construction and maintenance activities would apply any protection measures specified in the species' recovery plan.

Recreation Management

This program area could impact some individuals through disturbance by recreationists, and potential degradation of habitat from activities such as camping and trailing. If any related impacts are identified in the species' recovery plan, ARP-G-1 would ensure that the appropriate protection measures would be followed.

Range Management

Grazing has the potential to negatively affect habitats used by cuckoos. Livestock can affect the recruitment of riparian vegetation, destabilize stream banks, exacerbate erosion, and ultimately alter the hydrologic function of watersheds. These potential effects will be eliminated by RAM-G-1, 4, 5, 6, and 7 and help the CNF achieve the desired condition of diverse and resilient ecosystems, including areas crucial to WYBC.

Cumulative Effects

As defined in ESA (50 CFR §402.02), cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the federal action subject to consultation. For this consultation, the Action Area has been defined as the Coronado National Forest plus adjacent lands that the proposed action may directly or indirectly affect. In general, Arizona's human population is expected to increase in the next 10 years. Increased urbanization results increased intensity of recreational activities within the Action Area, particularly on Federal lands that are located adjacent or within a short driving distance of the major metropolitan areas of Phoenix and Tucson such as the Coronado NF (USFS 2011). Population increase is expected within the life of this forest plan and therefore increased recreational activities are expected to occur within the CNF boundary. Activities may occur on private lands adjacent to the CNF boundary which may affect dispersing individuals. Implementation of the Forest Plan will not encourage these types of activities on adjacent private lands and therefore will not contribute incremental effects to WYBC off Forest.

Summary of Effects and Determination - WYBC

The USFS recognizes that projects and program activities implemented under the CNF LRMP may occur near or within riparian areas. The LRMP does contain S&Gs that can be utilized to reduce or eliminate impacts to individuals and the habitat of WYBC. Many of the activities outlined in the CNF LRMP may have short-term negative effects, i.e. fuelwood thinning and invasive species control, but the overall application of the LRMP is designed to produce long-term positive effects all listed species, including WYBC.

The CNF lacks extensive sections of riparian gallery forests that are important to the conservation and recovery of WYBC; however, it is adjacent to important recovery areas like the San Pedro and Santa Cruz Rivers. Management actions on the CNF, therefore, have the possibility of affecting these important areas. The Desired Conditions and Plan Components of the CNF LRMP are designed to maintain and improve watershed function and integrity, which will contribute to the conservation and restoration of these landscape-level habitats, and, in turn, aid in the recovery of WYBC.

Although typical preferred habitat does not occur on the CNF, WYBC has been documented and evidence suggests they may breed in its mesic canyons and drainages (WestLand 2012 and 2013). Several Objectives, Standards, and Guidelines in the CNF LRMP refer specifically to the conservation and restoration of riparian areas, drainages, wetlands, and other water-orientated habitats that may be used by WYBC. And, as more information accumulates about the habits of this species in secondary habitats like those on the CNF, LRMP components allow for additional management objectives and protection measures to be incorporated.

The implementation of the Coronado NF LRMP **May Effect**, and is **Likely to Adversely Affect** the Western Yellow-billed cuckoo.

WYBC Proposed Critical Habitat

The FWS proposed 546,335 acres of critical habitat in Arizona, California, Colorado, Idaho, Nevada, New Mexico, Texas, Utah and Wyoming for the WYBC on August 14, 2014. Of the 245,000 acres of critical habitat proposed in Arizona, approximately 125 acres occur on the CNF on the Santa Rita EMA in Critical habitat unit-45: AZ-37, Florida Wash. Approximately 700 acres of proposed critical habitat occur in streams and major drainages adjacent to the CNF.

Primary Constituents Elements

Primary constituent elements (PCE) specific to the WYBC are:

(1) *Riparian woodlands*. Riparian woodlands with mixed willow cottonwood vegetation, mesquite-thorn forest vegetation, or a combination of these that contain habitat for nesting and foraging in contiguous or nearly contiguous patches that are greater than 325 ft (100 m) in width and 200 ac (81 ha) or more in extent. These habitat patches contain one or more nesting groves, which are generally willow dominated, have above average canopy closure (greater than 70 percent), and have a cooler, more humid environment than the surrounding riparian and upland habitats.

(2) *Adequate prey base*. Presence of a prey base consisting of large insect fauna (for example, cicadas, caterpillars, katydids, grasshoppers, large beetles, dragonflies) and tree frogs for adults and young in breeding areas during the nesting season and in post-breeding dispersal areas.

(3) *Dynamic riverine processes*. River systems that are dynamic and provide hydrologic processes that encourage sediment movement and deposits that allow seedling germination and promote plant growth, maintenance, health, and vigor (e.g. lower gradient streams and broad floodplains, elevated subsurface groundwater table, and perennial rivers and streams). This allows habitat to regenerate at regular intervals, leading to riparian vegetation with variously aged patches from young to old.

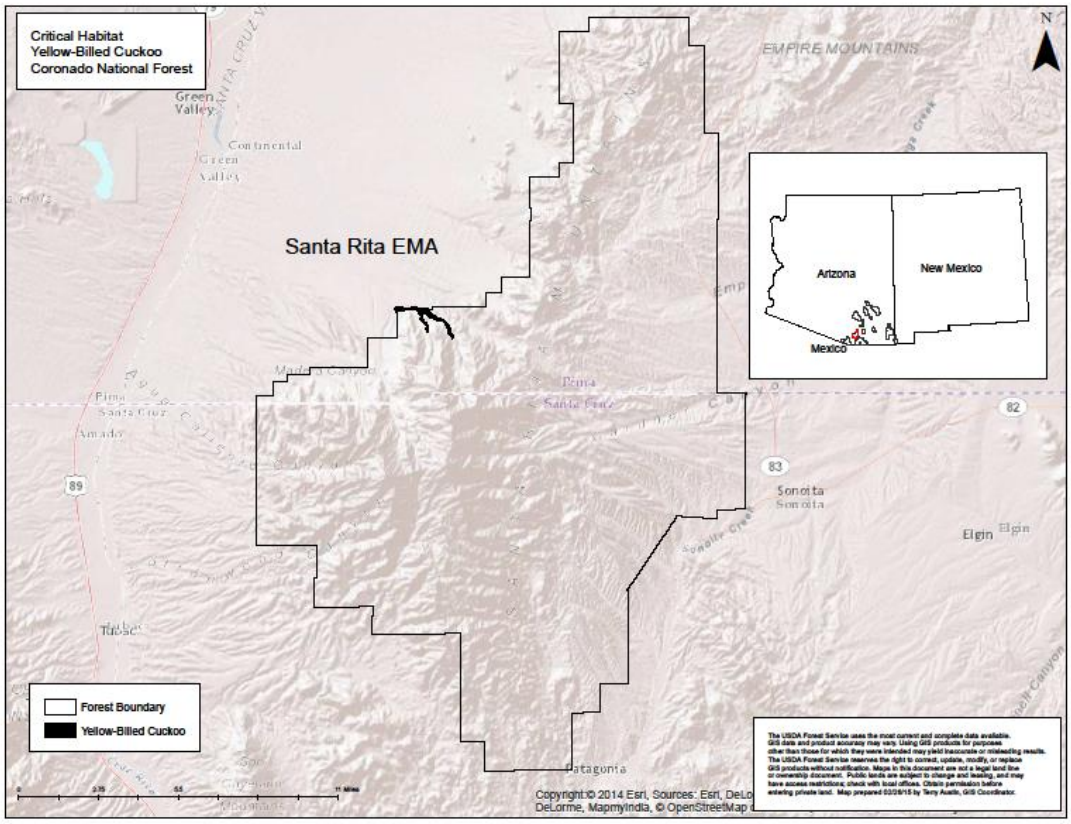

Figure 4. Map of WYBC critical habitat on the CNF.

Effects Analysis for WYBC Proposed Critical Habitat

Wildland-Urban Interface and Landscape-scale Fire

The Wildland-Urban Interface and Landscape-scale Fire represents all vegetation communities on the CNF within those areas of human populations and developments at imminent risk from wildfire. Treatment of these areas includes thinning, removal of fuels from the landscape, or altering the fuel profile to reduce the potential for loss of property. The treatment of WUI allows the Forest the flexibility to manage landscape-scale wildland fire for resource benefit.

Landscape-scale wildland fire is one of the methods for ecosystem restoration. The goal of this program is to enhance resiliency of all vegetation communities on the CNF by maintaining more sustainable fuel loads, improved habitat diversity, and watershed integrity.

All of the 125 acres of the WYBC critical habitat within the CNF is contained in a WUI. Management of WUI and Landscape-scale wildland fire has the potential to result in short term impacts to WYBC. The primary potential impacts from this treatment may include changes to habitat through structural changes or loss of nesting structure. The objectives of this program area (RIT-O-1,VDC-O-1,VIC-O-1,VME-O-1,VPO-O-1,VPP-O-1,WUI-O-1) is to restore uplands which would benefit riparian resources in the long-term, but could result in effects to riparian habitat through short-term watershed affects such as sedimentation. The objective RIA-0-1 would treat 2,500 to 10,000 acres every ten years specifically to maintain streams and riparian vegetation. The guideline NWS-G-3 would retain and benefit aquatic habitat by reducing

adjacent fuel buildup. These treatments would reduce the risk of overall long-term loss of WYBC habitat.

Water Resources – Natural

The objectives: RIA-O-1, MTS-O-5, and WET-O-1 would restore and maintain riparian habitat which would be beneficial to PCEs within critical habitat to this species. The standard WET-S-1 would ensure that existing wetland acreage would not be reduced due to management actions which would also be beneficial to critical habitat. The guidelines TUM-G-1 would enhance and maintain riparian habitat to the benefit of the PCEs within the critical habitat.

Invasive Species Management

This program area has the potential to help with removing invasive nonnative species. The guideline ISM-G-1 directly benefits these species by recommending the removal of non-native invasive animals in or near occupied habitat while the guideline RAM-G-6 will help in restoring native plant species. Herbicide and pesticide treatments are expected to continue under this plan as they have under the previous forest plan. The use of herbicide and pesticides can have adverse effects on aquatic species as well as upland species. Any potential future projects implemented under this plan would be assessed on a case by case basis to determine potential effects on individual species and to mitigate them. The use of pesticides may impact forage base for specific individual species.

Forest Products

The sale of forest products are often associated with thinning and fuels reduction projects or silvicultural treatments. Projects such as these can result in impacts to upland and aquatic habitat. The guidelines RIA-G-3, RIA-G-4, NWS-G-1, and NWS-G-3 would favor retention of large riparian woody debris and trees and minimize input of sediment into streams thereby increasing water quality, providing habitat with cover, reducing fuel buildup and regulating stream temperatures. These plan components would help to mitigate effects of the forest products program. The guidelines RIA-G-3 and RIA-G-4 stipulate vegetation treatments should favor the retention of large diameter woody debris in and near stream channels, as well as snags and growth of large riparian trees which would benefit PCEs in critical habitat by providing perching, foraging and nesting habitat as well as prey habitat.

Minerals Management

There are no current or proposed mines or accompanying operations within the WYBC critical habitat area of 125 acres on the CNF. However, several mines are located downstream of this critical habitat so there is a potential for mining operations to be excavated to a depth greater than that of the regional aquifer and water would drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body would continue to remove water from storage in the regional aquifer.

Motorized Transportation System

Approximately 921 feet of system roads occur within the critical habitat on the CNF, with so a minimal amount of road the management would have little to no effect on any PCEs. Although

the guidelines MTS-G-3, RIA-G-1, 3, and 4 would help minimize potential negative effects and would promote the hydrologic integrity and the retention of important riparian vegetation.

Range Management

Approximately 18 acres of the proposed WYBC critical habitat on the CNF is included in an active allotment. Direct and Indirect effects from this grazing allotment could increase erosion and sedimentation, and introduce invasive vegetation, however since the acreage is so small the effects would be insignificant and discountable. Any potential affects will be mitigated by RAM-G-1, 2, 4, 5, 6, and 7 and help the CNF achieve the desired condition of diverse and resilient ecosystems, including areas crucial to WYBC.

Recreation Management

This program area has the potential through recreation activities to impact WYBC or their prey, through disturbance and potential loss/fragmentation of habitat as stated under the Natural Water Resources section above, however since the acreage is 125 acres the impacts would be insignificant and discountable, as there is no access to this area. The use of motorized vehicles represents a popular and growing form of recreation on the CNF. Under the Standard MTS-S-1, motor vehicle use is restricted to existing roads.

Cumulative Effects

As defined in ESA (50 CFR §402.02), cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the federal action subject to consultation. For this consultation, the Action Area has been defined as the Coronado National Forest plus adjacent lands that the proposed action may directly or indirectly affect. In general, Arizona's population is expected to increase in the next 10 years. Increased urbanization results in loss of habitat or habitat suitability for federally listed species. Additionally, the intensity of recreational activities is also likely to increase within the Action Area, particularly on Federal lands that are located adjacent or within a short driving distance of the major metropolitan areas of Phoenix, Tucson, Albuquerque, and Santa Fe such as the Coronado NF (USFS 2011). Activities may be permitted which may affect individuals: private land commercial and residential development, groundwater pumping and water diversions, recreation, illegal collecting, mining and related contaminants, wildland fire and altered fire regimes, and overgrazing. These types of activities have occurred in the past and are likely to occur into the foreseeable future.

Summary of Effects and Determination of proposed critical habitat - WYBC

Of the 245,000 acres of critical habitat proposed in Arizona, approximately 125 acres occur on the CNF on the Santa Rita EMA within Florida Wash. The S&Gs in the Coronado LRMP seek to mitigate or prevent impacts on wildlife and plant diversity. Some plan direction is contained within the LRMP for avoiding riparian effects from roads. In general, guidance provided by the LRMP should assist in minimizing or, under certain circumstances, avoiding adverse effects to proposed WYBC critical habitat from prescribed fire management activities. The Coronado NF LRMP also seeks to provide livestock grazing on a sustainable basis and maintaining or improving riparian and watershed conditions. Direct and indirect effects, may take place as the result of the implementation of S&Gs pertinent to rangeland management, but overgrazing is not likely to result since grazing only occurs on 18 acres of the 125 acres on the CNF and the effects would be insignificant and discountable. Therefore, based on the analysis of plan components and Resource Programs, the effects to WYBC are expected to be insignificant or discountable at the

programmatic level, so the implementation of the Coronado LRMP **May Affect, and is Likely to Adversely Affect** WYBC proposed critical habitat.

Northern Aplomado falcon_____(*Falco femoralis septentrionalis*)

Endangered Species Act Status:	Non-essential experimental population in AZ and NM
Recovery Plan:	1990
District Occurrence	Douglas
Critical Habitat:	None
Determination of Effects:	Not likely to jeopardize

For brevity, the Northern Aplomado falcon is referred to as falcon throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Aplomado.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: the Final Rule listing the falcon as an endangered species (USFWS 1986); in the Recovery Plan (USFWS 1990); and in the 5-Year Review (USFWS 2014).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the Northern Aplomado falcon in Forest Service Region 3. All these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

A nonessential experimental population (10 (j)) for the Northern aplomado falcon was established in 2006 to include both Arizona and New Mexico. The action allowed for the reintroduction of up to 150 Northern aplomado falcons annually for 10 or more years into New Mexico. Currently, reintroduction sites are only on lands within New Mexico but falcons would be allowed to disperse into Arizona as part of the 10(j) population. To achieve species recovery and manage the falcon reintroduction program, the USFWS identified the experimental populations as all falcons found within the 10(j) area, including reintroduced falcons and any lone dispersers and their offspring (USFWS 2006). Arizona Department of Game and Fish is supportive of having falcons re-establish in the State under a 10(j) designation, but does not wish to conduct reintroductions. The 10(j) designation provides for the designation of specific reintroduced populations of listed species as ‘‘experimental populations” where Regulatory restrictions are considerably reduced on private lands as well as Federal lands managed by the USFS.

The Northern aplomado falcon is not known to occur regularly on lands administered by the CNF. Moderately suitable habitat for nesting and/or foraging exists within the USFS lands in the Peloncillo Mountains of the Coronado NF in New Mexico and the Chiricahua Mountains of the Coronado NF in Arizona. The Coronado Ecological Sustainability Report prepared for the LRMP revision states that semi desert grasslands make up 26 percent of the Coronado NF. Around 27 percent of these lands are currently in an open, native condition, similar to the reference condition. Another 42 percent have been invaded by shrubs, but have the potential to be restored

to an open, native condition through appropriate management actions. Some species such as the Aplomado falcon are considered locally rare and on the fringe of their normal range, so the Coronado NF probably provides suboptimal habitat.

Although the distance of juvenile dispersal is not well known for the Aplomado falcon, a 1993 to 1994 study of radio tagged falcons released in south Texas revealed that from two to six months post-release the movements of monitored falcons monitored did not extend beyond 6 miles from their birth location (Perez *et al*. 1996). Long range dispersals have, however, been recorded for other released falcons. One falcon is known to have dispersed 155 miles (USFWS 2006). The Peloncillo Mountains are located approximately 60 miles from a successful nest site near Deming, New Mexico. Therefore, it is conceivable that Aplomado falcons could utilize suitable nesting or foraging habitat found on Coronado NFS lands over a period of time.

Threats

The following discussion is taken partially from the 2006 USFWS Federal Register Notice for the Establishment of a Nonessential Experimental Population of Northern Aplomado falcon in New Mexico and Arizona; Final Rule. The final rule describes threats to the Northern Aplomado falcon. Portions of the final rule are incorporated by reference into this document as summarized below:

- The Aplomado falcon is at the northern limits of its continental range in southeastern Arizona, southern New Mexico, and western and southern Texas; and, therefore, possibly vulnerable to small changes in habitat quality in this region. Prior to the mid-1940s severe overgrazing, by domestic livestock, fire suppression and resultant brush encroachment in the Southwest has been most frequently implicated as the principal cause for the species' decline. Direct adverse effects of livestock grazing on potential falcon prey species have also been suggested as a possible cause. In southern Texas, relatively high numbers of falcon eggs and specimens were collected by professional collectors during the early-1900s and possibly contributed to the disappearance of Aplomados in that region. In portions of the Aplomado's former desert range, large tracts of native grassland have been converted to pasturelands and croplands, thereby further reducing the extent and quality of Aplomado falcon habitat. Other threats include direct loss of habitat from various forms of human development, secondary lead poisoning through ingestion of game birds (doves and quail), electrocution by improperly designed electrical transmission lines, and human disturbance in breeding areas, although falcons appear to be tolerant to some disturbance.

Conservation

No recovery efforts have been implemented by the Coronado NF specifically for the Northern aplomado falcon. The recovery plan for the species or recent Federal Register Notices related to the species do not identify the Region national forests anywhere as having any connection with species recovery. An active and ongoing Aplomado falcon release effort is currently ongoing in New Mexico on private lands and areas managed by the BLM and DOD. The USFWS began reintroducing Aplomado falcons into historical habitat in southern New Mexico in 2006 for the purpose of establishing a viable resident population in New Mexico and Arizona. This action is part of series of reintroductions and other recovery actions that the USFWS, Federal and State agencies, and other partners are conducting throughout the specie’s historical range. Therefore, the number of Aplomado falcons in New Mexico will likely increase over the next 5 to 10 years and falcons may eventually disperse into suitable habitat on the Coronado NF in New Mexico and Arizona. The fact that potentially suitable habitat does exist on NFS lands within the Action Area suggests that USFS activities could impact this species in the future.

Species and Habitat Effects for the Aplomado falcon

The proposed action would result in plant composition trending toward desired conditions, as would plant density, individual plant basal area, and root density in the surface soil horizon. The proposed action defines desired conditions based on the current science for grassland communities and provides management objectives and guidelines that would provide a framework for implementing site-specific projects to achieve desired conditions. These plan components would result in planned and unplanned ignitions and mechanical treatments on at least 72,000 acres to maintain open, native grasslands with appropriate shrub and overstory cover. Desired conditions and objectives would improve habitat quality and threats to the falcon associated with loss of habitat conditions. The proposed action would maintain grasslands in a more open state that would restore fire to its characteristic role in these communities. The reduction of shrub encroachment and the promotion of continuous fuels would increase fire spread and improve nutrient cycling, thus improving the health and vigor of individual plants that support bats and provide food sources. Encouraging characteristic disturbance in the grasslands also promotes a functioning system and further maintains the open, native states described by the desired conditions.

Wildland-Urban Interface and Landscape-scale Fire

Within this program area, activities are performed which are evaluated on a site-specific basis for impacts to the Aplomado falcon. Prescribed fire is beneficial for falcon habitat and their prey habitat by keeping brush encroachment down.

Animal and Rare Plants

The standard CHI-S-2A requires special use permits for the collecting of any animal species thereby reducing the likelihood of loss of falcons through collection. The guideline ARP-G-3 protects active raptor nests during nesting season.

Forest Products

The sale of forest products are often associated with thinning and fuels reduction projects or silvicultural treatments. Projects such as these can result in impacts to upland and aquatic habitat. The guidelines RIA-G-3, RIA-G-4, NWS-G-1, and NWS-G-3 would favor retention of large riparian woody debris and trees and minimize input of sediment into streams thereby increasing water quality, providing habitat with cover, reducing fuel buildup and regulating stream temperatures. These plan components would help to mitigate effects of the forest products program.

The two objectives CHI-O-1 and DRA-O-1 would ensure that treatments will be consistent with the objectives for Forestwide vegetation communities and resources benefitting falcon habitat and prey habitat. The standards CHI-S-1A and CHI-S-1B would also benefit habitat prohibiting vegetation treatments, new road construction or other improvements, including harvest of forest products and fuelwood within this area.

Recreation Management

The guidelines DRA-G-1and DRA-G-3 would minimize areas of disturbance from recreationists for the falcon.

Range Management

Within this program area, activities are performed which are evaluated on a site-specific basis for impacts to the Aplomado falcon. The guidelines RAM-G-1, RAM-G-2, and RAM-G-7 would mitigate potential adverse effects to falcon prey habitat by regulating grazing levels from light to moderate intensity, while also deferring burned areas to ensure growth and reproduction of desired plant species while maintaining or enhancing habitat for wildlife.

Cumulative Effects

Arizona's population is expected to increase in the next 10 years. Increased urbanization results in loss of habitat or habitat suitability for species. Additionally, the intensity of recreational activities is also likely to increase within the Action Area, particularly on Federal lands that are located adjacent or within a short driving distance of the major metropolitan areas of Phoenix, Tucson, Albuquerque, and Santa Fe such as the Coronado NF (USFS 2011).

Summary of Effects and Determination – Northern Aplomado Falcon

Within the drier grasslands of New Mexico and Arizona, the decline of the Northern aplomado falcon may have resulted from several causes; however, substantially altered grasslands through farming practices and improper grazing that reached its peak during 1870-1890 (Hastings and Turner 1965) is likely a major contributor to the decline of the species (USFWS 2003).

The USFS recognizes that projects and program activities implemented under the Coronado NF LRMP may occur near or within falcon habitat. The LRMP does contain S&Gs that can be utilized to reduce or eliminate impacts to the species. However, activities may be permitted which may affect individuals. Overgrazing and fire suppression have the potential to affect individual falcons. These types of activities have occurred in the past and are likely to occur into the foreseeable future.

Currently, no nesting or foraging Northern aplomado falcons are known to occur on NFS lands of the Region. There is, however, moderately suitable foraging and nesting habitat on the Coronado NF that could be colonized over the period of 5 to 10 years. If Northern aplomado falcons are found on USFS lands in the future, surveys would be conducted and protection of nesting and foraging habitats would be implemented. The determination for the implementation of the Coronado LRMP is **Not Likely to Jeopardize** the continued existence of the §10(j) non-essential, experimental population.

Amphibians/Reptiles

Sonoran tiger salamander_____(*Ambystoma mavortium stebbinsi*)

Endangered Species Act Status:	Endangered
Recovery Plan:	2002
District Occurrence	Sierra Vista
Critical Habitat:	None
Determination of Effects:	May affect, likely to adversely affect

For brevity, the Sonoran tiger salamander is referred to as STS throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Sonora_sal.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: the Final Rule listing the STS as an endangered species (USFWS 1997); in the Recovery Plan (USFWS 2002); and the 5-Year Review (USFWS 2007).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the STS in Forest Service Region 3. All these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

The STS is known from 71 localities, although not all are currently occupied and some probably do not represent breeding sites. During surveys by the AGFD (AGFD) from 2001-2006, STS were found at 37 of 139 stock tanks, which were sampled from 1 to 7 times each. At 23 of 29 tanks where salamanders were found, and which were sampled more than once, salamanders were not found on at least one visit. All sites where STSs have been found in Arizona are located in the Santa Cruz and San Pedro river drainages, including sites in the San Rafael Valley and adjacent portions of the Patagonia and Huachuca mountains in Santa Cruz and Cochise counties. All confirmed historical and extant aquatic populations are found in cattle tanks or impounded ciénegas within 19 miles of Lochiel, Arizona. In the past, salamanders were collected from a ciénega at Rancho Los Fresnos in the San Rafael Valley, Sonora, and they were likely A. m. stebbinsi. However, surveys during 2006 and 2007 failed to locate additional salamanders, and most waters on the ranch were occupied by non-native bullfrogs, crayfish, green sunfish, and/or black bullhead (USFWS 2009).

The recommendation in the 5-year review (USFWS 2007) was to leave the species status unchanged. It also stated that there were insufficient sample sizes for population trend analysis, and the level of public interest and/or scientific uncertainty or controversy for the species is low. The review stated that at least 5 years of data collected in accordance with the current protocol would be necessary to begin to assess any trend in the population. The STS monitoring protocol is set up to detect a 5 percent change in population trends with a minimum of 10 years of data, so it will likely require more time before a more telling trend analysis can be conducted. However, the data does verify that when non-native fish and/or frogs are present in high numbers in cattle tanks, the salamanders are usually absent, and if they are removed, the salamanders come back.

The Coronado NF accounts for approximately 90 percent of the known STS sites in its entire range. Most all known extant populations are within cattle tanks/ponds.
Recent genetic analysis confirmed that barred salamanders (*A. m. mavortium*) or hybrids between barred salamanders and STS are present at seven stock tanks along Highway 83 and near Parker Canyon Lake in the San Rafael Valley. A salamander population in Garden Canyon, Fort Huachuca, near the crest of the Huachuca Mountains, also contained hybrids, but this population has apparently disappeared. Barred salamanders are likely present due to their use as fish bait in and around Parker Canyon Lake (2009). Non-native predators (fish and bullfrogs) continue to be a significant threat to STS as infested cattle tanks within the STS's range continue to be confirmed on the Coronado NF. Eradication of these non-native species is ongoing.

The 5-year review for the STS (USFWS 2007) was not peer-reviewed because: it resulted in a commendation to leave the status unchanged, most new information was previously peer-

reviewed, there were insufficient sample sizes for population trend analysis, and because the level of public interest and/or scientific uncertainty or controversy is low. For further discussion on the status of the STS, see the STS species section and the 5-year review (USFWS 2007).

Threats
For detailed descriptions of the threats to the STS, we incorporate by reference the following documents: Sonoran Tiger Salamander Recovery Plan (USFWS 2002); BA-BO 2005; and USFWS 2009. No new threats to the salamander or its habitat are known at this time (USFWS 2007). The primary threats to the STS include predation by non-native fish and bullfrogs, diseases, catastrophic floods and drought, illegal collecting, introduction of other subspecies of salamanders that could genetically swamp STS populations, and stochastic extirpations or extinction characteristic of small populations (USFWS 2009).

Conservation
A STS recovery plan was completed in 2002, which outlines goals and objectives for downlisting to threatened status by 2007. Part of the recovery plan describes recovery actions the Coronado NF could implement in order to assist recovering the species. In addition, the Coronado NF and USFWS co-authored a "Stock Pond Management and Maintenance Plan" (SPMMP) specific to the needs and recovery efforts of the STS.

Over the past 7 years, the Coronado NF has partnered with the AGFD in survey efforts for the STS. In addition, the Coronado NF has continued to evaluate tanks for potential habitat restoration projects, eliminate stock ponds where bullfrogs were breeding, and manipulated water levels to facilitate extermination of exotic species. Volunteers, public agencies and TNC were invaluable participants in some of these recovery efforts. Lastly, the Coronado NF continues to implement the SPMMP.

Arizona treefrog (Huachuca/Canelo DPS)_____(*Hyla wrightorum*)

Endangered Species Act Status:	Candidate
Recovery Plan:	None
District Occurrence	Sierra Vista
Critical Habitat:	None
Determination of Effects:	(*If listed*) May affect, likely to adversely affect

For brevity, the Arizona tree frog is referred to as ATF throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located in the CNF DEIS and NatureServe website.

Status, Threats, and Conservation of the Species

Status

All U.S. sites are small, ranging from stock tanks to short reaches of streams. Estimated breeding habitat in the U.S. is probably less than 10 acres (ac) (less than 4 hectares (ha)) (roughly 70% U.S. Forest Service (USFS) – Coronado National Forest, and 30% U.S. Army - Fort Huachuca). In Sonora, breeding habitat consists of ciénegas (spring-fed wetlands) that are similar to small prairie potholes or vernal pools, or occur as slowly moving ephemeral drainages.

In summary, the Huachuca-Canelo population is known from three general localities at Rancho Los Fresnos, Sonora, Mexico and 13-15 verified localities and one unverified locality in the Huachuca Mountains and Canelo Hills, Arizona. The Arizona localities include 11 different canyons or drainages. All but one of those drainages (Turkey Creek) are in the Huachuca Mountains. Turkey Creek originates on the northeastern slope of the Canelo Hills, which is the range of hills just west of the Huachuca Mountains. Elevations of specific localities range from about 5,000-8,500 ft (1,525-2,590 m). The species likely occurs or occurred in other wet canyons with suitable breeding habitat in the Huachuca Mountains, and perhaps in ciénegas in the vicinity of Rancho Los Fresnos.

Threats

The greatest threat to the Huachuca-Canelo population in Arizona is catastrophic wildfire and subsequent erosion, sedimentation, and ash flow through the habitats of this frog. Fire frequency and intensities in southwestern forests are much altered from historical 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 1870-1900, these frequent ground fires ceased to occur due to intensive livestock grazing that removed fine fuels coupled with effective fire suppression in the mid to late 20th century that prevented frequent, widespread ground fires (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). Lack of vegetation and forest litter following intense crown fires exposed soils to surface erosion during storms, often causing high peak flows, sedimentation, and erosion in downstream drainages (DeBano and Neary 1996).

Conservation

Grazing activities may benefit the Arizona treefrog if ranchers maintain stock ponds that are suitable for breeding by treefrogs. The pond in Scotia Canyon where the frogs breed is a livestock impoundment.

Chiricahua leopard frog and critical habitat_____(*Lithobates chiricahuensis*)

Endangered Species Act Status:	Threatened
Recovery Plan:	2007
District Occurrence	Douglas, Nogales, Sierra Vista, and Safford
Critical Habitat:	Yes
Determination of Effects:	May affect, likely to adversely affect
Determination of Critical habitat:	May affect, not likely to adversely affect

For brevity, the Chiricahua leopard frog is referred to as CLF throughout the document. In addition, primary constituent elements of critical habitat are referred to as PCEs. The original listing cited the species as *Rana chiricahuensis*.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/CLF.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: the Final Rule listing the CLF as threatened species (USFWS 2002); in the Recovery Plan (USFWS 2007); and the 5-Year Review (USFWS 2011).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the CLF in Forest Service Region 3. All these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

In Arizona, the frog still occurs in seven of eight major drainages of historical occurrence (Salt, Verde, Coronado, San Pedro, Santa Cruz, Yaqui/Bavispe, and Magdalena river drainages), but appears to be extirpated from the Little Colorado River drainage on the northern edge of the species' range. Within the drainages where the species occurs, it was not found recently in some major tributaries and/or in river mainstems. For instance, the species has not been reported since 1995 from the following drainages or river mainstems where it historically occurred: White River, West Clear Creek, Tonto Creek, Verde River mainstem, 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 areas: Pinaleno Mountains, Peloncillo Mountains, and Sulphur Springs Valley. Moreover, the species is now absent from all but one of the southeastern Arizona valley bottom cienega complexes. Large valley bottom cienega complexes may have once supported the largest populations in southeastern Arizona, but non-native predators are now so abundant that the cienegas do not presently support the frog in viable numbers (USFWS 2002).

A review of the status of the species in Arizona from 2002, when the species was listed, to 2009 was conducted by Rorabaugh (2010). Overall, the data suggest that there has been an increase in the number of occupied sites from 2002-2009. However, the increase in sites may only represent a positive response to temporarily favorable environmental conditions (i.e., such as adequate summer rains in rare years that allow for limited dispersal, rather than an intrinsic improvement that will endure over time due to factors such as long-term drought) and/or it could be a result of our underestimating the number of sites in 2002 due to lack of surveys in areas the frog actually occurred in at that time.

Chiricahua leopard are found in several special areas that have inherent protections by their designation, such as the Goodding RNA, a natural water system that harbors the heart of the Sycamore Canyon metapopulation.

Threats

The recovery plan lists the following threats to habitat or range of the CLF: contaminants; mining, including mining-related contaminants; dams; diversions; stream channelization; groundwater pumping; woodcutting; urban and agricultural development; road construction; grazing by livestock and elk; climate change; and altered fire regimes. Habitat threats that remain important today are degradation and loss of habitat as a result of drought, water diversions and groundwater pumping; livestock management that degrades frog habitat; a history of fire suppression and grazing that has increased the likelihood of crown fires; mining; development; environmental contamination; disruption of metapopulation dynamics via physical blockage of dispersal corridors; and the dynamic nature of frog habitats. Although these threats are widespread and varied, a threats assessment that was accomplished as part of the recovery plan showed predation by non-native species (Section 2.3.2.3) and chytridiomycosis (Section 2.3.2.3) as consistently more important threats than these habitat-based factors (USFWS 2007).

Predation by non-native organisms, especially American bullfrogs, fish, and crayfish; the fungal disease chytridiomycosis and other disease parasites such as post metamorphic death syndrome,

six species of trematode, and one species of nematode (Sredl and Jennings, 2005) are the primary threat to the CLF. Disease, particularly infection caused by *Bd*, has accounted for the majority of CLF declines. This disease seems to present more of a threat the frog in New Mexico than it does in Arizona, perhaps due to the higher elevations and cooler conditions found at sites in New Mexico.

Other threats include drought; floods; degradation and loss of habitat as a result of water diversions and groundwater pumping, livestock management that degrades frog habitats, catastrophic wildfire (fire-prone upland habitats) resulting from a long history of fire suppression, mining, development, and other human activities; disruption of metapopulation dynamics; increased chance of extirpation or extinction resulting from small numbers of populations and individuals existing in dynamic environments; and environmental contamination such as runoff from mining operations and airborne contaminants from copper smelters. To address habitat threats to the frog, the Southwest Endangered Species Act Team (2008) published "CLF (*Lithobates* [*Rana*] *chiricahuensis*) considerations for making effects determinations and recommendations for reducing and avoiding adverse effects." This document includes detailed descriptions of how fire management, construction, native fish recovery, and livestock management projects may affect the frog and its habitat. Loss of CLF populations fits a pattern of global amphibian decline, suggesting other regional or global causes of decline may be important as well, such as elevated ultra-violet radiation, pesticides or other contaminants, and climate change (USFWS 2007). The Recovery Plan provides detailed descriptions of each threat and the discussion on pages 20 through 45 is incorporated by reference into this document.

Conservation

The Coronado NF occurs in three recovery units identified in the CLF recovery plan. In Recovery Unit 1 (Tumacacori-Atascosa-Pajarito Mountains, Arizona and Mexico) there are several populations or metapopulations on the Coronado NF. Sycamore Canyon is the only significant site with moving water in Recovery Unit 1 to support breeding CLFs. Most other sites are livestock tanks or impounded springs. The Sycamore Canyon site which includes the Bear Valley Ranch Tank, Rattlesnake Tank, and Atascosa Canyon downstream of Bear Valley Ranch were all occupied by CLFs at the time of listing. Currently, Sycamore Canyon, Yank Tank, North Mesa Tank, South Mesa Tank, and Bear Valley Ranch Tank are occupied. The next population is at Bonita, Upper Turner, and Mojonera Tanks. Two breeding sites (Bonita Tank and Mojonera Tank), combined with a dispersal site or site where breeding and recruitment may occur in wet years (Upper Turner Tank), form the nucleus for a future metapopulation. Three additional waters—Sierra Tank East, Sierra Tank West, and Sierra Well—may have the potential to support breeding with habitat work. Frogs currently occupy Bonita and Mojonera Tanks. Pena Blanca Lake/Spring and Associated Tanks is the third population area that includes Pena Blanca Lake, Pena Blanca Spring, Summit Reservoir, Tinker Tank, Thumb Butte Tank, and Coyote Tank. These sites were all occupied in 2009. CLFs and tadpoles were found in Pena Blanca Lake in 2009 and 2010, after the lake had been drained and then refilled, which eliminated the nonnative predators. However, early in 2010, rainbow trout (*Oncorhynchus mykiss*) were restocked back into the lake, and AGFD plans to reestablish a variety of warm water fishes, as well.

Recovery Unit 2 (Santa Rita-Huachuca-Ajos Bavispe, Arizona and Mexico) also hosts several population sites on the Coronado NF. The Florida Canyon site was augmented with frogs from elsewhere in the Santa Rita Mountains in 2009. The site was enhanced in 2010, with the addition of a steel tank for breeding. The eastern slope of the Santa Rita Mountains is another population site which includes two metal troughs in Louisiana Gulch, Greaterville Tank, Los Posos Gulch Tank, and Granite Mountain Tank complex. The Granite Mountain Tank complex includes two impoundments and a well. All but Los Posos Gulch Tank are currently occupied breeding sites. More than 60 frogs were observed at Los Posos Gulch Tank in 2008. It was once thought to be a

robust breeding site; however, it dried, and the frogs disappeared in 2009. Scotia Canyon is another population area where breeding habitat occurs at Peterson Ranch Pond and possibly at other perennial or nearly perennial pools. CLFs were reestablished in this canyon via a translocation in 2009; the last record of a CLF in the canyon before that was 1986. A population of the Ramsey Canyon leopard frog was located at Carr Barn Pond. The Coronado NF created and now maintains Carr Barn Pond consistent with the Ramsey Canyon (=Chiricahua) leopard frog conservation agreement, to which they are a signatory. This site was occupied in 2009, but the population has since been eliminated, probably by chytridiomycosis. Brown and Ramsey Canyons have been intensively managed for the Ramsey Canyon (=Chiricahua) leopard frog since 1995. Places where frogs have bred and that still retain habitat needed for the leopard frog include Ramsey Canyon, Trout and Meadow Ponds on private lands owned by The Nature Conservancy, and the Ramsey Canyon Box; and in Brown Canyon, the Wild Duck Pond, House Pond, and the Brown Canyon Box (on Coronado NFS lands).

Recovery Unit 3 (Chiricahua Mountains- Malpai Borderlands-Sierra Madre, Arizona, New Mexico, and Mexico***)*** includes the Peloncillo Mountains and its aquatic habitats where CLF populations occur or have occurred in Geronimo, Javelina, State Line, and Canoncito Ranch Tanks; Maverick Spring; and pools or ponds in the Cloverdale Cienega and along Cloverdale Creek below Canoncito Ranch Tank. Breeding occurs in State Line and Canoncito Ranch Tanks, and possibly other aquatic sites. In the Chiricahua Mountains, John Hands Pond (the type locality for the CLF) and a spring-fed pond at the Southwest Research Station are managed for the CLF recovery however, no frogs have been observed at the site since 1977.
In Recovery Unit 4 (Pinaleño-Galiuro-Dragoon Mountains, Arizona) a few CLF populations are in the Galiuro Mountains (Oak Spring and Oak Creek), and the Dragoon Mountains with existing populations at Shaw Tank, Tunnel Spring and until recently Halfmoon. The Galiuro and Dragoon mountains have been surveyed relatively well over the last decade or more.

Coronado NF lands are managed in accordance with the 1986 LRMP. Primary uses include recreation and livestock grazing, as well as some mining and other activities. Specific management activities have been implemented on the forest to benefit CLFs. Beginning as early as the 1990s, the Nogales RD constructed several rock and log wing dikes in the Sycamore Canyon to protect the Hank and Yank Spring box from bank erosion that threatened to undermine the spring. The spring box has been a refuge for frogs when contaminants, disease, or other factors have reduced populations in the creek.

Since then numerous other recovery actions have been conducted on the Forest. Beginning in 2002, the Coronado NF consulted under section 7 of the ESA with USFWS regarding effects of livestock grazing on the CLF and other listed species. At that time some modifications were built into allotment management plans to ensure continued habitat suitability for frogs. In 2005, volunteers, and AGFD initiated efforts to eliminate American bullfrogs from Sycamore Canyon. In 2006 the Douglas RD began working with partners to collect egg masses in the Dragoon Mountains to be reared and then released back into the Dragoons. That same year and again in 2008 the Galiuro and Santa Rita Mountains were surveyed and eggs were collected for headstarting. Bullfrogs were removed from Scotia Canyon in 2007 and 2008 to restore CLF to the area. In 2008 a new well was constructed in the Middle March area of the Dragoon Mountains to encourage use by CLF. A large metal drinker was buried near the well to be supplied by a 3,000 gallon tank installed in existing drinkers on the Oak Tree II allotment on the Nogales RD. In 2009 translocated leopard frog locations were monitored to determine the success of reintroductions on the Safford RD. Water was developed in 2009 at the Florida Work Center adjacent to Florida Canyon to benefit CLF.

Direct and indirect effects of various resource management activities to CLF are described in detail in the USFWS 2008 Effects Determination for CLF document. To reduce potential effects to CLF the Coronado surveys project areas for CLF prior to project Decisions and implementation. If CLF are found adverse effects to extant populations are avoided or minimized. Livestock grazing and native fish restoration projects consider recovery goals of the CLF. Livestock use in occupied CLF watersheds maintains or promotes satisfactory watershed condition such that the effects of livestock in the watershed do not alter flow regimes; accelerate erosion and sediment transport into occupied sites.

As a result of the current status of this species, the USFS and USFWS jointly developed a set of Conservation Measures for the CLF which became part of the proposed action under consultation. The conservation measures have been implemented by national forests as follows:
***Conservation Measure #1*:** Design projects in occupied CLF habitat on NFS lands which address the appropriate components of the CLF recovery plan, with the goal of implementing projects with beneficial, insignificant, or discountable effects to CLF.
Coronado participated in nonnative frog removal improvement of habitat conditions at several locations and rangeland management projects comply with CLF aquatic habitat guidelines.
***Conservation Measure #2*:** Over the next 5 years, cooperate with state game and fish agencies, other federal agencies, USFS research stations, USFWS, and others (universities, etc.) to assess and prioritize habitat for potential CLF re-introduction. Cooperatively document the result in an annual report to USFWS and to the extent feasible within the mission and capabilities of the USFS, assist with any CLF re-introduction efforts.
Regional Office: The threatened and endangered Program of the USFS Southwestern Regional Office (RO) has taken the lead in organizing and hosting CLF conservation coordination meetings. The team of agency personnel and other interested parties established several workgroups to address various aspects of protecting populations, identifying information needs, information access, seeking funding and resources, establishing partnerships, and other tasks. In addition, the RO has financially supported reintroduction projects, survey training workshops, and frog propagation efforts during the reporting period. The Coronado NF participates in CLF conservation meetings and Recovery Team meetings. The Forest implemented the Scotia Canyon project to create additional habitat for the species.
Conservation Measure #3*:* Implement, as appropriate, the recommendations to minimize the effects of stock pond management and maintenance identified in the final recovery plan for the CLF. The Forest implements stockpond and aquatic habitat guidelines consistent with the recovery plan. Permittees are notified of the requirements of the guidelines in AOIs.
***Conservation Measure #4*:** Continue to implement the standardized interagency monitoring protocol for CLFs. Forest surveyors are trained and certified.
***Conservation Measure #5*:** The long-term benefits directly attributable to wildland fire use for resource benefits, is the reduction of catastrophic fire. This is very significant in goals and objectives vital to restoring fire-adapted systems. Their absence predisposes ecosystems to the undesirable effects associated with catastrophic fires, potentially at levels of severity and intensity outside historic ranges of variability which are highly detrimental to aquatic systems. That said, the USFS agrees to the following:

A. Pre-ignition Planning: Maintain current distributions of threatened, endangered, proposed, and candidate species in GIS layers on each NF in the Southwestern Region and these GIS layers will be provided to the Line Officer, Fire Management staff and/or incident commander for each species occurring in the watershed of the ignition as well as surrounding watersheds. Identify watersheds that are particularly susceptible to ash flow and sediment following high intensity fires. Use this information to guide fire use mitigation measures such as; delay, direct check and/or suppress. A Forest or District biologist is available as a resource advisor on all fires. GIS layers are maintained and shared with fire staff prior to each fire season.

B. A USFS biologist for the appropriate species will be assigned and consulted during fire management activities to ensure that concerns for threatened and endangered species are addressed: for example, spawning season restrictions to protect breeding activities, appropriate buffers to filter ash and sediment, avoiding mechanical and chemical measures within the riparian corridor, etc. During development and implementation of operational management plans, identify potential threats to listed species and designated critical habitat and develop mitigation actions to eliminate threats. A Forest or District biologist is available as a resource advisor on all fires. GIS layers are maintained and shared with fire staff prior to each fire season.

C. Develop contingency plans in cooperation with USFWS, other federal agencies, state agencies, universities/colleges, and others to preserve, rescue and secure a population in imminent danger of localized extirpation due to fire use for resource benefits. USFWS and others are consulted as needed.

Northern Mexican gartersnake_____(*Thamnophis eques megalops*)

Endangered Species Act Status:	Threatened
Recovery Plan:	None
District Occurrence	Nogales and Sierra Vista
Critical Habitat:	Yes
Determination of Effects:	May affect, likely to adversely affect
Determination of Proposed Critical habitat:	May affect, not likely to adversely affect

For brevity, the Northern Mexican gartersnake is referred to as NMGS throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/MexGartersnake.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: in the Proposed rule (78 FR 41500) (USFWS 2013); and the general species information sheet (USFWS 2013); and the Final rule (USFWS 2014).

Status, Threats, and Conservation of the Species

Status

In Arizona, its distribution has been reduced to less than ten percent of its former range along large mainstem rivers. The species is considered likely extant in fragmented populations within the middle/upper Verde River drainage, middle/lower Tonto Creek, and the Cienega Creek drainage, as well as in a small number of isolated wetland habitats in southeastern Arizona. The species' current distribution in Mexico is uncertain.

An important component to suitable Mexican gartersnake habitat is a stable native prey base. The Mexican gartersnake is surface-active at ambient temperatures ranging from 71° F to 91° F and forages along the banks of waterbodies feeding primarily upon native fish (e.g. Gila topminnow, desert pupfish, etc.) and adult and larval native ranid frogs (e.g. lowland leopard frog, Chiricahua leopard frog, etc.). It may also supplement its diet with earthworms and vertebrates such as lizards, small rodents, salamanders, and hylid frogs (treefrogs). In some populations, adult Mexican gartersnakes will prey upon juvenile nonnative bullfrogs and/or bullfrog tadpoles where they co-occur.

Threats

Current threats to the Northern Mexican gartersnake include: 1) destruction and modification of its habitat; 2) predation from nonnative species such as bullfrogs; 3) significant reductions in its native prey base from predation/competition associations with nonnative species; and 4) genetic effects from fragmentation of populations caused by items 1-3. Human activities that diminish surface water or degrade streamside (riparian) vegetation are also significant threats, but particularly where they co-occur in the presence of nonnative species.

Conservation

No conservation measures are known for this species.

Species and Habitat Effects for the Sonoran tiger salamander, Arizona treefrog, Chiricahua Leopard frog, and Northern Mexican gartersnake

The STS, ATF, CLF, and NMGS have similar but somewhat different life functions and habitat needs. Plan components are generally not definitive enough to differentiate among the finite requirements of these four species. Therefore, these species are analyzed together and effects by plan component below apply to these species unless otherwise noted.

Wildland-Urban Interface and Landscape-scale Fire

The Wildland-Urban Interface represents all vegetation communities on the CNF within those areas of human populations and developments at imminent risk from wildfire. Treatment of these areas includes thinning, removal of fuels from the landscape, or altering the fuel profile to reduce the potential for loss of property. The treatment of WUI allows the Forest the flexibility to manage landscape-scale wildland fire for resource benefit.

Landscape-scale wildland fire is one of the methods for ecosystem restoration. The goal of this program is to enhance resiliency of all vegetation communities on the CNF by maintaining more sustainable fuel loads, improved habitat diversity, and watershed integrity.

Management of WUI and Landscape-scale wildland fire has the potential to result in short term impacts to STS, ATF, CLF, or NMGS. The primary potential impacts from this treatment may include changes to habitat through sedimentation or water quality. The objectives of this program area (PIN-O-1, RIT-O-1,VIC-O-1,VME-O-1,VPO-O-1,VPP-O-1,WUI-O-1) is to restore uplands which would benefit aquatic resources in the long-term, but could result in effects to aquatic habitat through short-term watershed affects such as sedimentation. The objective RIA-0-1 would treat 2,500 to 10,000 acres every ten years specifically to maintain streams and riparian vegetation. The guideline NWS-G-3 would retain and benefit aquatic habitat by reducing adjacent fuel buildup. These treatments would reduce the risk of overall long-term loss of STS, ATF, CLF, or NMGS habitat.

Water Resources – Natural

This program area has the potential through associated recreation or grazing activities to impact the STS, ATF, CLF, or NMGS or their habitat by trampling or harassment of or changing riparian and floodplain/streambank vegetation, or destroying loafing features such as logs. However, NWS-O-1 would have the CNF apply for 10 instream flow rights per decade to ensure water for aquatic species. NWS-O-2 calls for reconstruction of three developed springs per decade to for recovery of animal species. NWS-O-3 would have the CNF complete stream restoration to benefit aquatic species of conservation concern. The guideline RIA-G-2 has the potential to limit runoff and sediment into habitat although some affects could still occur to aquatic species.

Water Resources – Constructed

This program area has the potential through grazing activities to impact the STS, ATF, CLF, or NMGS or their habitat, often through livestock trampling of individuals or riparian and floodplain/streambank vegetation, or destroying loafing features such as logs, while moving through an area. The standards RAM-S-2 and RAM-S-3 ensure that grazing permits shall be in compliance with the Coronado National Forest's Stockpond and Aquatic Habitat Management and Maintenance Guidelines for the Chiricahua Leopard Frog and the Coronado National Forest's Stockpond Management and Maintenance Plan for the Sonora tiger salamander. These two standards ensure that grazing management complies with the CNF Habitat Management guidelines outlined for the CLF and STS. The guidelines COW-G-2 and Cow-G-3 allow for construction of water developments that support aquatic species recovery and direct overflow to maintain or create aquatic habitat for the benefit of species recovery. The guidelines HUA-G-1 and HUA-G-2 specifically protects ATF habitat, which also benefits the other species by protecting water levels for different life stages and from detrimental management actions.

Soil Management

This program area has direction to stabilize soil which would help improve habitat and prey habitat for these species. The objective, SOI-O-1 Would help maintain habitat needs for aquatic species by requiring that vegetation treatments enhance or restore soil condition indicators.

Animal and Rare Plants

The Species Diversity and Viability Report assessed STS, ATF, CLF, and NMGS. The viability report determined that STS and CLF population trends were unknown and habitats were in a negative trend; the report also showed that ATF population trends were unknown but the habitat trend was positive, while the NMGS population and habitat trend were both negative. The guidelines ARP-G-1, HUA-G-1 and HUA-G-2 provide for the continued existence of ATF as well as other species that use aquatic habitats.

Invasive Species Management

This program area has the potential to help with removing invasive nonnative species. The guideline ISM-G-1 directly benefits these species by recommending the removal of non-native invasive animals in or near occupied habitat while the guideline RAM-G-6 will help in restoring native plant species. Herbicide and pesticide treatments are expected to continue under this plan as they have under the previous forest plan. The use of herbicide and pesticides can have adverse effects on aquatic species as well as upland species. Any potential future projects implemented under this plan would be assessed on a case by case basis to determine potential effects on individual species and to mitigate them. The use of pesticides may impact forage base for specific individual species.

Forest Products

The sale of forest products are often associated with thinning and fuels reduction projects or silvicultural treatments. Projects such as these can result in impacts to upland and aquatic habitat. The guidelines RIA-G-3, RIA-G-4, NWS-G-1, and NWS-G-3 would favor retention of large riparian woody debris and trees and minimize input of sediment into streams thereby increasing water quality, providing habitat with cover, reducing fuel buildup and regulating stream temperatures. These plan components would help to mitigate effects of the forest products program.

This program area has the potential through vegetation treatments to impact STS, ATF, CLF, or NMGS and their prey, through disturbance and potential loss/fragmentation of habitat. Short term impacts would include change in stand structure which may impact foraging areas of these species. The guideline HUA-G-2 recommends mitigating effects within ATF habitat, which also benefits the other species from management actions.

Minerals Management

This program area has the potential through land or facility development or activities to impact the STS, ATF, CLF, or NMGS or their prey, often through disturbance, potential loss/fragmentation of habitat, and dewatering. Effects to STS, ATF, CLF, and NMGS from the activities of this program are similar to the effects of roads. Access roads and the accompanying vehicle traffic are a necessary component of mineral activities. In most cases mineral removal also requires the use of water resources. Previous mineral extraction activities have been shown to dewater springs and streams that provide habitat for these species. In addition surface occupancy causes direct habitat loss and the addition of human occupation increases the chances for harassment and possible mortality. There is a potential for mining operations to be excavated to a depth greater than that of the regional aquifer and water would drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body would continue to remove water from storage in the regional aquifer.

The CNF is currently aware of approximately 25 mineral projects within EMAs where STS, ATF, CLF, or NMGS occur. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Fifteen of these projects are active and currently in place, while three projects are expected to occur in the foreseeable future, two are completed and five are withdrawn from consideration at the point. One project is located on the Douglas R.D. within the Dragoon EMA, one on the Safford R.D. within the Galiuro EMA, eleven on the Nogales R.D. within the Santa Rita and Tumacacori EMAs, and twelve on the Sierra Vista R.D. within the Huachuca EMA.

Motorized Transportation System

Impacts of roads on these species include direct mortality from being run over by vehicles, increased avenue for possibility of collection, and direct habitat loss and/or fragmentation and harassment. MTS-O-4 would result in addition of 1 hardened road crossing per year to reduce effects to water quality and wildlife habitat. Similarly, MTS-O-5 would realign or remove 2 miles of roads from aquatic or meadow habitat in a decade to improve habitat conditions for aquatic species.

Recreation Management

This program area has the potential through recreation activities to impact STS, ATF, CLF, or NMGS or their prey, through disturbance and potential loss/fragmentation of habitat as stated under the Natural Water Resources section above. The use of motorized vehicles represents a popular and growing form of recreation on the CNF. Under the Standard MTS-S-1, motor vehicle use is restricted to existing roads. The guideline HUA-G-2 recommends that recreation actions that could affect ATF habitat be mitigated to minimize those effects.

Range Management

This program area has the potential through grazing activities to impact the STS, ATF, CLF, or NMGS or their habitat, often through livestock trampling of individuals or riparian and floodplain/streambank vegetation removal, or destroying loafing features such as logs. HUA-G-2 recommends that grazing actions be mitigated to minimize potential effects to ATF Habitat. Plan components applying to this program area are listed below, followed by discussion of potential effects to the species. The two standards RAM-S-2 and RAM-S-3 ensure that grazing management complies with the CNF Habitat Management guidelines outlined for the CLF and STS. The guideline HUA-G-2 recommends that recreation actions that could affect ATF habitat be mitigated to minimize those effects. RAM-G-5 recommends that grazing structures within riparian areas be located to avoid conflict with riparian functions and processes and RAM-G-3 contains guidelines on fencing structures.

Cumulative Effects

As defined in ESA (50 CFR §402.02), cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the federal action subject to consultation. For this consultation, the Action Area has been defined as the Coronado National Forest plus adjacent lands that the proposed action may directly or indirectly affect. The time period is defined as the predicted life of this plan which is 10 years. In general, Arizona's population is expected to increase in the next 10 years. Increased urbanization results in loss of habitat or habitat suitability for federally listed species. Additional, the intensity of recreational activities is also likely to increase within the Action Area, particularly on Federal lands that are located adjacent or within a short driving distance of the major metropolitan areas of Phoenix, Tucson, Albuquerque, and Santa Fe such as the Coronado NF (USFS 2011). Activities may be permitted which may affect individuals: private land commercial and residential development, groundwater pumping and water diversions, recreation, illegal collecting, mining and related contaminants, wildland fire and altered fire regimes, and overgrazing. These types of activities have occurred in the past and are likely to occur into the foreseeable future.

The CNF is currently aware of approximately 25 mineral projects within EMAs where STS, ATF, CLF, or NMGS occur. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Fifteen of these projects are active and currently in place, while three projects are expected to occur in the foreseeable future, two are completed and five are withdrawn from consideration at the point. One project is located on the Douglas R.D. within the Dragoon EMA, one on the Safford R.D. within the Galiuro EMA, eleven on the Nogales R.D. within the Santa Rita and Tumacacori EMAs, and twelve on the Sierra Vista R.D. within the Huachuca EMA.

The Rosemont Copper Mine is proposed to be constructed in the NE area of the Santa Rita Mountains on the Coronado National Forest. This mine, if actualized, will include a mine pit that will be excavated to a depth greater than that of the regional aquifer and water will drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body will continue to remove water from storage in the regional aquifer. This aquifer also supplies baseflow to Cienega Creek and its tributaries, an area immediately east of the proposed project site which is designated as the BLM's Las Cienegas National Conservational Area.

Several groundwater models have been developed to analyze potential effects from the proposed mine on groundwater withdrawals throughout the affected area, including Cienega Creek and Empire Gulch. Independent models used in the 2013 Biological Opinion analysis did not consider the cumulative impact of drawdowns on baseflow in Cienega Creek in combination with similar effects to its tributaries. New analysis which incorporates this cumulative effects indicate that, as a worst case scenario, within 50 years, upper Cienega Creek would have 141 days per year with extreme low flows, within 150 years this number would increase to 352 days per year.

Summary of Effects and Determination-Sonoran tiger salamander

The S&Gs contained within the Coronado NF LRMP provide for a considerable amount of protection for habitats occupied by the STS. However, the salamander does occupy areas that are not protected from some activities that could result in adverse effects. The salamander also occupies man-made stock tanks that need periodic maintenance which will result in direct and indirect effects to STSs. Recreational activities have the potential to impact STS or their prey, through disturbance and potential loss/fragmentation of habitat. Mineral activities have the potential through land or facility development or activities to impact this species through disturbance, potential loss/fragmentation of habitat, and dewatering. Impacts of roads on this species include direct mortality from being run over by vehicles, increased avenue for possibility of collection, and direct habitat loss and/or fragmentation and harassment. The SPMMP (Stock Pond Management and Maintenance Plan) seeks to minimize incidental take of salamanders during the use and maintenance of stock ponds. However, incidental take is assigned within the current SPMMP allowing for adverse effects. The SPMMP was jointly authored by personnel from the Coronado NF and the USFWS, and has also been incorporated into the Recovery Plan for the species. Furthermore, efforts to conserve, protect, and recover the species by the Coronado NF will continue. Nonetheless, the implementation of the Coronado NF's LRMP **May Affect**, and is **Likely to Adversely Affect** the STS.

Summary of Effects and Determination – Arizona treefrog

The S&Gs contained within the Coronado NF LRMP provide for a considerable amount of protection for habitats occupied by the ATF. However, the treefrog does occupy areas that are not protected from some activities that could result in adverse effects. The treefrog also occupies man-made stock tanks that need periodic maintenance which will result in direct and indirect effects to ATFs. Recreational activities have the potential to impact this species or their prey, through disturbance and potential loss/fragmentation of habitat. Mineral activities have the potential through land or facility development or activities to impact this species through disturbance, potential loss/fragmentation of habitat, and dewatering. Impacts of roads on this species include direct mortality from being run over by vehicles, increased avenue for possibility of collection, and direct habitat loss and/or fragmentation and harassment. The SPMMP (Stock Pond Management and Maintenance Plan) seeks to minimize incidental take of species during the use and maintenance of stock ponds. Furthermore, efforts to conserve, protect, and recover the species by the Coronado NF will continue. Nonetheless, the implementation of the Coronado NF's LRMP (*if this species is listed*) **May Affect**, and is **Likely to Adversely Affect** the ATF.

Summary of Effects and Determination - Chiricahua leopard frog

The Proposed Action provides guidelines and standards for Chiricahua leopard frogs mostly in the sections on natural waters (NWS), riparian management (RIA), and range management (RAM). For natural waters, NWS G-1 to 5 are guidelines that protect surface water quality and quantity, as well as the surrounding vegetation which provides foraging habitat for adults and metamorphs. Bank vegetation is also discussed in RIA-G-1, 2, 3, and 4. These measures provide shade and hibernacula for frogs. Range management standards RAM-S-2 and 3; refer to

stockpond guidance for Chiricahua leopard frogs and other species, because most leopard frog localities are now in stockponds, rather than natural waters. Stockponds often lack enough structure and features to allow healthy populations of frogs to persist, so guidance to land managers and permittees is important. COW-G-2 is a generic guideline stating that stocktanks should be structures that not only provide water for cattle, but habitat for wildlife. Some additional guidelines include MTS-G-2 and MTS-G-3 HUA-G-4, and ISM-G-1; these address the threats of invasive species (ISM) or site-specific management.

Some of the potentially negative effects on the species have been somewhat reduced (e.g., modification of grazing practices to benefit riparian habitat, removal on bullfrogs and other non-native predators) since the 2005 BO (USFWS 2005). Implementation of conservation measures has also reduced effects to the CLF on the Forest. However, there have not been substantial changes to the Coronado programs or S&Gs that would warrant a change in determination for this species since the 2004 BA. Potential negative effects associated with herbicide and pesticide use are still in the LRMP. Recreational activities have the potential to impact this species or their prey, through disturbance and potential loss/fragmentation of habitat. Mineral activities have the potential through land or facility development or activities to impact this species through disturbance, potential loss/fragmentation of habitat, and dewatering. Impacts of roads on this species include direct mortality from being run over by vehicles, increased avenue for possibility of collection, and direct habitat loss and/or fragmentation and harassment. Therefore, based on the analysis of plan components and Resource Programs, the effects to CLF are not expected to be insignificant or discountable at the programmatic level, so the implementation of the Coronado LRMP **May Affect, and is Likely to Adversely Affect**, the CLF.

Summary of Effects and Determination – Northern Mexican gartersnake

The S&Gs contained within the Coronado NF LRMP provide for a considerable amount of protection for habitats occupied by the NMGS. However, the gartersnake does occupy areas that are not protected from some activities that could result in adverse effects. Recreational activities have the potential to impact this species or their prey, through disturbance and potential loss/fragmentation of habitat. Mineral activities have the potential through land or facility development or activities to impact this species through disturbance, potential loss/fragmentation of habitat, and dewatering. Impacts of roads on this species include direct mortality from being run over by vehicles, increased avenue for possibility of collection, and direct habitat loss and/or fragmentation and harassment. Nonetheless, the implementation of the Coronado NF's LRMP **May Affect**, and is **Likely to Adversely Affect** the NMGS.

Critical habitat – Chiricahua leopard frog

Primary Constituents Elements of critical habitat – Chiricahua leopard frog

The USFWS designated critical habitat for the CLF in March, 2012. About 1,687.6 acres are on the Coronado NF in 13 separate Units. Primary Constituent Elements (PCEs) for CLF critical habitat were identified as the elements of physical and biological features that, when laid out in the appropriate quantity and spatial arrangement provide for a species' life-history processes, and are essential to the conservation of the species. Activities which occur on the Forest that may warrant special management of the physical and biological features that define essential habitat (appropriate quantity and distribution of PCEs) for the CLF include, but are not limited to, introduction of predators, such as bullfrogs, crayfish, sportfishes, and barred tiger salamanders; introduction or spread of chytridiomycosis; recreational activities; livestock grazing; water diversions and development; construction and maintenance of roads and utility corridors; fire suppression, fuels management, and prescribed fire; and various types of development. These

activities have the potential to affect critical habitat and PCEs if they are conducted within designated units or upstream and in some cases downstream in the floodplains of those units; however, some of these activities, when conducted appropriately, may be compatible with maintenance of adequate PCEs.
The USFSW determined that the PCEs essential to the conservation of the CLF are:
(1) Aquatic breeding habitat and immediately adjacent uplands exhibiting the following characteristics:
(a) Perennial (water present during all seasons of the year) or nearly perennial pools or ponds at least 6.0 feet in diameter and 20 inches in depth;
(b) Wet in most years, and do not or only very rarely dry for more than a month;
(c) pH greater than or equal to 5.6;
(d) Salinity less than 5 parts per thousand;
(e) Pollutants absent or minimally present at low enough levels that they are barely detectable;
(f) Emergent and or submerged vegetation, root masses, undercut banks, fractured rock substrates, or some combination thereof; but emergent vegetation does not completely cover the surface of water bodies;
(g) Nonnative crayfish, predatory fishes, bullfrogs, barred tiger salamanders, and other introduced predators absent or occurring at levels that do not preclude presence of the CLF;
(h) Absence of chytridiomycosis, or if chytridiomycosis is present, then conditions that allow persistence of CLFs with the disease (e.g., water temperatures that do not drop below 68° F, pH of greater than 8 during at least part of the year); and
(i) Uplands immediately adjacent to breeding sites that CLFs use for foraging and basking.
(2) Dispersal habitat, consisting of ephemeral (water present for only a short time), intermittent, or perennial drainages that are generally not suitable for breeding, and associated uplands that provide overland movement corridors for frogs among breeding sites in a metapopulation with the following characteristics:
(a) Are not more than 1.0 miles overland, 3.0 miles along ephemeral or intermittent drainages, 5.0 miles along perennial drainages, or some combination thereof not to exceed 5.0 miles;
(b) Provide some vegetation cover for protection from predators, and in drainages, some ephemeral, intermittent, or perennial aquatic sites; and
(c) Are free of barriers that block movement by CLFs, including urban, industrial, or agricultural development; reservoirs that are 50 acres or more in size and stocked with predatory fishes, bullfrogs, or crayfish; highways that do not include frog fencing and culverts; and walls, major dams, or other structures that physically block movement.

Designated critical habitat Units for the CLF are described fully in the March 20, 2012 Federal Register Notice. The following proposed critical habitat units are located on the Coronado NF:

Recovery Unit 1 (Tumacacori-Atascosa-Pajarito Mountains, Arizona and Mexico)
Critical Habitat Unit 4: Bonita, Upper Turner, and Mojonera Tanks. This unit includes 201 acres of Coronado NF lands in the Pajarito and Atascosa Mountains, Santa Cruz County, Arizona. This unit is proposed as critical habitat because it was occupied at the time of listing and currently contains sufficient PCEs to support life-history functions essential for the conservation of the species. In this unit, bullfrogs are a continuing threat, and illegal border activity and associated law enforcement have resulted in watershed damage. Frogs in this region have tested positive for chytridiomycosis, but the disease appears to have little effect on population viability.

Critical Habitat Unit 5: Sycamore Canyon. This unit includes 262 acres of Coronado NF land and 7 acres of private lands along Atascosa Canyon through Bear Valley Ranch in the Pajarito and Atascosa Mountains, Santa Cruz County, Arizona. This unit is proposed as critical habitat because it was occupied at the time of listing and currently contains sufficient PCEs (PCEs 1 and 2) to support life-history functions essential for the conservation of the species. Bullfrogs have

been a continuing problem in this unit, although recent control efforts seem to have eliminated them from Sycamore Canyon. Nonnative green sunfish (Lepomis cyanellus) have occasionally been found in Sycamore Canyon, as well. Pools critical to survival of frogs and tadpoles through the dry season, are sensitive to sedimentation and erosion upstream in the watershed of Sycamore Canyon. The earliest records of chytridiomycosis in the U.S. are from Sycamore Canyon (1972). A robust population of CLFs persists at this site despite the disease and periodic die-offs. Illegal border activity and associated law enforcement have resulted in many trails and new vehicle routes in the area, as well as trampling in the canyon.
Sycamore Canyon is designated a RNA by the Coronado NF and is closed to livestock grazing. Critical habitat is designated for the Sonora chub (*Gila ditaenia*) in Sycamore Canyon. Much of this unit also lies within the Pajarita Wilderness area. These designations provide some level of protection to CLF habitats in Sycamore Canyon.

Critical Habitat Unit 6: Pena Blanca Lake/Spring and Associated Tanks. This unit includes 202 acres and is all on Coronado NF lands, Santa Cruz County, Arizona. This area is proposed as critical habitat because it was occupied at the time of listing and currently contains sufficient PCEs (PCEs 1 and 2) to support life history functions essential for the conservation of the species. This unit is a metapopulation that includes numerous sites occupied in 2009. CLFs and tadpoles were found in Pena Blanca Lake in 2009 and 2010, after the lake had been drained and then refilled, which eliminated the nonnative predators. However, early in 2010, rainbow trout (Oncorhynchus mykiss) were restocked back into the lake, and plans are underway to reestablish a variety of warm water fishes, as well. Currently, the USFWS is working with project proponents to help design the sportfish project in a way that will allow persistence of CLFs Nonnative introduced predators, particularly bullfrogs and sportfish, remain a serious threat in this region. A concerted effort was made in 2008 to 2010 to clear the area of bullfrogs. The effort appears to be successful, and CLFs have benefited. However, there is a continuing threat of reinvasion or introduction of bullfrogs. As discussed, sportfish expected to be introduced by the AGFD at Pena Blanca Lake are a future additional threat. Frogs in this region test positive for chytridiomycosis; however, the disease appears to have little effect on population viability.

Recovery Unit 2 (Santa Rita-Huachuca- Ajos Bavispe, Arizona and Mexico)
Critical Habitat Unit 7: Florida Canyon. This unit includes 4 acres and is all on Coronado NF lands in the Santa Rita Mountains, Pima County, Arizona. This unit is proposed as critical habitat because it is essential for the conservation of the species. CLFs currently occupy this site; however, its occupancy status at the time of listing is unknown. A single frog was found in 2008, which was augmented with frogs from elsewhere in the Santa Rita Mountains in 2009. Water is a limiting factor in this system, particularly during drought. Fire in the watershed could result in scouring and sedimentation in the pools important as habitat for the frog. Chyridiomycosis and introduced predators are potential threats, but neither has been recorded at this site.

Critical Habitat Unit 8: Eastern Slope of the Santa Rita Mountains. This unit includes 172 acres of Coronado NF lands and 14 acres of private lands in the Greaterville area in Pima County, Arizona. Surface water is a primary limiting factor in this unit. Nonnative predators and chytridiomycosis are not known to be imminent threats in this area.

Critical Habitat Unit 11: Scotia Canyon. This unit includes 70 acres in Scotia Canyon, Huachuca Mountain, Cochise County, Arizona, and is entirely on Coronado NF lands. CLFs were reestablished in this canyon via a translocation in 2009; the last record of a CLF in the canyon before that was 1986. This canyon, and sites around it, has been the subject of intensive bullfrog eradication and habitat enhancement work in preparation for reestablishing the CLF. However, bullfrog reinvasion is a significant, continuing threat, and other nonnative predators could potentially reach Scotia Canyon via natural or human assisted immigration. Disease has resulted

in extirpations elsewhere in the Huachuca Mountains, and is considered a serious threat in Scotia Canyon. Finally, a road through the canyon is eroded in places and contributes sediment to the stream; it receives much use by recreationists and U.S. Customs and Border Protection. The proposed critical habitat designation for the CLF largely overlaps that of critical habitat for the endangered plant Huachuca water-umbel (Lilaeopsis schaffneriana var. recurva). Several listed and candidate species have been recorded in Scotia Canyon. These occurrences of critical habitat and listed species provide some level of protection to CLF habitat in this unit.

Critical Habitat Unit 13: Carr Barn Pond. This unit includes 0.6 acres of Coronado NF lands in the Huachuca Mountains, Cochise County, Arizona. Carr Barn Pond is an impoundment with a small, lined pond with water provided from a well. During runoff events, the size of the pond expands considerably and then gradually shrinks back to the lined section. As with Units 12 (private), 14, and 15, this unit has been the subject of a conservation agreement and much intensive management for the Ramsey Canyon (=Chiricahua) leopard frog. The Coronado NF created and now maintains Carr Barn Pond consistent with the Ramsey Canyon (=Chiricahua) leopard frog conservation agreement, to which they are a signatory. This site was occupied at the time of listing and was occupied into 2009, but the population has since been eliminated, probably by chytridiomycosis. The population has been eliminated after chytridiomycosis die-offs three times; twice the population has subsequently been reestablished through translocations. Largemouth bass have been introduced illegally into the pond and then removed, and bullfrogs periodically invade the site but are promptly removed before they breed.

Critical Habitat Unit 14: Ramsey and Brown Canyons. This unit includes 65 acres of private lands in Ramsey Canyon and 58 acres of Coronado NF in Brown and Ramsey Canyons, Huachuca Mountains, Cochise County, Arizona. This unit along with other Units (12, 13, and 15) have been managed intensively for Ramsey Canyon (=Chiricahua) leopard frog conservation since 1995. The Ramsey Canyon population has been eliminated twice and then reestablished; the Wild Duck and House Ponds have also undergone repeated disease-related declines and extirpations followed by reestablishments. The populations tend to do well for months or years after reestablishment only to experience epizootic (an outbreak of disease affecting many animals of one kind at the same time) chytridiomycosis outbreaks followed by declines or extirpation. Additional threats in this unit include nonnative species, drying, sedimentation, and fire. Nonnative predators threaten populations at the House and Wild Duck Ponds, where bullfrogs have been found periodically and gold fish were once introduced.

Recovery Unit 3 (Chiricahua Mountains- Malpai Borderlands-Sierra Madre, Arizona, New Mexico, and Mexico)

Critical Habitat Unit 16: Peloncillo Mountains. This unit includes 366 acres of Coronado NF lands and 289 acres of private lands in Hidalgo County, New Mexico. Periodic drought dries most of the aquatic sites completely or to small pools, which limits population growth potential. Nonnative sportfish are present at Geronimo Tank and may preclude successful recruitment. Occurrence of chytridiomycosis in this area has not been investigated, but may also be a limiting factor.

Critical Habitat Unit 17: Cave Creek. This unit includes 234 acres of Coronado NF lands and 92 acres of private lands owned by the American Museum of Natural History in the Chiricahua Mountains, Cochise County, Arizona. 2011. Scarcity of water can occur in drought years; however, the pond at the Southwest Research Station is fed by a well and thus is buffered against drought. Bullfrogs occur to the east but have never been recorded in the unit. The current status and past history of chytridiomycosis in this unit are unknown; however, the pond at the Southwest Research Station is fed by a warm spring and could provide some buffer against the disease. Rainbow trout were present and occurred concurrently with CLFs at Herb Martyr Pond,

but no trout are currently known in the unit. The Southwest Research Station has signed a Safe Harbor Agreement for the CLF and is an active participant in recovery.

Critical Habitat Unit 20: Deer Creek. This unit consists of 17 acres of Coronado NF, 69 acres of Arizona State Land Department lands, and 34 acres of private lands in the Galiuro Mountains, Graham County, Arizona. The primary threat to CLFs and their habitats in this unit is periodic drought that results in breeding sites drying out. During a severe drought in 2002, all but one of the waters in the unit dried out. The only nonnative aquatic predator recorded in this unit is the barred tiger salamander. Recovery work has occurred in this unit, including headstarting of egg masses and reestablishment and augmentation of populations.

Critical Habitat Unit 21: Oak Spring and Oak Creek. This unit consists of 27 acres of Coronado NF lands in the Galiuro Mountains, Graham County, Arizona. The primary threat in this unit is extended drought during which all of the pools are subject to reduction or drying. Cattail Pool is spring-fed, and is likely the last pool to dry out. Oak Spring is also tapped for water developments, which may limit the capability of the site to support frogs. CLFs have been headstarted and released at this site to augment the population.

Critical Habitat Unit 22: Dragoon Mountains. This unit includes 74 acres of Coronado NF lands in Cochise County, Arizona. Threats to the CLF and its habitat are primarily scarcity of suitable breeding habitat and loss of that habitat during drought. Tunnel Spring is spring-fed and thus buffered against drought; however, Shaw and Halfmoon Tanks are filled with runoff. Neither nonnative predators nor chytridiomycosis have been noted in these populations and habitats, although if introduced they would constitute additional stressors. Recovery work, including headstarting of eggs collected from Tunnel Spring and establishment of a new population at Shaw Tank with reared tadpoles and frogs, has been accomplished in this unit, and the USFSs livestock permittee has been an enthusiastic participant in those recovery activities.

Summary of Effects for critical habitat –Chiricahua leopard frog

Wildland-Urban Interface and Landscape-Scale Wildland Fire

Management of WUI and Landscape-scale wildland fire has the potential to result in short term indirect effects to CLF CH. The primary potential effects from this treatment may include changes to habitat through sedimentation or water quality that effect PCE's. The objectives of this program area (PIN-O-1, RIT-O-1,VDC-O-1,VIC-O-1,VME-O-1,VPO-O-1,VPP-O-1,WUI-O-1) is to restore uplands which would benefit aquatic resources in the long-term, but could result in effects to aquatic habitat through short-term watershed affects such as sedimentation. The objective RIA-0-1 would treat 2,500 to 10,000 acres every ten years specifically to maintain streams and riparian vegetation. The guideline NWS-G-3 would retain and benefit aquatic habitat by reducing adjacent fuel buildup. These treatments would reduce the risk of overall long-term loss of CLF CH.

Water Resources – Natural

This program area has the potential through grazing activities to impact PCEs within critical habitat, often through trampling of riparian and floodplain/streambank vegetation, or destroying loafing features such as logs, while moving through an area. The guideline RIA-G-2 has the potential to limit runoff and sediment into habitat provided that adjustments in the amount of forage removed are made considering seasonality of forage production and fluctuations in forage production year to year.

Water Resources – Constructed

This program area has the potential through grazing activities to impact PCEs within critical habitat, often through trampling of riparian and floodplain/streambank vegetation, or destroying loafing features such as logs, while moving through an area. The standards RAM-S-2 and RAM-S-3 ensure that grazing permits shall be in compliance with the Coronado National Forest's Stockpond and Aquatic Habitat Management and Maintenance Guidelines for the Chiricahua Leopard Frog and the Coronado National Forest's Stockpond Management and Maintenance Plan for the Sonora tiger salamander. These two standards ensure that grazing management complies with the CNF Habitat Management guidelines outlined for the CLF and STS. The guidelines HUA-G-1 and HUA-G-2 recommends mitigating effects within ATF habitat, which also benefits the other species by protecting water levels for different life stages and from detrimental management actions. These guidelines protect PCEs within CLF critical habitat.

Soil Management

This program area has direction to stabilize soil which would help improve PCEs within critical habitat.

Invasive Species Management

This program area has the potential to help with removing invasive nonnative species. The guideline ISM-G-1 directly benefits these species by recommending the removal of non-native invasive animals in or near occupied habitat while the guideline RAM-G-6 will help in restoring native plant species. Herbicide and pesticide treatments are expected to continue under this plan as they have under the previous forest plan. The use of herbicide and pesticides can have adverse effects on aquatic species as well as upland species. Any potential future projects implemented under this plan would be assessed on a case by case basis to determine potential effects on individual species and to mitigate them. The use of pesticides may impact forage base for specific individual species.

Forest Products

This program area has the potential through vegetation treatments to impact through potential loss/fragmentation of habitat, which would affect PCEs within critical habitat. The sale of forest products are often associated with thinning and fuels reduction projects or silvicultural treatments. Projects such as these can result in impacts to upland and aquatic habitat. The guidelines RIA-G-3, RIA-G-4, NWS-G-1, and NWS-G-3 would favor retention of large riparian woody debris and trees and minimize input of sediment into streams thereby increasing water quality, providing habitat with cover, reducing fuel buildup and regulating stream temperatures. These plan components would help to mitigate effects of the forest products program.

Minerals Management

This program area has the potential through land or facility development or activities to impact CLF CH through potential loss/fragmentation of habitat, and dewatering that may affect PCE's. In most cases mineral removal also requires the use of water resources. Previous mineral extraction activities have been shown to dewater springs and streams. It is not possible to predict exactly where or when mineral development will occur in the future or its effects. There is a potential for mining operations to be excavated to a depth greater than that of the regional aquifer and water would drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body would continue to remove water from storage in the regional aquifer.

The CNF is currently aware of approximately four mineral projects within the Santa Rita EMA on the Nogales R.D. where CLF CH occurs. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Two of these projects are active (Big Nugget and Greaterville AML) and currently in place, while one is completed (Oro Grande Placer) and one is withdrawn (Quartz Dream Placer) from consideration at the point.

Motorized Transportation System

Impacts of roads on PCEs within critical habitat can cause direct habitat loss and/or fragmentation. Objectives of this program area would help to mitigate the direct habitat loss and/or fragmentation: MTS-O-4 would result in addition of 1 hardened road crossing per year to reduce effects to water quality and wildlife habitat. Similarly, MTS-O-5 would realign or remove 2 miles of roads from aquatic or meadow habitat in a decade to improve habitat conditions for aquatic species. These two objectives may be used to improve conditions in CLF CH by improving PCE's.

Recreation Management

This program area has the potential through recreation activities to disturb adjacent upland habitat needed for basking and foraging and developments such as development of natural water sources to affect critical habitat PCE's. Of particular concern is the forest plan allowance of cross country travel up to 300 feet off of a designated road or motorized trail for the purposes of camping, this ongoing activity has the potential to affect PCE 1(i). The topography and difficulty of natural terrain features will limit the areas that are actually physically accessible. In general, drainage crossings are naturally too steep and rugged to allow this activity. The use of motorized vehicles represents a popular and growing form of recreation on the CNF. Under the Standard MTS-S-1, motor vehicle use is restricted to existing roads, except as described above for camping. NWS-O-2 encourages the CNF to improve habitat and benefit recovery of aquatic species when reconstructing water developments which may be restored for recreational use. This objective could assist in mitigating effects to PCE's.

Range Management

This program area has the potential through grazing activities to impact PCEs within critical habitat through livestock trampling of riparian and floodplain/streambank vegetation, or disturbing loafing features such as logs, while moving through an area. The two standards RAM-S-2 and RAM-S-3 ensure that grazing management complies with the CNF Habitat Management guidelines outlined for the CLF and STS.

Summary of Effects and Determination of critical habitat –Chiricahua leopard frog

Some of the potentially negative effects to CLF critical habitat from Coronado Programs' activities are reduced or eliminated by implementing specific Conservation Measures identified in the 2005 BO. These Conservation measures are applicable to CLF critical habitat. The S&Gs in the Coronado LRMP seek to mitigate or prevent impacts on wildlife and plant diversity. Specific objectives are discussed in several other S&Gs on how to accomplish wildlife mitigation goals. Some direction is contained within the LRMP for avoiding effects to riparian areas from roads. In general, guidance provided by the LRMP should assist in minimizing or, under certain circumstances, avoiding adverse effects to proposed CLF critical habitat from prescribed fire management activities. The Coronado NF LRMP also seeks to provide livestock grazing on a sustainable basis and maintaining or improving riparian and watershed conditions. Direct and

indirect effects, may take place as the result of the implementation of S&Gs pertinent to rangeland management, but overgrazing is not likely to result. Therefore, based on the analysis of plan components and Resource Programs, the effects to CLF critical habitat are expected to be insignificant or discountable at the programmatic level, so the implementation of the Coronado LRMP **May Affect, and is Not Likely to Adversely Affect** CLF critical habitat.

Critical habitat – Northern Mexican gartersnake

Primary Constituents Elements of critical habitat – NMGS

Critical habitat defines primary constituent elements which are the physical or biological features essential to the conservation of the species that may require special management considerations or protection. There is a total of about 93,552 acres of critical habitat for NMGS on the CNF, representing nine Critical Habitat sub-units. The NMGS has four primary constituent elements (PCEs) for critical habitat, they are listed below:

1) Aquatic or riparian habitat that includes:

a) Perennial or spatially intermittent streams of low to moderate gradient that possess appropriate amounts of in-channel pools, off-channel pools, or backwater habitat, and that possess a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of processing sediment loads; or

b) Lentic wetlands such as livestock tanks, springs, and cienegas; and

c) Shoreline habitat with adequate organic and inorganic structural complexity to allow for thermoregulation, gestation, shelter, protection from predators, and foraging opportunities (e.g., boulders, rocks, organic debris such as downed trees or logs, debris jams, small mammal burrows, or leaf litter); and

d) Aquatic habitat with characteristics that support a native amphibian prey base, such as salinities less than 5 parts per thousand, pH greater than or equal to 5.6, and pollutants absent or minimally present at levels that do not affect survival of any age class of the northern Mexican gartersnake or the maintenance of prey populations.

2) Adequate terrestrial space (600 ft (182.9 m) lateral extent to either side of bankfull stage) adjacent to designated stream systems with sufficient structural characteristics to support life-history functions such as gestation, immigration, emigration, and brumation (extended inactivity).

3) A prey base consisting of viable populations of native amphibian and native fish species.

4) An absence of nonnative fish species of the families Centrarchidae and Ictaluridae, bullfrogs (*Lithobates catesbeianus*), and/or crayfish (*Orconectes virilis*, *Procambarus clarki*, etc.), or occurrence of these nonnative species at low enough levels such that recruitment of northern Mexican gartersnakes and maintenance of viable native fish or soft-rayed, nonnative fish populations (prey) is still occurring.

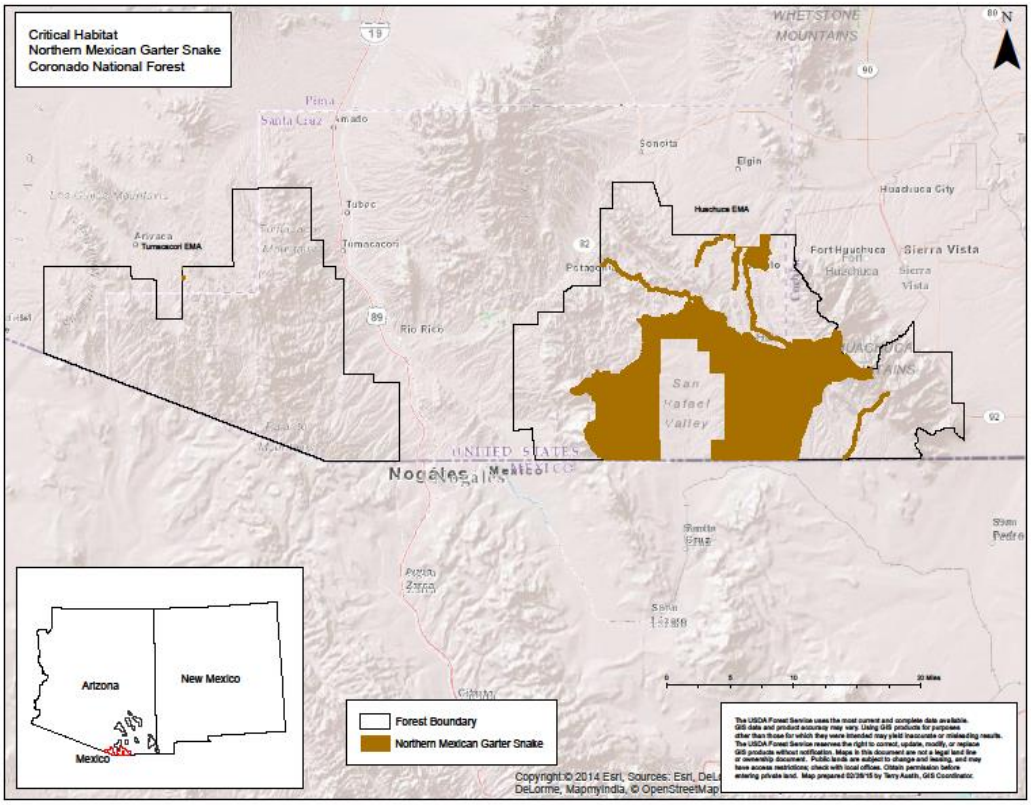

Figure 5. Map of NMGS critical habitat on the CNF.

Summary of Effects for critical habitat –Northern Mexican gartersnake

Wildland-Urban Interface and Landscape-Scale Wildland Fire

Management of WUI and Landscape-scale wildland fire has the potential to result in short term indirect effects to NMGS CH. The primary potential effects from this treatment may include changes to habitat through sedimentation or water quality that effect PCE's. The objectives of this program area (PIN-O-1, RIT-O-1,VDC-O-1,VIC-O-1,VME-O-1,VPO-O-1,VPP-O-1,WUI-O-1) are to restore uplands which would benefit aquatic resources in the long-term, but could result in effects to aquatic habitat through short-term watershed affects such as sedimentation. The objective RIA-0-1 would treat 2,500 to 10,000 acres every ten years specifically to maintain streams and riparian vegetation. The guideline NWS-G-3 would retain and benefit aquatic habitat by reducing adjacent fuel buildup. These treatments would reduce the risk of overall long-term loss of NMGS CH.

Water Resources – Natural

This program area has the potential through grazing activities to impact PCEs within critical habitat, often through trampling of riparian and floodplain/streambank vegetation, or destroying loafing features such as logs, while moving through an area. The guideline RIA-G-2 has the potential to limit runoff and sediment into habitat provided that adjustments in the amount of forage removed are made considering seasonality of forage production and fluctuations in forage production year to year.

Water Resources – Constructed

This program area has the potential through grazing activities to impact PCEs within critical habitat, often through trampling of riparian and floodplain/streambank vegetation, or destroying loafing features such as logs, while moving through an area. The standards RAM-S-2 and RAM-S-3 ensure that grazing permits shall be in compliance with the Coronado National Forest's Stockpond and Aquatic Habitat Management and Maintenance Guidelines for the Chiricahua Leopard Frog and the Coronado National Forest's Stockpond Management and Maintenance Plan for the Sonora tiger salamander. These two standards will also benefit NMGS Critical Habitat. The guidelines HUA-G-1 and HUA-G-2 specifically protects ATF habitat, which also benefits the other species by protecting water levels for different life stages and from detrimental management actions. These guidelines protect PCEs within portions of NMGS critical habitat.

Soil Management

This program area has direction to stabilize soil which would help improve PCEs within critical habitat.

Invasive Species Management

This program area has the potential to help with removing invasive nonnative species thereby improving conditions within critical habitat. The guideline ISM-G-1 directly benefits these species by recommending the removal of non-native invasive animals in or near occupied habitat while the guideline RAM-G-6 will help in restoring native plant species. Herbicide and pesticide treatments are expected to continue under this plan as they have under the previous forest plan. The use of herbicide and pesticides can have adverse effects on aquatic species as well as upland species. Any potential future projects implemented under this plan would be assessed on a case by case basis to determine potential effects on individual species and to mitigate them. The use of pesticides may impact forage base for specific individual species.

Forest Products

This program area has the potential through vegetation treatments to impact through potential loss/fragmentation of habitat, which would affect PCEs within critical habitat.

Minerals Management

This program area has the potential through land or facility development or activities to impact the NMGS CH, through potential loss/fragmentation of habitat, and dewatering that may affect PCE's. In most cases mineral removal also requires the use of water resources. Previous mineral extraction activities have been shown to dewater adjacent springs and streams. While it is not possible to predict exactly where or when mineral development will occur in the future or its effects. There is a potential for mining operations to be excavated to a depth greater than that of the regional aquifer and water would drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body would continue to remove water from storage in the regional aquifer.

The CNF is currently aware of approximately seven mineral projects within the Huachuca EMA on the Sierra Vista R.D. where NMGS CH occurs. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Five of these projects are active (Hermosa Exploration, Dice 8, CH Drill, Moore & Moore, Harshaw

Borrow Pit) and currently in place, while two are withdrawn (White Cloud Providencia and Oz Providencia) from consideration at the point.

Motorized Transportation System

Impacts of roads on PCEs within critical habitat can cause direct habitat loss and/or fragmentation. MTS-O-4 would result in addition of 1 hardened road crossing per year to reduce effects to water quality and wildlife habitat. Similarly, MTS-O-5 would remove 2 miles of roads from aquatic or meadow habitat in a decade to improve habitat conditions for aquatic species. These two objectives may be used to improve conditions in NMGS CH by improving PCE's.

Recreation Management

This program area has the potential through recreation activities and developments such as development of natural water sources to affect critical habitat PCE's. The use of motorized vehicles represents a popular and growing form of recreation on the CNF. Under the Standard MTS-S-1, motor vehicle use is restricted to existing roads. NWS-O-2 encourages the CNF to benefit aquatic species when reconstructing water developments which may be restored for recreational use. This objective could assist in mitigating effects to PCE's.

Range Management

This program area has the potential through grazing activities to impact PCEs within critical habitat through livestock trampling of riparian and floodplain/streambank vegetation, or disturbing loafing features such as logs, while moving through an area. The two standards RAM-S-2 and RAM-S-3 ensure that grazing management complies with the CNF Habitat Management guidelines outlined for the CLF and STS. Application of these standards to NMGS CH will help to mitigate potential effects.

Summary of Effects and Determination for critical habitat – Northern Mexican gartersnake

The S&Gs in the Coronado LRMP seek to mitigate or prevent impacts on wildlife and plant diversity. Some plan direction is contained within the LRMP for avoiding riparian effects from roads. In general, guidance provided by the LRMP should assist in minimizing or, under certain circumstances, avoiding adverse effects to proposed NMGS critical habitat from prescribed fire management activities. The Coronado NF LRMP also seeks to provide livestock grazing on a sustainable basis and maintaining or improving riparian and watershed conditions. Direct and indirect effects, may take place as the result of the implementation of S&Gs pertinent to rangeland management, but overgrazing is not likely to result. Therefore, implementation of the S&Gs can be considered insignificant or discountable at the programmatic level, so the implementation of the Coronado LRMP **May Affect, is not Likely to Adversely Affect** NMGS proposed critical habitat.

New Mexico ridge-nosed rattlesnake_____(*Crotalus willardi obscurus*)

Endangered Species Act Status:	Threatened
Recovery Plan:	1985
District Occurrence	Douglas
Critical Habitat:	None on FS land
Determination of Effects:	May affect, likely to adversely affect

For brevity, the New Mexico ridge-nosed rattlesnake is referred to as NMRR throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/NewMexico.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: the Final Rule listing the NMRNR as a threatened species (USFWS 1978); in the Recovery Plan (USFWS 1985); and the 5-Year Review (USFWS 2007).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provides information about the NMRR in FS Region 3. This document is incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

In the U.S., the largest known population is within the Animas Mountains of New Mexico. Smaller populations occur in the Peloncillo Mountains of Arizona and New Mexico. In Mexico, populations occur in the Sierra San Luis, Sonora and Chihuahua, Mexico (BA-BO 2005). Multiple lines of evidence suggest an exceptionally small population occurs in the Peloncillo Mountains, and the Peloncillo population tested positive for genetic bottlenecks in several statistical tests (Holycross and Douglas 2007).

Within the Animas Mountains, it was estimated in 1985 that 250 to 500 adult snakes occurred; however, based on 8 years of mark and recapture data in West Fork Canyon, Animas Mountains, it was suggested that this was an underestimate (BA-BO 2005). Encounter rates by experienced herpetologists indicate the densest populations may occur in the portions of the San Luis, Mexico with comparatively moderate and low densities in the Animas and Peloncillo Mountains, respectively. However, densities probably vary greatly within mountain ranges, and encounter rates may not be indicative of population densities (BA-BO 2005).

As of 2004, precise population trends were unknown, but it is believed that the Animas Mountains population could have been negatively impacted by habitat destruction or by overzealous and irresponsible collectors. The subspecies has historically been limited in range and never very common (BA-BO 2005).

The only significant change in the status of this species since the BA-BO 2005 is the effects of the Adobe fire in the Animas Mountains, 2007, and the Whitmire fire, 2008, in the Peloncillo Mountains. The loss of ground cover through fire has resulted in increased erosion and sediment accumulation in talus piles used as denning sites of New Mexico ridge-nosed rattlesnakes (USFWS 2008).

The Adobe wildfire burned through designated critical habitat for this species, with much of the area in Indian Creek being subjected to high-severity fire effects. Much of the riparian and pine woodland overstory in Indian Creek was lost to this wildfire. Areas in Bear and Spring Canyons appear to have been similarly affected, but an evaluation has not occurred. Several occupied talus slides in Indian Creek were partially buried in sediment and ash during post-fire runoff events.

Preliminary results from prey base monitoring in 2007 shows no discernable difference inside and outside the burn area. Individual snakes that appeared healthy were located within the severely affected areas of Indian Creek. However, based upon preliminary observations in the Sierra San Luis where a stand replacing fire burned through an occupied canyon in 1989, there may be some long-term effects of fire on the demographics of the snake population (USFWS 2008).

A total of 3,990 acres were burned by the Whitmire fire in the Peloncillo Mountains. The fire burned through part of three polygons of core NMRR habitat. Post-fire effects mapping was accomplished by helicopter on June 2, by the Douglas RD Biologist and Fire Management Officer. Preliminary analysis indicated that the fire effects were low, and the upper canopy in the core habitat polygons was not impacted (USFWS 2008).

Catastrophic, stand replacing fire events are a serious threat to the subspecies and its woodland habitat. The 1997 Maverick prescribed fire in the Peloncillo Mountains destroyed woodlands in one of the 12 locations where NMRRs have been observed in that mountain range. There has been only one high-severity fire in core NMRR habitat since 2002, and it was less than 2.2 acres (USFWS 2008).

Threats

Some of the primary threats to the NMRR include high-severity wildfires, illegal collection, prescribed fires, excessive erosion and sedimentation into talus slides, some recreational activities, and use of pesticides that may impact the forage base for this species (BA-BO 2005).

New Mexico ridge-nosed rattlesnakes occur in three, small disjunct populations, so its viability is sensitive to natural events, habitat destruction or modification, and collection. Natural threats to the NMRR include predation, starvation, and disease. While disease is not known to limit wild populations of *C. w. obscurus*, the highly disjunct range of this subspecies increases its vulnerability to extinction due to disease and habitat loss (BA-BO 2005).

The largest threat to the NMRR is loss of habitat. The Animas Mountains in New Mexico are privately owned, and access to this range of the ridge-nosed rattlesnake is strictly controlled. However, most of the rattlesnake habitat in the Peloncillo Mountains is managed by the Coronado NF and the BLM, and thus open to public use. The Peloncillo Mountains are more accessible than the Animas or San Luis ranges, making illegal collection and other human activities more likely. Activities that may affect the NMRR in the Peloncillos include prescribed fire, wildfire, illegal collection, cattle grazing, commercial beargrass harvesting, and low to moderate levels of recreational activities such as birding, vehicle use, backpacking, camping, and hunting (BA-BO 2005).

Conservation

Critical habitat has been designated in a portion of Hidalgo County, New Mexico.

Sonoran Desert tortoise_____(*Gopherus morafkai*)

Endangered Species Act Status:	Candidate
Recovery Plan:	None
District Occurrence:	Nogales, Safford, and Santa Catalina
Critical Habitat:	None
Determination of Effects:	(*If listed*) May affect, likely to adversely affect

For brevity, the Sonoran Desert tortoise is referred to as SDT throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors can also be found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Sonoran_Tort.htm (accessed 2014).

Status, Threats, and Conservation of the Species

Status

Historical core populations remain extant in Arizona. Concerns for population genetics exist due to habitat fragmentation and barriers (roads, urban development, canals, railroads, etc.) in valley bottoms used for dispersal and exchange of genetic material. Currently occupied range in Mexico is less understood.

Threats

Threats include nonnative plant species invasions and altered fire regimes; urban and agricultural development; barriers to dispersal and genetic exchange; off-highway vehicles; roads and highways; improper livestock grazing; undocumented human immigration and interdiction activities; illegal collection; predation from feral dogs; human depredation and vandalism; drought; and climate change.

Conservation

In late 2014, the BLM, USFWS, USFS, and AGFD have begun working to revise the Draft Arizona Interagency Desert Tortoise Team State Conservation Plan for the species. The intent of the team is to develop a Candidate Conservation Agreement that will preclude the need to list the species. The Coronado National Forest has committed to the success of this effort. The Sonoran desert tortoise is classified as a Tier 1b "Species of Greatest Conservation Need" by the Arizona Game and Fish Department and is listed under the Mexican equivalent to the Endangered Species Act as threatened in that country.

Sonoran desert tortoises in Arizona may not be collected from the wild, nor released as captives into the wild. As restricted live wildlife, Sonoran desert tortoises may not be imported, exported, or possessed without special license or lawful exemption.

Effects Analysis for the New Mexico ridge-nosed rattlesnake and Sonoran desert tortoise

As noted above, the NMRR and SDT have similar but somewhat different life functions and habitat needs. Plan components are generally not definitive enough to differentiate among the finite requirements of these two species. Therefore, both species are analyzed together and effects by plan component below apply to both species unless otherwise noted.

Wildland-Urban Interface and Landscape-Scale Wildfire

The Coronado NF has a Fire Management Plan (USFS 2012) that includes prescribed burns in the Peloncillo Mountains. Reducing threats of catastrophic fires, developing mosaic habitat patterns, and promoting natural ecological processes are some of the objectives of fire management for this

area that would benefit both SDT and NMRR. In addition, the NF has implemented riparian habitat enhancement work in pine/oak canyons of the Peloncillos that should benefit the NMRR (BA-BO 2005). The Fire Management Plan also identified Fire Management Unit 2 (FMU 2) that includes lands less than 4500 ft in elevation on the Santa Catalina, Santa Rita, Galiuro, and Tumacacori Ecosystem Management Areas. In FMU 2 resource protection is the only objective for fire suppression and consequently prescribed fire is precluded from these areas. These areas also coincide with potential and occupied SDT habitat on the CNF. The Goal VDC-G-2 precludes the use of fire both planned and unplanned in desert communities except as a means to control invasive vegetation.

Biophysical Features

Plan components applying to this program area are listed below, followed by discussion of potential effects to these species and their habitat. The standard BIP-S-1 would ensure that no NMRR or SDT are present in cave or mine features when they are closed. The guidelines BIP-G-1, BIP-G-2, BIP-G-3, BIP-G-4, CHI-G-2, DRA-G-2, PEL-G-1, RIT-G-1, PIN-G-3, and CAT-G-1 would protect natural cave features utilized by NMRR or SDT for reproduction and rearing purposes.

Water Resources – Natural

The guidelines NWS-G-1, NWS-G-2, and NWS-G-3 protect the habitat around natural water sources thereby providing foraging habitat to benefit SDT.

Soil Management

This program area has direction to stabilize soil which would help improve prey habitat and potentially prey population numbers for these two species. Plan components applying to this program area are listed below, followed by discussion of potential effects to the species.SOI-O-1 requires that vegetation treatments enhance or restore soil condition indicators which would help maintain prey species foraging habitat.

Minerals Management

This program area has the potential through land or facility development or activities to impact the NMRR or SDT and their prey, often through disturbance and potential loss/fragmentation of habitat. Effects to NMRR or SDT from the activities of this program are similar to the effects of roads. Access roads and the accompanying vehicle traffic are a necessary component of mineral activities. In most cases mineral removal also requires the use of heavy equipment on the site. In addition surface occupancy causes direct habitat loss and the addition of human occupation increases the chances for harassment and possible mortality. The guideline MIN-G-1 would protect natural features utilized by NMRR or SDT for reproduction and rearing purposes.

The CNF is currently aware of approximately 16 mineral projects within EMAs where SDT occur. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Nine of these projects are active and currently in place, while three projects are expected to occur in the foreseeable future, two are completed and two are withdrawn from consideration at the point. Four on the Santa Catalina R.D. within the Santa Catalina EMA, one on the Safford R.D. within the Galiuro EMA, and eleven on the Nogales R.D. within the Santa Rita and Tumacacori EMAs.

There is a potential for mining operations to be excavated to a depth greater than that of the regional aquifer and water would drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body would continue to remove water from storage in the regional aquifer.

Motorized Transportation System

This program area has the potential through disturbance and potential loss/fragmentation of habitat or activities to impact the NMRR or SDT and their prey. National Forest System Roads provide for public access to the CNF. Roads through NMRR and SDT habitat pose a risk of habitat loss and direct impacts to individuals. MTS-G-1 requires that all travel is limited to system roads thereby mitigating the potential for impacts to individuals and additional loss of habitat beyond the existing road system itself. In addition, recreational facilities can cause direct habitat loss and the addition of human occupation increases the chances for harassment and possible mortality.

Recreation Management

The guideline REC-G-6 would minimize NMRR habitat and prey habitat from overuse by recreationalists. Potential harassment and/or harm from recreational activities area a risk to the species. REC-G-2 may help to mitigate this in certain areas of high visitor use where SDT occur. Even with these mitigation measures, there is still the potential for adverse effects under this program.

Range Management

Grazing within the Peloncillo Mountains, where the NMRR is currently known to occur, is primarily managed at grazing Levels C and D. Grazing Levels of C and D are designed to manage for higher forage use levels and require higher density water developments and interior fencing. Loss of ground cover may cause snakes to move less during foraging or mating, as well as increasing their risk of predation. The guidelines RAM-G-4, RAM-G-6 and RAM-G-7 would provide for growth and reproduction of desired plant species while maintaining or enhancing habitat for both SDT and NMRR.

Cumulative Effects

As defined in ESA (50 CFR §402.02), cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the federal action subject to consultation. For this consultation, the Action Area has been defined as the Coronado National Forest plus adjacent lands that the proposed action may directly or indirectly affect. In general, Arizona's human population is expected to increase in the next 10 years. Increased urbanization results in loss of habitat or habitat suitability for federally listed species. Additional, the intensity of recreational activities is also likely to increase within the Action Area, particularly on Federal lands that are located adjacent or within a short driving distance of the major metropolitan areas of Phoenix and Tucson such as the Coronado NF (USFS 2011). Activities may occur on private lands which may affect individual SDT and NMRR: private land commercial and residential development, recreation, illegal collecting, mining, wildland fire, and overgrazing. These types of activities have occurred in the past and are likely to occur into the foreseeable future. Implementation of the Forest Plan will not encourage these types of activities on adjacent private lands and therefore will not contribute incremental effects to SDT and NMRR off Forest.

Summary of Effects and Determination – NMRR

The USFS recognizes that projects and program activities implemented under the Coronado NF LRMP may occur near or within habitat areas utilized by NMRR. The LRMP does contain S&Gs that can be utilized to reduce or eliminate impacts to the habitat of this species. However, activities may be permitted which may affect individuals. Recreation has the potential to affect individual NMRR based on past actions. Vegetation treatments, prescribed fire, and livestock grazing can be implemented within the constraints of the Coronado LRMP and still result in adverse effects to the NMRR. These types of activities have occurred in the past and are likely to occur into the foreseeable future.

Overall, part of the intent of the Coronado NF LRMP S&Gs is to maintain and improve current habitat for federally-listed plant and animal species, and to work toward delisting. However, there is potential for several activities to occur which could affect the NMRR.

The Peloncillo Mountains are much more accessible to the public (NFS and BLM lands) than the Animas and Sierra San Luis Mountain ranges, and human activities are potentially more important threats than elsewhere in the range of the NMRR. Therefore, simply as the result of the fact that NFS lands are open to the public, increases the likelihood of effects to the species. Although the Coronado NF LRMP S&Gs restrict the use of motorized vehicles to existing trails and roadways, and other roads are closed, and direct killing by motor vehicles could occur.

Furthermore, hot fires that destroy woodlands are a serious threat to the NMRR and its habitat (in USFS 2004) and fuel loading and altered fire regimes in the Peloncillo Mountains represent inherent risks of adverse effects occurring to the species when conducting prescribed fires or managing prescribed natural fires.

Grazing within the Peloncillo Mountains, where the NMRR is currently known to occur, is primarily managed at grazing Levels C and D. Grazing Levels of C and D are designed to manage for higher forage use levels and require higher density water developments and interior fencing. Loss of ground cover may cause snakes to move less during foraging or mating, as well as increasing their risk of predation.

For the reasons described above, it is believed that recreational activities, the use of prescribed fire or prescribed natural fire, and potentially livestock grazing, have the potential to reach a threshold which is not insignificant or discountable by definition. Therefore, the implementation of the Coronado NF LRMP **May Affect, and is Likely to Adversely Affect**, the NMRR.

Summary of Effects and Determination – Sonoran Desert Tortoise

The USFS recognizes that projects and program activities implemented under the Coronado NF LRMP may occur near or within habitat areas utilized by SDT. The LRMP does contain S&Gs that can be utilized to reduce or eliminate impacts to the habitat of this species. However, activities may be permitted which may affect individuals. Recreation has the potential to affect individual SDT based on past actions. Vegetation treatments, prescribed fire, and livestock grazing can be implemented within the constraints of the Coronado LRMP and still result in adverse effects to the SDT. These types of activities have occurred in the past and are likely to occur into the foreseeable future.

Overall, part of the intent of the Coronado NF LRMP S&Gs is to maintain and improve current habitat for federally-listed plant and animal species, and to work toward delisting. However, there is potential for several activities to occur which could affect the SDT.

Several areas on the CNF are accessible to the public making mortality by off-highway vehicle use and vehicles on roads, which also create dispersal barriers, as well as nonnative plant species invasions a possibility to affecting the dispersal of this slow moving species. Although the Coronado NF LRMP S&Gs restrict the use of motorized vehicles to existing trails and roadways, and other roads are closed, adverse effects from nonnative plant species invasion, altered fire regimes, poaching and direct killing by motor vehicles could occur.

For the reasons described above, it is believed that recreational activities, utilization of the forest system roads, and the use of prescribed fire or prescribed natural fire, have the potential to reach a threshold which is not insignificant or discountable by definition. Therefore, the implementation of the Coronado NF LRMP (*if this species is listed*) **May Affect, and is Likely to Adversely Affect**, the SDT.

Fish

Gila chub and critical habitat_____(*Gila intermedia*)

Endangered Species Act Status:	Endangered
Recovery Plan:	None
District Occurrence:	Nogales, Sierra Vista, and Santa Catalina
Critical Habitat:	Yes
Determination of Effects:	May affect, likely to adversely affect
Determination of Critical habitat:	May affect, likely to adversely affect

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/GilaChub.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in the Final Rule listing the Gila chub as an endangered species (USFWS 2005).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the Gila chub in Forest Service Region 3. All these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

Three populations of Gila chub are present on land managed by the CNF, Bear Creek, Romero Creek, and Sabino Creek. In 2005 all Gila chub streams on the Forest were considered unstable-threatened. FWS definition of unstable-threatened is that Gila chub are rare, have limited distribution, predatory or competitive nonnatives are present, or the habitat is modified or threatened in these three streams (USFWS 2005).

During 2005 Gila chub were repatriated in Sabino Creek and introduced to Romero and Bear Creeks. The Forest assisted with introductions, on private property, in the Canelo Hills. During 2008 Emergency flood repairs to Sabino Canyon resulted in short-term effects to habitat, but appear to have resulted in additional stability for habitats over the long term. Aquatic surveys

conducted in 2014 by the University of Arizona and AZGFD confirmed the stability of the Gila chub population in Sabino Creek, as well as the absence of nonnative species (AZGFD 2014).

Threats

The primary threats to Gila chub include predation by and competition with nonnative organisms, including fish in the family Centrarchidae (*Micropterus* spp., *Lepomis* spp.), other fish species, bullfrogs (*Rana catesbeiana*), and crayfish (*Orconectes virilis*), and habitat degradation from surface water diversions and ground water withdrawals. Secondary threats include habitat alteration, destruction, and fragmentation.

Conservation

Cooperative partnerships between Federal and State agencies, municipalities, and the public is a good approach to conservation for this species. During 2009 Gila chub were monitored in cooperation with AGFD where projects have been implemented in the past to eliminate non-natives, and may be continued into the future. The Forest removed a significant and widespread infestation of invasive exotic Giant Reed (*Arundo donax*) from Sabino Canyon.

Yaqui chub_____(*Gila purpurea*)

Endangered Species Act Status:	Endangered
Recovery Plan:	1995
District Occurrence:	Douglas
Critical Habitat:	None
Determination of Effects:	May affect, likely to adversely affect

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Yaqui_Chub.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: the Final Rule listing the Yaqui chub as an endangered species (USFWS 1984); in the Recovery Plan (USFWS 1995); and the 5-Year Review (USFWS 2008).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the Yaqui chub in Forest Service Region 3. All these documents are incorporated by reference into this document.

The Yaqui chub was considered for listing in 1966 and 1973, but no action was taken due to undetermined status in Mexico (USFWS 1984). Extensive surveys in the Rio Yaqui Basin of Mexico by biologists from the University of Michigan and Arizona State University yielded only one specimen of Yaqui chub, and the species was listed as endangered under the ESA (USFWS 1984).

The 2005 Programmatic BO/CO (USFWS 2005) describes the current distribution of Yaqui chub as the extreme headwaters of the Yaqui River drainage in Mexico and various sites in the San Bernardino Valley in southeastern Arizona, primarily on the San Bernardino/Leslie Canyon NWRs. On the CNF, it is believed that Yaqui chub historically occurred in the West Turkey Creek drainage (USFWS 1994) in the Chiricahua Mountains. However, Yaqui chub have not been found in West Turkey Creek since 2003 (USFS 2008) largely due to the ephemeral nature of

the habitat and an ongoing drought. In addition, there is no Yaqui chub critical habitat (USFWS 2005) designated on the Forest.

Downstream of the CNF, however, healthy populations persist in private ponds and in perennial stream reaches at El Coronado Ranch. On the San Bernardino/Leslie Canyon NWR, annual monitoring in 2009 showed that the percent habitat occupied for Yaqui chub was 50.8 percent for all impoundments, up from 35 percent in 2008, and at the Bar Boot Ranch, where Yaqui chub were previously stocked through implementation of a Safe Harbor Agreement, percent habitat occupied was 58 percent with many juveniles present (USFWS 2010).

Status, Threats, and Conservation of the Species

Status

In 2005, 60 Yaqui chub were collected from West Turkey Creek using minnow traps and immediately trucked up the canyon for release into three historically perennial pool habitats within the CNF. Twenty adult chubs were released into each pool (USFS 2005). Follow-up monitoring at each of the pools returned no fish in one of the pools, a few fry at another release site, and a few adults in two of the pools. In 2006, four Yaqui chub (and 80 long fin dace) were collected via electroshocking from an adjacent private land site and immediately transported up canyon for release into the three perennial pools on the Forest. Yaqui chub from previous introductions were not observed. Follow-up monitoring for the 2006 stocking revealed no fish in the lower two pools, and a few dead/dying long fin dace along with one chub in the upper pool. Low water conditions were suspected as the reason for poor survival (USFS 2006). Surveys on the CNF were conducted with assistance from AGFD in conjunction with the translocation efforts, as part of an on-going project to re-introduce a population of Yaqui chub (and associated fish species) into West Turkey Creek on the Douglas RD.

The Forest completed three surveys in 2007, and six surveys in 2008, both on and off the Forest. Private land below the Forest has an extant population. However, no Yaqui chub have been found in West Turkey Creek on the Forest since 2003. The probable reason for the loss of this population is most likely drought (USFS 2008). Pool habitats within the CNF have likely diminished in quantity and quality due to drought and sediment flows following wildfires, although this has not been documented using a standardized habitat assessment methodology.

In 2009, three sites on West Turkey Creek within the CNF boundary were surveyed, but no fish were found due to low water levels. Habitats on the Forest are ephemeral, but healthy populations persist in private ponds and in perennial stream reaches at El Coronado Ranch downstream of the Forest monitoring sites. Riparian areas are largely ungrazed and in good condition (USFS 2010).

There are currently no known populations of Yaqui chub within the CNF boundaries. However, the species does persist in private ponds and perennial reaches of West Turkey Creek on the El Coronado Ranch (USFS 2004), which borders the west boundary of the Chiricahua Mountains unit of the Douglas RD. The ponds on the El Coronado Ranch are within the Upper Turkey Creek watershed.

Threats

Threats include habitat destruction and modification and interactions with introduced fish species.

Conservation

Recognition of this species through listing encourages and results in conservation actions by Federal, State, and private agencies, groups, and individuals. A recovery plan was completed in 1995.

Gila topminnow_____(*Poeciliopsis occidentalis*)

Endangered Species Act Status:	Endangered
Recovery Plan:	1998
District Occurrence:	Sierra Vista and Safford
Critical Habitat:	None
Determination of Effects:	May affect, likely to adversely affect

For brevity, the Gila topminnow is referred to as topminnow throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Gila_Top.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in two documents: the Revised Recovery Plan (USFWS 1998); and the Safe Harbor Agreement (USFWS 2007).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the Gila topminnow in Forest Service Region 3. All these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

Historically Gila topminnow has been documented throughout Redrock Canyon since 1978 (USFWS 2008). The status of the Redrock Canyon population has declined recently and the species has not been documented since 2005(USFWS 2008). Although range and riparian conditions have largely improved, the area has been in drought since 1995, and the resulting reductions in habitat as stream channels have dried and perennial habitat has been reduced in extent, along with increases in nonnative species, primarily mosquitofish, have apparently extirpated the Gila topminnow from the drainage (USFWS 2008). The Forest has been working cooperatively with AGFD and USFWS to repatriate Gila topminnow to Redrock Canyon on the Forest.

Threats

Impacts include the introduction and spread of nonindigenous predatory and competitive fishes, water impoundment and diversion, water pollution, groundwater pumping, stream channelization, and habitat modification.

Conservation

The CNF has been working cooperatively with AGFD and USFWS to repatriate Gila topminnow to Redrock Canyon on the Forest by habitat protection, nonnative species removal and changes to grazing management.

Gila trout_____(*Oncorhynchus gilae*)

Endangered Species Act Status:	Threatened
Recovery Plan:	2003
District Occurrence:	Safford
Critical Habitat:	None
Determination of Effects:	May affect, likely to adversely affect

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Gila_Trout.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in two documents: the Recovery Plan (USFWS 2003); and the Special Final Rule Reclassification from endangered to threatened (USFWS 2006).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the Gila trout in Forest Service Region 3. All these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

Frye Creek near Mount Graham, in the Penaleño Mountains, was stocked with 500 Gila trout (South Diamond Lineage) in Oct 2009 and again in February 2011, a supplemental stocking was completed. Additionally, 5 trout were introduced into Ash Creek in November 2011. The Fry Creek population is doing well, reproducing with two age classes present. The Recovery Team has operated under the standard that new populations be stocked a minimum of three times and that reproduction be confirmed in the stream prior to the population being considered viable and established.

The Forest also continued planning efforts for establishment of Gila trout populations in additional streams in the Pinaleño Mountains. Other CNF potential recovery streams, now occupied by Apache trout, may have some risk from road systems. However, roads are limited on Mt. Graham in the Pinaleño Mountains where these streams are located. A new Forestwide S&G under the Motorized Transportation System Program prohibits motor vehicle use (cross country travel) off the designated system of roads, trails, and areas except as identified on motor vehicle use maps.

Authorized livestock use has decreased on the CNF. The CNF has in place restrictions on grazing in the vicinity of the current Apache trout populations in the Pinaleño Mountains. Those streams have been proposed to become Gila trout streams sometime in the future.

Threats

Current limiting factors for Gila trout recovery include impacts of wildfire; continued impacts from predation, competition and hybridization with non-native trout; limited range of the species; and other habitat impacts.

Conservation

The Forest and AGFD continue with planning efforts for establishment of Gila trout populations in additional streams in the Pinaleño Mountains.

Potential recovery streams for this species on the CNF are being monitored for risk from road systems and overgrazing. A new Forestwide S&G under the Motorized Transportation System Program prohibits motor vehicle use (cross country travel) off the designated system of roads, trails, and areas except as identified on motor vehicle use maps.

Apache trout_____(*Oncorhynchus apache*)

Endangered Species Act Status:	Threatened
Recovery Plan:	2009
District Occurrence:	Safford
Critical Habitat:	None
Determination of Effects:	May effect, likely to adversely affect

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/ApacheTrout.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: the Final Rule listing the Apache trout as a threatened species (USFWS 1975); in the Recovery Plan (USFWS 2009); and the 5-Year Review (USFWS 2010).

Status, Threats, and Conservation of the Species

Status

On the north side of the Pinaleño Mountains, four creeks (Ash, Frye, Deadman and Marijilda) have at some point contained hybridized populations of Apache trout. All the hybridized Apache trout have been chemically removed from Ash Creek. In 2004, post-fire flooding from the Nuttall Fire eliminated all of the hybridized Apache trout from Frye Creek, and most of the hybridized fish from Marijilda and Deadman creeks.

The trout in these creeks, along with Grant Creek and Big Creek (a tributary of Grant Creek) on the south side, were evaluated for genetic purity in 1998 (Grant and Big creeks were retested in 2013). Only the population in Grant and Big Creeks were found to be genetically pure, so the effects analysis that follows is directed only toward the population in these two creeks. Grant and Big Creeks drain into the Willcox Playa, which is a closed basin.

Ash, Frye, Deadman and Marijilda creeks are now considered within the historical range of Gila trout. Gila trout have been introduced into both Frye and Ash creeks. The hybridized Apache trout remaining in Marijilda and Deadman creeks do not qualify for recovery actions. Recent direction from the USFWS indicates that actions involving these hybrids do not require Section 7 consultation and, as such, effects to fish in these drainages will not be discussed further.

Threats

Current limiting factors for Apache trout recovery include impacts of wildfire; continued impacts from predation, competition and hybridization with non-native trout; limited range of the species; and other habitat impacts.

Conservation

CNF in cooperation with AGFD and USFWS has monitored habitat, population distribution and demographics and presence of non-native species.

Spikedace_____(*Meda fulgida*)

Endangered Species Act Status:	Endangered
Recovery Plan:	1991; A new recovery plan is scheduled for release by 2015.
District Occurrence:	None (located outside of forest, downstream)
Critical Habitat:	Yes
Determination of Effects:	May affect, likely to adversely affect
Determination of Critical habitat:	May affect, likely to adversely affect

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Spikedace.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: the Final Rule listing the spikedace as a threatened species (USFWS 1986); in the Recovery Plan (USFWS 1991); and the 5-Year Review (USFWS 2012).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the Spikedace in Forest Service Region 3. All these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

In Arizona, populations are found in Aravaipa Creek, and are believed to be present in the Verde River, and Eagle Creek within Graham, Pinal, Greenlee, and Yavapai counties. Undiscovered populations may exist in unsampled Gila basin streams. In addition, populations were translocated in Hot Springs and Redfield canyons (Cochise and Graham counties), and in Fossil Creek (Gila County) in 2007; Bonita Creek (Graham County), and the San Francisco River (Catron County) in 2008. Insufficient time has elapsed to determine whether these restoration projects will be successful. Spikedace does not occur within CNF boundaries all effects would occur downstream.

Threats

Spikedace are estimated to be extirpated from approximately 90 percent of their historical range. Prolonged drought, anticipated effects of climate change, and the increasing abundance and expanding range of competitive and predatory nonnative fishes have increased the threat of extinction for the species.

Conservation

The USFS has agreed to implement the following conservation measures for the spikedace (USFWS 2012):
Conservation Measure #1: Design projects in occupied spikedace habitat on NFS lands which address the appropriate components of the spikedace recovery plan, with the goal of implementing projects with beneficial, insignificant, or discountable effects to spikedace.
Conservation Measure #2: Cooperate with state game and fish agencies, other federal agencies, USFS research stations, USFWS, and others (universities, etc.) to assess and prioritize habitat of stream and river segments for potential spikedace reintroduction. Report results of these efforts to the USFWS in LMRP annual reports.
a. Determine necessary habitat and watershed improvements in occupied watersheds and watersheds identified as high priority reintroduction sites and implement projects needed to contribute to recovery.
Conservation Measure #3: Participate in ongoing efforts initiated in 2003 involving state agencies, other federal agencies, universities, USFS research facilities, and USFWS to document the current state of knowledge regarding the spikedace.
a. Identify existing populations in imminent need of protection and develop and implement, to the extent possible by the USFS, a strategy for protecting the population and reducing threats to the population.
Conservation Measure #4: With state agencies and other researchers (i.e. academic and USFS), who are currently monitoring spikedace populations, participate in the development of a consistent monitoring methodology for spikedace, their associated habitat, and co-occurring aquatic species. Report results of these efforts to the USFWS in the LRMP annual reports.
Conservation Measure #5: To the extent feasible within the mission and capabilities of the USFS, assist the USFWS, AGFD, and the NMDGF with any spikedace reintroduction efforts.
Conservation Measure #6: Within the mission and capabilities of the USFS, continue to assist the USFWS, other federal agencies, state agencies, universities, and others in the development of a captive spikedace propagation program designed to augment wild populations.
Conservation Measure #7: The long-term benefits directly attributable to wildland fire use for resource benefits is the reduction of catastrophic fire. This is very significant to long-term land management goals and objectives vital to restoring fire-adapted systems. Their absence predisposes ecosystems to the undesirable effects associated with catastrophic fires, potentially at levels of severity and intensity outside historic ranges of variability which are highly detrimental to aquatic systems. That said, the USFS agrees to the following:
a. Pre-ignition Planning: Maintain current distributions of threatened, endangered, proposed, and candidate species in Geographical Information System (GIS) layers on each forest in the Southwestern Region and these GIS layers will be provided to the Line Officer, Fire Management staff and/or incident commander for each species occurring in the watershed of the ignition as wells as surrounding watersheds. Identify watersheds that are particularly susceptible to ash flow and sediment following high intensity fires. Use this information to guide fire use mitigation measures such as; delay, direct check and/or suppress.

b. A USFS biologist for the appropriate species will be assigned and consulted during fire management activities to ensure that concerns for threatened and endangered species are addressed. For example, spawning season restrictions to protect breeding activities, appropriate

buffers to filter ash and sediment, avoiding mechanical and chemical measures within the riparian corridor, etc. During development and implementation of operational management plans, identify potential threats to listed species and designated critical habitat and develop mitigation actions to eliminate threats.

c. Develop contingency plans in cooperation with USFWS, other federal agencies, state agencies, universities, and others to preserve, rescue and secure a population in imminent danger of localized extirpation due to fire use for resource benefits.

Loach minnow_____(*Tiaroga cobitis*)

Endangered Species Act Status:	Endangered
Recovery Plan:	1991; A new recovery plan is scheduled for release by 2015.
District Occurrence:	None (located outside of forest, downstream)
Critical Habitat:	Yes
Determination of Effects:	May affect, likely to adversely affect
Determination of Critical habitat:	May affect, likely to adversely affect

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Loach minnow.htm (accessed 2015). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: the Final Rule listing the Loach minnow as an endangered species (USFWS 2012); in the Recovery Plan (USFWS 1991); and the 5-Year Review (USFWS 2011).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the Loach minnow in Forest Service Region 3. All these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

In Arizona, populations are found in Aravaipa Creek, within Graham, and Pinal counties. Loach minnow does not occur within CNF boundaries all effects would occur downstream.

Threats

Loach minnow and its designated CH may be affected on NFs by groundwater pumping, watershed conditions, stormwater runoff, non-native fish species, livestock grazing, timber harvest, wildfire, recreational activities, and other habitat alterations.

Conservation

The Forest continues to work with USFWS and others to address issues related to this species.

Sonora chub and critical habitat_____(*Gila ditaenia*)

Endangered Species Act Status:	Threatened
Recovery Plan:	1992
District Occurrence:	Nogales
Critical Habitat:	Yes
Determination of Effects:	May affect, likely to adversely affect
Determination of Critical habitat:	May affect, likely to adversely affect

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Sonora_Chub.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: the Final Rule listing the Sonora chub as a threatened species (USFWS 1986); in the Recovery Plan (USFWS 1992); and the 5-Year Review (USFWS 2008).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the Sonora chub in Forest Service Region 3. All these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

In May 2006, USFWS staff confirmed the continued presence of Sonora chub in the headwaters of the Río Cocóspera at Rancho el Aribabi in Sonora, but the current status in Mexico is unknown. It is presumed that predatory and competitive nonnative fishes are still present there and that drought has also affected the region (USFWS 2010).

A detailed description of the threats and status of the Sonora chub within the Action Area was included in the 2004 BA for the Continued Implementation for the Eleven National Forests and National Grasslands of the Southwestern Region (USFS 2004) and the resulting 2005 BO/CO (USFWS 2005). All waters occupied by Sonora Chub in the U.S are within the CNF and about one-half of the drainage is within Pajarita Wilderness and Goodding RNA (USFWS 2005). The CNF contains 6 miles of habitat occupied by Sonora chub. Various agency staff (USFS, USFWS, and other entities) have reliably detected Sonora chub, though the upstream limits of the species' occurrence in California Gulch appear to be variable based on the presence of nonnative fish - largemouth bass (*Micropterus salmoides*) in particular (USFWS 2010). It should be noted also that there is a personnel safety concern associated with surveying for this species. The canyons where it occurs (Sycamore and California Gulch/Warsaw Canyon) are known routes for drug traffickers and undeclared aliens; therefore, border security issues make it difficult to monitor Sonora Chub populations. As a result, population surveys are only conducted in a major pool in the upper end of the canyon. These drainages are negatively impacted by the presence of non-natives, including green sunfish and bullfrogs, although Sonora chub persists in good numbers in Sycamore Canyon, despite the presence of a large population of bullfrogs. Surveys conducted in 2005, 2006, and 2009 indicate that there was no known net loss of populations detected during the reporting period, nor a reduction of pool or spring habitat (USFS 2008, 2010).

Roadways in Sycamore Canyon south of Ruby road have been obliterated and closed to OHV traffic. In addition, livestock was eliminated from the riparian corridor of Sycamore Canyon, and in portions of the riparian corridor of California Gulch. Sonora chub are also now a primary consideration in the development of allotment management plans for grazing allotments in both Sycamore Canyon and California Gulch, south of Ruby road (USFS 2004).

Sycamore Canyon and its tributaries are relatively stable; fuel loads upslope are not excessive, and the stream and its tributaries handle flood events well. California Gulch is more prone to drought, and has far less surface water. Both systems have non-native species.

Threats

Bullfrogs have become extremely abundant in Sycamore Canyon (but the chub persists), and bullfrogs and warm water game fishes are found in California Gulch. The UA and AGFD have been eradicating bullfrogs in Sycamore Canyon. Because this canyon straddles the Mexican border, there are concerns that borderland security issues may inhibit surveys and conservation efforts (USFS 2008). There is a personnel safety concern associated with surveying for this species. The canyons where it occurs (Sycamore and California Gulch/Warsaw Canyon) are known routes for drug traffickers and undeclared aliens; therefore, border security issues make it difficult to monitor Sonora Chub populations.

Conservation

The Forest continues to work with Border Patrol, USFWS and others to address issues related to border fencing and livestock trespass on NFS land (USFS 2010).

Roundtail chub_____(*Gila robusta*)

Endangered Species Act Status:	Candidate
Recovery Plan:	None
District Occurrence:	None (located outside of forest, downstream)
Critical Habitat:	No
Determination of Effects:	(*If listed*) May affect, likely to adversely affect

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Roundtail_Chub.htm (accessed 2015).

Status, Threats, and Conservation of the Species

Status

The species was historically considered common in deep pools and eddies of large streams throughout its range in the upper and lower Colorado River basins in Wyoming, Utah, Colorado, New Mexico and Arizona. Today the roundtail chub occupies 18 to 32 percent of its historical range in the lower Colorado River basin and is limited to Arizona's Little Colorado, Bill Williams, Salt, and Verde River drainages and Eagle and Aravaipa Creeks, and New Mexico's

upper Gila River. Roundtail chub does not occur within CNF boundaries all effects would occur downstream.

Threats

Roundtail chub populations have declined due to a combination of habitat loss and degradation related to dams, diversions, groundwater pumping, mining, development, recreation, improper livestock grazing, and competition and predation from non-native fishes. Global climate change is anticipated to worsen the effects of these threats.

Conservation

The Forest continues to work with USFWS and others to address issues related to this species.

Species and Habitat Effects for the Gila chub, Yaqui chub, Gila topminnow, Gila trout, Apache trout, Spikedace, Loach minnow, Sonora chub, and Roundtail chub.

Wildland-Urban Interface and Landscape-scale Fire

The Wildland-Urban Interface represents all vegetation communities on the CNF within those areas of human populations and developments at imminent risk from wildfire. Treatment of these areas includes thinning, removal of fuels from the landscape, or altering the fuel profile to reduce the potential for loss of property. The treatment of WUI allows the Forest the flexibility to manage landscape-scale wildland fire for resource benefit.

Landscape-scale wildland fire is one of the methods for ecosystem restoration. The goal of this program is to enhance resiliency of all vegetation communities on the CNF by maintaining more sustainable fuel loads, improved habitat diversity, and watershed integrity.

Management of WUI and Landscape-scale wildland fire has the potential to result in long term beneficial affects to Gila chub, Yaqui chub, Gila topminnow, Gila trout, Apache trout, Spikedace, Loach minnow, Sonora chub or Roundtail chub habitat if a catastrophic fire were to occur within these landscapes. With upland restoration treatments maintaining watershed stability, the objective RIA-O-1 would treat 2,500 to 10,000 acres of uplands every 10 years in order to maintain watershed stability and function of streams, flood plains, and riparian vegetation. The objective is expected to result in lower intensity fires and ground cover that readily resprouts after fire. This would help limit runoff and sediment from any one fire event in the uplands above occupied or potentially occupied Gila chub, Yaqui chub, Gila topminnow, Gila trout, Apache trout, Spikedace, Loach minnow, Sonora chub, or Roundtail chub habitat. Management ignited fires would generally not burn in wetland habitat; however it has the potential to burn adjacent upland habitats causing indirect effects on riparian and streamside habitat. Effects include increased runoff of floodwaters, deposition of debris and sediment originating in the burned area.

Water Resources – Natural

The following objectives would help sustain and maintain suitable habitat for these species by providing adequate in-stream flow water rights, and proper ecosystem functions: RIA-O-1, NWS-O-1, NWS-O-2, and NWS-O-3. The guidelines NWS-G-2, NWS-G-3, NWS-G-4 and NWS-G-5 allow for natural in-stream movement, reduce fuel build up, and protect water quality, quantity, and habitat features at natural springs and seeps.

Animal and Rare Plants

The Species Diversity and Viability Report assessed Gila chub, Yaqui chub, Gila topminnow, and Sonora chub. The analysis found that programmatic direction under the LRMP would provide for viability. The viability report determined that Gila chub populations were stable and habitat was on a positive trend, for Yaqui chub populations were dynamic and habitat trend was positive, for Gila topminnow populations were unknown but habitat trends were positive, and for the Sonora chub population the trend was stable and the habitat trend was positive. ARP-G-1 would ensure that any activities occurring in these species habitats would be consistent with approved recovery plans.

Invasive Species Management

This program area has the potential to help with removing invasive nonnative species. The guideline ISM-G-1 directly benefits these species by recommending the removal of non-native invasive animals in or near occupied habitat while the guideline RAM-G-6 will help in restoring native plant species. Herbicide and pesticide treatments are expected to continue under this plan as they have under the previous forest plan. The use of herbicide and pesticides can have adverse effects on aquatic species as well as upland species. Any potential future projects implemented under this plan would be assessed on a case by case basis to determine potential effects on individual species and to mitigate them. The use of pesticides may impact forage base for specific individual species.

Forest Products

The sale of forest products are often associated with thinning and fuels reduction projects or silvicultural treatments with the herring. Projects such as these can result in impacts to upland and aquatic habitat by reducing cover and exposing soils to erosion. The guidelines RIA-G-3, RIA-G-4, NWS-G-1, and NWS-G-3 would favor retention of large riparian woody debris and trees and minimize input of sediment into streams thereby increasing water quality, providing habitat with cover, reducing fuel buildup and regulating stream temperatures. These plan components would help to mitigate effects of the forest products program.

Minerals Management

Minerals Management could impact fish species through changes to occupied habitat or dewatering of streams and springs often associated with mineral extraction. Potential impacts can occur as a result of mining infrastructure including but not limited to roads, buildings, water sources, processing plants, and tailings piles. There is a potential for mining operations to be excavated to a depth greater than that of the regional aquifer and water would drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body would continue to remove water from storage in the regional aquifer and effects to aquifer could be felt downstream and off forest.

The CNF is currently aware of approximately 28 mineral projects within EMAs where Gila chub, Yaqui chub, Gila topminnow, Gila trout, Apache trout, and Sonora chub occur. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Seventeen of these projects are active and currently in place, while four projects are expected to occur in the foreseeable future, two are completed and five are withdrawn from consideration at the point. Four on the Santa Catalina R.D. within the Santa Catalina EMA,

one on the Safford R.D. within the Galiuro EMA, eleven on the Nogales R.D. within the Santa Rita and Tumacacori EMAs, and twelve on the Sierra Vista R.D. within the Huachuca EMA.

Motorized Transportation System

This program area has the potential through motorized vehicle activities to impact Gila chub, Yaqui chub, Gila topminnow, Gila trout, Apache trout, and Sonora chub and through disturbance and potential loss/fragmentation of habitat. Potential downstream effects of this program area could result in increased sedimentation off forest in habitats where Spikedace, Loach minnow, and Roundtail chub occur. The potential downstream effects would occur differently depending upon the distance from the forest boundary due to the buffering effect of intervening habitat. The use of motorized vehicles represents a popular and growing form of recreation on the CNF. Under the Standard MTS-S-1, motor vehicle use is restricted to existing roads. The objective MTS-O-4 - helps protect downstream streams from erosion and sedimentation by installing at least one hardened road surface per year at creek crossings. Similarly, MTS-O-5 would realign or remove 2 miles of roads from aquatic or meadow habitat in a decade to improve habitat conditions for aquatic species. The standard, MTS-S-1 also ensure that sedimentation from vehicles is reduced and the guideline MTS-G-3 helps to sustain natural water flow and maintain native vegetation communities.

Recreation Management

This program area has the potential through recreation activities to impact Gila chub, Yaqui chub, Gila topminnow, Gila trout, Apache trout, and Sonora chub through disturbance and potential loss/fragmentation of habitat as stated under the Natural Water Resources section above. Potential downstream effects of this program area could result in increased sedimentation off forest in habitats where Spikedace, Loach minnow, and Roundtail chub occur. The potential downstream effects would occur differently depending upon the distance from the forest boundary due to the buffering effect of intervening habitat. The use of motorized vehicles represents a popular and growing form of recreation on the CNF. Under the Standard MTS-S-1, motor vehicle use is restricted to existing roads. The guideline REC-G-2 provides guidance to minimize recreational capacities before resource damage is caused.

Range Management

This program area has the potential through grazing activities to impact the Gila chub, Yaqui chub, Gila topminnow, Gila trout, Apache trout, and Sonora chub or their habitat, often through livestock riparian and floodplain/streambank vegetation removal. Potential downstream effects of this program area could result in increased sedimentation off forest in habitats where Spikedace, Loach minnow, and Roundtail chub occur. The potential downstream effects would occur differently depending upon the distance from the forest boundary due to the buffering effect of intervening habitat. Plan components applying to this program area are listed below, followed by discussion of potential effects to the species. RAM-G-5 recommends that grazing structures within riparian areas be located to avoid conflict with riparian functions and processes. The guideline RIA-G-2 recommends livestock grazing in riparian areas only when a site-specific analysis has determined that there would be no significant deleterious effects to riparian area form or function. This guideline would protect the riparian areas from overgrazing thereby affecting the fish species that inhabit these stream reaches from increased sedimentation.

Cumulative Effects

As defined in ESA (50 CFR §402.02), cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the

Action Area of the federal action subject to consultation. For this consultation, the Action Area has been defined as the Coronado National Forest plus adjacent lands that the proposed action may directly or indirectly affect. The time period is defined as the predicted life of this plan which is 10 years. Activities that may be permitted which may affect individuals: expanding range of competitive and predatory nonnative fishes and other wildlife, recreation, mining, wildland fire, and overgrazing. These types of activities have occurred in the past and are likely to occur into the foreseeable future.

The CNF is currently aware of approximately 28 mineral projects within EMAs where Gila chub, Yaqui chub, Gila topminnow, Gila trout, Apache trout, and Sonora chub occur. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Seventeen of these projects are active and currently in place, while four projects are expected to occur in the foreseeable future, two are completed and five are withdrawn from consideration at the point. Four on the Santa Catalina R.D. within the Santa Catalina EMA, one on the Safford R.D. within the Galiuro EMA, eleven on the Nogales R.D. within the Santa Rita and Tumacacori EMAs, and twelve on the Sierra Vista R.D. within the Huachuca EMA.

The Rosemont Copper Mine is proposed to be constructed in the NE area of the Santa Rita Mountains on the Coronado National Forest. This mine, if actualized, will include a mine pit that will be excavated to a depth greater than that of the regional aquifer and water will drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body will continue to remove water from storage in the regional aquifer. This aquifer also supplies baseflow to Cienega Creek and its tributaries, an area immediately east of the proposed project site which is designated as the BLM's Las Cienegas National Conservational Area.

The Oracle Ridge and Korn Kobb mines are located in the upper watershed of the San Pedro River above Aravaipa Creek. These mines could contribute effects to the hydrology of the San Pedro and Aravaipa drainages, but the effects are impossible to quantify at this time.

Several groundwater models have been developed to analyze potential effects from the proposed mine on groundwater withdrawals throughout the affected area, including Cienega Creek and Empire Gulch. Independent models used in the 2013 Biological Opinion analysis did not consider the cumulative impact of drawdowns on baseflow in Cienega Creek in combination with similar effects to its tributaries. New analysis which incorporates this cumulative effects indicate that, as a worst case scenario, within 50 years, upper Cienega Creek would have 141 days per year with extreme low flows, within 150 years this number would increase to 352 days per year.

Summary of Effects and Determination – Gila chub

The guidance provided in the LRMP for Wildland-Urban Interface and Landscape-scale Fire, Water Resources-Natural, Invasive Species Management, Forest Products, Minerals Management, Motorized Transportation System, and Range Management Programs are not sufficient to preclude activities that may adversely affect the Gila chub. In general, the S&Gs for the Motorized Transportation System include the only standard that applies in this program area to ensure that increased sedimentation from vehicles is reduced. However, roads can result in destruction of habitat through sedimentation or water quality degradation. Generally, the overall guidance of the LRMP S&Gs is to protect resources while maintaining multiple use activities. Most program guidance in the S&Gs does seek to allow multiple uses while still maintaining ecosystem health and function. However, some conflicts will arise with effects to the species

occurring due to the general lack of complete filtering necessary to prevent possible adverse effects. Therefore, the implementation of the CNF LRMP is **Likely to Adversely Affect** the Gila chub.

Primary Constituents Elements of critical habitat- Gila chub

Based on our current knowledge of the life history, biology, and ecology of the species and the requirements of the habitat to sustain the essential life history functions of the species, the FWS determined that the Gila chub's primary constituent elements are:

(1) Perennial pools, areas of higher velocity between pools, and areas of shallow water among plants or eddies all found in headwaters, springs, and cienegas, generally of smaller tributaries;

(2) Water temperatures for spawning ranging from 17 to 24 °C (62.6 to 75.2 °F), and seasonally appropriate temperatures for all life stages (varying from approximately 10 °C to 30 °C).

(3) Water quality with reduced levels of contaminants, including excessive levels of sediments adverse to Gila chub health, and adequate levels of pH (*e.g.* ranging from 6.5 to 9.5), dissolved oxygen (*e.g.* ranging from 3.0 to 10.0) and conductivity (*e.g.* 100 to 1000 mmhos).

(4) Food base consisting of invertebrates (*e.g.* aquatic and terrestrial insects) and aquatic plants (*e.g.* diatoms and filamentous green algae);

(5) Sufficient cover consisting of downed logs in the water channel, submerged aquatic vegetation, submerged large tree root wads, undercut banks with sufficient overhanging vegetation, large rocks and boulders with overhangs, a high degree of streambank stability, and a healthy, intact riparian vegetation community;

(6) Habitat devoid of nonnative aquatic species detrimental to Gila chub or habitat in which detrimental nonnatives are kept at a level that allows Gila chub to continue to survive and reproduce; and

(7) Streams that maintain a natural flow pattern including periodic flooding.

Critical habitat was designated for the Gila chub in 2005 (USFWS 2005a). On the CNF and adjacent BLM and private lands three streams reaches are designated.

***Sabino Canyon*—**6.9 miles of creek extending from the southern boundary of the Coronado National Forest upstream to its confluence with the West Fork of Sabino Canyon.

***O'Donnell Canyon*—** 6.2 miles of creek extending from its confluence with Turkey Creek upstream to the confluences of Western, Middle, and Pauline Canyons. Land ownership includes private, BLM, and the CNF.

***Turkey Creek*—**3.9 miles of creek extending from its confluence with O'Donnell Canyon upstream to where Turkey Creek crosses Arizona Highway 83. Land ownership includes private lands and CNF.

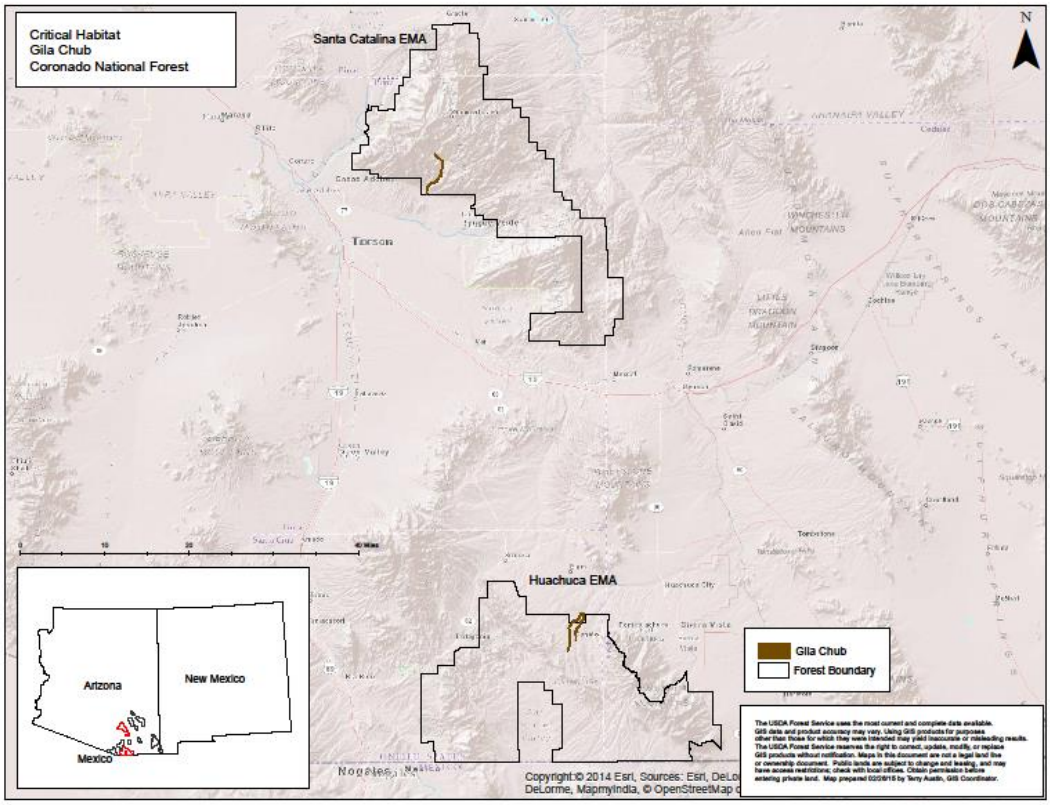

Figure 6. Map of Gila chub critical habitat on the CNF.

Summary of Effects and Determination of critical habitat – Gila chub

Generally, the overall guidance of the LRMP S&Gs is to protect resources while maintaining multiple use activities. Most program guidance in the S&Gs does seek to allow multiple uses while still maintaining ecosystem health and function. However, some conflicts will arise with effects to the species occurring due to the general lack of complete filtering necessary to prevent possible adverse effects. The Wildland-Urban Interface and Landscape-scale Fire, Water Resources-Natural, Invasive Species Management, Forest Products, Motorized Transportation System, and Range Management Program guidance is not sufficient to avoid all adverse effects to the PCEs. The implementation of the CNF LRMP **May Affect and is Likely to Adversely Affect,** the Gila chub critical habitat because the LRMP lacks S&Gs which provide guidance, for several programs, to avoid all adverse effects to the PCEs.

Summary of Effects and Determination – Yaqui chub

The Coronado LRMP guidance for Water Resources-Natural, Invasive Species Management, Forest Products, and Motorized Transportation System Programs is sufficient to avoid adverse impacts to Yaqui chub for activities carried out under these programs. Positive aspects of this direction include a focus on restoration ecology, watershed improvement, aquatic habitat improvement for threatened and endangered species, restrictions on OHV uses and livestock grazing in certain management areas, a new Motor Vehicle Use Map, and a focus on interagency coordination requirements. S&Gs for Rangeland and Recreation Management are not sufficient to preclude activities that may adversely affect the Yaqui chub, In addition, programs such as fire management, while overall beneficial to aquatic ecosystems, may have adverse impacts related to

erosion/sedimentation and ash flows in burn areas, and recreation, which is encouraged upstream from occupied habitat in West Turkey Creek, may affect Yaqui chub downstream.

Therefore, the implementation of the CNF LRMP **May Affect, and is Likely to Adversely Effect,** the Yaqui chub because implementation of the Coronado LRMP does not preclude activities that may result in measurable effects to the species such as livestock grazing, prescribed fire, and recreation.

Summary of Effects and Determination – Gila topminnow

Beneficial long-term effects should be realized as a result of the Wildland-Urban Interface-Landscape Scale Fire Management Program. However, the potential exists for adverse short-term effects due to fire, mining, and grazing. Implementation of guidance under the Rangeland Program should provide protection, for activities conducted for this program, to the Gila topminnow. The implementation of the LRMP for CNF **May Affect, and is Likely to Adversely Affect,** the Gila topminnow, when reintroduced, because the implementation of direction will not preclude adverse effects.

Summary of Effects and Determination – Gila trout

Short term adverse effects may occur as a result of guidance for the Wildland-Urban Interface-Landscape Scale Fire Management Program. However, guidance for the program provides for long term beneficial effects as riparian and upland conditions improve as a result of program implementation. Standards and Guidelines under the Rangeland Management program provide for beneficial effects to the Gila trout through improvement and maintenance of riparian areas. However, short term negative effects may occur due to methods used to accomplish this improvement. Therefore, the implementation of the CNF LRMP, is **May Affect, Likely to Adversely Affect** the Gila trout.

Summary of Effects and Determination – Apache trout

Short term adverse effects may occur as a result of guidance for the Wildland-Urban Interface-Landscape Scale Fire Management Program. However, guidance for the program provides for long term beneficial effects as riparian and upland conditions improve as a result of program implementation. Standards and Guidelines under the Rangeland Management program provide for beneficial effects to the Apache trout through improvement and maintenance of riparian areas. However, short term negative effects may occur due to methods used to accomplish this improvement. Therefore, the implementation of the CNF LRMP, is **May Affect, Likely to Adversely Affect** the Apache trout.

Summary of Effects and Determination – Spikedace

This species does not occur on forest and its occurrence off forest is downstream. The Oracle Ridge and Korn Kobb mines are located in the upper watershed of the San Pedro River above Aravaipa Creek. These mines could contribute effects to the hydrology of the San Pedro and Aravaipa drainages, but the effects are impossible to predict accurately at this time. Generally, the overall guidance of the LRMP S&Gs is to protect resources while maintaining multiple use activities. The guidance for the Wildland-Urban Interface and Landscape-scale Fire, Water Resources-Natural, Invasive Species Management, Forest Products, Motorized Transportation System, and Range Management Programs is sufficient to avoid effects from activities, carried out for these Programs that may adversely affect spikedace. Indirect effects that may occur downstream will be insignificant and discountable as they are likely not measurable or distinguishable from other, like, effects occurring to Aravaipa Creek and the Gila River from off

Forest activities. The implementation of the CNF LRMP **May Affect and is Likely to Adversely Affect** spikedace.

Primary Constituents Elements of critical habitat- Spikedace

Critical habitat was designated for the spikedace in 2007 and modification to the existing designation is currently proposed by the USFWS. There is no designated critical habitat located on the CNF. However, critical habitat is located in Redfield canyon less than 1 mile downstream of the forest boundary.

PCEs determined for the spikedace are:

(1) Habitat to support all egg, larval, juvenile, and adult spikedace, which includes:

a. Perennial flows with a stream depth generally less than 1 m (3.3 ft), and with slow to swift flow velocities between 5 and 80 cm per second (1.9 and 31.5 in. per second).

b. Appropriate stream microhabitat types including glides, runs, riffles, the margins of pools and eddies, and backwater components over sand, gravel, and cobble substrates with low or moderate amounts of fine sediment and substrate embeddedness;

c. Appropriate stream habitat with a low gradient of less than approximately 1.0 percent, at elevations below 2,100 m (6,890 ft); and

d. Water temperatures in the general range of 8.0 to 28.0 °C (46.4 to 82.4 °F).

(2) An abundant aquatic insect food base consisting of mayflies, true flies, black flies, caddisflies, stoneflies, and dragonflies.

(3) Streams with no or no more than low levels of pollutants.

(4) Perennial flows, or interrupted stream courses that are periodically dewatered but that serve as connective corridors between occupied or seasonally occupied habitat and through which the species may move when the habitat is wetted.

(5) No nonnative aquatic species, or levels of nonnative aquatic species that are sufficiently low as to allow persistence of spikedace.

(6) Streams with a natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of transporting sediments.

Summary of Effects and Determination of critical habitat – Spikedace

Generally, the overall guidance of the LRMP S&Gs is to protect resources while maintaining multiple use activities. The guidance for the Wildland-Urban Interface and Landscape-scale Fire, Water Resources-Natural, Invasive Species Management, Forest Products, Motorized Transportation System, and Range Management Programs is sufficient to avoid effects from activities, carried out for these Programs that may adversely affect primary constituent elements. Designated critical habitat is located approximately 0.9 miles downstream in Redfield Canyon, and 3.6 miles downstream of the forest boundary in Aravaipa Creek. The Oracle Ridge and Korn Kobb mines are located in the upper watershed of the San Pedro River above Aravaipa Creek. These mines could contribute effects to the hydrology of the San Pedro and Aravaipa drainages, but the effects are impossible to predict accurately at this time. The implementation of the CNF LRMP **May Affect and is Likely to Adversely Affect** spikedace designated critical habitat.

Summary of Effects and Determination – Loach minnow

This species does not occur on forest and its occurrence off forest is downstream. While there are potential minerals projects within the watershed the indirect effects that may occur downstream will be insignificant and discountable as they are likely not measurable or distinguishable from other effects occurring to Aravaipa Creek from off Forest activities. Generally, the overall guidance of the LRMP S&Gs is to protect resources while maintaining multiple use activities. The guidance for the Wildland-Urban Interface and Landscape-scale Fire, Water Resources-Natural, Invasive Species Management, Forest Products, Motorized Transportation System, and Range Management Programs is sufficient to avoid effects from activities, carried out for these Programs that may adversely affect loach minnow. Indirect effects that may occur downstream will be insignificant and discountable as they are likely not measurable or distinguishable from other, like, effects occurring to Aravaipa Creek from off Forest activities. The implementation of the CNF LRMP **May Affect and is Likely to Adversely Affect** Loach minnow.

Primary Constituents Elements of critical habitat- Loach minnow

Critical habitat was designated for the loach minnow in 2007. There is no designated critical habitat located on the CNF. However, critical habitat is located in Aravaipa Creek approximately 3.6 miles downstream of the forest boundary.

PCEs determined for loach minnow are:

1) Habitat to support all egg, larval, juvenile, and adult loach minnow;
(2) An abundant aquatic insect food base;
(3) Streams with no or no more than low levels of pollutants;
(4) Perennial flows, or interrupted stream courses that are periodically dewatered but that serve as connective corridors when wetted;
(5) No or low levels of nonnative aquatic species that allow for persistence of loach minnow; and
(6) Streams with a natural, unregulated flow regime that allows for periodic flooding or, if regulated, that allows for adequate river functions.

Summary of Effects and Determination of critical habitat – Loach minnow

Generally, the overall guidance of the LRMP S&Gs is to protect resources while maintaining multiple use activities. The guidance for the Wildland-Urban Interface and Landscape-scale Fire, Water Resources-Natural, Invasive Species Management, Forest Products, Motorized Transportation System, and Range Management Programs is sufficient to avoid effects from activities, carried out for these Programs that may adversely affect primary constituent elements. Designated critical habitat is located approximately 3.6 miles downstream of the forest boundary in Aravaipa Creek. Indirect effects that may occur to downstream critical habitat will be insignificant and discountable as they are likely not measurable or distinguishable from other effects occurring to Aravaipa Creek from off Forest activities. The implementation of the CNF LRMP **May Affect and is Likely to Adversely Affect** Loach minnow designated critical habitat.

Summary of Effects and Determination – Sonora chub

Surface disturbance activities such as livestock grazing, range improvements, mining, wildfire, recreation, and roads can cause unnatural levels of sediment to be moved downstream into pool habitats necessary for Sonora chub survival during low flows or cessation of flows. The S&Gs in the CNF LRMP provide an overall positive management framework for the long-term conservation of Sonora chub habitat. Positive aspects of the LRMP include a focus on restoration

ecology, watershed improvement, and aquatic habitat improvement for threatened and endangered species; restrictions on OHV uses and livestock grazing in certain management areas; a road density of less than 1mile/mile^2; and a focus on interagency coordination requirements and strategic mineral withdrawals.

All waters occupied by Sonora Chub in the U.S are within the CNF and about one-half of the drainage is within Pajarita Wilderness and Goodding RNA (USFWS 2005). The Sonora chub occurs in California Gulch and Sycamore Creek, the CNF has fenced a total of 13 miles of the occupied habitat in these two locations, it is still likely that some effects to this habitat may result from activities in the upper reaches of the watershed. Therefore, implementation of the CNF LRMP **May Affect and is Likely to Adversely Affect** the Sonora chub.

Primary Constituents Elements of critical habitat- Sonora chub

Critical habitat was designated at the time of federal listing to include Sycamore Creek, extending downstream from and including Yank Spring (= Hank and Yank Spring), to the International border. The lower 1.2 miles of Penasco Creek, and the lower 0.25 miles of an unnamed stream entering Sycamore Creek from the west, about 1.5 miles downstream from Yank Spring were also designated. In addition, critical habitat includes a 40-foot wide riparian area along each side of Sycamore and Penasco creeks (USFWS 2005).On the CNF, Approximately 6.5 miles of critical habitat are designated, including the following areas:
1. Sycamore Creek, and a riparian zone 25 feet wide along each side of the creek, from Yank's Spring downstream approximately 5 stream miles to the International Border with Mexico;
2. Yank's Spring;
3. Penasco Creek, including a riparian zone 25 feet wide along each side of the creek, from the confluence with Sycamore Creek; and
4. An unnamed tributary to Sycamore Creek, from its confluence with Sycamore Creek.

Primary Constituent Elements were not identified in the 1986 Final Rule. However, habitat characteristics important to Sonora chub include clean permanent water with pools and intermediate riffle areas and/or intermittent pools maintained by bedrock or by subsurface flow in areas shaded by canyon walls (USFWS 2005).

The amount of occupied habitat varies from year to year depending on stream flows, and the CNF does not have any information regarding the extent of occupied pools or spring habitats during the reporting period. If any were habitats were lost, it would not be the result of Forest management actions (USFS 2010b).

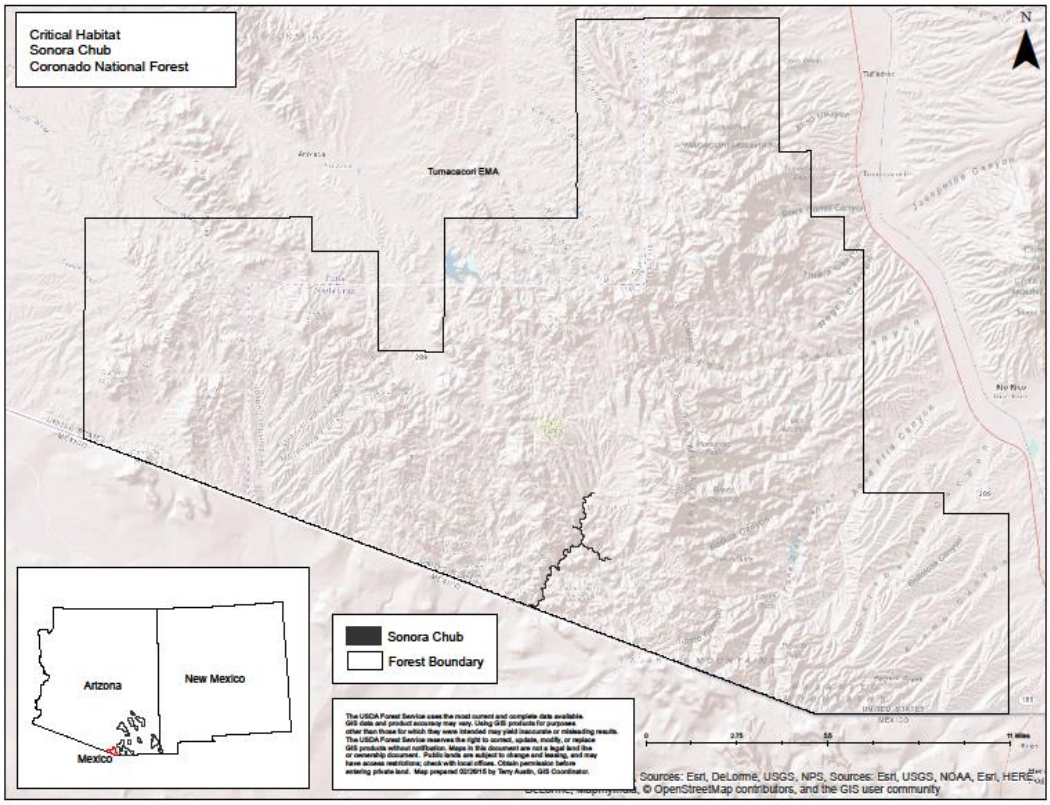

Figure 7. Map of Sonora chub critical habitat on the CNF.

Summary of Effects and Determination of critical habitat – Sonora chub

In Sycamore Canyon, critical habitat occurs within the Pajarita Wilderness and Goodding RNA of the CNF. These special designations help protect a biological community characterized by Mexican floral and faunal elements that do not otherwise occur, or are rare elsewhere, in the U.S. (USFWS 2005). Management direction for the RNA includes maintaining the area in climax vegetation, and as such, removal of minerals, livestock grazing, use of motorized vehicles, and harvest of timber or fuelwood is not permitted, and recreation is limited to non-developed and dispersed use. Livestock grazing is permitted within Pajarita Wilderness outside of Goodding RNA. The remainder of Sycamore drainage and California Gulch is open to multiple uses.

The S&Gs in the CNF LRMP provide an overall positive management framework for the long-term conservation of Sonora chub critical habitat. Positive aspects of the LRMP include a focus on restoration ecology, watershed improvement, and aquatic habitat improvement for threatened and endangered species; restrictions on OHV uses and livestock grazing in certain management areas; a road density of less than 1mile/mile2; and a focus on interagency coordination requirements and strategic mineral withdrawals. Surface disturbance activities such as livestock grazing, range improvements, mining, recreation, and roads can cause unnatural levels of sediment to be moved downstream into pool habitats necessary for Sonora chub survival during low flows or cessation of flows.

Although the critical habitat designation on the CNF has made the Sonora chub a primary consideration in the development of allotment management plans for grazing allotments in both Sycamore Canyon and California Gulch and the critical habitat portion of Sycamore Creek has

been excluded from grazing via fencing, it is likely that some effects to critical habitat may result from activities in the upper reaches of the watershed. Therefore, implementation of the CNF LRMP **May Affect and is Likely to Adversely Affect** designated critical habitat for the Sonora chub.

Summary of Effects and Determination – Roundtail chub

Surface disturbance activities such as livestock grazing, range improvements, mining, wildfire, recreation, and roads can cause unnatural levels of sediment to be moved downstream into pool habitats necessary for Roundtail chub survival during low flows or cessation of flows. The S&Gs in the CNF LRMP provide an overall positive management framework for the long-term conservation of Roundtail chub habitat. This habitat occurs off forest with a buffer of 3.6 miles of intervening habitat, thereby lessening the effects over distance. Positive aspects of the LRMP include a focus on restoration ecology, watershed improvement, and aquatic habitat improvement for threatened and endangered species; restrictions on OHV uses and livestock grazing in certain management areas; a road density of less than 1mile/mile^2; and a focus on interagency coordination requirements and strategic mineral withdrawals.

All waters occupied by Roundtail Chub in the U.S are off of the CNF and separated by a distance of 3.6 miles. Potential downstream effects from minerals activities while impossible to quantify at this time may occur therefore, implementation of the CNF LRMP (*if this species is listed*) **May Affect and is Likely to Adversely Affect** the Roundtail chub.

Invertebrates

Stephan's heterelmis riffle beetle_____ (*Heterelmis stephani*)

Endangered Species Act Status:	Candidate
Recovery Plan:	None
District Occurrence:	Nogales
Critical Habitat:	None
Determination of Effects:	(*If listed*) May affect, likely to adversely affect

For brevity, the Stephan's heterelmis riffle beetle is referred to as SHRB throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Stephan's.htm (accessed 2014) and within a 2010 species assessment form: http://ecos.fws.gov/docs/candforms_pdf/r2/I0CB_I01.pdf (accessed 2014). This species was listed as a candidate in 2008.

Status, Threats, and Conservation of the Species

Status

Heterelmis stephani is endemic to spring environments within the Santa Rita Mountains, Santa Cruz County, Arizona. Stephan's riffle beetle was described from specimens collected from Madera Canyon. Based on relatively intensive surveys, the entire range of this species was believed to be confined to Madera Canyon on the CNF. Historically, only three populations have been documented, including Bog Springs, Sylvester Spring, and in seepage from a water tank filled with water diverted from Bog Springs. Currently, the species is known only from the Sylvester Spring on the CNF. During field investigation in 2005, district personnel confirmed that Sylvester Spring was still flowing and providing suitable habitat conditions for the beetle. Although they did not conduct beetle surveys, the confirmation of flowing water indicates that conditions conducive to survival of the species remains intact. The population in the seepage from Bog Springs has been extirpated since water ceased flowing from the water tank in 1976.

Threats

Threats and vulnerability include the historical alteration of springs from boxing, capping, and piping; susceptibility of springs to recreational impacts; and the lack of State and/or local government programs structured to address the conservation of rare and imperiled insects.

The most significant habitat losses occurred after the species was originally described. The type locality, where the species was originally collected, no longer exists as habitat for the species. After conferring with the original collector, Barr and Shepard (1993) determined that the type locality was not Bog Springs proper but actually a site 1.5 miles away near a CNF campground. Apparently the original population was maintained by seepage from a pipe which was believed to be overflow seepage from a nearby tank storing water diverted from Bog Springs. Seepage from the tank ceased in 1976 and the tank was removed entirely in 1992. During the surveys conducted by Barr and Shepard (1993) only one adult riffle beetle was collected from Sylvester Spring. They were unable to find the beetle in Bog Springs proper. Based on the 71 beetle specimens originally collected in 1969 it appears the species was once very common. The loss of habitat at the type locality represents a significant portion of the range of Stephan's riffle beetle.

All of these springs are located immediately off a CNF maintained recreational trail. It is unlikely that recreationists are entirely aware of the sensitive nature of those spring ecosystems. In the absence of public education, recreationists may unknowingly degrade habitat by introducing chemicals or allowing pets into the springs. The unintentional killing of larvae may also occur as a result of trampling.

Conservation

Objective NWS-O-2 is the reconstruction of at least 3 developed springs every 10 years to provide aquatic habitat for the recovery of plant and/or animal species. This objective would benefit this species that uses spring habitats. Guideline COW-G-3 contains guidance that overflow should be diverted to allow for soil moisture recharge and creation or maintenance of wetland habitat features. While guideline NWS-G-4 contains guidance that Management activities should not impair soil moisture recharge at outflows of natural water sources, and guideline NWS-G-2 ensures that water quality, quantity, and aquatic habitat at natural springs and seeps should be protected or enhanced.

Huachuca springsnail_____(*Pyrgulopsis thompsoni*)

Endangered Species Act Status: Candidate

Recovery Plan:	None
District Occurrence:	Sierra Vista
Critical Habitat:	None
Determination of Effects:	(*If listed*) May affect, likely to adversely affect

For brevity, the Huachuca springsnail is referred to as HSS throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Huachuca_Snail.htm (accessed 2014), and within a 2014 species assessment form: http://ecos.fws.gov/docs/candidate/assessments/2014/r2/G05C_I01.pdf. This species was listed as a candidate in 1989.

Status, Threats, and Conservation of the Species

Status

The species is believed to currently occur in up to 21 sites in Arizona and Sonora, Mexico (Myers 2012). Landye (1995) indicates that sites include Conger Creek, Cienega Creek, Ramsey Canyon, Redfield Canyon, and Wet Beaver Creek as well as two potential sites including Mattie Canyon and Tombstone Reservoir. The U.S. Fish and Wildlife Service (1995) lists most of the same sites mentioned above, but recognized two other sites on the CNF, Sylvania Spring and Tombstone Reservoir. The Arizona Game and Fish Department (AGFD) (2003) lists 13 sites: Monkey Canyon, Sonoita Creek, Santa Cruz River, Canelo Hills Cienega, Scotia Canyon, Garden Canyon, McClure Canyon, Sawmill Canyon, Huachuca Canyon, Blacktail Canyon, Ramsey Canyon, Cienega Creek, and Redfield Canyon. Varela-Romero et al. (1992) reported the species from Cienega Los Fresnos in Sonora, Mexico. During field sampling for genetic analysis and habitat studies, Hurt (2004) sampled nine sites (Bear, Canelo Hills, Cottonwood, McClure, Garden, Cave, Monkey, Peterson Ranch, and Sawmill) and Tsai et al. (2007) sampled eight sites (Garden Canyon, McClure, Cave Spring 1 and 2, Sawmill Spring, Huachuca Spring 1, 2, and 3, all of which appear to overlap with sites previously identified.

The discrepancy in the number of sites presented by various authors likely reflects confusion over names and locations of springs, with some springs having multiple names and vague location descriptions. A recent synthesis of this information indicates the species has been reported from at least 21 sites in Arizona and Sonora, Mexico (Myers 2012).

In late June 2012, AGFD biologists conducted a baseline inventory and timed presence-absence survey of 17 Huachuca springsnail sites identified in the Myers (2012) report. The findings from this survey are documented in a July 2012 AGFD report (Piorkowski and Mulligan, 2012). Springsnails were found at 9 of the 17 sites visited; voucher specimens were collected at each site to aid in verifying their identity. Of the sampled sites, only BS01 (previously known as Bear Spring) and GC02 (previously known as Garden Canyon Broken Pipe and/or Garden Canyon Sandbox) contained high counts of live springsnails (>100 individuals within a 10-minute search) (Piorkowski and Mulligan, 2012).

Threats

Loss or degradation of spring and cienega habitat due to overgrazing, timber harvest, altered fire regimes, drought, mining, impoundments, water developments, groundwater withdrawal, recreation, and catastrophic fire resulting from human-caused alterations of fire regimes. Extirpation of a population could occur as a result of major storms, drought, fire, or other forms of environmental stochasticity or anthropogenic stressors. Because populations are isolated, once extirpated, sites are unlikely to be recolonized without active management. Small populations are also subject to genetic deterioration and demographic variability, which increases the likelihood of extinction when coupled with existing threats.

Conservation

No conservation measures have been established for this species at this time.

Species and Habitat Effects for the Stephan's heterelmis riffle beetle and the Huachuca springsnail

The SHRB and HSS have similar but somewhat different life functions and habitat needs. Plan components are generally not definitive enough to differentiate among the finite requirements of these two species. Therefore, both species are analyzed together and effects by plan component below apply to both species unless otherwise noted.

Wildland-Urban Interface and Landscape-Scale Wildland fire

With upland restoration treatments maintaining watershed stability, the objective RIA-O-1 has the potential to result in lower intensity fires and ground cover that readily resprouts after fire. This would help limit runoff and sediment from any one fire event in the uplands above occupied or potentially occupied SHRB or HSS habitat. Fires would generally not burn in wetland habitat, however it has the potential to burn adjacent upland habitats causing indirect effects on SHRB or HSS and their habitat. Effects include increased runoff of floodwaters, deposition of debris and sediment originating in the burned area.

Water Resources – Natural

The objectives WET-O-1,WET-O-2, NWS-O-1, NWS-O-2, and NWS-O-3 would benefit habitat by maintaining and restoring riparian/spring vegetation to help with recovery of both these species. The standard WET-S-1 ensures that the total acreage of existing wetlands on the CNF would not decrease, thereby always providing suitable habitat for these species. The guidelines WET-G-1, WET-G-2, NWS-G-1, NWS-G-2, NWS-G-3, NWS-G-4, and NWS-G-5 provide guidance for the continued protection of wetlands from grazing, roads, fuel build-up, and sedimentation build-up. Water quality, quantity, and habitat features at natural springs and seeps should also be protected or enhanced.

Animal and Rare Plants

The Species Diversity and Viability Report assessed the SHRB and HSS. The viability report determined that SHRB and HSS population trends were unknown and the habitat trend for SHRB was unknown while the HSS habitat trend was positive. The guidelines ARP-G-1, HUA-G-1 and HUA-G-2 provide for the continued existence of species that use aquatic habitats.

Minerals Management

The CNF is currently aware of approximately 19 mineral projects within EMAs where SHRB and HSS occur. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Twelve of these projects are active and currently in place, while two projects are expected to occur in the foreseeable future, one is completed and four are withdrawn from consideration at the point. Seven projects are located on the Nogales R.D. within the Santa Rita EMA, and twelve on the Sierra Vista R.D. within the Huachuca EMA.

There is a potential for mining operations to be excavated to a depth greater than that of the regional aquifer and water would drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body would continue to remove water from storage in the regional aquifer.

Range Management

Livestock management on the CNF has the potential to affect these species through loss or modification of occupied habitat. The guideline RIA-G-2 benefits riparian habitat by limiting livestock grazing in riparian areas, thereby benefitting both of these species.

Cumulative Effects

As defined in ESA (50 CFR §402.02), cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the federal action subject to consultation. For this consultation, the Action Area has been defined as the Coronado National Forest plus adjacent lands that the proposed action may directly or indirectly affect. The time period is defined as the predicted life of this plan which is 10 years. In general, Arizona's population is expected to increase in the next 10 years. Increased urbanization results in loss of habitat or habitat suitability for federally listed species. Additional, the intensity of recreational activities is also likely to increase within the Action Area, particularly on Federal lands that are located adjacent or within a short driving distance of the major metropolitan areas of Phoenix, Tucson, Albuquerque, and Santa Fe such as the Coronado NF (USFS 2011). Activities may be permitted which may affect individuals: private land commercial and residential development, groundwater pumping and water diversions, recreation, illegal collecting, mining and related contaminants, wildland fire and altered fire regimes, and overgrazing. These types of activities have occurred in the past and are likely to occur into the foreseeable future.

The CNF is currently aware of approximately 25 mineral projects within EMAs where STS, ATF, CLF, or NMGS occur. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Fifteen of these projects are active and currently in place, while three projects are expected to occur in the foreseeable future, two are completed and five are withdrawn from consideration at the point. One project is located on the Douglas R.D. within the Dragoon EMA, one on the Safford R.D. within the Galiuro EMA, eleven on the Nogales R.D. within the Santa Rita and Tumacacori EMAs, and twelve on the Sierra Vista R.D. within the Huachuca EMA.

The Rosemont Copper Mine is proposed to be constructed in the NE area of the Santa Rita Mountains on the Coronado National Forest. This mine, if actualized, will include a mine pit that will be excavated to a depth greater than that of the regional aquifer and water will drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body will continue to remove water from storage in the regional aquifer. This aquifer also supplies baseflow to Cienega Creek and its tributaries, an area immediately east of the proposed project site which is designated as the BLM's Las Cienegas National Conservational Area.

Summary of Effects and Determination – Stephan's heterelmis riffle beetle

Loss or degradation of spring and cienega habitat due to overgrazing, timber harvest, altered fire regimes, mining, and recreation. Extirpation of a population could occur as a result of major storms, drought, fire, or other forms of environmental stochasticity or anthropogenic stressors. Because populations are isolated, once extirpated, sites are unlikely to be recolonized without active management. Small populations are also subject to genetic deterioration and demographic variability, which increases the likelihood of extinction when coupled with existing threats. Therefore, the implementation of the Coronado NF LRMP (*if this species is listed*) **May Affect, and is Likely to Adversely Effect,** the SHRB because implementation of the Coronado LRMP does not preclude activities that may result in measurable effects to the species such as livestock grazing, prescribed fire, and recreation.

Summary of Effects and Determination – Huachuca springsnail

Loss or degradation of spring and cienega habitat due to overgrazing, timber harvest, altered fire regimes, mining, and recreation. Extirpation of a population could occur as a result of major storms, drought, fire, or other forms of environmental stochasticity or anthropogenic stressors. Because populations are isolated, once extirpated, sites are unlikely to be recolonized without active management. Small populations are also subject to genetic deterioration and demographic variability, which increases the likelihood of extinction when coupled with existing threats. Therefore, the implementation of the Coronado NF LRMP (*if this species is listed*) **May Affect, and is Likely to Adversely Effect,** the Huachuca springsnail because implementation of the Coronado LRMP does not preclude activities that may result in measurable effects to the species such as livestock grazing, prescribed fire, and recreation.

Plants

Canelo Hill's ladies'-tresses_____(*Spiranthes delitescens*)

Endangered Species Act Status:	Endangered
Recovery Plan:	None
District Occurrence:	Sierra Vista
Critical Habitat:	None
Determination of Effects:	May affect, not likely to adversely affect

For brevity, the Canelo Hill's ladies-tresses is referred to as CHLT throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Canelo.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in two documents: the Final Rule listing the CHLT as an endangered species (USFWS 1997); and in the general species information sheet (USFWS 2001).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provide information about the CHLT in Forest Service Region 3. All these documents are incorporated by reference into this document.

The Canelo Hills ladies'-tresses grows in cienegas in southern Arizona and northern Sonora, Mexico. Cienegas are mid-elevation wetland communities often surrounded by relatively arid environments, are usually associated with perennial springs and stream headwaters, have permanently or seasonally saturated highly organic soils, and have a low probability of flooding or scouring (USFWS 1997). In Southern Arizona Cienegas are extremely rare wetland habitats.

The Canelo Hills ladies'-tresses is known from five cienega sites at about 5,000 feet elevation in the San Pedro River watershed in Santa Cruz and Cochise counties, southern Arizona. The total amount of occupied habitat is less than 200 acres. Four of the sites are on private land less than 23 miles north of the U.S./Mexico border; one site is on the Sierra Vista RD of the Coronado NF, near a private land site. Potential habitat has been surveyed along Turkey Creek with no findings documented for this species; the forest will continue surveying for presence in this area, as the species occurred nearby on Turkey Creek on private land (USFS supplement to BA-August 1, 1997).

Status, Threats, and Conservation of the Species

Status

The Canelo Hills ladies'-tresses was recognized as a distinct species in 1990. Prior to that, plants now recognized as *Spiranthes delitescens* were included in *Spiranthes graminea*, a Mexican species (Sheviak 1990).

It is difficult to estimate population size and stability for this orchid because non-flowering plants are hard to find in the dense herbaceous vegetation and because uncounted dormant plants cause the total population to be underestimated (USFWS 1997). The Nature Conservancy has monitored the plants at its Canelo Hills reserve since 1979, and has made yearly population counts since 1993. There is no clear population trend because the number of plants varies greatly from year to year. It was as high as 521 in 1995 and as low as 19 in 1997. In 1995, 107 plants bloomed, but only one plant bloomed in 1997. An informal survey of the Sheehy Springs site in 1999 counted 731 blooming plants; based on the survey, this may be the largest Canelo Hills ladies'-tresses population (AGFD 2000).

The site on the Coronado NF, near the Canelo Hills reserve, had four flowering plants when it was discovered in 1996 (USFWS 1997). In a subsequent site visit in 1997 following heavy grazing in the area, all streamside vegetation had been removed including that supporting the plants previously found.

Threats

The primary threat to Canelo Hills ladies'-tresses is further loss of its limited habitat. The USFWS lists groundwater overdrafts, surface water diversions, impoundments, channelization,

improper livestock grazing, agriculture, mining, road building, nonnative species introductions, urbanization, illegal collection, wood cutting, and recreation as factors that contribute to riparian and cienega habitat loss and degradation in southern Arizona (USFWS 1997).

There is anecdotal evidence that Canelo Hills ladies'-tresses requires disturbances such as grazing or fire (AGFD 2000). Even if not required, these activities may benefit the orchid by reducing competing vegetation. The Listing Documents (FWS 1995, 1997) note that there is disagreement among scientists on the effect of fire on the species and that determining the role of fire will be essential in properly managing the species.

Conservation
The Coronado NF CHLT site has been fenced to exclude cattle grazing. One site with potential habitat along Turkey Creek will continue to be surveyed for CHLT. Any collection on FS lands will require a special use permit that will provide protection for the species, in addition to federal collection permit requirements.

Huachuca water umbel_____(*Lilaeopsis schaffneriana var. recurva*)

Endangered Species Act Status:	Endangered
Recovery Plan:	None
District Occurrence:	Sierra Vista
Critical Habitat:	Yes
Determination of Effects:	May affect, likely to adversely affect
Determination of Critical habitat:	May affect, likely to adversely affect

For brevity, the Huachuca water umbel is referred to as HWU throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/HuachucaUmbel.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: the Final Rule listing the HWU as an endangered species (USFWS 1997); in the general species information sheet (USFWS 2001), and the 5-year review (USFWS, *draft* 2014).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provides information about the HWU in FS Region 3. All these documents are incorporated by reference into this document.

The Huachuca water umbel grows in cienegas (marshy wetlands) and along streams, rivers, and ponds (USFWS 1997). It can grow in saturated soils or as an emergent in water depths up to about 10 inches. The surrounding non-wetland vegetation can be desertscrub, grassland, oak woodland, or conifer forest at elevations of 2,000 to 7,100 feet (AGFD 1997).

Although the taxon is capable of reproducing both sexually, through seed, and asexually, through rhizomes, vegetative reproduction is likely the primary form of reproduction in this taxon. Observations in the field suggest that seed may remain viable for five to ten years, an important survival strategy during times of drought. Another important survival strategy are its rhizomes, which enable occurrences to rapidly expand or contract in size between years, seasons, or both, in

response to local environmental conditions including temperature and water availability (USFWS, *draft* 2014).

This plant has been documented from 16 extant and 6 extirpated sites in Santa Cruz, Cochise, and Pima counties Arizona, and in adjacent Sonora, Mexico. The 16 extant sites are within the San Pedro, Santa Cruz, Rio Yaqui, and Rio Sonora watersheds. There are nine sites in the San Pedro River watershed, four in the Santa Cruz watershed, two in the Rio Yaqui watershed, and one in the Rio Sonora watershed (USFWS 1997).

Status, Threats, and Conservation of the Species

Status

Various sites are under the management of BLM (Tucson Field Office), Department of Defense (DOD) (Fort Huachuca), USFWS, Arizona State Park Department, and private citizens (Arizona Rare Plant Committee 2002). Six sites are under management of the USFS (Coronado NF, Sierra Vista RD).

Density of Huachuca water umbel plants and size of populations fluctuate in response to both flood cycles and site characteristics. Some populations are as small as 10-20 sq. ft. Sites such as Black Draw have a few sparsely distributed clumps, possibly due to the dense shade of the even-aged tree canopy and deeply entrenched channel. The Sonoita Creek population occupies 14.5 percent of a 5,400 sq. ft. patch of habitat. Scotia Canyon, by contrast, contains one of the largest populations occupying about 57 percent of the 4,800 feet perennial reach of the stream (USFWS 1997).

High quality Huachuca water umbel sites have stable perennial stream flow and herbaceous vegetation that stabilizes the banks and channel. Where these conditions are found, Huachuca water umbel often occurs as a common member of the aquatic community and is distributed uniformly along perennial stream segments. Huachuca water umbel seems to benefit from an intermediate level of flooding frequency that reduces competition with larger aquatic plants like cattails, sedges, and bulrushes. Conversely, floods that are too frequent or intense can destroy populations (Johnson *et al.* 1992).

The Coronado NF, Sierra Vista RD, manages seven Huachuca water umbel sites in the Huachuca Mountains. These are the Scotia, Bear, Sunnyside, and Lone Mountain canyon sites, as well as Sycamore Spring and Mud Spring. Scotia Canyon has one of the largest populations with plants occupying most of the suitable habitat along the 4,800 feet perennial reach of the stream. These sites are at the highest known elevations for Huachuca water umbel. They are in the upper parts of the watershed and relatively secure from water withdrawals or water diversions. Monitoring occurs every two years in Scotia, Sunnyside, and Bear Canyon, most recently in the fall of 2013 (USFWS, *draft* 2014).

Significant flows in Scotia Canyon from the 2013 monsoon season scoured the canyon and because of this, larger patches were not as prevalent in the lower canyon portion as in previous years of survey; the flood also removed competing vegetation (USFWS, *draft* 2014).

Significant flows from the 2013 monsoon season also scoured Sunnyside Canyon, and although larger patches were found, the overall extent in this canyon is believed to have contracted from previous years (USFWS, *draft* 2014).

At the confluence of Lone Mountain Canyon and Bear Canyon a cattle exclosure has been erected around multiple small patches for protection. In 2014, during a field visit it was observed that plants existed both inside and outside of the exclosure (USFWS, *draft* 2014).

The species has been regularly observed in visits at Sycamore Spring, and although intensive grazing has occurred in the past, population numbers and distribution have increased in recent years at this site. In 2014, a survey of Mud Spring revealed many patches occurring both inside and outside of an erect bullfrog exclosure that also excludes cattle. Patches outside of the exclosure occurred in two separate spring runs, one of which was heavily impacted by domestic livestock trampling and javelin wallows (USFWS, *draft* 2014).

Threats

Water withdrawals, diversions, stream channelization, and levies in southern Arizona and Sonora have reduced the habitat available for Huachuca water umbel. Several historical locations no longer provide any suitable habitat because perennial stream flows have ceased due to lowered water tables. Continued human population growth in southern Arizona is expected to put greater pressure on water resources. OHV use is also noted as a threat to this species and populations in Bear Canyon have been impacted by OHV use.

Widespread watershed degradation occurred in southern Arizona in the late 1800s due to uncontrolled livestock grazing, mining, hay harvesting, timber harvesting, and other practices such as fire suppression. This led to widespread erosion and channel entrenchment that has contributed to long-term or permanent degradation and loss of cienega and riparian habitats throughout southern Arizona and northern Mexico. Poor livestock management can destabilize stream channels and disturb cienega soils creating conditions unfavorable to HWU, which requires stable stream channels and cienegas. Such management can also change riparian structure and diversity causing a decline in watershed conditions.

Well-managed livestock grazing seems to be compatible with HWU. Cattle generally do not eat the plants because the leaves are too close to the ground, but they can trample plants, cause bank instability, and soil compaction. Because of their ability to reproduce via rhizomes, HWU seems to benefit from moderate levels of disturbance (REF). Grazing may also keep competing plant densities low, and moderate trampling may provide microsites for HWU expansion (USFWS 1997).

Conservation

Permanent monitoring transects have been established that include the entire occupied habitat in Scotia, Bear, and Sunnyside canyons.

Seven exclosures have been constructed to protect the species from livestock grazing and in one case recreation. Some of these exclosures are used to exclude all grazing while others allow a certain level of use. Also, most of these pastures only allow dormant season use (cattle on from Oct-March). Utilization standards were changed on the Lone Mountain allotment to protect the plant. In Sunnyside Canyon, Lone Mountain Canyon and its tributaries, Bear Canyon, and Scotia Canyon, the current Coronado NF Grazing Management Plan recommends grazing in winter months only when adequate water is available to disperse cattle and reduce impact on riparian areas.

Although OHV use has been noted as impacting populations in Bear Canyon generally OHV use is low on the CNF and restricted to a few areas where the species does not occur.

The USFS has requested water rights for two springs in Scotia Canyon, one for 10.3 acre feet and the other for 0.3 acre feet. These are in the claims process and will be finalized when the San Pedro River adjudication process is completed. The USFS has a water right on Bear Spring for 0.2 acre feet and two claims in process for Van Horn Spring and the Bear Creek-Cave Creek confluence (1.5 acre feet) near the USFS boundary (USFS 2011).

The guideline VLS-G-2 helps in conservation by ensuring that only native plant species or short-lived non-persistent nonnative species be used for mine reclamation and post fire wildfire treatments this would reasonably ensure that nonnative species would not out compete native species that are trying to reestablish.

Effects Analysis for the Canelo Hills ladies'-tresses and the Huachuca water umbel

The CHLT and HWU have similar but somewhat different habitat needs. Plan components are generally not definitive enough to differentiate among the finite requirements of these two species. Therefore, both species are analyzed together and effects by plan component below apply to both species unless otherwise noted.

Wildland-Urban Interface and Landscape-scale Fire

With upland restoration treatments maintaining watershed stability, the objective (RIA-O-2) has the potential to result in lower intensity fires and ground cover that readily resprouts after fire. This would help limit runoff and sediment from any one fire event in the uplands above occupied or potentially occupied HWU or CHLT habitat. The guideline RIA-G-6 would ensure that riparian areas are not used as points of ignition for prescribed burns. Fires would generally not burn in wetland habitat, however it has the potential to burn adjacent upland habitats causing indirect effects on HWU or CHLT and their habitat. Effects include increased runoff of floodwaters, deposition of debris and sediment originating in the burned area, and potential for scouring individuals and habitat (USFWS, *draft* 2014). The guideline VLS-G-2 states that only native plant species or short-lived non-persistent nonnative species be used for post fire wildfire treatments this would reasonably ensure that nonnative species would not out compete native species that are trying to reestablish. The guideline NWS-G-3 adds a protection measure from uncharacteristic fire effects of additional fuel buildup around natural water sources.

Water Resources – Natural

The standard WET-S-1 benefits both species by ensuring that wetland acreages would not be diminished due to management activities thereby always providing habitat. The guidelines NWS-G-4 and MOM-G-1 would ensure that management activities do not impair existing moisture recharge or native species diversity at natural water sources or meadow habitat thereby maintaining habitat for these two species. The guideline WET-G-1 ensures grazing management does not cause any significant deleterious effects to wetland form or function thereby maintaining habitat for these two species. The guideline RIA-G-1 ensures any road construction in riparian areas is designed and implemented to minimize effects to natural waterflow and native vegetation communities thereby maintaining habitat for these two species.

Soil Management

With upland restoration treatments maintaining watershed stability, the objective (RIA-O-2) has the potential to result in lower intensity fires and ground cover that readily resprouts after fire. This would help limit runoff and sediment from any one fire event in the uplands above occupied or potentially occupied HWU or CHLT habitat. The guideline RIA-G-6 would ensure that riparian areas are not used as points of ignition for prescribed burns. Fires would generally not

burn in wetland habitat, however it has the potential to burn adjacent upland habitats causing indirect effects on HWU or CHLT and their habitat. Effects include increased runoff of floodwaters, deposition of debris and sediment originating in the burned area, and potential for scouring individuals and habitat (USFWS, *draft* 2014).

Animal and Rare Plants

The Species Diversity and Viability Report assessed the HWU. The viability report determined that HWU population trend was unknown and that the habitat trend was positive. The guideline HUA-G-4 should ensure that management activities that could potentially have an effect on rare plant populations would incorporate site specific design features and mitigate impacts.

Invasive Species Management

The objective HUA-O-1 would treat vegetation on at least 25% of the Huachuca EMA to create resiliency to disturbance. Treatments will be consistent with the objectives for forestwide vegetation communities and resources and because of ARP-G-1 projects will be designed to comply with existing recovery plans for these species. Additionally, HUA-G-4 ensures that treatments would avoid adverse impacts to these plant species. Moreover, ISM-G-1 states that invasive species treatments next to water sources would consider native fish and frogs which would also benefit all aquatic species including these plants. ARP-G-1 requires that all activities occurring within federally listed species habitat will apply species protection measures from approved recovery plans and conservation agreements. These plant species do not have approved recovery plans or conservation agreements as the USFWS determined that protection of occupied habitat would be handled through site specific consultation. As such, adequate information exists for the conservation of the species and such guidelines would be used to guide invasive species treatments to avoid impacts to this these species. As the presence of exotic plants in aquatic habitats continue to become more prevalent in southeastern Arizona (USFWS, *draft* 2014), controlling invasives in these habitats would likely benefit HWU and CHLT.

This program area has the potential to help with removing invasive nonnative species. The guideline ISM-G-1 directly benefits these species by recommending the removal of non-native invasive animals in or near occupied habitat while the guideline RAM-G-6 will help in restoring native plant species. Herbicide and pesticide treatments are expected to continue under this plan as they have under the previous forest plan. The use of herbicide and pesticides can have adverse effects on aquatic species as well as upland species. Any potential future projects implemented under this plan would be assessed on a case by case basis to determine potential effects on individual species and to mitigate them. The use of pesticides may impact forage base for specific individual species.

Minerals Management

Open pit mining as well as sand and gravel mining removes riparian vegetation and destabilizes the ecosystem, which could cause habitat or patch losses upstream or downstream from the mining. These mines also pump water groundwater for processing, and could locally affect groundwater reserves and perennial stream base flows (USFWS, *draft* 2014). The guideline VLS-G-2 states that only native plant species or short-lived non-persistent nonnative species be used for mine reclamation this would reasonably ensure that nonnative species would not out compete native species that are trying to reestablish. There is a potential for mining operations to be excavated to a depth greater than that of the regional aquifer and water would drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit

lake would form, and evaporation from this water body would continue to remove water from storage in the regional aquifer.

The CNF is currently aware of approximately 12 mineral projects within EMAs where CHLT and HWU occur. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Eight of these projects are active and currently in place, while one project is expected to occur in the foreseeable future and three are withdrawn from consideration at the point. Twelve projects are located on the Sierra Vista R.D. within the Huachuca EMA.

Motorized Transportation System

The guideline MTS-G-3 and 4 would ensure that HWU and CHLT habitat is protected or that unavoidable management activities are mitigated to minimize effects within this program area.

Recreation Management

The Forest Plan does not include any Objectives, Standards, or Guidelines related to recreation for CHLT or HWU. MTS-S-1 directs that motor vehicle use is allowed only on the designated system of roads and motorized trails except where allowed on Motor Vehicle Use Maps (MVUM). MVUM for all districts allow motorists to drive up to 300 feet off a designated road for the purposes of camping and parking. The 300 ft camping allowance within occupied CHLT habitat could result in impacts to individual plants.

Range Management

Livestock grazing has the potential to impact these plant species through trampling of plants, and changed riparian and aquatic conditions. The guidelines RAM-G-4 would maintain or promote ground cover providing for soil moisture and stability beneficial for the HWU and CHLT habitat. The guideline RIA-G-1 limits grazing in riparian areas where there would be no significant deleterious effects to riparian area form or function. Analysis should consider grazing season, timing, intensity, grazing period and frequency. The guideline WET-G-1 recommends livestock grazing would not result in deleterious effects to wetlands and RAM-G-7 guides grazing practices to emphasize reproduction of desired plant species.

Cumulative Effects

As defined in ESA (50 CFR §402.02), cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the federal action subject to consultation. For this consultation, the Action Area has been defined as the Coronado National Forest plus adjacent lands that the proposed action may directly or indirectly affect. In general, Arizona's human population is expected to increase in the next 10 years. Increased urbanization results in loss of habitat or habitat suitability for federally listed species. Additional, the intensity of recreational activities is also likely to increase within the Action Area, particularly on Federal lands that are located adjacent or within a short driving distance of the major metropolitan areas of Phoenix and Tucson such as the Coronado NF (USFS 2011). Activities may occur on private lands which may affect individual CHLT plants: private land commercial and residential development, recreation, illegal collecting, mining, wildland fire, and overgrazing. These types of activities have occurred in the past and are likely to occur into the foreseeable future. Implementation of the Forest Plan will not encourage these types of activities on adjacent private lands and therefore will not contribute incremental effects to CHLT or HWU off Forest.

The Rosemont Copper Mine is proposed to be constructed within HWU habitat in the NE area of the Santa Rita Mountains on the Coronado National Forest. This mine, if actualized, will include a mine pit that will be excavated to a depth greater than that of the regional aquifer and water will drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body will continue to remove water from storage in the regional aquifer. This aquifer also supplies baseflow to Cienega Creek and its tributaries, an area immediately east of the proposed project site which is designated as the BLM's Las Cienegas National Conservational Area. Cienega Creek and its tributary, Empire Gulch, support numerous occurrences and more than 100 patches of HWU (USFWS, *draft* 2014).

Several groundwater models have been developed to analyze potential effects from the proposed mine on groundwater withdrawals throughout the affected area, including Cienega Creek and Empire Gulch. Independent models used in the 2013 Biological Opinion analysis indicate that, while some individual patches would fail to persist in Cienega Creek over time, the construction of Rosemont mine would not likely result in large reductions of perennial stream reaches and HWU would be unlikely to be extirpated from the Cienega Creek watershed. This model, however did not consider the cumulative impact of drawdowns on baseflow in Cienega Creek in combination with similar effects to its tributaries. New analysis which incorporates this cumulative effects indicate that, as a worst case scenario, within 50 years, upper Cienega Creek would have 141 days per year with extreme low flows, within 150 years this number would increase to 352 days per year. Given the biology of the species, such dewatering would result in the loss of the HWU in Cienega Creek and Empire Gulch (USFWS, *draft* 2014).

Summary of Effects and Determination - CHLT

The implementation of the Coronado NF LRMP **May Affect, but is Not Likely to Adversely Affect** the Canelo Hills ladies'-tresses.

Summary of Effects and Determination - HWU

The implementation of the Coronado LRMP **May Affect, and is Likely to Adversely Affect** the Huachuca water umbel.

Critical habitat – HWU

Primary Constituents Elements of critical habitat - HWU

Seven critical habitat units have been designated for Huachuca water umbel in Cochise and Santa Cruz counties. These are: part of Soniota Creek in T. 20 S., R. 16 E., Secs. 33 and 34 (Unit 1); part of the Santa Cruz River and a tributary in T. 24 S., R. 17 E., Secs. 11, 13, and 14 (Unit 2); **in the Huachuca Mountains part of Scotia Canyon in T. 23 S., R. 19 E., Secs. 3, 9, 10, 16, and 21 (Unit 3), part of Sunnyside Canyon in T. 23 S., R. 19 E., Sec. 10 (Unit 4)**, part of Garden Canyon on the Fort Huachuca Military Reservation (Unit 5), **and part of Bear Canyon and tributaries in T. 23 S., R. 19 E., Secs. 25 and 36, T. 23 S., R. 20 E, Secs. 30 and 31, and T. 24 S., R. 19 E., Sec. 1 (Unit 6)**; and the San Pedro River from T. 19 S., R. 21 E. to T. 23 S., R. 22 E. (Unit 7) (USFWS 1999). The Scotia, Sunnyside, and Bear canyon units (3, 4, and 6) are on the Coronado NF.

The critical habitat units include the stream courses and adjacent areas out to the beginning of upland vegetation. "Within these areas, the PCEs include, but are not limited to, the habitat

components which provide: 1) Sufficient perennial base flows to provide a permanently wetted substrate for growth and reproduction of *Lilaeopsis*; 2) A stream channel that is relatively stable, but subject to periodic flooding that provides for rejuvenation of the riparian plant community and provides open microsites for *Lilaeopsis* expansion; 3) A riparian plant community that is relatively stable over time and in which nonnative species do not exist or are at a density that has little or no adverse effect on resources available for *Lilaeopsis* growth and reproduction; and 4) In streams and rivers, refugia in each watershed and in each reach, including but not limited to springs or backwaters of mainstem rivers, that allow each population to survive catastrophic floods and recolonize larger areas." (USFWS 1999).

The discussions in the previous sections for effects to the species also apply to Critical Habitat. PCE's of critical habitat also include sufficient baseflow, healthy stream channels, and maintenance of riparian vegetation. All of the program areas mentioned above also similarly affect the PCEs of the critical habitat units for the CNF.

NWS-O-1 and 3, WET-O-1, WET-S-1, WET-G-1, NWS-G-1 through 5 address PCE 1 and 2

RIA-O-2 and RIA-G-6 address PCE 3

There are no plan components that specifically direct development of "refugia" in watershed supporting these plant species, however there are a number of components as discussed above that encourage management of healthy riparian and aquatic habitat that would tend to promote development of such refugia.

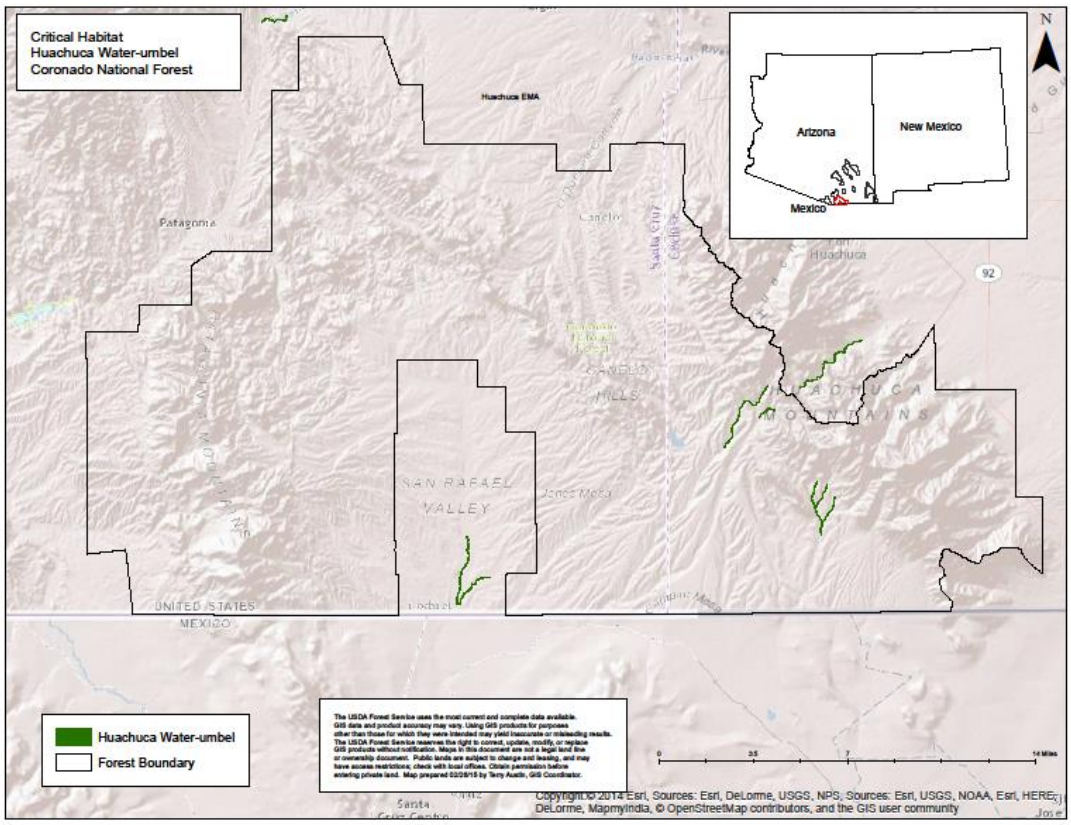

Figure 8. Map of HWU critical habitat on the CNF.

Summary of Effects and Determination of critical habitat - HWU

The implementation of the Coronado NF LRMP **May Affect, and is Likely to Adversely Affect** the designated critical habitat of the Huachuca water umbel.

Pima pineapple cactus_____(*Coryphantha scheeri var. robustispina*)

Endangered Species Act Status:	Endangered
Recovery Plan:	None
District Occurrence:	Nogales and Sierra Vista
Critical Habitat:	None
Determination of Effects:	May affect, likely to adversely affect

For brevity, the Pima pineapple cactus is referred to as PPC throughout the document.

Natural History and Distribution

Life history, distribution, status of the species range-wide and listing factors are found in documents located on the FWS website http://www.fws.gov/southwest/es/arizona/Pima.htm (accessed 2014). An account of the taxonomy, biology, and reproductive characteristics of this species is found in three documents: the Final Rule listing the PPC as an endangered species (USFWS 1993); in the Recovery Plan (USFWS 2005); and the 5-Year Review (USFWS 2007).

The 2012 Biological and Conference Opinion for the Continued Implementation of the Land and Resource Management Plan for the CNF (USFWS 2012) provides information about the PPC in FS Region 3. All these documents are incorporated by reference into this document.

Status, Threats, and Conservation of the Species

Status

There is ample habitat for survival of this cactus, but its key habitat in the vicinity of Tucson is privately owned and is prime real estate subject to commercial and residential development. The trend for this cactus is downward primarily due to this irreversible habitat loss (USFWS 1993). Some areas within the species' range have been developed for farm production. The Avra and Altar valleys and the Santa Cruz River basin are currently under cultivation, but were probably historical habitat for this species (USFWS 1993).

Pima pineapple cactus occurs on the Coronado NF, Nogales and Sierra Vista RDs. These populations are somewhat disjunct from the main distribution to the north. They represent only a minor part of the species' distribution and abundance, but are significant for their safety from potential development. The predominant land use is grazing. Lehmann's lovegrass dominates the herbaceous community.

Threats

Dispersed, patchy clusters of individual Pima pineapple cactus are becoming increasingly isolated as current land-management practices, increased recreational use when adjacent to urban expansion, and the continuing aggressive spread of non-native grasses threatens the habitat of the species. Also, the illegal collection of Pima pineapple cactus has been documented on numerous occasions throughout the range of the species. Hobbyists and commercial collectors are the two groups most likely to collect this species (USFWS 2012).

Practices used to modify desert communities to increase grass production for livestock have affected this plant more than any direct livestock impacts. Improper livestock grazing during the mid-to-late 1800s and continuing livestock grazing practices may have significantly altered the ecosystem. Effects of improper livestock grazing include: erosion, changes in hydrology and microclimate, invasion of weedy exotic plant species, shifts in density, relative abundance, and vigor of native species (USFWS 2012).

Mechanical vegetation manipulation such as imprinting, chaining, and ripping will directly damage or destroy plants, as well as reduce the shrub component of the plant community. The seeding of non-native grasses, predominately Lehman's lovegrass (*Eragrostis lehmanniana*), usually follows mechanical manipulation. Up to 75 percent of Pima pineapple cactus habitat has been significantly altered by the introduction of this grass that out competes native grasses and has created monotypic stands over large areas of mid-elevation southern Arizona. This grass creates abundant fine fuels that burn very hot and carry fire rapidly through an area. Most native grasses and shrubs are not adapted to such fires and are eliminated from the community while Lehmann's lovegrass prospers under such conditions. Cacti, including Pima pineapple cactus, do not tolerate hot fires and are damaged or killed. Under these altered community conditions, the elimination of grazing may do more damage than its presence. Although trampled plants have been seen in grazed areas, grazing removes much of the grass that is competing for space, water, and nutrients, and removes the standing dead grass thus reducing the fire hazard (USFWS 2012).

Off-road vehicle use can cause problems for Pima pineapple cactus. The cacti are small and can be covered by grass, making them difficult to see. Cacti on the Sierra Vista RD occur in relatively flat areas that are very popular for off-road vehicle use. This activity is not authorized by the USFS, but the area was not adequately signed for non-entry. The Coronado NF increased patrols during weekends and holidays to more effectively manage this activity in occupied habitat (USFWS 2012).

Conservation

There have been some notable conservation developments for this species. There are two established conservation banks, one on a private ranch in the Altar Valley and another owned by Pima County which includes areas in both the Altar Valley and south of Green Valley. Nine projects have used the bank to mitigate the loss of Pima pineapple cactus and habitat from residential and commercial development. Pima County and the City of Tucson's large-scale conservation efforts for this species are not yet complete, but strategies for Pima pineapple cactus conservation will likely include additional conservation banks, acquisition of occupied and suitable Pima pineapple cactus habitat, a revision of both the City and County ordinances dealing with native plant protection, and provisions for the protection of Pima pineapple cactus and habitat within subdivisions (USFWS 2007).

The CNF has spent considerable time managing the off-road vehicle use in the areas that support Pima pineapple cactus on the Sierra Vista R.D. In addition, roads have been signed and areas have been closed to protect occupied habitat.

Guideline ARP-G-1 contains guidance for applying habitat management objectives and species protection measures from approved recovery plans and signed conservation agreements within federally listed species habitat.

The CNF constructed two small exclosures on the Sierra Tordilla grazing
Allotment on the Sierra Vista R.D. to protect the Pima pineapple cactus and evaluate the effects of livestock grazing.

The CNF has carried out several actions to protect Pima pineapple cactus and its habitat. These include building exclosures that protect at least 50% of the cacti from the effects of livestock grazing; delineating potential habitat and surveying for Pima pineapple cactus; and attempting to control unauthorized off-road vehicle activity in occupied habitat.

The CNF has surveyed much of the suitable habitat on the Forest.

Species and Habitat Effects for the Pima pineapple cactus

Wildland-Urban Interface and Landscape-scale Fire

The Wildland-Urban Interface represents all vegetation communities on the CNF within those areas of human populations and developments at imminent risk from wildfire. Treatment of these areas incudes thinning, removal of fuels from the landscape, or altering the fuel profile to reduce the potential for loss of property. The treatment of WUI allows the Forest the flexibility to manage landscape-scale wildland fire for resource benefit.

Landscape-scale wildland fire is one of the methods for ecosystem restoration. The goal of this program is to enhance resiliency of all vegetation communities on the CNF by maintaining more sustainable fuel loads, improved habitat diversity, and watershed integrity.

Approximately 75 percent of PPC habitat has been significantly altered by the introduction of Lehman's lovegrass (*Eragrostis lehmanniana*), this grass out competes native grasses and has created monotypic stands over large areas of mid-elevation southern Arizona. This grass creates abundant fine fuels that burn very hot and carry fire rapidly through an area. Cacti, including PPC, do not tolerate hot fires and are damaged or killed. Impacts to this species could result from prescribed burning and vegetation treatments. The objectives RIT-O-1, HUA-O-1, and TUM-0-1 are to treat 20% of the of the Santa Rita, Huachuca, and Tumacacori ecosystems every 10 years using prescribed burning and mechanical treatment methods.

Conversely, impacts may be avoided by creating site specific design features to avoid PPC. RIT-G-2 and HUA G-4, specifically directs that ground disturbing activities and vegetation management must include site specific design features to avoid impacts to a list of species that includes PPC. TUM-G-4 does not specifically list PPC, but the direction is not limited to plant species listed in the guideline, so PPC would be included in any rare plant survey.

Animal and Rare Plants

The Species Diversity and Viability Report assessed the PPC. The viability report determined that PPC population trend was negative and that the habitat trend was unknown. The standard CHI-S-2A requires special use permits for any collection, in addition to federal permit requirements, these permits are reviewed thereby adding some protection to the species. The guidelines RIT-G-2 and HUA-G-4 both provide direction in that management activities should incorporate, site-specific design features to benefit habitat or mitigate impacts to the PPC.

Invasive Species Management

This program area has the potential to help with removing invasive nonnative species. Non-native grasses, particularly Lehmanns lovegrass pose the greatest risk to this species and much of its known range is affected by them. The abundance of grass creates fuel loading that supports extreme fire conditions that native plants are not adapted to withstand. The plan includes the objective VDC-O-1 to treat up to 72,500 acres of desert communities using spot herbicide

treatments to control buffelgrass and other invasives. Impacts to PPC could result from misapplication of herbicide, however RIT-G-2 and HUA-G-4 both provide direction in that management activities should incorporate, site-specific design features to benefit habitat or mitigate impacts to the PPC.

This program area has the potential to help with removing invasive nonnative species. The guideline ISM-G-1 directly benefits these species by recommending the removal of non-native invasive animals in or near occupied habitat while the guideline RAM-G-6 will help in restoring native plant species. Herbicide and pesticide treatments are expected to continue under this plan as they have under the previous forest plan. The use of herbicide and pesticides can have adverse effects on aquatic species as well as upland species. Any potential future projects implemented under this plan would be assessed on a case by case basis to determine potential effects on individual species and to mitigate them. The use of pesticides may impact forage base for specific individual species.

Minerals Management

The standard MIN-S-2 would ensure that disturbed sites would be reseeded with only native or non-persistent seed sources benefiting PPC habitat and reducing invasive species. There are no objectives or guidelines specific to PPC or its habitat within this program area. There is a potential for mining operations to be excavated to a depth greater than that of the regional aquifer and water would drain from storage in the aquifer into the pit. The need to dewater the pit during mining operations would result in ongoing water removal via pumping of aquifer water storage. Upon cessation of mining, a pit lake would form, and evaporation from this water body would continue to remove water from storage in the regional aquifer.

The CNF is currently aware of approximately 19 mineral projects within EMAs where PPC occur. These projects are exploration only and any future mineral operations would be dependent on the results of those explorations. Actual mining infrastructure and disturbance would be impossible to predict at the time of this document. Twelve of these projects are active and currently in place, while two projects are expected to occur in the foreseeable future, one is completed and four are withdrawn from consideration at the point. Seven projects are located on the Nogales R.D. within the Santa Rita EMA, and twelve on the Sierra Vista R.D. within the Huachuca EMA.

Recreation Management

The populations on the CNF are somewhat disjunct from the main population of this species to the north. Illegal collection as well as increased recreational use and off-road vehicle use can affect PPC and its habitat. The cacti are small and can be covered by grass, making them difficult to see. The CNF uses signage and closures to minimize OHV use in the specific areas to protect the species. The standard CHI-S-2A requires special use permits for any collection, in addition to federal permit requirements, these permits are reviewed thereby adding some protection to the species. There are no program objectives or standards specific to PPC or its habitat in this program area.

Range Management

As stated above, the presence of non-native grass species has had the greatest impact on this species through altered ecological conditions. Livestock grazing has been shown to help remove the grass that is competing for space, water, and nutrients, and removes the standing dead grass thus reducing the fire hazard (USFWS 1993). However, there have been instances of trampled plants in areas used by livestock. RAM-G-6 guides range-related treatments for rangeland

restoration to emphasize and perpetuate native plant species. Any treatments planned would also be guided by RIT-G-2 and HUA-G-4 that specifically address PPC.

Cumulative Effects

As defined in ESA (50 CFR §402.02), cumulative effects are those effects of future State or private activities, not involving Federal activities, that are reasonably certain to occur within the Action Area of the federal action subject to consultation. For this consultation, the Action Area has been defined as the Coronado National Forest plus adjacent lands that the proposed action may directly or indirectly affect. In general, Arizona's human population is expected to increase in the next 10 years. Increased urbanization results in loss of habitat or habitat suitability for federally listed species. Additional, the intensity of recreational activities is also likely to increase within the Action Area, particularly on Federal lands that are located adjacent or within a short driving distance of the major metropolitan areas of Phoenix and Tucson such as the Coronado NF (USFS 2011). Activities may occur on private lands which may affect individual PPC plants: private land commercial and residential development, recreation, illegal collecting, mining, wildland fire, and overgrazing. These types of activities have occurred in the past and are likely to occur into the foreseeable future. Implementation of the Forest Plan will not encourage these types of activities on adjacent private lands and therefore will not contribute incremental effects to PPC off Forest.

Summary of Effects and Determination- Pima pineapple cactus

The implementation of the Coronado NF LRMP **May Affect, and is Likely to Adversely Affect** the Pima pineapple cactus.

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Appendix A

Plan component codes - Individual plan component elements each have a unique identifying label. Abbreviations are used in each code to identify: (1) if a plan decision applies forestwide or within a particular management area or geological area; (2) resource area; and (3) type of plan decision. The last part of each code contains a number which is displayed in the left margin. For example: "FW-VLS-S-1" refers to the first listed standard for vegetation landscape scale ; "MA-LUZ-G-2" refers to the second listed guideline for the Land Use Zones by Management Area; and "GA-CHI-S-1a" refers to the first listed standard for the Chiricahua EMA, a geographical area.

Forestwide/Mgt Area/Geo Area	Resource area	Type of decision	Number	Management Action
FW	**VLS**	**S**	**1**	Public and firefighter safety will be the highest priority during all fire management activities.
FW	**VLS**	**S**	**2**	The maximum size opening that may be created in one harvest operation to create an even-aged stand shall not exceed 40 acres except when it is following a large-scale disturbance event such as a stand-replacing fire, wind storm, or insect or disease outbreak.
FW	**VLS**	**S**	**3**	When openings are created with the intent of regeneration, effort shall be made to ensure that lands can be adequately restocked within 5 years of final harvest.
FW	**VLS**	**G**	**1**	Project design should provide for wildlife movement between treated and untreated areas to increase available habitat.
FW	**VLS**	**G**	**2**	Only native plant species or short lived, non-persistent, nonnative species should be used for mine reclamation purposes or wildfire treatments.
FW	**VLS**	**G**	**3**	Management activities should favor the development of native grasses in areas where they have the potential to establish and grow.
FW	**VLS**	**G**	**4**	Even-aged silvicultural practices may be used as a strategy for achieving the desired conditions over the long term, such as bringing mistletoe infection levels to within a sustainable range.
FW	**VDC**	**G**	**1**	Ground-disturbing activities that occur in an area occupied by buffelgrass should include measures to eradicate or limit the spread of buffelgrass during or following the activity and implement measures to limit the potential for its spread into unoccupied areas.
FW	**VDC**	**G**	**2**	Wildland fire (planned or unplanned ignitions) should not be used as a management activity in desert communities, except as a strategy to control invasive vegetation.
FW	**VDC**	**G**	**3**	Vegetation treatments in desert communities should provide for maintaining a sustainable population of paniculate agaves.
FW	**VDC - Grasslands**	**G**	**1**	Some patches of shrubby species, such as mesquites and yuccas, should be retained during fuel reduction projects on sites where they are appropriate under the desired conditions.
FW	**VDC-Grasslands**	**G**	**2**	Vegetation treatments in semidesert grasslands should provide for maintaining a sustainable population of paniculate agaves.
FW	**VIC**	**G**	**1**	Vegetation treatments in interior chaparral should provide for maintaining a sustainable population of paniculate agaves.
FW	**VME**	**G**	**1**	Fuel reduction and habitat restoration projects should leave clusters of live trees and shrubs to benefit species that require these structures for breeding, feeding, shelter, and other habitat needs.

FW	**VME**	**G**	**2**	Vegetation treatments in Madrean encinal woodland should provide for maintaining a sustainable population of paniculate agaves.
FW	**VPO**	**G**	**1**	Vegetation treatments in Madrean pine-oak woodlands should provide for maintaining a sustainable population of paniculate agaves.
FW	**VPO**	**G**	**2**	Clusters of trees and shrubs should be maintained in treatment areas to benefit species that require these structures for breeding, feeding, shelter, and other needs.
FW	**VPO**	**G**	**3**	Slash piles should be burned in locations and at times that will minimize scorching of adjacent trees and shrubs.
FW	**VPO**	**G**	**4**	An uneven-aged forest management approach should be emphasized; however, both even-aged and uneven-aged systems may be used where appropriate to provide variation in existing stand structure and species diversity.
FW	**VPO**	**G**	**5**	Surveys for reforestation needs should be completed within 2 years following a wildfire or other natural disturbance greater than 2,000 acres.
FW	**VPO**	**G**	**6**	Natural regeneration of disturbed areas should be allowed where feasible unless the following circumstances exist: (1) endangered species habitat needs to be restored, (2) the time period of recovery is deemed excessive due to the large size of deforested area and/or lack nearby seed sources, or (3) there is concern for loss of site capacity from soils loss or extreme competition with early-seral species.
FW	**VPP**	**G**	**1**	Vegetation treatments should be designed such that replacement structural stages are proportionally present to assure continuous representation of old growth over time.
FW	**VPP**	**G**	**2**	Vegetation treatments should be designed such that replacement structural stages are proportionally present to assure continuous representation of old growth over time.
FW	**VPP**	**G**	**3**	Fuel reduction or firewood gathering projects should retain some large-diameter trees and shrubs, and these should be protected well enough from scorching to survive subsequent burn treatments.
FW	**VPP**	**G**	**4**	Surveys for reforestation needs should be completed within 2 years following a wildfire or other natural disturbance greater than 2,000 acres.
FW	**VPP**	**G**	**5**	Natural regeneration of disturbed areas should be allowed where feasible unless the following circumstances exist: (1) endangered species habitat needs to be restored, (2) the time period of recovery is deemed excessive due to the large size of deforested area/or lack of nearby seed sources, or (3) there is concern for loss of site capacity from soils loss or extreme competition with early-seral species.
FW	**VDM**	**G**	**1**	Vegetation treatments should be designed such that replacement structural stages are proportionally present to assure continuous representation of old-growth characteristics across the landscape over time.

FW	**VDM**	**G**	**2**	Slash piles should be burned in locations and at times that will minimize scorching of adjacent trees and shrubs.
FW	**VDM**	**G**	**3**	Fuel reduction or firewood gathering projects should retain some large diameter trees and shrubs, and these should be protected well enough from scorching to survive subsequent burn treatments.
FW	**VDM**	**G**	**4**	Surveys for reforestation needs should be completed within 2 years following a wildfire or other natural disturbance greater than 2,000 acres.
FW	**VDM**	**G**	**5**	Natural regeneration of disturbed areas should be allowed where feasible unless the following circumstances exist: (1) endangered species habitat needs to be restored, (2) the time period of recovery is deemed excessive due to the large size of deforested area/or lack of nearby seed sources, or (3) there is concern for loss of site capacity from soils loss or extreme competition with early-seral species.
FW	**VWM**	**G**	**1**	Forest landscapes should be managed such that replacement structural stages are proportionally present to assure continuous representation of old growth over time.
FW	**VWM**	**G**	**2**	Slash piles should be burned in locations and at times that will minimize scorching of adjacent trees and shrubs.
FW	**VWM**	**G**	**3**	Vegetation treatments should be designed to create stand conditions that enhance cone production of white fir, corkbark fir, Engelmann spruce, and Douglas-fir in order to provide a reliable Mount Graham red squirrel food source.
FW	**VWM**	**G**	**4**	Fuel reduction or firewood gathering projects should retain some large diameter trees and shrubs, and these should be protected well enough from scorching to survive subsequent burn treatments.
FW	**VWM**	**G**	**5**	Surveys for reforestation needs should be completed within 2 years following a wildfire or other natural disturbance greater than 1,000 acres.
FW	**VWM**	**G**	**6**	Natural regeneration of disturbed areas should be allowed where feasible unless the following circumstances exist: (1) endangered species habitat needs to be restored, (2) the time period of recovery is deemed excessive due to the large size of deforested area/or lack of nearby seed sources, or (3) there is concern for loss of site capacity from soils loss or extreme competition with early-seral species.
FW	**VSF**	**G**	**1**	Vegetation treatments should be designed such that replacement structural stages are proportionally present to assure continuous representation of old growth over time.
FW	**VSF**	**G**	**2**	Slash from firewood harvest should be managed to a level compatible with the Forest Service's ability to protect the remaining resources.
FW	**VSF**	**G**	**3**	Surveys for reforestation needs should be completed within 2 years following a wildfire or other natural disturbance greater than 200 acres.
FW	**VSF**	**G**	**4**	Natural regeneration of disturbed areas should be allowed where feasible unless the following circumstances exist: (1) endangered species habitat needs

				to be restored, (2) the time period of recovery is deemed excessive due to the large size of deforested area/or lack of nearby seed sources, or (3) there is concern for loss of site capacity from soils loss or extreme competition with early-seral species.
FW	**MOM**	**G**	**1**	There should be no new water diversions in meadows unless it can be demonstrated that there would be no significant changes to the native plant assemblage, such as species diversity and biomass.
FW	**MOM**	**G**	**2**	Meadows should not be used as staging areas for off-highway vehicles or livestock, or for storage of equipment or forest products.
FW	**MOM**	**G**	**3**	When thinning edges of meadows and clearings, all large standing trees and snags greater than 12 inches d.b.h. should be retained for bat roosting habitat.
FW	**WET**	**S**	**1**	The total acreage of existing wetlands will not be diminished due to management activities.
FW	**WET**	**G**	**1**	Livestock grazing in wetlands should only be allowed where there would be no significant deleterious effects to wetland form or function.
FW	**RIA**	**G**	**1**	New road construction in riparian areas should be avoided, except to cross drainages, unless alternate routes have greater overall resource impacts. If road construction in riparian areas is unavoidable, it should be designed and implemented to minimize effects to natural waterflow and native vegetation communities.
FW	**RIA**	**G**	**2**	Livestock grazing in riparian areas should only be allowed when there are no significant deleterious effects to riparian area structure or function.
FW	**RIA**	**G**	**3**	Vegetation treatments should favor the retention of large diameter woody debris in and near stream channels.
FW	**RIA**	**G**	**4**	Vegetation treatments should favor the retention of snags and growth of large riparian trees.
FW	**BIP**	**S**	**1**	When closing mine features and caves to public entry, pre-closure inspections shall be conducted to determine if cave dependent or other species are present. Closures will be designed and implemented to address the needs of resident or historically occurring wildlife within the constraints of meeting public safety needs.
FW	**BIP**	**S**	**2**	For caves that have been designated or nominated as “significant,” manage to perpetuate those features, characteristics, values, or opportunities for which they were designated.
FW	**BIP**	**G**	**1**	Talus slopes should not be altered and materials should not be removed from them. In areas that harbor talussnails, vegetation treatments should be designed to retain microhabitat characteristics for endemic snails and other talus-dependent species.
FW	**BIP**	**G**	**2**	Management activities should be designed to avoid or minimize the alteration of naturally occurring rocky outcroppings or cliff faces.
FW	**BIP**	**G**	**3**	Environments in caves and abandoned mines should not be altered except where necessary to protect associated natural resources or to protect health and safety. Where mine closure is necessary to protect human health and

				safety, closures should preserve habitats for roosting bats and avoid direct impacts to bats.
FW	**BIP**	**G**	**4**	Surface management activities, including drilling, in the vicinity of cave and karst features should avoid actions that would significantly impact underground ecosystems by modifying drainage patterns, subsurface airflow, or other natural processes.
FW	**BIP**	**G**	**5**	Identified bat roosts should be managed to provide for the enhancement and protection of bat populations. Protection measures may include seasonal closures, public education, and wildlife-friendly gates.
FW	**NWS**	**G**	**1**	Projects in upland habitats adjacent to streams should be designed to minimize input of sediment to streams.
FW	**NWS**	**G**	**2**	Water quality, quantity, and aquatic habitat at natural springs and seeps should be protected or enhanced.
FW	**NWS**	**G**	**3**	Fuel buildup should be reduced around natural water sources to protect them from uncharacteristic fire effects.
FW	**NWS**	**G**	**4**	Management activities should not impair soil moisture recharge at outflows of natural water sources.
FW	**NWS**	**G**	**5**	Projects affecting perennial streams should be designed and constructed to allow for the natural instream movement of native fish, except where barriers are necessary to preclude the movement of nonnative species.
FW	**COW**	**G**	**1**	Wildlife escape ramps should extend to the bottom and near edge of aboveground constructed waters, and at an angle to avoid entrapment of wildlife underneath the ramp.
FW	**COW**	**G**	**2**	Artificial waters constructed for livestock should be designed and/or retrofitted to provide a year-round drinking and habitat resource for native wildlife.
FW	**COW**	**G**	**3**	Overflow should be diverted to allow for soil moisture recharge and creation or maintenance of wetland habitat features.
FW	**AIR**	**G**	**1**	Class I and class II airsheds should be considered when determining the response to wildland fires.
FW	**ARP**	**G**	**1**	Activities occurring within federally listed species habitat should apply habitat management objectives and species protection measures from approved recovery plans and signed conservation agreements.
FW	**ARP**	**G**	**2a**	A minimum of three goshawk nest areas and three replacement nest areas should be located per goshawk territory. Goshawk nest and replacement nest areas should generally be located in drainages, at the base of slopes, and on northerly (northwest to northeast) aspects. Nest areas should generally be 25 to 30 acres in size.
FW	**ARP**	**G**	**2b**	Goshawk post-fledgling areas of approximately 420 acres in size should be designated surrounding nest sites
FW	**ARP**	**G**	**2c**	In goshawk foraging areas and post-fledgling family areas, groups of three to five reserve trees should be retained within management created openings greater than 1 acre

				in ponderosa pine-evergreen oak and dry mixed-conifer communities, and six reserve trees should be retained within management created openings greater than 0.5 acre in wet mixed-conifer and spruce-fir communities.
FW	**ARP**	**G**	**2d**	In occupied goshawk nest areas, human presence should be minimized between March 1 and September 30.
FW	**ARP**	**G**	**3**	Active raptor nests on cliff faces should be protected from disturbance during the nesting season.
FW	**ARP**	**G**	**4**	Trash cans and food storage boxes at developed recreation areas should be wildlife resistant.
FW	**ARP**	**G**	**5**	Identified bat roosts should be protected from disturbance during periods of bat occupancy. During nonoccupancy periods, activities should not modify biophysical features that contribute to roost habitat quality or contribute to the spread of diseases harmful to bats.
FW	**ISM**	**G**	**1**	Habitat improvement and aquatic restoration projects within or adjacent to water sources occupied by ranid frogs (see glossary), Mexican Gartersnake, Sonoran tiger salamanders, or native fish should include provisions to remove nonnative invasive animals.
FW	**FOP**	**S**	**1**	Harvesting systems should be selected based on their ability to meet desired conditions and not on their ability to provide the greatest dollar return.
FW	**FOP**	**S**	**2**	On lands classified as not suited for timber production, timber harvesting should only be used for making progress toward desired conditions or for salvage, sanitation, public health, or safety.
FW	**FOP**	**G**	**1**	Timber harvest activities should be carried out in a manner consistent with maintaining or making progress toward the desired conditions in this plan.
FW	**MIN**	**S**	**1**	Permanent structures and/or occupancy for mining purposes are limited to only those that are necessary and incidental to approved mining operations.
FW	**MIN**	**G**	**1**	Only native or nonpersistent seed and plant materials will be used when revegetating disturbed sites.
FW	**MIN**	**G**	**2**	Talus slopes should not be used as a common variety mineral materials source where disturbance would destabilize the talus slopes and alter any endemic or rare species habitat or presence.
FW	**MIN**	**G**	**3**	Mine reclamation should use a geomorphic approach that results in landforms similar to adjacent natural terrain and hydrologic functions similar to natural systems to minimize long-term monitoring and maintenance requirements.
FW	**PUA**	**S**	**1a**	Where an existing road through non-Federal lands (State, county, private, and other ownerships) to and within the Coronado National Forest, which has traditionally provided public access to National Forest System roads and trails, is closed to public use by a non-Federal landowner or agency (State, county, private, and other ownerships) and a right of public access (written or unwritten title) does not exist: a. Limit the use of the road(s) across National Forest System lands to

				administrative purposes or only where specifically authorized under the terms of a permit.
FW	**PUA**	**S**	**1b**	Do not allow ancillary uses of roads that are not open to the public outside the terms of a permit.
FW	**PUA**	**G**	**1**	Where no legal right of public or administrative access exists (written or unwritten title) or can't be determined, needed right-of-way easements for existing and proposed roads and trails through non-Federal lands (State, county, private, and others) adjacent to, adjoining, within, or a combination thereof, should be acquired using a variety of methods.
FW	**PUA**	**G**	**2**	If a non-Federal landowner or agency (State, county, private, and other ownerships) is unwilling to grant needed right-of-way easements for an existing or proposed road or trail alignment, the road or trail should be realigned and/or reconstructed. Construction around the non-Federal land onto National Forest System, other Federal, and non-Federal lands (State, county, private, and other ownerships), or a combination thereof, where a permanent legal right of public access exists should be secured unless it is not needed.
FW	**PUA**	**G**	**3**	Exclusive motorized and nonmotorized access routes across National Forest System lands to the National Forest System roads and trails from adjacent private developments, and subdivisions, and other non-Federal ownerships (State, county, and others) should not be authorized.
FW	**PUA**	**G**	**4**	Access routes across National Forest System land to National Forest System roads and trails from adjacent private developments, subdivisions, and other non-Federal ownerships or agencies (State, county, and others) should be available for use by the public. If access is not available to the public, access to the national forest from adjacent private developments, subdivisions, and other non-Federal ownerships should not be authorized.
FW	**PUA**	**G**	**5**	Legal public access to National Forest System lands should not be decreased, unless restricted for Forest Service administrative purposes
FW	**MTS**	**S**	**1**	Motor vehicle use is allowed on the designated system of roads and motorized trails shown on the motor vehicle use map that is available at each ranger district office. Motor vehicle use is prohibited in all other locations, unless it is specifically authorized by law, permit, and/or orders issued by the Forest Service in conjunction with resource management and public safety actions.
FW	**MTS**	**S**	**2**	Within inventoried roadless areas, roadless character shall be maintained.
FW	**MTS**	**G**	**1**	Where impacts to archaeological sites from road maintenance are unavoidable, they should be mitigated by adding fill to protect sites, ensuring leadout ditches and other features are not excavated within sites, or by conducting archaeological data recovery
FW	**MTS**	**G**	**2**	New road construction in meadows and wetlands should be avoided where physically or financially feasible. If these activities are unavoidable, they should be designed

				and implemented to minimize effects to waterflow, wetland recharge, and ecosystem function.
FW	**MTS**	**G**	**3**	New road construction in riparian areas should be avoided, except to cross the riparian area, unless alternate routes are physically or financially infeasible or have greater overall resource impacts. If these activities are unavoidable, they should be designed and implemented to minimize effects to natural waterflow and native vegetation communities.
FW	**MTS**	**G**	**4**	Construction of roads across highly erodible soils and areas of high and very high scenic integrity should be avoided.
FW	**REC**	**G**	**1**	The recreation opportunity spectrum framework for guiding recreation planning and management and the Coronado National Forest recreation opportunity spectrum maps should be incorporated into project designs as they are planned and implemented.
FW	**REC**	**G**	**2**	Recreation sites should be managed for capacities that do not cause unacceptable resource damage or impact the landscape character.
FW	**REC**	**G**	**3**	When possible, activities that affect visitors should be scheduled outside of the major recreation season.
FW	**REC**	**G**	**4**	The Coronado National Forest paint color guidelines, the Forest Service's "Built Environment Image Guide" and the "Coronado National Forest Architectural Guidelines for Recreation Residences" should be used for public and private facilities across the Coronado.
FW	**REC**	**G**	**5**	In recreation areas popular with Spanish-speaking visitors, information should be provided in both English and Spanish.
FW	**REC**	**G**	**6**	Rock climbing should be managed to balance demand for the activity and the need to protect plants, animals, and other natural resources.
FW	**SCQ**	**G**	**1**	Projects should use the Coronado National Forest Scenery Management System maps (including scenic integrity, scenic class, and concern levels) and meet scenic integrity objectives. Additionally, projects should use the scenery management system implementation guide during project design and planning.
FW	**SCQ**	**G**	**2**	Facilities should be designed to complement the landscape by siting them to reduce scenic impacts, using dark, neutral colors, and repeating the line, form, texture, pattern, and scale of the landscape to blend structures into their surroundings. This applies to public recreation sites, administrative sites, facilities owned by other government agencies (except for Department of Homeland Security), and permitted structures. Facilities associated with locatable mining activities should blend with the natural background.
FW	**SCQ**	**G**	**3**	Department of Homeland Security should attempt to use mitigation measures at their facilities to minimize impacts to scenic quality.
FW	**SCQ**	**G**	**4a**	Scenic integrity objectives may be temporarily lowered in the short term if necessary to meet project objectives, but should meet scenic integrity objectives over the long term

FW	**SCQ**	**G**	**4b**	Vegetation management projects should avoid even spacing of retained trees, leave a diversity of tree species and sizes, avoid damage to vegetation that will remain, and naturalize disturbed areas.
FW	**SCQ**	**G**	**4c**	Prescribed slash treatment in the immediate foreground (up to 300 feet) of concern level 1 and 2 travelways should be completed as soon as conditions permit.
FW	**SCQ**	**G**	**4d**	Healthy large trees should be favored as a larger proportion of the immediate foreground along concern level 1 and 2 travelways, unless doing so would not achieve project goals.
FW	**SCQ**	**G**	**4e**	In the immediate foreground along concern level 1 and 2 travelways, stumps should be treated to reduce their visibility by methods such as cutting as low as possible (no more than 6 inches above ground on uphill side) and angling large stump faces away from viewing locations.
FW	**SCQ**	**G**	**4f**	Log decks should be removed, and actions should be taken to naturalize skid trails as soon as conditions permit.
FW	**SCQ**	**G**	**5**	Effects from prescribed fire should be considered during project planning and implementation. Blackened and scorched vegetation may be visible in project areas in the short term following treatments, but scenic integrity objectives should be met in the long term, though blackened trunks may remain visible.
FW	**SCQ**	**G**	**6**	Range facilities are allowed in all scenic integrity objectives, but should use mitigation measures to minimize impacts to scenic quality.
FW	**SCQ**	**G**	**7**	New facilities added to communication sites, astrophysical complexes, and administrative sites should be clustered within existing areas. Facility colors and materials should blend with the landscape, structures should generally be below the height of vegetation, and vegetation that screens views to facilities should be protected and encouraged unless doing so would not achieve project goals.
FW	**SCQ**	**G**	**8**	Activities that affect scenic quality should be scheduled outside of the major recreation season, unless doing so would not achieve project goals or would conflict with wildlife restrictions.
FW	**SCQ**	**G**	**9**	New utility lines should be buried in areas with sensitive scenic resources, such as areas along scenic byways, nationally designated trails, and within recreation areas. Existing utility lines that do not meet scenic integrity objectives should be buried or relocated to reduce scenic impacts whenever opportunities become available (such as when poles are replaced).
FW	**SCQ**	**G**	**10**	Active exploratory mining may not meet the scenic integrity objectives in the short term. Exploratory mining drill pads and temporary access roads should be reclaimed by recontouring topography and revegetating sites so they mimic adjacent landscapes after project completion to meet scenic integrity objectives.
FW	**SCQ**	**G**	**11**	Mines and quarries should be reclaimed by shaping topography and vegetating sites so that they blend with adjacent landscapes unless doing so would cause greater resource impacts.

FW	**SUM**	**S**	**1**	A special use permit is required for collection of plants or animals in all zoological and botanical areas.
FW	**SUM**	**S**	**2**	Major utility corridor development is confined to the area identified and mapped in the 2008 "West-wide Energy Corridor Programmatic EIS."
FW	**SUM**	**S**	**3a**	Communications sites will be managed to the following standards: a. Maximize the colocation of new and existing buildings and structures
FW	**SUM**	**S**	**3b**	Site use shall be allocated to users on a facility-need basis.
FW	**SUM**	**S**	**3c**	Maintenance of National Forest System roads and trails to access communication sites, above and beyond normal Forest Service maintenance, or use and maintenance of private roads, will be carried out by the facility owner or association only after obtaining the proper authorizing document (e.g., road use permit).
FW	**SUM**	**S**	**3d**	Clearing of vegetation will be limited to that which poses a hazard to facilities and operational efficiency (see the communication site plan for further direction).
FW	**SUM**	**S**	**3e**	High- and low-power communication uses will be authorized only where designated as such in the communications site plans. Any potential electromagnetic interference must be resolved by the site users before construction can proceed. Senior uses on a site have priority over new or proposed uses. Microwave corridors will be protected from electromagnetic interference.
FW	**SUM**	**S**	**3f**	All new and replacement towers must be self-supporting
FW	**SUM**	**S**	**3g**	New and replacement antennas and towers will be below the height for which the Federal Aviation Administration requires lights because of the interference with the fire lookout tower and aesthetics.
FW	**SUM**	**S**	**3h**	All utility lines connecting to communications sites will be buried underground.
FW	**SUM**	**S**	**3i**	All buildings and towers will meet color requirements set forth in the Coronado National Forest's "Architectural Guidelines for Recreation Residences." Microwave dishes will use dark grey/brown covers. Other antennas will be dark grey/brown, when available through the manufacturer.
FW	**SUM**	**S**	**4**	Limit nonpedestrian activities (e.g., bicycle and equestrian) authorized under special use permits to existing National Forest System trails and roads
FW	**SUM**	**S**	**5**	Limit motorized special use activities to existing National Forest System roads and motorized trails.
FW	**SUM**	**S**	**6**	Require obliteration of non-National Forest System trails created by activities authorized under special use permits when the permit expires.
FW	**SUM**	**G**	**1**	Facilities should be sited and designed to blend into the landscape as much as possible. Whenever possible, heights of structures should be kept below the height of surrounding vegetation, and vegetation that screens

				views to utilitarian facilities should be protected and encouraged.
FW	**SUM**	**G**	**2**	Phone and power distribution lines that cross National Forest System lands to access private inholdings or Forest Service facilities should be located and designed so as to be screened by topography or vegetation as much as possible.
FW	**SUM**	**G**	**3**	Phone or power distribution line requests to cross National Forest System lands to access private lands outside the national forest boundary should not be permitted outside of existing utility corridors.
FW	**SUM**	**G**	**4**	New or reconstructed utility lines should be placed underground when possible to protect scenic resources, unless this is not feasible because of overriding environmental concerns or technical considerations.
FW	**SUM**	**G**	**5**	New electric transmission lines and natural gas pipelines should be located in existing corridors that meet the scenic integrity objective. Existing corridors that do not meet the scenic integrity objective should be relocated when construction becomes necessary.
FW	**SUM**	**G**	**6**	Public road or trail access to special use areas such as communication sites should not be restricted unless there are security, safety, or other concerns.
FW	**SUM**	**G**	**7**	Requests for permits or easements for private gates, driveways, trails, or roads to cross National Forest System lands to access private lands located outside the national forest boundary should be denied unless a public benefit can be shown, such as a reciprocal easement.
FW	**HER**	**G**	**1**	Contracts, permits, and leases that have the potential to affect cultural resources should include appropriate clauses on protection responsibilities and liability for damage.
FW	**HER**	**G**	**2**	Historic values should be considered in the development and modification of facilities.
FW	**RAM**	**S**	**1**	Grazing permits will not be issued for domestic goats or sheep in the Galiuro or Santa Catalina Mountain ranges.
FW	**RAM**	**S**	**2**	New issuance, renewal, modification, and management of grazing permits shall comply with the Coronado National Forest's "Stockpond and Aquatic Habitat Management and Maintenance Guidelines for the Chiricahua Leopard Frog." Additionally, for the San Rafael Valley and surrounding areas, permits shall comply with the Coronado National Forest's "Stockpond Management and Maintenance Plan for the Sonora Tiger Salamander."
FW	**RAM**	**S**	**3**	In areas occupied by lowland leopard frogs, stock ponds will be managed according to the general guidance, as applicable, of the Coronado National Forest's "Stock Pond and Aquatic Habitat Management Guidelines for Chiricahua Leopard Frog" (if lowlands are included in the revised guidelines, then this no longer applies).
FW	**RAM**	**G**	**1**	Forage utilization should be based on site-specific resource conditions and management objectives, but in general should be managed at a level corresponding to light to moderate intensity (15 to 45 percent of current year's growth). Exceptions may be allowed in order to meet objectives related to scientific studies,

				fuels reduction, invasive plant control, or other targeted grazing or site-specific objectives.
FW	**RAM**	**G**	**2**	Burned areas should be given sufficient deferment from grazing, especially during the growing season, to ensure plant recovery and vigor.
FW	**RAM**	**G**	**3**	Construction or reconstruction of livestock fencing and replacement of nonpermeable fencing where wildlife movement is restricted should be consistent with the appropriate state wildlife agency standards for safe passage of wildlife and/or species-specific fencing guidelines developed at the local or regional level.
FW	**RAM**	**G**	**4**	Grazing management practices should be designed to maintain or promote ground cover that will provide for infiltration, permeability, soil moisture storage, and soil stability appropriate for the ecological zone. Additionally, grazing management should retain ground cover sufficient for the forage and cover needs of native wildlife species.
FW	**RAM**	**G**	**5**	Within riparian areas, structures used to manage livestock should be located and used in a way that does not conflict with riparian functions and processes.
FW	**RAM**	**G**	**6**	Treatments for restoring rangelands should emphasize the use and perpetuation of native plant species.
FW	**RAM**	**G**	**7**	Grazing intensity, frequency, occurrence, and period should provide for growth and reproduction of desired plant species while maintaining or enhancing habitat for wildlife.
FW	**RAM**	**G**	**8**	Management practices to achieve desired plant communities should consider protection and conservation of known cultural resources, including historical sites, prehistoric sites, and plants of significance to Native American peoples.
FW	**LOA**	**G**	**1**	Land exchanges should result in an improved land ownership pattern, more effective management of National Forest System lands, and foster sound community development.
FW	**LOA**	**G**	**2**	Land exchanges should not result in the creation of isolated National Forest System parcels surrounded by non-Federal lands or isolated non-Federal parcels surrounded by National Forest System lands, unless it is found to be a public benefit.
FW	**LOA**	**G**	**3a**	The non-Federal lands considered for exchange into Federal ownership should meet one or more of the following criteria: a. Lands that provide needed public and administrative access, protect public lands from fire or trespass, or prevent damage to Coronado resources.
FW	**LOA**	**G**	**3b**	Lands that contain vital threatened and endangered species habitat or vital wildlife habitat.
FW	**LOA**	**G**	**3c**	Lands providing services to the public (e.g., developed and dispersed recreation, open space).
FW	**LOA**	**G**	**3d**	Wetlands, riparian areas, and other water-oriented lands.

FW	**LOA**	**G**	**3e**	Lands that contain unique, natural, or cultural values.
FW	**LOA**	**G**	**3f**	Lands within designated wilderness.
FW	**LOA**	**G**	**3g**	Lands that will improve public land management, meet specific administrative needs, or benefit other national forest programs.
FW	**LOA**	**G**	**3h**	Lands that meet programs prescribed or endorsed by acts or reports of Congress or the Department of Agriculture.
FW	**LOA**	**G**	**4a**	Federal lands offered by the United States in a proposed land exchange should meet one or more of the following criteria: a. Lands needed to meet the needs of communities and the public.
FW	**LOA**	**G**	**4b**	Lands that provide improved public land management.
FW	**LOA**	**G**	**4c**	Lands that will improve management, benefit specific resources, or increase management efficiency.
FW	**LOA**	**G**	**4d**	Lands that have lost their wildland characteristics.
FW	**LOA**	**G**	**4e**	Lands with long-term land occupancy commitments, high management and operating costs, do not contribute significantly to achieving management objectives, have minimal benefit to the public, and would not create an isolated non-Federal parcel surrounded by National Forest System lands such as, but not limited to, recreation residence areas and administrative sites.
FW	**LOA**	**G**	**1a**	Landline location surveys should be prioritized by the following criteria: a. Where known litigation is pending, a title claim has been asserted, encroachments are suspected, or the probability of encroachment can be reduced
FW	**LOA**	**G**	**1b**	Where significant resource values exist and use or manipulation of resources is planned (this includes the location, by survey, of right-of-way easements necessary for resource management).
FW	**LOA**	**G**	**1c**	All remaining property lines.
FW	**LOA**	**G**	**2**	A Bureau of Land Management (BLM) resurvey should be requested where there has been an extensive loss or obliteration of original corner monuments and/or where the potential for future litigation regarding the property boundaries between the national forest and private lands are high.
FW	**LOA**	**G**	**3**	Painting and excessive clearing of property lines should be avoided.
MA	**LUZ**	**G**	**1**	Recreation opportunity spectrum classes in this land use zone should be primitive, semiprimitive nonmotorized, and semiprimitive motorized except in areas where the recreation setting is influenced by motorized access in adjacent land use zones or by private inholdings.

MA	**LUZ**	**G**	**2**	Temporary roads should be allowed only for administrative access, national security, tribal needs, forest health projects, or fires, except in inventoried roadless areas (IRAs).
MA	**LUZ**	**G**	**3**	New roads should be allowed only as needed to restore motorized public access to National Forest System land.
MA	**LUZ**	**G**	**4**	Scenic resources should be managed so that human activities are minimally visually evident, as per the Coronado National Forest scenic integrity objective map.
MA	**LUZ**	**G**	**5**	New utility structures and power lines should not be allowed.
MA	**RBC**	**G**	**1**	Recreation opportunity spectrum classes in this land use zone should be semiprimitive nonmotorized, semiprimitive motorized, roaded modified, and roaded natural except where there are small, remote administrative sites, developed recreation sites, and permitted facilities.
MA	**RBC**	**G**	**2**	The level and type of development should be limited in order to protect the natural character inherent in this zone.
MA	**RBC**	**G**	**3**	Managers should consider expanding the uses of existing facilities before proposing new facilities.
MA	**RBC**	**G**	**4**	New roads may be constructed, reconstructed, or relocated for a variety of public and administrative uses and needs.
MA	**RBC**	**G**	**5**	Scenic resources should be managed so that human activities are visually subordinate or blend into the landscape, as per the Coronado National Forest scenic integrity objective map.
MA	**RBC**	**G**	**6**	New utility structures and power lines should be located within existing communications sites and utility corridors.
MA	**DEV**	**G**	**1**	Recreation opportunity spectrum classes in this land use zone should be roaded natural, roaded modified, rural, and urban unless conflicting with wilderness management or needed to support the larger forest setting.
MA	**DEV**		**2**	As public facilities are constructed or renovated, they should be made more accessible to meet or exceed accessibility guidelines.
MA	**DEV**		**3**	Scenic resources should be managed so that human activities are visually subordinate and blend into the landscape as much as possible, as per the Coronado National Forest scenic integrity objective map and recreation opportunity spectrum classes. Utilitarian facilities that would not meet this guideline because of their functional requirements should be mitigated to minimize their contrast with line, form, color, texture, and scale of the surrounding landscape and built environment.
MA	**DEV**	**G**	**4**	New utility structures and power lines should not be allowed, and upgrades to existing overhead lines should be buried when replaced.
MA	**DEV**	**G**	**5**	Livestock grazing should not be permitted within developed recreation zone sites, except where designated allotments overlap with recreation area boundaries or for

				the purposes of targeted grazing for vegetation management.
MA	**MOT**	**G**	**1**	Recreation opportunity spectrum classes in this land use zone should be semiprimitive motorized, roaded natural, and rural.
MA	**MOT**	**G**	**2**	In OHV corridors, development of new facilities should protect natural resources and mitigate OHV impacts.
MA	**MOT**	**G**	**3**	Scenic resources should be managed so that human activities are visually subordinate and blend into the landscape, as per the Coronado National Forest scenic integrity objective map.
MA	**MOT**	**G**	**4**	Facilities determined to be obsolete or no longer needed should be removed, except for facilities with historical significance.
MA	**CHR**	**G**	**1**	Wilderness character should be maintained or improved. This includes untrammeled, natural, and undeveloped qualities, as well as opportunities for solitude or primitive and unconfined recreation.
MA	**CHR**	**G**	**2**	Restrictions on visitor freedom (e.g., closures, permit systems, area quotas) should only be used when less invasive measures have proven insufficient to meet management objectives.
MA	**SQL**	**S**	**1**	Wilderness areas shall be managed for a scenic integrity objective of very high, except when specified otherwise in an individual wilderness management plan.
MA	**SQL**	**G**	**1**	When trees or other materials are used for building trails, fences, signage, or other structures, materials should be harvested out of view from trails and campsites. Cutting or removing materials should not be evident.
MA	**SQL**	**G**	**2**	Construction of additional structures should be limited in wilderness areas and should use a limited amount of nonnative materials when native materials are available.
MA	**FIR**	**G**	**1**	Natural unplanned ignitions should be used to obtain resource benefits.
MA	**FIR**	**G**	**2**	Prescribed fire should be used to create conditions that enable naturally occurring fires to return to their historic role or to achieve wilderness area desired conditions.
MA	**FIR**	**G**	**3**	Minimum impact suppression tactics should be used in wilderness.
MA	**ISM**	**G**	**1**	Human controls should not be applied to insect and disease life cycles, except to protect resources on adjacent lands, to protect threatened and endangered species, or when human health and safety are a concern.
MA	**WLF**	**S**	**1**	Nonnative species shall not be introduced into any wilderness area.
MA	**WLF**	**S**	**2**	Reintroductions shall only occur when a species is determined to be indigenous to the area and when it was extirpated by human-induced events.
MA	**WLF**	**G**	**1**	Nonnative species should not be introduced into areas adjacent to wilderness areas when it is likely that individuals of that species will spread to wilderness areas during ordinary life processes.

MA	**SLW**	**S**	**1**	Water quality measurements shall be made with temporary use of portable equipment.
MA	**SLW**	**G**	**1**	Designated camping areas should be located on durable surfaces, and should be contained by using natural materials to create perimeter boundaries to prevent from increasing in size or compaction.
MA	**REE**	**S**	**1**	The existing recreation opportunity spectrum classification composition shall be maintained at primitive, unless specified otherwise for an individual wilderness area.
MA	**REE**	**S**	**2**	Outfitter-guide operating plans shall include appropriate wilderness practices, such as “leave no trace” principles, and incorporate awareness for wilderness values in their interaction with clients and others.
MA	**TAS**	**G**	**1**	Trail maintenance should be coordinated to avoid anticipated high use visitor periods to minimize encounters.
MA	**TAS**	**G**	**2**	New trail construction should only be considered if the objective is to enhance wilderness character (e.g., control overuse, limit resource degradation).
MA	**TAS**	**G**	**3**	Bridges should not be constructed or installed.
MA	**TAS**	**G**	**4**	Signs within wilderness areas should provide directional information only, unless a specific need exists for an individual wilderness area.
MA	**TAS**	**G**	**5**	Natural and preferably locally available materials should be used in the construction and signing of trails within wilderness areas, except when specified otherwise for an individual wilderness area.
MA	**RES**	**G**	**1**	Research proposals should not be approved in wilderness areas if locations outside of wilderness areas provide similar research opportunities.
MA	**RES**	**G**	**2**	Field marking of temporary plots, points, or other research design components should not be noticeable to visitors or impair wilderness character.
MA	**RES**	**G**	**3**	Installations, such as cameras and remote sensing equipment, should be avoided.
MA	**CHI**	**S**	**1**	The existing recreation opportunity spectrum classification shall be maintained at primitive.
MA	**CHI**	**G**	**1**	Trailhead parking areas, adjacent to the wilderness area, should be designed to passively limit visitor use to levels that maintain the wilderness character.
MA	**MTW**	**S**	**1**	Wilderness areas within Madera Canyon shall be managed at the highest possible scenic integrity level, with a level of very high.
MA	**MTW**	**G**	**1**	Trailhead parking areas should be designed to passively limit visitor use at levels that maintain the wilderness character.
MA	**MTW**	**G**	**2**	The existing recreation opportunity spectrum classification composition should be maintained at semiprimitive nonmotorized, or increased to primitive.
MA	**PAJ**	**G**	**1**	Signs should be constructed from durable materials to sustain the impacts associated with the international border. In some cases,

				manmade materials may be the most appropriate for this purpose, although natural appearing materials should be favored.
MA	**PSR**	**S**	**1**	Wilderness areas near Sabino Canyon Recreation Area, Mount Lemmon communication sites, and along the General Hitchcock Highway shall be managed at the highest possible level, with a scenic integrity level of very high.
MA	**PSR**	**S**	**2**	The existing recreation opportunity spectrum classification shall be maintained at semiprimitive nonmotorized in areas near heavily used trailheads and primitive elsewhere.
MA	**PSR**	**S**	**3**	All areas treated for exotic invasive grass populations shall be monitored and re-treated as often as necessary to prevent reestablishment of the target invasive species.
MA	**PSR**	**G**	**1**	Recreation facilities should not be developed in the Pusch Peak area.
MA	**PSR**	**G**	**2**	Trailhead parking areas should be designed to passively limit visitor use at levels that maintain wilderness character.
MA	**PSR**	**G**	**3**	Natural appearing materials suitable for a primitive recreation opportunity spectrum setting should be favored. Manmade materials should only be used in the construction and signing of trails when natural materials cannot be obtained at, or transported to, the site.
MA	**PSR**	**G**	**4**	Cross-country travel should be discouraged to limit impacts to vegetation, soils, water, and wildlife.
MA	**RNC**	**G**	**1**	Trailhead parking areas should be designed to prevent motorized trespass beyond the wilderness boundary.
MA	**WSA**	**S**	**1**	Salable minerals extraction will not be allowed.
MA	**WSA**	**G**	**1**	Wilderness study areas and recommended wilderness areas should be managed to maintain their wilderness character.
MA	**WSA**	**G**	**2**	Wilderness study areas and recommended wilderness should be managed to preserve or enhance scenic resources.
MA	**WSA**	**G**	**3**	Wilderness study areas and recommended wilderness should be managed for primitive recreation settings.
MA	**WSA**	**G**	**4**	New recreation facilities other than trails should not be constructed.
MA	**WSA**	**G**	**5**	Timber harvest should not be permitted.
MA	**WSA**	**G**	**6**	Gathering of forest products for sale should not be permitted.
MA	**WSA**	**G**	**7**	Mechanized or motorized trails should not be designated.
MA	**WSA**	**G**	**8**	New roads should not be constructed.

MA	**EWA**	**S**	**1**	The conditions that support the classification and outstandingly remarkable values will be maintained when implementing projects.
MA	**RNA**	**S**	**1**	Salable minerals extraction will not be allowed.
MA	**AZT**	**G**	**1**	Management actions within ½ mile of the Arizona National Scenic Trail should not result in recreation setting changes from less to more developed.
MA	**AZT**	**G**	**2**	Permitted recreation special use authorizations should be managed to protect the desired recreation setting for a nonmotorized trail.
MA	**AZT**	**G**	**3**	New road or motorized trail construction across or adjacent to the Arizona National Scenic Trail should be avoided.
MA	**AZT**	**G**	**4**	Placement of new utility corridors and communication facilities should be avoided by choosing alternate locations or colocated with existing utility corridors and facilities.
MA	**AZT**	**G**	**5**	Utility lines should be buried when feasible to mitigate visual impacts.
MA	**AZT**	**G**	**6**	Forest health projects should be managed to minimize long-term visual impacts within and adjacent to the Arizona National Scenic Trail corridor.
MA	**AZT**	**G**	**7**	Fire on or in the foreground of the Arizona National Scenic Trail should be managed using minimum impact suppression tactics, or other tactics appropriate for the protection of values and resources for which the trail was designated.
GA	**CHI-Pole Bridge RNA**	**S**	**1a**	Within the Pole Bridge Research Natural Area and Proposed Pole Bridge Research Natural Area Extension: a. Vegetation cutting is prohibited, including harvest of forest products and firewood.
GA	**CHI-Pole Bridge RNA**	**S**	**1b**	New roads or other improvements are prohibited; the use of existing roads and trails is allowed for fire management purposes.
GA	**CHI-Pole Bridge RNA**	**S**	**1c**	Camping is prohibited.
GA	**CHI-South Fork of Crave Creek ZBA**	**S**	**2a**	Within South Fork of Cave Creek Zoological-Botanical Area and the proposed Cave Creek Canyon Birds of Prey Zoological-Botanical Area: a. A special use permit is required for any plant or animal collection.
GA	**CHI-South Fork of Crave Creek ZBA**	**S**	**2b**	A special use permit is required for scientific research that would involve placing anything on National Forest System lands within the proposed zoological-botanical area.

GA	**CHI**	**G**	**1**	Cattle should be excluded from Camp Rucker to foster protection of the historic buildings and ruins.
GA	**CHI**	**G**	**2**	During vegetation treatments, considerations of mesic microenvironments for woodland and talussnails endemic to the Chiricahua Ecosystem Management Area (e.g., trees near rocky features, islands of shrubs within talus slopes, riparian colluvia, large logs, scattered rocks on shady hillsides) should be incorporated.
GA	**CHI**	**G**	**3**	Incorporate site-specific design features to benefit habitat for, or mitigate impacts to, rare plant populations. For the Chiricahua Ecosystem Management Area, these species include, but are not limited to: Chiricahua fleabane, Chiricahua gentian, copper mine milk-vetch, Hinkley's Jacob's ladder, Porsild's starwort, purple-spike coralroot, Rusby's hawkweed, & smooth baby-bonnets
GA	**DRA**	**G**	**1**	Existing motorized dispersed camping areas on the west side of the ecosystem management area should be limited to defined motorized dispersed camping areas identified on the motor vehicle use map.
GA	**DRA**	**G**	**2**	During vegetation treatments, considerations of mesic microenvironments for woodland and talussnails endemic to the Dragoon Ecosystem Management Area (e.g., trees near rocky features, islands of shrubs within talus slopes, riparian colluvia, large logs, and scattered rocks on shady hillsides) should be incorporated.
GA	**DRA**	**G**	**3**	Areas disturbed by unauthorized motorized camping (outside of the defined dispersed camping areas) on the west side of the ecosystem management area should be revegetated and protected from new disturbance.
GA	**DRA**	**G**	**4**	Management activities involving ground disturbance and/or vegetation management should incorporate site-specific design features to benefit habitat for, or mitigate impacts to, rare plant populations. For the Dragoon Ecosystem Management Area, these species include, but are not limited to: Coleman's coral-root, Purple-spike coral-root
GA	**PEL**	**G**	**1**	During vegetation treatments within Skull Canyon, considerations of mesic microenvironments for talussnails endemic to the Peloncillo Ecosystem Management Area (e.g., trees near rocky features, islands of shrubs within talus slopes, riparian colluvia, large logs, scattered rocks on shady hillsides) should be incorporated.
GA	**PEL**	**G**	**2**	Management activities involving ground disturbance, vegetation management, or both should incorporate site-specific design features to benefit habitat for, or mitigate impacts to, rare plant populations. For the Peloncillo Ecosystem Management Area, these species include, but are not limited to: Chiricahua mudwort, Copper mine milk-vetch, & New Mexico bitterweed
GA	**PEL-Guadalupe Canyon ZBA**	**G**	**3a**	Within the Guadalupe Canyon Zoological Area: a. A special use permit should be issued for any plant or animal collection.

GA	**PEL-Guadalupe Canyon ZBA**	**G**	**3b**	A special use permit should be issued for scientific research that would involve placing anything on National Forest System lands within the proposed zoological area.
GA	**RIT**	**G**	**1**	During vegetation treatments, considerations of mesic microenvironments for woodland and talussnails endemic to the Santa Rita Ecosystem Management Area (e.g., trees near rocky features, islands of shrubs within talus slopes, riparian colluvia, large logs, and scattered rocks on shady hillsides) should be incorporated.
GA	**RIT**	**G**	**2**	Management activities involving ground disturbance, vegetation management, or both should incorporate site-specific design features to benefit habitat for, or mitigate impacts to, rare plant populations. For the Santa Rita Ecosystem Management Area, these species include, but are not limited to: Arizona eryngo, Arizona Manihot, Ayenia, beardless chinch weed, Chisos Coralroot, Cochise woolwort, Huachuca cinquefoil, Pima pineapple cactus, purple-spike coral-root, Santa Rita yellowshow, & Southwest monkeyflower
GA	**TUM-Wild Chile BA**	**S**	**1**	Within the Wild Chile Botanical Area: a. A special use permit is required for any plant or animal collection (excluding traditional uses) and for research activities that involve placing anything on National Forest System lands.
GA	**TUM-Goodding RNA**	**S**	**2a**	Within Goodding Research Natural Area and the proposed Goodding Research Natural Area Extension: a. Do not permit livestock grazing.
GA	**TUM-Goodding RNA**	**S**	**2b**	b. Do not permit harvest of forest products, including fuelwood.
GA	**TUM**	**G**	**1**	Fuel reduction and vegetation treatments should leave islands of mesic microenvironments around riparian areas, colluvium, and woody debris on side slopes and stream channels (ephemeral and perennial).
GA	**TUM**	**G**	**2**	In rocky stream areas where large granitic boulders occur, projects should be designed to minimize or avoid impact to Mannia californica and Plagiochasma wrightii habitat.
GA	**TUM-Wild Chile BA**	**G**	**3a**	Within the Wild Chile Botanical Area: a. Planned and unplanned ignitions should be used seasonally prior to wild chile flowering and fruiting.
GA	**TUM-Wild Chile BA**	**G**	**3b**	Livestock grazing should be deferred during the growing season of wild chiles, approximately August to November.
GA	**TUM-Wild Chile BA**	**G**	**3c**	Wild chile plants should be protected when high-severity fire threatens the population.
GA	**TUM**	**G**	**4**	Management activities involving ground disturbance and/or vegetation management should incorporate site-specific design features to benefit habitat for, or mitigate impacts to, rare plant populations. For the Tumacacori

				Ecosystem Management Area, these species include, but are not limited to, the following: Cochise woolwort, recurved corycactus, soft Mexican-orange, & Whisk fern.
GA	**HUA-Elgin RNA & Proposed Canelo RNA**	**S**	**1a**	Within Elgin Research Natural Area and the proposed Canelo Research Natural Area: a. Livestock grazing will not be permitted
GA	**HUA-Elgin RNA & Proposed Canelo RNA**	**S**	**1b**	Harvest of forest products, including fuelwood, will not be permitted
GA	**HUA**	**G**	**1**	In aquatic habitats occupied by Arizona treefrog, water levels should be maintained or enhanced during breeding season to a level adequate to support reproduction.
GA	**HUA**	**G**	**2**	Impacts from management actions such as grazing, vegetation treatments, and recreation should be mitigated within Arizona treefrog habitat.
GA	**HUA**	**G**	**3**	During vegetation treatments, mesic microenvironments for woodland and talussnails endemic to the Huachuca Ecosystem Management Area (e.g., trees near rocky features, islands of shrubs within talus slopes, riparian colluvia, large logs, and scattered rocks on shady hillsides) should be protected.
GA	**HUA**	**G**	**4**	Management activities involving ground disturbance, vegetation management, or both should incorporate site-specific design features to benefit habitat for, or mitigate impacts to, rare plant populations. For the Huachuca Ecosystem Management Area, these species include, but are not limited to: beardless chinch weed, Cochise woolwort, elusive browallia, Huachuca cinquefoil, Huachuca milkvetch, Huachuca water umbel, Pima pineapple, purple-spike coralrootcactus, Rusby's hawkweed, & smooth baby-bonnets.
GA	**WHE**	**G**	**1**	During vegetation treatments, mesic microenvironments for woodland and talussnails endemic to the Whetstone Ecosystem Management Area (e.g., trees near rocky features, islands of shrubs within talus slopes, riparian colluvia, large logs, and scattered rocks on shady hillsides) should be protected.
GA	**PIN-Goudy Canyon RNA**	**S**	**1a**	Within the Goudy Canyon Research Natural Area: a. Wildlife habitat improvement, water yield improvement, and related improvement projects are prohibited.
GA	**PIN-Goudy Canyon RNA**	**S**	**1b**	Vegetation manipulation, including timber sale and harvest of forest products, will not be allowed except for approved research purposes.
GA	**PIN**	**S**	**2**	Within habitat for the Mount Graham red squirrel, no new recreational residence or developed recreation areas will be established.

GA	**PIN**	**G**	**1**	Management activities involving ground disturbance, vegetation management, or both should incorporate site-specific design features to benefit habitat for, or mitigate impacts to, rare plant populations. For the Pinaleño Ecosystem Management Area, these species include, but are not limited to: broad-leaf ground-cherry, leafy Jacob's ladder, Rusby's hawkweed, & white-flowered cinquefoil.
GA	**PIN**	**G**	**2**	Planned and unplanned ignitions should be used to reduce the risk of uncharacteristic wildfires that can cause sedimentation, diminished water quality, and soil erosion in talussnail habitat.
GA	**PIN-Mount Graham red squirrel habitat**	**G**	**3a**	Within habitat for Mount Graham red squirrel: a. Red squirrel habitat needs should supersede the needs of all other species of plants and animals.
GA	**PIN-Mount Graham red squirrel habitat**	**G**	**3b**	Hiking use levels should not negatively impact Mount Graham red squirrel habitat or individuals.
GA	**PIN-Mount Graham red squirrel habitat**	**G**	**3c**	Vegetation treatments should be designed and implemented to avoid disturbance of Mount Graham red squirrel middens.
GA	**CAT-Santa Catalina & Butterfly Peak RNA**	**S**	**1a**	Within the Santa Catalina and Butterfly Peak Research Natural Areas, and the proposed Finger Rock Canyon Research Natural Area: a. Livestock grazing will not be permitted.
GA	**CAT-Santa Catalina & Butterfly Peak RNA**	**S**	**1b**	Timber cutting is prohibited.
GA	**CAT**	**G**	**1**	During vegetation treatments, mesic microenvironments for woodland and talussnails endemic to the Santa Catalina Ecosystem Management Area (e.g., trees near rocky features, islands of shrubs within talus slopes, riparian colluvia, large logs, and scattered rocks on shady hillsides) should be protected.
GA	**CAT**	**G**	**2**	Management activities involving ground disturbance, vegetation management, or both should incorporate site-specific design features to benefit habitat for, or mitigate impacts to, rare plant populations. For the Santa Catalina

				Ecosystem Management Area, these species include, but are not limited to: Aravaipa woodfern, Arizona eryngo, Arizona manihot, & Rusby's hawkweed

Appendix B. Definitions

Resource/Management Area definitions from Table in Appendix A.

Resource/Management Area	Definition
AIR	Air
ARP	Animals and Rare Plants
AZT	Arizona National Scenic Trail
BIP	Biophysical Features
CAT	Santa Catalina Ecosystem Management Area
CHI	Chiricahua Ecosystem Management Area
CHR	Wilderness Character
COW	Constructed Waters
DEV	Developed Recreation
DRA	Dragoon Ecosystem Management Area
EWA	Eligible, Wild, Scenic and Recreation Rivers
FIR	Fire
FOP	Forest Products
HER	Cultural Resources
HUA	Huachuca Ecosystem Management Area
ISM	Invasive Species
LOA	Land Ownership and Adjustment Boundary
LUZ	Land Use Zones
MIN	Minerals
MOM	Montane-Meadows
MOT	Motorized Recreation
MTS	Motorized Transportation System
MTW	Mount Wrightson Wilderness
NWS	Natural Water Sources
PAJ	Pajarita Wilderness
PEL	Peloncello Ecosystem Management Area
PIN	Pinaleño Ecosystem Management Area

PSR	Pusch Ridge Wilderness
PUA	Public Access
RAM	Range Management
RBC	Roaded Back Country
REC	Recreation
REE	Recreation and Education
RES	Research in Wilderness
RIA	Riparian Areas
RIT	Santa Rita Ecosystem Management Area
RNC	Rincon Mountain Wilderness
RNA	Research Natural Area
SCQ	Scenery
SLW	Soil and Water
SQL	Scenic Quality
SUM	Special Uses
TAS	Trails and Signage
TUM	Tumacacori Ecosystem Management Area
VDC	Desert Communities
VDM	Dry Mixed-Conifer Forest
VIC	Interior Chaparral
VLS	Vegetation Landscape Scale
VME	Madrean Encinal Woodlands
VPO	Madrean Pine-Oak Woodlands
VPP	Ponderosa Pine-Evergreen Shrub
VSF	Spruce-Fir
VWM	Wet Mixed-Conifer Forest
WET	Wetlands
WHE	Whetstone Ecosystem Management Area
WIN	Winchester Ecosystem Management Area
WLF	Wildlife
WSA	Wilderness Area and Study Recommended
ZBA	Zoological Botanical Area