United States Department of the Interior

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In reply refer to:

In Reply Refer To:
R2/ES-TE

Cons. #2012-F-0011

April 30, 2012

Corbin L. Newman, Jr.
Regional Forester
U.S. Forest Service, Southwestern Region
333 Broadway SE
Albuquerque, New Mexico 87102

Rita LaFord, Acting Forest Supervisor
2324 E. McDowell Rd.
Phoenix, AZ 85006

Dear Mr. Newman:

The enclosed biological opinion (BO) responds to your request for reinitiation of formal consultation under section 7(a) of the Endangered Species Act of 1973 (Act), as amended. We received your letter requesting reinitiation and a Biological Assessment (BA) titled *Biological Assessment for the Reinitiation of Consultation on the Forest Service's Continued Implementation of the Land and Resource Management Plans for the 11 Southwestern Region National Forests and National Grasslands* on April 9, 2011.

Described within your BA is the programmatic nature of the LRMPs. It analyzes the affects of LRMP implementation; specifically the implementation of the Standards and Guidelines (S&Gs) to species and their critical habitat within each National Forest. Each National Forest has a separate chapter within the BA that discusses the potential effects to each species resulting from the implementation of the S&Gs for that particular National Forest. This BO addresses the Forest Service's continued implementation of the Land and Resource Management Plan (LRMP) for the Tonto National Forest of the Southwestern Region. This BO will be in place until the Tonto National Forest revises its LRMP.

Throughout this process, we have been working closely with your staff. We appreciate your willingness to cooperate and assist the Service during the completion of this consultation.

If you have questions or comments, please contact me at the Arizona Ecological Services Office (AESO), at 602-242-0210.

Sincerely,

Steven L. Spangle
Field Supervisor

Enclosure

cc: Regional Consultation Coordinator, Threatened and Endangered Species, Ecological Services, Region 2
Chief, Threatened and Endangered Species, Ecological Services Region 2
Supervisor, Ecological Services Field Office, Phoenix, AZ

W:\Steve Spangle\2012 Tonto LRMP BO Cover letter.dochrb

BIOLOGICAL AND CONFERENCE OPINION

The Continued Implementation of the Land and Resource Management Plan
for
The Tonto National Forest and National Grasslands
of the
U.S.D.A. Forest Service Southwestern Region

Regional Office, Region 2
U.S. Fish and Wildlife Service

Cons. #2012-F-0011

April 30, 2011

Executive Summary

The accompanying document transmits the biological (BO) and conference opinion (CO) of the U.S. Fish and Wildlife Service (FWS) in response to the U.S. Forest Service's (USFS) request for re-initiation of consultation in accordance with the Endangered Species Act of 1973 (ESA or Act), as amended. This opinion addresses the USFS's continued implementation of the Land and Resource Management Plan (LRMP) for the Tonto National Forest (NF) of the Southwestern Region (proposed action), and their effects to 12 federally-listed species and five designated or proposed critical habitats (CHs). The consultation approach used to complete this consultation was the same used in the 2004/2005 consultation (Please refer to the executive summary in the 2005 BO). In addition, we are incorporating the 2004/2005 BA and BO by reference into this document.

This approach provided the information necessary to determine whether or not a jeopardy determination could be concluded. For those species with designated or proposed CH, our effects' analysis approach identified how the primary constituent elements (PCEs) or physical and biological features (PBFs) essential to the conservation of the species were likely to be affected; thus, how the proposed action affected the function and conservation value of the associated critical habitat units (CHUs).

A consultation agreement (CA) between the FWS and the USFS was signed on December 7, 2010. Included in the CA were timeframes, staffing, and a dispute resolution process. In addition, as part of the CA, the agencies have agreed to organize the Biological Assessment (BA) and BO/CO differently than was done in the previous consultation. This consultation is considered to be a programmatic batched consultation that will be organized by NF. Therefore, while the BA describes the programmatic nature of the LRMPs, it specifically analyzes the effects of LRMP implementation to species and their areas of CH within the action area of each NF. As a result, each NF has a separate chapter within the BA which discusses specifically the effects to the species that occur on that particular NF that are predicted to result from the implementation of the Standards and Guidelines (S&Gs) of that individual NF's LRMP. The resulting BO/COs issued by the FWS will assign incidental take, reasonable and prudent measures, and terms and conditions for each individual NF LRMP. This BO/CO will be in place until the Tonto NF revises its LRMP.

Using the approach described above, along with careful consideration of the species' status, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects; we found that the proposed action would not jeopardize the continued existence of the 12 species identified within the action area of the Tonto NF. Similarly, we determined that the proposed action was not likely to destroy or adversely modify CH for five species with designated or proposed CH.

Table of Contents

INTRODUCTION 1

CONSULTATION HISTORY 2

DESCRIPTION OF THE PROPOSED ACTION 5

DESCRIPTION OF THE ACTION AREA 6

Climate Change 6

CONSULTATION APPROACH 7

BIRDS
Mexican spotted owl 9

Southwestern willow flycatcher 29

REPTILES/AMPHIBIANS
Chiricahua leopard frog 45

FISH
Desert pupfish 77

Gila topminnow 86

Loach minnow 97

Spikedace 110

PLANTS
Arizona cliffrose 124

Arizona hedgehog cactus 131

DISPOSITION OF DEAD OR INJURED LISTED SPECIES 139

REINITIATION NOTICE 139

LITERATURE CITED 141

Description of the Proposed Action and Consultation Approach 141

Mexican Spotted Owl 141

Southwestern willow flycatcher 143

Chiricahua leopard frog 145

Desert pupfish 151

Gila topminnow 154

Loach minnow 159

Spikedace 163

Arizona cliffrose 167

Arizona hedgehog cactus 168

Appendix A: Not Likely to Adversely Affect Determinations A-1

Colorado pikeminnow (*Ptychochelius lucius*) Non-essential, Experimental §10(j) Population A-1

Razorback sucker (*Xyrauchen texanus*) Endangered A-1

Razorback sucker Critical Habitat A-1

Yuma clapper rail (*Rallus longirostris yumanensis*) Endangered A-2

Appendix B: Abbreviations and Acronyms B-1

INTRODUCTION

This biological and conference opinion (BO/CO) responds to the U.S. Forest Service's (USFS) request for reinitiation of consultation with the U.S. Fish and Wildlife Service (FWS) in accordance with the requirements of the Endangered Species Act of 1973 (ESA or Act), as amended (16 U.S.C. 1531 *et seq.*). We, the FWS, prepared this opinion which addresses the USFS's continued implementation of the Land and Resource Management Plan (LRMP) on the Tonto National Forest (NF) of the Southwestern Region, and its effects to 12 federally-listed species (see below) and five designated or proposed critical habitats (CHs). On April 17, 2009, the USFS requested re-initiation of the 2005 LRMP BO/CO due to the belief that the incidental take threshold for the Mexican spotted owl (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, as well as requesting consultation for the ocelot, a species now considered present in small numbers in Arizona. The FWS acknowledged the request for re-initiation for the MSO on June 22, 2010 and followed up with a clarification letter acknowledging the USFS request to reinitiate consultation for all other species, including the ocelot, on August 9, 2010. On October 18, 2010 the USFS submitted a species list for this re-initiation effort to the FWS for concurrence. On December 7, 2010 a consultation agreement was signed by the two agencies. On January 18, 2011 the USFS received a species list concurrence letter from the FWS.A final Biological Assessment (BA) from the USFS was received by the FWS on April 6, 2011.

The 2005 BO/CO was considered a plan-level or programmatic consultation, using a tiered approach. The tiered approach is a two-stage consultation process: the first stage is a programmatic BO/CO, which evaluates the program level effects of the continued implementation of the USFS's LRMPs that guide how site-specific projects are designed and managed. The second stage consists of the future consultations on site-specific projects proposed by the USFS. USFS site-specific activities affecting listed species have tiered from the 2005 programmatic BO/CO.

A distinct change from the 2004/2005 consultation is that this consultation will be a programmatic batched consultation that will be organized by NF. Therefore, while the USFS's BA describes the programmatic nature of the LRMPs, it specifically analyzes the effects of LRMP implementation to species and their CH within the action area of each NF. As a result, each NF has a separate chapter within the BA discussing the effects to the species that occur on that particular NF predicted to result from the implementation of the S&Gs of that individual NFs LRMP. Therefore, the FWS's resulting BO/COs will issue an incidental take statement, reasonable and prudent measures, and terms and conditions for each NF LRMP. These BO/COs will then be in place until each of the NFs revises its LRMP.

<u>Tonto National Forest</u>

This programmatic consultation examines the effects on 12 species and five designated or proposed CHs from the direction and guidance provided within the Tonto NF LRMP. The following species are included within this BO/CO for which the USFS and FWS agreed could be affected by the proposed action.

Birds
Mexican spotted owl (*Strix occidentalis lucida*) Threatened with designated CH
Southwestern willow flycatcher (*Empidonax traillii extimus*) Endangered with designated and proposed CH
Yuma clapper rail (*Rallus longirostris yumanensis*) Endangered

Reptiles/Amphibians
Chiricahua leopard frog (*Rana chiricahuensis*) Threatened with designated CH

Fish
Colorado Pikeminnow *(Ptychochelius lucius)*Experimental non-essential 10(j) population
Desert pupfish (*Cyprinodan macularius macularius)* Endangered with designated CH
Gila topminnow (*Poeciliopsis occidentalis*) Endangered
Loach minnow (*Tiaroga cobitis*) Endangered with designated CH
Razorback sucker (*Xyrauchen texanus*) Endangered with designated CH
Spikedace (*Meda fulgida*) Endangered with designated CH

Plants
Arizona cliffrose (*Purshiasubintegra*) Endangered
Arizona hedgehog cactus (*Echinocereus triglochidiatus* var. *arizonicus*) Endangered

This BO/CO is based on information provided in the USFS's April 6, 2011 BA, subsequent information provided by the USFS to the FWS throughout the consultation, the Tonto NF LRMP, the 1996 Regional Amendment and the 2004/2005 BA and BO/CO which are hereby incorporated by reference. In order to obtain current information concerning the above species, we reviewed final listing rules, candidate assessment forms, recovery plans, published literature, unpublished reports and data, species and CH location maps, and other sources of information. In addition, we consulted species experts (i.e., research scientists conducting field surveys, monitoring, or research studies on any of the above species) from state conservation agencies, USFS research stations, and FWS biologists. A complete administrative record of this consultation is on file at the FWS Regional Office, Albuquerque, New Mexico.

CONSULTATION HISTORY

The history of this consultation is complex. 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/CO on the 11 LRMPs, which concluded jeopardy to the MSO and adverse modification for its designated CH (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 challenged in 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/CO 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 NFs' LRMP consultation.

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

- On April 5, 2004, the USFS requested reinitiation 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 Land and Resource Management Plans for the Eleven NFs and National Grasslands of the Southwestern Region (U.S. Forest Service 2004).

- 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 four documents as follows: (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 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 USFS received a final programmatic BO/CO from the FWS.

- On April 17, 2009, the USFS requested re-initiation of the 2005 LRMP BO/CO due to the belief that the incidental take threshold for the MSO could soon be approached and/or exceeded and due to the inability to fully implement the monitoring requirements associated with the Reasonable and Prudent Measures 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, as well as requesting consultation for 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 USFS request to reinitiate consultation for all other species, including the ocelot on August 9, 2010.

- A CA between the FWS and USFS was signed on December 7, 2010, that addresses timeframes, staffing, and a dispute resolution process. As part of the CA, the agencies have agreed to organize the BA and BO/CO differently than was done in the 2004 BA and 2005 BO/CO. This consultation is considered to be a programmatic batched consultation that will be organized by NF. Therefore, while the BA describes the programmatic nature of the LRMPs, it specifically analyzes the effects of LRMP implementation to species and their CHs within the action area of each NF. The resulting BO/COs will issue incidental take, reasonable and prudent measures, and terms and conditions for each NF LRMP.

DESCRIPTION OF THE PROPOSED ACTION

The proposed action being analyzed in this BO/CO is Tonto NF LRMP in the USFS Southwestern Region(including the 1996 Region-wide Amendment). Also included in this BA is an analysis of those S&Gs that have been added through any amendments to the NF LRMP since the 2004 LRMP BA (See Appendix 4 for a complete list of S&Gs analyzed in the 2011 BA). This consultation will be in place until the Tonto NF completes a revised LRMP at which time they will re-consult with the FWS.

The LRMP directs how current and future activities will be carried out in the following Programs: Engineering; Fire Management; Forestry/Forest Health; Lands and Minerals; Rangeland Management; Recreation, Heritage and Wilderness; Watershed Management; and Wildlife, Fish, and Rare Plants (WFRP). The S&Gs related to these Programs are discussed in the **Effects of the Action** section of this BO/CO.

The LRMP and the 1996 Regional LRMP Amendment describe long-range management strategies for the NF. They provide a programmatic framework for future activities and emphasize the application of certain S&Gs in the undertaking of those activities on the land. The LRMP does not, however, make site-specific decisions about exactly how, when, and where these activities will be carried out. However, all site-specific activities must conform to the programmatic framework set up in the LRMP (S&Gs) and they must meet site-specific National Environmental Policy Act (NEPA) and ESA requirements. Implementation of ongoing projects and the issuance of incidental take associated with those projects is covered under this programmatic opinion since it supersedes the 2005 LRMP BO/CO.

This consultation on the LRMP does not eliminate the requirement for site-specific BAs and the need for site-specific informal or formal ESA § 7 consultation with the FWS for individual projects implemented under the LRMP. Furthermore, it should be noted that amendment (i.e., deleting/changing S&Gs) to the LRMP for a site specific project is allowed and can and does occur, although rarely. In this situation, the action would be considered outside of the scope of this consultation and would require its own site specific ESA § 7(a)(2) consultation to address the effects of that particular proposed action which is being implemented under a project specific amendment to the NF LRMP. Furthermore, wildfire and wildland fire use are not discussed in this BO/CO as they will be covered under separate emergency ESA § 7(a)(2) consultation.

As described above, the LRMP does not make site specific decisions, but it provides direction to each NF regarding how current and future activities will be carried out. Incidental take anticipated in this BO/CO would occur during implementation of site-specific projects. In addition, monitoring to determine overall compliance with the incidental take limits set forth in this BO/CO will be required in all future project level BOs. Project specific monitoring will be designed and implemented to determine if and/or when the incidental take limits set forth in this BO/CO have been exceeded.

DESCRIPTION OF THE ACTION AREA

The Action Area for this BO/CO is defined as all lands that the Tonto NF encompass in the Southwestern Region of the USFS, plus adjacent lands that the proposed action may directly or indirectly affect. The Tonto NF covers 2.9 million acres (ac) in central Arizona and is one of the most visited "urban" forests in the U.S. Elevations range from 1,300 to 7,900 feet (ft) and vegetation includes cactus, chaparral and grasslands above 4,000 ft, with juniper, mixed fir and ponderosa pine at higher elevations. There are eight designated wilderness areas (Four Peaks, Hellsgate, Salome, Mazatzal, Pine Mountain, Salt River Canyon, Sierra Ancha, and Superstition) and two designated Wild and Scenic Rivers (WSR) (Fossil Creek and Verde). The Forest is divided into six districts: Cave Creek, Globe, Mesa, Payson, Pleasant Valley, and Tonto Basin.

Climate Change

According to the Intergovernmental Panel on Climate Change (IPCC 2007) "Warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." Average Northern Hemisphere temperatures during the second half of the 20th century were very likely higher than during any other 50-year period in the last 500 years and likely the highest in at least the past 1300 years (IPCC 2007). It is very likely that over the past 50 years cold days, cold nights and frosts have become less frequent over most land areas, and hot days and hot nights have become more frequent (IPCC 2007). Data suggest that heat waves are occurring more often over most land areas, and the frequency of heavy precipitation events has increased over most areas (IPCC 2007).

The IPCC (2007) predicts that changes in the global climate system during the 21st century are very likely larger than those observed during the 20th century. For the next two decades a warming of about 0.2°C (0.4°F) per decade is projected (IPCC 2007). Afterwards, temperature projections increasingly depend on specific emission scenarios (IPCC 2007). Various emissions scenarios suggest that by the end of the 21st century, average global temperatures are expected to increase 0.6°C to 4.0°C (1.1°F to 7.2°F) with the greatest warming expected over land (IPCC 2007).

Localized projections suggest the southwest may experience the greatest temperature increase of any area in the lower 48 States (IPCC 2007), with warming in southwestern states greatest in the summer (IPCC 2007b). The IPCC also predicts hot extremes, heat waves, and heavy precipitation will increase in frequency (IPCC 2007). There is also high confidence that many semi-arid areas like the western United States (U.S.) will suffer a decrease in water resources due to climate change (IPCC 2007), as a result of less annual mean precipitation and reduced length

of snow season and snow depth (IPCC 2007b). Milly et al. (2005) project a 10–30 percent decrease in precipitation in mid-latitude western North America by the year 2050 based on an ensemble of 12 climate models.

The increase in global temperature is already putting pressure on ecosystems and the plants and animals that co-exist in those systems. Warmer temperatures during the second half of the 20th century have begun to shift the growing season in many parts of North America by increasing it as much as two weeks (Regonda et al. 2005). In addition, spring is coming earlier. This change in the growing season affects the broader ecosystem. Migrating animals have to start seeking food sources earlier. The shift in seasons may already be causing the lifecycles of pollinators, like bees, to be out of synch with flowering plants and trees. This mismatch can limit the ability of both pollinators and plants to survive and reproduce, which would reduce food availability throughout the food chain.

An extended growing season also means that plants need more water to keep growing throughout the season or they will dry out, increasing the risk of wildfire. Once the growing season ends, the shorter, milder winters fail to kill dormant insects, increasing the risk of large-scale insect infestations in subsequent seasons (Seager et al. 2007).

In some ecosystems, maximum daily temperatures might climb beyond the tolerance of indigenous plant or animal. To survive the extreme temperatures, both marine and land-based plants and animals have started to migrate towards the poles. Those species, and in some cases, entire ecosystems, that cannot quickly migrate or adapt, may ultimately face extinction.

CONSULTATION APPROACH

The purpose of this section is to articulate the FWS's approach to this consultation in order to clearly present the chain-of-logic supporting our determinations. During the initial consultation in 2005, the FWS came up with an analytical approach to completing the consultation. At that time, there was a large number of species to be considered, an extensive number of USFS S&Gs analyzed, as well as eight complex Forest programs. The approach is described in the 2005 BO/CO and is hereby incorporated by reference. It included deconstructing of the proposed action, diagnosing the species' status, establishing the species' condition within the action area, analyzing the effects, and finally, putting it back together to make our conclusions.

In this consultation, both agencies relied on the extensive analysis conducted in the 2005 opinion and incorporated all of the information that has remained unchanged since then. We also considered the species status and any changes that have occurred since 2005. Our analysis focuses on the changes in forest management and species status since the 2005 BO/CO. This approach is consistent with the 1998 Consultation Handbook and the implementing regulations at 50 CFR § 402.

As reflected in the 2005 BO/CO, in order to make determinations of effects to listed species, proposed, or candidate species, and proposed or designated CHs, the USFS made two primary assumptions about the implementation of the 11 LRMPs. These assumptions are as follows:

1. The NFs will implement site-specific management actions to move toward land management goals and desired future conditions for various resources, with the caveat that available funding and other LRMP direction will control the actual extent and intensity of these site-specific management actions;

2. The S&Gs in the LRMPs will be followed when selecting, planning, and executing site-specific management actions. In addition, should a site-specific action not follow the S&Gs, the action must be modified or the LRMP must be amended before the action can be allowed. In the situation where a site specific action requires LRMP amendment, the action would be considered outside the scope of this consultation and would require separate site specific ESA § 7(a) (2) consultation to address the effects of that particular proposed action.

The FWS concurred with the two assumptions stated above. However, based on the large amount of uncertainty surrounding how the S&Gs are implemented and exactly which ones are used during project development, it was necessary for the FWS to make additional assumptions regarding this consultation. Our assumptions are as follows:

3. Site-specific projects will conform to the S&Gs, as well as the programmatic framework established in the LRMPs. If not, the action would be considered outside the scope of this consultation and would require separate site specific ESA § 7(a) (2) consultation to address the effects of that particular proposed action.

4. Land managers use and/or implement the S&Gs at every level of planning (e.g., forest-wide, management areas, and project level).

5. Due to their broad scope, the S&Gs may be interpreted and applied differently depending upon the Forest planner and interdisciplinary teams.

6. Implementation of the S&Gs will have varying degrees of effects on the species analyzed.

Please refer to the exposure/response analysis in the 2005 BO/CO for an explanation of how the S&Gs were considered in the consultation.

For listed species with proposed or designated CH, the FWS analyzed the direct and indirect effects of the proposed action, and those actions interrelated and interdependent of the proposed action on proposed or designated CH. The CH analysis identified how the PCEs or biological features essential to the conservation of the species are likely to be affected, and in turn, how that will impact the function and conservation value of the associated CHU(s).

The following contains the jeopardy analysis for each of the 9 listed species arranged in the following order: birds, amphibian, fish, and plants. The status of the species, environmental baseline, effects of the action (which includes cumulative effects), conclusion, and incidental take statements are provided for each species henceforth. In the effects of the action section, we

evaluated all eight of the USFS programs within the Tonto NF LRMP for each species. The discussions within the effects of the action section address the pertinent S&Gs that had effects (both adverse and beneficial) to species as well as which S&Gs could cause take of listed species. Finally, standard language for the disposition of dead, injured, or sick federally listed species as well as a reintiation statement and literature cited section is contained at the end of this BO/CO.

The following section describes the effects to species of the continued implementation of the Tonto NF LRMP. No Effect calls were made for ocelot, Apache trout, Gila chub, lesser long-nosed bat, Desert pupfish designated CH, loach minnow designated CH, and California condor (endangered population); therefore, these species and CHs will not be addressed below. The FWS has concurred with the USFS on "may affect, but is not likely to adversely affect" determinations for the following species: Colorado pikeminnow, Razorback sucker and its designated CH, and Yuma clapper rail. These concurrences can be found in appendix A of this document.

MEXICAN SPOTTED OWL

STATUS OF THE SPECIES

In 1993, the FWS listed the Mexican spotted owl (*Strix occidentalis lucida*) (MSO) as threatened under the Endangered Species Act. The FWS appointed the MSO Recovery Team in 1993, which produced the Recovery Plan for the MSO (Recovery Plan) in 1995 (USDI Fish and Wildlife Service 1995). The FWS released a Draft Revised Recovery Plan for public review during the summer of 2011 (U.S. Fish and Wildlife Service 2011) and intends to finalize the revised recovery plan in 2012. In addition to referencing the 1995 Recovery Plan, we are also using additional information from the Draft Revised Recovery Plan (U.S. Fish and Wildlife Service 2011) in this BO/CO. Additional information included from the Draft Revised Recovery Plan in this BO/CO includes updated science about the biology of the MSO, updated threats information, and updated management recommendations (such as a revised population modeling framework).Critical habitat was designated for the MSO in 2004 (USDI Fish and Wildlife Service 2004).

A detailed account of the taxonomy, biology, and reproductive characteristics of the MSO is found in the Final Rule listing the MSO as a threatened species (USDI 1993), in the Recovery Plan (USDI Fish and Wildlife Service 1995), and in the Draft Revised Recovery Plan (U.S. Fish and Wildlife Service 2011). The information provided in those documents is included herein by reference. The MSO occurs in forested mountains and canyonlands throughout the southwestern U.S. and Mexico (Gutiérrez et al. 1995). It ranges from Utah, Colorado, Arizona, New Mexico, and the western portions of Texas south into several States of Mexico. Although the MSO's entire range covers a broad area of the southwestern U.S. and Mexico, it does not occur uniformly throughout its range. Instead, the MSO occurs in disjunct localities that correspond to isolated forested mountain systems, canyons, and in some cases steep, rocky canyon lands.

Known MSO locations indicate that the species has an affinity for older, uneven-aged forest, and the species is known to inhabit a physically diverse landscape in the southwestern U.S. and Mexico.

The MSO occupies many habitat types scattered across a diverse landscape. In addition to this natural variability in habitat influencing MSO distribution, human activities also vary across the MSO's range. The combination of natural variability, human influences on owls, international boundaries, and logistics of implementation of the Recovery Plan necessitates subdivision of the MSO range into smaller MAs. The 1995 Recovery Plan subdivided the MSO's range into 11 "Recovery Units" (RUs): six in the U.S. and five in Mexico. In this revision of the Recovery Plan, we renamed RUs as "Ecological Management Units" (EMUs) to be in accord with current FWS guidelines (USDC NMFS and USDI FWS 2010). We divide the MSO range within the U.S. into five EMUs: Colorado Plateau (CP), Southern Rocky Mountains (SRM), Upper Gila Mountains (UGM), Basin and Range-West (BRW), and Basin and Range-East (BRE) (Figure 1).

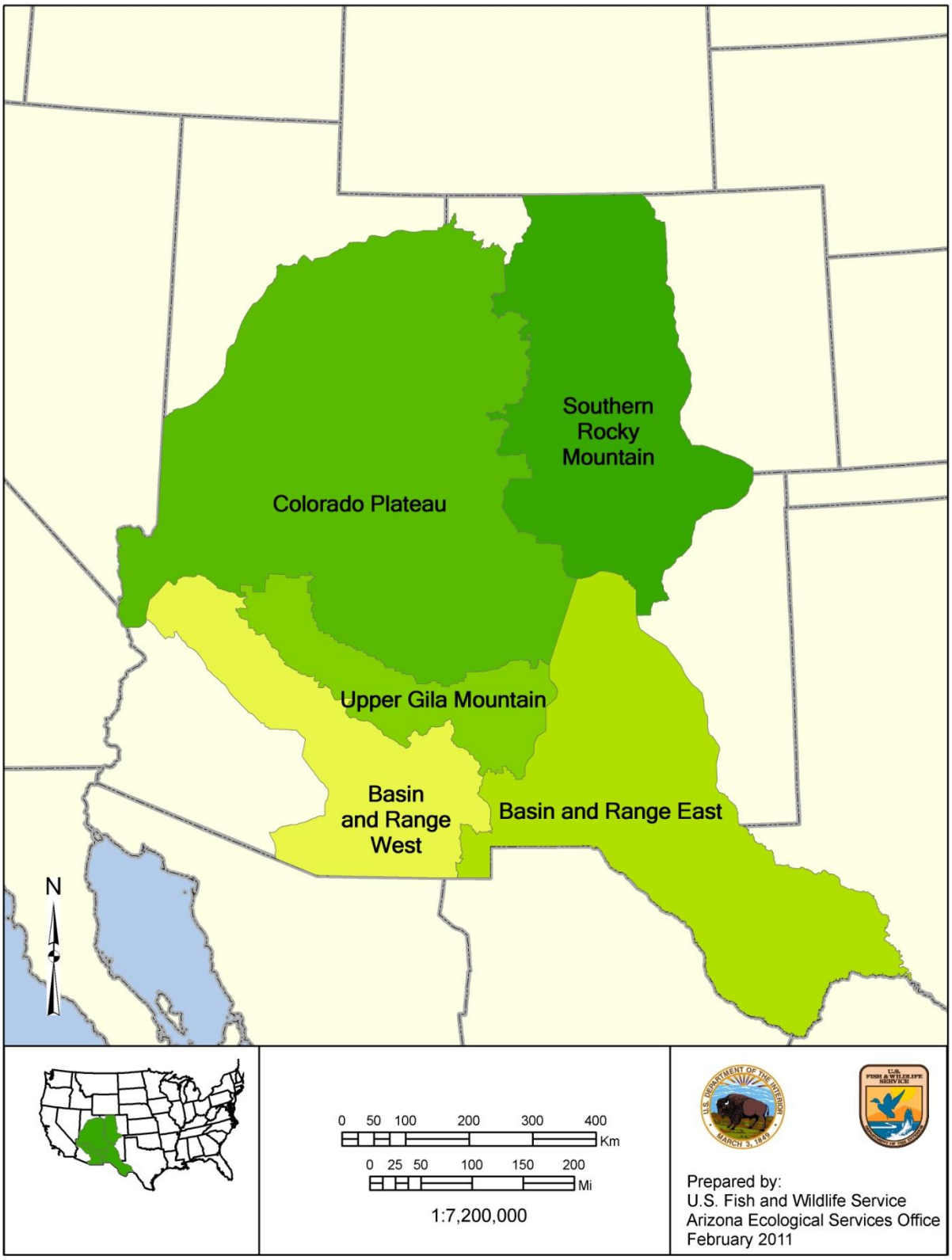


Figure 1. Ecological Management Units for the MSO in the U.S.

There are two types of monitoring that can be conducted for the MSO. The first type of monitoring is a site-specific inventory of MSO habitat conducted using the MSO survey protocol. This method can provide information regarding the presence or absence of owls in a specific area (and is used to establish PACs, etc.), but does not provide population level indicators of the species general population trend. We will refer to this type of monitoring as "MSO surveys." The second type of monitoring is population monitoring. Population monitoring is conducted at a large enough scale (typically range-wide) to provide information regarding population trend (i.e., is the species increasing, decreasing, or stable). Methodologies to conduct this type of monitoring include demographic studies or range-wide occupancy monitoring as described in the 2011 Draft Revised Recovery Plan (U.S. Fish and Wildlife Service 2011).

Mexican spotted owl surveys since the 1995 Recovery Plan and issuance of the 2005 LRMP BO/CO have increased our knowledge of MSO distribution, but not necessarily of MSO abundance. Population estimates, based upon MSO surveys, recorded 758 MSO sites from 1990 to 1993, and 1,222 MSO sites from 1990 to 2004 in the U.S.. An MSO site is an area used by a single or a pair of adult or subadult MSOs for nesting, roosting, or foraging. The increase in number of known MSO sites is mainly a product of new MSO surveys being completed within previously unsurveyed areas (e.g., several National Parks within southern Utah, Grand Canyon National Park in Arizona, Guadalupe National Park in West Texas, Guadalupe Mountains in southeastern New Mexico and West Texas, Dinosaur National Monument in Colorado, Cibola NF in New Mexico, and Gila NF in New Mexico). Thus, an increase in abundance in the species range-wide cannot be inferred from these data (U.S. Fish and Wildlife Service 2011). However, we do assume that an increase in the number of areas considered to be occupied to be a positive indicator regarding MSO numbers.

Two primary reasons were cited for the original listing of the MSO in 1993: (1) historical alteration of its habitat as the result of timber-management practices; and, (2) the threat of these practices continuing as evidenced in existing NF plans. The danger of stand-replacing fire was also cited as a threat. Since publication of the Recovery Plan (USDI Fish and Wildlife Service 1995), we have acquired new information on the biology, threats, and habitat needs of the MSO. The greatest threat to the population in the U.S. (but likely not in Mexico) has transitioned from commercial-based timber harvest to the risk of stand-replacing wildland fire. Recent forest management has moved from a commodity focus and now emphasizes sustainable ecological function and a return toward pre-settlement fire regimes, both of which have potential to benefit the MSO. Southwestern forests have experienced larger and more severe wildland fires from 1995 to the present than prior to 1995. Climate variability combined with dense forest conditions may also synergistically result in increased negative effects to habitat from fire. The intensification of natural drought cycles and the ensuing stress placed upon overstocked forested habitats could result in even larger and more severe fires in MSO habitat. Several fatality factors have been identified as particularly detrimental to the MSO, including predation, starvation, accidents, disease, and parasites.

Historical and current anthropogenic uses of MSO habitat include both domestic and wild ungulate grazing, recreation, fuels reduction treatments, utility infrastructure construction and maintenance, resource extraction (e.g., timber, oil, gas), and development. These activities have

the potential to reduce the quality of MSO nesting, roosting, and foraging habitat, and may cause disturbance during the breeding season. Livestock and wild ungulate grazing is prevalent throughout Region 3 NF lands and is thought to have a negative effect on the availability of grass cover for prey species. Recreation impacts are increasing on all forests, especially in meadow and riparian areas. Fuels reduction treatments, though critical to reducing the risk of severe wildland fire, can have short-term adverse effects to owls through habitat modification and disturbance. As the human population grows in the southwestern U.S., small communities within and adjacent to National Forest System (NFS) lands are being developed. This trend may have detrimental effects to owls by further fragmenting habitat and increasing disturbance during the breeding season.

West Nile Virus also has the potential to adversely impact the MSO. The virus has been documented in Arizona, New Mexico, and Colorado, and preliminary information suggests that owls may be highly vulnerable to this disease (Courtney et al. 2004). Unfortunately, due to the secretive nature of owls and the lack of intensive monitoring of banded birds, we will most likely not know when owls contract the disease or the extent of its impact to the MSO range-wide.

Currently, high-intensity, stand-replacing fires are influencing ponderosa pine and mixed conifer forest types in Arizona and New Mexico. Uncharacteristic, high-severity, stand-replacing wildland fire is probably the greatest threat to the MSO within the action area. As throughout the West, fire severity and size have been increasing within this geographic area. Landscape level wildland fires, such as the Rodeo-Chediski Fire (2002) and the Wallow Fire (2011), have resulted in the loss of tens of thousands of acres of occupied and potential MSO habitat across significant portions of its range.

Global climate variability may also be a threat to the MSO and synergistically result in increased effects to habitat from fire, management actions across the MSO's range that result in adverse impacts, and other factors discussed above. Studies have shown that since 1950, the snowmelt season in some watersheds of the western U.S. has advanced by about 10 days (Dettinger and Cayan 1995, Dettinger and Diaz 2000, Stewart et al. 2004). Such changes in the timing and amount of snowmelt are thought to be signals of climate-related change in high elevations (Smith et al. 2000, Reiners et al. 2003). The impact of climate change is the intensification of natural drought cycles and the ensuing stress placed upon high-elevation montane habitats (IPCC 2007, Cook et al. 2004, Breshears et al. 2005, Mueller et al. 2005). The increased stress put on these habitats is likely to result in long-term changes to vegetation, invertebrate, and vertebrate populations within coniferous forests and canyon habitats that affect ecosystem function and processes.

Critical Habitat

The FWS designated CH for the MSO in 2004, on approximately 8.6 million acres (3.5 million hectares) of Federal lands in Arizona, Colorado, New Mexico, and Utah (U.S. Fish and Wildlife Service 2004). Within the designated boundaries, CH includes only those areas defined as protected habitats (defined as PACs and unoccupied slopes >40 percent in the mixed conifer and pine-oak forest types that have not had timber harvest in the last 20 years) and restricted habitats(defined as unoccupied MSO foraging, dispersal, and future nest/roost habitat) as defined

in the 1995 Recovery Plan (USDI Fish and Wildlife Service 1995). The PCEs for MSOCH were determined from studies of their habitat requirements and information provided in the Recovery Plan (USDI Fish and Wildlife Service 1995). Since MSO habitat can include both canyon and forested areas, PCEs were identified in both areas. The PCEs identified for the MSO within mixed-conifer, pine-oak, and riparian forest types that provide for one or more of the MSO's habitat needs for nesting, roosting, foraging, and dispersing are:

- A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting different ages of trees, 30to 45 percent of which are large trees with diameter at breast height ((dbh) 4.5 ft above ground)) of 12 inches or more;
- A shade canopy created by the tree branches covering 40 percent or more of the ground and;
- Large, dead trees (snags) with a dbh of at least 12 inches.
- 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 and seeds, and allow plant regeneration.

The PCEs listed above usually are present with increasing forest age, but their occurrence may vary by location, past forest management practices or natural disturbance events, forest-type productivity, and plant succession. These PCEs may also be observed in younger stands, especially when the stands contain remnant large trees or patches of large trees. Certain forest management practices may also enhance tree growth and mature stand characteristics where the older, larger trees are allowed to persist.

Summary of Rangewide Status of the Mexican spotted owl and critical habitat

Overall, the status of the MSO and its designated CH has not changed significantly range-wide in the U.S. (which includes Utah, Colorado, Arizona, New Mexico, and extreme southwestern Texas), based upon on the information we have, since issuance of the 2005 LRMP BO/CO. What we mean by this is that the distribution of MSOs continues to cover the same area and CH is continuing to provide for the life history needs of the MSO throughout all of the EMUs located in the U.S. We do not have detailed information regarding the status of the MSO in Mexico, so we cannot make inferences regarding its overall status.

However, this is not to say that significant changes have not occurred within the action area described below. Wildland fire has resulted in the greatest loss of PACs and CH relative to other actions (e.g., such as forest management, livestock grazing, recreation, etc.) throughout the U.S. range of the MSO. These wildland fire impacts have most impacted MSOs within the Upper Gila Mountains EMU (e.g., Rodeo-Chediski and Wallow Fires on the Apache-Sitgreaves NF) and Basin and Range West EMU (e.g., Horseshoe 2 Fire on the Coronado NF); but other EMUs have been impacted as well (Southern Rocky Mountains EMU, the Santa Fe NF by the Las Conchas Fire). However, we do not know the extent of the effects of these wildland fires on actual MSO numbers.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all federal, state, or private actions within the action area. All proposed federal actions within the action area that have undergone formal or early section 7 consultation are included in the environmental baseline discussion. The environmental baseline discussion defines the current status of the MSO, its habitat, and designated CH within the Tonto NF. This discussion serves as a platform to assess the effects of the action to the MSO now under consultation.

Status of the Mexican Spotted Owl and Critical Habitat within the Action Area

The Tonto NF is located within the Upper Gila Mountain (UGM) and Basin and Range West (BRW) Ecological Management Units (EMU). The Tonto NF covers roughly three million acres of central Arizona and is divided into six districts including Cave Creek, Globe, Mesa, Payson, Pleasant Valley, and Tonto Basin. As of 2011, 72MSO PACs were delineated within the boundaries of the Tonto NF. Mexican spotted owls are widely distributed on the Tonto NF and are most common in mixed-conifer forests and ponderosa pine-Gambel oak.

Critical Habitat

Four MSO CHUs occur within the boundaries of the Tonto NF including the following: a portion of the UGM-10 unit occurs on the northern portion of the Forest; BR-W-4 unit within the Mazatzal Wilderness; which covers 158,624 areas, BR-W-5 unit (118,940 acres) which includes half of the Salome and Sierra Ancha Wilderness areas; and BR-W-6 unit which is located primarily in the Pinal Mountains and covers 51,782 acres. Only areas identified as protected and restricted pursuant to the Recovery Plan (USDI Fish and Wildlife Service 1995) within the CHUs are considered CH.

Factors Affecting the Mexican Spotted Owl and its Critical Habitat within the Action Area

Table 1. Formal consultations on the Tonto NF from 2005 to 2011.

Consultation #	**Date of Final BO**	**Project**	**Approximate # of Owls Anticipated Taken**	**# of PACs Anticipated Taken**	**Form of Take**
02-21-05-F-0380	7/27/2005	Salt Analysis Area	0	0	n/a
22410-2006-F-0441	1/10/2007	500-3 500kV Arizona Public Service and Salt River Project	0	0	n/a
22410-2007-F-0364	7/5/2007	Phase I Hazard Vegetation Removal in Utility Corridors	3-6 adult owls and/or associated eggs/juveniles	3 PACs	Harm and Harass
22410-2007-F-0365	7/17/2008	Phase II Maintenance in Utility Corridors	3-6 pairs of owls	3 PACs	Harm and Harass
22410-2008-F-	*12/2/2011*	*Effects to Listed*	*Incidental take*	*Incidental*	*Harm*

0149-R001		*Species from U.S. Forest Service Aerial Application of Fire Retardants on NFS Lands*	*will be tracked as it occurs per the BO*	*take will be tracked as it occurs per the BO*	*&Harass*
		TOTAL		6 PACs	

*Projects in italics are fire suppression activities that are not included in the proposed action for this consultation.

The factors (i.e., Federal, State, tribal, local, and private) already affecting the MSO and its designated CH within the action area are discussed in this section. Since the action area consists of NFS lands, there are likely very few, if any, State, tribal, or private actions impacting the MSO or its CH. Formal consultations that have occurred from 2005 (the year of the original LRMP BO/CO) to the present are summarized in Table 1.

Since 2005, four BOs have been issued to the Tonto NF addressing adverse effects to MSO from projects implemented under the LRMP. Six MSO PACs had associated incidental take in the form of harm and harassment. These projects included one fuels reduction/forest restoration project and two utility corridor hazard vegetation removal and maintenance projects(see Table 1). The Salt Analysis Area project combined timber harvest, prescribed fire, and road management associated with tree harvest. The objectives of the Salt Analysis Area project are to improve wildlife forage/cover ratios, treat dwarf mistletoe infection, increase stand diversity, and manage potential old growth stands toward old growth. No incidental take of MSOs was anticipated. Large tree removal from implementing and maintaining utility corridors resulted in take in the form of harm and harassment. Incidental take was anticipated in six MSO PACs.

Critical Habitat

The utility corridor projects listed in Table 1 have impacted MSO CH. Approximately 1,543 acres of MSO CH occurred within the action area of the utility corridor projects. This acreage total includes both protected and restricted habitat composed of forested mixed conifer and pine-oak habitat. Mexican spotted owl use is often correlated with a medium-to-large tree component. The removal of hazard vegetation associated with this project likely resulted in the reduction of large trees and snags that are an important element of MSO habitat. Large trees and snags take many years to develop and are very difficult to replace, even over the long-term.

EFFECTS OF THE ACTION

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

Background Information regarding the Proposed Action

The proposed action being analyzed in this BO/CO is implementation of the Tonto NF LRMP and its amendments. The most important amendment in regards to MSO management is the June

5, 1996, Amendment of Forest Plans in Arizona and New Mexico for the Management of the MSO and northern goshawk. This amendment was developed in collaboration with the FWS and incorporated many of the management recommendations from the Recovery Plan for the MSO (USDI Fish and Wildlife Service 1995) into all eleven NF LRMPs.

An LRMP provides guidance and direction in the context of a broad management framework. The LRMP define the direction for managing the NF. Direction in the LRMP is provided in the form of the S&Gs. Because it was unclear what the operational difference is between a "standard" and "guideline," neither the USFS nor FWS differentiated between the two for the analyses in the BA or the BO/CO. The FWS recognizes that some differences in interpretation may exist on the part of forest managers at the project level in the implementation of LRMP through the S&Gs. These differences in interpretation also add to the complexity of this consultation.

The S&Gs are written to apply Forest-wide or to a specific MA. The Tonto NF has designated "MAs" based on such criteria as vegetation type, principal land use, and special management designations such as wilderness areas. The LRMP contains some S&Gs that apply Forest-wide and some that apply only to specific MAs. During the development of a project, each management program reviews Forest-wide and MA-specific S&Gs that either provide direction and guidance or place constraints on management activities (e.g., logging, grazing, recreation, mining, etc.). The S&Gs that provide direction state what will be accomplished to achieve specific resource goals. In many cases, the S&Gs were developed to target management of a specific species (e.g., the 1996 Forest-wide amendment to include S&Gs for the threatened MSO).

This BO/CO is now covering the projects that were covered by prior opinions but have yet to be implemented. These projects include the vegetation restoration within the Salt Analysis Area, Arizona Public Service and Salt River Project, and Phase II Maintenance in Utility Corridor projects.

The LRMPs direct how current and future activities will be carried out in the following management programs: (1) Engineering, (2) Fire Management, (3) Forestry and Forest Health, (4) Lands and Minerals, (5) Rangeland Management, (6) Recreation, Heritage and Wilderness, (7) Watershed Management, and (8) Wildlife, Fish, and Rare Plants. Each of the USFS's eight resource programs were discussed in depth within the April 8, 2004, BA, the June 10, 2005, LRMP BO/CO, and the April 6, 2011, BA.

Effects to the MSO were evaluated in the 2005 BO/CO in detail (see USFWS 2005). The majority of the S&Gs, which continue to be implemented as the proposed action within the Tonto NF LRMP, were considered positive in the sense that they would maintain habitat for the MSO or provide for recovery. Because S&Gs have not changed since our 2005 opinion, we provide the summary below of our analyses by USFS program. Wildland fire, including fire suppression and wildland fire use, are not included in the proposed action (and therefore, are not covered under this consultation) and consultation on these actions will continue to be handled under emergency section 7 consultation procedures.

Effects of the Action on the Mexican spotted owl

Fire Management Program: Implementation of a fire program is good management and will be overall positive for MSO habitat. Fuels reduction and light burning are recommended in the 1995 Recovery Plan for the MSO to reduce the threat of large-scale, stand-replacing fires (U.S. Fish and Wildlife Service 1995). As a result, the 1996 Regional Amendment guides the NF through S&G 1455 to use combinations of thinning trees less than 9 inches in diameter, mechanical fuel removal, and prescribed fire, in order to reduce the threat of stand-replacing fires. Also within the 1996 Regional Amendment, S&G 1446 guides that NFs should select for treatment 10 percent of the PACs where nest sites are known in each RU having high fire risk conditions and to select another 10 percent to serve as control areas. This is expected to be beneficial for the MSO in the long-term, but short-term behavioral responses such as flushing or nest/roost abandonment could occur.

Forestry and Forest Health Program: Standard and Guideline 1392 states to integrate dwarf mistletoe surveys into stand examinations and remove infected overstories as soon as regeneration is accomplished. The S&G also states to thin understories to densities which will maximize fiber production, and therefore stand vigor, using yield simulation models as guides, and eradicate infected stands by clear-cutting and regenerate artificially when yield simulation models indicate that they will not reach maximum size potential because of mistletoe. In addition, the harvest of trees infested with mistletoe may eliminate future nest sites since owls use structures known as "witches brooms" (which are created by dwarf mistletoe) or possibly alter the multi-storied stand structure preferred by the MSO.

Rangeland Management Program: Standard and Guideline 1376 allows the Forest to manage suitable rangelands at Level C. Rangeland in less than satisfactory condition will be treated with improved grazing management. As stated above, Level C is defined as extensive livestock management with additional interior fencing and permanent waters. Inappropriate grazing practices is primarily manifested through two indirect effects, (1) adverse alteration of food and cover resources needed by the MSO's prey species and (2) adverse alteration or elimination of vegetation (e.g., riparian and oak communities) that may ultimately develop into owls roosting or nesting cover. Thus, this S&G could have sublethal effects to the MSO.

Since 2005, four BOs have been issued to the Tonto NF addressing adverse effects to MSOs from projects implemented under the LRMP. The FWS concluded that take in the form of harm and harassment was anticipated in six MSO PACs from utility corridor projects. All projects conducted on the Tonto NF resulted in non-jeopardy opinions.

In summary, we identified the S&Gs in the above programs that may result in adverse effects to the MSO. Nonetheless, the Tonto NF has many S&Gs in several programs that may be positive for the species. Although there were two S&Gs that were found to be lethal, our assessment of the Tonto NF was positive overall. Several S&Gs contribute to recovery or implement actions found in recovery plans for listed species. The Fire Management Program combines elements of fire prevention, prescribed fire, wildland fire, and fire suppression. However, wildland fire, including fire suppression and wildland fire use, are not included in the proposed action (and

therefore, are not covered under this consultation) and consultation on these actions will continue to be handled under emergency section 7 consultation procedures.

Effects of the Action on Mexican spotted owl Critical Habitat

Since 2005, MSO designated CH has been affected by the proposed action. Project impacts documented in BOs since 2005 to the PCEs related to forest structure and maintenance of adequate prey species are summarized below. The Tonto NF does not contain canyon habitat as described in the final designation of CH (U.S. Fish and Wildlife Service 2004). Therefore, the PCEs related to canyon habitat are not evaluated here. Below the PCEs related to forest structure and maintenance of adequate prey species and the effects from implementation of the LRMP are described.

Primary Constituent Elements related to forest structure:

PCE: 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 percent to 45 percent of which are large trees with diameter-at-breast height (dbh) of 12 inches or more.

Effect: Actions implemented under the LRMP are expected to retain the range of tree species (i.e., conifers and hardwoods associated with MSO habitat) and will not reduce the range of tree sizes needed to create the diverse forest and multi-layered forest canopy preferred by MSOs. Some loss of trees, of all types and dbh size classes, will occur from actions such as hazard tree removal, prescribed fire, and forest thinning (as implemented under the Fire Management and Forest and Forest Health Programs). However, actions implemented under the LRMP are expected to maintain a range of tree species and sizes needed to maintain this PCE in PACs and restricted habitat across the NF because the USFS is implementing the Recovery Plan guidelines that strive to retain large trees, canopy cover appropriate for MSO habitat, and a diverse range of tree species (such as Gambel oak in pine-oak forests and several conifer species in mixed conifer forest. Removal of trees and various trees species may also occur as part of the Recreation (development of recreation sites) and Engineering Programs (creation, maintenance of roads); but these effects should be small in extent and intensity. The function and conservation role of this PCE would not be compromised by the proposed action.

PCE: A shade canopy created by the tree branches covering 40 percent or more of the ground. Previous treatments were not expected to reduce the shaded canopy below 40 percent.

Effect: We expect that tree shade canopy will be reduced following hazard tree removal, thinning, and burning treatments implemented under the LRMP in the Fire Management and Forest and Forest Health Programs. However, we do not expect reduction of canopy cover in MSO forested habitat to be reduced below 40 percent because the USFS has adopted the Recovery Plan recommendations which include managing for higher basal area and denser canopy cover in MSO habitat versus pure ponderosa pine or other forest and woodland habitats. We would expect that some small reduction in existing canopy cover (5 to 10 percent) may actually aid in increasing understory herbaceous vegetation and forb production, which will

benefit MSO prey species. The function and conservation role of this PCE would not be compromised by the proposed action.

PCE: Large, dead trees (snags) with a dbh of at least 12 inches.

Effect: Large snags would most likely be reduced following proposed prescribed burning and hazard tree removal actions conducted under the Fire Management and Forest and Forest Health Programs. Loss of large snags may affect the quality of MSO and its prey habitat. Snags created through prescribed burning could benefit the MSO. However, snags currently used by owls for nesting are typically very old, large, and highly decayed snags with cavities. In individual burning projects, the USFS would attempt to minimize loss of these large snags through CMs (such as lining or using lighting techniques to avoid snags). However, it is likely that following burning treatments, approximately 20 percent of these existing snags may be lost within treated (i.e., burned) MSO habitat, resulting in short-term adverse effects to this PCE (Randall-Parker and Miller 2000). This is why CMs that the USFS implements to protect the largest and oldest snags (particularly those with nest cavities) are so important. As such, the function and conservation role of this PCE would not be compromised by the proposed action.

Primary Constituent Elements related to maintenance of adequate prey species:

PCE: High volumes of fallen trees and other woody debris.

Effect: Fallen trees and woody debris would likely be reduced by the proposed burning treatments (broadcast, piling, and maintenance burning) as part of the Fire Management Program. Logs are expected to be reduced by approximately 50 percent following prescribed burning in forested MSO habitat (Randall-Parker and Miller 2000). This loss of large logs would result in short-term adverse effects to this PCE and could result in localized impacts to prey species habitat. However, across the Tonto NF, it is likely that hazard tree removal and prescribed burning will also create fallen trees and woody debris as trees are felled (i.e., cut) and left on the ground or die post-burn and fall. The function and conservation role of this PCE would not be compromised by the proposed action.

PCE: A wide range of tree and plant species, including hardwoods.

Effect: This PCE will likely be positively affected by the actions taken under the Fire Management and Forest and Forest Health Programs. Plant species richness would likely increase following thinning and/or burning treatments that result in small, localized canopy gaps. Individual projects conducted under the LRMP typically propose CMs that focus on retaining Gambel oaks and other hardwoods, but some level of short-term loss could occur at the individual project level. However, the function and conservation role of this PCE would not be compromised by the proposed action.

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

Effect: Short-term decrease in plant cover will result from prescribed burning conducted under the Fire Management Program. We expect long-term increases in residual plant cover because treatments would provide conditions suitable for increased herbaceous plant growth by removing a thick layer of dead plant debris within treated areas. The mosaic effect created by burned and unburned areas and by opening up small patches of forest within protected habitat is also expected to increase herbaceous plant species diversity and, in turn, assist in the production and maintenance of the MSO prey base. The function and conservation role of this PCE would not be compromised by the proposed action. The combination of low-intensity prescribed burns during restoration projects most likely resulted in short-term adverse effects to the MSO with regard to modifying prey habitat within treatment areas. There is the potential for the Rangeland Program to have adverse effects on the production of plant cover post-burning. However, typically the USFS includes measures in its allotment (livestock) management plans to maintain healthy levels of forage and the Fire Program recommends removing livestock temporarily following prescribed and wildland fire.

Effects of the Action on the Role of Critical Habitat in Recovery

In our analysis of the effects of the action on CH, we must determine if the proposed action impacts CH PCEs to the point that they diminish the value of that CH for the recovery of listed species. To determine if an action results in destruction or adverse modification of CH, we must also evaluate the current condition of all designated CHUs and their PCEs, to determine the overall ability of all designated CH to support recovery.

Adverse effects and associated incidental take from the projects since 2005 (see Table 1 above) are not expected to negatively affect MSO recovery and/or further diminish the conservation contribution of CH to the recovery of the MSO. These projects include vegetation restoration within the Salt Analysis Area, Arizona Public Service and Salt River Project, Phase I Hazard Vegetation Removal in Utility Corridors, and Phase II Maintenance in Utility Corridor projects.

The proposed action includes actions that are recommended in the 1995 Recovery Plan and the Draft Revised MSO Recovery Plan. These actions were identified by the Recovery Team as being necessary to recover the MSO and the Tonto NF is implementing these actions in designated CH. Designated CH includes all protected (PACs and protected steep-slope habitat) and restricted habitat (unoccupied MSO habitat) within CHUs. These actions include the following:

- In 1996, the USFS amended the Tonto NF LRMP to incorporate management recommendations from the Recovery Plan (USDI Fish and Wildlife Service 1995) through an Environmental Impact Statement pursuant to the National Environmental Policy Act. Since then, the USFS has incorporated 1995 Recovery Plan recommendations into individual projects.

- Standards and Guidelines within the Tonto NF's LRMP have not changed since 2005, the majority of which were found to be beneficial to the MSO. The USFS continues to implement many of the 1995 Recovery Plan recommendations to protect the MSO (e.g., minimize noise disturbance and habitat altering actions within PACs during the breeding season) and its CH (e.g., manage for PCEs such as large trees, high canopy cover, snags, and logs in designated CH). There is currently an ongoing forest restoration effort (the

Four Forest Restoration Initiative) that should reduce the risk of catastrophic wildfires (e.g., the Rodeo-Chediski Fire) occurring on the Tonto NF. Prior to the Four Forest Restoration Initiative, the USFS planned small fuels reduction projects to protect communities, but did not focus on reducing fuels and restoring fire to the wildlands, where most MSO habitat is located. This project will conduct thinning and burning actions that will allow for restoration of fire-adapted ecosystems at the landscape level (which is the level at which these very destructive fires are occurring).

- Projects implemented under the Tonto NF's LRMP have not lead to a jeopardy determination or adverse modification of MSOCH since 2005. Implementation of fuels reduction and forest restoration projects that follow 1995 Recovery Plan recommendations will have long-term beneficial effects to MSO's survival and ultimately recovery (U.S. Fish and Wildlife Service 2011). We have information that these forest restoration actions are going to proceed (e.g., Four Forest Restoration Initiative) and that they will include protective measures for the MSO. If the USFS did nothing to reduce fuels and reintroduce fire to the landscape, we would continue to see fires of the size and intensity of the Wallow Fire. Existing forest conditions, climate change, and extended droughts will continue to impact forest sustainability without active management.

- The Tonto NF has and continues to designate 600 acres surrounding known MSO nesting and roosting sites. PACs are established around MSO sites and are intended to protect and maintain occupied MSO nest/roost habitat. Nesting and roosting habitat is rare across the range of the MSO and by identifying these areas for increased protection, the USFS is aiding in recovery.

- The Tonto NF has identified and is managing pine-oak, mixed-conifer, and riparian forests that have potential for becoming replacement MSO nest-roost habitat, or is currently providing habitat for MSO foraging, dispersal, or wintering habitats. As stated above, nesting and roosting habitat is a limiting factor for the MSO throughout its range. By managing CH for future nest/roost habitat, the USFS is aiding in recovery.

These actions should increase the sustainability and resiliency of MSO habitat (particularly through fuels management and forest restoration actions). Therefore, continued implementation of the Tonto LRMP is not expected to further diminish the conservation contribution of CH to the recovery of the MSO.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this BO/CO. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Since the land within the action area is almost exclusively managed by the USFS, most activities that could potentially affect listed species are Federal activities and subject to additional section 7 consultations.

The San Carlos Apache Tribal lands are located adjacent to the Tonto NF. Their Forestry Department staff developed the MSO Conservation Plan for the San Carlos Apache Indian Reservation (Conservation Plan) which has been approved by their Tribal Council. The San Carlos Apache Tribe conducts MSO surveys to evaluate and design projects that minimize or avoid impacts to the MSO and its habitat. The Tribe also conducts periodic surveys within PACs to determine occupancy. Owls are found across the northern third of the SCA Indian Reservation; however, most suitable nesting and foraging habitat is in remote, inaccessible areas. Although these areas have very little overlap with commercial forest operations, MSO habitat has generally been deferred from timber harvests since the listing of the MSO. Nevertheless, this continual monitoring of habitat and species occupancy provides current GIS and other information to manage the overall forest resources.

The San Carlos Apache Tribe's primary timber management practice is uneven-aged silvicultural systems, using single-tree selection methods. The key factor considered in the Tribe's Conservation Plan is that there is very little overlap between forested lands currently considered practical for commercial harvesting operations and forested lands considered to be MSO habitat. Thus, the majority of the high-potential breeding habitat (steep slopes, mixed-conifer) receives little or no timber management. The Tribe's conservation plan for the MSO addresses identified threats to MSO habitat by maintaining sufficient suitable habitat across the landscape and by using site-specific retention of complex forest structure following timber harvest in those few areas where MSO habitat and timber management overlap. Mexican spotted owl nest and roost habitats, primarily in mixed-conifer and steep slope areas, are not managed for timber extraction and will remain as suitable nest/roost habitat. Foraging habitat will be managed almost entirely by uneven-aged timber harvest methods. Timber sales, thinning, and fuelwood projects are conducted within some MSO habitat to extract resources, improve or maintain current habitat conditions, and increase forest health (e.g., controlling dwarf mistletoe and bark beetles).Wildland fire is considered to be the greatest threat to MSO habitat on the San Carlos Apache Reservation. Steep slopes and canyons occupied by the MSO are especially at risk. Fire is managed through the Tribe's Wildland Fire Management Plan Programmatic Environmental Assessment (Fire Management Plan).

The Fort Apache Indian Reservation is directly adjacent to the Tonto NF. The White Mountain Apache Tribe was one of the first Tribes to develop a management plan for the MSO. The Tribe developed a conservation plan for the MSO shortly after its listing. Areas containing spotted owls are placed in one of two land-management categories, termed Designated Management Areas (DMAs). Areas supporting "clusters" of four or more territories are considered Category-1 DMAs. In these areas, spotted MSO habitat concerns drive management prescription; timber harvest is a secondary objective. Category-1 DMAs range in size from approximately 6,000-10,000 acres (2,430-4,050 ha) in size and contain 57 percent of known spotted MSO sites on the Reservation. Category-2 DMAs include areas supporting 1-3 MSO territories. Habitat outside the territories managed only secondarily for spotted owls, with other objectives given priority. No timber harvest is allowed in 75 acre (30 ha) patches around the MSO activity centers. A seasonal restriction on potentially disturbing activities is provided in a 500 acre (202 ha) area, and timber prescriptions within this area should be designated to improve habitat integrity. The FWS determined that the White Mountain Apache management plan is adequate to ensure persistence of the MSO.

CONCLUSIONS

This BO/CO does not rely on the regulatory definition of "destruction or adverse modification" of CH in 50 CFR 402.02 because of various court cases surrounding the FWS's jeopardy and adverse modification analyses. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to CH. Critical habitat is defined in section 3 of the Act "as the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical and biological features essential to the conservation of the species and that may require special management considerations or protection; and specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species." We have also relied upon the Consultation Handbook which provides guidance on determining adverse modification of CH and jeopardy pursuant to the following: "Adverse effects on individuals of a species or constituent elements or segments of CH generally do not result in jeopardy or adverse modification determinations unless that loss, when added to the environmental baseline, is likely to result in significant adverse effects throughout the species' range, or appreciably diminish the capability of the CH to satisfy essential requirements of the species" (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998:4-34).

After reviewing the current status of the MSO and its CH, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, we conclude that continued implementation of the LRMP for the Tonto NF will not likely jeopardize the continued existence of the MSO and is not likely to destroy or adversely modify designated CH. Effects analyses and conclusions in BOs from 2005 through 2010 for the Tonto NF also determined that projects implemented under the current LRMP were not likely jeopardize the continued existence of the MSO or destroy/adversely modify designated CH. Projects implemented under the current Tonto NF LRMP since 2005 in which the FWS determined caused adverse effects and associated incidental take of owls were primarily due to hazard tree removal and maintenance of utility corridors which are consistent with management recommendation pursuant to the Recovery Plan (USDI Fish and Wildlife Service 1995). Further, summary of our reasoning for determining that the continued implementation of the LRMP for the Tonto NF will not jeopardize the MSO and will not adversely modify designated CH for the species is based on the following:

- In 1996, the USFS amended all 11 LRMPs to incorporate recommendations from the Recovery Plan (USDI Fish and Wildlife Service 1995) through an Environmental Impact Statement pursuant to the National Environmental Policy Act. Since then, the USFS has incorporated 1995 Recovery Plan recommendations into individual projects consulted on under the 2005 LRMP BO/CO and provided project implementation monitoring information to the FWS indicating that these projects were implemented as proposed.

- Standards and Guidelines within the Tonto NF's LRMP have not changed since 2005, the majority of which were found to be beneficial to the MSO. The USFS continues to implement many of the 1995 Recovery Plan recommendations to protect the MSO (e.g., minimize noise disturbance and habitat altering actions within PACs during the breeding season) and its CH (e.g., manage for PCEs such as large trees, high canopy cover, snags, and logs in designated CH). There is currently an ongoing forest restoration effort (the

Four Forest Restoration Initiative) that should reduce the risk of catastrophic wildfires (e.g., the Rodeo-Chediski Fire) occurring on the Tonto NF. Prior to the Four Forest Restoration Initiative, the USFS planned small fuels reduction projects to protect communities, but did not focus on reducing fuels and restoring fire to the wildlands, where most MSO habitat is located. This project will conduct thinning and burning actions that will allow for restoration of fire-adapted ecosystems at the landscape level (which is the level at which these very destructive fires are occurring).

- Projects implemented under the Tonto NF's LRMP have not lead to a jeopardy determination or adverse modification of MSOCH since 2005. Implementation of fuels reduction and forest restoration projects that follow 1995 Recovery Plan recommendations will have long-term beneficial effects to MSO's survival and ultimately recovery (U.S. Fish and Wildlife Service 2011). We have information that these forest restoration actions are going to proceed (e.g., Four Forest Restoration Initiative) and that they will include protective measures for the MSO. If the USFS did nothing to reduce fuels and reintroduce fire to the landscape, we would continue to see fires of the size and intensity of the Wallow Fire. Existing forest conditions, climate change, and extended droughts will continue to impact forest sustainability without active management.

- The population monitoring scheme within the 1995 Recovery Plan was proven to be not feasible due to logistics and expense. A new population monitoring protocol was developed within the Draft Revised Recovery Plan based on MSO occupancy. The USFS has agreed to meet with the FWS to discuss their future participation in population monitoring with us and other land management agencies.

Across the range of the MSO, the population monitoring described within the 1995 Recovery Plan was never implemented because it was not economically or operationally feasible. A revised population monitoring procedure has been outlined in the Draft Revised Recovery Plan (USFWS 2011) which aims at assessing MSO population trends. Although population trend monitoring has not occurred for the MSO, our records indicate no decline in the MSO population based upon an increase in known PAC numbers since the MSO was listed (see the Status of the Species section). However, some level of range-wide MSO population monitoring is needed in order for us to assess the status of the MSO. In the 2005 LRMP BO, we included a reasonable and prudent measure for occupancy monitoring that was not feasible, clearly defined, or constrained, nor could be used to effectively measure incidental take associated with the proposed action. Our revised incidental take statement provides for a level of project-specific implementation monitoring at the individual BO level by assessing incidental take associated with the site-specific actions implemented under the LRMP.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to

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

For the purpose of evaluating incidental take of MSOs from the action under consultation, incidental take can be anticipated as either the direct mortality of individual birds, or the alteration of habitat that affects behavior (e.g., breeding or foraging) of birds only temporarily, or to such a degree that the birds are considered lost as viable members of the population and thus "taken." Birds experiencing only temporary or short-term effects may fail to breed, fail to successfully rear young, or raise less fit young; longer-term disturbance may result in owls deserting the area because of chronic disturbance or because habitat no longer meets the MSO's needs.

We anticipate that the proposed action is reasonably certain to result in incidental take of MSOs. However, it is difficult to quantify the number of individual owls taken because: (1) dead or impaired individuals are difficult to find and losses may be masked by seasonal fluctuations in environmental conditions; (2) the status of the species could change over time through immigration, emigration, and loss or creation of habitat; and (3) the species is secretive and we rarely have information regarding the number of owls occupying a PAC and/or their reproductive status. For these reasons, we will attribute incidental take at the PAC level. This fits well with our current section 7 consultation policy which provides for incidental take if an activity compromises the integrity of an occupied PAC to an extent that we are reasonably certain that incidental take occurred (USFWS Memorandum, February 3, 1997). Actions outside PACs will generally not result in incidental take because we are not reasonably certain the owls are nesting and roosting in areas outside of PACs. We may modify this determination in cases when areas that may support owls have not been adequately surveyed and we are reasonably certain owls may be present.

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

Amount of Take

Based upon analyses of the effects of USFS projects within previous BOs, we anticipate the majority of incidental take for future projects implemented under the Tonto NF LRMP will be in

form of short-term harassment. Owls experiencing short-term harassment may fail to successfully rear young in one or more breeding seasons, but not likely desert the area because of a short-term disturbance (Delaney et al. 1999). Incidental take in the form of harm is also anticipated albeit at a lesser amount (i.e., the number of owls) than take from harassment. Harm would be defined as either the direct mortality of individual birds, or the alteration of habitat that affects behavior (e.g. breeding or foraging) of birds to such a degree that the birds desert the area and would be considered lost as viable members of the population.

The number of MSO PACs on the Tonto NF is currently 72. Based upon the potential for incidental take to occur as part of implementation of the LRMP, we anticipate the following incidental take for the proposed action, which is in addition to previously authorized take resulting from ongoing projects or projects that have yet to be implemented as identified in the "Background Information regarding the Proposed Action" section above:

- Harassment of owls associated with up to 4 PACs per year (5 percent) of the 72 PACs due to a single or short-term disturbance. Owls associated with an individual PAC may not be harassed over the course of more than three breeding seasons.

- Harm of owls associated with two PACs due to long-term or chronic disturbance (>3 years harassment during the breeding season), or habitat degradation or loss over the life of the project. We expect that actions that could result in harm would be very rare under the existing LRMP due to the protective S&Gs and other CMs included in the forest plan for the MSO.

This amount of incidental take is different from that anticipated in the 2005 LRMP BO/CO as it is based upon site-specific information from the Tonto NF and not a compilation of all Region 3 NFs in the UGM and BRW EMUs.

Effect of the Take

In this BO/CO, the FWS determines that this level of anticipated take is not likely to result in jeopardy to MSO. We base the numbers of MSO PACs with anticipated take on the potential for future projects implemented under the current LRMP that could have short-term adverse effects but long-term benefits to the MSO (such as, but not limited to, fuels reduction projects).Yearly reports will allow the FWS to evaluate whether projects under the LRMP were implemented as proposed and that the effects were equal to or less than we analyzed in our project-level BO.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

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

The FWS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of MSOs.

1. Minimize or eliminate adverse effects to MSOs on the Tonto NF.
2. Minimize or eliminate adverse effects to MSO habitat on the Tonto NF.

3. Monitor the impacts of site-specific projects implemented on the MSO.

TERMS AND CONDITIONS

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

The following terms and conditions will implement reasonable and prudent measure 1:

1.1 Where feasible, the Tonto NF shall avoid activities within 0.25 mile of PACs during the MSO breeding season (March 1 to August 31) that could result in disturbance to owls.

1.2 On site-specific projects, the USFS will work with FWS to identify and implement additional reasonable measures, specific to the project, to minimize effects to owls.

The following terms and conditions will implement reasonable and prudent measure 2:

2.1 Where feasible, vegetation management treatments (which could include activities such as fuels reduction, utility line maintenance, etc.) will maintain adequate amounts of important habitat features for MSOs (such as large trees, large snags, and large logs)

The following terms and conditions will implement reasonable and prudent measure 3:

3.1 The Tonto NF shall monitor incidental take resulting from the proposed action and report their findings to the FWS. Incidental take (implementation) monitoring shall include information such as when or if the project was implemented, whether the project was implemented as analyzed in the site-specific BO (including CMs and best management practices (BMPs)), breeding season(s) over which the project occurred, relevant MSO survey information, and any other pertinent information about the project's effects on the species.

3.2 Annual reports, which will include this species, shall be sent to the appropriate local FWS Ecological Services field office by March 1st of each year.

CONSERVATION RECOMMENDATIONS

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

1. We recommend that the USFS work with FWS to conduct MSO surveys over the next several years to attempt to determine how owls modify their territories in response to wildland fire. This information will aid us in understanding the short- and long-term impacts of fire on the MSO, and its subsequent effect on the status of the species in the UGM and BRW EMU.

2. We recommend that the USFS work with us to design forest restoration treatments across the Tonto NF that protects existing nest/roost habitat from high-severity, stand-replacing fire, and enhances existing or potential habitat to aid in sustaining MSO habitat across the landscape. PACs can be afforded substantial protection from wildland fire by emphasizing fuels reduction and forest restoration in surrounding areas outside of PACs and nest/roost habitat.

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

SOUTHWESTERN WILLOW FLYCATCHER

STATUS OF THE SPECIES

The Southwestern willow flycatcher (*Empidonax traillii extimus*) is a neotropical migrant that breeds in the southwestern U.S. and migrates to Mexico, Central America, and possibly northern South America during the non-breeding season (Phillips 1948, Stiles and Skutch 1989, Howell and Webb 1995). The historical and current breeding range of the Southwestern willow flycatcher included southern California, Arizona, New Mexico, western Texas, southern Colorado, southern Utah , southern Nevada, and extreme northwestern Mexico (Sonora and Baja) (Unitt 1987).

The Southwestern willow flycatcher was listed as endangered, without CH on February 27, 1995 (U.S. Fish and Wildlife Service 1995). Critical habitat was designated in 1997 and 2005, and a revision to the 2005 rule was proposed in August 2011 (see below). The 2011 proposal is expected to be finalized in August 2012. The 2005 designation is still in effect until the proposal is finalized. As a result, a unique situation occurs on Tonto Creek, Salt River, and the Verde River where proposed CH (2011) occurs on the same piece of ground where CH occurs (2005).

The historical range of the Southwestern willow flycatcher in Arizona included portions of all major watersheds (Swarth 1914, Phillips 1948, Unitt 1987). Contemporary investigations (post-1990) show the Southwestern willow flycatcher persists, probably in much reduced numbers, along the Big Sandy, Bill Williams, Colorado, Gila, Hassayampa, Little Colorado, Salt, San Francisco, San Pedro, Santa Cruz, Santa Maria, Tonto Creek, and Verde river systems (Sferra et al.1997, Sogge et al. 1997, McKernan and Braden 1999, Paradzick et al. 1999, Tibbitts and Johnson 1999).

The Southwestern willow flycatcher is an insectivore and thus catches insects while flying, hovers to glean them from foliage, and occasionally captures insects on the ground. The Southwestern willow flycatcher places its nest in relatively dense riparian tree and shrub communities associated with rivers, swamps, and other wetlands, including lakes (e.g., reservoirs). Most of these habitats are classified as forested wetlands or scrub-shrub wetlands. Across its range, the Southwestern willow flycatcher has commonly placed nests in the following trees and shrubs: Gooddings willow (*Salix gooddingii*), coyote willow (*S. exigua*), Geyer willow (*S. geyeriana* Andersson), arroyo willow (*S. lasiolepis*), red willow (*S. laevigata*), yewleaf willow (*S. taxifolia*), pacific willow (*S. lasiandra*), boxelder (*Acer negundo*), Russian olive (*Eleagnus angustifolia*), and salt cedar (*Tamarix* spp.). Habitat requirements for wintering are not well known, but include brushy savanna edges, second growth, shrubby clearings and pastures, and woodlands near water. Evidence gathered during multi-year studies of color-banded Southwestern willow flycatchers shows that individuals typically have a high fidelity to the general area where they were hatched but can regularly move among different breeding sites in close proximity within and between years (Netter et al. 1998).

The Southwestern willow flycatcher has experienced extensive loss and modification of breeding habitat, with consequent reductions in population levels. Destruction and modification of riparian habitats have been caused mainly by: reduction or elimination of surface and subsurface water due to diversion and groundwater pumping; changes in flood and fire regimes due to dams and stream channelization; clearing and controlling vegetation; livestock over-grazing; changes in water and soil chemistry due to disruption of natural hydrologic cycles; and increased fire risk due to the establishment of non-native plants. Concurrent with habitat loss have been increases in brood parasitism by the brown-headed cowbird (*Molothrus ater*), which can inhibit reproductive success and further reduce population levels. According to the FWS, the known number of territories has been on the increase from 1998 to 2007, however some of that increase is a result of increased survey effort.

We published a proposal to revise Southwestern willow flycatcher CH on August 15, 2011. The physical or biological features essential to the conservation of the Southwestern willow flycatcher that are part of the existing rule and proposed CH which may require special management considerations or protection include, but are not limited to the following:

(1) Space for individual and population growth and for normal behavior;

Streams of lower gradient and more open valleys with a wide or broad floodplain, and in some instances, streams in relatively steep, confined area can support Southwestern willow flycatcher breeding habitat (Service 2002, p. D–13). These areas support the abundance of riparian vegetation used for Southwestern willow flycatcher nesting, foraging, dispersal, and migration.

Many Southwestern willow flycatchers are found along streams using riparian habitat during migration (Yong and Finch 1997, p. 253; Service 2002, p. E–3). Migration stopover areas can be similar to breeding habitat or riparian habitats with less vegetation density and abundance compared to areas for nest placement (the vegetation structure is too short or sparse or the patch is too small) (Service 2002, p. E–3).

(2) Food, water, air, light, minerals, or other nutritional or physiological requirements;

Southwestern willow flycatchers consume a wide range of invertebrate prey, including flying and ground- and vegetation-dwelling species of terrestrial and aquatic origins.

Flowing streams with a wide range of stream flow conditions that support expansive riparian vegetation is an essential physical or biological feature of Southwestern willow flycatcher habitat. The most common stream flow conditions are perennial (persistent) stream flow with a natural hydrologic regime (frequency, magnitude, duration, and timing). However, in the Southwest, hydrological conditions can vary; causing some flows to be intermittent, but the floodplain can retain surface moisture conditions favorable to expansive and flourishing riparian vegetation. These appropriate conditions can be supported by managed water sources and hydrological cycles that mimic key components of the natural hydrologic cycle.

Elevated subsurface groundwater tables and appropriate floodplain fine sediments provide water and seedbeds for the germination, growth, and maintenance of expansive growth of riparian vegetation needed by the Southwestern willow flycatcher.

(3) Cover or shelter;

Riparian tree and shrub species (described in the PCE below) provide cover and shelter for nesting, breeding, foraging, dispersing, and migrating Southwestern willow flycatchers.

(4) Sites for breeding, reproduction, or rearing (or development) of offspring; and

Riparian tree and shrub species, typically, dense expansive riparian forests provide habitat to build nests. Riparian vegetation of broader quality, with a mosaic of open spaces, typically surround locations to place nests or along river segments and provide vegetation for foraging, perching, dispersal, and migration, and habitat that can develop into nesting areas through time.

The PCEs identified for the existing 2005 CH rule include the following:

(1) Riparian vegetation in riverine environments used for Southwestern willow flycatcher nesting, foraging, migration, dispersal, and shelter that comprises the following tree and shrub species:

a. Gooddings willow, coyote willow, Geyer willow, arroyo willow, red willow, yewleaf willow, pacific willow, boxelder, tamarisk, and Russian olive. Other plant species used for nesting have been buttonbush (*Cephalanthus occidentalis*), cottonwood (*Populus deltoids*), stinging nettle (*Urtica dioica*), alder (*Alnus rhombifolia, Alnus oblongifolia, Alnus tenuifolia*), velvet ash (*Fraxinus velutina*), poison hemlock (*Conium maculatum*), blackberry (*Rubus ursinus*), seep willow (*Baccharis salicifolia, Baccharis glutinosa*), oak (*Quercus agrifolia, Quercus chrysolepis*), rose (*Rosa californica, Rosa arizonica, Rosa multiflora*), sycamore (*Platinus wrightii*), giant reed (*Arundo donax*), false indigo

(*Amorpha californica*), Pacific poison ivy (*Toxicodendron diversilobum*), grape (*Vitus arizonica*), Virginia creeper (*Parthenocissus quinquefolia*), Siberian elm (*Ulmus pumila*), and walnut (*Juglans hindsii*).

b. Dense riparian vegetation with thickets of trees and shrubs ranging in height from 6 to 98 feet. Lower-stature thickets (6 to 13 feet tall) are found at higher-elevation riparian forests and tall-stature thickets are found at middle- and lower-elevation riparian forests;

c. Areas of dense riparian foliage at least from the ground level up to approximately 13 feet above ground or dense foliage only at the shrub level, or as a low, dense tree canopy;

d. Sites for nesting that contain a dense tree and/or shrub canopy (the amount of cover provided by tree and shrub branches measured from the ground) (*i.e.*, a tree or shrub canopy with densities ranging from 50 percent to 100 percent);

e. Dense patches of riparian forests that are interspersed with small opening of open water or marsh, or shorter/sparser vegetation that creates a mosaic that is not uniformly dense. Patch size may be as small as 0.25 acre or as large as 175 acres; and

(2) A variety of insect prey populations found within or adjacent to riparian floodplains or moist environments, including: flying ants, wasps, and bees (Hymenoptera); dragonflies (Odonata); flies (Diptera); true bugs (Hemiptera); beetles (Coleoptera); butterflies/moths and caterpillars (Lepidoptera); and spittlebugs (Homoptera).

The PCEs associated with the current 2011 proposal are very similar to what was finalized in 2005:

(1) Riparian vegetation

Riparian habitat in a dynamic river or lakeside, natural or manmade successional environment (for nesting, foraging, migration, dispersal, and shelter) that is comprised of trees and shrubs (that can include Gooddings willow, coyote willow, Geyers willow, arroyo willow, red willow, yewleaf willow, pacific willow, boxelder, tamarisk, Russian olive, buttonbush, cottonwood, stinging nettle, alder, velvet ash, poison hemlock, blackberry, seep willow, oak, rose, sycamore, false indigo, Pacific poison ivy, grape, Virginia creeper, Siberian elm, and walnut) and some combination of:

(a) Dense riparian vegetation with thickets of trees and shrubs that can range in height from about 2 m to 30 m (about 6 to 98 ft). Lower-stature thickets (2 to 4 m or 6 to 13 ft tall) are found at higher elevation riparian forests and tall-stature thickets are found at middle and lower-elevation riparian forests; and/or

(b) Areas of dense riparian foliage at least from the ground level up to approximately 4 m (13 ft) above ground or dense foliage only at the shrub or tree level as a low, dense canopy; and/or

(c) Sites for nesting that contain a dense (about 50 percent to 100 percent) tree or shrub (or both) canopy (the amount of cover provided by tree and shrub branches measured from the ground); and/or

(d) Dense patches of riparian forests that are interspersed with small openings of open water or marsh or areas with shorter and sparser vegetation that creates a variety of habitat that is not uniformly dense. Patch size may be as small as 0.1 ha (0.25 ac) or as large as 70 ha (175 ac);

(2) Insect prey populations:
A variety of insect prey populations found within or adjacent to riparian floodplains or moist environments, which can include: flying ants, wasps, and bees (Hymenoptera); dragonflies (Odonata); flies (Diptera); true bugs (Hemiptera); beetles (Coleoptera); butterflies, moths, and caterpillars (Lepidoptera); and spittlebugs (Homoptera).

Recovery

The Southwestern Willow Flycatcher Recovery Plan was finalized in 2002. Recovery actions in the Plan are categorized into nine types: (1) increase and improve occupied, suitable, and potential breeding habitat; (2) increase metapopulation stability; (3) Improve demographic parameters; (4) minimize threats to wintering and migration habitat; (5) survey and monitor; (6) conduct research; (7) provide public education and outreach; (8) assure implementation of laws, policies, and agreements that benefit the Southwestern willow flycatcher and; (9) track recovery progress. Figure 2 shows the RUs for the Southwestern willow flycatcher.

Figure 2.Southwestern willow flycatcher Recovery Units.

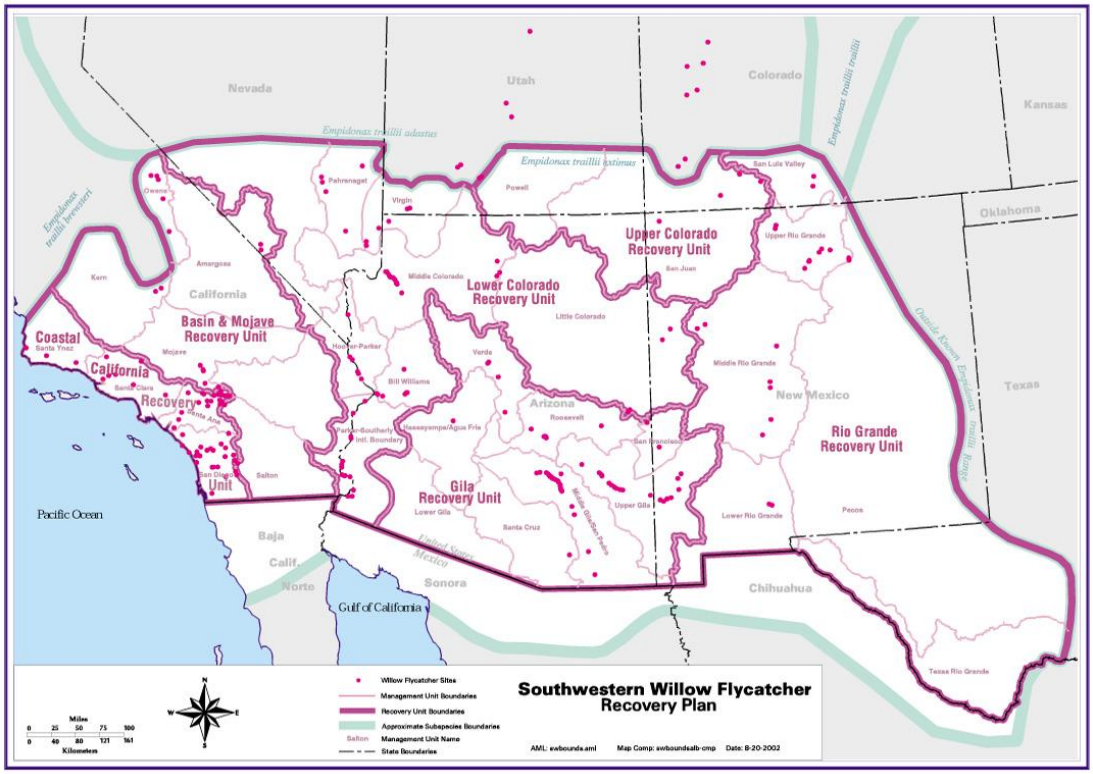


Figure 4. Recovery and Management Units for the southwestern willow flycatcher

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all federal, state, or private actions within the action area. All proposed federal actions within the action area that have undergone formal or early section 7 consultation are included in the environmental baseline discussion. The environmental baseline discussion defines the current status of the Southwestern willow flycatcher, its habitat, and designated CH within the Tonto NF. This discussion serves as a platform to assess the effects of the action to the Southwestern willow flycatcher now under consultation.

Status of the Species and Critical Habitat within the Action Area

The Tonto NF has had the largest number of known Southwestern willow flycatcher territories of all the NFs in the Southwest Region. The Tonto NF occurs within portions of the Verde and Roosevelt Management Units. Some private lands adjacent to the Tonto NF have had Southwestern willow flycatcher territories detected, but much of the available Southwestern willow flycatcher habitat within these two Management Units occurs on USFS lands. Streams where Southwestern willow flycatchers have been detected nesting within these two Management Units are: the Verde River, Tonto Creek, Roosevelt Lake, the Salt River, Cherry Creek, and Pinal Creek. Portions of these streams occur within the Cave Creek, Tonto Basin, and Globe Ranger Districts on the Tonto NF.

The BA estimates that from 1993 through 2007 the number of Southwestern willow flycatcher territories on Tonto NF lands ranged from six in 1993 to a high of 212 in 2004. As of 2007, the USFS reported 81 territories on the Tonto NF.

Southwestern willow flycatcher territories have fluctuated on the Tonto NF, in particular within the Tonto Basin Ranger District. The lowering and raising of Roosevelt Lake has helped to create and inundate large amounts of Southwestern willow flycatcher habitat. After the water storage of Roosevelt Lake dropped to a low of 10 percent in 2002, the number of Southwestern willow flycatcher territories within the Roosevelt Management Unit reached their highest in 2004 (Ellis et al. 2008, pps. 30-31). But after Roosevelt Lake filled to about 96 percent capacity in 2005, Southwestern willow flycatcher habitat was inundated within the conservation space and individuals began to establish territories along other nearby streams (Ellis *et al*. 2008, pps. 30-31). Southwestern willow flycatchers were recently detected furthest upstream on Tonto Creek (near the Town of Gisela) and on Rye Creek at its confluence with Tonto Creek (A. Madara, Tonto NF, pers. comm.). Similarly, on the Salt River, some territories (< 10) were newly discovered farther upstream along Horseshoe Bend/Redmond Flat and at Gleason Flats (A. Madara, Tonto NF, pers. comm.). A similar amount of Southwestern willow flycatcher territories were detected on Salt River tributaries of Pinal Creek (mostly on private land) and Cherry Creek (A. Madara, Tonto NF, pers. comm.).

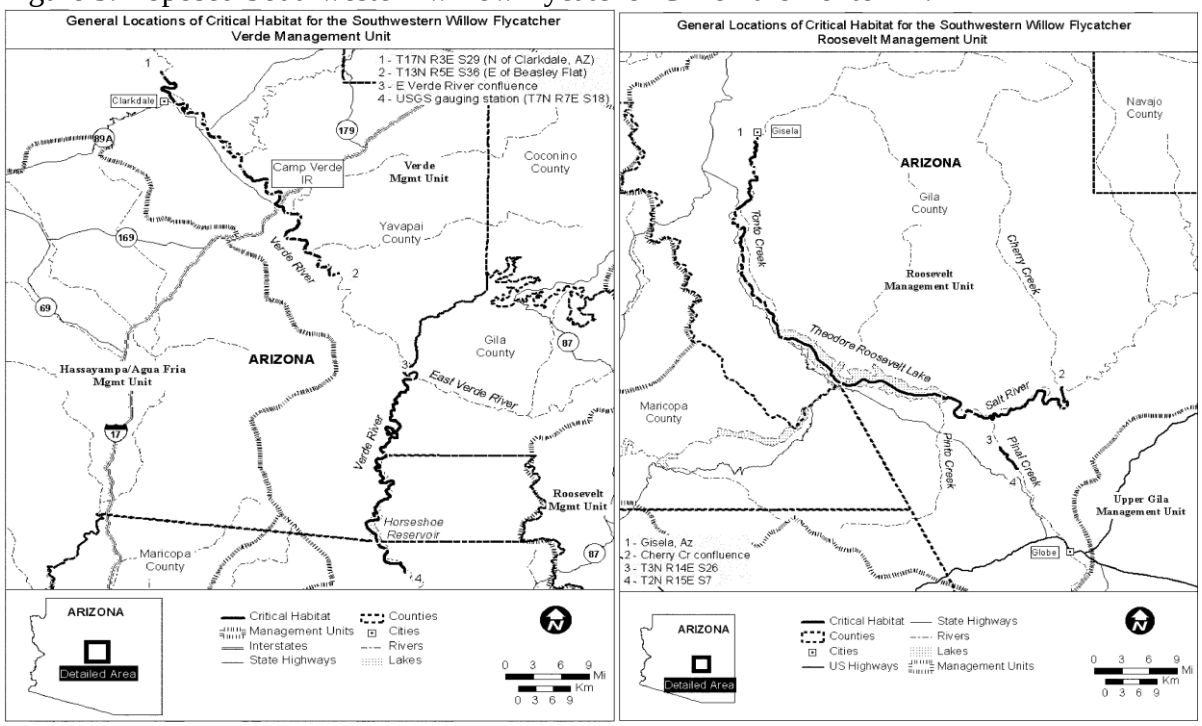
Southwestern willow flycatcher territories have also fluctuated within the Verde Management Unit and specifically at Horseshoe Lake within the Cave Creek Ranger District, but not to the degree observed at Roosevelt Lake. Unlike Roosevelt Lake, Horseshoe Lake is much smaller in capacity with a greater ability to manage lake levels. As a result, the number of Southwestern willow flycatcher territories at Horseshoe grew from 6 territories in 2002 to 20 in 2005, but decreased to 12 in 2007 (Sogge and Durst 2008) and 7 in 2008 (SRP 2008).

Critical Habitat

Areas on the Tonto NF have both proposed (2011) and designated (2005) CH. Tonto Creek, Salt River, and Verde River contain both proposed and existing CH. Critical habitat within the action area was designated for the Southwestern willow flycatcher along the Salt River immediately upstream from Roosevelt Lake (U.S. Fish and Wildlife Service 2005). On the Salt River, CH was designated from Cherry Creek downstream to the Roosevelt Lake boundary. The Salt River segment along with an additional segment along Tonto Creek, are all the designated segments within the Roosevelt Management Unit (as described in the Recovery Plan).

Critical habitat was proposed for the area within the conservation space of Roosevelt Lake, but due to USFS and Salt River Project management, the lake was excluded from CH. Therefore, there is no designated CH within the high water mark of Roosevelt Lake. Upper Tonto Creek, Roosevelt Lake, and Horseshoe Lake on the Verde River contain proposed CH. Proposed CH exists on the Tonto NF including the Verde and Roosevelt management units. The factors affecting the Southwestern willow flycatcher and its proposed CH within the action area (i.e., Tonto NF) are discussed in this section.

Figure 3.Proposed Southwestern willow flycatcher CH on the Tonto NF.



Factors Affecting the Southwestern Willow Flycatcher and its Critical Habitat within the Action Area

The factors (i.e., Federal, State, tribal, local, and private) already affecting the Southwestern willow flycatcher and its designated CH within the action area are discussed in this section. Since the action area consists of NFS lands, there are likely very few, if any, State, tribal, or private actions impacting the Southwestern willow flycatcher or its designated or proposed CH. Formal consultations that have occurred from 2005 (the year of the original LRMP BO/CO) to the present are summarized in Table 2.

Table 2. Formal consultations on the Tonto NF from 2005 to 2010.

Consultation #	Date of BO	Project	# of Territories Anticipated Taken	Form of Take Anticipated	Critical Habitat
22410-2004-F-0447	7/27/11	Tonto and Oak Creek Bridge Development	N/A	N/A	Adverse affect to critical habitat, no adverse modification
22410-2007-F-0218	8/17/09	Ongoing Grazing for Three Allotments	N/A	N/A	No adverse affects, no adverse modification
22410-2006-F-0364	7/5/07	Arizona Forests Utility Hazard Tree Removal Phase I	N/A	N/A	Adverse affect to critical habitat, no adverse modification
22410-2006-F-0365	7/17/08	Arizona Forests Utility Corridor Maintenance Phase II	All flycatchers nesting in ~5.5 acres of habitat	Harassment	Adverse affect to critical habitat, no adverse modification

Since 2005, incidental take in the form of harassment was anticipated during implementation of utility hazard tree removal but not from grazing. The proposed hazardous line repair activities were scheduled to occur during the Southwestern willow flycatcher breeding season (i.e., May 1 to September). Some projects occurred that had adverse effects to Southwestern willow flycatchers and/or their designated CH on Tonto NF lands, but the Tonto NF was not the action or lead agency. For example, adverse effects to CH are anticipated due to the proposed Tonto Creek Bridge development. Similarly, Salt River Project (SRP) dam operations were anticipated to incidentally take Southwestern willow flycatchers on Tonto NF managed land. The SRP has developed HCPs for their dam operations at Roosevelt Lake and also at Horseshoe and Bartlett Lakes.

This BO/CO is now covering the project that was covered by a prior opinion but has yet to be implemented. This project includes the vegetation management within the Phase II Maintenance in Utility Corridor project.

Critical Habitat

The FWS expects that Southwestern willow flycatcher habitat will be dynamic within the action area (including designated and proposed CH), including habitat at the Salt River Arm of Roosevelt Lake. The amount of Southwestern willow flycatcher nesting habitat increased with the gradual drawdown of Roosevelt Lake beginning in 1995. That habitat was nearly all impacted in 2005 when the lake rose to near capacity. Periodic recycling of habitat within the conservation space of Roosevelt will be necessary to regenerate and maintain quality Southwestern willow flycatcher habitat for the long-term. Based upon Southwestern willow flycatcher presence and distribution in 2005 and habitat conditions in 2006, the most significant changes in site occupancy appear to have occurred the second season following inundation. In 2005, while habitat was significantly altered, plants were still alive and green vegetation was still present. However, after continued inundation in 2006, nearly all of the salt cedar located within the lake had died. The Tonto NF has little to no control over this dynamic as regulation and management of Roosevelt Lake is out of the USFS' jurisdiction.

EFFECTS OF THE ACTION

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

An LRMP provides guidance and direction in the context of a broad management framework. These LRMPs define the direction for managing the NFs. Direction in the LRMP is provided in the form of the S&Gs. Because it was unclear what the operational difference is between a "standard" and "guideline," neither the USFS nor the FWS differentiated between the two for

our analysis. While the FWS recognizes that much discretion exists on the part of forest managers at the project level, in the implementation of LRMPs through the S&Gs, this discretion also adds to the complexity of this consultation due to the conflicting nature of some S&Gs that exist between the different operating programs within the same Forest. The LRMPs direct how current and future activities will be carried out in the following management programs: (1) Engineering, (2) Fire Management, (3) Forestry and Forest Health, (4) Lands and Minerals, (5) Rangeland Management, (6) Recreation, Heritage and Wilderness, (7) Watershed Management, and (8) Wildlife, Fish, and Rare Plants. However, adverse effects to Southwestern willow flycatchers were only found in the Rangeland Management program.

Rangeland Management: Standard and Guideline 1371 allows the Forest to manage suitable rangelands at Level B. Further, rangeland in less than satisfactory condition will be treated with improved grazing management. Projected range conditions were provided that stated unsatisfactory range conditions are or would be roughly 6,000 acres. The FWS ranked this S&G as having sublethal effects because grazing at levels with minimal fencing and other structures could impact Southwestern willow flycatchers. However, the emphasis of the range management program on the Forest is to improve watershed condition and wildlife habitat. Historically, improper livestock grazing in watershed uplands above riparian systems has resulted in bank destabilization, increased runoff, increased sedimentation, increased erosion, and reduced capacity of soils to hold water. Because the impact of herbivory can be highly variable both geographically and temporally, proper grazing management strategies must be developed locally. The Tonto NF aims to improve range conditions through current management and implement the grazing guidelines outline in the Southwestern Willow Flycatcher Recovery Plan.

According to S&G 1423, the Forest is directed to manage suitable rangelands at Level D in MA 6J, except South Thompson Mesa which is managed at Level A until the area returns to satisfactory productivity. Rangeland in less than satisfactory condition will be treated with improved grazing management along with the installation of structural and non-structural improvements. Projected changes in range condition acreages: satisfactory range condition - 44,664 acres (current) to 67,599 acres (decade 1); unsatisfactory range condition - 229,350 acres (current) to 206,415 acres.

Standard and Guideline 1423 allows the Forest to use approved herbicides on a selective basis where brush encroachment is clearly inhibiting forage production for wildlife and domestic livestock. Possible treatment areas will be identified in Allotment Management Plans and will involve areas of limited size and extent where other management practices (i.e. prescribed burning) cannot be effectively or economically utilized to achieve management objectives or economically utilized to achieve management objectives. Projects of this nature will be subject to environmental assessment and public involvement to insure project objectivity and public safety. Limit the use of certain facilities in floodplains to non-flood seasons or daylight hours only." As stated above, Southwestern willow flycatchers are insectivores; major prey items include small (flying ants) to large (dragonflies) flying insects. In addition, Southwestern willow flycatchers eat non-flying species, particularly Lepidoptera larvae. Any use of insecticides could kill Southwestern willow flycatcher food sources, thus, we ranked this S&G as causing sublethal effects to the Southwestern willow flycatcher. Standard and Guideline 1423 states that

maintenance performed on revegetation acres as determined in Allotment Management Plans to retain optimum forage production. Methods will be appropriate to vegetation and terrain of treatment areas and could include prescribed fire, chemical and/or mechanical means. Further, while prescribed fire is beneficial, fire is an imminent threat to occupied and potential Southwestern willow flycatcher breeding habitat. Although fires occurred to some extent in some of these habitats historically, many native riparian plants are neither fire-adapted nor fire-regenerated. Thus, fires in riparian habitats are typically catastrophic, causing immediate and drastic changes in riparian plant density and species composition. This S&G could prevent catastrophic wildfire from eliminating Southwestern willow flycatcher habitat.

To summarize the Tonto NF, we found some sublethal S&Gs within the Tonto NF's LRMP within the Rangeland Management Program, but the FWS found 35 S&Gs (70 percent) across all programs that implemented or worked towards recovery or delisting of listed species. Furthermore, the Tonto NF continues to exclude livestock grazing from approximately 15 miles of Tonto Creek. As stated above, the Tonto NF has the greatest number of known Southwestern willow flycatcher nest sites. The Forest conducted cowbird trapping at most occupied sites since 1995, and cooperates with the Salt River Project to implement mitigations from the Salt River Project Habitat Conservation Plan. Further, the Tonto has conducted numerous annual boating trips down the Verde River in order to survey for Southwestern willow flycatchers and a seasonal employee has been hired annually to patrol the area around Roosevelt Lake to protect sites.

Effects of the Action on Proposed and Designated Southwestern willow flycatcher Critical Habitat

In our analysis of the effects of the action on CH, we consider whether or not a proposed action will result in the destruction or adverse modification of CH. In doing so, we must determine if the proposed action will result in effects that appreciably diminish the value of CH for the recovery of a listed species. To determine this, we analyze whether the proposed action will adversely modify any of the PCEs that were the basis for determining the habitat to be critical. To determine if an action results in adverse modification of CH, we must also evaluate the current condition of all designated CHUs, and the PCEs of those units, to determine the overall ability of all designated CH to support recovery. Further, the functional role of each of the CHUs in recovery must also be considered because, collectively, they represent the best available scientific information as to the recovery needs of the species. The PCEs associated with the current 2011 proposal are very similar to what was finalized in 2005 and thus, we used the 2011 proposed PCEs for this analysis.

> *PCE:* Riparian vegetation - Riparian habitat in a dynamic river or lakeside, natural or manmade successional environment (for nesting, foraging, migration, dispersal, and shelter) that is comprised of trees and shrubs (that can include Gooddings willow, coyote willow, Geyer willow, arroyo willow, red willow, yewleaf willow, pacific willow, boxelder, tamarisk, Russian olive, buttonbush, cottonwood, stinging nettle, alder, velvet ash, poison hemlock, blackberry, seep willow, oak, rose, sycamore, false indigo, Pacific poison ivy, grape, Virginia creeper, Siberian elm, and walnut) and some combination of: (a) Dense riparian vegetation with thickets of trees and shrubs that can range in height from about 2 m to 30 m (about 6 to 98 ft). Lower-stature thickets (2 to 4 m or 6 to 13 ft tall) are found at higher elevation riparian forests and tall-stature thickets are found at middle and lower-

elevation riparian forests; and/or (b) Areas of dense riparian foliage at least from the ground level up to approximately 4 m (13 ft) above ground or dense foliage only at the shrub or tree level as a low, dense canopy; and/or (c) Sites for nesting that contain a dense (about 50 percent to 100 percent) tree or shrub (or both) canopy (the amount of cover provided by tree and shrub branches measured from the ground); and/or (d) Dense patches of riparian forests that are interspersed with small openings of open water or marsh or areas with shorter and sparser vegetation that creates a variety of habitat that is not uniformly dense. Patch size may be as small as 0.1 ha (0.25 ac) or as large as 70 ha (175 ac).

EFFECT: Standards and Guidelines 1371 and 1423could adversely affect proposed CH. In other words, all proposed PCEs for the Southwestern willow flycatcher could be affected. As stated above, improper livestock grazing can significantly alter plant community structure, species composition, relative abundance of species, and alter stream channel morphology which can harm Southwestern willow flycatcher habitat. We believe that, due in part to proposed utilization levels, the proposed grazing strategy will delay improvement of the PCEs and conservation contribution for Southwestern willow flycatchers. The Tonto NF however has excluded livestock from certain areas on the Forest. Specifically, the Tonto NF has excluded grazing from approximately 15 miles of Tonto Creek.

PCE: Insect prey populations - A variety of insect prey populations found within or adjacent to riparian floodplains or moist environments, which can include: flying ants, wasps, and bees (Hymenoptera); dragonflies (Odonata); flies (Diptera); true bugs (Hemiptera); beetles (Coleoptera); butterflies, moths, and caterpillars (Lepidoptera); and spittlebugs (Homoptera).

EFFECT: No adverse effects are anticipated occur to insect prey populations from the continued implementation of the Tonto's LRMP. If pesticides or herbicides were to be used within Southwestern willow flycatcher habitat, then adverse effects would be anticipated.

Effects of the Action on the Role of Critical Habitat in Recovery

Adverse effects and associated incidental take from the projects since 2005 (see Table 2 above) are not expected to negatively affect MSO recovery and/or further diminish the conservation contribution of CH to the recovery of the MSO. These projects include the Tonto and Oak Creek Bridge Development, Ongoing Grazing for Three Allotments, Issuance of Section 10(a)(1)(B) permit to Salt River Project for Incidental Take associated with operation of Horseshoe and Bartlett Dams, Arizona Forests Utility Hazard Tree Removal Phase I and Phase II.

The Forest continues to survey for and provide protection to Southwestern willow flycatcher. Protecting nesting habitat for Southwestern willow flycatchers from fires and illegal vehicle use is of highest concern on the Tonto NF. A Forest Protection Officer participates in Southwestern willow flycatcher surveys, and enforces the restrictions established for Southwestern willow flycatcher and riparian habitat. There are ongoing projects to restore and protect riparian habitat in potential and suitable Southwestern willow flycatcher habitat. For example, recently a protection fence was installed on the Globe Ranger District; this fence is designed such that it will prevent OHV access. In addition, a heavy-duty creek crossing designed and built specifically to withstand monsoon flood events. Another project was entailed the fencing six

miles of Pinto Creek, where adjacent lands have dormant season grazing. This project will also set the stage for a planned salt cedar removal project. New locations for similar type projects are continuously being sought out and evaluated.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this BO/CO. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Since the entire project area is within the Tonto NF, all legal actions likely to occur are considered Federal actions. However, the introduced tamarisk leaf beetle was first detected affecting tamarisk within the range of the Southwestern willow flycatcher in 2008 along the Virgin River in St. George, Utah. Initially, this insect was not believed to be able to move into or survive within the southwestern U.S. Along this Virgin River site in 2009, 13 of 15 Southwestern willow flycatcher nests failed following vegetation defoliation (Paxton et al.2010). As of 2010, the beetle has been found in southern Nevada, southern Utah, and northern Arizona within the Southwestern willow flycatcher's breeding range. Because tamarisk is a component of about 50 percent of all known Southwestern willow flycatcher territories (Durst et al. 2008) and is a significant component of Southwestern willow flycatcher habitat on the Tonto NF, continued spread of the beetle has the potential to significantly alter the distribution, abundance, and quality of Southwestern willow flycatcher nesting habitat.

CONCLUSIONS

This BO/CO does not rely on the regulatory definition of "destruction or adverse modification" of CH in 50 CFR 402.02 because of various court cases surrounding the FWS's jeopardy and adverse modification analyses. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to CH. Critical habitat is defined in section 3 of the Act "as the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical and biological features essential to the conservation of the species and that may require special management considerations or protection; and specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species." We have also relied upon the Consultation Handbook which provides guidance on determining adverse modification of CH and jeopardy pursuant to the following: "Adverse effects on individuals of a species or constituent elements or segments of CH generally do not result in jeopardy or adverse modification determinations unless that loss, when added to the environmental baseline, is likely to result in significant adverse effects throughout the species' range, or appreciably diminish the capability of the CH to satisfy essential requirements of the species" (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998:4-34).

After reviewing the current status of the Southwestern willow flycatcher and its CH, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, we conclude that continued implementation of the LRMP for the Tonto NF will not

likely jeopardize the continued existence of the Southwestern willow flycatcher and is not likely to destroy or adversely modify designated CH. Effects analyses and conclusions in BOs from 2005 through 2010 for the Tonto NF also determined that projects implemented under the current LRMP were not likely jeopardize the continued existence of the Southwestern willow flycatcher or destroy/adversely modify designated CH. Further, summary of our reasoning for determining that the continued implementation of the Tonto NF will not jeopardize the Southwestern willow flycatcher and will not adversely modify designated CH for the species is based on the following:

- Standards and Guidelines within the Tonto LRMP have changed only minimally since 2005, the majority of which were found to be beneficial to the Southwestern willow flycatcher.
- Projects implemented under the Forest's LRMP have not lead to a jeopardy determination or adverse modification of Southwestern willow flycatcher CH.
- The implementation of the proposed action is not expected to impede the survival or recovery of Southwestern willow flycatchers. The Tonto NF continues to exclude livestock grazing from approximately 15 miles of Tonto Creek and a seasonal employee is hired annually to patrol the area around Roosevelt Lake. The Tonto NF has also conducted cowbird trapping at most occupied sites since 1995, and cooperates with the Salt River Project to implement mitigations from the Salt River Project Habitat Conservation Plan. Furthermore, the Tonto NF conducts numerous annual boating trips down the Verde River in order to survey for Southwestern willow flycatchers.

INCIDENTAL TAKE STATEMENT

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

The measures described below are non-discretionary, and must be undertaken by the Forest so that they become binding conditions of any grant or permit issued to the appropriate utility, for the exemption in section 7(o)(2) to apply. The Forest has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest (1) fails to assume and implement

the terms and conditions or (2) fails to require the (applicant) to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Forest or appropriate utility must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement (see 50 CFR §402.14(i)(3)).

Extent of Take

Incidental take of Southwestern willow flycatchers is reasonably certain to occur as a result of the continued implementation of the Tonto NF's LRMP. Based upon analyses of USFS projects within previous BOs, we anticipate that incidental take for future projects implemented under the Tonto NF's LRMP will be in form of harassment. Southwestern willow flycatchers experiencing harassment may fail to successfully rear young or desert the area because of disturbance. The FWS cannot however anticipate the exact number of Southwestern willow flycatchers that will be harassed because of the uncertainty of where and when future projects will be implemented. Based on projects that have occurred since 2005, we anticipate that take in the form of harassment will occur during the life of the existing Tonto NF's LRMP. The incidental take anticipated as a result of the LRMP implementation is in addition to any previously authorized incidental take resulting from the Phase II Maintenance in Utility Corridor project. We anticipate that up to two Southwestern willow flycatcher territories per year will be taken over the life of the plan due to harassment as a result of the proposed action. A territory is defined as a discrete area defended by a resident single Southwestern willow flycatcher or pair of Southwestern willow flycatchers within a single breeding season (Sogge et al. 2010 *in* USFWS 2011).

Effect of the Take

In this BO/CO, the FWS determines that this level of anticipated take is not likely to result in jeopardy to Southwestern willow flycatcher. The Southwestern willow flycatcher has a wide distribution and thus, take in the form of harassment occurring twice during the life of the LRMP will not jeopardize the Southwestern willow flycatcher.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

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

The following reasonable and prudent measures and terms and conditions are necessary and appropriate to minimize take of Southwestern willow flycatcher:

1. Minimize or eliminate adverse effects to Southwestern willow flycatchers on the Tonto NF.
2. Minimize or eliminate adverse effects to Southwestern willow flycatcher habitat on the Tonto NF.
3. Monitor the impacts of site-specific projects on the Southwestern willow flycatcher on the Tonto NF.

TERMS AND CONDITIONS

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

The following terms and conditions will implement reasonable and prudent measure 1:

1.1 Proposed projects that may disturb Southwestern willow flycatchers should be implemented outside of the breeding season.

The following terms and conditions will implement reasonable and prudent measure 2:

2.1 Where appropriate, promote the growth of Southwestern willow flycatcher habitat that contains native vegetation so that Southwestern willow flycatchers may expand their numbers on the Forest.

The following terms and conditions will implement reasonable and prudent measure 3:

3.1 The Tonto NF shall monitor incidental take resulting from the proposed action and report their findings to the FWS. Incidental take (implementation) monitoring shall include information such as when or if the project was implemented, whether the project was implemented as analyzed in the site-specific BO/CO (including CMs and BMPs), breeding season(s) over which the project occurred, relevant Southwestern willow flycatcher survey information, and any other pertinent information about the project's effects on the species.

3.2 Annual reports, which will include this species, shall be sent to the appropriate local FWS Ecological Services field office by March 1st of each year.

CONSERVATION RECOMMENDATIONS

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

1. Implement Forest-specific actions of the Southwestern Willow Flycatcher Recovery Plan.
2. Develop and implement a monitoring plan to better determine the trend of Southwestern willow flycatchers on the forest.
3. Implement projects that reduce stressors and create landscape conditions to favor the growth of native riparian vegetation. Please see the Exotic vegetation and Riparian Restoration appendices in the Southwestern Willow Flycatcher Recovery Plan.

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

CHIRICAHUA LEOPARD FROG

STATUS OF THE SPECIES

The Chiricahua leopard frog (*Lithobates [=Rana] chiricahuensis*) was listed as a threatened species without CH in a Federal Register notice dated June 13, 2002. Included was a special rule to exempt operation and maintenance of livestock tanks on non-Federal lands from the section 9 take prohibitions of the Act. Critical habitat was designated on March 20, 2012 (U.S. Fish and Wildlife Service 2012) and includes 39 CHUs in Arizona and New Mexico. The Chiricahua Leopard Frog Final Recovery Plan (Recovery Plan) was finalized in April 2007 (U.S. Fish and Wildlife Service 2007).

The frog is distinguished from other members of the *Lithobates pipiens* complex by a combination of characters, including a distinctive pattern on the rear of the thigh consisting of small, raised, cream-colored spots or tubercles on a dark background; dorsolateral folds that are interrupted and deflected medially; stocky body proportions; relatively rough skin on the back and sides; and often green coloration on the head and back (Platz and Mecham 1979). The species also has a distinctive call consisting of a relatively long snore of 1 to 2 seconds in duration (Platz and Mecham 1979, Davidson 1996). Snout-vent lengths of adults range from approximately 2.1 to 5.4 inches (Platz and Mecham 1979, Stebbins 2003). The Ramsey Canyon leopard frog (*Lithobates* "*subaquavocali*s"), found on the eastern slopes of the Huachuca Mountains, Cochise County, Arizona, has recently been subsumed into *Lithobates chiricahuensis* (Crother 2008) and recognized by the FWS as part of the listed entity (U.S. Fish and Wildlife Service 2009).

The range of the Chiricahua leopard frog includes central and southeastern Arizona; west-central and southwestern New Mexico; and, in Mexico, northeastern Sonora, the Sierra Madre Occidental of northwestern and west-central Chihuahua, and possibly as far south as northern Durango (Platz and Mecham 1984, Degenhardt et al. 1996, Lemos-Espinal and Smith 2007, Rorabaugh 2008) (Figure 4). Reports of the species from the State of Aguascalientes (Diaz and Diaz 1997) are questionable. The distribution of the species in Mexico is unclear due to limited survey work and the presence of closely related taxa (especially *Lithobates lemosespinali*) in the southern part of the range of the Chiricahua leopard frog (see further discussion below).

The Chiricahua leopard frog is an inhabitant of montane and river valley cienegas, springs, pools, cattle (stock) tanks, lakes, reservoirs, streams, and rivers. The species requires permanent or semi-permanent pools for breeding and water characterized by low levels of contaminants and moderate pH, and may be excluded or exhibit periodic die-offs where *Batrachochytrium dendrobatidis (Bd)*, a pathogenic chytridiomycete fungus, is present (see further discussion of

this in the threats section below and in U.S. Fish and Wildlife Service 2011). The diet of the Chiricahua leopard frog includes primarily invertebrates such as beetles, true bugs, and flies, but fish and snails are also eaten (Christman and Cummer 2006).

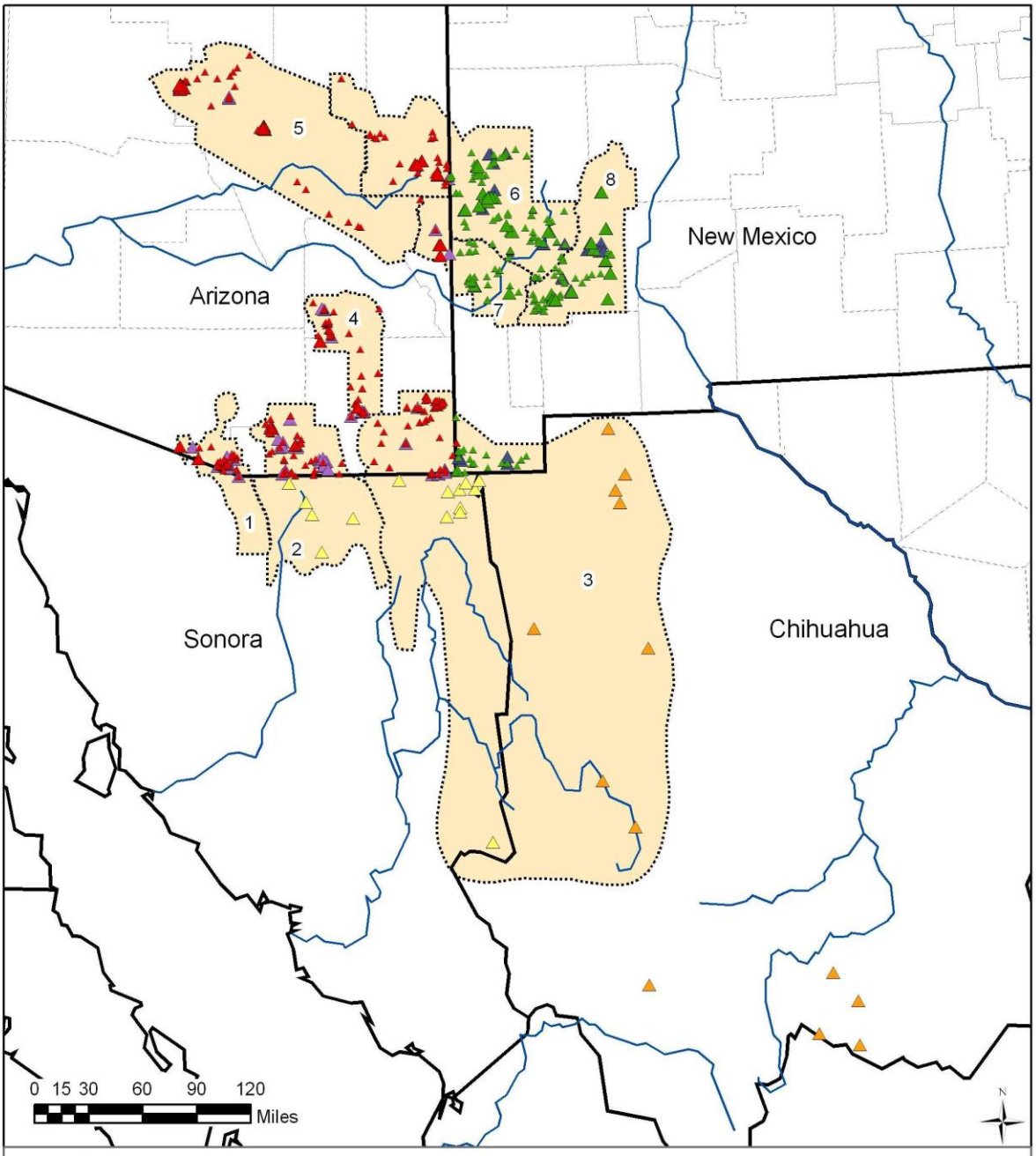


Figure 6: Recovery Units

Chiricahua Leopard Frogs in New Mexico
- 1917-1999
- 2000-2002

Chiricahua Leopard Frogs in Arizona
- 1928-1999
- 2000-2003
- Chiricahua Leopard Frogs in Chihuahua
- Chiricahua Leopard Frogs in Sonora
- Frogs Likely Present - Arizona
- Frogs Likely Present - New Mexico
- Rivers
- Counties
- Recovery Units
- Affected States

RECOVERY UNITS

No.	Name
1	Tumacacori Highlands
2	Upper San Pedro-Santa Cruz
3	Malpais-Cajon Bonito
4	Graham-Galiuros-Willcox
5	Mogollon Rim - Verde
6	Gila - White Mountains
7	Gila - Blue
8	Mimbres - Alamosa

Figure 4. Map of the known range of the Chiricahua leopard frog as of 2007. The map covers areas in Arizona, New Mexico, and Mexico. All eight RUs are delineated by number.

Prior to the invasion of perennial waters by predatory, non-native species (American bullfrog, crayfish, fish species), the frog was historically found in a variety of aquatic habitat types. Today, leopard frogs in the Southwest are so strongly impacted by harmful nonnative species, which are most prevalent in perennial waters, that their occupied niche is increasingly restricted to the uncommon environments that do not contain these nonnative predators, and these now tend to be ephemeral and unpredictable. This increasingly narrow realized niche is a primary reason for the threatened status of the Chiricahua leopard frog.

The life history of the Chiricahua leopard frog can be characterized as a complex life cycle, consisting of eggs and larvae that are entirely aquatic and adults that are primarily aquatic, making the species a habitat specialist (U.S. Fish and Wildlife Service 2007). The species has a distinctive call and males can be temporarily territorial (U.S. Fish and Wildlife Service 2007). Amplexus is axillary and the male fertilizes the eggs as the female attaches a spherical mass to submerged vegetation. Eggs are laid from February into October, with most masses found in the warmer months (U.S. Fish and Wildlife Service 2007). Numbers of eggs in a mass range from 300 to 1,485 (Jennings and Scott 1991) and may be correlated with female body size. The hatching time of egg masses in the wild ranges between 8-14 days, depending on water temperature (U.S. Fish and Wildlife Service 2007). Upon hatching, tadpoles are mainly herbivorous and remain in the water, where they feed and grow, with growth rates faster in warmer conditions. Tadpoles have a long larval period, from three to nine months, and may overwinter. After metamorphosis, Chiricahua leopard frogs eat an array of invertebrates and small vertebrates and are generally inactive between November and February (U.S. Fish and Wildlife Service 2007). Males reach sexual maturity at 2.1-2.2 in (5.3-5.6 cm), a size they can attain in less than a year (Sredl and Jennings 2005). Under ideal conditions, Chiricahua leopard frogs may live as long as 10 years in the wild (Platz et al. 1997, p. 553).

Chiricahua leopard frogs can be found active both day and night, but adults tend to be active more at night than juveniles (Sredl and Jennings 2005). Chiricahua leopard frogs presumably experience very high mortality (greater than 90 percent) in the egg and early tadpole stages, high mortality when the tadpole turns into a juvenile frog, and then relatively low mortality when the frogs are adults (Zug et al. 2001, U.S. Fish and Wildlife Service 2007). Adult and juvenile Chiricahua leopard frogs avoid predation by hopping to water (Frost and Bagnara 1977). They also possess an unusual ability among members of the Rana pipiens complex; they can also darken their ventral skin under conditions of low reflectance and low temperature (Fernandez and Bagnara 1991; Fernandez and Bagnara 1993), a trait believed to enhance camouflage and escape predation (U.S. Fish and Wildlife Service 2007).

Males have larger home range sizes than females, with the largest home range for a male documented at 251,769 ft2 (7,674 by 32 ft, or 23,390.2 m2 [2,339 by 9.8 m]) (U.S. Fish and Wildlife Service 2007). The maximum distance moved by a radio-telemetered Chiricahua leopard frog in New Mexico was 2.2 miles (3.5 km) in one direction (preliminary findings of telemetry study by R. Jennings and C. Painter, Technical Subgroup, 2004). In 1974, Frost and Bagnara (1977) noted passive or active movement of Chiricahua and Plains (*Lithobates blairi*) leopard frogs for five miles or more along West Turkey Creek in the Chiricahua Mountains. In

August 1996, Rosen and Schwalbe (1998) found up to 25 young adult and subadult Chiricahua leopard frogs at a roadside puddle in the San Bernardino Valley, Arizona. They believed that the only possible origin of these frogs was stock tank located 3.4 miles away. Although amphibians are known to have limited dispersal and colonization abilities due to physiological constraints, limited movements, and high site fidelity (Blaustein et al. 1994), Chiricahua leopard frogs can disperse to avoid competition, predation, or unfavorable conditions (Stebbins and Cohen 1995). Dispersal most likely occurs within favorable habitat, making the maintenance of corridors that connect disjunct populations possibly critical to preserve populations of frogs. Active or passive dispersal (while carried along stream courses) of juveniles or adults to discrete aquatic habitats facilitates the creation and maintenance of metapopulations (U.S. Fish and Wildlife Service 2007), an important option for a water-dependent frog in an unpredictable environment like the arid Southwest.

For far more detailed information on this species, please refer to the Recovery Plan (U.S. Fish and Wildlife Service 2007), which is the baseline in regard to the current status, biology, and threats to the Chiricahua leopard frog.

Population Status in Arizona, New Mexico, and Mexico

Evidence indicates that since the time of listing, the species has probably made at least modest population gains in Arizona, but is apparently declining in New Mexico. Overall in the U.S., the status of the Chiricahua leopard frog is either static or, more likely, improving, with much of the increase attributable to an aggressive recovery program that is showing considerable results on the ground through the reestablishment of populations (mainly in Arizona), captive rearing programs, creation of refugial populations, and enhancement and development of habitat have helped stabilize or improve the status of the species in some areas (U.S. Fish and Wildlife Service 2011). In Arizona and New Mexico, there are currently four main captive breeding facilities – the Phoenix Zoo, AGFD's Bubbling Ponds Fish Hatchery, AGFD's Tonto Creek Fish Hatchery, and the Ladder Ranch. In Arizona, a captive breeding program was established with the Phoenix Zoo in 2005 and the Ladder Ranch (a private 155,553 acre ranch in Sierra County, New Mexico) began captive propagation-headstarting-release in 2011. These programs, in concert with habitat restoration activities occurring across both states, are contributing to range-wide recovery of the frog. Population status and trends in Mexico are unknown.

Arizona

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 (U.S. Fish and Wildlife Service 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). A comparison of survey results during 2005-2009 versus 1999-2002 revealed increasing numbers of sites occupied by Chiricahua leopard frogs from 2002-2008. The total number of occupied sites increased from 49 in 2002 to 80 in 2008 and 90 in 2009, while the number of robust breeding populations increased from 5 in 2002 to 13 in 2008, and then declined slightly to 11 in 2009. The total number of breeding populations increased from 26 in 2002 to 34 in 2008 and then declined by 1 for a total of 33 sites in 2009. These trends were also generally reflected at the RU level of analysis. Exceptions included a reduction in number of breeding populations in RU 3 from three to two and in RU 6 from three to zero. Recovery Unit 5 also exhibited a reduction in the number of robust breeding populations from two to zero. 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.

The above data suggest substantial gains in the number of known locations of Chiricahua leopard frogs since the time of listing. However, basing status and trends on differences in numbers of occupied sites from 2002-2009 can be problematic for several reasons. First, if increasing trends are accurate, they may represent population response to temporarily favorable environmental conditions, such as adequate summer rains that allow dispersal, rather than an intrinsic improvement that will endure over time. Second, there are sources of bias that affect the conclusions. For instance, both data sets likely underestimate the number of occupied sites existing at the time, because some sites were unknown or surveys had not been conducted within the last three years to categorize all sites as occupied or unoccupied. But there is further bias in the survey data in that the 2009 data set benefits from recent discoveries of populations that could have existed in 2002, but we did not know of them at the time.

The latter type of bias can be eliminated by adding to the 2002 total all of the occupied sites that were discovered after 2002, except for those for which we are reasonably certain were unoccupied in 2002. If analyzed in this way, the total number of occupied sites, in 2002, increases from 49 to 83. This is roughly the same number of occupied sites as in 2008 (85). Based on this, the total number of occupied sites was fairly stable or increasing slightly in Arizona from 2002 (83) to 2008 (85) and 2009 (92). However, this correction inserts yet another type of bias into the sample – analyzed in this way, the 2002 total is based not only on what was found during 1999 to 2002, but also surveys during period 2003 to 2009. Yet the 2008 and 2009 totals are only based on surveys during 2005-2008 and 2006-2009 respectively. The number of occupied sites in 2009 would no doubt increase if we could add in new sites during the

equivalent future period (through 2016). Though we cannot provide an exact number of expected new sites that may be established by 2016, each RU stakeholder group has identified locations for potential new sites, so we potentially could work towards establishing four to eight new sites per year (though not all of these site are guaranteed to be successful).

As a result, concluding there were 83 extant sites in 2002, 85 in 2008, and 92 in 2009, is likely the worst case scenario, in that this analysis is most likely to show any declines, if they occurred from 2002-2009. The actual trend is probably somewhere between that (roughly stable) to what was concluded in the previous analysis (substantial increases). In conclusion, there is no evidence of decline in Arizona; rather, the data suggest at least modest increases.

New Mexico

In New Mexico, the frog historically occurs in west-central and southwestern New Mexico in Catron, Grant, Hidalgo, Luna, Socorro, and Sierra Counties and has been collected or observed at 182 localities over time (Painter 2000). In 1995, Jennings reported that frogs still occurred at only eleven sites in New Mexico. Based on additional work, Painter (2000) listed forty-one localities at which frogs were found from 1994-1999. Thirty-three of these are north of Interstate 10 and eight are in the southwestern corner of the state. Thirty-one of the 41 populations were verified extant during 1998-1999 (Painter 2000). However, during May-August 2000, the frog was found at only eight of 34 sites (U.S. Fish and Wildlife Service 2002). Three populations east of Hurley in Grant County declined or were extirpated during 1999 to 2000, and preliminary data indicate another population on the Mimbres River, also in Grant County, has experienced a significant die-off (U.S. Fish and Wildlife Service 2002). Survey results from the 2004 field season indicate that there are 31 locations where the frog can be considered as likely to occur in New Mexico (R. Williams, FWS, 2004, unpubl. data; R. Jennings, Western New Mexico University, 2005, unpubl. data).

A similar analysis as was done for Arizona populations (see above) was not possible in New Mexico because all sites have not been monitored annually and much of the reported survey information is reported as presence or absence. Due to the evolving nature of Chiricahua leopard frog monitoring since the early 1990s and the ability of frogs to move up to 5 miles (8 km), survey information has resulted in different definitions of “sites” and “populations” over time. Often site boundaries are indistinct making some connected areas a single site, and other connected areas several sites. Thus it is difficult to assess the frog’s status by enumerating sites and often comparisons among sites are not equivalent. However, based upon the data available, we can conclude that the frog has continued to decline annually in New Mexico since listing.

As background, the final rule listing the species indicated the frog had been found at 41 sites from 1994-1999, and 31 of these 41 sites were verified as extant during 1998-1999. The rule explains that frogs were found at only 8 of 34 surveyed sites (of the original 41 sites) in 2000. The Recovery Plan indicated that 30-35 populations of Chiricahua leopard frogs were likely extant in New Mexico at the time of writing (2006-7). The tally of these 30-35 populations included dispersal sites, which indicates that not all of these populations were robust, breeding sites. Starting with the 41 sites from 1994-1999, 27 of those sites are now extirpated, four of them are considered unstable with low population numbers or are possibly extirpated, two are

considered dispersal observations with no reproduction, one has an unknown status due to inaccessibility, and seven sites support reproduction and no significant die-off or population loss has been observed.

Based on the above data, collected from 2002 to 2010, 27 of the 41 sites are considered extirpated, representing a 66 percent drop in the known Chiricahua leopard frog sites in New Mexico during this 5-year period (U.S. Fish and Wildlife Service 2011). Since listing in 2002, an additional 30 new sites have been identified. To date, of these 30 new sites, 15 have become extirpated, six are unstable with low population numbers or are possibly extirpated, four are considered dispersal observations with no reproduction, one site is on private property with an unknown population status, and at four sites reproduction is occurring and no significant die-off or population loss has been observed. New sites have been found due to increased surveying efforts in remote areas and growing access to private lands through partnership activities. Although undiscovered occupied sites may still exist, the rate and likelihood of finding new sites will diminish, as the area of unsurveyed habitat is reduced each year. Furthermore, while the frog has a large capacity for dispersal, because of the many of the new observations were not near known occupied sites, we assume that most of the new observations were existing locations and not newly colonized locations. Thus in the past eight years, these newer sites have reflected a similar trend of decline, with half of the sites no longer occupied.

Disease, particularly infection caused by Bd, has accounted for the majority of Chiricahua leopard frog 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. However, non-native species (bullfrogs, crayfish, and non-native fish) also continue to significantly impact extant populations and threaten the frog in New Mexico. All remaining frog populations in New Mexico are extremely vulnerable to extirpation from disease, non-native species, small population sizes, habitat drying, and lack of connectivity between other suitable habitats or populations.

In recent years, New Mexico Chiricahua leopard frog partners have gained momentum in conservation actions. In an effort to stave off permanent genetic losses, much of the recovery activities in New Mexico have been focused on creating off-site refugia populations. This entails collecting wild eggs, tadpoles, or metamorphs and bringing them into captivity for rearing and disease testing and treatment if needed, and releasing them into confined steel rim tanks. Currently, the FWS New Mexico Ecological Services Field Office and the Bureau of Land Management (BLM) have the capacity to rear, hold, and treat animals; the USFS has set up a quarantine holding facility (for first use in Spring 2011); and the Ladder Ranch has outdoor holding pens for adult frogs (for captive reproduction). For the Chiricahua leopard frog in New Mexico, our hope is that not only will the refugia sites serve as a back-up if there is a die-off at the source population, but that with time, they will also serve as a source for additional repatriation efforts. The facilities that are contributing to these efforts will also serve to produce animals for repatriation projects once extant populations have been boosted. As of 2010, we have attempted to establish eight refugia populations.

Mexico: Sonora and Chihuahua

Based on published and unpublished reports and perusal of Sonora, Mexico collection data from 23 museums, the Chiricahua leopard frog is known from about 26 localities in Chihuahua, Mexico and 19 localities in Sonora (Lemos-Espinal and Smith 2007). *Lithobates* [*Rana*] *chiricahuensis* have been reported as far south as the Mexican state of Aguascalientes, but frogs south of central Chihuahua are of questionable identification (U.S. Fish and Wildlife Service 2007). Based on limited surveys, populations of leopard frogs, gartersnakes, and other native aquatic herpetofauna are generally more intact and non-native predators are much less widely distributed in Sonora and at least parts of Chihuahua (Rosen and Melendez 2010, Lemos-Espinal and Smith 2007, Rorabaugh 2008). However, specifically for the Chiricahua leopard frog, data are insufficient to determine status or trends in Mexico. None of the Chiricahua leopard frog localities in Sonora have been revisited recently, with the exception of one in the Sierra Los Ajos. No frogs were found at that site (L. Portillo, pers. comm. 2009). Chiricahua leopard frogs have been observed recently at several sites in Chihuahua (R. Jennings, pers. comm. 2007), but not enough is known to assess status or trends.

Summary of Population Status

In conclusion, the data suggest the status of the Chiricahua leopard frog is at least stable and probably improving in Arizona, declining in New Mexico, and unknown in Mexico. In pooled data for the U.S., a worst case analysis shows essentially no change in the number of occupied sites from 2002 to 2009 (133 versus 131, respectively); however, as discussed above, this likely underestimates the status of the species in Arizona, overestimates the status of the species in New Mexico, and includes data that are not standardized to be truly comparable. The actual situation is probably that the status of the species is stable in the U.S overall, but the different conditions between Arizona and New Mexico indicate that improvement is occurring only in Arizona at this time, while in New Mexico, frog numbers continue to decline. Continued and new aggressive recovery actions are needed to address threats to the species rangewide, to maintain positive trends in Arizona, to stabilize population losses in New Mexico, and to assist partners in Mexico with their conservation efforts. If on-going recovery actions are interrupted, drought worsens, or other threats intensify, the status of the species across its range could easily deteriorate.

<u>Threats</u>

The primary threats to this species are predation by nonnative organisms and die-offs caused by a fungal skin disease – chytridiomycosis. The chytridiomycete skin fungus, (*Bd* is the organism that causes chytridiomycosis) is responsible for global declines of frogs, toads, and salamanders (Berger et al. 1998, Longcore et al. 1999, Speare and Berger 2000, Hale 2001). Additional threats include: drought, floods, degradation and loss of habitat as a result of water diversions and groundwater pumping, poor livestock management, altered fire regimes, mining, development, and other human activities; disruption of metapopulation dynamics, resulting from an increased chance of extirpation or extinction resulting from small numbers of populations and individuals, and environmental contamination (U.S. Fish and Wildlife Service 2007). Loss of Chiricahua leopard frog populations is part of a pattern of global amphibian decline, suggesting other regional or global causes of decline may be important as well (Carey et al. 2001). Witte et al. (2008) analyzed risk factors associated with disappearances of ranid frogs in Arizona and

found that population loss was more common at higher elevations and in areas where other ranid population disappearances occurred. Disappearances were also more likely where introduced crayfish occur, but were less likely in areas close to a source population of frogs.

The goal of the Recovery Plan (U.S. Fish and Wildlife Service 2007) is to improve the status of the species to the point that it no longer needs the protection of the Endangered Species Act. The recovery strategy calls for reducing threats to existing populations; maintaining, restoring, and creating habitat that will be managed in the long term; translocation of frogs to establish, reestablish, or augment populations; building support for the recovery effort through outreach and education; monitoring; conducting research needed to provide effective conservation and recovery; and application of research and monitoring through adaptive management. Recovery actions are recommended in each of eight RUs throughout the range of the species. Management Areas (MAs) are also identified within RUs where the potential for successful recovery actions is greatest.

The Recovery Plan identifies eight RUs in Arizona and New Mexico (Figure 4, Table 2). Focus areas, referred to as MAs, are identified within each RU. Management areas are areas with the greatest potential for successful recovery actions and threat alleviation. Hydrologic units and mountain ranges are used as MA boundaries. Within MAs, sites where metapopulations and robust, isolated populations occur or will be established are referred to herein as "recovery sites." MAs have been delineated to include all habitats of known extant Chiricahua leopard frog populations as well as other sites with the highest potential for recovery, including sites where habitat restoration or creation, and establishment or re-establishment of Chiricahua leopard frog populations will likely occur or has already occurred. We include all known extant populations within MA boundaries because of the high value of those populations for recovery.

For the Chiricahua leopard frog to be recovered, conservation must occur in each RU (Table 3). Successful conservation is not necessary in every MA and recovery does not depend upon an even distribution of recovery efforts across an RU. Rather, we anticipate that recovery efforts will be focused in those MAs and portions of RUs in which opportunities are best. Recovery criteria to delist the Chiricahua leopard frog includes: 1) at least two metapopulations located in different drainages, plus at least one isolated and robust population in each RU, 2) protection of these populations and metapopulations, 3) connectivity and dispersal habitat protection, and 4) reduction or elimination of threats and long-term protection. As noted in the FWS's 1998 Consultation Handbook, RUs are population units that have been documented as necessary to both the survival and recovery of the species. Avoiding loss of populations or other serious adverse effects in a RU will ensure continued contribution of that RU to the recovery of the species.

Existing populations and suitable habitat in MAs will be protected through management. Management will include maintaining or improving watershed conditions both upstream and downstream of Chiricahua leopard frog habitats to reduce physical threats to aquatic sites and allow for Chiricahua leopard frog dispersal, reducing or eliminating non-native species, preventing and managing disease, and other actions. Suitable or potentially suitable unoccupied habitat with high potential for supporting Chiricahua leopard frog populations or metapopulations (referred to here as recovery sites) will be protected, and restored or created as

needed, within MAs. These habitats will include aquatic breeding habitats and uplands or ephemeral aquatic sites needed for movement among local populations in a metapopulation. Activities to achieve this include habitat management, removal of non-native species (e.g. American bullfrogs, non-native fishes, and crayfish), enhancing water quality conditions, and reducing sedimentation. Populations of Chiricahua leopard frogs will be established or reestablished in these MAs.

Table 3. The eight RUs as identified in the Recovery Plan and the current status of the delisting criteria for the Chiricahua leopard frog in each RU.

Recovery Unit	**RU#**	**Recovery Criteria 1**	**Recovery Criteria 2**	**Recovery Criteria 3**	**Recovery Criteria 4**
Tumacacori-Atascosa-Pajarito Mountains, Arizona and Mexico	1	Met	Not met	Not met	Not met
Santa Rita-Huachuca-Ajos Bavispe, Arizona and Mexico	2	Not met	Not met	Not met	Not met
Chiricahua Mountains-Malpai Borderlands-Sierra Madre, Arizona, New Mexico, and Mexico	3	Not met	Not met	Not met	Not met
Pinaleno-Galiuro-Dragoon Mountains, Arizona	4	Not met	Not met	Not met	Not met
Mogollon Rim-Verde River, Arizona	5	Not met	Not met	Not met	Not met
White Mountains-Upper Gila, Arizona and New Mexico	6	Not met	Not met	Not met	Not met
Upper Gila-Blue River, Arizona and New Mexico	7	Not met	Not met	Not met	Not met
Black-Mimbres-Rio Grande, New Mexico	8	Not met	Not met	Not met	Not met

Critical Habitat

The 2012 final rule for the designation of CH includes 39 Critical Habitat Units (CHUs) across the range of the species in Arizona and New Mexico (U.S. Fish and Wildlife Service 2012). Through the CH designation process, the FWS determined the PCEs for the Chiricahua leopard frog. We consider the PCEs to be the elements of the physical or biological features (PBFs) that provide for a species' life-history processes and are essential to the conservation of the species.

Based on the above needs and our current knowledge of the life history, biology, and ecology of the species, and the habitat requirements for sustaining the essential life-history functions of the species, we have determined that the PCEs essential to the conservation of the Chiricahua leopard frog are:

1. Aquatic breeding habitat and immediately adjacent uplands exhibiting the following characteristics:

a. Standing bodies of fresh water (with salinities less than 5 parts per thousand, pH greater than or equal to 5.6, and pollutants absent or minimally present), including natural and manmade (e.g., stock) ponds, slow-moving streams or pools within streams, off-channel pools, and other ephemeral or permanent water bodies that typically hold water or rarely dry for more than a month. During periods of drought, or less than average rainfall, these breeding sites may not hold water long enough for individuals to complete metamorphosis, but they would still be considered essential breeding habitat in non-drought years.
b. 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.
c. Nonnative predators (e.g., crayfish (*Orconectes virilis*), American bullfrogs (*Lithobates catesbeiana*), nonnative predatory fishes) absent or occurring at levels that do not preclude presence of the Chiricahua leopard frog.
d. Absence of chytridiomycosis, or if present, then environmental, physiological, and genetic conditions are such that allow persistence of Chiricahua leopard frogs.
e. Upland areas that provide opportunities for foraging and basking that are immediately adjacent to or surrounding breeding aquatic and riparian habitat.

2. Dispersal and non-breeding habitat, consisting of areas with ephemeral (present for only a short time), intermittent, or perennial water that are generally not suitable for breeding, and associated upland or riparian habitat that provides corridors (overland movement or along wetted drainages) for frogs among breeding sites in a metapopulation with the following characteristics:
    a. Are not more than 1.0 mile (1.6 kilometers) overland, 3.0 miles (4.8 kilometers) along ephemeral or intermittent drainages, 5.0 miles (8.0 kilometers) along perennial drainages, or some combination thereof not to exceed 5.0 miles (8.0 kilometers).
    b. In overland and non-wetted corridors, provides some vegetation cover or structural features (e.g., boulders, rocks, organic debris such as downed trees or logs, small mammal burrows, or leaf litter) for shelter, forage, and protection from predators; in wetted corridors, provides some ephemeral, intermittent, or perennial aquatic habitat.
    c. Are free of barriers that block movement by Chiricahua leopard frogs, including, but not limited to, urban, industrial, or agricultural development; reservoirs that are 50 acres (20 hectares) or more in size and contain predatory nonnative fishes, bullfrogs, or crayfish; highways that do not include frog fencing and culverts; and walls, major dams, or other structures that physically block movement.

With the exception of impoundments, livestock tanks, and other constructed waters, CH does not include manmade structures (such as buildings, aqueducts, runways, roads, and other paved areas) and the land on which they are located existing within the legal boundaries.

The purpose of the designation of CH is to conserve the PCEs essential to the conservation of the species through the identification of the appropriate quantity and spatial arrangement of the PCEs sufficient to support the life-history functions of the species. Because not all life-history

functions require both PCEs, not all areas designated as CH contain both PCEs. Each of the areas designated as CH have been determined to contain sufficient PBFs, or with reasonable effort, PBFs can be restored to provide for one or more of the life-history functions of the Chiricahua leopard frog.

All areas designated as CH will require some level of management to address the current and future threats to the Chiricahua leopard frog and to maintain or restore the PCEs. Special management in aquatic breeding sites will be needed to ensure that these sites provide water quantity, quality, and permanence or near permanence; cover; and absence of extraordinary predation and disease that can affect population persistence. In dispersal habitat, special management will be needed to ensure frogs can move through those sites with reasonable success.

The majority of Chiricahua leopard frog habitat and localities are on Federal lands, mostly managed by the USFS; however, key aquatic sites are sometimes on non-Federal lands (USFWS 2012). Of the 10,346 acres (4,187 ha) that were designated as CH for the Chiricahua leopard frog, 417 acres (169 ha) occur on the Tonto National Forest.

ENVIRONMENTAL BASELINE

The environmental baseline includes past and present impacts of all federal, state, or private actions within the action area. All proposed federal actions within the action area that have undergone formal or early section 7 consultation are included in the environmental baseline discussion. The environmental baseline discussion defines the current status of the Chiricahua leopard frog, its habitat, and CH within the Tonto NF. This discussion serves as a platform to assess the effects of the action to the Chiricahua leopard frog now under consultation.

Status of the Chiricahua leopard frog and its critical habitat within the Action Area

The Tonto NF occurs in one of eight (13%) RUs identified in the Chiricahua leopard frog Recovery Plan: RU 5 (Mogollon Rim-Verde River, Arizona). Only half of the Tonto NF is within this RU. The status of the species is described by RUs and associated MA and CHUs within Ranger Districts are discussed below.

About 417 acres (169 ha) of CH are now designated on the Tonto NF, consisting of two of 39 (5%) CHUs. The CHUs for the Chiricahua leopard frog that are located on the Tonto NF include the Crouch, Gentry, and Cherry Creeks, and Parallel Canyon Unit on the Pleasant Valley RD and the Ellison and Lewis Creeks Unit on the Payson RD. The status of the Chiricahua leopard frog is described by CHU.

Pleasant Valley RD and Payson RD

Recovery Units 5 - Mogollon Rim-Verde River

Within RU 5 on the Tonto NF, two of the three MAs (66%) occur: Gentry Creek and Upper East Verde River. Both MAs are currently occupied with reproduction occurring. As of 2011, there were eight sites that were occupied (two of which were reproductive) in the Gentry MA and 15 sites that were occupied (seven that were reproductive) in the Upper East Verde MA. Releases

or transplants of every age class have occurred in each MA (see Table 4 for details). Bullfrogs, crayfish, non-native fishes, Bd, wildfire, and drought continue to threaten Chiricahua leopard frogs in this RU. The status of the Chiricahua leopard frog is stable and threats are stable to increasing.

Management Area: Gentry Creek within Pleasant Valley RD and RU 5
Crouch, Gentry, and Cherry Creeks, and Parallel Canyon CHU
This unit includes 334 ac (135 ha) of Tonto NF lands, 64 ac (26 ha) of AGFD lands, and 6 ac (3 ha) of private lands in Gila County, Arizona. Included as CH are Trail Tank, HY Tank, Carroll Spring, West Prong of Gentry Creek, Pine Spring, and portions of Cherry and Crouch Creeks, all of which provide breeding or potential breeding habitat. Also included are intervening drainages and uplands needed for connectivity among breeding sites. The connectivity of Pine Spring to Cunningham Spring and other sites upstream in Crouch Creek is complicated by a waterfall below Cunningham Spring; however, an overland route of less than 1 mile provides access around the waterfall.

Threats in this unit include predation by nonnative species, including bullfrogs, crayfish, and sportfish; predation by tiger salamanders (presumably native); Bd, which was found in a Cherry Creek frog in 2009; and minimal water. None of the populations are robust due to the small size of breeding habitats. It is hoped that Trail Tank may provide enough aquatic habitat for a robust population. Other sites have renovation potential and could possibly in the future support robust populations, but none of the other sites currently have the PCEs due to presence of nonnative species or other factors. This unit has received habitat work, renovations, nonnative species control, headstarting, population reestablishment, and population augmentation.

Reproduction has been observed at West Prong of Gentry Creek and Crouch Creek (above the falls) since 2008 and 2009, respectively. Chiricahua leopard frogs were first noted in Cherry Creek in 2008, just before additional frogs were released into that site. Reproduction was documented in 2009 and Chiricahua leopard frogs were observed in Cherry Creek in 2010. Due to drought conditions, water levels were very low in Cherry Creek in 2011 and no frogs were observed. Chiricahua leopard frogs were moved to Pine Spring in 2006, and habitat work was accomplished there to improve pool habitats. However, no Chiricahua leopard frogs have been observed there since 2008. Trail Tank has nearly permanent water. In May 2010, it was renovated to remove a breeding population of bullfrogs and green sunfish. Bullfrogs at the nearby ephemeral Roadside Tank were also eliminated in 2010. Additional follow-up removal of bullfrogs occurred in July 2010 at Trail Tank, but bullfrogs were observed in September 2010. Removal efforts were repeated at Trail Tank in May 2011 with follow-up removals occurring between June & September 2011. Bullfrogs were also removed from Ramer Tank, within overland dispersal distance of Trail Tank, and at Upper Tank and the Tank Southwest of Upper Tank, which are located within overland dispersal distance of Cunningham Spring. As of October 2011, no bullfrogs had been observed at any of these locations. Trail Tank does not have historical records for CLF but is considered important habitat for the Gentry Creek MA and will be managed as such into the future with the goal of establishing Chiricahua leopard frogs there under the time frame covered by this consultation. Chiricahua leopard frogs were first noted in Cherry Creek in 2008, just before additional Chiricahua leopard frog s were released

into that site. Reproduction has been noted and Chiricahua leopard frogs were observed in Cherry Creek in 2010, but none were observed in 2011.

Management Area: Upper East Verde River (within Payson RD and RU 5)
Ellison and Lewis Creeks CHU
This CHU includes 83 ac of Tonto NF lands and 15 ac of private lands in Tonto County, Arizona. This site includes Moore Saddle Tank #2, Ellison Creek just east of Pyle Ranch, Lewis Creek downstream of Pyle Ranch, and Low Tank. In 1998, small numbers of Chiricahua leopard frogs were found here, but were not seen again until 2006. Chiricahua leopard frogs were not found in 2007 or 2008 in Ellison Creek. In 2009, egg masses from Crouch Creek in the Gentry Creek MA were headstarted, and tadpoles and subadult Chiricahua leopard frogs were stocked at the four sites listed above as potential breeding sites. Chiricahua leopard frogs from those releases appeared to be persisting at all four sites in 2010. Additional releases of Chiricahua leopard frogs occurred at these sites in July 2010 as well as six new sites (Table 4).

Table 4. Chiricahua leopard frog sites on the Tonto NF from 2008 - 2011.

Locality Name (Ranger District)	**2008 status**	**2009 status**	**2010 status**	**2011 status**
Trail Tank (Pleasant Valley RD)	No observations; bullfrogs observed	No observations; bullfrogs observed	No observations; bullfrogs removed	No observations; bullfrogs removed
HY Tank (Pleasant Valley RD)	No observations; 90 tadpoles and 2 frogs released	No observations; 1 egg mass released	No observations	No observations
Carroll Spring (Pleasant Valley RD)	Present; 45 tadpoles released	Present	Present	Present; 1 egg mass released
West Prong of Gentry Creek (Pleasant Valley RD)	Present; 3 egg masses observed	Present,;1 egg mass observed	Present; 1 egg mass observed	Present; 2 egg masses observed
Pine Spring (Pleasant Valley RD)	No observations; 38 tadpoles and 10 frogs released	No observations: 1 egg mass released	No observations	No observations
Bottle Springs (Pleasant	Present; 31 frogs released	No observations	No observations	No observations; bullfrog

Valley RD)				removed
Portions of Cherry Creek (Pleasant Valley RD)	Present; 119 tadpoles and 17 frogs released	Present; 3 egg masses observed	Present; reproducing; 97 frogs, 351 tadpoles released	No observations; 39 frogs, 317 tadpoles released
Crouch Creek, above the Falls (Pleasant Valley RD)	Present; 45 tadpoles and 11 frogs released	Present; 6+ egg masses observed	Present; 6 egg masses observed	Present; 7 egg masses observed
Crouch Creek, below the Falls (Pleasant Valley RD)	No observations	No observations	No observations	No observations; 150 tadpoles released
Unnamed spring & drainaged (Trib to Crouch Creek; Pleasant Valley RD)	No observations	No observations	No observations	No observations; 226 tadpoles released
Naegelin Rim Tank (Pleasant Valley Rd)	Not surveyed	Not surveyed	Not surveyed	No observations; 231 tadpoles released
Unnamed Tank NE of Naegelin Rim Tank (Pleasant Valley RD)	Not surveyed	Not surveyed	Not surveyed	No observations; 411 tadpoles released
Moore 4 Tank (Payson RD)	No observations	No observations; 148 frogs and 482 tadpoles released	Present	Present; tank dried earlier, transferred 50 frogs to Pieper Spring, but refilled and frogs returned
Lower	No	No	Present	Present:

Moore Tank (Payson RD)	observations	observations; 295 frogs and 462 tadpoles released		observed 12 egg masses
Lewis Creek (Payson RD)	No observations	No observations; 82 tadpoles and 90 frogs released	Present; 50 frogs released	Present; observed 5 egg masses
Ellison Creek, Trib 4 (Payson RD)	No observations	No observations; 82 tadpoles and 118 frogs released	Present; 54 frogs released	Present; observed 5 egg masses
Ellison Creek Trib 3 (Payson RD)	No observations	No observations	No observations; 50 frogs released	Present
Preacher Canyon (Payson RD)	No observations	No observations	No observations; 242 frogs and 33 tadpoles released	Present
Cabin Draw (Payson RD)	No observations	No observations	No observations: 197 frogs and 349 tadpoles released	Present
Pieper Spring	No observations	No observations	No observations; 75 frogs and 230 tadpoles released	Present; observed 11 egg masses
Big Canyon (Payson RD)	No observations	No observations	No observations; 79 frogs and 119 tadpoles released	Present
Unnamed Tributary to Big Canyon (Payson RD)	No observations	No observations	No observations; 94 frogs and 111 tadpoles released	Present
Upper Moore (Payson RD)	No observations	No observations	No observations	No observations; 1.5 egg

				masses released
Middle Moore Tank (Payson RD)	No observations	No observations	No observations	No observations; 1.5 egg masses released
Ellison Creek (Payson RD)	No observations	No observations	No observations	Present (new dispersal area); 2 egg masses observed
Perley Creek (Payson RD)	No observations	No observations	No observations	Present (new dispersal area); 1 egg mass observed
Moore Creek (Payson RD)	No observations	No observations	No observations	Present (new dispersal area); 1 egg mass observed

Factors Affecting the Chiricahua leopard frog and its Critical Habitat within the Action Area

The factors affecting the Chiricahua leopard frog and its CH within the action area (i.e., Tonto NF) are discussed in this section. Projects associated with formal consultations that evaluated adverse effects to the Chiricahua leopard frog that occurred from 2005 (i.e., the year of the original LRMP BO/CO) to the present are summarized in Table 5.

Table 5. Formal consultations and incidental take anticipated for the Chiricahua leopard frog on the Tonto NF from 2005 to 2011.

Consultation #	Date of Final BO	Project	Anticipated Take	Locations	Form of Take
2-21-04-F-0273	6/21/2005	Buzzard Roost and Soldier Camp allotments	No take	n/a	n/a
22410-2007-F-0075	2/6/2007	Chrysotile Allotment	No take	n/a	n/a
22410-2007-F-0052	5/17/2007	10-year Livestock Grazing Management Plan for Red Lake Allotment	Direct mortality or injury of adult frogs, metamorphs, tadpoles, or egg masses and loss of productivity	Occupied sites within Red Lake Allotment	Harm and Harass
22410-1999-F-0300-R2	7/1/2008	Little Green Valley Complex Allotment	Direct mortality or injury of adult frogs, metamorphs, tadpoles, or egg masses and loss	Occupied sites within Little Green Valley	Harm and Harass

			of productivity	Complex Allotment	
22410-F-2009-0217	4/1/2010	On-going Livestock grazing on the Crouch Mesa Allotment	Direct mortality or injury of adult frogs, metamorphs, tadpoles, or egg masses and loss of productivity	One occupied site within Crouch Mesa Allotment	Harm
*22410-2008-F-0149-R001**	*12/6/2011*	*Effects to Listed Species from U.S. USFS Aerial Application of Fire Retardants on NFS Lands*	*Four drops in occupied frog habitat affecting 24.8 stream miles or 1 acre of non-fluvial, standing water on the Tonto NF*	*Tonto NF*	*Direct mortality, harm, and harass*

** Projects in italics are fire suppression activities that are not included in the proposed action for this consultation.*

Since 2005, five site-specific BOs have been issued to the Tonto NF addressing adverse effects to Chiricahua leopard frogs from projects implemented under the LRMP. All adverse effects to the species were from grazing allotments. Within the five project-specific BOs, three opinions addressing affects from livestock grazing concluded that incidental take of frogs in the form of harm and/or harassment was anticipated. The Tonto NF provided CMs that would minimize the impacts to frogs in all formal consultations. All BOs for projects conducted on the Tonto NF were determined to be non-jeopardy for the species. Incidental take of Chiricahua leopard frogs associated with wildland fire suppression activities is not part of the action under consultation in this BO/CO, but is part of the environmental baseline for this consultation.

This BO/CO considers the incidental take from projects that were covered by prior opinions but have yet to be implemented or are ongoing. These projects include the 10-year Livestock Grazing Management Plan for Red Lake Allotment, Little Green Valley Complex Allotment, and the Ongoing Livestock Grazing on the Crouch Mesa Allotment, and any incidental take associated with this LRMP BO/CO is in addition to incidental take anticipated as a result of these previously consulted upon projects.

Effort has been undertaken to reestablish and conserve Chiricahua leopard frogs on the Tonto NF in the Gentry Creek and Crouch Creek areas near Young and the Ellison Creek and Lewis Creek areas near Payson. In 1998, Carroll Spring, in the headwaters of Crouch Creek, was renovated by building a pool just below the developed springhead. Forty captive-reared Chiricahua leopard frog s were released to the site by AGFD personnel on October 27, 1998. Additional releases occurred at H-Y Tank and Cunningham Spring. The latter site was partially fenced to exclude elk and cattle, and to prevent associated riparian damage. As of 2004, Chiricahua leopard frogs have persisted at Carroll Spring, but disappeared from the other two sites. Plans were developed to renovate and reestablish Chiricahua leopard frogs at several sites in the area. In 2005 sediment was removed from Bottle Spring and the tank was lined. Once completed, the area was fenced to exclude livestock and Chiricahua leopard frogs were released back into the new pond. In 2006 the Pleasant Valley RD implemented emergency measures identified by the FWS in the Gentry Creek Area. Sediment was removed in occupied sites, erosion control was implemented, breeding pools were established and the area was fenced from livestock use. In 2007 exotic species were removed from the Gentry Creek developments and other sites were fenced from livestock use. Exclosures are inspected annually and repairs are made as needed. In 2010 the existing exclosure fence at Carroll Spring and Crouch Creek was improved to reduce long-term

maintenance needs. In 2008 logs were placed along Ellison Trib 4 to reduce livestock usage of the riparian habitat. Elk fencing was placed surrounding no named spring on Ellison Trib 4 to protect the 2009 introductions. Livestock fencing was built to protect the CLF release (2009) on Lewis creek.

In each year since 2006, releases of tadpoles and small Chiricahua leopard frogs and/or movement of egg masses between sites have occurred in the Gentry Creek MA. Similar efforts have occurred since 2009 in the Upper East Verde River MA. Surveys of stock tanks, springs, and creeks have occurred in the Gentry Creek Area since 2004 and the Ellison Creek Area since 2006. A total of 78 miles of creeks and 33 springs and stock tanks in the Gentry Creek area and 50 miles of creeks and 19 springs and stock tanks in the Payson/Ellison Creek watershed area are surveyed each year to monitoring known populations and located new sites.

EFFECTS OF THE ACTION

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

Background Information regarding the Proposed Action

The proposed action being analyzed in this BO/CO is implementation of the Tonto NF LRMP and its amendments. During the 2005 LRMP consultation, the FWS and USFS jointly developed a set of CMs for the Chiricahua leopard frog which became part of the proposed action. The five CMs are listed below.

Conservation Measure #1: Design projects in occupied Chiricahua leopard frog habitat on National Forest System lands which address the appropriate components of the Chiricahua leopard frog recovery plan, with the goal of implementing projects with beneficial, insignificant, or discountable effects to Chiricahua leopard frog.

Conservation Measure #2: Over the next five years, cooperate with state game and fish agencies, other federal agencies, Forest Service research stations, FWS, and others (universities etc.) to assess and prioritize habitat for potential Chiricahua leopard frog reintroduction. Cooperatively document the result in an annual report to the FWS and to the extent feasible within the mission and capabilities of the Forest Service assist the with any Chiricahua leopard frog reintroduction efforts.

Conservation Measure #3: Implement, as appropriate, recommendations to minimize the effects of stock pond management and maintenance identified in the final recovery plan for the Chiricahua leopard frog.

Conservation Measure #4: Continue to implement the standardized interagency monitoring protocol for Chiricahua leopard frogs.

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 Forest Service agrees to the following:

a. Pre-ignition Planning: Maintain current distributions of threatened, endangered, proposed, and candidate species in GIS layers on each National 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 Forest Service 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 FWS, 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.

An LRMP provides guidance and direction in the context of a broad management framework. These LRMPs define the direction for managing the NFs. Direction in the LRMP is provided in the form of the Standards & Guidelines (S&Gs). Because it was unclear what the operational difference is between a "standard" and "guideline," we did not differentiate between the two for our analysis. While the FWS recognizes that much discretion exists on the part of forest managers at the project level, in the implementation of LRMPs through the S&Gs, this discretion also adds to the complexity of this consultation due to the conflicting nature of some S&Gs that exist between the different operating programs within the same Forest. We provide examples of this below by USFS program.

This BO/CO is now covering the incidental take from projects that consulted upon in previous opinions but have yet to be implemented or are ongoing. These projects include the 10-year

Livestock Grazing Management Plan for Red Lake Allotment, Little Green Valley Complex Allotment, and the Ongoing Livestock Grazing on the Crouch Mesa Allotment.

The S&Gs are written to apply Forest-wide or to a specific MA. The Tonto NF has designated "MAs" based on such criteria as vegetation type, principal land use, and special management designations such as wilderness areas. The LRMP contains some S&Gs that apply Forest-wide and some that apply only to specific MAs. During the development of a project, each management program reviews Forest-wide and MA-specific S&Gs that either give direction to, or place constraints on, management activities (e.g., logging, grazing, recreation, mining, etc.). The S&Gs that provide direction state what will be accomplished to achieve specific resource goals.

The LRMP directs how current and future activities will be carried out in the following management programs: (1) Engineering, (2) Fire Management, (3) Forestry and Forest Health, (4) Lands and Minerals, (5) Rangeland Management, (6) Recreation, Heritage and Wilderness, (7) Watershed Management, and (8) Wildlife, Fish, and Rare Plants. Each of the USFS's eight resource programs were discussed in depth within the April 8, 2004, BA, the June 10, 2005, LRMP BO/CO, and the April 6, 2011, BA.

Effects of the Action on the Chiricahua Leopard Frog

Effects to the Chiricahua leopard frog were evaluated in detail in the 2005 BO/CO (see U.S. Fish and Wildlife Service 2005). The majority of the S&Gs, which continue to be implemented as the proposed action within the Coconino NF LRMP, were considered positive in the sense that they would maintain habitat for the frog or provide for recovery. However, potential adverse effects were found in all of the management programs. The Fire Management Program combines elements of fire prevention, prescribed fire, wildland fire, and fire suppression. However, wildland fire, including fire suppression and wildland fire use, are not included in the proposed action and consultation on these actions will continue to be handled under emergency Section 7 consultation procedures.

Fire Management Program - No applicable S&Gs in the Fire Management Program are likely to result in direct negative impacts to the Chiricahua leopard frog. However, the use of prescribed fire could provide benefits to the Chiricahua leopard frog by reducing the risk of catastrophic wildfire, which given the limited numbers of populations in existence, could have serious impacts to population functions. At the project level, the fuels treatment projects are likely to result in lethal incidental take of individuals associated with humans, tools, machinery, and burning. There is also likely to be temporary avoidance of the burned and/or cleared areas resulting in decreased breeding success. Finally, as stated above, sedimentation/erosion and ash flows in burn areas have been known to cause local extirpations of Chiricahua leopard frog s in the affected areas.

Engineering Program - No applicable S&Gs in the Engineering Program are likely to result in negative effects to the Chiricahua leopard frog. However, there may be negative effects from this program not captured in the applicable S&Gs. The Engineering Program includes activities such as construction, maintenance, and operation of roads. Construction and use of roads in general

may have negative effects on Chiricahua leopard frogs in that, at any road density, improperly placed roads may disrupt metapopulation dynamics due to habitat fragmentation if these roads serve as barriers to movement (deMaynadier 2000). These effects would likely result in reduced feeding and breeding success due to degraded habitat and increased difficulty in dispersion and reproduction. Although not documented for Chiricahua leopard frogs, mortality of other species of leopard frogs by vehicle traffic on roadways can be considerable (Carr and Fahrig 2001). Chiricahua leopard frogs, although rarely, are sometimes found on roads (J. Rorabaugh, FWS, 2005, unpubl. data) where they could be subject to road mortality.

Rangeland Management Program - Of the applicable S&Gs in the Rangeland Management program, S&Gs 1376 and 1375 allow for some grazing. Standard and Guideline 1370c calls for continued maintenance of stock tanks. In addition, the goal statement for the Rangeland Management Program is to "Emphasize a program of range administration which will bring the range resource under proper management and improve range forage conditions (Tonto NF LRMP)." Where livestock is grazed in occupied Chiricahua leopard frog habitats, some negative impacts are expected even if the range management is allowing for improvement of the range condition. Impacts include reduced feeding and breeding success through avoidance of degraded areas. In addition, there could be impacts to individual Chiricahua leopard frogs under any grazing regime, in the form of lethal take via trampling, the possible spread of Bd, and livestock water maintenance, especially stock tanks used by Chiricahua leopard frogs as refugia.

The specific effects of livestock grazing on leopard frog population trends are not well-studied, however the literature is robust in its treatment of livestock grazing on aquatic and riparian habitat. Livestock are known to spend a disproportionate amount of their time in riparian zones and thus can adversely affect these systems in a number of ways (U.S. Fish and Wildlife Service 2007:32). Livestock grazing is nearly ubiquitous within the historical range of the Chiricahua leopard frog . In Arizona, stock tanks have become important habitats for the Chiricahua leopard frog. Adverse effects to the species and its habitat may occur under certain circumstances as a result of livestock grazing activities; particularly in drought conditions or in instances where numerous stressors on Chiricahua leopard frog populations act in concert.

Actual trampling of metamorphosed Chiricahua leopard frogs from livestock using occupied habitat has been reported in rare instances. In extreme drought conditions, the likelihood of adult or larval Chiricahua leopard frogs being trampled may increase due to the decrease of standing water and increase in livestock use. However, we believe the most significant adverse effect of livestock accessing breeding habitat of the Chiricahua leopard frog is the high likelihood of trampling egg masses. Egg masses may contain over 1,000 individual eggs and with even a one percent survival rate, constitute the simultaneous mortality of 10 or more reproductive individuals. Egg masses are also particularly important for use in head-starting, specifically in circumstances with limited access to egg masses within particular genetic strains.

Indirect effects from livestock grazing may include: deterioration of watersheds, erosion, scouring, and/or siltation of stream course, elimination of off-channel pools that provide breeding habitat and undercut banks that provide cover for Chiricahua leopard frogs, and possibly the spread of disease (i.e., Bd) (U.S. Fish and Wildlife Service 2007:33).

Forestry and Forest Health Program - Standard and Guideline 1400 in Forestry and Forest Health Program allows for skidding in areas with slopes of 40 percent or less. This S&G helps to minimize some erosion impacts, but it does not eliminate the potential for skidding and use of heavy machinery in the riparian or other occupied areas, which is likely to result in lethal take of individuals. There is also likely to be some temporary avoidance of the project areas which could result in reduced breeding success if projects occur during these times. Standard and Guideline 1398 provides some restrictions on timber sale roads by reducing erosion and soil compactions which degrade watersheds and alter streamflows. However, it does not completely remove the impacts. Roads may still be used in occupied areas resulting in lethal take of Chiricahua leopard frog s due to trampling, skidding, and heavy machinery and reduced breeding success to due avoidance of project areas.

Standards and Guidelines 1401 and 1403 should help to reduce the impacts of S&G 1400 by placing restrictions on use of skidding in sensitive soils and during inclement weather. This would help to alleviate the impacts on the watershed, but would not prevent lethal take of Chiricahua leopard frog s from the machinery and skidding itself.

Lands and Mineral Program - No applicable S&Gs in the Lands and Mineral Program are likely to result in negative impacts to the Chiricahua leopard frog. In addition, no negative impacts are anticipated from this program as a whole.

Recreation, Heritage, and Wilderness Program - No applicable S&Gs in the Recreation Program are likely to result in negative impacts to the Chiricahua leopard frog. However, there may be negative effects from the Recreation Program not captured in the applicable S&Gs. The goal statement for this program is to "Maintain and enhance visual resource values by emphasizing recreation resource management which will increase opportunities for a variety of developed and dispersed experiences. Provide those developed sites needed to meet most of the public demand and to support dispersed visitor use (Tonto NF LRMP)." This goal statement implies a multiple use recreation program which may include camping, hiking, boating, and fishing. Although these activities are not directly identified as threats to the Chiricahua leopard frog, they are likely to involve some incidental take of individual Chiricahua leopard frogs in the form of as disturbance, avoidance of impacted recreation areas, and even mortality if stepped on by humans. Additionally, as these recreational users move through the environment, they might contribute to the spread of Bd, especially water users if boats and other equipment are not thoroughly dried or sterilized between sites. Some recreationists are also likely to spread nonnative predators.

Watershed Management Program - No applicable S&Gs in the Watershed Management Program are likely to result in direct negative effects to the Chiricahua leopard frog. However, S&G 1350 allows for grazing in the riparian in order to rehabilitate the shrub cover. Any grazing in the riparian is likely to result in lethal take of individual Chiricahua leopard frogs and avoidance of the area resulting in decreased breeding success, as discussed under the Rangeland Management Program.

Wildlife, Fish, and Rare Plants Program - No applicable S&Gs in the Wildlife Program are likely to result in direct negative effects to the Chiricahua leopard frog. However, S&G 1348 provides for utilization within the riparian areas that will not exceed 20 percent of the current

annual growth by volume of woody species. This concept does not apply to the Chiricahua leopard frog as multiple life stages occur throughout the year; thus even if the riparian is not adversely affected, there could still be incidental trampling of Chiricahua leopard frogs.

Standards and Guidelines 1364 and 1365 allow for the minimization of impacts of roads in riparian areas. This should help to decrease watershed degradation in these areas. However, the actual construction and use of any roads in the riparian is likely to result in lethal take of individual Chiricahua leopard frog s from use of tools and machinery, and avoidance of the project area resulting in decreased breeding success. A number of S&Gs in the Wildlife Program provide a great deal of benefit to the Chiricahua leopard frog . Standards and Guidelines 1345, 1391, and 1410 all allow for habitat requirements for T&E species to take precedence over those for other species. These S&Gs should help to minimize the effects of projects and activities in all of the forest programs and even help establish new populations.

These S&Gs should help the Tonto NF to minimize the effects of other projects, prioritize its projects such that negative impacts of other Tonto NF uses could occur largely outside critical Chiricahua leopard frog areas, and may also result in increased population numbers and sizes.

In summary, the majority (79%) of the applicable S&Gs are likely to result in beneficial effects in the sense that management would maintain habitat for the Chiricahua leopard frog. Five percent of the applicable S&Gs are likely to cause negative responses of Chiricahua leopard frogs. The remaining 15 percent of the applicable S&Gs have no effect to the Chiricahua leopard frog or are subject to interpretation and difficult to analyze. There have been three amendments to the Tonto LRMP since the 2004 BA. It was determined that none of those amendments would affect the Chiricahua leopard frog. In summary, the applicable S&Gs within the Tonto NF LRMP have the potential to result in a variety of effects to the frog. To a large extent, activities conducted under the positive S&Gs should benefit the frog and/or help to eliminate or minimize the effects of activities conducted under the negative S&Gs. However, the positive S&Gs do not of themselves eliminate the possibility of take, thus take of frogs is reasonably certain to occur as a result of implementation of the Tonto NF LRMP.

Effects of the Action on Chiricahua Leopard Frog Critical Habitat

In our analysis of the effects of the action on CH, we must determine if the proposed action impacts CH PCEs to the point that they diminish the value of that CH for the recovery of listed species. To determine if an action results in destruction or adverse modification of CH, we must also evaluate the current condition of all designated CHUs and their PCEs, to determine the overall ability of all designated CH to support recovery. We evaluate the effects of the proposed action on each of the PCEs essential to the Chiricahua leopard frog below, and synthesize this to evaluate the effects of the action on the role of CH in recovery in the section that follows.

The FWS only proposed CH in 2011 and finalized the CH designation in 2012 (77 FR 16324). Therefore, we have not yet analyzed the effects of site-specific projects on CH occurring on the Tonto NF. Based upon actions we have consulted on within this action area, continued implementation of the Tonto NF LRMP may result in projects with adverse effects to CH. Below the PCEs related to Chiricahua leopard frog aquatic breeding habitat (including

immediately adjacent uplands) and dispersal habitat and the potential effects from implementation of the LRMP are described.

1. Aquatic breeding habitat and immediately adjacent uplands exhibiting the following characteristics:

> *PCE 1a:* Standing bodies of fresh water, including natural and manmade (e.g., stock) ponds, slow-moving streams or pools within streams, off-channel pools, and other ephemeral or permanent water bodies that typically hold water or rarely dry for more than a month. During periods of drought, or less than average rainfall, these breeding sites may not hold water long enough for individuals to complete metamorphosis, but they would still be considered essential breeding habitat in non-drought years.
>
> *Effect:* Actions implemented under the LRMP are expected to retain and recover this PCE for frogs. There are S&Gs in place to ensure that areas supporting listed species are not dewatered or impaired to the point that they cannot support frogs. Cleaning (i.e., draining and or removal of sediment) of stock tanks or piping of water from pools (spring-fed or perennial) that provide habitat for Chiricahua leopard frogs could result in the loss and/or reduction (reduced depth) of this PBF. However, occasional drying for short periods (less than one month) may be beneficial in that the frogs can survive, but nonnative predators, particularly fish, and in some cases, American bullfrogs and populations of aquatic forms of tiger salamanders, will be eliminated during the dry period (U.S. Fish and Wildlife Service 2007).
>
> *PCE 1b:* 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.
>
> *Effect:* The Rangeland Management Program is expected to result in adverse effects to this PCE. Livestock will eat and/or modify emergent and submerged vegetation at sites they occupy resulting in loss of cover for frogs. However, because we have worked with the Tonto NF to fence off portions of stock tanks and creeks occupied by Chiricahua leopard frogs and designated these locations as CH, the expected effect is that vegetation inside the protective fences will be protected and will maintain sufficient vegetation at these stock tanks to support breeding frogs (e.g., vegetation to attach egg masses, provide cover and food to tadpoles, etc.).
>
> *PCE 1c:* Nonnative predators absent or occurring at levels that do not preclude presence of the Chiricahua leopard frog.
>
> *Effect:* The Tonto NF is implementing CMs to ensure that actions implemented under the LRMP, particularly movement of water under the Fire Management and Range Management Programs does not result in the incidental movement of nonnative species into CH. These measures include mandatory notification of USFS biologists and the FWS 60-days prior to cleaning any stock tank located within Chiricahua leopard frog areas. Efforts are also made to ensure that USFS employees are aware of what stock

tanks contain frogs and nonnative species so that the potential for inadvertent transfers of nonnative species to occupied habitat is reduced.

PCE 1d: Absence of chytridiomycosis (Bd), or, if present, then environmental, physiological, and genetic conditions are such that allow persistence of Chiricahua leopard frogs.

Effect: There is the potential that actions carried out under the LRMP, such as the cleaning/sediment removal of stock tanks and moving machinery between stock tanks could result in the movement of Bd, or other diseases, to CH. However, the Tonto NF provides preventative measures to all of its livestock allotment permittees, field personnel, and others working in/near CH that require equipment be disinfected between sites. Pathogens, such as Bd, can easily be transferred between habitats on equipment and footwear. Disinfecting equipment between sites should significantly reduce the potential for Bd to be transmitted to CH.

PCE 1e: Upland areas that provide opportunities for foraging and basking that are immediately adjacent to or surrounding breeding aquatic and riparian habitat.

Effect: Rangeland management actions may result in reduced vegetative habitat immediately around and surrounding CH. As recommended by the Recovery Plan, reproductive sites have been partially fenced and stock-pond management guidelines are being followed according to the USFS. We have worked with the Tonto NF to fence off portions of stock tanks and creeks occupied by reproducing populations of Chiricahua leopard frogs and designated these locations as CH, the expected effect is that vegetation inside the protective fences will be protected and will maintain sufficient vegetation at these stock tanks to support breeding frogs (e.g., vegetation to attach egg masses, provide cover and food to tadpoles, etc.). Fencing at reproductive sites will leave some areas adjacent and immediately surrounding the stock tanks and creeks vegetated by denying livestock access. Livestock will be able to eat, trample, and/or otherwise modify vegetation outside the fenced area. This may result in some beneficial effects by providing basking habitat (e.g., open areas) for frogs.

2. Dispersal and non-breeding habitat, consisting of areas with ephemeral (present for only a short time), intermittent, or perennial water that are generally not suitable for breeding, and associated upland or riparian habitat that provide corridors (overland movement or along wetted drainages) for frogs to move among breeding sites in a metapopulation. The dispersal and non-breeding habitat need to have the following characteristics:

PCE 2a: Are not more than 1.0 mile 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.

Effect: Actions implemented under the LRMP should not result in the loss of stock tanks within CH that would change the movement distance between stock tanks. Therefore, dispersal and non-breeding habitat should remain intact.

PCE 2b: In overland and non-wetted corridors, provides some vegetation cover or structural features (e.g., boulders, rocks, organic debris such as downed trees or logs, small mammal burrows, or leaf litter) for shelter, forage, and protection from predators; in wetted corridors, provides some ephemeral, intermittent, or perennial aquatic habitat.

Effect: Actions implemented under the LRMP should not significantly reduce or modify this PBF within CH. Though actions may result in small reductions in organic debris as a result of prescribed fire, road maintenance, or livestock grazing, these impacts are not likely to significantly modify this PBF.

PCE 2c: Are free of barriers that block movement by Chiricahua leopard frogs, including, but not limited to, urban, industrial, or agricultural development; reservoirs that are 50 acres or more in size and contain predatory nonnative fishes, bullfrogs, or crayfish; highways that do not include frog fencing and culverts; and walls, major dams, or other structures that physically block movement.

Effect: Actions implemented under the LMRP would not result in the creation of barriers to movement within CH.

Effects of the Action on the Role of Critical Habitat in Recovery

Adverse effects and associated incidental take from the projects since 2005 (see Table 5 above) are not expected to negatively affect Chiricahua leopard frog recovery and/or further diminish the conservation contribution of CH to the recovery of the Chiricahua leopard frog. These projects include Buzzard Roost and Soldier Camp allotments, Chrysotile Allotment, 10-year Livestock Grazing Management Plan for Red Lake Allotment, Little Green Valley Complex Allotment, and on-going grazing on the Crouch Mesa Allotment.

The proposed action includes actions that are recommended in the Recovery Plan. These actions were identified as being necessary to recover the Chiricahua leopard frog and the Tonto NF is either implementing or assisting with implementation of these actions in CH. These actions include the following:

- The Tonto NF has and continues to design projects in occupied Chiricahua leopard frog habitat which address the appropriate components of the Recovery Plan, with the goal of implementing projects with beneficial, insignificant, or discountable effects to Chiricahua leopard frog.

- The Tonto NF has and continues to implement actions to minimize the effects of stock pond management and maintenance as identified in the Recovery Plan. As recommended by the Recovery Plan, occupied stock tanks have been partially fenced and stock-pond management guidelines are being followed according to the USFS.

- The Tonto NF, working with FWS and AGFD, has been monitoring potential habitat following the standardized interagency monitoring protocol for the Chiricahua leopard frog.

- The Tonto NF maintains GIS layers for the current distribution of Chiricahua leopard frogs on the forest and this information is used to guide fire management and mitigation to avoid or minimize the effect of wildland fires on the species. Fire use operational plans on each district are reviewed and updated prior to each fire season and are followed during a fire use event. USFS and FWS biologist are consulted prior to determining if a natural fire ignition may be allowed to burn in listed species habitat.

- The Tonto NF continues to participate in Chiricahua leopard frog 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. The Regional Office has financially supported reintroduction projects, survey training workshops, and frog propagation efforts during the reporting period. In addition, the biologists on the Tonto NF are active members of the Chiricahua leopard frog multi-organization conservation team. Further, the Tonto NF biologists have also helped with habitat improvements and re-introduction of populations.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this BO/CO. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act. Wildlife herds such as elk are managed by AGFD and NMDGF. Grazing by elk can adversely affect riparian health in similar ways as livestock. Additionally, sport fish stocking and management on USFS lands is conducted through these state agencies. The threat of non-native fishes to Chiricahua leopard frogs has been well documented. Although these programs are managed primarily by the state agencies, many of them are consulted on through the Federal Aid or Fisheries programs.

CONCLUSIONS

This BO/CO does not rely on the regulatory definition of "destruction or adverse modification" of CH in 50 CFR 402.02 because of various court cases surrounding the FWS's jeopardy and adverse modification analyses. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to CH. Critical habitat is defined in section 3 of the Act "as the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical and biological features essential to the conservation of the species and that may require special management considerations or protection; and specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species." We have also relied upon the Consultation Handbook which provides guidance on determining adverse modification of CH and jeopardy pursuant to the

following: "Adverse effects on individuals of a species or constituent elements or segments of CH generally do not result in jeopardy or adverse modification determinations unless that loss, when added to the environmental baseline, is likely to result in significant adverse effects throughout the species' range, or appreciably diminish the capability of the CH to satisfy essential requirements of the species" (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998:4-34).

After reviewing the current status of the Chiricahua leopard frog and its CH, the environmental baseline for the action area, the effects of the proposed action, and cumulative effects, we conclude that continued implementation of the LRMP for the Tonto NF will not jeopardize the continued existence of the frog and will not destroy or adversely modify CH for the Chiricahua leopard frog. Effects analyses and conclusions in BOs from 2005 through 2010 for the Tonto NF also determined that projects implemented under the current LRMP were not likely to jeopardize the continued existence of the Chiricahua leopard frog. Further, summary of our reasoning for determining that the continued implementation of the LRMP for the Tonto NF will not jeopardize the frog and will not destroy or adversely modify CH for the species is based on the following:

- During the 2005 LRMP consultation, the FWS and USFS jointly developed a set of CMs for the Chiricahua leopard frog which became part of the proposed action. Since then, the USFS has incorporated these recommendations into individual projects consulted on under the 2005 LRMP BO/CO and provided project implementation monitoring information to the FWS indicating that these projects were implemented as proposed. These CMs have been slightly modified and incorporated into the proposed action under this consultation (2011 LRMP).

- Standards and Guidelines within the Tonto NF's LRMP have not changed since 2005, the majority of which were found to be beneficial to the Chiricahua leopard frog. The frog's environmental baseline has improved on the Tonto NF as a result of conservation actions implemented by FWS, AGFD, and the USFS. These actions, such as habitat improvements and reintroductions, have resulted in an increase in the number of occupied sites since 2005 and protection of recently designated CH (e.g., fencing at occupied tanks to prevent livestock access to portions of the tank).

- Projects implemented under the Tonto NF's LRMP have not lead to a jeopardy determination.

The conclusion of this BO/CO are based on full implementation of the project as described in the Description of the Proposed Action section of this document, including any CMs that were incorporated into the project design.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the take of endangered and threatened species, respectively, without special exemption. Take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to

engage in any such conduct. “Harm” is further defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. “Harass” is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. “Incidental take” is defined as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the Act provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

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

Amount of Take

Incidental take of the Chiricahua leopard frog is reasonably certain to occur as a result of the continued implementation of the Tonto NF LRMP. This incidental take is expected to be in the forms of harm (including direct mortality) and harassment resulting from site-specific projects implemented under the LRMP. However, it is difficult to quantify the number of individual frogs taken because: (1) dead or impaired individuals are difficult to find (and are readily consumed by predators) and losses may be masked by seasonal fluctuations in environmental conditions; (2) the status of the species could change over time through immigration, emigration, and loss or creation of habitat; and (3) the species is small-bodied, well camouflaged, and occurs under water of varying clarity.

The standard Visual Encounter Surveys (VES) method is the survey protocol used to conduct Chiricahua leopard frog surveys (U.S. Fish and Wildlife Service 2007, Appendix E). The VES method will generate presence/absence data if used independently and generate information from which inferences about frog abundance and trends can be made at a specific site. However, we do not have a means of counting all individual frogs at a site. As noted above, we believe that we cannot measure the number of frogs taken as a result of this action because these frogs are difficult to find, particularly if they are dead or impaired, and the frog is difficult to see due to its size, cryptic coloring, and complex habitat. In addition, egg masses and tadpoles are frequently hidden in submerged vegetation and cannot be counted precisely. Therefore, though we can generate counts of frogs seen by surveyors, results from these surveys do not provide an accurate estimate of the number of frogs present at the site. If we are unable to know the number of frogs

at a site, it follows logically that we would be unable to count the number of frogs potentially incidentally taken as a result of the proposed action.

Since we cannot estimate the number of individual frogs that will be incidentally taken for the reasons listed above, the FWS is providing a mechanism to quantify when take would be considered to be exceeded as a result of the implementing the Tonto NF LRMP within the Gentry Creek and Ellison Creek areas (i.e., we will use the existing number of occupied sites on the Tonto NF to determine when take is exceeded). As of 2012, we consider there to be two reproductive sites on the Pleasant Valley RD and seven reproductive sites on the Payson RD. We conclude that the incidental take of Chiricahua leopard frogs will be considered exceeded if there is a net loss in the number of reproductive sites in either Ranger District for a period of three consecutive years a result of the implementation of the Tonto NF LRMP. In other words, we have identified actions that may result in the incidental take of individual frogs (due to actions implemented under the Management Programs discussed in the Effects section above); however, we do not anticipate the complete loss of an entire occupied stock tank as a result of any action authorized under the LRMP. The actions analyzed under the LRMP could take several (though we are unable to count the exact number) individual frogs of various life stages (frogs, tadpoles, and eggs) through direct mortality or harm from trampling (human, animal, or machine), and harm and/or harassment through habitat modification (e.g., as a result of roads, livestock, piping of water, and/or the movement of disease or nonnative predators through cleaning of stock tanks, or other action resulting in take authorized under the LRMP). If the loss of a currently occupied site occurs, in coordination with the Tonto NF, we will determine whether it was the result of the proposed action or if environmental conditions (such as drought) caused the loss (as occurred in 2002, see Environmental Baseline). This amount of incidental take will not prevent the MA from achieving recovery goals because existing occupied sites can serve as source populations to colonize new sites or recolonize formerly extant sites through metapopulation principles. Artificial population augmentations can also occur, as has been done in the past. We expect the Tonto NF will continue to work with the FWS and AGFD to continue to implement actions such as head-starting, wild-to-wild egg mass transfers, and habitat protection (e.g., fencing, silt fences, etc.) that will result in an increase in the number and resiliency of reproductive or occupied sites on the NF.

Effect of the Take

In this BO/CO, the FWS determines that this level of anticipated take is not likely to result in jeopardy to Chiricahua leopard frogs. While the proposed action, implementation of S&Gs under the seven Management Programs described in the Effects Section, may adversely affect the frog in the short-term through the loss of individual frogs of various life stages through any of the forms of incidental take described above, none of these actions as described in the BA should result in the loss of all frogs at a given stock tank.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

The FWS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of Chiricahua leopard frogs.

1. Minimize or eliminate adverse effects to Chiricahua leopard frogs on the Tonto NF.
2. Minimize or eliminate adverse effects to Chiricahua leopard frog habitat on the Tonto NF.
3. Monitor the impacts of site-specific projects on the Chiricahua leopard frog on the Tonto NF.

TERMS AND CONDITIONS

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

The following terms and conditions will implement reasonable and prudent measure 1:

1.1 The Tonto NF shall make protection of occupied breeding sites a priority during implementation of projects, which may include partial (or in rare circumstances, total) exclusion fencing of stock tanks, if necessary.

1.2 Where feasible, all equipment that comes into contact with aquatic habitats will be cleaned and disinfected or allowed to dry completely before visiting a different aquatic site by removing all soil, mud, and debris to ensure that Bd or other diseases are not spread between sites.

The following terms and conditions will implement reasonable and prudent measure 2:

2.1 Live fish, crayfish, bullfrogs, leopard frogs, salamanders, or other aquatic organisms shall not be moved among earthen stock tanks or other aquatic sites by Tonto NF employees or permittees unless approved by the FWS.

2.2 Water shall not be hauled to occupied sites by Tonto NF employees, permittees, or anyone operating under FS authorization, from other sites that support leopard frogs, bullfrogs, crayfish, or fish.

The following terms and conditions will implement reasonable and prudent measure 3:

3.1 The Tonto NF shall monitor incidental take resulting from the proposed action and report their findings to the FWS. Incidental take (implementation) monitoring shall include information such as when or if the project was implemented, whether the project was implemented as analyzed in the site-specific BO (including CMs, and BMPs), breeding season(s) over which the project occurred, relevant frog survey information, and any other pertinent information as described in the site specific BO about the project's effects on the species.

3.2 Annual reports, which will include this species, shall be sent to the appropriate local FWS Ecological Services field office by March 1st of each year.

CONSERVATION RECOMMENDATIONS

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

1. We recommend that the Forest implement Forest-specific actions within the Chiricahua Leopard Frog Recovery Plan.
2. We recommend that the USFS support research on the Forest to study how Bd is spread throughout Chiricahua leopard frog populations.

We recommend the Forest pursue opportunities for Safe Harbor Agreements with private landowners with inholdings surrounded by Forest land to create opportunities for additional refugium populations of Chiricahua leopard frogs.

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

DESERT PUPFISH

STATUS OF THE SPECIES

The desert pupfish was listed as an endangered species with CH in 1986 (51 FR 10842). Historical collections occurred in Baja California and Sonora, Mexico and in the U.S. in California and Arizona. Historical distribution of desert pupfish in Arizona included the Gila, San Pedro, Salt, and Santa Cruz rivers, and likely the Hassayampa, Verde, and Aqua Fria rivers, although collections are lacking for the latter three. The desert pupfish is also found in the Lower Colorado River, Rio Sonoyta basin, Salton Sink basin, and Laguna Salada basin (Eigenmann and Eigenmann 1888, Garman 1895, Gilbert and Scofield 1898, Evermann 1916, Miller 1943, Minckley 1980, Black 1980, Turner 1983, Miller and Fuiman 1987).

The desert pupfish is in the family Cyprinodontidae. In Arizona, this family was historically represented by two recognized subspecies, (*Cyprinodon m. macularius)* and (*C. m. eremus)*, and an undescribed species, the Monkey Spring pupfish. Minckley et al. (2002) raised *C. m.*

*eremus*to a species, *C. eremus*. Also, Minckley et al. (2002) suggested that the Santa Cruz River drainage was historically occupied by the extinct Santa Cruz (Monkey Spring) pupfish, described as *Cyprinodon arcuatus*. Minckley et al. (2002) suggest that the species are similar enough that they were long confounded under *C. macularius,* and the biogeographic considerations suggest that the affinities of *C. arcuatus*lie with *C. macularius* or *C. eremus*. The Rio Sonoyta pupfish (*C. eremus*) occurs in Quitobaquito Spring in the Rio Sonoyta drainage. Critical habitat in Arizona only occurs at Quitobaquito Spring (51 FR 10842).

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

Naturally occurring populations of desert pupfish (*Cyprinodon m. macularius* or *C. macularius*) are now restricted in the U.S. to two streams tributary to, and in shoreline pools and irrigation drains of, the Salton Sea in California (Lau and Boehm 1991). This species is found in Mexico at scattered localities along the Colorado River Delta and in the Laguna Salada basin (Hendrickson and Varela-Romero 1989, Minckley 2000). The Rio Sonoyta pupfish (*Cyprinodon m. eremus* or *C. eremus*), recently considered a separate species, persists in only two populations: one near the U.S. – Mexico border at Quitobaquito Springs in Organ Pipe Cactus National Monument in Arizona, in the U.S., and the other at Rio Sonoyta in Sonora, Mexico. Collectively, there are 11 extant populations of desert pupfish known in the wild in the U.S. and Mexico (California = 5, Arizona = 1, and Mexico = 5, Tier 1 populations in the Recovery Plan). Although many reintroductions have been attempted, approximately 16 transplanted populations of the desert pupfish exist in the wild at present, all in Arizona (Tier 2 populations in the Recovery Plan). There is a total of 46 captive or refuge desert pupfish populations (that do not qualify for the Tier 3 category), comprised of 27 in Arizona, 15 in California, and 4 in Sonora, Mexico. The range-wide status of desert pupfish is poor but stable. The fate of the species depends heavily upon future developments in water management of the Salton Sea and Santa de Clara Cienega in Mexico.

One or more threats imperil most natural and transplanted populations. Since the 19th century, desert pupfish habitat has been destroyed by stream bank erosion, the construction of water impoundments that dewatered downstream habitat, excessive groundwater pumping, the application of pesticides to nearby agricultural areas, and the introduction of nonnative fish species. Nonnative bullfrogs may also prove problematic in the management of desert pupfish. The bullfrog is an opportunistic omnivore with a diet throughout its range that includes fish (Cohen and Howard 1958, Clarkson and deVos 1986). There is also a concern that introduced salt cedar (*Tamarix* spp.) next to pupfish habitat may cause a lack of water at critical times (Bolster 1990; R. Bransfield, USFWS, pers. comm., 1999). The remaining populations continue to face these threats, and the Salton Sea area populations, in particular, are severely threatened.

Recovery Actions

A number of potentially viable sites have been identified by federal and state agencies that could support desert pupfish. These sites have not been stocked, but many have been evaluated.

The Arizona Department of Transportation has completed a Safe Harbor Agreement for the Gila topminnow and the desert pupfish (Arizona Department of Transportation 2000). This agreement covers all properties managed by Arizona Department of Transportation. The Arizona Game and Fish Department (AGFD) also has developed a Safe Harbor Agreement, which allows Gila topminnow and desert pupfish populations to be established on non-federal lands. Implementation of this Safe Harbor Agreement has allowed for the establishment of eight new populations and maintenance of genetic stocks and refuge populations in natural, semi-natural, or manmade habitats, which will aid in recovery efforts for the two species.

One stocked pond known as Mud Springs occurs on the Tonto NF. There are many reasons for failure of many of the stocked populations, but flooding, desiccation, water development, livestock, and non-native species have been identified as the major reasons (Brooks 1985, Weedman and Young 1997, Voeltz and Bettaso 2003). Additional efforts have identified suitable sites for stocking the pupfish on NFS lands.

ENVIRONMENTAL BASELINE

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

Status of the Species in the Action Area

There is one population of desert pupfish on NFS lands in Arizona on the Tonto NF. Several occupied desert pupfish watersheds contain or adjoin NFS lands within the action area of the Tonto NF (i.e. Redfield Canyon, Larry Creek, Lousy Canyon).

Factors Affecting the Species within the Action Area

The most-recent consultation regarding desert pupfish on the Tonto NF was our January 5, 2010, BO on forest uses and management of springs (22410-2009-F-0462). The action included measures to reduce the adverse effects of livestock grazing on Walnut Spring and Creek, Cottonwood Artesian, and Mud Spring (Tonto Basin) and recreation, vegetation management and pond maintenance, and crayfish removal. The proposed action may establish new populations of desert pupfish, which would contribute to recovery. The FWS anticipates that incidental take would be exceeded if desert pupfish are extirpated from all three ponds at the same time and it is due to the implementation of the Tonto NF projects. Terms and conditions were prescribed to ensure maintenance and monitoring of the sites, monitoring, and removing cattle quickly when they access exclosures. No fish have been released at these sites. In addition, we have removed Mud Spring (Tonto Basin RD) as a site for reintroduction.

The FWS transmitted a BO on Livestock Grazing on the Boneyback, Chrysotile, and Cross F Allotments (22410-2007-F-0218) to the Tonto NF on August 17, 2009. The BO examined the

effects of livestock grazing on desert pupfish and the species' habitat in Walnut Spring. The FWS anticipates that incidental take would be exceeded if the pond depth is reduced to six inches or less and this water decline is due to cattle grazing activities. Terms and conditions focused on measures to ensure monitoring of incidental take, maintenance of the fenced exclosures, and implementation of minimization measures.

The desert pupfish's status within the action area is not necessarily secure; the currently-occupied sites have not demonstrated occupancy over a sufficiently long time, and may lack the ability to survive the current, chronic drought. The reestablishment history of desert pupfish illustrates that even sites that were thought to be secure may fail for various reasons. Desert pupfish populations on federal lands are widely dispersed and in some cases vulnerable to events beyond the respective land management agencies' control. Such actions would include invasions or unauthorized introductions of non-native fishes and stochastic events such as floods or chronic drought. The risk associated with maintaining desert pupfish for the long-term across such a diversity of sites renders the species' status within the action area as tenuous as it is rangewide.

EFFECTS OF THE ACTION

The desert pupfish occurs on the Tonto NF at one site known as Mud Springs. The S&Gs listed in the Tonto NF LRMP and the 1996 Regional Amendment provide direction for the development of site-specific actions. Multiple S&Gs within the LRMP are applicable to the desert pupfish and its habitat. These S&Gs may result in both indirect and direct effects to the species. The 2005 BO/CO included tables showing the S&Gs considered for each species' analysis and a ranking table summarizing the types of effects (lethal, sublethal, etc.) expected to result from the S&Gs. Because no new significant scientific information has become available on the desert pupfish and there have been no changes in Forest policy or programs that would change the 2004 BA (USFS) and 2005 BO/CO (FWS) effects determination for this species, we hereby incorporate by reference the ranking tables and effects analysis presented in the 2005 BO/CO and provide a narrative summary below.

There are three S&Gs within the Tonto NF LRMP that may result in adverse effects to the desert pupfish. These S&Gs are within the Forestry and Forest Health; Rangeland Management; and Wildlife, Fish, and Rare Plants Programs, as discussed below. Although the majority of S&Gs are positive and provide for some level of recovery of the species, there were several that were beneficial in the long-term but had short-term adverse effects.

<u>Forestry and Forest Health Program</u>
The Forestry and Forest Health Program seeks to maintain a sustainable timber program consisting of vertical and horizontal diversity while protecting the watershed, riparian areas, stream channels, and water quality (U.S. Forest Service 2004). Overall, the S&Gs within this program have little effect on desert pupfish because the species generally does not occur in forested habitats.

With the above in mind, S&G 1400 seeks to restrict skidding to less than 40 percent slopes, but does not eliminate the possibility of sediment input into stream channels. Sedimentation from tributary canyons and streams leading into drainages contributes to the condition of the river

downstream. The amount of sediment in the stream system is a major force in determining the size and shape of the stream channel. Standards and Guidelines 1398, 1401, and 1403 will implement actions to reduce the impacts of soil disturbing activities to the watershed in the long-term, however this may result in short-term adverse effects.

Rangeland Management Program

Standards and Guidelines 1376 and 1423 seek to manage suitable rangelands at Level C and Level D, respectively. The effects that livestock management activities can have on riparian and aquatic habitats, both direct and through upland and watershed effects, have been well documented (Platts 1990, Bahre 1991, Meehan 1991, Fleischner 1994).

Sedimentation from tributaries contributes to the condition of the river downstream. The riparian vegetation and streambank condition in tributaries, including intermittent and ephemeral channels, form important buffers between upland impacts and the mainstem or perennial stream. A healthy riparian zone with substantial herbaceous cover is a very effective buffer for filtering sediment and pollutants before they can reach the stream (Erman et al.1977, Mahoney and Erman 1984, Lowrance et al.1984, Bisson et al.1992, Osborne and Kovacic 1993).

Although desert pupfish are highly tolerant of a wide range of environmental conditions, they may still be adversely affected by activities which alter the flow regime (i.e., water quality, quantity, intensity, and duration), degrading the stream channel, and modifying the floodplain and riparian vegetation structure and diversity. The ways in which the effects of livestock grazing are manifested, and the magnitude of the effects in the watershed, are dependent on local site conditions.

Wildlife, Fish and Rare Plants Program

Region-wide S&Gs within this program seek to maintain or improve habitat for listed and sensitive species, implement recovery plans, or ensure that beneficial activities occur for fish, wildlife, and plants. Within the Tonto NF LRMP, this program seeks to minimize or resolve conflicts between programs while maintaining a level of use compatible with federally listed species, healthy riparian areas watersheds, and stream channels (U.S. Forest Service 2004). However, little guidance is included in the Tonto NF LRMP that addresses the Wildlife Program. Standards and Guidelines 1355, 1364, and 1365 discuss rehabilitation and maintenance of riparian areas and include projects allowing for stream crossing and channel approaches. While the intent of these S&Gs is overall beneficial to the desert pupfish, the implementation of these S&Gs may result in short-term adverse effects to desert pupfish.

1996 Regional Amendment

All applicable S&Gs were determined to maintain habitat for the desert pupfish. Also, we found that the guidelines used by the USFS for the northern goshawk do not appreciably affect this species.

Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this BO/CO. Future federal actions

that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Off-highway vehicles (OHVs),Residential and commercial development on lands within watersheds containing T&E native fishes, are cumulative effects and can adversely affect the species through a variety of avenues.

Human population centers are also centers for the introduction and spread of nonnative aquatic species. New nonnative species are certain to be introduced in this area, and nonnative species already present in the area will continue to be introduced into new areas. These actions are likely to continue to impact wild aquatic ecosystems and extant or potential pupfish and topminnow sites.

Additional cumulative effects to desert pupfish include ongoing activities in watersheds such as livestock grazing and associated activities outside of federal allotments, irrigated agriculture, groundwater pumping, stream diversion, bank stabilization, channelization without a federal nexus, and recreation. Some of these activities, such as irrigated agriculture are declining and are not expected to contribute substantially to cumulative long-term adverse effects to native fishes.

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

CONCLUSION

After reviewing the current status of the desert pupfish, the environmental baseline, the effects of the proposed action, and the cumulative effects, it is the FWS's opinion that the proposed action is not likely to jeopardize the continued existence of the desert pupfish. Pursuant to 50 CRF 402.02, "jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species. No CH has been designated for the species on or near NFS lands in Arizona; therefore, none will be affected.

The FWS anticipates adverse effects to the desert pupfish from the implementation of the Tonto NF LRMP, as well as the 1996 Regional Amendment. However, the FWS does not believe the impacts of the proposed action will rise to the level of jeopardy for the species. The FWS bases this conclusion on the following reasons:

- Continuing efforts to stock desert pupfish in various wild sites and within NFS lands have allowed the status of pupfish populations to remain stable.

- The Tonto NF LRMP specifically states that habitat for desert pupfish will be maintained at current levels of occupied habitat.

Therefore, the FWS concludes that the proposed action is not likely to jeopardize the continued existence of the desert pupfish.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Per the Act, take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR 17.3)as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. "Incidental take" is defined (50 CFR 402.02) as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

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

Amount or Extent of Take Anticipated

Incidental take of the desert pupfish is reasonably certain to occur as a result of the continued implementation of the Tonto NF LRMP. On the Tonto NF, incidental take may result from the implementation of the Rangeland Management Program and Forestry and Forest Health Program. Harassment to individual fish may occur from activities conducted within occupied streams. Harm to the species occurs through activities that alter the suitability of the habitat to support desert pupfish.

The FWS anticipates incidental take of desert pupfish will be difficult to detect for the following reasons: finding a dead or impaired specimen is unlikely, and losses may be masked by seasonal fluctuations in environmental conditions and fish numbers. Although we cannot estimate the

number of individual pupfish that will be incidentally taken, the FWS is providing a mechanism to quantify when take would be considered to be exceeded at the population level. For purposes of this BO/CO, the FWS defines incidental take in terms of the number of extant populations.

The FWS concludes that the incidental take of desert pupfish will be considered to be exceeded if, over a period of two consecutive years, there is a loss of any currently extant population of desert pupfish on lands of the Tonto NF as a result of the proposed action. There is currently only one extant population on the Tonto NF, and this is the Mud Springs population.

Effect of the Take

In the accompanying BO/CO, the FWS determined that this level of anticipated take is not likely to result in jeopardy to the desert pupfish.

REASONABLE AND PRUDENT MEASURES

The FWS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of desert pupfish.

1. Minimize or eliminate adverse effects to the desert pupfish on the Tonto NF.
2. Minimize or eliminate adverse effects to desert pupfish habitat on the Tonto NF.
3. Monitor the impacts of the proposed action on desert pupfish populations on the Tonto NF.

TERMS AND CONDITIONS

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

The following terms and conditions will implement reasonable and prudent measure 1:

1.1 Manage riparian areas adjacent to and upstream of desert pupfish populations for conditions to minimize or eliminate direct and indirect effects to desert pupfish.

1.2 Design projects within the Forestry and Forest Health (i.e., pest management), Rangeland Management, Watershed Management, and Wildlife programs with the goal to minimize or eliminating adverse effects to the desert pupfish.

The following term and condition will implement reasonable and prudent measure 2:

2.1 Design projects in occupied desert pupfish habitat with the goal of implementing projects that have beneficial, insignificant, or discountable effects to the desert pupfish habitat.

The following term and condition will implement reasonable and prudent measure 3:

3.1 The Tonto NF shall monitor incidental take resulting from the proposed action and report their findings to the FWS. Incidental take (implementation) monitoring shall include information such as when or if the project was implemented, whether the project was implemented as analyzed in the site-specific BO (including CMs, and BMPs), breeding season(s) over which the project occurred, relevant fish survey information, and any other pertinent information as described in the site specific BO about the project's effects on the species.

3.2 Annual reports, which will include this species, shall be sent to the appropriate local FWS Ecological Services field office by March 1st of each year.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The federal agency must immediately provide an explanation of the causes of the taking and review with the FWS the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

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

1. Assist with the development of a desert pupfish monitoring plan that addresses all actions occurring within pertinent watersheds on the Coronado, Prescott, and Tonto NFs.

2. In cooperation with the AGFD and academia, assess habitat dynamics and fish- habitat relationships of the desert pupfish.

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

GILA TOPMINNOW

STATUS OF THE SPECIES

Description

Gila topminnow (*Poeciliopsis occidentalis occidentalis*) is a small live-bearing minnow belonging to the family Poeciliidae. The Gila topminnow is a subspecies of *Poeciliopsis occidentalis* that also includes the Yaqui topminnow (*Poeciliopsis occidentalissonoriensis*) and are collectively known as the Sonoran topminnow. Males are rarely greater than 1 inch in length, while females are larger, reaching 2 inches in length. Both males and females range in coloration from tan to olive bodies, usually with white on the belly. Breeding males are often blackened, with a golden coloration about the midline, and have orange or yellow at the base of their dorsal fin.

General topminnow habitat includes quiet, warm waters with slow current and abundant aquatic vegetation. However, topminnow can survive in swiftly flowing streams with vegetation providing adequate cover.

Legal Status: The Gila topminnow was listed as endangered in 1967 without CH (U.S. Fish and Wildlife Service 1967). The species was later revised to include two subspecies, *P. o. occidentalis* and *P. o. sonoriensis* (Minckley 1969, 1973). Both subspecies are protected under the ESA. Only Gila topminnow populations in the U.S., and not in Mexico, are listed under the ESA.

The original Recovery Plan for the Gila and Yaqui topminnows (The Sonoran Topminnow Recovery Plan) was completed on March 15, 1984. The Recovery Plan calls for the downlisting or delisting of both species. Criteria for downlisting were met for a short period. However, due to concerns regarding the status of several populations, downlisting was delayed. Subsequently, the number of reintroduced populations dropped below that required for downlisting, where it has remained. It was also recognized shortly after completion of the recovery plan that the criteria in the plan were inadequate to recover the species (FWS files).

The Yaqui topminnow is now included within the Yaqui Fishes Recovery Plan (USFWS 1995). A draft revised recovery plan for the Gila topminnow is available (Weedman 1999). The plan's short-term goal is to prevent extirpation of the species from its natural range in the US and reintroduce it into suitable habitat within historical range.

Distribution and Abundance (Rangewide)

Historically, the Gila topminnow was abundant in the Gila River drainage in Arizona and was one of the most common fishes of the Colorado River basin, particularly in the Santa Cruz system (Hubbs and Miller 1941). Gila topminnows were also recorded from the Gila River basin in New Mexico. In the last 50 years, this was reduced to only 16 naturally occurring populations. Presently, only 10 of the 16 known natural Gila topminnow populations are considered extant (Table 6) (Weedman and Young 1997, Voeltz and Bettaso 2003, Service files). Only eight have no nonnative fish present and therefore can be considered secure for the moment from non-native fish threats. There have been at least 200 wild sites stocked with Gila

topminnow, however, topminnow persist at only 30 of these localities. Of these, one site is outside topminnow historical range and one contains non-native fish (Voeltz and Bettaso 2003). All of these sites except one are in Arizona. Many of the reestablished sites are very small and may not contain viable populations. In addition several of the 30 sites have been reestablished in the last few years, and their eventual disposition is unknown.

Table 6. Status of natural Gila topminnow populations in the US.

Site	Ownership	Extant?[1, 8]	Non-natives?	Mosquitofish?	Habitat Size[2]	Threats[3]
Bylas Spring[5]	San Carlos	YES	NO[4]	NO[4]	S D	M/ N G
Cienega Creek	BLM	YES	NO	NO	L	M/ R N
Coal Mine Spring	AGFD	YES	NO	NO	S	L/ G
CocioWash	BLM	NO 1982	DRY	DRY	S	H/ M
Cottonwood Spring	Private	YES	NO	NO	S	M/ N
Fresno Canyon[7]	State Parks	YES	NO[9]	NO[4]	M	H/ N G U
Middle Spring[5]	San Carlos	YES	NO[4]	NO[4]	S	H/ N G
Monkey Spring	Private	YES	NO	NO	S	L/ W U
Redrock Canyon	USFS	NO 2005	YES	YES	M D	H/ W R G N
Salt Creek[5]	San Carlos	YES	NO[4]	NO[4]	S	M/ N G
San Pedro River	Private	NO 1976	YES	YES	-	H/ W N G R
Santa Cruz River San Rafael Tumacacori	Private, State Parks, TNC	 NO[6] YES 2003	 YES YES[4]	 YES YES	L D	H/ W N R G C U
Sharp Spring	State Parks	NO 2004	YES	YES	M	H/ N G U
Sheehy Spring	TNC	NO 1987	YES	YES	S	H/ N G U
Sonoita Creek	Private, TNC, State Parks	YES	YES	YES	L D	H/ W N G

[1] if no, last year recorded
[2] L = large M= medium S = small D = disjunct
[3] Immediacy H = high M = moderate L = low
Type W = water withdrawal C = contaminants R = recreation N = non-natives G = grazing M = mining U = urbanization
[4] none recently, they have been recorded
[5] recently renovated
[6] in Mexico 2006, US in 1993
[7] includes Sonoita Creek below Patagonia Lake
[8] Recent records are those less than 10 years old
[9] Fresno Canyon renovated in 2007 and is free of non-native- Sonoita Creek has many non-natives

Habitat

For a detailed description of Gila topminnow habitat please refer to the 2005 BO/CO.

Life History

Gila topminnow are viviparious fish, where embryos grow and mature within the female and are born living. Fertilization also occurs internally through deposition of spermatophores (packets of sperm). Breeding generally occurs from January to August, but can occur throughout the year in thermally constant springs (Heath 1962, Minkley 1973, Schoenherr 1974). Brood size ranges from one to 31, dependent upon standard length of the female (Constantz 1974, Schoenherr 1974, 1977), with 21.5 days as a mean interval between broods (Schoenherr 1974).

Gila topminnow are opportunistic omnivorous feeders (Schoenherr 1974), consuming detritus, vegetation, amphipods, ostracods, and insect larvae; and rarely, other fishes (Schoenherr 1974, Gerking and Plantz 1980, Meffe et al.1983, Meffe 1984).

Reasons for Listing

The Gila topminnow was listed as endangered in 1967 without CH (U.S. Fish and Wildlife Service 1967). The listing stated the species was threatened with extinction based on declining populations.

Threats: According to the Recovery Plan, threats to the Gila topminnow include habitat loss and predation by introduced mosquitofish. Habitat destruction and introduction of non-native species are the primary reasons for reductions in Gila topminnow populations, and are the causes for its listing as an endangered species (U.S. Fish and Wildlife Service 1984, Williams et al. 1985, 1989, Simmons et al. 1989).

During the early 20th century, several factors caused widespread habitat changes throughout the Southwest. These events include both biotic and abiotic factors, such as loss of vegetation through improper livestock grazing and timber wood harvesting, periods of flooding and drought, and the construction of water diversions and dams (Minckley 1993).

Although historic events occurring in the early 20th century permanently altered much of the aquatic habitat in the southwest, it is current and future activities that threaten the continued existence and reestablishment of this species. Current land use practices such as improper livestock grazing, mining, timber harvesting, road maintenance, and recreation pose major threats to habitat as well as existing and future populations. Additionally, population growth and development continue to affect potential recovery of the species through increased groundwater pumping and diversions to supply the growing populations, stream and river channelization, and increased water pollution (Weedman 1999).

The subspecies is highly vulnerable to adverse effects from non-native aquatic species (Johnson and Hubbs 1989), including non-native crayfish (Fernandez and Rosen 1996). Predation and competition from these species have resulted in Gila topminnow declines and continue to be a major threat to the remaining populations (Meffe et al. 1983, Meffe 1985, Brooks 1986, Marsh and Minckley 1990, Stefferud and Stefferud 1994, Weedman and Young 1997). Bullfrogs (*Rana catesbiana*) are widespread and abundant throughout Gila topminnow historical range and are known to prey on fishes (Rosen and Schwalbe 1996). However, Meffe et al. (1983) identify the introduction of the western mosquitofish as causing the most problems for the Gila topminnow because mosquitofish can tolerate similar environmental extremes, and can therefore occupy

similar habitats as Gila topminnow. It has been documented that mosquitofish can eliminate a population of topminnow within a year (Minckley and Deacon 1968, Schoenherr 1974, Voeltz and Bettaso 2003). To date, the spread of mosquitofish has continued virtually unchecked since their introduction to Arizona in 1926 (Minckley et al. 1977, Meffe et al. 1983).

Because the native fish fauna of the Gila basin and of the Colorado basin in general was naturally depauperate and contained few predatory fish (Carlson and Muth 1989), the Gila topminnow did not evolve mechanisms for protection against predation or competition. In the riverine backwater and side-channel habitats that formed the bulk of Gila topminnow natural habitat, predation and competition from other fishes was essentially absent. Therefore, the introduction of large numbers of predatory and competitive non-native fish, frogs, crayfish, and other species, provided conditions within which the Gila topminnow could no longer survive in many of their former habitats, or the small pieces of those habitats that had not been lost to human alteration.

Recovery Actions

The Tonto NF reintroduced Gila topminnow into Dutchman Grave Spring in 2005 after ash flow from the 2004 Willow fire eliminated the species from the site. Subsequent surveys by USFS and AGFD did not reveal that topminnow have persisted at Dutchman Grave Spring. The Cave Creek District would like to stock Dutchman Grave Spring again with Gila Topminnow. Walnut Spring was dredged in 2005 in an effort to avoid freezing and overheating of water in topminnow habitat. Cottonwood Artesian was deepened in 2006 and nonnative fish were removed to provide conditions necessary for restocking Gila topminnow in 2007. A fence was constructed along Campaign Creek to limit use by livestock. The Forest excluded grazing within Lime Creek watershed and Dutchman Grave Spring. During 2008 Gila topminnow were stocked into two springs, Cottonwood Spring and Mud Spring, on the Forest. The Forest completed NEPA analysis for construction of a barrier on Lime Creek in cooperation with Salt River Project to protect the topminnow population there and Gila topminnow were augmented in Lime Creek in cooperation with AGFD and Salt River Project.

ENVIRONMENTAL BASELINE

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

Status of the Species in the Action Area

Currently, 10 populations of Gila topminnow exist within the Tonto NF in Arizona. Extant population of Gila topminnow on the Tonto NF currently include: Bylas Spring, Cienega Creek, Coal Mine Spring, Cottonwood Spring, Fresno Canyon, Middle Spring, Monkey Spring, Salt Creek, Santa Cruz River San Rafael Tumacacori, and Sonoita Creek.

Factors Affecting the Species within the Action Area

The most-recent consultation regarding the Tonto NF's effects on the Gila topminnow was our January 5, 2010, BO/CO on forest uses and management of springs on Gila topminnow and desert pupfish (22410-2009-F-0462). The action included measures to reduce the adverse effects of livestock grazing on Walnut Spring and Creek, Cottonwood Artesian, and Mud Spring (Tonto Basin) and recreation, vegetation management and pond maintenance, and crayfish removal. The proposed action may establish new populations of Gila topminnow, which would contribute to recovery. The FWS anticipates that incidental take would be exceeded if Gila topminnow are extirpated from all three ponds at the same time and it is due to the implementation of USFS proposed land management actions. Terms and conditions were prescribed to ensure maintenance and monitoring of the sites, monitoring, and removing cattle quickly when they access areas within exclosures. No fish have been released at these sites. In addition, we have removed Mud Spring (Tonto Basin RD) as a site for reintroductions.

The FWS transmitted a BO on Livestock Grazing on the Boneyback, Chrysotile, and Cross F Allotments (22410-2007-F-0218) to the Tonto NF on August 17, 2009. The BO examined the effects of livestock grazing on Gila topminnow and the species' habitat in Walnut Spring. The FWS anticipates that incidental take would be exceeded if the pond depth is reduced to six inches or less and this water decline is due to cattle grazing activities. Terms and conditions focused on measures to ensure monitoring of incidental take, maintenance of the fenced exclosures, and implementation of minimization measures.

The Gila topminnow's status within the action area is not necessarily secure; the currently-occupied sites have not demonstrated occupancy over a sufficiently long time, and may lack the ability to survive the current, chronic drought. The reestablishment history of Gila topminnow illustrates that even sites that were thought to be secure may fail for various reasons. Gila topminnow on federal lands are widely dispersed and in some cases vulnerable to events beyond the respective land management agencies' control. Such actions would include invasions or unauthorized introductions of non-native fishes and stochastic events such as floods. Infrequent yet large floods have transported topminnow (Unnamed Drainage 68B) or destroyed structures intended to minimize the effects of livestock use (BLM's Tule Creek and Cienega Creek). The risk associated with maintaining Gila topminnow for the long-term across such a diversity of sites renders the species' status within the action area as tenuous as it is rangewide.

EFFECTS OF THE ACTION

The Gila topminnow occurs on the Tonto NF. The S&Gs listed in the Tonto NF LRMP and the 1996 Regional Amendment provide direction for the development of site-specific actions. Multiple S&Gs within the LRMP are applicable to the Gila topminnow and its habitat. These S&Gs may result in both indirect and direct effects to the species. The 2005 BO/CO included tables showing the S&Gs considered for each species' analysis and a ranking table summarizing the types of effects (lethal, sublethal, etc.) expected to result from the S&Gs. We hereby incorporate by reference the ranking tables and effects analysis presented in the 2005 BO/CO and provide a narrative summary below.

There are three S&Gs within the Tonto NF LRMP that may result in adverse effects to the Gila topminnow, as discussed below. Although the majority of S&Gs (41 S&Gs; 78.8 percent) are positive and provide for some level of recovery of the species, there were several that were beneficial in the long-term but had some short-term adverse effects. In addition, five S&Gs were open to interpretation and difficult to analyze.

Engineering, Lands and Minerals, and Recreation Programs

The majority of the S&Gs within the Engineering, Lands and Minerals, and Recreation, Heritage, and Wilderness Programs were found to be not applicable to the MAs where Gila topminnow occurs. No applicable S&Gs were identified within the Engineering Program, one was identified within the Lands and Minerals Program (S&G 1385), and two were identified within the Recreation, Heritage, and Wilderness Program (1421 and 1422). Standard and guideline 1385 states that the Tonto NF will process withdrawals for locatable and leasable minerals by 1988 and issue no surface occupancy stipulations for leasing activities. This S&G is too vague to identify tangible effects to the Gila topminnow. Standards and guidelines 1421 and 1422 limit group size in wilderness to 15 people and require that soaps and detergents are not introduced into sidecreeks. These S&Gs serve to minimize short-term adverse effects that could arise from recreational use in the wilderness areas where Gila topminnow occurs. Overall, these three programs essentially lack specific guidance and project-level activities could adversely affect the Gila topminnow. For example, roads, mining, and intense recreational activities on the Tonto NF could proceed within areas occupied by the Gila topminnow such that adverse effects are likely to occur. Project-level analysis may resolve these conflicts.

Fire Management Program

The Fire Management Program allows the Tonto NF to conduct prescribed burns in order to restore natural ecological function to these systems. Beneficial long-term effects should be realized as a result. However, the potential exists for adverse short-term effects due to disturbance from fire.

Forestry and Forest Health Program

The Forestry and Forest Health Program seeks to maintain a sustainable timber program consisting of vertical and horizontal diversity while protecting the watershed, riparian areas, stream channels, and water quality (U.S. Forest Service 2004). Overall, the S&Gs within this program have little effect on Gila topminnow because the species generally occurs in habitats not affected by the implementation of S&Gs within this program.

With the above in mind, S&G 1400 seeks to restrict skidding to less than 40 percent slopes, but does not eliminate the possibility of sediment input into stream channels. Sedimentation from tributary canyons and streams leading into drainages contributes to the condition of the river downstream. The amount of sediment in the stream system is a major force in determining the size and shape of the stream channel.

Standards and Guidelines 1398, 1401, and 1403 will implement actions to reduce the impacts of soil disturbing activities to the watershed in the long-term, however this may result in short-term adverse effects.

Rangeland Management Program

Standards and Guidelines 1376 and 1423 seek to manage suitable rangelands at Level C and Level D, respectively. The effects that livestock management activities can have on riparian and aquatic habitats, both direct and through upland/watershed effects, have been well documented and discussed in recent years (Platts 1990, Bahre 1991, Meehan 1991, Fleischner 1994). Implementation of guidance under the Rangeland Program and these two S&Gs (1367 and 1423) could reduce the likelihood or severity of effects to the Gila topminnow, but would not necessarily eliminate short-term adverse effects. However, this may potentially be addressed at the project-level due to the localized range of populations of Gila topminnow.

Sedimentation from tributary canyons and streams leading into drainages contributes to the condition of the river downstream. The amount of sediment in the stream system is a major force in determining the size and shape of the stream channel. The riparian vegetation and streambank condition in tributaries, including intermittent and ephemeral channels, form important buffers between upland impacts and the mainstem or perennial stream. A healthy riparian zone with substantial herbaceous cover is a very effective buffer for filtering sediment and pollutants before they can reach the stream (Erman et al.1977, Mahoney and Erman 1984, Lowrance et al.1984, Bisson et al.1992, Osborne and Kovacic 1993).

Although Gila topminnow are highly tolerant of a wide range of environmental conditions, it may still be adversely affected by activities which contribute to the alteration of the flow regime (i.e., water quality, quantity, intensity, and duration), degrading the stream channel, and modifying the floodplain and riparian vegetation structure and diversity. These impacts occur at all levels of cattle presence in the riparian zone, regardless of season, but increase as number of livestock and length of time the cattle are present increase (Marlow and Pogacnik 1985). The ways in which the effects of livestock grazing are manifested, and the magnitude of the effects in the watershed, are dependent on local site conditions.

Wildlife, Fish and Rare Plants Program

Region-wide S&Gs within this program seek to maintain/improve habitat for listed and sensitive species, implement recovery plans, or ensure that beneficial activities occur for fish, wildlife, and plants. Within the Tonto NF LRMP, this program seeks to minimize or resolve conflicts between programs while maintaining a level of use compatible with federally listed species, healthy riparian areas watersheds, and stream channels (U.S. Forest Service 2004). However, little guidance is included in the Tonto NF LRMP that addresses the Wildlife Program

Standards and Guidelines 1355, 1364, and 1365 discuss rehabilitation and maintenance of riparian areas and include projects allowing for stream crossing and channel approaches. While the intent of these S&Gs is overall beneficial to the Gila topminnow, the implementation of these S&Gs may result in short-term take of Gila topminnow.

1996 Regional Amendment

There are no adverse effects to the Gila topminnow from the implementation of the S&Gs for the 1996 Regional Amendment. We found that all of the S&Gs from the 1996 Regional Amendment used by the USFS for the MSO and the northern goshawk do not appreciably affect this species.

Cumulative Effects
Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this BO/CO. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Residential and commercial development on lands within watersheds containing T&E native fishes, are cumulative effects and can adversely affect the species through a variety of avenues.

Human population centers are also centers for the introduction and spread of nonnative aquatic species. New nonnative species are certain to be introduced in this area, and nonnative species already present in the area will continue to be introduced into new areas. These actions are likely to continue to impact wild aquatic ecosystems and extant or potential pupfish and topminnow sites.

Additional cumulative effects to Gila topminnow include ongoing activities in watersheds such as livestock grazing and associated activities outside of federal allotments, irrigated agriculture, groundwater pumping, stream diversion, bank stabilization, channelization without a federal nexus, and recreation. Some of these activities, such as irrigated agriculture are declining and are not expected to contribute substantially to cumulative long-term adverse effects to native fishes.

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

CONCLUSION

After reviewing the current status of the Gila topminnow, the environmental baseline, the effects of the proposed action, and the cumulative effects, it is the FWS's opinion that the proposed action is not likely to jeopardize the continued existence of the Gila topminnow. Pursuant to 50 CRF 402.02, "jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species. No CH has been designated for the species; therefore, none will be affected.

The FWS anticipates adverse effects to the Gila topminnow from the implementation of the Tonto NF LRMP. However, the FWS does not believe the impacts of the proposed action will rise to the level of jeopardy for the species. The FWS bases this conclusion on the following reasons:

- Continuing efforts to stock Gila topminnow in various wild sites and within NFS lands have allowed the status of topminnow populations to remain stable.

- The Tonto NF's LRMP specifically states that habitat for Gila topminnow will be maintained at current levels of occupied habitat.

Therefore, the FWS concludes that the proposed action is not likely to jeopardize the continued existence of the Gila topminnow.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Per the Act, take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined (50CRF 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50CRF 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. "Incidental take" is defined (50 CFR 402.02) as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

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

Amount or Extent of Take Anticipated

Incidental take of the Gila topminnow is reasonably certain to occur as a result of the continued implementation of the Tonto NF LRMP. On the Tonto NF, incidental take may result from the implementation of the Rangeland Management Program, Recreation Program, and Forestry and Forest Health Program. Harassment to individual fish may occur from activities conducted within occupied streams. Harm to the species occurs through activities that alter the suitability of the habitat to support Gila topminnow.

The FWS anticipates incidental take of Gila topminnow will be difficult to detect for the following reasons: finding a dead or impaired specimen is unlikely, and losses may be masked by seasonal fluctuations in environmental conditions and fish numbers. Although we cannot estimate the number of individual topminnows that will be incidentally taken, the FWS is providing a mechanism to quantify when take would be considered to be exceeded at the population level. For purposes of this BO/CO, the FWS defines incidental take in terms of the number of extant populations. The FWS concludes that the incidental take of Gila topminnow will be considered to be exceeded if, after a period of two consecutive years, there is a loss of any currently extant population of Gila topminnow on the Tonto NF as a result of the proposed action. Current extant populations of Gila topminnow on the Tonto NF include: Bylas Spring, Cienega Creek, Coal Mine Spring, Cottonwood Spring, Fresno Canyon, Middle Spring, Monkey Spring, Salt Creek, Santa Cruz River, and San Rafael, Tumacacori, and Sonoita Creeks.

Effect of the Take

In the accompanying BO/CO, the FWS determined that this level of anticipated take is not likely to result in jeopardy to the Gila topminnow.

REASONABLE AND PRUDENT MEASURES

The FWS believes the following reasonable and prudent measures are necessary and appropriate to minimize take of Gila topminnow.

1. Minimize or eliminate adverse effects to Gila topminnow on the Tonto NF.
2. Minimize or eliminate adverse effects to Gila topminnow habitat on the Tonto NF.
3. Monitor the effects of site-specific projects on Gila topminnow populations on the Tonto NF.

TERMS AND CONDITIONS

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

The following terms and conditions will implement reasonable and prudent measure 1:

1.1 Manage riparian areas adjacent to and upstream of Gila topminnow populations for conditions to avoid direct effects and minimize indirect effects to Gila topminnow and its habitat.

1.2 Design projects within the Forestry and Forest Health (i.e., pest management), Rangeland Management, Recreation, Watershed Management, and Wildlife programs with the goal to avoid or minimize adverse effects to the Gila topminnow.

The following term and condition will implement reasonable and prudent measure 2:

2.1 Design projects in occupied Gila topminnow habitat with the goal of implementing projects that have beneficial, insignificant, or discountable effects to the Gila topminnow and its habitat.

The following term and condition will implement reasonable and prudent measure 3:

3.1 The Tonto NF shall monitor incidental take resulting from the proposed action and report their findings to the FWS. Incidental take (implementation) monitoring shall include information such as when or if the project was implemented, whether the project was implemented as analyzed in the site-specific BO (including CMs, and BMPs), breeding season(s) over which the project occurred, relevant fish survey information, and any other pertinent information as described in the site specific BO about the project's effects on the species.

3.2 Annual reports, which will include this species, shall be sent to the appropriate local FWS Ecological Services field office by March 1st of each year.

The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize the impact of incidental take that might otherwise result from the proposed action. If, during the course of the action, this level of incidental take is exceeded, such incidental take represents new information requiring reinitiation of consultation and review of the reasonable and prudent measures provided. The federal agency must immediately provide an explanation of the causes of the taking and review with the FWS the need for possible modification of the reasonable and prudent measures.

CONSERVATION RECOMMENDATIONS

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

1. Assist with the development of a Gila topminnow monitoring plan that addresses actions occurring within pertinent watersheds on the Coronado, Prescott, and Tonto NFs.
2. In cooperation with the AGFD and academia, assess habitat dynamics and fish- habitat relationships of the Gila topminnow.
3. Continue to cooperate with state conservation agencies to eliminate presence of non-native fish species within Gila topminnow habitat.

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

LOACH MINNOW

STATUS OF THE SPECIES RANGEWIDE

Loach minnow was listed as a threatened species on October 28, 1986 (USFWS 1986). However, we determined in 1994 that reclassifying loach minnow to endangered status was warranted but precluded (59 FR 35303, July 11, 1994), and restated this conclusion on January 8, 2001 (66 FR 1295). We reanalyzed the determination each year in our Candidate Notice of Review, and determined that reclassification to endangered is warranted, in the Candidate Notice of Review published on November 9, 2009 (74 FR 57804). In 2010, we published a proposed rule to reclassify loach minnow to endangered status (75 FR 66482). During the preparation of this BO, the proposed rule changing the loach minnow's status from threatened to endangered was finalized on February 23, 2012 (77 FR 10810).

Critical habitat for the loach minnow was originally designated on March 21, 2007 (USFWS 2007). The 2007 designation included as CH portions of the East Fork Black River, North Fork East Fork Black River, Coyote Creek, and Boneyard Creek; Aravaipa Creek and its tributaries Deer and Turkey creeks; the San Francisco River and its tributary Whitewater Creek; Eagle Creek, the Blue River and its tributaries, Campbell Blue Creek, Little Blue Creek, Dry Blue Creek, Pace Creek, and Frieborn Creek; the Tularosa River and its tributary, Negrito Creek; ; the Gila River, and its tributaries West, Middle, and East Forks. Following a legal challenge to that designation, we filed a motion for voluntary remand in 2009 and began re-evaluating CH. Those areas originally designated as CH in the 2007 rule remained in place until the new designation was finalized. As mentioned above, USFWS published the final rule reclassifying the species as endangered and revising the loach minnow's designated CH on February 23, 2012 (77 FR 10810). The final rule became effective on March 26, 2012. While there are some differences between the 2007 designation and the 2012 revised designation, much of the geographic area included for loach minnow CH is the same in both proposals. Specific details regarding the areas included as designated CH can be found in the final rule. Key features, or PCEs 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. Additional detail on each of these PCEs are found in the CH rule.

Loach minnow is a small fish from the minnow family Cyprinidae. Loach minnow are olive colored, and highly blotched with darker spots. Whitish spots are present at the front and back edges of the dorsal fin, and on the dorsal and ventral edges of the caudal fin. A black spot is

usually present at the base of the caudal fin. Breeding males have bright red-orange coloration at the bases of the paired fins and on the adjacent body, on the base of the caudal lobe, and often on the abdomen. Breeding females are usually yellowish on the fins and lower body (Minckley 1973, USFWS 1991).

The limited taxonomic and genetic data available for loach minnow indicate there are substantial differences in morphology and genetic makeup between remnant loach minnow populations. Tibbets (1993) concluded that results from mitochondrial DNA (mtDNA) and allozyme surveys indicate variation for loach minnow follows drainage patterns, suggesting little gene flow among rivers. The levels of divergence present in the data set indicate that populations within rivers are unique, and represent evolutionarily independent lineages. The main difference between the mtDNA and allozyme data was that mtDNA suggest that the San Francisco/Blue and Gila groups of loach minnow are separate, while the allozyme data places the Gila group within the San Francisco/Blue group. Tibbets (1993) concluded that the level of divergence in both allozyme and mtDNA data indicated that all three main populations (Aravaipa Creek, Blue/San Francisco Rivers, and Gila River) were historically isolated and represent evolutionarily distinct lineages. No genetic information is currently available for loach minnow in the White River system.

Loach minnow is a bottom-dwelling inhabitant of shallow, swift water over gravel, cobble, and rubble substrates (Rinne 1989, Propst and Bestgen 1991). Loach minnow uses the spaces between, and in the lee of, larger substrate for resting and spawning (Propst et al. 1988; Propst and Bestgen 1991; Rinne 1989). It is rare or absent from habitats where fine sediments fill the interstitial spaces (Propst and Bestgen 1991). Some studies have indicated that the presence of filamentous algae may be an important component of loach minnow habitat (Barber and Minckley 1966). Loach minnow feeds exclusively on aquatic insects (Schrieber 1978, Abarca 1987). Loach minnow live two to three years with reproduction occurring primarily in the second summer of life (Minckley 1973, Sublette et al. 1990). Spawning occurs March through May (Britt 1982, Propst et al. 1988); however, under certain circumstances loach minnow also spawn in the autumn (Vives and Minckley 1990). The eggs of loach minnow are attached to the underside of a rock that forms the roof of a small cavity in the substrate on the downstream side. Limited data indicate that the male loach minnow may guard the nest during incubation (Propst et al. 1988, Vives and Minckley 1990). Additional details on habitat preferences are provided in the 2007 CH designation (72 FR 13356) the proposed rule for CH designation from 2010 (75 FR 66482), and the recently-published final rule for CH designation (77 FR 10810).

Loach minnow are believed to occupy approximately 15 to 20 percent of their historic range, and are now restricted to portions of the Gila River and its tributaries, the West, Middle, and East Fork Gila River (Grant, Catron, and Hidalgo Counties, New Mexico) (Paroz and Propst 2007, p. 16; Propst 2007, pp. 7–8, 10–11, 13–14); the San Francisco and Tularosa rivers and their tributaries Negrito and Whitewater creeks (Catron County, New Mexico) (Propst et al. 1988, p. 15; ASU 2002; Paroz and Propst 2007, p. 16; Propst 2007, pp. 4–5); the Blue River and its tributaries Dry Blue, Campbell Blue, Pace, and Frieborn creeks (Greenlee County, Arizona and Catron County, New Mexico) (Miller 1998, pp. 4–5; ASU 2002; Carter 2005, pp. 1–5; C. Carter, AGFD, pers. comm. 2008a; Clarkson et al. 2008, pp. 3–4; Robinson 2009, p. 3); Aravaipa Creek and its tributaries Turkey and Deer creeks (Graham and Pinal Counties, Arizona) (Stefferud and Reinthal 2005, pp. 16–21); Eagle Creek (Graham and Greenlee Counties, Arizona), (Knowles

1994, pp. 1–2, 5; Bagley and Marsh 1997, pp. 1–2; Marsh et al. 2003, pp. 666–668; Carter et al. 2007, p. 3; Bahm and Robinson 2009a, p. 1); and the North Fork East Fork Black River (Apache and Greenlee Counties, Arizona) (Leon 1989, pp. 1–2; M. Lopez, AGFD pers. comm. 2000; S. Gurtin, AGFD, pers. comm. 2004; Carter 2007a, p. 2; Robinson et al. 2009, p. 4); and possibly the White River and its tributaries, the East and North Fork White River (Apache, Gila, and Navajo Counties, Arizona).

Our information indicates that, rangewide, more than 390 consultations have been completed or are underway for actions affecting spikedace and loach minnow, which often co-occur. The majority of these opinions concerned the effects of road and bridge construction and maintenance, grazing, water developments, fire, species control efforts, or recreation. There are a high number of consultations for urban development and utilities, however, these projects typically do not result in adverse effects to the species but are for technical assistance only. Small numbers of projects occur for timber, land acquisition, agriculture, sportfish stocking, flooding, Habitat Conservation Planning, native fish restoration efforts, alternative energy development, and mining.

Drought and climate change could eventually exacerbate existing threats to streams in the Southwestern U.S. Increased and prolonged drought associated with changing climatic patterns could adversely affect streams by reducing water availability, and altering food availability and predation rates. Drying or warming of streams is of particular concern because loach minnow depend on permanent flowing water of appropriate water quality for survival. Long term climate change could exacerbate the effects of drought. Therefore we conclude that drought is negatively affecting the species now, and is likely to continue into the foreseeable future.

The status of loach minnow is declining rangewide. Although it was originally listed as threatened, the FWS determined in 1994 that a petition to uplist the species to endangered status was warranted (USFWS 1994). The FWS confirmed this decision in 2008 (USFWS 2008). As noted above, we published a proposed rule to for redesignation of CH as well as reclassification of loach minnow to endangered status in October 2010, and the final rule was published on February 23, 2012, and became effective on March 26, 2012.

Recovery Actions Rangewide

The Loach Minnow Recovery Plan (U.S. Fish and Wildlife Service 1991) was completed in 1991. Recovery goals include protection of existing populations, restoration of populations in portions of historic habitat, and eventual delisting, if possible. The Recovery Plan is currently being revised by a new recovery team, which was convened in 2011 and began meeting in 2012. We anticipate that a new recovery plan will be released within approximately two years.

The following recovery efforts for the loach minnow have been conducted by NFs in Region 3 (U.S. Forest Service 2004). Many of these recovery efforts were implemented as part of the "seven species direction" (U.S. Forest Service 1997). Riparian areas on NFS lands have been excluded from livestock grazing to protect habitat along the Gila, Mangas Creek, Bear Creek, San Francisco, Tularosa River, Negrito Creek, Verde, Blue, North Fork East Fork Black Rivers, and Campbell Blue and Eagle Creeks. Forest Road 586 on the Apache-Sitgreaves NF was

obliterated to reduce sediment input to Boneyard Creek which is a tributary to occupied habitat in the North Fork East Fork Black River. A fish barrier is under construction on the Blue River, which completion anticipated for late Spring 2012. The barrier will help to prevent the upstream movement of non-native predators and competitors.

During 2007 and 2008 loach minnow were stocked in Fossil Creek on the Forest. Monitoring during 2009 determined that loach minnow persisted in Fossil Creek. The Tonto NF has restricted livestock grazing in the stream reaches where stockings took place.

ENVIRONMENTAL BASELINE (Tonto NF)

Status of the Species within the Action Area

Prior to 2007, the species was believed to be extirpated from streams on the Tonto NF. During 2007 and 2008 loach minnow were stocked in Fossil Creek (ADGF 2009). Discussions are underway for a potential repatriation effort for Rock and Spring Creeks, and BOR is completing the barrier feasibility analysis and NEPA compliance for this effort. Monitoring during 2009 determined that loach minnow persisted in Fossil Creek (Orabutt and Robinson 2010). Monitoring completed in 2010 did not locate loach minnow (Marsh et al. 2010). Monitoring in 2011 located one individual loach minnow. The Tonto NF has restricted livestock grazing in the stream reaches where stockings took place.

Critical habitat was designated for the loach minnow in 2007, and modification to the existing designation was proposed on October 28, 2010 (75 FR 66482), and a final rule was published on February 23, 2012, and became effective on March 26, 2012.The original 2007 designation did not include any streams on the Tonto NF, but the recently published 2012 revised designation included Fossil Creek, which occurs on both the Coconino and Tonto NFs (4.7 miles extending from the confluence with the Verde River upstream to an unnamed tributary).

Factors Affecting the Species within the Action Area

No formal consultations involving impacts to loach minnow on the Tonto NF have been conducted since the 2005 BO/CO. Within the action area, however, there may be several factors that affect the loach minnow.

EFFECTS OF THE ACTION

The Tonto NF S&Gs were not assessed in the 2004 BA and 2005 BO/CO because the species did not occur on the Forest at that time. Therefore, the following effects analysis is for the Tonto NF LRMP S&Gs.

The S&Gs listed in the Tonto NF LRMP and the 1996 Regional Amendment provide direction for the development of site-specific actions. Multiple S&Gs within the LRMP are applicable to the loach minnow and its habitat. These S&Gs may result in both indirect and direct effects to the species. The following table summarizes the S&Gs presented to the FWS by the USFS as applicable to the loach minnow.

Table 7. Summary of S&Gs considered for the loach minnow.

National Forest	Standard and Guidelines
Tonto NF	1341-1342, 1344-45, 1348-50, 1352-1357, 1359, 1361-1368, 1371a-1371j, 1372, 1376a-1376d, 1381, 1387, 1388a-f, 1391, 1398-1404, 1404a-g, 1412, 1418a-b, 1420, 1422a, 1423, 1423a- 1423c, 2051 (MA-1C,1D,4D)
1996 Regional Amendments	1425-1428, 1432, 1434, 1437, 1438, 1440, 1441, 1445, 1448, 1449, 1453-1456, 1458, 1459, 1461-1465, 1468, 1473, 1474, 1476, 1477, 1479, 1486-1492, 1495, 1499-1501, 1504-1515

Table 8. Effects of the S&Gs analyzed for the Loach minnow

Ranking	Explanation of Ranking	Total	Percentage
-3	S&G is causing a lethal response	0	0%
-2	S&G is causing a sub-lethal response	1	2%
-1	S&G is causing a behavioral response	8	12%
0	S&G could be interpreted in many ways that could cause a negative or a positive response by the species	41	58%
+1	S&G is maintaining habitat & providing recovery	8	12%
+2	S&G is moving species toward recovery	5	7%
+3	S&G is implementing species recovery plan	2	3%
Y	S&G has no application to the species	4	6%
Z	S&G is in compliance with existing law, implementation is none discretionary	0	0
X	S&G is only a heading	0	0
Total		69	100%

Activities that affect water quality, such as removal of riparian cover, sedimentation, or control of water levels, can adversely affect loach minnow habitat quality. Dams and reservoirs appear to eliminate loach minnow for many miles upstream and downstream. Spread of non-native predators, especially flathead catfish and channel catfish can also directly reduce loach minnow populations.

The S&Gs analyzed for direct or indirect effects to the loach minnow include those for the Tonto NF as well as the 1996 Regional LRMP Amendment, and the 2004 Verde WSR Comprehensive River Management Plan (CRMP) which has been incorporated into the LRMP as S&G 2051 in MAs-1C, 1D, & 4D).

Engineering Program

S&Gs were not identified in the Tonto NF LRMP that are specific to the Engineering Program and may result in effects on loach minnow. However, other guidance may be present for other programs that could be applicable to activities conducted under the Engineering Program.

Fire Management Program

The Tonto NF LRMP contains one S&G (1376a) that guides the Fire Management Program to integrate habitat needs through prescribed fire within fire suppression objectives in MAs 1F, 4F, and 5G. S&G 1376d guides the program to use fire to treat vegetation for water yield, forage, and wildlife habitat improvement in MAs 1F, 4D, and 4F. The two S&Gs may reduce adverse effects and improve watershed condition. However, there may be short-term adverse effects from these activities. Forest-wide S&Gs were not identified for effects to loach minnow.

Forestry and Forest Health Program

The LRMP for the Tonto NF seeks to maintain a sustainable timber program consisting of vertical and horizontal diversity while protecting the watershed, riparian areas, stream channels, and water quality. Following S&Gs during project planning and implementation should result in long-term positive effects to the loach minnow. However, short-term effects may impact the species.

Lands and Minerals Program

No Forest-wide S&Gs were identified in the Tonto NF LRMP that address interactions between activities conducted under the Lands and Minerals Program and loach minnow. S&G 1371e guides the NF to withdraw from appropriation under mining laws all acreage within a quarter of a mile from the Verde River designated as a WSR. This will provide significant protection from activities associated with mining on or near the Verde River. However the S&Gs provide no further guidance for program activities that may impact the loach minnow.

Rangeland Management Program

The Tonto NF LRMP contains little guidance under the Rangeland Management Program. Management is expected to protect riparian areas and provide healthy watershed conditions. Guidance for most MAs includes grazing at Level B although the S&Gs provide guidance to manage certain allotments at Levels A and/or C. Forest-wide and MA S&Gs, would not prevent direct and indirect effects to the loach minnow.

Recreation, Heritage, and Wilderness Program

The Tonto NF LRMP contains S&Gs for the Recreation, Heritage, and Wilderness Program which restrict group size to 15 people or less in wilderness (S&G 1421), and prohibits the introduction of soaps and detergents into side creeks in wilderness (S&G 1422). Program S&Gs may be located under other program headings. Otherwise, S&Gs for this program provide little preventative guidance for avoiding adverse effects to loach minnow.

Watershed Program

The Tonto NF LRMP guides the Program to "rehabilitate…riparian areas through the use of appropriate grazing systems and methods" (S&G 1350). This could result in adverse effects to loach minnow due to short-term disturbance and impacts from grazing as discussed in the Rangeland Management Program section above. However, appropriate grazing systems and methods to rehabilitate riparian areas may include exclusion of grazing from these areas, thereby eliminating the potential for adverse effects from S&G 1350. Other S&Gs for the Program seek to maintain free-flowing condition of rivers (S&G 1371a) and reduce or eliminate pollution (S&G 1371d) in specific MAs.

Wildlife, Fish, and Rare Plants Program

The goal of the Tonto NF LRMP seeks to minimize or resolve conflicts amongst programs while maintaining a level of use compatible with federally listed species and their CH, healthy riparian areas watersheds, and stream channels. Forest-wide S&G 1341 indicates a commitment to "identify, survey, map, and analyze habitat for all federally listed species." And "Identify management conflicts and enhancement opportunities." The S&G states the Program should "Correct any management conflicts or problems". This could be interpreted to mean that all adverse effects should be avoided during project implementation. However, interpretation could vary at the project level.

1996 Regional Amendment

Short-term adverse effects to the loach minnow may occur from the implementation of the 1996 Regional Amendment. However, the majority of the S&Gs within the 1996 Regional Amendment maintain habitat and provide for recovery of the species. Also, we found that the guidelines used by the USFS for the northern goshawk do not appreciably affect this species because only two percent of all S&Gs may cause sub-lethal response.

Table 9. Effects of the S&Gs analyzed for the Loach minnow – 1996 Regional Amendment.

Ranking	Explanation of Ranking	Total	Percentage
-3	S&G is causing a lethal response	0	0.0%
-2	S&G is causing a sub-lethal response	0	0.0%
-1	S&G is causing a behavioral response	0	0.0%
0	S&G could be interpreted in many ways that could cause a negative or a positive response by the species	5	8.6%
+1	S&G is maintaining habitat & providing recovery	37	63.8%
+2	S&G is moving species toward recovery	0	0.0%
+3	S&G is implementing species recovery plan	0	0.0%
Y	S&G has no application to the species	8	13.8%
Z	S&G is in compliance with existing law, implementation is none discretionary	2	13.8%
X	S&G is only a heading	2	3.4%
Total		58	100.0%

The following S&Gs under the 1996 amendment are those that will ultimately result in a long-term beneficial effect; however there may be some potential short-term adverse effects. They are 1432, 1445, 1448, 1455, 1458, 1468, 1476, and 1508. All these S&Gs direct the Forests to use prescribed fire as a tool for fire risk abatement as well as thinning and other fuels management activities. Potential short-term effects include those associated with ground disturbance (i.e., sedimentation) as well as those from the fire itself. See previous discussion under the Fire Management Program for discussion of those effects.

Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this BO/CO. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Residential and commercial development on lands within watersheds containing T&E native fishes, are cumulative effects and can adversely affect the species through a variety of avenues.

Cumulative effects to native fishes include ongoing activities in the watersheds in which the species occurs such as livestock grazing and associated activities outside of federal allotments, irrigated agriculture, groundwater pumping, stream diversion, bank stabilization, channelization without a federal nexus, and recreation. Some of these activities, such as irrigated agriculture are declining and are not expected to contribute substantially to cumulative long-term adverse effects to native fishes.

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

CRITICAL HABITAT EFFECTS ANALYSIS

Critical habitat was designated for the loach minnow in 2007. The FWS published a new proposed rule on October 28, 2010 (75 FR 66482), and a final rule was published on February 23, 2012, and became effective on March 26, 2012. While the 2007 designation did not include any streams on the Tonto NF, the 2012 final rule does include Fossil Creek as CH for loach minnow.

A thorough review of all LRMP amendments and program descriptions since the 2004 BA (USFS 2004) for The Continued Implementation of the LRMP for the 11 NFs and NGs and the 2008 BA for Effects to CH of the Loach Minnow and Spikedace (USFS 2008) was conducted, and it was determined that the continued implementation of the Tonto NF LRMP may affect and is likely to adversely affect designated CH for loach minnow.

Critical Habitat
The Tonto NF LRMP lacks S&Gs which provide guidance to avoid all adverse effects to the PCEs from several Programs with S&Gs applicable to the proposed CH for loach minnow. Some conflicts will arise with effects to the CH occurring due to the lack of complete filtering necessary to prevent adverse influence on the PCEs. These effects will be addressed at the project-level when project-specific information is available.

After reviewing the current status of loach minnow CH, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our opinion that the continued implementation of the LRMP will not destroy or adversely modify CH for loach minnow. The LRMP contains guidance that seeks to minimize the magnitude of the effects; however, there is still a potential to implement the LRMPs while causing adverse effects to CH. Although the FWS anticipates some adverse effects to loach minnow CH from the implementation of the Tonto NF's LRMP, as well as the 1996 Regional Amendment, we do not believe the impacts of the proposed action will result in destruction or adverse modification to loach minnow CH.

The PCEs for loach minnow include habitat to support all life stages of the fish, including perennial flows, appropriate stream habitats and microhabitats, low levels of pollutants, an appropriate prey base, no or low levels of nonnative aquatic species, and a natural, unregulated flow regime that allows for periodic flooding (77 FR 10810). The various USFS programs may include activities such as road development or eradication, vegetation removal, and grazing which could impact these PCEs by removing vegetation, disturbing soils, or other activities. Consultation on site-specific projects under these programs will be conducted to more adequately address specific impacts to the PCEs.

It is possible that loach minnow still persist in areas thought to be extirpated and may occur in localities yet to be discovered. Proactive efforts by the USFS in the past and the continued monitoring of their management actions contribute positively to the overall status of the loach minnow and its CH. These actions together with the implementation of the beneficial S&Gs outlined above should continue to improve habitat conditions on NF lands in the Southwest. For these reasons, as well as the above analyses, it is the FWS's BO that the proposed action will not alter the ability of the loach minnow designated CH PCEs to function properly. As such, CH for the loach minnow will remain functional to serve its intended conservation role for the species (i.e. survival and recovery). Therefore, the FWS concludes that the proposed action is not likely to destroy or adversely modify CH for the loach minnow.

1996 Regional LRMP Amendment

The 1996 Regional LRMP Amendment is specific to Forest management within MSO habitat, however, it will potentially contribute to the protection of other imperiled species and their habitats. The amendment addressed several activities in several Resource Programs. One S&G provides guidance for Engineering and Recreation, Heritage and Wilderness Programs. S&G 1437 suggests avoidance of roads or trails in MSO PACs. This restricts the location of road and trail placement that could have varying effects to the loach minnow CH depending on location specifics. Additional guidance is provided for the Recreation, Heritage, and Wilderness

Program. S&G 1438, allows recreation to continue at the levels that were occurring prior to the listing of the MSO. Site-specific effects may remain as the result of maintaining those levels of recreation, particularly in riparian areas. Standards and Guidelines 1445, 1454, 1455, 1468, and 1508 apply to fire management and provided the Forests with guidance to treat fuel accumulations to abate fire risk and protect areas important to MSO and northern goshawk. The management of fuels should result in decreased threats or indirect effects to the loach minnow CH in the long-term, but may result in short-term adverse effects. The Forestry and Forest Health Program contains S&Gs that provide guidance primarily targeting timberland in areas that may affect the MSO and the northern goshawk.

This guidance may result in only minor influences or indirect effects to loach minnow CH or may result in neutral or no effects. Guidance provided for riparian areas has a greater influence on effects to loach minnow CH. Standard & Guideline 1473 emphasizes maintenance and restoration of healthy riparian ecosystems and should have beneficial effects to loach minnow CH. S&Gs 1448, 1474, 1477, 1479, 1489, and 1510, within the Rangeland Management Program, have significant influence on activities that may affect loach minnow CH. These S&Gs provide guidance for managing range in good to excellent condition, emphasizing maintenance and restoration of riparian habitats, and maintaining satisfactory soil conditions, hydrologic function, and nutrient cycles. Standard and Guideline 1489 provides guidance for forage use by grazing ungulates such that range conditions will not impede the conservation and recovery of a federally listed species. The implementation of S&Gs contained within the amendment should result in the minimization of potential adverse effects by the Fire Management, Rangeland Management and Forestry Programs.

Cumulative Effects

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

Residential and commercial development on lands within watersheds containing T&E native fishes, are cumulative effects and can adversely affect the species through a variety of avenues.

Cumulative effects to loach minnow CH include ongoing activities in the watersheds in which the species occurs such as livestock grazing and associated activities outside of Federal allotments, irrigated agriculture, groundwater pumping, stream diversion, bank stabilization, channelization without a Federal nexus, and recreation. Other activities, such as recreation, residential, or commercial use on non-Federal lands near the riparian areas could result in cumulative adverse effects to occupied, as well as potentially-occupied native fish habitat through increased water use, increased pollution, and increased alteration of the streambanks through riparian vegetation suppression, bank trampling, and erosion.

CONCLUSION

After reviewing the current status of the loach minnow, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the FWS's biological opinion that the proposed action will not jeopardize the continued existence of the loach minnow. Pursuant to 50 CFR 402.02, "jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species..

The FWS anticipates adverse effects to the loach minnow from the implementation of the Tonto NF LRMP, as well as the 1996 Regional Amendment. However, the FWS does not believe the impacts of the proposed action will rise to the level of jeopardy for the species. The FWS bases this conclusion on the following reasons:

- Loach minnow has not been reestablished on the Tonto NF for a number of years. However, if the species becomes established, then implementation of the S&Gs within the Tonto NF LRMP is sufficient to maintain or contribute towards recovery of the species.
- Critical habitat has been designated on the Tonto NF for loach minnow and will be managed to contribute towards recovery of the species.
- The CMs within the proposed action for the spikedace will also improve the status for the loach minnow.

The CMs direct the USFS to implement projects that will improve spikedace habitat. Since both species occupy mid-elevation stream habitats within the Gila River Basin, and in several instances are sympatric, several populations of loach minnow will benefit significantly from CMs applied to spikedace populations. Improved habitat for loach minnow due to implementation of the CMs and consideration given to recovery of the loach minnow within the LRMP, in combination with the relative widespread distribution of populations (of which the majority are substantial in numbers of individuals) within the Gila River drainage, ensure that the proposed action will not reduce appreciably the likelihood of both survival and recovery of the loach minnow. Although some take is reasonably certain to occur through time, incidental take of individuals during site-specific project activities is not expected to be appreciable. For these reasons, the FWS concludes that the proposed action is not likely to jeopardize the continued existence of loach minnow.

Critical Habitat

After reviewing the current status of loach minnow CH, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our opinion that the continued implementation of the Tonto NF LRMP is not likely to destroy or adversely modify CH for loach minnow. The LRMP contains guidance that seeks to minimize the magnitude of the effects; however, there is still a potential to implement the LRMP while still causing adverse effects to CH.

This BO/CO does not rely on the regulatory definition of "destruction or adverse modification" of CH in 50 CFR 402.02 because of various court cases surrounding the FWS's jeopardy and

adverse modification analyses. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to CH. Critical habitat is defined in section 3 of the Act "as the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the Act, on which are found those physical and biological features essential to the conservation of the species and that may require special management considerations or protection; and specific areas outside the geographical area occupied by a species at the time it is listed, upon a determination that such areas are essential for the conservation of the species." We have also relied upon the Consultation Handbook which provides guidance on determining adverse modification of CH and jeopardy pursuant to the following: "Adverse effects on individuals of a species or constituent elements or segments of CH generally do not result in jeopardy or adverse modification determinations unless that loss, when added to the environmental baseline, is likely to result in significant adverse effects throughout the species' range, or appreciably diminish the capability of the CH to satisfy essential requirements of the species" (U.S. Fish and Wildlife Service and National Marine Fisheries Service 1998:4-34).

Although the FWS anticipates some adverse effects to loach minnow CH from the implementation of the Tonto NF LRMP, as well as the 1996 Regional Amendment, we do not believe the impacts of the proposed action will result in destruction or adverse modification to loach minnow CH. The FWS bases this conclusion on the following reasons:

- The overall result of implementing the S&Gs within the Tonto NF LRMP will be beneficial to the loach minnow, particularly in the Fossil Creek drainage where designated CH occurs. The primary emphasis of management within Fossil Creek is for native fish, including loach minnow.

Proactive efforts by the USFS in the past and the continued monitoring of their management actions contribute positively to the overall status of the loach minnow CH in Fossil Creek. For this reason, it is the FWS's BO that the proposed action will not alter the ability of the loach minnow designated CH PCEs to function properly. As such, CH for the loach minnow will remain functional to serve its intended conservation role for the species. Therefore, the FWS concludes that the proposed action is not likely to destroy or adversely modify designated CH for the loach minnow.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Per the Act, take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. "Incidental take" is

defined (50 CFR 402.02) as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity.

Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part t of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

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

Amount or Extent of Take Anticipated

Incidental take of loach minnow is not reasonably certain to occur as a result of the continued implementation of the Tonto NF LRMP. The Tonto NF has only one translocated population of loach minnow in Fossil Creek, with one individual fish detected in 2011. Therefore, it is not clear that a population has established in Fossil Creek.

CONSERVATION RECOMMENDATIONS

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

1. In cooperation with AGFD, NMDGF, and FWS, remove all non-native species affecting the loach minnow and take measures to prevent re-occurrence of non-native species into loach minnow habitat.

2. Manage streams to create additional habitat for loach minnow.

3. Cooperate with state conservation agencies, FWS, and universities to conduct field studies and in-stream experiments to qualitatively and quantitatively describe indirect interactions among loach minnow and non-native fishes.

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

SPIKEDACE

STATUS OF THE SPECIES RANGEWIDE

Spikedace (Meda fulgida) was listed as a threatened species on July 1, 1986 (51 FR 23769). However, we determined in 1994 that reclassifying loach minnow to endangered status was warranted but precluded (59 FR 35303, July 11, 1994), and restated this conclusion on January 8, 2001 (66 FR 1295). We reanalyzed the determination each year in our Candidate Notice of Review, and determined that reclassification to endangered is warranted, in the Candidate Notice of Review published on November 9, 2009 (74 FR 57804). In 2010, we published a proposed rule to reclassify loach minnow to endangered status (75 FR 66482). During the preparation of this BO, the proposed rule changing the status of the spikedace from threatened to endangered was finalized on February 23, 2012 (77 FR 10810).

Critical habitat was originally designated on March 21, 2007 (72 FR 13356), and included portions of the Verde, middle Gila, lower San Pedro, and upper Gila rivers, and Aravaipa Creek, as well as several tributaries of those streams. Following a legal challenge to that designation, we filed a motion for voluntary remand in 2009 and began re-evaluating habitat CH. Those areas originally designated as CH in the 2007 rule remained in place until the new designation was finalized. As mentioned above, USFWS published the final rule reclassifying the species as endangered and revising the loach minnow's designated CH on February 23, 2012 (77 FR 10810). The final rule becomes effective on March 26, 2012. While there are some differences between the 2007 designation and the 2012 revised designation, much of the geographic area included for spikedace CH is the same in both proposals. Specific details regarding the areas included as designated or proposed CH can be found in the two rules. Key features, or PCEs for spikedace are: 1) Habitat to support all egg, larval, juvenile, and adult spikedace; (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 spikedace; and (6) Streams with a natural, unregulated flow regime that allows for periodic flooding or, if regulated, that allows for adequate river functions. Additional detail on each of these PCEs are found in the CH rule.

Spikedace is a small silvery fish whose common name alludes to the well-developed spine in the dorsal fin (Minckley 1973). Spikedace historically occurred throughout the mid-elevations of the Gila River drainage, but is currently known only from the middle, and upper Gila River and Aravaipa Creek. The species also occurs in the upper Verde River and Eagle Creek, but appears to be declining in numbers. It has not been documented in the Verde River since 1999 despite

annual surveys, and additional survey work is needed to determine its current status. Spikedace have not been detected in Eagle Creek since 1989 (Barber and Minckley 1966, Minckley 1973, Anderson 1978, Marsh et al. 1990, Sublette et al. 1990, Jakle 1992, Knowles 1994, Rinne 1999). Habitat destruction along with competition and predation from introduced nonnative species are the primary causes of the species decline (Miller 1961, Williams et al. 1985, Douglas et al. 1994).

Recent taxonomic and genetic work on spikedace indicates there are substantial differences in morphology and genetic makeup between remnant spikedace populations. Remnant populations occupy isolated fragments of the Gila basin and are isolated from each other. Anderson and Hendrickson (1994) found that spikedace from Aravaipa Creek are morphologically distinguishable from spikedace from the Verde River, while spikedace from the upper Gila River and Eagle Creek have intermediate measurements and partially overlap the Aravaipa and Verde populations. Mitochondrial DNA and allozyme analyses have found similar patterns of geographic variation within the species (Tibbets 1992, Tibbets 1993).

Spikedace live in flowing water with slow to moderate velocities over sand, gravel, and cobble substrates (Propst et al. 1986, Rinne and Kroeger 1988). Specific habitat for this species consists of shear zones where rapid flow borders slower flow, areas of sheet flow at the upper ends of mid-channel sand/gravel bars, and eddies at the downstream riffle edges (Propst et al. 1986). Spikedace spawns from March through May with some yearly and geographic variation (Barber et al. 1970, Anderson 1978, Propst et al. 1986). Actual spawning has not been observed in the wild, but spawning behavior and captive studies indicate eggs are laid over gravel and cobble where they adhere to the substrate. Spikedace lives about two years with reproduction occurring primarily in one-year old fish (Barber et al. 1970, Anderson 1978, Propst et al. 1986). It feeds primarily on aquatic and terrestrial insects (Schreiber 1978, Barber and Minckley 1983, Marsh et al. 1989). Additional details on habitat preferences are provided in the 2007 CH designation (72 FR 13356), the 2010 proposed rule for CH designation from 2010 (75 FR 66482), and the recently published 2012 final rule for CH designation (77 FR 10810).

The spikedace was once common throughout much of the Gila River basin, including the mainstem Gila River upstream of Phoenix, and the Verde, Agua Fria, Salt, San Pedro, and San Francisco subbasins. Habitat destruction and competition and predation by nonnative aquatic species reduced its range and abundance (Miller 1961; Lachner et al. 1970; Ono et al. 1983; Moyle 1986; Moyle et al. 1986; Propst et al. 1986). Spikedace are now restricted to portions of the upper Gila River (Grant, Catron, and Hidalgo Counties, New Mexico); Aravaipa Creek (Graham and Pinal Counties, Arizona); Eagle Creek (Graham and Greenlee Counties, Arizona); and the Verde River (Yavapai County, Arizona) (Marsh et al. 1990; M. Brouder, U.S. Fish and Wildlife Service (Service), pers. comm. 2002; Stefferud and Reinthal 2005; Paroz et al. 2006; Propst 2007).

In 2007, spikedace were translocated into Hot Springs Canyon, in Cochise County, Arizona, and Redfield Canyon, in Cochise and Pima Counties, Arizona, and these streams were subsequently augmented (Robinson 2008a; T. Robinson, Arizona Game and Fish Department (AGFD), pers. comm. 2008b; D. Orabutt, AGFD, pers. comm. 2009; Robinson 2009a; Robinson et al. 2010a; Robinson et al. 2010b). Both Hot Springs and Redfield canyons are tributaries to the San Pedro

River. Spikedace were also translocated into Fossil Creek, a tributary to the Verde River in Gila County, Arizona, in 2007, and were subsequently augmented in 2008 (Carter 2007; Carter 2008; Robinson 2009b; Boyarski et al. 2010). In 2008, spikedace were translocated into Bonita Creek, a tributary to the Gila River in Graham County, Arizona (H. Blasius, BLM, pers. comm. 2008; D. Orabutt, AGFD, pers. comm. 2009; Robinson et al. 2009), and were repatriated to the upper San Francisco River in Catron County, New Mexico (D. Propst, New Mexico Department of Game and Fish (NMDGF), pers. comm. 2010). Augmentations with additional fish will occur for the next several years at all sites, if adequate numbers of fish are available. Monitoring at each of these sites is ongoing; however, insufficient time has elapsed to allow us to determine if these translocation efforts will ultimately be successful and result in establishment of new populations of loach minnow in these locations.

Spikedace is now common only in Aravaipa Creek in Arizona (Arizona State University (ASU) 2002; P. Reinthal, University of Arizona, pers. comm. 2008, Reinthal 2009) and one section of the Gila River south of Cliff, New Mexico (NMDGF 2008; Propst et al. 2009). The Verde River is presumed occupied; however, the last captured fish from this river was from a 1999 survey (M. Brouder, FWS, pers. comm. 2002; AGFD 2004). Spikedace from the Eagle Creek population have not been seen for over a decade (Marsh 1996), although they are still thought to exist in numbers too low for the sampling efforts to detect (Carter et al. 2007; see Minckley and Marsh 2009). The Middle Fork Gila River population is thought to be very small and has not been seen since 1995. Planning among several State and Federal agencies is underway for restoration of native fish species, including spikedace, in the Blue River following construction of a barrier that will exclude nonnative fish from moving upstream from the lower San Francisco River, and allow for translocation of spikedace. Barrier construction is underway with completion anticipated in late Spring 2012. Federal land ownership throughout the majority of this proposed CHU would facilitate management for the species. While the Blue River and its tributaries were not included in the 2007 designation, the proposed rule in 2010 includes these areas for spikedace, and contains details on areas considered as proposed CH.

Our information indicates that, rangewide, more than 390 consultations have been completed or are underway for actions affecting spikedace and loach minnow, which often co-occur. The majority of these opinions concerned the effects of road and bridge construction and maintenance, grazing, water developments, fire, species control efforts, or recreation. There are a high number of consultations for urban development and utilities, however, these projects typically do not result in adverse effects to the species but are for technical assistance only. Small numbers of projects occur for timber, land acquisition, agriculture, sportfish stocking, flooding, Habitat Conservation Planning, native fish restoration efforts, alternative energy development, and mining.

The status of spikedace is declining rangewide. It is now restricted to approximately 10 to 15 percent of its historical range. Within occupied areas, it is common to very rare, but is presently common only in Aravaipa Creek and some parts of the upper Gila River in New Mexico (U.S. Fish and Wildlife Service 2000). Although it was listed as threatened at the time of the 2011 BA, we published to the final rule to re-designate CH and to reclassify spikedace to endangered status on February 23, 2012, and the rule became effective on March 26, 2012.

ENVIRONMENTAL BASELINE (Tonto NF)

Status of the Species within the Action Area

On the Tonto NF, spikedace were stocked in Fossil Creek in 2007 and 2008, the status of the population is not known at this time. In 2009 spikedace were believed to be present in six to seven miles of the stream. Monitoring in August 2011 detected spikedace (C. Crowder, AGFD, pers. comm. 2011).

The Forest cooperates with partners to monitor the fish community in Fossil Creek. Spikedace are estimated to be present in six to seven mi of Fossil Creek. Fossil Creek on the Tonto NF is excluded from livestock grazing.

Critical habitat was originally designated for the spikedace in 2007 and modification to the 2007 designation became final on February 23, 2012. The 2007 designation did not include any streams on the Tonto NF. The 2012 revisions designate as spikedace CH the stream reaches in the Verde River drainage and Salt River Sub-basin.

Factors Affecting the Species within the Action Area

Spikedace and its designated CH may be affected on NFs by groundwater pumping, watershed conditions, stormwater runoff, nonnative fish species, livestock grazing, timber harvest, wildfire, recreational activities, and other habitat alterations.

CONSERVATION MEASURES

The USFS has agreed to implement the following CMs for the spikedace:

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, FWS, 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 FWS 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 FWS 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 FWS in the LRMP annual reports.

Conservation Measure #5: To the extent feasible within the mission and capabilities of the USFS, assist the FWS, AGFD, and the NMDGF with any spikedace reintroduction efforts.

Conservation Measure #6: Within the mission and capabilities of the USFS, continue to assist the FWS, other federal agencies, state agencies, universities, and others in the continuation of a captive spikedace propagation program designed to augment wild populations.

Conservation Measure #7: The long-term benefit 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 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 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 T&E 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 CH and develop mitigation actions to eliminate threats.

c. Develop contingency plans in cooperation with FWS, 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.

EFFECTS OF THE ACTION

The 2005 BO/CO included tables showing the S&Gs considered for each species' analysis and a ranking table summarizing the types of effects (lethal, sublethal, etc.) expected to result from the S&Gs. Because no new significant scientific information has become available on the spikedace and there have been no changes in Forest policy or programs that would change the 2004 BA (USFS) and 2005 BO/CO (FWS) effects determination for this species, we hereby incorporate by reference the ranking tables and effects analysis presented in the 2005 BO/CO and provide a narrative summary below.

This section includes analyses of the direct and indirect effects of the proposed action on the spikedace for the Tonto NF LRMP.

Spikedace is currently not known from any naturally occurring populations on the Tonto NF; however, they have been translocated at Fossil Creek, and were detected in 2011. In addition, the lower Verde River and Tonto Creek are known to have been historically inhabited by spikedace. The majority of the S&Gs within the Tonto LRMP will maintain habitat and provide for recovery of the spikedace. There several S&Gs that may result in lethal, non-lethal and behavioral effects to the species. Additionally, there were several S&Gs that were beneficial in the long-term but had some short-term adverse effects.

Fire Management Program

Standards and Guidelines 1376a and 1376d allow the use of prescribed fire to treat vegetation for water yield, forage, and wildlife habitat improvement. Although it is recognized that fire has a role in the ecosystem and that using prescribed fire is one way to re-introduce fire into the system and reduce the risks of catastrophic wildfire in the long run, there are short-term effects of prescribed fire similar to those caused by fire suppression activities as well as effects of the prescribed fire itself.

Forestry and Forest Health Program

Standard and Guideline 1400 guides the Forest to restrict tractor skidding to those areas that have sustained slopes of 40 percent or less. This does not eliminate the possibility of sediment being transported off the slope and entering the stream. Sedimentation from tributary canyons and streams leading into drainages contributes to the condition of the river downstream. The amount of sediment in the stream system is a major force in determining the size and shape of the stream channel.

Standards and Guidelines 1398, 1401, and 1403 are all actions to reduce the impacts of ground disturbing activities to the watershed in the long-term, however this may result in short-term adverse effects.

Rangeland Management Program

Standards and Guidelines 1371c, 1388a, 1388b, 1404e, 1404f, 1404g, 1418a, 1418b, 1423, and 1423a all provide the Tonto with guidance on managing its grazing program. The effects that livestock management activities can have on riparian and aquatic habitats, both direct and through upland/watershed effects, have been well documented and discussed in recent years (Platts 1990, Bahre 1991, Meehan 1991, Fleischner 1994).

Sedimentation from tributary canyons and streams leading into drainages contributes to the condition of the river downstream. The amount of sediment in the stream system is a major force in determining the size and shape of the stream channel. The riparian vegetation and streambank condition in tributaries, including intermittent and ephemeral channels, form important buffers between upland impacts and the mainstem or perennial stream. A healthy riparian zone with substantial herbaceous cover is a very effective buffer for filtering sediment and pollutants before they can reach the stream (Erman et al. 1977, Mahoney and Erman 1984, Lowrance et al. 1984, Bisson et al. 1992, Osborne and Kovacic 1993).

Spikedace are adversely affected by activities that contribute to the alteration of the flow regime (i.e., water quality, quantity, intensity, and duration), degrading the stream channel, and modifying the floodplain and riparian vegetation structure and diversity. Some effects to spikedace and their habitat may be restricted within a small area, other effects extend downstream. The ways in which the effects of livestock grazing are manifested, and the magnitude of the effects in the watershed, are dependent on local site conditions.

Standard and Guideline 1423c allows the use of approved herbicides on a selective basis where brush encroachment is clearly inhibiting forage production for wildlife and domestic livestock. Possible treatment areas will be identified in Allotment Management Plans and will involve areas of limited size and extent where other management practices (i.e., prescribed burning) cannot be effectively or economically utilized to achieve management objectives. Projects of this nature will be subject to environmental assessment and public involvement to insure project objectivity and public safety.

Runoff that may contain herbicides could cause sublethal toxic effects in a species, affecting hormone regulation, reproduction, and embryonic development. Herbicides may affect not only aquatic species larval development, but also adult immune systems, rendering organisms more susceptible to disease. With fewer healthy adults in the breeding population, fewer young will be produced, and of those produced, more offspring will not develop normally.

Standards and Guidelines 1376b and 1388f provide guidance for the improvement of range condition. Methods to accomplish this could include prescribed fire and chemical and/or mechanical means. There could be short-term adverse effects from management to improve overall landscape conditions in the long-term.

Recreation, Heritage, and Wilderness Program

Standards and Guidelines 1388c and 1404d provide guidance for OHV use within the Tonto NF. Because of its proximity to a metropolitan area, the Tonto NF receives a high degree of recreation use including OHV use. If not controlled, OHV use could result in the deterioration of watershed conditions. As stated previously, one of the primary threats to spikedace is watershed deterioration. This could potentially lead to increased erosion into spikedace habitat, thereby increasing sedimentation into the stream channel and lowering water quality by allowing contamination of those streams. As a result, potential effects to the species may include a reduction of invertebrate food supplies, interference with reproduction, and direct mortality. Standard and Guideline 1371g allows the Forest to construct or reconstruct trails in either former or new locations to prevent resource degradation and provide public safety. Again, there are

potential short-term effects due to ground disturbing activities. The assumption is that the long-term benefit of relocating the trail will outweigh any short-term effects.

Wildlife, Fish, and Rare Plants Program
Standards and Guidelines 1364, 1365, and 1388d all provide guidance for minimizing impacts from stream crossing and habitat improvement projects. Although these are considered by the FWS to be positive, there is still the potential for short-term and localized effects to individuals from crushing and sedimentation during the implementation of these projects.

1996 Regional Amendment

Short-term adverse effects to the spikedace may occur from the implementation of the S&Gs within the 1996 Regional Amendment, based on the ranking of the S&Gs. Yet, we found that the guidelines used by the USFS for the northern goshawk do not appreciably affect this species.

The following S&Gs under the 1996 amendment are those that will ultimately have a long-term beneficial effect to the spikedace. They are 1432, 1445, 1448, 1455, 1458, 1468, 1476, and1508. All these S&Gs allow the Forests to use prescribed fire, thinning, and other fuels management activities as a tool for fire risk abatement. Potential short-term effects include those associated with ground disturbance (i.e. sedimentation) as well as those from the fire itself. See previous discussions under the Fire Management Program, Coconino NF for discussion of those effects. Although the implementation of all of these S&Gs will have short-term effects from using prescribed fire, there will be a long-term beneficial effect in the reduced risk of catastrophic wildfire.

CRITICAL HABITAT EFFECTS ANALYSIS
Critical habitat was designated for the spikedace in 2007, but the FWS published a proposed rule for a new designation in October 2010 (75 FR 66482). The final rule for the designation was published on February 23, 2012, and became effective on March 26, 2012. The 2007 designation did not include any streams on the Tonto NF; however, the 2010 proposal and 2012 final rule includes stream reaches on the Tonto NF within the Verde River and Salt River subbasins, as follows:.

Fossil Creek
4.7 mi of stream extending from the confluence with the Verde River upstream to the confluence with an unnamed tributary in T11.5N, R7E, center of section 29. This reach is on Coconino and Tonto NF lands.

Tonto Creek
29.7 mi of stream extending from the confluence with Greenback Creek upstream to the confluence with Houston Creek. This reach is mostly on Tonto NF lands and may include small parcels of private lands.

Greenback Creek
9.4 mi of stream extending from the confluence with Tonto Creek upstream to Lime Springs. This reach is mostly on Tonto NF lands and may include small parcels of private lands.

Rye Creek
1.8 mi of stream extending from the confluence with Tonto Creek upstream to the confluence with Brady Canyon. This reach is mostly on Tonto NF lands and may include small parcels of private lands.

Spring Creek
16.9 mi of stream extending from the confluence with the Tonto River upstream to the confluence with Sevenmile canyon. This reach is mostly on Tonto NF lands and may include small parcels of private lands.

Rock Creek
3.6 mi of stream extending from the confluence with Spring Creek upstream to the confluence with Buzzard Roost canyon. This reach is mostly on Tonto NF lands and may include small parcels of private lands.

Effects Analysis (Critical Habitat)
A thorough review of all LRMP amendments and program descriptions since the 2004 BA (USFS 2004) for The Continued Implementation of the LRMP for the 11 NFs and NGs and the 2008 BA for Effects to CH for the spikedace was conducted, and it was determined there have been no changes in Forest policy or programs that would warrant a change in the 2008 determination for spikedace CH.

The PCEs for loach minnow include habitat to support all life stages of the fish, including perennial flows, appropriate stream habitats and microhabitats, low levels of pollutants, an appropriate prey base, no or low levels of nonnative aquatic species, and a natural, unregulated flow regime that allows for periodic flooding (77 FR 10810). The various USFS programs may include activities such as road development or eradication, vegetation removal, and grazing which could impact these PCEs by removing vegetation, disturbing soils, or other activities. Consultation on site-specific projects under these programs will be conducted to more adequately address specific impacts to the PCEs.

Proactive efforts by the USFS in the past and the continued monitoring of their management actions contribute positively to the overall status of the spikedace and its CH. These actions together with the implementation of the beneficial S&Gs outlined above should continue to improve habitat conditions on NF lands in the Southwest. For these reasons, as well as the above analyses, it is the FWS's biological opinion that the proposed action will not alter the ability of the spikedace designated CH PCEs to function properly. As such, CH for the spikedace will remain functional to serve its intended conservation role for the species (i.e. survival and recovery). Therefore, the FWS concludes that the proposed action is not likely to destroy or adversely modify proposed CH for the spikedace.

1996 Regional LRMP Amendment

Although the 1996 Regional LRMP Amendment focuses on effects to MSO, there are some S&Gs that may contribute to the protection of imperiled species and their habitats. The

amendment addressed several activities in several Resource Programs. One S&G provides guidance for the Engineering and Recreation, Heritage and Wilderness Programs. S&G 1437 suggests avoidance of roads or trails in MSO PACs. This restricts the location of road and trail placement that could have varying effects to the spikedace CH depending on location specifics. Additional guidance is provided for the Recreation, Heritage, and Wilderness Program in S&G 1438, which allows recreation to continue at the levels that were occurring prior to the listing of the MSO. Site-specific effects may continue to occur as a result of maintaining those levels of recreation, particularly in riparian areas. S&Gs within the Fire Management Program provide guidance for treating fuel accumulations to abate fire risk and protect areas important to MSO and northern goshawk (S&G 1445, 1454, 1455, 1468, and 1508). The management of fuels should result in decreased threats or indirect effects to the spikedace CH. The Forestry and Forest Health Program has S&Gs that provide guidance primarily targeting timberland in areas that may affect the MSO and the northern goshawk. This guidance may result in only minor influences on indirect effects to spikedace CH or may result in neutral or no effect. Guidance provided for riparian areas has a greater influence on effects to spikedace CH. Standard & Guideline 1473 emphasizes maintenance and restoration of healthy riparian ecosystems. This S&G should have beneficial effects to the spikedace.

With regard to Rangeland Management, S&Gs 1448, 1474, 1477, 1479, 1489, and 1510 have significant influence on activities that may affect spikedace CH. The S&Gs provide guidance for managing range in good to excellent condition (S&G 1474), emphasizing maintenance and restoration of riparian habitats (S&G 1477, 1479, 1490), and maintaining satisfactory soil conditions, hydrologic function, and nutrient cycles. Standard and Guideline 1489 directs allowable forage use by grazing ungulates such that range conditions will not impede the conservation and recovery of federally listed species. The implementation of S&Gs contained within the amendment should result in some minimization of potential adverse effects by Fire Management, Rangeland Management and Forestry activities on spikedace CH.

Cumulative Effects

Cumulative effects include the effects of future state, tribal, local, or private actions that are reasonably certain to occur in the action area considered in this BO/CO. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

Residential and commercial development on lands within watersheds containing T&E native fishes, are cumulative effects and can adversely affect the species through a variety of avenues.

Cumulative effects to native fishes include ongoing activities in the watersheds in which the species occurs such as livestock grazing and associated activities outside of federal allotments, irrigated agriculture, groundwater pumping, stream diversion, bank stabilization, channelization without a federal nexus, and recreation. Some of these activities, such as irrigated agriculture are declining and are not expected to contribute substantially to cumulative long-term adverse effects to native fishes.

Other activities, such as recreation, residential, or commercial use of the non-federal lands near the riparian areas would likely result in cumulative adverse effects to occupied, as well as potentially-occupied native fish habitat through increased water use, increased pollution, and increased alteration of the streambanks through riparian vegetation suppression, bank trampling, and erosion.

CONCLUSION

After reviewing the current status of the spikedace, the environmental baseline for the action area, the effects of the proposed action which include the various CMs voluntarily brought forward by the USFS, and the cumulative effects, it is the FWS's biological opinion that the proposed action will not jeopardize the continued existence of the spikedace. Pursuant to 50 CRF 402.02, "jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species.

The FWS anticipates adverse effects to the spikedace from the implementation of the Tonto NF LRMP, as well as the1996 Regional Amendment. However, the FWS does not believe the impacts of the proposed action will rise to the level of jeopardy for the species for the following reasons:

- Several S&Gs within these NF LRMPs support conservation and recovery of spikedace. These S&Gs guide the Forest to implement recovery plans, improve habitat for T&E species by structural and nonstructural means, and to delist T&E species.
- The USFS has fenced hundreds of miles of streams within NFS lands for the protection of spikedace habitat.

In addition, the USFS will continue to implement (i.e., as part of the proposed action) several additional CMs specifically for the spikedace. These CMs include the following:

- Designing projects in occupied spikedace habitat on NFS lands that address the appropriate components of the spikedace recovery plan, with the goal of implementing projects with beneficial, insignificant, or discountable effects to spikedace.
- Cooperating with state conservation agencies, other federal agencies, USFS research stations, FWS, and others (universities) to assess and prioritize habitat of stream and river segments for potential spikedace reintroduction. In addition, determining necessary habitat and watershed improvements in occupied watersheds and watersheds identified as high priority reintroduction sites and implement projects needed to contribute to recovery.
- Participating in ongoing efforts initiated in 2003 involving state agencies, other federal agencies, universities/colleges, USFS research facilities, and FWS to document the current state of knowledge regarding the spikedace. Further, developing a conservation assessment and strategy for the spikedace with a target completion of this effort within 1.5 years.

- Identifying existing populations in imminent need of protection and develop and implement, to the extent possible, a strategy for protecting the population and reducing threats to the population.
- Work with state conservation agencies and other researchers (i.e., academia), who are currently monitoring spikedace populations, participating in the development of a consistent monitoring methodology for spikedace, their associated habitat, and co-occurring aquatic species. The USFS will cooperatively document the results in an annual report to the FWS.
- The USFS will assist the FWS, AGFD, and the NMDGF with any spikedace reintroduction effort to the extent feasible within the mission and capabilities.
- The USFS will, within the mission and capabilities, assist the FWS, other federal agencies, state agencies, universities/colleges, and others in the continuing a captive spikedace propagation program designed to augment wild populations.

The USFS has also agreed to implement the following CMs with regards to wildland fire use:

- 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 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.
- A USFS biologist for the appropriate species will be assigned and consulted during fire management activities to ensure that concerns for T&E 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 CH and develop mitigation actions to eliminate threats.
- Develop contingency plans in cooperation with FWS, 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.

The USFS has committed to the implementation of these CMs. Therefore, implementation of these CMs along with the management direction provided by the beneficial S&Gs within the Tonto NF LRMP should not result in a further decline in population numbers or habitat conditions of spikedace on NFS lands in the southwest. Habitat for the spikedace is expected to improve. Specifically, the CM direct actions at eliminating threats and augmenting populations. These efforts, in combination with actions already on-going for the conservation benefit of the species, will provide sufficient protection for the spikedace. Therefore, we conclude that the continued implementation of the Tonto NF LRMP is not likely to jeopardize the continued existence of the spikedace.

Critical Habitat

After reviewing the current status of spikedace CH, the environmental baseline or the action area, the effects of the proposed action, and the cumulative effects, it is our opinion that the continued implementation of the LRMP will not destroy or adversely modify CH for spikedace. The LRMPs contain guidance that seeks to minimize the magnitude of the effects; however, there is still a potential to implement the LRMPs while causing adverse effects to CH. Although the FWS anticipates some adverse effects to spikedace CH from the implementation of the Tonto NF's LRMP, as well as the 1996 Regional Amendment, we do not believe the impacts of the proposed action will result in destroy or adverse modification to spikedace CH.

Effects to the spikedace CH from the Tonto NF LRMP and the 1996 Regional Amendment were analyzed. Potential adverse effects from the implementation of these LRMPs and associated S&Gs were found likely to occur. In addition, short-term adverse effects were identified for activities associated with S&Gs that have a long-term benefit to the species. However, the FWS does not believe the impacts of the proposed action will result in the alteration of the abilities of the PCEs to function properly. The FWS bases this conclusion on the following reasons:

- The 1996 Regional LRMP Amendment essentially reduces the effects to CH caused by the Forestry and Forest Health and Rangeland Management Programs for the Tonto NF.

- The USFS has taken proactive measures in an attempt to reduce the decline of the spikedace. For example, the USFS and FWS jointly developed a set of CMs for the spikedace which became part of the proposed action under the 2004/2005 consultation. According to the October 2008, Final Annual Report, the forests have implemented those CMs into their projects designs as appropriate.

- The Southwestern Region of the USFS, in implementation of one of the RPMs described in the 2005 BO/CO, has hosted the Spikedace Conservation Coordination Meetings to identify priority sites for reintroducing spikedace. During these meetings, the team has identified existing populations of spikedace in imminent need of protection due to natural occurrences as well as management activities. Since then, the USFS has developed and implemented a strategy for protecting and reducing threats to the populations.

- In compliance with an RPM described in the 2005 BO/CO, the USFS agreed to 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 that the ignition occurs, as well as, surrounding watersheds. In addition, they have identified watersheds that are particularly susceptible to ash flow and sediment following high intensity fires. This information is used to guide fire use mitigation measures such as; delay, direct check and/or suppress. Also, avoidance buffers were established through the nationwide fire retardant consultation.

Proactive efforts by the USFS in the past and the continued monitoring of those areas contribute positively to the overall status of spikedace CH, promoting survival and recovery. Activities such as closing roads, removal of non-native fish, establishing a captive breeding program, and the exclusion of cattle from riparian areas continue to contribute toward the improvement of loach minnow habitat. In addition, there are activities being conducted by other land management agencies to enhance habitat for the spikedace that benefit its CH rangewide. All these actions together with the implementation of the beneficial S&Gs outlined above should continue to improve habitat conditions on NFS lands in the southwest. For these reasons, as well as the above analyses, it is the FWS's biological opinion that the proposed action will not alter the ability of the PCEs to function properly. As such, CH for the spikedace will remain functional to serve its intended conservation role for the species. Therefore, the FWS concludes that the proposed action is not likely to destroy or adversely modify proposed CH for the spikedace.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulation pursuant to section 4(d) of the ESA prohibit the take of endangered and threatened species, respectively, without special exemption. Per the Act, take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined (50 CFR 17.3) to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. "Harass" is defined (50 CFR 17.3) as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding, or sheltering. "Incidental take" is defined (50 CFR 402.02) as take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. Under the terms of section 7(b)(4) and section 7(o)(2), taking that is incidental to and not intended as part of the agency action is not considered to be prohibited taking under the ESA provided that such taking is in compliance with the terms and conditions of this Incidental Take Statement.

The measures described below are non-discretionary, and must be undertaken by the USFS so that they become binding conditions of any grant or permit issued, as appropriate, for the exemption in section 7(o)(2) to apply. The USFS has a continuing duty to regulate the activity covered by this incidental take statement. If the USFS (1) fails to assume and implement the terms and conditions or (2) fails to require the permittee to adhere to the terms and conditions of the incidental take statement through enforceable terms that are included in the permit or grant document issued by the USFS, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the USFS must report the progress of the action and its impact on the species to the FWS as specified in the Incidental Take Statement. [50 CFR section402.14(i)(3)]

Amount or Extent of Take Anticipated

Given the limited information available at this time, the FWS is unable to conclude that incidental take of spikedace is reasonably certain to occur within the Tonto NF during the

lifetime of the proposed action. We find this for the following reasons: the most significant factor is the very small population size and elusive nature of the species which inhibits the effectiveness (and/or confidence) of spikedace presence/absence survey techniques. Secondly, if the species is present but not detected, uncertainties on their location and abundance precludes our ability to estimate the method, timing, or location of adverse effects incurred either directly or indirectly from the proposed action. Although 69 spikedace were found in Fossil Creek during the last monitoring effort, it is not yet clear this an established population.

CONSERVATION RECOMMENDATIONS

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

1. Design and implement projects on NFS lands and within the range of spikedace consistent with the recovery plan. That is, the focus shall be on projects designed specifically for spikedace recovery and not on incidental take minimization within other projects
2. Manage streams to create additional habitat for spikedace.
3. Cooperate with state conservation agencies, FWS, and universities to determine range of natural variation in absolute abundance and age-class structure pursuant to Recovery Task 2.4.
4. In cooperation with FWS, state conservation agencies, and universities conduct field studies and in-stream experiments to qualitatively and quantitatively describe indirect interactions among spikedace and non-native fishes.
5. Work to secure funding for studies and habitat improvement projects.

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

ARIZONA CLIFFROSE

STATUS OF THE SPECIES

Description

The Arizona cliffrose (*Purshia subintegra*) is a long-lived evergreen shrub that is a member of the rose family (Rosaceae), reaching 5 to 6 ft (1.5-1.8 m) in height. Its bark is pale gray with young twigs covered with dense, soft, glandless, white hairs. Leaves are also glandless and

simple, usually no lobes (but occasionally one or two lobes), with smooth and revolute leaf margins. Flowers contain white or yellow petals about 0.4 in (1 cm) long.

Arizona cliffrose is a rare Arizona edaphic endemic, restricted to nutrient deficient calcareous soils (Anderson 1986, 1993). The species grows on gentle to steep slopes, open basins, and limestone ledges and outcrops. As stated in the June 2000 General Species Information worksheet available on the Arizona Ecological Services Field Office website, all four localities of this species are in central Arizona below the Mogollon Rim. These known sites include the Burro Creek drainage (Mohave County), Horseshoe Lake (Maricopa County), Verde Valley (Yavapai County) and the San Carlos Indian Reservation near Bylas (Graham County).

Legal Status: On May 29, 1984, the Arizona cliffrose was listed as an endangered species under the ESA, without CH designation (USFWS 1984). The Arizona Native Plant Law (A.R.S Chapter 7, Article 1) also protects the Arizona cliffrose. The provisions of the Arizona Native Plant Law significantly strengthen the protections offered by section 9 of the ESA because a violation of the Arizona Native Plant Law is also a violation of the ESA. Additionally, the Lacey Act, as amended in 1982, provides some protection for the Arizona cliffrose. Under this law, it is prohibited to import, export, sell, receive, acquire, purchase, or engage in the interstate or foreign commerce of this plant. The Arizona cliffrose Recovery Plan was completed in 1995.

Distribution and Abundance

This species has narrow habitat requirements and occurs in four widely separated areas in central Arizona as stated above. These four known populations are spread across a 200-mi zone of central Arizona within an elevation range of 2,100-3,600 ft (650-1,100 m). Each of the four populations of Arizona cliffrose is genetically variable, having distinct biological, ecological, and morphological characteristics (Mount and Logan 1992). Certain morphological characteristics, especially the frequency and degree of leaf lobing, and the density of leaf and flower stipitate glands, differ among the populations (Reichenbacher 1992).

The largest known populations of Arizona cliffrose occur in the Verde Valley and near Burro Creek population, the latter occurring on BLM administered lands. The 1,113-ac Clay Hills Area of Environmental Concern (ACEC) contains the largest subpopulation of Arizona cliffrose in the Burro Creek area (T. 14 N., R. 11 W., Secs. 1, 2, 11, and 12), but not two smaller, more recently discovered subpopulations (BLM1990).

Little is known of the Arizona cliffrose population near Bylas on the San Carlos Apache Indian Reservation. However, based on the presumed extent of appropriate habitat, this population may be rather large. The Horseshoe Lake population includes several subpopulations and is found on the Tonto NF. The Verde Valley population is the largest, covering over 1,000 ac (USFWS 1995), but total plant numbers are not known. A portion of the Verde Valley population is found on the Coconino NF (as discussed below); the remaining habitat is management by Yavapai County (formerly Arizona State Land Department), Dead Horse Ranch State Park, and private individuals.

Habitat

As stated in the June 2000 General Species Information worksheet available on the Arizona Ecological Services Field Office website, the species grows only on tertiary limestone lakebed deposits. The distinctive white soil color of these deposits can be seen from a distance. Each of the sites where the four populations occur differ slightly in elevation and associated vegetation, but all sites have limestone soils (generally white but also reddish in color) derived from tertiary lakebed deposits, and contain a locally unique vegetative community (Anderson 1993).

Life History

The Arizona cliffrose appears to be a long-lived shrub, capable of a large reproductive output, but recruitment rates vary among populations. For a detailed discussion of Arizona cliffrose life history, please refer to the 2005 BO/CO.

Reasons for Listing

The FWS listed the Arizona cliffrose as an endangered species under the ESA on May 29, 1984. The following information is reiterated from the 2005 BO/CO. Major reasons for listing the Arizona cliffrose as endangered include urbanization, recreation, road and utility line construction, mineral exploration, mining, and livestock and wildlife browsing. The Cottonwood population occurs in a developing urban/suburban area, where the most serious impacts stem from land development, road construction, and recreational activities. Soils supporting Arizona cliffrose populations contain high quality bentonite, a type of clay with numerous commercial uses. Mining and mineral exploration has impacted the Burro Creek and Horseshoe Lake populations. Additionally, many Arizona cliffrose populations are subject to impacts from livestock and/or wildlife grazing.

Threats: Threats to the species include livestock and burro grazing, mineral exploration and development, construction and maintenance of roads and utility rights-of-way, recreation, off-road vehicle use, urbanization, pesticides, poor reproduction (e.g., recruitment) and hybridization. The relative importance of these threats varies from population to population.

Climate Change

The 2011 BA states that no research has been initiated related to the specific effects of climate change on this species but that there are no expectations of measurable changes in climate within the temporal bounds of the proposed action. However, Maschinski et al. (2006) state that global warming conditions are likely to reduce the carrying capacity of many rare species' habitats; their models also suggest that the Arizona cliffrose population in the Verde Valley is slowly declining and will be at greater risk of extinction with global warming. With decreasing population size, the risks of genetic erosion and extinction increase, and these risks become even higher when habitat is fragmented (Young & Clarke 2000 *in* Maschinski et al. 2006). Additional studies will be necessary in order to better understand how climate change will affect the Arizona cliffrose.

Despite the current limits of climate change effects analysis, the 2011 BA also states that the USFS Southwestern Region has developed guidance for addressing climate change in NF LRMP revisions, which are broad and general in scope and which rely on adaptive management as climate change science evolves. Therefore, as we build a better understanding of the potential

effects resulting from climate change on Arizona cliffrose distribution, FWS expects that this increased knowledge will be incorporated into the revisions of the Coconino NF LRMP.

Conservation Measures
The 2011 BA did not mention any CMs currently occurring on the Tonto NF to benefit the Arizona cliffrose.

ENVIRONMENTAL BASELINE

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

Status of the Species in the Action Area
As stated in the 2011 BA, the Tonto NF has management responsibility for the Horseshoe Lake population, which contains several subpopulations. Recruitment rates to maintain viable populations of Arizona cliffrose are not well documented or known; the Cottonwood population in the Verde Valley is shown to support a relatively large number of established seedlings (USFS 2004). The Horseshoe Lake population was the subject of a BO issued on March 10, 1987, for the Central Arizona Water Control Study Plan 6. This 1987 BO determined that 250 plants would be affected due to construction and operation of the Cliff Dam (33 percent of the Horseshoe Dam population) (USFS 1987). However, Cliff Dam was never constructed. The Cottonwood population has also been the subject of several BOs as described in the 2005 BO/CO. No consultations have been conducted on the Tonto NF since the 2005 BO/CO.

Factors Affecting the Species within the Action Area
The following factors affecting the species on the Tonto NF are reiterated from both the 2005 BO/CO and the 2011 BA. On the Tonto NF, mining activities in the 1960s and 1970s occurred near Chalk Mountain and Lime Creek in the Horseshoe Lake population. Activities included varying levels of surface disturbance, but the effects to Arizona cliffrose are not known.

Also on the Tonto NF, the Horseshoe Lake populations are in an area closed to OHV use, except where posted as open. Despite the presence of a lake and campground, no off-highway vehicle use has occurred in the subpopulations. The Horseshoe Lake populations occur mostly in the Sears Club-Chalk Mountain grazing allotment, which is grazed with a five-pasture rest-rotation system. The management plan for this allotment was written before Arizona cliffrose was discovered here. The subpopulation near Horseshoe Dam is divided between the Sears Club-Chalk Mountain Allotment to the north and the St. Clair Allotment to the south (USFS 2004). The grazing permit for the St. Clair Allotment was cancelled in 1992.

EFFECTS OF THE ACTION

The S&Gs listed in the Tonto NF LRMP and 1996 Regional Amendment provide direction for the development of site-specific actions. Multiple S&Gs are related to the Arizona cliffrose and its habitat. The S&Gs, if applied to project-level activities, may result in both indirect and direct effects to the species. The 2005 BO/CO included tables showing the S&Gs considered for each species' analysis and a ranking table summarizing the types of effects (lethal, sublethal, etc.) expected to result from the S&Gs. Because no new significant scientific information has become available on the Arizona cliffrose and there have been no changes in Forest policy or programs that would change the 2004 BA (USFS) and 2005 BO/CO (FWS) effects determination for this species, we hereby incorporate by reference the ranking tables and effects analysis presented in the 2005 BO/CO and provide a narrative summary below.

On the Tonto NF, Arizona cliffrose populations occur in MAs 1E and 1F. Emphasis for MA 1E is developed and dispersed water-oriented recreation in association with Horseshoe and Bartlett reservoirs. Management area 1F emphasis is wildlife habitat improvement, livestock forage production, and dispersed recreation.

Slightly more than 30 percent of the S&Gs could cause mortality of Arizona cliffrose plants and habitat destruction, while 37 percent of the S&Gs offer protection and some recovery opportunities to the species. The remaining 32 percent of the S&Gs are not applicable to the species or were too vague to analyze.

All of the Rangeland Management Program S&Gs for MAs 1E and 1F (1423 b-e) manage activities in support of the range program, which include seeding, burning, building fences, and land treatments to improve forage conditions. All of these S&Gs can lead to habitat disturbance and mortality of cliffrose plants and were rated as such. There was one exception (S&G 1370d) that directs the Forest to maintain forage use at a level that assures the continued existence and recovery of listed species.

Alternatively, all of the S&Gs in the Wildlife, Fish, and Rare Plants Program provide benefits to the Arizona cliffrose on the Tonto NF. They allow for survey and inventory and provide for project evaluation and clearances by biologists. Therefore, these S&Gs minimize and offset impacts from other program areas. The one applicable S&G (1422a) related to the Recreation, Heritage, and Wilderness Program was too vague to analyze because it could be interpreted in many ways.

1996 Regional Amendment

The management direction provided by the S&Gs in the 1996 Regional Amendment relates to the conservation of MSO and northern goshawk. The S&Gs promote healthy forest ecosystems; properly functioning watersheds; and riparian and aquatic systems (USFS 2004). There is only one S&G (1510) that applies to the Arizona cliffrose. In addition, we found that the guidelines used by the USFS for the northern goshawk do not appreciably affect this species.

The one S&G from the 1996 Regional Amendment that applies to Arizona cliffrose states that forage use by grazing ungulates will be maintained at or above a condition which assures the recovery and continued existence of listed species. The implementation of this S&G, which is

applicable to the Rangeland Management Program, should preserve and protect, at a minimum, the known locations of Arizona cliffrose on the Tonto NF.

Cumulative Effects

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this BO/CO. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

As stated in the 2005 BO/CO, Arizona cliffrose locations on the Tonto NF are restricted to federal ownership. As such, there would be no cumulative effects for the Horseshoe Lake population. On the Coconino NF, Arizona cliffrose populations are not restricted to the Forest but also occur on adjacent state trust lands and lands managed by a state park. The Cottonwood population has already been affected by urban development and road maintenance and construction. These activities are likely to continue in the future as the Verde Valley continues to grow. The Bylas population is on the San Carlos Indian Reservation. That population will most likely be affected by development and infrastructure demands on the reservation. Livestock grazing on the reservation may be affecting the Bylas population.

CONCLUSION

After reviewing the current status of the Arizona cliffrose, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the FWS's BO that the Tonto NF LRMP and 1996 Regional Amendment, as proposed, are not likely to jeopardize the continued existence of the Arizona cliffrose. Pursuant to 50 CFR 402.02, "jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both survival and recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species. Critical habitat for this species has not been designated; thus none will be affected.

Arizona cliffrose has narrow habitat requirements and occurs in four widely separated areas in central Arizona: near Bylas (Graham County), the Horseshoe Lake vicinity (Maricopa County), near Burro Creek (Mohave County), and near Cottonwood in the Verde Valley (Yavapai County). These four known populations are spread across a 200-mile zone of central Arizona. The population near Burro Creek is on BLM land and is within a protected area. The Horseshoe Lake population is on the Tonto NF and a portion of the Verde Valley population is on the Coconino NF, with the remaining portions on lands managed by the Arizona State Land Department. The Bylas population is on the San Carlos Apache Reservation. The BLM and Coconino NF populations have the highest level of protection and are monitored on a regular basis. These populations seem to be stable, whereas the status of the other two populations is unknown.

As discussed above, the FWS anticipates that adverse effects to the Arizona cliffrose (including habitat modification and mortality) are reasonably certain to occur under direction of the Tonto NF LRMP and 1996 Regional Amendment. However, the FWS does not believe that such activities will rise to the level of jeopardy for the following reasons:

- Standard and guideline 1341 allows Arizona cliffrose habitat to be surveyed and plants to be mapped. This S&G allows for avoidance of known plants during site-specific activities.

- In accordance with S&G 1342, ground disturbing projects are to be evaluated by qualified biologists in order to develop ways to minimize the effects of projects on Arizona cliffrose.

- Under S&G 1370d and 1510, the habitat needs of federally listed species will be taken into consideration and forage use is not to preclude the recovery or continued existence of listed species.

Therefore, with the implementation of these beneficial S&Gs within the Tonto NF LRMPs and the conservation efforts conducted by the Forest, the FWS concludes that the proposed action is not likely to jeopardize the continued existence of the Arizona cliffrose.

INCIDENTAL TAKE STATEMENT

Sections 7(b)(4) and 7(o)(2) of the ESA generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the ESA prohibits the removal and reduction to possession of federally listed endangered plants, or the malicious damage of such plants on areas under federal jurisdiction, or the destruction of endangered plants on non-federal areas in violation of state law or regulation, or in the course of any violation of a state criminal trespass law.

CONSERVATION RECOMMENDATIONS

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

1. Develop a monitoring plan for populations of Arizona cliffrose on the Tonto NF.

2. Implement the recommendations in the 1995 Arizona Cliffrose Recovery Plan.

3. Determine if the Arizona cliffrose plants in the Sears Club-Chalk Mountain Allotment need protection from livestock or activities associated with livestock grazing. This allotment is currently in non-use.

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

ARIZONA HEDGEHOG CACTUS

STATUS OF THE SPECIES

Description

The Arizona hedgehog cactus (*Echinocereus triglochidiatus* var. *arizonicus*) is a succulent, perennial plant with diploid, perfect-flowers, occurring in a limited area of central Arizona. Distinguishing characteristics of the cactus include its thick stems and spines. The Arizona hedgehog cactus has a dark green cylindroid stem (2.5-12 in, 6.4-30.5 cm) with smooth spines. Stems occur singly or in clusters, with one to three gray or pinkish central spines and five to eleven shorter radial spines that are less than 0.5 inches in length (Baker 2006). The most distinguishing feature of this taxon comparing it to other varieties of *E.* triglochidiatus is its robustness; the stems are wider and generally taller (USFWS 1985). Flowers are bright red and are produced along the side of the stem, appearing April to May.

Legal Status: The Arizona hedgehog cactus was listed as endangered without CH on October 25, 1979 (USFWS 1979). No recovery plan has been established for the cactus. A technical review of the Arizona hedgehog cactus recovery plan was drafted in 1984 by the USFS, Region 3, but never finalized. The cactus is also protected by under the Arizona Native Plant Law as a highly safeguarded native plant and is listed in Appendix II under the Convention of International Trade in Endangered Species of Wild Fauna and Flora (CITES).

Distribution and Abundance

The Arizona hedgehog cactus occupies a narrow geographic range that is located within central Arizona in Pinal and Gila counties, and includes the Pinal, Dripping Springs, Superstition, and Mescal Mountains. This cactus can also be found in the highlands between the cities of Globe and Superior. More specifically, the Arizona Rare Plant Committee (2001) reports its range as the Superstition Mountains and Top of the World on the Tonto NF. However, two small subpopulations occur outside of this area, the Apache Peak subpopulation north of the city of Globe and the El Capitan subpopulation south of Globe. These populations (main and two subpopulations) are "classical var. *arizonicus*" and are the only populations of the Arizona hedgehog cactus subject to the protection and restrictions of the Act. This cactus occurs on the Tonto NF, Arizona State Land Department trust lands, lands administered by the BLM, and privately-owned lands. Land ownership of the main population area is about 17,500 acres on the Tonto NF, 550 acres of State trust land, and 825 acres of privately owned land (USFS 1996). Acreage on BLM lands is unknown.

No range-wide surveys have been conducted for this species. The Arizona Heritage Management Database has 28 records documenting the location and/or number of Arizona hedgehog cactus observed throughout its range up through 2009 (S. Schwartz, AGFD, pers. comm. 2009). Of these records, approximately 1,302 Arizona hedgehog cacti have been

observed between 1922 and 2009. Some of these records are anecdotal and, for older records, the genetics of the individual should be verified for the variety *arizonicus*. Since 2009, the Arizona Heritage Management Database has two additional records documenting the presence of Arizona hedgehog cactus. An additional record was gathered in April 2010, when 50 plants were counted in total along with additional plans observed along volcanic formations (S. Tonn, AGFD, pers. comm. 2011). An additional siting was documented in December 2011, when at least 15 plants were observed along the lower slopes of Devils Canyon with estimates of 25-30 plants in the vicinity (M. Taylor, USFS, pers. comm. 2011). Direct access to a large portion of the species range is very limited due to the rugged topography and remoteness of its habitat. Consequently, we have few reliable estimates on abundance counts and these are limited to only those areas associated with federally funded or authorized activities requiring section 7 consultation.

Cedar Creek Associates, during a 1992-1994 survey for the Carlota Mine project (22410-1992-F-419), estimated that Arizona hedgehog cactus occupied approximately 18,900 acres of habitat within the main population. This estimate does not consider any activities authorized, funded, or carried out by the Tonto NF since 1996. Thus this estimate is likely outdated.

In 2010, FWS completed a section 7 consultation on the Tonto NF's approval of the Pre-feasibility Activities Plan of Operations for the proposed Resolution Copper project. Pre-feasibility activities were estimated to impact approximately 47.47 acres of undisturbed land. This consultation and project has contributed more recent findings through survey efforts conducted between 2001 and 2010. Surveys were conducted for previously authorized drill sites in 2001, and no Arizona hedgehog cactus were found during these surveys but potential exists for the species to occur in areas adjacent to or very near the surveyed areas (WestLand Resource, Inc. 2009) suggesting that these lands may be potentially suitable for the species. Surveys of Arizona hedgehog cactus conducted again by WestLand Resources, Inc., in conjunction with the Resolution Cooper project in 2004, found nine cactus in the Oak Flat Campground area and surrounding land east of the town of Superior (WestLand Resources, Inc. 2009). Additional surveys for AHC were conducted during July and September 2007 and in January, February, March, and September 2008 by WestLand Resources, Inc. The surveyed areas included a 100-foot wide area centered on the roadway centerline, along proposed access roads, and a 50-foot area around each proposed drill site. The total surveyed area covered approximately 383.25 acres of public, State trust, and privately-owned lands. Previous surveys were conducted in 2001 and 2004 covering 3,184.25 acres (WestLand Resources, Inc. 2009). The surveyed areas included lands within the Oak Flat Campground and those immediately surrounding it as well as, lands surrounding previously-authorized drill sites. Information from all of these surveys identified 140 Arizona hedgehog cactus on USFS and privately-owned lands. Of this amount, approximately 63 plants are located adjacent to the existing USFS roads and user-created roads. One cactus is located adjacent to a proposed drill site. No Arizona hedgehog cactus were located on State trust land. Additionally, no individuals were located along FR 315 from SR 177 north to the boundary of State trust lands, along FR 2440 and drill site MB-03 and QC-04, along FR 2261, and around drill site H-C. This portion of the copper project's action area is estimated to be 12.28 acres and considered by the Forest not to be Arizona hedgehog cactus habitat or potential habitat (WestLand Resources, Inc 2009b). The Forest also considers 1.15 acres on

private land and 3.02 acres of disturbance from previously authorized activities not Arizona hedgehog cactus habitat or potential habitat.

Densities of this cactus species during the survey were reported to be one plant per 336 acres. It was noted that the density in this area was far less than the densities found for Carlota of two to twenty Arizona hedgehog cacti per acre, highlighting the variability between the data and the need for additional research to improve our understanding of the species.

Nine formal section 7 consultations have been conducted for the species since 1990. Previous projects have resulted in the direct impact or loss of an estimated 3,247 individuals and approximately 561.41 acres of occupied, suitable, and potential habitat. In 1996, a Conservation Assessment and Plan was finalized for the cactus on the Tonto NF (Carlota Mine 22410-1992-F-419). The main recommendation of the plan were the identification of "safe areas", logical ecological units within the distributional limits of the taxon where the Federal government has options to maintain relatively strict control over land uses with management emphasis toward the perpetuation of the species (USFS 1996).

Habitat

The range and distribution of the Arizona hedgehog cactus occurs within the ecotone between Madrean Evergreen Woodland and Interior Chaparral at elevations ranging from 3,300 to 5,700 feet. Preferred habitat for this cactus is exposed and stable bedrock or boulders exhibiting sufficient fracturing or rock interstices for establishment. Parent rock materials of preferred habitat are Schultze granite and Apache Leap tuff (dacite), both igneous in origin (AGFD 2003; USFS 1996). Pinal schist and the Pioneer formation in proximity to the dacite and Schultze granite also provide habitat for the cactus, but only where these formations express themselves as exposed bedrock (USFS 1996). The majority of Arizona hedgehog cacti are found scattered on open, rocky slopes of 20 to 90 degrees, and steep, fissured cliffs (Philips et al. 1979; USFWS 1985). Its roots invade cracks, fissures, or interstices within exposed rock or narrow pockets between boulders where the microclimate provides the necessary periodic moisture, moist soils, and shelter from high temperatures (USFS 1996). The cactus may be found on flatter ground and more open slopes as well as, in the understory of shrubs, but moderate to high shrub densities and associated deeper soils tend to preclude the cactus (USFS 1996). As mentioned above, there is no designated CH for the Arizona hedgehog cactus.

Life History

The Arizona hedgehog cactus produces flowers from April to May and fruits from May to June (AGFD1992). It is an obligate out crosser that is pollinated by hummingbirds, carpenter bees, solitary bees, and honeybees (USFS 2004). About 100 seeds are produced per fruit (AGFD 1992) and mature cacti can produce many fruits per year.

Reasons for Listing

Reasons for listing the Arizona hedgehog cactus include the limited distribution of the plant, its vulnerability to mining operations, off-road vehicle use, illegal collecting, and road and utility construction.

Threats: Threats to the species have been identified as habitat destruction by mining, mineral exploration, road construction, power-line construction and utility corridors, off-highway vehicle use and other recreational activities, rangeland improvements including water developments and trampling by livestock. Additional threats to the cactus include illegal collecting, wildfire, herbicide and pesticide application, and insect infestation (Philips et al. 1979; AGFD 2003; USFS 1996).

Climate Change

Potential effects of climate change throughout Arizona and New Mexico are discussed in the Introduction section of this BO/CO. Climate forecasts project not only temperature increases but also an increase in the frequency of hot extremes, heat waves, and heavy precipitation events. Ultimately, this may result in drier future conditions for the Southwest and an increasing probability of drought. Due to these projections, we anticipate that the Arizona hedgehog cactus will face drier conditions in the high shrub habitat it occupies. As you state in the 2011 BA, no research has been initiated related to the specific effects of climate change on this species; however, there are no expectations of immediate measurable changes in climate within the temporal bounds of the proposed action. Despite the current limits of climate change effects analysis, the 2011 BA also states that the USFS Southwestern Region has developed guidance for addressing climate change in NF LRMP revisions, which are broad and general in scope and which rely on adaptive management as climate change science evolves. Therefore, as we build a better understanding of the potential effects resulting from climate change on Arizona hedgehog cactus distribution, FWS expects that this increased knowledge will be incorporated into the revisions of the Tonto NF LRMP.

ENVIRONMENTAL BASELINE

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

Status of the Species in the Action Area

The Tonto NF, Globe RD manages 90 percent of the known occupied habitat of the Arizona hedgehog cactus (USFWS 2005). Surveys for Arizona hedgehog cactus on Schultze granite and dacite formations found densities of 64.05 and 5.72 plants per acre, respectively. The amount of these habitats in the main population area gave a total population estimate of about 257,500 cacti in 2005. Intensive surveys were conducted in conjunction with the Carlota Mine Project resulting in close observations of 1,150 cacti. These surveys determined a recruitment ratio of 1.65 new recruits to each loss indicating that the population was both healthy and increasing during the 1992-1994 surveys (USFS 1996).

Factors Affecting the Species within the Action Area

As stated above, threats to the AHC have been identified as habitat destruction by mining, mineral exploration, road construction, power-line construction and utility corridors, off-highway

vehicle use and other recreational activities, rangeland improvements including water developments and trampling by livestock. Additional threats to the cactus include illegal collecting, wildfire, herbicide and pesticide application, and insect infestation (Philips et al. 1979; AGFD 2003; USFS 1996). Nine formal section 7 consultations have been conducted for this species. These previous projects have resulted in the direct impact or loss of an estimated 3,267 individuals and approximately 596.23 acres of occupied, suitable, and potential habitat.

Mining activities and road construction associated with mining has resulted in the loss of the species and the loss, degradation, and fragmentation of its habitat. In fact, the majority of the previous section 7 consultations conducted on Arizona hedgehog cactus were the result of proposed mining activities. The species occurs adjacent to the footprint of the OMYA Mine, near drill sites and exploratory drill sites owned by Resolution Copper, and within the Carlota Copper Mine, now Quadra Mine. For the recent Resolution Mine project, FWS found that 20 plants may be transplanted and 34.82 acres of habitat lost or disturbed, further diminishing the baseline of this species. The Carlota Mine also resulted in the loss of 270 plants (Cedar Creek 2009) and disturbance to 23.94 acres.

The use, maintenance, and construction of roads for accessing mining, grazing, and recreation sites may also negatively impact the Arizona hedgehog cactus since this species grows along roadsides. The Tonto NF is currently working on their Travel Management Plan, and FWS is in early consultation with USFS on this project. The proposed action states, "there are approximately 4,290 miles of NFS roads on the Tonto NF, of which approximately 3,670 miles are currently open to the public for motorized travel." The Tonto NF proposed to open an additional 820 miles of roadway on the Forest, which will likely affect the species and its habitat since road construction has been identified as a threat to this species.

In the action area of the Tonto NF, grazing is a threat to the Arizona hedgehog cactus and could result in adverse effects due to trampling by livestock. The Arizona hedgehog cactus occurs in the following grazing allotments: Devil's Canyon, Bellevue, Superior, Millsite, and Bohme Allotments. In addition, the Arizona hedgehog cactus may occur in the Hobbs, Capitan, Coolidge-Parker, and Pinto Creek Allotments, and subpopulations may also include Lyons Fork, Radium, Winters, and one pasture in the Hicks-Pikes Peak Allotments. Only those cacti growing in a soil matrix on slopes less than 60 percent risk physical damage from livestock.

Invasive species control is another concern in the action area with the potential to affect Arizona hedgehog cactus and its habitat. This cactus occurs within the action area of the Integrated Treatment of Noxious and Invasive Weeds consultation that is currently in process. The project calls for some burning to remove invasive grasses and mechanical treatments in Arizona hedgehog cactus habitat that may cause plants to be killed or damaged if not properly implemented.

EFFECTS OF THE ACTION

The S&Gs listed in the Tonto NF LRMP and 1996 Regional Amendment provide direction for the development of site-specific actions. Multiple S&Gs are related to the Arizona hedgehog

cactus and its habitat. The S&Gs, if applied to project-level activities, may result in both indirect and direct effects to the species.

The 2005 BO/CO included tables showing the S&Gs considered for each species' analysis and a ranking table summarizing the types of effects to species (lethal, sublethal, etc.) expected to result from the S&Gs. Because there have been no changes in Forest policy or programs that would change the 2004 BA (USFS) and 2005 BO/CO (FWS) effects determination for this species, we hereby incorporate by reference the ranking tables and effects analysis presented in the 2005 BO/CO and provide a narrative summary below.

On the Tonto NF, Arizona hedgehog cactus occurs in MAs 2A, 2D, 2F, and 3B. Management area 2A is in the Superstition Wilderness. The emphasis is to manage for wilderness values while providing livestock grazing and recreation opportunities that are compatible with maintaining wilderness values and protecting resources. Management Area 2D occurs in the Globe RD. The emphasis is to manage for dispersed and developed recreation opportunities, for sustained yield of livestock forage, and to maintain or improve watersheds to a satisfactory or better condition. Sawtimber and fuelwood harvest will be compatible with the recreation and grazing opportunities and will be done primarily for salvage and sanitation purposes. Uses such as electronic sites will be allowed on special areas. The visual resource is an important consideration in the management of this area. Management Area 2F is mostly desert and chaparral on the Globe RD. It comprises about 385,000 ac (155,800 ha). The emphasis is to manage for a variety of renewable natural resources with primary emphasis on wildlife habitat improvement, water quality maintenance, livestock forage production, and dispersed recreation. Lastly, Management 3B on the Mesa District is managed for wilderness values, wildlife habitats and natural ecological processes while allowing livestock grazing and recreation opportunities that are compatible with maintaining these values and processes.

Overall, 32.1 percent of the S&Gs have the potential to result in the destruction of plants and habitat, while 21 percent of the S&Gs offer some habitat protection for the species. The remaining 47 percent of the S&Gs are not applicable to the species or were too vague to analyze.

The majority of the adverse effects to the cactus are found in the Rangeland Management Program as livestock grazing is allowed in all four MAs where the Arizona hedgehog cactus occurs. Standards and guidelines with the potential to cause adverse impacts to the cactus include those that guide the Forest to develop structural improvements and to revegetate areas using prescribed burns, chemical, or mechanical means. Alternatively, this program area also includes an S&G that allows the Forest to study and assess the effects of grazing on the Arizona hedgehog cactus, and this management action may offset the adverse effects from other S&Gs in the program.

During the 2004-2005 analysis, it was determined that most of the Lands and Minerals Program S&Gs were too vague to analyze but, depending on their interpretation, could also result in adverse effects to the Arizona hedgehog cactus. In particular, S&G 1384a applies to MA 2A and allows for surface occupancy but does not contain any provisions to protect listed species; therefore, adverse effects to the cactus have resulted from implementation of this S&G. Mineral extraction is identified as the dominant threat to this species.

S&Gs in the Wildlife, Fish, and Rare Plants Program were found to provide benefits to the Arizona hedgehog cactus as they allow for survey and inventory while also providing for project evaluation and clearances by biologists. The program could also cause adverse effects to the plant, however, as it contains two S&Gs discouraging road placement in sensitive areas (generally considered a good management practice for general ecosystem health) which could redirect roads into areas that support that cactus.

1996 Regional Amendment

The management direction provided by the S&Gs in the 1996 Regional Amendment relates to the conservation of MSOs and Northern Goshawks. The S&Gs promote healthy forest ecosystems; properly functioning watersheds; and riparian and aquatic systems (USFS 2004). There is only one S&G (1510) that applies to the cactus. This S&G from the 1996 Regional Amendment states that forage use by grazing ungulates will be maintained at or above a condition which assures the recovery and continued existence of listed species. This S&Gs applicable to the Rangeland Management Program may preserve and protect, at a minimum, the known locations of Arizona hedgehog cactus on the Tonto NF. In addition, we found that the guidelines used by the USFS for the Northern Goshawk do not appreciably affect this species.

Cumulative Effects

Cumulative effects include the effects of future state, tribal, local or private actions that are reasonably certain to occur in the action area considered in this BO/CO. Future federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the ESA.

As stated in the 2005 BO/CO, most of the populations of Arizona hedgehog cactus occur on the Tonto NF, but there is habitat and a few known locations off the Forest on adjacent lands. These locations most likely exist in areas that can be mined and plants and habitat may be destroyed. In addition, the cactus grows along roadsides and the ADOT plans to continue widening US 60 in the future, which could have affects to Arizona hedgehog cactus habitat and plants. In 2008, FWS completed a BO/CO for ADOT's work on US 60, and the result was the loss of 50 plants and disturbance of approximately 6.7 acres of Arizona hedgehog cactus habitat. The adjacent right-of-way is primarily located within the boundary of the Tonto NF, but it is not within jurisdiction of USFS. Actions related to this road widening project may result in the loss of additional habitat and plants.

CONCLUSION

After reviewing the current status of the Arizona hedgehog cactus, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the FWS's BO that the Tonto NF LRMP and 1996 Regional Amendment, as proposed, are not likely to jeopardize the continued existence of the Arizona hedgehog cactus. Pursuant to 50 CFR 402.02, "jeopardize the continued existence of" means to engage in an action that reasonably would be expected, directly or indirectly, to reduce appreciably the likelihood of both survival and

recovery of a listed species in the wild by reducing the reproduction, numbers, or distribution of that species. Critical habitat for this species has not been designated; thus none will be affected.

The main population of Arizona hedgehog cactus occupies 7,650 ha (18,900 ac) in the Arizona counties of Gila and Pinal between Miami and Superior, Arizona. In addition, the population at Superstition Wilderness (on the Millsite allotment) in Roger's Canyon includes at least 100 individuals. Two small subpopulations occur outside this area: Apache Peak subpopulation north of Globe, Arizona and the El Capitan subpopulation south of Globe, Arizona. These populations (main and 2 subpopulations) are "classical var. *arizonicus*" and are the only populations of the Arizona hedgehog cactus subject to the protection and restrictions of the ESA. The majority of the locations occur on the Tonto NF. The estimated main population is approximately 257,500 cacti.

Cumulative effects considered in our analysis include the possibility of mining activities and highway construction adjacent to NFS lands that could result in the loss of plants and habitat. The majority of occupied habitat is located on the Tonto NF, so cumulative effects are not likely to result in a significant decrease to the overall population. In addition, we know of very few activities that have significantly affected Arizona hedgehog cactus populations on the Tonto NF.

The continued implementation of the Tonto LRMP is likely to result in additional habitat modification and mortality of the Arizona hedgehog cactus. However, the FWS does not believe the impacts of the proposed action will rise to the level of jeopardy for the species. The FWS bases this conclusion on the management direction of the Tonto NF LRMP, which conserves Arizona hedgehog cactus populations with the following:

- Standard and guideline 1341 permits Arizona hedgehog cactus habitat to be surveyed and plants to be mapped. This S&G allows for avoidance of known plants during site-specific activities.

- In accordance with S&G 1342, ground disturbing projects are to be evaluated by qualified biologists in order to develop ways to minimize the effects of projects on Arizona hedgehog cactus.

- Under S&G 1510, the habitat needs of federally listed species will be taken into consideration and forage use is not to preclude the recovery or continued existence of listed species.

With the implementation of these beneficial S&Gs within the Tonto NF LRMP, the FWS concludes that the proposed action is not likely to jeopardize the continued existence of Arizona hedgehog cactus.

INCIDENTAL TAKE STATEMENT

Sections 7(b)(4) and 7(o)(2) of the ESA generally do not apply to listed plant species. However, limited protection of listed plants from take is provided to the extent that the ESA prohibits the

removal and reduction to possession of federally listed endangered plants, or the malicious damage of such plants on areas under federal jurisdiction, or the destruction of endangered plants on non-federal areas in violation of state law or regulation, or in the course of any violation of a state criminal trespass law.

CONSERVATION RECOMMENDATIONS

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

1. Implement the species and habitat management objectives outlined in the conservation strategy for Arizona hedgehog cactus, such as developing "safe sites" for this species that will protect its habitat and contribute to recovery.

2. Participate in the development of a recovery plan for this species.

3. Work with mining applicants to develop agreements where applicants will purchase land and establish conservation easements or mitigation banks in order to offset their activities and protect the species from further losses resulting from mineral extraction activities.

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

DISPOSITION OF DEAD OR INJURED LISTED SPECIES

Upon locating a dead, injured, or sick listed species initial notification must be made to the FWS's Law Enforcement Office at 505/346-7828 or the New Mexico Ecological Services Field Office within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care; and in handling dead specimens to preserve the biological material in the best possible state.

REINITIATION NOTICE

As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or CH in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or CH not considered in this opinion; or (4) a

new species is listed or CH designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

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Appendix A: Not Likely to Adversely Affect Determinations

Appendix A documents our concurrence with your determinations of "may affect, is not likely to adversely affect", "not likely to jeopardize" and "will not adversely affect or adversely modify CH" for the species and CHs listed below. In addition, the FWS has provided a brief reasoning for these concurrences.

Colorado pikeminnow (*Ptychochelius lucius*) Non-essential, Experimental §10(j) Population
The FWS concurs with your determination that the continued implementation of the S&Gs within the Tonto NF LRMP is not likely to jeopardize the non-essential, experimental population of Colorado pikeminnow for the following reasons:

1. The Tonto NF LRMP includes S&Gs that generally restrict the activities of Resource Programs to reduce impacts to the Colorado pikeminnow.
2. The Forest manages the river, flood plain, and the watersheds that feed the occupied habitat in a manner that is beneficial to the species.
3. The Colorado pikeminnow's main limiting factors, such as loss of habitat due to non-USFS impoundments leading to alterations in flow regimes and historical stocking of non-native fish by state agencies and private landowners, are unrelated to USFS management and out of the scope of this project.
4. While USFS management can have effects to water quality and quantity, the impacts are negligible given the established S&Gs, on-going CMs, and the full range of the species in the Colorado River Basin.

Razorback sucker (*Xyrauchen texanus*) Endangered
The FWS concurs with your determination that the continued implementation of the S&Gs within the Tonto NF LRMP may affect, but is not likely to adversely affect the razorback sucker for the following reasons:

1. Established S&Gs and on-going CMs minimize effects from USFS management that may affect water quality and quantity.
2. The primary limiting factor through the razorback sucker's range is due to the impoundments that lead to alterations in flow regimes as well as historical stocking of non-native predators and competitors by state agencies and private landowners; these activities are unrelated to USFS management and are outside the scope of the proposed action.
3. The recent LRMP amendment related to the Verde River WSR CRMP (S&G 2051 MA-1C, 1D, and 4D) has strengthened the Forest's management objectives for activities along the river.

Razorback sucker Critical Habitat
The FWS concurs with your determination that the LRMP for the Tonto NF will not adversely affect or destroy or adversely modify critical habitat of the razorback sucker for the following reasons:

1. Established S&Gs and on-going CMs minimize effects from USFS management that may affect water quality and quantity.
2. Effects to the PCEs of CH for the razorback sucker are insignificant and discountable because the S&Gs for most of the programs is sufficient to avoid activities that may adversely affect razorback sucker habitat.
3. The primary limiting factor through the razorback sucker's range is due to the impoundments that lead to alterations in flow regimes as well as historical stocking of non-native predators and competitors by state agencies and private landowners; these activities are unrelated to USFS management and are outside the scope of the proposed action.
4. The recent LRMP amendment related to the Verde River WSR CRMP (S&G 2051 MA-1C, 1D, and 4D) has strengthened the Forest's management objectives for activities along the river.

Yuma clapper rail (*Rallus longirostris yumanensis*) Endangered

The FWS concurs with your determination that the continued implementation of the S&Gs within the Tonto NF LRMP, may affect, but is not likely to adversely affect the Yuma clapper rail for the following reasons:

1. Though there has been documented occurrence of the Yuma clapper rail on the NF, no breeding has been observed or documented.
2. The Tonto NF has two S&Gs for the protection of Yuma clapper rail habitat.
3. The Tonto NF has excluded grazing from approximately 15 miles of Tonto Creek, where the Yuma clapper rail has been seen.
4. The Tonto NF cooperates with the Salt River Project to implement mitigations from the Salt River Project Habitat Conservation Plan.

Appendix B: Abbreviations and Acronyms

AGFD – Arizona Game and Fish Department

BA – Biological Assessment

BLM – Bureau of Land Management

BMPs – Best Management Practices

BO – Biological Opinion

BO/CO – Biological/Conference Opinion

CA – Consultation Agreement

CH - Critical Habitat

CHU – Critical Habitat Unit

CLF – Chiricahua leopard frog

CMs – Conservation Measures

CNOR – Candidate Notice of Review

CP – Colorado Plateau Recovery Unit

EMA – Ecosystem Management Area

EMU – Ecological Management Unit

ESA – Endangered Species Act

FAIR – Fort Apache Indian Reservation

ft. - feet

FWS – U.S. Fish and Wildlife Service

GIS – Geographical Information Systems

km. – kilometers

LAA – May Affect, Likely to Adversely Affect

LRMP – Land and Resource Management Plans (Forest Plans)

MA – Management Area

mi. – miles

MSO – Mexican spotted owl

MU – Management Unit

NA – Not Applicable

NE – No Effect

NF – National Forests

NEPA – National Environmental Policy Act

NFMA – National Forest Management Act of 1976

NFS – National Forest System

NG – National Grasslands

NLAA – May Affect, Not Likely to Adversely Affect

NLDAM – Not Likely to Destroy or Adversely Modify

NLJ – Not Likely to Jeopardize

NM – New Mexico

OHV – Off Road Vehicle

PAC – Protected Activity Center

PBF – Physical Biological Features

PCE – Primary Constituent Element

RD – Ranger District

RU – Recovery Unit

S&Gs – Standards and Guidelines

Sq – square

T&E – Threatened and Endangered Species

UGM – Upper Gila Mountains Recovery Unit

U.S. – United States

U.S.D.A. – U.S. Department of Agriculture

USFS – U.S. Forest Service

WFRP – Wildlife, Fish, and Rare Plants Program