



United States Department of the Interior

U.S. Fish and Wildlife Service

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In reply refer to:

In Reply Refer To:

R2/ES-TE

Cons. #2012-F-0001

April 30, 2012

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

Jim Zornes, Acting Forest Supervisor
30 S. Chiricahua Drive
P.O. Box 640
Springerville, Arizona 85938

Dear Mr. Newman:

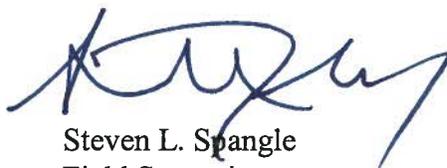
The enclosed biological opinion (BO) responds to your request for reinitiation of formal consultation under section 7(a) of the Endangered Species Act of 1973 (Act), as amended. We received your letter requesting reinitiation and a Biological Assessment (BA) titled *Biological Assessment for the Reinitiation 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 effects 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 Apache-Sitgreaves National Forest of the Southwestern Region. This BO will be in place until the Apache-Sitgreaves 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,

A handwritten signature in blue ink, appearing to read 'S. Spangle', with a stylized flourish at the end.

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 Office, Phoenix, AZ

W:Steve Spangle\2012 A-S LRMP BO Cover letter.docxrb

BIOLOGICAL AND CONFERENCE OPINION

The Continued Implementation of the Land and Resource Management Plan
for
The Apache-Sitgreaves NFs
of the
Southwestern Region U.S.D.A. Forest Service

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

Cons. #2012-F-0001

April 30, 2012

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, as amended (Act). This opinion addresses the USFS's continued implementation of the Land and Resource Management Plan (LRMP) and its effects to the 11 federally-listed species located on the Apache-Sitgreaves NFs and eight designated and proposed critical habitats (CH). 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/CO). We hereby incorporate the 2004/2005 BA and BO/CO by reference into this document.

This approach provided the information necessary to determine whether or not a jeopardy or adverse modification determination should be concluded. For those species with designated or proposed CH, our effects analysis approach identified how the primary constituent elements (PCEs) or biological features 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 CH unit(s) and how the effect to those units contribute to recovery.

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 the 2005 consultation. This consultation is considered to be a programmatic batched consultation that will be organized by National Forest (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 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 BO/COs issued by the FWS will assign incidental take, reasonable and prudent measures, and terms and conditions for each individual NF LRMP. The resulting BO/COs will then be in place until each of the NFs 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 11 species identified within the action area of the Apache-Sitgreaves NFs. Similarly, we determined that the proposed action was not likely to destroy or adversely modify CH for the species with designated or proposed CH.

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INTRODUCTION

This biological and conference opinion (BO/CO) responds to the USFS request for re-initiation of consultation with the 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) for the Apache-Sitgreaves NFs of the Southwestern Region, and its effects to 11 federally listed species and eight designated or proposed critical habitats (CHs) (see below) on the NFs. 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 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. The FWS acknowledged the requests 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 reinitiation 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 BA from the USFS was received by the FWS on April 6, 2011.

The 2005 opinion 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 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 to 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 according to 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 CHs within the action area of each NF. As a result, each NF has a separate chapter within the BA discussing specifically 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 individual NF LRMP. This BO/CO will then be in place until the Apache-Sitgreaves NFs revises its LRMP.

Apache-Sitgreaves NFs

This programmatic consultation examines the effects on 11 species and eight designated or proposed CHs from the direction and guidance provided within the Apache-Sitgreaves NFs LRMP. The following species are included within this BO/CO for which the USFS and FWS agreed would be affected by the proposed action.

Mammals

Mexican gray wolf (*Canis lupus baileyi*) Non-essential experimental population 10(j)

Birds

Mexican Spotted Owl (*Strix occidentalis lucida*) Threatened with designated CH

Southwestern willow flycatcher (*Empidonax traillii extimus*) Endangered with designated and proposed CH

Fish

Apache trout (*Oncorhynchus apache*) Threatened

Gila chub (*Gila intermedia*), Endangered with designated critical habitat

Gila trout (*Onchorynchus gilae*) Endangered

Little Colorado spinedace (*Lepidomeda vittata*), Endangered with designated critical habitat

Loach minnow (*Tiaroga cobitis*), Endangered with designated critical habitat

Spikedace (*Meda fulgida*), Endangered with designated critical habitat

Amphibians/Reptiles

Chiricahua Leopard Frog (*Lithobates (Rana) chiricahuensis*), Endangered with designated critical habitat

Snails

Three Forks springsnail (*Pyrgulopsis trivialis*), Endangered with designated critical habitat

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 11 NF LRMPs, 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 (e.g., 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 BO/CO is provided below.

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

- On April 15, 1993, the MSO was listed as threatened. On September 6, 1995, the USFS requested initiation of formal consultation on the 11 NF Plans for effects on the MSO.
- On May 14, 1996, the FWS issued a BO on the 11 LRMPs, which concluded jeopardy to the MSO and adverse modification for its designated CH (FWS 1996a). The FWS's Reasonable and Prudent Alternative to the existing LRMPs advised the USFS to implement the 1995 Recovery Plan for the Mexican Spotted Owl. 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 Mexican Spotted Owl, 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 (FWS 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 on the USFS's 1996 Regional Amendment to the LRMPs for all federally listed species other than the MSO (FWS 1997). This BO concluded non-jeopardy for all federally listed or proposed species, and no adverse modification for designated or proposed CHs. This opinion contained conservation measures (CMs) for seven listed species including the southwestern willow flycatcher, cactus ferruginous pygmy-owl, Sonora chub, Little Colorado River 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 the USFS would reinitiate consultation with the FWS on the USFS's 11 LRMPs and the 1996 Regional Amendment. On June 2, 2003, the

USFS and FWS signed a consultation agreement that outlined timelines, responsibilities, and dispute resolution for the 11 NF LRMP consultation.

- In November 2003, the USFS provided the FWS with a draft BA for the consultation.
- On April 5, 2004, the USFS requested 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 (USFS 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 River 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 the USFS received a final programmatic LRMP 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 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 consultation for the ocelot, a species now considered present in small numbers in Arizona.
- On June 22, 2010 FWS acknowledged 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 according to 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 the Apache-Sitgreaves NFs LRMP for the USFS Southwestern Region (including the 1996 Regional Amendment). Also included in this BO/CO is an analysis of those S&Gs that have been added through any amendments to the individual NF LRMPs since the 2005 LRMP BO/CO (See Appendix 4 in the BA for a complete list of S&Gs analyzed in the 2011 BA). This consultation will be in place until the Apache-Sitgreaves NFs completes a revised LRMP, at which time they will reconsult with the FWS.

The Apache-Sitgreaves NFs 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 describes long-range management for the NF. It provides a programmatic framework for future activities and emphasizes 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 biological analyses and the need for site-specific informal or formal ESA § 7 consultation with the FWS on individual projects implemented under the LRMP. Furthermore, it should be noted that any amendment (e.g., deleting/changing S&Gs) of 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 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 BO/COs. 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 of this BO/CO is defined as all lands that the Apache-Sitgreaves NFs encompasses in the Southwestern Region of the USFS plus adjacent lands that the proposed action may directly or indirectly affect. The Apache-Sitgreaves NFs contains two million acres (ac) and encompasses the mountain country in east-central Arizona along the Mogollon Rim and the White Mountains. The NF ranges in elevation from 3500 feet (ft.) near Clifton to nearly 11,500 ft. on Mount Baldy and contains three designated wilderness areas: Mount Baldy, Escudilla, and Bear Wallow. The Apache-Sitgreaves NFs is divided into five Ranger Districts (RDs): Lakeside, Alpine, Clifton, Black Mesa, and Springerville).

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 includes deconstruction 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 that might affect the current analysis. This 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 of the scope of this consultation and would require separate site specific ESA § 7 (a)(2) consultation to address the affects of that particular proposed action.

The FWS concurred with the two assumptions stated above. However, based on our understanding of 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:

1. 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 of the scope of this consultation and would require separate site specific ESA § 7 (a)(2) consultation to address the affects of that particular proposed action.
2. Land managers use and/or implement the S&Gs at every level of planning (e.g., forest-wide, management areas (MAs), and project level).
3. Due to their broad scope, the S&Gs may be interpreted and applied differently depending upon the forest planner and interdisciplinary teams.
4. 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 (pages 38-41) 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 to 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 11 listed species arranged in the following order: mammals, birds, amphibians, reptiles, fish, invertebrates 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 Apache-Sitgreaves NFs 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 incidental take of listed species. Finally, standard language for the disposition of dead, injured, or sick federally listed species as well as a reinitiation 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 Apache-Sitgreaves NF's LRMP. Determinations of "no effect" were made for the ocelot, California condor (endangered population), and the lesser long-nosed bat. The FWS does not provide concurrence on "no effect" determinations; therefore, these species will not be addressed below. The FWS has concurred with the USFS on "may affect, but is not likely to adversely affect" determination for the Gila trout and a "not likely to jeopardize" determination for the 10(j) population of the Mexican gray wolf. 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 Mexican Spotted Owl Recovery Team in 1993, which produced the Recovery Plan for the Mexican Spotted Owl (Recovery Plan) in 1995 (FWS 1995). The FWS released a Draft Revised Recovery Plan for public review during the summer of 2011 (FWS 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 (FWS 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). CH was designated for the MSO in 2004 (FWS 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 (FWS 1995), and in the Draft Revised Recovery Plan (FWS 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 MSOs, 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).

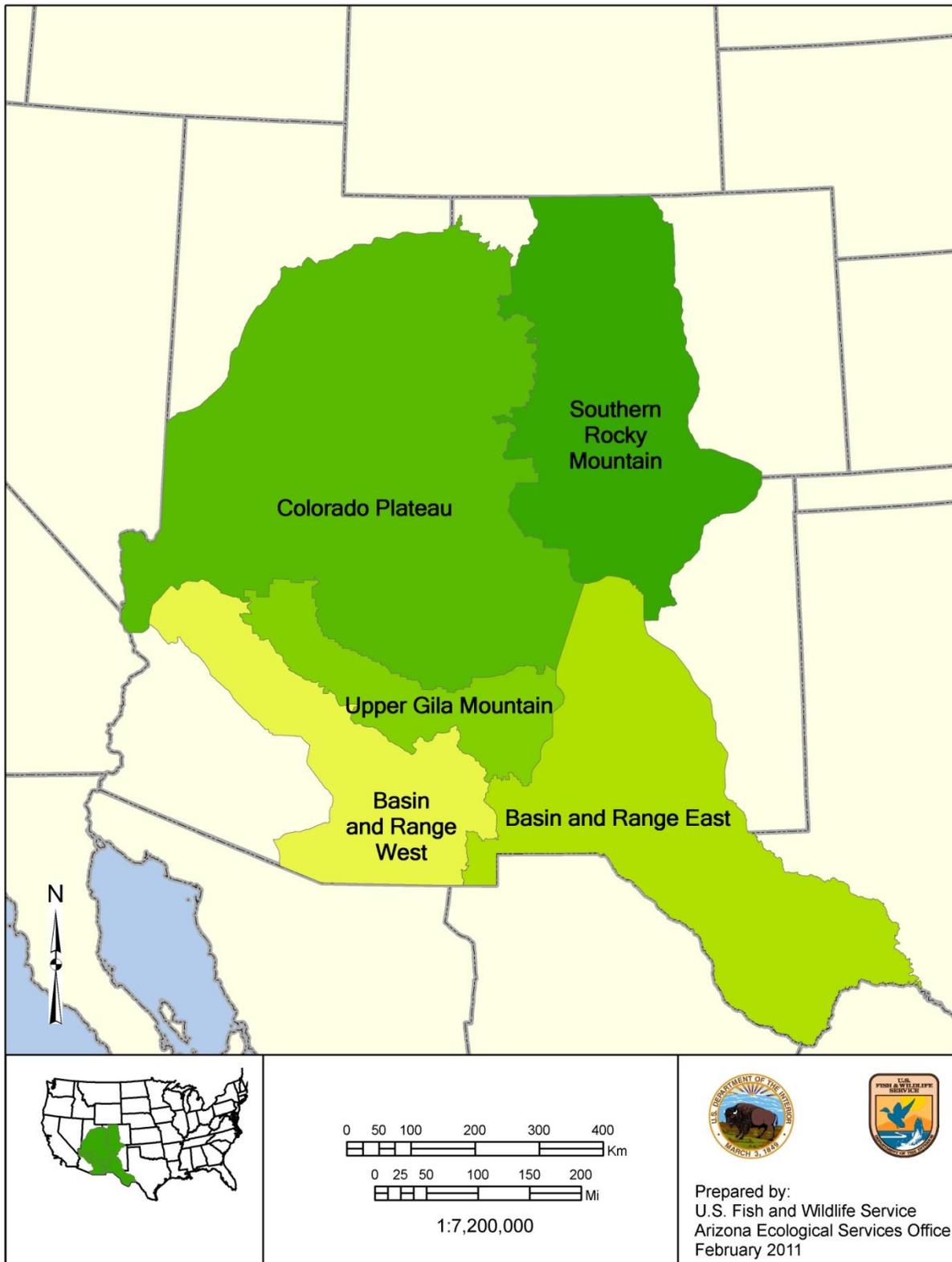


Figure 1. Ecological Management Units for the MSO in the U.S.

There are two types of monitoring that can be conducted for the MSO. The first type of monitoring is a site-specific inventory of suitable habitat conducted using the MSO survey protocol. This method can provide information regarding the presence or absence of MSOs 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 population trend monitoring as described in the 1995 Recovery Plan and the 2011 Draft Revised Recovery Plan (FWS 1995, FWS 2011).

MSO 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. The Draft Recovery Plan for the MSO (FWS 2011) states that there were 1,301 MSO sites as of June 2011. 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 (FWS 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 looming threat at that time. Since publication of the Recovery Plan (FWS 1995), we have acquired new information on the biology, threats, and habitat needs of the MSO. Threats to its population in the U.S. (but likely not in Mexico) have transitioned from commercial-based timber harvest to 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 unhealthy 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, 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 MSOs through habitat modification and disturbance. As the human population grows in the southwestern U.S., small communities within and adjacent to NFS lands are being developed. This trend may have detrimental effects to MSOs 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 MSOs may be highly vulnerable to this disease (Courtney et al. 2004). Unfortunately, due to the secretive nature of MSOs and the lack of intensive monitoring of banded birds, we will most likely not know when MSOs 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 and 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 (FWS 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 mixed conifer and pine-oak on slopes <40% or have been harvested for timber in the past 20 years and riparian forests) as defined in the 1995 Recovery Plan (FWS 1995). The PCEs for MSO CH were determined from studies of their habitat requirements and information provided in the Recovery Plan (FWS 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, 30 to 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 MSO and critical habitat

Overall, the distribution 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 MSOs continue to occur in the same areas 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 majority of impacts to PACs and CH compared to actions (e.g., such as forest management, livestock grazing, recreation, etc.) throughout the U.S. range of the MSO. These wildland fires have most impacted MSOs within the Upper Gila Mountains EMU (e.g., Rodeo-Chediski and Wallow Fires on the Apache-Sitgreaves NFs) 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 Apache-Sitgreaves NFs. The 2011 Wallow wildland fire is also included in the environmental baseline. 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 Apache-Sitgreaves NFs is located within the UGM and BRW EMU. Three potential natural vegetation types dominate the Apache-Sitgreaves NFs: ponderosa pine forests, pinyon-juniper woodlands, and Madrean encinal woodlands (Lee et al. 2006). Many canyons contain stringers of deciduous riparian forests, particularly at low and middle elevations. The UGM EMU contains the largest contiguous ponderosa pine forest in North America, an unbroken band of forest 25- to 40- miles (40- to 64- km) wide and approximately 300-miles (483-km) long extending from north-central Arizona to south-western New Mexico (Cooper 1960). The Apache-Sitgreaves NFs is located in the center of UGM EMU and the northeast portion of the BRW EMU and contains approximately 14 percent of the MSO PACs within Arizona and New Mexico NFS Lands.

Mexican spotted owls are widely distributed on the Apache-Sitgreaves NFs. They are most commonly found in mixed-conifer forests dominated by Douglas-fir and/or white fir and canyons with varying degrees of forest cover. MSOs also occur in ponderosa pine-Gambel oak forest, where they are typically found in stands containing well-developed understories of Gambel oak (Ganey and Dick 1995).

As of 2011, the Apache-Sitgreaves NFs has identified 147 MSO PACs containing 92,477 acres within the boundaries of the Apache-Sitgreaves NFs. The Apache-Sitgreaves NFs has the third largest number of MSO PACs in USFS Region 3 with the Gila NF containing the most MSO PACs. The number of PACs in Apache-Sitgreaves NFs is approximately 21 percent of PACs on USFS Region 3 NFs in the UGM EMU, 2.5 percent of all PACs on USFS Region 3 NFs in the BRW EMU, and 14 percent of all designated PACs on USFS Region 3 NFs. Most PACs on the forest have been designated within the UGM EMU. One-hundred forty-three PACs occur within the UGM EMU and four PACs lie within the BRW EMU. The USFS estimates that there are 73,352 acres of protected steep-slope habitat outside of PACs and 709,936 acres of restricted habitat on the Apache-Sitgreaves NFs. These areas of protected steep-slope and restricted habitat contain key habitat components (e.g., large trees, multi-layered canopies, snags, logs, etc.) for the MSO and may be occupied by MSOs. Future surveys the USFS may do as part of their regular management, within this suitable MSO habitat on the Apache-Sitgreaves NFs, may detect additional MSOs.

Since our issuance of the 2005 LRMP BO/CO, the habitat of the MSO within the action area has likely been most impacted by the 2011 Wallow Fire (see discussion below). However, because the fire occurred during the 2011 MSO breeding season, we will not have survey results until mid-to-late 2012 to assist us in determining the status of the MSO PACs in the action area.

Of the total acreage within the fire perimeter, approximately 50,399 acres are in PACs. Within these PACs, approximately 15,214 acres burned at high intensities, 7,053 acres burned at moderate intensities, and 26,009 acres were unburned or burned at low intensities, so approximately 22,267 acres within PACs may have impacts on nesting and roosting habitat, leaving 28,132 acres with little or no impacts on nesting and roosting habitat.

The Wallow Fire, a wildland fire which started on May 29, 2011, and burned over a half-million acres of the Apache-Sitgreaves NFs. Within the entire Wallow Fire perimeter, approximately 86,115 acres burned at high intensity, 73,634 acres burned at moderate intensity, and 386,996 acres were unburned or burned at low intensities within the Wallow Fire. Seventy-six PACs were located entirely or partially within the Wallow Fire perimeter. This equates to 52 percent of the known MSO PACs on the Apache-Sitgreaves NFs. The following numbers are approximate and are subject to additional refinement as new information is acquired. Approximately 50,399 PAC acres burned, of which, approximately 15,214 acres burned at high intensity, 7,053 acres burned at moderate intensity, and 17,890 acres burned at low intensity. Most PACs (95 percent) sustained some level of high and moderate fire intensities (USFS 2011b). Of the 76 PACs within the Wallow Fire perimeter, 53 PACs were estimated to have been seriously compromised in terms of providing nesting and roosting habitat post-fire (USFS 2011b). However, if 22,267 acres within PACs had impacts to nesting and roosting habitat, there is approximately 28,132 acres that should still be functioning as nesting/roosting habitat (USFS 2012). Ultimately, the habitat's ability to provide nesting/roosting habitat for the MSO will depend upon the size and juxtaposition of the forested patches remaining. On February 22, 2012, we were provided with a document from the Apache-Sitgreaves NFs (Apache-Sitgreaves NFs Rationale for 11 Forest LRMP BO/CO, Incidental take Assignment) that states "at most, 29 of the 74 PACs were "substantially impacted" or had "serious consequences"; 19 of the 74 PACs have unknown impacts from a loss of basal area; and 29 PACs had little or no substantial impact." At this time, we do not know what the short- or long-term effects of this fire are on MSO occupancy within the Wallow Fire boundary.

Fire has always been a major disturbance agent in southwestern forests (Swetnam 1990), and MSOs co-evolved with this disturbance. However, the structure of southwestern forests, the frequency with which they experience fire, and the types of fires experienced have changed greatly following increased human settlement of these lands (Covington and Moore 1994) as well as climate change (please refer to climate change section above).

The Draft Revised Recovery Plan (FWS 2011) provides a detailed review of the literature regarding the effects of high-severity fire on MSOs. Based upon what we know, in many cases (but probably not all) adult MSOs are able to fly to relative safety during fire and may survive the initial fire effects (Bond et al. 2002). However, it is unlikely that eggs or nestlings in a nest would survive moderate-to-high severity fire effects due to direct effects from burning or smoke inhalation (for nestlings). Fledgling MSOs (juvenile MSOs that have left the nest but are still

dependent upon their parents for care), are not likely to survive high-severity fire as they are not skilled at flying and may fly into the fire or become easy prey due to their weak flying skills and inexperience. Many of the key habitat components of MSO habitat are typically destroyed in high-severity fires such as the Wallow Fire. In addition to the direct loss of MSO nesting and roosting habitat caused by the Wallow Fire, effects to MSOs may also result from the actions taken to suppress the fire.

Research indicates that MSOs studied continued to occupy burned areas, even following relatively high-severity fires, except in the territory that experienced the highest burn severity (Bond et al. 2002). Results further suggest that survival rates and mate and site fidelity in these MSOs were relatively high in the year following fire. Bond et al. (2009) monitored movements and habitat use of radio-marked California MSOs from four territories in the southern Sierra Nevada, California, four years following a large wildfire. MSOs nested in all four territories, but only one pair was successful, fledging a single young. Two nests were located in moderate-severity burned mixed-conifer forest, in which one of the two fledged the single young: one in low-severity burned mixed-conifer forest and one in unburned mixed-conifer-hardwood forest. MSOs roosted selectively in low-severity burned forest, avoided moderate-severity and high-severity burned forest, and used unburned forest in proportion to availability. Within 1 km of their nest, MSOs foraged selectively in all severities of burned forests and avoided unburned forests. These results collectively suggest that the post-fire landscapes studied contained enough suitable habitat to support pair occupancy and at least attempted nesting. They further suggest that burned areas may provide benefits to foraging MSOs. Bond et al. (2009) concluded that assessments of fire impacts should not assume that all fires have negative impacts on MSOs and recommended that burned forests within 1.5 km of MSO roosts or nests not be salvage-logged.

In addition to the above studies, there are numerous anecdotal observations of MSOs occupying territories following wildfires and prescribed burns (Paul Boucher, Gila NF retired, pers. comm.; Shaula Hedwall, FWS, pers. comm.), as well as evidence of radio-marked MSOs moving into and foraging in burned areas during winter (J. P. Ward, Jr. and J. L. Ganey, unpublished data). Most wildland fires burn in a patchy nature and leave pockets of useable habitat for MSOs, and MSOs appear able to locate and use these patches. Thus, MSOs appear to be somewhat resilient to wildfire, at least in the short term. However, we have no data on long-term effects of these fires on occupancy patterns or on components of MSO fitness such as survival and reproduction. Therefore, it is unclear at this time how MSOs will respond to habitat modification resulting from the Wallow Fire and the associated suppression activities. However, based upon the intensity and extent of the fire and what we know about MSO habitat needs, the long-term survival of MSOs and persistence of key habitat components associated with nesting and roosting habitat in the Wallow Fire area will likely be low in the long-term. The post-fire data we do have indicates that there are few live patches of trees in pine-oak or mixed conifer habitat with multiple canopy layers that provide the type of habitat MSOs need to roost and nest (FWS 2011). However, only long-term (> five years) MSO surveys of the area will confirm this hypothesis.

Although the Wallow Fire was not an action included in the proposed action under consultation in this BO/CO, it will likely drive future management actions on the NF to ensure long-term

recovery of the site and in unburned forested habitat in order to ensure that the remaining PACs on the forest are not lost due to high-severity fire.

Critical Habitat

Two CHUs (UGM-7 and UGM-10) are designated on the Apache-Sitgreaves NFs. Within UGM-7, there are approximately 156,473 acres and within UGM-10 there are 462,525 acres of designated CH. Only areas identified as protected and restricted habitat pursuant to the 1995 Recovery Plan (FWS 1995) within these CHUs are considered to be CH. Therefore, the actual amount of MSO habitat within these two units likely covers less area than is indicated by the unit acreage. We refer to the 1995 Recovery Plan here because the 2004 CH rule relied upon this plan to define designated CH.

Since our issuance of the 2005 LRMP BO/CO, the status of CH has been most impacted by the 2011 Wallow Fire. Approximately 57 percent of designated CH on the Apache-Sitgreaves NFs was affected by the Wallow Fire. The CH PCEs have likely been significantly affected primarily by altering forest structure, including a range of tree species composed of different sizes and a shade canopy created by tree branches covering 40 percent or more of the ground. The fire did create numerous beneficial snags (dead trees) through fire kill, but many of these fire-killed trees will fall within a few years (Chambers and Mast 2005). As snags fall, the PCE of high volumes of fallen trees and other woody debris (related to prey abundance) will continue to increase, which may increase forage. However, the limiting habitat factor post-fire for MSOs will be nesting-roosting habitat (forested habitat with a range of trees species and high canopy cover).

Factors Affecting the MSO and its Critical Habitat within the Action Area

The factors (i.e., Federal, State, tribal, local, and private actions) 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 in the action area. Formal consultations that have occurred from 2005 (the year of the original LRMP BO/CO) to the present are summarized in Table 1.

Table 1. Formal consultations on the Apache-Sitgreaves NFs from 2005 to 2011.*					
Consultation #	Date of Final BO	Project	Approximate # of MSOs anticipated taken	# of PACs anticipated taken	Form of Incidental take
2-21-040F-0006	5/4/2006	Chitty Creek Restoration Project	Project not implemented, reinitiation below		
2-21-05-0385	6/5/2006	Nutriosio Wildland Urban Interface (WUI) Fuels Reduction Project	4-8 MSOs	4	Harm & Harass
2-21-04-F-0100	8/29/2006	ATV Jamboree	0	0	n/a

22410-2006-FE-0381*	12/14/2006	<i>Sand Fire</i>	<i>4-8 adults</i>	<i>4</i>	<i>Harass</i>
22410-2006-F-0364	7/5/2007	Arizona Forests Utility Hazard Tree Removal Phase I	1-2 adults	1	Harass
22410-2006-F-0365	7/17/2008	Arizona Forests Utility Corridor Maintenance Phase II	3-6 adults	3	Harm & Harass
22410-2006-FE-0452*	2/14/2008	<i>Beaverhead Fire</i>	<i>1-2 adults</i>	<i>1</i>	<i>Harass</i>
22410-2004-F-0006-R0001	4/2/2008	Chitty Creek Restoration Reinitiation	1 adult	1	Harass
22410-2001-F-0211 R1	8/26/2008	Wildbunch Grazing Allotment Reinitiation	0	0	n/a
22410-2006-FE-0318	12/5/2008	<i>Emergency Hazard Vegetation Treatment in Utility Corridors in Arizona</i>	<i>0</i>	<i>0</i>	<i>n/a</i>
22410-2007-FE-0338*	7/22/2009	<i>Chitty Emergency Fire Suppression</i>	<i>10-20 adults</i>	<i>10</i>	<i>Harm & Harass</i>
22410-2009-F-0142	8/24/2009	Chitty Salvage	0	0	n/a
22410-2009-F-0318	2/8/2010	Black Canyon Dam Maintenance Project	0	0	n/a
22410-2008-F-0149-R001	12/6/2011	<i>Effects to Listed Species from U.S. USFS Aerial Application of Fire Retardants on NFS Lands</i>	<i>Incidental take will be tracked as it occurs per the BO</i>	<i>Incidental take will be tracked as it occurs per the BO</i>	<i>Harm & Harass</i>
TOTAL				24 PACs	

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

Since 2005, 14 BOs have been issued to the Apache-Sitgreaves NFs addressing adverse effects to MSO. These projects included two fuels reduction/forest restoration projects; three utility corridor maintenance and vegetation management actions; one salvage operation; one dam maintenance project; one recreational activity; one grazing allotment; three emergency fire consultations; and a programmatic fire retardant consultation (see Table 1). These projects involved the Fire Management, Forestry and Forest Health, Wildlife, Fish, and Rare Plants, Rangeland, Recreation, Engineering, and Watershed Management programs. Within the BOs that have been completed for actions on the Apache-Sitgreaves NFs since 2005 (Chitty Creek Restoration was analyzed under two BOs), seven projects, were determined to result in some

form of incidental take of MSOs associated with 24 PACs. Included in this number, are three BOs which determined that fire suppression actions associated with three wildland fires resulted in incidental take of MSOs associated with 15 PACs (an action not included in the proposed action). As stated above, the combined actions have resulted in the total incidental take of MSOs associated with 24 PACs, but only MSOs associated with nine of the PACs are actions implemented under the LRMP. The Chitty Creek Restoration Project was anticipated to result in short-term disturbance to one PAC and the Nutrioso Fuels Reduction Project was anticipated to result in long-term disturbance and habitat degradation to four PACs. The utility corridor projects were expected to result in harm and/or harassment to four PACs. The Apache-Sitgreaves NFs provided CMs that would minimize the impacts to MSOs in all formal consultations. All BOs for projects conducted on the Apache-Sitgreaves NFs were determined to be non-jeopardy for the species and non-adverse modification for CH.

According to the USFS's 2009 Annual Report, the Apache-Sitgreaves NFs monitors MSO PACs each year as funding allows. Our information from BOs since 2005 has resulted in the issuance of incidental take of nine PACs on the Apache-Sitgreaves due to actions implemented under the LRMP. Nine MSO PACs represents 6 percent of the total 147 MSO PACs on the Apache-Sitgreaves NFs which is a relatively small number of MSO PACs impacted over seven years by the proposed action. However, the Wallow Fire impacted 52 percent of the PACs on the Apache-Sitgreaves NFs, and fire suppression activities for other fires (see Table 1) have resulted in impacts to MSOs associated with 15 PACs (~10 percent). In conclusion, approximately 68 percent of the PACs on the Apache-Sitgreaves NFs have been affected by wildland fire, wildland fire suppression, and LRMP actions (~6% for LRMP actions).

Critical Habitat

Critical Habitat Unit UGM-7 on the Apache-Sitgreaves NFs was impacted by the Wallow Fire. According to the USFS's 2011 fire effects assessment, 133,608 acres (85 percent of the CHU on the Apache-Sitgreaves NFs) of MSO CH within the UGM-7 was burned severely or moderately resulting in 50 to 100 percent loss of live tree basal area. The UGM-7 CHU had an estimated 156,473 acres of MSO habitat on the Apache-Sitgreaves NFs and thus, only 22,865 acres of CH was not impacted by the fire. Vegetation types (included as MSO PCEs) that the USFS included in the assessment were wet mixed conifer, dry mixed conifer, Douglas-fir, Madrean pine-oak woodland and riparian forests. Pursuant to the PCEs, associated with MSO CH, described in the Status of the Species section above, impact to MSO CH may include the loss of canopy cover, large trees, woody debris, and a range of age classes which provide horizontal diversity. The alteration of these elements could affect the behavior of nesting and roosting MSOs within the area. In addition, prey species such as deer mice tend to increase following fire. This will also affect the MSO's foraging behavior within the fire perimeter. Snags and downed wood will increase across the fire area as trees die and fall.

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 Apache-Sitgreaves NFs 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 (FWS 1995) into all eleven NF LRMPs.

Since the 2005 LRMP BO/CO was completed, there are four site-specific projects that are still ongoing on the Apache-Sitgreaves NFs. These projects are the Nutrioso WUI Fuels Reduction Project, the Arizona Forest Utility Hazard Tree Removal Project Phase II, the Chitty Creek Restoration Project, and the Wildbunch Allotment. We anticipated incidental take for three of these ongoing site-specific projects: Nutrioso WUI Fuels Reduction Project, the Arizona Forest Utility Hazard Tree Removal Project Phase II, and the Chitty Creek Restoration Project. Implementation of these ongoing projects and the issuance of incidental take are covered under this programmatic opinion since it supersedes the 2005 LRMP BO/CO. We have reviewed these site-specific projects to ensure that they will not further diminish the conservation contribution of CH to the recovery of the MSO.

An LRMP provides guidance and direction in the context of a broad management framework. The LRMP defines the direction for managing the Apache-Sitgreaves 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 FWS differentiated between the two for our analysis.

The S&Gs are written to apply Forest-wide or to a specific MA. The Apache-Sitgreaves NFs 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, guide or place constraints on, upon 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).

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 to the MSO were evaluated in the 2005 BO/CO and are included herein by reference (see FWS 2005). The majority of the S&Gs, which continue to be implemented as the proposed action within the Apache-Sitgreaves NFs LRMP, were considered positive in the sense that they would maintain habitat for the MSO or provide for recovery. Several S&Gs moved towards recovery or implemented actions found in recovery plans for listed species. However, potential adverse effects were found to be caused by actions implemented by the following programs, discussed in detail below: Engineering (e.g., disturbances from road construction); Fire Management Program; Forestry and Forest Health; Lands and Minerals (e.g., the potential for using chemical agents); Rangeland Management; Recreation, Heritage and Wilderness; Watershed Management; and Wildlife, Fish, and Rare Plants. 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 the MSO

Engineering Program

Facets of this program, such as road construction and road use, have the potential to cause disturbance to MSOs. High road densities can increase human presence into areas and increased human presence and/or activities can result in MSOs flushing or leaving their roost (Swarthout and Steidl 2001, 2003; Delaney et al. 1999). Forest-wide S&G 63 states that road densities on the Forest should average 3.5 mi/mi² or less. However, this program also permits the Forest to seasonally or permanently close existing roads in certain circumstances. Seasonally or permanently closing roads within areas where MSOs are known to occur would reduce the amount of disturbance, particularly during the MSO breeding season (March 1 – August 31). Road construction can also result in the loss of key habitat components as trees are cut and the ground cleared for either new roads or existing road maintenance. The USFS typically implements measures to minimize effects to the MSO and these key habitat components (such as avoiding road maintenance activities near PACs during the breeding season, avoiding construction of new roads in MSO habitat, etc.).

Fire Management Program

No applicable S&Gs in the Fire Management Program are likely to result in negative effects to the MSO. However, there may be negative effects from this program not captured in the applicable S&Gs. In the Apache-Sitgreaves NFs Plan there is not a specific Fire Management Program listed; however, there is a Protection Program listed which deals with fire. The goal for the Protection Program includes the following “Fire is used as a resource management tool where it can effectively accomplish resource management objectives (Apache-Sitgreaves LRMP)”. It can be inferred that prescribed fire would be utilized in this capacity. The use of prescribed fire and other fuels treatment methods are useful in reducing the risk of catastrophic

wildfire. However, these projects may result in adverse affects associated with humans, tools, machinery, and burning.

Forestry and Forest Health Program

This program had the majority of negative S&Gs ranked for the MSO. Though the program goal is to manage forest habitats for sustainability and resiliency, there is the potential for many different types of short-term adverse effects to the MSO from conducting forest management activities (such as thinning PAC habitat, etc.). However, as stated above, the 1996 Regional Amendment offers protection to the MSO by recommending that important MSO habitat components be retained in MSO PACs and restricted and protected (unoccupied) MSO habitat. So, though we expect that implementation of the Forestry and Forest Health Program to result in some short-term adverse effects (and possibly incidental take). Inclusion of the S&Gs within the 1996 amendment should result in actions associated with this program resulting in positive long-term impacts to the MSO and its habitat. The USFS typically implements measures to minimize effects to key habitat components (such as retaining large trees, large snags, etc.) and the MSO (such as conducting forestry operations outside the MSO breeding season when in or near PACs).

Examples of S&Gs in the Forestry and Forest Health Program that may have adverse effects to the MSO include the following:

- Standard and Guideline 89 states that, “All reforestation projects will include rodent control where needed.” This S&G could negatively affect the MSO by reducing its prey in certain areas.
- Standard and Guideline 93 advises the Forest to reduce susceptibility of Englemann spruce stands to Englemann bark beetle and to salvage windthrown trees as soon as possible. Because some PACs within the Apache-Sitgreaves NFs contain portions of Englemann spruce stands, removal of downed trees could remove important habitat components within MSO habitat.
- Standard and Guideline 96 allows the USFS to reduce the amount of wood volume lost to stem decays and to remove infected, unsound and defective trees at the first opportunity which would result in the removal of key habitat components of MSO habitat.
- Standard and Guideline 97 states that road densities (from timber sale preparation and administration) should be planned to economically balance road costs and skidding costs. The S&G additionally states that permanent road densities should average 3.5 mi/mi² or less, unless topography dictates higher densities to economically remove the timber and to open road densities after timber sale activities cease should average 2.0 mi/mi² or less. Pursuant to the Draft Revised Recovery Plan (FWS 2011), both motorized and non-motorized vehicles may degrade MSO habitat, particularly meadow and shrub habitat vital to the MSO’s prey. In addition, noise produced by vehicles and human presence may disturb nesting MSOs.

In summary, forest and forest health activities implemented under this program are planned to reduce the risk of severe, stand-replacing wildland fire across the landscape (which includes PACs, protected steep-slope, and restricted habitat as recommended in the Draft Revised Recovery Plan). However, even projects with projected long-term benefits may reduce habitat quality for MSOs in the short-term. In the short-term, direct and indirect effects to the MSO and its habitat may include disturbance and the loss of key habitat components, along with reduced wildland fire risk.

Lands and Minerals Program

This program had several S&Gs that were ranked as positive for the MSO. For instance, direction to protect threatened and endangered species (T&E) by controlling surface uses during mineral operations. In addition, guidance is given to protect riparian areas. These may have indirect benefits to the MSO. However, S&G 52 could have a potential sublethal effect on the MSOs as the use of rodenticides and other chemical agents in and near occupied MSO habitat could have negative effects on the MSOs prey or possibly on an individual MSO. The USFS typically implements measures to minimize effects to key habitat components (such as implementing the recommendations outlined in the FWS Region 2 Recommended Protection Measures for Pesticide Applications to reduce potential effects of chemical agents on MSOs) and the MSO (such as conducting operations outside the MSO breeding season when in or near PACs).

Rangeland Management Program

Grazing allotment plans, as developed under the LRMP, provide guidance for managing and monitoring public-lands range use by livestock on the Apache-Sitgreaves NFs. Grazing can adversely affect the MSO primarily through four indirect effects: (1) diminished prey availability and abundance (Ward 2004, Willey 2007, Willey and Willey 2010), (2) degradation of riparian and meadow plant communities, and (3) impaired ability of plant communities to recover or develop into more suitable MSO habitat. Though the USFS strives to manage livestock allotments to maintain habitat for the MSO and its prey, multiple factors (such as yearly precipitation, livestock numbers, and timing of grazing) may determine the specific influences of livestock on MSO habitat.

Recreation, Heritage and Wilderness Program

Recreational activities may affect MSOs directly through disturbances caused by human activity (e.g., hiking, shooting, and off-highway vehicle [OHV]) use at nesting, roosting, or foraging sites. Though specific S&Gs resulting in adverse effects to the MSO were not identified, the nature of the recreational program does come into conflict with MSO management across the forest and does result in disturbance to MSOs. Typically, this is a result of recreationists wanting to conduct activities (such as OHV group rides) in or adjacent to MSO PACs during the breeding season. Other recreation activities in the region that have resulted in potential adverse effects to the MSO include building trails within PACs, development of recreational facilities (such as campgrounds) within PACs.

Watershed Management Program

Within this program, the only S&G that was found to pertain to the MSO, related to enhancing watershed conditions by closing and/or obliterating roads that are causing resource damage. Implementation of this S&G would indirectly benefit MSO habitat by restoring damaged watersheds. However, there could be some short-term disturbance to MSOs from activities involving road obliteration adjacent to or within PACs.

Wildlife, Fish, and Rare Plants Program

The majority of S&Gs within this program were ranked as providing beneficial affects to the MSO when implemented. For example, several gave direction to manage T&E to achieve declassifying (i.e., delisting). Others stated that habitat management for federally listed species will take precedence over unlisted species. Standard and Guideline 30 specifically mentions consulting with a wildlife biologist during project planning within habitats with known MSOs. Implementing tasks within the MSO's recovery plan and working towards delisting the MSO is obviously beneficial for the species.

1996 Regional Amendment

All S&Gs within the 1996 Regional amendment have positive effects to the MSO in the long-term. However, several of the S&Gs that maintain habitat or provide recovery also have associated short-term adverse effects. For example, 1476 allows the Forest to utilize prescribed fire. Although prescribed fire may be beneficial to the protection of MSO habitat in the long-term, smoke and other disturbance from prescribed fire may result in short-term effects to the MSO. In addition the S&Gs within the 1996 Regional amendment do not cause do not impede recovery of the species.

In summary, over the last seven years, we have conducted a total of 14 formal consultations for actions implemented on the Apache-Sitgreaves NFs. These actions included a combination of short- and long-term harm and harassment that resulted in the anticipated incidental take of MSOs associated with nine PACs. We anticipate that over the life of this consultation, activities associated with forest management (e.g., fuels reduction, forest restoration, salvage logging) will likely be the predominant activity occurring within and adjacent to MSOs and MSO habitat. These activities can result in disturbance during the breeding season (such as mechanized logging, hauling routes, smoke), habitat modification (short-term reductions in large logs, snags, and other key habitat components), and habitat degradation (such as long-term loss of large trees to create openings for regeneration). Other actions, such as those conducted under the Rangeland Management; Lands and Minerals; and Recreation, Heritage, and Wilderness Programs, based upon recent site-specific consultations, could also result in adverse effects to MSOs from modification of prey species habitat due to livestock grazing and disturbance related to construction of infrastructure near occupied areas, respectively.

Effects of the Action on MSO Critical Habitat

Since 2005, approximately 9,000 acres (or <1 percent) of designated CH within CH unit UGM-7 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. 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 Mexican spotted 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. Any loss of this habitat component may be significant in terms of maintaining MSO and prey habitat. Some snags will be created through prescribed burning, which could benefit the MSO. However, snags currently used by MSOs for nesting are typically very old, large dbh, 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 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 Apache-Sitgreaves NFs, 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

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 Apache-Sitgreaves NFs is implementing these actions in designated CH. Designated CH includes all protected (PACs and protected steep-slope habitat) and restricted habitat (unoccupied or uninventoried MSO habitat) within CHUs. These actions include the following:

- The Apache-Sitgreaves NFs 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 Apache-Sitgreaves NFs 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.
- The Apache-Sitgreaves NF's intent is to implement the Four Forest Restoration Initiative. The USFS intent is to integrate the best available Recovery Plan habitat management objectives where possible into forest restoration and/or fuels reduction projects with the overall goal to protect PACs from high-severity wildland fire and conduct actions to improve forest sustainability (e.g., thinning and prescribed burning) in order to ensure MSO habitat continues to exist on the forest.
- The USFS is implementing several on-going projects previously consulted on under site-specific BOs. BOs issued for these projects have noted adverse effects to PCEs and MSOs. However, these projects are designed to result in long-term benefits to MSO habitat by reducing fuels and the risk of high severity wildland fire (Nutrioso WUI Fuels Reduction Project and Chitty Creek Restoration Project). Even the Arizona Forest Utility Hazard Tree Removal Phase II Project, though it is designed to protect infrastructure through the removal of hazard trees near utility lines, will ultimately reduce the risk of a wildland fire igniting from a power line into adjacent MSO habitat, particularly PACs.

These actions should increase the sustainability and resiliency of MSO habitat (particularly through fuels management and forest restoration actions). Therefore, continued implementation of the Apache-Sitgreaves 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. Essentially, this section is very similar to the section provided in the 2005 LRMP BO/CO except that is specific to areas surrounding the Apache-Sitgreaves NFs. 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.

Although a small number of MSOs most likely occur on state and privately owned parcels of land adjacent to and within the Apache-Sitgreaves NFs boundary, the majority of known MSOs occurring on non-USFS lands inhabit Tribal lands. Tribes are sovereign governments with management authority over wildlife and other Tribal land resources. In this section, we provide some of the specific Management/Conservation Plans for the MSO that were developed by the San Carlos Apache Tribe and White Mountain Apache Tribe, which are both adjacent to the Apache-Sitgreaves NFs. The FWS considers all of these plans beneficial overall to the MSO.

San Carlos Apache Tribe: The San Carlos Apache Tribal lands are located between and directly adjacent to the Tonto and Apache Sitgreaves NFs. 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. MSOs 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. MSO 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).

White Mountain Apache Tribe: The Fort Apache Indian Reservation is directly adjacent to the Tonto and Apache Sitgreaves NFs. 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 MSOs 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, MSO habitat concerns drive management prescription; timber harvest is secondary objective. Category-1 DMAs range approximately 6,000-10,000 acres (2,430-4,050 ha) in size and contain 57 percent of known MSO sites on the Reservation. Category-2 DMAs include areas supporting 1-3 MSO territories. Habitat outside the territories managed only secondarily for MSOs, 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.

CONCLUSION

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. CH 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 PCEs 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” (FWS and National Marine Fisheries Service 1998:4-34).

After reviewing the current status of the MSO and its designated 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 Apache-Sitgreaves NFs will not jeopardize the continued existence of the MSO and will not destroy or adversely modify designated CH. Effects analyses and conclusions in BOs from 2005 through 2010 for the Apache-Sitgreaves NFs also determined that projects implemented under the current LRMP were not likely to jeopardize the continued existence of the MSO or destroy/adversely modify designated CH. Further, summary of our reasoning for determining that the continued implementation of the LRMP for the Apache-Sitgreaves NFs will not jeopardize the MSO and will not destroy or adversely modify designated CH for the species is based on the following:

- In 1996, the USFS amended the Apache-Sitgreaves NF’s LRMP to incorporate recommendations from the 1995 Recovery Plan (FWS 1995) through an EIS pursuant to NEPA. 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 Apache-Sitgreaves NF's LRMP have not changed since 2005, the majority of which were found to be beneficial to the MSO. Although the MSO's environmental baseline has likely changed on the Apache-Sitgreaves NFs as a result of wildland fire, 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). Though the Wallow Fire impacted a large number of designated MSO PACs on the forest, the Apache-Sitgreaves NFs will continue ongoing forest restoration efforts that should reduce the risk of another high-severity fire occurring.
- Projects implemented under the Apache-Sitgreaves NF's LRMP have not lead to a jeopardy determination or adverse modification of MSO CH 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 (FWS 2011). We have information that these forest restoration actions are likely 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.
- Although MSO PACs were impacted by the 2011 Wallow Fire, evidence exists that MSOs often return to their nesting and roosting areas even after these areas have burned and have bred successfully (see Bond et al. 2002). Though we don't currently know the effects of the fire on the MSOs, we still consider those PACs occupied.

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 incidental take of endangered and threatened species, respectively, without special exemption. Per the Act, incidental 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 incidental take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity (50 CFR 402.02). 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 MSOs 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 MSOs 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 MSOs 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 (FWS Memorandum, February 3, 1997). Actions outside PACs will generally not result in incidental take because we are not reasonably certain the MSOs are nesting and roosting in areas outside of PACs. We may modify this determination in cases when areas that may support MSOs have not been adequately surveyed and we are reasonably certain MSOs may be present.

The reasonable and prudent 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/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 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 Incidental 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 Apache-Sitgreaves NFs LRMP will be in form of short-term harassment. MSOs 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 MSOs) than incidental 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.

There are 147 designated MSO PACs on the Apache-Sitgreaves NFs. Currently, because of impacts associated with the Wallow Fire, we are unclear as to the long-term status of 76 (52 percent) of these PACs. However, the USFS states that 29 of these PACs were substantially impacted and that the other PACs should continue to function as nesting/roosting habitat for the MSO. Better information (e.g., MSO surveys of the area) may show that some areas within the substantially impacted PACs continue to be used by MSOs. Nonetheless, until we receive site specific occupancy information, we will assume that all of the 147 currently designated PACs are occupied and may continue to be occupied over the life of this project. Therefore, using the best available information and 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 incidental 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 MSOs associated with up to 11 PACs per year (approximately 7.5 percent) of the 147 PACs that still are functioning as MSO nesting/roosting habitat due to a single or short-term (1 to 3 years) disturbance. Mexican spotted owls associated with an individual PAC may not be harassed over the course of more than three breeding seasons.
- Harm and/or harassment of MSOs associated with three PACs due to long-term or chronic disturbance, 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 Apache-Sitgreaves NFs and not a compilation of all Region 3 NFs in the UGM EMU.

Effect of the Take

In this BO/CO, the FWS determines that this level of anticipated incidental take is not likely to result in jeopardy to MSO. We base the numbers of MSO PACs with anticipated incidental take on the potential for future projects implemented under the current LRMP that could have short-term adverse effects due to fuels reductions and forest restoration. These types of projects may result in short-term adverse effect, but will also result in long-term beneficial effects to the MSO.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Apache-Sitgreaves NFs 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 incidental take of MSOs.

1. Minimize or eliminate adverse effects to MSOs on the Apache-Sitgreaves NFs.
2. Minimize or eliminate adverse effects to MSO habitat on the Apache-Sitgreaves NFs.
3. Monitor the impacts of site-specific projects on the MSO.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the ESA, the Apache-Sitgreaves NFs 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 Where feasible, the Apache-Sitgreaves NFs 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 MSOs.
- 1.2 MSO surveys shall occur within the Wallow Fire perimeter to determine the status and distribution of MSOs impacted by the fire. (Note: As we have stated earlier in this document, there is much uncertainty in regards to the status of the MSO within the Wallow Fire and we do not know how many MSOs will be able to use a portion of the fire area (approximately 22,267 acres of previously identified nesting/roosting habitat) for activities other than foraging into the future. There is currently no science that allows us to say exactly how many MSOs may be able to continue to conduct roosting and/or nesting behaviors within the fire perimeter. However, we are using our knowledge of MSO behavior following other large, high-severity fires and the existing status of the species within the UGM EMU to

estimate the number of PACs we believe must still be present before reinitiation of this consultation should occur.)

Surveys shall be conducted according to protocol unless other factors (e.g., human health and safety) result in needed modifications. Surveys should be coordinated with the FWS prior to implementation of any projects. Surveys should focus on potential habitat within the fire perimeter.

- 1.3 On site-specific projects, the USFS will work with FWS staff to identify and implement additional reasonable and prudent measures and terms and conditions specific to the project, to minimize effects to MSOs.

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 or MSOs (such as large trees, large snags, and large logs).
- 2.2 On site-specific project, the USFS will work with FWS staff to identify and implement additional reasonable measures, specific to the project, to minimize effects to MSO habitat.

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

- 3.1 The Apache-Sitgreaves NFs 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 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 USFS work with the FWS to conduct MSO surveys over the next several years to attempt to determine how MSOs modify their territories in response to the Wallow Fire and other wildland fires. 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 EMU.
2. We recommend that the USFS work with the FWS to design forest restoration treatments across the Apache-Sitgreaves NFs 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 (FWS 1995). CH 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*), arroyo willow (*S. lasiolepis*), red willow (*S. laevigata*), yewleaf willow (*S. taxifolia*), pacific willow (*S. lasiandra*), boxelder (*Acer negundo*), Russian olive (*Eleagnus angustifolia*), and tamarisk/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 show that they 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.

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 but several hundred miles from the Apache-Sitgreaves NFs. Because tamarisk is a component of about 50 percent of all known Southwestern willow flycatcher territories (Durst et al. 2008), continued spread of the beetle has the potential to significantly alter the distribution, abundance, and quality of suitable Southwestern willow flycatcher nesting habitat.

Critical Habitat

We published a proposal to revise Southwestern willow flycatcher CH on August 15, 2011 (Figure 1). 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 (FWS 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; FWS 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) (FWS 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;

(4) Riparian tree and shrub species (described in the PCE below) provide cover and shelter for nesting, breeding, foraging, dispersing, and migrating Southwestern willow flycatchers. 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 (*Platanus wrightii*), giant reed (*Arundo donax*), false indigo (*Amorpha californica*), Pacific poison ivy

(*Toxicodendron diversilobum*), grape (*Vitis 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, 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);

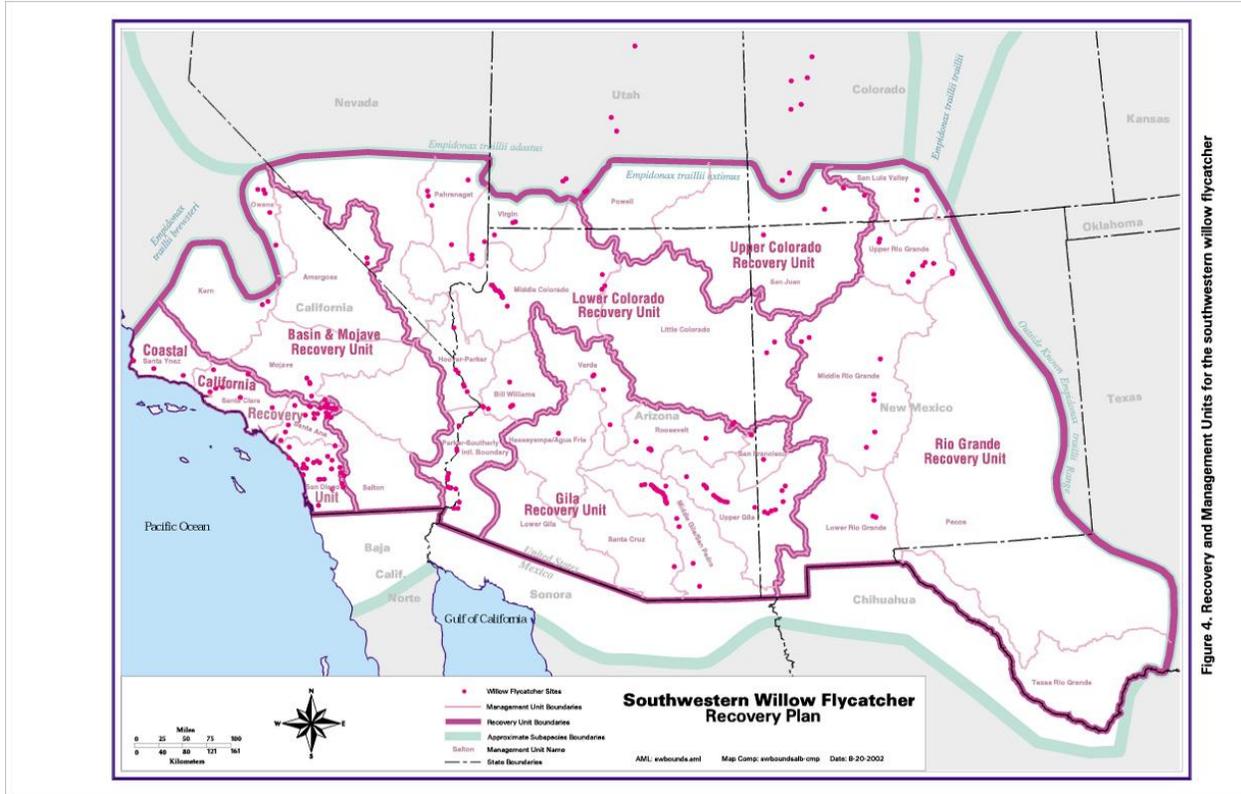
(2) Insect prey populations:

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 recovery units for the Southwestern willow flycatcher.

Figure 2. Southwestern Willow Flycatcher Recovery Units.



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 Apache-Sitgreaves NFs. 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

Four Southwestern willow flycatcher recovery management units (MUs) occur on the Apache-Sitgreaves NFs, the Little Colorado, Roosevelt, San Francisco, and Upper Gila MUs. However, only two MUs, the Little Colorado and San Francisco, are currently known to have territories. The BA for this action under consultation provides numbers of Southwestern willow flycatcher territories detected on the Apache-Sitgreaves NFs. Territories occur along the Little Colorado and San Francisco Rivers. Between 1993 and 2007, the highest number of territories detected on the forest was 14 (1996) and a low of 2 was detected in 2002. In 2007, the Apache-Sitgreaves NFs reported three Southwestern willow flycatcher territories from the San Francisco River MU, but it was unknown how many territories there were at the Little Colorado MU because that area was not surveyed that year. A declining population cannot be implied from these data because few sites receive standard survey efforts consistently. Further, riparian habitats are dynamic and Southwestern willow flycatchers have been known to move among sites from year to year. A general lack of surveys at high elevation sites on Apache-Sitgreaves NFs and non-USFS lands adjacent to the Forest has hindered our understanding of the status of Southwestern willow flycatchers and their distribution and abundance throughout the White Mountains and higher elevations of eastern and northeastern Arizona.

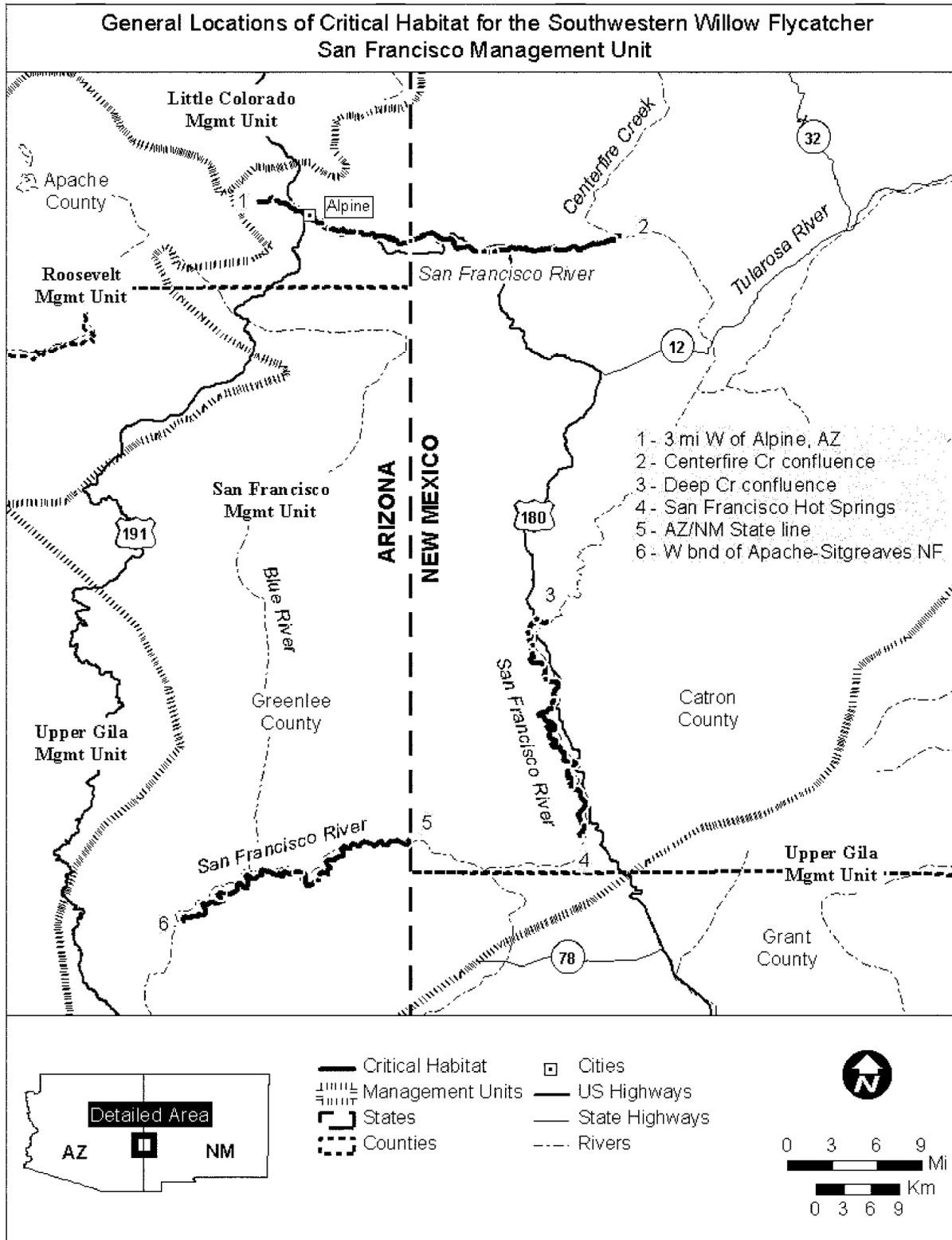
Critical Habitat

The 2005 designated CH on the Apache-Sitgreaves NFs occurs on the Springerville RD along the LCR (including both East and West Forks), and is within the Little Colorado MU and Lower Colorado RU for the Southwestern willow flycatcher (FWS 2005). There are approximately 442 acres of designated CH on the Forest. Designated CH falls within MAs 1, 3, 4, 11, and 17. Management Area 17 consists of the West Fork and part of the East Fork of the Little Colorado River, but riparian portions of the river corridor are subject to the direction for MA 3 where the management emphasis is to recognize the importance and distinctive values of riparian areas when implementing management activities, and to give preferential consideration to riparian area dependent resources in cases of unsolvable conflict and give priority to T&E. Approximately 8.2 mi of CH also falls within the WSR eligible segments on the East and West Forks of the Little Colorado River (MA 17).

Proposed CH exists on the Apache-Sitgreaves NFs including the Little Colorado Management Unit (Little Colorado River west fork) and San Francisco Management Unit (San Francisco River). The FWS proposed CH on two segments of the San Francisco River in Arizona and New Mexico which occur on the Apache NF (see Figure 2). Critical habitat occurring within New Mexico is managed by the Gila NF. The first segment, along the upper San Francisco River, occurs within both states, and extends from near the Town of Alpine, Arizona, to Centerfire Creek in Catron County, New Mexico. The second 36.9-km (22.9-mi) segment extends from the Arizona and New Mexico border to the southwestern boundary of the Apache NF, in Apache

County, and is entirely in Arizona. The San Francisco River is known to be occupied by Southwestern willow flycatchers at the time of listing, and contains the physical or biological features essential for the conservation of the species which may require special management considerations or protection, as described above. These San Francisco River segments were identified in the Recovery Plan as having substantial recovery value (FWS 2002, pp. 90– 91). In addition, these San Francisco River segments are anticipated to provide Southwestern willow flycatcher habitat for metapopulation stability, gene connectivity through this portion of the Southwestern willow flycatcher’s range, protection against catastrophic population loss, and population growth and colonization potential. As a result, these river segments and associated Southwestern willow flycatcher habitat are anticipated to support the strategy, rationale, and science of Southwestern willow flycatcher conservation in order to meet territory and habitat related recovery goals.

Figure 3. Proposed critical habitat for the Southwestern willow flycatcher on the Apache-Sitgreaves NFs.



Wildfire

The Wallow Fire, a wildland fire which started on May 29, 2011, burned over a half-million acres of the Apache-Sitgreaves NFs. Three Southwestern willow flycatcher breeding sites, consisting of extensive wetland/willow habitat, occur within the fire perimeter. Two sites are within the community of Greer (46 acres) within the Little Colorado River drainage and one within the community of Alpine (55 acres) on the San Francisco River. Neither patches of willows near Greer burned during the Wallow wildfire; however, the area is subject to extreme runoff during high rain events in the surrounding high and moderate severity burned areas of the watershed. Much of the uplands of the watershed draining into the two Greer sites were severely burned. Initially, USFS hydrologists predicted massive floods for this site according to post fire reports (J. Rhis and J. Snyder, Pers. Comm.), however, further evaluation indicates these massive floods will be unlikely to occur. High water flows, silt, and debris have the potential of ripping out or bending down willows. Flooding at these higher elevations could have more of an impact to the species because the vegetation will be slow to recovery back to the point where it supports Southwestern willow flycatchers. The USFS will be monitoring these areas pursuant to Wallow Fire Burned Area Emergency Response (BAER) report.

Factors Affecting the Species 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 and proposed 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 CH. Formal consultations that have occurred from 2005 (the year of the original LRMP BO) to the present are summarized in Table 2.

Consultation #	Date of BO	Project	# of Territories Anticipated Taken	Form of Incidental Take Anticipated	Critical Habitat
02-21-04-F-0355	5/20/05	26 Bar Grazing Allotments	0	N/A	Adverse affect to proposed critical habitat, no adverse modification
02-21-97-F-0229 R1	3/22/06	Sunrise Park-Big Lake Road - Forest Highway 43	0	N/A	Adverse affect to critical habitat, no adverse modification
22410-2003-F-0298	3/1/07	Voight Grazing Allotment	0	N/A	Adverse affect to critical habitat, no adverse modification
22410-2006-F-0364	7/5/07	Arizona Forests Utility Hazard Tree Removal Phase I	0	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 Southwestern willow flycatchers nesting in 1.6 acres of habitat	Harassment	Adverse affect to critical habitat, no adverse modification

Since 2005, five BO have been issued to the Apache-Sitgreaves NFs addressing adverse effects to Southwestern willow flycatcher from projects implemented under the LRMP, although only one projects resulted in the issuance of incidental take. These projects included two grazing allotments, road project, and two utility line hazard tree removal actions. 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). Implementation of these ongoing projects and the issuance of incidental take are covered under this programmatic opinion since it supersedes the 2005 LRMP BO/CO. We have reviewed these site-specific projects to ensure that they will not further diminish the conservation contribution of CH to the recovery of the Southwestern willow flycatcher.

Critical Habitat

Current Southwestern willow flycatcher CH on the Apache-Sitgreaves occurs along the East, West, and South Forks of the Little Colorado River, as well as the main stem of the Little Colorado River. In the latest proposed rule for CH, the East and South forks are no longer being considered for designation as CH. In addition, two sections of the San Francisco River beginning at the AZ/NM border are also proposed for designation.

The BAER report for the Wallow fire estimated a total of 26 miles of currently designated CH were potentially impacted by the Wallow Fire; however, the USFS did not report on the effects of the fire to proposed Southwestern willow flycatcher CH. Extreme runoff could potentially affect proposed Southwestern willow flycatcher CH by potentially causing irreversible damage to Southwestern willow flycatcher nesting habitat. In addition, high water flows, silt, and debris have the potential of ripping out or bending down willows.

EFFECTS OF THE ACTION

Effects of the action refer to the direct and indirect effects of an action on the Southwestern willow flycatcher and its designated and proposed 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,” 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. 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. For this consultation we addressed only those programs that had adverse effects to the species; the analysis for the other programs is hereby incorporated by reference.

Lands and Minerals Program

Standard and Guideline 52 guides the USFS to, “Limit use of herbicides, insecticides, rodenticides, or other chemical agents as part of management activities to times and places where possible transport to or by surface or groundwater has a low probability of occurrence. Limit the use of certain facilities in floodplains to non-flood seasons or daylight hours only.” This S&G does not authorize an action but guides the potential implementation of another action. However, due to the potential of pesticide use in Southwestern willow flycatcher foraging habitat, this S&G may in turn affect Southwestern willow flycatcher prey species, thus resulting in a temporary indirect effect.

Rangeland Management Program

Within the Rangeland Management Program, no S&Gs were ranked as having a negative effect to Southwestern willow flycatchers on the Apache-Sitgreaves NFs. However, the Apache-Sitgreave NF’s LRMP allows the Forest to provide a program of range management that emphasizes high quality range and forage improvements. Standard and Guideline 162 in the Rangeland Management Program states to ensure there is no effect on the unique willow stands caused by grazing. This was ranked as overall positive to the Southwestern willow flycatcher. Overall, our assessment is that the S&Gs within the Rangeland Management Program are unlikely to have adverse effects on the Southwestern willow flycatcher on the Apache-Sitgreaves NFs.

1996 Regional Amendment

Where the 1996 Regional Amendment to all National Forest LRMPs overlaps Southwestern willow flycatcher habitat within the Apache-Sitgreaves NF, we found all the S&Gs to have beneficial effects to the species in the long-term. However, several of the S&Gs that we ranked as maintaining habitat or providing for recovery of the species, also have associated short-term adverse effects. For example, S&G 1476 allows the Forests to utilize prescribed fire. The use of prescribed fire may provide some protection to Southwestern willow flycatcher habitat from catastrophic wildfire in the long-term. However, there may be potential short-term effects from disturbance associated with burning activities. Additionally we find that implementation of the guidelines for the Northern Goshawk do not appreciably affect this species.

Since the 2004 BA (USFS 2004) for The Continued Implementation of the LRMP for the 11 NFs and NGs, no new significant scientific information or data has become available that would change the 2004 effects analysis for the SWWF. In addition, there have been no changes in Forest policy or programs that would change the 2004 BA and 2005 BO/CO effects determinations. Therefore, the reader is directed to the 2004 BA (USFS 2004) and the 2005 BO/CO (USFWS 2005) for the in-depth effects analysis for this species.

In summary, although some of the potentially negative effects on the species have been somewhat reduced (e.g., lowered road densities in some areas, continued or increased livestock exclusion) since the 2005 BO/CO (USFWS 2005). However, there have not been substantial changes of the Apache-Sitgreaves programs or S&Gs that would warrant a change in determination for this species since the 2004 BA (USFS 2004). Therefore, the FWS anticipates that incidental take (in the form of harm and harass) is reasonably certain to occur on this Forest as a result of the implementation of their LRMP.

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: Livestock may physically contact and destroy nests. In addition, grazing in Southwestern willow flycatcher habitat may result in reduction of plant density and a drying of riparian habitats. Livestock grazing has been excluded from a large area of the Apache-Sitgreaves NFs. However, if livestock have not been removed from all areas, the PCEs for the Southwestern willow flycatcher proposed CH may be adversely affected by the rangeland management program due to the fact that PCE 5 states that dense patches of riparian forests are essential for the conservation of the species.

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: Use of insecticides could kill Southwestern willow flycatcher food sources.

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

The Southwestern Willow Flycatcher Recovery Plan was finalized in 2002. The following are some of the recovery efforts have been conducted on the Apache-Sitgreaves NFs.

- The Forest has conducted cowbird trapping at occupied sites.
- All known currently occupied sites are closed to livestock grazing.
- Standardized survey protocols for Southwestern willow flycatcher were performed in occupied and potential habitats.
- The first observation of Southwestern willow flycatcher was reported on private land along Eagle Creek within the Clifton RD in 2007, and surveys in this area detect if and when nesting should occur on the Forest.

These management actions should result in increased protection for Southwestern willow flycatcher habitat. Therefore, continued implementation of the Apache-Sitgreaves NFs LRMP is not expected to further diminish the conservation contribution of CH to the recovery of the Southwestern willow flycatcher.

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 Apache-Sitgreaves NFs, all legal actions likely to occur are considered Federal actions.

CONCLUSION

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. CH 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 PBFs 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” (FWS 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 Apache-Sitgreaves NFs 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 Apache-Sitgreaves NFs 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 Apache-Sitgreaves NFs LRMP will not jeopardize the Southwestern willow flycatcher and will not destroy or adversely modify designated or proposed CH for the species is based on the following:

- Standards and Guidelines within the Apache-Sitgreaves NF’s LRMP have not changed since 2005, the majority of which were found to be beneficial to the Southwestern willow flycatcher.
- There is currently an ongoing forest restoration effort (the Four Forest Restoration Initiative) that should reduce the risk of catastrophic wildfires (e.g., similar to the 2011 Wallow Fire) occurring on the Apache-Sitgreaves NFs. 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. 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). Abating destructive fires will assure that extreme runoff events do not impact Southwestern willow flycatcher habitat.

- Projects implemented under the Apache-Sitgreaves NF's LRMP have not lead to a jeopardy determination or adverse modification of Southwestern willow flycatcher CH since 2005.
- The implementation of the proposed action is not expected to impede the survival or recovery of Southwestern willow flycatchers. The Apache-Sitgreaves NFs conducts cowbird trapping at occupied sites, and all occupied sites are closed to livestock grazing. In addition the Forest has conducted riparian restoration and fencing at Nelson Reservoir along Nutrioso Creek specifically to improve habitat for the species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulations pursuant to section 4(d) of the Act prohibit the incidental take of endangered and threatened species, respectively, without special exemption. Incidental 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 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)).

Amount or Extent of Take

Incidental take of Southwestern willow flycatchers is reasonably certain to occur as a result of the continued implementation of the Apache-Sitgreave's LRMP. Based upon analyses of USFS projects within previous BOs, we anticipate that incidental take for future projects implemented under the Apache-Sitgreave's LRMP will be in form of harassment and harm. 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 incidental take in the form of harassment and harm will occur during the life of the existing Apache-Sitgreave's LRMP.

Since the 2005 LRMP BO/CO was completed, there are still ongoing projects occurring within the Apache-Sitgreaves NFs. These projects are listed in the Table above. Only the Arizona Forest Utility Hazard Tree Removal Project Phase II had any take associated with it. However, implementation of these ongoing projects and the issuance of incidental take are covered under this programmatic opinion since it supersedes the 2005 LRMP BO/CO. We have reviewed these site-specific projects to ensure that they will not further diminish the conservation contribution of CH to the recovery of the Southwestern willow flycatcher. We anticipate that up to three Southwestern willow flycatcher territories will be taken in the form of harassment or harm as a result of the proposed action.

Effect of the Take

In this BO/CO, the FWS determines that this level of anticipated incidental take is not likely to result in jeopardy to Southwestern willow flycatcher. The Southwestern willow flycatcher has a wide distribution and thus, incidental take in the form of harassment or harm occurring three times 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 Apache-Sitgreaves NFs 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 incidental take of Southwestern willow flycatcher:

1. Eliminate or minimize adverse effects to the Southwestern willow flycatcher on the Apache-Sitgreaves NFs.
2. Eliminate or minimize adverse effects to Southwestern willow flycatcher habitat on the Apache-Sitgreaves NFs.
3. Monitor the impacts of site-specific projects on the Southwestern willow flycatcher.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the ESA, the Apache-Sitgreaves NFs 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 term and condition will implement reasonable and prudent measure 2:

- 2.1 Where feasible, when designing projects, the Apache-Sitgreaves NFs will attempt to 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 Apache-Sitgreaves NFs 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 a project was implemented as analyzed in the site-specific BO (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 distribution, abundance, and trends of Southwestern willow flycatcher populations on the Apache-Sitgreaves NFs.
3. Implement projects that improve the occurrence, distribution, and abundance of riparian habitat at locations where enough vegetation is anticipated to develop into Southwestern willow flycatcher nesting 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.

APACHE TROUT

STATUS OF THE SPECIES

Description

Apache trout are yellow or yellow-olive with large dark spots on their body. Dorsal, anal, and caudal fins are edged with white. A yellow cutthroat mark is present. Apache trout have a body that is deep and compressed. They have pronounced spots on the body which are often uniformly spaced, round in outline, and medium-sized (FWS 1983).

Legal Status: Originally listed as endangered under the Federal Endangered Species Preservation Act of 1966 (FWS 1967) the Apache trout later became federally protected with passage of the Endangered Species Act (ESA) in 1973. Successful culturing in captivity and greater knowledge of existing populations led to its downlisting to threatened under the ESA in 1975 (FWS 1975) without CH. Reclassification to threatened status included a 4(d) rule, allowing Arizona Game and Fish Department (AGFD) to regulate incidental take of the species and to establish sportfishing opportunities.

Distribution/Abundance

Apache trout (*Oncorhynchus apache*, formerly *Salmo apache*) is one of two salmonid species native to Arizona (the other is Gila trout, *Oncorhynchus gilae*). Historical distribution of Apache trout is unclear. Once Apache trout were recognized as a species separate from Gila trout (Miller 1972), their original distribution was described as the upper Salt River drainage (Black and White Rivers) and headwaters of Little Colorado River in Arizona above 5,905 ft (1,800 m) in elevation (Miller 1972). Historic distribution has been estimated at approximately 603 mi (965 km) of stream in Arizona (Harper 1978).

Apache trout now exist primarily in headwater areas upstream from natural and artificial barriers (FWS 2010). This environment is subject to extreme variations in both temperature and flow. During winter, formation of anchor ice and ice bridges is common (Harper 1978). Apache trout generally require water temperatures below 77°F (25°C) (FWS 2010).

Habitat

Apache trout is endemic to high elevation streams in the upper Black, White, and Little Colorado River drainages in east-central Arizona. Apache trout evolved in low to moderate/high gradient mountain streams primarily above 5,900 ft elevation, within mixed conifer forests. Alcorn (1976) and Lee and Rinne (1980) studied temperature tolerances of Apache trout and found that critical upper limits were similar to data reported for other species of trout. Robinson and Tash (1979) reported on feeding of Apache trout in relation to light intensity and contrasted findings with brown trout, which were found to be more nocturnal.

More information concerning specific stream habitat requirements for all life stages of Apache trout can be found in the BA-BO, 2004, as well as the revised to the Apache Trout Recovery Plan was published in September 2009, along with a 5-Year Review in 2010. These documents update information regarding the status, listing criteria, and recovery actions for Apache trout (FWS 2009; FWS 2010). Juvenile (<5.1 in Total or <130 mm total length) Apache trout use

shallow water (<7.9 in or <20 cm) most frequently, while adults prefer water depth >7.9 in (20 cm) (Kitcheyan 1999). Juvenile fish were closely associated with cover such as surface turbulence, overhanging vegetation, and objects less than 5.9 in (150 mm) in diameter, while adults used cover less frequently (Kitcheyan 1999). In general, juveniles preferred faster moving water than adults, while both groups used substrates in proportion to their availability (Kitcheyan 1999).

Wada (1991) reported that in stream cover and bank cuts are important variables defining Apache trout habitat. In general, Apache trout selected areas with the greatest depths and cover in the absence of other non-native trout (Wada 1991). Nursery areas for fry were miniature pools in runs or shallow areas on the edges of pools in Firebox and Sun Creeks (Wada 1991). Wada (1991) reported that current velocities in nursery areas were low, with a mean of 0.96 cm/sec; depths were shallow, with a mean of 3.31 cm (1.30 in); and substrates tended to be composed of fines. Kitcheyan (1999) noted that trout were predominantly captured in areas exposed to direct sunlight. Similarly, Wada *et al.* (1995) reported that Apache trout spend a considerable portion of the day feeding and residing in portions of pools exposed to direct sunlight, rarely entering cover.

Kitcheyan (1999) reported that maximum movements of tagged Apache trout was 2,100 m (6,890 ft) upstream and 7,825 ft (2,385 m) downstream, but that most fish were recaptured within 2,461 ft (750 m) of the initial capture site. Harper (1978) reported that 41 tagged adults in Big Bonito Creek were recaptured within 328 ft (100 m) of where they were marked. Post-emergent fry in Bit Bonito Creek moved primarily at night, and primarily downstream between August and October. Rinne (1982) reported similar results for the closely-related Gila trout, noting that they are sedentary under normal population levels, moving little even with high population densities.

Life History

A detailed description of the natural history of Apache Trout was included in the 2004 BA for the Continued Implementation for the Eleven NFs and NGs of the Southwestern Region (USFS 2004) and the resulting 2005 Programmatic BO/CO (FWS 2005); collectively referred to here as BA-BO 2004. A revision to the Apache Trout Recovery Plan was published in September 2009, along with a 5-year review in 2010. These documents update information regarding the status, listing criteria, and recovery actions for Apache trout (FWS 2009; FWS 2010).

Reasons for Listing

Threats: According to the 1975 Federal Register notice, major threats to this species include habitat alterations, competition, hybridization and predation by non-indigenous fish. The 1975, Federal Register Notice noted logging operations in the headwaters of the Salt and Little Colorado Rivers in the White Mountains as causing destruction, modification, or curtailment of its habitat and range. The notice also indicated that introduced rainbow trout hybridized with Apache trout in some streams, and that reintroductions presented a continued threat to the species. The 1983, Recovery Plan (FWS) concluded that hybridization between rainbow and Apache trout was the major factor limiting persistence of Apache trout. Other threats to Apache trout habitat include grazing, reservoir construction, and road construction (FWS 1983).

Recovery Actions

The initial recovery plan for Apache trout was released in 1979, and was revised in 1983. The second revision was finalized in August 2009. The overall objective of recovery is to secure existing populations and planned populations of Apache trout and their stream habitat until the species can be delisted.

Recovery and management efforts for Apache trout have been on-going since the 1940's. Many of the recovery and conservation actions implemented to date have resulted in the expansion of populations and habitat protection/restoration within Apache trout historical range. At the time of publication of the 1983 Apache Trout Recovery Plan (FWS 1983), there were 14 known populations of Apache trout occupying less than 48 km (30 mi) of stream habitat. Currently, approximately 119 miles of streams in 32 pure Apache trout populations exist within historical range in Gila, Apache, and Greenlee counties of Arizona, on lands of the FAIR and Apache-Sitgreaves NFs.

Secure Apache trout populations primarily occur in headwater areas upstream of natural or artificial barriers. Maintaining these habitats in high quality condition is necessary to provide viable populations and species recovery. Various efforts accomplished, primarily between 1982 and 2010, have been completed on the Apache-Sitgreaves NFs to improve habitat conditions by protecting stream courses, implementing watershed restoration projects, constructing in-stream enhancement projects, and building and maintaining barriers. The Apache-Sitgreaves NFs has built migration barriers on 3+ streams and chemically renovated multiple recovery streams since 2003. The Apache-Sitgreaves NFs has removed livestock grazing from several miles of three recovery streams via the Burro Creek Allotment Reconfiguration of 2005 (Arizona Elk Society grazing permit purchase). Over 51 mi (82 km) of occupied or proposed to be occupied stream habitat has been protected from livestock grazing through the following practices: Livestock exclosures (32.2 mi; 51.8 km), no permitted grazing until livestock exclosures are completed (13.2 mi; 21.2 km), and pasture retirement (5.6 mi; 9.0 km). Watershed restoration includes riparian planting (over 6 mi; 9.7 km), road closure and reseeded (over 80 mi; 129 km), and spring protection (over 25 springs).

In stream habitat improvements implemented in the late 1980s into the 1990s, the USFS included implementation of over 200 rock and wood structures (FWS 2003). Construction of new barriers, maintaining all barriers, and coordinating with the AGFD on removing non-native fish, habitat and population inventories has been the focus of the past decade of recovery actions. Coordination with the FWS's Arizona Fisheries Resources Office in Pinetop has also been integral in accomplishing recovery actions, since their efforts to cooperate with the White Mountain Apache Tribe on Apache trout recovery are critical to overall recovery of the fish.

Genetic analysis work is also targeted at identifying the status of Apache trout in regards to variability of wild populations and extent of hybridization with rainbow trout and Gila trout (Wares et al. 2004.) The following streams are pure populations: Coyote/Mamie, Hayground, Home, Mineral, Soldier, Stinky, Wildcat, and West Fork Black River. A more recent genetics study by U of A showed Bearwallow to be hybridized.

ENVIRONMENTAL BASELINE

Status of the Species within the Action Area

Numerous populations of Apache trout occur within the Apache-Sitgreaves NFs. The Recovery Plan (FWS 2009) identifies one relict population (Lower Soldier Springs Creek) and eleven replicate populations. The eleven replicate populations are Bear Wallow, Coyote/Mamie, East Fork Little Colorado River, Fish Creek System (including Ackre Lake, Fish, Corduroy, and Double Cienega Creeks), Hayground, Lee Valley, Mineral, South Fork Little Colorado River, Stinky, West Fork Black River, and West Fork Little Colorado River. These populations are located within the historical range of the species. In addition, five other populations (Bear Wallow, Conklin, Centerfire/Boggy, Snake Creek, and East Fork Little Colorado River) were also identified for recovery but are in need of various actions such as renovation, stocking, and barrier maintenance.

Factors Affecting the Species within the Action Area

Within the action area, one factor that is affecting the Apache trout is the threat of hybridization. Competition from non-native species is a concern as well. As a result the Forest has coordinated with AGFD on the chemical treatment of several streams to remove non-native species. Drought is having an impact on this species where it exists on the Forests, particularly because of the species restriction to small streams that restrict population growth. The Forest reports that Boggy, Centerfire, Home, and Wildcat populations were lost during the last drought.

Recently the Wallow Fire (2011) has contributed to significant habitat alterations, increased ash and sediment flows, resulting in unsatisfactory watershed conditions within Apache trout habitat. The USFS (2011b) contains detailed information regarding Apache trout occupied habitat within the Wallow Fire boundary. It reports 162 miles, 12 pure populations (11 recovery streams), 6 hybrid populations (2 recovery streams) within the fire perimeter. Eighteen of 19 streams on forest either occupied or considered as recovery streams have been impacted to some extent by the Wallow Fire.

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 Apache trout 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.

There have been two biological opinions for effects related to Apache trout issued on the Apache-Sitgreaves NFs since the 2005 BO/CO. They are the Apache-trout Enhancement Project and the reinitiation of consultation on the Apache-trout Enhancement Project.

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 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.

The Apache-Sitgreaves LRMP had several S&Gs that we found would have a lethal or sub-lethal affect to the Apache trout when implemented according to our rankings system. In addition, several were found to cause a negative behavioral response. However, the majority of the S&Gs were ranked positive (e.g., as maintaining habitat for the MSO or providing recovery) and many S&Gs directed the Forest to move towards recovery or implement recovery plans for listed species.

Engineering Program

Standard and Guideline 63 relates to both total road and open road densities. This S&G states that total road density should average 3.5 miles/square mile or less, while open road densities should average 2.0 miles/square mile or less. As stated in the BA, road density is defined as the total miles (kilometers) of road in a defined area divided by the defined area in miles (square kilometers). Road density is used by the FWS and NOAA Fisheries as one way to measure watershed condition as it relates to resident fish in the Pacific Northwest. The joint agencies recommendation is that a given watershed should have less than 2.5 miles/square mile of road system; if in excess, the watershed is said to be not properly functioning.

On the Apache-Sitgreaves NFs, the known road densities are below the 2.5 miles/square mile, recommended by FWS and NOAA Fisheries at the Forest-wide level. However, if you look at the smaller level (e.g. HUC level), Apache trout recovery streams that occur outside of wilderness areas contain a much higher road density than the 2.5 miles/square mile. One of the primary threats to Apache trout is watershed deterioration. This could potentially lead to increased erosion into trout habitat, thereby increasing sedimentation into the stream channel and lowering water quality by allowing contamination of those streams. Sedimentation can contribute to poor water quality which can reduce quantity and quality of spawning and rearing areas, altering stream flow and temperature, and influence stream productivity and food supply (e.g., stream dwelling insects).

Forestry and Forest Health Program

Standard and Guideline 64 allows for controlling mistletoe by clearcutting. As stated in the BA, clear cutting in this region has undergone a major reduction over the past decade. On the Apache-Sitgreaves, a total of 704 acres have been clear cut during that time. New direction for Forest management (e.g., Healthy Forests Initiative) could potentially increase the use of clearcutting. Standard and Guideline 93 advises the Forest to reduce susceptibility of Englemann spruce stands to Englemann bark beetle and to salvage windthrown trees as soon as possible. Included in this are skid trails, disturbance of soils and vegetative ground cover and roads. All of these activities could lead to increased erosion and increased sediment into stream channel occupied by Apache trout. 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.

However, placement in the watershed, acres cut, number of trees cut, presence of buffers, etc. all work together to determine whether or not adverse effects to Apache trout are realized from any of these types of projects. These S&Gs can be implemented in watersheds that feed occupied habitat without adverse effects to the species. Project and site specific information is critical.

Standard and Guideline 97 states that road densities should be planned to economically balance road costs and skidding costs. Permanent road densities should average 3.5 miles/square mile or less, unless topography dictates higher densities to economically remove the timber. Also, open road densities after timber sale activities cease should average 2.0 miles/square mile or less. Depending upon scale, location, timing, and other factors, high road densities could contribute to poor water quality potentially affecting spawning and rearing areas, altering stream flow and temperature, and influencing stream productivity and food supply (e.g., stream dwelling insects). Other S&Gs are utilized to mitigate or minimize the impacts of S&Gs such as this one, especially in watersheds occupied by T&E species.

Wildlife, Fish and Rare Plants Program

Standards & Guidelines 39, 114-118, 123, and 152 all provide guidance for management of the riparian resources. The FWS recognizes that the intent of these S&Gs is positive; however, due to the current status of the Apache trout across its range, it is imperative that all habitat that is currently occupied or is capable of supporting Apache trout be maintained in optimal conditions. All of these S&Gs could result in a certain amount of riparian habitat being maintained at less than optimal conditions. This could result in localized streambank sloughing, thereby increasing sedimentation into the stream channel. Potential effects to the species may include a reduction of invertebrate food supplies and interference with reproduction.

S&Gs for the 1996 Regional LRMP Amendment

The following S&Gs have some potential for short-term adverse effects with overall long-term benefits, as described below.

Standard and Guidelines 1432, 1445, 1455, 1458, 1468, 1476 and 1508 are all related to the fuels treatment for fire risk abatement. 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 (e.g. sedimentation) as well as those from the fire itself. See previous discussions under the Fire Management Programs 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

In summary, several S&Gs within the Apache-Sitgreaves NFs LRMP were determined to have adverse effects to the Apache trout when implemented. We determined that several of these S&Gs may cause a negative behavioral response in Apache trout. However, the majority of the S&Gs were ranked positive (e.g., as maintaining habitat for the MSO or providing recovery) and

many S&Gs directed the Forest to move towards recovery or implement recovery plans for listed species.

Cumulative Effects

Commercial development on lands within watersheds containing threatened and endangered 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 could result in cumulative adverse effects to occupied, as well as potentially-occupied native fish habitat through water use, pollution, and alteration of the stream banks through riparian vegetation suppression, bank trampling, and erosion.

CONCLUSION

After reviewing the current status of the threatened Apache trout, the environmental baseline for the action area, all the effects of the proposed action, and the cumulative effects, it is the FWS's biological opinion that the action, as proposed, will not jeopardize the continued existence of the Apache trout. 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. We find that the continued implementation of the S&Gs within the Apache-Sitgreaves NFs LRMP will not jeopardize the Apache trout for the following reasons: (1) the LRMP directs the Forests to maintain and improve habitat for the species, contributing to both the survival and recovery of the species; and (2) our analysis reported very few S&Gs that could cause lethal or sub-lethal effects to the species, ensuring both the survival and recovery of the species.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation pursuant to section 4(d) of the Act prohibit the incidental take of endangered and threatened species, respectively, without special exemption. Per the Act, incidental take is defined as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is further defined by the FWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing essential behavioral patterns, including breeding, feeding, or sheltering. (50 CFR 17.3). "Harass" is defined 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 (50 CFR 17.3). Incidental take is defined as incidental take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity. (50 CFR 402.02). 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 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 Apache trout in the form of harm and harass is expected to result from the continued implementation of the LRMP for the following programs on the Apache-Sitgreaves NFs: Engineering, Forestry/Forest Health, and Wildlife, Fish and Rare Plants programs. The FWS anticipates, however, that incidental take of Apache trout associated with the proposed action cannot be directly quantified and will be difficult to detect for the following reasons: finding a dead or impaired specimen is unlikely; many effects are the result of non-point sources, and losses may be masked by seasonal fluctuations in environmental conditions and fish numbers. The FWS has determined that the anticipated level of incidental take was most appropriately quantified in terms of numbers of populations with disturbance or habitat alteration resulting from site-specific projects. Incidental take will be considered to be exceeded if 1 population is extirpated as a result of the proposed action, i.e., implementation of the Apache-Sitgreaves LRMP. Refer to the “Status of the Species within the Action Area” section for a complete list of current extant populations of Apache trout on the Apache-Sitgreaves NFs.

Effect of the Take

In the accompanying BO/CO, the FWS determined that this level of anticipated incidental take will not result in jeopardy to the Apache trout. The continued implementation of the Apache-Sitgreaves NFs LRMP accomplished through the implementation of the S&Gs as analyzed within this opinion indicates that most S&Gs are positive for threatened and endangered (T&E) species and although there are some S&Gs that could cause adverse effects there are other S&Gs that minimize or eliminate those effects. If the S&Gs are implemented as written, the risk of a jeopardy conclusion at this programmatic level is unlikely.

REASONABLE AND PRUDENT MEASURES

The FWS believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of the Apache trout:

1. Minimize or eliminate adverse effects to Apache trout on the Apache-Sitgreaves NFs.
2. Minimize or eliminate adverse effects to Apache trout habitat on the Apache-Sitgreaves NFs.
3. Monitor the impacts of site-specific projects on the Apache trout.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, 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 term and condition will implement Apache-Sitgreaves NFs RPM 1:

- 1.1 Manage riparian areas adjacent to and upstream of Apache trout populations for conditions to minimize direct and indirect effects to the species.

The following terms and conditions will implement Apache-Sitgreaves NFs RPM 2:

- 2.1 Emphasize habitat characteristics to optimize Apache trout habitat in occupied and recovery streams.
- 2.2 Strive to maintain or reduce road densities in occupied Apache trout watersheds with the goal of every occupied 6th Code watershed below 2.5 mi/mi².

The following terms and conditions will implement Apache-Sitgreaves NFs RPM 3:

- 3.1 The Apache-Sitgreaves NFs 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 Apache trout 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. Renovate more streams to improve habitat for Apache trout, in coordination with the Recovery Team.
2. Populations of Apache trout should continue to be replicated, in coordination with the Recovery Team, into streams that are geographically separate to ensure that natural or human-induced disasters do not extirpate the populations.

GILA CHUB

STATUS OF THE SPECIES

Description

The Gila chub is small-finned, deep-bodied, chubby, and darkly colored (sometimes lighter on belly; diffuse lateral band(s) are rarely present). Adult males average about 6 in (150 mm) in total length; females can exceed 10 in (250 mm) (Rinne and Minckley 1991). Scales are coarse, large, thick, and broadly overlapped, and radiate out from the base. Lateral-line scales usually number greater than 61 and less than 80. There are usually eight (rarely seven or nine) dorsal and anal fin-rays; pelvic fin-rays typically number eight, but sometimes nine (Rinne 1976, Minckley and DeMarais 2000, Minckley and March 2009).

Taxonomy

The Gila chub is a member of the minnow family Cyprinidae. Baird and Girard (1854) published a description of the Gila chub, as *Gila gibbosa*, based on the type specimen collected in 1851 from the Santa Cruz River, Arizona. For nomenclature reasons, the name was changed by Girard to *Tigoma intermedia* in 1856, working with specimens from the San Pedro River (Girard 1856). Despite that and other name changes, the Gila chub has been recognized as a distinct species since the 1850's, with the exception of a short period in the mid-1900's when it was placed as a subspecies of the roundtail chub (*Gila robusta*) (Miller 1946). For the past 30 years, *Gila intermedia* has been recognized as a full monotypic species, separate from the polytypic species *Gila robusta*, both currently accepted as valid (Nelson et al. 2004). Taxonomically problematic populations nonetheless exist, variously assigned to one or the other taxa and leading to continued confusion. Further complicating matters, Minckley and DeMarais (2000) described a new species, the headwater chub (*Gila nigra*), within the Gila River Basin. It is of hybrid origin derived from *Gila robusta* and *Gila intermedia*. Its range is similar to that of *Gila intermedia* and is another headwater-type chub, whereas, *Gila robusta* is found in the mainstem of the major rivers within the Gila River Basin. Dowling et al. (2008) reported on the genetics of many of the extant populations of these three Gila River chubs and recommended management units based on this information.

Life History

Gila chub interact with spring and small stream fishes regularly (Meffe 1985), but are usually restricted to deeper waters (Minckley and March 2009). Adults are often found in deep pools and eddies below areas with swift current. Young-of-the-year inhabits shallow water among plants or eddies, while older juveniles use higher velocity stream areas (Minckley 1973). Gila

chub feed on both plants and animals. Adults appear to be principally carnivorous, feeding on large and small terrestrial and aquatic insects and sometimes other small fishes. Smaller individuals often feed on organic debris and aquatic plants, especially filamentous (threadlike) algae, and less intensely on diatoms (unicellular or colonial algae) (Griffith and Tiersch 1989, Rinne and Minckley 1991).

Spawning typically occurs from late spring into summer (Minckley 1973, Griffith and Tiersch 1989, Nelson 1993). Breeding males display deep red or orange coloration on ventral surfaces and paired fin bases (Minckley 1973, Rinne 1976). Spawning is likely sporadic over a long reproductive season (Rinne and Minckley 1991), and in constant warm water temperature settings such as springs; and Gila chubs can spawn throughout the year (Minckley 1973, 1985, Griffith and Tiersch 1989). Spawning likely occurs over beds of submerged aquatic vegetation or root wads, with large females being followed by several smaller males (Minckley 1973). Males and females reach sexual maturity in 1 to 3 years at lengths of 3.6-3.8 in (90 to 95 mm) (Griffith and Tiersch 1989). Gila chub spawn at water temperatures warmer than 62 °F (17 °C), with optimal water temperatures of 68 to 75 °F (20° to 24 °C) (Nelson 1993), and optimal temperatures for growth of 75 to 82 °F (24° to 28 °C) (Schultz and Bonar 2007). Gila chub likely live up to 4 years or more (Griffith and Tiersch 1989).

Status and Distribution

The Gila chub was listed as endangered with CH on November 2, 2005 (FWS 2005a). Historically, Gila chub have been recorded in approximately 43 rivers, streams, and spring-fed tributaries throughout the Gila River basin in southwestern New Mexico, central and southeastern Arizona, and northern Sonora, Mexico (Miller and Lowe 1967, Rinne and Minckley 1970, Minckley 1973, Rinne 1976, DeMarais 1986, Weedman et al. 1996, FWS 2005a). The Gila chub now occupies an estimated 10 to 15 percent of its historical range, and is limited to about 30 small, isolated, and fragmented populations throughout the Gila River basin in Arizona and New Mexico (Weedman et al. 1996, FWS 2005a). Populations occur in tributaries of the Agua Fria, Babocomari, Gila, San Francisco, San Pedro, Santa Cruz, and upper Verde Rivers in Cochise, Coconino, Gila, Graham, Greenlee, Pima, Pinal, Santa Cruz, and Yavapai Counties in Arizona, and in Grant County, New Mexico (Weedman et al. 1996, FWS 2005a). Approximately half of all known Gila chub occupied habitat occurs on NFS lands. Of these populations, ten are estimated to be stable-threatened, meaning the Gila chub are considered common, but face threats from nonnative species, land-uses practices, and lack of recruitment. The remaining known extant populations are considered unstable-threatened, indicating that Gila chub are rare, have a limited distribution, predatory or competitive nonnative species are present, or the habitat is modified or poor land-use practices occur (Weedman et al. 1996, FWS 2005a).

In the Verde River basin, the Walker Creek, Red Tank Draw, and Spring Creek populations (Yavapai County) are considered stable-threatened, but the status of the Williamson Valley Wash population is unknown. The Santa Cruz River has three tributaries with extant populations of Gila chub: Sabino Canyon (Pima County) and Sheehy Spring (Santa Cruz County) have unstable-threatened populations, and Cienega Creek (Pima and Santa Cruz Counties) has the only known naturally-occurring stable-secure population of Gila chub. The San Pedro River basin has three extant, stable-threatened populations in Redfield Canyon (Graham and Pima Counties), O'Donnell Creek (Santa Cruz County), and Bass Canyon (Graham and Cochise

Counties). Gila chub still occupy T4 Spring in the Babocomari River basin (Santa Cruz and Cochise Counties), but it is very rare in this spring. The San Carlos River and the Blue River, (Gila and Graham Counties), tributaries of the Gila River located on the San Carlos Apache Indian Reservation, are currently occupied by Gila chub (FWS 2005a).

The San Francisco River has two tributaries with extant stable-threatened populations, Harden Cienega Creek and Dix Creek (Greenlee County). The Agua Fria River has four tributaries with stable-threatened populations, Larry, Lousy, Silver and Sycamore Creeks (Yavapai County), as well as two unstable-threatened populations in Little Sycamore Creek and Indian Creek (Yavapai County). Two tributaries of the Gila River in Arizona have extant populations of Gila chub: Eagle Creek (Graham and Greenlee Counties), has an unstable threatened population and Bonita Creek (Graham County), has a stable-threatened population which is now somewhat protected by placement of a fish barrier and chemical renovation of the stream in 2008, although green sunfish since reinvaded and additional renovation is planned (FWS 2005a, Marsh and Associates 2009, U.S. Bureau of Reclamation and Bureau of Land Management 2010).

In Mexico, Gila chub occurred in two small spring areas, Cienega los Fresnos and Cienega la Cienegita, adjacent to the Arroyo los Fresnos (tributary to the San Pedro River), within 1 mi (2 km) of the Arizona-Mexico border as recently as 1992, but are now thought to be extirpated (Varela-Romero et al. 1992). No Gila chub remain in the Mexican portion of the Santa Cruz River (Weedman et al. 1996).

Reestablishment of Gila chub has been attempted in at least six Arizona sites. Lousy Canyon and Larry Creek, stocked with 200 Gila chub from Silver Creek in July 1995, are extant. Gardner Canyon (Cochise County) was stocked from Turkey Creek (Santa Cruz County) with 150 Gila chub in July 1988. In May 1995, no Gila chub or any other fish were captured during surveys. Turkey Creek, a tributary to the Babocomari River, was stocked with a small number of Gila chub in 2005, but is now thought to be extirpated. In 2005, Bear and Romero Canyons in the Santa Rita Mountains were stocked with Gila chub from Sabino Canyon. Gila chub now appear extirpated from Bear Canyon, but are doing well in Romero Canyon, where they can be considered stable-threatened (Ehret and Dickens 2009).

Habitat

Gila chub commonly inhabit pools in smaller streams, springs, and cienegas, and can survive in small artificial impoundments (Miller 1946, Rinne 1975, Weedman et al. 1996, Minckley and March 2009). Gila chub are highly secretive, preferring quiet, deeper waters, especially pools, or remaining near cover including terrestrial vegetation, boulders, and fallen logs (Rinne and Minckley 1991, Carman 2006, Minckley and March 2009). Undercut banks created by overhanging terrestrial vegetation with dense roots growing into pool edges provide ideal cover (Nelson 1993). Gila chub can survive in larger stream habitat such as the San Carlos River and artificial habitats like the Buckeye Canal (Stout et al. 1970, Rinne 1976). Gila chub are also easily cultured in a hatchery setting (Schultz and Bonar 2007). Gila chub interact with spring and small stream fishes regularly (Meffe 1985), but adults are usually restricted to deeper waters (Minckley and March 2009). Native fish found in Gila chub habitat include desert sucker (*Catostomus clarki*), Sonora sucker (*Catostomus insignis*), longfin dace (*Agosia chrysogaster*), and speckled dace (*Rhinichthys osculus*) (USFS 2011a). They are often found in deep pools and

eddies below areas with swift current, as in the Gila chub habitats found in Bass Canyon and Hot Springs in the Muleshoe Preserve area along the western slopes of the Galiuro Mountains. Young-of-the-year inhabit shallow water among plants or eddies, while older juveniles use higher velocity stream areas and then retire to pools when adults (Minckley 1973, 1991). In general, key habitat components for Gila chub at all life stage appear to be in deep pools with cover in the form of undercut banks, root wad and instream organic debris (Rinne and Minckley 1991, Carman 2006, Minckley and March 2009).

Critical Habitat

CH for Gila chub is designated for approximately 160 mi (258 km) of stream reaches in Arizona and New Mexico that includes cienegas, headwaters, spring-fed streams, perennial streams, and spring-fed ponds. CH includes the area of bankfull width plus 300 ft (91 m) on either side of the banks. The bankfull width is the width of the stream or river at bankfull discharge (e.g., the flow at which water begins to leave the channel and move into the floodplain) (Rosgen 1996, FWS 2005a). CH is organized into seven areas or river units:

Area 1 - Upper Gila River, Grant County, New Mexico, and Greenlee County, Arizona, includes Turkey Creek (New Mexico), Eagle Creek, Harden Cienega Creek, and Dix Creek;

Area 2 - Middle Gila River, Gila and Pinal Counties Arizona, consists of Mineral Creek;

Area 3 - Babocomari River, Santa Cruz County, Arizona includes O'Donnell Canyon and Turkey Creek (Arizona);

Area 4 - Lower San Pedro River, Cochise and Graham Counties, Arizona, includes Bass Canyon, Hot Springs Canyon, and Redfield Canyon;

Area 5 - Lower Santa Cruz River, Pima County, Arizona, includes Cienega Creek, Mattie Canyon, Empire Gulch, and Sabino Canyon;

Area 6 - Upper Verde River, Yavapai County, Arizona, includes Walker Creek, Red Tank Draw, Spring Creek, and Williamson Valley Wash; and

Area 7 - Agua Fria River, Yavapai County, Arizona, includes Little Sycamore Creek, Sycamore Creek, Indian Creek, Silver Creek, Lousy Canyon, and Larry Creek (FWS 2005a).

There are seven PCEs of CH, which include those habitat features required for the physiological, behavioral, and ecological needs of the species:

1. Perennial pools, areas of higher velocity between pools, and areas of shallow water among plants or eddies all found in headwaters, springs, and cienegas, generally of smaller tributaries;

2. Water temperatures for spawning ranging from 63 to 75 °F (17 to 24 °C), and seasonally appropriate temperatures for all life stages (varying from about 50 to 86 °F [10 to 30 °C]);
3. Water quality with reduced levels of contaminants, including excessive levels of sediments adverse to Gila chub health, and adequate levels of pH (e.g., ranging from 6.5 to 9.5), dissolved oxygen (e.g., ranging from 3.0 to 10.0 ppm) and conductivity (e.g., 100 to 1,000 mmhos);
4. Prey base consisting of invertebrates (e.g., aquatic and terrestrial insects) and aquatic plants (e.g., diatoms and filamentous green algae);
5. Sufficient cover consisting of downed logs in the water channel, submerged aquatic vegetation, submerged large tree root wads, undercut banks with sufficient overhanging vegetation, large rocks and boulders with overhangs, a high degree of stream bank stability, and a healthy, intact riparian vegetation community;
6. Habitat devoid of nonnative aquatic species detrimental to Gila chub or habitat in which detrimental nonnative species are kept at a level that allows Gila chub to continue to survive and reproduce; and
7. Streams that maintain a natural flow pattern including periodic flooding.

The FWS is currently in the process of forming a recovery team for Gila chub to develop and implement a recovery plan for the species. Until the recovery plan is completed, there is limited information with which to evaluate the ability of CH to meet the recovery needs of the species, or how an action may alter the ability of CH to meet recovery needs. In lieu of a recovery plan, assessing the functionality of each of the PCEs of a given reach of CH, and how an action might affect the PCEs of that reach, can provide some insight into the effects of an action on the functionality of CH in terms of recovery.

Reasons for Listing

The Gila chub was listed as endangered with CH on November 2, 2005 (FWS 2005a). The listing stated that the species has been reduced in numbers and distribution in the majority of its historical range (Minckley 1973, Weedman et al 1996). Where it is still present, populations are often small, scattered, and at risk from known and potential threats and from random events.

Threats

Decline of Gila chub is primarily due to habitat loss from various land-use practices and predation and competition from nonnative fish species, and the highly fragmented and disconnected nature of the remaining Gila chub populations increases their vulnerability to these threats (FWS 2005a). Land uses that have caused past habitat loss and continue to threaten Gila chub habitat include hydrologic modification of rivers, springs, and cienegas for human uses (groundwater pumping, dewatering, diversion of water channels, impoundments, and flow regulation), poorly managed livestock grazing, logging and fuel wood cutting, road construction and use, recreation, mining, and urban and agricultural development (FWS 2005a). All of these

activities have promoted erosion and arroyo formation and the introduction of predaceous and competing nonnative fish species (Miller 1961, Minckley 1985), and at least one or some combination of these activities is occurring in all of the remaining populations. Wildfires and wildfire suppression activities also pose a threat to the remaining populations by causing water quality changes that can kill fish, (Rinne 2004, FWS 2005a, Rhodes 2007), negatively altering food base for fishes (Earl and Blinn 2003), and resulting in stream and riparian vegetation alteration that negatively affects fish habitat (FWS 2005a).

Perhaps the most serious threat to Gila chub is predation by and competition with nonnative organisms, including numerous nonnative fish species, bullfrogs (*Lithobates catesbeiana*), and virile crayfish (*Orconectes virilis*). The impacts of nonnative fish species on native fish including Gila chub have been well documented (Hubbs 1955, Miller 1961, Minckley and Deacon 1968, Minckley 1973, Meffe 1985, Minckley 1985, Williams and Sada 1985, Moyle et al. 1986, Minckley and Deacon 1991, Ruppert et al. 1993, Clarkson et al. 2005). Dudley and Matter (2000) correlated green sunfish presence with Gila chub decline, documented green sunfish predation on Gila chub, and found that even small green sunfish readily consume young-of-year Gila chub. Dudley (1995) found that green sunfish appeared to displace both subadult and adult Gila chub from preferred habitats, found that Gila chub utilized similar habitat types to green sunfish indicating competition for food and space was likely occurring, and concluded that predation by and competition with green sunfish virtually eliminated small chub from where the two species cooccurred, indicating recruitment failure. Unmack et al. (2003) similarly found that green sunfish presence was correlated with the absence of young-of-year Gila chub in Silver Creek, Arizona. Nonnative fish parasites, such as Asian tapeworm (*Bothriocephalus acheilognathi*) also may be a threat to Gila chub (FWS 2005a).

The U.S. Census predicts that Arizona will be the second fastest growing state in the country through 2030, adding an additional 5.6 million people (U.S. Census 2005). During the 2010 Census, Arizona maintained its standing as the second fastest population growth rate by growing more than 20 percent between 2000 and 2010 (Pollard and Mather 2010). If these predictions hold true, already severe threats to Gila chub and its habitat will worsen, primarily due to increased human demand for surface and ground water and decreased supply. Water demands continue to increase as the population increases. The agriculture population is also increasing and agriculture is Arizona's largest water demand. Most of Arizona's developed areas groundwater is pumped out faster than the aquifer can recharge, becoming more dependent on freshwater sources from nearby rivers (U.S. Environmental Protection Agency 2011).

Climate Change

General climate change effects on federally listed species are described earlier. Here we describe factors that might affect the Gila chub.

Several climate-related trends have been detected since the 1970s in the southwestern U.S. including increases in surface temperatures, rainfall intensity, drought, heat waves, extreme high temperatures, average low temperatures (Overpeck 2008). Annual precipitation amounts in the southwestern U.S. may decrease by 10 percent by the year 2100 (Overpeck 2008).

Current predictions of drought and/or higher winter low temperatures may also stress ponderosa pine forests in which Gila chub occurs. Ganey and Vojta (2010) studied tree mortality in mixed conifer and ponderosa pine forests in Arizona from 1997 to 2007, a period of extreme drought. They found the mortality of trees to be severe; the number of trees dying over a five-year period increased by over 200 percent in mixed-conifer forest and by 74 percent in ponderosa pine forest during this time frame (Ganey and Vojta 2010). Ganey and Vojta (2010) attributed drought and subsequent insect (bark beetle) infestation for the die-offs in trees.

Drought stress and a subsequent high degree of tree mortality from bark beetles make high-elevation forests more susceptible to unnaturally intense wildfires. Climate is a top-down factor which synchronizes with fuel loads which is a bottom-up factor; combined, these factors correlate to supporting larger, more frequent, and more severe wildfires in the southwestern U.S., influenced by a predicted reduction in snowpack and an earlier snowmelt (Fulé 2010). Wildfires are expected to reduce vegetative cover and result in greater soil erosion from increased droplet splash-erosion and reduced infiltration capacity, subsequently resulting in increased sediment flows in streams (Fulé 2010).

Overall, the populations of Gila chub rangewide (Arizona and New Mexico) currently appear to be stable. The current distribution Gila chub populations remain extant to the Agua Fria, Blue, Gila, San Francisco, Santa Cruz and Verde Rivers. These populations are spread across the drainages, and most are isolated from other populations.

ENVIRONMENTAL BASELINE

Under section 7(a)(2) of the ESA, when considering the effects of the action on federally listed species, we are required to take into consideration the environmental baseline. Regulations implementing the ESA (50 CFR 402.02) define the environmental baseline as the past and present impacts of all Federal, State, or private actions and other human activities in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone section 7 consultation, and the impacts of State and private actions that are contemporaneous with the consultation in progress. 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. We have defined the action area for the LRMP as the Apache-Sitgreaves NFs. The Apache-Sitgreaves NFs has a land base of approximately 2.63 million acres (1.06 million ha).

Status of the species within the action area

It must be noted that the Gila chub is a secretive species (Rinne and Minckley 1991). Most of the known recent and historical locations described above and in the final rule continue to lack extensive surveys, at least since the comprehensive status review by Weedman et al. (1996). The Gila chub may thus persist in some of the locations now considered extirpated, and may occur in localities as yet undiscovered. Although Gila chub have not been found in some of the localities listed in the Final Rule in recent years, these streams may still be occupied.

The Gila chub is currently restricted to small isolated populations scattered throughout its historical range. Approximately half of all known Gila chub occupied habitat occurs on NFS

lands. Most populations on NFS lands are considered to be small, isolated, and threatened. Specifically, on the Apache-Sitgreaves NFs in Arizona, there are three extant populations: Harden Cienega, Dix Creek, and Eagle. In 2005, both Dix Creek and Harden Cienega populations were considered stable-threatened and Eagle Creek was considered unstable-threatened (FWS 2005a).

Biological Opinions that have been issued to the Apache-Sitgreaves NFs since the 2005 BO/CO include the BOs on the Chitty Creek Restoration Project, The Wildbunch Allotment Management Plan, and the Suppression and Emergency Stabilization Activities Associated with the Chitty Wildfire.

Critical Habitat

There is only one designated CH area on the Apache-Sitgreaves. This is Area 1, which is the Upper Gila River, Grant County, New Mexico, and Greenlee County, Arizona, includes Turkey Creek (New Mexico), Eagle Creek, Harden Cienega Creek, and Dix Creek. The following creeks: Harden Cienega, Dix Creek, and Eagle Creek are within designated CH on the Apache-Sitgreaves NFs.

The Apache-Sitgreaves is comprised of 50.5 km (31.4 mi) of designated CH on the Apache-Sitgreaves NFs. Since our issuance of the 2005 LRMP BO/CO, the 2011 Wallow occurred, within the Eagle/East Eagle Creek watershed (57,839 acres [23,407 ha]); 2 percent (958 acres [388 ha]) was high burn severity, 2 percent (967 acres [391 ha]) was moderate, 8 percent (4,398 acres [1,780 ha]) was low, 12 percent (6,961 acres [2,817 ha]) was unburned, and 77 percent (44,544 acres [18,026 ha]) was outside the burn perimeter. No direct impacts could occur to the Gila chub or its designated CH, since the majority of the burn occurred outside both occupied and designated CH.

Factors affecting the species environment within the action area

On the Apache-Sitgreaves NFs, past and present federal, state, private, and other human activities that may affect Gila chub and their habitat include livestock grazing, wildfires and any other habitat alterations. We describe activities that have occurred within the Apache-Sitgreaves NFs to qualify the environmental baseline.

Livestock grazing

Improper livestock grazing has been shown to increase soil compaction, decrease water infiltration rates, increase runoff, change vegetative species composition, decrease riparian vegetation, increase stream sedimentation, increase stream water temperature, decrease fish populations and change channel form (Meehan and Platts 1978, Kauffman and Kruger 1984, Schulz and Leininger 1990, Platts 1991, Fleischner 1994, Ohmart 1996). Although direct impacts to the riparian zone and stream can be the most obvious adverse effects of livestock grazing, upland watershed condition is also important because of changes in soil compaction, percent cover, and vegetative type can influence the timing and amount of water delivered to stream channels (Platts 1991). These changes, increased soil compaction, decreased vegetative cover, and a decrease in grasslands, lead to faster water delivery to stream channels that increases peak flows and lowers fall base flow (Platts 1991, Ohmart 1996, Belsky and

Blumenthal 1997). As a consequence, streams are more likely to experience flood events that negatively affect the aquatic and riparian habitats. As a result, they are more likely to become intermittent or dry in the fall (groundwater recharge is less when water runs off quickly) (Platts 1991, Ohmart 1996).

Although improper livestock grazing has resulted in the legacy effects explained above, currently the emphasis of the range management program on the Forest is to improve watershed condition and wildlife habitat. Authorized livestock grazing on the Apache-Sitgreaves NFs is active in both occupied and designated CH within the following watersheds: Harden Cienega Creek, Dix Creek, Dry Prong Creek, East Eagle Creek, West Prong Creek, Middle Prong Creek and Mud Springs Canyon-Eagle Creek. However, many of the riparian areas within Gila chub habitat have been removed from livestock grazing on USFS lands through grazing decisions.

Fire

High-severity wildfires and subsequent floods and ash flows caused the extirpation of seven populations of Gila trout since 1989 including in: Main Diamond Creek (1989), South Diamond Creek (1995), Burnt Canyon (1995), Trail Canyon (1996), Woodrow Canyon (1996), Sacaton Creek (1996), and Upper Little Creek (2003) (Propst et al. 1992, Brown et al. 2001, FWS 2002). In June 2007, the upper portion of the East Eagle Creek was within the Chitty Fire which burned approximately 15,036 acres (6,084 ha). Then in 2011, Arizona experienced the largest wildfire the state has ever seen burning 538,049 acres (217,740 ha). According to the burn severity maps, upstream of both Eagle and East Creek burned from low to high. The Wallow Fire most likely stopped upstream of this area as a result of fuel being removed during the Chitty Fire. The severity percentage of areas burned within the Eagle/East Eagle Creek watershed (57,839 acres [23,407 ha]) is as follows: 2 percent (958 acres [388 ha]) was high burn severity, 2 percent (967 acres [391 ha]) was moderate, 8 percent (4,398 acres [1,780 ha]) was low, 12 percent (6,961 acres [2,817 ha]) was unburned, and 77 percent (44,544 acres [18,026 ha]) was outside the burn perimeter.

Because Gila chub are now found primarily in isolated, small streams, avoidance of ash flows may be impossible and opportunities for natural recolonization usually do not exist, as documented for Gila trout (Brown et al. 2001). Persistence of Gila chub in streams affected by fire and subsequent ash flows depend on management actions. In some instances, evacuation of Gila chub from streams in watersheds that have burned is deemed necessary and actions are taken, and in other cases populations are lost and must be replaced through stocking.

Nonnative species

Perhaps the most serious threat to Gila chub is predation by and competition with nonnative organisms, including numerous nonnative fish species, bullfrogs, and virile crayfish. The impacts of nonnative fish species on native fish including Gila chub have been well documented (Hubbs 1955, Miller 1961, Minckley and Deacon 1968, Minckley 1973, Meffe 1985, Minckley 1985, Moyle 1986, Williams and Sada 1985, Minckley and Deacon 1991, Ruppert et al. 1993, Clarkson et al. 2005).

Nonnative fish found in Gila chub habitat include channel catfish (*Ictalurus punctatus*), flathead catfish (*Pylodictis olivaris*), red shiner (*Cyprinella lutrensis*), fathead minnow (*Pimephales promelas*), green sunfish (*Lepomis cyanellus*), western mosquitofish (*Gambusia affinis*), rainbow trout (*Oncorhynchus mykiss*), common carp (*Cyprinus carpio*) and crayfish (*Orconectes virilus*) (Marsh et al. 1991, Weedman et al. 1996).

Climate change

General climate change effects are described earlier. Below, we describe factors that might affect Gila chub and their habitat:

1. increased water temperature;
2. decreased streamflow;
3. a change in the hydrograph; and
4. an increased occurrence of extreme events (fire, drought, and floods).

Increased water temperature

Kundzewicz et al. (2007) state that of all ecosystems, freshwater ecosystems will have the highest proportion of species threatened with extinction due to climate change (Kundzewicz et al. 2007). Species with narrow temperature tolerances will likely experience the greatest effects from climate change and it is anticipated that populations located at the margins of species hydrologic and geographic distributions will be affected first (Meisner 1990). High temperatures suppress appetite and growth, foster disease, can influence behavioral interactions with other fish (Schrank et al. 2003), or be lethal (McCullough 1999). The temperature preferences and tolerances of Gila chub is less than 98.6 °F (37.0 °C). However, increased stress from elevated temperatures could lead to greater susceptibility to disease and reduced reproductive success.

Decreased streamflow

Current models suggest a decrease in precipitation in the Southwest (Kundzewicz et al. 2007, Seager et al. 2007) which would lead to reduced streamflows and a reduced amount of habitat for Gila chub. Streamflow is predicted to decrease in the Southwest even if precipitation were to increase moderately (Nash and Gleick 1993, State of New Mexico 2005, Hoerling and Eischeid 2007). Winter and spring warming causes an increased fraction of precipitation to fall as rain, resulting in a reduced snow pack, an earlier snowmelt, and decreased summer base flow (Christensen et al. 2004, Stewart et al. 2005, Regonda et al. 2005). Earlier snowmelt and warmer air temperatures can lead to a longer dry season. Warmer air temperatures lead to increased evaporation, increased evapotranspiration, and decreased soil moisture. These three factors would lead to decreased streamflow even if precipitation increased moderately.

The effect of decreased streamflow is that streams become smaller, intermittent or dry, and thereby reduce the amount of habitat available for aquatic species. A smaller stream is affected more by air temperature than a larger one, exacerbating the effects of warm and cold air temperatures (Smith and Lavis 1975). In addition, fish isolated in pools may be subject to increased predation from terrestrial predators.

Change in the hydrograph

Another documented effect of climate change is a shift of the timing of spring snowmelt. Stewart et al. (2005) show that timing of spring streamflow in the western U.S. during the last 5 decades has shifted so that the major peak now arrives 1 to 4 weeks earlier, resulting in less flow in the spring and summer. They conclude that almost everywhere in North America, a 10 to 50 percent decrease in spring-summer streamflow fractions will accentuate the seasonal summer dry period with important consequences for warm-season water supplies, ecosystems, and wildfire risks (Stewart et al. 2005). Rauscher et al. (2008) suggest that with air temperature increases from 37 to 41 °F (3 to 5 °C), snowmelt driven runoff in the western U.S. could occur as much as 2 months earlier than present. Changes in the hydrograph could potentially alter native fish assemblages. Variability in the hydrographs and greater flow volume has been shown to sustain native fishes (e.g., as seen for spikedeace and loach minnow) over nonnatives between periodic flood events (Rinne and Miller 2006).

Increased occurrence in extreme events

Extreme events such as drought, fires, and floods are predicted to occur more frequently because of climate change (IPCC 2007). It is anticipated that an increase in extreme events will most likely affect populations living at the edge of their physiological tolerances. The predicted increases in extreme temperature and precipitation events may lead to dramatic changes in the distribution of species or to their extirpation or extinction (Parmesan and Matthews 2006).

Drought

The Southwest U.S. is currently experiencing drought conditions (University of Nebraska-Lincoln 2010). Portions of New Mexico are also considered abnormally dry, but not in areas currently occupied by Gila chub (University of Nebraska-Lincoln 2010). Although Gila chub evolved in the Southwest and have survived drought in the past, it is anticipated that a prolonged, intense drought would affect many populations, in particular those occupying small headwater streams which are likely to dry or become intermittent. Gila chub populations are protected from downstream populations of nonnative trout by barriers. In addition with streams drying there is a clear association between severe droughts and large fires in the Southwest (Swetnam and Baisan 1996) that can harm fish.

Fire

Since the mid-1980s, wildfire frequency in western forests has nearly quadrupled compared to the average of the period 1970 to 1986. The total area burned is more than six and a half times the previous level (Westerling et al. 2006). In addition, the average length of the fire season during 1987 to 2003 was 78 days longer compared to 1970 to 1986 and the average time between fire discovery and control increased from about 8 to 37 days for the same time frames (Westerling et al. 2006). McKenzie et al. (2004) suggest, based on models, that the length of the fire season will likely increase and fires in the western U.S. will be more frequent and severe. In particular, they found that fire in New Mexico appears to be acutely sensitive to summer climate and temperature changes and may respond dramatically to climate warming (McKenzie et al. 2004).

Severe wildfires capable of extirpating or decimating fish populations are a relatively recent phenomena and result from the cumulative effects of historical or ongoing grazing, which removes the fine fuels needed to carry fire, and fire suppression (Madany and West 1983, Savage and Swetnam 1990, Swetnam 1990, Touchan et al. 1995, Swetnam and Baisan 1996, Belsky and Blumenthal 1997, Gresswell 1999). Historical wildfires were primarily cool-burning understory fires with return intervals of 3 to 7 years in ponderosa pine (Swetnam and Dieterich 1985). Cooper (1960) concluded that prior to the 1950s; crown fires were extremely rare or nonexistent in the region.

Effects of fire may be direct and immediate or indirect and sustained over time (Gresswell 1999). The cause of direct fire-related fish mortalities has not been clearly established. Fatalities are most likely during intense fires in small, headwater streams with low flows (less insulation and less water for dilution) (Gresswell 1999). In these situations, water temperatures can become elevated or changes in pH may cause immediate death (Cushing and Olson 1963). Spencer and Hauer (1991) documented 40-fold increases in ammonium concentrations during an intense fire in Montana. The inadvertent dropping of fire retardant in streams is another source of direct mortality during fires.

Indirect effects of fire include ash and debris flows, increases in water temperature, increased nutrient inputs, and sedimentation (Swanston 1991, Bozek and Young 1994, Gresswell 1999). Ash and debris flows can cause mortality months after fires occur when barren soils are eroded during monsoonal rain storms (Bozek and Young 1994, Brown et al. 2001). Fish can suffocate when their gills are coated with fine particulate matter, they can be physically injured by rocks and debris, or they can be displaced downstream below impassable barriers into habitat occupied by nonnative fish. Ash and debris flows or severe flash flooding can also decimate aquatic invertebrate populations that fish may depend on for food (Molles 1985, Rinne 1996, Lytle 2000). In larger streams, refugia are typically available where fish can withstand the short-term adverse conditions; small headwater streams are usually more confined, concentrating the force of water and debris (Pearsons et al. 1992, Brown et al. 2001).

Floods

Floods that occur after intense wildfires that have denuded the watershed are also a threat. As described above, several streams occupied by Gila trout have had populations extirpated as a result of ash flows from floods after fire (Rinne 1996, Brown et al. 2001). Consequently, an increase in rain or snow events, intense precipitation that is unseasonable or heavy precipitation that occurs after fire, could extirpate affected Gila chub.

The conjunction of climate change with ongoing habitat loss and alteration; and nonnative species competition has caused a general loss of resiliency in the ecosystem that has serious consequences for Gila chub.

EFFECTS OF THE ACTION

The S&Gs listed in the proposed Apache-Sitgreaves NFs LRMP and the 1996 Regional Amendment provide direction for the development of site-specific actions. The Gila chub designated CH and occupied sites are within MAs: 01, 02, 03, 08, and 12. Multiple S&Gs within the Apache-Sitgreaves NFs LRMP are applicable to the Gila chub 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 to each species (lethal, sublethal, etc.) expected to result from the S&Gs. Because there have been no changes in NF 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.

In the previous 2005 BO/CO (FWS 2005), we indicated that there were three S&Gs (97, 114, and 116) that have the potential for adverse effects to the Gila chub within the Apache-Sitgreaves LRMP, but during this current analysis we identified that none of the S&Gs had the potential to have a lethal effects to the Gila chub. After reevaluating the S&Gs it was determined that S&Gs 97 and 116 may result in sublethal effects to the species because it is highly unlikely that direct mortality would occur for these S&Gs within occupied habitat on the NF (see explanation below). In addition, S&G 114 (within the Fish, Wildlife, and Rare Plants Program), guides the NF to manage for at least 60 percent of habitat capability for Apache trout, rainbow trout, brook trout, brown trout, loach minnow, and Gila chub. There are also six S&Gs (63, 97, 115, 116, 117, and 123) that have the potential for sublethal effects on Gila chub and two S&Gs (39 and 64) were found to have a negative behavioral response that are within the Engineering, Forest Health, and Fish and Wildlife and Rare Plant Programs.

S&Gs 63 and 97 state that the total road density should average 3.5 mi/mi^2 (2.2 km/km^2) or less, while open road densities should average 2.0 mi/mi^2 (1.2 km/km^2) or less. Road density is used by FWS and NOAA Fisheries as one way to measure watershed condition as it relates to resident fish in the Pacific Northwest. The joint agencies recommendation is that a given watershed should have less than 2.5 mi/mi^2 (1.6 km/km^2) of road system; if in excess, the watershed may not be properly functioning. As stated in the Travel Management Plan BA, for Gila chub there are currently 81.4 miles of open routes for a current open road density of 0.6 miles/square mile; and there are 26.9 miles of closed routes, for a current closed road density of 0.2 miles/square mile.

S&Gs 115 to 117, and 123 all provide beneficial guidance for management of the riparian resources in the action area. However, all of these S&Gs could result in riparian habitat being maintained at less than optimal conditions. For example, if 80 percent of the streambank linear distance is maintained in stable condition, then the assumption is that 20 percent of the streambank is at less than stable conditions. If this were the case, degraded streambank conditions could expand downstream until the majority of the streambank is unstable. This could result in the streambank collapsing into the stream, 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, temporary displacement, and possibly injury. Collectively, the total amount of habitat being managed outweighs the amount that is not being managed.

However, we still assume that implementation of these S&Gs could have adverse effects in waters containing endangered species.

Standard & Guideline 39 states that within each diversity unit maintain or achieve at least 40 percent of the potential habitat capability for the management indicator species selected for each vegetation type. Standard & Guideline 64 allows the NF to remove infected overstories (i.e., infected with dwarf mistletoe) and to thin understories to densities which will maximize fiber production over the length of the rotation, using yield simulation models as guides. This S&G allows for control of mistletoe by clear cutting (in conformance with Regional Standards for clear cut size) and regenerating artificially when yield simulation models indicate that stands will not reach maturity because of dwarf mistletoe (USFS 2004). Both S&Gs could cause a negative behavioral response to the species such as displacement because habitat conditions may not be sufficient for this species.

The majority of the S&Gs maintain habitat and provide for recovery of this species. Additionally, there are several S&Gs that are beneficial in the long-term but have some short-term adverse effects, as discussed in the 2005 BO/CO.

1996 Regional Amendment

The management direction provided by the 1996 Regional Amendment S&Gs was related to the conservation of MSOs and northern goshawks. The S&Gs promote healthy forest ecosystems; functioning watersheds; and healthy riparian and aquatic systems (USFS 2004). There are no lethal or sublethal effects to the Gila chub as a result of the implementation of the 1996 Regional Amendment. Yet, some S&Gs may have short-term adverse effects on the species; these S&Gs are described below.

S&G 1432 allows no timber harvest except for fire risk abatement in mixed conifer and pine-oak forests on slopes greater than 40 percent where timber harvest has not occurred in the last 20 years. S&G 1445 allows treatment of fuel accumulations to abate fire risk. S&G 1455 directs the Forests to use combinations of thinning trees less than 9 in (23 cm) in diameter, mechanical fuel removal, and prescribed fire. S&G 1458 allows prescribed fire where appropriate within Reserved Lands (wilderness, research natural areas, wild and scenic rivers, and congressionally recognized wilderness study areas). S&G 1468 encourages prescribed and prescribed natural fire to reduce hazardous fuel accumulation. Thinning from below may be desirable or necessary before burning to reduce ladder fuels and the risk of crown fire. S&G 1476 directs the NF to apply ecosystem approaches to manage for landscape diversity mimicking natural disturbance patterns, incorporating natural variation in stand conditions and retaining special features such as snags and large trees, utilizing appropriate fires, and retention of existing old growth in accordance with the NF plan old growth S&Gs.

Each of the aforementioned S&Gs permits short-term adverse effects on forested environments in order to secure long-term stability and create conditions more desirable for the northern goshawk and MSO. The range of the Gila chub is generally situated downstream of much of the habitat occupied by (or suitable for) these raptors and thus, the fish can be expected to experience indirect, short-term adverse effects in exchange for long term habitat stability or improvement.

S&G 1508 allows for low intensity ground fires at any time in all forested cover types, but high intensity crown fires are not acceptable in the post-fledgling family area or nest areas. This S&G directs the NF to avoid burning the entire home range of a goshawk pair in a single year. For fires planned in the occupied nest area, a fire management plan should be prepared. The fire management plan should minimize the risk of goshawk abandonment while low intensity ground fire burns in the nesting area. Prescribed fire within nesting areas should be planned to move with prevailing winds away from the nest tree to minimize smoke and risk of crown fire developing and driving the adults off or consuming the nest tree. Although, protecting one species could possibly impact another like Gila chub, directing a prescribe fire towards occupied or potential Gila chub habitat. As stated the climate change section for Gila chub, both direct and indirect fire are ongoing threats for many fish species.

Collectively, implementation of the MSO and northern goshawk guidelines may affect the following Gila chub CH PCEs: 1) by reducing the availability of perennial pools; areas of higher velocity between pool areas; and areas of shallow water among plants or eddies by increasing sedimentation into pool habitat; 2) by opening up the overstory resulting in increased water temperatures; 3) by increasing sedimentation resulting in contamination of water quality; 4) by reducing the food base including invertebrates; filamentous algae; and insects; 5) by reducing sufficient hiding and spawning cover consisting of downed logs in the water channel; submerged large tree root wads; undercut banks with sufficient overhanging vegetation; and large rocks and boulders with overhangs; and 6) by altering a streams natural unregulated flow pattern including periodic natural flooding, which can prolong recovery efforts, but we anticipate these affects to be short term.

Standards & Guidelines 1432, 1445, 1455, 1458, 1468, 1476 and 1508 are all related to the fuels treatment for fire risk abatement. As discussed previously, there are potential short-term effects from fuels treatments; however, the beneficial effect of reduced catastrophic fire risk far outweighs those short-term adverse 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.

Activities on residential and commercial inholdings within watersheds containing Gila chub can adversely affect the species through poor land management practices and water withdrawal. These effects have not been quantified within the action area.

CONCLUSION

After reviewing the current status of the Gila chub, 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 Gila chub or

its recovery. 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.

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. CH is defined in section 3 of the ESA “as the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the ESA, on which are found those PBFs 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” (FWS and National Marine Fisheries Service 1998).

Effects to the Gila chub from the Apache-Sitgreaves NFs LRMP and the 1996 Regional Amendment were analyzed in the 2005 BO/CO. Potential adverse effects from the implementation of the LRMP and associated S&Gs were found likely to occur on the Apache-Sitgreaves NFs. 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 rise to the level of jeopardy for the species. The FWS bases this conclusion on the following reasons:

- There are several S&Gs within the Apache-Sitgreaves NFs LRMP that support conservation and recovery of Gila chub. These are S&Gs 1 and 4 within the Apache-Sitgreaves NFs LRMP that state that management of sensitive species will take precedence over other species except threatened and endangered. All of these S&Gs guide the NFs to implement recovery plans, improve habitat for T&E by structural and nonstructural means, and to delist T&E.

Due to the fact that the Gila chub is a hard-to-find, secretive species and because there have been no extensive survey efforts for this species since the comprehensive status review by Weedman et al. (1996), it is possible that Gila chub 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 those actions contribute positively to the overall status of the Gila chub. In addition, there are activities being conducted by other land management agencies to enhance habitat for the chub that benefit its status rangewide. All these actions together with the implementation of the beneficial S&Gs outlined above should continue to improve habitat conditions and increase populations of Gila chub on NFS lands in the Southwest. For these

reasons, we conclude that the proposed action on the Apache-Sitgreaves NFs will not jeopardize the continued existence of Gila chub.

Based on 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, Gila chub designated CH will remain functional to serve its intended conservation role for the species. Therefore, we conclude that the proposed action will not destroy or adversely modify Gila chub designated CH.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulations pursuant to section 4(d) of the ESA prohibit the incidental take of endangered and threatened species, respectively, without special exemption. "Incidental take" is defined in section 3 of the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. "Harm" is defined at 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 at 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 incidental take that is incidental to, and not the purpose of, the carrying out of an otherwise lawful activity (50 CFR 402.02). 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.

Amount or Extent of Take Anticipated

Incidental take of the Gila chub is reasonably certain to occur as a result of the continued implementation of the Apache-Sitgreaves NFs LRMP, as well as the 1996 Regional Amendment. On the Apache-Sitgreaves NFs, incidental take is expected to be in the forms of harm, harassment, and mortality to the species from LRMP implementation.

The FWS anticipates, however, that the aforementioned incidental take 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. Therefore, it is not possible to provide precise numbers of Gila chub that will be harassed, harmed, or killed as a result of the proposed action. For purposes of this BO/CO, we define incidental take in terms of the number of extant populations. The extant populations of Gila chub within the Apache-Sitgreaves NFs are Harden Cienega, Dix Creek, and Eagle Creek. The FWS concludes that incidental take of Gila chub will be considered to be exceeded if, during a period of 3 consecutive years, any currently extant population of Gila chub is lost (e.g., absent) as a result of the proposed action.

Effect of the Take

In the accompanying BO/CO, the FWS determined that this level of anticipated incidental take will not result in jeopardy to the Gila chub.

REASONABLE AND PRUDENT MEASURES

The FWS believes the following reasonable and prudent measure is necessary and appropriate to minimize incidental take of Gila chub:

1. Minimize or eliminate adverse effects to Gila chub on the Apache-Sitgreaves NFs due to LRMP activities.
2. Minimize or eliminate adverse effects to Gila chub habitat on the Apache-Sitgreaves NFs due to implementation of the LRMP.
3. Monitor the impacts of implementing the proposed action on Gila chub and its habitat and report the findings to the FWS.

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 nondiscretionary.

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

- 1.1 Manage riparian areas adjacent to and upstream of Gila chub populations for conditions to minimize direct and indirect effects to Gila chub and its habitat.
- 1.2 Develop and implement projects within the Apache-Sitgreaves NFs with the goal to minimize or eliminate adverse effects to Gila chub.

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

- 2.1 Develop and implement projects (i.e., watershed or riparian restoration) in occupied Gila chub habitat with the goal of minimizing or eliminating adverse effects to Gila chub habitat.

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

- 3.1 The Apache- Sitgreaves NFs 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 Gila chub 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.

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 USFS 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. Continue to identify factors that limit the recovery of the Gila chub on NFs lands and work to correct them.
2. Acquire instream flow water rights to ensure perennial flow in streams with Gila chub.
3. Work with the FWS and AGFD to remove nonnative species and reestablish Gila chub throughout its historical range in and Arizona.
4. Continue fish surveys to determine to what extent other chub occur within the Apache-Sitgreaves NFs.
5. Work cooperatively with the FWS, BLM, NMDGF, and AGFD to establish refugia populations of Gila chub wherever possible.

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.

LITTLE COLORADO SPINEDACE

STATUS OF THE SPECIES AND CRITICAL HABITAT

The Little Colorado spinedace (*Lepidomeda vittata*) was listed as threatened with CH on October 16, 1987 (FWS 1987). Threats were identified as habitat alteration and destruction, predation by and competition with nonnative aquatic organisms, and recreational fishery management. Forty-four stream miles of CH were designated: 18 miles of East Clear Creek immediately upstream and 13 miles downstream from C.C. Cragin Reservoir (formerly called Blue Ridge Reservoir) in Coconino County; eight miles of Chevelon Creek in Navajo County; and five miles of Nutrioso Creek in Apache County. Primary biological factors of CH consist of clean, permanent flowing water with pools and a fine gravel or silt-mud substrate.

The spinedace is a small (about 4 inch) minnow native to the Little Colorado River drainage. This fish occurs in disjunct populations throughout much of the Little Colorado River drainage in Apache, Coconino, and Navajo counties. Extensive collections summarized by Miller (1963) indicated that the spinedace had been extirpated from much of the historical range from 1939 to 1960. Although few collections were made of the species prior to 1939, the species is believed to have inhabited the northward flowing Little Colorado River tributaries of the Mogollon Rim, including the northern slopes of the White Mountains.

Food habits of spinedace include chironomid and other dipteran larvae, filamentous green algae, and crustaceans (Runck and Blinn 1993, Blinn and Runck 1990). Spinedace are late-spring to early-summer spawners (Blinn and Runck 1990, Miller 1961, Minckley 1973, Minckley and Carufel 1967) although some females have been found to contain mature eggs as late as October (Minckley and Carufel 1967). A complete discussion of the taxonomic, distributional, and life history information is compiled in the Little Colorado Spinedace Recovery Plan (FWS 1998), and is included herein by reference.

Mitochondrial DNA work on the spinedace was initiated in the 1990s and indicated the existence of three sub-groups identifiable by geographic area (Tibbets *et al.* 1994): the East Clear Creek drainage, Chevelon Creek, and the upper Little Colorado River including Nutrioso and Rudd creeks. The study concluded that the genetic patterns seen were likely the result of populations isolated and differentiated by both natural and human-caused events. The East Clear Creek and Chevelon Creek sub-groups are more individually distinctive, likely the result of a higher degree of isolation, and possess unique haplotypes. Individuals from the upper Little Colorado sub-group are more similar to each other. Possibly, until recent time, there was one population with considerable gene flow until various dams and diversions increased local isolation. The cause and exact time of the isolation of the three sub-groups are not known, but Tibbets *et al.* (1994) recommend that all of these populations be maintained to conserve genetic variation in this species.

As would be expected for a species adapted to fluctuating physical conditions, the spinedace is found in a variety of habitats (Blinn and Runck 1990, Miller 1963, Miller and Hubbs 1960, Nisselson and Blinn 1989). It is unclear whether occupancy of these habitats reflects the local preferences of the species or its ability to tolerate less-than-optimal conditions. Available

information indicates that suitable habitat for the Little Colorado spinedace is characterized by clear, flowing pools with slow to moderate currents, moderate depths, and gravel substrates (Miller 1963, Minckley and Carufel 1967). Cover provided by undercut banks or large rocks is often a feature. Spinedace have also been found in pools and flowing water conditions over a variety of substrates, with or without aquatic vegetation, in turbid and clear water (Denova and Abarca 1992, Nisselson and Blinn 1991). Water temperatures in occupied habitats ranged from 58 to 78 ° F (Miller 1963). Miller (1963) called the spinedace “trout like” in behavior and habitat requirements, and it is likely that prior to 1900 the spinedace used habitats now dominated by nonnative salmonids.

As with most aquatic habitats in the Southwest, the Little Colorado River basin contains a variety of aquatic habitat types and is prone to rather severe seasonal and yearly fluctuations in water quality and quantity. Both mountain streams and lower-gradient streams and rivers have provided habitat for the spinedace. Residual pools and spring areas are important refuges during periods of normal low water or drought. From these refuges, spinedace are able to recolonize other stream reaches during wetter periods. This ability to quickly colonize an area has been noted in the literature (Minckley and Carufel 1967), as well as in observations by others familiar with the species. Populations seem to appear and disappear over short time frames and this has made specific determinations on status and exact location of populations difficult. This tendency has been observed by both researchers and land managers (Miller 1963, Minckley 1965, Minckley 1973) and has led to concerns for the species’ survival.

Native fishes associated with spinedace include speckled dace (*Rhinichthys osculus*), bluehead sucker (*Pantosteus discobolus*), Little Colorado sucker (*Catostomus* sp.), roundtail chub (*Gila robusta*), and Apache trout (*Oncorhynchus gilae apache*) (FWS 1998). The list of nonnative fishes is much larger and includes species with varying degrees of incompatibility with the spinedace’s long-term survival. The presence of nonnatives was one of the primary reasons the species was listed, and may contribute to the disjunct distribution patterns observed and the spinedace’s retreat to what may be suboptimal habitats. Nonnative fish may compete with, prey upon, harass, and alter habitat utilized by native fish. In the last 100 years, at least ten nonnative fish species have been introduced into spinedace habitats. These include rainbow trout (*Oncorhynchus mykiss*), fathead minnow (*Pimephales promelas*), and golden shiner (*Notemigonus crysoleucus*). Surveys in East Clear Creek have documented the presence of these three nonnative species and brown trout (*Salmo trutta*) in the watershed (Denova and Abarca 1992). Data from research experiments and field observations indicate that at least the rainbow trout is a predator and potential competitor with the spinedace (Blinn *et al.* 1993).

The spinedace is assumed to still occupy the streams it is known from historically (Chevelon, Silver, Nutrioso, East Clear Creek, and the Little Colorado River proper). Populations are generally small and the true population size for any occupied stream is unknown due to the yearly fluctuations and difficulty in locating fish. Spinedace have a tendency to disappear from sampling sites from one year to the next and may not be found for several years. This ephemeral nature makes management of the species difficult since responses of the population to changes within the watershed cannot be measured with certainty. However, all of the known populations have decreased since 1993 and drought conditions continue to put additional strain on all known populations.

The most recent survey and habitat data for each watershed are indicated below:

Chevelon Creek Watershed: Currently, the spinedace occupies a section of Chevelon Creek, several miles upstream of Chevelon Creek's confluence with the Little Colorado River on the privately owned Rock Art Ranch. Chevelon Creek through the Ranch supports robust populations of spinedace, where large schools of fish (40-50 individuals) can be seen swimming in pools downstream of The Steps (the name of the stream section on the Rock Art Ranch), something not seen in any other currently occupied area (Lopez *et al.* 1998).

On July 23, 2007, AGFD stocked 95 spinedace into five pools on West Chevelon Creek on the Apache-Sitgreaves NFs. This tributary to middle Chevelon Creek contains only native fish at this time and is expected to provide habitat for spinedace. In July 2008, surveys located spinedace within the perennial pools they were originally stocked and downstream of the area in ephemeral reaches. It is unclear how many fish are still present or if they spawned in 2008. Further surveys and stockings of this area are needed in order to ensure that spinedace persist in this Chevelon Creek tributary if it is to contribute to recovery.

There are nonnative species present throughout the occupied reach of Chevelon Creek, but green sunfish (*Lepomis cyanellus*) and crayfish, both predators of spinedace, were found to be uncommon in areas where spinedace numbers were highest (Lopez *et al.* 1998). However, AGFD has reported that largemouth bass (*Micropterus salmoides*) appear to be increasing in abundance above The Steps. At this time, the distribution and abundance of largemouth bass in this reach and how that may be impacting spinedace populations in the area is unknown. In addition, Willow Springs Lake, a reservoir located at the head of Chevelon Creek, contains a thriving population of smallmouth bass (*Micropterus dolomieu*). Though the smallmouth bass are currently located many miles upstream of known spinedace locations in Chevelon Creek, their occurrence and potential to move downstream are a threat to spinedace and other native fish in the drainage. The presence of these predatory, nonnative fishes may adversely impact the future abundance and persistence of spinedace in Chevelon Creek. In cooperation with AGFD, we plan to conduct surveys in Chevelon Creek in 2012.

East Clear Creek Watershed: Spinedace currently occupy small, perennial pool habitats in West Leonard Canyon, Leonard Canyon (including Dines Tank), Bear Canyon, Dane Canyon, and Yeager Canyon. The populations and available habitat are all relatively small throughout the watershed, but West Leonard and Leonard Canyons continue to be the most dependable locations to find spinedace in the entire watershed. The Bear, Dane, and Yeager Canyon populations are sustained by stocking spinedace from West Leonard Canyon and Dines Tank (Leonard Canyon) to these areas.

In October 2007, nonnative green sunfish (multiple size classes), largemouth bass, and yellow bullhead (*Ameiurus natalis*) were detected near the boat ramp and in the Bear Canyon arm of the C.C. Cragin (Blue Ridge) Reservoir. These nonnative species had not been located here prior to this time and if they were to access the above drainages, these predatory fishes could completely derail recovery efforts in the watershed. High-flow events during the winter 2007-2008 could have allowed these fish to spread up- and downstream of these locations. Surveys conducted to

date in 2010 have not located these nonnative fishes upstream of the reservoir; however, in spring 2010 and spring 2011, AGFD found green sunfish below the dam. Currently Bear Canyon is the only occupied habitat located upstream of C.C. Cragin Reservoir. Efforts will be made to stock spinedace in Miller and Kehl Canyons in 2012, which are also located upstream of the reservoir.

Little Colorado River (including Nutrioso Creek and Rudd Creek): Spinedace are documented in the Little Colorado River from Springerville downstream to St. Johns, Arizona (Dorum and Young 1995). Spinedace occur on both the AGFD Wenima and Becker Wildlife Areas within this reach of the Little Colorado River in small to moderate numbers. Survey efforts in July 2005 found 39 spinedace at Wenima and 92 spinedace at Becker Wildlife Area. Surveys conducted in 2008 by the AGFD and BLM also located spinedace above Lyman Lake in the Little Colorado River.

Spinedace have been located in middle Nutrioso Creek from the Apache-Sitgreaves Forest boundary upstream to Nelson Reservoir and from Nelson Reservoir upstream to Nutrioso, Arizona (Lopez *et al.* 2001a). Spinedace were first located in Rudd Creek in 1994 (Lopez *et al.* 2001b).

In the spring 2005, AGFD personnel surveyed several 328-foot transects in Rudd and Nutrioso Creeks. In Rudd Creek, only a single spinedace and a few speckled dace were captured. A total of 7 spinedace were captured upstream of Nelson Reservoir in Nutrioso Creek. No spinedace were found below the reservoir, but many fathead minnow and green sunfish were captured. Surveys conducted in April 2006 in Nutrioso Creek located 128 spinedace upstream of Nelson Reservoir. The largest concentration of spinedace was found on the EC Bar Ranch. No spinedace were located downstream of Nelson Reservoir (in Nutrioso Creek) or in Rudd Creek. However, in June 2006, AGFD located 415 spinedace in a drying pool in Nutrioso Creek that were moved into a more permanent pool on the EC Bar Ranch, and 74 spinedace in Rudd Creek. Surveys conducted in 2008 located spinedace above Nelson Reservoir, and above and below the gauging station on Nutrioso Creek. Spinedace were also located on lower Rudd Creek, below AGFD's property.

On June 18, 2011, in response to the Wallow Fire on the Apache-Sitgreaves NFs AGFD, FWS, and USFS personnel salvaged 185 Little Colorado spinedace from Rudd and Nutrioso Creeks. Upper Rudd and Nutrioso Creek watersheds burned severely and impacts to the stream from ash flows and post-fire flooding were expected, including a likely fish kill. AGFD and FWS translocated the spinedace to the spinedace refuge pond at AGFD's Grasslands Wildlife Area, near Greer, Arizona, the same day. We do not have current information regarding post-fire impacts to these watersheds, but it is likely that there has been mortality of fish and long-term impacts to stream habitat. We will conduct surveys with AGFD in 2012 to assess impacts to the spinedace and CH.

Silver Creek: As stated above, spinedace were thought to be extirpated from Silver Creek until a small number of fish were discovered in lower Silver Creek in July 1997 (Lopez *et al.* 1999). However, numerous surveys since then have failed to find spinedace, including an extensive survey in 2004 funded by a cooperative agreement with BLM (McKell and Lopez 2005). It is

believed that changes to the habitat since 1997 have likely increased habitat for nonnative fishes and negatively affected our ability to capture spinedace during surveys. If spinedace are still present in Silver Creek, it may be that they exist at such low numbers that our current sampling techniques are insufficient to detect them in this altered habitat.

In 1997, the habitat in Silver Creek consisted primarily of shallow riffle/run habitat with occasional relatively small pools. Starting in 1999 and continuing to the present, the same areas now consist of almost exclusively deep, wide pool habitat due to extensive beaver dams. In addition, the extensive pool habitat, which extends for miles, has created prime habitat for nonnative fish and crayfish. This change in habitat has made sampling the area extremely difficult. At this time, both the FWS and AGFD are hopeful that spinedace still exist in lower Silver Creek. However, the prognosis for spinedace recovery in Silver Creek is bleak at this time. The habitat is conducive to promoting nonnative fish and crayfish and there are fewer and fewer native fish found within Silver Creek.

In addition to the above in-stream populations of spinedace, there are currently two functioning refugial populations of spinedace. We have a refugial population of Little Colorado spinedace (>400 fish) at AGFD’s Grasslands Property and we have approximately 200 spinedace from East Clear Creek in captivity that we are caring for until construction of the refuge pond at AGFD’s Raymond Ranch can be completed (the expected date of completion is spring 2012). We currently do not have a refugial population for the Chevelon Creek genetic sub-group, although we expect to have a captive population established at Winslow High School for the Chevelon Creek genetic sub-group in late 2012. For many years we had a refugial population of East Clear Creek spinedace at the Flagstaff Arboretum, but this site is no longer functional.

Our information indicates 37 formal consultations have been completed or are underway for actions affecting Little Colorado spinedace rangewide (Table 3). Adverse effects to Little Colorado spinedace have occurred due to these projects and many of these consultations have required reasonable and prudent measures to minimize effects of incidental take the species. However, as is the case with many aquatic species, it is difficult, if not impossible, to quantify the actual incidental take of spinedace to date. The continued invasion of nonnative aquatic species into spinedace habitat and the on-going reductions in surface water (due to both drought and groundwater pumping) are two of the greatest threats to the species and are contributing factors to the spinedace’s overall decline.

Table 3: Formal consultations for actions affecting the Little Colorado spinedace on the Apache-Sitgreaves NFs.

	Consultation #	Date	Name	Anticipated Incidental Take
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20	02-21-05-F-0640	May 12, 2006	Eager South WUI Project	Yes, incidental take and not possible to quantify. Concludes that IT of LC be exceeded if there are declines or poor ratings upland or stream state conditions measured by and/or the BMPs are in preventing sediment transport as determined monitoring.
23	02-21-05-F-0385	June 5, 2006	Nutriosio WUI Project	Yes, incidental take and not able to quantify. FV concludes that IT of LC be exceeded if: there are declines in stream function conditions; effects to LC greater than those disclosed the BAE; and/or, there is decline in LCS constituent elements due to proposed action.
26	22410-1995-F-0290	May 22, 2007	Carlisle Complex Allotment Management Plan	None anticipated
27	22410-2007-F-0099	October 15, 2007	Rudd Creek Diversion	None anticipated
34	22410-2008-F-0149-R001	December 6, 2011	<i>Effects to Listed Species from USFS Aerial Application of Fire Retardants on NFS Lands</i>	<i>Incidental take described in terms of stream miles potentially affected, rather than number of fish.</i> <ul style="list-style-type: none"> • <i>One drop in occupancy habitat affecting 10 miles on Apache-Sitgreaves NF.</i>

ENVIRONMENTAL BASELINE

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

Status of the Species within the Action Area

On the Apache-Sitgreaves NFs the species is extant in Nutriosio, Rudd, and West Cheylon creeks. The most recent survey and habitat data for each of the three watersheds can be found in the Status of the Species Rangewide discussion above.

We do not have current information regarding post-fire impacts from the Wallow fire to these watersheds, but it is likely that there has been mortality of fish and long-term impacts to stream habitat. We will conduct surveys with AGFD in 2012 to assess impacts to the spinedace and CH.

In 1987, forty-four total stream miles of CH were designated within the Apache-Sitgreaves and Coconino NFs (FWS 1987). Of the total 44 miles of CH designated, eight miles of Chevelon Creek in Navajo County; and five miles of Nutrioso Creek in Apache County occur on the Apache-Sitgreaves NFs. Primary biological factors of CH consist of clean, permanent flowing water with pools and a fine gravel or silt-mud substrate.

Factors Affecting the Species within the Action Area

Little Colorado spinedace and its 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.

Nutrioso and Rudd creeks were affected by the 2011 Wallow fire, as described in detail in Apache-Sitgreaves NFs 2011 Fire Report and Potential Changes to T&E Status (USFS 2011). On June 18, 2011, in response to the Wallow Fire on the Apache-Sitgreaves NFs AGFD, FWS, and USFS personnel salvaged 185 Little Colorado spinedace from Rudd and Nutrioso Creeks. Upper Rudd and Nutrioso Creek watersheds burned severely and impacts to the stream from ash flows and post-fire flooding were expected, including a likely fish kill. AGFD and FWS translocated the spinedace to the spinedace refuge pond at AGFDs' Grasslands Wildlife Area, near Greer, Arizona, the same day.

In addition, continued 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. Long term climate change could exacerbate the effects of drought. We believe that drought is negatively affecting the species now, and is likely to continue into the foreseeable future

Description of the Action Area

The Action Area includes all streams occupied by Little Colorado spinedace that may be directly or indirectly affected by actions occurring on Apache-Sitgreaves NFs.

On the Apache-Sitgreaves NFs, the Action Area includes middle Nutrioso Creek from the Apache-Sitgreaves Forest boundary upstream to Nelson Reservoir and from Nelson Reservoir upstream. The privately-owned EC Bar Ranch is capable of being indirectly affected by actions taken on the Forest and is thus part of the action area. Rudd Creek on the Forest is also included. The Action Area also includes Chevelon and West Chevelon Creeks in the Chevelon Creek watershed, and a portion of the East Clear Creek watershed (Leonard Canyon is the boundary between the Apache-Sitgreaves and Coconino NFs).

Conservation Measures

In February 2005 the USFS supplemented the 2004 BA to incorporate the following CMs meant

to benefit the spinedace. The Apache-Sitgreaves will continue to incorporate these CMs as part of their proposed action. They are as follows:

Conservation Measure #1: Design projects in occupied Little Colorado spinedace habitat on NFS lands which address the appropriate components of the Little Colorado spinedace recovery plan, with the goal of implementing projects with beneficial, insignificant, or discountable effects to Little Colorado spinedace.

Conservation Measure #2: Over the next two years, the USFS, in cooperation with other state agencies and federal agencies, universities/colleges, USFS research facilities, and FWS will assess and prioritize habitat stream and river segments on NFS lands for potential Little Colorado spinedace reintroduction. Cooperatively document the results in an annual report to FWS.

Conservation Measure #3: To the extent feasible within the mission and capabilities of the USFS, assist the FWS and AGFD with any Little Colorado spinedace reintroduction efforts.

Conservation Measure #4: With state agencies and other researchers (i.e., academic and USFS), who are currently monitoring Little Colorado spinedace populations, participate in the development of a consistent monitoring methodology for Little Colorado Spinedace, their associated habitat, and co-occurring aquatic species. Cooperatively document the results in an annual report to the FWS.

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 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.

- a. Pre-ignition Planning: Maintain current distributions of threatened, endangered, proposed, and candidate species in GIS layers on each NF in the Southwestern Region and these GIS layers will be provided to the Line Officer, Fire Management staff and/or incident commander for each species occurring in the watershed of the ignition as well as surrounding watersheds.

Identify watersheds that are particularly susceptible to ash flow and sediment following high intensity fires. Use this information to guide fire use mitigation measures such as; delay, direct check and/or suppress.

- b. A USFS biologist for the appropriate species will be assigned and consulted during fire management activities to ensure that concerns for T&E are addressed (i.e., 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/colleges, and others to preserve, rescue and secure a population in imminent danger of localized extirpation due to fire use for resource benefits.

In summary, these CMs should go a long way towards not only minimization of projects impacts, but also towards recovery of Little Colorado Spinedace populations on USFS lands. Conservation Measure #1 attempts to reduce and/or remove adverse impacts at the project level. It is understood that not all projects will be able to meet this standard, but as a goal statement, this measure can be very powerful and should help alleviate some of the threats to the Little Colorado Spinedace. Conservation Measure #5 is similar to Conservation Measure #1 in that it minimizes impacts, but is aimed specifically at minimizing threats of fire use. Finally, CMs #2, #3, and #4 address recovery actions that will be required to actually recover the Little Colorado Spinedace. As much of the historical habitat for the Little Colorado Spinedace has been lost and population numbers have been declining, beneficial actions such as these will be required in order to reverse this trend.

EFFECTS OF THE PROPOSED ACTION

Relevant S&Gs were identified and analyzed for the Apache-Sitgreaves NFs LRMP and for the 1996 Regional Amendment. 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 each 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.

The proposed action's effects on Little Colorado spinedace CH will be analyzed based on the respective S&G's impact on the PCEs within each CH unit (CHU) identified in the final rule. The PCEs for Little Colorado spinedace CH include: (1) aquatic systems with perennial flow; (2) free of nonnative fishes; (3) natural hydrographs; and (4) good water quality, free of pollutants. Since these PCEs relate directly to the life history requirements of the species itself, the effects section will seek primarily to identify which PCEs are being affected by each S&G that has received an adverse numeric effects rating. A summary section will analyze the proposed action's effects to the Little Colorado spinedace and to the species' CH in terms of ensuring that recovery is not precluded.

The FWS ranked three S&Gs within the Apache-Sitgreaves NFs LRMP as causing a lethal response to this species and three that would cause a sublethal response to the Little Colorado Spinedace. Six S&Gs were found to cause a negative behavioral response. However, the majority were found to maintain habitat and provide recovery. Several S&Gs have direction to

recover listed species. Additionally, there were several S&Gs that were beneficial in the long-term but had some short-term adverse effects.

Engineering Program

Standard and Guideline 63 guides the management of total road density to average 3.5 mi/mi² or less. Open road densities should average 2.0 mi/mi² or less. As stated in the BA (USFS 2004), road density is defined as the total kilometers (miles) of road in a defined area divided by the defined area in square kilometers (miles). The analysis in the BA recognizes that the numbers that were being evaluating were the known system roads and that the non-system (unclassified) roads are unknown. Therefore, the total road densities represented in the BA do not include the non-system roads. Road density is used by FWS and NOAA Fisheries as one way to measure watershed condition as it relates to resident fish in the Pacific Northwest. The joint agencies recommendation is that a given watershed should have less than 2.5 mi/mi² of road system; if in excess, the watershed is said to be not properly functioning. This S&G may result in a sublethal effect to the Little Colorado Spinedace because of sediments and pollutants from high road densities.

On the Apache-Sitgreaves NFs, the known road densities are below the 2.5 mi/sq.mi. recommended by FWS and NOAA Fisheries. Road density on the Apache-Sitgreaves NFs is about 1.1 km/km², however this number does not include the non-classified roads (USFS 2004:33). Standard and Guideline 63 allows for the total road density to reach 3.5 mi/mi². High road densities on the landscape have the potential to deteriorate watershed conditions. One of the primary threats to Little Colorado spinedace is watershed deterioration. This could potentially lead to increased erosion into Little Colorado spinedace habitat (including CH), 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. Moreover, the relatively short lifespan of the Little Colorado spinedace, coupled with the comparatively low fecundity of the species and the small population sizes makes it vulnerable to serious adverse effects from activities which may only impact the species' habitat for relatively short time periods, especially during the spawning season. Any situation that eliminated or greatly reduced a year-class would severely deplete recruitment to a population. For example, excessive sedimentation during the spawning season might suffocate a large portion of that year's reproductive effort. In the succeeding year, total reproductive effort would be diminished. The net effect would be a major reduction in population size (Propst *et al.* 1988).

Implementation of this S&G may affect Little Colorado spinedace CH PCEs: (3) by altering the natural hydrograph and (4) by reducing water quality due to increased sedimentation into the Chevelon Creek and Nutrioso Creek CHUs.

Forestry and Forest Health Program

Standard and Guideline 64 allows the NF to remove infected overstories (e.g., dwarf mistletoe) as soon as regeneration is accomplished. In addition, it allows the NF to thin understories to densities which will maximize fiber production over the length of the rotation, by using yield simulation models as guides and to control mistletoe by clear-cutting (in conformance with Regional Standards for clear-cut size) and regenerating artificially when yield simulation models

indicate that stands will not reach maturity because of dwarf mistletoe. This S&G may result in a negative behavioral response by the Little Colorado Spinedace.

This S&G (64) allows for controlling mistletoe by clear-cutting. As stated in the BA, clear-cutting in this region has undergone a major reduction over the past decade. On the Apache-Sitgreaves, a total of 704 acres have been clear-cut during that time. Although the potential for implementation of this S&G is very remote and the 1996 Regional Amendment for MSO and northern goshawk prohibit the use of clear-cutting within MSO and goshawk habitats, this S&G still exists and will be analyzed for potential effects. One potential effect to the watershed condition from clear-cutting may be increased erosion resulting from new road construction and heightened soil runoff from reduced ground cover and compacted surfaces in staging areas. Implementation of this S&G may affect Little Colorado spinedace CH PCEs: (3) by altering the natural hydrograph and (4) by reducing water quality due to increased sedimentation into the Chevelon Creek and Nutrioso Creek CHUs.

Standard and Guideline 97 states that road densities should be planned to economically balance road costs and skidding costs. Permanent road densities should average 3.5 mi/mi² or less, unless topography dictates higher densities to economically remove the timber. Also, open road densities after timber sale activities cease should average 2.0 mi/mi² or less. This S&G may cause a sublethal effect.

The S&G (97) as written could potentially allow total road densities to reach 3.5mi/mi.² or above if needed to economically remove timber. The FWS's recommendation is that in order to maintain a properly functioning watershed that total road density be 2.5 mi/mi². See the discussion above for S&G 63 for the discussion on the effects of high road densities. Implementation of this S&G may affect Little Colorado spinedace CH PCEs: (3) by altering the natural hydrograph and (4) by reducing water quality due to increased sedimentation into the Chevelon Creek and Nutrioso Creek CHUs.

Wildlife, Fish and Rare Plants Program

Standard and Guideline 114 guides the Apache-Sitgreaves NFs to manage for or maintain at least 60 percent of potential habitat capability for Apache trout, rainbow trout, brook trout, brown trout, loach minnow, and Little Colorado spinedace. Standards and Guidelines 115 and 116 discusses aquatic resources directing the NF to manage for and maintain at least 80 percent of near natural shade over water surfaces and stream bank total linear distance in stable condition. These S&Gs may cause a potentially lethal effect to the Little Colorado Spinedace. The FWS is concerned with the inverse implications, that allowing up to 20 percent of streambank to exist in unstable condition will adversely affect the Little Colorado spinedace. The FWS also notes that 20 percent unstable banks could result in sedimentation over the remaining 80 percent, bank stability in those reaches notwithstanding.

Three S&Gs within this program may cause a lethal response; 114, 116, and 152. Standards and Guidelines 114 and 152 both direct the Apache-Sitgreaves NFs to manage for at least 60 percent of habitat capability for Apache trout, rainbow trout, brook trout, brown trout, loach minnow, and Little Colorado spinedace. These S&Gs presents two sources of concern; first that it implicitly permits up to a 40 percent loss of habitat capability for the Little Colorado spinedace,

and second, that it promotes management of nonnative, competitive/predatory salmonids, particularly the piscivorous brown trout. Implementation of this S&G may affect Little Colorado spinedace CH PCEs: (2) by increasing the likelihood of nonnative presence; (3) by altering the natural hydrograph; and (4) by reducing water quality due to increased sedimentation into the Chevelon Creek and Nutrioso Creek CHUs.

Standard and Guideline 118 allows the Apache-Sitgreaves NFs to maintain 80 percent of a stream's spawning gravel surface free of inorganic sediment. This S&G may cause sublethal effects to the Little Colorado Spinedace. Like S&Gs 39, 115, 117, and 123, we have interpreted this S&G to result in up to 20 percent inorganic sediment in spawning gravels. The loss of such an appreciable proportion of spawning gravels could restrict the ability of Little Colorado spinedace to recover their diminished numbers following chronic drought or stochastic events (e.g., flash floods, post-fire runoff).

The FWS identified a host of Wildlife Program S&Gs that when implemented may result in adverse effects. Specifically, S&Gs 39, 115, 117, 123, and 150a were all ranked as causing a negative behavioral response. Standards and Guidelines 39, 115, 117, and 123 received negative rankings due to their emphasis on various states of habitat maintenance in Little Colorado spinedace habitat. For example, S&G 117 guides the Apache-Sitgreaves NFs to limit siltation of streams to no more than 20 percent. While this standard represents a worthwhile target for improving stream health, it has been interpreted by us to mean that up to 20 percent siltation may be permitted. Excessive sediment loading is detrimental to aquatic species (Newcombe and MacDonald 1991). Such a level of siltation may adversely affect Little Colorado spinedace, primarily through lost spawning and foraging habitat (embedded gravel), reduced predator avoidance (increased turbidity), and gill occlusion (suspended fines). Standard and Guideline 39 states that within each diversity unit maintain or achieve at least 40 percent of the potential habitat capability for the management indicator species selected for each vegetation type. This may result in a negative behavioral response. The remaining S&Gs ranked as adversely affecting Little Colorado spinedace because they allow the Apache-Sitgreaves NFs to manage habitat to maintain a fishery. For purposes of this analysis, the FWS assumes that a "fishery" could include both native and nonnative fish. Competition with nonnative fishes is often cited as a major factor in the decline of native fishes (Propst 1999). The red shiner, in particular, is frequently indicated in the decline of native cyprinids (Minckley and Deacon 1968; Minckley 1973). While not necessarily a fishery, red shiners are a legal bait fish in Arizona. The existence of a sport fishery thus renders the introduction of red shiner (and fathead minnow) likely. Introduced trout (Salmonidae) may co-occur and prey on Little Colorado spinedace, though it is likely that the native Apache trout co-existed historically with Little Colorado spinedace at some elevations in the Little Colorado River. It is likely, however, that the piscivorous tendencies of brown trout render coexistence between the species less certain. These nonnative fish may also impact Little Colorado spinedace populations through competition for food and space.

1996 Regional Amendment

The following S&Gs within the 1996 LRMP Amendment could have potential short-term adverse effects to the Little Colorado spinedace:

Standard and Guideline 1432 allows no timber harvest except for fire risk abatement in mixed conifer and pine-oak forests on slopes greater than 40 percent where timber harvest has not occurred in the last 20 years. Standard and Guideline 1445 guides the NFs to treat fuel accumulations to abate fire risk. Standard and Guideline 1455 guides the NFs to use combinations of thinning trees less than 9 inches in diameter, mechanical fuel removal, and prescribed fire in MSO protected areas. Standard and Guideline 1458 allows for prescribed fire within Reserved Lands (Wilderness, Research Natural Areas, Wild and Scenic Rivers, and Congressionally-recognized Wilderness Study Areas). Standard and Guideline 1468 encourages the Forest to utilize prescribed and prescribed natural fire to reduce hazardous fuel accumulation and further states that thinning from below may be desirable or necessary before burning to reduce ladder fuels and the risk of crown fire. Standard and Guideline 1476 allows the Forests to apply ecosystem approaches to manage for landscape diversity mimicking natural disturbance patterns, incorporating natural variation in stand conditions and retaining special features such as snags and large trees, utilizing appropriate fires, and retention of existing old growth in accordance with forest plan old growth S&Gs. Standard and Guideline 1508 permits the Forests to pursue low-intensity ground fires at any time in all forested cover types inhabited by northern goshawks, but high intensity crown fires are not acceptable in the post-fledgling family area or nest areas and further guides the Forests to avoid burning the entire home range of a goshawk pair in a single year. For fires planned in the occupied nest area, a fire management plan should be prepared. The fire management plan should minimize the risk of goshawk abandonment while low intensity ground fire burns in the nesting area. Prescribed fire within nesting areas should be planned to move with prevailing winds away from the nest tree to minimize smoke and risk of crown fire developing and driving the adults off or consuming the nest tree.

Each of the aforementioned S&Gs permits short-term adverse effects on forested environments in order to secure long-term stability and/or to create conditions more desirable for the northern goshawk and/or MSO. The range of the Little Colorado spinedace coincides with or is downstream of much of the habitat occupied by (or suitable for) these raptors and thus, the fish can be expected to experience short-term adverse effects in exchange for long-term habitat stability or improvement.

Implementation of these S&Gs may affect Little Colorado spinedace CH PCEs: (1) by altering perennial flows of streams; (2) by increasing habitat conditions preferred by nonnative fishes; (3) by altering the natural hydrograph; and (4) by reducing water quality due to increased sedimentation into the East Clear Creek CHU.

Effects to Recovery

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 objective of the Little Colorado Spinedace Recovery Plan (FWS 1997) is to delist the species. The recovery criteria developed to implement this objective are: (1) to secure and maintain all extant populations; and (2) to establish refugia in the most natural, identifiable habitats within the probable historical range. Reintroduced populations will not be considered established until they have persisted for a minimum of five years. In our 5-Year Review of the status of the Little Colorado spinedace (FWS 2008), we determined that the Recovery Plan did not address the five factors (or threats) that resulted in the species' listing nor were the delisting criteria objective and measurable. Although the FWS acknowledges that the AGFD, USFS, and others have made significant efforts to conserve Little Colorado spinedace, we also recommended in the 5-Year Review that the species be uplisted from threatened to endangered due to extensive threats from invasion of nonnative fishes, groundwater pumping, and lack of available habitat for recovery (due to fragmentation, long-term drought, etc.).

Moreover the Coconino and Apache-Sitgreaves NFs, AGFD, and FWS are implementing the 1999 *East Clear Creek Watershed Recovery Strategy for the Little Colorado spinedace and other Riparian Species*. This document identified current and ongoing impacts to the watershed, the needs for reducing these impacts, and recommended potential projects and actions to reduce and/or eliminate those impacts. The East Clear Creek Watershed Health Improvement Project (see list of BOs for past and ongoing projects, above) includes the proposed implementation of many of those recommendations.

In the analyses in the Effects of the Proposed Action section above, the applicable S&Gs from the Apache-Sitgreaves NFs including the S&Gs from the 1996 LRMP Amendment, were analyzed individually to determine their effects to the species and CH. The S&Gs were also assigned numeric values based on their effects to the species and/or PCEs of CH, and these amalgamated values are useful for a qualitative analysis of the proposed action's effect to recovery.

Out of the 102 S&Gs affecting Little Colorado spinedace on the Apache-Sitgreaves, 2.9% could cause a lethal response, 2.9% could cause a sublethal response, and 5.9% could cause a negative behavioral response while 56.9% are maintaining habitat and providing some recovery value, 3.9% are moving towards recovery, and 1% are implementing the Recovery Plan. Of the 51 S&Gs associated with the 1996 Regional Plan Amendment, which includes the Apache-Sitgreaves NFs, 58.8 percent are maintaining habitat and providing recovery. In summary, across the Apache-Sitgreaves NFs, an appreciably greater proportion of S&Gs are associated with recovery of Little Colorado spinedace than with harm and mortality of the species. We also reiterate that both the Apache-Sitgreaves and the Coconino NFs are implementing the *East Clear Creek Watershed Recovery Strategy for the Little Colorado spinedace and other Riparian Species*, which is guided by the S&Gs and has resulted in the implementation of projects that assist in recovering the species.

Again, while the Apache-Sitgreaves NFs is making progress towards the recovery of the Little Colorado spinedace, we do not feel the species should be delisted and, in fact, we feel uplisting

may be necessary due to worsening threats such as the continued invasion of nonnative aquatic species into Little Colorado Spinedace habitat and the on-going and future reductions in surface water (due to both drought and surface and groundwater pumping) (FWS 2008). We note, however, that the primary impediments to securing and maintaining all extant populations of the species and establishing refuge sites within its historical range are the increasing threats posed by small- and large-scale habitat fragmentation caused by water development and long-term drought; the effects of the unlawful introduction of competitive and/or predatory nonnative fishes; and the effects of climate change (FWS 2008). These threatening factors' combined, long-term effect may be to preclude the species' recovery, but none are the result of implementation of S&Gs on the Apache-Sitgreaves or Coconino NFs.

For this analysis, we have focused instead on the ability for the S&Gs, through specific projects, to protect the PCEs of the Little Colorado spinedace's habitat, including CH, so that the species' natural ecological resilience can continue to ensure its survival and recovery in the wild. Watershed protection initiatives such as the East Clear Creek Watershed Health Project and others (see consultations in Table 3, above) are likely to have short-term adverse effects such as sedimentation while increasing herbaceous ground cover and reducing wildfire risk over the long term. Consultation on USFS grazing allotments focuses on protecting watersheds from excessive impacts. We thus conclude that implementation of the proposed action will not preclude the recovery of the 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.

A large proportion of the range of the Little Colorado spinedace exists on federal lands. Future projects undertaken by the respective federal agencies managing those lands would thus be subject to interagency consultation under section 7 of the ESA. Further, it is expected that a portion of the projects occurring on non-federal lands would nonetheless be considered federal action by nature of their funding (e.g., Federal Highway Administration road projects, Natural Resource Conservation Service restoration actions). The effects of any remaining actions occurring within the range of the Little Colorado spinedace but lacking discretionary involvement by a federal agency would thus be considered cumulative. Future actions within the action area that are reasonably certain to occur include increased water use, development, road maintenance, private fuels-reduction treatments, ungulate grazing on pastures adjacent to streams, and other associated actions. It is currently unknown whether state or private lands in the project area will be subject to future state or private projects; however, large-scale development of the area is not reasonably certain to occur in the near future because of the rural nature and economy of much of the area.

These cumulative actions, though potentially limited in extent, have the potential to reduce the quality of habitat for the Little Colorado spinedace and contribute as cumulative effects to the proposed action. In 1991, the American Fisheries Society (AFS) adopted a position statement

regarding cumulative effects of small modifications to fish habitat (Burns 1991). Though the AFS's use of the term "cumulative" differs from the definition found in the ESA, the statement concludes that accumulation of and interaction between localized or small impacts, often from unrelated human actions, pose a serious threat to fishes. It also points out that some improvement efforts to fish habitat may not result in accumulative increases in status of the species but instead may simply mitigate accumulative habitat alterations from other activities.

CONCLUSION

After reviewing the current status of the Little Colorado spinedace, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the Little Colorado spinedace, is not likely to destroy or adversely modify designated CH, and will not preclude recovery of the species. Pursuant to 50 CFR 402.02, to "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 Little Colorado spinedace from the implementation of the Apache-Sitgreaves NF's 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:

- Actions implemented by the USFS for the conservation of Little Colorado spinedace include land management actions designed to improve or protect habitat and the protection of some habitats from threats associated with land-use practices such as livestock grazing.
- The Apache-Sitgreaves NFs initiated a cost-share agreement with AGFD to inventory selected lotic habitats to determine the status of Little Colorado Spinedace, document existing fish communities, and evaluate opportunities to improve existing habitat conditions for native fish. In addition, the project was intended to identify drainages on the Apache-Sitgreaves NFs that might be suitable for the repatriation of Little Colorado spinedace. In 2007, AGFD translocated Little Colorado Spinedace into West Chevelon Creek where these fish continue to persist.
- During the late-1990s, the Black Mesa RD analyzed livestock allotments in the Chevelon Creek (west-side of the watershed) and Willow Creek watersheds and reduced livestock numbers 30 to 75 percent. The continued absence of livestock on about 50,000 ac ("Wildlife Area") in the upper, middle, and lower reaches of Chevelon and Willow Creek watersheds, and the continued preclusion of livestock from the mainstream of Chevelon Creek will likely facilitate watershed recovery and the future reintroduction of the species in both drainages. Livestock grazing was also eliminated on all portions of Nutrioso and Rudd Creeks on the Springerville RD.

- In 1997, Region 3 of the USFS funded the implementation of several actions intended to address “short-term” needs for the conservation of Little Colorado spinedace as part of the “Seven Species Effort”. These actions included fencing to preclude livestock from Dines Tank (Apache-Sitgreaves NFs), adding large, woody debris to Dines Tank (Apache-Sitgreaves NFs), and fencing a portion of the Picnic Allotment (Apache-Sitgreaves NFs).
- There are several S&Gs within the Apache-Sitgreaves LRMP that support conservation and recovery of Little Colorado spinedace. These are S&Gs 1, 4, 19, 21, and 26. All of these S&Gs guide the Forest to implement recovery plans, improve habitat for T&E by structural and non-structural means, and to delist T&E.
- The *East Clear Creek Watershed Recovery Strategy for the Little Colorado Spinedace and Other Riparian Species* (USFS 1999), guided by S&Gs, identified activities to assist in the recovery of the Little Colorado Spinedace and its habitat within the East Clear Creek Watershed on both the Coconino and Apache-Sitgreaves NFs. Projects implemented under this strategy include the planned supplemental stocking of Little Colorado Spinedace into Willow Creek, Turkey Creek, and Gentry Canyon; improved livestock management within the watershed; and increased protection for headwater meadows and occupied Little Colorado Spinedace habitats from detrimental land management activities.
- Additionally AGFD has been very proactive in recovery efforts for Little Colorado spinedace. Their efforts include cost-share projects with the USFS; funding survey and inventory efforts, as well as assisting in those efforts; conducting emergency salvage efforts; and, managing properties along Rudd Creek and the Little Colorado River with occupied habitat or potential habitat. In addition, the Grasslands Wildlife Area contains the refugia pond for the upper Little Colorado genetic sub-group. In addition, through consultation with FWS on the Wildlife and Sport Fish Restoration Funding of AGFD’s stocking program, AGFD has altered stocking rates for rainbow trout at three reservoirs to limit the migration of the trout downstream to occupied Little Colorado Spinedace habitat and will soon employ triploid (sterile) rainbow trout to further limit persistence.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulations pursuant to section 4(d) of the ESA prohibit the incidental take of endangered and threatened species, respectively, without special exemption. “Take” is defined in section 3 of the ESA as to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or to attempt to engage in any such conduct. “Harm” is defined at 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 at 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 (50 CFR 402.02). 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 to the applicant, 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 us as specified in the incidental take statement. [50 CFR §402.14(i)(3)].

Amount or Extent of Take Anticipated

Incidental take of the Little Colorado spinedace is reasonably certain to occur as a result of the continued implementation of the Apache-Sitgreaves NFs LRMPs, as well as the 1996 Regional Amendment. This incidental take is expected to be in the forms of harm (e.g., mortality) and harassment of Little Colorado spinedace from the Engineering, Forestry and Forest Health, and Wildlife programs on the Apache-Sitgreaves NFs.

However, the FWS believes that the aforementioned incidental take will be difficult to detect for the following reasons: finding a dead or impaired specimen (adult, young-of-year, or egg) is unlikely, and losses may be masked by seasonal fluctuations in environmental conditions and fish numbers. Therefore, it is not possible to provide precise numbers of Little Colorado spinedace that will be harassed, harmed, or killed during projects implemented under the plan amendment.

Although we cannot estimate the number of individual Little Colorado Spinedace that will be taken as a result of the proposed action, the FWS is providing a mechanism for when incidental take would be considered exceeded at the population level. The FWS concludes that incidental take of Little Colorado spinedace will be exceeded if there is a loss of one population in the current number of Little Colorado Spinedace populations (three populations: Nutrioso, Rudd, and West Cheylon Creeks) on the Apache-Sitgreaves NFs as a result of the proposed action, without being offset by newly established populations. This surrogate is reasonable to use to measure when take is exceeded for the following reasons:

- 1) As stated above, Little Colorado Spinedace populations naturally fluctuate. Some years we find only a few individual fish and in other years we find more individuals, but the number of individual fish (i.e., adults, young-of-year, eggs) in a particular system is not static; therefore, we cannot use a single number of individuals to identify if incidental take has occurred or not.

- 2) Because individual populations of Little Colorado Spinedace within single drainages are discrete from other populations on the Apache-Sitgreaves NFs, we may infer the absence of Little Colorado Spinedace from a particular drainage if none are found during surveys. As stated above, numbers naturally fluctuate, but if numbers are so low we are not detecting Little Colorado Spinedace, it is likely that the population cannot recover without management assistance.

Effect of the Take

In the accompanying BO/CO, the FWS determined that this level of anticipated incidental take is not likely to result in jeopardy to the Little Colorado spinedace.

REASONABLE AND PRUDENT MEASURES

The FWS believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of Little Colorado spinedace.

1. Minimize or eliminate adverse effects to Little Colorado spinedace on the Apache-Sitgreaves NFs due to LRMP activities.
2. Minimize or eliminate adverse effects to Little Colorado spinedace habitat on the Apache-Sitgreaves NFs during implementation of the LRMP.
3. Monitor the impacts of implementing the proposed action on Little Colorado spinedace and its habitat and report the findings to the FWS.

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 Where feasible, manage riparian areas adjacent to and upstream of Little Colorado spinedace populations for potential natural vegetation conditions to eliminate direct effects and minimize indirect effects to Little Colorado spinedace.
- 1.2 Design projects to minimize or eliminate adverse effects to the Little Colorado spinedace.

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

- 2.1 Design projects to reduce negative effects (direct and indirect) with the goal of implementing projects that have beneficial, insignificant, or discountable effects within occupied Little Colorado Spinedace habitat.

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

- 3.1 The Apache-Sitgreaves NFs 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 Little Colorado Spinedace 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.

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 re-initiation of consultation and review of the reasonable and prudent measures provided. The federal action 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 that the USFS:

1. Continue working with FWS, AGFD, and our other partners to implement the *East Clear Creek Watershed Recovery Strategy for the Little Colorado spinedace and other Riparian Species* (USFS 1999).
2. Continue to identify factors that limit the recovery potential of the Little Colorado Spinedace on lands under their jurisdiction and work to correct them.
3. Acquire instream flow water rights to ensure perennial flow in streams with Little Colorado spinedace habitat.

4. Assist FWS and AGFD to reestablish Little Colorado spinedace throughout its historical range.
5. Continue to work with the FWS and AGFD to eliminate nonnative aquatics within occupied habitat of the Little Colorado Spinedace on NFS lands and when designing fish habitat improvement projects, give consideration to native fish species.

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.

LOACH MINNOW

STATUS OF THE SPECIES RANGEWIDE

Loach minnow was listed as a threatened species on October 28, 1986 (FWS 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).

CH was designated on March 21, 2007 (FWS 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 are currently re-evaluating CH. However, those areas designated as CH in the 2007 rule remain in place until a new designation can be finalized. A final rule to redesignate CH and reclassify loach minnow as an endangered species was published on February 23, 2012 (77 FR 10810). While there are some differences between the 2007 designation and the 2010 proposal, much of the geographic area included for loach minnow is the same in both proposals. Specific details regarding the areas included as designated or proposed CH can be found in these rules. 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 is 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, FWS 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) and in the proposed rule for CH designation from 2010 (75 FR 66482).

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) (Stefferdud 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.

The status of loach minnow is declining rangewide. Although it is currently listed as threatened, the FWS determined in 1994 that a petition to uplist the species to endangered status is warranted (FWS 1994). The FWS confirmed this decision in 2008 (FWS 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, with a final rule is expected in March, 2012.

Recovery Actions Rangewide

The Loach Minnow Recovery Plan (FWS 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 (USFS 2004). Many of these recovery efforts were implemented as part of the “seven species direction” (USFS 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 NFs 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. Off-highway vehicles can cause significant damage. Areas to focus efforts to control and enforce existing regulations on the Prescott NF have been identified.

ENVIRONMENTAL BASELINE

Status of the Species within the Action Area

On the Apache-Sitgreaves NFs the species is extant in the San Francisco River and its tributaries, Blue River and its tributaries, North Fork East Fork Black River and its tributaries, and Eagle Creek.

On the Apache-Sitgreaves NFs, recent surveys have located loach minnow within the Blue River system (C. Carter 2005, pp. 1–5; C. Carter, AGFD, pers. comm. 2008; Clarkson *et al.* 2008, pp. 3–4; Robinson 2009, p. 3). Though Blue River surveys were not conducted, AGFD in cooperation with USFS, FWS, and BOR collected loach minnow from the Blue River for captive propagation in 2007 and 2008. The BOR surveyed loach minnow for a 6.8 mi reach of the Blue River from its mouth to the Juan River Crossing in 2008 and documented two individuals (Clarkson *et al.* 2008). During 2009 loach minnow were captured and transported from the Blue River to Bubbling Ponds hatchery. Monitoring of the Blue River completed in the Fall of 2011 indicated reduced numbers of loach minnow (Adelsberger *et al.* 2011), possibly due to the increased ash and sediment contributed to the river during the monsoon season following the Wallow Fire. Livestock continue to be excluded from the Blue River and Three Forks area. The Blue River was limited to crossing livestock on existing USFS roads, and the Blue River corridor continues to be excluded from livestock grazing on the Wildbunch Allotment.

Loach minnow were first detected in the Black River system in 1996, and monitoring has occurred since then. AGFD, in cooperation with the Forest, conducted surveys in about 6.5 mi of the Three Forks area in 2007 and 2008 and did not observe any loach minnow. (M. Lopez, AGFD pers. comm. 2000; S. Gurtin, AGFD, pers. comm. 2004; Carter 2007, p. 2; Robinson *et al.* 2009). Loach minnow were last detected in 2004 (Robinson *et al.* 2009).

Annual surveys are conducted on the Clifton RD in Eagle Creek by BOR contractors and AGFD; however no loach minnow have been found since 1997.

CH was designated for the loach minnow in 2000 and 2007. A proposed rule was completed in October 2010 and a final rule to redesignate CH and reclassify loach minnow as an endangered species was published on February 23, 2012 (77 FR 10810). On the Apache-Sitgreaves NFs the 2011 CH designation includes portions of East Fork Black River, North Fork East Fork Black River, Coyote Creek, Boneyard Creek, Blue River, Campbell Blue Creek, Little Blue Creek, the San Francisco River, and Eagle Creek.

Factors Affecting the Species within the Action Area

Loach minnow and its 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.

Loach minnow streams were affected by the 2011 Wallow fire, as described in detail in Apache-Sitgreaves NFs 2011 Fire Report and Potential Changes to T&E Status (USFS 2011). During 2011, the Wallow Fire occurred on the Apache-Sitgreaves NFs and many streams either occupied by loach minnow or that are identified as CH for loach minnow are within the Wallow Fire perimeter. Streams on the Apache-Sitgreaves NFs affected by the Wallow Fire include the East Fork Black River, North Fork East Fork Black River, Coyote Creek, Boneyard Creek, the Blue River, Campbell Blue Creek, Little Blue Creek, Eagle Creek, and the San Francisco River. The majority of East Fork Black River falls within an area that experienced low burn severity, but does cross a few areas that were either unburned or burned at moderate burn severity. Coyote Creek is in an area almost entirely burned at low severity. Within Unit 7, the majority of Campbell Blue Creek is within unburned or low burn severity areas; however, approximately 2.4 km (1.5 mi) of the upper end of Campbell Blue Creek is within moderate and high burn severity. The Wallow Fire stopped just west of the Blue River, but came within approximately 0.3 km (0.2 mi) of the River. However, the rainfall during the monsoon, which began before the fire was extinguished, contributed ash and sediment to both streams. In the Blue River, ash and sediment travelled as far downstream as the San Francisco River, resulting in fish kills (Blasius, 2011, pers. comm.). Fish surveys completed in the Fall of 2011 indicated reduced numbers of loach minnow (Adelsberger et al. 2011, p.1). The impacts of the fire will be considered as part of the baseline for loach minnow within this consultation.

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

EFFECTS OF THE ACTION

Since the 2004 BA for “The Continued Implementation of the LRMP for the 11 NFs and NGs,” little new significant scientific information or data has become available that would change the 2004 effects analysis for loach minnow and designated and proposed CH for the Apache-Sitgreaves NFs.

The following effects analysis for the Apache-Sitgreaves NFs is consistent with the USFS’s 2004 BA and 2008 BA, and the FWS’s 2005 BO/CO and 2010 BO/CO. 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 each 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.

The Apache-Sitgreaves NFs has several S&Gs that could have lethal and sublethal effects to the loach minnow. In addition, several were found to potentially cause a negative behavioral response. The majority of the S&Gs, however, were found to maintain habitat and provide for recovery of the species. Additionally, there were several S&Gs that were beneficial in the long-term but had some short-term adverse effects.

Engineering Program

Standard and Guideline 63 relates to both total and open road densities. This S&G states that total road density should average 3.5 mi/mi² or less while open road densities should average 2.0 mi/mi² or less. Road density is defined as the total miles of road in a defined area divided by the defined area in square kilometers miles (USFS 2004). The analysis in the BA recognizes that the numbers that were being evaluated were the known system roads and that the non-system (unclassified) roads are unknown. Therefore, the total road densities represented in the BA do not include the non-system roads. Road density is used by the FWS and NOAA Fisheries as one way to measure watershed condition as it relates to resident fish in the Pacific Northwest. The joint agencies recommendation is that a given watershed should have less than 2.5 mi/mi² of road system; if in excess, the watershed is said to be not properly functioning. High road densities on the landscape have the potential to deteriorate watershed conditions. One of the primary threats to loach minnow is watershed deterioration.

On the Apache-Sitgreaves NFs, the known road densities are below the 2.5 mi/mi² recommended by FWS and NOAA Fisheries. Although the allowable road density on the Apache-Sitgreaves is 3.5 mi/mi², the forest-wide level is below the 2.5 mi/mi² recommendation of the FWS and NOAA fisheries.

Fire Management Program

No applicable S&Gs in the Fire Management Program are likely to result in negative effects to the loach minnow. However, there may be negative effects from this program not captured in the applicable S&Gs. In the Apache-Sitgreaves NFs Plan there is not a specific Fire Management Program listed; however, there is a Protection Program listed which deals with fire. The goal for the Protection Program includes the following “Fire is used as a resource management tool where it can effectively accomplish resource management objectives (Apache-Sitgreaves LRMP)”. It can be inferred that prescribed fire would be utilized in this capacity. The use of prescribed fire and other fuels treatment methods are useful in reducing the risk of catastrophic wildfire. However, these projects may result in adverse affects associated with humans, tools, machinery, and burning. Additionally, ash flows and erosion/sedimentation in burn areas may have adverse effects to fish species.

Forestry and Forest Health Program

Standard and Guideline 97 states that road densities should be planned to economically balance road costs and skidding cost. Permanent road densities should average 3.5mi/mi² or less, unless topography dictates higher densities to economically remove the timber. Also, open road densities after timber sale activities cease should average 2.0 mi/mi² or less. This S&G could potentially allow total road densities to reach 3.5 mi/mi² or above if needed to economically remove timber. The FWS recommendation is that in order to maintain a properly functioning

watershed that total road density be 2.5 mi/mi². See the discussion above for S&G 63 for the discussion on the effects of high road densities.

Standard and Guideline 64 allows for the control of mistletoe by clear-cutting. As stated in the BA, clear-cutting in this region has undergone a major reduction over the past decade.

One potential effect to the watershed condition from clear-cutting may be increased erosion resulting from sedimentation into the stream channel. 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.

Rangeland Management Program

As per our analysis, there were no negative S&Gs within the Apache-Sitgreaves NFs LRMP for the Rangeland Management Program. All of the S&Gs that were analyzed had positive effects to the loach minnow. During meetings with the Forest, it was reiterated that the Apache-Sitgreaves NFs had numerous formal consultations on grazing activities. However, grazing was removed from loach minnow habitat in the Blue River and Eagle creek.

Wildlife, Fish and Rare Plants Program

Standards & Guidelines 39, 114-118, 123, and 152 all provide guidance for management of the riparian resources. All of these S&Gs could result in a certain amount of riparian habitat to be maintained at less than optimal conditions. This could result in localized streambank collapse, potentially increasing sedimentation into the stream channel. Potential effects could include a reduction of invertebrate food supplies interference with reproduction, and loss of shelter.

Standard and Guideline 150a allows the Forest to manage waters capable of supporting fish to maintain a fishery. For the purposes of this analysis, the FWS assumes that a “fishery” could include both native and non-native fish. Competition with non-native fishes is often cited as a major factor in the decline of loach minnow (Propst 1999). The red shiner (*Cyprinella lutrensis*), in particular, is frequently indicated in the decline of this fish (Minckley and Deacon 1968; Minckley 1973). The red shiner out-competes loach minnow for food items and habitat; and is very tolerant of many extremes found in the desert and semi-desert aquatic habitats (Matthews and Hill 1977). Channel catfish and flathead catfish frequent riffles occupied by loach minnow, especially at night when catfish move onto riffles to feed (Propst 1999) and may prey on loach minnow. In addition, largemouth bass, smallmouth bass, green sunfish, and introduced trout (Salmonidae) may co-occur and prey on loach minnow. These non-native fish may also impact loach minnow populations through competition for food and space. Nonnative channel catfish, flathead catfish, and smallmouth bass are present in loach minnow habitat in several areas including the San Francisco River (Papoulias *et al.* 1989, pp. 77–80; Propst *et al.* 2009, pp. 5–6); the Blue River (ASU 1994, multiple reports; ASU 1995, multiple reports; Clarkson *et al.* 2008, pp. 3–4); and Eagle Creek (Marsh *et al.* 2003, p. 667; Bahm and Robinson 2009a, pp. 2–6).

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.

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 (e.g., sedimentation) as well as those from the fire itself. See previous discussion under the Fire Management Program.

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.

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

For a list of the S&Gs considered for loach minnow CH please refer to Appendix H of the April 2005, BA (Consultation #2-22-03-f-366).

Engineering Program

The Engineering Programs, on the NFs with loach minnow CH or watersheds that drain into CH, manage roads, facilities and structures. Degradation of loach minnow CH could take place directly or indirectly as the result of road, facility, or structure construction or maintenance. In general, S&Gs do not exist in the LRMPs for facility or structure construction or maintenance. The lack of S&Gs that prevent effects to the loach minnow CH and the varying nature of such projects make it necessary to address these activities at the project-level. Region-wide, the administration of the variety of roads on NF lands has the most direct link between management activities and CH effects. Although the LRMPs generally lack S&Gs directly related to the Engineering Program, S&Gs do exist in other programs (e.g., Watershed) that are directly related to activities administered by the Engineering Program, primarily roads. For example, S&G 63 in the A-S LRMP states that total road density should average 3.5 mi/mile² or less with open road

densities averaging 2.0 mi/mile² or less (USFS 2004). The FWS and NOAA Fisheries recommendation is that a given watershed should have less than 2.5 mi/mile² of road system. Above that standard, the watershed is said to be not properly functioning.

As stated in the April 2005 BA, road density is defined as the total miles of road in a defined area divided by the defined area in square kilometers (miles). The analysis in the BA recognizes that the numbers that were being evaluated were the known system roads and that the non-system (unclassified) roads were unknown. Therefore, the total road densities represented in the BA do not include the non-system roads. As noted above, road density is used by the FWS and the NOAA Fisheries as one way to measure watershed condition as it relates to resident fish in the Pacific Northwest. The joint agencies', recommendation is that a given watershed should have less than 2.5 mi/mile² of road system; if in excess, the watershed is said to be not properly functioning.

The Apache-Sitgreaves NFs LRMP provides guidance to protect erosive soils, riparian areas, wildlife areas, watershed condition (e.g. S&G 62), and prevent erosion (e. g., S&G 171,172) from the construction or maintenance of roads. However, roads can affect CH through sedimentation or water quality degradation. Disease may also be transported from one site to another via NF roads where low water fords exist. High road densities on the landscape have the potential to deteriorate watershed conditions, which can affect loach minnow habitat depending on project location, scale, and timing. S&G 63 may allow the NF to limit road densities to 3.5 mi/mi² or higher if other non-system roads are not considered. S&G 97 allows higher road densities if topography determines it necessary "to economically remove timber." Guidance is present in the LRMP to reduce the amount of erosion that may take place as a result of activity damage (S&G 172). S&G 61 requires the construction of roads in a manner that "keeps sediment out of riparian and aquatic habitats."

The Apache-Sitgreaves NFs contains S&Gs that are likely to reduce the effects associated with program activities; however, effects are likely to occur in the absence of other inter-program guidance or site-specific resolution. Implementation of these S&Gs could result in the degradation of watershed conditions and affect the PCEs for loach minnow, such as unpolluted water; living areas for loach minnow adults, juveniles, and larvae with appropriate flow regimes and substrates; spawning areas; low amounts of fine sediment and substrate embeddedness; pool, riffle, run, and backwater components; low to moderate stream gradients; appropriate water temperatures; periodic natural flooding; and unregulated hydrograph, or if flows are modified, a hydrograph that demonstrates an ability to support a native fish community; an abundant aquatic insect food base; and, habitat devoid of non-native aquatic species detrimental to loach minnow, or habitat where such non-native species are at levels which allow persistence of loach minnow (FWS 2007). Again, potential effects will largely depend on project location, scale, and timing.

Forestry and Forest Health Program

The Forestry and Forest Health Program on the Apache-Sitgreaves NFs includes S&Gs to protect riparian areas and limit road densities. There is very little direction within the S&Gs to prevent damage to the watershed that may result in indirect effects to the loach minnow CH. Direct effects are reduced by guidance to protect riparian areas by limiting activities. However, there are some Forest-wide S&Gs that guide the Forest to restrict activities that may cause indirect

effects. For example, MA3, which represents riparian areas, guides managers to give “preferential consideration to riparian area-dependent resources in cases of unsolvable conflicts.” This S&G may limit the extent of the effects that could take place during implementation, however it only suggests that such consideration take place.

Lands and Minerals Program

The Apache-Sitgreaves NFs LRMP contains S&G 50 that guides the control of "surface uses through plans of operation and permits which provides for preservation of water quality, protection of watershed values, reforestation or revegetation to attain soil stability, and protect threatened, endangered and sensitive species"; thereby, limiting the effects to loach minnow CH. In addition, S&G 52 guides the Program to reduce the probability of contamination of surface or groundwater during the application of chemicals. However, this guidance is not prohibitive. S&Gs 59, 60, and 180 guide land acquisitions of vital species habitats, such as wetlands, riparian areas, or other water oriented lands, under the Land and Water Conservation Fund Act and include habitat for T&E species. S&G 55 guides the Forest to limit the amount of disturbance by oil and gas leasing in riparian areas, areas with slopes greater than 40% grade, highly visible areas, erosive or unstable soils, other wildlife habitat, and watersheds managed for community water supplies. S&G 58 limits access roads to private properties to only one access for one or more private land inholdings. S&G 51 allows streambed alteration only if insignificant effects occur to riparian-dependent resources, channel morphology, or stream bank stability. No guidance exists in the LRMP that encourages withdrawals, limits right-of-ways and easements, or limits water use authorizations to benefit loach minnow CH or T&E species. Therefore, the potential exists for adverse effects to the loach minnow CH through the implementation of the Apache-Sitgreaves LRMP.

Rangeland Management Program

The Apache-Sitgreaves NFs LRMP provides guidance for the management of livestock grazing such that maintenance or the improvement of current conditions is the desired outcome. Specific S&G guidance (e.g., S&Gs 40, 41, 132-137, 162, and 163) seeks to protect riparian dependent resources, including wildlife. Grazing is allowed in areas adjacent to or within watersheds containing designated loach minnow CH; as part of the on-going livestock grazing consultation in 1999, cattle have been excluded from all known occupied loach minnow habitat, including areas designated as CH.

Recreation, Heritage, and Wilderness Programs

S&Gs within the Apache-Sitgreaves NFs LRMP implementation should effectively protect loach minnow CH from recreational activities by providing for OHV closures in designated areas. S&G 160 guides the Forest to protect soils, water quality, and willow stands. In addition, S&Gs 7, 8, 9, 10, 12, 14, 16, 17, and 18 should protect watersheds from damage associated with OHV use. In addition, S&G 154 provides guidance to close areas to the public to protect species during critical use periods. This may include loach minnow CH. S&G 6 allows for trails on the Apache-Sitgreaves to be closed unless signed open. This provides protection by preventing or reducing user-created trails that may indirectly impact loach minnow CH. Approximately 25 miles of the Blue River and three miles of Little Blue Creek are within the Blue Range Primitive Area.

Watershed Program

The LRMP guidance for the Watershed Programs on all NFs seeks to maintain or improve watershed conditions and maintain good water quality. The guidance is cross-program in orientation in that it seeks to mitigate impacts from other program activities. The guidance for the Watershed Program can be used to fill in the gaps for other programs with inadequate guidance. Abundant guidance is provided in the LRMPs to assist the NFs in avoiding or minimizing adverse effects to loach minnow CH.

Standards and Guidelines 49, 98, and 99 guide the Watershed Program on the Apache-Sitgreaves NFs to close or obliterate roads causing intolerable damage. In addition, S&Gs 53, 171, 177, 178, 43, 179, 48, 44, and 46, guide soil productivity; conserve water and soil resources by controlling surface run-off and erosion; maintain buffer strips between stream courses and disturbed areas and maintain suitable water quality standards; protect riparian-dependent resources, channel morphology, or stream bank stability; prevent water quality degradation; identify lands with riparian and wetland areas for acquisition; maintain and enhance riparian vegetation; and prevent sediment-laden water from entering stream courses. Several S&Gs are given for individual MAs that accomplish the same as above Forest-wide S&Gs. Abundant guidance is provided under the Watershed Program that addresses activities conducted in other programs, for example, road management and land acquisition.

Wildlife, Fish, and Rare Plants Program

The intent of LRMP and most of the S&Gs applicable to the Fish, Wildlife and Rare Plants Program is to maintain or improve conditions for wildlife habitat Region-wide. The S&Gs for this program are often cross-program in nature, therefore, some S&Gs seek to restrict or encourage activities in other programs in consideration of wildlife, fish or rare plants. However, there are a few other S&Gs that allow for water diversions (e.g., S&G 143 and 475), facilitate the introduction of predators (S&Gs 152, 498, and 885), or guide the use of chemical substances (S&G 698, e.g.) which may have adverse effects to loach minnow CH.

The Apache-Sitgreaves NFs LRMP seeks to conserve and protect all species of fish, wildlife, and plants, however, a few conflicts exist for conserving or protecting federally listed species. For example, S&Gs 155, 156, and 161 allow fish and wildlife improvements to take place only if they do not conflict with management emphasis for the MA. Other S&Gs (e.g., S&G 34, 143, and 152) may facilitate the introduction of predators and may allow water diversions. Standard and Guideline 117 could result in some adverse effects to the aquatic environment. Although conflicts may arise, the vast majority of S&Gs guiding the Fish, Wildlife, and Rare Plants Program are beneficial to federally listed species. For example, S&G 19 guides the Forest to "manage threatened and endangered animals, fish, and plant habitat to achieve declassifying" as a federally protected habitat. Standard and Guideline 33 allows for closures to protect habitat of listed, sensitive, or proposed T&E species and S&G 4 provides guidance to improve habitat for protected listed species and work toward recovery and declassification. Standard and Guideline 26 guides the NF to pursue recovery activities for listed species where pertinent. In general, the implementation of the S&Gs in the Apache-Sitgreaves NFs LRMP would result in beneficial effects to loach minnow CH, however, some S&Gs exist that could result in adverse effects to loach minnow CH.

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. Standard and Guideline 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 on indirect effects to loach minnow CH or may result in neutral or no effect. 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. Standards and Guidelines 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.

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, are increasing. Increasing recreational, residential, or commercial use on 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 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.

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. CH 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 PCEs 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" (FWS and National Marine Fisheries Service 1998:4-34).

The FWS anticipates adverse effects to the loach minnow from the implementation of the Apache-Sitgreaves NF's 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:

- As part of the Seven Species Regional Direction implemented by the Southwestern Region of the USFS, riparian areas on USFS lands have been excluded from livestock grazing to protect habitat along the Gila, San Francisco, Verde, Blue, North Fork East Fork Black Rivers, and Eagle Creek and their tributaries.
- As part of the on-going consultation in 1999, cattle have been excluded from all known occupied loach minnow habitat.
- Forest Road 586 on the Apache-Sitgreaves NFs was obliterated to reduce sediment input to Boneyard Creek, which is a tributary to occupied habitat in the North Fork East Fork Black River, and which is designated as CH for loach minnow.

- A barrier is under construction on the Blue River to assist in preventing spread of nonnative fish species in the Blue River.
- The CMs within the proposed action for the spikedace will also improve the status for the loach minnow.
- There are several S&Gs within the Apache-Sitgreaves LRMP that support conservation and recovery of the loach minnow. All of these S&Gs guide the Forests to implement recovery plans, improve habitat for T&E by structural and non-structural means, and to take actions which will lead to the delisting of T&E. In addition, S&Gs 163 and 164 within the Apache-Sitgreaves LRMP guide the Forest to manage for loach minnow so that it can eventually be delisted

With the continuing exclusion of livestock grazing from occupied loach minnow habitat and the benefits from the USFS's CMs for the spikedace (e.g., as part of the proposed action), loach minnow habitat is expected to improve and contribute to the survival and recovery of the species. These CMs direct the USFS to implement projects that will improve spikedace habitat. Both species occupy mid-elevation stream habitats within the Gila River drainage, and in several instances are sympatric, so that 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, continued exclusion of livestock grazing in all occupied habitats on NF lands, consideration given to recovery of the loach minnow within the proposed action, in combination with the relatively widespread distribution of populations 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 incidental take is reasonably certain to occur through time, incidental take of individuals during site-specific project activities is not expected to be appreciable, and these projects will undergo additional section 7 consultation through which attempts will be made to minimize incidental take. 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 Apache-Sitgreaves NFs LRMP will not destroy or adversely modify CH for loach minnow. 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 affects to CH. Although the FWS anticipates some adverse effects to loach minnow CH from the implementation of the Apache-Sitgreaves NF's LRMP, as well as the 1996 Regional Amendment, we do not believe the impacts of the proposed action will result in adverse modification to loach minnow CH. The FWS bases this conclusion on the following reasons:

- As part of the Seven Species Regional Direction implemented by the Southwestern Region of the USFS in 1997, riparian areas on USFS lands have been excluded from

livestock grazing to protect habitat along the Gila, San Francisco, Verde, Blue, North Fork East Fork Black Rivers, and Eagle Creek.

- As part of the on-going livestock grazing consultation in 1999, cattle have been excluded from all known occupied loach minnow habitat, including areas designated as CH.
- The 1996 Regional LRMP Amendment essentially reduces the effects caused by the Forestry and Forest Health and Rangeland Management Programs for all NFs.
- The Apache-Sitgreaves NFs has obliterated Forest Road 586 to reduce sediment input to Boneyard Creek, which is a tributary to occupied habitat in the North Fork East Fork Black River and is designated CH for loach minnow.
- A fish barrier is under construction on the Blue River which will help to prevent the upstream movement of non-native predators and competitors.

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. Activities such as closing roads, removal of non-native fish, participating in a captive breeding program, and the exclusion of cattle from riparian areas continue to contribute toward the improvement of loach minnow habitat, ensuring the survival and recovery of the species. In addition, there are also activities being conducted by other land management agencies to enhance habitat for the loach minnow 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 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 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 proposed 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 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 grant 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 loach minnow is reasonably certain to occur as a result of the continued implementation of the Apache-Sitgreaves NFs LRMPs. On the Apache-Sitgreaves NFs, incidental take in the form of harassment is expected from the Engineering, Forestry and Forest Health, Rangeland Management, and Wildlife programs. Harassment to individual fish may occur from activities conducted within occupied streams.

The FWS anticipates incidental take of loach minnow 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 loach minnow that will be incidentally taken, the FWS is providing a mechanism to determine when incidental take would be considered to be exceeded. The FWS has determined that the anticipated level of incidental take is most appropriately quantified in terms of disturbance or habitat alteration resulting from site-specific projects. Incidental take of loach minnow on the Apache-Sitgreaves NFs will be considered to be exceeded if a total of five miles of temporary impact (e.g. impacts that may cause ponding behind a fish barrier or temporary loss of sediment downstream of a fish barrier) lasting more than one year or one mile of permanent impact (i.e. stream barrier) occur as a result of the proposed action.

Effect of the Take

In the accompanying BO/CO, the FWS determined that this level of anticipated incidental take is not likely to result in jeopardy to the loach minnow, or destruction/adverse modification of CH.

REASONABLE AND PRUDENT MEASURES

The FWS believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of loach minnow:

1. Minimize or eliminate adverse effect to loach minnow on the Apache-Sitgreaves NFs due to LRMP activities.

2. Minimize or eliminate adverse effects to loach minnow habitat on the Apache-Sitgreaves NFs during implementation of the LRMP.
3. Monitor the impacts of implementing site-specific projects on loach minnow and its habitat and report the findings to the FWS.

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 Where feasible, manage riparian areas adjacent to and upstream of loach minnow populations for conditions to minimize direct and indirect effects to loach minnow and its habitat.
- 1.2 Develop and implement projects in LRMP programs with the goal of minimizing or eliminating adverse effects to loach minnow.

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

- 2.1 Design projects in loach minnow habitat with the goal of implementing projects that have beneficial, insignificant, or discountable effects to the loach minnow and its habitat to contribute to recovery.

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

- 3.1 The Apache-Sitgreaves NFs 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 loach minnow 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.

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. In cooperation with AGFD, NMDGF, and FWS, remove all non-native species affecting the loach minnow and take measures to prevent reoccurrence 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 spikedace to endangered status (75 FR 66482).

Critical habitat was 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 and are currently re-evaluating CH. However, those areas designated as CH in the 2007 rule remain in place until a new designation can be finalized. A final rule to redesignate CH and reclassify spikedace as an endangered species was published on

February 23, 2012 (77 FR 10810). While there are some differences between the 2007 designation and the 2010 designation, much of the geographic area included for spikedace is the same in both proposals. Specific details regarding the areas included as designated 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 is 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) and in the 2010 proposed rule for CH designation from 2010 (75 FR 66482).

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, FWS, 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, 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, U.S. Bureau of Land Management (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 CH unit 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 (FWS 2000). A final rule to redesignate CH and reclassify spikedace as an endangered species was published on February 23, 2012 (77 FR 10810).

ENVIRONMENTAL BASELINE

Status of the Species within the Action Area

On the Apache-Sitgreaves NFs, Eagle Creek is the only stream believed to be currently occupied by spikedace.

During 2007 the Forest began discussions with the AGFD for potential reintroduction of spikedace in the Blue River. The Forest assisted with surveys on Eagle Creek and the Blue River. Livestock are excluded from the Blue River and Eagle Creek on the Forest. During 2009 nonnative crayfish were removed from Forest reaches of Eagle Creek.

CH was designated for the spikedace in 2007 and in 2012. The 2007 designation did not include any streams on the Apache-Sitgreaves NFs. The 2012 designation includes stream reaches in the Blue and San Francisco River drainages and Eagle Creek. The final rule was published on February 23, 2012, and became effective March 26, 2012.

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. Several loach minnow streams were affected by the 2011 Wallow fire, as described in USFS (2011).

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 spikedace 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.

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 (e.g. 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 the captive spikedace propagation program designed to augment wild populations.

Conservation Measure #7: The long-term benefit directly attributable to wildland fire use 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 well as surrounding watersheds. Identify watersheds that are particularly susceptible to ash flow and sediment following high intensity fires. Use this information to guide fire use mitigation measures such as; delay, direct check and/or suppress.
- b. A USFS biologist for the appropriate species will be assigned and consulted during fire management activities to ensure that concerns for T&E are addressed. (e.g., 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 to each 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.

This section includes analyses of the direct and indirect effects of the proposed action on the spikedace for the Apache-Sitgreaves NFs. The FWS assumes the spikedace to be present on the Apache-Sitgreaves NFs. The Eagle Creek population has not been seen for over a decade (Marsh 1996), although it is thought to still exist in numbers too low for the present sampling to detect. Our analysis found several S&Gs within the Apache-Sitgreaves LRMP that could potentially result in negative sublethal effects to the spikedace. In addition, there are five S&Gs that could result in negative behavioral responses. These include S&Gs 39, 64, 123, 150a, and 152. However, overall, the majority of the S&Gs are maintaining habitat and providing recovery for the spikedace.

Additionally, there were several S&Gs that were beneficial in the long-term but had some short-term adverse effects.

Engineering Program

Standard and Guideline 63 relates to both total and open road densities. This S&G states that total road density should average 3.5 mi/mi² or less while open road densities should average 2.0 mi/mi² or less. As stated in the BA (USFS 2004), road density is defined as the total miles of road in a defined area divided by the defined area in square miles.

The analysis in the BA recognizes that the numbers that were being evaluated were the known system roads and that the non-system (unclassified) roads are unknown.

Therefore, the total road densities represented in the BA do not include the non-system roads. Road density is used by the FWS and NOAA Fisheries as one way to measure watershed condition as it relates to increased sedimentation and its effects on resident fish in the Pacific Northwest. As stated above in the description of the proposed action, the joint agencies recommendation is that a given watershed should have less than 2.5 mi/mi² of road system; if in excess, the watershed is said to be not properly functioning.

Although the LRMPs generally lack S&Gs directly related to the Engineering Program, S&Gs do exist in other programs (e.g., Watershed) that are directly related to activities administered by the Engineering Program, primarily roads. For example, S&G 63 in the Apache-Sitgreaves NFs LRMP states that total road density should average 3.5 mi/mile² or less with open road densities averaging 2.0 mi/mile² or less (USFS 2004). The FWS and NOAA Fisheries recommendation is that a given watershed should have less than 2.5 mi/mile² of road system. Above that standard, the watershed is said to be not properly functioning.

On the Apache-Sitgreaves NFs, the known road densities are below the 2.5 mi/mi² recommended by FWS and NOAA fisheries. According to the BA (USFS 2004:33), road density on the Apache-Sitgreaves is approximately 1.7 mi/mi² (1.1 km/km²). However this number does not include the non-classified roads. Standard & Guideline 63 may allow for the total road density to reach 3.5 mi/mi². High road densities on the landscape have the potential to deteriorate watershed conditions. One of the primary threats to spokedace is watershed deterioration, which can lead to increased erosion into spokedace habitat, thereby increasing sedimentation into the stream channel and lowering water quality. As a result, potential effects to the species may include a reduction of invertebrate food supplies, interference with reproduction, and direct mortality of demersal eggs.

Fire Management Program

No applicable S&Gs in the Fire Management Program are likely to result in negative effects to the spokedace. However, there may be negative effects from this program not captured in the applicable S&Gs. In the Apache-Sitgreaves NFs Plan there is not a specific Fire Management Program listed; however, there is a Protection Program listed which deals with fire. The goal for the Protection Program includes the following "Fire is used as a resource management tool where it can effectively accomplish resource management objectives (Apache-Sitgreaves LRMP)." It can be inferred that prescribed fire would be utilized in this capacity. The use of prescribed fire and other fuels treatment methods are useful in reducing the risk of catastrophic wildfire. However, these projects may result in adverse effects associated with humans, tools, machinery, and burning. Additionally, ash flows and erosion/sedimentation in burn areas may have adverse effects to fish species.

Forestry and Forest Health Program

Standard and Guideline 97 states that road densities should be planned to economically balance road costs and skidding costs. Permanent road densities should average 3.5 mi/mi² or less, unless topography dictates higher densities necessary to economically remove the timber. Also, open road densities after cessation of timber sale activities should average 2.0 mi/mi² or less. The S&G as written could potentially allow total road densities to reach 3.5 mi/mi² or above, if needed, to economically remove timber. The FWS recommendation is that in order to maintain a properly functioning watershed, total road density should be 2.5 mi/mi² or less (see the discussion above for S&G 63).

Standard and Guideline 64 allows for controlling mistletoe by clear-cutting. Clear-cutting in this region has undergone a major reduction over the past decade. On the Apache-Sitgreaves, a total of 704 acres have been clear-cut during that time. One potential effect to watershed condition from clear-cutting would be increased erosion of the exposed soils into streams. In addition, if the clear-cuts remove the vegetation near the streambanks, this could result in temperature changes to the water that would be deleterious to the spokedace.

Rangeland Management Program

Within the Apache-Sitgreaves NFs LRMP, there are no negative S&Gs within the Rangeland Management Program. All of the S&Gs that were analyzed have positive effects to the spokedace. Although there have been numerous formal consultations addressing the adverse effects of grazing activities on spokedace on the Apache-Sitgreaves since 1987, grazing is now excluded in several streams and the goal of the Rangeland Management program is to improve watershed condition and wildlife habitat.

Wildlife, Fish, and Rare Plants Program

Standards & Guidelines 39, 114-118, 123, and 152 all provide guidance for management of the riparian resources. The FWS recognizes that the intent of these S&Gs is positive; however, due to the current status of the spokedace across its range, it is imperative that all habitat that is currently occupied or is capable of supporting spokedace be maintained in optimal conditions. All of these S&Gs could result in a certain amount of riparian habitat to be maintained at less than optimal conditions. This could result in portions of the streambank collapsing into the stream, causing localized sedimentation, widening the stream, and increased summer water temperatures. In addition, the loss of riparian vegetation at a location could impair the filtering capacity of the riparian buffer leading to an increase in nutrients and contaminants into the creek. Loss of riparian vegetation also leads to increased summer water temperatures and lower winter water temperatures. As a result, potential effects to the species could include a reduction of invertebrate food supplies, interference with reproduction, and direct mortality to demersal eggs. These effects would be highly dependent on project-level information, including scope, location, and timing, and will be analyzed at the individual project level.

Standard and Guideline 150a allows the Forest to manage waters capable of supporting fish to maintain a fishery, which could include native as well as non-native fish. Competition with non-native fishes is often cited as a major factor in the decline of spokedace (Propst 1999). The red shiner, in particular, is frequently indicated in the decline of this fish (Minckley and Deacon

1968, Minckley 1973). The red shiner is a very competitive species that out-competes spinedace for food items and habitat and is very tolerant of many extremes found in the desert and semi-desert aquatic habitats (Matthews and Hill 1977). In addition, largemouth bass, smallmouth bass, green sunfish, and introduced trout may co-occur and prey on spinedace. These non-native fish may also impact spinedace populations through competition for food and space. Nonnative channel catfish, flathead catfish, and smallmouth bass are present in spinedace habitat in several areas including the San Francisco River (Papoulias *et al.* 1989, pp. 77–80; Propst *et al.* 2009, pp. 5–6); the Blue River (ASU 1994, multiple reports; ASU 1995, multiple reports; Clarkson *et al.* 2008, pp. 3–4); and Eagle Creek (Marsh *et al.* 2003, p. 667; ASU 2008, multiple reports; Bahm and Robinson 2009a, pp. 2–6).

1996 Regional Amendment

Short-term adverse effects to the spinedace may occur from the implementation of the S&Gs within the 1996 Regional Amendment. 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 spinedace. They are 1432, 1445, 1448, 1455, 1458, 1468, 1476, and 1508. 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 (e.g. sedimentation) as well as those from the fire itself. 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

Designated Critical Habitat

Generally, the overall guidance of the LRMP S&Gs is to protect resources while maintaining multiple use activities. The guidance for the Engineering, Fire Management, Forestry and Forest Health, Lands and Minerals, Rangeland Management, Recreation, Heritage, and Wilderness, and WFRP Programs is not sufficient to avoid activities, carried out for these programs, which may adversely affect spinedace habitat. The continued implementation of the Apache-Sitgreaves NFs LRMP is **Not Likely to Adversely Modify** CH for the spinedace. The continued implementation of the Apache-Sitgreaves NFs LRMP **May Affect**, and is **Likely to Adversely Affect** spinedace designated CH because the LRMP lacks S&Gs which provide guidance to avoid all adverse effects to the PCEs from several Programs with S&Gs applicable to the CH for spinedace. Some conflicts will arise with effects to the designated CH occurring due to the lack of complete filtering necessary to prevent adverse influence on the PCEs. Designated CH includes the Blue River, Campbell Blue Creek, Little Blue Creek, Eagle Creek, and the San Francisco River.

The PCEs for spinedace 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 Engineering, Fire Management, Forestry and Forest Health Program, and Rangeland Management 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.

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.

Unregulated activities on non-federal lands, such as trespass livestock, inappropriate use of OHVs, illegal introduction of bait and sport fishes, and residential and commercial development on lands within watersheds containing threatened and endangered 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.

Cumulative effects to spinedace CH include ongoing activities on non-federal lands within watersheds with designated CH such as livestock grazing and associated activities outside of the allotments addressed herein, irrigated agriculture, groundwater pumping, stream diversion, bank stabilization, channelization, and recreation. Some of these activities are declining and are not expected to contribute substantially to cumulative long-term adverse effects.

Other activities, such as recreation, residential, or commercial use of the private lands near riparian areas could result in increased cumulative adverse effects to spinedace CH 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 nor destroy or adversely modify designated CH. 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.

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. CH 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 PBFs 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" (FWS and National Marine Fisheries Service 1998:4-34).

The FWS anticipates adverse effects to the spikedace from the implementation of the Apache-Sitgreaves NFs 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 for the following reasons:

- Several S&Gs within this NFs LRMP support conservation and recovery of spikedace. These S&Gs guide the Forest to implement recovery plans, improve habitat for T&E by structural and nonstructural means, and to delist T&E.
- As part of the Seven Species Regional Direction, the USFS has excluded livestock grazing on USFS lands to protect riparian habitats along the San Francisco and Blue rivers, and Eagle Creek.
- The Apache-Sitgreaves has fenced streams within the Forest for the protection of spikedace habitat.

In addition, the USFS will continue to implement (e.g., 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.
- With state conservation agencies and other researchers (e.g., academia and USFS), 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 continuation of a captive spikedace propagation program designed to augment wild populations.

In addition to CMs implemented under the consultation for use of fire retardant, the USFS has also agreed to continue 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 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 well as surrounding watersheds.
- Identify watersheds that are particularly susceptible to ash flow and sediment following high intensity fires. Use this information to guide fire use mitigation measures such as; delay, direct check and/or suppress.
- A USFS biologist for the appropriate species will be assigned and consulted during fire management activities to ensure that concerns for T&E 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 NF LRMPs 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 CMs direct actions at eliminating threats and augmenting populations, contributing to the survival and recovery of the species. 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 Apache-Sitgreaves NFs LRMP is not likely to jeopardize the continued existence of the spikedace nor destroy or adversely modify its designated CH.

INCIDENTAL TAKE STATEMENT

Section 9 of the ESA and federal regulation pursuant to section 4(d) of the ESA prohibit the incidental take of endangered and threatened species, respectively, without special exemption. Per the Act, incidental 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 incidental 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 section 402.14(i)(3)].

Amount or Extent of Take Anticipated

Incidental take of spikedace is reasonably certain to occur as a result of the continued implementation of the NF LRMP. On the Apache-Sitgreaves NFs, incidental take in the form of harassment is expected from the implementation of the LRMP. Harassment to individual fish may occur from activities conducted within occupied streams. The FWS anticipates, however,

that incidental take of spokedace 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. However, we discuss when incidental take will be considered to be exceeded below.

The FWS anticipates incidental take of spokedace 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 spokedace that will be incidentally taken, the FWS is providing a mechanism to determine when incidental take would be considered to be exceeded. The FWS has determined that the anticipated level of incidental take was most appropriately quantified in terms of disturbance or habitat alteration resulting from site-specific projects. Incidental take of spokedace on the Apache-Sitgreaves NFs will be considered to be exceeded if a total of five miles of temporary impact (e.g. impacts that may cause ponding behind a fish barrier or temporary loss of sediment downstream of a fish barrier) lasting more than one year or one mile of permanent impact (i.e. stream barrier) occur as a result of the proposed action.

Effect of the Take

In the accompanying BO/CO, the FWS determined that this level of anticipated incidental take will not jeopardize the spokedace.

REASONABLE AND PRUDENT MEASURES

The FWS believes the following reasonable and prudent measures are necessary and appropriate to minimize incidental take of the spokedace:

1. Minimize or eliminate adverse effect to spokedace on the Apache-Sitgreaves NFs due to LRMP activities.
2. Minimize or eliminate adverse effects to spokedace habitat on the Apache-Sitgreaves NFs during implementation of the LRMP.
3. Monitor the impacts of implementing the proposed action on spokedace and its habitat and report the findings to the FWS.

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 Where feasible, manage riparian areas adjacent to and upstream of spikedace populations for conditions to minimize direct and indirect effects to spikedace and its habitat.
- 1.3 Develop and implement projects in LRMP programs with the goal of minimizing or eliminating adverse effects to spikedace.

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

- 2.1 Design projects in spikedace habitat with the goal of implementing projects that have beneficial, insignificant, or discountable effects to the spikedace and its habitat to contribute to recovery.

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

- 3.1 The Apache-Sitgreaves NFs 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 spikedace 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.

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 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. 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.
3. 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.

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.

CHIRICAHUA LEOPARD FROG

STATUS OF THE SPECIES

The Chiricahua leopard frog (*Lithobates [=Rana] chiricahuensis*) (CLF) 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. CH was proposed in 2011 (FWS 2011a, 2011b) and includes 43 CHUs in Arizona and New Mexico. The CLF Final Recovery Plan (Recovery Plan) was finalized in April 2007 (FWS 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 "subaquavocalis"*), 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 (FWS 2009).

The range of the CLF 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 1). 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 CLF (see further discussion below).

The CLF 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 FWS 2011). The diet of the CLF includes primarily invertebrates such as beetles, true bugs, and flies, but fish and snails are also eaten (Christman and Cummer 2006).

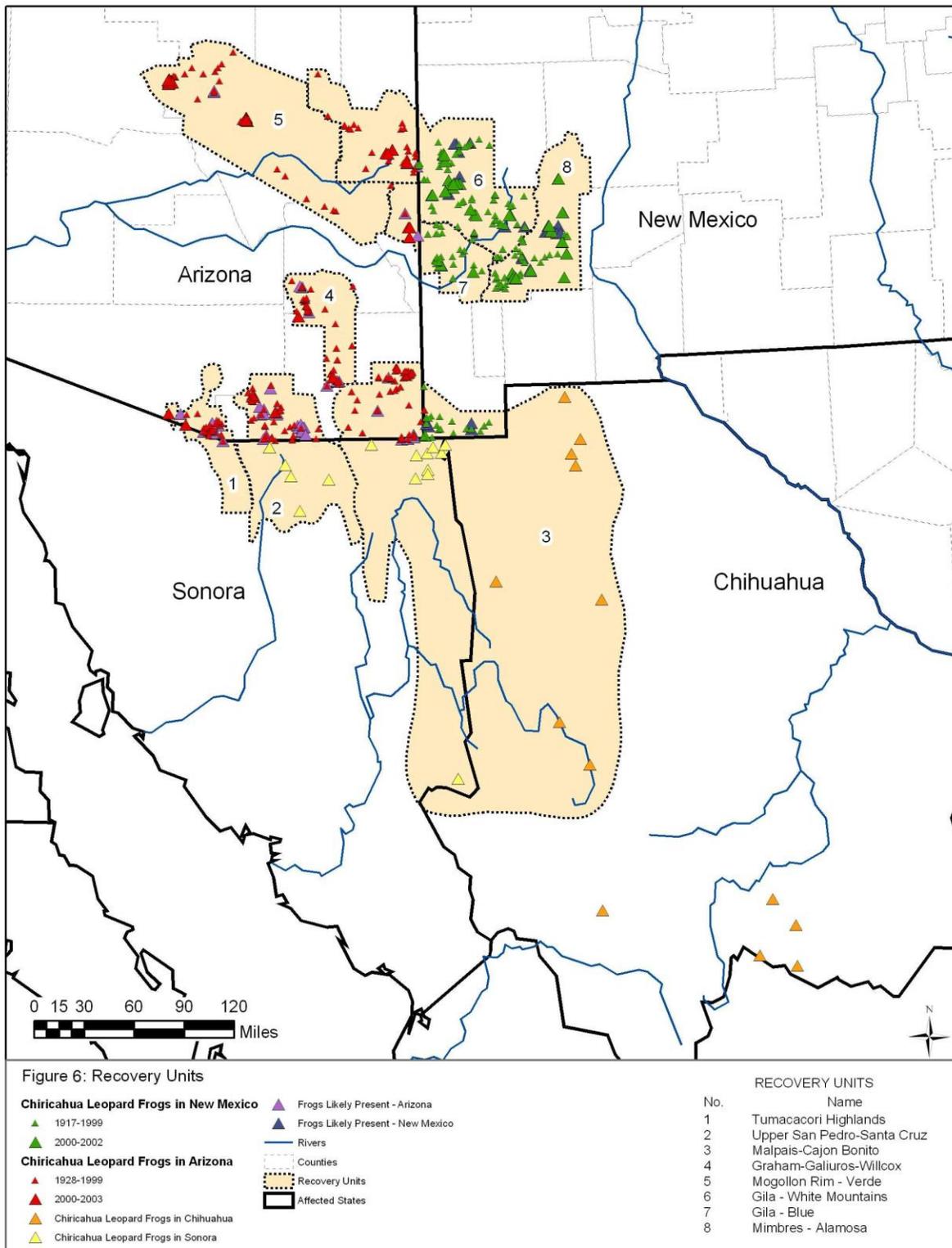


Figure 4. Map of the known range of the CLF as of 2007. The map covers areas in Arizona, New Mexico, and Mexico. All eight recovery units (RUs) are delineated by number.

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 increased narrowing of its realized niche is a primary reason for the threatened status of the CLF.

The life history of the CLF 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 (FWS 2007). The species has a distinctive call and males can be temporarily territorial (FWS 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 (FWS 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 (FWS 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, CLFs eat an array of invertebrates and small vertebrates and are generally inactive between November and February (FWS 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, CLFs may live as long as 10 years in the wild (Platz et al. 1997, p. 553).

CLFs can be found active both day and night, but adults tend to be active more at night than juveniles (Sredl and Jennings 2005). CLFs 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, FWS 2007). Adult and juvenile CLFs 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 (FWS 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]) (FWS 2007). The maximum distance moved by a radio-telemetered CLF 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 CLFs 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), CLFs 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 (FWS 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 (FWS 2007), which is the baseline in regard to the current status, biology, and threats to the CLF.

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 CLF 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 (FWS 2011). In Arizona and New Mexico, there are currently two main captive breeding facilities – the Phoenix Zoo 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 (FWS 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 CLFs 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 CLFs 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 sites 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 (FWS 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 (FWS 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 CLF 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 CLFs 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 CLF sites in New Mexico during this 5-year period (FWS 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 CLF declines. This disease seems to present more of a threat the frog in New Mexico than it does in Arizona, perhaps due to the higher elevations and cooler conditions found at sites in New Mexico. 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 CLF 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 New Mexico Ecological Services Field Office and the 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 CLF 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 CLF 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 (FWS 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 CLF, data are insufficient to determine status or trends in Mexico. None of the CLF 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). CLFs 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 CLF 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.

Threats

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 (FWS 2007). Loss of CLF 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 (FWS 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 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 4). Focus areas, referred to as MAs, are identified within each RU. MAs 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 CLF 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 CLF 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 CLF to be recovered, conservation must occur in each RU (Table 4). 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 CLF 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 CLF habitats to reduce physical threats to aquatic sites and allow for CLF 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 CLF 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 CLFs will be established or reestablished in these MAs.

Table 4. The eight RUs as identified in the Recovery Plan and the current status of the delisting criteria for the CLF 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 CHUs across the range of the species in Arizona and New Mexico (FWS 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, 270 acres occur on the Apache-Sitgreaves NFs.

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 CLF, its habitat, and designated CH within the Apache- Sitgreaves NFs.

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

The Apache-Sitgreaves NFs is located within three of the eight RUs identified in the CLF Recovery Plan: RU 5 (Mogollon Rim-Verde River, Arizona), RU 6 (White Mountains-Upper Gila, Arizona and New Mexico) and RU 7 (Upper-Gila River). The following description of the status of CH and the Chiricahua leopard frog populations within that CH is described by RUs, associated Recovery Management Areas (RMAs), and CHUs within RMAs, within RDs below.

Roughly 270 acres of CH have been designated on the Apache-Sitgreaves NFs, consisting of five of 39 CHUs. Critical habitat units for the CLF that are located on the Apache-Sitgreaves NFs include Concho Bill and Deer Creek, Campbell Blue and Coleman Creek, Left Prong of Dix Creek, Rattlesnake Pasture Tank and Associated Tanks, and Coal Creek. The status of the CLF is described by CHU. The CHUs discussed below encompass all of the known occupied Chiricahua leopard frog habitat.

Alpine/Springerville Ranger Districts

Recovery Unit 6 (White Mountains- Upper Gila, Arizona and New Mexico)

Within RU 6 on the Apache-Sitgreaves NF, three of seven (~43%) RMAs occur: Black River; Coleman Creek/Blue River; and Nutrioso and Rudd Creeks. However, only two are occupied or have identified recovery sites. Black River and Coleman Creek/Blue River RMAs contain small, isolated populations with generally only a few CLFs if any detected during surveys (FWS 2011). A release of 25 adults CLFs occurred in 2009. Crayfish, non-native fishes, bullfrogs, wildfire, elk, and *Bd* continue to threaten CLFs or their habitat in this RU. Frogs in this unit are particularly sensitive to *Bd*, which if present, usually results in decline and extirpation of affected CLF populations. No releases of CLF were conducted in the Arizona portion of RU 6 in 2011 due to concerns about post-fire habitat stability and a general lack of production from captive stock. The status of the CLF is declining and threats are stable to increasing.

Negative CLF surveys in 2011 within the Arizona portion of RU 6 include the following sites (followed by the number of surveys): Lake Sierra Blanca (n = 1), Concho Bill Spring (n = 4; discussed in detail below), East Black River-Three Forks (n = 1), Dry Lake Tank (n = 5; 2010 release site), Prescribed Tank (n = 1), Ridge Top Tank (n = 1), and Firebox Lake (n = 4).

RMA: Black River

CHU: Concho Bill and Deer Creek

This CHU includes 17 ac of Apache-Sitgreaves NFs in Apache County, Arizona, consisting of a spring at Concho Bill and a meadow-ephemeral stream reach extending for approximately 2,667

ft (813 m) below the spring. The population has remained historically small since it was originally stocked in 2000 with frogs generated from captive breeding as well as translocated frogs from Three Forks. Stocking efforts continued sporadically post-2000. Generally only a few CLFs if any are detected during surveys (FWS 2011). A release of 25 adults CLFs occurred in 2009. The primary threat is the limited pool habitat for breeding and overwintering, which thus far has limited the size of the population. In addition, crayfish are nearby in the Black River and could invade this site. The Wallow Fire occurred in this area and any significant precipitation will likely create runoff with ash and burned soil. This site was surveyed on 4 different occasions in 2011; May 5, June 30, and September 6 and 7. No frogs were observed during any of the surveys. On June 30, with permission from the USFS Concho Bill Spring was subject to intensive survey effort in order to salvage any remaining frogs from post-fire effects. The surveys included call playbacks and seining but no Chiricahua leopard frogs were detected. After the monsoon rains, it was evident that high flows had deposited sediment on the northeast and northwest sides of the pool along with a reduction in aquatic vegetation. As of September 2011, CLF appear to be extirpated from this site.

RMA: Coleman Creek/Blue River

CHU: Campbell Blue and Coleman Creeks

The CHU includes 174 ac of Apache-Sitgreaves NFs in Greenlee County, Arizona. Included as critical habitat is an approximate 2.04 mi (3.28-km) reach of Campbell Blue Creek from the western boundary of Luce Ranch upstream to the Coleman Creek confluence, and Coleman Creek from its confluence with Campbell Blue Creek upstream to its confluence with Canyon Creek, an approximate stream distance of 1.04 mi (1.68 km). This CLF population has been historically considered small, with generally only a few CLFs if any detected during surveys (FWS 2011). However the habitat is complex, making detection of CLF problematic. In 2010, the creeks had numerous beaver ponds and vegetation cover that are probably important as protection from predators. Backwaters and off-channel pools provide better habitat than the often swiftly moving, shallow water in the creeks. Crayfish and introduced rainbow trout are present throughout this stream system, which likely limit recruitment of CLFs into the population. In 2009, the USFS reported that crayfish and trout removal actions were implemented. The presence of *Bd* has not been investigated in this unit. Campbell Blue Creek was impacted from sedimentation following the Willow Fire and subsequent monsoon rains. No CLF surveys were conducted in this CHU in 2011 but one fisheries survey detected a single adult CLF in November 2011. The CHU is currently considered occupied.

Clifton Ranger District

Recovery Unit 7 (Upper Gila-Blue River, Arizona and New Mexico)

Within RU 7 on the Forest, 1 of the four (25%) RMAs occur: San Francisco and Blue Rivers. However, this RMA has three occupied or identified recovery sites. San Francisco and Blue Rivers RMA contains few, isolated populations, only one is robust, Rattlesnake Pasture Tank. Bullfrogs, drought, and wildfire continue to threaten CLFs in this RU. *Bd* has been recently detected in the New Mexico portion of this RU. The Wallow Fire occurred in the northern portions of this area. A ranarium has been constructed in this area. The status of the CLF is stable to declining and threats are increasing.

RMA: San Francisco and Blue Rivers

CHU: Left Prong of Dix Creek

This CHU contains 13 ac of Apache-Sitgreaves NFs lands in Greenlee County, Arizona. This CHU includes a stream reach that runs from a warm spring above “The Hole” and continues to the confluence with the Right Prong of Dix Creek, an approximate stream distance of 4,248 ft (1,296 m). This is an isolated population. The last recorded observation of CLF from the Left Prong of Dix Creek was in 2005. An effort to survey the warm spring in 2010 was thwarted by the presence of a large boulder that blocked the only viable access to the canyon. We are unable to confirm the current status of the CLF population in this CHU but presume it is occupied based on the presence of CLF during the last survey (2005), the lack of significant threats that would otherwise preclude their existence, and the absence of any recent surveys. CLF surveys in 2010 in the nearby Right Prong of Dix Creek yielded only lowland leopard frogs (*Lithobates yavapaiensis*) but similarity of appearance between the two species may have confounded those survey results. The warm waters of the spring may allow persistence of CLFs if *Bd* is present or if it colonizes this area in the future. At this time *Bd* is not known to be present. A rough Forest System road crosses the Left Prong of Dix Creek in the proposed CHU and it likely contributes some sediment to the stream. A ranarium has been constructed in this area.

RMA: San Francisco and Blue Rivers

CHU: Rattlesnake Pasture Tank and Associated Tanks

This CHU contains 59 ac of Apache-Sitgreaves NFs in Greenlee County, Arizona. Included in this CHU are three stock tanks: Rattlesnake Pasture, Rattlesnake Gap, and Buckhorn, as well as intervening drainages and uplands for connectivity, including: (1) From Rattlesnake Pasture Tank downstream in an unnamed drainage to Red Tank Canyon (including Buckhorn Tank), then upstream in Red Tank Canyon to Rattlesnake Gap Tank; and (2) from Rattlesnake Gap Tank upstream in an unnamed drainage to its confluence with a minor drainage, then upslope to a saddle, and across that saddle and directly downslope to Rattlesnake Pasture Tank. Populations are isolated and only one, the Rattlesnake Pasture Tank, of the five tanks are thought to be currently occupied. These tanks are fed by rainfall runoff, but Rattlesnake Pasture Tank may be spring fed as well. Tiger salamanders, presumably native Arizona tiger salamanders (*Ambystoma mavortium nebulosum*), occur in at least three tanks and likely prey upon CLFs to some degree. However, a healthy population of CLFs occurs with Arizona tiger salamanders at Rattlesnake Pasture Tank. Three juvenile to small adult bullfrogs, which were likely immigrants from another site, were found at Rattlesnake Gap Tank in June 2010. Follow up surveys in September 2010 at Rattlesnake Gap Tank detected multiple leopard frogs, with one confirmed Chiricahua leopard; there were no detections of bullfrogs. Surveys of Rattlesnake Gap Tank in 2011 failed to detect any frogs with the tank nearly dry. September 2010 surveys detected leopard frogs in Rattle Snake No 1 Tank, Rattle Snake No 2 Tank, and Buckhorn Tank; however, 2011 surveys of these sites failed to detect occupancy. If a population of bullfrogs is established at Rattlesnake Gap Tank, it would threaten CLFs in Rattlesnake Pasture Tank and the capacity for recovery in this RU. The status of the *Bd* is unknown in this CHU. There is some risk that these tanks, particularly Buckhorn Tank, could dry out during an extended drought.

RMA: San Francisco and Blue Rivers

CHU: Coal Creek

This CHU consists of 7 ac of the Apache-Sitgreaves NFs in Greenlee County, Arizona. Specifically, this CHU consists of an approximate 3,447-ft (1,051-m) reach of Coal Creek from

Highway 78 downstream to the confluence with an unnamed drainage. This is an isolated population and is considered to be currently occupied. Neither *Bd* nor nonnative predators are known to be a problem in this unit; however, should they be introduced or naturally colonize this CHU, they could be a serious impediment to recovery, particularly when the creek dries to isolated pools, concentrating CLFs and any predators or disease in remaining waters. Primary threats to this CHU include wildfire that could result in ash flow, sedimentation, and erosion in Coal Creek, as well as extended drought, during which the aquatic habitats of the CLF could be severely limited or could dry out completely, resulting in extirpation of this isolated population with little to no ability of the species to recolonize naturally.

Wildland Fires

Recent wildfires may have affected the PCEs of CH for the CLF. Areas containing CHUs may have experienced a range of burn severities and fire could have removed all or a portion of the surrounding vegetation component (including trees, shrubs, grasses, and forbs). Post-fire storm water runoff may have carried ash or sediment into the streams, resulting in poor water quality and sedimentation events that reduced or eliminated particular habitat features. The extent of damage to the PCEs of CHUs is not well known at this time.

Wallow Fire

The Wallow Fire started on May 29, 2011, and burned approximately 15,400 acres on the Apache NF in New Mexico. Two CHUs were impacted: Concho Bill and Deer Creek, number 26, and Campbell Blue and Coleman Creeks, number 27. There were two specific areas that were impacted within these CHUs: Concho Bill Tank and Campbell Blue Creek. Threats resulting from the fire include silting from runoff of ash and burned soil and could affect Sierra Blanca Lake, Concho Bill Tank, and Campbell Blue Creek. However, wetland vegetation roots and green growth are intact and terrain is flat at Dry Lake Tank. Runoff is expected to be little.

In summary, the status of the CLF on the Apache-Sitgreaves NFs (i.e., its environmental baseline) is stable to declining and threats are stable to increasing. The applicable CMs for the CLF that were associated with the 2005 consultation have been implemented, as appropriate. The 2011 wildfires on the Apache-Sitgreaves NFs consumed large amounts of vegetation. Silting from runoff of ash and burned soil could be significant in RU 6. However, the exact impact on proposed CH for the CLF from the fires is unknown. Non-native, predatory species are having significant impacts to the CLF and *Bd* is currently a threat or is found nearby on the Apache-Sitgreaves NFs.

Pursuant to the recovery plan for the CLF, areas within RU 6 in Arizona which encompasses the Apache-Sitgreaves NFs are in need of immediate recovery actions to ensure the persistence CLF populations. Frog populations in RU 6 need to be increased. Because recovery must be achieved in each RU in order to downlist or delist the species, actions or projects that affect CLFs or their habitats within a RU are considered in the ESA's section 7 consultation process.

Factors Affecting the Species Environment Within the Action Area

The factors affecting the CLF and its proposed CH within the action area (i.e., Apache-Sitgreaves NFs) are discussed in this section. Formal consultations that have 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 Apache- Sitgreaves NFs from 2005 to 2011.					
Consultation #	Date of Final BO	Project	Anticipated Incidental take	Locations	Form of Incidental take
22410-02-F-0101 R001	March 11, 2010	Apache-Trout Enhancement Project	0	Apache-Sitgreaves NFs, AZ	NA
02-21-03-F-0046 R2	July 26, 2005	Awtrey (formerly Coleman) and Marks Ditch Diversion Repair	5 frogs and 5 tadpoles per year	Apache-Sitgreaves NFs, AZ	death, wounds, trapping, or harassment
22410-2008-F-0215	March 1, 2010	Four Bridge	0	Apache-Sitgreaves NFs, AZ	0
22410-2001-F-0211 R1	August 26, 2008	Wildbunch Allotment Management Plan	2 dead or dying frogs or disturbed eggmass	Apache-Sitgreaves NFs, AZ	Harm and/or harassment
22410-2008-F-0149-R001	12/6/2011	<i>Effects to Listed Species from U.S. USFS Aerial Application of Fire Retardants on NFS Lands</i>	<i>Incidental take will be tracked as it occurs per the BO</i>	<i>Incidental take will be tracked as it occurs per the BO</i>	<i>Harm & Harass</i>

Since 2005, five site-specific BOs have been issued on the Apache-Sitgreaves NFs addressing adverse effects to CLFs. The FWS determined that the Awtrey and Marks Ditch Diversion Repair and Wildbunch Allotment Management Plan projects would incidentally take frogs, tadpoles, and egg-masses. The Apache-Sitgreaves NFs provided CMs that would minimize the impacts to frogs in all formal consultations. All BOs for projects conducted on the Apache-Sitgreaves NFs were determined to be non-jeopardy for the species. Incidental take of CLFs 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.

All Districts on the Apache-Sitgreaves NFs have completed the pre-ignition planning (subpart a) including the development and maintenance of GIS layers for all T&E species and have provided this information to Line Officers and Fire Management staff. Biological input is provided for fire management activities on all Districts (subpart b) and the development of contingency plans for CLF salvage during wildfires are still in the development phase for some Districts. On Clifton RD, the process is in place (subpart c). District fish/wildlife/fire staff and employees review and update this geographic information system (GIS) layer/map. Maps are coordinated with adjacent land administrators: Gila NF, BLM Safford Field Office, State Lands, and local tribal lands.

The Apache-Sitgreaves NFs uses prescribed burning to reduce catastrophic wildfires. Best Management Practices are implemented to minimize soil and ash movement. The Apache-Sitgreaves NFs has followed subparts *a* and *b* in the CMs listed below. The Apache-Sitgreaves NFs has access to species distribution maps. Districts also apply mitigation measures for species protection during the development of fire use plans.

Fish and wildlife staffs are conferred with by the Fire staff regarding any ongoing prescribed burning projects and regarding any wildfire, especially those in confine/contain strategies. During large wildfires fisheries and terrestrial biologists are present as Resource Advisors. On Districts where the CLF occurs, the fire staff coordinates with wildlife and fisheries resource staffs on activities that may affect the species downstream or on potentially occupied habitats to assure appropriate mitigations are in place to protect the species. During wildfire situations, the Incident Command and Team are informed on T&E species' issues and are addressed during management/suppression activities.

Recovery Actions

Conservation efforts on the Apache-Sitgreaves NFs included closing the area around the Three Forks Springs area (about 50 ac) to protect several species including the Three Forks springsnail, California floater, and the CLF populations in the spring complex. The Apache-Sitgreaves NFs is also cooperating with the AGFD to re-establish a population of CLF in Sierra Blanca Lake. The Apache-Sitgreaves actively participates in recovery efforts with the recently-formed CLF multi-agency recovery (Stakeholder) groups. Work plans are drafted annually which identify priority management activities and areas for recovery in RU 6. The Alpine and Clifton RDs coordinate with AGFD on seasonal ranid surveys. On the Alpine RD the population at Concho Bill Tank (spring fed tank) was supplemented with 25 adult CLFs Sept. 21, 2009. These were released by AGFD with assistance from Alpine RD.

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 Apache-Sitgreaves NFs LRMP and its amendments. During the 2005 LRMP consultation, the FWS and USFS jointly developed a set of CMs for the CLF which became part of the proposed action. The Apache-Sitgreaves NFs will continue to implement those CMs as part of the proposed action for this consultation. The five CMs are listed below.

Conservation Measures

Conservation Measure #1: Design projects in occupied CLF habitat on NFS lands which address the appropriate components of the CLF recovery plan, with the goal of implementing projects with beneficial, insignificant, or discountable effects to CLF.

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

Conservation Measure #4: Continue to implement the standardized interagency monitoring protocol for CLFs.

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.

a. Pre-ignition Planning: Maintain current distributions of threatened, endangered, proposed, and candidate species in GIS layers on each NF in the Southwestern Region and these GIS layers will be provided to the Line Officer, Fire Management staff and/or incident commander for each species occurring in the watershed of the ignition as well as surrounding watersheds.

Identify watersheds that are particularly susceptible to ash flow and sediment following high intensity fires. Use this information to guide fire use mitigation measures such as; delay, direct check and/or suppress.

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/colleges, and others to preserve, rescue and secure a population in imminent danger of localized extirpation due to fire use for resource benefits.

In summary, these CMs should go a long way towards not only minimization of projects impacts, but also towards recovery of frog populations on USFS lands. Conservation Measure #1 attempts to reduce and/or remove adverse project level impacts. It is understood that not all projects will be able to meet this standard, but as a goal statement, this measure can be very powerful and should help alleviate some of the threats to the frog. Conservation Measures #3 and #5 are similar to Conservation Measure #1 in that they minimize impacts, but they are aimed specifically at minimizing impacts of stock tanks and fire use, respectively. Finally, CMs #2 and #4 address recovery actions that will be required to actually recover the frog. As much of the historical habitat for frogs has been lost and population numbers have been declining, beneficial actions such as these will be required in order to reverse this trend.

In addition, the Apache-Sitgreaves NFs will also implement the following CMs for the CLF as part of their proposed action:

1. The Apache-Sitgreaves NFs will cooperate with partners including state, private, and other federal agencies in an effort to increase the number of CLF breeding populations on the Forest. Sites where efforts will be undertaken may include historically occupied areas but will also include finding new suitable, unoccupied sites that may require renovation or physical habitat improvement, for eventual repatriation of frogs. The Forest will continue to be an active partner of the Mogollon Rim and Upper Gila-Blue River Stakeholders' groups and participate in the development and implementation of annual work and strategy plans for CLF recovery actions in those RUs. The Forest will work with the FWS and other partners annually, to report accomplished activities from previous year and to identify new priorities for the duration of this consultation.
2. In cooperation with the Mogollon Rim and Upper Gila-Blue River Stakeholder groups and other partners, the Apache-Sitgreaves NFs will participate in the identification and implementation of actions in an attempt to control nonnative invasive species impacting the CLF at occupied or possible repatriation sites, where those actions can be reasonably accomplished and reasonably certain to have measurable benefits to the CLF.
3. The Apache-Sitgreaves NFs in cooperation with partners will create new refugia populations of frogs on the Forest when identified as a priority by the Mogollon Rim and Upper Gila-Blue River Stakeholders' groups.
4. The Apache-Sitgreaves NFs will seek opportunities to improve physical habitat conditions within occupied, recently occupied, and historic habitat for the CLF on the Forest. Examples might include habitat improvement actions, installing erosion controls, creating or deepening pools, or installing liners or groundwater wells to ensure permanency of water at a given site (within the limits of existing USFS water rights and applicable water law).

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.

The Apache-Sitgreaves NFs 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 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 CLF were evaluated in the 2005 BO/CO, and are included herein by reference (see FWS 2005). The majority of the S&Gs, which continue to be implemented as the proposed action within the Apache-Sitgreaves NFs 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.

Since the 2005 LRMP BO/CO was completed, there is one site-specific project that is still ongoing on the Apache-Sitgreaves NFs. This is the Wildbunch Allotment Management Plan. Implementation of this ongoing project and the issuance of incidental take is covered under this programmatic opinion since it supersedes the 2005 LRMP BO/CO. We have reviewed this site-specific project to ensure that they will not further diminish the conservation contribution of CH to the recovery of the Chiricahua Leopard Frog.

Effects of the Action on the Chiricahua Leopard Frog

Effects to the CLF were evaluated in the 2005 BO/CO (see FWS 2005). The majority of the applicable S&Gs are likely to result in beneficial effects to the CLF; however, we found six

S&Gs that are likely to result in a lethal, sublethal, or negative behavioral response in CLFs. In summary, less than six percent of the applicable S&Gs are likely to cause negative responses of CLFs, while almost 66 percent of the S&Gs have positive effects to the species. The remaining 29 percent of the applicable S&Gs have no effect to the CLF or are too vague or ill-defined to analyze. Adverse effects were found to occur from the Fire Management, Engineering, Rangeland Management, Forestry and Forest Health, Land and Minerals, Recreation, Heritage, and Wilderness, Watershed Management, and Wildlife, Fish and Rare Plants and are discussed below.

Fire Management Program

Fire management has little guidance in LRMP S&Gs to address conflicts between fire management and the CLF. No applicable S&Gs in the Fire Management Program are likely to result in negative effects to the CLF. However, there may be negative effects from this program not captured in the applicable S&Gs. In the Apache-Sitgreaves NFs LRMP there is not a specific Fire Management Program listed; however, there is a Protection Program which uses fire as a resource management tool where it can effectively accomplish resource management objectives (i.e. to improve wildlife habitat, livestock forage, reduce fuel hazards, and watershed condition) (Apache-Sitgreaves NFs LRMP). The use of prescribed fire and other fuels treatment methods provides great benefit to the CLF by reducing the risk of catastrophic wildfire, which given the limited number of extant populations on the Apache-Sitgreaves NFs, could have serious impacts to population functions. However, these projects are likely to result in lethal incidental 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. The use of fire as well as fire suppression activities may result in direct and indirect short-term modification of habitat. Finally, ash flows and erosion/sedimentation in burn areas have been known to cause local extirpations of CLFs in the affected areas. Conservation Measures in the 2005 BO/CO related to fire are being implemented on the Apache-Sitgreaves NFs, reducing the potential for adverse modification of proposed CH.

A number of S&Gs may provide substantial benefit to the CLF by helping to minimize impacts of this and other programs. Although not specific to fire use impacts, S&G 44 should help to minimize impacts of the Fire Management Program, discussed above, by reducing ash flow and sediment delivery to water courses. Furthermore, S&Gs 171 and 177 should help to minimize effects of disturbance by conserving soil and water resources and using appropriate buffers in order to maintain water quality. Taken together, these S&Gs should minimize the impacts to watersheds of projects in multiple programs across the Forest.

Engineering Program

Three S&Gs were analyzed for the Engineering Program on the Apache-Sitgreaves NFs. Of these, only S&G 63 had a negative effect on the CLF. This S&G allows for a road density which is above the level determined by the FWS and NOAA Fisheries to affect functioning watershed condition in the Northwestern U.S. At this density it is likely that watershed and water quality degradation will occur due to increased erosion, leading in turn to impairment and/or loss of CLF habitats. Although S&G 63 allows for a higher road density, the actual classified road density on the Apache-Sitgreaves is currently 2.2 mi/mi², which is below the level established by FWS and NOAA Fisheries and significantly below the level allowed by S&G 63. However, this density

does not include non-system (unclassified) roads which may be contributing to watershed degradation. Additionally, at any road density, improperly placed roads may disrupt metapopulation dynamics due to habitat fragmentation, as these roads may 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 CLF, mortality of other species of leopard frogs by vehicle traffic on roadways can be considerable (Carr and Fahrig 2001). CLFs are sometimes found on roads (J. Rorabaugh, FWS, 2005, unpubl. data) where they could be subject to road mortality.

Rangeland Management Program

The Rangeland Management Program in the LRMP provides guidance on grazing on the Apache-Sitgreaves NFs. No applicable S&Gs in the Rangeland Management Program are likely to result in direct negative effects to the CLF. There are, however, multiple S&Gs which are likely to have short-term impacts to individuals, although they may provide benefit to the CLF populations in the long-term. Standards and Guidelines 41 and 170 promote the use of road pit tanks as water sources for livestock. Stock tanks provide refugia for CLF populations and are important for this species in many areas. In Arizona, stock tanks have become important habitats for the CLF. Stock tanks can be very dynamic and lack habitat complexity. Tanks often dry out during drought, and flooding may destroy downstream impoundments or cause siltation, either of which may result in loss of aquatic communities and site-specific extirpation of CLF populations.

Standard and Guideline 137 allows for some livestock use of riparian habitat. This S&G is somewhat self-limiting; however, it does not completely remove the impact. Increased watershed erosion caused by grazing can accelerate sedimentation of pools used by CLFs and limit the persistence of standing water (Gunderson 1968). Sediment can alter primary productivity and fill interstitial spaces in streambed materials with fine particulates that impede water flow, reduce oxygen levels, and restrict waste removal (Chapman 1988). In the event livestock are moved through the riparian area without degrading it appreciably, all life stages, but particularly eggs, small tadpoles, and small CLFs, could be trampled during this process.

In addition, there may be negative effects from the Rangeland Management Program not captured in the applicable S&Gs. The goal for this program is to “Provide a program of range management that emphasizes high quality range forage and improvements. Benefits are improved watershed conditions, improved range forage production, improved wildlife habitat, and enhanced visual quality (Apache-Sitgreaves LRMP).” This goal statement provides direction for the Rangeland Management Program which should, in the long-term, provide increased watershed health and improved habitat for the CLF. There are likely to be impacts to the populations during the time that these areas are improving. Impacts include degraded watersheds that result in reduced breeding success through avoidance of those degraded areas. There are likely to be impacts to CLFs under any grazing regime, in the form of lethal effects resulting from trampling, spread of *Bd* and non-native predators, and livestock water maintenance.

Forestry and Forest Health Program

The Forestry and Forest Health program seeks to protect riparian areas and limit road densities. Only one S&G (97) in this program has a negative effect on the CLF. Like S&G 63 mentioned

above, S&G 97 also allows for a road density which was determined to compromise watershed functionality. Although the higher road density is temporary, the effects are likely to be the same as discussed above in the Engineering Program. Forest-wide S&Gs not assigned to a particular Program serve to restrict activities that may cause indirect effects. For example, MA3, which represents riparian areas, provides direction to managers to give “preferential consideration to riparian area-dependent resources in cases of unsolvable conflicts”. This S&G only limits the extent of the effects which could take place at the project level by suggesting only consideration to take place at the planning level.

Land and Minerals Program

Standard and Guideline 52 within the Land and Minerals Program allows for the use of herbicides, insecticides, rodenticides, and other chemical agents. Although this S&G is somewhat self-limiting in requiring that minimal probability of transfer to surface or groundwater will occur, it is still likely that CLFs would be affected. Standard and Guide 50 provides for preservation of water quality, protection of watershed values, reforestation or revegetation to attain soil stability, and protect threatened, endangered and sensitive species. The LRMP also seeks to limit the amount of disturbance by oil and gas leasing in riparian areas, areas with slopes greater than 40% grade, highly visible areas, erosive or unstable soils, other wildlife habitat, and watersheds managed for community water supplies (S&G 55). Roads to private properties are limited to only one access for one or more private land inholdings (S&G 58). Streambed alteration is allowed only if insignificant effects occur to riparian-dependent resources, channel morphology, or stream bank stability (S&G 51).

Adult CLFs living in the terrestrial environment could be impacted directly through reduced feeding success as a result of insecticide use. Additionally, this S&G does not eliminate the potential for transmission of chemicals into aquatic environments. These types of chemicals are likely to result in death and deformity of multiple life stages of CLFs. Also, at a minimum, any herbicide or insecticide in the waters would likely result in reduced breeding success through lack of cover and reduced feeding success through lack of prey and forage items.

Amphibians in general, and ranid frogs, in particular, are quite sensitive to pesticides and other chemical insult. These chemicals have a variety of direct and indirect effects on amphibians (Sparling 2003). Airborne movement and deposition of acidic compounds, pesticides, and potentially other chemicals over long distances can affect otherwise pristine areas that do not receive direct applications (Blanchard and Stromberg 1987, Davidson et al. 2002), and some pesticides may cause sublethal effects at very low dosages (Hayes et al. 2002, Hayes 2004; but see Carr et al. 2003).

Vital species habitats, such as wetlands, riparian areas, or other water oriented lands, have been identified for acquisition under the Land and Water Conservation Fund Act (S&G 59). S&G 60 and 180 extend this to include habitat for T&E species. No filters exist in the LRMP that encourage withdrawals, limit right-of-ways and easements, or limit water use authorizations. Therefore, the possibility exists for modification to the CLF proposed CH through the implementation of the Apache-Sitgreaves NFs LRMP.

Watershed Management Program

No applicable S&Gs in the Watershed Management Program are likely to result in direct negative effects to the CLF. However, S&G 49 is likely to result in incidental take of individuals while contributing positively to the populations. This S&G allows for roads that are causing resource damage to be closed and obliterated. This activity should result in improved watershed conditions reducing the impact on CLFs; however, the act of obliterating roads is likely to result in adverse effects 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.

Recreation, Heritage, and Wilderness Program

No applicable S&Gs in the Recreation Program are likely to result in negative effects to the CLF. However, there may be negative effects from this program not captured in the applicable S&Gs... Although activities are not directly identified as threats to the CLF, they are likely to involve some incidental take of individual CLFs in the form of disturbance, avoidance of impacted recreation areas, and even mortality from direct contact with humans and vehicles. 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, and some will likely spread non-native predators.

The Apache-Sitgreaves NFs LRMP implementation should effectively protect CLF proposed CH from recreational activities by allowing OHV closures in occupied areas. This can be accomplished under direction from the LRMP to protect soils, water quality, willow stands (S&G 160) and watersheds from damage (S&Gs 7, 8, 9, 10, 12, 14, 16, 17, and 18) associated with OHVs. The LRMP provides direction to close areas to the public to protect T&E species during critical use periods (S&G 154). This would include the CLF proposed CH. Also, trails on the Apache-Sitgreaves NFs are closed unless signed open (S&G 6) providing habitat protection by preventing or reducing user-created trails.

Wildlife, Fish, and Rare Plants Program

The vast majority of the applicable S&Gs in the Wildlife, Fish, and Rare Plants Program are beneficial to the CLF, but there are also some S&Gs with negative impacts. Standard and Guideline 114 allows for the maintenance and management of game fish habitat. While the act of specifically managing for game fish habitat should not negatively impact the CLF, where these game fish are already present in the watershed, improved habitat will allow them to expand their ranges, or increase population sizes and/or densities. This has potential to increase predation and competition pressures on the CLFs resulting in reduced feeding and breeding success, lethal take via consumption of tadpoles, eggs, and metamorphosed CLFs, and avoidance of affected areas.

Standard and Guideline 35 allows for the use of wildlife escape ramps in all livestock waters. These waters can be crucial CLF refugia in years of drought; however, there could be lethal take of individuals due to trampling. In addition, wildlife movement between waters could contribute to the spread of *Bd* and availability of these waters could facilitate the dispersal of non-native bullfrogs and salamanders.

Standards and Guidelines 155, 156, and 161 are all similar in that they provide for habitat improvement which benefits the CLF populations. However, the actual construction and maintenance of these structures is likely to result in incidental take of individuals. Frogs of

multiple life stages could be killed by tools and machinery. 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.

A number of S&Gs in the Wildlife Program provide substantial benefits to the CLF. Standard and Guideline 20 benefits the CLF by prioritizing T&E habitat above those of other species. Standard and Guideline 5 takes this one step further by actually directing the Forest to identify and protect T&E species habitat.

Standards and Guidelines 4 and 19 provide direction to improve habitat for T&E species and to work towards recovery. These S&Gs should help the Forest to minimize the effects of other projects, prioritize its projects such that negative impacts of other Forest uses could occur largely outside critical CLF areas, and may also result in increased population numbers and sizes.

In summary, the applicable S&Gs in the Apache-Sitgreaves LRMP could result in a variety of effects to the CLF. To a large extent, activities conducted under the positive S&Gs should benefit the CLF and/or help to eliminate or minimize the effects of activities conducted under the negative S&Gs. However, the positive S&Gs do not eliminate the possibility of adverse effects, thus incidental take of CLFs is reasonably certain to occur as a result of implementation of the Apache-Sitgreaves NFs LRMP.

Since the 2005 consultation, the FWS anticipated that incidental take of CLFs would occur in the form of harm and harass from one project that involved livestock allotment management (Wildbunch Allotment) and repairs to two diversion structures (Awtrey (formerly Coleman) and Marks Ditch). Two dead or dying CLFs or disturbed eggmass and five CLFs and five tadpoles per year (for a year and half) were anticipated to be taken (see Table 3 above). Although the CLF numbers are low, projects on the Apache-Sitgreaves that were evaluated since 2005 did not result in jeopardy or adverse modification determination.

Effects of the Action on Chiricahua Leopard Frog 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 are the basis for CH. To determine if an action results in adverse modification of CH, we must also evaluate the current condition of all CHUs, and the PCEs of those CHUs, to determine the overall ability of all 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 FWS only designated CH in 2012. Therefore, we have not yet analyzed the effects of site-specific projects on CH. Based upon actions we have consulted on within this action area, continued implementation of the Apache-Sitgreaves NFs LRMP may result in projects with adverse effects to CH. Below the PCEs related to CLF 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 CLFs could result in the loss and/or reduction (reduced depth) of this PCE. 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 (FWS 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 Apache-Sitgreaves NFs to fence off portions of stock tanks occupied by CLFs and 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 CLF.

Effect: The Apache-Sitgreaves NFs 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 CLF 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 CLFs.

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 Apache-Sitgreaves NFs 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. However, fencing at occupied habitat will leave some areas adjacent and immediately surrounding the stock tanks 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 PCE 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 PCE.

PCE 2c: Are free of barriers that block movement by CLFs, 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

The proposed action includes actions that are recommended in the Recovery Plan. These actions were identified as being necessary to recover the CLF and the Apache-Sitgreaves NFs is either implementing or assisting with implementation of these actions in CH. These actions include the following:

- The Apache-Sitgreaves NFs has and continues to design projects in occupied CLF habitat which address the appropriate components of the Recovery Plan, with the goal of implementing projects with beneficial, insignificant, or discountable effects to CLF.
- The Apache-Sitgreaves NFs 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.
- The Apache-Sitgreaves NFs, working with FWS and AGFD, has been monitoring potential habitat following the standardized interagency monitoring protocol for the CLF.
- The Apache-Sitgreaves NFs maintains GIS layers for the current distribution of CLFs 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 Apache-Sitgreaves NFs continues to participate in CLF conservation coordination meetings. The team of agency personnel and other interested parties established several workgroups to address various aspects of protecting populations, identifying information needs, information access, seeking funding and resources, establishing partnerships, and other tasks. 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 Apache-Sitgreaves NFs are active members of the CLF multi-organization conservation team. Further, the Apache-Sitgreaves NFs biologists have also helped with habitat improvements and re-introduction of populations.

These actions should increase the sustainability and resiliency of CLF habitat. Therefore, continued implementation of the Apache-Sitgreaves NF's LRMP is not expected to diminish the conservation contribution of CH to the recovery of the CLF.

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. Since the entire project area is within the Apache-Sitgreaves NFs, all legal actions likely to occur are considered federal actions.

Cumulative effects to native aquatic animals 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, and recreation without a Federal nexus. 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 aquatic animals. Other activities, such as recreation, are increasing. Increasing recreational, residential, or commercial use of the non-Federal lands near riparian areas and earthen stock tanks would likely result in increased cumulative adverse effects to occupied, as well as potentially occupied native aquatic animal habitat through increased water use, increased pollution, and increased alteration of the stream banks through riparian vegetation suppression, bank trampling, changing flow regimes, and erosion.

CONCLUSION

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 ESA to complete the following analysis with respect to CH. Critical habitat is defined in section 3 of the ESA "as the specific areas within the geographical area occupied by the species, at the time it is listed in accordance with the ESA, on which are found those PBFs 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" (FWS and National Marine Fisheries Service 1998:4-34).

After reviewing the current status of the CLF 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 Apache-Sitgreaves NFs will not jeopardize the

continued existence of the frog and will not destroy or adversely modify CH. Effects analyses and conclusions in BOs from 2005 through 2010 for the Apache-Sitgreaves NFs also determined that projects implemented under the current LRMP were not likely to jeopardize the continued existence of the CLF. Further, summary of our reasoning for determining that the continued implementation of the LRMP for the Apache-Sitgreaves NFs will not jeopardize the frog and will not 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 CLF 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. In addition, in 2012, additional CMs were developed between the two agencies.
- Standards and Guidelines within the Apache-Sitgreaves NF's LRMP have not changed since 2005, the majority of which were found to be beneficial to the CLF. The frog's environmental baseline has improved on the Apache-Sitgreaves NFs 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 stock tanks occupied since 2005 and protection of CH (e.g., fencing at occupied tanks to prevent livestock access to portions of the tank).
- Projects implemented under the Apache-Sitgreaves NF's LRMP have not lead to a jeopardy determination.

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 Apache-Sitgreaves NFs 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 Apache-Sitgreaves NFs has a continuing duty to regulate the activity covered by this incidental take statement. If the

Apache-Sitgreaves NFs (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 Apache-Sitgreaves NFs 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

Incidental take of the CLF is reasonably certain to occur as a result of the continued implementation of the Apache-Sitgreaves NFs 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 CLF surveys (FWS 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 Apache-Sitgreaves NFs LRMP. Taking into account the ongoing take identified for projects identified in Table 3, we conclude that the incidental take of CLFs will be considered exceeded if there is a net loss in the number of reproductive sites for a period of three consecutive years as a result of activities implemented by the Apache-Sitgreaves NFs as proposed herein. The incidental take is in addition to previously authorized take resulting from ongoing projects or projects that have yet to be fully implemented as identified in the “Factors Affecting the Species Environment Within the Action Area” section above. 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 site 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 Apache-Sitgreaves NFs, 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 population from recovering to pre-take levels because the existing occupied stock tanks are all within frog dispersal distance of one another (frogs can move up to 5 miles, see Status of the Species) and connected via CH. Therefore, if frogs cease to be present at one site, the frogs will be able to recolonize the site on their own, or we can assist them as we have done in the past. We anticipate the Apache-Sitgreaves NFs will continue to work with the FWS and AGFD to continue to implement actions such as captive breeding, habitat protection (e.g., fencing, silt fences, etc.) that will result in an increase in the number and resiliency of occupied stock tanks or other suitable habitats 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 the CLF. While the proposed action, implementation of S&Gs under the 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 reproductive site.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

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

1. Minimize or eliminate adverse effects to CLFs on the Apache-Sitgreaves NFs.
2. Minimize or eliminate adverse effects to CLF habitat on the Apache-Sitgreaves NFs.
3. Monitor the impacts of site-specific projects on the CLF.

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 The Apache-Sitgreaves NFs shall attempt to protect occupied breeding sites during implementation of projects, which may include fencing of stock tanks to exclude livestock or wild ungulates if necessary.
- 1.2 Where feasible, all equipment that comes into contact with aquatic habitats will be cleaned and disinfected before visiting a different aquatic site by removing all soil, mud, and debris and disinfecting or drying the equipment 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 Apache-Sitgreaves USFS employees or permittees unless approved by the FWS.
- 2.2 Where new or existing sites occupied by CLFs occur, water shall not be exchanged between sites that support leopard frogs, bullfrogs, crayfish, or fish by Apache-Sitgreaves NFs employees, permittees, or anyone operating under USFS authorization.

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

- 3.1 The Apache-Sitgreaves NFs 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 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.

1. We recommend that the USFS 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 frog populations.

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.

THREE FORKS SPRINGSNAIL

STATUS OF THE SPECIES

The Three Forks springsnail (*Pyrgulopsis trivialis*) was proposed endangered (76 FR 20464) on April 12, 2011, with proposed CH within the North Fork East Fork Black River watershed in the White Mountains of east-central Arizona. The proposal became a final rule on April 17, 2012. The Three Forks springsnail is listed as Endangered with CH. It is also listed under Arizona Game and Fish Commission Order 42, which establishes no open season for the species. The Order prohibits the direct taking of the springsnail, but does not prohibit spring modification or habitat destruction.

The Three Forks springsnail is an endemic freshwater gastropod limited in distribution to Boneyard Bog and Boneyard Creek springs. The species formerly occurred in Three Forks springs, but is now extirpated. Each of these springs complexes consist of a series of several free-flowing spring heads, concrete boxed spring heads, spring runs, and spring seepage. These spring complexes are found in open mountain meadows at 8,200 feet (2,500 m) elevation and occur over approximately 3.7 miles (6 km) of perennial flowing stream.

The Three Forks springsnail historically occurred at all spring sites in abundance (Myers 2000, p. 1; Nelson *et al.* 2002, p. 5; Myers 2011, p. 5). Nelson *et al.* (2002, p. 5) reported Three Forks springsnail densities of approximately 72 per square yard (60 snails per square meter) at Three Forks and approximately 945 per square yard (790 snails per square meter) at Boneyard Bog Springs. The number at a single springbrook, with an area of 254 square yards (213 square meters), at Three Forks Springs in 2002 was estimated at tens of thousands of individual snails (Martinez 2009, pp. 31–32). Since 2004, the Three Forks springsnail is extirpated from Three Forks springs.

Three Forks springsnail habitats are isolated, permanently saturated, spring fed aquatic communities. The most common habitat for species is a rheocrene, or a spring emerging from the ground as a free-flowing stream. Observations during the winter at Three Forks Springs suggest water temperature at the spring heads are warmer than nearby waters not influenced by spring water (USFS 2004). Three Forks snails are rarely found on or in soft sediment typically associated with seeps, and low-gradient, low-flow springheads. Firm substrates such as cobble, gravel, woody debris, and aquatic vegetation are more typical of springsnail habitat. Aquatic

vegetation within the Three Forks habitat includes watercress (*Nasturtium* sp.), buttercup (*Ranunculus* sp.), and filamentous green algae.

Martinez and Myers (2008, p. 189–194) found the presence of Three Forks springsnail associated with gravel/pebble substrates, shallow water up to 2.4 in (6 cm) deep, high conductivity, alkaline waters of pH 8, and the presence of pond snails (*Physa gyrina*). Density of Three Forks springsnail is significantly greater on gravel/cobble substrates (Martinez and Myers 2002, p. 1; Nelson *et al.* 2002, p. 1), though the species has been reported as “abundant” in the fine-grained mud of a 0.025 ac (0.01 ha) pond at Three Forks (Taylor 1987, p. 32). Abundance has been found to decrease downstream from springheads (Nelson *et al.* 2002, p. 11), consistent with studies of other springsnails (Hershler 1984, p. 68; Hershler 1998, p. 11; Hershler and Sada 2002, p. 256; Martinez and Thome 2006, p. 14; Tsai *et al.* 2007, p. 216).

Springsnails are typically distributed across the landscape as geographically isolated populations exhibiting a high degree of endemism (found only in a particular area or region) (Taylor 1987, pp. 5–6; Shepard 1993, p. 354; Hershler and Sada 2002, p. 255). Springsnails are strictly aquatic and respiration occurs through an internal gill. Springsnails in the genus *Pyrgulopsis* are egg-layers (Hershler 1998, p. 14). The larval stage is completed in the egg capsule and, upon hatching, tiny snails emerge into their adult habitat (Brusca and Brusca 1990, p. 759; Hershler and Sada 2002, p. 256). The sexes are separate and physical differences are noticeable between them, with females being larger than males. Three Forks springsnails are approximately 1.5–4.5 mm (0.06–0.18 inches) in shell height. Mobility is limited, and significant migration likely does not occur, although aquatic snails have been known to disperse by becoming attached to the feathers of migratory birds. Martinez and Rogowski (2011) concluded that Three Forks springsnails compete and partition habitat with pond snails (*Physa*).

Occupied springsnail habitat at the spring complexes may be affected by multiple factors, including wildfires, wildfire suppression activities, non-native aquatic species, ungulates, recreational use, and natural events. For a complete description of the threats to the species, refer to the five-factor analysis in the proposed rule (76 FR 20464; April 12, 2011).

During the summer of 2004, the Three Forks fire ignited on USFS lands and developed into a hot crown fire (fires burning in tree canopies). Fire suppression efforts by the USFS included application of aerial fire retardants. Although this fire did not directly burn the Three Forks Springs area, surface waters within the Three Forks fire area were likely exposed to fire retardant (chemicals used to suppress fire) that drifted from high elevation retardant releases from aircraft (USFS 2005). Many fire retardant chemicals contain ammonia while some formulations contain sodium ferrocyanide, both of which can be toxic to aquatic wildlife.

Available data indicate that the species was still abundant in all historically occupied sites at Three Forks Springs in 2002 and 2003, just prior to the fire (76 FR 20464; April 12, 2011; Martinez 2009, pp. 31–32). Surveys since 2004, following the fire, have failed to locate springsnails, suggesting that lethal concentrations of retardant may have contaminated the water in Three Forks Springs.

Three Forks springsnail habitats were also affected by the recent Wallow Fire in the summer of 2011. Many of the spring sites and surrounding areas exhibited burned conditions (USFS 2011). Although abundance of Three Forks springsnails may have been affected by the wildfire, suppression, and rehabilitation efforts, it is unknown if the landscape-scale distribution of this species will be permanently affected (USFS 2011). Salvage efforts were largely successful and should assist managers in restoring populations that may have been affected by the wildfire, suppression, rehabilitation, and post-fire flooding.

Interactions with non-native snails and other aquatic species may affect the distribution and abundance of Three Forks springsnails. Non-native crayfish (*Oronectes viriles*) have invaded springs complexes occupied by Three Forks springsnails. Crayfish are known to directly prey upon aquatic invertebrates such as springsnails. Crayfish are also known to consume aquatic macrophytes and algae that springsnails rely on for grazing and egg laying. The indirect effects of crayfish on the integrity and structure of aquatic habitats is well documented, and have the potential to threaten the habitat of Three Forks springsnails (Olsen *et al.* 1991, BISON 2000). Due to its geographic isolation, the Three Forks springsnail may not be evolutionarily adapted to cope with crayfish, perhaps making the species susceptible to crayfish predation.

Currently, livestock grazing does not occur in occupied springsnail habitat. However, free-ranging elk (*Cervus elaphus*) have access to all spring areas containing Three Forks springsnails. During the summers of 1999 and 2000, agency biologists became concerned with potential impacts of elk wallowing at Boneyard Bog springs. The primary concern was observed bank degradation of springs and changes in substrate composition within springsnail habitat. Specifically, wallowing seems to result in the filling of gravel substrates with fine sediments, which data suggests are less conducive to occupation by springsnails. Elk impacts appear benign at habitats in the Three Forks Springs complex, possibly due to geology (e.g. rocky). Yet, elk are known to congregate seasonally at Boneyard Bog Springs, resulting in soil disturbance that may alter substrate quality or directly impact springsnails.

Three Forks springsnails have continued to exist through prolonged, and at times, intensive disturbance to their habitats. In the 1930s, Civilian Conservation Corps activities at the Three Forks Springs complex impacted the springs and surrounding habitat with the construction of spring-boxes, road use, and human habitation (USFS 2004). Roads and road reconstruction has occurred in close proximity to the Three Forks Springs complex for many decades.

The restricted geographic distribution of Three Forks springsnails increases the species' susceptibility to stochastic extinction. Catastrophic natural disasters such as wildfires, flooding, extreme drought, and changes in spring water chemistry may significantly alter watershed conditions within the Three Forks Creek or upper Boneyard Creek drainage systems, resulting in qualitative or quantitative changes to springsnail habitats (USFS 2004).

Recovery Actions

A standardized monitoring protocol for Three Forks springsnails was developed by interagency cooperators in the summer of 2001 and refined in the summer of 2002. AGFD conducts annual surveys. In 2002, the AGFD, in coordination with the Apache-Sitgreaves NFs, began an

intensive crayfish removal program at Three Forks Springs (Nelson *et al.* 2002). By 2003, thousands of crayfish had been removed, though not eliminated, from the Three Forks area.

The Alpine RD has made efforts to eliminate direct impacts on Three Forks springsnail habitat from livestock grazing. The last permitted livestock use at Three Forks Springs (Black River allotment) was in 1997. From 1998 through 2001, the permittee voluntarily did not stock livestock on the Black River allotment. In February 2002, the permittee waived his grazing permit back to the USFS, restricting livestock use on the entire allotment, including all of Three Forks Creek and upstream to include Boneyard Creek immediately adjacent to the downstream side of Boneyard Bog springs (USFS 2004). In 1998, the Alpine RD constructed a fence around Boneyard Bog to eliminate any direct impacts to the area from permitted livestock on the Nutrioso Summer allotment. Since 2002, livestock have been precluded from direct access to Boneyard Creek upstream of Boneyard Bog Springs (USFS 2004).

To reduce the potential negative impacts associated with recreational activities, the Apache-Sitgreaves NFs closed the Three Forks Springs area to public access in 2000. The administrative closure does not apply to federal, state, or local officers in the performance of an official duty, and to those persons with a permit specifically authorizing entrance to the site (USFS 2004). The public closure may reduce the likelihood of adverse effects associated with dispersed recreation. The closure will remain in effect until rescinded by the NF Supervisor.

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 within the Action Area

The entire range of the species occurs within the action area on the Apache-Sitgreaves NFs, thus the status of the species in the action area does not differ from the description of the status of the species rangewide.

EFFECTS OF THE ACTION

Since the 2004 BA for The Continued Implementation of the Apache-Sitgreaves LRMP, the most significant new information for Three Forks springsnail is related to the Wallow Fire, which is summarized in USFS (2011). In addition, after a thorough review of all LRMP amendments and various land and resource management program descriptions since 2004, it was determined there have been no changes in Forest policy or programs that would change the 2004 BA effects determinations. Therefore, the reader is directed to the 2004 BA (USFS 2004) and the 2005 BO/CO (FWS 2005) for the in-depth effects analysis for this 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 each 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 these 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.

The S&Gs listed in the Apache-Sitgreaves NFs LRMP and 1996 Regional Amendment provide direction for the development of site-specific actions. Multiple S&Gs within these LRMPs are applicable to Three Forks springsnails and designated CH. The S&Gs, if applied to project-level activities, may result in both indirect and direct effects to the species. USFS management on the Apache-Sitgreaves NFs may potentially impact Three Forks springsnails and designated CH if that direction is likely to direct actions that alter the quantity or quality of waters at spring sources and rheocrene habitats (outflow streams from the springs); influence the presence of non-native species, or directly impact the snails themselves (USFS 2004).

The majority of occupied springsnail habitat occurs in MA 3 within non-wilderness areas. The emphasis of MA 3 focuses on the importance and distinctive values of riparian areas. This area is managed to maintain or improve riparian areas to satisfactory condition (USFS 1987).

The long-term survival of the Three Forks springsnail is dependent upon the protection of riparian habitats, spring sources, and rheocrene habitats. In general, the S&Gs of the Apache-Sitgreaves NFs LRMP provides management direction that promotes the conservation of soil, water, and riparian resources. Approximately 60 percent of the S&Gs are likely to have a positive impact on the Three Forks springsnail. Yet, no S&Gs within the Apache-Sitgreaves NFs LRMP specifically address the conservation of the species.

Less than 12 percent of the S&Gs within the Apache-Sitgreaves NFs LRMP have the potential for negative effects to the Three Forks springsnail. However, these S&Gs may alter the quantity or quality of spring habitats where Three Forks springsnails reside, having an indirect impact to the species. Specific S&Gs may lead to activities that directly impact springsnails and their habitats by dislodging the snails from their substrate, crushing individual snails, and support the presence of non-native species.

Drought and climate change could eventually exacerbate existing threats to spring habitats in the Southwestern U.S. Increased and prolonged drought associated with changing climatic patterns could adversely affect spring habitats by reducing water availability, and altering food availability and predation rates. Drying of spring flow is of particular concern because springsnails depend on permanent flowing water for survival. However, we have no specific information indicating that any springs occupied, or formerly occupied, by Three Forks

springsnail have experienced decline in water flow, or are likely to do so. Therefore we conclude that drought is not currently affecting the species, but may affect the species or its habitats in the foreseeable future.

Below we discuss various USFS programs and the effect from selection of S&Gs.

Engineering Program

The Engineering Program of the Apache-Sitgreaves NFs LRMP includes the construction, maintenance and operation of roads. Such activities have the potential to indirectly affect Three Forks springsnails by disrupting watershed function. Road-associated activities can affect riparian and spring habitats by generating sediments, altering runoff regimes, contaminating surface waters, and facilitating access by humans to aquatic habitats.

Standard and Guideline 63 directs total road density within the Apache-Sitgreaves NFs to average 3.5 mi/mi² or less. The S&G also directs open road density to average 2.0 mi/mi² or less. The recommended road density standard is 2.5 mi/mi²; yet, S&G 63 allows road density on the Forest to average above this standard. The potential exists for adverse affects to Three Forks springsnail habitat if roads were to occur in the vicinity of spring habitats. In particular, road maintenance activities on Road 249 may affect designated CH near Three Forks Springs.

Standard and Guideline 62 provides direction for the management of roads on the Apache-Sitgreaves NFs. Standard and Guideline 62 directs the seasonal or permanent closure of existing roads and prohibits off-road vehicle use when conflicts occur with wildlife and soil resource objectives. The guidance of S&G 62 also recommends limiting local road closures in erosive soil areas, riparian areas, or wildlife areas that require specific management practices. The implementation of such management guidance for the protection of wildlife resources would be beneficial to Three Forks springsnails and designated CH. Standard and Guideline 62 minimizes the impact of road use on Three Forks springsnails by reducing public access to Boneyard Creek and prohibiting off-road vehicle use near Three Forks Springs. These management efforts can promote the survival and recovery, and ensure that designated CH continues to contribute to the conservation of the species.

Forestry and Forest Health Program

The Forestry and Forest Health Program includes timber harvest, forest product extraction, and forest health. Areas within and adjacent to Three Forks springsnail habitat are not suitable for timber harvest. MA 3 directs the use of vegetation manipulations when needed to enhance riparian objectives.

Few S&Gs within the Forestry and Forest Health Program are applicable to Three Forks springsnails and their spring habitats. However, S&G 64 has the potential to affect springsnail habitat by authorizing the use of clear-cutting for mistletoe control. Clear-cutting activities increase sediment run-off and erosion potential. The implementation of S&G 64 could have a negative impact on Three Forks springsnails through the alteration of spring habitat and water quality. However, according to the USFS (2004), there has been a major reduction in the number of clear cut acres over the past decade. Therefore, threats to the Three Forks springsnail from clear-cutting activities are significantly reduced.

Many S&Gs within the Forestry and Forest Health Program call for special consideration of riparian areas, which include spring habitat. Standard and Guideline 42 requires riparian areas to be mapped as separate areas when they are at least 10 acres. Defined and mapped riparian areas are managed as a sensitive resource. Therefore, Three Forks springsnail habitat is specifically managed as a riparian area receiving special consideration for the protection of riparian resources.

Lands and Minerals Program

The Lands and Minerals Program manages purchases, withdrawals, land exchanges, mining, oil, gas, and geothermal leases, and the issuance of non-recreational special use authorizations. The management and administration of minerals includes surface disturbances associated with underground mining operations, such as exploration drill holes, road construction, and active mining. These activities, if conducted within areas occupied by the Three Forks springsnail, could affect the species and designated CH, though effects would be considered in a site specific project analysis.

Standard and Guidelines associated with surface disturbances within or adjacent to occupied Three Forks springsnail habitat could have a negative impact to the species, except at Three Forks which is closed to entry. Forest-wide S&G 51 restricts streambed alteration or the removal of material if the action significantly affects riparian-dependent resources, channel morphology, or streambank stability. However, if such factors are not significantly affected, streambed alterations and material removal is permitted. Such activities could directly affect Three Forks springsnails through the crushing of springsnails. Standard and Guideline 178 restates S&G 51 and could have the same effect on the species.

Management activities associated with the use of pesticides could have an adverse effect upon Three Forks springsnails. Standard and Guideline 52 limits the use of herbicides, insecticides, rodenticides, or other chemical agents to times and places where possible transport to or by surface or groundwater has a low probability of occurrence. Although this S&G aims to minimize the negative effects associated with chemical use, the guidance also allows for the possibility of chemicals to degrade surface waters, though such use would be considered in a site specific analysis. Poor water quality could have an adverse effect upon Three Forks springsnails.

Rangeland Management Program

The Rangeland Management Program provides for grazing of domestic livestock on NFS lands (USFS 2004). Livestock grazing on the Apache-Sitgreaves NFs can directly impact areas through trampling. Grazing impacts can also include the contamination and degradation of springs.

However, no applicable S&Gs within the Rangeland Management Program have a negative effect on Three Forks springsnail. The S&Gs incorporate the protection of riparian resources with the use of livestock. For MA 3, S&Gs 132 and 133 guide allotment plans and grazing strategies towards the improvement of riparian habitat and the recovery of both biological systems (vegetative diversity and structure) and physical systems (channel characteristics and hydrology). These S&Gs indirectly benefit Three Forks springsnails by maintaining and

improving riparian areas, which include spring habitats. In addition, S&Gs 134 and 135 have a positive impact on Three Forks springsnails. Standard and Guideline 143 directs the grazing capability to consider other resource objectives and riparian recovery goals. Standard and Guideline 135 supports the implementation of management plans to limit grazing in unsatisfactory riparian conditions to allow such areas to recover. Such management direction helps minimize adverse effects to riparian areas by livestock grazing.

Livestock grazing is currently restricted from occupied springsnail habitat at Three Forks and Boneyard Bog springs complexes. This restriction has removed a significant stressor to the springsnail and designated CH, and contributed to the protection of the Three Forks springsnail. Positive S&Gs and the restriction of livestock grazing eliminate the threats to Three Forks springsnails associated with livestock. These management efforts can promote the survival and recovery, and ensure that designated CH continues to contribute to the conservation of the species.

Recreation, Heritage, and Wilderness Program

The Recreation Program oversees the management of recreation and heritage sites within the NFs and National Grasslands of the Southwestern Region. Recreational activities (both developed and dispersed) are an important public function of NFS lands, as mandated by law, and recreational demands on NFs continue to increase. The Apache-Sitgreaves NFs experienced over 2,000,000 visitors in 2001 (USFS 2004).

The management direction of S&G 112 is unlikely to negatively affect Three Forks springsnails. Within MA 3, S&G 112 emphasizes maximum possible recreation use. The S&G also directs the protection of riparian characteristics. Also, the Three Forks area is closed to access without permit. Maximum recreational use is not likely to coincide with the protection of riparian resources. Recreational activities at the Three Forks springs complex are somewhat controlled by the closing of the spring to recreation. The spring's close proximity to USFS Road 249 and large vehicle "pull-off" has continued to attract recreationists. However, interpretive signage exists to increase public awareness of the sensitivity of the area. Recreational activities at Boneyard Bog springs have been less frequent than those activities conducted at the Three Forks springs complex due to its geographic isolation and limited access.

Management direction for MA 3 provides guidance for managing recreation to protect natural resources. Standard and Guideline 113 prohibits recreation in areas of unsatisfactory condition, when recreation was a significant factor in causing the condition. Standard and Guideline 113 would have a positive effect upon Three Forks springsnails by minimizing threats caused by recreational activities.

Multiple S&Gs within the Recreation Program provide direction for the management of OHV use. These S&Gs restrict or limit OHV use for the protection of riparian-dependent resources. Forest-wide S&Gs 7 and 9 call for OHV closures when needed to protect soil characteristics and water quality. Standard and Guideline 14 restricts OHV use for the protection of wildlife. Also, S&Gs 16 and 17 impose OHV closures to prevent adverse effects to watercourses, wetlands, and watersheds. These S&Gs provide direction for managing OHV in ways that are beneficial to Three Forks springsnail and designated CH.

Watershed Management Program

Objectives of the Watershed Management Program include improving and maintaining water quality, protecting and restoring riparian areas, and prioritizing watersheds for protection or improvement. Structural and non-structural measures are used to maintain and improve watershed conditions. These measures include fencing to exclude livestock from riparian areas; prescribed burns; road obliteration; and other soil and water improvement activities (USFS 2004).

Multiple S&Gs within the Watershed Management Program provide management direction for protecting and restoring riparian habitat areas. Standard and Guidelines 45, 47, 48, 49, 171, and 177 call for the protection of soil and water resources (temperature, water quality, erosion) during USFS projects. These S&Gs also direct the closure and obliteration of roads causing resource damage. In addition, forest-wide S&G 53 guides improvement projects to protect and restore downstream riparian resources. Standard and Guidelines for MA 2 and MA 3 provide further protection of riparian-dependent resources by requiring buffer strips and BMPs to prevent water quality degradation. These S&Gs of the Watershed Management Program indirectly affect Three Forks springsnails by protecting and improving spring habitats. As a result, these S&Gs have a positive impact upon the species.

Standard and Guideline 43 provides management direction for preventing and improving water quality degradation through the implementation of BMPs. However, S&G 43 also permits temporary water degradation from road crossing construction and similar activities. Temporary road construction activities could have a short-term effect on spring habitats. Standard and Guideline 43 minimizes impacts to aquatic species; yet, the guideline could have a short-term negative effect on Three Forks springsnail.

Wildlife, Fish, and Rare Plants Program

The Wildlife Program involves a variety of activities including inventory and monitoring, habitat assessments, habitat improvements through land treatments and structures, species reintroductions, development of conservation strategies, research, and information and education (USFS 2004). The majority of S&Gs within the Wildlife Program emphasize the protection and improvement of fish and wildlife habitat. However, a few S&Gs may directly or indirectly have a negative effect to Three Forks springsnails.

Forest-wide S&G 39 provides management direction for maintaining a minimum of 40 percent potential habitat capability for the management indicator species selected for each vegetative type. As a macro-invertebrate, the Three Forks springsnail is an indicator species. Maintaining a minimum 40 percent habitat capability could adversely affect the quality and availability of spring habitat, thus having a negative effect on the species.

Standards and Guidelines 116 and 117 apply to MA 3. These S&Gs outline habitat requirements for Priority 1 and 2 Riparian Areas. Standard and Guideline 116 directs for at least 80 percent of stream bank total linear distance be maintained in stable condition. Standard and Guideline 117 establishes the limit for siltation at 855 mm. These habitat requirements do not provide for

quality spring habitat. The S&Gs set habitat standards that could indirectly have a negative effect on Three Forks springsnail and designated CH.

Standard and Guideline 143 applies to MA 4. The S&G provides management direction for the development of springs. Standard and Guideline 143 emphasizes the redirecting of water to non-sensitive areas outside of meadows and riparian habitat. Although minimizing direct adverse effects to Three Forks springsnails, altering water flow affects the spring system. Thus indirectly, S&G 143 may have a negative effect on Three Forks springsnail and designated CH.

In general, management direction within the Wildlife Program promotes the conservation of soil, water, and riparian resources. The S&Gs provide guidance for minimizing adverse effects on riparian-dependent resources when implementing USFS activities. Standard and Guideline 142 applies within MA 4, and emphasizes the protection of key meadows from grazing. The S&G directly benefits the Three Forks springsnail by authorizing the use of fences to protect sensitive riparian habitat from livestock.

Standard and Guidelines within the Wildlife Program also provide direction on managing T&E species habitat. In particular, S&Gs 4, 20, and 33 emphasize habitat management of threatened, endangered, and sensitive species. Standard and Guideline 4 directs management to improve TES habitat and work towards recovery and declassification of the species. Standard and Guideline 20 outlines the priority of habitat management, with endangered species taking precedence over threatened species, and sensitive species taking precedence over non-sensitive species. Standard and Guideline 33 allows for areas closures, as needed to protect habitat of sensitive or T&E species. These S&Gs establish management direction that directly and indirectly benefits Three Forks springsnails.

Management direction in S&Gs 107 and 108 emphasizes riparian areas and riparian resources. Standard and Guideline 107 directs action to maintain or improve riparian areas to satisfactory riparian condition. Such guidance has a positive effect upon the spring habitats of Three Forks springsnails. However, while conducting activities that contribute to the conservation of springsnails, negative impacts may occur. As a result, S&G 107 may have short-term negative effects to Three Forks springsnails while managing for the long-term conservation of the species. Standard and Guideline 108 provides direction for managing riparian dependent resources, placing an emphasis on T&E species before other riparian dependent resources. Such guidance has a positive effect on Three Forks springsnails. In addition, the implementation of S&G 108 helps reduce the threat of non-native crayfish on populations of springsnails inhabiting the Three Forks Springs complex.

In summary, the management direction of the Apache-Sitgreaves NFs LRMP promotes the conservation of soil, water, and riparian resources, including the spring sources and rheocrene habitats occupied by the Three Forks springsnail. However, a few specific guidelines within the Lands and Minerals, recreation, and watershed programs have the potential to adversely affect the springsnail. Streambed alteration and sediment removal within springs occupied by Three Forks springsnails alters spring habitat and its function, as well as cause the crushing of individual springsnails. Also, the use of chemical agents within occupied springs or adjacent

stream reaches is likely to degrade water quality and adversely affect Three Forks springsnail populations.

Management direction emphasizing maximum recreational use does not provide for the protection of riparian resources. The impacts of recreationists using the Road 249 “pull-off” may affect the Three Forks springsnails through the introduction of contaminants into Three Forks springs complex, if springboxes were used for bathing. However, the likelihood is low considering the existence of educational signage. Thus, management guidance currently limits such threats,

Although many S&Gs within the Watershed Management Program of the Apache-Sitgreaves NFs LRMP provide for the protection and restoration of riparian habitats, specific S&Gs also could result in temporary water degradation from road crossing construction and maintenance activities. Such activities are likely to have a short-term adverse effect on spring habitat. Poor water quality conditions resulting from road construction and maintenance are likely to affect Three Forks springsnails at both locations.

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; functioning watersheds; and riparian and aquatic systems (USFS 2004). Three Forks springsnail sites occur within the MSO restricted and protected areas, as well as the nesting and post-fledgling family areas of northern goshawks. As a result, the S&Gs associated with the 1996 Regional Amendment are applicable to Three Forks springsnails and designated CH. However, we found that the guidelines used by the USFS for the northern goshawk do not appreciably affect this species.

All of the S&Gs within the 1996 Regional Amendment lie under the Wildlife Program; yet the content of the S&Gs apply to several program activities. The majority of these S&Gs provide management direction for maintaining MSO and northern goshawk habitat, and at least recovery of these species. While not a focus of the Amendment, the S&Gs have the potential to affect other T&E species. In the case of the Three Forks springsnail, 59 percent of the S&Gs have positive effects on the species, while 2 percent of the S&Gs adversely impact Three Forks springsnails and designated CH.

Within MSO protected areas, S&G 1438 allows for the level of recreational use that occurred prior to the threatened listing of the MSO. Depending on the location of recreational activities, such a level of use may adversely affect Three Forks springsnails. Although closed to recreational users, Three Forks Springs lies within close proximity to FR 249, which offers a “pull-off” area frequented by recreational users. Contaminants associated with bathing, cooking, etc. could potentially be introduced at these pull-off areas, which lie directly above the Three Forks springhead. However, camping is not allowed in this area and USFS personnel have never observed this type of use. Although Standard and Guideline 1438 allows for continued recreation use of areas adjacent to the Three Forks springs complex and springs within the

Boneyard Bog Springs complex, the probability the S&G could affect the Three Forks springsnail is low.

In general, the S&Gs of the 1996 Regional Amendment emphasize the maintenance and restoration of healthy riparian ecosystems. In particular, S&Gs minimize the threats of livestock grazing by directing grazing management to maintain and restore riparian ecosystems (S&G 1474), and ensure the recovery and continued existence of T&E species (S&G 1510). Within northern goshawk habitats, S&Gs 1488 and 1490 provide guidance for maintaining satisfactory soil conditions, minimizing soil compaction, and restoring degraded riparian areas. These S&Gs of the 1996 Regional Amendment have a positive impact upon Three Forks springsnails and their spring habitat.

Multiple S&Gs within the 1996 Regional Amendment encourage the use of prescribed and prescribed natural fire to reduce hazardous fuel accumulation and manage for landscape diversity. Wildfires in the southwest are getting larger and more intense, largely due to the density of trees and accumulated dead woody debris on NFS lands (USFS 2004). Standard and Guidelines 1445, 1455, 1468, and 1476 direct the use of prescribed fire for the treatment of fuel accumulations within protected and restricted areas of MSO habitat. Standard and Guideline 1458 directs the use of prescribed fire on Reserved Lands, which include Wilderness Areas, Research Natural Areas, Wild and Scenic Rivers, and Congressionally Recognized Wilderness Study Areas. Standard and Guideline 1508 guides the use of low-intensity ground fires in all forested cover types within nesting areas of northern goshawk habitat. These S&Gs encourage prescribed fires to reduce hazardous fuel accumulation, and permit thinning before burning to reduce ladder fuels and the risk of crown fire. Such activities have the potential to cause short-term adverse effects upon Three Forks springsnails. However, the long-term effects of prescribed fire are beneficial to the species. Prescribed fires reduce fuel loads and prevent catastrophic fires that would negatively affect Three Forks springsnails and designated CH. Therefore, these S&Gs (1445, 1455, 1458, 1468, 1476, and 1508) are beneficial to Three Forks springsnails.

In summary, the management direction of the 1996 Regional Amendment provides for healthy functioning riparian and aquatic systems. However, a few specific guidelines associated with recreation and fire activities are likely to adversely affect Three Forks springsnail populations in MSO protected areas. Standard and Guideline 1438 allows for the continued recreational use of Boneyard Bog Springs and areas adjacent to the Three Forks Springs complex. Recreational activities, particularly near the Three Forks Springs complex, may introduce contaminants into the watershed, reducing water quality. Prescribed fire activities within protected and restricted of MSO habitat are likely to have a short-term impact on springsnail habitat through poor water quality resulting from excess ash. Thus, both recreation and fire activities contribute to the likelihood of adverse effects to the Three Forks springsnail through the implementation of the Apache-Sitgreaves NFs LRMP.

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.

Private lands exist near Boneyard Bog Springs. The AGFD has conducted surveys for springsnail occupancy on these lands. No springsnails have been found to occupy the spring runs on this land. Therefore, activities there are unlikely to affect Three Forks springsnails.

The AGFD has management authority for game populations on federal lands. Elk herds located near Boneyard Bog Springs are known to wallow throughout the springs. Visual inspections of elk wallowing have shown reduced bank stability of spring-runs. Such bank disturbance causes filling of gravel and pebble substrates with sand and silt, which data suggests is less conducive to occupation by springsnails. This change in spring substrate may reduce fecundity of springsnails because it is believed that Three Forks springsnails lay eggs on large substrates such as gravel and pebble. Therefore, state managed activities related to game species (elk) may have a negative effect on Three Forks springsnails.

CONCLUSION

After reviewing the current status of the Three Forks springsnail, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is the FWS's conference opinion that the Apache-Sitgreaves NFs LRMP and 1996 Regional Amendment, as proposed, will not jeopardize the continued existence of the Three Forks springsnail nor destroy or adversely modify designated CH. 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.

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. CH 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 PBFs 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" (FWS and National Marine Fisheries Service 1998:4-34).

The Three Forks springsnail is limited to several springs on the Apache-Sitgreaves NFs. Threats to the Three Forks springsnail may include non-native aquatic species, ungulates, recreational

activities, and natural events. Prolonged, and intensive habitat disturbances have occurred in close proximity to the species for decades; yet, the springsnails have continued to inhabit springs and spring outflows on the Apache-Sitgreaves NFs, with the exception of Three Forks. Although adverse effects to the springsnail may occur from the continued implementation of the Apache-Sitgreaves NFs LRMP and 1996 Regional Amendment, the FWS does not believe the impacts to the species will rise to the level of jeopardy or adverse modification.

The management direction provided in the Apache-Sitgreaves NFs LRMP emphasizes the conservation of soil, water, and riparian resources. Although no S&Gs specifically address the conservation of the Three Forks springsnail, guidance through multiple S&Gs (S&Gs 4, 20, 33, 45, 47, 48, 49, 108, 113, 142, 171, and 177) provides for the protection and improvement of riparian habitats, spring sources, and rheocrene habitats. In addition, a few of these S&Gs prioritize habitat management of T&E over nonlisted species. USFS activities under the direction of such S&Gs minimize or eliminate adverse effects on springsnails and designated CH.

Although somewhat general in relation to Three Forks springsnails, management direction provided in the 1996 Regional Amendment is not likely to limit the conservation of Three Forks springsnails and designated CH. The majority of S&Gs (1473, 1488, and 1490) direct the maintenance of healthy riparian ecosystems by requiring actions within riparian areas to protect and improve riparian dependent resources. Implementation of such management direction will likely minimize threats to the species and contribute to the species' conservation.

The Apache-Sitgreaves NFs has implemented additional management practices specifically designed to protect Three Forks springsnails and its habitat. In coordination with the AGFD, the Apache-Sitgreaves NFs has removed thousands of non-native crayfish from the Three Forks Springs complex. Also, the Alpine RD has restricted grazing from all springs complexes that are crucial for survival and recovery. Conservation efforts include the closure of Three Forks springs to public access. With the implementation of these CMs, as well as the management S&Gs outlined above, the FWS concludes that the proposed action will not jeopardize the continued existence of the Three Forks springsnail nor adversely modify designated CH.

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 Apache-Sitgreaves NFs 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 Apache-Sitgreaves NFs has a continuing duty to regulate the activity covered by this incidental take statement. If the Apache-Sitgreaves NFs (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 Apache-Sitgreaves NFs 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 or Extent of Take Anticipated

Incidental take of the Three Forks springsnail is reasonably certain to occur as a result of the continued implementation of the Apache-Sitgreaves NFs LRMP and the 1996 Regional Amendment. The FWS anticipates incidental take of Three Forks springsnails will be in the forms of harm and harassment to the species from the Engineering, Lands and Minerals, Recreation, Watershed Management, and Wildlife programs. Direct mortality and harm to the species is anticipated through crushing and trampling of individual springsnails, and the impairment of essential behavior patterns, including but not limited to, breeding, feeding, or sheltering, due to spring habitat modification and destruction. The proposed action is likely to take Three Forks springsnails in the form of harassment by significantly disrupting normal behavior patterns including, but not limited to, breeding, feeding, or sheltering.

Road construction and maintenance, prescribed fires, sediment removal, recreation activities, and pesticide use have the potential to harm Three Forks springsnails. Recreational use at the springs may result in direct mortality of springsnails through crushing, burying, and suffocation. Harm to the springsnails is could occur as a result of recreation-related activities, road activities, sediment removal, pesticide use, and prescribed fires, which all disrupt watershed function and degrade water quality. Alteration and destruction of spring habitat could impair essential behavior patterns of Three Forks springsnails. Within the Apache-Sitgreaves NFs LRMP and 1996 Regional Amendment, S&Gs manage for recreational use, road construction and maintenance, sediment and mineral removal, use of pesticides, and prescribed fires. As a result, direct effects to Three Forks springsnails could occur as a result of the proposed action.

Quantifying anticipated take of Three Forks springsnails at occupied sites on the Apache-Sitgreaves NFs is difficult, partially because precise density estimates are not known for the species. In addition, the springsnail exhibits seasonal variation in numbers and occurs in patchy distributions throughout a given population. Determining an estimate of anticipated take is further complicated by the difficulty in detecting snails. Incidental take of the Three Forks springsnail will be difficult to detect for the following reasons: the species has small body size,

losses may be masked by seasonal fluctuations in water quality, and the species occurs in habitat that makes detection difficult. Based on the high variation in density estimates, the variability in spatial and temporal distribution of the species in spring habitats, and the difficulty in detecting dead or moribund snails, the FWS has determined that the anticipated level of take was most appropriately quantified in terms of numbers of populations with disturbance or habitat alteration resulting from site-specific projects. Incidental take will be considered to be exceeded if 1 population is extirpated as a result of the proposed action. Each springhead within the Boneyard Creek and Boneyard Bog springs complexes will be considered to be a 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 Three Forks springsnail, for the effects are not expected to appreciably reduce the survival and recovery of the species.

REASONABLE AND PRUDENT MEASURES

The FWS believes the following reasonable and prudent measures are necessary and appropriate to minimize impacts of incidental take of Three Forks springsnails:

1. Minimize or eliminate adverse effects to the Three Forks springsnails on the Apache-Sitgreaves NFs.
2. Minimize or eliminate adverse effects to Three Forks springsnail habitat on the Apache-Sitgreaves NFs.
3. Monitor the impacts of site-specific projects on the Three Forks springsnail.

TERMS AND CONDITIONS

Following the species listing or designation, 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 Design projects within the Engineering (e.g., road management), Fire Management, Lands and Minerals, Recreation, Watershed Management, and Wildlife programs with the goal of minimizing adverse effects to the Three Forks springsnail.
- 1.2 Consider alternative measures when using chemicals for noxious weed control, insect control, and other pest control within or adjacent to occupied Three Forks springsnail habitat.

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

- 2.1 Design Engineering (e.g., road management), Fire Management, Lands and Minerals, Recreation, Watershed Management, and Wildlife programs to reduce negative effects (direct

and indirect) with the goal of implementing projects that will have beneficial, insignificant, or discountable effects within occupied Three Forks springsnail habitat.

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

- 3.1 The Apache-Sitgreaves NFs 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 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

This conference opinion does not prohibit the USFS from taking an action that may have adverse effects on the Three Forks springsnail. However, 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 advises the Apache-Sitgreaves NFs to consider implementing the following conservation recommendations to avoid likely future conflict:

1. Continue to work cooperatively with the FWS to develop a conservation strategy for the Three Forks springsnail. Identify and secure funding sources and technical expertise necessary to implement the conservation strategy.
2. Maintain the Three Forks Creek Area Closure to minimize the effects of recreation.
3. Continue the use of livestock exclosures to protect the springsnail site at Boneyard Bog Springs.

4. Work with the AGFD to evaluate and implement techniques to manage elk herds within the Boneyard Bog Springs area to minimize the effects of elk wallowing.
5. Continue to participate in reintroduction or transplantation efforts, development of captive propagation and transplantation techniques, and identification of potential reintroduction and transplantation sites.
6. Support efforts to gather information and conduct research on population demographics, habitat requirements, water quantity and quality, and other potentially limiting factors for the Three Forks springsnail.
7. Move forward with plans to designate the Three Forks Recommended Research Natural Area and Associated Features.

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.

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 determination of “may affect, is not likely to adversely affect” for the species listed below. In addition, the FWS has provided a brief reasoning for these concurrences.

Gila trout (*Onchorynchus gilae*)

The FWS concurs with your determination that the continued implementation of the S&Gs within the Apache-Sitgreaves NFs LRMP may affect, but is not likely to adversely affect the Gila trout for the following reasons:

1. Based on new information, there is no longer a Gila trout population on the Apache-Sitgreaves NFs.
2. Recovery actions by the USFS in the past have included stocking Gila trout into multiple creeks and watersheds in the last 10 years in coordination with the FWS, NMDGF, and AGFD. These populations are currently being monitored for survival, and impacts on the populations due to drought and overall stream condition to assess recovery efforts in implementing the recovery plan.
3. There are S&Gs that support conservation and recovery of Gila trout. These S&Gs guide the USFS to implement recovery plans, improve habitat for T&E species, and to delist T&E species.

Mexican gray wolf (*Canis lupus baileyi*) Non-essential experimental §10(j) Experimental population

The FWS concurs with your determination that the continued implementation of the S&Gs within the Apache-Sitgreaves NFs LRMP is not likely to jeopardize the continued existence of the §10(j) non-essential, experimental population.

1. Overall, the Apache-Sitgreaves NFs LRMP is generally positive for the long-term conservation and recovery of the experimental population due to direction on maintaining viable populations, requirements for consultation with FWS, controls on surface occupancy for oil and gas and minerals operations, habitat enhancement for listed species, riparian protection and enhancement standards, emphasis on road obliteration in Management Area 4, limiting new power lines to existing corridors and emphasizing big game habitat in Management Areas 1 and 2.
2. The Apache-Sitgreaves NFs participates in a number of proactive conservation efforts for the Mexican gray wolf including:
 - a. Employs a full time Mexican wolf liaison to work with livestock permittees to find solutions to wolf/livestock conflicts;
 - b. Participates in the annual helicopter count and capture operations;
 - c. Participates in initial releases and translocations, including providing acclimation pens;
 - d. Assist with funding of Range Riders;
 - e. Provides program to educate the public and promote acceptance of wolves.
3. The 1996 Regional LRMP is neutral toward the long-term conservation and recovery of the Mexican gray wolf.

4. By definition, a nonessential experimental population is not essential to the continued existence of the species; therefore, no proposed action impacting the experimental, nonessential population so designated under the ESA §10(j) could lead to a jeopardy determination for the entire species.

Appendix B: Abbreviations and Acronyms

AGFD – Arizona Game and Fish Department

ATV – All Terrain Vehicle

AZ - Arizona

BA – Biological Assessment

BAER – Burnt Area Emergency Rehabilitation

BLM – Bureau of Land Management

BMPs – Best Management Practices

BO – Biological Opinion

BO/CO – Biological/Conference Opinion

BOR – Bureau of Reclamation

BRW – Basin and Range West Recovery Unit

BRWRA – Blue Range Wolf Recovery Area

CA – Consultation Agreement

CH - Critical Habitat

CHU – Critical Habitat Unit

CLF – Chiricahua leopard frog

CMs – Conservation Measures

CO – Conference Opinion

DMA –Designated Management Area

EMU – Ecological Management Unit

ESA – Endangered Species Act

ft. - feet

FWS – U.S. Fish and Wildlife Service

GIS – Geographical Information Systems

IFT – Interagency Field Team (Mexican gray wolf)
LAA – May Affect, Likely to Adversely Affect
LCR – Little Colorado River
LRMP – Land and Resource Management Plans (Forest Plans)
MA – Management Area
MWNEPZ - Mexican Wolf Nonessential Experimental Population Zone
mi. – miles
MOU – Memorandum of Understanding
MSO – Mexican Spotted Owl
NA – Not Applicable
NE – No Effect
NF – NFs – National Forest
NEPA – National Environmental Policy Act
NFMA – NF Management Act of 1976
NFS – NF 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
NMGFD – New Mexico Game and Fish Department
OHV – Off Highway Vehicle
ORV – Outstanding Remarkable Values
PAC – Protected Activity Center
PCE – Primary Constituent Element

RD – Ranger District

RU – Recovery Unit

S&Gs – Standards and Guidelines

Sq - square

UGM – Upper Gila Mountains Recovery Unit

U.S. – United States

U.S.D.A. – U.S. Department of Agriculture

USFS – U.S. Forest Service

USGS – U.S. Geological Service

WFRP – Wildlife, Fish, and Rare Plants Program

WUI – Wildland Urban Interface