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In Reply Refer to:
AESO/SE
02EAAZ00-2013-F-0093

August 27, 2014

Jim Upchurch
Forest Supervisor, Coronado National Forest
300 West Congress Street
Tucson, Arizona 85701

Dear Mr. Upchurch:

Thank you for your request for formal consultation with the U.S. Fish and Wildlife Service (FWS) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). Your request was dated January 4, 2013, and received by us on January 11, 2013. At issue are impacts that may result from the proposed Galiuro Firescape (implemented by the Coronado National Forest, the lead Federal agency for this consultation) and the Rockhouse Burn (implemented by the Bureau of Land Management) projects located in Graham and Cochise counties, Arizona. The proposed action may affect, and is likely to adversely affect, the desert pupfish (*Cyprinodon macularius*), Gila chub (*Gila intermedia*) and critical habitat, Gila topminnow (*Poeciliopsis occidentalis occidentalis*), loach minnow (*Tiaroga cobitis*) and critical habitat, spikedace (*Meda fulgida*) and critical habitat, Chiricahua leopard frog (*Lithobates chiricahuensis*) and critical habitat, and Mexican spotted owl (*Strix occidentalis lucida*) and critical habitat.

In your memorandum, you requested our concurrence that the proposed action may affect, but is not likely to adversely affect, ocelot (*Leopardus (=Felis) pardalis*) and lesser long-nosed bat (*Leptonycteris curasoae yerbabuenae*). We concur with those determinations and provide our rationale in Appendix A at the end of this BO.

This biological opinion is based on information provided in the biological assessment (BA) submitted with your request letter, telephone conversations, electronic mail, other letters, previous consultations addressing prescribed fire in the project area, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the species of concern, prescribed fire, fuel treatments, or their effects, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office**.**

Consultation History

- September 3, 2004. We issued the biological and conference opinion for the BLM Arizona Statewide Land Use Plan Amendment for Fire, Fuels, and Air Quality Management (Fire BO) (#02EAAZ00-2003-F-0210).

- April 19, 2005. We issued the biological opinion for the Proposed Reestablishment of Spikedace, Loach Minnow, Gila Topminnow, Desert Pupfish, and Augmentation of Gila Chub in Multiple Springs and Streams within the Muleshoe Cooperative Management Area (Fish BO) (#02EAAZ00-2004-F-0454). This consultation included the use of prescribed fire within the Muleshoe EMA.

- June 10, 2005. We issued the Programmatic Biological and Conference Opinion on the Continued Implementation of the Land and Resource Management Plans for the Eleven National Forests and National Grasslands of the Southwestern Region (LRMP BO) (2-22-03-F-366).

- April 30. 2012. We issued the reinitiation of the LRMP BO for the Coronado National Forest (LRMP CNF BO) (2012-F-005).

- January 11, 2013. We received your request for formal consultation on the Galiuro Firescape and Rockhouse Burn projects.

- April 24, 2013. We sent you a 30-day letter requesting additional information required before we could initiate formal consultation.

- May 17, 2013. We received your response to our 30-day letter.

- May to December, 2013. We corresponded through e-mails and telephone calls to provide us additional information required to initiate formal consultation.

- August 11, 2014. We sent you the draft Biological Opinion for your review and comments.

- August 22, 2014. We received your comments on the draft Biological Opinion.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The Bureau of Land Management (Gila District Fire Management Program) (BLM) and the Coronado National Forest (Safford Ranger District) (CNF) are proposing the implementation of a series of prescribed fire treatments over ten years within a 156,636-acre project area in a portion of the Muleshoe Ecosystem Management Area (EMA), areas to the east of the EMA, and throughout the portion of Galiuro Mountains managed by the CNF (Figure 1). The BLM and CNF will apply prescribed fire as a resource management tool to restore fire-adapted ecosystems, restore natural species composition of vegetation, improve habitat for and provide protection to federally-listed and other wildlife species, improve upland rangeland health and watershed function by reducing undesirable woody and succulent species (e.g., *Agave schottii, Gutierrezia sarothrae*, *Opuntia* spp.), and provide the opportunity for an increase in herbaceous cover and plant species diversity throughout the mountain range. Additional goals will include protection of old-growth Douglas-fir (*Pseudotsuga menziesii*) and Arizona cypress

(*Cupressus arizonica*) stands, and cultural sites within the Galiuro Mountains. Prescribed fire treatment objectives are also intended to reduce fuel loads and to improve watershed conditions with the goals of decreased frequency and intensity of floods, increased base flows, improved water quality through reduced sediment yields, improved aquatic habitat for native fish (particularly an increase in pool habitat), and improved riparian vegetation development.

The agencies propose to apply low-intensity prescribed fire incrementally over a 10-year period on each of ten burn units. Only one burn unit would be burned annually. Each year, one burn unit from among ten would be targeted for treatment. The method of treatment would likely differ among units, depending on the findings of a pre-project review of vegetation and fuel conditions, topography, need for resource surveys, need for blacklining, and uses of the unit. Also a consideration is the need for advance coordination with grazing permittees on certain parcels, because fire across the landscape may cause permittees economic hardship if livestock are unable to use certain areas for forage.

After a specific unit is proposed for treatment, the prescribed fire burn boss and various resource specialists would draft a burn plan for line officer approval. The following information would be provided (but is not limited to): a burn unit description, project objectives, coordination with other regulatory agencies, a hazard analysis and risk assessment, measures to mitigate or avoid adverse effects, contingency plans, firing procedures, anticipated fire behavior, acceptable weather conditions, and agency participants and organization.

Depending on conditions, such as weather and fuel loading, fires would generally be scheduled during the typical southern Arizona burn seasons of spring and early (pre-monsoon) summer, although autumn and winter entries may be preferable in areas that would benefit from lower-intensity fire (i.e., a cooler burn). The latter include areas where protection of historic and cultural resources or range improvements is essential. Varying the burn season encourages adaptability in areas where prescribed fire has already been applied.

Multiple burning patterns would be incorporated into burn plans to best reintroduce fire into the ecosystem. Top-down burning would introduce fire at higher elevations first, which decreases the likelihood that very hot fires would travel uphill. This approach benefits riparian areas, because it allows fire to back into drainages, rather than be introduced by direct ignition. In contrast, some units may be treated at lower elevations first, because they require higher intensity fire to move vegetation toward desired conditions.

Fires would be ignited using one or more methods, including drip torches, hand-held firing devices, and aerial igniter devices dropped by helicopters. These methods would allow for a multiple-source ignition strategy.
The last option would quickly scatter small ignitions across the burn unit, which would encourage a mosaic burn pattern of burned/unburned (green) areas on the landscape.

Based on monitoring results, initial applications of fire may be followed by maintenance prescribed fires within the ten-year period. In general, it is expected that a maintenance fire would be needed on each individual unit every three to seven years over the life of the project. Before future maintenance fire is applied, resource specialists will compare current environmental conditions of each unit to those reported in this EA to determine if additional effects analyses are necessary.

The application of prescribed fire within this series of burn units is not intended to burn every available acre, but to judiciously apply ignition patterns that promote low intensity fire behavior and spread to create a mosaic pattern of burned and unburned areas within the burn unit. The burned areas would provide sites that offer opportunities for fuels reduction and an improvement of the composition of native plant cover. Creating a more diverse landscape in terms of vegetative cover is one of the main objectives; the resulting vegetative diversity through the prudent application of prescribed fire is intended to encourage a healthier landscape.

Ignitions would be planned and conducted in a way to allow for a mosaic burning pattern. In recent prescribed fires on the Safford Ranger District, planned ignitions have allowed for approximately 40-60% of the project area to burn, while leaving green materials and unburned patches scattered throughout the burn area. Use of aerial ignition devices may encourage a more natural mosaic pattern of burning.

Access to burn units would be over roads designated for motorized use or by foot. No off-road travel is permissible. No permanent or temporary road construction will be allowed.

A complete description of the proposed action is found in the BA, the Galiuro Firescape Project Environmental Assessment (USDA Forest Service 2013) (EA), the Galiuro FireScape Project Hydrology and Soils Report (Arias 2012), and the Galiuro Firescape Silviculture Specialist Report (Willcox 2011), and is incorporated herein by reference.

Conservation Measures

Along with the conservation measure developed specifically for this project, all relevant conservation measures found in the Fire BO and the LRMP BO will be implemented on CNF lands as part of the proposed action. All conservation measures found in the Fire BO will be implemented on BLM lands. Conservations measures have been edited, as necessary, to apply specifically to this project. Conservation measures specific to the proposed action that will be implemented include:

Chiricahua Leopard Frog (developed specifically for this project)

Where Chiricahua leopard frogs (CLFs) and critical habitat occur, the CNF will not burn more than 30% of the Forest Land within the 5th level watershed in any given year.

Fire BO

All conservation measures in the Fire BO that are applicable to this prescribed fire will be implemented. These include FT-1 to FT-5, RR-1 to RR-6, RA-1 to RA-14, AM-1 to AM-5, SO-1 to SO-6, FI-1, DP-1 to DP-4, GT-1 to GT-6, LM-1 to LM-6, GC-1 to GC-3, and LB1-LB6. The specific conservation measures addressed in this BO include:

FT-3 Pre-project surveys and clearances (biological evaluations/assessments) for federally-protected species will be required for each project site before implementation. All applicable Conservation Measures will be applied to areas with unsurveyed suitable habitat for federally-protected species, until a survey has been conducted by qualified personnel to clear the area for the treatment activity. If a federally-protected species or its habitat is detected during the surveys, then the conservation measures for that species will be applied as appropriate (last sentence added for this project).

FT-4 Use of motorized vehicles during prescribed burns or other fuels treatment activities in a federally-protected species' suitable or occupied habitat will be restricted to existing roads and trails.

RA-14 For priority fire/fuels management areas (e.g., Wildland Urban Interface) with federally-protected species or designated critical habitat downstream, BLM biologists and other resource specialists, as appropriate, in coordination with USFWS and Arizona Game and Fish Department (AGFD), will determine:

A) The number of acres and the number of projects or phases of projects to occur within one watershed per year (a*ddressed in the Proposed Action).*

B) An appropriately-sized buffer adjacent to perennial streams in order to minimize the potential for soil and ash to enter the stream.

For this project, BLM/CNF will establish a 300-foot buffer adjacent to all large drainages, riparian areas, and perennial streams throughout the project area on CNF and BLM lands. This buffer will prevent direct sediment input through overland flow (Arias 2012). Periodic large pulses of erosion may occur during intense water yield and overland flow events but would be buffered from streams by the 300-foot riparian area buffer. No ignition will be applied within these buffers, but low intensity fire may be allowed to move into the buffers.

RR-3 Sediment traps or other erosion control methods will be used to reduce or eliminate influx of ash and sediment into aquatic systems.

RR-4 Use of motorized vehicles during rehabilitation or restoration activities in a federally-listed species' suitable or occupied habitat will be restricted to existing roads and trails.

RR-6 Burned area emergency rehabilitation (BAER) activities and long-term restoration activities should be monitored, and the results provided to the USFWS and AGFD.

AM-2 For fire management sites with habitat for the CLF, unsurveyed sites will be considered occupied unless surveyed prior to project implementation.

AM-3 Install sediment traps, as determined by a Resource Advisor or qualified biologist approved by BLM or CNF, upstream of tanks and ponds occupied by Chiricahua leopard frogs in order to minimize the amount of ash and sediment entering the water.

SO-2 Suitable habitat and designated critical habitat for Mexican Spotted Owl (MSO) will be surveyed prior to implementing prescribed fire or vegetation treatment activities to determine MSO presence and breeding status. These fire management activities will only be implemented within suitable or critical habitat if birds are not present. If a spotted owl is discovered during these surveys, BLM will notify the USFWS to reinitiate consultation and will determine any additional Conservation Measures necessary to minimize or eliminate impacts to the owl.

SO-3 If a MSO is discovered during fuels treatment activities, the Resource Advisor or a qualified wildlife biologist will document the find and assess potential harm to the owl and advise the project crew boss of methods to prevent harm. For each owl, the information will include the location, date, and time of observation and the general condition of the owl. The Resource Advisor or biologist will contact the appropriate USFWS office, and BLM will reinitiate consultation for the fire suppression or project activities.

SO-4 Within MSO critical habitat designated in the project area:

A) To minimize negative effects on the primary constituent elements of critical habitat, wildland fire use and prescribed fires will be managed primarily as low-intensity fires, with only scattered high-intensity patches. The BLM's objective will be to limit mortality of trees greater than 18 inches diameter at breast height (dbh) to less than 5 percent, occasionally up to 10 percent, within critical habitat.

B) If fireline construction is necessary during fire suppression, wildland fire use, or prescribed fires, BLM will minimize the cutting of trees and snags larger than 18 inches dbh, and no trees or snags larger than 24 inches dbh will be cut unless absolutely necessary for safety reasons.

C) For mechanical vegetation treatments within critical habitat, BLM will minimize the cutting of trees and snags larger than 18 inches dbh, and no trees or snags larger than 24 inches dbh will be cut unless absolutely necessary for safety reasons.

D) Critical habitat disturbed during fire suppression or fuels treatment activities, such as fire lines, crew camps, and staging areas, will be rehabilitated to prevent their use by vehicles or hikers. Fire line rehabilitation will include pulling soil, duff, litter, woody debris, and rocks back onto the line to bring it up to grade and to make it blend in with the surrounding area. Such rehabilitation will be inspected one year after the event to ensure effectiveness.

SO-5 The following measures will be followed in suitable habitat (occupied or unoccupied) whenever consistent with objectives to reduce hazardous fuels:

A) Manage mixed-conifer and pine-oak forest types to provide continuous replacement nest habitat over space and time (Table III.B.1 of the Recovery Plan for Mexican Spotted Owl).

B) Incorporate natural variation, such as irregular tree spacing and various stand/patch sizes, into management prescriptions and attempt to mimic natural disturbance patterns.

C) Maintain all species of native vegetation in the landscape, including early seral species. To allow for variation in existing stand structures and provide species diversity, both uneven-aged and even-aged systems may be used as appropriate.

D) Allow natural canopy gap processes to occur, thus producing horizontal variation in stand structure.

E) Within pine-oak types, fuels treatment activities should emphasize retaining existing large oaks and promoting the growth of additional large oaks.

F) Retain all trees >24 inches dbh.

G) Retain hardwoods, large downed logs, large trees, and snags. Emphasize a mix of size and age classes of trees. The mix should include large mature trees, vertical diversity, and other structural and floristic characteristics that typify natural forest conditions.

SO-6 The effects of fire suppression and fuels treatment activities on MSO and their habitat, and the effectiveness of these Conservation Measures, will be assessed after each fire event or fuels treatment project by the Resource Advisor or local biologist to allow evaluation of these guidelines and to allow the USFWS to track the species' baseline. Prescriptions for wildland fire use, prescribed fires, and vegetation treatments will be adjusted, if necessary.

LB-1 Instruct all crew bosses (wildfire suppression, managed wildfire, prescribed fire, and vegetation treatments) in the identification of agave and columnar cacti and the importance of their protection for lesser long-nosed bats (LLNBs).

LB-2 Prior to implementing any fuels treatment activities (prescribed fire, vegetation treatments), pre-project surveys will be conducted for paniculate agaves and saguaros that may be directly affected by fuels management activities.

LB-3 Protect LLNB forage plants -- saguaros and high concentrations of agaves -from wildfire and fire suppression activities, and from modification by fuels treatment activities (prescribed fire, vegetation treatments), to the greatest extent possible. "Agave concentrations" are contiguous stands or concentrations of more than 20 plants per acre. Avoid driving over plants, piling slash on top of plants, and burning on or near plants. Staging areas for fire crews or helicopters will be located in disturbed sites, if possible.

LB-4 No seeding/planting of nonnative plants will occur in any wildfire rehabilitation site or fuels treatment site with paniculate agaves or saguaros.

LB-5 A mitigation plan will be developed by the BLM in coordination with the USFWS for prescribed fires or fuels management projects (mechanical, chemical, biological treatments) within 0.5 mi of LLNB roosts or in areas that support paniculate agaves or saguaros. The mitigation plan will ensure that effects to bat roosts and forage plants are minimized and will include monitoring of effects to forage plants. The plan will be approved by the USFWS.

LB-6 BLM personnel will examine concentrations of agaves (including shindagger – *A. schottii*) within each proposed fuels treatment area, and blackline or otherwise protect from treatments any significant concentrations of agaves that appear to be amidst fuel loads that could result in mortality greater than 20 percent (>50% for *A. schottii).* BLM personnel will determine which significant agave stands are prone to mortality greater than 20 percent (>50% for *A. schottii*) (see Conservation Measures FT-1 and FT-3).

LRMP BO

<u>Spikedace (pages 29-31) and Chiricahua leopard frog (pages 32-33).</u>

These were developed specifically for spikedace and CLF, but are beneficial to other aquatic species in the action area.

Conservation Measure #1: In occupied habitat on National Forest System lands, design projects which address the appropriate components of the spikedace and CLF recovery plans, with the goal of implementing projects with beneficial, insignificant, or discountable effects to spikedace and CLF.

Conservation Measure #3 (CLF): Implement, as appropriate, recommendations to minimize the effects of stock pond management and maintenance on CLF identified in the CLF final recovery plan.

Conservation Measure #7 (spikedace) #5 (CLF): 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. The absence of fire-adapted systems 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 CNF 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 National Forest in the Southwestern Region. 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 CNF biologist for the appropriate species will be assigned and consulted during fire management activities to ensure that concerns for threatened and endangered species are addressed. For example, the biologist will identify spawning season restrictions to protect breeding activities, appropriate buffers to filter ash and sediment, and the avoidance of mechanical and chemical measures within the riparian corridor. During development and implementation of operational management plans, the biologist will identify potential threats to listed species and designated critical habitat and develop mitigation actions to eliminate threats.

c. Develop contingency plans in cooperation with FWS, other Federal agencies, State agencies, universities, and others to preserve, rescue and secure a federally-listed species population in imminent danger of localized extirpation due to fire use for resource benefits.

STATUS OF THE SPECIES AND CRITICAL HABITAT

Desert Pupfish

The desert pupfish was listed as an endangered species with critical habitat in 1986 (51 FR 10842). Historical collections occurred in Baja California and Sonora, Mexico and in the United States in California and Arizona. Historical distribution of desert pupfish in Arizona included the Gila, San Pedro, and Salt rivers, and likely the Hassayampa, Verde, and Agua Fria rivers, although collections are lacking for the latter three. The desert pupfish was also found in the Lower Colorado River, Salton Sink basin, and Laguna Salada basin (Eigenmann and Eigenmann 1888, Garman 1895, Gilbert and Scofield 1898, Evermann 1916, Miller 1943, Minckley 1980, Black 1980, Turner 1983, Miller and Fuiman 1987). Additional life history information can be found in the recovery plan (USFWS 1993) and other references cited there.

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

Our records indicate that in Arizona, 54 formal conferences or consultations have been completed for actions affecting desert pupfish.

Critical Habitat

Critical habitat was designated for the desert pupfish at Quitobaquito Spring, Organ Pipe Cactus National Monument, Pima County, Arizona; and along portions of San Felipe Creek, Carrizo Wash, and Fish Creek Wash, Imperial County, California. These areas provide the PCEs necessary to maintain pupfish, including adequate food and cover, and are at least partially isolated from predatory and competing exotic fishes.

Gila Chub

The Gila chub (*Gila intermedia*) was listed as endangered with critical habitat on November 11, 2005 (USFWS 2005). The final rule cites collection records, historical habitat data, the 1996 AGFD Gila chub status review (Weedman et al. 1996), and USFWS information documenting currently occupied habitat to conclude that the Gila chub has been eliminated from 85 to 90 percent of formerly occupied habitat. It was also estimated that 90 percent of the currently occupied habitat is degraded due to the presence of nonnative species and land management actions. Due to fragmented and often small population sizes, extant populations are susceptible to environmental conditions such as drought, flood events, and wildfire. Primary threats to Gila chub, such as predation by and competition with nonnative organisms, and secondary threats identified as habitat alteration, destruction, and fragmentation are all factors identified in the final rule that contribute to the consideration that the Gila chub is in danger of extinction throughout all or a significant portion of its range (USFWS 2005).

Background

The Gila chub is a member of the roundtail chub (*G. robusta*) complex that also includes headwater chub (*G. nigra*). The roundtail chub complex has had a turbulent and controversial taxonomic history that includes an assortment of classification schemes. Much of the debate has centered on whether the complex represents a number of nominal species or subspecies of *G. robusta.* Further discussion on classification of the Gila chub can be found in Minckley (1973). Miller (1945) following the arrangement of Jordan and Evermann (1896), supported full generic rank for the genus Gila (Baird and Girard) with a "*Gila robusta* complex" that included the Gila chub. Miller (1946) considered the Gila chub to be an "ecological subspecies" of *G. robusta* (i.e., *G. r. intermedia*) characteristic of the small tributaries they inhabit. Rinne (1969, 1976), using univariate analyses of morphological and meristic characters, argued for recognition of both *G. robusta* and *G. intermedia* as distinct species and against the ecological subspecies concept. This approach was supported by some (e.g. Minckley 1973), but it was not until further evidence was generated by DeMarais (1986, 1995) that the specific status for *G. intermedia* was generally accepted. DeMarais (1995) supported continued recognition of *G. intermedia* based on the following arguments: 1) phenotypic extremes between *G. intermedia* and *G. robusta* are widely divergent and each possesses many morphologically uniform populations; (2) the geographic distributions of both species is an overlapping mosaic, therefore not satisfying traditional geographic criteria; and (3) contiguous populations of *G. intermedia* and *G. robusta* show no evidence of genetic exchange, thus each species maintains its evolutionary independence.

The Gila chub is a thick-bodied species, chunky in aspect, whereas roundtail chub is slender and elongate, and headwater chub is intermediate in meristic and morphometric characteristics (Rinne 1969, 1976, Minckley 1973, DeMarais 1986, Minckley and DeMarais 2000, Minckley and Marsh 2009). Females can reach 250 mm in total length (TL), but males rarely exceed 150 mm (Minckley 1969, 1973, Rinne and Minckley 1991, Schultz and Bonar 2006). Body coloration is typically dark overall, sometimes black or with diffuse, longitudinal stripes, with a lighter belly speckled with gray. The lateral scales often appear to be darkly outlined, lighter in center. Breeding males, and to a lesser extent females, develop red or orange on lower parts of the head and body and on bases of the pectoral, pelvic and anal fins.

While most reproductive activity by the Gila chub occurs during late spring and summer, in some habitats it may extend from late winter through early autumn (Minckley 1973). Schultz and Bonar (2006) data from Bonita and Cienega creeks suggested that multiple spawning attempts per year per individual were likely, with a major spawn in late February to early March followed by a secondary spawn in autumn after monsoon rains. Reproductive activities in Monkey Spring (where Gila chub are now extirpated) reportedly occurred for longer periods than in other populations, as breeding appeared to last virtually all season (Minckley 1969, 1973, 1985). Bestgen (1985) concluded that temperature was the most significant environmental factor triggering spawning.

Spawning probably occurs over beds of submerged aquatic vegetation or root wads. Minckley (1973) observed a single female closely followed by several males over a bed of aquatic vegetation in a pond. Nelson (1993) also suspected deep pools with vegetation in Cienega Creek were important sites for spawning but did not witness any associated behavior near submerged vegetation.

The Gila chub is considered a habitat generalist (Schultz and Bonar 2006), and commonly inhabits pools in smaller steams, cienegas, and artificial impoundments throughout its range in the Gila River basin at elevations between 609 and 1,676 m (2,000 to 5,500 ft) (Miller 1946, Minckley 1973, Rinne 1975, Weedman et al. 1996). Common riparian plants associated with these populations include willows (*Salix* spp.), tamarisk (*Tamarix* spp.), cottonwoods (*Populus* spp.), seep-willow (*Baccharis glutinosa*), and ash (*Fraxinus* spp.). Typical aquatic vegetation includes watercress (*Nasturtium officinale*), horsetail (*Equisetum* spp.), rushes (*Juncus* spp.), and speedwell (*Veronica anagallis-aquatica*) (USFWS 1983, Weedman et al. 1996).

The Gila chub is a highly secretive species, remaining near cover including undercut banks, terrestrial vegetation, boulders, root wads, fallen logs, and thick overhanging or aquatic vegetation in deeper waters, especially pools (Rinne and Minckley 1991, Nelson 1993, Weedman et al. 1996). Recurrent flooding and a natural hydrograph are important in maintaining Gila chub habitats and in helping the species maintain a competitive edge over invading nonnative aquatic species (Propst et al. 1986, Minckley and Meffe 1987). They can survive in larger steam habitats, such as the San Carlos River, and artificial habitats, like the Buckeye Canal (Minckley 1985, Rinne and Minckley 1991, Stout et al. 1970, Rinne 1976), and they interact with spring and small-stream fishes regularly (Meffe 1985).

Young Gila chub are active throughout the day and feed on small invertebrates, as well as aquatic vegetation (especially filamentous algae) and organic debris (Bestgen 1985, Griffith and Tiersch 1989, Rinne and Minckley 1991). Adult Gila chub are crepuscular feeders, consuming a variety of terrestrial and aquatic invertebrates, and fishes (Griffith and Tiersch 1989, Rinne and Minckley 1991). Benthic feeding may also occur, as suggested by presence of small gravel particles.

The Gila chub evolved in a fish community with low species diversity and where few predators existed, and as a result developed few or no mechanisms to deal with predation (Carlson and Muth 1989). This species is known to be associated with speckled dace (*Rhinichthys osculus*), longfin dace (*Agosia chrysogaster*), desert sucker (*Pantosteus clarki*), Sonora sucker (*Catostomus insignis*), Gila topminnow (*Poeciliopsis occidentalis*), desert pupfish (*Cyprinodon macularius*), and Monkey Spring pupfish (*Cyprinodon arcuatus*). Prior to the widespread introduction of nonnative fishes, the Gila chub was probably the most predatory fish within the habitats it occupied. In the presence of the nonnative green sunfish (*Lepomis cyanellus*) in lower Sabino Creek, Arizona, Gila chub failed to recruit young (Dudley and Matter 2000). Direct predation by green sunfish on young Gila chub was the acknowledged cause of this observation.

Status and Distribution

Historically, the Gila chub was recorded from nearly 50 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, Sublette et al. 1990, Weedman et al. 1996); and occupancy by the Gila chub throughout its range was more dense, and currently-occupied sites were likely more expansive in distribution (Hendrickson and Minckley 1985, Minckley 1985, Rinne and Minckley 1991). The Gila chub now occupies an estimated 10 to 15 percent of its historical range (Weedman et al. 1996, USFWS 2005) and approximately 25 of these current localities are considered occupied, but all are small, isolated, and face one or more threats (Weedman et al. 1996, USFWS 2005). The biological status of several of these populations is uncertain, and the number of localities currently occupied may overestimate the number of remnant populations in that some might not persist if its core connected population was extirpated.

Agua Fria River Subbasin

The Agua Fria subbasin is the system furthest downstream in the Gila River basin that currently supports or is historically known to have supported Gila chub. This subbasin sustains or recently sustained four remnant Gila chub populations. The Agua Fria River mainstem was historically occupied, but that population is now considered extirpated. The four extant populations are Indian Creek, Little Sycamore Creek, Silver Creek (with replicates in Larry and Lousy Canyon), and Sycamore Creek. In 1996, all remnant populations were considered threatened, and two of the four were considered unstable (Weedman et al. 1996).

In Silver Creek, a natural fish barrier (waterfall) has prevented invasion of green sunfish into the uppermost reaches, but the protected reach has only a few kilometers (km) of perennial water, and the reach below is infested with nonnative green sunfish (Weedman et al. 1996). Natural barriers on Sycamore Creek have protected a portion of the population from nonnative fishes, but nonnative rainbow trout (*Oncorhynchus mykiss*) is present upstream, and the Gila chub may be functionally extirpated below the lowermost barrier where a suite of warmwater nonnative fishes reside (Weedman et al. 1996). The Gila chub population in Little Sycamore Creek inhabits two short perennial reaches totaling only about one km in length, but nonnative fishes have not been recorded within collections. The Indian Creek population was not detected until 1995 and, in 2005, a portion of the population was salvaged as a precaution following the Cave Creek Fire Complex and later successfully returned. Weedman et al. (1996) noted that cattle grazing and recreational uses within some of the streams may create additional threats to the populations. The replicated populations in Lousy and Larry canyons seem to be doing well, and there are no threats from nonnative fishes.

Verde River Subbasin

The Verde subbasin drainage includes the north-central Gila River basin between the Agua Fria and Salt subbasins. The Verde mainstem downstream from Sullivan Lake is mostly perennial to its confluence, and several large tributary systems contribute perennial flows, primarily from the eastern portion of the drainage. Gila chub populations are recently known from only four remnant sites within the Verde subbasin: Red Tank Draw, Spring Creek, Walker Creek, and Williamson Valley Wash. A population historically collected from Big Chino Wash is considered extirpated. There have been no replications of any Verde subbasin populations to date.

Williamson Valley Wash was tentatively considered extirpated by Weedman et al. (1996), but Bagley (2002) captured 50 individuals from the site in 2001. Spring Creek appears stable, and no nonnative fishes have been recorded recently from above a low (approximately 0.5 meter) diversion dam located near the mouth. Walker Creek appears stable and nonnative-free based on a number of surveys conducted between 1978, 2001, 2003, and 2007.

Santa Cruz River Subbasin

Gila chub populations are known from three remnant sites (Cienega Creek, Sabino Canyon, and Sheehy Spring) in the Santa Cruz subbasin (USFWS 2005). The population in Cienega Creek and its tributaries is the largest and most geographically widespread. The Sabino Creek population experienced recent bottlenecking associated with post-fire runoff, although the population was replicated into nearby Romero Canyon. Sheehy Spring is a small system that likely never supports more than approximately 1,000 adults. The Gila chub also was known historically from Monkey Spring and the mainstem Santa Cruz River, but these populations are now considered extirpated.

Cienega Creek is protected against nonnative fishes by at least two natural barriers, and the Gila chub population appears stable. However, headcutting along lower Wood Canyon threatens to capture Cienega Creek, which would initiate headward erosion up Cienega Creek that likely would significantly diminish Gila chub habitat. The Gila chub habitat in Sabino Creek seems to be recovering since the Aspen Fire in 2003, and the stream is protected against upstream invasions of nonnative fishes by a low-head dam. Sheehy Spring has been invaded by nonnative mosquitofish, which has displaced Gila topminnow, but the species does not appear to be significantly affecting Gila chub. Sheehy Spring, however, is a tiny drainage and is close to the mainstem Santa Cruz River, possibly enhancing its potential for upstream invasions.

San Pedro River Subbasin

The San Pedro River Subbasin includes the entire San Pedro River watershed upstream from the confluence with Gila River. Gila chub populations are known from three remnant sites (Hot Springs Canyon, O'Donnell Canyon, and Redfield Canyon) in the San Pedro River Subbasin (USFWS 2005). Hot Springs Canyon and O'Donnell Canyon populations are protected behind constructed fish barriers, and a barrier on Redfield Canyon is expected to be constructed during 2014. At least four, and possibly as many as six, of the nine historically-known populations within the subbasin are considered extirpated.

Upper Gila River Subbasin

Upper Gila River Subbasin includes the entire Gila River watershed upstream of the Salt River confluence, exclusive of the Santa Cruz and San Pedro subbasins. Major subdrainages include the San Carlos, San Simon, San Francisco, and upper Gila rivers (including its three forks).

There are six remnant populations of Gila chub within this unit, and five historically-occupied streams are considered extirpated. The six populations are Blue River (San Carlos), Eagle, Bonita, Harden Cienega, and Dix creeks; and Turkey Creek, New Mexico (USFWS 2005). The Blue River (San Carlos) population is entirely on San Carlos Apache Tribal (SCAT) lands, but there is little information available regarding its status. There are constructed fish barriers on Bonita and Dix creeks, although nonnatives remain present in lower Bonita Creek. Harden Cienega appears free of nonnatives, although there is no barrier preventing their encroachment. The Eagle Creek population was significantly impacted by severe runoff following the 2011 Wallow Fire. The Turkey Creek population appears large and relatively stable, although rainbow trout inhabits the upper reaches and some warmwater nonnative species inhabit the lower reaches.

Critical Habitat

Critical habitat for the Gila chub is designated for approximately 160.3 miles of stream reaches in Arizona and New Mexico that includes cienegas, headwaters, spring-fed streams, perennial streams, and spring-fed ponds. Critical habitat includes the area of bankfull width plus 300 feet on either side of the banks. The bankfull width is the width of the stream or river at bankfull discharge (i.e., the flow at which water begins to leave the channel and move into the floodplain) (Rosgen 1996, USFWS 2005). Critical habitat 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 (USFWS 2005).

There are seven primary constituent elements (PCEs) of critical habitat, which include those habitat features required for the physiological, behavioral, and ecological needs of the species (USFWS 2005):

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 degrees Fahrenheit (°F) to 75 °F, and seasonally appropriate temperatures for all life stages (varying from about 50°F to 86 °F;

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 (i.e., ranging from 3.0 parts per million (ppm) to 10.0 ppm) and conductivity (i.e., 100 millimhos (mmhos) to 1,000 mmhos);

4) Prey base consisting of invertebrates (i.e., aquatic and terrestrial insects) and aquatic plants (i.e., 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 the Gila chub or habitat in which detrimental nonnative species are kept at a level that allows the Gila chub to continue to survive and reproduce; and

7) Streams that maintain a natural flow pattern including periodic flooding.

Consultation History

Our information indicates that, rangewide, more than 33 consultations have been completed or are underway for actions affecting the Gila chub. These opinions primarily include the effects of grazing, water developments, fire, species control efforts, recreation, sportfish stocking, native fish restoration efforts, and mining.

Gila Topminnow

The Gila topminnow was listed as endangered in 1967 without critical habitat (32 FR 4001). Only Gila topminnow populations in the United States, and not in Mexico, are listed under the ESA. The reasons for decline of this fish include past dewatering of rivers, springs and marshlands, impoundment, channelization, diversion, regulation of flow, land management practices that promote erosion and arroyo formation, and the introduction of predacious and competing nonnative fishes (Miller 1961, Minckley 1985). Other listed fish suffer from the same impacts (Moyle and Williams 1990). Life history information can be found in the 1984 recovery plan (USFWS 1984), the draft revised Gila topminnow recovery plan (Weedman 1999), and references cited in the plans.

Gila topminnows are highly vulnerable to adverse effects from nonnative aquatic species (Johnson and Hubbs 1989). Predation and competition from nonnative fishes have been a major factor in their decline and continue to be a major threat to the remaining populations (Meffe *et al.* 1983, Meffe 1985, Brooks 1986, Marsh and Minckley 1990, Stefferud and Stefferud 1994, Weedman and Young 1997, Minckley and Marsh 2009). The native fish fauna of the Gila basin and of the Colorado basin overall, was naturally depauperate and contained few fish that were predatory on or competitive with Gila topminnow (Carlson and Muth 1989). In the riverine backwater and side-channel habitats that formed the bulk of Gila topminnow natural habitat, predation and competition from other fishes was essentially absent. Thus Gila topminnow did not evolve mechanisms for protection against predation or competition and is predator- and competitor-naive. Due to the introduction of many predatory and competitive nonnative fish, frogs, crayfish, and other species, Gila topminnow could no longer survive in many of their former habitats, or the small pieces of those habitats that had not been lost to human alteration. Both large (Bestgen and Propst 1989) and small (Meffe *et al.* 1983) nonnative fish cause problems for Gila topminnows, as can nonnative crayfish (Fernandez and Rosen 1996) and bullfrogs.

It has long been known and thoroughly documented, that, western mosquitofish *Gambusia affinis* (mosquitofish) has major deleterious effects on individual Gila topminnow and their populations (Minckley *et al.* 1977, Meffe *et al.* 1983, Minckley *et al.* 1991, Minckley 1999, Voeltz and Bettaso 2003). These publications and others (Miller 1961, Meffe *et al.* 1982, Duncan 2013) have made it abundantly clear that mosquitofish negatively impact topminnow, and documented the likely mechanisms responsible (Schoenherr 1974, Meffe 1984, 1985).

The Sonoran topminnow (*Poeciliopsis occidentalis*) was listed in 1967. The species was later revised to include two subspecies, *P. o. occidentalis* and *P. o. sonoriensis* (Minckley 1969, 1973). *P. o. occidentalis* was known

as the Gila topminnow, and *P. o. sonoriensis* was known as the Yaqui topminnow. *P. occidentalis*, including both subspecies, was collectively known as the Sonoran topminnow. Both subspecies are protected under the ESA. Minckley (1999) stated that the Yaqui topminnow and Gila topminnow are separate species named *P. sonoriensis* and *P. occidentalis*, respectively (Nelson *et al.* 2006). Other researchers make the same argument (Quattro *et al.* 1996, Hedrick *et al.* 2001, Hedrick and Hurt 2012). The name change has not been made to 50 CFR 17.11.

Historically, the Gila topminnow was abundant in the Gila River drainage in Arizona and was one of the most common fishes of the Colorado River basin, particularly in the Santa Cruz system (Hubbs and Miller 1941). Gila topminnow also were recorded from the Gila River basin in New Mexico (Minckley and Marsh 2009). In the last 50 years, they were reduced to only 16 naturally occurring populations. Presently, only 8 of the 16 known natural Gila topminnow populations are considered extant (Table GT-1)(Weedman and Young 1997, Voeltz and Bettaso 2003, Duncan 2013). There have been at least 200 wild sites stocked with Gila topminnow, however, topminnow persist at only 33 of these localities (Table GT-2). Of these, two sites are outside topminnow historical range and one contains nonnative fish (Voeltz and Bettaso 2003). All of these sites except two are in New Mexico. Many of the reestablished sites are very small and may not contain viable populations, as defined in the draft revised recovery plan (Weedman 1999). In addition several of the 33 sites have been reestablished in the last few years, and their eventual disposition is unknown.

The *Sonoran Topminnow Recovery Plan* (USFWS 1984) established criteria for down- and de-listing. Criteria for down-listing were met for a short period. However, due to concerns regarding the status of several populations, down-listing was delayed. Subsequently, the number of reestablished populations dropped below that required for down-listing, where it has remained. The Yaqui topminnow is now included within the *Yaqui Fishes Recovery Plan* (USFWS 1995). A draft revised recovery plan for the Gila topminnow is available (Weedman 1999). The plan’s short-term goal is to prevent extirpation of the species from its natural range in the US and reestablish it into suitable habitat within historical range.

The status of the species is mixed. An active recovery program actively stocks Gila topminnow in Arizona and New Mexico, reestablishing topminnow in “new” sites (Robinson 2010, 2011, 2012). However, natural sites continue to slowly decline. Gila topminnow has gone from being one of the most common fishes of the Gila basin to one that exists at about 41 localities (8 natural and 33 stocked). Many of these localities are small and highly threatened. The theory of island biogeography can be applied to these isolated habitat remnants, as they function similarly (Meffe 1983, Laurenson and Hocutt 1985). Species on islands are more prone to extinctions than continental areas that are similar in size (MacArthur and Wilson 1967). Meffe (1983) considered extirpation of Gila topminnow populations almost as critical as recognized species extinctions. Moyle and Williams (1990) noted that fish in California that are in trouble tend to be endemic, restricted to a small area, part of fish communities with fewer than five species, and found in isolated springs or streams. The Gila topminnow has most of these characteristics.

Table GT-1. Status of natural Gila topminnow populations in the US.

Site	Ownership	Extant?[1,8]	Nonnatives?	Mosquitofish?	Habitat Size[2]	Threats[3]
Bylas Spring[5]	San Carlos	YES	NO[4]	NO[4]	S D	M/ N G
Cienega Creek	BLM/County	YES	NO	NO	L	H/ R N W U M
Coal Mine Spring	AGFD	YES	NO	NO	S	L/ G
Cocio Wash	BLM	NO 1982	DRY	DRY	S	H/ M
Cottonwood Spring	Private	YES	NO	NO	S	M/ N W
Fresno Canyon[7]	State Parks	YES	NO[9]	NO[4]	M	H/ N U
Middle Spring[5]	San Carlos	YES	NO[4]	NO[4]	S	H/ N G
Monkey Spring	Private	YES	NO	NO	S	L/ W U
Redrock Canyon	USFS	NO 2008[10]	YES	YES	M D	H/ W R G N
Salt Creek[5]	San Carlos	YES	NO[4]	NO[4]	S	M/ N G
San Pedro River	Private	NO 1976	YES	YES	-	H/ W N G R
Santa Cruz River	Private, State Parks, TNC				L D	H/ W N R G C U
San Rafael		NO[6]	YES	YES		
Tumacacori		NO 2003	YES[4]	YES		
Sharp Spring	State Parks	NO 2004	YES	YES	M	H/ N G
Sheehy Spring	TNC	NO 1987	YES	YES	S	H/ N G
Sonoita Creek	Private, TNC, State Parks	YES	YES	YES	L D	H/ W N G

[1] if no, last year recorded
[2] Size L = large M= medium S = small D = disjunct
[3] Immediacy H = high M = moderate L = low
Type W = water withdrawal C = contaminants R = recreation N = nonnatives
G = grazing M = mining U = urbanization
[4] none recently, they have been recorded
[5] renovated
[6] in Mexico 2006, US in 1993
[7] includes Sonoita Creek below Patagonia Lake
[8] Recent records are those less than 10 years old
[9] Fresno Canyon renovated in 2007 and is free of nonnatives- Sonoita Creek has many nonnatives
[10] Stefferud and Stefferud 2008
The Bylas Springs complex, Bylas Spring, Middle Spring, and Salt Creek count as one natural site.

Table GT-2. Reestablished wild populations of Gila topminnow that are likely extant. In Arizona unless noted otherwise (Voeltz and Bettaso 2007, FWS files).

Site Name	Year stocked (discovered)	Mixed/pure	Lineage(s)	Fish From:
AD Wash	1993	Pure	Sharp Spring	Dexter NFH
Ben Spring	2011	Pure	Cottonwood Springs	Bubbling Ponds
Bleak Spring	2005	Pure	Bylas	San Carlos
Bonita Creek (upper)	2010	Pure	Bylas Spring	Dudleyville pond
Buckhorn Spring	2011	Pure	Sharp Spring	
Burro Cienega, NM	2008	Pure	Bylas Spring	Dudleyville pond
Campaign Creek	1983 - **Failed**	Mixed	Monkey/Bylas/Cocio	BTA
	2001	Mixed	Sharp/Cienega	ASU ARC
Cement Spring	2005	Pure	Bylas	San Carlos
Chalky Spring	2009	Pure	Sharp Spring	
Charlebois Spring	1983	Mixed	Monkey/Bylas/Cocio	BTA
Cherry Spring (Muleshoe)	2007-2008	Pure	Bylas Spring	Dudleyville pond
Cieneguita Wetland	2013	Pure	Cienega Creek	
Cold Spring (#85)	1985	Pure	Monkey Springs	BTA
Cottonwood Spring (Goldfield Mountains)	2008	Mixed	Monkey Springs	Boyce Thompson Arboretum
Cottonwood Artesian	1982 - **Failed**	Mixed	Monkey/Bylas/Cocio	BTA
	2001	Pure	Bylas Springs	ASU ARC
Dutchman Grave Spring	1983- **Failed**	Mixed	Monkey/Bylas/Cocio	BTA
	2006	Mixed	Monkey/Bylas/Cocio	BTA
Empire Tank	2013	Pure	Cienega Creek	
Fossil Creek (#280)	2007-2010	Pure	Sharp Spring	
Headquarters Spring (Muleshoe)	2008	Pure	Bylas Spring	Dudleyville pond
Horse Thief Draw	2011	Pure	Cottonwood Springs	Bubbling Ponds
Howard Well	2008	Pure	Bylas Spring	Dudleyville pond
Larry Creek trib	2005	Pure	Coalmine Spring	Coalmine Spring
Lime Creek	Dispersal from Lime Cabin	Mixed	Monkey/Bylas/Cocio (Lime Cabin Spring	BTA

	Spring (1996)		stocked in 1982)	
Little Nogales Spring	2013	Pure	Cienega Creek	
Lousy Canyon	1999, 2006	Pure	Coalmine Spring	Coalmine Spring
Morgan City Wash	2009	Pure	Sharp Spring	
Mud Springs	1982	Mixed	Monkey/Bylas/Cocio	BTA
Murray Spring	2011	Pure	Cottonwood Springs	Bubbling Ponds
Nogales Spring	2013	Pure	Cienega Creek	
O'Donnell Creek	1974	Pure	Monkey	Monkey
Pasture 2 Tank	2013	Pure	Sharp Spring	Robbins Butte
Redrock Wildlife Area NM	2010	Pure	Bylas Spring	Dudleyville pond
Road Canyon Tank	2012	Pure	Cienega Creek	Robbins Butte
Rock Spring	2013	Pure	Santa Cruz (Peck)	Phoenix Zoo
Secret Spring (#331, Muleshoe)	2007	Pure	Bylas Spring	Dudleyville pond
Springwater Wetland	2013	Pure	Cienega Creek	
Swamp Spring (Muleshoe)	2007-2008	Pure	Bylas Spring	Dudleyville pond
Tule Creek	1981	Mixed	Monkey/Bylas/Cocio	BTA
Unnamed Drainage 68b	Dispersal from Mesquite Tank #2 (1985)	Mixed	Monkey/Bylas/Cocio (Mesquite Tank @ stocked in 1982)	BTA
Walnut Spring (Mesa Ranger District)	1982	Mixed	Monkey/Bylas/Cocio	BTA
Walnut Spring (Tonto Basin Ranger District)	2013	Pure	Redrock Canyon	ASU & Desert Harbor
Usery Park	2011	Pure	Cottonwood Springs	

Consultation History

Our information indicates that, range wide, over 100 formal consultations have been completed for actions affecting Gila topminnow. These opinions primarily include the effects of grazing, water developments, fire, species control efforts, recreation, land management planning, native fish restoration efforts, and mining.

Loach minnow

The loach minnow (*Tiaroga cobitis)* was reclassified as an endangered species on February 23, 2012 (77 FR 10810), and was originally listed as a threatened species on October 28, 1986 (51 FR 39468). Critical habitat has been designated (March 8, 1994 - 59 FR 10898) and redesignated (April 25, 2000 –

65 FR 24328; March 21, 2007 – 72 FR 13356) in response to legal concerns and policy changes (see summary discussion at 75 FR 66482, p. 66485). The current critical habitat designation was published simultaneously with the reclassification of loach minnow to endangered status on February 23, 2012 (77 FR 10810).

Background

The loach minnow is a small fish from the minnow family Cyprinidae. Loach minnow are olivaceous in color, and highly blotched with darker spots. Whitish spots are present at the front and back edges of the dorsal fin, and on the dorsal and ventral edges of the caudal fin. A black spot is usually present at the base of the caudal fin. Breeding males have bright red-orange coloration at the bases of the paired fins and on the adjacent body, on the base of the caudal lobe, and often on the abdomen. Breeding females are usually yellowish on the fins and lower body (Minckley 1973; USFWS 1991).

The limited taxonomic and genetic data available for the 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 and allozyme surveys indicate variation for the loach minnow follows drainage patterns, suggesting little gene flow among rivers. The levels of divergence present in the data set indicated 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.

The 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 use 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 feed exclusively on aquatic insects (Schreiber 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).

Distribution

Loach minnow are believed to occupy approximately 15 to 20 percent of their historical 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; Propst et al. 2009); the San Francisco and Tularosa rivers and their tributaries Negrito and Whitewater creeks (Catron County, New Mexico) (Propst *et al.* 1988, p. 15; Arizona State University (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; Carter 2008a, pers. comm.; Clarkson *et al.* 2008, pp. 3–4; Robinson 2009a, p. 3); Aravaipa Creek and its tributaries Turkey and Deer creeks (Graham and Pinal Counties, Arizona) (Stefferud and Reinthal 2005, pp. 16–21); Eagle Creek (Graham and Greenlee Counties, Arizona), (Knowles 1994, pp. 1–2, 5; Bagley and Marsh 1997; pp. 1–2; Marsh *et al.* 2003; pp. 666–668; Carter *et al.* 2007, p. 3; Bahm and Robinson 2009, p. 1); and the North Fork East Fork Black River (Apache and Greenlee Counties, Arizona) (Leon 1989, pp. 1–2; Lopez 2000, pers. comm.; Gurtin 2004, pers. comm.; 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).

Loach minnow have recently been placed in additional streams as part of the recovery efforts for the species. In 2007, loach minnow 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; Orabutt 2009, pers. comm.; Robinson *et al.* 2010a; Robinson *et al.* 2010b; Robinson 2011a, pers. comm.). Both Hot Springs and Redfield canyons are tributaries to the San Pedro River. Augmentation efforts have been suspended in Redfield Canyon due to drought and a lack of adequate flowing water. Augmentation efforts have been suspended at Hot Springs Canyon to allow managers to better evaluate if recruitment of loach minnow is occurring without further augmentation. Monitoring will continue at this site, and future augmentations may occur if needed.

In 2007, loach minnow were translocated into Fossil Creek, within the Verde River subbasin (Carter 2007b), with additional fish added in 2008 and 2011 (Carter 2007b; Carter 2008b; Robinson 2009b; Boyarski *et al.* 2010; Robinson 2011b). In 2008, loach minnow were translocated into Bonita Creek, a tributary to the Gila River in Graham County, Arizona (Blasius 2008, pers. comm.; Robinson 2008b, pers. comm.). Augmentations at Bonita Creek have been temporarily suspended due to re-invasion of by nonnative species above the fish barrier. We anticipate that augmentations with additional fish will occur for the next several years at these sites, if adequate numbers of fish are available, and habitats remain suitable. 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.

Critical Habitat

When critical habitat was designated in 2012, the Fish and Wildlife Service determined the primary constituent elements (PCEs) for loach minnow. PCEs include those habitat features required for the physiological, behavioral, and ecological needs of the species. The PCEs describe appropriate flow regimes, velocities, and depths; stream microhabitats; stream gradients; water temperatures; and acceptable pollutant and nonnative species levels (see 77 FR 10810, p. 10837), which are summarized in Table 1 below.

The loach minnow critical habitat designation includes eight units based on river subbasins, including the Verde River, Salt River, San Pedro, Bonita Creek, Eagle Creek, San Francisco River, Blue River, and Gila River subbasins. Critical habitat has been designated in each of these subbasins (See 77 FR 10810 for additional detail).

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.

Table 1. Primary Constituent Elements (PCEs) for Loach Minnow Critical Habitat.

PCE	Description
Abundant Aquatic Insect Food Base	mayflies, true flies, black flies, caddis flies, stoneflies, and dragonflies.
Flows	Perennial flows or interrupted stream courses that are periodically dewatered but serve as connective corridors between occupied or seasonally occupied habitats
Depth	Generally less than 3.3 feet
Velocities	Slow to swift velocities between 0.0 and 31.5 inches per second
Stream Microhabitats	Pools, runs, riffles, and rapids
Substrate	Gravel, cobble, and rubble with low or moderate amounts of fine sediment and substrate embeddedness
Gradient	Less than 2.5 percent
Elevation	8,200 feet or less
Water Temperatures	46.4 to 77 degrees Fahrenheit
Pollutants	No or low levels present
Nonnative Aquatic Species	None, or present at levels sufficiently low as to allow persistence of loach minnow
Flow Regime	Natural and unregulated, or if modified or regulated, regimes that allow for adequate river functions, such as flows capable of transporting sediments.

Spikedace

The spikedace (*Meda fulgida*) was originally listed as a threatened species on July 1, 1986 (51 FR 23769) and reclassified as endangered on February 23, 2012 (77 FR 10810). Critical habitat has been designated (March 8, 1994 - 59 FR 10906) and redesignated (April 25, 2000 - 65 FR 24328; March 21, 2007 - 72 FR 13356) in response to legal concerns and policy changes (see summary discussion at 75 FR 66482, p. 66485). The current critical habitat designation was published simultaneously with the reclassification of spikedace to endangered status on February 23, 2012 (77 FR 10810).

<u>Background</u>

The spikedace is a small silvery fish whose common name alludes to the well-developed spine in the dorsal fin (Minckley 1973). 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 spawn 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 live 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 2012 critical habitat designation (77 FR 10810).

<u>Distribution</u>

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; Brouder 2002; pers. comm.; 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; Robinson 2008b, pers. comm.; Orabutt 2009, pers. comm.; Robinson 2009a; Robinson *et al.* 2010a; Robinson *et al.* 2010b; Robinson 2011a, pers. comm.). Both Hot Springs and Redfield canyons are tributaries to the San Pedro River. Augmentation efforts have been suspended in Redfield Canyon due to drought and a lack of adequate flowing water. Augmentation efforts have been suspended at Hot Springs Canyon to allow managers to better evaluate if recruitment of spikedace is occurring without further augmentation. Monitoring will continue at this site, and future augmentations may occur if needed.

Spikedace were translocated into Fossil Creek, a tributary to the Verde River in Gila County, Arizona, in 2007, and were subsequently augmented in 2008 and 2011 (Carter 2007; Carter 2008; Robinson 2009b; Boyarski *et al.* 2010; Robinson 2011b).

In 2008, spikedace were translocated into Bonita Creek, a tributary to the Gila River in Graham County, Arizona (Blasius 2008, pers. comm.; Robinson *et al.* 2009), and were repatriated to the upper San Francisco River in Catron County, New Mexico (Propst 2010, pers. comm.). Augmentations at Bonita Creek have been temporarily suspended due to re-invasion by nonnative species above the fish barrier. We anticipate that augmentations with additional fish will occur for the next several years at all sites, if adequate numbers of fish are available and habitats remain suitable. 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 spikedace in these locations.

The spikedace is now common only in Aravaipa Creek in Arizona (Arizona State University (ASU) 2002; Reinthal 2008, pers. comm., Reinthal 2011) 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 (Brouder 2002, pers. comm.; 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 1991 (Jakle 1992), but sampling is localized and inadequate to detect a sparse population.

Planning among several State and Federal agencies is underway for restoration of native fish species, including spikedace, in the Blue River through 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 was completed in mid-2012, and plans are underway to translocate spikedace to the Blue River.

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).

<u>Critical Habitat</u>

When critical habitat was designated in 2012, the Fish and Wildlife Service determined the primary constituent elements (PCEs) for spikedace. PCEs include those habitat features required for the physiological, behavioral, and ecological needs of the species. The PCEs describe appropriate flow regimes, velocities, and depths; stream microhabitats; stream gradients; water temperatures; and acceptable pollutant and nonnative species levels (see 77 FR 10810, p. 10837), which are summarized in Table 2 below.

The spikedace critical habitat designation includes eight units based on river subbasins, including the Verde River, Salt River, San Pedro, Bonita Creek, Eagle Creek, San Francisco River, Blue River, and Gila River subbasins (See 77 FR 10810 for additional detail on occupancy by subbasin). Critical habitat has been designated in each of these subbasins (See 77 FR 10810 for additional detail).

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.

Table 2. Primary Constituent Elements (PCEs) for Spikedace Critical Habitat (77 FR 10810).

PCE	Description
Flows	Perennial, or interrupted stream courses that are periodically dewatered but serve as connective corridors between occupied or seasonally occupied habitats
Depth	Generally less than 3.3 feet (1 meter)
Velocities	Slow to swift, between 1.9 and 31.5 inches per second (5 and 80 centimeters/second)
Stream Microhabitats	Glides, runs, riffles, margins of pools and eddies
Substrate	Sand, gravel, and cobble, with low or moderate amounts of fine sediment and substrate embeddedness
Gradient	Less than approximately 1.0 percent
Elevation	Below 6,890 feet (2,100 meters)
Water Temperatures	Between 46.4 to 82.4 degrees Fahrenheit; 8.0 to 28.0 degrees Celsius
Pollutants	No or low levels present
Nonnative Aquatic Species	None, or present at levels sufficiently low as to allow persistence of spikedace
Flow Regime	Natural and unregulated, or if modified or regulated, regimes that allow for adequate river functions, such as flows capable of transporting sediments.

Chiricahua Leopard Frog

The CLF was listed as a threatened species without critical habitat in a Federal Register notice dated June 13, 2002. Included was a special rule under Section 4(d) of the Act to exempt operation and maintenance of livestock tanks on non-Federal lands from the section 9 take prohibitions of the Act. Subsequently, the listing of the species was reevaluated to include the previously known Ramsey Canyon leopard frog (*Lithobates subaquavocalis*) that was subsumed into the CLF species designation. A revised final rule was published on March 20, 2012 (77 FR 16324) that listed the species as threatened with critical habitat and included the special rule included in the original listing. Final designation of critical habitat includes 39 units in Arizona and New Mexico.

The CLF 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 (U.S.

Fish and Wildlife Service [USFWS] 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). 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. Historically, the CLF was an inhabitant of a wide variety of aquatic habitats, including cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,281 to 8,890 feet. However, the species is now limited primarily to headwater streams, springs and cienegas, and cattle tanks into which nonnative predators (e.g. sportfishes, American bullfrogs, crayfish, and tiger salamanders) have not yet invaded or where their numbers are low (USFWS 2007). The large valley-bottom cienegas, rivers, and lakes where the species occurred historically are populated with nonnative predators at densities with which the species cannot coexist.

The primary threats to this species are predation by nonnative organisms and die offs caused by a fungal skin disease – chytridiomycosis. 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 due to fire suppression and livestock grazing, mining, development, and other human activities; disruption of metapopulation dynamics, increased chance of extirpation or extinction resulting from small numbers of populations and individuals, and environmental contamination (USFWS 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 CLFs.

Based on 2009 data, the species is still extant in the major drainage basins in Arizona and New Mexico where it occurred historically; with the exception of the Little Colorado River drainage in Arizona and possibly the Yaqui drainage in New Mexico. It has not been found recently in many rivers within those major drainage basins, valleys, and mountains ranges, including the following in Arizona: White River, West Clear Creek, Tonto Creek, Verde River mainstem, San Francisco River, San Carlos River, upper San Pedro River mainstem, Santa Cruz River mainstem, Aravaipa Creek, Babocomari River mainstem, and Sonoita Creek mainstem. In southeastern Arizona, no recent records (1995 to the present) exist for the Pinaleño Mountains or Sulphur Springs Valley. Once thought to be extirpated from the Chiricahua Mountains, the species now occurs in Cave Canyon, in the vicinity of the Southwestern Research Station operated by the Smithsonian Institution. The species is now absent from all but one of the southeastern Arizona valley bottom cienega complexes. In many of these regions CLF were not found for a decade or more despite repeated surveys.

As of 2009, there were 84 sites in Arizona at which CLF occur or are likely to occur in the wild, with an additional four captive or partially captive refugia sites. At least 33 of the wild sites support breeding. In New Mexico, 15-23 breeding sites were known in 2008; the CLFs occur at additional dispersal sites. The species has been extirpated from about 80 percent of its historical localities in Arizona and New Mexico. Nineteen and eight localities are known from Sonora and Chihuahua, respectively. The species' current status in Mexico is poorly understood; however, it has been found in recent years in western Chihuahua. Some threats, such as introduced nonnative predators and the threat of catastrophic wildfire, appear to be less important south of the border, particularly in the mountains where CLF have been found (Gingrich 2003, Rosen and Melendez 2006, Rorabaugh 2008).

The chytridiomycete skin fungus, *Batrachochytrium dendrobatidis* (*Bd*), 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). Decline or extinction of about 200 amphibian species worldwide has been linked to the disease (Skerratt *et al*. 2007). In Arizona, *Bd* infections have been reported from numerous populations of CLF in southeastern Arizona and one population on the Tonto National Forest, as well as populations of several other frogs and toads in Arizona (Morell 1999, Davidson et al. 2000, Sredl and Caldwell 2000, Hale 2001, Bradley *et al.* 2002, USFWS 2007). In New Mexico, chytridiomycosis appears to be widespread in populations in west-central New Mexico, where it often leads to population extirpation. A threats assessment conducted for the species during the development of the recovery plan identified *Bd* as the most important threat to the CLF in recovery units 7 and 8 in New Mexico. In recovery unit 6, which includes much of the mountainous region of west-central New Mexico, *Bd* and nonnative predators were together identified as the most important threats. Die-offs from disease typically occur during the cooler months from October-February (USFWS 2007).

Numerous studies indicate that declines and extirpations of CLF are at least in part caused by predation and possibly competition by nonnative organisms, including fishes in the family Centrarchidae (*Micropterus* spp., *Lepomis* spp.), bullfrogs, tiger salamanders (*Ambystoma mavortium mavortium*), crayfish (*Orconectes virilis* and possibly others), and several other species of fishes (Clarkson and Rorabaugh 1989; Sredl and Howland 1994; Fernandez and Bagnara 1995; Rosen *et al*. 1996, 1994; Snyder *et al*. 1996; Fernandez and Rosen 1996, 1998). For instance, in the Chiricahua region of southeastern Arizona, Rosen et al. (1996) found that almost all perennial waters investigated that lacked introduced predatory vertebrates supported CLFs. All waters except three that supported introduced vertebrate predators lacked CLFs. Sredl and Howland (1994) noted that CLFs were nearly always absent from sites supporting bullfrogs and nonnative predatory fish. Rosen *et al*. (1996) suggested further study was needed to evaluate the effects of mosquitofish, trout, and catfish on frog presence.

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

Three wildfires in 2011 affected CLF and its habitat. The first of these fires was the Greaterville Fire. The Greaterville Fire started on May 2, 2011, and may have affected dispersal habitat and designated critical habitat along the eastern bajada of the Santa Rita Mountains. This fire was less severe, comparatively small-sized, and of shorter duration than the following two fires. The second fire, the Wallow Fire, started on May 29, 2011, and became Arizona's largest wildfire in recorded history. The Wallow Fire consumed 538,049 acres of montane conifer forest on the Apache-Sitgreaves National Forest and likely adversely affected habitat and critical habitat on Campbell Blue and Coleman creeks. All five known CLF sites on the Alpine Ranger District were within the Wallow Fire boundary. Although wetland vegetation immediately adjacent to these sites was not burned or very patchily burned, all sites were threatened with sedimentation from potential post-fire inundation of debris and silt from upland burned areas that experienced low to high soil burn severity (Gordon 2014, pers. comm.). As of October 2010, little information was available on the post-fire status of potential CLF habitat within the fire footprint. Since many tanks and springs that are important for recovery of the species in this area occur in meadows, sediment flows may not have affected them as they would habitat within canyon bottoms. The final fire that affected the species was the Monument Fire, which began on June 12, 2011, 4-miles east of Hereford, Arizona; ultimately consuming 30,526 acres and significantly affecting a portion of the Huachuca Mountains, including Miller Canyon and the Beatty Guest Ranch. Subsequent monsoon precipitation in the region liberated significant amounts of top soil and sediment which scoured the canyon bottom and filled-in the majority of ponds and suitable habitat for the CLF in lower Miller Canyon on the Ranch. Waters at the Beatty's Guest Ranch supported one of the most robust and dense populations of CLFs. The remaining population at the Ranch represents a small fraction of its former number.

Fire frequency and intensity in Southwestern forests are much altered from historical conditions (Dahms and Geils 1997). Before 1900, surface fires generally occurred at least once per decade in montane forests with a pine component. Beginning about 1870-1900, these frequent ground fires ceased to occur due to intensive livestock grazing that removed fine fuels, followed by effective fire suppression in the mid to late 20th century (Swetnam and Baisan 1996). Absence of ground fires allowed a buildup of woody fuels that precipitated infrequent but intense crown fires (Swetnam and Baisan 1996, Danzer *et al*. 1997). Absence of vegetation and forest litter following intense crown fires exposes soils to surface and rill erosion during storms, often causing high peak flows, sedimentation, and erosion in downstream drainages (DeBano and Neary 1996). These post-fire events have likely resulted in scouring or sedimentation of frog habitats (Wallace 2003).

An understanding of the dispersal abilities of CLFs is the key to determining the likelihood that suitable habitats will be colonized from a nearby extant population of frogs. As a group, leopard frogs are surprisingly good at dispersal. In Michigan, young northern leopard frogs (*Lithobates pipiens*) commonly move up to 0.5 mile from their place of metamorphosis, and three young males established residency up to 8.4 miles from their place of metamorphosis (Dole 1971). Both adults and juveniles wander widely during wet weather (Dole 1971). In the Cypress Hills, southern Alberta, young-of-the year northern leopard frogs successfully dispersed to downstream ponds 3.4 miles from the source pond, upstream 0.6 mile, and overland 0.6 mile. At Cypress Hills, a young-of-the-year northern leopard frog moved 5 miles in one year (Seburn *et al*. 1997). The Rio Grande leopard frog (*Lithobates berlandieri*) in southwestern Arizona has been observed to disperse at least one mile from any known water source during the summer rainy season (Rorabaugh 2005). After the first rains in the Yucatan Peninsula, leopard frogs have been collected a few miles from water (Campbell 1998). In New Mexico, Jennings (1987) noted collections of Rio Grande leopard frogs from intermittent water sources and suggested these were frogs that had dispersed from permanent water during wet periods.

Dispersal of leopard frogs away from water in the arid Southwest may occur less commonly than in mesic environments in Alberta, Michigan, or the Yucatan Peninsula during the wet season. However, there is evidence of substantial movements even in Arizona. Movement may occur via locomotion of frogs or passive movement of tadpoles along stream courses. The maximum distance moved by a radio-telemetered CLF in New Mexico was 2.2 miles in one direction (R. Jennings, Western New Mexico University, C. Painter, NMDGF, pers. comm. 2004). In 1974, Frost and Bagnara (1977) noted passive or active movement of Chiricahua and Plains (*Lithobates blairi*) leopard frogs for 5 miles or more along East Turkey Creek in the Chiricahua Mountains. In August, 1996, Rosen and Schwalbe (1998) found up to 25 young adult and subadult CLF at a roadside puddle in the San Bernardino Valley, Arizona. They believed that the only possible origin of these frogs was a stock tank located 3.4 miles away. Rosen *et al*. (1996) found small numbers of CLF at two locations in Arizona that supported large populations of nonnative predators. The authors suggested these frogs could not have originated at these locations because successful reproduction would have been precluded by predation. They found that the likely source of these animals were populations 1.2-4.3 miles distant. In September 2009, 15-20 CLF were found at Peña Blanca Lake west of Nogales. The nearest likely source population is Summit Tank, a straight line distance of 3.1 miles overland and approximately 4.1 miles along intermittent drainages.

Movements away from water do not appear to be random. Streams are important dispersal corridors for young northern leopard frogs (Seburn *et al*. 1997). Displaced northern leopard frogs will home, and apparently use olfactory and auditory cues, and possibly celestial orientation, as guides (Dole 1968, 1972). Rainfall or humidity may be an important factor in dispersal because odors carry well in moist air, making it easier for frogs to find other wetland sites (Sinsch 1991). Based on these studies, the CLF recovery plan (USFWS 2007) provides a general rule on dispersal capabilities. CLFs are assumed to be able to disperse one mile overland, three miles along ephemeral drainages, and five miles along perennial water courses.

A recovery plan has been completed (USFWS 2007), the goal of which 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 recovery units throughout the range of the species. Management areas are also identified within recovery units where the potential for successful recovery actions is greatest.

Additional information about the CLF can be found in Platz and Mecham (1984, 1979), Sredl and Howland (1994), Jennings (1995), Rosen *et al*. (1996, 1994), Degenhardt et al. (1996), Sredl *et al*. (1997), Painter (2000), Sredl and Jennings (2005), and USFWS (2007).

<u>Critical habitat</u>

The final rule (77 FR 16324; March 20, 2012) designated 39 critical habitat units across the range of the species in Arizona and New Mexico. 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 the physical or biological features (the general habitat features upon which a species depends), as described by the primary constituent elements (or PCEs the more specific habitat parameters defining the physical and biological features), essential to the conservation of the CLF 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, bullfrogs, nonnative fish) absent or occurring at levels that do not preclude presence of the CLF.

(d) Absence of chytridiomycosis, or if present, then environmental, physiological, and genetic conditions are such that allow persistence of CLFs.

(e) Upland habitats that provide opportunities for foraging and basking that are immediately adjacent to or surrounding breeding aquatic and riparian habitat.

(2) Dispersal and nonbreeding 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 CLFs 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 nonwetted corridors, provide 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, provide some ephemeral, intermittent, or perennial aquatic habitat.

(c) Are free of barriers that block movement by CLFs, including, but not limited to, urban, industrial, or agricultural development; reservoirs that are 50 acres (20 hectares) or more in size and contain nonnative predatory fish, 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, critical habitat 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.

With this designation of critical habitat, we intend 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 critical habitat will contain both PCEs. Each of the areas designated have been determined to contain sufficient PCEs, or with reasonable effort, PCEs can be restored to provide for one or more of the life-history functions of the CLF.

All areas designated as critical habitat will require some level of management to address the current and future threats to the CLF 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 CLFs can move through those sites with reasonable success.

Mexican Spotted Owl

In 1993, the FWS listed the Mexican spotted owl (hereafter, referred to as Mexican spotted owl, spotted owl, and owl) as threatened under the ESA. The FWS appointed the Mexican spotted owl Recovery Team in 1993, which produced the Recovery Plan for the Mexican spotted owl in 1995 (USDI FWS 1995). The FWS released the final Mexican spotted owl Recovery Plan, First Revision (Recovery Plan) in December 2012 (USDI FWS 2012). Critical habitat was designated for the spotted owl in 2004 (USDI FWS 2004).

A detailed account of the taxonomy, biology, and reproductive characteristics of the Mexican spotted owl is found in the Final Rule listing the owl as a threatened species (USDI FWS 1993), the original Recovery Plan (USDI FWS 1995), and in the revised Recovery Plan (USDI FWS 2012). The information provided in those documents is included herein by reference.

The spotted owl occurs in forested mountains and canyonlands throughout the southwestern United States 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 owl's entire range covers a broad area of the southwestern United States and Mexico, it does not occur uniformly throughout its range. Instead, the Mexican spotted owl occurs in disjunct localities that correspond to isolated forested mountain systems, canyons, and in some cases steep, rocky canyon lands. Known owl 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 United States and Mexico.

In addition to this natural variability in habitat influencing owl distribution, human activities also vary across the owl's range. The combination of natural habitat variability, human influences on owls, international boundaries, and logistics of implementation of the Recovery Plan necessitates subdivision of the owl's range into smaller management areas. The 1995 Recovery Plan subdivided the owl's range into 11 "Recovery Units" (RUs): six in the United States and five in Mexico. In the 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 Mexican spotted owl's range within the United States 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 2). Within Mexico, the Revised Recovery Plan delineated five EMUs: Sierra Madre Occidental Norte, Sierra Madre Occidental Sur, Sierra Madre Oriental Norte, Sierra Madre Oriental Sur, and Eje Neovolcanico.

Mexican spotted owl surveys since the 1995 Recovery Plan have increased our knowledge of owl distribution, but not necessarily of owl abundance. Population estimates, based upon owl surveys, recorded 758 owl sites from 1990 to 1993, and 1,222 owl sites from 1990 to 2004 in the United States. The Recovery Plan (USDI FWS 2012) lists 1,324 known owl sites in the United States. An owl site is an area used by a single or a pair of adult or subadult owls for nesting, roosting, or foraging. The increase in number of known owl sites is mainly a product of new owl 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 National Forest in New Mexico, and Gila National Forest in New Mexico). Thus, an increase in abundance in the species range-wide cannot be inferred from these data (USDI FWS 2012). However, we do assume that an increase in the number of areas considered to be occupied is a positive indicator regarding owl abundance.

Two primary reasons were cited for the original listing of the Mexican spotted owl in 1993:
1) the historical alteration of its habitat as the result of timber-management practices; and, 2) the threat of these practices continuing. The danger of stand-replacing fire was also cited as a looming threat at that time. Since publication of the original Recovery Plan (USDI FWS 1995), we have acquired new information on the biology, threats, and habitat needs of the Mexican spotted owl. Threats to its population in the U.S. (but likely not in Mexico) have transitioned from commercial-based timber harvest to the risk of stand-replacing wildland fire. Recent forest management has moved away 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 spotted owl. 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 owl habitat.

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 Mexican spotted owl 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), the Wallow Fire (2011), and the Whitewater-Baldy Complex (2012) have resulted in the loss of tens of thousands of acres of occupied and potential nest/roost habitat across significant portions of the Mexican spotted owl's range.

Historical and current anthropogenic uses of Mexican spotted owl 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 owl nesting, roosting, and foraging habitat, and may cause disturbance during the breeding season. Livestock and wild ungulate grazing is prevalent throughout the range of the owl and is thought to have a negative effect on the availability of grass cover for prey species. Recreation impacts are increasing throughout the Southwest, especially in meadow and riparian areas. There is anecdotal information and research that indicates that owls in heavily used recreation areas are much more erratic in their movement patterns and behavior. Fuels reduction treatments, though critical to reducing the risk of severe wildland fire, can have short-term adverse effects to owls through habitat modification and disturbance. As the human population grows in the southwestern United States, small communities within and adjacent to wildlands are being developed. This trend may have detrimental effects to spotted owls by further fragmenting habitat and increasing disturbance during the breeding season.

Several fatality factors have been identified as particularly detrimental to the Mexican spotted owl, including predation, starvation, accidents, disease, and parasites. For example, West Nile Virus also has the potential to adversely impact the Mexican spotted owl. The virus has been documented in Arizona, New Mexico, and Colorado, and preliminary information suggests that owls may be highly vulnerable to this disease (Courtney et al. 2004). Unfortunately, due to the secretive nature of spotted owls and the lack of intensive monitoring of banded birds, we will most likely not know when owls contract the disease or the extent of its impact to the owl range-wide.

Finally, global climate variability may also be a threat to the owl. Changing climate conditions may interact with fire, management actions, and other factors discussed above, to increase impacts to owl habitat. 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, and to invertebrate and vertebrate populations within coniferous forests and canyon habitats that affect ecosystem function and processes.

Critical Habitat

The FWS designated critical habitat for the Mexican spotted owl in 2004 on approximately 8.6 million acres (3.5 million hectares) of Federal lands in Arizona, Colorado, New Mexico, and Utah (USDI FWS 2004). Within the designated boundaries, critical habitat includes only those areas defined as protected habitats (defined as Protected Activity Centers (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 (now called "recovery") habitats (unoccupied owl foraging, dispersal, and future nest/roost habitat) as defined in the 1995 Recovery Plan (USDI FWS 1995). The PCEs for Mexican spotted owl critical habitat were determined from studies of their habitat requirements and information provided in the Recovery Plan (USDI FWS 1995). Since owl habitat can include both canyon and forested areas, PCEs were identified in both areas. The PCEs identified for the owl within mixed-conifer, pine-oak, and riparian forest types that provide for one or more of the owl'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 dbh (4.5 feet above ground) of 12 inches or more;
- A shade canopy created by the tree branches covering 40 percent or more of the ground;
- 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.

Steep-walled rocky canyonlands occur typically within the Colorado Plateau EMU, but also occur in other EMUs. Canyon habitat is used by owls for nesting, roosting, and foraging, and includes landscapes dominated by vertical-walled rocky cliffs within complex watersheds, including many tributary side canyons. These areas typically include parallel-walled canyons up to 1.2 miles (2 kilometers) in width (from rim to rim), with canyon reaches often 1.2 miles (2 kilometers) or greater, and with cool north-facing aspects. The PCEs related to canyon habitat include one or more of the following:

- Presence of water (often providing cooler and often higher humidity than the surrounding areas);
- Clumps or stringers of mixed-conifer, pine-oak, pinyon-juniper, and/or riparian vegetation;
- Canyon walls containing crevices, ledges, or caves; and,
- High percent of ground litter and woody debris.

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

Overall, the status of the owl and its designated critical habitat has not changed significantly range-wide in the U.S. (which includes Utah, Colorado, Arizona, New Mexico, and extreme southwestern Texas), based upon the information we have. What we mean by this is that the distribution of owls continues to cover the same area and critical habitat is continuing to provide for the life history needs of the Mexican spotted owl throughout all of the EMUs located in the U.S. We do not have detailed information regarding the status of the Mexican spotted owl 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 owl's U.S. range. Wildland fire has resulted in the greatest loss of PACs and critical habitat relative to other actions (e.g., such as forest management, livestock grazing, recreation, etc.) throughout the U.S. range of the Mexican spotted owl. These wildland fire impacts have mainly impacted Mexican spotted owls within the UGM EMU (e.g., Rodeo-Chediski and Wallow Fires on the Apache-Sitgreaves NF and Whitewater-Baldy Complex on the Gila NF) and BRW EMU (e.g., Horseshoe 2 Fire on the Coronado NF); but other EMUs have been impacted as well (SRM EMU, the Santa Fe NF by the Las Conchas Fire, CP EMU by the Warm Fire). However, we do not know the extent of the effects of these wildland fires on actual owl numbers.

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.

Description of the Action Area

The action area includes the project area and drainages from the project area extending for approximately two miles downstream. Considering that the prescribed burns are anticipated to generally result in low fire behavior intensities and that the 300-foot buffer will prevent direct sediment input through overland flow (Arias 2012) , we do not anticipate that storms after a burn will result in sufficient soil or ash being washed downstream to change the characteristics of aquatic systems beyond two miles.

Climate data indicate that average annual precipitation is about 13 inches. The wettest month, on average, occurs in August (2.5 inches) while the driest month occurs in May (0.24 inch). The Fort Grant, AZ Station climate data is representative of the lower elevation areas within the project area, but does not reflect the significantly higher precipitation at higher elevations. Values for higher elevations/higher precipitation areas were estimated using WEPP: Clime data (Elliot et.al., 1999). Results showed annual precipitation averages in higher elevations of up to 24 inches (Arias 2012).

Livestock grazing, roads, and recreational off-road-vehicle use occur within the action area. Livestock grazing in the Muleshoe Area may be resulting in some watershed effects, including sediment movement, but it was determined that these effects are minimal (Consultation # 22410-2006-F-0414). Sediment contributed from roads and delivered to streams can affect water quality, habitat, sediment transport regimes, and channel morphology. Most of the proposed nine treatment blocks are located in a roadless area. There are a total of 71 miles of roads within the CNF portion of the project area, but few are maintained with regularity. Unmaintained roads are a source of accelerated erosion. These roads are not included in the impaired or unsatisfactory soil condition statistics; however low road densities indicate that subwatersheds are in excellent conditions. Road densities in the BLM portion of the project area are lower than the CNF portion (based on maps of the areas). In general, the effects of recreation (including off-road-vehicle use), grazing, and road construction and maintenance that occur are minimal (Arias 2012).

<u>Muleshoe EMA (Rockhouse Burn Area) (BLM) (from the BA)</u>

The Rockhouse Burn area includes portions of the Muleshoe EMA and areas to the east of the Muleshoe EMA. The description for the Muleshoe EMA is valid for all of the Rockhouse Burn area.

Five major vegetation communities from 14 vegetation associations have been mapped within the Muleshoe ecosystem boundaries: Sonoran desert scrub, desert grassland/semi-desert shrub land, broadleaf deciduous woodland (riparian), evergreen woodland chaparral, montane forests and woodlands. The lower elevation mesa tops and hotter south- and west-facing slopes are dominated by Sonoran desert scrub with creosote bush, palo verde, diverse shrubs and saguaro. Mid-elevations have semi-desert grassland/scrub communities consisting of open stands of evergreen and deciduous trees such as mesquite and hackberry with an understory of native perennial grasses such as sideoats grama and curly mesquite and with varying levels of shrubs such as acacias, amole, snakeweed and burroweed. Riparian areas support large broad-leaved deciduous forests of sycamore, cottonwood, willow, walnut, ash, and white oak. Mesquite bosques line higher terraces above the floodplain. Steeper slopes at middle and upper elevations support evergreen woodlands of Mexican blue oak and juniper, and on north slopes, a mixed chaparral with species typical of Sierra Madrean vegetation. The highest elevations of the planning area support montane forests and woodlands consisting of open stands of evergreen trees such as Arizona cypress, piñon pine, and ponderosa pine with dense understories of evergreen chaparral shrub species such as manzanita, buckbrush, and snowberry.

The soils in the Muleshoe Ecosystem Management Area are generally very shallow with rock outcrops on ridges and sideslopes. Inventories in 1994 found that approximately 40% of the Muleshoe Allotment is composed of slopes greater than 50% and that the ground cover averages almost three-fourths rock and gravel. Although the watershed terrain is steep, the amount of bare soil subject to erosion is rather small. Approximately three-fourths of this ground cover has an overstory of protective grass, shrubs, and litter. On average, only 3% bare soil is exposed to direct raindrop impact. While the soils are moderately permeable, they have a low water holding capability. Therefore, these steep, rocky slopes will tend to shed water quickly, producing high volumes of runoff during storm events. The high peak flows tend to scour wash bottoms and creek channels rather than deposit sediments.

The Nature Conservancy and BLM have studied the effects of prescribed fire in the Muleshoe Ecosystem Management Area. They have found that prescribed fire increases perennial grasses and decreases shrub cover, and that these changes result in a dramatic improvement in watershed condition (live herbaceous cover and total ground cover have increased significantly over unburned plots). The effect on aquatic habitat has also been significant: emergent, floating and overhanging vegetation increased by 27 percent; undercut bank increased from 0 meters per 500 meters in 1995 to 46.1 meters per 500 meters in 1999; and the mean maximum depth of pools increased by 9 cm. Native fish populations have also increased: the density of adult native fishes increased by 5.6 percent per year, and Gila chub population growth rate increased by 47 percent per year from 1991 to 1999. These results are even more significant considering the period of study was characterized by below average summer rainfall and reduced stream flows (Gori and Backer, July 2001).

The Fish BO addressed prescribed fires in the Muleshoe area, stating:

> *The Prescribed burns may result in short-term influxes of sediments, should heavy rains fall immediately after burning. To minimize the potential for influxes of sediment or ash, all efforts will be taken to burn before the start of monsoonal rains. Long-term effects of prescribed burns should improve watershed function by producing more ground cover to protect the soils and facilitate groundwater infiltration.*

See the BA for further information regarding the Rockhouse Burn area existing condition.

<u>Galiuro Mountains (CNF) (from the BA)</u>

Two broad categories of woodland communities are found within the Galiuro Mountains: Madrean encinal woodlands and Madrean pine-oak woodlands. Pinyon-Juniper and Interior chaparral communities are often intermixed within the landscape. There is also a small but none-the-less significant mixed-conifer community and montane riparian community in canyon stringers. Scattered Arizona cypress communities occur in several drainages within the Galiuros.

Lower elevations on CNF lands have semi-desert grassland and some areas of scrub communities. Desert grasslands consist of a mix of native perennial grasses including tobosa (*Hilaria mutica*), *Aristida* sp., sideoats grama (*Bouteloua curtipendula*), spruce top grama (*Bouteloua chondrosioides*), black grama, blue grama, curly mesquite (*Hilaria belangeri*), and *Muhlenbergia* sp. Desert scrub contains overstory elements such as mesquite and hackberry with an understory of these same grasses, and may incorporate shrubs such as acacias, snakeweed and burroweed. Riparian areas support large broad-leaved deciduous forests of sycamore, cottonwood, willow, walnut, ash, and white oak.

Throughout the project area, soils have developed in a mosaic pattern as dictated by topographic relief, water content, and vegetation. Soils across the project area are generally well-drained, medium to very rapid runoff, and moderate permeability. They are typically extremely cobbly loamy sands or gravelly loams in texture, with a fine granular structure and numerous rock outcrops. Approximately 53% of all the acres in the project area are over 40 percent slope. The satisfactory soil condition class covers about 83% of the project area. These soils are functioning properly and retain their inherent productivity. The impaired soil condition class covers 14%. These soils have a reduced ability to function properly. The impaired soil condition areas are generally from compaction either from historic or current uses. The unsatisfactory soil condition class covers 3%. Historical livestock impacts have occurred, and the near surface subzone was mechanically compacted. The A horizon, litter and duff layer are absent.

Relatively few wildfires have occurred in the Galiuro Mountains, resulting in much denser vegetation than would be expected under natural fire disturbances. Many of the vegetative communities appear to have missed several natural fire cycles, resulting in an increase of fuels throughout the areas.

See the BA, Hydrology and Soils Report (Arias 2012), and Silviculture Specialist Report (Wilcox 2011) for further information on the existing condition of the Galiuro Mountains.

Status of the Species, Critical Habitat, and Factors Affecting Species Environment and Critical Habitat within the Action Area

Fish (General)

Formal consultation was completed in 2005 (#02-21-2007-F-0233) to reestablish five native fish species within the Muleshoe Ecosystem Management Area (Fish BO). This project resulted in desert pupfish, Gila topminnow, loach minnow, and spikedace being established in and near the action area, and Gila chub being augmented in and near the action area. This consultation covered the use of prescribed fire in the Muleshoe EMA, a portion which is included in the action area. A discussion of the effects of prescribed fire and the anticipated effects (Fire BO) are presented above.

Desert Pupfish

Pupfish were reestablished in 2007 and augmented in 2008 in Swamp Springs Canyon and Cherry Spring Canyon. Three additional sites, located on TNC property were stocked in 2007, 2008, and 2009, and two were augmented in 2010. Additional stockings are planned for future years.

Critical Habitat

No desert pupfish designated critical habitat occurs within the action area.

The currently occupied and future reestablishment sites within the action area have been and continue to be adversely affected by natural events, such as fire, flood, or drought, and from non-native species invasions, water withdrawal, improperly managed livestock grazing, recreational activities, and/or other land-use practices on public and private lands. The BLM, along with FWS, TNC, and AGFD, has committed to maintaining the current and future occupied sites, and possibly pursuing other sites for reestablishment. Past and current actions in the action area have resulted in some potential sites not being an option for reestablishment, but with the current commitments from the BLM and other organizations, the current pupfish sites will likely be maintained in the long-term, and pupfish will be reestablished in other sites.

Gila Chub

Gila chub currently are extant in the Hot Springs and Bass canyons within the action area. These populations are persisting in the extant areas.

Critical Habitat

Critical habitat has been designated within in the action area. Critical habitat in the action area includes approximately fourteen miles in Bass/Hot Springs Canyon. This area likely provides sufficient PCEs and currently contains chub.

Recovery and Critical Habitat Management

No recovery plan has been drafted or finalized for the Gila chub, but the critical habitat designation (70 FR 66701) lists the actions that may adversely affect critical habitat. They include actions that would significantly alter the minimum flow or the natural flow regime, the watershed characteristics, the channel morphology, and the water chemistry during water flow. The use of prescribed fire could affect all of these PCEs. Critical habitat managed to maintain or improve the PCEs for the Gila chub over time will not significantly alter these PCE characteristics, and should maintain or improve these characteristics.

The currently occupied and future reestablishment sites within the action area have been and continue to be adversely affected by natural events, such as fire, flood, or drought, and from non-native species invasions, improper livestock grazing, recreational activities, and/or other land-use practices on public and private lands. However, the FS/BLM, along with FWS, TNC, and AGFD, has committed to maintaining the current and future occupied sites, and possibly pursuing other sites for reestablishment. Past and current actions in the action area may result in some potential sites not being an option for reestablishment, but with the current commitments from the BLM and other organizations, the current chub sites will likely be maintained in the long-term, and chub will be reestablished in other sites.

Gila Topminnow

Gila topminnow were established in the Hot Springs Canyon within the action area under the Fish BO. Gila topminnow were reestablished in 2007 and augmented in 2008 in Swamp Springs Canyon and Cherry Spring Canyon. Three additional sites located on TNC property were stocked in 2007, 2008 and 2009 and two were augmented in 2010. Additional stockings are planned for future years.

The currently occupied and anticipated future reestablishment sites within the action area have been and continue to be adversely affected by natural events, such as fire, flood, or drought, and from non-native species invasions, livestock grazing, recreational activities, and/or other land-use practices on public and private lands. The BLM, along with FWS, TNC, and AGFD, has committed to maintaining the current and future occupied sites, and possibly pursuing other sites for reestablishment. Past and current actions in the action area may result in some potential sites not being an option for reestablishment, but with the current commitments from the BLM and other organizations, the current Gila topminnow sites will likely be maintained in the long-term, and Gila topminnow will be reestablished in other sites.

<u>Loach Minnow</u>

Loach minnow were reestablished in Hot Springs Canyon in 2007 under the Fish BO. Augmentations occurred in 2008, 2009, and 2010 for Hot Springs Canyon. Future augmentations will be considered until loach minnow established self-sustaining populations or it is decided that current habitat conditions will prevent their establishment.

Critical Habitat

Critical habitat has been designated in the action area within in the Muleshoe EMA. Critical habitat in the action area includes approximately fourteen miles in Bass/Hot Springs Canyon. This area likely provides sufficient PCEs and currently contains loach minnow.

Recovery and Critical Habitat Management

The recovery plan does not identify prescribed fire as affecting loach minnow habitat, but does consider the management of landscapes to benefit the species. The only recovery objective related to prescribed fire is to manage protected lands in ways that are consistent with the perpetuation of loach minnow populations. The listing (77 FR 10810) lists the actions that may destroy or adversely modify critical habitat, which does not include prescribed fire, though the improper use of fire could result in excessive sedimentation.

The currently occupied and anticipated future reestablishment sites, as well as critical habitat, within the action area have been and continue to be adversely affected by natural events, such as fire, flood, or drought, and from non-native species invasions, livestock grazing, recreational activities, and/or other land-use practices on public and private lands. However, the BLM, along with FWS, TNC, and AGFD, has committed to maintaining the current and future occupied sites, and possibly pursuing other sites for reestablishment. Past and current actions in the action area may result in some potential sites not being an option for reestablishment, but with the current commitments from the BLM and other organizations, the current loach minnow sites will likely be maintained in the long-term, and loach minnow will be reestablished in other sites.

<u>Spikedace</u>

Spikedace were reestablished in the Redfield and Hot Springs canyons in 2007 under the Fish BO. Augmentations occurred in 2008 and 2009 for Redfield Canyon and in 2008, 2009, and 2010 for Hot Springs Canyon. Future augmentations will be considered until spikedace establish self-sustaining populations or it is decided that current habitat conditions will prevent their establishment.

Critical Habitat

Critical habitat has been designated in the action area within in the Muleshoe EMA. Critical habitat in the action area includes approximately fourteen miles in Bass/Hot Springs Canyon. This area likely provides sufficient PCEs and currently contains spikedace.

Recovery and Critical Habitat Management

The recovery plan does not identify prescribed fire as affecting spikedace habitat, but does consider the management of landscapes to benefit the species. The only recovery objective related to prescribed fire is to manage protected lands in ways that are consistent with the perpetuation of spikedace populations. The listing (77 FR 10810) lists the actions that may destroy or adversely modify critical habitat, which does not include prescribed fire, though the improper use of fire could result in excessive sedimentation. The proposed action will mostly result in low intensity fires that will result in critical habitat managed to maintain or improve the PCEs for loach minnow over time.

The currently occupied and anticipated future reestablishment sites, as well as critical habitat, within the action area may be adversely affected by natural events, such as fire, flood, or drought, and from non-native species invasions, water withdrawal, livestock grazing, recreational activities, and/or other land use practices on public and private lands. The BLM, along with FWS, TNC, and AGFD, has committed to maintaining the currently and future occupied sites, and possibly pursuing other sites for reestablishment. Past and current actions in the action area may result in some potential sites not being an option for reestablishment, but with the current commitments from the BLM and other organizations, the current spikedace sites will likely be maintained in the long-term, and spikedace will be reestablished in other sites.

Chiricahua Leopard Frog

The action area is within the Galiuros management area of recovery unit 4 for the CLF. This management area has an expanding population of CLFs, primarily due to the combined efforts of AGFD, CNF, and FWS. An existing metapopulation of CLFs in the area of Deer Creek and Oak Creek, as well as two developing metapopulations in Rattlesnake Canyon and Ash Creek are found within the proposed Fourmile, China Peak, Deer Creek, Little Bull, and Rockhouse (USFS) burn area boundaries (Figure 1) and within two miles downstream. In addition, two of the 39 designated critical habitat units for the CLF are entirely within the action area.

The Deer Creek metapopulation is found within the boundaries of the proposed China Peak and Deer Creek burn areas. CLFs occupy as many as fourteen sites that make up the Deer Creek metapopulation including Home Ranch tank and Oak Creek drainage on the CNF, as well as portions of Deer Creek and stock and mining tanks in the Deer Creek drainage just off-Forest but in the action area. They are found throughout the Deer Creek drainage and in the Oak Creek drainage from where the trail drops into the canyon upstream to the spring. In 2013, CLFs were extant at eight (Oak Creek, Home Ranch Tank, Clifford’s Tank, Vermont Tank, Deer Creek, Unmarked Tank #5, Unmarked Mine Pits, and Unnamed Tank NE of Deer Creek Ranch) of the 14 sites and breeding was detected at six (Oak Creek, Home Ranch Tank, Vermont Tank, Deer Creek, Unmarked Mine Pits, Unnamed Tank NE of Deer Creek Ranch) of these sites.

A developing metapopulation of CLFs in Rattlesnake Canyon is found within the proposed Fourmile burn area. Attempts to reintroduce CLFs into Rattlesnake Creek have taken place in October 2010, June 2011, March and April 2012, and May and October 2013. Although surveys have yet to confirm dispersal, CLFs are expected to disperse along Rattlesnake Creek, and this represents approximately 15 miles of potential locations for CLFs; however this is highly dependent on rainfall, as only 3 miles of this Creek are considered perennial.

A developing metapopulation of CLFs in the Ash Creek/High Creek area is found within the proposed Little Bull and Rockhouse (USFS) burn areas. In 2012 and 2013, CLFs were translocated from the Deer Creek metapopulation area to Bull Tank in the Ash Creek/High Creek area. Translocations have been successful thus far as AGFD found seven egg masses as well as adult and juvenile CLFs at Bull Tank in 2013, and also detected CLFs in Little Bull Tank that had dispersed from Bull Tank. In addition, the

Bull Allotment permittee indicated that she has seen CLFs at two additional tanks further west on the allotment (King, 2014, pers comm). There are a number of sites in the action area that CLFs may disperse to in the vicinity of Ash Creek/High Creek including, but not limited to, Little Red Tank, Saddle Tank, Cave Tank, Knob Tank, Ramon Tank, Narrow Tank, and Oak Creek Dam.

Critical Habitat

The Oak Spring and Oak Creek critical habitat unit for the CLF is in the proposed China Peak burn area, and the Deer Creek critical habitat unit is within both the proposed Deer Creek burn area and two mile downstream boundary included in the action area. Designated critical habitat in these two units found within the action are includes approximately 147 acres (60 ha) of aquatic and riparian habitat along approximately 3.6 lentic stream miles and ten lentic locations on private, CNF, and Arizona State Trust Lands. All PCEs are likely present in the areas. Special management is required both of these designated critical habitat units to alleviate periodic drought, which results in breeding sites drying. The barred tiger salamander (*Ambystoma mavortium*) is currently the only nonnative predator that presents a threat to the CLF in the Deer Creek unit.

Recovery and Critical Habitat Management

The recovery plan identified prescribed fire as a possible impact to CLFs and CLF habitat, but also identifies prescribed fire as a tool to improve watershed condition where CLFs occur. The recovery actions related to prescribed fire include:

1.2. Ameliorate threats to each extant population.

  1.2.3. Restore hydrology with actions that maximize function of the natural hydrologic regime.

  1.2.4. Restore natural fire regimes in the watersheds of extant populations.

2.4. Treat potentially suitable habitat at recovery sites to eliminate or reduce threats to habitat suitability, which will typically involve measures discussed in recovery action 1.2.

The critical habitat rule (77 FR 16324) states that activities that may destroy or adversely modify critical habitat are those that alter the physical or biological features to an extent that appreciably reduces the conservation value of critical habitat for the CLF. These include actions that would significantly increase sediment deposition or scouring with a stream channel, pond or alter water chemistry beyond the tolerance limits of the CLF, or alter the water quantity or permanence of a breeding site or dispersal corridor.

The currently occupied and anticipated future reestablishment sites, as well as critical habitat, within the action area may be adversely affected by natural events, such as fire, flood, or drought, and from non-native species invasions, water withdrawal, improper livestock grazing, recreational activities, and/or other land use practices on public and private lands. The CNF, along with FWS, and AGFD, has committed to maintaining the currently and future occupied sites, and possibly pursuing other sites for reestablishment. Past and current actions in the action area may result in some potential sites not being an option for reestablishment, but with the current commitments from the CNF and other organizations, the current spikedace sites will likely be maintained in the long-term, and spikedace will be reestablished in other sites.

Mexican Spotted Owl

The proposed project area contains five known MSO PACs and critical habitat. Two PACs occur within the Kielberg Canyon area, on north-facing slopes west (Kielberg Canyon PAC) and north (Toosteep PAC) of Kielberg Peak. One PAC is centrally-located, along Rattlesnake Creek (Holdout PAC). The two remaining PACs are more easterly, one in the upper reaches of High Creek (High Creek PAC), one along Upper Ash Creek (Bassett PAC).

Some areas outside PACs meet the definition of Recovery Habitat (RH) as defined by the RP. Approximately 6,500 acres of RH occurs in the project area, most of which is pine-oak habitat. None of the RH is expected to be, or ever become, nest/roost recovery habitat, but provides foraging, dispersal, and wintering habitat.

Over the past 20-30 years, this mountain range has had a series of very small natural ignition wildfires, but not the large-scale fires that have occurred in some of the other nearby mountain ranges. While this may seem to be a benefit to the MSO, it results in woodlands becoming densely-grown with woody species and the understory grasses becoming less and less prevalent, which limits the fine fuels that carry low intensity fires. In addition, heavy fuels build up beneath closed canopies, which can increase the potential for high-severity fires, which would adversely affect habitat for the MSO and its prey.

Should new PACs be identified during the life of this project, consultation with FWS will be re-initiated.

Critical Habitat

Within the action area, critical habitat was designated within a 63,515-acre boundary in the CNF portion of the project area, but only approximately 7,000 acres meet the definition of critical habitat (PACs and RH). All or a portion of the PCEs occur within this area.

Recovery and Critical Habitat Management

The recovery plan identified wildfire as a concern for managing MSO habitat, but also identified prescribed fire as a tool to decrease the effects of wildfires. The recovery plan lists actions that would reduce fuel loads in and near MSO habitat, identifying prescribed fire as one of the tools to accomplish those actions.

The CH listing (61 FR 5382) states that activities that may result in the destruction or adverse modification include those that alter the PCEs to an extent that the value of critical habitat for the conservation of the owl is appreciably reduced. Critical habitat managed, including using lower intensity prescribed burns, to maintain or improve the PCEs for MSO over time will maintain or improve these characteristics. The proposed action, which includes conservation measures to minimize the temporary adverse effects to PCEs, will likely maintain and improve the PCEs for MSO.

The currently occupied, as well as critical habitat, within the action area may be adversely affected by natural events, such as fire, flood, or drought, improper livestock grazing, recreational activities, and/or other land use practices on public and private lands. The CNF has committed to managing the area for MSO.

EFFECTS OF THE ACTION

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

This biological opinion does not rely on the regulatory definition of "destruction or adverse modification" of critical habitat at 50 CFR 402.02. Instead, we have relied upon the statutory provisions of the Act to complete the following analysis with respect to critical habitat. In particular, herein we describe how the proposed action would affect those physical or biological features (primary constituent elements –PCEs) that are essential to the conservation, including recovery, of the species, and whether such effects rise to the threshold of destruction or adverse modification. If the proposed action would severely compromise or preclude our ability to recover a species, then that threshold has been exceeded. To evaluate whether critical habitat is likely to be destroyed or adversely modified, we assess the effects of the proposed action on the PCEs, and we compare the effects of the proposed action to the recommendations in recovery plans regarding the manner in which prescribed burning should be conducted in recovery areas (where such documents and recommendations exist) and the guidance in final critical habitat rules, which define those activities or categories of activities that may result in destruction or adverse modification of critical habitat. Thus, based on these analyses, we make determinations on whether or not the proposed action will compromise or preclude recovery of the species.

As discussed above, wildfire can result in effects to federally-listed species habitats as a result of intense runoff, ash flow, scouring of drainages, and excessive sedimentation. However, prescribed burns have different burn characteristics than wildfires and incorporate measures to reduce the negative effects of fire on the landscape. Implementation of prescribed fire associated with the proposed action is, in fact, a tool that allows land managers to manage the landscape to decrease the likelihood of extreme wildfires and the associated negative effects. While there may be some temporary negative effects, it is our opinion that the use of prescribed fire, as outlined in the proposed action, will benefit and enhance the ecological function of the landscape.

Fish (Desert Pupfish, Gila Chub, Gila Topminnow, Loach Minnow, and Spikedace)

We do not anticipate that there will be direct effects to fish because fire is not likely to burn within the 300 foot buffers that will be established and any fire that may burn within the 300-foot buffers will be low intensity. Therefore, individual fish or habitat characteristics are unlikely to be directly affected for the reasons described below.

Effects to fish in the action area will be indirect. The low intensity fire behavior will result in a mosaic of burned and unburned areas, which may result in increases of sediment or ash transport from the burned uplands to the water sources that have, or may have in the future, fish. Considering that the burns will generally be low intensity, that a 300-foot buffer will be established adjacent to all large drainages, riparian areas, and perennial streams, and that the substrates within the Rockhouse project area are mainly rock and gravel, we do not anticipate that the sediment or ash increase will be sufficient to measurably affect habitat characteristics or affect individual fish. There is a possibility that a major storm event over a recently burned area may move sufficient sediment or ash into fish habitat which could temporarily alter habitat characteristics. We do not expect these habitat changes to injure or kill adult fish because these habitat changes would be small and temporary, but there is a possibility that sediment or ash from these events soon after a burn could smother eggs and larvae, and possibly kill them. The likelihood of this happening is low because burning areas near where the fish are located, which are generally rock/gravel substrates, would result in minor sediment or ash movement.

Critical Habitat for Fish (Gila Chub, Loach Minnow, and Spikedace)

Effects to critical habitat PCEs are similar to effects to habitat as described above. We do not anticipate any long-term changes to any PCE from implementing the proposed action. There may be temporary effects to PCEs related to substrate/sediment and prey species habitat if a major storm event occurs soon after a burn, but these effects will be temporary and characteristics will return to pre-burn conditions. In conclusion, we anticipate that the proposed action will not significantly alter any of the characteristics of critical habitat PCEs for these fish.

Recovery and Critical Habitat Management

The recovery potential of critical habitat will not be compromised by the proposed action. As stated in the previous paragraph, it is unlikely that the action will significantly alter any of the PCE characteristics for these fish species. Critical habitat will be managed by the CNF and BLM to maintain or improve the PCEs for the fish over time, so the recovery potential of critical habitat will not be compromised. Thus, the proposed action will not reduce recovery opportunities and should enhance opportunities for the recovery of the fish species.

Chiricahua Leopard Frog

We do not anticipate that there will be direct effects to CLF because fire is not likely to burn within the 300 foot buffers that will be established and any fire that may burn within the 300-foot buffers will be low intensity. Therefore, individual CLF or habitat characteristics such as water quality, sediment, and aquatic vegetations are unlikely to be directly affected by the proposed action.

We expect most effects to CLFs in the action area will be indirect. The low intensity fire behavior will result in a mosaic of burned and unburned areas. This may result in increases of sediment or ash transport from the burned uplands to the water sources that have, or may have, CLFs in the future. Considering that the burns will generally be low intensity and that a 300-foot buffer will be established adjacent to all large drainages, riparian areas, and perennial streams, we do not anticipate that sediment or ash increase will be sufficient to measurably affect habitat characteristics or affect individual CLFs. As stated in Arias (2012), the "amount of actual sediment delivery and water yield is expected to be negligible". There is a possibility that a major storm event could occur over a recently burned area. Even though low intensity burns will generally be implemented, a major storm event may move sufficient sediment or ash into CLF habitat which could temporarily alter habitat characteristics. Pre-burn CLF habitat characteristics should return within a few years. We do not expect these habitat changes to injure or kill adult CLFs because these habitat changes would be small and temporary, but there is a possibility that sediment or ash from monsoon storms soon after a burn could smother eggs or tadpoles, and possibly kill them. The likelihood of this happening is low because we do not anticipate that such major storm events would always occur over recently burned areas, fires would generally be low intensity maintaining a mosaic of vegetation cover that would result in relatively minor sediment or ash production, and most of the soils are functioning properly (are in satisfactory condition) and would thus be able to absorb the majority of runoff preventing significant sedimentation or ash flow.

Despite these short-term effects, long-term benefits will also result from the application of prescribed fire. Implementing prescribed fire should result in reducing the sediment erosion potential from future wildfires and decrease the likelihood that a wildfire will burn within CLF habitat.

Critical Habitat

Effects to critical habitat PCEs are similar to effects to suitable CLF habitat as described above. We do not anticipate any long-term changes to any PCE from implementing the proposed action. There may be effects to PCEs related to water quality if a large storm occurs soon after a burn, but these effects will be temporary and characteristics will return to pre-burn conditions within a few years. In conclusion, we anticipate that the proposed action will not significantly alter any of the characteristics of critical habitat PCEs for the CLF.

Recovery and Critical Habitat Management

The recovery potential of critical habitat will not be compromised by the proposed action. As stated in the previous paragraph, it is unlikely that the action will significantly alter any of the PCE characteristics. Critical habitat will be managed by the CNF to maintain or improve all the PCEs for the CLF over time, so the recovery potential of critical habitat will not be compromised. Thus, the proposed action will not reduce the opportunity for recovery of the CLF and should enhance opportunities for the recovery of the species.

Mexican Spotted Owl

No direct effects of fire to PACs or reproducing MSO are expected because no ignitions or overflights will occur over or within 0.5 mile of PACs. Indirect effects may be present in the form of smoke within PACs, which will occur at some point during the implementation. Prevailing winds in this area are out of the south/southwest, and during the day they are predominantly up-slope, up-valley winds, in accordance with rising ground temperatures. At these times, smoke will generally rise and be carried quickly past/through PACs that may be located north and northwest of ignitions. After sunset and until dawn, down-slope, down-valley winds form as a result of cooler temperatures, and these may direct smoke into or along drainages. It is these cooler hours when owls or more likely to be exposed to the presence of smoke. Smoke likely will be greatly dispersed by the time it reaches a nest or roost site because no fire will occur in a PAC, or within 0.5 mile of a PAC. A pair is unlikely to abandon a nest site because of this smoke. Adults may adjust their foraging behavior to avoid the smoke by foraging in areas with no or very little smoke, but this is not expected to affect their ability to acquire prey for themselves or for their young. No other effects to reproducing MSO are expected outside of the current PACs because surveys will be conducted before areas are burned to determine if the areas are occupied by MSOs. If necessary based on survey results, additional PACs will be established before an area is burned, and the same actions and effects regarding PACs will apply.

Recovery habitat in the project area will be burned. Most of the burn intensity will be light, with some higher intensity fire scattered throughout the burn areas, creating a mosaic of burn intensity and vegetation. We expect almost all large trees, large snags, hardwoods, and large downed logs will be retained because most of the burned areas will be light intensity burns. Loss of these components in the higher intensity burn areas will occur. While there will be loss of these components within a burn area, we do not expect the overall quality or quantity of MSO habitat to be altered significantly.

Proposed action treatments will result in treating fuels, reducing the likelihood of active and passive crown fires, and favor conditions that will support surface fires to which this forest was adapted before fire suppression and grazing impacts became prevalent. In areas and conditions where fire must be suppressed, the proposed action would reduce the occurrence of fire with flame lengths that exceed those that can be fought with direct attack. This reduces the need for the use of aerial retardant applications, which will reduce the noise disturbance and the introduction of potential toxins into owl habitat.

The proposed action may improve MSO prey habitat by increasing the vigor of herbaceous plants. Prey density and availability may increase, at least in the short-term, in the burned areas.

Critical Habitat

Effects to critical habitat PCEs are similar to effects to suitable MSO habitat as described above. We expect PCEs associated with a range of tree and plant species, large trees, large snags, hardwoods, canopy cover, and large downed logs will be retained because most of the burned areas will either not be burned or experience low intensity burns, but loss of these components in the higher intensity burn areas will occur. Residual plant cover will be affected temporarily after an area has burned, but is expected to return soon during the following growing season. While there will be loss of these components within a burn area, we do not expect the PCES related to the quality or quantity of MSO critical habitat to be altered significantly in the long-term.

Recovery and Critical Habitat Management

The recovery potential of critical habitat will not be compromised by the proposed action. As stated in the previous paragraph, it is unlikely that the action will significantly alter any of the PCE characteristics in the long-term. Critical habitat will be managed by the CNF to maintain or improve the PCEs for the MSO over time, so the recovery potential of critical habitat will not be compromised. Thus, the proposed action will provide for 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 biological opinion. 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. Cumulative effects include those described in the BOs listed in the Consultation History. Refer to these BOs for more discussions of cumulative effects.

General Cumulative Effects

Livestock grazing on non-Federal lands affects the watershed conditions for some listed species. Excessive livestock grazing could result in increased erosion, high run-off after storms, and decreased habitat quality and quantity because of reduced plant cover and soil disturbance. Other activities on non-Federal lands that may not be subject to section 7 consultation include fuel reductions, recreation, residential and commercial development, groundwater pumping, water diversions and channelization, and mining; these activities can and do result in adverse effects to listed species in the action area. All of these actions could reduce or eliminate habitat that could adversely affect some species in some areas. The effects on species vary depending on the actions in the immediate areas of listed species.

General Cumulative Effects for all Aquatic Species

Aquatic non-native plants, animals, and disease organisms in streams, tanks, and ponds on non-Federal lands pose a threat to aquatic listed species. Non-native organisms may move on their own through drainages or overland, or be moved intentionally by anglers and bait collectors or unintentionally via water transfers, hitchhiking on boats, and other mechanisms. Some of the areas with non-native species are in close proximity to areas occupied by native species. An increase of predation, competition, diseases, and habitat alteration is anticipated if these non-native species establish in listed species habitat, resulting in adverse effects to some species in some areas. This threat varies, but is present throughout the action area.

CONCLUSION

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

Desert Pupfish

After reviewing the current status of desert pupfish, 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 is neither likely to jeopardize the continued existence of the desert pupfish, nor likely to destroy or adversely modify designated critical habitat for desert pupfish. We base these conclusions on the following reasons:

1. No direct or indirect effects will measurably affect individual adult fish and, generally, no indirect effects will measurably affect habitat characteristics because the burns are expected to be of low intensity, a 300-foot buffer will be established adjacent to all large drainages, riparian areas, and perennial streams, and the substrates within the Rockhouse project area are mainly rock and gravel.
2. The likelihood that a major storm event over a recently burned area would result in sediment or ash transport is extremely low because the rock and gravel substrates that dominate the Rockhouse project area would only result in minor sediment or ash movement, if any.
3. Effects to habitat characteristics may occur from a major storm event after a burn, but these effects will be temporary, and pre-burn habitat characteristics should return or be enhanced within a few years.
4. No desert pupfish critical habitat is designated within the action, so none will be affected.

Gila Chub

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 is neither likely to jeopardize the continued existence of the Gila chub, nor likely to destroy or adversely modify designated critical habitat for Gila chub. We base these conclusions on the following reasons:

1. No direct or indirect effects will measurably affect individual adult fish and, generally, no indirect effects will measurably affect habitat characteristics because the burns are expected to be of low

intensity, a 300-foot buffer will be established adjacent to all large drainages, riparian areas, and perennial streams, and the substrates within the Rockhouse project area are mainly rock and gravel.

2. The likelihood that a major storm event over a recently burned area would result in sediment or ash transport is extremely low because the rock and gravel substrates that dominate the Rockhouse project area would only result in minor sediment or ash movement, if any.
3. Effects to habitat characteristics may occur from a major storm event after a burn, but these effects will be temporary, and pre-burn habitat characteristics should return within a few years.
4. We do not expect any long-term changes to any PCE from implementing the proposed action. There may be effects to PCEs related to substrate/sediment and prey species habitat if a major storm event occurs soon after a burn, but these effects will temporary and characteristics will return to pre-burn conditions.
5. The effects of the proposed action will not significantly alter any of the critical habitat PCEs that typically result in adverse modification or destruction of critical habitat, so it will not compromise the recovery potential of critical habitat.

Gila Topminnow

After reviewing the current status of Gila topminnow, 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 is not likely to jeopardize the continued existence of the Gila topminnow. No critical habitat is designated, thus none will be affected. We base this conclusion on the following reasons:

1. No direct or indirect effects will measurably affect individual adult fish and, generally, no indirect effects will measurably affect habitat characteristics because the burns are expected to be of low intensity, a 300-foot buffer will be established adjacent to all large drainages, riparian areas, and perennial streams, and the substrates within the Rockhouse project area are mainly rock and gravel.
2. Effects to habitat characteristics may occur from a major storm event after a burn, but these effects will be temporary, and pre-burn habitat characteristics should return within a few years.

Loach Minnow

After reviewing the current status of 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 is neither likely to jeopardize the continued existence of the loach minnow, nor likely to result in destruction or adverse modification of its critical habitat. We base these conclusions on the following reasons:

1. No direct or indirect effects will measurably affect individual adult fish and, generally, no indirect effects will measurably affect habitat characteristics because the burns are expected to be of low intensity, a 300-foot buffer will be established adjacent to all large drainages, riparian areas, and perennial streams, and the substrates within the Rockhouse project area are mainly rock and gravel.
2. The likelihood that a major storm event over a recently burned area would result in sediment or ash transport is extremely low because the rock and gravel substrates that dominate the Rockhouse project area would result in only minor sediment or ash movement, if any.
3. Effects to habitat characteristics may occur from a major storm event after a burn, but these effects

will be temporary, and pre-burn habitat characteristics should return within a few years.

4. We do not expect any long-term changes to any PCE from implementing the proposed action. There may be effects to PCEs related to substrate/sediment and prey species habitat if a major storm event occurs soon after a burn, but these effects will temporary and characteristics will return to or be improved compared to pre-burn conditions.
5. The effects of the proposed action will not significantly alter any of the critical habitat PCEs; this action is not one that would typically result in adverse modification or destruction of critical habitat (as described by the final listing), so it will not compromise the recovery potential of critical habitat.

Spikedace

After reviewing the current status of spikedace, 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 is neither likely to jeopardize the continued existence of the spikedace, nor is likely to result in destruction or adverse modification of its critical habitat. We base these conclusions on the following reasons:

1. No direct or indirect effects will measurably affect individual adult fish and, generally, no indirect effects will measurably affect habitat characteristics because the burns are expected to be of low intensity, a 300-foot buffer will be established adjacent to all large drainages, riparian areas, and perennial streams, and the substrates within the Rockhouse project area are mainly rock and gravel.
2. The likelihood that a major storm event over a recently burned area would result in sediment or ash transport is extremely low because the rock and gravel substrates that dominate the Rockhouse project area would result in only minor sediment or ash movement, if any.
3. Effects to habitat characteristics may occur from a major storm event after a burn, but these effects will be temporary, and pre-burn habitat characteristics should return within a few years.
4. We do not expect any long-term changes to any PCE from implementing the proposed action. There may be effects to PCEs related to substrate/sediment and prey species habitat if a major storm event occurs soon after a burn, but these effects will temporary and characteristics will return to or be improved compared to pre-burn conditions.
5. The effects of the proposed action will not significantly alter any of the critical habitat PCEs; this action is not one that would typically result in adverse modification or destruction of critical habitat (as described by the final listing), so it will not compromise the recovery potential of critical habitat.

Chiricahua Leopard Frog

After reviewing the current status of CLF, 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 is neither likely to jeopardize the continued existence of the CLF, nor likely to result in destruction or adverse modification of its critical habitat. We base these conclusions on the following reasons:

1. No direct or indirect effects are expected to measurably affect adult CLFs or, generally, measurably affect habitat characteristics because the burns are expected to be of low intensity and the 300-foot buffer established adjacent to all large drainages, riparian areas, and perennial streams.
2. Major storm events over a recently burned area may move sufficient sediment or ash into CLF

habitat to result in changes to habitat characteristics, but these effects will be temporary, and pre-burn habitat characteristics should return within a few years.

3. Unlike the area described above for the fish species, CLFs occur in an area where major storm events over a recently burned area may result in sediment or ash that may smother or kill eggs or tadpoles, but the likelihood of this happening is low because we do not anticipate that all major storm events would always occur over a recently burned area, fires would generally be low intensity and would result in relatively minor sediment or ash production, and most of the soils are functioning properly (are in satisfactory condition) and would absorb runoff and reduce sedimentation.
4. We do not expect any long-term changes to any PCE from implementing the proposed action. There may be temporary effects to PCEs related to water quality if a large storm occurs soon after a burn, but these effects will temporary and characteristics will return to pre-burn conditions within a few years.
5. The effects of the proposed action will not significantly alter any of the critical habitat PCEs that typically results in adverse modification or destruction of critical habitat, so it will not compromise the recovery potential of critical habitat.

Mexican Spotted Owl

After reviewing the current status of the Mexican spotted owl, 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 is neither likely to jeopardize the continued existence of the Mexican spotted owl, nor likely to result in destruction or adverse modification of its critical habitat. We base these conclusions on the following reasons:

1. No individual MSO, reproduction, or PAC habitat characteristics will be affected because fire will not occur within any PAC or within 0.5 mile of any PAC. MSO are not expected to abandon their nests because smoke will be dispersed by the time it reaches a nest site. Individual owls may adjust their foraging behavior to avoid smoke, but this is not expected to affect their ability to acquire prey for themselves or for their young.
2. Most habitat components in recovery habitat will be retained because most areas will either not burn or will experience low intensity burns.
3. Most critical habitat PCEs will be retained because most areas will either not burn or will experience low intensity burns. Residual plant cover will be affected temporarily after an area has burned, but is expected to return soon during the following growing season.
4. The proposed action will reduce fuel levels in and near MSO habitat, which will reduce the likelihood of future active and passive crown fires, and increase the likelihood that a future fire will be a low-intensity surface fire.

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 BLM so that they become binding conditions of any grant or permit issued to the permittees, as appropriate, for the exemption in section 7(o)(2) to apply. The BLM has a continuing duty to regulate the activity covered by this incidental take statement. If the BLM (1) fails to assume and implement the terms and conditions or (2) fails to require the permittees 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 BLM 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)].

Desert Pupfish, Gila Chub, Gila Topminnow, Loach Minnow, and Spikedace

AMOUNT OR EXTENT OF TAKE

Incidental take of any fish species is not reasonably certain to occur because implementing the proposed action will generally result in low fire intensity, the Rockhouse Burn area soils generally consist of rock/gravel substrates which would result in only minor sediment or ash movement, if any, and buffers will be established to keep high-intensity fire out of fish habitat and filter or prevent any minor sedimentation or ash flows. This is consistent with the Fish BO which also did not anticipate incidental take of fish due to prescribed fire in this same area and under a similar proposed action.

Chiricahua Leopard Frog

AMOUNT OR EXTENT OF TAKE

The FWS anticipates that the proposed action may result in incidental take of some CLF eggs or tadpoles within one occupied drainage over the ten-year life of the project. Unlike the area occupied by the fish species as described above, CLFs occur in in areas where major storm events over a recently burned area may result in sediment or ash being transported to occupied CLF areas, and may smother or kill some eggs or tadpoles. This is anticipated to occur only once during the life of the project because:

1. The CLF only occurs in some drainages on the east side of the Galiuro Mountains, more than one of which is unlikely to be burned in any given year, and
2. We do not anticipate that major storm events will always occur over recently burned areas, fires would generally be low intensity and would result in a mosaic of remaining vegetation cover resulting in relatively minor sediment or ash production, and most of the soils are functioning properly (are in satisfactory condition) and could absorb runoff and reduce sedimentation or ash flow.

This anticipated level of take will be exceeded if a major storm event occurs over a recently burned area within a drainage that is occupied by CLFs and it is shown that sediment or ash has been transported into occupied CLF habitat that may harm or kill eggs or tadpoles more than once during the life of the project.

EFFECT OF THE TAKE

In this biological opinion, the FWS determines that this level of anticipated take is not likely to result in jeopardy to the species or destruction or adverse modification of critical habitat for the reasons stated in the Conclusions section.

REASONABLE AND PRUDENT MEASURES and TERMS AND CONDITIONS

All appropriate reasonable and prudent measures have been incorporated into the proposed action and as conservation measures for this consultation. These conservation measures generally and specifically require the FS/BLM to reduce effects to the CLF and its habitat. No additional reasonable and prudent measures are necessary to minimize incidental take.

Mexican Spotted Owl

AMOUNT OR EXTENT OF TAKE

The FWS does not anticipate incidental take of the Mexican spotted owl from implementing the proposed action because individuals will not be harmed and reproduction will not be affected. PACs, and 0.5mile outside of PACs, will not be burned, and any smoke will not be at a sufficient level to affect reproduction.

CONSERVATION RECOMMENDATIONS

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

Fish Species and CLF

1. We recommend that FS/BLM coordinate with AGFD and FWS on efforts to work with private landowners upstream of occupied listed fish and CLF locations to eradicate any source populations of non-native aquatic species from their lands.

2. We recommend that BLM collect flow data to apply for instream flow rights with the Arizona Department of Water Resources in occupied fish sites, if such rights have not been previously obtained.

3. We recommend that the BLM consider additional private property acquisition to expand the boundaries of the Muleshoe EMA to include any additional ecologically sensitive areas.

4. We recommend that the FS/BLM keep accurate records of the successes and complications encountered with stocking efforts. These records will assist others in future stocking efforts.

5. We recommend that the FS/BLM work with FWS on developing, if necessary, and implementing the recovery plan for each listed fish and CLF, and assist in establishing additional populations.

6. We recommend that the FS/BLM coordinate with other land managers and landowners to develop cooperative projects to improve watershed conditions.

Lesser Long-nosed Bat

1. We recommend that the FS/BLM support surveys for lesser long-nosed bats to facilitate better management of lesser long-nosed bats and their habitat.

Mexican spotted owl

1. We recommend that the FS/BLM work with the FWS on implementing the recovery plan.
2. We recommend that the FS monitor the PACs within the Galiuro Mountains.

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.

REINITIATION NOTICE

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

The FWS appreciates the CNF/BLM's efforts to identify and minimize effects to listed species from this project. For further information please contact Mark Crites (520-670-6150 ext. 229) or Scott Richardson (ext. 242). Please refer to consultation number 22410-F-2006-0414 in future correspondence concerning this project.

Sincerely,

/ s / Scott Richardson for
Steven L. Spangle
Field Supervisor

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TABLES AND FIGURES

Figure 1. Action Area

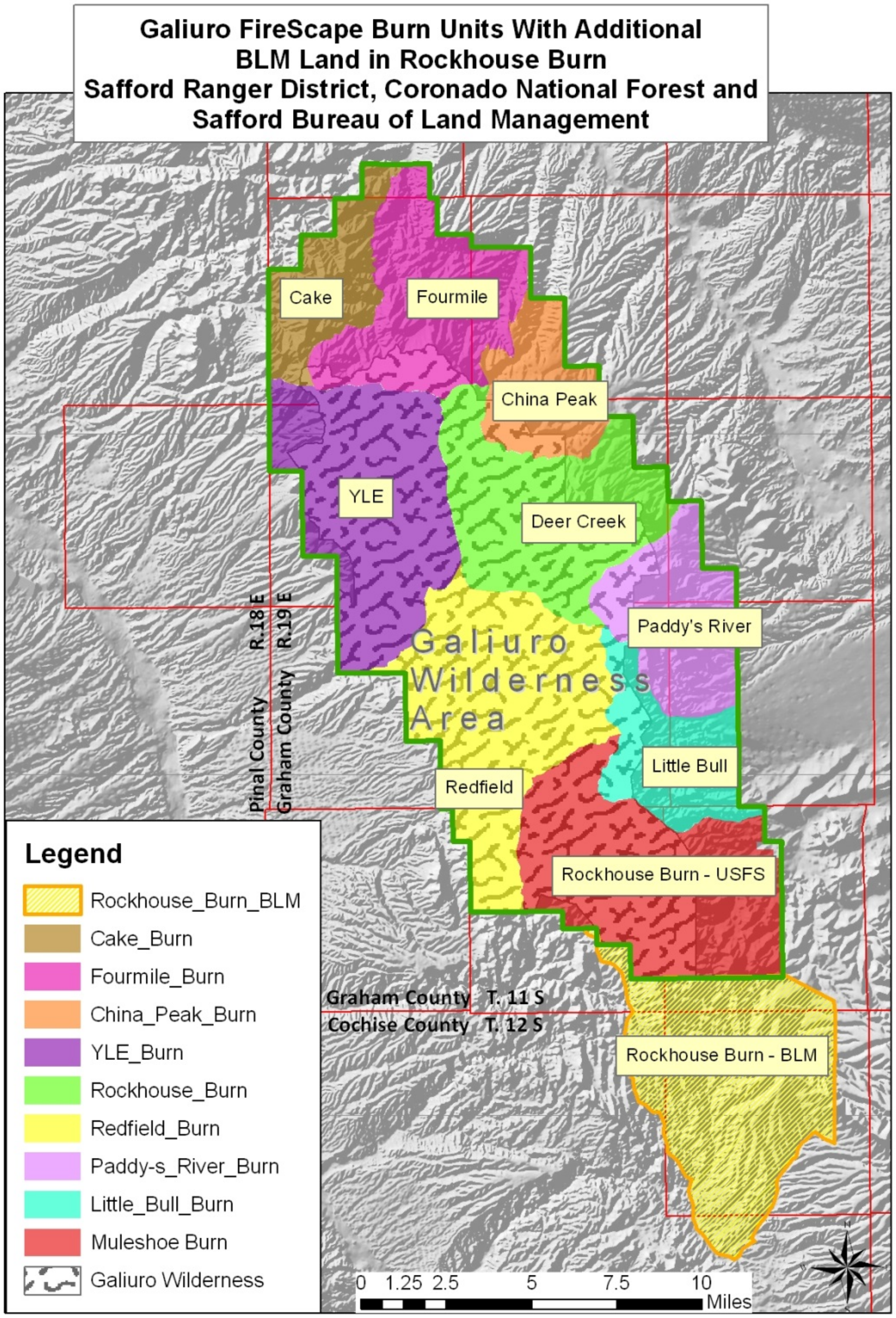

Figure 2. Ecological Management Units for the Mexican spotted owl in the southwestern United States.

Appendix A: Concurrences

Ocelot

In November 2009, the first live ocelot was documented in Arizona (in Cochise County) south of the action area. Additionally, in April 2010, an ocelot was found dead on a road near Globe, Arizona, north of the action area. Additional sightings have been documented in southeastern Arizona during the period from 2011 to 2014, south of the action area. At this time, there are no documented occurrences of ocelots within the action area. Likely habitat occurs within the canyons and some of the uplands with dense vegetation. Sightings of ocelot within southern Arizona, while increasing within the last few years, are still extremely uncommon. Implementing prescribed fire may potentially disturb ocelots, but considering that they are uncommon and highly secretive, it is unlikely that individuals will be affected.

Conclusion

After reviewing the status of the ocelot, the environmental baseline for the action area, and the effects of the proposed action, we concur that the proposed action may affect, but is not likely to adversely affect, the ocelot based upon the following:

1. We expect effects from implementing the action to be discountable because ocelot are extremely uncommon in southern Arizona, including within the action area. If present during implementation, we expect them to easily avoid fire, smoke, and personnel so that their reproduction or survival is not affected.
2. The proposed action is not anticipated to result in significant changes to habitat quality or quantity because the prescribed fires will generally result in low intensity burns and a mosaic of burned and unburned areas, and improve forest health, which should benefit ocelots and ocelot habitat.
3. Any changes to prey habitat are likely to be localized, and are not expected to significantly change prey availability throughout the areas where ocelots may occur.

Lesser Long-nosed Bat

Lesser long-nosed bats are known to forage within the action area. Adult male lesser long-nosed bats have been documented in the general area. We expect females and young of the year to also use the area for foraging; however, the known post-maternity roosts that exist within the action area are not expected to be affected by the proposed action due to lack of fuels in the cliff habitat that supports these roosts.

Conclusion

After reviewing the status of the lesser long-nosed bat, the environmental baseline for the action area, and the effects of the proposed action, we concur that the proposed action may affect, but is not likely to adversely affect, the lesser long-nosed bat based upon the following:

1. No known roost sites are expected to be disturbed or modified by the proposed action.
2. Effects to foraging individuals within the action area will be insignificant because bats will adjust their foraging behavior to avoid fire and smoke. This adjustment of behavior will not affect their ability to obtain adequate forage, thus their survival or reproduction will not be affected.
3. Effects to forage plants will be insignificant because the FS/BLM will survey for paniculate agaves

and saguaros that may be directly affected by a prescribed fire, and will protect high concentrations of forage plants as much as possible.