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January 27, 2004

Mr. Karl P. Siderits, Forest Supervisor
Tonto National Forest
U.S. Forest Service
2324 East McDowell Road
Phoenix, Arizona 85006

Dear Mr. Siderits:

This constitutes the U.S. Fish and Wildlife Service's biological and conference opinion pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). At issue is the Tonto National Forest's (Tonto) Verde Analysis Area Wildland Urban Interface (WUI) Fuels Treatment analysis within the Payson Ranger District. You determined this proposed action "may adversely affect" the threatened Mexican spotted owl (*Strix occidentalis lucida*) (MSO) and the threatened Chiricahua leopard frog (*Rana chiricahuensis*). You determined "no effect" to the threatened bald eagle (*Haliaeetus leucocephalus*) and endangered Gila trout (*Oncorhynchus gilae gilae*) from the implementation of your proposed action. Lastly, you have requested formal conference on proposed MSO critical habitat with your determination that the proposed action may affect but is not likely to destroy or adversely modify the proposed critical habitat.

This biological and conference opinion is based on information provided in the February 26, 2003 biological assessment evaluation (BAE), telephone conversations and e-mail transmissions, meetings, and other sources of information and correspondence. Literature cited in this biological and conference opinion is not a complete bibliography of all literature available on the species of concern, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at Arizona Ecological Services Field Office in Phoenix, Arizona.

Consultation History

A batched-programmatic consultation was completed in 2001 (referred to as the Regional programmatic consultation) that allowed the Forest Service to begin moving forward with fuel reduction efforts on 283 WUI projects throughout the Forest Service's Southwestern Region (Arizona and New Mexico). At the time of the batched consultation, it was the intent of the Tonto to include the Verde WUI Analysis Area, as well as 4 other WUI projects on the Payson

Ranger District. Unfortunately, mix-up in communication led to the projects on the Payson District being removed from the batched consultation which required the Verde Analysis Area Biological Assessment and Evaluation and formal consultation with this office.

The following represents a summary of actions which have taken place up to the issuance of the final Biological Opinion.

February 26, 2003: We received a draft version of Tonto's Biological Assessment and Evaluation (BAE) for the Verde Analysis Area Wildland Urban Interface (WUI) Fuels Treatment analysis. The Tonto determined this action may adversely affect the threatened MSO and the threatened Chiricahua leopard frog. The Tonto determined this action would have "no effect" to the threatened bald eagle and endangered Gila trout. These species will not be addressed further.

March 24, 2003: Meeting held between us and Don Pollock, of the Payson Ranger District, to discuss the project in greater detail and various elements under consideration in the draft BAE.

April 11, 2003: The Tonto requested that the BAE dated February 26, 2003 be considered "final" and subsequently requested initiation of formal consultation on effects to the threatened MSO and the threatened Chiricahua leopard frog.

May 12, 2003: A meeting was held between us and the Payson Ranger District to discuss various WUI projects on the district. Some discussion held was pertinent to the proposed action.

May 14, 2003: The Tonto supplied us with electronic copies of the various Tonto natural resource Specialist Reports in an e-mail transmission from Don Pollock.

May 30, 2003: We sent a letter to the Tonto which both initiated formal consultation and requested additional, technical information on the proposed action.

June 16, 2003: The Tonto replied to our May 30, 2003, request for additional information with an email that included an attachment document of the Tonto's responses to our informational requests.

September 09, 2003: The Tonto supplied us with the electronic version of the Verde Analysis Area Biological Assessment and Evaluation in an e-mail transmission from Don Pollock.

September 15, 2003: We received field survey data sheets, from the Tonto, for Chiricahua leopard frog surveys conducted within the Verde Analysis Area.

December 04, 2003: We received an e-mail transmission from the Tonto requesting formal conferencing on proposed MSO critical habitat. The transmission included an addendum to the February 26, 2003, BAE which declared the Tonto's determination that the proposed action may affect but is not likely to destroy or adversely modify proposed MSO critical habitat.

January 02, 2004: We transmitted draft biological and conference opinion to the Tonto for review.

January 13, 2004: We received notice from the Tonto, via electronic correspondence, that no comments on the draft biological opinion were offered and requested the document be finalized.

Biological Opinion

Description of the Proposed Action

The purpose of the proposed action is to reduce fuel loads where fuel accumulations and ignition potential threaten human life, property, and natural resources, including listed species and protected habitat. The footprint of the proposed action is approximately 48,688 acres in size and is bounded on the north by the Mogollon Rim, the west by State Route 87, the south by the East Verde River, and the east by Bonita Creek and an unnamed drainage, on the Payson Ranger District.

The methods used to maximize the reduction of fuels within the analysis area include fuelbreak construction, broadcast burning, mechanical treatments, and fuelbreak maintenance. The typical progression of these various treatments within designated areas includes fuelbreak construction, broadcast burning, mechanical treatments, fuelbreak maintenance, a second broadcast burn, and a second maintenance burn.

Mechanical Treatments

Mechanical treatments include a variety of treatment prescriptions used. Proposed methods may include using chainsaws to cut trees and lop slash, using bulldozers to pile slash, and other specialized equipment to cut, chop, bust, lop or “treat” fuels to meet the designated objectives.

There are six specified mechanical treatments proposed to meet the objectives for the analysis area. These various treatments are described below in greater detail.

Thin from below 18 inches Diameter at Breast Height (dbh)¹

On 4,039 acres within the analysis area, the Tonto is proposing to thin from below 18 inches dbh. This specific treatment is proposed for ponderosa pine stands in particular. The desired leave density for areas which are proposed to receive this treatment is 70 - 100 square feet of basal area

¹ Diameter at Breast Height (dbh) – The diameter of the bole of a tree, measured horizontally at 4.5 feet above ground surface. It is referred to as “breast height” as this is approximately “breast height” for an adult person. This measurement is used primarily for commercial tree species such as pines, firs, spruce, aspen, etc.

(BA) for all tree species². The trees chosen for treatment are based on a species preference and are listed in order of preference below:

- 1) Live ponderosa pines up to 18 inches dbh;
- 2) Dead ponderosa pines up to 18 inches dbh;
- 3) Live Arizona white oak and Emory oak up to ten inches diameter at root collar (drc)³;
- 4) Dead Arizona white oak and Emory oak up to six inches drc
- 5) All live juniper species up to 20 inches drc
- 6) All dead juniper species up to 12 inches drc
- 7) All species and all sizes of bushes associated with the chaparral vegetation type.

The Tonto has proposed, in the case where this treatment type is desired in areas considered as pinyon-juniper or chaparral vegetation types where achieving 70-100 square feet basal area is not achievable, that pines, oaks and juniper with diameters greater than the limits stated above would be retained but with smaller diameter trees being cut. The goal for this vegetation type, for this treatment, is to create a mosaic pattern by retaining either smaller groups of immature plants or single mature plants at 40-60 foot intervals.

² Basal Area (BA) – The term itself refers to the horizontal measurement (square feet) of a tree bole taken at 4.5 feet above ground surface (known as diameter at breast height or dbh). It is calculated using the following formula: basal area per tree (square feet) = tree diameter (squared) X .005454. Often the term “basal area” is used to mean “square feet of basal area per acre”. To calculate the “basal area” you would sum the basal area of each of the individual trees on an acre.

³ Diameter Root Collar (drc) – The diameter of the bole of a tree, measured horizontally at ground level (where the root collar of the tree is located). This measurement is used primarily for non-commercial species such as cedars, cypress, and miscellaneous hardwoods.

Outside designated fuelbreaks, the Tonto is proposing that activity slash⁴ be lopped⁵ and scattered to within 2 feet above ground surface and is subject to further treatments in addition (i.e. broadcast burning).

Thin from below to 9 inches dbh

Essentially, this 6,671 acre treatment prescription for mechanical thinning is the same as the “Thin from below 18 inches Diameter at Breast Height (dbh)” prescription with some exceptions. The desired leave density will be less at 50-70 square feet basal area for all tree species and average spacing of tree boles will be 16-20 feet with all trees considered for residual stocking. Other differences in these two prescriptions refer to species preference for leave trees and maximum size of the trees proposed for cutting. Specifically, these preferences are:

- 1) live and dead ponderosa pine trees up to 9 inches dbh
- 2) live Arizona white oak and Emory oak up to 10 inches drc
- 3) dead Arizona white oak and Emory oak up to 6 inches drc
- 4) live and dead pinyon pines up to 8 inches drc; and,
- 5) all live and dead juniper species up to 12 inches drc.

Pinyon-Juniper Savanna Restoration

The third treatment prescription is intended for stands of pinyon-juniper that were historically more savanna-like in vegetative structure with a pinyon-juniper influence which constitutes approximately 1,401 acres. Thus, the main objective for this treatment is to return these areas to historical conditions. In meeting this objective, the Tonto is proposing to leave three or four of the largest junipers and all pinyon pines while cutting the remaining, smaller junipers. The prescription is intended to apply per acre of treated land. All live Arizona white oak and Emory oak ten inches or greater drc and all dead trees of the same species 6 inches drc or greater will not be cut. Specimens of either species which do not meet these parameters may be cut. Finally, the Tonto will minimize stocking in all species and sized of brush species which are associated with the chaparral vegetation type.

⁴ Activity slash is defined as all slash left on-site that is generated by the project treatments. This would include all material generated during a pre-commercial thinning treatment as none of the material is removed, but only the material left after the commercial product is removed in a commercial treatment.

⁵ Trimming and cutting activity slash so that it lies within a specified distance to the ground. Usually this is 2' (a study done by USFS Regional Office in Albuquerque years ago determined that this was the point where economics and effectiveness were best). The objective in putting the activity slash closer to the ground is to 1) reduce the “ladder-fuel-effect” by reducing the height of the fuels; 2) put slash closer to the ground where humidity's are higher and decomposition rates will be higher; and, 3) allow fires to burn at lower intensities.

Pinyon-Juniper Thinning

The fourth treatment prescription will reduce the propensity for crown fires by reducing the canopy density and continuity through the thinning of these two tree species and will occur in a relatively small proportion (755 acres) of the Verde Analysis Area. The Tonto is proposing to manage areas designated for this treatment at stocking levels in the range of 0-50 trees per acre, for all species. To help in this endeavor, the Tonto is proposing to cut all trees less than 6 feet tall as well as all brush. The stocking effort would consist of individual trees or small clumps of trees with up to five trees per clump. The preferred leave trees in these areas will include all large junipers and pinyon pines with 5 inches dbh or greater. Pruning of leave trees is also expected to occur. Specifically, trees may be pruned up to 6 feet from ground level, but not more than 1/3 of the total tree height.

Any activity slash generated as a result of this treatment will be lopped to within 2 feet above ground surface with the possibility of further prescribed treatment (broadcast or maintenance burning) after native grass species have recovered enough to primarily carry fire through these areas.

Constructed Fuelbreaks

The fifth treatment prescription addresses how constructed fuelbreaks⁶ will be managed when adjacent to either the “Thin from below 18 inches dbh” or “Thin from below 9 inches dbh” treatment areas. The treatments to live and dead fuels within the constructed fuelbreak will be consistent with the treatments prescribed in the adjacent treatment area. In the case(s) where there is no specific treatment prescription for an area adjacent to a constructed fuelbreak, the “Thin from below 18 inches dbh” prescription will be used. Disposal of slash piles within these areas will be performed in accordance with the following discussion of “Pile Burning”. The Tonto anticipates approximately 4,761 acres in the project footprint will be managed as constructed fuelbreaks.

Road Maintenance

The final, remaining treatment prescription has the objective of minimizing road construction while facilitating access to treatment sites. No new road construction is planned for the Verde Analysis Area. However, there will be the occasion where a closed road will require re-opening and minor improvements for use in accessing treatment areas. At the completion of any given treatment, the road will be closed again after final maintenance is completed. There are approximately 37 miles of roads that will be used for access to treatment areas within the Verde Analysis Area with a smaller undisclosed subset of road miles scheduled for reopening, maintenance, and subsequent closing.

⁶ A fuelbreak is defined as a wide strip or block of land on which the native or pre-existing vegetation has been permanently modified so that fires burning into it can be more readily extinguished, or where a fire-line can be constructed and held with minimal support and resources.

The six treatment prescriptions described above constitute the proposed methods of mechanical thinning across the Verde Analysis Area.

Prescribed Fire⁷

The other major category of treatment prescriptions is prescribed fire.

Broadcast Burning⁸

Approximately 23,677 acres are proposed for broadcast burning within the Verde Analysis Area. Areas designated were chosen because fuel loadings are unnaturally high due to historical exclusion of natural fire and/or because an accumulation of activity slash from past treatments has occurred.

In ponderosa pine vegetative communities, the objective of broadcast burning is to reduce fuel loadings to an average of 5-10 tons per acre of course woody material outside of fuelbreaks and 3-5 tons per acre of course woody material within fuelbreaks. Target fuels are proposed to be 1 hour, 10 hour, 100 hour, and 1000 hour. These proposed target fuels pertain to the concept of “dead fuel moisture”. Dead fuel moisture is a management tool used to predict fire intensities and fuel consumption levels for vegetation types where dead fuels are the primary carrier of fire. It is measured as the time necessary for a fuel particle to gain or lose approximately 63% of the difference between its initial moisture content and its equilibrium moisture content. It is used for all vegetation types with a dry grass component or a tree component. Since these are the fuels that are the primary carrier of the fire, they are generally the dead fuels located on the forest floor, but in some extreme circumstances could include some aerial dead fuels. One hour fuels are fuels that are less than ¼” in diameter which include dead grasses, pine needles, leaves, twigs, duff, etc. Ten hour fuels range from ¼” to 1” in diameter and include large twigs, small branches, the boles of small trees, etc. One hundred hour fuels range from 1” to 3” in diameter and include branches, and boles of small trees. Finally, 1000 hour fuels range from 3” to 8” in diameter and may include large branches or small logs. However, 1000-hour fuels only cover material up to 8” diameter. Measuring fuels larger than 8” diameter and beyond 1000 hours is not practical for management so materials larger than this are usually lumped into the 1000 hour fuels class in determining fire effects.

⁷ Prescribed fire refers to a controlled application of fire to wildland fuels in either their natural or modified state, under specified environmental conditions that allows the fire to be confined to a predetermined area, and produce the fire behavior and fire characteristics required to attain planned fire treatment and resource management objectives. Broadcast, maintenance, and pile burning are types of prescribed fire treatments.

⁸ Broadcast burning is a form of prescribed burning that involves ignition over a continuous and often large area. It can be accomplished in many ways including hand ignition or aerial ignition (helicopter). The objective is to treat a high percentage of the area at some predetermined intensity level (this varies considerably based on treatment objectives and the type of fuel being treated).

The Tonto expects that broadcast burns will have to be repeated in many areas to meet desired objectives. If required, repeated broadcast burning will occur every 3-5 years until management objectives are met.

Certain environmental conditions are required when conducting broadcast burns to ensure the effectiveness of the burn as well as ensure an action agency's ability to control a burn. Past consultations and coordination between our respective agencies have resulted in the agreement of exactly what environmental conditions are required for broadcast burns within MSO habitat. For example, the maximum daytime temperature may be 90 degrees Fahrenheit and the minimum 30 degrees Fahrenheit. The maximum humidity can be 90% and the minimum 15%. Dead fuel moisture conditions vary with respect to the material in question. Generally, the dead fuel moisture of 1 hour fuels have a maximum of 15% and a minimum of 5%; 10 hour fuels have a maximum moisture level of 35% and a minimum of 6%; 100 hour fuels have a maximum moisture level of 40% and a minimum of 8%; and 1000 hour fuels have a maximum moisture level of 50% and a minimum of 13%. All live fuels have maximum and minimum moisture levels of 300% and 80%, respectively. Wind speed, an important parameter when assessing prescribed fire conditions cannot exceed 15 mph.

In pinyon-juniper and chaparral type vegetation, the goal of restoring these areas to resemble the historical fire regime is unchanged. Treatment objectives for these areas are designed to create a mosaic of burned and unburned areas. Specifically, the Tonto anticipates burning 40%-75% of these areas to create such a mosaic. Within burned areas, approximately 80%-100% of live vegetation would be consumed. Further broadcast burns in these areas will likely occur given proper weather conditions and adequate funding but are not to exceed 75% of the total treatment area.

Maintenance Burning⁹

The Tonto proposes to conduct maintenance burns in treated or untreated areas that closely resemble the natural or presettlement conditions and generally where dead and live fuels do not exceed 10 tons per acre. For example, grasslands would be subject to this low-intensity type of prescribed fire. It is expected that maintenance burning will occur on approximately 23,677 acres within the Verde Analysis Area.

In ponderosa pine vegetation, the objective is to maintain live and dead fuel loads at an average of 5-10 tons per acre. There is no proposed treatment differentiation between fuelbreak and non-fuelbreak areas when prescribing maintenance burns. Generally, target fuels are noted as 1 hour and ten hour dead fuels and includes all live understory vegetation up to six feet in height.

⁹ Maintenance burning may be considered as broadcast burning under conditions where the fuel types and fuel loadings are similar to pre-European settlement times. The by-product of this type of burn would be a low intensity burn that produces very short-term negative effects to all resources (vegetation, soils, water quality, wildlife, etc.) and long-term positive effects (nutrient recycling, improved plant vigor, stable soil and water quality conditions, etc.).

Again, maintenance burns are characterized by their low-intensity nature. The average flame lengths will rarely exceed 18 inches. Maintenance burns are expected to occur in target areas every 2-10 years and may be supplemented by wildland fires.

Pile Burning¹⁰

Pile burning, anticipated on approximately 4,761 acres within the Verde Analysis Area, pertains generally to the treatment of generated slash piles in constructed fuelbreaks with the Tonto's objectives being the ignition of 90%-100% of the slash piles with an 80% consumption for each pile.

Streamside Management Zones

The Tonto has designated all streamside/riparian habitats within the Verde Analysis Area as "Streamside Management Zones" with varying degrees of protections proposed for each of four types. Their definitions and management prescriptions are as follows (USFS 2003):

1. Riparian Filter Strip: "Areas of vegetation and litter from 1 to 2 chains (depending on slope) around the entire riparian zone, which serve to filter sediment, protect bank stability, and provide aquatic habitat. Limited non-riparian tree removal may occur, but landings, decking areas, machine piling, skid trails, borrow pits, and roads may not be planned within the strip. More prominent riparian areas such as the East Verde River and Webber Creek are designated as riparian filter strips."
2. Non-riparian Filter Strip: "Also areas of vegetation and litter, which serve to filter sediment and protect stream banks. These strips are on less prominent, usually ephemeral riparian habitats. They range from 0.5 to 1.5 chains (depending on slope) on both sides of the stream channel. As with riparian filter strips, limited non-riparian tree removal may occur, but landings, decking areas, machine piling, skid trails, borrow pits, and roads may not be planned within the strip."
3. Buffer Strip: "Are the most restrictive of streamside management zones. They are reserved for high quality streams or streams that are highly unstable. The only such stream in the analysis area is Dude Creek, because it supports a population of the endangered Gila trout. No management activity is permitted within buffer strips. Width of buffer strips is generally topographically defined, being at least from the toe of one slope to the other."

¹⁰ Pile burning is defined as a form of prescribed burning that entails burning of previously constructed hand piles or machine piles.

4. Wildlife Travel Corridor: “Areas that provide connectivity between habitats, usually incorporating riparian areas. Management actions that may or may not occur are not specifically defined, however the intent is to maintain cover attributes such that wildlife can comfortably move through the areas. Limited non-riparian tree removal may occur and leaving a certain number of untreated slash piles in the corridor is encouraged. Where it already exists, basal area should be a minimum of 120 sq. ft./acre. Corridor boundaries are generally defined from the toe of one slope to the other. As such, width will vary. Corridors lower in the watershed may be as wide as 300 ft., while corridors higher up in feeder drainages may be considerably less. Numerous mainly ephemeral drainages have been designated as travel corridors within the analysis area.”

Proposed Conservation Measures

The Regional programmatic WUI consultation identified several conservation measures for implementation when conducting on-the-ground activities consistent with fuels treatment projects. Similarly, the following conservation measures are proposed by the Tonto for implementation with the Verde Analysis Area (most, but not all, of the following conservation measures were specifically referenced in the Regional programmatic consultation):

- 1) Best Management Practices will be followed in all treatment area.
- 2) No permanent or temporary roads will be constructed.
- 3) All skid trails and ORV trails resulting from the proposed action will be obliterated and restored.
- 4) There will be no creek crossings in perennial systems except where established crossings exist or where dry, intermittent sections occur.
- 5) In areas with streams, there will be no vehicles or heavy equipment use in riparian areas, except for when crossing riparian areas at established crossings.
- 6) Within WUIs, mechanical treatments will occur in stands with high fuel loads in order to minimize high intensity fires that may occur from either prescribed burns or wildfires. Once these areas have been mechanically treated, prescribed burning may be used to further reduce fuel levels. Before prescribed burning can occur, a burn plan must be developed. This burn plan will be designed to minimize high intensity fires and the possibility of escape.
- 7) Biologists and watershed specialists will be involved in the development of prescribed burn plans and thinning plans to minimize downstream effects to threatened, endangered, and proposed (TEP) species and their habitats. Activities to

consider include: implementing projects in phases, burning during the time of year to allow vegetative growth prior to summer rains, protecting key riparian areas, minimize fire or thinning in riparian areas, installation of sediment structures, and monitoring.

- 8) No more than a reasonable number of projects or phases of projects, or acres per year can be thinned or prescribed burned in any individual watershed. This will be determined by a biologist and watershed specialist and will depend on a multitude of considerations.
- 9) Fire will not be used as a tool in riparian area within or in close proximity to TEP species or their habitat or in areas where there is a potential to impact downstream TEP species habitat.
- 10) There will be no pile or jackpot burning in ephemeral, intermittent, or perennial channels. Specialists will determine appropriate buffers for these actions outside the stream channel. There will be no fires within a reasonable number of feet from a perennial stream's edge in order to provide a buffer for occupied TEP species aquatic habitat. The local biologist, fisheries biologist, hydrologist, and other qualified personnel will determine an appropriately sized buffer adjacent to perennial streams where TEP species occur in order to minimize soil and ash from entering the stream.
- 11) Large downed woody materials (12" in diameter or greater) and snags will be retained in riparian areas.
- 12) Native species of seed will be used where re-seeding of grasses and herbaceous vegetation occurs after ground disturbing activities.
- 13) When prescriptions require modification of forested areas, a certified silviculturist must be involved in the design of treatment plan and must approve the final plan.
- 14) Broadcast burning is allowed in riparian areas only where low intensity fires can be maintained.
- 15) To minimize the cumulative effects of livestock grazing in areas that have been burned, livestock will not be allowed within the treated area of the watershed until the area has sufficiently recovered to control ash and sediment produced by the treatment. The biologist will coordinate with the hydrologist and range specialist to determine the appropriate period of rest before grazing may occur after prescribed burning.

Conservation Measures Specific to Fish and Wildlife

- 1) A ½ mile buffer around private lands has been delineated in each WUI. In this ½ mile band, treatment levels can be as intensive as the prescriptions described in this document. Outside of the ½ mile area, in MSO habitat (PACs, protected, restricted), treatments will be designed to be consistent with the MSO Recovery Plan and Forest Land Management Plans.
- 2) For WUI areas with habitat for the Chiricahua leopard frog, unsurveyed sites will be considered as occupied unless surveyed prior to project implementation.
- 3) Sediment traps will be installed upstream of occupied tanks and ponds in order to minimize the amount of ash and sediment entering (Chiricahua leopard frog) occupied waters.
- 4) Thinning and any other type of mechanical treatment of vegetation in drainage bottoms that flow into TEP fish habitat will be coordinated with the District Biologist and a Forest Service Fisheries Biologist.
- 5) In order to reduce the effects to MSO from project implementation, the following minimization measures are recommended in MSO habitat located within the ½ mile buffer around private lands:
 - a) When possible, conduct MSO surveys in protected and restricted habitat prior to prescribed fire and/or thinning. Surveys should be conducted to protocol such that no more than one breeding season has elapsed since the last survey and the action.
 - b) Identify all 100 acre PAC activity centers; do not allow prescribed fire in these areas.
 - c) When possible, avoid burning or thinning during the breeding season within PACs or within ¼ mile of the PAC boundary if nest site is unknown; if the nest site location is known, no burning within ¼ mile of nest site.
 - d) Limit fire use in PACs to blocks of 100 acres or less.
 - e) When possible, prescriptions for prescribed fire in PACs should be designed such that no more than 10 percent of the canopy will be affected by gaps created by single or groups of trees crowning.
 - f) For all fire in PACs, construct handline around all snags equal or greater than 18 inches dbh and ensure the protection of 80-90% of logs 12 inches dbh or

greater at midpoint through handlining or burning only when fuel moistures are adequate to guarantee their protection. In addition, when burning adjacent to or proximate to the activity center, ensure its protection through hand lining or the use of existing roads/trails.

- g) Retain large trees by thinning from below and limiting removal of trees to trees less than nine inches dbh within protected or restricted habitat.
 - h) Retain hardwoods, large down logs, and snags in protected and restricted habitat.
 - i) Identify target/threshold habitat for all restricted habitat within the analysis area.
 - j) No removal of oak greater than five inches dbh in pine/oak target/threshold stands within the Upper Gila Mountains, Basin and Range West, or the Zuni Mountains or Mount Taylor Regions of the Colorado Plateau Recovery Units.
 - k) Thinning and/or burning in target/threshold will not lower threshold conditions or move target stands away from threshold conditions.
 - l) Burning proximate to PAC(s) during the breeding season will be conducted in such a manner that only limited smoke will occur within a PAC(s) and smoke will not settle in the PAC(s).
 - m) No livestock grazing in areas where fires (prescribed and wildland fire use) occur in PACs for a minimum of one full year after the fire; grazing can only occur when forage plants are deemed mature based upon a pre-grazing visit. Mature means that forage plants exhibit the presence of multiple leaves, seed heads are present for cool season species, and the health of the plants are such that there is reasonable certainty that root reserves have been recharged.
 - n) Implement pre and post fire monitoring plans for burning and/or thinning within owl protected and restricted habitat.
 - o) Inform all field personnel who implement any portion of the proposed action of regulations and protective measures as described herein for the MSO.
- 6) Retain as many snags > 9" dbh as possible.
- 7) Pastures within WUI areas may need to be rested from livestock grazing for one year prior to burning and two years after burning in any portion of the pasture.

Status of the Species / Proposed Critical Habitat

Chiricahua leopard frog

The Chiricahua leopard frog was listed as a threatened species without critical habitat on June 13, 2002 (USFWS 2002). Included was a special rule to exempt operation and maintenance of livestock tanks on non-Federal lands from the section 9 take prohibitions of the Act. The species is an inhabitant of cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,281 to 8,890 feet in central and southeastern Arizona; west-central and southwestern New Mexico; and northern Sonora, the Sierra Madre Occidental of Chihuahua, and northern Durango, Mexico (Platz and Mecham 1984, Jennings and Scott 1993, Degenhardt *et al.* 1996, Sredl *et al.* 1997, Sredl and Jennings *in press*). Reports of the species from the State of Aguascalientes (Diaz and Diaz 1997) are questionable; however, the distribution of the species in Mexico is unclear due to limited survey work and the presence of closely related taxa (especially *Rana montezumae*) in the southern part of the range of the Chiricahua leopard frog. In New Mexico, of sites occupied by Chiricahua leopard frogs from 1994-1999, 67 percent were creeks or rivers, 17 percent were springs or spring runs, and 12 percent were stock tanks (Painter 2000). In Arizona, slightly more than half of all known historical localities are natural lotic systems, a little less than half are stock tanks, and the remainder are lakes and reservoirs (Sredl *et al.* 1997). Sixty-three percent of populations extant in Arizona from 1993-1996 were found in stock tanks (Sredl and Saylor 1998). Northern populations of the Chiricahua leopard frog along the Mogollon Rim and in the mountains of west-central New Mexico are disjunct from those in southeastern Arizona, southwestern New Mexico, and Mexico.

Mexican spotted owl

The MSO was listed as a threatened species in 1993 (USFWS 1993). The primary threats to the species were cited as even-aged timber harvest and the threat of catastrophic wildfire, although grazing, recreation, and other land uses were also mentioned as possible factors influencing the MSO population. Although the MSO's entire range covers a broad area of the southwestern United States and Mexico, the MSO does not occur uniformly throughout its range. Instead, it occurs in disjunct localities that correspond to isolated forested mountain systems, canyons, and in some cases steep, rocky canyon lands. Surveys have revealed that the species has an affinity for older, well-structured forest, and is known to inhabit a physically diverse landscape in the southwestern United States and Mexico. The U.S. range of the MSO has been divided into six recovery units (RU), as discussed in the Recovery Plan (USFWS 1995a). The primary administrator of lands supporting the MSO in the United States is the Forest Service. Most owls have been found within Forest Service Region 3 (including 11 National Forests in Arizona and New Mexico). Forest Service Regions 2 and 4 (including 2 National Forests in Colorado and 3 in Utah) support fewer owls. According to the Recovery Plan, 91% of MSO known to exist in the United States between 1990 and 1993 occurred on lands administered by the Forest Service. A reliable estimate of the numbers of owls throughout its entire range is not currently available.

(USFWS 1995a) and the quality and quantity of information regarding numbers of MSO vary by source.

For a complete description of the status of these species which is incorporated by reference herein, please visit our web page (<http://arizonaes.fws.gov/>) under Document Library, Documents by Species. If you do not have access to the Internet or can not otherwise access the information, please contact this office.

Proposed Mexican Spotted Owl Critical Habitat

On November 18, 2003 (USFWS 2003), a proposed rule was issued in the Federal Register proposing critical habitat for the MSO. We previously designated critical habitat for the MSO in 1995 and again in 2001 where 4.6 million acres were additionally included (USFWS 1995b, 2001). Both designations were successfully challenged in court. A subsequent court order by a District Court in January 2003 required the FWS to re-propose the critical habitat.

There are 7.5 million acres of U.S. Forest Service lands and 1.2 million acres of tribal lands in Arizona and New Mexico that could be included in the critical habitat designation. Our previous designation was challenged in court because it excluded those lands. The existing critical habitat remains in effect and be enforced until such time as we publish the final designation.

The current proposal includes public and tribal lands in four states: 4,965,686 acres in Arizona; 569,125 acres in Colorado; 4,630,281 acres in New Mexico; and 3,322,452 acres in Utah. A public comment period opened from November 18 to December 18, 2003 and the final rule is scheduled for August, 2004.

The physical and biological aspects of a given habitat which are essential to a given species dependent on that habitat may be considered a habitat's primary constituent elements. For MSO, the primary constituent elements have been separated into two groups based on the two distinct habitat types preferred by MSO, canyon-type habitats and forest-type habitats.

The primary constituent elements for a canyon-type habitat include:

- 1) Cooler and often more humid conditions than the surrounding area:
- 2) Clumps or stringers of trees and/or canyon wall containing crevices, ledges, or caves;
- 3) High percent of ground litter and woody debris; and,
- 4) Riparian or woody vegetation.

The primary constituent elements for forest-type habitat include:

- 1) High basal area of large diameter trees;
- 2) Moderate to high canopy closure;
- 3) Multi-layered canopy with large overstory trees of various species;
- 4) High snag basal area;
- 5) High volumes of fallen trees and other woody plants;
- 6) High plant species richness, including hardwoods; and,
- 7) Adequate levels of residential plant cover to maintain fruits, seeds, and regeneration to provide for the needs of Mexican spotted owl prey species.

Environmental Baseline

The environmental baseline includes past and present impacts of all Federal, State, or private actions in the action area, the anticipated impacts of all proposed Federal actions in the action area that have undergone formal or early section 7 consultation, and the impact of State and private actions which are contemporaneous with the consultation process. The purpose of the environmental baseline is to define the current status of species and their habitats in the action area to provide a platform from which to assess the effects of the action now under consultation. The action area considered in this biological and conference opinion consists of the footprint of the proposed action itself. While we have considered the effects of fuel treatments from a potential increase in sedimentation of streams within and downstream of the action area, we are confident the conservation measures and best management practices which are designed to mitigate sediment generation and transport will be effective.

On May 14, 2003, Don Pollock, of the Tonto, forwarded us electronic copies of the specialist reports for Verde Analysis Area which were very descriptive and useful in the context of assessing the condition of proposed critical habitat within the Verde Analysis Area. Consequently, these reports were used in establishing the following discussion of the action area's environmental baseline.

Vegetation Types

The Verde Analysis Area occurs in Management Areas 4D and 4F of the Tonto National Forest Plan (1985) and is located within the Transition life zone directly below the Mogollon Rim (Pollock 2002). Elevations range from 4,530 feet along the East Verde River to 7,300 feet along the face of the Mogollon Rim (Pollock 2002).

Based upon Terrestrial Ecosystem Survey (TES) data, biotic communities represented in the area can be broken down into ten broad vegetation types. These vegetation types are ponderosa pine (18,501 acres), mixed conifer (3,408 acres), pinyon/juniper/oak (5,356 acres), ponderosa pine/manzanita (1,461 acres), lovegrass (5,640 acres), turbinella oak chaparral (6,816 acres), Arizona white oak chaparral (2,921 acres), juniper savanna (1,948 acres), Arizona cypress (203 acres), and riparian (2,434 acres) (Pollock 2002).

The Arizona cypress vegetation type is very limited within the Verde Analysis Area (approximately 203 acres), has a fairly dense overstory, with little herbaceous ground cover and tends to be comprised of Arizona cypress mixed with some junipers (*Juniperous osteosperma*, *Juniperous deppeana*) and oaks (*Quercus arizonica*, *Quercus emoryii*) with a dense understory of turbinella oak, mountain mahogany, and possibly some manzanita (Mercer 2002). Historically, this vegetation type has experienced a high intensity, low frequency fire interval, meaning that fires only occurred once every hundred years or so but these fires were generally stand replacement fires (Mercer 2002).

The turbinella oak chaparral vegetation type exists over approximately fourteen percent of the Verde Analysis Area and consists predominantly of shrub live oak (*Quercus turbinella*) mixed with a variety of other chaparral species such as mountain mahogany, silktassel, manzanita, skunkbush sumac, and others (Mercer 2002). Alligator juniper (*Juniperous deppeana*) occurs in some areas and may provide crown cover up to twenty to thirty percent (Mercer 2002). Historically, this vegetation type had a high intensity, low frequency fire interval, meaning fires may only occur on the average of every fifty to one hundred years, but were generally stand replacement fires (Mercer 2002). Within the Verde Analysis Area, there have not been any natural fires of any significant size for several decades, although there have been prescribed burns within this type in several locations within the past ten to fifteen years which have had the effect of stand replacement fires (Mercer 2002).

The Arizona white oak chaparral vegetation type exists over approximately six percent of the Verde Analysis Area, and is generally associated with the face of the Mogollon Rim (Mercer 2002). Consistent with the vegetation types discussed immediately above, the Arizona white oak chaparral vegetation type has a high intensity, low frequency fire interval history and few fires have occurred within this type for several decades (Mercer 2002).

The juniper savanna vegetation type exists over approximately four percent of the Verde Analysis Area and is generally located on fairly flat, broad ridgetops located in the southwest portion of the Verde Analysis Area (Mercer 2002). This vegetation type's overstory is characterized by alligator juniper and Utah juniper (*J. deppeana* and *J. osteosperma*) with varying amounts of Arizona White oak and Emory oak and some pinyon intermixed with an understory dominated by grasses but varies, depending upon past treatments and possibly soil types, to some extent (Mercer 2002). The chaparral species present within this vegetation type may include turbinella oak, mountain mahogany, skunkbush sumac, etc. (Mercer 2002). Buckhead and Cedar Mesas are located in the southwest portion of the Verde Analysis Area, approximately 5 miles southeast of

Pine, Arizona, on each side of State Route 260. Approximately eighty to ninety percent of the Buckhead Mesa area and sixty to seventy percent of the Cedar Mesa area has been mechanically treated within the past thirty to forty years with the purpose of reducing overstory tree cover and increasing grass-forb cover (Mercer 2002). Approximately forty to fifty percent of the Buckhead Mesa area currently has a low canopy cover with good grass-forb cover, with the remaining area exhibiting fairly dense canopy and less grass cover (Mercer 2002). The Cedar Mesa is currently exhibiting a tree canopy cover estimated at fifty to seventy percent over the entire area (Mercer 2002). Areas which have previously undergone mechanical treatments now exhibit a dense growth of young junipers with light to very marginal herbaceous ground cover (Mercer 2002). Both mesas were historically more open grass land with scattered individual junipers or groups of junipers and was historically maintained by fairly frequent grass fires that kept the juniper populations down, maintaining the savanna condition (Mercer 2002).

The lovegrass vegetation type was created by seeding after the 1990 Dude Fire in the northeasternmost part of the Verde Analysis Area and now exists as a dense ground cover with relatively dense Emory oak and Arizona White oak seedlings and saplings intermixed, that have sprouted since the fire (Mercer 2002). The fire hazard in the lovegrass vegetation type is high due mostly to the continuous ground cover of grass two to three feet tall and the large volume of dead woody material standing and down (Mercer 2002).

The mixed conifer vegetation type exists on approximately seven percent of the Verde Analysis Area and occurs primarily along the face of the Mogollon Rim and secondarily on north or northwest facing slopes of drainages near the base of the Rim (Mercer 2002). The density of vegetation within this type is estimated to generally range between 80 square feet of basal area up to 150 basal area or more, all species combined (Mercer 2002).

The pinyon/juniper/oak vegetation type accounts for close to eleven percent of the Verde Analysis Area and generally extends in a band from below the Little Diamond Rim and the East Verde River westward to Buckhead Mesa, with some areas found on slopes below the Mogollon Rim west of Geronimo Estates (Mercer 2002). The historical fire regime for this vegetative type was one of low frequency and high intensity fires capable of full stand replacement (Mercer 2002). Within the Verde Analysis Area, this vegetative type has not been burned for decades which has allowed mature, decadent brush to die and a considerable amount of dead woody fuel to accumulate (Mercer 2002).

The ponderosa pine vegetative type is the most prevalent within the Verde Analysis Area at approximately thirty-eight percent of the total area (Mercer 2002). Due to stand densities and the general lack of fire activity within most of this vegetative type for several decades, fuel loading is rather high and ranges from ten tons per acre in open stands up to thirty to forty tons per acre in the densest stands (Mercer 2002).

A sample of forty stands within this vegetative type were examined across this Verde Analysis Area and basal areas were tallied (Mercer 2002). Conifer basal areas ranged from 24 ft² to 137 ft² with an average of 87 ft² (Mercer 2002). Juniper species basal areas ranged from none to a high of 75 ft² with an average of 29 ft² (Mercer 2002). Oak species basal area ranged from a low of 10

ft² to a high of 80 ft² with an average of 34 ft² (Mercer 2002). Total stand basal areas (all species combined) ranged from a low of 62 ft² to a high of 238 ft² with an average of 150 ft² (Mercer 2002). These figures depict the fact that stocking levels are high as basal areas of 60-100 ft² (all species combined) are considered desirable by management for vegetation health and vigor as well as fire risk (Mercer 2002).

However, areas (approximately 1864 acres within the Verde Analysis Area) within this vegetative type have undergone various forms of mechanical treatment in the recent past including timber harvest, timber stand improvement, fuel break construction, and some fuelwood harvest (Mercer 2002). Within these treatment areas, the basal area has been reduced to acceptable levels (Mercer 2002). Some treated stands have also experienced prescribed fire treatments and are within the acceptable range of fuel loading levels but many treated acres are in need of additional burning to reduce fuel loading levels (Mercer 2002).

The Ponderosa pine/manzanita vegetation type comprises approximately three percent of the Verde Analysis Area and is found generally on broad ridges below the Mogollon Rim (Mercer 2002). As with many of the other vegetative types discussed above, this vegetative type has a low frequency high intensity fire regime with a high propensity for stand replacement fires (Mercer 2002).

The riparian vegetative type is found within the various drainage systems across the Verde Analysis Area and comprising approximately five percent of the total Verde Analysis Area (Mercer 2002). Although many of these areas originate at higher elevations on the Mogollon Rim (within the mixed conifer vegetative type), the majority of these areas extend through the Ponderosa pine vegetative type (Mercer 2002). Ponderosa pine is most common, followed by Douglas-fir, white fir, Arizona walnut, alder, box elder, Arizona white oak, Emory oak, Gambel oak, sycamore and maple (Mercer 2002). Riparian areas tend to have dense overstories in association with varying degrees of herbaceous ground cover (Mercer 2002). Due to the combination of dead down woody material and a deep litter layer from the overstory canopy, fuel loadings within these drainage systems can be considerable, with fuel ladders common (Mercer 2002). Further discussion of riparian areas and their existing state within the action area is offered in the "Stream Channels and Riparian Areas" section below.

Forested vegetation types can be further categorized into Vegetative Structural Stages (VSS) which are based on the average tree diameter within a stand (Pollock 2002).

Table 1. Current distribution of Vegetative Structural Stages in the Ponderosa pine vegetative type in the Verde Analysis Area. Note: Percent Grass/Forb does not include area burned in the Dude Fire.

Vegetative Type	Grass/Forb (VSS 1)	Sapling (VSS 2)	Young (VSS 3)	Mid-aged (VSS 4)	Mature (VSS 5)	Old Growth (VSS 6)
Ponderosa Pine	2%	0%	52%	36%	7%	3%

As indicated in previous discussion, the Verde Analysis Area is diverse in terms of a variety of vegetation types, topography, and elevation, but is not structurally diverse within vegetation types, with over 80% of the area in mid-aged (VSS 3 and 4) classes (Pollock 2002). All vegetation types are significantly lacking in the VSS 1 and VSS 2 classes (with the exception of large burned areas such as the Dude Fire), illustrating the significant lack of large openings, regeneration, and herbaceous vegetation within and among the various vegetation types (Pollock 2002).

Stream Channels and Riparian Areas

The Verde Analysis Area resides within the East Verde River 5th code watershed. Within the Verde Analysis Area, the East Verde River originates on the Mogollon Rim and flows south through the eastern portion of the analysis area, forming the southeastern boundary of the Verde Analysis Area (Mason 2002). Several tributaries enter the East Verde River within the analysis area including Sycamore, Webber, Bray, North Sycamore, Chase, Mail, Dude, Dry Dude, Brody, Fuller, and Ellison creeks (Mason 2002). These tributaries are generally intermittent, moderately steep (2-4%), V-shaped headwater streams within narrow valleys (Mason 2002). Their substrate is generally cobble and riparian vegetation within or adjacent to the stream banks is low to moderate in abundance (Mason 2002). However, numerous springs supply various reaches with perennial flow and abundant riparian habitat (Mason 2002). In areas where perennial flow exists, heavy recreation is the norm (Mason 2002).

The Tonto provided an analysis of these stream reaches and classified them according to the Rosgen (Rosgen, 1996) stream classification system (Mason 2002). In addition to using the Rosgen stream classification system, the condition of many of these reaches was also assessed using the Tonto Stream Assessment Method (Mason and Johnson 1999, Mason 2002). The Tonto (Mason 2002) based these assessments on sediment depositional pattern, streambank vegetative health (Thompson et al 1998), stream channel width/depth ratio, channel stability rating (Pfankuch 1975), and bank erosion hazard index (Rosgen 1996). The three condition rating classes are stable, impaired, or unstable. A stream's stability is defined by its ability to process the water and sediment of its watershed while maintaining its dimension, pattern, and

profile, without aggrading or degrading, over time and in the present climate (Rosgen 1996). The following table portrays how various tributaries within the Verde Analysis Area were classified using Rosgen's (1996) technique (Mason 2002).

Table 2. Rosgen (1996) classifications of nine streams within the Verde Analysis Area.

Stream Name	Number of Reaches	Rosgen Stream Type
East Verde River	3	B ¹¹ , C ¹²
Bray Creek	2	F ¹³
Chase Creek	1	B
Dry Dude Creek	1	B
Dry Dude Tributary	1	B
Dude Creek	2	B, C, F
Ellison Creek	1	B
Sycamore Creek	3	F, C
Webber Creek	5	B

East Verde River

The headwaters of the East Verde River originate near the top of the Mogollon Rim, flowing south through the eastern portion of the Verde Analysis Area where it subsequently forms the southeastern boundary of the Verde Analysis Area (Mason 2002). Along its course, the East Verde River flows through numerous private parcels within the project area including (from north

¹¹ A stream with a "B" type description implies that the stream is moderately entrenched; has a moderate gradient, riffle dominated channel, with infrequently spaced pools; has a very stable plan and profile with stable banks. Landform/soils descriptors may include moderate relief; colluvial deposition; moderate entrenchment and width/depth ratio; narrow, gently sloping valleys; and, rapids predominating with scour pools.

¹² A stream with a "C" type description implies that the stream is low gradient; meandering; has point bars; riffle/pools present; alluvial channels and broad, well defined floodplains. Landform/soils descriptors may include broad valleys with terraces, in association with floodplains, alluvial soils; slight entrenchment with well defined meandering channels; and a riffle/pool bed morphology.

¹³ A stream with a "F" type description implies that the stream has an entrenched, meandering riffle/pool channel; has a low gradient and a high width/depth ratio. Landform/soils descriptors may include entrenchment in highly weathered material; gentle gradients with a high width/depth ratio; meandering; laterally unstable with high bank erosion rates; and riffle/pool morphology.

to south) Washington Park, Washington Park Summer Homes, Rim Trail Estates, Verde Glenn, Whispering Pines, Beaver Valley Estates, and Flowing Springs where it also receives heavy recreational pressure (Mason 2002). There are also several designated recreation areas stationed along the East Verde River such as (from north to south) Washington Park Trailhead, Verde Glen, Third Crossing, Second Crossing, Waterwheel, Flowing Springs, East Verde, and East Verde Crossing, in addition to a number of dispersed campsites, which increase the recreational use of the river within the Verde Analysis Area (Mason 2002).

The Tonto classified three reaches of the East Verde River within the Verde Analysis Area (Mason 2002). The first reach, above Rim Trail Estates, and the second reach, from the Rim Trail Estates and the Flowing Springs, both classify as “B” type streams. Above the Rim Trail Estates, dominate riparian vegetation consists of alder, Douglas fir, and bigtooth maple (Mason 2002). Ash, sycamore, cottonwood, alder, and juniper comprise the dominate riparian species between Rim Trail Estates and Flowing Springs (Mason 2002). The Dude Fire of 1990 resulted in excessive bank cutting and erosion due to the ensuing flows and the post-fire alteration of the upper watershed. The Tonto’s photo monitoring of this reach has indicated that some stability has returned to this reach but there remains areas which have yet to stabilize (Mason 2002).

The lower reach downstream of Waterwheel Recreation Area was classified as a “C” type, indicating its susceptibility to disturbance and relative importance of riparian vegetation in maintaining stability (Mason 2002). The condition of this reach was assessed as impaired by the Tonto due to, in part, heavy recreational use which impacts the stream banks and riparian vegetation as evidenced through the lateral cutting of the channel and the large sand banks eroding into the channel during high flows (Mason 2002).

Due to an agreement between Phelps Dodge Corporation and the Salt River Project, streamflow in the East Verde River has been augmented by diversions from Blue Ridge Reservoir above the Mogollon Rim since 1966 (Mason 2002). Phelps Dodge typically diverts into the East Verde from early spring to late fall at rates varying from about 15 to 30 cubic feet per second (Mason 2002).

Sycamore Creek

Sycamore Creek is an intermittent stream with some perennial reaches and originates just below Milk Ranch Point, flowing south and east to its confluence with the East Verde River (Mason 2002). The Tonto assessed and classified three reaches of Sycamore Creek adjacent to Highway 87 and bordering the project area (Mason 2002).

The first reach is above the Forest Road (FR) 1667 road crossing and was classified as an “F” type stream and was assessed as impaired as evidenced by the depositional pattern (number of channel bars), indicating the system is overloaded with sediment (Mason 2002). Bank erosion and the presence of a road within the channel corridor are the likely sources contributing to the excessive sedimentation of this reach (Mason 2002). Within this reach, the dominant riparian species consist of cypress, ash, and oak, with some deergrass (Mason 2002).

The second reach, below the FR 1667 road crossing, was classified as a “C” type stream in impaired condition due mostly to the elevated sediment generated upstream which is causing a depositional pattern that reflects excessive sedimentation within this reach (Mason 2002). In terms of riparian species, this reach is similar to the first, but the channel widens, allowing for more deergrass to become established (Mason 2002).

The third reach of Sycamore Creek within the Verde Analysis Area is a perennial reach below the spring and was classified as a “C” type stream in stable condition (Mason 2002). The Tonto notes the dominant riparian tree species as sycamore, willow, ash, and cypress with deergrass, sedges, rushes, mint, and monkey flower comprising the herbaceous riparian component (Mason 2002). Although a small campground and a forest road exists, the Tonto believes that recreational impacts are less significant within this reach (Mason 2002).

Webber Creek

Webber Creek is a perennial stream originating near the top of the Mogollon Rim, flowing south for approximately 10 miles to its confluence with the East Verde River near the Flowing Springs subdivision (Mason 2002). The creek flows through Geronimo Boy Scout Camp and Geronimo Estates subdivision where it receives heavy recreation use (Mason 2002). Five reaches of Webber Creek within the Verde Analysis Area were classified (mostly as “B” stream types) and assessed by the Tonto (Mason 2002).

The Tonto assessed the two reaches above Camp Geronimo as stable except for some bank erosion, which is thought to be due to recreation activities. These two reaches generally have narrow channels with limited potential for riparian vegetation establishment (Mason 2002). Pine trees occur down to the floodplain. The Tonto’s Riparian Inventory and Monitoring Method (TRIMM) survey done in these reaches in 1995 indicated the dominant riparian species included alder, sycamore, white fir, and douglas fir, with Ponderosa pine occurring immediately adjacent to the floodplain (Mason 2002).

The Tonto has also assessed the two reaches between Camp Geronimo and Geronimo Estates as impaired due to excessive deposition and some bank cutting which the Tonto suspects may be due to the road which runs adjacent to the creek within these reaches which is likely contributing excessive sediment to the system (Mason 2002). The Tonto noted that, within these two reaches of Webber Creek, the valley widens which offers greater potential for riparian vegetation to develop, should these reaches stabilize in the future (Mason 2002).

Lastly, the Tonto assessed the furthest downstream reach, just above the Flowing Springs subdivision, as impaired, citing a very high channel width/depth ratio and little riparian vegetative cover (Mason 2002). During a field visit in May 2000, the Tonto observed significant impacts from livestock grazing which included bank alteration and high forage use on woody vegetation and deergrass which could be considered a primary reason for this reaches impairment (Mason

2002). However, the floodplain within this reach is generally wider and has potential for the recovery of riparian vegetation (Mason 2002).

Webber Creek has apparently seen little change in its overall condition (stream channel characteristics and riparian vegetation diversity, distribution and abundance), according to photo monitoring implemented by the Tonto from 1995 through 2001 (Mason 2002). Although three of five reaches of Webber Creek within the Verde Analysis Area assessed as impaired, it does not appear as though the condition Webber Creek has continued to worsen in recent years.

Bray Creek

Bray Creek is an intermittent stream within the Verde Analysis Area that originates near the top of the Mogollon Rim, flowing south approximately three miles to its confluence with Webber Creek (Mason 2002). The first reach is just downstream from Bray Creek Ranch and was classified by the Tonto as an “F” type stream in unstable condition likely due to the 1990 Bray Fire which resulted in the channel being downcut to bedrock, leaving cut banks 3-8 feet high with sparse vegetation, which is eroding (Mason 2002).

The second reach, just upstream of the Control Road, is an “F” type stream and is in impaired condition due to excessive deposition and little vegetative cover and, according to the Tonto, there is also an old logging road acting as an overflow channel next to the stream (Mason 2002).

Chase Creek

Chase Creek is an intermittent stream, with some perennial sections, that originates near the top of the Mogollon Rim, flowing south (through the Shadow Rim Girl Scout Camp and adjacent to FR 437 road for approximately ½ mile) for approximately four miles to its confluence with the East Verde River.

The Tonto classified and assessed one reach just upstream from the Shadow Rim Camp as a “B” type stream in stable condition (Mason 2002). This reach is characterized by a small floodplain capable of supporting only a small amount of riparian vegetation. The presence of some bedrock and boulders within its channel contributes to its stability (Mason 2002).

Dude Creek

Dude Creek is an intermittent stream that originates near the top of the Mogollon Rim, flowing south approximately four miles, where it receives high recreation use, to its confluence with the East Verde River. Two reaches within the Verde Analysis Area were classified and assessed by the Tonto.

The first reach, upstream from the Dry Dude Creek confluence and an old road crossing, alternates between a “C” and an “F” type stream classification and is in unstable condition as

lateral channel movement has created multiple channels which are experiencing lateral and vertical erosion (Mason 2002). The Tonto suspects this channel status was the result of Dude Fire and the exacerbating effects of high livestock use on both herbaceous and woody vegetation within the riparian area (Mason 2002). Ancillary effects from high recreational use and a robust elk population may not only worsen channel stability but also slow the recovery of this reach (Mason 2002).

The second reach, downstream from the Dry Dude Creek confluence, is a “B” type stream and is in impaired condition. The Tonto concludes this condition is the result from the effects of the Dude Fire in 1990 (Mason 2002).

Dry Dude Creek and Tributary

Dry Dude Creek is an intermittent stream with ephemeral characteristics that originates near the top of the Mogollon Rim, flowing southwest approximately three miles to its confluence with Dude Creek. The Tonto classified the creek just upstream from its confluence as a “B” type stream with a narrow, rocky channel which has low potential for riparian vegetation (Mason 2002). The Tonto did not assess the condition of this reach.

The Dry Dude Tributary, as the name implies, is a largely intermittent tributary to Dry Dude Creek and originates near the top of the Mogollon Rim, flowing southwest approximately for two miles to its confluence with Dry Dude Creek. The Tonto conducted a field visit in July 2000 of the perennial reach just upstream from where FR 1189 ends which revealed high livestock use on the herbaceous vegetation and significant bank alteration from trampling, etc. (Mason 2002).

The Tonto observed that the stream has been downcut and photo points indicate there has also been lateral cutting in addition to bank erosion, citing the likelihood from the effects of the Dude Fire when most of the pines on the banks and uplands were burned, opening up the channel of vegetation. After the fire, the area was seeded with lovegrass for soil stabilization (Mason 2002).

Brody Creek

Brody Creek is ephemeral and originates near the top of the Mogollon Rim, flowing southwest for approximately two miles to its confluence with the East Verde River. Photo monitoring indicates that most of the pine trees on the banks and uplands around the stream were burned in the Dude Fire, opening up the channel of vegetation, however, no changes in the channel were evident (Mason 2002).

Fuller Creek

Fuller Creek forms a portion of the eastern boundary of the Verde Analysis Area, is an ephemeral stream, and originates near the top of the Mogollon Rim flowing south approximately 2.5 miles to its confluence with Bonita Creek. Photo monitoring efforts have indicated that most of the pine trees on the banks and uplands around the stream were burned in the Dude Fire, opening up the channel of vegetation. Some erosion was evident after the fire, but it appears to have stabilized (Mason 2002).

Bonita Creek

Like Fuller Creek, lower Bonita Creek also forms a portion of the eastern boundary of the Verde Analysis Area. Lower Bonita Creek is an intermittent stream originating near the top of the Mogollon Rim, flowing southwest approximately four miles to its confluence with Ellison Creek (Mason 2002). The upper reach of Bonita Creek (outside of the Verde Analysis Area) flows through Bonita Creek Estates and was classified as a “B” type stream (Mason 2002).

Ellison Creek

Lower Ellison Creek forms a portion of the southern boundary of the Verde Analysis Area. Lower Ellison Creek is an intermittent stream with perennial reaches, originating near the top of the Mogollon Rim and flowing south and then west approximately nine miles to its confluence with the East Verde River.

Soils

The Tonto investigated the relative topography and soil characteristics within the Verde Analysis Area. The analysis of slope provides insight as how the area responds to precipitation and the associated potential for ground disturbing activities to generate sediment loading of the stream channels. The slope within the Verde Analysis Area varies but is generally considered moderately steep, to steep. Specifically, 33% of the area (15,792 acres) had a slope ranging from 0-15%; 50% (24,058 acres) had a slope ranging from 15-40%; 16% (7,957 acres) had a slope ranging from 40-80%; and a mere 1% of the Verde Analysis Area had a slope greater than 80% (Ambos 2002).

The soil condition for the Verde Analysis Area was evaluated by the Tonto in referencing the Terrestrial Ecosystem Survey method in combination with field inspections of key areas, digital elevation models and topographic maps (Ambos 2002).

The majority of the Verde Analysis Area’s soil condition assessed as “satisfactory” with 34,014 acres (70%) rating as having satisfactory soil condition (Ambos 2002). Within this condition type, associated vegetative communities consist of mixed conifer, ponderosa pine, seral stage grasslands (lovegrass), pinyon/juniper/oak, with chaparral vegetation types where there is a high amount of effective vegetative ground cover (litter and plant basal area) (Ambos 2002). Some factors which contribute to sustaining the satisfactory soil condition include the fact that livestock are restricted due to the steep slopes, the high surface rock cover, and the significant distance from reliable water sources for livestock and/or recreational uses (Ambos 2002).

The second highest percentage of soils (14%) is in the “impaired and satisfactory” soil condition class as represented by 6,976 acres of the Verde Analysis Area. Variation between areas with soils in “impaired” condition and others with soils in “satisfactory” condition appeared consistent

with the degree of management impact. Areas rated as this soil condition type cannot be cartographically delineated and therefore merit the use of a dual soil condition class (Ambos 2002). However, areas in the satisfactory soil condition class make up the majority of these acres and are found on areas with slopes ranging from 0 to 40 percent, in pinyon/juniper/oak and some riparian vegetation types, and a high amount of effective vegetative ground cover which curb the potential for erosion. Impaired soils within this dual soil condition class are consistently found where interspaces in canopy closure allow for precipitation to enhance sheet and rill erosion which is additionally exacerbated by moderate compaction, and limited nutrient cycling (Ambos 2002).

Within the Verde Analysis Area, approximately 3,099 acres (6%) have soils which are predominantly in “impaired” soil condition and generally located on steep slopes within the Dude Fire area where soils have experienced accelerated erosion after the fire and still have not completely stabilized. Areas outside of the Dude Fire area which also exhibited impaired soil conditions include intermediate slopes ranging from 15 to 40 percent, under pinyon/juniper/oak vegetation types, with slight to moderate soil compaction, moderate sheet and rill erosion, and limited nutrient cycling (Ambos 2002).

Approximately 4,020 acres (8%) within the Verde Analysis Area have a soil condition rating of “impaired and unsatisfactory” (Ambos 2002). Much like the “satisfactory and impaired” soil condition class referenced above, these areas cannot be cartographically delineated on an appropriate scale and therefore require the use of a dual soil condition class. Within this soil condition class, the slope consistently ranges from 0 - 15% with relatively few surface rocks, enabling heavy use by livestock which leads to a worsening soil condition (Ambos 2002).

The soil condition varies between impaired and unsatisfactory (Ambos 2002). The Tonto described impaired soils within the Verde Analysis Area as having loam surface textures with slight to moderate surface compaction, limited soil porosity and root distribution, low to moderate sheet, rill, and gully erosion, and low vegetation species’ composition and diversity. Unsatisfactory soils are described as having clay, loam or finer surface textures, wide surface cracking, piping, high surface compaction, poor soil porosity and root distribution resulting in moderate amounts of sheet, rill, and gully erosion, along with very poor diversity, density, and composition of perennial grasses with small amounts of vegetative litter cover (Ambos 2002).

Lastly, the “unsatisfactory” soil condition class by itself makes up the smallest area in the Verde Analysis Area at 1% of the total area, or 427 acres. All of these soils occur on flat slopes ranging from 0 to 15 percent, on pinyon/juniper/oak vegetation types with high amounts of surface compaction, poor soil porosity and root distribution, moderate to high amounts of sheet, rill, and gully erosion, and very poor diversity, density, and composition of perennial grasses which can be attributed predominantly to effects from high livestock use (Ambos 2002).

Status of the Species / Proposed Critical Habitat within the Action Area

Chiricahua leopard frog

In 1991 the Arizona Game and Fish Department began a Forest-wide amphibian survey targeting suitable habitat throughout the Tonto which yielded the discovery additional populations of

Chiricahua leopard frogs in the northern portions of both the Pleasant Valley and Payson Ranger Districts (USFS 2003). One existing population is known on the Payson Ranger District, in Ellison Creek, which drains from the Mogollon Rim approximately four miles east of the Verde Analysis Area (USFS 2003). There are no known populations of Chiricahua leopard frog within the Verde Analysis Area.

The distance from the Verde Analysis Area to the Ellison Creek population is outside of the dispersal distance guidelines.

In subsequent attempts to determine species occupation within the Verde Analysis Area, Arizona Game and Fish Department herpetologists have conducted surveys within, and adjacent to, the Verde Analysis Area in the recent past, all with negative results for Chiricahua leopard frogs (USFS 2003).

Additionally, the Tonto identified suitable habitat within the Verde Analysis Area that provides the highest potential for supporting Chiricahua leopard frogs which included the perennial reaches of Dude Creek, Chase Creek, Bray Creek, Webber Creek, and other small streams originating just underneath the top of the Mogollon Rim. Subsequently, the Tonto conducted several surveys during the months of May, June and July 2003. Specifically, the Tonto conducted surveys in various reaches of Mail Creek, Webber Creek, East Verde River, Ellison Creek, Bray Creek, Poison Creek, Brody Hills Tank, Washington Spring, Geronimo Spring, Poison Spring, Bear Spring, Erosion Tank, Park Tank, as well as in eight additional unnamed tanks. Several factors were referenced on the associated survey forms which may effectively preclude the occupation of some or most of these sites by Chiricahua leopard frog. The most prominent factors include 1) the presence of nonnative predators such as crayfish, bullfrogs, and trout; 2) high recreational use; and, 3) ongoing drought conditions which have dewatered several stock tanks.

Mexican spotted owl

The Verde Analysis Area is within the Upper Gila Mountain Recovery Unit (USFWS 1995a). A number of MSO inventory surveys related to a variety of projects have been conducted, according to Regional protocol, over the last decade. As a result of this on-going survey effort, eight MSO PACs were identified within the Verde Analysis Area. Surveys were completed during the 2001 and 2002 breeding seasons in all areas of suitable (restricted/protected) habitat (USFS 2003). Survey results are discussed in detail below.

Within the analysis area, the bulk of suitable habitat for the MSO is associated with the face of the Mogollon Rim; where all eight PACs occur (USFS 2003). The 1,637 acres of "restricted" habitat within the Verde Analysis Area is widely distributed and comprise only 4% of the habitat, excluding PAC acreage (USFS 2003). A number of these habitats do not possess many of the structural/composition elements typical of suitable MSO habitat and lack typical components such as numerous large (>18" dbh) trees, high basal area, large hardwoods, multistoried structure, etc. which are generally associated with the steep, mesic canyons and slopes of the Mogollon Rim (USFS 2003).

Table 3. Summary of Target/Threshold acreage for the pine/oak habitat type within the Verde Analysis Area (USFS 2003).

Acres of pine/oak restricted habitat	892
Acres required to achieve 10% in threshold condition	89.2
Acres in Analysis Area that currently meet threshold condition	0
Acres needed to be designated as target pursuant to MSO Recovery Plan	89.2
Acreage actually designated as target	237
Total acreage of combined threshold and target pine/oak habitat	237

Table 4. Summary of Target/Threshold acreage for the mixed conifer habitat type within the Verde Analysis Area (USFS 2003).

Acres of mixed conifer restricted habitat	745
Acres required to achieve 10% in threshold condition [170 ft ² basal area (BA)]	74.5
Acres in Analysis Area that currently meet threshold condition (170 ft ² BA)	85
Acres needed to be designated as target threshold pursuant to MSO Recovery Plan (170 ft ² BA)	0
Acres needed to achieve 15% in threshold condition (150 ft ² BA)	111.75
Acres in Verde Analysis Area that currently meet threshold condition (150 ft ² BA)	101
Acres required for designation as target threshold pursuant to MSO Recovery Plan (150 ft ² BA)	10.75
Acreage actually designated as target	143
Total acreage of combined threshold and target mixed conifer habitat	329

Protected Activity Centers (PACs)

The following discussion within this section of this biological and conference opinion was summarized from the USFS' (2003) BAE. For a record of survey results for the eight PACs within the Verde Analysis Area, please see Appendix 1.

Camp Geronimo PAC (120419)

Suitable habitat within this PAC is somewhat scattered, and there is a high percentage of manzanita and mixed interior chaparral making up the vegetative composition. The best MSO habitat is generally restricted to an east-west drainage that runs through the middle of the PAC and a north facing slope of the Mogollon Rim at the extreme northwest end of the PAC. The single known roost, and the observation of the two fledglings, was associated with the drainage. Fuel loading within the PAC is very high, both in the conifer and chaparral types. High levels of dead/down material are present and the current insect-kill epidemic continues to add to it.

From a wildfire standpoint, this PAC is strategically located. To the north of the PAC lies Camp Geronimo, a Boy Scout camp that houses upwards of 700 youths every week during the summer. The camp is serviced by a single (one way in – one way out) road that skirts the edge of the PAC. To the south of the PAC is Forest Road #64 (Control Road). This road represents a potential ignition source for human caused fires, as does the access road to the camp. Prevailing southwest winds would carry a fire started at the Control Road through the PAC directly towards Camp Geronimo. Such a fire would also reach the road first, making evacuation problematic. This situation has long been a concern for the Payson Ranger District, as well as the relevant Congressional delegation. No nest (and more recently not even birds) has been found in this PAC and it remains untreated. However, Ward and Salas (2000) published a peer-reviewed paper which describes the use of known roost locations in lieu of nest locations for the establishment of buffer areas. We have approved these methodologies as a surrogate to knowing nest locations.

The proposed action includes conducting broadcast burning, but no mechanical treatments, within this PAC. A 115-acre buffer around the area containing the known roost and the 1994 observation of two fledglings has been designated and no burning is proposed within that buffer. A two-track road serves as the northern boundary of this buffer within the PAC. Protecting the southern boundary of the buffer is more problematic, and will likely require backing off from the PAC to a drainage or even the Control Road, thereby making the actual treatment buffer larger. Burning within, and adjacent to, this PAC will be done in small blocks under relatively conservative prescriptions, both because of concerns for the PAC and the proximity of the scout camp. Burning within and within ¼ mile of the PAC will also be done outside of the MSO breeding season (March 1 – August 31). The proposed treatment is in compliance with the MSO Recovery Plan, provided the activity center buffer is considered adequate and implementation occurs as planned.

West Webber PAC (120415)

Most of the PAC consists of a steep north facing mixed conifer slope. Habitat attributes conducive to MSO occupancy are all present and extensive. Fuel loading is extremely high and ground and ladder fuels are persistent throughout. The north facing slope tends to minimize fire hazard in two ways. A finger of Milk Ranch Point on the Mogollon Rim forms the slope that is this PAC, and also serves as a screen to the prevailing southwest winds. Also, the microclimate is

cooler and wetter than the surrounding forest. Nonetheless, an ignition at the bottom of the slope during the wrong time of the year could easily result in a crown fire throughout this PAC.

The proposed action will have minimal effects to this PAC. From a strategic standpoint, treatment in this PAC is not nearly as critical for the protection of private property. The proposed action includes thinning to 9" dbh and broadcast burning between the West Webber PAC and Camp Geronimo, both as protection for the private land and protection of the forest from ignitions that may start within the camp. Because these treatments use a non-system trail as a boundary, approximately 6 acres of the treatments are within the PAC. The treatments are about ½ mile from the activity center of the PAC and well outside of the associated buffer. Treatments within and within ¼ mile of the PAC will be done outside of the MSO breeding season. The proposed treatments are in compliance with the MSO Recovery Plan, provided the activity center buffer is considered adequate.

Turkey Springs PAC (120424)

Suitable habitat in this PAC is also extensive, particularly in the areas south of West Webber Creek. Most of the PAC consists of steep mixed conifer slopes with some south facing aspects supporting manzanita chaparral. Habitat attributes conducive to MSO occupancy are all present and extensive. Again, fuel loading is extremely high and ground and ladder fuels are persistent throughout the PAC.

There are no treatments proposed within this PAC. Thinning to 9" dbh and broadcast burning is proposed within ¼ mile, between the PAC and Camp Geronimo. Treatments within ¼ mile of the PAC will be done outside of the MSO breeding season. Proposed treatments are in compliance with the MSO Recovery Plan.

Lee Johnson Spring PAC (120421)

This PAC encompasses the upper watershed of Webber Creek and contains some very good habitat, particularly within Webber Creek and its tributary drainages. South facing slopes support dense stands of manzanita chaparral. As with the previous PACs, fuel loading is extremely high and ground and ladder fuels are persistent throughout.

There are no treatments proposed within this PAC. Thinning from below to 9" dbh and broadcast burning are proposed within ½ mile, between the PAC and Camp Geronimo. Treatments within ¼ mile of the PAC will be done outside of the MSO breeding season. Proposed treatments are in compliance with the MSO Recovery Plan.

Poison Spring PAC (120420)

Due to the physical structure of the Rim country and the manner in which area PACs have been delineated, drainages are often separated by areas not considered nesting/roosting habitat within

the PAC boundary, as is the case with the Poison Spring PAC. All observations of owls have been within the Poison Spring drainage, above the spring. The PAC is on a south facing aspect of the Mogollon Rim, so exposed ridges are largely composed of manzanita chaparral.

Approximately 200 acres of this PAC (including the activity center) was within the December Wildfire in 2000. Because the fire occurred in December, fire effects were less than they would have been during the heat of the fire season. Nonetheless, stands of saplings and poles torched during the fire and, in many places, ground fuels were completely consumed. This was the case in the activity center of the PAC. Overstory trees were generally left intact, but much of the forest floor was burned clean. A visit to the PAC the following summer found that falling fire-killed trees and needles were already replenishing the dead/down component. Fuel loading was significantly reduced in the 200 acres.

Broadcast burning is the only treatment proposed within this PAC. This is proposed to occur south of the Highline Trail. A 160 acre buffer has been designated around the existing roost locations, which are north of the Highline Trail. Additionally, due to the observation of a pair with two young in 2003, the adjacent canyon to the immediate west of Poison Spring Canyon is included in the buffer area for this PAC. No treatments will occur within this buffer. Thinning from below to 9" dbh is proposed near the southern end of the PAC, approximately ¾ mile from the activity center. Thinning from below to 18" dbh is proposed within ¼ mile of the PAC (1 mile from the activity center). Treatments in, and within ¼ mile of, the PAC will be done outside of the MSO breeding season. Proposed treatments are in compliance with the MSO Recovery Plan.

East Bray Creek PAC (120414)

This PAC is dominated by a south facing aspect, so suitable habitat is again largely restricted to areas influenced by drainages (particularly East Bray Creek). Ridges are composed of dense manzanita chaparral. Fuel loading is very high in both vegetation types.

There are treatments proposed within this PAC. Fuelbreak construction is proposed on two brush dominated ridges in the PAC. One is in the south central portion of the PAC and the other is on the southeastern boundary of the PAC. Implementation of the fuelbreaks are described in the proposed action section, and no trees greater than 9" dbh would be removed. Pile burning of treatment slash would occur within the fuelbreaks. In addition, some broadcast burning is planned in the southeast portion of the PAC, between and within the two fuelbreaks. Because the upper reaches of North Sycamore Creek is between the fuelbreaks, and that drainage has been identified as a "non-riparian filter strip", broadcast burning in the drainage will range from low intensity backing fires to none at all.

No treatments are proposed above the Highline Trail, including the vicinity of the 1991 roost. In addition, a 256 acre buffer has been designated around the 1992 roost in which no treatments will occur. Treatments within the PAC, and within ¼ mile of the PAC, will be done outside of the MSO breeding season. Proposed treatments are in compliance with the MSO Recovery Plan provided the activity center buffer is considered adequate.

Shadow Rim PAC (120408)

This PAC is also dominated by a south facing aspect, so suitable habitat is again largely restricted to areas influenced by drainages. Ridges are composed of dense manzanita chaparral. Fuel loading is very high in both vegetation types. The PAC includes drainages containing suitable habitat on the face of the Mogollon Rim. The owls stay in the drainage south of the trail. Approximately 400 acres of this PAC (everything above the Highline Trail) was burned in the Pack Rat Fire of 2002. This fire burned hot enough to severely impact MSO habitat attributes in that area.

There are no treatments proposed within this PAC. Thinning from below to 18" dbh and broadcast burning are proposed immediately south of the PAC. The unnamed drainage where the roosts are located is also designated as a "wildlife travel corridor;" therefore, broadcast burning in the drainage will range from low intensity backing fires to none at all and thinning in the drainage corridor will be very limited.

Treatments within ¼ mile of the PAC will be done outside of the MSO breeding season. Proposed treatments are in compliance with the MSO Recovery Plan.

Chase Creek East PAC (120412)

This PAC is also dominated by a south facing aspect, so suitable habitat is again largely restricted to areas influenced by drainages and basins directly under the Rim. Ridges are composed of dense manzanita chaparral. Fuel loading was very high in both vegetation types. Almost all of this PAC was burned in the Pack Rat Fire of 2002. The activity center experienced a stand replacement crown fire, as did much of the rest of the PAC. Some islands of live conifer overstory still exist in the PAC, but the effect of the fire on the owl pair is currently unknown.

A small piece (about 10 acres) of a proposed fuelbreak is within this PAC, at the very southernmost boundary. This fuelbreak is on a ridge dominated by manzanita chaparral, and is south of the Highline Trail. No trees greater than 9" dbh will be removed in this fuelbreak. Broadcast burning is also proposed for about 60 acres within the PAC below the Highline Trail. A 134 acre buffer was designated around the known activity center, and no treatments will occur in that buffer. Given the condition of the activity center, the buffer is somewhat moot. If the owls have moved to some other location in the PAC, it is doubtful that they moved south of the Highline Trail, since habitats there are somewhat xeric and not particularly suitable. It is more likely that, if they were able to move, they are in another steep drainage under the Rim where the canopy was less affected by the fire.

Treatments within and within ¼ mile of the PAC will be done outside of the MSO breeding season. The proposed treatments are in compliance with the MSO Recovery Plan, and the activity center buffer is considered adequate, as per Ward and Salas (2000).

Proposed Critical Habitat for Mexican Spotted Owl

Proposed critical habitat occurs in the northern 1/3 (approximately 18,500 acres) of the Verde Analysis Area (USFS 2003). All of the PACs occurring within the Verde Analysis Area, also are considered proposed critical habitat for MSO. Additionally, all of the non-PAC protected habitat, and most of the mixed conifer restricted habitat, also occurs within the proposed critical habitat boundaries. According to the Tonto, the majority of pine-oak restricted habitat within the Verde Analysis Area currently occurs outside of the delineated proposed critical habitat (USFS 2003). The Tonto reports this restricted habitat does not currently possess the primary constituent elements necessary to support the roosting and nesting requirements of MSO (USFS 2003).

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 (50 CFR §402.02). Therefore, when examining indirect effects analyze whether an indirect effect is caused by the action, is reasonably certain to occur, and is later in time.

Chiricahua Leopard Frog

We agree with discussion of effects presented by the Tonto in the BAE (USFS 2003). In that document, the Tonto noted that, due to the various protections afforded in the proposed management of streamside areas throughout the Verde Analysis Area, it is likely that only indirect effects may be incurred by a species which inhabits these areas. In particular, soil or ash migration (sedimentation) into suitable habitat is the most likely to occur to some degree, despite measures taken to address this concern.

Sedimentation of habitat can result in the smothering and suffocation of frog eggs and tadpoles (affecting recruitment) and the inhibition of respiratory function in aquatic prey species resulting in reduced density and composition in the frog's prey base. These are potential adverse effects to the Chiricahua leopard frog.

However, there are several factors which offset the significance of adverse affects pertaining to this consultation with respect to the Chiricahua leopard frog:

- 1) The Tonto's proposal for conservative prescriptions within streamside management zones;

- 2) Proposed conservation measures as described in the Proposed action section of this document;
- 3) The failure to document species presence within the Verde Analysis Area despite numerous surveys performed according to approved protocol;
- 4) Surveyor's notations of poor habitat condition, recreational pressures, and nonnative species presence increasing the validity of survey results;
- 5) The closest extant population, in Ellison Creek, is 7 ephemeral stream miles upstream of the action area and is unlikely to act as a source population to the Verde Analysis Area within the duration of implementation of the proposed action.

Based on the proposed conservation measures, the questionable habitat suitability within the Verde Analysis Area, the negative results for all surveys conducted to protocol within the Verde Analysis Area, and the significant distance between the nearest extant population from the Verde Analysis Area, we believe the proposed action may adversely affect the Chiricahua leopard frog from temporary disturbances to unoccupied habitat but are reasonably certain that take of the species is not likely to occur.

Mexican Spotted Owl

The potential for effects to MSO to occur is largely contingent on the specific type of on-the-ground action proposed and its location, within or in proximity to, a given PAC, timing, duration, and breadth of the action. Furthermore, effects to MSO may be contingent upon effects to various habitat parameters in many instances.

The Tonto predicts fire intensity, during the implementation of broadcast burns, to be low to moderate with flame lengths that average less than 2 feet, rarely exceeding four feet. Live fuels may be affected by prescribed fire in a variety of ways. Some of the anticipated effects are 1) charred bark up to ten feet from the ground; 2) needles and leaves may be scorched in the lower branches (usually those less than 20 feet from the ground); 3) smaller trees occupying the understory may be lost, especially when dead fuels have accumulated at their base and/or are already susceptible due to old scars, etc.; and, 4) canopy structure may be opened but would rarely exceed 1/4 acre in size and would impact less than 5% of the treated area (USFS 2003).

Regarding maintenance burning, the Tonto expects that live fuels will be affected by 1) charred bark up to 6 feet from the ground; 2) needle and leaf scorch in the lower branches (typically less than 10 feet from the ground); 3) individual, small understory trees may be lost which have accumulated fuels at their base or are already susceptible due to scarring, etc.; 4) grasses, forbs, herbs and shrubs are expected to be consumed; and, 5) new openings would be uncommon and would rarely exceed 1/8 acre in size and impact less than 1% of the entire treated area.

Pile burning effects to vegetation are considered to insignificant and discountable because the activity is limited to specific slash piles and fire is rarely expected to creep outside of these piles (unless associated with broadcast burns).

The following discussion addresses specific activities planned to occur, and their anticipated effects, in specific PACs within the Verde Analysis Area:

Protected Activity Centers with proposed mechanical fuel treatments:

- 1) East Chase Creek - 120412
- 2) East Bray Creek - 120414
- 3) West Webber - 120415

The three PACs listed above all have mechanical fuel treatments proposed to occur within their boundaries. Specifically, a thin from below 9" dbh prescription is proposed for areas within these three PACs. In the process of implementing mechanical treatments within a PAC, disturbances to MSO may be created. Disturbances may be in the form of harassment from the MSOs detection and ensuing stress from the presence of humans, the noise pollution created by mechanical tools used in the treatment process, and the vehicles used to access treatment areas.

Protected Activity Centers with proposed broadcast burn treatments:

- 1) Poison Spring - 120420
- 2) East Bray Creek - 120414
- 3) Geronimo - 120419
- 4) East Chase Creek - 120412

The four PACs listed above all have prescribed broadcast burn treatments proposed to occur within their boundaries. Additionally, fuelbreak construction and pile burning are expected to occur within the East Bray Creek PAC. Effects from prescribed burning activities may include 1) smoke generation which impedes respiratory function and vision required to catch prey and escape predation in addition to creating avoidance behavior; 2) heat generation increasing overall stress and creating avoidance behavior; 3) temporary augmentation of habitat used by prey species; and 4) auditory and visual disturbances created from human presence and associated mechanical tool use.

Protected Activity Centers: 1) Lee Johnson Spring - 120421
2) Turkey Spring - 120424

The two PACs listed above do not have any on-the-ground treatments proposed to occur within their boundaries. However, there remains the possibility that smoke and noise pollution from activities being conducted in adjacent areas may act as a disturbance to MSO in the form of harassment within these two PACs.

There are several conservation measures specific to this type of proposed action which are outlined in the MSO Recovery Plan that have been adopted and incorporated into the Tonto's proposed action. These specific conservation measures are either outlined previously in this biological and conference opinion under the "Proposed Conservation Measures" section, available online in the MSO Recovery Plan (USFWS 1995a) at <http://arizonaes.fws.gov/Documents/RecoveryPlans/MexicanSpottedOwl.pdf>, or referenced in the Tonto's BAE (USFS 2003) for the Verde Analysis Area.

As stated in the Tonto BAE (USFS 2002), no MSO nest locations have been identified to date in any of the eight PACs affected by the proposed action. The Tonto used a surrogate procedure, using known roost locations, to establish the necessary minimum 100 acre activity buffers required in the MSO Recovery Plan (USFWS 1995a). This surrogate procedure used by the Tonto is based on Ward and Salas (2000) which is widely considered by wildlife professionals in both public and private sectors to be an acceptable protocol for use when establishing activity buffers in MSO PACs when nest locations have not been identified.

Given the considerable degree of incorporation of conservation measures into the Tonto's proposed action, the Tonto's strict adherence to recommendations outlined in the MSO Recovery Plan, and the confidence achieved in defining activity buffers by using a peer-reviewed and widely accepted surrogate procedure, we believe that any effects to MSO within the action area will be insignificant and discountable and, consequently, not likely to result in adverse affects to the MSO.

Proposed Mexican Spotted Owl Critical Habitat

To accurately assess the effects of the proposed action on the proposed MSO critical habitat, it is necessary to analyze potential effects and how they may influence the condition and utility of primary constituent elements present within the Verde Analysis Area. Canyon-type habitat for MSO does not occur within the Verde Analysis Area. Therefore, the primary constituent elements for Forest-type habitat are used for this purpose.

High basal area of large diameter trees: The proposed mechanical treatments are intended to remove smaller trees in favor of leaving the larger trees. Specific to given areas, no conifers greater than 9" dbh, or 18" dbh will be removed and most treatments are scheduled to occur on ridge tops with primarily chaparral habitat which is not desirable MSO habitat.

This project is expected to result in properly implemented broadcast burning which favors the retention and growth of larger trees and is not expected to significantly impact this primary constituent element (USFWS 2003). Broadcast burns are consistent with guidance offered in the MSO Recovery Plan, and no treatments are proposed within the 100-acre buffer area (USFWS 1995a).

Moderate to high canopy closure: The largest trees in a given area comprise the majority of the canopy cover (USFS 2003). As mentioned previously, most mechanical treatments scheduled are

proposed to occur on the ridge tops dominated by chaparral which do not possess the canopy closure characteristics specified as a primary constituent element and are not expected to incur significant effects to this parameter. We agree with the Tonto that the removal of small trees, brush, etc. has a limited effect on canopy densities.

In addition to mechanical treatments, broadcast burning is not expected to significantly alter canopy closure inside or outside of PACs (USFS 2003). Broadcast burning targets dead and live fuels near the forest floor, including dead and down material, live brush and, in some cases, thickets of conifer regeneration and does not effect canopy closure. With respect to potential effects to this primary constituent element from implementing the proposed action, we agree with the Tonto that canopy closure is unlikely to be appreciably affected.

Wide range of tree sizes suggestive of uneven-age stands: The majority of the Verde Analysis Area supports even-aged stands of VSS3 (6"-12"dbh) and VSS4 (12"-18"dbh) trees. A primary objective of the proposed treatments is to create a wide distribution of age classes across the action area (USFS 2003). In an attempt to gain better representation of the larger age-classes, mechanical treatments are designed to encourage residual tree growth while maintaining a clumped or grouped arrangement of the larger trees. The Tonto expects that the small amount of mechanical treatment within restricted sites will have minimal effects to VSS distribution at any scale, as most treatments within PACs are largely in non-forested stands where VSS is not a relevant parameter to assess.

Broadcast burning at the proposed intensities will have little effect on the VSS in a given stand other than the potential for alteration of structure in the small, site-specific locations where VSS2 conifer regeneration could be temporarily converted to a VSS1 assemblage which is not currently well-represented within the action area (USFS 2003). The goal of the proposed mechanical and broadcast burn treatments is to create a diversified vegetative age class structure which is recommended in the MSO Recovery Plan and we agree that implementation of these procedures is not expected to adversely affect this primary constituent element.

Multi-layered canopy with large overstory trees of various species: Within the Verde Analysis Area and outside of PACs, mixed conifer stands are comprised primarily of ponderosa pine with few Douglas-fir in the overstory (USFS 2003). The proposed treatments target small brush and trees which is intended to leave a mosaic of Gambel oak, Douglas-fir, and white fir as well as larger (>10"drc) madrean oaks. Similar complex vertical communities with high percentages of Douglas-fir, white fir, maple, and Gambel oak often occur on steep, protected slopes below the Mogollon Rim, and are largely within PACs and will not be subjected to treatment (USFS 2003). Prescribed burning is not expected to have a significant effect on large trees or canopy structure, as a result, we agree this primary constituent element will not be adversely affected by the implementation of the proposed action.

High snag basal area: Due to high levels of bark beetle mortality within and adjacent to the Verde Analysis Area, large, quality snags are relatively abundant and in most areas, exceed the recommended 2 quality snags per acre in ponderosa pine habitat and 3 quality snags per acre in

mixed conifer habitat (USFWS 1995a, USFS 2003). The proposed mechanical treatments have an 18”dbh cap on pine snag removal, a 6”drc cap on dead oak removal, and a 10”dbh cap on dead juniper removal and will retain all snags above these size classes. Therefore, we agree that mechanical treatments will not have an adverse effect on this primary constituent element.

Broadcast burning is expected to result in the loss of some snags and the creation of others; particularly smaller snags (USFS 2003). Following the burning prescriptions described in the Proposed Action section above will facilitate control and allow for a high snag basal area to persist. We also expect that any loss to snags within a treatment area will be insignificant and discountable with respect to this primary constituent element.

High volumes of fallen trees and other woody debris: Due to decades of fire suppression within the Verde Analysis Area, excessive dead vegetative matter has become the primary carrier of fire and has been identified as the causal agent for the extreme fire hazard within the Verde Analysis Area (USFS 2003). For these reasons, management of this habitat component is problematic at best.

The intent of the fuel reduction treatments proposed within the Verde Analysis Area is to remove as much small and medium-sized dead and down fuel as possible while retaining an acceptable level of large woody debris (USFS 2003). Such a goal is readily obtainable using mechanical methods of fuel reduction but becomes much more difficult when applying prescribed fire (USFS 2003). As noted previously, broadcast burning within and around PACs and restricted/protected habitat is dictated by a very conservative prescription, using adaptive management. This will assist in the control of these events ensuring that, while some dead and down material will be lost, adequate levels will be left behind and/or generated by tree mortality while still meeting the desired objectives of the treatment.

It cannot, however, be ruled-out that instances may occur where loss of the dead and down component reaches an unacceptable level in a given area. The Tonto expects, and we agree, that such an affect would be very short-term as replacement material (tree mortality from bark beetle and burns, etc.) will be readily available to again bolster this primary constituent element to an acceptable level in these circumstances. Therefore, although short-term adverse affects to this primary constituent element may occur, we believe they will be temporary and not likely to cover a significant portion of the action area. As with all proposed treatments which may affect primary constituent elements of MSO proposed critical habitat, no treatments will occur within the designated minimum 100-acre buffer areas in any PAC.

High plant species richness, including hardwoods: No treatments are expected to alter plant species composition where they occur. We agree with the Tonto that, given the types and locations of treatments with respect to proposed critical habitat, any effects to this primary constituent element are expected to be insignificant.

Adequate levels of residual plant cover to maintain fruits, seeds, and regeneration to provide for the needs of MSO prey species: The Tonto expects that treatments such as broadcast burning will provide conditions suitable for increased herbaceous plant growth by removing a thick layer of dead plant debris within treated areas. The mosaic effect created by burned and unburned areas is also expected to increase herbaceous plant species diversity and, in turn, assist in the production and maintenance of the MSO prey base. Prescribed burning will result in a mosaic of burned, partially burned, and unburned duff layers, thus providing for more diversity of herbaceous composition. Such diversity is expected to benefit MSO prey species. In addition to herbaceous production, proposed treatments are expected to favor larger conifers and oaks which supply a large amount of forage in the way of seeds, buds, acorns, etc. (USFS 2003). Furthermore, the conservative prescriptions for proposed MSO critical habitat will ensure adequate cover remains to support an abundance of prey species and populations. We agree with the Tonto that implementation of the proposed treatments are not expected to adversely effect this primary constituent element.

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.

Within the Verde Analysis Area, land use patterns are not expected to change appreciably. Specific land uses and associated cumulative effects have been identified in final rule and in final recovery plans, as applicable, and are incorporated here by reference (USFWS 1993, 1995a, 2002). The Tonto (USFS 2003) noted an expected, gradual increase of fuel treatment activity on private in-holdings within the Payson Ranger District. This is due to a widely-accepted notion of the increase in wildfire risk from extended drought conditions and the effect of bark beetle kills within the conifer and mixed-conifer communities.

With respect to human population growth in the action area, it is expected that the rural population will continue to grow slowly consistent with recent trends (USFS 2003). However, around larger communities such as Payson, Pine and Strawberry, it is expected that population growth will increase at a slightly faster rate than in rural communities (USFS 2003). Considering the population trends in both rural and developed areas within the Verde Analysis Area and the effect of a rapidly growing urban center in greater Phoenix, recreation/visitation use within the Verde Analysis Area is expected to increase at a slow, linear rate.

As noted by the Tonto, impacts associated with increasing human visitation, human-caused wildfire and associated suppression activities will also affect habitats within the Verde Analysis Area (USFS 2003). The Tonto expects that, as the general public becomes better informed about wildfire risk, fuel reduction and fire suppression strategies are expected to stem the rising trend frequency in, and damage from, wildfires which should reduce the loss of habitat (USFS 2003).

Conclusion

After reviewing the current status of the Chiricahua leopard frog, the MSO, and its proposed critical habitat, the environmental baseline for the Verde Analysis Area, the effects of the proposed action over a ten-year time frame, and the cumulative effects, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of either the Chiricahua leopard frog or the MSO, and is not likely to destroy or adversely modify proposed MSO critical habitat due to the adherence to guidelines included in the MSO Recovery Plan and the conservation measures proposed by the Tonto. The Chiricahua leopard frog has not been documented in the action area and any suitable habitat should be protected by the agency's conservation measures.

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 all Conservation Measures that were incorporated into the project design.

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.

No conservation recommendations are proposed for this project.

Reinitiation Notice

This concludes formal consultation and conference on the Verde Analysis Area as outlined in the BAE (USFS 2003). 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.

We look forward to working with the Tonto National Forest in the future for the recovery and conservation of listed species and critical habitat within Forest lands. We recognize the value of your proposed action in the protection of human life and property and as a critically important step in both preventing unnaturally intense wildfire from significantly adversely affecting listed

Mr. Karl Siderits

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species and their habitats as well as helping to ensure the future recovery of our native imperiled species.

If we can be of further assistance in this matter, please contact Jeff Servoss (x237) or Debra Bills (x239).

Sincerely,

/s/ Steven L. Spangle
Field Supervisor

cc: Regional Director, U.S. Fish and Wildlife Service, Albuquerque, NM (ARD-ES)
Edward E. Armenta, District Ranger, Payson Ranger District, Tonto National Forest, Payson, AZ

Acting Chief, Habitat Branch, Arizona Game and Fish Department, Phoenix, AZ

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Appendix 1. Summary of MSO survey data for all PACs within the Verde Analysis Area from 1989-2003 (USFS 2003).

Year	PAC Name / Number							
	Shadow Rim 120408	E. Chase Creek 120412	E. Bray Creek 120414	West Webber 120415	Camp Geronimo 120419	Poison Spring 120420	Lee Johnson Spr. 120421	Turkey Spring 120424
1989	P	NI	NI	NI	NI	NI	NI	NI
1990	O-NN	NI	NI	NI	NI	NI	NI	NI
1991	O-NU	F	NI	NI	NI	NI	NI	NI
1992	O-NN	O-1Y	P	NI	NI	NI	NI	NI
1993	O-NN	IM-NR	IM-NR	NI	NI	NI	NI	NI
1994	O-NN	IM-NR	IM-NR	O-1Y	O-2Y	O-NU	NI	NI
1995	NI	IM-NR	IM-NR	O-1Y	F	O-NU	O-NU	NI
1996	IM-NR	P	IM-NR	O-2Y	F	IM-NR	IM-NR	NI
1997	NI	NI	NI	IM-NR	IM-NR	NI	NI	NI
1998	NI	NI	NI	M	P	O-NU	NI	NI
1999	NI	NI	NI	IM-NR	IM-NR	P	NI	NI
2000	NI	NI	NI	IM-NR	IM-NR	NI	NI	NI
2001	O-NU	O-NU	IM-NR	IM-NR	IM-NR	IM-NR	NI	O-NN
2002	IM-NR	M	NI	IM-NR	IM-NR	IM-NR	IM-NR	IM-NR
2003	M	O-1Y	O	NI	NN	O-2Y	NI	NI

Legend:
O = Pair occupancy inferred or confirmed
P = Presence of a single owl inferred or confirmed, sex unknown
F = Female inferred or confirmed
M = Male inferred or confirmed
Y = Number of young fledged

NN = Non-nesting confirmed
NI = No Information
NU = Nesting status undetermined
IM-NR = Informally monitored - no response or location