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In Reply Refer To:
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02EAAZ00-2012-F-0304

January 22, 2013

Mr. Jim Zornes, Forest Supervisor
Apache-Sitgreaves National Forests
P.O. Box 640
Springerville, Arizona 85938

RE: Final Biological Opinion on the Foote Creek Allotment Management Plan, Alpine Ranger District

Dear Mr. Zornes:

Thank you for your June 19, 2012, letter received in our office June 23, 2012 requesting initiation of formal section 7 consultation under the Endangered Species Act of 1973, as amended (Act) (16 U.S.C. 1531 et seq.) for the Foote Creek Grazing Allotment Management Plan (AMP) for the Alpine Ranger District, Apache-Sitgreaves National Forests (ASNFs), Arizona. We also received the biological assessment (BA) for the allotment, and we thank you for ongoing coordination between our staffs to clarify relevant information.

You determined the proposed action is “likely to adversely affect” loach minnow (*Tiaroga cobitis*) and its critical habitat, and spikedace (*Meda fulgida*) critical habitat. You further determined that the proposed action is “not likely to adversely affect” Chiricahua leopard frog (*Lithobates chiricahuensis*) and its critical habitat, Apache trout (*Oncorhynchus apache*) and Mexican spotted owl (*Strix occidentalis lucida*) and its critical habitat. Your letter also concluded that the proposed action is “not likely to jeopardize the continued existence” of the nonessential experimental population of the Mexican gray wolf (*Canis lupus baileyi*). In addition, you determined that the proposed action will have “no effect” on the southwestern willow flycatcher (*Empidonax traillii extimus*) or its critical habitat. Species with “no effect” determinations do not require review by the Fish and Wildlife Service (FWS), and are not addressed further in this correspondence. We concur with your “not likely to adversely affect” and “not likely to jeopardize the continued existence” determinations and will provide our rationales in Appendix A. All information required to initiate consultation was either included with your letter, staff emails, or otherwise accessible for our consideration and reference.

CONSULTATION HISTORY

- July, 19, 2012 The ASNFs sent a final biological assessment on the effects of the proposed action and requested formal consultation.
- December 4, 2012 We sent a draft biological opinion to the ASNFs for review.
- January 16, 2013 The ASNFs sent us comments on the draft biological opinion.

BIOLOGICAL OPINION

The proposed action is renewal and implementation of the Foote Creek AMP (USFS 2012). The ASNF authorizes this AMP under a ten-year permit. The effects determinations are based on current management and the 2012 grazing season management that addresses temporary livestock reductions, pasture closures, and reduced forage use thresholds as a result of the 2011 Wallow Fire. The Wallow Fire was the largest fire recorded in Arizona; it burned approximately 841 square miles (2,180 square kilometers) in Apache, Graham, Greenlee and Navajo counties in Arizona and Catron County in New Mexico. Livestock management, as described in the BA, will be implemented when future monitoring indicates that the allotment has sufficiently recovered to allow full permitted livestock numbers, rested pastures to be grazed, and forage use thresholds to be increased.

Description of the Action Area

The action area is defined as those areas influenced by direct and indirect effects of the proposed action (USFWS 1998). The Foote Creek Allotment is located approximately 11 miles southwest of the Town of Alpine, Apache County, Arizona. There are both private and Forest Service-administered lands in the action area. For the purpose of this consultation, we define the action area as the Foote Creek Allotment and portions of the Campbell Blue Creek and Blue River that it drains into, including:

- Those portions of Castle Creek from its headwaters down to its confluence with Campbell Blue Creek;
- Those portions of Campbell Blue Creek from its confluence with Castle Creek downstream approximately six miles to its confluence with Dry Blue Creek;
- Foote Creek in the Foote Creek Winter Pasture, which exits the southeast corner of the allotment before flowing 3.5 miles through the Red Hill and Fish Hook allotments to its confluence with the Blue River; and
- Those portions of the Blue River from its origin at the confluence of the Campbell Blue and Dry Blue creeks to approximately 15-miles downstream from its confluence with Foote Creek to the HU Bar Box.

The Foote Creek allotment is vegetated by Douglas fir (*Pseudotsuga menziesii*) and white fir (*Abies concolor*), ponderosa pine (*Pinus ponderosa*), and pinyon (*Pinus sp.*) and juniper (*Juniperus sp.*) plant communities. Two small pastures, Cole and Taylor, are grasslands.

In June and July 2011, the Wallow Fire burned over a large portion of the Apache-Sitgreaves National Forests including the Foote Creek Allotment. Approximately 72 percent of the allotment was either unburned (23%) or had a low severity burn (49%).

A fire is considered “low severity” when:

- Duff and debris are partly burned;
- Soil is normal color;
- Soils do not become hydrophobic (high temperatures do not form an impenetrable top surface layer that prevents water infiltration);
- Trees still have green needle and leaves, although stems may be scorched;
- Perennial grasses will re-sprout;
- Root crown and surface roots will re-sprout quickly (within a year); and
- Infiltration and erosion potential are not significantly changed; there is no sediment movement from surface flow during storm events.

Twelve percent of the allotment experienced a moderate burn severity where:

- Duff is consumed;
- Trees with some canopy cover are killed, but needles are not consumed (orange-brown needles are present in standing trees);
- Soil is darkened with ash;
- Hydrophobic soil levels are low to medium on surface soil up to one inch deep;
- Fine dead twigs and pre-fire levels of organic matter on the soil surface is consumed and logs charred;
- Most perennial grasses will re-sprout;
- Root crowns will usually re-sprout; roots and rhizomes one inch below soil surface will re-sprout;
- Soil erosion potential is increased because of a lack of ground causing some sediment movement during surface flow.

Sixteen percent of the allotment experienced high severity burn where:

- Uniformly gray or white ash;
- No shrub stumps or small fuels remain;
- Hydrophobic soil levels are medium to high and up to two inches deep;
- Two to four inches of soil is darkened;
- Roots burned two to four inches into ground;
- Soil physically affected (crusting, crystallization, agglomeration);
- Standing trees charcoal up to one inch deep;
- Canopy trees killed and needles consumed;
- Surface litter of all sizes and soil organic layer largely consumed;

- Soil productivity is greatly reduced;
- Some roots and rhizomes will re-sprout, but only those deep in soil; and
- Soil erosion potential can be significantly increased making sediment movement likely to occur during surface flow.

Proposed Action

Livestock grazing will be authorized on the Foote Creek Allotment as described below. This allotment is permitted and managed with Cow Flat, PS, and Stone Creek allotments. This consultation only addresses the Foote Creek Allotment. The Foote Creek Allotment has 11 pastures and four holding areas (Holding 1, Holding 2, Holding 3, and Holding 4).

Future use of the un-grazed pastures will depend on herbaceous vegetation recovering to a point that it will provide sufficient ground cover to protect soils and sustain livestock grazing. Recovery will be based on ground cover, production, and forage species composition in key areas.

Pastures will be reevaluated prior to the 2013 grazing season to determine condition, recovery and grazing suitability. Incidental use in moderate to high severity burn areas will be documented. Monitoring will follow the Range Monitoring Plan described in Appendix A of the BA (USFS 2012).

Proposed Allotment Management

Foote Creek Allotment (except the Winter Pasture) is used annually from May 16 to October 15. The Foote Creek Winter Pasture is used from October 16 to May 15. Each pasture within the allotment is rested every other year. The stocking rate is 126 cow-calf pairs on the summer to fall allotments (managed between two permittees) and 110 cow-calf pairs on the winter-spring allotments (managed by one permittee).

Livestock forage use guidelines are:

- Maximum of 40% use on shrubs;
- Maximum of 45% use on key grass species where range condition is good on both winter to spring and summer to fall pastures, otherwise:
 - Summer to Fall: maximum of 20% on very poor range, 30% on poor range, 40% on fair range,
 - Winter to Spring: maximum of 20% on very poor range, 35% on poor range, 45% on fair range
- Maximum use of 30% on herbaceous plants (grasses, sedges and rushes) and 40% on woody species in riparian areas.

STATUS OF THE SPECIES

Loach Minnow

Loach minnow, originally listed as a threatened species on October 28, 1986 ((51 FR 39468), was reclassified as an endangered species on February 23, 2012 (USFWS 2012).

Background

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

The limited taxonomic and genetic data available for loach minnow indicate there are substantial differences in morphology and genetic makeup between remnant loach minnow populations. Tibbets (1993) concluded that results from mitochondrial DNA and allozyme surveys indicate variation for loach minnow follows drainage patterns, suggesting little gene flow among rivers. Divergence levels present in the data set indicated that populations within rivers are unique, and represent evolutionarily independent lineages. Tibbets (1993) concluded that the level of divergence in both allozyme and mtDNA data indicated that all three main populations (Aravaipa Creek, Blue/San Francisco Rivers, and Gila River) were historically isolated and represent evolutionarily distinct lineages.

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

Distribution

Loach minnow are believed to occupy approximately 15 to 20 percent of their historical range: the Gila River and its tributaries, the West, Middle, and East Fork Gila River (Grant, Catron, and Hidalgo Counties, New Mexico) (Paroz and Propst 2007, Propst 2007, Propst *et al.* 2009); the San

Francisco and Tularosa rivers and their tributaries Negrito and Whitewater creeks (Catron County, New Mexico) (Propst *et al.* 1988, Arizona State University (ASU) 2002, Paroz and Propst 2007, Propst 2007); the Blue River and its tributaries Dry Blue, Campbell Blue, Pace, and Frieborn creeks (Greenlee County, Arizona and Catron County, New Mexico) (Miller 1998, ASU 2002, Carter 2005, Carter 2008a pers. comm., Clarkson *et al.* 2008, Robinson 2009a); Aravaipa Creek and its tributaries Turkey and Deer creeks (Graham and Pinal Counties, Arizona) (Stefferdud and Reinthal 2005); Eagle Creek (Graham and Greenlee Counties, Arizona), (Knowles 1994, Bagley and Marsh 1997, Marsh *et al.* 2003, Carter *et al.* 2007, Bahm and Robinson 2009); and the North Fork East Fork Black River (Apache and Greenlee Counties, Arizona) (Leon 1989, Lopez 2000 pers. comm., Gurtin 2004 pers. comm., Carter 2007a, Robinson *et al.* 2009); and possibly the White River and its tributaries, the East and North Fork White River (Apache, Gila, and Navajo Counties, Arizona). Occupancy within these units is described in Appendix B, Table 1 (see USFWS 2012 for additional detail on occupancy by subbasin).

Loach minnow have recently been released into additional streams as part of the recovery efforts for the species. In 2007, loach minnow were translocated into Hot Springs Canyon, in Cochise County, Arizona, and Redfield Canyon, in Cochise and Pima Counties, Arizona, and these streams were subsequently augmented (Robinson 2008a, Orabutt 2009 pers. comm., Robinson *et al.* 2010a, Robinson *et al.* 2010b, Robinson 2011a pers. comm.). Both Hot Springs and Redfield canyons are tributaries to the San Pedro River. Augmentation efforts have been suspended in Redfield Canyon due to drought and a lack of adequate flowing water. Augmentation efforts have been suspended at Hot Springs Canyon to allow managers to better evaluate if recruitment of loach minnow is occurring without further augmentation. Monitoring will continue at this site, and future augmentations may occur if needed.

In 2007, loach minnow were translocated into Fossil Creek, within the Verde River subbasin (Carter 2007b), with additional fish added in 2008 and 2011 (Carter 2007b, Carter 2008b, Robinson 2009b, Boyarski *et al.* 2010, Robinson 2011b). In 2008, loach minnow were translocated into Bonita Creek, a tributary to the Gila River in Graham County, Arizona (Blasius 2008 pers. comm., Robinson 2008b, pers. comm.). Bonita Creek augmentations have been temporarily suspended due to re-invasion of by non-native species above the fish barrier. We anticipate that augmentations with additional fish will occur for the next several years at these sites, if adequate fish numbers are available, and habitats remain suitable. Monitoring at each of these sites is ongoing; however, insufficient time has elapsed to allow us to determine if these translocation efforts will ultimately be successful and result in establishment of new populations of loach minnow in these locations.

Loach Minnow and Spikedace Critical Habitat

The current critical habitat designation, for both of these species was published simultaneously with their reclassification to endangered status on February 23, 2012 (USFWS 2012). When critical habitat was designated in 2012, FWS determined the primary constituent elements (PCEs) for loach minnow and spikedace. PCEs include those habitat features required for the physiological, behavioral, and ecological needs of the species. The PCEs describe appropriate flow regimes, velocities, and depths; stream microhabitats; stream gradients; water temperatures; and acceptable pollutant and non-native species levels, which are summarized in Appendix B (Table 2 for loach minnow, Table 3 for spikedace).

The loach minnow and spikedace critical habitat designation includes eight units based on river subbasins, including the Verde River, Salt River, San Pedro, Bonita Creek, Eagle Creek, San Francisco River, Blue River, and Gila River subbasins. Critical habitat has been designated in each of these subbasins, as summarized in Appendix B, Table 4 for loach minnow and Table 5 for spikedace. (See USFWS 2012 for additional detail).

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

ENVIRONMENTAL BASELINE

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

The ASNFs consulted with the FWS on the Foote Creek AMP, along with the PS, Red Hill, Cow Flat, and other allotments in 2003. Five Foote Creek pastures (Cole, Taylor, Willow, East Fletcher, and North Thomas) and the four holding areas were grazed in 2012. Six pastures (Hannagan, West Thomas, East Thomas, Foote Creek Winter, Castle, and South Castle) were not grazed in 2012.

Approximately one year after the Wallow Fire, full capacity rangeland on the allotment, was estimated to be mostly in good condition with an upward trend (USFS 2012). Full capacity refers to lands that are presently stable because effective ground cover is holding soil loss to an acceptable level, lands are suited for grazing, and can support a livestock operation.

Range condition was very poor in potential capacity range on Foote Creek Winter (1,920 acres) and the summer pastures (8,972 acres). Potential capacity refers to lands not undergoing accelerated erosion but requiring access, water developments, or other improvements to bring them up to full capacity.

Approximately 7,145 acres of the Foote Creek Winter pasture and 344 acres within the summer pastures are considered no capacity range. No capacity refers to lands, under natural conditions, that are incapable of being grazed by livestock under reasonable management goals. This includes areas that have soils that are incapable of producing vegetation needed to prevent excessive erosion rates and are located on slopes greater than 45%. Only full and potential capacity rangelands are used to determine livestock numbers to balance capacity with forage production.

The upper 2.25 miles of Castle Creek are located in the South Castle Pasture in the northeast corner of the allotment. It continues through the Bobcat Johnson and Lower Campbell Blue allotments into the Campbell Blue Creek. Summer thunderstorms can carry sediment from this portion of Castle Creek into Campbell Blue Creek. This would be a minor sediment contribution when compared to the Campbell Blue watershed as a whole. The Campbell Blue watershed is approximately 70 square miles. The Castle Creek watershed, within the allotment, is only 1.5 square miles. Almost the entire Campbell Blue Creek watershed was burned during the Wallow Fire. Precipitation events anywhere on this watershed are expected to contribute sediment into the creek until vegetation has sufficiently established to protect the soils.

The Foote Creek and Right Fork of Foote Creek headwaters, which flow into the Blue River, are located in the Foote Creek Winter Pasture. A Terrestrial Ecosystem Survey of the Apache-Sitgreaves National Forests (Laing *et al.* 1989) has mapped this pasture as predominantly Terrestrial Ecosystem Units- 130 (very shallow, extremely gravelly sandy loam) and 131 (very gravelly sandy loam). Both of these are unstable and highly erosive soil types. As such, grazing may be occurring on unstable soils leading to increased levels above natural soil loss. Fifty-five percent of the Foote Creek Winter Pasture has slopes greater than 40%, which naturally provides high erosion and sediment delivery to the Blue River.

Four other allotments that burned during the Wallow Fire are in the action area: KP, Red Hill, Steeple Mesa, and Fish Hook, are located at and immediately downstream of the Foote Creek confluence with the Blue River.

Status of the Loach Minnow in the Action Area

Loach minnow are not found on the Foote Creek Allotment; however, streams on the allotment (Castle and Foote creeks) drain into Campbell Blue Creek and the Blue River respectively, which is occupied by loach minnow, and which is designated as critical habitat for spiketail and loach minnow. Loach minnow have been found in Campbell Blue Creek and Blue River since 1976, although no long term or consistent (at the same location) surveys have occurred. Loach minnow was last documented in Campbell Blue Creek in 1992 at its confluence with Turkey Creek and a site two miles below the Luce Road. Surveys completed in 2010 and 2011 in the same areas did not detect loach minnow although the habitat appeared intact (USFS 2012). Loach minnow were found on the Blue River at Jones Canyon (five miles downstream from the Campbell Blue Creek confluence) in 2011 (Adelsberger *et al.* 2011), at Bobcat Flat (2005, 2010, and 2011), and the Blue Crossing (2005). Loach minnow and its critical habitat and spiketail critical habitat in the Blue River and Campbell Blue Creek have been impacted by wildfires and post-fire ash flows the last two years.

Surveys in 2010 after the Paradise Fire (KP Allotment, three miles south of Foote Creek Allotment) began before initial ash flows from KP Creek into the Blue River portion of the action area. Six loach minnow were collected during these surveys in Blue River at four locations between Jones Canyon and KP Creek (USFS 2012).

Fall 2011 surveys at the same locations as 2010 found loach minnow at two of eight sites in the upper reaches of the Blue River; four fish were collected at Jones Canyon and one at Bobcat Flat (Adelsberger *et al.* 2011). High sediment embeddedness was observed in the Bobcat Flat area and

the stream channel itself seemed quite altered compared with pre-fire site visits (Bagley *et al.* 1998, Kesner *et al.* 2011). No loach minnow were detected in lower reaches of the Blue River at KP and Grant creeks in 2011 (Kesner *et al.* 2011).

Castle Creek, located in the South Castle Pasture, exits the allotment and flows northeast approximately 4.7 miles to its confluence with the Campbell Blue Creek. The Castle Creek watershed, within the allotment is only 1.5 square miles; however the majority of the watershed experienced a moderate to high burn severity from the Wallow Fire. Ash and sediment may be transported down this drainage into the Campbell Blue Creek.

Foote Creek and the Right Fork Foote Creek are located in the Foote Creek Winter Pasture. The confluence of these two creeks is located at the allotment boundary. Foote Creek then continues southeast 3.8 miles to the Blue River. The Foote Creek watershed had approximately 12 percent high and moderate burn severity; 77 percent low burn severity, and 11 percent unburned. The Blue River, downstream of the Foote Creek confluence is within the action area because of sediment transport associated with the proposed action from the Foote Creek watershed can travel into loach minnow and spikedace critical habitat.

The Hannagan, West Thomas, Cole, Taylor, East Fletcher, North Thomas, Willow, and Holding 1, 2, 3, and 4 pastures flow into Beaver Creek in the Black River below currently occupied or designated critical habitat. Livestock use of these pastures will not affect loach minnow or its critical habitat.

There are many other allotments located north (Bobcat Johnson, Turkey Creek, and Coyote-Witmer) and south (Steeple Mesa, KP, Strayhorse, Raspberry, Fish Hook and Red Hill) of the Foote Creek Allotment that were also burned during the Wallow Fire; although Red Hill and Fish Hook allotments were mostly unburned. All of these allotments drain into the Campbell Blue Creek or Blue River portions of the action area. AMPs are being prepared for these allotments and will be analyzed separately.

Impacts to critical habitat from ash flows and increased sedimentation associated with the Wallow Fire can be expected to continue for the next few years. The extent of any alterations is difficult to define given they are driven by: 1) the intensity and duration of rain events and 2) the time it will take for sediment from these events to pass through the system. The ASNF considers the overall habitat capability to be unsatisfactory at this time.

For the purposes of this analysis, it is assumed that loach minnow are present in the Campbell Blue Creek and Blue River portions of the action area. Spikedace have never been documented within the Blue River watershed during survey efforts, therefore they are assumed not to be present in the action area. Spikedace were recently stocked downstream of the action area at Juan Miller Crossing in the Blue River; however, insufficient time has elapsed to determine the success of this action. A natural barrier is located at the HU Bar Box on the Blue River between the spikedace release site and the action area.

The Foote Creek Winter and the South Castle pastures which drains into loach minnow occupied critical habitat and spokedace critical habitat on the Blue River and Campbell Blue Creek were not grazed in 2012, but will be in the future based on recovery and interdisciplinary team review.

Status of Loach Minnow and Spikedace Critical Habitat

Loach minnow and spikedace critical habitats in the action area are located within Unit 7 – Blue River Subdivision. They include:

- The Blue River from the confluence of Campbell Blue and Dry Blue creeks downstream to the HU Bar Box; and
- The Campbell Blue Creek from the confluence of Dry Blue and Campbell Blue creeks upstream to the confluence with Castle Creek.

These reaches are considered in the action area because portions of the Foote Creek Allotment drain into them. Loach minnow and spikedace critical habitat in Pace, Dry Blue, Frieborn, and Little Blue creeks (Blue River Subdivision) is not within the action area.

The Blue River and Campbell Blue Creek were designated loach minnow critical habitat because they are both occupied by loach minnow, and:

- contain suitable habitat for all life stages (PCE 1);
- have an appropriate food base (PCE 2);
- consist of perennial streams with no or low pollutant issues (PCEs 3 and 4);
- have no non-native aquatic species, or levels of non-native aquatic species that are sufficiently low to allow persistence of spikedace and loach minnow (PCE 5); and
- have an appropriate hydrologic regime to maintain suitable habitat characteristics (PCE 6).

The Blue River was designated spikedace critical habitat due to its large size, perennial flow, and proposed conservation management activities (non-native fish removal and barrier construction), as compared to the smaller tributaries this species currently occupies.

Loach minnow and spikedace critical habitat in the Blue River and Campbell Blue Creek have been impacted from recent wildfires and post-fire ash flows the last two years. Given the compromised watershed conditions, the PCEs will continue to be affected by sedimentation from multiple sources including the subsequent effects of fire recovery, livestock grazing, road use and construction, and other factors that can alter watershed and flood plain conditions.

Factors Affecting Loach Minnow and Loach Minnow and Spikedace Critical Habitat in the Action Area

Foote Creek Allotment is not the only allotment that drains into occupied loach minnow habitat and spikedace and loach minnow critical habitats. AMPs are being prepared for Coyote-Witmer, Williams Valley, Tenney, and Turkey Creek allotments. These allotments are located upstream on the Blue River watershed from where Foote Creek drains into the Blue River. All of these allotments burned, with differing severities, during the Wallow Fire. Predicted ash flows from the

Foote Creek Allotment would also be expected to occur from these allotments as well. We will review any additional impacts from these actions when consultation is initiated.

Private lands are concentrated in the upper portion of the Blue River. Agricultural lands with associated diversions and irrigation canals are present, and livestock graze on these private lands. Livestock grazing was excluded from the Blue River and its associated riparian areas on Forest Service lands as a result of the Red Hill AMP in 1999 and the Bush Creek AMP in 2001.

Forest Service Road 281 parallels the Blue River, including the action area portion; it has been a continuous sediment source from bank erosion and channel damage. There are numerous low-water crossings on Forest Service Road 281 that may contribute to localized disturbances.

The Arizona Department of Environmental Quality had found the Blue River, from KP Creek to the San Francisco River, to be no longer impaired by turbidity based on a total maximum daily load analysis study in 2002. This was prior to both the Paradise and Wallow fires in 2010 and 2011, respectively.

EFFECTS OF THE PROPOSED ACTION

Effects of the proposed action refers 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, which 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.

Indirect impacts to loach minnow and loach minnow and spokedace critical habitat are expected to be similar to pre-fire levels. Grazing will only be authorized in areas where low intensity fire occurred until the more intensely burned areas recover. The low intensity burned areas will have almost a full growing season to recover before cattle are reintroduced. Vegetation has re-grown to levels that are expected to filter sediment. Post fire monitoring by the ASNF documented range conditions similar to those prior to the Wallow Fire. We anticipate that harm and or harassment will result from excessive sedimentation affecting the ability of loach minnow to find adequate shelter, and to feed and breed. Any managed activity that contributes fine sediment into the action area could adverse effect loach minnow by:

- Increasing fine sediment deposition in critical egg-laying areas, which in turn prevents successful egg-laying or burying and smothering of eggs;
- Increasing fine sediment deposition, which in turn decreases habitat quality needed for aquatic macro invertebrates that are the prey base for loach minnow; and
- Increasing fine sediment deposition in spaces between cobbles, eliminating habitat that loach minnow uses for sheltering.

Both loach minnow and spokedace critical habitats have a PCE that addresses appropriate low or moderate amounts of fine sediment in required microhabitats. Low sedimentation is needed to maintain habitats conducive to breeding, feeding, and sheltering. The effects to loach minnow

from excess sedimentation are described immediately above. For spinedace, suitable habitats are typically over sand and gravel substrates, and not over silt or fine substrates. For both spinedace and loach minnow, suitable habitat is adversely affected by excessive fine sediment deposition. Other PCEs that could be affected by the proposed action, such as low levels of pollutants and changes to pools, runs, riffles, and rapids (stream microhabitats) are not likely to significantly modify conditions.

With respect to the proposed action, we anticipate a gradual reduction in these impacts during the life of the project with continued improvement of watershed conditions. Surface flow runoff from low burn severity areas is expected to be similar to pre-fire conditions and to be affected only by storm duration and intensity. Unburned areas received two full growing seasons of rest when livestock were removed from the Foote Creek Winter Pasture in mid-May prior to the Wallow Fire. The South Castle Pasture also received two full growing seasons of rest (mid-May to mid-October) after livestock were removed during the Wallow Fire.

Post-fire monitoring on Alpine Ranger District, while not done on the Foote Creek Allotment, was completed on the adjacent Beaver Creek and Upper Campbell Blue Allotments. Percent vegetation cover in low severity areas was above 50% in wet meadows and 65% in grasslands on the two allotments.

The Foote Creek Winter Pasture has the potential for the highest indirect effects to the loach minnow and loach minnow and spinedace critical habitats. Given the recent impacts to the watershed and subsequent erosion, the effects of this erosion may be greater than prior to the Wallow Fire. The upper half of the Foote Creek watershed is located within the allotment boundary and could provide sediment input to Blue River during precipitation events. Foote Creek continues 3.5 miles downstream from the Foote Creek allotment boundary, through the Red Hill and Fish Hook allotments, into occupied loach minnow critical habitat and unoccupied spinedace critical habitat in the Blue River. This distance is short enough that sediment could be transported from the Foote Creek Allotment and alters important primary constituent elements of critical habitat in the Blue River. It is unknown whether the natural soil erosiveness can be separated from that caused by the Wallow Fire. As in the case of the Foote Creek Winter Pasture, the Red Hill and Fish Hook allotments are dominated by the Terrestrial Ecosystem Unit- 130 an unstable and highly erosive soil type. However, given the Wallow Fire and fire history of the Blue River watershed; baseline sedimentation levels are expected to stay elevated in the future. The adverse impacts of the proposed livestock management described under the proposed action should ultimately decrease and watershed and riparian conditions are likely to improve, but we anticipate short-term indirect effects from the proposed action.

Although the vast majority of sediment entering the system is a direct result of ground cover loss caused by the Wallow fire, we anticipate that the Blue River and Campbell Blue Creek, within the action area, will be impacted by impaired water quality from sediment or organic matter or both from the proposed action. Both spinedace and loach minnow require sand and gravel or cobble substrates with low levels of fine sediment for spawning habitat. This is not likely to be available during the first few years of watershed recovery, which will impact the species and/or their critical habitats with or without the proposed action. However, the impacts associated with the proposed

action, as well as with the fire, are expected to decrease over time and are not expected to preclude the conservation role of critical habitat.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, Tribal, local, or private actions that are reasonably certain to occur in the action area considered in this BO. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation following section 7 of the Act. The environmental baseline addresses many ongoing actions on private lands along the Blue River, which are also considered to contribute to cumulative effects. These non-Federal actions, agricultural diversions and livestock grazing, are expected to continue during the life of this new AMP.

CONCLUSION

After reviewing the current loach minnow status, the environmental baseline for the action area, the effects of the proposed action, and the cumulative effects, it is our biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the endangered loach minnow or adversely modify its critical habitat, and is not likely to adversely modify spikedace critical habitat.

INCIDENTAL TAKE STATEMENT

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

AMOUNT OR EXTENT OF TAKE

Based upon the best available information concerning the loach minnow and the project description, the FWS believes that the proposed action's disturbances and increases in sediment into the Blue River is reasonably certain to affect loach minnow to the point where incidental take may occur. Given the watershed impacts by the Wallow Fire and subsequent summer precipitation currently impacting the Campbell Blue Creek and Blue River, we believe loach minnow will be harmed or harassed through the reduction in suitable sheltering and spawning areas and decreased food resources associated with the increased fine sediment deposition. This take associated with livestock grazing will not be discernible from the overwhelming amount of disturbance currently

occurring in the system. Currently, loach minnow habitat quality is negatively affected by ongoing sediment input into occupied and suitable habitat because of the Wallow Fire and the naturally-erosive characteristics of the soils on the Foote Creek Winter Pasture. Spikedace critical habitat is similarly affected.

We anticipate that there will be adverse effects resulting from sediment pulses from the proposed action, and that they will be difficult to separate from the constant sediment input which occurs otherwise from the above mentioned agents. Ash and sediment from the Wallow Fire has been seen as far downstream as the Gila River near Safford, Arizona. We cannot say with certainty that future sediment flows that are expected to occur in the Blue River are solely a response of the proposed action. However, we do know that the loach minnow ability to persist is closely tied to fine sedimentation which can fill spawning areas suffocating eggs, removing shelter, and reducing available breeding and foraging habitat. Therefore, we anticipate that loach minnow will be harmed or harassed or both by the proposed action. Given the uncertainty of sediment sources during this recovery period, we are unable to quantify incidental take. However, we assume take will be exceeded if fine sediment deposition (embeddedness) can be documented in the Blue River as a result of livestock grazing on this allotment after it has been resumed.

The proposed conservative grazing levels and committed range monitoring and evaluation prior to opening closed pastures are expected to improve range conditions over the long-term. However, we expect sediment inputs into loach minnow habitat and its and spikedace critical habitat would be expected to increase temporarily due to the current conditions of the watershed following the Wallow Fire.

EFFECT OF TAKE

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

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

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

The following reasonable and prudent measures, with their accompanying terms and conditions, are necessary and appropriate to minimize incidental take of loach minnow:

1. Once the ASNFs determine that watershed condition and health have documented sufficient improvements, and that watershed conditions on the allotment have improved to the point that they can authorize full livestock numbers, as described under the proposed action; the ASNFs will initiate baseline and follow-up monitoring of loach minnow habitat in the Blue River to determine whether fine sediment deposition in important habitat areas (e.g. riffles) is affected by the proposed action.

- A. The following term and condition implements reasonable and prudent measure 1:
The ASNFs shall monitor stream bed embeddedness (fine sediment deposition in the interstitial spaces between gravels and cobbles) in the closest riffle upstream and downstream of the Foote Creek confluence with the Blue River prior to the authorization for use of the allotment by full livestock numbers. This monitoring will constitute a baseline estimate of sedimentation and embeddedness for the Blue River. Following use of the Foote Creek Allotment by full livestock numbers, as described above, the ASNFs will again measure stream bed embeddedness in the same area as the baseline monitoring. If embeddedness is significantly different in the riffle downstream of the confluence such that it could preclude spawning, smother eggs, or decrease food availability or habitat used for sheltering, incidental take has been exceeded and the ASNFs will reinitiate consultation.
2. Exceptions to this term and condition could occur if actions unrelated to the proposed action occur on the Foote Creek Winter Pasture or Red Hill and Fish Hook allotments that may be expected to cause an increase in sediment transported down Foote Creek into the Blue River.
3. The ASNFs shall protect loach minnow (and critical habitat) by grazing at appropriate levels supported by monitoring results; monitoring the incidental take resulting from the proposed action, and reporting the findings to the FWS.
 - A. The following term and condition implements reasonable and prudent measure 2:
The ASNF shall submit an annual summary report to our office by January 15 of each year during the proposed action implementation that documents, for the previous grazing season, the results of monitoring efforts conducted. This monitoring should follow the Range Monitoring Plan described in Appendix A of the BA. The report should include, but is not limited to collected and analyzed data, photographs, and recommendations for the next grazing season. Should the Forest determine that condition, recovery, and grazing suitability do not support livestock grazing of moderate and high burn severity areas, these areas will be managed at 2012 levels.

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.

1. Implement a basin-wide monitoring program for loach minnow and its accompanying native fish community. Coordinate the monitoring program with existing surveying efforts to avoid over sampling. Monitoring protocols and habitat suitability criteria should be agreed upon with the New Mexico and Arizona Game and Fish Department (AGFD) and the FWS to ensure consistency and avoid redundancy.

2. Work with the FWS and the AGFD to reintroduce the Chiricahua leopard frog to suitable habitats.
3. Work with the FWS and the AGFD to begin an aggressive program to control non-native aquatic organisms on the Forest, particularly bullfrogs, fish, and crayfish.
4. Work with the Arizona Department of Environmental Quality, or other suitable partners, to install water quality monitoring equipment.

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

Disposition of Dead or Injured Listed Animals

Upon finding a dead or injured threatened or endangered animal, initial notification must be made within three days to the FWS Law Enforcement Office, located at 2450 West Broadway Road #113, Mesa, Arizona 85202 (480) 967-7900. Written notification must be made within five calendar days and include the date, time, and location of the animal, and any other pertinent information. Care must be taken in handling injured animals to ensure effective treatment and care and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact specimens of listed animal species shall be submitted as soon as possible to this office or the nearest AGFD office, educational, or research institutions (e.g., University of Arizona in Tucson) holding appropriate State and Federal permits.

Arrangements regarding proper disposition of potential museum specimens shall be made with the institution before implementation of the action. A qualified biologist should transport injured animals to a qualified veterinarian. Should any treated listed animal survive, FWS should be contacted regarding the final disposition of the animal.

REINITIATION STATEMENT

This concludes the formal consultation on the Foote Creek Allotment. As provided in 50 CFR 402.16, re-initiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been maintained (or is authorized by law) and if: 1) new information reveals effects of the agency action that may adversely affect listed species in a manner or to an extent not considered in this opinion; 2) the proposed action is subsequently modified in a way that causes an effect to a listed species that was not considered in this opinion; 3) a new species is listed or critical habitat designated that may be affected by this action; or 4) incidental take is exceeded.

Thank you for your continued coordination. No further section 7 consultation is required for this project at this time. Should project plans change, or if information on the distribution or abundance of listed species or critical habitat becomes available, these determinations may need to be reconsidered. We encourage you to continue coordinating with our office as monitoring data

become available. We also encourage you to coordinate the review of this project with the Arizona Game and Fish Department.

In all future correspondence on this project, please refer to the consultation number 22410-2012-F-0304. Should you require further assistance or if you have any questions, please contact Dave Smith (928) 556-2183 or Mary Richardson (602) 242-0210 x242.

Sincerely,

/s/ Debra Bills for

Steven L. Spangle
Field Supervisor

cc: Regional Supervisor, Arizona Game and Fish Department, Pinetop, AZ
ecc: Shaula Hedwall, Mary Richardson, Ryan Gordon, Jeff Servoss

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APPENDIX A. CONCURRENCES

Apache trout

Apache trout occur in Hannagan Creek within the allotment boundary. However, Hannagan Creek has been fenced out from livestock grazing. Indirect effects will be insignificant based on conservative forage utilization levels, deferred rotation, fencing that preclude grazing on Hannagan Creek, and the number of livestock. Any adverse impacts are expected to be very minor and insignificant.

Chiricahua Leopard Frog and its Critical Habitat

Chiricahua leopard frogs have been found within the action area, as described above, in areas downstream of the allotment in Campbell Blue Creek and Blue River. The species is not reasonably certain to occur within the intermittent drainages (Castle Creek) within the allotment. Chiricahua leopard frogs have not been found within Hannagan Creek, and Hannagan Creek is excluded from livestock grazing within the allotment. Coleman Creek, Canyon Creek, and Campbell Blue Creek, north of but not in the Foote Creek Allotment, were surveyed in 2009 along with various tanks in the area. Coleman and Campbell Blue creeks stream flow appear too fast for suitable Chiricahua leopard frog habitat; however, small pools and wetlands on the edges would provide suitable habitat. AGFD only found tiger salamanders during surveys in the Beaver Creek watershed. Post-Wallow fire surveys conducted in Coleman and Campbell Blue creeks found one Chiricahua leopard frog (USFS 2012).

Indirect effects to the Chiricahua leopard frogs and their critical habitat within Campbell Blue Creek and Blue River will be insignificant based on forage utilization guidelines, low drainage connectivity to occupied critical habitat, and distance to occupied critical habitat. Proposed management activities are not likely to spread or increase non-native predators or chytrid fungus or otherwise effect the PCEs. No new stock tanks are proposed and frog surveys will occur prior to any tank cleaning. Chiricahua leopard frog recovery plan recommendations for tank cleaning and precautions to prevent spread of chytrid fungus would be implemented. To date, chytrid fungus has not yet been detected on the ASNFs (USFS 2012).

Mexican Gray Wolf

We concur with your determination that the proposed action “is not likely to jeopardize” the Mexican gray wolf because of the wolves’ status as an experimental, non-essential population. Wolves found in Arizona are treated as though they are proposed for listing for section 7 consultation purposes. By definition, an experimental non-essential population is not essential to the continued existence of the species. Thus, no proposed action impacting a population so designated could lead to a jeopardy determination for the entire species.

Mexican Spotted Owl and its Critical Habitat

Mexican spotted owls and their critical habitat occur in the Foote Creek Allotment. Eight protected activity centers (PACs) are located within the allotment (Hannagan Creek, Willow Creek, Castle Rock, Right Fork, Foote Creek, Oliver, Thomas Creek, and East Castle). The Horton Creek PAC is located partially within the allotment boundary. The Hannagan Creek and Horton Creek PACs were surveyed and found to be occupied in 2010.

All PACs in this allotment experienced some burn severity from the Wallow Fire. Burn severity acreages varied between PACs (Table 1). One hundred percent of the Horton PAC had a high severity burn, whereas the Oliver PAC experienced low to no burn severity on 94 % of its area. Sixty-seven percent of the PAC area in the Foote Creek Allotment experienced low to no burn severity. Trees and perennial grasses were not killed in these areas and would be expected to still provide habitat for Mexican spotted owls and their prey species.

Table 1. Burn Severity Percentages for Protected Activity Centers located in the Foote Creek Allotment, Alpine Ranger District, Apache Sitgreaves National Forests.

PAC Name	Percent Burn Severity (%)			
	High	Moderate	Low	None
Willow Creek	15	9	73	2
Foote Creek	6	26	62	6
Thomas Creek	32	16	52	0
Oliver	0	6	59	35
Hannagan Creek	18	15	49	18
Castle Rock	0	10	70	20
East Castle	25	39	27	9
Right Fork Foote Creek	9	11	43	37
Horton Creek	100	0	0	0

Most of the Foote Creek allotment (22,005 acres), with the exception of the southeast corner, is designated Mexican spotted owl critical habitat.

We concur with your “may affect, not likely to adversely affect” determination for Mexican spotted owl and designated critical habitat because the proposed action has several provisions that will minimize impacts to Mexican spotted owl, as follows:

1. Livestock grazing will occur within PACs, but no human disturbance or construction actions associated with the livestock grazing will occur in PACs during the breeding season;
2. Livestock grazing within PACs will be managed for levels that provide the woody and herbaceous vegetation necessary for cover for important prey species;
3. Forage use will be maintained at conservative levels. The Annual Operating Instructions allow 20 to 40 percent forage use to meet the guidance criteria and ensure adequate vegetation cover is present across owl foraging areas; and

4. Livestock grazing will be excluded on pastures with high percentage (greater than 40 percent) of moderate to high burn intensity and the pastures rested in 2012 to provide more time for forage and soil recovery. Livestock generally avoid these heavily timbered areas because of the steep slopes and low forage availability. These areas will be reevaluated yearly to determine condition, recovery, and grazing suitability. Incidental livestock use in these burn areas will be documented.

APPENDIX B. TABLES

Table 1. Stream occupancy for loach minnow.

Unit	Occupied at time of listing or documented as occupied since listing	Currently occupied	Translocated/ Reintroduced Population
Unit 1 – Verde River Subbasin			
Verde River	Yes	Yes	No
Granite Creek	No	No	No
Oak Creek	No	No	No
Beaver and Wet Beaver Creek	No	No	No
West Clear Creek	No	No	No
Fossil Creek	No	Uncertain	Yes
Unit 2 – Salt River Subbasin			
White River Mainstem	Yes	Yes	No
East Fork White River	Yes	Yes	No
East Fork Black river	No	No	No
North Fork East Fork Black River	Yes	Yes	No
Boneyard Creek	Yes	No	No
Coyote Creek	No	Yes	No
Unit 3 – San Pedro River Subbasin			
San Pedro River	No	No	No
Hot Springs Canyon	No	Yes	Yes
Bass Canyon	No	No	No
Redfield Canyon	No	Uncertain	Yes
Aravaipa Creek	Yes	Yes	No
Deer Creek	Yes	Yes	No
Turkey Creek	Yes	Yes	No
Unit 4 – Bonita Creek Subbasin			
Bonita Creek	No	Uncertain	Yes
Unit 5 – Eagle Creek Subbasin			
Eagle Creek	Yes	Yes	No
Unit 6 – San Francisco River Subbasin			
San Francisco River	Yes	Yes	No
Tularosa River	Yes	Yes	No
Negrito River	Yes	Yes	No
Whitewater Creek	Yes	No	No
Unit 7 – Blue River Subbasin			
Blue River	Yes	Yes	No
Campbell Blue Creek	Yes	Yes	No
Little Blue Creek	Yes	No	No

Pace Creek	Yes	Yes	No
Frieborn Creek	Yes	Yes	No
Dry Blue Creek	Yes	Yes	No
Unit 8 – Gila River Subbasin			
Gila River	Yes	Yes	No
West Fork Gila River	Yes	Yes	No
Middle Fork Gila River	Yes	Yes	No
East Fork Gila River	Yes	Yes	No
Mangas Creek	Yes	Yes	No
Bear Creek	Yes	Yes	No

Table 2. Primary Constituent Elements (PCEs) for Loach Minnow.

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

Table 3. Primary Constituent Elements (PCEs) for Spikedace.

PCE	Description
Flows	Perennial flows or interrupted stream courses that are periodically dewatered but serve as connective corridors between occupied or seasonally occupied habitats
Depth	Generally less than 3.3 feet
Velocities	Slow to swift velocities between 1.9 and 31.5 inches per second
Stream Microhabitats	Glides, runs, riffles, the margins of pools and eddies, and backwater components
Substrate	Sand, gravel, and cobble with low or moderate amounts of fine sediment and substrate embeddedness
Gradient	Less than 1.0 percent
Elevation	6,890 feet or less
Water Temperatures	46.4 to 82.4 degrees Fahrenheit

Table 4. Designated Loach minnow Critical Habitat

Unit 1 – Verde River Subbasin			
Stream	Total Miles	Area Designated	
		Upstream Point	Downstream Point
Verde River	73.6	Sullivan Dam	Beaver/Wet Beaver Creek Confluence
Granite Creek	2.0	Spring at Township 17 North, Range 2 West, southwest quarter of the southwest quarter of section 13	Verde River Confluence
Oak Creek	33.7	Confluence with unnamed tributary in Township 17 North, Range 5 East, southeast quarter of northeast quarter of section 24	Verde River Confluence
Beaver/Wet Beaver Creek	20.7	Casner Canyon Confluence	Verde River Confluence
West Clear Creek	6.8	Black Mountain Canyon Confluence	Verde River Confluence
Fossil Creek	13.6	Old Fossil Diversion Dam	Verde River Confluence
Unit 2 – Salt River Subbasin			
East Fork Black River	11.9	Unnamed tributary 0.51 miles downstream of the Boneyard Creek confluence	West Fork Black River Confluence
North Fork East Fork Black River	4.4	Unnamed tributary at Township 6 North, Range 29 east, center of section 30	East Fork Black River Confluence
Boneyard Creek	1.4	Unnamed tributary at Township 6 North, Range 29 East, southeast quarter of section 32.	East Fork Black River Confluence
Coyote Creek	2.1	Unnamed confluence at Township 5 North, Range 29 East, northwest quarter of section 10	East Fork Black River Confluence
Unit 3 – San Pedro Subbasin			
Aravaipa Creek	27.9	Stowe Gulch	San Pedro Confluence
Turkey Creek	2.7	Oak Grove Canyon	Aravaipa Creek Confluence
Deer Creek	2.3	Aravaipa Wilderness Boundary	Aravaipa Creek Confluence
Hot Springs Canyon	5.8	Bass Canyon	Township 12 South, Range 20 East, Southeast Quarter of Section 22

Redfield Canyon	4.0	Sycamore Canyon Confluence	Township 11 South, Range 19 East, northeast quarter of section 36
Bass Canyon	3.4	Pine Canyon	Hot Springs Canyon Confluence
Unit 4 – Bonita Creek Subbasin			
Bonita Creek	14.8	Martinez Wash Confluence	Gila River Confluence
Unit 5 – Eagle Creek Subbasin			
Eagle Creek	16.5	East Eagle Creek Confluence	Freeport McMoRan Diversion Dam, excluding lands owned by Freeport McMoRan
Unit 6 – San Francisco River Subbasin			
San Francisco River	117.7	Northern boundary of Township 6 South, Range 19 West, section 2.	Confluence with the Gila River
Tularosa Rive	18.6	Town of Cruzville at Township 6 South, Range 18 West, southern boundary of section 1	San Francisco River Confluence
Negrito Creek	4.2	Cerco Canyon	Tularosa River Confluence
Whitewater Creek	1.2	Little Whitewater Creek Confluence	San Francisco River Confluence
Unit 7 – Blue River Subbasin			
Blue River	50.6	Campbell Blue and Dry Blue Creek Confluence	San Francisco River Confluence
Campbell Blue Creek	7.7	Coleman Canyon	Confluence of Dry Blue and Campbell Blue Creeks
Little Blue Creek	3.1	Canyon mouth at Township 1 North, Range 31 East, northeast quarter section 29	Blue River Confluence
Pace Creek	0.8	Barrier falls at Township 6 South, Range 21 West, northeast quarter of section 29	Dry Blue Creek Confluence
Frieborn Creek	1.1	Unnamed tributary at Township 7 South, Range 21 West, northeast quarter of southwest quarter of section 8	Dry Blue Creek Confluence
Dry Blue Creek	3.0	Pace Creek Confluence	Campbell Blue Creek Confluence
Unit 8 – Gila River Subbasin			
Gila River	95.4	Confluence of the East and West Forks of the Gila River	Moore Canyon Confluence
West Fork Gila River	8.1	EE Canyon	East Fork Gila River Confluence
Middle Fork Gila River	11.9	Brothers West Canyon	West Fork Gila River Confluence
East Fork Gila	26.2	Beaver and Taylor Creeks	West Fork Gila River

River		Confluence	Confluence
Mangas Creek	0.8	Blacksmith Canyon Confluence	Gila River Confluence
Bear Creek	18.4	Confluence of Sycamore and North Fork Walnut Creek	Township 15 South, Range 17 West, eastern boundary of section 33

Table 5. Designated Spikedace Critical Habitat

Unit 1 – Verde River Subbasin			
Stream	Total Miles	Area Designated	
		Upstream Point	Downstream Point
Verde River	105.9	Sullivan Dam	Fossil Creek Confluence
Oak Creek	33.7	Confluence with unnamed tributary in Township 17 North, Range 5 East, southeast quarter of northeast quarter of section 24	Verde River Confluence
Beaver/Wet Beaver Creek	20.7	Casner Canyon Confluence	Verde River Confluence
West Clear Creek	6.8	Black Mountain Canyon Confluence	Verde River Confluence
Fossil Creek	13.6	Old Fossil Diversion Dam	Verde River Confluence
Unit 2 – Salt River Subbasin			
Tonto Creek	29.7	Greenback Creek	Houston Creek
Greenback Creek	9.4	Lime Springs	Tonto Creek
Rye Creek	1.8	Brady Canyon	Tonto Creek
Spring Creek	16.9	Sevenmile Canyon	Tonto Creek
Rock Creek	3.6	Spring Creek	Buzzard's Roost Canyon
Unit 3 – San Pedro Subbasin			
Aravaipa Creek	27.9	Stowe Gulch	San Pedro Confluence
Turkey Creek	2.7	Oak Grove Canyon	Aravaipa Creek Confluence
Deer Creek	2.3	Aravaipa Wilderness Boundary	Aravaipa Creek Confluence
Hot Springs Canyon	5.8	Bass Canyon	Township 12 South, Range 20 East, Southeast Quarter of Section 22
Redfield Canyon	4.0	Sycamore Canyon Confluence	Township 11 South, Range 19 East, northeast quarter of section 36
Bass Canyon	3.4	Pine Canyon	Hot Springs Canyon Confluence
Unit 4 – Bonita Creek Subbasin			
Bonita Creek	14.8	Martinez Wash Confluence	Gila River Confluence
Unit 5 – Eagle Creek Subbasin			
Eagle Creek	16.5	East Eagle Creek Confluence	Freeport McMoRan Diversion Dam, excluding lands owned by Freeport McMoRan

Unit 6 – San Francisco River Subbasin			
San Francisco River	103.5	Northern boundary of Township 6 South, Range 19 West, section 2.	Confluence with the Gila River
Unit 7 – Blue River Subbasin			
Blue River	50.6	Campbell Blue and Dry Blue Creek Confluence	San Francisco River Confluence
Campbell Blue Creek	7.7	Coleman Canyon	Confluence of Dry Blue and Campbell Blue Creeks
Little Blue Creek	3.1	Canyon mouth at Township 1 North, Range 31 East, northeast quarter section 29	Blue River Confluence
Pace Creek	0.8	Barrier falls at Township 6 South, Range 21 West, northeast quarter of section 29	Dry Blue Creek Confluence
Frieborn Creek	1.1	Unnamed tributary at Township 7 South, Range 21 West, northeast quarter of southwest quarter of section 8	Dry Blue Creek Confluence
Dry Blue Creek	3.0	Pace Creek Confluence	Campbell Blue Creek Confluence
Unit 8 – Gila River Subbasin			
Gila River	95.4	Confluence of the East and West Forks of the Gila River	Moore Canyon confluence
West Fork Gila River	8.1	EE Canyon	East Fork Gila River
Middle Fork Gila River	7.7	Big Bear Canyon	West Fork Gila River
East Fork Gila River	26.2	Beaver and Taylor creeks confluence	West Fork Gila River
Mangas Creek	0.8	Blacksmith Canyon	Township 17 South, Range 17 West, east boundary of section 3