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Fish and Wildlife Service

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In reply refer to:

AESO/SE
02EAAZ00-2015-F-0512

May 6, 2016

Mr. Steve Best
Acting Forest Supervisor
Apache-Sitgreaves National Forests
Post Office Box 640
Springerville, Arizona 85938

RE: Hickey Allotment Management Plan

Dear Mr. Best:

Thank you for your July 21, 2015, letter received in our office on that date 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 ongoing livestock grazing and effects to seven listed species and proposed and designated critical habitat under the Hickey Allotment Management Plan (AMP) on the Clifton Ranger District, Apache-Sitgreaves National Forests (ASNFs), Arizona (Appendix A, Map 1). A biological assessment (BA) analyzed the effects of the proposed action on seven federally-listed species and their designated or proposed critical habitat (Table 1).

Table 1. Summary of newly listed species and critical habitat analyzed for Hickey Allotment.

May Affect, Likely to Adversely Affect Determination
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Species/Critical Habitat

Chiricahua Leopard Frog (<i>Lithobates chiricahuensis</i>) and its critical habitat

May Affect, Not Likely to Adversely Affect Determination
Species/Critical Habitat
Yellow-billed cuckoo (<i>Coccyzus americanus occidentalis</i>)
Southwestern Willow Flycatcher (<i>Empidonax traillii extimus</i>) and its critical habitat
Narrow-headed gartersnake (<i>Thamnophis rufipunctatus</i>)
Loach minnow (<i>Tiaroga cobitis</i>) and its critical habitat
Spikedace (<i>Meda fulgida</i>) and its critical habitat
Gila Chub (<i>Gila intermedia</i>) and its Critical Habitat

Not Likely to Adversely Modify Determination (<i>If Designated</i>)
Proposed Critical Habitat
Narrow-headed Gartersnake Proposed critical habitat*
Yellow-billed cuckoo Proposed critical habitat*

*This determination would be converted to a “not likely to adversely affect” determination once the critical habitat designation is finalized.

We concur with your “likely to adversely affect” determination for the Chiricahua leopard frog and its critical habitat, and your “not likely to adversely affect”, “not likely to jeopardize the continued existence”, and “not likely to adversely modify” determinations for the remaining species in Table 1. We provide our rationales in Appendix B of this consultation. All information required to initiate consultation was either included with your letter, numerous staff emails, the BA, or is otherwise accessible for our consideration and reference.

CONSULTATION HISTORY

- July 29, 2015 We received a letter, from the ASNFs, requesting formal consultation on all listed species and their critical habitats on the Hickey Allotment.

- November 30, 2015 We received an email from the ASNFs, informing us that the proposed action had changed. Only Rattlesnake Gap Tank would be partially fenced instead of Rattlesnake No 1 and No 2 tanks.

- December 14, 2015 We sent a draft BO to the ASNFs for their review.

- February 26, 2016 We received comments on the draft BO from the ASNF.

BIOLOGICAL OPINION

Description of the Proposed Action and Action Area

The proposed action is the continued implementation of the Hickey AMP (Appendix A, Map 1), which was previously consulted on in January 31, 2003 (USFWS 2003). That consultation reviewed the effects on four listed species: loach minnow, spikedace, Chiricahua leopard frog, and the Mexican spotted owl. We are not reviewing effects to the Mexican spotted owl in the re-initiation; our findings on that species remain in effect. Since the original consultation, the remaining species subject to this review have either been listed or reclassified, or new populations have or will be established, and critical habitats have been finalized or proposed, thus prompting this re-initiation.

The Hickey Allotment is used annually and year round, with different pastures in use at different times, from March 1 to February 28. It has six main pastures (Hickey, Sunset, Little Hickey, Silver Basin, Hamilton, and Rattlesnake Gap) and three holding pastures (Bird Trap, RU Trap, and Hickey Trap). Due to its small size, Rattlesnake Gap Pasture is used more as an additional holding pasture than a main pasture (A. Graves USFS, pers. comm. 2015a). Permitted use is 400 cow and calf pairs annually. Currently, only 120 cow and calf pairs are grazed due to poor water distribution in the allotment. Numerous stock tanks across the Hickey Allotment have silted in and have no water storage capacity (A. Graves, USFS, pers. comm. 2015b). The current permittee acquired the grazing permit in 2014. A pasture rotation schedule will be resumed, consistent with Hickey AMP consultation in 2003, when water distribution is improved in 2016. Livestock are currently scattered, in small groups across the allotment in areas with reliable water (A. Graves, USFS, pers. comm. 2015a and 2015b). The permittee is planning to clean 4 to 5 dry stock tanks within the next 2 to 3 years (A. Graves, USFS, pers. comm. 2015b).

Livestock forage use guidelines for the Hickey Allotment are:

- 40 percent forage use in dormant season pastures
- 30 to 35 percent forage use in summer growing season pastures with deferment

Stock-tank maintenance is authorized under the existing grazing permit. Prior to using heavy equipment to clean out a stock tank, the ASNFs will conduct archeological and biological clearances (A. Graves, USFS, pers. comm. 2015c). On average, stock tanks are generally cleaned out once every 10 years (A. Graves, USFS, pers. comm. 2015c). The ASNFs will be responsible for ensuring the enclosure fences are functioning and intact (A. Graves, USFS, pers. comm. 2015c). Although not part of the proposed action, AGFD will be at these sites twice a year for Chiricahua leopard frog surveys. They will also be able to inspect enclosure conditions.

There are no conservation measures identified for any listed species for this allotment (USFWS 2003). As stated above, the ASNFs will conduct a biological clearance prior to any stock tank cleaning activity as required under the grazing permit. This would include surveying the stock tanks for Chiricahua leopard frogs.

The AGFD has proposed to construct partial fencing in the Rattlesnake Gap Tank in coordination with the allotment permittee and the ASNFs in the Rattlesnake Gap Pasture in the southeast corner of the allotment (C. Akins, AGFD, pers. comm. 2015a). This partial enclosure may allow Chiricahua leopard frog habitat to develop to its potential in protected portions of the stock tank. AGFD has proposed to release Chiricahua leopard frogs into Rattlesnake Gap Tank. In addition, Chiricahua leopard frogs may also be released into other suitable habitats, not limited to Rattlesnake No. 1 and No. 2, Rattlesnake Pasture, Buckhorn, Lambing Camp, and Brushy Mountain tanks within the next five years. Only Rattlesnake Gap, Rattlesnake Pasture and Buckhorn tanks are located in Chiricahua leopard frog critical habitat (Appendix 1, Map 2). The effects to these anticipated populations are discussed further in the Effects to the Species section of this consultation.

The action area is defined as those areas influenced by direct and indirect effects of the proposed action (USFWS 1998). For the purpose of this consultation, we define the action area as the allotment and the portions of San Francisco River into which it drains. The Hickey Allotment is located approximately 3 miles northeast of the Town of Clifton, Greenlee County, Arizona. It is comprised of two major vegetation types: semi-desert grassland and Madrean pine-oak woodland. Specifically, the Hamilton and Rattlesnake Gap pastures are dominated by alligator juniper (*Juniperus deppeana*), pinjon pine (*Pinus edulis*), gray oak (*Quercus grisea*), and a grass understory dominated by numerous grama grasses (*Bouteloa spp.*) (USFS 1989). Ephemeral washes are present and are comprised of vegetation that is similar to that in the uplands (USFS 1989).

STATUS OF THE SPECIES

The Chiricahua leopard frog was listed as a threatened species without critical habitat in 2002 (USFWS 2002). Critical habitat was designated in 2012 (USFWS 2012). The Chiricahua Leopard Frog Final Recovery Plan was signed in April 2007 (USFWS 2007).

The Chiricahua leopard frog inhabits central and southeastern Arizona; west-central and southwestern New Mexico; and, in Mexico, northeastern Sonora, the Sierra Madre Occidental of northwestern and west-central Chihuahua, and possibly as far south as northern Durango (Platz and Mecham 1984; Degenhardt *et al.* 1996; Lemos-Espinal and Smith 2007; Rorabaugh 2008).

Based on 2009 data, Chiricahua leopard frogs are still extant in the major drainage basins in Arizona and New Mexico where it occurred historically; with the exception of the Little Colorado River drainage in Arizona and possibly the Yaqui drainage in New Mexico. However, within those major drainage basins, there are numerous systems in which it has not been recently found. These include the White River, West Clear Creek, Tonto Creek, Verde River mainstem, San Francisco River, San Carlos River, upper San Pedro River mainstem, Santa Cruz River mainstem, Aravaipa Creek, Babocomari River mainstem, and Sonoita Creek mainstem. In southeastern Arizona, no recent records (1995 to the present) exist for the Pinaleño Mountains or Sulphur Springs Valley; and the species was extirpated from the Chiricahua Mountains. The Partners for Fish and Wildlife Program (Arizona Ecological Service Office) has funded five projects to allow re-introduction of Chiricahua leopard frogs in the Chiricahua Mountains (K. Randall, USFWS, pers. comm. 2015). Chiricahua leopard frogs are now absent from all but one

of the southeastern Arizona valley bottom cienega complexes. As of 2009, there were only 84 sites statewide in Arizona at which Chiricahua leopard frogs occur or are likely to occur in the wild, with an additional four captive or partially captive refugia sites. Breeding populations are found in at least 33 of the Arizona sites. In New Mexico, only 15 to 23 breeding sites were known in 2008; the frogs occur at additional dispersal sites. The species has been extirpated from about 80 percent of its historical localities in Arizona and New Mexico. In Mexico, nineteen and eight localities are known from Sonora and Chihuahua, respectively. Some threats, such as introduced nonnative predators and the threat of catastrophic wildfire, appear to be less important south of the border, particularly in the mountains where Chiricahua leopard frogs have been found (Rosen and Melendez 2006; Rorabaugh 2008).

The Chiricahua leopard frog coexists with grazing activities at most sites where it is found. In fact, stock tanks constructed as water sources for livestock are important habitats for the Chiricahua leopard frog, particularly in Arizona (Sredl and Saylor 1998; Sredl and Jennings 2005). In some areas, stock tanks replaced natural springs and cienegas or were developed at spring headwaters or cienegas and now provide the only suitable habitat available to the Chiricahua leopard frog. For these reasons, there is a high probability that the Chiricahua leopard frog would be extirpated from many more areas if ranchers had not built and maintained stock tanks for livestock production (USFWS 2007).

The primary threats to this species are predation by nonnative species and die-offs caused by the fungal skin disease, chytridiomycosis (Bd) (Berger *et al.* 1998; Longcore *et al.* 1999). Additional threats include: drought, floods, habitat loss and degradation from water diversions and groundwater pumping, improper livestock management, altered fire regimes, mining, development, and other human activities (USFWS 2007).

Critical Habitat

The Chiricahua leopard frog critical habitat rule designated 39 critical habitat units (CHUs) in eight Recovery Units in Arizona and New Mexico (USFWS 2012). These CHUs are to conserve the physical or biological features that are essential to the conservation of the species and which may require special management consideration or protection. We determined the primary constituent elements (PCEs)¹ of critical habitat that are specific to the Chiricahua leopard frog (USFWS 2012), which include:

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

PCE 1a: Standing bodies of fresh water, including natural and manmade (e.g., stock) ponds, slow-moving streams or pools within streams, off-channel pools, and other ephemeral or

¹ The term "primary constituent elements" was introduced in critical habitat designation regulations (50 CFR 424.12) to describe aspects of "physical or biological features," which are referenced in the statutory definition of "critical habitat". The Services have removed the term "primary constituent elements" and returned to use of the statutory term "physical or biological features" (79 FR 27066). Existing critical habitat designations will not be republished to make this change; however, in future rules we will discontinue the use of the term "primary constituent elements" and instead will be using "physical and biological features".

permanent water bodies that typically hold water or are rarely dry for more than a month. During periods of drought, or less-than-average rainfall, these breeding sites may not hold water long enough for individuals to complete metamorphosis, but they would still be considered essential breeding habitat in non-drought years.

PCE 1b: Emergent and or submerged vegetation, root masses, undercut banks, fractured rock substrates, or some combination thereof, but emergent vegetation does not completely cover the surface of water bodies.

PCE 1c: Nonnative predators absent or occurring at levels that do not preclude presence of the Chiricahua leopard frog.

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

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

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

PCE 2a: Not more than 1.0 mile overland, 3.0 miles along ephemeral or intermittent drainages, 5.0 miles along perennial drainages, or some combination thereof not to exceed 5.0 miles.

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

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

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

Approximately 36 percent of all designated critical habitat for the Chiricahua leopard frog is located on five National Forests in Region 3 (the Coronado, Gila, Tonto, Coconino, and Apache-Sitgreaves National Forests). The majority of these CHUs are represented by populations occupying stock tanks.

ENVIRONMENTAL BASELINE

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

Status of the Chiricahua Leopard Frog and its Critical Habitat in the Action Area

Chiricahua leopard frogs were noted on the main stem of the Blue River in the 1970s and 1980s (USFWS 2003). The species was collected and photographed in 1997 on the Blue River approximately 17 miles upstream of the Hickey Allotment. There are approximately 12.5 miles of historical frog habitat along the San Francisco River, all of which is excluded from livestock use. Chiricahua leopard frogs were last documented in the San Francisco River in Arizona approximately 110 miles upstream of the Hickey Allotment near the Town of Alpine, Arizona in 1974 (C. Akins, AGFD, pers. comm. 2015b).

The Hickey Allotment contains ten stock tanks and seven springs (USFWS 2003). The ten stock tanks, located in the southeast corner of the Hickey Allotment, as well as dispersal habitat between them, may be potential Chiricahua leopard frog habitat. These are the Gayle, Brushy Mountain, Rattlesnake Gap, Rattlesnake Pasture, Rattlesnake No. 1, and Rattlesnake No. 2, Lambing Camp, Red Tank Canyon, Buckhorn, and Cold Spring Mountain tanks. Chiricahua leopard frogs have only been documented breeding in one stock tank, Rattlesnake Pasture Tank, on the Hickey allotment. Rattlesnake Pasture Tank was a very productive breeding site for the Chiricahua leopard frog from at least 2003 to 2010. In 2010 after plentiful rainfall in the area, Chiricahua leopard frogs had dispersed to from Rattlesnake Pasture Tank to Rattlesnake Gap, Rattlesnake No. 1, and Rattlesnake No. 2 tanks. During that same year, lowland leopard frogs (*Lithobates yavapaiensis*) were also found in Rattlesnake No. 1, Rattlesnake No. 2, Lambing Ground, and Buckhorn tanks, and Red Tank Canyon (C. Crawford, USFWS pers. comm. 2015). In 2011, Chiricahua leopard frogs were detected only in Rattlesnake Pasture Tank. Although lowland leopard frogs were found at four sites within the allotment, AGFD did not find Chiricahua leopard frogs in any of the above stock tanks during 2012, 2013, or 2014 surveys (C. Akins, AGFD, pers. comm. 2015c).

The closest known Chiricahua leopard frog site, the Left Prong of Dix Creek, is located 1 to 1.7 miles from Hickey Allotment on the Pleasant Valley Allotment. Chiricahua leopard frogs were found at this site in 2003 and 2005 (USFWS 2012). Surveys in 2010, 2011, and 2013 (C. Akins, AGFD, pers. comm. 2015b) only detected lowland leopard frogs or unknown leopard frog species in that area. In 2014, AGFD, New Mexico AGFD, and USFWS released Chiricahua

leopard frogs into both prongs of Dix Creek. Since the release, only two adult Chiricahua leopard frog were observed at this site in 2015; one of which was found dead (C. Akins, AGFD, pers. comm. 2015c). Very little of the Hickey Allotment uplands drain into the Left Prong of Dix Creek or the Pleasant Valley Allotment.

The Pleasant Valley Allotment contains five stock tanks within one mile of the Hickey Allotment boundary. At this time, none of the stock tanks on either allotment are known to contain Chiricahua leopard frogs. Suitable and/or potential habitat may be present in stock tanks on both allotments (C. Akins, AGFD, pers. comm. 2015c). It is unlikely that the Hickey AMP will have an adverse effect on Chiricahua leopard frogs or their critical habitat on the Pleasant Valley Allotment.

The Rattlesnake Pasture Tank and Associated Tanks CHU (Recovery Unit 7) contain Rattlesnake Gap, Rattlesnake Pasture, and Buckhorn tanks, as well as intervening drainages and uplands between these three tanks that provide connectivity. Both PCEs 1 and 2 are present in this unit. All of these stock tanks are currently used as a livestock water sources for the Hamilton and Rattlesnake Gap pastures. Rattlesnake Gap Tank will have partial fencing constructed in July 2016 to protect Chiricahua leopard frogs that will be released there and their critical habitat. Due to poor vehicular access, fencing will not occur at Rattlesnake Pasture Tank (C. Akins, AGFD, pers. comm. 2015d). There are no plans currently to fence Buckhorn Tank (C. Akins, AGFD, pers. comm. 2015d).

Factors Affecting the Chiricahua Leopard Frog and its Critical Habitat in the Action Area

The greatest threats to Chiricahua leopard frogs in the proposed action area are nonnative aquatic species, drought, and possibly disease (USFWS 2011, USFWS 2012). The San Francisco River is inhabited by nonnative fish and crayfish which may prey upon any frogs that disperse into the river. Native tiger salamanders (*Ambystoma tigrinum*), a potential predator of the frog especially in its paedomorphic form, have been detected in livestock tanks in the action area in recent years. Native tiger salamanders were found in Rattlesnake Gap, Rattlesnake Pasture, and Brushy Mountain tanks during 2014 surveys (C. Akins 2015a, pers. comm.). Although one bullfrog (*Lithobates catesbeiana*) was found in Rattlesnake Gap Tank in 2010, bullfrogs and crayfish have not become established in the action area (USFWS 2012).

Drought is problematic in the action area because all stock tanks are currently fed only by rainfall and risk drying during times of extended drought. Much of the action area is very remote so that efforts to decrease drying of tanks, such as installing geotextile liners or drilling wells, are expensive and difficult to implement.

Although disease has not been detected in the action area, lowland leopard frogs have recently tested positive for chytridiomycosis (Bd) in Dix Creek approximately 8 miles northeast of the action area. Chytridiomycosis (Bd) is also prevalent in New Mexico east of the action area (USFWS 2011, 20012, and files).

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.

The proposed action is expected to result in adverse effects and long-term benefits to the Chiricahua leopard frog and its habitat. Potential habitat for Chiricahua leopard frogs exist along 12.5 miles of the San Francisco River, if the nonnative predators were ever removed. This habitat is excluded from livestock grazing.

Stock-tank maintenance generally involves periodic removal of accumulated sediment with heavy equipment. Due to poor road access, a tracked bulldozer must be used to clean stock tanks in the Hamilton and Rattlesnake Gap pastures (A. Graves, USFS, pers. comm. 2015c). Such maintenance is required approximately once every 10 years and is typically done when the tank is dry or almost dry. In some cases, the work may require deliberate drying of the tank. If Chiricahua leopard frogs are present, this would likely result in death or injury to frogs that remained in the tank, unless provisions are included to retain a portion of the tank as escape cover or the frogs are salvaged beforehand.

Stock-tank maintenance, which is included in the grazing permit, would be critical to the survival of the Chiricahua leopard frog released into these stock tanks. Stock-tank maintenance ultimately benefits Chiricahua leopard frogs, since earthen tanks would otherwise fill with sediment and lose their value as frog habitat. The Rattlesnake No. 1 and No. 2, Buckhorn and Silver Basin tanks were cleaned in 2013 (N. Spencer-Morris, USFS 2015, pers. comm.). We believe that the stock tanks must be routinely maintained and sediment regularly removed to ensure the Chiricahua leopard frog and their habitat persists on the allotment.

The Chiricahua leopard frog Recovery Plan (USFWS 2007) provides a lengthy discussion of potential effects to frogs from livestock grazing activities, with an emphasis on effects to Chiricahua leopard frogs during the warmer periods of the year when the species is assumed to be surface-active and/or reproductive. Adverse effects may result from livestock grazing, but limited grazing around an occupied leopard frog habitat can also provide openings in the vegetation that provide beneficial basking and foraging sites for frogs.

Both direct and indirect adverse effects may occur through a variety of means during the non-active (*i.e.*, non-breeding) seasons of the year for Chiricahua leopard frogs. This may include trampling of hibernating frogs or tadpoles, loss of wetland vegetation along stock tank shorelines used for cover, and spread of disease and nonnative predators (Sredl and Jennings 2005; USFWS 2007). The indirect effects of livestock grazing in the Hickey Allotment may also include increases in sediment into the stock tanks generated by grazing levels. These effects will likely

occur on the Hickey Allotment, but are expected to be minimal, and attenuated through consistent monitoring, and sediment removal from the stock tanks.

Direct mortality of all life stages of amphibian species due to trampling by livestock is documented in the literature (Bartelt 1998; Ross *et al.* 1999), but most likely occurs with egg masses. However, there is currently no documentation of trampling of Chiricahua leopard frogs specifically. Such mortality is likely to occur, particularly in confined, simple habitats such as stock tanks, and has been documented with other frog and toad species. Juvenile and adult frogs can probably avoid trampling when they are active; however, leopard frogs are known to hibernate on the bottom of ponds (Harding 1997) where they may be subject to trampling during their periods of non-activity in the winter months. We are reasonably certain that the proposed action would result in increased risks of trampling to hibernating frogs, carry-over tadpoles from previous years that have not yet metamorphosed, and egg masses that may occur at sites that are occupied or may become occupied by frogs due to dispersal from nearby sites during the life of the project.

In summary, with respect to the effects of the proposed action on the frog, we believe there is a potential for impacts to frogs during livestock watering in the tanks as well as tank maintenance activities such as dredging or silt removal; injury at tanks due to transmission of disease by livestock or ranch hands; and direct or indirect fatality at those tanks grazed by livestock as a result of cattle wading into stock tanks, removing shoreline or aquatic cover at egg deposition sites, and increasing turbidity. However, the partial enclosure that AGFD will construct at Rattlesnake Gap Tank in 2016 will provide some livestock-free habitat for frogs while still providing livestock access to water. This partial enclosure will reduce the opportunity for livestock to accidentally trample frogs at Rattlesnake Gap Tank, but will not completely remove the threat of trampling. If and when Chiricahua leopard frogs are released to or naturally disperse to the other available stock tank habitats, they would not be protected from accidental trampling from livestock watering at those sites.

Effects of the Action on Chiricahua Leopard Frog Critical Habitat

In our analysis of the effects of the action on critical habitat, we consider whether or not a proposed action will result in the destruction or adverse modification of critical habitat. In doing so, we must determine if the proposed action will result in effects that appreciably diminish the value of critical habitat for the recovery of a listed species. The PCEs² related to Chiricahua leopard frog aquatic breeding habitat (including immediately adjacent uplands) and dispersal habitat and the potential effects from implementation of the Hickey AMP are described below.

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

PCE 1a: Standing bodies of fresh water, including natural and manmade (e.g., stock) ponds, slow-moving streams or pools within streams, off-channel pools, and other ephemeral or permanent water bodies that typically hold water or are rarely dry for more than a month. During periods of drought, or less-than-average rainfall, these breeding sites may not hold water

² See footnote, page 5.

long enough for individuals to complete metamorphosis, but they would still be considered essential breeding habitat in non-drought years.

Effect: Actions implemented under the Hickey AMP are expected to maintain this PCE for Chiricahua leopard frogs. Cleaning (i.e., draining and or removal of sediment) of stock tanks that provide habitat for Chiricahua leopard frogs could result in the loss and/or reduction (reduced depth) of this PCE for short periods of time. Stock tanks on the Hickey Allotment are cleaned on average every 10 years as part of the grazing permit (A.Graves, USFS. pers. comm. 2015b). However, occasional drying for short periods (less than one month) may be beneficial in that the frogs can survive, but predators such as bullfrogs and aquatic forms of tiger salamanders will be eliminated during the dry period (USFWS 2007). Chytrid fungus may also be eliminated, if present, in stock tanks that dry for short periods of time. Therefore, this PCE will not be adversely modified by the proposed action.

PCE 1b: Emergent and or submerged vegetation, root masses, undercut banks, fractured rock substrates, or some combination thereof, but emergent vegetation does not completely cover the surface of water bodies.

Effect: The Hickey AMP is expected to result in adverse effects to this PCE. Livestock will eat and/or modify emergent and submerged vegetation at sites they occupy resulting in loss of cover for frogs. Rattlesnake Gap Tank will be partially fenced so that vegetation inside the exclosures will be protected to support breeding frogs (e.g., vegetation to attach egg masses, provide cover and food to tadpoles, etc.). However, the other two livestock tanks included in the Rattlesnake Gap CHU and within the action area that should have this PCE will not be fenced. Emergent and submerged vegetation can be adversely affected at these stock tanks. Livestock, because they are excluded from the San Francisco and Blue rivers, would not adversely affect this PCE on these rivers.

PCE 1c: Nonnative predators absent or occurring at levels that do not preclude presence of the Chiricahua leopard frog.

Effect: There are tiger salamanders in Rattlesnake Gap and Rattlesnake Pasture Tanks (C. Akins, AGFD, pers. comm. 2015a). The ASNFs' Land Management Plan (LMP) has specific standards and guidelines, required under all forest programs, to reduce or prevent the spread of nonnative predators through management activities (USFS 2013). There is little if any potential for the proposed action to result in movement or increase of non-native predators in critical habitat.

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

Effect: There is the potential that actions such as the cleaning of accumulated sediment from stock tanks and moving machinery among stock tanks could result in the movement of chytrid fungus, or other diseases, to critical habitat. However, the Hickey Allotment permittee, who maintains the Rattlesnake Gap Tank, only does so when it is dry. The chytrid fungal spores are likely not viable or present when a tank is completely dry, but may reside in mud. Heavy equipment at a dry tank is unlikely to transfer these spores from one stock tank to another in this

situation. If chytrid fungal spores are transported to another dry stock tank during maintenance it is unlikely that they would remain viable or alive until the stock tank fills with water (C. Akins, AGFD, pers. comm. 2015e). Rattlesnake No. 1 and No. 2 tanks, outside of critical habitat, are only 0.5 mile from Rattlesnake Gap Tank. Other nearby stock tanks, within (Rattlesnake Pasture Tank) and immediately adjacent (Buckhorn Tank) to critical habitat are within 1.0 mile of each other. This is within the dispersal distance for Chiricahua leopard frogs (see PCE 2 below). Regardless of equipment cleaning, if chytrid fungus becomes established in any of the stock tanks, in or outside of critical habitat, it is more likely to be spread to the nearby habitats by dispersing frogs than by heavy equipment that is being used as part of the proposed action. Heavy equipment must be driven to the site; it cannot be transported by trucks. This would provide ample time for the heavy equipment to dry and chytrid fungal spores to die before stock tank maintenance occurs in this area.

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

Effect: Implementing the Hickey AMP may result in reduced vegetative habitat immediately around and surrounding critical habitat. However, fencing at Rattlesnake Gap Tank will allow aquatic habitat to develop and persist in a portion of the stock tank. Livestock will be able to eat, trample, and/or otherwise modify vegetation outside the fenced area. Although this will degrade some frog habitat, it will also benefit frog habitat by providing needed open basking areas and foraging habitat. There may be adverse effects to this PCE in the portions of the stock tank that are outside of the enclosure.

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

PCE 2a: Not more than 1.0 mile overland, 3.0 miles along ephemeral or intermittent drainages, 5.0 miles along perennial drainages, or some combination thereof not to exceed 5.0 miles.

Effect: Actions implemented under the Hickey AMP should not result in stock tank loss within critical habitat that would change the movement distance (connectivity) between stock tanks. Routine stock tank maintenance to remove sediment, as part of the grazing permit, would protect this PCE. If stock tanks are not maintained they may eventually fill with sediment and frog habitat would be lost. The loss of Rattlesnake Gap Tank would eliminate its use as a “stepping stone” to allow Chiricahua leopard frogs to disperse back and forth between existing tanks (within and outside of critical habitat) and limit their ability to spread into new habitats. Therefore, we anticipate effects of the action (*i.e.*, cleaning of stock tanks) to be beneficial to this PCE.

PCE 2b: In overland and non-wetted corridors, provides some vegetation cover or structural features (e.g., boulders, rocks, organic debris such as downed trees or logs, small mammal

burrows, or leaf litter) for shelter, forage, and protection from predators; in wetted corridors, provides some ephemeral, intermittent, or perennial aquatic habitat.

Effect: Actions implemented under the Hickey AMP should not significantly reduce or modify this PCE within critical habitat. The drainages that would provide dispersal habitat from Rattlesnake Pasture and Rattlesnake Gap tanks are all ephemeral. There are no perennial or intermittent drainages that Chiricahua leopard frogs would use to disperse. We do not expect there to be measurable adverse effects to these ephemeral dispersal corridors from livestock use because these areas are dry, do not have undercut banks, wetland and/or riparian vegetation, or permanent backwater pools, and do not possess habitat components associated with perennial drainages that could be adversely affected by livestock. Existing vegetation in the ephemeral drainages is the same as that present in the uplands (USFS 1989); consequently, we do not anticipate that these ephemeral drainages will result in concentrated livestock use to the point that adverse effects would occur.

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

Effect: Actions implemented under the Hickey AMP would not result in the creation of barriers to movement within critical habitat.

Effects of the Action on Recovery

The minimum habitat features that we consider necessary to preserve the frog's recovery opportunities are based upon active management and protection of important breeding habitats. These breeding habitats must have the following features: perennial water; shallow water with emergent and perimeter vegetation for egg deposition, tadpole and adult thermoregulation or basking sites, and foraging sites; and deeper water, root masses, and undercut banks for refuge from predators and potential hibernacula (see Status of the Species for more details).

The three stock tanks (two of which are outside of critical habitat) in which Chiricahua leopard frog releases are proposed are not long-term breeding habitats that may support meta-populations of frogs. Although these stock tanks are not perennial and may dry during an extended drought, the Service determined that the Rattlesnake Pasture Tank and Associated Tanks CHU were essential to the conservation of this species because it contained three tanks, Rattlesnake Pasture, Rattlesnake Gap, and Buckhorn, along with dispersal corridors between these and other tanks in the vicinity (USFWS 2012). In addition, stock tanks do not form undercut banks and root masses for protection from predators. Undercut banks are formed by flowing water and need root masses to develop and support them so they do not collapse. Aquatic herbaceous vegetation may establish within the protected areas of the three tanks, which would provide substrate for frog egg deposition and cover for older age classes of frogs.

The proposed action authorizes periodic maintenance and cleaning of the stock tanks on the Hickey Allotment, as part of the grazing permit. In addition to the proposed action, but not included as such, AGFD has proposed to construct an enclosure and release Chiricahua leopard frogs in the Rattlesnake Gap Tank within the CHU and two stock tanks adjacent to this CHU. We conclude that the implementation of the Hickey AMP is not expected to diminish the conservation contribution of the Rattlesnake Pasture Tank and Associated Tanks CHU to Chiricahua leopard frog recovery.

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. There are private parcels along the San Francisco River in the proposed action area. It is unknown whether there are non-Federal actions, such as agricultural diversions and livestock grazing, occurring on these lands that may affect Chiricahua leopard frogs in that reach of the San Francisco River.

CONCLUSION

After reviewing the current Chiricahua leopard frog 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 Chiricahua leopard frog or destroy or adversely modify its 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

Incidental take of Chiricahua leopard frogs is reasonably certain to occur in the form of harm (including direct fatality) as a result of the proposed action. We recognize that providing a

numerical estimate of incidental take is the preferred method of measuring incidental take. However, it is impossible to quantify the number of individual frogs taken because:

- Dead or impaired individuals are almost impossible to find (and are readily consumed by predators) and losses may be masked by seasonal fluctuations in environmental conditions;
- The status of the species may change over time through immigration, emigration, and natural loss or active creation of habitat through management; and,
- The species is small-bodied, well camouflaged, and occurs under water of varying clarity, and thus individuals are difficult to detect.

It is not meaningful to provide a number for incidental take of frogs associated with this proposed action because we can count what we see but there is much we cannot see under the water, in root wads, and in other hiding locations. We are capable of counting frogs at tanks to some extent (particularly if we put a certain number of frogs into an unoccupied site), but many factors (weather conditions, predator presence, etc.) can all modify the number of frogs seen at a tank during a survey.

Establishing a number for incidental take becomes even more impracticable when we acknowledge that Chiricahua leopard frogs naturally experience very high mortality rates (greater than 90 percent) in the egg and early tadpole stages, high mortality when the tadpole turns into a juvenile frog, and then relatively lower mortality rates when the frogs become adults (USFWS 2007). The recovery strategy and delisting criteria in the Chiricahua leopard frog Recovery Plan are built upon numbers of populations (not individuals) and we use counts of frogs only to define a "robust" population which, depending upon the habitat can range from an estimate of 40 to 60 adults, depending upon whether the habitat is drought-resistant (USFWS 2007).

Since we cannot estimate the number of individual frogs that will be incidentally taken for the reasons listed above, the USFWS is providing a mechanism to quantify when take would be considered to be exceeded as a result of implementing the Hickey AMP. Specifically, we will use the existing number of stock tanks in which Chiricahua leopard frog populations are successfully established on the Hickey Allotment to determine when take is exceeded.

There are ten stock tanks within dispersal distance of each other in the Hamilton and Rattlesnake Gap pastures in this allotment. Chiricahua leopard frogs that are released to suitable stock tank habitats within the allotment may disperse to other stock tanks and become established. Once released frogs become established and breeding is documented, we have set an incidental take limit of the loss of all Chiricahua leopard frogs in one tank. Such take will be determined by monitoring for 3 consecutive years with negative monitoring results. We believe this incidental take limit is measurable, and will indicate when the frogs are being impacted at a level where management needs to change. We are confident that repeated surveys can tell us whether a site is occupied or not, which will clearly show if incidental take is exceeded. AGFD surveys these stock tanks twice a year (C. Akins, AGFD, pers. comm. 2015f). We conclude that the incidental take of Chiricahua leopard frogs will be considered exceeded and re-initiation of consultation required if more than one stock tank population is lost for 3 consecutive years as a result of the implementation of the Hickey AMP.

This incidental take will be measured by biannual surveys conducted from March to October (frog activity season) in order to determine presence or infer absence of frogs. We have identified actions that may result in the incidental take of individual frogs (due to actions implemented through the AMP and discussed in the Effects section above); however, we do not anticipate the complete loss of an entire occupied stock tank as a result of any action authorized under the Hickey AMP. If the loss of a currently occupied site occurs, in coordination with the ASNFs, we will determine whether it was the result of the proposed action or if environmental conditions such as drought caused the loss. If the loss of a site is a result of the proposed livestock grazing action, re-initiation of formal consultation would be required as the amount or extent of incidental take would be exceeded. If the loss of an occupied site occurs as a result of drought or other environmental factors in combination with the proposed action, then re-initiation would also be necessary in light of the new information regarding the status of the Chiricahua leopard frog on the Hickey Allotment.

This amount of incidental take (all frogs at one site) will not prevent the population from recovering to pre-take levels because the breeding sites are all within frog dispersal distance of one another (frogs can move up to 5 miles) and connected via critical habitat. Therefore, if frogs cease to be present at one site, the frogs will be able to recolonize the site on their own, or we can assist them as we have done in the past at other breeding areas. We conclude that this level of incidental take does not place recovery of the Chiricahua leopard frog at risk. We know that regardless of whether the ASNFs continues to authorize grazing on the Hickey Allotment, environmental factors such as drought, movement of nonnative species, maintenance of stock tanks, and natural fluctuations in frog populations will result in changes in the occupancy of stock tanks across the allotment. Recovery of the species will not be achieved or lost within the Hickey Allotment as it includes only a small portion of the overall range of the species. However, by implementing the proposed action with the included Recovery Plan actions, the prospects for this population to recover and contribute to the overall recovery of the species are very high, even with the potential temporary loss of one occupied site over the life of this project.

The USFWS has determined that this level of anticipated take is not likely to result in jeopardy to Chiricahua leopard frogs. While the proposed action may result in short-term, adverse effects to the frog through the loss of individual frogs of various life stages via the forms of incidental take described above, we do not anticipate that any of these actions, as described in the BA, will result in the loss of all frogs at a given stock tank.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

The USFWS believes that the following reasonable and prudent measures are necessary and appropriate to minimize take of Chiricahua leopard frogs:

1. Protect Chiricahua leopard frogs on the Hickey Allotment.
2. Protect and maintain identified Chiricahua leopard frog habitats on the Hickey Allotment.
3. Monitor and report the impacts of implementation of the Hickey AMP on the Chiricahua leopard frog.

TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the ESA, the ASNFs must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary. The following terms and conditions will implement reasonable and prudent measure 1:

1.1 The ASNFs shall continue to work with USFWS, AGFD, and the permittee to define when conditions warrant installation of erosion control structures, or other measures needed to improve soil and vegetative conditions around stock tanks or other suitable habitats to minimize indirect effects to Chiricahua leopard frogs.

1.2 In addition to the biological clearances incorporated as part of the proposed action, prior to stock tank cleaning, the ASNFs shall provide USFWS and AGFD staff at least 60 days notice prior to the permittee conducting work in the stock tanks. This notice will allow for surveys, frog capture if needed and they are still present, and/or implementation of additional conservation measures (*e.g.* flag or mark portions of the stock tank not to be disturbed during maintenance and/or ensure that exclosures are still intact and protected during maintenance) to reduce adverse effects to Chiricahua leopard frogs.

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

2.1 Live fish, crayfish, leopard frogs, salamanders, or other aquatic organisms shall not be moved among earthen stock tanks or other aquatic sites by ASNFs employees or the permittee unless approved by the USFWS.

2.2 Water shall not be hauled to any occupied leopard frog habitat or potentially suitable stock tanks by ASNFs employees, the permittee, or anyone operating under Forest Service authorization, from another aquatic site or tank that supports leopard frogs, crayfish, or fish. If water is needed to address drought concerns for the frog or livestock, the ASNFs must seek USFWS approval prior to adding any water to a stock tank occupied by Chiricahua leopard frogs.

2.3 If nonnative aquatic species are detected within occupied Chiricahua leopard frog habitat or habitat that connects to occupied Chiricahua leopard frog habitat on the Hickey Allotment, the ASNFs shall immediately initiate a multi-stakeholder planning effort with the USFWS and AGFD to remove the nonnative species from the stock tank as quickly as possible. This may involve the complete drying of a stock tank if deemed as the most effective management tool to address the threat of nonnatives. As stated above, under 1.2, the ASNFs shall provide USFWS and AGFD staff at least 60 days notice prior to this action to allow Chiricahua leopard frog salvage if determined necessary.

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

3.1 The ASNFs shall submit an annual summary report to our Phoenix Office by January 31 of each year. This annual report shall summarize the livestock grazing management that occurred (e.g., livestock numbers, pastures used, timing of use, etc.), a summary of situations (and corrective actions) that pertain to the above items, relevant frog or other aquatic species survey information, and any other pertinent information about the project's effects on the Chiricahua leopard frog. The report shall also make recommendations for modifying or refining these terms and conditions to enhance leopard frog protection.

3.2 The ASNFs shall notify (written correspondence, email, or phone call) our Phoenix Office as soon as practicable of the observed occurrence or the discovery of aquatic nonnative species in any stock tank on the Hickey Allotment to provide for collaborative emergency planning and corrective action as required in reasonable and prudent measure 2 and its implementing terms and conditions.

3.3 The ASNFs shall notify (written correspondence, email, or phone call) our Phoenix Office within 48 hours of any observation of any pasture boundary or exclusion fence line failure or fence line disrepair that is adjacent to known occupied habitat within the Hickey Allotment, and the corrective actions implemented.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species initial notification must be made to the USFWS' Law Enforcement Office, 4901 Paseo del Norte NE, Suite D, Albuquerque, New Mexico, 87113, telephone (505) 248-7889, within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to the AESO. Care must be taken in handling sick or injured animals to ensure effective treatment and in handling dead specimens to preserve the biological material in the best possible state. If possible, the remains of intact species shall be provided to the AESO. If the remains of the species are not intact or are not collected, the information noted above shall be obtained and the carcass left in place. Injured animals should be transported to a qualified veterinarian by an authorized biologist. Should the treated species survive, contact our office regarding the final disposition of the animal.

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. We recommend that the ASNFs implement Forest-specific actions within the Recovery Plan (USFWS 2007).

2. We recommend that the ASNFs work with us and AGFD to reintroduce the Chiricahua leopard frog to additional suitable habitats identified through habitat assessment and surveys conducted throughout the range of the frog on the ASNFs.
3. We recommend the ASNFs work with us and the AGFD to continue to control nonnative aquatic organisms on the Forest, particularly American bullfrogs, nonnative fish, and crayfish.
4. We recommend that the ASNFs work with us to develop a programmatic environmental assessment and biological opinion to cover tank renovation and maintenance on the ASNFs and effects to Chiricahua leopard frog.
5. We recommend that the ASNFs continue to identify factors that limit the recovery potential of Chiricahua leopard frogs on lands under their jurisdiction and work to correct them.

REINITIATION STATEMENT

This concludes the formal consultation on the Hickey Allotment. 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 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. 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,



Steven L. Spangle
Field Supervisor

cc (electronic):

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

Regional Supervisor, Arizona Game and Fish Department, Pinetop, AZ

Wildlife Biologists, Fish and Wildlife Service, Phoenix, Flagstaff, Tucson, AZ

(Attn: Mary Richardson, Ryan Gordon, Shaula Hedwall, Jeff Servoss, Cat Crawford)

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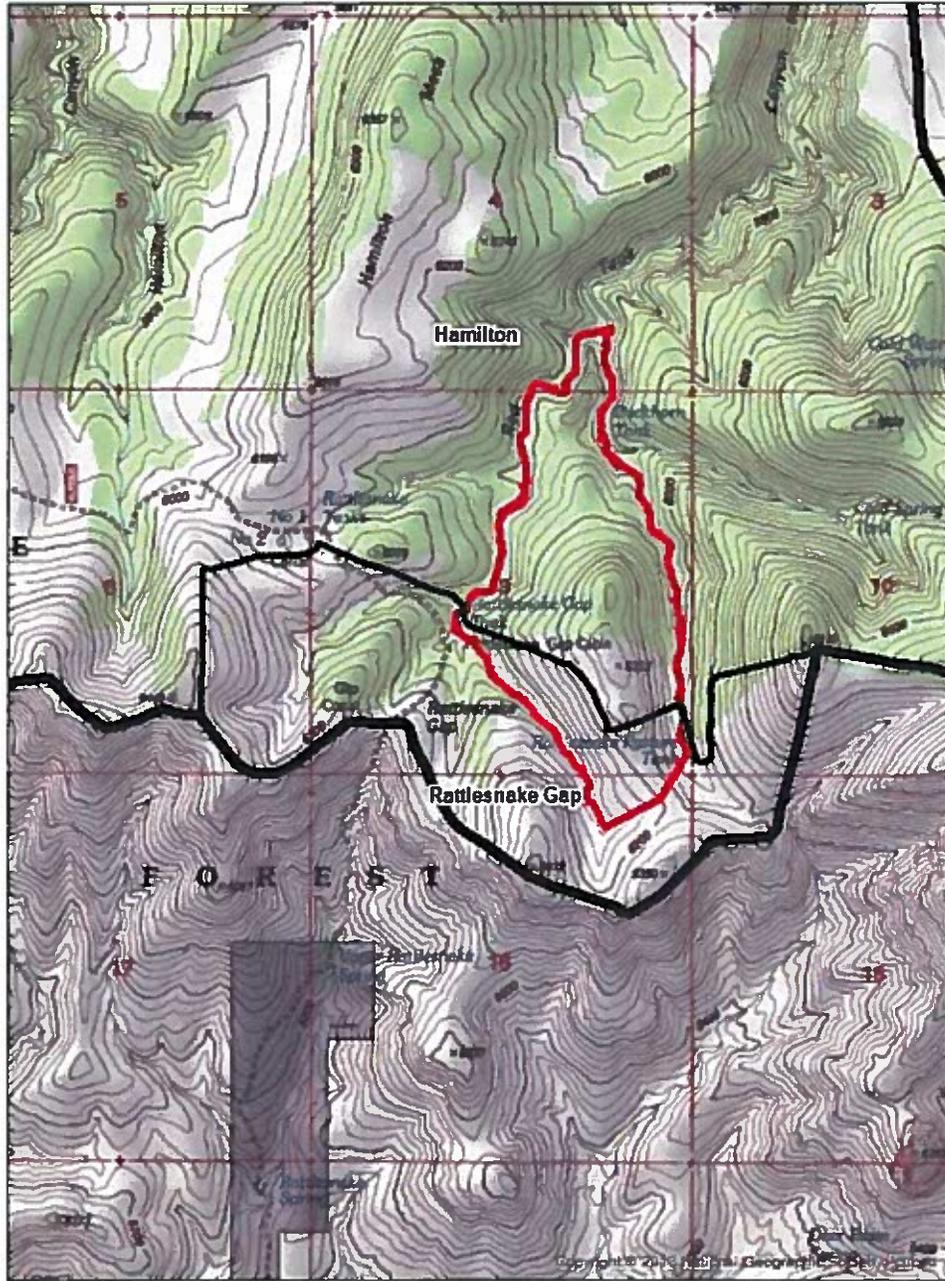
LITERATURE CITED

- Akins, C. 2015a. March 11, 2015, email transmission from C. Aikens (Arizona Game and Fish Department) to C. Crawford (USFWS) Re: Chiricahua leopard frog recovery unit 7 meeting highlights and supporting documents.
- Akins, C. 2015b. September 21, 2015 email transmission from C. Aikens (Arizona Game and Fish Department) to D. Smith (USFWS) Re: Leopard frog location information on the San Francisco River.
- Akins, C. 2015c. September 8, 2015 email transmission from C. Aikens (Arizona Game and Fish Department) to D. Smith (USFWS) Re: Leopard frog survey data for the Pleasant Valley and Hickey allotments.
- Akins, C. 2015d. August 20, 2015 email transmission from C. Aikens (Arizona Game and Fish Department) to D. Smith (USFWS) Re: Information on Rattlesnake Pasture and Buckhorn tanks on the Hickey Allotment.
- Akins, C. 2015e. September 9, 2015, email transmission from C. Aikens (Arizona Game and Fish Department) to C. Crawford (USFWS) Re: Stock tank cleaning and chytrid spread prevention.
- Akins, C. 2015f. September 10, 2015 email transmission from C. Aikens (Arizona Game and Fish Department) to D. Smith (USFWS) Re: Leopard frog survey frequency on the Hickey Allotment.
- Bartelt, P. E. 1998. *Bufo boreas* (Western Toad) mortality. *Herpetological Review* 29(2):96.
- Berger, L., R. Speare, P. Daszak, D.E. Green, A.A. Cunningham, C.L. Goggins, R. Slocombe, M.A. Ragan, A.D. Hyatt, K.R. McDonald, H.B. Hines, K.R. Lips, G. Marantelli, and H. Parkes. 1998. Chytridiomycosis causes amphibian mortality associated with population declines in the rain forests of Australia and Central America. *Proceedings of the National Academy of Science* 95:9031-9036.
- Crawford, C. 2015. May 22, 2015 email transmission from C. Crawford (USFWS) to D. Smith (USFWS) re: Chiricahua leopard frog survey and annual reports for the San Francisco River Management Unit, Recovery Unit 7.
- Degenhardt, W.G., C.W. Painter, and A.H. Price. 1996. *Amphibians and reptiles of New Mexico*. University of New Mexico Press, Albuquerque, New Mexico.
- Graves, A. 2015a. August 28, 2015 telephone call between A. Graves (Clifton Ranger District) and D. Smith (USFWS) Re: Pasture rotation schedule on the Hickey Allotment.

- Graves, A . 2015b. September 21, 2015 telephone call between A. Graves (Clifton Ranger District) and D. Smith (USFWS) Re: Stock tank maintenance responsibilities and future pasture rotation information.
- Graves, A . 2015c. August 26, 2015 email transmission from A. Graves (Clifton Ranger District) to D. Smith (USFWS) Re: Maintenance of stock tanks on the Hickey Allotment.
- Harding, J.H. 1997. Amphibians and Reptiles of the Great Lakes Region. The University of Michigan Press, Ann Arbor, Michigan.
- Lemos-Espinal, J.A., and H.M. Smith. 2007. Anfíbios y reptiles del Estado de Chihuahua, México/Amphibians and reptiles of the State of Chihuahua, México. Universidad Nacional Autónoma de México y CONABIO, México D.F.
- Longcore, J.E., A.P. Pessier, and D.K. Nichols. 1999. *Batrachyrium dendrobatidis* genus et species nova, a chytrid pathogenic to amphibians. *Mycologia* 91(2):219-227.
- Platz, J.E., and J.S. Mecham. 1984. *Rana chiricahuensis*. Catalogue of American Amphibians and Reptiles 347.1.
- Randall, K. 2015. December 3, 2015, email transmission from K. Randall (USFWS) to D. Smith (USFWS). Re: Partners for Fish and Wildlife Program projects supporting Chiricahua leopard frogs in the Chiricahua Mountains.
- Rorabaugh, J.C. 2008. An introduction to the herpetofauna of mainland Sonora, México, with comments on conservation and management. *Journal of the Arizona-Nevada Academy of Science* 40(1):20-65.
- Rosen, P.C., and C. Melendez. 2006. Observations on the status of aquatic turtles and ranid frogs in northwestern Mexico. Pages 104-106 *In* Extended Abstracts, Proceedings of the 6th Conference on Research and Resource Management in the Southwestern Deserts. USGS Southwest Biological Science Center, Sonoran Desert Research Station, Tucson, Arizona.
- Ross, D.A., J.K. Reaser, P. Kleeman, and D.L. Drake. 1999. *Rana luteiventris* (Columbia spotted frog). Mortality and site fidelity. *Herpetological Review* 30(3):163.
- Spencer-Morris, N. 2015. August 27, 2015, email transmission from N. Spencer-Morris (Clifton Ranger District) to D. Smith (USFWS) Re: Stock tank cleaning in the Hickey Allotment.
- Sredl, M.J., and R.D. Jennings. 2005. *Rana chiricahuensis*: Chiricahua leopard frogs. Pages 546-549 in M.J. Lannoo (Ed.), *Amphibian Declines: The Conservation Status of United States Species*. University of California Press, Berkeley, California.

- Sredl, M.J. and L.S. Saylor. 1998. Conservation and management zones and the role of earthen cattle tanks in conserving Arizona leopard frogs on large landscapes. Pages 211-225 *In* Proceedings of Symposium on Environmental, Economic, and Legal Issues Related to Rangeland Water Developments. November 13-15, 1997, Tempe, Arizona. 622 pages.
- U.S. Fish and Wildlife Service (USFWS). 1998. Endangered species consultation handbook. U.S. Fish and Wildlife Service and National Marine Fisheries Service, Washington, D.C.
- U.S. Fish and Wildlife Service (USFWS). 2002. Endangered and threatened wildlife and plants; Listing of the Chiricahua leopard frog (*Rana chiricahuensis*). Federal Register 67(114):41790-811.
- U.S. Fish and Wildlife Service (USFWS). 2003. Biological opinion: Blue and San Francisco Rivers Consultation. File Code Numbers 2-21-95-F-441, 2-21-95-F-442, 2-21-95-F-443, 2-21-95-F-446, 2-21-95-F-447, F2-21-01-F-105, F2-21-01-F-211, F2-21-01-F-300, F2-21-01-F-302, 2-21-01-F-303, 2-21-01-F-306, 2-21-01-F-307. Arizona Ecological Services Office, Phoenix, Arizona.
- U.S. Fish and Wildlife Service (USFWS). 2007. Chiricahua leopard frog (*Rana chiricahuensis*) recovery plan. Region 2, U.S. Fish and Wildlife Service, Albuquerque, New Mexico.
- U.S. Fish and Wildlife Service (USFWS). 2011. Chiricahua leopard frog (*Lithobates [=Rana] chiricahuensis*) 5-Year Review: Summary and Evaluation. Arizona Ecological Services Office, Phoenix, Arizona. 39 pages.
- U.S. Fish and Wildlife Service (USFWS). 2012. Endangered and threatened wildlife and plants; Listing and designation of critical habitat for the Chiricahua leopard frog. Federal Register 76(50):14126-41207.
- U.S. Forest Service. (USFS). 1989. Terrestrial ecosystems survey of the Apache-Sitgreaves National Forests. Southwest Region, Albuquerque, New Mexico. 453 pages.
- U.S. Forest Service. (USFS). 2013. Proposed land management plan for the Apache-Sitgreaves National Forests: Apache, Coconino, Greenlee and Navajo Counties, Arizona. Southwestern Region MB-R3-01-6. Albuquerque, New Mexico. 274 pages.

Map 2. Rattlesnake Gap Critical Habitat Unit (outlined in red) on the Hickey Allotment Clifton Ranger District, ASNFs, Arizona



APPENDIX B. CONCURRENCES

Loach Minnow and its Critical Habitat

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the loach minnow or its critical habitat for the following reasons:

- Loach minnow do not occupy those portions of the San Francisco River adjacent to the Hickey Allotment.
- The portions of the San Francisco River bordering this allotment which are designated as critical habitat for loach minnow are excluded from livestock grazing.
- Riparian pasture widths are adequate to buffer any upland grazing affects if present.

Spikedace and its Critical Habitat

We concur with your determination that the proposed action may affect, but is not likely to adversely affect spikedace or spikedace critical habitat for the following reasons:

- Spikedace do not occupy those portions of the San Francisco River adjacent to the Hickey Allotment.
- The portions of the San Francisco River bordering this allotment which are designated as critical habitat for spikedace are excluded from livestock grazing.
- Riparian pasture widths are adequate to buffer any upland grazing affects if present.

Gila chub and its Critical Habitat

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the Gila chub or its critical habitat for the following reasons:

- Gila chub do not inhabit the San Francisco River.
- The Hickey Allotment does not contain Gila chub or its critical habitat, nor does a significant portion of the allotment drain into habitat found north in Dix Creek on the Pleasant Valley Allotment.

Southwestern Willow Flycatcher and its Critical Habitat

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the southwestern willow flycatcher and its critical habitat for the following reasons:

- Southwestern willow flycatchers have not been detected breeding on the San Francisco River in the Action Area.
- All designated critical habitat is located within a livestock-excluded pasture on the San Francisco River.

Yellow-billed Cuckoo Proposed Critical Habitat

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the yellow-billed cuckoo and its proposed critical habitat for the following reasons:

- Yellow-billed cuckoos have not been detected breeding on the San Francisco River in the Hickey Allotment.
- The portions of the San Francisco River bordering this allotment which are designated as critical habitat for yellow-billed cuckoos are excluded from livestock grazing.

Narrow-headed Gartersnake and its Proposed Critical Habitat

We concur with your determination that the proposed action may affect, but is not likely to adversely affect the narrow-headed gartersnake for the following reasons:

- Livestock are excluded from narrow-headed gartersnake habitat and proposed critical habitat on the San Francisco River adjacent to this allotment.