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In Reply Refer To:
AESO/SE
22410-1999-F-0300-R2

July 1, 2008

Mr. Gene Blankenbaker
Forest Supervisor
Tonto National Forest
2324 East McDowell Road
Phoenix, Arizona 85006

Dear Mr. Blankenbaker:

Thank you for your June 11, 2008, request for reinitiation of formal section 7 consultation under the Endangered Species Act of 1973 (Act), as amended (16 U.S.C. 1531-1544 et seq.). At issue are effects to the Chiricahua leopard frog (*Rana chiricahuensis*) from proposed changes to your action that underwent formal consultation with a biological opinion issued on November 17, 2004. That consultation addressed the issuance of a term permit to graze livestock for 10 years on the Little Green Valley Complex Allotments within the Payson Ranger District of the Tonto National Forest (Tonto) near Payson, Gila County, Arizona. The November 17, 2004, biological opinion also addressed likely adverse effects to Mexican spotted owl (*Strix occidentalis lucida*) and Gila trout (*Oncorhynchus gilae gilae*). Our concurrence with your determinations that the proposed action may affect, but is not likely to adversely affect the Arizona agave (*Agave arizonica*), bald eagle (*Haliaetus leucocephalus*), southwestern willow flycatcher (*Empidonax traillii extimus*), Gila topminnow (*Poeciliopsis occidentalis occidentalis*), razorback sucker (*Xyrauchen texanus*), spikedace (*Meda fulgida*) and loach minnow (*Tiaroga cobitis*), and critical habitat for razorback sucker, spikedace, and loach minnow was also provided on November 17, 2004. These determinations remain the same and are not addressed herein.

All information and analysis, including the description of the action area and the life of the project, provided in the November 17, 2004, biological opinion is hereby incorporated by reference with the exception of the following changes to the proposed action (conservation measures) that were specified in your June 11, 2008 correspondence, unless otherwise noted. Additionally, updates to the environmental baseline and status of the Chiricahua leopard frog within the action area are provided below and included in Appendix 1. Lastly, we do not anticipate effects to the Chiricahua leopard frog from the proposed construction of fenceline discussed immediately below because they are of short duration, occur in a small area, and intensive survey efforts have not identified Chiricahua leopard frogs as present at these specific locations. However, the long-term purpose of these activities is to provide greater recovery potential for the species within this area and future reintroductions of head-started individuals are

reasonably certain to occur within the lifespan of the current term grazing permit. Thus, the potential for a greater number of individuals, along with some additional adverse affects by livestock grazing activities are anticipated, requiring updates to the November 17, 2004, effects analysis and accompanying Incidental Take Statement.

Updated Consultation History

Details on consultation history provided in the November 17, 2004 Biological Opinion are incorporated by reference. The following provides an update to relevant activities that have occurred since that time.

- **June 14-15, 2006:** Arizona Game and Fish Department (AGFD) personnel conducted Chiricahua leopard frog surveys in Ellison Creek, Tributary 3, and Tributary 4. Three Chiricahua leopard frogs were detected during this effort; one in Tributary 3 and two in Tributary 4.

- **August 28-29, 2006:** AGFD and Tonto personnel conducted additional Chiricahua leopard frog surveys in the three streams surveyed in June 2006. Chiricahua leopard frogs were not detected.

- **December 11, 2006:** Meeting between agency and conservation stakeholders held at the Tonto National Forest Supervisor's Office to discuss 2006 Chiricahua leopard frog positive survey findings, conservation and head-starting activities, potential allotment management plans, and preliminary consultation needs. Attendees included representatives from our office, the Tonto, AGFD, and the Phoenix Zoo.

- **January 17, 2007:** Meeting between project stakeholders (including permittee, Ray Tanner) held at the Tonto National Forest Supervisor's Office to discuss 2006 Chiricahua leopard frog survey findings, allotment management ideas, and potential consultation needs.

- **March 28- April 30, 2007:** Two to three survey days were dedicated each week between March 28 and April 30, 2007. The emphasis of the surveys was to find and collected Chiricahua leopard frog egg masses for head-starting at the Phoenix Zoo. Surveys targeted the three streams previously surveyed in 2006, and also additional streams and stock tanks identified in the surrounding vicinity. A total of nine survey-days were given to this effort; neither Chiricahua leopard frogs nor egg masses were detected.

- **June 12, 2007:** Tonto staff conducted low-water surveys of Tributaries 3 (Appendix 2, Figure 1 and 2) and 4 (Appendix 2, Figure 3) as well as Ellison Creek to identify where water is likely to remain perennial to help concentrate future egg mass surveys in areas where oviposition is likely to occur. GPS coordinates and pool habitat descriptions were generated for each of the pools identified in this effort.

- **December 3, 2007:** A meeting was held at the Payson Ranger District Office between representatives of the AGFD, the Tonto, and the Natural Resource Conservation Service to discuss 2007 survey findings and plan conservation activities and consultation needs for 2008.

- **January 14, 2008:** A meeting was held at the Payson Ranger District Office between representatives our office, the AGFD, and the Tonto to discuss and confirm survey, conservation, and consultation activities to be conducted in 2008 associated with the plans for modifying the 2004 biological opinion. Three survey days were scheduled per month during the spring and summer months.

- **May 12, 2008:** Representatives of our office, the AGFD, the Tonto, and the permittee, Ray Tanner met in the field to survey for egg masses, visit sites where proposed livestock and elk exclosures are to be constructed (see Description of the Proposed Action), and determine and delineate the final placement of fence lines to conclude cost estimates for the work.

- **June 11, 2008:** We received the request for reinitiation of formal consultation from the Tonto addressing changes to the proposed action consulted upon in November 2004, with the understanding that an expedited biological opinion would be needed.

- **June 19, 2008:** We discussed the draft biological opinion and requested additional information from the Tonto in an e-mail with respect to a map depicting the locations of proposed changes of exclusion fencing as well as survey data from 2006-current.

- **June 20, 2008:** We informally discussed the biological opinion and the long-term management strategy for Chiricahua leopard frogs on the Little Green Valley Complex with AGFD staff biologists.

- **June 24, 2008:** We informally discussed the biological opinion and the long-term management strategy for Chiricahua leopard frogs on the Little Green Valley Complex with Payson Ranger District personnel. Payson Ranger District staff agreed to forego draft review to facilitate project implementation.

BIOLOGICAL OPINION

PROPOSED ACTION (UPDATED)

The proposed action that was originally consulted upon in 2002 was a ten-year grazing permit for the Little Green Valley Complex, set to expire in 2012. This consultation was reinitiated in 2004 and biological opinion was issued on November 17, 2004. In that 2004 reinitiated consultation, two conservation measures were proposed for the Chiricahua leopard frog: 1) the construction 1.75 miles of fenceline to exclude livestock from a reach of Ellison Creek within the Moore Pasture where Chiricahua leopard frogs were considered extant at that time; and, 2) potential Chiricahua leopard frog habitat surrounding Gilliland and Wildcat springs was required to be excluded from livestock via the construction of fencing. This consultation has been reinitiated again to address changes to these 2004 conservation measures.

Because of new on-the-ground conservation opportunities, fencing will not be constructed along Ellison Creek or Gilliland and Wildcat springs, but instead be constructed in two new areas: 1) along Lewis Creek within the Moore Pasture, just east and downstream of the Ellison Creek Estates private in-holding; and, 2) an unnamed spring and adjacent, downstream stream channel along Tributary 4 (Appendix 2, Figure 3). Additionally, pool habitat along Tributary 3 (Appendix 2, Figure 1) has been identified and armored by Tonto staff using dead and downed trees to restrict elk and livestock access and significantly lessen the potential for trampling of egg masses or early-stage tadpoles. Along Lewis Creek, the total length of fenceline to be constructed will be 0.6 mile and will exclude approximately 0.25 mile of stream habitat. The unnamed spring adjacent to Tributary 4 will be protected from ungulate access using 0.2 mile of elk fencing constructed around the spring and associated pool as well as along a short distance of perennial downstream habitat. The total size of the exclosed area is approximately 1.5 acres. Material and construction costs for all exclosures have been funded by the AGFD and are scheduled to be completed prior to livestock access to these areas.

In addition to identifying these areas for protection, on-going surveys continue in the area in hopes of collecting egg masses for use in head-starting with the assistance of the Phoenix Zoo. Head-starting activities in partnership with the Phoenix Zoo have proven to be valuable in similar applications on the neighboring Pleasant Valley Ranger District, for the Gentry Creek Conservation and Management Zone (CMZ). If these surveys are unsuccessful in locating egg masses, plans are underway to cross genetic material with the closest extant Chiricahua leopard frog populations from east and west of Ellison Creek, Gentry Creek and the Buckskin Hills, respectively. Reproductively mature specimens from both locations are available for head-starting at the Phoenix Zoo. Late-stage tadpoles and metamorphosed frogs produced from this effort will then be released into the Tributary 4 and Lewis Creek exclosures created as part of this reinitiation of formal consultation.

Rationale for Changes to Original Proposed Action

As stated above, 1.75 miles of Ellison Creek were to be excluded from livestock access (approximately 50 percent of the pasture) as well as two springs, Gilliland and Wildcat, prior to use by livestock. Ellison Creek is currently occupied by both salmonid and centrarchid species of nonnative fish. The last record of Chiricahua leopard frogs on the allotment, prior to the 2006 observation of three individuals in Tributaries 3 (one frog) and 4 (two frogs), was in 1998 on Ellison Creek within the Ellison Pasture (see 2004 biological opinion). Intensive survey efforts in Ellison Creek since that time have failed to document the species. Both Gilliland and Wildcat springs have been significantly impacted by ungulates, are not likely to provide suitable habitat in the near term, and have not been documented as being occupied by Chiricahua leopard frogs. Other locations on the allotment have been determined to be more suitable for the species than Ellison Creek.

In the spirit of cooperative conservation, several meetings involving public and private stakeholders were held from 2006-current to discuss the best strategy to provide both opportunities for Chiricahua leopard frog recovery and more flexibility for livestock management within the Little Green Valley Complex. These discussions focused on species documentation in 2006, and the identification and preservation of pool habitat most important to conservation and recovery of the species. Chiricahua leopard frogs are most sensitive to direct effects of livestock grazing at the beginning of their life cycle, as egg masses or early-stage tadpoles. In the case of egg masses, this is because they are often attached to vegetation along the shallow banks of pools where livestock will stand to drink. Early-stage tadpoles are susceptible because they are have very limited mobility and often reside motionless near their hatching place until they gain the strength and size required for enhanced aquatic mobility. For these reasons, pool habitat is particularly important for Chiricahua leopard frog conservation and recovery. Within this context, AGFD, Tonto, my staff, with the assistance of Mr. Tanner, have conducted extensive habitat mapping surveys in an effort to identify stream pools within the area of the 2006 species observations that possess these conservation values; these data are maintained in our files. The three areas that provide the best scenario for oviposition opportunities, local recovery potential, and require protection from livestock access are identified and described below.

STATUS OF THE SPECIES (UPDATED)

The status of the Mexican spotted owl and Gila trout were addressed in the 2004 biological opinion. Updates on those species can be found on our website.

Chiricahua Leopard Frog

Rangewide

We listed the Chiricahua leopard frog as a threatened species without critical habitat on June 13, 2002 (USFWS 2002). A recovery plan was completed in 2007 (USFWS 2007). Threats to Chiricahua leopard frogs include predation by nonnative organisms, especially bullfrogs (*Rana catesbeiana*), fish including Salmonidae and Centrarchidae (such as *Micropterus* spp. and *Lepomis* spp.), and crayfish (*Orconectes virilis* and possibly others); disease; drought; floods; degradation and loss of habitat as a result of water diversions and groundwater pumping, improper livestock management, altered fire regimes due to fire suppression and livestock grazing, mining, development, and other human activities; disruption of metapopulation dynamics; increased chance of extirpation or extinction resulting from small numbers of populations and individuals; and environmental contamination. The Chiricahua leopard frog has disappeared from more than 75 percent of its historical localities (Clarkson and Rorabaugh 1989, Jennings 1995, Rosen *et al.* 1996, Sredl *et al.* 1997, Painter 2000, USFWS files). Loss of populations is part of a pattern of global amphibian decline, suggesting other regional or global causes of decline may be important as well (Carey *et al.* 2001).

The Chiricahua leopard frog is an inhabitant of cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,281 to 8,890 feet in central and southeastern Arizona; west-central and southwestern New Mexico; and in Mexico, northern Sonora and the Sierra Madre Occidental of Chihuahua (Platz and Mecham 1984, Degenhardt *et al.* 1996, Sredl *et al.* 1997, Sredl and Jennings 2005). In New Mexico, of sites occupied by Chiricahua leopard frogs from

1994-1999, 67 percent were creeks or rivers, 17 percent were springs or spring runs, and 12 percent were stock tanks (Painter 2000). In Arizona, slightly more than half of all known historical localities are natural lotic systems, a little less than half are stock tanks, and the remaining locations are lakes and reservoirs (Sredl *et al.* 1997). Sixty-three percent of populations extant in Arizona from 1993-1996 were found in stock tanks (Sredl and Saylor 1998).

Northern populations of the Chiricahua leopard frog along the Mogollon Rim and in the mountains of west-central New Mexico are disjunct from those in southeastern Arizona, southwestern New Mexico, and Mexico. Recent genetic analyses support describing the northern populations as a distinct species (Benedict and Quinn 1999, Platz and Grudzien 1999, Goldberg *et al.* 2004). Goldberg *et al.* (2004) present evidence that *R. subaquavocalis* (Ramsey Canyon leopard frog) and *R. chiricahuensis* may be conspecific.

The species is still extant in most major drainages in Arizona and adjacent areas of 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 (Painter 2000, Sredl *et al.* 1997, USFWS files). However, it has not been found recently in many rivers, valleys, and mountain ranges, including the following in Arizona: White River, West Clear Creek, Tonto Creek, Verde River mainstem, San Francisco River, San Carlos River, upper San Pedro River mainstem, Santa Cruz River mainstem, Aravaipa Creek, Babocomari River mainstem, and Sonoita Creek mainstem. In southeastern Arizona, no recent records (1995 to the present) exist for the following mountain ranges or valleys: Pinaleno Mountains, Peloncillo Mountains, Sulphur Springs Valley, and Huachuca Mountains. Moreover, the species is now absent from all but one of the southeastern Arizona valley-bottom cienega complexes. In many of these regions, Chiricahua leopard frogs were not found for a decade or more despite repeated surveys. Recent surveys suggest that the species may have recently disappeared from some of the major drainages in New Mexico (R. Jennings pers. comm. 2004).

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

The dispersal abilities of Chiricahua leopard frogs are key to determining the likelihood that suitable habitats will be colonized from a nearby extant population. Evidence exists to show substantial movements of leopard frogs and passive movement of tadpoles along stream courses. Current guidance, supported by scientific literature, suggests dispersal of Chiricahua leopard frogs can be up to one mile overland, three miles within intermittent drainages, and five miles within perennial drainages. Dispersal of this species is largely thought to occur during the summer monsoon.

Within the last decade, a chytridiomycete skin fungus (*Batrachochytrium dendrobatidis*) (Bd) has been recognized as an important contributor to global declines of frogs, toads, and salamanders (Speare and Berger 2000; Longcore *et al.* 1999; Berger *et al.* 1998; Daszak 2000; Hale 2001). Bd does not have an airborne spore, so it must spread via other means, including the international pet trade (Europe and USA), outdoor pond supplies (USA), zoo trade (Europe and USA), or laboratory supply houses (USA).

Bd could also be spread by people (and terrestrial animals) moving among various tanks and/or by personnel sampling aquatic habitats (Halliday 1998). The fungus can exist in water or mud and spread by wet or muddy boots, vehicles, livestock, and other animals moving among aquatic sites, or during scientific sampling of fish, amphibians, or other aquatic organisms.

Studies indicate that declines and extirpations of Chiricahua leopard frogs are at least in part caused by predation and possibly competition by nonnative organisms, including fish in the family Centrarchidae, bullfrogs, tiger salamanders, crayfish, and several other species of fish (Fernandez and Rosen 1996; 1998; Rosen *et al.* 1994; 1996; Snyder *et al.* 1996; Fernandez and Bagnara 1995; Sredl and Howland 1994; Clarkson and Rorabaugh 1989).

Actions that result in changes to the water quality and quantity of the leopard frog's habitats can result in negative impacts on the species. These actions include wildfire suppression, prescribed fire, wildland-fire use, road-management activities, recreational use, water extraction, and livestock grazing among other actions. Some of these actions in habitat and upslope may result in soil or ash depositing in occupied waters, decreasing the quantity or quality of water, reducing riparian vegetation, smothering eggs and tadpoles, and reducing the macroinvertebrate community used as a prey base. A lack of vegetation in and upslope of habitat may result in less dependable water quantity and other structural characteristics that Chiricahua leopard frogs may require. These indirect effects have the capability of affecting the numbers and reproduction of the species and may result in a change in its distribution, if isolated populations are locally extirpated and recolonization from adjacent sites is not feasible.

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

Recovery Unit 5

The recovery plan for Chiricahua leopard frog (USFWS 2007) delineated eight recovery units in key areas that were targeted as valuable in the recovery of this species. The action area considered under this consultation lies within Recovery Unit 5, which is delineated on the west by the Verde River southeast of Camp Verde, to the north along the interface between the forested mountains and the grasslands and pinyon-juniper woodlands of the Colorado Plateau, to the east where elevations rise into the White Mountains, and to the south where elevations drop below about 4,000 feet which corresponds to the presumed lower limit of the frog's distribution within the recovery unit. Five management units have been delineated within Recovery Unit 5. The action area for this project resides within the Upper East Verde Management Area. The establishment of a metapopulation and a buffer population (relatively isolated population that

may serve as a source population if necessary) of Chiricahua leopard frogs within this management area will meet its recovery goals according to the recovery plan (USFWS 2007).

Within Recovery Unit 5, the Chiricahua leopard frog was recently known from three presumed metapopulations: 1) the Buckskin Hills area of the Coconino National Forest (Fossil Creek drainage); 2) the upper Ellison Creek drainage within the Payson Ranger District of the Tonto; and 3) the Cherry and Crouch creek area near Young within the Pleasant Valley Ranger District on the Tonto, which is also referred to as the Gentry Creek CMZ.

In the Buckskin Hills, Chiricahua leopard frogs were observed at 15 different livestock tanks during the 1990s and early 2000s. However, invasion by nonnative predators and drought reduced the number of occupied tanks dramatically by the end of 2002. In 2002, Chiricahua leopard frogs were salvaged from Walt's Tank as it was going dry, and were transferred to the Arizona-Sonora Desert Museum for temporary holding. The tank was renovated and refilled, and the frogs were repatriated in 2003. Water was pumped to Sycamore Basin Tank to prevent it from drying and to conserve the frog population there. Five tanks in the area were chemically renovated to remove nonnative fishes, which are expected to provide additional habitat for the frogs. At that time only a small number of frogs were known to occupy two tanks. In September 2005, four frogs were salvaged and taken to the Phoenix Zoo for captive breeding in the hope of creating a source of animals for reestablishment projects. One of the four frogs died, but the effort has produced two viable egg masses. Earlier this year, adult frogs were collected from the Gentry Creek CMZ and crossed with specimens previously collected from the Buckskin Hills due to low survivorship of previous egg masses generated by pure Buckskin breeding attempts and as a result of concerns about the advanced age of some of the Buckskin specimens maintained in captivity. Egg masses generated by this cross have since hatched and are currently being head-started at the Phoenix Zoo for reintroduction into the Buckskin Hills.

As of 2005, four distinct, occupied subpopulations comprised the metapopulation of Chiricahua leopard frogs within the Gentry Creek CMZ of the Gentry Creek Management Area: 1) Bottle Spring; 2) Carroll Spring; 3) Crouch Creek; and 4) West Prong Gentry Creek.

In 2005 and 2006, several habitat-improvement projects, which included sediment removal and fence reconstruction, were initiated in occupied sites or sites where Chiricahua leopard frog reintroductions were planned within the Gentry Creek CMZ. In 2006 and subsequent to those efforts, 25 tadpoles and metamorphosed frogs were released at both Bottle Spring and Carroll Spring to augment the extant populations at those sites. Additionally, a total of 49 tadpoles and metamorphs were released at Crouch Creek to augment the extant population at that locality.

Additionally in 2006, two historical sites that were extirpated of Chiricahua leopard frog, Ramer Tank and Pine Spring, were reintroduced with 662 and 400 tadpoles and metamorphosed frogs, respectively, which were head-started with the assistance of the Phoenix Zoo. These two sites occur within wildlife exclosures on the Red Lake Allotment within the Red Lake and Gentry pastures, respectively. The day that tadpoles and metamorphosed frogs were released into these sites, a low pressure weather system had settled in the area which brought significant amounts of precipitation. These wet conditions provided the opportunity for some of the newly released metamorphosed frogs to disperse out of these sites, using either drainages or overland travel as dispersal routes, given the wet conditions. Subsequent surveys at these locations have indicated partial success of these reintroduction efforts. Surveys at Ramer Tank have failed to document

any Chiricahua leopard frogs on repeated visits. However, survey efforts at Pine Spring in May of this year documented 18 sub-adult frogs occupying the release site and habitat immediately downstream, with more individuals likely present but undetected.

In September 2007, over 400 late-stage tadpoles and metamorphosed frogs were released in upper Cherry Creek that were produced from egg masses collected from Carroll Spring earlier that year. On the same day those frogs were released, a single individual was discovered in upper Cherry Creek that indicates natural dispersal had occurred from a nearby extant locality (likely from Bottle Springs which is approximately 1.5 miles away within drainage). Natural dispersal was also documented in 2007 at H-Y Tank and at an unnamed stock tank created that year within the Red Lake allotment in close proximity to Carroll Spring (the likely source of the frog). Since reintroductions efforts have begun in 2006, no reproduction of Chiricahua leopard frogs has been documented at any of the sites that received reintroduced frogs. However, we anticipate reproduction to occur at Pine Spring when those individuals reach reproductive status late this year or next year. Additional reintroductions and/or augmentations are anticipated in late summer of this year from head-starting efforts of two egg masses discovered on separate occasions at West Prong Gentry Creek. Currently, a total of seven localities are presumed to be occupied by Chiricahua leopard frogs within the Gentry Creek CMZ.

A complete list of all consultations affecting this species in Arizona can be found on our website (http://www.fws.gov/southwest/es/arizona/) by clicking on the “Document Library” tab and then on the “Section 7 Biological Opinions” tab. Survey work and recovery projects also occur periodically, and are summarized in the appropriate land-management agency or AGFD documents as well as in the BAE associated with this project.

ENVIRONMENTAL BASELINE (UPDATED)

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 information for the Chiricahua leopard frog within the action area was provided in the November 2004, biological opinion and is incorporated herein by reference. However, a significant amount of survey effort has been afforded to this area since that consultation. Appendix 1 includes survey reports provided by the AGFD that provide ecological observations made during the various surveys (attached). We incorporate those findings by reference. General environmental baseline discussion is also incorporated herein by reference. The following discussion provides additional information regarding ecological observations made during survey efforts that have occurred since the November 2004 biological opinion, as well as a description of three important conservation areas (Lewis Creek, Tributary 3, and Tributary 4).

The Chiricahua leopard frog uses riparian herbaceous vegetation for cover, thermoregulation, and foraging including areas on the Little Green Valley Complex. Clary and Webster (1989) noted that excessive grazing and trampling from livestock can affect riparian and stream communities by reducing or eliminating this vegetation, causing channel aggradation or

degradation, causing widening or incisement of stream channels, and changing streambank morphology, with the cumulative result of lowering corresponding water tables. These effects, while attributed largely to elk in many areas of the allotment, can be easily disguised by on-going watershed perturbations caused by the 1990 Dude Fire and demonstrate the relative fragility of potential habitat on the Little Green Valley Complex. However, even when livestock access to riparian areas is restricted, grazing in the uplands can lead to soil compaction and decreased filtering capacity of vegetation. These effects increase the speed and amount of runoff from the uplands, which contributes heightened, unnatural amounts of sediment in aquatic habitat. This situation is further adversely affected by elk which cause significant damage to bankside vegetation while further contributing to sedimentation of the pool habitat. These siltation damages the suitability of that habitat and fills in pools, which may affect their permanency during extended dry periods (Sartz and Tolsted 1974; Weltz and Wood 1986; Orodho *et al*. 1990; Trimble and Mendel 1995; Pearce *et al*. 1998). However, effects from upland erosion have been attenuated by the significant amount of relatively unpalatable Layman's lovegrass that has invaded the area of the 1990 Dude Fire.

Lewis Creek

The habitat within the proposed exclosure along Lewis Creek is spatially perennial and contains a series of moderate to large-sized pools bordered with bankside vegetation, undercut banks, and adequate sun exposure for thermoregulation and foraging which are all habitat variables preferred by Chiricahua leopard frogs. This area is approximately 5,600-5,800 feet in elevation. This stream reach has been surveyed recently on numerous occasions (see updated Chiricahua leopard frog status discussion below) by representatives of the AGFD, the Tonto, and my staff. These survey efforts have not detected Chiricahua leopard frogs in this immediate area; however consensus opinion of the surveyors is that numerous pools within this particular reach provide reliable water and suitable habitat for reproduction and oviposition of Chiricahua leopard frog egg masses to serve as a potential source population within the Ellison Creek metapopulation.

Tributary 3

Tributary 3 is a perennial, small-order stream that drains from the east of Ellison Creek and is a tributary to Ellison Creek. Headwaters of Tributary 3 form at approximately 6,700 feet elevation and reach their confluence with Ellison Creek at approximately 6,100 feet elevation. This stream courses through an area that burned during the 1990 Dude Fire which is characterized by an open canopy and significant amounts of dead and downed trees along and within the steam channel which make human and/or ungulate access problematic (see Appendix 2, Figure 1). The stream is narrow, incised, and has a moderately high gradient in most reaches which is not generally preferred by Chiricahua leopard frogs. However, a few small to moderately sized pools exist within short reaches of Tributary 3 where stream gradient lessens and log jams provide plunge pools (see Appendix 2, Figure 2). Structurally, these pools are potential habitat for Chiricahua leopard frog oviposition and also maintain adequate vegetative growth to support adequate prey density and provide protective cover.

Tributary 4

Tributary 4 is a spatially intermittent small-order stream that also drains from the east of Ellison Creek and is also a tributary to Ellison Creek. Although not the extent of Tributary 3, several

downed trees occur along this drainage as well because it partially flows through burned areas within the 1990 Dude burn. Short reaches of Tributary 4 are deeply incised, some 15 feet or more below bankline. Downed trees and debris have formed significant log jams (see Appendix 2, Figure 3) within the stream channel which has consequently slowed flood pulses and formed more pools, potentially enhancing the probability for Chiricahua leopard frog occupation. There is significantly more pool habitat in Tributary 4 than there is in Tributary 3. Immediately upstream of the conjunction of the Highline Trail and Tributary 4, an unnamed spring creates an extensive, perennial pool that occurs within the floodplain of Tributary 4 but adjacent to the active channel itself (see Appendix 2, Figure 4). This spring-fed pool is approximately 10 feet by 20 feet in size and is protected from flood-related scouring by a significant, boulder-reinforced, earthen berm that is approximately 4-5 feet tall and is located on the upstream side of the pool.

EFFECTS OF THE ACTION (UPDATED)

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

Chiricahua Leopard Frog

This reinitiated consultation is expected to result in benefits to the Chiricahua leopard frog. The revised fencing strategy and plans for additional reintroductions of the species will contribute to the species conservation. However, livestock grazing can cause a decline in diversity, abundance, and species composition of riparian herpetofauna communities from direct or indirect threats including: (1) declines in the structural richness of the vegetative community; (2) losses or reductions of the prey base; (3) increased aridity of habitat; (4) loss of thermal cover and protection from predators; and (5) a rise in water temperatures to levels lethal to larval stages of amphibian and fish development (Szaro *et al*. 1985; Schulz and Leininger 1990; Belsky *et al*. 1999). Livestock grazing may also lead to a loss in soil fertility from erosion and gaseous emissions spurred by a reduction in vegetative ground cover, particularly at lower elevations (Schlesinger *et al*. 1990). Specific attributes of ecosystems, such as composition, function, and structure, have been documented as being altered by improper livestock management through a variety of means including: (1) decreasing the density and biomass of individual species, reducing species richness, and changing biological community organization; (2) interfering with nutrient cycling and ecological succession; and (3) changing vegetation stratification, contributing to soil erosion, and decreasing availability of water to biotic communities (Fleischner 1994). These effects may occur but are expected to be attenuated through consistent monitoring and adaptive management as proposed by the Tonto in their livestock management plan for the Little Green Valley Complex.

Management of stock tanks is an important consideration for Chiricahua leopard frog. Stock tanks can be intermediary “stepping stones” in the dispersal of nonnative species from larger

source populations to new areas (Rosen *et al*. 2001). Stock tanks have facilitated the spread of nonnative species of fish, amphibians, and crayfish when they are intentionally or unintentionally stocked by anglers and private landowners (Rosen *et al*. 2001). Stock tanks that receive heavy livestock use may become fouled to such a point they may become toxic to frogs. Dense bank and aquatic vegetation is an important habitat characteristic for the Chiricahua leopard frog that can be affected if the impoundment receives too much grazing use, which may lead to trampling or overgrazing of the bankside vegetation. Alternatively, well-managed stock tanks provide important habitat for Chiricahua leopard frogs, especially when the tank remains devoid of nonnative species; provides adequate vegetation cover; and provides reliable water sources in periods of prolonged drought. This will be especially important for the duration of this term grazing permit considering the on-the-ground reintroduction activities that are planned. Given these benefits of well-managed stock tanks, we believe well-managed stock tanks are an important component to Chiricahua leopard frog recovery and are expected to significantly contribute to Chiricahua leopard frog conservation on the Little Green Valley Complex in the long-term.

Livestock management on the Little Green Valley Complex is expected to maintain suitable habitat as a result of distribution of livestock across the entire grazing space although some adverse effects can not be avoided. Fleischner (1994) found that "Because livestock congregate in riparian ecosystems, which are among the most biologically rich habitats in arid and semiarid regions, the ecological costs of grazing are magnified at these sites." Stromberg and Chew (2002) and Trimble and Mendel (1995) also discussed the propensity for livestock to remain within or adjacent to riparian communities. Trimble and Mendel (1995) stated that "Cows, unlike sheep, appear to love water and spend an inordinate amount of time together lounging in streams and ponds, especially in summer (surface-active season for reptiles and amphibians), sometimes going in and coming out several times in the course of a day." These livestock behaviors can be expected to occur on the Little Green Valley Complex as well, and have been observed along Tributary 4 during survey efforts (Bill Burger, AGFD, pers. obs.). Expectedly, this inactive behavior is more pronounced in more arid regions (Trimble and Mendel 1995). In one rangeland study, it was concluded that 81 percent of the vegetation that was removed by livestock was from a riparian area which amounted to only two percent of the total grazing space (Trimble and Mendel 1995). Another study reported that grazing rates were 5 to 30 times higher in riparian areas than on the uplands which may be due in part to several factors: (1) higher forage volume and palatability of species in riparian areas; (2) water availability; (3) the close proximity of riparian areas to the best upland grazing sites; and (4) microclimatic features such as cooler temperatures and shade (Trimble and Mendel 1995). These studies illustrate the propensity for riparian habitat to easily become overgrazed, especially in a drought cycle within an arid region such as the Little Green Valley Complex. Adaptive management and on-the-ground monitoring are designed to limit this occurrence.

Direct mortality of amphibian species, in all life stages, from being trampled by livestock has been documented in the literature (see Bartelt 1998; Ross *et al*. 1999) but most likely occurs to egg masses. The Tonto has taken measures to reduce the likelihood of trampling of egg masses by identifying pool habitat within Tributary 3 and armoring these areas using dead and downed trees. The construction of exclosures around other likely egg mass oviposition sites furthers protective measures on the allotment as described above. Direct mortality may also occur from livestock tank maintenance activities in occupied habitat, although the Tonto will take measures to minimize effects of tank maintenance by using the protocol outlined in Appendix A of the

recovery plan (USFWS 2007). Other areas, like the spring on Tributary 4 (Appendix 2, Figure 4) will be excluded from all ungulate access.

In review of the potential effects to occupied Chiricahua leopard frog habitat and individual frogs discussed above, and in acknowledgement of the head-starting the reintroduction activities planned for Chiricahua leopard frogs in this area, we are reasonably certain that trampling of egg masses, early-stage tadpoles, or dormant-season metamorphosed frogs, will occur at some rate over the remaining 4 years of the grazing permit. Additionally, we are reasonably certain that adverse effects to bankside and aquatic vegetation in occupied habitat, causing loss of cover for frogs, will also occur at some level during the duration of this proposed action. We anticipate these direct and indirect effects could occur on any of the current or future habitat areas such as Tributary 3 or habitat in the vicinity of livestock-excluded reintroduction sites within the Little Green Valley Complex.

While watershed effects such as increased siltation are often associated with livestock grazing of upland habitats, we are reasonably certain that monitoring, conservative use, and adaptive management proposed by the Tonto for the Little Green Valley Complex, as well as the influence of significant grass cover established after the 1990 Dude Fire, will minimize any potential effects of upland grazing on occupied habitat in the area of reintroduction sites.

CUMULATIVE EFFECTS

Cumulative effects include those of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions are subject to the consultation requirements established under section 7 and, therefore, are not considered cumulative in the proposed action. Cumulative effects discussed in the 2004 biological opinion are expected to continue under this reinitiated biological opinion.

CONCLUSION

Our conclusions remain the same for Mexican spotted owl and Gila trout as stated in the 2004 biological opinion.

Chiricahua Leopard Frog

After reviewing the current status of the Chiricahua leopard frog, the environmental baseline for the action area, the effects of the revised proposed grazing authorization and strategy for the Little Green Valley Complex, and the cumulative effects, it is our biological opinion that the proposed action is not likely to jeopardize the continued existence of the Chiricahua leopard frog. We make this finding for the following reasons:

1. Livestock grazing will be excluded from key habitats identified within the action area as particularly important for Chiricahua leopard frog egg mass oviposition providing significant protections to the most vulnerable life stage of the species.

2. The Tonto will coordinate with AGFD and our office to ensure that management of the allotment is consistent with the recommendations of the Chiricahua Leopard Frog Recovery Plan (USFWS 2007).

3. A Chiricahua leopard frog head-start program has been developed in coordination with the Phoenix Zoo, the AGFD, and other stakeholders for reintroduction of the species in the action area using the habitat protected for egg mass oviposition which is expected to provide a significant improvement in the status of the species within the action area over time.

INCIDENTAL TAKE STATEMENT

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

The measures described below are non-discretionary, and must be undertaken by the Forest Service so that they become binding conditions of any grant or permit issued to the applicant, as appropriate, for the exemption in section 7(o)(2) to apply. The Forest Service has a continuing duty to regulate the activity covered by this incidental take statement. If the Forest Service (1) fails to assume and implement the terms and conditions or (2) fails to require the permittee to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant document, the protective coverage of section 7(o)(2) may lapse. In order to monitor the impact of incidental take, the Forest Service must report the progress of the action and its impact on the species to the FWS as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT OR EXTENT OF TAKE

No new incidental take is anticipated for Mexican spotted owl or Gila trout. We anticipate that the proposed action is reasonably certain to result in incidental take of Chiricahua leopard frogs. However, it is difficult to quantify the number of individual frogs taken because: (1) dead or impaired individuals are difficult to find and losses may be masked by seasonal fluctuations in environmental conditions; (2) the status of the species could change over time through immigration, emigration, and loss or creation of habitat; and (3) the species is small-bodied, well camouflaged, and occurs under water of varying clarity. For these reasons, we will attribute take at the sub-population level (hereinafter referred to as occupied sites) as addressed in the Programmatic Biological and Conference Opinion on the Continued Implementation of the Land and Resource Implementation Plans for the Eleven National Forests and National Grasslands of the Southwest Region (USFWS 2005). We anticipate all of the following forms of take over the remaining life of the project:

1. Direct mortality or injury of a proportion of Chiricahua leopard frog adults, metamorphs, tadpoles, or egg masses at one occupied livestock tank where maintenance activities result in significant disturbance at the tank (e.g., dredging or silt removal, major repair of berms).

2. Direct mortality or injury through trampling of a proportion of Chiricahua leopard frog adults, metamorphs, tadpoles, or egg masses at one occupied site in a summer pasture from March through October; and trampling of small tadpoles and overwintering frogs at one occupied site in a winter pasture where cattle have access from November through February.

3. Harm or harassment including lost productivity of a proportion of Chiricahua leopard frogs due to loss of bankline and emergent vegetation cover, increased sedimentation of pools, or other forms of habitat at one occupied site where cattle contribute to erosion within or upstream of these sites.

4. Harassment of a proportion of Chiricahua leopard frogs at one occupied livestock tank due to unintentional benefit to, or facilitation of, nonnative bullfrogs, fish, salamanders, or crayfish that immigrate to newly constructed livestock tanks from nearby populations, existing or introduced.

Occupancy of suitable habitat within a Chiricahua leopard frog metapopulation is dynamic. Discovery of new populations, recolonizations of extirpated sites, and extirpation of occupied sites are common occurrences with this species; therefore, we expect that over the life of this proposed action, sites where take may occur (sites occupied by Chiricahua leopard frogs) will change across the allotment. The above anticipated take considers the dynamic nature of frog occupancy; thus, we do not believe reinitiation is needed whenever a new population of Chiricahua leopard frogs is found, or frogs in a particular livestock tank are periodically absent. However, take is considered to be exceeded if all four scenarios listed above are exceeded during the life of this project.

We also reviewed the prescriptions for take outlined on pages 270 and 271 of the LRMP BO to identify when take has been exceeded. In the LRMP BO and as of June 10, 2005, the Payson Ranger District was identified as possessing one extant population of Chiricahua leopard frogs. As provided for in the LRMP BO, the authorized level of incidental take of Chiricahua leopard frogs from the proposed action will be exceeded if, after a period of two consecutive years, there is a decrease in the total number of occupied Chiricahua leopard frogs population sites on the Payson Ranger District of the Tonto National Forest as a result of the proposed action. In other words and in this example, if after a period of two consecutive years, the species is considered extirpated from the Payson Ranger District as a result of livestock management, take will have been exceeded. The amount or extent of take anticipated in this biological opinion may potentially exceed that provided for in the LRMP BO. However, the amount or extent of take anticipated in this biological opinion is predicated upon the reintroduction of Chiricahua leopard frogs as a result of head-starting activities anticipated to occur next year. Therefore, a much larger number of Chiricahua leopard frogs will be extant within the action area and potentially taken through any or all of the means anticipated herein.

EFFECT OF THE TAKE

In this biological opinion, we determine that this level of anticipated take is not likely to result in jeopardy to Chiricahua leopard frogs. No additional effects are expected to either Mexican spotted owl or Gila trout.

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

In order to be exempt from the prohibitions of section 9 of the Act, the Tonto must comply with the following terms and conditions (T&Cs), which implement the reasonable and prudent measures (RPMs) and outline required reporting/monitoring requirements. These terms and conditions are non-discretionary.

The following reasonable and prudent measures and terms and conditions are necessary and appropriate to minimize take of Chiricahua leopard frogs:

1. Ensure the continued integrity of all pasture boundary or livestock exclosure fence lines when adjacent to areas known to be occupied by Chiricahua leopard frogs, and ensure that trespass livestock are removed as soon as possible.

    a. The Tonto shall inspect pasture boundary and livestock exclosure fence lines that are adjacent to areas known to be occupied by Chiricahua leopard frogs immediately prior to pasture use.

    b. The Tonto shall ensure that any trespass livestock that are observed in unauthorized areas are removed from those areas within 48 hours of their discovery, ensure fence repairs are completed as soon as practicable, and initiate corrective actions immediately to avoid future breaches.

2. Take appropriate actions to help prevent nonnative species such as sportfish, crayfish, or bullfrogs from becoming established in livestock waters that occur in the allotment complex.

    a. The Tonto shall work with our office to develop a schedule to conduct annual surveys as per approved protocol (e.g. one-half of all stock tanks on alternating years).

    b. If nonnative species are detected in stock tanks, the Tonto shall immediately initiate a multi-stakeholder planning effort to remove the nonnative species from the stock tank as quickly as possible. If a complete drying of a stock tank is deemed as the most effective management tool to address the threat of nonnatives, the Tonto may time this action so as to not place an unnecessary burden on the permittee.

3. Reporting requirements to our office.

    a. The Tonto shall notify (written correspondence, e-mail, or phone call) our office as soon as practicable of any observation of any pasture boundary or exclusion fenceline failure or fenceline disrepair that is adjacent to known occupied habitat within the Little

Green Valley Complex; with information on the corrective actions were implemented and when pursuant to the T&C and RPM items 1.a. and 1.b. above.

b. The Tonto shall notify (written correspondence, e-mail, or phone call) our office as soon as practicable after its observed occurrence, any observation of trespass livestock in unauthorized areas of the Little Green Valley Complex; what corrective actions were implemented and when pursuant to the T&C and RPM items 1.a. and 1.b. above.

c. The Tonto shall notify (written correspondence, e-mail, or phone call) our office as soon as practicable of the observed occurrence, or the discovery of nonnative species in any newly constructed stock tank to provide for collaborative emergency planning and corrective action as required in T&C and RPM items 3.a. and 3.b. above.

d. The Tonto shall submit an annual summary report to our office by January 1 each year during project implementation. These reports shall briefly document, for the previous calendar year, the results of any monitoring efforts conducted, a summary of any situations (and their corrective actions), that pertain to above items, and the fence line inspection findings from the previous year. The report shall also make recommendations for modifying or refining these terms and conditions to enhance listed species protection.

Review requirement: The reasonable and prudent measures, with their implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action. If, during the course of the action, the level of incidental take is exceeded, such incidental take would represent new information requiring review of the reasonable and prudent measures provided. The Tonto must immediately provide an explanation of the causes of the taking and review with our office the need for possible modification of the reasonable and prudent measures.

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. We provide the following recommendations prescribed in the Chiricahua Leopard Frog Recovery Plan (USFWS 2007) for your consideration [several recommendations to accomplish each of the following objectives can be found in USFWS (2007)]:

1. Implement guidelines for livestock pond use and maintenance. The “Recommended Minimization Measures”, Part IV “Actions Available for Leopard Frog Recovery” in Appendix A and “Livestock Grazing and Management” in Appendix I of the Recovery Plan provide guidance regarding minimizing effects of livestock grazing activities, including livestock pond use and maintenance, on the Chiricahua leopard frog.

2. Continue to enhance bankline and aquatic vegetation, and habitat complexity at sites with extant populations, where needed.

3. Continue to collaborate with other stakeholders to eliminate nonnative predators at or near Chiricahua leopard frog populations that pose a threat to those populations, and/or prevent existing sites with suitable Chiricahua leopard frog habitat from becoming occupied by nonnative species.

4. Continue to collaborate in identifying, restoring, or creating as needed, and protecting currently unoccupied recovery sites in the Upper East Verde Management Area necessary to support viable populations and metapopulations of Chiricahua leopard frogs.

5. Continue to collaborate in establishing new, or re-establishing former, populations of Chiricahua leopard frogs at selected recovery sites.

6. Continue to collaborate in augmenting populations in the Upper East Verde Management Area, as needed, to increase persistence.

7. Continue to collaborate in monitoring extant Chiricahua leopard frog populations and habitats, and implementation of the recovery plan.

8. Continue to support research needed to support recovery actions and adaptive management.

9. Continue to encourage and develop support for the recovery efforts for the Chiricahua leopard frog in the Upper East Verde Management Area through collaborative public and private partnerships.

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.

REINITIATION NOTICE

This concludes reinitiated formal consultation on the action outlined herein. As provided in 50 CFR §402.16, reinitiation of formal consultation is required where discretionary Federal agency involvement or control over the action has been retained (or is authorized by law) and if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect listed species or critical habitat in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; (4) if utilization levels are consistently exceeded in critical areas; or (5) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

We appreciate the Tonto’s efforts to identify and minimize effects to listed species from this project. We encourage you to continue to coordinate the review and implementation of this project with the Arizona Game and Fish Department. For further information please contact Jeff Servoss (x237) or Debra Bills (x239).

Please refer to consultation number 22410-1999-F-0300-R2 in future correspondence concerning this project.

Sincerely,

/s/Debra Bills for

Steven L. Spangle
Field Supervisor

cc (with Appendices):

Jim Rorabaugh, U.S. Fish and Wildlife Service, Tucson, AZ
District Ranger, Payson Ranger District, Tonto National Forest, Payson, AZ

Mike Sredl, Nongame Branch, Arizona Game and Fish Department, Phoenix, AZ
Bill Burger, Region VI, Arizona Game and Fish Department, Mesa, AZ
Mr. Ray Tanner, Permittee; Little Green Valley Complex; Phoenix, AZ

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Appendix 1

Little Green Valley Complex Chiricahua Leopard Frog Survey Information

Appendix 2

Photo Documentation

Figure 1. Log jam on Tributary 3 limits ungulate access and creates pool habitat.

Figure 2. Plunge pool habitat on Tributary 3.

Figure 3. Log jam on Tributary 4 significantly mitigates flood pulses within the system.

Figure 4. Spring on Tributary 4 to be excluded from ungulate access.