

DRAFT
**ENVIRONMENTAL ASSESSMENT
FOR
SAFE HARBOR AGREEMENT**

FOR THE

CHIRICAHUA LEOPARD FROG

IN ARIZONA

**Between Arizona Game and Fish Department and
U.S. Fish and Wildlife Service**



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1.0 PURPOSE AND NEED FOR ACTION

1.1 INTRODUCTION

On May 6, 2005, the Arizona Game and Fish Department (AGFD) submitted an application for an Enhancement of Survival Permit and Safe Harbor Agreement under section 10(a)(1)(A) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.). The Safe Harbor Agreement (Agreement) seeks to provide a voluntary conservation program for landowners to implement recovery actions for Chiricahua leopard frogs (*Rana chiricahuensis*) on non-Federal lands in Arizona. The proposed Agreement would include actions ranging from increased protection of existing habitat to reestablishment of population sites within the historical range of Chiricahua leopard frog in Arizona. Also covered are any appropriate facilities used under this Agreement to hold, contain, or propagate this species. The draft Agreement is incorporated herein by reference.

1.2 PURPOSE OF THE PROPOSED ACTION

The purpose of issuing a section 10(a)(1)(A) Enhancement of Survival permit and the approval of the associated state-wide Agreement is to facilitate recovery activities on non-Federal lands within the historical range of the threatened Chiricahua leopard frog. The Agreement sets up a state-wide program to implement recovery actions, on non-Federal lands, that are outlined in the draft Chiricahua leopard frog Recovery Plan (USFWS 2006). These recovery actions can be implemented on non-Federal lands, and participants in the Agreement will receive the assurance of a Agreement consistent with the Safe Harbor Agreement Policy, as amended, (64 FR 3271, 52686, and 69 FR 24084) and related implementing regulations (50 CFR Parts 13 & 17).

1.3 NEED FOR TAKING THE PROPOSED ACTION

The range of the Chiricahua leopard frog is divided into two parts, including: (1) a southern group of populations (the majority of the species' range) located in mountains and valleys south of the Gila River in southeastern Arizona, extreme southwestern New Mexico, and Mexico; and (2) northern montane populations in west-central New Mexico and along the Mogollon Rim in central and eastern Arizona (Platz and Mecham 1979). The Chiricahua leopard frog is currently a habitat specialist in the sense that its breeding habitat now falls within a narrow portion of the continuum from small, shallow, ephemeral, and unpredictable waters to large, deep, predictable, and perennial waters. They are excluded from ephemeral waters by their requirements for surface moisture for adult survival and a relatively long larval period (minimum of 3 months). They are often excluded from perennial waters by the presence of non-native predatory and competing species of fishes, frogs, and crayfish. Prior to the arrival of the American bullfrog, the Chiricahua leopard frog was the most aquatic of frogs in the Southwest, with the exception of the Tarahumara frog (*R. tarahumarae*). Thus, they are pinched between these two opposing sets of processes. In the Southwest, leopard frogs are currently so strongly impacted by harmful non-native species, which are most prevalent in perennial waters, that their occupied niche is increasingly restricted to environments that tend to be ephemeral and unpredictable. This increasingly narrow realized niche is an important reason why the Chiricahua leopard frog is threatened.

Despite this current specialization, which is usual for most members of the leopard frog radiation but is accentuated in the Southwest, leopard frogs are capable of occupying a broad range of environmental types in the absence of aquatic predatory species, particularly non-natives. Chiricahua leopard frogs were historically habitat generalists and have been found in a variety of natural and artificial aquatic systems (Mecham 1968, Zweifel 1968, Frost and Bagnara 1977, Scott and Jennings 1985, Sredl and Saylor 1998). Natural systems include rivers, permanent streams, permanent pools in intermittent streams, beaver ponds, cienegas (= wetlands), and springs. Artificial systems in which they have been recorded include reservoirs, earthen cattle tanks, livestock drinkers, irrigation sloughs or acequias, wells, abandoned swimming pools, ornamental back yard ponds, and mine adits at elevations of 3,281 to 8,890 feet. Even though Chiricahua leopard frogs are found in intermittent bodies of water, mechanisms by which they survive the loss of surface water are unknown. However, Southwestern leopard frogs, including the Chiricahua leopard frog, have been observed to survive drought by burrowing into muddy cracks and holes around drying water sources (Howland et al. 1997, Rorabaugh, pers. obs.). Some habitat types may be particularly important. Year-round flow and constant water temperature that permit year-round adult activity and winter breeding, and the depauperate fish communities of thermal springs, make these sites particularly important breeding sites for Chiricahua leopard frogs in New Mexico (Scott and Jennings 1985).

Principle historical habitats were montane streams and springs, and valley bottom cienegas and streams or rivers. Based on published literature, field notes, and museum records, Chiricahua leopard frogs in southeastern Arizona, under natural conditions, were most abundant in lowland cienegas and marshy streams, which are more productive and had a greater aerial extent than suitable montane aquatic systems. This suggests that an understanding of Chiricahua leopard frog use of cienegas, and restoration of cienega populations, may be essential to recovery of the Chiricahua leopard frog in southeastern Arizona and potentially elsewhere. There was probably a historical metapopulation relationship between montane and valley floor populations, with the intervening bajadas being only sparsely or temporarily occupied. The consequences of the loss of these valley floor populations and habitats for population genetics and leopard frog recovery have not been explored.

In natural cienega settings, water levels would have fluctuated over long periods and on a seasonal basis, creating significant areas in which leopard frog tadpoles would have thrived in the presence of little competition or predation from fishes. Current situations in cienegas retain little of this possibility; most cienegas have been reduced, dammed, or otherwise simplified, and fish, even native fish, tend to have been spread throughout the waters of cienegas. The consequences of this for Chiricahua leopard frog populations have not been evaluated, but are likely to be significant.

Another consideration in habitat suitability is survival of the emerging fungal disease chytridiomycosis. Evidence has accumulated that Southwestern leopard frogs often survive best, and maintain highest abundances, at sites where chytridiomycosis has not arrived, or, most notably, at warm sites where the frogs may be able to survive with the disease or clear it from their systems. This indicates that warmer, southern exposures, lower elevations, and especially warm springs, may be critical for the persistence of native leopard frogs in the Southwest as the effects of this emerging disease occur in full force.

No formal studies of habitat use by Chiricahua leopard frogs have been completed. However, important general characteristics include permanent or nearly permanent water that is free of non-native predators. Additionally, the role of habitat heterogeneity within the aquatic and terrestrial environment is unknown, but is likely to be important. Shallow water with emergent and perimeter vegetation provides egg deposition, tadpole and adult thermoregulation or basking sites, and foraging sites, while deeper water, root masses, and undercut banks provide refuge from predators and potential hibernacula (Sredl, unpublished data). Aquatic sites should have substrate (some mud and not just bare rock as in some tinaja pools) that will allow for the growth of algae, diatoms, etc, to serve as food for developing tadpoles, and to allow for overwintering hibernation sites. Most perennial waters supporting Chiricahua leopard frogs possess fractured rock substrata, emergent or submergent vegetation, deep water, root masses, undercut banks, or some combination of these features that frogs may use as refugia from predators and extreme climatic conditions (Jennings, unpublished data). Chiricahua leopard frogs likely overwinter at or near breeding sites, although microsites for these “hibernacula” have not been studied. Other leopard frogs typically overwinter at the bottom of well-oxygenated ponds or lakes and may bury themselves in the mud (Harding 1997, Nussbaum et al. 1983, Cunjak 1986). Northern leopard frogs have also been found in caves during the winter (Rand 1950).

A diversity of nearby aquatic sites and types of water (streams, tinajas, stock ponds of varying permanency, concrete drinkers and holding tanks, marshes, and ciénegas) is generally preferable to single sites, especially if there are no plans to move frogs around regularly to protect against complete population loss. Habitat diversity is important even within a single site. Springs and groundwater- (spring-) fed streams are likely to offer superior habitat qualities, especially against winter cold or against periodic drought. Ranid frogs are sensitive to chemical insult (Sparling 2003) and therefore, water at aquatic sites must not be overly polluted by livestock feces or chemical pollutants (e.g., runoff from agricultural fields, roadside use of salts, aerial overspray).

Chiricahua leopard frogs are rarely found in abundance in natural montane settings in southern Arizona; rather they sometimes achieve high reproductive success and population density in constructed ponds in the mountains. The optimal setting appears to include a stream or tinaja-studded canyon within ready dispersal distance of suitable pond habitats. The ponds provide the biggest reproductive habitat, whereas the natural waters provide either drought refugia, habitat complexity as a buffer against unpredictability, additional reproductive output, or a combination of some or all of these factors. Although additional research is needed to examine this in more detail, a landscape structure with perennial natural water and semi-perennial ponds poorly suited to non-native species, or with perennial ponds not successfully reached by non-native species, may be key to recovery of the species in montane settings.

1.4 DECISION TO BE MADE BY THE RESPONSIBLE OFFICIAL

The scope of the analysis in this environmental assessment covers the direct, indirect, and cumulative environmental effects of approving this Agreement and issuing a section 10(a)(1)(A) Enhancement of Survival permit and anticipated future effects of implementation of the Agreement (including the take authorization). The decisions to be made are which alternative to implement and whether the alternative to be implemented will have a significant impact over the

existing environment, which would require the preparation of an Environmental Impact Statement.

2.0 ALTERNATIVES

This section presents details of the preferred alternative and other alternatives that have been considered. The National Environmental Policy Act (NEPA) requires that Federal agencies consider a range of alternatives that could reduce the environmental impacts of the particular projects under consideration. The analysis of the environmental consequences of these alternatives is discussed in section 4 of this document.

2.1 ALTERNATIVE 1: NO ACTION

In the No Action Alternative, the U.S. Fish and Wildlife Service (FWS) would not approve the state-wide Chiricahua Leopard Frog Safe Harbor Agreement or issue the associated section 10(a)(1)(A) Enhancement of Survival permit. Therefore, a coordinated effort to recover Chiricahua leopard frogs on non-Federal properties using a single programmatic Enhancement of Survival permit and Safe Harbor Agreement would not occur. Individual landowners or regional organizations could still develop individual Safe Harbor Agreements or Habitat Conservation Plans (HCP), as discussed below. Livestock pond use and maintenance activities would continue as they are currently under the section 4(d) rule promulgated in the final rule listing the Chiricahua leopard frog as threatened, which exempted livestock use and routine maintenance of livestock ponds from the section 9 prohibitions of the Act (67 FR 40790). In addition, construction of new stock tanks, wells, and pipelines would occur as part of the continued livestock and agricultural operations within the historical range of the Chiricahua leopard frog. However, there would be no requirement to minimize impacts of these activities on Chiricahua leopard frog or other listed species. Furthermore, there would be no need to notify FWS or AGFD of the activities that may impact the frog. While FWS recognizes the benefits of livestock waters to this species, even with normal livestock use and maintenance of these facilities, the additional conservation benefits from the conservation requirements of the preferred alternative would not be realized under this Alternative. Recovery efforts for this species would primarily occur on Federal lands, with minor participation of non-Federal land owners. The no action alternative provides the baseline for comparison of environmental effects of the preferred alternative.

2.2 ALTERNATIVE 2: STATE-WIDE AGREEMENT (PREFERRED)

The preferred alternative is the approval of the Agreement and the issuance of a section 10(a)(1)(A) enhancement of survival permit to cover take of Chiricahua leopard frogs during the implementation of the Agreement. This alternative is intended to contribute to the conservation and recovery of the Chiricahua leopard frog. However, some future incidental take of Chiricahua leopard frogs is anticipated to occur through implementation of this Agreement and providing the assurance that a landowner may take his property back to the baseline condition.

Under this Agreement, the AGFD would be able to provide coverage to non-Federal landowners who voluntarily agree to enhance or create new habitat, protect existing habitat, and/or allow a

population to be re-established on their lands. In addition, neighboring landowners can seek coverage under the Agreement against new regulatory restrictions should frogs move onto their property as a result of recovery activities. However, these regulatory assurances only cover Chiricahua leopard frogs and habitat that are not part of an enrolled property's existing baseline condition. Those Chiricahua leopard frog population sites that are occupied at the time of enrollment under the Agreement would be fully protected under the Act. This Agreement and the assurances would only cover those Chiricahua leopard frog populations and habitat created through participation in the Agreement.

This Agreement provides two levels of participation that a non-Federal landowner can choose from; that of Participating Landowner or Participating Neighbor. Participation and the level of participation is voluntary. Regulations require that baseline surveys be performed, an agreement be signed by the landowner, reasonable notification be given of any activity that may result in take of the covered species, and access be granted to minimize any take of the covered species. In addition, the Agreement sets minimum conservation measures (Section 2.5 of the Agreement) for all participants to reduce incidental take; these include:

- Managing existing riparian communities along streams and rivers occupied by Chiricahua leopard frogs in a manner to attain and maintain Proper Functioning Condition (Prichard et al. 1998)
- Measures to reduce mortality of frogs during routine stock tank maintenance, such as, development of double tank systems or providing a refugium during maintenance, and limiting maintenance activities to the frog's active season. Exceptions to stock tank maintenance requirements are also provided for emergency situations.
- Measures to reduce the loss of frog egg masses from cattle use during the breeding season; the use of ranch management plans, such as those prepared with the assistance of NRCS, to manage cattle numbers and seasonal use; and any other measures to which the participant agrees to reduce livestock impacts.
- Measures that restrict participants from introducing non-native predators and competitors to covered sites, reporting the presence of such non-native species, allowing access to agency personnel to control or eradicate such non-native species, and requesting the landowner to assist in implementing these control measures, when appropriate and possible.
- Working with AGFD and our office to determine means by which impacts from land treatment activities, such as prescribed fire, pesticide treatments, and brush control, could be minimized.

The duration of most individual landowner enrollment in the Agreement will be a minimum of 10 years, but could be for the duration of the permit, 50 years. The Agreement allows landowners to opt out of their conservation commitments early for emergency situations; however, their assurances from the Agreement also end at that time.

In addition to those actions common to all participants, the Participating Landowners will implement one or more active conservation measures as part of their enrollment (Section 2.6 of the Agreement), including, but not limited to:

- Leopard frog translocation into a covered aquatic site;

- Construction of a double tank system or a small refugia site at single tank systems;
- Fencing of a portion of tank or stream to prevent destruction or excessive deterioration or trampling of leopard frog habitat at an aquatic site;
- Deepening the tank or pool to increase the amount of water in a tank or pool;
- Drilling a new well and or connecting sites by pipeline to improve persistence at population sites;
- Removing non-native aquatic predators and competitors from otherwise suitable sites;
- Maintaining existing habitat conditions;
- Enhancing travel corridors between population sites within a metapopulation;
- Enhancing existing stream and cienega habitats; and
- Enhancing vegetation to provide additional cover sites and reduce siltation.

Incidental take may result from the implementation of these conservation activities, and would be authorized only for Chiricahua leopard frogs that are not part of the baseline condition on enrolled properties. Implementation activities are grouped into Management, Construction, Non-native Species Control, and Reestablishments for the sake of this analysis. Management activities include all the required conservation measures mentioned above, maintaining existing habitat conditions, enhancing travel corridors between population sites within a metapopulation, enhancing existing stream and cienega habitats, and enhancing vegetation to provide additional cover sites and reduce siltation. Construction activities would include construction of a double tank system or a small refugia site at single tank systems, fencing of a portion of tank or stream to prevent destruction or excessive deterioration or trampling of leopard frog habitat at an aquatic site, drilling a new well and/or connecting sites by pipeline to improve persistence at population sites, deepening the tank or pool to increase the amount of water in a tank or pool, adding silt traps to existing livestock tanks, and the construction of refugia sites or new livestock tanks. Non-native species control activities would include removing non-native aquatic predators and competitors from otherwise suitable sites. Reestablishment activities would include allowing the translocation of Chiricahua leopard frogs into existing or newly constructed habitats on a participant's property.

Take of individuals in existing populations and breeding facilities from the capture, handling, holding, moving, and reestablishment efforts will be authorized under separate Section 10(a)(1)(A) Research and Recovery Permits with appropriate terms and conditions to minimize impacts to existing populations and individuals. The impacts of this source of take is addressed through the process of issuing separate Research and Recovery Permits and is not addressed further in this document, other than under cumulative impacts.

2.3 ALTERNATIVES CONSIDERED BUT ELIMINATED FROM DETAILED ANALYSIS

Individual landowner or regional Safe Harbor Agreements for conservation of the Chiricahua leopard frog on non-Federal lands have been discussed. One has been completed, Malpai Borderland Group Safe Harbor Agreement, and another is being developed, Altar Valley Conservation Alliance Agreement. An individual landowner or regional HCP could be developed that would include recovery activities, including the reestablishment of populations, as part of the proposed mitigation. The re-establishment of Chiricahua leopard frog populations

and other recovery actions can also be accomplished under section 7 on Federal lands and those projects that have a Federal nexus. Finally, some sites could be covered under the AGFD's or FWS's section 10(a)(1)(A) Research and Recovery Permit, as has been done for some populations during short-term, emergency salvage efforts related to drought and wildfire. These approaches have been considered, but eliminated from detailed analysis.

2.3.1 Individual or Regional Agreements.

If a landowner or group of landowners decide to develop individual or regional safe harbor agreements and obtain endangered species permits to contribute to the conservation and recovery of the Chiricahua leopard frog, they often become discouraged with the complexity of the permitting process and the time delays associated with the issuance of these traditional endangered species permits. Individual agreements require less processing time than programmatic agreements, but may still take from several months to years to complete. Even with our template agreement, the projected timeframe to customize each individual agreement before review, approval, and permit issuance may take 4-12 months. These time delays, and such a piecemeal approach, also delay the implementation of conservation measures for Chiricahua leopard frogs, which are urgently needed. The individual approach would add significant workload to the AGFD and FWS staff, with no appreciable benefit over the preferred alternative.

2.3.2 Habitat Conservation Plans

Habitat Conservation Plans (HCPs) could be developed for individual property owners, regionally, and/or rangewide for the Chiricahua leopard frog. An HCP is typically written to provide incidental take coverage for an otherwise legal activity, through a section 10(a)(1)(B) Incidental Take Permit. An HCP is developed to minimize and mitigate the effects of the activities covered by the HCP on existing populations and suitable habitat. While HCPs include measures to protect, enhance, and/or re-establish covered species; these plans are typically in response to some potential impact on a listed species or its habitat by the covered activities. Therefore, while an HCP could be developed to implement recovery activities on non-Federal lands, it is not the best conservation tool to apply to this situation.

2.3.3 Releases under Section 7

Releasing frogs as a Federal action covered by a section 7 consultation is possible, but for many sites there would be no Federal nexus, which is necessary for section 7 to apply. In addition, several Federal land managers will not implement recovery activities on Federal lands if there is a possibility of the neighboring non-Federal land owners being impacted by a listed species moving onto the non-Federal lands, perceived or real. Some sites can be covered under the AGFD or FWS section 10(a)(1)(A) Research and Recovery Permit, as has been done for some populations during emergency salvage efforts related to drought and wildfire. However, these permits were not intended for covering widespread activities for the recovery of species. Landowners do not receive assurances when section 7 or Research and Recovery Permits are used. Therefore this alternative was eliminated from further consideration.

3.0 AFFECTED ENVIRONMENT

The Agreement proposes to cover Chiricahua leopard frog habitat within its historical range in Arizona (Figure 1), and any captive holding or propagation sites within Arizona, on non-federally owned lands. The programmatic nature of the proposed Agreement, it potentially covers many sites over a large area, makes it impossible to characterize each site that may be used. This is especially true as participation is voluntary for landowners, and particular sites that may be enrolled under this Agreement can not be predicted. Therefore, the discussion of the affected environment and the environmental consequences must be approached broadly. Sites may include, but are not limited to:

- Artificial stock ponds or tanks
- Retention basins
- Natural and artificial wetlands
- Springs, marshes, streams, or cienegas
- Natural or artificial ponds, lakes, or catchments

The historical range of the Chiricahua leopard frog is divided into two parts: 1) Southern Form: a southern group of populations (the majority of the species' range) located in mountains and valleys south of the Gila River in southeastern Arizona, extreme southwestern New Mexico, and Mexico; and 2) Rim Form: northern montane populations in west-central New Mexico and along the Mogollon Rim in central and eastern Arizona (Platz and Mecham 1979). In Arizona, the Southern Form is found within the aquatic sites described above at elevations ranging from 3,480 to 6,600 feet. The Rim Form is found at elevations from 3500 to 8890 feet.

Specific aquatic sites and surrounding upland communities will vary depending on the elevation and geographic location within the state. These aquatic sites would be subject to active conservation on a Participating Landowner's property or passive conservation on a Participating Neighbor's property. Potential enrolled sites will be selected based upon a willing landowner, if the site is within the historical range of the species, the persistence of the aquatic site, the potential role a site may have in recovery, and the landowner's desired level of participation.

3.1 VEGETATION

Vegetation within the historical range of the Southern Form includes Sonoran Desert scrub, semi-desert grasslands, mesquite savannas, plains grasslands, Chihuahuan Desert scrub, Madrean oak woodland, mixed conifer, Ponderosa, Aspen, and petran (Rocky Mountain) subalpine conifer forest at higher elevations (Brown and Lowe 1980). The range of the Rim Form is at higher elevations and the vegetation is characterized by high elevation meadows, Ponderosa and mixed conifer forest, and pinyon-juniper at the lower elevations (Brown and Lowe 1980). The actual vegetation at a particular site will potentially include the upland biotic community referenced above, but also an aquatic site and the associated riparian community around it. Riparian communities in the covered area are very diverse and can include bare-banked livestock ponds, sedges, cattails, coyote willows, mesquites, desert willows, cottonwoods, and Fremont willows. The vegetation and species within the riparian community

are a reflection of the upland vegetation, the elevation, and the local impacts around the aquatic site.

Vegetation communities within the historical range of Chiricahua leopard frogs are currently impacted by existing land-use activities, such as livestock ranching, recreation, and residential development. Livestock management is conducted by private ranch operators in a patchwork of grazing practices with varying impacts on upland, riparian, and aquatic vegetation. The extent of these impacts, both positive and negative, vary with the grazing intensity, grazing duration, vegetation communities present, and precipitation. Ranch management plans, like those developed with the assistance of NRCS, are developed on some ranches at the discretion of the owner. Construction of new livestock ponds occurs as a need is identified and funding becomes available. This results in a conversion of small localized portions of upland and xeroriparian vegetation communities into aquatic sites with the potential for mesoriparian vegetation communities to colonize saturated soils adjacent to newly constructed ponds. Construction of new wells, water distribution pipelines and fences would result in localized trimming and removal of vegetation within project areas. These sites would typically be in upland sites, but occasionally will cross riparian vegetation communities. Pipeline construction is usually done along or within existing roadways to minimize vegetation and ground disturbance. Modification of existing habitat would result in impacting some riparian vegetation near the inflow to stock ponds on a short-term basis, but should result in more stable aquatic and riparian vegetation as disturbance from maintenance activities should be less frequent and impact less aquatic vegetation.

Prescribed fires, thinning, and other land treatments occur within the covered area to varying degrees, based upon the landowner/operator's desire and funding availability. Prescribed fire, chaining, pushing, and herbicide use are intended to control shrubs in shrub invaded grasslands or reduce fuel levels in forested areas. This would result in maintaining grasslands with more historical levels of shrub component than are generally present today. Thinning of forest vegetation would reduce fuels and reduce the likelihood of a stand-replacing catastrophic fire. These activities are designed to maintain existing or historical vegetation types, but the end result is opening up the shrub or canopy cover of many vegetation types.

Recreational activities have very little impact on vegetation communities, but locally severe impacts to vegetation can occur. Recreational activities can be a conduit for invasive, non-native plant species, which could be spread from one area to another. Once these species become established within an ecosystem, they are often difficult to control or eradicate. This often can change the structural components of the surrounding lands and the ecological function. This is often most severe in the case of fire adapted non-native species invading non-fire adapted vegetation communities. The change in fire ecology can result in a complete conversion from native vegetation to the non-native species.

Residential developments are being planned and built throughout many parts of the range of the Chiricahua leopard frog. These developments often result in type conversion of existing vegetation communities to those associated with a residential community. These type conversions fragment existing vegetation communities and the habitat of the animal species that are associated with the impacted vegetation communities. Many non-natives are introduced for

landscaping purposes or by the eventual owners of a residence. This can include many ornamental plants that have invasive qualities. Once established, they can provide a seed source for these plants to disperse into the native vegetation communities surrounding the development.

Current mining operations are typically well established, and the impacts to vegetation are relatively local or have already occurred. Expansions of mines, processing sites, and waste piles can result in the local loss of existing vegetation communities. The disturbed areas around mining operations can provide sites for invasive plant species to become established and have similar impacts as described above on surrounding vegetation. Revegetation of mining sites after operation is a slow process and is often abandoned by small operators. Mine reclamation can often result in improvements over the existing vegetation on the mine site, but may take decades for native vegetation to establish. A few new mining operations are contemplated within the covered area, but are only at the exploratory stages. New mines typically result in the loss of the vegetation communities and the use of large amounts of water for dust abatement, processing, and revegetation. The indirect impact of this groundwater pumping can include dropping of surface and subsurface water, which would impact riparian vegetation locally and down stream.

3.2 WILDLIFE

Wildlife presence at a potential site will vary greatly depending on location within the human development continuum (urban to wilderness), vegetation community, land use, and proximity to other wetland areas and neighboring vegetation communities, as well as, other factors like annual precipitation and dispersal corridors. Since each site will have water present, wildlife use is likely to be far greater than in the surrounding upland vegetation communities. Common wildlife species in the range of the southern form of Chiricahua leopard frog include: desert mule deer (*Odocoileus hemionus crooki*), Coues' whitetail deer (*O. virginianus couesi*), mountain lion (*Felis concolor*), bobcat (*F. rufus*), coyote (*Canis latrans*), javelina (*Dicotyles tajacu*), white-nosed coati (*Nasua narica*), scaled quail (*Callipepla squamata*), Gambel's quail (*Lophortyx gambeli*), Montezuma quail (*Crytonyx montezumae*), curve-billed thrasher (*Toxostoma curvirostra*), white-winged dove (*Zenaida asiatica*), American bullfrog (*R. catesbeiana*), black-necked gartersnake (*Thamnophis cyrtopsis*), Mohave rattlesnake (*Crotalus scutulatus*), and canyon treefrog (*Hyla arenicolor*). In the higher elevation vegetation communities in the range of the rim form common wildlife species include: black bear (*Ursus americanus*), elk (*Cervus elaphus*), common black-hawk (*Buteogallus anthracinus*), western rattlesnake (*C. viridis*), and western chorus frog (*Pseudacris triseriata*). A more complete list and discussion of common animals found by biotic community is found in Brown (1994).

Existing stock ponds are used not only by domestic livestock, but also by many wildlife species. They are not only useful for native species, but also to non-native predators and competitors of Chiricahua leopard frogs. New construction of livestock ponds and improved water supply distribution could result in easier dispersal of these non-native predators and competitors.

Recreation within this area includes the harvest of some game species. Recreational use of off-highway vehicles in the covered area often can disrupt wildlife movement and when used irresponsibly, can result in damage to existing vegetation used by various species of wildlife.

Residential development has had, and will continue to have, an impact on wildlife distribution and abundance. Residential areas often end up simplifying the surrounding ecosystems, resulting in the loss of species that are not tolerant of human disturbance and the increase in abundance of those species that flourish around residential developments. Infrastructure for residential and industrial developments, such as roads and utility corridors, fragment the existing landscape and the habitats of many species.

Mining can have the same impacts on wildlife as residential developments. The increased availability of water over the surrounding environment can result in drawing in wildlife. However, since most vegetation has been removed, the wildlife that is usually associated with these sites consists of those species that prefer habitats that are open and have relatively little vegetation. The heavy equipment and vehicles can increase road associated mortality, and various settling ponds can result in incidental mortality due to extreme pH values. However, the latter of these is often mitigated to avoid migratory bird related mortality.

3.3 LISTED, PROPOSED, AND CANDIDATE SPECIES

The information in section 2.0 above, described the current status for the Chiricahua leopard frog. Additional information can be found in the draft Recovery Plan and other documents referenced therein (USFWS 2006).

Other listed, proposed, or candidate species (special status species) are likely to occur at potential sites covered by this Agreement or on adjacent Federal lands within the historical range of the Chiricahua leopard frog. The more urban and disturbed the site is, the less likely it is that special status species will occur there; the likelihood is greater for rural and less disturbed sites. Special status species that would likely occur in the area covered by this Agreement include: Riparian Species: the endangered Huachuca water-umbel (*Lilaeopsis schaffneriana* ssp. *recurva*) with critical habitat, endangered Canelo Hills ladies' tresses (*Spiranthes delitescens*), endangered Kearney bluestar (*Amsonia kearneyana*), endangered southwestern willow flycatcher (*Empidonax trailli extimus*) with critical habitat, threatened bald eagle (*Haliaeetus leucocephalus*), and candidate western yellow-billed cuckoo (*Coccyzus americanus*); Upland Species: endangered Pima pineapple cactus (*Coryphantha scheeri* var. *robustispina*), threatened Cochise pincushion cactus (*Coryphantha robbinsorum*), endangered Arizona cliff rose (*Purshia subintegra*), endangered Arizona hedgehog cactus (*Echinocereus triglochidiatus* var. *arizonicus*), threatened Mexican spotted owl (*Strix occidentalis lucida*) with critical habitat, endangered lesser long-nosed bat (*Leptonycteris curasoae yerbabuena*), endangered Jaguar (*Panthera onca*), endangered Mexican gray wolf (*C. lupus baileyi*), endangered Mount Graham red squirrel (*Tamiasciurus hudsonicus grahamensis*) with critical habitat, threatened New Mexico ridge-nosed rattlesnake (*C. willardi obscurus*) with critical habitat, and endangered masked bobwhite quail (*Colinus virginianus ridgewayi*); and Aquatic Species: endangered Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*), endangered desert pupfish (*Cyprinodon macularius*), endangered Gila topminnow (*Poeciliopsis occidentalis occidentalis*), endangered Sonoran chub (*Gila ditaenia*), endangered Razorback sucker (*Xyrauchen texanus*) with critical habitat, endangered Yaqui topminnow (*P. occidentalis sonoriensis*) with critical habitat, endangered Yaqui Chub (*G. purpurea*) with critical habitat, endangered Little Colorado spinedace (*Lepidomeda vittata*) with critical habitat, threatened Apache trout (*Oncorhynchus*

apache), endangered Gila trout (*O. gilae*), candidate headwater chub (*G. nigra*), endangered Yaqui catfish (*Ictalurus pricei*) with critical habitat, threatened spikedace (*Meda fulgida*) with proposed critical habitat, threatened loach minnow (*Tiaroga cobitis*) with proposed critical habitat, endangered Gila chub (*G. intermedia*) with critical habitat, threatened beautiful shiner (*Cyprinella formosa*) with critical habitat, candidate Huachuca springsnail (*Pygrulopsis thompsoni*), candidate Three Forks springsnail (*P. trivialis*), and candidate Stephan's riffle beetle (*Heterelmis stephani*).

Current impacts to sensitive species in this area include those described above for wildlife in general including the fragmentation of species habitats from existing roadways, impacts from habitat conversions from rural to urban and ongoing activities on Federal lands under section 7 consultations, including agency recovery efforts.

3.4 CULTURAL RESOURCES

Cultural resources are distributed throughout Arizona, with many along natural waterways, springs and seeps. The programmatic nature of this Agreement makes predictions as to the specific sites and activities impossible to determine. The area of potential coverage is large enough to assume that cultural resources are within the covered area of the Agreement.

Those activities associated with existing livestock ranching, residential development, recreation, and mining that do not disturb soil typically do not impact cultural resources. However, any construction work related to livestock ponds, wells, pipeline, fencing, residential development, and mining that disturb soil potentially impact cultural resources. Activities like this on State Trust Land go through archeological clearance and review process established through the Arizona State Land Department and the State Historic Preservation Officer (SHPO), in accordance with State law. Soil disturbing activities on private lands are not required to go through cultural resource surveys or consultation with the SHPO. Only when human remains are found on privately owned property is clearance and consultation with the Arizona State Museum required. Therefore, most construction projects on private property do not have cultural resources inventories conducted prior to construction.

3.5 SOCIOECONOMIC ENVIRONMENT

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, mandates that Federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of programs on minority or low-income individuals.

The socioeconomic environment throughout the covered area varies greatly with location. Potential Chiricahua leopard frog conservation sites would range from undeveloped springs and livestock ponds to backyard ponds and captive breeding facilities. The most common potential sites would be livestock ponds, used for watering livestock associated with private grazing operations. These are of economic benefit to the owner/operators of these grazing operations. Other possible sites include, but are not limited to, private ponds, springs, streams, water features, and recharge facilities. Private ponds are not likely to be economically beneficial, but

are likely to be socially important to their owners. These backyard ponds may be used as Refugia or breeding sites where natural dispersal will not occur; or they may be adjacent to the urban fringe and may work as part of a metapopulation. Arizona is one of the fastest growing states in the country, and the trend is expected to continue. This results in increasing amounts of rural lands being converted to urban land uses and their associated impacts.

3.6 WETLANDS

Natural wetlands within the covered area of the Agreement are much reduced from historical accounts of the area. Loss of wetlands has been one of the factors that threaten the continued existence of most of our native aquatic and semi aquatic species, including the Chiricahua leopard frog. Most wetlands are small and centered around small isolated springs or along the margins of small streams. Some small cienegas and marshes exist in the covered area of the Southern Form, but most of these are on Federal lands. Current impacts from construction activities in wetlands within the covered area are regulated through the Army Corps of Engineers and the Arizona Department of Environmental Quality under the authority of the Clean Water Act.

3.7 LAND USE

The existing land use within the covered area of the Agreement runs the continuum of possible land uses found within the State of Arizona. The gradient of potential land use could include uninhabited rangeland to urban residential developments. The majority of expected covered sites will be on open rangeland with existing livestock grazing operations. These same rangelands are used for a variety of outdoor recreational activities. These activities can range from hunting and fishing to hiking and off-highway vehicle use. As the increased demand for rural residential housing continues, especially in outlying areas, there is a general conversion of land use from agricultural to residential. Some private lands within the proposed covered area are used for commercial and hobby mining of metal ores and decorative rock. Mining in this area is a minor part of the overall land use, but is locally important. Mining occurs based upon market price of the ore or decorative rock and the costs of recovering the ore or decorative rock. Where mining is occurring is not likely to change, but the intensity of activity and development of new mining operations may be based upon the economics of the operation. A smaller proportion of expected participation would be within urban areas, the predominate land use being residential development. These sites may be backyard ponds or institutional situations like zoos or universities.

3.8 WATER RESOURCES

Water resources in the proposed covered area include a few intermittent to perennial streams and a few small, perennial rivers, but the majority of available water resources are associated with run-off or ground water filled livestock ponds. Much of the water in the streams and rivers is diverted for agricultural uses and some for municipal water system use. Water resources in the covered area also include ground water that is pumped for agricultural, residential, municipal, and industrial use. Continued residential growth will place great demands on water resources, likely drying many natural waters. However, artificial ponds may increase in numbers in

urbanized environments while rural, open-range stock ponds will likely decrease as urban sprawl converts rangelands into communities.

Water resource use for livestock ranching is fairly constant. New water developments for livestock ranching are developed based upon identified needs to improve livestock operations and to improve livestock movements and utilization of forage across the range. Within the covered area, a few new water developments for livestock go in annually. These include a combination of run-off fed stock ponds, wells, distribution pipelines, and water troughs. New wells and distribution pipelines are often constructed to provide more reliable water sources than are currently available at existing tanks. Development of natural springs and seeps may still occur, but these activities are often undertaken to improve natural vegetation around the spring or seep by providing water just off site.

AGFD will occasionally establish wildlife waters for the use of wildlife or fund livestock operators to develop dual use waters. Wildlife water developments will continue to be established for identified wildlife needs, but no unified program will be established to consider recovery efforts for Chiricahua leopard frogs in their design, placement, or operations. Furthermore, the placement and management of these waters may inadvertently establish new dispersal routes for non-native predators and competitors, like bull frogs. Additionally, some impoundments exist within the covered area to store water for residential and industrial use. Many of these are also used for recreational boating and fishing.

Residential water resources are often surface water developments or from groundwater pumping. As existing communities expand and new communities are built, there is an increased demand on the finite water resources in the covered area. The conversion of agricultural (irrigated crop and pasturelands) and mining water resources to residential is often seen as water savings. However, residential communities are continuing to grow, and water resources in the covered area are finite. Communities such as Sierra Vista, Arivaca, and those along the Verde River are trying to address this issue. The primary concern beyond just the potential loss of ground water resources and subsidence is the impact on surface water in the remaining streams and rivers within the covered area. This is similar to concerns around the water resources used for mining. Water use in mining can include dust control, equipment cooling, processing of mineral ores, and reclamation of disturbed sites.

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 ALTERNATIVE 1: NO ACTION

Under the No Action Alternative, the FWS would not approve a statewide Safe Harbor Agreement for Chiricahua leopard frogs nor issue a section 10(a)(1)(A) Enhancement of Survival Permit to cover activities under a statewide Safe Harbor Agreement. Management of existing aquatic sites would be consistent with current land uses. The majority of these sites would be managed in association with livestock grazing, but some sites, associated with residential backyards, would be managed for aesthetics. Land use of upland vegetation communities would be related to existing land uses, ranging from livestock ranching to urban development. Conversion of rangeland to residential developments would continue at existing

rates around the urban centers in the state. Furthermore, as more people want to live in outlying areas, these urban developments are spreading to outlying communities along major highways. Construction of new livestock ponds, backyard ponds, wells, and pipelines would continue at the existing rates, based upon funding and the need for new sites for livestock operations or the desires of homeowners. Construction of fences to exclude livestock from all or portions of livestock tanks and natural aquatic sites would occur within the covered area at existing levels to accommodate the needs of livestock operations. Any modifications to existing habitat, like the development of sand traps on existing livestock ponds, would occur to meet needs of the property owner. Modification of existing Chiricahua leopard frog habitat is not likely to occur for the conservation of this species under this alternative. It may still occur to facilitate management of livestock or recreation needs. The normal operation and maintenance of livestock ponds with existing populations of Chiricahua leopard frogs are exempt from the section 9 prohibition of take by the section 4(d) rule that was promulgated in the final rule listing the Chiricahua leopard frog as threatened (67 FR 40790). However, other activities that may result in take of Chiricahua leopard frog would need to have a section 10(a)(1)(B) Incidental Take Permit, or if there is a Federal nexus, activities could be covered through section 7 consultation. Reestablishment of Chiricahua leopard frog population sites would likely occur primarily on federally owned lands and only secondarily on non-Federal lands, through natural dispersal. Control of non-native aquatic predators and competitors would not occur in a systematic manner and would likely only occur on Federal lands. This would result in a situation where non-native species would likely recolonize Federal lands on a periodic basis and control efforts of non-native species would need to be ongoing. Under this alternative some conservation for Chiricahua leopard frogs would still occur on non-Federal lands under the Malpai Borderlands Group Safe Harbor Agreement and future individual or regional agreements.

4.1.1 Vegetation

No change in the current impacts to vegetation communities, from those described in section 3.1 above, are expected under this alternative. Conservation of Chiricahua leopard frog on non-Federal lands would not necessarily be part of the considerations in any management of existing vegetation within the covered area. Any protection of vegetation that is habitat for the Chiricahua leopard frogs would be incidental to existing land uses or through the desires of individual landowners.

4.1.2 Wildlife

No change in the current impacts to wildlife, as described in section 3.2 above, is expected under this alternative. Conservation of Chiricahua leopard frogs on non-Federal lands would not necessarily be part of the considerations in any management of existing wildlife within the covered area.

4.1.3 Listed, Proposed, and Candidate Species

No change in the current impacts to sensitive species, as described in section 3.3, is expected under this alternative. Conservation of Chiricahua leopard frogs on non-Federal lands would not necessarily be part of the considerations in any management of sensitive species within the

covered area, unless through some other agreement such as an HCP or individual Safe Harbor Agreement. Conservation of Chiricahua leopard frogs would continue on Federal lands consistent with section 7 consultations and recovery activities.

4.1.4 Cultural Resources

No change in the current impacts to cultural resources, as described in section 3.4 above, is expected under this alternative. Conservation of Chiricahua leopard frogs on non-Federal lands would not necessarily be part of the considerations in the management of cultural resources within the covered area and would be incidental to existing land uses or through the desires of individual landowners.

4.1.5 Socioeconomic Environment

No change in the current impacts to the socioeconomic environment, as described in section 3.5 above, is expected under this alternative. This alternative will not provide the potential beneficial effects expected from the preferred alternative from additional funding that would be targeted towards conservation that would also be beneficial to livestock operations on non-Federal lands. Furthermore, the assurances given to non-Federal landowners through a Safe Harbor Agreement would not be available to land owners under this Alternative to address Chiricahua leopard frogs that may disperse onto their non-Federally owned lands. This lack of assurances may result in economic issues for landowners who desire to develop their lands at a future time or need to work on an aquatic site in a manner that might result in take of Chiricahua leopard frogs, other than routine livestock use and maintenance.

4.1.6 Wetlands

No change in the current impacts to wetlands, as described in section 3.6 above, is expected under this alternative. This alternative may result in less incentive to maintain permanent wetlands for fear on the landowner's part that the wetland may provide habitat for a species listed under the Act. There would not be the incentives to improve floodplain protection, or the ecological function, persistence, and diversity of vegetation communities for Chiricahua leopard frogs that is anticipated under the preferred alternative.

4.1.7 Land Use

No change in the current impacts to land use, as described in section 3.7 above, is expected under this alternative. Conservation of Chiricahua leopard frogs on non-Federal lands would not necessarily be part of the considerations in any existing land use. Any protection of habitat for Chiricahua leopard frogs would be incidental to existing land uses or through the desires of individual landowners.

4.1.8 Water Resources

No change in the current impacts to water resources, as described in section 3.8 above, is expected under this alternative. Conservation of Chiricahua leopard frog on non-Federal lands

would not necessarily be part of the considerations in any management of existing water resources. Any protection of habitat for Chiricahua leopard frogs would be incidental to existing water resource uses or through the desires of individual landowners.

4.2 ALTERNATIVE 2: STATE-WIDE AGREEMENT (PREFERRED)

Sites that would be included under the Agreement are any non-Federal lands within the historical range of the Chiricahua leopard frog within Arizona (Figure 1). In addition, any site that would be suitable as a temporary refugium or as isolated populations outside of the historical range could be considered by AGFD, provided frogs would not be able to freely and successfully disperse. Conservation measures to control or eliminate non-native competitors and predators may also be implemented outside the range of Chiricahua leopard frogs, to prevent dispersal into existing or reestablished population sites.

The action under this alternative would be the approval of the Agreement and issuance of the section 10(a)(1)(A) Enhancement of Survival Permit to AGFD.

4.2.1 Vegetation

Potential covered sites under the Agreement can vary widely in the quality and quantity of vegetation emerging from the aquatic sites and growing on the adjacent banks or shorelines. No activity directly related to the issuance of this permit should impact vegetation at potential covered sites. Indirect effects of implementing the Agreement are likely to consist of both short-term negative and long-term beneficial impacts on vegetation in and around the aquatic sites. Management of existing riparian areas and stock tanks to reduce impacts from livestock grazing should enhance vegetation in these areas. This would be accomplished through managing riparian communities in lotic systems to achieve and maintain Proper Functioning Condition of these aquatic systems (Prichard et al. 1998). In lentic and lotic systems, management of livestock in accordance with a ranch management plan, similar to those developed through NRCS, would also likely improve vegetation in existing habitats, or maintain the vegetation that exists, if the livestock management is consistent with, or already under, a ranch management plan. So, conservation measures such as partial fencing of livestock ponds and riparian areas could result in improvements, in both quantity and quality, of shoreline and emergent vegetation.

Construction of new tanks or sand traps on existing livestock ponds would result in short-term disturbance of vegetation and potential conversion of upland or xeroriparian vegetation communities into small aquatic sites with patches of mesoriparian vegetation. The location and amount of area subjected to this type of disturbance is not predictable at this time due to the programmatic nature of this Agreement. However, it is anticipated that these major construction projects would be a minor portion of the projects conducted under this Agreement. The frequency of new livestock tank construction is anticipated to be similar to that under the No Action Alternative, as most land owners will establish livestock tanks in response to the needs of their livestock management, and not for Chiricahua leopard frogs. In addition, the areas of disturbance associated with these projects are relatively small, less than an acre, and individually or cumulatively would not result in a significant change in vegetation types or distribution.

The impacts from livestock grazing on the vegetation around these livestock ponds and periodic maintenance of these sites would remain unchanged, or may be decreased with partial fencing and the development and implementation of new ranch management plans with the NRCS (section 2.5.1 of the Agreement), which should result in improvements in vegetation cover on participating properties. This in turn should reduce run-off and sediment accumulation in new and existing tanks.

Reestablishment of Chiricahua leopard frog sites or control of non-native predators or competitors is not anticipated to impact vegetation or vegetative communities.

While we anticipate a general improvement in aquatic and riparian vegetation and conversion of upland, forest, and xeroriparian vegetation to aquatic and mesoriparian vegetation over the life of the plan because of the small size (less than an acre) of stock tanks impacts from construction are insignificant. The cumulative impacts of implementing the proposed Agreement on vegetation communities should generally be positive, but insignificant due to the anticipated small size of the sites relative to the covered area and the widely scattered distribution of sites.

4.2.2 Wildlife

Sites potentially covered by the Agreement could vary greatly with regard to wildlife species that are associated with these sites. No activity directly related to the issuance of this permit and acceptance of the Agreement should negatively impact wildlife at potentially covered sites.

Indirect effects of implementing the Agreement are likely to consist of increased forage, water, and cover resources for existing wildlife species (e.g. white-tailed deer, elk, and gamble and scaled quail) through improved management associated with implementation of ranch management plans. If new tanks are constructed, they may increase the range of some species by adding additional localities of suitable habitat. However, due to the anticipated small size and scattered distribution, it is not likely to result in any significant range expansions for any native species. The construction of new pipelines, wells, and fences are also not expected to impact wildlife species or their distribution. Modification of existing habitat is likely to increase the diversity of forage and cover resources and improve community diversity by protecting areas or allowing longer periods between disturbances. Reestablishment of Chiricahua leopard frogs at existing or new aquatic sites would likely result in a small increase in local biodiversity by providing an additional forage species for some wildlife species and an additional predator of invertebrates and small vertebrates at these locations. The control of non-native competitors and predators of the Chiricahua leopard frog would impact species that are legally harvested in Arizona through angling (sportfish) or gigging (bullfrogs). However, since the Agreement covers private property, which may have some level of harvest, it is not a significant portion of the state's recreational harvest of these species. The majority of the state's recreational angling and gigging occurs on large lakes and impoundments on State and Federal lands. The potential private lands involved would not result in significant, negative impacts to recreational opportunities in any portion of the state.

4.2.3 Listed, Proposed, and Candidate Species

No direct impacts to special status species are anticipated from the issuance of the permit and approval of the Agreement under this alternative. Indirect impacts to sensitive species would generally occur when implementing the actions covered under the Agreement, such as construction activities, the reestablishment of Chiricahua leopard frogs, or returning sites to baseline conditions.

Chiricahua leopard frog

The impacts on Chiricahua leopard frogs are less than significant on a rangewide basis. The range of Chiricahua leopard frogs is approximately 42,760,364 acres [66,813 mi²], with approximately 11,294,491 of these acres [17,647 mi²] in Arizona. Full implementation of the Agreement, including population reestablishment, will only occur on non-Federal lands within the Arizona range of Chiricahua leopard frogs, approximately 5,792,179 acres [9,050 mi²].

Changes in management of aquatic sites and surrounding uplands are proposed to improve juvenile survival through improvements in cover vegetation, reduction of obstacles to dispersal, and improvements in the stability of suitable habitat sites. Changes in management practices would further reduce impacts of routine livestock use and livestock pond maintenance; e.g., reduce trampling by providing an exclusion area and reducing the need for maintenance through construction of sand traps.

Construction activities under this alternative could be related to creation of new aquatic sites or modifications to existing aquatic sites. Construction to create new aquatic sites would not negatively impact Chiricahua leopard frogs, but would provide benefits by increasing the number of aquatic sites in a metapopulation or adding a new isolated refugia site. Construction related to the modification of existing aquatic and riparian communities, such as sand traps, could have a short-term negative impact, but will be offset with the long-term benefits of improvements in water quality and quantity. It would also reduce the frequency of routine maintenance of these modified stock tanks. The potential short-term impacts of modifying existing aquatic communities are related to the need to dry out the site before using heavy machinery. This is typically done through natural drying of a site, but occasionally through pumping. Therefore, frogs are not likely to be present during construction, as they have either sought refuge elsewhere or have died through desiccation. In addition, under this alternative there are measures to reduce impacts to existing frog populations even further, through salvage and reestablishment. Light construction, such as partial fencing of aquatic and riparian communities, has a small potential to negatively impact Chiricahua leopard frogs, but this is outweighed by the improvements to the quantity and quality of emergent and bank line vegetation used for escape cover. Development of new wells and pipelines could have similar impacts as other construction, when associated with riparian communities. However, any activity that would improve the persistence of existing or new aquatic sites would outweigh any short-term impacts related to construction, especially in light of the current drought.

The two remaining potential actions associated with this alternative are the removal of non-native predators and competitors, and the reestablishment of Chiricahua leopard frog population

sites. Reestablishment of Chiricahua leopard frogs in appropriate aquatic sites are a major goal of this alternative. Reestablishments will be accomplished with individuals from existing captive populations or thriving wild populations. They will be placed in unoccupied habitats or to augment existing populations on private lands within the historical range of this species. Reestablishments are proposed to assist in meeting the primary recovery goal of stable and persistent metapopulations. The larger the number of population sites that are within a metapopulation, the more likely it is to persist over time. Therefore, this action would be beneficial to the continued existence of Chiricahua leopard frogs in Arizona and to their eventual recovery. The potential for landowners at the end of their participation to return a site to baseline conditions would have an impact on Chiricahua leopard frogs. The negative impacts of removing population sites reestablished under the proposed Agreement should be out-weighted by the reestablishment of population sites above the current baseline for the species, the reproduction and dispersal of individuals from these reestablishment sites, and their contribution to metapopulation stability during the minimum of 10-years of conservation participation for each site. Additionally, the removal of non-native predators and competitors in stock tank sites often is accomplished through fencing a site and pumping the tank dry. This removes aquatic sites from the landscape, temporarily. While this is a negative impact to Chiricahua leopard frogs, the presence of non-native predators and competitors in these simple communities usually result in the eventual exclusion of Chiricahua leopard frog. Therefore, the impacts of this type of action may be negative in the short-term, but, it has long-term benefits for this and other native species.

The source populations for reestablishment may be impacted by these translocations, however, while associated with this alternative, impacts from the translocations would occur under a separate section 10(a)(1)(A) Recovery and Research Permit. The impacts of actions would therefore be analyzed in association with the issuance of a separate permit with appropriate terms and conditions to reduce potential impacts to the source population sites.

Other listed, proposed, or candidate species:

Under this alternative, changes in management of aquatic sites should reduce the impacts from land-use activities on aquatic, riparian, and upland sensitive species. This would be accomplished through the development and implementation of a ranch management plan. This should result in long-term improvements of the vegetation communities and limit extreme impacts from existing land use through improving management, timing, and duration of livestock grazing.

Typically, construction of new stock tanks would occur in upland or xeroriparian vegetation communities, not in or near existing aquatic and mesic riparian communities. Therefore, impacts would be primarily limited to Upland and Riparian Species (see section 3.3). These impacts would include the conversion of these species' habitats to an aquatic community, which over time may support a mesoriparian community along its banks. The development of a mesoriparian community around a new livestock tank may provide additional habitat for Riparian Species, but it would not be in a patch size large enough to provide southwest willow flycatcher or western yellow-billed cuckoo breeding habitat. Other than the habitat impacts, there may be noise-related impacts during construction which could negatively impact Upland

and Riparian Species, but these would typically be reduced through pre-construction surveys and timing such activities to avoid critical nesting and dispersal periods. The impacts from the construction of new wells, water distribution pipelines, and modifications to existing livestock ponds would be similar to those described above, but would likely impact less habitat for Upland, Riparian and Aquatic Species (see section 3.3). New wells and water distribution systems would have the long-term beneficial impact of providing persistent water sources for aquatic communities. Modification of existing aquatic sites, such as exclusion fencing and sand traps, would reduce the amount and frequency of disturbance from routine maintenance and would provide the long-term benefit of allowing the aquatic and riparian vegetation to attain a more mature age with longer periods between disturbances. All negative impacts above dealing with construction would be reduced or eliminated through appropriate species specific surveys, timing of construction to avoid breeding and dispersal seasons, and sighting of new facilities outside of the existing habitat of these species.

Reestablishment of Chiricahua leopard frogs in riparian and aquatic communities within its historical range should not result in impacts to Upland or Riparian Species. However, Reestablishment of Chiricahua leopard frogs, a predator, is likely to impact Aquatic Species. The Chiricahua leopard frog's diet is primarily composed of invertebrates, but they have been documented to, on occasion, eat fish or salamanders (Marti and Fisher 1998, Demlong 1997, Degenhardt et al. 1996, and Stebbins 1951). This might include the Aquatic species listed in section 3.3. These aquatic species were part of the natural aquatic communities that contained Chiricahua leopard frogs, and any predation on these species by Chiricahua leopard frogs would be at a natural rate. The Yaqui fish species have continued to co-exist with Chiricahua leopard frogs on the San Bernardino National Wildlife Refuge, and the Sonora tiger salamander co-exists with them in livestock tanks within the San Rafael Valley in southern Arizona. Reestablishment of Chiricahua leopard frogs is not expected to represent a significant impact to these listed, proposed, or candidate species. No impacts are expected on upland species.

The removal of non-native predators and competitors in stock tank sites often is accomplished through fencing a site and pumping the tank dry. This removes the aquatic site from the landscape, temporarily. Alternative water sources are often provided for livestock and wildlife species. Therefore, negative impacts to Upland Species are anticipated to be minor, if any. Riparian species may be negatively impacted by the temporary loss of water, but the riparian vegetation will not likely be impacted, and any long-term impacts are anticipated to be insignificant. Aquatic species will be negatively impacted by the temporary loss of the aquatic site, but the presence of non-native predators and competitors in these simple communities usually result in the eventual exclusion of aquatic sensitive species. Impacts to aquatic species will be minimized through pre-renovation salvage of these species and post treatment reestablishment, when possible. Therefore, the impacts of this type of action may be negative in the short-term, but it has long-term positive benefits for this and other native species.

Potential impacts to other special status species as an indirect result of Chiricahua leopard frog capture, monitoring, transportation, and reestablishment are covered under a separate section 10(a)(1)(A) Research and Recovery Permit held by AGFD or other qualified individuals, implementing these activities. These impacts would be analyzed as part of that permitting process, and while noted in this analysis, these impacts are considered a separate action.

4.2.4 Cultural Resources

No activity directly related to the issuance of this permit and approval of the Agreement is anticipated to impact cultural resources. Indirect impacts of implementation of this Agreement could occur from construction of new or modification of existing stock tanks, wells, and pipelines. Changes in management of aquatic sites, reestablishment of Chiricahua leopard frog population sites, and the removal of non-native predators and competitors will not involve ground disturbing activities and should not impact cultural or historical resources.

Any construction activities would be part of the normal infrastructure improvements related to a livestock operation. Therefore, the impacts from these activities are not completely associated with this alternative and may be common to both of the alternatives. It is anticipated that most participants will enroll existing aquatic habitat sites, and no disturbance of cultural resources will occur. Any maintenance of existing stock ponds are anticipated to be within the previously disturbed areas around existing stock tanks and livestock waters and would not impact cultural resources. Any renovations of existing stock tanks or construction of new stock tanks, wells, and pipelines could impact cultural resources and will need to be reviewed at the project level in accordance with local, State, and Federal law. Most of the new construction would be funded through various Federal programs administered by NRCS or administered through AGFD. It is anticipated that AGFD will implement this Agreement with Federal funds, such as traditional section 6 or State Wildlife Grants, and compliance with the National Historic Preservation Act will be consistent with current processes that AGFD has established for existing Federal Aid projects. Therefore, any proposed ground disturbing activities will go through individual project review and appropriate consultation with the SHPO. It is anticipated that any potential adverse effects to cultural resources will be mitigated in accordance with SHPO requirements or the project sites moved to avoid adverse effects. Construction, ground breaking and any other activity that may impact cultural resources will be better managed under this alternative than if there were no State or Federal agency involvement. Therefore, it is anticipated that no significant local or cumulative impact to cultural resources is likely to occur under this alternative.

In addition, because of the unique government to government relationship between tribal governments, the State of Arizona, and the Federal government, consultation with representatives of interested tribal governments will occur on a project level basis on any cultural resource site that potentially could be impacted through implementation of this Agreement.

4.2.5 Socioeconomic Environment

No activity directly related to the issuance of this permit should impact the socioeconomic environment. There are no indirect effects expected from the implementation of this Agreement as participation is voluntary on each non-Federal landowner's part. Neighboring landowners that may be affected indirectly from the dispersal of Chiricahua leopard frogs from an enrolled site could potentially be affected economically; however, the existing section 4(d) rule recognizes livestock ponds as a benefit to this species and thus, exempts normal maintenance and use of these ponds from the incidental take prohibition for these activities on non-Federal

lands. In addition, the Neighboring Landowner provisions of the Agreement negate any potential or perceived impact on the socioeconomic environment of neighboring landowners. Dispersal of Chiricahua leopard frogs from enrolled sites onto a neighboring Federal grazing allotment may result in a need for the management agency to reinitiate consultation on that allotment, but this Agreement is consistent with existing grazing Biological Opinions and the draft Chiricahua Leopard Frog Recovery Plan. Therefore, no significant socioeconomic impact is anticipated locally or cumulatively.

4.2.6 Wetlands

No activity directly related to the issuance of this permit and approval of the Agreement should impact wetlands. Indirect impacts of this alternative to the covered area are not expected to be significant.

The incentive under this Alternative to improve management of existing wetland resources through the implementation of ranch management plans, resulting in improvements to ecological function should result in local beneficial impacts. Construction of new livestock ponds should not affect any wetlands, as these are primarily filled from the collection of sheet or arroyo flows. Any alteration of existing wetlands or fill within waters of the United States will have to be permitted under the Clean Water Act and other applicable State and Federal laws. This includes the construction of new wells and pipelines, or applicable modifications of existing livestock ponds. There are indirect effects on wetlands or floodplains from the reestablishment of Chiricahua leopard frogs or removal of non-native predators and competitors from aquatic sites. Any potential effects to wetlands or floodplains would be beneficial through improved ranch management, fencing of Chiricahua leopard frog habitat, or changes in management to improve ecological function, persistence, and habitat diversity.

4.2.7 Land Use

No activity directly related to the issuance of this permit should impact existing land use. No significant indirect effects are expected from implementation of the Agreement, as it was developed to be compatible with the current land uses within the historical range of Chiricahua leopard frogs. The development and implementation of NRCS style Ranch Management Plans encouraged in this alternative should not result in significant impacts to existing land use in the area covered by this Agreement. Construction of new livestock ponds or backyard ponds would be accomplished in response to livestock management or landscaping desires of landowners rather than the needs of Chiricahua leopard frog conservation and should not have an impact on existing land uses. The drilling of new wells and installation of new water distribution pipelines will be in response not only to Chiricahua leopard frog conservation needs, but also to enhance existing land-use practices. No impacts are anticipated on land use by the voluntary reestablishment of Chiricahua leopard frogs into aquatic sites, or the removal and control of non-native predators or competitors of Chiricahua leopard frogs. The Neighboring Landowner provisions in this Alternative and the section 4(d) rule would provide coverage for neighboring landowners that have Chiricahua leopard frogs disperse onto their property from that of participating landowners or adjacent Federal lands. No cumulative impacts are anticipated on land use if this alternative is implemented.

4.2.8 Water Resources

No activity directly related to the approval of the Agreement and issuance of this permit should impact water resources. Indirect impacts of implementation of this Agreement may result in improvements to water quality and quantity, locally around specific sites, depending upon a landowner's conservation commitments. Changes in land-use management should improve or maintain vegetative structure in aquatic, riparian, and upland communities. This in turn should improve soil stability, water infiltration, and slow runoff. Construction of new livestock ponds, new well and water distribution systems, and modification of existing habitats may have some initial negative impacts through increased sediment transport, but should eventually improve long-term water quantity, quality, and persistence. All existing water rights would need to be given preference; and any construction of new wells, pipelines, or livestock ponds will need to comply with State and Federal approval processes for this type of construction. Therefore, site-by-site review will be carried out in accordance with State and Federal law at the time of construction. No impacts on water resources are anticipated from the reestablishment of Chiricahua leopard frog population sites. The removal and control of non-native predators and competitors will locally reduce water availability in existing aquatic sites, but should be off set by the temporary availability of alternative water sources. No long-term impact on water resources from removal or control of non-native predator and competitors is anticipated. No significant impacts, locally or cumulatively are anticipated.

4.3 CUMULATIVE IMPACTS

The Council on Environmental Quality defines cumulative impacts as the incremental impacts of multiple present and future actions with individually minor, but collectively significant, effects. Cumulative impacts can be concisely defined as the total effects of the multiple uses and development, including their interrelationships, on the environment. Current impacts to the existing environment within the covered area and impacts from future actions under the Preferred Alternative are described above. Because of the large area covered, the localized nature of impacts related to the Preferred Alternative, and the temporal nature of these impacts, cumulative impacts are anticipated to be generally neutral or beneficial, and insignificant locally or across the covered area.

5.0 PUBLIC INVOLVEMENT

5.1 AGENCY INVOLVEMENT

The Agreement and this draft Environmental Assessment were developed in coordination with the AGFD's Nongame Branch, Phoenix, Arizona. AGFD consulted with members of the Arizona Game and Fish Commission and selected livestock operators to get input on language contained in the Agreement.

5.2 PUBLIC REVIEW

This document, along with the Agreement, will be made available for public review. The review period will be for a minimum of 30 days. A Notice of Availability will be mailed to interested

parties and agencies, and posted on the Arizona Ecological Services Office website (<http://www.fws.gov/arizonaes/>).

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Appendix A: Figure 1. Covered Area

