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In Reply Refer To:
AESO/SE
22410-2010-F-0330

May 10, 2011

Memorandum

To: Chief, Division of Wildlife and Sport Fisheries Restoration, U.S. Fish and Wildlife Service, Albuquerque, New Mexico

From: Field Supervisor

Subject: Biological Opinion on Stocking of Warmwater Fish at Peña Blanca Lake, Santa Cruz County, Arizona

Thank you for your request of May 2, 2011, received by us on May 3, for formal intra-service consultation with the Arizona Ecological Services Office (AESO) pursuant to section 7 of the Endangered Species Act of 1973 (16 U.S.C. 1531-1544), as amended (Act). At issue are impacts that may result from stocking of warm-water fish (largemouth bass [*Micropterus salmoides*], channel catfish [*Ictalurus punctatus*], redear sunfish [*Lepomis microlophus*], bluegill [*L. macrochirus*], and black crappie [*Pomoxis nigromaculatus*]) by Arizona Game and Fish Department (AGFD) into Peña Blanca Lake (Lake), Santa Cruz County, Arizona for three years, from the spring, 2011, through spring, 2013. The Lake is on the Coronado National Forest (CNF) and recreation at the Lake outside of the angling opportunity is managed by the CNF. The proposed action may affect the Chiricahua leopard frog (*Lithobates chiricahuensis*), a threatened species, and the Gila topminnow (*Poeciliopsis occidentalis occidentalis*), an endangered species. For Gila topminnow, we concur with your finding of "may affect, not likely to adversely affect" and provide our rationale in Appendix A.

This biological opinion is based on the project proposal, literature, telephone conversations, field investigations, and other sources of information. Literature cited in this biological opinion is not a complete bibliography of all literature available on the Chiricahua leopard frog, stocking of sportfishes into the frog's habitat, or on other subjects considered in this opinion. A complete administrative record of this consultation is on file at this office.

Consultation History

2008: CNF consults with AESO on mercury remediation at the Lake. Finding of no effect from activities of implementing sediment removal was made. CNF did not request consultation on restocking the Lake with warmwater sportfish after the remediation was completed.

March 16, 2010: AESO completed the biological opinion on the March, 2010, rainbow trout (*Oncorhynchus mykiss*) stocking at Peña Blanca Lake, Santa Cruz County, Arizona by AGFD. This consultation was needed due to documentation of Chiricahua leopard frogs at the Lake the prior fall, and their presence at the time of the stocking. Federal funding for the stocking was provided by Wildlife and Sport Fish Restoration (WSFR), a branch of the Fish and Wildlife Service (FWS). The consultation covered only the initial cold-water fish stocking in Peña Blanca Lake in spring, 2010. The CNF was aware of the proposed action but was not a party to the consultation.

March 24, 2010: AESO received the Peña Blanca Lake Post-renovation Sportfish Stocking Biological Assessment and Evaluation and request to initiate formal consultation from Kent Ellet, Nogales District Ranger CNF. The consultation request is for the action by AGFD of stocking warmwater sportfish in Peña Blanca Lake to restore the sportfish community eliminated by the mercury remediation at the Lake.

April 13, 2010: AESO sent a letter to Kent Ellet, Nogales District Ranger, requesting additional information needed to analyze the potential effects of the action.

May 24, 2010: AESO received the May 18, 2010, revised Peña Blanca Lake Post-Renovation Sportfish Stocking Biological Assessment and Evaluation which included some of the additional information requested by AESO.

July 7, 2010: During surveys, AGFD detected approximately 60 Chiricahua leopard frog around the perimeter of Peña Blanca Lake.

September 28, 2010: AESO sent a letter to Kent Ellet, Nogales District Ranger, requesting additional information needed to analyze the potential effects of the action.

September 29, 2010: AESO, CNF, and AGFD met to discuss conservation measures, additional information needs, and timing for completion of the biological opinion.

September 30, 2010: AESO staff conducted a field trip to the southwestern part of Peña Blanca Lake and observed suitable frog habitat as well as Chiricahua leopard frog and lowland leopard frogs in several areas.

October 4, 2010: AESO sent the September 29 meeting attendees a follow-up summary via electronic mail. The summary included incomplete conservation measures needing further discussion and draft conservation measures agreed to by AESO, AGFD, and CNF.

October 19, 2010: AESO received a request for reinitiation of consultation from WSFR for AGFD to stock rainbow trout from November, 2010 through March, 2011 into the Lake.

October 27, 2010: AESO completed the biological opinion on stocking rainbow trout in Peña Blanca Lake by AGFD from November 2010, through March, 2011.

November 1, 2010: AESO received draft response from CNF to the AESO September 29, 2010 information request letter via electronic mail.

November 2, 2010: AESO, AGFD, and CNF discussed draft conservation measures and remaining information needs via conference call.

October 4 - November 24, 2010: AESO, AGFD, and CNF developed draft conservation measures via electronic mail and phone calls.

November 24, 2010: AESO received letter from CNF in response to our September 29, 2010, letter requesting additional information. We initiated formal section 7 consultation upon receipt of this letter.

April 18, 2011: AGFD sent a letter to WSFR indicating that the CNF was withdrawing its status as the consulting agency but remained committed to implement the conservation measures in concert with AGFD and FWS. AGFD requested that WSFR reinitiate formal consultation as the consulting agency.

May 2, 2011: WSFR sent a memorandum to AESO requesting formal intra-service consultation as the consulting agency for the proposed action. WSFR funding may be used to stock the warmwater sportfish; however, WSFR was not funding the conservation measures.

May 3, 2011: AESO initiated formal intra-service consultation with WSFR.

BIOLOGICAL OPINION

DESCRIPTION OF THE PROPOSED ACTION

The mercury removal project undertaken by CNF in 2008-2009 eliminated the warmwater fish community present in the Lake. The remediation project envisioned the restoration of the warmwater fishery after the completion of the project; however, the effects of that restoration were not considered in the section 7 consultation completed with the CNF on the proposed mercury removal action. To restore the warmwater sportfishery, WSFR and AGFD propose to stock largemouth bass, channel catfish, redear sunfish, bluegill sunfish, and black crappie in Peña Blanca Lake over a three-year period. Largemouth bass, bluegill, and redear sunfish (fry/fingerling, sub-catchables, catchables) and channel catfish and black crappie (sub-catchables, catchables) will be stocked as needed. Numbers of fish stocked will adhere to the AGFD stocking guidelines identified in its sportfish stocking protocol (Table 1). The initial stocking rate for the 45-acre lake is 270,000 fry, 19,350 sub-catchable fish, and 5,850 catchable fish. Stocking may occur during any time of the year and will be most dependent on the availability of WSFR and AGFD funding and fish. One to six truckloads of fish will be needed for the initial stocking. Three to 18 truckloads of fish are anticipated for the total three-year stocking period. AGFD cannot predict the need for future augmentations beyond the three year period. If stocking is needed beyond this initial period, consultation will be re-initiated.

Table 1. Recommended Stocking Rate for Warmwater Fisheries for a 45-acre water body (Arizona Game and Fish Department 2010).

Species	Rate (#/acre)		
	Fry/fingerlings	Sub-catchable	Catchable
Channel catfish	Not proposed for stocking	100	50
Largemouth bass	2000	100	20
Bluegill sunfish	2000	100	30
Redear Sunfish	2000	100	30
Black crappie	Not proposed for stocking	30	Not proposed for stocking
Total	**6000 x 45 = 270,000**	**430 x 45 = 19,350**	**130 x 45 = 5,850**

Hazard Analysis and Critical Control Point (HACCP) and transport protocols developed and implemented by AGFD will be strictly followed to prevent the unintentional transport of unwanted species. AGFD requires that all fish imported into the State be accompanied with fish health certificates certifying them to be disease- and parasite-free. Each load of fish delivered to Peña Blanca Lake will be inspected by trained AGFD biologists to prevent the introduction of non-target organisms.

Conservation Measures

We recognize the CNF, AGFD, FWS, and other partners' extensive efforts to eliminate bullfrogs (*Lithobates catesbeianus*) from the greater Peña Blanca Lake area to improve the baseline for Chiricahua leopard frog (see discussion under the Environmental Baseline) in the Peña Blanca watershed. The intent of these Conservation Measures is to work jointly to maintain these improvements for Chiricahua leopard frog after the proposed stocking action is initiated.

1. Permanent informational signs in English/Spanish will be posted in prominent locations near each parking area at Peña Blanca Lake that will include, at a minimum, a list of the sportfish species currently in the Lake and the fishing regulations for Peña Blanca Lake; including that use of live bait, with the exception of waterdogs, is illegal, and release of any live animals is illegal. The size and content of the signs will be mutually developed and agreed to by AGFD, CNF, and AESO. Temporary signs will be in place prior to release of the first stocking of warmwater fish. Permanent signs will be in place within six months of the date of this opinion. These signs will include educational information on conservation and identification of Chiricahua leopard frog and lowland leopard frog (*Lithobates yavapaiensis*), the identification of bullfrogs, and the threat of exotic species including bullfrogs. These signs will be worded in a way that encourages the public to participate in frog conservation and good stewardship of the Lake. If possible, the partners will develop an interactive sign that includes vocalizations of Chiricahua leopard frog, lowland leopard frog, and bullfrogs. The partners will also provide an AGFD phone number and email address to report bullfrogs or violations of fishing regulations.

2. The AGFD will, within 15 days of the erection of the sign described in Conservation Measure 1, submit to AESO a brief, written report of the installation and text of the sign.

3. The AGFD will, within 15 days of fish stockings, provide AESO with a copy of the invoice or other documentation of the date, number, age class, and species of fish stocked.

4. To maintain habitat for the Chiricahua leopard frog, the AGFD and CNF will protect naturally developing shoreline, aquatic, and emergent vegetation at Peña Blanca Lake. The AGFD and CNF may remove invasive plant species to prevent further spread. The AGFD and CNF will not remove downed trees or other vegetation debris in the water or on the banks and will not harvest or cut aquatic or emergent vegetation except where necessary to maintain access or protect public safety. This does not extend to prohibiting the public from removing vegetation in the course or pursuit of angling, boating, swimming, or other recreational activities.

5. AGFD will conduct a statewide live bait (bait fish and tiger salamanders) regulation assessment and risk analysis to develop recommendations to amend live bait regulations. These recommendations will be presented to the AGFD Commission for implementation consideration.

6. AGFD will reject fish shipments that contain any deleterious non-target species (tadpoles, crayfish, snails, plants, etc.). AGFD personnel checking fish shipments will receive the appropriate training to detect non-target species and will be authorized to reject shipments.

7. The AGFD, CNF, and AESO will coordinate the development of, and implementation of, a survey/monitoring plan for ranid frogs within three months of the date of this biological opinion. This survey/monitoring plan will be adaptable in requirements for intensity, type, and focus of the survey/monitoring effort. Implementation of the survey/monitoring plan will be dependent on agency resource availability. The plan will include the provision that if bullfrogs are detected during the survey, a reasonable effort will be made to remove them, and their presence will be reported to AESO as soon as practicable after the survey. If this monitoring reveals a large bullfrog population is present and a more intensive bullfrog removal program is needed, it will be reported to AESO immediately and AGFD, CNF, and AESO will coordinate development of a more intensive bullfrog removal plan, with implementation dependent upon resource availability of the three agencies. Each agency conducting surveys will send the other two agencies completed survey forms and summary reports for the work it accomplished. CNF will prepare summary reports on its actions, and will provide them to AESO as part of the annual CNF section 7 reporting.

   The survey/monitoring plan will provide methods for implementation at the following three areas:

   a. Selected stock ponds, tanks, and pools within a five-mile radius of Peña Blanca Lake. The minimum focus is on the presence of Chiricahua leopard frog, lowland leopard frog, and bullfrogs and the removal of bullfrogs at these sites.

b. Surveys for bullfrogs at Peña Blanca Lake in conjunction with, but not limited to, annual fish surveys by AGFD. The minimum focus is the presence and removal of bullfrogs at the lake

c. Annual monitoring of Chiricahua leopard frog and lowland leopard frog at Peña Blanca Lake.

8. The CNF will provide training and information to employees to assure that CNF employees working at Peña Blanca Lake are aware of the potential for unauthorized fish stocking and are prepared to inform the public and to report violations.

9. Fish transport water will not be disposed of in any location where it can reach a wet site.

10. AGFD will implement their HACCP process to minimize the likelihood of transporting non-target organisms from the hatcheries to Peña Blanca Lake (Gurtin, undated). AGFD requires that all fish imported into the State be accompanied with fish health certificates certifying them to be disease and parasite free. The five steps in the HACCP planning process are:
    - Describe the activity
    - Identify the potential hazards
    - Diagram the flow of steps for the activity
    - Fill out a hazard analysis worksheet
    - Complete the HACCP plan form

Status of the Species

CHIRICAHUA LEOPARD FROG

The Chiricahua leopard frog was listed as a threatened species without critical habitat in a Federal Register notice dated June 13, 2002. Included was a special rule to exempt operation and maintenance of livestock tanks on non-Federal lands from the section 9 take prohibitions of the Act. Critical habitat was proposed on March 15, 2011 (76 FR 14126) and includes 40 sites in Arizona and New Mexico.

The frog is distinguished from other members of the *Lithobates pipiens* complex by a combination of characters, including a distinctive pattern on the rear of the thigh consisting of small, raised, cream-colored spots or tubercles on a dark background; dorsolateral folds that are interrupted and deflected medially; stocky body proportions; relatively rough skin on the back and sides; and often green coloration on the head and back (Platz and Mecham 1979). The species also has a distinctive call consisting of a relatively long snore of 1 to 2 seconds in duration (Platz and Mecham 1979, Davidson 1996). Snout-vent lengths of adults range from approximately 2.1 to 5.4 inches (Platz and Mecham 1979, Stebbins 2003). The Ramsey Canyon leopard frog (*Lithobates* "*subaquavocali*s"), found on the eastern slopes of the Huachuca Mountains, Cochise County, Arizona, has recently been subsumed into *Lithobates chiricahuensis* (Crother 2008) and recognized by the FWS as part of the listed entity (U.S. Fish and Wildlife Service [USFWS] 2009).

The range of the Chiricahua leopard frog includes central and southeastern Arizona; west-central and southwestern New Mexico; and, in Mexico, northeastern Sonora, the Sierra Madre Occidental of northwestern and west-central Chihuahua, and possibly as far south as northern Durango (Platz and Mecham 1984, Degenhardt et al. 1996, Lemos-Espinal and Smith 2007, Rorabaugh 2008). Reports of the species from the State of Aguascalientes (Diaz and Diaz 1997) are questionable. The distribution of the species in Mexico is unclear due to limited survey work and the presence of closely related taxa (especially *Lithobates lemosespinali*) in the southern part of the range of the Chiricahua leopard frog. Historically, the frog was an inhabitant of a wide variety of aquatic habitats, including cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 3,281 to 8,890 feet. However, the species is now limited primarily to headwater streams, springs and cienegas, and cattle tanks into which nonnative predators (e.g. sportfishes, American bullfrogs, crayfish, and tiger salamanders) have not yet invaded or where their numbers are low (USFWS 2007). The large valley-bottom cienegas, rivers, and lakes where the species occurred historically are populated with nonnative predators at densities with which the species cannot coexist.

The primary threats to this species are predation by nonnative organisms and die offs caused by a fungal skin disease – chytridiomycosis. Additional threats include drought, floods, degradation and loss of habitat as a result of water diversions and groundwater pumping, poor 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 (USFWS 2007). Loss of Chiricahua leopard frog 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). Witte et al. (2008) analyzed risk factors associated with disappearances of ranid frogs in Arizona and found that population loss was more common at higher elevations and in areas where other ranid population disappearances occurred. Disappearances were also more likely where introduced crayfish occur, but were less likely in areas close to a source population of frogs.

Based on 2009 data, the species is still extant in the major drainage basins in Arizona and New Mexico where it occurred historically; with the exception of the Little Colorado River drainage in Arizona and possibly the Yaqui drainage in New Mexico. It has not been found recently in many rivers within those major drainage basins, valleys, and mountains 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 Pinaleño Mountains or Sulphur Springs Valley; and the species is now apparently extirpated from the Chiricahua 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 frog were not found for a decade or more despite repeated surveys. As of 2009, there were 84 sites in Arizona at which Chiricahua leopard frog occur or are likely to occur in the wild, with an additional four captive or partially captive refugia sites. At least 33 of the wild sites support breeding. In New Mexico, 15-23 breeding sites were known in 2008; the frogs occur at additional dispersal sites. The species has been extirpated from about 80 percent of its historical localities in Arizona and New Mexico. Nineteen and eight localities are known from Sonora and Chihuahua, respectively.

The species' current status in Mexico is poorly understood; however, it has been found in recent years in western Chihuahua. Some threats, such as introduced nonnative predators and the threat of catastrophic wildfire, appear to be less important south of the border, particularly in the mountains where Chiricahua leopard frog have been found (Gingrich 2003, Rosen and Melendez 2006, Rorabaugh 2008).

The chytridiomycete skin fungus, *Batrachochytrium dendrobatidis* (*Bd*), the organism that causes chytridiomycosis, is responsible for global declines of frogs, toads, and salamanders (Berger et al. 1998, Longcore et al. 1999, Speare and Berger 2000, Hale 2001). Decline or extinction of about 200 amphibian species worldwide has been linked to the disease (Skerratt et al. 2007). In Arizona, *Bd* infections have been reported from numerous populations of Chiricahua leopard frog in southeastern Arizona and one population on the Tonto National Forest, as well as populations of several other frogs and toads in Arizona (Morell 1999, Davidson et al. 2000, Sredl and Caldwell 2000, Hale 2001, Bradley et al. 2002, USFWS 2007). In New Mexico, chytridiomycosis appears to be widespread in populations in west-central New Mexico, where it often leads to population extirpation. A threats assessment conducted for the species during the development of the recovery plan identified *Bd* as the most important threat to the frog in recovery units 7 and 8 in New Mexico. In recovery unit 6, which includes much of the mountainous region of west-central New Mexico, *Bd* and nonnative predators were together identified as the most important threats. Die-offs from disease typically occur during the cooler months from October-February (USFWS 2007).

The role of the *Bd* fungus in the population dynamics of the Chiricahua leopard frog is as yet undefined. Some populations are driven to extinction soon after the animals become symptomatic; however, other Chiricahua leopard frog populations can exist with the pathogen for years (USFWS 2007). For instance, the frog has coexisted with *Bd* in Sycamore Canyon, Santa Cruz County, Arizona since at least 1972. That is the earliest record for *Bd* in the western United States, which roughly corresponds to the first observed mass die-offs of ranid frogs in Arizona. Even in cases where populations exist with the disease, it is an additional stressor, resulting in periodic die-offs that increase the likelihood of extirpation and extinction.

Epizootiological data from Central America and Australia (high mortality rates, wave-like spread of declines, wide host range) suggest introduction of the disease into previously uninfected populations and the disease subsequently becoming enzootic in some areas. Alternatively, the fungus may be a widespread organism that has emerged as a pathogen because of either higher virulence or an increased host susceptibility caused by other factors such as environmental changes (Berger et al. 1998), including changes in climate or microclimate, contaminant loads, increased UV-B radiation, or other factors that cause stress (Pounds and Crump 1994; Carey et al. 1999, 2001; Daszak 2000). Morehouse et al. (2003) found low genetic variability among 35 *Bd* strains from North America, Africa, and Australia, suggesting that the first hypothesis – that it is a recently emerged pathogen that has dispersed widely – is the correct hypothesis.

The infection intensity or lethal threshold of *Bd* is perhaps more important to control than the prevalence of infection (the proportion of infected hosts). Efforts to limit multiple exposures to the pathogen can prevent the host population from reaching the lethal threshold of zoospores per frog. In a nine to13 year study by Vredenberg et al. (2010), a *Bd* infection took three years to spread until nearly all the 88 yellow-legged frog populations at a lake were infected. A lethal threshold of about 10,000 zoospores of the fungus per frog caused the collapse of these

amphibian populations with Bd. Within a population, as the infection prevalence reached 100%, the infection intensity on individual frogs increased in parallel. Frog mass mortality began only when infection intensity reached a critical threshold and repeatedly led to extinction of populations. Our results indicate that the high growth rate and virulence of *Bd* allow the near-simultaneous infection and buildup of high infection intensities in all host individuals; subsequent host population crashes therefore occur before *Bd* is limited by density-dependent factors. Preventing infection intensities in host populations from reaching this threshold could provide an effective strategy to avoid the extinction of susceptible amphibian species in the wild. Because of a threshold of zoospores per frog must be reached before it results in mortality, there is a time lag between exposure to the pathogen and mortality. This time lag allows for the spread of the pathogen throughout the amphibian population before the population crashes. Unlike other pathogens that disappear as their hosts decline in numbers, this pathogen can cause the extirpation of its host population (Blaustein and Johnson 2010).

Because of this threshold, there is a time lag between exposure and mortality, so the pathogen can spread through much of the amphibian population before disease-driven reductions in host density negatively affect the transmission of *Bd*. Consequently, the pathogen can cause the loss and extinction of its host population, unlike the many other pathogens that disappear as their hosts decline in numbers (Blaustein and Johnson 2010).

Retrospective analysis revealed presence of chytridiomycosis in wild African clawed frogs (*Xenopus laevis*) dating to 1938 (Weldon et al. 2004). African clawed frogs were exported to many areas of the globe from Africa for use in human pregnancy testing beginning in the 1930s. Some of the test frogs escaped or were released and established populations in California, Arizona, and other areas. Although other explanations for the origin of the disease are viable, Weldon et al. (2004) suggest that Africa is where the disease originated and that international trade in African clawed frogs was the means of disease dissemination.

If the disease was introduced to the Southwest via escaped or released clawed frogs, it may have spread across the landscape by human introductions or natural movements of secondarily-infected American bullfrogs, tiger salamanders, or leopard frogs. If this is the case, its rapid establishment and spread could be attributable to humans. *Bd* does not have an airborne spore, so it must spread via other means. Amphibians in the international pet trade (Europe and USA), outdoor pond supplies (USA), zoo trade (Europe and USA), laboratory supply houses (USA), and species recently introduced (*Rhinella marinus* in Australia and American bullfrog in the USA and Uruguay) have been found infected with *Bd*, suggesting human-induced spread of the disease (Daszak 2000, Mazzoni et al. 2003).

Free-ranging healthy bullfrogs with low-level *Bd* infections have been found in southern Arizona (Bradley et al. 2002). Tiger salamanders and bullfrogs can carry the disease without exhibiting clinically significant or lethal infections. When these animals move, or are moved by people, among aquatic sites, *Bd* may be carried with them (Collins et al. 2003, Picco and Collins 2008). Other native or nonnative frogs may serve as disease vectors or reservoirs of infection, as well (Bradley et al. 2002). Green and Dodd (2007) found *Bd* in bullfrogs at a fish hatchery in Georgia and suggested the disease could be moved with stocks of fish. Since that study, *Bd* was confirmed from a bullfrog captured at the Bubbling Ponds Hatchery in Arizona (V. Boyarski, pers. comm.). *Bd* could also be spread by tourists or fieldworkers sampling aquatic habitats (Halliday 1998). The fungus can exist in water or mud and thus could be spread by wet or

muddy boots, vehicles, cattle, fishing gear, and other animals moving among aquatic sites, or during scientific sampling of fish, amphibians, or other aquatic organisms. The AESO and AGFD are employing preventative measures to ensure the disease is not spread by aquatic sampling.

Numerous studies indicate that declines and extirpations of Chiricahua leopard frog are at least in part caused by predation and possibly competition by nonnative organisms, including fishes in the family Centrarchidae (*Micropterus* spp., *Lepomis* spp.), bullfrogs, tiger salamanders (*Ambystoma mavortium mavortium*), crayfish (*Orconectes virilis* and possibly others), and several other species of fishes (Clarkson and Rorabaugh 1989; Sredl and Howland 1994; Fernandez and Bagnara 1995; Rosen et al. 1996, 1994; Snyder et al. 1996; Fernandez and Rosen 1996, 1998). For instance, in the Chiricahua region of southeastern Arizona, Rosen et al. (1996) found that almost all perennial waters investigated that lacked introduced predatory vertebrates supported Chiricahua leopard frogs. All waters except three that supported introduced vertebrate predators lacked Chiricahua leopard frogs. Sredl and Howland (1994) noted that Chiricahua leopard frogs were nearly always absent from sites supporting bullfrogs and nonnative predatory fish. Rosen et al. (1996) suggested further study was needed to evaluate the effects of mosquitofish, trout, and catfish on frog presence.

Waters at the Beatty's Guest Ranch in the Huachuca Mountains supports one of the most robust and dense populations of Chiricahua leopard frog. Mosquitofish occupy all the waters at the Ranch, suggesting predation by mosquitofish may be insignificant; however, the coexistence of these species could be influenced by other factors, such as abundant escape cover, high adult frog survivorship, and high reproductive output in terms of numbers of frog egg masses produced. Examination of studies with other ranid frog species illustrates the likely effects of trout on Chiricahua leopard frog. The relationship between trout and amphibian decline has best been documented with the Mountain yellow-legged frog (*Rana muscosa*) in high lakes of the Sierra Nevada, California. Several authors have concluded that predation by introduced trout and charr (*Salveninus* spp.) into these previously fishless lakes have eliminated many populations of this species (Bradford 1989, Bradford et al. 1993, Knapp and Mathews 2000, Vredenburg et al. 2005). One of the threats that lead to the listing of the southern California populations of the Mountain yellow-legged frog was predation by introduced trout. However, other factors, including chytridiomycosis and pesticides, are possible contributors to the decline of the species as well (Fellers et al. 2001, 2004; Vredenburg et al. 2005). Predation by trout has also been also implicated as a factor in decline or population loss in the Cascades frog (*Rana cascadae*, Fellers et al. 2007) and Columbia spotted frog (*Rana luteiventris*, Reaser and Pilliod 2005).

Disruption of metapopulation dynamics is likely an important factor in regional loss of populations (Sredl and Howland 1994, Sredl et al. 1997). 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 winked out due to drought, disease, or other causes, extirpated sites could be re-colonized via immigration from nearby populations. However, as numbers of populations declined, populations became more isolated and were less likely to be re-colonized if extirpation occurred. Also, most of the larger source populations along major rivers and in cienega complexes have disappeared.

Fire frequency and intensity in Southwestern forests are much altered from historical conditions (Dahms and Geils 1997). Before 1900, surface fires generally occurred at least once per decade in montane forests with a pine component. Beginning about 1870-1900, these frequent ground fires ceased to occur due to intensive livestock grazing that removed fine fuels, followed by effective fire suppression in the mid to late 20th century (Swetnam and Baisan 1996). Absence of ground fires allowed a buildup of woody fuels that precipitated infrequent but intense crown fires (Swetnam and Baisan 1996, Danzer et al. 1997). Absence of vegetation and forest litter following intense crown fires exposes soils to surface and rill erosion during storms, often causing high peak flows, sedimentation, and erosion in downstream drainages (DeBano and Neary 1996). These post-fire events have likely resulted in scouring or sedimentation of frog habitats (Wallace 2003).

An understanding of the dispersal abilities of Chiricahua leopard frogs is the key to determining the likelihood that suitable habitats will be colonized from a nearby extant population of frogs. As a group, leopard frogs are surprisingly good at dispersal. In Michigan, young northern leopard frogs (*Lithobates pipiens*) commonly move up to 0.5 mile from their place of metamorphosis, and three young males established residency up to 8.4 miles from their place of metamorphosis (Dole 1971). Both adults and juveniles wander widely during wet weather (Dole 1971). In the Cypress Hills, southern Alberta, young-of-the year northern leopard frogs successfully dispersed to downstream ponds 3.4 miles from the source pond, upstream 0.6 mile, and overland 0.6 mile. At Cypress Hills, a young-of-the-year northern leopard frog moved 5 miles in one year (Seburn et al. 1997). The Rio Grande leopard frog (*Lithobates berlandieri*) in southwestern Arizona has been observed to disperse at least one mile from any known water source during the summer rainy season (Rorabaugh 2005). After the first rains in the Yucatan Peninsula, leopard frogs have been collected a few miles from water (Campbell 1998). In New Mexico, Jennings (1987) noted collections of Rio Grande leopard frogs from intermittent water sources and suggested these were frogs that had dispersed from permanent water during wet periods.

Dispersal of leopard frogs away from water in the arid Southwest may occur less commonly than in mesic environments in Alberta, Michigan, or the Yucatan Peninsula during the wet season. However, there is evidence of substantial movements even in Arizona. Movement may occur via locomotion of frogs or passive movement of tadpoles along streamcourses. The maximum distance moved by a radio-telemetered Chiricahua leopard frog in New Mexico was 2.2 miles in one direction (R. Jennings, Western New Mexico University, C. Painter, NMDGF, pers. comm. 2004). In 1974, Frost and Bagnara (1977) noted passive or active movement of Chiricahua and Plains (*Lithobates blairi*) leopard frogs for 5 miles or more along East Turkey Creek in the Chiricahua Mountains. In August, 1996, Rosen and Schwalbe (1998) found up to 25 young adult and subadult Chiricahua leopard frog at a roadside puddle in the San Bernardino Valley, Arizona. They believed that the only possible origin of these frogs was a stock tank located 3.4 miles away. Rosen et al. (1996) found small numbers of Chiricahua leopard frog at two locations in Arizona that supported large populations of nonnative predators. The authors suggested these frogs could not have originated at these locations because successful reproduction would have been precluded by predation. They found that the likely source of these animals were populations 1.2-4.3 miles distant. In September 2009, 15-20 Chiricahua leopard frog were found at Peña Blanca Lake west of Nogales. The nearest likely source population is Summit Tank, a straight line distance of 3.1 miles overland and approximately 4.1 miles along intermittent drainages.

Movements away from water do not appear to be random. Streams are important dispersal corridors for young northern leopard frogs (Seburn et al. 1997). Displaced northern leopard frogs will home, and apparently use olfactory and auditory cues, and possibly celestial orientation, as guides (Dole 1968, 1972). Rainfall or humidity may be an important factor in dispersal because odors carry well in moist air, making it easier for frogs to find other wetland sites (Sinsch 1991). Based on these studies, the Chiricahua leopard frog recovery plan (USFWS 2007) provides a general rule on dispersal capabilities. Chiricahua leopard frogs are assumed to be able to disperse one mile overland, three miles along ephemeral drainages, and five miles along perennial water courses.

A recovery plan has been completed (USFWS 2007), the goal of which is to improve the status of the species to the point that it no longer needs the protection of the Endangered Species Act. The recovery strategy calls for reducing threats to existing populations; maintaining, restoring, and creating habitat that will be managed in the long term; translocation of frogs to establish, reestablish, or augment populations; building support for the recovery effort through outreach and education; monitoring; conducting research needed to provide effective conservation and recovery; and application of research and monitoring through adaptive management. Recovery actions are recommended in each of eight recovery units throughout the range of the species. Management areas are also identified within recovery units where the potential for successful recovery actions is greatest.

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

Critical habitat

The 2011 proposed rule includes 40 critical habitat units across the range of the species in Arizona and New Mexico. When critical habitat was proposed, the FWS determined the physical and biological features (PBFs) for Chiricahua leopard frog. PBFs include those habitat features required for the physiological, behavioral, and ecological needs of the species.

Based on the above needs and our current knowledge of the life history, biology, and ecology of the species, and the habitat requirements for sustaining the essential life-history functions of the species, we have proposed that the PBFs essential to the conservation of the Chiricahua leopard frog are:

(1) Aquatic Breeding Habitat and Immediately Adjacent Uplands. These aquatic sites and uplands exhibit the following characteristics:

(a) Perennial or nearly perennial pools or ponds at least 6.0 ft (1.8 m) in diameter and 20 in. (0.5 m) in depth;

(b) Wetted in most years, and do not or only very rarely dry for more than a month;

(c) pH greater than or equal to 5.6;

(d) Salinity less than 5 parts per thousand;

(e) Pollutants absent or only present at levels that do not exceed the tolerances of the Chiricahua leopard frog;

(f) Emergent and or submerged vegetation, root masses, undercut banks, fractured rock substrates, or some combination thereof; but emergent vegetation does not completely cover the surface of water bodies;

(g) Non-native crayfish, predatory fishes, bullfrogs, Barred tiger salamanders, and other introduced predators absent or occurring at levels that do not preclude presence of the Chiricahua leopard frog;

(h) Absence of chytridiomycosis or conditions (e.g., water temperatures that do not drop below 20^{o} C (68^{o} F), pH of greater than 8 during at least part of the year) that allow persistence of Chiricahua leopard frogs with the disease; and

(i) Uplands immediately adjacent to breeding sites that Chiricahua leopard frogs use for foraging and basking.

(2) Dispersal Habitat. Consisting of ephemeral, intermittent, and or perennial drainages that are generally not suitable for breeding, and associated uplands that provide overland movement corridors for frogs among breeding sites in a metapopulation with the following characteristics:

(a) Are not more than 5.0 mi (8.0 km) along perennial drainages, 3.0 mi (4.8 km) along ephemeral or intermittent drainages, 1.0 mi (1.6 km) overland, or some combination thereof not to exceed 5.0 mi (8.0 km);

(b) Provide some vegetation cover for protection from predators, and in drainages, some ephemeral, intermittent, and or perennial aquatic sites, and

(c) Are free of barriers that block movement by Chiricahua leopard frogs, including urban, industrial, or agricultural development; or reservoirs that are 50 ac (20 ha) or more in size and stocked with predatory fishes, bullfrogs, or crayfish; highways that do not include frog fencing and culverts; and walls, major dams, or other structures that physically block movement.

With this proposed designation of critical habitat, we intend to conserve the PBFs essential to the conservation of the species through the identification of the appropriate quantity and spatial arrangement of the PBFs sufficient to support the life-history functions of the species. Because not all life-history functions require both PBFs, not all areas proposed as critical habitat will contain both PBFs. Each of the areas proposed in this rule have been determined to contain sufficient PBFs, or with reasonable effort, PBFs can be restored to provide for one or more of the life-history functions of the Chiricahua leopard frog.

All areas proposed for designation as critical habitat will require some level of management to address the current and future threats to the Chiricahua leopard frog and to maintain or restore

the PBFs. Special management in aquatic breeding sites will be needed to ensure that these sites provide water quantity, quality, and permanence or near permanence; cover; and absence of extraordinary predation and disease that can affect population persistence. In dispersal habitat, special management will be needed to ensure frogs can move through those sites with reasonable success.

Environmental Baseline

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

Description of the Action Area

The Action Area includes all areas to be affected directly or indirectly by the Federal action and not merely the immediate area involved in the action. The action area is Peña Blanca Lake and connected reaches of Peña Blanca Canyon upstream and downstream of the Lake and stock tanks within the five mile dispersal distance to the Lake in the watershed. The majority of the potential effects will occur in the Lake. However, stocked fish and their progeny could potentially move downstream or upstream in Peña Blanca Canyon, and frogs within dispersal distance to the lake could be subject to predation by the stocked sportfish if they move to the Lake.

Environmental Setting

Peña Blanca Lake, when full, covers roughly 45 acres in hilly oak-grassland terrain at about 3,800 feet elevation. The dam, which is at the Lake's north end, was built in 1957 by the AGFD and the Lake opened to the public in 1958. The area is popular with bird watchers and hikers. There is a boat ramp and fishing pier along with the Peña Blanca Trail - a fairly level path that follows the approximate two mile shoreline. The Lake is situated near a Forest Service-maintained campground and is surrounded by CNF lands that support a variety of recreational opportunities.

Peña Blanca Lake is a run-off fed reservoir with Peña Blanca Wash as its main tributary. The wash starts in Mexico and flows north for 4.5 miles before reaching Peña Blanca Lake. The canyon is ephemeral and contains water only following rainfall events. Alamo Canyon, an ephemeral tributary to Peña Blanca Canyon, also starts in Mexico and is a major tributary; it often flows continuously throughout the summer monsoon season. These canyons join approximately 0.75 miles above Peña Blanca Lake.

Peña Blanca Dam has an incorporated spillway and does spill in high seasonal rains. The first mile downstream is a canyon that contains scattered pools of water that can persist throughout much of the year, except during the driest summer months. The next two miles downstream, the wash is ephemeral with a wide sandy bottom. Three miles downstream of the lake, the wash joins with Aqua Fria Canyon, also an ephemeral drainage with a wide sandy bottom. The drainage continues another 4 miles before being intercepted by a large sand and gravel operation

located within Aqua Fria Canyon, where flow would be a thin sheet of water spread across the channel. The drainage leaving the sand and gravel operation continues 1.5 miles to the confluence with the Santa Cruz River. The Santa Cruz River is perennial at the confluence with Aqua Fria Canyon due to sewage effluent releases from the City of Nogales.

History of Nonnative Species at the Lake

Peña Blanca Lake was created in 1957 by AGFD using Federal funding from what is now WSFR. Water in the Lake is from a water right owned by the Arizona Game and Fish Commission (CNF 2008), and AGFD also provided the boat launch ramp and parking for boat trailers. Initial stocking of the Lake was by AGFD in 1957-1958 (USFWS 2011). For many years Peña Blanca Lake has been a popular fishing and tourist destination, with largemouth bass, bluegill, redear sunfish, green sunfish, black crappie, channel catfish, and black bullhead catfish populating the lake. These fishes all reproduced in the lake. From November to March of each year, the AGFD would stock rainbow trout, which do not reproduce or survive through the summer months. Angler surveys completed in 2001 estimated angler use days at 21,298 (Arizona Game and Fish Department [AGFD] 2009); however, mercury contamination and decommissioning of the lodge and restaurant reduced visitation. Fathead minnow and threadfin shad were stocked in the lake by AGFD in the early 1990s and late 1950s, respectively, but neither species persisted. AGFD also stocked crayfish (1991-1993) and bullfrogs (1968-1971). No AGFD stockings of bluegill, redear sunfish, or green sunfish occurred (AGFD 2009). No populations of these species are known upstream of the lake, so these species were likely stocked by anglers.

American bullfrog tadpoles were stocked in Peña Blanca Lake in 1968 and 1971. Hale and May (1983) reported the first stocking of bullfrogs was on September 27, 1968, when 3000 juvenile frogs were released. However, the first collection of a bullfrog in the region - a 1967 collection (UAZ 21104) from Summit Tank - indicates they were already in the area. Furthermore, three specimens were collected from Peña Blanca Lake in April 1968 (UAZ 30073, 52490, 52491), five months before the first frogs were stocked. Rorabaugh and Hale (2005) suggested that predation by introduced nonnative fishes, particularly sunfishes (Centrarchidae) and American bullfrogs, may have contributed to the disappearance of the Tarahumara frog (*Lithobates tarahumarae*) from Peña Blanca Spring and portions of Peña Blanca Canyon. If bullfrogs colonized the area in the late 1960s, this corresponds fairly well with the first detection of chytridiomycosis at Sycamore Canyon in 1972, suggesting bullfrogs may have been the vector that brought the disease to the area.

The Lake was thought to act as a source population of bullfrogs for the region (USFWS 2007), creating a seemingly intractable nonnative problem for Chiricahua leopard frogs and other native amphibians. But the CERCLA project at the Lake presented an opportunity to potentially eliminate bullfrogs from the Lake and surrounding areas. In 2008-2009, a coalition of public and private entities, lead by AGFD, CNF, and AESO made a herculean effort to do just that. The significant importance of this landscape-level project to Chiricahua leopard frogs was summarized in a recent grant request (Sferra 2010) for additional survey funding. Essentially, the coalition's efforts to remove bullfrogs from the tanks in the watershed and the immediate vicinity of the Lake provided a significant conservation benefit to the Chiricahua leopard frog in the drainage, since it provided additional locations for populations to establish and develop into a connected metapopulation. Because bullfrogs take more than one year to metamorphose from

tadpoles to adults, they require waters that have greater permanence to persist in an area. These more hydrologically secure tanks on the watershed that once supported bullfrogs are now available for use by both Chiricahua and lowland leopard frogs. As of this writing, all or most of the bullfrogs have been eliminated from the Lake and an area within five miles of the Lake.

The current status of crayfish at Peña Blanca Lake is unknown. They were observed before the draining of the lake near the inlet to the lake. But they were not known from Peña Blanca Spring or tanks in the region. Whether they survived the renovations and sediment removal at Peña Blanca Lake is unknown. However, no crayfish have been observed since the lake refilled.

Post-remediation stocking activities at the Lake

Under a Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) or 'Superfund' project, Peña Blanca Lake was drained and mercury-contaminated sediment removed in 2008-2009. All fish were eliminated during the draining and sediment removal process and it is likely that bullfrogs and crayfish were also eliminated. It was anticipated that the sportfishery would be reestablished at the Lake once it refilled. Owing to the continuing drought in Arizona, it was anticipated refilling could take several years.

In the winter of 2009-2010, the Lake refilled with the winter rains. On February 9, 2010, AGFD stocked about 2000, 10-12 inch rainbow trout into the Lake. The trout originated from the Page Springs Fish Hatchery near Sedona. We had conducted an informal intra-service consultation in October, 2009, between AESO and the WSFR (with AGFD as the applicant) concurring with a "not likely to adversely affect" determination regarding a one year proposal to stock rainbow trout into Peña Blanca Lake during the winter of 2009-2010; however, we concurred with that determination before we knew there were Chiricahua leopard frogs in the lake (see discussion in the next section below). A biological opinion was prepared (March 13, 2010 biological opinion) that analyzed the stocking of rainbow trout for spring, 2010, and determined such action was not likely to jeopardize the Chiricahua leopard frog. Incidental take was issued based on the potential for rainbow trout predation on eggs, tadpoles, and sub-adult frogs.

Rainbow trout were stocked into Peña Blanca Lake in February and March, 2010, under that consultation. The Incidental Take statement in the March 13, 2010, biological opinion included a reasonable and prudent measure with the following terms and conditions:

A. A sign shall be posted in a prominent place at Peña Blanca Lake that will include, at a minimum, the fishing regulations for Peña Blanca Lake, including that use of live bait (excluding salamanders) is illegal, release of any live animals is illegal, and that the only sportfish currently in the Lake is rainbow trout. This sign shall be in place before the first rainbow trout stocking event occurs. The sign must be maintained through the period when trout persist in the Lake.

B. WSFR shall, within 15 days of the erection of the sign described in 1.a., submit to Arizona Ecological Services a brief, written report of the installation of the sign, the text of the sign, and the stocking of the trout.

On March 23, 2010, we approved proposed language for the sign with WSFR, and later received a photograph of the sign. The October 27, 2010, biological opinion for stocking rainbow trout

between November 2010 and March 2011 contained the same reasonable and prudent measure and terms and conditions.

Chiricahua Leopard Frogs in and near the Action Area

Chiricahua leopard frogs were first collected in the region in 1953 at Sycamore Canyon (collection record UAZ 19800). In the action area, they have been found at Peña Blanca Spring, also known as Rudy Ronquillo Spring (2010), Summit Tank (2010), Lookout Tank (2002), North Mesa Tank (2008), South Mesa Tank (2009), Coyote Tank (2009), Yank Tank (2010), Thumb Butte Tank (2010), Bear Valley Ranch Tank (2010), and Tinker Tank (2010) (Akins 2010b). A frog was also photographed at Alamo Spring that appeared to be a Chiricahua leopard frog in 2006. Not all of these sites have permanent water, and locations of frogs at some sites may represent dispersing individuals. Breeding has been confirmed only at Summit Tank, but likely occurs at one or more of the other sites, particularly in wet cycles. These tanks likely form a loose metapopulation, and sites that are extirpated through drying or other factors are likely recolonized from adjacent sites. Lowland leopard frogs also occur in the action area, and Tarahumara frogs occurred historically in Peña Blanca and Alamo canyons.

The action area lies within recovery unit 1, which supports more occupied sites (32) than any other recovery unit, and the strongest metapopulation in the range of the species, which is at Buenos Aires National Wildlife Refuge. This unit is also closer to recovery in terms numbers of metapopulations and isolated robust populations (see recovery criteria 1in the recovery plan) than any other recovery unit.

On September 23, 2009, a biologist for the Nogales Ranger District found 15 Chiricahua leopard frogs in Peña Blanca Lake. On September 29, 2009, seven Chiricahua leopard frogs, one lowland leopard frog, and one possible Chiricahua X lowland leopard frog was observed in the Lake. At that time, herons were patrolling the shoreline and it was thought these frogs might not persist. However, on October 13, 2009, a biologist again reported eight “big fat” Chiricahua leopard frogs, eight lowland leopard frogs, and another 11 frogs she thought were lowland leopard frogs. The latter species had also colonized nearby Peña Blanca Spring and was reproducing there. Tadpoles were subsequently observed in Peña Blanca Lake (D. Sebesta, CNF, pers. comm. 2009), confirming reproduction by either or both lowland and Chiricahua leopard frogs. While Chiricahua leopard frogs had likely moved to the Lake prior to the remediation, they were unlikely to successfully reproduce and recruit at the Lake due to the nonnative fish and bullfrog populations present. That they were able to do so in 2009 was the result of the remediation at the Lake that provided predator-free conditions not previously available.

No surveys were conducted during the spring or early summer when the stocked rainbow trout from February and March, 2010, were likely still present. A Peña Blanca Lake perimeter survey conducted via kayak and canoe from 1830-2300 on July 7, 2010 documented approximately 60 Chiricahua leopard frogs, mostly on the western end and at inlets (Akins 2010a). The lake perimeter was covered in woody and nonwoody debris, including trash, which provided good cover for frogs. Frogs were observed along the entire perimeter of the lake, but mostly on the west end and in inlets. No bullfrogs were detected. The number of frogs detected indicates successful reproduction likely occurred in the lake.

On July 10, 2010, AGFD and AESO staff broadcast Chiricahua leopard frog vocalizations from 1300 to 1400 at 5 locations along the southern third of Peña Blanca Lake and received responses from one to two individuals at each location (S. Sferra, AESO, pers.comm. 2010). No bullfrogs were detected.

On the afternoon of September 30, 2010, staff from AESO visited the southwestern shore of Peña Blanca Lake. There were several lake fingers that were currently, or could develop into, good frog habitat. Good frog habitat exists along the shallow channel adjacent to a picnic area and trails with overhanging, emergent, and floating vegetation as well as downed logs and branches. At least five Chiricahua leopard frogs were observed, several other leopard frogs could not be identified to species, and several lowland leopard frogs were heard calling. Both Chiricahua and lowland leopard frogs were also observed at nearby Peña Blanca Spring and Rudy Ronquillo pond. We anticipate that at the time of these surveys, tadpoles were likely present in the Lake and there may also have been egg masses; however, most Chiricahua leopard frog reproduction at sites below 5,900 feet elevation is between February and June, with a peak in March-May (USFWS 2007).

On November 3-5, 2010, AGFD conducted presence-absence surveys for bullfrogs at various sites near Peña Blanca Lake (Akins 2010b). The survey concentrated on previously known bullfrog removal sites and sites that might become occupied by bullfrogs immigrating from east of the lake. Eight sites located within a five mile radius of the lake and seven additional sites west of the lake between Yank and Peck Canyons were surveyed. Bullfrogs were detected at only one site, Bolsa Tank, which is west of the five mile radius of the lake, and in the Arivaca drainage. Lowland leopard frogs and Chiricahua leopard frogs were observed at multiple sites. Chiricahua leopard frogs were found as far as five miles downstream of Peña Blanca Lake during a November frog survey conducted by AGFD (C. Akins, AGFD, pers.comm. 2010).

Immediately below the dam, the canyon was very complex and pools were covered in leaf litter and perimeter vegetation. Three Chiricahua leopard frogs were confirmed in the pool (valve box) below the east trail that leads from the dam into the canyon and two Chiricahua leopard frogs were in the boulder pool directly below dam. Water was present throughout the 450 meter area surveyed below the dam, however, water was only running in a few places and large pools were evenly scattered throughout.

The most recent survey was April 26-27, 2011. Chiricahua leopard frogs were confirmed at and below the Lake and no bullfrogs were detected at the Lake or at tanks within the five-mile radius (S. Sferra, USFWS, pers. comm. 2011)

The Peña Blanca Lake proposed critical habitat unit includes 202 acres and is all on Coronado National Forest lands. PBFs #1 and 2 are present. It is proposed as critical habitat because it was occupied at the time of listing and currently contains sufficient PBFs to support life history functions essential for the conservation of the species. This unit is a metapopulation that includes Peña Blanca Lake, Peña Blanca Spring, Summit Reservoir, Tinker Tank, Thumb Butte Tank, and Coyote Tank. These sites were all occupied in 2009. In 2002, Chiricahua leopard frogs were only known to occur at Peña Blanca Spring. Occupancy status at the time of listing for the other sites is unknown. Proposed critical habitat also includes: 1) From Summit Reservoir directly southeast to a saddle on Summit Motorway, then downslope to an unnamed drainage and downstream in that drainage to its confluence with Alamo Canyon, then

downstream in Alamo Canyon to its confluence with Peña Blanca Canyon, then downstream in Peña Blanca Canyon to Peña Blanca Lake, to include Peña Blanca Spring, 2) from Thumb Butte Tank downstream in an unnamed drainage to its confluence with Alamo Canyon, 3) from Tinker Tank downstream in an unnamed drainage to its confluence with Alamo Canyon, then downstream in Alamo Canyon to the confluence with the drainage from Summit Reservoir, 4) from Coyote Tank downstream in an unnamed drainage to its confluence with Alamo Canyon, and then downstream in Alamo Canyon to the confluence with the drainage from Tinker Tank, to include Alamo Spring. Although bullfrogs were removed from a portion of the overall drainage, they remain in other areas within dispersal distance and continue to be a threat to the conservation value of critical habitat in this region.

Effects of the Action

Studies that have implicated nonnative fish in declines of Chiricahua and other leopard frogs in Arizona include Clarkson and Rorabaugh (1989), Sredl and Howland (1994), Rosen et al. (1994, 1996), and Snyder et al. (1996). These studies and the Chiricahua leopard frog recovery plan (USFWS 2007) identify predation by nonnative fish as one of the primary threats to the Chiricahua leopard frog. Specifically, predation by stocked fish in the family Centrarchidae (e.g., *Micropterus* spp., *Lepomis* spp.) is thought to have the most dramatic impact on Chiricahua leopard frog larvae, metamorphs, and adults. Additionally, other species such as catfishes (*Ictalurus* spp.), the flathead catfish (*Pylodictus olivaris*), and species of trout (*Oncorhynchus* spp. and *Salvelinus* spp.) are thought to prey upon life stages of the Chiricahua leopard frog. Bullfrogs are significant predators, and while they are not proposed for stocking at the Lake, the stocking may provide a catalyst for their illegal introduction (see Cumulative Effects)

Given the above analysis, it is likely that stocked warmwater fish in Peña Blanca Lake would prey upon Chiricahua leopard frog adults, froglets, and tadpoles once overwintering warmwater sportfish became active and adult Chiricahua leopard frogs begin breeding in late winter or spring. Largemouth bass and channel catfish are likely to reach sizes to be able to prey on adult frogs and froglets, with smaller individuals of these species and the sunfishes and black crappie able to prey on tadpoles or eggs. Most tadpoles likely metamorphose into froglets in three to nine months, and any overwintering tadpoles may be sufficiently large to escape predation by stocked rainbow trout but not from the larger largemouth bass or channel catfish. Egg masses are usually placed in shallow water in dense vegetative cover, and are less likely to be at risk from predation, although some may occur. The tadpoles that will hatch in the spring of 2011 are at risk of predation by stocked rainbow trout and newly stocked warmwater species. With the potential for dozens of adult frogs producing young, the number of tadpoles at risk could number in the tens of thousands over the course of the 2011 breeding season. As the warmwater sportfish establish populations in the Lake and expand their populations, the number of tadpoles reaching adulthood is likely to be reduced by the increase in potential predators. The future status of the resident breeding population of Chiricahua leopard frogs in the Lake is uncertain.

The amount of predation on Chiricahua leopard frogs from each of the stocked sportfish species will vary due to dietary preferences, foraging locations, and other variables. Chiricahua leopard frogs and other leopard frogs can coexist with introduced predators in complex habitats that provide escape cover for frogs and tadpoles (USFWS 2007). The current conditions at Peña Blanca Lake include a significant amount of vegetative cover that creates complex habitat around the perimeter of the Lake; however, we do not know if Chiricahua leopard frogs will be

able to persist as a reproducing population in the Lake due to the presence of significant predators such as largemouth bass and sunfish. Adult Chiricahua leopard frogs may be able to persist in the Lake, their numbers supported by dispersal from occupied stock tanks in the drainage. Conservation measure 4 is designed to maintain the habitat complexity in the Lake that may provide refuge areas for frogs from the larger predatory species and possibly allow for persistence of a reproducing population of frogs.

The absence of Chiricahua leopard frog records from the Lake suggests the mix of nonnative fishes and bullfrogs that occurred prior to the CERCLA project and bullfrog control efforts was apparently capable of preventing Chiricahua leopard frogs from successfully colonizing the lake. Given that Chiricahua leopard frogs immigrated to Peña Blanca Lake in the fall of 2009, they likely did so in previous years (they were documented at nearby Peña Blanca Spring, also known as Rudy Ronquillo Spring, in 2002), but were likely consumed by predators soon after they arrived. It is possible that some very large adult Chiricahua leopard frogs, big enough to avoid predation by most bullfrogs and introduced fish, might have survived for extended periods of time at the Lake. But Peña Blanca Lake would have served as a population sink for these individuals, in which large adults lived out their lives, but all of their progeny were consumed by introduced predators. Further, the bullfrog population at the Lake was a significant source population for dispersal to tanks in the watershed that were supporting native frog populations. Conservation measure 7 provides for surveys at the Lake and associated tanks in the watershed to document native frog populations and detect and remove bullfrogs when detected. This survey effort is very important to maintaining the bullfrog-free area at and around the Lake and preserving the conservation gains for the Chiricahua leopard frog that were obtained by the coalition's efforts to remove bullfrogs from the drainage. The additional security provided to the potentially occupied tanks in the drainage through this measure is a significant benefit to those sites and allows for future development of a metapopulation that supports recovery efforts for the Chiricahua leopard frog.

The proposed action would impair PBF 1g through the introduction of nonnative warmwater fish that are predators on Chiricahua leopard frog, particularly largemouth bass and channel catfish. Whether or not the Chiricahua leopard frogs in the Lake would be able to maintain a reproducing population is uncertain; however, implementation of the conservation measures will assist in preserving the value of critical habitat away from the Lake, and support the opportunity to maintain the species at the Lake through habitat protection and public education on illegal movement of nonnative species.

Fish Movement from Peña Blanca Lake

During periods of flooding, it is unlikely fish could move upstream due to the presence of a partial barrier created by Arizona Hwy 289, also known as Ruby Road that crosses Peña Blanca Canyon just above the lake and creates a fish barrier with a three to four foot drop. This drainage is usually dry except during rainfall or snowmelt events, so fish would not persist below the barrier.

Fish can spill from the reservoir during flood events. The first mile downstream contains pool habitat that is suitable for fish. Warmwater fish that wash out of the lake may or may not be likely to survive in pools below the dam dependent on temperature and dissolved oxygen conditions. These pools below the lake were surveyed in 1996 and 1997, and although fish had

escaped from the lake, they did not reproduce or persist for more than a couple of months because the pools either dried up during the summer months or dissolved oxygen dropped to lethal levels for fish. Table 2 shows species occurrence documented below the lake during this survey (D. Mitchell, AGFD. pers. comm.). Beyond the few pools immediately below the lake there is no perennial water in Peña Blanca Canyon, Aqua Fria Canyon, or any of their tributaries.

While warmwater sportfish are present in the pools below the Lake, they could be in contact with the Chiricahua leopard frogs living below the dam. Frogs were documented in 2010 and there is no reason to suspect that absent bullfrogs or other predators that they would not persist during the period sportfish are stocked and establish in the Lake unless dissolved oxygen drops to lethal levels and eliminates tadpoles. The sportfish may not establish in the pools below the Lake, but they could be present at least through the majority of the breeding season for Chiricahua leopard frogs. The amount of potential predation on frogs, froglets, or tadpoles is unknown since not all pools might contain sportfish spilled from the Lake, the predatory nature of a particular species of sportfish varies, and spills of sufficient magnitude to result in fish moving from the Lake are unlikely to occur every year.

Table 2. Species composition and distribution below Peña Blanca Lake 1996 and 1997.

Date	**Station 1**	**Station 2**	**Station 3**	**Station 4**	**Station 5**
12/1996	No fish	Dry	Dry	Dry	Dry
01/1997	No fish	Dry	Dry	Dry	Dry
02/1997	Green sunfish, bluegill, yellow bullhead, mosquitofish	No Fish	Dry	Dry	Dry
03/1997	Mosquitofish	mosquitofish	Mosquitofish	Dry	Dry
04/1997	No Fish	No fish	No Fish	Dry	Dry
05/1997	Largemouth bass, yellow bullhead, mosquitofish, bluegill	No fish	Dry	Dry	Dry
09/1997	mosquitofish	Dry	Dry	Dry	Dry

Indirect Effects

Two types of indirect effects are possible: 1) movement of non-target animals, plants, or disease organisms from hatcheries with the fish, and 2) fishing attracting anglers or others who would introduce other species.

Movement of non-target animals, plants, or diseases.

Transportation of sportfish from hatcheries to wild sites has the potential to move non-target plants, mollusks, amphibians, diseases, and parasites with the fish. Bullhead catfish and some of the sunfishes likely were introduced unintentionally to the Southwest with stocks of more desirable sportfishes (Minckley and Marsh 2009). Dodd and Barichivich (2007) found evidence of inadvertent movement of bullfrog tadpoles with warmwater fishes to Harris Neck National Wildlife Refuge, Georgia. Platz et al. (1990) indicated the most likely way that Rio Grande leopard frogs arrived in Arizona was via unintentional transport with warmwater fishes from a hatchery in New Mexico. Presence of Plains leopard frogs well outside of their range at the Utah State Fish Hatchery near Glen Canyon City is also likely the result of inadvertent transport with fish stocks. Green and Dodd (2007) also documented *Bd* and amphibian microsporidian and myxozoan parasites in bullfrog tadpoles at four warmwater hatcheries in the southeastern U.S., which were likely moved inadvertently with stocks of hatchery fishes. A bullfrog in the outside ponds at Bubbling Ponds Fish Hatchery, adjacent to the Page Springs Hatchery, tested positive for *Bd* (Valerie Boyarski, pers. comm. 2009). Inadvertent transport of bullfrogs or their tadpoles with stocks of fish could move *Bd* or their parasites into stocked waters. *Bd* can also survive in water and remain infectious for 3-6 weeks (Johnson and Speare 2003), so potentially the organism could be moved in the water in which the fish are transported. Retallick (pers. comm. in Wixson and Rogers 2009) found *Bd* on the scales of fathead minnows; however, swab, scrape, and fin samples from rainbow trout in ponds known to harbor *Bd*- infected amphibians failed to test positive for the disease (Wixson and Rogers 2009).

Conservation measures contained in the November 23, 2010, letter from the CNF and listed in the Description of the Proposed Action section of this biological opinion are intended to reduce the opportunity for non-target aquatic organisms to be introduced to the Lake during stocking actions. Specifically, conservation measures 3, 6, 9, and 10 work to significantly reduce the risk of inadvertent introductions through documentation of stocking actions, use of HACCP plans and intensive monitoring of shipments of fish to be stocked, and in contract restrictions for the importation of sportfish from other states. These measures are under the control of AGFD for implementation, since they are the entity acquiring and stocking the fish under the proposed action.

The conservation measures may be less successful in regard to *Bd* transmission via stocking actions. *Bd* has been present in the region since at least 1972 (Sycamore Canyon). It has been found in Chiricahua leopard frogs at Buenos Aires National Wildlife Refuge, as well (C. Schwalbe, U.S. Geological Survey. pers. comm. 2009). Although not documented from the Peña Blanca area (no frogs have been tested to our knowledge), it is almost certainly present, given its long proximity at Sycamore Canyon. In this recovery unit (recovery unit one), Chiricahua leopard frogs are persisting, if not thriving with the disease, unlike some regions (e.g. recovery unit 6 in New Mexico, U.S. Fish and Wildlife Service 2007). So, in the relatively unlikely event that the proposed action inadvertently resulted in the introduction of *Bd* to Peña Blanca Lake, it would not be expected to affect the frogs, because it is almost certainly already there and while individual frogs die, the populations appear to persist over time.

Fishing increasing the probability of other species introductions.

The presence of sportfish at Peña Blanca Lake attracts significant numbers of anglers. These anglers bring with them boats and fishing gear that may be wet or have mud attached to them that could carry nonnative snails, plants, plant seeds, or disease organisms such as *Bd.* Bilge tanks or live wells may carry water with disease organisms, fish, invertebrates, amphibians, or plants, which if discharged could inoculate the Lake with these species.

Use of live bait fish is illegal at Peña Blanca Lake, but use of nonnative tiger salamander as bait is not, and tiger salamanders are legally used as bait for largemouth bass across much of Arizona. *Bd*- and ranavirus-infected tiger salamanders have been detected in bait shops in Arizona (Picco and Collins 2008). In a survey of anglers that use tiger salamanders as bait, 67% of them claimed to release bait salamanders into the bodies of water they fished, even though such release is strictly prohibited by AGFD fishing regulations (Picco and Collins 2008). Tiger salamanders are predators on ranid frogs, and while they may be present for a short time if released, they do not establish populations where warmwater predatory fish are present (T. Jones. AGFD, pers. comm. 2011)

In the action area it is currently illegal to bring in live bait fish or crayfish to use as bait for fishing. If collected from the wild, these bait organisms are likely to come with some plant material, invertebrates, and potentially other non-target organisms. Small sunfish are often used as bait and stocking records by AGFD do not indicate any sunfish species (except black crappie) were stocked by them into the Lake. Before 2008, bluegill, green sunfish, and redear sunfish were all documented from the Lake as well as black bullhead (*Ameiurus melas*). These species could have been introduced to the Lake from tanks in the upper watershed, or by anglers using live bait either before or after such actions were prohibited. Nonetheless, illegal stocking of small sunfish and other live bait fish does continue to occur at some level across Arizona. With the establishment of bluegill and redear sunfish as part of the stocking program, any introductions of these species is unlikely to influence the resident populations of these species, but any introduction of green sunfish would add a highly predaceous species to the system.

Crayfish were also present before the Lake was renovated in 2008 and have not been observed since the Lake refilled. The removal of the contaminated sediments may have also removed any crayfish buried in the mud and eliminated them from the lake. Crayfish cannot be moved alive from waters in Arizona (except for a limited area of La Paz County and they cannot be moved alive from that area only within the area). Crayfish are not in the watershed around the Lake but they are present in other Santa Cruz watersheds. Illegal use and release of live bait fish or crayfish, and illegal release of live of tiger salamanders by anglers at Peña Blanca Lake may occur as a result of the proposed action and result in the presence of additional predator species in the Lake. Conservation measures 1, 2, 5, and 8 included in the proposed action are focused on reducing the likelihood of illegal or inadvertent introductions of live bait fish, tiger salamanders, or crayfish through increasing public awareness that these actions are illegal and harmful to the fishery and native aquatic species.

Furthermore, as discussed above, if *Bd* was introduced via indirect effects, it is not expected to affect the conservation of or population persistence of the Chiricahua leopard frog in the action area (the disease is probably already there and the frogs are not much affected by it in recovery unit one).

Summary

The status of the Chiricahua leopard frog in recovery unit one, which is better and closer to recovery than in any other recovery unit, evolved during a time when Peña Blanca Lake supported a diverse warmwater sportfish community and a bullfrog population. The efforts of the coalition to remove bullfrogs from the watershed after the Lake was drained improved the opportunity for recovery within the drainage outside of the Lake itself. There was not a population of Chiricahua leopard frogs at the Lake prior to 2009, and its formation was solely due to the remediation efforts at the Lake that removed nonnative fish and bullfrogs from the Lake. Predation by stocked sportfish on Chiricahua leopard frogs in the Lake is not expected to deter that recovery momentum within this recovery unit given that the population in the Lake is not crucial to the ongoing momentum and that conservation benefits to the tanks in the watershed that were not present before bullfrog removal efforts will be maintained through the conservation measures. Predation by stocked sportfish on various life stages of Chiricahua leopard frog is likely to occur in Peña Blanca Lake and in the pools within a mile downstream of the lake, which may preclude persistence of a reproducing population of Chiricahua leopard frogs in the Lake. In addition, the indirect affects discussed above create additional pressures on the Chiricahua leopard frog population in the Lake and potentially in the watershed. The implementation of the conservation measures reduces the risks of indirect effects occurring due to the continuing monitoring commitment that would detect any new invasion by bullfrogs and allow for their subsequent removal. The implementation of these conservation measures is a direct result of the proposed action, and the amount of effort expended to protect the gains made in the watershed without the proposed action may have been considerably less.

CUMULATIVE EFFECTS

Cumulative effects include the effects of future State, tribal, local or private actions that are reasonably certain to occur in the action area considered in this biological opinion. Future Federal actions that are unrelated to the proposed action are not considered in this section because they require separate consultation pursuant to section 7 of the Act.

Most management actions in the action area are likely to be Federal due to the preponderance of Federal lands managed by the CNF in the action area.

Bullfrogs were in the Peña Blanca watershed before official stocking by AGFD in 1968 likely as a result of deliberate stocking actions by individuals. Bullfrogs were introduced as a sport species and were widely disseminated across the landscape. Anglers do not use bullfrogs as bait, and legal taking of bullfrogs requires they not be transported alive from the site of capture. Because bullfrogs were in the Lake prior to the CERCLA renovation, individuals who previously hunted for them may attempt to reintroduce them to the Lake. The conservation measures that address illegal introductions may deter some individuals from releasing bullfrogs illegally; however, that may not stop all such introductions. Such ad hoc stockings may also contain other non-target organisms since the collections of bullfrogs would come from the wild.

Surveys conducted under conservation measure 7 that locate bullfrogs in the Lake or in tanks in the watershed will allow for documentation of any illegal introductions. Removal efforts initiated while only a few bullfrogs are present can be successful at preventing establishment of a population.

Cross-border violation (CBV) activity in southern Arizona has resulted in route proliferation, off-highway vehicle activity, increased human presence in backcountry areas, discarded trash and abandoned vehicles, cutting of firewood, illegal campfires, and increased chance of wildfire. Additionally, contamination of water sources, including stock tanks used for bathing or waste disposal is of concern for the Chiricahua leopard frog.

CONCLUSION

After reviewing the current status of the Chiricahua leopard frog, the environmental baseline for the action area, the effects of the proposed warmwater sportfish stocking action at Peña Blanca Lake, and the cumulative effects, it is the FWS's biological opinion that the action, as proposed, is not likely to jeopardize the continued existence of the Chiricahua leopard frog. Proposed critical habitat at the Lake will also be affected. We have come to this conclusion based on the following:

1) Even if the Lake is considered "lost" as a reproducing habitat supporting the metapopulation, the LRMP conservation measures and those included with the proposed action to stock the Lake add up to a net benefit to the local metapopulation for the following reasons: bullfrogs are no longer found in the watershed, so Chiricahua leopard frogs have more suitable waters available for colonization (bullfrogs require permanent water over more than one year in order to metamorphose and the 11 sites from which they were removed were likely more permanent than other waters); Chiricahua leopard frogs can still move through the Lake to other locations, facilitated by the maintenance of vegetative cover that provides some protection from predation by fish; establishment and extirpation of occupied sites within a metapopulation are normal events over time, so judging the health of a metapopulation should not rely on the number of sites occupied at any one time, but the number of sites available to be occupied to keep the desired robustness of the metapopulation, and the remediation has provided additional waters to support the metapopulation through elimination of bullfrogs at 11 sites. Not having the Lake as a reproducing population does not compromise the ability of the other sites in the watershed to support recovery in the recovery unit; and, the monitoring program included in the proposed stocking action will, when implemented, allow the gains made in the watershed to continue into the future.

2) Effects to PBF 1g are likely to occur at the Lake; however, it is unclear if with the implementation of the conservation measures adult Chiricahua leopard frogs would be eliminated from the Lake. Implementation of the conservation measures also protects PBF 1g in the tanks in the watershed from reinvasion by bullfrogs, thereby enhancing the conservation value of those areas for recovery.

3) Indirect effects and cumulative effects are reduced by the conservation measures for public education and surveys.

4) If *Bd* was inadvertently introduced as a result, directly or indirectly, of the trout stocking, it is not expected to affect the conservation of or population persistence of the Chiricahua leopard frog in recovery unit one because 1) the disease is probably already present in the action area, and 2) frog populations are persisting despite the presence of the disease in recovery unit one.

The conclusions of this biological opinion are based on full implementation of the project as described in the Description of the Proposed Action section of this document, including any Conservation Measures that were incorporated into the project design.

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 CNF so that they become binding conditions of any grant or permit issued to the AGFD, as appropriate, for the exemption in section 7(o)(2) to apply. CNF has a continuing duty to regulate the activity covered by this incidental take statement. If CNF (1) fails to assume and implement the terms and conditions or (2) fails to require AGFD 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, CNF and AGFD 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

The FWS anticipates that incidental take is anticipated and reasonably certain to occur as a result of stocking warmwater sportfish species into the Lake by AGFD through direct mortality to all life stages (from egg to adult) of Chiricahua leopard frogs in and below Peña Blanca Lake due to predation and harassment by stocked warmwater sportfish and any other nonnative species, diseases, or parasites introduced via the stocking process. Take of all life stages of frogs may occur in the form of harm from competition for food or habitat by the introduction of nonnative aquatic species resulting from sportfish stocking actions by AGFD. This take will occur through decreased health, shorter life spans, decreased reproduction, increased loss from predation, and other impairments of breeding, feeding, and sheltering. Take may also occur from habitat or

community alteration by the introduction of warmwater sportfish, thus disrupting and impairing breeding, feeding, and sheltering. Because we cannot issue incidental take for the result of illegal activities, we do not include the deliberate or inadvertent introduction of other nonnative aquatic species, diseases, or parasites by individuals in this take statement.

The anticipated amount of take from warmwater sportfish and any other nonnative species, disease, or parasites introduced to Peña Blanca Lake as a result of stocking actions by AGFD cannot be directly quantified and will be highly variable over time and space. In addition, population levels of the Chiricahua leopard frog cannot be accurately described with existing information and techniques and may vary substantially from year to year and season to season. Individuals consumed by predation cannot be detected, individuals dead from incidental take are difficult to find, and the cause of their death may be difficult to determine. Losses in populations may be masked by fluctuations in numbers that are natural or caused by other factors. However, based on the history of Chiricahua leopard frogs co-existing with warmwater sportfish, we believe it is reasonable to assume that all Chiricahua leopard frogs in the Lake or that reach the Lake from other populations in the watershed will be taken. We anticipate that the amount of take that may occur will be minimized by implementation of the conservation measures proposed by the CNF and included as part of the proposed action.

EFFECT OF THE TAKE

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

REASONABLE AND PRUDENT MEASURES AND TERMS AND CONDITIONS

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

The Conservation Measures included in the proposed action significantly reduce the amount of incidental take and are not repeated here as reasonable and prudent measures or terms and conditions.

The following reasonable and prudent measure, with its accompanying terms and conditions, is necessary and appropriate to minimize incidental take of the Chiricahua leopard frog:

Fish stocking personnel shall adhere to Appendix G, Requirements for Working in Wetland and Aquatic Systems, in the Chiricahua Leopard Frog Recovery Plan (U.S. Fish and Wildlife Service 2007).

- Dedicated equipment will be used by staff, crews, and permitees frequently working in springs occupied by Chiricahua leopard frogs. This includes footwear. Dedicated equipment will be cleaned and stored separately.

- Equipment which cannot be duplicated or can be easily cleaned must be disinfected before fish transport. Equipment will be rinsed and all debris removed. Surfaces, which should appear clean, will be scrubbed with one of the following solutions:
-

1) rinsing with 1 percent sodium hypochlorite (household bleach);

2) 20-second exposure to 70 percent ethanol or 1 mg/ml benzalkonium chloride;

3) desiccation and exposure to 50-60°C heat for 30 minutes;

4) 0.012 percent Path-X™ or 0.008 percent quaternary ammonium compound 128 (both containing DDAC, didecyl dimethyl ammonium chloride as active ingredient) Solution concentrations from Johnson, ML, L Berger, L Philips and R, Speare. 2003. Fungicidal effects of chemical disinfectants, UV light, desiccation and heat on the amphibian chytrid Batrachochytrium dendrobatidis. Diseases of Aquatic Organisms 57:255-260.

- Following disinfection, equipment should be rinsed copiously with tap water.

- Footwear belonging to occasional users must be completely cleaned before and between visiting the Lake, with special attention paid to grips, cleats, and laces. Felt-bottomed wader boots are very difficult to clean completely and should be avoided whenever possible. To further reduce the risk of disease transfer, all equipment will be completely dried before re-use.

Review requirement: The reasonable and prudent measure, with its implementing terms and conditions, are designed to minimize incidental take that might otherwise result from the proposed action, but will also allow assessment of whether anticipated incidental take has been exceeded. 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 CNF must immediately provide an explanation of the causes of the taking and review with the Arizona Ecological Service Office the need for possible modification of the reasonable and prudent measures.

Disposition of Dead or Injured Listed Species

Upon locating a dead, injured, or sick listed species, initial notification must be made to the FWS's Law Enforcement Office, (2450 W. Broadway Rd, Suite 113, Mesa, Arizona, 85202, telephone: 480/967-7900) within three working days of its finding. Written notification must be made within five calendar days and include the date, time, and location of the animal, a photograph if possible, and any other pertinent information. The notification shall be sent to the Law Enforcement Office with a copy to this office. Care must be taken in handling sick or injured animals to ensure effective treatment and care and in handling dead specimens to preserve the biological material in the best possible state.

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid adverse effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information.

1) We recommend that CNF assist us with all aspects of recovery for the Chiricahua leopard frog, as described in the 2007 recovery plan.

2) We recommend that CNF work with the AGFD to implement the Conservation and Mitigation Program from the soon to be completed 10-year federally funded sportfish stocking consultation in implementing Chiricahua leopard frog recovery/conservation strategies, including monitoring, nonnative species removal efforts, reestablishment of populations within the historical range, monitoring and repair of barriers, or other tools/approaches.

REINITIATION NOTICE

This concludes formal consultation on the proposed stocking of rainbow trout at Peña Blanca Lake. 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 CH in a manner or to an extent not considered in this opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the listed species or critical habitat not considered in this opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action. In instances where the amount or extent of incidental take is exceeded, any operations causing such take must cease pending reinitiation.

For further information, please contact Lesley Fitzpatrick (602) 242-0210 (x236), or Susan Sferra (602) 242-0524 (x208).

Please refer to consultation number 22410-2010-F-0330 in future correspondence concerning this project.

/s/ Steven L. Spangle

cc: Forest Supervisor, Coronado National Forest, Tucson, AZ
Assistant Field Supervisor, Fish and Wildlife Service, Tucson, AZ

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

Chief, Nongame Branch, Arizona Game and Fish Department, Phoenix, AZ
Regional Supervisor, Region V, Arizona Game and Fish Department, Tucson, AZ

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Appendix A: Concurrences: Gila Topminnow

Gila topminnow is an endangered species without critical habitat. The closest suitable habitat and documented occurrences for Gila topminnow occur in the Santa Cruz River approximately seven miles downstream from the lake. Upstream in the Santa Cruz from the confluence with the Aqua Fria Canyon in Nogales Wash, topminnows were documented in 2002 (HDMS). Downstream near the confluence of the Santa Cruz and Negro Canyon, topminnows were documented in 2002 (Arizona Heritage Database Management System [HDMS]).

Sportfish can spill from the reservoir during flood events. The first mile downstream contains pool habitat that is suitable for fish. Warmwater fish that wash out of the lake are may be likely to survive in pools below the dam. Beyond the few pools immediately below the lake there is no perennial water in Peña Blanca Canyon, Aqua Fria Canyon, or any of their tributaries. The ephemeral nature of the extensive sandy washes provides no habitat for fish. The gravel and sand operation in the drainage forces flows to a thin sheet that would not support fish movement, and any water would quickly be absorbed by the sand bottom. The lake was pumped dry during fall 2008 and winter 2009, and water flowed continuously over the spillway for 34 days. Even then, flows were only a trickle when they finally reached the bridge at I-19, and they were not enough to transport stocked species (J. Kline, AGFD pers. comm.). Furthermore, there are no records of stocked species occurring in the Santa Cruz River in the vicinity of the confluence of Agua Fria Canyon (HDMS).

The proposed activity is not anticipated to have impacts to topminnow due to the distance and conditions in the drainage below the Lake. In the unlikely event stocked fish were able to access the Santa Cruz River mainstem and move into occupied topminnow habitat, potential impacts may include predation and competition for space, but we do not expect this contact to occur.