

BIOLOGICAL OPINION SUMMARY
Effects of the proposed Section 404 permit for Bachmann Springs, Ltd.
development in Cochise County, Arizona

Date of opinion: August 28, 2001

Project: Effects of the proposed Section 404 permit for Bachmann Springs, Ltd.
development in Cochise County, Arizona

Location: Cochise County, Arizona

Listed species affected: proposed threatened Chiricahua leopard frog (*Rana chiricahuensis*)

Biological opinion: No Jeopardy

Incidental take statement:

Anticipated take: *Exceeding this level may require reinitiation of formal consultation.* Mortality of all frogs at Sycamore Spring due to restoration and maintenance activities; mortality of recently metamorphosed frogs due to unintentional introduction of chytridiomycosis resulting from transport of water or mud among aquatic sites Bachmann Springs personnel or contractors; and mortality of all frogs from the intentional or unintentional introduction of nonindigenous species. Measures to minimize the impacts of the proposed project were included as part of the proposed action following negotiation between the applicant, the applicant's consultants, and the Service. There are three reasonable and prudent measures and six terms and conditions.

Conservation recommendations: *Implementation of conservation recommendations is discretionary.* The use of water features at the development as Chiricahua leopard frog habitat should be explored in cooperation with the Arizona Game and Fish Department and the Service. We request copies of any reports regarding implementation of the project. We are especially interested in reports that include an analysis of the effectiveness of the mitigation measures. The permittee should consider additional water saving mechanisms, such as effluent recharge and minimizing turf grass areas. We recommend the Corps with the Service and Arizona Game and Fish Department to reestablish the Chiricahua leopard frog to suitable habitats. We recommend the Corps and permittee work with the Service and Arizona Game and Fish Department to begin an aggressive program to ensure that nonindigenous aquatic organisms are not introduced to the action area, and if they are, to support actions to remove them.

United States Department of the Interior

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August 28, 2001

Ms. Cindy Lester
Arizona Section, Regulatory Branch
U.S. Army Corps of Engineers
3636 North Central Avenue, Suite 760
Phoenix, Arizona 85012-1936

Dear Ms. Lester:

This letter transmits the Fish and Wildlife Service's (Service) conference opinion based on the Service's review of the proposed Bachmann Springs, Ltd. development (File No. 1999-16307-RJD) in Cochise County, Arizona, and its effects on the proposed threatened Chiricahua leopard frog (*Rana chiricahuensis*) in accordance with section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 et seq.). Your December 14, 2000, request for a formal conference was received on December 15, 2000. However, the initial request did not contain all of the information necessary to initiate formal consultation as outlined in the regulations governing interagency consultations (50 CFR §402.14c). We notified the Corps of this deficiency in our letter of May 1, 2001. Your letter of June 29, 2001, which we received July 2, 2001, and communications the Service had with the applicant and their consultants provided the information required to initiate consultation.

This conference opinion is based on information provided in the June 1999, July 1999, and November 2000 biological assessments, information provided by the Corps, the applicant, and the applicant's consultants, telephone conversations, meetings, field investigations, and other sources of information. A complete administrative record of this consultation is on file in this office. We have assigned log number 2-21-00-I-212 to this consultation. Please refer to that number in future correspondence on this consultation.

CONFERENCE OPINION

DESCRIPTION OF THE PROPOSED ACTION

The proposed action is the issuance of a permit under section 404 of the Clean Water Act (CWA). The proposed permit will cover utility, road, and golf cart crossings in Haberstock Wash and other unnamed washes. This permit will facilitate the development of the proposed 685 ha (1,700 ac) Bachmann Springs Resort. The proposed development will include lodging, residences, golf, commercial, recreational, and cultural developments. Open space is expected to cover about 280 ha (700 ac). Only the 12 road and 10 golf cart crossings that are in waters of the U.S. will be considered here.

The road crossings will result in the discharge of 475 m³ (621 cy) at each crossing. The total discharge associated with the golf cart crossings is 191 m³ (250 cy). The total discharge into waters of the U.S. associated with the crossings is 5889 m³ (7702 cy). The total area of fill is 1215 m³ (0.3 ac). The golf cart crossings will span the drainage, and the road crossings will consist of culverts with some fill in the floodplain.

The action being permitted under the Clean Water Act is only the road and golf cart crossings. However, the implementing regulations (50 CFR §402.02) for the Endangered Species Act are clear that all impacts from a project must be analyzed during section 7 consultation. The action area affected by the proposed development is far larger than the washes under Corps' jurisdiction and includes the whole development. The Sycamore Spring Chiricahua leopard frog population is part of a larger metapopulation in the Dragoon Mountains, and actions affecting Sycamore Spring could impact the entire metapopulation. Therefore, the Service considers the action area to be the entire 685 ha (1,700 ac) development and the area surrounding the Dragoon Mountain metapopulation.

The best information presently available shows that potential impacts from groundwater pumping to the San Pedro River have been fully mitigated through an agreement between Bachmann Springs, Ltd. and the Bureau of Land Management. Therefore, the San Pedro River is considered to be outside of the action area at this time. If new information illustrates that groundwater withdrawal associated with the development impacts the San Pedro River, or other listed species habitat, reinitiation of consultation may be necessary (50 CFR §402.16).

A buffer will be established between Sycamore Spring and proposed development areas. The pond and stock trough at Sycamore Spring will be maintained and restored. The banks of the pond will be rock armored, perennial water will be maintained, and aquatic vegetation will be reestablished.

Other potential plans include stormwater detention basins to catch storm runoff from the golf course and parking lots, a pond on the golf course in the south-central part of the development, and sewage treatment wetlands (Jim Hyde, Bachmann Springs, Ltd., pers. comm., August 9, 2001). Because these plans are tentative and information is lacking, they are not considered part of the proposed action and will not be analyzed in this conference opinion. Further section 7 consultation will be necessary if these future actions are likely to affect listed species.

STATUS OF THE SPECIES (range-wide)

The Chiricahua leopard frog was proposed for listing as a threatened species without critical habitat on June 14, 2000 (USFWS 2000). The rule included a proposed special rule to exempt operation and maintenance of livestock tanks on non-Federal lands from the section 9 take prohibitions of the Act. This species is distinguished from other members of the *Rana 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 one to two seconds in duration (Davidson 1996, Platz and Mecham 1979). Snout-vent lengths of adults range from approximately 54.0 to 139.0 millimeters (2.1-5.4 inches)(Platz and Mecham 1979, Stebbins 1985). The Ramsey Canyon leopard frog (*Rana subaquavocalis*) is similar in appearance to the Chiricahua leopard frog, but it often grows to a larger size and has a distinct call that is typically given under water (Platz 1993).

The Chiricahua leopard frog is an inhabitant of cienegas, pools, livestock tanks, lakes, reservoirs, streams, and rivers at elevations of 1,000 to 2,710 meters (3,281-8,890 ft) in central and southeastern Arizona; west-central and southwestern New Mexico; and in Mexico, northern Sonora, and the Sierra Madre Occidental of Chihuahua, northern Durango and northern Sinaloa (Platz and Mecham 1984, Degenhardt et al. 1996, Sredl et al. 1997). The distribution of the species in Mexico is unclear due to limited survey work and the presence of closely related taxa (especially *Rana montezumae*) in the southern part of the range of the Chiricahua leopard frog. In New Mexico, of sites occupied by Chiricahua leopard frogs from 1994-1999, 67 percent were creeks or rivers, 17 percent were springs or spring runs, and 12 percent were stock tanks (Painter 2000). In Arizona, slightly more than half of known historic localities are natural lotic systems, a little less than half are stock tanks, and the remainder are lakes and reservoirs (Sredl et al. 1997). Sixty-three percent of extant populations in Arizona occupy stock tanks (Sredl and Saylor 1998).

Populations on the Mogollon Rim are disjunct from those in southeastern Arizona. Based on preliminary analysis of allozymes, the Rim populations may represent a taxon distinct from the southern populations (James Platz, Creighton University, pers. comm., 2000). However, mitochondrial DNA work at the University of Denver does not support this conclusion (N. Benedict, pers. comm., 1999). Additional work is needed to clarify the genetic relationship among Chiricahua leopard frog populations.

Die-offs of Chiricahua leopard frogs were first noted in former habitats of the Tarahumara frog (*Rana tarahumarae*) in Arizona at Sycamore Canyon in the Pajarito Mountains (1974) and Gardner Canyon in the Santa Rita Mountains (1977-78)(Hale and May 1983). From 1983 to 1987, Clarkson and Rorabaugh (1989) found Chiricahua leopard frogs at only two of 36 Arizona localities that had supported the species in the 1960s and 1970s. Two new populations were reported. During extensive surveys from 1995-2000, primarily by Arizona Game and Fish Department personnel, Chiricahua leopard frogs were observed at 60 localities in Arizona (Rosen et al. 1996, Sredl et al. 1997, Service files). In New Mexico, the species was found at 41 sites from 1994 to 1999; eight of 31 of those were verified extant during 1998 to 1999 (Painter 2000).

During May to August 2000, the Chiricahua leopard frog was found extant at only eight of 34 sites where the species occurred in New Mexico during 1994 to 1999 (C. Painter, pers. comm., 2000). The species has been extirpated from about 75 percent of its historic localities in Arizona and New Mexico. The status of the species in Mexico is unknown.

Based on Painter (2000) and the latest information for Arizona, the species is still extant in all major drainages in Arizona and New Mexico where it occurred historically; however, it has not been found recently in many rivers, valleys, and mountain ranges, including the following in Arizona: White River, East Clear Creek, West Clear Creek, Silver 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, Sonoita Creek, Pinaleno Mountains, Peloncillo Mountains, Sulphur Springs Valley, and Huachuca Mountains. In many of these regions Chiricahua leopard frogs were not found for a decade or more despite repeated surveys. Recent surveys suggest the species may have recently disappeared from some major drainages in New Mexico (C. Painter, pers. comm., 2000).

Threats to this species include predation by nonindigenous organisms, especially bullfrogs, fish, and crayfish; disease; drought; floods; degradation and destruction of habitat; water diversions and groundwater pumping; disruption of metapopulation dynamics; increased chance of extirpation or extinction resulting from small numbers of populations and individuals; and environmental contamination. Numerous studies indicate that declines and extirpations of Chiricahua leopard frogs are at least in part caused by predation and possibly competition by nonindigenous organisms, including fish in the family Centrarchidae (*Micropterus* spp., *Lepomis* spp.), bullfrogs (*Rana catesbeiana*), tiger salamanders (*Ambystoma tigrinum mavortium*), crayfish (*Orconectes virilis* and possibly others), and several other species of fish (Clarkson and Rorabaugh 1989, Sredl and Howland 1994, Fernandez and Bagnara 1995, Rosen et al. 1994, 1996, Snyder et al. 1996, Fernandez and Rosen 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 nonindigenous predatory fish. Rosen et al. (1996) suggested further study was needed to evaluate the effects of mosquitofish, trout, and catfish on frog presence.

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 recolonized via immigration from nearby populations. However, as numbers of populations declined, populations became more isolated and were less likely to be recolonized if extirpation occurred. Also, most of the larger source populations along major rivers have disappeared.

Where several populations of Chiricahua leopard frogs occur in close proximity (separated by no more than a few kilometers), functional metapopulations may exist. Two areas of the Galiuro

Mountains of Arizona support a total of 12 extant localities, including four localities in the northern end of the range and eight in the southern end. A similar cluster of seven localities occurs in the Dragoon Mountains, Arizona. Metapopulations may exist elsewhere, for instance, in Arizona in the southwest quarter of the San Rafael Valley, and in the Crouch Creek area, and in New Mexico, east and northeast of Hurley, and in the Frieborn Canyon-Dry Blue Creek area. However, with the exception of those in the Dragoon and southern Galileo mountains, metapopulations of which we are aware probably consist of five or fewer localities.

Metapopulations, particularly the larger examples, are critical to long-term survival of the species. Also critical are large populations, such as on the Tularosa River, New Mexico, and Sycamore Canyon and associated tanks in the Pajarito Mountains, Arizona, which are expected to experience relatively low extinction rates and may serve as source populations for colonization of nearby suitable habitats (USFWS 2000).

Fire frequency and intensity in the mountain ranges of southeastern Arizona and southwestern New Mexico are much altered from historic conditions. Before 1900, surface fires generally occurred at least once per decade in montane forests with pine. Beginning about 1870 to 1900, these frequent ground fires ceased to occur due to intensive and extensive livestock grazing that removed fine fuel, 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). Following the 1994 Rattlesnake fire in the Chiricahua Mountains, Arizona, a debris flow filled in Rucker Lake, a historic Chiricahua leopard frog locality. Leopard frogs (either Chiricahua or Ramsey Canyon leopard frogs) apparently disappeared from Miller Canyon in the Huachuca Mountains, Arizona, after a 1977 crown fire in the upper canyon and subsequent erosion and scouring of the canyon during storm events (Tom Beatty, Miller Canyon, pers. comm., 2000). Leopard frogs were historically known from many localities in the Huachuca Mountains; however, natural pool and pond habitat is largely absent now and the only breeding leopard frog populations occur in man-made tanks and ponds. Crown fires followed by scouring floods are a likely cause of this absence of natural leopard frog habitats. Bowers and McLaughlin (1994) list six riparian plant species they believed might have been eliminated from the Huachuca Mountains as a result of floods and debris flow following destructive fires.

An understanding of the dispersal abilities of Chiricahua leopard frogs is 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 (*Rana pipiens*) commonly move up to 800 m (0.5 mi) from their place of metamorphosis, and three young males established residency up to 5.2 km (3.2 mi) 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 2.1 km (1.3 mi) from the source pond, upstream 1 km (0.6 mi), and overland 400 m (0.25 mi). At Cypress Hills, a young-of-the-year northern

leopard frog moved 8 km (5.0 mi) in one year (Seburn et al. 1997). The Rio Grande leopard frog (*Rana berlandieri*) in southwestern Arizona has been observed to disperse at least 1.6 km (1.0 mi) from any known water source during the summer rainy season (Rorabaugh, in press). After the first rains in the Yucatan Peninsula, Rio Grande leopard frogs have been collected several kilometers 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 common 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. In August, 1996, Rosen and Schwalbe (1998) found up to 25 young adult and subadult Chiricahua leopard frogs 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 5.5 km (3.4 mi) away. Rosen et al. (1996) found small numbers of Chiricahua leopard frogs 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 sources of these animals were populations 2 to 7 km (1.2-4.3 mi) distant. In the Dragoon Mountains, Arizona, Chiricahua leopard frogs breed at Halfmoon Tank, but frogs occasionally turn up at Cochise Spring (1.3 km [0.8 mi] down canyon in an ephemeral drainage from Halfmoon Tank) and in Stronghold Canyon (1.7 km [1.1 mi] down canyon from Halfmoon Tank). There is no breeding habitat for Chiricahua leopard frogs at Cochise Spring or Stronghold Canyon, and it appears observations of frogs at these sites represent immigrants from Halfmoon Tank. In the Chiricahua Mountains, a population of Chiricahua leopard frogs disappeared from Silver Creek stock tank after it dried up; but frogs then began to appear in Cave Creek, which is about 1.0 km (0.6 mi) away, again, suggesting immigration. 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).

Recent evidence suggests a chytridiomycete skin fungi is responsible for observed declines of frogs, toads, and salamanders in portions of Central America (Panama and Costa Rica), South America (Atlantic coast of Brazil, Ecuador, and Uruguay), Australia (eastern and western States), New Zealand (South Island), Europe (Spain and Germany), Africa (South Africa, “western Africa”, and Kenya), Mexico (Sonora), and United States (8 States)(Berger et al. 1998, S. Hale pers. comm. 2000, Longcore et al. 1999, Speare and Berger 2000). Ninety-four species of amphibians have been diagnosed as infected with the chytrid *Batrachochytrium dendrobatidis*. In Arizona, chytrid infections have been reported from four populations of Chiricahua leopard frogs (M. Sredl, pers. comm., 2000), as well as populations of Rio Grande leopard frog (*Rana berlandieri*), Plains leopard frog (*Rana blairi*), lowland leopard frog (*Rana yavapaiensis*), Tarahumara frog (*Rana tarahumarae*), canyon treefrog (*Hyla arenicolor*), and Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*)(Morell 1999, Davidson et al. 2000, S. Hale pers.

comm., 2000, Sredl and Caldwell 2000). The disease was recently reported from a metapopulation of Chiricahua leopard frogs from New Mexico; that metapopulation may have been extirpated (C. Painter, pers. comm., 2000). The proximal cause of extinctions of two species, the Australian gastric brooding frogs and the golden toad (*Bufo periglenes*) in Costa Rica, was likely chytridiomycosis. Another species in Australia for which individuals were diagnosed with the disease may be extinct (Daszak 2000).

The role of the fungi in the population dynamics of the Chiricahua leopard frog is as yet undefined; however, it may well prove to be an important contributing factor in observed population decline. Rapid death of recently metamorphosed frogs in stock tank populations of Chiricahua leopard frogs in New Mexico was attributed to post-metamorphic death syndrome (Declining Amphibian Populations Task Force 1993). Hale and May (1983) and Hale and Jarchow (1988) believed toxic airborne emissions from copper smelters killed Tarahumara frogs and Chiricahua leopard frogs in Arizona and Sonora. However, in both cases, symptoms of moribund frogs matched those of chytridiomycosis. Chytrids were recently found in a specimen of Tarahumara frog collected during a die off in 1974 in Arizona. This earliest record for chytridiomycosis corresponds to the first observed mass die-offs of ranid frogs in Arizona.

The origin of the disease is unknown, but epizootiological data from Central America and Australia (high mortality rates, wave-like spread of declines, wide host range) suggest introduction of the disease into naive 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 global climate change (Pounds and Crump 1994, Daszak 2000). If it is a new introduction, its rapid colonization could be attributable to humans. The fungus 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 (*Bufo marinus* in Australia and bullfrog in the USA) have been found infected with chytrids, suggesting human-induced spread of the disease (Daszak 2000). Chytrids 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, and other animals moving among aquatic sites, or during scientific sampling of fish, amphibians, or other aquatic organisms. The Service and Arizona Game and Fish Department are employing preventive measures to ensure the disease is not spread by aquatic sampling. Additional information about the Chiricahua leopard frog can be found in Sredl et al. (1997), Jennings (1995), Degenhardt et al. (1996), Rosen et al. (1994, 1996), Sredl and Howland (1994), Platz and Mecham (1979, 1984), and Painter (2000).

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.

Most land in the area is owned by the Arizona State Land Department, Coronado National Forest, and private parties. There are parcels managed by the Bureau of Land Management nearby. The Bureau's San Pedro Riparian National Conservation Area is about 16 kilometers (10 mi) away.

Middlemarch Road runs through the property. A right-of-way for a new public access road across State Land has been applied for by Cochise County. The road is considered part of the proposed action because it is interrelated to the whole project.

The action area has been historically used for livestock grazing for well over 100 years (Bahre 1991). This use still occurs in the area, but at levels less than historic use. Most livestock have been removed from the Bachmann property, but some livestock use still occurs. Most of the area is Chihuahuan desert scrub. There are limited areas with riparian woodland and scrub. There is cottonwood-willow vegetation associated with both Sycamore and Costello Spring. Quality of the riparian vegetation at both springs is poor and water is present at both springs. It is unknown how many other potential water sources are in the area and what their permanence is. Many tanks, windmills, and springs upslope of the property are shown on topographic maps.

Status of the species within the action area

The range of the Chiricahua leopard frog in Arizona can be divided into two general areas: (1) the southeastern part of the state and (2) centered along the Mogollon Rim. Threats to the species occur throughout its range, but the populations above the Mogollon Rim in Arizona appear to have relatively poor persistence (J. Rorabaugh, U.S. Fish and Wildlife Service, pers. comm., 2001).

The leopard frog has not been found recently on the mainstem of the upper San Pedro River (USFWS 2000). A cluster of seven localities occurs in the Dragoon Mountains (includes Sycamore Spring). In addition, three other historic sites are known from the Dragoons. The Dragoon sites are one of only a few metapopulations of the Chiricahua leopard frog, and thus are very important for the conservation of the species.

There are records of Chiricahua leopard frogs occurring at Sycamore Spring in 1995, 1998, and 2000 (service files, SWCA 2000). Even though only two frogs were found in 2000 (SWCA 2000), since the stock tank held water before then, it is likely that this site contained a breeding population. The minimal habitat that remains may not be large enough to support a breeding population. However, if frogs still survive, a breeding population might quickly reestablish if the stock tank was refilled.

The dispersal distance of Chiricahua leopard frogs is regarded to be 1.6 km (1 mi) overland, 4.8 km (3 mi) down ephemeral drainages, and 8.1 km (5 mi) down perennial drainages (Jim Rorabaugh, pers. comm., August 2001). Sycamore Spring is about 10 km (6 mi) from the nearest of the other known Chiricahua leopard frog localities in the Dragoon Mountains. Though this distance is greater than the given dispersal distance, it is suspected that Chiricahua leopard frogs have dispersed greater distances (Rosen et al. 1996). In addition, the tanks, windmills, and springs that appear to be between Sycamore Spring and the other sites could provide at least temporary habitats, and an intermediate stopping point for dispersing Chiricahua leopard frogs. Therefore, Sycamore Spring is still an important site for the conservation of Chiricahua leopard frogs and any impacts to the Spring or associated habitat and the surrounding area is a concern for management of the Chiricahua leopard frog.

Effects of the Action

The development will affect 685 ha (1,700 ac) of Chihuahuan desert scrub although 280 ha (700 ac) will remain as open space. The impacts from the golf cart and road crossings should likewise affect riparian vegetation. There are three main effects that the proposed development will have on the Chiricahua leopard frog. These effects are both direct and indirect.

Direct and Indirect Effects

The development may indirectly affect potential dispersal and connectivity among sites within the Dragoon Mountain Chiricahua leopard frog metapopulation. Because the development is situated between a known Chiricahua leopard frog population at Sycamore Spring and occupied and potential habitat to the north and east, the development has the potential to restrict frog dispersal routes. Dispersing frogs might still move around the property or in the washes and drainages that run through the property. Additionally, certain parts of the development may assist with leopard frog movement, dependent on how development occurs. Developments often create more mesic microhabitats, such as turf grass, other vegetated areas, and ponds, that could be used by dispersing frogs.

However, the creation of mesic microhabitats also has the potential to negatively impact the Chiricahua leopard frog because it creates habitats for and avenues of introduction for nonindigenous species. Once nonindigenous species are established in an area, they move elsewhere on their own or are moved, intentionally or unintentionally, by humans. The two greatest factors in the introduction of nonindigenous species are humans and alteration of habitat (Soule 1990, Davies and Meador 1992, Meador 1992, 1996, Aquatic Nuisance Species Task Force 1994). The nonnative bullfrog is probably the nonindigenous species that is the greatest threat to the Chiricahua leopard frog (see Status of the Species above). Other frogs, crayfish, and predatory fish can also impact Chiricahua leopard frog populations (Clarkson and Rorabaugh 1989, Rosen et al. 1994, 1996; Sredl and Howland 1994, Fernandez and Bagnara 1995, Snyder et al. 1996, Fernandez and Rosen 1998, USFWS 2000). All of these species have been transported, intentionally and unintentionally, by humans, into areas outside of their historic ranges.

If bullfrogs are present at a site, it almost always follows that leopard frogs are absent (Rosen 2000). Bullfrog populations and numbers are great in the upper San Pedro River valley. Therefore, source populations are nearby and readily available. Bullfrogs are known to move up to 8 km (5 mi)(Cecil Schwalbe, USGS, pers. comm., 2001; ISSG 2001).

Any work done at or near Sycamore Spring has the potential to directly and indirectly affect Chiricahua leopard frogs. If leopard frogs are still present, any work or activities at the site could result in death or injury to leopard frogs. Despite the degraded habitat condition and that only two frogs were seen at Sycamore Spring in 2000, the Service still considers the Chiricahua leopard frog to be present at the site. Indirect effects could occur from work done when leopard frogs are not present or in nearby areas that impact the functioning of the spring system and associated habitats. Rewatering the stock pond should enhance habitat for Chiricahua leopard frogs, though it could also provide habitat for bullfrogs or other nonindigenous species. The habitat that the dirt stock tank at Sycamore Spring would provide for Chiricahua leopard frogs would be enhanced if steps were taken to manage against nonindigenous species.

Interrelated and Interdependent Actions

Interrelated activities are part of the proposed action that depends on the action for its justification, and interdependent activities have no independent utility apart from the action. The new road that is proposed is an interrelated action. The road will allow for easier access to the development. Ease of access is one factor in human-aided movement of nonindigenous species. The road is not expected to cause a measurable impact to the leopard frog.

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.

The State and private lands in the area are likely to remain as grazing lands in the near-term. Development in the area is also likely to continue. Development could occur as haphazard wildcat development or as approved rezoning proposals. Any development greater than five acres will require a federal permit and may need section 7 consultation. If Bachmann Springs proposed a wetland to treat wastewater, a National Pollutant Discharge Elimination System permit under the Clean Water Act would be required and section 7 consultation would probably be necessary.

CONCLUSION

After reviewing the current status of Chiricahua leopard frog, the environmental baseline for the action area, the effects of the proposed Bachmann Springs, Ltd. development and the cumulative effects, it is the Service's conference opinion that the action, as proposed, is not likely to

jeopardize the continued existence of the proposed threatened Chiricahua leopard frog. No critical habitat has been proposed. Thus, none would be affected. We base these conclusions on the following:

1. Habitat at Sycamore Spring will be maintained and enhanced;
2. The Chiricahua leopard frog occurs over a large area of eastern Arizona, western New Mexico and portions of northwestern Mexico. The proposed action affects a small portion of the species' range; and
3. Though the potential connectivity between Sycamore Spring and extant Chiricahua leopard frog sites in the Dragoon Mountains may be lessened by the project, some connectivity will be maintained and could possibly be enhanced.

INCIDENTAL TAKE STATEMENT

Section 9 of the Act and Federal regulation following 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 by the Service 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 by the Service as intentional or negligent actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavioral 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 prohibitions against taking the species found in section 9 of the Act do not apply until the species is listed. However, the Service advises the Corps to consider implementing the following reasonable and prudent measures. If this conference opinion is adopted as a biological opinion following a listing or designation, these measures, with their implementing terms and conditions, will be nondiscretionary, and must be undertaken by the Corps so that they become binding conditions of any grant or permit issued to the permittee, as appropriate, for the exemption in section 7(o)(2) to apply. The Corps has a continuing duty to regulate the activity covered by this incidental take statement. If the Corps (1) fails to assume and implement the terms and conditions or (2) fails to require the permittee to adhere to the terms and conditions of the incidental take statement through enforceable terms that are added to the permit or grant

document, the protective coverage of section 7(o)(2) may lapse. To monitor the impact of incidental take, the Corps or permittee must report the progress of the action and its impact on the species to the Service as specified in the incidental take statement [50 CFR §402.14(i)(3)].

AMOUNT OF EXTENT OF TAKE ANTICIPATED

Although the occurrence of Chiricahua leopard frogs in the project area is certain, the abundance of frogs at Sycamore Spring is uncertain. Also, because the status of the species could change over time through immigration, emigration, and loss or creation of habitats in the area, the precise level of take resulting from this action cannot be quantified. However, given the presence of Chiricahua leopard frogs and suitable habitat throughout the action area, Chiricahua leopard frogs are likely to occur on the project site during development. We anticipate that the following take could occur as a result of the proposed action:

1. Mortality of all frogs at Sycamore Spring due to restoration and maintenance activities;
2. Mortality of all recently metamorphosed frogs at Sycamore Spring due to unintentional introduction of chytridiomycosis resulting from transport of water or mud among aquatic sites Bachmann Springs personnel or contractors; and
3. Mortality of all frogs at Sycamore Spring from the intentional or unintentional introduction of nonindigenous species.

EFFECT OF TAKE

In this conference opinion, the Service finds the anticipated level of take is not likely to jeopardize the continued existence of the proposed threatened Chiricahua leopard frog.

REASONABLE AND PRUDENT MEASURES

The prohibitions against taking the species found in section 9 of the Act do not apply until the species is listed. However, the Service advises the Corps to consider implementing the following reasonable and prudent measures. If this conference opinion is adopted as a biological opinion following a listing or designation, these measures, with their implementing terms and conditions, will be nondiscretionary. In addition to such measures, the following reasonable and prudent measures are necessary and appropriate to minimize take of the Chiricahua leopard frog:

1. The Corps shall continue to monitor the Chiricahua leopard frog and its habitat to document levels of take and determine effectiveness of mitigation measures;
2. Measures shall be implemented to reduce trampling of egg masses, tadpoles, and metamorph frogs; and

3. Personnel education programs and well-defined operational procedures shall be implemented.

Terms and Conditions

To be exempt from the prohibitions of section 9 of the Act once the proposed species is listed, the Corps must comply with the following terms and conditions, which implement the reasonable and prudent measures described above and outline required reporting and monitoring requirements. If this conference opinion is adopted as a biological opinion following a listing or designation, these terms and conditions will be non-discretionary.

1. The following term and condition implements reasonable and prudent measure number one:

- 1.1. Before renovation activities occur at the dirt tank and cement trough, or any other potential habitat at Sycamore Spring, monitor for the presence of Chiricahua leopard frog.

- 1.2. We request copies of any reports regarding implementation of the project. We are especially interested in reports that include an analysis of the effectiveness of the mitigation measures. Any take must be reported annually.

2. The following term and conditions implements reasonable and prudent measure number two:

- 2.1. When renovation occurs at Sycamore Spring, work will occur first at the dirt tank. After work there is complete, any work necessary on the cement trough will occur.

- 2.2. Before work occurs at the dirt tank, Chiricahua leopard frogs, metamorphs, tadpoles, and egg masses will be moved to suitable habitat out of harms way, such as the cement trough. The obverse will be done when the cement trough is renovated.

3. The following terms and conditions implement reasonable and prudent measure number three:

- 3.1. Nonindigenous fish, crayfish, bullfrogs, leopard frogs, salamanders, or other aquatic organisms shall not be moved into any aquatic sites by Bachmann Springs personnel or contractors and Bachmann Springs shall monitor for the unintentional introduction of these organisms into the system.

3.2. All construction personnel, and others implementing the proposed action shall be given a copy of these terms and conditions, and informed of the need to comply with them.

3.3. The permittee shall survey the tank for Chiricahua leopard frogs. Measures to minimize take should include salvage and temporary holding of frogs, limiting disturbance and work areas to the minimum area practicable, leaving stands of emergent vegetation in place, or measures to minimize the likelihood of disease transmission.

Disposition of Dead or Injured Listed Animals

Upon finding a dead or injured threatened or endangered animal, initial notification must be made to the Service's Division of Law Enforcement, Federal Building, Room 8, 26 North McDonald, Mesa, Arizona (602-261-6443) 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, and any other pertinent information. Care must be taken in handling injured animals to ensure effective treatment and care, and in handling dead specimens to preserve biological material in the best possible condition. If feasible, the remains of intact specimens of listed animal species shall be submitted as soon as possible to the nearest Service or AGFD office, educational, or research institutions (e.g., University of Arizona) holding appropriate State and Federal permits.

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

CONSERVATION RECOMMENDATIONS

Section 7(a)(1) of the Act directs Federal agencies to utilize their authorities to further the purposes of the Act by carrying out conservation programs for the benefit of endangered and threatened species. Conservation recommendations are discretionary agency activities to minimize or avoid effects of a proposed action on listed species or critical habitat, to help implement recovery plans, or to develop information on listed species. The recommendations provided here do not necessarily represent complete fulfillment of the agency's section 7(a)(1) responsibilities for the Chiricahua leopard frog. To further the purposes of the Act, we recommend implementing the following discretionary actions:

1. The incorporation of Chiricahua leopard frog habitat into water features at the development should be explored in cooperation with the Arizona Game and Fish Department and the Service.
2. The permittee should consider additional water saving mechanisms, such as effluent recharge and minimizing turf grass areas.

3. The Corps should work with the Service and Arizona Game and Fish Department to reestablish the Chiricahua leopard frog to suitable habitats.
4. The Corps and permittee should work with the Service and Arizona Game and Fish Department to begin an aggressive program to ensure that nonindigenous aquatic organisms are not introduced to the action area, and if they are, to support actions to remove them.

REINITIATION NOTICE

This concludes the conference for the proposed Bachmann Springs, Ltd. development. You may ask the Service to confirm the conference opinion as a biological opinion issued through formal consultation if the Chiricahua leopard frog is listed. The request must be in writing. If the Service reviews the proposed action and finds that there have been no significant changes in the action as planned or in the information used during the conference, the Service will confirm the conference opinion as the biological opinion on the project and no further section 7 consultation will be necessary.

After listing of the Chiricahua leopard frog as threatened and any subsequent adoption of this conference opinion, the Corps shall request reinitiation of consultation if: (1) the amount or extent of incidental take is exceeded; (2) new information reveals effects of the agency action that may affect the species or critical habitat in a manner or to an extent not considered in this conference opinion; (3) the agency action is subsequently modified in a manner that causes an effect to the species or critical habitat that was not considered in this conference opinion; or (4) a new species is listed or critical habitat designated that may be affected by the action.

The incidental take statement provided in this conference opinion does not become effective until the species is listed and the conference opinion is adopted as the biological opinion issued through formal consultation. At that time, the project will be reviewed to determine whether any take of the Chiricahua leopard frog has occurred. Modifications of the opinion and incidental take statement may be appropriate to reflect that take. No take of the Chiricahua leopard frog may occur between the listing and the adoption of the conference opinion through formal consultation, or the completion of a subsequent formal consultation. If you have questions regarding this conference opinion or the consultation process, please contact Doug Duncan 520-670-4860, or Sherry Barrett 520-670-4617 of our Tucson Ecological Services Suboffice.

Sincerely,

/s/ David L. Harlow
Field Supervisor

Ms. Cindy Lester

17

cc: Regional Director, Fish and Wildlife Service, Albuquerque, NM (ARD-ES)

John Kennedy, Arizona Game & Fish Department, Phoenix, AZ
Arizona Game and Fish Department, Region 5, Tucson, AZ

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