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FISH AND WILDLIFE SERVICE

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Subject
FORMAL PETITION TO LIST THE AMARGOSA TOAD (RECEIVED 9/21/94)

ASSIGNMENTS

ROUTED TO	DATE	ACTION	DUE	COMPLETED
AES	09/21/94	2 For Appropriate Action		
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COMMENTS

ACTION CODES

0 - Prepare Draft Reply
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Rec. 9-21-94

BIODIVERSITY
LEGAL
FOUNDATION

September 19, 1994

303-442-3037

Mollie Beattie, Director
U.S. Fish and Wildlife Service
United States Department of the Interior
18th and C Streets, N.W.
Washington, D.C. 20240

Dear Director Beattie:

Enclosed is our formal petition to list the Amargosa Toad (Bufo nelsoni) in Nevada pursuant to Section 4 of the Endangered Species Act (16 U.S.C. 1531 et seq.). This petition is filed under 5 U.S.C. 553(e) and 50 C.F.R. 424.14 (1990) which grants interested parties the right to petition for issuances of a rule from the Assistant Secretary of the Interior.

We understand that this petition action sets in motion a specific process placing definite response requirements on the U.S. Fish and Wildlife Service (USFWS) and very specific time constraints upon those responses.

Due to the severe degree of imperilment of the Amargosa Toad, extremely restricted range, and continuing threats to its riparian/wetland ecosystem in Nevada, we urge the USFWS to expeditiously act upon the Petitioners' request. Thank you for your consideration in this matter.

Respectfully submitted,

D. C. "Jasper" Carlton
Director
Biodiversity Legal Foundation

Copy: Janna Remington
Eric R. Glitzenstein

P.O. BOX 18327 BOULDER, CO 80308-1327

Amargosa Toad
Bufo nelsoni

BY CERTIFIED MAIL

September 19, 1994

In the Office of Endangered Species
Fish and Wildlife Service
United States Department of Interior

Biodiversity Legal Foundation	)	Petition for a Rule to list the Amargosa toad,
P.O. Box 18237	)	Bufo nelsoni, as "endangered" in the conterminous
Boulder, CO 80308-1327	)	United States under the Endangered Species Act,
303-442-3037	)	16 U.S.C. Sec 1531 et seq. (1973) as amended.

Introduction

The Biodiversity Legal Foundation (BLF) hereby petitions the Department of the Interior to formally list the Amargosa toad, Bufo nelsoni, as "endangered" in the lower 48 conterminous United States pursuant to the Endangered Species Act, 16 U.S.C. Sec. 1531 et seq. (hereinafter referred to as "ESA"). This petition is filed under 5 U.S.C. Sec. 553(e) and 50 C.F.R. Sec. 424.14(a) (1990), which grant interested parties the right to petition for issue of a rule from the Assistant Secretary of the Interior.

The petitioner understands that this petition action sets in motion a specific process placing definite response requirements on the U.S. Fish and Wildlife Service (USFWS) and very specific time constraints upon those responses.

The Amargosa toad is endemic to the Oasis Valley in Nye County, Nevada. It was first described by Stejneger in 1893. Confusion over the classification of this species persisted for several decades thereafter, resulting in "false" sightings in California. B. nelsoni exists only in a small number of sites along the Amargosa River in the Oasis Valley of Nevada.

Beatty, Nevada, is located near the southern end of B. nelsoni range. Twelve miles north of Beatty is the town of Springdale, representing the range's northern end. An interstate highway extends along the Amargosa River between Beatty and Springdale. Most populations of the toad exist along this stretch of river; two are found at springs a few miles to the west. Springs, still water, and nearby vegetation provide habitat for B. nelsoni.

Because this species is endemic to an area populated by people--indeed, the human population of the Oasis Valley has increased from 300 to 1,800 in 30 years--B. nelsoni is directly affected by

human habitation. In the past 10 years alone, these toads have experienced the effects of off-road vehicle races, water diversion, grazing, and the introduction of exotic predators. They have not fared well. A biologist reported seeing thousands of this species in 1958 (Savage 1959); only 30 adult and juveniles have been seen in 1994 (Hoff 1994b).

Petitioner requests that Amargosa toad populations across their entire known historic range in the 48 contiguous United States be listed and protected as "endangered," and that the Fish and Wildlife Service give full consideration to emergency listing for the Amargosa toad in the Oasis Valley. The Amargosa toad is now confined to only this one river valley, in Southern Nevada.

Petitioner

The Biodiversity Legal Foundation (BLF) is a non-profit public interest organization dedicated to the preservation of all native wild plants and animals, communities of species, and naturally functioning ecosystems in this country. Through visionary educational, administrative, and legal actions, the BLF endeavors to encourage improved public attitudes and policies for all living things.

Criteria for Listing

Reasons for serious concern about the petitioned species include:

1. Present and threatened destruction, modification, or curtailment of habitat or range;
2. Overuse of habitat for commercial, recreational, scientific, or educational purposes;
3. Other natural or man-made factors affecting its continued existence;
4. Severely restricted range;

5. Inadequacy of existing regulatory mechanisms.

Geographic Distribution

Historic

In the conterminous United States, the Amargosa toad historically occurred in the Oasis Valley in Nye County, Nevada. Stejneger (1893) collected the species from this area in 1891. Anecdotal reports of the Amargosa toad in the Pahranagat Valley, Hot Creek Valley, and Owens Valley (CA) have been discounted by Schuierer (1963). In 1958, Savage (1959) reported seeing "thousands of this extremely rare toad" in the Oasis Valley. Although Savage did not identify the site, Maciolek (1983) believes from Savage's description that it is the LaFleur, or Fleur de lis, site. Altig (1981) reported populations at LaFleur and Indian Springs.

Current

Nine sites constitute the current habitat of the Amargosa toad (Hoff 1994b). These sites range along the Amargosa River from just south of Beatty, Nevada, to southeast of Springdale, Nevada--a distance of approximately nine miles.

Site #1 is in the Amargosa Narrows.

Site #2 is at the Amargosa River in Beatty at the east end of Cedar Street.

Site #3 is at the Amargosa River at the north end of Beatty, north of the I95 bridge.

Site #4 is at Fran's Ranch Brothel, 3 miles northwest of Beatty.

Site #5 is at Manley's Junkyard, 3.7 miles north of Beatty.

Site #6 is at Spicer's Ranch, at Oleo Road

Site #7 is at Crystal Springs.

Site #8 is at Lower Indian Springs.

Site #9 is at Ute Springs.[1]

The best scientific data available indicates B. nelsoni has probably been extirpated from one site (LaFleur) and from one spring at the Crystal Springs complex (Karin Hoff, telephone interview, September 8, 1994). Visits to several nearby sites with habitat suitable to B. nelsoni have revealed no additional groups of toads (Maciolek 1983; Hoff 1993). Many potential sites in the Oasis Valley are on private land; an extensive survey of these areas has not been done and is needed.

Nomenclature

Common Name

The common name of Bufo nelsoni is Amargosa toad.

Taxonomy

> "There has been some confusion in the taxonomy of the Amargosa toad. Stejneger (1893) originally described the Amargosa toad as Bufo boreas nelsoni. The subspecific status of the Amargosa toad was recognized by Wright and Wright (1949) and Stebbins (1951, 1954, and 1966); however, others have considered it to be a full species (Savage 1959; Schuierer 1963; Feder 1977; Altig 1981; Maciolek 1983; Stebbins 1985). The only recent systematic review of the group was that done by Feder (1977) and based on biochemical genetics in which she recognized B. nelsoni as a distinct species, easily distinguished from B. boreas and from B. exsul, another isolated endemic toad, from Deep Springs Valley, California. There is a suite of morphological and ecological characters that distinguishes B. nelsoni from other members of the genus.

[1] The site numbers in this document differ somewhat from those in the attached reference documents; however, any reference to a site number in this document--including quoted material--is consistent with the numbering scheme provided on this page. This numbering scheme was derived from the works of Hoff (1992, 1993, 1994).

"The systematic status of the Amargosa toad is not merely an esoteric exercise of taxonomists but rather an important adjunct to sound conservation and management. Toads are superficially similar in morphology and require experienced anuran taxonomists to accurately describe and sort. This superficial morphological similarity masks a more dramatic biochemical and genetic variability that is of crucial importance for management. Feder's (1977) electrophoretic survey of the B. boreas group clearly demonstrated that B. nelsoni is distinct but because she sampled only one population we remain ignorant of the underlying genetic structure among and within Amargosa Toad populations" (Hoff 1993).

Description

General

Amargosa toads are of medium size. Juvenile and adult Amargosa toad ground colors range from olive-gray to dark brown. Lighter toads have brown and reddish markings. Darker toads have brown and black mottling. Toads tend to be lighter colored at night. All toads have an olive to yellow mid-dorsal stripe. Juveniles display a very dark pelvic patch, which fades in older toads. The toad's parotid glands are distinctly colored from surroundings.

Warts are relatively small, light brown to tan at the tops, and usually ringed with black. Skin between warts is smooth and spotted with black. The head of B. nelsoni is narrow and wedge shaped. The maximum snout-vent length is about 8 cm. The limbs are short; the elbows and knees do not touch when the limbs are adpressed to the body. The feet are small with reduced webbing.

Life History

Reproduction

> "Reproduction occurs from mid-March to early April (Stebbins 1985). Nothing is known about courtship. The males of this species are not known to have an advertising call (Stebbins pers. comm.). A release call has been noted (Altig 1981). A detailed description of courtship, any vocalizations, mating system and reproductive requirements is needed" (Hoff 1993).

Maciolek (1983) reports finding hatching eggs, tadpoles, and metamorphosing toadlets in late August, but this appears anomalistic.

Mortality

Desiccation: Hoff (1994a) describes desiccation as a major cause of mortality in the Amargosa toad: "Approximately 50,000 tadpoles died before metamorphosis as a result of dropping water levels. . . ." Hoff (1994b) estimates that because of desiccation only one in 3,000 Amargosa toad tadpoles survived to maturity. Because most of the toad's water supply comes from nearby springs that are privately owned, the toad is especially vulnerable. Capped springs and redirected water bode poorly for B. nelsoni, as this species is dependent on water throughout its life cycle.

Predation: Amargosa toads have a number of known and suspected predators, several of which are exotic. The non-native crayfish Procambarus clarkii occurs in the Amargosa River and at Indian Springs and has been observed to prey upon Amargosa toad tadpoles in captivity and to attack adult toads in the wild. "It is likely that crayfish (which are active predators in the water and on land) reduced recruitment to zero or very near zero in 1993 at two sites" (Hoff 1994a). Exotic catfish inhabit at least one pool where Amargosa toads have historically occurred. These fish are suspected of preying on the Amargosa toad (Hoff 1994a); indeed, no recruitment of toads has occurred in this pool in recent years.

The bullfrog Rana catesbeiana has been introduced to the Oasis Valley and has been found in the Amargosa River bed and in spring pools close to the river. "Although predation by Bullfrogs on Bufo nelsoni has not been documented, neither adult nor larval toads have been found in the deepest portion of the river bed . . . , where Bullfrogs are common, in the last two years. . . . It is likely that Bullfrogs have eliminated or drastically reduced toad populations throughout the river bed and at the

springs where they occur" (Hoff 1994a). Domestic cats and dogs also may prey on B. nelsoni, but no predation by these animals has been directly observed.

The salamander Ambystoma tigrinum has been seen apparently hunting newly metamorphosed toadlets (Hoff 1994a). It is not known if this salamander is native to the area. Many potentially predatory birds (e.g., ducks, killdeer, ravens, and crows) have been observed only when large numbers of tadpoles were metamorphosing (Hoff 1994a). Native aquatic beetles and odonate larvae have been observed pursuing and feeding on tadpoles on numerous occasions (Hoff 1994a).

Pollution: In 1994, three Amargosa toads were found dead and intact in the Amargosa Narrows, south of Beatty. Pollution is considered the most likely cause of death in these toads (Hoff, telephone interview, September 8, 1994).

Ecology

Habitat

> "The Amargosa toad, like its semiaquatic congeners, has a critical requirement for ponds or pools to accomplish breeding, oviposition, and larval development. Perennial ponds are desirable habitat adjuncts, but such water is essential only during spring months, up to the time of tadpole metamorphosis. Adult and juvenile toads require surface water (standing or flowing) periodically for hydration after spending time on riparian land foraging and sheltering (Altig 1981, Savage 1959). The terrestrial shelters are subsurface retreats, such as in rodent burrows or under rocks, where dehydration is reduced and temperature is moderated. Winter hibernation occurs in such shelters (Savage op. cit.), and Altig (op. cit.) suggested that they may also hibernate in deep muck. Toads have been found in spring areas and along watered reaches of river channel. Aquatic vegetation provides daytime cover, but dense stands of cattail or large rush do not seem to provide adequate open space for habitation. At all sites where toads were found, the water was fresh and relatively cool (65-71°F in August), although ponds where tadpoles develop probably reach higher temperatures.

> Absence of these toads in the lower Amargosa River may be due to their intolerance of alkaline water (Savage 1959)" (Maciolek 1983).

B. nelsoni is found in or near shallow water. Standing water is necessary for the development of tadpoles. "It appears that the requirements that the habitat must provide for these toads to survive include at least the following: an area with deep muck near the spring heads for hibernation, an area of shallow non-flowing water without tall vegetation for breeding, sufficient area surrounding the green area for [s]ummer and [f]all foraging . . . , and (perhaps) sufficient numbers of retreats away from water during these [s]ummer and [f]all forays" (Altig 1981).

Hoff (1994a) conducted a preliminary examination of habitat use in larval, juvenile and adult toads using visual tracking and radio-telemetry. She described the results of this examination as follows:

> Tadpoles
>
> Large aggregates of tadpoles were most often found in very shallow sandy areas with no overhanging vegetation. At two sites that had extensive and diverse habitat, tadpoles were not found in the deepest water or in heavily vegetated areas. Younger tadpoles were found close to the edges of pools during the day and slightly farther from the edge during the night. In many cases tadpoles were in such shallow water that they were barely covered and were tightly packed right up to the edge of the water. At night the tadpoles were slightly more dispersed with very few tadpoles within the first 10 or 20 centimeters of shore. Brattstrom (1979) has suggested that these movements of tadpole aggregates are a behavioral means of thermoregulation, but tadpoles may also be avoiding visually hunting predators such as odonate larvae or the larger predators such as crayfish that do not venture into warm shallow water during the day. This pattern was consistent on five visits between late March and late May at which time the tadpoles had started to metamorphose. However, in early June, metamorphosing tadpoles were found at the edges of pools during the day and night.
>
> Juveniles
>
> Juvenile toads were active during the day and night until the end of June. During this time they were most often found at the water's edge in sparsely vegetated areas with sandy soil. Most were found where the spacing of the vegetation (1 to 5 centimeters) allows easy passage to toadlet-sized animals without requiring that plants be climbed over or bent to the side. In these sparsely vegetated areas toadlets would

occasionally run or hop away through the vegetation and away from the water when they were startled rather than jumping into the water. It is likely that this habitat inhibits the movements of larger predators. Immediately after metamorphosis the toadlets were found in dense clusters, but within two weeks of metamorphosis they were found in far fewer numbers and usually only one at a time. Toadlets were not found in the same microhabitat as the adults (see below). Juveniles began to aggregate with adults at the end of the summer (late August). At this time young of the year, second year and adult toads were found together at night on one site (site #2) in relatively open areas at the water's edge. No daytime retreats for juveniles were located. It is not clear what microhabitat is used by toadlets and juveniles during most of the summer.

Adults

Adult toads were active in every month of the year that extensive searches were made (March through November). Searches for toads were not conducted in January, February or December because it was not anticipated that toads could be located in the winter. However, local residents have reported that toads have been seen in every month of the year.

In March and early April toads were occasionally seen in the water at breeding sites during both day and night searches. In the late spring they were most often found in relatively open areas adjacent to pools and waterways, although a few were found forcing their way through dense grasses at one site (site #1). Toads were active on land during the day through the end of June. During the summer, several toads at two sites were regularly relocatable . . . These were found in water, either floating in pools or in the river in crevices under rocks or hidden in litter and silt on the bottom during the day. Terrestrial retreats were not located except on one occasion when a toad was observed in the opening of a small rodent burrow in moist organic soil at the water's edge. Residents of the Oasis Valley also have reported finding toads buried in the loose, moist soils of their garden and in moist areas around their houses. When the last survey was made in November, several toads were still active and were found during the day in water. It may be that at least some toads remain in the water rather than in terrestrial retreats during the winter as do many frogs.

Classification

Bufo nelsoni is classified as a Category 2 Species by the U.S. Fish and Wildlife Service, indicating the possible appropriateness of listing as endangered or threatened, "but for which conclusive data on biological vulnerability and threat are not currently available to support proposed

rules." Under this classification, the USFWS does not provide substantive or procedural protection to the Amargosa toad under the Endangered Species Act.

Current Status

Populations of Bufo nelsoni exist in the following nine known sites in the Oasis Valley:

Site #1 -- in the Amargosa Narrows.

Site #2 -- at the Amargosa River in Beatty at the east end of Cedar Street.

Site #3 -- at the Amargosa River at the north end of Beatty, north of the I95 bridge.

Site #4 -- at Fran's Ranch Brothel, 3 miles northwest of Beatty.

Site #5 -- at Manley's Junkyard, 3.7 miles north of Beatty.

Site #6 -- at Spicer's Ranch, at Oleo Road

Site #7 -- at Crystal Springs.

Site #8 -- at Lower Indian Springs.

Site #9 -- at Ute Springs.

Site #1 -- Amargosa Narrows

Hoff (1994b) describes the Amargosa Narrows:

> This site is a strip of riparian woodland that follows the course of the Amargosa River for approximately 2 km south of the town of Beatty. It varies from 50 to 150m wide. The majority of the land at this site is owned by the federal government and administered by the Bureau of Land Management, although two parcels are privately owned. There is no water source in the narrows. All water flow in the river at this site depends on springs farther north in the Oasis Valley, or, to a lesser extent, on rainfall. Since 1990 this site has had variable water availability during the summer months with the major reproductive site being completely dry by the end of May. Approximately one half of all known reproduction in this species took place at this site in 1993 (more than 30,000 eggs/tadpoles). Less than 1% of these tadpoles survived to

metamorphosis due to rapid decreases in the water availability. Adult toads follow the receding water north and by midsummer have moved more than 1 km to a portion of the river bed through the town of Beatty that contains year-round water.

In 1994 fewer than 500 tadpoles were found at this site. This is probably due to the destruction of the adult habitat north of the site.

Site #2 -- Amargosa River in Beatty at the east end of Cedar Street

This site consists of approximately 1/2 km of heavily impacted riparian corridor that extends from the US Highway 95 bridge on the north end of Beatty to Cottonwood Avenue on the south end. Privately owned springs (Revert Springs) provide water for this section of the river. These springs are not currently capped or diverted for other uses. They supply the only water to the river through the Amargosa Narrows site (site #1). Approximately half of the known population of Bufo nelsoni relies on water from those springs.

Seven adult females, one adult male, and 13 juveniles were found here at the end of August 1993. The area was bulldozed for flood control over the winter of 1993/94, and fewer than 500 tadpoles were found in spring 1994. On September 6, 1994, only four adults and 6 juveniles were seen at this location.

Site #3 -- Amargosa River at the north end of Beatty, north of I95 bridge

This site consists of approximately 1/2 km of heavily impacted riparian corridor extending from the Stagecoach Casino on US Highway 95 to the US Highway 95 bridge on the north end of Beatty. The water from this section comes from Revert Springs (as it does for sites #1 and #2). This section is overgrown with cattails and bulrushes. Trees have been removed as part of a flood control project. In 1994, adults have been seen occasionally on this site, although no reproduction has occurred.

Site #4 -- Fran's Ranch Brothel

A large spring feeds two pools, a small marshy area, and several acres of woodland with large cottonwood trees at this site. One of the pools has been converted to a concrete swimming hole; the other contains goldfish and bullfrogs and is choked with vegetation. The riparian area is relatively intact. Residents at Fran's have reported that there have been "hundreds" of toads at this site. In 1993, several hundred tadpoles were seen by Glenn Clemmer (Nevada Natural Heritage). In 1994, only three adult toads (one female, one male, one not captured) were documented at this site.

Site #5 -- Manley's Junkyard

This site is a broad expanse of privately owned river bed, which has water only in the spring. In 1992, this site had more than 10,000 tadpoles and more than 200 toadlets. Crayfish have since moved into this area. In 1993, 10,000 tadpoles were seen, but these numbers quickly diminished to a handful. No toadlets and only a few juveniles were seen later in the summer. In 1994, a few hundred tadpoles were seen.

Site #6 -- Spicer's Ranch at Oleo Road

Breeding habitat occurs at the Amargosa River where it crosses Dave Spicer's ranch. The river dries up in May or June, and is therefore not suitable for permanent habitation by adults. Historically, toads lived in several large springs and pools behind Spicer's house; Spicer reports that up to 80 toads have lived under his house at one time.

Spicer has begun work on a catfish farm (Spicer, telephone interview, September 15, 1994). In the winter of 1993/94 he made substantial modifications to the riparian area using heavy equipment (Hoff 1994b). According to Karin Hoff (1994b), many of the adult toads probably were killed during these modifications.

Catfish are known to prey on B. nelsoni.

Several hundred to several thousand tadpoles were seen at the river by Spicer's Ranch in 1991, 1992, and 1993. None were observed in 1994 (Hoff 1994b).

Site #7 -- Crystal Springs

This site is a complex of springs, two of which are on BLM land and have pools that are, or have been, suitable for breeding. Both pools are visited by large numbers of feral burros, and the pools and the surrounding area are severely degraded. Little recruitment has occurred at these pools in the past several years.

One pool, which is adjacent to five acres of fenced private land owned by Shirley Harlan and Elizabeth Keal, contains introduced catfish. A dozen or fewer toadlets have emerged from the pool in the past several years. The house and garden on the Harlan/Keal land provide protected habitat for adult toads. At least 12 adults and second-year juveniles live under the house or in the garden.

Site #8 -- Lower Indian Springs

This site is a complex of several springs. The BLM has secured water rights for two of them and in the spring of 1994 fenced approximately 5 acres to exclude burros. There is no salt cedar at this

time. Predators at this site include crayfish, odonate larvae and predacious beetles. Maciolek found 26 adults here on one night in 1983. Currently, two adults are known to occupy this site. Little or no recruitment occurs here.

Site #9 -- Ute Springs

Ute Springs is located about one mile north of Manley's Junkyard, near the Amargosa River. Five adults were observed at this site in 1992 (Hoff 1992). No adults have been observed at this site since 1992. Tadpoles were observed here in 1994; however, little or no recruitment occurs at Ute Springs (Hoff, telephone interview, September 8, 1994).

Summary

These nine sites contain the remnant population of an Amargosa toad population that once may have covered the entire Oasis Valley (Hoff, telephone interview, August 29, 1994). In 1994, only 30 adult and juvenile toads were observed at these sites (Hoff, telephone interview, September 8, 1994). The populations at LaFleur and at one spring at the Crystal Springs complex are thought to be extirpated.

Because much of the land in the Amargosa Valley is privately owned and therefore inaccessible, other populations of Bufo nelsoni may exist. Several other sites have been examined for toad populations and habitat suitability. These include Mud Springs, Species Springs, Sullivan Spring, Buck Spring, and Amargosa Canyon. No toads were found at these sites. The total number of toads

may be slightly greater than indicated above, but any undiscovered toads are not accessible and therefore not protectable at this time.

Assessment: Population Management

The Amargosa toad relies on a variety of habitat for oviposition, breeding, foraging, and hibernation. Historically, Amargosa toad habitat has been exploited by humans for cattle grazing, water diversion, off-road vehicle racing, insect control via exotic species introduction, and road building.

A total of 24 adult and 6 juvenile toads have been seen this year (Hoff 1994b). Barring further mortalities, these 24 adults--combined with at least one second-year juvenile--constitute the known potential breeding population for 1995.

Wildlife management has evolved toward the conservation of biodiversity. As such, sound management principles dictate that both state and federal agencies prioritize their management of wildlife and habitat toward the preservation of species rather than consumptive uses (e.g., water diversion and cattle grazing). Much of the recent Amargosa toad population decline is attributed to consumptive and reckless habitat degradation.

"The endemic Amargosa toad has clearly experienced severe population declines in the Amargosa Valley. The remnant population found in the valley is threatened by the genetic pressures associated with small population sizes. Prescriptions, standards, and guidelines must be developed and implemented in order to ensure the viability of the species in its range. Genetic variation needs to be assured through the augmentation or reintroduction of individual toads into these existing remnant

populations" (Hoff 1992). A program of captive maintenance has begun at the University of Nevada, Las Vegas; however, no native captive-bred toads of any species have been successfully reintroduced and reestablished into the wild in North America.

The best scientific data available indicates that the last remaining population of Amargosa toads in the Oasis Valley of Nevada is well below the viability threshold and is on the verge of extinction.

Habitat Management

In general, Amargosa toads need large undisturbed roadless riparian areas with standing water and vegetation for foraging (Altig 1981). They may be capable of repopulating areas of suitable habitat as long as they have refugia to repopulate from, such as riparian corridors, marshes, and woodlands.

Since Amargosa toads are ill-equipped to survive water shortages, grazing, and incidental effects of human habitation, standards and guidelines need to be expeditiously developed and implemented by state and federal agencies as part of their land-use planning process on behalf of this seriously beleaguered species.

Identified Threats to the Petitioned Species

Petitioners request the Department of the Interior to formally list the Amargosa toad, Bufo nelsoni, as "endangered" in the lower 48 conterminous United States pursuant to the Endangered Species Act for the following reasons:

1. Present and Threatened Destruction, Modification, or Curtailment of Habitat or Range

The historical decline of Amargosa toads in the Amargosa Valley has been attributed to the loss or modification of habitat through cattle grazing, feral burro grazing, introduction of non-native predatory species, off-road vehicle racing, redirection of spring water, flood control measures, and other destructive practices. The destruction of habitat has been documented as a primary cause of decline in populations of B. nelsoni (Hoff 1994a). Private ownership of water rights represents a major threat to B. nelsoni. Privately owned springs provide the primary source of water for each of the eight populated localities. One of the largest recent populations of B. nelsoni, that found at Spicer's Ranch, showed no recruitment this year, as heavy equipment was used on that property to begin construction of a catfish pond. This project, initiated 13 years after precipitous declines in B. nelsoni were first documented, is indicative of the inadequacy of protective measures provided for the species along its entire range by state and federal agencies and private citizens. It is apparent that current and recent conservation practices have afforded the toad little or no protection against habitat loss.

2. Overuse of Habitat for Commercial, Recreational, Scientific, or Educational Purposes

Grazing, Cattle

> "There has been extensive cattle grazing and overgrazing in many places along the Amargosa River bed. Cattle hoofprints and feces are common in some areas which are also typically stripped of vegetation immediately surrounding the open water. The largest cattle presence is at the LaFleur site. Altig (1981) counted about a dozen cattle and a few burros making nightly use of the pools at the LaFleur site in 1981; he had considered this habitat stable. In 1991 LaFleur provided forage and water for at least 60 (statement from current cattle operator) and possibly as many as 100 cattle. . . . The area is severely trampled and there is considerable fecal material in and around the marshy areas and pools. Apart from trampling by the cattle, there may also be significant mortality of eggs and/or larvae due to declining water quality" (Hoff 1992).

Since no introduced predators have been observed at LaFleur, cattle grazing can be assumed to be the primary cause of the extirpation of Amargosa toads at this site. Altig (1981) recommended relief measures for toads at this site in 1981 when only about 10 cattle were present, noting the mortality of tadpoles due to trampling. No fences were built, and no relief was granted. In fact, the cattle population increased tenfold in the following decade. No meaningful measures restricting the grazing of cattle have been implemented on any land in B. nelsoni habitat.

Grazing, Feral Burros

> "Feral burros contribute substantially to habitat degradation at the two localities remote from the Amargosa River (Crystal and Indian Springs). Two to eight burros were sighted on almost all visits to Crystal Springs. . . . Burro feces and evidence of trampling (especially in and immediately surrounding the spring) were common on all visits. . . . Soil compaction due to trampling, as well as grazing, probably inhibits the growth of vegetation at the water's edge. Trampling of the spring by feral burros and burro feces in the spring significantly increases turbidity and nutrient load, degrading water quality and decreasing springs suitability as habitat for developing tadpoles.
>
> "Burro cropping of the vegetation is a matter of concern. Little is known about the habitat requirements of the toad but it is likely that vegetation cover is important in providing mediation of temperature extremes. It provides hiding places. It supports rodent populations that construct burrows where toads may avoid heat and desiccation . . . " Hoff (1992).

Five acres of toad habitat at Indian Springs were fenced by the Bureau of Land Management (BLM) in 1994. Burros continue to access water and vegetation at other B. nelsoni habitat.

Catfish Farm

One of the largest recent populations of B. nelsoni has occurred on Spicer's Ranch. Dave Spicer, owner of the ranch, has estimated that as many as 80 toads have lived under his house at one

time (Hoff 1994b). "Toads residing under Dave Spicer's house and around the spring pools behind his house have, until this year, laid eggs in the river where it crosses his property. . . . Several hundred to several thousand tadpoles were seen in 1991, 1992 and 1993. None were seen in 1994" (Hoff 1994b). Spicer has begun work on a catfish farm (Dave Spicer, telephone interview, September 15, 1994). In the winter of 1993/94 he made substantial modifications to the riparian area using heavy equipment. According to Hoff (1994b), many of the adult toads--including those breeding in the river--probably were killed during these modifications. The catfish, in addition will make the habitat unsuitable for tadpoles (Hoff 1994b).

Off-Road Vehicles

Casual off-road vehicle (ORV) use damages riparian areas. This activity destroys vegetation, fouls water, compacts soils, and occasionally kills toads and tadpoles by direct impact.

Organized off-road vehicle use has greater consequences, as Hoff (1992) describes:

> The Nevada 500 route has passed through or adjacent to toad habitat for many years. In 1988 the course for this race was in the Amargosa River bed from 1 mi. south of the Narrrows through Beatty to approximately 1 mi. north of town. The course ran along the river bed and within 1 meter of the water. Pit crews for the racers and BLM monitors walked through the river during the race and several vehicles drove across the river. One pit crew was observed carrying an open fuel can across the river to service a vehicle. . . . [M]any years of using the Amargosa River bed as a race course (and also of preparing it for traffic by grading) have reduced or eliminated much of the vegetative area at the water's edge . . . and probably compacted the soil (Webb and Wilshire 1983). The Nevada 500 route in 1991 and 1992 also passed immediately adjacent to and within 15 meters of Crystal Springs. . . . In this area, the race itself, as well as casual use of the course throughout the year, has destroyed vegetation in the spring area. . . . The passage of vehicles over the course in this area has pulverized the soil adjacent to and on the hillside above the spring. Wind blown dust from the race course is accumulating in the spring and eventually the natural water drainage course along which the race course proceeds will carry much of this material into the spring. The soil surface along the race course on the hillside above Crystal Springs has been

> destabilized by ORV activity and now threatens to erode into the spring with potentially disastrous consequences for the spring and this population of toads.

It is clear that ORV use degrades Amargosa toad habitat. Although the Nevada 500 has been rerouted around this sensitive area, casual off-road vehicle use continues unabated.

Water Development

> "At the Indian Springs site two of the original three springs are capped and there is no longer any open water in those areas. Additional water developments are planned by the city of Beatty, and there have been large allocations of ground water to two mining operations in the area (the Bullfrog and the Motherlode mines). The development of housing on private properties along the river also suggests additional water development. It is uncertain what the existing and planned uses of water will do to water availability at the springs and in the river.
>
> "The Amargosa River drains a very large watershed (approximately 13,700^{2}km) but is mostly dry throughout the year (Soltz and Naiman 1978). The section from Springdale to the Amargosa Narrows derives its flow from springs and ground water flow from the Pahute Mesa Groundwater Basin. The hydrology of this system is poorly understood. The relationships among groundwater flow, surface flow, recharge, spring flow and recent pumping of groundwater is poorly understood. There are major water exploration efforts underway in this area. The town of Beatty's demand for water exceeds the surface flow of this region" (Hoff 1992).

At all stages of life, B. nelsoni is dependent on water. The remaining springs provide water for most existing toad habitat. Water development in this area could imperil existing populations and render sites unsuitable for habitation. Since most of these springs and concomitant water rights are privately owned, the government has little say in how they are used and therefore cannot protect existing toad habitat. Recent history shows that private citizens in this area do not make such protection a priority.

3. Other Natural or Man-Made Factors Affecting Its Continued Existence

Introduction of Non-Native Species

Bullfrogs

Rana catesbeiana, a large, aggressive and voracious frog, was introduced to the West in the late 1800s and has since spread into most aquatic environments. In some areas bullfrogs have depleted or extirpated the native frogs and toads (Stewart and Sandison 1972; Moyle 1973; Bury and Whelan 1984). Bullfrogs are thought to have been involved in the extinction of the Las Vegas leopard frog (Bury and Whelan 1984).

Although bullfrogs are suspected of eating B. nelsoni tadpoles and juveniles, the extent of the impact of bullfrogs on Amargosa toads is not known. This predator occurs along the Amargosa River in the deeper pools. No toads have been found in these areas.

Crayfish

> "The crayfish Procambarus clarkii occurs in the Amargosa River and at Indian Springs. This crayfish has been observed to prey upon Amargosa toad tadpoles in captivity and attack adult toads in the wild. It is likely that they represent a significant source of mortality to both tadpoles and adults. There are no known native western crayfish, thus it is reasonable to assume that crayfish were introduced into Indian Springs and the Amargosa River. The extent of the impacts of crayfish predation on toad populations should be determined. On August 26-27, 1992, Jim Heinrich (NDOW) trapped 203 crayfish at Indian Spring and removed them from the spring. On February 21, 1993, Karin Hoff and Ron Marlow removed another 364 crayfish. These removals do not seem to have appreciably reduced the crayfish population" (Hoff 1992).

A pool was inadvertently drained by the BLM at Indian Springs this year. Although several hundred crayfish were eliminated as a result of this action, it is not known if this predator has been

extirpated from this site (Hoff, telephone interview, September 8, 1994). Crayfish continue to thrive throughout the Amargosa River and at several spring pools.

Salamanders

Salamanders, Ambystoma tigrinum, have been observed at several sites along the Amargosa River bed. They have been observed preying on tadpoles (Hoff 1994b). It is not known if these animals are native.

Catfish

Catfish have been introduced into several pools in Amargosa toad habitat, including one at Crystal Springs, where little recruitment has occurred in recent years. In addition, a catfish farm is planned at one site (Spicer's Ranch) where toads have historically thrived. Catfish are known to prey on tadpoles of other species (Hoff 1994b).

Representatives from The Nature Conservancy (TNC) and Nevada Natural Heritage visited Crystal Springs in 1994 and seined 52 catfish from a pool.

Goldfish

Goldfish, an exotic species in the Oasis Valley, exist in a pool at Fran's Ranch Brothel and in at least one spring-fed pool between Beatty and Fran's. Goldfish are known to prey on tadpoles of other species (Hoff 1994b).

Salt Cedar

At Amargosa Narrows, Manley's Junkyard, and Ute Springs, an infestation of non-native salt cedar (i.e., Tamarisk) occurs. This may contribute to the overall decrease in the availability of surface water during the critical spring and summer months (Hoff 1994b).

Flood Control

Flood control work in the winter of 1993/94 included the bulldozing of Amargosa toad habitat at Beatty, with three toad sites being affected. "Seven adult females, one adult male (the potential breeding population for 1994) and 13 juveniles were found here on one night at the end of August 1993 (before the area was bulldozed). Less than 500 tadpoles were found this spring (1994) at sites #s 1, 2 and 3, probably because the bulldozing killed most of the reproductive population" (Hoff 1994b). Half of all known Amargosa toad production occurs at these three sites (Hoff 1994b).

No alternate flood plans have been suggested for the winter of 1994/95 (Hoff, telephone interview, August 29, 1994). More grading would likely lead to further toad mortalities.

Pollution

Human-related waste, such as motor oil, is occasionally dumped into the Amargosa River in Beatty and flows downstream to the breeding area in the Amargosa Narrows; motor oil is deadly to tadpoles (Hoff 1994b).

Human Predation

Although the Amargosa toad is not a food item for humans, Hoff (1994a) reports the incidence of humans collecting, harassing, and killing toads.

4. Severely Restricted Range

Loss and degradation of habitat--including flood control projects, cattle grazing, exotic species introduction, and off-road vehicle traffic--have severely impacted the range of the Amargosa toad. One site (Spicer's Ranch) where recruitment occurred in 1993 showed no recruitment in 1994 (Hoff 1994b). Another site (LaFleur, or Robert's Field) where toad populations historically occurred was not populated in 1994.

5. Inadequacy of Existing Regulatory Mechanisms

> *Clearly, the existing management of wetland areas in the Oasis Valley has not been adequate to protect the Amargosa Toad.*
>
> -Karin Hoff, 1994

Currently, no federal protection exists for the Amargosa toad, and the state of Nevada offers no substantive protection to the species or its habitat. The toad is listed by the U.S. Fish and Wildlife Service as a Category 2 species.

Many agencies and entities (i.e., Bureau of Land Management, Nevada Division of Wildlife, U.S. Fish and Wildlife Service, The Nature Conservancy, and Nevada Natural Heritage) have been aware of the plight of the Amargosa toad for many years and have participated in some conservation-related activities; however, to date, the conservation accomplishments are limited to the fencing of 5 acres of public land by the Bureau of Land Management. The Nevada Division of Wildlife is

considering the development of a riparian park through the town of Beatty. The Nature Conservancy hopes to purchase land at the LaFleur site and Revert Springs. Several other measures have been suggested, including the education of area schoolchildren and the establishment of conservation easements.

Although such measures may indeed benefit the Amargosa toad to some degree, they do not carry the teeth of the law and have not prevented continuing population declines or overall habitat degradation, and therefore cannot be trusted with the fate of this species. Indeed, as this petition is being written, grazing continues--as does the existence of exotic species, the planning of further flood control work, the completion of a catfish farm, and the battles for water rights. No existing regulatory mechanisms protect the Amargosa toad from such threats. Protection for the toad and its habitat under the Endangered Species Act is required on an urgent basis.

Summary

Thirty-six years ago, in 1958, thousands of Amargosa toads were observed in Nevada's Oasis Valley. Thirteen years ago, fewer than 100 toads were observed. This year, only 30 toads were observed. The forces driving this toad toward extinction are easily identified. Scientists list grazing, water diversion, flood control measures, and introduction of exotic species among the many actions that have spelled the steady demise of the Amargosa toad. But awareness and action are quite distinct. Although officials with the U.S. Fish and Wildlife Service, the Bureau of Land Management, and the Nevada Division of Wildlife have for many years been aware of the plight of the Amargosa toad, virtually no effective measures have been implemented on behalf of the species.

When researcher Karin Hoff warned in bold type on page one of her 1992 status review that "the Amargosa toad is in imminent danger of extinction," nothing was done. When she repeated the warning verbatim in 1993, nothing was done. When the data in Hoff's reviews indicated the ecological health of this species is much worse than that of many species at the time they were listed under the ESA, nothing was done. The toad now barely hangs on as one of the most seriously imperiled, unprotected amphibians in North America.

Amazingly, since 1981, the only change in the Amargosa toad's status in the Federal Register was a *downlisting* from Category 1 to Category 2.

Apparently, factors other than the application of sound science have precluded the implementation of conservation measures required for the toad's recovery.

It is incomprehensible that we have stood by for so long while this species has spiraled toward extinction, particularly since the U.S. Congress passed a law in 1973 to prevent such an occurrence. To stand by any longer would be reckless. We cannot plead ignorance in the case of the disappearing toad; we can only plead guilty.

Piecemeal efforts such as the Bureau of Land Management's fencing of five acres and the Nevada Division of Wildlife's informally proposed Beatty riparian park guarantee no future and certainly no recovery for this species. The 11th hour is no time for uncertain methods. What is needed is a well-funded cooperative and comprehensive effort involving state and federal agencies and private individuals. To survive, the Amargosa toad, Bufo nelsoni, requires nothing less than the full protection of the Endangered Species Act.

Requested Designation

In light of the reasons listed above--present and threatened destruction, modification, or curtailment of habitat or range; overuse of habitat for commercial, recreational, scientific, or educational purposes; other natural or man-made factors affecting its continued existence; severely restricted range; and inadequacy of existing regulatory mechanisms--which serve to limit Amargosa toad numbers in the conterminous United States, petitioners request that Amargosa toad populations across their entire known historic range in the 48 conterminous United States be listed as "endangered."

Due to the severe degree of imperilment and ongoing imminent threats to the Amargosa toad, petitioner formally requests that the Service consider an emergency listing for the toad. Due to

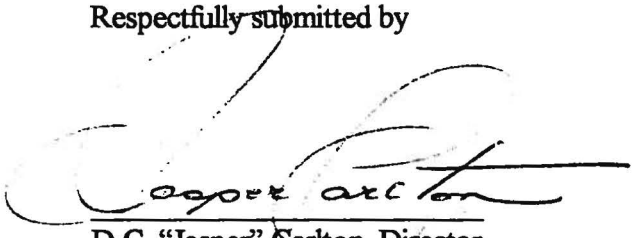
imminent threats to the toad and its habitat, extremely limited breeding population, and very restricted range, the Amargosa toad cannot wait for the usual two or more years required for the regular listing process for a species under the Endangered Species Act.

Critical Habitat Designation

Petitioner strongly recommends the designation of critical habitat for the Amargosa toad within a reasonable period of time following its listing. Critical habitat should be designated in all areas where the toad is currently located and in the key unoccupied sites where restoration is necessary for the long-term conservation of the species.

Dated this 15th day of September, 1994.

Respectfully submitted by



D.C. "Jasper" Carlton, Director
Biodiversity Legal Foundation
P.O. Box 18237
Boulder, CO 80308-1327
303-442-3037

copy: Bruce Babbit, Secretary of the Interior
Michael J. Spear, Regional Director, USFWS
Eric R. Glitzenstein, Attorney at Law

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