

CONSERVATION AGREEMENT
for the
AMARGOSA TOAD
(*Bufo nelsoni*)
and co-occurring sensitive species in Oasis Valley,
Nye County, Nevada

Developed cooperatively by:

Nevada Division of Wildlife
Southern Region - Las Vegas

Nye County Department of Natural Resources
and Federal Facilities
Tonopah

US Fish and Wildlife Service
Southern Nevada Field Office

US Bureau of Land Management
Nevada State Office, Reno
Tonopah Field Station, Tonopah

The Nature Conservancy
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September 2000

INTRODUCTION

This conservation agreement (Agreement) and attached conservation strategy (Strategy) for the Amargosa toad, *Bufo nelsoni*, have been developed to expedite conservation measures needed for the continued existence of the species for the identified 10-year implementation period. The Agreement will provide guidance and a framework for implementation of cooperative long-term conservation actions to benefit the included species. The Strategy is intended to provide conservation measures during an interim 2-year period, during which time a long-term management plan will be developed. Cooperators signatory to this Agreement have committed to specific conservation actions which will identify and reduce or eliminate threats to the species, and maintain and enhance a properly functioning ecosystem for the Amargosa toad and other indigenous species of Oasis Valley.

Although many threats identified in this Agreement are largely speculative, substantial ecological changes associated with the introduction and spread of invasive nonnative species are eliminating native fauna in the western United States. Adverse effects associated with nonnative species is a major concern of Cooperators and will be addressed through various investigations proposed under this Agreement. Other significant threats to the toad and other native species include, but are not limited to, riparian area dessication, and destruction and modification of habitats. The purpose of actions proposed under this Agreement and Strategy is to minimize threats and expand the distribution of the Amargosa toad across the Oasis Valley. Proposed actions will be in accordance with the Endangered Species Act of 1973, as amended (ESA).

The Amargosa toad is currently classified as a species of concern by the US Fish and Wildlife Service (USFWS). That classification does not extend any federal protection for the species or its habitat. The State of Nevada extends protection to the species through the following statutes: NRS 504.295 prohibits the possession of live wildlife unless licensed to do so; NRS 503.597 prohibits unauthorized movement of wildlife within the state of Nevada; NAC 503.075 allows classification of amphibians as protected; NAC 503.090 provides that no open season shall be designated for species of resident wildlife classified as protected; and NAC 503.093 requires a license, permit or authorization to capture, kill or possess protected wildlife. The Amargosa toad and two other native amphibians were classified as protected amphibians by action of the Nevada Board of Wildlife Commissioners in 1998, under authority of NAC 503.075.

The historic distribution of the Amargosa toad is restricted to riparian, wetland and adjacent upland areas within Oasis Valley, Nye County, Nevada. In 1994, concerns, including a petition for the USFWS to emergency list the species as endangered under the protection of the ESA, prompted agencies to appropriate funds and time toward actions which monitor populations, research life history, minimize threats, and conserve habitat of the Amargosa toad. Following a 90-day finding which acknowledged the petitioner's adequacy of information on the petition to list the Amargosa toad as endangered (Federal Register 1995), and then a subsequent 12-month finding on the listing of the species (USFWS 1995), the USFWS announced in March 1996 that listing of the species was not warranted (Federal Register 1996). This determination was based on information which indicated that the Amargosa toad is more abundant and widespread than stated in the petition.

Part of the not warranted finding was based on the Nevada Division of Wildlife (NDOW) and the Nevada Natural Heritage Program (NNHP) having conducted status surveys and undertaken conservation activities, including the initiation of conservation agreements. In addition, the finding was based on the Bureau of Land Management (BLM) actively managing public lands for the conservation of the species. Other interests which had influence upon the finding include The Nature Conservancy (TNC) and private landowners. TNC has been involved with the Beatty Beautification Committee, a subcommittee of the Beatty Town Board, and ongoing negotiations to purchase private parcels which contain key Amargosa toad habitat.

In 1994, a small group of biologists formed the Amargosa Toad Working Group (ATWG). The purpose of the ATWG is to develop this Agreement and Strategy, and provide oversight on implementation of conservation actions to benefit the toad. The ATWG meets twice per year and at other times as needed. During development of this Agreement and Strategy, the ATWG identified key parcels within the range of the Amargosa toad that are considered important for the long-term conservation needs for Oasis Valley species. These parcels include: Harlan/Keel, Mullins, Spicer, Crystal Spring (BLM land), Angel's Ladies, Torrence Ranch, Parker Ranch, and the Amargosa River (within Beatty and south to the Narrows). Actions undertaken pursuant to this Agreement and Strategy will be accomplished with permission from private landowners.

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AUTHORITIES

The signatory parties hereto enter into this Agreement under federal and state laws as applicable, including but not limited to, section 6(c)(1) of the Endangered Species Act of 1973, as amended, and

sections 503.351 and 503.584 of Nevada Revised Statutes (NRS). This Agreement is subject to and is intended to be consistent with all applicable federal and state laws.

Section 6(c)(1) of ESA provides encouragement to the states and other interested parties, through federal financial assistance and a system of incentives, to develop and maintain conservation programs which meet national and international standards. This is a key to meeting the United States' international commitments and to better safeguard, for the benefit of all citizens, the Nation's heritage in wildlife and plants.

NRS 503.351 provides authority for the Administrator of NDOW to enter into cooperative agreements for the purpose of the management of native wildlife. NRS 503.584 recognizes the state's obligation to conserve and protect imperiled native species. NAC 503.075 extends protected wildlife status to certain native amphibians, including the Amargosa toad.

Nevada BLM sensitive species are designated by the BLM Nevada State Director and are protected by the policy described for candidate species as a minimum. The BLM shall carry out management, consistent with the principles of multiple use, for the conservation of candidate species and their habitats and shall ensure that actions authorized, funded, or carried out do not contribute to the need to list any of the species as threatened or endangered (BLM Manual section 6840.06 C).

REQUIRED CONSERVATION ACTIONS

To meet the goals and objectives of this Agreement, the parties agree to undertake specific tasks, as described in this Agreement and in the Strategy (Attachment A). Where responsibility for undertaking a specific action has not yet been assigned, the parties agree to determine appropriate actions to implement through modifications to this Agreement, based on outcomes of reviews as proposed in this Agreement.

Parties to this Agreement recognize that they have specific statutory responsibilities that cannot be delegated, particularly with respect to the management and conservation of wildlife. Nothing in this Agreement, Strategy or the management plan to be developed is intended to abrogate any of the parties' respective responsibilities. The Strategy is attached as Attachment A and is a part of this Agreement. Completion of a detailed species management plan is dependent upon the outcome of specific life history studies and is intended to be a dynamic document, subject to modification based on the concept of adaptive management. It is the intent of the signatories for the management plan to be completed in draft form within 12 months of the final signature date to this Agreement and it will become a part of this Agreement upon approval of all signatories.

STATUS AND DISTRIBUTION OF THE SPECIES

The Amargosa toad, *Bufo nelsoni*, is an endemic amphibian indigenous only to Oasis Valley in Nye County, Nevada. The historic range of the species is believed to be limited to a 10-mile reach of the Amargosa River and its associated riparian corridor, and nearby spring and wetland systems. Long-term population trends are not known for this species, however mark/recapture studies are underway to establish a population baseline at representative sites across the range of the toad. Future survey efforts should produce trend data on toad numbers. Because the distribution of the species is so limited, and the riparian areas which are significantly important to the species are subject to negative modification from both natural and human-induced causes, management agencies and researchers have committed resources to develop and implement this Agreement. Conservation actions include surveys, applied research, and habitat projects.

Initial field work by Altig (1981) and Maciolek (1983) seemed to differ in evaluation of the extent and the condition of the population. In 1994, one study asserted that off-road vehicles, water diversions, grazing, and the introduction of nonnative predators caused this species to decline to as few as thirty individual

adult toads rangewide (Hoff 1994). However, during this same period NDOW and others conducted field surveys at multiple locations in the valley and estimated the adult population at these sites to be somewhat higher (Heinrich 1995; Clemmer 1995). The NDOW survey locations represented approximately 40 percent of the riparian habitat in the valley and identified a minimum of 190 individuals at sites surveyed. This and other conflicts in status assessment supported a need for better quantifiable information on the status and distribution of the species.

In a concerted effort to expand the base knowledge of this endemic amphibian, NDOW, in cooperation with the NNHP, USFWS, BLM, and TNC, has conducted surveys at least twice a year, starting in 1995. Beginning in 1998, formal survey efforts have been conducted at least three times annually. Recent survey efforts have focused on obtaining additional information on life history, habitat use, movement of individuals and distribution, in addition to enumeration for assistance in determining population size. Surveys conducted in May, June, and July 1998 identified a cumulative total of 655 individual adults (Stein 1999). Continued 1999 surveys during the same time periods captured 893 adult toads, 117 of which were recaptured animals originally tagged in 1998. These numbers represent only observed individuals and do not represent total or site specific population estimates, because of the complexity of habitats and the lack of access to some potentially occupied private land parcels. Initial population estimates for all survey sites combined indicate an adult population in excess of 4,700 individuals but need to be further refined (Stein et al., 2000).

Cooperators and private landowners have also implemented specific conservation activities to protect or enhance habitats, including but not limited to fencing of key wetland and spring sites to reduce wild burro impacts, enhancements to spring pools and outflows, and removal and control of undesirable nonnative species. Toad habitat has been protected, enhanced and created in cooperation between BLM, private landowners, and other partners. Remaining potential threats to the species, and mechanisms which will be used to better identify and reduce or where possible eliminate those threats, are detailed in the attached Strategy.

CONSERVATION GOALS OF THE AGREEMENT

Conservation measures needed for the continued existence of the Amargosa toad focus on four goals:

1. To identify and eliminate threats to the continued existence of the species or substantially minimize those threats which cannot be completely eliminated.
2. To maintain habitats on key parcels through implementation of proposed actions to protect, restore, and enhance toad habitat.
3. To continue population monitoring and investigate the natural history of the toad to provide the basis for management actions.
4. To experimentally test various methods of habitat manipulation and monitor the effectiveness of these methods on key parcels.

CONSERVATION OBJECTIVES

The following conservation objectives will be implemented to reach the goals of the Agreement and Strategy stated above. The specific goals that will be achieved follow the objectives in parenthesis. Included with the objective is a statement on how the objective will benefit the toad and Oasis Valley ecosystem and a standard to determine if the objective was successful at achieving the goal within the first 2 years of this Agreement and Strategy. The conservation actions and commitments by the Cooperators as described in this Agreement and Strategy will be implemented as proposed in Table A-3.

1. *Protect Amargosa toads and their habitat on public lands through implementation of land-use controls that minimize adverse effects to the Amargosa toad. (Goals 1 and 2)*

Benefit: Ensure viability of Amargosa toad metapopulations and persistence of suitable habitat across the range of the toad by minimizing impacts including wild burro removals and implementation of appropriate land use regulations on public land.

Success standard: The BLM has designated appropriate public lands within the Oasis Valley as an Area of Critical Environmental Concern (ACEC), or a similar community-based designation and coordinated management strategy which accomplishes a similar level of conservation is in place.

2. *Conserve toad habitat on non-Federal lands that the ATWG has determined essential for long-term survival of the toad and co-occurring species identified in Table 1 of the Agreement. (Goals 1 and 2):*

Benefit: Provide habitat for reproduction and dispersal; maintain or expand current distribution of the species in the Oasis Valley. Protect toad habitat along the Amargosa River which provides the major source population and dispersal corridor.

Success standard: Efforts are underway to conserve Amargosa toad habitat on private lands through development of Candidate Conservation Agreements, conservation easements, or voluntary management agreements with landowners. Contacts have been made to private landowners in the Oasis Valley with Amargosa toad habitat and at least one Candidate Conservation Agreement is under formal development. At least one key parcel has been acquired by TNC or otherwise provided with formal protection, in addition to the Torrence Ranch.

3. *Develop and implement empirically proven techniques to improve toad habitat through manipulations. (Goals 2 and 4)*

Benefit: Restore historic or optimal habitat conditions at selected sites that result in persistence of toads and overall increase in adult numbers, reproduction, and recruitment.

Success standard: Habitat manipulation studies are underway at Torrence Ranch and one other site within the Oasis Valley. Through research and adaptive management, Amargosa toad habitat has improved, with relatively stable numbers of toads at each site. Experimental habitat manipulations and life history studies are providing important information on habitat features that should be managed to enhance reproduction, recruitment, survival, and dispersal of toads.

4. *Develop and implement control methods for non-natives as appropriate. (Goal 1)*

Benefit: Minimize impacts to the toad and Oasis Valley ecosystem from competition, predation, and degradation of habitat conditions resulting from nonnative plant and animal species.

Success standard: Researchers and cooperators have developed a study proposal to test control methods for crayfish and have established a study site to conduct the experiment. A minimum of two tamarisk removal projects have been completed on private or public lands

5. *Complete studies to understand the life history and ecological requirements for the Amargosa toad. (Goal 3)*

Benefit: Assist in accomplishing conservation objectives and benefits associated with improving Amargosa toad habitat and elevating the status of the species.

Success standard: A request for proposals has been developed to investigate the life history and ecological requirements for the Amargosa toad and funds for this investigation have been acquired.

6. *Establish population baseline for adult and juvenile (>50 mm snout-vent length) toads. Determine population trends based on survey data. (Goal 3)*

Benefit: Enable biologists and managers to identify changes in Amargosa toad populations and implement appropriate management to reverse declines in toad numbers and correlate habitat degradation with declining toad populations.

Success standard: The Amargosa toad population monitoring program have established a population baseline and initial population trends on key parcels. Annual surveys have been completed for a 5-year period. Plans to continue the monitoring program have been developed by NDOW in coordination with the Cooperators.

7. *Involve and educate the local community on the conservation efforts of the Amargosa toad and Oasis Valley ecosystem. (Goals 1 and 2)*

Benefit: An essential component of this Agreement and Strategy involves community support of conservation actions. Because key Amargosa toad sites occur on private lands, conservation of these sites requires cooperation with the private landowner. Actions proposed under this Agreement and Strategy (e.g., Conservation Actions 5.a-c.) would provide a level of conservation that will collectively secure toad habitat and populations on private lands in the Oasis Valley.

Success standard: The Cooperators have held public meetings to address concerns and issues relative to conservation actions proposed or underway in the Oasis Valley, as the need arises or as requested by representatives of the community. The public education program will be considered successful when cooperators have determined that known threats to the toad have been reduced through implementation of voluntary conservation efforts on public and private lands, and monitoring shows upward population trends in these areas.

8. *Maintain cooperator involvement and responsibility through the ATWG and implementation of the Agreement and management plan when developed. Provide semi-annual assessments of progress towards implementing actions identified in this Agreement to the ATWG by all signatories, for distribution to cooperators and interested parties. (Goals 1-4)*

Benefit: Provide focused management and the basis for adaptive management by periodically assessing the effectiveness of conservation actions. Modify actions as necessary to achieve the anticipated level of conservation.

Success standard: Cooperators have remained involved in conservation efforts pursuant to this Agreement and Strategy and the ATWG has continued to meet twice per year and continue to provide management and conservation oversight.

9. *Research the historic ecological condition of the Oasis Valley and incorporate findings in design of habitat projects as appropriate. (Goals 2 and 3)*

Benefit: Guide restoration of historic sites, enhancement of existing sites, and creation of new sites to natural and pre-existing conditions which occurred in the Oasis Valley prior to human influences.

Success standards: Research on the historic ecological condition of the Oasis Valley has been completed and the findings have been evaluated and approved by the Cooperators.

10. *Determine baseline groundwater levels and fluctuation cycles, and water quality conditions. Periodically measure these parameters to determine if water use and availability are changing over time. (Goals 1 and 2)*

Benefit: Provide baseline data on groundwater levels and quality to monitor the effects of future groundwater pumping on toad habitat.

Success standards: Baseline data on groundwater has been acquired.

11. *Obtain sufficient funding to implement the commitments made in the Agreement. ((Goals 1-4)*

Benefit: Ensure that conservation actions may be accomplished as proposed.

Success standard: All commitments made in the Agreement and Strategy are adequately funded. Projects are underway and objectives are being met.

CO-OCCURRING SENSITIVE SPECIES

Table 1 is a list of sensitive species which have been recorded in the Oasis Valley area in addition to the Amargosa toad. Many of these species will benefit directly from actions implemented to conserve the toad.

Table 1. List of sensitive species, in addition to Amargosa toad, occurring in the Oasis Valley area.		
Fish	Oasis Valley speckled dace	<i>Rhinichthys osculus ssp.</i>
Invertebrates	Oasis Valley springsnail endemic ant	<i>Pyrgulopsis micrococcus</i> <i>Neivamyrmex nyensis</i>
Mammals	desert shrew pale Townsend's big-eared bat western small-footed or California myotis Yuma myotis long-legged myotis long-eared myotis fringed myotis spotted bat greater western mastiff bat	<i>Notiosorex crawfordi</i> <i>Corynorhinus townsendii pallescens</i> <i>Myotis ciliolabrum/californicus</i> <i>Myotis yumanensis</i> <i>Myotis volans</i> <i>myotis evotis</i> <i>Myotis thysanodes</i> <i>Euderma maculata</i> <i>Eumops perotis californicus</i>
Plants	Mohave fishhook cactus black woolypod Ripley gilia holly goldenbush Bullfrog Hills sweetpea weasel phacelia delicate rockdaisy alkali mariposa lily Tecopa birdsbeak white bearpoppy Eastwood's milkweed Beatley milkvetch Toquima milkvetch Cane Spring evening primrose Clokey pincushion sanicle biscuitroot Pahute green gentian Pahute Mesa beardtongue Nye pincushion	<i>Sclerocactus polyancistrus</i> <i>Astragalus funereus</i> <i>Gilia ripleyi</i> <i>Hazardia brickellioides</i> <i>Lathyrus hitchcockianus</i> <i>Phacelia mustelina</i> <i>Perityle intricata</i> <i>Calochortus striatus</i> <i>Cordylanthus tecopensis</i> <i>Arctomecon merriamii</i> <i>Asclepias eastwoodiana</i> <i>Astragalus beatleyae</i> <i>Astragalus toquimanus</i> <i>Camissonia megalantha</i> <i>Coryphanta vivipara rosea</i> <i>Cymopterus ripleyi saniculooides</i> <i>Frasera pahutensis</i> <i>Penstemon pahutensis</i> <i>Sclerocactus nyensis</i>
Reptiles	desert tortoise chuckwalla	<i>Gopherus agassizii</i> <i>Sauromalus ater</i>
Birds	western burrowing owl black tern American peregrine falcon blue grosbeak phainopepla white faced ibis southwestern willow flycatcher Lucy's warbler Yellow-billed cuckoo	<i>Athene cunicularia hypugea</i> <i>Chlidonias niger</i> <i>Falco peregrinus anatum</i> <i>Guiraca caerulea</i> <i>Phainopepla nitens</i> <i>Plegadis chihi</i> <i>Empidonax traillii extimus</i> <i>Vermivora luciae</i> <i>Coccyzus americanus</i>
Information for this table was generated from the Nevada Natural Heritage Program database, 3-1-99, and other sources.		

TASKS AND RESPONSIBILITIES OF COOPERATORS

Table 2 summarizes tasks which will be assumed by cooperators to the Agreement to implement conservation actions for the Amargosa toad. Lead responsibilities for specific tasks are identified by agency. Refer to the attached Strategy for more detail on site-specific actions and responsibilities.

Table 2. Summary of task responsibilities by cooperator	
COOPERATOR	TASKS AND LEAD RESPONSIBILITIES
Nye County	<ul style="list-style-type: none"> • Lead responsibility for coordination on highway/road maintenance and flood control activities. • Lead responsibility for local community coordination. • Assist in development of programs for beautification and habitat restoration/enhancement, including potential TEA21 funding grants. • Assist in working with private landowners to identify and implement protection opportunities which may include: acquisition from willing sellers, conservation easements, voluntary management agreements (Candidate Conservation Agreements).
Nevada Division of Wildlife	<ul style="list-style-type: none"> • Lead responsibility for monitoring program, including survey and population status assessments two to three times annually; compile survey data and maintain species information database; present a semi-annual summary of findings to the ATWG. • Coordinate with private landowners and local governments for conservation projects and to obtain access for survey efforts. • Co-lead responsibility to develop and implement public information and education programs. • Coordinate with and assist other cooperators with habitat conservation and enhancement projects. • Lead responsibility for development and periodic review of Agreement. • Lead responsibility to develop and implement control methods for nonnative species. • Lead responsibility to develop and modify Strategy and species management plan documents with assistance and input from other cooperators. • Secure water rights for wildlife on public lands where available.
Nevada Natural Heritage Program	<ul style="list-style-type: none"> • Maintain databases on the distribution, population status, and various biological parameters pertaining to the Amargosa toad and its habitat; similar data on other sensitive species in the area; and land management and ownership in the Oasis Valley. • Coordinate and chair ATWG meetings at least twice annually.
U.S. Bureau of Land Management	<ul style="list-style-type: none"> • Lead habitat enhancement and protection projects on BLM administered land. • Nominate and designate occupied and potential Amargosa toad habitat on public lands as an ACEC, if appropriate. • Assist in population monitoring projects. • Secure public water reserves on public land for wildlife where available, only as authorized in budget process
U.S. Fish and Wildlife Service	<ul style="list-style-type: none"> • Advise and assist in the implementation of the Agreement. • Periodically review Agreement to insure relevance to goals and objectives for management and conservation of the species. • Participate in surveys and population status assessments. • Assist in the control of nonnative species, as appropriate. • Co-lead responsibility to develop and implement public information and education programs. • Provide technical assistance in all aspects of the Agreement and field assistance on habitat enhancement projects. • Provide funding support for conservation actions, only as authorized in budget processes. • Provide guidance to private landowners on developing candidate conservation agreements or other Federal-private management partnerships. • Pursue the use of TEA21 funds to restore and enhance habitats along the US95 corridor in Oasis Valley.

Table 2. Summary of task responsibilities by cooperator	
COOPERATOR	TASKS AND LEAD RESPONSIBILITIES
The Nature Conservancy	<ul style="list-style-type: none"> • Work with private landowners to identify protection opportunities which may include: acquisition from willing sellers, conservation easements, voluntary management agreements (Candidate Conservation Agreements). • Work with agencies to prioritize and coordinate conservation activities via Site Conservation Planning methodology. • Work in close coordination with Nye County to pursue programs for beautification and habitat restoration/enhancement of Amargosa River riparian areas on public and private lands. • Work in close coordination with Nye County and FWS to pursue the use of TEA21 funds to acquire or restore habitats along the US 95 corridor in Oasis Valley.
UNR-BRRC	<ul style="list-style-type: none"> • Lead responsibility to initiate research to: 1) address effectiveness of conservation measures such as spring enclosures; 2) identify methods to establish and maintain open water at spring sites; 3) determine methods and materials most effective in enhancing toad habitat; 4) determine effects of crayfish and bullfrogs on toads; and 5) identify other adverse conditions that potentially threaten the persistence of toad metapopulations. • Provide assistance and input to insure that actions are designed and implemented experimentally and are compatible with the concepts of adaptive management. • Lead responsibility for implementation of EPA water quality assessments and monitoring. • Assist in monitoring program.

FUNDING OF CONSERVATION ACTIONS

Implementation of actions in this Agreement will be funded by Federal, state, and local sources. Agencies will seek long-term funding for the management and conservation actions initiated under this Agreement. Funding for research proposed by UNR will be provided through the Nevada Biodiversity Initiative, and from cooperating agencies. In-kind contributions such as personnel, field equipment, vehicles, and supplies will be provided by cooperators, partners, and volunteers. It is understood that all funding commitments made pursuant to this Agreement are subject to budget authorization and approval by the appropriate agency.

DURATION OF AGREEMENT

The initial term of this Agreement shall be ten (10) years following the date of the last signature. During the 12th month of the Agreement, and at least annually thereafter through the ATWG, the parties involved will review the document and its effectiveness to determine if revision is necessary. At the end of the 10-year period, the Agreement must be reviewed and either modified, renewed, or terminated. If all signatories agree that sufficient progress has been made towards the conservation of the Amargosa toad this Agreement shall be extended for an additional ten (10) years. The attached Strategy is intended to cover the first two (2) years of the Agreement. A comprehensive management plan will be developed during that initial two-year period and will serve as the guidance document during the remaining term of this Agreement.

Any party may withdraw from this Agreement on sixty (60) days written notice.

All signatories hereto agree to provide written documentation of activities carried out under this Agreement to the ATWG semi-annually. Such reports will become an attachment to the ATWG minutes for distribution to members and interested parties. The ATWG chair, normally representing NNHP, will maintain the records of all activities carried out under this Agreement.

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ATTACHMENT A

CONSERVATION STRATEGY FOR THE AMARGOSA TOAD *Bufo nelsoni*

PURPOSE

The purpose of this document is to describe procedures and actions required for conservation of the Amargosa toad, *Bufo nelsoni*, and the mechanisms for their implementation. The general conservation approach focuses on four primary goals with associated conservation objectives and success standards, which are identified in the Agreement. Although the primary focus of this Strategy is conservation of the Amargosa toad, it may also reduce or eliminate threats and improve habitat for certain other native species occurring in the Oasis Valley ecosystem, which could preclude their need for federal listing pursuant to the Endangered Species Act of 1973 as amended (ESA).

BACKGROUND

The Oasis Valley represents the uppermost portion of the 13,700 km² Amargosa River watershed which extends approximately 140 km to the southwest, terminating in the Death Valley sink area of California. Although the Amargosa River is ephemeral for much of its length, portions of the river channel in the Oasis Valley are permanently watered because of numerous springs and seeps (Soltz and Naiman 1978). Numerous spring sources and seeps, some of which provide extensive wetted outflow systems, occur in associated ephemeral tributary drainages, but are discontinuous from the Amargosa River main channel area except during storm events or in years of high precipitation. Although upland benches and ephemeral portions of the river channel are typical of the surrounding transitional zone between Mojave desert scrub and Great Basin desert scrub ecotypes, the permanently wetted channel and the extensive complex of springs and seeps in the valley represent a unique ecological situation.

The Amargosa toad is known to occur only in habitats within the Oasis Valley. This member of the larger *Bufo boreas* group is a population isolate and there is no known or probable connection between it and other members of the complex such as *B. exsul* or *B. b. halophilus*. Although there are no historic records of *Bufo* in the Ash Meadows area, which is located adjacent to the normally dry Amargosa River channel about 80 km southwest of Oasis Valley, recent reports of an undescribed *Bufo* species from this area deserve further investigation.

Systematics and Description

The Amargosa toad (*Bufo nelsoni*) is a member of the family of North American true toads, Bufonidae. It was originally described by Stejneger in 1891 as *Bufo boreas nelsoni*, a subspecies of the boreal toad *B. boreas*. Since that time, it has variously been described as a species or subspecies, without the benefit of any comprehensive evaluation of the western *Bufo* group to better understand the relationship with this and other desert isolates (Altig 1981). Although Collins (1990) classified the toad as *B. b. nelsoni*, *Bufo nelsoni* is the most commonly used descriptor and will be used in this paper.

Bufo nelsoni is a medium-sized toad within the *Bufo boreas* group with the following characteristics: males typically 42-68 mm snout-vent length, females typically 46-89 snout-vent length; similar to *B. boreas* with skin smooth between the warts; snout protracted and pointed in profile; webs of hind feet very large; soles rather smooth; limbs short, knees and elbows not large. Ground color buffy to olive with numerous specks and spots between warts; olive to yellow mid-dorsal stripe; parotoids distinctly colored from surroundings; throat white to yellowish; belly whitish with scattered black blotches, more pronounced in juveniles; voice is generally considered absent except for warning chuckles during breeding season or gentle peeping release calls from males during handling (Altig 1981; B. Hobbs, NDOW, pers. com. 1998), although Clemmer (1995) anecdotally reported light trilling vocalization.

Life History

Amargosa toads breed in early spring, generally in the months of March through April, although egg clutches have been observed as late as July, with tadpoles observed as late as October and early November in some years. Eggs are laid in long strings of a few hundred to 6200 or more, averaging around 3000 per clutch. Deposition is usually in shallow water (<5cm) and in moderate to dense cover if available. Development to the tadpole stage can take from three days to a week depending on water temperatures (Altig 1981; Hoff 1996; G. Clemmer, NNHP, and J. Moore, TNC, pers. comm. 1996). Toadlets and adult toads frequent areas with ample, clean flowing or ponded water, and may be more dependent seasonally on the availability of those open water habitats than other *Bufo* species. Conversely, adult toads, particularly in late summer and fall, clearly exhibit foraging and resting behaviors at considerable distances from open water areas (>180m). Adult toads use vegetative and woody structure, rocks and rodent burrows as daytime resting and escape cover in upland areas (Altig 1981).

Comprehensive information on population demographics and structure is not available. Altig (1981) estimated sex ratios at about 50/50 but another researcher observed significant skewing at one survey location (Hoff 1996). Altig (1981) characterized toads less than 44mm snout-vent length (SVL) to be immature. Longevity is unknown; Maciolek (1983) assumed it was similar to *Bufo exsul* which matures at two to three years and lives at least five. *Bufo nelsoni* in captive conditions are known to have lived for at least 7 years (K. Hoff, UNLV, pers. comm. 1998).

Hoff (1996) and others have observed a typical diurnal activity pattern, with most active adult feeding and movement occurring at night in the spring through fall periods. Toadlets are more active during daylight periods than adults. Adult toads will generally visit open water periodically during periods of activity, but this may not occur at sites with consistently high soil moisture. The presence of a native burrowing rodent community may be integral to the burrow needs of juvenile toadlets and adults.

Habitat requirements for breeding and population recruitment can be characterized as the presence of open water, ponded or flowing, with moderately dense riparian vegetative cover in an early to intermediate successional stage. Adult habitat requirements are similar, with the addition of low to moderate soil compaction to allow burrowing, and the presence of adjacent vegetated uplands for nocturnal foraging. Dense vegetation and advanced successional stages appear to limit habitat suitability and occupancy by all life stages, particularly where this causes the loss of open water areas, but the failure to observe toads in dense habitats may also be an artifact of sampling difficulty at some locations (Stein 1999, Stein et al. 2000).

Home range sizes for adult toads are not well known. Hoff (1996) found that adult toad behaviors were highly individualistic and daily activity ranges varied from 15m to 200m or more, although individuals generally returned to specific shelter sites around pond margins or in areas of high soil moisture. Habitat time-sharing was also observed, where age class groups of juveniles and adults were sequentially observed in the same area of limited habitat during different diurnal periods.

Seasonal and spatial migration patterns are also not well understood. It is assumed that movement occurs between isolated open water habitats at some level, either across upland areas or along drainage courses, and at least during periods of high humidity and soil moisture, but little specific documentation exists. Marked individuals have been observed to move at least 900m across upland habitats between spring habitat sites over a period of several weeks in mid-summer (Stein et al. 2000). However, specific characteristics of migration corridors, seasonal or other cues which trigger individual movements, and the importance of soil moisture, seeps or ephemeral standing water, or other conditions are not known.

Historic Distribution

Although the Amargosa toad was first identified and described in 1891 (Stejneger 1893) there is little specific or systematic information available on historic occurrence or distribution of the species. Most early reports centered on discussions of systematic relationships (Clemmer 1995), and published information on distribution is generally generic to the Oasis Valley and nearby locations (Stebbins 1985); more recent literature which gives some indication of distribution and occurrence has been compiled in the past 20 years (Altig 1981; Maciolek 1983), but those works are not comprehensive or systematic in their assessment. Historic distribution is assumed to encompass the mainstream Amargosa River drainage from Springdale and upper Oasis Valley in the north, to the area immediately downstream of the narrows south of Beatty, and associated tributary drainages which contained permanent springs and seeps in the Bullfrog Hills and in foothills immediately to the east of existing US Highway 95. This assumed distribution is based only on known existing and historic habitat distribution accounts and limited sight records and observations.

PROBLEMS FACING THE SPECIES

Amargosa toads are known to exist in multiple locations within the Oasis Valley watershed of the upper Amargosa River drainage in Nye County, Nevada. Sites with relatively large numbers of toads and extensive habitat occur at the Crystal Spring/Harlan-Keal complex, the Spicer Ranch on Boiling Pot Road, the Mullins parcel, and in the mainstream channel of the Amargosa River in the immediate vicinity of the town of Beatty. Other sites with more restricted habitat and fewer toads occur in at least nine additional locations in or adjacent to the Oasis Valley. The status and reproductive potential of some of these additional sites, such as Lower Indian Spring and Roberts Field are unclear or poorly defined. Because of the ephemeral nature of the Amargosa River drainage and the substantial distance separating some known occupied toad habitats from the mainstream river corridor, certain sites may be somewhat isolated except in years of high precipitation. The relationship between the various sites, the location and relative importance of migration and movement corridors, and the nature and extent of interchange and individual toad movements, are not clearly understood. Efforts are underway as part of the monitoring program to provide a better understanding of toad movements and distribution.

Several additional areas of potentially suitable toad habitat exist within the larger drainage area and may contain toads, but have not been surveyed within recent times due to access difficulties. Although the current distribution of the toad may be restricted from historic levels because of urban and agricultural development, this cannot be validated with any accuracy because of the lack of historic baseline survey information or comprehensive accounts of distribution prior to extensive habitat alteration. Because the Amargosa toad is so narrowly distributed, the primary purpose of this Agreement and Strategy is to provide stability to the limited toad habitat in the Oasis Valley, and secondarily, to minimize threats to the species through conservation actions in concert with adaptive management. Species that are endemic to geographically small areas such as the Amargosa toad, are more vulnerable to certain threats than wide-ranging species. For example, the loss of one breeding site may be a substantial concern for the Amargosa toad whereas a similar loss would result in a negligible effect on the widely distributed and relatively abundant Pacific treefrog (*Pseudacris regilla*).

The limited aquatic resources of the Oasis Valley have been under varied pressures as a result of the permanent settlement and development which has occurred over the past 100 years. Expansion of urban development, flood control activities, agriculture and mining projects, and the concomitant support services and recreational activities have the potential to cause deterioration of the remaining habitat for the toad. Springs northwest of Beatty have recently been capped to provide a local municipal water supply. Several sites have been heavily disturbed by wild burros and/or livestock grazing. Predation and competition from nonnative species introduced into aquatic habitats is an ongoing impact and concern, as evidenced by the recent and widespread occurrence of nonnative crayfish (*Procambarus* sp.) at several sites within the watershed. Lowering of the water table from increased groundwater use for municipal, agricultural or industrial purposes could seriously impact the limited habitat available to the toad. Beyond direct impacts from development of water sources and spring habitats, changes in water use patterns and physical alterations of habitats in the riverine corridor may affect habitat connectivity and migration corridors dependent on seasonal/ephemeral habitats.

The Amargosa toad has been given a ranking of G1G2, S1S2 by the Nevada Natural Heritage Program, a designation of global imperilment. In 1977, the US Fish and Wildlife Service (USFWS) included the toad in its list of Category 2 candidate species for listing under the ESA, and it remained in candidate status until elimination of the existing category rankings by the USFWS in 1996. A petition for emergency listing of the toad as endangered was filed with the USFWS in September 1994 by the Biodiversity Legal Foundation of Boulder, Colorado. The USFWS issued a 90-day finding on the petition on March 23, 1995 (60 FR 15280), and issued a 12 month finding of not warranted on March 1, 1996 (61 FR 8018), primarily because of additional information on the species collected through intensified survey effort and the implementation of conservation activities. The toad remains a species of substantial concern because of its restricted range, potential susceptibility to various threats, and insufficient data relative to status and population size.

The following discussion summarizes threats and conservation needs for the Amargosa toad which will be addressed by conservation actions identified in this strategy, and the management plan to be developed. An adaptive management process based on monitoring results will be used to identify management actions necessary to minimize threats to the species. Initial strategies to address threats and conservation needs are summarized in Table A-1.

Threats to the continued existence of the Amargosa toad

1. Habitat alteration or elimination

Amargosa toad habitat alteration and/or elimination has occurred primarily through human activities including alteration or diversion of springs and associated pools and outflows, agricultural and urban land development, and alteration of the Amargosa River channel and riparian corridor for flood control and by locally intensive vehicle traffic. Fragmentation of existing habitats has occurred through the construction of US Highway 95 through the channel of the Amargosa River, and ongoing maintenance activities and highway surface runoff represent concerns to the long-term viability of populations adjacent to and in the road corridor. Conversely, loss of suitable habitat has also occurred at some sites because of a lack of disturbance, resulting in an overgrowth of dense vegetation and loss of open water areas. Such changes in habitat have contributed to declines of toad numbers, below the level of detectability at one or more sites.

2. Presence of aquatic nonnative species and invasive nonnative plants.

Direct predation and competition by nonnative species affects all life stages of Amargosa toad. The bullfrog (*Rana catesbiana*) is an aggressive predator and occurs at a limited number of open water sites. Black bullhead catfish (*Ictalurus melas*) occurs at one public land site and may occur with other Ictalurid species at an unknown number of sites on private lands. Crayfish (*Procambarus* sp.) have been introduced in the Oasis Valley and occur both in the mainstream Amargosa River channel and in springs and outflow pools in other areas. Nonnative and invasive species such as Tamarisk (*Tamarix* sp.) have substantially altered riparian plant communities in several areas of the valley to the detriment of the toad and other native species.

3. Reductions in perennial flow along Amargosa River corridor

The mainstream Amargosa River channel is assumed to have served as a primary conduit for Amargosa toad movement in the Oasis Valley, and to have acted as a mechanism for connectivity between otherwise isolated toad population segments both along the mainstream corridor and at off-mainstream spring and wetland sites. Although perennial flow still exists in some reaches, other reaches are seasonally or perennially dewatered in most years, as a consequence of both normal climatic variation and human caused impacts. These dewatered channel segments result in both a direct reduction in habitat availability and quality, and a likely reduction in habitat connectivity which may eventually result in genetic problems (inbreeding depression), although the absence of historic baseline information on toad habitats makes it difficult to attribute specific causes of habitat reduction or quantify the extent of habitat loss.

4. Impacts from wild burros

Wild burros impact the Amargosa toad through intensive seasonal use of water sources. This can result in the loss of riparian and open water marginal cover, decreased water quality, direct impacts to habitat quality at spring outflow streams and along watercourses, and accelerated drying and loss of pool habitats during spring and summer months. Direct mortality of all life stages of toads due to trampling may also occur and is of particular concern during key periods of life history such as during breeding, egg-laying, maturation and emergence of toadlets.

5. Impacts from OHV use

Intensive use of riparian corridors by OHV and other motor vehicles may cause loss or decreased quality of riparian cover. Direct mortality of toads may also occur both in riparian areas and upland zones.

Conservation Needs for the Amargosa Toad

Based on existing information, the following have been identified as the primary needs which must be addressed to effect short-term conservation of the Amargosa toad, and contribute to long-term maintenance of viable populations and functional processes in the Oasis Valley landscape. During the 2-year term of this Strategy, the conservation needs identified below will be addressed as described in the Agreement and Strategy. As a better understanding of threats to the Amargosa toad and its conservation needs are developed, the management strategy for the toad may be revised through an adaptive management process.

5. Protection and enhancement of key habitats

The Amargosa toad is highly dependent on specific, identifiable spring and riparian system habitats. These habitats must have adequate water quality and vegetative cover at an appropriate early to intermediate successional stage. Although periodic grazing may be useful to maintain appropriate vegetation communities, intense or unregulated use by livestock and wild burros can result in decreased water quality and habitat suitability, increased trampling hazards, and accelerated seasonal drying and soil compaction. Excessive recreational use and vehicle traffic can alter vegetative cover characteristics. Direct impacts to open water habitats include flow diversion and physical alteration of pools and channels, and dense vegetative growth which limits habitat suitability and utility to all life stages of the toad. Protective or restorative efforts must be implemented at key sites to insure persistence of existing toad population groups and to increase habitat availability and suitability.

6. Selective control of nonnative aquatic species and invasive nonnative plants

Nonnative aquatic species which negatively impact the Amargosa toad through competition and predation include the crayfish, mosquito fish (*Gambusia* sp.), black bullhead and bullfrog. Bullfrogs and nonnative game fish species are aggressive predators and competitors on all life stages of the toad where the species co-occur. Both the mosquito fish and crayfish are known to prey on amphibian eggs and larvae (Axelsson, et al. 1997; Webb and Joss 1997). Invasive nonnative plant species, including Russian olive and tamarisk, have substantially altered native riparian vegetation communities and directly impact the toad and other native species through increased transpiration and alteration of habitat structure. Direct control and elimination strategies, and where feasible actions to reduce habitat suitability for invasive nonnative species, must be implemented at specific sites where Amargosa toads co-occur with nonnative species and these impacts occur.

7. Develop adequate baseline information and population trends on species status

Available species status and survey information is sporadic and not comprehensive of currently occupied and historic habitats. Although efforts since 1990 have substantially increased knowledge of toad distribution, characteristics of specific occupied and historic sites, and

demographics, additional monitoring information is necessary to develop a baseline assessment of species status and population trends. These data will provide both an understanding of current conditions and a marker for measurement of the efficacy of implemented conservation actions.

8. Develop additional life history information

Although some life history information on the Amargosa toad is available from historic sources, and additional information has been developed since 1990, primarily on site specific habitat use and behavior, substantial gaps exist in general ecological knowledge about this species. Additional information on demographics, longevity, habitat use and needs, migration and movement, and the interrelationship of occupied sites is essential to develop a comprehensive species management strategy and conservation plan, and accurately identify important habitat features for protection through ACEC designation or similar actions.

Occupied and potential key habitats for the Amargosa toad can be grouped into four primary ecosystem types; spring systems, upland habitats, the Amargosa River system, and urban lands. Table A-1 identifies and summarizes by each of these ecosystem groups, co-occurring dependent species, threats to the toad and other native species, and strategies to alleviate those threats and address conservation needs.

ADAPTIVE MANAGEMENT

This Strategy is conceptually based on adaptive management principles. All cooperators agree and recognize, consistent with Goal 4 of this strategy identified previously, that monitoring actions and conservation measures implemented through the Agreement and Strategy will be conducted experimentally consistent with the concepts of adaptive management. The experimental approach to habitat manipulations will provide managers the most effective and efficient method to restore, enhance, or create optimal toad habitat through the adaptive management process. The effectiveness of all conservation measures and monitoring methods will be periodically reviewed and evaluated by implementing cooperators and by the ATWG, and based on such evaluation appropriate modifications to methods, actions and strategies will be made to insure scientific rigor and the efficacy of conservation measures.

CONSERVATION ACTIONS TO BE IMPLEMENTED

Conservation actions for the Amargosa toad as described in this Strategy document focus on a combination of site-specific activities, where these can be identified, and general strategy actions that will be implemented on a broad scale, or used as conceptual guidance in development of the more action-specific species management plan. Because substantial aspects of the life history and ecological needs of the Amargosa toad are unknown, it is not possible at this time to definitively identify all actions needed to insure long-term viability of the species. As that additional information is collected, it will be used to identify additional specific activities for inclusion into the species management plan development and management process. However, it is recognized that both short-term and long-term conservation for the species must include aspects of ecosystem-wide conservation and not just focus on small-scale habitat restoration and preservation. The full nature of those large-scale ecosystem processes necessary for the toad's conservation are not yet fully understood, but information from current and future studies and monitoring will be incorporated adaptively as an integral part of the ongoing management process.

Table A-1. Summary of threats and potential conservation strategies by ecosystem type for Amargosa toad and associated sensitive species.

Spring Systems	Dependent Species	Amargosa toad; Oasis Valley speckled dace; Oasis Valley springsnail; spotted bat; small-footed myotis; greater western mastiff bat; long-legged myotis; long-eared myotis; Yuma myotis; pale Townsend's big-eared bat; fringed myotis; southwestern willow flycatcher; white-faced ibis; alkali mariposa lily; Tecopa bird's beak.
	Threats	Diversion; development; intensive recreation/OHV; nonnative species; vandalism; vegetation encroachment (undesirable species); ground water pumping; wild burros; livestock; rights-of-way; predation; mining.
	Strategies to Alleviate Threats	ACEC nomination/designation; exclosures/fencing; nonnative species control; public education; wild burro management; livestock grazing management; site-specific habitat enhancement projects (rehabilitation, mechanical, controlled burns, artificial structures, revegetation, etc.); private land protection (cooperative landowner agreements, conservation easements, acquisition, etc.); recreation management; law enforcement; mining compliance and activity review.
Upland Habitats	Dependent Species	Amargosa toad; desert tortoise; funeral milkvetch; chuckwalla; spotted bat; small-footed myotis; greater western mastiff bat; long-legged myotis; long-eared myotis; Yuma myotis; pale Townsend's big-eared bat; fringed myotis; desert shrew; western burrowing owl; alkali mariposa lily; Tecopa bird's beak; Mojave fishhook cactus; Ripley gilia; Bullfrog Hills sweetpea; weasel phacelia; delicate rockdaisy.
	Threats	Wild burros; livestock grazing; mining; intensive recreation/OHV; urbanization; rights-of-way; indiscriminate dumping of trash; predation.
	Strategies to Alleviate Threats	ACEC nomination/designation; exclosures/fencing; nonnative species control; public education; wild burro management; livestock grazing management; recreation management; law enforcement; rehabilitation and reclamation; road designation; mining compliance and activity review; Section 7 ESA compliance; zoning and local trash ordinances; community-based partnership development; mining activity review.
Amargosa River System	Dependent Species	Amargosa toad; Oasis Valley speckled dace; spotted bat; small-footed myotis; greater western mastiff bat; long-legged myotis; long-eared myotis; Yuma myotis; pale Townsend's big-eared bat; fringed myotis; southwestern willow flycatcher; white-faced ibis.
	Threats	Diversion; development; intensive recreation/OHV; nonnative species; vandalism; vegetation encroachment (undesirable species); ground water pumping; wild burros; livestock; rights-of-way; highway construction, maintenance, and runoff; predation; agricultural development; stochastic events (flooding); channelization/maintenance for flood control; point and non-point source pollution.
	Strategies to Alleviate Threats	ACEC nomination/designation; exclosures/fencing; nonnative species control; public education; wild burro management; livestock grazing management; site-specific habitat enhancement projects (rehabilitation, mechanical, controlled burns, artificial structures, revegetation, etc.); private land protection (cooperative landowner agreements, conservation easements, acquisition, etc.); recreation management; law enforcement; Section 404 permitting; state dredging laws; zoning and local trash ordinances; community-based conservation; flood control preparedness; road maintenance coordination; modification of road maintenance activities, methods and season.
Urban Lands	Dependent Species	Amargosa toad; spotted bat; small-footed myotis; greater western mastiff bat; long-legged myotis; long-eared myotis; Yuma myotis; Townsend's big-eared bat; fringed myotis.
	Threats	Vandalism; intensive recreation/OHV; point and non-point source pollution; nonnative plants and animals; predation; feral pets predation/harassment.
	Strategies to Alleviate Threats	Public education; law enforcement; local pet ordinances; nonnative species control; private land protection agreements; discourage uncontrolled vehicular travel along river.

NOTE: items under species, threats, and strategies are not identified by priority order.

Numerous activities and actions have already been initiated for conservation of the Amargosa toad, by cooperators to this Agreement and Strategy. The majority of those prior actions are precursors to, contribute to, and serve as a foundation for the actions proposed in the Agreement. Table A-2 identifies those previous activities by cooperator and date of initiation.

Table A-2. Summary of Amargosa toad conservation activities initiated prior to Conservation Agreement implementation.	
Cooperator	Activity (date of initiation)
Nevada Division of Wildlife	<p>Initiate periodic [annual +] population status and distribution surveys (1994)</p> <p>Fund toad life history study by UNLV (1996)</p> <p>Assist cooperators in habitat protection and enhancement projects (1994)</p> <p>Initiate population monitoring and characteristics study, habitat characterization and modeling [USGS SAR Grant funding] (1998)</p>
Nevada Natural Heritage Program	<p>Form ATWG and provide coordination, organize semi-annual meetings (1993)</p> <p>Conservation Status Assessment (1995)</p> <p>Provide assistance to toad survey efforts and on-ground enhancement activities (1994)</p>
Nye County	<p>Coordinate flood control activities and emergency roadway maintenance with NDOW prior to actions when possible (1995)</p>
US Bureau of Land Management	<p>Riparian habitat protection fencing - Lower Indian Spring (1994)</p> <p>Riparian habitat protection fencing - Crystal and Harlan springs (1995)</p> <p>Wild burro gathers - remove 909 burros from HMA (1995 and 1996)</p> <p>Provide assistance to toad survey efforts (1996)</p> <p>Crystal Spring outflow pool rehabilitation (1997)</p> <p>Identify and evaluate Amargosa/Oasis ACEC Nomination area for inclusion in Land Use Plan Amendment (1997)</p> <p>Complete cadastral survey for Oasis Valley (1998 - report done 1999)</p> <p>Initiate planning for habitat enhancement projects at Wild Burro Seep (1998) and Upper Cave Spring [Lower Indian Spring] (1999)</p>
US Fish and Wildlife Service	<p>Fund status and life history assessments for Amargosa toad</p> <ul style="list-style-type: none"> • Altig (1981) • Maciolek (1983) • Hoff (1992) <p>Assist cooperator survey and habitat enhancement efforts (1995)</p> <p>Fund experimental habitat investigations (1999)</p>

Table A-2. Summary of Amargosa toad conservation activities initiated prior to Conservation Agreement implementation.	
Cooperator	Activity (date of initiation)
The Nature Conservancy	Initiate local community coordination to pursue development of riparian greenbelt and discuss flood control options (1996) Pursue opportunities for private landowner conservation agreements and conservation activities (1996) Acquisition of key habitat parcel (Torrence Ranch) through purchase from willing seller (1999) Identify land status and water rights holdings/history for Oasis Valley (1993)
University of Nevada - BRRRC	Amargosa toad Blue Ribbon Panel evaluation (1997) Amargosa toad life history field studies and <i>Bufo</i> complex genetics assessment (1996)

Conservation Actions to be Implemented:

In order to reach the program goals and objectives described in the Agreement, the following actions will be implemented. These objectives will not necessarily be accomplished in the order they are written. Table A-3 lists specific tasks that will be carried out by Cooperators during the first 2 years of implementation of this Agreement., while a detailed species management plan is being developed. That plan, upon completion and approval by the Cooperators, will identify additional specific actions to be taken to assure conservation of the toad.

The conservation actions described in this document, and actions developed in the future, will focus on two guiding principles identified from experience in other anuran conservation programs (Denton, et al. 1997): (1) It is essential to take into consideration all aspects of a species' ecological requirements and to insure that management is in place to address them; and (2) the conservation of imperiled species requires a holistic approach at the habitat scale.

It is the belief of the Cooperators to this document that the actions and processes described below address these principles to the extent possible given limitations on knowledge of species needs and behaviors, and functional constraints on action implementation.

1. **Secure and protect sufficient habitat in the Oasis Valley to ensure the long-term survival of the Amargosa toad and co-occurring species identified in Table 1 of the Agreement.**
 - 1.a. Nominate/designate all Amargosa toad habitat on lands administered by the BLM as Areas of Critical Environmental Concern or provide a comparable level of conservation through alternative processes.
 - 1.b. Pursue cooperative management agreements and conservation easements with private landowners.
 - 1.c. Acquire through purchase from willing sellers, key parcels of private lands that are available, as identified by the ATWG.

- 1.d. Develop and implement a monitoring program to determine effectiveness of exclosures in achieving conservation benefit to the toad and construct and maintain ungulate exclosures around springs if determined necessary for toad conservation.
- 1.e. Provide technical assistance to state and local agencies on road and right-of-way maintenance and flood-control activities to minimize impacts to the toad and its habitat.
- 1.f. Periodically review and acquire unappropriated water rights for the benefit of wildlife, particularly Oasis Valley endemic species.
- 1.g. Develop habitat conservation plan to include the Oasis Valley.
- 2. Manipulate existing habitat features as appropriate, to improve the overall suitability of occupied and potentially occupied toad habitat.**
 - 2.a. Develop and experimentally test various designs at seeps and springs to provide habitat suitable for toad reproduction including the provision of natural and artificial materials to increase cover habitat.
 - 2.b. Develop methods of habitat manipulation that will provide an advantage to the toad over non-native competitors and predators and maintain open water at spring sites and ponds.
 - 2.c. Implement projects to increase the quantity and quality of potential toad habitat in the Oasis Valley as determined through tasks 2.a. and 2.b. above.
- 3. Develop population baseline and increase knowledge of life history and ecology of the toad.**
 - 3.a. Continue life history studies of the Amargosa toad.
 - 3.b. Continue annual surveys, population assessments, and mark/recapture studies.
 - 3.c. Investigate the ecological relationship between endemic mammals and the toad.
 - 3.d. Initiate research on the historic ecology of the Oasis Valley to provide an overview of the pre-existing habitat conditions and establish goals for habitat projects.
- 4. Minimize potential impacts to the toad and its habitat through control of nonnative and invasive species.**
 - 4.a. Initiate tamarisk eradication program on public and private lands.
 - 4.b. Install and evaluate efficacy of pond liners or similar material to provide a barrier to the establishment of invasive aquatic species.

- 4.c. Experimentally determine relative importance of nonnative competitors and predators of the Amargosa toad.
- 4.d. Initiate habitat manipulations and/or selective control of nonnatives and invasive plant species to minimize potential impacts to the toad from nonnatives, as appropriate.
- 5. Enhance public involvement and awareness of the Amargosa toad and the Oasis Valley ecosystem.**
 - 5.a. Initiate public information and education activities within the Beatty community.
 - 5.b. Provide relevant information to the local and regional press outlets.
 - 5.c. Develop conservation projects in coordination with the local community.
- 6. Continue species management coordination process through the ATWG. Evaluate effectiveness of conservation actions through monitoring and adaptive management.**
 - 6.a. Organize and conduct semi-annual and ad hoc meetings of the ATWG to provide a forum for management decisions within the Oasis Valley ecosystem.
 - 6.b. Prepare progress reports on conservation actions and distribute at ATWG meetings.
 - 6.c. Review Agreement approximately once per year and revise as appropriate.
 - 6.d. Develop comprehensive management plan for the Oasis Valley ecosystem and provide a draft to the ATWG for review.
 - 6.e. Maintain databases on the Amargosa toad and co-occurring species.
- 7. Pursue funding opportunities for research, monitoring, habitat restoration, and habitat acquisition or conservation.**
 - 7.a. Apply for Federal funds (TEA21) to restore habitat along U.S. Highway 95.
 - 7.b. Encourage private landowners to apply for Federal assistance to conserve toads and co-occurring species on their land.
- 8. Determine hydrological properties of the Oasis Valley including ground water levels and water quality.**
 - 8.a. Monitor ground water levels and fluctuations.
 - 8.b. Implement water quality assessment and monitoring protocol.

COOPERATOR TASKS AND RESPONSIBILITIES

Table 2 of the Agreement summarizes key tasks and responsibilities for implementation of conservation actions for the Amargosa toad, arranged by cooperator. Specific commitments of the cooperating entities are as follows:

Nevada Division of Wildlife:

Lead responsibility: Survey and population status assessment

NDOW has lead responsibility for coordination of monitoring surveys and population status assessments at least twice annually with a summary of findings presented at the subsequent workgroup meetings. NDOW will develop and update survey and monitoring protocols in coordination and cooperation with other ATWG participants.

Lead responsibility: Development and revision of Agreement

NDOW has lead responsibility for development and periodic revision of the Agreement. The document will be reviewed on the schedule specified in the Agreement and revised as necessary, incorporating comments and input from other cooperators.

Lead responsibility: Development of species management plan

NDOW has lead responsibility to develop a draft detailed species management plan with assistance and input from other cooperators, within 12 months of completion of the Agreement, with a final plan within 24 months. The species management plan will be developed as a cooperative document by ATWG participants with NDOW having lead responsibility for its timely completion.

Lead responsibility: Development and implementation of control methods for nonnative species

NDOW has lead responsibility to develop and implement control methods for nonnative species.

Co-lead responsibility with BLM: Mining activity review

NDOW will monitor and review mining activities which may impact Amargosa toad habitats and provide input to public land decision processes on mining activities.

NDOW will monitor water rights applications and changes thereto, and take appropriate actions to maintain water availability and quality for wildlife, including the Amargosa toad.

Co-lead responsibility with BLM: Law enforcement

NDOW will maintain appropriate status classification for the Amargosa toad under NAC 503.075. NDOW will enforce statutory prohibitions against unauthorized transportation and release of native and nonnative wildlife.

Co-lead responsibility with US Fish and Wildlife Service: Public education and outreach

NDOW will cooperate with other participants to generate public awareness about the toad and its needs including educational activities. This will include:

1. Providing information to local and regional press outlets on the toad and conservation activities.
2. Participation in local educational activities as opportunities are available.
3. Provide survey and study findings for distribution in report form, including distribution of life history and movement studies through the USGS-BRD National Biological Information Infrastructure.

Co-lead responsibility with Nye County, BLM and TNC: Amargosa River riparian area enhancement

Continue to pursue programs for beautification and habitat restoration/enhancement of Amargosa River riparian areas on public and private lands.

Cooperator: Private landowner and local government coordination

NDOW will assist other cooperators in coordination with private landowners and local governments for conservation projects.

Cooperator: Habitat conservation and enhancement projects

NDOW will coordinate with and assist other cooperators with habitat conservation and enhancement projects developed through the ATWG or independently.

Nevada Natural Heritage Program:

Lead responsibility: Database management

NNHP will maintain databases on the distribution, population status, and various biological parameters pertaining to the Amargosa toad and its habitat; similar data on other sensitive species in the area; and land management and ownership in the Oasis Valley. Database information will be available to cooperators and other interested parties for scientific and conservation purposes.

Lead responsibility: ATWG coordination

A representative of NNHP shall serve as the chair of the ATWG and will coordinate workgroup activities with meetings scheduled at least twice annually.

Nye County:

Lead Responsibility: Flood control and right-of-way maintenance coordination

Nye County will coordinate with other designated cooperators on actions involving flood control, right-of-way, and highway maintenance activities to minimize impacts to Amargosa toad habitats.

Lead Responsibility: Local community coordination

Nye County will assist in coordination between the ATWG and other cooperators, and the local community and town government, pertaining to development and implementation of conservation strategies and actions for the Amargosa toad. This may include interactions with the Beatty Town Board and committees thereto, development of mechanisms to insure public and landowner input and interaction, focus groups, and other strategies to be identified.

Co-lead responsibility with NDOW, BLM and TNC: Amargosa River riparian area enhancement

Continue to pursue programs for beautification and habitat restoration/enhancement of Amargosa River riparian areas on public and private lands.

Cooperator: Development of programs for community beautification, and habitat restoration and enhancement

Nye County will assist TNC and other cooperators in the development of programs for community beautification and habitat restoration/enhancement of Amargosa River riparian areas on public and private lands, and assist with coordination and public input to habitat development and restoration activities. Nye County will collaborate in the development of species enhancement strategies, and in efforts to pursue the use of ISTEPA funds to acquire or restore habitats along the US 95 corridor in Oasis Valley.

Cooperator: Identification and implementation of private land protection opportunities

Nye County will assist TNC and other cooperators in the identification and implementation of protection opportunities on private lands and with private landowners, which may include: voluntary management agreements, conservation easements, acquisition from willing sellers, or other strategies to be identified.

Bureau of Land Management:

Lead responsibility: ACEC nomination/designation

The Tonopah Field Station is currently preparing a plan amendment to the Tonopah Resource Management Plan and Record of Decision dated October 6, 1997. The Amargosa/Oasis area was nominated as an Area of Critical Environmental Concern (ACEC) in order to protect Nevada BLM Sensitive Species crucial riparian habitat. The Amargosa toad, Oasis Valley speckled dace (*Rhinichthys osculus spp.*), Oasis Valley springsnail (*Pyrgulopsis micrococcus*), and funeral milkvetch (*Astragalus funereus*) would directly benefit from ACEC designations. The plan amendment will go to the ATWG and general public for review and public comment.

Amargosa/Oasis ACEC Nomination is presently being managed as an ACEC until the completion of the plan amendment. The target date for completion of the plan amendment is September 30, 2001.

Lead responsibility: Exclosures on public lands

The Tonopah Field Station, in cooperation with the USFWS and NDOW, will erect exclosures around Amargosa toad habitat that is being negatively impacted on public land when it is determined an exclosure will reduce the negative impacts. The exclosures would be erected primarily to regulate grazing animal use (burros and livestock) in Amargosa toad habitat. By excluding these animals periodically or entirely, the overutilization of riparian and upland vegetation, consumption of water, soil compaction in riparian areas, direct mortality due to trampling, and reduced water quality will be minimized.

Lead responsibility: Wild burro management

During March 1-8, 1995, the Tonopah Field Station removed 492 burros from the Bullfrog Herd Management Area near Beatty, Nevada. Again in August 24-30, 1996, the BLM removed an additional 417 wild burros from the Bullfrog Herd Management Area. The wild burro gathers that took place in 1995 and 1996 have reduced the wild burro population to approximately 30 individuals. By removing these animals, the overutilization of riparian and upland vegetation, consumption of water, soil compaction in riparian areas, direct mortality due to trampling, and reduced water quality have been significantly reduced. By reducing the burro population, habitat for the Amargosa toad has improved on public and private land. Additional management action (removal) may occur if wild burros are determined to be causing a negative impact to Amargosa toads or their habitat.

Lead responsibility: Livestock/grazing management

The Montezuma Allotment encompasses Amargosa toad habitat within the Oasis Valley. Currently, a Proposed Multiple Use Decision for the Montezuma Allotment dated February 11, 1994, is under appeal by the permittee; however, the permittee has lost his grazing privileges due to continuous trespass livestock. There is no permitted livestock grazing within the Montezuma Allotment at this time.

The pending Proposed Multiple Use Decision did not analyze potential impacts to the Amargosa toad and its habitat; therefore, prior to re-authorizing livestock grazing on the Montezuma Allotment within Amargosa toad habitat, an analysis of impacts to Amargosa toads and other sensitive species and their habitat will be completed. If threats are identified during the re-evaluation process, recommendations to reduce and eliminate threats will be incorporated into terms and conditions of the grazing permit.

Lead responsibility: Habitat protection, enhancement and creation projects on public lands

The Tonopah Field Station, in cooperation with ATWG, will design and implement habitat protection, enhancement and creation projects (improve breeding and hiding habitat) to benefit Amargosa toad and their habitat with consideration to other multiple uses.

Lead responsibility: Recreation management on public lands

The acres nominated for the Amargosa/Oasis ACEC are currently closed to competitive recreational events to protect sensitive resource values. Vehicles are limited to existing roads and trails in desert tortoise habitat. The general public, under "dispersed use", have no restrictions on what type of recreation they perform on BLM-administered lands. However, the desert tortoise occurs within the Oasis Valley and unauthorized "take" of a desert tortoise is subject to penalties invoked under the Endangered Species Act of 1973, as amended.

Lead responsibility: ESA Section 7 compliance for public land actions

Section 7(a)(2) of the ESA requires Federal agencies to consult with the USFWS on discretionary actions that may affect federally listed species. Currently, the desert tortoise (*Gopherus agassizii*) is the only listed species which is known to be resident within the Oasis Valley. The BLM will enter consultation with the USFWS whenever a discretionary action may affect the desert tortoise and recommend minimization measures.

Lead responsibility: Road designation on public lands

The BLM will realign existing and permit new routes as appropriate to protect Amargosa toad habitat on public lands. The Amargosa/Oasis ACEC Nomination is closed to competitive recreational events to protect sensitive resource values.

Co-lead responsibility with NDOW, Nye County, and TNC: Amargosa River riparian area enhancement

Continue to pursue programs for beautification and habitat restoration/enhancement of Amargosa River riparian areas on public and private lands.

Co-lead responsibility with NDOW: Mining activity review

Amargosa/Oasis ACEC nomination is being managed as an ACEC until ACECs are designated under the plan amendment. BLM has regulatory authority to mitigate disturbances proposed by mineral actions. Mining actions in the Amargosa/Oasis ACEC nomination area would be considered under a Plan of Operation and as such impacts would be analyzed in an Environmental Assessment or Environmental Impact Statement. Mineral Material Sales (sand and gravel) are discretionary and the BLM Field Station Manager has the authority to deny all requests for a sale that would impact toad habitat.

Co-lead responsibility with NDOW: Law enforcement

The BLM Law Enforcement Ranger will routinely patrol Amargosa toad sites and inspect for vandalism.

Cooperator: Nonnative species control

The BLM will work with ATWG on control of nonnative species which occur on BLM administered public lands.

Cooperator: Public education

The BLM will coordinate with NDOW and USFWS on public education activities that will assist in improving relations with the public and keeping the public informed on issues involving Amargosa toad or other sensitive species within Oasis Valley.

Cooperator: Mining compliance

The BLM will coordinate with NDOW and use regulatory methods available to protect Amargosa toad habitat. The BLM will ensure mining claimants are aware of the concerns over Amargosa toad and its habitat and work with them to ensure impacts to the Amargosa toad and its habitat will not occur.

Cooperator: Inventory

The BLM will assist NDOW in surveys and mark/recapture studies by providing biologists for surveys, within funding constraints. The BLM will review survey reports and provide technical assistance as appropriate.

US Fish and Wildlife Service:

Lead responsibility: Section 404 of the Clean Water Act Permits

The USFWS will coordinate with the Army Corps of Engineers (Corps) and Nye County Public Works to ensure that work within the Amargosa River does not result in harm to sensitive species by establishing points of contact for appropriate agencies. The USFWS will develop a flood-control work plan in cooperation with the Corps, ATWG, and Nye County to allow work within the Amargosa River to accomplish protective measures to the residents of Beatty from flood events and minimize impacts to sensitive species.

Lead responsibility: Consultation under Section 7 of the Endangered Species Act

Section 7(a)(2) of the ESA requires Federal agencies to consult with the USFWS on those actions that may affect federally-listed species. At present, the desert tortoise is the only listed species known to be resident in the Oasis Valley, although the southwestern willow flycatcher may also occur. The USFWS will assist Federal agencies, primarily the BLM, in making the appropriate determination of effect and minimization measures.

Lead responsibility: Candidate Conservation Agreement and Safe Harbor programs

Provide technical guidance and information on opportunities for private lands conservation actions encompassing Candidate Conservation and Safe Harbors agreements. Assist Nye County, TNC, and private landowners in information delivery, identification of opportunities and development of agreements

Co-lead responsibility with NDOW: Public education and outreach

1. Inform the residents in the Beatty community of conservation actions proposed, in progress, and completed by all entities, that will benefit the Amargosa toad and other sensitive species in the Oasis Valley. The USFWS, in coordination with the ATWG, will prepare articles and announcements to be provided to local media or posted in public areas. Information will include: Proposed survey dates and habitat enhancement projects; survey results; recommended conservation actions that residents could implement to sensitive species; and proposed land management actions.
2. Develop a brochure on the Amargosa toad and other sensitive species in the Oasis Valley, describing its natural history, status, distribution, threats, current management, and relevant issues of interest to the public. Provide the brochure to residents of the community and interested parties.
3. Coordinate with State and Federal agencies to provide incentives to landowners that allow biologists access to their property for surveys or accomplish conservation actions. Such incentives may include formal recognition of their conservation efforts.
4. Involve residents of the Beatty community in management and conservation actions for the toad and other sensitive species, by inviting those interested to meetings of the ATWG.
5. Establish and maintain a mailing list of interested parties in the Oasis Valley and provide periodic updates on the status of sensitive species in the area and conservation efforts.

Cooperator: ACEC Designation

Provide technical assistance to BLM on proposed delineation and management of ACECs in the Oasis Valley.

Cooperator: Nonnative Species Control

Coordinate with the Nevada Division of Wildlife (NDOW), private landowners, and the ATWG to develop and implement a nonnative species eradication and control program. Solicit recommendations from nonnative species experts and incorporate into the plan. Emphasis will be placed on crayfish, bullfrogs, and tamarisk, which have the greatest potential to impact the Amargosa River ecosystem. Provide funding when available to implement experimental control programs.

Cooperator: Inventory

1. Assist NDOW in surveys and mark/recapture studies by providing a minimum of 1-2 USFWS biologists for each survey.
2. Provide equipment and supplies for surveys and mark/recapture studies within funding constraints.
3. Review survey reports and provide technical assistance as appropriate.

The Nature Conservancy:

Lead responsibility: Private land conservation

Work with private landowners to identify protection opportunities which may include: conservation easements and voluntary management agreements (Candidate Conservation Agreements).

Lead Responsibility: Implementation of Site Conservation Planning

Work with agencies to prioritize and coordinate conservation activities via Site Conservation Planning methodology.

Co-lead responsibility with NDOW, BLM and Nye County: Amargosa River riparian area enhancement

Continue to pursue programs for beautification and habitat restoration/enhancement of Amargosa River riparian areas on public and private lands. Pursue the use of TEA21 funds to acquire or restore habitats along the US 95 corridor in Oasis Valley.

Cooperator: Inventory

Assist NDOW in surveys and mark/recapture studies.

University of Nevada, Reno - Biological Resources Research Center:

Lead Responsibility: Research

Coordinate with cooperators and private landowners to conduct research on the life history and ecology of the Amargosa toad and associated species, to assess the effectiveness of conservation measures and identify methods to effectively implement conservation measures and strategies.

Lead Responsibility: Water quality assessments and monitoring

Initiate EPA water quality assessments and monitoring at selected sites in the Oasis Valley

Lead Responsibility: Adaptive management

Provide assistance and input to insure that monitoring and conservation measures are designed and implemented experimentally and are compatible with the concepts of adaptive management. Assist in cooperative periodic review of conservation measures and methods to evaluate efficacy and scientific rigor.

Lead Responsibility: Management database

Maintain databases on experiments, habitat manipulations, and monitoring assessments

Co-lead Responsibility with NDOW: Public information and outreach

Prepare and maintain a web site for public information and education

Cooperator: Inventory

Assist NDOW and other cooperators in surveys and mark/recapture studies.

Table A-3. CONSERVATION AGREEMENT SUMMARY AND IMPLEMENTATION SCHEDULE

Conservation Actions ¹	Year 1	Year 2	Cont ²	Priority	Tasks ³	Responsible Parties	Objectives Targeted ⁴	Projected Cost	Funding Source
1.a.	✓	✓		MED	Prepare and finalize amendment to the Tonopah RMP to nominate and designate the Amargosa/Oasis area as ACEC, as appropriate	BLM	1	see note B	In-kind
1.b.					Develop candidate conservation agreements, easements, and voluntary management agreements with private landowners for at least 2 of the following:	NDOW, FWS, TNC, Nye Co.	2, 7	see note B	In-kind
				✓	• Harlan/Keel				
				✓	• Greenspun/Spicer				
				✓	• Angel's Ladies				
				✓	• Mullins				
✓	• Other parcels								
1.c.	✓			HIGH	Pursue purchase of Parker Ranch or similar parcel of private land.	TNC	2	unk	TNC
1.c.			✓	HIGH	Pursue acquisition of 280 acres of private land identified in the Tonopah RMP and Record of Decision.	BLM	2	unk	TBD
1.d.	✓			MED	Construct spring exclosures on Torrence Ranch and create control areas	TNC, NDOW, BLM, FWS	2	16.5 K	WHIP
1.d.	✓			MED	Develop monitoring program to evaluate effectiveness of spring exclosures at Torrence Ranch.	BRRC, NDOW, TNC, FWS, BLM	2, 3	see note A	WHIP, PIW
1.d.			✓	HIGH	Maintain existing spring exclosures on public land.	BLM	1, 2	unk	In-kind
1.e.	✓		✓	MED	Establish and maintain line of communication between the Cooperators and NDOT on procedures to conduct road maintenance-related activities within the Amargosa River and zone-of-influence.	NDOW, FWS, Nye Co.	1, 2	see note B	In-kind
1.e.	✓		✓	HIGH	Establish and maintain line of communication between the Cooperators and Nye County Public Works on low-impact procedures to conduct flood-control activities in the Amargosa River.	NDOW, FWS, Nye Co.	1, 2	see note B	In-kind
1.f.			✓	LOW	Acquire unappropriated water rights for wildlife on TNC property	TNC	1, 2	2 K	TNC
1.g.	✓	✓	✓	HIGH	Develop habitat conservation plan for southern Nye County to include the Oasis Valley.	Nye County, FWS, BLM	2, 4, 7, 9	TBD	In-kind
2.a.		✓		MED	Identify methods and materials that are required to provide suitable cover for toads.	BRRC, NDOW, FWS, BLM	3, 5	unk	BRRC, other coop

Table A-3. CONSERVATION AGREEMENT SUMMARY AND IMPLEMENTATION SCHEDULE

Conservation Actions ¹	Year 1	Year 2	Cont ²	Priority	Tasks ³	Responsible Parties	Objectives Targeted ⁴	Projected Cost	Funding Source
2.a.-c., 4.b., 4.d.		✓		MED	Determine mechanisms to establish and maintain open water at spring sites.	BRRC, NDOW, FWS, BLM	3, 10	unk	BRRC, other coop
2.a.-c., 4.d.	✓	✓		MED	Develop and experimentally test various designs and methods to provide optimal toad habitat with emphasis on cover and reproduction at Torrence Ranch (TNC)	BRRC, NDOW, FWS, TNC, BLM	3, 10	see note A	various
3.a.	✓			HIGH	Prepare scope of work and issue contract for life history studies on the Amargosa toad.	NDOW, FWS	5	est. 8 K p/a	In-kind
3.b.	✓	✓	✓	HIGH	Continue annual surveys, population assessments, and mark/recapture studies at: Angel's Ladies; Torrence (TNC) Ranch; Crystal; Mullins; Greenspun/Spicer; Harlan/Keel; and the river corridor. Develop and evaluate additional census methods (e.g., drift fence arrays, upland transects)	NDOW, BLM, BRRC, FWS	6	10 K p/a	In-kind by participants
3.c.	✓	✓		MED	Initiate studies to determine the ecological relationship between endemic rodents and the Amargosa toad.	NDOW, FWS	5	unk	TBD
3.d.		✓		LOW	Determine the historic ecological condition of the Oasis Valley through literature and archive searches of all available resources.	FWS, TNC, NDOW	10	see note B	In-kind
4.a.	✓	✓	✓	HIGH	Initiate tamarisk removal projects on Harlan/Keel, Torrence Ranch, the Amargosa River corridor, and other sites with permission of the landowner; replace with native species.	ALL	4, 7, 10	6.5K p/a	NDOW, BLM, FWS
4.b-d.	✓	✓		MED	Establish experimental treatments for control of crayfish and bullfrogs at Lower Indian Spring.	BRRC, NDOW, BLM, FWS	4, 7	BLM 3.5K	CCS
4.d.	✓		✓	HIGH	Remove bullhead catfish at the Harlan/Keel spring pool site, other locations on public lands as identified.	NDOW, FWS, BLM	4, 7	4K	In-kind
5.a., 5.b.		✓		MED	Prepare website in collaboration with the local community to serve as a mechanism to disperse progress reports to interested parties.	BRRC, NDOW	7	unk	BRRC
5.c.		✓		MED	Work with local casinos and businesses to improve the aesthetics of the riparian corridor through town.	TNC, NDOW	2, 3, 5, 7	see note B	In-kind
6.a.-c.	✓	✓	✓	HIGH	Ensure coordination among Cooperators and oversight of Agreement implementation.	ALL	8	see note B	In-kind
6.d.	✓	✓		HIGH	Prepare comprehensive management plan for the Amargosa toad and Oasis Valley. A draft plan will be distributed to the ATWG for review within 12 months of the date of the signed Agreement.	NDOW, FWS	1-10	\$6K	NDOW, FWS

Conservation Actions ¹	Year 1	Year 2	Cont ²	Priority	Tasks ³	Responsible Parties	Objectives Targeted ⁴	Projected Cost	Funding Source
6.e.	✓	✓	✓	MED	Maintain databases on the Amargosa toad and co-occurring species in the Oasis Valley.	NNHP	8	see note B	NNHP
7.a.	✓			HIGH	Pursue TEA21 funds through the Nevada Department of Transportation as mitigation for U.S. Highway 95.	FWS, TNC, Nye Co.	9	see note B	In-kind
7.b.	✓	✓	✓	HIGH	Assist private landowners in attaining conservation easements through the National Resource Conservation Service's Wetland Reserve Program and similar funding sources. Priorities include Younghan, Mullins, and Roberts Field/Reverts properties.	FWS, Nye Co.	2, 7, 9	see note B	In-kind
8.a.	✓		✓	MED	Install ground water monitoring wells at strategic sites to determine ground water levels and fluctuation cycles at Torrence Ranch.	TNC, FWS, NDOW	11	see note A	PIW
8.b.		✓	✓	MED	Implement EPA water quality protocol assessment of water resources of the Oasis Valley and initiate biennial monitoring.	BRRC, FWS	11	unk	NDEQ, Nye Co., BRRC, FWS

¹ Conservation Actions - reference to actions described on Pg. A-11 through A-13 of the Strategy

² Cont. = continuing actions initiated prior to completion of the Agreement and Strategy

³ Tasks - refers to cooperator tasks and responsibilities in Table 2 of Agreement and Pg. A-14 through A-21 of the Strategy

⁴ Objectives - refers to activities described on Pg. 4 of Agreement and Pg. A-10 through A-11 of the Strategy

NDEQ = Nevada Division of Environmental Quality

Funding notes:

- A. Activities identified for conservation on Torrence Ranch property are partially funded through Partners in Wildlife grant, and through in-kind existing cooperator budgets.
- B. Administrative actions and some field activities are not separable to specific individual costs but are included in budget authorization requests and/or work programs for identified cooperators

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