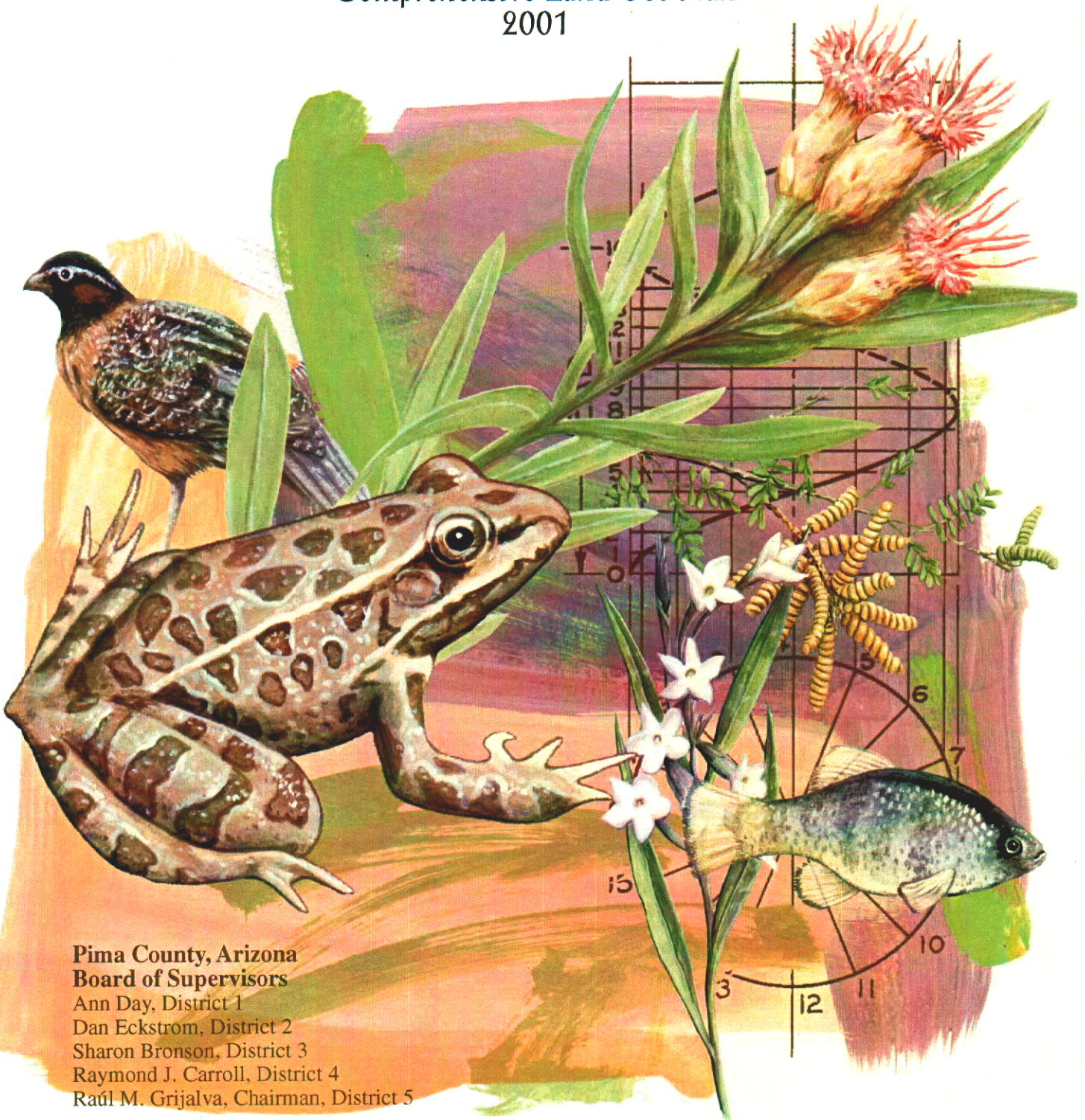


**DRAFT**

# Species Re-establishment within Pima County

Sonoran Desert Conservation and  
Comprehensive Land Use Plan  
2001



**Pima County, Arizona  
Board of Supervisors**

Ann Day, District 1  
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Sharon Bronson, District 3  
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**County Administrator**  
Chuck Huckelberry





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# MEMORANDUM

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Date: September 4, 2001

To: The Honorable Chair and Members  
Pima County Board of Supervisors

From: C.H. Huckelberry  
County Administrator

A handwritten signature in dark ink, appearing to be "CHH", is written over the printed name "C.H. Huckelberry".

Re: **Species Re-establishment within Pima County**

## **Background**

Under Section 10 of the Endangered Species Act, a Habitat Conservation Plan must specify what steps will be taken to "minimize and mitigate" impacts. This is a low standard. The overall purpose of the Endangered Species Act will not be met though the application of this standard. Quite simply, we can not "mitigate" a species into recovery. This is particularly true given the dire status of many of the priority vulnerable species proposed for coverage under the Sonoran Desert Conservation Plan. It is clear that a proactive program of species recovery will be an aspect of the Sonoran Desert Conservation Plan and in order to be successful, the program will require broad inter-agency cooperation, at both the policy and technical levels. The attached study on *Species Re-establishment within Pima County* describes successful re-establishment efforts, and proposes that more than a dozen native species can be assisted through re-establishment programs, primarily on County-owned land. The species proposed for re-establishment, their status, and the proposed locations are summarized on the next page and include:










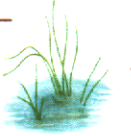



- Sonoran mud turtle and Mexican garter snake
- Chiricahua leopard frog and Lowland leopard frog
- Huachuca water umbel, Screwbean mesquite, and Arrow weed; and
- Gila topminnow, Desert pupfish, Longfin dace, Gila chub, and Desert sucker.

## **Proactive Approach to the Technical and Policy Aspects of Re-establishment Programs**

I have directed staff to continue to work with the Science Technical Advisory Team and the expert community to craft program proposals that we will incorporate into the Multi-Species Conservation Plan permit, or the larger Sonoran Desert Conservation Plan itself. We have already issued studies and proposals related to some aquatic species, including amphibians, fish and certain plants. We have funded research and survey efforts that have advanced the science of the pygmy-owl. Similar attention will be paid to other bird species identified as priority vulnerable species. Inspired by the accumulation of information that is resulting from the Sonoran Desert Conservation Plan science-based approach, the expert community is contributing to further the overall base of knowledge at the species-specific and natural system level, in ways that really open up the potential for the recovery of species and their habitats. This will be a long term endeavor.

Re-establishments and long term recovery efforts are hindered by a fragmented system of authority and responsibility for species protection. Cooperative commitments to re-establishment programs will be sought from state and federal wildlife officials so that the potential created by the science community is not lost at the intergovernmental and interagency level.

**Table 2: Species Proposed for Re-establishment within Pima County**

Species Proposed for Re-establishment		Currently found within Pima County	Extirpated from Pima County	Threatened or Endangered	Proposed Location
Amphibians	 <i>Chiricahua leopard frog</i>	X		Candidate	Various sites throughout the county
	 <i>Lowland leopard frog</i>	X			Various sites throughout the county, including Agua Caliente Park
Fish	 <i>Gila topminnow</i>	X		X	Various sites throughout the county, including Agua Caliente Park, Bingham Cienega, and Cienega Creek Natural Preserve
	 <i>Desert pupfish</i>	Quitibaquito subspecies present	X	X	Where habitat exists or could exist with restoration
	 <i>Longfin dace</i>	X		Candidate	Agua Caliente Park
	 <i>Gila chub</i>	X			Agua Caliente Park, and Cienega Creek Natural Preserve
	 <i>Desert sucker</i>	X			Agua Caliente Park
Reptiles	 <i>Sonoran mud turtle</i>	X			Agua Caliente Park
	 <i>Mexican garter snake</i>	X			Agua Caliente Park
Plants	 <i>Huachuca water umbel</i>	X		X	Where habitat exists or could exist with restoration
	 <i>Screwbean mesquite</i>		X		Santa Cruz River
	 <i>Arrow weed</i>		X		Santa Cruz River
Birds	 <i>Gould's Turkey</i>		X		Suitable habitat in Southeastern AZ

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## Acknowledgments

This report was prepared by Pima County staff to discuss re-establishment proposals for Pima County and how such efforts may be carried out. The report was prepared by Neva Connolly (Pima County Flood Control District) and internally reviewed by Julia Fonseca (Pima County Flood Control District).

Significant contributions were also provided by Doug Duncan (U.S. Fish and Wildlife Service) and Sherry Ruther (Arizona Game and Fish Department). Other contributions were made by Jim Heffelfinger (Arizona Game and Fish Department) and Mima Falk (U.S. Fish and Wildlife Service).

## Species Re-establishments in Pima County

### Purpose

Pima County and other agencies have proposed and will propose to re-establish species at a number of sites in Pima County. Species re-establishment is the attempt to establish a species in an area which was once part of its historical range, but from which it has been extirpated<sup>1</sup> or become extinct in the wild<sup>2</sup> (IUCN, 1996). Re-establishment has the following goals:

- to enhance the long-term survival of the species.
- to re-establish a keystone species (in the ecological sense). Keystone species enrich ecosystem function in a unique and significant manner through their activities, and the effect is disproportionate to their numerical abundance. Their removal initiates changes in ecosystem structure and often loss of diversity.
- to increase or maintain biodiversity;
- to provide long-term economic benefits to the local people;
- to provide social benefits to the local people and their cultural traditions;
- or to achieve a combination of the above.

The purpose of this report is to discuss re-establishment proposals for Pima County. Relevant laws and regulations governing re-establishment efforts will be discussed to give readers an idea how such efforts might be carried out. Case studies will illustrate how previous efforts have been conducted and how the populations have fared.

### Need for Species Re-establishment

Many species around the world have declined until the remaining numbers are so few that the species existence is in severe peril. Reasons for these declines vary with species, but one of the most common is habitat loss and fragmentation (Reid and Miller 1989). Other factors in species loss include over-exploitation, non-indigenous species introductions, pollution, and the cumulative effects of human disturbances. Some species have extinction-prone traits (see Table 1), which can exacerbate the effects of human or natural disturbances.

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<sup>1</sup> Extirpated species are those that once lived in a particular area, but are no longer found there, though still exist in other areas.

<sup>2</sup> Extinct in the wild: Species no longer exists naturally in the wild, though occurs in captivity, or may have been released into the wild as a result of captive breeding programs.



**Table 1: Extinction-prone Species Groups (Reid and Miller, 1989)**

<b>Species at higher trophic levels</b>	Species high in the food chain tend to be large, rare animals with slow reproductive rates. These species are particularly sensitive to over-exploitation and habitat loss.
<b>Local endemics</b>	Species with restricted ranges are susceptible to habitat losses. For example, within Pima County, the Quitobaquito pupfish is restricted to one pond. This population could be exterminated by water pollution or habitat alteration.
<b>Species with chronically small populations</b>	Small populations face an increased chance of extinction due to problems associated with environmental chance and natural catastrophes, genetic chance, demographic chance (sex ratios), and social dysfunction (disruption of social behaviors due to absence of some critical number of individuals).
<b>Largest members of a guild</b>	Large species often have high metabolic demands, require large habitats, and occur in low densities.
<b>Species with poor dispersal and colonization ability</b>	Similar to <b>Local endemics</b> . Low likelihood of finding unoccupied suitable habitat.
<b>Species with colonial nesting habits</b>	These species are susceptible to over-exploitation or the loss of breeding habitat.
<b>Migratory species</b>	Depend on suitable habitat along course of their migratory range, and in summer and winter ranges.
<b>Species dependent on unreliable resources</b>	Species population fluctuates widely depending on availability of food resources. During times of low population, species may face increased threats of extinction (similar problems associated with <b>Species with chronically small populations</b> .). Fruit and nectar dependant species may be reduced during years when production is low.
<b>Species with little evolutionary experience with disturbances.</b>	Species do not have adaptations or skills to face new challenges, such as introduced species or human disturbance. Typical of species found on islands.

Occasionally, a species number will drop so low, that unless human intervention occurs, the species is likely to become extinct in the wild. At the point where species extinction is imminent, attention must be given to whether a program of captive breeding (*ex situ* conservation) would be appropriate and feasible. The artificially maintained population is held in a zoo, aquarium, seed bank or botanical garden. Species such as the black-footed ferret and the California condor were considered extinct in the wild. The last known wild populations of these animals were brought into

captivity and successfully breed. Captive populations of the black-footed ferret and California condor have been released into historic habitat, and can once again be found in the wild.

Species re-establishments have become an important tool in preserving biodiversity. Frequently, the objective is to enhance remaining wild populations of endangered species numerically and/or genetically with captive-bred stock. *In extremis*, where the species is extinct in the wild, a captive population will be held until habitats are sufficiently restored to reinstate a population.

Species re-establishment can be an important tool in endangered species management. Re-establishments address causes of extinction by remedying low population numbers, and can decrease a species vulnerability to environmental variability. Additionally, re-establishments can begin to restore natural ecological processes. Each species has a niche that it fills in the ecosystem and the elimination of one species may cause a chain of events that disrupts the functioning of an ecosystem. The re-establishment of the missing species can restore natural functions.

Species re-establishments have been widely promoted as a technique for reinstating wild populations (Maunder, et al in Fielder, 1998). It represents one tool in a conservation strategy that seeks to conserve the maximum amount of biodiversity. Other conservation practices, such as habitat restoration, can lead to re-establishment opportunities.

### **Complexities with Re-establishments**

Re-establishments are often a last opportunity to prevent a species' extinction. The ideal situation is to take action to protect species and their habitats before significant losses occur. Typically, re-establishment is only attempted when other options do not exist. It is felt by many conservation biologists that ecosystem conservation is a much more effective conservation tool than re-establishment projects. Protecting ecosystems can protect a whole range of plant, animals, and invertebrates in their natural habitats (Lannoo, no date).

Re-establishment projects can be a very expensive, time and personnel intensive process. Re-establishments can involve a multitude of people, including land owners and various governmental agencies. All re-established species need to be monitored; for some animals monitoring can be very intensive, requiring daily monitoring, while certain plants or animals may only require occasional monitoring.

In many cases, species re-establishments necessitate captive breeding programs. Criticisms of captive breeding include its focus on few, charismatic species, low genetic diversity of captive populations, and the high cost of maintaining one species diverts resources from much more cost-effective ecosystem and habitat conservation measures.

- *Few, charismatic species:* It is not feasible to assume all species in danger of extinction can be saved by captive breeding and corresponding species re-establishment projects, so choices must be made as to what species can be rescued. Considerable attention has been given to high-profile species with public appeal. Traditionally, mammals, birds, and select plants have been the past focus of captive breeding and re-establishment projects. Amphibians, reptiles, and invertebrates, species that may be relatively easy to breed in captivity and re-established in historic habitat, have been under-represented in re-establishment projects.



- *Low genetic diversity:* In many cases, by the time *ex situ* conservation strategies are implemented, genetic variation in the surviving captive population are already severely reduced (Stewart and Hutchings, 1996). Presumably, one advantage in captive breeding is that there is greater control over matings. The goal is to obtain maximal genetic variation within the captive population.
- *High cost of maintenance:* Keeping animals in an artificial environment can be expensive. It is more effective to conserve species habitat, and its local assemblage of plants, invertebrates, and other species.

## **Successful Re-establishments**

In spite of the criticisms and difficulties of species re-establishment programs, they continue to be used as a conservation tool. Re-establishments have made a critical difference in the status of several North American endangered species.

### The Peregrine Falcon

The peregrine falcon was listed as endangered in 1970 under the Endangered Species Act of 1969. The species had been nearly eliminated from the eastern United States by the mid-60's, and the decline spread west, where it was estimated that peregrine falcon populations had been reduced by 80 to 90 percent (U.S. Fish and Wildlife Service, 1999). The U.S. Fish and Wildlife Service (USFWS) established a peregrine falcon recovery team composed of federal, state, and independent biologists to recommend actions necessary to restore peregrine populations in the United States. As part of the recovery actions, Cornell University bred and raised peregrines in captivity.

Under a cooperative effort, more than 6,000 American peregrine falcons have been released since 1974. Because of the success of many of these re-establishments, large-scale releases have ceased. Populations of peregrines are estimated at 1,659 breeding pairs (1999 estimate) in the US and Canada, with pairs also in Mexico. The recovery goal for the species was 631 pairs. In August 1999, the American peregrine falcon was removed from the ESA list of endangered and threatened species.

### Black-Footed Ferrets

Biologists consider the black-footed ferret the most endangered mammal in the United States. In 1985-1986, there were only 18 wild ferrets known in North America. These remaining individuals were taken into captivity in 1986-1987 to serve as founders for a captive propagation program (USFWS, 1998). In 1998, the captive ferret population annually fluctuated between 300 and 600 ferrets. As of 1998, there were seven subpopulations of captive ferrets. Current recovery efforts emphasize the re-establishments of animals back into the wild from the captive source stock.

While the black-footed ferret continues to be listed as endangered, the future is looking brighter for this species. Re-establishments began in 1991 in Wyoming, Montana, South Dakota, Utah, Colorado, and Arizona. Re-established ferret populations have been designated "non-essential experimental" populations under Section 10j of the Endangered Species Act. This designation allows more flexibility in managing new populations. National goals to recover this species are to

establish 10 free-ranging populations of ferrets, with each population having 30 or more breeding adults (USFWS, no date).

### The American Bald Eagle

Due to recovery efforts by the USFWS in partnerships with federal, state, tribal, and local governments, the number of bald eagle pairs is estimated at 5748 nesting pairs (USFWS, 1999). Much of the bald eagle's success is due to re-establishment programs.

The bald eagle was listed as endangered in 1978, and reclassified as threatened in 1995. The US Fish and Wildlife Service is considering de-listing the species and declaring it fully recovered. A decision was due in July of 2000, but has been delayed until the USFWS decides on how the eagle will be managed once it is removed from federal protection.

### The American Bison

In the 1700's and early 1800's, the American bison roamed in herds across the plains of North America, in numbers that have been estimated from 30 million to 200 million animals. In the mid to late 1800's, unregulated killing of the bison reduced the numbers to an estimated 300 to 1500 animals (Stewart, 1978). Public and private protection of this animal, along with captive breeding programs and re-establishments, have brought the bison's number to over 350,000 animals (National Buffalo Foundation, 2000).

### **Re-establishments within Pima County**

There have been several endangered species re-establishment projects within Pima County. These re-establishments have fulfilled both functional and conservation re-establishment goals.

#### Kearney's Blue Star (*Amsonia kearneyana*):

Kearney's Blue Star was listed as endangered in 1989 because of its limited distribution, apparently declining population numbers, declining habitat due to overgrazing, and poor reproduction. At the time, the only known surviving population was found in South Canyon, in the Baboquivari Mountains.

In 1981, the natural population supported a total of 25 plants, but by 1983 had decreased to 8 plants (USFWS, 1993). An *ex situ* conservation program was established for the plant, and the plant was propagated through cuttings and seeds. A population was introduced in 1988 to Brown Canyon, also in the Baboquivari Mountains. Originally consisting of 181 plants, catastrophic flooding reduced the introduced population to 33 plants. In 1992, 69 plants were added to the introduced population. Various efforts to insure this species against extinction include an established seed bank, a botanical garden population, and the re-establishment of populations to the wild.

Currently, the population in Brown Canyon has about 40 to 50 remaining plants, with low levels of reproduction. About 10 sub-populations (an approximate total of about 1000 individuals) of naturally-occurring plants have been found on surrounding U.S. Bureau of Land Management land (Falk, personal comm., 2001).



### Masked Bobwhite Quail

The masked bobwhite quail disappeared from southern Arizona by the early 1900's, due to cattle overstocking and drought. This combination stripped the land bare of most vegetation. As food and shelter were trodden out of existence, the bobwhite followed.

In 1964, a population of masked bobwhites was discovered in Sonora, Mexico. Birds from this population were taken with the intent to protect and relocate the quail. When efforts were proven unsuccessful, the remaining birds were donated to US Fish and Wildlife Service in 1966. These birds, along with other wild-trapped birds taken in 1968 and 1970 were the basis of the gene pool for the captive breeding and reintroduction program.

Several early attempts were made to re-establish masked bobwhite to Arizona. The earliest documented release dates back to 1937. Attempts at re-establishment of the bobwhite continued until the end of 1950. All early attempts were unsuccessful in establishing masked bobwhites (USFWS, 1995). Most releases were well outside of the presumed historic range of the masked bobwhite because it was believed that range conditions in historic habitat were completely unsuitable for the bird.

In 1969, the USFWS, with cooperation from the Arizona Game and Fish Department (AGFD), initiated searches for suitable re-establishment sites in Arizona. Several sites were found, and masked bobwhites were released on various sites in Altar Valley and in Mexico from 1970 through 1984. These re-established populations were presumed failed (USFWS, 1985). Many of the past attempts at re-establishment failed due to areas chosen with less than ideal habitat, although they represented the best available. Some re-establishments failed due to grazing pressure and drought.

In 1985, with the acquisition of Buenos Aires National Wildlife Refuge, masked bobwhite from Patuxent Wildlife Research Center were released within the 112,000 acre refuge. A recovery plan was developed for the quail in 1978 and updated throughout the years, the latest being 1995.

Masked bobwhites have been released onto the refuge annually since 1985. The re-establishment has been a long and difficult process. Thousands of quail have been released, with disappointing results until recently. Fall and winter (1999-2000) quail counts trapped 22 wild born quail. Quail have been seen throughout the refuge, and may be expanding past refuge boundaries (Hunnicut, pers.comm., 2001).

Past difficulties with masked bobwhite quail re-establishments have been attributed to intensive grazing, unsuitable habitat conditions, predation, and severe weather conditions (USFWS, 1995). Recent success may be due to improvement, and improved techniques in quail releases (Hunnicut, pers.comm., 2001).

### Pronghorn

Similar to bison, the American pronghorn once ranged the western United States, stretching from Saskatchewan to just north of Mexico City. And like bison, the antelope population was nearly devastated by the spread of Anglo settlers. Populations declined from an estimated 30 to 60 million in the early 1800s to less than 15,000 by 1915 (USFWS, 2001). In 1921, an estimated 650 remained in Arizona (Lewis, no date). The population declines were caused by unregulated market hunting and by changing land use patterns, such as grazing (BISON-M, 2000).

Early conservationists centered their efforts on improving the enforcement of game laws and restocking pronghorn to former habitats. With the cooperation of ranchers, the control of predators, and the decline in livestock grazing pressure after World War I, the pronghorn population began to increase. By 1941, the pronghorn population in Arizona had reached several thousand, and animals from northern Arizona became available for transplant to suitable southern Arizona habitats (Lewis, no date).

Although once found in large numbers throughout the grasslands of southeastern Arizona, all of the pronghorn in southeastern Arizona are re-established populations (USFSW, 2001). Populations of the endangered Sonoran pronghorn, found in western Pima County and in Sonora, Mexico, have not been supplemented; therefore, the following remarks do not apply to this sub-species. During the 1940s and 1950s, southeastern Arizona was stocked with the common, or American subspecies of pronghorn (*Antilocapra americana americana*), naturally found in most of the pronghorns' range, including northern Arizona (BISON-M, 2000). The subspecies originally found in southeastern Arizona was the Mexican/Chihuahuan pronghorn (*Antilocapra americana mexicana*), found in New Mexico, Texas, and formerly in southeastern Arizona.

In 1981, 51 Chihuahuan pronghorn from Texas were stocked in the Empire-Cienega area (Heffelfinger, 1995). After initial mortalities and a slow reproductive start (Heffelfinger, 1995), the pronghorn population now averages about 100 animals (Simms, personal comm., 2001).

The Altar Valley received 87 translocated Chihuahuan pronghorn from Texas in 1987. Shortly after the release, the translocated population suffered heavy losses due to predators (Heffelfinger, 1995). Since then the population has slowly risen to about 75 animals. Low winter rain and predators keep the population from expanding (Heffelfinger, personal comm., 2001).

Both the Altar Valley and Empire-Cienega antelope were corralled in Texas and brought by truck to their release sites. The animals were "hard released", or released directly onto the site, without holding pens and supplemental food. The release sites were located in areas with suitable forage and watering sites nearby (Heffelfinger, personal comm., 2001).

#### Desert Pupfish and Gila Topminnow

The desert pupfish and Gila topminnow are both endangered fish, once widespread in streams throughout Arizona. Currently in Pima County, Cienega Creek supports a population of Gila topminnow. Quitobaquito Springs within the Organ Pipe Cactus National Monument supports the only known population of the Quitobaquito pupfish.

Several captive fish populations are held by public and private groups in the Tucson area (Scalero and Fonseca, 2000). The fish are maintained in artificially made aquatic habitats including ponds and streams. These populations are maintained as exhibits for parks and museums (see Appendix 1).

Re-establishment efforts without success have been made for both species within Pima County (see Appendix 2). Most populations disappeared almost immediately, while others survived 5 to 10 years before eventually dying off (Weedman, 1998). Reasons for failure include drying of the water source, flooding, non-indigenous species invasions, cattle overuse, dredging, low oxygen and other unknown factors. A unifying factor in the re-establishment failure was that most of the selected

ponds and springs were so small that they were inherently vulnerable to natural and human-induced factors leading to extinction (Weedman, 1998).

The status of native fish in the southwestern deserts is so poor that stocks of fish are maintained in hatcheries, such as the Dexter National Fish Hatchery in New Mexico. These stocks are maintained in order to insure the continued existence of native fish species in case native populations become extirpated or contaminated. Stocked populations could be used to re-establish native fish populations into restored aquatic habitats (Scalero and Fonseca, 2000). The re-establishment of native fish populations should be an important component of Pima County's conservation and restoration efforts to protect and expand depleted aquatic ecosystems.

### **Potential Re-establishments within Pima County**

The biological goal of the Sonoran Desert Conservation Plan is to ensure the long-term survival of the full spectrum of plants and animals that are indigenous to Pima County through maintaining or improving the habitat conditions and ecosystem functions necessary for their survival (Pima County Administration, 2000). Inherent with this broad goal are several objectives;

- Promote recovery of federally listed and candidate species to the point where their continued existence is no longer at risk.
- Where feasible and appropriate, re-establish and recover species that have been extirpated from this region.

Scientists working on the Sonoran Desert Conservation Plan have proposed the re-establishment of several species (see Table 2). These species were once present in Pima County, or in some cases, still occur, though in much reduced numbers.

### **Re-establishment Regulations**














#### **Arizona Game and Fish Department Regulations**

Arizona Revised Statutes (ARS) Title 17 declares that wildlife found in the state of Arizona, both resident and migratory, are property of the state. The Arizona Game and Fish Department (AGFD) is charged with managing the state's wildlife in trust for Arizona residents and operates under the auspices of the Arizona Game and Fish Commission (AGFC). The AGFC is a 5-member board appointed by the Governor.

The authority to re-establish wildlife species in the state of Arizona, with limited exception, rests solely with the AGFC and AGFD via delegated authority from the AGFC. Because of the shared Federal/State management responsibility for those species listed as Threatened and Endangered under the federal Endangered Species Act, re-establishment of these species is a cooperative management decision between the U.S. Fish and Wildlife Service and the AGFD/Commission.

Prior to release of either a game or nongame species (including T/E species) for re-establishment purposes, the AGFD evaluates the proposed re-establishment. The evaluation generally involves compliance the National Environmental Policy Act, coordination with affected landowners (public and private) and an evaluation of habitat suitability at the proposed release site. The procedure AGFD utilizes for the re-establishment of nongame and T/E species is generally referred to as the

Table 2: Species Proposed for Re-establishment within Pima County

Species Proposed for Re-establishment		Currently found within Pima County	Extirpated from Pima County	Threatened or Endangered	Proposed Location
Amphibians	 Chiricahua leopard frog	X		Candidate	Various sites throughout the county
	 Lowland leopard frog	X			Various sites throughout the county, including Agua Caliente Park
Fish	 Gila topminnow	X		X	Various sites throughout the county, including Agua Caliente Park, Bingham Cienega, and Cienega Creek Natural Preserve
	 Desert pupfish	Quitibaquito subspecies present	X	X	Where habitat exists or could exist with restoration
	 Longfin dace	X		Candidate	Agua Caliente Park
	 Gila chub	X			Agua Caliente Park, and Cienega Creek Natural Preserve
	 Desert sucker	X			Agua Caliente Park
		X			Agua Caliente Park
Reptiles	 Sonoran mud turtle	X			Agua Caliente Park
	 Mexican garter snake	X			Agua Caliente Park
Plants	 Huachuca water umbel	X		X	Where habitat exists or could exist with restoration
	 Screwbean mesquite		X		Santa Cruz River
	 Arrow weed		X		Santa Cruz River
			X		Suitable habitat in Southeastern AZ
Birds	 Gould's Turkey		X		

12-Step-Process (Appendix 2). Procedures for re-establishing big game species are promulgated in the AGFD Policy Number 11.2: Big Game Transplant Procedure (Appendix 3). No policy currently exists to specifically guide the re-establishment of small game species; however, depending upon which is more appropriate, AGFD will use either the big game transplant procedures or the 12-Step Process.

Partnerships are created with private or public landowners, depending on who owns the affected lands. AGFD partners with the landowner for re-establishment of any species. The 12-step process does not apply to Gila topminnow or desert pupfish re-establishments. The U.S. Bureau of Land Management, and Forest Service have Memorandum's of Understanding (MOU's) with AFGD and USFWS for the re-establishment of both topminnow and pupfish (Duncan, personal comm., 2001).

### Federal Regulations

Procedures or guidelines for re-establishments may be found in recovery plans. There are many species and taxa that do not have a recovery plan, or do not have procedures or guidelines for re-establishment.

Threatened and endangered plants do not have the same restrictions that federally listed animals have. For instance, threatened and endangered plants are not protected on private land. The Endangered Species Act does not restrict the collection of endangered plants on private land, as long as no state law is violated. No permit is required to possess, cultivate, or propagate endangered plants as long as no interstate commercial activity is involved (McDonald, 1996).

Within the Endangered Species Act, there is a provision, Section 10(j), that allows the release of a threatened or endangered species with reduced protection of the ESA (see Box 1 for ESA Section 10(j) text). These populations are termed "experimental" and must further the conservation of the listed species.

The Endangered Species Act and the implementing regulations require 10(j) populations to follow the listing process (Duncan, per.comm., 2001). Listing requires a proposed rule and a final rule. There is a minimum 30 day comment period on the proposed rule. The proposal must define the geographical area, proposed management, and special rules, re-establishment protocol, and why the population will be considered "essential," or integral to the existence of the species, or "non-essential," or not integral in the existence of the species. The "experimental" population must also be placed in an area where the "experimental individuals" cannot mix with any fully protected individuals.

Non-essential populations outside of national wildlife refuges or national park lands are treated as if they are proposed for listing. This means that federal agencies are under an obligation to confer, as opposed to consult, on any actions authorized, funded, or carried out by them that are likely to jeopardize the continued existence of the species. Nonessential populations located on national wildlife refuges and national park lands are considered threatened, and a formal consultation may be required. Activities on private or tribal lands are not affected unless they are authorized or funded by a federal agency, although take prohibitions may still apply. Because a nonessential experimental population is not essential to the continued existence of the species, no proposed action impacting the designated population could lead to a jeopardy determination for the entire



species. A listed species that is re-established into its historic range without experimental population status receives full protection under the ESA.

A Section 10(j) designation is a difficult and time consuming process, which may not contribute to long-term recovery because the non-essential populations can be purposely eradicated. At the time of this report, there are no essential experimental population designations (Duncan, personal comm., July 2001). The Section 10(j) non-essential designation has been used for species such as the Mexican gray wolf, the black-footed ferret, the Colorado pikeminnow, and several other animals.

Section 10(j) permits have not been designated for endangered or threatened plants, despite many reestablishment projects (McDonald, 1996). Several reasons for this include the small area of most plant re-establishments, plants usually stay within the project area, and endangered plants are not protected on private land (McDonald, 1996). While not presently used, the experimental population designation is available as a management tool for federally protected plant re-establishments.

#### Box 1.1 Endangered Species Act Section 10(j)

Section 10 (j): EXPERIMENTAL POPULATIONS.--(1) For purposes of this subsection, the term "experimental population" means any population (including any offspring arising solely therefrom) authorized by the Secretary for release under paragraph (2), but only when, and at such times as, the population is wholly separate geographically from non-experimental populations on the same species.

(2)(A) The Secretary may authorize the release (and the related transportation) or any population (including eggs, propagules, or individuals) of an endangered species or a threatened species outside the current range of such species if the Secretary determines that such release will further the conservation of such species.

(B) Before authorizing the release of any population under subparagraph (A), the Secretary shall by regulation identify the population and determine, on the basis of the best available information, whether or not such population is essential to the continued existence of an endangered species or a threatened species.

(C) For the purposes of this Act, each member of an experimental population shall be treated as a threatened species; except that--

(i) solely for purposes of section 7 (other than subsection (a)(1) thereof), an experimental population determined under subparagraph (B) to be not essential to the continued existence of a species proposed to be listed under section 4; and

(ii) critical habitat shall not be designated under this Act for any experimental population determined under subparagraph (B) to be not essential to the continued existence of a species.

(3) the Secretary, with respect to populations of endangered species or threatened species that the Secretary authorized, before the date of the enactment of this subsection, for release in geographical areas separate from the other populations of such species, shall determine by regulation which of such populations are an experimental population for the purposes of this subsection and whether or not each is essential to the continued existence of an endangered species or a threatened species.

Endangered Species Act of 1973.

#### Re-establishments and Habitat Conservation Plans (HCPs)

Habitat Conservation Plans (HCP) can be instrumental in contributing to endangered species recovery. If all or most of a species range is covered by an HCP, recovery cannot occur unless the plan contributes to or is consistent with recovery (Hood, 1998). Despite this, HCPs are not required to be consistent with or contribute to recovery. The HCP Handbook states, "Issuance of a Section

10 permit must not “appreciably reduce” the likelihood of the survival and recovery of the species in the wild. Note that this does not explicitly require an HCP to recover listed species or contribute to their recovery objectives outlined in a recovery plan” (USFWS and National Marine Fisheries Science, 1996).

The purpose of the ESA “is to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species” (ESA, Section 2(b)). The term conservation is defined as, “the use of all methods and procedures which are necessary to bring any endangered species or threatened species to the point at which the measures provided pursuant to this Act are no longer necessary.” (ESA, Section 3 (3)). Following the legal mandate set forth in the ESA with species recovery as the main goal, HCPs should be consistent with species recovery (Hood, 1998).

Depending on the species, recovery plans can call for re-establishments in suitable habitat. As mentioned in the previous section, recovery plans are not available for many species listed under the ESA. With no recovery plan available to guide recovery of a species, HCPs should afford better protection for the species, to compensate for inadequate species information. Species re-establishment is one way to promote recovery of a species, as well as assist in the conservation goals of a HCP.

The Sonoran Desert Conservation Plan (SDCP) intends to conserve species above and beyond that legally called for in obtaining a Section 10 permit from the USFWS. As previously mentioned, the biological goal of the SDCP is to ensure the long-term survival of Pima County's indigenous plants and animals. Objectives to reach this goal include promoting the recovery of federally listed and candidate species, re-establishing and recovering species that have been extirpated from the county, maintaining or improving the status of unlisted vulnerable species, and promoting long-term viability for species, environments and biotic communities that have special significance to people due to their aesthetic or cultural values, regional uniqueness, or economic significance (Pima County Administration, 2000).

#### The Safe Harbor Policy

The Safe Harbor policy provides incentives for landowners to restore, enhance, or maintain habitats for listed species. Under the policy, the USFWS will provide the participating property owners with technical assistance to develop a Safe Harbor Agreement that manages habitat for listed threatened or endangered species, and provide assurances that additional land, water, and/or natural resource use restrictions will not be imposed as a result of their conservation actions to benefit covered species (USFWS, 1999). When the landowner meets all the terms of the Agreement, the USFWS will authorize incidental taking of the covered species at a level that enables the landowner to ultimately return the property back to an agreed baseline condition.

The Arizona Department of Transportation has signed a draft Safe Harbor Agreement for the Gila topminnow and desert pupfish. The Safe Harbor Agreement covers State Land controlled by ADOT, including retention basins, water treatment facilities, springs, marshes, streams, and ponds, though the proposal specifically calls for Gila topminnow and desert pupfish to be stocked into a retention basin in the Phoenix area (Sowka, 2000).

## **Conclusion**

The goal of any re-establishment should be to establish a viable, free-ranging population in the wild, of a species, subspecies or race, which has become locally extirpated. It should be re-established within the species' former natural habitat and range and should require minimal long-term effort. While objectives will vary from species to species, they may include: to enhance the long-term survival of a species; to re-establish a keystone species in an ecosystem; to maintain or restore biodiversity, to promote conservation awareness, or a combination of all of the above (IUCN, 1996).

The re-establishment of critically declining species in Pima County shall be an important component of Pima County's conservation and restoration efforts to protect and expand species populations. Pima County has every opportunity to support the re-establishment of plants onto county property, such as the endangered Huachuca water umbel, or even the extirpated screwbean mesquite and arrowweed, and that effort may be helped with the development of the Pima County Plant Nursery. In the case of listed plants not occurring on Pima County property, permits to obtain and propagate the plant would be required from the USFWS. The re-establishment of fish and wildlife species are administered and coordinated by the Arizona Game and Fish Department and Commission. The county, however can propose, support, and assist in the execution of fish and wildlife re-establishment efforts.

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Appendix 1A: Captive Native Fish Populations in Pima County

Appendix 1B: Re-established Populations of Native Fish in Pima County

**Appendix 1A: Captive native fish populations in Pima County**

Locality	Maintaining Party	Water Source	Native Fish
Arizona-Sonora Desert Museum	Ken Wintin, ASDM Heidi Blasius, AGFD	Non-chlorinated well water	bonytail chub, speckled dace, Sonora chub, Gila chub, desert sucker, Yaqui catfish, Gila topminnow, and desert pupfish
International Wildlife Museum	Heidi Blasius, AGFD	Domestic potable water	Gila topminnow and desert pupfish
Flowing Wells Junior High School	Janet Slingerland	Filtered and recycled domestic potable water	desert pupfish
Tohono Chul Park	Lee Mason Jo Falls	Domestic potable water and some stormwater	Gila topminnow, Quitobaquito pupfish and desert pupfish
Arizona Historical Society	Ron Regan	Domestic potable water and small amounts of stormwater	desert pupfish
Palo Verde High School	Heidi Blasius		Gila Topminnow and desert pupfish

**Appendix 1B: Re-established populations of native fish in Pima County**

Common Name	Year	Status	Locality Stocked
Gila topminnow	1936	Not extant	Arivaca Creek
Gila topminnow	1976	Not extant	Apache Canyon, East Fork
Gila topminnow	1982	Not extant	Alambre Tank
Gila topminnow	1982	Not extant	The Lake
Gila topminnow	1982	Not extant	Government Tank
Gila topminnow	1982	Not extant	Buehman Canyon
Gila topminnow	1982	Not extant	Canada del Oro
Gila topminnow	1982	Unknown	Romero Canyon
Gila topminnow	1982	Not extant	Sabino Canyon
Gila topminnow	1982	Extirpated	Yellowstone Tank near Redington Road
Gila topminnow	1982	Extirpated	White Tank #2 near Redington Road
Gila topminnow	1987-Pre	Not extant	Madrona Canyon (Rincon Mountains)
Gila topminnow	1987	Not extant	Rincon
Gila topminnow	1988	Not extant	Little Nogales Spring
Gila topminnow	1988	Not extant	Nogales Spring
Gila topminnow	1960's	Not extant	Williams Spring
desert pupfish	Late 1960's, Early 1970's	Not extant	Blanketship Ranch
desert pupfish	Late 1960's, Early 1970's	Not extant	Bonita Well
desert pupfish	1977	Not extant	Gachado Tank
desert pupfish	1978	Not extant	Bates Well
desert pupfish	1989	Unknown	Buehman Canyon

Sources: USDI, 1993; Weedman and Young, 1997; Weedman, 1998

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## Appendix 2: Arizona Game and Fish 12-Step Re-establishment Process

PROCEDURES FOR  
NONGAME WILDLIFE AND ENDANGERED SPECIES  
RE-ESTABLISHMENT PROJECTS  
IN ARIZONA

Terry B. Johnson and Richard L. Glinski  
Wildlife Management Division, Nongame Branch

Technical Report 13  
Nongame and Endangered Wildlife Program  
Program Chief: Terry B. Johnson  
Arizona Game and Fish Department  
2221 West Greenway Road  
Phoenix, Arizona 85023-4399

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**Procedures for  
Nongame Wildlife and Endangered Species  
Re-establishment Projects**

(Nongame and Endangered Wildlife Program Technical Report 13)

In accordance with an Arizona Game and Fish Commission Policy approved in June 1987, the Arizona Game and Fish Department shall pursue an active program of re-establishing, where appropriate to do so, all species on the Commission's list of Threatened Native Wildlife in Arizona. Such reintroductions shall:

1. generally be restricted to areas within the range of known or probable historical (post-1800) occurrence of each species. Experimental reintroductions outside historic range shall be permitted in accordance with experimental population guidelines in the Endangered Species Act and its rules of implementation and shall require Commission approval.
2. consist of releases of captive-bred and-or wild-caught individuals of as similar a genetic history as possible to the native forms that once occurred in such areas.
3. be made in accordance with the procedures described herein.

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**Schedule of Activities for Proposing  
Nongame Wildlife and Endangered Species  
Re-establishment Projects**

<u>Activities for Project Originators</u>	<u>Function</u>
1. Assess status of species/population available resources.	Determine feasibility of re-establishment project.
2. Complete re-establishment scorecard, submit it to Nongame Branch.	Facilitate priority ranking and preliminary review from programmatic perspective.
-----	
<u>Activities by Nongame Branch</u>	<u>Function</u>
3. Prepare proposal abstract, distribute it and scorecard throughout AGFD.	Elicit broad review of project and of possible conflicts or effects on other programs, projects, etc.
4. Submit briefing memo to AGFC through AGFD Director. No general press release.	Provide AGFC with background on potential project.
5. Review AGFD comments and develop project checklist. Submit summary to AGFD Director.	Identify and address any specific concerns and actions necessary to mitigate them; determine whether to proceed with, or to reject, the project.
6. Solicit comment on project concept from public and appropriate agencies, organizations.	Communicate goals, provide early awareness of intent.
7. Discuss project and public input and AGFD recommendations with AGFC.	Determine appropriate action; terminate project or proceed. Inform public of decision.
8. Prepare re-establishment proposal. Distribute for review inside-outside AGFD and submit to AGFC.	Document specifics of proposed project. Elicit philosophical, technical review.
9. Summarize comment, revise proposal and complete AGFD Environmental Checklist. If necessary, draft Environmental Assessment or Impact Statement.	Ensure NEPA compliance and requisite coordination with existing programs, projects.
10. Submit final draft project proposal for outside review and to AGFC.	Provide for peer, agency and public comment.
11. Summarize comment, review proposal. Submit final project proposal to AGFD Director for action.	Ensure policy review, compliance with procedures and determine final approval or denial of proposal.
12. Notify AGFC and public of decision.	Provide information on decision and notice of project implementation schedule.

**Scorecard for  
 Nongame Wildlife and Endangered Species  
 Re-establishment Project Proposals**

Factors	Scoring Points	Weighting Factors =	Total Score
Historic range in Arizona	1 2 3 4	2	
Historic occurrence in release area	1 2 3 4	2	
Species ranking priority/status	1 2 3 4	2	
Availability of re-establishment stock	1 2 3 4	2	
Major extinction factors	1 2 3 4	2	
Available habitat remaining	1 2 3 4	2	
Competition/Interaction with species	1 2 3 4	1.5	
Expansion potential	1 2 3 4	1.5	
Land ownership conflicts	1 2 3 4	1.5	
Land use conflicts	1 2 3 4	1.5	
Complexity of re-establishment logistics:			
Coordination scoring	1 2 3 4	1.0	—
Access scoring	1 2 3 4	1.0	—
Equipment scoring	1 2 3 4	1.0	—
Site preparation scoring	1 2 3 4	1.0	—
Complexity of monitoring logistics:			
Monitoring duration	1 2 3 4	1.0	
Monitoring objectives	1 2 3 4	1.0	
Monitoring methods	1 2 3 4	1.0	
Species Mobility	1 2 3 4	1.0	
Monitoring access	1 2 3 4	1.0	
Species sensitivity	1 2 3 4	1.0	
Public acceptance	1 2 3 4	1.0	
CUMULATIVE SCORE			=

**Scorecard Narrative for  
Nongame Wildlife and Endangered Species  
Re-establishment Proposals**

Historic Range in Arizona. How well documented and common was the species in Arizona from 1800s through early to mid-1900s?

- Scoring:
1. Species never occurred in Arizona.
  2. Species likely occurred in Arizona, but documented only by vague reports or questionable records, range limits unknown.
  3. Species presence well documented in Arizona, species uncommon, range limits somewhat known.
  4. Species presence well documented in Arizona, species common in preferred habitat, range well defined.

Historic Occurrence in Release Area. How well documented and common was the species in the proposed release area?

- Scoring:
1. Species never documented in release area.
  2. Species likely present in release area, but documented only by vague reports or questionable records.
  3. Species presence well documented in release area, species uncommon.
  4. Species presence well documented in release area, species common.

Species Ranking Priority/Status. State and Federal classification ("Threatened Native Wildlife in Arizona" listing; Federal status relative to Endangered Species Act).

- Scoring:
1. No official classification.
  2. State 1, 2 or 3, Candidate Federal classification.
  3. State 1 or 2, Proposed Federal classification.
  4. State 1 or 2, Federally endangered or threatened.



Scorecard Narrative, continued.

Availability of Re-establishment Stock. This set of criteria relates mainly to availability of stock (pen-reared, captive or wild), and to a lesser degree to the quality of the stock (e.g. genetic variability, condition of stock). It is assumed that all stock is free of disease.

- Scoring:
1. Pen-reared, captive or wild stock seldom available.
  2. Pen-reared or long-term captive stock available.
  3. Captive stock available.
  4. Wild stock readily available and obtainable.

Major Extinction Factors. These factors, which may or may not be known, include events which alone or in concert were largely responsible for the extinction of the species. Examples include extreme conditions of habitat alteration such as persistent chemical contamination and uncontrolled habitat degradation.

- Scoring:
1. Major extinction factors either unknown or still present and uncontrollable.
  2. Extinction factors somewhat known and significantly reduced or probably controllable.
  3. Extinction factors largely known and eliminated or largely controllable.
  4. Extinction factors well known and essentially eliminated.

Available Habitat remaining. Factors include general condition and trend of historic or suitable habitat; presence of critical components (e.g. water, foraging habitat, specific topography, etc.), necessary structure, and proper spatial arrangement; presence of historic habitat or suitable areas where present management may allow species to exist; and the likelihood that remaining habitat is in jeopardy of being eliminated or altered.

- Scoring:
1. Historic or suitable habitat no longer present in Arizona.
  2. Historic or suitable habitat limited to small isolated areas, which are in jeopardy.

Scorecard Narrative, continued.

3. Historic areas somewhat intact or restoration possible near small areas of historic habitats; habitats not presently in jeopardy.
4. Historic habitat is intact or has been restored to historic conditions, and area not likely in jeopardy in foreseeable future.

Competition/Interaction with Introduced or Native Species. Considered here are impacts of floral and faunal changes brought about by exotic introductions or expanding populations of native flora and fauna.

- Scoring:
1. Large, vigorous populations of several exotic or native taxa that directly compete with reestablishment species.
  2. Variable populations of competing exotic and native taxa regularly occupy re-establishment area.
  3. High potential for competing exotic and native taxa to enter area of re-establishment periodically.
  4. No competing exotics or natives in area of proposed reintroductions.

Expansion Potential. This involves the ability for species to inhabit areas around release sites, and to experience an increase in population and distribution. Factors include the distance to, and extent and condition of surrounding habitat that can likely sustain the organism.

- Scoring:
1. No suitable habitat nearby.
  2. Limited area of lower quality habitat within reasonable dispersal distance.
  3. Limited area of good quality habitat nearby.
  4. Large areas of good habitat nearby.

Land Ownership Conflicts. Potential for management of species and habitats is directly related to land ownership; private lands usually afford less management potential than do public lands.

Scorecard Narrative, continued.

- Scoring:
1. Area under private ownership; landowner opposes re-establishment proposal.
  2. Privately or publicly owned release sites where future of area is uncertain.
  3. Private or public owned release sites where future of area is relatively secure.
  4. Privately or publicly owned release sites managed primarily for floral and faunal elements.

Land Use Conflicts. This category is similar to land ownership conflicts, but more specifically addresses present use conflicts as opposed to potential use conflicts that can arise under various ownerships.

- Scoring:
1. Present land use has eliminated a significant amount of habitat, and currently is not compatible with re-establishment efforts.
  2. Present land use has somewhat impacted habitat and species, and current use is not likely to be compatible with re-establishment efforts.
  3. Present land use has not yet impacted habitat, but potential for impact to habitat or species is high since habitat or species is not controlled, and present use is somewhat compatible with re-establishment efforts.
  4. Present land use is favorable for species' survival, land use may be controlled, and present use is compatible with re-establishment efforts.

Complexity of Re-establishment Logistics. Considered here are a combination of various factors, including the amount of coordination required, access to the release area (e.g. wilderness restrictions), special equipment needs (e.g. transport boxes, etc.), and site preparation needs (e.g. hacking). These factors are scored separately below.

Coordination

- Scoring:
1. Much coordination involved with other countries and/or states.
  2. Moderate coordination needed with several agencies and private individuals.

Scorecard Narrative, continued.

3. Little coordination needed with single agency or private owner.
4. Little coordination needed; all capture and release areas owned or managed by Arizona Game and Fish Department.

Access

- Scoring:
1. Capture and release areas very remote.
  2. Capture or release area somewhat remote.
  3. Capture or release area readily accessible.
  4. Capture and release areas readily accessible.

Equipment

- Scoring:
1. Much capture, transport and release equipment needed; equipment expensive and presently not on inventory.
  2. Much special equipment needed; equipment presently on inventory.
  3. Little special equipment/supplies needed; materials on inventory.
  4. No special materials needed; any necessary materials are readily accessible.

Site Preparation

- Scoring:
1. Release site needs major modification or construction of major release-holding facility (permanent enclosure).
  2. Release site needs minor modification or construction of temporary release-holding facility.
  3. Release area needs no modification and minimum, temporary release-holding facility needed.
  4. No site preparation or construction needed.

Scorecard Narrative, continued.

Complexity of Monitoring Logistics. This category relates to ability to monitor re-established individuals successfully. Main factors are duration, objectives and methods of monitoring, mobility of species, and accessibility of area. These factors are scored separately below.

Monitoring Duration

- Scorecard:
1. > 5 years
  2. 3 - 5 years
  3. 1 - 2 years
  4. < 1 year

Monitoring Objectives

- Scorecard:
1. Daily movements, mortality and habitat selection.
  2. Weekly movements, mortality and general habitat selection.
  3. Bi-weekly or monthly movements, mortality, general habitat preferences and home range.
  4. General information on movements, home range and longevity.

Monitoring Methods

- Scorecard:
1. Expensive telemetry equipment, frequent aerial tracking flights and extensive ground tracking.
  2. Expensive telemetry equipment and some aerial tracking flights and frequent ground tracking.
  3. Telemetry equipment or visual markers and frequent ground tracking.
  4. Visual markers and limited ground tracking.

Scorecard Narrative, continued

Species Mobility

- Scorecard:
1. Extensive daily and seasonal movements, species migratory.
  2. Extensive daily and seasonal movements, species resident.
  3. Resident species with limited movements.
  4. Resident species with very limited movements.

Monitoring Access

- Scorecard:
1. Access difficult; rugged terrain with no roads, poor visibility.
  2. Access limited; rugged terrain with few roads, limited visibility.
  3. Access good; moderately rugged terrain with many roads, limited long-range visibility.
  4. Access very good; relatively open, level or rolling terrain with many roads, good long-range visibility.

Species Sensitivity. This category considers how sensitive the species and its habitat are to human intrusion and disturbance; it relates to the species' potential to become more visible to the public.

- Scoring:
1. Species very sensitive and intolerant of disturbance; habit sensitive to disturbance.
  2. Species not secretive, but sensitive to human disturbance; species habitat somewhat fragile.
  3. Species is somewhat sensitive; habitat is not fragile.
  4. Species and habitat are tolerant of human intrusion.

Scorecard Narrative, continued.

Public Acceptance. This category assesses the potential for positive feedback from the public relative to the re-establishment project; it also considers how accessible the species is to humans.

- Scoring:
1. Public unaware of species, species secretive and not accessible to public.
  2. Public slightly aware of species, but not much species appeal or opportunity to experience species.
  3. Public somewhat aware of species, but no public appeal presently; species is accessible to public and species can become appealing if public informed about species.
  4. Public very aware of species, and species has much public appeal; public has ready access to experience species.

**Proposal Abstract for  
Nongame Wildlife and Endangered Species  
Re-establishment Projects**

Project originator  
and affiliation:

\_\_\_\_\_ Date \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Principle investigator  
and affiliation:

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Species \_\_\_\_\_

Status: State \_\_\_\_\_

~~State~~ Federal \_\_\_\_\_

Funding source \_\_\_\_\_ Project cost \_\_\_\_\_

Project duration \_\_\_\_\_

Proposed area(s) of re-establishment:

Land ownership at proposed site:

Summary of need for re-establishment:

Proposed re-establishment strategy: (Technique, time and duration of re-establishment, funding sources, personnel needed, monitoring activity and duration, etc.)



**Checklist for Reviewing  
Nongame Wildlife and Endangered Species  
Re-establishment Projects**

The Checklist topics provided below are to be answered in a narrative that will be used to determine whether or not a project proposal and related documents will be prepared. Additional topics should be identified and addressed as appropriate to the project being considered.

1. Has the re-establishment proposal abstract been reviewed?
2. Are there conflicts with other threatened or endangered species? Which ones?
3. Is the project covered under or at conflict with an existing conservation plan or Federal Aid project? Is a Program Narrative or Project or Job Description needed?
4. Will an AGFD environmental assessment checklist be needed?
5. Is there an existing Environmental Assessment that can be modified to address this project?
6. What State, Federal or other permits are needed?
7. What agencies, individuals, organizations or landowners need to know about this project early in the process?
8. What agencies, individuals, organizations or landowners should be informed later but before final approval or implementation?
9. Will current hunting, fishing, trapping regulations (open areas, seasons, etc.), critical habitat designations, etc. or special closures be affected?
10. Quarantine needs?
11. Are temporary holding facilities needed? Where?
12. What are the data collection needs (measurements, tissues, etc.)?
13. What are personnel needs (FTEs, contract person). Are they available?
14. What Information and Education support is needed?
15. Are there other specific project needs?

**Proposal Format for  
Nongame Wildlife and Endangered Species  
Re-establishment Projects**

A PROPOSAL  
TO RE-ESTABLISH

(name of species)

INTO

(name of proposed re-establishment area)

by

(Author)  
(Title)  
Nongame Branch  
Arizona Game and Fish Department  
2222 West Greenway Road  
Phoenix, Arizona 85023-4399

(Date)

I. Introduction

A. Brief discussion of:

1. Need/Problem
2. Objective (Self-sustaining population target)
3. Approach
4. Location
5. Expected results/benefits
6. Project duration

B. Funding Source(s)

II. Historic Status in State

- A. Population (size and range)
- B. Habitat (extent, location and condition)
- C. Brief life history sketch as relates to status
- D. Historic management activities
  1. Species range-wide (other states)
  2. In Arizona

III. Present Status in State

- A. Population (size and range)
- B. Habitat (extent, location, condition, species expansion potential)
- C. Reasons for decline (man, climate, etc.)
- D. Legal status

IV. Methodology

- A. Areas
  1. Capture
  2. Release
    - a) Within historic range?
    - b) Expansion potential
- B. Capture techniques/equipment/manpower
- C. Transport techniques/equipment/manpower
- D. Release techniques/equipment/manpower
- E. Monitoring techniques/equipment/manpower

IV. continued.

F. Data collection

1. Measurements, tissue, etc.
2. Movements
  - a) Frequency
  - b) Duration

G. Schedule/duration of study

H. Budget

V. Coordination

A. Authority

1. Recovery Plan tasks
2. Interagency Agreements, etc.
3. Status, regulations, policies, etc.

B. Agency roles, responsibilities

C. EA/EIS requirements

D. Public involvement

E. Conflicts/resolutions

VI. Implementation schedule

A. Field activities/schedule

B. Reporting activities/schedule

VII. Management Alternatives

A. No action consequences

B. Proposed project benefits

VIII. Recommendations

### Appendix 3: Arizona Game and Fish Policy Number I1.2



River drainage, the Colorado River Wildlife Council.

Cross-reference: See Commission Policy A2.7.  
See also: RI2-4-311.

## **11.2 Big Game Transplant Procedures**

*Effective: 05-01-1992*

### **Department Policy:**

- A. Sites for proposed reintroduction should be identified, described, and evaluated using established reintroduction criteria (where none exists a narrative will suffice until criteria are established). An excellent example of this procedure is the "*History and Recommended Management for Desert Bighorn Sheep - The Gila Bend Mountains, Maricopa County, Arizona*" by Richard Remington. The Transplant Proposal should include information concerning needed habitat improvements (including predator control), history of the species in this area, present population, expected carrying capacity, and land ownership/management patterns. This step would preferably be completed by the District Wildlife Manager or the Regional Game Specialist, but could be done by any interested person.
- B. Upon review of the Transplant Proposal, and if the reintroduction criteria score merits, the site will be inspected by the Transplant Coordinator. The Transplant Coordinator will be the Game Branch Chief, or designee. If the proposed transplant site appears suitable, it will be placed on a list of potential transplant sites, ranked in order of numerical score.
- C. Written permission from the landowner and/or permittee(s) will be obtained by the Region. There are several "Memoranda of Understanding" on file which can be used as examples to aid in the completion of this procedure. This document(s) will be provided to the Transplant Coordinator for inclusion into the transplant file.
- D. Written permission from the appropriate land management agency, or agencies, will be obtained by the Region. This document(s) will be provided to the Transplant Coordinator for inclusion into the transplant file.
- E. Upon receipt of written permission to release wildlife at the proposed transplant site, the necessary environmental assessments will be initiated. A current Environmental Assessment Checklist must be completed for each proposed transplant site. The Transplant Proposal should accompany the Checklist through the Department to provide necessary information regarding location, species, numbers of animals to be released, potential



diseases, and planned monitoring for use by those individuals responsible for completing portions of the Checklist. The Environmental Assessment Checklist will be initiated by the Region and forwarded to the Transplant Coordinator for completion in Phoenix. Upon completion, the Checklist will be placed in the transplant file.

- F. When a capture and/or a release site is located within Arizona, preliminary capture and release plans will be developed by the appropriate Regional Game Specialists. In the case of out-of-state captures or releases, the Transplant Coordinator will prepare the plans for that portion of the project occurring outside of Arizona.
- G. The Transplant Coordinator will present the prioritized transplant list (with estimates of the number of animals to be transplanted, the equipment and personnel needed, the cost, and the funding base) to the Executive Staff for their approval and inclusion into Federal Aid and other Department programs. Out-of-state transplants will require the approval of the Commission. For approved transplants, the Transplant Coordinator will be responsible for completing the appropriate Federal Aid documentation, which must be done by April to be included in the approved Jobs for that year.
- H. Affected land management agencies will be notified in writing by the Transplant Coordinator three months prior to the transplant. This notification will include estimates of dates, numbers of animals, locations, etc.
- I. Operational capture and release plans will be developed by the appropriate Regional Game Specialist(s). Due to the commitment of manpower and equipment, these documents must be signed by the appropriate Regional Supervisors. These documents (of which numerous examples are on file) will include, but are not limited to, manpower and equipment lists, training and equipment familiarization, capture methods, coordination of helicopter services, transportation, release technique and site preparation, post-release monitoring plans, coordination of volunteers, data recording at capture and release, specific personnel assignments, disease screening and medical treatment, alternative plans, and notification of the Information and Education Assistant Director. These plans will be submitted through the Assistant Director for Field Operations to the Transplant Coordinator for approval 30 days prior to the scheduled transplant.
- J. The Regional Game Specialist(s) will notify by mail the appropriate land management agencies, Department and volunteer personnel, and landowner/permittee 30 days prior to the transplant.

Copies of this notification will be provided to the Transplant Coordinator for inclusion into the transplant file.

- K. Notification of the State Veterinarian must be made by the Transplant Coordinator 45 days prior to the transplant.
- L. **Transplant.** At the capture site, field assignments, pre-capture briefing, capture, restraint, and handling will be the responsibility of the capture Regional Game Specialist, or the Transplant Coordinator if an out-of-state transplant. The transport plan, loading of the transport vehicle, personnel assignments, monitoring of animals, the release plan, actual release, and data distribution will be the responsibility of the release Regional Game Specialist, or the Transplant Coordinator if an out-of-state transplant.
- M. The implementation of the post-release monitoring plan will be the responsibility of the Region.
- N. The results of the transplants will be documented in the appropriate Federal Aid reports. These reporting requirements will be the responsibility of the author(s) of the Transplant Proposal and will be approved by the Transplant Coordinator. The presentation of results of the transplant efforts in various technical papers or symposiums by the author(s) of the Transplant Proposal will be encouraged. Information and Education follow-ups will be at the discretion of the Information and Education Assistant Director.

## Appendix 4: IUCN's Guidelines for Re-introductions





## Species Survival Commission



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# IUCN/SSC Guidelines For Re-Introductions

Prepared by the SSC Re-introduction Specialist Group \*

Approved by the 41st Meeting of the IUCN Council, Gland Switzerland, May 1995

## INTRODUCTION

These policy guidelines have been drafted by the Re-introduction Specialist Group of the IUCN's Species Survival Commission (1), in response to the increasing occurrence of re-introduction projects worldwide, and consequently, to the growing need for specific policy guidelines to help ensure that the re-introductions achieve their intended conservation benefit, and do not cause adverse side-effects of greater impact. Although IUCN developed a Position Statement on the Translocation of Living Organisms in 1987, more detailed guidelines were felt to be essential in providing more comprehensive coverage of the various factors involved in re-introduction exercises.

These guidelines are intended to act as a guide for procedures useful to re-introduction programmes and do not represent an inflexible code of conduct. Many of the points are more relevant to re-introductions using captive-bred individuals than to translocations of wild species. Others are especially relevant to globally endangered species with limited numbers of founders. Each re-introduction proposal should be rigorously reviewed on its individual merits. It should be noted that re-introduction is always a very lengthy, complex and expensive process.

Re-introductions or translocations of species for short-term, sporting or commercial purposes - where there is no intention to establish a viable population - are a different issue and beyond the scope of these guidelines. These include fishing and hunting activities.

This document has been written to encompass the full range of plant and animal taxa and is therefore general. It will be regularly revised. Handbooks for re-introducing individual groups of animals and plants will be developed in future.

## CONTEXT

The increasing number of re-introductions and translocations led to the establishment of the IUCN/SSC Species Survival Commission's Re-introduction Specialist Group. A priority of the Group has been to update IUCN's 1987 Position Statement on the Translocation of Living Organisms, in consultation with IUCN's other commissions.

It is important that the Guidelines are implemented in the context of IUCN's broader policies pertaining to biodiversity conservation and sustainable management of natural resources. The philosophy for environmental conservation and management of IUCN and other conservation bodies is stated in key documents such as "Caring for the Earth" and "Global Biodiversity Strategy" which cover the broad themes of the need for approaches with community involvement and participation in sustainable natural resource conservation, an overall enhanced quality of human life and the need to conserve and, where necessary, restore ecosystems. With regards to the latter, the re-introduction of a species is one specific instance of restoration where, in general, only this species is missing. Full restoration of an array of plant and animal species has rarely been tried to date.

Restoration of single species of plants and animals is becoming more frequent around the world. Some succeed, many fail. As this form of ecological management is increasingly common, it is a priority for the

Species Survival Commission's Re-introduction Specialist Group to develop guidelines so that re-introductions are both justifiable and likely to succeed, and that the conservation world can learn from each initiative, whether successful or not. It is hoped that these Guidelines, based on extensive review of case - histories and wide consultation across a range of disciplines will introduce more rigour into the concepts, design, feasibility and implementation of re-introductions despite the wide diversity of species and conditions involved.

Thus the priority has been to develop guidelines that are of direct, practical assistance to those planning, approving or carrying out re-introductions. The primary audience of these guidelines is, therefore, the practitioners (usually managers or scientists), rather than decision makers in governments. Guidelines directed towards the latter group would inevitably have to go into greater depth on legal and policy issues.

## 1. DEFINITION OF TERMS

**"Re-introduction"**: an attempt to establish a species<sup>(2)</sup> in an area which was once part of its historical range, but from which it has been extirpated or become extinct <sup>(3)</sup> ("Re-establishment" is a synonym, but implies that the re-introduction has been successful).

**"Translocation"**: deliberate and mediated movement of wild individuals or populations from one part of their range to another.

**"Re-inforcement/Supplementation"**: addition of individuals to an existing population of conspecifics.

**"Conservation/Benign Introductions"**: an attempt to establish a species, for the purpose of conservation, outside its recorded distribution but within an appropriate habitat and eco-geographical area. This is a feasible conservation tool only when there is no remaining area left within a species' historic range.

## 2. AIMS AND OBJECTIVES OF RE-INTRODUCTION

### a. Aims:

The principle aim of any re-introduction should be to establish a viable, free-ranging population in the wild, of a species, subspecies or race, which has become globally or locally extinct, or extirpated, in the wild. It should be re-introduced within the species' former natural habitat and range and should require minimal long-term management.

### b. Objectives:

The objectives of a re-introduction may include: to enhance the long-term survival of a species; to re-establish a keystone species (in the ecological or cultural sense) in an ecosystem; to maintain and/or restore natural biodiversity; to provide long-term economic benefits to the local and/or national economy; to promote conservation awareness; or a combination of these.

## 3. MULTIDISCIPLINARY APPROACH

A re-introduction requires a multidisciplinary approach involving a team of persons drawn from a variety of backgrounds. As well as government personnel, they may include persons from governmental natural resource management agencies; non-governmental organisations; funding bodies; universities; veterinary institutions; zoos (and private animal breeders) and/or botanic gardens, with a full range of suitable expertise. Team leaders should be responsible for coordination between the various bodies and provision should be made for publicity and public education about the project.

## 4. PRE-PROJECT ACTIVITIES

### 4a. BIOLOGICAL

**(i) Feasibility study and background research**

- An assessment should be made of the taxonomic status of individuals to be re-introduced. They should preferably be of the same subspecies or race as those which were extirpated, unless adequate numbers are not available. An investigation of historical information about the loss and fate of individuals from the re-introduction area, as well as molecular genetic studies, should be undertaken in case of doubt as to individuals' taxonomic status. A study of genetic variation within and between populations of this and related taxa can also be helpful. Special care is needed when the population has long been extinct.
- Detailed studies should be made of the status and biology of wild populations (if they exist) to determine the species' critical needs. For animals, this would include descriptions of habitat preferences, intraspecific variation and adaptations to local ecological conditions, social behaviour, group composition, home range size, shelter and food requirements, foraging and feeding behaviour, predators and diseases. For migratory species, studies should include the potential migratory areas. For plants, it would include biotic and abiotic habitat requirements, dispersal mechanisms, reproductive biology, symbiotic relationships (e.g. with mycorrhizae, pollinators), insect pests and diseases. Overall, a firm knowledge of the natural history of the species in question is crucial to the entire re-introduction scheme.
- The species, if any, that has filled the void created by the loss of the species concerned, should be determined; an understanding of the effect the re-introduced species will have on the ecosystem is important for ascertaining the success of the re-introduced population.
- The build-up of the released population should be modelled under various sets of conditions, in order to specify the optimal number and composition of individuals to be released per year and the numbers of years necessary to promote establishment of a viable population.
- A Population and Habitat Viability Analysis will aid in identifying significant environmental and population variables and assessing their potential interactions, which would guide long-term population management.

**(ii) Previous Re-introductions**

- Thorough research into previous re-introductions of the same or similar species and wide-ranging contacts with persons having relevant expertise should be conducted prior to and while developing re-introduction protocol.

**(iii) Choice of release site and type**

- Site should be within the historic range of the species. For an initial re-inforcement there should be few remnant wild individuals. For a re-introduction, there should be no remnant population to prevent disease spread, social disruption and introduction of alien genes. In some circumstances, a re-introduction or re-inforcement may have to be made into an area which is fenced or otherwise delimited, but it should be within the species' former natural habitat and range.
- A conservation/ benign introduction should be undertaken only as a last resort when no opportunities for re-introduction into the original site or range exist and only when a significant contribution to the conservation of the species will result.
- The re-introduction area should have assured, long-term protection (whether formal or otherwise).

**(iv) Evaluation of re-introduction site**

- Availability of suitable habitat: re-introductions should only take place where the habitat and landscape requirements of the species are satisfied, and likely to be sustained for the foreseeable future. The possibility of natural habitat change since extirpation must be considered. Likewise, a change in the legal/ political or cultural environment since species extirpation needs to be ascertained and evaluated as a possible constraint. The area should have sufficient carrying capacity to sustain growth of the re-introduced population and support a viable (self-sustaining) population in the long run.

- Identification and elimination, or reduction to a sufficient level, of previous causes of decline: could include disease; over-hunting; over-collection; pollution; poisoning; competition with or predation by introduced species; habitat loss; adverse effects of earlier research or management programmes; competition with domestic livestock, which may be seasonal. Where the release site has undergone substantial degradation caused by human activity, a habitat restoration programme should be initiated before the re-introduction is carried out.

#### **(v) Availability of suitable release stock**

- It is desirable that source animals come from wild populations. If there is a choice of wild populations to supply founder stock for translocation, the source population should ideally be closely related genetically to the original native stock and show similar ecological characteristics (morphology, physiology, behaviour, habitat preference) to the original sub-population.
- Removal of individuals for re-introduction must not endanger the captive stock population or the wild source population. Stock must be guaranteed available on a regular and predictable basis, meeting specifications of the project protocol.
- Individuals should only be removed from a wild population after the effects of translocation on the donor population have been assessed, and after it is guaranteed that these effects will not be negative.
- If captive or artificially propagated stock is to be used, it must be from a population which has been soundly managed both demographically and genetically, according to the principles of contemporary conservation biology.
- Re-introductions should not be carried out merely because captive stocks exist, nor solely as a means of disposing of surplus stock.
- Prospective release stock, including stock that is a gift between governments, must be subjected to a thorough veterinary screening process before shipment from original source. Any animals found to be infected or which test positive for non-endemic or contagious pathogens with a potential impact on population levels, must be removed from the consignment, and the uninfected, negative remainder must be placed in strict quarantine for a suitable period before retest. If clear after retesting, the animals may be placed for shipment.
- Since infection with serious disease can be acquired during shipment, especially if this is intercontinental, great care must be taken to minimize this risk.
- Stock must meet all health regulations prescribed by the veterinary authorities of the recipient country and adequate provisions must be made for quarantine if necessary.

#### **(vi) Release of captive stock**

- Most species of mammal and birds rely heavily on individual experience and learning as juveniles for their survival; they should be given the opportunity to acquire the necessary information to enable survival in the wild, through training in their captive environment; a captive bred individual's probability of survival should approximate that of a wild counterpart.
- Care should be taken to ensure that potentially dangerous captive bred animals (such as large carnivores or primates) are not so confident in the presence of humans that they might be a danger to local inhabitants and/or their livestock.

### **4b. SOCIO-ECONOMIC AND LEGAL REQUIREMENTS**

- Re-introductions are generally long-term projects that require the commitment of long-term financial and political support.
- Socio-economic studies should be made to assess impacts, costs and benefits of the re-introduction programme to local human populations.
- A thorough assessment of attitudes of local people to the proposed project is necessary to ensure long term protection of the re-introduced population, especially if the cause of species' decline was

due to human factors (e.g. over-hunting, over-collection, loss or alteration of habitat). The programme should be fully understood, accepted and supported by local communities.

- Where the security of the re-introduced population is at risk from human activities, measures should be taken to minimise these in the re-introduction area. If these measures are inadequate, the re-introduction should be abandoned or alternative release areas sought.
- The policy of the country to re-introductions and to the species concerned should be assessed. This might include checking existing provincial, national and international legislation and regulations, and provision of new measures and required permits as necessary.
- Re-introduction must take place with the full permission and involvement of all relevant government agencies of the recipient or host country. This is particularly important in re-introductions in border areas, or involving more than one state or when a re-introduced population can expand into other states, provinces or territories.
- If the species poses potential risk to life or property, these risks should be minimised and adequate provision made for compensation where necessary; where all other solutions fail, removal or destruction of the released individual should be considered. In the case of migratory/mobile species, provisions should be made for crossing of international/state boundaries.

## 5. PLANNING, PREPARATION AND RELEASE STAGES

- Approval of relevant government agencies and land owners, and coordination with national and international conservation organizations.
- Construction of a multidisciplinary team with access to expert technical advice for all phases of the programme.
- Identification of short- and long-term success indicators and prediction of programme duration, in context of agreed aims and objectives.
- Securing adequate funding for all programme phases.
- Design of pre- and post- release monitoring programme so that each re-introduction is a carefully designed experiment, with the capability to test methodology with scientifically collected data. Monitoring the health of individuals, as well as the survival, is important; intervention may be necessary if the situation proves unforeseeably favourable.
- Appropriate health and genetic screening of release stock, including stock that is a gift between governments. Health screening of closely related species in the re-introduction area.
- If release stock is wild-caught, care must be taken to ensure that: a) the stock is free from infectious or contagious pathogens and parasites before shipment and b) the stock will not be exposed to vectors of disease agents which may be present at the release site (and absent at the source site) and to which it may have no acquired immunity.
- If vaccination prior to release, against local endemic or epidemic diseases of wild stock or domestic livestock at the release site, is deemed appropriate, this must be carried out during the "Preparation Stage" so as to allow sufficient time for the development of the required immunity.
- Appropriate veterinary or horticultural measures as required to ensure health of released stock throughout the programme. This is to include adequate quarantine arrangements, especially where founder stock travels far or crosses international boundaries to the release site.
- Development of transport plans for delivery of stock to the country and site of re-introduction, with special emphasis on ways to minimize stress on the individuals during transport.
- Determination of release strategy (acclimatization of release stock to release area; behavioural training - including hunting and feeding; group composition, number, release patterns and techniques; timing).
- Establishment of policies on interventions (see below).
- Development of conservation education for long-term support; professional training of individuals involved in the long-term programme; public relations through the mass media and in local community; involvement where possible of local people in the programme.
- The welfare of animals for release is of paramount concern through all these stages.

## 6. POST-RELEASE ACTIVITIES

- Post release monitoring is required of all (or sample of) individuals. This most vital aspect may be by direct (e.g. tagging, telemetry) or indirect (e.g. spoor, informants) methods as suitable.
- Demographic, ecological and behavioural studies of released stock must be undertaken.
- Study of processes of long-term adaptation by individuals and the population.
- Collection and investigation of mortalities.
- Interventions (e.g. supplemental feeding; veterinary aid; horticultural aid) when necessary.
- Decisions for revision, rescheduling, or discontinuation of programme where necessary.
- Habitat protection or restoration to continue where necessary.
- Continuing public relations activities, including education and mass media coverage.
- Evaluation of cost-effectiveness and success of re-introduction techniques.
- Regular publications in scientific and popular literature.

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### Footnotes:

1 Guidelines for determining procedures for disposal of species confiscated in trade are being developed separately by IUCN.

2 The taxonomic unit referred to throughout the document is species; it may be a lower taxonomic unit (e.g. subspecies or race) as long as it can be unambiguously defined.

3 A taxon is extinct when there is no reasonable doubt that the last individual has died

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The IUCN/SSC Re-introduction Specialist Group (RSG) is a disciplinary group (as opposed to most SSC Specialist Groups which deal with single taxonomic groups), covering a wide range of plant and animal species. The RSG has an extensive international network, a re-introduction projects database and re-introduction library. The RSG publishes a bi-annual newsletter RE-INTRODUCTION NEWS.

If you are a re-introduction practitioner or interested in re-introductions please contact:

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