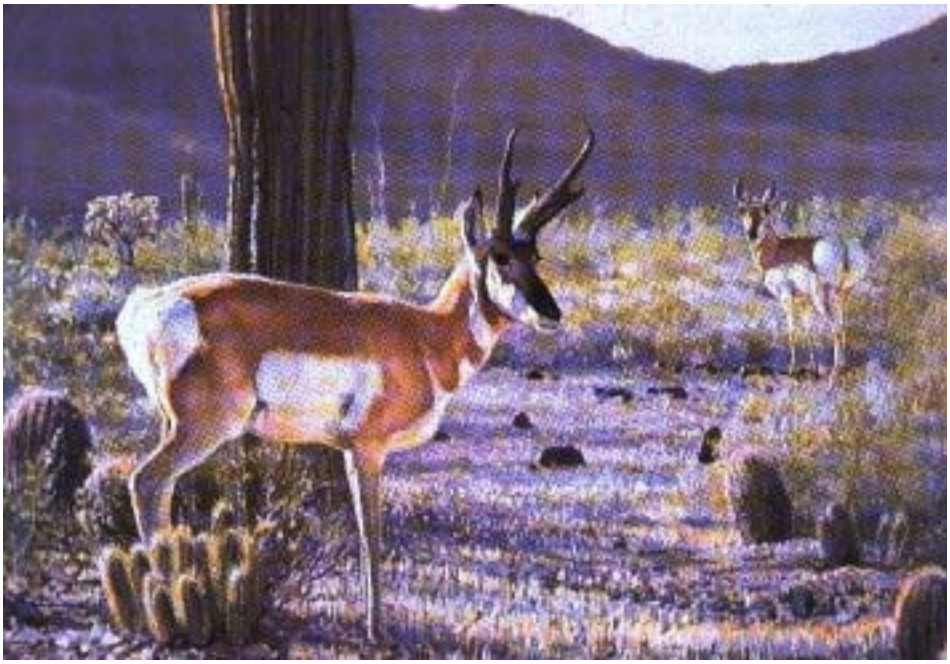
U.S. Fish & Wildlife Service

Recovery Criteria and Estimates of Time for Recovery Actions for the Sonoran Pronghorn:

A Supplement and Amendment to the Final Revised Sonoran Pronghorn Recovery Plan



January 2002

RECOVERY CRITERIA
AND
ESTIMATES OF TIME FOR RECOVERY ACTIONS
FOR THE SONORAN PRONGHORN

A Supplement and Amendment to the
1998 Final Revised Sonoran Pronghorn Recovery Plan

U.S. Fish and Wildlife Service
Region 2, Albuquerque, New Mexico

Approved: H Dale Hall
Regional Director, U.S. Fish and Wildlife Service

Date: 1/11/02

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Literature citations should read as follows:

U.S. Fish and Wildlife Service. 2003. Supplement and Amendment to the 1998 Final Revised Sonoran Pronghorn Recovery Plan (*Antilocapra americana sonoriensis*). U.S. DOI Fish and Wildlife Service, Albuquerque, New Mexico. i-iv + 60pp., A1-3, B1-30, C1-8.

Additional copies may be purchased from:
Fish and Wildlife Reference Service
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ACRONYMS AND ABBREVIATIONS

ADOT	Arizona Department of Transportation
AGFD	Arizona Game and Fish Department
BEC	Barry M. Goldwater Executive Council
BLM	Bureau of Land Management
BMGR	Barry M. Goldwater Range
Court	U. S. District Court
CPNWR	Cabeza Prieta National Wildlife Refuge
El Pinacate	El Pinacate y Gran Desierto de Altar Biosphere Reserve
EHD	Epizootic Hemorrhagic Disease
EOD	Explosive Ordnance Disposal
ESA	Endangered Species Act
FWS	U.S. Fish and Wildlife Service
IMADES	Instituto del Medio Ambiente y el Desarrollo Sustentable de Estatio de Sonora
MCWRU	Montana Cooperative Wildlife Research Unit
NPS	National Park Service
OPCNM	Organ Pipe Cactus National Monument
PVA	Population Viability Analysis
Recovery Plan	Final Revised Sonoran Pronghorn Recovery Plan
RT	Recovery Team
UA	University of Arizona
UDM	Undocumented Migrant
USAF	U. S. Air Force
USBP	U. S. Border Patrol
USFWS	U. S. Fish and Wildlife Service
USMC	U. S. Marine Corps
WTI	Weapons and Tactics Instructor Course

EXECUTIVE SUMMARY

This document supplements and amends the Final Revised Sonoran Pronghorn Recovery Plan (Recovery Plan) (USFWS 1998) in response to a court-ordered remand (Federal District Court, Washington, D.C., 12 April 2001) to the U.S. Fish and Wildlife Service (USFWS) to reassess and incorporate Sonoran pronghorn (*Antilocapra americana sonoriensis*) recovery criteria and to incorporate objective measurable criteria for the delisting of the pronghorn, and provide estimates of time required to carry out those measures needed to achieve the plan's goal and intermediate steps toward that goal. This amendment updates selected sections of the Recovery Plan to ensure that the best and most current data available are considered. Accordingly, updates on recent Sonoran pronghorn population surveys in the United States and Mexico, mortality investigations, disease testing, and the effects of military overflights on behavior and hearing are presented.

In addition, the discussion of recovery criteria is prefaced by an assessment of the five factors that must be considered when determining if a species meets the requirements for listing as threatened or endangered under the Endangered Species Act (ESA) of 1973. The Sonoran pronghorn was initially designated endangered in 1967 under the Endangered Species Preservation Act of 1966. The subspecies was "grandfathered" in under the ESA, and as a consequence, formal listing factors were never established. The five factors described in section 4(a)(1) of the ESA are: 1) the present or threatened destruction, modification, or curtailment of its habitat or range; 2) overutilization for commercial, sporting, scientific, or educational

purposes; 3) disease or predation; 4) the inadequacy of existing regulatory mechanisms; and 5) other natural or manmade factors affecting its continued existence. A discussion of the five factors is presented in this amendment to the Recovery Plan.

Also, recovery criteria established in the Recovery Plan for downlisting/delisting are reassessed and discussed. The criteria for downlisting remain valid and achievable. Specified recovery efforts are applied to the appropriate listing factors outlined on page 22 of the Court Order. The USFWS believes these recovery efforts will in the short-term lead to downlisting the Sonoran pronghorn from endangered to threatened, and in the long-term, will contribute to the delisting of the species.

Finally, the implementation table presented in the Recovery Plan is expanded to include a breakdown of all recovery actions. The table has been updated to provide estimates of time necessary to carry out measures needed to effect recovery of Sonoran pronghorn as articulated in the Recovery Plan.

INTRODUCTION

In response to a lawsuit by the Defenders of Wildlife, et al., (Civil Action No. 99-927 [ESH]), Judge Ellen Huvelle of the United States District Court (Court) for the District of Columbia issued a Memorandum Opinion and Order on February 12, 2001 that ruled (in part):

> "...that the Fish and Wildlife Service has acted in a manner that is arbitrary and capricious and contrary to law by issuing a Recovery Plan that fails to establish (1) objective measurable criteria, which, when met, would result in a determination that the pronghorn may be removed from the list of endangered species or, if such criteria are not practicable, an explanation of that conclusion and (2) estimates of the time required to carry out those measures needed to achieve the plan's goal and to achieve intermediate steps toward that goal where practicable, or, if such estimates are not practicable, an explanation of that conclusion."

The Order also stated:

> "... this matter is remanded to the Fish and Wildlife Service, which has 120 days from the date of this Order to reconsider those portions of the December 1998 Final Revised Sonoran Pronghorn Recovery Plan that have been found to be contrary to the dictates of the Endangered Species Act."

On April 12, 2001, the deadline for completion of this task was extended by the Court to November 16, 2001. On September 6, 2001, the Court extended the deadline to November 30, 2001 to allow for a full 60-day public review period. On October 22, 2001, the Court granted Defendant's motion for additional time to ensure public comments were adequately considered and addressed in the Final Supplement and Amendment and set a new deadline of January 15, 2002.

Additional data on various aspects of Sonoran pronghorn (*Antilocapra americana sonoriensis*) biology have been collected since completion of the Final Revised Sonoran Pronghorn Recovery Plan (Recovery Plan) (U. S. Fish and Wildlife Service [USFWS] 1998). Accordingly, the objectives of this supplement and amendment are to: 1) update selected sections of the Recovery Plan (USFWS 1998) to ensure that the best and most current data available are considered; 2) address the five listing/"delisting" factors mandated by the Endangered Species Act (ESA); 3) reassess recovery criteria presented in the Recovery Plan (USFWS 1998) in relation to these five factors; and 4) where practicable, provide estimates of time necessary to carry out measures needed to effect recovery of Sonoran pronghorn as articulated in the Recovery Plan (USFWS 1998).

1. Sonoran Pronghorn Biology Update

U. S. population surveys - Sonoran pronghorn in the U. S. were surveyed biennially from 1992 to 2000 (Bright et al. 1999; J. L. Bright et al., Arizona Game and Fish Department [AGFD] unpubl. data) by the AGFD and cooperating Federal land management agencies using aerial line transects (Johnson et al. 1991). The AGFD derived population estimates using three estimators: DISTANCE, Lincoln-Peterson Index, and a sightability model. From 1992 to 1996, DISTANCE (Laake et al. 1993), a computer software statistical program, was used to estimate population based on density. However, the coefficient of variation was unacceptably high, and an alternative estimator was sought (Bright et al. 1999). From 1996 to 1998, the agencies used the Lincoln-Peterson Index, a mark-and-recapture method, as a population estimator (Davis and

Winstead 1980). This technique is biased towards larger groups of animals and overestimates populations (McCullough and Hirth 1988, Estes and Jameson 1988). In 1998, a group size adjusted estimator (i.e., sightability model) (Samuel and Pollock 1981) was used to correct for inherent bias in the Lincoln-Peterson Index (Bright et al. 1999). This involved calculating sighting rates by group size using Sonoran pronghorn groups with radiocollared animals that were observed or missed during previous surveys. This estimator corrects for group size bias and is more conservative than the Lincoln-Peterson Index (Bright et al. 1999). Furthermore, the low coefficient of variation for the sightability model suggests it is a more precise descriptor of the relationship between group size and observation rate. For these reasons, the sightability model is the better estimator of the three used and is the current method of choice for calculating Sonoran pronghorn population size. Population estimates were subsequently calculated for all survey years, 1992-2000, using the sightability model (Bright et al. 1999; J. L. Bright et al., AGFD, unpubl. data) (Table 1).

Table 1. Comparison of U.S. Sonoran pronghorn population surveys, 1992-2000.

	Pronghorn observed		Population estimate		
Date	On transect	Total observed	Density estimate using DISTANCE (95% CI)	Lincoln-Petersen (95% CI)	Sightability model (95% CI)
Dec 1992	99	121	246 (103-584)	n/a	179 (145-234)
Mar 1994	100	109	184 (100-334)	n/a	282 (205-489)
Dec 1996	71	82 (95[1])	216 (82-579)	164 (4-324)	130 (114-154)
Dec 1998	74	86 (98[1])	n/a	172 (23-321)	142 (125-167)
Dec 2000	67	69[1]	n/a	n/a	99 (69-392)

[1] including animals missed on survey, but located using radiotelemetry.

With the exception of 1994, the sightability model shows a general downward population trend from 1992 to 2000. The 1994 estimate may be inflated due to inconsistent survey timing. The decline in numbers from 1992 to 2000 is supported by other survey data including high adult mortality, low fawn survival and recruitment, and smaller average herd sizes (J. J. Hervert, AGFD, unpubl. data).

Mexico population surveys - Suitable habitat within the current known range of Sonoran pronghorn in Mexico was surveyed in March 1993 (Snow 1994) and December 2000 (J. L. Bright et al., AGFD, unpubl. data). Population estimates for both years were determined using the sightability model (Bright et al. 1999) (Table 2).

Table 2. Comparison of Sonoran pronghorn surveys in Mexico, 1993 and 2000.

	Total number of pronghorn seen	Sightability model (95% CI)
March 1993		
Southeast of Highway 8	163	289 (226-432)
West of Highway 8	51	124 (91-211)
Total	214	414 (317-644)
December 2000		
Southeast of Highway 8	249	311 (261-397)
West of Highway 8	17	34 (27-48)
Total	266	346 (288-445)

Sonoran pronghorn in Mexico declined approximately 16% (not statistically significant based on overlapping confidence intervals) from 1993 to 2000. This apparent decrease was not experienced equally across pronghorn range. Sonoran pronghorn habitat in Mexico is bisected by Highway 8 (J. L. Bright et al., AGFD, unpubl. data; Figure 1). It is unknown how complete a barrier Highway 8 is to pronghorn movements. In July 1996, a male pronghorn was found dead on the highway. In addition, anecdotal reports of pronghorn crossing this road are occasionally received from travelers to and from Puerto Peñasco (J. Bright, AGFD, pers. comm.). Conversely, no radiocollared pronghorn were known to cross the road during a study conducted in the 1990s (R. Paredes, Instituto del Medio Ambiente y el Desarrollo Sustentable de Estatio de

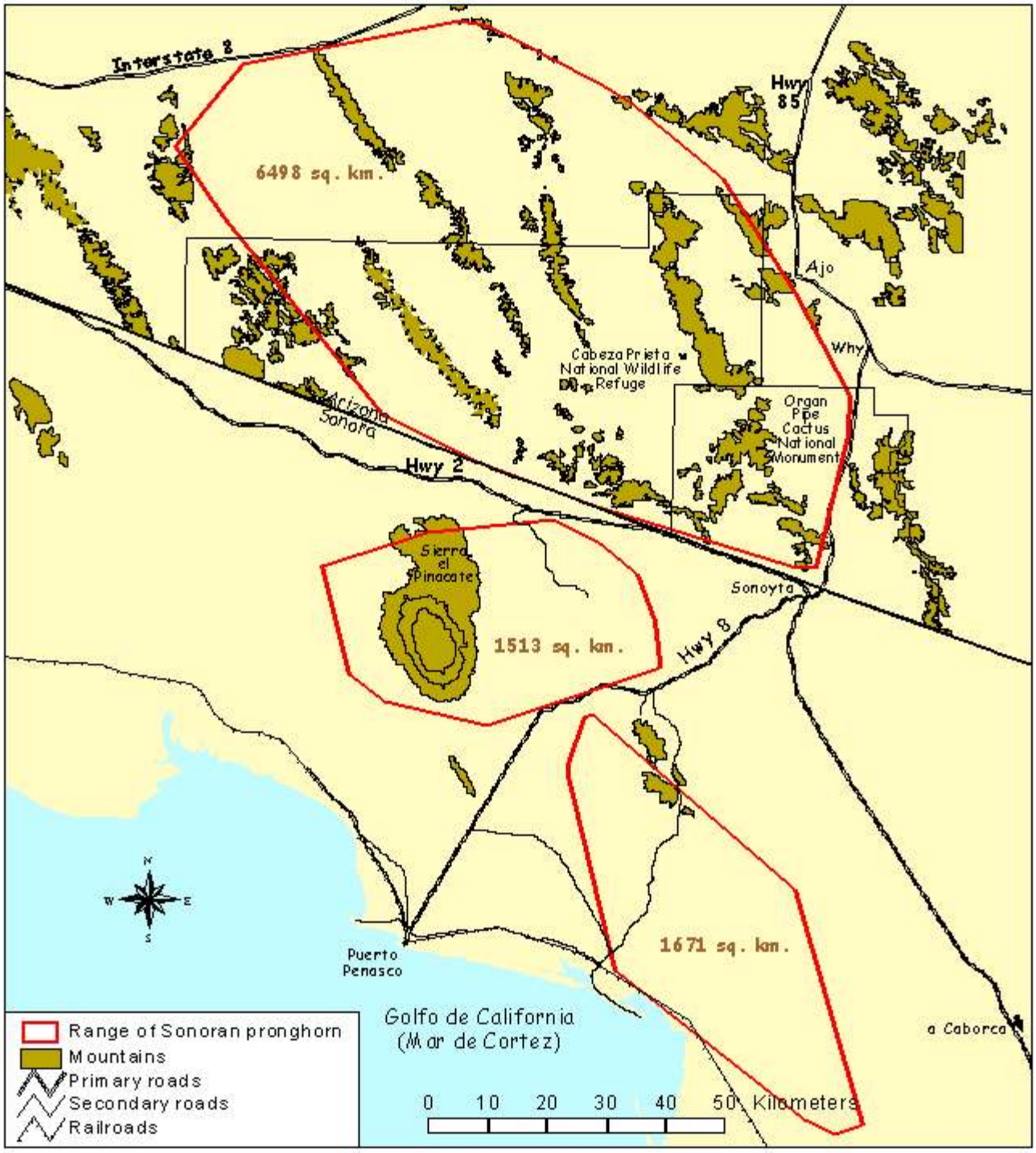

Figure 1. Current occupied range of the Sonoran pronghorn in Arizona and Sonora, Mexico.

Sonora [IMADES], pers. comm.). The subpopulation southeast of Highway 8 remained stable or even increased slightly between 1993 and 2000. Forage conditions in 2000 were better in this area than the rest of Sonoran pronghorn range in Mexico and the U.S. (J. L. Bright et al., AGFD, unpubl. data). The subpopulation west of Highway 8 ranges throughout pronghorn habitat on the El Pinacate y Gran Desierto de Altar Biosphere Reserve (El Pinacate) and surrounding buffer areas, and is adjacent to the U.S. subpopulation (Figure 1). Mexico Highway 2 (and to a lesser extent the international boundary fence) acts as a barrier to movement between the El Pinacate and U.S. subpopulations. The El Pinacate subpopulation declined significantly (based on non-overlapping confidence intervals) between 1993 and 2000 (Table 2). Recurring drought and associated poor forage conditions, likely exacerbated by extensive livestock grazing, may have figured prominently in the significant decline observed in the El Pinacate subpopulation. Loss of the El Pinacate subpopulation would result in further fragmentation and isolation of the remaining Sonoran pronghorn subpopulations in the U.S. and Mexico.

Mexican biologists from IMADES and El Pinacate are active members of the Sonoran pronghorn recovery team. Survey results and management issues in Mexico are closely coordinated with their U.S. counterparts. Pronghorn status and recovery options in the U.S. cannot be fully addressed without some consideration of pronghorn status in Mexico. For example, loss of the U.S. subpopulation can not be rationalized as acceptable simply because two subpopulations remain extant in Mexico and a reintroduction from Mexico to the U.S. is a perceived option. The Sonoran pronghorn is classified as endangered by the Mexican government (R. Paredes,

IMADES, pers. comm.) and the future of Mexico's two subpopulations is far from secure. Herd status and habitat conditions are not monitored in Mexico as closely as they are in the U.S.. Sonoran pronghorn habitat southeast of Mexico Highway 8 is privately owned and while current numbers appear stable (Table 2), livestock grazing and poaching (R. Paredes, IMADES, pers. comm.) need to be considered for the long-term health and stability of this subpopulation. In addition, this area is threatened by encroachment from agriculture and residential developments, and fragmentation from mining and road building (J. J. Hervert, AGFD, pers. comm.).

Pronghorn mortalities - Thirty-five adult Sonoran pronghorn have been captured and radio-collared since 1994; 22 in 1994, nine in 1997/98, and four in 2000. Twenty-two of the 35 collared animals (63%) have since died. Four additional uncollared adult mortalities were documented during this same period (Hervert et al. 2000; AGFD files, Region IV, Yuma, Arizona; Cabeza Prieta National Wildlife Refuge [CPNWR] files, Ajo, Arizona).

Five pronghorn captured in 1994 died within 1-33 days post-capture. Three of these mortalities were from unknown causes, while two appeared predator-related (mountain lion [*Puma concolor*] and coyote [*Canis latrans*]). Since it is unusual to have this many animals die within 40 days post-capture, the direct or indirect effects of capture myopathy (Beheler-Amass et al. 1998), was a suspected factor in their deaths (Hervert et al. 2000). Capture myopathy is a physiological condition of an animal, caused by fear and stress, that sometimes manifests itself during capture. Left untreated, the effects of capture myopathy can range from temporary

debilitation to death. Capture and handling procedures were immediately modified and no subsequent losses related to capture myopathy have occurred. (J. J. Hervert, AGFD, pers. comm.). A sixth animal died from a broken neck caused by capture operations in December 2000.

Of the 20 remaining documented mortalities since 1994, nine (45%) were directly attributable to predation (i.e., five coyote, two bobcat [*Lynx rufus*], one mountain lion, and one unknown), and 11 (55%) were from unknown causes. When investigating a Sonoran pronghorn mortality, cause of death was ascertained using forensic evidence present at the scene (e.g., tracks of a predator chasing a pronghorn, multiple knock-down sites, broken branches and disturbed soils from thrashing). Some of the 11 mortalities attributed to unknown causes were likely caused by predation (J. J. Hervert, AGFD, pers. comm.), however, unavoidable lags between time of death and scene investigation caused available evidence to sometimes be obscured by weather and scavengers. In summary, this level of predator-related adult mortality is high given the current low numbers of Sonoran pronghorn in the U.S., and could pose serious problems for the eventual recovery, or for that matter continued maintenance, of this subpopulation without active predator control.

Pronghorn and disease - Blood samples from five Sonoran pronghorn captured in December 2000 were evaluated by the Arizona Veterinary Diagnostic Lab at the University of Arizona (UA) for evidence of epizootics. All five samples tested positive for bluetongue and epizootic hemorrhagic disease (EHD) (one sample tested "weak" positive); two potentially fatal diseases that may afflict pronghorn. These findings were consistent with serological examinations performed on Sonoran pronghorn from earlier capture operations (AGFD unpubl. data). Bluetongue is carried by cattle and is one of the most serious diseases affecting pronghorn (Yoakum et al. 1996, Yoakum and O'Gara 2000). Epizootic hemorrhagic disease is similar to and not readily distinguishable from bluetongue, and occurs in pronghorn (Merck & Company 1979, Jessup and Boyce 1996). Arizona pronghorn populations, in general, exhibit a high exposure rate to bluetongue (Heffelfinger et al. 1999). No Sonoran pronghorn have been captured or observed (including mortality investigations) with any obvious clinical signs of disease (J. J. Hervert, AGFD, pers. comm.).

The biting midge (*Culicoides* spp.) is a suspected vector in the transmission of bluetongue and EHD to Sonoran pronghorn. This insect breeds in damp or watery habitats, a condition that may only exist in Sonoran pronghorn habitat around some wildlife waters or in wet years when water persists in playas and other natural collection basins for extended periods. The AGFD is currently attempting to collect biting midges from Sonoran pronghorn range for disease testing (J. J. Hervert, AGFD, pers. comm.).

Military overflights - The level of military flights over most of the Sonoran pronghorn range in the U.S. has raised concerns about their potential effects on Sonoran pronghorn (Krausman et al. 2001, USFWS 1998). Possible direct effects of military overflights on Sonoran pronghorn include death or injury from ordnance delivery, live rounds, and aircraft mishaps; possible indirect effects include influences on behavior or physiology (USFWS 1997). However, empirical data have not provided evidence of these threats.

A modeling exercise was conducted to estimate the likelihood of military aircraft flying over Sonoran pronghorn during low altitude sorties (Robinson et al. 2000). Flight paths were simulated within nine existing flight corridors over the Barry M. Goldwater Range (BMGR) and CPNWR, using both known (March and October) and randomly generated Sonoran pronghorn locations that were stratified by habitat. It was concluded that the probability of low-flying military aircraft encountering Sonoran pronghorn in training routes and the number of pronghorn encountered differed seasonally and among corridors. Few Sonoran pronghorn would likely be encountered until flight strip widths were >0.8 km. This ranged from one to 11 encounters (grand mean for March and October actual location data) for flight strip widths of 0.8 to 6.4 km, respectively. Habitat use patterns coupled with known Sonoran pronghorn location data has potential in identifying flight corridors that minimize the probability of encounters (Robinson et al. 2000).

A three-year study of the effects of noise from military overflights on Sonoran pronghorn on the BMGR was recently completed (Krausman et al. 2001). The objective of the study was to determine if noise from military activities on BMGR's tactical ranges influenced Sonoran pronghorn behavior and hearing. American pronghorn (*A. a. americana*) and desert mule deer (*Odocoileus hemionus eremicus*) hearing was tested during this study and compared with known hearing data from desert bighorn sheep (*Ovis canadensis*) (Weisenberger et al. 1996, Krausman et al. 1998) and humans. Noise levels from military activity on BMGR did not influence Sonoran pronghorn hearing, and in fact, pronghorn appeared to have habituated to most military activities. While military activity was associated with occasional changes in pronghorn behavior, these changes likely did not significantly effect the animals (Krausman et al. 2001).

2. Reasons For Listing

The Sonoran pronghorn was determined to be an endangered species on 11 March 1967 (32 FR 4001). This determination was made in accordance with the Endangered Species Preservation Act of 15 October 1966, which pre-dated the ESA by more than six years. Section 4(c)(3) of the ESA provides that:

> "(A)ny list in effect on the day before the date of the enactment of this Act of species of fish or wildlife determined by the Secretary of the Interior, pursuant to the Endangered Species Conservation Act of 1969, to be threatened with extinction shall be republished to conform to the classification for endangered species or threatened species, as the case may be, provided for in this Act, but until such republication, any such species so listed shall be deemed an endangered species within the meaning of this Act. The republication of any species pursuant to this paragraph shall not

> require public hearing or comment under section 553 of title 5, United States Code."

Section 4(a)(1) of the ESA lists five factors that must be considered when determining if a species should be designated as threatened or endangered. As a consequence of the "grandfather" clause [Section 4(c)(3)] in the ESA, formal listing factors were never established or required for Sonoran pronghorn to be listed under the ESA. Regardless, these same five factors must also be considered when determining if a species qualifies for delisting. The purpose of this section is to provide this documentation. The five factors as they apply to Sonoran pronghorn are discussed below and have been taken into account in the development of the recovery efforts (Section 3. Recovery Criteria) and implementation schedule (Section 4. Updated Implementation Schedule).

A. *The present or threatened destruction, modification, or curtailment of its habitat or range.* The pronghorn is a unique wild ruminant, endemic to North America, and adapted to a wide range of climatic conditions (Yoakum and O'Gara 2000). The Sonoran race occurs at the southern edge of the species geographic range in some of the more hostile environmental conditions. It is probably not a coincidence that the three desert subspecies are experiencing the greatest survival problems (Yoakum and O'Gara 2000). Although probably never abundant (Yoakum and O'Gara 2000), Sonoran pronghorn were observed in every open valley from Nogales, Mexico to Yuma, Arizona, during the course of an international boundary survey from 1892 to 1894 (Carr 1971). Sonoran pronghorn require vast areas of unencumbered open range to

meet their annual needs for survival and reproduction. This includes the ability to freely travel long distances between localized, seasonally sporadic rainfall in search of sustenance. Unfortunately, Sonoran pronghorn have been extirpated from much of their historic habitat in the U.S. and Mexico (USFWS 1998), and currently occupy <10% of their suspected former range (J. Hervert, AGFD, unpubl. data) (Figures 1 and 2).

Livestock grazing has the potential to alter pronghorn habitat more than any other anthropogenic activity (Leftwich and Simpson 1978, Kindschy et al. 1982, Yoakum et al. 1996), especially in the arid Sonoran Desert. Cattle and other domestic livestock were first brought to northwestern Sonora, Mexico, in 1694 by Father Kino, a Jesuit priest (Wildeman and Brock 2000). One of the more important livestock ranches established by Kino was located near present day Sonoyta, Mexico, just south of the International Border at Lukeville, Arizona. In 1702, Kino's ranch had >3,500 head of cattle (Officer 1993). By 1751, however, this herd had disappeared (Officer 1993). Overgrazing well into the nineteenth century caused widespread habitat changes (e.g., erosion, species composition) throughout much of the Sonoran Desert, particularly in more settled areas such as central Sonora, Mexico (Sheridan 2000). This apparently was not the case for much of southern Arizona because conflicts between settlers and Native Americans throughout the 1800s limited grazing (Sheridan 2000). American ranchers were raising livestock by the early 1900s in much of the area that would later become Organ Pipe Cactus National Monument (OPCNM) (Rutman 1997) and Cabeza Prieta Game Range (CPNWR files, Ajo, Arizona). Because there was no International Boundary fence until 1947, livestock from the U.S.

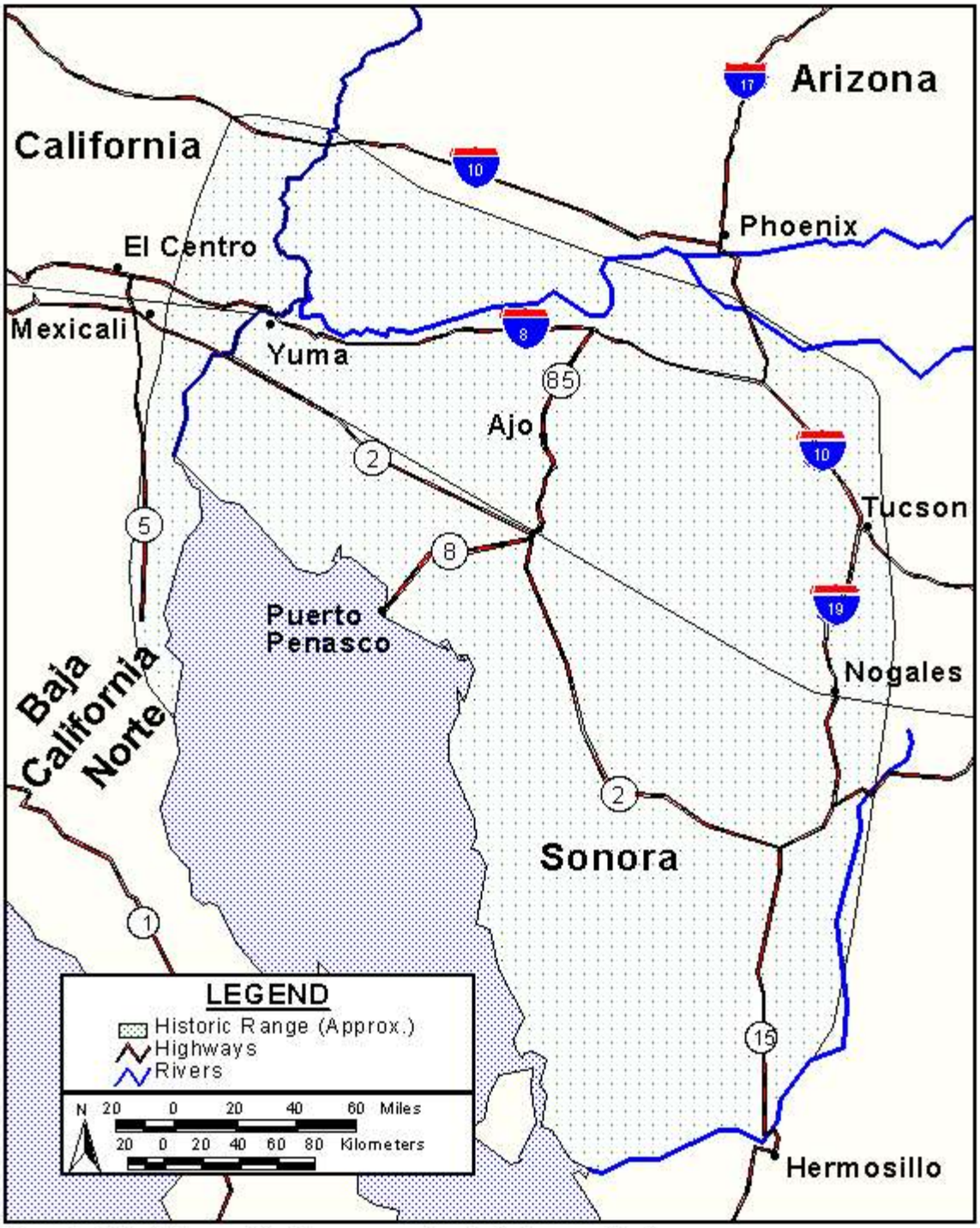

Figure 2. Historic Range of the Sonoran pronghorn in Arizona and Mexico.

and Mexico ranged freely across the border (Rutman 1997). Accurate figures describing livestock numbers in the region are sparse, but Rutman (1997) cites estimates of 1,000 head of burros and horses in 1942 on the southern half of OPCNM, and as many as 3,000 cattle on OPCNM at one time. Livestock grazing and range management programs have had a greater effect on the vegetation of southeastern Arizona than any other single land use (Bahre 1991). While this relationship may not be as well documented for southwestern Arizona (Hastings and Turner 1980), it still has relevance. The BMGR was closed to livestock use in 1941 (Executive Order 8892), although trespass grazing occurred east of Highway 85, at least sporadically, until the late 1970s (Sue Rutman, NPS, pers. comm.) . Trespass cattle and feral burros continue to occur west of Highway 85 outside of currently occupied Sonoran pronghorn habitat (Betsy Wirt, USAF, pers. comm.). Cattle were removed from OPCNM and CPNWR in 1978 and 1983, respectively (USFWS 1998). Habitat alteration (caused in part by livestock grazing) was a leading cause in the decline in Sonoran pronghorn numbers (Wright and deVos 1986).

Livestock grazing on lands administered by the Bureau of Land Management (BLM) continues on a small portion of currently occupied Sonoran pronghorn habitat around Ajo, Arizona. The BLM is in the process of performing allotment analyses on these areas in terms of their current conditions and ongoing uses to determine if grazing is in compliance with the Arizona standards for rangeland health. If current grazing practices prove to be a factor in these areas not meeting established standards, the BLM must adjust grazing through the permitting process to ensure significant progress is made towards achieving standards (T. Hughes, BLM, pers. comm.).

De-watering of most of the lower Gila and Sonoyta rivers has likely caused significant habitat modification (Wright and deVos 1986), as has agricultural, urban, and commercial development. Highways, fences (e.g., rights-of-way, livestock allotments, the International Boundary), railroads, and canals have caused habitat fragmentation.

The single U.S. subpopulation of Sonoran pronghorn is segregated from Mexico by an incomplete, and often cut or washed out International Boundary fence, and by Mexico Highway 2 (Figure 1). Current plans by the Mexican government include upgrading Highway 2 into a four-lane divided highway (R. Paredes, IMADES, pers. comm.). The two Mexican subpopulations are separated by Mexico Highway 8. Traffic on Highway 8 continues to grow with the increased marketing of Puerto Peñasco as a tourist destination. Fortunately, most of the presently occupied habitat in the U. S. is administered by the USFWS, National Park Service (NPS), Department of Defense, or BLM. There are a few hectares of patented mining claims in pronghorn habitat in the U.S. The size and degraded habitat conditions of occupied range in the U.S. may no longer be adequate to provide all of the critical life needs for Sonoran pronghorn in all years without active management.

B. *Overutilization for commercial, sporting, scientific, or educational purposes.*

Hunting of wild game in southwest Arizona was pervasive during the frontier period through the 1940s. Some commercial use of Sonoran pronghorn occurred in the early 1900s to feed miners, railroad workers, and other laborers in the region (Sue Rutman, NPS, pers. comm.). Hunting of

Sonoran pronghorn in the U.S. was banned in the early 1920s (Wright and deVos 1986). Commercial hunting operations continued to offer illicit guided hunts for bighorn sheep and Sonoran pronghorn at least throughout the 1930s. One well known guide in Sonoyta, Mexico, was very successful at taking Sonoran pronghorn. His business was active in the 1930s and attracted clients from across the U.S. and Mexico (Sue Rutman, NPS, pers. comm.). In addition to commercial hunting pressure, residents of the Ajo-Sonoyta area hunted Sonoran pronghorn to supplement their diet (USFWS 1939, 1940, 1946a, 1946b, 1951, 1954, 1966, 1971; OPCNM 1939, 1941). Controlling illegal hunting on OPCNM and the Cabeza Prieta Game Range was one of the first management priorities when the two units were established in the late 1930s. Currently, poaching in the U.S. is not identified as an issue although it may still be a problem in Mexico (Wright and deVos 1986, USFWS 1998).

A maximum of six Sonoran pronghorn have potentially been lost as a result of capture operations in the U.S. since 1994 when the pronghorn population was 282 animals. At least two of these were taken by predators (a mountain lion and a coyote), with direct or indirect effects of capture myopathy suspected in their deaths (Hervert et al. 2000). Finally, there are no known Sonoran pronghorn maintained in captivity at this time nor has this subspecies been routinely maintained in captivity in the past.

C. *Disease or predation.*

Little is known regarding the influence disease has on the population dynamics of Sonoran

pronghorn. Extensive control of other pronghorn populations by an epizootic is uncommon (Yoakum et al. 1996, Yoakum and O'Gara 2000). Pronghorn in general are susceptible to a variety of bacterial, rickettsial, and viral diseases, and internal and external parasites (Jessup and Boyce 1996). Bluetongue is arguably the most important epizootic of pronghorn (Yoakum et al. 1996, Yoakum and O'Gara 2000) as evidenced by a 1976 outbreak in eastern Wyoming in which at least 3,200 pronghorn died. A second outbreak in the northeastern part of Wyoming in 1984 killed at least 300 more (Thorne et al. 1988).

Blood samples from Sonoran pronghorn were collected during capture operations in 1997, 1998 and 2000. Serological examination revealed a nearly 100% incidence of exposure to bluetongue and EHD viruses in Sonoran pronghorn (AGFD unpubl. data), which is exceedingly high compared to pronghorn exposure rates outside of Arizona (B. W. O'Gara, USFWS, Montana Cooperative Wildlife Research Unit [retired], pers. comm.). Both viruses are closely related and difficult to distinguish, and are collectively referred to as hemorrhagic disease (Thomas 1981). Exposure to bluetongue by pronghorn is widespread throughout Arizona, although actual effects on populations in the state is unclear (Heffelfinger et al. 1999). Livestock are the primary reservoir for the bluetongue virus and EHD (Jessup and Boyce 1996) and the likely avenue of transmission to pronghorn is by biting midges. Bluetongue primarily affects animals in late summer (July to September) during the peak of insect activity and coincident with the pronghorn breeding season (Heffelfinger et al. 1999). A viremic female may be in poor reproductive condition or her behavior altered enough to effect breeding (Heffelfinger et al. 1999). Viremic

males may be unsuccessful in defending breeding territories or females. Other diseases tested for in Sonoran pronghorn included leptospirosis, parainfluenza 3, infectious bovine rhinotracheitis, bovine viral diarrhea, and bovine syncytial virus. All tests were either negative, or in the case of one Sonoran pronghorn that tested positive for parainfluenza 3, not a health concern at the detection level (AGFD, unpubl. data).

Various predatory birds and mammals kill pronghorn. In general, predation on pronghorns is significant when predator numbers are high relative to pronghorn numbers (Yoakum et al. 1996, Yoakum and O'Gara 2000). Sonoran pronghorn habitat in the U.S. has been significantly altered by past grazing practices so that the current population is depressed. Only anecdotal information exists at this time on predator numbers relative to Sonoran pronghorn; however, any predation on a severely depressed population may be significant (Errington 1956, Scott et al. 1994). Fawns $\leq$3 weeks of age are most susceptible to loss from predators (O'Gara and Yoakum 1992). Adult American pronghorn (*A. a. americana*) on the National Bison Range in Montana were not at risk from predation by coyotes due to their attentiveness and superior speed (Byers 1997). Conversely, coyotes were a serious predator of pronghorn fawns up to about 45 days of age (Byers 1997).

Coyote, mountain lion, and bobcat prey on Sonoran pronghorn (AGFD files, Region IV, Yuma, Arizona; CPNWR files, Ajo, Arizona). Predation generally has an insignificant effect except on small populations such as the Sonoran pronghorn (Lee et al. 1998). Coyotes are the most

abundant large predator sympatric with Sonoran pronghorn. In 20 mortality investigations not related to capture operations, coyotes killed at least five Sonoran pronghorn and are suspected in the death of another. Coyotes are thought to prey heavily on Sonoran pronghorn fawns as well. The evidence for this is mostly inferred, and consists primarily of several observations during aerial telemetry surveys of females with a newborn fawn(s) and one or more coyotes nearby. Subsequent surveys 1-2 weeks later located the female, but only one or no fawns (AGFD Sonoran pronghorn weekly radio telemetry forms, 1994-2001). Mountains lions in southwest Arizona prey mostly on mule deer (Cashman et al. 1992) but may kill pronghorn when they use rugged terrain (Ockenfels 1994). One adult Sonoran pronghorn was killed by a mountain lion. The ambush site was located in a small desert wash with trees that served as cover (L. Piest, AGFD, pers. comm.). Finally, two adult Sonoran pronghorn were killed by bobcats. The actual number of adult Sonoran pronghorn killed by predators would likely be higher if cause could accurately be assigned in the deaths of 12 other animals.

D. *The inadequacy of existing regulatory mechanisms.*

The Sonoran pronghorn has been federally protected since 1967. Pursuant to the ESA, it is unlawful to import or export, take, possess, or sell any endangered or threatened species. Permits have been authorized under the authority of the ESA for certain scientific, management, or incidental take purposes. The policy of the State of Arizona is to protect and preserve all native species (and their habitat) that are threatened by extinction or are experiencing a significant decline that, if not halted, would lead to a threatened or endangered designation. According to

Arizona state law (A.R.S. 17-314) anyone convicted of unlawfully wounding or killing, or unlawfully possessing an endangered species of wildlife may be subject to civil action by the Arizona Game and Fish Commission in the form of license revocation and/or recovery of a minimum sum (currently $2,131.19). Hunting license privileges can be revoked by the Commission for up to five years upon conviction (A.R.S. 17-340).

Critical habitat for Sonoran pronghorn has not been designated. Current Sonoran pronghorn range in the U.S. is almost entirely encompassed by lands under federal jurisdiction. Involved federal lands include CPNWR administered by the USFWS, OPCNM administered by the NPS, BMGR administered by the U. S. Air Force (USAF) and U. S. Marine Corps (USMC), and public lands administered by the BLM. All agencies either have in place (NPS 1994, 1997; BLM 1988), or are actively working on comprehensive management plans (e.g.., CPNWR Comprehensive Conservation Plan; BMGR Integrated Natural Resources Management Plan) designed to guide management of natural resources on the affected lands for the next 10 to 25 years. All of these plans either do or will address Sonoran pronghorn issues. The USAF and USMC assumed responsibilities for natural resource management on BMGR from BLM in November 2001. Until the BMGR Integrated Natural Resources Management Plan is completed, natural resource management on the range continues under the guidance provided by the Goldwater Amendment to BLM's Lower Gila South Resource Management Plan (BLM 1990).

Section 7(a)(2) of the ESA states that each federal agency shall, in consultation with the Secretary, insure that any action they authorize, fund, or carry out is not likely to jeopardize the continued existence of listed species. In fulfilling these requirements, each agency is to use the best data available. The ESA requires action agencies to consult or confer with the USFWS when there is discretionary federal involvement or control over an action. Formal consultation would become necessary when the action agency requests consultation after determining a proposed action may affect Sonoran pronghorn. However, if the USFWS concurs in writing that a proposed action is not likely to adversely affect pronghorn (i.e., the effects are completely beneficial, insignificant, or discountable), then formal consultation is not required. Formal consultation is also required if the USFWS, through informal consultation, does not concur with the action agency's finding that a proposed action is not likely to adversely affect Sonoran pronghorn.

All applicable federal, state, and county laws, regulations, and ordinances are enforced on the various federal properties by their respective law enforcement branches, County Sheriff Departments, and AGFD. In addition, the U.S. Border Patrol (BP), Drug Enforcement Administration, and U.S. Customs Service are empowered with patrolling the U.S./Mexico border and enforcing federal laws covering, in part, smuggling and illegal entry to the U.S. by undocumented migrants (UDM). Most of the BMGR is closed to all public access. Each visitor to CPNWR and the open portions of BMGR must obtain a permit and sign a hold harmless agreement prior to entry. Visitors to CPNWR and BMGR are required to check in prior to entry

by placing a toll-free call. Visitors to OPCNM are required to have a permit to access or camp in the back country. No permit is required to access BLM lands, however, vehicle travel is restricted to existing roads and trails and camping is limited to 14 days per group.

Existing regulatory mechanisms appear adequate to minimize effects of illegal anthropogenic actions on Sonoran pronghorn in currently occupied habitat in the U.S.. However, the capabilities of the various law enforcement entities in the region can be overwhelmed by the logistics of patrolling such a vast and isolated area, compounded by staffing and funding limitations, changing agency priorities, and a growing UDM and smuggling problem that is overtaxing court dockets. There is a general lack of legal mechanisms for land managers to prosecute UDMs caught trespassing on federal lands. Unless there is evidence of chronic repeat violations or other illegal activities such as drug smuggling, the BP typically processes UDMs and returns them to Mexico.

E. *Other natural or manmade factors affecting its continued existence.*

Sonoran pronghorn numbers in the U.S. are critically small with only 99 pronghorn (Table 1). Interaction between the U.S. subpopulation and the two known subpopulations from northern Sonora, Mexico is unlikely. The U.S. subpopulation of Sonoran pronghorn is vulnerable to extinction from threats associated with small population size, naturally occurring events, and other disturbances.

The number of pronghorn in currently occupied habitat in the U.S. is low. The minimum size at which an isolated group of this species can be expected to maintain itself without the deleterious effects of inbreeding is not known. A population viability analysis (PVA) workshop conducted in 1996 modeled the U.S. subpopulation of Sonoran pronghorn (Defenders of Wildlife 1998). A PVA is a form of risk assessment that predicts the probability of a population going extinct under different scenarios of biological and environmental change (Scott et al. 1994). The PVA model using VORTEX computer software suggested that the U.S. subpopulation was at serious risk of extinction due to population fluctuations, periodic decimation during droughts (especially of fawns), small present population size, limited habitat preventing expansion to a more secure population size, and expected future inbreeding depression (Defenders of Wildlife 1998). The results of the PVA modeling exercise must be interpreted with caution because many of the population parameter inputs used to explore the risk of extinction were unknown, but arrived at by best biological judgment and consensus of participants in the workshop (Defenders of Wildlife 1998).

Other factors that have the potential to directly contribute to Sonoran pronghorn mortality are highways, railroads, and canals. In June 1996, a dead, radiocollared pronghorn was located approximately 400 m south of U.S. Interstate 8. The animal had a broken femur and had been scavenged by vultures. The animal may have been struck by a vehicle on the interstate and then made its way south some distance before death (J. Hervert, AGFD, pers. comm.). Sonoran pronghorn were regularly seen along and east of Arizona Highway 85 many years ago (USFWS

1998). With the exception of an adult doe observed on the right-of-way of Arizona Highway 85 (the animal ran west off the right-of-way at the vehicle's approach) on the north end of the Crater Range in June 1996 (R. Barry, USAF, pers. comm.), contemporary confirmed observations are lacking. Unconfirmed reports of Sonoran pronghorn crossing Mexico Highway 8 are occasionally received from residents of Puerto Peñasco (J. L. Bright et al., AGFD, unpubl. data), although no Sonoran pronghorn from previous radiocollar studies in Mexico have ever been recorded crossing this road (R. Paredes, IMADES, pers. comm.). An adult male pronghorn was struck and killed by a vehicle near kilometer post 29 on Mexico Highway 8 in July 1996. Two Sonoran pronghorn have been pulled from the Wellton-Mohawk Canal on the northern end of their range (CPNWR files, Ajo, Arizona). The potential for injuries and deaths from highways, railroads, and canals remains a concern and the influence to the population from accidents could be significant (Defenders of Wildlife 1998).

The BMGR is the nation's second largest terrestrial aerial gunnery training range and has been used for developing and maintaining the combat readiness of the tactical air forces of the military since 1941. Natural resources on the BMGR are managed primarily by the USAF and USMC. Prior to November 2001, this function was performed by the BLM. The airspace above CPNWR is under the jurisdiction of the USAF. Military activities in pronghorn habitat on and above the BMGR and above CPNWR include such things as airspace use by military jets and helicopters (primarily daylight although night time missions are run), manned air-to-ground ranges, tactical air-to-ground target areas, auxiliary airfields, explosive ordnance disposal/burn

areas, ground support areas, and military use roads (USFWS 1996, 1997). Direct death or injury to pronghorns could occur as a result of ordnance deliveries, other objects falling from aircraft, spent shells, live rounds, aircraft crashes, or collisions with ground vehicles. Potential impacts of normal ordnance deliveries are limited to manned and tactical ranges. On manned ranges and most areas of tactical ranges, ordnance is limited to strafing and practice bombs and rockets. High explosive delivery is limited to small areas on each tactical range. Numerous targets throughout the tactical ranges receive various degrees of strafing. Pronghorn are also exposed to some indirect impacts of military activities, primarily noise and visual, from low-level aircraft overflights, ordnance delivery, and vehicle and foot traffic. Two other military activities have potential significance for Sonoran pronghorn. Explosive Ordnance Disposal (EOD) personnel collect and destroy dangerous unexploded munitions on tactical ranges and other developed target areas. The EOD clearances occur annually on tactical ranges and can take up to three months. During range clearances, large six-wheeled trucks are driven across the desert at intervals ranging from 15 to 50 m searching for ordnance items. Some desert vegetation is unavoidably crushed during these operations and pronghorn may avoid the areas due to the activity and noise (USFWS 1997). The USMC conducts the Weapons and Tactics Instructor Course (WTI) twice a year (March-April and October-November). During the five days of a typical WTI course, one flight/day of two to eight helicopters (65 to100 m apart) traverse CPNWR within established flight corridors from west to east. They continue to target areas on the BMGR north and east of the refuge where they may deliver ordnance to target areas (USFWS 1996). Some ground-based activities in association with WTI exercises occurs in pronghorn

habitat (USFWS 1996). Finally, Sonoran pronghorn may also be affected by potential contaminant issues, such as high levels of aluminum in the soil and vegetation on BMGR (USFWS 1997).

The BLM , BMGR, CPNWR, and OPCNM have public use programs for lands under their jurisdiction. Types of use (e.g., season of use, duration of stay, activities engaged in) vary somewhat for each area, with highest visitation rates centered around the cooler months and unpredictable but popular "wild flower" events that occur in spring and early summer.

Approximately 1/3 of the BMGR is regularly restricted from recreational access (including manned ranges, tactical ranges, and Moving Sands/Cactus West Target Complex) (U.S. Department of Defense 2001). Visitation on the USAF portion of BMGR is currently restricted to the Sauceda Mountains area east of Highway 85 and outside of currently occupied Sonoran pronghorn habitat. The USAF occasionally issues special use permits to bighorn sheep tag holders to access the Mohawk, Granite, and northern Growler mountains during December on no-fly weekends (R. Barry, USAF, pers. comm.). Current Sonoran pronghorn habitat most frequently visited by recreationists on the USMC side of the BMGR includes open areas of the Mohawk Valley between the Copper and Mohawk mountains (U.S. Department of Defense 2001). The entire CPNWR (860,010 acres or 348,046 hectares) is open to recreational access. A total of 93% of the refuge is Wilderness and is closed to vehicle entry. The El Camino del Diablo, Christmas Pass, and Charlie Bell roads are designated corridors not included in

Wilderness that allow vehicle access by the public to remote areas of the refuge. A hold harmless permit is required for all visitors to BMGR and CPNWR. Organ Pipe Cactus National Monument (330,689 acres or 133,830 hectares) is entirely open to visitors and is approximately 95% designated Wilderness. Developed facilities for public use include the visitor center near Lukeville, Arizona, one remote primitive camping area, one developed campground, and approximately 100 miles of graded dirt scenic roadways (T. Tibbitts, NPS, pers. comm.). Habitat frequented by Sonoran pronghorn on OPCNM only occurs west of Highway 85 at this time. BLM lands that provide habitat for Sonoran pronghorn primarily occur east of CPNWR and west of Highway 85. Public use in these areas generally consists of primitive camping in recreational vehicles by winter visitors. Camp stays on BLM lands are limited to 14 days.

Although recreational permits are required to access BMGR, CPNWR, and the back country of OPCNM, compilation of visitor use data is not easily standardized. No visitor use statistics are collected for the affected BLM lands (D. Carpenter, BLM, pers. comm.). Based on the number of hold harmless permits issued out of the CPNWR office, on average, visitor use of the region is on the rise, with sharp increases in "wild flower" years (V. Harp, USFWS, pers. comm.). For example, on CPNWR a total of 258 visitor permits were issued in 1992 for an estimated total of 2,277 user days. In 2000, 1,447 permits were issued out of the refuge office for an estimated total of 4,630 user days. Visitor use spiked in 1998, a good "wild flower" year, with 7,021 user days (V. Harp, USFWS, pers. comm.). Increasing visitor use of the region, particularly in back country areas, increases the potential for visitor/pronghorn interactions.

The number and frequency of UDMs and drug smugglers illegally entering the U. S. on foot and by vehicle from Mexico along the southern boundaries of OPCNM, CPNWR, and the far western reaches of the BMGR has increased dramatically since January 2000 (even during the hot, dry summer months when the number of entries typically decrease). The majority of crossings occur at night, and primary travel routes are up broad valleys, across bajadas, and through mountain passes frequented by Sonoran pronghorn. In one area, illegal traffic has created a 61 km road since 1999 that traverses pronghorn habitat. In addition, there are hundreds, and perhaps thousands, of additional kilometers of single vehicle tracks laid down across the otherwise undisturbed desert by UDM and drug smugglers seeking new routes or to escape detection. This increase is partly a consequence of stepped-up enforcement activities by immigration authorities in urban areas along the border (e.g., Sonoyta, Douglas, Yuma). As an illustration of the scale of the problem, in 1997, 1998, 1999, and 2000, a minimum of eight, four, six, and 11, respectively, abandoned or confiscated vehicles used for smuggling UDMs were removed from CPNWR. By comparison, 25 vehicles were removed in 2001, with an additional eight remaining in the desert (L. Williams, CPNWR, pers. comm.). The number of known (i.e., interdicted) UDMs that crossed the west half of CPNWR averaged 2,800/year from 1997 to 2000. For the first 5 months of 2001, this figure was 2,200 (Wellton BP Station, unpubl. data; V. Harp, CPNWR, pers. comm.). These numbers are representative of only one portion of the current range of Sonoran pronghorn and it is a certainty that many more vehicles and individuals pass through undetected than are reflected in official tallies (based on vehicle and human tracks, other sign, sensor hits, unsuccessful pursuits by law enforcement officers, and reports by agency employees and

visitors).

Increased illegal border crossings have resulted in stepped-up law enforcement activities (e.g., more officers and vehicles, increased patrolling and interdictions) with their own set of potential impacts to Sonoran pronghorn. Officers from the BP, U.S. Customs Service, Drug Enforcement Agency, NPS, BLM, USFWS, and County Sheriff Departments (Pima, Maricopa, and Yuma) are all charged with enforcing specific components of State or federal law. In addition, the USAF and USMC have their own security forces tasked with patrolling the BMGR and they can detain unauthorized entrants on the military range or alert other law enforcement entities to their presence. Activities performed in pronghorn habitat by the various law enforcement agencies include: routine surveillance (e.g., periodic fixed-wing flights by the U.S. Customs Service and daily helicopter flights by the BP, placement and maintenance of sensors, foot and vehicle patrols, and check stations); roadblocks and hot pursuit chases; detention, arrest, and transport of UDMs and smugglers; search and rescue operations; and removal of abandoned/confiscated vehicles and other contraband. In addition, different agencies periodically conduct joint field operations with large numbers of law enforcement officers (sometimes in cooperation with the Army National Guard and their helicopter units) that specifically target high traffic areas. By policy, memorandum of understanding, and/or informal agreement, use of vehicles by law enforcement officers on federal lands is generally confined to established roadways (including public use corridors and administrative trails in wilderness areas on OPCNM and CPNWR). However, during emergency situations (e.g., hot pursuit chases, search-and-rescue operations)

these restrictions are often disregarded. As more law enforcement assets are deployed along the remote stretches of the Mexican border in southern Arizona and apprehensions increase, the number of attempted illegal entries through pronghorn habitat in the U.S. will likely decrease, with the UDMs and smugglers shifting their activities elsewhere, at least temporarily. This trend could reverse itself sometime in the future, in an ongoing cycle, if law enforcement assets are redeployed to other "hotspots" and it becomes known that this area of the border is once again patrolled less.

The recent exposure-related deaths of 14 UDMs (May 2001) on CPNWR and BMGR has increased public awareness of the hazards of crossing the Sonoran Desert on foot (particularly in the hot, dry summer months). Humane Borders, a Tucson, Arizona-based humanitarian organization has proposed placing "water stations" on federal lands throughout the border desert region of southwest Arizona. The hope is that UDMs (and others) that find themselves in trouble in the desert will locate these stations and the loss of life due to high temperatures and thirst will be minimized. The placement of water stations has the potential to increase UDM traffic (particularly for those traveling by foot) through Sonoran pronghorn habitat by those with the knowledge or expectation of finding a source of potable water along their travel route. Maintenance of these water stations would also necessitate additional travel (vehicle and/or foot), weekly or more often depending on UDM use, in pronghorn habitat. The BP has proposed an alternative solution which would involve placement of a series of solar-powered, radio transmitters that would send a distress signal resulting in the immediate dispatch of rescue forces

once a "panic button" was pressed. These radio stations would be strategically placed in areas of high UDM traffic based on frequency of past rescues and deaths. Placement of radio transmitters in Sonoran pronghorn habitat would also increase human presence in these areas (e.g., BP maintenance and rescue crews).

3. Recovery Criteria

The primary recovery objective in the 1982 Sonoran Pronghorn Recovery Plan was to "(M)aintain existing population numbers and distribution of Sonoran pronghorn while developing techniques which will result in a U.S. population of 300 animals (average for a five-year period) or numbers determined feasible for the habitat" (USFWS 1982). Once this population figure was met and major threats eliminated, the species would be considered for delisting (USFWS 1982). The 1982 Recovery Plan also noted that reintroduction into historic habitat may be the only realistic way to achieve the population goal of 300 (USFWS 1982). Little quantitative information on the subspecies or its habitat existed at the time, and this figure was arrived at using the best biological judgment of the recovery team (Ted Cordery, BLM, pers. comm.). A population goal of 300 animals may approach or exceed carrying capacity given current conditions on the occupied range.

Based on new information, the standards for recovery were revised and tightened in the 1998 Recovery Plan. Specifically, for downlisting from endangered to threatened the 1998 Plan requires "...an estimated 300 adult Sonoran pronghorn in one U.S. population and a second separate population is established in the U.S. and remains stable over a 5-year period or, numbers...adequate to sustain the population through time (USFWS 1998)." These criteria were based on the results of a PVA (Defenders of Wildlife 1998).

Although new data were available since the 1982 Plan (USFWS 1982), the "Core Working Group" tasked with developing the 1998 Revision determined there were still insufficient data on which to base delisting criteria (Mike Coffeen, USFWS, pers. comm.). Two meetings of the Sonoran Pronghorn Recovery Team were held on March 5 and December 6, 2001, to discuss those sections of the 1998 Recovery Plan remanded by the Court to the USFWS for reconsideration, and in particular recovery criteria for delisting. Establishing delisting criteria for the pronghorn would necessitate defining a population level and an amount and distribution of habitat that would provide for long-term persistence of the entire subspecies, even in the face of local subpopulation losses. Further development and refinement of collaborative recovery efforts between the U.S. and Mexico would also be necessary.

After a thorough review of the best available information and considerable discussion, the Recovery Team concluded that given the nature and significance of current threats (e.g., lengthy and recurring dry seasons, long-term and perhaps irreversible habitat changes brought about by

past overgrazing and continued global warming, explosive increase in illegal across-the-border activities, habitat fragmentation), unknown elements of Sonoran pronghorn life history and habitat requirements (e.g., seasonal need for free water, effects of an aging reproductive component, fawn survival, the differential role of predation on adults and young), uncertainty of availability of suitable reintroduction sites and animals for transplants, resistance to management actions on wilderness and other areas of the public lands (e.g., forage and water enhancement, habitat manipulation, predator control), and continuing uncertainty in the long-term stability and status of subpopulations in Mexico, establishing delisting criteria (i.e., defining a population level and an amount and distribution of habitat that would provide for long-term persistence of the entire subspecies) at this time is not practicable. However, pursuant to court order, specified recovery efforts listed below are applied to the appropriate listing factors outlined on page 22 of the court order. Based upon current research, the USFWS believes these recovery efforts will in the short-term lead to downlisting the Sonoran pronghorn from endangered to threatened (an estimated 300 adults in one U.S. population and a second separate population is established in the U.S.), and in the long-term, will contribute to the delisting of the subspecies. Tasks necessary to accomplish reclassification from endangered to threatened, as detailed in the Recovery Plan (USFWS 1998) should provide the information necessary to determine when delisting will be possible and what the delisting objectives and criteria should be.

A. Recovery Efforts.

In the near-term, recovery efforts should focus on: 1) improving habitat for fawn survival and recruitment through the establishment and evaluation of forage enhancement plots on the BMGR (USAF 2000); 2) initiating a quantitative evaluation of pronghorn use and reliance on sources of free water (temporary and permanent); 3) reducing predation through the selective removal of coyotes from specific areas and at times of the year when adult female pronghorn are most susceptible to predation (the need for coyote control will vary from year-to-year based on environmental conditions); 4) evaluating potential transplant locations, establishing relocation methodology and protocols, developing interagency agreements (including with Mexico as required), acquiring funding, and initiating reestablishment projects; 5) increasing frequency and expanding scope of aerial monitoring in Mexico to improve comparability with U. S. surveys; 6) investigating potential pronghorn disease vectors; 7) reducing disturbance at critical times of the year; and 8) investigating and reducing movement barriers. The Service will annually review implementation of the Recovery Plan to determine when revisions are appropriate, including the appropriateness of establishing delisting criteria.

B. Application of Recovery Efforts to the Five Factors to be Considered when Listing, Delisting, or Reclassifying the Species.

Below, the five factors to be considered when listing/delisting/reclassifying the species are given.

Pursuant to the remand, this section explains how the recovery efforts and implementation tasks address those factors. Additionally, examples of current projects and programs are given.

1. Factor (A): "the present or threatened destruction, modification, or curtailment of Sonoran pronghorn habitat or range." The above listed recovery efforts that address this factor include: 1) improving habitat for fawn survival and recruitment through the establishment and evaluation of forage enhancement plots on the BMGR (USAF 2000); 2) initiating a quantitative evaluation of pronghorn use and reliance on sources of free water (temporary and permanent); 4) evaluating potential transplant locations, establishing relocation methodology and protocols, developing interagency agreements (including with Mexico as required), acquiring funding, and initiating reestablishment projects; and 5) increasing frequency and expanding scope of aerial monitoring in Mexico to improve comparability with U.S. surveys. The Updated Implementation Schedule (see pages 45-49 of this Supplement) identifies recovery plan tasks and estimates the duration of each task. Recovery effort 1 and its associated tasks is covered in the Implementation Schedule by tasks 1.1 Fawn recruitment, 1.2 Habitat enhancement, 2.22 Habitat criteria for reintroduction, 2.243 Status and availability of preferred forage, 2.244 Water availability at release sites, and 3.5 Recruitment. Recovery effort 2 and its associated tasks is covered in the Implementation Schedule by tasks 1.52 Investigate preferred habitat, 2.244 Water availability at release sites, 2.413 Monitoring - behavior and habitat use, 3.1 Aerial surveys, 3.2 Infrared aerial surveys, and 3.3 Other surveys. Recovery effort 4 and its associated tasks is covered in the Implementation Schedule by tasks 1.51 Protect present range, 1.53 Investigate range expansion,

1.71 Critical use areas on military lands, 1.74 Maintain updated MOU between military and USFWS, 1.11 Viable population estimates, 2.21 Evaluate reintroduction sites and techniques, 2.22 Habitat criteria for reintroduction, 2.23 Public input into reintroduction, 2.241 Determine predator status at reintroduction sites, 2.242 Fencing needs, 2.243 Status and availability of preferred forage, 2.244 Water availability at release sites, 2.25 Legal aspects of reintroduction, 2.31 Transplant herd dynamics, 2.32 Review capture techniques, 2.33 Transplant holding requirements, 2.34 Transplant protocol, 2.411 Monitoring - acceptable levels of loss/mgmt steps, 2.412 Monitoring - mgmt steps for expected/unexpected threats, and 2.413 Monitoring - behavior and habitat use. Recovery effort 5 and its associated tasks is covered in the Implementation Schedule by tasks 3.1 Aerial surveys, 3.2 Infrared aerial surveys, 3.3 Other surveys, and 3.4 Continue telemetry tracking and assessment of radiomarking goals.

An Environmental Assessment to initiate forage enhancement on the BMGR has been completed. The USAF has funded the project and is negotiating with the Bureau of Reclamation to drill two test wells as a source of water for the project. Depending on the results of the well drilling, initial site preparation on several areas should begin in the spring of 2002. This project will be closely monitored and if the desired results are achieved, expanded to other areas of current pronghorn range. In addition, AGFD and USFWS placed a number of small, temporary water facilities (15-30 gallon plastic tubs) on CPNWR during the hottest, driest months (June - August) of 2001. The temporary waters were placed in such a way that they received no use by predators and deer. The placement of these water facilities demonstrated for the first time that

Sonoran pronghorn are attracted to and readily use sources of free water when available during the most critical period of fawn rearing.

2. Factor (B): "overutilization for commercial, recreational, scientific, or educational purposes." This factor is addressed by the above listed recovery effort 7: reducing disturbance at critical times of the year. Recovery effort 7 and its associated tasks is covered in the Implementation Schedule by tasks 1.71 Critical use areas on military lands, 1.72 Annual review of military activities, 1.73 Long-term investigation of military effects on behavior, 1.81 Human disturbance - seasonal closures, 1.103 Notify Refuge of fatalities, 2.412 Monitoring - mgmt steps for expected/unexpected threats.

The USAF recently completed a study evaluating the effects of military overflights on Sonoran pronghorn. This study, as well as data from other sources, is being used to further refine the USAF'S monitoring and operating procedures in order to reduce military impacts on Sonoran pronghorn. Additionally, portions of the BMGR and OPCNM will be closed to public use in the spring and early summer of each year to decrease disturbance to adults and fawns.

3. Factor (C): "disease or predation." The above listed recovery efforts that address this factor include: 3) reducing predation through the selective removal of coyotes from specific areas and at times of the year when adult female pronghorn are most susceptible to predation (the need for coyote control will vary from year-to-year based on environmental conditions); and 6)

investigating potential pronghorn disease vectors. Recovery effort 3 and its associated tasks is covered in the Implementation Schedule by tasks 1.4 Predator investigation, 2.241 Determine predator status at reintroduction sites, and 2.411 Monitoring - acceptable levels of loss/mgmt steps. Recovery effort 6 and its associated tasks is covered in the Implementation Schedule by tasks 1.75 Investigate military contaminants, 1.9 Effects of disease and parasites, 1.101 Update veterinarian contact, and 1.102 Materials for medical situations and specimen salvage.

AGFD has purchased 12 GPS satellite collars for purposes of monitoring coyote movements within the BMGR during 2002. Monitoring will provide information on seasonal habitat use of coyotes relative to Sonoran pronghorn, and movements of coyotes relative to sources of free water and forage enhancement plots.

During 2001, AGFD collected biting midges from the BMGR and is currently testing for bluetongue and EHD. USFWS has purchased the necessary scientific sampling equipment to collect biting midges from CPNWR during summer 2002, when environmental conditions are favorable for biting midge breeding. This equipment will be used in the future to collect biting midges elsewhere in the range of the Sonoran pronghorn.

4. Factor (D): "the inadequacy of existing regulatory mechanisms." This Supplement and Amendment to the 1998 Final Revised Sonoran Pronghorn Recovery Plan determines that "existing regulatory mechanisms appear adequate to minimize effects of illegal anthropogenic

actions on Sonoran pronghorn in currently occupied habitat in the U.S." (see analysis on page 23 of this Supplement).

5. Factor (E): "other natural or manmade factors affecting its continued existence." This factor is addressed by the above listed recovery effort 8: investigating and reducing movement barriers. Recovery effort 8 and its associated tasks is covered in the Implementation Schedule by tasks 1.53 Investigate range expansion, 1.6 Livestock, and 2.242 Fencing needs.

The BLM recently prepared a report entitled "Draft Ajo Block Rangeland Health Evaluation". This document assesses current range condition and, when finalized, will provide recommendations necessary to make specific changes in current management where standards and objectives for each livestock grazing allotment are not being met. The recommendations for change consider the needs of Sonoran pronghorn. In addition, previously modified livestock fencing between BLM allotments and OPCNM, and between BLM allotments and CPNWR, will be re-evaluated to identify whether additional modifications to the fence may be made to promote Sonoran pronghorn movements.

4. Updated Implementation Schedule

The implementation schedule outlined in the Recovery Plan (USFWS 1998) was taken directly from the narrative outline; however, it did not include a complete listing of the lowest "stepped

down" tasks. In addition, duration for most of the tasks in the implementation schedule was listed as ongoing. The following amendment to the implementation schedule includes a complete listing of all tasks and provides specific durations.

Updated Implementation Schedule

Priority	Task	Task Description	Task Duration	Responsible Party	Cost Estimate (in thousands)			Comments
					2002	2003	2004	
1	1.1	Fawn recruitment	15 years	USAF, USFWS, USMC	30.0	30.0	30.0	
1	1.2	Habitat enhancement	10 years	USAF, USFWS, USMC	150.0	150.0	150.0	
1	1.3	Water investigation	10 years	USAF, USFWS, USMC	50.0	50.0	50.0	
1	1.4	Predator investigation	5 years	USAF, USFWS, USMC	40.0	40.0	40.0	
1	1.51	Protect present range	ongoing	BLM, NPS, USAF, USFWS, USMC	-	-	-	part of ongoing agency programs
1	1.52	Investigate preferred habitat	5 years	AGFD, BLM, USFWS	20.0	50.0	50.0	
1	1.53	Investigate range expansion	5 years	AGFD, BLM, NPS, USAF, USFWS, USMC	-	-	-	cost estimates included in task 1.52
1	1.6	Livestock	5 years	BLM, USFWS	50.0	50.0	50.0	
1	1.71	Critical use areas on military lands	5 years	AGFD, USAF, USMC	50.0	50.0	50.0	
1	1.72	Annual review of military activities	ongoing	USAF, USFWS, USMC, BEC, RT	50.0	50.0	50.0	
1	1.73	Long-term investigation of military effects on behavior	10 years	AGFD, UA, USAF, USMC	100.0	100.0	100.0	
1	1.74	Maintain updated MOU between military and USFWS	ongoing	USAF, USFWS, USMC, BEC	-	-	-	part of ongoing agency programs
1	1.75	Investigate military contaminants	3 years	USAF, USFWS, USMC	50.0	50.0	50.0	expansion of narrative action 1.7

Priority	Task	Task Description	Task Duration	Responsible Party	Cost Estimate (in thousands)			Comments
					2002	2003	2004	
1	1.81	Human disturbance - seasonal closures	ongoing	BLM, BP, NPS, USAF, USFWS, USMC	50.0	50.0	50.0	
1	1.9	Effects of disease and parasites	5 years	AGFD, USAF, USFWS	20.0	20.0	20.0	
1	1.101	Update veterinarian contact	ongoing	USFWS, AGFD, RT	10.0	10.0	10.0	
1	1.102	Materials for medical situations and specimen salvage	ongoing	USFWS, AGFD, RT	-	-	-	cost estimates included in task 1.101
1	1.103	Notify refuge of fatalities	ongoing	USAF, USMC, NPS, BLM, AGFD, USFWS	-	-	-	part of ongoing agency programs
1	1.11	Viable population estimates	ongoing	AGFD, RT	10.0	10.0	10.0	initial population viability analysis completed; model updated periodically to reflect new data
2	2.111	Captive population demographics and genetics	5 years	Phoenix Zoo, Los Angeles Zoo, RT	50.0	200.0	200.0	
2	2.112	Captive population size	1 year	Phoenix Zoo, Los Angeles Zoo, RT	-	-	-	cost estimates included in task 2.111
2	2.113	Husbandry requirements	1 year	Phoenix Zoo, Los Angeles Zoo, RT	-	-	-	cost estimates included in task 2.111
2	2.114	Captive space availability	1 year	Phoenix Zoo, Los Angeles Zoo, RT	-	-	-	cost estimates included in task 2.111

Priority	Task	Task Description	Task Duration	Responsible Party	Cost Estimate (in thousands)			Comments
					2002	2003	2004	
2	2.12	Physiologic monitoring	1 year	Phoenix Zoo, Los Angeles Zoo, RT	-	-	-	cost estimates included in task 2.111
2	2.13	Hand-raising	1 year	Phoenix Zoo, Los Angeles Zoo, RT	-	-	-	cost estimates included in task 2.111
2	2.21	Evaluate reintroduction sites and techniques	3 years	AGFD, USFWS, RT	60.0	70.0	70.0	
2	2.22	Habitat criteria for reintroduction	3 years	AGFD, USFWS, RT	10.0	10.0	10.0	
2	2.23	Public input into reintroduction	1 year	AGFD, USFWS	10.0	-	-	
2	2.241	Determine predator status at reintroduction sites	3 years	AGFD, BLM, USFWS	20.0	20.0	20.0	
2	2.242	Fencing needs	1 year	AGFD, USFWS, RT	-	-	-	cost estimates included in task 2.21
2	2.243	Status and availability of preferred forage	5 years	AGFD, BLM, USFWS	-	-	-	cost estimates included in task 2.21
2	2.244	Water availability at release sites	1 year	AGFD, BLM, USFWS	-	-	-	cost estimates included in task 2.21
2	2.25	Legal aspects of reintroduction	2 years	AGFD, BLM, IMADES, USFWS	-	-	-	part of ongoing agency programs
2	2.31	Transplant herd dynamics	10 year	AGFD, USFWS, RT	100.0	100.0	100.0	

Priority	Task	Task Description	Task Duration	Responsible Party	Cost Estimate (in thousands)			Comments
					2002	2003	2004	
2	2.32	Review capture techniques	1 year	AGFD, USFWS, RT	-	-	-	cost estimates included in task 2.31
2	2.33	Transplant holding requirements	1 year	AGFD, USFWS, RT	-	-	-	cost estimates included in task 2.31
2	2.34	Transplant protocol	1 year	AGFD, USFWS, RT	-	-	-	cost estimates included in task 2.31
2	2.411	Monitoring - acceptable levels of loss/mgmt steps	ongoing	AGFD, USFWS, RT	-	-	-	cost estimates included in task 2.413
2	2.412	Monitoring - mgmt steps for expected/unexpected threats	ongoing	AGFD, USFWS, RT	-	-	-	cost estimates included in task 2.413
2	2.413	Monitoring - behavior and habitat use	ongoing	AGFD, BLM, USFWS, RT	50.0	50.0	50.0	
3	3.1	Aerial surveys in U.S. and Mexico	ongoing	AGFD, NPS, USAF, USFWS, USMC, RT	10.0	10.0	10.0	
3	3.2	Infrared aerial surveys	completed	USAF, USMC	-	-	-	results inconclusive; current technology inadequate
3	3.3	Other surveys - U.S. and Mexico	ongoing	AGFD, USFWS, RT	30.0	30.0	30.0	
3	3.4	Continue telemetry tracking and assessment of radiomarking goals, including Mexico	ongoing	AGFD, RT	50.0	50.0	50.0	
3	3.5	Recruitment	ongoing	AGFD, USFWS	10.0	10.0	10.0	

Priority	Task	Task Description	Task Duration	Responsible Party	Cost Estimate (in thousands)			Comments
					2002	2003	2004	
4	4.1	Evaluate taxonomic specimens	3	AGFD, BLM, NPS, USAF, USFWS, USMC	60.0	60.0	60.0	
4	4.2	Documentation of subspecies differentiation	1	AGFD, RT	-	-	-	cost estimates included in task 4.1
4	4.3	Additional information needs on taxonomic status	1	AGFD, RT	-	-	-	cost estimates included in task 4.1
				Total	1,140.0	1,320.0	1,320.0	

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APPENDIX A.

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APPENDIX B.

PUBLIC COMMENTS ON DRAFT SUPPLEMENT AND AMENDMENT

Yuma Valley Rod & Gun Club, Inc.

ORGANIZED 1936

INCORPORATED 1938

POST OFFICE BOX 10450 * YUMA, ARIZONA 85366

November 1, 2001

Dr. John Morgart, Wildlife Biologist
Cabeza Prieta National Wildlife Refuge
1611 North second Avenue
Ajo, Arizona 85321

RE: Comment To The Supplement And Amendment Regarding The Final Revised Sonoran Pronghorn Recovery Plan Of 1998

Dear Dr. Morgart

On behalf of the Yuma Valley Rod and Gun Club (YVRGC), I would like to thank you for the opportunity to provide comment regarding Recovery Criteria And Estimates Of Time For Recovery Actions For Sonoran Pronghorn. It is our belief, all stakeholders who have an interest in the recruitment of pronghorn by providing forage and water, should support this project. This was clearly apparent over a year ago when attendees at a public meeting questioned the Recovery Team having to wait 60 to 90 days for the NEPA process to allow for the necessary signatures on the Record of Decision. It should be known those presenting (AGFD, USAF, FWS, BLM) made it very clear the process was not going to be accelerated. It was also noted and made clear that it is imperative to fully complete the process to ensure litigation would not impede the project.

Even after all of this was developed and implemented properly, the plan was still challenged. Thanks to those who apparently do not believe the Recovery Plan nor the Team are the best chance we have of saving this population of pronghorn, this supplement and amendment to the 1998 Final Revised Sonoran Pronghorn Recovery Plan had to be developed. The YVRGC firmly believes as we always have, that the professionals who are out on the ground working diligently to assist in the downlisting of pronghorn should be supported for their efforts, not challenged.

After a brief review of the document, the YVRGC believes the Team has once again did an excellent job in explaining in detail, the importance of the plan. We now hope the Recovery Team can implement what should have already been implemented.

Sincerely,

Jon Fugate, President

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20 November 2001

Don Tiller
Refuge Manager, Cabeza Prieta National Wildlife Refuge
U.S. Fish and Wildlife Service
1611 North Second Avenue
Ajo, Arizona 85321

Re: Draft Supplement and Amendment to the Sonoran Pronghorn Recovery Plan: Recovery Criteria and Estimates of Time for Recovery Actions for the Sonoran Pronghorn

Dear Mr. Tiller:

On behalf of our 6.9 million members and constituents, The Humane Society of the United States (HSUS) would like to take this opportunity to provide comments on the Draft Supplement and Amendment to the Sonoran Pronghorn Recovery Plan.

The HSUS supports efforts by the U.S. Fish and Wildlife Service (USFWS) to recover the Sonoran pronghorn population through habitat improvement, monitoring, disease research, and reducing barriers to pronghorn movement. We understand that the USFWS is approaching this recovery goal through a variety of tactics. However, we oppose the plan for control of coyotes, to the extent that this control would occur through lethal means. 2-1

The Draft Supplement and Amendment repeatedly emphasizes that several factors have had, and continue to have, major impacts on the Sonoran pronghorn population. These factors include drought, disease (exacerbated by the presence of livestock), habitat destruction or alteration (especially via livestock grazing), and incidental mortality related to stress from capture as predominate factors influencing the Sonoran pronghorn population. Predation by coyotes and other predators is also apparently having an effect on the pronghorn. Nevertheless, The HSUS is concerned that the extent to which coyotes are negatively impacting the pronghorn population may not necessitate lethal control of these predators. Instead, we suggest that the USFWS focus its recovery efforts on habitat improvement and on reducing the incidence of disease in the Sonoran pronghorn.

We understand that the USFWS proposes to limit coyote control to specific areas and to times of the year when adult female pronghorn are most susceptible to

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predation. However, we request that the USFWS consider lethal control only as a last resort. We acknowledge that some individual coyotes may "specialize" in killing specific types of prey animals. Therefore, considering the precarious status of Sonoran pronghorn, the USFWS may find it necessary to remove individual coyotes that have repeatedly attacked pronghorns. But by indiscriminately removing *any* resident coyotes occurring in a given area, the USFWS may allow other coyotes to move into the vacated territory. These immigrant coyotes may pose a greater threat to the pronghorn, or may at least provoke even more inhumane, costly, and unnecessary predator control efforts aimed at preventing predation that has not yet occurred.

2-1

Thank you for the opportunity to comment on this important matter.

Sincerely,

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Wildlife Scientist
Wildlife and Habitat Protection

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21 November 2001

Don Tiller, Refuge Manager
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Dear Mr. Tiller:

I am an Associate Professor and Chair of the Department of Biological Sciences here at the University of Southern Maine. I have studied pronghorn behavior and ecology for ten years, working with populations in Nevada, California, Montana and South Dakota, and I have published several papers on pronghorns in peer reviewed journals. I would like to submit my comments on the U.S. Fish and Wildlife Service's (USFWS) "Recovery Criteria and Estimates of Time for Recovery Actions for the Sonoran Pronghorn: A Supplement and Amendment to the 1998 Final Revised Sonoran Pronghorn Recovery Plan."

My research has focused primarily on the behavior of pronghorns. I have described activity budgets and mating system of males (published in the *Journal of Mammalogy*) as well as activity budgets and group stability in females (published in the *Southwestern Naturalist*). I also have explored the relationships of ecological variables, such as food quality and quantity, and testosterone levels to the degree of territoriality that pronghorn males exhibit in different populations (part of my doctoral dissertation as well as papers published in *Behavioral Ecology and Sociobiology* and the *Canadian Journal of Zoology*). Most recently, Carl Mitchell and I have studied the effects of selective hunting on pronghorn behavior and group composition (published in the *Canadian Field-Naturalist*), and we have examined the relationship between age and horn characteristics (published in the *Wildlife Society Bulletin*). I am a co-author, along with Dr. David Kitchen, on the pronghorn entry in the second edition of *The Encyclopedia of Mammals*.

In addition to my own research, I have remained current on the published pronghorn literature, and I have reviewed pronghorn-related manuscripts for various journals. I have followed the status of the endangered Sonoran pronghorns since 1995. I have read the biological opinions and assessments from various agencies, the different recovery plans and supplements that have been released, and the population viability analysis (PVA) that was conducted in 1996. Finally, I personally visited the Barry M. Goldwater Range in Arizona and, therefore, am familiar with the habitat of Sonoran pronghorns, first hand. Thus, I feel I am well informed and qualified to assess the many issues surrounding pronghorn biology, including those of Sonoran pronghorns.

Judge Ellen Huvelle ruled that the USFWS did not establish objective measurable criteria that would result in delisting of Sonoran pronghorns, and they did not provide estimates of the time required to carry out measures needed to achieve the plan's goal. In light of that ruling, the draft plan has 3 objectives: 1) to reassess recovery criteria for Sonoran pronghorns, 2) to

"incorporate objective measurable criteria" for delisting, and 3) to provide time estimates for executing actions "needed to achieve the plan's goal" (p. 1). Unfortunately, none of these objectives is clearly met in the document. Below, I comment on each objective.

Recovery criteria

The document includes a somewhat extensive update on the status of Sonoran pronghorns, both in the U.S. and Mexico, and it includes discussion of the problems that these animals face (reasons for listing). In fact, 31 pages of the document are devoted to a review of their biology and current situation. In contrast, however, 6 pages are spent discussing recovery criteria, and three of those pages simply list tasks included in the Implementation Schedule table at the end of the document. Recovery criteria and efforts actually receive little attention. Furthermore, when I examined the list of tasks themselves (pp. 42-46), I was dismayed by the number that use words such as "evaluate/evaluation" (6 items), "monitor" or "survey" (7 items), "evaluate", "notify", "update", "review", and "maintain" (1 item each). It seems that the agencies will spend the next 1-15 years studying Sonoran pronghorns rather than taking definitive action necessary to recover them. By the time the agencies have gathered "sufficient" information to establish criteria for delisting, the species may well be extinct.

The 1982 Recovery Plan stated that the objective was to "maintain existing population numbers" and develop "techniques" resulting in a "U.S. population of 300 animals". The 1998 Recovery Plan modified the original goal for downlisting, retaining the n = 300 adults criterion and adding the criterion of establishing a second U.S. population. Not only have we not realized the goal of 300 pronghorns, but the population has declined over time, to its current estimate of just 99 animals. In light of that fact, the idea of establishing another U.S. population from such a small starting size seems secondary to the need to increase the current population size. The USFWS has not been able to meet its objective of maintaining the status quo, in part perhaps because the animals are being "studied to death". 3-1

As a scientist, I understand the need for evidence prior to formulating conclusions and the need not to overreach one's conclusions and make sweeping generalizations. However, the fields of conservation biology and wildlife management have progressed to the point where biologists know a great deal about the effects of factors such as habitat fragmentation, inbreeding, and genetic drift on species. Although we still do not fully understand all the factors affecting Sonoran pronghorn survival and reproduction, we probably never will. Nevertheless, some concrete measures could be taken to recover this subspecies. Acting conservatively, while understandable from a purely scientific perspective, may not be justified when the population numbers less than 100 animals.

Objective measurable criteria

Instead of listing "objective measurable criteria," the USFWS states that such criteria cannot be determined at this time. Rather, they provide a list of recovery efforts that they believe "will in the short-term lead to downlisting" and "in the long-term, will lead to the delisting of the species." However, the USFWS does not provide enough information for someone to determine objectively if such recovery efforts actually are feasible and will benefit pronghorns in the short term or the long term.

As noted earlier, the USFWS has paid very little attention to the recovery efforts themselves. They provide no information about how the efforts will be implemented (i.e., "methods"), and some of the specific efforts seem ill advised and unlikely to succeed in recovering the species. I focus on several of those efforts, including captive breeding, translocation and predator control.

3-2 Captive breeding seems to be a high priority in the recovery plan. Although a few zoos successfully maintain pronghorns in captivity, in most cases, the animals do not thrive in those conditions (Moore 1987). Pronghorn fawns will imprint on humans (C. Maher, pers. obs.), thus making their subsequent release and survival in the wild somewhat questionable.

3-3 Another priority is translocation. I personally have been involved in translocation projects of pronghorns, when I was a doctoral student and Graduate Assistant with the California Department of Fish and Game in 1989 and 1990. Although the personnel took pains to handle the animals carefully, the pronghorns certainly showed signs of stress, including significant amounts of hair loss, which left bald patches on their skin, as well as abrasions and scratches from interacting with other individuals in artificially close quarters. Furthermore, I knew of 3 animals, out of a release of 34 animals, that died within the first 24 hours after the release, in part from the stress of the procedure and from exposure. For a subspecies that numbers in the hundreds of thousands, those losses might be considered acceptable, although 10% seems rather high. However, when we consider the already low numbers of Sonoran pronghorns living in the U.S., a 10% loss would represent a significant part of the population's gene pool, which leads to problems associated with inbreeding depression and genetic drift (Hedrick and Kalinowski 2000). Furthermore, the PVA for Sonoran pronghorns concluded that translocating animals from other populations (e.g., Mexico) would not ensure the long term survival of the population (Defenders of Wildlife 1998).

3-4 Predator control is another task favored in the recovery plan supplement. Although these efforts could yield quantified results (i.e., number of bobcats, mountain lions, and coyotes killed), they are unlikely to provide long term benefits to the Sonoran pronghorn population. For one reason, predators such as coyotes (the primary predator of pronghorns, Kitchen and O'Gara 1982) are known to exhibit density dependent responses to predation themselves. Thus, when humans have removed coyotes, the survivors in turn produced larger litters. The more coyotes killed in an area, the greater the density dependent response, i.e., the larger the subsequent litters (Knowlton 1972). Predator control has been used at the National Bison Range to improve pronghorn fawn survival (O'Gara and Malcolm 1988). However, this population is contained within a small, fenced area, and coyote removal easily could be targeted to this area. Predator control to enhance Sonoran pronghorn productivity would have to be conducted over a much larger scale because of the large range of these animals, and such efforts probably would not be cost effective. Again, predation currently is a problem because of the limited size of the population. Unfortunately, the animals are caught in a catch-22. They have reached such low numbers for a variety of reasons, and now that they are at such low numbers, they are vulnerable to any minor perturbations, including predation. Predator control might, in theory, enhance their numbers, but the scale of such an operation is likely to render such efforts costly and ineffective. Instead, efforts might be better spent in other areas, such as habitat protection and elimination of barriers to dispersal.

3-5 The present population size is approaching dangerously low levels, and actions should be taken to increase the size for several reasons. Such small populations are highly vulnerable to chance events that could significantly alter the genetics of the population (Soule 1986, Meffe and Carroll 1997). For example, a freak snowstorm (or flashflood) that trapped animals in a fenced area might eliminate 15% of the population, just at random. If the population consists of 10,000 animals, that loss represents 1500 animals, but it leaves 8,500 animals to repopulate the area. However, if the population consists of only 100 animals, the loss of 15 animals can be significant and could lead to loss of advantageous alleles through genetic drift. It also would increase the level of inbreeding, with its often negative effects (Meffe and Carroll 1997). Because pronghorns exhibit a polygynous mating system where relatively few males breed, the

3-5 need to maintain larger populations, and thus maintain greater genetic diversity, is even more important (Samson et al. 1985, Reed et al. 1986).

One way to increase population size may be to improve or increase their existing habitat. One criterion for listing/delisting a species is "present or threatened destruction, modification or curtailment of its habitat or range." The USFWS states that current habitat no longer may be adequate to meet the pronghorns' needs "*without active management*" (p. 19, emphasis added). However, they do not propose any actions that suggest active management. Certainly, existing habitat has some limitations. Therefore, one option could be to expand pronghorn habitat, e.g., the area east of Highway 85, and reduce impediments to their use of such areas, e.g., by lowering speed limits and removing fences. Fences and fenced highways hamper pronghorn
3-6 movements (e.g., Buechner 1950, Ockenfels et al. 1994). Many studies have reported that fences pose a significant risk to pronghorns because, unlike deer, pronghorns cannot jump over fences easily (Buechner 1950, Spillett 1965, Hailey 1979, Yoakum et al. 1996). Instead, they prefer to crawl beneath the strands. I personally have seen pronghorns caught in barbed wire fences with their hindfeet entangled in the strands. One female hung there until she died, but I was able to cut a male free before he met the same fate. Furthermore, I have observed pronghorns run back and forth along fencelines for several minutes, looking for a place to cross, and probably expending valuable energy in the process. Thus, fence removal would be beneficial to the animals.

Another proactive task would be to reduce human-related disturbance on their existing habitats, especially during critical periods such as fawning and breeding seasons, by restricting or prohibiting human access to important areas. Ockenfels et al. (1994) reported that pronghorns showed a slight tendency to avoid paved highways, probably due to disturbance from traffic.
3-7 Although my research suggests that low levels of human activity, even hunting, may not disrupt pronghorn behavior, we studied populations that regularly encountered humans (Maher and Mitchell 2000). However, higher densities of people have the potential to alter the breeding system of the animals (Copeland 1980), and to my knowledge, no one has studied the effects of even low levels of human disturbance (aside from aircraft) on the behavior of pronghorns that were not habituated to humans. Nevertheless, other species are vulnerable to disturbance during the reproductive season (Flemming et al. 1988, Fernandez and Azkona 1993, Phillips and Alldredge 2000).

Sonoran pronghorns exist in a difficult environment, but they apparently have adapted and thrived in those conditions for a long period of time. Unfortunately, a variety of factors has resulted in the drastic reduction of this subspecies. At this point, seemingly minor stochastic events could have major impacts on the small remaining population (Meffe and Carroll 1997).
3-8 The combination of stochastic events (e.g., drought), barriers to movements (fences, highways), human disturbance, and even reasonable predation rates could act synergistically to produce a greater cumulative impact on the animals.

Time estimates

The plan includes durations for the various tasks listed on pp. 42-46. However, the plan does not include any information stating how the time frames were determined, i.e., objective criteria that were applied consistently. Some tasks warrant a 5-year time frame, e.g., predator
3-9 investigation (task 1.4) and effects of disease and parasites (task 1.9), whereas other tasks warrant a 10-year time frame, e.g., water investigation (task 1.3). Yet, no reasons are provided, *a priori*, for why some tasks require more time to complete than others.

To conclude, data from the Arizona Game and Fish Department show that the Sonoran pronghorn population has been declining for the past 7 years, during which time the USFWS has spent considerable time and energy determining that it is not possible to establish "objective measurable criteria" for delisting pronghorns. Over the next 10 years, they propose to "evaluate" many aspects of pronghorn biology. Cumulative impacts of all the various agencies' activities jeopardize the continued existence of this species. Thus, to avoid further declines and to recover the species, these agencies must take serious steps to alter those activities. Without immediate action that involves activities other than monitoring and reviewing their lives, Sonoran pronghorns simply may decline to extinction.

Thank you for the opportunity to submit these comments.

Sincerely,

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Associate Professor of Biology

5

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November 26, 2001

Don Tiller, Refuge Manager
Cabeza Prieta National Wildlife Refuge
United States Fish and Wildlife Service
1611 North Second Avenue
Ajo, AZ 85321

Re: Draft Supplement and Amendment to 1998 Final Revised Sonoran Pronghorn Recovery Plan

Dear Mr. Tiller:

Defenders of Wildlife is a national nonprofit organization dedicated to the protection of native wild plants and animals in their natural communities. As an integral part of its mission, Defenders is actively involved in efforts to preserve Arizona's unique Sonoran Desert, one of the most biologically rich and diverse desert ecosystems in the world. Among its efforts in the region, Defenders has been working for many years to promote the survival and recovery of the critically endangered Sonoran pronghorn. This subspecies of pronghorn, which once roamed in the thousands throughout its range in the Sonoran Desert, has been reduced to a population of roughly 100 animals or fewer in Arizona and a total of perhaps 200-300 individuals in Mexico. The decline of the Sonoran pronghorn to the brink of extinction is attributable in large part to human activities that have resulted, both directly and indirectly, in the loss, degradation, and fragmentation of pronghorn habitat, as well as in the harassment, injury, and mortality of pronghorns.

Defenders' work relating to conservation of the pronghorn has included, among other efforts: co-sponsoring, facilitating, and participating in a population viability analysis ("PVA") for the subspecies; submitting written comments and attending public meetings on numerous issues and decisions affecting the pronghorn; and filing a lawsuit against multiple federal agencies to ensure that cumulative impacts on the pronghorn are properly considered when authorizing and conducting activities in pronghorn habitat, and that the subspecies has an adequate recovery plan. The survival and recovery of the pronghorn are among our organization's top conservation priorities, and we intend to remain actively involved in ensuring the FWS's development and implementation of an adequate recovery plan for the subspecies, as well as in ensuring that the Service and other agencies fully consider the impacts of their activities on the subspecies. On behalf of our more than 450,000 members and supporters, Defenders is submitting these comments on the U.S. Fish and Wildlife Service's ("FWS") Draft Supplement and Amendment to the 1998 Final Revised Sonoran Pronghorn Recovery Plan ("Draft Supplement and Amendment").

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Defenders of Wildlife
Page 2

Under § 4 of the Endangered Species Act ("ESA"), the FWS is required to develop and implement a recovery plan "for the conservation and survival of" each listed endangered or threatened species, including the Sonoran pronghorn. 16 U.S.C. § 1533(f)(1). The purpose of a recovery plan is to establish "a basic road map to recovery, i.e., the process that stops or reverses the decline of a species and neutralizes threats to its existence." Fund for Animals v. Babbitt, 903 F. Supp. 96, 103 (D.D.C. 1995). The Act provides that, in preparing such a plan, the FWS **shall**, to the maximum extent practicable, incorporate:

> (i) a description of such site-specific management actions as may be necessary to achieve the plan's goal for the conservation and survival of the species;
> (ii) objective, measurable criteria which, when met, would result in a determination, in accordance with the provisions of this section, that the species be removed from the list; and
> (iii) estimates of the time required and the cost to carry out those measures needed to achieve the plan's goal and achieve intermediate steps toward that goal.

16 U.S.C. § 1533(f)(1)(B)(i)-(iii). "Obviously, the phrase 'to the maximum extent practicable' does not permit an agency unbridled discretion. It imposes a clear duty on the agency to fulfill the statutory command to the extent that it is feasible or possible." Fund for Animals, 903 F. Supp. at 111.

Notwithstanding this clear mandate, in the 1998 Final Revised Sonoran Pronghorn Recovery Plan ("1998 Plan") and again in the Draft Supplement and Amendment, the FWS has failed to develop and implement an adequate recovery plan for the pronghorn that identifies and provides for the pronghorn's known recovery needs. Instead, the FWS has consistently relied on a purported lack of information to justify an approach that may ultimately result in a species that, rather than recovering, is simply "studied to death."

4-1 In February 2001, a federal district court ruled that the FWS's 1998 Plan did not comply with the ESA because the agency failed to establish objective, measurable criteria for delisting the pronghorn, and also failed to include time estimates for measures needed to achieve the Plan's goals. Defenders of Wildlife v. Babbitt, 130 F. Supp.2d 121 (D.D.C. 2001). On remand pursuant to the Court's decision, the FWS has issued a Draft Supplement and Amendment that is intended to address these deficiencies. Yet, as explained below, this draft fails to remedy the shortcomings identified by the Court and thus, the pronghorn is still without a recovery plan adequate to address either ongoing threats to its existence or its recovery needs.

Recovery plans, by definition, are aimed at the "the conservation and survival" of listed species. 16 U.S.C. § 1533(f)(1). The term "conservation" in the ESA means "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 the Act are no longer necessary." 16 U.S.C. § 1532(3). In other words, the concept of conservation goes far beyond mere survival to encompass actual recovery of the species to the point that it can be delisted.

The Act's requirement that recovery plans include "objective, measurable criteria" plainly reflects this overarching objective of delisting because the criteria must be such that, "when met, [they] would result in a determination, in accordance with the provisions of this section, that **the species be removed from the list**." 16 U.S.C. § § 1533(f)(1)(B)(ii) (emphasis added). "Congress has spoken in clarion terms: the objective, measurable criteria must be directed towards the goal of removing the endangered or threatened species from the list. Since the same five statutory factors must be considered in delisting as in listing, ... the FWS, in designing objective, measurable criteria, must address each of the five statutory delisting factors and measure whether threats to the [species] have been ameliorated." Fund for Animals, 903 F. Supp. at 111 (citations omitted). The delisting determination "sets a target to be aimed at by meeting the recovery goals set forth in the Plan." Id.

The five statutory listing/delisting factors set forth in the ESA are: (1) the present or threatened destruction, modification, or curtailment of its habitat or range, (2) overutilization for commercial, recreational, scientific, or educational purposes, (3) disease or predation, (4) the inadequacy of existing regulatory mechanisms, or (5) other natural or manmade factors affecting its continued existence. 16 U.S.C. § 1533(a)(1).

In the Draft Supplement and Amendment, the FWS has not met its obligation under the ESA to develop objective, measurable criteria by which to assess threats to the pronghorn's conservation and survival with respect to each of these factors. For one thing, the FWS fails altogether to define criteria for **delisting**, as opposed to **downlisting**, the pronghorn, instead concluding that establishing such delisting criteria at this time "is not practicable." Draft Supplement and Amendment at 37.[1] Yet such delisting criteria are clearly required by both the ESA and the Court's order. Moreover, even with respect to downlisting, the FWS never actually develops the criteria envisioned in the Act – i.e., a gauge of what ultimately has to happen with respect to habitat quantity and quality, disturbance, disease, and other threat factors in order for the pronghorn to recover. Instead, the FWS simply describes the listing/delisting factors and then categorizes various recovery measures – which consist primarily of continued studies, investigation, and observation – under each factor.

4-2

The FWS's attempt to supplement and amend the 1998 Recovery Plan falls short of ESA requirements, as well as the Court's order, because the Service focuses too heavily on the supposed lack of information concerning pronghorn needs and habits and the purported impracticability of achieving various objectives. Yet a recovery plan should be an **action-forcing** document that establishes recovery criteria supported by site-specific actions and estimates of time and resources needed. Although we may not fully understand all factors

4-3

[1]Indeed, the FWS makes the conflicting assertions that, on the one hand, "the Sonoran pronghorn may not be fully recoverable," and on the other hand, "these recovery efforts will in the short-term lead to downlisting the pronghorn from endangered to threatened, and in the long-term, will contribute to the delisting of the species." Draft Supplement and Amendment at 37.

affecting pronghorn survival and recovery, we may never have such complete information, and some concrete measures can and must be taken to recover the species based on the scientific understanding we do have before it is too late. Furthermore, criteria for delisting the pronghorn do not become "impracticable" simply because they are difficult to implement: the question is whether it is practicable to come up with the criteria, which it clearly is in this case. From there, all interested parties can and must work together to determine how to make these criteria a reality.[2]

4-3

For instance, an earlier recovery plan for the species, developed in 1982, highlights a particularly egregious shortcoming in the current Draft Supplement and Amendment. There, the FWS stated that "[t]he probable reason for the [pronghorn's] decline is loss of habitat ... this habitat has yet to recover." "Range extension" was thus identified as on of the "only known ways" to recover the species. 1982 Sonoran Pronghorn Recovery Plan at 6-7. Almost twenty years later, however, the FWS still has not made progress toward tangible actions that will ensure the subspecies' existence into the future. Indeed, the Draft Supplement and Amendment actually calls into question whether the current habitat could support the minimal 300-member population that was stated as a recovery goal in the 1998 Plan, Draft Supplement and Amendment at 35, yet proposes no measures aimed at range expansion.

The following are examples of recovery criteria that should be included in the recovery plan for the pronghorn. This list is not intended to be comprehensive, but to reflect a minimum of factors and objectives that must be considered in determining when to delist the pronghorn.

4-4

[2] The Supreme Court has described the ESA as the "most comprehensive legislation for the preservation of endangered species ever enacted by any nation." Babbitt v. Sweet Home Chapter of Communities for a Great Oregon, 515 U.S. 687, 698 (1995) (quoting Tennessee Valley Authority v. Hill, 437 U.S. 153, 180). According to the Court, finding "the value of endangered species as '**incalculable**,'" Tennessee Valley Authority, 437 U.S. at 187 (emphasis added), the "plain intent" of Congress in passing the statute "was to halt and reverse the trend toward extinction, **whatever the cost**." Sweet Home, 515 U.S. at 699 (quoting Tennessee Valley Authority, 437 U.S. at 180) (emphasis added). Thus, as the Court explained: "Congress has spoken in the plainest of words, making it abundantly clear that the balance has been struck in favor of affording endangered species the **highest of priorities** ...." Tennessee Valley Authority, 437 U.S. at 194 (emphasis added). The ESA, in short, reflects "an explicit congressional decision to afford **first priority** to the declared national policy of saving endangered species." Id. at 185. Given the overriding nature of this obligation, it is clear that once the FWS establishes meaningful criteria for recovering and ultimately delisting the Sonoran pronghorn, the federal agencies that operate within occupied and potential pronghorn habitat will be required to do what it takes to achieve the objectives contained in those criteria – even if that means ceasing or substantially curtailing activities that are adversely impacting the pronghorn.

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I. There are an estimated 500 Sonoran pronghorn (or a biologically reasonable estimate based on the goal of maintaining a stable population in perpetuity) in one U.S. population and a second separate population is established in the U.S. and remains stable over a 5-year period.

II. Threats to the persistence of Sonoran pronghorn have been substantially reduced or eliminated throughout a significant portion of its current and potential range including but not limited to:

A. Critical habitat is designated for the Sonoran pronghorn and existing habitat is maintained, degraded habitat is restored, and available habitat is expanded.

1. The negative impacts of cattle grazing on Sonoran pronghorn habitat have been eliminated.
2. Access to potential habitat and other population segments has been expanded and the risk of mortality along movement barriers (i.e. highways, railroads, fences, canals) has been reduced.
3. The Lower Gila River is restored to seasonally flood and regenerate vegetation growth and access to the river by Sonoran pronghorn is also restored.

B. Human disturbance to Sonoran pronghorn, particularly during sensitive times of year, is substantially reduced or eliminated.

1. The negative impacts of military activities have been abated.
2. The negative impacts of recreation use in Sonoran pronghorn habitat have been eliminated.
3. The negative impacts of illegal border traffic and associated Border Patrol operations have been abated.
4. Special Management Areas have been established to protect Sonoran pronghorn during sensitive times of year in important habitat areas.

C. The anthropogenic transmission of disease has been eliminated.

III. Movement of individual Sonoran pronghorn between population segments within Arizona and between Arizona and Mexico is possible based on the availability of habitat and the capabilities of dispersing Sonoran pronghorn.

4-4

All of these criteria are critically important for enabling the pronghorn's recovery, which must be the ultimate goal of the recovery plan. A viable population is perhaps the most fundamental measure of recovery of a species. Achieving this objective may entail intensive management efforts, such as captive breeding, but concurrent with bolstering the population, threats to the population must be abated. If the reasons for a species' decline and listing are not addressed, artificially increasing the population by captive breeding and other efforts will not recover the species over the long term. Finally, to increase the viability of the species, there needs to be potential for movement between populations to increase genetic exchange and to repopulate potential habitat naturally.

The following discussion explains the above criteria and the rationale supporting their

necessity in further detail, including bulleted quotes from the FWS's own information, research, and analysis contained in the Draft Supplement and Amendment, as well as earlier recovery plans for the pronghorn:

I. There are an estimated 500 Sonoran pronghorn (or a biologically reasonable estimate based on the goal of maintaining a stable population in perpetuity) in one U.S. population and a second separate population is established in the U.S. and remains stable over a 5-year period.

Many recovery plans require that more than one population of a species exist before de-listing. As explained in the 1992 Eastern Timber Wolf Recovery Plan:

> • "The Plan's basic approach to eastern timber wolf recovery is, and has always been, to try to ensure that there be at least two viable populations of wolves within the historic range in the United States. The requirement for more than a single recovery population stems from the basic concept of conservation biology that a species can never be assumed to be secure from extinction if only a single population exists." U.S. Fish and Wildlife Service 1992 at 24.

The latest scientific estimate for a minimum viable population size was provided in the 1996 population viability analysis ("PVA") for the Sonoran pronghorn. Until the PVA is updated and revised or other biologically reasonable assessments are made, the population goal for the Sonoran pronghorn should be based on this latest scientific understanding, which is 500 individuals to maintain the subspecies and its genetic diversity:

4-4

> • "...although a carrying capacity of 300 individuals might be as likely to insure simple survival as a carrying capacity of 500, only at carrying capacities at or above 500 would the long-term genetic diversity goal be likely to be achieved. Conservation biologists tend to agree that simply maintaining a species, without maintaining very high levels of genetic diversity, is a poor management approach to any species, be it an endangered species or not. In order to attain anything near a population of 500 Sonoran pronghorn, severe habitat modifications and/or additional habitat protections would certainly need to be accomplished." Defenders of Wildlife 1998 at vii.

If, as suggested by the Draft Supplement and Amendment, the current range may not support even 300 animals, then it is even more imperative to expand available habitat to support these numbers, instead of being justification for not being able to establish objective, measurable recovery criteria.

II. A. Critical habitat is designated for the Sonoran pronghorn and existing habitat is maintained, degraded habitat is restored, and available habitat is expanded.

As stated in the FWS press release for the Draft Supplement and Amendment,

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"Conversion of habitat to other uses and barriers to movement caused by roads, canals, train tracks, and fences are the primary culprits in the decline of the Sonoran pronghorn." The reduction and degradation of Sonoran pronghorn habitat is cited throughout the 1982 Recovery Plan, the 1998 Final Revised Recovery Plan, and the 2001 Draft Supplement and Amendment, as a major factor in the decline of the subspecies.

In light of this clear need, Defenders has petitioned the FWS to designate critical habitat for the Sonoran pronghorn. Petition for Rule Designating Critical Habitat for the Endangered Sonoran Pronghorn, Defenders of Wildlife, December 27, 1999. Critical habitat will provide critically needed protections for the Sonoran pronghorn including: requiring federal agencies to avoid the continued destruction and adverse modification of occupied and unoccupied pronghorn habitat; allowing the FWS and other federal agencies to more effectively analyze individual and cumulative impacts on the subspecies and its habitat; ensuring that greater conservation is given to the impacts of human activities taking place in pronghorn habitat; and clearly identifying for federal and non-federal parties the habitat that must be protected to ensure the pronghorn's conservation. Instead of recognizing the need for critical habitat for the pronghorn, the Draft Supplement and Amendment alludes to the position that existing land management programs are adequate for the protection of pronghorn habitat:

4-4

> • "Critical habitat for Sonoran pronghorn has not been designated. Current Sonoran pronghorn range in the U.S. is almost entirely encompassed by lands under federal jurisdiction... All agencies either have in place..., or are actively working on comprehensive management plans... designed to guide management of natural resources on the affected lands for the next 10 to 25 years. All of these plans do or will address Sonoran pronghorn issues." Draft Supplement and Amendment at 24.

Relying on individual agency management plans and actions has clearly failed to conserve the Sonoran pronghorn up to this point. The agencies have not only failed to recover the subspecies, but have failed to maintain the population at the level it started out at when recovery efforts commenced, even though this was a major goal of the 1982 recovery plan. The primary reason for this failure has been the inability of existing conservation measures to stop the continued loss and degradation of pronghorn habitat on federal lands.

Since 1977, the FWS has repeatedly emphasized habitat conservation as the critical measure for ensuring the subspecies' survival and recovery. In 1977, the Sonoran Pronghorn Recovery Team supported its recommendation for the designation of pronghorn critical habitat by stating clearly the result if the subspecies' habitat is not adequately protected:

> • "Any changes in present land use or future development of this habitat could jeopardize segments of the Sonoran antelope population in the United States. Since the present Sonoran antelope population of the United States is estimated to be approximately 100 individuals, little margin is afforded and the result could be extinction." Sonoran

Pronghorn Recovery Team Recommendations for Critical Habitat for the Sonoran Antelope (1977) at 3 (emphasis added).

Critical habitat is defined as those areas that are, "essential for the conservation of the species," including both occupied and unoccupied habitat. 16 U.S.C. §1532(5)(A). By defining critical habitat in terms of what is necessary for species conservation, and by expressly providing for the inclusion of unoccupied habitat, critical habitat represents those areas an endangered or threatened species needs not only to survive but also to recover. This is especially important for the Sonoran pronghorn, for which throughout the recovery program's history, translocation and establishment of multiple populations has been recommended. Without critical habitat designation in unoccupied habitat, there is no regulatory mechanism to protect and secure a location to re-establish a second population – a longstanding and essential criteria for recovery.

In addition to establishing critical habitat, the following habitat issues have been highlighted by the Service and should serve as recovery criteria:

4-4 (1) *The negative impacts of cattle grazing on Sonoran pronghorn habitat have been eliminated.*

The Draft Supplement and Amendment and past recovery plans for the Sonoran pronghorn repeatedly state the negative impacts cattle grazing has on the Sonoran pronghorns

- "Livestock grazing has the potential to alter pronghorn habitat more than any other anthropogenic activity" Draft Supplement and Amendment at 16.

- "Livestock grazing and range management programs have had a greater effect on the vegetation of southeastern Arizona than any other single land use." Draft Supplement and Amendment at 18.

- "Habitat alteration (caused in part by livestock grazing) was a leading cause in the decline in Sonoran pronghorn numbers." Draft Supplement and Amendment at 18

- "long-term and perhaps irreversible habitat changes brought about by past overgrazing" is in a list of significant "current threats." Draft Supplement and Amendment at 36.

- "It seems possible that pronghorn might have been displaced from preferred habitat by livestock, given that the distribution of sightings seems to have shifted to the east with cattle removal." 1998 Plan at 14.

- "The following are thought to be reasons for the population decline of the Sonoran pronghorn:... degradation of habitat from livestock grazing..." 1998 Plan at 21.

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In addition, a number of studies have shown that American pronghorn generally compete with cattle and other livestock for forage. Stephenson et al. 1985.

Clearly, it has been documented that livestock grazing has been a major factor in the decline of the pronghorn. Yet according to the 1998 Plan and Draft Supplement and Amendment the BLM and FWS intend over the next *five years* (at a cost of $150,000) to "[i]nvestigate potential competition in areas where livestock occur in Sonoran pronghorn habitat. If competition occurs, evaluate decreasing livestock numbers to eliminate negative effects on Sonoran pronghorn." 1998 Plan at 38, Draft Supplement and Amendment at 42. Objective measurable criteria, especially for a threat factor as important as grazing, are critical for the development of implementation tasks that will lead to the recovery of the Sonoran pronghorn. As stated previously, "the FWS, in designing objective, measurable criteria, must address each of the five statutory delisting factors and measure whether threats to the [species] have been ameliorated." Fund for Animals, 903 F. Supp. at 111 (citations omitted).

(2) *Access to potential habitat and other population segments has been expanded and the risk of mortality along movement barriers (i.e. highways, railroads, fences, canals) has been reduced.*

4-4

Highways, fences, railroads, canals, and other movement barriers have been documented to reduce habitat availability, isolate populations, and pose a mortality risk, all of which are stated factors in the Sonoran pronghorn's decline. The Draft Supplement and Amendment and past recovery plans for the Sonoran pronghorn repeatedly state the negative impacts of movement barriers on the Sonoran pronghorn's population:

- "Highway 2 (and to a lesser extent the international boundary fence) acts as a barrier to movement between the El Pinacate and U.S. subpopulations... Loss of the El Pinacate subpopulation would result in further fragmentation and isolation of the remaining Sonoran pronghorn subpopulations in the U.S. and Mexico." Draft Supplement and Amendment at 9.

- "Sonoran pronghorn require vast areas of unencumbered open range to meet their needs for survival and reproduction." Draft Supplement and Amendment at 16.

- "Highways, fences..., railroads, and canals have caused habitat fragmentation." Draft Supplement and Amendment at 19.

- "The potential for injuries and deaths from highways, railroads, and canals remains a concern and the influence to the population from accidents could be significant." Draft Supplement and Amendment at 28.

"Habitat frequented by Sonoran pronghorn on OPCNM only occurs west of Highway 85

at this time." Draft Supplement and Amendment at 31

• "Increased use of highways, fences, railroad, and canals could be a deterrent to expanding pronghorn populations." 1998 Plan at 11.

• "A lack of recent observations east of [Highway 85], however, indicates that this heavily used road currently poses a barrier to eastward movement." 1998 Plan at 12.

• "Interstate 9 and adjacent agriculture act as barriers for northward movements of Sonoran pronghorn." 1998 Plan at 12.

• "The following are thought to be reasons for the population decline of the Sonoran pronghorn:... Difficulties for population expansion due to barriers to historical habitat..." 1998 Plan at 21.

Clearly, movement barriers have been major factors in the decline of the pronghorn. Yet according to the 1998 Plan and the Draft Supplement and Amendment the AGFD, BLM, FWS, NPS, USAF, and USMC intend over the next *five years* to "[i]nvestigate expansion of present range through barriers such as east of Highway 85, south of Highway 2 in Mexico, north of Interstate 8, Wellton Canal, fences, agriculture to Gila River historical habitat." 1998 Plan at 38, Draft Supplement and Amendment at 42. If there were objective measurable criteria in place, as we have suggested above, they would provide a target for the agencies to actually begin to reduce movement barriers, in addition to the continued investigation of the problem that may be required.

4-4

For instance, the 1998 Plan states that "[t]raffic volume and probably average speeds have increased substantially over the last 30 years" on Highway 85. 1998 Plan at 12. It is during this time period when pronghorn seem to have ceased crossing Highway 85. Yet the speed limit in Organ Pipe Cactus National Monument was increased, even though the NPS originally proposed lowering the speed limit of Highway 85 for the benefit of the pronghorn. Simple, immediately implementable actions like reducing the speed limit of Highway 85 and installing traffic calming devices could facilitate more movement of pronghorn into high quality habitat on the east side of Highway 85 in OPCNM and further north on the BMGR. These areas are within historic habitat (pronghorn have been observed there as late as 1996) and are important for the recovery of the species. Again, without objective measurable criteria regarding habitat and barriers to movements to work towards, it is difficult to develop meaningful implementation tasks.

(3) *The Lower Gila River is restored to seasonally flood and regenerate vegetation growth and access to the river by Sonoran pronghorn is also restored.*

The river systems of the Sonoran Desert were once seasonally extremely important to Sonoran pronghorn. Their degradation is a leading factor in the pronghorn decline:

• "De-watering of most of the lower Gila and Sonoyta rivers has likely caused significant habitat modification, as has agricultural, urban, and commercial development." Draft Supplement and Amendment at 19.

• "The drying of the Gila River in Arizona and other rivers in Sonora may have been a significant cause of the species becoming endangered... Historic descriptions of these rivers suggest a greenbelt that could have contributed to Sonoran pronghorn survival, not from a drinking water resource standpoint, but by providing green forage during a time of year when this resources was limited in the rest of the range." 1998 Plan at 22 (citations omitted).

In addition, the effects of drought on the current population are profound. Without river systems available as refugia of adequate forage, one of the main coping mechanisms for drought has been eliminated for the Sonoran pronghorn. Without the restoration of at least a portion of the river systems within the pronghorn's historic habitat, its long-term persistence is in serious question.

II. B. Human disturbance to Sonoran pronghorn, particularly during sensitive times of year, is substantially reduced or eliminated.

4-4 Given the precarious state of the Sonoran pronghorn population in the United States, *everything* that reduces in some way the survival of an individual or lowers its reproductive potential should be eliminated. Many types of human disturbance are easily controllable and are at the discretion of the action agencies. Because the FWS and other relevant agencies can actually do something about these impacts to the pronghorn – as opposed to, say, drought, which is beyond human control – these are particularly appropriate and critical areas on which to focus recovery efforts.

(1) *The negative impacts of military activities have been abated.*

A primary example of human sources of disturbance to the pronghorn lies in the extensive military operations that take place on the Barry M. Goldwater Range, which is the second largest aerial gunnery training facility in the nation and contains one of the largest remaining areas of pronghorn habitat. Three branches of the military – the Air Force, the Marine Corps, and the Army National Guard – engage in numerous activities on the Range that regularly harass, harm, and possibly even kill Sonoran pronghorn. As the FWS has recognized:

• "Direct death or injury to pronghorns could occur as a result of ordnance deliveries, other objects falling from aircraft, spent shells, live rounds, aircraft crashes, or collisions with ground vehicles." Draft Supplement and Amendment at 29.

• "Pronghorn are also exposed to some indirect impacts of military activities, primarily

noise and visual, from low-level aircraft overflights, ordnance delivery, and vehicle and foot traffic." Draft Supplement and Amendment at 29.

• " Explosive Ordnance Disposal (EOD) personnel collect and destroy dangerous unexploded munitions on tactical ranges and other developed target areas. ... Some desert vegetation is unavoidably crushed during these operations and pronghorn may avoid the areas due to the activity and noise." Draft Supplement and Amendment at 29.

• The Marine Corps' Weapons and Tactics Instructor Course ("WTI") is conducted twice a year and includes overflights as well as ground-based activities that may occur in pronghorn habitat. Draft Supplement and Amendment at 29-30.

Clearly, reducing or eliminating impacts from such military activities must be a criteria for ultimately recovering the pronghorn. Yet at present, the Air Force still does not even monitor for pronghorn before strafing (shooting rapid-action guns from aircraft) or dropping certain inert ordnance in the tactical ranges. At a minimum, monitoring must be required before all such activities that could harass, injure, or even kill specific animals. Likewise, continued monitoring should be required in connection with explosive ordnance disposal ("EOD") due to the extreme sensitivity of pronghorn to on-the-ground activity and disturbance. In certain instances, moreover, military activities should be completely prohibited or substantially curtailed, such as during sensitive fawning seasons or in areas known to provide crucial habitat for pronghorn biological needs.

4-4

Unfortunately, in lieu of developing specific criteria and management actions to address the obvious and substantial threats to the pronghorn posed by military activities, the FWS in its Draft Supplement and Amendment simply describes these activities and alludes to the potential impacts on pronghorn. This approach is clearly inadequate in light of the Service's, as well as the military agencies', overriding obligations under the ESA to avoid jeopardy to the pronghorn and to ensure the subspecies' survival and recovery.

(2) *The negative impacts of recreation use in Sonoran pronghorn habitat have been eliminated.*

Recreational use of federal lands in southern Arizona is on the rise and is projected to continue to increase. This increased level of human activity, especially if not properly regulated, is yet another obstacle facing pronghorn recovery. As the FWS recognized:

• "Increasing visitor use of the region, particularly in back country areas, increases the potential for visitor/pronghorn interactions." Draft Supplement and Amendment at 31.

• "Investigate seasonal closures of certain areas to decrease disturbance to foraging/fawning pronghorn." 1998 Plan at 39.

• "Studies of captive pronghorn other than Sonoran, have shown that they are sensitive to disturbance such as human presence and vehicular noise." 1998 Plan at 21.

There are myriad ways to control visitor numbers and destinations. Though a large portion of the current range of the Sonoran pronghorn is designated wilderness this does not mean those areas are free from human disturbance, and certainly does not justify not controlling visitor use outside of wilderness areas. The federal agencies involved in pronghorn recovery have direct control over recreational use should do everything in their power to eliminate its negative impacts. To achieve this goal the FWS must establish recovery criteria and management actions to address the threat posed by recreational use.

(3) *The negative impacts of illegal border traffic and associated Border Patrol operations have been abated.*

While the FWS devotes substantial time in the Draft Supplement and Amendment to describing the growing threat of illegal border crossings on the Sonoran pronghorn, no recovery criteria or management actions are suggested to recognize the role of this activity in impeding pronghorn recovery or to alleviate the problems associated with this issue. Again, the FWS has clearly recognized the threats stemming from both the border traffic and the resulting law enforcement activity:

4-4

• "In one area, illegal traffic has created a 61 km road since 1999 that traverse pronghorn habitat." Draft Supplement and Amendment at 32.

• "Increased illegal border crossings have resulted in stepped-up enforcement activities (e.g., more officers and vehicles, increased patrolling and interdictions) with their own set of potential impacts to Sonoran pronghorn." Draft Supplement and Amendment at 33.

• "explosive increase in illegal across-the-border activities" are in a list of significant "current threats." Draft Supplement and Amendment at 36.

But the Service must do more than simply acknowledge the potential impacts. In order to ensure pronghorn survival and ultimate recovery, the FWS must provide for the abatement of this and other threats to the subspecies by establishing recovery criteria and developing action measures that will force the relevant agencies to curtail or cease their harmful activities.

(4) *Special Management Areas have been established to protect Sonoran pronghorn during sensitive times of year in important habitat areas.*

To partially address these problems, we suggest that the establishment of Special Management Areas (SMAs) be a criteria for delisting the pronghorn. While "Investigate

seasonal closures of certain areas... to decrease disturbance to foraging/fawning pronghorn", 1998 Plan at 39, is an implementation task already identified by the recovery team, we believe enough is already known about pronghorn distribution to establish these areas. Further investigation can be used to refine their location and test their efficacy, but disturbance to pronghorn must be reduced immediately. SMAs should be located in bajada habitat, identified by the Arizona Game and Fish Department as important to the Sonoran pronghorn year round, Hervert et al. 2000, and other locations used by Sonoran pronghorn during breeding, fawning, and times of stress (e.g. drought).

II. C. The anthropogenic transmission of disease has been eliminated.

4-4 As stated in the Draft Supplement and Amendment, disease may be limiting the productivity of Sonoran pronghorn:

> • "Serological examination revealed a nearly 100% incidence of exposure to bluetongue and EHD viruses in Sonoran pronghorn... which is exceedingly high compared to pronghorn exposure rates outside of Arizona... Livestock are the primary reservoir for the bluetongue virus and EHD... and the likely avenue of transmission to pronghorn is by biting midges... A viremic female may be in poor reproductive condition or her behavior altered enough to effect breeding... Viremic males may be unsuccessful in defending breeding territories or females." Draft Supplement and Amendment at 22.

Combined with the extensive impacts cattle have on habitat already described, the transmission of disease provides more cause to eliminate cattle grazing on public lands in Sonoran pronghorn habitat. In addition to bluetongue and EHD viruses spread from cattle via biting midges, artificial watering holes may also contribute to the spread of disease. These and other types of human influenced disease transmission can and should be eliminated to recover the subspecies.

***

4-5 The population of the Sonoran pronghorn is critically low. As stated in the plan, the historical factors leading to the species' decline were over harvest and habitat loss and degradation. Currently, over harvest is less of a concern, but because of the extremely low population **every factor that has been identified as potentially adverse to the population is significant**. While any one factor, whether it be disease, disturbance, or lack of forage, may normally not influence the population, the cumulative impact of all of the myriad factors identified will likely send the species spiraling to extinction if each is not substantially addressed. As stated in the PVA, the loss of just one animal per year could be the difference between the

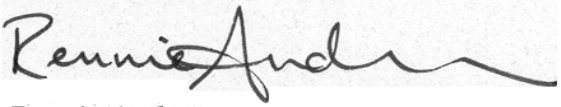
4-5 population recovering or going extinct.[3] The FWS must account for this both in the recovery criteria for the subspecies as well as when authorizing incidental take.

The Draft Supplement and Amendment for the Sonoran pronghorn contains a detailed description of the state of knowledge of Sonoran pronghorn. What it lacks, however, is a clear, rational connection between what we know about the species, and the actions necessary to address the many problems identified in the plan facing the pronghorn.

Thank you for the opportunity to submit these comments.

Sincerely,

Noah Matson
Science Policy Analyst



Rennie Anderson
Associate Counsel

[3] "[A] cessation of losses of animals due to research during times that the population is at critically low numbers might be important. Analogously, any actions which result in the survival of a few more animals during times when numbers are very low might significantly increase the changes of population recovery. It is notable that a difference of one animal surviving per year can sometimes be the difference between the population recovering or going extinct." Defenders of Wildlife at 14 (emphasis added).

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Center for Biological Diversity

Protecting and restoring endangered species and wild places of Western North America and the Pacific through science, policy, education, and environmental law.

FAX TRANSMISSION to (520)387-5359 ◆ 2 pages ◆ Nov 26, 2001

Don Tiller, Refuge Manager
Cabeza Prieta National Wildlife Refuge
US Fish and Wildlife Service
1611 North Second Avenue
Ajo, AZ 85321

Dear Mr. Tiller:

Re: Draft Supplement & Amendment to Sonoran Pronghorn Recovery Plan

The Center for Biological Diversity is a national nonprofit organization dedicated toProtecting and restoring endangered species and wild places of Western North America and the Pacific through science, policy, education, and environmental law. On behalf of our 6000+ members and supporters throughout the United States, CBD is actively involved in efforts to preserve Arizona's unique Sonoran Desert, one of the most biologically rich and diverse desert ecosystems in the world. Of great concern is the survival and recovery of the critically endangered Sonoran pronghorn. This subspecies of pronghorn, which once roamed in the thousands throughout its range in the Sonoran Desert, has been reduced to a population of roughly 100 animals or fewer in Arizona and a total of perhaps 200-300 individuals in Mexico. The decline of the Sonoran pronghorn to the brink of extinction is attributable in large part to human activities that have resulted, both directly and indirectly, in the loss, degradation, and fragmentation of pronghorn habitat, as well as in the harassment, injury, and mortality of pronghorns.

We generally concur with the comments concurrently being submitted by the Defenders of Wildlife, to the effect that:-

1. The FWS has still failed to establish"objective, measurable criteria" for delisting the Sonoran pronghorn, as required by the ESA and Judge Huvelle's order. It is unacceptable for the Service to continue to rely on a purported lack of information as a justification for its failure to develop and implement concrete measures needed to protect and recover the pronghorn. 5-1

2. The FWS has failed to substantially address the many factors that are individually and cumulatively contributing to the pronghorn's decline, including: barriers to pronghorn movement and habitat expansion, the negative effects of livestock ranching on pronghorn, and other sources of disturbance (e.g., recreation, hunting and other human presence, military and Border Patrol operations) that may particularly impact pronghorn during breeding and fawning seasons. Livestock have largely been removed from much of the pronghorn's range in SW Arizona. 5-2

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However, ranching operations still go on around Ajo and the long term impacts of livestock still are seen in the landscape. Fencing and water developments are still in place to entrap pronghorn or affect predator distributions. Cattle negatively affect pronghorn antelope by depleting key browse species on critical wintering grounds (Mackie, 1978; McNay, 1982). Pronghorn fawn production has jumped up in recent years after closure of the Hart Mtn Antelope Refuge in Oregon to grazing in 1991. This was despite no predator control program on the refuge.

5-2

3. To increase fawn survival, reduce disturbance, and protect habitat, the FWS should establish Special Management Areas in areas identified as important to pronghorn. Any and all disturbance to pronghorn should be eliminated in these areas while pronghorn are present, particularly during sensitive breeding and fawning periods, and habitat in these areas should be protected and restored.

5-3

Sincerely,

Martin Taylor, Ph.D.
Coordinator

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November 24, 2001

Don Tiller
Cabeza Prieta National Wildlife Refuge
U. S. Fish and Wildlife Service
1611 North Second Avenue
Ajo, AZ 85321

Re: Draft Supplement and Amendment to the 1998 Final Revised Sonoran Pronghorn Recovery Plan

Dear Mr. Tiller:

These comments are to address the Draft Supplement and Amendment to the 1998 Final Revised Sonoran Pronghorn Recovery Plan put out by U.S. Fish and Wildlife Services to address the deficiencies in your 1998 Recovery Plan for the pronghorn. Specifically, the Recovery Plan was ruled out of compliance with the Endangered Species Act because U.S. Fish and Wildlife Services failed to incorporate "objective, measurable criteria" for delisting the pronghorn and failed to include time estimates for accomplishing measures necessary to recover the species.

In reading the Draft, I find that it does not meet the ESA requirements and one part of the court order in that it, like the original Plan, fails to establish criteria for delisting the Sonoran pronghorn. For a myriad of reasons the Sonoran Pronghorn Recovery Team, despite new data obtained since the 1982 Plan, determined that "establishing delisting criteria at this time is not practicable" (Draft, page 37). Perhaps that is because the next line of the Draft states that the Sonoran pronghorn may not be fully recoverable, implying that devising delisting criteria would be a waste of time. It is unacceptable that the Service continues to rely on a purported lack of information to justify it's failure to develop and implement concrete measures needed to recover and protect the pronghorn.

6-1

The Draft mentions the many factors that contribute to pronghorn decline, such as present or threatened destruction or modification of habitat, various predators, disease, barriers to movement and habitat expansion, disturbances from military activities, recreation, immigrant traffic and Border Patrol operations, but there is nothing that specifically addresses what is to be done to address these factors, other than kill some coyotes and investigate range expansion. I see investigations of various factors (military effects on behavior, military contaminants, etc.) on the Implementation Schedule, but what will be done with the information gathered?

6-2

Is Fish and Wildlife willing to establish Special Management Areas in areas identified as important to pronghorn? Will it require that disturbances to pronghorn be eliminated in these areas, particularly during fawning and breeding seasons? Will it limit recreational permits during these seasons? The military should be capable of conducting training using computer simulations instead of "live" flights and

6-3 ordinance training, at least during breeding and fawning seasons - and that could reduce the contaminant levels over time. Will military maneuvers be limited?

6-4 It is unconscionable that we may be unable to support and protect a few hundred Sonoran pronghorn in our state yet allow millions of humans to live here. Until your Draft Plan is adequately amended to remedy the shortcomings identified by the court, the Sonoran pronghorn is still without a recovery plan that addresses ongoing threats to its survival or its recovery.

Sincerely,

Kathy Roediger

APPENDIX C.

RESPONSES TO PUBLIC COMMENTS

Letter 1 - Yuma Valley Rod & Gun Club, Inc.

The Service appreciates the comments of the Yuma Valley Rod & Gun Club.

Letter 2 - The Humane Society of the United States

2-1 *Predators play an important role in population processes of prey species. As a general rule, it is uncommon for healthy, naturally occurring prey populations in intact ecosystems to be driven to extinction by predation alone. This rule may cease to apply, however, once an established predator-prey balance is disrupted by overt or even subtle disturbances (e.g., anthropogenic, climatic, biotic) in the animal's environment. For reasons detailed in the 1998 Recovery Plan and this Supplement and Amendment to the 1998 Recovery Plan, the Sonoran Pronghorn is likely in this situation today.*

Based on the December 2000 census, there are currently less than 100 adult Sonoran pronghorn remaining in the U.S. subpopulation. Of this number, fewer than 60 are females. Furthermore, the vast majority of adult females are nearer the end of their reproductive life than the beginning. As modeled during the September 1996 Defenders of Wildlife organized Population Viability Analysis Workshop, Sonoran pronghorn are currently very sensitive to reduced fawn and adult survival, such that the loss of even one animal per year has consequences to herd welfare.

Coyotes have been shown to be the primary predator on Sonoran pronghorn. Most coyote predation on adult Sonoran pronghorn occurs during winter in years when winter precipitation is well below normal. This appears to be due to several potentially interacting factors. A "dry" winter (especially one immediately preceded by a summer monsoon with below average rainfall) can cause a marked decline in the availability of preferred coyote prey species (e.g., rabbits and other small rodents). In addition, pronghorn use of more heavily vegetated bajadas (versus more preferred open valleys) increases during dry winters as a function of forage availability. A pronghorn in this habitat is more susceptible to predation. Finally, coyotes form breeding associations in the winter comprised of an adult female and one or more attendant males. Mortality investigations suggest that coyotes hunting in packs under the conditions described above can effectively take Sonoran pronghorn.

The Service has no intention of initiating a predator control program aimed at the widespread and indiscriminate removal of coyotes. In fact, the AGFD will initiate a coyote collaring study on the BMGR in the spring of 2002 to further evaluate coyote/Sonoran pronghorn predator/prey relationships. However, limited coyote control is one element in a suite of management practices that may be employed in order to effect meaningful Sonoran pronghorn recovery. Predator control as a recovery action would only be used to remove a small number of coyotes, and only at times and in years when environmental factors create conditions as described above. Unfortunately, monitoring at a scale that allows the identification and removal of individual coyotes shown to have repeatedly attacked pronghorn, as suggested in this comment, would be impractical and much more behaviorally intrusive to coyotes and pronghorn alike. Coyote control is viewed as a short-term management action. Ideally, as other recovery actions are implemented, the need to conduct coyote control activities will diminish over time once pronghorn numbers reach an acceptable level and the population stabilizes.

Letter 3 - Christine R. Maher

3-1 *The Service agrees that increasing the current population size of Sonoran pronghorn is of primary importance at this time, but takes exception to the assertion that the cooperating agencies will spend the next 1-15 years studying Sonoran pronghorns rather than taking definitive actions necessary to recover them. While delisting represents the ultimate measure of success, accomplishments such as the prevention of extinction and further decline of the Sonoran pronghorn population and its habitat represent noteworthy recovery successes as well. The Service believes the 1998 Recovery Plan and this Supplement and Amendment to the 1998 Recovery Plan provide the guidance necessary for active management to increase survival and improve habitat, thereby providing for reclassification to threatened status, and contributing to the eventual delisting of the species.*

Judge Huvelle, in her Memorandum Opinion (Civil Action No. 99-927, dated February 12, 2001) found that the 1998 Recovery Plan does "...recommend actions or...steps that could ultimately lead to actions to address the threats identified." She also cited Fund for Animals v. Babbitt, 903 F. Supp. 96,108 (D.D.C. 1998) for the proposition that, "The choice of one particular action over another is not arbitrary, capricious or an abuse of discretion simply because one may happen to think it ill-considered, or to represent the less appealing alternative solution available. The Court will not impose plaintiffs' or its own view of a better way to stem the threat posed...than the methods chosen by the FWS". The Court held that "...The Court will defer to the agency's discretion that critical information is not sufficiently known to implement an exhaustively detailed plan at this time, and that annual updates for the short-term duration of the plan are the best

method to insure that the plan is current and up-to-date." Finally, Judge Huvelle noted that "...the FWS recognized in the Plan that it would be reviewed every five years and revised as necessary. In these circumstances, the Court concludes that the FWS has provided sufficient detail to satisfy the statute."

The Service defends the need for conservative action in a situation where the population is critically small. Acting conservatively includes the need to "evaluate," "monitor," and "survey" so that information can be gained and the appropriate actions can be taken. Meanwhile, recovery actions not dependent on research results, such as habitat enhancement, can and will proceed.

3-2 *Techniques for captive propagation of pronghorns have greatly improved in recent years, as evidenced by the success of the Los Angeles Zoo (Jeff Holland, Curator, L. A. Zoo, pers. comm.). Removal from the wild and captive breeding of Sonoran pronghorn in zoos is not a Service priority at this time, however. This could change at a later date if other recovery actions fail to produce desired results or if the U. S. subpopulation continues to decline. It would be irresponsible of the Service not to thoroughly evaluate this approach and have a contingency plan prepared well in advance in the event captive breeding becomes necessary. We concur that fawns raised in captivity and allowed to imprint on humans make poor candidates for subsequent release in the wild. However, innovative approaches to avoid imprinting have been successfully implemented in other endangered species captive breeding programs (e.g., whooping crane, peregrine falcon, Mexican wolf).*

A promising variation on the theme of captive rearing in zoos is currently under evaluation by the Service. This approach uses a large enclosure (>2.59 km^2) and is patterned after the work of a Mexican biologist, Dr. Jorge Cancino (Centro de Investigaciones Biológicas del Noroeste, La Paz, Baja California Sur), on the endangered peninsular pronghorn of the Reserva de la Biosfera El Vizcaíno (Baja California Sur). Enclosures have been successfully used for the rearing, semi-captive management, and "soft" release of numerous big game species (e.g., desert bighorn sheep, mule deer, moose). If this technique is adopted by the Service, a serious examination of all past successful (and unsuccessful) approaches will be undertaken.

3-3 *Translocation has been one of the primary management tools employed since the early 1900's in the successful restoration of most big game populations across North America and is an important consideration for Sonoran pronghorn recovery. Specifically, downlisting (and eventual delisting) of Sonoran pronghorn is not an option until Sonoran pronghorn are reestablished in one or more new areas of their former range and the risk of extinction is lessened. We acknowledge that capture and handling procedures are stressful to pronghorn and can cause capture-related mortality. This is equally true for*

any species of big game, however, and wildlife managers routinely have to weigh the risk of injury or death to a few animals over potential benefits to the species. The Service agrees that the Sonoran pronghorn population in the U. S. is too small to permit capture and free-release elsewhere in the numbers required to ensure a reasonable chance of success without negative consequences for the founder herd (IUCN 1998, Lee et al. 1998). Conversely, use of an on-site enclosure and semi-captive breeding program as described in comment 3-2 is feasible, because this technique requires fewer animals than a free-release, and poses fewer capture-related risks.

Finally, the Sonoran pronghorn population viability analysis (Defenders of Wildlife 1998) stated that "...a strategy of occasionally translocating a pronghorn from Mexico...in order to prevent the accumulation of the effects of inbreeding would likely provide some long-term benefit but would not be sufficient to ensure the persistence of the population." The latter portion of this statement was made in recognition of the danger of extinction due to the demographic effects of stochastic processes. Periodic translocation of pronghorn from Mexico should help maintain genetic diversity, just as reestablishment of additional herds in the U. S. (and Mexico) should lower the chance of extinction by random events.

3-4 *See response to comment 2-1.*

3-5 *Agreed.*

3-6 *We agree that two of the best ways to increase the population size of Sonoran pronghorn is to improve <u>and</u> increase their existing habitat. Contrary to the claim made in this comment, the 1998 Recovery Plan contains numerous active management elements to accomplish this very goal. Unfortunately, it appears that a number of the recovery actions in the 1998 Recovery Plan have been interpreted as passive. Recovery actions 1.1 - 1.9, and 2.1 - 2.4 all contain elements of proactive management and a number are in various stages of implementation. Examples include, but are not limited to:*

> *a) <u>Habitat enhancement 1.2</u> – an Environmental Assessment to initiate forage enhancement on the BMGR has been completed. The USAF has funded the project and is negotiating with the Bureau of Reclamation to drill two test wells as a source of water for the project. Depending on the results of the well drilling, initial site preparation on several areas should begin in the spring of 2002. This project will be closely monitored and if the desired results are achieved, expanded to other areas of current pronghorn range. This approach is one of the fundamental premises of effective wildlife management; diagnosing the problem, testing potential applications on a small scale, and expanding successful treatments, as appropriate, to a larger area.*

b) Habitat enhancement 1.2 and Water investigation 1.3 – AGFD and USFWS placed a number of small, temporary water facilities (15-30 gallon plastic tubs) on CPNWR during the hottest, driest months (June - August) of 2001. This demonstrated for the first time that Sonoran pronghorn are attracted to and readily use sources of free water when available during the most critical period of fawn rearing. Almost as important, the temporary waters were placed in such a way that they received no use by predators and deer. Although the long-term benefit to adult and fawn survival is still under evaluation, this adds a potential new tool, with significant management implications, for Sonoran pronghorn recovery.

c) Livestock 1.6 – The BLM recently prepared a report entitled "Draft Ajo Block Rangeland Health Evaluation." This document is still under internal review; however, it assesses current range condition and provides recommendations to make specific changes in current management where standards and objectives for each allotment are not being met. Recommendations for change takes into consideration Sonoran pronghorn and other endangered species and are coordinated with the Service and the Recovery Team.

d) Military activities 1.7 – The *USAF recently completed a study evaluating the effects of military overflights on Sonoran pronghorn. This study, as well as data from other sources, is being used to further refine the USAF's monitoring and operating procedures in order to reduce military impacts on Sonoran pronghorn.*

e) Human disturbance 1.8 – As described in the November 16, 2001 Biological Opinions prepared for the USAF, USMC, and NPS, portions of the BMGR and OPCNM will be closed to public use in the spring and early summer of each year to decrease disturbance to adults and fawns.

Fences unquestionably fragment pronghorn habitat and create barriers to free movement. This effect is mitigated, at least in part, through the construction or modification of fences with wire spacing designed to allow for pronghorn passage. With the exception of State Highway 85 and the International Boundary, all fences in currently occupied Sonoran pronghorn range have either been modified for pronghorn or removed (BLM 2001). In addition, the Service continues to evaluate opportunities for additional fence modifications along the OPCNM and CPNWR boundaries with the BLM livestock allotments. Fence removal or modification is not a cure-all, however, and can even be detrimental to pronghorn welfare under some circumstances. For example, the International Boundary fence, although incomplete, washed out, and cut in some areas, is still a significant barrier to pronghorn movement between the U. S. and Mexico.

However, Mexico Highway 2 is also a significant barrier and parallels the International Boundary just south of the border. In this instance, the fence reduces the likelihood of pronghorn being killed on this high speed, high volume road, or being taken by poachers along Highway 2.

Highway 85 between Gila Bend and Ajo is contained within two right-of-ways granted to the Arizona Department of Transportation (ADOT) by the Department of Interior in 1937 and 1940. Both right-of-ways are for an indefinite period of time and contain no provisions for altering or removing right-of-way fences, or changing the current speed limit for endangered species conservation. As a consequence, unless ADOT requests a change in the currently established right-of-ways, the federal government lacks the discretion to legally mandate modifications to fencing or the speed limit (Gene Dahlem, BLM, pers. comm.). Fencing and the speed limit on highway 85 north of Ajo has not been a conflict with pronghorn in recent years because there have been virtually no documented instances of pronghorn approaching the right-of-ways within several miles (Fig. 1). Furthermore, Highway 85 within OPCNM has never been fenced and no pronghorn have been documented to move east of the road in recent years. Highway fencing may become a significant issue in the future, as implementation of proposed recovery actions lead to an increase in the pronghorn population and current range. The Service has not broached the subject of voluntarily modifying right-of-way fencing to facilitate pronghorn movements (particularly along stretches that pass through BMGR where there is no livestock grazing) with ADOT, for some of the same reasons discussed above for the International Boundary fence and Mexico Highway 2.

3-7 *The 1998 Sonoran Pronghorn Recovery Plan identifies seasonal closures of certain areas to minimize human disturbance as a recovery action (Human disturbance - seasonal closures 1.81). The recent (November 16, 2001) remanded Biological Opinions for the USAF, USMC, and NPS contain conservation measures and provisions for seasonal closures to public use of currently occupied Sonoran pronghorn habitat during fawning and early fawn rearing periods. Recreational use of pronghorn habitat during these periods is low, however, because much of the area in question is not used by the public. In addition, some seasonal limits on military activities in Sonoran pronghorn habitat have been initiated. Unfortunately, the overwhelming majority of potential human-related disturbances to pronghorn are caused by illegal immigration and smuggling, which are not influenced by agency closures.*

3-8 *Agreed.*

3-9 *Judge Huvelle in her Memorandum Opinion dated February 12, 2001 (Civil Action No. 99-927 [ESH]) stated that "...recovery measures will be subject to ongoing revision and*

updating." She also stated in the Memorandum Opinion that "...While a particular research project may require more time than is initially anticipated, the statute does not require that binding deadlines be set." Task durations listed in the updated implementation schedule of the Supplement and Amendment to the 1998 Final Revised Sonoran Pronghorn Recovery Plan are best estimates of time needed based on review of each task, opinion, discussion, and concurrence by individual Recovery Team members. Consideration of task difficulty and the unpredictable nature of weather cycles (wet vs. dry years) and events (timing, distribution, and intensity of precipitation) in the Sonoran Desert figured prominently in the decision-making process.

Letter 4 - Defenders of Wildlife

4-1 *The Court did not rule that the entire 1998 Final Revised Sonoran Pronghorn Recovery Plan was inadequate. Judge Huvelle stated in her Memorandum Opinion and Order (Civil Action No. 99-927, both dated February 12, 2001) that the Recovery Plan was deficient in two areas [measurable criteria for delisting Sonoran pronghorn or an adequate explanation as to why the delisting criteria cannot practicably be incorporated at this time, and where practicable, time estimates] and "...remanded the Plan to the FWS for inclusion of these elements or for an explanation why their inclusion is not practicable." The Service has addressed both deficiencies in the Final Supplement and Amendment to the Recovery Plan (see pages 35-46).*

This comment references the Service's consistent reliance on a "purported" lack of information to justify their approach, yet Defenders of Wildlife does not identify sources of available information that the Service has failed to take into consideration or misused. The approach taken by the Service is reasonable and prudent given the current status of the animal, our understanding of pronghorn biology, and the science available at this time.

4-2 *See responses to comments 3-1 and 4-1 and also:*

Plaintiffs' Memorandum in Support of Motion for Summary Judgment (Civil Action No. 99-927, dated May 12, 2000) and elsewhere criticized the 1998 Recovery Plan for not addressing the five listing factors required under Section 4(a)(1) of the ESA. Judge Huvelle in her Memorandum Opinion (Civil Action No. 99-927, dated February 12, 2001) agreed that the Service must consider the five statutory factors in delisting as in listing. As explained at some length in the Final Supplement and Amendment to the Recovery Plan, listing factors were never established or for that matter required in order for Sonoran pronghorn to be listed under the ESA. This lack of listing factors has been corrected in the Supplement and Amendment (see pages 14-34). In addition, the

listing/delisting factors have been taken fully into account in the Supplement and Amendment in the development of recovery efforts (see pages 38-41).

4-3 *See responses to comments 3-1 and 3-6.*

4-4 *Defenders of Wildlife makes a number of good recommendations for helping to define delisting criteria and the Service has taken these and other criteria under further consideration. For reasons outlined in the Supplement and Amendment to the 1998 Recovery Plan and in the response to comment 3-1, the Service continues to believe that establishing meaningful criteria for delisting at this time would be premature, arbitrary, and capricious. It should be kept in mind that criteria for downlisting detailed in the 1998 Recovery Plan and the Supplement and Amendment to the 1998 Recovery Plan provide a blueprint towards recovery and eventual delisting. Delisting criteria will be developed once we better understand the significance of current threats, unknown elements of Sonoran pronghorn life history and habitat requirements, uncertainty of availability of suitable reintroduction sites and animals for transplants, resistance to management efforts on wilderness areas and other areas of the public lands, and continuing uncertainty in the long-term stability and status of subpopulations in Mexico. Meanwhile, the Recovery Plan calls for implementation of research and management projects that will maintain and augment the current population. Furthermore, the Recovery Plan, along with the Supplement and Amendment and the actions contained therein, should result in the downlisting and eventual recovery of the Sonoran pronghorn.*

4-5 *Agreed.*

Letter 5 - Center for Biological Diversity

5-1 *See responses to comments 3-1 and 4-1.*

5-2 *See responses to comments 2-1, 3-6, and also:*

There are no data at this time to indicate that water developments have had any meaningful influence on predator distribution in Sonoran pronghorn habitat. External and internal livestock allotment fences on BLM *have all been modified for pronghorn (BLM 2001). Based on data provided in a recent report by the BLM entitled "Draft Ajo Block Rangeland Health Evaluation" (document currently under internal review), it appears that competition with cattle for key browse species in the pronghorn diet is minimal.*

5-3 *See response to comment 3-7*

Letter 6 - Kathleen A. Roediger

6-1 *See responses to comments 3-1 and 4-1.*

6-2 *See responses to comments 2-1, 3-2, 3-3, 3-6, and 3-7.*

6-3 *See response to comment 3-7 and also:*

Military activities on and over pronghorn habitat on the BMGR and CPNWR are permitted by law under the Military Lands Withdrawal Act of 1999 (Public Law 106-65) and impacts on Sonoran pronghorn have been thoroughly reviewed and documented in recent USFWS Biological Opinions (Army National Guard 2001, USAF 2001, USMC 2001. The USFWS *works closely with the USAF and USMC to minimize the impacts of military training on Sonoran pronghorn. One example of this cooperation is the program the USAF has implemented to monitor pronghorn activity on their two tactical ranges. If pronghorn are detected on or within a certain distance of a target on a given day, missions requiring ordnance delivery on the affected targets are cancelled for the day.*

6-4 *Contrary to the assertion in this comment, all deficiencies remanded by the Court have been addressed in the Final Supplement and Amendment to the 1998 Recovery Plan. Together these two documents lay out a blueprint for recovery of the Sonoran pronghorn in the U.S.*

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Pronghorn at Cabeza Prieta.
Painting by Paul Boseman, 2001