PETITION TO LIST THE CACTUS FERRUGINOUS PYGMY OWL AS A THREATENED OR ENDANGERED SPECIES UNDER THE ENDANGERED SPECIES ACT

March 15, 2007

CENTER FOR BIOLOGICAL DIVERSITY
DEFENDERS OF WILDLIFE

DELIVERED VIA CERTIFIED MAIL

March 15, 2007

Dirk Kempthorne
Secretary of the Interior
Office of the Secretary
U.S. Department of the Interior
18th and "C" Street, N.W.
Washington, D.C. 20240

Dr. Tuggle, Regional Director
Southwest Resion
U.S. Fish and Wildlife Service
500 Gold Avenue SW
Albuquerque NM 87102

The Center for Biological Diversity and Defenders of Wildlife hereby formally petition the U.S. Fish and Wildlife Service (also "Service") to list one of the following entities of cactus ferruginous pygmy-owl: 1) the Arizona distinct population segment ("DPS") of the cactus ferruginous pygmy-owl; 2) the Sonoran Desert DPS of the cactus ferruginous pygmy-owl; or 3) the western subspecies of cactus ferruginous pygmy-owl (*G. ridgwayi cactorum*) as a threatened or endangered species under the Endangered Species Act ("ESA"), 16 U.S.C. §§ 1531-1544. Petitioners also seek emergency protection for any of the three petitioned pygmy-owl entities and designation of critical habitat concurrent with any listing decision.

Petitioners file this petition pursuant to § 553(e) of the Administrative Procedure Act ("APA"), 5 U.S.C. §§ 551-559 and § 1533(b)(3) of the ESA, and 50 C.F.R. part 424.14, which grant interested parties the right to petition for issuance of a rule from the Assistant Secretary of the Interior.

Petitioners request the Service emergency list the pygmy-owl, which is threatened with imminent extinction in the U.S. The Service has the authority to promulgate an emergency listing rule for any species when an emergency exists that poses a significant risk to the species. 16 U.S.C. §1533(b)(7). Such rule shall take effect immediately upon publication in the Federal Register, and shall be effective for a maximum of 240 days. *Id.*

Petitioners request designation of critical habitat for the pygmy-owl as required by 16 U.S.C. 1533(b)(6)(C), 50 C.F.R. 424.12, and pursuant to the Administrative Procedures Act (5 U.S.C. 553).

Endangered Species Act "critical habitat" protections are a crucial tool to recover endangered species. A peer-reviewed study in the April 2005 issue of BioScience, "The Effectiveness of the Endangered Species Act: A Quantitative Analysis," concludes that species with critical habitat for two or more years are more than twice as likely to have improving population trends than species without. Critical habitat is particularly important for the pygmy-

owl because there are so few individuals of the species left in Arizona. Development project proponents and responsible federal agencies routinely take advantage of this desperate situation by denying that particular projects will result in any harm and dismissing any responsibility to mitigate impacts or improve the status of the species. For example, the U.S. Army Corps of Engineers has steadfastly denied that development projects near Tucson may affect the pygmy-owl unless the species is either present or critical habitat is designated on a particular property. The existence of designated critical habitat at a particular project site provides virtually irrefutable proof that the project "may affect" the species, thereby triggering formal ESA section 7 consultation duties by responsible federal agencies. Pygmy-owl critical habitat has also provided essential guidance in identifying development project mitigation standards under the Pima County government's Sonoran Desert Conservation Plan and Multiple Species Conservation Plan as a means to balance long-term pygmy-owl conservation with reasonable future urban development.

Petitioners recognize this petition sets in motion a specific process placing definite response requirements on the Service and very specific time constraints upon those responses.

The Center for Biological Diversity is a non-profit environmental organization dedicated to protecting endangered species and wild places through science, policy, education, and environmental law. The Center submits this petition on its own behalf and on behalf of its members and staff, with an interest in protecting the pygmy-owl and its habitat.

Defenders of Wildlife is dedicated to the protection of all native wild animals and plants in their natural communities. We focus our programs on what scientists consider two of the most serious environmental threats to the planet: the accelerating rate of extinction of species and the associated loss of biological diversity, and habitat alteration and destruction.

Failure to grant the petitioned action will adversely affect the aesthetic, recreational, commercial, research, and scientific interests of members of the Center for Biological Diversity, Defenders of Wildlife, and of the citizens of the United States.

Respectfully submitted,

/s/
Noah Greenwald

Executive Summary

In Arizona, U.S. and Sonora, Mexico, the cactus ferruginous pygmy-owl is highly endangered by habitat destruction and other factors. The species was formerly listed under the Endangered Species Act as a distinct population segment in Arizona, but following a court decision that the U.S. Fish and Wildlife Service (FWS) had not properly demonstrated that the population is significant to the taxon as a whole, the agency elected to delist the species. In doing so, however, FWS failed to consider whether the Arizona population is significant to the taxon because it represents the only population of the subspecies (*Glaucidium ridgwayi cactorum*) in the continental U.S. like other populations protected under the Endangered Species Act, including the bald eagle, gray wolf, and grizzly bear, or to consider whether another entity should be protected, including the population occupying both Arizona and Sonora ("Sonoran Desert Population"), which qualifies as a distinct population because it occurs in a unique ecological setting, its loss would result in a significant gap in the range of the species, and it is markedly different in its genetic characteristics. FWS also failed to consider protection for the subspecies *G. ridgwayi cactorum*, which is threatened or endangered in a significant portion of its range. The following petition requests that FWS consider listing one of these three entities because they meet three of the five factors for consideration as a threatened or endangered species:

The Present or threatened destruction, modification or curtailment of the cactus ferruginous pygmy-owl's habitat or range.

The cactus ferruginous pygmy-owl was historically common in riparian woodlands across much of southern Arizona. With the loss of at least 85% of Arizona's riparian areas to livestock grazing, water withdrawal, development and other factors, the pygmy-owl has largely disappeared from the state's few remaining riverside forests. Today, the species is found in small numbers primarily in upland habitats, including Sonoran desertscrub and semidesert grasslands, where it is threatened by urban development in both Arizona and Sonora, where human populations are rapidly expanding, and the loss of essential habitat components that follow conversion of native vegetation to African buffelgrass (*Pennisetum ciliare*) either to support livestock grazing or by subsequent spread and invasion. These factors have greatly reduced available habitat for pygmy-owls and are continuing to result in rapid loss and fragmentation of habitat.

Other natural or manmade factors affecting the continued existence of the cactus ferruginous pygmy-owl

Historically, fires were not a frequent occurrence in Sonoran desertscrub occupied by pygmy-owls. With the invasion of buffelgrass and other fire-dependent non-native grasses, fire has become more common and poses a direct threat to pygmy-owl habitat because most native desert plants are not adapted to fire. In particular, saguaro cacti, that provide nest cavities essential to pygmy-owls, are often killed or weakened by fire.

Populations of pygmy-owls in Arizona are exceedingly small and isolated. To date, no more than 41 adult pygmy-owls have been detected in any one breeding season despite extensive

survey effort. Many sites recently occupied by pygmy-owls in Arizona are separated from one another and from populations in Mexico by large expanses of unsuitable habitat. Likewise, in northern Sonora, pygmy-owls are declining, not abundant and separated from potentially larger populations in southern Sonora and Sinaloa. Small isolated populations are vulnerable to extinction from both demographic factors, such as random shifts in gender ratio and loss of genetic diversity, and stochastic factors, such as drought, storms or fire, that result in loss of individuals.

Inadequacy of existing regulatory mechanisms to protect the cactus ferruginous pygmy-owl

Endangered status provided substantial protection for the pygmy-owl, requiring FWS oversight of most urban development projects, which were then required to avoid adverse impacts to the pygmy-owl through land protection, research and other mitigation. With delisting of the pygmy-owl, these requirements have disappeared and extensive development of pygmy-owl habitat is either ongoing or in planning.

Although not finalized, the pygmy-owl may receive some protection under Pima County's multi-species habitat conservation plan, which proposes to protect areas, including some pygmy-owl habitat, through direct acquisition, conservation easements, and stipulations on zoning variances. At this time, funding has not been secured for acquisition of habitat or conservation easements, nor have willing sellers been identified and thus, there is little certainty that these measures will protect sufficient habitat to allow the survival or recovery of the pygmy-owl. Stipulating that landowners protect habitat in exchange for changes in their zoning permits could result in some habitat protection. Such actions, however, are at the voluntary discretion of the county and thus as above, there is no guarantee that sufficient habitat will be protected to ensure the pygmy-owl's viability.

No other law, regulation or policy provides substantial protection for pygmy-owl habitat.

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I. Description and Systematics

A. Physical Description

Cactus ferruginous pygmy-owls are small diurnal owls, approximately 14-18 centimeters long. Males average 62 grams, and females average 75 grams. The pygmy-owl is reddish-brown overall, with a cream-colored belly streaked with reddish-brown. Some individuals are grayish, rather than reddish-brown. The crown is lightly streaked, and paired black-and-white spots on the nape suggest eyes. There are no ear tufts, and the eyes are yellow. The tail is relatively long for an owl and is colored reddish-brown with darker brown bars (Ridgway 1914).

B. Taxonomic Classification

Until recently, all ferruginous pygmy-owls in North, Central and South America were classified as one species: *Glaucidium brasilianum* (AOU 1957, USFWS 1997 - 62 Fed. Reg. at 10730). Genetic analyzes, however, revealed that *G. brasilianum* is paraphyletic, with North American and South American clades representing two distinct groups that should be recognized as distinct species: 1) *Glaucidium ridgwayi* in North and Central America, and 2) *Glaucidium brasilianum* in South America. The two species differ in vocalizations, morphology, genetics and ecology (Heidrich et al. 1995, König et al. 1999, Proudfoot et al. 2005a, Proudfoot et al. 2006). Within North America, genetic analyses also suggest a further division of *G. ridgwayi* into two subspecies or phylospecies, one found in Arizona, Sonora and Sinaloa and a second in Texas-Tamaulipas and the remainder of states in Mexico (Proudfoot et al. 2006). Proudfoot et al. (2006) conclude:

> "Patterns of mtDNA variation also provide strong evidence of two genetically distinct units in North America, one in Arizona, Sonora, and Sinaloa, and the other in Texas, Tamaulipas, and regions of South-Central Mexico. These results are congruent with earlier taxonomic studies that recognized birds from these regions as distinct subspecies (van Rossem 1937; Peters 1940; Phillips 1966; König et al. 1999). Using revised nomenclature, the Arizona, Sonora, and Sinaloa group and the other group in Texas, Tamaulipas, and regions of South-Central Mexico, would be recognized as *G. r. cactorum* and *G. r. ridgwayi*, respectively. The separation is probably the consequence of northern expansion of the pygmy-owl range and barriers to gene flow provided by the Sierra Madre Occidental and the Sierra Madre Oriental, because pygmy-owls rarely occur above 1300 m (Proudfoot and Johnson 2000)."

Following Proudfoot et al. (2006) and others, we refer to the western subspecies as *G. ridgwayi cactorum* throughout this petition.

Proudfoot et al. (2006) also found evidence of genetic differentiation between pygmy-owls in Arizona and Sonora and Sinaloa, concluding:

> "Based on the haplotypic separation that exists between the pygmy-owl populations of Arizona, Texas, and regions of South-Central Mexico, data from this study do not indicate genetic isolation between the distinct populations in the US and those

> immediately across the border in either Sonora or Tamaulipas, Mexico. However, because NCA implies some restricted gene flow between the Arizona-Sonora and Sinaloa population, caution should be demonstrated when developing management plans for endangered pygmy-owls in Arizona. For example, management agencies may consider excluding the Sinaloan group when estimating potential gene flow, immigration through dispersal, and projected recovery of pygmy-owls in Arizona. Because genetic data provide a snap-shot of the past and recognition of genetically distinct units plays only one role in conservation policy (Barrowclough 1992), current demographic data should also be considered in developing management policies for pygmy-owls in Arizona."

These findings suggest that the western subspecies may be further divided into two management units and indeed, Proudfoot (2005) concluded:

> "analysis of mtDNA and nuclear DNA implies some restricted gene flow between the Arizona-Sonora and Sinaloa population. Based on these results, I recommend that the United States Fish and Wildlife Service recognize current biological information and ascertain the distribution of what seems to be a genetically fragmented population in Arizona and Sonora before removing the pygmy-owl from the endangered species list."

Figure 1. The range of *Glaucidium ridgwayi* with the western subspecies *cactorum* depicted in yellow and the Sonoran Desert population depicted with diagonal lines.

II. Distinct Population Segments

The term "species" is defined broadly under the ESA to include "any subspecies of fish or wildlife or plants and any distinct population segment of any species of vertebrate fish or wildlife which interbreeds when mature." 16 U.S.C. § 1532 (16).

The Service and NOAA Fisheries have published a policy to define a "distinct population segment" for the purposes of listing, delisting, and reclassifying species under the ESA. 61 Fed. Reg. 4722 (February 7, 1996). Under this policy, a population segment must be found to be both "discrete" and "significant" to be recognized as a DPS. The Sonoran Desert and the Arizona populations of the Pygmy-owl meet both of these tests, and thus are listable entities under the ESA.

A. The Sonoran Desert Population qualifies as a DPS

A review by the Arizona Ecological Services Field Office of FWS dated November 25, 2003 and attached to this petition concluded that the "Sonoran Desert Biome population segment" meets both the discreteness and significance criteria for designation as a DPS and defined the boundaries of the population as such (FWS 2003):

> "In our analysis of potential DPS boundaries for the pygmy-owl, this division presented a logical DPS boundary based on ecological conditions, pygmy-owl distribution and genetics. The boundaries of the Sonoran Desert Biome population segment (SDBPS) include all areas below 4,000 feet elevation that fall within the Sonoran Desert and Semidesert Grassland biotic communities in Arizona and Sonora, Mexico. Within these communities, riparian and xeroriparian communities are also included."

The following discussion unequivocally demonstrates that the Sonoran Desert population should be recognized as a DPS.

1. Discreteness

Under the DPS Policy, a population segment is discrete if it satisfies either one of the following criteria:

1. It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors. Quantitative measures of genetic or morphological discontinuity may provide evidence of this separation. The policy further clarifies that a population need not have "absolute reproductive isolation" to be recognized as discrete.

2. It is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act. 61 Fed. Reg. 4725.

The Sonoran Desert population of pygmy-owls is markedly separated from other populations of the same taxon (subspecies *cactorum*, as well as the eastern Population) by physical, ecological and behavioral differences.

i. Geographic separation

Extensive pygmy-owls surveys in Sonora document a marked separation between pygmy-owls in northern Sonora and Arizona and pygmy-owls in southern Sonora and Sinaloa. Based on a survey of over 2800 stations along 1100 kilometers of transects throughout Sonora in 2000 and 2001, Flesch (2003a) identified an area in central Sonora where because of lack of suitable habitat, such as large columnar cacti and nesting cavities, there are few pygmy-owls (Flesch 2003a, Figure 2). Lack of habitat is caused by a combination of extensive agricultural development in central Sonora, including massive conversion of native vegetation to buffelgrass, and urban development centered in the city of Hermosillo (FWS 2003), and low abundance of columnar cacti as subtropical vegetation transitions into temperate regions of the Sonoran Desert. The Sonoran Desert population is also geographically separated from eastern populations of the pygmy-owl found in Texas and central and southern Mexico by the Sierra Madre and other mountain ranges. In support of these conclusions, FWS (2003) concluded:

> "In summary, the SDBPS is physically separated from the southern portion of the WPS [western population segment] by the lack of pygmy-owl habitat in central Sonora that is being exacerbated by agricultural conversion, urban development, and the conversion of native vegetation to buffelgrass for livestock grazing. The SDBPS is physically separated both geographically and elevationally from the EPS [eastern population segment] by the altitudinal mountains and highlands of the Sierra Madre Occidental and Oriental and the Mexican Plateau, including the Chihuahuan desert, as described above."

This information indicates that pygmy-owls in Arizona and northern Sonora are geographically separated from pygmy-owls in southern Sonora and Sinaloa by lack of habitat.

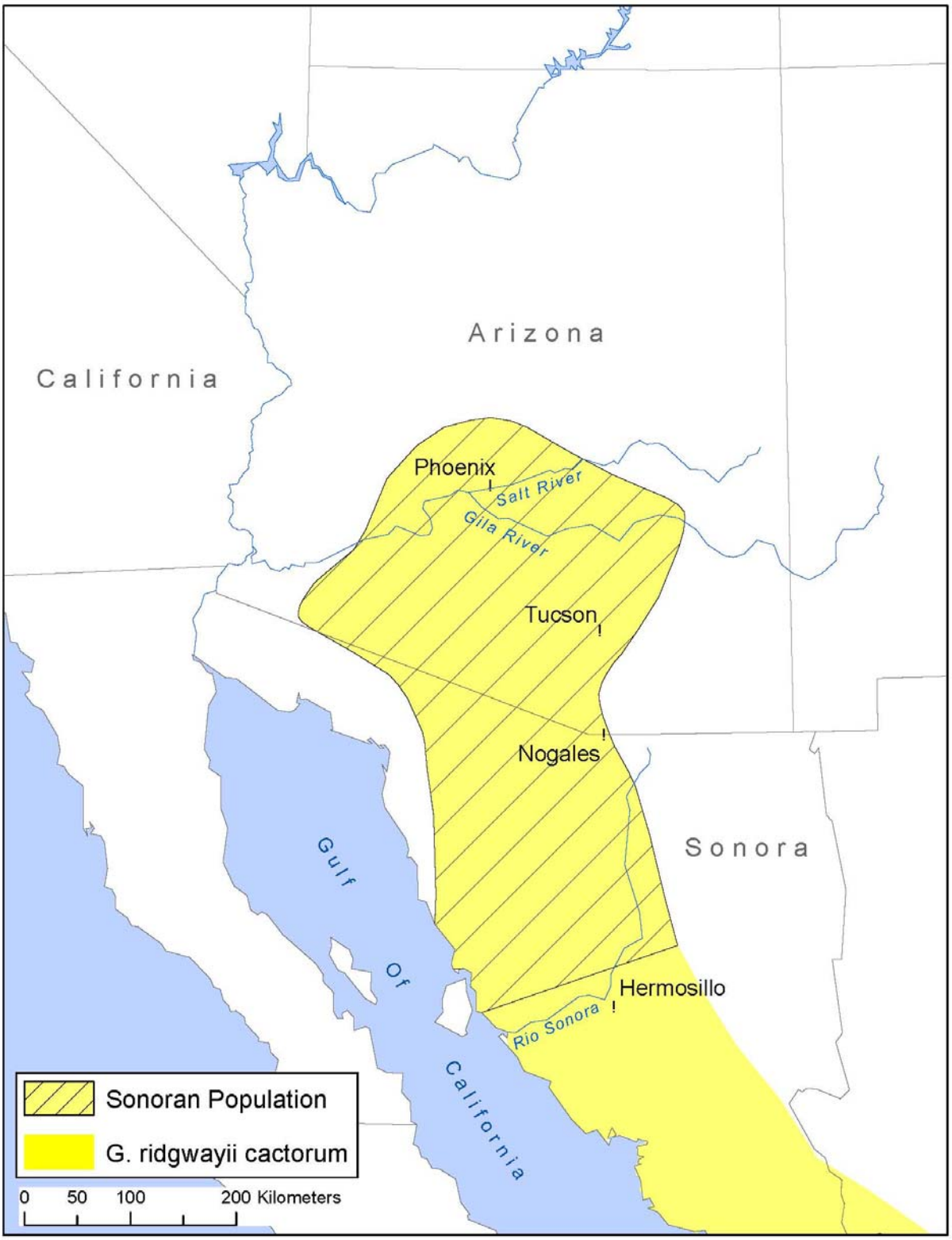

Figure 2. Range of the Sonoran Desert population based on surveys by Flesch (2003a).

ii. Reproductive Isolation

Genetic information provides further evidence for discreteness of the Sonoran Desert population. Proudfoot (2005) summarizes genetic data from recent research presented in Proudfoot et al. (2006) as follows:

> "[B]ecause nested clade analysis implies some restricted gene flow between the Arizona-Sonora and Sinaloa population, and results from nuclear DNA indicate a recent bottleneck or founder event in populations in Arizona and Sonora, thus providing further evidence of a lack of gene flow between populations in the U.S. and those in Mexico, caution should be demonstrated when developing management plans for endangered pygmy-owls in Arizona. For example, management agencies may consider excluding the Sinaloan group when estimating potential gene flow, immigration through dispersal, and projected recovery of pygmy-owls in Arizona. Nevertheless, if the separation between Sonora and Sinaloa is valid, and not the effect of limited sampling, the Arizona-Sonora group should be considered a distinct management unit."

iii. Ecological Separation

The overall ecological conditions in the range of the Sonoran Desert population are significantly different from the conditions found in the rest of the range of the taxon and with southern Sonora and Sinaloa in particular (Proudfoot and Johnson 2000, Flesch 2003a, Flesch and Steidl 2005). In northern Sonora, vegetation is comprised of the Arizona Upland subdivision of the Sonoran Desert and Semidesert Grassland (Brown 1982, Flesch 2003a). Uplands in the Arizona Uplands subdivision are dominated by open woodland and scrub of short leguminous trees and shrubs (Flesch 2003a). Uplands in Semidesert Grassland are dominated by open woodland and savannah of mesquite and sub-shrubs. *Id*. Riparian areas in both vegetation communities are dominated by woodlands of mesquite and acacia. *Id.* Saguaro cacti, which often contain cavities excavated by woodpeckers and used by pygmy-owls, occurs in both vegetation communities. *Id.* In contrast, pygmy-owls in southern Sonora, Sinaloa and farther south occupy Sinaloan thornscrub and tropical deciduous forest, more tropical vegetation communities that vary markedly in structure and composition from habitat to the north. *Id.* Indeed, FWS (2003) conluded:

> "Within the WPS, the SDBPS occurs in a unique ecological setting. Pygmy-owls within the SDBPS are all found within Sonoran Desertscrub or Semidesert Grassland biotic communities and associated riparian and xeroriparian communities. All owls outside the SDBPS occur within the more tropical Sinaloan thornscrub and Sinaloan deciduous forest community types and associated riparian types (Brown 1994, Phillips and Comus 2000). These vegetation communities differ significantly in species composition, vegetation structure, temperature, humidity, precipitation and soils (http://mexicochannel.net/maps (soils, vegetation, temperature, and climate maps)."

Combined, these data indicate the Sonoran Desert population is discrete based on geographic, reproductive and ecological separation. Although limited reproductive interchange may be occurring, this does not preclude the population being considered discrete.

2. Significance

Under the DPS policy, a population will be considered significant based on, but not limited to, the following factors:

1. Persistence of the discrete population segment in an ecological setting unusual or unique for the taxon,

2. Evidence that loss of the discrete population segment would result in a significant gap in the range of a taxon,

3. Evidence that the discrete population segment represents the only surviving natural occurrence of a taxon that may be more abundant elsewhere as an introduced population outside its historic range, or

4. Evidence that the discrete population segment differs markedly from other populations of the species in its genetic characteristics.

The Sonoran Desert population of the pygmy-owl meets three of the non-inclusive "significance" criteria.

i. The Sonoran Desert population occupies a unique ecological setting

The Sonoran Desert population occurs within Sonoran desertscrub and Semidesert Grassland vegetation communities and associated riparian and xeroriparian areas (Cartron et al. 2000b, Proudfoot and Johnson 2000, Leopold 1950, Brown 1994, Phillips and Comus 2000). In southern Sonora, Sinaloa, and Nayarit, in contrast, pygmy-owls occur within subtropical thornscrub, thornforest, and tropical deciduous and semideciduous forest and associated riparian areas (Leopold 1950, Brown 1994, Phillips and Comus 2000) and thus, vegetation communities occupied by the Sonoran Desert population are unique for the taxon.

Flesch (2003a) found distinct and quantifiable differences in vegetation composition between vegetation communities occupied by the Sonoran Desert population and areas further south. In riparian area, for example, Flesch (2003a) concludes; "composition of riparian vegetation at occupied stations varied among vegetation communities." Likewise, in upland areas, Flesch (2003) concludes:

> "In desertscrub and grasslands of northern Sonora, microphyllous species dominated upland vegetation. Sinaloan thornscrub and deciduous forest included numerous broadleaf species, however".

And:

> "In northern regions, understory species were characterized by subshrubs and grass mixed with woody shrubs, hackberry, and succulents. In southern regions, understory species were composed of more large woody shrubs and short trees and mamoa."

Because vegetation composition and structure influences perch sites, flight space and configuration, prey composition and availability, nest site abundance and location, pygmy-owls in all likelihood have local adaptations that would not make them easily transferable between these areas.

Differences in climate also demonstrate the Sonoran Desert population occurs in a unique setting. The Sonoran Desert population extends roughly four degrees latitude farther north than the population of pygmy-owls on the eastern Coastal Plain of Mexico. As a result, conditions within the Sonoran Desert population's range are cooler and drier than in the rest of the range of the taxon. Climate in the area occupied by the Sonoran Desert population is arid to very arid, while those areas outside the Sonoran desert are typically moister, with tropical or sub-tropical climates. Based on these differences, FWS (2003) concluded:

> "The SDBPS occurs in a unique ecological setting when compared to the remainder of the WPS. The SDBPS occurs at the northern end of the WPS distribution and is subject to unique climatic conditions. The SDBPS occupies an area that is cooler and drier than the southern portion of the WPS. Vegetation communities within the SDBPS are desert-like, consisting of Sonoran desertscrub and semidesert grasslands. In contrast, the southern portion of the WPS is characterized by warmer, wetter conditions classified as tropical or subtropical, represented by Sinaloan thornscrub and deciduous forest."

FWS (2003) also concluded that the Sonoran Desert population occurs in a unique ecological setting because of rapid changes in vegetation within the Biome, including conversion to buffelgrass and mining, determining:

> "This creates a unique ecological setting of diminishing and changing native vegetation communities on a scale not seen throughout the remainder of the WPS or within the EPS. Genetic diversity is the key to population persistence in the face of a changing environment. The SDBPS contains a point of documented genetic divergence subject to ongoing environmental changes."

ii. Loss of the Sonoran Desert Population Will Result in a Significant Gap in the Range of the Taxon.

The Sonoran Desert DPS occupies south-central Arizona and northern Sonora, which accounts for roughly 49% of the range of the subspecies *cactorum* (Proudfoot and Johnson 2000, Proudfoot 2005, figure 2). Loss of the Sonoran Desert population would create a significant gap in the range of the taxon under the definition upheld by the Ninth Circuit ("We defer to the FWS' interpretation of a 'gap at the end of the fence' because it is not plainly erroneous. Even the loss of a peripheral population, however small, would create an empty geographic space in the range of the taxon." *NAHB v. Norton*, 340 F.3d at 846).

The Sonoran Desert population represents a peripheral population, the loss of which would result in the reduction of genetic variability, which in turn would reduce the species ability to adapt to changing environmental conditions and increase the likelihood of extinction. Genetic divergence tends to occur at the periphery of a species' range (Lesica and Allendorf 1995). This genetic

divergence allows adaptation of the species as a whole in the face of environmental change. Loss of genetic diversity translates into a loss of fitness, or reproductive success, for the species (Meffe and Carroll 1997). The peripheral nature of the Sonoran Desert population increases the potential for the population to further diverge from populations in southern Sonora, Sinaloa and further south. Resistance to environmental change and genetic distinction often allow peripheral populations to persist when core populations are extirpated (Channell and Lomolino 2000a, 2000b, Lomolino and Channell 1995). In the face of changing environmental conditions, what constitutes a peripheral population today could be the center of the species' range in the future (Nielsen et al. 2001). Peripheral populations survive more frequently than do core populations when species undergo dramatic reductions in their range (>75%; Channell and Lomolino 2001). Therefore, the Sonoran Desert population is significant to the taxon.

FWS (2003), likewise, concluded:

> "The loss of the SDBPS represents a significant gap in range of the WPS. The SDBPS represents approximately 50% of the WPS. Given the evidence presented by Proudfoot and Slack (2001), showing that the WPS is a potentially distinct subspecies, the loss of the SDBPS would represent approximately 50% of the range of the taxon. Regardless of the scale of analysis, the loss of the SDBPS would result in a significant gap in the range of the WPS and the taxon as a whole. Given the unique ecological setting within which the SDBPS occurs, the significance of this gap is solidified."

Loss of the Sonoran Desert population would also create a significant gap in the taxon as a whole with FWS (2003) having concluded:

> "As the range of the taxon is currently defined, the SDBPS represents approximately 25% of the range of the taxon. Genetic evidence is presented (Proudfoot and Slack 2001) suggesting that the WPS is a distinct subspecies of pygmy-owl.[1] The significance of the SDBPS to the taxon is stepped up by an entire level when this is considered."

Thus, loss of the Sonoran Desert population would create a significant gap in the range of either the subspecies cactorum (alternately recognized as the WPS) or the taxon as a whole, including the EPS.

iii. The Sonoran Desert DPS differs markedly in its genetic characteristics from Other Pygmy-owls

Proudfoot et al. (2006) documented restricted gene-flow between Sinaloa and the Sonoran Desert population, suggesting marked differences in genetic characteristics and a recent genetic bottleneck for Arizona and Sonora owls. Proudfoot et al. (2006) concludes:

> "because NCA implies some restricted gene flow between the Arizona-Sonora and Sinaloa population, caution should be demonstrated when developing management plans for endangered pygmy-owls in Arizona. For example, management agencies may

[1] Publication of Proudfoot et al. 2006 provides substantial evidence for recognition of the subspecies.

> consider excluding the Sinaloan group when estimating potential gene flow, immigration through dispersal, and projected recovery of pygmy-owls in Arizona."

Proudfoot et al. (2006) found substantially less genetic diversity in Arizona and Sonora populations than further south, stating:

> "with only three haplotypes in Arizona, one haplotype in Texas, and 27 haplotypes in Mexico, results from this study indicate northern expansion and recent colonization of Arizona, Sonora, and Sinaloa, and Texas and Tamaulipas, with low levels of divergence reflecting a recent common ancestry (Hewitt 2000). Based on estimates derived from MDIV, dates for divergence time for the Arizona/Sonora/Sinaloa populations and Texas/Tamaulipas/South Central Mexico populations range between 1.04 and 3.14 myr."

Similar information was recently used by FWS to conclude the Yellowstone population of the Grizzly Bear has marked genetic characteristics with the agency concluding:

> "Several genetics studies have confirmed the uniqueness of grizzly bears in the Yellowstone area. The Yellowstone area population has been isolated from other grizzly bear populations for approximately 100 years or more (Miller and Waits 2003). Yellowstone grizzly bears have the lowest relative heterozygosity of any continental grizzly population yet investigated (Paetkau et al. 1998; Waits et al. 1998b). Only Kodiak Island grizzly bears, a different subspecies (*Ursus arctos middendorfi*), have lower heterozygosity scores (26.5 percent), reflecting as much as 12,000 years of separation from mainland populations (Paetkau et al. 1998; Waits et al. 1998b). Miller and Waits (2003) conclude that gene flow between the Yellowstone area and the closest remaining population was limited prior to the arrival of European settlers but could only speculate as to the reasons behind this historical separation. The apparent long-term difference in heterozygosity between Yellowstone and other Montana populations indicates a unique set of circumstances in which limited movement between these areas has resulted in a markedly different genetic situation for the Yellowstone population" (Federal Register: November 17, 2005, Volume 70, Number 221, Page 69853-69884).

In sum, the best available information indicates that the Sonoran Desert population is significant because it occurs in a unique ecological setting, its loss would create a significant gap in range, and it differs markedly from other pygmy-owl populations.

B. The Arizona Population qualifies as a DPS

Alternately, the Service could reinstate listing of the Arizona DPS based on the following information.

1. Discreteness

The Arizona DPS is discrete because it is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act.

Currently, pygmy-owls in Sonora receive little protection and are subject to rampant habitat loss from livestock grazing, conversion to bufflegrass and other factors (Flesch and Steidl 2006a).

2. Significance

The Arizona DPS is significant for all of the same reasons as the Sonoran Desert population. Like the Sonoran Desert population, the Arizona DPS occurs in a unique ecological setting and differs markedly in its genetic characteristics from pygmy-owls in Sinaloa and elsewhere in the species range. Loss of the Arizona DPS would also create a significant gap in the species range, resulting in loss of roughly a third of the subspecies range, and half of the species range in the Sonoran Desert.

The Arizona DPS is also significant because it represents the entire range of *G. ridgwayi cactorum* in the U.S. The Service has listed several species, including the bald eagle, gray wolf, Canada lynx, and grizzly bear to avoid extinction of these species in the U.S. This is consistent with the purposes of the Endangered Species Act, which declared that preservation of the Nation's imperiled species is of "esthetic, ecological, educational, historical, recreational, and scientific value to the Nation and its people." 16 U.S.C. § 1531(a)(3). Congress cited the case of the bald eagle throughout the legislative history as an example of why it is necessary to list a DPS of a species when it is threatened with extinction in the U.S., although common in Canada and Alaska. Clearly, Congress intended the Service to list DPS of species to avoid loss of those species from the nation.

C. The subspecies *G. ridgwayi cactorum* is a listable entity and should be listed because it is threatened or endangered in a significant portion of range.

Should FWS determine that neither the Arizona or Sonoran Desert populations qualify as distinct population segments, there is no question that the subspecies *G. ridgwayi cactorum* qualifies as a listable entity under the Act and thus should be listed because it is threatened or endangered in a significant portion of its range, including at a minimum all of its range in Arizona and northern Sonora which is roughly 49% of the range of the subspecies.

III. Ecology and Biology of the Pygmy-owl in the Sonoran Desert

A. Nesting

The pygmy-owl begins nesting activities in late winter to early spring. The presence of large saguaros or other columnar cacti, or large trees with cavities created by woodpeckers is a key factor influencing pygmy-owl nesting (most recently Flesch 2003a, b, Flesch and Steidl 2002). Females lay between 3 and 7 eggs and incubates for approximately 28 days; the young fledge about 28 days after hatching. (Bent 1938, Heintzelman 1979, Proudfoot and Johnson 2000).

B. Calling and Foraging

Flesch (2003b) found that perch substrates used for calling were generally the largest trees available and that individuals called from the upper third of trees. Calling also occurs from

inside cavities, which may aid advertisement of potential nest cavities to females (Proudfoot and Johnson 2000, Flesch 2003b).

The pygmy-owl's diverse diet includes birds, lizards, insects, small mammals (Bendire 1888, Sutton 1951, Sprunt 1955, Earhart and Johnson 1970, Oberholser 1974), and frogs (Proudfoot et al. 1994b). Flesch (2003b) stated that the same vegetation patches and perch substrates used for calling are also likely preferred for foraging.

C. Distribution

Based on recognition of *G. ridgwayi* by Proudfoot et al. (2006), the distribution of the cactus ferruginous pygmy-owl includes the lowlands from southeastern Texas to Tamaulipas and Nuevo Leon in northeastern Mexico, and from central Arizona south to Michoacan in lowland western Mexico, of which Sonora and Sinaloa has been recognized as the subspecies *G.r. cactorum* (Cartron et al. 2000, Proudfoot et al. 2006). The separate species, *G. brasilianum*, extends through South America as far as Argentina and is considered common in much of its range (Johnsgard 1988, Cartron et al. 2000).

D. Habitat Requirements

In the Sonoran Desert, pygmy-owls occur in three distinct vegetation types: riparian woodlands, Sonoran Desertscrub, and semidesert grasslands (Wilcox et al. 1999, Cartron et al. 2000b, Flesch 2003a, b). Although quantitative studies with a sufficient sample size to fully characterize pygmy-owl habitat have not been conducted in Arizona, habitat descriptions and data from hundreds of occupied sites in Sonora (Flesch 2003a, Flesch and Steidl 2002) indicate these areas share several features that are important to pygmy-owls, including a mix of woodland vegetation or dense scrub and openings, combined with one or more large columnar cacti or tall trees with cavities. In all three vegetation types, these characteristics are often found in association with washes or other riparian habitats. In Sonora, for example, Flesch (2003a) concluded:

> "All areas occupied by owls supported large columnar cacti or large trees with cavity potential and either scrub, woodland or forest vegetation with woody trees ≥2 m tall. In the Sonoran Desert, pygmy-owls occupied upland desertscrub or savannah with woody trees and saguaros, riparian woodland, or well-developed desertscrub along drainages. In semidesert grasslands, pygmy-owls occupied mesquite woodland or dense savannah associated with one or more drainages and upland savannah or scrub with scattered trees or shrubs and saguaros."

Wilcox et al. (2000) found that pygmy-owl nesting and perching sites had greater vegetation density and diversity, greater stem densities at upper canopy levels, and a greater degree of canopy layering than random sites, although in most cases these differences were not statistically significant. Flesch (2003b) found that pygmy-owl calling sites were typically the tallest trees and surrounded by moderately dense, patchy vegetation. These findings suggest that pygmy-owls require mature vegetation that does not occur everywhere on the landscape. Indeed, FWS (2005) concluded:

> "While there are hundreds of thousands of acres of Sonoran desertscrub, not all of this plant community is vegetatively suitable for pygmy-owls. Preliminary habitat assessment data appear to indicate that those areas of Sonoran desertscrub characterized by high plant species diversity, high structural diversity, and the presence of tall canopy are the areas being used by pygmy-owls. These areas are typically located along drainages and wash systems, or in areas with better soil and moisture conditions, such as bajadas. The occurrence of these areas is more limited than overall distribution of Sonoran desertscrub."

Dense woodland vegetation likely provides cover from predators, thermal extremes, and habitat for key prey species, and openings likely provide areas where prey is visible and there is flight space for pygmy-owls to capture prey. Such characteristics are often found in association with desert washes, where xeroriparian vegetation provides abundant cover, but the surrounding area provides sufficient openings for foraging. Flesch (2003b), for example, concluded:

> "Vegetation cover in occupied woodlands was moderate and patchy, and vegetation volume near the ground was often moderate around perch substrates. This structure provided good horizontal and vertical visibility that may be important for the perch-and-pounce or sit-and-wait hunting strategies of pygmy-owls. Woodlands along drainages provided cover for hunting, roosting, and escape, whereas saguaros and desertscrub vegetation in uplands contributed potential nest and roost cavities and cover."

As an obligate-cavity nester, pygmy-owls require cacti or trees large with one or more cavities. Tall cacti and trees also provide perching sites for foraging and calling (Wilcox et al. 1999, Cartron et al. 2000, Flesch 2003a, b). The requirement for these structures further accentuates the pygmy-owl's dependence on riparian or xeroriparian habitats, which in some landscapes contain the only available tall structures. Cartron et al. (2000) concluded:

> "Thus, nest location may strongly reflect nest cavity availability. Historical records suggest that in riparian areas, mesquite, a hard wood less readily excavated by Gila woodpeckers and northern flickers, was less frequently used than softwood trees (Hunter 1988). With the loss and alteration of riparian areas in Arizona, saguaros may now provide the most available source of cavities for nesting; most recent nest sites have, in fact, been located in saguaro cavities. However, two nests monitored in 1999 were located in eucalyptus and an Arizona ash. The eucalyptus was an integral component of an exotic landscape, but the ash was in an ephemeral wash surrounded by uplands of mesquite/grassland vegetation with no available saguaros. The only cavities in the area were in the large trees along the wash. Within certain portions of the cactus ferruginous pygmy-owl's range in Arizona, riparian and xeroriparian vegetation communities may still contain the only available pygmy-owl nest sites."

In sum, the pygmy-owl's dependence on a combination of patchy, dense vegetation, and large structures frequently associated with drainages, make the species highly sensitive to activities that result in vegetation clearing, changes in drainage patterns, or loss of cavity-harboring structures, such as columnar cacti or tall trees.

E. Population Status

The Sonoran Desert population of pygmy-owls has severely declined in Arizona, is declining in northern Sonora Mexico and is threatened by multiple factors across its range. According to numerous accounts, the pygmy-owl was historically quite common in south-central Arizona, particularly in riparian forests and bosques along the state's rivers (Bendire 1888, Fisher 1983, Breninger 1898, Gilman 1909, Bent 1938, Johnson et al. 2000). Johnson et al. (2000), for example, note that after their discovery in 1872, pygmy-owls were frequently collected and considered common:

> "During the next five decades, naturalists collected many specimens of this owl and typically described the subspecies as common or fairly common along some streams and rivers of central and southern Arizona."

With the rampant destruction of Arizona's riparian forests and woodlands, the pygmy-owl declined sharply (Davis and Russell 1979, Johnson *et al*. 1979, Monson and Phillips 1981, AGFD 1988a, Johnson-Duncan *et al*. 1988, and Millsap and Johnson 1988, Johnson et al. 2000). Johnson et al. (2000) conclude:

> "Evidence of a sharp population decline dating back to the early 20th century exists for the Phoenix area, including the lower Salt River. Along the lower and middle Gila Valley, a severe population decline is also apparent but its timing is uncertain. In southern Arizona, changes in the overall status of the owl are more difficult to detect in part due to the lack of baseline information. However, along Rillito Creek and the Santa Cruz River in particular, an early population decline is also probable. Along these two rivers, and along the Salt and Gila rivers, the owl's population decline could have coincided with intensive woodcutting and the construction of the first dams, causing deforestation and reduced waterflow early in the 20th century."

Loss of pygmy-owls from riparian forests of southern Arizona resulted in the truncation of the population's range. Pygmy-owls were reported to be present as far north as New River, 35 miles north of Phoenix (Fisher 1893), whereas pygmy-owls currently cannot be found further north than Northwest Tucson, where they have declined to a single male owl and have not nested in several years. Further, pygmy-owls and their habitat has been eliminated from all of the major rivers of southern Arizona, with the possible exception of the lower San Pedro River.

Today, pygmy-owls primarily occur in Sonoran desertscrub, where surveys indicate the population is critically small and near extinction. During the 1970s and 1980s reports of pygmy-owls were sporadic and widely spaced, but included many areas where the species no longer occurs, such as Sabino Canyon, the confluence of the Salt and Verde Rivers, and Sonoita Creek, Dudleyville Crossing and Aravaipa Creek on the Lower San Pedro River (Hunter 1988). The small number of reports in combination with the ease of detection of the species and interest by birders, led Hunter (1988) to conclude:

> "There may be additional unpublished reports of the species in Arizona, but the species is highly sought after by the bird-watching community and such reports invariably surface

on 'birding hotlines.' In addition, the species is relatively easy to detect as it is active in the daytime and is often found calling in the early morning hours or is found being scolded by songbirds. The dramatic increase of bird-watching during the last 20 years in central and southern Arizona, resulting in less than twenty documented reports, provides compelling evidence of the restriction from much of the historical range of this species."

Interest and concern for the pygmy-owl grew in the 1990s with surveys for the species begun in 1990 in Organ Pipes National Monument, filing of a petition to list the pygmy-owl as threatened or endangered under the Endangered Species Act in 1992 (Galvin et al. 1992), and the beginning of extensive broadcast surveys for the species in 1993, where observers broadcast recorded vocalizations to locate pygmy-owls. Despite substantially increased survey effort, known pygmy-owls remain few with 41 individuals being the most found in any year (Abbate 1996, 1998, 1999, Richardson et al. 2000, FWS 2003, FWS 2004, FWS 2005)(Table 1).

Table 1. Numbers of adult pygmy-owls documented in Arizona 1993-2001.

Year	Adult pygmy-owls
1993	2
1994	2
1995	7
1996	15-18
1997	8
1998	15
1999	41
2000	30
2001	36
2002	24
2003	21
2004	20

The few number of owls documented in Arizona is far below minimum thresholds for population viability (e.g. Gilpin and Soule 1986). More birds may be present on Tohono O'odham lands, but given unknowns about their numbers or management of these areas, and the patchy and potentially limited distribution of the species' habitat, these lands cannot be assumed to harbor sufficient birds to rescue Arizona populations. Indeed, Richardson et al. (2000) conclude

"While there is a considerable amount of potentially suitable cactus ferruginous pygmy-owl habitat that remains unsurveyed, we have learned the following information about the distribution of cactus ferruginous pygmy-owls within Arizona: 1) despite increased survey efforts and an increased number of cactus ferruginous pygmy-owl detections, the Arizona population of cactus ferruginous pygmy-owls appears small; 2) the currently known population of cactus ferruginous pygmy-owls occurs chiefly in desertscrub habitats rather than riparian habitats reported in historical accounts; 3) the population of cactus ferruginous pygmy-owls appears patchily distributed across suitable habitat with population pockets occurring in southwest Tucson; southern Pinal County, the Altar Valley, Organ Pipe Cactus National Monument, and the Tohono O'odham Reservation."

It should be noted that in proposing to delist the subspecies, FWS in no way concluded that pygmy-owls in Arizona are secure and viable.

Pygmy-owls have also declined in northern Sonora, Mexico where like Arizona, pygmy-owls primarily occur in Sonoran desertscrub and grassland with appropriate nest structures (Flesch and Steidl 2005, Flesch and Steidl 2006a and b, Flesch 2007). Flesch and Steidl (2006a) surveyed randomly selected transects, totaling just under 54 km, in northern Sonora, Mexico for pygmy-owls between 2000-2004 and identified a decline in owl abundance that averaged -7% per year. Based on this analysis, Flesch and Steidl (2006a) determined that pygmy-owls in northern Sonora declined by an estimated 37 percent from 2000 to 2004 and concluded:

> "Should this apparent decline continue, recovery strategies that rely on pygmy-owls from Sonora could be jeopardized as will continued persistence of pygmy-owl populations in northern Sonora."

Flesch and Steidl (2006b) note that determining whether these declines result from "short-term natural variation" or represent "a long-term systematic decline" will take further study, and further note that observed declines are strongly influenced by the year 2000 when a higher number of birds were observed, but ultimately conclude:

> "Nonetheless, because pygmy-owl populations have declined to endangered levels in Arizona, we believe that the decline we observed in northern Mexico is cause for concern and continued study."

Observed declines continued in 2006 with Flesch (2007) concluding:

> "In 2006, I surveyed all 54 km of transects that had been surveyed each year since 2000, determined occupancy in 102 territories, and monitored 47 nests within 110 km of Arizona. Abundance of pygmy-owls was similar to that observed in 2005 and has declined by an average of 4.4 ± 1.9% (± SE) per year ($P = 0.0027$) since 2000, a 26% decline over 7 years. Further, territory occupancy declined 3.2 ±1.2% per year ($P = 0.010$) between 2002 and 2006 or 13% over 5 years, providing additional evidence that populations of pygmy-owls have recently declined in northern Sonora."

That observed declines represent a true decline in the population is bolstered by an observed correspondence between abundance and occupancy with Flesch (2007) concluding:

> "Importantly, the similarity of trends in occupancy and abundance provides an additional line of evidence that pygmy-owls are declining in northern Sonora. Should this apparent decline continue, recovery strategies in Arizona that rely on pygmy-owls from Sonora will be jeopardized as will the persistence of pygmy-owls in northern Sonora."

Populations in Sonora are also severely threatened by habitat loss with Flesch and Steidl (2006a) concluding:

> "Numerous threats to pygmy-owl habitat exist in northern Sonora, however, including woodcutting, vegetation clearing for agriculture or buffelgrass (*Pennisetum ciliare*), and overgrazing, and there are few regulatory mechanisms in place to protect habitat."

These threats have resulted in habitat loss over large expanses of northwest Mexico. For example, an estimated 1.2 million hectares have been intentionally cleared and planted with buffelgrass and most remaining pygmy-owl habitat in Sonora is slated by the government for clearing (Burquez et al. 1998). The combination of massive habitat loss and observed declines indicates the pygmy-owl is severely threatened in Sonora, Mexico. Thus, the Sonoran Desert population is threatened throughout all or a significant portion of its range.

IV. The Sonoran Desert Distinct Population Segment Qualifies as a Threatened or Endangered species under the Endangered Species Act

The Service is required to determine, based solely on the basis of the best scientific and commercial data available, whether a species is endangered or threatened because of any of the following factors: (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) and 1533(b).

The Sonoran Desert population of pygmy-owls is at risk of extinction now or in the foreseeable future because of the present or threatened destruction of habitat or range, an inadequacy of existing regulations and to a lesser extent other factors. FWS (2005), for example, concluded for Arizona:

> "The pygmy-owl is threatened by present and potential future destruction and modification of its habitat throughout a significant portion of its range in Arizona. One of the most urgent threats to pygmy-owls in Arizona continues to be the loss and fragmentation of habitat… There are currently no provisions under Arizona statute addressing the destruction or alteration of pygmy-owl habitat."

A. The Present or Threatened Destruction, Modification, or Curtailment of its Habitat or Range

Numerous threats to pygmy-owl habitat exist in Arizona and Sonora, including urban sprawl, woodcutting, vegetation clearing for agriculture, livestock grazing, and exotic plant species invasion (Abouhaider 1992, Burquez and Martinez-Yrizar 1997, Burquez et al. 1998, Abouhaider and McPherson 1999, Flesch 2003a, FWS 2005, Flesch and Steidl 2006a). Loss and fragmentation of habitat have led to loss of pygmy-owls from portions of their range and likely caused declines in abundance in the United States and Sonora (Hunter 1988, Milsap and Johnson 1988, Johnson et al. 2000, Flesch and Steidl 2005).

i. Riparian forest destruction

Evidence indicates that the widespread destruction of riparian woodlands throughout Arizona and Sonora led to a decline in the pygmy-owl's range and declines in abundance (Hunter 1988, Milsap and Johnson 1988, Burquez and Martinez-Yrizar 1997, Johnson et al. 2000). It is estimated that between 85 to 90% of riparian bottomland forests in the southwestern United States have been modified or lost; these alterations and losses are attributed to woodcutting, urban and agricultural encroachment, water diversion and impoundment, channelization, groundwater pumping, livestock overgrazing, and hydrologic changes resulting from various land-use practices (e.g., Phillips et al. 1964, Carothers 1977, Kusler 1985, Jahrsdoerfer and Leslie 1988, USFWS 1988, 1997, U.S. GAO 1988, Szaro 1989, Dahl 1990, State of Arizona 1990, Bahre 1991). Likewise, in Sonora there has been widespread destruction of riparian habitats for agriculture and other uses. Burquez and Martinez-Yrizar (1997), for example, concluded about riparian habitats in Mexico:

> "Although agricultural development in the desert was relatively small in scale and confined to areas with a shallow water table, nonetheless it had seriously affected riparian habitats by the end of the nineteenth century. After many years of low rates of population increase, growth in Sonora has accelerated rapidly. The coastal plain did not play a significant role in development until the appropriation of the vast underground aquifers in the Rio Concepcion, Rio Sonora, and Rio Matape basins in the late 1940s. The deltas of the Rio Mayo and Rio Yaqui were not extensively altered until the construction of dams upriver in the 1940s, 1950s, and 1960s. These reservoirs opened the way to further growth through the generation of electricity and the stimulus to rapid expansion of agriculture. By the late 1970s the deltas were almost entirely converted to agriculture. Within a few years of intensive development, huge expanses of natural vegetation had been cleared. The vast mesquite forests of the Llanos de San Juan Bautista, in the delta of the Rio Sonora, disappeared with the colonization of the Costa de Hermosillo irrigation district… In the Rio Yaqui and Rio Mayo deltas, more than 1,000,000 ha of mesquite, cottonwood, and willow riparian forests and coastal thorn-scrub disappeared once dams upriver started to operate."

In recent decades, riparian woodlands have continued to be modified and destroyed by agricultural development, mesquite logging, livestock grazing, groundwater pumping, urban expansion, and general watershed degradation (Phillips et al. 1964, Brown et al. 1977, State of Arizona 1990, Bahre 1991, Stromberg et al. 1992, Stromberg 1993a, 1993b, Burquez and Martinez-Yrizar 1997). The human population in both Arizona and Sonora continues to grow at a rapid rate with concurrent demand for water. In Arizona, for example, population growth in Sierra Vista is known to be depleting the aquifer that supports perennial flow in the San Pedro River and if growth is not curbed and serious conservation measures not implemented, will likely result in drying of the river and loss of the riparian habitats it currently supports.
Likewise in Mexico, woodcutting in the Rio Magdelena watershed associated with one of the larger human populations of any watersheds in northern Mexico has likely resulted in reduced pygmy-owl occupancy. Flesch and Steidl (2006b) concluded:

> "Territory occupancy was at least 21% lower in the Rio Magdelena watershed than in any of the 6 other watersheds we studied. Such variation may be related to differences in habitat characteristics that explained variation in trends in abundance among years (Flesch and Steidl 2006). For example, the cumulative effects of land-use activities by humans (mainly woodcutting and agriculture) were associated with greater declines in abundance between 2000 and 2004 (Flesch and Steidl 2006). Land use by humans is especially intense in the Rio Magdelena watershed that harbors a larger human population than any of the other watersheds we studied, which likely reduces habitat quality for pygmy-owls."

ii. Urban sprawl

Urban sprawl is a serious threat to the continued existence of the pygmy-owl in both Arizona and Sonora (FWS 2005, Burquez and Martinez-Yrizar 1997). Pima County, where most remaining pygmy-owls in Arizona reside, is one of the fastest growing counties in the U.S. with the counties' population expected to increase from 889,000 to 1,200,000 (26%) by 2020 (SDCP 2004). Likewise in Sonora, the population is growing rapidly with Burquez and Martinez-Yrizar (1997) observing that urban centers in the deserts of Sonora have grown "exponentially." Of particular concern, Burquez and Martinez-Yrizar (1997) document that urban sprawl in Sonora has in several cases eclipsed preserves:

> "Urban development has also taken its toll on nature reserves. Three of them have already disappeared through the ignorance and complacency of local authorities. The Arroyo Los Nogales and the Zona Protectora Forestal de Hermosillo were buried in oblivion and later integrated into urban centers. Recently, the reserve that the Centro Ecologico de Sonora had been endowed by a former governor was cleared to promote urban development by a subsequent governor."

Urban sprawl affects pygmy-owls and there habitat in several ways. Housing development results in the direct removal of nesting and perching structures, such as saguaro cactus, in the footprint of the houses, yards and driveways created during development. Housing development also indirectly impacts pygmy-owls and their habitat by increasing road networks and traffic, introducing house cats, and altering hydrological patterns (FWS 2004). Discussing the impacts of roads and road networks, for example, FWS (2004) concluded:

> "The presence of transportation infrastructure (i.e. roads) often degrades and fragments habitat, and given that such infrastructure is typically part of a network or system, the effects are often synergistic and widespread (Seiler 2001). Where such features are already present, the initial adverse effects of new residential development are the result of increased use of that infrastructure. Roads present a mortality hazard to pygmy-owls. While narrower roads or wider roads with medians that incorporate trees can minimize the risk of mortality, it cannot be eliminated. Further, the risk of vehicle-strike mortality is likely related to the number of vehicles using the road; a greater number of vehicles (or a greater frequency of use) can reasonably be expected to increase the probability that a pygmy-owl will be struck. Given the pygmy-owl's rarity and patchy distribution, any

> vehicle strike mortality could have serious adverse consequences to a regional subpopulation."

Although documenting bird mortality or injury is quite difficult, Cartron et al. (2000a) note that a pygmy-owl "nesting near a house," was rescued after colliding with a car window. The bird survived, but suffered cerebral hemorrhage. Based on this and other observations, they concluded that "human related factors may be a significant cause of owl mortality."

Another source of mortality for pygmy-owls in association with urban sprawl is house cats. One adult owl and a juvenile were killed by a house cat in Texas (Cartron et al. 2000a). Based on existing studies, FWS (2004) determined that house cats will travel up to 0.6 miles into adjacent habitat and thus determined that housing development impacts an area the size of the development plus this additional distance.

Finally, housing development can affect pygmy-owls by altering drainage patterns thereby altering the distribution, quantity and quality of xeroriparian vegetation depended on by the owl. Direct construction in, or channelization of washes can result in destruction and loss of xeroriparian habitat with direct impacts on the pygmy-owl. Likewise, construction of roads that bisect washes or construction of houses between washes can result in increases in the velocity of flow, resulting in scour of vegetation, which again results in the direct loss of pygmy-owl habitat (FWS 2004).

In contrast to the above impacts, Cartron et al. (2000b) observed that there may be some association between pygmy-owls and low density housing development, noting that "[i]n the Tucson area, which supports many of the known owls (Feller and Corman 1993, Lesh and Corman 1995), documented habitat occupancy is higher in low density (one house per 3.3 acres or more) residential areas," and further that this may be because of increased vegetation density due to irrigation and the presence of large, ornamental trees. Cartron et al. (2000b) also observed, however, that: "[r]ecent survey efforts have resulted in an increased number of owl detection in areas with little or no residential development," and further that: "[s]tatewide, there are now more known nests in non-residential areas than in residential areas." If increased vegetation density associated with low density housing does attract pygmy-owls, which is very much uncertain, it is quite possible that that such habitat may be a sink for the pygmy-owl because of the increased risk of mortality from collision, house cats and other factors. Regardless of uncertainty about the effects of low density housing development on pygmy-owls, much development occurring within the range of the species is not low-density and thus has known negative impacts on the species, as discussed above (FWS 2004). Indeed, FWS (2004) concluded:

> "One of the most urgent threats to pygmy-owls in Arizona continues to be the loss and fragmentation of habitat (U.S. Fish and Wildlife Service 1997, Abbate *et al.* 1999). The complete removal of vegetation and natural features required for many large-scale and high-density developments directly and indirectly affects the pygmy-owl (Abbate *et al.* 1999)."

iii. Buffelgrass Conversion and Invasion

In large portions of Sonora, native vegetation has been purposefully converted to African buffelgrass (*Pennisetum ciliaris*) to provide forage for livestock, which in combination with spread of buffelgrass into adjacent areas, including portions of Arizona, is leading to massive loss of pygmy-owl habitat. Burquez et al. (1998) note that buffelgrass:

> "is the dominant herbaceous plant in large tracts of the Southwestern USA and northern Mexico (8-10 million ha according to Cox 1991). In the Sonoran Desert it is actively invading natural desertscrub and thornscrub communities. Buffelgrass, 30 years after its introduction to NW Mexico, is altering the landscape at a fast pace."

In Sonora, lands are actively being cleared for buffelgrass with Burquez et al. (1998) concluding:

> "Sonora has now more than 600,000 ha officially planted with buffelgrass. The government provides subsidies for desertscrub clearings for buffel, and permits are issued annually to increase their extent. Clearings are usually larger than officially granted, and many areas are converted illegally without government permits. These factors give a conservative estimate of about 1.2 million ha deliberately cleared in the state of Sonora… The area proposed by government agencies [for conversion to buffelgrass] cover most of the Sonoran Desert subdivision Plains of Sonora, portions of the foothills of Sonora, and tropical deciduous forests."

Conversion to and invasion by buffelgrass results in the direct loss and fragmentation of pygmy-owl habitat by eliminating large columnar cacti and other vegetation required by pygmy-owls for nesting, perching and cover, likely reducing prey, and increasing fire frequency (Flesch 2003a). In many areas, buffelgrass is permanently maintained through prescribed fire and in some cases plowing (Burquez and Martinez-Yrizar 1997), effectively preventing recovery of vegetation necessary for pygmy-owl habitat.

Where vegetation is not actively cleared and bufflegrass has invaded on its own, large cacti and other vegetation utilized by the pygmy-owl are frequently lost in subsequent fires carried by the non-native. Many desert trees, shrubs, and cacti, including saguaros, are poorly adapted to fire and cannot withstand buffelgrass fires; those that survive a fire generally still suffer severe damage and are eliminated in subsequent fires (Burquez-Montijo et al. 2002). Esque ***et al.*** (2000) reported mortality of adult saguaros in excess of 20 percent after a fire in desertscrub at Saguaro National Park. In areas where naturalized stands of buffelgrass are becoming dominant, natural fire cycles begin within a few years following colonization, which enlarges the affected area by eliminating the desert and thornscrub species and providing new seed sources (Burquez-Montijo et al. 2002). Thus, the introduction of buffelgrass into fire-intolerant desert communities results in a permanent conversion to a buffelgrass savanna with reduced plant cover and diversity (Van Devender and Dimmit 2000), containing stands of nonnative weeds and relatively few native desertscrub species (e.g. *Encelia farinose*, *Simmondsia California*, and *Acacia greggii*) that are tolerant of fire.

Although it has not been directly studied, conversion to bufflegrass likely also severely impacts many of the pygmy-owl's prey species, potentially resulting in a decrease in prey abundance. Burquez and Martinez-Yrizar (1997) reported that:

> "Paired samples on neighboring plots with and without introduced buffelgrass show an order of magnitude decrease in species numbers, and a fourfold decrease in standing crop biomass."

It seems highly unlikely that losses in species diversity and overall productivity of this magnitude would not impact pygmy-owl prey abundance.

Buffelgrass is just one of many invasive plant and animal species that are threatening ecosystems in the Southwest (Minckley and Deacon 1991; Rosen *et al.*, 1994, Bahre 1995, Stromberg and Chew 1997). Biological invasions, such as that of buffelgrass, are now rated among the top ten threats to the integrity of Sonoran Desert ecosytems (Nabhan 2000). Desert habitats are described as being relatively "open" to colonization by exotics compared with grasslands and woodlands because ground cover is so sparse (Esque and Schwalbe 2002). As with buffelgrass, these other non-native species are reducing vegetation diversity and structure and altering fire regimes with concurrent impacts on pygmy-owl habitat.

iv. Livestock Grazing

In addition to the severe impacts caused by conversion of land to buffelgrass to provide forage for cattle, livestock grazing directly impacts pygmy-owl habitat by eliminating riparian habitat, reducing saguaro establishment and by spreading non-native species. Livestock grazing results in the direct removal of riparian vegetation through browsing, trampling and changes in channel morphology, and has been a primary factor in the loss of most riparian woodlands in the Southwest (Schulz and Leininger 1990, Armour et al. 1991, Fleishner 1994, Krueper 1996, Ohmart 1994 and 1996, Belsky et al. 1999).

In uplands, studies show that livestock grazing negatively affects saguaro regeneration. Abouhaider (1992) compared paired adjacent plots in Saguaro National Monument, where one plot had not been grazed since 1958 and the other had not been grazed since 1978, and concluded that:

> "Data analysis indicated that significantly more young saguaros existed on the area free of grazing the longest (20 years longer)."

All of the variation between the two plots was in the youngest age class (11-20 years), reflecting the fact that livestock grazing retards saguaro regeneration. With prolonged grazing, lack of regeneration will overtime result in decline and loss of saguaros from the landscape.

Flesch (personal communication) found that at fine scales pygmy-owls may select areas with more bare ground, which can be created by livestock grazing, probably because prey is more vulnerable in such areas. Given the pervasiveness of livestock grazing in Arizona and Sonora, the above impacts on saguaros and riparian vegetation, and the fact that nest sites in saguaros and

large riparian trees are limiting for pygmy-owls in many areas, however, livestock grazing has likely resulted in loss and degradation of pygmy-owl habitat over a majority of the landscape.

v. Border wall

Recent plans by the U.S. to construct a wall along the Mexican border to impede illegal migration may impact the ability of pygmy owls to move from Mexico to Arizona and vice versa, thereby limiting gene flow and ensuring that birds from Mexico will not be able to supplement the Arizona population. This will almost certainly increase risk of extinction in the U.S., leading to a substantial range loss for the Sonoran Desert population. Flesch (2007), for example, concluded:

> "In addition to habitat management, enhancing and maintaining landscape permeability should foster movement and immigration of pygmy-owls from Sonora to Arizona. Pygmy-owls often fly short distances just above the ground when crossing vegetation openings both during natal dispersal and when traversing their home ranges (Flesch and Steidl 2007a). Recent plans to replace permeable wire fences and vehicle barriers with tall impermeable walls along the U.S.-Mexican border may limit movements by pygmy-owls and other species (Segee and Neeley 2006, Cohn 2007)."

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes

i. Disturbance by Human Activity

Although overall pygmy-owls are very tolerant of humans, there is some evidence that professional and recreational birding tours may disturb individual pygmy-owls, particularly those in proximity to large human population centers, and disturbance by humans may cause individual pygmy-owls to lose reproductive fitness or vacate a territory. This is unlikely a major factor in pygmy-owl declines past or present.

C. Disease or Predation

i. Disease

Hematozoa (blood parasites) may cause neonatal bacterial diarrhea, marginal anemia, and septicemia (Hunter et al. 1987), reducing survival and recruitment of birds. However, no evidence of hematozoa in pygmy-owls in Texas (Proudfoot and Radomski 1997) or Arizona has been recorded (Proudfoot unpubl. data). Trichomoniasis can cause mortality of raptors (Boal et al. 1998) that ingest infected prey. Most species of raptors in the Tucson area, including small owls such as screech-owls and elf owls, have had documented cases of trichomoniasis (AGFD unpubl. data). House finches and doves are prey items for pygmy-owls in Arizona and are carriers of trichomoniasis (Abbate et al. 1999). Recent investigations in Texas and Arizona have indicated the regular occurrence of avian parasites in the materials inside of pygmy-owl nest cavities. The numbers of parasites may be high enough to impact nestling pygmy-owls (Proudfoot et al. 2005b). The West Nile Virus (WNV) is causing significant mortality in nearly

all bird species and continues to spread across North America, and constitutes a grave threat to pygmy-owls.

ii. Predation

Pygmy-owls are susceptible to predation from a wide variety of species. In Texas, eggs and nestlings were depredated by racoons (*Procyon lotor*) and bullsnakes (*Pituophis melanoleucus*), and adults were killed by great horned owls (*Bubo virginianus*), Harris' hawks *(Parabuteo unicinctus*), Cooper's hawks *Accipiter cooperii*), and eastern screech-owls (*Otus asio*) (Proudfoot and Johnson 2000, G. Proudfoot unpubl. data). Many of these same predators are suspected to have taken pygmy-owls in Arizona (Abbate et al. 2000, AGFD unpubl. data). Pygmy-owls are particularly vulnerable to predation and other threats during and shortly after fledging (Abbate et al. 1999). AGFD telemetry monitoring in 2002 indicated at least four of the nine young produced that year were eaten by predators prior to or shortly after dispersal during a year when tree species failed to leaf out due to drought conditions (AGFD unpubl. data). These observations, in conjunction with observations from previous years indicate cover near nest sites may be important for young to fledge successfully (Abbate et al. 1999, Wilcox et al. 1999, Wilcox et al. 2000).

D. The Inadequacy of Existing Regulatory Mechanisms

As a listed endangered species under the Endangered Species Act, the cactus ferruginous pygmy-owl formerly received substantial protection in Arizona. Under the Act, federal agencies are prohibited from permitting, funding, or carrying out actions that jeopardize the continued existence of any endangered species, and have affirmative duties to use their authorities to recover endangered species. To ensure this occurs, the Act requires federal agencies to consult with FWS when their actions may affect endangered species. These requirements provided substantial protection for the pygmy-owl. As of July 12, 2005, FWS evaluated 871 actions with potential impacts on the pygmy-owl in Arizona. In all of these cases, FWS determined whether or not projects were likely to adversely affect the pygmy-owl, and in cases where there were likely to be impacts, required or recommended mitigations to reduce or remove these impacts (FWS 2005).

As a listed species, the pygmy-owl benefited from designation of critical habitat, which greatly expanded the above consultation requirements by prohibiting federal agencies from permitting, funding, or carrying out actions that adversely modify critical habitat. This prohibition applied to private lands where development or other actions modified waterways because such action requires a federal permit from the Army Corps of Engineers under the Clean Water Act and thus required private landowners to mitigate their impacts on the pygmy-owl and its habitat by conducting surveys, modifying development plans and other actions. Given the pygmy-owl's association with riparian and xeroriparian areas, these protections were particularly important. Critical habitat also provided local governments, private landowners and others important information about the pygmy-owl's habitat needs and indeed, Pima County substantially relied on pygmy-owl critical habitat when identifying conservation areas for the "Sonoran Desert Conservation Plan" and "multi-species habitat conservation plan."

Listing of the pygmy-owl also prohibited individuals from taking pygmy-owls, which includes any action that would "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect" pygmy-owls. Because take has been interpreted to include habitat protection, this prohibition provided further protection to the pygmy-owl's habitat.

With delisting of the pygmy-owl, these protections and resulting mitigations have disappeared. As discussed below, no other law or regulation provides a similar degree of protection and the pygmy-owl is at substantially increased risk of extinction.

i. U.S. Federal Law

In the absence of protection under the Endangered Species Act, the pygmy-owl receives little protection from other federal laws or regulations. The ferruginous pygmy-owl is protected under the Migratory Bird Treaty Act ("MBTA"). 16 U.S.C. §§ 703-712. The MBTA prohibits "take" of any migratory bird. "Take" is defined as: "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect." However, unlike the ESA, there are no provisions in the MBTA for preventing habitat destruction unless direct mortality or destruction of active nests occurs. Under the National Environmental Policy Act (NEPA), federal agencies must consider the impacts of their actions on the environment, including the pygmy-owl and its habitat. However, NEPA fails to require that environmentally benign alternatives are selected or that impacts to pygmy-owls or their habitat are avoided, and thus fails to provide substantial protection. No other federal law or regulation provides substantial protection to the pygmy-owl.

ii. Arizona State Law

The State of Arizona lists the ferruginous pygmy-owl (subspecies not defined) as endangered (AGFD 1988). However, this designation does not provide special regulatory protection. Arizona regulates the capture, handling, transportation, and take of most wildlife, including *G. b. cactorum*, through game laws, special licenses, and permits for scientific investigation. There are no provisions for habitat protection under Arizona endangered species law.

iii. Local conservation mechanisms

Sonoran Desert Conservation Plan / Multiple Species Conservation Plan. Before discussing proposed protections for the pygmy-owl under the Sonoran Desert Multiple Species Conservation Plan (MSCP), it is important to note that when considering whether or not to list a species, the Fish and Wildlife Service is not to consider promised or future management actions, but instead only the current management and status of the species. In numerous cases, FWS has been forced by judicial action to reverse decisions not to list species because they relied on promised management actions, including decisions over the Barton Spring's salamander, Queen Charlotte goshawk, jaguar, Alexander Archipelago wolf and coho salmon. This is not merely a legalistic technicality. There is good reason for considering only the current management and status. States, Federal agencies and private interests can easily promise to protect and recover species in order to avoid or delay a listing that they consider potentially controversial, but there is no way of knowing whether they will follow through on their promises or whether their

actions will result in recovery. To protect species from ongoing destruction, modification or curtailment of habitat or range, listing under the Act is required while management actions are being tested. If it turns out promised management actions result in substantial recovery, then at that point they can be incorporated into a recovery plan for the species. In response to the above court decisions, FWS has developed a policy for evaluating the contribution of conservation efforts towards negating the need for listing, which identifies criteria for determining the certainty a conservation effort will be implemented and whether it is likely to be effective (FR: March 28, 2003 V. 68, No. 60). We have considered this policy when evaluating ongoing conservation efforts, and understand that FWS must do the same when considering listing of the Sonoran Desert population of the pygmy-owl. Clearly, the pygmy-owl is experiencing ongoing habitat destruction that is placing it in danger of extinction and thus requires protection as an endangered species, regardless of untested and promised management actions.

Pima County's Multiple Species Conservation Plan includes the pygmy-owl on its list of "covered species based on provision of several conservation measures. Under the MSCP, Pima County would protect habitat for the owl (and 35 other covered species) through acquisition of land and conservation easements, State land leases, and protection and management of these and other existing conserved land (e.g. County parks). Overall, there is little certainty that the MSCP will be implemented or effective.

The County plans to protect the pygmy-owl through continued discretionary application of its "Conservation Lands System" (CLS). The CLS requires varying percentages of habitat protection on private lands where there has been a requested increased zoning density depending on the property's location in the CLS categories (e.g. Biological Core Management Area, Multiple Use Management Area, etc). The County would also protect the pygmy-owl by implementing several "special conditions, management, and monitoring directives" in addition to the Conservation Lands System including prioritizing protection of and acquiring priority owl habitat and supporting and participating in owl research and experiments.

Pima County's MSCP is not yet final and so many related conservation commitments cannot be assured. Some elements of the MSCP such as application of the Conservation Lands System to proposed new development would also only occur at the discretion of the Board of Supervisors even after approval of the MSCP.

The County has promised to acquire pygmy-owl habitat proactively and to fill any gaps left by discretionary implementation of the CLS. But the County has not yet established a funding mechanism for the specific purpose of pygmy-owl conservation and is not likely to do so in the future. The County has also actively directed acquisitions away from occupied pygmy-owl habitat in areas with significant development pressure.

Acquisition of important habitat for a broad range of species would likely continue with funding under a 2004 "Habitat Protection Priority Areas" bond. But important pygmy-owl habitat and known locations were never included as criteria for identifying the Habitat Protection Priority Areas so any benefits to the species are likely to be more accidental than designed.

Other directives for pygmy-owl special conditions, management, and monitoring have not yet been identified as of filing of this petition. Crucial pygmy-owl conservation conditions such as required surveys prior to approval of development projects, required avoidance of occupied pygmy-owl habitat, in-kind mitigation for any unavoidable development impacts to occupied pygmy-owl habitat, and pygmy-owl specific protective management measures are not included in the MSCP.

iv. Mexican Law

The national species protection law in Mexico, NORMA, does not list the ferruginous pygmy-owl as a protected species and the pygmy-owl receives no other protection under Mexican law.

v. Conclusion

In sum, the pygmy-owl is not receiving substantial protection in either the U.S. or Mexico and needs the protections of the Act to avoid extinction. Although Pima County's MSCP may eventually provide some protection to the pygmy-owl in Pima County, such protection is uncertain and its effectiveness unknown because it has yet to be implemented, funding yet to be identified and much of its provisions discretionary. The MSCP also provides no protection to pygmy-owls outside of Pima County, including the species' substantial range in Mexico. For these and other reasons, the pygmy-owl should again be listed as an endangered species under the Endangered Species Act.

E. Other Natural or Manmade Factors Affecting its Continued Existence

i. Genetic Stochasticity

Low genetic variability can lead to a reduction in reproductive success and environmental adaptability. Caughley and Gunn (1996) note that small populations can become extinct entirely by chance even when their members are healthy and the environment favorable. The pairing of siblings or parents with their offspring is rare in raptors, only 18 cases have been recorded (Carlson et al. 1998). Four of the seven incestuous species listed by Carlson et al. (1998) include barn owls, burrowing owls (*Athene cunicularia*), screech-owls, and spotted owls (*Strix occidentalis*). In 1998 and 1999, two cases of sibling pygmy-owls pairing and breeding were documented (Abbate et al. 1999). Additional cases of sibling pairings have been documented in 2001 and 2002 (AGFD unpubl. data). These unusual pairings likely resulted from extremely low numbers of available mates within range of dispersal, and/or from barriers (including fragmentation of habitat) that create dispersal bottlenecks and funnel dispersing owls into the same area. Further, because the pygmy-owl is nonmigratory, there may be an additional limitation on the flow of genetic material between populations which may reduce the chance of demographic and genetic rescue through recruitment from adjacent populations. Proudfoot and Slack (2001) found that average haplotype diversity among pygmy-owls in Arizona (e.g., Northwest Tucson) was low relative to pygmy-owls in Sonora, Mexico. They speculated that the lack of genetic diversity in pygmy-owls in Arizona may have been a product of "founder events" (i.e., a small number of owls immigrating to an area and starting a population).

ii. Fire and non-native species invasions

Fires can negatively affect pygmy-owls by altering their habitat (Abbate et al. 1999). Of particular concern is the introduction of fire into Sonoran Desertscrub communities invaded by buffelgrass. Sonoran Desertscrub is not adapted to fire, as native grasses do not provide the necessary fine fuels. Recent introduction and spread of nonnative annual plants, such as cheatgrass (*Bromus* sp.), Mediterranean grass (*Schismus barbatus*), and Sahara mustard (*Barassica tournefortii*); as well as the perennial buffelgrass, increase fire frequency and intensity in desertscrub communities (Minnich 1994). When nonnative annual plants dry during annual dry seasons or droughts, they can form continuous stands of fine fuels that carry fire. These fine fuels have resulted in increased fire frequency in desertscrub (Rogers and Steele 1980, Schmidt and Rogers 1988, Minnich 1994).

Once established, alien grasses, such as buffelgrass, suppress the regeneration of key desert species by setting in motion a grass/fire cycle by providing the fine fuel necessary to initiate and propagate fire (d'Antonio and Vitousek 1992). Alien grasses recover more rapidly than native species following such fires and cause a further increase in susceptibility to fire (D'Antonio and Vitousek 1992). Theoretically, if subsequent fires were prevented, it might take as long as twenty years for the total plant density to recover, and much longer for plant species composition to recover (Esque and Schwalbe 2002).

Many desert trees, shrubs, and cacti, including saguaros, are poorly adapted to fire and cannot withstand fires. Those that survive a fire generally still suffer severe damage and are eliminated in subsequent fires (Burquez-Montijo et al. 2002). Esque *et al.* (2000) reported mortality of adult saguaros in excess of 20 percent after a fire in desertscrub at Saguaro National Park. Loss of saguaros in particular, as well as other native desert vegetation, results in severe degradation and loss of pygmy-owl habitat.

V. Critical Habitat Should be Designated for the Pygmy-owl

i. Critical Habitat is Beneficial to Listed Species

Critical habitat is defined by Section 3 of the ESA as:

(i) the specific areas within the geographical area occupied by the species,
at the time it is listed in accordance with the provisions of section 1533 of this title, on which are found those physical or biological features (I) essential to the conservation of the species and (II) which may require special management considerations or protection; and

(ii) specific areas outside the geographical area occupied by the species at the time it is listed in accordance with the provisions of section 1533 of this title, upon a determination by the Secretary that such areas are essential for the conservation of the species.16 U.S.C. §1532(5).

Therefore, critical habitat should ensure an adequate amount of protected habitat in a spatial configuration that allows for the long-term survival and recovery of the species, including a

network of interconnected reserves that provide for self-sustaining populations, genetic interchange, migration and dispersal. These are basic tenets of conservation biology.

The designation and protection of critical habitat "provide[s] a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved." 16 U.S.C. §1536(a)(2). The designation of critical habitat provides listed species with additional protections under Section 7 of the ESA. The Section 7 consultation requirements provide that no action authorized, funded, or carried out by any federal agency will "jeopardize the continued existence of any endangered species or threatened species *or result in the destruction or adverse modification of [critical habitat].*" 16 U.S.C. §1536(a)(2) (emph. added). A more scrutinizing level of consultation is conducted when habitat is designated as "critical." If critical habitat is involved in the consultation, the project must not impede recovery of the species. In comparison, a project that may affect a species' occupied habitat that is not officially designated as "critical habitat" must only show that its impact on that habitat will not jeopardize the continued existence of the species.

Several courts of appeal have recently invalidated the Service's position that critical habitat does not provide additional benefit above and beyond listing alone, holding that such a position violates congressional intent and the plain language of the Act. These rulings have emphasized that critical habitat provides additional protection to species, primarily through the requirement that actions not impede recovery and through the protection of unoccupied habitat, and thus it adds an additional layer of protection to the consultation requirement. *See, e.g. Gifford Pinchot Task Force v. U.S. Fish and Wildlife Serv.*, 378 F.3d 1059, 1069-1070 (9th Cir. 2004); *Sierra Club v. U.S. Fish and Wildlife Serv.*, 245 F.3d 434, 441-42 (5th Cir. 2001); *N.M. Cattle Growers Ass'n v. United States Fish and Wildlife Serv.,* 248 F.3d 1277, 1283 & n. 2 (10th Cir. 2001) (holding invalid the Service's regulation defining destruction or adverse modification of critical habitat in terms of impeding the recovery *and* survival of a species and determining jeopardy consultation is not functionally equivalent to consultation under the destruction/adverse modification standard). These cases should lie to rest further efforts on the part of the Service to argue that critical habitat is irrelevant.

The Ninth Circuit's decision reiterated that recovery is a key purpose of the Endangered Species Act, one that is largely implemented through the critical habitat provisions of the Act. The court noted that the Service had been operating under regulations that failed to acknowledge the crucial and distinct role of critical habitat: "That the agency was operating under a regulation that we now hold was impermissible has an inescapable bearing on the requisite showing of whether the [Service] considered recovery in its critical habitat inquiry." *Gifford Pinchot* at 1071.

Critical habitat designation also protects species by helping to define the meaning of "harm" under Section 9 of the ESA, which prohibits unlawful "take" of listed species, including harming the species through habitat degradation. Although "take" through habitat degradation is not expressly limited to harm to "critical habitat," it is practically much easier to demonstrate the significance of the impact to a species' habitat where that habitat has already been deemed "essential," or "critical," to the species' continued survival. *See Palila v. Hawaii Department of Land and Natural Resources*, 852 F. 2d 1106 (9th Cir. 1988).

Critical habitat also helps species by providing for agency accountability through the citizen suit provision of the Act. The citizen suit provision permits members of the public to seek judicial review of the agency's compliance with its mandatory statutory duty to consider the habitat needs of imperiled species. Also, the designation of critical habitat provides valuable information for the implementation of recovery plans.

Endangered Species Act "critical habitat" protections are a crucial tool to recover endangered species. A peer-reviewed study in the April 2005 issue of BioScience, "The Effectiveness of the Endangered Species Act: A Quantitative Analysis," concludes that species with critical habitat for two or more years are more than twice as likely to have improving population trends than species without. Critical habitat is particularly important for the pygmy-owl because there are so few individuals of the species left in Arizona. Development project proponents and responsible federal agencies routinely take advantage of this desperate situation by denying that particular projects will result in any harm and dismissing any responsibility to mitigate impacts or improve the status of the species. For example, the U.S. Army Corps of Engineers has steadfastly denied that development projects near Tucson may affect the pygmy-owl unless the species is either present or critical habitat is designated on a particular property. The existence of designated critical habitat at a particular project site provides virtually irrefutable proof that the project "may affect" the species, thereby triggering formal ESA section 7 consultation duties by responsible federal agencies. Pygmy-owl critical habitat has also provided essential guidance in identifying development project mitigation standards under the Pima County government's Sonoran Desert Conservation Plan and Multiple Species Conservation Plan as a means to balance long-term pygmy-owl conservation with reasonable future urban development.

In sum, critical habitat is a separate and additional requirement of the Act that provides important protections for listed species not otherwise provided by law. Without critical habitat designated with recovery as the goal, the pygmy-owl's chances of persisting and recovering are greatly diminished.

VI. Processing of this Petition

Petitioners request that the Service use its authority pursuant to Section 4(b)(7) of the Endangered Species Act (ESA), 16 U.S.C. § 1533(b)(7), and 5 U.S.C. § 533(e) to emergency list either the Sonoran Desert DPS, Arizona DPS or western subspecies of the pygmy-owl as endangered and to initiate a rulemaking to make that emergency designation permanent. Pygmy-owls in Arizona are at critically low numbers with imminent threats to the remaining vestiges of habitat and populations in Sonora are declining and threatened by severe habitat loss and conversion. This dwindling population and the imminent threats constitute an emergency posing a significant risk to the well-being of this species. Immediate action to protect these populations is necessary.

This petition is submitted under the provisions of the ESA, 16 U.S.C. §§1531 et seq., 50 C.F.R. 424.14, and the APA, 5 U.S.C. §533. The Service is bound to process this petition within a predetermined time frame as defined by CFR 424.14(c). The regulations require the Service to make a finding within 90 days of receipt of this petition as to whether the petition presents substantial scientific information indicating that the emergency listing may be warranted. The

finding shall be promptly published in the Federal Register. 50 CFR 424.14(c)(1). If warranted for emergency listing, the Service must immediately list the species as an endangered species. Within 12 months of receiving this petition, the Service is required to determine how it will proceed with the permanent listing, and shall promptly publish notice of such intention in the Federal Register. 50 CFR 424.14(c)(3). Petitioner fully expects the Service to comply with these mandatory deadlines.

D. Noah Greenwald
Conservation Biologist
Center for Biological Diversity
917 SW Oak St. Suite 413
Portland, OR 97205
503-484-7495

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