PETITION TO LIST THE MEXICAN GRAY WOLF, CANIS LUPIS BAILEYI, AS AN ENDANGERED SUBSPECIES UNDER THE U.S. ENDANGERED SPECIES ACT

Honorable Kenneth L. Salazar
U.S. Secretary of the Interior
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Rowan Gould, Director
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Mr. Secretary and Director Gould:

WildEarth Guardians and The Rewilding Institute hereby formally petition the Secretary of the Interior ("Secretary") to list the Mexican gray wolf (*Canis lupus baileyi*) as an endangered subspecies pursuant to the Endangered Species Act (ESA), 16 U.S.C. §§ 1531 *et seq*.

This petition is filed under 5 U.S.C. § 553(e) and 50 C.F.R. § 424.14 (1990), which grants interested parties the right to petition for issue of a rule – including a rule to list a subspecies under 16 U.S.C. § 1533 as endangered – from the Secretary. Petitioners also request that, pursuant to 16 U.S.C. § 1533(a)(3)(A), 50 C.F.R. § 424.12, and 5 U.S.C. § 553(e), the Secretary further designate critical habitat be designated for the Mexican gray wolf concurrent with its listing.

This petition sets in motion a specific process that places: 1) unambiguous response requirements on the U.S. Fish and Wildlife Service ("FWS"); and 2) detailed time constraints upon those responses. Given the perilously small population of Mexican wolves in the wild and the failure of the present recovery program to effect recovery, it is imperative that FWS issue 90-day and 12-month findings on this petition in a timely fashion. This petition presents evidence that the Mexican gray wolf merits protection as a separate subspecies under the ESA and should be recovered within its historic and other appropriate range as described herein. Questions regarding our sources of information are welcome and should be directed to Rob Edward at 720.663.9653 or Dave Parsons at 505.275.1944.

As necessary, petitioners may provide supplemental scientific information related to this petition before the 90-day finding deadline. However, given the legal and policy history of this subspecies—which clearly establishes that the Mexican wolf is critically imperiled—the primary substance of this filing is to establish the legal context for the petition and to trigger the response deadline requirements.

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PETITIONERS

WildEarth Guardians. WildEarth Guardians protects and restores wildlife, wild rivers, and wild places in the American West. Using a combination of litigation, scientific analysis, and grassroots organizing, WildEarth Guardians defends the West's wild heritage on behalf of approximately 4,500 members, many of whom live in or frequently visit the Blue Range Wolf Recovery Area ("BRWRA"). WildEarth Guardians and its predecessor organizations has been significantly involved in restoring and protecting wolves in the American West for over 15 years. The members and employees of WildEarth Guardians engage in, and will continue to engage in, outdoor recreation, wildlife viewing, and other activities throughout the southwest in general, and in the BRWRA in particular. The existence of one or more thriving wild Mexican wolf populations is an important part of these individuals' aesthetic and recreational enjoyment. WildEarth Guardians' members and employees have scientific, aesthetic, recreational, and conservation interests in Mexican gray wolf recovery and in the preservation of suitable habitat for the wolf. WildEarth Guardians believes that true recovery for the Mexican gray wolf can be achieved only if FWS lists this subspecies as endangered in its own right under the ESA and expeditiously designates critical habitat for this separately listed subspecies.

The Rewilding Institute. The Rewilding Institute is a non-profit, conservation think tank dedicated to science-informed protection and restoration of biological diversity at landscape and continental scales in North America. A primary focus of the Rewilding Institute is the restoration and conservation of ecologically effective populations of top predators. Such top predators include the Mexican gray wolf, which formerly inhabited vast areas in the Southwest and is currently being restored to portions of Arizona and New Mexico. Ensuring a healthy and viable wild population of Mexican gray wolves in Arizona and New Mexico is one of the Rewilding Institute's primary conservation endeavors. The Rewilding Institute's Carnivore Conservation Biologist, David Parsons, led FWS's Mexican Wolf Recovery Program from 1990-1999, and has continued to advocate for recovery of the Mexican wolf since his retirement from FWS.

EXECUTIVE SUMMARY

This petition aims to rekindle the recovery of the Mexican gray wolf: an imperiled gray wolf subspecies that presently suffers from insufficient recovery action by FWS. Petitioners assert that listing the Mexican gray wolf under the ESA as a subspecies separate from *Canis lupus* is both biologically warranted and legally required. Such a subspecies listing is in conformity with FWS's own historical recognition of *Canis lupus baileyi* as a "valid biological subspecies for the purposes of research and conservation," 63 Fed. Reg. 1752 (1998), and will initiate the development of a new, science-based recovery plan tailored to the unique needs of this critically imperiled and taxonomically/ecologically valid wolf subspecies.

The Mexican gray wolf is the most genetically and taxonomically distinctive subspecies of contemporary gray wolves, and is the smallest and southernmost subspecies of gray wolf in North America. The core of its historic distribution consisted of northern Mexico, southeastern Arizona and southwestern New Mexico, and far western Texas. Mexican wolves intergraded with other gray wolf subspecies outside of that core of historic range.

Mexican wolves were eliminated from the wild in the lower forty-eight states by the 1920s, and other efforts in Mexico left an estimated 30 or fewer individual wolves in the wilds of northern Mexico by 1980. The subspecies was extirpated from Mexico by the 1980s or 1990s (Brown 1983; Robinson 2005). Subsequent conservation efforts for the subspecies were forced to rely upon a captive population founded from seven wolves, the last of which was caught in 1980. This rescue population was bred in three lineages, and then merged beginning in 1995 (Fredrickson & Hedrick, 2002).

Although FWS reintroduced an "experimental, non-essential" population of Mexican gray wolves into the Blue Range of Arizona and the Mogollon highlands of New Mexico beginning in 1998, federal predator control and illegal killing has suppressed the reintroduced population. As of the end of 2008, only 52 wolves and two breeding pairs existed in the wilds of the BRWRA. Moreover, predator control is diminishing the efficacy of merging the three lineages (in the wild population), thus perpetuating inbreeding depression—with concomitant small litter sizes, low body weight, and suspected infertility among males (Fredrickson & Hedrick 2002; Fredrickson et al. 2007).

Human activity, including livestock grazing and development, is destroying, modifying and curtailing Mexican wolf habitat. Current federal, interagency, and local regulations scapegoat Mexican wolves, leading to their persecution and greatly endangering the subspecies. Additionally, federal regulations that bar wolves from reclaiming their evolutionary homelands deprive the subspecies of the very evolutionary forces that created such a diminutive wolf so well adapted to preying on small ungulates in arid and semi-arid environments.

This petition reasserts the intention in the ESA and implementing regulations that any designation of subspecies should be for the purpose of conserving imperiled populations and their ecosystems. As outlined herein, the Mexican wolf qualifies for listing as a distinct subspecific taxonomic unit under the ESA, based on endangerment from several of the ESA's listing factors. Petitioners request designation of the Mexican gray wolf as an endangered subspecies. Petitioners also request concurrent designation of critical habitat, which is necessary for the Mexican wolf's conservation within the ecosystems on which it depends.

I. Introduction

Petitioners herein request listing of the Mexican gray wolf, *Canis lupus baileyi*, as an endangered subspecies under the ESA. In 1976, FWS listed *Canis lupus baileyi* as endangered under authority of the ESA. *See* 41 Fed. Reg. 17736 (1976). In 1978, FWS consolidated separate gray wolf subspecies listings in North America south of Canada into a single species-level listing as endangered, except in Minnesota where wolves were listed as threatened. *See* 43 Fed. Reg. 9607 (1978). Although the 1978 listing of the gray wolf species as a whole subsumed the Mexican wolf subspecies listing, FWS affirmed it would continue to recognize valid biological subspecies for purposes of research and conservation. *See id.* As outlined herein, taxonomists and geneticists have confirmed that the Mexican wolf is a valid subspecies of the gray wolf. The Mexican gray wolf was listed as an endangered subspecies under the ESA in 1976 (41 Fed. Reg. 17742), but was subsumed under the full species in 1978, when the species as a whole south of Canada was listed (43 Fed. Reg. 9607).

In sum, absent the benefits of listing the Mexican wolf subspecies as endangered, the recovery efforts on behalf of the subspecies have proven inadequate to conserve it and the ecosystems on which it depends. Because this subspecies, which continues to face threats as enumerated at 16 U.S.C. § 1533(a)(1), is recognized as biologically valid, it should be returned to listed status under the ESA.

II. Species Description

The Mexican wolf has been previously described within the original listing for *Canis lupus baileyi*. *See* 41 Fed. Reg. 17736 (1976).

III. Taxonomy

Multiple taxonomic accounts clearly identify the Mexican wolf as a taxonomically valid subspecies *Canis lupus baileyi* (Young and Goldman 1944; Hall 1981; Bogan & Mehlhop 1983; Hoffmeister 1986; Nowak 1995; Leonard et al. 2005; Wayne et al. 1992; Garcia-Moreno et al. 1996; Hedrick et al. 1997; Leonard et al. 2004). Several studies—including Young and Goldman (1944); Leopold (1959); Nowak (1995); Garcia-Moreno et al. (1996); Munoz-Fuentes et al. (2009)—assert that *C. l. baileyi* is a uniquely adapted ecotype of the gray wolf that evolved in arid environments and habitats in the southwestern U.S. and Mexico.

A thorough review of the literature fails to indicate any explicit contrary opinions to those listed above. Notably, the Mexican wolf was originally listed as an endangered subspecies in 1976 (41 Fed. Reg. 17736). Given the totality of published research recognizing the Mexican gray wolf as a valid biological subspecies, its original listing as such, and FWS's continued recognition of the Mexican gray wolf at the subspecies level, petitioners assert that listing the subspecies under the ESA is appropriate on the basis of taxonomy. Moreover, listing as a subspecies will ensure that the Mexican wolf is the focus of a scientifically and legally valid recovery plan and associated recovery emphasis.

IV. Historic and Current Distribution

According to the ESA, an "endangered species" is "any species which is in danger of extinction throughout all or a significant portion of its range." 16 U.S.C. §1532(6). The term "species" includes "any subspecies" of wildlife. *Id.* § 1532(16).

Given the extensive analysis of historical distribution of the Mexican wolf by multiple authors, petitioners herein simply incorporate by reference the following analyses: Young and Goldman (1944); Nowak (1983); Nowak (1995); Leonard et al. (2005); Bogan and Mehlhop (1983). Regardless of nuances from one study to the next, it is clear that southern New Mexico and Arizona and southwestern Texas comprise the core of the subspecies' historic distribution in the lower forty-eight states, bounded by shifting "large zones of intergradation" with other haplotypes as described by Leonard et al. (2005).

Petitioners reserve the right to supplement this petition more substantial analyses of historic and current distribution at a later time if necessary.

V. Natural History and Habitat Requirements

Given that the Mexican wolf is presently recognized as endangered under the umbrella of the taxon (*C. lupus*), petitioners here exclude any exhaustive discussion of the subspecies natural history and habitat requirements. Petitioners reserve the right to supplement this petition with such information at a later time if necessary.

VI. Population Status

C. l. baileyi is in imminent danger of extinction. This is self-evident and undisputed by virtue of the fact that as of the end of 2008 the wild Mexican gray wolf population comprised approximately 52 animals and two breeding pairs.[1] The population was projected to reach 102 wolves, including 18 breeding pairs, by end of 2006, but has not reached that level because of the combined effects of federal predator control and private poaching. Multiple studies anticipate that such a small population of a wide-ranging species is not viable and is extremely likely to go extinct (Franklin 1980; Soulé 1987; Frankham 1995; Reed, et al. 2003). Moreover, captive populations deteriorate genetically over time and eventually lose genes that are adaptive for survival in wild environments (Fredrickson and Hedrick 2002; Fredrickson et al. 2007; Frankham 2008).

Since reintroduction began, 100 captive-born wolves have been released into the wild. Mortality has been overwhelmingly human-caused: 11 wolves have been shot in authorized federal predator control actions, 18 wolves (including a litter of five pups conceived in the wild and born in captivity) have died inadvertently due to capture, 32 wolves are known to have been shot illegally, and 12 wolves have been killed in vehicle strikes, for a total of 73 wolves. In addition, 37 other wolves have been captured alive and not re-released; nine of those have died from age-related ailments and most of the others will never be released. Comparatively few wolves have died of natural causes: five mortalities to non-predatory natural deaths, and two killed by mountain lions.

The impact of human-caused mortality (N=73) on population growth from 1998 – 2008 is profound. Given that the population was predicted to exceed 100 animals in the wild by 2006, human-caused mortality more than accounts for the deficit in sheer numbers of animals in the wild. When the number of management related mortalities (N=29) is combined with the number of non-lethal removals (N=37), it is clear that management removals are the primary hindrance to population growth to date.

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[1] According to the definition of breeding pair set forth at 63 Fed. Reg. 1752, 1771 (1998).

The population has also undergone significant fluctuation from the end of 2003 to the end of 2008, as indicated by the chart below (Figure 1).

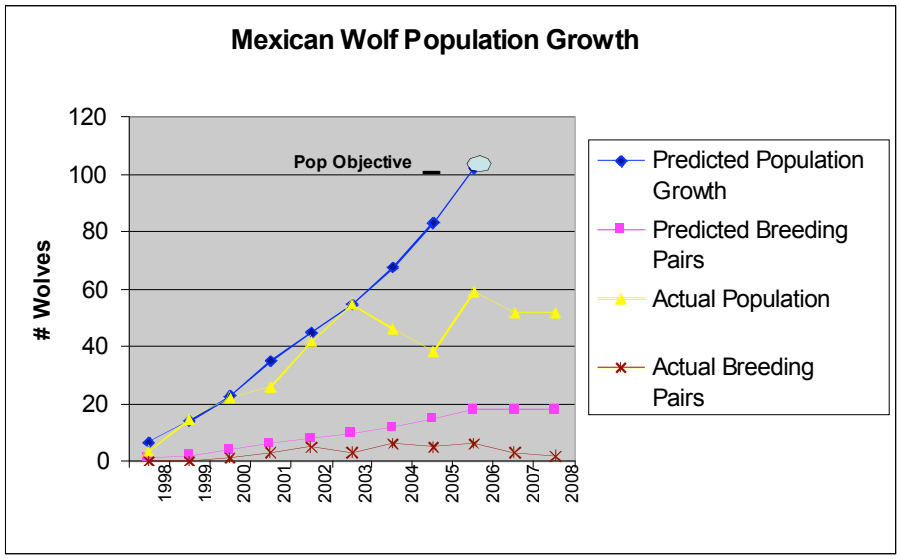

Figure 1. Mexican Wolf Population Growth, 1998 – 2008. Projected end-of-year figures from *Final Environmental Impact Statement on Reintroduction of the Mexican Wolf* (FWS 1996). Actual figures from end-of-year counts conducted by Mexican wolf interagency field team and published in annual reports, with a breeding pair adjustment of minus one in 2006 and 2007 to comply with Federal Register (FWS 1998) definition of breeding pair for consistency.

The Mexican gray wolf population shows effects of inbreeding depression, including low litter size, possible infertility in some males, and low body weights (Fredrickson & Hedrick 2002; Fredrickson et al. 2007). This population is clearly at risk of extinction from stochastic and genetic factors and their synergistic effects, independent of the current high mortality and removal rates resulting from federal predator control and illegal killings (Parsons & Ossorio 2007; Vucetich et al. 1997).

VII. ESA Listing Factor Analysis for the Mexican Gray Wolf Subspecies.

The Mexican gray wolf is in danger of extinction due to four of the five factors set forth at 16 U.S.C. § 1533(a)(1)(A-E) which tests whether it qualifies as an endangered species. FWS is required to list as either threatened or endangered any species facing extinction due to any one, or any combination of, the following five factors:

(A) the present or threatened destruction, modification, or curtailment of the species' habitat or range;
(B) overutilization for commercial, recreational, scientific, or educational purposes;
(C) disease or predation;
(D) the inadequacy of existing regulatory mechanisms; or
(E) other natural or manmade factors affecting the species' continued existence.

16 U.S.C. § 1533(a)(1)(A)-(E). While it needs to meet only one of these factors to qualify for ESA listing, the Mexican wolf meets Factors A, C, D, and E (and arguably Factor B, if FWS considers poaching under this Factor).

In addition to analysis under these five factors, FWS is required to make listing determinations "solely on the basis of the best scientific and commercial data available," without reference to the possible economic or other impacts of such a determination. 16 U.S.C. § 1533(b)(1)(A); 50 C.F.R. § 424.11(c).

The primary threat facing the Mexican gray wolf subspecies in the wild is human persecution as a response to potential or actual conflict with domestic livestock. Continued degradation and fragmentation of habitat also pose long-term threats (Carroll et al. 2006) that should be addressed through critical habitat designation. Below, we explore each applicable category of threat as it applies to the Mexican wolf and as it applies to the need to designate critical habitat.

1. Present or threatened destruction, modification or curtailment of the Mexican gray wolf's habitat or range.

Habitat within the range of the Mexican gray wolf is undergoing adverse modification, curtailment, and destruction, and this threat is increasing. Barring significant reversals in human population growth and land use trends, the Mexican wolf's range will continue to be subject to heavy livestock use, increased off-road vehicle use, increased road and residential development, increased mining, and accelerating depletion of surface and subsurface waters – the totality of which are likely to reduce native prey, increase the potential for livestock conflicts, and generally expose wolves to excessive unregulated human-caused mortality. The best available scientific data indicates that the Mexican wolf range faces significant long-term risk from present conditions and from the likely changes in human-associated impacts (e.g., increased road density and human population), thus endangering the subspecies (Carroll et al. 2006).

Mexican wolves once occupied or transited through most, if not all, of the American Southwest and Mexico. However, much of the region previously used by Mexican wolves has been modified for human use and is presently in need of restoration for wolves to be able to use it. If not curtailed, impacts to habitat within the Mexican wolf's range threaten extinction, as discussed in detail below. Given that the subspecies is presently represented by approximately 50 individuals in the wild and that population is suffering from inbreeding depression, the designation of the Mexican wolf as a listed subspecies and the concurrent designation of critical habitat are necessary for its conservation.

Petitioners reserve the right to supplement this petition with information relevant to this section at a later time if necessary.

A. *Habitat fragmentation.* Human impacts pervade most North American ecosystems. Exploration and development of oil and gas, minerals, and forest products; the expansion of rural and suburban housing; and increases in leisure, travel, and recreation activities have resulted in a greater presence of people across areas that were once exclusive habitat for native flora and fauna (Ceballos and Ehrlich 2002). The range of potential, documented effects is extensive and often varies across species, populations and time, including seasons or following a period of exposure (Blumstein et al. 2003, Beale and Monaghan 2004).

The construction of facilities, such as roads, trails, or buildings and increased presence of humans, beyond some threshold, will result in a direct loss of habitats, or indirectly following avoidance

behavior of affected wildlife (McLellan and Shackelton 1988, Cameron et al. 1992, Mace and Waller 1996, Stevens and Boness 2003). Human facilities, especially roads, trails, pipelines, and other linear developments, also can fragment and isolate habitats (Baldwin et al. 2004, Deng and Zheng 2004, Jedrzejewski et al. 2004, McDonald and St. Clair 2004, Vistnes et al. 2004).

In addition to a loss or reduction in the effectiveness of habitats, disturbance may result in response behaviors with negative social or physiological consequences (Van Dyke et al. 1986, Skogland and Grøvan 1988, Bradshaw et al. 1997). Disruption of breeding or rearing activities, for example, can reduce fecundity and recruitment (White and Thurow 1985, Goodrich and Berger 1994, Linnell et al. 2000, Mullner et al. 2004). The nutritional or hormonal costs of avoiding or responding to a disturbance may have cumulative and important implications for individual fitness and population productivity (MacArthur et al. 1979, Fowler 1999, Kerley et al. 2002, Constantine et al. 2004). More directly, human access can increase mortality through non-monitored and controlled hunting, vehicle collisions, or the removal or destruction of problem animals (Johnson and Todd 1977, Johnson 1985, Del Frate and Spraker 1991, Wilkie et al. 2000, Johnson et al. 2004). Human presence and activities also can alter interspecific interactions, namely rates of predation (Rich et al. 1994, James and Stuart-Smith 2000, Marchand and Litvaitis 2004).

Developed areas also create disturbance zones that extend beyond the actual development and into adjacent natural habitat. Predation by household pets (cats are particularly destructive), the spread of noxious weeds, increases in aggressive human-adapted species (e.g., raccoons, *Procyon lotor*, striped skunks, *Mephitis mephitis*, or starlings, *Sturnus vulgaris*), introduction of detrimental wildlife attractions (e.g., trash cans), and increases in recreational activity surrounding developed areas greatly affect ecological integrity (Knight 1995). The extended zone of negative effect for songbirds and medium-sized mammals is similar around low-density housing development and dense development; indeed, low-density housing may produce a greater overall impact due to the larger landscape area required (Odell and Knight 2001).

Studies of the cumulative impacts of human developments (mines, other energy extractive developments, housing developments) on large carnivores indicate that such developments have a significant negative impact on habitat effectiveness. In one study, wolves strongly avoided major developments (Johnson et al. 2005). Since social carnivores such as wolves often require larger territories than solitary species of similar size, they may be even more vulnerable to landscape fragmentation (Carrol et al 2003).

Carroll et al. (2006) made clear that suitable breeding habitat, or what Vucetich et al (2006) call high-density wolf habitat, within the historic range of the Mexican wolf subspecies is threatened by future development trends. In particular, their model suggested that development trends over 25 years could significantly depress a future New Mexico wolf population (Carroll et al. 2006). Several aspects of human development—including roads and the border wall—significantly fragment Mexican wolf range and habitat.

Roads and off-road vehicle route creation and access. Roads are known to have significant harmful effects on native species and ecosystem function (Schoenwald-Cox and Buechner 1992, Trombulak and Frissell 2000). The negative impacts of roads include:

- Greater human access to habitat interiors for activities such as fuel-wood gathering, hunting, poaching, plant gathering, and motorized recreation in those areas (Lyon 1983; Trombulak and Frissell 2000);

- Increased dispersal of some edge-adapted, weedy, aggressive, predatory and parasitic species due to the travel corridor effect (Tysor and Worley 1992, Parendes and Jones 2000);
- Increased wildlife mortality due to automobile collisions (Bangs et al. 1989, Fuller 1989);
- Reduced species mobility, including both small and large animals, due to the barrier effect (Fahrig et al. 1995, Foster and Humphrey 1995);
- Increased sediment and pollution runoff into nearby streams and wetlands (Bauer 1985; Forman and Deblinger 2000);
- Increased likelihood of severe erosion of roads on steep slopes (Trombulak and Frissell 2000).

These factors interact in myriad ways, fragmenting and isolating natural habitat, leaving formerly intact vegetation patches subdivided, and creating a "road effect zone" that changes the habitat conditions and species compositions well into the interiors of adjacent natural habitat (Reed et al. 1996, Forman 2000).

The relative impact of roads is influenced by a variety of factors, including type (dirt or paved) and width of road, volume and speed of traffic, and area road density. Management options such as road closure during animal breeding or "mud season" may mitigate some negative ecological effects, but still fail to address the cumulative impacts of the vast reach of road networks. Further, roads provide a means of ingress for humans that may ultimately result in harm to wolves (Lyon 1983; Trombulak and Frissell 2000). For example, many, if not most, of the 32 Mexican wolves killed illegally were apparently shot alongside roads; petitioners are aware of only one of those animals known to have been shot in a roadless area. Within the range of the Mexican wolf, roads and other vehicular trails have fragmented the landscape, and although wolves are highly adaptive habitat generalists, the ubiquity of roads may have a significant impact on the long-term viability of a restored Mexican wolf population (Carroll et al. 2006).

Effects of roads on wolf and prey habitat use and distribution. Most of the BRWRA outside of designated Wilderness Areas is open and accessible to vehicular use, and off-road vehicle drivers are creating new vehicle routes on a continuous basis out of pedestrian and equestrian trails and across open terrain. Nearly 80% (>800,000 hectares) of the Apache-Sitgreaves NF and nearly 72% of the Gila NF (~790,000 hectares) are open to Off-Highway Vehicle ("OHV") traffic (U.S. Forest Service ["USFS"] 2004). The proliferation of roads and vehicle routes modifies wolf habitat by reducing areas in which wolves and their prey may be secure from poachers and traffic. As discussed previously, roads provide a means of ingress for humans that may ultimately result in harm to wolves (Lyon 1983; Trombulak and Frissell 2000).

Studies of roads impacts on wolf habitat in the northern Great Lakes region are likely to be applicable to the Mexican wolf as well. Studies suggest that wolves generally do not persist where road densities exceed 0.45 km/km^2 (Mladenoff et al. 1995, Potvin et al. 2005). Assuming the road impacts on Great Lakes wolves are equally applicable to Mexican wolves, road densities of many federally managed lands within Arizona and New Mexico are presently trending above the threshold limit identified by Mlandenoff et al. (1995); as discussed in Carroll et al. (2006). This trend threatens to reduce significantly the amount and quality of habitat available for Mexican wolves by 2025. In particular, the road density within significant parts of the Sky Islands ecosystem of southeastern Arizona would likely preclude wolf survival presently. The Arizona Department of Game and Fish (Johnson et al. 1992)

studied three broad areas of the Sky Islands for their potential to support wolves and listed road densities in each area according to kilometers of road/square kilometer. The Galiuro/Pinaleno Mountain had 1.45 km/km^2, Chiricahua Mountains 1.77 km/km^2 and Atascosa/Patagonia Mountains 2.25 km/km^2 of road. These parts of the Sky Islands would need significant restoration (i.e. road closure or removal and revegetation) in order to support wolf persistence. Yet, given the ongoing proliferation of roads and motorized trails within the range of the Mexican wolf, it is reasonable to expect that increasing road density will continue to threaten wolf habitat.

Studies of a wide variety of species demonstrate that high road densities lower the likelihood of wildlife persistence due to an aversion to roads or negative impacts from increased human hunting, poaching, and harassment (Lyon 1983, Van Dyke et al. 1986, McClellan and Shackleton 1988). Indirect impacts from roads such as habitat fragmentation, direct habitat loss, increased human development, increased motorized access, and habitat displacement also account for substantial human-caused mortality of predators (Ruediger 1996). A study of the effects of roads and trails on the behavior of wolves in Jasper National Park (Canada) suggests that, although roads and trails were not complete impediments to wolf movement, they altered wolf movements across their territories (Whittington et al. 2004). Notably, wolves in this study avoided crossing high use roads and trails more than they avoided crossing low use roads and trails, indicating a clear impact on habitat quality as it relates to wolves.

Roads and road density may also affect wolves indirectly, via their impacts upon prey species such as elk. Wildlife biologists have been researching the relationship between roads and elk in the Western United States for several decades. This research overwhelmingly demonstrates that elk avoid forest roads (Lyon 1983, Thomas et al. 1979, Christensen et al. 1993, Lyon and Jensen 1980). Elk aversion to roads is mostly associated with vehicular traffic. Therefore closing (or obliterating) roads is an important management option for improving elk habitat. Lyon (1983) showed that elk habitat effectiveness could be expected to decrease by at least 25% with a density of one mile of road per square mile of land (m/m^2), and by at least 50% with a density of 2 m/m^2. This same study concluded that the best method for obtaining full use of habitat is effective road closures.

Wildlife-proof border wall. In 2008, the U.S. Department of Homeland Security installed several multi-mile segments of a double-layer steel wall along the U.S. - Mexico border that will block movements of Mexican gray wolves, thereby drastically curtailing their ability to access and use habitats in the Republic of Mexico, in which most of the Mexican wolf's historic range occurs. As construction of the border wall continues, Mexican wolf habitat faces significant threat of further curtailment (Bies 2007; McCain & Childs 2008; Flesch et al. 2009).

B. *Livestock grazing*. Livestock and associated management drastically degrade western ecosystems (Fleischner 1994; Noss & Cooperrider 1994; Donahue 1999). In arid regions, livestock degrade riparian areas and hydrological function through herbivory and trampling, which removes vegetation, rendering the ground less porous. Livestock grazing ultimately destroys riparian areas, reducing the populations of wolves' native prey, such as elk and beaver, which are commonly associated with riparian forests and adjacent uplands. Through removing grasses, livestock also drastically reduce fire frequency, enabling the growth of woody thickets that will support fewer elk than the park-like grasslands they replace; when fires eventually burn these thickets, the ensuing conflagration may scorch the soil so much hotter than a grassfire would that it may render the area even less amenable to ungulates and hence to wolves. Noss and Cooperrider (1994:230) state that livestock grazing is the "most insidious and pervasive threat to biodiversity on rangelands."

Despite ongoing degradation and loss of Mexican wolf habitat and range to livestock, federal and state agencies maintain high stocking rates and forage allocations for stock within the BRWRA. In 1996, livestock grazed roughly 69% of the BRWRA (FWS 1996), most of it year-round, leaving Mexican wolves little spatial or temporal respite from stock.

C. *Other threats to habitat and range.* Residential and commercial development, gargantuan open-pit copper mines and associated tailings ponds and row-crop agriculture are destroying, degrading, and curtailing the Mexican wolf's habitat and range. For example, copper mines and associated tailings ponds south and east of Silver City, New Mexico; at Morenci, Arizona;[2] and southwest of Tucson, Arizona[3] have obliterated historic Mexican wolf habitat and block potential movement of wolves between mountain ranges, thus curtailing use of their historic habitats in the Sky Islands region. Another such mine is being excavated north of Safford, Arizona, and another is being planned at the edge of the Santa Rita Mountains of Arizona.

Human development often yields a direct loss of habitats, or indirectly following avoidance behavior of affected wildlife (McLellan and Shackelton 1988, Cameron et al. 1992, Mace and Waller 1996, Stevens and Boness 2003). Further roads, trails, pipelines, and other linear developments often associated with mines can fragment and isolate habitats (Baldwin et al. 2004, Deng and Zheng 2004, Jedrzejewski et al. 2004, McDonald and St. Clair 2004, Vistnes et al. 2004).

Studies of the cumulative impacts of human developments (mines, other energy extractive developments, housing developments) on large carnivores indicate that such developments have a significant negative impact on habitat effectiveness. In one study, wolves strongly avoided major developments (Johnson et al. 2005). Since social carnivores such as wolves often require larger territories than solitary species of similar size, they may be even more vulnerable to landscape fragmentation (Carroll et al 2003).

Petitioners reserve the right to supplement this petition with information relevant to this section at a later time if necessary.

2. Disease and Predation.

A number of viral, fungal, and bacterial diseases, as well as endo- and ectoparasites have been documented in gray wolf populations (Kreeger 2003). Typically, diseases are transmitted through direct contact (e.g., feces, urine, or saliva) with an infected animal, or by aerosol routes. Parasites are picked up through water, food sources, or direct contact; wolves are able to tolerate a number of parasites, such as tapeworms or ticks, but at times, such organisms are lethal (Kreeger 2003). Although the taxon is generally susceptible to these diseases, only canine distemper and canine parvovirus have been documented in the wild population of Mexican wolves in the BRWRA.

Canine distemper, caused by a paramyxovirus, is a febrile disease typically transmitted by aerosol routes or direct contact with urine, feces, and nasal exudates. Symptoms of distemper may include fever, loss of appetite, loss of coordination (ataxia), shortness of breath (dyspnea), swollen feet, and eye/nose discharge. Death from distemper is usually caused by neurological complications (e.g., paralysis, seizures). Once an animal is infected, distemper is untreatable. Although wolf populations

[2] For more information, *see* http://www.mining-technology.com/projects/morenci/ (accessed July 14, 2009).
[3] For more information, *see* http://www.elmhurst.edu/~chm/vchembook/330copper.html (accessed July 14, 2009).

are known to be exposed to the virus in the wild, mortality from distemper in wild wolves is uncommon. Even so, two Mexican wolf pups brought to a wolf management facility in 2000 from the wild were diagnosed with distemper, indicating they were exposed to the disease in the wild and died in captivity (AMOC and IFT: TC-12). These are the only known mortalities due to distemper documented in relation to the Blue Range population, and are considered captive deaths rather than wild mortalities (U.S. Fish & Wildlife Service 2008: Population Statistics).

Canine parvovirus is an infectious disease caused by a virus that results in severe gastrointestinal and myocardial (heart disease) symptoms. Canine parvovirus can be transmitted between canids (e.g., wolves, coyotes, dogs), but not to other hosts such as humans or cats (although there are other strains of parvovirus that can infect both). Canine parvovirus is typically transmitted through contact with feces or vomit, where it can survive for months. Symptoms of an infected adult animal may include severe vomiting and diarrhea, resulting in death due to dehydration or electrolyte imbalance. Pups may die from myocardial (heart) disease if infected with canine parvovirus while *in utero* or soon after birth from cardiac arrhythmias. Although canine parvovirus has been documented in wild wolf populations, there are few documented mortalities due to parvovirus; it is hypothesized that parvovirus is a survivable disease, although less so in pups. Captive wolves have been successfully treated with fluid therapy until symptoms abated. Three Mexican wolf pups brought to wolf management facilities from the wild died from canine parvovirus in 1999, indicating that they had been exposed to the disease in the wild (AMOC and IFT 2005: TC-12). Mortality from canine parvovirus has otherwise not been documented in the Blue Range population.

3. Inadequacy of Existing Regulatory Mechanisms.

A. *FWS.* On January 12, 1998, FWS issued a final rule for the reintroduction of the Mexican gray wolf that includes provisions since shown to block conservation of the subspecies. *See* 63 Fed. Reg. 1752. The 1998 rule designates the wolves as "experimental, non-essential" under Section 10(j) of the Endangered Species Act, 16 U.S.C. § 1539(j). The rule authorizes federal take of wolves without any demographic threshold to ensure a minimal number of individual wolves and breeding pairs survive. Furthermore, the rule lacks criteria safeguard the genetic diversity of the population. As a result, the population has declined over the past five years, increasing the risk of extinction. The rule precludes the release of captive bred wolves into the New Mexico portion of the BRWRA. This deleterious provision—and others—in the rule was rebuked in the program's independent Three-year Review (Paquet et al. 2001).

Parsons and Ossorio (2007) showed that in the absence of sustained new releases, the wolf population would continue to decline. They also acknowledged that actual releases (99) had far exceeded anticipated releases (66) and occurred for four years beyond expectations set forth in the final EIS. Management-related taking of Mexican wolves under provisions of the nonessential, experimental population rule is the primary cause of the failure to reach the reintroduction objective. Each time FWS removes a wolf from the wild, the total number of individuals decreases, leaving the wild population incrementally less viable. "From the perspective of a free-ranging population, returning a wolf to captivity…is equivalent to a mortality event." (Mexican Wolf Recovery: Three-Year Program Review and Assessment: 30). "Human-caused mortality can…be an important limiting factor [in population viability]." (Paquet et al., 2001 at 29).

Finally, current regulatory mechanisms have failed to adequately curtail the incidence of poaching that impacts the imperiled wild population of the Mexican wolf subspecies. Since reintroduction began,

poachers have killed at least 32 wolves. Poaching is a significant threat to the success of the recovery program. Such illegal activity may continue to thwart recovery without more robust enforcement.

B. *USFS*. The Forest Service authorizes livestock grazing in the Gila and Apache National Forests, but does not require any management that would reduce or prevent conflicts between Mexican wolves and livestock – action that would no doubt reduce the high rate of federal wolf removal. Removing livestock carcasses before wolves scavenge on them and employing herders during calving season are two straightforward measures that would enhance wolf survival but are not required in USFS grazing regulations (Paquet et al. 2001, at 54). USFS also allows the proliferation of roads and all-terrain vehicle routes that curtail the areas in which wolves may seek safety from poachers. Existing regulations pertaining to the Gila and Apache National Forests only prohibit vehicles in areas especially so designated; all other areas are de facto open to vehicle use.[4]

Through the issuance of 10-year term livestock grazing permits, USFS authorizes cattle grazing year round, often in habitats important to Mexican wolves. These habitats and the species they support are vulnerable to disturbances, such as vegetation depletion, soil erosion, and water quality deterioration, all of which are caused by grazing. Mexican wolves are routinely shot or removed from the wild for conflicting with domestic cattle within these allotments or on adjoining base properties.

The National Environmental Policy Act of 1969 ("NEPA"), 42 U.S.C. § 4321 *et seq.*, requires USFS to examine and open to public scrutiny how its actions impact threatened endangered species. When issuing or renewing a 10-year term grazing permit, USFS typically complies with NEPA by completing and publicly disseminating for comment and appeal either an environmental assessment ("EA") or environmental impact statement ("EIS"). Importantly, NEPA acts as both an environmental checkpoint and avenue for public involvement in USFS's grazing management decisions.

At the request of USFS and others, Congress recently allowed a deviation from standard NEPA compliance for grazing management decisions. Section 339 of the 2005 Consolidated Appropriations Act (PL 108-447), and Section 421 of the 2008 Consolidated Appropriations Act (PL 110-161), allow USFS to categorically exclude from NEPA review the authorization or reauthorization of livestock grazing when it can show that such decision satisfies several discrete factors. Normally restricted to small activities like painting a fence or installing a picnic area, categorical exclusions ("CEs") are unusual for grazing permit decisions, as each decade-long management decision may affect tens of thousands of acres. Accordingly, Congress sharply limited USFS's authority to issue CEs in both scope and duration. USFS cannot utilize a CE to authorize grazing on USFS allotments where federally protected species like the Mexican gray wolf may be significantly impacted.

In a blatant misuse of these restrictions, USFS has repeatedly issued improper grazing CEs in lieu of formal NEPA documentation when authorizing or reauthorizing livestock grazing on the Gila National Forest, i.e., the BRWRA. Indeed, USFS has engaged in a *carte blanche* approach to grazing permit renewals on the BRWRA by trading in much-needed NEPA analyses for non-appealable CE decision memos ("DMs"). By undertaking the aforementioned actions, USFS has misapplied its limited CE authority and unreasonably delayed compliance with NEPA to the detriment of the Mexican gray wolf.

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[4] For more information, *see* http://www.fs.fed.us/r3/asnf/projects/docs/modified_proposed_action02122008.pdf (accessed 15 July, 2009).

Mexican wolves are significantly harmed by grazing on the Gila and Apache National Forests. In 1998, when wolf reintroduction began, USFS was authorizing approximately 82,600 cattle and 7,000 sheep to graze roughly 69 percent of the BRWRA. Since that time, there have been multiple conflicts between cattle and Mexican wolves leading to federal removal of wolves from the wild. Yet, stocking rates remain significantly unaltered while USFS has failed to institute any sort of policy or routine procedures to help better avoid wolf-livestock conflicts on the Gila. The absence of federally led proactive measures leaves federal wolf removal as the only "solution" to the conflict. FWS has removed more wolves from the BRWRA for conflicts with livestock than for any other reason.

USFS is a partner in wolf management. As such, USFS is fully aware of the magnitude of wolf-livestock conflicts on the BRWRA and how these conflicts directly lead to an unsustainable rate of wolf removals. The 3-Year Wolf Recovery Program Review acknowledges that livestock are "omnipresent" in the BRWRA and that USFS should do more to avoid inevitable conflicts. "Because of the extensive temporal and spatial distribution of livestock, interactions with wolves are unavoidable…Livestock producers using public lands can make a substantive contribution to reducing conflicts with wolves through improved husbandry and better management of carcasses." (Paquet et al. 2001, at 54). In its "Overall Conclusions and Recommendations," the Paquet Report goes on to state that, "livestock operators on public land should be required to take some responsibility for carcass management/disposal to reduce the likelihood that wolves become habituated to feeding on livestock." Id. at 67 – 68.

The laissez-faire grazing practices authorized under CEs pose a significant threat to the survival of the Mexican wolf subspecies in the wild. Furthermore, the Forest Service has not implemented a "program for the conservation" of endangered Mexican gray wolves as expressly required by Section 7(a)(1) of the ESA, 16 U.S.C. § 1536(a)(1). This ESA requirement is specifically preserved for experimental populations designated under Section 10(j) of the ESA. *See* 16 U.S.C. § 1539(j)(2)(C)(i)).

D. *Catron County, New Mexico.* Acting under the purported authority of a local ordinance, the Catron County Commission has directed the stalking and trapping of at least two Mexican gray wolves in the wild. Barring federal intervention, these hostile county trapping efforts are not expected to cease, and pose an imminent threat to the wild wolf population.

4. Other Natural or Manmade Factors Affecting the Continued Existence of the Mexican Gray Wolf.

A. *Low population numbers and inbreeding depression*. The last count of Mexican wolves in the wild, completed in January 2008, found 52 wolves and only 2 breeding pairs. The present day population is lower in terms of wolf numbers and breeding pairs than the wild population at the end of 2003 (FWS expected to attain the BRWRA reintroduction population objective of at least 100 wolves by the end of 2006). Further, there are approximately 300 wolves maintained in captivity, managed to conserve the species' remaining genetic integrity. All Mexican wolves known in the world stem from seven founding animals, containing greatly reduced genetic diversity from their original population (Hedrick et al. 1997; Fredrickson et al. 2007). The wild Mexican gray wolf population has begun to show the signs of inbreeding depression, such as smaller size, reduced fertility, and lower litter sizes – including suspected infertility in some males (Fredrickson & Hedrick 2002; Fredrickson et al. 2007). Inbreeding depression not only threatens to reduce recruitment to the population, but also threatens future fitness, viability, and resilience.

B. *Genetic adaptation to captive conditions*. The captive population is itself likely to be undergoing evolutionary degradation due to the genetic selection for traits that are adaptive in captivity, but

maladaptive in the wild. In the case of the Mexican wolf, which has already lost significant genetic diversity, fifty generations in captivity could prove catastrophic and well beyond the point at which recovery from captive stock is still possible. A thorough discussion of the potential perils of inbreeding depression can be found in Frankham (2008) and Mech & Seal (1987).

Petitioners reserve the right to supplement this petition with information relevant to this section at a later time if necessary.

C. *Federal predator control*. Predator control was the cause of the original extirpation of the Mexican gray wolf from the wild in the United States and Mexico (Robinson 2005). Since reintroduction began, federal predator control has included the shooting of eleven wild Mexican wolves and the inadvertent deaths of 18 additional Mexican wolves. Thirty-seven wolves captured from the wild, most for control purposes, have been consigned to indefinite captivity; nine of those have died of age-related infirmities, and most will never be released. Dozens of additional wolves have been captured and re-released, often in unfamiliar terrain, with lowered chances of survival.

The historic role of federal, state and local predator control in extirpating wolves is well documented by a host of different authors, including: Young and Goldman (1944), Robinson (2005); and (Schmidt (1978

Petitioners reserve the right to supplement this petition with information relevant to this section at a later time if necessary.

D. *Poaching*. Poachers have killed 32 Mexican gray wolves since reintroduction began in 1998 (FWS 2008). Poaching is the second most noteworthy cause of population loss for Mexican wolves, and a contributing significantly to the population stagnant growth.

E. *Collisions with vehicles*. A final factor having a negative effect on the wild population of the Mexican wolf subspecies is collision with vehicles. Research suggests a correlation between time spent on the roadway and probability of lethal collisions (Waller 2005). A total of 12 Mexican wolves have died due to vehicle collisions since the outset of the reintroduction program, a rate of more than one per year in a very small population situated in an area that has one of the lightest road densities of all landscapes within the Mexican wolf's range. These deaths are part of the impact of a road network that fragments habitat used by such a wide-ranging animal as the wolf. Further, studies in Italy have found that collisions with vehicles are the primary detectible source of mortality for wolves there (Lovari et al. 2007). In Canada, studies have shown that collisions with vehicles are a significant cause of mortality for large carnivores (Waters 1988, Kansas et al. 1989, Woods 1991, Gibeau 1993, Paquet 1993, Thurber 1994).

VIII. Request for Critical Habitat Designation

1. *Overview*. Critical habitat is defined as: "(i) the specific areas within the geographical area occupied by the species at the time it is listed in accordance with the [ESA], on which are found those physical or biological features (I) essential to the conservation of the species and (II) which 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 [ESA], upon a determination by the Secretary that such areas are essential for the conservation of the species." *See* 16 U.S.C. § 1532(5)(A). Under the ESA, conservation is synonymous with recovery. *See id.* § 1532(3). Threatened and endangered species that have critical habitat designated are almost twice as likely to be making

progress toward recovery than those without critical habitat (Taylor et al. 2005). The plight of the sole wild Mexican wolf population is, in part, a reflection of the legal ban on designating critical habitat within experimental population areas for populations that are designated as nonessential.

As outlined in section VIII above, Mexican wolves face a variety of threats to their survival. Ongoing destruction and modification of the subspecies' habitat threatens the recovery and survival of the subspecies throughout its range. As demonstrated by Carroll et al. (2006), existing wolf habitat in the region faces serious threats by development. Conversely, habitat in the region could actually be improved by decreasing road densities on federal lands. *Id*.

The recovery of the Mexican wolf subspecies would be both enhanced and greatly expedited if the subspecies is fully protected under the ESA, as the new listing rule would require a concurrent prudency determination relative to a new critical habitat designation. Designation of critical habitat for the Mexican wolf subspecies in the United States stands to enhance the efficacy of the recovery program through the protective powers contained within the consultation process outlined by Section 7(a)(2) of the ESA, 16 U.S.C. § 1536(a)(2). In particular, federal actions that affect designated critical habitat must be scrutinized to determine if the proposed action would cause jeopardy to the listed species or adversely modify its critical habitat. *See id. See also* 50 C.F.R. § 402.14. After such a determination is made, FWS must provide the action agency with a biological opinion explaining how the proposed action will affect the subspecies or its habitat. If FWS concludes that the proposed action will jeopardize the continued existence of the subspecies or result in the destruction or adverse modification of its critical habitat, the biological opinion must outline any "reasonable and prudent alternatives" that FWS believes will avoid that consequence. *See* 16 U.S.C. § 1536(b)(3)(A).

FWS has in the past often erroneously claimed that critical habitat designations do not benefit listed species, as the adverse modification prohibition in Section 7 provides no greater protection than the prohibition against substantive jeopardy. The courts have barred this maladministration of the ESA. *See e.g.*, Gifford Pinchot Task Force v. FWS, 378 F.3d 1059, 1070 (9th Cir.2004). Critical habitat designation and subsequent protection is mandated by the ESA precisely because it *does* provide more protection to species and subspecies by encouraging their recovery, not just mere survival.

2. *Critical habitat areas within the range of the subspecies*

Petitioners request designation of all biologically suitable areas as critical habitat, but recognize there may presently be legal obstacles to such designation. For example, Section 10(j) of the ESA prohibits critical habitat designation for experimental, nonessential populations. Since the BRWRA Mexican wolf population has been designated experimental, nonessential, and the range of that designation extends from I-10 north to I-40 within Arizona and New Mexico, only areas to the south of I-10 and north of I-40 within these two states are currently eligible for critical habitat designation.

Petitioners assert that critical habitat should be designated on a variety of lands that include the present BRWRA and others outside of the experimental population area, which also essential to the conservation of the Mexican wolf. Petitioners reserve the right to supplement this section with additional information as necessary.

IX. Conclusion

Despite an ongoing recovery program for Mexican wolves within the BRWRA, the subspecies remains poised for a second extinction in the wild. As outlined in this petition, as well as in the original 1976

listing factor analysis for the subspecies, the Mexican gray wolf faces a variety of threats to its continued existence. Therefore, this taxonomically valid subspecies merits protection under the ESA, deserving of a scientifically rigorous and modern recovery plan and the designation and protection of critical habitat within the subspecies' range. As stated previously, it is imperative that FWS issue 90-day and 12-month findings on those actions requested in this petition in a timely fashion.

Any questions regarding this petition should be directed to Rob Edward (720.663.9653) or Dave Parsons (505.275.1944).

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