A PETITION TO PREPARE A RECOVERY PLAN UNDER THE ENDANGERED SPECIES ACT FOR THE GRAY WOLF

Natural Resources Defense Council

Defenders of Wildlife

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I. EXECUTIVE SUMMARY

The Natural Resources Defense Council (NRDC) and Defenders of Wildlife hereby petitions the United States Fish and Wildlife Service ("Service") to prepare a recovery plan for the gray wolf (C*anis lupus*) in the conterminous United States pursuant to section 4 of the Endangered Species Act ("ESA"), 16 U.S.C. § 1533(f), and section 553 of the Administrative Procedure Act ("APA"), 5 U.S.C. § 553, or, in the alternative, to revise the recovery plans for the eastern timber wolf, the Mexican gray wolf, and the Northern Rocky Mountain gray wolf pursuant to section 1533 of the ESA and section 553 of the APA.

Gray wolves, the largest member of the canid family, once numbered in the hundreds of thousands across most of North America. With the exception of a population of wolves in the upper Great Lakes region, federal and state eradication efforts led to the almost complete extirpation of gray wolves from the lower-48 United States by the 1930s.

Highly social animals, gray wolves form packs in which ordinarily only the dominant or "alpha" male and female breed. Pack size, litter size and pack ranges can vary dramatically. Wolves prey on a variety of game, but are primarily dependant on ungulates, such as caribou, elk, and deer. Healthy wolf populations can have dramatic beneficial effects on the ecology of a region. The reintroduction of wolves in the greater Yellowstone area, for example, has led to significant reductions in coyote populations, concomitant increases in pronghorn antelope, raptor, and small rodent populations, and improved riparian forest regeneration, thus helping increase songbird diversity and abundance.

Shortly after the passage of the ESA, four then-recognized subspecies of gray wolves, the eastern timber wolf (*C. l. lycaon*), the Northern Rocky Mountain wolf (*C. l. irremotus*), the Mexican gray wolf (*C. l. baileyi*), and the Texas gray wolf (*C. l. monstrabilis*), were listed as endangered. In 1978, in light of growing taxonomic uncertainty surrounding these classifications, the Service relisted the entire species, *Canis lupus*, in the lower-48 states. Despite this change in listing status, however, the Service erroneously continued to manage gray wolves on a subspecies basis. For example, while the Service prepared recovery plans for the Northern Rocky Mountain wolf, the Mexican gray wolf, and the eastern timber wolf, it failed to prepare a recovery plan for the listed gray wolf species.

The ESA requires the Service to prepare a recovery plan for all "endangered species and threatened species." 16 U.S.C. § 1533(f)(A). Absent a formal finding that it will not benefit a species, the obligation to prepare a recovery plan is mandatory. In this case, although the Service has prepared recovery plans for subspecies that it no longer recognizes, it has never prepared a comprehensive recovery plan for the gray wolf, *Canis lupus*, as currently listed. Relying solely on these disconnected and uncoordinated recovery plans cannot substitute for preparing a national recovery plan for the gray wolf. By failing to develop a recovery plan that is focused on the listed entity, the Service has failed to assess comprehensively the dramatic reduction in wolf abundance, distribution, and continued decline of habitat conditions throughout the range of the listed species. Even if it were legally acceptable for the Service to rely on recovery plans that relate to a superseded listing entity, the gray wolf recovery plans are badly out of date (the most recent plan is over 15-years old), do not reflect the most recent scientific data on wolves,

and set recovery goals that are grossly inadequate. Contemporary scientific literature suggests that minimum population viability for gray wolves requires multiple, connected populations, forming a metapopulation of at least several thousand individuals. The Service's recovery plans, however, call for population targets well below these levels. The recovery plan for the Northern Rocky Mountain wolf, for example, calls for three groups of 10 breeding pairs of wolves (defined by the Service as 2 wolves of opposite sex and adequate age, capable of producing offspring);[1] the recovery plan for the Mexican gray wolf calls for a mere 100 individuals in a single recovery area; and the recovery plan for the eastern timber wolf only commits to establishing one population of 100 wolves outside of Minnesota, despite explicitly acknowledging the need for a much more robust population. Thus, at a minimum, the Service needs to revise each of these recovery plans to reflect a contemporary scientific understanding of wolf recovery needs.

While a national recovery plan should be prepared for the gray wolf, that recovery plan can and should contain sections that treat different regions of the country separately. These regions could roughly correspond to those that the Service has already prepared recovery plans for, but should also include some unaddressed regions. Petitioners recommend that the following recovery goals be adopted for the Northeastern United States, Northern Rocky Mountains, and the Southwest (for the Northwestern United States and the Southwest, revised numerical targets should be adopted for each metapopulation as part of the recovery planning process):

[1] As discussed below, the Service has recognized the inadequacy of its 1987 recovery plan by referencing revised recovery standards of 30 breeding pairs defined as an alpha male and female wolf that have produced at least 2 pups that survived until December 31, but it has failed to formally revise its Northern Rockies wolf recovery plan, so the legitimacy of the revised recovery standard is in question. *See* 72 Fed. Reg. 6107, citing Bangs (2002)

- Northeast/Great Lakes: In addition to existing wolf populations in the Great Lakes, the establishment of multiple, connected populations, in at least Maine, New York and, potentially, New Hampshire, with a minimum of several thousand individuals, forming a metapopulation of sufficient size to ensure its long-term genetic stability and ecological viability.

- Northern Rocky Mountains: At least 2,500 - 5,000 individuals in at least three interconnected populations in Idaho, Wyoming, and Montana. Independently viable or connected populations should also be established in the Colorado/Utah area, and in Oregon and Washington.

- Southwest: At least several thousand individuals in multiple, connected populations in Arizona and New Mexico, forming a metapopulation of sufficient size to ensure its genetic stability and ecological viability.

It should be emphasized that these recommendations should be refined during the planning process and may, consistent with recent studies of minimum population viability for the gray wolf, need to be expanded or altered. The recovery of wolves in Texas, potentially portions of the mid-Atlantic, and the Northwest United States may also need to be further addressed. What is clear is that if the gray wolf is to be truly recovered and delisted in the lower-48 States, a nationwide recovery plan is the first and best step towards that goal.

II. PETITIONERS

Petitioner, Natural Resources Defense Council (NRDC), is a national non-profit conservation organization with approximately 1-million members and activists. One of NRDC's organizational goals is to further the ESA's purpose and to preserve our national biodiversity. NRDC's members have a direct interest in ensuring the survival and recovery of the gray wolf and in conserving the unique native plant and animal communities on which they rely and which they benefit. This Petition was authored by Dr. Sylvia Fallon and Andrew E. Wetzler. Any correspondence regarding this petition should be sent to:

Sylvia Fallon, Ph.D.
Natural Resources Defense Council
1200 New York Avenue, NW
Suite 400
Washington, D.C. 20005-6166
(202) 289-6868
sfallon@nrdc.org

Petitioner Defenders of Wildlife ("Defenders") is a national non-profit conservation organization headquartered in Washington, D.C. with more than 1 million members and supporters nationwide. Defenders is a science-based advocacy organization focused on conserving and restoring native species and the habitat upon which they depend, and has been involved in such efforts since the organization's establishment in 1947. Over the last three decades, Defenders has played a leading role in the recovery of wolves in the Northern Rockies and throughout the United States. Defenders administers The Bailey Wildlife Foundation Wolf Compensation Trust, which has reimbursed ranchers in the Northern Rockies for more than $900,000 since the program was founded in 1987, and The Bailey Wildlife Foundation Carnivore

Conservation Fund, which assists family ranchers and farmers with nonlethal, proactive methods that help reduce or prevent livestock losses to wolves. Defenders' efforts have also included the 2007 publication of a report, *Places for Wolves*.

III. BASIS FOR THE PETITION

Section 4 of the ESA requires the Service to prepare a recovery plan for all "endangered species and threatened species" protected by the Act. 16 U.S.C. § 1533(f)(A). Recovery plans prepared under the Act must contain the following elements: (1) a description of "site-specific management actions that may be necessary to achieve the plan's goal" for the recovery of the species; (2) "objective, measurable criteria" which, when met, would result in an initial determination that delisting of the species may be appropriate; and (3) an estimate of the "time required and cost to carry out those measures" needed to achieve the plan's recovery goals. Id. at §1533(f)(B). Unless the Service finds that preparing such a plan "will not promote the conservation of the species," the obligation to prepare a recovery plan is mandatory. 16 U.S.C. § 1533(f). *See also Southwest Center for Biological Diversity v. Bartel*, 470 F.Supp.2d 1118 (S.D. Cal. 2006); *Environmental Defense Center v. United States Department of the Interior*, Case No. 99-9042, at 9 (C.D. Cal. May 20, 2001); *Sierra Club v. Lujan*, 1993 WL 151353, *11 (W.D. Tex. 1993).

Once prepared, recovery plans must be frequently reassessed by the Service. Section 4 requires the Service to report to Congress every two years "on the status of efforts to develop and implement recovery plans for all species" and explicitly contemplates that the Service will prepare "revised" recovery plans when necessary. Id. at § (f)(3), (4). In fact, the ESA specifically provides that FWS shall provide public

notice and an opportunity for public review and comment" on any "revised recovery plan" prepared by the agency. Id. at (f)(4).[2]

As described more fully below, the Service has never issued a recovery plan for the gray wolf, *Canis lupus*, as listed. Instead, the Service has issued a series of disconnected recovery plans for a number of subspecies of gray wolves that are no longer listed under the ESA.[3] These isolated recovery plans fail to satisfy the ESA's clear mandate to prepare a recovery plan for each listed "species" as a whole. The Service's subspecies recovery plans do not take into account the recovery needs of the entire listed species, do not consider the relationship between wolves in various regions of the country, and do not address the "gaps" created by the various disconnected regional recovery plans. Because the Service has never issued a recovery plan for the listed gray wolf species, and because the Service is under a mandatory obligation to do so within a reasonable time, it has violated the requirements of the ESA and the APA.

The Service may take the view that it is not under a legal obligation to prepare a national recovery plan for the gray wolf because it has already prepared recovery plans covering wolves in the northeast United States, Northern Rocky Mountains, and the southwest United States. Petitioners do not believe that this view is consonant with the requirements of the ESA. At a minimum, the regional recovery plans prepared by the Service should themselves be revised. Existing recovery plans for wolf populations are

[2] Although there are no regulations governing the preparation and revision of recovery plans, the Service has prepared guidelines for the agency on recovery planning. *See* U.S. Fish and Wildlife Service, *Policy and Guidelines for Planning and Coordinating Recovery of Endangered and Threatened Species* (May 1990) (available at http://www.fws.gov/endangered/pdfs/Recovery/90guide.pdf).

[3] The Service originally listed the eastern timber wolf (*C. l. lycaon*), the Northern Rocky Mountain wolf (*C. l. irremotus*), the Mexican gray wolf (*C. l. baileyi*), and the Texas gray wolf (*C. l. monstrabilis*) as separate subspecies. In 1978 the wolf was listed on the species level in response to evolving science. *See* Part IV, *infra*.

badly out of date and set "recovery" goals that have little to no support in contemporary conservation biology or genetics.

Despite a clear requirement to do so, the Service has failed to develop a national recovery plan for the gray wolf, *Canis lupus*, as listed under the ESA. The Service's failure to prepare a recovery plan for the entire species violates a clear, non-discretionary, duty under the ESA and constitutes agency action "unlawfully withheld and unreasonably delayed" under the APA. Those recovery plans that have been prepared do not constitute a national recovery plan and, at any rate, need to be revised. Accordingly, pursuant to section 4 of the ESA and section 553 of the APA,[4] Petitioners request that the Service prepare a recovery plan for the species, *Canis lupus*, as listed or, in the alternative, revise its recovery plans for the Northern Rocky Mountain wolf, the Mexican gray wolf, and the eastern timber wolf..

III. SPECIES DESCRIPTION

The gray wolf (*Canis lupus*) is the largest member of the canine family. Adult gray wolves range from 40–175 pounds with males weighing approximately 20% more than females (Mech 1974). Total body length, from nose to tail, ranges from 3-4 feet. Height (measured from base of paws to shoulder) generally ranges from 2-3 feet. The fur color of gray wolves varies geographically, ranging from white in Arctic populations, to mixtures of gray and brown to pure black (Gipson 2002).

Wolves are social animals that typically live in packs varying in size from 2-12 or more animals. Pack size depends on the amount of available prey, conflict with other

[4] Section 553 of the APA provides that "[e]ach agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule." 5 U.S.C. § 553(e). The APA defines a "rule" as "the whole or a part of an agency statement of general or particular applicability and future effect designed to implement, interpret, or prescribe law or policy or describing the organization, procedure, or practice requirements of an agency." 5 U.S.C. § 551(4).

wolf packs, other forms of mortality, and dispersal. Packs typically occupy distinct territories, the size of which can vary by orders of magnitude from 13 square miles to more than 1,500 square miles, which they defend from other wolves (Mech and Boitani 2003).

In general, only the dominant, or "alpha," male and female in a pack breed annually to produce litters ranging in size from 1-11 pups, but average 5-7 pups per litter. Pup production occurs in the spring with pups remaining in the den for 8-10 weeks. After this point, pups are cared for by the entire pack. A gray wolf's lifespan is approximately 4-8 years in the wild (Mech 1988). Wolves usually disperse from their natal pack in search of mates and their own territory when they reach sexual maturity at 2-3 years. Dispersal distances vary, but movements on order of 800 km (500 mi) have been documented (68 Fed. Reg. 15805).

Wolves play an important ecological role as top predators in their ecosystems. For example, in areas where wolves are absent, ungulate populations have increased (Messier 1994, Crete 1999) leading to a decline in total and native plant species richness as well as the general degradation of forests and other ecosystems (Rooney et al. 2004). A series of studies have documented excessive overbrowsing by elk and moose on key riparian habitat including cottonwoods, willows and aspens (Baker et al. 1997, Ripple and Larsen 2000, Ripple et al. 2001, Beschta 2003). One study found that the overbrowsing additionally led to a decrease in neotropical migrant songbirds (Berger et al. 2001). There is also evidence that wolves reduce coyote populations thereby boosting pronghorn antelope and other small mammal populations (Berger, in prep). Wolves may also increase the presence of raptors and other scavengers by increasing food availability

(Wilmers et al. 2003). Finally, since wolves tend to prey on the oldest, youngest or debilitated prey, wolves help maintain the health and productivity of the herds they prey on. With their reintroduction into Yellowstone National Park, wolves are beginning to restore ecological balance to the ecosystem (Ripple and Beschta 2004).

The gray wolf historically occurred across most of North America, Europe, and Asia. The present distribution of wolves, however, is much more restricted with most populations confined to wilderness areas. Aggressive government-sponsored eradication programs nearly eliminated the gray wolf from the western United States by the early twentieth century (Young and Goldman 1944). By the time the gray wolf was added to the endangered species list, only several hundred wolves could be found in the lower-48 states, primarily in the Great Lakes region of Wisconsin, Michigan and Minnesota.

Historically, the gray wolf has been divided into as many as thirty-two subspecies worldwide including twenty-four in North America (Hall and Kelson 1959, Hall 1981). Based on a statistical assessment of morphological characters, Nowak (1995) suggested that the North American subspecies should be reduced to five subspecies: *C. l.arctos,* found in the arctic, *C. l. occidentalis,* a large wolf of Alaska and western Canada, *C. l. nubilus*, a moderate-sized wolf originally found from Oregon to Newfoundland and from Hudson Bay to Texas, *C. l. baileyi,* a smaller wolf of the Southwest, and *C. l. lycaon*, a small wolf restricted to southeastern Canada. Genetic studies based on mitochondrial DNA have shown even less geographic grouping of these hypothesized subspecies (Jenks and Wayne 1992, Wayne 1992, 1995). Instead, relatively recent geneflow suggests gradual gradations between wolf groups rather than pronounced demarcations. Evidence of hybridization between wolves and coyotes in certain regions further complicates

subspecific classification (Kolenosky and Standfield 1975, Nowak 1979, Sears 1999, Lehman et al. 1991). As a result, great uncertainty continues to surround any taxonomic designations below the species level.

IV. PREVIOUS FEDERAL ACTION

Two subspecies of the gray wolves were protected under the Endangered Species Act as endangered in January of 1974: the eastern timber wolf (*C. l. lycaon*) and the Northern Rocky Mountain wolf (*C. l. irremotus*). See Endangered Wildlife Lists, 39 Fed. Reg. 1171 (January 4, 1974). Two additional subspecies, the Mexican gray wolf (*C. l. baileyi*), and the Texas gray wolf (*C. l. monstrabilis*), were listed as endangered in April and June of 1976. See "Determination that Two Species of Butterflies are Threatened Species and Two Species of Mammals are Endangered Species (Schaus swallowtail; Bahama swallowtail; Mexican wolf, *Canis lupus baileyi*; gray bat, *Myotis grisescens*)," 41 Fed. Reg. 17742 (April 28, 1976); "Endangered Status for 159 Taxa of Animals," 41 Fed. Reg. 24062 (June 16, 1976).

In 1978, due in part to uncertainty of subspecific designations, the Service listed the gray wolf as endangered at the species level (*Canis lupus*) throughout the conterminous 48 states and Mexico, except for Minnesota, where the gray wolf was classified as threatened. *See* "Reclassification of the gray wolf in the United States and Mexico, with determination of critical habitat in Michigan and Minnesota," 43 Fed. Reg. 9607 (March 9, 1978). Despite the listing of the species as a whole, the Service has continued to manage the original subspecies separately, among other things developing recovery plans for individual subspecies. In 1978, for example, the Service completed a recovery plan for the eastern timber wolf in the Northeast/Great Lakes region (USFWS

1978); in 1982 a recovery plan was developed for the Mexican wolf in the Southwest (USFWS 1982); and the recovery plan for the Northern Rocky Mountains wolf was completed in 1980 and revised in 1987 (USFWS 1987).

On November 22, 1994, areas of Idaho, Montana and Wyoming were designated as nonessential experimental population areas for the gray wolf under section 10(j) of the ESA and wolves were reintroduced to the region in two separate areas. *See* "Establishment of a Nonessential Experimental Population of Gray Wolves in Yellowstone National Park in Wyoming, Idaho and Montana," 59 Fed. Reg. 60252 (November 22, 1994); "Establishment of a Nonessential Experimental Population of Gray Wolves in Central Idaho and Southwestern Montana," 59 Fed. Reg. 60266 (November 22, 1994). Similarly, on January 12, 1998, the Service established a nonessential experimental population for the Mexican gray wolf in portions of Arizona, New Mexico and Texas and began reintroducing wolves in eastern Arizona within the Blue Range Wolf Recovery Area. *See* "Establishment of a Nonessential Experimental Population of the Mexican Gray Wolf in Arizona and New Mexico," 63 Fed. Reg. 1752 (January 12, 1998).

On July 13, 2000, the Service published a proposal to revise the listing of the gray wolf by designating four distinct population segments (DPSs) pursuant to section 4 of the ESA. Specifically, the four proposed DPSs were: a Western Great Lakes DPS, a Northeastern DPS, a Western DPS and a Southwestern DPS. The Service also proposed to reclassify the gray wolf as threatened in each DPS, except for the Southwest where it would remain endangered. *See* "Proposal to Reclassify and Remove the Gray Wolf from the List of Endangered and Threatened Wildlife in Portions of the Conterminous United

States; Proposal to Establish Three Special Regulations for Threatened Gray Wolves," 65 Fed. Reg. 43449 (July 13, 2000). On April 1, 2003, the Service issued a final rule designating three DPSs (Western, Eastern and Southwestern), and reclassifying wolves in the Eastern and Western DPS as threatened. The rule also implemented a special regulation under section 4 (d) of the ESA to allow greater flexibility in the management of wolf conflicts.

In 2005, the U.S. District Courts in Oregon and Vermont invalidated the 2003 final rule finding that it was "arbitrary and capricious" and in violation of the ESA. *See Defenders of Wildlife v. Norton*, 354 F. Supp. 2d 1156 (D. OR 2005); *National Wildlife Federation v. Norton*, 386 F. Supp. 2d 553 (D. VT 2005). While the Service's proposed DPSs were rejected by the courts, the Service nonetheless continued to manage the regional wolf populations as separate management units. Details on federal actions in each area are provided below.

A. Northeast/Western Great Lakes

In the spring of 2000, the Service received two petitions requesting the establishment and delisting of a Western Great Lakes DPS. The Service found the action requested in the petitions to be warranted and on February 8, 2007, published a final rule establishing a Western Great Lakes DPS and removing the DPS from the list of endangered and threatened species. *See* "Final Rule Designating the Western Great Lakes Populations of Gray Wolves as a Distinct Population Segment; Removing the Western Great Lakes Distinct Population Segment of the Gray Wolf From the List of

Endangered and Threatened Wildlife," 72 Fed. Reg. 6051 (February 8, 2007). The Western Great Lakes DPS was officially removed from the list on March 12, 2007.[5]

B. Northern Rocky Mountains/Northwest

On October 30, 2001, the Service received a petition to delist the gray wolf from the Friends of the Northern Yellowstone Elk Herd, Inc. (Friends petition). Additionally, on July 19, 2005, the Office of the Governor of the State of Wyoming and the Wyoming Game and Fish Commission petitioned the Service to establish a Northern Rocky Mountain DPS for the gray wolf and remove the DPS from endangered species protections (Wyoming petition). On October 26, 2005, the Service published a finding that the Friends petition failed to present substantial information that delisting may be warranted, but that the Wyoming petition did presented substantial information that wolves in the Rocky Mountain region may qualify as a DPS and may warrant delisting. *See* "90-day Finding on Petitions to Establish the Northern Rocky Mountain Distinct Population Segment of Gray Wolf (*Canis lupus*) and to Remove the Gray Wolf in the Northern Rocky Mountain Distinct Population Segment from the List of Endangered and Threatened Species," 70 Fed. Reg. 61770 (October 26, 2005). On August 1, 2006, the Service published a finding that the Wyoming petition was not warranted because of inadequate state plans. *See* "Endangered and Threatened Wildlife and Plants; 12-Month Finding on a Petition To Establish the Northern Rocky Mountain Gray Wolf Population (*Canis lupus*) as a Distinct Population Segment To Remove the Northern Rocky Mountain Gray Wolf Distinct Population Segment From the List of Endangered and Threatened Species," 71 Fed. Reg. 43410 (August 1, 2006). On February 8, 2007, the

[5] This delisting is currently subject to court challenge. *The Humane Society of the United States v. Kempthorne*, 1:07-cv-00677-PLF (D.D.C. 2007).

Service published a proposed rule to establish a Northern Rocky Mountain DPS and delist wolves in the states of Idaho and Montana, but to continue federal protection within the state of Wyoming until an adequate state plan could be developed. *See* "Designating the Northern Rocky Mountain Population of Gray Wolf as a Distinct Population Segment and Removing This Distinct Population Segment From the Federal List of Endangered and Threatened Wildlife," 72 FR 6105 (February 8, 2007). On December 12, 2007, the Service apparently approved Wyoming's state plan (Wyoming Fish and Game 2007)..

C. Southwest

In 2003, the Service entered into a memorandum of understanding (MOU) with several state and federal agencies including the Arizona and New Mexico Fish and Game Departments, the U.S. Department of Agriculture Wildlife Services, and the White Mountain Apache tribe allowing the states and tribe to manage wolf reintroduction within the Blue Range Wolf Recovery Area while the Service remains responsible for wolf recovery. The MOU establishes an Adaptive Management Oversight Committee (AMOC). In 2005, the AMOC completed a 5-year review of wolf reintroduction and recovery efforts and suggested 37 steps for improving the process which are under consideration by the Service since some of the suggestions would require changes to the final rule.

IV. A NATIONAL RECOVERY PLAN FOR THE GRAY WOLF WITH REGIONAL RECOVERY GOALS SHOULD BE ESTABLISHED.

As discussed above, while the Service has failed to prepare a comprehensive recovery plan for the listed gray wolf species, it has adopted as series of recovery plans for the gray wolf's superseded subspecies listing. Currently, recovery plans have been prepared for the Northern Rocky Mountains wolf, the eastern timber wolf, and the

Mexican wolf. Although these plans do not satisfy the Act's requirement to prepare recovery plans for each *listed* species, 16 U.S.C. § 1533(f)(A), and a nation-wide recovery plan for *Canis lupus* should be prepared, incorporating regional recovery goals into an overall recovery plan is appropriate. The available scientific literature indicates that in order to be considered recovered multiple, connected populations of gray wolves must be established throughout their range, forming a metapopulation of sufficient size to ensure the wolf's long-term genetic stability and ecological viability in various regions throughout the country. Unfortunately, the recovery plans prepared to date do not reflect this science. After a general discussion of general wolf population viability, we will address each individual region's population needs in turn.

A. Multiple Connected Populations of Wolves With Thousands of Individuals Are Required to Achieve Regional Recovery.

It is a well-established principle of conservation biology that populations of organisms need substantial and robust numbers of individuals to maintain viability. An often cited estimate for minimum population viability (MPV) is an effective population size (N_e) of 500 individuals to avoid the effects of genetic inbreeding (Soule and Wilcox 1980, Frankel and Soule 1981, Soule 1986, Franklin and Frankham 1998). For these reasons, Soule and Simberloff (1986) concluded that "estimates of MVPs for many animal species are rarely lower than an *effective size* of a few hundred." Since effective population sizes are generally only 10-20% of the census population, this lower limit translates into a total population count of 2,500-5,000 individuals (Frankham 1995).

Other estimates have predicted that viable population numbers should be even higher. For example, Lande (1988) criticized the application of a blanket number like N_e=500 because it fails to consider critical species-specific demographic data. Lande

then outlined examples in which demographic parameters, such as an alee effect, stochasticity, edge effects or local extinctions in a patchy habitat, could require populations to have even larger numbers than an effective population of 500. Lande (1995) further explored this topic in the context of genetic variation and mutation and concluded that effective populations should number in the 5,000s. C. D. Thomas (1990) also estimated that MVPs should number in the thousands – ideally, 10,000 individuals for populations that experience fluctuations. Similarly, in 2004, Reed and Hobbs examined the population viability of 2,387 populations of 203 species and found that vertebrates need to number in the thousands for effective conservation.

Recently, a number of studies have been published that examine population viability based on empirical data and gray wolves specifically. Brook et al. (2006) estimated the MVP for 1,198 species including the gray wolf and found that the median overall estimate was 1,377 individuals. Traill et al. (2007) conducted a meta-analysis of MVPs for 212 species including gray wolves and concluded that the MVP for most species will exceed a few thousand individuals. Finally, Reed et al. (2003) estimated the minimum viable population size for over 100 vertebrate organisms, including the gray wolf. The MVP for *adult* gray wolves was estimated at 1,403. Moreover, when Reed et al (2003) corrected for 40 generations worth of data, the MVP for gray wolves was estimated to be 6,332.

Significant advancements have also been made in the field of conservation genetics. Genetic data shows that historically wolves in the United States numbered in the several hundreds of thousands (Leonard et al. 2005). Additionally, the genetic diversity of the extirpated North American gray wolves was twice that of the current

population. Therefore, the current assemblage of gray wolves in the lower-48 states is a profound under-representation both numerically and genetically of the original gray wolves that once occupied this landscape. Additionally, when setting recovery goals for wolf populations, the importance of genetic connectivity must be emphasized. Substantial scientific literature supports the fact that inbreeding reduces fitness and can cause extinction (e.g. Frankham and Ralls 1998, Hedrick and Kalinowski 2001). Inbreeding depression has been documented in captive wolves, (Laikre and Ryman 1991), and O'Grady et al (2006) found that "disregarding the influence of inbreeding depression on extinction risk will lead to serious overestimates of the survival prospects of threatened mammalian and avian taxa." Thus, any recovery plan for the gray wolf prepared or revised by the Service must adequately account for the need to ensure sufficient connectivity between wolf populations.

B. Northeast/Great Lakes

A subset of gray wolves historically occurred throughout the northeastern United States commonly referred to as the eastern timber wolf (*Canis lupus lycaon*). These wolves are typically smaller than other gray wolves with grayish brown fur showing red markings around the ears. While there is some uncertainty regarding the subspecific status of wolves that occupied the northeastern US (Nowak 1995, Wilson et al. 2000, Nowak 2003), some form of gray wolf (*Canis lupus*) was historically found throughout the eastern United States including the Great Lakes region of Minnesota, Wisconsin and Michigan, across the Midwestern states of Indiana, Ohio and Pennsylvania to the eastern shore of Maine, New Hampshire, Vermont, and New York, and possibly down through

the southern Appalachian states of Tennessee and the Carolinas (Young and Goldman 1944, Hall 1981, Mech 1974).

Despite the creation and delisting of a Great Lakes DPS, current efforts have addressed wolf recovery in only a fraction of the wolves' previous range and gray wolves remain a listed species throughout the northeastern United States. The delisting of gray wolves in the upper Midwest DPS thus does not constitute a reasonable measure of recovery, even regionally, for the species *Canis lupus*. While the eastern timber wolf recovery plan (USFWS 1992) only commits to a single population of 100 individuals outside of Minnesota, the plan explicitly acknowledges the need to establish multiple, separate, and viable populations of wolves in the Adirondack Mountains of New York, northwestern Maine and adjacent New Hampshire and/or northeastern Maine. This portion of the recovery plan, however, was never implemented by the Service and has since been abandoned.

In preparing a revised recovery plan for gray wolves, the Service should develop recovery goals for wolves in the northeastern United States, outside of the Great Lakes DPS. As discussed above, these recovery goals should include multiple, connected populations with a minimum of several thousand individuals, forming a metapopulation of sufficient size to ensure its long-term genetic diversity and ecological viability. These populations should also be geographically distributed, ideally in at least Maine and New York and, potentially, New Hampshire.

C. Northern Rocky Mountains/Northwest

Gray wolf recovery in the Rocky Mountain region was originally designed to recover a subspecies of the wolf called the Rocky Mountain gray wolf, *Canis lupus*

irremotus, although the inhabitants of this area were also at times classified as *Canis lupus nubilus*. Wolves reintroduced into this region from Canada were classified by some as *Canis lupus occidentalis* (Nowak 1995). Significant disagreement over subspecific classifications of wolves continues. Gray wolves in the Rocky Mountains are slightly larger than wolves in the two other regional recovery areas of the Great Lakes and the Southwest, and these wolves occupied most of the western United States, including Colorado, Utah, Oregon and Washington, until the 1930s when they were nearly eradicated.

In 1980, a recovery plan for *Canis lupus irremotus* was established and then revised in 1987. The plan called for establishing a minimum of 10 breeding pairs (two adult wolves capable of producing offspring) in each of three separate areas for three successive years (USFWS 1987). The Service evaluated this goal as part of the wolf reintroduction Environmental Impact Statement (EIS) in 1994 and again in 2001-2002. Without formally revising its 1987 recovery plan, the Service has subsequently asserted that 30 breeding pairs comprising at roughly 300 wolves in a metapopulation with genetic exchange between subpopulations for three successive years are needed for recovery. *See* 72 Fed. Reg. 6107. For the reasons set forth below, the recovery criterion originally adopted by the Service, and the Service's subsequent recovery targets do not form an adequate scientific basis for the recovery of this population.

1. <u>The Recovery Plan's goals lack scientific basis and justification</u>

The demographic recovery goal established by the 1987 recovery plan was 10 breeding pairs living in each of three separate areas for at least three consecutive years (USFWS 1987). This recovery goal could be satisfied with as few as 20 wolves in each

of three isolated "recovery" areas. The recovery plan states that these goals "were developed based on the most current information and the opinions of recovery team members, other 'experts' on the species, and the Fish and Wildlife Service" (USFWS 1987, p.19). However, the plan does not include any presentation of scientific literature to support the proposed recovery goal, nor does it outline which "experts" were consulted or the process by which the recovery goal was established.

2. The Service's 1994 evaluation of the recovery plan's goals ignored the best available science.

The recovery goal set by the 1987 NRM Recovery Plan was reevaluated by the Service in 1994 for the EIS prepared in connection with the introduction of an experimental population of wolves into the region (USFWS 1994: Appendix 9). After this evaluation, the Service reaffirmed its recovery criteria for the region: a minimum of 10 breeding pairs in three separate locations over a three-year period. This evaluation was also published as an article, (Fritts and Carbyn 1995). The Service's reevaluation included: (a) a review of the scientific literature on minimum viable population size; (b) the results of a survey, or opinion poll, of wolf biologists on proposed recovery goals; and (c) a presentation of case histories of small, isolated wolf populations that appear to be self-sustaining. A close examination reveals, however, that each part of this reevaluation either provided little support for the Service's recovery goal or clearly indicated that a minimum population size far above those established by the 1987 recovery plan was needed.

a. Review of literature

First, a review of the literature available in 1994 clearly showed that a far larger population was needed in order to achieve recovery. Indeed, as Fritts' (USFWS 1994:

Appendix 9) review itself acknowledged, current scientific literature at the time identified that long-term viability for wolf populations would require an effective population size (N_e) of at least 500 and up to the low thousands of individuals (p.38-39). Yet Fritts dismisses this finding as unachievable stating, "Clearly, finding an area to support N_e = 500 of wolves in the lower 48 states is very unlikely, as this would equate to a total population in the low thousands" (USFWS 1994: Appendix 9, pg. 38).

Similarly, in their subsequent article, Fritts and Carbyn (1995) conclude, "it is clear that finding any totally protected reserves that could support an N_e of 500 wolves in the lower 48 states or Canada would be very difficult – much less any additional such reserves." They further state, "If (thousands of wolves) were the case, long-term conservation for many wolf populations in a specific regional setting would be impossible." The Service's own evaluation of the recovery goal identified in the 1987 recovery plan thus clearly finds that the plan's target population (10 breeding pairs in three locations--i.e., about 60 wolves) was simply not supported by the available scientific literature, yet the Service simply discounted this science believing, erroneously, that maintaining a population of thousands of wolves in the region would be unachievable.

b. Survey of biologists

Second, the Service's survey of wolf biologists, which was methodologically flawed, also provided little support for the Service's proposed recovery goal. Fritts (USFWS 1994: Summarized in Appendix 9) surveyed the opinions of wolf biologists to determine whether they thought that the Service's recovery goal constituted a viable population (see also Fritts and Carbyn 1995). The survey did not provide a definition of

viability, leaving a critical element to the discretion of the evaluator. Additionally, the survey presented the biologists with the Service's arbitrary recovery goals, rather than soliciting the biologist's own definition of recovery. Furthermore, the survey was designed in a way that likely biased support for the service's pre-established goal.

The survey began by asking if even *fewer* wolves than proposed in the 1987 recovery goals would constitute a viable population. That is, the survey first asked whether one group of 10 breeding pairs would constitute a viable population. This question was followed by asking whether three groups of 10 breeding pairs acting in a metapopulation would constitute a viable population. Predictably, many of the answers indicated that the second definition of three groups would be "more viable" (Mike Phillips, Kyran Kunkel), "more defensible" (John Weaver), or would have "more chance of constituting a viable population" (John Theberge), than the first definition. Several of these same respondents, however, were critical of either definition, indicating that many responses were comparative and did not necessarily indicate agreement that the definition constitutes a viable population.

Further, while some of the biologists did agree with one or the other of the definitions, many were also careful to warn that their response represented their opinion only which was subjective since none of the definitions were based on explicit data. For example, Bob Stephenson wrote, "Unless someone has done a study of minimum viable population (MVP) of wolves from a genetic standpoint there would be no way to know for sure whether this population would sustain itself in the long term." John Weaver responded, "In lieu of a formal PVA for gray wolves in the Northern Rocky Mountains, I can only respond subjectively to the proposed definitions." Mark Boyce cautioned, "A

definition for a viable population is arbitrary, and we do not know enough to say how many is sufficient." Lu Carbyn advised, "I would not split hairs over what is viable or not – make sure you have large enough areas with suitable prey base….then let nature seek its own level." Finally, Kyran Kunkel concludes, "When any of the above definitions are finally made, I think it is essential for us to realize and state that these definitions are not based on any true knowledge of what a population or viable population for wolves is but rather, mostly a guess based upon the best information available. We should be willing to change our definition as new information is obtained. These definitions should not make or break wolf recovery or reintroductions" (USFWS 1994).

Some biologists' responses not only were subjective, but were affected by their perception of agency motivations. For example, the third and final question of the survey addressed the definition of a wolf population (not a viable population). Mark Boyce, who favored allowing natural dispersers to colonize the area, questioned whether the agency's definition of a wolf population was designed to allow the 10(j) experimental population designation to move forward. He writes, "if accepting your definition would imply that a population doesn't exist and therefore you have free reign to carry on with a release program, I would reject your definition." By contrast, Mike Phillips indicates that he would be likely to agree to any definition of a viable population if it meant that the recovery process would move forward. After agreeing with the Service's first definition, Phillips writes, "As a matter of fact, I'd support a revised Plan that presented smaller numbers for recovery goals…if such a revision increased the odds of getting wolves 'on the ground.'" However, Phillips also indicates that he believes greater numbers of

wolves than represented by the second definition would constitute "an even more viable population (higher probability of persistence)."

Other reviewers disagreed with either of the definitions. Jim Peek responded, "Aren't these numbers a bit *low* and the *time interval too short*?" (emphasis in original). John Theberge wrote, "30 breeding pairs is still well below the 1% rule which I believe is overly low itself. I think this population size is still too marginal to be considered viable. These definitions are inadequate." Mike Nelson responded, "There also appears to be agreement that 'several hundreds' of breeders are needed to ensure long-term evolutionary potential. The common value in the literature is $N_e = 500$ and that translates into the low thousands for a population size in wolves. By this criterion, the individual wolf populations as well as their metapopulation would not be evolutionarily viable."

c. Case histories

Third, the "case histories" used by the Service to support the recovery plan's goal were flawed. In their review, Fritts and Carbyn (1995) present a series of examples of small, isolated populations of wolves in order to make the case that a wolf population below that supported by the existing scientific literature could, in fact, persist.[6] Many of the populations presented as case studies, however, had not been isolated for more than 20-30 years and some of them experienced wide fluctuations in numbers including an extinction event on Coronation Island, Alaska, and a population crash of 75% on Isle Royale, Michigan in the early 1990s. Furthermore, most of the populations evaluated are either free of human persecution or occur in culturally and geographically different settings than the Rocky Mountains. None of the case histories lend any support to the

[6] These case histories were: Isle Royale National Park, Michigan; Riding Mountain National Park, Manitoba; Jasper National Park, Alberta; Kenai Peninsula, Alaska; Alexander Archipelago, Alaska; Coronation Island, Alaska; various European populations in Italy, Spain, Poland, and Scandinavia.

notion that a population of 60 wolves (i.e. 10 breeding pairs in each of 3 locations as defined in the 1987 recovery plan) in the Rocky Mountain region would be viable over a significant time period.

In short, the Service's 1994 evaluation provided little, if any support for the 1987 recovery plan's goals for the Northern Rocky Mountain. If anything, the 1994 evaluation identified the need for thousands of wolves in order for recovery to be achieved.

3. The Service's 2001 survey of its recovery goals identified significant scientific objections to its recovery criteria

The Service evaluated the recovery goals for a second time in 2001 through another opinion survey of biologists (Bangs 2002). Referred to as a "peer review," the survey, or opinion poll, identified significant scientific disagreement with variations of the Service's recovery goal of 10 breeding pairs in three separate recovery areas for three successive years, but the Service again ignored these concerns in favor of its own recovery targets. Given the numerous scientific opinions that strongly conflicted with the Service's plans, it is unclear why this review process failed to lead to a revision of the recovery plan for the Northern Rocky Mountain gray wolf or any significant change in its recovery goals.

Biologists were presented with three alternative definitions of a viable population and asked to rank the definitions in order of viability. The three definitions were all slight variations of the Service's goal of 10 breeding pairs in three separate areas for three successive years. Reviewers were also offered a fourth possibility of creating their own definition. A number of reviewers were highly critical of the survey's methodology. One reviewer described the presentation as "artificial and misleading" (Reed Noss). Another reviewer noted, "By limiting the choices to those 3 options approved by the

Service, plus a category of 'other', it may unfairly bias the results" (Brian Miller). As other reviewers pointed out, viability and introduction are not the same as recovery.

The survey also identified considerable dissent from a number of scientific experts. A common criticism was that the proposed recovery goals had no scientific basis. In fact, Brian Kelly, a U.S. Fish and Wildlife Service employee, was asked to review the recovery plans and concluded that "a definition of viability without quantify-able data to back it up is problematic and will be difficult to defend because it is subjective…Some reasonable attempt to model the dynamics of the N. Rockies population showing that 30 (breeding pairs)/300 (wolves) has a reasonable expectation to persist, is needed." Kelly continued by pointing out, "Survival/mortality rates, age at first breeding, fluctuations in prey numbers, among other factors, should be incorporated into the determination of whether a population is viable." He concluded that, "in the absence of such a quantitative assessment, it is subjective and conjectural to simply interpret 30/300 as meeting…population viability."

This sentiment was reflected in a number of other reviews. Mark Shaffer and Martin Smith noted that, "Despite the intense study wolves have received in this region, and the wealth of population data that must be available to the Service, the Service has presented no quantitative modeling of the dynamics of the existing populations…Such a modeling effort is essential to gauge the relative worth, from a population viability perspective, of the various definitions you have asked us to consider." Another reviewer, Robert Taylor, wrote, "The fact that the Fish and Wildlife Service has not had the vision to support such a (spatially explicit, individual-based) modeling exercise is not sufficient reason to force me to make wild guesses about the parameters of viability." Brian Miller

noted, “None of the definitions offered by the Service is calibrated from the probability, length of time, or specific conditions of survival by 30 breeding pairs of wolves. Unless we are given such information, we are being asked to choose among three ‘black boxes.’” Reed Noss wrote, “Viability is relative, not strictly yes or no…One must consider population growth rates, spatial distribution, and source-sink dynamics, among other factors…The recovery area and population goals need to be expanded.” Yet another reviewer noted that, “It may be generally inappropriate to conduct an opinion poll, even from experts, when no quantitative analyses have been conducted to assess the issues at hand” (John Vucetich).

In addition to excluding life history data, a number of reviewers noted that genetic problems were likely to become an issue without greater attention to connectivity. Gordon Haber noted that the proposed definitions “ignore underlying qualitative – behavioral and genetic – aspects of population biology.” Fred Allendorf reviewed the recovery plans with his conservation genetics class and concluded that “the recovery goal of at least 300 wolves is too small to avoid genetic problems in the foreseeable future….Therefore, a population of this size should not considered [sic] to be ‘recovered’….Thus, the recovery criteria need to require some gene flow into this population.” Dan Pletscher ranked the proposed plans, but added, “Without connectivity to Canada, this is unlikely to be viable.”

Dale Seip, a wildlife ecologist, noted during his review that, “Presumably, delisting is not going to result in some rampant slaughter of wolves. It would be useful to state the management consequences of delisting the species….If conditions have been suitable for wolves to increase over the past few years, so long as those conditions do not

drastically change, there is no major risk in delisting. However, if delisting would lead to drastic changes then there would be concern" (USFWS 2002). And finally, the Service's western gray wolf recovery coordinator, Ed Bangs, who implemented and evaluated the 2001 survey recently said about the recovery goal, "I, personally, think it is too low" (Morell 2008).

The Service's 2001 survey, or opinion poll, did not present any scientific data or justification for the proposed recovery goals. Nor do either of the 1994 or 2001 opinion polls constitute scientific justification for the recovery goals since opinion polls cannot be substituted for actual scientific data and modeling. Furthermore, both opinion polls identified significant scientific dissent and objection to the proposed recovery goals. Nevertheless, the Service categorically ignored these objections and has not revised the Northern Rocky Mountain gray wolf recovery plan since 1987. The Service's current descriptions of its demographic recovery standards similarly lack scientific justification.

4. Current recovery goals for the Northern Rocky Mountains ignores the best available science

As discussed in Part IV.A, above, the best available scientific literature clearly indicates that in order to establish a stable and persistent wolf population, wolf recovery targets must be far higher than those adopted by the Service for the Northern Rocky Mountains. Recent scientific evidence specific to the Northern Rocky Mountains confirms the need for more robust recovery goals. For example, vonHoldt et al. (2008) demonstrates that the wolves in the Greater Yellowstone region have been genetically isolated from other wolf populations in Montana and Idaho for the 10 years since their reintroduction. These new data indicate that the current population of 1,300 - 1,500 individuals distributed between three subpopulations is inadequate to ensure genetic

connectivity between the subpopulations. The authors further show that if this isolation persists, the wolves in the Greater Yellowstone region will experience reduced genetic variability due to inbreeding within the next several decades.

Clearly, the science of population viability estimates has advanced since the development of the Northern Rocky Mountain gray wolf recovery plan in 1987 and even since its reevaluation in 1994 and 2001. Although estimates at the time the recovery plans were crafted already pointed to the need for a larger number of wolves, developments since this time solidify the scientific conclusion that recovery goals for wolves should number in the thousands rather than the hundreds. Therefore, the Service's recovery plan for the Northern Rocky Mountain wolf is not consistent with the best available science and needs to be revised. At a minimum, current science indicates that in the Northern Rocky Mountain region alone, a viable population size of at least 2,500 - 5,000 individuals in at least three interconnected populations is required. Independently viable or connected populations should also be established in the Colorado/Utah area and in Oregon and Washington before this region can be considered to be recovered.

D. Southwest

The Southwestern region of the United States was previously occupied by a southern subset of gray wolves referred to as the Mexican wolf (*Canis lupus baylei*). Extirpated from the US in the 1970s, these wolves are smaller than the rest of the *Canis lupus* species and historically occurred over much of New Mexico, Arizona, and Texas. , A captive breeding program for the Mexican wolf needed to be established due to their near extinction in the wild. The Mexican wolf recovery plan (USFWS 1982) calls for

establishing a population of at least 100 wolves in a 5,000-square-mile area designated as the Blue Range Wolf Recovery Area (BRWRA) straddling the borders of New Mexico and Arizona. The recovery plan stated that a second proposed recovery area near White Sands, New Mexico could also be adopted, but would be expected to support only 20 wolves. This plan would reintroduce wolves into only a fraction of their historical range.

Reintroduction of the Mexican gray wolf into BRWRA was initiated in 1998 and wolves were expected to meet the recovery goal of 100 wolves by 2005. Ten years later, however, the reintroduction program is struggling to maintain even half of these numbers (USFWS 2008). As part of a 5-year review of the program, an Adaptive Management Oversight Committee (AMOC) was established. Among other recommended improvements, the AMOC recommended that the recovery goal of 100 wolves be treated instead as a 'population management objective,' not a recovery goal for delisting, stating that, "an updated recovery goal…has not yet been determined by a recovery team." (*See* Mexican Wolf Blue Range Adaptive Management Oversight Committee and Interagency Field Team 2005; p. 4). In August, 2007, the USFWS announced that it would evaluate amending the Mexican gray wolf reintroduction and recovery program. *See* "Endangered and Threatened Wildlife and Plants; Notice of Scoping Meetings and Intent To Prepare an Environmental Impact Statement and Socio-Economic Assessment for the Proposed Amendment of the Rule Establishing a Nonessential Experimental Population of the Arizona and New Mexico Population of the Gray Wolf ('Mexican Gray Wolf')", 72 Fed. Reg. 44065 (August 7, 2007).

As set forth in Part IV.A, above, the best available scientific literature clearly demonstrates that 100 wolves are entirely too few to establish a self-sustaining, viable

population in the BRWRA and would not constitute recovery of *Canis lupus*, even regionally. Similar to the recovery goals described in this petition for the Northeast United States and Rocky Mountain region, a recovery plan for gray wolves should include recovery goals for wolves in the Southwest United States that include several thousand individuals in multiple, connected populations, forming a metapopulation of sufficient size to ensure its genetic stability and ecological viability.

V. CONCLUSION

It is long past time for the Service to produce a recovery plan for the gray wolf, as listed, based on the best available science. The gray wolf is listed on the species level in the lower-48 states and the ESA is clear that it is on that level that a recovery plan must be produced. However, a national recovery plan for the gray wolf can and should contain regional recovery goals. The Service has already made some progress in thinking about these goals through the preparation of recovery plans for some regions. Serious revisions of the recovery plans are needed and expansion of recovery planning to more explicitly include other areas, such as the Northwest United States, is also crucial.

Accordingly, pursuant to section 4 of the ESA and section 553 of the APA, Petitioners formally request that the Service prepare a comprehensive recovery plan for the listed gray wolf species, *Canis lupus*, or, in the alternative, and that it revise its

existing wolf recovery plans in order to address the conservation needs of the species throughout its range and to update the recovery goals in light of the best available science.

February 20, 2008 Respectfully submitted,

By: _____
Sylvia Fallon, Ph.D.

NATURAL RESOURCES DEFENSE COUNCIL

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