A PETITION TO LIST THE WESTERN NORTH AMERICAN POPULATION OF GRAY WOLVES (*Canis lupus*) AS A DISTINCT POPULATION SEGMENT

Petition Submitted to the U.S. Secretary of Interior
Acting through the U.S. Fish and Wildlife Service
July 29, 2021

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Extirpated Shasta Pack *CDFW photo*

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August 10, 2021

Please note that we have clarified and corrected parts of the text of this petition with an addendum.

INTRODUCTION

Petitioners hereby submit to the U.S. Fish and Wildlife Service ("Service") a petition to promulgate a rule (16 U.S.C. §1533(b)(7)) for the Western Distinct Population Segment ("DPS") of gray wolves (*Canis lupus*), listing wolves as endangered under the Endangered Species Act ("ESA"), based on an abundance of scientific and commercial information. 16 U.S.C. § 1531(b).

Petitioners include Western Watersheds Project, Western Watersheds Project, Bad River Tribe, WildEarth Guardians, Protect the Wolves, Alliance for the Wild Rockies, Predator Defense, Footloose Montana, Colorado Wolf Alliance, Native Ecosystems Council, Western Wildlife Conservancy, Oceanic Preservation Society, Andean Tapir Fund, Kettle Range Conservation Group, Los Padres ForestWatch, Bozeman Broadband of Great Old Broads for Wilderness, Wyoming Untrapped, Environmental Protection Information Center, Klamath Forest Alliance, Northeast Oregon Ecosystems, Endangered Species Coalition, Yellowstone to Uintas Connection, National Wolfwatcher Coalition, Western Wildlife Outreach, San Luis Valley Ecosystem Council, Californians for Western Wilderness, Apex Protection Project, Nimiipuu Protecting the Environment, EcoFlight, Wild Equid League of Colorado, Farmer Frog, Klamath-Siskiyou Wildlands Center, Dailypitchfork.org, Fleet of Angels, Great Old Broads for Wilderness, Animal Wellness Action, Center for a Humane Economy, Animal Wellness Foundation, The Rewilding Institute, Montana Wilderness Education School, Friends of the Bitterroot, Project Coyote, Trap Free Montana Public Lands, Wolves of the Rockies, Friends of the Wild Swan, Born Free USA, Colorado Wolf and Wildlife Center, Factory Farming Awareness Coalition, Wyoming Wildlife Advocates, Friends of the Clearwater, Plan B to Save Wolves, Rocky Mountain Wild, Gallatin Wildlife Association, Friends of the Earth, Alberta Wilderness Association, Eastern Coyote/Coywolf Research, American Wild Horse Campaign, Equine Welfare Alliance, Friends of Animals, Conservation Congress, The International Wildlife Coexistence Network, Biophilia Foundation, Nevada Wildlife Alliance, Wild Arizona, Wilderness Watch, New Mexico Sportsmen, Rio Grande Indivisible – New Mexico, Whispering Winds Animal Sanctuary, Sheep Mountain Alliance, and Wolves Offered Life and Friendship (WOLF). Collectively, we represent millions of Americans who seek to see gray wolves fully recovered and protected across the western United States, and who believe that current management of the species is insufficient to prevent a second wild extinction. This petition and its findings are in accord with calls by Indigenous peoples to protect the gray wolf nationwide under the Endangered Species Act,[1] and the recommendations of 400 prominent scientists who have called on this administration to provide emergency protections for wolves in the Northern Rockies.[2]

[1] The international Indigenous treaty titled, 'The Wolf: A Treaty of Cultural and Environmental Survival,' as well as individual tribes' formal statement on wolf listing, is found online at https://www.globalindigenouscouncil.com/wolf-treaty; see also https://www.youtube.com/watch?v=8ZWmfMK6bfc for a short film by the Global Indigenous Council calling for Sec. Haaland to re-list the wolf and meet with a tribal delegation on the topic.

[2] https://wildlifecoexistence.org/news/emergency-endangered-species-act-protections-needed-for-northern-rockies-wolves/

Specifically, we seek ESA "endangered" protection for gray wolves in Idaho, Montana, Wyoming, Utah, Oregon, Washington, Colorado, California, Nevada, and northern Arizona.[3] Each of these states are part of the current range of wolves, because wolves currently reside or were recently documented in each of these states. These wolves are at risk of extinction throughout all of their range, and unquestionably are at risk of immediate extinction in significant portions of their range, as explained below. 16 U.S.C. § 1532(6); *see also* 16 U.S.C. § 1533(a)(1). The re-listing of these wolves as a Distinct Population Segment should be a priority for prompt action because new laws in Idaho and Montana, and longstanding wolf management in Wyoming, are intended to reduce gray wolf populations in the core wolf recovery zone by 85 to 90 percent by incentivizing wolf killing and authorizing use of new methods to kill wolves. This decimation could happen in a very short span of time, several years or less. This poses a significant near-term risk to the core of the Distinct Population Segment, particularly when coupled with the likelihood of stochastic events like disease outbreaks. The wolf management plans of these three states constitute inadequate regulatory mechanisms, an important failure under the Service's Policy for Effective Conservation Efforts that weighs in favor of listing. In the absence of minimum viable population sizes in California, Nevada, Utah, Colorado, and northern Arizona, as well as in suitable wolf habitats in Washington and Oregon west of the Cascade Range, extinction of wolves in these areas is a very strong likelihood in the immediate future.

I. THE SERVICE IS LEGALLY OBLIGATED TO CONSIDER WHETHER WESTERN GRAY WOLVES ARE ENDANGERED.

The Service is required to make listing determinations "solely on the basis of the best scientific and commercial data available to [it] after conducting a review of the status of the species and after taking into account" existing efforts to protect the species 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(b). "The obvious purpose of [this requirement] is to ensure that the ESA not be implemented haphazardly, on the basis of speculation or surmise." *Bennett v. Spear*, 117 S.Ct. 1154, 1168 (1997). "Reliance upon the best available scientific data, as opposed to requiring absolute scientific certainty, 'is in keeping with congressional intent' that an agency 'take preventive measures' before a species is 'conclusively' headed for extinction." *Ctr. for Biological Diversity v. Lohn*, 296 F. Supp. 2d 1223, 1236 (W.D. Wash. 2003) (emphasis in original).

After receiving a petition to list a species, the Secretary is required to determine "whether the petition presents substantial scientific or commercial information indicating that the petitioned action may be warranted." 16 U.S.C. § 1533(b)(3)(A). Such a finding is termed a "90-day finding." A "positive" 90-day finding leads to a status review and a determination whether the species will be listed, to be completed within twelve months. 16 U.S.C. § 1533(b)(3)(B). A "negative" initial finding ends the listing process, and the ESA authorizes judicial review of such a finding. 16 U.S.C. § 1533(b)(3)(C)(ii). The applicable regulations define "substantial information," for purposes of consideration of petitions, as "that amount of information that

[3] This petition does not address Mexican gray wolves (*C.l. baileyi*) currently only present in Arizona and New Mexico.

would lead a reasonable person to believe that the measure proposed in the petition may be warranted." 50 C.F.R. § 424.14(b)(1).

As the language of both the statute and the regulations make clear, the ESA does not require "conclusive evidence of a high probability of species extinction" in order to support a positive 90-day finding. *Ctr. for Biological Diversity v. Morgenweck*, 351 F. Supp. 2d 1137, 1140 (D. Colo. 2004). "This standard is in contrast to the 'best scientific and commercial data' standard applied to actually listing a species and does not require conclusive evidence." *W. Watersheds Project v. Norton,* No. CV 06-00127S-EJL, 2007 WL 2827375, at *5 (D. Idaho Sept. 26, 2007). Instead, it is a "lesser standard by which a petitioner must simply show that the substantial information in the Petition demonstrates that listing of the species *may be warranted.*" *Morgenweck*, 351 F. Supp. 2d at 1141 (emphasis added) (quoting 16 U.S.C. § 1533(b)(3)(A)). *See also Ctr. for Biological Diversity v. Kempthorne*, No. C 06-04186 WHA, 2007 WL 163244, at *3 (N.D. Cal. Jan. 19, 2007) (holding that in issuing negative 90-day findings for two species of salamander, the Service "once again" erroneously applied "a more stringent standard" than that of the reasonable person).

In 2003, the U.S. Fish and Wildlife Service reclassified wolves in the coterminous United States into three Distinct Population Segments ("DPSs"): a Western DPS, an Eastern DPS, and a Southwestern (Mexican wolf, *Canis lupus baileyi*) DPS, and de-listed wolves in the Western DPS. 68 Fed. Reg. 15804. This Rule made a finding that the Western DPS satisfied the discreteness and significance criteria set for Distinct Population Segments under the ESA. However, this Rule was vacated based on a legal challenge. A subsequent 2011 Rule designating a Northern Rocky Mountain DPS (consisting of Montana, Wyoming, and Idaho only) was similarly vacated by the courts, and presently wolves in western North America are not designated as part of any Distinct Population Segment.

In recent years, wolves in the western United States have been managed in a disjointed way, with populations divided based on state lines, and sometimes regions within states, as to whether or not they were protected under the ESA. Even prior to the 2020 nationwide delisting, wolves had been delisted for a number of years in Wyoming, Montana, and Idaho, an outcome based on a budget rider advanced by Senators Tester and Simpson in 2011 that required the Service to re-issue the 2009 Final Rule for wolves without regard to whether that rule was legally compliant otherwise, and without being subject to court review. Wolves were delisted in northeastern Utah, north of Interstate 80 and east of Interstate 84, but remained listed outside that limited geography. In Washington state, wolves were de-listed east of U.S. Highway 97, State Highway 17, and U.S. Highway 395, and listed as endangered west of these highways. In Oregon, In Washington state, wolves were de-listed east of U.S. Highway 95, State Highway 78, and U.S. 395, and endangered west of these roads. These political boundaries arbitrarily divided habitats used by individual wolves and packs into protected and unprotected status, depending on where these highly mobile animals roamed.

As the evidence provided in this petition demonstrates, gray wolves in the western United States merit urgent consideration and ESA protection.

II. GRAY WOLVES ARE IN NEED OF ESA PROTECTION

A. Legal history of gray wolves and the ESA

Although information about the gray wolf's historic occupancy of North America and its extirpation from much of its range in the coterminous United States — as well as the contentious history surrounding wolf reintroduction to Yellowstone National Park and central Idaho and the series of politically-charged efforts to remove it from the endangered species list — are well known to the Service, we briefly summarize that history here.

The gray wolf (*Canis lupus*) historically occurred throughout most of the lower 48 states. But as the Service has explained:

> European settlers in North America and their cultures often had superstitions and fears of wolves. Their attitudes, coupled with perceived and real conflicts between wolves and human activities along the frontier, led to widespread persecution of wolves. Poisons, trapping, and shooting-spurred by Federal, State, and local government bounties-resulted in extirpation of this once widespread species from more than 95 percent of its range in the 48 conterminous States.

2003 Wolf Downlisting Rule, 68 Fed. Reg. 15805 (Apr. 1, 2003).

When the Endangered Species Act was first passed in 1973, what was then identified as the northern Rocky Mountain wolf (*C. l. irremotus*) was listed as endangered. Amendments to Lists of Endangered Fish and Wildlife, 38 Fed. Reg. 14678 (June 4, 1973). In 1978, with a changing understanding of wolf taxonomy, the gray wolf was listed as endangered at a species level throughout the United States and Mexico, except for the wolf population in Minnesota, which was classified as threatened. 8 Fed. Reg. at 35666; *see also id*. at 35670 (discussing changes in taxonomy classifications).

By the time they received federal protections, wolves had largely been extirpated from the northern Rockies; reproducing populations were not known to exist in Idaho or Wyoming, and only a few dozen wolves inhabited northwestern Montana, in and around Glacier National Park. *See* Wolf Reintroduction Rule, 59 Fed. Reg. 60253 (Nov. 22, 1994). Between 1980 and 1987, the Service wrote a recovery plan for the Northern Rocky Mountain gray wolf that "recommended a combination of natural recovery and reintroduction be used to recover wolves in the area around Yellowstone National Park …north to the Canadian border, including central Idaho." *See* Wolf Reintroduction Rule, 59 Fed. Reg. 60253 (Nov. 22, 1994). The 1987 revised recovery plan defined "recovery" as securing and maintaining a minimum of 10 breeding pairs in each of three recovery areas—Yellowstone, Central Idaho, and Northwest Montana—for three years. *See* 1987 Wolf Recovery Plan at 15. The Service separately developed recovery plans for what were then recognized as the eastern timber wolf and the Mexican wolf. *See* 2000 Proposed Wolf Delisting Rule, 65 Fed. Reg. 43454 (July 13, 2000).

However, because there were no reproducing wolf populations in Yellowstone or central Idaho, the Service decided in 1994 to reintroduce "nonessential, experimental" populations of wolves

into those two core protected areas. 59 Fed. Reg. 60252-60266. While reiterating the need for geographically distributed wolf populations, the 1994 Environmental Impact Statement (EIS) supporting wolf reintroduction characterized the 1987 recovery plan's 10 breeding pair recovery goal, as "at best, a minimum recovery goal," warranting "modifications…on the basis of more recent information about wolf distribution, connectivity, and numbers." 74 Fed. Reg. at 15130. The Service redefined "breeding pair" as "an adult male and an adult female wolf that have produced at least two pups that survived until December 31 of the year of their birth, during the previous breeding season." *Id.* It redefined a recovered wolf population for the northern Rockies as "10 breeding pairs of wolves in each of three areas for three successive years with some level of movement between areas'' and "determined that a metapopulation of this size and distribution among the three areas of core suitable habitat in the NRM DPS would result in a wolf population that would fully achieve our recovery objectives." *Id.*

The Service carried out wolf reintroduction between 1995 and 1996, and "slow" wolf population expansion began. *See* 2000 Proposed Wolf Delisting Rule, 65 Fed. Reg. 43457 (July 13, 2000. By the late 1990s, wolves from Idaho and Montana were already dispersing into eastern Washington and eastern Oregon, but they did not establish populations there during this period. *Id*. at 43458.

In 2000, the Service proposed to downlist wolves in the northern Rockies (renamed the "Western DPS" and expanded to include other western states) to threatened species status because it anticipated that "[a]chieving the Rocky Mountain Plan's delisting goal of 10 breeding packs in each of the 3 recovery areas (about 300 adult wolves) for a minimum of 3 successive years is expected to be achieved by 2002 or 2003." *Id.* The final 2003 rule established three DPSs: the Western DPS (downlisted to threatened), the Eastern DPS which included the Western Great Lakes (downlisted to threatened), and the Southwestern DPS (maintained as endangered). 68 Fed. Reg. 15804 (Apr. 1, 2003). This rule was overturned by the courts because of the unlawful decision to downlist wolves upon their recovery in small portions of the geographically vast new DPSs while the species' status was precarious or extirpated in other large swaths of the DPSs. *Defs. of Wildlife v. Sec'y, U.S. Dep't of the Interior*, 354 F. Supp. 2d 1156, 1171 (D. Or. 2005); *see also Nat'l Wildlife Fed'n v. Norton*, 386 F. Supp. 2d 553, 565 (D. Vt. 2005) ("The FWS simply cannot downlist or delist an area that it previously determined warrants an endangered listing because it "lumps together" a core population with a low to non-existent population outside of the core area.")

In response, the Service drew narrower DPS boundaries and in 2007 the Service issued a new rule to delist wolves in the "western Great Lakes." 2007 Western Great Lakes Delisting Rule, 72 Fed. Reg. 6052 (Feb. 8, 2007). This rule was also overturned. *Humane Soc'y v. Kempthorne*, 579 F. Supp. 2d 7 (D.D.C. 2008).

In 2008, the Service issued a rule establishing and delisting a Northern Rocky Mountains DPS of gray wolves that encompassed the eastern third of Washington and Oregon, a small part of northern Utah, and all of Montana, Idaho, and Wyoming. *See* 2008 Northern Rocky Mountains Delisting Rule, 73 Fed. Reg. 10514 (Feb. 27, 2008). This rule was subsequently enjoined in large part because the Service had failed to consider a Wyoming law that treated wolves as predatory

wildlife that could be shot on sight in most of the state. *Defenders of Wildlife v. Hall*, 565 F. Supp. 2d 1160 (D. Mont. 2008)

After the 2007-2008 delisting rules were enjoined or set aside by federal courts, the Service issued new rules delisting wolves in the Northern Rockies and Western Great Lakes in 2009 and 2011. *See* 74 Fed. Reg. 15070 (Apr. 2, 2009) (2009 Great Lakes delisting rule); 74 Fed. Reg. 15123 (Apr. 2, 2009) (2009 Northern Rockies delisting rule); 76 Fed. Reg. 81,666 (Dec. 28, 2011) (2011 Great Lakes delisting rule). Importantly, the 2009 Northern Rockies delisting rule relied on maintaining a metapopulation of greater than 600 wolves in the Northern Rockies:

> To ensure that the NRM wolf population always exceeds the recovery goal of 30 breeding pairs and 300 wolves, wolves in each State shall be managed for at least 15 breeding pairs and at least 150 wolves in mid-winter. This and other steps, including human assisted migration management if required (discussed below), will maintain the NRM DPS's current metapopulation structure. Further buffering our minimum recovery goal is the fact that Service data since 1986 indicate that, within the NRM DPS, each breeding pair has corresponded to 14 wolves in the overall NRM wolf population in mid-winter (including many wolves that travel outside these recognized breeding pairs) (Service et al. 2008, Table 4). **Thus, managing for 15 breeding pairs per State will result in substantially more than 150 wolves in each State (>600 in the NRM).**

74 Fed. Reg. at 15132, emphasis added.

Each successive delisting new rule was vacated by a federal court or abandoned by the Service. *See Humane Soc'y v. Jewell*, 76 F. Supp. 3d 69, 111-14 (D.D.C. 2014) (vacating 2011 western Great Lakes delisting rule); *Defenders of Wildlife v. Salazar*, 729 F. Supp. 2d 1207, 1221-22 (D. Mont. 2010) (vacated 2009 Northern Rockies delisting rule); *Humane Society of the U.S. v. Salazar*, No. 09–1092, Docket Entry No. 27 (D.D.C. July 2, 2009) (Service vacates 2009 Great Lakes delisting rule as promulgated without proper process). In 2012, the Service issued a rule to delist wolves in Wyoming and that rule was also set side by the District of D.C. but later revived by the D.C. Circuit. *See Defenders of Wildlife v. Jewell*, 68 F. Supp. 3d 193 (2014) *reversed in part Defenders of Wildlife v. Zinke*, 849 F.3d 1077 (D.C. Cir. 2017). The Service formally "reinstated" the Wyoming rule on May 1, 2017. 2017 Wyoming Wolf Delisting Reinstatement, 82 Fed. Reg. 20284 (May 1, 2017).

On April 15, 2011 Congress directed the Service to reissue the unlawful 2009 Northern Rockies delisting rule, which the Service did the following month (2011 Delisting Rule, 76 Fed. Reg. 25590-25592 (May 5, 2011)) and which the courts later upheld. *All. for the Wild Rockies v. Salazar*, 672 F.3d 1170, 1175 (9th Cir. 2012).

In 2020, the Service issued a rule delisting all remaining gray wolf populations (except *C.l. baileyi*) in the lower 48 states. *See* 2020 Nationwide Wolf Delisting Rule, 85 Fed. Reg. 60780 (Nov. 3, 2020)

B. Delisted gray wolves and state management in the West

Virtually as soon as ESA protections were removed from the northern Rockies DPS the states of Idaho, Montana, and Wyoming began instituting rules and policies aimed at killing increasing numbers wolves. Thus far, none of the other states subject to delisting in 2011 or 2020 have opened trophy hunting seasons for wolves. (Note that these 'legal' mortalities are in addition to illegal mortalities (*e.g.* wolf poaching) that continue to adversely affect wolf populations, as described below in the sections on threats.)

1. Idaho

Immediately following the 2009 federal delisting, Idaho's state fish and game commission instituted a hunting and trapping season, during which 188 wolves were killed during the first year.[4] Recreational wolf-killing was briefly suspended while wolves were returned to ESA protection, but following Congressional delisting in 2011, the commission directed the Idaho Department of Fish and Game (IDFG) to manage wolves as big game animals, under a wolf management plan written by the Idaho Legislature in 2002 that allowed IDFG to manage for as few as 15 breeding pairs and only 150 wolves.[5] In 2020, the commission adopted 11-month to year-round wolf hunting seasons across most of the state.[6]

The Idaho Legislature has vigorously supported and promoted wolf-killing. In 2014, the Idaho Legislature created the Wolf Depredation Control Board, a special fund for killing wolves, to which it has earmarked over half a million dollars every year since except for one. *See* Idaho Code § 22-5301. Powerful legislators, including then-Lieutenant Governor Brad Little (a rancher himself) have attended fundraising banquets held by the Foundation for Wildlife Management—a nonprofit that pays wolf bounties to trappers of up to $500-$1000 per wolf.[7] In 2021, the IDFG Commission awarded the Foundation for Wildlife Management $44,220 in "Challenge Grant" funding to support these bounties.[8] Also in 2021, the Idaho Legislature passed, and Governor Little signed into law S. 1211—a law that allows wolves to be killed by all methods used to kill coyotes, including night hunting, pursuit using dogs, and other methods; authorizes year-round wolf trapping on private lands; and increases the Wolf Depredation Control Board's budget to over $800,000 annually.[9]

Between 2011 and spring of 2021, nearly 4,500 wolves were killed in Idaho. Figure 1. Records obtained from IDFG showed that pups between 16 and 18 pounds were killed for "stalking" and one of the pup carcasses had a damaged occipital lobe, suggesting it may have been beaten; they

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[4] https://idfg.idaho.gov/press/idahos-first-wolf-hunt-over
[5] *See* Idaho Legislative Wolf Oversight Committee as amended by the 56th Idaho Legislature, Idaho Wolf Conservation and Management Plan 5 (Mar. 2002).
[6] Nicole Blanchard, Idaho Fish and Game approves year-round wolf hunts after weighing over 27,000 comments, Idaho Statesman (Feb. 21, 2020)
[7] *See* Amanda Peacher, State of Idaho Funds Controversial Wolf Bounty Program (Mar. 28, 2019) available at https://www.boisestatepublicradio.org/environment/2019-03-28/state-of-idaho-funds-controversial-wolf-bounty-program.
[8] *See* https://www.foundationforwildlifemanagement.org/IDFG-Grant.
[9] *See* S1211 (attached).

also showed numerous wolves captured that had shattered teeth from biting traps or only three legs after losing limbs in traps.

1. Montana

Montana has largely followed Idaho's lead in allowing excessive take of wolves. Montana authorized 75 wolves to be killed following the 2009 delisting, and then when wolves were delisted again in 2011, Montana authorized 220 wolves to be killed. Between 2009 and 2020 Wildlife Services, along with hunters and trappers, have reported killing at least 2,400 wolves in Montana. *See* Figure 2.

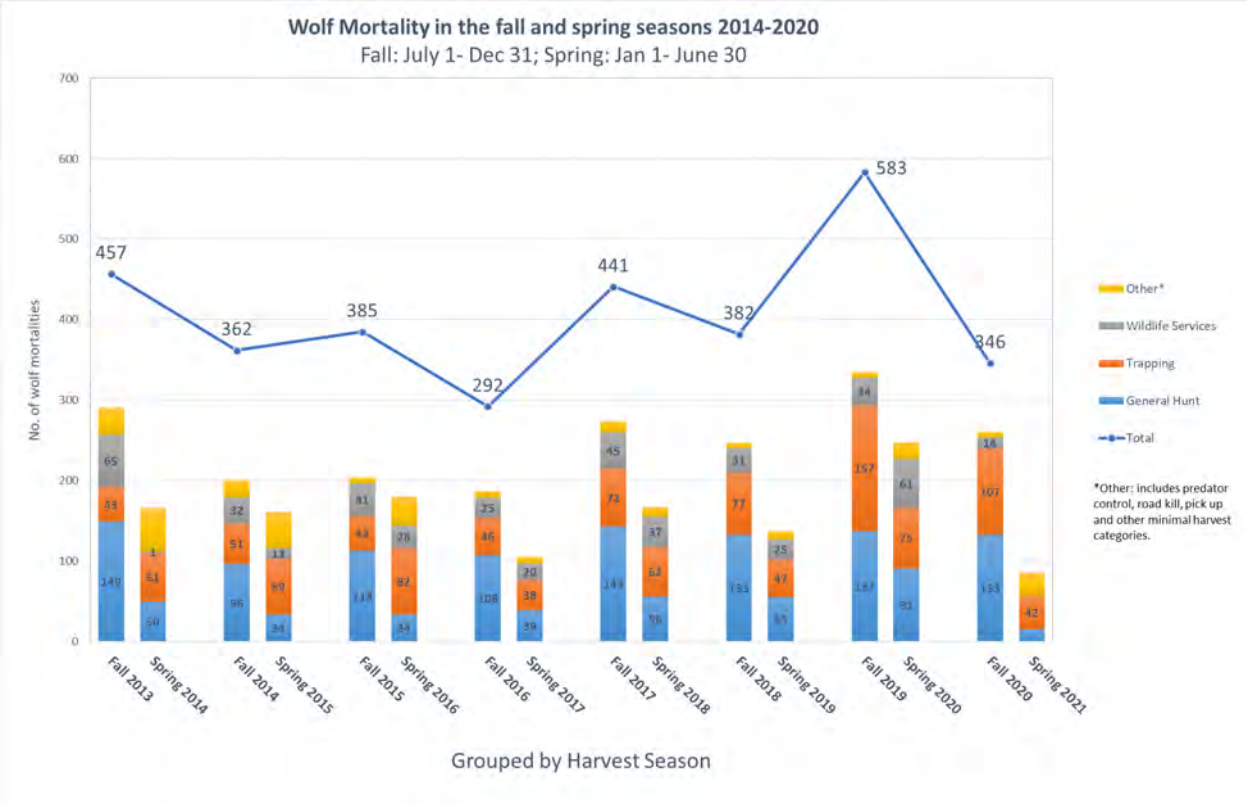

Figure 1. Wolf mortality in Idaho, 2013-2021.

Since delisting, the hunting regulations in the state have become increasingly lax. In 2012, Montana allowed the trapping of wolves for the first time, allowed each person to purchase up to three wolf licenses, removed the statewide quota, and extended the hunting season. In 2013, the bag limit was increased to allow each person to kill up to five wolves via any combination of hunting and trapping. The cost of a wolf license has decreased from $19 to $12 for a resident license and $350 to $50 for a nonresident license between 2011 and 2020.

In 2021, four new laws targeting wolves were passed, in an effort to reduce the state's wolf population by 85% to the minimum floor of 15 breeding pairs or 150 wolves.

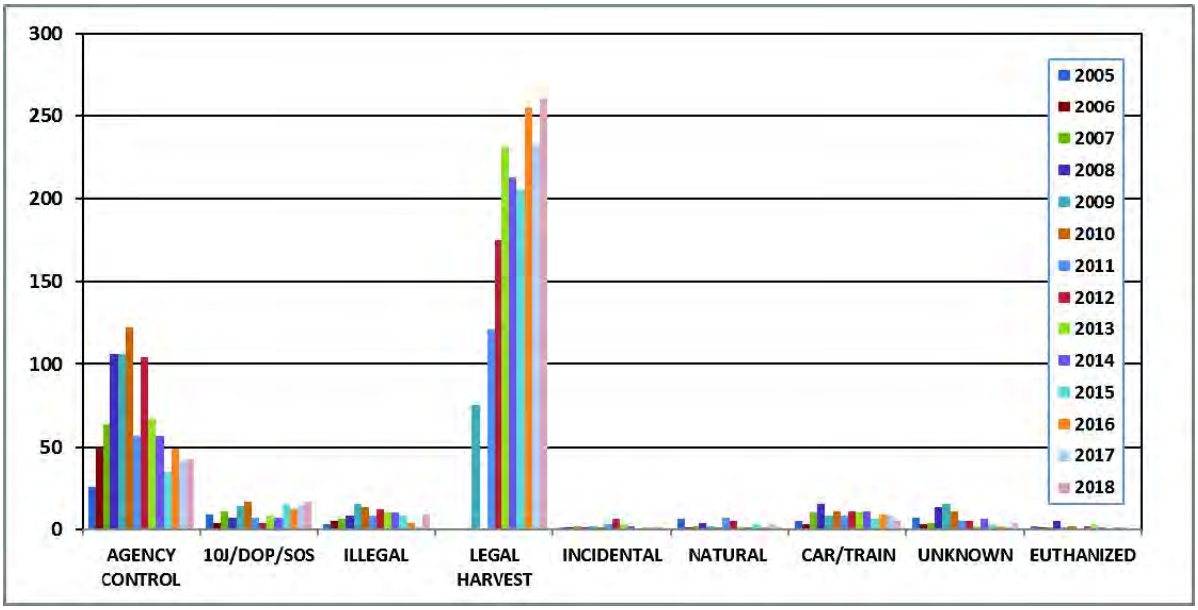

Figure 2. Wolf mortality in Montana between 2005 and 2018 (Inman et al. 2019).

2. Wyoming

In accordance with the "Wyoming Gray Wolf Management Plan," Wyoming's wolves are classified as a "predatory animal" throughout 85 percent of the state and may be shot on sight without bag limits, hunting license requirements, or limits on methods of take. The only requirement is notification to the Wyoming Department of Game and Fish within ten days.

Wolves are managed as game animals in a "Trophy Zone" in the northwestern corner of the state, primarily within the wilderness areas adjoining Yellowstone and Grand Teton National Parks. *See* 77 Fed. Reg. at 55530. Trophy Zone hunts are subject to bag limits and hunting seasons; in 2020, a total of 31 of approximately 147 total wolves in this area were killed (WGFD et al. 2020).

Wyoming never committed to maintain 150 wolves and 15 breeding pairs as other states did, and instead manages only for an "adequate buffer" above the minimal 10 breeding pairs/100 wolves required to avoid relisting. 77 Fed. Reg.at 55535. In 2018, the Wyoming wolf population in the trophy zone declined below 15 breeding pairs and Wyoming elected to rein in wolf quotas to increase the state's wolf population to 160 wolves in 2019.[10]

C. Basis of the DPS

Wolf populations in the western United States are not currently identified within Distinct Population Segments ("DPSs"). Wolves in the western continental United States are distinguishable on a genetic basis from *C. l. baileyi,* and based on mitochondrial DNA, genetic partitioning is discernible between the Northern Rocky Mountain wolves, characteristic of drier

[10] Urbigkit, C. 2019. " WY Wolf Population Drops 18%, Pinedale Online, 21 Apr. 2019; Koshmrl, M. Wyoming Reels in Wolf Hunting Quotas, Jackson Hole Daily, 5 June 2019.

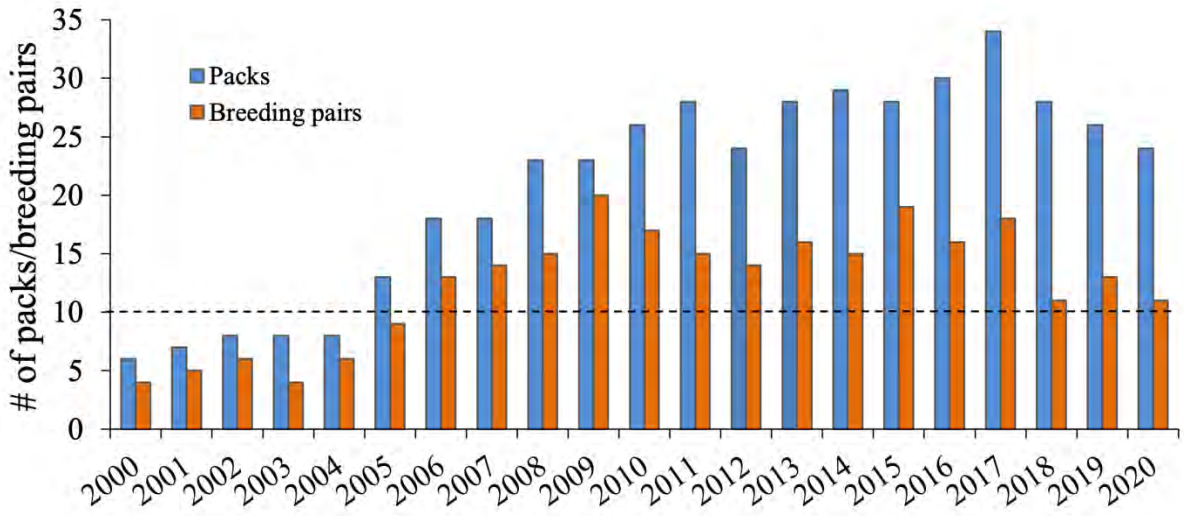

Figure 3. Wolf packs and breeding pairs in the Wyoming Trophy Game Management Area (WGFD et al. 2020).

interior habitats, and coastal rainforest wolves of British Columbia. While coastal wolves are genetically distinct (Muñoz-Fuentes et al. 2009, Weckworth et al. 2010), continental wolf populations in North America are heavily mixed (Weckworth et al. 2010). The Washington wolf population is an admixture of Northern Rocky Mountains and coastal rainforest wolves, while Oregon wolves were exclusively derived from Northern Rocky Mountain breeding stock (Hendricks et al. 2019). Rocky Mountain wolves provided the founder individuals for both populations.

Wolves are capable of dispersals in excess of 1,000 km in straight-line distance (e.g., Wabakken et al. 2007). In the western United States, Wolf OR-93 originated south of Mount Hood in Oregon, as part of the White River Pack, and traveled southward as far as San Luis Obispo County in California between January 30 and April 5, a travel distance of 935 air miles (CDFW 2021b). Oakleaf et al. (2006) identified corridors of suitable habitat likely to enable wolf colonization from the northern Rocky Mountains into Washington and Oregon. Habitat modeling by Carroll et al. (2012) shows that habitat connectivity is continuous between northern Idaho and Montana, and Washington and Oregon. Jimenez et al. (2017) documented wolf dispersal from the Montana/Idaho/Wyoming area into Utah, Colorado, Oregon, and Washington between 1993 and 2008 based on radio-collar data. Multiple collared wolves originating in northeastern Oregon have been recorded in northern California (CDFW 2021b). Taken together, this information indicates that wolves across the western continental United States are one single large metapopulation, and do not support the differential ESA status between eastern Washington and Oregon and the western parts of these states, or between northeastern Utah and the remainder of that state (or indeed elsewhere in the DPS region).

The population of wolves in the western United States is, however, discrete from upper Midwest wolf populations due to spatial isolation. Because agricultural land cover, road density, and/or private land ownership strongly discourage wolf colonization (Mladenoff et al. 1999, Oakleaf et al. 2006), the Great Plains ecoregion is effectively a barrier to wolf colonization (although perhaps permeable to occasional dispersal of individuals) that separates western wolves from

Midwest wolf populations, rendering the western population discrete. Modeling of occupied wolf habitat indicates that the prairie region, with its intensive agricultural development, has indeed become a barrier to wolf colonization (Mladenoff et al. 2009). There is strong genetic evidence of a separation between eastern wolves (Minnesota, Quebec, and western Ontario) from the western wolf population (Geffen et al. 2004).

The proposed Western DPS of gray wolves is significant because it occupies a large swath of gray wolves' geographic range, representing the westernmost and southernmost extent of gray wolf range in the coterminous United States. Individual wolves from this DPS have ranged as far south as San Luis Obispo County, California, and the North Rim of the Grand Canyon. Breeding activity has been recorded as far south as northern Colorado (in June 2021), and as far west as the Lassen National Forest in the northern Sierra Nevada of California, and the Rogue River watershed in the Oregon Cascades.

The DPS is also economically significant. The return of wolves to Yellowstone National Park has sparked tourist expenditures directly attributable to wolves that, as of 2005, was contributing $35.5 million annually to the local economies of Wyoming, Montana, and Idaho (Duffield et al. 2008).

The proposed Western DPS of gray wolves is important from an ecological standpoint by virtue of the fact that uniquely among wolves it occupies a number of ecosystems in the coterminous United States. These ecosystems include Rocky Mountain coniferous forest (dominated by Douglas fir, subalpine fir, Englemann spruce, and ponderosa pine, forest types not found elsewhere in the occupied range of the gray wolf in the coterminous United States), sagebrush steppe, shortgrass prairie, coastal rainforest and coniferous forest, and bunchgrass prairie. Each of these ecosystem types represent unique communities of plant and animal life which evolved with the gray wolf, and which are enhanced by the restoration of healthy wolf populations. In addition, a number of ungulate prey species and subspecies that evolved with the wolf are found only within the occupied and historic range of the Western DPS of gray wolves. These include the Shiras moose (*Alces alces shirasi*), Rocky Mountain elk (*Cervus canadensis nelsoni*), Roosevelt elk (*Cervus candensis roosevelti*), tule elk (*Cervus canadensis nannodes*), mule deer (*Odocoileus hemonius*), pronghorn (*Antilocapra americana*), Rocky Mountain bighorn sheep (*Ovis canadensis canadensis*), California bighorn sheep (*Ovis canadensis sierrae*), desert bighorn sheep (*Ovis candensis nelsoni*), and mountain goat (*Oreamnos americanus*). In addition, wild horses (*Equus caballus ferus*) occur sympatrically (currently or potentially) with wolves only within the occupied and historic range of the Western DPS of the gray wolf. Each of these ungulates is a potential prey species for the gray wolf, and has unique behavioral adaptations and demographic responses that are only expressed in the presence of gray wolves.

The recovery of gray wolves within parts of the Western DPS historic range will uniquely restore natural predator-prey relationships for each of these species. Wolves' return triggers cascading ecological shifts toward increased bird and mammalian diversity, dampened population fluctuations of prey species, and changed patterns of vegetation; wolves have been described as a keystone species (Smith and Peterson 2021). The restoration of wolves to Yellowstone National Park has resulted in trophic cascades (Ripple and Beschta 2009) derived from an "ecology of fear" and changes in herbivore distribution and movements (Brown et al. 1999, Laundré et al.

2001, Ripple and Beschta 2004, Fortin et al. 2005, Mao et al. 2005, Halofsky and Ripple 2008a, White et al. 2012). Wolf reintroduction in Yellowstone and surroundings has been linked to rebounds in aspen (Ripple and Beschta 2003, Ripple and Beschta 2007, Halofsky and Ripple 2008, Painter et al. 2012, 2015, Beschta et al. 2018), cottonwoods (Beschta 2003, 2005, Beschta and Ripple 2015), willows (Ripple and Beschta 2005, Ripple and Beschta 2006, Beschta and Ripple 2010b), alders (Ripple et al. 2015a), and berry-producing shrubs (Beschta and Ripple 2012b, Ripple et al. 2015b). Rebound of woody plants has increased numbers of songbirds (Baril et al. 2011), had a significant effect on cavity-nesting birds (Hollenbeck and Ripple 2008), and is partly responsible for increases in beavers and bison (Ripple and Beschta 2012). Wolf effects on numbers and distribution of coyotes resulted in increases in pronghorn fawn survival (Berger et al. 2008) and rodent populations (Miller et al. 2010). The ecological effects of improved riparian shrub vigor and abundance (Beschta and Ripple 2016), and conversely, the previous absence of wolves, have led to significant changes in stream morphology (Beschta and Ripple 2006, Wolf et al. 2007, Beschta and Ripple 2012a). Similar trophic cascades have been demonstrated for Mexican wolves and aspens in New Mexico (Beschta and Ripple 2010a), for gray wolves and soil productivity and carbon cycling on Isle Royale and in Yellowstone National Park (Wilmers and Schmitz 2016), for gray wolves and browse species in Wisconsin (Bouchard et al. 2013), between gray wolves and aspens in Banff National Park in Canada (Hebblewhite et al. 2005), and between gray wolves and tree regeneration in the Scottish highlands (Manning et al. 2009). While a handful of studies (Creel and Christianson 2009, Kaufman et al. 2010, Kimble et al. 2011) contest these findings, the overwhelming majority of studies show significant results supporting the trophic cascade hypothesis. In the final analysis, the ecological significance of returning healthy wolf populations to all of the western DPS states is potentially enormous.

The loss of gray wolves from the western United States has created a significant gap in the species' range, and the current absence of viable breeding populations in the Southern Rockies, Great Basin, Sierra Nevada, Coast Ranges, and Colorado Plateau perpetuates that gap. The greater Yellowstone area, along with the mountains of central Idaho, offers the potential for the largest wolf population in the United States (Carroll et al. 2006), and, at least prior to the implementation of state legislation in Idaho and Montana (enacted in 2021), this three-state area held the largest wolf population west of the Great Plains. Maintaining multiple, secure, interconnected populations of wolves is important for conserving genetically significant ecotypes that contribute toward the resilience of the species as a whole (Carroll et al. 2021). The planned significant reduction of this core population clearly merits the intervention of federal protection. The Service has already effectively agreed with our assertion that a Western DPS meets significance criteria, stating in relevant part that the loss of this DPS "would clearly produce huge gaps in current gray wolf distribution in the 48 States." 68 Fed. Reg. 15819.

III. JUSTIFICATION FOR LISTING/ CONSERVATION STATUS

As noted, a species (or DPS) is "endangered" species if it is "in danger of extinction throughout all or a significant portion of its range," and it is "threatened" if it "is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range." 16 U.S.C. § 1532(6), (20). The Service may find a species is endangered based upon any of the following factors:

A. The present or threatened destruction, modification, or curtailment of its 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 its continued existence.

50 C.F.R. § 424.11.

The Western DPS of gray wolves faces immediate threat of extinction across all or a significant portion of its range under each criterion. In the western coterminous United States, gray wolves are below viable population levels and functionally extirpated over a significant portion of their range. Wolves have been documented in Arizona, Utah, and Nevada, but there are no breeding populations in these states. Colorado had its first documented instance of successful wolf breeding in the wild in 2021,[11] while California currently has three groups of wolves; neither state can reasonably claim to have viable populations as of yet. In Montana, Wyoming, and Idaho, where the Service previously determined that wolves were fully recovered and warranted delisting, wolf populations also presently at risk of with extinction due to unrealistically low population targets (which are set below minimum viable population size) and by aggressive efforts by state governments in all three states to reduce wolf populations to insufficient minimum thresholds.

A. Gray wolf population and distribution

1. Historic distribution and population

The gray wolf originally occurred throughout virtually all of the lower 48 states, except some areas of the southeast. 59 Fed. Reg. at 60252. It is estimated that 380,000 wolves occupied North America in Pre-European Contact times (Leonard et al. 2005). An estimated 2,332 wolves might occur in the Western DPS area today.

Human persecution destroyed the species in the western United States: "An active eradication program is the sole reason that wolves were extirpated from the [Northern Rocky Mountains]." 2007 Wolf Delisting Rule, 72 Fed. Reg. 6125 (Feb. 8, 2007) (citing Weaver 1978, p. i). The federal government played a critical role in removing wolves from the landscape. Beginning in the late 1880s, the so-called "Division of Biological Survey"—later called the "Bureau of the Biological Survey" and the "Division of Predatory Animal and Rodent Control"—killed birds, rodents, and later wolves, to benefit agribusiness. Beginning in 1905, the fledgling Forest Service partnered with the Biological Survey to locate and kill wolves on the new Forest Reserves (Robinson 2005:55-69).

[11] Brasch, S. 2021 It's official: Colorado has its first wild wolf pups since the 1940s. Colorado Public Radio 9 June 2021. <https://www.cpr.org/2021/06/09/wild-wolf-pups-found-colorado/ > Accessed 5 July 2021.

In 1931, Congress formally passed the Animal Damage Control Act, which authorized the Secretary of Agriculture to "promulgate the best methods of eradication, suppression, or bringing under control" a whole host of species, including wolves. 7 U.S.C. § 426 (1931). The focus was on wiping out entire statewide populations of species and the program "contributed to decimating gray wolf populations in the continental United States."[12] Between July 1, 1915, when the federal government first hired hunters to kill wolves using funds appropriated by Congress, and June 30, 1942, those hunters killed 24,132 wolves (Lopez 1978:187).

State agencies initiated similar campaigns. During the early 1900s, the Idaho Department of Fish and Game was authorized by state legislation to "devise and put into operation such methods and means, as would best serve to attain extermination of wolves, coyotes, wildcats, and cougars."[13] Between 1919 and 1928, 258 wolves were poisoned, trapped, or shot in Idaho (USFWS 1987).

By the 1930s, wolves had largely been extirpated from the lower 48 states. 59 Fed. Reg. at 60252. By the time reintroduction was underway, reports of wolves in the Northern Rockies consisted of few individuals. To support recovery of the species, in 1995 and 1996, the Service reintroduced wolves to Yellowstone National Park and central Idaho, which "greatly expanded" the numbers and distribution of wolves in the Northern Rockies. 68 Fed. Reg. at 15815. Wolves—some dispersing from the Northern Rockies population—began to move through and sometimes occupy Washington, Oregon, California, Utah, and even Colorado. However, as discussed in more detail below, the species remains largely absent through large swaths of its former range in the West.

Wolves are functionally extirpated in a number of expansive ecoregions within the bounds of the Western DPS area where they originally roamed. Breeding populations of wolves are entirely absent from the Great Basin ecoregion. The Colorado Plateaus ecoregion currently lacks an extant wolf population. The Wyoming Basins ecoregion also lacks a breeding population of wolves, although a pack of wolves was present in the Irish Canyon area of northwestern Colorado during 2020 before disappearing under suspicious circumstances in early 2021. Southern Rockies voters passed a ballot initiative in 2020 mandating Colorado reintroduction by 2023 and thus far state agencies have been slow in laying the groundwork for this reintroduction by drafting a wolf management plan.

The Coast Range ecoregion of the Pacific Northwest, along with the Puget Lowlands, Klamath Mountains, and Willamette Basin ecoregions, lie to the west of the Cascade Mountains crest, and have yet to recover wolf populations sufficiently large to be secure from the threat of extinction. The temperate rainforests typified by these ecoregions are suitable habitat for wolves, as evidenced by the presence of wolf populations in coastal British Columbia and southeastern Alaska.

[12] Government Accountability Office. (1990). Wildlife management: Effects of Animal Damage Control program on predators. (GAO Publication No. RCED-90-149) Washington, D.C. : U.S. Government Printing Office.
[13] 1987 Northern Rocky Mountains Gray Wolf Recovery Plan 2 (1987) (quoting Idaho Department of fish and Game Biannual Report in Kaminski and Boss 1981).

The Eastern Cascades Slopes and Foothills has four packs of wolves in Oregon, and the recently-established Siskiyou Pack of northeastern California. The Sierra Nevada ecoregion has the Lassen Pack and a new wolf pack called the Beckwourth pack established in 2021 in southern Plumas County. This cannot yet be said to constitute a viable population. The Central Valley and Southern and Central California Chaparral and Oak Woodlands ecoregions are unlikely to support viable wolf populations over the long term due to intensive agricultural and residential development, but a single dispersing wolf recently was recorded near the Southern California Mountains ecoregion,[14] which could potentially support its own wolf population.

Each of these ecoregions, by itself, would constitute a significant portion of the range of the Western DPS of gray wolves, and extinction is imminent for each of them, indicating that 'endangered' status under the ESA is warranted. Collectively, these ecoregions where wolves currently remain on the brink of extinction are significant because they represent the westernmost and southernmost limit of gray wolf habitat and range in the coterminous United States, and because they represent unique ecosystems distinct from those in the Northern Rockies where gray wolves are more numerous.

2. Present numbers and distribution

To our knowledge, there is no rangewide tracking of wolf populations in the Western DPS, the Northern Rockies, or for the lower 48 states. Instead, wolf populations are typically monitored by state agencies, which use different methods to estimate the wolf populations within their boundaries. Some of the wolf monitoring methods used by the states have changed over time, which means that population estimates do not provide a strong or consistent basis for assessing the stability of the wolf populations there over time, or even understanding present wolf populations. However, the status of wolves in each state is reported below based on the best available information.

a. Idaho

In Idaho, between 1996 and 2005, the wolf population was monitored and tracked using aerial surveys and radio collar data.[15] After 2005, however, IDFG adopted a different method of estimating the wolf population that—anecdotally—produced higher wolf population estimates. In 2010, IDFG estimated Idaho's wolf population at 777 using this method, but in 2011 the population dipped to 746.[16] In 2012, the population was estimated at 722 wolves, in 2013, 659 wolves, in 2014, 785 wolves, and in 2015, 786 wolves.[17] When the five-year post-delisting

[14] Newman, M. Gray wolf makes historic trek into San Luis Obispo County. KSBY Television 6 April 2021. <https://www.ksby.com/news/local-news/gray-wolf-makes-historic-trek-into-san-luis-obispo-county> Accessed 5 July 2021.
[15] Johnson, D. 2020. A big win for the Frank Church-River of No Return Wilderness and a call to protect wolves and wilderness in Idaho. Counterpunch 29 April 2020. <https://www.counterpunch.org/2020/04/29/a-big-win-for-the-frank-church-river-of-no-return-wilderness-and-a-call-to-protect-wolves-and-wilderness-in-idaho/>; *see also* Hayden, J. and Oelrich, K. 2020. 2018 Statewide Wolf Report 5-6 (IDFG 2020).; *See also* Rachael, J. and C. Mack, 2011 Wolf Monitoring Progress Report 93 (March 2012) (describing wolf population estimate methods).
[16] *Id.*
[17] *See* Jason Husseman, Jennifer Struthers, and Curt Mack, 2013 Wolf Monitoring Progress Report 8 (IDFG Mar. 2014); Jim Hayden, Statewide Report Wolf 14 (IDFG 2017).

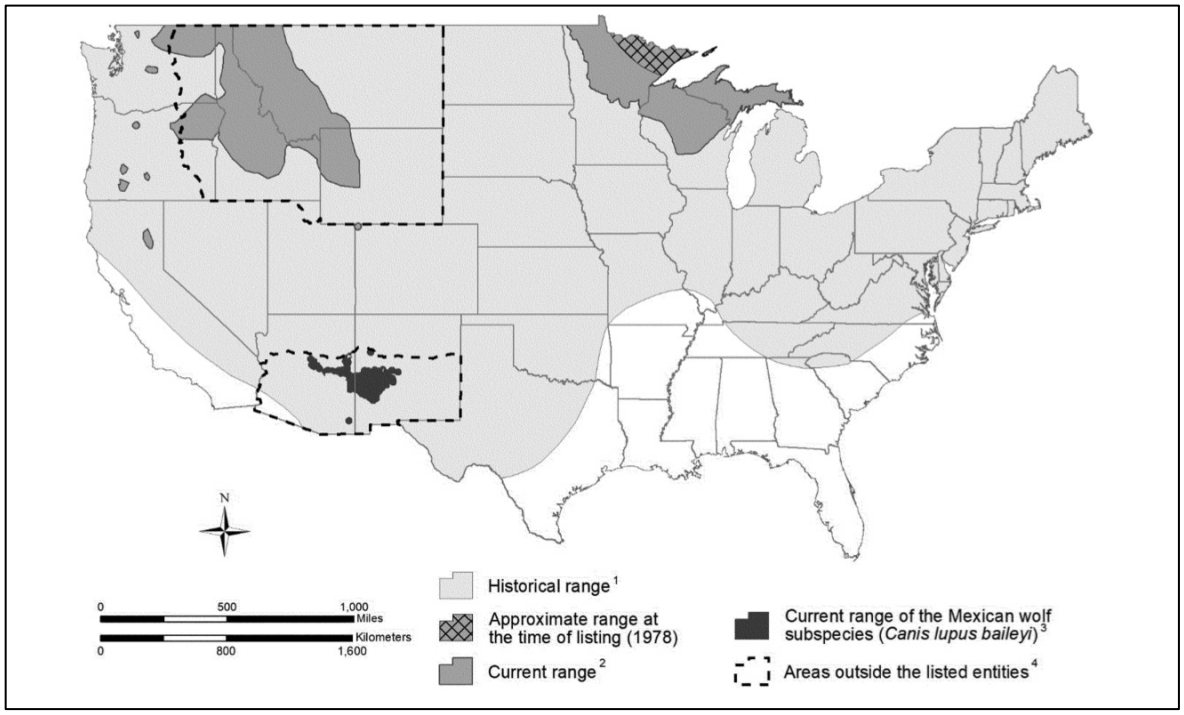

Figure 4. Map of historical range and current range of the gray wolf (C. lupus) in the lower 48 states. Reproduced from 85 Fed. Reg. 69789

monitoring period ended in 2016, however, IDFG shifted to a looser method of estimating the wolf population that looked to "estimating the number of wolf packs rather than establishing a number of wolves in documented packs" and counting wolves during breeding season, rather than in mid-winter (Hayden 2017: 6).[18]

In 2019, IDFG implemented a new camera trap survey method to estimate the wolf population. Using this new method IDFG estimated the state's wolf population at 1,566 wolves—a number higher than any previously reported and which purportedly remained stable in 2020, despite 53% more human-caused mortality.[19] Thus, while it is presently oft-repeated that the estimated wolf population in Idaho was 1,500 in 2020, that number measures the population at its peak and not in midwinter, and the Service previously rejected the population estimates produced by the new method as "not comparable to previous wolf surveys." 2020 National Wolf Delisting Rule, 85 Fed. Reg. 69800 (Nov. 3, 2020). The current wolf population in Idaho, while purportedly "stable," is unknown.

b. Montana

In Montana, from 2005-2015 the wolf population was monitored and tracked using aerial surveys, radio collar data, and reported wolf sightings. At the time of removal of federal

[18] *see also* Jim Hayden and Katie Oelrich, 2018 Statewide Wolf Report 6 (IDFG 2020) (discussing modeling used to estimate wolf population through 2017).
[19] Francovich, E. 2021. Idaho Wolf Population Remains Stable, Despite More Hunting, Trapping. The Spokesman Review, 22 February 2021. <https://www.spokesman.com/stories/2021/feb/22/idaho-wolf-population-remains-stable-despite-more-/> Accessed 15 July 2021.

protections in 2011 Montana had 653 wolves; the population thereafter declined to 536 wolves in 2015 (Mech 2017). In 2015, Montana switched to utilizing a patch occupancy model that estimates the number of wolf packs rather than the number of wolves (*see* Coltrane et al. 2015). However, Montana has not estimated its wolf population at all since 2019, when it had 833 wolves (with a confidence range of 665 to 1021 wolves). And although recent news articles report that the Montana wolf population is close to 1,200,[20] this number is not supported by any publicly available data. Regulated public hunting and trapping of wolves in Montana has removed an average of 22% (range: 10–31%) of Montana's minimum known wolf population annually, and the minimum known number of wolves in Montana also declined as regulations became less restrictive with the objective of reversing wolf population growth in Montana. 85 Fed. Reg. at 69802.

c. Wyoming

The State of Wyoming has committed to maintain 10 breeding pairs of wolves and 100 individuals outside the boundaries of Yellowstone National Park and the Wind River Reservation, and 5 breeding pairs and 50 individuals inside Yellowstone and the Wind River Reservation. Wyoming Wolf Plan at 1. The state plan commits to managing for a buffer above these minima, within the Trophy Game area. Wyoming Wolf Plan at 24. The 2018 tally of 13 breeding pairs (see Figure 5) appears to be below the population goals set, indicating that wolves may have dipped below even the regulatory threshold that year. Importantly, from a genetic perspective, a population that drops below the genetic minimum viable population is vulnerable to a genetic bottleneck, in which heterozygosity and genetic information is lost permanently from the population, potentially resulting in genetic problems that persist even after the population rebounds above the genetic minimum viable population threshold.

Year		**Packs**	**Individuals**	**Packs**	**Individuals**	**Packs**	**Individuals**	**Packs**	**Individuals**
	Breeding Pairs	(WY)	(WY)	excl. Y/WR	excl. Y/WR	YNP	YNP	WRR	WRR
2019	22	43	311	32	201	8	94	3	16
2018	13	46	286	35	196	9	80	2	10
2017	23	53	347	40	238	11	97	2	12
2016	18	52	377	41	269	11	108	3	9
2015	30	48	382						
2014	25	44	333						
2013	23	43	306						
2012	21	43	277						
2011			328						

Figure 5. Tally of wolves, packs, and breeding pairs in Wyoming according to joint state/federal estimates Yellowstone National Park abbreviated "YNP" or "Y;" Wind River Reservation abbreviated "WRR" or "WR"). Data from WGFD et al. (2020); WGFD et al. (2019); WGFD et al. (2018); USFWS et al. (2017); USFWS et al. (2016); WGFD et al. (2015); WGFD et al. (2014); WGFD et al. (2013).

[20] *Two bills look to reduce wolf populations*, by Amanda Eggert. Montana Free Press, Feb. 3, 2021; *Return of wolves to Yellowstone affects wide range of species*, by Jim Robbins. San Francsico Chronicle, January 1, 1998.

a. Washington

In Washington, wildlife managers use aerial surveys and collar data to count wolves and perform a mid-winter count to best estimate the statewide wolf population. The Washington Department of Fish and Wildlife (WDFW) confirmed its first wolf pack in 2008 in Okanogan County. In July 2011, there were five confirmed wolf packs in Washington (WDFW 2011b). Gray wolves were delisted in eastern Washington in 2012, but remain classified as an endangered species under state law (WAC 220-610-010).

State agencies nevertheless kill wolves for livestock predation control. More than 30 wolves have been removed by WDFW due to conflicts with livestock between 2008, when wolves were first documented in the state, and 2019. 85 Fed. Reg. at 69,808. Washington's current wolf population is estimated at 132 wolves in 24 packs with 13 successful breeding pairs (Washington Dept. Fish & Wildlife 2021), in addition to 46 wolves in five packs on lands managed by the Confederated Tribes of the Colville Reservation. A total of 23 packs are located in eastern Washington, while six packs are in central Washington.

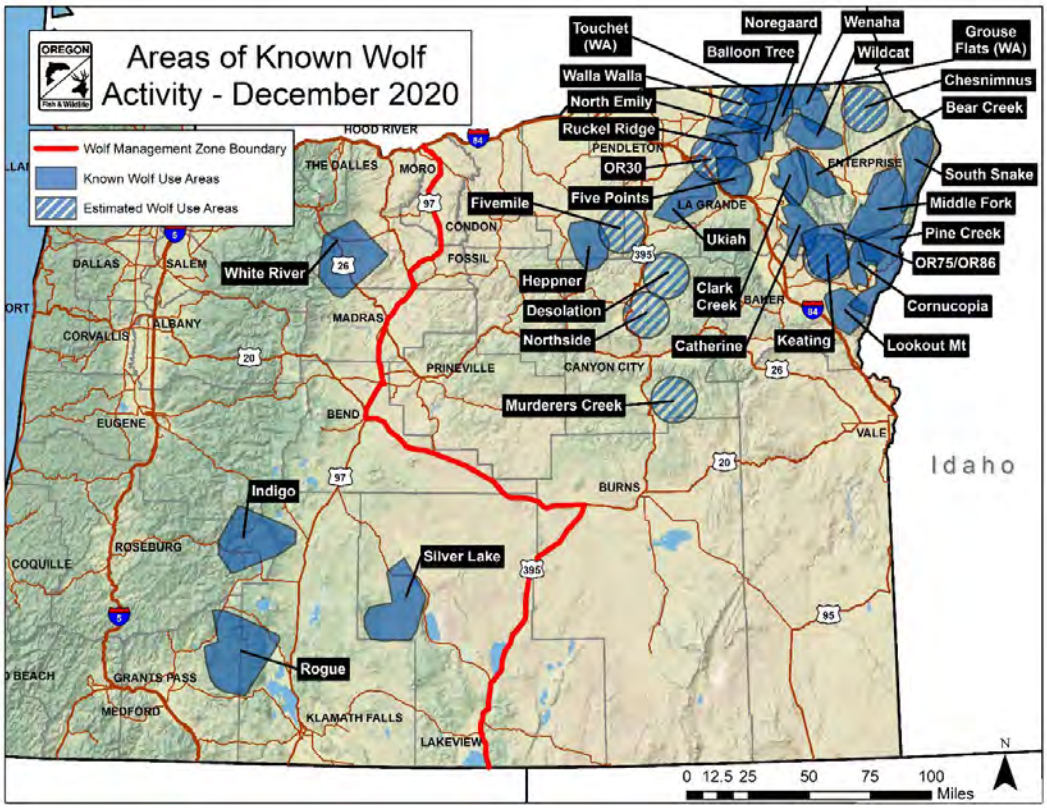

Figure 6. Distribution of known wolf packs in Oregon as of 2020 (ODFW 2021).

b. Oregon

The Imnaha pack in Oregon was first confirmed by the Oregon Department of Fish and Wildlife (ODFW) in 2009, but was likely present in 2008 as the pack consisted of 5 adult-sized wolves when it was discovered (ODFW 2010).

Wolf populations in Oregon are currently expanding, but the population remains small and growth has been slow. As of December 2020, Oregon had 22 wolf packs including 17 breeding pairs, with a total population estimate of 173 wolves statewide (Oregon Dept. of Fish and Wildlife 2021). Wolf territories are heavily concentrated in the northeastern corner of the state, with only three packs and one breeding pair recorded for the Cascade Mountains as of December 2020, and no packs in the Coast Ranges (*id*., see Figure 6).

c. California

Since the first wolf, OR-7, dispersed from Oregon's Imnaha pack and entered California in late 2011, several radio-collared wolves have dispersed into the state, along with unknown number of un-collared wolves. At the present time, California has three wolf packs: the Lassen Pack (with two breeding females and approximately 14 family members), the Whaleback Pair, and the recently announced Beckwourth Pack, a group of three wolves (CDFW 2021b). Additional uncollared wolves have been documented in the state. Based on modeling, favorable habitat for wolf recovery exists in the Sierra Nevada, Modoc Plateau, Klamath Mountains, and Coast Range (Kovacs et al. 2016, Nickel and Walther 2019).

d. Colorado

Wolves were extirpated from Colorado in 1945, when the last wolf was killed by a federal wolf trapper in Conejos County. Following wolf reintroduction in Yellowstone, a number of dispersing wolves have reached Colorado via Wyoming, but never in sufficient numbers to establish a self-sustaining population there. One lone wolf (F1084) took up residence in the state in July 2019 and was joined by collared wolf M2101 in 2021. In June 2021, Colorado Parks and Wildlife confirmed three pups born to the pair, the first breeding activity documented among wolves in the state in almost 80 years.[21]

e. Nevada

Nevada does not have a breeding population of wolves, although solitary dispersers have been recorded. In November, 2016, a yearling male of the Shasta Pack from northeastern California wandered over to northwestern Nevada and his presence was identified through genetic testing of scat (CDFW 2021b). This wolf traveled as far as 20 miles west of Black Rock City. Nevada has not had a breeding population of wolves in recent decades.

i. Utah

Utah does not have a breeding population of wolves, although single dispersers have been recorded. Modeling shows an abundance of wolf habitat in the Uinta Mountains, along the state's central mountain spine, and in southeastern Utah, adequate to support a statewide wolf population of 711 animals (Switalski et al. 2002b). Following reintroduction of wolves into Yellowstone, periodic confirmed sightings of wolves have been made in north-central Utah.

[21] Colorado Parks and Wildlife, 2021. <https://cpw.state.co.us/wolves. Accessed 15 July 2021.

j. Arizona

A sole dispersing gray wolf briefly forayed south into northern Arizona in October 2014, into the Kaibab National Forest north of Grand Canyon National Park;[22] This wolf was killed the following year in Utah.[23] Any other gray wolves dispersing from the northern populations into the state are unknown, but the central and southern parts of Arizona are designated as recovery zones for the Mexican wolf, which in turn occasionally foray north towards the Grand Canyon area.

B. Threats Facing the Western DPS of gray wolves

Historically, gray wolves have suffered from persecution and extirpation across their range pursuant to rapid European colonization and Euro-American settlement in the western United States, Canada, and Mexico, during the 1700s, 1800s, and 1900s. Early natural histories and biological surveys recorded a diverse array of wolf populations across western North America, and zoologists split the species into a variety of wolf subspecies and types during the 1800s and early 1900s. The original western wolf genetic diversity, phenotypic expression, and geographic variation of wolf populations across the habitats of western North America have been lost as a result of socially- and politically-motivated eradication efforts that wiped out many wolf populations and subspecies. Large numbers of wolves that were adapted to particular climates, terrains, native vegetation communities, and prey bases have likely disappeared utterly; geographically unique genetics have most likely been lost to history and are not recoverable.

The Service has acknowledged these multiple changes and challenges in the understanding of wolf taxonomy in its attempts to list various wolf populations:

> In 1978, we published a rule (43 FR 9607, March 9, 1978) reclassifying the gray wolf as an endangered population at the species level (*C. lupus*) throughout the contiguous United States and Mexico, except for the Minnesota gray wolf population, which was classified as threatened. At that time, we considered the gray wolf group in Minnesota to be a listable entity under the Act, and we considered the gray wolf group in Mexico and the 48 contiguous United States other than Minnesota to be another listable entity (43 FR 9607 and 9610, respectively, March 9, 1978). The separate subspecies listings thus were subsumed into the listings for the gray wolf in Minnesota and the gray wolf in the rest of the contiguous United States and Mexico. The 1978 reclassification was undertaken to "most conveniently" handle a listing that needed to be revised because of changes in our understanding of gray wolf taxonomy, and in recognition of the fact that individual wolves sometimes cross subspecific boundaries. In addition, we sought to clarify that the gray wolf was only listed south of the Canadian border. However, the 1978 rule also stipulated that "biological subspecies would continue to be maintained and dealt with as separate entities" (43 FR 9609), and offered "the firmest assurance that [the Service]

[22] Associated Press. 2014.Wolf-like animal a rare sight in northern Arizona. The Weather Channel, 31 October 2014. <https://weather.com/news/news/wolf-animal-northern-arizona-20141031> Accessed 15 June 21.
[23] McCombs, B. 2015. Wolf killed in Utah was animal from rare Arizona sighting. Salt Lake Tribune, 12 February 2015. <https://trib.com/outdoors/wolf-killed-in-utah-was-animal-from-rare-arizona-sighting/article_452d854d-9b91-511f-b58e-e44be9c98132.html> Accessed 15 June 21.

> will continue to recognize valid biological subspecies for purposes of its research and conservation programs" (43 FR 9610, March 9, 1978). Accordingly, we implemented three gray wolf recovery programs in the following regions of the country: the Western Great Lakes (Minnesota, Michigan, and Wisconsin, administered by the Service's Great Lakes, Big Rivers Region), the Northern Rocky Mountains (Idaho, Montana, and Wyoming, administered by the Service's Mountain–Prairie Region and Pacific Region), and the Southwest (Arizona, New Mexico, Texas, Oklahoma, Mexico, administered by the Service's Southwest Region).

78 Fed. Reg. at 35670.

These three currently identified wolf recovery programs fail to recognize and protect a broad Western DPS that attempts to conserve the remnant genetic adaptations of the Rocky Mountain wolf subspecies *C. l. occidentalis* and any unstudied genetic contributions from other populations that historically intergraded with this subspecies. Thus, the species' ability to adapt to variable climate and geographies has been curtailed, and the range contraction enforced by state management limits the species' available habitat.

1. Habitat destruction, modification, and curtailment of range

Wolves are habitat generalists, and historically occupied diverse vegetation types in North America, including tundra, forests, grasslands, oak savannas, and deserts. Their primary habitat requirements are the presence of adequate ungulate prey, and water, and habitat use is strongly affected by the availability and abundance of prey, availability of den sites, ease of travel, snow conditions, availability of protected public lands, road density, human presence, and topography (Paquet and Carbyn 2003). Suitable habitat generally consists of areas with adequate prey where the likelihood of human contact is relatively low (Mladenoff et al 1999).

Large undeveloped areas of public land often provide suitable habitat and are generally required for the persistence of regional wolf populations in North America (Paquet and Carbyn 2003). The primary role of wildlands in supporting wolves appears to be that they reduce human intrusions, and thus provide indirect protection for wolves (Mech 1995). Wolves expand their home range size in response to increased road density, and select core areas within their territories at greater elevation and in more forested an inaccessible-to-humans portions of their home range (Mancinelli et al. 2018). However, gray wolves continue to expand their range in the U.S., and some wolves live proximate to substantial human development. Wolves can likely survive in areas near substantial human development, as long as disjunct populations are linked by dispersal, prey is abundant, and human persecution is not severe (Haight et al 1988).

Wolves' public land habitats in the West are being degraded by increasing recreational pressure, climate stressors, intensifying and more frequent wildfires, and urban encroachment along public lands boundaries. Ongoing development of private lands and increasing habitat degradation on public lands has the effect of reducing the overall carrying capacity for wolves in the western United States. In the northern Rocky Mountains, the carrying capacity for wolves was projected to decrease by 12.2 percent between 2000 and 2025, due about equally to private land development and continuing habitat degradation on public land (Carroll et al. 2004).

Suitable wolf habitat may be limited in its value for recovering wolf populations due to prey scarcity. Wolf diets include a wide range of prey items, including rabbits, rodents, carrion, deer, elk, moose, birds, and invertebrates. In North America, wolves are primarily predators of medium and large mammals, such as moose (*Alces alces*), elk (*Cervus elaphus*), white-tailed deer (*Odocoileus virginianus*), mule deer (*Odocoileus hemionus*), caribou (*Rangifer tarandus*), muskox (*Ovibos moschatus*), bison (*Bison bison*), muskox (*Ovibos moschatus*), bighorn sheep (*Ovis canadensis*), Dall sheep (*O. dalli*), mountain goat (*Oreamnos americanus*), and beaver (*Castor canadensis*) (78 Fed. Reg. at 35670, Paquet and Carbyn 2003). But herbivores are not always easy to kill: Elk and bison that stood their ground against wolves had a much better chance of surviving than those that ran (Robbins 1998).

Wolves have been observed to take salmon out of rivers during spawning runs and may have historically formed an important part of wolf diets when salmon were more abundant. Observations made in 1937-1941 in British Columbia indicated that wolves lived almost exclusively on sockeye salmon in August (Young and Goldman, 1944: 251). The collapse of chinook and coho salmon populations in California and the Pacific Northwest due to dams, water diversions, and sedimentation of spawning gravels may have caused a shift in wolf prey selection.

Bison, antelope, elk, deer, caribou, and moose were historically preferred foods of the wolf, and there are accounts of large "buffalo wolves" following in the outskirts of the great bison herd migrations (Young and Goldman 1944: 224). Bison developed many behavioral tactics to defend against wolf attacks on young calves (*id:* 230). During the mass slaughter of bison on the Plains in the mid 1800s during the EuroAmerican period of colonization, wolves fed on the offal and carrion of the bison carcasses, according to historic reports (*id*: 215). The availability of bison today is much reduced, with wolves and bison coexisting only within the Yellowstone ecosystem and this important food source largely unavailable.

Wolves' prey base is also affected by the reduced availability of ungulates on most public lands due to livestock grazing displacement and competition. Livestock are generally allocated about fifty percent of the annual vegetation production on national forests and Bureau of Land Management grazing allotments, and each cow is assumed to eat about 1000lbs of forage per month, known as an "AUM" or animal unit month. Each cow thus eats the equivalent forage that would otherwise be available to five mule deer, five antelope, one female bison or moose, sixty-two black-tailed jackrabbits, or three-hundred and eighty-five ground squirrels.[24] With about 22 million AUM authorized on approximately 230 million acres of public land,[25] an incalculable amount of otherwise available-as-prey wildlife are replaced by livestock, which wolves are penalized for preying upon. This represents a significant displacement and reduction in available food for wolves.

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[24] Lacey, J. No date. Forage consumption estimated animal unity conversion. Montguide, Montana State University Extension Service. https://animalrangeextension.montana.edu/forage/documents/forage%20consumpiton%20estimated%20AUM%20conversion.pdf> Accessed 15 July 2021.

[25] Government Accountability Office. (2005). Livestock grazing: Federal expenditures and receipts vary, depending on the agency and the purpose of the fee charged. (GAO Publication No. GAO-05-869) Washington, D.C. : U.S. Government Printing Office.

2. Overutilization

Creel et al. (2015) found that an anthropogenic mortality rate of about 25% typically yields a declining population and observed that wolf populations in Idaho and Montana showed indications of instability as early as 2013. These authors also provided as an illustration the International Union for Conservation of Nature Red List Criterion C1, which classifies a population segment as endangered if it holds fewer than 2500 individuals and has declined by ≥20% (*Id*., p. 1475). Existing liberal hunting and trapping policies in both states reduced year-end wolf populations by 40-50% in 2019, close to double the level of anthropogenic mortality a healthy wolf population can withstand.

Much of the states' wolf 'management' is being accomplished by anti-wolf elements of the public through expanded or unlimited hunting seasons, as described below. In both Idaho and Montana, wolf trapping is incentivized; both states now allow "reimbursement" of up to $1,000 per wolf for successful wolf trappers. The bounties are paid through the Foundation for Wildlife Management, which boasts that it has paid $750,000 for the killing of 1,100 wolves in Idaho since its inception in 2014.[26] That is approximately a quarter of all wolves killed in Idaho since 2011. In the 2019-2020 season, the Foundation for Wildlife Management paid "well over $200,000 in reimbursements" for trappers killing 271 wolves—nearly half of all wolves killed in Idaho that year.[27] In 2021, the Foundation for Wildlife Management announced new Montana fundraising chapters in Sanders County, the Flathead Valley, and the Anaconda/Butte areas and will now be reimbursing Montana members for killing wolves.[28] These bounties fuel overharvest.

The annual death toll amounting to 40-50% of the year-end wolf populations in Idaho and Montana far exceeds the 25% that Creel et al. (2015) posited a healthy wolf population could withstand. Yet both states have passed laws to further increase wolf killing. These are not adequate regulatory mechanisms; they are management for extirpation.

Poaching is a significant source of wolf mortality and serves as yet another example of how politics shaped by human hostility intrude into wolf management. Individuals who illegally kill wolves often face no, or minimal, consequences for their actions from sympathetic state management authorities. This lack of accountability incentivizes additional cryptic wolf killing.

For example, in Montana, in April 2021, two men shot one wolf each on private property from a helicopter near Wisdom, MT. Neither man had a wolf license, they did not have permission to hunt on the property, and it is illegal to kill a wolf from an aircraft.[29] The men claimed to have permits for coyote control and to have confused the wolves for coyotes. When investigating the incident, the Montana Fish, Wildlife and Parks personnel doing the investigation did not seek proof of the permits for coyote control, therefore failing to verify this story. The investigators

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[26] *See* https://www.foundationforwildlifemanagement.org/ (accessed June 23, 2021).
[27] *Id*.
[28] *Id*.
[29] Cast, M. 2021. *Two wolves poached by helicopter in the Big Hole Valley; citations issued*. Montana Standard 25 April 2021. <https://mtstandard.com/news/local/two-wolves-poached-by-helicopter-in-the-big-hole-valley-citations-issued/article_384a95dd-24b0-5a64-80f5-60cb58f60a99.html> Accessed 15 July 2021.

also did not charge the men with the $1,000 wolf restitution cost of a gray wolf, and neither was required to forfeit their hunting privileges.

In Wyoming, several examples illustrate a lack of consequences for wolf killing, even inside Grand Teton National Park. A hunter illegally killed an uncollared two-year-old wolf on a private inholding within Grand Teton National Park on January 20, 2014.[30] This was the first wolf shot inside Grand Teton since wolf reintroduction began.[31] The shooter was immune from federal prosecution under a ruling that the State of Wyoming retains authority over hunting on private inholdings inside National Parks. *Defenders of Wildlife v. Everson*, 984 F.3d 918, D.DC 2020. Then, in 2019, a state-licensed hunting guide killed a wolf near Spread Creek inside Grand Teton National Park, ultimately receiving a fine of $5,040 plus one year's suspension of wolf hunting privileges; he did even not lose his guiding license after a review by the State Board of Outfitters and Professional Guides.[32] Another wolf was found shot and killed near Pilgrim Creek inside Grand Teton National Park on October 26, 2020.[33]

In Idaho, a significant number of wolves are killed each year by poaching. *See* IDFG (2012, 2014, 2017, 2020). In Washington, where wolves are slowly recovering, the breeding female of the Wedge pack was found illegally shot in Stevens County on May 26, 2021.[34] A wolf pack that was reestablishing in California in 2019 also mysteriously vanished and is presumed to have been killed.[35] Oregon lost two breeding males to poachers in 2020,[36] and five wolves were found killed in February of 2021.[37]

Chapron and Treves (2016) found that legal removals of wolves, although often posited to increase "social tolerance" among local communities, actually was correlated with increased levels of poaching. These researchers concluded that "granting management flexibility for endangered species to address illegal behaviour may instead promote such behaviour." Similarly, allowing public hunting of wolves does not increase "social tolerance" for the species or reduce poaching. Indeed, Santiago-Avila et al. (2020) found that the delisting of wolves in Wisconsin, triggering the onset of sport hunting, was accompanied by a significant spike in illegal shooting

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[30] National Park Service. 2014. Press release: Gray wolf shot and killed within Grand Teton National Park. 21 January 2014. <https://www.nps.gov/grte/learn/news/news-release-14-02.htm> Accessed 7 June 2021.
[31] Stuntz, S. 2014. First gray wolf shot inside Grand Teton National Park. Teton Valley News, 23 January 2014. <https://www.tetonvalleynews.net/news/first-gray-wolf-shot-in-grand-teton-national-park/article_cf4c8a14-844a-11e3-bf03-0019bb2963f4.html> Accessed 7 June 2021.
[32] Wilkinson, T. 2019. Man who killed wolf inside Grand Teton pleads guilty. Mountain Journal, Feb. 6, 2019. <https://mountainjournal.org/man-fined-for-killing-wolf-in-grand-teton-national-park> Accessed 7 June 2021; Associated Press, 2019. Guide who shot wolf in Grand Teton National Park given conditional license. Casper Star-Tribune, 24 September 2019. < https://trib.com/outdoors/guide-who-shot-wolf-in-grand-teton-national-park-given/article_3d223b50-f91d-5d68-a118-7aabd484de45.html> 7 June 21.
[33] Capron, M. Gray wolf found illegally shot and killed in Grand Teton National Park, officials say. Idaho State Journal, 2 November 2020. <https://www.idahostatesman.com/news/nation-world/national/article246909297.html> Accessed 7 June 2021.
[34] Associated Press. 2021. Conservation grouse offer $15k reward for info on wolf death. The Olympian. 18 June 2021.https://www.theolympian.com/news/state/washington/article252193203.html> Accessed 15 July 2021/
[35] Sabalow, R. 2019. Did someone kill the Shasta Pack, California's mysterious wolf family? The Sacramento Bee. 1 February 2019. https://www.sacbee.com/news/local/environment/article225258150.html> Accessed 15 July 2021.
[36] https://www.opb.org/article/2021/04/22/gray-wolf-population-oregon-2020/
[37] https://www.bluemountaineagle.com/news/officials-investigate-mystery-of-five-dead-wolves-found-feb-9-in-union-county/article_9face954-8cec-11eb-b026-8b78d7cfa660.html

of wolves. Barber-Meyer et al. (2021) found mixed results regarding social tolerance in Minnesota, but found that poaching in non-hunting-season years kept wolf mortality high in non-wilderness areas, where wolves were more vulnerable to opportunistic poaching.

3. Disease and predation

Wolves are vulnerable to a multitude of diseases, which may significantly reduce wolf populations. According to Brandell et al. (2020: 121), "All pathogens incrementally reduce the fitness of infected hosts by diminishing either fecundity or the survival of those hosts, but pathogens have to overcome constraints on their ability to become established and persist in a host population." The stochastic nature of disease outbreaks can cause unexpected and unpredictable population losses that are additive to human take of wolves through hunting or depredation killings. Coyotes and foxes are affected by many of the same diseases (Brandell et al. 2020), and could be reservoirs of diseases in areas inhabited by wolves.

Wolf pups are particularly vulnerable to potentially fatal diseases including parvovirus, distemper, canine herpesvirus, and canine coronavirus (Smith and Almberg 2007). Disease is one of several factors that significantly affect litter size and survival in wolves (Stahler et al. 2013), which makes it a potentially primary driver of wolf population crashes.

Historic outbreaks of illness have had serious effects on wolf populations. For example, it is likely that a 30% decline of wolves in Yellowstone National Park in 2005 was caused by an outbreak of distemper (Smith and Almberg 2007, Brandell et al. 2020). Viral encephalitis may be one of the main factors in keeping down wolf populations in the caribou country of Canada (Young and Goldman 1944: 155). Herpesvirus can cause fetal and neonate mortality and in Yellowstone, 67% of the wolf population tested were positive for herpesvirus by 1997 (Brandell et al. 2020).

Sarcoptic mange is caused by a mite that burrows into the skin, causing itching, hair loss, and secondary infections. In Yellowstone wolves infected with mange must ingest an estimated 1,700 additional calories per day to make up for heat lost in winter due to hair loss (Brandell et al. 2020). Mange has been documented on multiple occasions in the wolf packs surrounding Yellowstone National Park, and was documented for the first time inside the Park in 2007 (Smith and Almberg 2007).

Wolf parasites can be serious problems for wolves in their own right, and also can carry deadly pathogens. Wolves are also affected by gastrointestinal parasites such as tapeworms and Giardia *spp*. as well as heartworm and canine adenoviruses. In 2017, research found that 76% of adults and 39% of pups in their Minnesota population had been exposed to Lyme disease (Carstensen et al. 2017). Some 37% of adult wolves and 18% of pups were found to be exposed to West Nile virus in Minnesota (Carstensen et al. 2017). Lyme disease is rare to absent in many western states, but has at times been documented to be quite prevalent in California, Washington, Idaho, and Wyoming within the Western DPS area (Bacon et al. 2008).

Canine parvovirus is one of the most prevalent diseases affecting wolves. Stronen et al. (2011) found that all wolves sampled in their central Canada population had been exposed to canine

parvovirus. In Minnesota, Carstensen et al. (2017) found an 82% exposure rate. In their Minnesota study, Mech et al. (2008) found that 66% of adults and 25% of pups tested positive for canine parvovirus. Zarnke et al. (2004) reported a range of 13-76% exposure to parvovirus for wolves in Alaska and Yukon Territory. Smith and Almberg (2007) found 100% seroprevalence of parvovirus antibodies on Yellowstone wolves. Mech et al. (2008) found that canine parvovirus reduced wolf pup survival by 40-60% in Minnesota, creating population-level effects and significantly reducing population growth, dispersal, and colonization of new habitats.

Canine distemper likely originated from the European continent, and has been circulating in North America since at least the early 1800s (Smith and Almberg 2007). It spreads through direct contact with feces or nasal excretions, can survive for six months outside the host, and is considered epizootic as outbreaks are short in duration, widespread, and typically cause high mortality or induce strong immunity (Brandell et al. 2020). Stronen et al. (2011) found that 44% of wolves sampled in their central Canada population had been exposed to canine distemper virus. Carstensen et al. (2017) found a 19% exposure rate for adult wolves in Minnesota. Zarnke et al. (2004) found seropositive rates for distemper of 0-64% in different populations of wolves in Alaska and Yukon Territory; pups had a 0% infection rate, leading these authors to hypothesize that distemper is universally fatal for pups.

Given the potentially severe effects and stochasticity of disease outbreaks (particularly canine parvovirus and canine distemper) on wolf recruitment and therefore population trends, disease is properly viewed as a serious threat to the continued persistence of wolf populations, particularly when those populations are already reduced by management actions or hunting to levels close to minimum viable population thresholds.

4. The inadequacy of existing regulatory mechanisms

a. The federal wolf recovery plan

The Federal Wolf Recovery Plan is itself an inadequate regulatory mechanism because it sets recovery targets that are below minimum viable population thresholds and thereby promotes overutilization. The Federal Wolf Recovery Plan requires a minimum of 30 breeding pairs and 300 total individuals with an equitable distribution among the states of Montana, Idaho, and Wyoming for three consecutive years to support delisting (USFWS 1987). In addition, USFWS presently requires that wolves remain at least 50% above this objective, or 45 packs and 450 individuals for the three states. Neither metric is adequate.

Because only the alpha pair in a given pack typically participates in breeding, the effective number (N_e) of wolves in a given population (i.e., the number of wolves participating in breeding assuming an equal sex ration of breeders) is equal to the number of alpha pairs that breed each year. According to USFWS (1994: App. 9 p. 39), “If isolation is not complete, population variability is low, and the environment is stable, geometric mean values of 500 may allow long-term persistence." Genetic population viability can be achieved at a lower population threshold than ecological population viability, but ultimately, a wolf population that goes extinct due to ecological rather than genetic causes is equally extirpated. From a genetic standpoint, an effective population size (N_e) of 50 breeding adults assuming equal sex ratios of breeders (as in

wolves) and a total population of 500 adults may suffice from a genetic perspective (Franklin 1980).

For a population to survive stochastic events such as disease outbreaks, Traill et al. (2010) posited that a total population above 5,000 individuals is necessary. Reed et al. (2003) estimated a slightly larger size, with a mean and median population size required to maintain viability at 7,316 and 5,816 adults, respectively, and stated "conservation programs, for wild populations, need to be designed to conserve habitat capable of supporting approximately 7000 adult vertebrates in order to ensure long-term persistence." Obviously, the combined core populations of Idaho, Montana, and Wyoming would be much lower than these ecological viability thresholds should wolves be reduced to levels close to the Recovery Plan goals, as these states intend to do. Fritts and Carbyn (1995) recommended maintaining connectivity between populations as a buffer against genetic problems. According to Bulte (2001), politically-charged wildlife management issues characterized by interest groups putting political pressure on wildlife managers to increase quotas (setting wolf killing quotas in Wyoming is a perfect example) cause wildlife management decisionmaking to become sluggish and unresponsive to population downturns, requiring more rigorous (higher) minimum viable population threshold to be set, setting extinction risk over 100 years at 1%, rather than the 5% commonly adopted in modeling.

By allowing for a population of as few as 450 wolves in the Northern Rockies states of Idaho, Wyoming, and Montana, the Federal Wolf Recovery Plan fails to provide for a minimum viable population of wolves. It therefore constitutes an inadequate regulatory mechanism and allows for overutilization of the species by setting an artificially low recovery threshold. It is therefore necessary to relist wolves and revise the recovery plan based on the best available science.

b. State management plans

Human persecution has historically been, and continues to be, the primary threat to wolves. Whereas efforts to recover wolves presumed that human understanding had evolved to appreciate the gray wolf as "an important and necessary part of natural ecosystems" (59 Fed. Reg. at 60253), this has not proven to be the case in the Legislatures of Idaho, Montana, and Wyoming. In agriculture-based rural areas, hostility to wolves often leads to aggressive efforts to eliminate them (Musiani and Paquet 2004, Mech 2017), and that hostility drives state management policy.

The reality of 2021 wolf management in Wyoming, Montana, and Idaho very much fulfills the risk of extirpation identified by Wayne and Hedrick (2011):

> "The question is then, what will happen if western states allow the population to be hunted to the federal minimum requirement for recovery (the enacted State plans actually required a higher figure of 15 packs or 150 individuals)? Such small populations would also be more vulnerable to random demographical and genetic affects and could sink far below the minimum numbers. Unfortunately, the 10 by 10 designation for each of the three recovery areas was not based on quantitative and model-based science, but instead reflected primarily a survey of 'expert' opinion."

State wolf policies aimed at reducing populations can have rapid results, potentially overshooting the intended minimum population target (Treves et al. 2021). In the absence of federal wolf protections, politicized management in Idaho, Montana and Wyoming has focused increasingly on reducing wolf populations to the minimum previously required by the Service to avoid returning the species to ESA protection. This minimum is insufficient to ensure the persistence of the species.

State laws in Idaho, Wyoming, Montana, and Utah are also inadequate regulatory mechanisms to conserve wolves on the landscape, because they strive to either prevent wolf populations from becoming established in large portions of their historic range, or else confine their populations to the inadequate minimum thresholds from the Federal Wolf Recovery Plan. These state laws not only jeopardize wolf populations within the states where they occur, but they also jeopardize rangewide wolf recovery because they impair the ability of dispersing wolves to establish populations in their historic ranges in Washington, Oregon, California, Nevada, Utah, Colorado, and other western states. In addition, protected wolves that wander out into states or areas where hunting is permitted are susceptible to being killed once they leave more protective jurisdictions. From a population dynamics standpoint, human-caused wolf mortality is highly additive or super-additive, rather than compensatory, and state-managed wolf harvest quotas in western states exceed sustainable thresholds and therefore cause wolf population declines (Creel and Rotella 2010, Creel et al. 2015). This explicitly constitutes overutilization, a threat to the survival of the Western DPS, and consequently state laws are not adequate regulatory mechanisms.

i. Idaho

The Idaho Legislature wrote Idaho's wolf management plan, which allows the state to maintain as few as 15 breeding pairs and 150 wolves, in 2002. *See* Idaho Legislative Wolf Oversight Committee as amended by the 56th Idaho Legislature, Idaho Wolf Conservation and Management Plan 5 (Mar. 2002).

In 2021, the Idaho Legislature passed S. 1211, a new state law that invades the jurisdiction of the Idaho Fish and Game Commission by providing that although wolves are classified as a Big Game species in Idaho, they may be treated like predatory wildlife; setting a year-round wolf trapping season on private lands; establishing that any individual may purchase an unlimited number of wolf tags which may be used to hunt, trap, or snare wolves; and allowing wolves to be "disposed of" for "depredating" on wildlife populations whenever they exceed the 15 breeding pair/150 wolf recovery goal of the 2002 wolf conservation and management plan. S. 1211 also increased funding for the Wolf Depredation Control Board to over $800k annually, allowed the Board to use those funds to hire private contractors to kill wolves, and, by allowing wolves to be killed by any method used for any wild canid, made new ways of killing them available—including night hunting, baiting, and hunting them with dogs, available to the public. In addition, under this provision wolves could be killed by the federal agency Wildlife Services using any method allowed to kill coyotes, including aerial gunning and, potentially, the use of M-44 cyanide bombs or denning cartridges.

In Idaho, newly-passed S. 1211 strives to reduce the state wolf population by 90%. Presently—with S. 1211 not yet in effect—an individual may receive up to 30 wolf tags, 15 for hunting and

15 for trapping, although hunting tags may also be used for trapped wolves. *See* IDFG 2021 Idaho Big Game 2021 Seasons & Rule 81 (2020). Trappers may use foothold traps, body-gripping traps, or snares. *Id.* Wolves may be incidentally killed over bear baits and trapped beyond 30 feet of the carcass of a naturally killed big game species, legally-salvaged roadkill, or wolf carcass with its hide removed. *Id*. Wolf hunting is allowed 11 to 12 months a year in the entire state; trapping is allowed 5 months of the year in many units and year-round in portions of units 15, 18, 22, 23, 24, 28, 29, 31, 32, 32A, 33, 36A, 36B, 37, 43, 44, 50, and 65. *See id.* at 83.

Tellingly, Idaho's Governor Brad Little's office rejected sections of a media statement that included the phrases, "Despite the characterizations as such, this is not an attempt to decimate Idaho's wolf population," and "Idaho has no interest in decimating our wolf population in the state."[38] It thus seems reasonable then to infer that the new rules *are* an attempt decimate wolf populations in Idaho.

Under similarly permissive rules, 137 wolves were hunted in Idaho in 2019 and an additional 157 were trapped; in total, a record 583 wolves were killed in the state that year. In 2020, 133 wolves were hunted, 107 were trapped, and a total of approximately 511 wolves were killed. While Idaho's wolf population estimates are unreliable, 583 wolves in 2019 was nearly 60% of the estimated year-end population of 1,000 wolves. The new laws are likely to have even greater negative consequences.

ii. Montana

In 2021, Montana passed four bills aimed at reducing Montana's wolf population to as few as 15 breeding pairs by extending wolf seasons, approving new wolf killing methods, allowing for glorified bounties, and providing for new, permissive wolf killing rules. Collectively, these bills extend the wolf trapping season by approximately one month to "increase trapper success;"[39] allow licensed trappers to use snares to "give wildlife managers another tool to reduce wolf numbers;"[40] allow a person, firm, or club to reimburse expenses from wolf trapping and hunting; and authorize the Fish and Wildlife Commission to draft rules that would allow an unlimited number of wolves to be killed per license, the use of bait, and night hunting on private property.

The focus on a reduction in wolf numbers in this legislation is contrary to Montana's Wolf Conservation and Management Plan, which states that an upper limit will not be set by Montana Fish, Wildlife and Parks. As such, this is another example of politicized wolf management that seizes decisionmaking authority from a state wildlife agency and veers away from the best available science.[41]

In Montana, new state laws also seek to achieve an 85% wolf population reduction, to the 150-wolf floor, through liberal hunting and trapping regulations and the institution of wolf bounties.

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[38] *See* https://www.westernwatersheds.org/wp-content/uploads/2021/07/Little-email-on-wolf-messaging.jpeg, Attachment 1.
[39] Committee hearing, H.B. 225, 2021.
[40] *see* Representative Paul Fielder as quoted in https://www.nationalgeographic.com/animals/article/efforts-to-make-wolf-hunting-easier-upset-hunters
[41] *See* Montana Wolf Conservation and Management Planning Document at i, 22.

Montana hunter kills of wolves is already rising (see Figure 7). During the 2021 Legislative session Montana passed more laws that would be harmful to wolf populations than ever before with the end goal of reducing the wolf population to 150 wolves in 15 breeding pairs. This target was regularly discussed by legislator and cemented into law by SB 314. SB 314 allows an unlimited number of wolves to be killed by a single person, allows the use of bait for wolf trapping, and allows light and night vision scopes for night hunting on private lands. The intent of this bill is directly contradictory to Montana's Wolf Management and Conservation Plan, which states that

> MFWP does not administratively declare an upper limit or maximum number of individuals of any wildlife species in the state in the sense of a 'cap.' Instead, MFWP identifies population objectives that are based on landowner tolerance, habitat conditions, social factors, and biological considerations…Wolf distribution in Montana, as for other species, will ultimately be defined by the interaction of the species ecological requirements and human tolerance, not through artificial delineations that are administratively determined.

The legislature removed Montana FWP's ability to manage wolves with ecological considerations by passing legislation with the intent to reduce wolf numbers. Along with SB 314, were HB 224, HB 225, and SB 267 which collectively allow the snaring of wolves, extend the wolf trapping season, and allow reimbursement for scouting, hunting, and trapping of wolves. Taken in combination, these laws will undoubtedly increase the number of wolves killed each year in the state above the already high number.

Each year, Montana's wolf hunt quota has been increased. In 2009, 72 wolves were killed, in 2011, 166 were killed, in 2012, 225 were killed, in 2013, 230 were killed, in 2014, 206 were killed, in 2015, 210 were killed, in 2016, 247 were killed, in 2017, 254 were killed, in 2018 259 were killed and in 2019, 298 were killed. See Figure 2. In 2020, approximately 40 percent of Montana's wolves were killed by hunters, trappers, and Wildlife Services (*See below*).

In February 2021, Montana Governor Gianforte was himself issued a warning for illegally trapping a collared wolf just outside Yellowstone National Park. The Governor failed to take a required certification course, and very well could have violated additional state hunting regulations although the details surrounding the incident remain unclear. Following the incident, the new Director of Montana Fish, Wildlife, and Parks, appointed by Gov. Gianforte, reportedly denied[42] that the Governor's trapping of the Yellowstone wolf was illegal at all, contributing to the overall conclusion that a coverup was underway.

[42] Olmstead, M. 2021. The bizarre story of the Montana governor shooting a wolf from Yellowston. Slate 28 March 2021. <https://slate.com/news-and-politics/2021/03/montana-governor-greg-gianforte-yellowstone-wolf-reporter-interview.html> Accessed 15 July 2021.

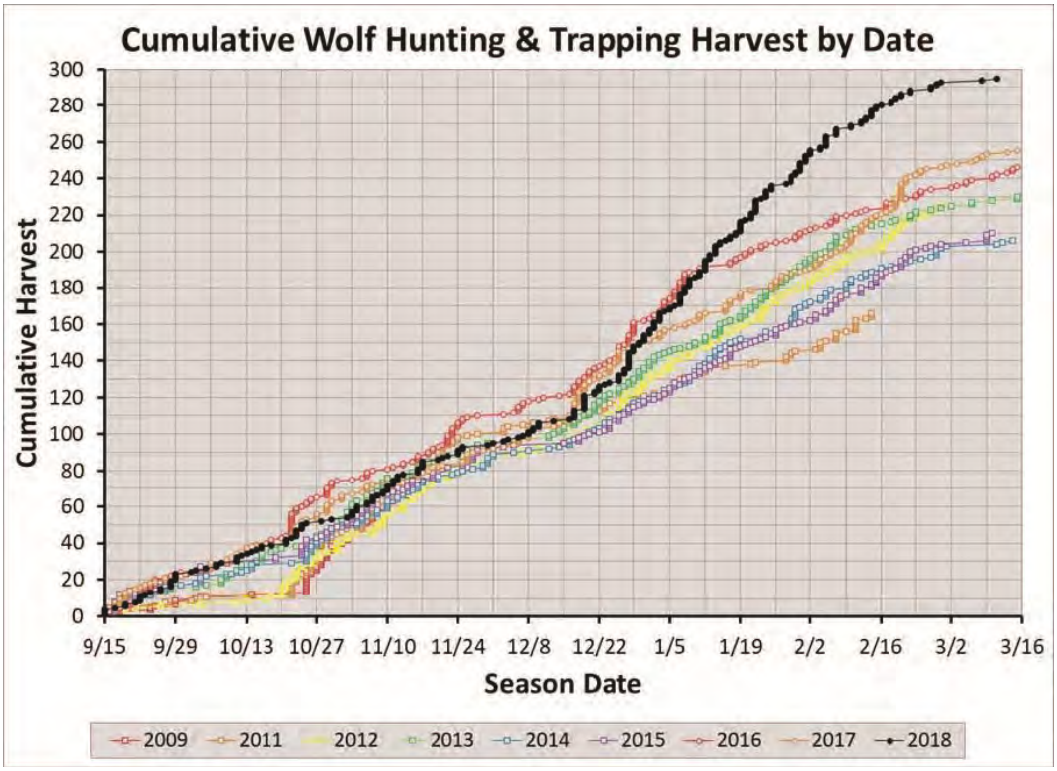

Figure 7. Montana wolf harvest totals, 2009-2018 (Inman et al. 2019).

iii. Wyoming

The State of Wyoming has long been hostile to wolf conservation and recovery, and has actively worked to frustrate and limit the recolonization of wolves to their historic range across most of the state. According to Skopek and Schuhmann (2005: 11), this opposition to wolf recovery is rooted in systemic political resistance:

> For Wyoming, the wolf reintroduction policy is reflective of a variation on "agency capture" or "client politics." Here, the traditional idea of agency capture focuses on having a regulated industry or interest group (in this case ranching and agriculture) control the regulating agency. Here, too, "capture" occurs where an agency is more responsive to a special interest group than it is to the legislature or the executive. We see Wyoming Game and Fish as more reflective of Strigler's (1971) idea of a "clientele agency" where the agency promotes the interests of a given sector of the economy (e.g., Department of Agriculture and the agribusiness industry) rather than simply performing a regulatory function.

As noted elsewhere in this Petition, the State of Wyoming's wolf management plan (WGFC 2011) classifies wolves as "Trophy Game" status in the northwestern corner of the state only, and "Predatory Animal" status (entailing no limitations on killing) across the vast majority of the state. In September of 2002, the U.S. Fish and Wildlife Service notified the State of Wyoming that its plan was unacceptable due to the uncontrolled wolf killing. Following a peer review evaluation of the state plans, in January 2004 the Service notified the Wyoming Game and Fish Department that its wolf management plan was unacceptable, and, although state plans in

Montana and Idaho were sufficient to support delisting, the problems with the Wyoming plan were sufficiently grave that wolf management in Wyoming blocked the Service from delisting the wolf in all three states. *State of Wyoming v. U.S. Dept. of Interior*, 360 F. Supp. 2d 1214 (D.Wyo. 2005). In this letter, the USFWS (2004) stated in relevant part,

> The 'predatory animal' status for wolves must be changed. The unregulated harvest, inadequate monitoring plan, and unit boundaries proposed by the state's management plan do not provide sufficient management controls to assure the Service that the wolf population will remain above recovery levels. The designation of wolves as 'trophy game' statewide would allow for self-sustaining populations above recovery goals, regulated harvest and adequate monitoring of that harvest.

The State of Wyoming sued over this letter, but in *State of Wyoming* the court dismissed the case, finding that the USFWS letter did not constitute a final agency action, and therefore was not ripe for judicial review. The rejection of the state's challenge was affirmed by the 10th Circuit Court of Appeals in 2006.

In 2005, USFWS underscored that "The Service determined that Wyoming's current State law and its wolf management plan do not suffice as an adequate regulatory mechanism for the purposes of delisting (letter from Service Director Steven Williams to Montana, Idaho, and Wyoming, January 13, 2004)." 70 Fed. Reg. 1289.

In 2007, the State of Wyoming issued a new wolf management plan, which retained the "Predatory Animal" status and broad outline of the geographic scope of this zone of uncontrolled wolf killing from the previous plan, but committed to maintaining 15 packs and 150 wolves statewide, an increase from previous plans. In response, the U.S. Fish and Wildlife Service reversed its determination that the Wyoming plan constituted an inadequate regulatory mechanism, redesignating a smaller Northern Rocky Mountain DPS and issuing a Final Rule stripping wolves within these bounds of their ESA protections. 73 Fed. Reg. 10514. This Rule was immediately challenged, and was enjoined by the courts, returning wolves to the Endangered Species Act list. *Defenders of Wildlife v. Hall*, 08-cv-56-M-DWM (D.Mont. *filed* Sept. 22, 2008). After an eleventh-hour attempt by the George W. Bush administration to delist this DPS once again, vacated by the Obama administration after taking office, a new delisting Rule took effect on May 4, 2009 that applied to Montana and Idaho only. 74 Fed. Reg. 15123. Wolves remained federally protected in Wyoming under this Rule, and the U.S. Fish and Wildlife Service stated, "In light of the July 18, 2008, U.S. District Court order, we reexamined Wyoming law, its management plans and implementing regulations, and now determine they are not adequate regulatory mechanisms for the purposes of the Act." *Id*.

Then, in 2012, the USFWS reversed itself once again, declaring the Wyoming wolf plan (which had added some minor tweaks) an adequate regulatory framework. 77 Fed. Reg. 55530. Importantly, the Service failed to address the continuation of the "Predatory Animal" status for wolves across the vast majority of the state (See 77 Fed. Reg. 55534-55535), even as it acknowledged that it had previously determined that statewide "Trophy Game" status was "the best way to provide adequate regulatory mechanisms." 77 Fed. Reg. 55558.

In the final analysis, the U.S. Fish and Wildlife Service has never made a determination that the Predatory Animal status — and its absolute lack of management of wolf killing — across the vast majority of Wyoming constitutes an adequate regulatory mechanism, based on the best available scientific and commercial information. Indeed, this portion of the Wyoming Wolf Management Plan is not a regulatory mechanism at all, but the absence of one, and exhibits a derogation of wildlife management responsibility on the part of the Wyoming Game and Fish Department and Commission to manage hunting and trapping of wolves across the vast majority of the state.

In Wyoming, the overwhelming majority of wolves that die each year are killed by humans. Human-caused mortality is one of the major determinants of wolf population dynamics in the western United States (Creel and Rotella 2010, Gude et al. 2012). In 2019, 92% of Wyoming wolf deaths were human-caused, while 7% of mortalities were from natural causes (WGFD et al. 2020). In 2019, a Trophy Game mortality quota of 34 was established for 2019, and 26 were killed legally, and one was killed illegally in this area; 23 wolves were reported killed in the Predatory Animal area (WGFD et al. 2020).

In the Predatory Animal area, wolf killing is unrestricted, and does not require a license, can occur year-round, without bag limit, and without restrictions on killing method. Indeed, "Killing of wolves will not be regulated in areas of Wyoming where wolves are designated as a predatory animal" (WGFC 2011: 23, emphasis added). The sole requirement that applies to wolf killing in this 85% of the state is that wolf kills must be reported to WGFD within 10 days (WGFC 2011: 8). This complete derogation of wildlife management responsibility by the state creates a killing zone across 85% of the state where wolves are effectively eliminated. This blocks the natural dispersal of wolves across Wyoming, and impedes movement of wolves into neighboring states like Colorado and Utah. As a result, natural recolonization from Wyoming and recovery of wolves in these states (and adjacent states like Arizona and Nevada) has effectively been blocked by the Wyoming wolf policy.

The practice of "coyote whacking" (the use of snowmobiles to repeatedly run over and maim and ultimately kill coyotes or wolves) came to light as a result of hunters posting videos of themselves engaging in the "sport."[43] Because wolves have "predatory animal" status (like coyotes) across much of Wyoming, and this status permits killing of wolves without limitations, this practice is not prosecuted in Wyoming. A bill ("Animal cruelty-snowmobiles," H.B. 288, Attachment 2) was introduced in the Wyoming legislature to amend the state animal cruelty statute and ban the practice of using snowmobiles to run down canids, but it died in committee.[44] In the absence of legal or regulatory mechanisms banning the use of snowmachines as killing devices for wolves, this practice continues in Wyoming. No regulatory mechanism exists to govern or limit it.

[43] One such video remains online at https://www.ebaumsworld.com/videos/hunting-coyotes-with-snowmobiles/81979289/; Accessed 7 June 21.

[44] Koshmrl, M. 2019. Bill to ban snowmobile coyote whacking is run down. Jackson Hole News and Guide, 29 January 2019. <https://www.jhnewsandguide.com/news/environmental/bill-to-ban-snowmobile-coyote-whacking-is-run-down/article_4d30e8f4-4623-5d33-a9e5-3ba459b64563.html> Accessed 7 June 2021.

The State of Wyoming compensates landowners and grazing lessees for wolf-related losses of livestock that occur in the Trophy Game zone of the state (WGFD et al. 2020: 22). In January of 2020, a bill (HB 0035) was introduced in the Wyoming legislature to create a compensation fund to reimburse livestock owners for wolf-killed livestock in the Predatory Animal zone, but this bill died in committee. In the absence of compensation, killing wolves is the only recourse available to ranchers who believe they have lost livestock to wolves outside the Trophy Game area. This provides an additional incentive for livestock owners to kill wolves that occur in the Predatory Animal zone, as a means of preventing them from potentially taking livestock (for which there would then be no compensation).

Wolves colonized the Wind River Reservation in 2003, and the population has fluctuated between 10 and 20 animals, primarily in the Wind River and Owl Creek Mountains (WGFD et al. 2020). On the Wind River Reservation, wolves fall under the tribal Wolf Management Plan for the Wind River Reservation (Eastern Shoshone and Northern Arapaho Tribes 2007). This plan provides that ESA restrictions do not apply on the Reservation, recognizes the kinship of wolves and tribal members, authorizes the killing of wolves that are in the act of attacking livestock or dogs, and authorizes hunting and trapping under tribal management following delisting (WGFD et al. 2020).

Overall, the complete absence of regulation of hunting and trapping across 85% of Wyoming, paired with the heavy proportion of wolves killed by humans (both through hunting and through agency-sponsored wolf killing in response to conflicts with livestock) has rendered the vast majority of Wyoming where wolves are classified as a Predatory Animal an extirpation zone for wolves. This area contains large mountain chains under Forest Service management, including the Big Horn, Laramie, Sierra Madre, and Medicine Bow Mountains. It includes the vast Red Desert, primarily Bureau of Land Management lands, which is one of the largest and most unfragmented and unfenced landscapes in North America. Wolves are habitat generalists, and the chief criteria for suitable habitat are an abundance of natural prey and minimal human interference (USFWS 1987). When these vast tracts of public lands are paired with Wyoming's low human population density, the Wyoming Wolf Management Plan can be seen as actively (and by design) preventing the recovery of wolves across tens of millions of acres of suitable habitats. The Wyoming plan is therefore not only an inadequate regulatory mechanism, but a state-sanctioned absence of a regulatory mechanism for wildlife management as it applies to the gray wolf.

Wyoming's state laws have demonstrated that they affect the rangewide recovery of wolves. Wolf killings under Wyoming's "predatory animal" provisions likely played a role in decimating or even extirpating the nascent wolf population that became established in the Irish Canyon area of northwest Colorado, where wolves were protected under the ESA at the time. In that case, wolves were sighted in Colorado in 2019 and 2020, but in early 2021, several individuals from Meeker, Colorado reportedly hazed some or all of these wolves from Colorado (where wolves were protected under the ESA at the time) into Wyoming, where wolf hunting is essentially unregulated, and shot three of them. As of June 2021, after regular Colorado Parks and Wildlife reports regarding this pack ceased, it appears likely that the nascent Irish Canyon wolf population has been extirpated.

This incident illustrates the consequences of protecting a wide-ranging species inconsistently across state or other jurisdictional boundaries. By hazing wolves across state boundaries (or shooting them when they left Colorado of their own volition), a few wolf hunters prevented wolves from becoming established in Colorado. The wolf eradication policies put in place by the State of Wyoming, and later adopted in similar form by the States of Idaho and Montana, not only threaten the viability of wolves within these states but also hamper the dispersal and establishment of wolf populations in neighboring states where wolves are struggling to become established and recover to levels that permit long-term viability. This is exacerbated by increased vulnerability of dispersing wolves to die from human-related causes versus wolves that remain in their home territories (Boyd and Pletscher 1999).

iv. Washington

While wolves are currently a state-listed endangered species in Washington, the Washington Department of Fish and Wildlife (WDFW) has signaled its intention to respond to federal wolf delisting by adopting a new management plan modeled after states like Idaho, Montana, and Wyoming. Wolves began to reoccupy eastern Washington in 2008 and they were delisted in the eastern one third of the state along with the NRM DPS in 2011 despite there being less than 40 wolves in the state at that time. The present population estimate is 178 animals (WDFW et al. 2021). Washington's gray wolf conservation and management plan has been in effect since December 2011 in the eastern third of the state, and is now in effect across the entire state following federal delisting (WDFW et al. 2021). The plan calls for a delisting objective of 15 breeding pairs of wolves present in the state for at least three years, with at least four in eastern Washington, four in the northern Cascades, four in the southern Cascades/northwest coastal area, and three others anywhere in the state (Attachment 3).

There are criteria for downlisting wolves to threatened or sensitive across the state under state statute, but due to a number of factors, there are currently no wolf packs or breeding pairs in the southern Cascades/northwest coastal region to satisfy these criteria. Despite this, there is sentiment among many hunters and ranchers across the state that there are already too many wolves and that they no longer require state endangered species status.

While WDFW has wolf management authority in the state, the agency defers substantial authority to the Washington Wolf Advisory Group (WAG). This citizen group was created in 2013 and is composed of hunters, livestock producers, and conservation groups. The WAG is responsible for recommending strategies for reducing conflicts with wolves and in 2017, WDFW and the WAG developed the Wolf-Livestock Interaction Protocol which has since been updated several times. Although killing and harassing wolves is illegal under state law due to the listing status, WDFW still kills wolves for conflict with livestock.

Responding to wolf-livestock conflicts in Washington is governed by the Wolf-Livestock Interaction Protocol (Attachment 4) which leaves discretion for lethal removal decisions to the Director of the Department of Fish and Wildlife. This allows extreme political pressure to be exerted by the livestock industry for the continued removal of wolves following conflict with livestock despite mounting evidence that this tool does not work. Washington is a great real-world example of the lack of usefulness of lethal removal to prevent wolf-livestock interactions.

In fact, approximately 85 percent of wolves removed in Washington have been removed for one ranch. To address chronic conflict areas, the WAG began, but has yet to complete, the process of drafting language for "Special Focus Areas." The final document which will guide WDFW management in areas identified as Special Focus Areas provides no meaningful changes, ensuring continued lethal removal of wolves. All the document does is establish a working group in an area identified as a Special Focus Area so that a plan can be made for proactive nonlethal measures, yet there is nothing governing the extent of preventative measures, no level of accountability that the plan will be adhered to, and the Director still retains sole discretion for determining when to kill wolves.

The survival of Washington's small and still recovering population should not be left to the discretion of one individual who is subject to political pressures. Instead, there should be regulatory mechanisms that are specific and encourage coexistence and wolf recovery. However, in 2014 when the Fish and Wildlife Commission was petitioned (*See* Petition to amend the Washington Administrative Code to codify certain portions of the Washington Wolf Conservation and Management Plan) to create such a regulatory mechanism, the petition was denied. The decision was appealed to the Governor, and subsequently denied. In 2020, the Fish and Wildlife Commission again denied a petition (*See* Petition to amend the Washington Administrative Code to require use of nonlethal techniques to reduce livestock-wolf conflict) to create enforceable rules for wolf-livestock conflict mitigation, showing a lack of support within the agency for reforming wolf management in a meaningful way. While the Governor in 2020 approved the subsequent appeal, asking WDFW to have a rule drafted prior to the 2021 grazing season, the Department has not yet created a draft, instead relying on new WAG recommendations for Special Focus Areas and Range Riding guidance for the 2021 grazing season.

The newly crafted guidance for range riding was finalized in September 2020 and incorporated into the Wolf-Livestock Interaction Protocol. However, this guidance only recommends that range riders, which are heavily relied upon as a non-lethal deterrent measure, check allotments "near daily" which is defined as four to five days per week, and only recommends that range riders may have to work long hours such as overnight on occasion. These parameters do not accurately reflect wolf biology and their propensity for hunting outside of normal working hours.

WDFW has recently begun to revitalize its "post-recovery" planning efforts and draft a new conservation plan. As mentioned previously, there are still no wolves in one of the three recovery areas within Washington, meaning the population has not met any triggers for state downlisting. Yet, wolf policy personnel have repeatedly pushed for renewed planning efforts. More concerning, is the reference to states such as Idaho, Wyoming, and Montana as places that WDFW can learn from moving forward with wolf management. Based on the extermination policies present in those three states, it seems highly likely that wolves will never recover within Washington.

v. Oregon

Wolves are not currently protected as an Oregon state endangered species. OAR 635-100-0125. Wolves are killed for livestock depredations almost every year under the state's inadequate management plan (Oregon Dept. Fish and Wildlife 2019). At present, the wolf population, currently estimated at 173 animals (ODFW 2021), is heavily concentrated in the northeast corner of the state, with only four known packs along the eastern flanks of the Cascades and no known packs west of the Cascade crest (*see* Figure 6).

vi. California

Wolves were listed as an 'endangered species' under the California Endangered Species Act (CESA) in 2014, and also are listed as a Species of Greatest Conservation Need in the State Wildlife Action Plan. CESA is a strong statute, prohibiting all killing of wolves, even in the wake of livestock depredations. Under Fish and Game Code section 86, prohibited "take" pursuant to CESA means to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill" (Kovacs et al. 2016: 10). In this respect, CESA protection is stronger yet than that which the federal ESA listing confers. The Conservation Plan for Gray Wolves in California (Kovacs et al. 2016) directs California Department of Fish and Wildlife to manage for "biologically sustainable populations," but does not include a Recovery Plan and this does not set a recovery threshold.

However, the recent federal delisting could have significant impacts on the incipient California wolf population and reversion to state management predicts some negative trends. Wolves in California are currently limited to three breeding packs (two of which are shown in Figure 8; Beckwourth Pack not shown).

Figure 8. Approximate area of resident wolves in California, as of March 2021, not including dispersing wolves[45].

[45] https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=190598&inline

Part of the need for wolves to push out to new geographic areas and new states was that the Northern Rocky Mountains was a good source population with a healthy number of wolves for the ecosystem, having reached the saturation point where all available territories were occupied. Wolves then began dispersing outward to find new areas to find unoccupied suitable habitats. If these source populations in the Northern Rocky Mountains are removed, then the influx of wolves into California is likely to cease.

Healthy wolf populations are needed in source-population states to keep pushing dispersers into California's formerly occupied habitat.

vii. Utah

The Utah Wolf Management Plan (UDWR n.d.) took effect upon nationwide delisting of wolves in 2020. Under the Utah state plan, wolves would be allowed to disperse into the state and be conserved, except where wolves cause "unacceptable" livestock depredation or where wolf predation contributes to wildlife populations (presumably focused on game species) not meeting state wildlife management objectives (UDWR n.d.: 28).

Upon delisting, wolves were given "the same [Utah Division of Wildlife Resources] predator management policies as the black bear and cougar" (UDWR n.d.: 28). Utah cougar hunting is permitted on a managed-quota basis in some units, while unlimited quotas are available in others (UDWR 2019: 35). With this as guidance, wolf hunting will presumably be permitted under the Utah Wolf Management Plan, but no limits on such hunting are provided in the Plan. In addition, in the case of wolves harassing (defined as "chasing, actively disturbing or harming") or biting or grasping of livestock, livestock owners are permitted to use "lethal control" against wolves without a permit, but must report killings to UDWR within 72 hours. (UDWR n.d.: 37). This gives ranchers essentially unlimited license to kill wolves on sight statewide, as "actively harassing" could be colorably be construed as anything from being present in the presence of livestock to engaging in predatory behaviors of any kind.

viii. Colorado

In 2004, the State of Colorado convened a Wolf Working Group that drafted and adopted a wolf management plan to guide management of wolves dispersing naturally into Colorado (CDOW 2004). While this plan provided that wolves would not be geographically restricted anywhere in the state, it did not establish recovery target populations, nor limits on human-caused wolf killing. It did allow for the killing of wolves in response to livestock depredations (CDOW 2004: 6), and when "predator populations are inhibiting the ability of CDOW to attain management objectives" for game species (CDOW 2004: 11). The Colorado plan includes provisions for monitoring, public education, and encouragement of non-lethal coexistence strategies for livestock producers as an alternative to lethal control. Overall, the loosely defined "adaptive management" approach of the Colorado wolf plan lacks the specificity to provide the certainty of implementation and science-based effectiveness to meet the legally required assurance of maintaining viable wolf populations once they become established in Colorado.

After it became obvious that natural dispersal was not resulting in a viable Colorado wolf population, Colorado voters passed a ballot initiative in 2020, requiring the Colorado Parks and Wildlife Department to reintroduce wolves in western Colorado no later than 2023. The passage of this initiative gives it the authority of state law. The management of wolves that are reintroduced under this ballot measure remains undetermined. Whether or not wolf killings would be permitted in response to livestock depredations, whether sport hunting seasons for wolves would be authorized or prohibited, and population targets to guarantee wolf population viability remain to be determined. Whether or not such a new Colorado wolf management plan would meet adequacy of regulations requirements under the ESA remains speculative, as such regulations are not in existence at this point.

5. Other Natural and Manmade Factors

a. Predator Control

Wolves are frequently killed in response to conflicts with domestic livestock. This is primarily carried out by the federal agency Wildlife Services, although in Washington and Oregon it is carried out by the state Departments of Fish and Wildlife, and livestock producers also are responsible for some deaths. The official federal program to eradicate wolves and coyotes for the benefit of agricultural interests began in 1905 when the USDA Division of Biological Survey began collaborating with the Forest Service to develop methods to control wolves and coyotes (Bacon 2012). During this period, the livestock industry and sportsmen groups circulated exaggerated accounts of individual wolves engaging in killing sprees against livestock or game animals, using the notoriety created to fuel wolf eradication programs (Gipson et al. 1998).

In Wyoming, "control," or killing of wolves in response to livestock depredations, is the single largest cause of wolf mortality, accounting for 33% of wolf mortalities statewide (*id.*; the figure for 2018 was 37%, WGFD et al. 2019). Some 71% of confirmed cattle conflicts with wolves occurred on public lands (WGFD et al. 2020), indicating that wolves remain unsafe even when inhabiting public lands.

In Washington, more than 34 wolves have been killed by WDFW because of conflict with livestock with at least four being killed by landowners for being "caught in the act." In total, 31% of documented wolf mortalities in the state since 2012 have been agency killing in response

Livestock	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Cattle	55	41	20	26	35	44	40	56	72	154	110	54	42
Sheep	16	26	195	33	30	112	33	6	62	88	81	15	27
Dogs	2	0	7	0	1	3	1	0	0	0	1	0	0
Goats	0	0	0	0	0	0	1	0	0	0	0	0	0
Horses/Donkey	1	0	0	1	1	1	0	0	0	1	0	1	1
Livestock killed	74	67	222	60	67	160	75	62	134	243	191	70	70
Wolves killed	63	46	31	40	36	43	33	37	54	113	61	64	30

Figure 9. Confirmed livestock killed by wolves, and wolves killed in conflict control actions, 2007-2019 (WGFD et al. 2020).

to livestock depredations. (*See* Washington Gray Wolf Conservation and Management Annual Reports 2012 through 2020, Attachment 5).

In Idaho between 2011 and 2015, Wildlife Services and livestock producers killed approximately 285 wolves in Idaho. Post-2015, as federal oversight decreased, these numbers increased substantially: Between 2016 and 2020, Wildlife Services reported killing 353 wolves in Idaho.[46] These deaths account for approximately 10 percent of wolf mortalities in Idaho since 2011.

In Montana, between 2011 and 2020 Wildlife Services reported killing approximately 588 wolves.[47] As Figure 2 shows, these lethal controls are a significant source of wolf mortality in Montana.

Several researchers have analyzed wolf-livestock conflict data for Montana and Wyoming, to determine the effectiveness of wolf killing in response to depredations. Wielgus and Peebles (2014) initially found that livestock losses increased with increasing wolf-killing effort. Poudyal et al. (2016) took issue with Wielgus and Peebles' statistical treatment of the time-series data (most particularly the failure to consider a time-lag variable), and their re-analysis of the dataset indicated that killing wolves increases losses of domestic sheep during the same year, but decreased sheep and cattle losses during the following year. Subsequently, Kompaniyets and Evans (2017) argued that the general linear model approach with log-link function and negative binomial distribution used in both Wielgus and Peebles (2014) and Poudyal et al. (2016) was statistically inappropriate, and re-ran the analysis accounting for the non-linear nature of wolf population growth, livestock depredation, and wolf killing.

Kompaniyets and Evans found that cattle losses indeed increase with increased wolf killing over the first 25 years of the program, but in year 25 (as wolf populations hit saturation and leveled off), cattle losses began to decrease with increased wolf killing effort. According to Kompaniyets and Evans (2017: 11), "Only an increased removal of wolves well above and beyond the rate used by wildlife managers will reduce the rate of cattle depredations, but this level of removal is likely to increase public reaction to the killing of wolves." This, reducing livestock losses is theoretically possible when wolf populations are at saturation, but only with levels of wolf removal that are socially unacceptable.

Santiago-Avila et al. (2018) examined the question of the effect of wolf removals on future livestock depredations in Michigan, and found that removal of depredating wolves reduced livestock losses on that particular farm, but increased livestock losses on neighboring farms within 5 km. Overall, there is insufficient scientific support for the use of wolf removals in response to livestock depredations, if reducing livestock depredations (rather than assuaging the feelings of livestock owners through retribution) is the primary policy goal.

Lethal control of wolves may stimulate reproductive output. With the loss of a breeding female, subdominant females in a pack may also breed, resulting in rapid pack expansion (VonHoldt et

[46] *See generally*, Program Data Reports, available at https://www.aphis.usda.gov/aphis/ourfocus/wildlifedamage/pdr/?file=PDR-G_Report&p=2020:INDEX:
[47] *See id.*

al. 2007). Ausband et al. (2017) found that removal of alpha females from packs (but not alpha males) resulted in increased reproductive output in following years, due to short-term polygyny following removal of the alpha female. Thus, wolf "control" programs can potentially result in increased wolf populations as social hierarchies are disrupted causing an increased number of breeding females.

In a survey of worldwide scientific literature, Van Eeden et al. (2018) found non-lethal coexistence methods, particularly the use of guardian animals to accompany livestock, to be equally effective to predator removal in minimizing livestock losses. Janeiro-Otero et al. (2020) reviewed wolf/livestock science worldwide, and found that wolves preferred native prey to livestock. These researchers recommended that prey species be increased in abundance as a means to reduce livestock depredations and achieve coexistence between livestock operations and wolves.

b. Loss of genetic diversity

Leonard et al. (2004) found evidence of a large loss of genetic diversity in wolves in western North America during the past two centuries. The authors compared the mitochondrial DNA (mDNA) of modern wolves with sequences extracted from specimens from 34 specimens dated between 1856 and 1915. The ancestral wolf population was found to possess twice the genetic diversity of modern wolves, which suggests that the mDNA diversity of the extirpated wolf populations from the western U.S. was more than twice that of the remaining modern population. Some haplotypes possessed by the Mexican wolf, the extinct Great Plains wolf, and the extinct Southern Rocky Mountain wolf were found to form a unique southern clade. All North American wolves group together with those from Eurasia, except for the southern clade which forms a group that is exclusive to North America. The wide distribution area of the southern clade indicates that gene flow was extensive across the recognized limits of its subspecies.

According Chambers et al. (2012), phylogenetic analyses of North American gray wolves show that there are three clades corresponding to *C. l. occidentalis*, *C. l. nubilus* and *C. l. baileyi*, each one representing a separate invasion into North America from distinct Eurasian ancestors. *C. l. occidentalis*, the most northwestern subspecies, is descended from the last gray wolves to colonize North America. It likely crossed into North America through the Bering land bridge after the last ice age, displacing *C. l. nubilus* populations as it advanced. Along with *C. l. nubilus*, *C. l. occidentalis* is the most widespread member of the gray wolf subspecies in North America.

Weckworth et al. (2005, 2010, 2011) found evidence using mitochondrial DNA that the wolves of coastal south-east Alaska are genetically distinct from inland gray wolves. They show a phylogenetic relationship with extirpated wolves from the south (Oklahoma), indicating that these wolves are the last remains of a once widespread group that has been largely extirpated during the last century.

During the 19th century, increased wolf killings linked to human population expansion and declines in prey availability resulted in declining wolf populations throughout much of North America (Young and Goldman 1944; Leopold et al. 1981). By the mid-20th century, predator

control programs brought wolves to near extinction in the conterminous United States, except for northeastern Minnesota (Leonard et al. 2004). Wolves went through a severe genetic bottleneck when they were reduced to a few thousand wolves in Minnesota, from overhunting, trapping, and removal of the prey base. Half the genetic variability of the species was lost during the extirpation of wolves that eliminated the species from the American West (Leonard et al. 2005). Tomiya and Meachen (2018) described ecomorphic impoverishment in modern wolves, when looking at such characters as limb bone length in modern and fossil gray wolves form the Holocene and late Pleistocene of North America. Climate change could have a further significant negative effect on wolf populations and genetics through displacement of packs and prey by more frequent fires, and by habitat shifts and reduced populations of prey animals (Hendricks et al. 2019).

At population levels as they are currently managed, the Montana/Idaho/Wyoming wolf population is at risk for further genetic problems as well as extirpation from ecological threats. Modeling suggests that significant inbreeding depression will occur in the Greater Yellowstone wolf population, at carrying capacity, without connectivity and genetic exchange with other populations (vonHoldt et al. 2007). VonHoldt et al. (2007) found high heterozygosity and few inbreeding problems, as well as behavioral safeguards against within-pack inbreeding, but "future projections of the population at carrying capacity suggest significant inbreeding depression will occur without connectivity and migratory exchange with other populations." While Yellowstone is a source population for wolves, few wolves disperse into Yellowstone (VonHoldt et al. 2007, 2010). The 5.4 dispersing wolves entering Yellowstone per generation found by VonHoldt et al. (2010) is smaller than the minimum of 10 migrants per generation required based on the best available science to maintain genetic heterozygosity in subpopulations (Mills and Allendorf 1996, Vucetich and Waite 2000, Nathan et al. 2017).

Oakleaf et al. (2006) found that there was connectivity between the Idaho and northern Montana wolf populations, but connectivity between either of these populations and the Yellowstone population was significantly less. High wolf density and territory saturation in Yellowstone likely inhibits the movement of wolves into the Yellowstone region from neighboring regions (VonHoldt et al. 2007). VonHoldt et al. (2010) found lower genetic diversity due to smaller population size in the northern Montana wolf population than in the Idaho and Yellowstone populations.

In Yellowstone wolves, DeCandia et al. (2021) found that severity of sarcoptic mange infections were inversely proportional to genetic heterozygosity, indicating that inbreeding is a strong predictor of vulnerability to severe disease. Thus, inbreeding adds increased vulnerability to stochastic disease events to add problems related to birth defects and inbreeding depression.

On Isle Royale, the wolf population fluctuated between 12 and 50 individuals, and after 50 years had lost half its genetic heterozygosity compared to the mainland population (Wayne et al. 1991). This population has collapsed, with inbreeding cited as a major contributing factor (Hedrick et al. 2014, 2019; Robinson et al. 2019). This illustrates that inbreeding can result in population implosions for wolves.

The absolute minimum N_e for genetic viability for any species of animal is 50 (Franklin 1980). Based on a 2004 Yellowstone population size of 170 individuals, Vonholdt et al. (2007) calculated an effective population size (N_e) of 22.1 animals. The Federal Wolf Recovery Plan sets a threshold of 45 pairs total for the combined Montana/Idaho/Wyoming subpopulation(s) which, while above the absolute genetic viability of 50 individuals, is still inadequate to prevent problems like inbreeding depression and birth defects. According to VonHoldt et al. (2007: 16), "For a constant-size isolated population of similar demography and life history, it is predicted that a population size of approximately 600 individuals would be needed to prevent a decrease in heterozygosity and increase in the inbreeding coefficients by less than 5% over 100 years (Table S3)." Likewise the Recovery Plan sets the minimum threshold for total population size at 450, well below the 600-wolf minimum required to prevent a loss of genetic heterozygosity.

IV. THE WESTERN DPS OF GRAY WOLF MEETS THE DEFINITION OF A THREATENED OR ENDANGERED SPECIES AND THE SERVICE CANNOT RELY ON STATE MANAGEMENT TO CONSERVE THIS SPECIES.

When Congress narrowly amended the ESA to direct the Service to reissue the rule removing wolves in some areas from the endangered species list and immunizing that action from judicial review, it did not prevent gray wolves from *ever* being listed under the ESA. *See* 2011 Delisting Rule, 76 Fed. Reg. 25591 (May 5, 2011). Instead, it simply directed the Service to reissue the 2009 Delisting Rule. *See id*. That rule committed that:

> Three scenarios could lead us to initiate a status review and analysis of threats to determine if relisting was warranted including: (1) If the wolf population falls below the minimum NRM wolf population recovery level of 10 breeding pairs of wolves and 100 wolves in either Montana or Idaho at the end of the year; (2) if the wolf population segment in Montana or Idaho falls below 15 breeding pairs or 150 wolves at the end of the year in any one of those States for 3 consecutive years; or (3) if a change in State law or management objectives would significantly increase the threat to the wolf population.

74 Fed. Reg. 15185. It further explained that "management objectives that would significantly increase the threat to the wolf population could lead to reconsideration of listing, including the potential for emergency listing, *at any point*." *Id*. at 15148.

In light of the changes in law and management objectives in Idaho and Montana, the Service must now reconsider this delisting determination.

Regulatory changes in Idaho and Montana significantly increase the threat to the wolf population in the Western United States. When the 2009 Delisting Rule was first issued, there were approximately 491 wolves in Montana, 846 wolves in Idaho, and 302 wolves in Wyoming. 74 Fed. Reg. 15123. The Service believed that "the NRM wolf population will be managed for over 1,000 wolves…." *Id*. at 15133. Idaho intended to allow harvest of only about 54 wolves per year to maintain the state's wolf population at or above 518 wolves statewide. *Id*. at 15169. *See also* IDFG, Idaho Wolf Population Management Plan 2008-2012 (Mar. 6, 2008). Montana

predicted that under its management plan, the wolf population would be between 328 and 657 wolves by 2015. *Id*. at 15167.

The present status of wolves in all three states stands in stark contrast to the situation that existed in 2009. Wyoming is presently managing for 160 wolves and the population dipped below even that minimal threshold in 2018.[48] While Idaho's minimum estimated wolf population was estimated at 900 at the end of 2020,[49] a number comparable to the 846 wolves estimated in 2009, the Idaho Legislature passed S. 1211, a law intended to reduce the population to only 150 animals. Similarly, while the 2019 wolf population in Montana remained comparable to the 854 wolves estimated in 2009,[50] the 2021 Montana Legislature passed new laws expressly aimed at aggressively reducing the population to 150. There are likely fewer wolves in Idaho, Montana, and Wyoming than in 2009, and the Service's 2009 belief that the wolf population in Idaho, Montana, and Wyoming would be managed for over 1,000 wolves can no longer stand in light of these changes.

Even before state Legislatures took charge of wolf management in Idaho and Montana, however, hunting and trapping rules in both states were causing unsustainable annual population reductions. Of the minimum[51] 2019 Idaho wolf population of 1000, a shocking 583 wolves were killed—nearly 60 percent.[52] While the Idaho Department of Fish and Game characterized the wolf population as "stable" with an estimated minimum population of 900 in 2021, it noted that the estimate measured lower wolf occupancy in areas where wolf mortality was the highest.[53] Similarly, in Montana, 40% of the wolf population was killed in 2020 (Inman et al. 2019). These numbers far exceed the 25% annual reductions a healthy wolf population can withstand. (Creel et al. 2015). As enumerated above, in 2021, the State Legislatures of Idaho and Montana each passed new laws in 2021 aimed at reducing the wolf populations by 85-90%, to only 150 animals in each state. Top scientists have described these recent decisions as "eras[ing] any chance of continued recovery of these wolf populations."[54] It would be irresponsible for the U.S. Fish and Wildlife not to step in and restore ESA protections.

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[48] *See* Urbigkit, C. 2019. Woming Wolf Population Drops 18%. Pinedale Online, 21 April 2019; Koshmrl, M. 2019. Wyoming reels in wolf hunting quotas. Jackson Hole Daily, 5 June 2019.

[49] Roger Phillips, Idaho wolf populations remains stable between 2019 and 2020 despite higher mortality, IDFG (Feb. 8, 2021) (available at https://idfg.idaho.gov/press/idaho-wolf-populations-remains-stable-between-2019-and-2020-despite-higher-mortality).

[50] *See* Inman, B., K. Podruzny, A. Nelson, D. Boyd, T. Parks, T. Smucker, M. Ross, N. Lance, W. Cole, M. Parks, and S. Wells. 2019. Montana Gray Wolf Conservation and Management 2019 Annual Report. Montana Fish, Wildlife & Parks. Helena, Montana, pp. 7.

[51] This narrative relies on "minimum" wolf populations because the "minimum" is the wolf population estimated at year's end, as required by the Service. The approximately 1,500-wolf population number commonly cited for Idaho in 2019 and 2020 is measured at the population peak in August.

[52] Roger Phillips, Idaho wolf populations remains stable between 2019 and 2020 despite higher mortality, IDFG (Feb. 8, 2021) (available at https://idfg.idaho.gov/press/idaho-wolf-populations-remains-stable-between-2019-and-2020-despite-higher-mortality).

[53] *Id*.

[54] https://wildlifecoexistence.org/wp-content/uploads/2021/07/Why-We-Should-Act-Now-in-Defense-of-Wolves_7.1.2021.pdf

V. CONCLUSION

In conclusion, wolf populations in a number of states in the Western DPS area (including California, Colorado, Arizona, Utah, Oregon, Washington, and Nevada) are currently below minimum viable population criteria, and are in imminent danger of extinction. Because these states constitute a significant portion of the range of the Western DPS, listing of the gray wolf as "endangered" is clearly warranted. In addition, regulatory mechanisms are clearly inadequate in Wyoming, Idaho, and Montana (and likely other states as well), and new or previously existing state policies are likely to reduce wolf populations in these states down to, or below, the 45 breeding pairs prescribed in the Northern Rocky Mountains Wolf Recovery Plan. Multiple threats exist — notably including overutilization, genetic inbreeding, and particularly disease — and are likely, singly or acting in concert, to reduce these populations significantly below ecological and even genetic minimum viable population thresholds, threatening gray wolves with extirpation in these three states presently holding the Western DPS's largest wolf populations. Thus, the Western DPS of gray wolves is also in danger of extirpation across all of its range.

For these reasons, the signatory organizations and our members urge you to move swiftly to protect the Western DPS of gray wolves before it is too late. There is ample scientific evidence that this species is facing significant threats throughout significant portions of its range, and wolves need Endangered Species Act protection to avoid a second extinction in the wild.

LIST OF ATTACHMENTS

1. Email of Communications Director, Gov. Brad Little, on wolf legislation messaging.

2. Wyoming HB 288, Animal Cruelty - Snowmobiles

3. WDFW Wolf Management Plan, 2011

4. WDFW Wolf-Livestock Interaction Protocol, 2017

5. Washington Gray Wolf Conservation and Management Annual Reports, 2012 through 2020

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ADDENDUM

August 10, 2021

A PETITION TO LIST THE WESTERN NORTH AMERICAN POPULATION OF GRAY WOLVES (*Canis lupus*) AS A DISTINCT POPULATION SEGMENT

Petition Submitted to the U.S. Secretary of Interior

Acting through the U.S. Fish and Wildlife Service

July 29, 2021

Page 7, full paragraph 3:

Current text: In Oregon, In Washington state, wolves were de-listed east of U.S. Highway 95, State Highway 78, and U.S. 395, and endangered west of these roads.

Replacement text: In Oregon, wolves were delisted in the eastern portion of the state, east of the centerline of Highway 395 and Highway 78 north of Burns Junction, and that portion of Oregon east of the centerline of Highway 95 south of Burns Junction.

Page 28, final paragraph:

Current text: Chapron and Treves (2016) found that legal removals of wolves, although often posited to increase "social tolerance" among local communities, actually was correlated with increased levels of poaching. These researchers concluded that "granting management flexibility for endangered species to address illegal behaviour may instead promote such behaviour." Similarly, allowing public hunting of wolves does not increase "social tolerance" for the species or reduce poaching. Indeed, Santiago-Avila et al. (2020) found that the delisting of wolves in Wisconsin, triggering the onset of sport hunting, was accompanied by a significant spike in illegal shooting of wolves.

Replacement text: Chapron and Treves (2016) found that legal removals of wolves, although often posited to increase "social tolerance" among local communities, actually was correlated with slow-downs in population growth unrelated to the number of wolves killed legally. They interpreted this as increased rates of poaching. These researchers concluded that "granting management flexibility for endangered species to address illegal behaviour may instead promote such behaviour." Similarly, allowing public hunting of wolves does not increase "social tolerance" for the species or reduce poaching. Indeed, Santiago-Avila et al. (2020) found that reducing ESA protections was followed by a significant spike in disappearances of wolves that was best explained by cryptic poaching.

Page 32, the first sentence of the first paragraph:

Current text: State wolf policies aimed at reducing populations can have rapid results, potentially overshooting the intended minimum population target (Treves et al. 2021).

Replacement text: State wolf policies aimed at reducing populations can have rapid results, potentially jeopardizing the security of wolf populations and the sustainability of legitimate uses (Treves et al. 2021).

Page 44, final full paragraph:

Existing text: Santiago-Avila et al. (2018) examined the question of the effect of wolf removals on future livestock depredations in Michigan, and found that removal of depredating wolves reduced livestock losses on that particular farm, but increased livestock losses on neighboring farms within 5 km. Overall, there is insufficient scientific support for the use of wolf removals in response to livestock depredations, if reducing livestock depredations (rather than assuaging the feelings of livestock owners through retribution) is the primary policy goal.

Replacement text: Santiago-Avila et al. (2018) examined the effect of wolf removals on future livestock depredations in Michigan, and found that removal of wolves suspected of perdition on domestic ungulates had a net effect of increasing risk for livestock in the region. They found that Michigan's lethal management actions had reduced livestock losses on that particular farm non-significantly, but increased livestock losses on neighboring farms three-fold albeit also not significantly. They also concluded that prior analyses of wolf removal in the Northern Rocky Mountains were irreproducible and not a sound basis for policy. Overall, there is insufficient scientific support for the use of wolf removals in response to predation on domestic animals, if reducing livestock depredations (rather than assuaging the feelings of livestock owners through retribution) is the primary policy goal.