ANIMAL WELFARE INSTITUTE ▪ BUFFALO FIELD CAMPAIGN ▪ GRAVELBAR ▪ NATURAL RESOURCES DEFENSE COUNCIL ▪ AMERICAN BUFFALO FOUNDATION ▪ WESTERN WATERSHEDS PROJECT ▪ SEVENTH GENERATION FUND FOR INDIGENOUS DEVELOPMENT ▪ HORSE BUTTE NEIGHBORS OF BUFFALO ▪ BIG WILD ADVENTURES ▪ GALLATIN WILDLIFE ASSOCIATION ▪ AMERICAN INDIAN LAW ALLIANCE ▪ THE HUMANE SOCIETY OF THE UNITED STATES ▪ WILDEARTH GUARDIANS ▪ KARRIE TAGGART ▪ BARB ABRAMO ▪ GEORGE NELL ▪ ROSALIE LITTLE THUNDER

April 10, 2008

BY ELECTRONIC AND OVERNIGHT MAIL

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Ms. Mary Bomar, Director
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Ms. Suzanne Lewis, Superintendent
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Mr. Mike Snyder, Regional Director
National Park Service
Intermountain Region
National Park Service
12795 Alameda Parkway
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Re: Emergency Rulemaking Petition to Protect the Genetic Diversity and Viability of the Bison of Yellowstone National Park

Dear Secretary Kempthorne, Director Bomar, Superintendent Lewis, and Regional Director Snyder:

On behalf of the Animal Welfare Institute, Buffalo Field Campaign, GravelBar, Western Watersheds Project, American Buffalo Foundation, Natural Resources Defense Council, Seventh Generation Fund for Indigenous Development, Horse Butte Neighbors of Buffalo, American Indian Law Alliance, Gallatin Wildlife Association, Big Wild Adventures, The Humane Society of the United States, WildEarth Guardians, West Yellowstone, MT residents Karrie Taggart, barb abramo, Gardiner, MT resident George Nell, and Rapid City, SD resident Rosalie Little Thunder (hereafter collectively referred to as the petitioners), we hereby petition the U.S. Department of the Interior (DoI) and National Park Service (NPS) to immediately promulgate emergency regulations to protect the genetic diversity and viability of the bison

who inhabit Yellowstone National Park (YNP).[1] This emergency rulemaking petition is submitted pursuant to 5 U.S.C. 553(e).[2]

Petitioners request the immediate promulgation of a rule that prohibits the NPS from killing or participating in the killing of bison from Yellowstone's northern range or central herd populations if the numbers in each population are reduced through management actions and/or natural mortality to 2,000 or fewer bison.[3] Specifically, as required by 43 C.F.R. §14.2, petitioners request the emergency adoption of the following rule in the YNP regulations at 36 CFR 7.13 et seq.:

> 7.13(i) Bison Conservation: Employees, agents, or contractors of the National Park Service are prohibited from killing or capturing for the purpose of removing individuals from the breeding population, removing from the ecosystem, and/or participating in any similar action involving bison within or outside of the park when 2,000 or fewer bison are estimated to remain in any distinct bison population within the park.
>
> 7.13(i)(1) A distinct bison population is any herd or group of bison that are determined to be distinct based upon physical, physiological, ecological, or behavioral factors, including genetic or morphological differences. The Northern range bison population (primarily inhabiting the Lamar Valley) and the Central herd population (primarily inhabiting Pelican and Hayden Valleys and the Firehole region) both constitute distinct bison populations.
>
> 7.13(i)(2) Verification of distinct bison population numbers shall be determined using scientifically sound, peer-reviewed methodologies for determining bison population size.
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> 7.13(i)(3) Notwithstanding any other provision of the law, the prohibition against the lethal and non-lethal removal of bison contained in this subsection shall not prevent any

[1] Bison who inhabit YNP are variously referred to in this petition as "YNP bison," "park bison," or similar terms. These descriptive terms are not intended to connote and should not be interpreted to mean that the bison belong to YNP and/or that bison should be solely managed within YNP or solely by the NPS. Bison are a free-ranging wildlife species that should and must be given access to habitat outside of the boundaries of YNP.

[2] A similar emergency rulemaking petition prepared pursuant to the Montana Administrative Procedures Act and other relevant statutes will be submitted to Governor Brian Schweitzer, the Montana Department of Livestock, and the Montana Department of Fish, Wildlife and Parks seeking the immediate promulgation of a similar rule to restrict the lethal management of bison by state agencies.

[3] The proposed emergency rule should not be interpreted as petitioners support for: (1) the NPS-initiated lethal management of bison when estimated population numbers are in excess of 2,000 animals; (2) for an interagency limit of 4,000 bison in the Greater Yellowstone Ecosystem; (3) for restricting bison range so as to prevent the natural reestablishment of wild bison on suitable lands outside YNP, including in the upper Gallatin Valley; or (4) long-term support for the capture, holding, and release of bison in the Stephens Creek trap who should, under the terms of the 1999 land deal, have access to Royal Teton Ranch/Church Universal and Triumphant lands.

> employee, agent, or contractor of the National Park Service from destroying any bison within the park or from participating in the destruction of any bison outside the park if necessary and authorized to protect human life or to prevent undue suffering of any bison injured as a result of human actions.

Once promulgated this regulation would prohibit the NPS from using lethal tools to manage northern range or central herd bison inside or outside of YNP, from participating in actions outside of YNP the intent of which is to kill or capture bison for the purpose of slaughter, and/or from allowing or participating in the non-lethal management of bison that effectively removes an animal from the ecosystem (i.e., capture for quarantine or for other research purposes) if or when the number of bison in that herd are reduced to a minimum of 2,000 animals. Population estimates would be assessed using the standard techniques employed by the NPS that have been sufficiently tested and subject to appropriate peer review including park-wide aerial surveys. Once either the Northern range or Central herd population is estimated to contain a minimum of 2,000 or fewer animals, the NPS is limited to the use of non-lethal management actions that will not result in the removal of any bison of that herd from the ecosystem to control the distribution and movements of bison.

This emergency rule, as is further articulated below, is essential to protect the short and long-term genetic diversity and viability of Yellowstone Northern range and Central herd bison populations. The emergency regulation will prevent unacceptable impacts and impairments to the bison populations that are prohibited under the NPS Organic Act (16 U.S.C. §1 et seq.), NPS Policy (NPS 2006), and will enable the NPS to meet its legally required conservation mandate. Consequently, the petitioners believe the legal criteria of "good cause," 5 U.S.C. §553(d)(3) are met in this case and justify the immediate publication of the proposed language as an emergency rule without providing an opportunity for public notice and comment to stop the NPS from continuing to capture and slaughter or otherwise remove bison from the ecosystem during the winter/spring of 2007/2008. As the petitioners are seeking the permanent amendment to the YNP regulations as specified in the proposed rule, they also request that the NPS subject the proposed rule to the formal rulemaking process, including the provision for public notice and comment, prior to the resumption of any NPS-led or initiated lethal bison management activities in the future.

This emergency rule is justified based on a series of dissertations and published scientific studies documenting the presence of two or more genetically distinct bison populations within YNP and the need to protect a minimum of 2,000 bison in each population to preserve sufficient allelic diversity in order to ensure survival of the populations over 200 years (see Halbert 2003, Christianson 2005, Olexa and Gogan 2005, Gardipee 2007, Gross and Wang 2005, Gross et al. 2006, Freese et al. 2007). The existing bison management plan was developed prior to the publication of the studies documenting the presence of genetically distinct bison populations within YNP and has yet to be adapted or amended to consider this new evidence. As a result, the existing plan does not contain sufficient controls on lethal bison

management removals to protect the genetic diversity or viability of the populations. Furthermore, the adaptive management framework inherent to the Interagency Bison Management Plan (IBMP) also requires that the NPS and its cooperating agencies update the plan based on new information such as the genetic evidence summarized in this petition.

Background – Bison Management:

The IBMP, adopted in 2000, currently directs bison management within and outside of YNP. The IBMP was a result of The Final Environmental Impact Statement and Bison Management Plan for the State of Montana and Yellowstone National Park (Final EIS) prepared by the NPS and the U.S. Department of Agriculture's U.S. Forest Service and Animal and Plant Health Inspection Service (hereafter the federal agencies). The agencies, including the Montana Department of Livestock (MDOL) and Montana Department of Fish, Wildlife and Parks (hereafter also referred to as the state agencies), published a Draft EIS on June 16, 1998, followed by the publication of the Final EIS in August 2000. On December 20, 2000, the federal agencies published a Record of Decision (RoD). This was preceded, on November 15, 2000 by the publication of a Final EIS by the state agencies which, in effect, adopted the modified preferred alternative set forth in the Final EIS by the federal agencies. Because the federal and state RoDs are largely identical, for the purpose of this rulemaking petition the federal RoD will be used to describe current bison management provisions.

The overarching purpose of the IBMP is to "maintain a wild, free-ranging population of bison and address the risk of brucellosis transmission to protect the economic interest and viability of the livestock industry in the state of Montana" (Final EIS at vii). Among the objectives agreed to by the federal and state agencies to aid in their selection of a bison management alternative was to, "at a minimum, maintain a viable population of wild bison in Yellowstone National Park, as defined in biological, genetic, and ecological terms" (Final EIS at vii). To accomplish this purpose and achieve the specified objectives, the agencies included in the Final EIS a modified preferred alternative, which "employs an adaptive management approach that allows the agencies to gain experience and knowledge before proceeding to the next management step…" (Final EIS at xxii).[4] This provision provides the agencies with the ability to adapt their management of bison as they implement the plan. Moreover, the agencies "may agree to modify elements of this plan based on research and/or adaptive management findings."[5] RoD at 32.

[4] Adaptive management is defined in the Federal RoD as "testing and validating with generally accepted scientific and management principles the proposed spatial and temporal separation risk management and other management actions. Under the adaptive management approach, future management actions could be adjusted based on feedback from implementation of the proposed risk management actions." Federal RoD at 22.

[5] See also, July 12, 2006 letter from Clarke et al. to Senator Max Baucus ("under the adaptive management approach, future management actions can be adjusted as new information … is obtained").

The modified preferred alternative was not originally included in the Draft EIS but was created by the federal and state agencies during the development of the Final EIS. This alternative established three zones, both within and outside of YNP's northern and western borders, where bison management would become more intensive as the bison moved from zone 1 (inside of the park) through zone 2 (immediately adjacent to park boundaries) and into zone 3 (further removed from park boundaries) and where bison are not permitted. In addition to the zone concept, the modified preferred alternative incorporated three "adaptive management steps" that are intended to "minimize the risk of transmission of brucellosis to cattle grazing on public and private lands adjacent to Yellowstone National Park, and will, when all criteria are met,[6] provide for the tolerance of a limited number of untested bison on public and private lands where permitted adjacent to Yellowstone National Park during winter." Federal RoD at 22.

For example, on the west side during step 1, if hazing became ineffective all bison would be subject to capture and testing with seropositive bison sent to slaughter while up to 100 seronegative bison, including pregnant females, could be released to temporarily occupy certain lands within zone 2 (Final EIS at 178; Federal RoD at 12). The agencies would endeavor to capture and test all bison that leave the park during step one but can allow seronegative bison as well as other bison that cannot be captured to remain outside the park until May 15 (Federal RoD at 12).

Step 2 would begin when the agencies could deliver a safe and effective vaccine to bison calves and yearlings and would allow for the remote vaccination of any untested bison calves, yearlings, or other vaccine eligible bison who could not be captured in the west boundary area (Final EIS at 179; Federal RoD at 13).

Step 3 would be initiated when the agencies have collected adequate data and acquired sufficient experience in managing bison outside of the park (at least two years of data/experience following initial release of seronegative bison) and would tolerate up to 100 untested bison to freely range in the western boundary area subject to zone management restrictions (Final EIS at 180; Federal RoD at 13).

On the northern boundary, the NPS would attempt to prevent bison from emigrating beyond the park's northern boundary onto private land through the use of hazing. If hazing became ineffective then, in step 1 of the IBMP, the NPS could capture bison in its Stephens Creek trap (inside of YNP), test all captured bison, send seropositives to slaughter while holding up to 125 seronegative bison for release back into the park in early spring (Final EIS at 180; Federal RoD at 12).[7]

[6] These specific criteria are detailed in the Federal RoD (pages 23 through 31).
[7] The capacity of the Stephens Creek trap to hold bison has been increased since the IBMP went into effect with current temporary holding capacity believed to equal or exceed 300 bison.

Step 2 was to begin upon the expiration of a cattle grazing lease on private lands owned by the Church Universal and Triumphant (a.k.a. Royal Teton Ranch) in 2002 after which time up to 100 seronegative bison could be released from the Stephens Creek trap and allowed to roam outside of the park (Final EIS at 183; Federal RoD at 12).

In step 3, after two years of gathering information about bison movements and behavior, and acquiring experience monitoring bison in the Reese Creek area (the park's northern boundary area), untested bison would be allowed outside the park in this area (Final EIS at 183; Federal RoD at 13). The agencies estimated that step three of the IBMP would be initiated on the west and north boundaries of YNP by 2003/2004 and 2004/2005, respectively (Final EIS at 180).

The NPS analysis of the impacts of the modified preferred alternative in both the Final EIS and Federal RoD on the park's bison was premised on a single population of bison inhabiting the park. As a consequence, the impacts associated with the shooting or capture and slaughter of bison from within or outside YNP were evaluated based on the presumption that the park's bison population was a single, inter-mixing unit.

The IBMP established a bison "population target" of 3,000 animals.[8] Federal RoD at 20. This "population target" was not based on any assessment of the biological/ecological carrying capacity of the park or its surrounding lands. Rather, it was the product of an analysis conducted by Cheville et al. in their National Academy of Sciences report on brucellosis in bison in which they concluded that at a population size of 3,000, bison are "most likely to respond to heavy snow or ice by attempting to migrate to lower elevation winter range outside Yellowstone National Park" (Final EIS at 192). Consequently, the IBMP was never intended to be a bison population management plan and the 3,000 bison "population target" is "defined as a population indicator to guide implementation of risk management activities, and is not a target for deliberate population adjustment."[9]

Though the IBMP was not designed to limit the size of the bison population, it specifies that if the late-winter/early-spring bison population count is above 3,000 or if tolerance levels outside the park are exceeded, the agencies have the discretion to send seronegative bison to quarantine (if available) or to slaughter all captured bison without testing (Final EIS at 193; Federal RoD at 20 and 32). Conversely, if the late-winter/early-spring bison population was less than 3,000 bison, contingency measures may be put into effect in the Reese Creek area to keep the population stabilized. In the West Yellowstone area, no specific contingency measures, with

[8] Some, including agency officials, have misinterpreted this "population target" as a population cap. No such cap has ever been established for bison in or outside of YNP with the exception of the IBMP's proposed tolerance levels applicable to bison emigrating beyond park borders. Indeed, any cap placed on bison numbers within YNP would be illegal as it would violate the NPS natural regulation mandate provided in the agency's Organic Act, regulations, and policies.

[9] See November 20, 2006 Memorandum to Administrative Record, Re: Adjustments to 2006-2007 Interagency Bison Management Plan Operating Procedures.

the exception of sending captured seronegative bison to quarantine, were identified (Final EIS at 193).

The Federal RoD includes another contingency provision to mitigate total removal of bison due to exigent circumstances arising from severe winter conditions. Federal RoD at 34. Under this provision, when the total bison population declines below 2,300 within a single winter, the agencies may, on a temporary basis for that winter, increase implementation of non-lethal management measures to provide management flexibility and reduce the total management removal of bison from the population. Federal RoD at 34. If the total bison population declines below 2,100 within a single winter, the agencies will, on a temporary basis for that winter, increase implementation of non-lethal management measures. Federal RoD at 34.

The Final EIS and Federal RoD both included an abbreviated discussion of bison genetics. In those documents, the NPS concedes that though cattle mitochondrial DNA had been found in several privately-owned, state, and federal herds, there was no evidence of hybridization with cattle in Yellowstone bison (Final EIS at 287). It also reported that, as a species, bison demonstrate levels of genetic variation that are "relatively low" but higher than other species that have been subject to recent population bottlenecks and that YNP bison "display average levels of genetic variation when compared with other bison populations" (Final EIS at 287).

Though the NPS includes a discussion of what would have to be taken into account to estimate a minimum viable population for bison required to maintain the population at a constant level of genetic variation (i.e., sex ratio of breeding adults, reproductive success of males and females, fluctuations in population size, role of random chance within the population), it does not disclose the minimum viable population size for Yellowstone bison (Final EIS at 288; Federal RoD at 51). It does concede, however, that "management prescriptions that result in nonrandom selective removal of bison from the population through lethal and non-lethal mechanisms … can negatively influence the resultant genetic integrity and viability of a population" (Final EIS at 288). This is precisely what is happening near the northern and western borders of YNP.

Moreover, in the Federal RoD, the NPS indicates its commitment to conducting additional research on genetics in bison, and if said research suggests that the management practices of the IBMP adversely affect genetic diversity, the "NPS will review management actions and recommend adjustments." Federal RoD at 51.

Since the IBMP was implemented in 2000, the agencies have undertaken a single review of the plan. This review, published in 2005 (Clarke et al. 2005), included an assessment of new information about potential brucellosis vaccines as well as a summary of fetal disappearance and *Brucella* persistence studies conducted in the Yellowstone area. These latter studies were to assess the risk of indirect transmission of the bacteria based on the presence of contaminated fetal tissues or the survival of the bacteria itself in the environment.

Background – Legal Issues:

YNP was created on March 1, 1872 as America's first national park. In setting aside YNP as a "public park or pleasuring ground for the benefit and enjoyment of the people," 16 U.S.C. § 21, Congress expressly provided for the protection of the park's superlative features. It did so by directing the Secretary of the Interior to ensure that all "timber, mineral deposits, natural curiosities, or wonders within the park," be preserved from "injury or spoliation" and retained "in their natural conditions." Id. at § 22.

At the time of park establishment, there were only several hundred bison within the remote reaches of the park. These bison were the only wild bison who survived the government-approved near extermination of the species as a consequence of disease, competition with cattle, and excessive market and sport hunting. Yet, Yellowstone's creation did not stop the continued exploitation of bison within the park boundaries as poaching reduced the park population to an estimated 23 animals by 1902. In 1894, in recognition of the continued illegal killing of wildlife in YNP, Congress amended Yellowstone's enabling legislation to explicitly prohibit "all hunting, or the killing, wounding, or capturing at any time of any bird or wild animals, except dangerous animals, when it is necessary to prevent them from destroying human life or inflicting an injury." 16 U.S.C. § 26.

Forty-four years after establishing YNP, Congress created the NPS. The primary NPS mandate was to "promote and regulate the use of the Federal areas known as national parks, monuments, and reservations … by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservation, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations." 16 U.S.C. § 1. Congress, in 1978, reemphasized the conservation mandate of the NPS when it passed the Redwood Amendment to the NPS General Authorities Act. That amendment specified that "the authorization of activities shall be construed and the protection, management and administration of these areas shall be conducted in light of the high public value and integrity of the National Park System and shall not be exercised in derogation of the value and purposes for which these various areas have been established…" 16 U.S.C. § 1a-1.

NPS regulations pertaining to wildlife protection prohibit "possessing, destroying, injuring, defacing, removing, digging, or disturbing from its natural state … living or dead wildlife or fish." 36 C.F.R. § 2.1(a) and (a)(1). Though there are no NPS regulations explicitly addressing the protection of genetic viability within park wildlife populations, the overall conservation mandate of the NPS along with its policies (NPS 2006) require that such protections be implemented.

NPS Policies, for example, require the agency to "strive to understand, maintain, restore, and protect the inherent integrity of the natural resources, processes, systems, and values of the parks …" NPS Policies at 4. These "resources, processes, systems, and values" include "biological resources such as native plants, animals, and communities, biological processes such as photosynthesis, succession, and evolution…" Id.

NPS Policy specifies that "natural resources will be managed to preserve fundamental physical and biological processes, as well as individual species, features, and plant and animal communities." NPS Policies at 4.1. More specifically, the NPS "will try to maintain all the components and processes of naturally evolving park ecosystems, including the natural abundance, diversity, and genetic and ecological integrity of the plant and animal species native to those ecosystems." Id.

In managing plants and animals native to park ecosystems, the NPS is required to preserve and restore "the natural abundances, diversities, dynamics, distributions, habitats, and behaviors of native plant and animal populations and the communities and ecosystems in which they occur" and to minimize "human impacts on native plants, animals, populations, communities, and ecosystems, and the processes that sustain them." NPS Policies at 4.4.1. Thus, "whenever possible" the NPS will rely on natural processes "to maintain native plant and animal species and (to) influence natural fluctuations in populations of these species." NPS Policies at 4.4.2. This includes protecting "the full range of genetic types (genotypes) of native plant and animal populations in the parks by perpetuating natural evolutionary processes and minimizing human interference with evolving genetic diversity." NPS Policies at 4.4.1.1. The overarching goal is to preserve these naturally evolving components and processes in their "natural condition" in order to prevent "resource degradation." NPS Policies at 4.1. A "natural condition" is defined as "the condition of resources that would occur in the absence of human dominance over the landscape." NPS Policies at 4.

As specified above, the NPS Organic Act requires the conservation of park resources, including wildlife, and prohibits the impairment of and/or unacceptable impacts to the national parks. NPS Policy provides additional guidance on the conservation standard and what constitutes an impairment or unacceptable impact.

NPS Policies make clear that the "fundamental purpose of the national park system ... begins with a mandate to conserve park resources and values." NPS Policies at 1.4.3. This mandate is independent of the prohibition on impairment and is applicable "all the time" to "all park resources and values" even if there is no risk of impairment. Id. To achieve this mandate, NPS managers must "always seek ways to avoid or to minimize to the greatest extent practicable, adverse impacts on park resources and values." Id. According to NPS policies, discretion is provided to the NPS to allow such adverse impact but only "when necessary and appropriate to fulfill the purposes of a park" as long as the impact does not cause an impairment, id., and

when any impacts associated with such uses are avoided, minimized, or mitigated through restrictions placed on the use in question. NPS Policies at 8.1.2.

An "impairment" is defined in NPS Policies as "an impact that, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values." NPS Policies at 1.4.5. Such "resources and values" include "the park's scenery, natural and historic objects, and wildlife, and the processes and conditions that sustain them, including, to the extent present in the park, the ecological, biological, and physical processes that created the park and continue to act upon it (including) … native plants and animals." NPS Policies at 1.4.6. Impairments can result from visitor activities, NPS administrative actions, concessionaire and contractor activities, and even from activities occurring outside of the park. Impairments are more likely to occur when the activity: "affects a resource or values whose conservation" fulfills the specific purposes of the park; is key to the natural or cultural integrity of the park or the opportunities to enjoy the park; or that is identified as significant in the park's general management plan or other planning document. NPS Policies at 1.4.5. Whether an action constitutes an impairment depends on a number of other variables including: the resource and values in question; the severity, duration, and timing of the impact; and the direct, indirect, and cumulative effects of the impact. Id. Impairments to park resources and values are not permissible "unless directly and specifically (and explicitly) provided for by legislation or by the proclamation establishing the park." NPS Policies at 1.4.4.

To reduce the likelihood of any action impairing park resources or values, NPS Policies also specify that "unacceptable impacts" are "not to be allowed." NPS Policies at 1.4.7.1. "Unacceptable impacts" are those impacts that, individually or cumulatively, would "be inconsistent with a park's purposes or values, or impeded the attainment of a park's desired future conditions for natural … resources, … or diminish opportunities for current or future generations to enjoy, learn about, or be inspired by park resources or values." Id. and NPS Policies at 8.2.

In addition to the impairment and unacceptable impacts standards to which the NPS must comply, there is a separate and overarching conservation mandate required by relevant statutes (i.e., National Park Service Organic Act and 1978 amendments to the General Authorities Act). The mandate to conserve park resources and values is separate from the prohibition on impairment, and therefore, the conservation mandate applies even when there is no risk that park resources or values may be impaired. Federal RoD at 9. Unless otherwise specifically and directly provided for in a particular law, the NPS "must manage park resources and values to allow them to continue to exist in a condition that will allow the American people to have present and future opportunities for enjoyment of them." Federal RoD at 10.

Discussion – Status of the IBMP:

To date, the IBMP has been a failure. Entering its eighth year of implementation, the IBMP remains hopelessly stuck on step one of the three-step plan on both the northern and western boundaries of YNP.

Many of the predictions contained in the Draft EIS were wrong, and therefore, the analysis based on those predictions was in error. For example, the claim that step 3 of the IBMP would be initiated on the western and northern boundaries of the park by 2003/04 and 2004/05, respectively, was wrong.

On the northern boundary, while the Church Universal and Triumphant (CUT) did not renew an existing cattle grazing lease when the lease expired in 2002 (as was apparently agreed to by CUT and the agencies), it elected to stock its own cattle on the previously leased land undermining the intent of not renewing the previous lease. Much of the plan's analysis and predictions regarding bison management on the northern border of YNP near Gardiner, MT were premised on the non-renewal of the lease, the establishment of a cattle-free scenario on CUT lands, the establishment of an agency/CUT bison management plan as called for in the 13 million dollar 1999 land deal, and increased flexibility with bison management beyond YNP's northern boundary.[10] These predictions and analyses are now entirely worthless as the scenario anticipated by the agencies never materialized.

Similarly, the development of a safe and efficacious vaccine and delivery system to initiate a park-wide bison vaccination program – the trigger to graduate from step 1 to step 2 on the west side of YNP has not been completed.[11]

Even implementation of the terms of the IBMP and associated agreements has been controversial. For example, the IBMP requires the agencies to test all captured bison and release/hold seronegatives and slaughter seropositives until and unless the late winter/early

[10] The 1999 land deal which was orchestrated by the Rocky Mountain Elk Foundation, CUT, and state and federal agencies included the fee purchase of 5,262 acres of CUT lands in Cutler Meadows, North Dry Creek, Bassett Creek, and Royal Teton Ranch lands between Yankee Jim Canyon and Cinnabar Mountain near YNP, the exchange of other lands, and the establishment of conservation easements involving additional land parcels including 1,508 acres near Devil's Slide. At the time this deal was trumpeted by former Montana Governor Marc Racicot and former Secretary of the Interior Bruce Babbitt as of significant value and benefit to YNP wildlife, including bison, because it was intended to facilitate wildlife use of CUT lands. Though both the agencies and CUT are equally at fault for the subsequent dissolution of the agreement inherent to the 1999 land deal, only now, after several years of negotiations, has a new agreement been developed which, though not made public yet, involves a multi-million dollar payout to CUT in exchange for removal of its cattle from its private land near its Corwin Springs, MT headquarters and to allow limited numbers of seronegative bison to use its lands or traverse its land to access other public land areas. The new deal includes the construction of miles of bison-proof fencing to control what areas the bison can use and to create movement corridors. The cost of the fencing and its maintenance is in addition to the multi-million dollar payout to the CUT.

[11] Though an EIS on the proposed vaccination program is allegedly due to be released for public comment soon, there remains a considerable scientific debate over the efficacy of RB51; the primary vaccine currently used in cattle in the U.S. and in many other countries.

spring bison count is conducted.[12] If that count reveals that there are more than 3,000 bison in the population, the agencies then have the discretion to send all captured bison to slaughter without testing. The agencies have ignored this requirement by routinely capturing and slaughtering all bison without testing even before the late winter/early spring count is conducted based on an assumption that the count will exceed 3,000 if the pre-winter count is far in excess of the 3,000 threshold. Similarly, the agencies, particularly the MDOL, routinely violated restrictions placed on bison hazing operations on the Gallatin National Forest to protect nesting bald eagles prior to the delisting of the species. Though these restrictions were originally implemented after consultation with the U.S. Fish and Wildlife Service as required by the Endangered Species Act, instead of enforcing compliance with the restrictions, the restrictions have subsequently been repealed, weakened, or waived to allow the agencies to engage in many hazing practices that were previously prohibited.

Simply stated, though the agencies seemingly remain supportive of the IBMP, it has been a complete failure from the perspective of numerous Native American tribes, environmental, conservation, and animal protection organizations, wildlife and hunting groups, local residents, and the tens of thousands of people who have participated in the government's planning efforts, and for the millions of Americans and citizens from around the world who have repeatedly expressed their concerns pertaining to bison management only to have their input ignored.

As previously stated, there has been a single agency review of the IBMP (Clarke et al. 2005). The 2005 review held that the agencies had successfully implemented the IBMP and met the plan's objectives of maintaining a wild, free-ranging bison population and of addressing the risk of brucellosis transmission to cattle. The review included updated information about bison population abundance, bison movements, bison management actions, the safety and efficacy of vaccines, the development of a remote vaccine delivery system, and the survival and persistence of the *Brucella* bacteria and fetal tissues in the environment. During the course of the first five years of the IBMP, several agencies were engaged in multiple experiments to test vaccines, develop vaccine delivery systems, and to assess the survival of the bacteria and fetal tissues in the Yellowstone environment.

What was entirely missing from the 2005 review was any discussion of the new evidence pertaining to the genetics, genetic health, and genetic diversity of the Yellowstone bison population. Indeed, despite the publication of several dissertations or peer-reviewed studies on the subject between December 2000 and the review's release in September 2005, not a single one of these publications was mentioned in the review. Moreover, since September 2005, there is no evidence that the agencies have subsequently evaluated or considered Yellowstone bison

[12] The NPS has ignored this mandate in the past (e.g., winter of 2005/06) and during the present winter as evidenced by the capture and slaughter of bison who have not been tested before engaging in the late winter/early spring bison count. One or more of the petitioners raised this issue with the NPS in 2005 to no avail.

genetic issues raised in an increasing number of studies and/or contemplated any adaptation of the IBMP in light of this new evidence.

Indeed since 2000, the agencies have, to the best of our knowledge, adapted the IBMP only twice. Prior to the initiation of Montana's bison hunt in the fall of 2005, the agencies altered the zone 2 hazing provisions on the western boundary to reduce or to cease hazing altogether from mid-November to mid-February in order to facilitate the hunt.[13] In addition, prior to the 2006-2007 winter season the agencies adapted the IBMP by agreeing to: 1) allow bison outside the park between November 1 and May 15 to be hazed from higher risk areas toward area(s) of lower risk outside the park; 2) tolerate bull bison (single or small groups) outside the park between November 1 to May 15 who are otherwise subject to hazing under the IBMP if the bison are deemed of low risk for disease transmission, and public or property safety; and 3) clarified that the "population target" of 3,000 bison is a "population indicator to guide implementation of risk management activities, and is not a target for deliberate population adjustment."[14] Adaptations 1 and 2, however, remain under the jurisdiction and discretion of the Montana State Veterinarian meaning that they are not permanent changes but are permitted if or when acceptable to the State Veterinarian.

From December 2000 through April 9, 2008, under the terms of the IBMP, 3,528 bison have been killed. This includes approximately 270 bison killed by hunters during Montana's three bison hunting seasons (2005-06, 2006-07, 2007-08). The remaining bison have been killed by agency officials largely as a result of capture and slaughter. For 2007-2008, 1,510 bison have been killed (including hunter-caused mortality) as of April 8, 2008. In total, to date, 1,609 or more than one-third of the pre-winter bison population have been killed this winter or sent to quarantine; the largest number of wild bison killed in a single winter since the 19th century.[15] Given deep snow conditions, snow-water equivalent levels, and the possibility that ice layers are beginning to form in the snow pack there is a very real possibility that hundreds, and perhaps as many as a thousand additional bison may emigrate near or beyond park borders over the next few months. Each of these bison may be killed given the agencies' particularly aggressive implementation of the IBMP this winter.[16]

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[13] See July 12, 2006 letter from Clarke et al. to Senator Max Baucus. See also, Interagency Bison Management Plan Operating Procedures, Updated November 16, 2007.

[14] See November 20, 2006 Memorandum to the Administrative Record from the Interagency Bison Management Plan Partner Agencies regarding Adjustments to 2006-2007 Interagency Bison Management Plan Operating Procedures.

[15] On March 19, 2008 the NPS modified its capture and slaughter operation at its Stephens Creek bison trapping facility. Captured calves testing seronegative will now be sent to captive facilities for use in a pilot quarantine project. Other captured seronegative bison are to be held and released back into the park later in the spring while seropositive bison will be sent to slaughter. Despite this transition, potentially hundreds of bison may still be slaughtered this spring.

[16] Unlike previous years when increased tolerance was shown toward bison during the post-hunt period (after February 15 until mid-late April) on the western side of the park, it appears that such tolerance is no longer being practiced. Considering that there are no cattle on public or private lands adjacent or near the western border of

Bison have been killed on winter ranges in the western and northern borders of YNP. Nearly all bison who have been hunted or captured and slaughtered on the western border originate from the Central range herd. On the northern border, both Central range and Northern range bison are subject to hunting, agency shooting, or capture and slaughter. Bison from the Central range move both west and north during the winter months with their northern movements to the Gardiner Basin facilitated by their use of the snow-packed roads from Madison Junction through Norris to Mammoth (Gates et al. 2005). Gates et al. (2005) questioned whether such northward movements involving Central range bison would have occurred in the absence of the snow-packed road corridors.

Discussion – Genetic Health, Viability, and Diversity of Yellowstone Bison:

This emergency rulemaking petition is justified based on the best available scientific evidence pertaining to the genetic health, viability and diversity of Yellowstone's bison population and in light of the mass and ongoing emigration of bison to the park's northern and western borders. As of April 9, over 1,609 bison have been killed or removed from the ecosystem. This includes 166 killed by hunters (tribal and non-tribal), 1,341captured and sent to slaughter 99 removed for quarantine, and three who died or were euthanized in the capture facilities[17] with a few months left before bison movements beyond park boundaries are likely to slow or cease altogether. As a consequence, it is possible that hundreds of additional bison may be captured and slaughtered this winter, which, when added to the bison who will succumb to natural winterkill, could result in one-half of Yellowstone's pre-winter bison population being lost forever.[18]

YNP and that cattle are not returned to private lands in the area until June 1 or later, the risk of bacteria transmission from bison to cattle is non-existent. In addition, the principle destination of many bison is Horse Butte, which contains a large area of private land that is now owned by a couple who have no intention of running cattle on their land, who have designated their land as an unofficial bison safe zone where bison are welcome and permitted, and who have advised the MDOL that trespass on their property for the purpose of hazing bison is not permitted (see August 16, 2007 correspondence from Rob and Janae Galanis, Yellowstone Ranch Preserve to Dr. Marty Zaluski, State Veterinarian, MDOL). On adjacent federal land, a former cattle grazing allotment was vacated by court order in 2002 (Greater Yellowstone Coalition v. Bosworth, 209 F. Supp. 2d 156 (D.D.C. 2002)). The change in ownership and management of the Horse Butte lands (both private and public) has also eliminated any chance of bison/cattle commingling on the entirety of Horse Butte, a 9,600 acre area bounded by Hebgen Lake to its south, west, and north. It is believed that the lack of tolerance for bison occupying public or private land outside YNP's western border this winter is a product of a confirmed case of brucellosis in a Bridger, MT cattle herd (in which bison played no role), increased pressure by the livestock industry on the agencies to adhere to a zero-tolerance policy for bison in Montana, and an intentional effort by the agencies to limit the number of bison outside YNP during the spring months to simplify and expedite potential hazing and slaughtering operations generally implemented in April/May.

[17] See Yellowstone Bison Population Management Activities report for the period 15 March through 31 March, 2008.

[18] It must be noted that the U.S. Fish and Wildlife Service, in response to a 1999 petition filed seeking the listing of Yellowstone bison under the Endangered Species Act, concluded that the "YNP bison herd may be discrete from other members of the taxon *Bison bison* because of physical distance and barriers," "YNP bison may exist in

The information referenced and summarized below has, to date, been ignored by the agencies with regard to their annual operating plans for the management of bison under the IBMP. This evidence demonstrates that there are two or more genetically distinct bison populations in YNP. Consequently, boundary management removals may be causing a far more severe impact on the genetic health of the bison populations than the NPS and/or its cooperating agencies ever considered or analyzed in the Draft or Final EIS, in its 2005 IBMP review or in any previous or subsequent planning document. As this winter's bison death toll increases because of management removals on both the west and northern borders of YNP, the impacts to the genetic health, viability, and diversity of the two primary populations – the Central herd and Northern range herd – are escalating. This, in turn, is irreparably jeopardizing the long-term genetic health of these populations and compromising the fitness of future park bison by reducing the allelic diversity of the current bison populations. In the long-term, this may lead to the "ecological extinction" and potentially the local extirpation of park bison as genetically less diverse bison may not be able to adapt to changing environmental conditions.

Neither the NPS nor any of the cooperating state or federal agencies has made any effort to amend or adapt the IBMP in light of this new evidence on distinct bison populations and genetic viability. For the NPS this failure violates its statutory conservation mandate, its policies pertaining to the protection and conservation of park wildlife, and the adaptive management framework which underlies the IBMP.

Therefore, to ensure that the NPS complies with its own statutory, regulatory, and policy mandates to conserve and protect park bison and that it adapts the IBMP to consider this important and compelling new scientific evidence, an emergency rule is required. This rule would prohibit the NPS from engaging in the lethal management of bison within or outside of YNP if the Northern range bison herd and/or Central range bison herd are determined to include a minimum of 2,000 or fewer bison each. Once the populations fall below this threshold (which has already occurred), the NPS is no longer permitted to directly or indirectly participate in bison management actions that will result in the shooting, slaughter, or death of any bison in that herd.[19] The NPS is not prohibited from employing non-lethal management actions including capture and holding bison for release in the spring, strategic hazing, or monitoring of bison within or outside of park boundaries. In addition, the NPS must engage its IBMP partners, in particular, the U.S. Forest Service whose "principal role" in the IBMP "is to provide habitat for bison." RoD at 14. Such cooperation would facilitate non-lethal management actions for bison on public lands.

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a unique ecological setting within the meaning of our DPS Policy," and that the "loss of the YNP bison herd might result in a significant gap in the current range of the taxon." See 72 FR 45717 et seq.

[19] This includes the capture and testing of bison calves for the purpose of sending seronegative calves to quarantine since, under the terms of the current quarantine pilot project, at least half of said calves will be killed as part of the experiment.

As a preface to an analysis of the genetic health, viability, and diversity of Yellowstone bison, a broader examination of the current status of *Bison bison* in North America is warranted. As reported by Boyd and Gates (2006), it is estimated that there are over 500,000 plains bison in North America including both commercial and conservation populations (Boyd 2003). Ninety-five percent of these bison are under commercial production. Of the 500,000 plains bison, only approximately 19,200 exist in "conservation herds" (17,251 or 90% in the U.S. and 1,949 or 10% in Canada) which are herds managed by municipal, state, provincial, and federal governments and private organizations having clear conservation objectives. These 19,200 bison exist in fifty plains bison herds of which 32 percent contain less than 50 bison (Boyd 2003) with only 13 herds containing 400 or more animals (Boyd 2003). Only 22 percent of plains bison herds are increasing in size (Boyd and Gates 2006). Moreover, of the 19,200 plains bison in conservation herds, Boyd and Gates (2006) estimated that only 8,337 are free-ranging. Thus, Yellowstone bison represent approximately half of all plains bison that are managed as free-ranging animals in North America.[20]

The near extinction of the American bison in the late-1800s when the population was reduced from an estimated 30 million to fewer than 1,000 individuals and the subsequent decline of wild, free-ranging bison to approximately 23 animals in YNP at the turn of the 20th century are indicative of the severe population bottlenecks experienced by the species. Only through the efforts of a handful of rancher/conservationists, organizations (e.g., American Bison Society), Congress, and the NPS were bison spared extirpation. Population bottlenecks may have lowered the genetic diversity of extant bison populations compared to pre-decline populations (Boyd and Gates 2006, Freese et al. 2007). Alternatively, the brevity of the bottleneck may have prevented significant genetic erosion in bison since nuclear genetic variation in the species is generally greater than other mammalian species that have also gone through bottlenecks (McCleneghan et al. 1990, Stormont 1993) and appears to be similar to other wild ungulates (Wilson and Strobeck 1999, Halbert 2003).

Within a species, genetic diversity provides the mechanism for evolutionary change and adaptation (Allendorf and Leary 1986, Meffe and Carroll 1994, Chambers 1998). A reduction in genetic diversity can cause a reduction in fitness, decreased growth, increased mortality, increased susceptibility to disease, and a reduction in the flexibility of individual animals to adapt to evolutionary changes (Ballou and Ralls 1982, Mitton and Grant 1984, Allendorf and Leary 1986, Berger and Cunningham 1994). Genetic diversity can be reduced as a product of hybridization (e.g., with cattle), inbreeding, founder effects, genetic drift, and as a consequence of domestication where purposeful selection will favor some

[20] Yellowstone bison are free-ranging but only within a limited geographic area defined largely by the boundaries of YNP. Even within those boundaries, bison are not entirely free-ranging because many are captured and shipped to slaughter at the Stephens Creek trap site which is located within YNP near its northern border. YNP bison are not allowed to freely-range beyond YNP borders because many are subject to hunting during the bison hunting season, capture and slaughter, agency removal, and/or are routinely hazed during certain times of the year to move them back into YNP and to prevent them from establishing a permanent presence outside of the park.

morphological/behavioral/physiological traits over others ultimately leading to genomic extinction (Freese et al. 2007) of bison as a wildlife species.

In general, populations with a genetically effective population size of 50 to 500 were considered secure (Meffe and Carroll 1995).[21] Gross et al. (2006) report that populations containing fewer than 500 breeding individuals are believed to be especially vulnerable to harmful consequences of inbreeding depression and other impacts that can be directly traced to the genetic composition of the populations (Frankham 1995, Keller and Waller 2002). Low levels of inbreeding, for example, were determined to be highly correlated with susceptibility to bacterial diseases in sea lions in recent studies (Acevedo-Whitehouse et al. 2003).

Genetic diversity within a species or population is generally measured by examining heterozygosity (versus homozygosity) and/or by determining allelic diversity.[22] Simply put, heterozygosity is a good predictor of the potential of a population to evolve in the immediate future following a recent population bottleneck, while allelic diversity is important for the long-term response to selection and survival of populations and species (Allendorf 1986, Amos and Balmford 2001, Petit et al. 1998). This difference is also mentioned by Gross et al. (2006) who report that:

> "High allelic diversity will virtually always be correlated with the occurrence of many alleles that have a low frequency in the population. These rare alleles are unlikely to contribute substantially to short-term population responses to selection, but they can be a very important limit to the response to selection over many generations (James 1971, Allendorf 1986). Allelic diversity is thus considered important to the long-term survival of a species, especially where there may be substantial environmental changes, range expansions, or (re)introduction into new sites."[23]

Since heterozygosity is a relatively insensitive indicator of the loss of genetic variation in bison (Gross et al. 2006), the number of alleles has been advocated as a more appropriate measure of genetic health because it is more sensitive to differences in population size and the number of populations, and therefore, will be affected first as populations decline in size or as whole

[21] The "effective population size" is the size of an ideal population composed of randomly breeding individuals (Hartl and Clark 1997). Effective population size is, however, notoriously difficult to estimate in real populations because it is affected by various population attributes such as sex ratio, age-specific breeding success, population size fluctuations (Harris and Allendorf 1989, Shull and Tipton 1987), and breeding patterns/behaviors (i.e., random, non-random). Consequently, accurate estimation of effective population size is, therefore, usually intractable because of the variation exhibited in most populations (Harris and Allendorf 1989). For bison, effective population size has been estimated to range between 0.2 and 0.35 percent of the total population (Shull and Tipton 1987, Berger 1996, Wilson and Zittlau 2004).

[22] A measure of heterozygosity refers to the proportional amount of genetic variance at a locus while allelic diversity refers to the actual number of alleles at an individual locus.

[23] See also, Amos and Balmford (2001) ("Perhaps the main consequence of reduced survivability (due to a loss of genetic diversity) is thought to lie in lowering a population's ability to react to novel changes.

populations are extirpated (Allendorf 1986, Neel and Cummings 2003). Halbert (2003) found an average of 4.4 alleles at each loci for NPS bison herds, and that across all NPS bison herds, 84% of all loci have at least four alleles. However, individual herds may carry fewer alleles than the above estimated average across all NPS herds. In regard to how many alleles to protect, Petit et al. (1998) recommend conserving as many marker alleles as possible, regardless of their frequency. Marker alleles serve as correlates of genetic diversity at loci directly affecting adaptive traits and account for the potential importance of low-frequency alleles in some contexts, including self-incompatibility, disease resistance, or adaptation to local environmental conditions (Neel and Cummings 2003).

Freese et al. (2007) report that the plains bison, having "barely escaped" extinction in the late 1800s, are now confronting a second form of extinction due to domestication and anthropomorphic selection and cattle gene introgression. Indeed, they conclude that the plains bison is "for all practical purposes ecologically extinct within its original range."

Concerns about the impact of agency bison management removals on the genetic health of park bison are not new.[24] For example, at the May 21, 1998 meeting of the Executive Committee of the Greater Yellowstone Interagency Brucellosis Committee, Dr. Joe Templeton of Texas A&M University summarized the results of a bison genetics study conducted to determine what is required for a species to survive after nearing extinction (as is the case with bison in North America). Dr. Templeton reported that "the genetic effects of a population bottleneck on a species are directly correlated to the length and severity of decline on the limited gene pool" and that "every animal which is removed from the breeding population can no longer contribute to the genetic variability of the herd."[25] He cautioned the agencies that:

> "The so called "random" shooting at the Montana's borders is actually eliminating or depleting entire maternal lineages, therefore this action will cause an irreversible crippling of the gene pool. Continued removal of genetic lineages will change the genetic makeup of the herd, thus it will not represent the animals of 1910 or earlier."[26]

At the same meeting, Dr. James Derr, also of Texas A&M University, summarized the results of a bison genetics study designed to identify and characterize genetic variation from selected mitochondrial and nuclear gene regions in extant and historical bison populations. Dr. Derr reported that the Yellowstone bison herd maintains "reasonable genetic variation" and that the discovery (as also reported by Dr. Templeton) of naturally occurring resistance to brucellosis

[24] While concerns about the impact of removing matrilineal groups of bison through agency management actions is not new, much of the genetic information referenced in this petition is new and has yet to be considered by the NPS or its cooperating agencies.
[25] See Greater Yellowstone Interagency Brucellosis Committee Executive Committee Meeting Minutes, Cavanaugh's on the Falls, Idaho Falls, Idaho, May 21, 1998.
[26] See also, Halbert (2003), "it is possible that the culling of bison at the YNP boundaries is non-random with respect to family groups, a practice that over sufficient time may lead to systematic loss of genetic variation."

may be a viable long-term solution to the present bison management controversy. He cautioned, however, that "in order to fully explore this option (of a naturally occurring resistance to brucellosis) it is important to not reduce the bison population levels any further and risk the elimination of these disease resistant genes" and that "we should know the genetic makeup of bison before management decisions are made which may compromise the future of bison genetic health."[27]

Knowledge of the bison genome has increased substantially over the past 15 years. Of particular importance was the determination of domestic cattle maternal introgression from historic bison-cattle hybridization efforts found in several public bison populations through the analysis of mitochondrial DNA (Polziehn et al. 1995, Ward et al. 1999). As reported by Ward et al. (1999), 5.2% of the bison tested (30/572) were found with domestic cattle mtDNA, representing 40% (6/15) of the examined US and Canadian bison populations.[28] Yellowstone's bison were identified by Ward et al. (1999) as one of nine herds of bison that demonstrated no evidence of hybridization with domestic cattle.

In a more detailed study published in 2005, well after the FEIS was published, Halbert et al. examined nuclear introgression using microsatellite markers to evaluate levels of domestic cattle nuclear introgression in bison to accurately assess the significance of introgressive hybridizations and potential impacts of domestic cattle introgression on the conservation of the bison species. Of the 14 bison herds (13 public, 1 private) examined by Halbert et al. (2005), six public herds including Yellowstone were identified as having no evidence of either mitochondrial or nuclear domestic cattle introgression.[29] In yet another study of cattle introgression in bison, Halbert and Derr (2007) examined 11 federal bison populations in the United States and found no evidence of mitochondrial or nuclear domestic cattle introgression in bison from only four populations, including Yellowstone.[30] Of the four bison populations, adequate sample sizes were available from only the Wind Cave and Yellowstone National Park herds to allow for statistical confidence (>90%) in nuclear introgression detection limits.

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[27] More recently, in a March 23, 2008 article in the New York Times ("Anger Over Culling of Yellowstone's Bison"), Dr. Derr expressed fear that some bison behaviors or traits, including the propensity to migrate, could be lost with the killed bison. Specifically, he was quoted as saying that "the great-grandmother, grandmother, mother and daughter often travel together" and added that killing them "is like going to a family reunion and killing off all of the Smiths." This would affect "the genetic architecture of the herd."

[28] Though the precise implications of such introgression on bison physiology, behavior, and fitness is not clear, Freese et al. (2007) speculate that the presence of a domestic cattle mitochondrial genome affect bison energetics, growth, and seasonal foraging behavior.

[29] Mitochondrial DNA is maternally inherited and reflects the maternal history in the population. Nuclear DNA is DNA inherited by both parents.

[30] Of the three other populations in which no cattle introgression was found (i.e., Grand Teton National Park (GTNP), Sully's Hill National Game Preserve (SH), and Wind Cave National Park (WCNP), the SH herd was created using bison from herds that have subsequently been determined to contain hybrid animals, the GTNP was supplemented years ago with bison from Theodore Roosevelt National Park which contains hybridized bison, and Halbert (2003) and Halbert and Derr (2007) appear to include conflicting information about potential cattle introgression in the WCNP herd.

Considering that nearly all private bison herds have domestic cattle gene introgression, Freese et al. (2007) concluded that less than 1.5% of the 500,000 plains bison in North America are likely free of cattle genes. [31]

To date, and based on the best available scientific evidence, Yellowstone bison are one of the few federally managed conservation herds that show no evidence of cattle introgression or hybridization. From a genetics perspective, this increases the collective value of these animals for the long-term survival of the species.

In addition to demonstrating no evidence of hybridization with cattle, Halbert (2003) investigated potential population substructure within the Yellowstone bison population based on genetic analysis of liver, whole blood, and/or tail hair samples from bison exiting the YNP boundaries at West Yellowstone or Gardiner in the winters of 1996-97, 1998-99, and 2001-02. The STRUCTURE program was used to test the probability of subpopulation structure through a clustering method for multilocus genotype data (Pritchard et al. 2000). When the loci between bison sampled at Gardiner and West Yellowstone were compared, Halbert (2003) found 65.3% of the loci between the two groups significantly different in genotypic distribution for samples collected in 1996-97 with 77.6% significantly different when all Gardiner and all West Yellowstone samples were compared. Based on the sampling data collected from both sites in 1996-97, the posterior probabilities of the number of genetically distinct populations within YNP is three (81.7%) or four (18.2%).

Similarly, Gardipee (2007), who used non-invasive sampling of bison fecal samples at geographic areas in YNP and Grand Teton National Park (GTNP) where bison breed to assess genetic differences (mitochondrial DNA) between and within populations, found significant differentiation between YNP and GTNP bison populations but even greater genetic differences between the Lamar Valley bison herd (Northern range) and the Hayden Valley herd (Central range) in YNP. It is also interesting to note that this same study found only two of ten known haplotypes (maternal genetic lineages; haplotypes 6 and 8) identified for North American bison (including Canada) among the 120 bison tested from YNP and GTNP. Further, the GTNP bison were fixed for a single haplotype (6), and the YNP central range bison (sampled in Hayden Valley) were nearly fixed (~90%) for the same haplotype. The greatest diversity was found in the northern range breeding group (Lamar Valley) where both haplotypes 6 (46%) and 8 (54%) were found.

Halbert (2003) cautions against the possibility of four populations in YNP stating that, while not excluded by her data, such a subdivision is "unlikely" due to the possible "nonrandomness of the dataset," "bias of the data caused by unpaired collections in various years for the West Yellowstone and Gardiner sites," "observational data of only 2 (Central and Northern) or at

[31] Freese et al. (2007) also included the Henry Mountains State Park bison herd in Utah as being free of cattle genes but cautioned that the sample size from this population was too small to ensure statistical certainty.

most 3 (Mary Mountain, Pelican Valley, and Lamar) subpopulations…," and "the tendency of the STRUCTURE program to overestimate K" (in this case the number of subpopulations). However, she adds that "these analyses do provide sufficient evidence to exclude the possibility of a single, admixed bison population at YNP and are supported by significant genotypic differentiation between the samples collected from Gardiner and West Yellowstone." (emphasis added).

Additional evidence of the existence of distinct bison populations in YNP has also been presented by Christianson et al. (2005) who found significant differences in bison incisor wear when comparing female bison sampled from the northern and central ranges of YNP, Olexa and Gogan (2005) who found that YNP bison were spatially structured into two distinct groups or populations, and Gogan et al. (2005) who documented differences in parturition timing between the two populations, and differences in the populations' age structure (Olexa and Gogan 2005 citing to P. Gogan, USGS, unpublished data).

While Halbert (2003) found significant genotypic variation between bison samples collected from Gardiner and West Yellowstone, she cautions that the Gardiner and West Yellowstone bison groups (i.e., Northern range and Central herd bison) "may not be true subpopulations given that the Gardiner group appears in part to contain bison with similar genetic background to the West Yellowstone samples." One of three explanations offered by Halbert for this observation is the possibility "that a relatively large number (of) samples from the Central herd (i.e., those that would otherwise have been found at West Yellowstone) migrated north to Gardiner in the winter of 1996-97." Subsequent to the publication of Halbert's dissertation, it was disclosed that, indeed, Central herd bison were routinely moving north from the Firehole past Norris and Mammoth into the Gardiner Basin where they were subject to capture and slaughter at the NPS-operated Stephens Creek bison trap (Clarke et al. 2005, Gates et al. 2005, Fuller et al. 2006). Clarke et al. (2005), for example, reported that "evidence from radio marked bison and winter aerial surveys indicates that the northern range sub-population has not moved down river to the Gardiner Basin during the period of this analysis (2000-2005) and nearly all of the bison in the Northern IBMP Management Area traveled there from the central population." Based on her analysis of YNP bison emigration and density dependence, Fuller et al. (2006) determined that the sustained removal of >2,000 bison between 1982 and 2000 from YNP's northern bison herd was impossible without substantial emigration from the central herd to winter ranges outside the north boundary of YNP.

During the winter of 1996-97, movements of Central herd bison into the Gardiner Basin were likely extensive due to the severe winter conditions experienced that year, including the formation of thick ice layers in the snowpack, which forced a significant proportion of the park's bison to seek forage on lower elevation lands beyond park boundaries. Many of these Central herd bison, again based on radio-marked animals, likely used the snow-packed road corridor from Madison Junction through Norris to Mammoth to rapidly and inexpensively (energetically) access the Gardiner Basin. According to Gates et al. (2005), Central range

bison have migrated in increasing numbers north to the Blacktail Plateau and the Gardiner Basin in winter since the early 1990's by using a road between Madison Junction and Mammoth. They opined that this "calculated migration of Central Range bison to the Northern Range would likely not have developed in the absence of the groomed road between Madison Junction and Mammoth."

Considering this evidence of bison movements from the Central herd to the Northern IBMP management area, the lack of a higher genotypic differentiation between the West Yellowstone and Gardiner bison samples Halbert collected is understandable. Had Halbert (2003) known of this learned movement pattern of Central herd bison north to the Gardiner Basin and compensated for this in her study methodology (e.g., by sampling at geographic locations of breeding groups within YNP), there is a high confidence that the genotypic difference that Halbert found comparing Northern range and Central herd bison would have been significantly larger.

The management implications of there being two or more bison populations in YNP are significant, but to date, have not been addressed by the NPS or its cooperating agencies. Halbert (2003) suggests that the existence of several bison populations within YNP "may contribute to the relatively high levels of overall genetic variation observed in this population." However, she warns that "caution must be practiced in the management of populations with substructure to ensure the maintenance of both subpopulation and total population variation" and that "the current practice of culling bison without regard to possible subpopulation structure has potentially negative consequences of reduced genetic diversity and alteration of current genetic constitution both within individual subpopulations and the overall YNP bison population." Halbert added that "if in fact the Yellowstone bison population is represented by 2 or 3 different subpopulations, disproportionate removals of bison from various subpopulations might have detrimental long-term genetic consequences." In addition, Olexa and Gogan (2005) warn that given the YNP bison population structure, "the possibility of reducing a herd below the level needed to maintain the effective genetic population size of 50-500 bison (Franklin 1980, Soulé 1980, United States Department of the Interior 2000) cannot be ignored given the limited spatial overlap of the 2 herds during the rut and the uncertainty regarding the timing and location of breeding activity."

Gross et al. (2006) provided additional evidence of relevance to the management of Yellowstone's bison in their assessment of the impact of bison population control strategies on the genetic diversity of NPS bison herds. Among other things, their study estimated bison population sizes necessary to maintain 90% of heterozygosity and 90% of allelic diversity over 200 years. They found that a population size of approximately 400 bison was needed to retain 90% of selectively neutral variation (heterozygosity) with a 90% probability for 200 years.[32]

[32] These results, however, were based on precisely implemented management treatments, including random removal of bison, which is not occurring in YNP. Gross et al. (2006) cautioned that under typical field conditions

Conversely, for allelic diversity, approximately 1000 bison are necessary to achieve a 90% probability of retaining 90% of currently existing alleles over 200 years.[33]

To protect more than 95% of bison allelic diversity over 200 years, a population size of a minimum of 2000 animals is necessary if the population is subject to random removals (Freese et al. 2007 citing Gross and Wang 2005). Since bison removals in YNP are not known to be random, this could alter the population size necessary to preserve sufficient heterozygosity and/or allelic diversity over the long term. Freese et al. (2007), recommend that bison herd sizes of at least 2000 animals are required to meet the need for bison to adapt to new areas where they are reintroduced and to adapt to large current (e.g., exotic diseases) and future (e.g., climate change) alterations in their habitats, as well as for the intrinsic value of conserving genetic diversity. Thus, the lethal bison management actions taken by the state and federal agencies jeopardize the natural evolutionary adaptation of bison in their native habitat and do not even begin to protect at least 95% of allelic diversity over 200 years (Gross and Wang 2005) for the bison populations in YNP.[34]

Analysis/Argument:

This petition is submitted pursuant to 5 U.S.C. § 553(e) which gives any interested person "the right to petition for the issuance, amendment, or repeal of a rule." In this case, petitioners are seeking an emergency rule to prevent the NPS from killing so many YNP bison during the present winter/spring that the genetic health and diversity of the bison populations (i.e., Northern range and Central herd) are compromised to the point of harming future viability. When granted, the emergency rule will also ensure that the NPS is complying with its conservation mandate and that it is not engaging in impermissible activities that impair or cause unacceptable impacts to the park's bison.

As explained above, YNP is home to one of the few and the largest publicly-owned bison herds in the United States that demonstrate no evidence of hybridization with cattle. Historically, bison management planning has considered the YNP bison herd to represent one population. Since 2003, however, several studies have been published documenting the existence of at least two populations of bison (Halbert 2003, Olexa and Gogan 2005, Christianson 2005, Gardipee 2007). Gross and Wang (2005) and Gross et al. (2006) report that approximately 1,000 bison are required to have a 90% probability of preserving 90% of a population's allelic diversity

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implementation of treatments will surely be less precise than simulations requiring prudence to accommodate the inevitable variation.

[33] Gross et al. (2006) concede that their model results should be interpreted as representing a single herd unit and that a more complex simulation analysis would be necessary to fully assess the long-term genetic consequences of multi-population structure and interchange, and non-random removal of matrilineal groups. See also, Gardipee (2007) "these models (referring to those used by Gross and Wang 2005) were based on genetic data from YNP provided by Halbert (2003) without accounting for any existing populations subdivision within this herd…"

[34] Gross and Wang (2005) is the same as Gross et al. (2006) except additional coauthors were added to the latter study.

over 200 years with at least 2,000 bison needed for a population to preserve 95% of allelic diversity. Considering the importance of preserving allelic diversity to protect the long-term evolutionary potential and fitness of bison, Freese et al. (2007) recommend protecting and managing for bison populations containing at least 2,000 animals. The emergency rule, therefore, establishes a minimum of 2,000 bison as the threshold for each the Central herd and Northern range bison populations below which the NPS is prohibited from killing or participating in the killing of YNP bison.

Despite this evidence and with apparent disregard for its imposition of an adaptive management framework into its current IBMP, neither the NPS nor any of its cooperating agencies have reassessed their bison management strategies based on the population structure of the YNP bison herd. As a consequence, the agencies, including the NPS, are capturing and slaughtering bison at numbers, particularly during the present winter, that will, if not stopped, adversely impact the genetic health and diversity of the bison populations and their long-term fitness. Already during the winter of 2007-2008, 1,510 bison have been killed. The majority (1,217) have been captured by the NPS at its Stephens Creek bison trap near the northern border of YNP and sent to slaughter. Many of these bison likely originated from the Central range bison population (pers. comm. with Rick Wallen, YNP biologist) emigrating north – their movements facilitated by using the snow packed roads from Madison Junction to Norris and then to Mammoth – to their deaths. As the winter progresses, however, more of the captured animals on the north side may be from the Northern Range population.

As of March 31, 2008 there are some mixed bison groups, totaling ~350, moving around Hayden Valley, the Lakeshore and in Pelican Valley. There are still approximately 770 bison in the Geyser Basins. In addition, there are approximately 20 bison out of the park, west of Hwy 191 and on Hwy 191 itself, approximately 80 bison between Highway 191 and Cougar Meadows inside the park, with an estimated 40 bison between Mammoth and Gibbon Meadows. On the Northern Range, bison are primarily utilizing Lamar and Blacktail with limited, but increasing use of Little America and Hellroaring Slope. There are approximately 500 bison on Blacktail Deer Plateau and bison movements continue from the Mammoth/ Blacktail area north to the Gardiner Basin. There are approximately 150-200 bison in the Gardiner Basin, including ~100 in the Eagle Creek area.[35] All of these bison may be, and likely will be, subject to capture and possibly slaughter or shooting if they emigrate near or beyond park borders or, for the bison in Eagle Creek, if they cross the Little Trail Creek/Maiden Basin hydrographic divide.

The 2007 YNP bison summer population estimate was 4,700 animals.[36] This estimate included approximately 2,200 bison adults/yearlings and 445 calves in the Central herd population and

[35] See Yellowstone Bison Population Management Activities for the period 15 March through 31 March, 2008.
[36] See Yellowstone National Park News Release "Yellowstone's Summer Bison Population Estimate Released." October 15, 2007. The 4,700 estimate was the highest of three bison counts conducted during the summer of 2007 so it may be an overestimate of the actual size of 2007/2008 pre-winter bison population.

1,700 adults/yearlings and 344 calves in the Northern range population (pers. comm., Rick Wallen, YNP biologist). With 1,609 bison killed or removed to quarantine as of April 8, 2008, and additional bison likely to be killed this spring, and recognizing that the majority of bison captured in the Stephens Creek trap and sent to slaughter were likely from the Central range population, the current Central range and Northern range bison populations are each already well below the minimum 2,000 threshold established in the proposed emergency rule. Thus, at a minimum, upon receipt of this emergency rule petition, the NPS must cease all lethal bison control operations. Based on its own 2008 late–winter bison population estimate of 3,000 animals,[37] however, the NPS must cease such operations immediately to prevent any further reduction in the park bison populations.

Moreover, since the IBMP is based on an adaptive management framework that specifies that management actions are to be adjusted as new information becomes available, the new genetic evidence should have compelled agency review and modification of the IBMP. To date, such a review has not been undertaken. Considering the significance of the new evidence, the adaptation of the IBMP must be commenced immediately to ensure that the IBMP is based on the most up-to-date scientific evidence and that YNP bison populations and the population as a whole, receive sufficient protection to maintain 95% of allelic diversity over 200 years.

Conclusion:

The IBMP has been a failure. Much of the plan's analysis was speculative and was based on assumptions that have not been realized. Thus, the agencies have made no progress in moving through the adaptive management steps incorporated into the plan, nor have they adequately adapted the plan based on new circumstances or information relevant to the plan and its impacts on bison's genetic health, fitness and viability.

This emergency rulemaking petition is critical to preventing the NPS from killing, participating in the killing, or otherwise removing such a large number of YNP bison during the winter of 2007/2008 that the very survival of the park's bison populations is jeopardized. Significant new scientific evidence pertaining to the genetic diversity of YNP bison has been published since initiation of the IBMP in 2000 that raises serious concerns about the IBMP, its emphasis on lethal control of bison, and its implications to bison population health, viability, and survival. The evidence documents the existence of two or more genetically distinct bison populations in YNP and raises concerns about the size of these populations in relationship to the preservation of allelic diversity. Such diversity, as documented in the scientific literature, is critical to protect the long-term viability of the YNP bison populations. To date, the NPS has failed to consider, evaluate, or otherwise analyze the new genetic information or to modify the IBMP in response to this evidence.

[37] See March 27, 2008 Yellowstone National Park News Release entitled "Yellowstone Late Winter Bison Population Estimate Released."

Since the NPS has refused to provide legally required protection and continues to kill or participate in the killing of an excessive number of bison, potentially harming the park's population, an emergency rule is critical to slow or stop the continued slaughter of these animals. The emergency rule prohibits the NPS from killing, participating in the killing, and/or authorizing/participating in the non-lethal removal of any YNP bison if or when the Central range and/or Northern range bison populations decline to a minimum of 2,000 animals each. With 1,609 bison killed or removed for quarantine during the winter of 2007/08 and considering the pre-winter population count (and the specific individual population counts), the NPS has failed to sustain the 2,000 bison threshold lower limit for both the Northern range and Central herd populations this winter, and therefore, the emergency rule must be published and take effect immediately.

Ergo, the petitioners request that the NPS publish an emergency rule by no later than April 25, 2008, and in the interim, immediately cease its role in the lethal management of YNP bison. Should the NPS ignore this request and continue to kill or participate in the killing of bison thereby further jeopardizing the survival of the populations, petitioners will consider all options, including legal recourse, to prevent the NPS from continuing to kill or participate in the killing of YNP bison and to force the agency to adopt the emergency rule.

The petitioners thank the NPS for urgently reviewing this emergency petition and acting immediately to publish the requested rule. The petitioners request a written response informing them of your decision in regard to this request for an emergency rule. Please send your response to D.J. Schubert, Animal Welfare Institute, 3121-D Fire Road, PMB#327, Egg Harbor Township, NJ 08234.

Sincerely,

D.J. Schubert
Wildlife Biologist
Animal Welfare Institute

On behalf of:

Mr. Michael Mease, President and Co-Founder
Buffalo Field Campaign

Mr. Robert Hoskins
GravelBar

Mr. Jonathan B. Ratner, Director
Western Watersheds Project – Wyoming Office

Mr. Joe Gutkoski, Vice-President
American Buffalo Foundation

Ms. Louisa Willcox, Senior Wildlife Advocate
Natural Resources Defense Council

Chris Peters, President
Seventh Generation Fund for Indigenous Development

Mr. Glenn Hockett, Volunteer President
Gallatin Wildlife Association

Mr. Howie Wolke and Ms. Marilyn Olsen
Big Wild Adventures

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Rosalie Little Thunder
Rapid City, SD

cc: Congressman Nick Rahall (D-WV), Chairman, House Natural Resource Committee
Congressman Maurice Hinchey (D-NY)
Congressman Raul Grijalva (D-AZ), Chairman, Subcommittee on National Parks, Forests, and Public Lands, House Natural Resources Committee
Senator Jeff Bingaman (D-NM), Chairman, Senate Committee on Energy and Natural Resources
Senator Daniel Akaka (D-HI), Chairman, Subcommittee on National Parks, Senate Committee on Energy and Natural Resources

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