EMERGENCY RULEMAKING PETITION TO PROTECT THE GENETIC DIVERSITY AND VIABILITY OF THE BISON OF YELLOWSTONE NATIONAL PARK AND GALLATIN NATIONAL FOREST

Buffalo rutting territory, Hayden valley. Photo by Darrell Geist, Buffalo Field Campaign.

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September 15, 2014

NOTICE OF PETITION FOR RULEMAKING

September 15, 2014

Via Certified Mail (with Literature Cited)

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Golden, CO 80401–4720

Dear Secretary Jewell, Secretary Vilsack, Director Jarvis, Chief Tidwell, Regional Director Masica, and Regional Forester Jirón:

Friends of Animals and the Buffalo Field Campaign (hereinafter "Petitioners") submit this emergency rulemaking petition, pursuant to section 553(e) of the Administrative Procedure Act ("APA").[1] Petitioners are "interested persons" under APA section 553(e), and seek emergency issuance of certain rules to establish regulatory protocol to govern a future revision to the Interagency Bison Management Plan ("IBMP") to ensure that management of bison in and near Yellowstone National Park is consistent with best available science, American values, and with all relevant legal authorities and policies.

PROPOSED EMERGENCY RULES

Petitioners request the immediate promulgation of rules that requires the National Park Service ("NPS") and the Forest Service to revise their conservation plan for wild plains bison (*Bison bison bison*) in Yellowstone National Park and surrounding public lands in Idaho, Wyoming and Montana to address existing scientific deficiencies in the program.

[1] The APA provides that "[e]ach agency shall give an interested person the right to petition for the issuance, amendment, or repeal of a rule." 5 U.S.C. § 553(e).

Under this rule, annual bison population evaluations and adaptive management activities shall utilize the best available scientific data and methods in quantitative population ecology, genomics, and veterinary medicine, and shall err on the side of caution in the preservation of potential allelic diversity when faced with scientific uncertainty.

Specifically, Petitioners seek issuance of the following rules:

36 C.F.R. § 2.63: Rule to Protect the Genetic Diversity and Viability of the Bison of Yellowstone National Park and Gallatin National Forest

(a) Annual bison population evaluations and adaptive management activities at Yellowstone National Park shall utilize the best available scientific data and methods in quantitative population ecology, genomics, and veterinary medicine, and shall err on the side of caution in the preservation of potential allelic diversity when faced with scientific uncertainty.

(b) The National Park Service shall develop within 90 days a protocol for all adaptive management activities for bison that reside year-round or seasonally in Yellowstone National Park which contain:

1. A requirement that all future management decisions be made based upon scientifically justified herd size that ensure a viable gene pool and integrity of the bison herds;
2. A mandate that NPS create new viability numbers for bison that take into account the northern range and central herds, and potential additional herd distinctions within the population;
3. A prohibition on the practice of transporting bison around to achieve genetic diversity or viable herd size number;
4. A requirement that all future management decisions include a plan to track and publically report losses of bison from each herd (both natural and non-natural losses).

(c) Upon completion of the protocol required under subsection (b), Secretary of Interior will develop, in cooperation with the Secretary of Agriculture, a new Interagency Bison Management Plan using the protocol established under this rule.

(d) The capture, removal, or killing of bison at Stephens Creek area of Yellowstone National Park and Horse Butte area of the Gallatin National Forest is hereby prohibited until the protocol required under subsection (b) is developed, a new management plan is adopted as required under subsection (c), and new viable population numbers are established based on the distinct herds at Yellowstone.

and

36 C.F.R. Part 222 Subpart D § 222.55: Cooperative Rule to Protect the Genetic Diversity and Viability of the Bison of Yellowstone National Park and Gallatin National Forest

(a) Annual bison population evaluations and adaptive management activities within the Gallatin National Forest and Yellowstone National Park shall utilize the best available scientific data and methods in quantitative population ecology, genomics, and veterinary medicine, and shall err on the side of caution in the preservation of potential allelic diversity when faced with scientific uncertainty.
(b) Upon completion of the protocol required under 36 C.F.R. § 2.63(b), the Secretary of Agriculture will cooperate with the Secretary of the Interior to produce a new Interagency Bison Management Plan for bison that reside year-round or seasonally in Yellowstone National Park and the Gallatin National Forest using the protocol established by the National Park Service.
(c) The capture, removal, or killing of bison within the Gallatin National Forest and Yellowstone National Park is hereby prohibited until the protocol required under subsection (b) is developed, a new management plan is adopted as required under 36 C.F.R. § 2.63(c), and new viable population numbers are established based on the distinct herds at Yellowstone.

These emergency rules, as further supported in the attached "Basis of Support for Adoption of Proposed Rule to Protect the Genetic Diversity and Viability of the Bison of Yellowstone National Park and Gallatin National Forest," are essential to protect the short and long-term genetic diversity and viability of Yellowstone National Park area northern range and central interior bison populations and potential additional herd distinctions within the population. The emergency regulations will prevent unacceptable impacts and impairments to the bison populations that are prohibited under NPS Organic Act (16 U.S.C. §1 *et seq*.) and NPS Policy (NPS 2006), and will enable NPS to meet its legally required conservation mandate. Moreover, if NPS or others continue to capture and slaughter or otherwise remove bison from the ecosystem during the winter/spring of 2014/2015 it could damage the viability of the bison herds and cause long-lasting, irreparable damage to the herds. Thus, Petitioners believe the legal criteria of "good cause," 5 U.S.C. §553(d)(3) is met and NPS and U.S. Department of Agriculture ("USDA") should immediately cease their roles in the lethal management of Yellowstone National Park bison until a new rule is promulgated pursuant to this petition. Should you 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 NPS and/or USDA from continuing to kill or participate in the killing of Yellowstone National Park bison and to force the agencies to adopt the emergency rule.

STATEMENT OF PETITIONERS' INTERESTS

Friends of Animals ("FoA") is an international animal rights organization incorporated in the state of New York since 1957. FoA has nearly 200,000 members worldwide, including many that visit Yellowstone National Park and live in Wyoming and Montana near Yellowstone National Park. FoA and its members seek to free animals from cruelty and exploitation around the world, and to promote a respectful view of non-human,

free-living and domestic animals. FoA activities include educating its members on current threats to many species' abilities to live in ecosystems free from human manipulation, exploitation, and abuse; monitoring federal agency actions to ensure that laws enacted to protect the environment and wildlife are properly implemented; and advocating for the extension of these legal protections, such as those under the Endangered Species Act, to qualifying species and distinct population segments that are currently unlisted.

Buffalo Field Campaign ("BFC") is a non-profit public interest organization founded in 1997 to protect the natural habitat of wild migratory buffalo and native wildlife, to stop the slaughter and harassment of America's last wild buffalo as well as to advocate for their lasting protection, and to work with people of all Nations to honor the sacredness of wild buffalo. BFC has its headquarters in West Yellowstone, Gallatin County, Montana.

Petitioners thank each of you for urgently reviewing this emergency petition and acting immediately to publish a new rule. Petitioners request a written response informing them of your decision in regard to this request for an emergency rule.

Respectfully submitted,

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On behalf of:

Priscilla Feral, President
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and

Daniel Brister, Executive Director
Buffalo Field Campaign

Basis of Support for Adoption of Proposed Rule to Protect the Genetic Diversity and Viability of the Bison of Yellowstone National Park and Gallatin National Forest

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I. INTRODUCTION

The proposed emergency rule is justified based on a series of dissertations and published scientific studies documenting: (1) the presence of two or more genetically distinct bison populations within Yellowstone National Park and (2) 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, Traill 2007). The existing interagency bison management plan was developed prior to the publication of the studies documenting the presence of genetically distinct bison populations within Yellowstone National Park and has yet to be adapted or amended to consider the growing body of peer-reviewed scientific evidence that specific vulnerabilities and risks threaten the genetic health of Yellowstone's bison herds. 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 IBMP also requires that NPS and its cooperating agencies update the plan based on new information such as the genetic evidence summarized in this petition.

II. BACKGROUND

A. Near-Extirpation and Recovery of American Bison.

Today, Yellowstone National Park has the last 4,000 (NPS 2014) genetically intact bison left in the United States, as well as one of only three free-roaming bison herds left in the country, but not so long ago, our own reckless mismanagement nearly drove them past the brink of extinction. With the complicity of United States government authorities and the frontier army (Smits 1994), the American bison was systematically slaughtered to near-extinction in the 19th century (Hornaday 1889). American bison were extirpated from nearly all of their original range—which covered one-third of North America and spanned more than twenty unique ecosystems across roughly two billion acres of habitat (Sanderson 2008). Depleted of roaming bison herds, the northern plains swiftly became filled with ranchers and cattle. Between 1866 and 1884, at least 5 million longhorns were driven north out of Texas. The number of cattle in Wyoming rose from 90,000 in 1874 to 500,000 by 1880; and by 1883 Montana's cattle population had gone from nearly zero to 500,000 in under a decade (Ketcham 2008).

In 1872, Yellowstone National Park was set aside as "public park or pleasuring ground for the benefit and enjoyment of the people," 16 U.S.C. § 21. In the Park's early years, however, weak and ineffectual wildlife protection laws left the few remaining wild bison vulnerable to poachers in pursuit of a trophy (Cope 1885; Meagher 1973). By the turn of the 20th century, only 23 wild bison remained in the United States taking refuge in Yellowstone's remote Pelican Valley under armed patrols by the U.S. Army (Meagher 1973).

The near extinction of bison in Yellowstone was partially averted in the early 1900s by the introduction of 21 bison from the Confederated Salish and Kootenai Tribes, Pablo, Allard, Walking Coyote, and Goodnight families (Boyd 2003). Nearly all bison living in North America today are descended from the 23 indigenous Pelican Valley Yellowstone bison and/or the 76 to 84 individuals that were scattered in five bands across the country at the turn of the century (year 1901) (Halbert 2003; Hedrick 2009). This severe genetic bottleneck left twelve bloodlines that founded all remaining bison populations.

Beginning over 120 years ago, four bloodlines were artificially crossed with cattle by ranchers to commercially exploit survival attributes of bison. Cattle ancestry in bison is now widespread (Hedrick 2010) and Yellowstone is considered the last American population to retain their identity as wild migratory plains bison (White *et al.* 2014).

B. History of the Interagency Bison Management Plan.

1. Maintaining a "Brucellosis-Free" State.

The Interagency Bison Management Plan, adopted in 2000, currently directs bison management within and outside of Yellowstone National Park and on the Gallatin National Forest. The original impetus behind the creation of the IBMP can be traced to 1995, when the State of Montana sued NPS and the Animal and Plant Health Inspection Service ("APHIS"), complaining both of NPS management of bison and the possibility that APHIS would change the state's brucellosis class-free status, which allows cattle producers within the state to ship their animals without testing, thus saving them from certain expenses.[2] *See Citizens for Balanced Use v. Maurier*, 303 P.3d 794, 796 (Mont. 2013).

It was at this time that the State of Montana also began taking considerable interest in the tendencies of growing populations of Yellowstone bison to graze beyond Yellowstone National Park's borders during the late winter, and first of a series of lawsuits seeking to enjoin the slaughter of migrating bison was brought against NPS. *See W. Watersheds Project v. Salazar*, 766 F. Supp. 2d 1095, 1115 (D. Mont. 2011) (discussing the history of litigation surrounding Yellowstone bison management).

By the mid-1990s, the outcome of this litigation had led to the formal collaboration of multiple federal and state agencies to create the IBMP. The purpose of the IBMP was 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." (NPS 2000 at 22).

The managing body of the IBMP is comprised of the National Park Service, U.S. Forest Service, U.S. Department of Agriculture—Animal and Plant Health Inspection Service, Montana Department of Livestock, and Montana Department of Fish, Wildlife &

[2] There have been no documented transmission of brucellosis from Yellowstone bison to cattle (White *et al.* 2011) and the risk is very small. In order for bison to transmit brucellosis to cattle, infected bison must shed infectious birth tissues via abortions or live births, and cattle must contact infected tissues before they are removed from the environment or the *Brucella* bacteria die.

Parks. The agencies published a Draft Environmental Impact Statement on June 16, 1998, followed by the publication of the Final EIS in August 2000 ("FEIS"). On December 20, 2000, the federal agencies published a Record of Decision ("Federal ROD"). 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" (FEIS at vii). To accomplish this purpose and achieve the specified objectives, the agencies included in their FEIS a modified preferred alternative (absent in the draft document), which "employs an adaptive management approach that allows the agencies to gain experience and knowledge before proceeding to the next management step…" (FEIS at xxii).[3] 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."[4] (Federal ROD at 32). However, the resulting IBMP failed to give consideration to the viability of the Yellowstone National Park bison herds, and has never been modified to include adequate conservation measures to protect bison herds in Yellowstone National Park and the Gallatin National Forest. Instead, it focused on the unfounded concerns of cattle ranchers.

The modified preferred alternative established three zones, both within and outside of Yellowstone National Park'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 including National Forest lands) and where bison are not permitted. In addition to the zone concept, the modified preferred alternative incorporated three "adaptive management steps" 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,[5] 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 blood testing for brucellosis antibodies, 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 (FEIS at 178; Federal ROD at 12). The agencies would endeavor to capture and test all bison that leave the Park

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[3] 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.

[4] *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").

[5] These specific criteria are detailed in the Federal ROD (pages 23 through 31).

during step one but could allow seronegative bison as well as other bison that cannot be captured to remain outside the Park until May 15 (Federal ROD at 12).

To facilitate capturing bison on the west side, the Gallatin National Forest has permitted (USDA 1998-1999) and continues to permit (USDA 2009), the Montana Department of Livestock to capture, trap, and ship migratory bison to slaughter. Permitting the removal of migratory bison from National Forest lands is in conflict with the Gallatin National Forest Plan (USDA 1987) and its provisions to provide "habitat for viable populations of all indigenous species and increasing populations of big game animals," adopted in the rules (36 CFR 219.19 (2000)) and the National Forest Management Act's mandate to protect diversity (16 U.S.C. § 1604(g)(3)(B)).

Step 2 was intended to 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 (FEIS at 179; Federal ROD at 13). The commencement of Step 2 further depended 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 (FEIS at 183; Federal ROD at 12).

In the third and final step of the original Plan, untested bison would be allowed year-round outside the Park in the Reese Creek boundary area (FEIS at 183; Federal ROD at 13). Step 3 would tolerate up to 100 untested bison to freely range in the western boundary area subject to zone management restrictions (FEIS at 180; Federal ROD at 13). On the northern boundary, NPS would attempt to use hazing to prevent bison from emigrating beyond the Park onto private land. If NPS determined that hazing was ineffective, then it could trap bison at Stephens Creek before they reached the Park edge and send seropositives to slaughter while holding up to 125 seronegative bison for release back into the Park in early spring (FEIS at 180; Federal ROD at 12).[6]

The greatest problem presented by Step 1, apart from ranchers' resistance to permitting wild bison to roam near their heads of cattle, was that the serologic testing method utilized in the field, a fluorescent polarization assay, will reliably test positive for brucellosis antibodies regardless of whether the animal is infectious or has merely acquired immunity to the disease (Treanor *et al.* 2010). Thus, if the program is stopped short of achieving its goal of entirely eradicating the bacterium itself, as it has been (*see infra* discussion of 2014 FEIS on Remote Vaccine Delivery Program) and was always doomed to be, due to the presence of Yellowstone elk as another major reservoir for transmission, it could likely have the unwanted effect of artificially selecting for a population of bison whose immune systems are actually more susceptible to brucellosis and/or selecting for a more virulent strain of *Brucella abortus* (Dieckmann *et al.* 2005).

[6] 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.

Any remaining goals of eventually reaching Step 2 were definitively halted in January 2014, when the National Park Service issued its Final Environmental Impact Statement on a Remote Vaccination Program to Reduce the Prevalence of Brucellosis in Yellowstone Bison, followed by the Record of Decision in March ("Vaccine ROD"). The decision stated that NPS chose the No Action Alternative based on substantial uncertainties associated with vaccine efficacy, delivery of vaccine, duration, diagnostics, etc., as well as concerns from "chronic infection in elk which are widely distributed and would almost certainly re-infect bison if brucellosis prevalence in bison was significantly reduced from current levels." (Vaccine ROD at 9).

Though the agencies estimated that step three of the IBMP would be initiated on the west and north boundaries of Yellowstone National Park by 2003/2004 and 2004/2005, respectively (FEIS at 180), it has become clear that even the addition of multiple new "Adaptive Management" practices implemented over the past five years will ultimately not be able to bring the vision of the original IBMP to fruition.

2. The Failure of the IBMP and Rise of "Adaptive" Management Strategies.

Many of the predictions contained in the Draft EIS were found to be incorrect and therefore, the analyses made in reliance on those predictions were in error. For example, 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 undermined the cattle-free scenario needed for Step 3 when it elected to stock its own cattle on the previously leased land. 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 Yellowstone National Park was never completed.[7]

Moreover, researchers have cautioned that culling Yellowstone National Park bison based on brucellosis, rather than on the health of their genes, may push the species over the edge into a form of extinction:

> The removal of animals crossing the boundaries of the park is the present policy for bison in the Yellowstone ecosystem. The historical records that detail the relationship among stock, recruitment, and removals, and the relationship between population size and prevalence can be combined to examine the relationship between culling intensity and resultant prevalence [ ]. This analysis suggests one would need to almost eradicate the bison before one could produce significant reduction in prevalence. More significantly the

[7] In January 2014, NPS issued a Final EIS on the remote vaccination program, in which it determined that remote vaccination was not a feasible management strategy and elected to persist with only the current limited hand-delivered vaccination program at Stephens Creek under the "No Action" alternative. One stated reason for the program's discontinuation was that there remains considerable scientific uncertainty regarding the efficacy of RB51, the primary vaccine currently used in cattle in the U.S., on producing lasting immunity in bison.

> levels of removal required to eradicate *Brucella* may be sufficient to also drive the bison to extinction.

(Dobson and Meagher 1996 at 1034).

In 2004, the Montana Department of Fish, Wildlife and Parks ("MDFWP") issued an EA and ROD, which made it possible to hunt bison outside Yellowstone National Park as an adaptive adjustment and tool for the IBMP. In 2005, a 5-year status review (the first and only of its kind; Clarke *et al.* 2005) of the IBMP was published which 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. The review additionally recommended adaptive management adjustments to incorporate hunting as a new tool for managing bison abundance and distribution. The Montana Department of Livestock endorsed this designation of hunting as a management tool in a memorandum.

3. The 2008 Petition.

The 2005 review lacked a discussion of new evidence pertaining to the genetics, genetic health, and genetic diversity of the Yellowstone bison population, despite the publication of several dissertations and peer-reviewed studies on the subject between December 2000 and the review's release in September 2005. This marked lack of review, discussion, or agency evaluation of Yellowstone bison genetic issues, coupled with the largest scale wild buffalo slaughter in over 100 years[8] during the winter of 2007-2008, prompted the Buffalo Field Campaign to petition NPS for the creation of a rule mandating that a minimum herd size of 2,000 bison be maintained in both the Central and Northern Yellowstone National Park herds in order to adequately preserve genetic and allelic diversity of Yellowstone's bison as a whole. The petition, filed April 10, 2008, was the product of collaboration amongst a diverse coalition of tribal, conservation, hunting, animal welfare and wildlife groups, an outfitting business, and concerned citizens. Other signatories included: the Animal Welfare Institute, 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, Ms. Karrie Taggart, Ms. Barb Abramo, Mr. George Nell, and Ms. Rosalie Little Thunder.

The coalition requested immediate measures be taken by NPS to ensure bison's long-term survival and health including protecting a minimum of 2,000 bison in each

[8] Winter of 2007-2008 was the largest scale wild bison slaughter to date since the 19th Century. Over 1,716 wild buffalo had been killed by late April. Of those, 1,276 had been trapped and shipped to slaughterhouses on orders from officials in the NPS under Superintendent Lewis. Since 1985, more than 7,200 Yellowstone bison have been killed.

distinct bison subpopulation/cluster/herd within Yellowstone. That number is considered a minimum for each population segment to retain genetic diversity over a 200-year time period (Gross and Wang 2005; Gross *et al.* 2006). Maintaining sufficiently high levels of genetic diversity within the Yellowstone National Park bison population as might naturally be found within a natural population (one whose growth is limited by spatially or temporally dictated carrying capacity, rather than a government-issued population cap) is essential to ensuring that sufficient variation exists within the greater Yellowstone bison population such that the presence of previously rare alleles, now serendipitously advantageous in an altered environment, might allow the species to naturally evolve and adapt to a changing environment, and retain important survival traits like natural migration and selection.

The petition presented scientific evidence of at least two genetically distinct bison populations inhabiting Yellowstone National Park: the central range herd inhabiting Pelican Valley, Hayden Valley, and the Firehole region, and the northern range herd inhabiting the Lamar Valley. It also argued that the IBMP did not contain sufficient controls or conservation measures for Yellowstone's distinct bison populations, and that the interagency partners had systematically failed to adapt to emerging bison science, research and changed circumstances that favor greater conservation of wild bison and their habitat.

As the Buffalo Field Campaign and its co-petitions were preparing their petition to NPS, the U.S. Government Accountability Office ("GAO") was also preparing its own report of the IBMP's shortcomings, which it published March 7, 2008, and publically released a month later. The GAO report documented the IBMP member agencies' lack of accountability to the American people and Congress, lack of progressive measures towards goal achievement, lack of scientific review addressing assumptions and unknowns to improve decisions in the field, agency failure to adapt new science when it emerges, significant delays in progressing to the next step in a 3-step plan, millions of taxpayer dollars spent on land deals that have not benefited wild buffalo roaming freely in their native range, and the fact that bison are unnecessarily killed or placed in quarantine (GAO 2008; Magnon and Fox 2011). [9]

Although there was a response to the April 2008 petition and GAO report, significant management changes have yet to be implemented. NPS representatives addressed the petition at a meeting of IBMP partners that October in a briefing and presentation on bison conservation genetics in Yellowstone. The presentation purported to contain an assessment of how to incorporate new information on conservation genetics into the adaptive management of Yellowstone bison, but documents from the meeting, all of which are publically available at www.ibmp.info, contain essentially a restatement of the IBMP's standing position on genetic diversity maintenance (that while population size does provide the best mechanism for preserving genetic diversity, a population of 1,000-2,000 bison in each herd should be sufficient to maintain viability), along with an admission that

[9] A copy of GAO's report "YELLOWSTONE BISON, Interagency Plan and Agencies' Management Need Improvement to Better Address Bison-Cattle Brucellosis Controversy" is online: http://www.gao.gov/docsearch/abstract.php?rptno=GAO-08-291.

many other previously mysterious factors impacting viability and diversity were now becoming the subject of a great deal of scientific research and needed to be analyzed in the context of Yellowstone bison. In August 2008, NPS provided two years of funding to scientists at the University of Montana to conduct further research to estimate genetic diversity and gene flow between the central and northern breeding herds; quantitatively model the potential effects of risk management removals on the genetic diversity of Yellowstone bison; assess the numbers of bison necessary in each breeding herd and the entire population to preserve 90-95% of existing levels of genetic diversity; and recommend long-term genetic surveillance objectives and methodologies to ensure adequate data is collected to detect any significant changes in genetic diversity. What knowledge has and has not materialized from these goals, and how it has been implemented, is one focus of this Petition's requests for rulemaking.

In December 2008, IBMP partner agencies created a formal single-document Adaptive Management Plan incorporating all adaptive management changes made to the program since the 2000 ROD. The single document additionally encompassed partner agency responses, per partner deliberations, to recommendations from the March 2008 GAO report. This single document superseded all adaptive management documents before it and became effective December 17, 2008. In May 2009, the IBMP published a Review of Adaptive Adjustments to the Interagency Bison Management Plan: a document demonstrating links for each of the management actions defined in the December 2008 IBMP Adaptive Management Plan to text from the Record of Decision for the Final Environmental Impact Statement for the IBMP. Though some changes have been made, under the current plan bison herds are still captured and slaughtered on the assumption that they are single metapopulation, using the total number of bison as the most important, or only, factor in determining appropriate winter cull levels (U.S. Department of the Interior and U.S. Department of Agriculture 2000; Plumb *et al.* 2009).

C. Adaptive Management Plan Changes and Current Status of Yellowstone National Park Bison

1. 2011 Adaptive Management Plan Changes.

a. Gardiner Basin Adaptive Management Changes Not Included.

In January 2011, the initial adaptive management change in the Gardiner Basin of capturing, collaring, splitting family groups, and releasing 25 bison through an electrified fence onto Cutler Meadows (the northernmost area of the Gardiner Basin) failed within a manner of weeks when two bison were shot, and the remainder forced back into Yellowstone National Park or held in pens at Stephens Creek, and Corwin Springs. Public outcry stayed certain slaughter of 650 bison trapped in pens during the 2010-2011 winter. While the majority were released in the spring, Yellowstone National Park permitted APHIS to take 53 animals for a bison population control program.

In April 2011, the IBMP partners discussed the results of the Gardiner Basin adaptive management experiment conducted in that January and concluded that the northern IBMP management area boundary should be adjusted to encompass the Gardiner

Basin on both sides of the Yellowstone River. In 2012, the state of Montana issued a decision on new boundaries for the migratory species in Gardiner basin.

By April 2011, all partners had signed on for these changes to be implemented as an addition to the December 2008 IBMP Adaptive Management Plan. Because of a lawsuit challenging these changes, however, state agencies were required to withhold their absolute agreement until the lawsuit was settled on behalf of the partners (upholding the Gardiner Basin adaptive management changes), which did not occur until January 7, 2013, and was not affirmed by the Montana Supreme Court until March 2014. *Park Cnty. Stockgrowers Ass'n v. Mont. Dep't of Livestock*, 320 P.3d 467 (Mont. 2014).

2. 2013 Adaptive Management Change to Support Additional Bison Hazing (Effective November 7, 2013).

Meanwhile, as conservation groups continued to generate media attention and support for once more giving bison the freedom to roam, the possibility of bison moving into the Gardiner Basin became more real to the State of Montana, and the IBMP issued yet another adaptive management change. (See *Draft Joint Environmental Impact Statement, July 2013: New Map Incorporating Recent North Side AM Adjustment into Zone 2 (Effective November 19, 2013)*). According to their website, this adaptive change had a goal "to reduce the opportunity for bison to exit the tolerance area," namely by hazing them back inside the park.

3. Remote Delivery of Brucellosis Vaccine Deemed Infeasible.

Earlier in 2014, the constant glimmer of hope to which refusal of more humane bison management techniques always alluded—the possibility of eradicating brucellosis from wild bison herds, thus eliminating their alleged risk to domestic cattle, without having to capture and quarantine entire herds—was dashed. The scientific evaluation of a remote-delivery vaccination program was mandated as a high priority research need by the 2000 Record of Decision for the IBMP (Final Environmental Impact Statement for a Remote Vaccination Program to Reduce the Prevalence of Brucellosis in Yellowstone Bison at I; NPS 2000; FEIS Appendix D at 731).

The chosen alternative was to continue to implement the hand vaccination program (syringe delivery of Strain RB51). Pursuant to this alternative, each bison captured in the Stephens Creek facility is individually handled and has its blood drawn, and the young non-pregnant females are then vaccinated. There is little rational to justify this action, especially when hand vaccination at Stephens Creek has only been employed three times to date (2004:111 yearlings and calf bison; 2008:24 yearlings and calf females; 2011:149 yearlings, 2 adults) (NPS, FEIS: Remote Vaccination Program to Reduce the Prevalence of Brucellosis in Yellowstone Bison at iii).

The Park's decision to continue hand syringe vaccination ignores the health and well-being of the bison populations. Vaccination is detrimental because it requires handling bison, which can result in changes to bison behavior and lead to management-based selection that, over time, alters genetic composition of the herd (Lott 2002). These changes

can be irreversible and detrimental to conserving or restoring a "wild" population (Gates et al. 2010 at 98).

Despite the ongoing vaccination studies and interests in vaccinating bison, the intentions of the program shifted at some point ten years ago when brucellosis eradication in bison was recognized as an undesirable and impractical feat. Despite the Park's decision not to conduct a remote delivery vaccination program, USDA APHIS and the MT DOL continue to develop a proposal to vaccinate bison in an attempt to reduce sero-prevalence in the population. Vaccination superficially appeases particular interest groups without actually acting in the best interests of the bison or in accordance with the fiduciary duties of a trustee of valued national public resources.

4. 2014 Joint Environmental Impact Statement.

Not surprisingly, the National Park Service and State of Montana announced on March 28, 2014, their decision to prepare a new joint Environmental Impact Statement to consider changes for managing wild Yellowstone bison and brucellosis (per Interagency News release, available at: http://www.nps.gov/yell/parknews/032814.htm). In its conclusion, the announcement stated: "NPS and the State will continue to implement the current IBMP with agreed upon adaptive management changes until new Federal and State Records of Decision are signed at the conclusion of this environmental planning and review process." However, one cannot evaluate the success of a management program, when there are no underlying goals that the program seeks to meet. Additionally, one cannot analyze the health and viability of a population when the management "target numbers" cease to be proxies for long-term wellbeing and become arbitrary ends within themselves.

III. PETITION FOR RULEMAKING

It is for the foregoing reasons that Petitioners seek the immediate promulgation of rules to ensure maintenance of the highest levels of genetic diversity achievable both within and among Yellowstone's bison herds and to demand that best scientific data and knowledge be utilized to their full extent, with public transparency. Such rules not only serve the public interest by keeping Yellowstone National Park in line with the conservation purposes articulated in the National Park Service's Organic Act and the Gallatin National Forest Land and Resource Management Plan in line with its legal mandates, but also serve to ensure the Federal and State agencies consider all factors in their NEPA decision making process.

This petition seeks the promulgation of emergency measures to address the following needed reforms:

1. Relevant scientific justification must provide herd sizes that ensure a viable gene pool and integrity of the bison herds;

2. Viable herd size numbers must account for the need to independently maintain current levels of genetic heterozygosity and allelic diversity in both the northern and central herds; and potential additional herd distinctions within the population;

3. The movement of bison from Stephens Creek area of Yellowstone National Park to remote locations beyond must be enjoined and properly evaluated for its repercussions on the genetic composition of both the YNP herds and other herds;

4. The capturing, removal, or killing of bison at Stephens Creek area of Yellowstone National Park must be enjoined and properly evaluated for its repercussions on the genetic composition of both the Yellowstone National Park herds and other herds;

5. The capturing, removal, or killing of bison at Horse Butte area of the Gallatin National Forest must be enjoined and properly evaluated for its repercussions on the genetic composition of both the Yellowstone National Park herds and other herds;

6. All losses of bison from each herd must be tracked and publically reported; and

7. Viable population analyses must be thoroughly reported and constantly revised for accuracy.

A. The National Park Service Must Uphold Its Fiduciary Duties as Trustee of Yellowstone's Public National Resources and Interests of The Public at Large.

1. Substantive Rules Must Ensure That Management Activities Are Consistent With All Relevant Policies and Legal Authorities.

Yellowstone National Park was created on March 1, 1872 as America's first national park. In setting aside Yellowstone National Park 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. In 1894, in recognition of the continued illegal killing of wildlife in Yellowstone National Park, 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 Yellowstone National Park, Congress created the National Park Service. The mission of the U.S. National Park Service is 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 reservations, 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." National Park Service Organic Act, 16 U.S.C. §1, *et seq*.

It is acknowledged that existing law, 16 U.S.C. § 36, grants NPS broad authority to remove so-called "surplus." However, this authority should be read in light of longstanding NPS policies stating that NPS will, *inter alia*, "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." NPS Policies at 4.1; *see also W. Watersheds Project v. Salazar*, 766 F. Supp. 2d 1095, 1115 (D. Mont. 2011). In managing plants and animals native to park ecosystems, 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" NPS should 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 discussed in more detail below, the current management of bison in Yellowstone National Park violates the Organic Act's wildlife conservation requirements. The management disrupts the bison natural movements, has unacceptable impacts on bison social structure and genetic viability, and fails to ensure that a natural and wild bison population will be available for future generations.

2. Unique Considerations of Yellowstone National Park History.

Though touted as the only remaining population of American plains bison alive today, [10] current management practices neglect the unique history of the Yellowstone National Park herds. The bison herds in Yellowstone National Park area represent an evolutionary legacy for conservation of bison because they are the only surviving naturally occurring wild bison population in the United States (Freese *et al.* 2007). As documented by Meagher in 1973, (and restated by Boyd 2003 and examined by Hedrick 2009), the Yellowstone National Park herd dwindled to 23 native members by the early 1900s, and then 18 bison cows from the Pablo-Allard herd in northern Montana, and 3 bulls (1 of whom died the first year) from the Goodnight herd of Southern plains bison in Texas were transported and added to the area. In 1936, a portion of the herd was moved to a separate area in Yellowstone. These imported bison were kept separated from the wild population for their first five years in Yellowstone (1915-1920), and it has been suggested by Meagher

[10] Dratch and Gogan identified Yellowstone bison as the only population remaining without cattle ancestry: "Yellowstone National Park has the only DOI herd where there is no suggestion of cattle introgression using all of the available molecular methods." (2010 at 9)

(1973) and recently affirmed by Hedrick (2009), that a majority of the Yellowstone National Park herd ancestry may have been descended from this small number of founder animals from the Pablo-Allard and Goodnight herds. This hypothesis is further substantiated by a re-examination of Halbert and Derr's 2008 research that found Yellowstone National Park to be one of two existing herds with the highest levels of genetic variation (based on 11 microsatellite loci), which was positively correlated with a herd having multiple founder sources.

Yellowstone National Park has at least two genetically distinct herds that are potentially an irreplaceable component of their subspecies, the northern and central herds (Halbert *et al.* 2012 at 1). As well as being ecologically distinct, the marked difference in mtDNA haplotypes between the northern and central Yellowstone herds has also been noted since Gardipee published her thesis in 2007 and was later confirmed by Pringle in 2011 and is recommended for further investigation by NPS and Derr, according to NPS's 2014 Yellowstone National Park monitoring report, available online. However, under the current plan bison are targeted and slaughtered without regard to what herd they come from or how it will affect the herds. Genetically uniformed culls not only violate NPS legal obligations, they also could mark a crisis for bison conservation. "Recovery of large herds of animals outwardly resembling bison serves no authentic conservation purpose if these bison are hobbled by inherited disease and no longer function as they had evolved up to the era of human interference." (Pringle 2011 at 1).

B. The Forest Service Must Uphold Its Fiduciary Duties as Trustee of Public Lands Utilized by Yellowstone Bison that Reside Year-Round or Seasonally Outside of Yellowstone National Park.

As noted in the IBMP, public lands adjacent to Yellowstone National Park include national forest system lands upon which bison migrate seasonally or year round. Moreover, the IBMP further recognizes that "When the bison are on national forest system lands, the U.S. Forest Service has responsibilities under federal laws to provide habitat for the bison, a native species." (Federal ROD at 6).

Under the Forest Service Organic Act, the Secretary of Agriculture is given general authority to regulate the use and occupancy of the national forests so as to achieve the objectives for which they were reserved. The Multiple-Use Sustained-Yield Act of 1960 broadened the purposes for which national forests were established and are managed to include outdoor recreation, range, timber, watershed, and wildlife and fish purposes. That act also established the concepts of multiple use and sustained yield as the guiding principle underlying national forest management. Multiple use means the management of all the various renewable surface resources of the national forests in the combination that best meets the needs of the American people. Sustained yield means the achievement and maintenance in perpetuity of a high-level annual or regular periodic output of the various renewable resources of the national forests without impairment of the productivity of the land. The Forest Service achieves these objectives for a national forest through the development and implementation of a Land and Resource Management Plan ("Forest Plan").

Specifically, the IBMP states: "The principal role of the Forest Service in implementing the Joint Management Plan is to provide habitat for bison. Cooperating with various agencies of the federal and state governments in performing their respective roles in bison management and animal health management is consistent with this role. The Gallatin National Forest Land and Resource Management Plan (1987) provides habitat management emphasis for the geographic area of the Joint Management Plan, predominantly within management areas for wilderness and wildlife emphasis. The 1987 Forest Plan, in turn, provides: that the goal of the plan, among others is to "provide habitat for **viable** populations of **all** indigenous wildlife species . . .." (Emphasis added).

C. Management Activities Fail to Utilize Best Available Scientific Data and Methods.

1. Scientific and Ethical Flaws in Determination of Population Targets.

The IBMP established a bison "population target" of 3,000 animals.[11] (Federal ROD at 20). This "population target" was not based on any assessment of the biological or 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." (FEIS at 192). Consequently, the IBMP was never intended to responsibly manage bison population viability, and the 3,000 bison "population target" was defined as "a population indicator to guide implementation of risk management activities, and is not a target for deliberate population adjustment."[12]

The FEIS and Federal ROD both included an abbreviated discussion of bison genetics. In those documents, NPS conceded 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 (FEIS at 287). It also reported that "[a]s a species, bison show levels of [genetic] variation that are 'relatively low,' but higher than other species that have recently undergone population bottlenecks" (citing Bonnell and Selander 1974; Roy *et al.* 1994). This statement that American bison as a whole display greater genetic variation than other recently bottlenecked species is presented without context, however, and has the effect (whether intentionally or through carelessness) of being misleading. The Bonnell and Selander study cited for support of this unfounded claim was conducted 30 years ago. Rather than today's standard analysis of microsatellite

[11] 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 Yellowstone National Park 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 Yellowstone National Park would be illegal as it would violate the NPS natural regulation mandate provided in the agency's Organic Act, regulations, and policies.
[12] See November 20, 2006 Memorandum to Administrative Record, Re: Adjustments to 2006-2007 Interagency Bison Management Plan Operating Procedures.

markers or mitochondrial DNA haplotypes, the researchers were limited to using structural analyses of only 21 proteins. And most importantly, the study **only considered Northern elephant seals** near Baja Mexico. There were no cross-species comparisons considered. The focus of the Roy *et al.* study was not genetic bottlenecking, but rather the investigation of whether red wolf mtDNA revealed a recent gray wolf-coyote hybrid origin.

Though NPS includes a discussion of what would have to be taken into account to estimate a 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 viable population size for Yellowstone bison (FEIS 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" (FEIS at 288). This is precisely what is happening near the northern and western borders of Yellowstone National Park.

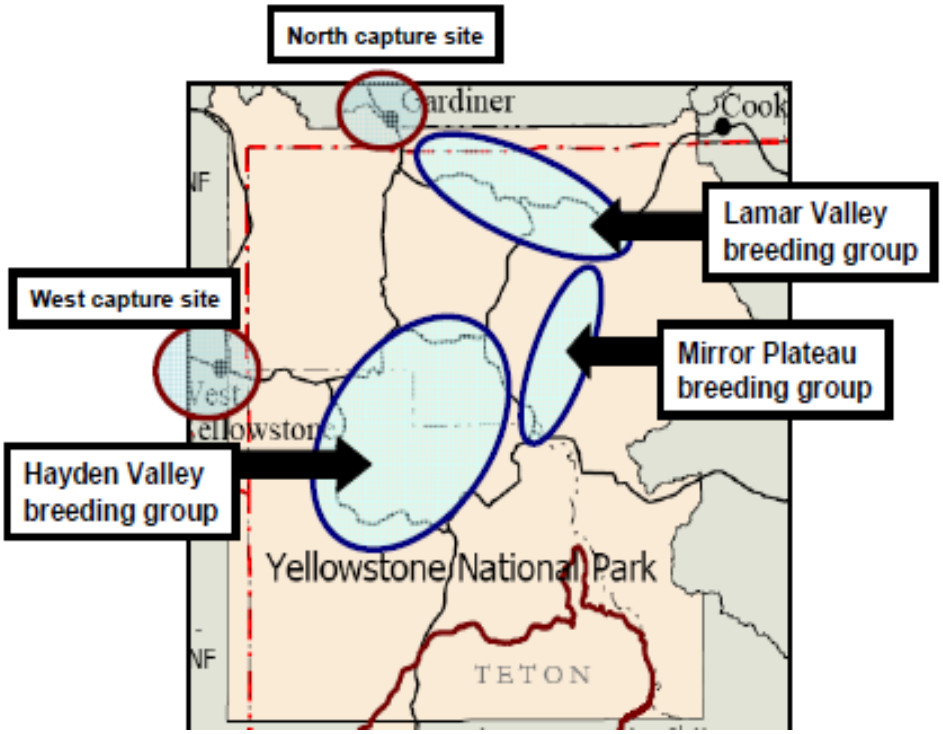
a. Inadequate Population Model and Failure to Account for Distinct Herds.

In both the initial FEIS/ROD and subsequent Adaptive Management changes, any analyses of impacts on maintaining the health and viability of Yellowstone National Park's bison was premised on the assumption that despite the existence of multiple breeding herds, all the bison should be managed as one intermixing population. While the consideration of the Yellowstone National Park metapopulation as a whole is valuable for comparative studies with other large, geographically isolated bison populations, it is entirely inappropriate for the management of genetic health and allelic diversity within Yellowstone over time.

There are at least two distinct herds, clusters, or subpopulations of bison at Yellowstone National Park: the northern range herd, central interior herd, and possibly a third western herd (Gardipee 2007; Meagher 1973). The northern range herd or Lamar Valley breeding group, which has approximately 3,500 individuals, ranges from the northern park entrance near Gardiner, Montana through the Blacktail Plateau and into the Lamar Valley. Bison from the Northern herd congregate in the Lamar Valley and on adjacent high-elevation meadows to the south for the breeding season, but move west towards lower-elevation areas nearer Mammoth, Wyoming and Gardiner, Montana during winter (Geremia *et al.* 2011). The central herd or Mirror Plateau breeding group, which has approximately 1,400 individuals, ranges from the Madison River valley into the Hayden Valley and Upper and Lower Geyser Basins. Bison from the central herd congregate in the Hayden Valley for the breeding season (15 July–15 August), but move between the Madison, Firehole, Hayden, and Pelican valleys during the rest of the year. Also, some bison from the Central Interior herd travel to the northern portion of Yellowstone during winter and return to the Hayden Valley for the subsequent breeding period. Another potential subpopulation consists of about 63 animals, and migrates through the West side of Yellowstone National Park (Halbert 2003). Yellowstone National Park bison biologist Dr. Mary Meagher also observed (1973) a third potential subpopulation, the Mary Mountain

herd. *See* Figure 1; Figure 2. (See also Gates *et al.* 2005 at vii, 48, 85-86, 109, 114-115, 121, 132).

Figure 1.



Map of Yellowstone National Park showing locations of bison breeding groups as described by Meagher 1973, Taper and Meagher 2000, Meagher *et al.* 2002 (GYA map from NPS 2007; Labels from Gardipee 2007 at 12).

Bison from both the northern and central herds may migrate to the northern part of Yellowstone National Park's boundaries during the winter months and be slaughtered at Stephens Creek in Gardiner Basin (Gardipee 2007). However, members of the central herd that return from Gardiner Basin migrate to the central interior during the summer rut season (Gates et al. 2005), and genetic analysis suggests that they do not intermix with other bison herds (Gardipee 2007).

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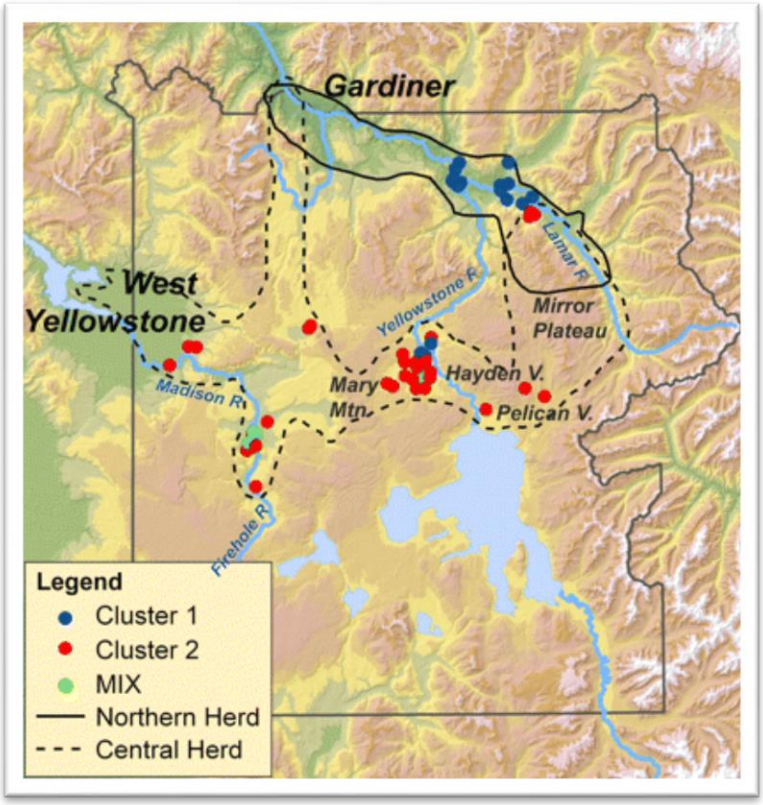
Figure 2.



Map of Yellowstone National Park indicating the locations and genetic types of bison live captured between February 2000 and October 2003. Bison with at least 70% assignment to one of the clusters are indicated by blue (cluster 1) or red (cluster 2) circles, and green circles indicate bison with less than 70% assignment to a single cluster (mixed). The dashed and solid lines represent the maximum annual distribution of central and northern herd Yellowstone bison, respectively. Abbreviations: R, river; Mtn, mountain; and V, valley (Halbert *et al.* 2012 at 2).

One of the most remarkable distinctions documented about the two herds is that the Hayden Valley breeding group (central herd) only contained Haplotype 6 in 2006 and approximately 90% Haplotype 6 in 2005. One plausible explanation for this bottlenecking is that while the 21 bison imported at the turn of the century were introduced to the Lamar Valley, it was a smaller selection of their offspring that was later introduced to the Hayden Valley. This same mitochondrial homozygosity for Haplotype 6 is repeated in the Grand Teton National Park Herds, which trace their lineage largely to the Teddy Roosevelt National Park herd members, who in turn were sourced from Ft. Niobrara National Park, which is also comprised only of Haplotype 6 (Gardipee 2007). Similarly, the Texas State Bison Herd (a.k.a. the Goodnight herd, one of Yellowstone's founding sire sources), which have been maintained at low, stable numbers for nearly 100 years, are now rapidly dying off due to homozygous-linked disorders and phylogenetic abnormalities caused by inbreeding depression, equivalent in its expression two generations of full-sib mating (Halbert 2009).

In his recommendations to avoid similar inbreeding depression risks, Hedrick is careful to specify that 2,000-3,000 bison are needed in each herd or cluster, not just in the total metapopulation as is Yellowstone's current policy (2009 at 419). Given this data, it is particularly important that small satellite bison populations not be haphazardly established without proper consideration of the risk of founder effects and future inbreeding.

The treatment of the distinct herds as one population is one of the most significant flaws driving the management of Yellowstone National Park bison herds. NPS continues to discuss genetic viability of Yellowstone National Park bison based on the Hardy-Weinburg principle that allele and genotype frequencies in a population will remain constant from generation to generation. For example, the assumption of Hardy-Weinberg proportions across all Yellowstone National Park bison was essential to the methodology utilized in Perez-Figueroa's 2012 publication, which commissioned by NPS and cited in the 2011 *Western Watersheds* decision as supporting the one-deme model for Yellowstone National Park bison population ecology studies. However, one of the fundamental assumptions driving the Hardy Weinberg equilibria analyses is that the population is comprised of a single, inter-mixing unit that practices random mating (Hedrick 2000). Though the Hardy-Weinberg assumptions almost never hold true in the animal kingdom, it is an illogical and capricious choice to consider two genetically distinct, physically segregated breeding herds of over 1,000 animals to comprise only one "single intermixing unit" for the purpose of estimating allelic frequencies when those very frequencies may differ markedly between the two herds, as is the case in the northern and central Yellowstone National Park herds. In fact, the existence of two genetically distinct subpopulations within the Yellowstone National Park metapopulation was thoroughly documented and discussed in the publication by Halbert *et al.*, which concluded that, "[t]he continued practice of culling bison without regard to possible subpopulation structure has the potentially negative long-term consequences of reducing genetic diversity and permanently changing the genetic constitution within subpopulations and across the Yellowstone metapopulation. Population subdivision is a critically important force for maintaining genetic diversity and yet has been assessed in only a handful of species to date. The identification of cryptic population subdivision of the magnitude identified in this study exemplifies the importance of genetic studies in the management of wildlife species." (2012 at 9).

Given that the relative size of the two Yellowstone National Park breeding herds has fluctuated dramatically in recent years, tracking and monitoring them for genetic diversity independently may reveal far more valuable information regarding gene flow between the two groups, and whether migration tends to be one-way (as in a continent-island model) or both (Hedrick 2000 at 299). Under this one-population-only model, the impacts associated with the shooting or capture and slaughter of bison from within or outside Yellowstone National Park are evaluated as though the bison being captured and slaughtered (and the genes within them) were being drawn from a hat, when in fact there are strong spatiotemporal correlations between which genotypes are more likely to be removed depending on where and when slaughter and hunting occurs. For example, there is a disproportionate amount of bison being killed from the central herd in recent years. The central herd subpopulation is subject to culls from the western and northern park

boundaries (Halbert *et al.* 2012 at 1), and has not recovered from the last Park-led slaughter in 2008 that killed over half of the central herd bison. More than 1,000 bison were also killed during the winter of 2005-2006. Negative impacts from these repeated Park-led slaughters "differentially affected breeding herds" in the central subpopulation, altered sex and age structures, and disproportionately removed female and calf cohorts (White *et al.* 2011 at 1322). All of these negative consequences were evidenced in a report to the IBMP agencies including the Park:

> Due to risk management and other concerns, more than 3,600 bison were removed from the population during 2001 to 2010, with more than 1,000 bison and 1,700 bison being removed from the population during winters 2006 and 2008, respectively. These culls unintentionally removed more calf and female bison from the central breeding herd which, if continued over time, could result in alterations of the sex and age structure of the population and consequent changes in demographic processes that could persist for decades (White *et al.* 2011). Also, productivity in the northern breeding herd increased, resulting in record abundance in 2011, with higher proportions of females and calves in the herd.

(Geremia *et al.*, 2011 at 2).

According to National Park's most recent 2014 population estimate, the central herd only has a population of 1,400 (NPS 2014). This is a sharp decline from the 2005 population count of 3,531 bison in this herd (NPS 2008). According to Gates *et al.*, "when removing a large proportion of a herd, the primary threat to long-term preservation of the herd is a loss of genetic diversity that can be very difficult, if not impossible, to restore. Therefore, thorough genetic evaluation [] is necessary before, during, and after planned large-scale herd reductions." (2010 at 93).

The harmful effects of treating bison as a single population in a total number has also resulted in adverse impacts to the northern range herd:

> It is highly likely, therefore, that the 2 subpopulations have been disproportionately culled in some years. For example, approximately 735 bison were culled near Gardiner at the park's northern boundary during the 1996–1997 winter. Applying our estimate that around 68% of the bison culled near Gardiner that year originated from the Northern subpopulation (Figure 3A), we calculate that approximately 500 of the bison culled during the 1996–1997 winter were from the Northern subpopulation. Given the prewinter estimate for the Northern subpopulation of 877 bison (US Department of Interior and US Department of Agriculture 2000 ; Gates *et al.* 2005), the 500 culled bison represent approximately 57% of the entire subpopulation.

(Halbert *et al.* 2012).

b. Applying Vital Rates From Female Bison To All Age/Sex Classes Is Not Reliable.

The 2014 Winter Harvest Plan, like the harvest plans preceding it, simply states that emigration patterns considered in their population modeling derived from data collected on adult radio-collared female bison, only 8 to 38 of which may have actually been collared at the same time. At the most generous estimate, this represents the movements of only 1.3% of the target herd number of bison in Yellowstone National Park. Such a small sample cannot be considered informative. Likewise, life history information for all females seems to have been derived from this small sample. This is a significant failing considering that bison fecundity rates have been known to exhibit a negative non-linear density dependent relationship to population size (Fowler 1981 at 60) and that male American bison sons are known to suckle longer than daughters (up to 15 months), causing bison cows that birth sons, as opposed to those that birth daughters, to breed later in the season and increasing their likelihood of being born in the next year (Wolff 1998). Finally, the use of radio collars is no longer justified now that practical, less invasive methods exist for obtaining more descriptive data, such as Gardipee's fecal DNA collection protocol.

c. Additional Management Problems.

The Yellowstone National Park bison management plan has also failed to fully address other recommendations that appear in studies that it commissioned, and that the IBMP 2012 annual report and NPS's Yellowstone National Park Bison Monitoring Plan cited, such as Perez-Figueroa (2012) recommendations, among other things, that: the inbreeding effective size must be considered in addition to the population effective size in simulations modeling the conservation of heterozygosity and allelic diversity, and that bison populations must be 3,250 at minimum. The Perez-Figueroa (2012) publication also noted the heightened impact of variance in male reproductive success on rapidly diminishing genetic diversity in polygymous mating systems containing a dominance hierarchy. An extreme disproportionate ratio of male to female gene flow (12.31) was mathematically demonstrated to be true of the Yellowstone National Park metapopulation as well (Hedrick *et al.* 2013). The study further noted that its model failed to consider the impact of female vital rates and fecundity on genetic diversity, which is a significant shortcoming (replicated by NPS in all its considerations of female bison life history to date) considering the long-standing history of knowledge of female bison fecundity studies (discussed above) and recent affirmations by Gardipee 2007 and Hedrick 2009.

d. The Petitioned Agencies Have An Ethical Duty To The Bison.

It is time for the NPS and USDA to recognize that individual animals have intrinsic value, and this in turn demands that the agencies incorporate ethics into its consideration of wildlife management activities on public lands. There is a growing recognition among conservationists and biologists that ethics must play a greater role in wildlife policy. See, e.g., Fox & Bekoff, Integrating Values and Ethics into Wildlife Policy and Management—Lessons from North America, *Animals* 2011, 1, 126-143. But as Fox and Bekoff point out: "[w]hile many agree that ethics must play a central role in any project involving [animals], it is often interesting to note

that in many books on human-animal interactions . . . there is often no mention of ethics. This needs to change." *Id*. at 129. The same must be said for the regulation of animals.

Undoubtedly, discussions in the context of policy development about ethics and animals can make some people uncomfortable. But, of course, just a generation ago it was also unheard of for an agency to even incorporate the humane treatment of animals into its decision-making process. This has changed dramatically. Our generation must now adopt the same approach to educating the decision-makers and the public as to the role of ethics in making wildlife management decisions. Indeed, it is our jobs as conservationists, animal advocates and scientists "to work toward public education and information dissemination to address real and perceived fears held" by others. *Id*. at 128. What is missing in the current regulations, policies, and environmental analysis regarding the Yellowstone National Park bison is the viewpoint of the animals. Again, from Fox and Bekoff:

> The growing body of literature on animal cognition and emotions demonstrates undeniably that animals have interests and points of view. Like us, they avoid pain and suffering and seek pleasure. They form close social relationships, cooperate with other individuals, and likely miss their friends when they are apart. Emotions have evolved, serving as "social glue," and playing major roles in the formation and maintenance of social relationships among individuals. Emotions also serve as "social catalysts," regulating behaviours that guide the course of social encounters when individuals follow different courses of action, depending on their situations. If we carefully study animal behaviour, we can better understand what animals are experiencing and feeling and how this factors into how we treat them.
> *Id.* at 131.

The current management of the bison is far too invasive and fails to account for the health of the herds and the individual bison. As already discussed above, the existing plan does not ensure viable populations short of extensive human management. This is not an ethical human-wildlife relationship. No consideration is being given to the right of the bison to exist as a viable population with access to historic range.

Likewise, encounters with individual bison— whether hazing by helicopters, or the tracking animal activity using RFID technology—are unnecessarily intrusive and often inflict pain or duress on the animal. It is time for scientists and government agencies to begin forging non-invasive methods and techniques to gain knowledge of bison. Knowledge of the bison can be gained while respecting the integrity of bison to live as wildlife. We encourage all parties to cultivate patient observation and apply creative non-intrusive methods as an ethical path to learning about bison.

IV. CONCLUSION

NPS has refused to provide legally required protection for the natural Yellowstone National Park bison herds and continues to kill or participate in the killing of an excessive number of bison, potentially harming the Park's bison population. Now, it is critical to slow or stop the continued slaughter of these animals to preserve natural, viable herds for future generations. Therefore, an emergency rule must be published and take effect immediately to prohibit NPS and Gallatin National Forest from killing, participating in the killing, and/or authorizing/participating in the non-lethal removal of any bison until it has provided scientific justification for viable herd sizes, and incorporated Petitioners recommendations.

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Items marked with an asterisk (*) are incorporated by reference, but are not included on the CD-R disc that accompanies this petition.