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Buffalo Field Campaign scoping comments on restoring wild migratory bison populations in Montana.

Dear Arnie Dood,

Thank you for the opportunity to submit scoping comments on restoring wild migratory bison populations in Montana.

Please consider all of our scoping comments in detail including the development of alternatives that best protect America's last wild buffalo, and provide Montanan's and the American people an opportunity to advocate for natural restoration of wild bison populations.

Buffalo Field Campaign was founded in 1997 to stop the slaughter of Yellowstone's wild buffalo herd, protect the natural habitat of wild free-roaming buffalo and native wildlife, and to work with people of all Nations to honor the sacredness of the wild buffalo.

Buffalo Field Campaign is located in West Yellowstone, Gallatin County, Montana, and is supported by volunteers and citizens in Montana, Idaho and Wyoming, and by people from around the world who value

America's native wildlife and the ecosystems upon which they depend, and enjoy the natural wonders of our irreplaceable public lands.

As an organization and on behalf of our members, Buffalo Field Campaign is concerned and actively involved with protecting the last remaining descendants of indigenous bison in North America to occupy their original range. Buffalo Field Campaign actively publicizes the plight of the bison, to end their slaughter by government agencies, and to secure long-term protection for viable populations of wild bison and year-round habitat. Buffalo Field Campaign actively engages the American public to honor our cultural heritage by allowing wild buffalo to exist as an indigenous wildlife species and fulfill their inherent ecological role within their native range, and serve as the genetic wellspring for future wild, free ranging bison populations.

Range of possible alternatives for restoring wild migratory bison populations in Montana needs to be expanded to include wild, natural restoration.

Montana already hosts a migratory population of wild buffalo. In fact, the Yellowstone population has existed in the wild since prehistoric times and has continuously occupied the region after glacial retreat 12,000 years ago (Gates 2005). If wild, natural restoration is to be properly considered by the people, Montana needs to evaluate how to do just that.

Evaluate how natural restoration can be accomplished using known buffalo migration corridors: Madison River into Madison valley, and Yellowstone River into Paradise valley.

Evaluate designating migration corridors and habitat for migratory bison from the Madison River to the Gravelly, Red Rock and Centennials; to Henrys Lake, Henrys Fork, Island Park, and the Snake River.

Buffalo are known to migrate beyond Hebgen Basin crossing the Targhee into Idaho.

Open negotiations and coordinate with Idaho Fish & Game to consider and evaluate designated corridors to Henrys Lake, Henrys Fork, Island Park, and the Snake River.

Range of possible alternatives for restoring wild migratory bison populations in Montana must be expanded to include designating large core habitats that provide connectivity for bison populations to intermingle and adapt in a changing environment.

Identify, evaluate and designate public trust lands migratory bison could occupy in the Madison River and Yellowstone River corridors that provide connectivity for bison populations to intermingle and adapt from the Madison River to the Gravelly, Red Rock and Centennials; to Henrys Lake, Henrys Fork, Island Park, and the Snake River.

Identify, evaluate and designate Montana Wildlife Management Areas and state-owned lands that provide connectivity to larger core habitats for migratory bison to occupy year-round.

Identify habitats migratory bison could occupy on public trust lands. Consider historic bison ranges as noted by Schullery and Whittlesey (2006) "… bison appear to have been living everywhere in Greater Yellowstone where habitats were suitable," Plumb (2009) "Yellowstone bison historically occupied approximately 20,000 km^2 in the headwaters of the Yellowstone and Madison rivers in what is now referred to as the northern Greater Yellowstone Area," and Gates (2005):

> "In combination, archaeological evidence indicates a continuous association between bison and Native peoples in the Yellowstone area enduring more than 10 millennia.
>
> The Lamar Valley and the Yellowstone River Valley north of the park (Figure 4.1) to Livingston and beyond was an important area for bison and Native peoples throughout the Holocene. This system can be considered the original Northern Range for Yellowstone bison[2], functioning as an ecological continuum of grasslands that likely supported seasonal migrations by bison as far south as the high elevation ranges in the Upper Lamar Valley. Davis and Zeier (1978:224) described the lower Yellowstone Valley as an exceptional area for Native people to gather, drive and kill bison. Eight bison jumps and three kill sites have been documented south of Livingston. The closest jump site to YNP is 25 km north of the park boundary. It was used

during the late prehistoric period between 1,700 and 200 b.p. (Cannon 1992). There is evidence of a human use corridor from the Gallatin and Madison River drainages into the interior Yellowstone National Park. Several major bison kill sites are located in the Gallatin Valley outside of Bozeman Montana[3]. Archaeological sites in Fawn Pass provide evidence in support of the hypothesis that Native people moved between the Gallatin drainage and the interior of the park[4]. Chert and obsidian projectile points were found at the Fawn Pass site. The chert implements likely originated west of the park. The obsidian is being fingerprinted to determine its origin. Approximately half the projectile points were the Pelican Lake type, the most commonly represented prehistoric culture in YNP, dating from 1000 B.C. to A.D. 200. Other points were assigned to the McKean Complex, dating to around 3500 B.C. McKeean Complex sites are also quite common in the park. There is an obsidian source at Cougar meadows in west central Yellowstone Park. The material is inferior to the Obsidian Cliff source and was only used for making utility implements like knives and scrapers rather than projectile points. An obsidian artifact found at Yellowstone Lake was determined to be Cougar Creek Obsidian.

Prehistorically, YNP bison ranges were probably the "tips of the fingers" of seasonal migration from large source populations associated with expansive grasslands (Figure 4.1) lying to the north, west and southwest around the Yellowstone Plateau[7]. The high mountains on the east side of YNP and discontinuous habitat would likely not have supported bison migration. Historical accounts indicate that interior ranges also supported resident bison populations (Meagher 1973: Appendix II). Today, the bison of YNP are a source population with the potential to reoccupy surrounding grasslands systems if incompatible land uses and policies did not constrain expansion. There are no free-roaming bison populations in adjacent areas containing habitat contiguous with the park. The closest contemporary population is in the Jackson Valley, separated from YNP bison ranges by the Continental Divide and an expansive

tract of coniferous forest.

The Gallatin and Madison Valleys and the Snake River Plain contain extensive grasslands that served as habitat for large numbers of bison (Figure 4.1), source populations for bison entering the park from the west. In 1880, Superintendent Norris commented on the presence of about 300 bison on the Madison Plateau and Madison River (Meagher 1973: 118). He speculated that the winter range of this population may have been outside the park. M. Meagher[9] inferred that bison would have migrated into the park from the west in the spring and summer by several routes: the chain of wet meadows along the Bechler River in the southwest corner of the park; diffuse movements across the Madison Plateau; and through Raynolds Pass and other low passes in the Continental Divide west of the Park. There is little available evidence for or against the possible use of the Madison River corridor during prehistoric or the early historic period. Meagher (1973:23) cites Raynolds (1867) who in 1860 saw "bison among the hills" while traveling from Henry's Lake to the Madison River west of the park. Bison were present in this corridor in the 1950's (Meagher 1973:23) and the corridor is heavily used by contemporary bison (Bjornlie and Garrott 2001)."

In restoring wild migratory bison populations Montana must recognize its' public trust responsibility to American Indian Tribes.

"In the end, the frontier army's well-calculated policy of destroying the buffalo in order to conquer the Plains Indians proved more effective than any other weapon in its arsenal. Too small and too inept to vanquish the plains tribes expeditiously, the army aided and was in turn aided by the "sportsmen" and professional hunters who, along with the army itself, managed to destroy the Indians' staff of life. With the mainstay of their diet gone the Indians had no choice but to accept a servile fate on a reservation where they could subsist on government handouts. From the Indian perspective the buffalo's disappearance was a shattering blow. Crow Chief Plenty Coups described its impact to Frank Linderman: "When the buffalo went away

> the hearts of my people fell to the ground, and they could not lift them up again. After this nothing happened. There was little singing anywhere." Sitting Bull summed up the results of the annihilation: "A cold wind blew across the prairie when the last buffalo fell-a death-wind for my people." (Smits 1994)

Under Article VI of our United States Constitution, Treaties made "under the Authority of the United States, shall be the supreme Law of the Land." Online:
http://www.house.gov/house/Constitution/Constitution.html

Where wild migratory bison populations are restored on public trust lands, Montana must provide equitable access for American Indian Tribes to exercise their respective Treaty rights (Harris 2008; Confederated Salish and Kootenai Tribes 2012), cultural traditions (LaDuke 2000; Little Thunder 2010; Looking Horse 2008), and rights to self-determination (USA 1855).

The Montana-Wyoming Tribal Leaders Council (2012) urged Montana to protect the buffalo in Yellowstone, to cease harassing the wild species on their calving grounds, and to recognize Treaty Obligations to American Indian Tribes to protect viable populations of migratory buffalo in their native habitat.

Montana should take a hard look at the American Indian Laws and Treaties that are effected by its decision to proceed with a statewide bison management plan:
http://digital.library.okstate.edu/KAPPLER/index.htm

Open negotiations and coordinate with American Indian Tribes willing to include Tribal lands as designated larger core habitats migratory bison could roam (Magnon and Fox 2011).

Consider and evaluate co-managing public trust and Tribal lands together (King 2007; Nie) to provide connectivity to larger core habitats for migratory bison to roam.

Montana must expand its identification of potential restoration locations for wild migratory bison populations to occupy habitat year-round.

A key commitment from Montana to wild bison must include opening negotiations and coordinating with National Forests, National Grasslands, National Parks, National Wildlife Refuges, Bureau of Land Management and American Indian Tribes on developing public and transparent processes for restoring wild bison populations.

Disclose the receptivity of, resources available to, legal authorities and public processes of National Forests, National Grasslands, National Parks, National Wildlife Refuges, Bureau of Land Management and American Indian Tribes to restore wild migratory bison populations.

Describe the steps to be taken including public participation and government-to-government consultation with American Indian Tribes (NCAI 2010) to achieve restoration of wild migratory bison populations on public trust and Tribal lands.

The Interagency Bison Management Plan must not limit range of possible alternatives for restoring wild migratory bison populations in Montana.

Montana requires our governor to approve a bison management plan under MCA 81-2-120. MCA 81-2-120 does not limit consideration to managing bison under one plan, but a "plan approved by the governor."

Range of possible alternatives for restoring wild migratory bison populations in Montana must include on-going evaluations by Montana to expand habitat in the Yellowstone region.

In 2009, Montana Fish, Wildlife & Parks and Gallatin National Forest outlined several on-going processes and opportunities to expand habitat available for bison to roam Montana:

- As a continuation of the adaptive management process, a sub-group of the Technical Committee was asked to look at potential available habitat expansion areas.
- The task assigned to this group was to assess the habitat areas adjacent to Yellowstone National Park that may be available, because of changed conditions, new information or adaptive changes, to bison both spatially and temporally.
- These additional habitat areas could potentially lead to

adjustments in the conservation zones originally mapped in the IBMP.
- These additional habitat areas could lead to increased state and treaty hunting opportunities.
- Both short and long terms habitat changes could be evaluated.

Opportunities Available:
- There is potential year-round habitat for bulls or mixed groups in the western bison management area on Horse Butte and the Flats east of the South Fork of the Madison.
- A temporal expansion, to May 31 or beyond, of the bison tolerance date in the western bison management area, Zone 2, could provide additional late winter habitat.
- Year-round bull habitat to the north of Duck Creek (south of Highway 287 and east of Highway 191) or (south of Grayling Creek) is potentially available. (Montana Fish, Wildlife & Parks and Gallatin National Forest 2009).

When analyzing the Cache-Eldridge allotment management plan, the Gallatin National Forest also found suitable habitat for bison to occupy in the Taylor Fork:

> "**Response:** The Gallatin National Forest (GNF) recognizes that the Taylor Fork is biologically suitable habitat for bison. Bison are known to have occupied the Taylor Fork historically and there are no natural barriers precluding bison from entering the Taylor Fork today." (U.S. Forest Service 2006)

A Montana Fish, Wildlife & Parks assessment of the Upper Gallatin River Drainage in 2006 mapped potential bison wintering range in the Taylor Fork/Porcupine areas (Jourdonnais 2006).

A Montana Fish, Wildlife & Parks biologist (Lemke 2006) also evaluated habitat east of the Yellowstone River to Dome Mountain.

Montana Fish, Wildlife & Parks (2010) suggested retiring public lands grazing allotments on the South Fork and Watkins Creek in Hebgen Basin in consideration of "the adaptive nature of bison management into the future."

In response to the U.S. Government Accountability Office's report on Yellowstone bison (U.S. GAO 2008), the Interagency Bison Management Plan agencies committed in 2008 to provide conflict-free habitat in Hebgen and Gardiner basins:

> MANAGEMENT ACTIONS
> 1.3.a—Work with private landowners and livestock producers and operators to provide conflict-free habitat in the Hebgen and Gardiner basins.
> 1.3.b—Work with landowners who have human safety and property damage concerns, as well as those who favor increased tolerance for bison, to provide conflict-free habitat in the Hebgen and Gardiner basins. (Yellowstone National Park 2008)

Evaluate and disclose all potential bison habitat expansions in the Yellowstone region.

Consider and evaluate adapting fire as a management component to open up migration corridors in dense forested areas, and in restoring grasslands.

Range of possible alternatives for restoring wild migratory bison populations in Montana must not be limited by laws that impede recovery of indigenous wildlife species, a public trust resource for present and future generations. Montanan's Constitutional right to maintaining and improving a clean and healthful environment shall not be denied by the legislature.

Along with MCA 81-2-120, the legal construction of MCA 87-1-216 is diametrically opposed to managing bison as wildlife, and in effect and outcome, the legislature has statutorily prohibited, and seeks to prohibit, the recovery of this extirpated wildlife species in Montana.

As constructed, MCA 81-2-120 and MCA 87-1-216 infringes on Montanan's constitutional right to a clean and healthful environment. By outlawing wild migratory bison in Montana, MCA 81-2-120 and MCA 87-1-216 statutorily prohibit the keystone roles migratory bison provide for our environmental life support system.

Evaluate and disclose obstacles and impairments to restoring wild migratory bison as an indigenous wildlife species. Review and adopt solutions that are the most effective, least costly, and most beneficial for wild migratory bison populations.

Discuss the findings of Kilpatick (2009) on how Montana can adapt low cost solutions to resolve actual bison-cattle conflicts that allow for greater bison abundance and distribution.

Provide concise information on living with wild bison and co-existing with the indigenous wildlife species in Montana.

Evaluate and disclose legal constraints and impairments to restoring wild migratory bison as native wildlife. Review all of the restrictions contained in MCA 81-2-120 and MCA 87-2-716.

Evaluate and disclose Montana's public trust responsibilities to ensuring a clean and healthful environment and how wild, natural restoration of bison accomplishes this constitutional imperative to maintain and improve our environmental life support system.

Articulate Montana's public trust responsibilities for ensuring that wild, migratory population of bison persist for present and future generations.

Despite the prejudiced findings enshrined in MCA 81-2-120 and MCA 87-1-216, the state of Montana has a public trust responsibility to restore the wild, free migration of bison across Montana's landscape - enriching life's diversity, improving watershed health, and providing for our environmental life support system for future generations.

Migratory bison are North America's largest terrestrial mammal, and a traditional wild food source hunted for subsistence.

Where natural resources have been depleted and degraded for livestock production (Fleischner 1994) at a great cost to taxpayers (Moscowitz and Romaniello 2002) the reintroduction of migratory bison could remedy the loss of public trust resources caused by their extirpation from Montana.

Montana must evaluate and adapt the most up to date, peer-reviewed science to achieve bison population viability, and migratory populations that retain the most genetic diversity over the long-term, e.g. > 200 years.

Traill (2010) surveyed population viability for a range of species and found that managers are managing for extinction, not long-term persistence:

> "To ensure both long-term persistence and evolutionary potential, the required number of individuals in a population often greatly exceeds the targets proposed by conservation management."
>
> "The bottom line is that both the evolutionary and demographic constraints on populations require sizes to be at least 5000 adult individuals. These seem to be large requirements, but a number of studies across taxonomic groups have made similar findings: the median MVP derived from PVA of 102 vertebrate species was 5816 individuals (Reed et al., 2003), and 4169 individuals from a meta-analysis of 212 species (Traill et al., 2007). The census-based MVP of 5500 reported by Thomas (1990) is also remarkably congruent; all similar to the recommended census N of 5000 individuals (Frankham, 1995). We note though that similarities are not strictly equivalent, and are a result of evaluation of some non-overlapping factors, meaning minimum viable population size in many circumstances will be larger still."

Montana must review and utilize the most recent scientific data available in setting long-term, viable population goals for migratory bison.

Evaluate and disclose the loss of alleles, long-term adaptive potential, disease resistance and diversity in populations of buffalo greater and less than 5,000 individuals.

Evaluate and disclose how managing for greater and less than 5,000 buffalo in an isolated population impacts genetic drift,

genetic diversity across microsatellite and immune system loci, and adaptation to environmental change.

An initial modeling study of genetic diversity in migratory bison by Pérez-Figueroa (2012) found:
* A stable population census size of 2000 bison is not likely to maintain 95% of initial allelic diversity.
* Maintenance of 95% of allelic diversity will likely be achieved over 200 years with a fluctuating population size that frequently increases to > 3500 bison.
* Allelic diversity was lower when only adults were culled.
* Removal of only young bison did not reduce effective population size compared to the removal of only adults.
* Culling of only younger individuals preserves the older age cohorts.

Pérez-Figueroa (2012) also noted the limitations and qualifications of their study, including lack of actual empirical data to determine retention of genetic diversity and thus ensure bison population viability:
* Base population of 2000 bison.
* Yellowstone bison is one deme (an interbreeding group within a larger population).
* Little is known about male reproductive success in bison.
* DNA-based paternity analysis was not used.
* Selection and mutation were not included.
* Actual levels of allelic diversity could be even higher than those obtained in the model's simulations (mutation was not considered; selection could enhance genetic diversity in isolated ungulate populations).
* Culling was random among all age classes or random within age groups.
* Culling was conducted whenever population size exceeded a threshold value of 4500 or 3500 depending on the scenario. Individuals were culled until the target population size (2500 or 3000) was reached.
* We did not consider high variance in female reproductive success or heritability of fitness, both of which could increase the rate of loss of variation (heterozygosity) by perhaps 10-20%.

Evaluate and disclose how Montana will gather, monitor and use the best available science to protect bison genetic diversity and ensure population viability.

Gardipee (2007) field-tested bison DNA fecal analysis, a non-intrusive technique for gathering bison genetic data. Using DNA fecal analysis, Gardipee (2008) also found evidence of Yellowstone bison subpopulation structure.

Consider evaluating bison genetic data using only non-intrusive methods that require no capturing, drugging or other disrespectful livestock management techniques on an indigenous wildlife species.

Evaluate and disclose how Montana will gather, monitor and use the best available science to protect bison genetic diversity and ensure population viability based on genetically distinct bison subpopulations, an isolated population, and populations that intermingle.

Recent genetic analyses by Halbert (2012) support the finding of genetically distinct bison subpopulations in the Yellowstone herd that "could lead to divergence of adaptively important genetic attributes given that their environments are significantly different (Christianson et al. 2005; Olexa and Gogan 2007)."

Furthermore, "the level of divergence is expected to continue to increase, and there is a potential for adaptive differentiation in the different environments inhabited by the Yellowstone subpopulations."

Halbert (2012) also raised concern about the disproportionate killing of subpopulations under Montana's participation in the IBMP, the unknown impacts of management practices on bison genetic integrity, and called for a population viability analysis to determine long-term sustainability.

In addition to different tooth wear patterns, parturition timing and synchrony, longitudinal differences in migration patterns, differences in diet and environment, fidelity to rutting and calving grounds, evidence of genetically distinct subpopulations begs Montana to consider developing wild, natural restoration options for the only migratory population of bison in the Yellowstone ecosystem.

Evaluate and disclose how Montana can manage known buffalo corridors to help maintain genetically distinct bison

subpopulations originating from the Central Interior and Northern Range of the Yellowstone ecosystem.

Consider and evaluate ecosystem changes that climate change will have on grasslands, and grasslands species.

> **"**Forest Service Chief Tom Tidwell has recognized that 'climate change is already altering our Nation's forests in significant ways and those alterations are very likely to accelerate in the future, in some cases dramatically . . . In the uncertain environment of climate change, risk management will become critical. This is managing ecosystems for resiliency to prepare uncertain future outcomes.'[1] Leadership in mitigating climate change and adaptive management for unavoidable climate change are the modern challenges of proper land stewardship for our national forests and grasslands. This leadership needs to be demonstrated in our land management planning processes, especially at the time of plan revision." (U.S. Forest Service 2010)
>
> "Projected climate change impacts include air temperature increases; sea level rise; changes in the timing, location, and quantity of precipitation; and increased frequency of extreme weather events such as heat waves, droughts, and floods. These changes will vary regionally and affect renewable resources, aquatic and terrestrial ecosystems, and agriculture. While uncertainties will remain regarding the timing and extent magnitude of climate change impacts, the scientific evidence predicts that continued increases in GHG emissions will lead to increased climate change." (U.S. Forest Service 2009)

Consider and evaluate the adaptability of migratory bison to ecosystem changes that climate change forecasts for grasslands and watersheds.

Evaluate and disclose the keystone role and ecological contributions of wild bison freely roaming the ecosystem.

Review and evaluate bison's roles and contributions in providing ecosystem health and diversity.

"Heavy grazing by prairie-dogs or bison created a low 'grazing lawn' that is the preferred habitat for many grassland bird species that are restricted to the shortgrass prairie and desert grasslands." (Askins 2007)

"… grazers influence the distribution of soil N properties at every spatial scale from individual plants to landscapes." (Augustine 2001)

"The influence that over 100 million bison wallows in the tallgrass prairie, and perhaps an equal combined number in the mid- and shortgrass prairies, had on surface hydrology and runoff can only be considered to have been regionally substantial and locally enormous." (Butler 2006)

"… loss of species diversity due to frequent burning was reversed by bison, a keystone herbivore in North American grasslands." (Collins 1998)

"… bison, in conjunction with other factors such as fire and drought, significantly limited the historical distribution of woody vegetation in the Great Plains." (Coppedge 1997)

"Bison social groups had different grazing patterns." (Coppedge 1998)

"… bison urine deposition leads to patches of vegetation having much higher total aboveground plant biomass, root mass and N concentrations." (Day and Detling 1990)

"Bison have a unique ecology that has profound effects on mixed-prairie ecosystems. Their grazing style provides spatial and temporal heterogeneity which benefits plant and animal species diversity. Bison also increase overall plant productivity by enhancing nutrient cycling and nitrogen availability. Their distinctive behavioral trait of wallowing further creates spatial patchiness of resource availability and boosts plant species composition. Finally, predators and

scavengers benefit from consuming bison while the remains confer rich nutrients to prairie soils and plant communities." (Fallon 2009)

"… grazers probably increased NO^3 availability to plants… ungulates additionally may promote N availability to plants… Both would have positive effects on the primary productivity of this ecosystem." (Frank 1997)

"The decline in grazers probably had indirect cascading effects on trophic processes that should be expected to reverberate in this grazing-dominated ecosystem until herbivore populations recover." (Frank 1992)

"Grazers were a particularly important component of the N budget of this grassland. Estimated rates of N flow from ungulates to the soil ranged … approximately 4.5 times the amount of N in senescent plants." (Frank 1994)

"Ungulates increase aboveground production of grasslands in Yellowstone by stimulating grazed plants to allocate resources aboveground and by facilitating the rate of net nitrogen (N) mineralization and the availability of N to plants. Moreover, the migration of ungulates from winter to summer range in Yellowstone is associated with animals following the spatio-temporal pattern of nutrient-rich forage across the ecosystem. This is likely critical in the positive feedback of herbivores on their forage by providing grazed plants extended periods to recover while soil conditions are suitable for plant growth." (Frank 1998)

"… bison can de-stabilize the vegetated edges of dunes precipitating a geomorphological cascade impacting biodiversity." (Gates 2011)

"Western Chorus Frogs, *Pseudacris triseriata*, in tallgrass prairie breed in ephemeral aquatic habitats including intermittent streams and bison wallows." (Gerlanc and Kaufman 2005)

"… ungulates are important agents of change in ecosystems,

acting to create spatial heterogeneity, modulate successional processes, and control the switching of ecosystems between alternative states." (Hobbs 1996)

"… I found ~45% more grasshopper species and significantly increased values of Shannon *H′* diversity at sites with bison grazing." (Joern 2005)

" … unique spatial and temporal complexities of bison grazing activities … are critical to the successful maintenance of biotic diversity in this grassland." (Knapp 1999)

"The isolation of several viable AMF [arbuscular mycorrhizal fungi] taxa from bison feces indicates that wide-ranging bison could be a vector for at least some RFLP types among grasslands within YNP." (Lekberg 2011)

"The heterogeneous species assemblages of wallows enhance grassland species diversity primarily because wallows increase habitat diversity." (Polley and Wallace 1986)

"… bison are potentially important dispersers of forbs as well as graminoids. A high abundance and wide diversity of seeds were found in both bison hair and dung. The great majority of seeds found undamaged in bison dung were small seeds, which agrees with the 'foliage is the fruit' hypothesis. Dispersal by both epizoochory and endozoochory may play an important role in life history of many species in tallgrass prairie landscapes." (Rosas 2008)

"In combination, urine patches plus grazing produced unique large-scale patch structure compared to urine patches in ungrazed prairie. The most important impact of urine patches on community structure resulted from preferential grazing of urine patches by bison, which increases both the size and severity of the grazed area." (Steinauer and Collins 2001)

Contrast these contributions by evaluating impacts of establishing another limited ranged, fenced population of bison in Montana that are rounded up by government agents in helicopters, on horses and ATVs, captured in pens, ear-tagged, computer chipped, bled, disease tested, radio-collared, inserted with vaginally telemetry, quarantined, etc.

Evaluate and disclose the ecological contributions of greater migratory bison abundance and distribution for recovering rare, sensitive, threatened and endangered species.

Mattson and Merrill (2002) found that grizzly bear occupied grasslands only where migratory bison ranged and that the historic range of migratory bison was positively associated with grizzly bear occurrence:

> "Grizzly bear range in 1850 was positively related to occurrence in mountainous ecoregions and the ranges of oaks (*Quercus spp*.), piñon pines (*Pinus edulis* and *P. monophylla*), whitebark pine (*P. albicaulis),* and bison (*Bos bison*) and negatively related to occurrence in prairie and hot desert ecoregions.
>
> Of the foods, grizzly bear range was most strongly positively associated with ranges of oak dominated vegetation types and bison.
>
> Grizzly bears apparently occupied the prairies and grasslands only where there were bison (Fig. 3) or humans not engaged in maize cultivation."

As key native food sources decline --whitebark pine and cutthroat trout-- for the distinct population of grizzly bears in the Yellowstone ecosystem, bison become a more critical key native food source for grizzly bear fecundity and survival:

> "With the elimination of garbage, Yellowstone ecosystem grizzly bears now depend on several categories of food including army cutworm moths, ungulate meat, fish meat, whitebark pine nuts, forb roots, forb foliage, and grasses and sedges … only ungulate meat from elk and bison may have contributed to the lower average age of first

reproduction, the increase in average litter size, the reduction in adult female mortality, and the positive trends in grizzly bear population … since the mid 1980's. Due to the potential importance of ungulate meat to the grizzly bears … careful analysis of the impacts of the bison management alternatives … is warranted." (Gunther and Haroldson 1997)

"Ungulates may provide as much as one-half the energy required by Yellowstone's grizzly bears during the nondenning season (Mattson 1997)." (Green 1997)

"The greater use of bison compared to elk, and especially deer carcasses, also indicated importance of slower carcass depletion rates to bears." (Green 1997)

"Following the establishment of lake trout in the lake, the average number of Yellowstone cutthroat trout entering Clear Creek during the annual spawning migration dropped from 43,580 between 1977 and 1992 (Gresswell et al. 1994) to 3,828 between 2001 and 2004 (Figure 3; Koel et al. 2005). The number of spawners in 2006 was the lowest in the 60-year period of record (489; Koel et al. 2007). Similar declines in the abundance of spawners have been noted in smaller tributaries in the northwestern portion of the lake (Koel et al. 2005). (Gresswell 2009)

"In response to a petition the Natural Resources Defense Council (NRDC) the US Fish & Wildlife Service agreed that the whitebark pine, a wide-ranging species of tree found on mountain tops in much of western North America, faces an "imminent" risk of extinction brought on by climate change. The "warranted but precluded" decision acknowledges that climate change is driving the tree species to the brink, but the Service's limited budget prevents adding whitebark to the federal endangered species list at this time. A recent study shows 80% of the whitebark pine forests in the Greater Yellowstone Ecosystem are already dead or dying; similar declines have been observed in other parts of its range. Last year the Canadian government declared the tree endangered throughout its range." Online:

http://www.nrdc.org/media/2011/110718.asp

Evaluate and disclose how recovering threatened grizzly bear populations can be accomplished by restoring bison abundance and distribution in larger core habitats. Review the potential for reduced predator take of domestic livestock.

> "More positively, our results contribute to identifying areas where there are good prospects for restoring grizzly bears extirpated between 1850 and 1970. Ideal restoration areas would be larger than 20,000 km^2 and would contain <7 humans/ km^2. Extensive core areas would also exist where there are <0.5 humans/ km^2. Greater topographic relief would be an asset, but only where key foods dispersed bears away from human activity. The presence of bison and extensive communities of oaks such as *Quercus gambelii* or *Q. turbinella* would also enhance prospects for restoration by providing high quality bear food. The identification of such areas, if they exist, is a necessary next step toward ensuring the long-term survival of grizzly bears in the contiguous United States." (Mattson and Merrill 2002)

Evaluate and disclose benefits for predators consuming wild migratory bison as a food source. Review the potential for reduced predator take of domestic livestock.

Evaluate funding and development of safe passages in wildlife migration corridors.

Review the ample materials and tools that are being designed and developed in Montana to help people and wildlife co-exist (American Wildlands 2009; Western Transportation Institute 2007; Hardy 2008).

Evaluate and disclose conservation status of wild migratory bison in Montana, and long-term threats to the indigenous species survival.

Since 2008, the International Union for Conservation of Nature has Red Listed the American bison as near threatened.

Sanderson (2008) and scientists estimate American bison occupy less

than 1% of their original range.

Bison's original range spanned one-third of North America's landmass - more than two billion acres - and the wildlife species evolved in and adapted to over twenty distinct ecosystems (Sanderson 2008; IUCN 2010).

In Montana, bison's status is S2: "At risk because of very limited and/or potentially declining population numbers, range and/or habitat, making it vulnerable to global extinction or extirpation in the state. Montana Fish, Wildlife, and Parks also designated bison a Tier I species: "Greatest conservation need." Montana Fish, Wildlife & Parks has a clear obligation to use its resources to implement conservation actions that provide direct benefit to these species, communities, and focus areas." (Adams and Dood 2011)

Freese (2007) found that "Today, the plains bison is for all practical purposes ecologically extinct within its original range."

Boyd (2003) found that greater than 95% of the 500,000 bison in North America today reside in private ownership as domestic livestock.

Less than 1.5% of bison are genetically *Bison bison* (Freese 2007).

In the late 1800's and early 1900's, forced cattle-bison breeding experiments by ranchers to commercially exploit fitness traits of wild bison led to widespread introgression of cattle genes in private, public and Tribal bison herds (Polziehn 1995; Ward; Halbert 2003; Halbert and Derr 2007; Hedrick 2009-10-11; Schnabel 2011).

A study by Douglas (2011) suggests that cattle genes in bison will adversely affect mitochondrial health and function, and the overall fitness of bison. Bison genetics researcher James Derr (2009) has made similar warnings.

The extensive prevalence of cattle genes in bison populations (Polziehn 1995; Ward 1999; Halbert 2003; Halbert and Derr 2007; Hedrick 2009-10-11), habitat fragmentation, loss of natural habitats and isolated populations, limited range and population sizes (Boyd 2003; Boyd and Gates 2006), artificial selection, intensive management, unnatural confinement to fenced ranges, absence of predators, introduction of

non-native disease (Freese 2007) are some of the risk factors of ecological extinction that threaten the identity and survival of American bison as a wildlife species.

Genetic testing of bison (Polziehn 1995; Ward 1999; Halbert 2003; Halbert and Derr 2007; Schnabel 2011) suggests that only bison descended from Yellowstone have no cattle ancestry.

The Henry Mountains bison was founded with bison solely descended from Yellowstone (Boyd 2003).

Cattles genes have been found in American bison previously thought to have no cattle ancestry based on prior genetic testing: Wind Cave National Park, Grand Teton National Park, and Sullys Hill National Game Preserve (Dratch 2011).

A report by scientists Dratch and Gogan (2010) suggests that only Yellowstone bison retain their wildlife identity. (The report did not survey bison in the Henry Mountains).

"The Bison of Yellowstone National Park are unique among bison herds in the United States, being descendants, in part, of the only continuously wild herd in this country." Dr. Margaret Mary Meagher, retired Yellowstone National Park bison biologist, 1973.

A recent study by Halbert (2012) found “strong evidence for the existence of 2 genetically distinct subpopulations of bison” in the Yellowstone population.

"Prehistoric bison distribution in the GYE can perhaps best be summarized simply by saying that bison appear to have been living everywhere in Greater Yellowstone where habitats were suitable." (Schullery and Whittlesey 2006)

Scientist Joel Berger (2004) found that bison’s nomadic nature and migratory behavior is still intact but they are cut-off from 100% of their historic migration corridors.

A Position Statement of the Montana Chapter of The Wildlife Society on Wild Bison in Montana warned: "Current management of private, state and Federal bison herds is leading towards domestication of bison that

threatens their wild character and limits important natural selection processes."

The American bison is a land-intensive species that once roamed over great distances (Boyd and Gates 2006).

American bison, North America's largest terrestrial mammal and historically its most numerous mammal that left behind 100 million wallows (Butler 2006), are architects of their environment shaping their world through shared behaviors in migratory herds across diverse habitats ranging from the Chihuahuan desert to northern grasslands (IUCN 2010).

Long distance migration, what defines wild bison as a nomadic, herd animal that once thundered across the plains, is in danger of being lost forever.

Extirpation of American bison from their native range is an indicator that the prairie ecosystem they played a part in forming is also at risk of extinction (Knapp 1999).

Grazing by bison can reverse the loss of native grassland species and the disruption of grassland ecosystem structure and function caused by their extirpation (Collins 1998).

Bison migrating freely in a wild state fulfill keystone ecological relationships that keep grasslands open and healthy, watersheds clean, and create habitats that supports an abundance and diversity of plants, birds, and wildlife (Fallon 2009; IUCN 2010; Sanderson 2008).

Bison are an important food source for bears, wolves, eagles, coyotes, ravens and scavengers in the Yellowstone ecosystem (Green 1997; Fallon 2009; Mattson and Merrill 2002).

Yellowstone is the last stronghold and wellspring of the Buffalo Nation (LaDuke 2000).

"Yellowstone territory, the habitat of the last wild Buffalo Nation - is sacred ground, it has been a SACRED SITE for the First Nation's people, and for all humanity who hold deep respect for all Creation." (Looking Horse 2008).

Yellowstone's remnant population represents a living link to the last of our nation's wild American bison.

Evaluate economic benefits of restoring wild bison in Montana.

A cost-benefit study from acquiring winter range for bison outside Yellowstone National Park found "conservatively calculated" net "measurable benefits" of $4.43 million. (Yellowstone National Park 2000)

"… *between 1969 and 1989, more than 96% of all new jobs in the Greater Yellowstone Area came from sectors other than timber, mining, and agriculture*." (Yellowstone National Park 2000)

According to the Montana Office of Tourism, *"Tourism is one of Montana's leading and fastest growing industries."*
• 10 million people traveled to Montana in 2008 and spent $3 billion supporting $897 million dollars in worker salaries.
• Tourism and recreation businesses account for 42,200 Montana jobs.

Over 3,640,000 people visited Yellowstone National Park in 2010. (Yellowstone National Park 2011)

Over 2 million people visited Glacier National Park in 2009. (Thackeray 2010)

According to a study by the Bureau of Business and Economic Research (2010), a record 2 million people visited Montana state parks in 2010 with nonresidents spending over $122 million dollars that produced 1,600 jobs in Montana.

"The fundamental conclusion of this study is that Montana State Parks represent an invaluable resource for the economy of Montana's regions, as well as the state as a whole."

Over 755,000 people engaged in Wildlife-Watching in Montana in 2006 - generating $375 million dollars in retail sales, creating 9,772 jobs, and bringing in nearly $100 million dollars in revenues. (Leonard USFWS 2008)

Hunter and angler expenditures in Montana topped half a billion dollars in 2008: fishing $239,917,978 and hunting $292,367,289. (Brooks and King MT FWP 2009)

Evaluate Montanan's views on recovering wild bison populations. Include an evaluation of the American people's views towards Montana recovering wild bison populations in the state.

Seventy percent of Montanans favor restoration of wild bison in Montana according to a February 2011 poll by Moore Information.

Three in four Americans polled in 2008 believe that the wild American bison is an "*extremely important living symbol of the American West*." (Science Daily 2008)

Thank you for considering these comments.

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Citations incorporated by reference and provided on CD to assist the State of Montana in disclosing additional new information and science as submitted in our comments for further review and evaluation. Citations can also be found online: http://www.buffalofieldcampaign.org/habitat/bisonconservation.html

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