Billing Code 4310-55-P

DEPARTMENT OF THE INTERIOR

Fish and Wildlife Service

50 CFR Part 17

[Docket No. FWS-R6-ES-2010-0095]

[MO 92210-0-0008-B2]

Endangered and Threatened Wildlife and Plants: 90-Day Finding on a Petition to List the Wild Plains Bison or Each of Four Distinct Population Segments as Threatened

AGENCY: Fish and Wildlife Service, Interior.

ACTION: Notice of 90-day petition finding.

SUMMARY: We, the U.S. Fish and Wildlife Service, announce a 90-day finding on a petition to list the wild plains bison (*Bison bison bison*), or each of four distinct population segments (DPSs), as threatened under the Endangered Species Act of 1973, as

amended (Act). Based on our review, we find that the petition does not present substantial information indicating that listing may be warranted. Therefore, we are not initiating a status review in response to this petition. However, we ask the public to submit to us any new information that becomes available concerning the status of, or threats to, the wild plains bison or its habitat at any time.

DATES: The finding announced in this document was made on [INSERT DATE OF FEDERAL REGISTER PUBLICATION].

ADDRESSES: This finding is available on the Internet at *http://www.regulations.gov* at **Docket No. FWS-R6-ES-2010-0095**. Supporting documentation we used in preparing this finding is available for public inspection, by appointment, during normal business hours at the U.S. Fish and Wildlife Service, Ecological Services, Wyoming Field Office, 5353 Yellowstone Road, Suite 308A, Cheyenne, WY 82009. Please submit any new information, materials, comments, or questions concerning this finding to the above address.

FOR FURTHER INFORMATION CONTACT: Mark Sattelberg, Field Supervisor, Wyoming Field Office (see **ADDRESSES**), by telephone (307-772-2374) or by facsimile (307-772-2358). If you use a telecommunications device for the deaf (TDD), please call the Federal Information Relay Service (FIRS) at 800-877-8339.

SUPPLEMENTARY INFORMATION

Background

Section 4(b)(3)(A) of the Act (16 U.S.C. 1531 *et seq.*) requires that we make a finding on whether a petition to list, delist, or reclassify a species presents substantial scientific or commercial information indicating that the petitioned action may be warranted. We are to base this finding on information provided in the petition, supporting information submitted with the petition, and information otherwise available in our files. To the maximum extent practicable, we are to make this finding within 90 days of our receipt of the petition, and publish our notice of the finding promptly in the **Federal Register**.

Our standard for substantial scientific or commercial information within the Code of Federal Regulations (CFR) with regard to a 90-day petition finding is "that amount of information that would lead a reasonable person to believe that the measure proposed in the petition may be warranted" (50 CFR 424.14(b)). If we find that substantial scientific or commercial information was presented, we are required to promptly conduct a species status review, which we subsequently summarize in our 12-month finding.

Petition History

On June 22, 2009, we received a petition, dated June 19, 2009, from James A. Bailey and Natalie A. Bailey, requesting that the wild plains bison be listed as threatened

or that each of its four major ecotypes be considered DPSs and listed as threatened (Bailey and Bailey 2009, cover page). The petition clearly identified itself as such and included the requisite identification information for the petitioners, as required by 50 CFR 424.14(a). In a July 14, 2009, letter to the petitioners, we responded that we reviewed the information presented in the petition and determined that issuing an emergency regulation temporarily listing the subspecies under section 4(b)(7) of the Act was not warranted. We also stated that due to staff and budget limitations, we would not be able to begin work on a 90-day finding for this petition until Fiscal Year 2010 or 2011. On August 25, 2010, we received a letter from the petitioners requesting that we consider (1) new information regarding genetic diversity; (2) a publication by Gates *et al*., 2010; (3) the National Park Service's (NPS) draft environmental impact statement on a proposed brucellosis remote vaccination program; and (4) any new information that was added to our files since the date of the original petition. This finding addresses the petition and all information readily available to us at this time.

Previous Federal Action(s)

We received a petition to list the bison herd at Yellowstone National Park (Yellowstone) in the northwest corner of Wyoming as a subspecies or "distinct population group" on February 11, 1999. We completed a 90-day finding on August 15, 2007 (72 FR 45717). Based upon the information available at that time, we determined that there was substantial information indicating that the Yellowstone bison herd may meet the criteria of discreteness and significance as defined by our policy on DPSs.

However, we also determined that there was not substantial information indicating that listing the Yellowstone bison herd was warranted throughout all or a significant part of its range, and a status review was not conducted.

Species Information

Taxonomy

Bison occupied Eurasia about 700,000 years ago and moved across the Bering Land Bridge into Alaska during the middle Pleistocene Epoch 300,000 to 130,000 years ago (Martin 1970, p. 220; Kurtén and Anderson 1980, p. 39; Gates *et al.* 2010, p. 5). Bison moved further south into the grasslands of central North America as ice sheets retreated 130,000 to 75,000 years ago (Gates *et al.* 2010, p. 5). The genus *Bison* is represented by two extant species, the American bison (*Bison bison*) and the European bison (*B. bonasus*) (Halbert 2003, p. 1; Gates *et al.* 2010, p. 15).

Linnaeus first classified the bison in 1758, assigning the animal to *Bos*, the same genus as domestic cattle (*Bos taurus*) (Gates *et al.* 2010, p. 13). During the 19th century, taxonomists determined that there was adequate anatomical distinctiveness to warrant assigning the bison to its own genus, *Bison* (Gates *et al.* 2010, p. 13). Since then, taxonomists have debated the validity of the genus. Some recommend returning the species to the genus *Bos* (Boyd 2003, p. 27; Halbert 2003, p. 2). However, most sources, including the American Society of Mammalogists, the Integrated Taxonomic Information

System (ITIS), and the International Union for Conservation of Nature (IUCN), consider *Bison* as a separate genus from *Bos* (Meagher 1986, p. 1; Wilson and Ruff 1999, pp. 342–343; Reynolds *et al*. 2003, p. 1010; Gates *et al.* 2010, p. 15; ITIS 2010, p. 1). At this time, we support continued placement of bison in the genus *Bison* because the majority of taxonomic experts consider this classification to be correct.

American bison is divided into two subspecies, first recognized by Rhoads in 1897 (Gates *et al.* 2010, p. 15). The two subspecies of American bison, plains bison (*B. b. bison*) and wood bison (*B. b. athabascae*), diverged approximately 5,000 years ago (Halbert 2003, p. 1). Many authors have acknowledged subspecific status, although some attribute differences in morphology to environmental influences and not to genetics (Reynolds *et al*. 2003, p. 1009). Differences in physical traits between the two subspecies are not affected by geographic location, suggesting that differences are genetically controlled (Boyd 2003, p. 32; Reynolds *et al*. 2003, p. 1009; Gates *et al.* 2010, pp. 15–18). However, due to the recent divergence of the two bison subspecies, current genetic analysis techniques may not yet be able to detect the differences (Boyd 2003, p. 33). At this time, we support continued recognition of two subspecies of American bison because of geographic separation, morphological differences, and greater genetic differences between the two subspecies than within either of the two subspecies (Gates *et al*. 2010, pp. 15–18).

Although the two entities are the same species (*Bison bison bison*), the petitioners generally limit their discussion to “wild” plains bison and assert that plains bison in

commercial herds do not contribute to restoration of wild plains bison (Bailey and Bailey 2009, p. 5). Commercial herds are typically managed by private entities for production of meat and other commodities. Wild plains bison currently exist only in conservation herds, which are typically managed by governments and environmental organizations for the purpose of conserving the subspecies as wildlife in their native ecosystem. The petitioners contend that commercial herds are selectively bred, mixed with cattle genes, removed from natural selection, and not legally classified as wildlife under State laws (Bailey and Bailey 2009, p. 5). Further, the petitioners claim that wild plains bison in many conservation herds also may undergo selective culling, contain cattle genes from early efforts to crossbreed with domestic cattle, are removed from some aspects of natural selection, and in some cases are not legally classified as wildlife. These considerations are discussed in more detail under Factors B, D, and E.

Determination of the Listable Entity

Neither the Act nor our implementing regulations expressly address whether commercial populations should be considered part of an entity being evaluated for listing, and no Service policy addresses the issue. Consequently, in our determination of how to address commercial populations in our analysis, we considered the following: (1) Our interpretation of the intent of the Act with respect to the disposition of native populations, and (2) criteria from another organization (IUCN) regarding the consideration of commercial populations in species evaluations.

Intent of the Endangered Species Act

Section 2(b) of the Act states that the purposes of the Act "are to provide a means whereby the ecosystems upon which endangered species and threatened species depend may be conserved, to provide a program for the conservation of such endangered species and threatened species, and to take such steps as may be appropriate to achieve the purposes of the treaties and conventions set forth." In recent decisions, including a 12-month finding published on September 8, 2010 (75 FR 54707), for the Arctic grayling (*Thymallus arcticus*) and a 12-month finding published on September 22, 2010, for the plant *Agave eggersiana* (75 FR 57720), we have focused on wild populations in our analysis of the species' status and potential threats because these are the populations that contribute to conservation of the species. Therefore, we believe that considering populations that contribute to species conservation in a listing evaluation is consistent with the intent of the Act.

Guidelines Used in Other Evaluation Systems

The IUCN follows similar criteria in their species evaluations. The IUCN uses its Red List system to evaluate the conservation status and relative risk of extinction for species, and to catalogue and highlight plant and animal species that are facing a higher risk of global extinction (*http://www.iucnredlist.org*). The IUCN does not use the term "listable entity" as the Service does; however, IUCN does clarify that their conservation ranking criteria apply to any taxonomic group at the species level or below (IUCN 2001,

p. 4). Further, the IUCN guidelines for species status and scope of the categorization process focus on wild populations inside their natural range (IUCN 2001, p. 4; 2003, p. 10) or so-called "benign" or "conservation introductions," which are defined as attempts to establish a species, for the purpose of conservation, outside its recorded distribution, when suitable habitat is lacking within the historical range (IUCN 1998, p. 6; 2003, pp. 6, 10). Commercial plains bison herds are not eligible for consideration in the guidelines for evaluating conservation status under the IUCN (IUCN 2008, *www.iucnredlist.org*). In effect, the IUCN delineates between commercial plains bison herds and wild plains bison in conservation herds, in that commercial herds do not qualify for evaluation under the IUCN Red List system.

There does not appear to be any conservation value for plains bison in commercial herds, as they are not used in restoration programs. Instead, their primary purpose is the production of meat and other commodities for commercial purposes. Our interpretation is that the Act intended to conserve species in their native ecosystems. We are not considering plains bison managed for production of meat and other commodities in this finding because we do not believe that individuals propagated and managed for commercial uses aid in the conservation or the recovery of the subspecies in the wild. For the purposes of this finding, we are analyzing status and potential threats to a petitioned entity that includes plains bison managed primarily for purposes of wildlife and ecosystem conservation, hereby referred to as wild plains bison, even though no bison herd has remained in a completely wild state since prehistoric times (see our discussion on *Significance*, below). Consequently, we do not address commercial bison

herds further in this finding.

In summary, we accept the characterization of plains bison as a valid subspecies because the preponderance of currently available information indicates that the genus, species, and subspecies nomenclature are correct. Furthermore, we will only consider wild plains bison in conservation herds in this evaluation because we do not consider it to be within the intent of the Act to consider plains bison in commercial herds for listing.

Physical Description

Bison are the largest native terrestrial mammal in North America (Reynolds *et al*. 2003, p. 1015). Wood bison are generally larger than the plains bison, but there is an overlap in size and dimensions between the two subspecies (Meagher 1986, p. 1). Body mass is 1,200 to 2,000 pounds (lbs) (544 to 907 kilograms (kg)) in mature males and 700 to 1,200 lbs (318 to 545 kg) in mature females (Meagher 1986, p. 1). Bison are brown, with longer hair over the forehead, neck, shoulder hump, and front-quarters; and shorter hair over the rear and tail (Meagher 1986, p. 1; Reynolds *et al*. 2003, p. 1009). The head is large and carried low on a short, thick neck (Meagher 1986, p. 1; Reynolds *et al*. 2003, p. 1009). Both sexes have short, black horns curving upward and inward, which are never shed (Meagher 1986, p. 1; Reynolds *et al*. 2003, p. 1009).

Life History

Sexual maturity most commonly occurs at 2 to 4 years of age; however, bulls do not usually breed until age 6 (Meagher 1986, p. 4). Female wild plains bison typically breed as 2-year olds and have their first calf at 3 years (Gates *et al*. 2010, p. 49). Gestation is approximately 285 days (Meagher 1986, p. 4). Calving season is from mid-April through May, with one calf being born; twins are rare (Meagher 1986, p. 4). Females typically breed until at least 16 years of age, although they may not breed in every year (Gates *et al*. 2010, p. 49).

Wild plains bison are grazers throughout the year, taking mostly grasses and sedges (Meagher 1986, p. 5; Reynolds *et al*. 2003, p. 1034). Most free-ranging wild plains bison appear to be seasonally migratory (Meagher 1986, p. 5). Females of all ages, calves, and young males form herds (Meagher 1986, p. 6). Older bulls temporarily join these groups in late July to mid-August as rut approaches, but are otherwise found singly or in small groups (Meagher 1986, p. 6; Reynolds *et al*. 2003, p. 1020). It is likely that the vast historical plains bison herds had a considerable impact on vegetation within their traditional ranges, through grazing, nutrient cycling, and physical disturbance (Reynolds *et al*. 2003, p. 1037). Prairie dog colonies (*Cynomys spp*.) are preferentially grazed by wild plains bison and also are used for grooming and wallowing (Reynolds *et al*. 2003, p. 1039).

Distribution

Historically, habitat for the wild plains bison encompassed approximately 2.8

million square miles (mi^2) (7.2 million square kilometers (km^2)), with approximately 1.9 million mi^2 (5.0 million km^2) west of the Mississippi River (Sanderson *et al*. 2008, p. 257). Wild plains bison were most abundant on the Great Plains, but their range also extended eastward into the Great Lakes region, beyond the Allegheny Mountains, and into Florida; westward into Nevada, the Cascade Mountains, and the Rocky Mountains; northward into mid-Alberta and Saskatchewan; and southward along the Gulf of Mexico into Mexico (Hornaday 1889, p. 377; Boyd 2003, p. 20; Reynolds *et al*. 2003, p. 1012; Gates *et al.* 2010, p. 56). Wild plains bison were eliminated west of the Rocky Mountains and east of the Mississippi River by the early 1800s (Halbert 2003, p. 4). By 1889, only a few wild plains bison remained in the Texas Panhandle, Colorado, Wyoming, Montana, and the western Dakotas, as well as a small number in captive herds (Hornaday 1889, p. 525). Today, wild plains bison occur in parks, preserves, other public lands, and on private lands throughout, and external to, their historical range.

Abundance

Historical estimates regarding numbers of wild plains bison range from 30 to 75 million (Shaw 1995, p. 149). At the close of the Civil War, wild plains bison probably numbered in the tens of millions (Shaw 1995, p. 150). Intensive market hunting for hides and meat occurred following the Civil War; by 1889, a minimum of 285 free-ranging wild plains bison and 256 captive plains bison were estimated to remain (Hornaday 1889, p. 525). Recent population estimates range from 400,000 to 500,000, with approximately 20,500 animals in 62 conservation herds (Gates *et al*. 2010, p. 57) and the remainder in

approximately 6,400 commercial herds (Gates *et al*. 2010, p. 57).

Trends

In the 1800s, wild plains bison declined from approximately 30 million individuals rangewide to perhaps as few as 541. In the late 1800s, a few concerned individuals undertook independent efforts to conserve the remaining plains bison (Hornaday 1889, pp. 458–464; Freese *et al*. 2007, p. 176). The American Bison Society formed in 1905 and pressed Congress to establish public bison herds in several locations, including Wichita Mountains National Wildlife Refuge (NWR) in Oklahoma, National Bison Range in Montana, Sullys Hill National Game Preserve in North Dakota, and Fort Niobrara NWR in Nebraska (Boyd 2003, p. 23). Yellowstone National Park (NP) and Elk Island National Park in Alberta, Canada, also participated in early efforts to conserve the wild plains bison. By 1970, an estimated 30,000 plains bison occurred in North America, approximately half in public conservation herds and half in private commercial herds (Boyd 2003, p. 23). By 2003, the number of plains bison in commercial herds increased dramatically to approximately 300,000 to 500,000 (Boyd 2003, p. 23; Halbert 2003, p. iii), while wild plains bison in conservation herds increased modestly to approximately 19,200 (Boyd 2003, p. 23). In 2007, there were approximately 420,000 plains bison in commercial herds in the United States and Canada (National Bison Association 2010). In 2008, there were an estimated 20,500 wild plains bison in conservation herds (Gates *et al*. 2010, p. 57). Population trends for wild plains bison in conservation herds appear stable to slightly increasing in recent years. The petitioners

also note that population trends for wild plains bison in conservation herds have been stable since the 1930s, based upon information presented by Freese *et al.* (2007, p. 177) (Bailey and Bailey 2009, p. 15).

The most recent information we have in our files regarding population status and trends of wild plains bison in conservation herds is presented in the following table. All information is from Boyd (2003, Appendix 1), with the exception of information for Rocky Mountain Arsenal NWR (Hastings 2011, pers. comm.) and House Rock Valley State Wildlife Area (Northern Arizona University 2009, p. 15).

Table 1. Plains Bison Conservation Herd Status (The Nature Conservancy is abbreviated TNC).

HERD	JURISDICTION	POPULATION	TREND
Antelope Island State Park, UT	State	600	Stable
Badlands NP, SD	Federal	750	Stable
Bear River State Park, WY	State	8	Stable
Blue Mounds State Park, MN	State	56	Stable
Buffalo Pound Provincial Park, SK	Provincial (Canada)	33	Stable
Caprock Canyons State Park, TX	State	40	Decreasing
Chitina, AK	State	38	Stable
Clymer Meadow Preserve, TX	TNC & Private	320	Stable
Copper River, AK	State	108	Stable
Cross Ranch Nature Preserve, ND	TNC	140	Increasing
Custer State Park, SD	State	1100	Stable
Daniels Park, CO	Municipal	26	Stable
Delta Junction, AK	State	360	Stable
Elk Island NP, AB	Federal (Canada)	430	Stable
Farewell Lake, AK	State	400	Increasing
Fermi National Accelerator Lab, IL	Federal	32	Stable
Finney Game Refuge, KS	State	120	Stable
Fort Niobrara NWR, NE	Federal	352	Stable
Fort Robinson State Park, NE	State	500	Stable
Genesee Park, CO	Municipal	26	Stable
Grand Teton NP & National Elk Refuge, WY (Jackson Herd)	Federal & State	700	Increasing
Henry Mountains, UT	State	279	Stable
Hot Springs State Park, WY	State	11	Stable
House Rock Valley State Wildlife Area, AZ	State	276	Increasing
Konza Prairie Biological Station, KS	State & TNC	275	Stable
Land Between the Lakes National Recreation Area, KY	Federal	130	Decreasing
Maxwell Wildlife Refuge, KS	State	230	Stable
Medano-Zapata Ranch, CO	TNC	1500	Decreasing
National Bison Range, MT	Federal	400	Stable
Neal Smith NWR, IA	Federal	35	Stable
Niobrara Valley Preserve, NE	TNC	473	Stable
Ordway Prairie Preserve, SD	TNC	255	Stable
Pink Mountain, BC	Provincial (Canada)	1000	Stable

HERD	JURISDICTION	POPULATION	TREND
Prairie State Park, MO	State	76	Stable
Primrose Air Weapons Range, AB & SK	Provincial & Federal (Canada)	100	Increasing
Prince Albert NP, SK	Federal (Canada)	310	Increasing
Raymond Wildlife Area, AZ	State	72	Stable
Riding Mountain NP, MB	Federal (Canada)	33	Increasing
Rocky Mountain Arsenal NWR, CO	Federal	47	Increasing
Sandhill Wildlife Area, WI	State	15	Stable
Santa Catalina Island, CA	Catalina Island Conservancy	225	Increasing
Smoky Valley Ranch, KS	TNC	45	Increasing
Sullys Hill National Game Preserve, ND	Federal	37	Stable
Tallgrass Prairie Preserve, OK	TNC	1500	Increasing
Theodore Roosevelt NP, ND	Federal	850	Stable
Wainwright Training Center, AB	Federal (Canada)	16	Stable
Waterton Lakes NP, AB	Federal (Canada)	27	Stable
Wichita Mountains NWR, OK	Federal	565	Stable
Wildcat Hills State Recreation Area, NE	State	10	Stable
Wind Cave NP, SD	Federal	375	Stable
Yellowstone NP, WY, MT, ID	Federal	4000	Stable

U.S. Department of the Interior's Bison Conservation Initiative

The U.S. Department of Interior (USDOI) Bison Conservation Initiative provides a framework for managing wild plains bison within the USDOI (USDOI 2008, p. 3). This initiative specifies that the USDOI will: (1) Manage wild plains bison on their lands based on the best available science, seeking to restore them on appropriate landscapes; (2) apply adaptive management principles; (3) seek to develop genetic tests to maximize genetic diversity in herds; (4) seek to develop new techniques to diagnose, prevent, and control contagious diseases; and (5) work with interested parties (USDOI 2008, p. 2). One priority of the Initiative is to actively seek opportunities to increase existing herds to 1,000 or more wild plains bison, or establish new herds that can reach that size (USDOI 2008, p. 2). This priority describes numeric goals and allows the other seven priorities, including genetic diversity, disease, and introgression with cattle genes, to also be addressed. This initiative addresses the major concerns of wild plains bison management on USDOI lands, including genetics, disease, introgression with cattle genes, and the number and size of herds.

Private Management

Forty-two wild plains bison conservation herds in the United States were described in 2003; of these, 22 are solely or jointly managed by States, 12 herds are solely or jointly managed by Federal agencies, 9 herds are solely or jointly managed by private organizations, and 2 herds are managed by municipalities (Boyd 2003, pp. 144–

147). An additional eight herds are managed by Federal or provincial agencies in Canada (Boyd 2003, p. 147). Since 2003, 12 additional wild plains bison herds have been enumerated (Gates *et al*. 2010, p. 57). Initiatives for new wild herds also are under way, including herds managed by The Nature Conservancy (TNC) in Alberta and in South Dakota, by American Prairie Foundation and World Wildlife Fund in Montana, by the Cheyenne River Sioux Tribe in South Dakota, by the Lower Brule Sioux Tribe in South Dakota, and by Rosebud Sioux Tribe in South Dakota (Freese *et al*. 2007, p. 182). Management of wild plains bison for conservation purposes appears to be active in both the private and public sectors. An additional 6,400 herds are managed for commercial purposes (Gates *et al*. 2010, p. 57).

Evaluation of Information for This Finding

Section 4 of the Act (16 U.S.C. 1533) and its implementing regulations at 50 CFR 424 set forth the procedures for adding a species to, or removing a species from, the Federal Lists of Endangered and Threatened Wildlife and Plants. A species may be determined to be an endangered or threatened species due to one or more of the five factors described in section 4(a)(1) of the Act:

(A) The present or threatened destruction, modification, or curtailment of its habitat or range;

(B) Overutilization for commercial, recreational, scientific, or educational purposes;

(C) Disease or predation;

(D) The inadequacy of existing regulatory mechanisms; or

(E) Other natural or manmade factors affecting its continued existence.

In making this 90-day finding, we evaluated whether information regarding the threats to the wild plains bison, as presented in the petition and other information available in our files, is substantial, thereby indicating that the petitioned action may be warranted. Our evaluation of this information is presented below.

In considering what factors might constitute threats, we must look beyond the mere exposure of the species to the factor to determine whether the species responds to the factor in a way that causes actual impacts to the species. If there is exposure to a factor, but no response, or only a positive response, that factor is not a threat. If there is exposure and the species responds negatively, the factor may be a threat and we then attempt to determine how significant a threat it is. If the threat is significant, it may drive or contribute to the risk of extinction of the species such that the species may warrant listing as threatened or endangered as those terms are defined by the Act. This does not necessarily require empirical proof of a threat. The combination of exposure and some corroborating evidence of how the species is likely impacted could suffice. The mere identification of factors that could impact a species negatively may not be sufficient to compel a finding that listing may be warranted. The information shall contain evidence sufficient to suggest that these factors may be operative threats that act on the species to the point that the species may meet the definition of threatened or endangered under the Act. We found no information to suggest that threats are acting on the wild plains bison

such that the species may become extinct now or in the foreseeable future.

A. The Present or Threatened Destruction, Modification, or Curtailment of Its Habitat or Range.

Information Provided in the Petition

The petitioners note the historical destruction and modification of plains habitat due to conversion to cropland and development of grazing land for cattle (Bailey and Bailey 2009, p. 15). They assert that there are ongoing habitat impacts from dam construction, cattle grazing, cropland conversion, tree invasion, wetland drainage, absence of fire, subdivision of land for housing and other construction, and energy development (Bailey and Bailey 2009, p. 16). They further assert that with the possible exceptions of cattle grazing and dam construction, all of these activities are expected to increase in the foreseeable future (Bailey and Bailey 2009, p. 16). The petitioners also assert that a lack of populations on a minimum range size of 500 mi^2 (1,300 km^2) of habitat threatens the wild plains bison, and only the Yellowstone herd meets this standard (Bailey and Bailey 2009, p. 21). The petitioners contend that the lack of suitable habitat is evidenced by dramatic declines in grassland birds (Bailey and Bailey 2009, p. 22).

Evaluation of Information Provided in the Petition and Available in Service Files

We agree that there have been historical destruction and modification of habitat

due to conversion to cropland and development of grazing land for cattle. Information in our files indicates that cropland conversion, woody plant invasion, and cattle grazing have altered native grasslands (Ricketts *et al*. 2008, pp. 273–274), and cultivation has reduced the tallgrass portion of the Great Plains from approximately 168 million acres (ac) (68 million hectares (ha)) to less than 5 percent of that amount (Knapp *et al*. 1999, p. 39). American bison, including both plains bison and wood bison in conservation and commercial herds, currently occupy less than 1 percent of their historical range (Sanderson *et al*. 2008, p. 253).

The petitioners do not provide citations to support their assertions regarding the present or threatened destruction, modification, or curtailment of habitat or range. Their arguments seem to rely on the losses of individuals and habitat that occurred in the 1800s. We do not have information indicating that present or potential future impacts to habitat or range from dam construction, cattle grazing, cropland conversion, tree invasion, wetland drainage, absence of fire, subdivision, or energy development are threats to wild plains bison.

Despite the historical loss of grasslands, much suitable habitat remains available, and additional habitat has often been only degraded rather than converted. There is potential for rapid recovery of these degraded grasslands (Ricketts *et al*. 2008, p. 288). Boyd (2003, pp. 95, 148–151) states that a lack of suitable habitat is limiting wild plains bison recovery, but also notes that 25 out of 50 wild plains bison herds that she evaluated have potential for expansion. The petitioners note that wild plains bison restoration

opportunities exist on public lands managed by the USDOI and the U.S. Department of Agriculture (USDA), often mixed with State public lands (Bailey and Bailey 2009, p. 10). National Grasslands managed by the U.S. Forest Service (USFS) account for nearly 4 million ac (1.6 million ha), with some parcels of suitable habitat currently large enough to maintain wild plains bison herds (Olson 1997, p. 4; Ricketts *et al*. 2008, p. 275). Native American Tribes also have large tracts of suitable habitat that could support wild plains bison (Boyd 2003, p. 106; Freese *et al*. 2007, p. 181).

When determining whether a species should be listed, we examine the current status of a species, which necessitates examining the species in its current range and analyzing current and future threats to the remainder of the species' distribution. The information the petitioner presented on lost historical range, by itself, does not provide substantial information that listing the wild plains bison may be warranted. However, loss of historical range may be relevant to the analysis of the current and future viability of the species, if the factors that caused the past decline are shown to be operating on populations within the current range. Once wild plains bison were protected from market hunting, beginning in the late 1800s, their numbers rapidly increased (Gates *et al.* 2010, p. 9). We do not believe that the market hunting that led to the precipitous decline of wild plains bison in the 1800s is likely to be repeated. Habitat is currently available to accommodate additional herds. Furthermore, recent stable-to-slightly increasing population trends in conservation herds do not indicate that habitat is a limiting factor for wild plains bison.

The petitioners did not provide any citations and we do not have any information in our files to support a proposed minimum of 500 mi^2 (1,300 km^2) of habitat necessary to maintain an ecologically significant herd. The petitioners state that only the Yellowstone herd meets this proposed standard, and the Henry Mountain herd nearly meets it. We are aware of three additional wild plains bison herds that occupy more than 500 mi^2 (1,300 km^2) of habitat: Farewell Lake in Alaska, Pink Mountain in British Columbia, and Primrose Air Weapons Range in Alberta and Saskatchewan. The first two herds are outside of the historical range of the plains bison, and the Primrose herd is at the periphery of the historical range. Nevertheless, five herds meet or exceed 500 mi^2 (1,300 km^2). We agree that, in general, the larger the extent of habitat available, the greater the ecological significance. However, we believe that herds residing on less than 500 mi^2 (1,300 km^2) also can have ecological significance. We have no evidence that indicates that wild plains bison in herds occupying less than 500 mi^2 (1,300 km^2) of habitat are threatened from lack of habitat. Most herds, whether occupying more or less than this amount, exhibit stable to increasing population trends. Therefore, we do not believe that there is substantial information indicating that listing may be warranted due to a lack of herds occupying at least 500 mi^2 (1,300 km^2) of habitat.

The petitioners also contend that the lack of suitable habitat is evidenced by dramatic declines in grassland birds (Bailey and Bailey 2009, p. 22). Grassland bird abundance and diversity is one indicator of a healthy ecosystem, as the petitioners suggest, but addressing their population trends is beyond the scope of this document. We have no evidence that there is a relationship between grassland bird abundance and wild

plains bison persistence.

In summary, we find that the information provided in the petition, as well as other information in our files, does not present substantial scientific or commercial information indicating that the petitioned action may be warranted due to present or threatened destruction, modification, or curtailment of habitat or range.

B. Overutilization for Commercial, Recreational, Scientific, or Educational Purposes.

Information Provided in the Petition

The petitioners do not assert that overutilization is a threat to the wild plains bison. They do note that, historically, wild plains bison numbered in the tens of millions, but were subsequently reduced to near extinction (Bailey and Bailey 2009, p. 3). They also suggest that hunting may be an appropriate management tool (Bailey and Bailey 2009, p. 11).

Evaluation of Information Provided in the Petition and Available in Service Files

We agree that there was a dramatic historical decline in numbers of wild plains bison due to market hunting and, to a lesser extent, subsistence hunting and recreational shooting (Hornaday 1889, pp. 499–525; Boyd 2003, p. 22; Freese *et al*. 2007, p. 176; IUCN 2008). However, market hunting for wild plains bison ended in 1884 (Hornaday

1889, p. 513) and is no longer a factor. We also agree that hunting can be an appropriate management tool. Limited authorized hunting of wild plains bison currently occurs on three public herds in the contiguous United States, four herds in Alaska, and five herds in Canada (Reynolds *et al*. 2003, pp. 1047–1048).

In summary, we find that the information provided in the petition, as well as other information in our files, does not present substantial scientific or commercial information indicating that the petitioned action may be warranted due to overutilization for commercial, recreational, scientific, or educational purposes.

C. Disease or Predation.

Information Provided in the Petition

The petitioners note that wild plains bison in the Greater Yellowstone Ecosystem are infected with brucellosis (*Brucella abortus*), which they assert is a minor direct threat, but indirectly severely limits the herd because of limitations imposed by disease management (Bailey and Bailey 2009, pp. 8, 21). They note that management for brucellosis can involve capture, retention, handling, culling, hazing, and vaccination and assert that this interferes with natural selection, may enhance disease transmission, alters age structure, and limits herd numbers (Bailey and Bailey 2009, p. 21). They also contend that vaccinations in general subvert natural selection and promote domestication (Bailey and Bailey 2009, p. 21). The petitioners did not cite predation as a threat.

Evaluation of Information Provided in the Petition and Available in Service Files

Brucellosis is a bacterial infection that occurs in cattle, bison, and other mammals (Cook *et al*. 2004, p. 254; Seabury *et al*. 2005, p. 104). It has been eradicated from all commercial bison herds and most wild bison herds in the United States through improved management (Seabury *et al.* 2005, p. 105).

Wild plains bison and elk (*Cervus elaphus*) in the Greater Yellowstone Area are the last remaining reservoirs of brucellosis in the United States (Aune *et al.* 2007, p. 205). Brucellosis is not a direct threat, because reproduction is only marginally limited, but wild plains bison can be indirectly affected by the potential risk that infected bison herds pose to the livestock industry. Wild plains bison leaving Yellowstone NP in the winter on the northern and western boundaries are subject to hazing, vaccination, radio-telemetry, capture, testing, and slaughter of animals that test positive for the disease (Aune *et al.* 2007, p. 206). Transmission of brucellosis from bison to cattle has been demonstrated in captive studies, but there are no confirmed cases of transmission in the wild (Boyd 2003, p. 80).

In December 2000, following more than 10 years of collaborative planning, the USDOI (NPS) and the USDA (Animal and Plant Health Inspection Service and USFS) signed a Record of Decision for a joint bison management plan for Yellowstone and the State of Montana (USDOI and USDA 2000, p. 3). The intent of this plan is to preserve

Yellowstone's wild plains bison and minimize the potential risk of transmission of brucellosis from bison to cattle (USDOI and USDA 2000, p. 6). This separation is attempted through hazing of wild plains bison back into Yellowstone, followed by, when necessary, capture, testing, and slaughter or release of captured bison, depending on test results (USDOI and USDA 2000, p. 6). Agencies allow wild plains bison outside of Yellowstone in areas without cattle (USDOI and USDA 2000, p. 11). If severe winter conditions exist and wild plains bison numbers drop below 2,300, the agencies will temporarily halt slaughter of infected bison (USDOI and USDA 2000, pp. 13, 34). This plan is a comprehensive approach to protecting wild plains bison in the Park and minimizing the risk of brucellosis transmission to cattle grazing on adjacent lands. The NPS has recently proposed a remote vaccination program for wild plains bison in Yellowstone that would minimize capture and handling of bison (NPS 2010, p. iii).

Brucellosis has been eradicated from all wild plains bison herds in the United States, with the exception of the two herds in the Greater Yellowstone Area (Yellowstone and Jackson herds). The Jackson herd is jointly managed by Grand Teton National Park and the Service's National Elk Refuge. Disease management is ongoing in these two herds. The petitioners contend that the hazing, capture, vaccination, and culling that may occur subvert natural selection, may enhance disease transmission, alter age structure, and limit herd numbers (Bailey and Bailey 2009, p. 21). However, the petitioners did not provide evidence to support that these activities are a threat to the status of the species such that the species may warrant listing as threatened or endangered. Furthermore, recent stable-to-increasing population trends do not indicate that management for

brucellosis is a limiting factor for wild plains bison in the Greater Yellowstone Area. Additionally, disease management is often an essential aspect of wildlife management.

In summary, we find that the information provided in the petition, as well as other information in our files, does not present substantial scientific or commercial information indicating that the petitioned action may be warranted due to disease or predation.

D. The Inadequacy of Existing Regulatory Mechanisms.

Information Provided in the Petition

The petitioners assert that existing Federal and State regulatory mechanisms for wild plains bison conservation are inadequate (Bailey and Bailey 2009, pp. 16–19). They cite the Interagency Bison Management Plan for Yellowstone NP, the USDOI's Bison Conservation Initiative, Charles M. Russell NWR, National Grasslands management, and legal designations by the States as examples of inadequate regulations where more could be done to restore wild plains bison. They also assert that management by private programs is inadequate (Bailey and Bailey 2009, p. 19).

Evaluation of Information Provided in the Petition and Available in Service Files

We consider plans and initiatives to be voluntary agreements that provide guidance for better managing wild plains bison, rather than regulatory mechanisms.

Therefore, we discuss the Interagency Bison Management Plan for Yellowstone under Factor C, because it focuses on disease. The USDOI's Bison Conservation Initiative and private programs are discussed under **Background**. Management of wild plains bison on NWRs and National Grasslands, and legal designations by States, are discussed under this factor. We evaluate the inadequacy of existing regulatory mechanisms from the standpoint of the other factors. If there is not substantial information that listing a species may be warranted due to another factor, then the regulations affecting that factor cannot be considered inadequate.

Charles M. Russell National Wildlife Refuge

The National Wildlife Refuge System Administration Act established the National Wildlife Refuge System and identified a primary mission of wildlife conservation. The Service manages over 500 National Wildlife Refuges and their satellites. Wild plains bison conservation is a National Wildlife Refuge System priority (Jones and Roffe 2008, p. 5). Purposes of wild plains bison management include: (1) To fulfill a legal mandate as part of establishing a Refuge, (2) to conserve bison, (3) to provide education and recreation for the public, (4) to manage habitat, (5) to protect cultural or historic significance, and (6) to carry out research (Jones and Roffe 2008, p. 5). Charles M. Russell NWR is one of eight National Wildlife Refuges in the contiguous United States that include wild plains bison management among their priorities (Jones and Roffe 2008, p. 3). Wild plains bison management is at an early stage at Charles M. Russell NWR, with only a small number of bison currently present. The other refuges

with wild plains bison are Wichita Mountains NWR in Oklahoma (herd founding date 1907), the National Bison Range in Montana (herd founding date 1908), Fort Niobrara NWR in Nebraska (two herds, founding dates 1913 and 1919), Sullys Hill National Game Preserve in North Dakota (herd founding date 2006), Neal Smith NWR in Iowa (herd founding date 1996), the National Elk Refuge in Wyoming (jointly managed with Grand Teton National Park; herd founding date 1948), and Rocky Mountain Arsenal NWR in Colorado (herd founding date 2007). The Service has a strong and active commitment to wild plains bison conservation and ecological restoration, and we do not believe that there is substantial information indicating that listing may be warranted due to perceived inadequacies in refuge planning at Charles M. Russell NWR.

National Grasslands Management

The USFS administers 20 National Grasslands consisting of approximately 3.8 million ac (1.6 million ha) in 13 States, but the grasslands are primarily in Colorado, North Dakota, South Dakota, and Wyoming (Olson 1997, p. 4). According to the Federal Land Policy and Management Act, these grasslands are to be administered under sound and progressive principles of land conservation and multiple use (36 CFR 213). Approximately 189 million ac (77 million ha) of National Forests also are managed by the USFS. We believe that several National Grasslands and National Forests are of sufficient size and habitat type to support wild plains bison. Wild plains bison on USFS lands are typically the result of overflow from herds on NPS lands (such as the Yellowstone herd) (USDOI and USDA 2000, p. 3), or are State-owned herds (such as the

House Rock Valley herd) (Northern Arizona University 2009, p. 1). These wild plains bison are adequately protected by Federal laws and regulations mandating how USFS lands are managed. We do not believe that there is substantial information indicating that listing may be warranted due to lack of actions on the part of the USFS.

Legal Designations

Plains bison fall into an unusual legal classification that can complicate understanding the management intent for a given herd (Freese *et al*. 2007, p. 181). Their legal status can be either domestic livestock or wildlife among various Federal, State, and provincial jurisdictions across North America (Gates *et al*. 2010, p. 66). Plains bison are managed as captive or free-ranging wildlife on National Parks and National Wildlife Refuges. They have dual status (herds may be considered domestic livestock or wildlife, depending on whether they are commercial or conservation herds) in Alaska; Arizona; Idaho; Utah; Missouri; Montana; New Mexico; South Dakota; Texas; Wyoming; British Columbia; Saskatchewan; and Chihuahua, Mexico (Gates *et al*. 2010, pp. 66–73). Plains bison are classified solely as domestic livestock in Colorado, Illinois, Iowa, Kansas, Louisiana, Minnesota, Nebraska, North Dakota, Nevada, Oklahoma, Alberta, and Manitoba, regardless of whether they are in commercial or conservation herds (Gates *et al*. 2010, pp. 66–73). Nevertheless, wild plains bison that are classified as domestic livestock and are in conservation herds are managed for purposes of wildlife conservation, and not for production of meat and other commodities. Therefore, they are not adversely affected by their legal designation. A more uniform and straightforward

classification of plains bison could simplify the regulatory status by which they are managed, but we do not believe that there is substantial information indicating that listing may be warranted due to their legal status.

Summary of Factor D

In summary, we find that the information provided in the petition, as well as other information in our files, does not present substantial scientific or commercial information indicating that the petitioned action may be warranted due to the inadequacy of existing regulatory mechanisms.

E. Other Natural or Manmade Factors Affecting Its Continued Existence.

Information Provided in the Petition

The petitioners assert that loss of genetic diversity threatens the wild plains bison, and that a minimum herd size of 2,000 animals is required to provide genetic diversity, noting that only 1 herd (Yellowstone) fulfills this requirement (Bailey and Bailey 2009, p. 19). They contend that management activities such as roundups, culling, protection from predators, pasture rotation, supplemental feeding, and vaccination lead toward domestication and genomic extinction (Bailey and Bailey 2009, p. 20).

The petitioners assert that introgression (hybridization) with cattle genes threatens

the wild plains bison, and that only seven herds have been found to be free of cattle genes (Bailey and Bailey 2009, p. 20). The petitioners also allude to impacts from climate change, noting that the presence of at least one wild plains bison herd in each of the four major ecotypes could provide redundancy, resiliency, and perhaps genetic adaptations in the event of global warming (Bailey and Bailey 2009, pp. 11–12).

Evaluation of Information Provided in the Petition and Available in Service Files

Loss of Genetic Diversity

Preservation of genetic diversity in the wild plains bison is essential to its conservation (Boyd 2003, p. 60). Genetic diversity provides flexibility for evolutionary change and adaptation (Gardipee 2007, p. 1; Gates *et al*. 2010, p. 19). The population decline for wild plains bison was severe—from tens of millions to possibly as low as 541 animals. Demographic bottlenecks such as this, and resultant founder effects, genetic drift, and inbreeding, can reduce genetic diversity (Boyd 2003, p. 60). The consequences of a bottleneck depend on the severity of the decline and how quickly the population recovers (Boyd 2003, p. 60).

The small numbers of plains bison remaining after the bottleneck resulted in very few founders and the possibility for genetic drift, which involves the random change in gene frequencies leading to the loss of certain unique DNA sequences in a particular gene type (allele) from one generation to the next (Boyd 2003, pp. 60–61). Small populations

also may experience inbreeding or highly skewed gender ratios, which can lead to the expression of deleterious alleles, the decreased presence of both dominant and recessive alleles (decreased heterozygosity (decreased hybridization of genes; an indicator of poor genetic health), lower fecundity, and developmental defects (Boyd 2003, p. 61). However, the duration of the bottleneck for plains bison was relatively short (Halbert 2003, p. 52), and the population recovered quickly (Boyd 2003, p. 60). Pre-bottleneck wild plains bison numbers, movement, and distribution suggest widespread interbreeding and significant genetic homogeneity among continental populations. The selection of captive and wild plains bison used in early foundation herds represented a large portion of the historical range and, therefore, likely captured a large portion of pre-bottleneck genetic variation (Halbert 2003, p. 52). Today's wild plains bison have substantially greater genetic variation than reported for other mammalian species that have experienced similar bottlenecks (Halbert 2003, p. 51). In general, populations of wild plains bison that have been tested display a moderately high level of overall genetic diversity, with notable differences in overall allelic variation and heterozygosity (Halbert 2003, p. 60).

A minimum viable population (MVP) is the smallest population size that provides a high probability (typically 95 percent) of persistence for a given period of time (typically, 100 years) (Boyd 2003, p. 36). Large-bodied species with a long lifespan tend to experience less severe population fluctuations than smaller, short-lived species (Boyd 2003, p. 37). Consequently, a lower MVP is typical for large, long-lived species. The Canadian National Wood Bison Recovery Team uses a MVP of 400 for wood bison

(Boyd 2003, p. 38). More recently, the IUCN considered wild plains bison populations to be viable if they were greater than 1,000 animals (IUCN 2008). Freese *et al*. (2007, p. 180) suggest that in consideration of exotic diseases and climate change, a prudent goal would be retention of at least 95-percent allelic diversity for 200 years, which would require a MVP of 2,000 animals. We are aware of 15 conservation herds with at least 400 wild plains bison, 4 conservation herds with at least 1,000 wild plains bison (Custer State Park in South Dakota, Medano-Zapata Ranch in Colorado, Pink Mountain in British Colombia, and Yellowstone), and 1 conservation herd with more than 2,000 wild plains bison (Yellowstone). Selectively moving animals in smaller herds from one herd to another as is still frequently done in conservation herds, and can counter the effects of genetic drift and maintain viability (Halbert 2003, p. 153; Jones and Roffe 2008, p. 8). The USDOI has a priority of increasing their existing herds to at least 1,000 animals, or establishing new herds that can reach that size (USDOI 2008, p. 2).

All wild plains bison herds have experienced some degree of management, ranging from initial establishment of the herd to more intensive management activities such as roundups, culling, protection from predators, pasture rotation, supplemental feeding, and vaccination. We recognize that maximizing the wildness of the plains bison is important for the maintenance of genetic diversity, but also believe that continued judicious management is necessary for long-term survival in the modern world. For example, in an effort to minimize capture and handling of wild plains bison in Yellowstone, the NPS is considering the use of air rifles to deliver brucellosis vaccines remotely (NPS 2010, p. iii).

Populations of wild plains bison that have been tested display a moderately high level of overall genetic diversity. Selective movement of animals between herds, as currently practiced, can help maintain that genetic diversity. We do not believe that there is substantial information indicating that listing may be warranted due to a loss of genetic diversity.

Introgression with Cattle Genes

Introgression was caused by hybridization between plains bison and cattle, followed by breeding of the hybrid offspring to at least one of their respective parental populations (Gates *et al*. 2010, p. 22). The introgressed or alien DNA replaced sections of the original DNA, thereby affecting the genetic integrity of the wild plains bison (Gates *et al*. 2010, p. 22). Most genetic studies we are aware of have been conducted on conservation herds (Polziehn *et al*. 1995, p. 1638; Ward *et al*. 1999, p. 52; Boyd 2003, p. 68; Halbert 2003, p. 70; Halbert *et al*. 2005, pp. 2349–2350).

When plains bison were at their lowest numbers in the late 1800s, a few individuals established small captive foundation herds that saved the subspecies from extinction. Each of these herds was, to some extent, used to either experimentally create bison–domestic cattle crosses, or supplemented with plains bison from herds involved in such experiments (Halbert *et al*. 2005, p. 2344). Controlled breeding of male plains bison to female domestic cattle has been recorded extensively, although the birth rate of first-

generation offspring is very low (Halbert *et al*. 2005, p. 2344), and male offspring are usually sterile (Meagher 1986, p. 6). Behavioral constraints typically prevent domestic bulls from mating with female bison (Boyd 2003, p. 67). Due to the sterility of male offspring and the lack of domestic bulls that successfully breed with female bison, there is no evidence of male-linked or Y-chromosome cattle gene introgression in bison (Boyd 2003, p. 67). However, maternally inherited DNA, known as mitochondrial DNA (mtDNA), and nuclear DNA (contributed by either parent) introgression have been demonstrated (Polziehn *et al*. 1995, p. 1641; Ward *et al*. 1999, p. 51; Boyd 2003, p. 67; Halbert 2003, p. 13), which indicates that many plains bison contain some cattle DNA from experimental crosses conducted in the past.

The proportion of cattle DNA that has been measured in introgressed individuals and herds is typically quite low, ranging from 0.56 to 1.8 percent (Polziehn *et al*. 1995, p. 1642; Halbert *et al*. 2005, p. 2343). However, estimates based on extrapolation from portions of genomes sampled, to the entire genome, to all animals in a herd should be considered only as approximations (Roffe and Jones 2008, p. 1). The petitioners assert that seven herds have been found free of cattle genes (Bailey and Bailey 2009, p. 20). We are aware that very few herds lack evidence of at least some cattle allele introgression. Based upon the information currently available, the following wild plains bison conservation herds show no evidence of introgression: Elk Island National Park in Alberta, Jackson herd (Grand Teton National Park – National Elk Refuge) in Wyoming, Henry Mountains in Utah, Sullys Hill National Game Preserve in North Dakota, Wind Cave National Park in South Dakota, and Yellowstone (Halbert and Derr 2007, p. 8).

One private herd, Castle Rock in New Mexico, also shows no evidence of introgression (Freese *et al*. 2007, p. 182). The Jackson and Sullys Hill herds have not been adequately sampled to allow for statistical confidence (Halbert and Derr 2007, p. 8), and many other herds have not yet been tested. As techniques improve and more extensive sampling occur, some herds previously without evidence of introgression may be found to contain introgressed alleles.

Some conservation herds known to have low levels of cattle introgression also contain unique or rare plains bison genetic diversity (Halbert 2003, p. 98; Gates *et al*. 2010, p. 23). To minimize genetic loss and not exacerbate the effects of the historical bottleneck on the wild plains bison, managers feel that this unique genetic background should be conserved, while herds with no evidence of introgression should be maintained in isolation from introgressed populations (Halbert 2003, p. 94). Issues of introgression and unique genetic diversity are both considered in management of wild plains bison.

The presence of cattle DNA in the genetic makeup of wild plains bison appears widespread, but occurs at low levels. Conservation herds are managed according to their genetic background, so as to maintain genetic diversity and introgression-free herds. We expect the frequency of cattle DNA to remain low in conservation herds. Wild plains bison from introgressed herds conform morphologically, behaviorally, and ecologically to the scientific taxonomic description of the native subspecies. Some wild plains bison herds with evidence of cattle introgression also contain valuable genetic diversity that is not found elsewhere and should be conserved. We do not believe that there is substantial

information indicating that listing may be warranted due to introgression with cattle genes.

Climate Change

No information on the direct relationship between climate change and wild plains bison was provided by the petitioners or is available in our files. According to the Intergovernmental Panel on Climate Change (IPCC 2007, p. 6), "warming of the climate system is unequivocal, as is now evident from observations of increases in global average air and ocean temperatures, widespread melting of snow and ice, and rising global average sea level." Average Northern Hemisphere temperatures during the second half of the 20th century were very likely higher than during any other 50-year period in the last 500 years, and likely the highest in at least the past 1,300 years (IPCC 2007, p. 6). It is very likely that over the past 50 years, cold days, cold nights, and frosts have become less frequent over most land areas, and hot days and hot nights have become more frequent (IPCC 2007, p. 6). It is likely that heat waves have become more frequent over most land areas, and the frequency of heavy precipitation events has increased over most areas (IPCC 2007, p. 6).

Changes in the global climate system during the 21st Century are likely to be larger than those observed during the 20th Century (IPCC 2007, p. 19). For the next 2 decades, a warming of about 0.2 ºCelsius (ºC) (0.4 ºFahrenheit (ºF)) per decade is projected (IPCC 2007, p. 19). Afterward, temperature projections increasingly depend on

specific emissions scenarios (IPCC 2007, p. 19). Various emissions scenarios suggest that by the end of the 21st Century, average global temperatures are expected to increase 0.6 to 4.0 ºC (1.1 to 7.2 ºF), with the greatest warming expected over land (IPCC 2007, p. 20). The IPCC (2007, pp. 22, 27) report outlines several scenarios that are virtually certain or very likely to occur in the 21st Century including: (1) Over most land, there will be warmer days and nights, and fewer cold days and nights, along with more frequent hot days and nights; (2) areas affected by drought will increase; and (3) the frequency of warm spells and heat waves over most land areas will likely increase. The IPPC predicts that the resiliency of many ecosystems is likely to be exceeded this century by an unprecedented combination of climate change, associated disturbances (e.g., flooding, drought, wildfire, and insects), and other global drivers. With medium confidence, IPCC predicts that approximately 20 to 30 percent of plant and animal species assessed so far are likely to be at an increased risk of extinction if increases in global average temperature exceed 1.5 to 2.5 ºC (3 to 5 ºF).

The wild plains bison had a very extensive historical range that extended nearly coast to coast and from central Canada to northern Mexico. Therefore, it would appear that it is adaptable to a wide variety of climatic conditions. We also believe that all four ecotypes described by the petitioners as potential distinct population segments will persist in the face of climate change. Consequently, we do not believe that there is substantial information indicating that listing may be warranted due to climate change.

Summary of Factor E

In summary, we find that the information provided in the petition, as well as other information in our files, does not present substantial scientific or commercial information indicating that the petitioned action may be warranted due to loss of genetic diversity, introgression with cattle genes, or climate change.

Summary of Five Factor Evaluation

We have carefully examined information from the petition and from our files regarding the status of wild plains bison. We also consulted with Service biologists and managers from NWRs that have wild plains bison. There have been several impacts to the wild plains bison; in particular, market hunting caused a precipitous decline in the mid- to late-1800s. Diligent efforts by a few individuals prevented extinction. However, subsequent attempts to crossbreed plains bison with cattle resulted in low-level, but widespread, presence of cattle DNA. Nevertheless, the wild plains bison appears to have retained much of its genetic diversity. However, the presence of both commercial herds and conservation herds has resulted in some conflicting legal designations. Brucellosis in the Greater Yellowstone Ecosystem requires special management. Despite these stressors, the numbers of plains bison have increased dramatically since the early 1900s, and population trends of wild plains bison in conservation herds appear to be stable to increasing in recent years. The number of conservation herds also continues to increase. In summary, the petition does not present substantial information that wild plains bison as a subspecies may require listing.

Distinct Vertebrate Population Segments

The petitioners requested that if we should determine that substantial information was not presented indicating that listing may be warranted, then each major ecotype of the subspecies should be listed as a "significant distinct population segment (DPS)." The petitioners specified four ecotypes (population segments) of wild plains bison: The northern Great Plains, the southern Great Plains, the Rocky Mountains, and the Great Basin–Colorado Plateau.

To interpret and implement the DPS provisions of the Act, the Service and the National Oceanic and Atmospheric Administration published the *Policy Regarding the Recognition of Distinct Vertebrate Population Segments Under the Endangered Species Act* in the **Federal Register** on February 7, 1996 (61 FR 4722). Under the DPS Policy, three elements are considered in the decision regarding the establishment and classification of a population of a vertebrate species as a possible DPS: (1) The discreteness of a population in relation to the remainder of the species to which it belongs, (2) the significance of the population segment to the species to which it belongs, and (3) the population segment's conservation status in relation to the Act's standards for listing, delisting, or reclassification. Both discreteness and significance are required for a species population to meet our criteria for classification as a DPS. If any portion of a species' population is considered a potentially valid DPS, we may list, delist, or reclassify that DPS under the Act. We address these elements with respect to the wild plains bison.

Discreteness

Under the DPS policy, a population segment of a vertebrate species may be considered discrete if it satisfies either one of the following conditions: 1) It is markedly separated from other populations of the same taxon as a consequence of physical, physiological, ecological, or behavioral factors (quantitative measures of genetic or morphological discontinuity may provide evidence of this separation); or 2) it is delimited by international governmental boundaries within which differences in control of exploitation, management of habitat, conservation status, or regulatory mechanisms exist that are significant in light of section 4(a)(1)(D) of the Act.

Markedly Separated

The petitioners assert that the four proposed wild plains bison ecotypes or population segments are physically separated, and therefore discrete (Bailey and Bailey 2009, p. 11). While nearly all conservation herds are geographically separated, the available information indicates that the "markedly separated" criteria are not satisfied because the frequent interchange between herds that has occurred since the late 1800s has provided a physical connectivity between herds, and has maintained genetic homogeneity.

There is no evidence indicating that landscape features historically separated herds of plains bison. Prior to the population bottleneck in the late 1800s, the species likely experienced a high degree of genetic homogeneity, despite their extensive range (Gates *et al.* 2010, p. 20). Wild plains bison ranged over large areas, suggesting extensive animal movement and gene flow between populations (Gates *et al.* 2010, p. 20).

Separation should also be considered in the context of the more recent history of the four wild plains bison ecotypes or population segments. Several researchers have concluded that nearly all plains bison present today in both commercial and conservation herds descend from 76 to 84 individuals from 5 private foundation herds and no more than 30 wild bison in Yellowstone (Halbert 2003, p. 9). The private foundation herds originated from across a large portion of the species' range. Early federally owned herds were established from foundation herds and subsequently augmented with plains bison from multiple herds in disparate locations. For example, the current wild plains bison herd on the National Bison Range was started in 1908 with stock from three different foundation herds in Canada, Texas, and Montana (Halbert and Derr 2007, p. 2). This same herd was augmented in 1939 with plains bison from a private ranch of unknown origin; in 1952 with wild plains bison from Fort Niobrara NWR, Nebraska; in 1953 with wild plains bison from Yellowstone, Wyoming; and in 1984 with wild plains bison from Maxwell Wildlife Refuge, Kansas (Halbert and Derr 2007, p. 2). Similar histories exist for most other Federal herds (Halbert and Derr 2007, p. 2). In contrast, one State-owned herd, the Texas Caprock herd, has been a small, closed population for more than 120

years since its founding with five plains bison from the Goodnight foundation herd (Halbert 2003, p. 95). This herd suffers from lower birth rates and higher death rates than other captive herds (Halbert 2003, p. 95). The careful introduction of unrelated plains bison has been recommended to increase genetic diversity, reduce inbreeding, and increase fitness (Halbert 2003, p. 124).

The strategy for wild plains bison herds in the National Wildlife Refuge System is to manage bison as a metapopulation to maintain the genetic complement and minimize loss of diversity through low levels of carefully planned and monitored translocations between herds (Jones and Roffe 2008, p. 9). Similar translocations occur for other public herds (Halbert and Derr 2007, p. 2). Translocations are often between ecotypes, which further supports management as a metapopulation (Boyd 2003, Appendix 2).

The diverse origins of the early foundation herds, and subsequent translocations that were undertaken (and continue to be undertaken) to establish new herds and to later augment herds, have resulted in population segments that, despite their current geographic separation, are essentially one metapopulation where connectivity is maintained through management practices. Therefore, the four wild plains bison ecotypes or population segments are not markedly separate.

International Boundaries with Differences in Exploitation, Management, Status, or Regulations

Although wild plains bison herds also occur in Canada, each of the four plains bison ecotypes or population segments proposed by the petitioners occurs within the United States. Therefore, there are no international governmental boundaries to consider.

Conclusion

The historically wide-ranging nature of wild plains bison likely resulted in a high degree of genetic homogeneity for the species. The subsequent management of the wild plains bison has maintained that homogeneity through numerous translocations between various conservation herds. Additionally, there are no international boundaries between the four proposed population segments. Therefore, the discreteness criteria, as applied to the DPS policy, have not been met.

Significance

Because the petition does not present substantial information that any of the four wild plains bison ecotypes or population segments is discrete, we did not evaluate whether the information contained in the petition regarding significance was substantial. However, we note that the wild plains bison is a generalist with regard to its habitat requirements, as evidenced by its broad historical range, and none of the ecological settings of the four population segments is unique or unusual. Each of the population segments contains multiple herds managed under different Federal, State, municipal, or private regimes, and the complete loss of any population segment is very unlikely. No

population segment represents the only surviving natural occurrence of the taxon. Lastly, due to multiple, diverse origins and subsequent translocations, no population segment is genetically, behaviorally, or ecologically unique.

We recognize that this conclusion differs to some extent from an earlier decision. In a previous negative 90-day finding published on August 15, 2007 (72 FR 45717), we determined that the Yellowstone plains bison herd may meet the criteria of discreteness and significance as defined by our policy on DPS. However, this finding and the previous 90-day finding differ in scope. The August 15, 2007, finding only addressed plains bison in the Yellowstone herd. The current finding addresses wild plains bison in all conservation herds.

The 2007 finding concluded that the Yellowstone herd may be discrete from other plains bison, because it was considered the only herd that has "remained in a wild state since prehistoric times" and because of physical distance and barriers. The best available information now indicates that the basis for our 2007 DPS determination was erroneous. We still use the term "wild plains bison" to describe the Yellowstone herd because they are managed as a conservation herd, rather than as a commercial herd. However, we no longer consider the Yellowstone herd to have remained in more of a "wild" state than any other conservation herd. Specifically, these wild plains bison are no longer thought to have remained in an unaltered condition from prehistoric times, as implied in the previous determination. In 1902, no more than 30 wild plains bison remained in Yellowstone (Halbert 2003, p. 24). In the same year, 18 female plains bison from the

captive Pablo-Allard herd in Montana and 3 bulls from the captive Goodnight herd in Texas were purchased to supplement the Yellowstone herd (Halbert 2003, pp. 24-25). Additionally, intensive management (supplemental feeding, roundups, and selective culling) of the Yellowstone herd occurred from the 1920s through the late 1960s (Gogan *et al.* 2005, p. 1719). Wild plains bison from Yellowstone also have been used to start or augment many later conservation herds (Halbert and Derr 2007, p. 2). Despite geographic separation, the Yellowstone herd is essentially part of one metapopulation and is not markedly separate from other herds.

Summary of the Distinct Population Segment Analysis

On the basis of the preceding discussion, we believe that the petition has not provided substantial information to conclude that each of the four population segments may be discrete. Therefore, we did not evaluate significance or conservation status of the four population segments within the meaning of the DPS Policy. In conclusion, we do not believe that any of the population segments may constitute a valid DPS.

However, even if we had concluded that the four population segments may be discrete and significant, the petition does not present substantial information that any of the stressors described under the above five factor analysis are concentrated within any one DPS to indicate that any of the DPSs would be more likely to be threatened or endangered than the species at large. Thus, there is no information indicating stressors rise to the level of a threat for any population segment.

Finding

In summary, the petition does not present substantial information that wild plains bison may require listing either as a subspecies or a DPS. The conclusion that impacts from the various factors discussed above may constitute a threat is not supported by the available information regarding distribution, abundance, and population trends of wild plains bison. Wild plains bison are distributed in parks, preserves, other public lands, and private lands throughout and external to their historical range. The current population of wild plains bison is estimated to be 20,500 animals in 62 conservation herds. Recent population trends appear stable to slightly increasing in conservation herds (as noted by the petitioners).

On the basis of our determination under section 4(b)(3)(A) of the Act, we conclude that the petition does not present substantial scientific or commercial information to indicate that listing the wild plains bison, or any of four proposed DPSs, under the Act as threatened or endangered may be warranted at this time. Although we will not review the status of the species at this time, we encourage interested parties to continue to gather data that will assist with conservation of the wild plains bison. If you wish to provide information regarding the wild plains bison, you may submit your information or materials to the Wyoming Field Supervisor (see **ADDRESSES**) at any time.

References Cited

A complete list of references cited is available on the Internet at *http://www.regulations.gov* and upon request from the Wyoming Field Office (see **FOR FURTHER INFORMATION CONTACT**).

Authors

The primary authors of this notice are staff members of the Mountain-Prairie Regional Office and the Wyoming Field Office (see **ADDRESSES**).

Authority

The authority for this action is the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq*.).

Rowan W. Gould,

Director, U.S. Fish and Wildlife Service.

[~~Endangered and Threatened Wildlife and Plants; 90-Day Finding on a Petition to List the wild plains bison as threatened, or to list each of four Distinct Population Segments as threatened~~]

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