ENVIRONMENTAL ASSESSMENT

DESIGNATION OF NONESSENTIAL EXPERIMENTAL POPULATION STATUS FOR WOOD BISON IN INTERIOR ALASKA

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in Cooperation with

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SUMMARY

The wood bison (*Bison bison athabascae*) currently is listed as threatened under the Endangered Species Act of 1973, as amended (ESA or Act). At present, free-ranging populations of wood bison occur only in Canada, although the historic range included a large region in Alaska. The Alaska Department of Fish and Game (ADF&G) proposes to restore wood bison in one to three locations within the species' historic range in interior (central) Alaska. The U.S. Fish and Wildlife Service (USFWS or Service) has determined, through the rulemaking process and based on the best scientific and commercial data available, to designate reintroduced wood bison in Alaska as a "nonessential experimental population" (NEP) and to designate a large portion of the historic range of wood bison in Alaska as an NEP area, pursuant to section 10(j) of the Act. The Service also establishes special rules for management of wood bison under section 4(d) of the Act. The 10(j) and 4(d) rule promulgation and subsequent reintroduction of wood bison to Alaska constitute the Service's proposed action and preferred alternative for this environmental assessment (EA).

For consultations under section 7 of the Act, wood bison within the designated NEP area will be treated as proposed for listing, except on lands within the National Wildlife Refuge or National Park systems, where they will be treated as threatened. The final 4(d) rule published in the Federal Register defines allowable take of wood bison in Alaska, and is intended to promote the conservation of wood bison and ensure that other lawful activities, such as natural resource development projects, are not impeded. Captive breeding herds in Canada and Alaska can provide sufficient wood bison to reestablish populations in Alaska over the next several years. ADF&G presently maintains a captive herd of wood bison at the Alaska Wildlife Conservation Center (AWCC) at Portage, Alaska. These animals and their progeny are intended to be used as founding stock for reintroductions of wood bison to the wild in Alaska.

In addition to the proposed action, we have (1) analyzed a No Action alternative (i.e., not establishing an NEP and not reintroducing wood bison); and (2) considered an alternative that would reintroduce wood bison in Alaska without using an NEP designation. We rejected the alternative that would reintroduce wood bison without an NEP designation because of concerns about the potential for restrictions on other land uses and resource development and the resulting loss of public and agency support for the restoration effort. The State of Alaska will not consider reintroducing wood bison to Alaska in the absence of Federal regulatory assurance to land owners and land managers that such action will not adversely affect resource development activities important to Alaska's economy.

The preferred alternative was designed to accomplish the following goals:

(1) It meets the purpose and need identified in this EA;
(2) Land owners, land managers, and resource development interests are more likely to accept wood bison reintroduction within the NEP area with the regulatory flexibility and protections provided by ESA section 10(j) and 4(d) rules;
(3) It addresses concerns about land restrictions under the Act, because critical habitat cannot be designated for NEP species; and

(4) Incidental take associated with otherwise lawful activities would not pose a substantial threat to wood bison recovery in interior Alaska because activities that currently occur within the NEP area or are likely to occur in the foreseeable future are compatible with wood bison recovery. Thus, more stringent legal protections are unnecessary.

This final EA was prepared pursuant to the requirements of the National Environmental Policy Act of 1969 (NEPA) as implemented by the Council on Environmental Quality (CEQ) regulations. Once the Federal rulemaking process is completed, the State of Alaska may proceed with reintroducing wood bison into one to three locations within portions of their probable historic range, with adequate protections for other land uses and resource development in place.

This EA was designed to evaluate the environmental effects of designating wood bison in Alaska as an NEP, but was not intended to establish priorities or reach decisions on the sequence of implementing wood bison restoration in specific areas. The State of Alaska will determine the locations and timing of wood bison restoration efforts in consultation with other agencies and public interests. Following development of a cooperative management plan, the initial release is expected to take place at the lower Innoko/Yukon River site.

For each area where wood bison reintroduction is pursued. ADF&G will conduct a cooperative planning effort with other State and Federal agencies, local residents, land owners, Native organizations, wildlife conservation organizations, potentially affected industries, and other stakeholders. These management plans will specify herd size objectives, biological monitoring programs, and cooperative arrangements between land owners and land and wildlife management agencies.

1.0 INTRODUCTION, PURPOSE AND NEED

1.1 INTRODUCTION

The Service and the State of Alaska, through the Alaska Department of Fish and Game (ADF&G), have jointly prepared this environmental assessment (EA). ADF&G has worked for over 15 years to evaluate the possibility of restoring wood bison into parts of their historic range in interior (central) Alaska. The three primary sites identified as having suitable wood bison habitat include the Yukon Flats, Minto Flats, and the lower Innoko/Yukon River areas (Figure 1).

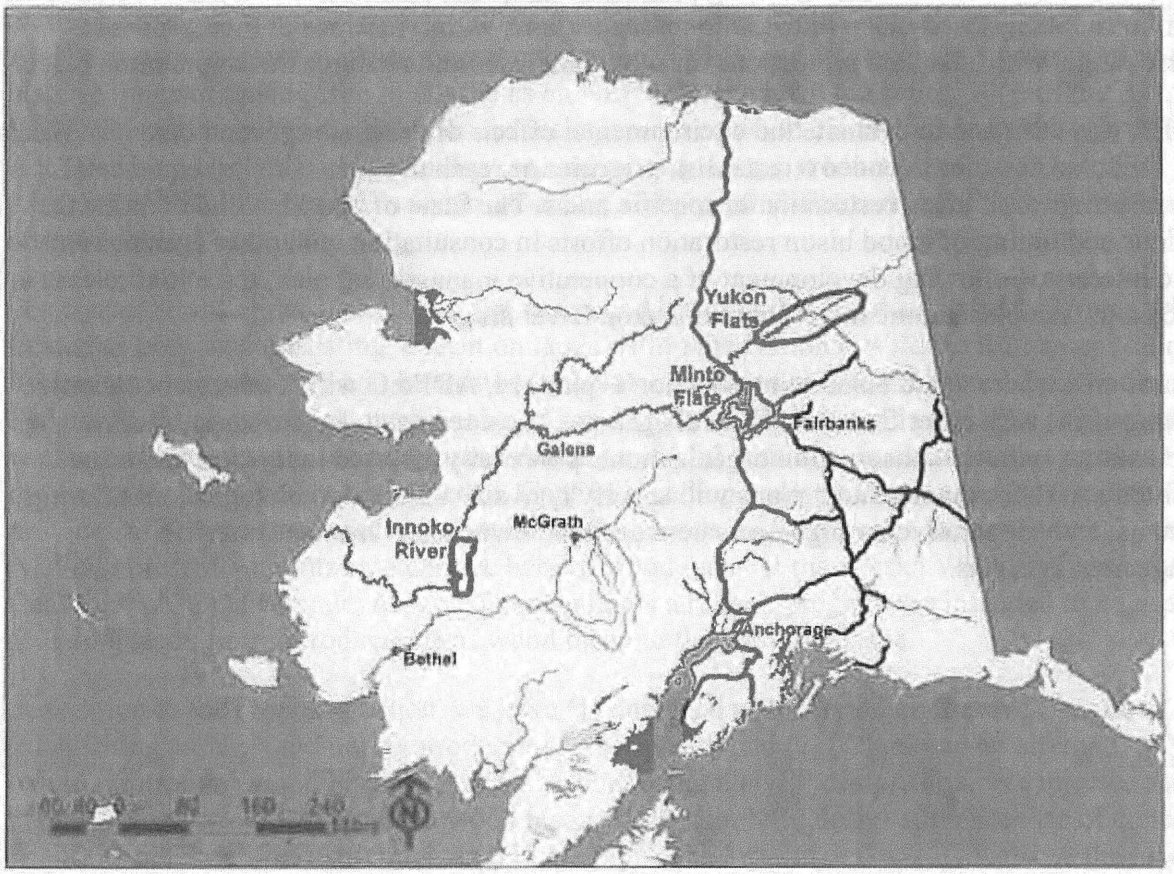

Figure 1. Location of the three sites identified as having suitable habitat for wood bison.

Restoration of wood bison in Alaska from Canadian founder populations will be a major step forward in range-wide wood bison conservation. If successful, the restoration program will increase the number of free-ranging, disease-free herds throughout much of the original range of the subspecies in North America. The restoration program also represents a significant opportunity for international cooperation to improve the status of a historically important native species.

Recovery of wood bison in Canada does not depend on reestablishing a population in Alaska. However, reintroducing wood bison in Alaska will make a significant contribution to several key conservation goals and objectives outlined in Canada's Wood Bison Recovery Plan (Gates *et al.* 2001), including:

- fostering the restoration of wood bison in parts of their original range outside Canada;

- ensuring that the genetic integrity of wood bison is maintained without further loss as a consequence of human intervention;
- reestablishing wood bison in more areas where they will be subject to natural selection; and
- restoring disease-free wood bison herds, thereby contributing to the aesthetic, cultural, economic, and social well-being of local communities and society in general.

This final EA evaluates the environmental effects of the proposed restoration effort, based on the draft EA and in part on analysis in the document "Wood Bison Restoration in Alaska: A Review of Environmental and Regulatory Issues and Proposed Decisions for Project Implementation" (Environmental Review or ER; ADF&G 2007). The Environmental Review was prepared to analyze potential effects on physical and biological resources and social and economic conditions that may result from the reestablishment of wood bison in Alaska; to inform the public of the key issues involved; and to provide an opportunity for public comment. The ER is available online at: http://www.adfg.alaska.gov/index.cfm?adfg=woodbison.management.

Although the Service has determined that reintroducing native species into historic habitat could qualify for a Categorical Exclusion under NEPA (USFWS 2012), in the case of wood bison and the associated level of interest and potential controversy, the decision was made to prepare an EA for this nonessential experimental population (NEP).

This final EA describes the three areas being considered for wood bison reintroduction, and analyzes the potential environmental effects of restoring this species to these areas. The EA also describes other natural resource development projects that have been proposed or implemented in or near the three potential wood bison reintroduction sites. The EA evaluates potential effects on these resource development projects in the context of the proposed action, i.e., to designate wood bison in Alaska as an NEP under section 10(j) of the Act.

1.2 Purpose of the Action

The ultimate goal of this action is to re-establish one or more free-ranging populations of wood bison in Alaska. Promulgating regulations to designate an NEP area for wood bison in Alaska will promote wood bison conservation while reducing concerns that reintroduction of a listed species could result in restrictions on existing or proposed natural resource development projects.

ADF&G has established the following general goal for the restoration effort:

> Restore wood bison populations to portions of their former habitat in Alaska so that they are again an integral part of Alaska's wildlife, providing Alaskans and others the opportunity to enjoy and benefit from this ecologically important northern mammal.

The Alaska wood bison restoration program includes objectives designed to:

- Increase the number of wood bison in free-ranging herds and enhance the survival of the species in the wild;
- Reestablish wood bison in suitable habitats in their original range in Alaska;
- Reestablish a cultural connection between wood bison and people in Alaska;
- Reestablish wood bison populations that can be harvested on a sustained yield basis in the future;

- Reestablish a renewable resource and provide a regulatory framework that allows for sustainable development, including opportunities for local tourism, and, in the future, hunting and guiding businesses; and
- Provide an opportunity to monitor the long-term ecological effects of a large grazing mammal as global climate change occurs, possibly shifting northern ecosystems towards grasslands.

In order to achieve the conservation benefits of wood bison restoration in Alaska, the project must be balanced with other resource development activities important to Alaska's economy. The Service and the State of Alaska believe this can best be accomplished by designating wood bison as an NEP under section 10(j) of the Act.

1.3 Need for the Action

Although not required (as mentioned above), we reviewed the proposed Federal action of designating wood bison released to the wild in Alaska as an NEP under the National Environmental Policy Act (NEPA) to determine the potential environmental impacts of the project. The permit issued to ADF&G by the USFWS to import wood bison from Canada to Alaska (permit number MA150411-0, issued February 8, 2008) does not authorize release of the wood bison or their progeny to the wild until the requirements of the Act and NEPA have been addressed. The regulations under sections 10(j) and 4(d) of the Act, as promulgated in the final rule, and in this final EA and associated Finding of No Significant Impact (FONSI), will fulfill this permit requirement.

Several potential oil and gas, mining, agriculture, and other resource development projects that may also be important to the economic development of Alaska could occur within or in the vicinity of the three potential wood bison restoration locations. The State of Alaska and industry are concerned about potential restrictions on other land uses and economic development that could result from reestablishing a listed species in these areas. Without an NEP designation, which both provides for conservation of wood bison and reduces the regulatory requirements that normally would apply to a listed species, the State of Alaska will not proceed with the wood bison restoration program.

An NEP designation establishes a regulatory framework that will ensure that wood bison restoration does not result in restricting other land uses and resource development activities. Therefore, there is a compelling need for this action in order to proceed with reintroducing wood bison into portions of their historic range in interior Alaska and to advance recovery of the subspecies in North America. The purpose of this document is to analyze the environmental effects of the NEP designation and the effects that wood bison might have on both other natural resources and resource development in the reintroduction areas.

1.4 Consultation and Coordination

ADF&G has conducted an extensive consultation and coordination process since the wood bison restoration project was initiated in the early 1990s. Section 2.3 provides an overview of previous public involvement. In developing the Environmental Review, ADF&G consulted with several State and Federal agencies and private land owners. More detail is provided in the wood bison Environmental Review (ADF&G 2007).

In summer 2005, ADF&G (through the consulting firm Hunter Environmental Associates) sent letters to agencies, land owners, and others requesting scoping comments. ADF&G asked for assistance in identifying issues to be addressed concerning the three potential reintroduction areas being considered, and specifically, possible issues associated with constructing temporary holding facilities in remote areas. This consultation effort focused primarily on public agencies with potential permitting requirements and on land owners adjacent to local communities where a temporary holding facility might be constructed to support restoration efforts. The U.S. Army Corps of Engineers (USACE) indicated that a section 404 wetlands permit would not be required for temporary facilities with no fill in wetlands. Similarly, the Alaska State Historic Preservation Office concluded that no significant cultural resources would likely be affected.

ADF&G has consulted with wood bison managers in Canada, other State and Federal agencies, and other interests as needed to respond to specific issues during the project. Specifically, ADF&G has consulted with the USFWS, the Alaska Department of Law, Doyon, Limited (Doyon; the regional Alaska Native corporation established under the Alaska Native Claims Settlement Act [ANCSA] for this portion of central Alaska), and others regarding how to best address the status of wood bison under the Act. ADF&G has consulted with the Alaska State Veterinarian and the U.S. Department of Agriculture (USDA) on wood bison disease-testing protocols and health-certification standards. The Alaska Department of Natural Resources has contributed information on other resource development activities in or near proposed wood bison reintroduction areas.

1.5 Scoping Process

A request for scoping comments and notice of intent to prepare a draft EA was published in the Federal Register on February 25, 2010 (75 FR 8736). The USFWS sent this notice to over 80 individuals, agencies, land owners, and organizations, including Native corporations and tribal councils in or near the proposed wood bison reintroduction sites. ADF&G sent the notice to over 300 individuals, agencies, and organizations, including local governments, conservation groups, Native organizations, development organizations, the Alaska congressional delegation, and members of the Alaska legislature whose districts include the proposed wood bison reintroduction sites or who have otherwise expressed interest in the project.

Eighteen written comments were received by the USFWS and ADF&G. The scoping comments did not identify any new issues that have not already been considered. The comments did, however, articulate in greater detail and reemphasize the importance of several issues. As a result, some sections of the EA were expanded with more in-depth discussion. Public comments on the draft EA (summarized in section 12.0) have been addressed in this final EA. We received 21 comments, with most expressing support for bison restoration in Alaska; several that did not raise substantive issues; and a few that a) raised issues that warranted additional detail, or b) expressed opposition to wood bison restoration in one or more areas.

1.5.1 Issues and Concerns

An "issue," in the context of NEPA, is a cause-and-effect relationship that may result from implementation of an action. An issue is a point of disagreement, debate, or dispute with a proposed action, based on some anticipated effect. Significant issues (i.e., issues within the scope of the proposed action, not already decided by law, regulations, or land management plans, and relevant to the decision to be made) related to the proposed wood bison reintroduction project have

been addressed in the draft and final EAs. While no completely new issues were raised in response to the request for scoping comments or comments on the draft EA, some concerns that were reemphasized in public comments are listed below:

- Possible restrictions on natural resource development projects in or near proposed wood bison reintroduction areas due to regulatory requirements of the Act. Specific activities identified include oil and gas exploration and development, mining exploration and development, pipeline construction, and agricultural development;
- Other land use activities, (e.g., logging, hunting, and trapping) being fiscally impacted by new regulatory requirements associated with wood bison reintroduction and the Act;
- The presence of a listed species, even with an NEP designation, having a "chilling effect" on other potential natural resource development projects;
- Ecological benefits or negative impacts likely to occur as a result of wood bison restoration;
- The importance of wood bison restoration in Alaska to overall recovery of wood bison across North America;
- Future hunting of wood bison and appropriate criteria to determine when hunting could be authorized;
- Predation on wood bison and the possible need for predator-control activities to protect wood bison herds or increase herd growth rates;
- The need for a long-term biological monitoring program to assess the status of wood bison herds and ecological effects;
- The extent of the probable historical range of wood bison in Alaska and whether an NEP designation is appropriate for all of the proposed reintroduction areas;
- Consistency of wood bison restoration with the purposes of the Yukon Flats and Innoko National Wildlife Refuges and the Service's policy on biological integrity, diversity, and environmental health; and
- Possible introduction of new diseases that might pose a threat to other wildlife species.

1.6 Decision to be Made

This final EA evaluates the potential environmental impacts of the proposed action to designate an NEP for wood bison in Alaska, thereby facilitating restoration to one or more of three areas within the subspecies' probable historical range in the State. The EA also considers an alternative of reintroducing wood bison in Alaska without designating an NEP, as well as a "No Action" alternative, under which there would be no NEP designation and wood bison would not be reintroduced. The Service will issue a Finding of No Significant Impact to document that Alternative A was selected as the preferred alternative. This FONSI will allow the State of Alaska to decide when to move forward with the wood bison reintroduction program. Subsequent site-specific management plans will be prepared in coordination with partners to address details of how reintroduction efforts will be conducted.

2.0 BACKGROUND

2.1 History of Wood Bison in North America

Wood bison (*Bison bison athabascae*) are one of two subspecies of North American bison. They are larger than plains bison (*Bison bison bison*) and have a more pronounced hump, forward-falling display hair on the head, reduced chaps and beard, and different demarcation on the cape

(van Zyll de Jong *et al.* 1995). Wood bison are well adapted to northern meadow and forest habitats. Radiocarbon dates and paleontological data show that bison were present in Alaska for more than 400,000 years. Radiocarbon dates for bison skeletal remains range from over 40,000 to 170 years ago. Large-horned Pleistocene bison existed in North America until about 10,000 years ago, after which smaller-horned bison evolved, ultimately developing into the two most recent North American subspecies, wood bison and plains bison (McDonald 1981). Wood bison were the last subspecies of bison to occur naturally in Alaska, and were present for most of the last 5,000 to 10,000 years. Skeletal remains and historical accounts show that wood bison persisted in a large part of their original range in Alaska and Canada during the last 10,000 years (Fig. 2) and were a component in the economies of Athabascan people in central and eastern Alaska during this period (Stephenson *et al.* 2001; Gardner and DeGange 2003).

Soper (1941) estimated that 168,000 wood bison existed in North America in 1800. By the end of the 19th century, wood bison had nearly vanished because of unregulated hunting following the westward expansion of the fur trade and European settlement (Gates *et al.* 1992). Subsequent conservation efforts markedly improved their status in Canada. As of May 2013, there were approximately 11,000 wood bison in Canada, including nearly 5,000 in 7 free-ranging, disease-free herds (including one outside the original range of wood bison); 6,000 in 5 free-ranging but diseased herds; and 300 in a captive conservation population that is maintained by Parks Canada Agency to provide stock for conservation efforts in the wild (G. Wilson, Canadian Wildlife Service, *in litt.*, 2013).

Archaeological evidence and oral accounts from Alaska Native elders indicate that humans hunted wood bison until they disappeared from Alaska. Detailed historical accounts from Athabascan elders describe how people hunted and used bison, and indicate that the species was an important source of food for Athabascan people before the bison population declined to low levels within the last few hundred years. These accounts indicate that by 1800, only small numbers of bison persisted. The most recent records of wood bison are from the early 1900s, and include sightings of small groups or single bison in northeastern Alaska. The most likely reason for the extirpation of bison was the combined effects of unregulated hunting by humans and changes in habitat distribution (Stephenson *et al.* 2001; Gardner and DeGange 2003).

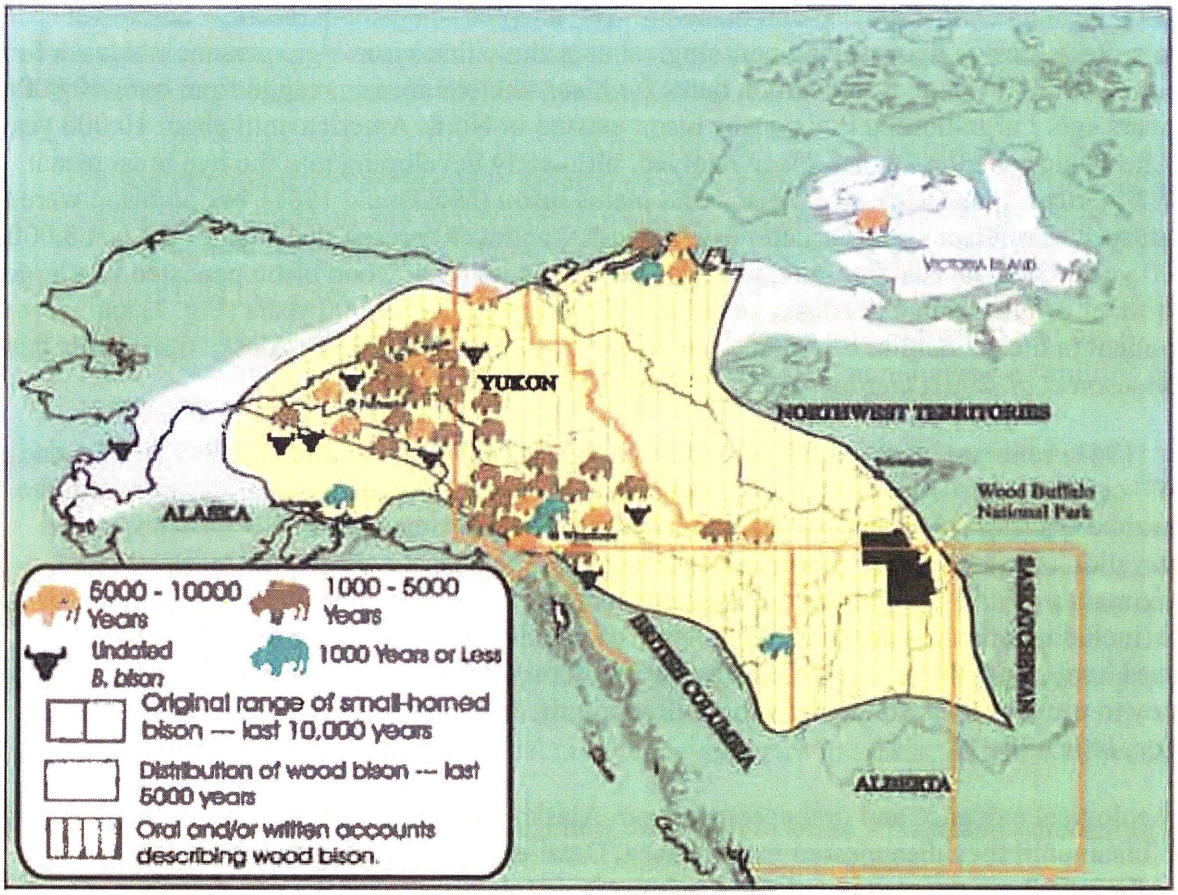

Figure 2. Approximate location of Holocene bison remains in Alaska and adjacent Canada, and estimated original and late Holocene range of wood bison in North America (Stephenson *et al.* 2001)

The Yukon Flats and Minto Flats areas are located within the currently estimated range of wood bison during the last 5,000 years (Figure 2). Numerous fossil specimens from this area have been radiocarbon dated to within the last few thousand years. It is likely that bison were distributed unevenly in this large area, with the highest concentrations in the best habitat, which increasingly focused on low-elevation meadow systems (Stephenson *et al.* 2001). Small-horned bison specimens that date to the early Holocene and additional undated specimens have been found east (Victoria Island, Canada) and west (St. Michael, Alaska) of this area, indicating that the total Holocene range was larger than the current estimate for the range occupied within the last 5,000 years. Given the occurrence of wood bison remains to the east and west of the proposed lower Innoko/Yukon River reintroduction site, an unpublished historical account from the Galena area (G. Stout, ADF&G Galena Area Biologist, pers. comm. 2003), and that there are large expanses of suitable forage in the area, it is likely that small-horned bison also occurred in the lower Innoko/Yukon River area during the late Holocene.

2.2 Legal Status of Wood Bison

Canada

Wood bison were listed by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) as endangered in 1978, and downlisted to threatened in 1988. At that time, COSEWIC listings were not recognized under a specific Federal endangered species act. The Species at Risk Act (SARA) was enacted in 2003. Currently, COSEWIC recommends listings to appropriate Federal departments, which then accept or reject these listings under SARA. When SARA came into force, the listing of wood bison as threatened was recognized under that Act (Wilson, *in litt.*, 2013).

United States

In the United States, the wood bison was first listed under the Endangered Species Conservation Act of 1969, and was included as an endangered species on the first list promulgated under the Endangered Species Act of 1973. It remained listed as endangered until May 3, 2012, when the Service published a final rule reclassifying the wood bison as threatened (77 FR 26191).

2.3 Overview of Project History and Previous Public Involvement

The concept of reintroducing wood bison in Alaska on the Yukon Flats area northeast of Fairbanks has been a focus of cooperative efforts among ADF&G, Canada, local land owners, Native organizations, and other conservation interests since 1991. An extensive record of support for wood bison restoration from tribal councils on the Yukon Flats resulted from meetings that occurred in the 1990s (ADF&G 2007).

Alaska's restoration effort is supported by conservation authorities in the United States and Canada, including the International Union for the Conservation of Nature (IUCN)/North American Bison Specialist Group, the Wildlife Conservation Society, the American Bison Society, and Canada's Wood Bison Recovery Team. These entities regard the restoration effort as having significant conservation value for bison, other wildlife, and the environment.

A wood bison habitat inventory was conducted on the Yukon Flats in the early 1990s (Berger *et al.* 1995). This study focused on a 410-square-mile area south of the Yukon River and a 633-square-mile area east of Fort Yukon and south of the Black and Porcupine Rivers. This inventory also included aerial and ground reconnaissance surveys in three additional areas north and northwest of Fort Yukon and north of the Black River. The study concluded that the two intensively studied areas (1,043 square miles) could support at least 2,000 bison.

In 2003, ADF&G initiated a broader habitat assessment effort to identify additional areas in interior Alaska that could sustain wood bison. This habitat assessment identified the Minto Flats and lower Innoko/Yukon River areas as suitable sites for wood bison reintroduction. Based on the size of the area and available forage quality and quantity, the study concluded that the Minto Flats could support a herd of about 500 wood bison, and the lower Innoko/Yukon River area could easily support a herd of 400 or more, with a large quantity of additional bison habitat in adjacent areas (Gardner 2007). Another reason for selecting these potential sites was that they are located

far enough from areas occupied by plains bison to eliminate the possibility of hybridization (ADF&G 2007).

In 2005, ADF&G initiated further public planning and consultation efforts to evaluate public support for wood bison restoration in Alaska. ADF&G established the Wood Bison Restoration Advisory Group (WBRAG), a citizen's advisory group representing diverse stakeholders in Alaska wildlife and land management, to review the proposal to reintroduce wood bison, discuss the relevant issues, and provide recommendations to ADF&G on wood bison reintroduction. The WBRAG recommended that ADF&G move forward with wood bison restoration in Alaska and continue to pursue all three potential release sites, with the understanding that additional planning and public involvement would be needed prior to release.

In 2007, ADF&G distributed approximately 130 copies of the wood bison Environmental Review (similar to a NEPA Environmental Assessment but at the State level) for public and agency review and comment. The report distribution included the State Fish and Game Advisory Committees, the Federal Regional Advisory Council chairs, Alaska Board of Game members, conservation organizations including both sportsman's and environmental groups, village councils, tribal governments, Alaska Native corporations, several members of Canada's Wood Bison Recovery Team, and other involved State and Federal agency staff and political representatives.

In addition, a 12-page summary of the ER and a Public Comment Response Form were enclosed in the project newsletter "Wood Bison News," which was mailed to 430 people and organizations on the ADF&G wood bison project mailing list, and to over 1,600 post office box holders in communities within or adjacent to the sites being considered for wood bison reintroductions. In December 2007, ADF&G issued a *Review of Public Comment and Notice of Decision on the Environmental Review*. This notice concluded that there is strong public support for wood bison restoration in Alaska and that "ADF&G will continue efforts to restore wood bison in Alaska to enhance the wildlife and ecological diversity of our State and provide new opportunities for human use and enjoyment of wildlife." Based on the public comments received, ADF&G announced its intent to continue efforts to import wood bison to Alaska from Elk Island National Park (EINP) in Canada and to initiate cooperative planning for wood bison reintroduction.

The border between the United States and Canada was reopened to the importation of bovines in late 2007. ADF&G subsequently obtained the necessary Federal, State and Provincial permits to import wood bison, and in June 2008 transported 53 wood bison from EINP to AWCC at Portage, Alaska. These bison are being maintained at this facility under a cooperative agreement between the AWCC and ADF&G. The herd has undergone extensive disease testing and health certification programs in Canada and also in Alaska, under a cooperative agreement with the Alaska State Veterinarian, with involvement of the USDA.

In January 2009, Doyon submitted two reports to the Governor of Alaska and the Alaska Legislature asserting that the wood bison reintroduction posed a major and unnecessary risk to resource development because of provisions of the Act, possible litigation, or both. This action heightened public awareness and concern about the status of wood bison under the Act and underscores the importance of designating wood bison in Alaska as an NEP to ensure that other land uses and resource developments are not restricted. Based on the concerns raised by Doyon, some Alaska Native village corporations (from Nenana and Birch Creek) and one tribal

government (Minto) in areas being considered for wood bison restoration expressed concern about potential restrictions on use of their lands because of the presence of a listed species.

To address these concerns, ADF&G increased its efforts to inform the public about the proposal to designate wood bison in Alaska as an NEP under section 10(j) of the Act and to explain how this provision of the law has worked to protect other land uses and resource development in other states. Prior to releasing bison at any of the three potential sites, ADF&G will also develop site-specific wood bison management plans in cooperation with other State and Federal agencies, land owners, local residents, wildlife conservation organizations, and other stakeholders.

2.4 Previous Peer Review

The history of wood bison in Alaska is documented in a peer-reviewed paper titled "Wood bison in Late Holocene Alaska and Adjacent Canada: Paleontological, Archeological and Historical Records" (Stephenson *et al.* 2001). The wood bison restoration proposal has undergone peer review by the Alaska Chapter of The Wildlife Society (TWS; *see* Griffith *et al.* 1998), and also during four days of WBRAG meetings in 2005, where biologists from Canada, the University of Alaska Fairbanks (UAF), Federal agencies, and ADF&G presented information about bison ecology and management. These reviews concluded that reintroduced wood bison are unlikely to have negative effects on other wildlife or the environment at the population densities that would be expected to develop (Griffith *et al.* 1998; ADF&G 2007).

ADF&G and the USFWS completed a joint review of information on wood bison in Alaska and adjacent Canada in July 2003. This review concluded that the combined effect of changes in habitat distribution and harvest by humans was the most likely cause for wood bison extirpation in Alaska and that a low- to medium-density population of wood bison is unlikely to have negative effects on waterfowl, moose, or other wildlife. This report is included as Appendix A in the 2007 wood bison Environmental Review (ADF&G 2007).

A review of the project was also conducted pursuant to the ADF&G Division of Wildlife Conservation Wildlife Transplant Policy. The review committee included seven biologists from ADF&G and was chaired by Dr. Kris Hundertmark, UAF Assistant Professor of Wildlife Ecology. The committee reviewed all available documents, including the information provided to the WBRAG, and unanimously agreed that wood bison restoration in the proposed areas is not likely to effect a significant reduction in the range, distribution, habitat, or pre-existing human use of other species (ADF&G unpublished report 2007). The Alaska Chapter of TWS, the WBRAG, and the Wildlife Transplant Policy Review Committee offered recommendations for post-release studies, monitoring, and public information programs. ADF&G plans to work with these and other scientists, land management entities, and interests to develop research and monitoring plans appropriate for each site.

Alaska's restoration effort has also been reviewed and is supported by Canada's National Recovery Team for the Wood Bison, and by the World Conservation Union-North American Bison Specialist Group. The restoration project and the effort to designate wood bison as an NEP are described in the International Union for Conservation of Nature's *American Bison Status Survey and Conservation Guidelines 2010* (Gates *et al.* 2010). Wood bison conservation efforts in Alaska are also recognized in the U.S. Department of Interior's Bison Conservation Initiative, issued in July 2008. In that document, Action Item 5: Pursue Collaborative Bison Conservation

Projects, encourages ADF&G to "actively seek bison conservation projects consistent with this framework that involve partnership efforts, for both plains and wood bison." The initiative also notes that "ADF&G has led an effort to restore wood bison at the Yukon Flats National Wildlife Refuge, with cooperation of the Council of Athabascan Tribal Governments, USFWS, NPS and other private partners. This is a priority in wood bison conservation and a good international cooperative effort . . ." (Department of the Interior 2008).

In addition, the Service requested peer review of the draft EA and NEP proposed rule from four knowledgeable individuals with scientific expertise including familiarity with wood bison and their habitat, biological needs, recovery efforts, and threats. We received a response from three of the peer reviewers. The peer reviewers concluded that information in the proposed rule and draft EA supported the feasibility of the reintroduction project. One peer reviewer provided some recent information on bison herds, disease, and Canada's Species at Risk Act, which was incorporated where appropriate. One peer reviewer raised the issue of hybridization, and recommended that maintenance of physical and genetic separation of plains bison and wood bison specifically be addressed when management plans are developed for wood bison in Alaska. Another reviewer suggested expanding the boundaries of the NEP area to minimize the chance that reintroduced animals would move beyond it. These issues have been addressed in section 2.5 below.

2.5 Geographic Scope of the Proposed Action

The area proposed for wood bison reintroduction includes primarily remote areas in interior Alaska within the species' historical range. The boundaries of the proposed NEP area encompass the drainages of the Yukon, Tanana, and Kuskokwim Rivers in Alaska (Figure 2). The NEP area encompasses the three sites under consideration for wood bison reintroduction and the maximum area around those sites where wood bison might be expected to range within the foreseeable future. It is highly unlikely that wood bison will move beyond the boundaries of the NEP area because bison populations have a strong tendency to establish, and remain in, traditional home ranges (Gates *et al.* 2001; Larter and Gates 1990), and because population size in each area would be regulated through active management. If wood bison were to move beyond the NEP boundaries they would be classified as a threatened species given their present listing status.

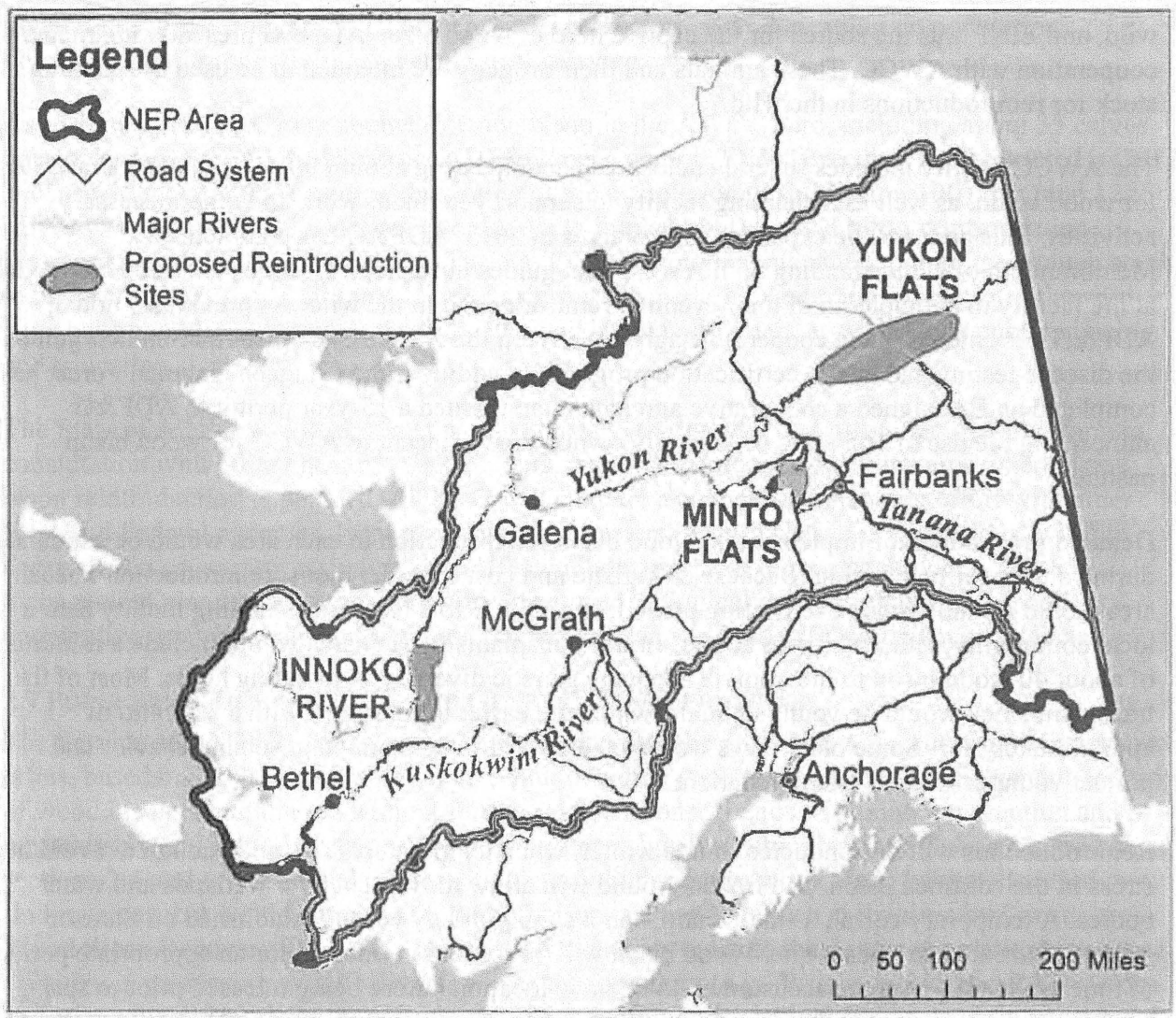

Figure 3. Boundary of the NEP area for reintroduced wood bison in Alaska.

2.6 General Logistic Approach and Reintroduction Techniques.

Wood bison restoration efforts will incorporate guidelines and recommendations found in ADF&G's Wildlife Transplant Policy; the IUCN/Species Survival Commission guidelines for the Translocation of Living Organisms; the IUCN Guidelines for the Reintroduction of Native Species; and American Bison: Status Survey and Conservation Guidelines (Gates *et al.* 2010). Reintroduction procedures at potential release sites will employ methods used in successful wood bison reintroductions in northern Canada (Gates *et. al.* 2001; ADF&G 2007). Initially, wood bison will be held in a temporary corral, and then will be released on State or private lands. Following release, bison could roam onto other public and private lands.

The reintroduction program will use wood bison stock imported from EINP in Alberta, Canada where a herd of 300–400 wood bison is maintained for the primary purpose of providing stock to reestablish additional healthy, free-ranging herds in additional parts of the species' original range. The priority use of surplus animals at EINP is for conservation and reintroduction efforts in the

wild, and EINP was the source for the captive herd of wood bison ADF&G presently maintains in cooperation with AWCC. These animals and their progeny are intended to be used as founding stock for reintroductions in the wild.

The AWCC facility includes several enclosures encompassing about 100 acres that are available for wood bison, as well as a handling facility to support veterinary work and other necessary activities. This area will be expanded to 265 acres in 2013. ADF&G has completed a Memorandum of Understanding with AWCC that guides husbandry practices for wood bison held at the facility in anticipation of their eventual reintroduction in the wild. As previously noted, ADF&G has entered into a cooperative agreement with the Alaska State Veterinarian that guides the disease-testing and health certification program. In addition, the Chugach National Forest has completed an EA, signed a cooperative agreement, and issued a 15-year permit to ADF&G authorizing the use of 165 acres of federally owned land adjacent to AWCC for wood bison pasture.

Detailed procedures for implementing wood bison reintroduction in each area would be established during site-specific planning. Because of logistic and cost considerations, reintroduction in each area would initially require relocating bison from AWCC to a temporary holding facility near a local community with air or road access. Initial transplants in each area would include a minimum of about 40 wood bison to incorporate adequate genetic diversity in founding herds. Most of the transplant stock would be young animals, which are easier to transport, with a sex ratio of approximately 1:1. Some older cows would be included to help maintain social behavior and protect younger animals from predation.

Reintroductions will be conducted in late winter, when temperatures are cold enough to avoid heat stress in the confined bison, and frozen ground will allow movement over wetlands and water bodies. A temporary corral, a small camp, and a supply of hay will be established on State or private lands at each release site. Wood bison will be fed and monitored for an appropriate period of time while they become accustomed to the new location before being released prior to spring breakup and green-up. The holding time will be based on animal behavior and condition, as well as local weather and seasonal conditions (G. Parsons, pers. comm. 2012). After the animals are released, the temporary facilities will be dismantled; there will be no permanent impacts on the land. It is unlikely that reintroduced wood bison will wander far from meadow systems in the proposed reintroduction areas, where forage is most abundant. (Gates *et al.* 2001; Gates and Larter 1990; Larter and Gates 1990). This suggests that expanding the boundaries of the NEP area is unnecessary.

As described in section 2.3 in this document, each potential reintroduction area was selected in part based on the presence of sufficient high-quality habitat to ultimately support a sustainable population. Specific, science-based population objectives for each area will be developed during public management planning efforts to address site-specific conditions. Based on experience with other reintroduced populations, wood bison populations in Alaska would be expected to increase at a rate of 15–25 percent annually after becoming established (Gates and Larter 1990). Experience in managing other bison herds and population modeling indicate that founding populations of at least 40 bison could grow to 400 animals in 10–15 years. Future harvests will depend on sustainable management strategies based on population objectives established in management plans. As in several other areas where bison populations are hunted, harvest rates for stable wood bison

populations range from about 10 percent to 20 percent per year depending on population objectives, herd productivity, and ecological carrying capacity.

As of June 2012 there were about135 wood bison in the AWCC herd, including about 35 calves born in spring 2012 (B. Stephenson, ADF&G, pers. comm. 2012). Breeding was restricted in 2012 because of uncertainty regarding the timing of the completion of the section 10(j) rule, and 12 calves were born in 2013. ADF&G would like to implement the wood bison reintroduction program over the next several years. The AWCC herd could be managed to produce enough stock to release wood bison in all three locations during this period. Once reintroductions to the wild have been completed, approximately 5–10 wood bison will remain at AWCC for public viewing and education.

The State of Alaska will determine the locations and timing of wood bison restoration efforts in consultation with other agencies, stakeholders, and public interests. For each area where wood bison reintroduction is pursued, ADF&G will conduct a cooperative planning effort with other State and Federal agencies, local residents, land owners, Alaska Native organizations, wildlife conservation organizations, potentially affected industries, and other stakeholders. These management plans will specify herd size objectives, biological monitoring programs, and cooperative arrangements between land owners and land and wildlife management agencies.

2.7 Population Demographic and Genetic Considerations

The Service and ADF&G are committed to maximizing the probability of a successful restoration effort, based on the best available science and including goals to a) ensure that the genetic integrity of wood bison is maintained without further loss as a consequence of human intervention and b) reestablish wood bison in areas where they will be subject to natural selection. As discussed in sections 2.6 and 4.1, ADF&G's efforts to identify high-quality wood bison habitats focused on finding areas that would support at least 400 bison, as recommended at the time by Canada's Wood Bison Recovery Team. We recognize that studies indicate that larger populations are more effective in preserving genetic diversity over the long term (e.g., Wilson and Zittlau 2004; Gross and Wang 2005; Hedrick 2009). Rather than setting minimum population goals in this document or the 10(j) rule, however, ADF&G will develop science-based population objectives for each reintroduction area during public management planning efforts to address site-specific conditions. The areas being considered for reintroduction can support populations ranging from 400 to 2,000 or more animals. These free-ranging bison will be subjected to a full array of ecological processes, including natural selection, which will influence population demographics and genetics over time. Long-term management efforts will incorporate demographic, genetic, logistic, and other considerations necessary to achieve successful reintroductions that will contribute substantially to wood bison conservation.

3.0 PROPOSED ACTION AND ALTERNATIVES

3.1 Alternatives Considered

The three alternatives initially evaluated for inclusion in this EA included: A) the Proposed Action to establish a nonessential experimental population, or NEP, designation for wood bison in Alaska and authorize their release into suitable habitat in one or more locations within the NEP area; B) to reintroduce wood bison into parts of their historic range in Alaska without an NEP designation or

special regulations under section 4(d) of the Act; and C) the No Action alternative, in which there would be no NEP designation and wood bison would not be reintroduced in Alaska.

3.2 Alternative A

The proposed action is to designate wood bison in Alaska as an NEP and authorize the State of Alaska to reintroduce wood bison in one to three areas with suitable habitat. This action develops rules under sections 10(j) and 4(d) of the Act to designate wood bison in interior Alaska as an NEP and to specify special management provisions. This action will enable the State to reestablish free-ranging wood bison herds in parts of their original range in Alaska, and will make a major contribution to international wood bison recovery and wildlife conservation in general. These wild herds will be subject to natural selection, will remain disease-free because of their isolation, and will reestablish a population that will supplement existing populations in Canada and Russia. The environmental effects of wood bison restoration in the three areas currently being considered are evaluated below, based in part on previous analyses (ADF&G 1994; Griffith *et al.* 1998; Gardner and DeGange 2003; ADF&G 2007).

3.3 Alternative B

The Service and the State of Alaska determined that Alternative B was not acceptable due to public concern about possible restrictions on other resource development and land uses. The State will not proceed with wood bison reintroduction without an NEP designation. For this reason the two alternatives we considered in this EA are the No Action alternative and the proposed action to designate wood bison as an NEP and authorize their release to the wild.

3.4 No Action Alternative C

Under this alternative, a section 10(j) rule designating NEP status for wood bison in Alaska and a section 4(d) rule would not be completed. Because wood bison would not be released in the wild, there are no environmental or socioeconomic issues to address regarding the effects of free-ranging herds on other wildlife or the human environment. However, there would be important impacts in terms of loss of the opportunity to contribute to wood bison conservation and to restore part of Alaska's natural wildlife diversity. The effects of global climate change may shift northern ecosystems towards grasslands, creating more suitable habitat for wood bison. Without the reintroduction, Alaska would lose an opportunity to restore a large grazing mammal to these ecosystems. Opportunities for public use and enjoyment of free-ranging herds of wood bison, including wildlife viewing and future subsistence and other hunting activities, would also be lost.

In addition, there would be costs associated with maintaining the currently captive animals or euthanizing them. Transporting the bison back to Canada is not a viable option because it would require another disease testing and handling program to satisfy Canadian import requirements. Further, Canadian jurisdictions have no need for additional wood bison, since EINP already produces enough animals for reintroduction efforts. Moreover, Parks Canada Agency policy prohibits the introduction of animals to EINP.

4.0 DESCRIPTION OF THE AFFECTED ENVIRONMENT AND EVALUATION OF POTENTIAL ENVIRONMENTAL EFFECTS

4.1 Description of Proposed Reintroduction Sites

The proposed release sites lie within the northern boreal forest ecosystem, and support extensive graminoid meadow systems interspersed with mixed spruce-poplar and spruce-hardwood forest. Forage species suitable for bison dominate the meadow plant communities. All three areas are ecologically similar in that they encompass extensive wetland and meadow systems and contain important waterfowl nesting areas.

Reintroductions at other sites are not currently being considered, but could become possible in the future in the unlikely event that additional historical information shows that wood bison occurred in other parts of Alaska and suitable habitat is identified in other parts of their original range. In that event, we might have to conduct a thorough review of other potential areas through the NEPA process and conduct a rule-making process under the ESA to increase the boundaries of the NEP area or establish new NEP areas elsewhere.

This final EA is designed to evaluate the environmental effects of designating wood bison in Alaska as an NEP, but is not intended to establish priorities or reach decisions on the sequence of implementing wood bison restoration in specific areas. However, the State of Alaska has indicated that an initial reintroduction effort would occur in the lower Innoko/Yukon River area, and that it will continue to evaluate the possibility for reintroductions in the other areas (D. Vincent-Lang, ADF&G, pers. comm. 2013).

Wood bison are bulk feeders that select for sedges and grasses (Reynolds *et al.* 1978). They use a variety of habitats throughout the year but show an affinity for wet and mesic sedge-grass meadows (Larter and Gates 1991; Berger *et al.* 1995). Compared with other northern grazing ungulates, wood bison are less selective and can utilize graminoid forage more efficiently. They use a variety of forage species, seasonally selecting for those that yield the greatest amount of protein (Larter and Gates 1991). The diet of the Slave River wood bison herd included 29 different plant species, and 12 species contributed over 1 percent of the diet during at least one season (Reynolds *et al.* 1978). The most nutritious sedge throughout the year is slough sedge (*Carex atherodes*) and, where available, this is the most-selected forage species (Reynolds *et al.* 1978; Larter and Gates 1990; Fortin and Andruskiw 2003).

Wet, boggy conditions and deep snow cover can restrict bison movements and foraging behavior (Telfer and Kelsall 1979). Thus, during spring and summer, wood bison tend to prefer drier meadows. Because bison do not dig craters, but instead use their heads to push away snow to access forage, deep snow or a snowpack with hard layers may limit feeding sites. Snow depths up to 30 inches and 24 inches do not restrict foraging behavior of adult and calf bison, respectively (Van Camp 1975; Reynolds and Peden 1987). Bison can withstand deeper snow without affecting mortality or productivity if wind or icing does not increase snow density. Plains bison in Yellowstone National Park have been observed foraging in snow about four feet deep that had no hard or ice layers (Meagher 1973). Snow hardness was found to be the principal characteristic of snow cover influencing bison use of feeding sites. Bison select areas with soft snow for winter feeding habitat and avoid large, windswept meadows (Reynolds and Peden 1987).

Feasibility and habitat inventory studies conducted by ADF&G in the mid-1990s concluded that the Yukon Flats area could support a herd of at least 2,000 wood bison (Berger *et al.* 1995). An assessment in 2006 of habitat in other areas of interior Alaska concluded that Minto Flats and the lower Innoko/Yukon River area could each support a population of at least 400 wood bison (Gardner 2007). These studies relied on helicopters to reach randomly selected meadows and sites where plant species and communities were identified, including both large (>200 acres) and small meadows in each area.

One of the criteria used to determine the suitability of potential reintroduction sites was their distance from plains bison populations. ADF&G and the Service are aware of the importance of preventing hybridization between wood bison and plains bison. There are two plains bison populations in the NEP area, including the Delta and Farewell herds. These herds occur from 110 to 190 miles away from the nearest potential release sites (110 miles in the case of Minto Flats and 140 miles in the case of the Yukon Flats). The lower Innoko/Yukon River wood bison habitat is about 190 miles west of the area used by the Farewell plains bison herd, and the landscape between the two areas consists mainly of forested and hilly terrain, with relatively little bison forage. It is unlikely that bison would cross this large expanse of forested habitat. Both GPS and conventional radio collars will be maintained in reintroduced herds, allowing movements to be monitored. Agency surveys for other wildlife populations, in addition to private and commercial air traffic, will also increase the chances of detecting wood bison movement across the area.

The Yukon Flats area offers the best habitat and can support a large herd of bison (Berger *et al.* 1995). The Minto Flats area offers abundant forage but the extent of suitable habitat is limited by the relatively small size of the area and extensive wet areas that could limit summer access by bison. The lower Innoko/Yukon River area offers abundant forage and may support a large wood bison population, depending on the extent to which access to summer and winter forage would be limited by spring flooding and winter snow (Gardner 2007).

The environmental characteristics and potential environmental effects are similar for all three potential release sites, except where differences are specifically noted. There is extensive empirical and some published information available for both plains and wood bison regarding interactions with many components of northern ecosystems. ADF&G has decades of experience with the Delta, Copper River, Chitina, and Farewell plains bison herds, and wood bison have occupied similar boreal forest ecosystems in Canada for thousands of years, with several recently reintroduced herds occupying the landscape for decades. No significant adverse ecological impacts due to the presence of bison of either subspecies have been documented, suggesting that adverse effects are not likely to occur as a result of wood bison restoration in Alaska.

Additional details regarding the environment and biological resources in the potential release areas are provided in the description of each area and analysis of environmental effects below. As noted previously, this EA is designed to evaluate the environmental effects of designating wood bison in Alaska as an NEP, but is not intended to establish priorities or reach decisions on the sequence of implementing wood bison restoration in specific areas.

4.1.1 Yukon Flats

The Yukon Flats site includes about 3,800 square miles of high-quality wood bison habitat, consisting of 63 percent Yukon Flats National Wildlife Refuge (YFNWR) lands, 32 percent

private, and 4 percent State-owned land (Table 1, Figure 4). The area encompasses a vast wetland basin lying in a level plain through which the Yukon and Porcupine Rivers and nine major tributaries flow. The climate in the upper Yukon valley is generally classified as Continental Subarctic, with temperatures ranging from up to 110 degrees F in summer to -60 degrees F or colder in winter. Snow accumulation rarely exceeds 30 inches. Excess spring runoff, ice jams on larger rivers, or heavy rains in surrounding uplands during summer result in occasional flooding of low-elevation areas adjacent to rivers. Although flooding is common, high water rarely persists for more than a few hours or days, or affects areas extensive enough to hinder bison movements (ADF&G 1994; Berger 1995).

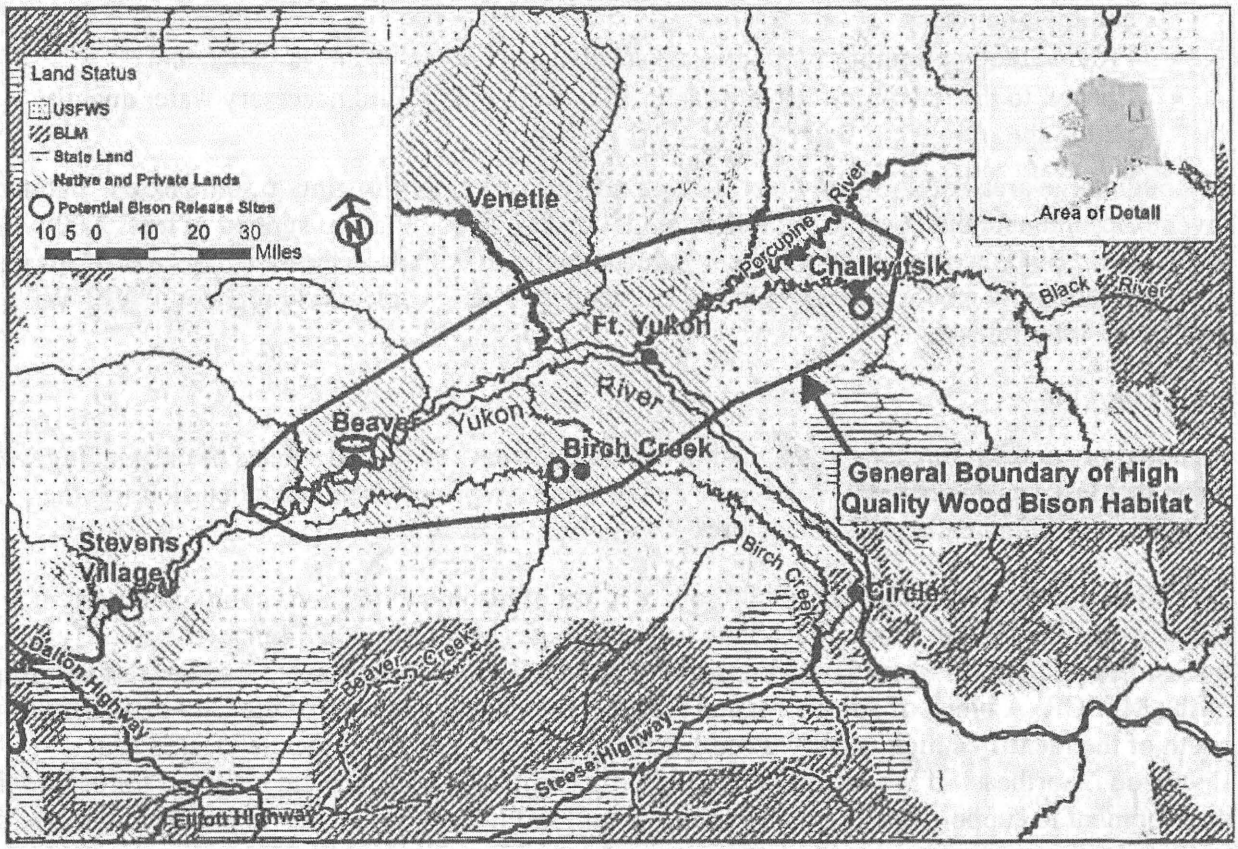

Figure 4. Land ownership in the Yukon Flats area and approximate area with high-quality wood bison habitat.

The Yukon Flats site lies near the northern edge of the boreal forest and is characterized by numerous thermokarst and oxbow lakes and diverse vegetation mosaics, including mixed spruce-poplar and spruce-hardwood forests, spruce muskeg, extensive successional and climax stands of willow and alder, and wet and dry meadows composed of sedges (*Carex* spp.), grasses, and a variety of forbs (ADF&G, 1994). Inventories of potential wood bison habitat indicate there are extensive areas of wet and dry meadows on the Yukon Flats that are suitable for year-round use by wood bison (Berger *et al.* 1995; C. Gates, unpublished data; ADF&G, unpublished data). Plant communities are similar to those in existing wood bison range in northern Canada, and include substantial amounts of preferred forage species. The characteristics of potential bison habitat on

the Yukon Flats compare favorably with the Slave River lowlands and Mackenzie Bison Sanctuary in Canada, where wood bison have existed for decades.

The purposes of the YFNWR, established in the Alaska National Interest Lands Conservation Act (ANILCA), are to:

- Conserve fish and wildlife populations and habitats in their natural diversity, including, but not limited to, canvasbacks and other migratory birds, Dall sheep, bears, moose, wolves, wolverines and other furbearers, caribou, and salmon;
- Fulfill international treaty obligations of the United States with respect to fish and wildlife and their habitats;
- Provide the opportunity for continued subsistence uses by local residents; and
- Ensure, to the maximum extent practicable, water quality and necessary water quantity within the refuge.

Although large areas of uniformly wet terrain may limit summer foraging to some extent, habitat inventories indicate that there is sufficient habitat on the Yukon Flats to support at least 2,000 wood bison. Bison would initially be reintroduced on private lands in the area, where airstrips and other infrastructure would reduce logistical challenges. Bison would likely roam onto YFNWR lands soon after release.

4.1.2 Minto Flats

As noted previously, this EA is designed to evaluate the environmental effects of designating wood bison in Alaska as an NEP, but is not intended to establish priorities or reach decisions on the sequence of implementing wood bison restoration in specific areas.

The Minto Flats site includes about 800 square miles of bison habitat, consisting of 86 percent State-owned land in the Minto Flats State Game Refuge (MFSGR), and 14 percent privately owned land (Table 1, Figure 5). Portions of the Tanana Valley State Forest lie to the east and south of the MFSGR. A block of Alaska Mental Health Trust lands[1] lies west of the City of Nenana and south of the identified high-quality wood bison habitat, and a second block is located near Livengood, northeast of the identified high-quality habitat. These lands are intended for economic development to support funding for Alaska Mental Health Trust programs. In addition, the block of State land identified by the Alaska Division of Agriculture (ADOA) for the conceptual Nenana-Totchaket Agricultural Project (NTAP) is located south of the MFSGR and west of Nenana. These potential resource development projects are described in more detail in section 4.4.

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[1] The Alaska Mental Health land trust was originally established by Federal legislation in 1956. The trust granted the State of Alaska the right to select one million acres of Federal land to provide a reliable source of funding for mental health services in Alaska. State legislation in 1994 established the Alaska Mental Health Trust Authority to create a comprehensive mental health program for Alaska. The Trust Land Office's mission is twofold: (1) to protect and enhance the long-term productivity of Alaska Mental Health Trust lands; and (2) to maximize long-term revenues from Trust lands. Revenues generated from Trust lands are used by the Alaska Mental Health Trust Authority to improve the lives and circumstances of Alaska Mental Health Trust beneficiaries. *See* http://www.mhtrustland.org/index.cfm?section=About&page=About-the-Trust

Minto Flats is less remote than the Yukon Flats or the lower Innoko/Yukon River, with road access from the Elliot Highway and Minto Road. The Parks Highway is located in the uplands east of Minto Flats. The Alaska Railroad also traverses the area near the base of the hills on the southeastern edge of the Minto Flats site. There is currently some agricultural development near the Parks Highway at the eastern edge of the Minto Flats site.

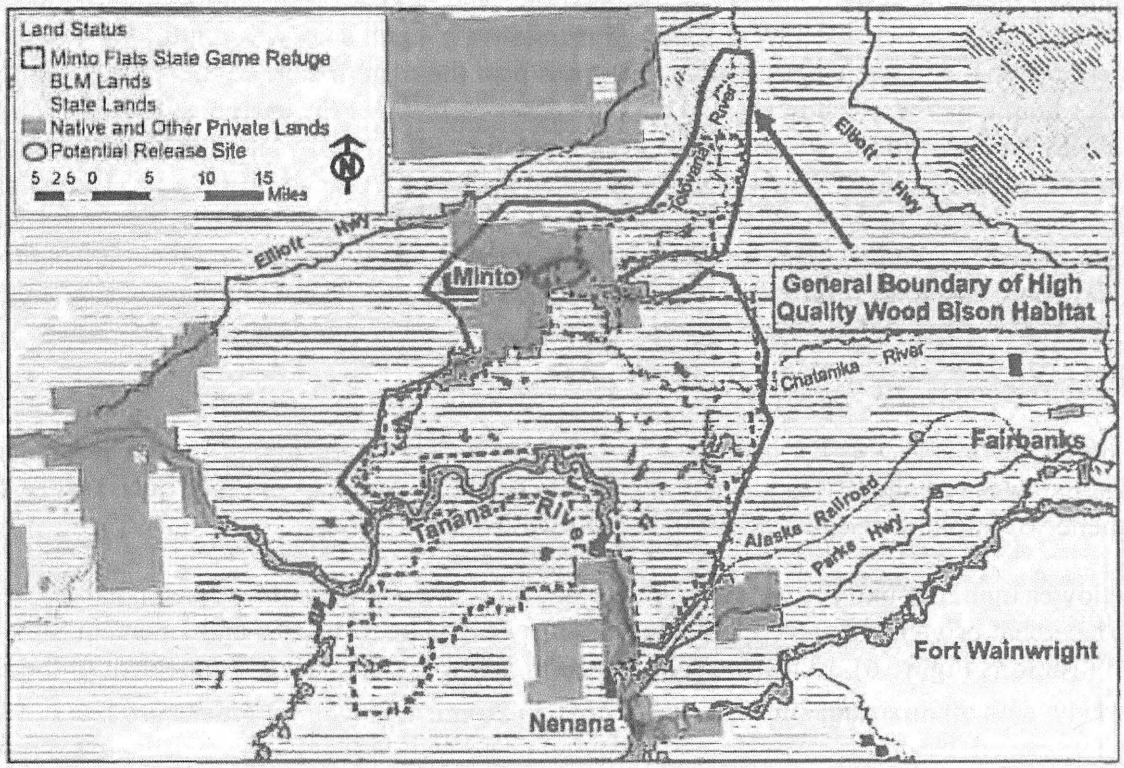

Figure 5. Land ownership in the Minto Flats area and approximate area with high-quality wood bison habitat.

The Minto Flats State Game Refuge was established to: (1) ensure protection and enhancement of habitat; (2) ensure the conservation of fish and wildlife; and (3) guarantee the continuation of hunting, fishing, trapping, and other uses by the public compatible with the protection and enhancement of habitat and conservation of fish and wildlife, pursuant to Alaska Statute 16.20.037(b). The statute also provides that:

> Entry upon the Minto Flats State Game Refuge for purposes of exploration and development of oil and gas resources shall be permitted unless a person demonstrates, on the basis of sound science or local traditional knowledge, that exploration and development is incompatible with the purposes specified in (b) of this section.

AS 16.20.037(h). The ADF&G Habitat Division oversees management of the MFSGR and has concluded that wood bison introduction on Minto Flats is a compatible use under the guidelines established in the Minto Flats State Game Refuge Management Plan (ADF&G 1992).

The Minto Flats area is categorized as an "open" wetland system because of the annual flow of new water into most water bodies into the area. The watershed includes numerous semi-permanent wetlands and eutrophic lakes and is drained by the Chatanika, Tolovana, and Tatalina rivers and Goldstream Creek. The area undergoes large fluctuations in water depth within and between seasons (Rowinski 1958; Petrula 1994; Walker 2004). The Minto Flats area supports an extensive graminoid meadow system interspersed with spruce and mixed forest, but its potential to support wood bison is somewhat limited because of its relatively small size, wet conditions throughout the eastern portion, and some agricultural operations near the eastern edge of the flats. Bison forage species dominate the meadow ground cover. Access by bison to the eastern side during summer would be limited, but the western and northern portions offer good year-round habitat. Snow depths or drifts would not likely limit wood bison access to forage during winter. The relatively wet eastern part of the Minto Flats would probably be used by wood bison primarily during winter (Gardner 2007). A Minto Flats wood bison population would be limited to about 500 animals, which would reduce the likelihood that bison would spend significant amounts of time outside low-elevation areas, where habitat and suitable forage is most abundant (ADF&G 2007).

4.1.3 Lower Innoko/Yukon River

As noted previously, this EA is designed to evaluate the environmental effects of designating wood bison in Alaska as an NEP, but is not intended to establish priorities or reach decisions on the sequence of implementing wood bison restoration in specific areas.

The lower Innoko/Yukon River site includes at least 1,348 square miles of bison habitat, consisting of 51 percent private, 48 percent Bureau of Land Management (BLM), and 1 percent State-owned land (Table 1, Figure 6). Extensive sedge-grass meadow systems cover 7.6 percent of the area

(Gardner 2007).

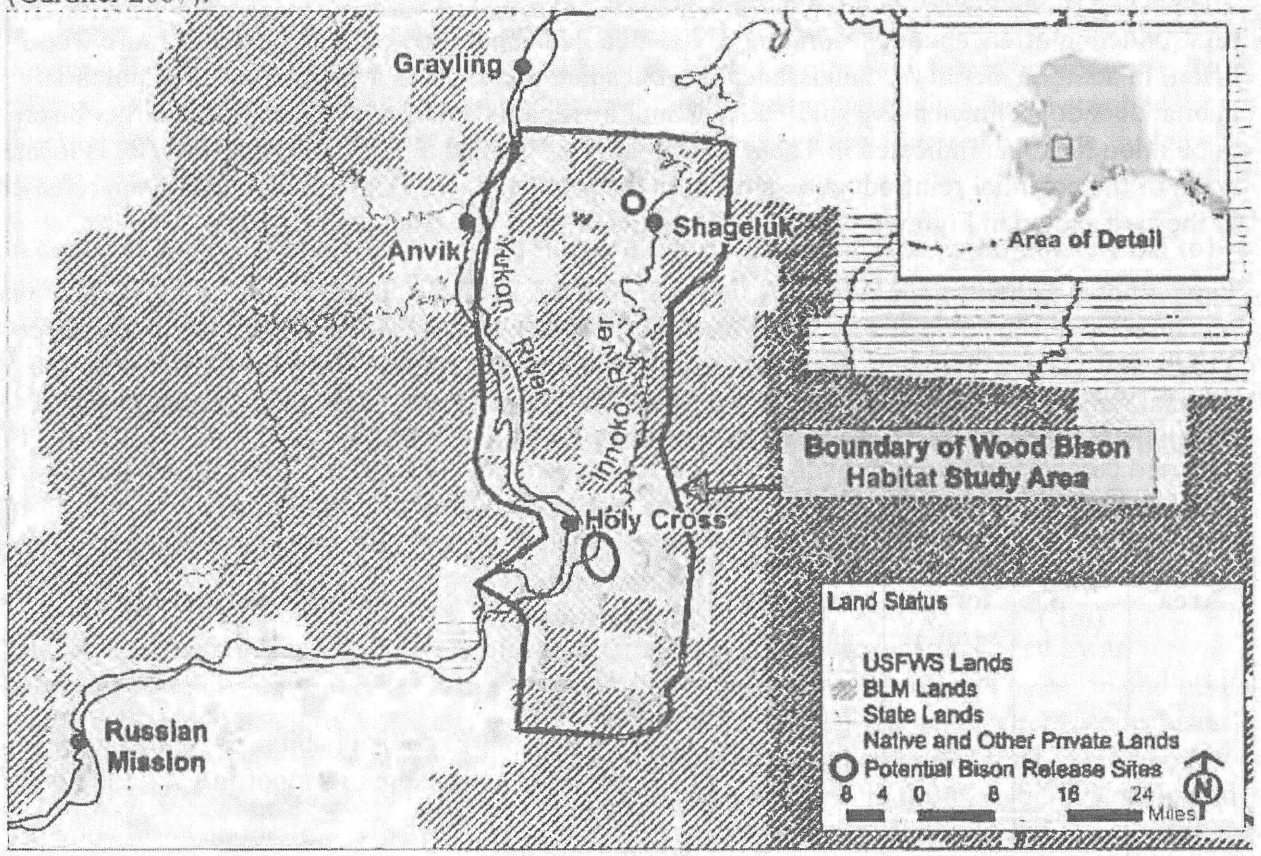

Figure 6. Land ownership in the lower Innoko/Yukon River area and approximate area where studies have identified high-quality wood bison habitat.

The lower Innoko valley is characterized by numerous lakes and semi-permanent wetlands and is drained by the Yukon and Innoko Rivers. Like the Minto Flats area, the lower Innoko/Yukon River area is primarily an "open" wetland system, and most water bodies are subject to changes in water levels and chemistry as a result of spring flooding in the Innoko and Yukon rivers. Spring flooding occurs annually and is most extensive in the lower Innoko drainage because of its topography and relatively low elevation.

Snow surveys conducted in this area by the Natural Resource Conservation Service (NRCS) recorded maximum snow depths of 36–44 inches at stations not influenced by wind. The 20-year average for these snow-measuring stations is 28–36 inches. Although average snowfall in the lower Innoko/Yukon River area is greater than that in most wood bison ranges in Canada, forage-rich, small- to medium-sized meadow systems with soft snow are common and well distributed throughout the area, and wind exposes forage in some meadow systems. These conditions should allow bison adequate access to forage. Short-term spring flooding can be extensive in parts of the area; however, it appears that meadow habitat would be available along the western side of the study area even during the worst flood years. During periods of high water, additional forage would be available in burned areas of various ages in the hills adjacent to the Innoko River and along the Yukon River.

The portion of the lower Innoko/Yukon River area investigated by ADF&G for wood bison reintroduction offers abundant forage and itself could support approximately 400 or more wood bison. In addition, aerial reconnaissance indicates that there is also a large expanse of potential habitat outside the intensively studied area, and the region could probably support a larger bison population than that indicated in Table 1. The Innoko National Wildlife Refuge (INWR) is located north of the potential reintroduction sites near Shageluk and Holy Cross, and wood bison released in the area shown in Figure 6 would likely spread onto INWR lands in the future.

The purposes established in ANILCA for the INWR are similar to those of the YFNWR. There is less direct historical evidence of wood bison in the lower Innoko/Yukon River than in the upper Yukon and Tanana drainages. However, available evidence suggests that this area is within the original range of wood bison (Stephenson, *et al.* 2001, C. Gerlach, UAF, pers. comm. 2010). A comparison of key habitat features of each area is provided in Table 1.

Table 1. Habitat comparison of potential wood bison restoration sites in Alaska.

Area	Size (mi^2)	Bison forage (mi^2)	Potential carrying capacity	Land status (approximate)	Habitat characteristics
Yukon Flats	3,800	156–239	>2,000	63 percent NWR 32 percent private 4 percent State	Excellent habitat, estimated to be capable of supporting at least 2,000 bison
Minto Flats	812	98	500 or slightly more	85 percent State 14 percent private	Good to excellent habitat. Small area in southeastern portion may not be accessible during spring/ summer. Carrying capacity limited to about 500.
Lower Innoko /Yukon River	1,348	50.2	400 or more	51 percent private 48 percent BLM 1 percent State	High forage biomass with good habitat potential. Spring flooding (during some years more than70 percent of available land can be flooded); deep snow at times. Carrying capacity estimated to be at least 400.

4.2 Physical and Biological Factors

4.2.1 Water Quality and Wetlands

Although grazing by high densities of cattle has been shown to cause erosion and have detrimental effects on streamside vegetation and aquatic systems (Belsky *et al.* 1999; Steinman *et al.* 2003), these effects are not known to occur at the relatively low densities that characterize northern free-ranging bison populations.

Detrimental effects of high densities of cattle have been most apparent in relatively arid areas in the western United States and Canada, where the number of ponds, lakes, and rivers is limited, and the use of aquatic systems and riparian areas by ungulates and other animals is concentrated in relatively small areas. Impacts on wetland invertebrates, riparian vegetation, and watershed function have been documented at stocking rates equivalent to a few hundred or more cattle per square mile (Belsky *et al.* 1999; Steinman *et al.* 2003).

In contrast, wood bison restoration in Alaska would result in densities of approximately 0.5 to1 bison per square mile of total habitat and a maximum of 10–12 bison per square mile of meadow habitat (ADF&G 2007). Densities of wood bison populations in Canada are approximately 5–7 bison per square mile of meadow habitat, in herds ranging from about 400 to 2,000 animals (Gardner and DeGange 2003). The effects of intensive grazing on aquatic systems can be mitigated by limiting cattle density, along with other management practices (Fitch and Adams 1998). Wood bison population sizes in Alaska would eventually be limited, mainly through regulated harvest, to levels outlined in cooperative management plans, and maximum population densities would be orders of magnitude lower than those at which grazing by cattle has caused negative effects on wetlands.

The areas being considered for wood bison restoration in Alaska are characterized by an abundance and diversity of lakes and rivers, which would tend to disperse use by bison and other wildlife. In contrast, sources of water are relatively limited in the Delta area, where plains bison have caused some stream sedimentation in a few high-use riparian areas (J. Durst, ADF&G Division of Habitat, pers. comm. 2006). This is less likely to occur in the areas being considered for wood bison restoration, where water sources are abundant and widespread and bison would be unlikely to concentrate near or use a small number of individual sources frequently.

One issue to consider is whether bison activity could cause hyper-eutrophy (nutrient overload) or increased water turbidity. The potential effects of wood bison on water quality can be projected based on evidence from other areas where bison inhabit wetlands. Relevant information is provided by studies in EINP, Alberta, where relatively high densities of bison and other ungulates inhabit an area with hundreds of lakes and ponds that are naturally eutrophic or hyper-eutrophic. Park biologists have seen no indication that bison have increased the level of eutrophy, noting that lakes outside EINP (i.e., not influenced by wood bison) are virtually identical in terms of their trophic status, and that eutrophication is a natural characteristic of lakes in the region. In addition, water quality in EINP was monitored for several years with no indication that fecal coliform levels are higher than normal, even in wetlands adjacent to bison holding facilities (G. Sargent, former Park Superintendent, pers. comm. 1993).

The widespread availability of water sources, combined with the relatively low densities of grazing ungulates, would minimize the potential for detrimental effects on water quality in the areas proposed for wood bison reintroductions. Any influence of bison on water quality would likely be overshadowed by the effects of drought, flooding, siltation, and beaver and waterfowl activity on the dynamic wetlands in the proposed release sites. The available information suggests that the effects of wood bison on water quality would be minor or nonexistent.

(a) U.S. Army Corps of Engineers, Section 404 Wetlands Permit Requirements

In 2005, the USACE indicated that the proposed project would not require a Clean Water Act section 404 wetlands permit, even for work conducted in wetlands (33 U.S.C. §1344). The project does not entail the use of mechanized land-clearing equipment and involves no permanent fill material in a navigable waterway or wetlands. Once a specific location for a temporary corral and other facilities has been selected and a construction method is chosen, ADF&G will consult with the USACE again to conduct a wetland jurisdictional determination for the site(s) and to determine whether a permit is needed.

4.2.2 Soil Quality

Wood bison would likely have localized beneficial effects on soil quality by increasing soil fertility and plant productivity in grazing and resting areas. Studies of the effects of grazing by plains bison show that bison positively affect nutrient cycling processes and patterns of nutrient availability, by increasing nitrogen availability and the amount and quality of plant litter returned to soils (Knapp *et al.* 1999). No significant adverse effects on soil quality are anticipated due to wood bison restoration.

4.2.3 Vegetation

Grasslands and grazing herbivores have coexisted and co-evolved for millions of years (Stebbins 1981; Owen and Wiegert 1981). Grazing animals typically move frequently, so grazing at any one site may be intense but does not last long. Key factors in the relation between grasslands and grazers include the large spatial and temporal variation in mineral-rich forage; the ability of defoliated grass and sedges to re-grow after grazing; and the migratory tendencies of bison and other grazers. In the absence of grazing, nutrient cycling is reduced.

The effects of bison and other large herbivores on vegetation and their relationships with plant communities have been evaluated in a number of studies (Reynolds *et al.* 1978; Reynolds and Hawley 1987; Larter and Gates 1990; Larter and Gates 1991; Smith 1990; Berger 1996; Frank *et al.* 1998; Knapp *et al.* 1999). These studies were reviewed by ADF&G (1994 and 2007) and by ADF&G and USFWS (Gardner and DeGange 2003). Reestablishing wood bison would restore natural processes, including more rapid nutrient cycling. Studies of grazing ecology show that ungulates can affect plant species composition, richness, diversity, productivity, and physiognomy of plant communities, and that effects are related to grazing intensity, frequency, and season.

In general, ungrazed areas tend to have low species richness and diversity, and overgrazed areas are species-poor and provide little forage value. Moderate grazing, however, results in increased species diversity, richness, and plant quality. Grazing by bison reduces dead biomass, and moderate grazing can increase productivity in many graminoid species, in part due to the reduced accumulation of dead material. Wood bison are adapted to boreal regions; they have a highly efficient digestive system and can forage on a variety of common grasses and sedges found in boreal meadows and early successional habitats, and are unlikely to have any detrimental effects on native vegetation.

One concern about impacts to vegetation communities is the possibility of introducing non-native (i.e., invasive) plant species into remote areas by feeding wood bison hay grown in other parts of Alaska. This concern can be mitigated by feeding bison only certified weed seed-free hay prior to

and after the animals are moved to temporary containment facilities at remote locations. The reintroduction plans include feeding certified weed-free hay prior to and after transport. In addition, the bison pastures at the Alaska Wildlife Conservation Center are regularly inspected for invasive plants and none have been found.

4.2.4 Fish

The fish fauna of the Yukon River drainage is described in detail by Mecklenberg *et al.* 2002, Vania *et al.* 2002, and Burr 2004; *see also* Table 2. Except for a few isolated lakes in the Tanana River system, all populations are wild; at present there is no enhancement of fish populations in the remainder of the drainage.

All five species of Pacific salmon (Chinook, coho, chum, sockeye, and pink) migrate annually into the Yukon River and its tributaries. Migratory and resident whitefish species include inconnu (sheefish), broad whitefish, humpback whitefish, least cisco, Bering cisco, and round whitefish. Resident species that are widely distributed in lakes and streams of the Yukon drainage include Arctic grayling, northern pike, Dolly Varden, burbot, longnosed sucker, and Alaska blackfish. Lake trout are present in many higher elevation lakes. Rainbow trout (*Oncorhynchus mykiss)* do not occur naturally in drainages north of the Gulkana and Kuskokwim Rivers.

Table 2. Fish species found in the proposed wood bison reintroduction area.

Common name(s)	Linnaean taxonomic name
Pacific salmon	
Chum salmon	*Oncorhynchus keta*
Coho salmon	*Oncorhynchus kisutch*
Chinook salmon	*Oncorhynchus tshawytscha*
Pink salmon	*Oncorhynchus gorbuscha*
Sockeye salmon	*Oncorhynchus nerka*
Alaska blackfish	*Dallia pectoralis*
Burbot	*Lota lota*
Chars	
Arctic char	*Salvelinus alpinus*
Dolly Varden	*Salvelinus malma*
Lake trout	*Salvelinus namaycush*
Arctic grayling	*Thymallus arcticus*
Northern pike	*Esox lucius*
Longnose sucker	*Catostomus catostomus*
Whitefishes	
Broad whitefish	*Coregonus nasus*
Least cisco	*Coregonus sardinella*
Humpback whitefish	*Coregonus pidschian*
Bering cisco	*Coregonus laurettae*
Round whitefish	*Prosopium cylindraceum*
Sheefish	*Stenodus leucichthys*

To our knowledge there are no studies of the potential effects on fisheries of bison in general, or wood bison in particular. Wood bison would have little direct effect on fish themselves, but could have indirect effects on fish populations by affecting aquatic systems. Although grazing by

extremely high densities of cattle has been shown to have detrimental effects on streamside vegetation and aquatic systems (Belsky *et al.* 1999; Steinman *et al.* 2003), these effects are unlikely to occur at the relatively low densities that characterize established northern free-ranging bison populations. Like other large mammals in the area, wood bison would periodically cross streams and rivers, and would probably spend brief periods foraging or drinking at the edges of lakes and ponds. Because bison are predicted to have minor effects on water quality, and minor or beneficial effects on vegetation (Smith 1990), however, there is little likelihood that they would have any detrimental effect on fish or fisheries.

4.2.5 Waterfowl

The Yukon Flats is one of the most productive waterfowl breeding areas in North America, producing approximately 1.6 million ducks, geese, and swans annually (USFWS 1987). Minto Flats and the lower Innoko/Yukon area also provide high-quality waterfowl nesting and staging habitat. Short-term spring floods sometimes occur in these areas, especially in the lower Innoko drainage because of its low elevation relative to the Yukon River. Floods can have a large effect on waterfowl production by reducing the amount of available nesting habitat. As in other waterfowl nesting areas in interior Alaska, water levels and predation appear to be the major factors determining waterfowl nesting success in the three areas being considered for wood bison reintroduction.

Table 3. Waterfowl species in interior Alaska.

Common name(s)	Linnaean taxonomic name
Ducks	
Mallard	*Anas platyrhynchos*
Northern pintail	*Anas acuta*
Northern shoveler	*Anas clypeata*
Gadwall	*Anas strepera*
Green-winged teal	*Anas crecca*
Blue-winged teal	*Anas discors*
Canvasback	*Aythya valisineria*
Scaup	*Aythya* spp.
Redhead	*Aythya americana*
Ring-necked duck	*Aythya collaris*
Common Goldeneyes	*Bucephala clangula*
Bufflehead	*Bucephala albeola*
Long-tailed duck (oldsquaw)	*Clangula hyemalis*
Scoter	*Melanitta* spp.
Ruddy duck	*Oxyura jamaicensis*
Mergansers	*Mergus* spp.
Geese	
Canada goose	*Branta canadensis*
White-fronted geese	*Anser* spp.
Loons	*Gavia* spp.
Swans	
Trumpeter swan	*Cygnus buccinator*

Although there have been no studies specifically addressing the effects of bison on waterfowl in the northern boreal forest, substantial relevant research from other areas and empirical data from present-day wood bison ranges indicate no significant adverse effects of bison on waterfowl populations in EINP, Alberta, or in the Mackenzie Bison Sanctuary or Mills Lake area in the Northwest Territories (ADF&G 1994). For interior Alaska, the potential effects of wood bison and other large ungulates on waterfowl were reviewed by Gardner and DeGange (2003) and ADF&G (1994 and 2007). These assessments were based on: (1) a review of major studies of the effects of grazing ungulates (primarily plains bison or cattle) on waterfowl nesting success, nesting vegetation, and nutrient cycling; (2) consultation with wildlife biologists familiar with the ecology of waterfowl and bison where these animals presently coexist; and (3) the density and patterns of habitat use that would likely characterize a wood bison population on any of the three reintroduction sites.

Some concerns were also expressed about bison activity in the Innoko area, which provides molting and staging habitat for non-breeding and failed-breeding white-fronted geese. During the molting period (from approximately late June to mid-August), geese feed primarily on sedges and spike-rushes along the muddy edges of drawdown lakes and river beds, although they also make some use of adjacent areas containing *Calamagrostis* and dwarf willows. The potential for damage to this habitat by bison activity is limited, however, because these muddy "grazing lawns" are distant (about 20 miles upriver) from the potential reintroduction site near Shageluk, and are not preferred bison habitat. Therefore, any bison use of these areas is expected to be minimal.

As explained in detail below for the Yukon Flats, there is no evidence that the expected low densities of reintroduced bison would have significant negative impacts on waterfowl. Similarly, for the Innoko area, there is no evidence that bison activity would be detrimental to white-fronted geese. The muddy, low-biomass grazing lawns would not attract bison during summer, when high-quality forage in drier habitats is abundant. In addition, the Innoko area is not a major breeding or nesting area for white-fronted geese (Kovach et al. 2010). Moreover, if any detrimental effects to goose habitat from bison use develop in the future, the section 10(j) and 4(d) rules provide sufficient management flexibility for the State to authorize reduction or removal of segments of the bison population by public hunting or other means.

Mark Lindberg, an Associate Professor of Wildlife Biology at UAF who specializes in waterfowl biology, indicated that although wood bison might have some direct effects on nest survival through trampling or disturbance, these would probably be localized and minimal and would not have negative effects on overall waterfowl population levels (M. Lindberg, presentation to Wood Bison Restoration Advisory Committee, June 2005). Lindberg speculated that long-term, indirect negative effects could include the creation of travel corridors that could be used by predators and a reduction in the height of nesting cover by intensive grazing. However, he noted that grazing by bison could also have a long-term beneficial effect by maintaining and increasing the extent and quality of meadow habitat adjacent to water bodies, which is important nesting habitat for waterfowl. Bison grazing could help reverse encroachment by trees and shrubs while increasing nitrogen input and nutrient cycling in general. Nitrogen input aids plant productivity and growth.

Lindberg cited studies showing that small mammal population cycles and their effects on predator numbers have a strong influence on waterfowl nesting success, as do annual fluctuations in water levels. High water levels reduce the amount of nesting habitat available. Nest survival rates on the Minto Flats ranged from near zero to 40 percent based on surveys in seven years between 1989 and 2003, demonstrating that substantial variability in nesting success occurs under current conditions. Additional relevant analysis is provided in Gardner and DeGange (2003); pertinent sections are included below:

> There are numerous studies assessing the effects of cattle grazing on waterfowl (examples include Kirsch 1969; Mundinger 1976; Kantrud 1986; Gilbert *et al.* 1996) but none on bison and none in taiga wet meadows. Cattle grazing has been used as a tool to manage and improve waterfowl nesting habitat in some areas, but its usefulness has been questioned (Kirsch 1969; Gilbert *et al.* 1996; Mundinger 1976), and Gilbert *et al.* (1996) reported that even light grazing (evaluated grazing densities were 43–320 cattle per square mile) by cattle was detrimental to ducks. However, it is difficult to infer much about the effects of bison grazing on waterfowl from cattle grazing because the grazing behavior of cattle differs from that of bison, and the cattle grazing intensities that have been evaluated are much higher than those that would be associated with a free-ranging bison population.
>
> Based on range use patterns of wood bison populations in Canada, densities approximate five to seven bison per square mile of meadow habitat. The densities of cattle at which some negative effects of grazing have been documented range from approximately 43–320 cattle per square mile or more (Kirsch 1969; Mundinger 1976; Gilbert *et al.* 1996). Grazing during winter by cattle at densities ranging from approximately 116–320 per square mile was found to reduce nesting habitat (Mundinger 1976) and nest density (Gilbert *et al.* 1996). Wood bison select for wet meadows during winter (Gates and Larter 1990) where probably most waterfowl nesting occurs on the Yukon Flats. Based on the regression models presented by Gilbert *et al.* (1996), and assuming wood bison population densities as described above, the effect of wood bison grazing on nesting density and success should approximate that in an ungrazed system. S. DuBois, ADF&G Delta Area Biologist, (pers. comm. 2005) reports that extensive grazing by the Delta bison herd in preferred habitats during winter does not appear to affect the height or density of vegetation during the following summer.
>
> Bison select different habitats during the year (Gates and Larter 1990; Larter and Gates 1991). Intensive grazing during nesting is more likely to hinder waterfowl production than grazing at other times of year (Glover 1956; Mundinger 1976). However, wood bison avoid wet meadows, the primary waterfowl nesting habitat (M. Lindberg, UAF, pers. comm. 2003), during spring and summer (Larter and Gates 1991). This would tend to minimize nest disturbance and other potential effects of grazing. Bison are also unlikely to occur on nesting islands during this period. Wood bison select dry meadows during the spring and summer. Waterfowl nesting occurs less frequently in these habitats, but they are still important for several species (D. Groves, pers. comm. 2003). Larter and Gates (1994) observed no difference in the standing crop of vegetation in grazed and ungrazed dry meadows in an area supporting a herd of about 550 bison.

Bison generally graze in a given area for short periods (Reynolds *et al.* 1978) and differ from cattle in that they allocate less time to grazing during a set period (Peden 1976), select primarily for annual growth, and spend less time in an area before moving (Hein and Preston 1998). Because of these behavioral differences, the effect of bison on habitats will be different than that of cattle. Gilbert *et al.* (1996) suggest that grazing by native herbivores such as bison may provide a more suitable way to manage waterfowl habitat where some vegetation removal is necessary.

Although the effects of grazing by bison on waterfowl have not been studied in detail, there are relevant case studies. Elk Island National Park (75.5 square miles) includes boreal and aspen parkland habitat that supports approximately 227 bird species, including 50 wetland species (Burns and Cool 1986). Ungulate density is about 40 per square mile, with bison densities of 10–12 per square mile relative to the total park area, and more than 30 bison per square mile in grassland, sedge meadow, and shrub habitats (Blyth and Hudson 1987; Blyth *et al.* 1993). The number of lesser scaup, bufflehead, ring-necked ducks, blue-winged teal, gadwall, mallard, American widgeon and red-necked grebes (*Podiceps grisegena)* that use the park during spring and fall migrations is in the tens of thousands (Burns and Cool 1986). American widgeon, lesser scaup, buffleheads, ruddy duck, common goldeneye, blue and green-winged teal, and mallards are common nesters in the park, using wet and dry meadows and tree cavities as nest sites (Burns and Cool 1986). Waterfowl have been inventoried in the park since the early 1900s with more intensive data collected since the 1930s. No management problems or concerns were reported for any of the waterfowl species due to competition with large mammals (Burns and Cool 1986). In the opinion of park biologists, the presence of bison has a beneficial effect on waterfowl populations by maintaining or increasing productivity and diversity of meadow vegetation (12/15/93 letter from EINP Manager Gary Sargent, in Appendix B of ADF&G 1994).

The status of bison and waterfowl in the Mackenzie Bison Sanctuary and Wood Buffalo Park also suggest a lack of any negative effect of bison on waterfowl. Both areas support substantial populations of waterfowl similar in species composition to the Yukon Flats. Biologists familiar with the ecology of these areas see no evidence of adverse effects (12/15/93 letter from EINP Manager Gary Sargent, in Appendix B of ADF&G 1994). There is also no indication of adverse effects of wood bison on waterfowl populations in the Mills Lake area near Fort Providence, NWT. Surveys show Mills Lake has continued to be an important pre-migratory and migratory staging area for large numbers of tundra swans (*Cygnus columbianus*), snow geese (*Chen caerulescens*), and lesser and greater white-fronted geese, as well as large numbers of ducks during the past 25 years. Wood bison have used the wetlands surrounding Mills Lake on a regular basis, especially in years when water level in the Mackenzie River recedes enough to allow access to sedge meadows (P. Latour, Canadian Wildlife Service, pers. comm. 2002). Based on his experience conducting aerial waterfowl surveys in Wood Buffalo National Park for over 20 years, USFWS biologist C. Ferguson (pers. comm. 2002) could see no reason to anticipate negative effects of bison on waterfowl, noting that waterfowl populations are known to be affected by numerous other factors that are far more important.

The available information indicates that wood bison would have no effect, or would have minor beneficial effects, on waterfowl at the wood bison restoration sites being considered.

4.2.6 Small Mammals and Birds

A wide variety of small mammals and birds occur in the Yukon Flats, Minto Flats, and lower Innoko/Yukon River areas, as shown in Table 4. Regarding small mammals, there are few studies focusing on the ecological relationship between large ungulates and small mammals such as microtine rodents, ground squirrels, beavers, and snowshoe hares. However, these species occur in EINP (Blyth and Hudson 1987; Blyth *et al.* 1993), in Wood Buffalo National Park, and in the Mackenzie Bison Sanctuary at population levels typical of northern environments. An increase in habitat diversity and productivity could potentially benefit small mammals such as microtine rodents. The effects of wood bison on small mammals should be minor and could be somewhat beneficial.

Table 4. Small mammal and bird species found in proposed wood bison reintroduction areas (mammals from MacDonald and Cook 2002).

Common name(s)	Linnaean taxonomic name
Small mammals	
Voles	
Tundra	*Microtus oeconomus*
Taiga (yellow-cheeked)	*Microtus xanthognathus*
Meadow	*Microtus pennsylvanicus*
Red-backed	*Myodes rutilus*
Meadow jumping mouse	*Zapus hudsonicus*
Brown lemming	*Lemmus trimucronatus*
Arctic ground squirrel	*Spermophilus parryii*
Red squirrel	*Tamiasciurus hudsonicus*
Porcupine	*Erethizon dorsatum*
Snowshoe hare	*Lepus americanus*
Shrews	*Sorex* spp.
Birds	
Thrushes	Turdidae
Warblers	Parulidae
Sparrows, juncos, longspurs, and snow buntings	Emberizidae
Swallows	Hirundinidae
Chickadees	Paridae
Crossbills, grosbeaks, redpolls, and other finches	Fringillidae
Jays, magpies, and ravens	Corvidae
Gulls, terns, and jaegers	Laridae
Shorebirds	Scolopacidae

Small bird species present in the reintroduction area are typical of interior Alaska. A study of effects of ungulate grazing on upland birds in a 231,600 square-mile area on the Great Plains, including a review of 241 related scientific articles, showed that light to moderate grazing increased species richness for 19 upland bird species (Kantrud and Kologiski 1982). Other studies

show various effects ranging from no change or increases in bird density with increased grazing intensity, to declines in density and richness with heavy grazing. Population levels of 227 bird species recorded in EINP have remained stable, indicating that healthy upland bird populations persist even in the presence of relatively high densities of bison and other ungulates (Blyth and Hudson 1987; Blyth *et al.* 1993). Based on these studies of the relationship between grazing and upland bird numbers and species diversity elsewhere in North America, it is likely that wood bison would have a neutral or beneficial effect on upland birds.

4.2.7 Raptors

Although the effect of grazing on ground-nesting raptors such as short-eared owls (*Asio flammeus*) and northern harriers (*Circus cyaneus*) in boreal environments has not been specifically evaluated, studies in other habitats indicate that grazing can have both positive and negative effects on these raptors, depending on grazing intensity and timing. Intensive livestock grazing can have negative effects on nesting success and prey availability, while moderate and periodic grazing can be beneficial by maintaining open habitats and increasing populations of small mammal prey (Kantrud and Kologiski 1982; Kochert *et al.* 1988; Dechant *et al.* 2003; Wiggins 2004; Slater and Rock 2005). Periodic grazing by relatively low-density wood bison populations would likely have little negative effect on ground-nesting raptors, and may be beneficial in the long term.

4.2.8 Moose

Potential effects of reintroduced wood bison on moose *(Alces americanus)* populations were reviewed by ADF&G (1994) and Gardner and DeGange (2003), including the potential for food competition and effects on moose numbers due to changes in predator populations. The three proposed wood bison release areas support a wide range of moose densities. Moose population density on the Yukon Flats is relatively low at about 1 moose per 3–4 square miles (Stephenson 2002). Moose are relatively abundant in the Minto Flats area, with a population density of about 2–4 moose per square mile. The lower Innoko/Yukon River area also supports a relatively healthy moose population of about 1 moose per square mile. The potential effects of reintroduced wood bison on moose numbers via effects on predator numbers are discussed in section 4.2.10.

There is generally little competition for food between moose and bison. Wood bison are primarily grazers, consuming mainly sedges and grasses, while moose are primarily browsers, relying on willow, birch, and aspen. Most dietary overlap between moose and bison occurs during late spring and early summer, when forage quality and quantity is highest and competition between species would be lowest. Blyth and Hudson (1987) found little overlap in the food of wood bison and moose despite relatively high overlap in habitat use in EINP. The available information indicates that wood bison might have minor impacts on moose forage availability, and that this would be more likely where moose densities are extremely high. There is evidence, however, that bison and moose can coexist at high densities. Examples include the Delta and Farewell areas in Alaska and EINP, where moose populations in excess of 1 moose per square mile have coexisted with plains bison populations for decades (Blyth and Hudson 1987; DuBois and Stephenson 1998; Whitman and Stephenson 1998).

Wood bison could also have beneficial effects on moose populations by providing an alternative big game resource that could result in reduced harvest pressure on moose. In Yukon, Canada, most wood bison harvest takes place in winter, providing a source of meat and reducing demand for harvest of moose at a time when more cow moose are often taken. (T. Jung, presentation to Wood

Bison Restoration Advisory Committee, June 2005). Harvesting fewer cows can help maintain the reproductive potential of the moose population.

4.2.9 Caribou and Dall Sheep

Wood bison and caribou (*Rangifer tarandus*) have different dietary preferences. Caribou use a broad range of plants including forbs, twigs and leaves of shrubs, lichens, fungi, sedges and grasses (Miller 1982; Fischer and Gates 2005), whereas wood bison have a strong preference for graminoid plants during most of the year. Wood bison and caribou seem to be behaviorally compatible, and can be found in the same general geographic areas, although their ranges often do not overlap (Fischer and Gates 2005).

Dall sheep (*Ovis dalli*) occur south of the Yukon Flats in the White Mountains, with the nearest sheep populations located about 20 miles from the nearest wood bison habitat. Bison would be unlikely to occur in this area unless the bison population increased to an extremely high level, which might cause some bison to disperse from low-elevation meadow systems. Even if that were to occur, however, bison and Dall sheep exist in close proximity in some areas, including the Farewell area in Alaska and in the southern Yukon, without negative effects (T. Boudreau, former ADF&G Area Biologist, and M. Oakley, Yukon Department of Environment, pers. comm. 2005). Neither caribou nor Dall sheep normally occur in the Minto Flats or the lower Innoko/Yukon River areas. Reintroduction of wood bison is unlikely to have any effect on caribou or Dall sheep populations.

4.2.10 Predator-Prey Interactions

The relationship between wood bison and predators—primarily bears and wolves—has been reviewed by Oosenbrug and Carbyn (1985), Van Camp and Calef (1987), Carbyn and Trottier (1988), Larter *et al.* (1994), and Gardner and DeGange (2003). Predation on bison by black bears (*Ursus americanus*) or grizzly bears (*Ursus arctos*) has rarely been documented and does not appear to be a significant source of mortality for any bison herd, regardless of size.

Wolves (*Canis lupus*) can be an important predator on bison, especially on calves, although disease-free wood bison are not a preferred prey for wolves (Oosenbrug and Carbyn 1985; Van Camp and Calef 1987; Carbyn and Trottier 1988; Larter *et al.* 1994). No studies have demonstrated that wolf numbers or wolf predation on moose increased following the reestablishment of bison in northern habitats (N. Larter, pers. comm. 2006). Thus, there is no indication that reintroduced bison would provide a substantial additional source of prey for wolves, leading to increased wolf populations and associated increased predation on moose.

Wolf predation on wood bison has been almost nonexistent during the 25 years following their release in the Nisling River valley in Yukon: only two cases of wolf predation have been documented, both of which occurred in the last few years. There are currently over 1,000 bison in this herd (T. Jung, Yukon Department of Environment, pers. comm. 2011). Similarly, wolf predation was not detected during the first 19 years in the Mackenzie Bison Sanctuary (Gates and Larter 1990). These herds increased by at least 15 percent annually during these years, further suggesting low levels of predation.

Plains bison were introduced to the Delta Junction area, Alaska, in 1928, and were subsequently transplanted to the Copper River in 1950, the Chitina River in 1962, and the Farewell burn area

near McGrath in 1965 and 1968 (ADF&G 2007). There has been no direct evidence of predation on the Delta bison herd since it was established (S. Dubois, ADF&G Delta Area Biologist, pers. comm. 2007), and predation is not considered a significant mortality factor for the Copper River, Chitina, or Farewell herds.

Few wolf kills have been documented in the over 40-year history of the Farewell plains bison herd, which has numbered as high as 350 animals (Whitman and Stephenson 1998; Boudreau 2002). Predation by wolves, grizzly bears, or both was first documented in the Farewell herd in the early 1990s, almost thirty years after bison were introduced. From the estimated population high of 350 in the late 1990s, surveys indicate that the Farewell population had decreased to approximately 225 bison by 2009. Possible contributing factors include harvest of cow bison and declines in habitat quality. Following a reduction in the number of harvest permits offered, along with improved habitat quality resulting from a recent fire in the area, surveys indicate that the herd has increased to approximately 250 bison as of 2012. The degree to which wolf predation may have affected herd growth is unknown (Peirce and Seavoy, 2010). Existing studies indicate that there is little interaction between wolves and wood bison when bison numbers are below about 500 (Gates *et al.* 2001; Boudreau 2002; DuBois 2002) and are not limited by habitat (Gates and Larter 1990). The history of the Yukon herd indicates that wolf predation can be rare even when wood bison numbers exceed 1,000.

Based on the above review of information, predation by bears or wolves is not likely to have a significant effect on wood bison herds at the population sizes envisioned for the three potential reintroduction locations. The presence of wood bison on the Yukon Flats, Minto Flats, or in the lower Innoko/Yukon River area is unlikely to cause significant changes in bear or wolf numbers or predation rates on moose.

4.2.11 Furbearers

The Yukon Flats, Minto Flats, and lower Innoko/Yukon River area support populations of a variety of furbearers (Table 5). Wood bison coexist with these species without detrimental effects in other locations. Where bison are abundant, the remains of bison killed by predators or dying of other causes are a source of food for small predators and scavengers such as wolverines, foxes, and ermine. The reintroduction of wood bison is not likely to have any detrimental effects on furbearer populations in the proposed NEP area.

Table 5. Furbearer[2] species found in the proposed wood bison reintroduction area.

Common name(s)	Linnaean taxonomic name
Lynx	*Lynx canadensis*
Red fox	*Vulpes vulpes*
Wolverine	*Gulo gulo*
River otter	*Lontra canadensis*
Marten	*Martes spp.*
Mink	*Neovison vison*
Beaver	*Castor canadensis*
Muskrat	*Ondatra zibethicus*

4.2.12 Wildlife Disease

The diseases of greatest concern in wood bison conservation are bovine tuberculosis (TB) (*Mycobacterium bovis*), bovine brucellosis (*Brucella abortus*), and anthrax (*Bacillus anthracis*) (Gates *et al.* 2001). There are no known cases of bovine TB or brucellosis in Alaska wildlife or livestock, and serologic and empirical evidence indicates that neither of these diseases is present in Alaska. There are also no records of anthrax in Alaska. Johne's disease (*Mycobacterium avium paratuberculosis*) exists in some areas of Alaska where livestock are present (R. Gerlach, Alaska State Veterinarian, unpublished data), but the proposed wood bison reintroduction sites are not in close proximity to those areas.

The EINP wood bison herd has a long history of being free of TB, brucellosis, and other diseases of concern. The USDA completed a detailed Risk Assessment in 2008 prior to granting ADF&G a permit to import wood bison from EINP. The Risk Assessment concluded that the risk of these diseases being present in wood bison imported from EINP was less than .01 percent (USDA 2008). Disease testing and health certification requirements established by the State of Alaska, USDA, and Canadian Food Inspection Agency were met prior to the import of wood bison in 2008, and there were no results indicating the presence of any diseases of concern

The wood bison imported in 2008, as well as the stock transferred to AWCC in 2003, have undergone additional disease testing based on a protocol defined in a cooperative agreement between the State veterinarian and ADF&G. By March 2010, ADF&G had completed three wood bison handling and disease-testing operations in cooperation with the State veterinarian and AWCC. The USDA Northwest Area Epidemiologist provided test results in March 2010 documenting that the AWCC wood bison herd is free of TB. In addition, multiple brucellosis tests conducted during the three handling operations showed that the herd is also free of this disease. These results are consistent with the USDA risk assessment and the history of the EINP herd.

While not considered significant diseases of concern, tests have shown the presence of *Ostertagia* round worms and *Coccidia* bacteria in the AWCC wood bison herd. These parasites are endemic in

[2] The use of "furbearer" in this document is consistent with the State of Alaska Trapping Regulations, http://www.adfg.alaska.gov/static/regulations/wildliferegulations/pdfs/trapping.pdf. On page 16 of those regulations, a "furbearer" is defined as a "classification of animals subject to taking with a trapping license."

many bison herds, and are sometimes a problem in herds confined in relatively small areas, but not in free-ranging populations. An aggressive anti-parasite program is being used to control or eliminate *Ostertagia* round worms and other parasites in the wood bison at AWCC.

There is little reason to expect that wood bison might contract a pathogenic disease endemic to Alaska wildlife (ADF&G 1994; Gardner and DeGange 2003). A form of porcine brucellosis (*Brucella suis* biovar IV) is serologically evident in various caribou herds and sometimes in other ungulates in Alaska (Zarnke 1991). However, this disease does not appear to be pathogenic in bison, and is not a disease risk (Bevins *et al.* 1996).

Neither caribou nor reindeer frequent the areas being considered for bison reintroductions. Caribou calving areas are separated from bison by habitat type (high alpine not preferred by bison) and distance (at least 100 miles) in interior Alaska. The possibility that bison could physically contact caribou birth products and contract any form of brucellosis is extremely small. Because of behavioral barriers to physical contact between these species the chance that other diseases could be spread through contact at any time of year is also small. Furthermore, the caribou herd closest to the first proposed release site is serum negative for *B. suis* biovar IV.

More recently there has been a concern about the existence of a different form of *B. suis* in feral swine populations in 38 of the contiguous 48 United States (Wyckoff *et al.* 2009). These populations are infected with *B. suis* biovar I, which is very different than the *B. suis* biovar IV found in some wildlife populations in Alaska. Scientific research has shown that *B. suis* biovar IV cannot infect cattle or bison, but *B. suis* biovar I can. The prevalence of *B. suis* biovar I in infected feral swine does pose a risk to bison and cattle. However, there are no known feral swine in Alaska.

While it is currently difficult to distinguish *B. suis* from *B. abortus* with serological testing (testing blood for antibodies to the disease), it is easy to distinguish the two organisms by culturing the bacteria in a laboratory. In surveillance conducted over the past several decades, *B. suis* biovar IV has been cultured from tissues of caribou and reindeer in Alaska, but according to State records on file, neither *B. abortus* nor *B. suis* biovar I has been cultured from any animal in Alaska. Disease surveillance in the area proposed for bison reintroductions has not found serologic reactions to any *Brucella* species (R. Gerlach, Alaska State Veterinarian, pers. comm. 2013).

The procedures used during the last several decades at EINP and elsewhere have provided disease-free stock for several wood bison reintroductions in Canada, as well as several disease-free plains bison herds in Canada and the U.S. during the last several decades. Cattle diseases still occur in the Wood Buffalo and Yellowstone National Park herds because diseased bison were introduced in these areas decades ago. No effort was made to test for and eliminate diseased animals in the 1920s, when a large number of plains bison were introduced to Wood Buffalo National Park, or when diseased bison were introduced into the Yellowstone area early in the effort to rebuild the herd about a century ago. There was relatively little awareness of these diseases and little or no availability of accurate tests at the time.

In summary, there are no wild or domestic animal populations that are infected with bovine brucellosis (*B. abortus*) or tuberculosis (*M. bovis*) in Alaska, which became a certified *B. abortus*-free state in 1984 and a certified *M. bovis* free state in 1986. Due to the extensive testing

and quarantine in Canada and at AWCC there is virtually no possibility that reintroduced wood bison populations could infect other animals.

The wood bison herd at AWCC is derived from EINP stock that has been determined to be disease-free by the Canadian Food Inspection Agency and by the USDA (USDA 2008), based on over 40 years of testing.[3] The AWCC herd was then subjected to a 2-year quarantine and disease-testing program in Alaska. The herd has been tested multiple times with various tests for bovine TB and brucellosis as well as other diseases. The herd has been certified as disease-free by the Alaska State Veterinarian, the USDA Regional Veterinarian, and ADF&G's Wildlife Veterinarian. Therefore, the Service and ADF&G conclude that additional disease testing of wood bison at each site prior to release is unnecessary. In addition, returning bison to a fenced location for handling at periodic intervals is not feasible in the remote areas proposed for release. The only access to these areas is by small aircraft or boat, and bison are likely to be 10–30 miles away from any holding and testing facility, separated by creeks, rivers, lakes and dense forest.

After release, however, wood bison would be incorporated into ADF&G's ongoing disease surveillance and testing program employed for other big game species in Alaska. In this program, samples from live-captured animals (immobilized via helicopter) and hunter kills are tested for a range of diseases on an ongoing basis.

The disease-testing protocol that has been applied in the Alaska wood bison restoration project is even more comprehensive than the thorough health certification approach that has been used in connection with the establishment of six wild and several captive disease-free wood bison herds in Canada, which itself has been shown to be very effective. With this intensive disease-testing program and other precautions being applied, the proposed action presents a negligible risk of introducing disease to Alaska wildlife or domestic livestock.

4.2.13 Federally listed threatened and endangered plant and animal species

There are no federally listed threatened or endangered species of plants or animals in the areas being considered for wood bison reintroduction.

4.2.14 Effects of Climate Change

Bison are adapted to a wide range of climates: their original distribution included much of North America and Eurasia, in habitats ranging from the arid southwest to temperate woodlands, prairies, mountains, and the boreal forest (Guthrie 1990; Stephenson *et al.* 2001). Some climate models indicate that interior Alaska is experiencing a warming and drying trend, which is expected to continue (Chapin *et al.* 2003). This trend may slow the growth and reduce the distribution of forests (particularly coniferous plants), increase the occurrence of wildland fires, and favor the expansion of grasslands. The three potential release sites in interior Alaska currently support substantial areas with high-quality habitat for wood bison, but climate change may increase the amount of available habitat over the long term. As parts of the Arctic become drier and/or warmer,

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[3] The USDA risk assessment can be found at http://www.aphis.usda.gov/animal_health/animal_diseases/downloads/elkisland_ra.pdf.

the area burned by forest fires is likely to increase (Chapin *et al.* 2003). These trends should have a beneficial effect on wood bison habitat by increasing the amount of forage available to grazing herbivores, such as wood bison, which are well adapted to northern grassland environments. Wood bison restoration could help offset possible future declines in other northern mammals such as moose and caribou, because wood bison populations would help maintain grassland habitats, and would maintain or enhance subsistence economies in the north (F.S. Chapin III, presentation to Wood Bison Restoration Advisory Committee, June 2005).

4.3 Land and Wildlife Uses

4.3.1. National Wildlife Refuge System Lands

The Yukon Flats and Innoko National Wildlife Refuges (NWRs) include areas that contain good- to excellent-quality habitat for wood bison. In addition, portions of the Arctic, Kanuti, Tetlin, Koyukuk, Nowitna, Yukon Delta, and Togiak NWRs are located within the proposed NEP Area. The release of bison onto Refuge lands in Alaska is subject to the regulations and policies that govern the NWR system.

Generally, Refuge policy states that the Service will not introduce a species unless we determine that the species was present in the area under historic conditions. While Service policies (FWS Administrative Manual, 601 FW 3) encourage the reintroduction of extirpated native species, the Manual also specifically directs us to "not introduce species on refuges outside their historic range or introduce species if we determine that they were naturally extirpated, unless such introduction is essential for the survival of a species and prescribed in an endangered species recovery plan . . . ." This determination for specific areas is beyond the scope of this EA and would have to be made for any Refuge being considered as a release site for bison. Release sites on non-Federal lands within Refuge boundaries are not subject to these determinations. The Service has worked diligently to assist ADF&G with wood bison reintroduction efforts, and the success of this project has been a priority for the Service. We recognize that the reintroduction presents a good opportunity to support effective conservation of wood bison.

4.3.2 Recreational Use

As described above, common activities on existing wood bison ranges include hunting, trapping, woodcutting, berry picking, fishing, camping, hiking and other forms of recreation and resource use. The EINP, for example, is used by thousands of visitors each year who camp, hike, and picnic in an area where they routinely encounter wood bison and other ungulates (Blyth *et al.* 1993; Olson 2005). Wood bison generally avoid people, but should be treated with the same respect as other large animals. We do not expect wood bison restoration to reduce opportunities for recreational use. Their restoration will generally enhance wildlife viewing opportunities and outdoor recreational opportunities (ADF&G 2007).

4.3.3 Cultural Resources

In 2005, ADF&G contacted the Alaska Department of Natural Resources (ADNR) State Historic Preservation Office (SHPO) regarding the possible presence of historic properties or archeological sites near potential locations for temporary facilities needed for wood bison reintroduction. The SHPO indicated that although there are no reported historic or archeological sites in the locations identified, the general areas have medium to high archeological potential. Based on their review of

the proposed project and site locations, the SHPO concurred with the preliminary finding of "No Historic Properties Affected." ADF&G will consult with the SHPO before initiating construction of temporary facilities at a specific site in any of the potential restoration areas to confirm that the project will not affect listed cultural sites (ADF&G 2007).

4.3.4 Trapping

Recent experience in Canada with wood bison populations shows that they are compatible with the variety of activities that typically characterize human use of northern environments, including trapping. Wood bison are likely to have a small beneficial effect on furbearer populations and thus, on trapping, by increasing biological diversity and productivity (ADF&G 2007). Bison could have a minimally negative effect on trapping activity because, like moose, they may occasionally cross or travel on snow machine trails during winter, temporarily resulting in a rough surface (ADF&G 1994), or may displace snares set for furbearers. Except for these minor effects on snowmachine trails and snares, wood bison would not affect trapping activity.

4.3.5 Hunting

As described above in the section regarding effects on trapping activity, wood bison in Canada occur in areas that support a variety of other human uses including hunting for other big game animals, upland game, waterfowl, and small mammals. We expect that reestablished wood bison will have little or no effect on hunting for other species, and in the long term, restoring this species will result in increased hunting opportunities (ADF&G 2007).

4.3.6 Subsistence

Wood bison occur in areas that support a variety of other human uses including hunting for other big game animals, upland game, waterfowl, and small mammals, as well as trapping. The presence of wood bison would have no effect on subsistence hunting for other species, and in the long term would result in increased hunting opportunities.

The status of wood bison relative to State and Federal subsistence laws in Alaska would depend on future actions by the Alaska Board of Game (BOG) and/or the Federal Subsistence Board (FSB), depending on land ownership. If one or both of these regulatory bodies made a positive determination regarding the customary and traditional (C&T) subsistence use of wood bison, subsistence would be given priority for harvest of wood bison, according to each board's area of jurisdiction. A positive C&T determination by the BOG would apply to all Alaska residents and all lands. A positive C&T determination by the FSB would result in application of the Federal subsistence priority for qualified rural residents on Federal lands only.

Any minor conflicts between various user groups could be mitigated through a cooperative management planning process and development of a harvest management system that would distribute hunting pressure in time and space. Limiting harvest activities to certain times of year could help provide opportunities for wildlife viewers to more easily enjoy wood bison when hunting is not occurring.

4.4 Resource Development

Several proposed or potential natural resource development projects that could be important to Alaska's economy are located within or near the three potential wood bison restoration sites (Figure 7).

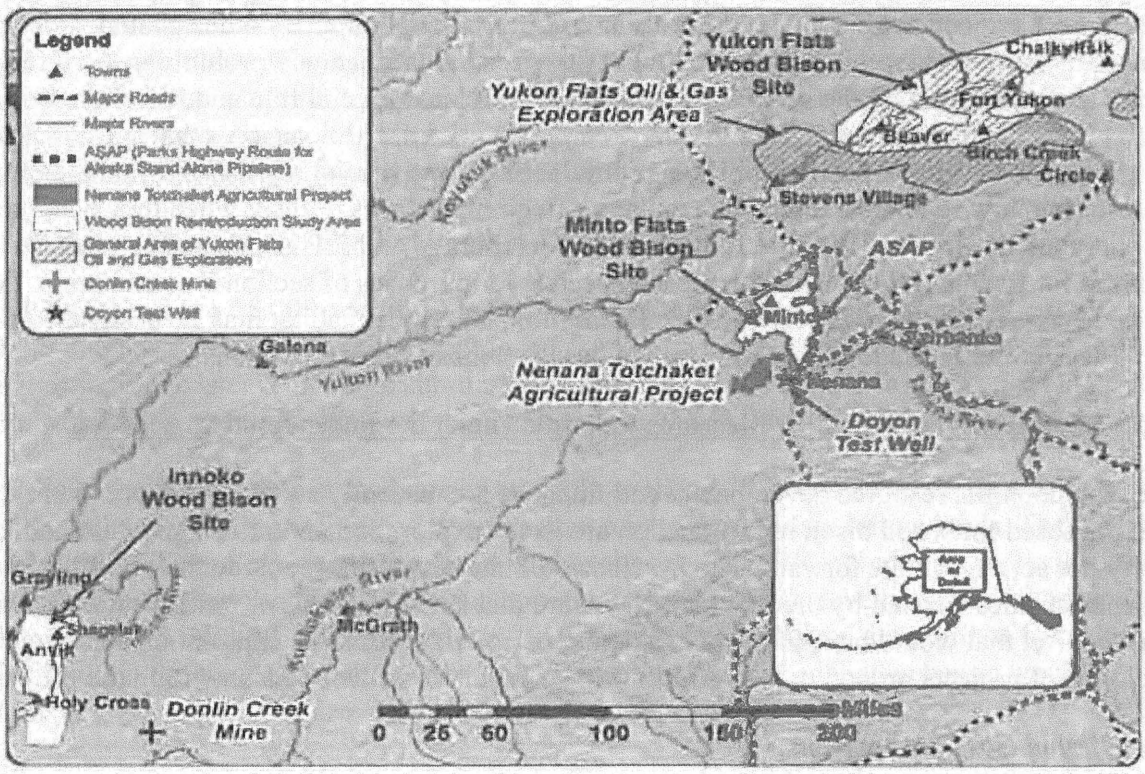

Figure 7. Location of other potential resource development projects in the vicinity of proposed wood bison reintroduction areas.

Bison are generally tolerant of a variety of human activities, including oil and gas exploration and extraction, logging, and recreational activities (Gates *et al.* 2001, Fortin and Andruskiw 2003). There is some potential for train or vehicle collisions in the Minto area, but these would probably be limited because highway and railroad transportation routes occur only near the eastern edge of potential bison habitat. The main concern, however, about wood bison restoration affecting resource development is the possibility of restrictions on other land uses that could result from its current status as a threatened species under the Act.

One of the central purposes for developing the regulations to designate wood bison in Alaska as an NEP is to ensure that wood bison restoration does not result in restrictions on other land uses or resource development. This is consistent with the congressional intent in adding section 10(j) to the Act. The 4(d) rule associated with this action specifies conditions under which removal, including lethal removal, of free-ranging wood bison from Alaska may be considered when deemed appropriate by ADF&G under the agency's management authority.

The regulations developed under sections 10(j) and 4(d) of the Act will permit many actions and activities that might otherwise be restricted when affecting threatened or endangered species. The

regulatory requirements of the Act that could otherwise result in additional regulatory work or restrictions on other land use activities include section 7 consultation requirements, section 9 prohibitions on take of a threatened or endangered species, and designation of critical habitat.

Several provisions under sections 10(j) and 4(d) limit the restrictions that may be placed on development projects within the NEP area. For an experimental population designated under section 10(j), the regulations at 50 CFR 17.31 that extend most section 9 prohibitions to threatened species are superseded by the section 10(j) rule and associated special rule under section 4(d), which contain the specific prohibitions and exemptions necessary to conserve that species. Section 4(d) grants the Service broad flexibility in promulgating these special regulations, including the authority to allow regulated, direct take under some circumstances. Except when they occur on National Park or National Wildlife Refuge lands, members of an NEP are treated as a species proposed for listing, rather than a threatened species, for purposes of section 7 consultation, thus adding even more management flexibility. In addition, no critical habitat may be designated for an NEP. Please refer to the final rule for detailed descriptions of these provisions.

(a) Stipulations or Mitigation Measures Required Under the Endangered Species Act

All of the potential resource development activities we are currently aware of that are in or near areas proposed for wood bison reintroduction are in the exploration and/or design phase and may or may not actually move forward. The Service and State of Alaska conclude that the 10(j) and 4(d) special rules enacted by the Service will ensure that no stipulations or mitigation measures under the Act that would be applicable to existing or potential resource exploration and development projects or land uses in Alaska will be required for wood bison within the NEP area.

4.4.1 Oil and Gas Development

Maps produced by ADNR identify basins with potential for oil and gas development on the Yukon Flats and Minto Flats. Doyon is actively exploring for oil and gas in both areas. There is no known potential or any planned exploration for oil and gas development in the lower Innoko/Yukon River area at this time. The general location of proposed or ongoing exploration or development activities discussed below is shown in Figure 7.

(a) Alaska Stand Alone Pipeline

The State of Alaska is evaluating the economic benefits and considering supporting construction of a 24-inch-diameter, high-pressure pipeline from Alaska's North Slope to Cook Inlet, to transport North Slope natural gas to in-state Alaska markets. Two routing options are being considered: one via the Richardson Highway and the other via the Parks Highway. The Parks Highway route would cross along the eastern edge of Minto Flats. Several other options are being considered to transport natural gas from the North Slope, including a larger-diameter pipeline that would extend through Canada to the contiguous 48 states; a pipeline that would end at the Port of Valdez; and an option of trucking natural gas to Fairbanks from the North Slope.

The State is cooperating with the USACE and other Federal agencies to prepare a draft Environmental Impact Statement (EIS) for the Alaska Stand Alone Pipeline (ASAP) project. If the ASAP is constructed on the Parks Highway route it would cross near some areas that have been identified as potential wood bison habitat along the eastern edge of Minto Flats. There are no

national park or wildlife refuge lands in this area. Because the activity would have to be authorized by Federal agencies, however, those agencies theoretically would be required to confer (rather than consult) with the Service, but only on actions that are likely to jeopardize the continued existence of wood bison. Generally, conferences on proposed projects for species proposed for listing can result in one or more optional conservation recommendations. However, because several wood bison populations are thriving in Canada, and because wood bison are tolerant of human activity, we do not envision any development scenario that would be likely to jeopardize the continued existence of wood bison, thus triggering the conference requirement. Thus, with an NEP designation for wood bison, it is virtually certain that there would be no Act-related requirements or restrictions on construction of a gas pipeline on the edge of Minto Flats.

(b) Yukon Flats Oil and Gas Exploration

The Yukon Flats is a 15,000-square-mile lowland area that lies over a large geologic basin with oil and gas potential. The U.S. Geological Survey has used gravity and aeromagnetic data to infer the existence of some sub-basins within the overall area of the Yukon Flats basin. Most of these sub-basins lie at depths in excess of 8,000 feet.

Doyon and the YFNWR have evaluated a possible exchange of lands on the Yukon Flats to help facilitate oil and gas exploration and development and to consolidate refuge lands. The USFWS completed an EIS evaluating the proposed land exchange. The EIS includes an analysis of the potential environmental effects of various hypothetical oil and gas development scenarios on the Yukon Flats (USFWS 2010). On April 21, 2010, the USFWS released a Record of Decision indicating that the No Action alternative had been selected and the land exchange would not be completed.

Doyon is continuing to explore for oil and gas on private ANCSA lands on the Yukon Flats. The corporation conducted a seismic exploration program in the vicinity of Stevens Village during winter and early spring, 2010 (Doyon Limited, 2010). Doyon plans to complete additional seismic work near Stevens Village, Beaver, and areas south of the Yukon River on Birch Creek ANCSA lands. About half of this area is within the area identified as having high-quality habitat for wood bison (Figure 7). If economically recoverable oil and gas deposits and subsequent developments are located in good wood bison habitat, there could be minor effects on the bison themselves, due to slightly diminished habitat access (related to the presence of oil and gas exploration infrastructure—e.g., access roads, drill pads, and oil and gas wells). If necessary, bison would be managed to ensure that their presence would not impinge on such infrastructure development.

Oil and gas development activities are unlikely to occur on YFNWR lands, due to their general incompatibility with Refuge purposes. However, if Federal permits were required for access across National Park or Refuge lands, permitting agencies theoretically would be required to consult (rather than confer, as would be the case on other lands) with the Service before issuing any permit for activities that may affect wood bison, to determine whether these activities would jeopardize the continued existence of the species. Because a number of populations are thriving in Canada, and because wood bison are tolerant of human activity, however, we do not anticipate any development scenario in Alaska that would be likely to jeopardize the continued existence of wood bison.

One potential development on the western edge of the Yukon Flats involves construction of an access road from the Dalton Highway to Stevens Village (D. Schwalenberg, pers. comm. 2010). The road would end about 35 miles west of the nearest high-quality wood bison habitat, however, and it is unlikely that the presence of wood bison would have any effect on road construction or use. There is also little chance that the road would affect wood bison or their management.

(c) Minto Flats Oil and Gas Exploration

The Nenana Basin lies in a long, narrow, northeast-trending zone just a few miles northwest of the city of Nenana, and covers approximately 8,500 square miles. Its deepest portion lies to the north in the area of the Minto Flats State Game Refuge. The basin is generally considered to be prospective for natural gas.

Gas exploration in the Nenana Basin has so far occurred primarily in the area west of the Nenana River and south of the Tanana River, with some initial seismic testing north of the Tanana River near the edge of the Minto Flats Refuge (Liles 2010). As previously mentioned, there is a block of Alaska Mental Health Trust lands in the vicinity of Nenana, and another Trust block northeast of Minto Flats near Livengood. The Trust is required by statute to maximize long-term revenue from Trust land; thus, there is a strong interest in obtaining an economic return from these lands from production of oil and gas and/or mining.

Two relatively shallow wells on the western flank of the basin were drilled in the Nenana Basin prior to 1985, and in 2005 a 2-D seismic program was conducted in the area. An exploration well was permitted and drilled by Doyon and other current licensees in 2009, and future testing in the Tanana Valley State Forest and the MFSGR is planned (J. Mery, Doyon, pers. comm. 2010). Additional seismic testing occurred in the winter of 2011–12. The oil potential of this basin is uncertain; the significant volume of coal present suggests that natural gas is more likely than oil to be encountered in commercial quantity. ADNR believes that the gas potential of this basin ranges from moderate to good.

Any oil and gas development within the MFSGR would be jointly regulated by ADNR and ADF&G. There is little potential wood bison habitat south of the Tanana River, and the presence of wood bison should have little effect on development activities. If necessary, roads and pipelines could be designed to allow passage of wood bison and other wildlife, similar to what was implemented in Alaska's North Slope oil developments (Carruthers and Jakimchuk 1987). Even in a scenario involving major oil and gas development, wood bison could coexist with industry, and would not have a significant effect on these development activities.

As with the ASAP, if there are activities that must be authorized by Federal agencies, these agencies would be required to confer (rather than consult) with the Service only on actions that are likely to jeopardize the continued existence of wood bison. In general, conferences result in non-mandatory conservation recommendations. However, because a number of wood bison populations are thriving in Canada and because wood bison are tolerant of human activity, we do not envision any development scenario in Alaska that would be likely to jeopardize the continued existence of wood bison. With an NEP designation for wood bison in Alaska, we anticipate no Act requirements or restrictions on oil and gas exploration and development on the Minto Flats.

4.4.2 Mineral Development

An ADNR map of significant mineral resources in the State identifies areas of mineral potential near Livengood, north of the Minto Flats, as well as in the Donlin Creek area and in the hills east of the lower Innoko River area. A large gold deposit has been discovered at Money Knob in the Livengood area, and substantial mineral exploration and development is underway. While potential wood bison habitat extends up the Tolovana River valley from Minto Flats, the Livengood prospect lies outside this area and reestablished wood bison would not be likely to occupy areas with potential for mineral development.

The Donlin Gold project, proposed by Donlin Gold, LLC, involves a large gold deposit located 12 miles north of the Kuskokwim River and about 280 miles northwest of Anchorage. The proposed mine is located approximately 30–40 miles from potential wood bison habitat in the Innoko River area and is on a hilltop near the tree line, an area wood bison would be unlikely to frequent because of the lack of suitable forage. The deposit occurs on Alaska Native corporation lands owned by The Kuskokwim Corporation (surface estate) and Calista Corporation (subsurface estate). Using its preferred design, Donlin Gold would expect to operate for approximately 27 years and could produce up to 1.5 million ounces of gold annually. The USACE initiated the permitting process for the mine in December, 2013, when it filed a Notice of Intent to prepare an EIS. Cooperators in the NEPA environmental review process include State and Federal agencies. Alaska Native corporations, local community councils, and the Kuskokwim River Watershed Council. Mine development is not expected until 2016 at the earliest.

The proposed Donlin Gold access road would run along a ridgeline extending southwest from the mine to the Kuskokwim River between Aniak and Kalskag. At the closest point, the proposed road would be located approximately 8–10 miles and over a ridge from the identified high-quality wood bison habitat. A study released in late 2011 confirmed the feasibility of burying a 12-inch diameter natural gas pipeline from Cook Inlet to the mine site to generate power for mine operations. The presence of wood bison in the vicinity of the pipeline is not likely to create problems for either the pipeline or the bison.

The USACE has determined that permitting for the Donlin Gold mine requires an EIS and other Federal approvals across BLM lands. Because the proposed mine and associated facilities would not occur within the identified potential wood bison habitat in the lower Innoko/Yukon River area, the action as proposed is anticipated to comply with section 7 of the Act. Therefore, we expect that the requirement to confer (on actions that are likely to jeopardize the continued existence of wood bison, an unlikely event) would not be triggered, because there would be little or no negative effects on bison.

However, public scoping for the EIS identified an alternative that would include an access route from the Yukon River to the mine site. If that alternative were selected and portions of the mine or associated facilities do occur within the NEP in the lower Innoko/Yukon River area, we anticipate that the requirement to confer could be triggered. Any suggested project modifications would likely be minimal, however, again because there would be little or no negative effects on reintroduced bison.

There is also potential for additional mineral development in the Flat Mining District, north of Donlin Creek. If that development were to occur there could be a need for a road extending west to

the Yukon River, which might be located in potential wood bison habitat. Again, it is unlikely that mineral development in or near the lower Innoko/Yukon River wood bison habitat would be extensive enough to adversely affect bison (ADF&G 2007). Similarly, the designation of wood bison as an NEP would ensure that their presence in the general area would have no significant effects on the Donlin Gold project or other mining.

4.4.3 Agriculture

Bison activity in agricultural areas can cause crop damage from foraging and trampling, and can also damage some fences. The selection process for possible reintroduction sites took this into account, and focused on high-quality wood bison habitat well away from existing agricultural development. There are no existing or formally proposed large-scale agricultural developments within the areas being considered for wood bison restoration in the Yukon Flats and Innoko areas. Some existing agricultural development occupies a small area near the southeastern edge of the Minto Flats, close to the Parks Highway north of Nenana, outside but adjacent to the area identified as potential wood bison habitat.

In addition, ADOA has considered a potentially large agriculture development, the Nenana-Totchaket Agricultural Project (NTAP), south of the MFSGR. The NTAP project could involve 130,000 acres or more of State land about 10 miles west of the city of Nenana, and 10 miles south of the Minto Flats and Tanana River (Fig. 7). This area is approximately 40 miles from potential wood bison release sites near the village of Minto, and currently supports little bison forage (ADF&G, unpublished data).

The draft EA addressed the potential for conflicts with agriculture in the area west of Nenana, several miles south of the Tanana River, and the high-quality bison habitat to the north, and explained that conflicts were unlikely or could be mitigated. ADNR indicated in the Draft Yukon Tanana Basin Plan[4] that:

> There is little agricultural activity in the region, although the area west of the Tanana River directly and the community of Nenana, has soils suitable for agriculture. There may be some use of agriculture land in this area, but its development of this is dependent upon the construction of a bridge across the Tanana River near Nenana. This same area was identified for agricultural development in the 1985 Area Plan.

The draft plan goes on to state, on p. 3–66:

> Some amount of agricultural development (148,502 acres) may also occur, but because of the absence of access, limited market demand, and scarce infrastructure, this is likely to be very limited. It will nonetheless, be important to retain lands designated Agriculture that are not developed so they can function as reserve in the event that this land is eventually needed for agricultural purposes.

Two public comments received on the draft EA mentioned concerns about possible effects of wood bison on potential agricultural developments. The Service and ADF&G believe that the protection for these and other land uses provided by the NEP designation and special rule, and the

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[4] Available at: http://dnr.alaska.gov/mlw/planning/areaplans/ytap, p. 3–64.

mitigation measures outlined in the EA, will allow wood bison restoration to proceed without interfering with these potential agricultural developments.

Recently we became aware of an effort to seek funding to build a resource development corridor west of Nenana, south of the Tanana River, with the goal of providing access to the NTAP, as well as potential timber, oil and gas and mineral development. This conceptual project would require a bridge across the Nenana River. The provisions in the special rule will allow wood bison to exist on the landscape without affecting these and other potential developments.

Several factors make it unlikely that wood bison would locate and inhabit the potential NTAP agricultural development, even if substantial amounts of hay or grain crops suitable for bison were eventually grown there. First, the range size of wood bison herds is closely linked with population size and habitat quality, and bison show a strong fidelity to seasonal ranges (Gates and Larter 1990; Larter and Gates 1990). Based on wood bison population ecology observed in the Mackenzie Bison Sanctuary (MBS) and the Delta and Farewell plains bison herds in Alaska, a population of about 500 wood bison would be expected to remain within an area of about 500 square miles or less. The total area occupied could be smaller, however, if bison forage is more abundant than in the MBS, as it appears to be in the three areas being considered in Alaska (Berger *et al.* 1995; Gardner 2007). More than 800 square miles of high-quality habitat is located north of the Tanana River in the northern part of the Minto Flats State Game Refuge (Gardner 2007). In habitats like those being considered for restoration in Alaska, including the Minto Flats, bison populations typically do not expand their range until population density reaches at least 1.5 to 2 bison per square mile (Gates and Larter 1990). However, a population of 500 wood bison could eventually range onto the fairly limited agricultural lands at the eastern edge of Minto Flats along the Parks Highway.

If the reintroduction project proceeds as envisioned, wood bison would be unlikely to affect agricultural developments south of the Tanana River unless the population were allowed to grow well beyond 500 animals, which could cause the herd to expand its range beyond the high-quality habitat north of the Tanana River. Interactions between wood bison and agricultural development can be prevented or minimized by managing wood bison herd size so that the herd remains on the MFSGR, away from agricultural areas. However, in the event that some bison eventually located an agricultural development, it would be possible to remove the colonizing animals to prevent a pattern of use from developing. Adequate fencing of agricultural developments is another option that would mitigate conflicts.

Designating wood bison as an NEP in itself will have no significant effects on agricultural development in the Minto Flats area; however, by providing a means for the wood bison restoration project to move forward, the NEP designation does create a small possibility of future conflicts between bison and agriculture. The Service and ADF&G believe any substantial conflict is unlikely, however, because the northern edge of the NTAP area is located approximately 10 miles from the identified high-quality wood bison habitat and involves only State lands. The NEP designation is intended to provide the flexibility to manage bison populations to minimize any disruption for landowners and other land uses. There would be no section 7 consultation or other regulatory requirements stemming from the Act that would affect this potential agricultural development. Even if Federal NRCS funding were provided to private farmers, the NRCS would have to confer with the Service only if the funded activity were likely to jeopardize the continued

existence of wood bison, which is unlikely given its status as an NEP, as explained above. Even then, any conservation recommendations made by the Service would be optional.

4.5 Cumulative Effects

The CEQ Regulations that implement NEPA require Federal agencies to analyze and disclose effects that result from incremental impacts of an action "when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

For the reasons described in sections 4.3 and 4.4, we do not expect the presence of free-roaming wood bison in Alaska to be associated with a significant change in the status of other wildlife, or land or water uses, agriculture, or resource exploration and development activities. The areas in question are remote, comprising wild lands adjacent to a few small communities. The restoration of wood bison, a native wildlife species, would result in the addition of a subsistence and general hunting resource in Alaska at some future time. However, the presence of wood bison in these remote areas in Alaska is not expected to increase the level of human activity significantly, and the total amount of such activity is expected to remain relatively low.

Because we expect few, if any, adverse environmental impacts from restoring wood bison at any of the individual sites, the anticipated level of cumulative effects, in particular those that might be regarded as negative, is limited. The areas currently being considered for wood bison restoration include a small portion of interior Alaska (a total of about 6,000 square miles, or 2.5 percent). Bison populations would be monitored frequently, and population sizes would be limited based on habitat and active management objectives developed in site-specific management plans.

The effects on other resource development activities in or near the proposed wood bison restoration areas would consist primarily of the potential for some requirements to confer with the Service regarding activities on lands other than NWRs or National Parks. The conference process would likely result in only minor increases in the cost and time involved in implementing other natural resource development projects. This effect should be minimal, however, because Section 7 conferences would be required only in the improbable event that federally authorized or funded proposed resource development activities were deemed likely to jeopardize the continued existence of the wood bison throughout its range in Alaska and Canada.

5.0 COUNCIL OF ENVIRONMENTAL QUALITY ANALYSIS OF SIGNIFICANCE

Pursuant to CEQ regulations for implementing NEPA, preparation of an environmental impact statement is required if an action is determined to significantly affect the quality of the human environment (40 CFR 1508.27). Significance is determined by analyzing the context and intensity of a proposed action (40 CFR 1508.27).

Context refers to the setting of the proposed action and includes consideration of the affected region, affected interests, and locality (40 CFR 1508.27(a)). The context of both short- and long-term effects of the proposed restoration of wood bison within its historic range is the action area, as encompassed in its maximum extent by the proposed NEP area shown in Figure 3 and described

in section 2.5. The effects of the proposed reintroduction of wood bison, although likely to extend over the indefinite future, would be small.

Intensity refers to severity of an impact and is evaluated by considering ten factors (*see* 40 CFR 1508.27(b)). The intensity of potential impacts that may result from reestablishment of populations of wood bison within their historic range under the proposed action is low, as indicated below:

1. The potential impacts of reintroducing wood bison may be both beneficial and adverse, but will be minor. Designation of reestablished populations as an NEP under section 10(j) would prohibit designation of critical habitat, reduce section 7 requirements, and relax prohibitions on take under section 9 for otherwise lawful activities. These provisions will ensure that adverse effects on other resource development activities are minor.
2. The action would have minor effects on public health or safety. In the future, when wood bison populations have grown and sustainable harvest can be allowed, a new source of healthy meat will benefit both local and nonlocal hunters.
3. There are areas with unique characteristics within the geographic area of the proposed NEP, including National Wildlife Refuges, National Parks, National Wild and Scenic Rivers and State Game Refuges. Wood bison are not likely to occur on National Park Service lands. The action will also enhance biological diversity and ecological processes in other unique areas within the NEP, and no significant adverse impacts to biological or cultural resources are expected.
4. The potential effects of wood bison restoration on the quality of the human environment are not highly controversial, from either a scientific or public interest standpoint. From a scientific standpoint, restoring a native species that is well-adapted to northern meadow habitats is not expected to result in any detrimental effects to the environment. Likewise, public comment over the last decade or more has demonstrated support for the project among diverse interest groups, and very little opposition. Any opposition that has been expressed related to potential adverse effects of wood bison reintroduction on other resource development activities due to the regulatory requirements of the Act. Designating wood bison as an NEP will address those concerns.
5. The possible effects of the action are not highly uncertain and do not involve unique or unknown risks. Experience with wood bison populations in similar northern ecosystems in Canada has identified no significant adverse effects. Similarly, ADF&G has extensive experience with managing plains bison herds in Alaska, where no significant adverse ecological effects have been observed.
6. The action will not establish a precedent for future actions with significant effects and does not represent a decision in principle about a future consideration.
7. The action is not related to other actions which are individually insignificant but could have significant cumulative impacts.
8. The action is not likely to adversely affect properties listed or eligible for listing in the National Register of Historic Places or cause loss or destruction of significant scientific, cultural or historical resources.
9. The action will not adversely affect an endangered or threatened species or its habitat.
10. The action does not threaten a violation of Federal, State or local law or requirements imposed for protection of the environment.

6.0 ANILCA SECTION 810 EVALUATION AND FINDING

Section 4.3.6 of this final EA addresses subsistence uses and indicates that "[t]he presence of wood bison would have no effect on subsistence hunting for other species, and in the long term would result in increased hunting opportunities and harvest." Reintroduction of wood bison is not expected to have adverse effects on other species important for subsistence use, including moose, caribou, Dall sheep, waterfowl, small game and birds, and resident and anadromous fish. Once wood bison populations have grown sufficiently to allow sustainable harvest, subsistence resources will be enhanced by the renewed availability of this source of food. This could be an especially important contribution to subsistence hunting opportunities in areas such as the Yukon Flats, where the moose population is low, making it difficult to meet subsistence needs. The Federal Subsistence Regional Advisory Councils whose regions include the proposed wood bison restoration areas have indicated strong support for the project as a means of enhancing subsistence opportunities.

As previously noted, for hunting seasons to be established, State and Federal regulatory boards must make various determinations, as appropriate, within their respective jurisdictions. ADF&G will use a public planning process to develop a management plan for each wood bison restoration site. For each reintroduction, the planning process will include representatives from local communities, regional population centers, landowners, Alaska Native interests, wildlife conservation interests, industry, and State and Federal agencies. Local and non-local hunting opportunities—including timing, access, and methods—will be thoroughly explored in the planning process. The planning process will also address the impact of wood bison hunting on other subsistence hunting such as for moose.

ANILCA Section 810 Finding: The action of designating wood bison in Alaska as an NEP and authorizing the reintroduction of wood bison in one to three locations in interior Alaska would not result in a significant restriction on subsistence uses. Designating the NEP has the potential to substantially enhance subsistence opportunities and support local economies.

7.0 CONCLUSIONS OF THE ENVIRONMENTAL ASSESSMENT

This EA is intended to assist the Service in determining whether wood bison proposed for reintroduction into suitable habitat in interior Alaska should be designated as a nonessential experimental population. The analysis in the EA indicates that there will be no significant environmental impacts associated with the proposal to designate wood bison in Alaska as an NEP.

Pursuant to NEPA, the Service adopts Alternative A, to designate an NEP for wood bison in Alaska. Pursuant to the ESA, through the final rule, the Service also designates an NEP and adopts the associated special rule, which authorizes the State to proceed with plans for reintroductions. This alternative and the associated rule will maximize the efficiency in achieving our Purpose and Need by facilitating landowner cooperation. Without an NEP designation, the State will not be able to move forward with reintroducing wood bison into the wild at this time. A Finding of No Significant Impact has been prepared to document this decision.

8.0 LIST OF PREPARERS

Alaska Department of Fish and Game: Randy Rogers and Bob Stephenson, Division of Wildlife Conservation, Fairbanks (retired), with review by ADF&G Endangered Species Program staff, the Alaska Department of Natural Resources, and the Alaska Department of Law.

U.S. Fish and Wildlife Service: Judy Jacobs, USFWS, Ecological Services, Anchorage (retired), and Sonja Jahrsdoerfer, Regional Endangered Species Coordinator, with review by Ecological Services and Refuges Staff.

9.0 AGENCIES AND PERSONS CONTACTED

The agencies, organizations, political representatives and businesses listed below were sent the Notice of Intent to Prepare an Environmental Assessment and request for scoping comments published in the Federal Register on February 25, 2010 by the Service and/or ADF&G. In addition, the notice was sent to many individuals who have expressed interest in the wood bison project and are included on the ADF&G mailing list. Many of these organizations have received previous newsletters and announcements of public comment opportunities through ADF&G.

Arctic Village Traditional Council
Alaska Biological Research
Alaska Backcountry Hunters & Anglers
Alaska Center for the Environment
Alaska Chapter Safari Club International
Alaska Conservation Alliance
Alaska Convention and Visitors Bureau
Alaska Department of Environmental Conservation, Office of the Alaska State Veterinarian
Alaska Department of Fish & Game
Alaska Department of Law
Alaska Department of Natural Resources
Alaska Division of Forestry
Alaska Governor's Office
Alaska Mental Health Lands Trust Office
Alaska Miners Association
Alaska Natural Gas Development Authority
Alaska Outdoor Council
Alaska Professional Hunters Association
Alaska State Parks, Office of History and Archeology
Alaska State Representative Woodie Salmon
Alaska State Representative Mike Kelly
Alaska State Representative David Guttenberg
Alaska State Representative Scott Kawasaki
Alaska State Representative Jay Ramras
Alaska State Representative Tammy Wilson
Alaska State Representative John Harris
Alaska State Representative Mike Hawker
Alaska State Representative Craig Johnson

Alaska State Representative Beth Kerttula
Alaska State Senator Albert Kookesh
Alaska State Senator Joe Thomas
Alaska State Senator Joe Paskvan
Alaska State Senator John Coghill
Alaska State Senator Con Bunde
Alaska State Senator Bill Wielechowski
Alaska Village Initiatives
Alaska Wilderness Recreation & Tourism Association
Alaska Wildlife Alliance
Alaska Wildlife Conservation Center
Alyeska Pipeline Co.
Anchorage Fish and Game Advisory Committee
Anchorage Soil and Water Conservation District
Anvik Traditional Council
Arctic Audubon Society
Audubon Alaska
Bean Ridge Corporation
Beaver Kwit'chin Corporation
Beaver Traditional Council
Alaska Board of Game
Bureau of Indian Affairs
Bureau of Land Management
Bureau of Wildlife Enforcement
Calista Corporation
Canyon Village Traditional Council
Carlile Transportation Systems
Center for Biological Diversity
Central Fish and Game Advisory Committee
Central Kuskokwim Fish and Game Advisory Committee
Chalkyitsik Native Corporation
Chalkyitsik Village Council
Chugach National Forest
Circle Traditional Council
City of Aniak
City of Anvik
City of Fort Yukon
City of Lower Kalskag
City of Nenana
City of Russian Mission
City of Upper Kalskag
Council of Athabascan Tribal Governments
Danzhit Hanlaii Corporation
Defenders of Wildlife
Deloy Ges Inc.
Deloycheet, Incorporated

Delta Sportsman's Association, Inc.
Denduu Gwich'in Tribal Council
Donlin Creek LLC
Doyon, Limited
Eagle Fish and Game Advisory Committee
Eastern Interior Regional Subsistence Advisory Council
Fairbanks Fish and Game Advisory Committee
Fairbanks Chamber of Commerce
Fairbanks North Star Borough
Fairbanks Soil and Water Conservation District
Federal Subsistence Board
Foundation for North American Wild Sheep
Fort Yukon City Council
Grayling, Anvik, Shageluk, Holy Cross Fish and Game Advisory Committee
Dinyee Corporation
Grayling City Council
Grayling IRA Council
Gwitchyaa Gwichin Tribal Government
Gwitchyaa Zhee Corporation
Hee-Yea-Lingde Corporation
Holy Cross City Council
Holy Cross Village Council
Innoko National Wildlife Refuge
Institute of Arctic Biology
Intertribal Bison Cooperative
Kanuti National Wildlife Refuge
Kenai Soil and Water Conservation District
Kuskokwim Native Association
Lake Minchumina Fish and Game Advisory Committee
Manley Hot Springs Community Association
Manley Traditional Council
Matanuska Valley Sportsmen's Association
McGrath Fish and Game Advisory Committee
Middle Nenana River Fish and Game Advisory Committee
Middle Yukon River Fish and Game Advisory Committee
Middle Yukon-Kuskokwim Soil and Water Conservation District
Minto Village Council
Minto-Nenana Fish and Game Advisory Committee
National Park Service
National Parks Conservation Association
National Wildlife Federation
Nenana Traditional Council
Northern Alaska Environmental Center
Natural Resource Conservation and Development Board
Natural Resource Conservation Service
Pope & Young Club

Rampart Traditional Council
Resource Development Council
Ruby Fish and Game Advisory Committee
Ruffed Grouse Society
Russian Mission Native Corporation
Russian Mission Traditional Council
Safari Club International
Safari Club International Foundation
Safari Club International, Alaska Chapter
Safari Club International, Kenai Peninsula Chapter
Salcha-Delta Soil and Water Conservation District
Seth-De-Ya-Ah Corporation
Shageluk City Council
Shageluk IRA Tribal Council
Sierra Club, Alaska Chapter
Sportsmen for Fish and Wildlife, Alaska Chapter
Stevens Village IRA Council
Tanana Chiefs Conference
Tanana City Council
Tanana Tribal Council
Tanana Valley Sportsmen's Association
Tanana-Rampart-Manley Fish and Game Advisory Committee
Tech Resources
Territorial Sportsmen, Inc.
The Nature Conservancy of Alaska
The Wilderness Society, Alaska Chapter
The Kuskokwim Corporation
Toghotthele Corporation
Turner Endangered Species Fund
U.S. Forest Service, Chugach National Forest
U.S. Congressman Don Young
U.S. Senator Lisa Murkowski
U.S. Senator Mark Begich
University of Alaska Fairbanks
University of Alaska Palmer Research Center
Upper Tanana/Fortymile Fish and Game Advisory Committee
U.S. Department of Agriculture, Animal, Plant Health Inspection Service
USGS, Biological Resources Division
Van Ness Feldman, P.C
Venetie Village Council
Village of Kalskag
Village of Lower Kalskag
Western Interior Regional Subsistence Advisory Council
Wildlife Conservation Society
World Wildlife Fund
Yukon Flats Fish and Game Advisory Committee

10.0 LIST OF ACRONYMS

Act	Endangered Species Act
ADF&G	Alaska Department of Fish and Game
ADNR	Alaska Department of Natural Resources
ADOA	Alaska Division of Agriculture
ANCSA	Alaska Native Claims Settlement Act
ANILCA	Alaska National Interest Lands Conservation Act
ASAP	Alaska Stand Alone Pipeline
AWCC	Alaska Wildlife Conservation Center
BOG	Alaska Department of Fish and Game Board of Game
C&T	Customary and Traditional
CEQ	Council on Environmental Quality
EA	Environmental Assessment
EINP	Elk Island National Park
EIS	Environmental Impact Statement
ER	Environmental Review
ESA	Endangered Species Act
FONSI	finding of no significant impact
FSB	Federal Subsistence Board
INWR	Innoko National Wildlife Refuge
IUCN	International Union for Conservation of Nature
MFSGR	Minto Flats State Game Refuge
NEP	nonessential experimental population
NEPA	National Environmental Policy Act of 1969
NRCS	Natural Resource Conservation Service
Service	U.S. Fish and Wildlife Service
SHPO	State Historic Preservation Officer
UAF	University of Alaska, Fairbanks
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WBRAG	Wood Bison Restoration Advisory Group
YFNWR	Yukon Flats National Wildlife Refuge

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SECTION 12.0. SUMMARY OF PUBLIC COMMENTS AND RESPONSES FROM FWS AND ADF&G

The wood bison herd should be managed to prevent disease outbreaks among captive and reintroduced animals and to avoid disease transmission between reintroduced wood bison and other wildlife. The Service and ADF&G agree that disease prevention is an important component of the wood bison reintroduction project. This issue is addressed in section 4.2.12 of the EA.

Private landowners should retain the right to develop their land free of any conflict that the release of wood bison may cause. The NEP designation and associated special rule will accomplish this goal. The rule-making process will establish a regulatory framework that will ensure that wood bison restoration does not restrict other land uses and resource development activities.

Concern was expressed that reintroduction of wood bison would lead to increased predation of native ungulates (e.g., moose) by wolves and bears. As explained in section 4.2.10 of the EA, no studies have demonstrated that wolf numbers or wolf predation on moose increased following the reestablishment of bison in northern habitats. Although reintroduced bison would provide some potential additional prey for wolves, there is no indication that predation by wolves on bison would lead to increased wolf populations and increased predation on moose. Evidence from Canada and elsewhere indicates that there is little competition between bison and other species, as detailed in sections 4.2.8, 4.2.9, and 4.2.10 in the EA. Bison coexist with high densities of moose and other wildlife in parts of Alaska and Canada.

The wood bison reintroduction project should be designed to prevent introduction of invasive plant species. Plans to feed bison only certified weed-free hay prior to and after transport are outlined in section 4.2.3 in the EA.

Several commenters raised issues about various characteristics of the different release sites, including access and associated cost, habitat conditions, levels of conflict, planned agricultural use, and other land development.
One commenter supported the finalization of the rule, but cited concerns about potential conflicts with agricultural developments being considered in the area south of Minto Flats and in the Yukon Flats area, and recommended that the initial release of wood bison occur at the lower Innoko River site. This issue is discussed in section 4.4.3 in the EA. The State of Alaska has indicated that the Innoko area is its preferred first release site, and that it will continue to evaluate the possibility of other reintroductions. The Service agrees with the commenter's conclusion that the establishment of an NEP would support conservation goals, while providing flexibility for sustainable reestablishment of bison and reducing conflicts with land development such as future oil and gas development and agriculture. Agricultural issues are discussed in section 4.4.3 in the EA. Habitat conditions and access issues in the three potential reintroduction areas are evaluated in section 4.1, "Description of Proposed Reintroduction Sites." Other issues such as associated cost will be addressed in more detail in future site-specific management plans.

Will this project lead to introductions in other areas? Only the three areas mentioned in the EA are currently being considered for reintroductions. Others could emerge as potential reintroduction sites in the future if additional historical information shows that wood bison occurred in other parts of Alaska or suitable habitat is identified in other parts of their original range. However, the emergence of additional historical information in new areas seems unlikely. Historical information is reviewed in section 4.1 in the EA.

How will the 10(j) rule affect wood bison that could possibly migrate from the Yukon (in Canada) across the Alaska border? Wood bison that might move into Alaska from Yukon, Canada would be considered to be part of the NEP.

What are the benefits of the 10(j) designation? The purpose and benefits of the NEP designation are detailed in the proposed and final rule, and discussed in section 4.4 in the EA.

What happens to wood bison that move outside the NEP boundary? This issue is addressed in section 2.5 in the EA. The likelihood that wood bison will move outside of the NEP area is extremely small.